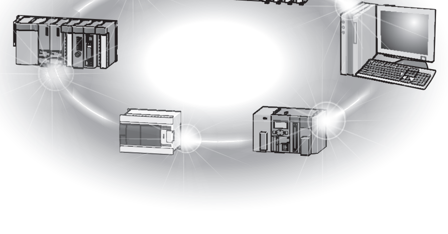
MITSUBISHI
ELECTRIC

Programmable Controller

# CC-Link System RS-232 Interface Module User's Manual (Nonprocedural Protocol Mode)



# ●SAFETY PRECAUTIONS●

(Always read these instructions before using this equipment.)

Before using this product, please read this manual and the relevant manuals introduced in this manual carefully and pay full attention to safety to handle the product correctly.
The instructions given in this manual are concerned with this product only. For the safety instructions of the programmable controller system, please read the user's manual for the CPU module used.

In this manual, the safety precautions are ranked as "⚠ WARNING" and "⚠ CAUTION".

| | |
|---|---|
| ⚠ WARNING | Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury. |
| ⚠ CAUTION | Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage. |

Note that the ⚠CAUTION level may lead to a serious consequence according to the circumstances.
Always follow the instructions of both levels because they are important to personal safety.

Please save this manual to make it accessible when required and always forward it to the end user.

## [Design Precautions]

### ⚠WARNING

- When controlling a running programmable controller (data modification) by connecting a peripheral to a CPU module or connecting a personal computer to an intelligent/special function module, create an interlock circuit on the sequence program so that the whole system will operate safely all the time.
  Also, before performing other controls (e.g. program modification, operating status change (status control)), read this manual carefully and ensure the safety.
  Especially, in the control from an external device to a programmable controller in a remote location, some programmable-controller-side problems cannot be resolved immediately due to a data communication failure.
  To prevent this, establish corrective procedures for communication failure between the external device and the programmable controller CPU, as well as creating an interlock circuit on the sequence program.

- In the case of a data link error, the operation status of a faulty station is as shown below. Using the communication status information, create an interlock circuit on the sequence program for the system to operate safely.
  Incorrect output or malfunction can lead to an accident.
  (1) All of general-purpose inputs from this module turn OFF.
  (2) All of general-purpose outputs from this module turn OFF.

- Depending on the module failure, inputs and outputs may turn ON or OFF incorrectly.
  For I/O signals that may cause a serious accident, provide an external monitoring circuit.

## ⚠CAUTION

- Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other.
  They should be installed 100 mm (3.94 inch) or more from each other.
  Not doing so could result in noise that would cause erroneous operation.

- Always use the data link terminal block for connection of a CC-Link dedicated cable to a master module.
  Care must be taken because, if the cable is incorrectly inserted into the general-purpose I/O terminal block instead of the data link terminal block, the module will break down.

## [Installation Precautions]

## ⚠CAUTION

- Use the programmable controller in an environment that meets the general specifications given in this manual.
  Using this programmable controller in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.

- Using a tool specified by the manufacturer, correctly press, crimp, or solder the wires of the connector and securely connect the connector to the module.
  Incomplete connection may cause a short circuit and/or malfunctions.

- Do not directly touch the module's conductive parts or electronic components.
  Touching the conductive parts could cause an operation failure or give damage to the module.

- Securely fix the module with the DIN rail or installation screws. Installation screws must be tightened within the specified torque range.
  A loose screw may cause a drop of the module, short circuit or malfunction.
  Overtightening may damage the screw, resulting in a drop of the module or a short circuit.

- Completely connect each cable connector to each receptacle.
  Incomplete connection may cause a malfunction due to poor contact.

## [Wiring Precautions]

### ⚠CAUTION

- Be sure to shut off all phases of the external power supply used by the system before installation or wiring.
  Failure to do so may cause an electric shock, damage to the product and/or malfunctions.
- Attach the terminal cover to the product before energizing and operating the system after installation or wiring.
  Failure to do so may cause an electric shock.
- Be sure to ground the FG terminals and LG terminals to the protective ground conductor.
  Failure to do so may result in malfunctions.
- Use applicable solderless terminals and tighten them within the specified torque range. If any spade solderless terminal is used, it may be disconnected when a screw on the terminal block comes loose, resulting in failure.
- Use applicable solderless terminals and tighten them within the specified torque range. If any spade solderless terminal is used, it may be disconnected when a screw on the terminal block comes loose, resulting in failure.
- When wiring in the programmable controller, be sure that it is done correctly by checking the product's rated voltage and the terminal layout.
  Connecting a power supply that is different from the rating or incorrectly wiring the product could result in fire or damage.
- Tighten the terminal screws with the specified torque.
  If the terminal screws are loose, it could result in short circuits, fire, or erroneous operation.
  Overtightening a terminal screw may damage the screw, resulting in a short circuit or malfunction.
- Be sure there are no foreign substances such as sawdust or wiring debris inside the module.
  Such debris could cause fires, damage, or erroneous operation.
- Place the connection wires and cables in a duct or clamp them.
  If not, dangling cables may swing or inadvertently be pulled, resulting in damage to the module and/or cables or malfunctions due to poor cable connection.
- Do not install the control cable(s) together with the communication cable(s).
  Doing so may cause malfunctions due to noise.
- When disconnecting a communication or power cable from the module, do not pull it by holding the cable part.
  For a cable with connector, hold the connector and disconnect it from the module.
  For a cable without connector, loosen the connector screw and disconnect the cable.
  Pulling the cable that is still connected to the module may damage the module and/or cable and cause malfunctions due to poor cable connection.

## ⚠CAUTION

- Make sure that the interface type is correct before connecting the cable.
  Do not connect a cable to a module that has different interface specification.
  Doing so will cause a module failure.
- Using a tool specified by the manufacturer, correctly press, crimp, or solder the wires of the connector and securely connect the connector to the module.
  Failure to do so may result in a malfunction or failure of the module.

# [Startup·Maintenance Precautions]

## ⚠CAUTION

- Before performing online operations (especially, program modification, forced output or operating status change) through connection between a running CPU module and a peripheral, read this manual carefully and ensure the safety.
  An improper operation will cause mechanical damage or accidents.
- Do not touch terminals while the power is ON.
  Doing so may cause an electric shock.
- Be sure to shut off all phases of the external power supply used by the system before cleaning or retightening the terminal screw or module fixing screw.
  Failure to do so may result in a failure or malfunction of the module.
  A loose screw may cause a drop of the module, short circuit or malfunction.
  Overtightening may damage the screw and/or module, resulting in a drop of the module, a short circuit or malfunctions.
- Do not touch any connector under the cover on the front of the module.
  Doing so may result in a failure or malfunction of the module.
- Do not disassemble or remodel the module.
  Doing so may cause a failure, malfunctions, personal injuries and/or a fire.
- Before handling the module, touch a conducting object such as a grounded metal to discharge the static electricity from the human body.
  Failure to do so may cause the module to fail or malfunction.
- Do not drop or apply a strong shock to the module since the case is made of resin.
  Doing so will damage the module.
- Be sure to shut off all phases of the external power supply before mounting or removing the module to/from the panel.
  Failure to do so may result in a failure or malfunction of the module.

## ⚠CAUTION

- Do not install/remove the terminal block more than 50 times after the first use of the product.
(IEC 61131-2 compliant)

- Before handling the module, touch a conducting object such as a grounded metal to discharge the static electricity from the human body.
Failure to do so may cause the module to fail or malfunction.

- Before handling the module, touch a conducting object such as a grounded metal to discharge the static electricity from the human body.
Failure to do so may cause the module to fail or malfunction.

- Do not change the switch settings while the power is ON.
Doing so may cause a failure or malfunctions.

- The terminal cover must be closed all the time, except during installation, wiring or operation check.
If the cover remains open, it may cause damage to the module, a short circuit due to cable connection failure, or malfunctions.

## [Disposal Precautions]

## ⚠CAUTION

- When disposing of this product, treat it as industrial waste.

# ●CONDITIONS OF USE FOR THE PRODUCT●

(1) Mitsubishi programmable controller ("the PRODUCT") shall be used in conditions;
i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and
ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.
MITSUBISHI SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI'S USER, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.
("Prohibited Application")
Prohibited Applications include, but not limited to, the use of the PRODUCT in;

- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

Notwithstanding the above, restrictions Mitsubishi may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by Mitsubishi and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTs are required. For details, please contact the Mitsubishi representative in your region.

## REVISIONS

* The manual number is given on the bottom left of the back cover.

| Print Date | * Manual Number | Revision |
|---|---|---|
| Jul., 2007 | SH(NA)-080685ENG-A | First edition |
| Sep., 2008 | SH(NA)-080685ENG-B | Partially revised<br>SAFETY PRECAUTIONS, ABOUT MANUALS, Compliance with the EMC and Low Voltage Directives, GENERIC TERMS AND ABBREVIATIONS, Section 2.2, 2.3, 3.2, 3.5.1, 5.1.1, 5.2, Appendix 1.1, Appendix 1.2<br>Added<br>Section 2.4, 3.6.1, 3.6.2 |
| Aug., 2010 | SH(NA)-080685ENG-C | Partially revised<br>SAFETY PRECAUTIONS, ABOUT MANUALS, GENERIC TERMS AND ABBREVIATIONS, Section 4.5.1, 5.1.1, Chapter 6, Chapter 7<br>Added<br>CONDITIONS OF USE FOR THE PRODUCT |
| Oct., 2014 | SH(NA)-080685ENG-D | Partially revised<br>SAFETY PRECAUTIONS, Related manuals, Compliance with the EMC and Low Voltage Directives, HOW TO USE MANUALS, GENERIC TERMS AND ABBREVIATION, DEFINITIONS OF TERMINOLOGY, Section 1.1, 2.1 to 2.3, 3.1 to 3.4, 3.5.1, 3.6.1, 3.6.2, 3.7.1, 3.7.3, 3.9.1, 3.9.2, 4.1, 4.2, 4.2.1, 4.2.2, 4.3, 4.3.2, 4.3.3, 4.5.1 to 4.5.3, 4.5.6, 4.5.10, 5.1.1, 5.2, 5.4, Chapter 6, Section 7.7.1, Chapter 9, Section 9.1, 9.2, Appendix 1.1, 2<br>Added<br>Section 2.5, 6.1.1, 6.1.3, Appendix 4<br>Change<br>Section 6.1.1→6.1.2, Section 6.1.2→6.1.4 |
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|  |  |  |

Japanese Manual Version SH-080684-F

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## INTRODUCTION

Thank you for purchasing the Mitsubishi Electric MELSEC-A series programmable controller.
Before using the product, please read this manual carefully to familiarize yourself with the features and performance of the A series programmable controller to ensure proper use of the product.

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## ABOUT MANUALS

The following manuals are also related to this product.
Please purchase it if necessary.

Related manuals

| Manual name | Manual number (Model code) |
|---|---|
| CC-Link System RS-232 Interface Module User's Manual (MELSOFT Connection Mode)<br>MELSOFT connection mode of AJ65BT-R2N<br>(Sold separately) | SH-080687ENG<br>(13JZ01) |
| MELSEC iQ-R CC-Link System Master/Local Module User's Manual (Startup)<br>Specifications, procedures before operation, system configuration, wiring, and communication examples of the CC-Link system master/local module<br>(Sold separately) | SH-081269ENG<br>(13JX10) |
| MELSEC iQ-R CC-Link System Master/Local Module User's Manual (Application)<br>Functions, parameter settings, programming, troubleshooting, I/O signals, and buffer memory of the CC-Link system master/local module<br>(Sold separately) | SH-081270ENG<br>(13JX19) |
| MELSEC-Q CC-Link System Master/Local Module User's Manual<br>System configuration, performance specifications, functions, handling, wiring, and troubleshooting of the CC-Link system master/local module<br>(Sold separately) | SH-080394E<br>(13JR64) |
| MELSEC-L CC-Link System Master/Local Module User's Manual<br>Settings, specifications, handling, data communication methods, and troubleshooting of the built-in CC-Link function of the CPU module or the CC-Link system master/local module<br>(Sold separately) | SH-080895ENG<br>(13JZ41) |
| CC-Link System Master/Local Module Type AJ61QBT11/A1SJ61QBT11 User's Manual<br>System configuration, performance specifications, functions, handling, wiring, and troubleshooting of the CC-Link system master/local module<br>(Sold separately) | IB-66722<br>(13J873) |
| CC-Link System Master/Local Module Type AJ61BT11/A1SJ61BT11 User's Manual<br>System configuration, performance specifications, functions, handling, wiring, and troubleshooting of the CC-Link system master/local module<br>(Sold separately) | IB-66721<br>(13J872) |
| MELSEC iQ-R Programming Manual (Instructions, Standard Functions/Function Blocks)<br>Instructions for the CPU module, dedicated instructions for the intelligent function modules, and standard functions/function blocks<br>(Sold separately) | SH-081266ENG<br>(-) |
| QnACPU Programming Manual (Special Function Module)<br>Dedicated instructions for the special function module of the QnA series programmable controller CPU<br>(Sold separately) | SH-4013<br>(13JF56) |
| Type AnSHCPU/AnACPU/AnUCPU/QCPU-A (A Mode) Programming Manual (Dedicated Instructions)<br>Instructions extended for the AnSHCPU/AnACPU/AnUCPU<br>(Sold separately) | IB-66251<br>(13J742) |

## COMPLIANCE WITH THE EMC AND LOW VOLTAGE DIRECTIVES

### (1) For programmable controller system

To ensure that Mitsubishi Electric programmable controllers maintain EMC and Low Voltage Directives when incorporated into other machinery or equipment, certain measures may be necessary. Please refer to one of the following manuals.

- User's manual for the CPU module or head module used
- Safety Guidelines
  (This manual is included with the CPU module, base unit, or head module.)

The CE mark on the side of the programmable controller indicates compliance with EMC and Low Voltage Directives.

### (2) For the product

To ensure that this product maintains EMC and Low Voltage Directives, please refer to one of the manuals listed under (1).

## HOW TO USE MANUALS

This section explains how to use manuals when using the AJ65BT-R2N CC-Link system RS-232 interface module.

(1) User's manuals for the AJ65BT-R2N

The following manuals describe the AJ65BT-R2N.
Refer the manual(s) suitable for the intended use.

| | Hard ware<br>(Packed) | Nonprocedural Protocol Mode | MELSOFT Connection Mode |
|---|---|---|---|
| **Purpose** | CC-Link System RS-232 Interface Module User's Manual (Hardware) | CC-Link System RS-232 Interface Module User's Manual (Nonprocedural Protocol Mode) | CC-Link System RS-232 Interface Module User's Manual (MELSOFT Connection Mode) |
| Checking part names and specifications of AJ65BT-R2N | Outline | Details | Details |
| Confirming how to connect AJ65BT-R2N to external device | Outline | Details | Details |
| Checking remote I/O and remote register of AJ65BT-R2N | | Details | Details |
| Confirming Nonprocedural protocol mode of AJ65BT-R2N<br>•Functions<br>•Program examples<br>•Error code<br>•Troubleshooting<br>•Differences between AJ65BT-R2N and AJ65BT-R2 | | Details | |
| Confirming MELSOFT connection mode of AJ65BT-R2N<br>•Functions<br>•Error code<br>•Troubleshooting<br>•Differences between AJ65BT-R2N and AJ65BT-G4-S3 | | | Details |

(2) About this manual

Use this manual when you want to know the following:

(a) Features of the AJ65BT-R2N
  ☞Section 1.1 Features

(b) System configurations and applicable systems
  ☞Section 2.1 System Configuration
  Section 2.2 Applicable System

(c) Performance specifications of the AJ65BT-R2N
  ☞Section 3.2 Performance Specifications

(d) Functions of the AJ65BT-R2N
  ☞CHAPTER 4 FUNCTIONS

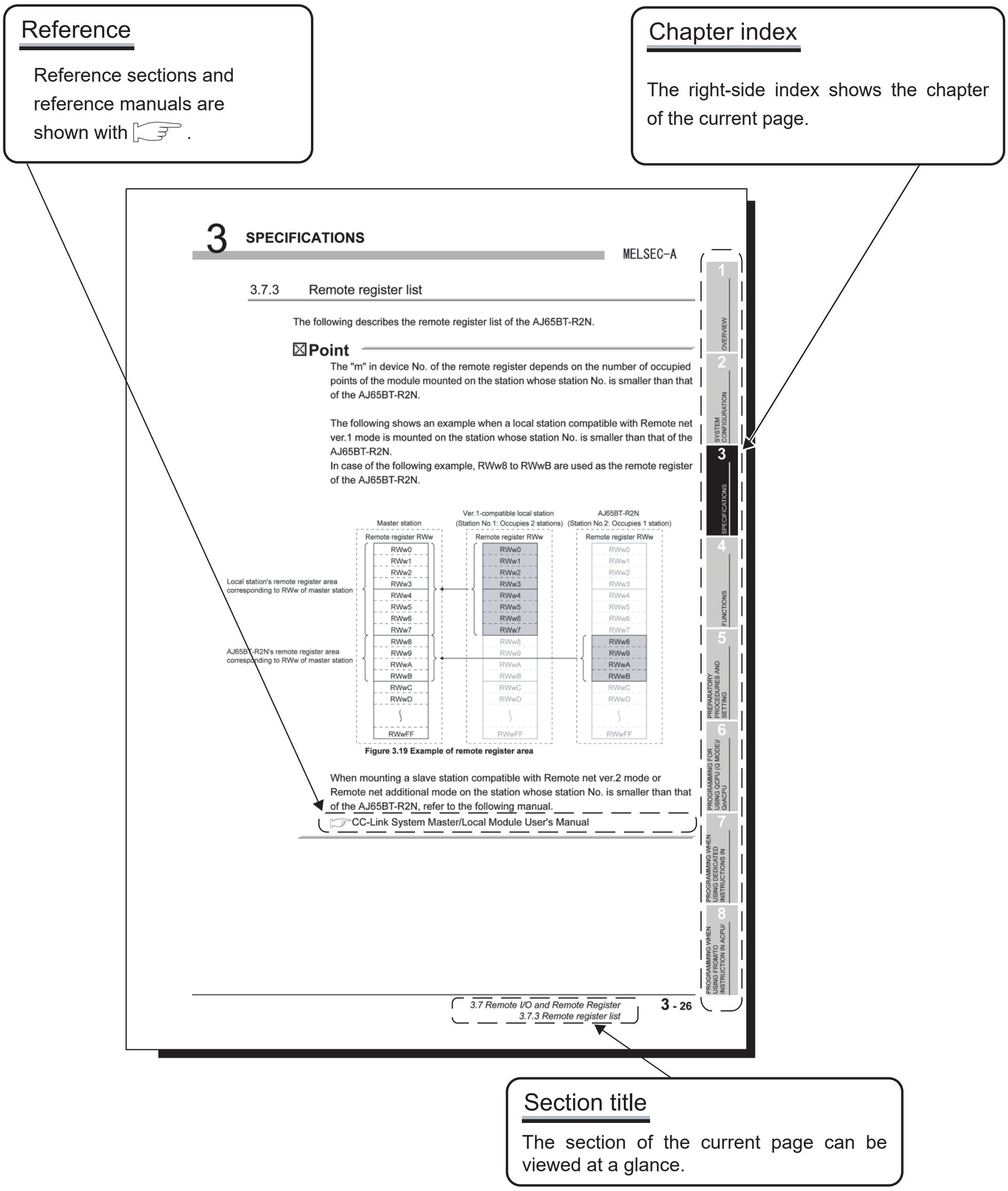
(e) Preparatory procedures and setting of the AJ65BT-R2N
  ☞Section 5.2 Set-up and Procedure Before Operation

(f) Other than using ACPU/QCPU (A mode)
  1) When using QCPU (Q mode)/QnACPU
    ☞Section 6.1 Setting of Each Station
    Section 6.3 Initial Setting for AJ65BT-R2N
    Section 6.9 Program Examples
  2) When using dedicated instructions in ACPU/QCPU (A mode)
    ☞Section 7.1 Setting of each station
    Section 7.3 Initial Setting for AJ65BT-R2N
    Section 7.9 Program Example
  3) When using the FROM/TO instruction in ACPU/QCPU (A mode)
    ☞Section 8.1 Setting of Each Station
    Section 8.3 Initial Setting for AJ65BT-R2N
    Section 8.9 Program Example

(g) How to solve the error that has occurred
  ☞Section 9.1 Troubleshooting in Nonprocedural Protocol Mode
  Section 9.2 Error code list

(h) Differences between the AJ65BT-R2N and existing products
  ☞Appendix 1 Differences between AJ65BT-R2N and AJ65BT-R2

(3) Page layout



**Reference**

Reference sections and reference manuals are shown with ☞ .

**Chapter index**

The right-side index shows the chapter of the current page.

**Section title**

The section of the current page can be viewed at a glance.

3 SPECIFICATIONS MELSEC-A

3.7.3 Remote register list

The following describes the remote register list of the AJ65BT-R2N.

☒Point

The "m" in device No. of the remote register depends on the number of occupied points of the module mounted on the station whose station No. is smaller than that of the AJ65BT-R2N.

The following shows an example when a local station compatible with Remote net ver.1 mode is mounted on the station whose station No. is smaller than that of the AJ65BT-R2N.
In case of the following example, RWw8 to RWwB are used as the remote register of the AJ65BT-R2N.

Figure 3.19 Example of remote register area

When mounting a slave station compatible with Remote net ver.2 mode or Remote net additional mode on the station whose station No. is smaller than that of the AJ65BT-R2N, refer to the following manual.

☞CC-Link System Master/Local Module User's Manual

3.7 Remote I/O and Remote Register
3.7.3 Remote register list

3 - 26

The above page is for the purpose of illustration only and is different from actual pages.
This manual also contains the following kinds of descriptions.

## ☒Point

Describes precautions or important functions related to the explanation on the page.

**Remark**

Indicates references and/or useful information about the explanation on the page.

## GENERIC TERMS AND ABBREVIATIONS

Unless otherwise stated, this manual uses the following generic terms and abbreviations to describe the AJ65BT-R2N CC-Link system RS-232 interface module.

| Generic term/ abbreviation | Description |
|---|---|
| AJ65BT-R2N | Abbreviation for the AJ65BT-R2N CC-Link system RS-232 interface module |
| RCPU | Generic term for the R04CPU, R08CPU, R16CPU, R32CPU, and R120CPU |
| QCPU (Q mode) | Generic term for the Basic model QCPU, High Performance model QCPU, Process CPU, Redundant CPU, and Universal model QCPU |
| LCPU | Generic term for the L02SCPU, L02SCPU-P, L02CPU, L02CPU-P, L06CPU, L06CPU-P, L26CPU, L26CPU-P, L26CPU-BT, and L26CPU-PBT |
| QCPU (A mode) | Generic term for the Q02CPU-A, Q02HCPU-A, and Q06HCPU-A |
| QnACPU | Generic term for the Q2ACPU, Q2ACPU-S1, Q2ASCPU, Q2ASCPU-S1, Q2ASHCPU, Q2ASHCPU-S1, Q3ACPU, Q4ACPU, and Q4ARCPU |
| AnNCPU | Generic term for the A0J2HCPU, A1SCPU, A1SCPUC24-R2, A1SHCPU, A1SJCPU, A1SJCPU-S3, A1SJHCPU, A1NCPU, A2CCPU, A2CCPUC24, A2CCPUC24-PRF, A2CJCPU, A2NCPU, A2NCPU-S1, A2SCPU, A2SHCPU, and A1FXCPU |
| AnACPU | Generic term for the A2ACPU, A2ACPU-S1, A3NCPU, and A3ACPU |
| AnUCPU | Generic term for the A2UCPU, A2UCPU-S1, A2USCPU, A2USCPU-S1, A2USHCPU-S1, A3UCPU, and A4UCPU |
| ACPU | Generic term for the AnNCPU, AnACPU, and AnUCPU |
| GX Developer | The product name of the software package for the MELSEC programmable controllers |
| GX Works2 | |
| GX Works3 | |
| Engineering tool | Generic term for GX Developer and GX Works2 |
| External device | Generic term for equipment such as an ID controller, barcode reader or personal computer, which is connected to the AJ65BT-R2N for data communication. |
| Master module | Generic term for modules that can serve as a master station |
| Remote module | Module used as a remote I/O station, remote device station or intelligent device station<br>Generic term for the AJ65BTB□□-□□, AJ65BTC□-□□, AJ65BT-64AD, AJ65BT-64DAV, and AJ65BT-64DAI, etc. |
| Link device | A device (RX, RY, RWr, RWw, SB, SW) in a CC-Link module |

(Continued to the next page)

(From previous page)

| Generic term/ abbreviation | Description |
|---|---|
| SB | Link special relay (for CC-Link)<br>Bitwise information showing the module operating status or data link status of the master/local station |
| SW | Link special register (for CC-Link)<br>Information in units of 16 bits, which shows the module operating status or data link status of the master/local station |
| RX | Remote input (for CC-Link)<br>Bitwise information that is input from a remote station to a master station |
| RY | Remote output (for CC-Link)<br>Bitwise information that is output from a master station to a remote station |
| RWw | Remote register (Write area for CC-Link)<br>Information that is output from a master station to a remote station in units of 16 bits |
| RWr | Remote register (Read area for CC-Link)<br>Information that is output from a master station to a remote station in units of 16 bits |
| Remote net ver.1 mode | Mode selected when not increasing the cyclic transmission data size, or when replacing the QJ61BT11 with the QJ61BT11N |
| Remote net ver.2 mode | Mode selected when constructing a new system with the cyclic transmission data size increased |
| Remote net additional mode | Mode selected when adding a Ver.2 station to a remote net ver.1 mode system and increasing the cyclic transmission data size |

## DEFINITIONS OF TERMINOLOGY

Definitions of the terms used in this manual are explained below.

| Term | Description |
|---|---|
| Transient transmission | A function of communication with another station, which is used when requested by a dedicated instruction or engineering tool. |
| Cyclic transmission | A function by which data are periodically exchanged among master stations and other stations on the same system using link devices |
| M □□□$_H$ | Buffer memory address of the master station |
| R2N □□□$_H$ | Buffer memory address of the AJ65BT-R2N |
| Intelligent device station | A station that exchanges I/O signals (bit data) and I/O data (word data) with another station by cyclic transmission. This station responds to a transient transmission request from another station and also issues a transient transmission request to another station. |
| Auto-refresh buffer | Buffer memory of the master station, which is automatically refreshed with data in the buffer memory of the AJ65BT-R2N |
| Send-frame-1 area | By using the Send-frame-1 area, arbitrary data can be sent with one frame added to each of the beginning and end of the data.<br>R2N $118_H$ to $119_H$ are used. |
| Send-frame-2 area | By using the Send-frame-2 area, up to 100 frames can be added to the data to be sent.<br>R2N $120_H$ to $185_H$ are used. |
| Registration frame | Data name for fixed format data to be contained in a message transferred between the AJ65BT-R2N and external device. It is registered to the module with the frame function and used for data transmission/reception.<br>There are two frame types: Default registration frames that have been registered in the AJ65BT-R2N and User registration frames that the user is required to register to the E$^2$PROM. |
| Buffer memory auto-refresh function | Function that automatically refreshes the buffer memory of the AJ65BT-R2N and the auto-refresh buffer of the master station |
| Local station | Station that has a programmable controller CPU and can communicate with the master station and other local stations |
| Master station | Station that controls remote stations, local stations, and intelligent device stations. |
| Nonprocedural protocol | Procedure for exchanging any data between the external device and AJ65BT-R2N |

## PACKING LIST

The following is included in the package of the AJ65BT-R2N CC-Link system RS-232 interface module.

| Model | Product name | Quantity |
|---|---|---|
| AJ65BT-R2N | The AJ65BT-R2N CC-Link system RS-232 interface module | 1 |

# CHAPTER 1 OVERVIEW

This manual describes the specifications, functions, preparatory procedures and setting, and troubleshooting of the AJ65BT-R2N CC-Link system RS-232 interface module (hereinafter referred to as AJ65BT-R2N).
When applying a program example introduced in this manual to an actual system, make sure to examine the applicability and confirm that it will not cause system control problems.
The AJ65BT-R2N can exchange data with an RS-232 connection type external device, such as a barcode reader, ID controller or personal computer.

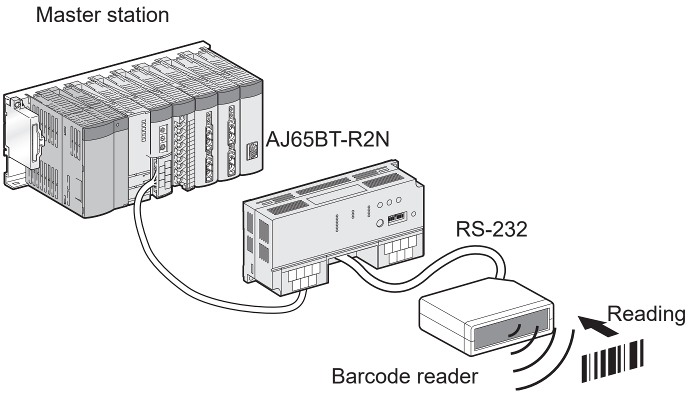


Figure 1.1 When connecting a barcode reader

**Remark**

This manual describes the functions, preparatory procedures and setting, and troubleshooting in the Nonprocedural protocol mode.
For those in the MELSOFT connection mode, refer to the following manual.

☞CC-Link System RS-232 Interface Module User's Manual (MELSOFT Connection Mode)

## 1.1 Features

This section explains the features of the AJ65BT-R2N.

### (1) Nonprocedural data communication is available using an RS-232 cable.

Any data can be sent and received in a nonprocedural way by connecting an RS-232 cable between the AJ65BT-R2N and an external device.

Variable or fixed length data can be transmitted, to meet the specifications of external devices.

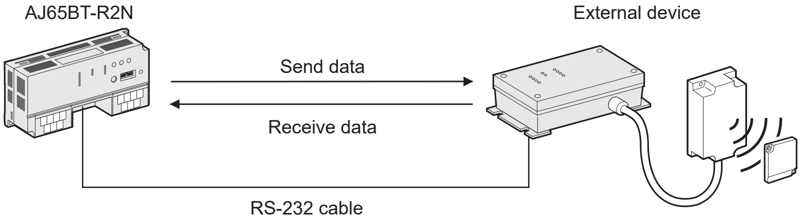


**Figure 1.2 Nonprocedural communication function**

### (2) Communication method between master module and AJ65BT-R2N is selectable.

The following two kinds of communications are available between a master module and the AJ65BT-R2N.

- Send/receive buffer communication function
- Buffer memory auto-refresh function

☞Section 4.1.1 (1) Selecting the send/receive buffer communication function or the buffer memory auto-refresh function

(a) The send/receive buffer communication function allows effective use of the transmission path.
By using this function, only the necessary data of the specified size can be sent/received at any given timing.
This can improve the transmission line efficiency (link scan time) because unnecessary data will not be transferred.

☞Section 4.2 Send/Receive Buffer Communication Function

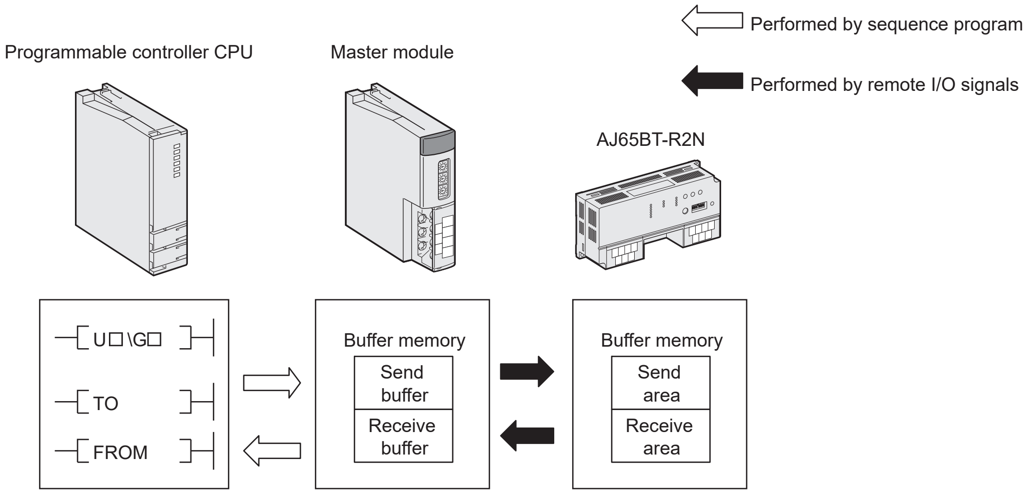


**Figure 1.3 Send/receive buffer communication function**

(b) The buffer memory auto-refresh function makes communication easier.
The buffer memories of the AJ65BT-R2N and master station are refreshed automatically at a timing set in the AJ65BT-R2N.
The buffer memory auto-refresh function eliminates the need for creating programs for reading/writing data between the AJ65BT-R2N and master station.
Data can be read or written with intelligent function module devices or FROM/TO instructions, which makes programming easier.

☞Section 4.3 Buffer Memory Auto-Refresh Function

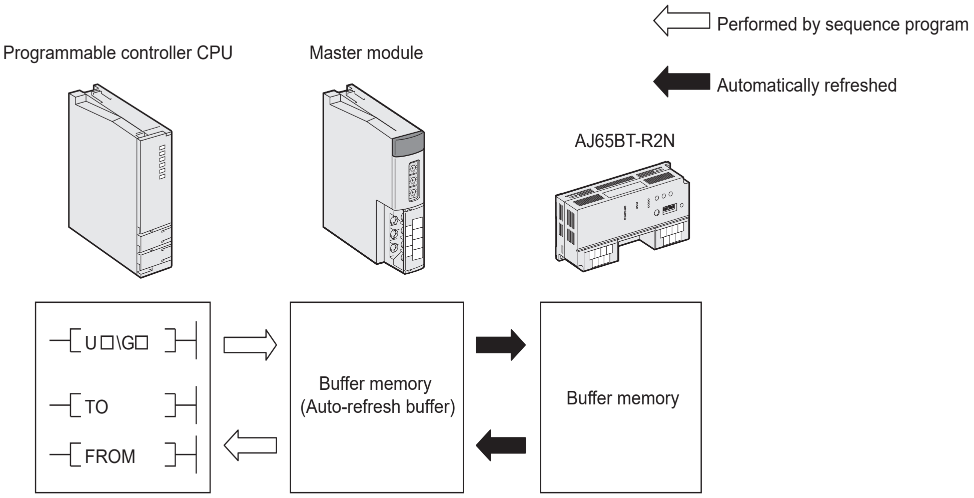


**Figure 1.4 Buffer memory auto-refresh function**

(3) Frames can be added at the time of data exchange with the external device.

Any fixed data (frame) can be added to the beginning and end of the original data, which allows data communications in any data format appropriate to the specifications of the external device.

There are two frame types: Default registration frames that have been registered in the AJ65BT-R2N and User registration frames that the user is required to register to the E$^2$PROM.

☞Section 4.5.1 Frame function

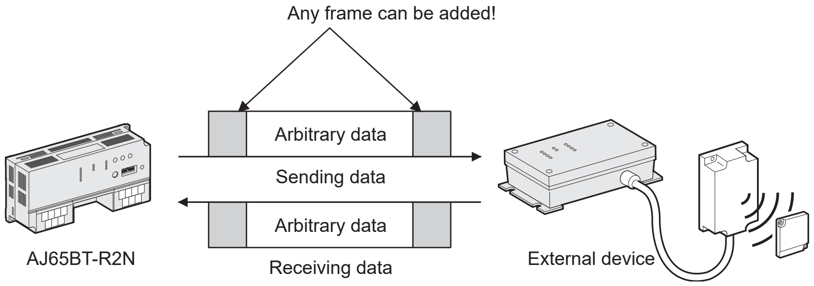


**Figure 1.5 User registration frame function**

(4) Data can be sent automatically upon satisfaction of user-defined conditions.

When user-specified send conditions (values in RX, RY and/or RW) are met, data are automatically sent to the external device.

☞Section 4.5.2 Monitoring-based transmission function

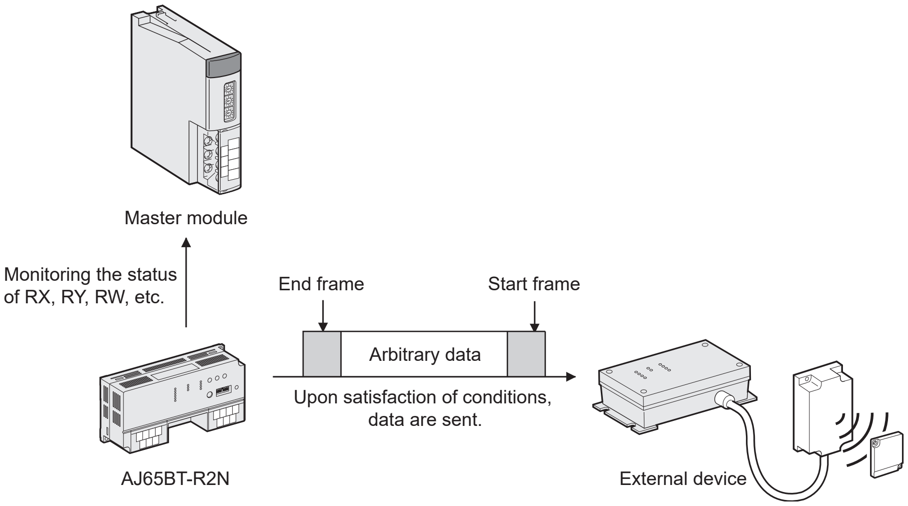


**Figure 1.6 Monitoring-based transmission function**

(5) General-purpose inputs and outputs (2 points for each) are featured as standard.

General-purpose inputs and outputs (2 points for each) are provided as standard. Synchronizing signals with a barcode reader or ID controller can be directly input or output without placing any other remote I/O module.

(6) Engineering tool connection allows access to another station.

The AJ65BT-R2N can access a programmable controller CPU by connecting a personal computer running the engineering tool.
For details, refer to the following manual.

☞CC-Link System RS-232 Interface Module User's Manual (MELSOFT Connection Mode)

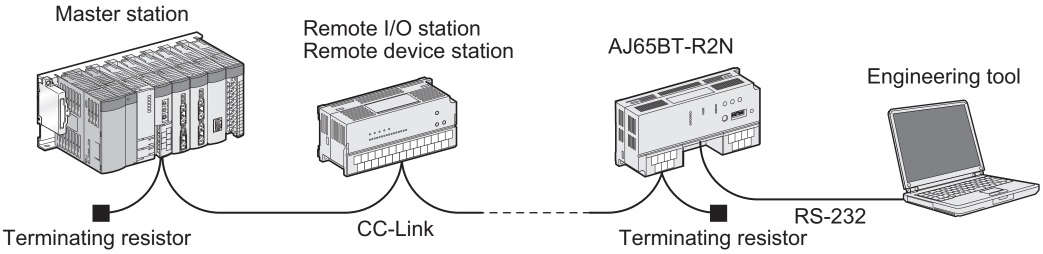


**Figure 1.7 Connection with the engineering tool**

# CHAPTER 2 SYSTEM CONFIGURATION

## 2.1 System Configuration

This section gives system configuration examples for using the AJ65BT-R2N.
Up to 26 AJ65BT-R2Ns can be connected to a single master station.

(1) System configuration examples when using Nonprocedural protocol mode

(a) When connecting a barcode reader

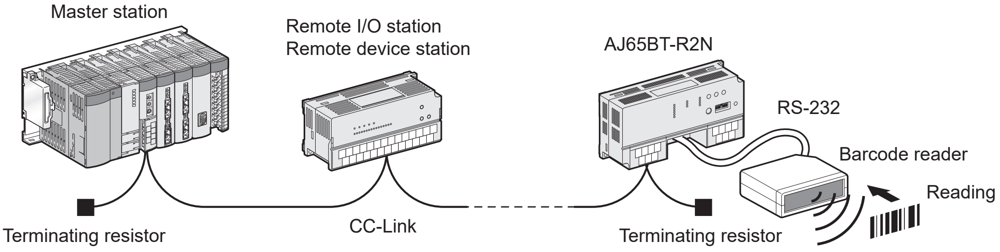


**Figure 2.1 When connecting a barcode reader**

(b) When connecting an ID controller

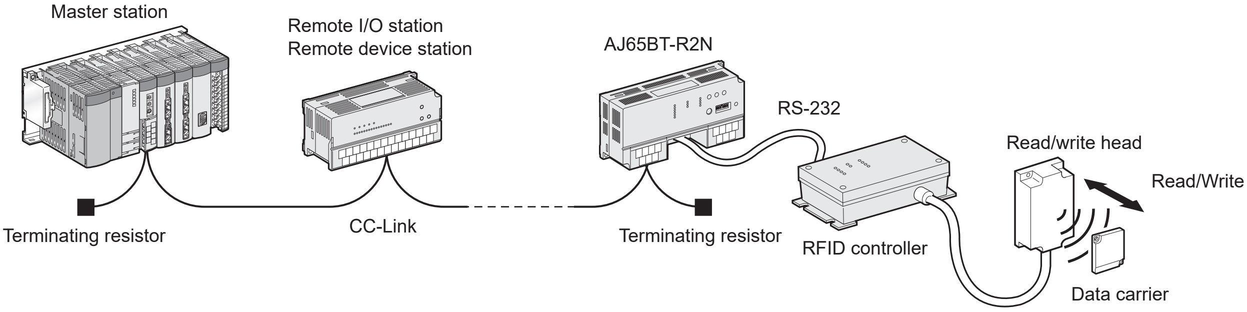


**Figure 2.2 When connecting an ID controller**

(2) System configuration example when using MELSOFT connection mode

(a) When connecting the engineering tool

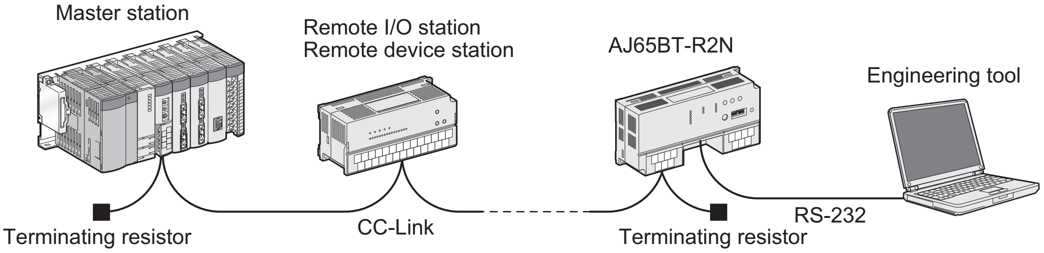


**Figure 2.3 When connecting the engineering tool**

## 2.2 Applicable System

This section describes applicable systems.

(1) Applicable master modules

The following master modules can be used with the AJ65BT-R2N.

**Table 2.1 Applicable master modules**

| Master module | | Applicability |
|---|---|---|
| Series | Model | |
| MELSEC iQ-R series | RJ61BT11 | ○ |
| Q series | QJ61BT11N<br>QJ61BT11 | ○ |
| L series | L26CPU-BT<br>L26CPU-PBT<br>LJ61BT11 | ○ |
| QnA series | AJ61QBT11<br>A1SJ61QBT11 | ○ |
| A series | AJ61BT11<br>A1SJ61BT11 | ○ |
| Personal computer board | A80BD-J61BT11<br>A80BDE-J61BT11<br>Q80BD-J61BT11N<br>Q81BD-J61BT11 | ○ |
| FX series | $FX_{2N}$-16CCL-M | × |

○: Applicable, ×: N/A

**Remark**

For a master module other than the above, contact the manufacturer before using it.

(2) Software package

When using MELSOFT connection mode, use the following software package.

**Table 2.2 Software package**

| Product name | Model | Remarks |
|---|---|---|
| GX Developer | SWnD5C-GPPW-E | Use Version 6 or later.<br>("n" in the model name must be 6 or greater.) |
| GX Works2 | •SWnDNC-GXW2-E<br>•SWnDND-GXW2-E | - |

## 2.3 Precautions for System Configuration

This section describes precautions for system configuration.

### (1) Restrictions on using dedicated instructions

When using the A series programmable controller CPU or the master module, the dedicated instructions are not available in some cases.
For details of restrictions, refer to the following manual.

☞User's manual for each A series master module
Type AnSHCPU/AnACPU/AnUCPU/QCPU-A (A Mode) Programming Manual (Dedicated Instructions)

### (2) Functions and supported versions of the related products

The following shows the year and month of manufacture, function versions, software versions of the related products that support the AJ65BT-R2N functions, and explains how to check the information.
For the availability of the MELSOFT connection function of when routing through a network, refer to the following.

☞CC-Link System RS-232 Interface Module User's Manual (MELSOFT Connection Mode

**Table 2.3 Supported versions of the related products**

| Supported versions of the related products | | | Function | |
|---|---|---|---|---|
| | | | Nonprocedural protocol mode | MELSOFT connection mode |
| Master/local module | MELSEC iQ-R series | RJ61BT11 | ○ | × |
| | Q series | QJ61BT11N | ○ | ○<br>(Function version B or later for accessing to the non control CPU mounted on the master/ local module in the multiple CPU systems) |
| | | QJ61BT11 | | |
| | L series | L26CPU-BT | ○ | ○ |
| | | L26CPU-PBT | | |
| | | LJ61BT11 | | |
| | QnA series | AJ61QBT11 | Year and month of manufacture is 9707 or later, and function version is B or later | Function version B or later and software version J or later |
| | | A1SJ61QBT11 | | |
| | A series | AJ61BT11 | | |
| | | A1SJ61BT11 | | |
| | Personal computer board | A80BD-J61BT11 | ○ | × |
| | | A80BDE-J61BT11 | | |
| | | Q80BD-J61BT11N | | |
| | | Q81BD-J61BT11 | | |
| Software package | GX Developer | | ○ | Version 6 or later |
| | GX Works2 | | ○ | ○ |
| | GX Works3 | | ○ | × |

○: Applicable, ×: N/A

(a) Checking the function version of a Q series programmable controller

1) Checking it on the "rating plate" on the side face of the module
The suffix of the SERIAL code indicates the function version of the module.

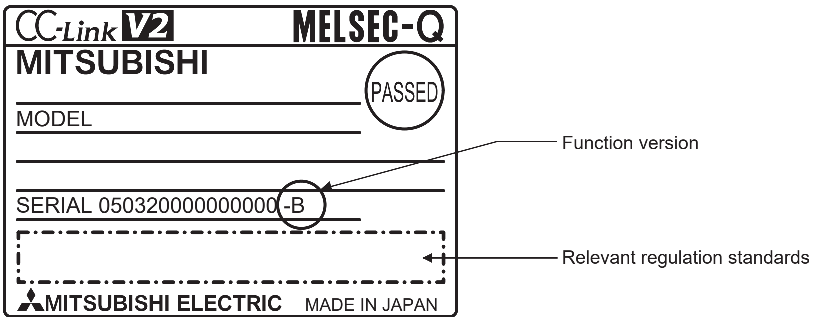
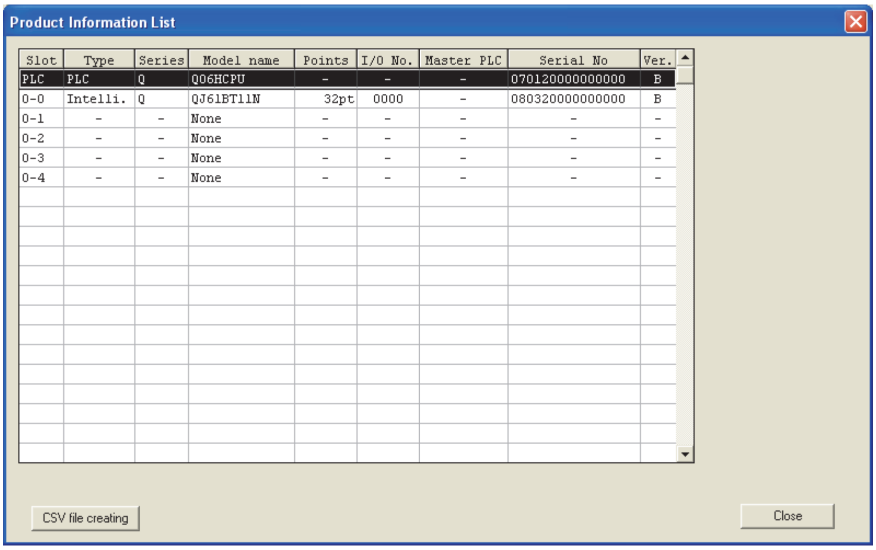


Figure 2.4 Rating plate

2) Checking it in GX Developer
The following explains how to check the function version of the module by using GX Developer.
The function version is displayed on the "Product Information List" or "Module's Detailed Information" screen of GX Developer.
How to check the function version on the "Product Information List" screen is shown below.

[Operation procedure]
[Diagnostics] → [System Monitor] → [Product Information List]



| Slot | Type | Series | Model name | Points | I/O No. | Master PLC | Serial No | Ver. |
|---|---|---|---|---|---|---|---|---|
| PLC | PLC | Q | Q06HCPU | - | - | - | 070120000000000 | B |
| 0-0 | Intelli. | Q | QJ61BT11N | 32pt | 0000 | - | 080320000000000 | B |
| 0-1 | - | - | None | - | - | - | - | - |
| 0-2 | - | - | None | - | - | - | - | - |
| 0-3 | - | - | None | - | - | - | - | - |
| 0-4 | - | - | None | - | - | - | - | - |

Figure 2.5 Product information list

[Ver.]
The function version of the module is displayed in the Ver. column.

3) Checking it in GX Works2

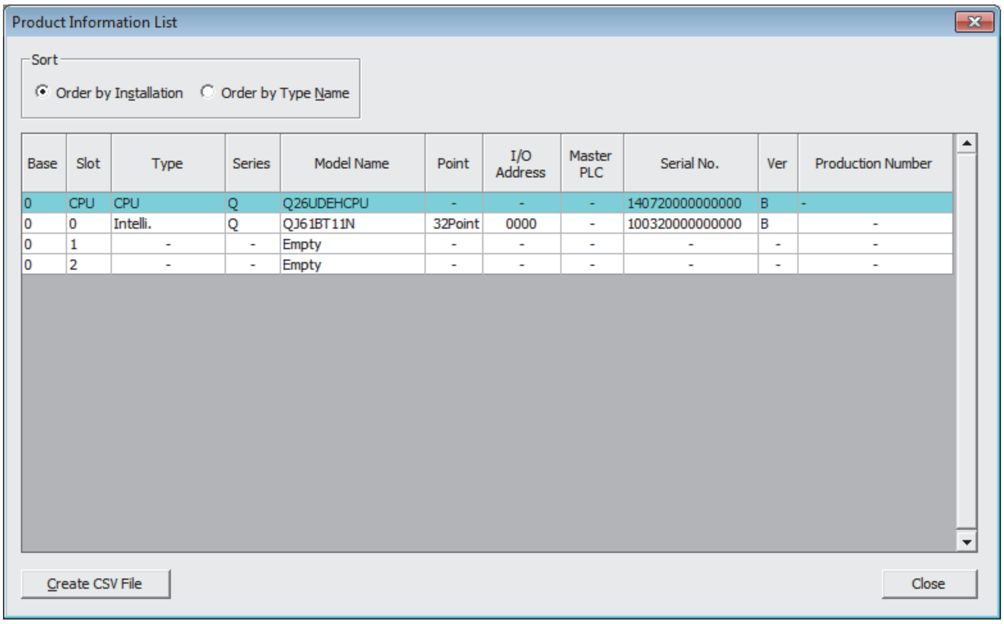
The following explains how to check the function version of the module by using GX Works2.

The function version is displayed on the "Product Information List" or "Module's Detailed Information" screen of GX Works2.

How to check the function version on the "Product Information List" screen is shown below.

[Operation procedure]

[Diagnostics] → [System Monitor] → [Product Information List]



| Base | Slot | Type | Series | Model Name | Point | I/O Address | Master PLC | Serial No. | Ver | Production Number |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | CPU | CPU | Q | Q26UDEHCPU | - | - | - | 140720000000000 | B | - |
| 0 | 0 | Intelli. | Q | QJ61BT11N | 32Point | 0000 | - | 100320000000000 | B | - |
| 0 | 1 | - | - | Empty | - | - | - | - | - | - |
| 0 | 2 | - | - | Empty | - | - | - | - | - | - |

**Figure 2.6 Product Information List**

[Ver.]

The function version of the module is displayed in the Ver. column.

(b) Checking the year and month of manufacture, function version and software version of a QnA or A series programmable controller

1) Checking the year and month of manufacture and function version on the "rating plate" on the side of the module
The year and month of manufacture and the function version are shown in the DATE field of the rating plate.

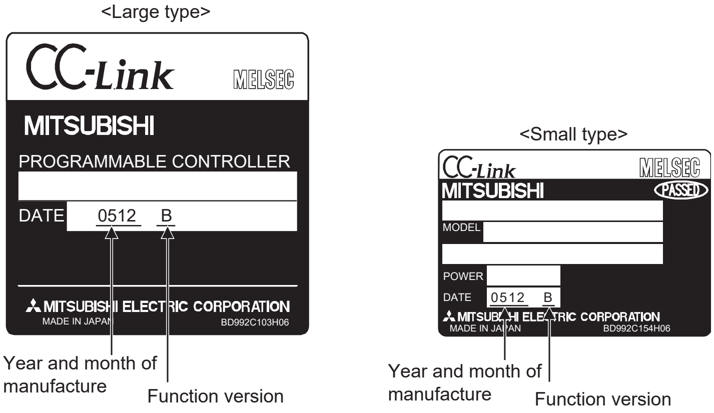


**Figure 2.7 Rating plate**

2) Checking the software version by the module version label sticked on the module front
The software version of the module is printed on the module version label.

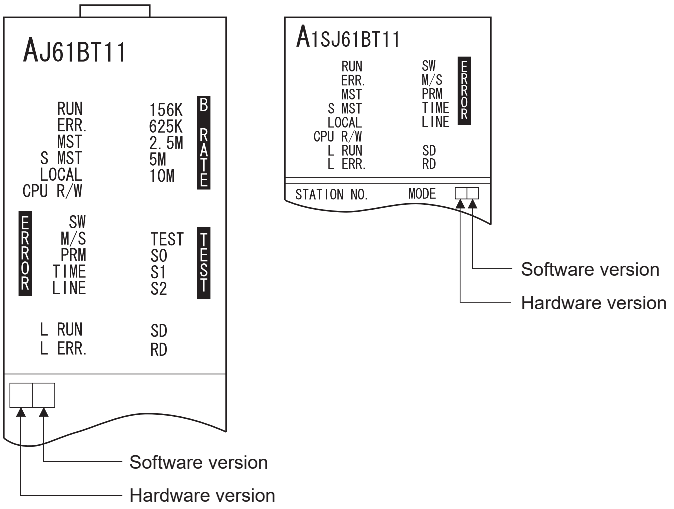
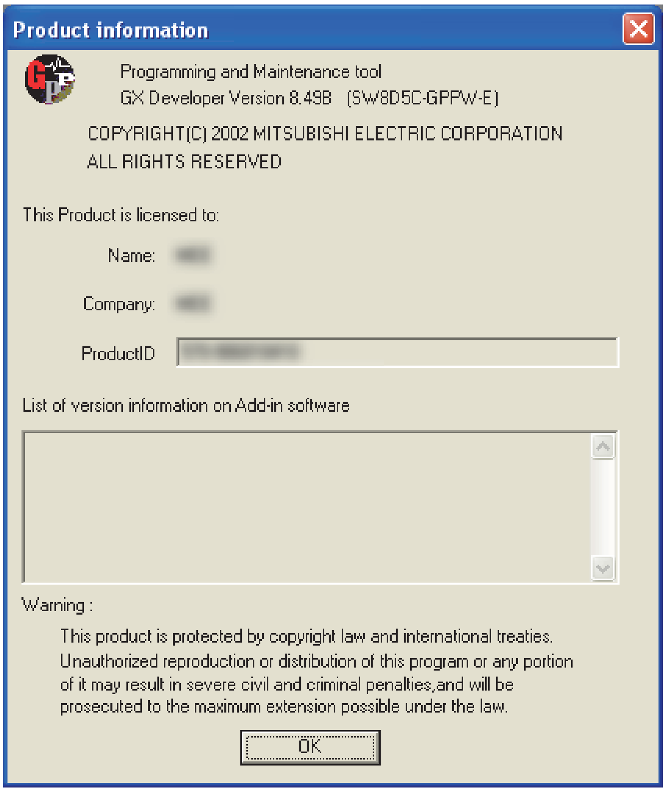


**Figure 2.8 Module version label**

(c) Checking the software version of the GX Developer

1) Check the software version of the GX Developer.
   The software version is displayed on the "Product information" screen of GX Developer.
   [Operation procedure]
   [Help] → [Product information]



Programming and Maintenance tool
GX Developer Version 8.49B (SW8D5C-GPPW-E)

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ALL RIGHTS RESERVED

This Product is licensed to:

Name: [redacted]

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List of version information on Add-in software

Warning :

This product is protected by copyright law and international treaties. Unauthorized reproduction or distribution of this program or any portion of it may result in severe civil and criminal penalties,and will be prosecuted to the maximum extension possible under the law.

**Figure 2.9 Product information**

## 2.4 Checking the Hardware Version

The hardware version of the AJ65BT-R2N can be checked in the DATE section on the rating plate.

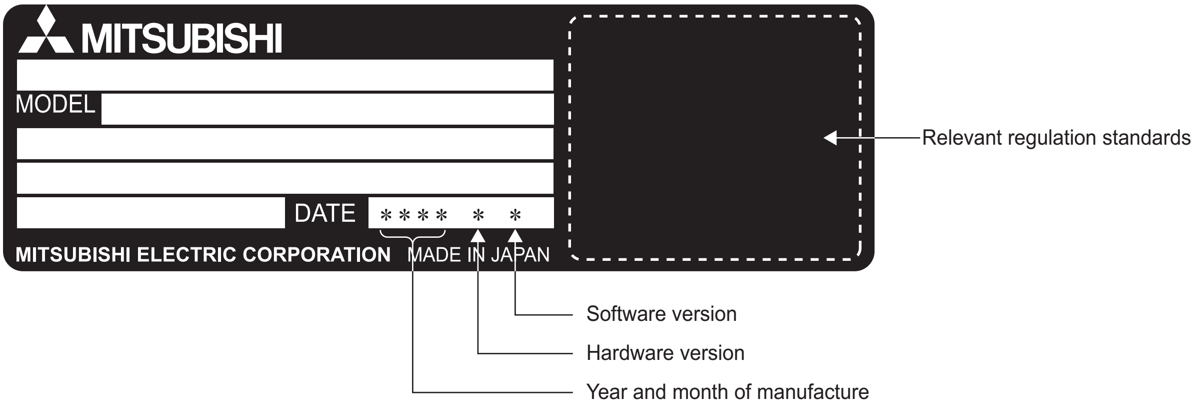


Figure 2.10 Hardware version

## 2.5 Checking the Production Number (SERIAL)

The production number (SERIAL) of the AJ65BT-R2N can be checked in the SERIAL section on the rating plate.

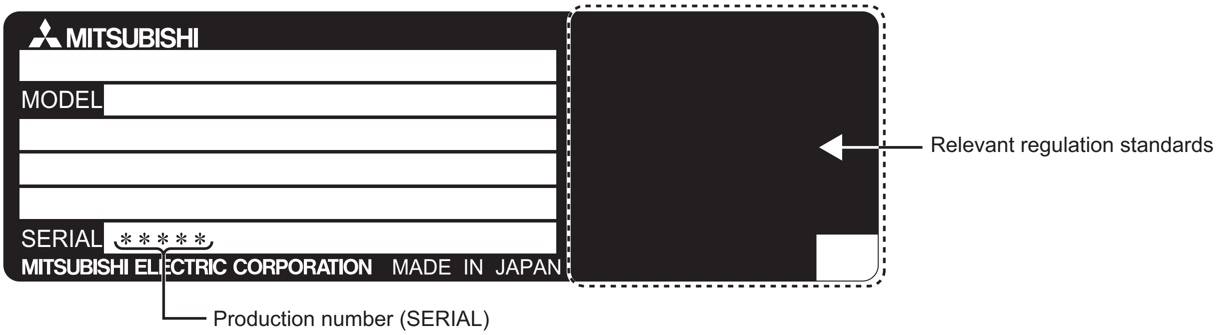


Figure 2.11 Production number

# CHAPTER 3 SPECIFICATIONS

## 3.1 General Specifications

This section describes general specifications of the AJ65BT-R2N.

Table 3.1 General specifications

<table>
<tr><th>Item</th><th colspan="6">Specifications</th></tr>
<tr><td>Operating ambient temperature</td><td colspan="6">0 to 55℃</td></tr>
<tr><td>Storage ambient temperature</td><td colspan="6">-20 to 75℃</td></tr>
<tr><td>Operating ambient humidity</td><td colspan="6" rowspan="2">10 to 90%RH, condensation not allowed</td></tr>
<tr><td>Storage ambient humidity</td></tr>
<tr><td rowspan="5">Vibration resistance</td><td rowspan="5">Compliant with JIS B 3502, IEC 61131-2</td><td></td><td>Frequency</td><td>Constant acceleration</td><td>Half amplitude</td><td>No. of sweeps</td></tr>
<tr><td rowspan="2">For intermittent vibration</td><td>5 to 8.4Hz</td><td>—</td><td>3.5mm</td><td rowspan="2">10 times each in X, Y, and Z directions</td></tr>
<tr><td>8.4 to 150Hz</td><td>$9.8\text{m/s}^2$</td><td>—</td></tr>
<tr><td rowspan="2">For continuous vibration</td><td>5 to 8.4Hz</td><td>—</td><td>1.75mm</td><td rowspan="2">—</td></tr>
<tr><td>8.4 to 150Hz</td><td>$4.9\text{m/s}^2$</td><td>—</td></tr>
<tr><td>Shock resistance</td><td colspan="6">Compliant with JIS B 3502, IEC 61131-2 ($147\text{m/s}^2$, 3 times each in X, Y and Z directions)</td></tr>
<tr><td>Operating atmosphere</td><td colspan="6">No corrosive gases</td></tr>
<tr><td>Operating altitude[*1]</td><td colspan="6">0 to 2000m</td></tr>
<tr><td>Installation location</td><td colspan="6">Inside control panel</td></tr>
<tr><td>Overvoltage category[*2]</td><td colspan="6">Ⅱ or lower</td></tr>
<tr><td>Pollution degree[*3]</td><td colspan="6">2 or lower</td></tr>
</table>

* 1 Do not use or store the programmable controller in an environment where the atmospheric pressure is higher than the one at 0m elevation.
Doing so may cause malfunctions. For use in a compressed-air environment, please consult your local Mitsubishi representative.

* 2 It indicates the device is to be connected to which power distribution part, within the area from the public electricity network to machinery on the premises.
Category Ⅱ applies to devices to which power is supplied from fixed installations. The surge voltage withstand for devices rated up to 300V is 2500V.

* 3 This is an index showing the degree of the conductive pollution that can occur in the environment where the device is used.
In Pollution degree 2, only nonconductive pollution occurs. Occasionally, however, temporary conductivity caused by condensation can be expected.

## 3.2 Performance Specifications

This section describes performance specifications of the AJ65BT-R2N.

**Table 3.2 Performance specifications**

| Item | | | Specifications |
|---|---|---|---|
| RS-232 | | | — |
| | Interface | | RS-232 compliant (D-Sub 9P) |
| | Communication method | | Full-duplex communication method |
| | Synchronization method | | Asynchronous method |
| | Transmission speed | | 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600[*1], 115200[*1](bps)<br>(Select with RS-232 transmission setting switches.) |
| | Transmission distance | | Up to 15m |
| | Data format | Start bit | 1 |
| | | Data bit | 7/8 |
| | | Parity bit | 1 (Vertical parity)/None |
| | | Stop bit | 1/2 |
| | Error detection | Parity check | Checked (even/odd)/Not checked |
| | Communication control (Flow control) | | DTR/DSR (ER/DR) control<br>DC1/DC3 control |
| | OS reception area | | 5120 bytes |
| CC-Link | | | — |
| | Transmission path | | Bus (RS-485) |
| | CC-Link station type | | Intelligent device station |
| | Connection cable | | CC-Link dedicated cable/CC-Link high-performance cable/CC-Link Ver.1.10-compatible cable[*2] |
| | No. of occupied stations | | 1 station (RX/RY: 32 points each, RWw/RWr: 4 points each) |
| No. of writes to $E^2$PROM | | | Up to 100,000 times |
| Withstand voltage | | | One minute at 500VAC between all external DC terminals and ground |
| Insulation resistance | | | 500VDC between all external DC terminals and ground, 10MΩ or more with insulation resistance tester |
| Noise immunity | | | DC type noise voltage: 500Vp-p<br>Tested by noise simulator of noise width of 1μs, and noise frequency of 25 to 60Hz |
| Module fixing screw | | | M4×0.7mm×16mm or larger<br>DIN-rail mounting is also possible. |
| Applicable DIN rail | | | TH35-7.5Fe, TH35-7.5Al, TH35-15Fe (Compliant with IEC 60715) |
| External power supply | | | 24VDC (Ripple ratio: 5% or less) (Allowable voltage range: 20.4 to 26.4VDC) |
| | | | Current consumption: 0.11A (TYP. 24VDC) |
| Allowable momentary power failure time | | | 1ms |
| External dimensions | | | 80(H)×170(W)×47(D) [mm] |
| Weight | | | 0.40kg |

[*1] Unless data are sent concurrently from the AJ65BT-R2N and external-device sides in Nonprocedural protocol mode, communication at 57600bps or 115200bps is available.
If data is communicated simultaneously, the RS-232 receive overrun error (BB23$_H$) may occur.

[*2] Combined use of CC-Link Ver.1.10-compatible cables, CC-Link dedicated cables (Ver.1.00) and/or CC-Link high-performance cables is not allowed.
If cables of different types are used, normal data transmission cannot be ensured.
Also, terminating resistors appropriate to the cable type must be used.

## 3.3 Function List

This section describes function list of the AJ65BT-R2N.

**Table 3.3 Function List**

| Function | | Description | Reference section |
|---|---|---|---|
| Nonprocedural protocol mode | | — | — |
| | Send/receive buffer communication function | When only the necessary data in the required size is specified by the user, sends/ receives it in a given timing. | Section 4.2 |
| | Buffer memory auto-refresh function | Automatically refreshes the buffer memories of the AJ65BT-R2N and master station at a timing set in the AJ65BT-R2N. | Section 4.3 |
| | AJ65BT-R2N initialization function | Performs the following processing.<br>•Stop the processing in execution<br>•Initialize the AJ65BT-R2N<br>•Enable the setting written to a buffer memory | Section 4.4 |
| | Frame function | Sends the data with adding the specific data, and receives the data where the specific data from the external device is added. | Section 4.5.1 |
| | Monitoring-based transmission function | Sends data specified in the send table if the send condition specified by the user is met. | Section 4.5.2 |
| | Send cancel function | Cancels the send processing which has already been requested to the AJ65BT-R2N from the master module. | Section 4.5.3 |
| | Forced receive completion function | Forcibly completes data reception from the external device, and reads the received data if the data reception is not completed. | Section 4.5.4 |
| | Flow control function | Discontinues or restarts data sending depending on the status of the OS reception area of the AJ65BT-R2N or the request from the external device. | Section 4.5.5 |
| | ASCII-binary conversion function | Sends/receives data in ASCII code when data is communicated between the AJ65BT-R2N and the external device. | Section 4.5.6 |
| | RW refresh function | Assigns a part of a buffer memory of the AJ65BT-R2N to the remote register (RW), and monitors the buffer memory. | Section 4.5.7 |
| | OS reception area clear function | Clears data in the OS reception area of the AJ65BT-R2N. | Section 4.5.8 |
| | $E^2$PROM function | Registers the setting value of the AJ65BT-R2N to $E^2$PROM, and uses the setting value of the buffer memory registered in $E^2$PROM as an initial value at the time of the AJ65BT-R2N startup. | Section 4.5.9 |
| | RS-232 signal control function | Reads the signal status of the RS-232 interface stored in a buffer memory of the AJ65BT-R2N, and controls output. | Section 4.5.10 |
| MELSOFT connection mode | | — | — |
| | MELSOFT connection function | Accesses the programmable controller CPU when connecting the AJ65BT-R2N to the engineering tool. | *1 |

[1] For details of MELSOFT connection mode, refer to the following manual.
CC-Link System RS-232 Interface Module User's Manual (MELSOFT Connection Mode)

## 3.4 CC-Link Dedicated Cable Specifications

In CC-Link systems, use CC-Link dedicated cables.
The performance of the CC-Link system cannot be guaranteed when any other than dedicated CC-Link cables is used.
For more information, visit the following website.

☞CC-Link Partner Association (www.cc-link.org)

**Remark**

Refer to the CC-Link Cable Wiring Manual issued by the CC-Link Partner Association.

## 3.5 RS-232 Interface Specifications

### 3.5.1 RS-232 connector specifications

The following describes specifications of the RS-232 connector connected to the external device.

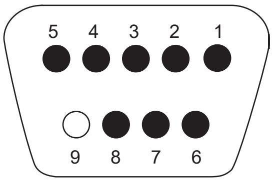


**Figure 3.1 RS-232 connector**

**Table 3.4 RS-232 connector specifications**

| Pin No. | Mnemonic | Signal name | Signal direction |
|---|---|---|---|
| | | | AJ65BT-R2N ↔ External device |
| 1 | CD | Receive carrier detect | ← |
| 2 | RD (RXD) | Receive data | ← |
| 3 | SD (TXD) | Send data | → |
| 4 | DTR (ER) | Data terminal ready | → |
| 5 | SG | Signal ground | ↔ |
| 6 | DSR (DR) | Data set ready | ← |
| 7 | RS (RTS) | Request to send | → |
| 8 | CS (CTS) | Clear to send | ← |
| 9 | Unused | — | — |

(1) Control signal
The following shows each control signal.

(a) CD signal
The CD signal status can be read by the CD signal (RXnB).
The AJ65BT-R2N cannot use the CD signal as the control signal for sending/ receiving data to/from the external device.
The control status of the CD signal can be checked by the CD signal (RXnB).

- ON: The status of CD signal is turned ON.
- OFF: The status of CD signal is turned OFF.

(b) DTR (ER) signal
When the DTR/DSR (ER/DR) control is implemented, the AJ65BT-R2N is turned ON/OFF depending on the size of an empty area of the OS reception area for storing receive data.
(The DTR (ER) signal is turned ON when the AJ65BT-R2N is ready to receive data.)
If the DTR/DSR (ER/DR) control is not implemented, the AJ65BT-R2N follows the DTR (ER) signal.

(c) DSR (DR) signal

When the DTR/DSR (ER/DR) control is implemented, data will not be sent to the external device from the AJ65BT-R2N at OFF.

Always turn ON the external device when it is ready to receive the signal.

If the DTR/DSR (ER/DR) control is not implemented, the status of the DSR (DR) signal will be ignored.

The control status of the DSR (DR) signal can be checked by the DSR (DR) signal (RXnA).

- ON: Data can be sent to the external device from the AJ65BT-R2N.
- OFF: Data cannot be sent to the external device from the AJ65BT-R2N.

(d) RS (RTS) signal

The AJ65BT-R2N follows the setting of the RS (RTS) signal status specification (R2N 101H) and the RS (RTS) signal.

(e) CS (CTS) signal

When the CS (CTS) signal is OFF, it will not be sent to the external device from the AJ65BT-R2N.

Always turn ON the external device when it is ready to receive the signal.

The control status of the CS (CTS) signal can be checked by the CS (CTS) signal (RXn9).

- ON: Data can be sent to the external device from the AJ65BT-R2N.
- OFF: Data cannot be sent to the external device from the AJ65BT-R2N.

(2) Interface connector

Connectors of 9-pin D-sub (female) screw type (mating screw M2.6) are used as RS-232 interface connectors for the AJ65BT-R2N.

For the relevant models, refer to Appendix 4.

For the AJ65BT-R2N side cable, use a connector shell appropriate to the above.

The screw size for the connector is M2.6.

Use the following model as a connector shell of the AJ65BT-R2N side connection cable.

- DDK Ltd.
  Plug, shell: 17JE-23090-02 (D8A) (-CG)

## 3.5.2 RS-232 cable specifications

Use an RS-232 cable that is compliant with the RS-232 standard, in a length of 15m or less.

(Recommended cable)

- Oki Electric Cable Co., Ltd.
  7/0.127☐P HRV-SV (☐: Specify the number of pairs.)

## 3.6 General-purpose I/O Specifications

This section describes general-purpose I/O specifications of the AJ65BT-R2N.

### 3.6.1 Hardware version B or later, or production number (SERIAL) (first five digits) of "16041" or later

(1) General-purpose I/O terminal block
The following shows a general-purpose I/O terminal block.

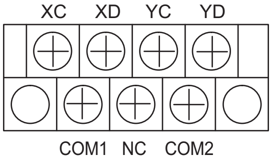
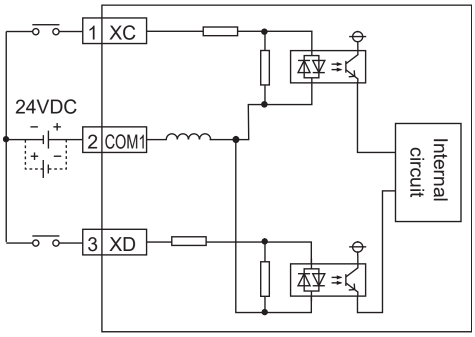


**Figure 3.2 General-purpose I/O terminal block**

(2) General-purpose input specifications

**Table 3.5 General-purpose input specifications**

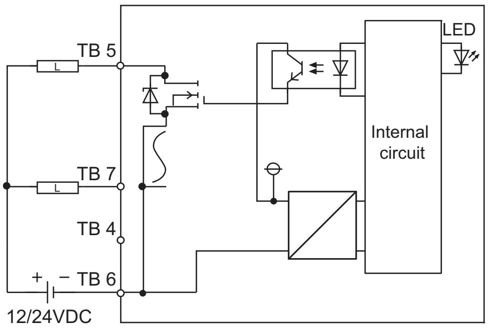
| Item | | DC input (Positive common/negative common shared type) | | | | |
|---|---|---|---|---|---|---|
| | | AJ65BT-R2N | External connection view | | | |
| No. of input points | | 2 points |  | | | |
| Insulation method | | Photocoupler | | | | |
| Rated input voltage | | 24VDC (Ripple ratio: 5% or less) | | | | |
| Rated input current | | Approx. 7mA | | | | |
| Operating voltage range | | 19.2 to 28.8VDC | | | | |
| Max. No. of simultaneous input points | | 100% | | | | |
| ON voltage/ON current | | 14V or more/3.5mA or more | | | | |
| OFF voltage/OFF current | | 6V or less/1.7mA or less | | | | |
| Input resistance | | Approx. 3.3kΩ | | | | |
| Response time | OFF → ON | 10ms or less | | | | |
| | ON → OFF | 10ms or less | | | | |
| Wiring method for common | | 2 points/common (COM1)<br>Positive common/negative common shared type | | | | |
| External connection method | | 7-point terminal block (M3.5 screw) | **Terminal No.** | **Signal name** | **Terminal No.** | **Signal name** |
| Applicable wire size | | 0.75 to 2mm$^2$ | TB1 | XC | TB3 | XD |
| Applicable solderless terminal | | RAV1.25-3.5, RAV2-3.5 (Compliant with JIS C 2805) | TB2 | COM1 | — | — |

### (3) General-purpose output specifications

**Table 3.6 General-purpose output specifications**

| Item | | Transistor output (Sink type) |
|---|---|---|
| | | AJ65BT-R2N |
| No. of output points | | 2 points |
| Insulation method | | Photocoupler |
| Rated load voltage | | 12 to 24VDC (+20/-15%) (Ripple ratio: 5% or less) |
| Operating load voltage range | | 10.2 to 28.8VDC |
| Max. load current | | 0.1A/point<br>0.2A/common |
| Max. inrush current | | 0.7A, 10ms or less |
| Leakage current at OFF | | 0.1mA or lower |
| Max. voltage drop at ON | | 0.1VDC(TYP.)0.1A, 0.2VDC(MAX.)0.1A |
| Response time | OFF → ON | 1ms or less |
| | ON → OFF | 1ms or less (Resistance load) |
| External power supply of output section | Voltage | 12/24VDC (Ripple ratio: 5% or less)<br>(Allowable voltage range: 10.2 to 28.8VDC) |
| | Current | 10mA (at 24VDC) (MAX all points ON) |
| Surge suppressor | | Zener diode |
| Wiring method for common | | 2 points/common (COM2) |
| External connection method | | 7-point terminal block (M3.5 screw) |
| Applicable wire size | | 0.75 to 2mm$^2$ |
| Applicable solderless terminal | | RAV1.25-3.5, RAV2-3.5 (Compliant with JIS C 2805) |
| Protective function | | Provided<br>•Overheat protective function operates in unit of 1 point.<br>•Overload protective function operates in unit of 1 point.<br>(Detection disabled) |

**External connection view**



| Terminal No. | Signal name | Terminal No. | Signal name |
|---|---|---|---|
| TB4 | NC | TB6 | COM2 |
| TB5 | YC | TB7 | YD |

## 3.6.2 Hardware version A

### (1) General-purpose I/O terminal block

The following shows a general-purpose I/O terminal block.

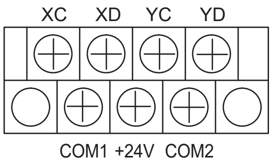


**Figure 3.3 General-purpose I/O terminal block**

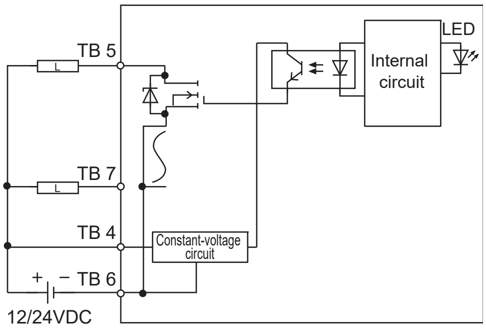
### (2) General-purpose input specifications

They are the same as those of hardware version B or later, or production number (SERIAL) (first five digits) of "16041" or later.

☞Section 3.6.1 (2) General-purpose input specifications

### (3) General-purpose output specifications

**Table 3.7 General-purpose output specifications**

| Item | | Transistor output (Sink type) | |
|---|---|---|---|
| | | AJ65BT-R2N | External connection view |
| No. of output points | | 2 points |  |
| Insulation method | | Photocoupler | |
| Rated load voltage | | 12 to 24VDC (+20/-15%) (Ripple ratio: 5% or less) | |
| Operating load voltage range | | 10.2 to 28.8VDC | |
| Max. load current | | 0.1A/point<br>0.2A/common | |
| Max. inrush current | | 0.7A, 10ms or less | |
| Leakage current at OFF | | 0.1mA or lower | |
| Max. voltage drop at ON | | 0.1VDC(TYP.)0.1A, 0.2VDC(MAX.)0.1A | |
| Response time | OFF → ON | 1ms or less | |
| | ON → OFF | 1ms or less (Resistance load) | |
| External power supply of output section | Voltage | 12/24VDC (Ripple ratio: 5% or less)<br>(Allowable voltage range: 10.2 to 28.8VDC) | |
| | Current | 10mA (at 24VDC) (MAX all points ON) | |
| Surge suppressor | | Zener diode | |
| Wiring method for common | | 2 points/common (COM2) | |
| External connection method | | 7-point terminal block (M3.5 screw) | |
| Applicable wire size | | 0.75 to 2mm$^2$ | |
| Applicable solderless terminal | | RAV1.25-3.5, RAV2-3.5 (Compliant with JIS C 2805) | |
| Protective function | | Provided<br>•Overheat protective function operates in unit of 1 point.<br>•Overload protective function operates in unit of 1 point.<br>(Detection disabled) | |

| Terminal No. | Signal name | Terminal No. | Signal name |
|---|---|---|---|
| TB4 | +24V | TB6 | COM2 |
| TB5 | YC | TB7 | YD |

## 3.7 Remote I/O and Remote Register

This section describes the remote I/O and remote register of the AJ65BT-R2N.

### 3.7.1 Remote I/O list

The remote I/O list of the AJ65BT-R2N is shown below.

**☒Point**

The "n" in device No. of the remote I/O depends on the number of occupied points of the module mounted on the station whose station No. is smaller than that of the AJ65BT-R2N.

The following shows an example when a local station compatible with Remote net ver.1 mode is mounted on the station whose station No. is smaller than that of the AJ65BT-R2N.
In case of the following example, RX40 to RX5F are used as the remote input of the AJ65BT-R2N.

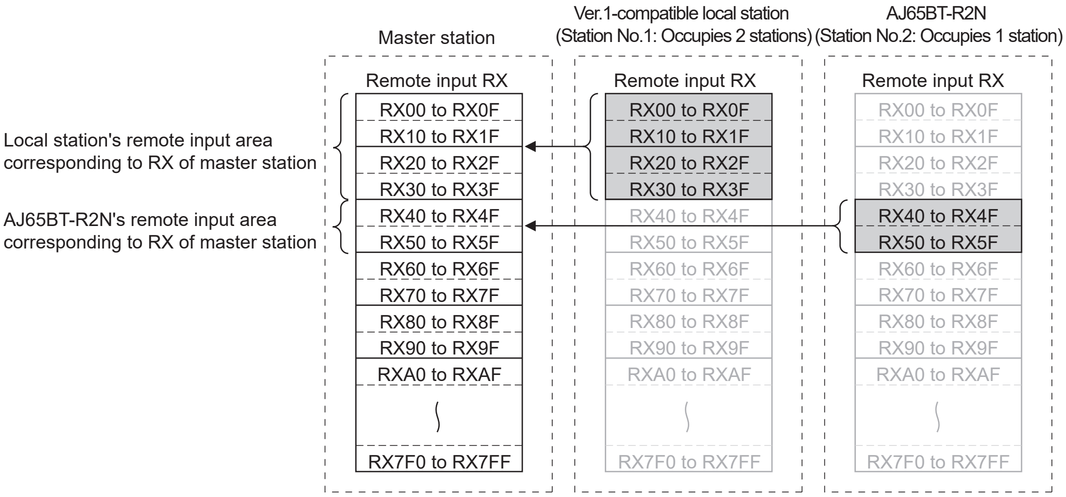


**Figure 3.4 Example of remote input area**

When mounting a slave station compatible with Remote net ver.2 mode or Remote net additional mode on the station whose station No. is smaller than that of the AJ65BT-R2N, refer to the following manual.

☞User's manual for the master module used

## (1) In Nonprocedural protocol mode (When Mode setting switch is 0 to 4)

**Table 3.8 I/O signal list for Nonprocedural protocol mode**

| Signal direction: AJ65BT-R2N → Master station | | | Signal direction: Master station → AJ65BT-R2N | | |
|---|---|---|---|---|---|
| Device No. | Signal name | | Device No. | Signal name | |
| RXn0 | Send complete signal | | RYn0 | Send request signal | |
| RXn1 | Send failed signal | | RYn1 | Send cancel request signal | |
| RXn2 | Normal receive data read request signal | | RYn2 | Receive data read completion signal | |
| RXn3 | Error receive data read request signal | | RYn3 | Forced receive completion request signal | |
| RXn4 | Initialization complete signal | | RYn4 | Initialization request signal | |
| RXn5 | Initialization failed signal | | RYn5 | Use prohibited | |
| RXn6 | OS reception area cleared signal | | RYn6 | OS reception area clear request signal | |
| RXn7 | E$^2$PROM function complete signal | | RYn7 | E$^2$PROM function request signal | |
| RXn8 | E$^2$PROM function failed signal | | RYn8 | Use prohibited | |
| RXn9 | Signal status | CS (CTS) signal | RYn9 | Signal setting | RS (RTS) signal*1 |
| RXnA | | DSR (DR) signal | RYnA | | DTR (ER) signal*2 |
| RXnB | | CD signal | RYnB | Use prohibited | |
| RXnC | General-purpose external input signal | | RYnC | General-purpose external output signal | |
| RXnD | | | RYnD | | |
| RXnE | Use prohibited | | RYnE | Use prohibited | |
| RXnF | | | RYnF | | |
| RX(n+1)0 | | | RY(n+1)0 | | |
| RX(n+1)1 | | | RY(n+1)1 | | |
| RX(n+1)2 | | | RY(n+1)2 | | |
| RX(n+1)3 | | | RY(n+1)3 | | |
| RX(n+1)4 | Mode setting switch status signal | | RY(n+1)4 | | |
| RX(n+1)5 | | | RY(n+1)5 | | |
| RX(n+1)6 | | | RY(n+1)6 | | |
| RX(n+1)7 | | | RY(n+1)7 | | |
| RX(n+1)8 | Use prohibited | | RY(n+1)8 | | |
| RX(n+1)9 | Initial data read completion signal | | RY(n+1)9 | Initial data read request signal | |
| RX(n+1)A | Error status signal | | RY(n+1)A | Error reset request signal | |
| RX(n+1)B | Remote station ready signal | | RY(n+1)B | Use prohibited | |
| RX(n+1)C | Use prohibited | | RY(n+1)C | | |
| RX(n+1)D | | | RY(n+1)D | | |
| RX(n+1)E | Intelligent device station access completion signal | | RY(n+1)E | Intelligent device station access request signal | |
| RX(n+1)F | Use prohibited | | RY(n+1)F | Use prohibited | |

* 1 The setting of the RS signal is invalid when the RS (RTS) signal status specification (R2N 101$_H$) is 0 (always ON).

* 2 The setting of the ER signal is invalid when Flow control specification (R2N 100$_H$) is 1 (The flow is performed by the DTR/DSR (ER/DR) control).

(2) In MELSOFT connection mode (When Mode setting switch is 5)

**Table 3.9 I/O signal list for MELSOFT connection mode**

| Signal direction AJ65BT-R2N → Master station | | | Signal direction Master station → AJ65BT-R2N | |
|---|---|---|---|---|
| Device No. | Signal name | | Device No. | Signal name |
| RXn0 | Use prohibited | | RYn0 | Use prohibited |
| RXn1 | | | RYn1 | |
| RXn2 | | | RYn2 | |
| RXn3 | | | RYn3 | |
| RXn4 | | | RYn4 | |
| RXn5 | | | RYn5 | |
| RXn6 | | | RYn6 | |
| RXn7 | | | RYn7 | |
| RXn8 | | | RYn8 | |
| RXn9 | Signal status | CS (CTS) signal | RYn9 | |
| RXnA | | DSR (DR) signal | RYnA | |
| RXnB | | CD signal | RYnB | |
| RXnC | General-purpose external input signal | | RYnC | General-purpose external output signal |
| RXnD | | | RYnD | |
| RXnE | Use prohibited | | RYnE | Use prohibited |
| RXnF | | | RYnF | |
| RX(n+1)0 | | | RY(n+1)0 | |
| RX(n+1)1 | | | RY(n+1)1 | |
| RX(n+1)2 | | | RY(n+1)2 | |
| RX(n+1)3 | | | RY(n+1)3 | |
| RX(n+1)4 | Mode setting switch status signal | | RY(n+1)4 | |
| RX(n+1)5 | | | RY(n+1)5 | |
| RX(n+1)6 | | | RY(n+1)6 | |
| RX(n+1)7 | | | RY(n+1)7 | |
| RX(n+1)8 | Use prohibited | | RY(n+1)8 | |
| RX(n+1)9 | | | RY(n+1)9 | |
| RX(n+1)A | | | RY(n+1)A | |
| RX(n+1)B | | | RY(n+1)B | |
| RX(n+1)C | | | RY(n+1)C | |
| RX(n+1)D | | | RY(n+1)D | |
| RX(n+1)E | | | RY(n+1)E | |
| RX(n+1)F | | | RY(n+1)F | |

## ☒Point

Do not output (turn ON) the "Use prohibited" signal among the I/O signals for the programmable controller CPU.

Doing so may cause malfunction of the programmable controller system.

## 3.7.2 Remote I/O details

The following describes details of the remote I/O of the AJ65BT-R2N.

### (1) Send request signal (RYn0), Send complete signal (RXn0), and Send failed signal (RXn1)

The signals are used to send data to the external device from the AJ65BT-R2N.

(a) When normally completed

1) When turning ON Send request signal (RYn0) after writing the send data to the send area of the AJ65BT-R2N, the data is sent to the external device from the AJ65BT-R2N.
2) When transmission is normally completed, Send complete signal (RXn0) turns ON.
3) Turn OFF Send request signal (RYn0) after Send complete signal (RXn0) is turned ON.

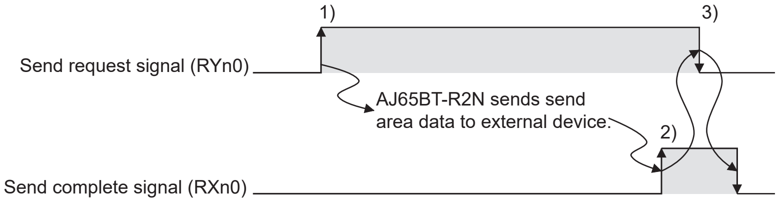


**Figure 3.5 Send request signal (RYn0) and Send complete signal (RXn0)**

(b) When failed

1) When turning ON Send request signal (RYn0) after writing the send data to the send area of the AJ65BT-R2N, the data is sent to the external device from the AJ65BT-R2N.
2) When failed, Send failed signal (RXn1) turns ON.
   When sending data is failed, an error occurred is stored into the send error code (R2N 1B1H).
3) Turn OFF Send request signal (RYn0) after Send failed signal (RXn1) is turned ON.

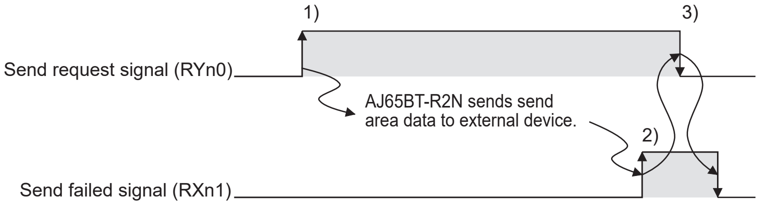


**Figure 3.6 Send request signal (RYn0) and Send failed signal (RXn1)**

(2) Send cancel request signal (RYn1)

The signal is used to cancel sending data to the external device after turning ON Send request signal (RYn0).

1) To cancel sending data to the external device is started when Send cancel request signal (RYn1) is turned ON after turning ON Send request signal (RYn0).

2) Send failed signal (RXn1) is turned ON when sending data is forcibly canceled.[*1]

3) Turn OFF Send request signal (RYn0) and Send cancel request signal (RYn1) after Send failed signal (RXn1) is turned ON.

* 1 In some cases, sending data may be completed before Send cancel request signal (RYn1) is turned ON, which leads to turn ON Send complete signal.
Create an interlock circuit so that Send cancel request signal (RYn1) will not be accepted except for when requesting to send data.

☞Section 4.5.3 Send cancel function

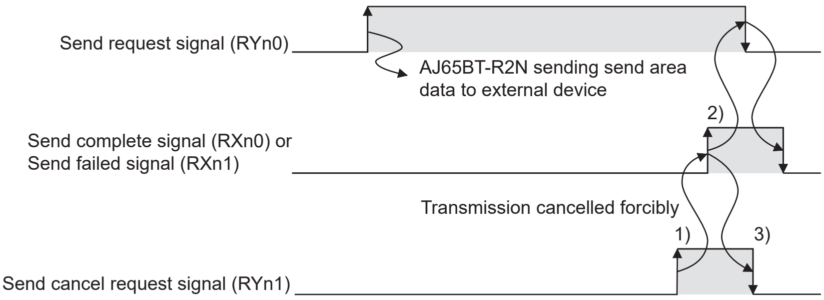


**Figure 3.7 Send cancel request signal (RYn1)**

(3) Receive data read completion signal (RYn2), Normal receive data read request signal (RXn2), and Error receive data read request signal (RXn3)

The signals are used to receive data to the AJ65BT-R2N from the external device.

(a) When normally completed

1) Normal receive data read request signal (RXn2) is turned ON when data is normally received to the AJ65BT-R2N from the external device.
At this time, the data received is stored into the receive area of the AJ65BT-R2N.

2) The data in the receive area of the AJ65BT-R2N is read after Normal receive data read request signal (RXn2) is turned ON.
Turn ON Receive data read completion signal (RYn2) after reading data is completed.

3) Normal receive data read request signal (RXn2) is turned OFF after turning ON Receive data read completion signal (RYn2).

4) Turn OFF Receive data read completion signal (RYn2) after turning OFF Normal receive data read request signal (RXn2).

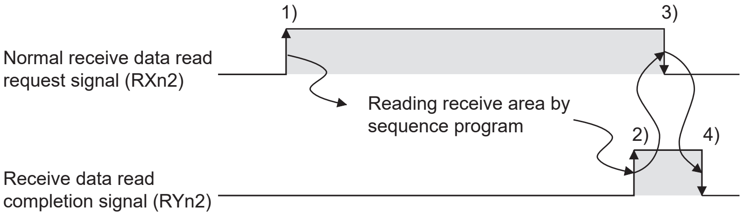


Figure 3.8 Receive data read completion signal (RYn2) and Normal receive data read request signal (RXn2)

(b) When failed

1) Error receive data read request signal (RXn3) is turned ON when data is failed to be received to the AJ65BT-R2N from the external device.
   At this time, the data received is stored into the receive area of the AJ65BT-R2N.
2) The data in the receive area of the AJ65BT-R2N is read after Error receive data read request signal (RXn3) is turned ON.
   Turn ON Receive data read completion signal (RYn2) after reading data is completed.
   When receiving data is failed, an error occurred is stored into the receive error code (R2N 1B2H).
3) Error receive data read request signal (RXn3) is turned OFF after turning ON Receive data read completion signal (RYn2).
4) Turn OFF Receive data read completion signal (RYn2) after turning OFF Error receive data read request signal (RXn3).

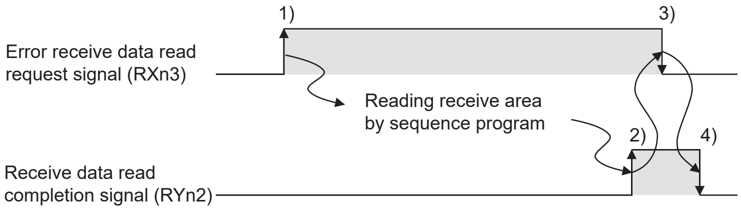


**Figure 3.9 Receive data read completion signal (RYn2) and Error receive data read request signal (RXn3)**

(4) Forced receive completion request signal (RYn3)

The signal is used to forcibly receive data from the external device.

1) Normal receive data read request signal (RXn2) or Error receive data read request signal (RXn3) is turned ON when turning ON Forced receive completion request signal (RYn3) if the data reception is not completed.
   At this time, data received in the OS reception area up to now is stored into the receive area of the AJ65BT-R2N.
   When Error receive data read request signal (RXn3) is turned ON, an error occurred is stored into the receive error code (R2N 1B2H).
2) The data in the receive area of the AJ65BT-R2N is read after Normal receive data read request signal (RXn2) or Error receive data read request signal (RXn3) is turned ON.
   Turn OFF Forced receive completion request signal (RYn3) and turn ON Receive data read completion signal (RYn2) after reading data is completed.
3) Normal receive data read request signal (RXn2) or Error receive data read request signal (RXn3) is turned OFF after turning ON Receive data read completion signal (RYn2).
4) Turn OFF Receive data read completion signal (RYn2) after turning OFF Normal receive data read request signal (RXn2) or Error receive data read request signal (RXn3).

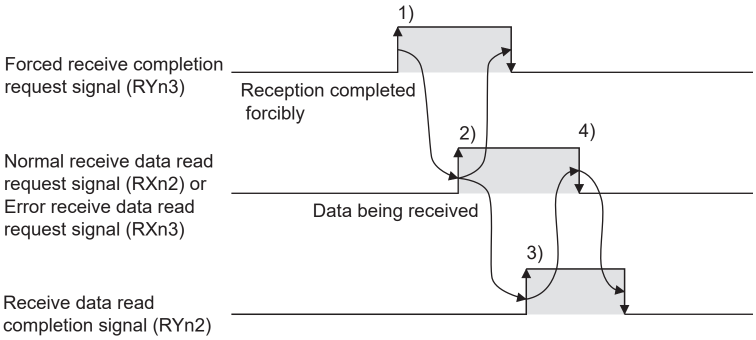


**Figure 3.10 Forced receive completion request signal (RYn3)**

(5) Initialization request signal (RYn4), Initialization complete signal (RXn4), and Initialization failed signal (RXn5)

The signals are used to initialize the setting of the AJ65BT-R2N.

(a) When normally completed

1) Initialization of the AJ65BT-R2N is started when Initialization request signal (RYn4) is turned ON after writing data for initialization to the buffer memory of the AJ65BT-R2N.
2) When the initialization of the AJ65BT-R2N is completed normally, Initialization complete signal (RXn4) is turned ON.
3) Turn OFF Initialization request signal (RYn4) after Initialization complete signal (RXn4) is turned ON.

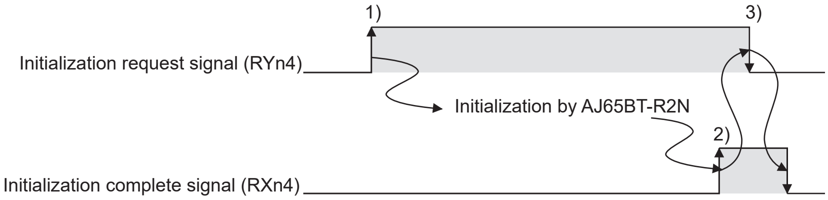


**Figure 3.11 Initialization request signal (RYn4) and Initialization complete signal (RXn4)**

(b) When failed

1) Initialization of the AJ65BT-R2N is started when Initialization request signal (RYn4) is turned ON after writing data for initialization to the buffer memory of the AJ65BT-R2N.
2) When the initialization of the AJ65BT-R2N is failed, Initialization failed signal (RXn5) is turned ON.
When initialization is failed, an error occurred is stored into General error codes (R2N 1B0H).
3) Turn OFF Initialization request signal (RYn4) after Initialization failed signal (RXn5) is turned ON.

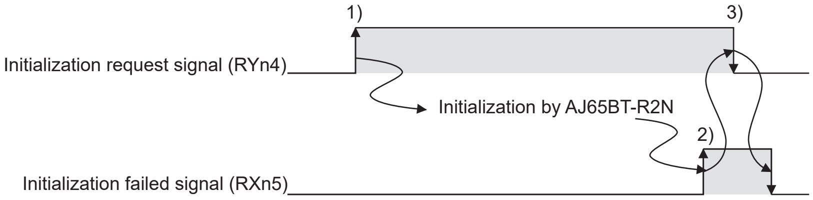


**Figure 3.12 Initialization request signal (RYn4) and Initialization failed signal (RXn5)**

(6) OS reception area clear request signal (RYn6) and OS reception area cleared signal (RXn6)

The signals are used to clear OS reception area of the AJ65BT-R2N.

1) Clearing OS reception area of the AJ65BT-R2N is started when turning ON OS reception area clear request signal (RYn6).

2) OS reception area cleared signal (RXn6) is turned ON when clearing data of OS reception area is completed.

3) Turn OFF OS reception area clear request signal (RYn6) after OS reception area cleared signal (RXn6) is turned ON.

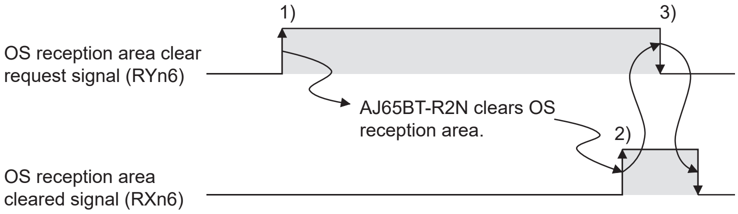


**Figure 3.13 OS reception area clear request signal (RYn6) and OS reception area cleared signal (RXn6)**

(7) E$^2$PROM function request signal (RYn7), E$^2$PROM function complete signal (RXn7), and E$^2$PROM function failed signal (RXn8)

The signals are used to register the setting value of the buffer memory of the AJ65BT-R2N to E$^2$PROM or initialize it.

(a) When normally completed

1) Registration of the setting value to E$^2$PROM or initialization of it is started when turning ON E$^2$PROM function request signal (RYn7) after data is written to E$^2$PROM function specification (R2N 1C0H).

2) E$^2$PROM function complete signal (RXn7) is turned ON when registration of the setting value to E$^2$PROM or initialization of it is completed normally.

3) Turn OFF E$^2$PROM function request signal (RYn7) after E$^2$PROM function complete signal (RXn7) is turned ON.

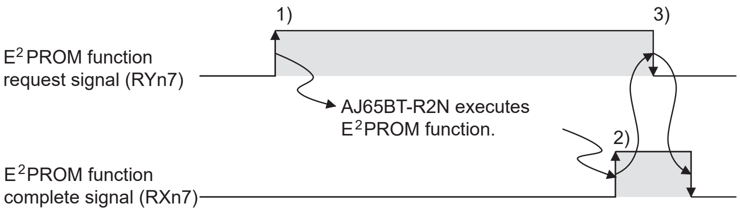


**Figure 3.14 E$^2$PROM function request signal (RYn7) and E$^2$PROM function complete signal (RXn7)**

(b) When failed

1) Registration of the setting value to E$^2$PROM or initialization of it is started when turning ON E$^2$PROM function request signal (RYn7) after data is written to E$^2$PROM function specification (R2N 1C0H).

2) E$^2$PROM function failed signal (RXn8) is turned ON when registration of the setting value to E$^2$PROM or initialization of it is failed.
When failed, an error occurred is stored into General error codes (R2N 1B0H).

3) Turn OFF E$^2$PROM function request signal (RYn7) after E$^2$PROM function failed signal (RXn8) is turned ON.

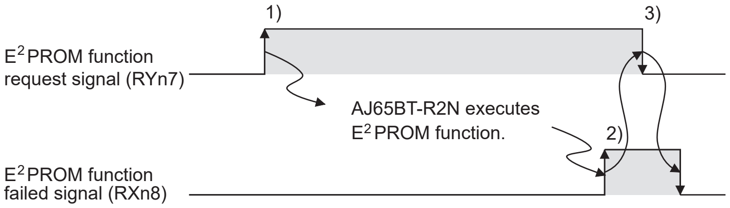


**Figure 3.15 E$^2$PROM function request signal (RYn7) and E$^2$PROM function failed signal (RXn8)**

(8) Signal setting: RS (RTS) signal (RYn9)

1) This is used to turn ON/OFF the RS (RTS) signal in the RS-232 communication.

2) However, when RS (RTS) signal status specification (R2N 101H) is 0 (always ON), the RS (RTS) signal (RYn9) is always ON regardless of turning it ON/OFF.

3) When controlling the RS (RTS) signal by the RS (RTS) signal (RYn9), set 1 (which follows ON/OFF of the RS (RTS) signal (RYn9)) to RS (RTS) signal status specification (R2N 101H).

(9) Signal setting: DTR (ER) signal (RYnA)

1) This is used to turn ON/OFF the DTR (ER) signal in the RS-232 communication.

2) This is available when 0 (not executing flow control) or 2 (executing flow control by the DC code control) is set to Flow control specification (R2N 100H).

(10) Signal status: CS (CTS) signal (RXn9), DSR (DR) signal (RXnA), and CD signal (RXnB)

This is used to check the status of the control signals (CS (CTS) signal, DSR (DR) signal, and CD signal) in RS-232 communication.
For signal status of each control signal, refer to the following.
☞Section 3.5.1 RS-232 connector specifications

(11) General-purpose external output signal (RYnC and RYnD)

General-purpose external output signals (RYnC and RYnD) are used to turn ON/OFF the general-purpose external outputs (YC and YD) of the AJ65BT-R2N.
RYnC corresponds to YC, and RYnD corresponds to YD, respectively.

(12) General-purpose external input signal (RXnC and RXnD)

General-purpose external input signals (RXnC and RXnD) are used to check the status of the general-purpose external inputs (XC and XD) of the AJ65BT-R2N.
General-purpose external input signals (RXnC and RXnD) are indicated by ON/OFF.
RXnC corresponds to XC, and RXnD corresponds to XD, respectively.

### (13)Mode setting switch status signal (RX(n+1)4 to RX(n+1)7)

Mode setting switch status signals (RX(n+1)4 to RX(n+1)7) are used to check the status of Mode setting switch.

**Table 3.10 Mode setting switch status signal**

| Mode setting switch | Name | | | RX(n+1)7 | RX(n+1)6 | RX(n+1)5 | RX(n+1)4 |
|---|---|---|---|---|---|---|---|
| 0 | Nonprocedural protocol mode | Send/receive buffer communication function | Mode 0 | 0 | 0 | 0 | 0 |
| 1 | | Buffer memory auto-refresh function | Mode 1 | 0 | 0 | 0 | 1 |
| 2 | | | Mode 2 | 0 | 0 | 1 | 0 |
| 3 | | | Mode 3 | 0 | 0 | 1 | 1 |
| 4 | | | Mode 4 | 0 | 1 | 0 | 0 |
| 5 | MELSOFT connection mode | | | 0 | 1 | 0 | 1 |
| 6 | Unused | | | 0 | 1 | 1 | 0 |
| 7 | | | | 0 | 1 | 1 | 1 |
| 8 | | | | 1 | 0 | 0 | 0 |
| 9 | | | | 1 | 0 | 0 | 1 |
| A | | | | 1 | 0 | 1 | 0 |
| B | | | | 1 | 0 | 1 | 1 |
| C | | | | 1 | 1 | 0 | 0 |
| D | | | | 1 | 1 | 0 | 1 |
| E | | | | 1 | 1 | 1 | 0 |
| F | | | | 1 | 1 | 1 | 1 |

### (14)Initial data read request signal (RY(n+1)9) and Initial data read completion signal (RX(n+1)9)

The signals are used to read the initial value of the AJ65BT-R2N to the auto-refresh buffer before initialization of the AJ65BT-R2N when the buffer memory auto-refresh function is used.

1) Reading the initial value of the AJ65BT-R2N is started when Initial data read request signal (RY(n+1)9) is turned ON.
   Remote station ready signal (RX(n+1)B) is turned OFF when Initial data read request signal (RY(n+1)9) is turned ON.
2) When reading the initial value to the auto-refresh buffer is completed, Initial data read completion signal (RX(n+1)9) is turned ON, leading to turn OFF Initial data read request signal (RY(n+1)9).
3) After turning OFF Initial data read request signal (RY(n+1)9), Initial data read completion signal (RX(n+1)9) is turned OFF and Remote station ready signal (RX(n+1)B) is turned ON.
4) Initialization of the AJ65BT-R2N.
   ☞(5) Initialization request signal (RYn4), Initialization complete signal (RXn4), and Initialization failed signal (RXn5) in this section

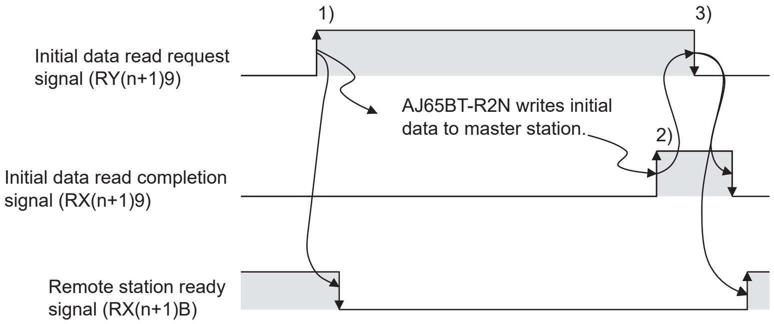


**Figure 3.16 Initial data read request signal (RY(n+1)9) and Initial data read completion signal (RX(n+1)9)**

(15)Error reset request signal (RY(n+1)A) and Error status signal (RX(n+1)A)

The signals are used to check the ERR. LED status of the AJ65BT-R2N.

- ON: ERR. LED is ON
- OFF: ERR. LED is OFF

For errors due to failure of initialization, refer to (b).
For errors due to failure other than initialization, refer to (a).

(a) When Initialization failed signal (RXn5) is OFF

1) Error status signal (RX(n+1)A) is turned ON if an error occurs.
   An error occurred is stored into Error code storage area ($\boxed{\text{R2N}}$ 1A8H to 1B2H).
2) Turn ON Error reset request signal (RY(n+1)A) after removing the cause of an error.
3) Error status signal (RX(n+1)A) is turned OFF after turning ON Error reset request signal (RY(n+1)A).

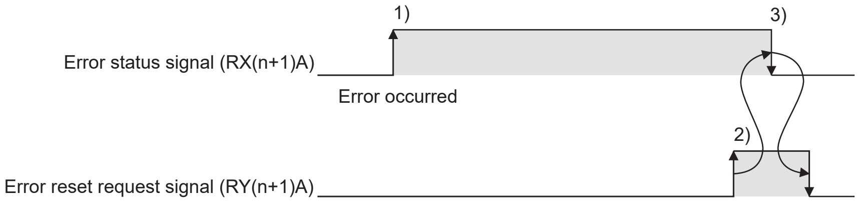


**Figure 3.17 Error reset request signal (RY(n+1)A) and Error status signal (RX(n+1)A) (When Initialization failed signal (RXn5) is OFF)**

(b) When Initialization failed signal (RXn5) is ON

It is necessary to initialize the AJ65BT-R2N if Initialization failed signal (RXn5) is turned ON.

In this case, Error status signal (RX(n+1)A) cannot be turned OFF by turning ON Error reset request signal (RY(n+1)A).

1) Error status signal (RX(n+1)A) is turned ON if an error occurs.

   An error occurred is stored into Error code storage area (R2N 1A8H to 1B2H).

2) After reviewing the initial setting of the AJ65BT-R2N, turn ON Initialization request signal (RYn4) again to reinitialize the AJ65BT-R2N.

   ☞(5) Initialization request signal (RYn4), Initialization complete signal (RXn4), and Initialization failed signal (RXn5) in this section

3) Error status signal (RX(n+1)A) is turned OFF when reinitialization is completed normally and Initialization complete signal (RXn4) is turned ON.

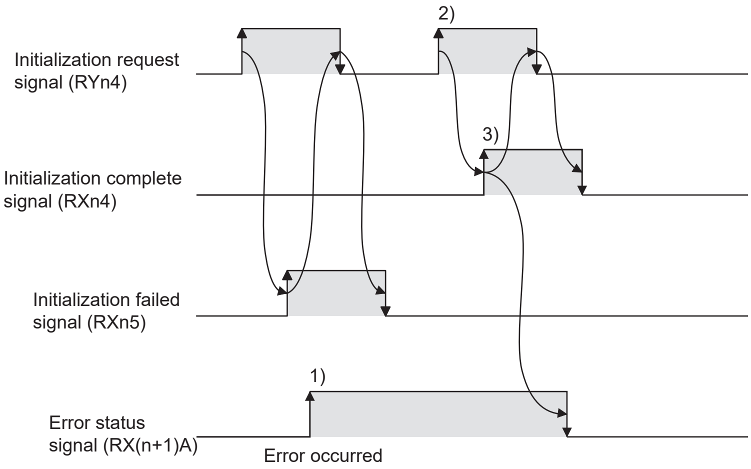


**Figure 3.18 Error reset request signal (RY(n+1)A) and Error status signal (RX(n+1)A) (When Initialization failed signal (RXn5) is ON)**

(16)Remote station ready signal (RX(n+1)B)

Remote station ready signal (RX(n+1)B) is used to check whether the AJ65BT-R2N can operate or not.

☞(14) Initial data read request signal (RY(n+1)9) and Initial data read completion signal (RX(n+1)9) in this section

**Table 3.11 Remote station ready signal**

| Status | Description |
|---|---|
| ON | Status where the AJ65BT-R2N can operate or when Initial data read request signal (RY(n+1)9) is turned OFF. |
| OFF | When the initialization error of the AJ65BT-R2N occurs (setting value error of the buffer memory of the AJ65BT-R2N) or when Initial data read request signal (RY(n+1)9) is turned ON. |

### (17)Intelligent device station access request signal (RY(n+1)E) and Intelligent device station access completion signal (RX(n+1)E)

The signals are used to send contents written to the send buffer of the master station to the AJ65BT-R2N when the FROM/TO instruction is used in the ACPU/QCPU (A mode).

1) The data of send buffer of the master station is sent to the AJ65BT-R2N when turning ON Intelligent device station access request signal (RY(n+1)E) after writing data to send buffer of the master station.
2) If the requested access is completed, Intelligent device station access completion signal (RX(n+1)E) is turned ON.
3) After Intelligent device station access completion signal (RX(n+1)E) is turned ON, turn OFF Intelligent device station access request signal (RY(n+1)E).

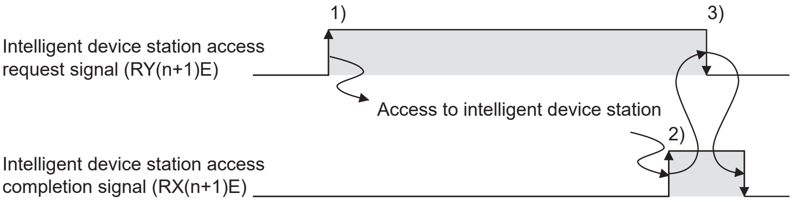


**Figure 3.19 Intelligent device station access request signal (RY(n+1)E) and Intelligent device station access completion signal (RX(n+1)E)**

## 3.7.3 Remote register list

The following describes the remote register list of the AJ65BT-R2N.

**☒Point**

The "m" in device No. of the remote register depends on the number of occupied points of the module mounted on the station whose station No. is smaller than that of the AJ65BT-R2N.

The following shows an example when a local station compatible with Remote net ver.1 mode is mounted on the station whose station No. is smaller than that of the AJ65BT-R2N.
In case of the following example, RWw8 to RWwB are used as the remote register of the AJ65BT-R2N.

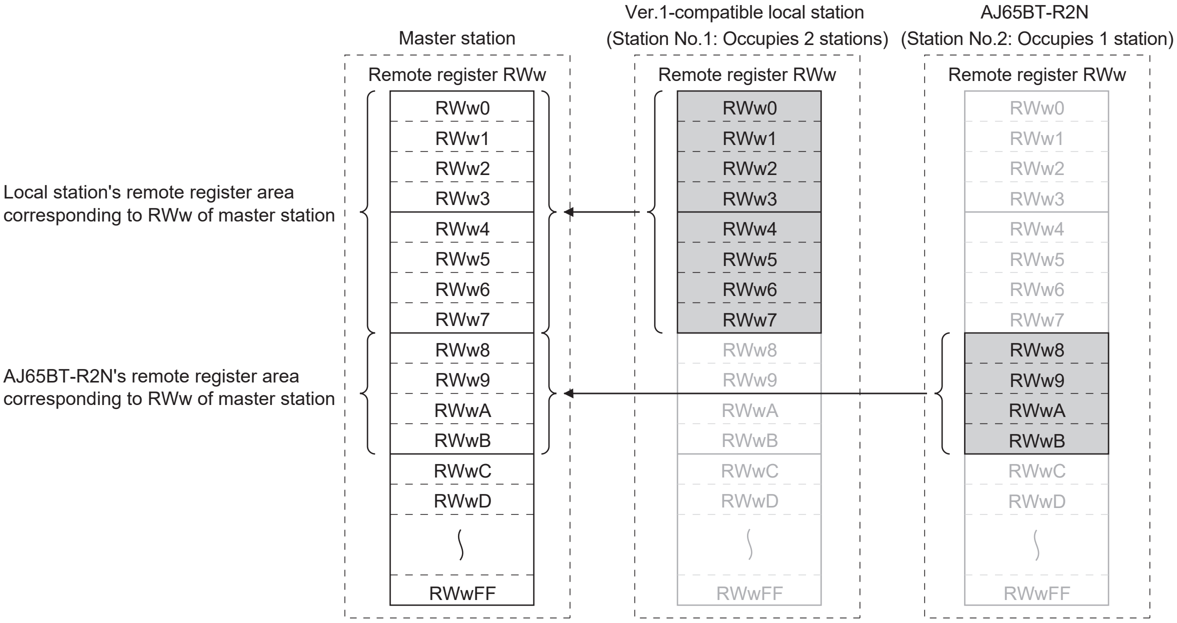


**Figure 3.20 Example of remote register area**

When mounting a slave station compatible with Remote net ver.2 mode or Remote net additional mode on the station whose station No. is smaller than that of the AJ65BT-R2N, refer to the following manual.

☞User's manual for the master module used

### (1) In Nonprocedural protocol mode

**Table 3.12 Remote register list in Nonprocedural protocol mode**

| Device No. | Signal name | Device No. | Signal name |
|---|---|---|---|
| RWrm | General error codes (R2N 1B0$_H$)[*1] | RWwm | Unused[*1] |
| RWr(m+1) | Error codes generated when sending (R2N 1B1$_H$)[*1] | RWw(m+1) | |
| RWr(m+2) | Error codes generated when receiving (R2N 1B2$_H$)[*1] | RWw(m+2) | |
| RWr(m+3) | No. of data stored in OS reception area(R2N 1B6$_H$)[*1] | RWw(m+3) | |

[*1] Contents at the time of default of RW refresh function.
Other buffer memories can be assigned by the setting of RW refresh function.

### (2) In MELSOFT connection mode

**Table 3.13 Remote register list in MELSOFT connection mode**

| Device No. | Signal name | Device No. | Signal name |
|---|---|---|---|
| RWrm | Use prohibited | RWwm | Use prohibited |
| RWr(m+1) | | RWw(m+1) | |
| RWr(m+2) | | RWw(m+2) | |
| RWr(m+3) | | RWw(m+3) | |

## 3.8 Buffer Memory

### 3.8.1 Buffer memory list

The following describes the buffer memory list.
Contents of buffer memory of the AJ65BT-R2N can be returned to default by turning ON power supply of the AJ65BT-R2N again or reset operation.
However, if registering the changed contents of buffer memory of the AJ65BT-R2N to the E$^2$PROM of the AJ65BT-R2N, the initial value of E$^2$PROM will be written when turning ON power supply of the AJ65BT-R2N.
The following shows how buffer memory list is organized.

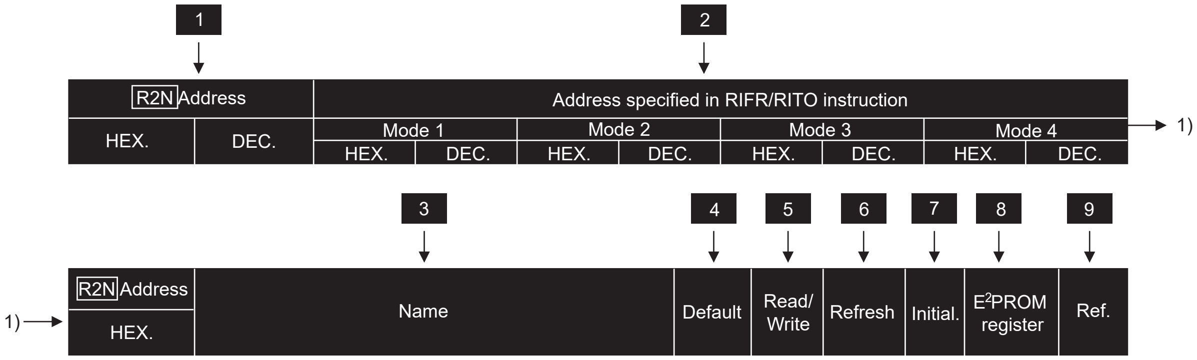


**Figure 3.21 Organization of list**

**Table 3.14 Organization of list**

| No. | Name | Description |
|---|---|---|
| 1 | R2N Address | The address of buffer memory of the AJ65BT-R2N in hexadecimal or decimal. |
| 2 | Address specified by RIFR/ RITO instruction | The address specified by the RIFR/RITO instruction shown per mode.<br>In mode 1, address can be changed by changing the auto-refresh buffer assignment.<br>In modes 2 to 4, the auto-refresh buffer assignment cannot be changed. |
| 3 | Name | The name of buffer memory of the AJ65BT-R2N. |
| 4 | Default | The value at factory default setting of the AJ65BT-R2N. |
| 5 | Read/Write | Applicability of reading/writing.<br>•R: Readable only<br>•W: Writable only<br>•R/W: Readable and writable |
| 6 | Refresh | Shows which of the master station or the AJ65BT-R2N refreshes the buffer memory value of the AJ65BT-R2N.<br>•M: Refresh is performed by the master station<br>•R2N: Refresh is performed by the AJ65BT-R2N<br>•Both: Refresh is performed by the master station and the AJ65BT-R2N |
| 7 | Initial. | Shows whether the initialization is necessary or not when changing the buffer memory value of the AJ65BT-R2N.<br>•Needed: Initialization is necessary<br>•Not needed: Initialization is not necessary |
| 8 | E$^2$PROM register | Shows whether contents of buffer memory of the AJ65BT-R2N can be registered to the E$^2$PROM of the AJ65BT-R2N or not.<br>•Available: Registration to E$^2$PROM is possible<br>•N/A: Registration to E$^2$PROM is not possible |
| 9 | Ref. | Chapter and section of the detailed description. |

(1) Area for various assignments (R2N 0H to FFH)

**Table 3.15 Area for various assignments (R2N 0H to FFH)**

| R2N Address | | Address specified by RIFR/RITO instruction | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| HEX. | DEC. | Mode 1 | | Mode 2 | | Mode 3 | | Mode 4 | |
| | | HEX. | DEC. | HEX. | DEC. | HEX. | DEC. | HEX. | DEC. |
| 0H | 0 | 0H | 0 | 0H | 0 | — | — | — | — |
| 1H | 1 | 1H | 1 | 1H | 1 | — | — | — | — |
| 2H | 2 | 2H | 2 | 2H | 2 | — | — | — | — |
| 3H | 3 | 3H | 3 | 3H | 3 | — | — | — | — |
| 4H to FH | 4 to 15 | 4H | 4 | 4H | 4 | — | — | — | — |
| 10H | 16 | 10H | 16 | 10H | 16 | — | — | — | — |
| 11H | 17 | 11H | 17 | 11H | 17 | — | — | — | — |
| 12H | 18 | 12H | 18 | 12H | 18 | — | — | — | — |
| 13H | 19 | 13H | 19 | 13H | 19 | — | — | — | — |
| 14H | 20 | 14H | 20 | 14H | 20 | — | — | — | — |
| 15H | 21 | 15H | 21 | 15H | 21 | — | — | — | — |
| 16H | 22 | 16H | 22 | 16H | 22 | — | — | — | — |
| 17H | 23 | 17H | 23 | 17H | 23 | — | — | — | — |
| 18H | 24 | 18H | 24 | 18H | 24 | — | — | — | — |
| 19H | 25 | 19H | 25 | 19H | 25 | — | — | — | — |
| 1AH | 26 | 1AH | 26 | 1AH | 26 | — | — | — | — |
| 1BH | 27 | 1BH | 27 | 1BH | 27 | — | — | — | — |
| 1CH | 28 | 1CH | 28 | 1CH | 28 | — | — | — | — |
| 1DH | 29 | 1DH | 29 | 1DH | 29 | — | — | — | — |
| 1EH | 30 | 1EH | 30 | 1EH | 30 | — | — | — | — |
| 1FH | 31 | 1FH | 31 | 1FH | 31 | — | — | — | — |
| 20H | 32 | 20H | 32 | 20H | 32 | — | — | — | — |
| 21H | 33 | 21H | 33 | 21H | 33 | — | — | — | — |
| 22H | 34 | 22H | 34 | 22H | 34 | — | — | — | — |
| 23H | 35 | 23H | 35 | 23H | 35 | — | — | — | — |
| 24H | 36 | 24H | 36 | 24H | 36 | — | — | — | — |
| 25H | 37 | 25H | 37 | 25H | 37 | — | — | — | — |
| 26H | 38 | 26H | 38 | 26H | 38 | — | — | — | — |
| 27H | 39 | 27H | 39 | 27H | 39 | — | — | — | — |
| 28H | 40 | 28H | 40 | 28H | 40 | — | — | — | — |
| 29H | 41 | 29H | 41 | 29H | 41 | — | — | — | — |
| 2AH | 42 | 2AH | 42 | 2AH | 42 | — | — | — | — |
| 2BH | 43 | 2BH | 43 | 2BH | 43 | — | — | — | — |
| 2CH | 44 | 2CH | 44 | 2CH | 44 | — | — | — | — |
| 2DH | 45 | 2DH | 45 | 2DH | 45 | — | — | — | — |
| 2EH | 46 | 2EH | 46 | 2EH | 46 | — | — | — | — |
| 2FH | 47 | 2FH | 47 | 2FH | 47 | — | — | — | — |
| 30H | 48 | 30H | 48 | 30H | 48 | — | — | — | — |
| 31H | 49 | 31H | 49 | 31H | 49 | — | — | — | — |
| 32H | 50 | 32H | 50 | 32H | 50 | — | — | — | — |
| 33H | 51 | 33H | 51 | 33H | 51 | — | — | — | — |
| 34H to 3FH | 52 to 63 | 34H | 52 | 34H | 52 | — | — | — | — |

| R2N Address | Name | | | Default | Read/ Write | Refresh | Initial. | $E^2$PROM register | Ref. |
|---|---|---|---|---|---|---|---|---|---|
| HEX. | | | | | | | | | |
| 0H | Start address specification area | | Send area, start address specification | *1 | R/W | M | Needed | Available | Section 4.2 |
| 1H | | | Send area size specification | | | | | | |
| 2H | | | Receive area, start address specification | | | | | | |
| 3H | | | Receive area size specification | | | | | | |
| 4H to FH | System area | | | — | — | — | — | — | — |
| 10H | Auto-refresh area specification | Status data storage area | Transfer size | *1 | R/W | M | Needed | Available | Section 4.3.1 |
| 11H | | | AJ65BT-R2N side start address | | | | | | |
| 12H | | | Fixed value | | | | | | |
| 13H | | | Master station side offset address | | | | | | |
| 14H | | Send area 1) | Transfer size | | | | | | |
| 15H | | | AJ65BT-R2N side start address | | | | | | |
| 16H | | | Fixed value | | | | | | |
| 17H | | | Master station side offset address | | | | | | |
| 18H | | Send area 2) | Transfer size | | | | | | |
| 19H | | | AJ65BT-R2N side start address | | | | | | |
| 1AH | | | Fixed value | | | | | | |
| 1BH | | | Master station side offset address | | | | | | |
| 1CH | | Receive area | Transfer size | | | | | | |
| 1DH | | | AJ65BT-R2N side start address | | | | | | |
| 1EH | | | Fixed value | | | | | | |
| 1FH | | | Master station side offset address | | | | | | |
| 20H | | Initial setting area | Transfer size | | | | | | |
| 21H | | | AJ65BT-R2N side start address | | | | | | |
| 22H | | | Fixed value | | | | | | |
| 23H | | | Master station side offset address | | | | | | |
| 24H | | $E^2$PROM function area | Transfer size | | | | | | |
| 25H | | | AJ65BT-R2N side start address | | | | | | |
| 26H | | | Fixed value | | | | | | |
| 27H | | | Master station side offset address | | | | | | |
| 28H | | User registration frame area | Transfer size | | | | | | |
| 29H | | | AJ65BT-R2N side start address | | | | | | |
| 2AH | | | Fixed value | | | | | | |
| 2BH | | | Master station side offset address | | | | | | |
| 2CH | | Monitoring-based transmission area 1) | Transfer size | | | | | | |
| 2DH | | | AJ65BT-R2N side start address | | | | | | |
| 2EH | | | Fixed value | | | | | | |
| 2FH | | | Master station side offset address | | | | | | |
| 30H | | Monitoring-based transmission area 2) | Transfer size | | | | | | |
| 31H | | | AJ65BT-R2N side start address | | | | | | |
| 32H | | | Fixed value | | | | | | |
| 33H | | | Master station side offset address | | | | | | |
| 34H to 3FH | System area | | | — | — | — | — | — | — |

(Continued to next page)

Table 3.15 Area for various assignments (R2N $0_H$ to $FF_H$)(Continued)

| R2N Address | | Address specified by RIFR/RITO instruction | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| HEX. | DEC. | Mode 1 | | Mode 2 | | Mode 3 | | Mode 4 | |
| | | HEX. | DEC. | HEX. | DEC. | HEX. | DEC. | HEX. | DEC. |
| $40_H$ | 64 | $40_H$ | 64 | $40_H$ | 64 | — | — | — | — |
| $41_H$ | 65 | $41_H$ | 65 | $41_H$ | 65 | — | — | — | — |
| $42_H$ | 66 | $42_H$ | 66 | $42_H$ | 66 | — | — | — | — |
| $43_H$ | 67 | $43_H$ | 67 | $43_H$ | 67 | — | — | — | — |
| $44_H$ | 68 | $44_H$ | 68 | $44_H$ | 68 | — | — | — | — |
| $45_H$ | 69 | $45_H$ | 69 | $45_H$ | 69 | — | — | — | — |
| $46_H$ | 70 | $46_H$ | 70 | $46_H$ | 70 | — | — | — | — |
| $47_H$ | 71 | $47_H$ | 71 | $47_H$ | 71 | — | — | — | — |
| $48_H$ | 72 | $48_H$ | 72 | $48_H$ | 72 | — | — | — | — |
| $49_H$ | 73 | $49_H$ | 73 | $49_H$ | 73 | — | — | — | — |
| $4A_H$ | 74 | $4A_H$ | 74 | $4A_H$ | 74 | — | — | — | — |
| $4B_H$ to $6F_H$ | 75 to 111 | $4B_H$ | 75 | $4B_H$ | 75 | — | — | — | — |
| $70_H$ | 112 | $70_H$ | 112 | $70_H$ | 112 | — | — | — | — |
| $71_H$ | 113 | $71_H$ | 113 | $71_H$ | 113 | — | — | — | — |
| $72_H$ to $77_H$ | 114 to 119 | $72_H$ | 114 | $72_H$ | 114 | — | — | — | — |
| $78_H$ | 120 | $78_H$ | 120 | $78_H$ | 120 | — | — | — | — |
| $79_H$ | 121 | $79_H$ | 121 | $79_H$ | 121 | — | — | — | — |
| $7A_H$ to $F7_H$ | 122 to 247 | $7A_H$ | 122 | $7A_H$ | 122 | — | — | — | — |
| $F8_H$ to $FF_H$ | 248 to 255 | $F8_H$ | 248 | $F8_H$ | 248 | — | — | — | — |

(From previous page)

| R2N Address | Name | | Default | Read/ Write | Refresh | Initial. | $E^2$PROM register | Ref. |
|---|---|---|---|---|---|---|---|---|
| HEX. | | | | | | | | |
| $40_H$ | RW refresh interval specification | | 1 | R/W | M | Needed | Available | Section 4.5.7 |
| $41_H$ | RWw refresh enable/disable setting | | $0_H$ | | | | | |
| $42_H$ | RWr refresh enable/disable setting | | $1_H$ | | | | | |
| $43_H$ | RW refresh target address specification | Master station → AJ65BT-R2N(RWwm) | $118_H$ | | | | | |
| $44_H$ | | AJ65BT-R2N → Master station (RWrm) | $1B0_H$ | | | | | |
| $45_H$ | | Master station → AJ65BT-R2N(RWw(m+1)) | $119_H$ | | | | | |
| $46_H$ | | AJ65BT-R2N → Master station (RWr(m+1)) | $1B1_H$ | | | | | |
| $47_H$ | | Master station → AJ65BT-R2N(RWw(m+2)) | $120_H$ | | | | | |
| $48_H$ | | AJ65BT-R2N → Master station (RWr(m+2)) | $1B2_H$ | | | | | |
| $49_H$ | | Master station → AJ65BT-R2N(RWw(m+3)) | $121_H$ | | | | | |
| $4A_H$ | | AJ65BT-R2N → Master station (RWr(m+3)) | $1B6_H$ | | | | | |
| $4B_H$ to $6F_H$ | System area | | — | — | — | — | — | — |
| $70_H$ | Monitoring interval specification | | 0 | R/W | M | Needed | Available | Section 4.5.2 |
| $71_H$ | No. of monitoring settings | | 0 | | | | | |
| $72_H$ to $77_H$ | System area | | — | — | — | — | — | — |
| $78_H$ | Monitoring setting - 1 | Monitoring target | $0_H$ | R/W | M | Needed | Available | Section 4.5.2 |
| $79_H$ | | Send data specification | $0_H$ | | | | | |
| $7A_H$ to $F7_H$ | Monitoring setting - 2 to - 64 | Same as Monitoring setting - 1 | $0_H$ | | | | | |
| $F8_H$ to $FF_H$ | System area | | — | — | — | — | — | — |

* 1 Shows the default of Start address specification area and Auto-refresh area specification per mode.
In modes 0 and 1, default can be changed by E$^2$PROMregistration function.
In modes 2 to 4, default cannot be changed.

**Table 3.16 Default of Start address specification area and Auto-refresh area specification per mode**

| R2N Address | | Name | | |
|---|---|---|---|---|
| HEX. | DEC. | | | |
| $0_H$ | 0 | Start address specification area | | Send area, start address specification |
| $1_H$ | 1 | | | Send area size specification |
| $2_H$ | 2 | | | Receive area, start address specification |
| $3_H$ | 3 | | | Receive area size specification |
| $10_H$ | 16 | Auto-refresh area specification | Status data storage area | Transfer size |
| $11_H$ | 17 | | | AJ65BT-R2N side start address |
| $12_H$ | 18 | | | Fixed value |
| $13_H$ | 19 | | | Master station side offset address |
| $14_H$ | 20 | | Send area 1) | Transfer size |
| $15_H$ | 21 | | | AJ65BT-R2N side start address |
| $16_H$ | 22 | | | Fixed value |
| $17_H$ | 23 | | | Master station side offset address |
| $18_H$ | 24 | | Send area 2) | Transfer size |
| $19_H$ | 25 | | | AJ65BT-R2N side start address |
| $1A_H$ | 26 | | | Fixed value |
| $1B_H$ | 27 | | | Master station side offset address |
| $1C_H$ | 28 | | Receive area | Transfer size |
| $1D_H$ | 29 | | | AJ65BT-R2N side start address |
| $1E_H$ | 30 | | | Fixed value |
| $1F_H$ | 31 | | | Master station side offset address |
| $20_H$ | 32 | | Initial setting area | Transfer size |
| $21_H$ | 33 | | | AJ65BT-R2N side start address |
| $22_H$ | 34 | | | Fixed value |
| $23_H$ | 35 | | | Master station side offset address |
| $24_H$ | 36 | | E$^2$PROM function area | Transfer size |
| $25_H$ | 37 | | | AJ65BT-R2N side start address |
| $26_H$ | 38 | | | Fixed value |
| $27_H$ | 39 | | | Master station side offset address |
| $28_H$ | 40 | | User registration frame area | Transfer size |
| $29_H$ | 41 | | | AJ65BT-R2N side start address |
| $2A_H$ | 42 | | | Fixed value |
| $2B_H$ | 43 | | | Master station side offset address |
| $2C_H$ | 44 | | Monitoring-based transmission area 1) | Transfer size |
| $2D_H$ | 45 | | | AJ65BT-R2N side start address |
| $2E_H$ | 46 | | | Fixed value |
| $2F_H$ | 47 | | | Master station side offset address |
| $30_H$ | 48 | | Monitoring-based transmission area 2) | Transfer size |
| $31_H$ | 49 | | | AJ65BT-R2N side start address |
| $32_H$ | 50 | | | Fixed value |
| $33_H$ | 51 | | | Master station side offset address |

| R2N Address HEX. | Mode 0 | Mode 1 | Mode 2 | Mode 3 | Mode 4 |
|---|---|---|---|---|---|
| 0H | 200H | | 200H | | |
| 1H | 200H | | 100H | 80H | 60H |
| 2H | 400H | | 400H | | |
| 3H | 200H | | 100H | 80H | 60H |
| 10H | 20H | | 20H | | |
| 11H | 1A0H | | 1A0H | | |
| 12H | 4004H | | 4004H | | |
| 13H | 1A0H | | 1A0H | A0H | 20H |
| 14H | 88H | | 88H | 88H | 8H |
| 15H | 118H | | 118H | | |
| 16H | 4004H | | 4004H | | |
| 17H | 118H | | 118H | 18H | 18H |
| 18H | 200H | | 100H | 80H | 60H |
| 19H | 200H | | 200H | | |
| 1AH | 4004H | | 4004H | | |
| 1BH | 200H | | 200H | 100H | 40H |
| 1CH | 200H | | 100H | 80H | 60H |
| 1DH | 400H | | 400H | | |
| 1EH | 4004H | | 4004H | | |
| 1FH | 400H | | 300H | 180H | A0H |
| 20H | 1A0H | | 1A0H | A0H | 20H |
| 21H | 0H | | 0H | 100H | 100H |
| 22H | 4004H | | 4004H | | |
| 23H | 0H | | 0H | | |
| 24H | 30H | | 30H | 30H | 0H |
| 25H | 1C0H | | 1C0H | 1C0H | 0H |
| 26H | 4004H | | 4004H | | |
| 27H | 1C0H | | 1C0H | C0H | 0H |
| 28H | 29H | | 29H | 29H | 0H |
| 29H | 1C7H | | 1C7H | 1C7H | 0H |
| 2AH | 4004H | | 4004H | | |
| 2BH | 1C7H | | 1C7H | C7H | 0H |
| 2CH | 88H | | 88H | 88H | 8H |
| 2DH | 118H | | 118H | | |
| 2EH | 4004H | | 4004H | | |
| 2FH | 118H | | 118H | 18H | 18H |
| 30H | 200H | | 100H | 80H | 60H |
| 31H | 200H | | 200H | | |
| 32H | 4004H | | 4004H | | |
| 33H | 200H | | 200H | 100H | 40H |

(2) Area for parameters (R2N 100H to 19FH)

**Table 3.17 Area for parameters (R2N 100H to 19FH)**

| R2N Address | | Address specified by RIFR/RITO instruction | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| HEX. | DEC. | Mode 1 | | Mode 2 | | Mode 3 | | Mode 4 | |
| | | HEX. | DEC. | HEX. | DEC. | HEX. | DEC. | HEX. | DEC. |
| 100H | 256 | 100H | 256 | 100H | 256 | 0H | 0 | 0H | 0 |
| 101H | 257 | 101H | 257 | 101H | 257 | 1H | 1 | 1H | 1 |
| 102H | 258 | 102H | 258 | 102H | 258 | 2H | 2 | 2H | 2 |
| 103H | 259 | 103H | 259 | 103H | 259 | 3H | 3 | 3H | 3 |
| 104H | 260 | 104H | 260 | 104H | 260 | 4H | 4 | 4H | 4 |
| 105H | 261 | 105H | 261 | 105H | 261 | 5H | 5 | 5H | 5 |
| 106H to 107H | 262 to 263 | 106H | 262 | 106H | 262 | 6H | 6 | 6H | 6 |
| 108H | 264 | 108H | 264 | 108H | 264 | 8H | 8 | 8H | 8 |
| 109H | 265 | 109H | 265 | 109H | 265 | 9H | 9 | 9H | 9 |
| 10AH | 266 | 10AH | 266 | 10AH | 266 | AH | 10 | AH | 10 |
| 10BH | 267 | 10BH | 267 | 10BH | 267 | BH | 11 | BH | 11 |
| 10CH | 268 | 10CH | 268 | 10CH | 268 | CH | 12 | CH | 12 |
| 10DH | 269 | 10DH | 269 | 10DH | 269 | DH | 13 | DH | 13 |
| 10EH | 270 | 10EH | 270 | 10EH | 270 | EH | 14 | EH | 14 |
| 10FH | 271 | 10FH | 271 | 10FH | 271 | FH | 15 | FH | 15 |
| 110H | 272 | 110H | 272 | 110H | 272 | 10H | 16 | 10H | 16 |
| 111H | 273 | 111H | 273 | 111H | 273 | 11H | 17 | 11H | 17 |
| 112H | 274 | 112H | 274 | 112H | 274 | 12H | 18 | 12H | 18 |
| 113H to 117H | 275 to 279 | 113H | 275 | 113H | 275 | 13H | 19 | 13H | 19 |
| 118H | 280 | 118H | 280 | 118H | 280 | 18H | 24 | 18H | 24 |
| 119H | 281 | 119H | 281 | 119H | 281 | 19H | 25 | 19H | 25 |
| 11AH | 282 | 11AH | 282 | 11AH | 282 | 1AH | 26 | 1AH | 26 |
| 11BH to 11FH | 283 to 287 | 11BH | 283 | 11BH | 283 | 1BH | 27 | 1BH | 27 |
| 120H | 288 | 120H | 288 | 120H | 288 | 20H | 32 | — | — |
| 121H | 289 | 121H | 289 | 121H | 289 | 21H | 33 | — | — |
| 122H to 185H | 290 to 299 | 122H | 290 | 122H | 290 | 22H | 34 | — | — |
| 186H to 19FH | 390 to 415 | 186H | 390 | 186H | 390 | 86H | 134 | — | — |

| R2N Address HEX. | Name | | | Default | Read/Write | Refresh | Initial. | $E^2$PROM register | Ref. |
|---|---|---|---|---|---|---|---|---|---|
| 100H | Flow control specification | | | 1H | R/W | M | Needed | Available | Section 4.5.5 |
| 101H | RS (RTS) signal status specification | | | 0H | | | | | Section 4.5.10 |
| 102H | Word/byte specification | | | 0H | | | Not needed | | Section 4.2 |
| 103H | ASCII-binary conversion specification | | | 0H | | | Needed | | Section 4.5.6 |
| 104H | System area | | | — | — | — | — | — | — |
| 105H | Transient timeout time specification | | | 0 | R/W | M | Needed | Available | Section 4.3 |
| 106H to 107H | System area | | | — | — | — | — | — | — |
| 108H | Receive start frame No. | 1 | | 0H | R/W | M | Needed | Available | Section 4.5.1 |
| 109H | | 2 | | 0H | | | | | |
| 10AH | | 3 | | 0H | | | | | |
| 10BH | | 4 | | 0H | | | | | |
| 10CH | Receive end frame No. | 1 | | AH | | | | | |
| 10DH | | 2 | | DH | | | | | |
| 10EH | | 3 | | 0H | | | | | |
| 10FH | | 4 | | 0H | | | | | |
| 110H | Receive start/end frame elimination | | | 1H | | | | | |
| 111H | No. of receive end data | | | 0H | | | | | Section 4.2, Section 4.3 |
| 112H | Receive timeout time specification | | | 0 | | | | | |
| 113H to 117H | System area | | | — | — | — | — | — | — |
| 118H | Send-frame-1 area | Send start frame No. | | 0H | R/W | M | Not needed | Available | Section 4.5.1 |
| 119H | | Send end frame No. | | 0H | | | | | |
| 11AH | Send timeout time specification | | | 0 | | | | | Section 4.2, Section 4.3 |
| 11BH to 11FH | System area | | | — | — | — | — | — | — |
| 120H | Send-frame-2 area | Transmission table start No. specification | | 0 | R/W | M | Not needed | Available | Section 4.5.1 |
| 121H | | No. of transmission tables | | 0 | | | | | |
| 122H to 185H | | Transmission table specification | No.1 to No.100 | 0H | | | | | |
| 186H to 19FH | System area | | | — | — | — | — | — | — |

### (3) Setting status storage area (R2N 1A0$_H$ to 1A7$_H$)

**Table 3.18 Setting status storage area (R2N 1A0$_H$ to 1A7$_H$)**

| R2N Address | | Address specified by RIFR/RITO instruction | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| HEX. | DEC. | Mode 1 | | Mode 2 | | Mode 3 | | Mode 4 | |
| | | HEX. | DEC. | HEX. | DEC. | HEX. | DEC. | HEX. | DEC. |
| 1A0$_H$ | 416 | 1A0$_H$ | 416 | 1A0$_H$ | 416 | A0$_H$ | 160 | 20$_H$ | 32 |
| 1A1$_H$ | 417 | 1A1$_H$ | 417 | 1A1$_H$ | 417 | A1$_H$ | 161 | 21$_H$ | 33 |
| 1A2$_H$ | 418 | 1A2$_H$ | 418 | 1A2$_H$ | 418 | A2$_H$ | 162 | 22$_H$ | 34 |
| 1A3$_H$ | 419 | 1A3$_H$ | 419 | 1A3$_H$ | 419 | A3$_H$ | 163 | 23$_H$ | 35 |
| 1A4$_H$ | 420 | 1A4$_H$ | 420 | 1A4$_H$ | 420 | A4$_H$ | 164 | 24$_H$ | 36 |
| 1A5$_H$ | 421 | 1A5$_H$ | 421 | 1A5$_H$ | 421 | A5$_H$ | 165 | 25$_H$ | 37 |
| 1A6$_H$ | 422 | 1A6$_H$ | 422 | 1A6$_H$ | 422 | A6$_H$ | 166 | 26$_H$ | 38 |
| 1A7$_H$ | 423 | 1A7$_H$ | 423 | 1A7$_H$ | 423 | A7$_H$ | 167 | 27$_H$ | 39 |

### (4) Communication status storage area (R2N 1A8$_H$ to 1BF$_H$)

**Table 3.19 Communication status storage area (R2N 1A8$_H$ to 1BF$_H$)**

| R2N Address | | Address specified by RIFR/RITO instruction | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| HEX. | DEC. | Mode 1 | | Mode 2 | | Mode 3 | | Mode 4 | |
| | | HEX. | DEC. | HEX. | DEC. | HEX. | DEC. | HEX. | DEC. |
| 1A8$_H$ to 1AF$_H$ | 424 to 431 | 1A8$_H$ | 424 | 1A8$_H$ | 424 | A8$_H$ | 168 | 28$_H$ | 40 |
| 1B0$_H$ | 432 | 1B0$_H$ | 432 | 1B0$_H$ | 432 | B0$_H$ | 176 | 30$_H$ | 48 |
| 1B1$_H$ | 433 | 1B1$_H$ | 433 | 1B1$_H$ | 433 | B1$_H$ | 177 | 31$_H$ | 49 |
| 1B2$_H$ | 434 | 1B2$_H$ | 434 | 1B2$_H$ | 434 | B2$_H$ | 178 | 32$_H$ | 50 |
| 1B3$_H$ | 435 | 1B3$_H$ | 435 | 1B3$_H$ | 435 | B3$_H$ | 179 | 33$_H$ | 51 |
| 1B4$_H$ | 436 | 1B4$_H$ | 436 | 1B4$_H$ | 436 | B4$_H$ | 180 | 34$_H$ | 52 |
| 1B5$_H$ | 437 | 1B5$_H$ | 437 | 1B5$_H$ | 437 | B5$_H$ | 181 | 35$_H$ | 53 |
| 1B6$_H$ | 438 | 1B6$_H$ | 438 | 1B6$_H$ | 438 | B6$_H$ | 182 | 36$_H$ | 54 |
| 1B7$_H$ to 1BE$_H$ | 439 to 446 | 1B7$_H$ | 439 | 1B7H | 439 | B7$_H$ | 183 | 37$_H$ | 55 |
| 1BF$_H$ | 447 | 1BF$_H$ | 447 | 1BF$_H$ | 447 | BF$_H$ | 191 | 3F$_H$ | 63 |

| | R2N Address | Name | Default | Read/ Write | Refresh | Initial. | E$^2$PROM register | Ref. |
|---|---|---|---|---|---|---|---|---|
| | HEX. | | | | | | | |
| | 1A0$_H$ | Station No. setting switch | $0^{*1}$ | R | R2N | Not needed | N/A | Section 5.4 |
| | 1A1$_H$ | Data link transmission speed setting switch | $156^{*1}$ | | | | | |
| | 1A2$_H$ | Mode setting switch | $0_H{}^{*1}$ | | | | | |
| | 1A3$_H$ | RS-232 transmission speed | $300^{*1}$ | | | | | |
| | 1A4$_H$ | RS-232 data bit length | $8^{*1}$ | | | | | |
| | 1A5$_H$ | RS-232 parity bit | $0^{*1}$ | | | | | |
| | 1A6$_H$ | RS-232 stop bit length | $1^{*1}$ | | | | | |
| | 1A7$_H$ | Buffer memory default setting status storage | 0$_H$ | | | | | Section 4.5.9 |

* 1 The switch setting status at factory default setting.

| | R2N Address | Name | | Default | Read/ Write | Refresh | Initial. | E$^2$PROM register | Ref. |
|---|---|---|---|---|---|---|---|---|---|
| | HEX. | | | | | | | | |
| | 1A8$_H$ to 1AF$_H$ | Error code storage area | Error code history | 0$_H$ | R | R2N | Not needed | N/A | Section 9.2 |
| | 1B0$_H$ | | General error codes | 0$_H$ | | | | | |
| | 1B1$_H$ | | Error codes generated when sending | 0$_H$ | | | | | |
| | 1B2$_H$ | | Error codes generated when receiving | 0$_H$ | | | | | |
| | 1B3$_H$ | System area | | — | — | — | — | — | — |
| | 1B4$_H$ | No. of actual send data | | 0$_H$ | R | R2N | Not needed | N/A | Section 4.2, Section 4.3 |
| | 1B5$_H$ | Receive frame index No. storage | | 0$_H$ | | | | | Section 4.5.1 |
| | 1B6$_H$ | No. of data stored in OS reception area | | 0$_H$ | | | | | Section 4.2, Section 4.3 |
| | 1B7$_H$ to 1BE$_H$ | System area | | — | — | — | — | — | — |
| | 1BF$_H$ | Software version storage | | *1 | R | R2N | Not needed | N/A | — |

* 1 Varies depending on software version.

### (5) $E^2$PROMarea (R2N 1C0H to 1FFH)

**Table 3.20 $E^2$PROM area (R2N 1C0H to 1FFH)**

| R2N Address | | Address specified by RIFR/RITO instruction | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| HEX. | DEC. | Mode 1 | | Mode 2 | | Mode 3 | | Mode 4 | |
| | | HEX. | DEC. | HEX. | DEC. | HEX. | DEC. | HEX. | DEC. |
| 1C0H | 448 | 1C0H | 448 | 1C0H | 448 | C0H | 192 | — | — |
| 1C1H | 449 | 1C1H | 449 | 1C1H | 449 | C1H | 193 | — | — |
| 1C2H to 1C6H | 450 to 454 | 1C2H | 450 | 1C2H | 450 | C2H | 194 | — | — |
| 1C7H | 455 | 1C7H | 455 | 1C7H | 455 | C7H | 199 | — | — |
| 1C8H to 1EFH | 456 to 495 | 1C8H | 456 | 1C8H | 456 | C8H | 200 | — | — |
| 1F0H to 1FFH | 496 to 511 | 1F0H | 496 | 1F0H | 496 | F0H | 240 | — | — |

### (6) User-defined area (R2N 200H to F1FH)

**Table 3.21 User-defined area (R2N 200H to F1FH)**

| R2N Address | | Address specified by RIFR/RITO instruction | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| HEX. | DEC. | Mode 1 | | Mode 2 | | Mode 3 | | Mode 4 | |
| | | HEX. | DEC. | HEX. | DEC. | HEX. | DEC. | HEX. | DEC. |
| 200H | 512 | 200H | 512 | 200H | 512 | 100H | 256 | 40H | 64 |
| 201H to 3FFH | 513 to 1023 | 201H to 3FFH | 513 to 1023 | 201H to 2FFH | 513 to 767 | 101H to 17FH | 257 | 41H to 9FH | 65 to 159 |
| 400H | 1024 | 400H | 1024 | 300H | 768 | 180H | 384 | A0H | 160 |
| 401H to 5FFH | 1025 to 1535 | 401H to 5FFH | 1025 to 1535 | 301H to 3FFH | 769 to 1023 | 181H to 1FFH | 385 to 511 | A1H to FFH | 161 to 255 |
| 600H to 7FFH | 1536 to 2047 | — | — | — | — | — | — | — | — |
| 800H to F1FH | 2048 to 3871 | — | — | — | — | — | — | — | — |

| R2N Address<br>HEX. | Name | Default | Read/ Write | Refresh | Initial. | $E^2$PROM register | Ref. |
|---|---|---|---|---|---|---|---|
| 1C0$_H$ | $E^2$PROM function specification | 0$_H$ | R/W | M | Not needed | N/A | Section 4.5.1, Section 4.5.9 |
| 1C1$_H$ | User registration frame No. | 0$_H$ | | | | | Section 4.5.1 |
| 1C2$_H$ to 1C6$_H$ | System area | — | — | — | — | — | — |
| 1C7$_H$ | No. of user registration frame bytes | 0$_H$ | R/W | Both | Not needed | N/A | Section 4.5.1 |
| 1C8$_H$ to 1EF$_H$ | User registration frame | 0$_H$ | | | | | |
| 1F0$_H$ to 1FF$_H$ | System area | — | — | — | — | — | — |

| R2N Address<br>HEX. | Name | Default | Read/ Write | Refresh | Initial. | $E^2$PROM register | Ref. |
|---|---|---|---|---|---|---|---|
| 200$_H$ | Send data size specification area (at default) | 0$_H$ | R/W | M | Not needed | N/A | — |
| 201$_H$ to 3FF$_H$ | Send data area (at default) | 0$_H$ | | | | | |
| 400$_H$ | Receive data size specification area (at default) | 0$_H$ | | R2N | Not needed | N/A | — |
| 401$_H$ to 5FF$_H$ | Receive data area (at default) | 0$_H$ | | | | | |
| 600$_H$ to 7FF$_H$ | Unused area (at default) | 0$_H$ | | *1 | Not needed | N/A | — |
| 800$_H$ to F1F$_H$ | System area | — | — | — | — | — | — |

* 1 The send area is refreshed by the M station, and the receive area is refreshed by the R2N, respectively.

## 3.9 Processing Time

### 3.9.1 Transmission delay time

The following shows the transmission delay time.

(1) Calculation formula

**Table 3.22 Calculation formula of transmission delay time**

| Description | Calculation formula (Unit: ms) | |
|---|---|---|
| | Master station: MELSEC iQ-R/Q/L series | Master station: QnA/A series |
| Master station (RX/RWr) ← AJ65BT-R2N (RX/RWr) | SM＋LS×3＋RS | SM＋LS×3＋RS |
| Master station (RY/RWw) → AJ65BT-R2N (RY/RWw) | SM＋LS×2＋RS | |
| Master station (RX) → General-purpose input (RXnC, RXnD) | SM＋LS×3＋10 | |
| Master station (RY)→ General-purpose output (RYnC, RYnD) | SM＋LS×3＋2 | |

SM: Master station sequence program scan time

LS: Link scan time

(For details, refer to the manual for the master module.)

RS: Internal processing time in the AJ65BT-R2N[*1]

[*1] The internal processing time in the AJ65BT-R2N (RS) is calculated by the following formula.
RS＝LS×K (Constant)

**Table 3.23 Constant corresponding to transmission speed**

| Transmission speed | 156kbps | 625kbps | 2.5Mbps | 5Mbps | 10Mbps |
|---|---|---|---|---|---|
| K (Constant) | 2 | 2 | 4 | 8 | 32 |

(2) Calculation example

The following shows a calculation example of transmission delay time from the master station (RY/RWw) to the AJ65BT-R2N (RY/RWw).

(Example) An example for connecting the AJ65BT-R2N in the following conditions is shown below.

- SM: 20ms
- Transmission speed: 156kbps
- AJ65BT-R2N: Only one

(a) When master station is MELSEC iQ-R/Q/L series

$$\begin{aligned}\text{LS} &= 51.2 \times \{27 + (8 \times 4.8) + (8 \times 9.6) + (1 \times 30) + (1 \times 4.8) + (1 \times 9.6)\}\\ &\quad + 1300 + 0 + 0\\ &\fallingdotseq 10854[\mu\text{s}]\ (10.90[\text{ms}])\end{aligned}$$

$$\begin{aligned}\text{Transmission delay time} &= \text{SM} + \text{LS} \times 2 + \text{RS}\\ &= 20 + 10.9 \times 2 + 10.9 \times 2\\ &\fallingdotseq 63.60[\text{ms}]\end{aligned}$$

(b) When master station is QnA/A series

$$\begin{aligned}\text{LS} &= 51.2 \times \{29.4 + (8 \times 4.8) + (8 \times 9.6) + (1 \times 32.4) + (1 \times 4.8) + (1 \times 9.6)\}\\ &\quad + 1300\\ &\fallingdotseq 11100[\mu\text{s}]\ (11.10[\text{ms}])\end{aligned}$$

$$\begin{aligned}\text{Transmission delay time} &= \text{SM} + \text{LS} \times 3 + \text{RS}\\ &= 20 + 11.1 \times 3 + 11.1 \times 2\\ &= 75.50[\text{ms}]\end{aligned}$$

## 3.9.2 Transmission time

The following shows the transmission time.

### (1) When buffer memory auto-refresh function is used

The following shows the transmission time when using the buffer memory auto-refresh function.

The send time is time required for the AJ65BT-R2N from turning ON Send request signal (RYn0) to turning ON Send complete signal (RXn0).
The receive time is time required for the AJ65BT-R2N from starting data reception to turning ON Normal receive data read request signal (RXn2) or Error receive data read request signal (RXn3).

(a) Calculation formula

**Table 3.24 Calculation formula when using the buffer memory auto-refresh function**

| Description | | Calculation formula (Unit: ms) |
|---|---|---|
| Master station: MELSEC iQ-R/Q/L series | Send time | SM × 2 ＋ LS × 4 ＋ RS ＋ Data send time[*1]<br>＋ Request/response scan of the area to be refreshed at sending data[*2] |
| | Receive time | SM ＋ LS × 2 ＋ RS ＋ Data receive time[*1]<br>＋ Request/response scan of the area to be refreshed at receiving data[*2] |
| Master station: QnA/A series | Send time | SM × 2 ＋ LS × 6 ＋ RS ＋ Data send time[*1]<br>＋ Request/response scan of the area to be refreshed at sending data[*2] |
| | Receive time | SM ＋ LS × 3 ＋ RS ＋ Data receive time[*1]<br>＋ Request/response scan of the area to be refreshed at receiving data[*2] |

SM: Master station sequence program scan time
LS: Link scan time
(For details, refer to the manual for the master module.)
RS: Internal processing time in the AJ65BT-R2N
(☞Section 3.9.1 (1) Calculation formula)

* 1 Data send (receive) time
It depends on No. of data, RS-232 transmission speed etc.

(Example) An example for calculating the send time in the following conditions is shown below.

•No. of data : 200 bytes
•Transmission speed : 9600bps
•Data bit length : 8
•Stop bit length : 1
•Parity bit : Even

Send time ＝ No. of data bytes × (Data bit length ＋ Stop bit length ＋ Parity bit length ＋ 1)
＝ 200 × 10 ÷ 9600
≒ 0.208[s](208.0[ms])

* 2 Request/response scan of area to be refreshed at sending (receiving) data
Request/response scan of each area to be refreshed automatically at the time of sending (receiving) data.
Status data storage area and Send areas 1) and 2) are refreshed at default of sending data, and Status data storage area and Receive area are refreshed at default of receiving data.

- Request/response scan of area where data from the master station is written to the AJ65BT-R2N

(No. of data to be auto-refreshed $+$ 16) $\div$ 72 $\times$ LS [ms] (Fractional part rounded up)

- Request/response scan of area where data from the AJ65BT-R2N is written to the master station

(No. of data to be auto-refreshed $+$ 16) $\div$ 16 $\times$ LS [ms] (Fractional part rounded up)

(b) Calculation example

1) Send time

The following shows a calculation example of send time when sending data of 10 words (20 bytes).

**Table 3.25 Setting example**

| Item | Description |
|---|---|
| Transfer size of each area | Default |
| Transmission speed | 156kbps |
| No. of modules connected | Only one AJ65BT-R2N |
| Master station sequence program scan time | 20ms |
| Transmission speed | 9600bps |
| Data bit length | 8 |
| Stop bit length | 1 |
| Parity bit | Even |

- When master station is MELSEC iQ-R/Q/L series

$$\begin{aligned} \text{LS} &= 51.2 \times \{27 + (8 \times 4.8) + (8 \times 9.6) + (1 \times 30) + (1 \times 4.8) + (1 \times 9.6)\} \\ &\quad + 1300 + 0 + 0 \\ &\fallingdotseq 10854[\mu s]\ (10.90[ms]) \end{aligned}$$

$$\begin{aligned} \text{Data send time} &= 20 \times 10 \div 9600 \\ &\fallingdotseq 0.0208[s]\ (20.80[ms]) \end{aligned}$$

$$\begin{aligned} \text{Send time} &= 20 \times 2 + 10.9 \times 4 + (10.9 \times 2)^{*1} + 20.8^{*2} + \{(136 + 16) \div 72 \times 10.9\}^{*3} \\ &\quad + \{(512 + 16) \div 72 \times 10.9\}^{*4} + \{(32 + 16) \div 16 \times 10.9\}^{*5} \\ &= 126.2 + 3 \times 10.9 + 8 \times 10.9 + 3 \times 10.9 \\ &= 278.8[ms] \end{aligned}$$

- When master station is QnA/A series

$$
\begin{aligned}
\text{LS} &= 51.2 \times \{29.4 + (8 \times 4.8) + (8 \times 9.6) + (1 \times 32.4) + (1 \times 4.8) + (1 \times 9.6)\} \\
&\quad + 1300 \\
&\fallingdotseq 11100[\mu\text{s}]\ (11.10[\text{ms}])
\end{aligned}
$$

$$
\begin{aligned}
\text{Data send time} &= 20 \times 10 \div 9600 \\
&\fallingdotseq 0.0208[\text{s}]\ (20.80[\text{ms}])
\end{aligned}
$$

$$
\begin{aligned}
\text{Send time} &= 20 \times 2 + 11.1 \times 6 + (11.1 \times 2)^{*1} + 20.8^{*2} + \{(136 + 16) \div 72 \times 11.1\}^{*3} \\
&\quad + \{(512 + 16) \div 72 \times 11.1\}^{*4} + \{(32 + 16) \div 16 \times 11.1\}^{*5} \\
&= 149.6 + 3 \times 11.1 + 8 \times 11.1 + 3 \times 11.1 \\
&= 305.0[\text{ms}]
\end{aligned}
$$

* 1 RS (Internal processing time in the AJ65BT-R2N)
* 2 Data send time
* 3 Request/response scan of Send area 1) (88H (size of 136 words))
* 4 Request/response scan of Send area 2) (200H (size of 512 words))
* 5 Request/response scan of Status data storage area (20H (size of 32 words))

2) Receive time

The following shows a calculation example of receive time when receiving data of 10 words (20 bytes).

**Table 3.26 Setting example**

| Item | Description |
|---|---|
| Transfer size of each area | Default |
| Transmission speed | 156kbps |
| No. of modules connected | Only one AJ65BT-R2N |
| Master station sequence program scan time | 20ms |
| Transmission speed | 9600bps |
| Data bit length | 8 |
| Stop bit length | 1 |
| Parity bit | Even |

- When master station is MELSEC iQ-R/Q/L series

$$\begin{aligned} \text{LS} &= 51.2 \times \{27 + (8 \times 4.8) + (8 \times 9.6) + (1 \times 30) + (1 \times 4.8) + (1 \times 9.6)\} \\ &\quad + 1300 + 0 + 0 \\ &\fallingdotseq 10854[\mu s]\ (10.90[ms]) \end{aligned}$$

$$\begin{aligned} \text{Data receive time} &= 20 \times 10 \div 9600 \\ &\fallingdotseq 0.0208[s]\ (20.80[ms]) \end{aligned}$$

$$\begin{aligned} \text{Receive time} &= 20 + 10.9 \times 2 + (10.9 \times 2)^{*1} + 20.8^{*2} + \{(32 + 16) \div 16 \times 10.9\}^{*3} \\ &\quad + \{(512 + 16) \div 16 \times 10.9\}^{*4} \\ &= 84.4 + 3 \times 10.9 + 33 \times 10.9 \\ &= 476.8[ms] \end{aligned}$$

- When master station is QnA/A series

$$\begin{aligned} \text{LS} &= 51.2 \times \{29.4 + (8 \times 4.8) + (8 \times 9.6) + (1 \times 32.4) + (1 \times 4.8) + (1 \times 9.6)\} \\ &\quad + 1300 \\ &\fallingdotseq 11100[\mu s]\ (11.10[ms]) \end{aligned}$$

$$\begin{aligned} \text{Data receive time} &= 20 \times 10 \div 9600 \\ &\fallingdotseq 0.0208[s]\ (20.80[ms]) \end{aligned}$$

$$\begin{aligned} \text{Receive time} &= 20 + 11.1 \times 3 + (11.1 \times 2)^{*1} + 20.8^{*2} + \{(32 + 16) \div 16 \times 11.1\}^{*3} \\ &\quad + \{(512 + 16) \div 16 \times 11.1\}^{*4} \\ &= 96.3 + 3 \times 11.1 + 33 \times 11.1 \\ &= 495.9[ms] \end{aligned}$$

* 1 RS (Internal processing time in the AJ65BT-R2N)
* 2 Data receive time
* 3 Request/response scan of Status data storage area (20H (size of 32 words))
* 4 Request/response scan of Receive area (200H (size of 512 words))

### (2) When send/receive buffer communication function is used

The following shows transmission time when using the send/receive buffer communication function.

The send time is time required for the AJ65BT-R2N from turning ON Send request signal (RYn0) to turning ON Send complete signal (RXn0).
The receive time is time required for the AJ65BT-R2N from starting data reception to turning ON Normal receive data read request signal (RXn2) or Error receive data read request signal (RXn3).

#### (a) Calculation formula

**Table 3.27 Calculation formula when using send/receive buffer communication function**

| Description | | Calculation formula (Unit: ms) |
|---|---|---|
| Master station: MELSEC iQ-R/Q/L series | Send time | SM×2＋LS×4＋RS＋Data send time*1<br>＋Transient transmission time*2 |
| | Receive time | SM＋LS×2＋RS＋Data receive time*1<br>＋Transient transmission time*2 |
| Master station: QnA/A series | Send time | SM×2＋LS×6＋RS＋Data send time*1<br>＋Transient transmission time*2 |
| | Receive time | SM＋LS×3＋RS＋Data receive time*1<br>＋Transient transmission time*2 |

SM: Master station sequence program scan time
LS: Link scan time
(For details, refer to the manual for the master module.)
RS: Internal processing time in the AJ65BT-R2N
(☞ Section 3.9.1 (1) Calculation formula)

* 1 Data send (receive) time
It depends on No. of data, RS-232 transmission speed etc.

(Example) An example for calculating the send time in the following conditions is shown below.

- No. of data :200 bytes
- Transmission speed :9600bps
- Data bit length :8
- Stop bit length :1
- Parity bit :Even

Send time ＝No. of data bytes×(Data bit length＋Stop bit length＋Parity bit length＋1)
＝200×10÷9600
≒0.208[s](208.0[ms])

* 2 Transient transmission time
Time for writing data from the master station to the AJ65BT-R2N at sending data.
Time for reading data from the AJ65BT-R2N to the master station at receiving data.
For details of calculation formula, refer to the manual for each master module.

(b) Calculation example

1) Send time

The following shows a calculation example of send time when sending data of 10 words (20 bytes).

**Table 3.28 Setting example**

| Item | Description |
|---|---|
| Transmission speed | 156kbps |
| No. of modules connected | Only one AJ65BT-R2N |
| Master station sequence program scan time | 20ms |
| Transmission speed | 9600bps |
| Data bit length | 8 |
| Stop bit length | 1 |
| Parity bit | Even |

- When master station is MELSEC iQ-R/Q/L series

$$\begin{aligned} \text{LS} &= 51.2\times\{27+(8\times4.8)+(8\times9.6)+(1\times30)+(1\times4.8)+(1\times9.6)\} \\ &\quad +1300+0+0 \\ &\fallingdotseq 10854[\mu s]\ (10.90[ms]) \end{aligned}$$

$$\begin{aligned} \text{Data send time} &= 20\times10\div9600 \\ &\fallingdotseq 0.0208[s]\ (20.80[ms]) \end{aligned}$$

$$\begin{aligned} \text{Send time} &= 20\times2+10.9\times4+(10.9\times2)^{*1}+20.8^{*2}+1+10.9 \\ &\quad \times[6+\{(11+16)\div72\}\times1.13]^{*3} \\ &= 126.2+78.717 \\ &= 204.917 \\ &\fallingdotseq 205.0[ms] \end{aligned}$$

- When master station is QnA/A series

$$\begin{aligned} \text{LS} &= 51.2\times\{29.4+(8\times4.8)+(8\times9.6)+(1\times32.4)+(1\times4.8)+(1\times9.6)\} \\ &\quad +1300 \\ &\fallingdotseq 11100[\mu s]\ (11.10[ms]) \end{aligned}$$

$$\begin{aligned} \text{Data send time} &= 20\times10\div9600 \\ &\fallingdotseq 0.0208[s]\ (20.80[ms]) \end{aligned}$$

$$\begin{aligned} \text{Send time} &= 20\times2+11.1\times6+(11.1\times2)^{*1}+20.8^{*2}+\{20+11.1+(11+16)\div72 \\ &\quad \times11.1+11.1+20+11.1\times2+11.1+11.1+11.1\}\times1^{*3} \\ &= 149.6+(20+11.1+11.1+11.1+20+22.2+11.1+11.1+11.1) \\ &= 149.6+128.8 \\ &= 278.4[ms] \end{aligned}$$

* 1 RS (Internal processing time in the AJ65BT-R2N)

* 2 Data send time

* 3 Transient transmission time (size of 10 words + 1 word (No. of send data))

2) Receive time
The following shows a calculation example of receive time when receiving data of 10 words (20 bytes).

**Table 3.29 Setting example**

| Item | Description |
|---|---|
| Transmission speed | 156kbps |
| No. of modules connected | Only one AJ65BT-R2N |
| Master station sequence program scan time | 20ms |
| Transmission speed | 9600bps |
| Data bit length | 8 |
| Stop bit length | 1 |
| Parity bit | Even |

- When master station is MELSEC iQ-R/Q/L series

$$\begin{aligned}
\text{LS} &= 51.2\times\{27+(8\times4.8)+(8\times9.6)+(1\times30)+(1\times4.8)+(1\times9.6)\}\\
&\quad+1300+0+0\\
&\fallingdotseq 10854[\mu s]\ (10.90[ms])
\end{aligned}$$

$$\begin{aligned}
\text{Data receive time} &= 20\times10\div9600\\
&\fallingdotseq 0.0208[s]\ (20.80[ms])
\end{aligned}$$

$$\begin{aligned}
\text{Receive time} &= 20+10.9\times2+(10.9\times2)^{*1}+20.8^{*2}+1+10.9\\
&\quad\times[6+\{(10+16)\div16\}\times1.067]^{*3}\\
&= 84.4+89.6606\\
&= 174.0606\\
&\fallingdotseq 174.1[ms]
\end{aligned}$$

- When master station is QnA/A series

$$\begin{aligned}
\text{LS} &= 51.2\times\{29.4+(8\times4.8)+(8\times9.6)+(1\times32.4)+(1\times4.8)+(1\times9.6)\}\\
&\quad+1300\\
&\fallingdotseq 11100[\mu s]\ (11.10[ms])
\end{aligned}$$

$$\begin{aligned}
\text{Data receive time} &= 20\times10\div9600\\
&\fallingdotseq 0.0208[s]\ (20.80[ms])
\end{aligned}$$

$$\begin{aligned}
\text{Receive time} &= 20+11.1\times3+(11.1\times2)^{*1}+20.8^{*2}+\{20+11.1+11.1+11.1+20\\
&\quad+11.1\times2+(10+16)\div16\times11.1+11.1+11.1\}\times1^{*3}\\
&= 96.3+(20+11.1+11.1+11.1+20+22.2+22.2+11.1+11.1)\\
&= 96.3+139.9\\
&= 236.2[ms]
\end{aligned}$$

* 1 RS (Internal processing time in the AJ65BT-R2N)
* 2 Data receive time
* 3 Transient transmission time (size of 10 words)

# CHAPTER 4 FUNCTIONS

## 4.1 Selecting Mode and Function(s)

The modes of the AJ65BT-R2N are shown below.
Select a mode that is suitable for the intended use.

(1) Communication with nonprocedural protocol

Use the Nonprocedural protocol mode for exchanging data by nonprocedural protocol through an RS-232 cable connected between the AJ65BT-R2N and external device.
For selection of functions used in Nonprocedural protocol mode, refer to the following.
☞ Section 4.1.1 Function selection in Nonprocedural protocol mode

(2) Connection with the engineering tool

Use the MELSOFT connection function when accessing a programmable controller CPU via the AJ65BT-R2N from a personal computer where the engineering tool is installed.
For the MELSOFT connection function, refer to the following.
☞ CC-Link System RS-232 Interface Module User's Manual (MELSOFT Connection Mode)

(3) Hardware test

Perform the hardware test when checking whether a single unit of the AJ65BT-R2N operates normally or not.
For the hardware test, refer to the following.
☞ Section 5.5.1 Hardware test

### 4.1.1 Function selection in Nonprocedural protocol mode

(1) Selecting the send/receive buffer communication function or the buffer memory auto-refresh function

The table below shows comparisons between the send/receive buffer communication function and the buffer memory auto-refresh function.
Select the function that is suitable for your system.

**Table 4.1 Function comparisons**

| No. | Item | | Description | |
|---|---|---|---|---|
| | | | Send/receive buffer communication function | Buffer memory auto-refresh function |
| 1 | No. of modules connected | 16 or less | Setting for auto-refresh buffer assignments is not required. | Mode setting is required depending on No. of modules connected. |
| | | 17 or more | | Setting for auto-refresh buffer assignments is required. |
| 2 | Processing speed | | Faster than that of the buffer memory auto-refresh function because the send/receive data size can be specified. | Slower than that of the send/receive buffer communication function because all of data are sent/received at a time. |
| 3 | Send/receive data size | | Regardless of the No. of modules connected, data of the specified size can be sent/received. | As the No. of modules increases, the send/receive data size decreases. |
| 4 | Send/receive program | Dedicated instruction | More than one dedicated instruction cannot be executed to the same station during the same scan.<br>Processing for waiting for completion of the previous instruction execution is required. | More than one dedicated instruction cannot be executed to the same station during the same scan. |
| | | FROM/TO instruction | Program is complicated. | Program is simple. |

**Remark**

When accessing the buffer memory of the AJ65BT-R2N, use of a dedicated instruction simplifies the AJ65BT-R2N address specification.
Use of the FROM/TO instruction makes address specification complicated since other connected stations need to be considered.

(2) Selecting other function(s)

Refer to the following for functions other than the send/receive buffer communication function and the buffer memory auto-refresh function, and select desired function(s).

(a) Function used when initializing the AJ65BT-R2N

**Table 4.2 Function selection**

| Function name | Description |
|---|---|
| AJ65BT-R2N initialization function | Initializes the AJ65BT-R2N and enables the settings written to the buffer memory. |

(b) Functions used for data communication

**Table 4.3 Function selection**

| Function name | Description |
|---|---|
| Frame function | •Adds an arbitrary frame to the start and/or end of send data.<br>•Sends up to 100 frames.<br>•Distinguishes an arbitrary frame which is added to the beginning of receive data.<br>•Distinguishes characters other than CR or LF at the end of receive data. |
| Monitoring-based transmission function | •Sends data to the external device, depending on the status change of master station's remote input (RX), remote output (RY) or remote register (RW), CC-Link or programmable controller CPU. |
| Send cancel function | •Cancels transmission to the external device. |
| Forced receive completion function | •Terminates reception of data that are being received from the external device, and reads the received data. |
| Flow control function | •Notifies whether data reception is available or not, with the DTR/DSR (ER/DR) signal control or the DC code control. |
| ASCII-binary conversion function | •Converts binary data to ASCII data before transmission.<br>•Converts received ASCII data to binary data. |
| RW refresh function | •Automatically refreshes remote registers (RWr) of the master station with buffer memory data of the AJ65BT-R2N.<br>•Refreshes remote registers (RWr) of the master station with information other than error codes of the AJ65BT-R2N.<br>•Automatically refreshes the AJ65BT-R2N buffer memory with data in remote registers (RWw) of the master station. |
| OS reception area clear function | •Clears the OS reception area data. |
| E$^2$PROM function | •Allows registration of set values in the buffer memory to the E$^2$PROM to use them as initial values at startup. |
| RS-232 signal control function | •Checks RS-232 input signals.<br>•Changes the ON/OFF status of the RS-232 output signal. |

## 4.2 Send/Receive Buffer Communication Function

By using this function, only the necessary data of the specified size can be sent/received at any given timing.
This can improve the transmission line efficiency (link scan time) because unnecessary data will not be transferred.

### (1) Overview of send/receive processing

(a) When using dedicated instructions
The RIWT and RIRD instructions are used for transmission and reception accordingly.

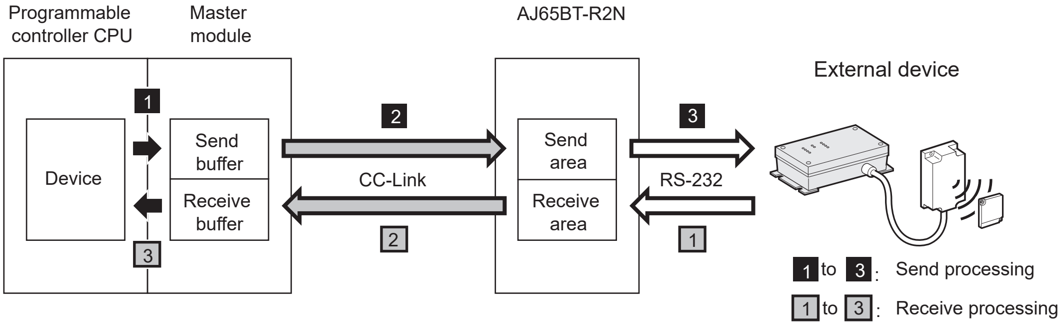


**Figure 4.1 Overview of send/receive processing**

- Send processing

**Table 4.4 Overview of send processing**

| No. | Processing |
|---|---|
| 1, 2 | With the RIWT instruction, the send data are written from the programmable controller CPU devices to the send area of the AJ65BT-R2N. |
| 3 | Send request signal (RYn0) is turned ON to send the send data from the send area of the AJ65BT-R2N to the external device. |

- Receive processing

**Table 4.5 Overview of receive processing**

| No. | Processing |
|---|---|
| 1 | When the AJ65BT-R2N normally completes data reception from the external device, Normal receive data read request signal (RXn2) turns ON.[1] |
| 2, 3 | With the RIRD instruction, the receive data are read from the receive area of the AJ65BT-R2N to the programmable controller CPU devices. |

[1] If the reception fails, Error receive data read request signal (RXn3) turns ON.

**Remark**

The RISEND and RIRCV instructions can be also used for the communication.
For a sample program using the RISEND and RIRCV instructions, refer to the following.
☞ Section 6.9.2 Program example for sending/receiving data with GP.RISEND/GP.RIRCV instruction

(b) When using the FROM/TO instruction in ACPU/QCPU (A mode)

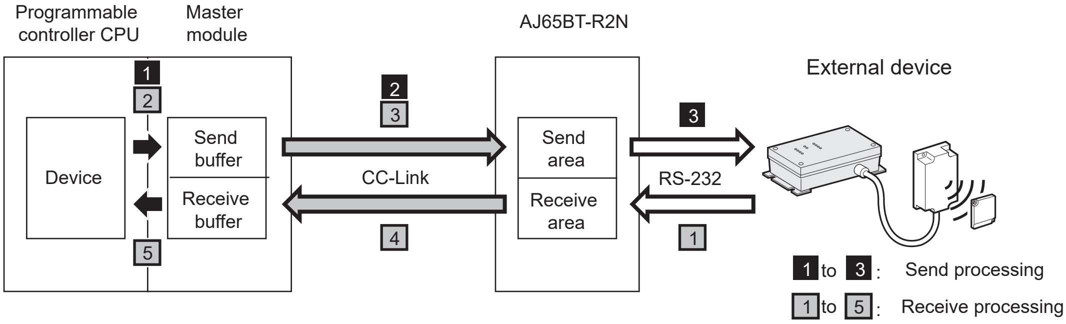


**Figure 4.2 Overview of send/receive processing**

- Send processing

**Table 4.6 Overview of send processing**

| No. | Processing |
|---|---|
| 1 | With the TO instruction, control data and send data are written from the programmable controller CPU devices to the send buffer of the master module. |
| 2 | Intelligent device station access request signal (RY(n+1)E) is turned on to write the control data and send data from the send buffer of the master module to the send area of the AJ65BT-R2N. |
| 3 | Send request signal (RYn0) is turned ON to send the send data from the send area of the AJ65BT-R2N to the external device. |

- Receive processing

**Table 4.7 Overview of receive processing**

| No. | Processing |
|---|---|
| 1 | When the AJ65BT-R2N normally completes data reception from the external device, Normal receive data read request signal (RXn2) turns ON.[*1] |
| 2 | With the TO instruction, control data that specifies receive data to be read are written to the send buffer of the master module. |
| 3 | Intelligent device station access request signal (RY(n+1)E) is turned ON to write the control data from the send buffer of the master module to the send area of the AJ65BT-R2N. |
| 4 | The receive data are read from the receive area of the AJ65BT-R2N to the receive buffer of the master module. |
| 5 | With the FROM instruction, the receive data are read from the receive buffer of the master module to the programmable controller CPU devices. |

* 1 If the reception fails, Error receive data read request signal (RXn3) turns ON.

### (2) Initial setting

Configure the following settings.

- Mode of AJ65BT-R2N
- Network parameters of AJ65BT-R2N
- Initial setting for the send/receive buffer communication function

(a) Mode setting of the AJ65BT-R2N

Set the Mode setting switch of the AJ65BT-R2N to 0 (Send/receive buffer communication function).

For the Mode setting switch, refer to the following.

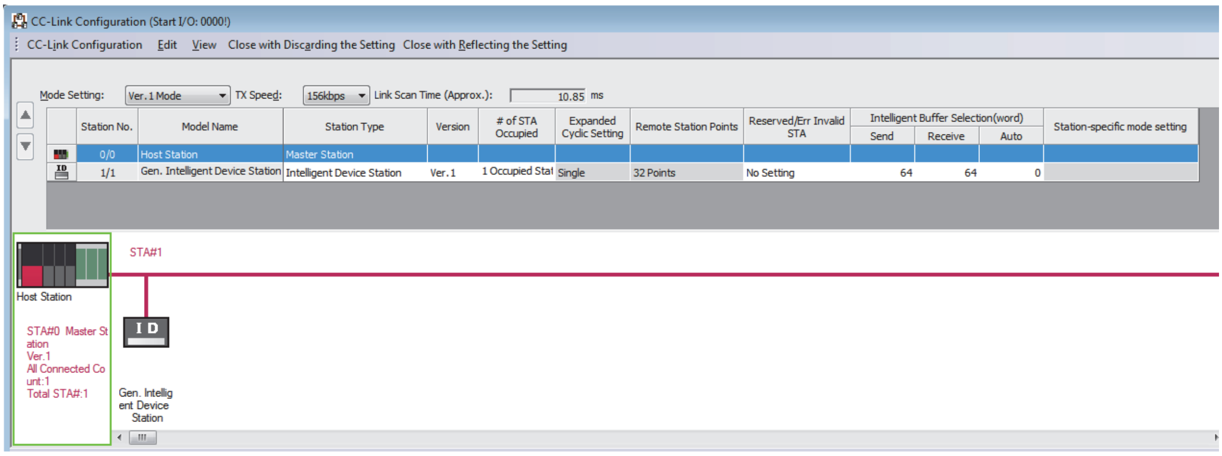
☞ Section 5.4 Part Names and Settings

(b) Network parameter setting of the AJ65BT-R2N

Set network parameters of the AJ65BT-R2N as shown below.

1) When using RCPU

Set the following using GX Works3.



Mode Setting: Ver.1 Mode TX Speed: 156kbps Link Scan Time (Approx.): 10.85 ms

| Station No. | Model Name | Station Type | Version | # of STA Occupied | Expanded Cyclic Setting | Remote Station Points | Reserved/Err Invalid STA | Intelligent Buffer Selection(word) | | | Station-specific mode setting |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Send | Receive | Auto | |
| 0/0 | Host Station | Master Station | | | | | | | | | |
| 1/1 | Gen. Intelligent Device Station | Intelligent Device Station | Ver.1 | 1 Occupied Stat | Single | 32 Points | No Setting | 64 | 64 | 0 | |

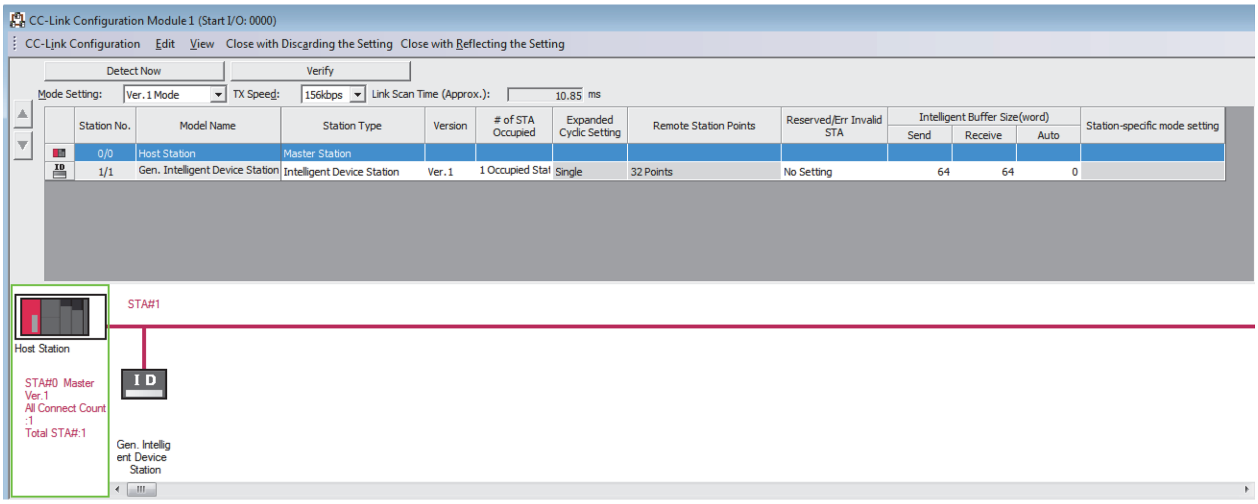
Figure 4.3 When using RCPU

For the intelligent buffer select (word), set the following.

Table 4.8 When using RCPU

| Item | | Description |
|---|---|---|
| Intelligent buffer select (word) | Send | (Send data size (words))＋(5 words) |
| | Receive | (Receive data size (words))＋(5 words) |
| | Automatic | 0 |

2) When using LCPU
Set the following using GX Works2.



CC-Link Configuration Module 1 (Start I/O: 0000)

Mode Setting: Ver. 1 Mode
TX Speed: 156kbps
Link Scan Time (Approx.): 10.85 ms

| | Station No. | Model Name | Station Type | Version | # of STA Occupied | Expanded Cyclic Setting | Remote Station Points | Reserved/Err Invalid STA | Intelligent Buffer Size(word) | | | Station-specific mode setting |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Send | Receive | Auto | |
| | 0/0 | Host Station | Master Station | | | | | | | | | |
| ID | 1/1 | Gen. Intelligent Device Station | Intelligent Device Station | Ver. 1 | 1 Occupied Stat | Single | 32 Points | No Setting | 64 | 64 | 0 | |

STA#0 Master
Ver.1
All Connect Count:1
Total STA#:1

Figure 4.4 When using LCPU

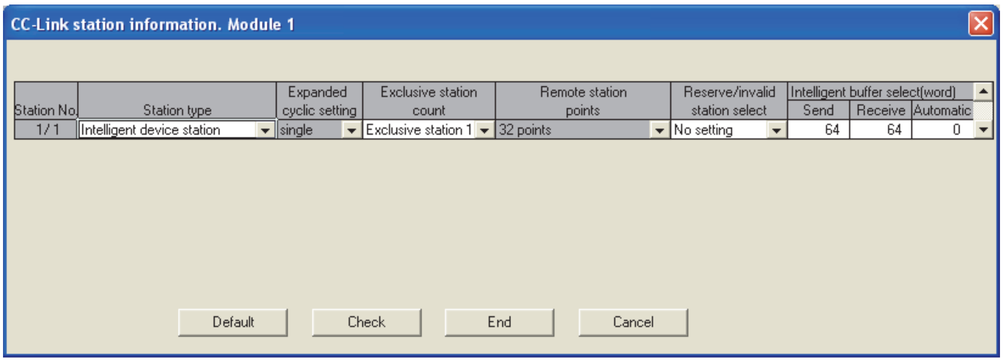
For the intelligent buffer select (word), set the following.

Table 4.9 When using LCPU

| Item | | Description |
|---|---|---|
| Intelligent buffer select (word) | Send | (Send data size (words)) + (5 words) |
| | Receive | (Receive data size (words)) + (5 words) |
| | Automatic | 0 |

3) When using QCPU (Q mode)/QnACPU

- When QCPU (Q mode) is used, set the following using the engineering tool.
  This section describes the parameter setting of when GX Developer is used.
  When GX Works2 is used, refer to the following.
  ☞MELSEC-Q CC-Link System Master/Local Module User's Manual
- When QnACPU is used, set the following using GX Developer.



| Station No. | Station type | Expanded cyclic setting | Exclusive station count | Remote station points | Reserve/invalid station select | Intelligent buffer select(word) Send | Receive | Automatic |
|---|---|---|---|---|---|---|---|---|
| 1/1 | Intelligent device station | single | Exclusive station 1 | 32 points | No setting | 64 | 64 | 0 |

Figure 4.5 When using QCPU (Q mode)/QnACPU

For the station type and intelligent buffer select (word), set the following.

Table 4.10 When using QCPU (Q mode)/QnACPU

| Item | | Description |
|---|---|---|
| Station type | | •When the CC-Link mode is "Remote net - ver.1 mode"<br>Intelligent device station<br>•When the CC-Link mode is "Remote net - ver.2 mode" or "Remote net - additional mode"<br>Ver.1 intelligent device station |
| Intelligent buffer select (word) | Send | (Send data size (words))＋(5 words) |
| | Receive | (Receive data size (words))＋(5 words) |
| | Automatic | 0 |

4) When using dedicated instructions in ACPU/QCPU (A mode)
Set the following on the sequence program.

**Table 4.11 When using dedicated instructions in ACPU/QCPU (A mode)**

| Item | | M Address | | Description |
|---|---|---|---|---|
| | | HEX. | DEC. | |
| Station information | Station type | $20_H$ to $5F_H$ | 32 to 95 | 2 (Intelligent device station) |
| | No. of occupied stations | | | 1 |
| | Station No. | | | Station No. set with the Station No. setting switch on the AJ65BT-R2N |
| Send/receive or auto-refresh buffer assignment | Send | $80_H$ to $CD_H$ | 128 to 205 | •Using RIWT instruction: (Send data size (words))＋(4 words)<br>•Using RISEND instruction: (Send data size (words))＋(5 words) |
| | Receive | | | •Using RIRD instruction: (Receive data size (words))＋(4 words)<br>•Using RIRCV instruction: (Receive data size (words))＋(5 words) |
| | Auto | | | 0 |

5) When using the FROM/TO instruction in ACPU/QCPU (A mode)
Set the following on the sequence program.

**Table 4.12 When using the FROM/TO instruction in ACPU/QCPU (A mode)**

| Item | | M Address | | Description |
|---|---|---|---|---|
| | | HEX. | DEC. | |
| Station information | Station type | $20_H$ to $5F_H$ | 32 to 95 | 2 (Intelligent device station) |
| | No. of occupied stations | | | 1 |
| | Station No. | | | Station No. set with the Station No. setting switch on the AJ65BT-R2N |
| Send/receive or auto-refresh buffer assignment | Send | $80_H$ to $CD_H$ | 128 to 205 | (Send data size (words))＋(7 words) |
| | Receive | | | (Receive data size (words))＋(7 words) |
| | Auto | | | 0 |

(c) Buffer memory used for the send/receive buffer communication function
The following buffer memory area is used for the initial setting and status check of the send/receive buffer communication function.

**Table 4.13 Initial setting of the send/receive buffer communication function**

| R2N Address | Name | Description |
|---|---|---|
| 0H | Send area, start address specification | Specify the start address of the send area (Send data size specification area＋Send data area).<br>Specify an area that does not overlap with the receive area.<br>•Setting range: 200H to 7FEH (Default: ☞ Section 3.8) |
| 1H | Send area size specification | Specify the size of the send area (Send data size specification area＋Send data area).<br>Specify an area that does not overlap with the receive area.<br>•Setting range: 2H to 5FEH (Unit: Word, Default: ☞ Section 3.8) |
| 2H | Receive area, start address specification | Specify the start address of the receive area (Receive data size specification area＋Receive data area).<br>Specify an area that does not overlap with the send area.<br>•Setting range: 200H to 7FEH (Default: ☞ Section 3.8) |
| 3H | Receive area size specification | Specify the size of the receive area (Receive data size specification area＋Receive data area).<br>Specify an area that does not overlap with the send area.<br>•Setting range: 2H to 5FEH (Unit: Word, Default: ☞ Section 3.8) |
| 102H | Word/byte specification | Specify the unit of data handled in the following areas.<br>(1) No. of receive end data (R2N 111H)<br>(2) No. of actual send data (R2N 1B4H)<br>(3) No. of data stored in OS reception area (R2N 1B6H)<br>(4) Send data size specification area (R2N 200H (at default))<br>(5) Receive data size specification area (R2N 400H (at default))<br>•0H: In word units<br>•1H: In byte units<br>•Setting range: 0H, 1H (Default: 0H) |
| 111H | No. of receive end data | For receiving fixed length data, specify the number of data to be received.<br>When using the frame function to receive fixed length data, specify the number of data excluding the start and end frame data.<br>The value changes depending on the setting of Word/byte specification (R2N 102H).<br>•0H: Receive variable length data with frame function<br>•Setting range (in word units): 0H to (Receive area size－1) (Default: 0H)<br>•Setting range (in byte units): 0H to (Receive area size－1) ×2 (Default: 0H) |
| 112H | Receive timeout time specification | Specify a timeout time for receiving data from the external device.<br>A receive timeout occurs during data reception when the specified timeout time has been reached.<br>If a receive timeout occurs, Error receive data read request signal (RXn3) turns ON, and the receive timeout error (BB21H) is stored in Error codes generated when receiving (R2N 1B2H).<br>When the frame function is used, the receive timeout time includes the time for receiving the start and/or end frame.<br>•0: Infinitely wait for receive completion<br>•Setting range: 0, 1 to 32767 (Unit: ×100ms, Default: 0) |
| 11AH | Send timeout time specification | Specify a time (send timeout time) if transmission is to be terminated when a specific time has elapsed after starting transmission to the external device (after Send request signal (RYn0) turns ON).<br>•0: Infinitely wait for send completion<br>•Setting range: 0, 1 to 32767 (Unit: ×100ms, Default: 0) |

(Continued to next page)

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Table 4.13 Initial setting of the send/receive buffer communication function (Continued)

| R2N Address | Name | Description |
|---|---|---|
| 1B4H | No. of actual send data | Upon completion of transmission, the number of the data that were actually sent is stored.<br>When the frame function is used, this area stores the number of the entire send data including the start and end frames.<br>When the ASCII-binary conversion function is active. the number of converted send data is stored.<br>The value changes depending on the setting of Word/byte specification (R2N 102H). |
| 1B6H | No. of data stored in OS reception area | Number of the data stored in the OS reception area is stored.<br>The information stored is updated every 100ms.<br>The value changes depending on the setting of Word/byte specification (R2N 102H). |

## ☒Point

Initialize the AJ65BT-R2N if a set value in R2N 0H to 101H and 103H to 112H is changed.

☞ Section 4.4 AJ65BT-R2N Initialization Function

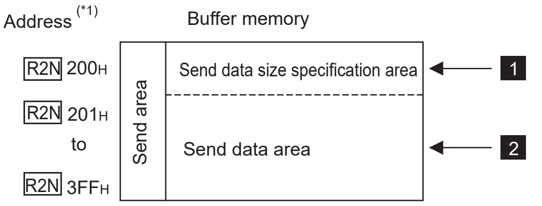
## 4.2.1 Send processing

### (1) Send area

Data to be sent to the external device are stored in the send area.

(a) Composition of the send area

The send area is composed of Send data size specification area and Send data area.



*1 When Send area, start address specification (R2N 0H) is 200H

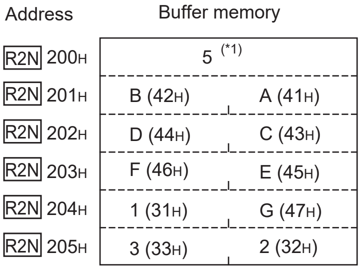
**Figure 4.6 Composition of the send area**

**Table 4.14 Composition of the send area**

| No. | Name | Description |
|---|---|---|
| 1 | Send data size specification area | Number of send data is stored.<br>The value changes depending on the setting of Word/byte specification (R2N 102H). |
| 2 | Send data area | Send data are stored in order starting from the lower byte of the lowest address. |

(b) A storage example of the send area

The following shows an example of storing "ABCDEFG123" in the send area when sending it to the external device. (In the case of: Send area, start address specification (R2N 0H): 200H, and Word/byte specification (R2N 102H): 0H (In word units))



| Address | Buffer memory | |
|---|---|---|
| R2N 200H | 5 (*1) | |
| R2N 201H | B (42H) | A (41H) |
| R2N 202H | D (44H) | C (43H) |
| R2N 203H | F (46H) | E (45H) |
| R2N 204H | 1 (31H) | G (47H) |
| R2N 205H | 3 (33H) | 2 (32H) |

*1 When Word/byte specification (R2N 102H) is 1H (Bytes), AH (10) is stored.

**Figure 4.7 A storage example of the send area**

### (2) Transmission procedures

#### (a) When using dedicated instructions

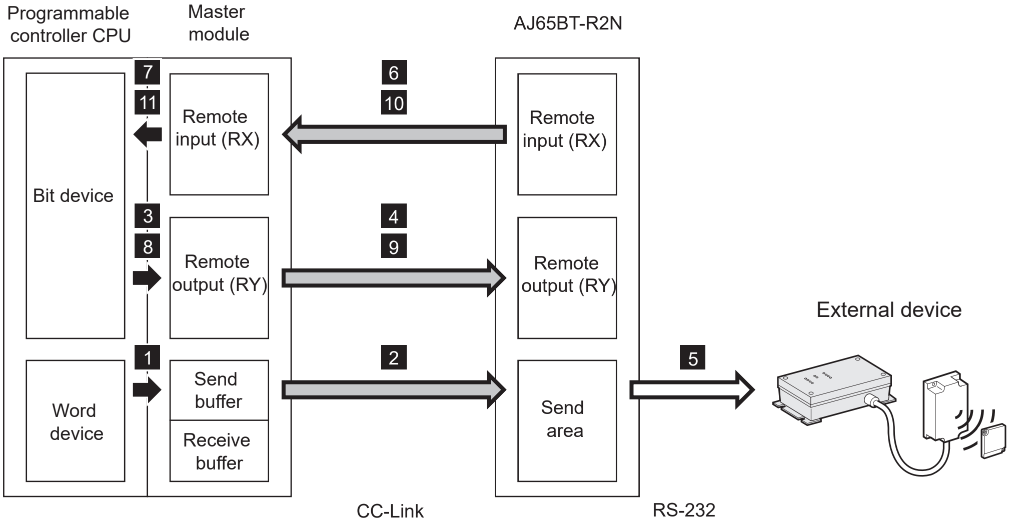


**Figure 4.8 Transmission procedures when using the send/receive buffer communication function**

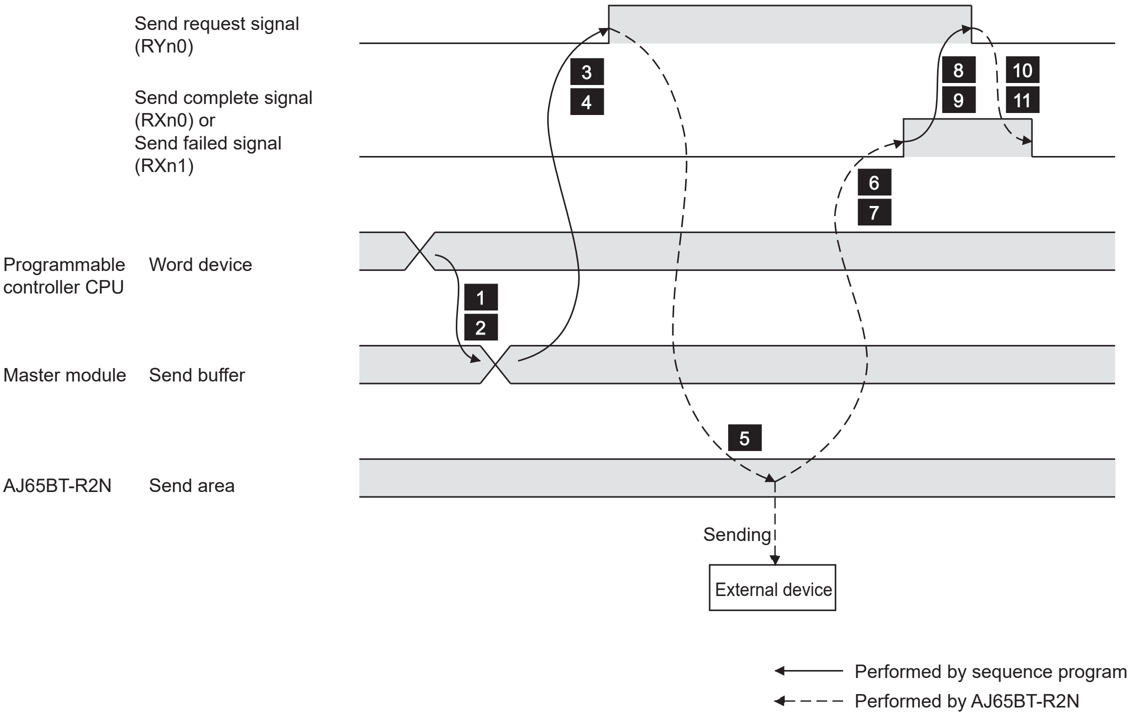


**Figure 4.9 Timing chart when using the send/receive buffer communication function**

Table 4.15 Transmission procedures when using the send/receive buffer communication function

| No. | Processing |
|---|---|
| 1, 2 | With the RIWT instruction, the send data are written from the word devices of the programmable controller CPU to the send area of the AJ65BT-R2N. |
| 3, 4 | Send request signal (RYn0) is turned ON. |
| 5 | The send data are sent from the send area of the AJ65BT-R2N to the external device. |
| 6, 7 | When transmission is normally completed, Send complete signal (RXn0) turns ON.<br>When failed, Send failed signal (RXn1) turns ON. |
| 8, 9 | Send request signal (RYn0) is turned OFF. |
| 10, 11 | Send complete signal (RXn0) and Send failed signal (RXn1) are turned OFF. |

(b) When using the FROM/TO instruction in ACPU/QCPU (A mode)

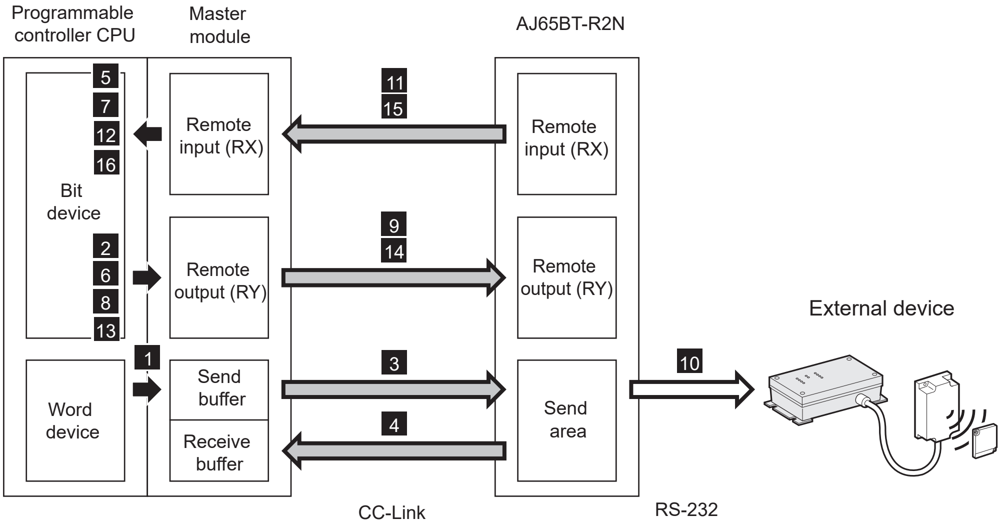


Figure 4.10 Transmission procedures when using the send/receive buffer communication function

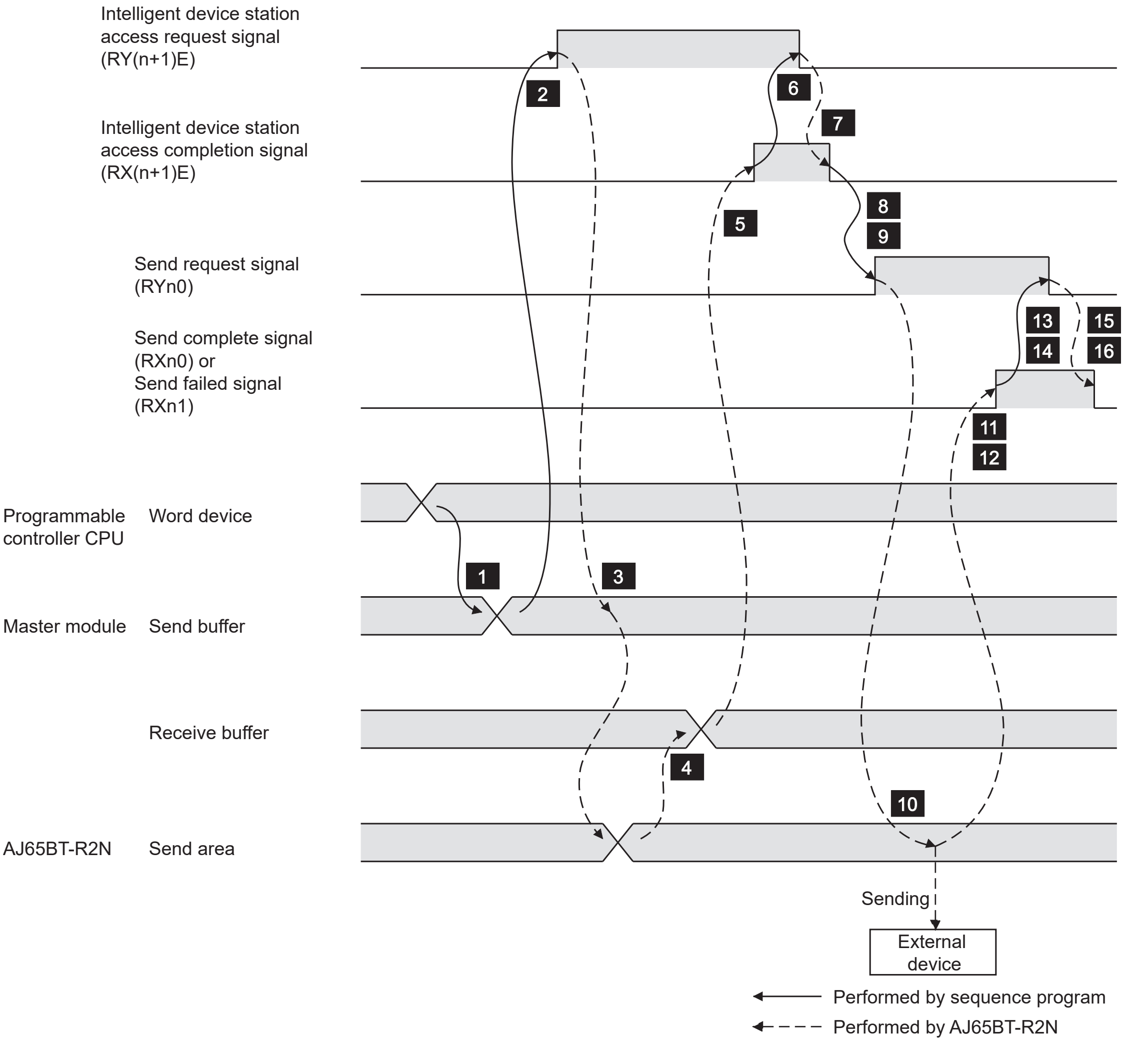


Figure 4.11 Timing chart when using the send/receive buffer communication function

Table 4.16 Transmission procedures when using the send/receive buffer communication function

| No. | Processing |
|---|---|
| 1 | With the TO instruction, control data and send data are written from the programmable controller CPU devices to the send buffer of the master module. |
| 2 | Intelligent device station access request signal (RY(n+1)E) is turned ON. |
| 3 | Control data and send data are sent from the send buffer of the master module to the AJ65BT-R2N. |
| 4 | A transmission result is written from the AJ65BT-R2N to the receive buffer. |
| 5 | Intelligent device station access completion signal (RX(n+1)E) turns ON. |
| 6 | Intelligent device station access request signal (RY(n+1)E) is turned OFF. |
| 7 | Intelligent device station access completion signal (RX(n+1)E) turns OFF. |
| 8, 9 | Send request signal (RYn0) is turned ON. |
| 10 | The send data are sent from the send area of the AJ65BT-R2N to the external device. |
| 11, 12 | When transmission is normally completed, Send complete signal (RXn0) turns ON.<br>When failed, Send failed signal (RXn1) turns ON. |
| 13, 14 | Send request signal (RYn0) is turned OFF. |
| 15, 16 | Send complete signal (RXn0) and Send failed signal (RXn1) are turned OFF. |

**Remark**

When using the FROM/TO instruction, the station No. or buffer memory address of the access target is specified in control data.
For sample programs using the FROM/TO instruction, refer to the following.
☞ CHAPTER 8 PROGRAMMING WHEN USING FROM/TO INSTRUCTION IN ACPU/QCPU (A MODE)

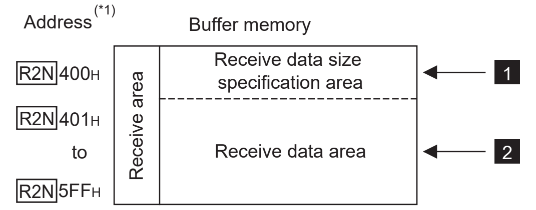
## 4.2.2 Receive processing

(1) Receive area

Data received from the external device are stored in the receive area.
Read the received data from the receive area to the programmable controller CPU .

(a) Composition of the receive area

The receive area is composed of Receive data size specification area and Receive data area.



*1 When Receive area, start address specification (R2N 2H) is 400H

Figure 4.12 Composition of the receive area

**Table 4.17 Composition of the receive area**

| No. | Name | Description |
|---|---|---|
| 1 | Receive data size specification area | Number of receive data is stored.<br>The value changes depending on the setting of Word/byte specification (R2N 102H). |
| 2 | Receive data area | Receive data are stored in order starting from the lower byte of the lowest address. |

(b) A storage example of the receive area

The following shows an example of storing "ABCDEFG123" in the receive area when receiving it from the external device. (In the case of: Receive area, start address specification (R2N 2H): 400H, Word/byte specification (R2N 102H): 0H)

| Address | Buffer memory | |
|---|---|---|
| R2N 400H | 5 (*1) | |
| R2N 401H | B (42H) | A (41H) |
| R2N 402H | D (44H) | C (43H) |
| R2N 403H | F (46H) | E (45H) |
| R2N 404H | 1 (31H) | G (47H) |
| R2N 405H | 3 (33H) | 2 (32H) |

*1 When Word/byte specification ( R2N 102H) is 1H (Bytes), AH (10) is stored.

Figure 4.13 A storage example of the receive area

(2) Reception procedures

When the send/receive buffer communication function is used, the following receive processing is performed.

(a) When using dedicated instructions

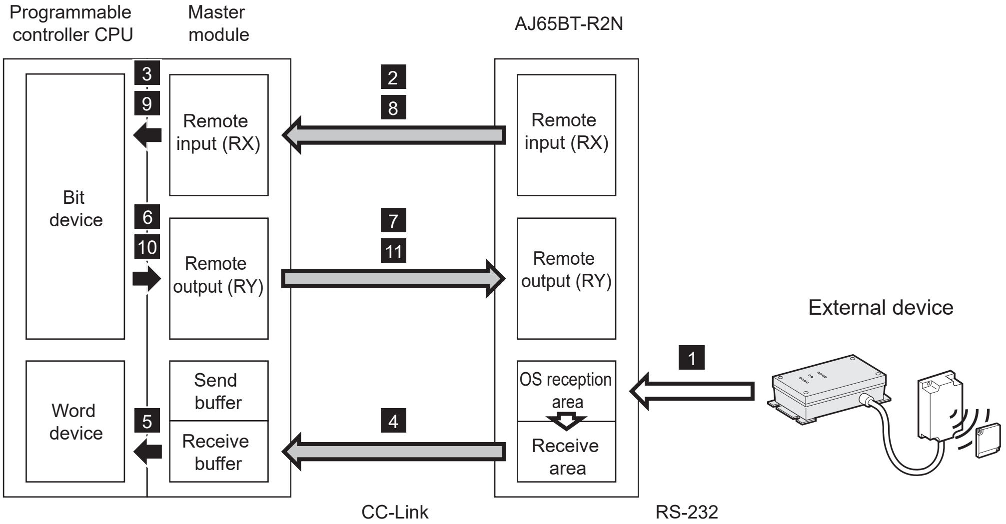


**Figure 4.14 Receive processing when using the send/receive buffer communication function**

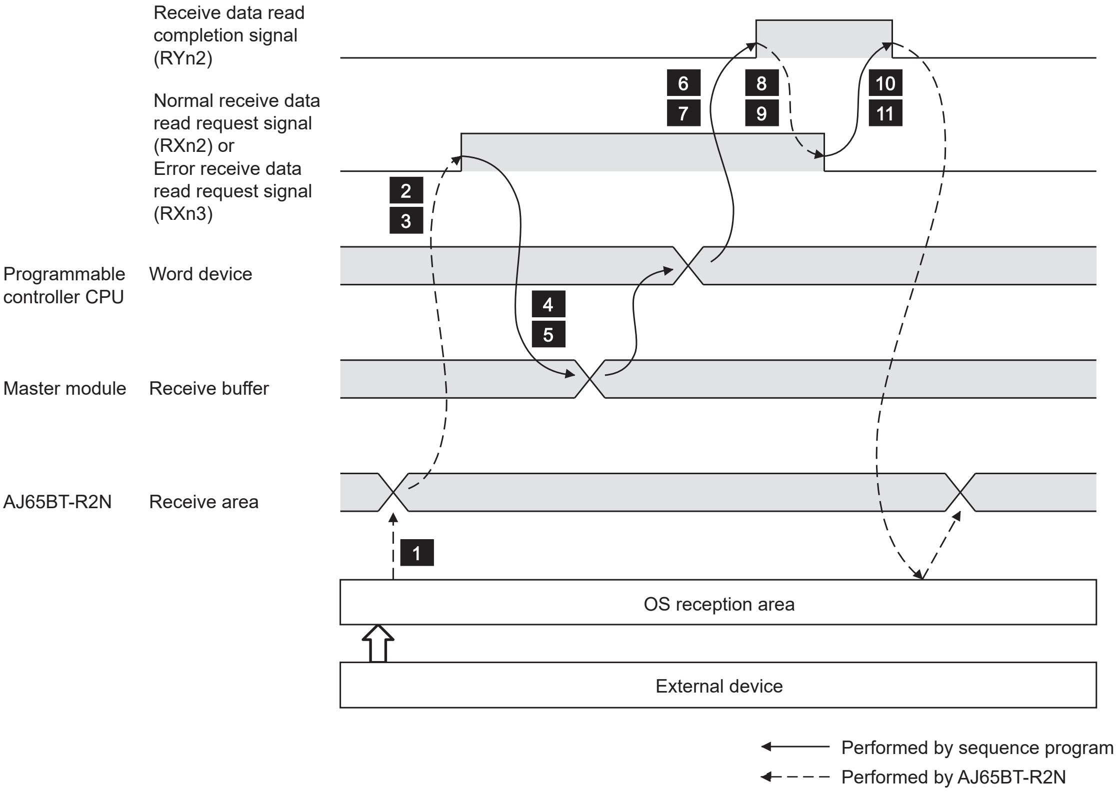


**Figure 4.15 Timing chart when using the send/receive buffer communication function**

Table 4.18 Reception procedures when using the send/receive buffer communication function

| No. | Processing |
|---|---|
| 1 | Data are received from the external device through the OS reception area, and stored in the receive area. |
| 2, 3 | When reception is normally completed, Normal receive data read request signal (RXn2) turns ON.<br>When failed, Error receive data read request signal (RXn3) turns ON. |
| 4, 5 | With the RIRD instruction, the receive data are read from the receive area of the AJ65BT-R2N to the programmable controller CPU devices. |
| 6, 7 | Receive data read completion signal (RYn2) is turned ON. |
| 8, 9 | Normal receive data read request signal (RXn2) and Error receive data read request signal (RXn3) turn OFF. |
| 10, 11 | Receive data read completion signal (RYn2) is turned OFF. |

(b) When using the FROM/TO instruction in ACPU/QCPU (A mode)

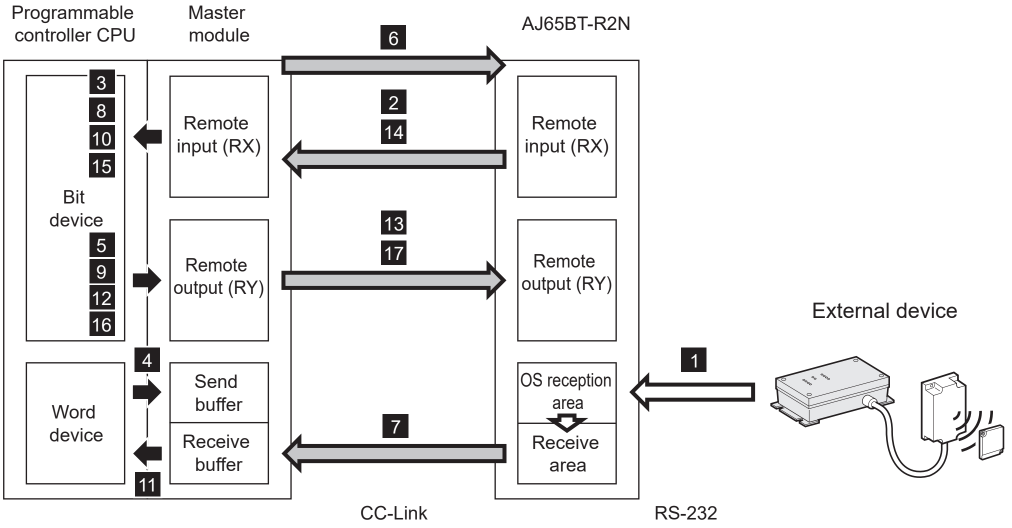


Figure 4.16 Receive processing when using the send/receive buffer communication function

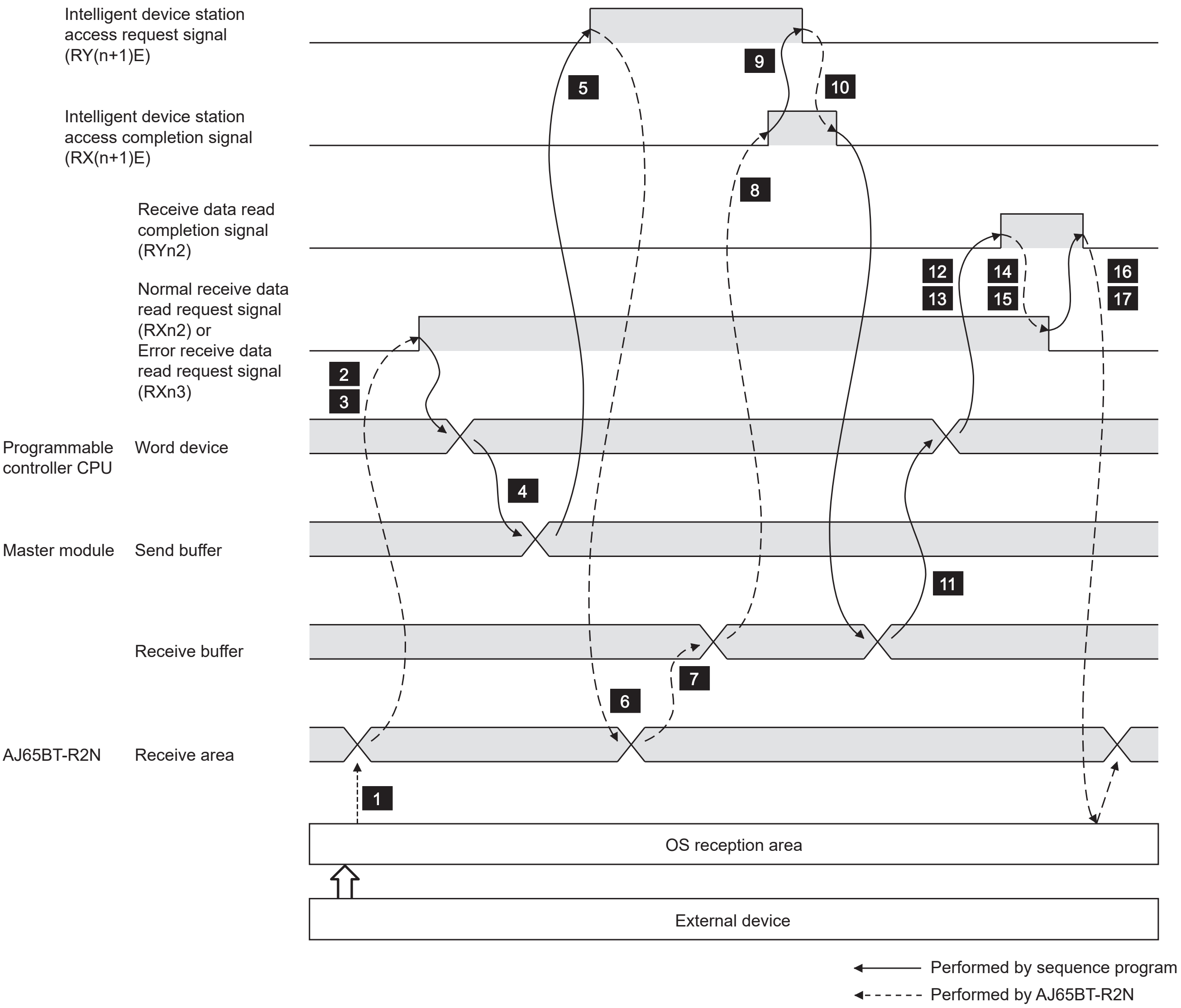


Figure 4.17 Timing chart when using the send/receive buffer communication function

**Table 4.19 Reception procedures when using the send/receive buffer communication function**

| No. | Processing |
|---|---|
| 1 | Data are received from the external device through the OS reception area, and stored in the receive area. |
| 2, 3 | When reception is normally completed, Normal receive data read request signal (RXn2) turns ON.<br>When failed, Error receive data read request signal (RXn3) turns ON. |
| 4 | With the TO instruction, control data are written from the programmable controller CPU devices to the send buffer of the master module. |
| 5 | Intelligent device station access request signal (RY(n+1)E) is turned ON. |
| 6 | A read request set in control data is sent to the AJ65BT-R2N. |
| 7 | Control data and receive data in the receive area of the AJ65BT-R2N are stored in the receive buffer of the master module. |
| 8 | Intelligent device station access completion signal (RX(n+1)E) turns ON. |
| 9 | Intelligent device station access request signal (RY(n+1)E) is turned OFF. |
| 10 | Intelligent device station access completion signal (RX(n+1)E) turns OFF. |
| 11 | With the FROM instruction, the receive data are read from the receive buffer of the master module to the programmable controller CPU devices. |
| 12, 13 | Receive data read completion signal (RYn2) is turned ON. |
| 14, 15 | Normal receive data read request signal (RXn2) and Error receive data read request signal (RXn3) turn OFF. |
| 16, 17 | Receive data read completion signal (RYn2) is turned OFF. |

**Remark**

When using the FROM/TO instruction, the station No. or buffer memory address of the access target is specified in control data.
For sample programs using the FROM/TO instruction, refer to the following.
☞ CHAPTER 8 PROGRAMMING WHEN USING FROM/TO INSTRUCTION IN ACPU/QCPU (A MODE)

## 4.3 Buffer Memory Auto-Refresh Function

The buffer memories of the AJ65BT-R2N and master station are refreshed automatically at a timing set in the AJ65BT-R2N.
The buffer memory auto-refresh function eliminates the need for creating programs for reading/writing data between the AJ65BT-R2N and master station.
Data can be read or written with intelligent function module devices or FROM/TO instructions, which makes programming easier.

### (1) Overview of send/receive processing

The RITO or TO instruction is used when sending, and the RIRD or FROM instruction is used when receiving.

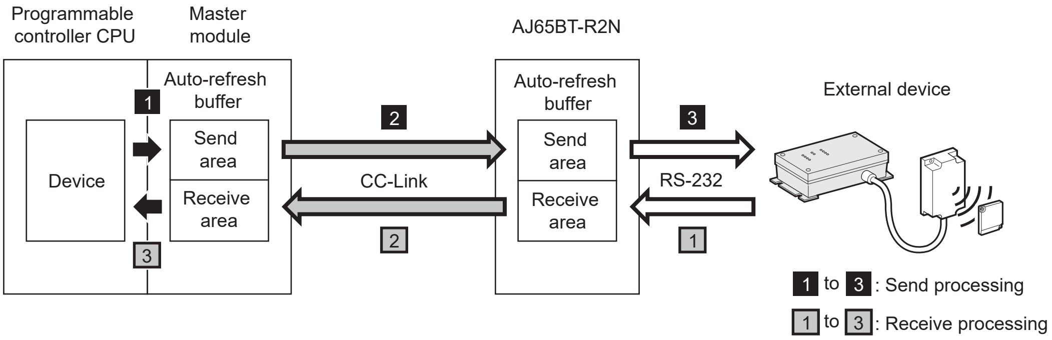


**Figure 4.18 Overview of send/receive processing**

- Send processing

**Table 4.20 Overview of send processing**

| No. | Processing |
|---|---|
| 1 | With the RITO or TO instruction, the send data are written from the programmable controller CPU devices to the send area of the master module. |
| 2, 3 | Send request signal (RYn0) is turned ON to send the send data from the send area of the master module to the external device. |

- Receive processing

**Table 4.21 Overview of receive processing**

| No. | Processing |
|---|---|
| 1, 2 | When the AJ65BT-R2N normally completed reception from the external device, the receive data in the receive area of the AJ65BT-R2N are stored in the receive area of the master module.<br>Normal receive data read request signal (RXn2) turns ON.[1] |
| 3 | With the RIFR or FROM instruction, the receive data are read from the receive area of the master module to the programmable controller CPU devices. |

[1] If the reception fails, Error receive data read request signal (RXn3) turns ON.

### (2) Precautions on the access target address

The buffer memory specification of the AJ65BT-R2N is different depending on using the RIFR/RITO or FROM/TO instruction.

(a) When using RIFR/RITO instruction

Specify the buffer memory address of the AJ65BT-R2N.

(b) When using FROM/TO instruction

Specify the buffer memory address of the master station, to which the buffer memory of the AJ65BT-R2N is assigned.

(Example)

Using the buffer memory auto-refresh function, data in Station No. setting switch (R2N 1A0$_H$) of station No.2 are read out.

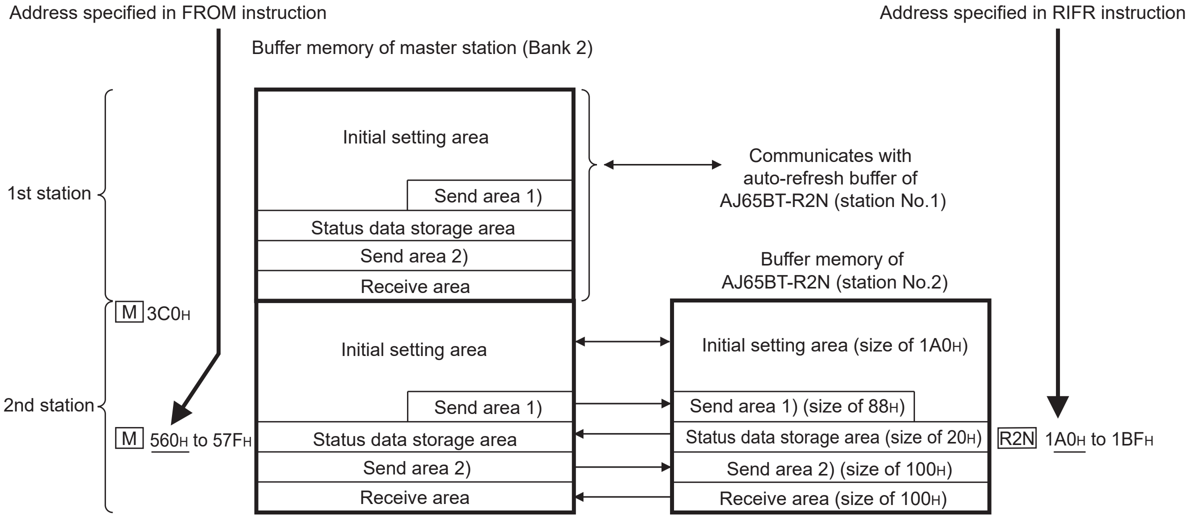


**Figure 4.19 Address specification method by instruction (for ACPU)**

**Table 4.22 Address specification method by instruction**

| Instruction | Specification method |
|---|---|
| RIFR | Specify station No.2, and the address of Station No. setting switch (R2N 1A0$_H$).<br>`[GP.RIFR U0 K2 H1A0 D200 K1 ]`<br>K2: Station No.; H1A0: Address |
| FROM | Specify the address assigned to the buffer memory (bank 2) of the master station ( M 560$_H$).<br>`——[FROM H0 H560 D200 K1 ]`<br>H560: Address |

(3) Initial setting

Configure the following settings.

- Mode of AJ65BT-R2N
- Network parameters of AJ65BT-R2N
- Initial data reading
- Initial setting for the buffer memory auto-refresh function

(a) Mode of the AJ65BT-R2N

Set a mode of the AJ65BT-R2N depending on the number of connected modules as shown below.

**Table 4.23 Mode of the AJ65BT-R2N**

| No. of modules connected | Mode setting switch[*1] | Remarks |
|---|---|---|
| 1 to 2 | Mode 1 | For auto-refresh buffer assignment in each mode, refer to the following.<br>☞ Section 3.8.1 Buffer memory list |
| 3 to 4 | Mode 2 | |
| 5 to 8 | Mode 3 | |
| 9 to 16 | Mode 4 | |
| 17 or more | Mode 1 | Referring to the following, change the auto-refresh buffer assignment.<br>☞ Section 4.3.1 Details of the auto-refresh buffer |

* 1 For the Mode setting switch, refer to the following.
☞ Section 5.4 Part Names and Settings

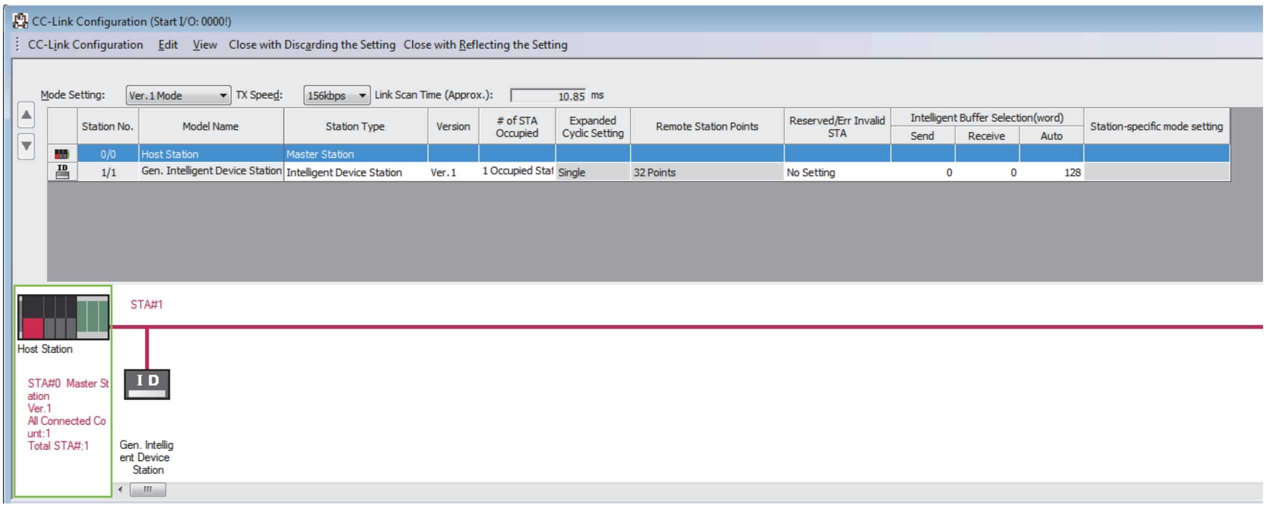
**Remark**

For using a function of the area that is not assigned to the auto-refresh buffer, use the RIRD, RIWT, RIRCV, or RISEND instruction.
Such function cannot be used with the RIFR or RITO instruction.

Ex.)When the Mode setting switch is set to Mode 4, the $E^2$PROM function cannot be used with the RIFR or RITO instruction.

(b) Network parameter setting of the AJ65BT-R2N

1) When using RCPU
Set the following using GX Works3.



CC-Link Configuration (Start I/O: 0000!)

Mode Setting: Ver.1 Mode TX Speed: 156kbps Link Scan Time (Approx.): 10.85 ms

| | Station No. | Model Name | Station Type | Version | # of STA Occupied | Expanded Cyclic Setting | Remote Station Points | Reserved/Err Invalid STA | Intelligent Buffer Selection(word) | | | Station-specific mode setting |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Send | Receive | Auto | |
| | 0/0 | Host Station | Master Station | | | | | | | | | |
| | 1/1 | Gen. Intelligent Device Station | Intelligent Device Station | Ver.1 | 1 Occupied Stat | Single | 32 Points | No Setting | 0 | 0 | 128 | |

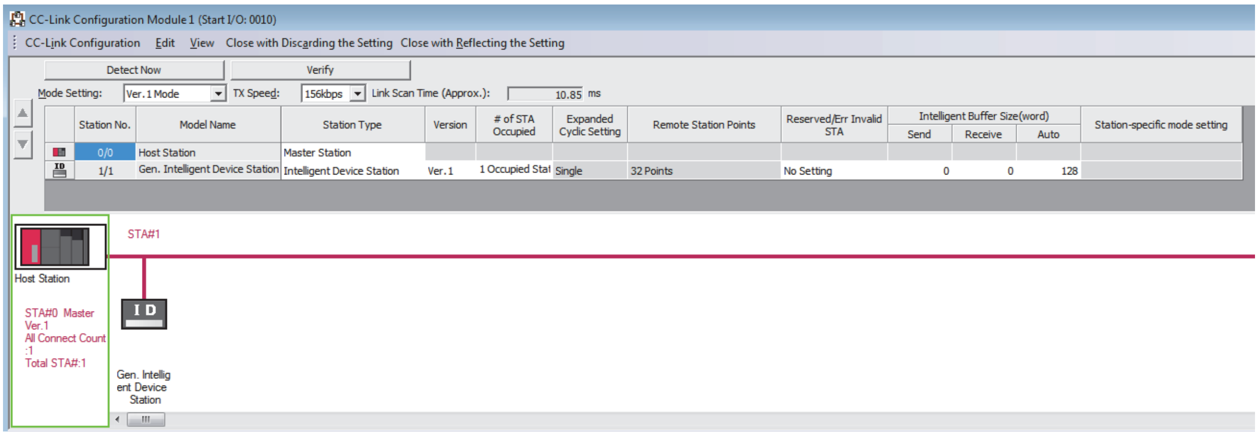
**Figure 4.20 When using RCPU**

For the intelligent buffer select (word), set the following.

**Table 4.24 When using RCPU**

| Item | | Description | |
|---|---|---|---|
| | | **Mode setting switch setting** | **Description** |
| Intelligent buffer select (word) | Automatic | Mode 1 | •Default assignments: $600_H$<br>•Changed assignments: Auto-refresh buffer size (words) |
| | | Mode 2 | $400_H$ |
| | | Mode 3 | $200_H$ |
| | | Mode 4 | $100_H$ |

2) When using LCPU
Set the following using GX Works2.



Mode Setting: Ver.1 Mode
TX Speed: 156kbps
Link Scan Time (Approx.): 10.85 ms

| | Station No. | Model Name | Station Type | Version | # of STA Occupied | Expanded Cyclic Setting | Remote Station Points | Reserved/Err Invalid STA | Intelligent Buffer Size(word) | | | Station-specific mode setting |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Send | Receive | Auto | |
| | 0/0 | Host Station | Master Station | | | | | | | | | |
| | 1/1 | Gen. Intelligent Device Station | Intelligent Device Station | Ver.1 | 1 Occupied Stat | Single | 32 Points | No Setting | 0 | 0 | 128 | |

Figure 4.21 When using LCPU

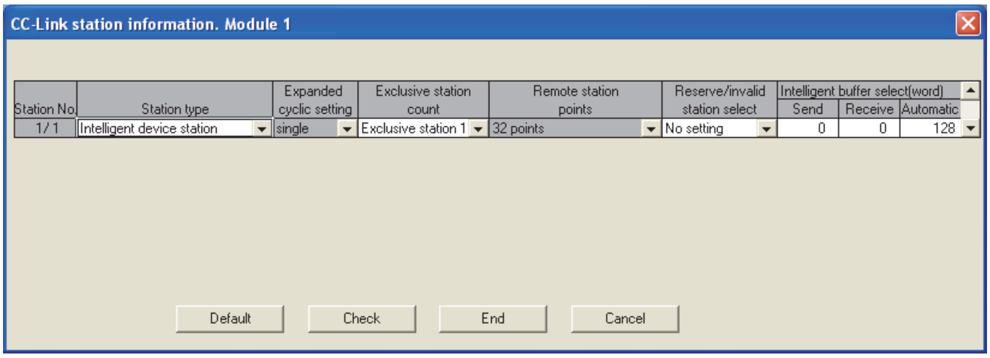
For the automatic intelligent buffer select (word), set the following.

Table 4.25 When using LCPU

| Item | | Description | |
|---|---|---|---|
| | | **Mode setting switch setting** | **Description** |
| Intelligent buffer select (word) | Automatic | Mode 1 | •Default assignments: 600H<br>•Changed assignments: Auto-refresh buffer size (words) |
| | | Mode 2 | 400H |
| | | Mode 3 | 200H |
| | | Mode 4 | 100H |

3) When using QCPU (Q mode)/QnACPU

- When QCPU (Q mode) is used, set the following using the engineering tool.
  This section describes the parameter setting of when GX Developer is used.
  When GX Works2 is used, refer to the following.
  ☞MELSEC-Q CC-Link System Master/Local Module User's Manual
- When QnACPU is used, set the following using GX Developer.



| Station No. | Station type | Expanded cyclic setting | Exclusive station count | Remote station points | Reserve/invalid station select | Intelligent buffer select(word) | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Send | Receive | Automatic |
| 1/1 | Intelligent device station | single | Exclusive station 1 | 32 points | No setting | 0 | 0 | 128 |

Figure 4.22 When using QCPU (Q mode)/QnACPU

For the station type and automatic intelligent buffer select (word), set the following.

Table 4.26 When using QCPU (Q mode)/QnACPU

<table>
<tr><th colspan="2">Item</th><th colspan="2">Description</th></tr>
<tr><td colspan="2">Station type</td><td colspan="2">•When the CC-Link mode is "Remote net - ver.1 mode"<br>Intelligent device station<br>•When the CC-Link mode is "Remote net - ver.2 mode" or "Remote net - additional mode"<br>Ver.1 intelligent device station</td></tr>
<tr><td rowspan="5">Intelligent buffer select (word)</td><td rowspan="5">Automatic</td><th>Mode setting switch setting</th><th>Description</th></tr>
<tr><td>Mode 1</td><td>•Default assignments: 600H<br>•Changed assignments: Auto-refresh buffer size (words)</td></tr>
<tr><td>Mode 2</td><td>400H</td></tr>
<tr><td>Mode 3</td><td>200H</td></tr>
<tr><td>Mode 4</td><td>100H</td></tr>
</table>

4) When using dedicated instructions in ACPU/QCPU (A mode)
Set the following on the sequence program.

**Table 4.27 When using dedicated instructions in ACPU/QCPU (A mode)**

| Item | | M Address | | Description | |
|---|---|---|---|---|---|
| | | HEX. | DEC. | | |
| Station information | Station type | 20H<br>to<br>5FH | 32<br>to<br>95 | 2 (Intelligent device station) | |
| | No. of occupied stations | | | 1 | |
| | Station No. | | | Station No. set with the Station No. setting switch on the AJ65BT-R2N | |
| Send/receive or auto-refresh buffer assignment | Send | 80H<br>to<br>CDH | 128<br>to<br>205 | 0 | |
| | Receive | | | | |
| | Auto | | | **Mode setting switch setting** | **Description** |
| | | | | Mode 1 | •Default assignments: 600H<br>•Changed assignments: Auto-refresh buffer size (words) |
| | | | | Mode 2 | 400H |
| | | | | Mode 3 | 200H |
| | | | | Mode 4 | 100H |

5) When using the FROM/TO instruction in ACPU/QCPU (A mode)
Set the following on the sequence program.

**Table 4.28 When using the FROM/TO instruction in ACPU/QCPU (A mode)**

| Item | | M Address | | Description | |
|---|---|---|---|---|---|
| | | HEX. | DEC. | | |
| Station information | Station type | 20H<br>to<br>5FH | 32<br>to<br>95 | 2 (Intelligent device station) | |
| | No. of occupied stations | | | 1 | |
| | Station No. | | | Station No. set with the Station No. setting switch on the AJ65BT-R2N | |
| Send/receive or auto-refresh buffer assignment | Send | 80H<br>to<br>CDH | 128<br>to<br>205 | 0 | |
| | Receive | | | | |
| | Auto | | | **Mode setting switch setting** | **Description** |
| | | | | Mode 1 | •Default assignments: 600H<br>•Changed assignments: Auto-refresh buffer size (words) |
| | | | | Mode 2 | 400H |
| | | | | Mode 3 | 200H |
| | | | | Mode 4 | 100H |

(c) Initial data reading
Be sure to read out the initial data from the AJ65BT-R2N to the master module before making the initial setting for the buffer memory auto-refresh function.
For a sample program for reading initial data, refer to the following.
☞ Section 6.3.2 For the buffer memory auto-refresh function

(d) Buffer memory used for the buffer memory auto-refresh function
The following buffer memory area is used for the initial setting and status check of the buffer memory auto-refresh function.

**Table 4.29 Initial setting of the buffer memory auto-refresh function**

| R2N Address | Name | Description |
|---|---|---|
| $0_H$ | Send area, start address specification | Specify the start address of the send area (Send data size specification area＋Send data area).<br>Specify an area that does not overlap with the receive area.<br>•Setting range: $200_H$ to $7FE_H$ (Default: ☞ Section 3.8) |
| $1_H$ | Send area size specification | Specify the size of the send area (Send data size specification area＋Send data area).<br>Specify an area that does not overlap with the receive area.<br>•Setting range: $2_H$ to $5FE_H$ (Unit: Word, Default: ☞ Section 3.8) |
| $2_H$ | Receive area, start address specification | Specify the start address of the receive area (Receive data size specification area＋Receive data area).<br>Specify an area that does not overlap with the send area.<br>•Setting range: $200_H$ to $7FE_H$ (Default: ☞ Section 3.8) |
| $3_H$ | Receive area size specification | Specify the size of the receive area (Receive data size specification area＋Receive data area).<br>Specify an area that does not overlap with the send area.<br>•Setting range: $2_H$ to $5FE_H$ (Unit: Word, Default: ☞ Section 3.8) |
| $102_H$ | Word/byte specification | Specify the unit of data handled in the following areas.<br>(1) No. of receive end data (R2N $111_H$)<br>(2) No. of actual send data (R2N $1B4_H$)<br>(3) No. of data stored in OS reception area (R2N $1B6_H$)<br>(4) Send data size specification area (R2N $200_H$ (at default))<br>(5) Receive data size specification area (R2N $400_H$ (at default))<br>•$0_H$: In word units<br>•$1_H$: In byte units<br>•Setting range: $0_H$, $1_H$ (Default: $0_H$) |
| $105_H$ | Transient timeout time specification | Specify a timeout time for data communication which is based on the buffer memory auto-refresh function and is performed between the master module and AJ65BT-R2N.<br>•0, 5: Specified as 5 seconds.<br>•Setting range: 0, 1 to 360 (Unit: Seconds, Default: 0) |
| $111_H$ | No. of receive end data | For receiving fixed length data, specify the number of data to be received.<br>When using the frame function to receive fixed length data, specify the number of data excluding the start and end frame data.<br>The value changes depending on the setting of Word/byte specification (R2N $102_H$).<br>•$0_H$: Receive variable length data with frame function<br>•Setting range (in word units): $0_H$ to (Receive area size－1) (Default: $0_H$)<br>•Setting range (in byte units): $0_H$ to (Receive area size－1) × 2 (Default: $0_H$) |

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Table 4.29 Initial setting of the buffer memory auto-refresh function (Continued)

| R2N Address | Name | Description |
|---|---|---|
| $112_H$ | Receive timeout time specification | Specify a timeout time for receiving data from the external device.<br>A receive timeout occurs during data reception when the specified timeout time has been reached.<br>If a receive timeout occurs, Error receive data read request signal (RXn3) turns ON, and the receive timeout error ($BB21_H$) is stored in Error codes generated when receiving (R2N $1B2_H$)<br>When the frame function is used, the receive timeout time includes the time for receiving the start and/or end frame.<br>•0: Infinitely wait for receive completion<br>•Setting range: 0, 1 to 32767 (Unit: × 100ms, Default: 0) |
| $11A_H$ | Send timeout time specification | Specify a time (send timeout time) if transmission is to be terminated when a specific time has elapsed after starting transmission to the external device (after Send request signal (RYn0) turns ON).<br>•0: Infinitely wait for send completion<br>•Setting range: 0, 1 to 32767 (Unit: × 100ms, Default: 0) |
| $1B4_H$ | No. of actual send data | Upon completion of transmission, the number of the data that were actually sent is stored.<br>When the frame function is used, this area stores the number of the entire send data including the start and end frames.<br>When the ASCII-binary conversion function is active, the number of converted send data is stored.<br>The value changes depending on the setting of Word/byte specification (R2N $102_H$). |
| $1B6_H$ | No. of data stored in OS reception area | Number of the data stored in the OS reception area is stored.<br>The information stored is updated every 100ms.<br>The value changes depending on the setting of Word/byte specification (R2N $102_H$). |

## ☒Point

Initialize the AJ65BT-R2N if a set value in R2N $0_H$ to $101_H$ and $103_H$ to $112_H$ is changed.

☞ Section 4.4 AJ65BT-R2N Initialization Function

## 4.3.1 Details of the auto-refresh buffer

The auto-refresh buffer is an area for data communication between the master module and AJ65BT-R2N, and is operated by the buffer memory auto-refresh function.
When changing the auto-refresh buffer assignments, refer to this section.

**☒Point**

- Assignments of each area cannot be changed if the AJ65BT-R2N is in Mode 2 to Mode 4.
  Use Mode 0 or Mode 1 to change any assignment.
  For changing the mode, refer to the following.
  ☞ Section 5.4 Part Names and Settings
- The default shown in each area setting is for the case where the AJ65BT-R2N is in Mode 1.
  For defaults in Modes 2 to 4, refer to the following.
  ☞ Section 3.8 Buffer Memory

(1) Configuration of the auto-refresh buffer

The auto-refresh buffer is composed of the following areas.

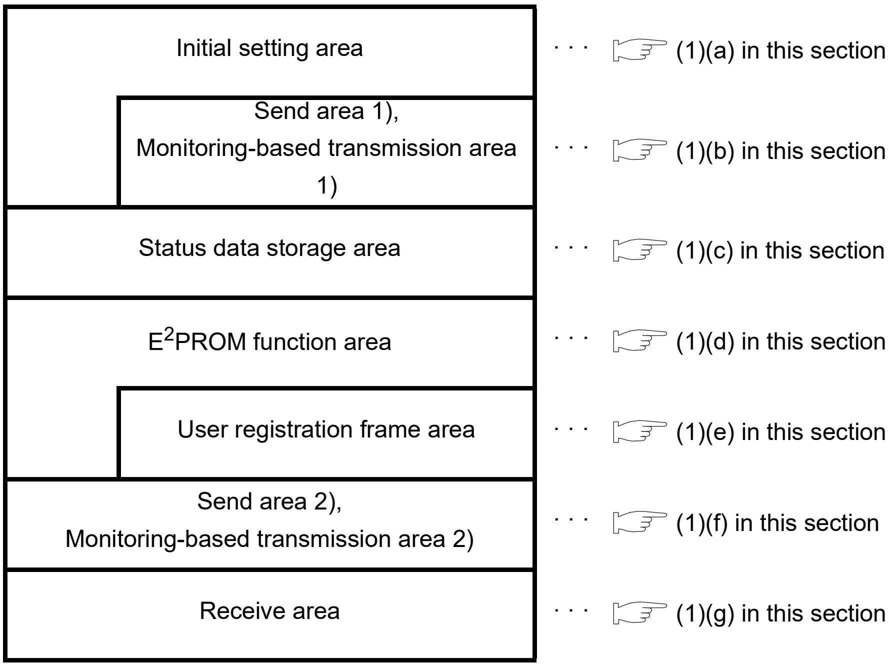


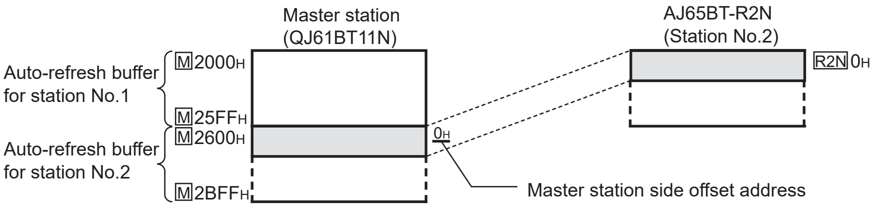
**Figure 4.23 Configuration of the auto-refresh buffer**

Usage of each area, assignment setting, and refresh timing are explained on the following pages.

(a) Initial setting area
The initial settings of each AJ65BT-R2N function are configured in this area.

1) Assignment settings
Assignment settings in the Initial setting area can be changed.
When reducing the transfer size, remove any unnecessary buffer memory from the assignments.
If the entire area is not used, it can be set as unused.

**Table 4.30 Assignment settings**

| R2N Address | Name | Description |
|---|---|---|
| 20H | Transfer size | Specify an initial setting area size.<br>•0H: Initial setting area not used<br>•Setting range: 0H to 1A0H (Unit: Word, Default: 1A0H) |
| 21H | AJ65BT-R2N side start address | Specify the start address of the Initial setting area that is assigned to the AJ65BT-R2N buffer memory.<br>•0H: Initial setting area not used<br>•Setting range: 0H to 19FH (Default: 0H) |
| 22H | Fixed value | 4004H (Fixed) |
| 23H | Master station side offset address | Specify the offset address of the Initial setting area that is assigned to the auto-refresh buffer of the master station.<br>The offset address is the start address of the Initial setting area, which is counted from the start address of the auto-refresh buffer for the target station.<br>•0H: Initial setting area not used<br> <br>•Setting range: 0H to 19FH (Default: 0H) |

2) Refresh timing

**Table 4.31 Refresh timing**

| Transfer direction | Refresh timing |
|---|---|
| AJ65BT-R2N→Master module | Updated immediately following a refresh occurred immediately after Initial data read request signal (RY(n+1)9) is turned ON. |
| Master module→AJ65BT-R2N | Updated immediately following a refresh occurred immediately after Initialization request signal (RYn4) is turned ON. |

(b) Send area 1) and Monitoring-based transmission area 1)

These areas are used for transferring settings of Send start frame No. (R2N 118H) through System area (R2N 19FH) in the Send-frame-1 area from the master module to the AJ65BT-R2N.

1) Assignment settings

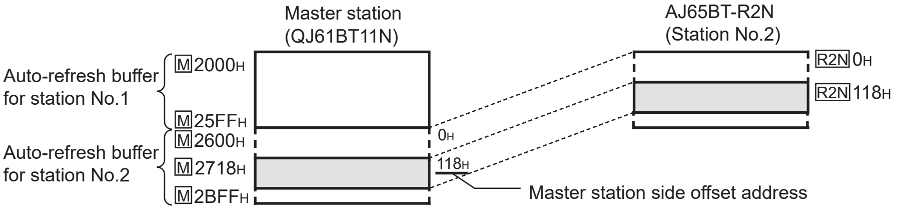
Assignment settings in Send area 1) and Monitoring-based transmission area 1) can be changed.

When reducing the transfer size, remove any unnecessary buffer memory from the assignments.

If the entire area is not used, it can be set as unused.

- Send area 1)

**Table 4.32 Assignment settings**

| R2N Address | Name | Description |
|---|---|---|
| 14H | Transfer size | Specify the size of the Send area 1).<br>•0H: Send area 1) not used<br>•Setting range: 0H to 88H (Unit: Word, Default: 88H) |
| 15H | AJ65BT-R2N side start address | Specify the start address of the Send area 1) that is assigned to the AJ65BT-R2N buffer memory.<br>•0H: Send area 1) not used<br>•Setting range: 0H, 118H to 19FH (Default: 118H) |
| 16H | Fixed value | 4004H (Fixed) |
| 17H | Master station side offset address | Specify the offset address of the Send area 1) that is assigned to the auto-refresh buffer of the master station.<br>The offset address is the start address of the Send area 1), which is counted from the start address of the auto-refresh buffer for the target station.<br>•0H: Send area 1) not used<br> <br>•Setting range: 0H, 118H to 19FH (Default: 118H) |

- Monitoring-based transmission area 1)

**Table 4.33 Assignment settings**

| R2N Address | Name | Description |
|---|---|---|
| 2CH | Transfer size | Specify the size of the Monitoring-based transmission area 1).<br>•0H: Monitoring-based transmission area 1) not used<br>•Setting range: 0H to 88H (Unit: Word, Default: 88H) |
| 2DH | AJ65BT-R2N side start address | Specify the start address of the Monitoring-based transmission area 1) that is assigned to the AJ65BT-R2N buffer memory.<br>•0H: Monitoring-based transmission area 1) not used<br>•Setting range: 0H, 118H to 19FH (Default: 118H) |
| 2EH | Fixed value | 4004H (Fixed) |

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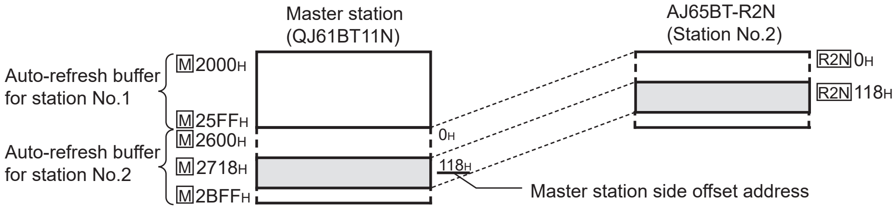
Table 4.33 Assignment settings (Continued)

| R2N Address | Name | Description |
|---|---|---|
| 2FH | Master station side offset address | Specify the offset address of the Monitoring-based transmission area 1) that is assigned to the auto-refresh buffer of the master station.<br>The offset address is the start address of the Monitoring-based transmission area 1), which is counted from the start address of the auto-refresh buffer for the target station.<br>•0H: Monitoring-based transmission area 1) not used<br> <br>•Setting range: 0H, 118H to 19FH (Default: 118H) |

2) Refresh timing

- Send area 1)

**Table 4.34 Refresh timing**

| Transfer direction | Refresh timing |
|---|---|
| Master module→AJ65BT-R2N | Refreshed immediately after Send request signal (RYn0) is turned ON. |

- Monitoring-based transmission area 1)

**Table 4.35 Refresh timing**

| Transfer direction | Refresh timing |
|---|---|
| Master module→AJ65BT-R2N | Refreshed immediately after transmission trigger conditions for the monitoring-based transmission function are met. |

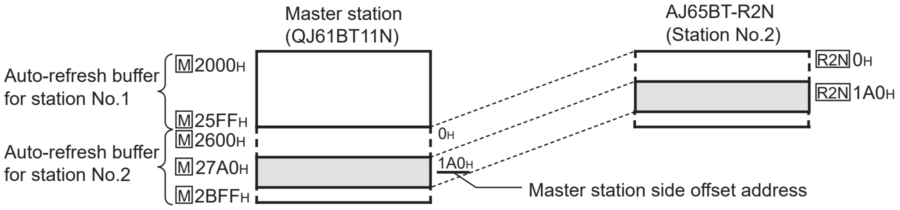
(c) Status data storage area

The setting status or communication status of the AJ65BT-R2N are stored in this area.

1) Assignment settings

Assignment settings in the Initial setting area can be changed.
When reducing the transfer size, remove any unnecessary buffer memory from the assignments.
If the entire area is not used, it can be set as unused.

**Table 4.36 Assignment settings**

<table>
<tr><th>R2N Address</th><th>Name</th><th>Description</th></tr>
<tr><td>10H</td><td>Transfer size</td><td>Specify the size of the Status data storage area.<br>•0H: Status data storage area not used<br>•Setting range: 0H to 20H (Unit: Word, Default: 20H)</td></tr>
<tr><td>11H</td><td>AJ65BT-R2N side start address</td><td>Specify the start address of the Status data storage area that is assigned to the AJ65BT-R2N buffer memory.<br>•0H: Status data storage area not used<br>•Setting range: 0H, 1A0H to 1BFH (Default: 1A0H)</td></tr>
<tr><td>12H</td><td>Fixed value</td><td>4004H (Fixed)</td></tr>
<tr><td>13H</td><td>Master station side offset address</td><td>Specify the offset address of the Status data storage area that is assigned to the auto-refresh buffer of the master station.<br>The offset address is the start address of the Status data storage area, which is counted from the start address of the auto-refresh buffer for the target station.<br>•0H: Status data storage area not used<br>
<br>•Setting range: 0H, 1A0H to 1BFH (Default: 1A0H)</td></tr>
</table>

2) Refresh timing

**Table 4.37 Refresh timing**

| Transfer direction | Refresh timing |
|---|---|
| AJ65BT-R2N→Master module | Refreshed immediately before Initial data read completion signal (RX(n+1)9) turns ON. |
| | Refreshed immediately before Initialization complete signal (RXn4) or Initialization failed signal (RXn5) turns ON. |
| | Refreshed immediately before Send complete signal (RXn0) or Send failed signal (RXn1) turns ON. |
| | Refreshed immediately before Normal receive data read request signal (RXn2) or Error receive data read request signal (RXn3) turns ON. |
| | Updated immediately following a refresh occurred immediately after Error reset request signal (RY(n+1)A) is turned ON. |
| | Refreshed immediately after an error occurrence in transmission by the monitoring-based transmission function. |
| | Refreshed immediately before $E^2$PROM function complete signal (RXn7) or $E^2$PROM function failed signal (RXn8) turns ON. |

(d) E$^2$PROM function area

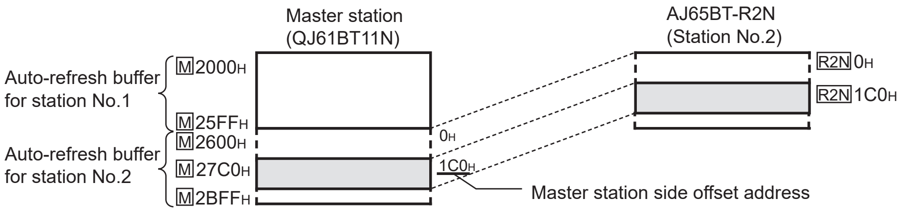
This area is provided for the following processing that is performed using the E$^2$PROM.

- E$^2$PROM function setting
- Registration of user registration frames
- Reading of user registration frames
- Deletion of user registration frames

1) Assignment settings

Assignment settings in the E$^2$PROM function area can be changed.
When reducing the transfer size, remove any unnecessary buffer memory from the assignments.
If the entire area is not used, it can be set as unused.

**Table 4.38 Assignment settings**

| R2N Address | Name | Description |
|---|---|---|
| 24H | Transfer size | Specify the size of the E$^2$PROM function area.<br>•0H: E$^2$PROM function area not used<br>•Setting range: 0H to 30H (Unit: Word, Default: 30H) |
| 25H | AJ65BT-R2N side start address | Specify the start address of the E$^2$PROM function area that is assigned to the AJ65BT-R2N buffer memory.<br>•0H: E$^2$PROM function area not used<br>•Setting range: 0H, 1C0H to 1EFH (Default: 1C0H) |
| 26H | Fixed value | 4004H (Fixed) |
| 27H | Master station side offset address | Specify the offset address of the E$^2$PROM function area that is assigned to the auto-refresh buffer of the master station.<br>The offset address is the start address of the E$^2$PROM function area, which is counted from the start address of the auto-refresh buffer for the target station.<br>•0H: E$^2$PROM function area not used<br><br> <br>•Setting range: 0H, 1C0H to 1EFH (Default: 1C0H) |

2) Refresh timing

**Table 4.39 Refresh timing**

| Transfer direction | Refresh timing |
|---|---|
| Master module→AJ65BT-R2N | Updated immediately following a refresh occurred immediately after E$^2$PROM function request signal (RYn7) is turned ON. |

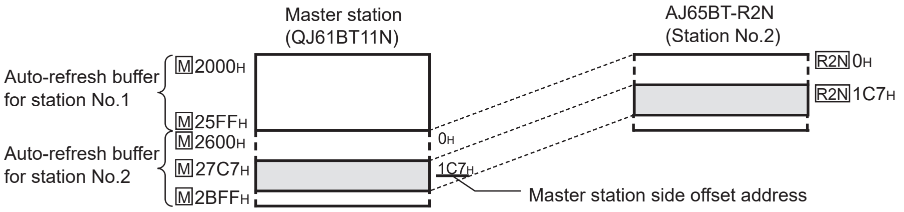
(e) User registration frame area

This area is provided for registration and reading of user registration frames.

1) Assignment settings

Assignment settings in the User registration frame area can be changed.
When reducing the transfer size, remove any unnecessary buffer memory from the assignments.
If the entire area is not used, it can be set as unused.

**Table 4.40 Assignment settings**

| R2N Address | Name | Description |
|---|---|---|
| 28H | Transfer size | Specify the size of the User registration frame area.<br>•0H: User registration frame area not used<br>•Setting range: 0H to 29H (Unit: Word, Default: 29H) |
| 29H | AJ65BT-R2N side start address | Specify the start address of the User registration frame area that is assigned to the AJ65BT-R2N buffer memory.<br>•0H: User registration frame area not used<br>•Setting range: 0H, 1C7H to 1EFH (Default: 1C7H) |
| 2AH | Fixed value | 4004H (Fixed) |
| 2BH | Master station side offset address | Specify the offset address of the User registration frame area that is assigned to the auto-refresh buffer of the master station.<br>The offset address is the start address of the User registration frame area, which is counted from the start address of the auto-refresh buffer for the target station.<br>•0H: User registration frame area not used<br><br> <br>•Setting range: 0H, 1C7H to 1EFH (Default: 1C7H) |

2) Refresh timing

**Table 4.41 Refresh timing**

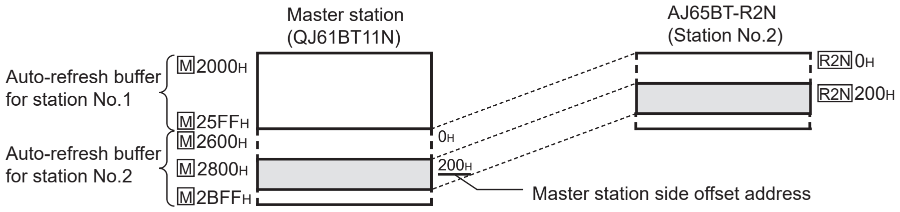
| Transfer direction | Refresh timing |
|---|---|
| AJ65BT-R2N→Master module | Refreshed immediately before E$^2$PROM function complete signal (RXn7) or E$^2$PROM function failed signal (RXn8) turns ON. |

(f) Send area 2) and Monitoring-based transmission area 2)
These area are provided for transferring data, which are addressed to the external device, from the master module to the send area of the AJ65BT-R2N.

1) Assignment settings
Assignment settings in Send area 2) and Monitoring-based transmission area 2) can be changed.
When reducing the transfer size, remove any unnecessary buffer memory from the assignments.
If the entire area is not used, it can be set as unused.

- Send area 2)

**Table 4.42 Assignment settings**

| R2N Address | Name | Description |
|---|---|---|
| 18H | Transfer size | Specify the size of the Send area 2).<br>•0H: Send area 2) not used<br>•Setting range: 0H, 2H to 5FEH (Unit: Word, Default: 200H) |
| 19H | AJ65BT-R2N side start address | Specify the start address of the Send area 2) that is assigned to the AJ65BT-R2N buffer memory.<br>•0H: Send area 2) not used<br>•Setting range: 0H, 200H to 7FEH (Default: 200H) |
| 1AH | Fixed value | 4004H (Fixed) |
| 1BH | Master station side offset address | Specify the offset address of the Send area 2) that is assigned to the auto-refresh buffer of the master station.<br>The offset address is the start address of the Send area 2), which is counted from the start address of the auto-refresh buffer for the target station.<br>•0H: Send area 2) not used<br> <br>•Setting range: 0H, 200H to 7FEH (Default: 200H) |

- Monitoring-based transmission area 2)

**Table 4.43 Assignment settings**

| R2N Address | Name | Description |
|---|---|---|
| 30H | Transfer size | Specify the size of the Monitoring-based transmission area 2).<br>•0H: Monitoring-based transmission area 2) not used<br>•Setting range: 0H, 2H to 5FEH (Unit: Word, Default: 200H) |
| 31H | AJ65BT-R2N side start address | Specify the start address of the Monitoring-based transmission area 2) that is assigned to the AJ65BT-R2N buffer memory.<br>•0H: Monitoring-based transmission area 2) not used<br>•Setting range: 0H, 200H to 7FEH (Default: 200H) |
| 32H | Fixed value | 4004H (Fixed) |

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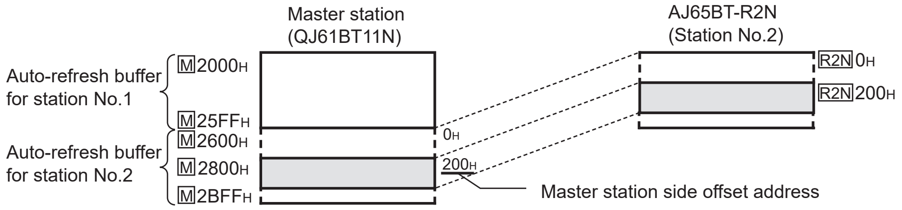
Table 4.43 Assignment settings (Continued)

| R2N Address | Name | Description |
|---|---|---|
| 33H | Master station side offset address | Specify the offset address of the Monitoring-based transmission area 2) that is assigned to the auto-refresh buffer of the master station.<br>The offset address is the start address of the Monitoring-based transmission area 2), which is counted from the start address of the auto-refresh buffer for the target station.<br>•0H: Monitoring-based transmission area 2) not used<br> <br>•Setting range: 0H, 200H to 7FEH (Default: 200H) |

2) Refresh timing

- Send area 2)

**Table 4.44 Refresh timing**

| Transfer direction | Refresh timing |
|---|---|
| Master module→AJ65BT-R2N | Refreshed immediately after Send request signal (RYn0) is turned ON. |

- Monitoring-based transmission area 2)

**Table 4.45 Refresh timing**

| Transfer direction | Refresh timing |
|---|---|
| Master module→AJ65BT-R2N | Refreshed immediately after transmission trigger conditions for the monitoring-based transmission function are met. |

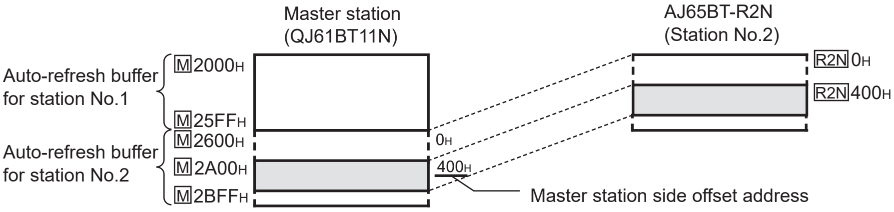
(g) Receive area

This area is provided for data received from the external device to be transferred from the receive area of the AJ65BT-R2N to the master module.

1) Assignment settings

Assignment settings in the Receive area can be changed.
When reducing the transfer size, remove any unnecessary buffer memory from the assignments.
If the entire area is not used, it can be set as unused.

**Table 4.46 Assignment settings**

| R2N Address | Name | Description |
|---|---|---|
| 1CH | Transfer size | Specify the size of the Receive area.<br>•0H: Receive area not used<br>•Setting range: 0H, 2H to 5FEH (Unit: Word, Default: 200H) |
| 1DH | AJ65BT-R2N side start address | Specify the start address of the Receive area that is assigned to the AJ65BT-R2N buffer memory.<br>•0H: Receive area not used<br>•Setting range: 0H, 200H to 7FEH (Default: 400H) |
| 1EH | Fixed value | 4004H (Fixed) |
| 1FH | Master station side offset address | Specify the offset address of the Receive area that is assigned to the auto-refresh buffer of the master station.<br>The offset address is the start address of the Receive area, which is counted from the start address of the auto-refresh buffer for the target station.<br>•0H: Receive area not used<br><br> <br>•Setting range: 0H, 200H to 7FEH (Default: 400H) |

2) Refresh timing

**Table 4.47 Refresh timing**

| Transfer direction | Refresh timing |
|---|---|
| AJ65BT-R2N→Master module | Refreshed immediately before Normal receive data read request signal (RXn2) or Error receive data read request signal (RXn3) turns ON. |

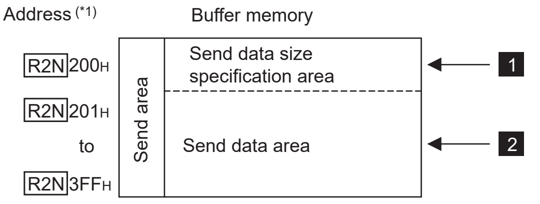
## 4.3.2 Send processing

(1) Send area

Data to be sent to the external device are stored in the send area.

(a) Composition of the send area

The send area is composed of Send data size specification area and Send data area.



*1 When Send area, start address specification (R2N 0H) is 200H

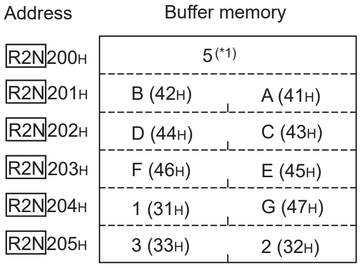
**Figure 4.24 Composition of the send area**

**Table 4.48 Composition of the send area**

| No. | Name | Description |
|---|---|---|
| 1 | Send data size specification area | Number of send data is stored.<br>The value changes depending on the setting of Word/byte specification (R2N 102H). |
| 2 | Send data area | Send data are stored in order starting from the lower byte of the lowest address. |

(b) A storage example of the send area

The following shows an example of storing "ABCDEFG123" in the send area when sending it to the external device. (In the case of: Send area, start address specification (R2N 0H): 200H, and Word/byte specification (R2N 102H): 0H (In word units))



*1 When Word/byte specification ( R2N 102H) is 1H (Bytes), AH (10) is stored.

**Figure 4.25 A storage example of the send area**

(2) Transmission procedures

When the buffer memory auto-refresh function is used, the following send processing is performed.

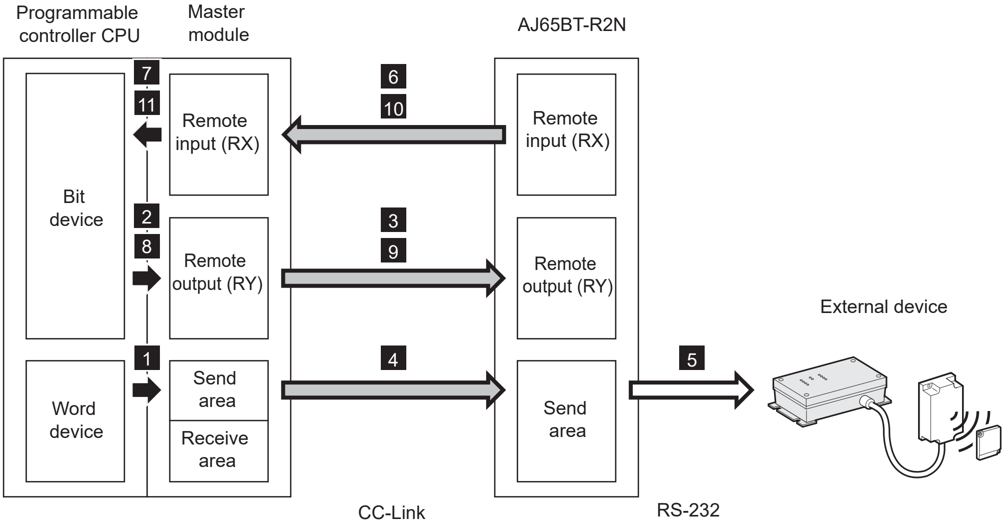


**Figure 4.26 Send processing when using the buffer memory auto-refresh function**

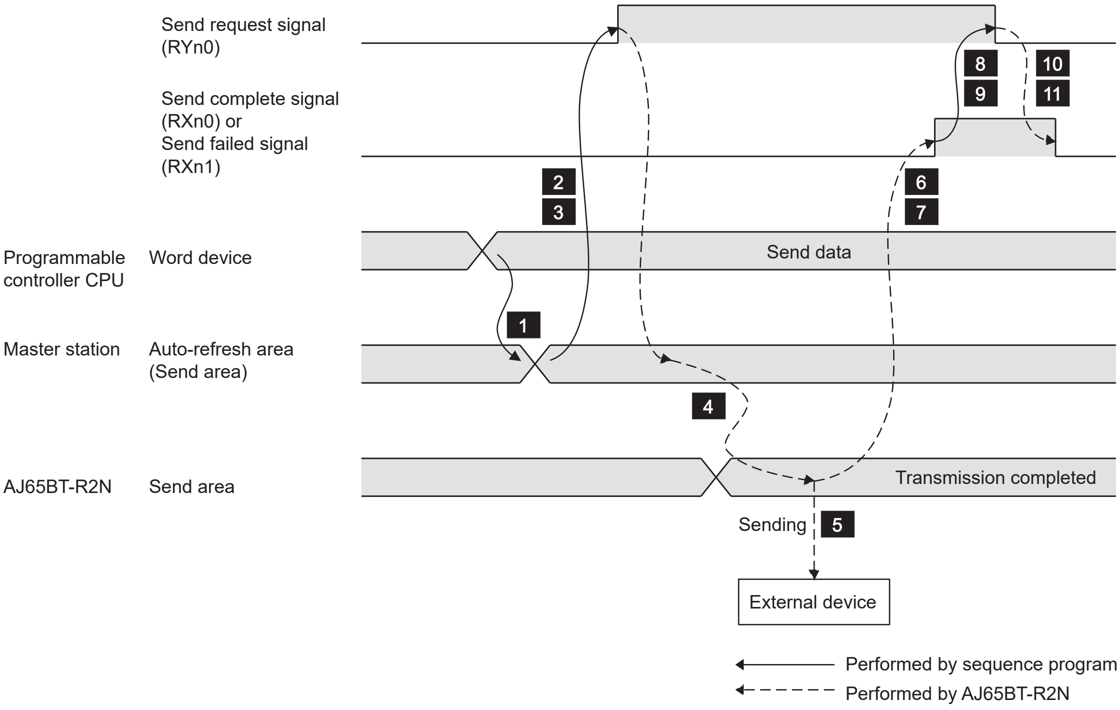


**Figure 4.27 Timing chart when using the buffer memory auto-refresh function**

Table 4.49 Transmission procedures when using the buffer memory auto-refresh function

| No. | Processing |
|---|---|
| 1 | With the RITO instruction, the send data are written from word devices of the programmable controller CPU to the send area of the master module. |
| 2, 3 | Send request signal (RYn0) is turned ON. |
| 4 | The send data are written from the send area of the master module to the send area of the AJ65BT-R2N. |
| 5 | The send data are sent from the send area of the AJ65BT-R2N to the external device. |
| 6, 7 | When transmission is normally completed, Send complete signal (RXn0) turns ON.<br>When failed, Send failed signal (RXn1) turns ON. |
| 8, 9 | Send request signal (RYn0) is turned OFF. |
| 10, 11 | Send complete signal (RXn0) and Send failed signal (RXn1) are turned OFF. |

**Remark**

If the programmable controller CPU does not support dedicated instructions, the FROM/TO instruction can be used for communication.

For a sample program using the FROM/TO instruction, refer to the following.

☞ CHAPTER 8 PROGRAMMING WHEN USING FROM/TO INSTRUCTION IN ACPU/QCPU (A MODE)

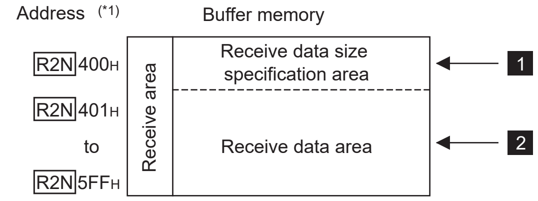
## 4.3.3 Receive processing

(1) Receive area

Data received from the external device are stored in the receive area.
Read the received data from the receive area to the programmable controller CPU .

(a) Composition of the receive area

The receive area is composed of Receive data size specification area and Receive data area.



*1 When Receive area, start address specification (R2N 2H) is 400H

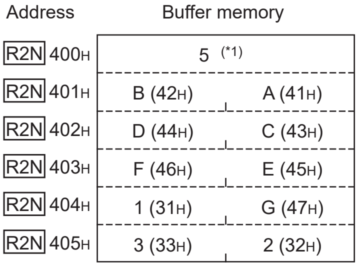
**Figure 4.28 Composition of the receive area**

**Table 4.50 Composition of the receive area**

| No. | Name | Description |
|---|---|---|
| 1 | Receive data size specification area | Number of receive data is stored.<br>The value changes depending on the setting of Word/byte specification (R2N 102H). |
| 2 | Receive data area | Receive data are stored in order starting from the lower byte of the lowest address. |

(b) A storage example of the receive area

The following shows an example of storing "ABCDEFG123" in the receive area when receiving it from the external device. (In the case of: Receive area, start address specification (R2N 2H): 400H, and Word/byte specification (R2N 102H): 0H)



| Address | Buffer memory | |
|---|---|---|
| R2N 400H | 5 (*1) | |
| R2N 401H | B (42H) | A (41H) |
| R2N 402H | D (44H) | C (43H) |
| R2N 403H | F (46H) | E (45H) |
| R2N 404H | 1 (31H) | G (47H) |
| R2N 405H | 3 (33H) | 2 (32H) |

*1 When Word/byte specification (R2N 102H) is 1H (Bytes), AH (10) is stored.

**Figure 4.29 A storage example of the receive area**

## (2) Reception procedures

When the buffer memory auto-refresh function is used, the following receive processing is performed.

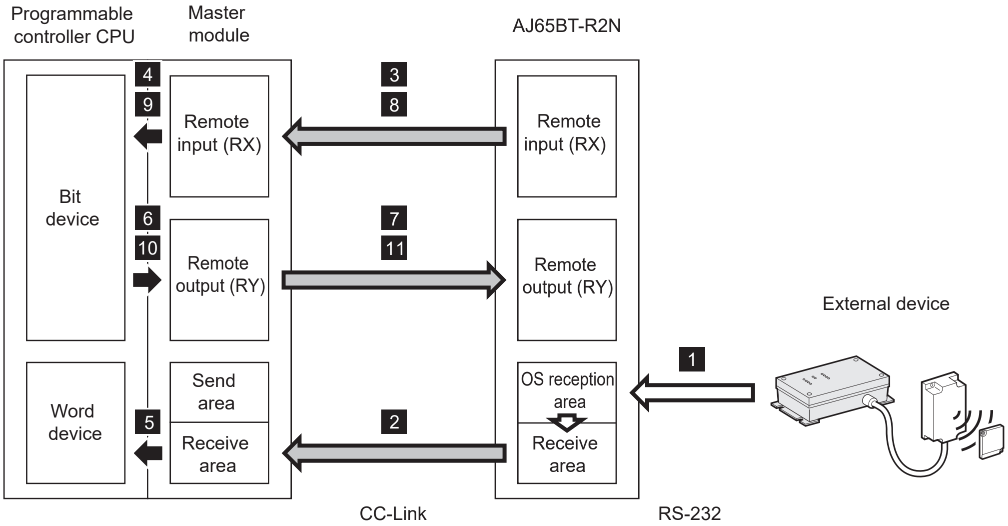


**Figure 4.30 Receive processing when using the buffer memory auto-refresh function**

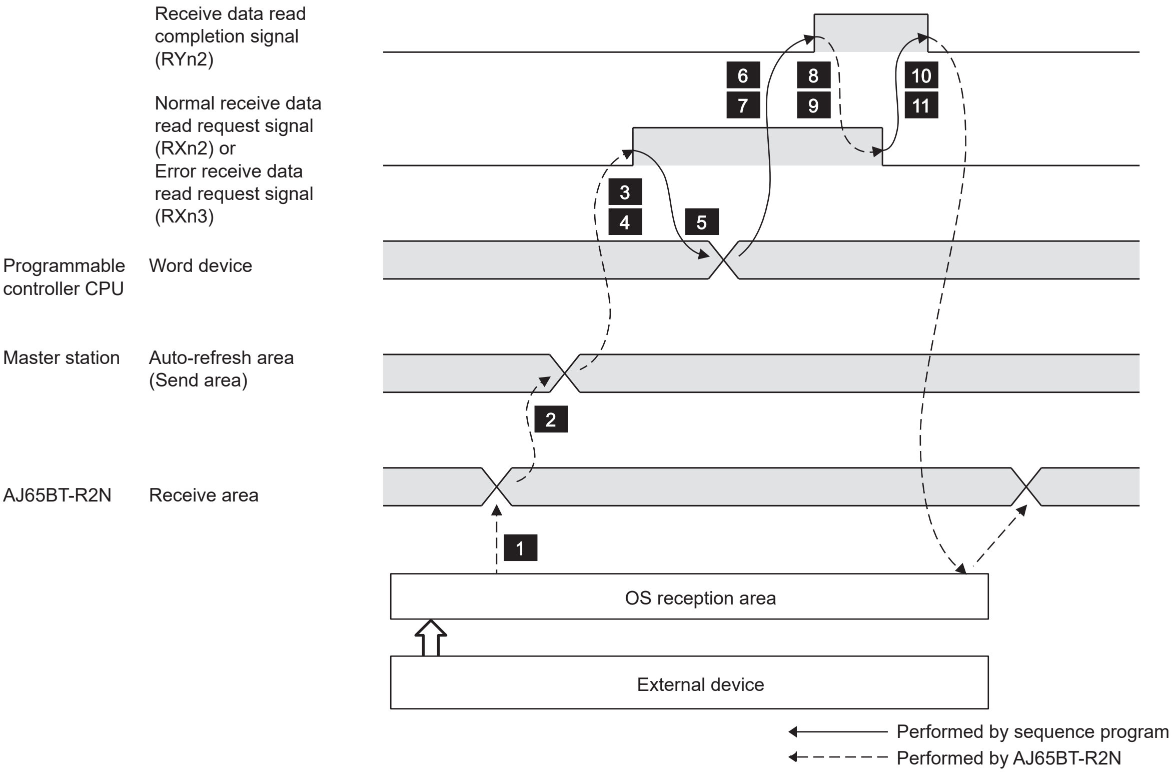


**Figure 4.31 Timing chart when using the buffer memory auto-refresh function**

Table 4.51 Reception procedures when using the buffer memory auto-refresh function

| No. | Processing |
|---|---|
| 1 | Data are received from the external device through the OS reception area, and stored in the receive area. |
| 2 | The receive data are written from the receive area of the AJ65BT-R2N to the receive area of the master module. |
| 3, 4 | When reception is normally completed, Normal receive data read request signal (RXn2) turns ON.<br>When failed, Error receive data read request signal (RXn3) turns ON. |
| 5 | With the RIFR instruction, the receive data are read from the receive area of the master module to the programmable controller CPU devices. |
| 6, 7 | Receive data read completion signal (RYn2) is turned ON. |
| 8, 9 | Normal receive data read request signal (RXn2) and Error receive data read request signal (RXn3) turn OFF. |
| 10, 11 | Receive data read completion signal (RYn2) is turned OFF. |

**Remark**

If the programmable controller CPU does not support dedicated instructions, the FROM/TO instruction can be used for communication.

For a sample program using the FROM/TO instruction, refer to the following.

☞ CHAPTER 8 PROGRAMMING WHEN USING FROM/TO INSTRUCTION IN ACPU/QCPU (A MODE)

## 4.4 AJ65BT-R2N Initialization Function

The AJ65BT-R2N initialization function performs the following processing.

- Stopping the processing in execution
- Initializing the AJ65BT-R2N
- Enabling the setting written to a buffer memory

### (1) Processing

(a) Stopping the following processing that is in execution

1) Send/receive processing
2) OS reception area clear function processing
3) Send cancel function processing
4) Forced receive completion function processing

(b) Initializing the AJ65BT-R2N

1) Initializing the DTR/DSR (ER/DR) control and DC code control of the flow control function.
2) Initializing the send/receive processing of the frame function.
3) Resetting the RS (RTS) signal status of the RS-232 control signals.
4) Clearing the OS reception area (☞ Section 4.5.8 OS reception area clear function)
5) Turning OFF the ERR. LED and clearing the Error code storage area (R2N 1A8H to 1B2H)

(c) Enabling the setting written to the buffer memory
The setting written to the following buffer memory is enabled.

1) Send area, start address specification (R2N 0H) to RS (RTS) signal status specification (R2N 101H)
2) ASCII-binary conversion specification (R2N 103H) to Receive timeout time specification (R2N 112H)

### (2) Processing method

The AJ65BT-R2N initialization function is executed by turning ON the Initialization request signal (RYn4).

For a sample program for initialization, refer to the following.

☞ Section 6.3 Initial Setting for AJ65BT-R2N

### (3) Precautions

For initialization of the AJ65BT-R2N, confirm that the following remote outputs (RY) are OFF before turning ON Initialization request signal (RYn4).

If Initialization request signal (RYn4) is turned ON while any of the following remote output signals (RY) is ON, the processing started by the signal (RY) may be stopped.

**Table 4.52 Remote outputs (RY) to be turned OFF**

| Device No. | Signal name | Device No. | Signal name |
|---|---|---|---|
| RYn0 | Send request signal | RYn6 | OS reception area clear request signal |
| RYn1 | Send cancel request signal | RYn7 | E$^2$PROM function request signal |
| RYn2 | Receive data read completion signal | RY(n+1)9 | Initial data read request signal |
| RYn3 | Forced receive completion request signal | RY(n+1)A | Error reset request signal |

Example) Interlock circuit for confirming remote outputs (RY) are OFF

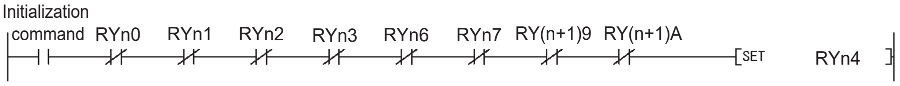


**Figure 4.32 Example of an interlock circuit for confirming remote outputs (RY) are OFF**

## 4.5 Functions Used for Data Communication

### 4.5.1 Frame function

The frame function is used to add specific data to original data to send them to the external device or to receive data containing specific data from the external device.
In the frame function, specific data are set up with a registration frame, which can be added or deleted.
Using this frame function makes processing of specific data easy when they are to be added to send/receive data of the external device.

The following methods are available for data communication using the frame function.

**Table 4.53 Communication methods using the frame function**

| Send/receive | Method | Reference |
|---|---|---|
| Send | Adds one registration frame to the start and/or end of the send data that is stored in the send area. | (1) in this section |
| | Sends up to 100 registration frames that are specified in Transmission table specification (R2N 122H to 185H). | (2) in this section |
| Receive | Identifies necessary data with registration frame(s) from the data received from the external device. | (3) in this section |

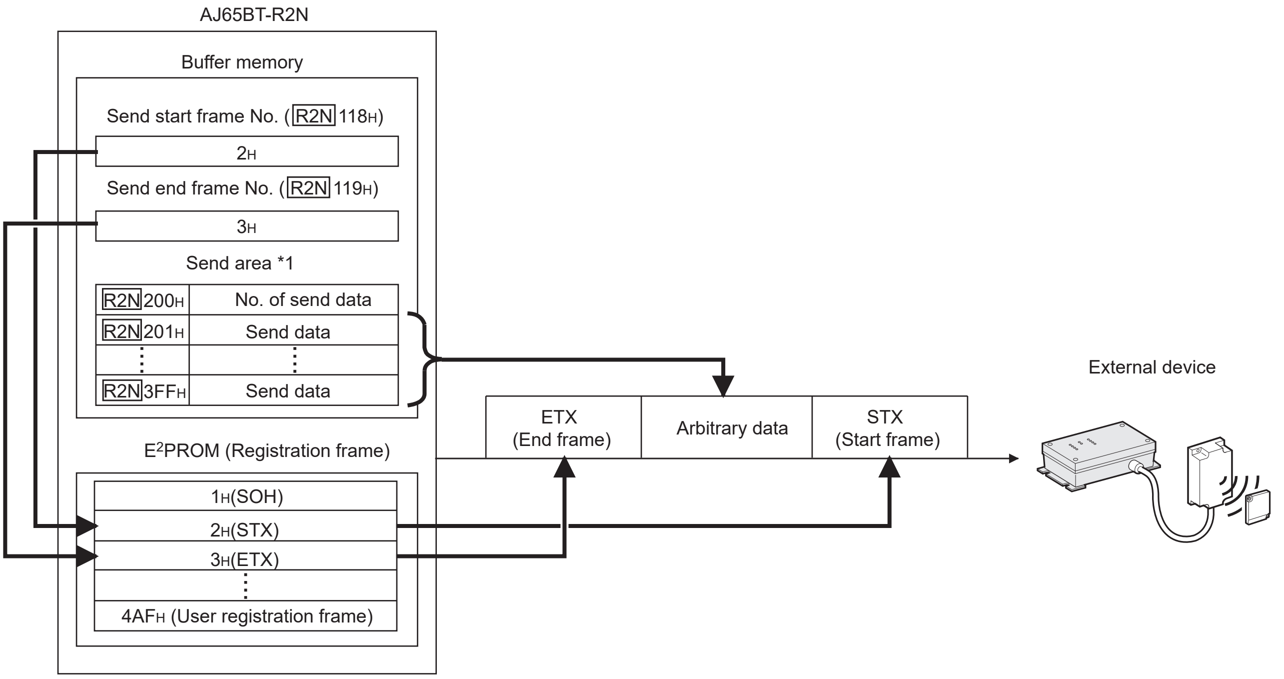
There are the following kinds of registration frames.

**Table 4.54 Registration frame**

| Name | Description | Reference |
|---|---|---|
| Default registration frame | Frames that have been registered in the AJ65BT-R2N by default.<br>These frames cannot be changed. | (4) in this section |
| User registration frame | Frames that the user is required to register to the $E^2$PROM of the AJ65BT-R2N.<br>The user can specify any frame data. | (5) in this section |

(1) Frame transmission (Send-frame-1 area)

One registration frame can be added to the start and/or end of the send data that is stored in the send area.



*1 When Send area, start address specification (R2N 0H) and Send area size specification (R2N 1H) are defaulted

**Figure 4.33 Schematic diagram of transmission**

(a) Setting

**Table 4.55 Setting for frame transmission (Send-frame-1 area)**

| R2N Address | Name | | Description |
|---|---|---|---|
| 118H | Send-frame-1 area | Send start frame No. | Specify a registration frame that is to be added to the head of send data.<br>•0H: No registration frame added to the head.<br>•1H to 161H: Specify default registration frame. (☞ (4) in this section)<br>•3E8H to 4AFH: Specify user registration frame. (☞ (5) in this section)<br>•Setting range: 0H, 1H to 161H, 3E8H to 4AFH (Default: 0H) |
| 119H | | Send end frame No. | Specify a registration frame that is to be added to the end of send data.<br>•0H: No registration frame added to the end.<br>•1H to 161H: Specify default registration frame. (☞ (4) in this section)<br>•3E8H to 4AFH: Specify user registration frame. (☞ (5) in this section)<br>•Setting range: 0H, 1H to 161H, 3E8H to 4AFH (Default: 0H) |

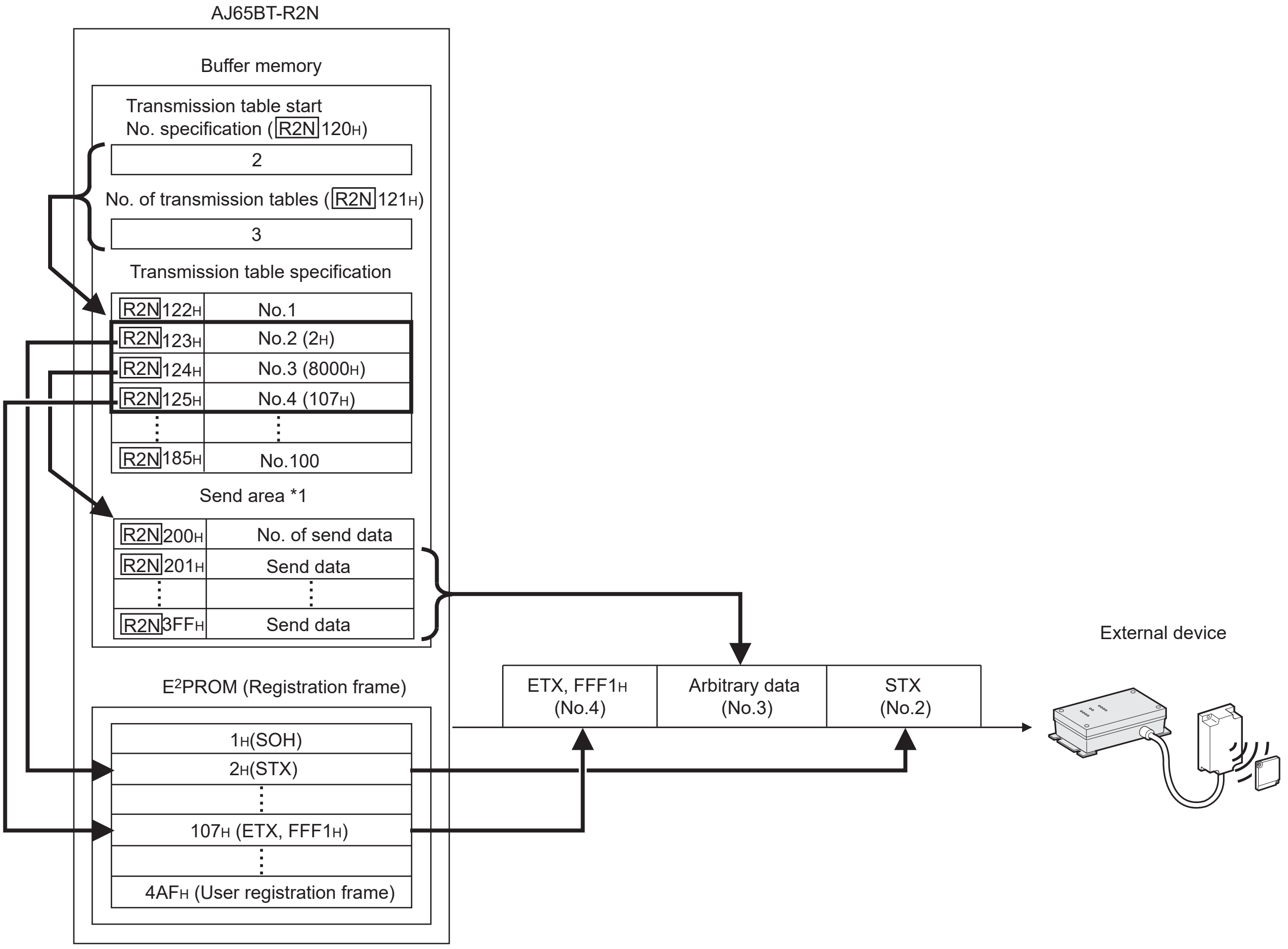
(b) Transmission method

If a registration frame has been specified in the Send-frame-1 area (R2N 118H to 119H), the frame is automatically added to data when they are sent to the external device.

(c) Precautions

Do not include the same data as the start or end frame in send data (R2N 201H to 3FFH (at default)).
Doing so may cause the external device to recognize the received data as a start or end frame.

(2) Frame transmission (Send-frame-2 area)
Up to 100 registration frames, which are specified in Transmission table specification (R2N 122H to 185H), are sent as concatenated data.



*1 When Send area, start address specification (R2N 0H) and Send area size specification (R2N 1H) are defaulted

Figure 4.34 Schematic diagram of transmission

(a) Setting

**Table 4.56 Setting for frame transmission (Send-frame-2 area)**

| R2N Address | Name | | Description |
|---|---|---|---|
| 120H | Send-frame-2 area | Transmission table start No. specification | Specify the start No. of the registration frame to be sent.<br>Specify a start No. corresponding to Transmission table specification (R2N 122H to 185H).<br>•0: No registration frame sent<br>•Setting range: 0, 1 to 100 (Default: 0) |
| 121H | | No. of transmission tables | Specify the number of registration frames to be sent.<br>•0: No registration frame sent<br>•Setting range: 0, 1 to 100 (Default: 0) |
| 122H to 185H | | Transmission table specification (No.1 to No.100) | Specify a registration frame to be sent.<br>One frame is specified for one number in Transmission table specification.<br>•1H to 161H: Specify default registration frame. (☞ (4) in this section)<br>•3E8H to 4AFH: Specify user registration frame. (☞ (5) in this section)<br>•8000H: Specify send data stored in the send area (R2N 200H (at default))<br>•Setting range: 0H, 1H to 161H, 3E8H to 4AFH, 8000H (Default: 0H) |

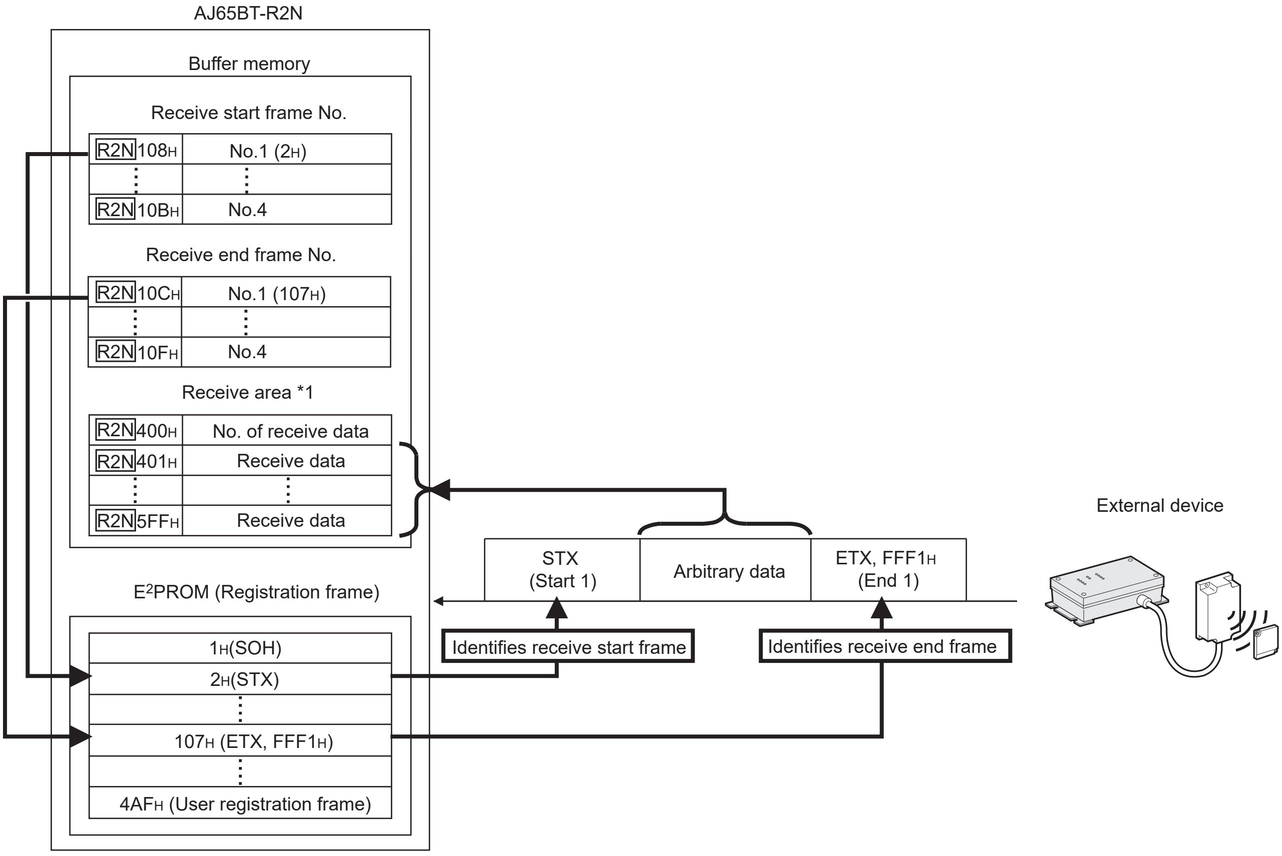
(b) Transmission method

If any registration frames have been specified in the Send-frame-2 area (R2N 120H to 185H), the frames are sent at the time of transmission to the external device.

The frames to be sent are concatenated data in the range specified by Transmission table start No. specification (R2N 120H) and No. of transmission tables (R2N 121H) in Transmission table specification (R2N 122H to 185H).

(3) Frame reception

Necessary data with registration frame(s) are identified from the data received from the external device.

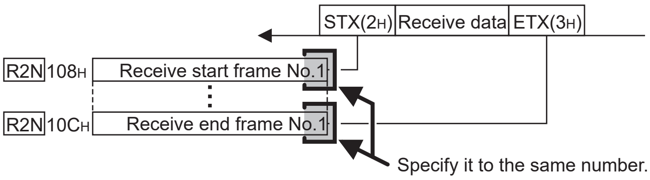


*1 When Send area, start address specification (R2N 0H) and Send area size specification (R2N 1H) are defaulted

**Figure 4.35 Schematic diagram of reception**

(a) Setting

Table 4.57 Setting for frame reception

| R2N Address | Name | Description |
|---|---|---|
| 108H to 10BH | Receive start frame No.1 to 4 | Specify a registration frame, which is to be identified as the data head, in Receive start frame No. (R2N 108H to 10BH)<br>Specify a registration frame, which is to be identified as the data end, in Receive end frame No. (R2N 10CH to 10FH)<br>When both of the start and end of the data are to be identified, specify the registration frames to the same number.<br> <br>When the data head need not be identified with a registration frame, specify 0H in Receive start frame No. (R2N 108H to 10BH).<br>When the data end need not be identified with a registration frame, specify 0H in Receive end frame No. (R2N 10CH to 10FH).<br>•1H to 161H: Specify default registration frame. (☞ (4) in this section)<br>•3E8H to 4AFH: Specify user registration frame. (☞ (5) in this section)<br>•Setting range: 0H, 1H to 161H, 3E8H to 4AFH (Default: 0H)<br>Depending on the specification in this buffer memory, specification of No. of receive end data (R2N 111H) may be required.<br>For details, refer to the following.<br>☞ (3)(c) in this section<br>Some precautions must be taken for this buffer memory.<br>For details, refer to the following.<br>☞ (3)(d) in this section<br>☞ (3)(e) in this section |
| 10CH to 10FH | Receive end frame No.1 to 4 | |
| 110H | Receive start/end frame elimination | Specify whether or not to remove the receive start frame and the receive end frame from the receive data before storing the data in the receive area.<br>•0H: Not remove from receive data<br>•1H: Remove from receive data<br>•Setting range: 0H, 1H (Default: 1H) |
| 1B5H | Receive frame index No. storage | The number of the receive start frame or receive end frame, which is identified in data reception, is stored.<br>If no receive start or end frame is identified in data reception, 0H is stored. |

(b) Reception method

When a registration frame has been specified in Receive start frame No.1 to 4 (R2N 108H to 10BH) or Receive end frame No.1 to 4 (R2N 10CH to 10FH), data are received with the registration frame identified.

(c) No. of receive end data (R2N 111H) setting

Whether specification of No. of receive end data (R2N 111H) is required or not is determined by whether the receive start frame and receive end frame are specified or not.

**Table 4.58 Need for setting of No. of receive end data (R2N 111H)**

| Receive start frame | Receive end frame | Need for specification of No. of receive end data (R2N 111H) |
|---|---|---|
| ○ | ○ | Specify a value to complete reception for the case of no receive end frame detection. |
| ○ | × | Required |
| × | ○ | Specify a value to complete reception for the case of no receive end frame detection. |

○: Specified, × : Not specified

**Remark**

For receiving variable length data, specify a receive end frame and set 0 in No. of receive end data (R2N 111H).

(d) Timing of reception

1) Comparisons of receive start or end timing between using and not using the frame function

**Table 4.59 Timing comparisons between using and not using the frame function**

| Receive start/end | Using the frame function | Not using the frame function |
|---|---|---|
| Receive start | •When a receive start frame is specified<br>At a time of receiving the receive start frame from the external device<br>•When no receive start frame is specified<br>At a time of receiving any data from the external device | At a time of receiving any data |
| Receive end | •When the number of received data reaches the value specified in No. of receive end data (R2N 111H)<br>•At a time of receiving a receive end frame<br>•When a receive error occurred (e.g. receive timeout)[*1] | •When the number of received data reaches the value specified in No. of receive end data (R2N 111H)<br>•When a receive error occurred (e.g. receive timeout)[*1] |

* 1 If a receive error occurred, data received before the error occurrence will be stored in Receive data area just like the case where no receive error occurred.

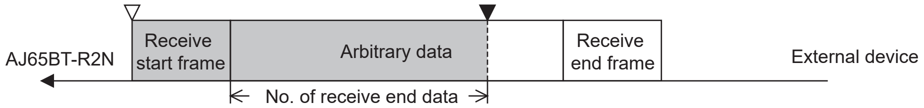
2) Timing at which Normal receive data read request signal (RXn2) or Error receive data read request signal (RXn3) turns ON according to the frame setting combination and the relation of the following values:

- 1: Value specified in No. of receive end data (R2N 111H)
- 2: No. of received data

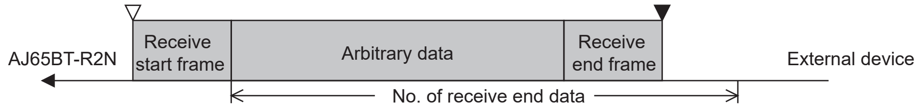
**Table 4.60 Timing at which Normal receive data read request signal (RXn2) or Error receive data read request signal (RXn3) turns ON**

<table>
<tr><th>Setting</th><th>Timing at which RXn2 or RXn3 turns ON</th></tr>
<tr><td>When receive start frame and receive end frame are set</td><td>

•When 1 < 2

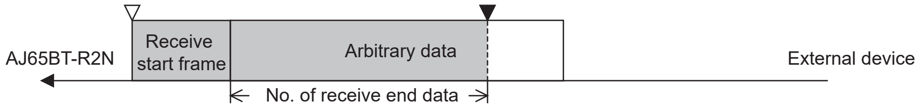


•When 1 ≧ 2, or 1 = 0

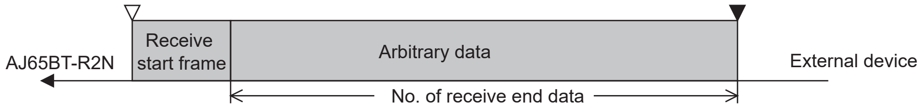


</td></tr>
<tr><td>When receive start frame only is set</td><td>

•When 1 < 2



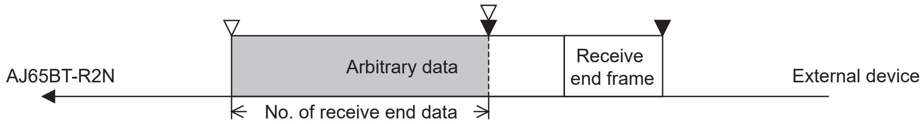
•When 1 ≧ 2



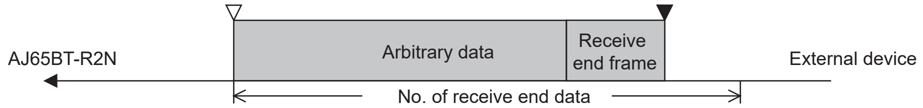
•When 1 = 0

</td></tr>
<tr><td>When receive end frame only is set</td><td>

•When 1 < 2



•When 1 ≧ 2, or 1 = 0



•When receive end frame only is received

</td></tr>
</table>

▽ : Receive start timing, ▼ : Timing at which reception is completed and RXn2 or RXn3 turns ON, ▨ : Data received

(e) Precautions on receive start frames and receive end frames

1) Specify a receive start frame and/or a receive end frame only in the following combinations 1 to 4, or 5 to 7.
A mixed setting of combinations 1 to 4 and 5 to 7 may result in abnormal data reception.

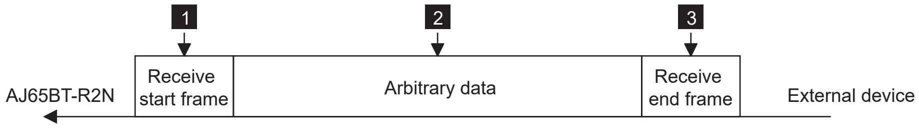


**Figure 4.36 Receive data**

- Combinations 1 to 4

**Table 4.61 Combinations of receive start frame and receive end frame (Receive start frame specified)**

| Combination | Receive start frame 1 | Arbitrary data 2 | Receive end frame 3 |
|---|---|---|---|
| 1 | ○ | ○ | ○ |
| 2 | ○ | ○ | — |
| 3 | ○ | — | ○ |
| 4 | ○ | — | — |

○: Specified, × : Not specified

- Combinations 5 to 7

**Table 4.62 Combinations of receive start frame and receive end frame (Receive start frame not specified)**

| Combination | Receive start frame 1 | Arbitrary data 2 | Receive end frame 3 |
|---|---|---|---|
| 5 | — | ○ | ○ |
| 6 | — | ○ | — |
| 7 | — | — | ○ |

○: Specified, × : Not specified

2) When a receive start frame is specified and no receive end frame is specified, set a number of receive data that does not include the receive start frame, in No. of receive end data (R2N 111H).
If 0H is specified in No. of receive end data (R2N 111H), only the receive start frame will be received.

3) If a receive start frame has been specified, data received before receive start frame reception will not be received.

4) If a receive start frame has been specified, data after the receive end frame or data exceeding the No. of receive end data will not be received.

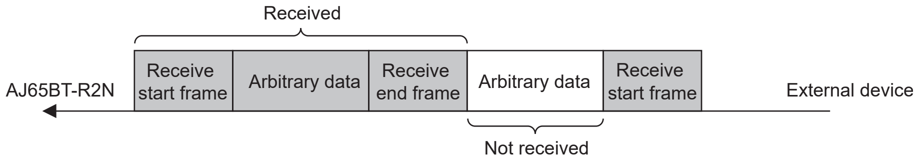


**Figure 4.37 Data that are not received**

5) Do not include the same data as the receive start frame or receive end frame in receive data.
   Doing so may cause the data to be incorrectly recognized as the frame.
6) When using the frame function, specify the size of the entire receive data including frame(s) in Receive area size specification (R2N 3H).
7) When 0H is specified in Receive start/end frame elimination (R2N 110H), a value in Receive data size specification area (R2N 400H (at default)) is not equal to a value in No. of receive end data (R2N 111H). The following relational expression is used.

   No. of receive data = No. of receive end data + (No. of received frame data)

(4) Default registration frames

The following send/receive data have been pre-registered as default registration frames.

These data cannot be changed.

To create any registration frame, use a user registration frame (☞ (5) in this section).

**Table 4.63 Default registration frames**

| Frame No. | | No. of bytes | Description | | Remarks |
|---|---|---|---|---|---|
| HEX. | DEC. | | | | |
| 0H | 0 | — | Use prohibited | | — |
| 1H<br>to<br>FEH | 1<br>to<br>254 | 1 | Data that is the same as the frame No. (1H to FEH)<br>Example: When 2H is specified, STX(02H) is sent/received. | | — |
| FFH | 255 | — | Use prohibited | | — |
| 100H | 256 | 1 | NUL (00H) | | — |
| 101H | 257 | 2 | Special character (FFH + FFH) | | — |
| 102H | 258 | 2 | CR (0DH), LF (0AH) | | — |
| 103H | 259 | 2 | DLE (10H), STX (02H) | | — |
| 104H | 260 | 2 | DLE (10H), ETX (03H) | | — |
| 105H | 261 | 2 | NUL (00H), FEH | | — |
| 106H | 262 | 3 | NUL (00H), NUL (00H), FEH | | — |
| 107H | 263 | 3 | ETX (03H), special character (FFH + F1H) | | — |
| 108H | 264 | 5 | ETX (03H), special character (FFH + F1H), CR (0DH), LF (0AH) | | — |
| 109H<br>to<br>12BH | 265<br>to<br>299 | — | Use prohibited | | — |
| 12CH | 300 | 4 | STX (02H), '0', '0', 'G' | 2600 series (DENSEI-LAMBDA) | Start frame of In-zone ON command |
| 12DH | 301 | 5 | STX (02H), '0', '0', 'S', ETX (03H) | | In-zone OFF command |
| 12EH | 302 | 4 | STX (02H), '0', '0', 'D' | | Start frame of barcode data |
| 12FH | 303 | 4 | STX (02H), '0', '0', 'E' | | Start frame when barcode reader is faulty |
| 130H | 304 | 4 | STX (02H), 'B', 'R', ETX (03H) | TLMS-3500RV (TOHKEN) | Frame at no read |
| 131H | 305 | 3 | STX (02H), 'E', 'R' | | Start frame in the case of an error |
| 132H | 306 | 4 | ESC (1BH), 'A', '0', CR (0DH) | | SYNC ON command |
| 133H | 307 | 4 | ESC (1BH), 'A', '0', ',' | | Start frame of SYNC ON command at edge input |
| 134H | 308 | 4 | ESC (1BH), 'A', '1', CR (0DH) | | SYNC OFF command |
| 135H | 309 | 4 | STX (02H), CAN (18H), CR (0DH), LF (0AH) | DS50AF (IDEC DATALOGIC) | Frame at no read |
| 136H | 310 | 4 | STX (02H), BEL (18H), CR (0DH), LF (0AH) | | Frame at error |
| 137H | 311 | 2 | '*', CR (0DH) | V620 (OMRON) | End frame |
| 138H | 312 | 2 | 'RD' | | Start frame of each command |
| 139H | 313 | 2 | 'WT' | | |
| 13AH | 314 | 2 | 'AR' | | |
| 13BH | 315 | 2 | 'AW' | | |
| 13CH | 316 | 2 | 'PR' | | |
| 13DH | 317 | 2 | 'PW' | | |
| 13EH | 318 | 2 | ÅeTS' | | |

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Table 4.63 Default registration frames (Continued)

| Frame No. | | No. of bytes | Description | | Remarks |
|---|---|---|---|---|---|
| HEX. | 1DEC. | | | | |
| 13F$_H$ | 319 | 4 | 'AA *', CR (0D$_H$) | V620 (OMRON) | Each command frame |
| 140$_H$ | 320 | 4 | 'XZ *', CR (0D$_H$) | | |
| 141$_H$ | 321 | 3 | Special character (FF$_H$ + FA$_H$), CR (0D$_H$) | ID/R/X (SUNX) | End frame |
| 142$_H$ to 14C$_H$ | 322 to 332 | — | Use prohibited | | — |
| 14D$_H$ | 333 | 2 | 'ST' | ID/R/X (SUNX) | Start frame of each command |
| 14E$_H$ | 334 | 2 | 'WR' | | |
| 14F$_H$ | 335 | 2 | 'CT' | | |
| 150$_H$ | 336 | 2 | 'RD' | | |
| 151$_H$ | 337 | 2 | 'RA' | | |
| 152$_H$ | 338 | 2 | 'RP' | | |
| 153$_H$ | 339 | 2 | 'WA' | | |
| 154$_H$ | 340 | 2 | 'WP' | | |
| 155$_H$ | 341 | 2 | 'CL' | | |
| 156$_H$ | 342 | 2 | 'WI' | | |
| 157$_H$ | 343 | 2 | 'SP' | | |
| 158$_H$ | 344 | 5 | 'RD6A', CR (0D$_H$) | | Each command frame |
| 159$_H$ | 345 | 5 | 'RP5E', CR (0D$_H$) | | |
| 15A$_H$ | 346 | 5 | 'EQ6A', CR (0D$_H$) | | |
| 15B$_H$ | 347 | 5 | 'NC6F', CR (0D$_H$) | | |
| 15C$_H$ | 348 | 5 | 'RI9B', CR (0D$_H$) | | |
| 15D$_H$ | 349 | 5 | 'CP93', CR (0D$_H$) | | |
| 15E$_H$ | 350 | 5 | 'EQ96', CR (0D$_H$) | | |
| 15F$_H$ | 351 | 7 | 'SM0000', CR (0D$_H$) | | |
| 160$_H$ | 352 | 7 | 'SM0101', CR (0D$_H$) | | |
| 161$_H$ | 353 | 7 | 'SM0202', CR (0D$_H$) | | |
| 162$_H$ to 3E7$_H$ | 354 to 999 | — | Use prohibited | | — |

(5) User registration frame

An arbitrary frame can be registered to the $E^2$PROM and used as a user registration frame.

(a) Setting

When $E^2$PROM function request signal (RYn7) is turned ON after setting of the following buffer memory, processing specified in $E^2$PROM function specification (R2N 1C0H) is performed.

For details of $E^2$PROM function request signal (RYn7), refer to the following.

☞ Section 3.7.2 (7) E2PROM function request signal (RYn7), E2PROM function complete signal (RXn7), and E2PROM function failed signal (RXn8)

**Table 4.64 Setting for frame reception**

| R2N Address | Name | Description |
|---|---|---|
| 1C0H | $E^2$PROM function specification | Specify whether to register, read or delete a user registration frame to or from the $E^2$PROM.<br>•1H: Register a user registration frame.<br>•2H: Read out a user registration frame.<br>•3H: Delete a user registration frame.<br>•Setting range: 0H to 4H (Default: 0H)<br>0H or 4H is used for registering settings of the AJ65BT-R2N to the $E^2$PROM. (☞ Section 4.5.9) |
| 1C1H | User registration frame No. | Specify a frame No. (3E8H to 4AFH) of the user registration frame to be registered, read out, or deleted.<br>•Setting range: 0H, 3E8H to 4AFH (Default: 0H) |
| 1C7H | No. of user registration frame bytes | Specify the number of bytes of the user registration frame to be registered or read out.<br>•Setting range: 0H, 1H to 80H (Default: 0H) |
| 1C8H to 1EFH | User registration frame | Specify characters to register them as a user registration frame. Or, characters read out from a user registration frame are stored.,<br>Characters are specified or stored in order starting from the lower byte of the lowest address.<br>Example: When registering ETX (03H) + FFH + F1H + CR (0DH) + LF (0AH)<br>Address Buffer memory<br>R2N 1C7H 5<br>R2N 1C8H FFH ETX(03H)<br>R2N 1C9H CR(0DH) F1H<br>R2N 1CAH 00H LF(0AH)<br>For registration of normal characters (☞ (5)(b) in this section), specify 00H to FEH.<br>For registration of special characters (☞ (5)(c) in this section), specify FFH + (character code, etc.)<br>•Setting range: 0H to FFH (Default: 0H) |

(b) Normal character

Normal characters are the same data as characters (00H to FEH (00 to 254)).

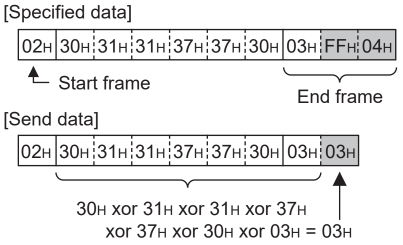
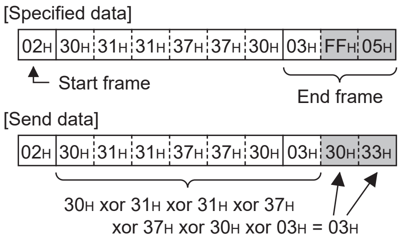
Example: 2H is STX (2H).

(c) Special character
A special character is sent or received by specifying character codes and necessary data following FFH.

**☒Point**

Sum check code or special characters for horizontal parity code only cannot be specified in the user registration frames. For specifying sum check codes or horizontal parity codes, add an arbitrary data. If no arbitrary data is added, a registration frame specification error (BB8BH) occurs.

**Table 4.65 Special character**

| Character code | Function | Applicability | | | | | |
|---|---|---|---|---|---|---|---|
| | | Send | | | | Receive | |
| | | Frame transmission (Send-frame-1 area) | | Frame transmission (Send-frame-2 area) | Monitoring-based transmission | Frame reception | |
| | | Start | End | | | Start | End |
| 00H | When sending, 00H (NUL) is sent.<br>When receiving, the part where 00H is specified (1 byte) is not checked. It is received as normal data.<br>•Specification method: FFH + 00H | ○ | ○ | ○ | ○ | ○ | ○ |
| 01H to 03H | Use prohibited | — | | | | | |
| 04H | A horizontal parity code calculated from the send/receive data excluding the start frame is sent/received as a 1-byte binary code.<br>•Specification method: FFH + 04H<br>Example: When sending the following data<br> | × | ○ | × | × | × | ○ |
| 05H | A horizontal parity code calculated from the send/receive data excluding the start frame is sent/received as a 2-byte ASCII code.<br>•Specification method: FFH + 05H<br>Example: When sending the following data<br> | × | ○ | × | × | × | ○ |

○: Applicable, ×: N/A
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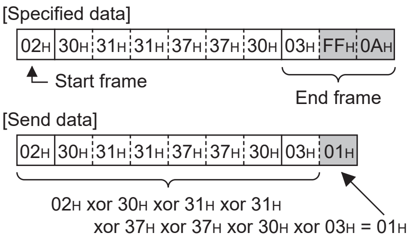
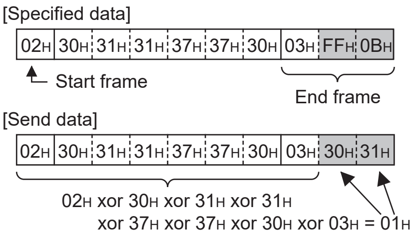
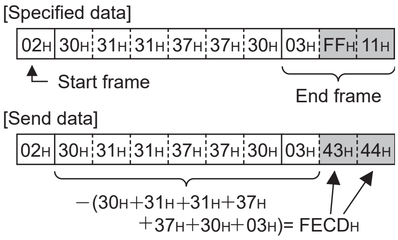
Table 4.65 Special character (Continued)

| Character code | Function | Applicability | | | | | |
|---|---|---|---|---|---|---|---|
| | | Send | | | | Receive | |
| | | Frame transmission (Send-frame-1 area) | | Frame transmission (Send-frame-2 area) | Monitoring-based transmission | Frame reception | |
| | | Start | End | | | Start | End |
| 0AH | A horizontal parity code calculated from the send/receive data including each frame is sent/received as a 1-byte binary code.<br>•Specification method: FFH + 0AH<br>Example: When sending the following data<br> | × | ○ | × | × | × | ○ |
| 0BH | A horizontal parity code calculated from the send/receive data including each frame is sent/received as a 2-byte ASCII code.<br>•Specification method: FFH + 0BH<br>Example: When sending the following data<br> | × | ○ | × | × | × | ○ |
| 11H | A sum check code, which is calculated by excluding the start frame from the send/receive data and taking its 2's complement, is sent/received as a 2-byte ASCII code.<br>•Specification method: FFH + 11H<br>Example: When sending the following data<br> | × | ○ | × | × | × | ○ |

○: Applicable, × : N/A

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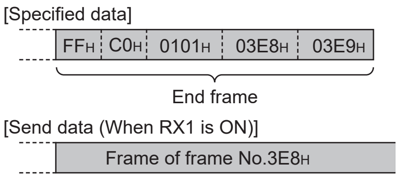
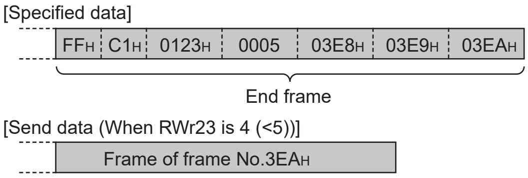
Table 4.65 Special character (Continued)

| Character code | Function | Applicability | | | | | |
|---|---|---|---|---|---|---|---|
| | | Send | | | | Receive | |
| | | Frame transmission (Send-frame-1 area) | | Frame transmission (Send-frame-2 area) | Monitoring-based transmission | Frame reception | |
| | | Start | End | | | Start | End |
| C0H | A specified frame is sent depending on the ON/OFF status of the remote input (RX) or remote output (RY).<br>•Specification method: FFH + C0H + (RX/RY specification[*1])<br>+ (Registration frame No. at ON)<br>+ (Registration frame No. at OFF)<br>Example: When sending data differently depending on the ON/OFF status of RX1<br> | ○ | ○ | ○ | ○ | × | × |
| C1H | According to the result of comparison between the remote register (RW) and a comparison value, a specified frame is sent.<br>•Specification method: FFH + C1H + (RW specification [*2])<br>+ (Comparison value)<br>+ (Registration frame No. (RW = Comparison value))<br>+ (Registration frame No. (RW>Comparison value))<br>+ (Registration frame No. (RW<Comparison value))<br>Example: When sending data comparing RWr23 with 5<br> | ○ | ○ | ○ | ○ | × | × |
| C2H to CFH | Use prohibited | — | | | | | |

○: Applicable, × : N/A
(Continued to next page)

(From previous page)

Table 4.65 Special character (Continued)

| Character code | Function | Applicability | | | | | |
|---|---|---|---|---|---|---|---|
| | | Send | | | | Receive | |
| | | Frame transmission (Send-frame-1 area) | | Frame transmission (Send-frame-2 area) | Monitoring-based transmission | Frame reception | |
| | | Start | End | | | Start | End |
| D0H | A frame or send area data are sent depending on the remote register (RW) value.<br>To send a default registration frame (☞ (4) in this section), specify 1H to 161H in the remote register (RW).<br>To send a user registration frame (☞ (5) in this section), specify 3E8H to 4AFH in the remote register (RW).<br>To send data stored in the send area (R2N 200H(at default)), specify 8000H in the remote register (RW).<br>•Specification method: FFH + D0H + (RW specification $^{*2}$)<br>Example: When sending a registration frame of RWr21<br>[Specified data]<br>FFH D0H 0121H<br>End frame<br>[Send data (When RWr21 is 102H)]<br>0DH 0AH | ○ | ○ | ○ | ○ | × | × |
| D1H to D7H | Use prohibited | — | | | | | |
| D8H | When sending, a remote register (RW) value is regarded as an unsigned decimal number (0 to 65535) and sent as a 5-digit ASCII code.<br>If a remote register (RW) value has four digits or less, (Space (20H)) + (RW value) is sent.<br>•Specification method: FFH + D8H + (RW specification $^{*2}$)<br>Example: When sending a RWr22 value<br>[Specified data]<br>FFH D8H 0022H<br>End frame<br>[Send data (When RWw22 is 1234)]<br>20H 31H 32H 33H 34H | ○ | ○ | ○ | ○ | × | × |

○: Applicable, ×: N/A

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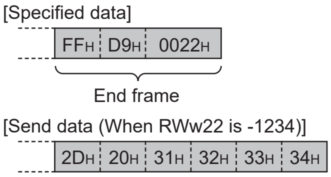
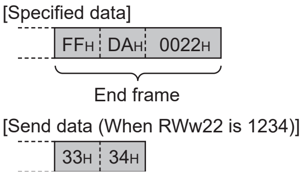
Table 4.65 Special character (Continued)

| Character code | Function | Applicability | | | | | |
|---|---|---|---|---|---|---|---|
| | | Send | | | | Receive | |
| | | Frame transmission (Send-frame-1 area) | | Frame transmission (Send-frame-2 area) | Monitoring-based transmission | Frame reception | |
| | | Start | End | | | Start | End |
| D9H | When sending, a remote register (RW) value is regarded as a signed decimal number (-32768 to 32767) and sent as a 6-digit ASCII code.<br>If a remote register (RW) value has five digits or less, (Space (20H)) + (RW value) is sent.<br>If the value is negative and has four digits or less, (- (2DH)) + (Space (20H)) + (RW value) is sent.<br>•Specification method: FFH + D9H + (RW specification *2)<br>Example: When sending a RWr22 value<br><br> | ○ | ○ | ○ | ○ | × | × |
| DAH | When sending, a remote register (RW) value is regarded as an unsigned decimal number (0 to 65535) and the last two digits are sent as an ASCII code.<br>If a remote register (RW) value is one digit, (0(30H)) + (RW value) is sent.<br>•Specification method: FFH + DAH + (RW specification *2)<br>Example: When sending a RWr22 value<br><br> | ○ | ○ | ○ | ○ | × | × |

○: Applicable, × : N/A

(Continued to next page)

(From previous page)

Table 4.65 Special character (Continued)

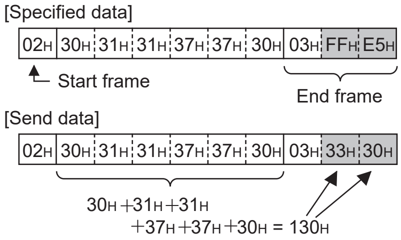
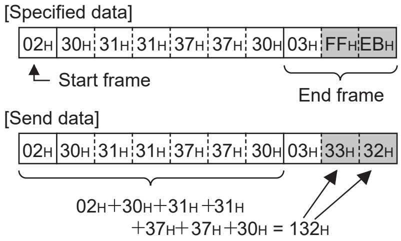
| Character code | Function | Applicability | | | | | |
|---|---|---|---|---|---|---|---|
| | | Send | | | | Receive | |
| | | Frame transmission (Send-frame-1 area) | | Frame transmission (Send-frame-2 area) | Monitoring-based transmission | Frame reception | |
| | | Start | End | | | Start | End |
| DB$_H$ | When sending, a remote register (RW) value is regarded as a hexadecimal number (0000$_H$ to FFFF$_H$) and sent as a 4-digit ASCII code.<br>If a remote register (RW) value has three digits or less, (0(30$_H$)) + (RW value) is sent.<br>•Specification method: FF$_H$ + DB$_H$ + (RW specification *2)<br>Example: When sending a RWr22 value<br>[Specified data]<br>FF$_H$ DB$_H$ 0022$_H$<br>End frame<br>[Send data (When RWw22 is 1234 (4D2$_H$))]<br>30$_H$ 34$_H$ 44$_H$ 32$_H$ | ○ | ○ | ○ | ○ | × | × |
| DC$_H$ | The lower one byte of the remote register (RW) is sent.<br>•Specification method: FF$_H$ + DC$_H$ + (RW specification *2)<br>Example: When sending a RWr22 value<br>[Specified data]<br>FF$_H$ DC$_H$ 0022$_H$<br>End frame<br>[Send data (When RWw22 is 16706 (4142$_H$))]<br>42$_H$ | ○ | ○ | ○ | ○ | × | × |
| DD$_H$ | A remote register (RW) value is sent in order, the lower one byte first and then the upper one byte.<br>•Specification method: FF$_H$ + DD$_H$ + (RW specification *2)<br>Example: When sending a RWr22 value<br>[Specified data]<br>FF$_H$ DC$_H$ 0022$_H$<br>End frame<br>[Send data (When RWw22 is 16706 (4142$_H$))]<br>42$_H$ 41$_H$ | ○ | ○ | ○ | ○ | × | × |
| DE$_H$ to E4$_H$ | Use prohibited | — | | | | | |

○ : Applicable, × : N/A

(Continued to next page)

(From previous page)

Table 4.65 Special character (Continued)

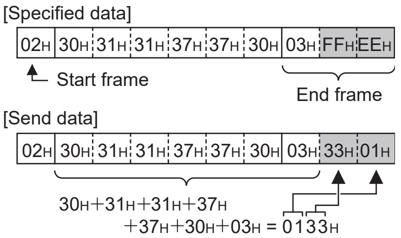
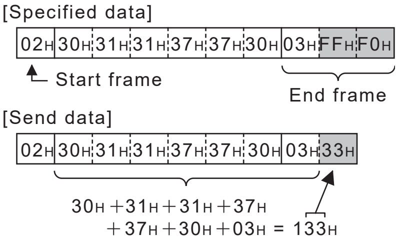
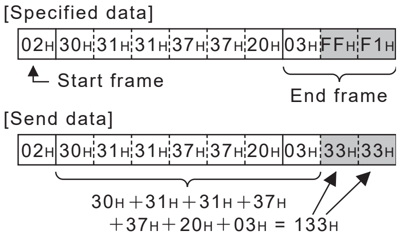
| Character code | Function | Applicability | | | | | |
|---|---|---|---|---|---|---|---|
| | | Send | | | | Receive | |
| | | Frame transmission (Send-frame-1 area) | | Frame transmission (Send-frame-2 area) | Monitoring-based transmission | Frame reception | |
| | | Start | End | | | Start | End |
| E5$_H$ | A sum check code calculated from the send/receive data excluding the start and end frames is sent/received as a 2-byte ASCII code.<br>•Specification method: FF$_H$ + E5$_H$<br>Example: When sending the following data<br> | × | ○ | × | × | × | ○ |
| E6$_H$ to EA$_H$ | Use prohibited | — | | | | | |
| EB$_H$ | A sum check code calculated from the send/receive data excluding the end frame is sent/received as a 2-byte ASCII code.<br>•Specification method: FF$_H$ + EB$_H$<br>Example: When sending the following data<br> | × | ○ | × | × | × | ○ |
| EC$_H$, ED$_H$ | Use prohibited | — | | | | | |

○: Applicable, × : N/A

(Continued to next page)

(From previous page)

Table 4.65 Special character (Continued)

| Character code | Function | Applicability | | | | | |
|---|---|---|---|---|---|---|---|
| | | Send | | | | Receive | |
| | | Frame transmission (Send-frame-1 area) | | Frame transmission (Send-frame-2 area) | Monitoring-based transmission | Frame reception | |
| | | Start | End | | | Start | End |
| EEH | The lower two bytes of a sum check code, which is calculated from send/receive data excluding the start frame, are sent or received in order from the lowest byte .<br>•Specification method: FFH + EEH<br>Example: When sending the following data<br> | × | ○ | × | × | × | ○ |
| EFH | Use prohibited | — | | | | | |
| F0H | The lower one byte of a sum check code, which is calculated from the send/receive data excluding the start frame, is sent or received.<br>•Specification method: FFH + F0H<br>Example: When sending the following data<br> | × | ○ | × | × | × | ○ |
| F1H | The lower one byte of a sum check code, which is calculated from the send/receive data excluding the start frame, is sent or received as a 2-byte ASCII code.<br>•Specification method: FFH + F1H<br>Example: When sending the following data<br> | × | ○ | × | × | × | ○ |

○: Applicable, × : N/A

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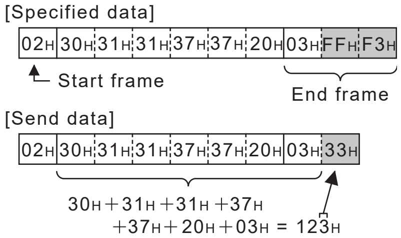
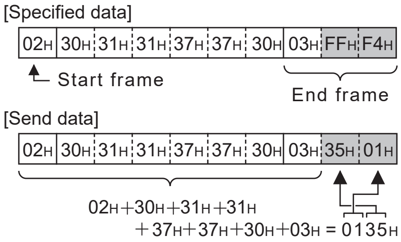
Table 4.65 Special character (Continued)

| Character code | Function | Applicability | | | | | |
|---|---|---|---|---|---|---|---|
| | | Send | | | | Receive | |
| | | Frame transmission (Send-frame-1 area) | | Frame transmission (Send-frame-2 area) | Monitoring-based transmission | Frame reception | |
| | | Start | End | | | Start | End |
| F2H | Use prohibited | — | | | | | |
| F3H | The lower 4 bits of a sum check code, which is calculated from the send/receive data excluding the start frame, are sent or received as a 1-byte ASCII code.<br>•Specification method: FFH + F3H<br>Example: When sending the following data<br> | × | ○ | × | × | × | ○ |
| F4H | The lowest 2 bytes of a sum check code, which is calculated from the send/receive data including each frame, are sent or received in order from the lowest byte.<br>•Specification method: FFH + F4H<br>Example: When sending the following data<br> | × | ○ | × | × | × | ○ |
| F5H | Use prohibited | — | | | | | |

○: Applicable, × : N/A

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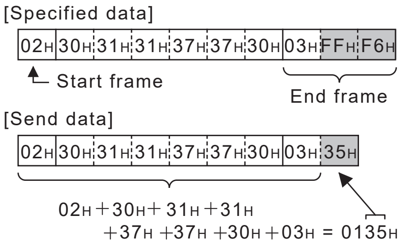
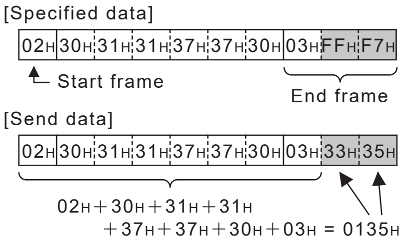
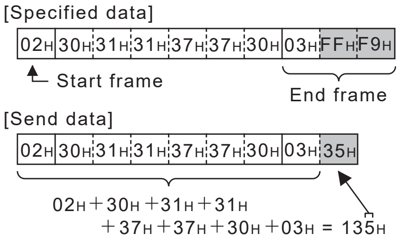
Table 4.65 Special character (Continued)

| Character code | Function | Applicability | | | | | |
|---|---|---|---|---|---|---|---|
| | | Send | | | | Receive | |
| | | Frame transmission (Send-frame-1 area) | | Frame transmission (Send-frame-2 area) | Monitoring-based transmission | Frame reception | |
| | | Start | End | | | Start | End |
| F6H | The lower one byte of a sum check code, which is calculated from the send/receive data including each frame, is sent or received.<br>•Specification method: FFH + F6H<br>Example: When sending the following data<br><br> | × | ○ | × | × | × | ○ |
| F7H | The lower one byte of a sum check code, which is calculated from the send/receive data including each frame, is sent or received as a 2-byte ASCII code.<br>•Specification method: FFH + F7H<br>Example: When sending the following data<br><br> | × | ○ | × | × | × | ○ |
| F8H | Use prohibited | — | | | | | |
| F9H | The lowest 4 bits of a sum check code, which is calculated from the send/receive data including each frame, are sent or received as a 1-byte ASCII code.<br>•Specification method: FFH + F9H<br>Example: When sending the following data<br><br> | × | ○ | × | × | × | ○ |

○: Applicable, × : N/A

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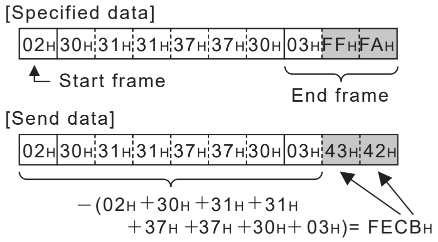
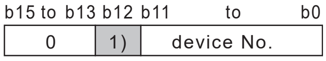
Table 4.65 Special character (Continued)

| Character code | Function | Applicability | | | | | |
|---|---|---|---|---|---|---|---|
| | | Send | | | | Receive | |
| | | Frame transmission (Send-frame-1 area) | | Frame transmission (Send-frame-2 area) | Monitoring-based transmission | Frame reception | |
| | | Start | End | | | Start | End |
| FA$_H$ | A 2's-complement sum check code, which is calculated from the send/receive data including each frame, is sent or received as a 2-byte ASCII code.<br>•Specification method: FF$_H$ + FA$_H$<br>Example: When sending the following data<br> | × | ○ | × | × | × | ○ |
| FB$_H$ to FE$_H$ | Use prohibited | — | | | | | |
| FF$_H$ | FF$_H$ is sent or received.<br>•Specification method: FF$_H$ + FF$_H$ | ○ | ○ | ○ | ○ | ○ | ○ |

○: Applicable, × : N/A

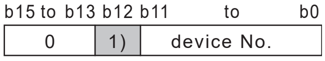
* 1 RX/RY is specified as follows:



1) Device type
0: RY
1: RX

**Figure 4.38 RX/RY specification**

* 2 RW is specified as follows:



1) Device type
0: RWw
1: RWr

**Figure 4.39 RW specification**

## 4.5.2 Monitoring-based transmission function

This function allows data specified in the transmission table to be sent when the transmission condition specified by the user is met.

### (1) Monitoring-based transmission function overview

Change of the monitoring target (device or status) can be specified as a transmission condition. (Transmission trigger)

(a) Device monitoring

The AJ65BT-R2N monitors the remote I/O (RX, RY) or remote register (RW) of the master module on the CC-Link system, and sends data when a transmission trigger occurs.

(b) Status monitoring

The AJ65BT-R2N monitors the status of the master module on the CC-Link system or that of the programmable controller CPU on the master-module-mounted station, and sends data when a transmission trigger occurs.

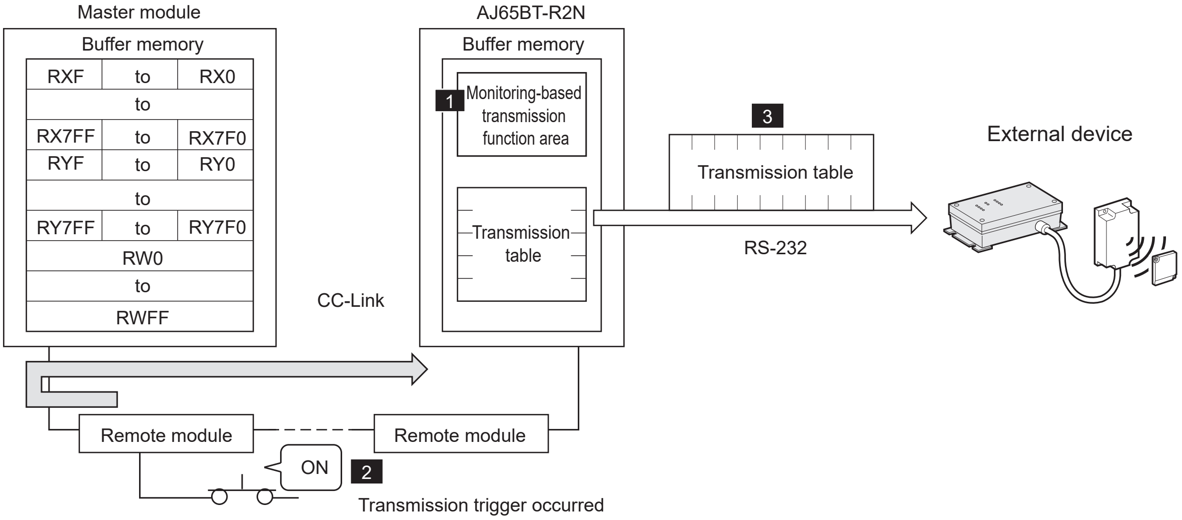


**Figure 4.40 Monitoring-based transmission function overview**

**Table 4.66 Monitoring-based transmission function overview**

| No. | Processing |
|---|---|
| 1 | A transmission condition is set. |
| 2 | The monitoring target device or status value changes, and a transmission trigger occurs. |
| 3 | The AJ65BT-R2N sends data to the external device, according to the contents of the transmission table. |

(2) Send processing

The settings of the buffer memory used for the monitoring-based transmission function are explained.

(a) Buffer memory used for the monitoring-based transmission function

Configure the monitoring-based transmission function settings in the following buffer memory.

Also, in Transmission table specification (R2N $122_H$ to $185_H$), specify a registration frame(s) to be sent.

☞Section 4.5.1 (2) Frame transmission (Send-frame-2 area)

**Table 4.67 Buffer memory used for the monitoring-based transmission function**

| R2N Address | Name | | Description |
|---|---|---|---|
| $70_H$ | Monitoring interval specification | | Specify a monitoring interval used when the AJ65BT-R2N monitors the device or status specified for transmission trigger detection.<br>If no monitoring-based transmission is to be performed, specify 0.<br>•Setting range: 0, 1 to 32767 (Unit: ×100ms, Default: 0) |
| $71_H$ | No. of monitoring settings | | Specify the number of settings that are set in Monitoring setting - 1 to - 64 (R2N $78_H$ to $F7_H$).<br>If no monitoring-based transmission is to be performed, specify 0.<br>•Setting range: 0, 1 to 64 (Default: 0) |
| $78_H$ | Monitoring setting - 1 | Monitoring target | Specify a device or status for transmission trigger detection.<br>•When specifying a device, refer to (2)(b) in this section.<br>•When specifying a status, refer to (2)(c) in this section. |
| $79_H$ | | Send data specification | Specify which data are to be sent by the AJ65BT-R2N when a transmission trigger occurs.<br>•Refer to (2)(d) in this section. |
| $7A_H$ to $F7_H$ | Monitoring setting - 2 to - 64 | | Same as Monitoring setting - 1 |

## ☒Point

Initialize the AJ65BT-R2N if a set value in R2N $0_H$ to $101_H$ and $103_H$ to $112_H$ is changed.

☞ Section 4.4 AJ65BT-R2N Initialization Function

(b) Monitoring target (When specifying a device)

Set a device used for transmission trigger detection.

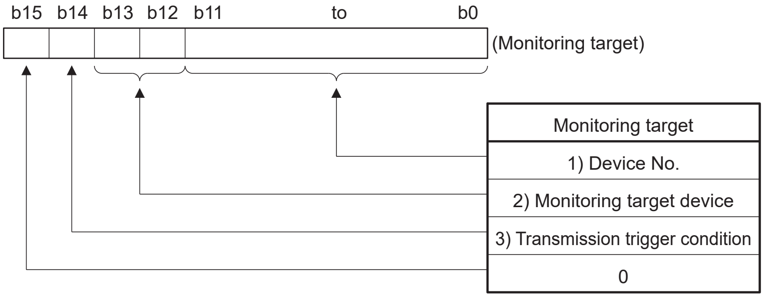


**Figure 4.41 Monitoring target (When specifying a device)**

1) Device No.

Specify the device No. of the monitoring target device.

(Example)

When specifying RX5 of the first remote module: 5H

When specifying RX5 (RX25) of the second remote module: 25H

| | Master station address | b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1st station | E0H | RXF | RXE | RXD | RXC | RXB | RXA | RX9 | RX8 | RX7 | RX6 | RX5 | RX4 | RX3 | RX2 | RX1 | RX0 |
| | E1H | RX1F | RX1E | RX1D | RX1C | RX1B | RX1A | RX19 | RX18 | RX17 | RX16 | RX15 | RX14 | RX13 | RX12 | RX11 | RX10 |
| 2nd station | E2H | RX2F | RX2E | RX2D | RX2C | RX2B | RX2A | RX29 | RX28 | RX27 | RX26 | RX25 | RX24 | RX23 | RX22 | RX21 | RX20 |
| | E3H | RX3F | RX3E | RX3D | RX3C | RX3B | RX3A | RX39 | RX38 | RX37 | RX36 | RX35 | RX34 | RX33 | RX32 | RX31 | RX30 |

**Figure 4.42 Device No.**

2) Monitoring target device

Specify a monitoring target device.

**Table 4.68 Monitoring target device**

| Bit position | | Monitoring target device |
|---|---|---|
| b13 | b12 | |
| 0 | 0 | RY |
| 0 | 1 | RX |
| 1 | 0 | RWw |
| 1 | 1 | RWr |

3) Transmission trigger condition

Specify a condition for a transmission trigger.

**Table 4.69 Transmission trigger condition**

| Monitoring target device | Transmission trigger condition setting | | Transmission trigger timing |
|---|---|---|---|
| | b14=0 | b14=1 | |
| RX, RY | Rising edge detection | Falling edge detection | When the AJ65BT-R2N detects a change at the rising/falling edge |
| RWw, RWr | (Status of b14 is invalid.) | | When the specified remote register (RW) value is other than "0" |

(c) Monitoring target (When specifying a status)
Set a status used for transmission trigger detection.

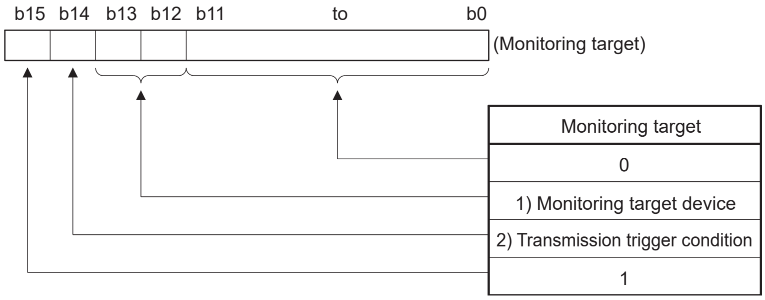


**Figure 4.43 Monitoring target (When specifying a status)**

1) Monitoring target status
Specify a monitoring target status.

**Table 4.70 Monitoring target status**

| Bit position | | Monitoring target status |
|---|---|---|
| b13 | b12 | |
| 0 | 0 | (Setting prohibited) |
| 0 | 1 | CC-Link data link status |
| 1 | 0 | Operating status of programmable controller CPU |
| 1 | 1 | Programmable controller CPU status |

2) Transmission trigger condition
Specify a condition for a transmission trigger.

**Table 4.71 Transmission trigger condition**

| Monitoring target status | Transmission trigger condition setting | | Transmission trigger timing |
|---|---|---|---|
| | b14=0 | b14=1 | |
| CC-Link data link status | Data link stopped | Data link running | When the AJ65BT-R2N detects a change of each status |
| Operating status of programmable controller CPU [*1] | RUN | STOP | |
| Programmable controller CPU status | Abnormal [*2] | Normal | |

[*1] When parameters have been set with GX Developer, GX Works2, GX Works3, or the RLPA instruction, RLPASET instruction, RUN/STOP of the programmable controller CPU on the master station is a condition for trigger occurrence.
When parameters have been set by a sequence program, ON/OFF of Refresh instruction (Yn0) of the master module is a condition for trigger occurrence.
ON: Operating status of programmable controller CPU: RUN
OFF: Operating status of programmable controller CPU: STOP

[*2] A stop error in the programmable controller CPU is a condition for trigger occurrence.
For details, refer to the user's manual for the programmable controller CPU used.

(d) Send data specification

Data to be sent in the event of a transmission trigger are specified with the transmission table start No. and No. of transmission tables.

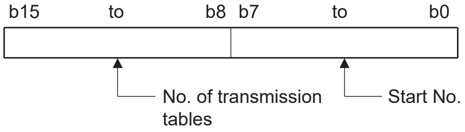


**Figure 4.44 Send data specification**

1) Start No.
Specify the transmission table start No. within the range from 1 to 100.

2) No. of transmission tables
Specify the number of transmission tables within the range from 1 to 100.

(Example)

When a transmission trigger occurs, data specified with transmission tables No.2 to No.4 are sent as shown below.

In this case, in Send data specification (R2N 79H), "0302H" is set.

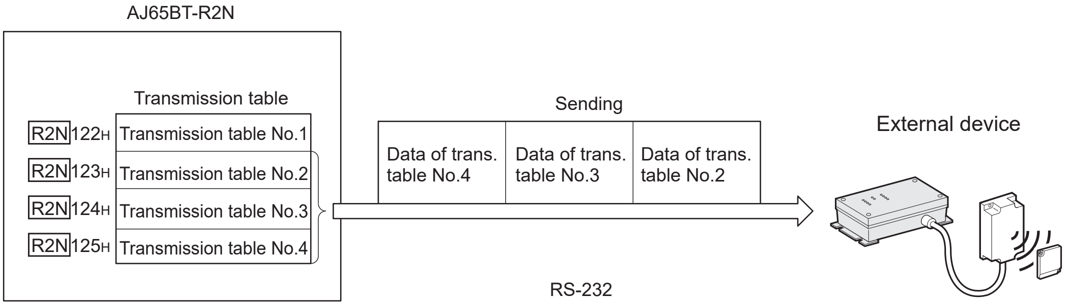


**Figure 4.45 Send data setting example**

(3) Precautions for using the monitoring-based transmission function

(a) Device or status monitoring for transmission trigger detection is performed at intervals set in Monitoring interval specification ($\boxed{\text{R2N}}$70H) of the buffer memory.
The ON/OFF state, value or status causing a transmission trigger must be held for the length of the time set in Monitoring interval specification ($\boxed{\text{R2N}}$70H) or longer (Set time＋100ms or more).
If it is not held for the length of the time set in Monitoring interval specification ($\boxed{\text{R2N}}$70H) or longer, the AJ65BT-R2N may not be able to detect a transmission trigger.

(b) When a monitoring-based transmission and any other transmission (nonprocedural or frame transmission) are generated concurrently, the AJ65BT-R2N sends data in order of the occurrence of the send processing.

(c) If two or more transmission triggers occur at the same time, data are sent in order of transmission trigger detection.

## 4.5.3 Send cancel function

The send cancel function cancels the send processing which has already been requested to the AJ65BT-R2N from the master module.

### (1) Processing method

Turning ON Send cancel request signal (RYn1) after turn-ON of Send request signal (RYn0) stops data transmission to the external device.
For Send cancel request signal (RYn1), refer to the following.

☞Section 3.7.2 (2) Send cancel request signal (RYn1)

### (2) Processing procedures

The following shows an example of using the buffer memory auto-refresh function.

(a) Processing flow

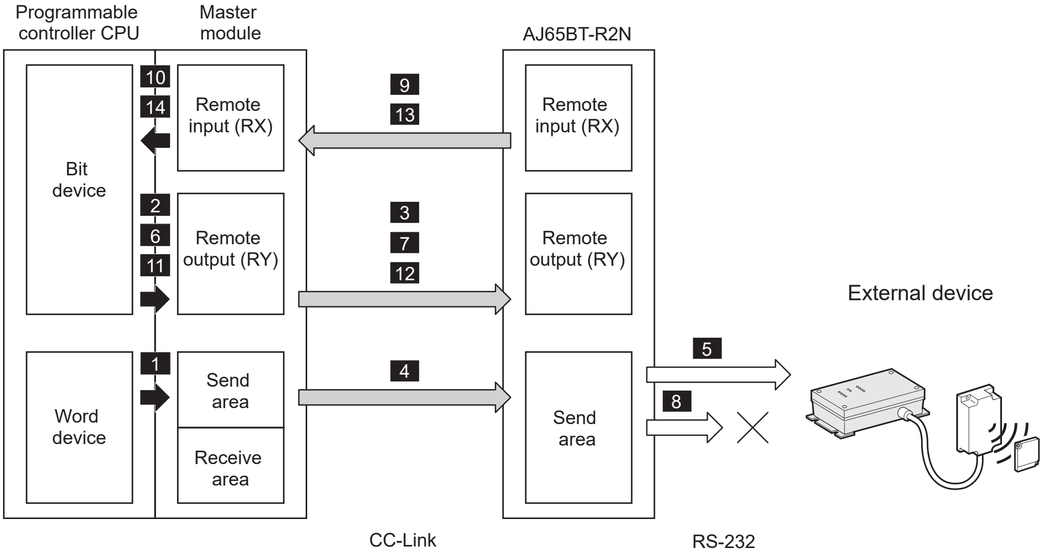


**Figure 4.46 Canceling transmission when using the buffer memory auto-refresh function**

### (b) Timing chart

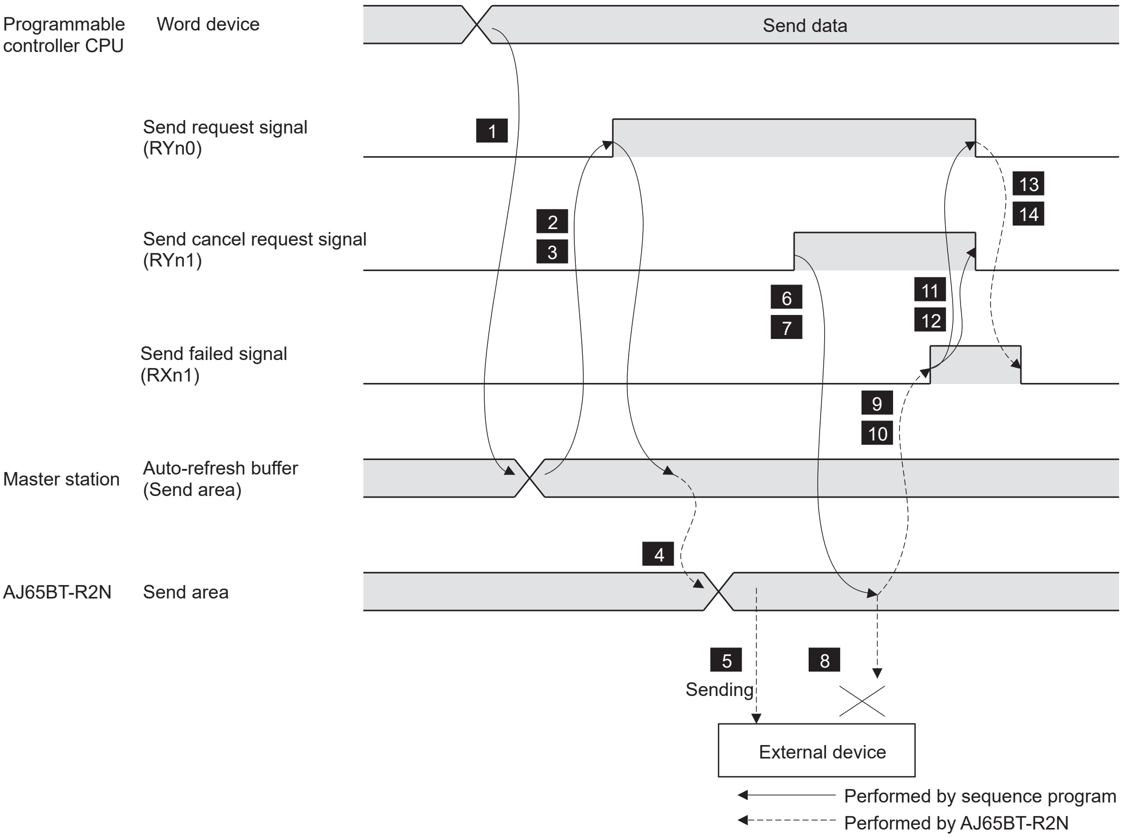


**Figure 4.47 Canceling transmission when using the buffer memory auto-refresh function**

### (c) Processing procedures

**Table 4.72 Send cancel procedures when using the buffer memory auto-refresh function**

| No. | Processing |
|---|---|
| 1 | With the RITO instruction, the send data are written from word devices of the programmable controller CPU to the Send area 2) of the master module. |
| 2, 3 | Send request signal (RYn0) is turned ON. |
| 4 | The send data are written from the send area of the master module to the send area of the AJ65BT-R2N. |
| 5 | The send data are sent from the send area of the AJ65BT-R2N to the external device. |
| 6, 7 | Send cancel request signal (RYn1) is turned ON. |
| 8 | Transmission from the send area of the AJ65BT-R2N to the external device is stopped. |
| 9, 10 | When the transmission is stopped, Send failed signal (RXn1) turns ON. |
| 11, 12 | Send request signal (RYn0) and Send cancel request signal (RYn1) are turned OFF. |
| 13, 14 | Send failed signal (RXn1) turns OFF. |

**Remark**

If the programmable controller CPU does not support dedicated instructions, the FROM/TO instruction can be used for communication.
For a sample program using the FROM/TO instruction, refer to the following.

☞CHAPTER 8 PROGRAMMING WHEN USING FROM/TO INSTRUCTION IN ACPU/QCPU (A MODE)

**☒Point**

(1) Transmissions generated by the monitoring-based transmission function cannot be canceled with the send cancel function.
(2) When resending data whose transmission was canceled with the send cancel function, perform the send processing again.

(3) Precautions

(a) When Send cancel request signal (RYn1) is turned ON, Send complete signal (RXn0) may turn ON.

(b) Create an interlock circuit as shown below so that Send cancel request signal (RYn1) will not turn ON unless a send request is made.
(Example)
Interlock circuit by which Send cancel request signal (RYn1) does not turn ON unless a send request is made

**Table 4.73 Devices used in the interlock circuit example**

| Device No. | Signal name | Device No. | Signal name |
|---|---|---|---|
| RXn0 | Send complete signal | RYn0 | Send request signal |
| RXn1 | Send failed signal | RYn1 | Send cancel request signal |

**Figure 4.48 Interlock circuit example**

## 4.5.4 Forced receive completion function

The forced receive completion function allows forced completion of data reception from the external device to read the received data, when the data reception is not completed.
This function is used in the following cases:

- Data as many as the No. of receive end data cannot be received.
- The start or end frame cannot be identified in the data received.

### (1) Processing method

When Forced receive completion request signal (RYn3) is turned ON, data reception from the external device is forcibly terminated.
For Forced receive completion request signal (RYn3), refer to the following.

☞Section 3.7.2 (4) Forced receive completion request signal (RYn3)

### (2) Processing procedures

The following shows an example of using the buffer memory auto-refresh function.

(a) Processing flow

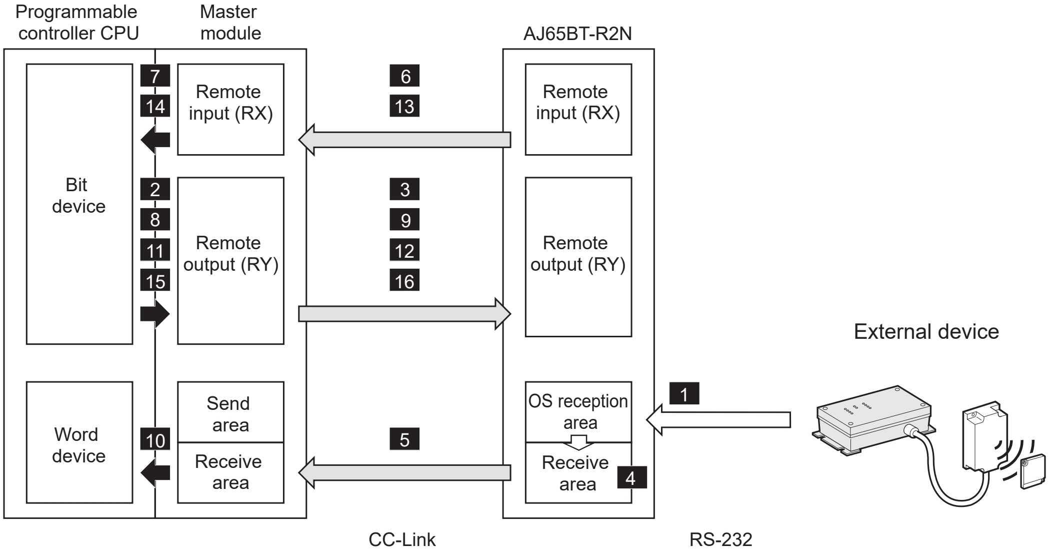


**Figure 4.49 Forced receive completion when using the buffer memory auto-refresh function**

(b) Timing chart

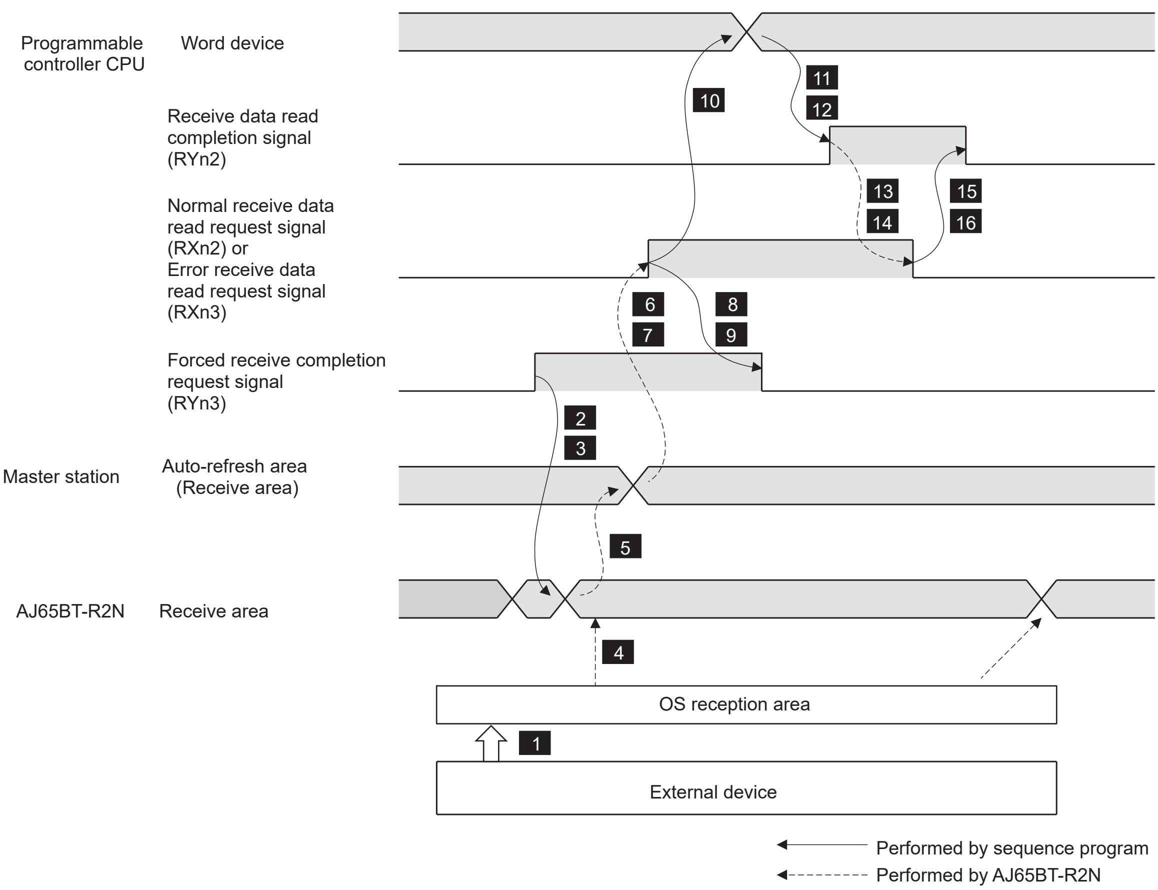


**Figure 4.50 Forced receive completion when using the buffer memory auto-refresh function**

(c) Processing procedures

**Table 4.74 Forced receive completion procedures when using the buffer memory auto-refresh function**

| No. | Processing |
|---|---|
| 1 | Data received from the external device are stored in the OS reception area. |
| 2, 3 | Forced receive completion request signal (RYn3) is turned ON. |
| 4 | The data stored in the OS reception area are written to the receive area. |
| 5 | The receive data are written from the receive area of the AJ65BT-R2N to the receive area of the master module. |
| 6, 7 | When reception is normally completed, Normal receive data read request signal (RXn2) turns ON.<br>When failed, Error receive data read request signal (RXn3) turns ON. |
| 8, 9 | Forced receive completion request signal (RYn3) is turned OFF. |
| 10 | With the RIRD instruction, the receive data are read from the receive area of the master module to the programmable controller CPU devices. |
| 11, 12 | Receive data read completion signal (RYn2) is turned ON. |
| 13, 14 | Normal receive data read request signal (RXn2) or Error receive data read request signal (RXn3) turns OFF. |
| 15, 16 | Receive data read completion signal (RYn2) is turned OFF. |

## ☒Point

(1) Forced receive completion is enabled only when no receive start frame No. is specified.
If any receive start frame No. is specified, Forced receive completion request signal (RYn3) is ignored.

(2) If data exceeding the receive area size are stored in the OS reception area when forced receive completion is activated, data as much as the receive area size are stored in the receive area and the reception is terminated.

### (3) Precautions for using the forced receive completion function

If Forced receive completion request signal (RYn3) is turned ON with Normal receive data read request signal (RXn2) or Error receive data read request signal (RYn3) set to ON, an error will occur.
To prevent this, create an interlock circuit as shown in the following example so that Forced receive completion request signal does not turn ON unless reading of received data is requested.
(Example)
Interlock circuit by which Forced receive completion request signal (RYn3) does not turn ON unless reading of received data is requested

**Table 4.75 Devices used in the interlock circuit example**

| Device No. | Signal name | Device No. | Signal name |
|---|---|---|---|
| RXn2 | Normal receive data read request signal | RYn3 | Forced receive completion request signal |
| RXn3 | Error receive data read request signal | — | |

**Figure 4.51 Interlock circuit example**

## 4.5.5 Flow control function

The flow control function discontinues or restarts data transmission depending on the status of the OS reception area of the AJ65BT-R2N or a request from the external device.

Discontinuation or restart is notified by the following control methods.

**Table 4.76 Flow control**

| Name | Description | Reference section |
|---|---|---|
| DTR/DSR (ER/DR) control | The AJ65BT-R2N informs the external device with the DTR (ER) signal of whether it can receive data or not, and checks whether the external device can receive data or not with the DSR (DR) signal. | (1) in this section |
| DC code control | The AJ65BT-R2N informs the external device of whether it can receive data or not by sending DC1 or DC3, and confirms whether the external device can receive data or not by receiving DC1 or DC3. | (2) in this section |

(1) DTR/DSR (ER/DR) control

(a) DTR (ER) control

When the size of free OS reception area space is reduced to 64 bytes or less, the AJ65BT-R2N turns OFF the DTR (ER) signal to stop transmission from the external device to the AJ65BT-R2N.

After reading of data received from the programmable controller CPU, when the size of free OS reception area space is increased to 263 bytes or more, the AJ65BT-R2N turns ON the DTR (ER) signal to restart transmission from the external device to the AJ65BT-R2N.

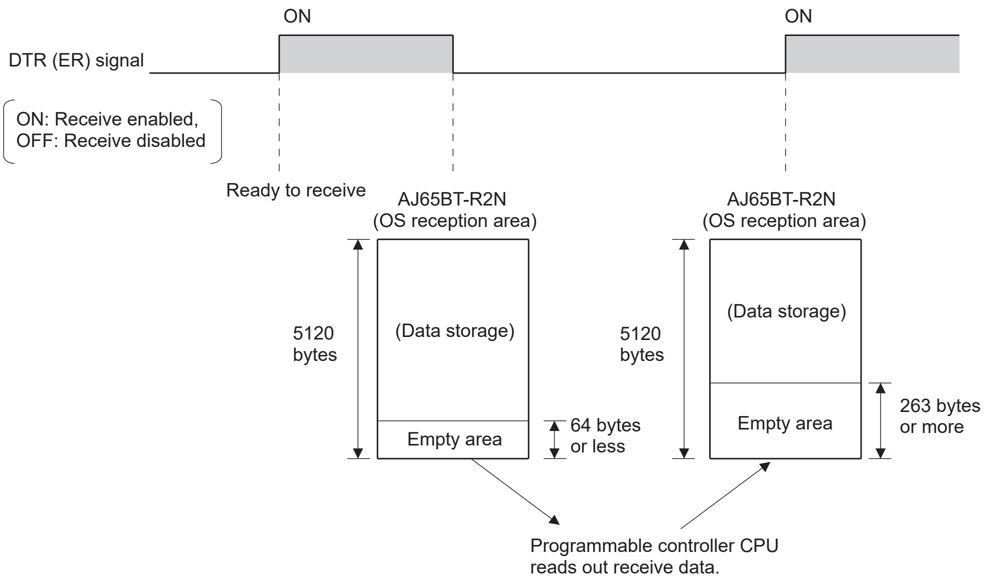


**Figure 4.52 DTR (ER) control**

(b) DSR (DR) control

When the DSR (DR) signal turns ON, the AJ65BT-R2N restarts transmission to the external device.

When the DSR (DR) signal turns OFF, transmission to the external device is stopped.

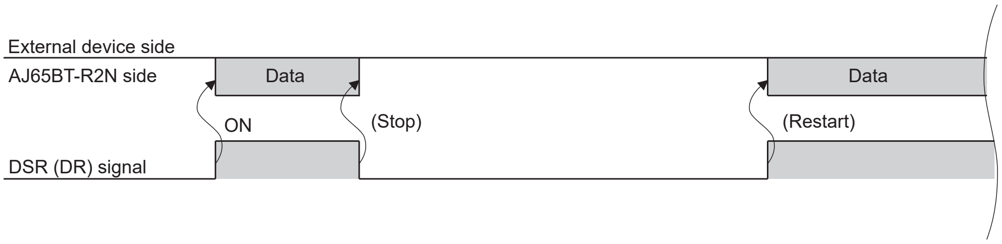


**Figure 4.53 DSR (DR) control**

(2) DC code control

(a) DC1/DC3 (XON/XOFF) transmission control

When the size of free OS reception area space is reduced to 64 bytes or less, the AJ65BT-R2N sends DC3 to the external device to stop data transmission from the external device to the AJ65BT-R2N.

After reading of data received from the programmable controller CPU, when the size of free OS reception area space is increased to 263 bytes or more, the AJ65BT-R2N sends DC1 to the external device to restart data transmission from the external device to the AJ65BT-R2N.

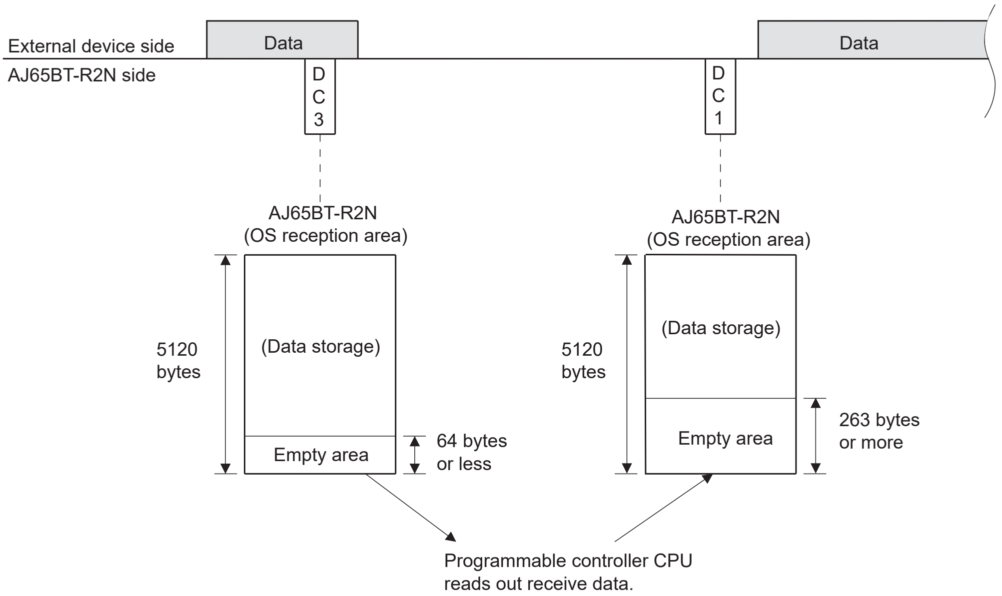


**Figure 4.54 DC1/DC3 (XON/XOFF) transmission control**

(b) DC1/DC3 (XON/XOFF) reception control

Upon reception of the DC3 code, the AJ65BT-R2N stops transmission to the external device.

Transmission to the external device is restarted upon reception of the DC1 code.

**Figure 4.55 DC1/DC3 reception control**

(c) Precautions for using the DC code control

1) At the time of power ON or in the initialized state, the AJ65BT-R2N is in the DC1 send and DC1 receive status.
Note that it does not send DC1 to the external device, and does not wait for reception of DC1.

2) The DC1 and DC3 codes are shown below.
   - DC1: $11_H$
   - DC3: $13_H$

3) Use the ASCII-binary conversion function to utilize the DC control function.
In the DC code control, the DC1 or DC3 code received from the external device is not stored in the receive area of the AJ65BT-R2N.

### (3) Buffer memory used for the flow control function

Configure the flow control function setting in the following buffer memory.

**Table 4.77 Buffer memory used for the flow control function**

| R2N Address | Name | Description |
|---|---|---|
| $100_H$ | Flow control specification | Specify DTR/DSR (ER/DR) control or DC code control, for data communication between the AJ65BT-R2N and external device.<br>•$0_H$ : Flow control not performed<br>•$1_H$ : Perform flow control by DTR/DSR (ER/DR) control<br>(The ON/OFF status of the DTR (ER) signal (RYnA) is invalid.)<br>•$2_H$ : Perform flow control by DC code control<br>•Setting range: $0_H$ to $2_H$ (Default: $1_H$) |

### ☒Point

Initialize the AJ65BT-R2N if the value set in Flow control specification (R2N $100_H$) was changed.

☞Section 4.4 AJ65BT-R2N Initialization Function

## 4.5.6 ASCII-binary conversion function

The ASCII-binary conversion function allows the AJ65BT-R2N to exchange data with the external device using ASCII codes.

### (1) ASCII-binary conversion function overview

The AJ65BT-R2N converts ASCII/binary data as shown below.

**Table 4.78 ASCII-binary conversion function overview**

| Status | Description |
|---|---|
| When sending | Regards the send area data as binary data, and converts them to ASCII code data before sending. |
| When receiving | Regards received data as ASCII code data, converts them to binary code data, and stores them in the receive area. |

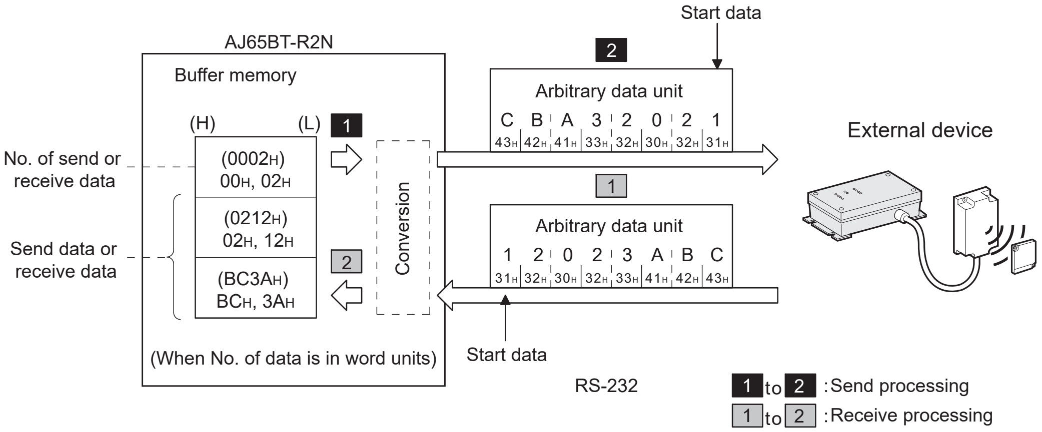
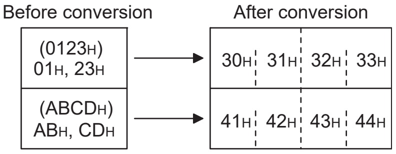
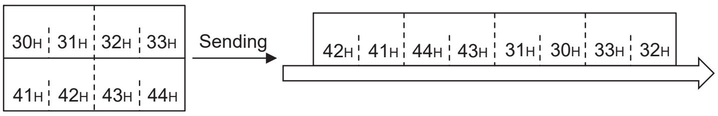


**Figure 4.56 ASCII-binary conversion function overview**

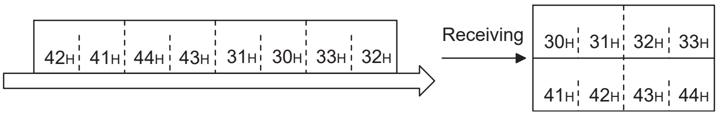
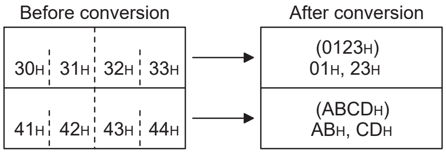
#### (a) Send processing

**Table 4.79 ASCII-binary conversion function overview (Send processing)**

| No. | Processing |
|---|---|
| 1 | Data written to the send area are converted from binary codes to ASCII codes.<br> |
| 2 | Data converted to ASCII codes are sent to the external device in the order shown below.<br> |

(b) Receive processing

**Table 4.80 ASCII-binary conversion function overview (Receive processing)**

| No. | Processing |
|---|---|
| 1 | The AJ65BT-R2N receives data from the external device.<br> |
| 2 | Data received from the external device are converted from ASCII codes to binary codes, and they are written to the receive area.<br> |

(2) Buffer memory used for the ASCII-binary conversion function

Configure the ASCII-binary conversion function setting in the following buffer memory.

**Table 4.81 Buffer memory used for the ASCII-binary conversion function**

| R2N Address | Name | Description |
|---|---|---|
| $103_H$ | ASCII-binary conversion specification | Specify whether or not to enable ASCII-binary conversion for data communication with the external device.<br>•$0_H$: Disable ASCII-binary conversion<br>•$1_H$: Enable ASCII-binary conversion<br>•Setting range: $0_H$, $1_H$ (Default: $0_H$) |

## ☒Point

Initialize the AJ65BT-R2N if the value set in ASCII-binary conversion specification (R2N $103_H$) was changed.

☞Section 4.4 AJ65BT-R2N Initialization Function

### (3) Precautions for using the ASCII-binary conversion function

(a) The target of conversion is 30H to 39H (0 to 9) and 41H to 46H (A to F).

(b) Pay attention to the following when ASCII-binary conversion is specified in the frame function.

1) Only the receive data (the data to be stored in the receive area) are converted to a binary code.
Receive start and end frames are not converted to binary codes regardless of the setting in Receive start/end frame elimination (R2N 110H).
Receive data are compared with the registered data with the receive start and end frames unchanged.

2) Only the send data (the data in the send area) are converted to an ASCII code.
Registration frames are not converted to ASCII codes.

3) The number of bytes of the total data including send data, receive data, and start and end frames after ASCII-binary conversion must be 4096 bytes or less.
Either of the following errors occurs when the number of bytes exceeds 4096.
    - When sending: Send data size exceeded error (BB93H)
    - When receiving: Receive data size exceeded error (BBA2H)

(c) Pay attention to the following when ASCII-binary conversion is specified in the monitoring-based transmission function.

1) Only the send data (the data in the send area) are converted to an ASCII code.
Registration frames are not converted to ASCII codes.

2) The number of bytes of binary data before conversion must be 4096 or less.
When the number of bytes exceeds 4096, a send data size exceeded error (BB93H) occurs.

## 4.5.7 RW refresh function

The RW refresh function enables monitoring of the buffer memory by assigning a part of the AJ65BT-R2N buffer memory to the remote register (RW).

### (1) RW refresh function overview

By assigning the constantly changing AJ65BT-R2N buffer memory to the remote register, the following can be done.

- When assigned to the remote register (RWr), the master station can detect a change of the AJ65BT-R2N buffer memory.
- When assigned to the remote register (RWw), a part of the AJ65BT-R2N buffer memory can be changed easily.

### (2) Refresh timing of the RW refresh function

Data refresh between the remote register (RW) of the master module and the AJ65BT-R2N buffer memory is performed at the following timing.

(a) At intervals of the time set in RW refresh interval specification (R2N 40H)

(b) At the same timing as refresh of the auto-refresh buffer

☞Section 4.3.1 (1) Configuration of the auto-refresh buffer

**☒Point**

When the RW refresh function and the buffer memory auto-refresh function are activated at the same time, RW refresh function data are overwritten with the buffer memory auto-refresh function.

Make the setting carefully so that the refresh areas will not be overlapped.

### (3) Buffer memory used for the RW refresh function

Configure the RW refresh function settings in the following buffer memory.

**Table 4.82 Buffer memory used for the RW refresh function**

| R2N Address | Name | | Description |
|---|---|---|---|
| 40H | RW refresh interval specification | | Specify a time interval at which data are refreshed between the remote register (RW) of the master station and the AJ65BT-R2N buffer memory.<br>If no refresh of remote register (RW) is to be performed, specify 0.<br>•Setting range: 0, 1 to 32767 (Unit: × 100ms, Default: 1) |
| 41H | RWw refresh enable/disable setting | | Specify whether to enable or disable the RWw refresh.<br>•0H: Disable refresh of RWw<br>•1H: Enable refresh of RWw<br>•Setting range: 0H, 1H (Default: 0H) |
| 42H | RWr refresh enable/disable setting | | Specify whether to enable or disable the RWr refresh.<br>•0H: Disable refresh of RWr<br>•1H: Enable refresh of RWr<br>•Setting range: 0H, 1H (Default: 1H) |
| 43H | RW refresh target address specification | Master station→AJ65BT-R2N (RWwm) | Specify a buffer memory address of the AJ65BT-R2N, which is assigned to the remote register (RW) on the master station side.<br>For details, refer to Table 4.83. |
| 44H | | AJ65BT-R2N→Master station (RWrm) | |
| 45H | | Master station→AJ65BT-R2N (RWw(m+1)) | |
| 46H | | AJ65BT-R2N→Master station (RWr(m+1)) | |
| 47H | | Master station→AJ65BT-R2N (RWw(m+2)) | |
| 48H | | AJ65BT-R2N→Master station (RWr(m+2)) | |
| 49H | | Master station→AJ65BT-R2N (RWw(m+3)) | |
| 4AH | | AJ65BT-R2N→Master station (RWr(m+3)) | |

In RW refresh target address specification (R2N 43H to 4AH), the following buffer memory data are set as defaults.

If necessary, specify a buffer memory address of the AJ65BT-R2N, which is assigned to the remote register (RW).

**Table 4.83 RW refresh target address specification**

| Transfer direction | R2N Address | Remote register (RW) | Default | AJ65BT-R2N buffer memory indicated by default | |
|---|---|---|---|---|---|
| Master station→AJ65BT-R2N | 43H | RWwm | 118H | Send-frame-1 area | Send start frame No. |
| | 45H | RWw(m+1) | 119H | | Send end frame No. |
| | 47H | RWw(m+2) | 120H | Send-frame-2 area | Transmission table start No. specification |
| | 49H | RWw(m+3) | 121H | | No. of transmission tables |
| AJ65BT-R2N→Master station | 44H | RWrm | 1B0H | Error code storage area | General error codes |
| | 46H | RWr(m+1) | 1B1H | | Error codes generated when sending |
| | 48H | RWr(m+2) | 1B2H | | Error codes generated when receiving |
| | 4AH | RWr(m+3) | 1B6H | No. of data stored in OS reception area | |

**☒Point**

Initialize the AJ65BT-R2N if a set value in the AJ65BT-R2N buffer memory used for the RW refresh function was changed.

☞Section 4.4 AJ65BT-R2N Initialization Function

## 4.5.8 OS reception area clear function

The OS reception area clear function clears data in the OS reception area of the AJ65BT-R2N.

(1) OS reception area

The OS reception area is explained.

(a) The OS reception area is an OS area where the AJ65BT-R2N temporarily stores the following receive data.

- Data received before a request for reading out receive data to the programmable controller CPU is generated by the user-set "No. of receive end data" and "Receive end frame"
- Data received from the external device while receive data stored in the receive area of the buffer memory are requested to be read out to the programmable controller CPU

(b) Data stored in the OS reception area are transferred to the receive area in the following cases:

- When a request for reading out receive data to the programmable controller CPU is generated by the user-set "No. of receive end data" and "Receive end frame"
- When the forced receive completion function is used

(c) The number of receive data stored in the OS reception area can be checked in No. of data stored in OS reception area (R2N 1B6H).
When the buffer memory auto-refresh function is used, however, an accurate number of receive data cannot be read depending on the time of receive completion since it is updated at the auto-refresh timing.

**☒Point**

To check the number of receive data stored in the OS reception area, use the RW refresh function to read No. of data stored in OS reception area (R2N 1B6H).
Note that the OS reception area data cannot be read out directly from the programmable controller CPU.

(2) Processing method

The OS reception area of the AJ65BT-R2N is cleared when OS reception area clear request signal (RYn6) is turned ON.
For OS reception area clear request signal (RYn6), refer to the following.

☞Section 3.7.2 (6) OS reception area clear request signal (RYn6) and OS reception area cleared signal (RXn6)

(3) Processing procedures

(a) Processing flow

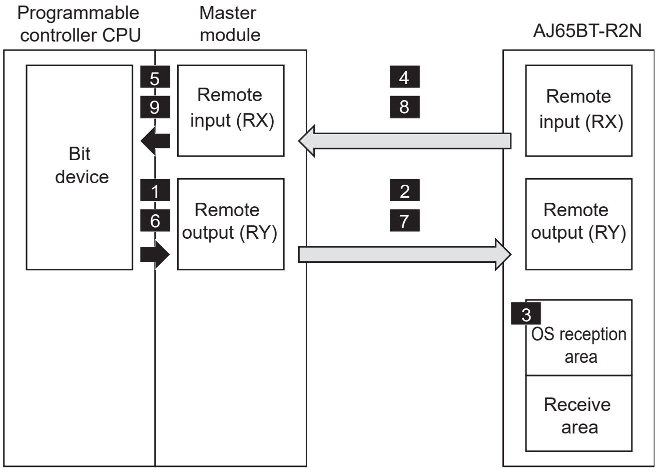


**Figure 4.57 Operating procedures of the OS reception area clear function**

(b) Timing chart

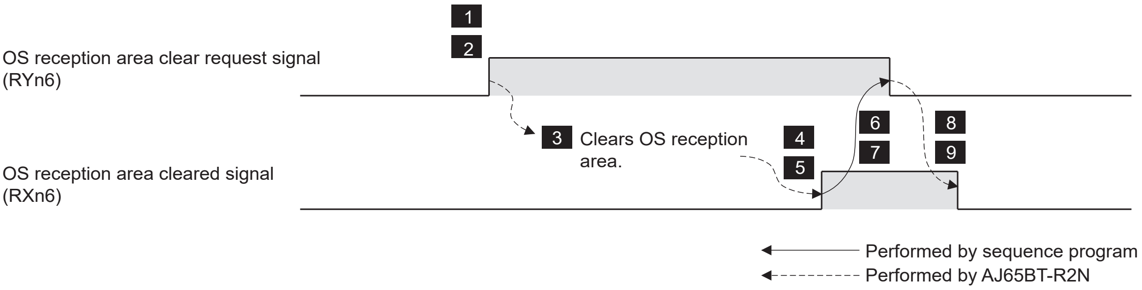


**Figure 4.58 Operating procedures of the OS reception area clear function**

(c) Processing procedures

**Table 4.84 Operating procedures of the OS reception area clear function**

| No. | Processing |
|---|---|
| 1, 2 | OS reception area clear request signal (RYn6) is turned ON. |
| 3 | Clearing the OS reception area is started. |
| 4, 5 | OS reception area cleared signal (RXn6) turns ON when clearing of the OS reception area is completed. |
| 6, 7 | OS reception area clear request signal (RYn6) is turned OFF. |
| 8, 9 | OS reception area cleared signal (RXn6) turns OFF. |

**☒Point**

(1) The OS reception area clear function clears only the OS reception area. The receive area in the buffer memory of the AJ65BT-R2N is not cleared.

(2) If the OS reception area clear function is performed in frame reception, all of the receive data stored in the OS reception area are cleared.

### (4) Buffer memory used for the OS reception area clear function

Configure the OS reception area clear function setting in the following buffer memory.

**Table 4.85 Buffer memory used for the OS reception area clear function**

| R2N Address | Name | Description |
|---|---|---|
| 1B6H | No. of data stored in OS reception area | Number of the data stored in the OS reception area is stored.<br>The information stored is updated every 100ms.<br>The value changes depending on the setting of Word/byte specification (R2N 102H). |

## 4.5.9 E$^2$PROM function

The E$^2$PROM function allows the user to register values set in the AJ65BT-R2N buffer memory to the E$^2$PROM to use them as initial values at the time of the AJ65BT-R2N startup.

### ☒Point

(1) After registration to the E$^2$PROM, there is no need to create a sequence program for changing defaults of the AJ65BT-R2N buffer memory.

(2) Do not execute registration to the E$^2$PROM every time the AJ65BT-R2N is started up.

Doing so may cause the maximum number of writes to E$^2$PROM (service life) to be reached earlier.

(1) Processing method

The E$^2$PROM function is enabled when E$^2$PROM function request signal (RYn7) is turned ON after data is written to E$^2$PROM function specification (R2N 1C0H).

For E$^2$PROM function request signal (RYn7), refer to the following.

☞Section 3.7.2 (7) E2PROM function request signal (RYn7), E2PROM function complete signal (RXn7), and E2PROM function failed signal (RXn8)

(2) Processing procedures

The following shows an example of using the buffer memory auto-refresh function.

(a) Processing flow

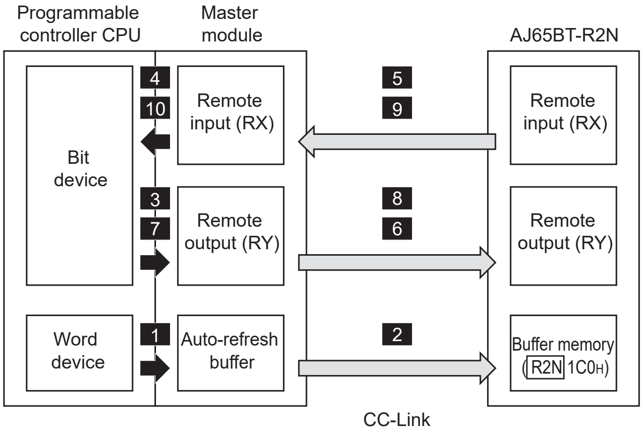


Figure 4.59 E$^2$PROM function processing procedures

(b) Timing chart

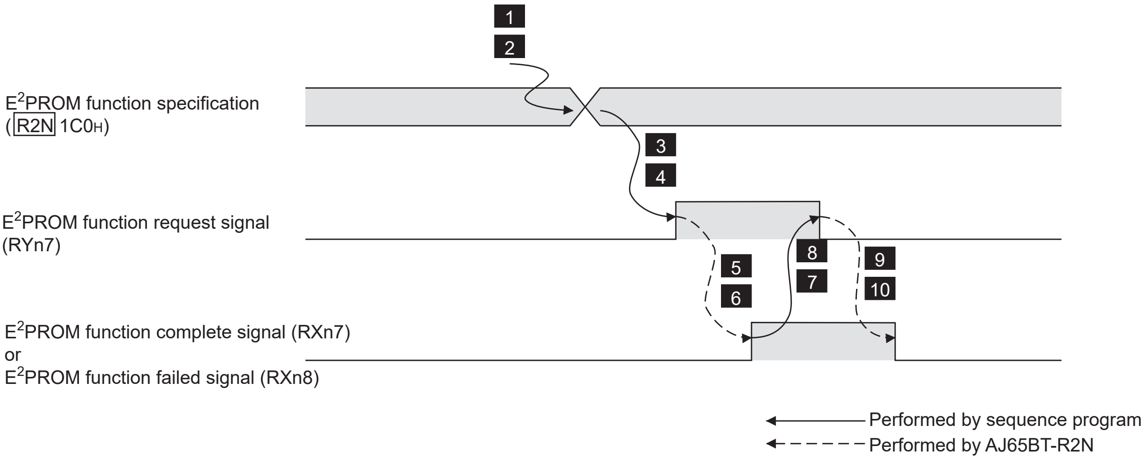


**Figure 4.60 E$^2$PROM function processing procedures**

(c) Processing procedures

**Table 4.86 E$^2$PROM function processing procedures**

| No. | Processing |
|---|---|
| 1, 2 | In E$^2$PROM function specification (R2N 1C0H), the E$^2$PROM function is specified. |
| 3, 4 | E$^2$PROM function request signal (RYn7) is turned ON. |
| 5, 6 | E$^2$PROM function complete signal (RXn7) turns ON when the E$^2$PROM function is completed normally.<br>E$^2$PROM function failed signal (RXn8) turns ON when the E$^2$PROM function failed. |
| 7, 8 | E$^2$PROM function request signal (RYn7) is turned OFF. |
| 9, 10 | E$^2$PROM function complete signal (RXn7) or E$^2$PROM function failed signal (RXn8) turns OFF. |

## (3) Buffer memory used for the E$^2$PROM function

Configure the E$^2$PROM function settings in the following buffer memory.

**Table 4.87 Buffer memory used for the E$^2$PROM function**

| R2N Address | Name | Description |
|---|---|---|
| 1C0H | E$^2$PROM function specification | Specify the function.<br>Specify registration of the values set in the buffer memory to the E$^2$PROM, or initialization of them.<br>•0H: Register values set in the buffer memory<br>•4H: Initialize the buffer memory back to defaults<br>•Setting range: 0H to 4H (Default: 0H)<br>1H to 3H are used when a user registration frame is set.<br>☞ Section 4.5.1 (5) User registration frame |
| 1A7H | Buffer memory default setting status storage | The default buffer memory status at startup of the AJ65BT-R2N is stored.<br>•0H: Defaults of AJ65BT-R2N are stored.<br>•1H: Initial values registered to E$^2$PROM are stored. |

## 4.5.10 RS-232 signal control function

With the RS-232 signal control function, the RS-232 interface signal status data stored in the AJ65BT-R2N buffer memory can be read and outputs can be controlled.
The RS-232 signals are controlled by remote I/O signals (RX/RY).

### (1) Relation between the RS-232 control signals and remote I/O signals (RX, RY)

The RS-232 interface control signals and remote I/O signals (RX, RY) are shown below.

**Table 4.88 Relation between the RS-232 control signals and remote I/O signals (RX, RY)**

| Remote I/O signal (RX, RY) | | Control signal | Description |
|---|---|---|---|
| Remote input signal (RX) | RXn9 | CS (CTS) signal | The ON/OFF status of the control signal is reflected to the corresponding remote input signal (RXn9 to RXnB). |
| | RXnA | DSR (DR) signal | |
| | RXnB | CD signal | |
| Remote output signal (RY) | RYn9 | RS (RTS) signal | The ON/OFF status of the remote output signal (RYn9, RYnA) is reflected to the corresponding control signal. |
| | RYnA | DTR (ER) signal | |

Refreshes between the RS-232 control signals and I/O signals are performed at intervals of 100ms.
For each RS-232 signal, refer to the following.

☞Section 3.5.1 RS-232 connector specifications

### (2) Buffer memory used for the RS-232 signal control function

Configure the RS-232 signal control function settings in the following buffer memory.

**Table 4.89 Buffer memory setting**

| R2N Address | Name | Description |
|---|---|---|
| $100_H$ | Flow control specification | Specify DTR/DSR (ER/DR) control or DC code control, for data communication between the AJ65BT-R2N and external device.<br>•$0_H$ : Flow control not performed<br>•$1_H$ : Perform flow control by DTR/DSR (ER/DR) control (The ON/OFF status of the DTR (ER) signal (RYnA) is invalid.)<br>•$2_H$ : Perform flow control by DC code control<br>•Setting range: $0_H$ to $2_H$ (Default: $1_H$) |
| $101_H$ | RS (RTS) signal status specification | Specify whether to set the RS (RTS) signal status constantly to ON or to change it according to ON/OFF of RS (RTS) signal (RYn9).<br>•$0_H$: Always ON(The ON/OFF status of the RS (RTS) signal (RYn9) is invalid.)<br>•$1_H$: Change according to ON/OFF of RS (RTS) signal (RYn9)<br>•Setting range: $0_H$, $1_H$ (Default: $0_H$) |

**☒Point**

Initialize the AJ65BT-R2N if a set value in the AJ65BT-R2N buffer memory used for the RS-232 signal control function was changed.

☞Section 4.4 AJ65BT-R2N Initialization Function

# CHAPTER 5 SET-UP AND PROCEDURE BEFORE OPERATION

## 5.1 Implementation and Installation

### 5.1.1 Handling precautions

The following describes precautions for handling the AJ65BT-R2N.

**⚠WARNING**

- Do not touch terminals or connectors while the power is ON.
  Doing so may cause electric shock or malfunctions.
- Do not touch any connector under the cover on the front of the module.
  Doing so may result in a failure or malfunction of the module.

**⚠CAUTION**

- Take care to prevent foreign matter such as dust or wire chips from entering the module.
  Failure to do so may cause a fire, failure or malfunctions.
- Do not disassemble or remodel the module.
  Doing so may cause a failure, malfunctions, personal injuries and/or a fire.
- Do not drop or apply a strong shock to the module since the case is made of resin.
  Doing so will damage the module.
- Tighten terminal screws within the specified torque range.
  A loose screw may cause a short circuit or malfunction.
  Overtightening a terminal screw may damage the screw, resulting in a short circuit or malfunction.
- When disposing of this product, treat it as industrial waste.
- Use the module in an environment that meets the general specifications given in this manual.
  Operating it in any other environment may cause an electric shock, fire, malfunction, product damage or deterioration.
- Securely fix the module with the DIN rail or installation screws. Installation screws must be tightened within the specified torque range.
  A loose screw may cause a drop of the module, short circuit or malfunction.
  Overtightening may damage the screw, resulting in a drop of the module or a short circuit.
- Be sure to shut off all phases of the external power supply before mounting or removing the module to/from the panel.
  Failure to do so may result in a failure or malfunction of the module.

(1) Tighten the module mounting screws within the following ranges.

Table 5.1 Screw tightening torque

| Screw | Tightening torque range | Remarks |
|---|---|---|
| Module mounting screw (M4) | 0.78 to 1.18N·m | — |
| Terminal block terminal screw (M3.5) | 0.59 to 0.88N·m | — |
| Terminal block mounting screw (M4) | 0.98 to 1.37N·m | — |
| RS-232 cable connector screw (M2.6) | 0.20 to 0.39N·m | Screw hole depth: L=3.2mm or less<br>(Internal dimension from end face) |

(2) When using the DIN rail adapter, pay attention to the following.

(a) Applicable DIN rail type (Compliant with IEC 60715)
- TH35-7.5Fe
- TH35-7.5Al
- TH35-15Fe

(b) DIN rail mounting screw pitch
When installing a DIN rail, tighten the screws at a pitch of 200mm or less.

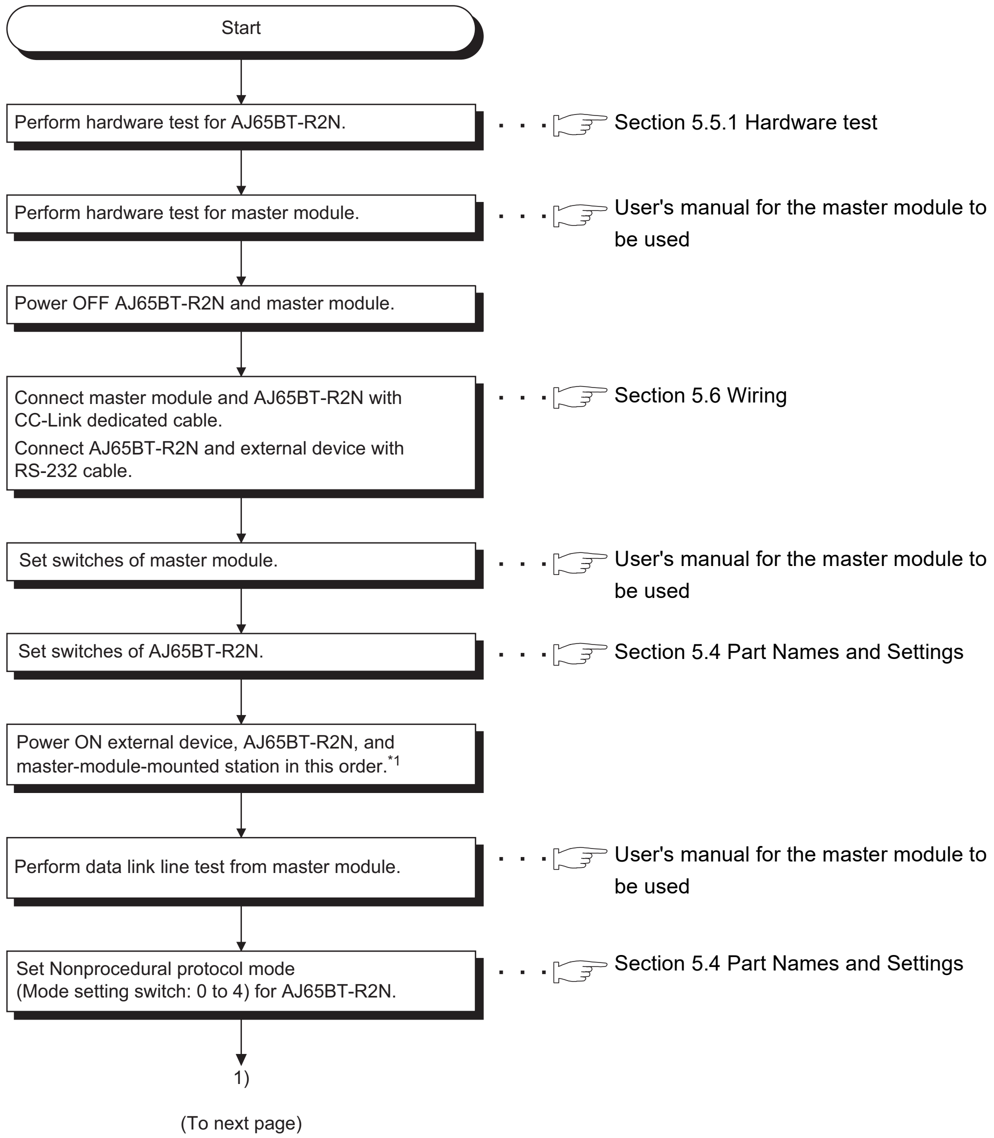
(3) Use drivers, which match the following recommended driver dimensions, for the operation of Station No. setting switches and Data link transmission speed setting switch. Using drivers with unsuitable edge width or thickness may damage the switches.

| Recommended driver dimensions | |
|---|---|
| Edge width (L) | 2.0 to 2.4mm |
| Edge thickness (W) | 0.5 to 0.6mm |

Front view of blade edge Side view of blade edge

## 5.2 Set-up and Procedure Before Operation

This section describes the preparatory procedures of the AJ65BT-R2N.



Start

Perform hardware test for AJ65BT-R2N. . . . Section 5.5.1 Hardware test

Perform hardware test for master module. . . . User's manual for the master module to be used

Power OFF AJ65BT-R2N and master module.

Connect master module and AJ65BT-R2N with CC-Link dedicated cable. Connect AJ65BT-R2N and external device with RS-232 cable. . . . Section 5.6 Wiring

Set switches of master module. . . . User's manual for the master module to be used

Set switches of AJ65BT-R2N. . . . Section 5.4 Part Names and Settings

Power ON external device, AJ65BT-R2N, and master-module-mounted station in this order.[*1]

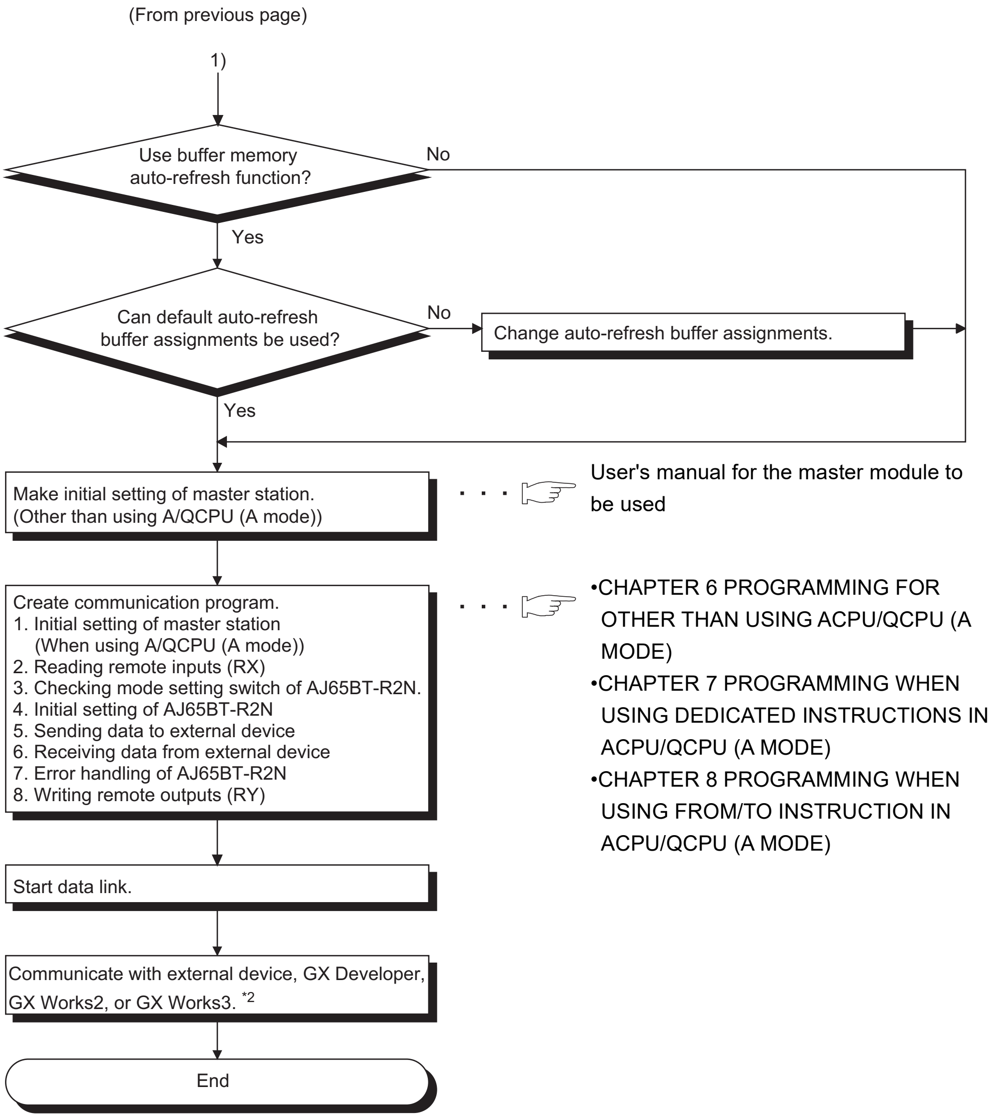
Perform data link line test from master module. . . . User's manual for the master module to be used

Set Nonprocedural protocol mode (Mode setting switch: 0 to 4) for AJ65BT-R2N. . . . Section 5.4 Part Names and Settings

1)

(To next page)

Figure 5.1 Preparatory procedures and setting



User's manual for the master module to be used

- CHAPTER 6 PROGRAMMING FOR OTHER THAN USING ACPU/QCPU (A MODE)
- CHAPTER 7 PROGRAMMING WHEN USING DEDICATED INSTRUCTIONS IN ACPU/QCPU (A MODE)
- CHAPTER 8 PROGRAMMING WHEN USING FROM/TO INSTRUCTION IN ACPU/QCPU (A MODE)

Figure 5.1 Preparatory procedures and setting (Continued)

* 1 When an external device detects a communication error at powering on the AJ65BT-R2N, power on the order of the master-module mounted station, AJ65BT-R2N, and external device.

* 2 To use a general-purpose output on a module of hardware version A, the +24V input terminal must be wired on the general-purpose I/O terminal block.

## 5.3 Installation Environment

(1) AJ65BT-R2N

For the AJ65BT-R2N installation environment, refer to the following.

☞Section 3.1 General Specifications

(2) CC-Link

For the installation environment of the CC-Link system, refer to the following.

☞User's manual for the master module to be used

## 5.4 Part Names and Settings

This section describes the part names, description of LEDs, and each switch of the AJ65BT-R2N.

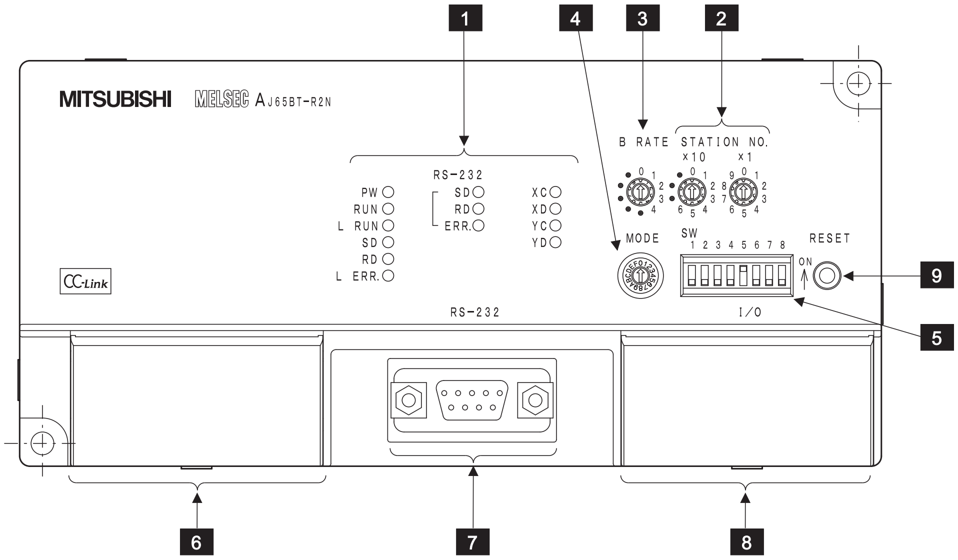
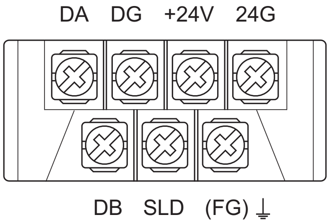


**Figure 5.2 AJ65BT-R2N outline view**

Table 5.2 Part names

| No. | Name | Description |
|---|---|---|
| 1 | Indicator LEDs | Indicate the operating status of the AJ65BT-R2N.<br>For details, refer to (1) in this section. |
| 2 | Station No. setting switch | Set a station No. for the AJ65BT-R2N. (Factory default: 0)<br>Setting range: 1 to 64<br>Set the tens place of the station No. with "×10", and the ones place with "× 1". |
| 3 | Data link transmission speed setting switch | Set the transmission speed of the AJ65BT-R2N.<br>For details, refer to (2) in this section. |
| 4 | Mode setting switch | Set the operation status of the AJ65BT-R2N.<br>For details, refer to (3) in this section. |
| 5 | RS-232 transmission setting switches | Set the RS-232 transmission specifications.<br>For details, refer to (4) in this section. |
| 6 | Data link terminal block | Connect a CC-Link dedicated cable for power supply and data link. (Detachable terminal block)<br> |
| 7 | RS-232 interface | Connect an RS-232 cable for connection to an external device. |
| 8 | General-purpose I/O terminal block | Connect input/output wires. (Detachable terminal block) |
| 9 | Reset switch | Used to return to the power-up status. |

(1) Indicator LEDs

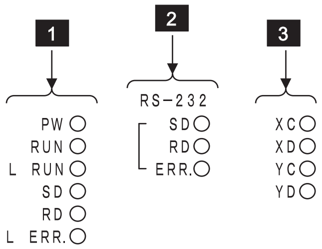


**Figure 5.3 Indicator LEDs**

**Table 5.3 Indicator LEDs**

| LED | | Status | Description |
|---|---|---|---|
| 1 | PW | ON | Power is ON |
| | | OFF | Power is OFF |
| | RUN | ON | Operating normally |
| | | OFF | •24V DC power failure or watchdog timer error occurred<br>•In MELSOFT connection mode, any of the RS-232 transmission setting switches SW1 to SW8 is ON<br>•Incorrect switch setting |
| | L RUN | ON | Communicating normally |
| | | OFF | •Communication failure or timeout error occurred<br>•Incorrect switch setting |
| | SD | ON | Data being sent by data link |
| | | Flashing | Data being sent by data link |
| | | OFF | Data not sent by data link |
| | RD | ON | Data being received by data link |
| | | Flashing | Data being received by data link |
| | | OFF | Data not received by data link |
| | L ERR. | ON | Invalid transmission speed or station No. setting |
| | | Flashing regularly | Transmission speed or station No. setting changed after power-ON |
| | | Flashing irregularly | •Terminating resistor not connected<br>•AJ65BT-R2N or CC-Link dedicated cable affected by noise |
| | | OFF | Communicating normally |
| 2 | SD | ON | RS-232 data being sent |
| | | Flashing | RS-232 data being sent |
| | | OFF | RS-232 data not sent |
| | RD | ON | RS-232 data being received |
| | | Flashing | RS-232 data being received |
| | | OFF | RS-232 data not received |
| | ERR. | ON | When Nonprocedural protocol mode is active, RS-232 transmission error |
| | | OFF | •In Nonprocedural protocol mode, normal communication<br>•In MELSOFT connection mode, always OFF |
| 3 | XC, XD | ON | General-purpose input (XC, XD) is ON |
| | | OFF | General-purpose input (XC, XD) is OFF |
| | YC, YD | ON | General-purpose output (YC, YD) is ON |
| | | OFF | General-purpose output (YC, YD) is OFF |

### (2) Data link transmission speed setting switch

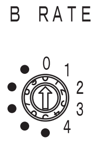


**Figure 5.4 Data link transmission speed setting switch**

**Table 5.4 Data link transmission speed setting switch**

| Setting | Transmission speed |
|---|---|
| 0[*1] | 156kbps |
| 1 | 625kbps |
| 2 | 2.5Mbps |
| 3 | 5Mbps |
| 4 | 10Mbps |
| · | Use prohibited |

* 1 Data link transmission speed setting switch at factory default setting is 0 (156kbps).

### (3) Mode setting switch

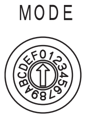


**Figure 5.5 Mode setting switch**

**Table 5.5 Mode setting switch**

| Setting | Name | | | Description |
|---|---|---|---|---|
| 0[*1] | Nonprocedural protocol mode | For send/receive buffer communication function | Mode 0 | Communications are performed in Nonprocedural protocol mode.<br>Set this when using the send/receive buffer communication function. |
| 1 | | For buffer memory auto-refresh function | Mode 1 | Communications are performed in Nonprocedural protocol mode.<br>Set this when using the buffer memory auto-refresh function. |
| 2 | | | Mode 2 | |
| 3 | | | Mode 3 | |
| 4 | | | Mode 4 | |
| 5 | MELSOFT connection mode | | | Used for communications with the engineering tool. |
| 6 | Use prohibited | | | Setting error (RUN LED OFF) |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| A | | | | |
| B | | | | Use prohibited |
| C | | | | |
| D | Hardware test mode | | | Set this when conducting a hardware test. |
| E | Use prohibited | | | Setting error (RUN LED OFF) |
| F | | | | |

* 1 Mode setting switch at factory default setting is 0 (Nonprocedural protocol mode).

(4) RS-232 transmission setting switches

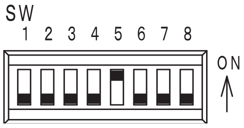


**Figure 5.6 RS-232 transmission setting switches**

**Table 5.6 RS-2332 transmission setting switches**

| Switch No. | Setting item | Switch status | | Factory default setting |
|---|---|---|---|---|
| | | ON | OFF | |
| SW1 | Transmission speed | For details, refer to Table 5.7 | | OFF |
| SW2 | | | | |
| SW3 | | | | |
| SW4 | | | | |
| SW5 | Data bit length | 8 | 7 | ON |
| SW6 | Parity bit | Present | None | OFF |
| SW7 | | Even | Odd | |
| SW8 | Stop bit length | 2 | 1 | |

**Table 5.7 RS-232 transmission setting switches (SW1 to SW4)**

| Setting item | | Switch No. | | | |
|---|---|---|---|---|---|
| | | SW1 | SW2 | SW3 | SW4 |
| Transmission speed | 300bps | OFF | OFF | OFF | OFF |
| | 600bps | ON | OFF | OFF | OFF |
| | 1200bps | OFF | ON | OFF | OFF |
| | 2400bps | ON | ON | OFF | OFF |
| | 4800bps | OFF | OFF | ON | OFF |
| | 9600bps | ON | OFF | ON | OFF |
| | 19200bps | OFF | ON | ON | OFF |
| | 38400bps | ON | ON | ON | OFF |
| | 57600bps | OFF | OFF | OFF | ON |
| | 115200bps | ON | OFF | OFF | ON |

**☒Point**

(1) When MELSOFT connection mode is used, turn OFF SW1 to SW8.
If any of SW1 to SW8 is ON, the setting error (RUN LED is OFF) may occur.

(2) Unless data are sent concurrently from the AJ65BT-R2N and external-device sides in Nonprocedural protocol mode, communication at 57600bps or 115200bps is available.
If data is communicated simultaneously, the RS-232 receive overrun error (BB23H) may occur.

(5) How to check the switch status of the AJ65BT-R2N

The switch status of the AJ65BT-R2N can be checked with R2N addresses 1A0H to 1A6H.

**Table 5.8 Checking switch status with buffer memory**

| R2N Address | Name | Description |
|---|---|---|
| 1A0H | Station No. setting switch | Station No. setting switch status of the AJ65BT-R2N is stored.<br>•Storage range: 1 to 64 (Default: 0) |
| 1A1H | Data link transmission speed setting switch | Data link transmission speed setting switch status of the AJ65BT-R2N is stored.<br>•156 :156kbps (Default)<br>•625 :625kbps<br>•2500 :2.5Mbps<br>•5000 :5Mbps<br>•10000 :10Mbps |
| 1A2H | Mode setting switch | Mode setting switch status of the AJ65BT-R2N is stored.<br>•0H :When send/receive buffer communication function is used<br>•1H to 4H :When buffer memory auto-refresh function is used<br>•5H :In MELSOFT connection mode<br>•6H to CH :Area that cannot be set<br>•DH :In hardware test<br>•EH, FH :Area that cannot be set<br>•Storage range :0H to FH (Default: 0H) |
| 1A3H | RS-232 transmission speed | Transmission speed set in the AJ65BT-R2N is stored.<br>•300 :300bps (Default)<br>•600 :600bps<br>•1200 :1200bps<br>•2400 :2400bps<br>•4800 :4800bps<br>•9600 :9600bps<br>•19200 :19200bps<br>•384 :38400bps<br>•576 :57600bps<br>•1152 :115200bps |
| 1A4H | RS-232 data bit length | Data bit length set in the AJ65BT-R2N is stored.<br>•7 :7 bits<br>•8 :8 bits<br>•Storage range :7, 8 (Default: 8) |
| 1A5H | RS-232 parity bit | Parity bit set in the AJ65BT-R2N is stored.<br>•0 :Bit is absent<br>•1 :Bit is present (Odd)<br>•2 :Bit is present (Even)<br>•Storage range :0 to 2 (Default: 0) |
| 1A6H | RS-232 stop bit length | Stop bit length set in the AJ65BT-R2N is stored.<br>•1 :1 bit<br>•2 :2 bits<br>•Storage range :1, 2 (Default: 1) |

## 5.5 AJ65BT-R2N Single Unit Test

Check if the single unit of the AJ65BT-R2N operates normally.
Always perform a test before configuring the system.

### 5.5.1 Hardware test

The following describes a hardware test of the AJ65BT-R2N.
Perform a test according to the following procedures.

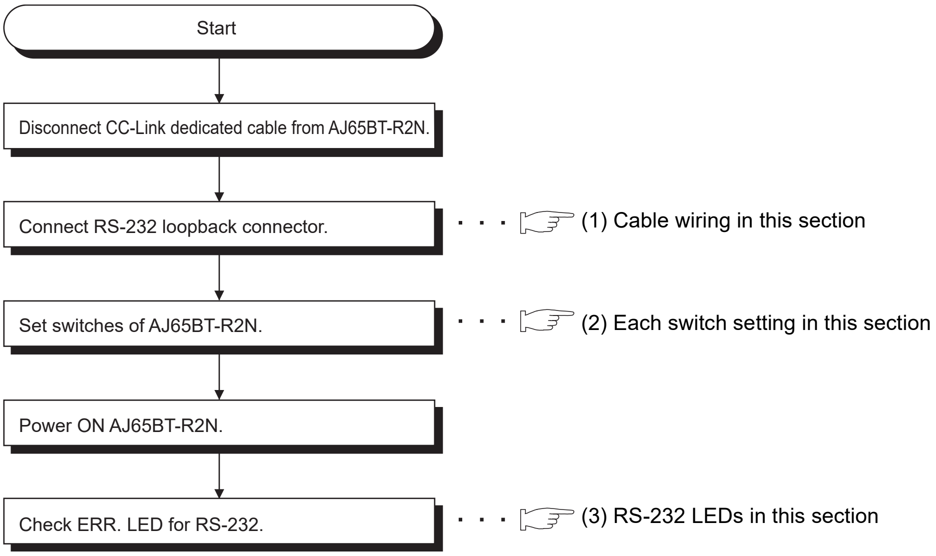
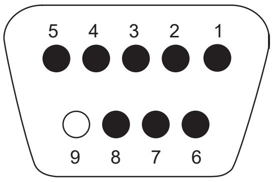
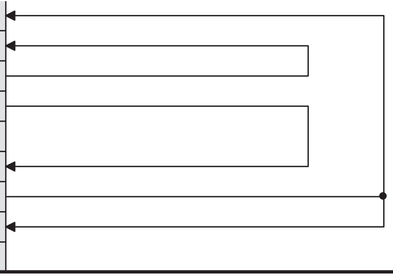


**Figure 5.7 Hardware test procedure**

(1) Cable wiring

The following shows specifications of the RS-232 loopback connector.
Create the RS-232 loopback connector in accordance with the RS-232 loopback connector wire connection shown below.

**Table 5.9 RS-232 loopback connector wire connection**

| RS-232 connector | AJ65BT-R2N side (DTE) | | Loopback connector wire connection |
|---|---|---|---|
| | Signal mnemonic | Pin No. | |
|  | CD | 1 |  |
| | RD (RXD) | 2 | |
| | SD (TXD) | 3 | |
| | DTR (ER) | 4 | |
| | SG | 5 | |
| | DSR (DR) | 6 | |
| | RS (RTS) | 7 | |
| | CS (CTS) | 8 | |
| | - | 9 | |

## ☒Point

In Hardware test mode, the data for check is sent to the CC-Link at the time of CC-Link loopback check.
Disconnect a wiring of the CC-Link before performing a hardware test.

(2) Each switch setting
Set each switch of the AJ65BT-R2N as shown below.

**Table 5.10 Each switch setting**

| Item | | Description | Set value |
|---|---|---|---|
| Station No. setting switch | | Station No.1 | " × 10":0<br>" × 1":1 |
| Data link transmission speed setting switch | | 10Mbps | 4 |
| Mode setting switch | | Hardware test mode | D |
| RS-232 transmission setting switches | SW1 to SW4 | Transmission speed: 300bps | OFF |
| | SW5 | Data bit length: 8 | ON |
| | SW6, SW7 | Parity bit: None | OFF |
| | SW8 | Stop bit length: 1 | OFF |

(3) RS-232 LEDs

(a) At normal status
ERR. LED of the RS-232 is flashing.
If LED flashes 30 seconds or more, the RS-232 is normal.

(b) At error status
ERR. LED of the RS-232 is turned ON.
Errors are indicated depending on the YC LED/YD LED status as shown below.

**Table 5.11 YC LED/YD LED status**

| LED status | Test name | Description | Corrective action |
|---|---|---|---|
| RS-232<br>SD ○ XC ○<br>RD ○ XD ○<br>ERR. ● YC ○<br>YD ○ | ROM test | ROM check error | The hardware has an error.<br>Please consult your local Mitsubishi representative, explaining a detailed description of the problem. |
| RS-232<br>SD ○ XC ○<br>RD ○ XD ○<br>ERR. ● YC ●<br>YD ○ | RAM test | RAM check error | |
| RS-232<br>SD ○ XC ○<br>RD ○ XD ○<br>ERR. ● YC ○<br>YD ● | Data link loopback test | The hardware has an error or the CC-Link dedicated cable is still connected. | Disconnect the CC-Link dedicated cable.<br>If the ERR. LED will not flash even after disconnecting a cable, please consult your local Mitsubishi representative, explaining a detailed description of the problem. |
| RS-232<br>SD ○ XC ○<br>RD ○ XD ○<br>ERR. ● YC ●<br>YD ● | RS-232 loopback test | The hardware has an error or the RS-232 loopback connector is not mounted. | Mount a loopback connector.<br>If the ERR. LED will not flash even after mounting a connector, please consult your local Mitsubishi representative, explaining a detailed description of the problem. |

○: OFF, ●: ON

## 5.6 Wiring

### 5.6.1 CC-Link dedicated cable connection method

The following describes the connection method of a CC-Link dedicated cable.

**⚠CAUTION**

- Be sure to shut off all phases of the external power supply used by the system before installation or wiring.
  Failure to do so may cause an electric shock or damage to the product.
- Attach the terminal cover to the product before energizing and operating the system after installation or wiring.
  Failure to do so may cause an electric shock.
- Be sure to shut off all phases of the external power supply used by the system before cleaning or retightening the terminal screw.
  Failure to do so may result in a failure or malfunction of the module.
  A loose screw may cause a drop of the module, short circuit or malfunction.
  Overtightening may damage the screw, resulting in a drop of the module, short circuit or malfunction.
- Do not install the control or communication cable(s) together with the main circuit or power cables.
  Keep a distance of 100mm or more between them.
  Failure to do so may cause malfunctions due to noise.
- Always ground the FG terminal to the protective ground conductor.
  Failure to do so may result in electric shock or malfunctions.
- Check the rated voltage and terminal layout and then wire the module correctly.
  Connecting a power supply of a different voltage rating or incorrect wiring may cause a fire or failure.
- Completely connect each cable connector to each receptacle.
  Failure to do so may cause malfunctions due to poor contact.
- Place the connection wires and cables in a duct or clamp them.
  If not, dangling cables may swing or inadvertently be pulled, resulting in damage to the module and/or cables or malfunctions due to poor cable connection.
- Do not install the control cable(s) together with the communication cable(s).
  Doing so may cause malfunctions due to noise.
- Always use the data link terminal block for connection of a CC-Link dedicated cable to a master module.
  Care must be taken because, if the cable is incorrectly inserted into the general-purpose I/O terminal block instead of the data link terminal block, the module will break down.

The following shows how to connect the AJ65BT-R2N to a master module and a remote module with CC-Link dedicated cables.

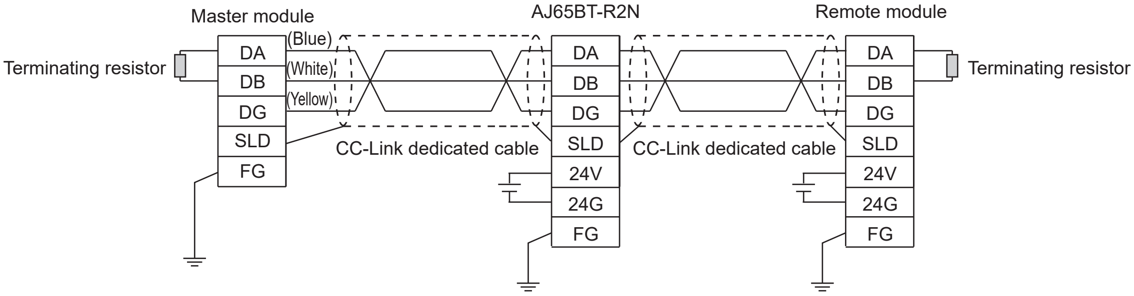


**Figure 5.8 Connection between AJ65BT-R2N and master module**

## ☒Point

Be sure to connect terminating resistors, which are supplied with the master module, to modules on both ends of the data link network. (Connect it between DA and DB.)

## 5.6.2 External device connection method

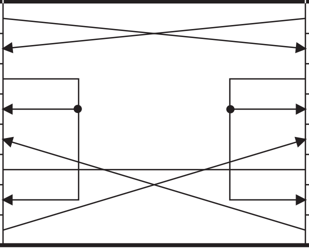
The following shows how to connect the AJ65BT-R2N and the external device of the RS-232.

### (1) Connection example

The AJ65BT-R2N cannot use the CD signal as the control signal for sending/receiving data to/from the external device.
Wire the CD signal line of the AJ65BT-R2N and external device as shown in Table 5.12.

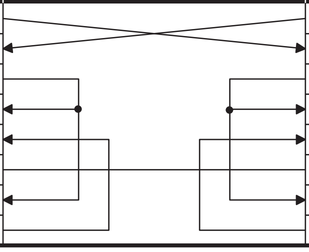
(a) Connection example where DC code control and DTR/DSR(ER/DR) control are executable

**Table 5.12 DC code control and DTR/DSR (ER/DR) control**

| AJ65BT-R2N side (DTE) | | Cable connection and signaling | External device (DTE) |
|---|---|---|---|
| Signal mnemonic | Pin No. | | Signal mnemonic |
| SD | 3 |  | SD |
| RD | 2 | | RD |
| RS | 7 | | RS |
| CS | 8 | | CS |
| DR | 6 | | DR |
| SG | 5 | | SG |
| CD | 1 | | CD |
| ER | 4 | | ER |

(b) Connection example only DC code control is executable

**Table 5.13 Connection example only DC code control is executable**

| AJ65BT-R2N side (DTE) | | Cable connection and signaling | External device (DTE) |
|---|---|---|---|
| Signal mnemonic | Pin No. | | Signal mnemonic |
| SD | 3 |  | SD |
| RD | 2 | | RD |
| RS | 7 | | RS |
| CS | 8 | | CS |
| DR | 6 | | DR |
| SG | 5 | | SG |
| CD | 1 | | CD |
| ER | 4 | | ER |

(2) Precautions for connection

(a) Connect the FG signal line and shield of the RS-232 cable as follows:

**Table 5.14 Precautions for connection**

| RS-232 cable | Connection method | Remarks |
|---|---|---|
| FG signal | Connected to the screw clamp of the AJ65BT-R2N side connector. | •Do not short-circuit the FG and SG signal lines of the RS-232 cable.<br>•If the FG and SG signal lines are connected inside the external-device side, do not connect the FG signal line on the AJ65BT-R2N side to the external device. |
| Shield | Connected to the screw clamp of the AJ65BT-R2N side connector.<br>(Not connected to external device) | |

(b) When data communication cannot be performed normally due to external noise, connect the wires as follows:

1) Connect the FG terminals of both stations with the shield of the RS-232 cable. For the external device side, refer to the handling instructions for the external device.
2) Each signal line (except for SG) must be twisted with the SG signal line.
3) FG of the AJ65BT-R2N is connected to the screw clamp of the connector, acting as FG of the module.

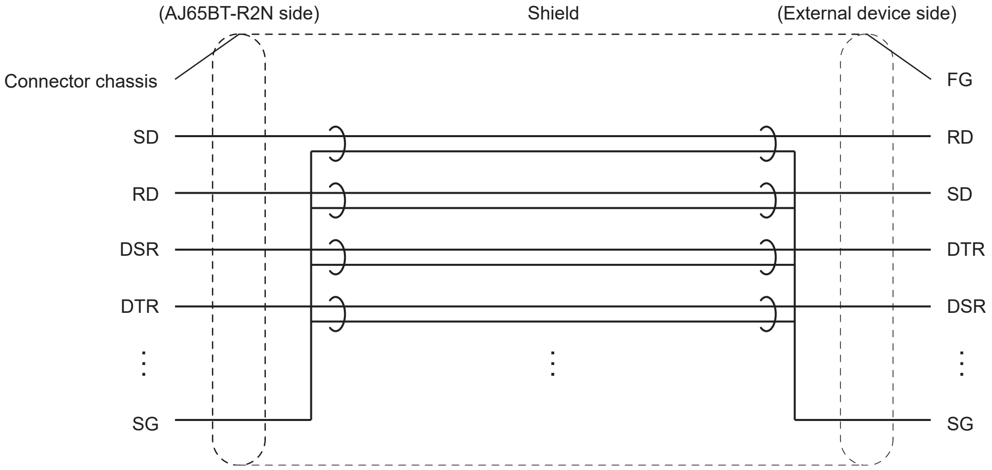


**Figure 5.9 Precautions for connection**

(c) Do not connect an RS-422 device to the RS-232 interface.
Doing so will damage the RS-422 interface of the connected device, resulting in communication failure.

# CHAPTER 6 PROGRAMMING FOR OTHER THAN USING ACPU/QCPU (A MODE)

(1) How to read this chapter

The configuration of this chapter is as follows.

- For RCUP, refer to the MELSEC iQ-R Programming Manual (Instructions, Standard Functions/Function Blocks).
- For QCUP (Q mode), refer to the MELSEC-Q CC-Link System Master/Local Module User's Manual.
- For LCUP, refer to the MELSEC-L CC-Link System Master/Local Module User's Manual.
- For QnACPU, refer to the QnACPU Programming Manual (Special Function Module).

(a) System configuration

This explains the system where the programs described in this chapter are executed.

☞ CHAPTER 6 (2) System configuration for program

(b) Setting of each station

This explains the setting of the master station, remote I/O station and AJ65BT-R2N.

☞ Section 6.1 Setting of Each Station

(c) Executable programs

Various programs are shown, which can be operated when the settings and system configuration are the same as those given in this chapter.

- Send/Receive program

  ☞ Section 6.2 Entire Send/Receive Program Structure
- Program for changing the auto-refresh buffer assignments and registering the assignment settings to E$^2$PROM.

  ☞ Section 6.9.1 Program example for changing auto-refresh buffer assignments
- Program for sending or receiving data with GP.RISEND and GP.RIRCV instructions

  ☞ Section 6.9.2 Program example for sending/receiving data with GP.RISEND/GP.RIRCV instruction
- Program for receiving data when a receive timeout occurs

  ☞ Section 6.9.3 Program example for receiving data when a receive timeout occurs

(d) Each program processing

Each processing in a program is explained.

☞ Section 6.3 Initial Setting for AJ65BT-R2N to Section 6.6 Error Handling of AJ65BT-R2N

(e) Programs used according to function

Programs used according to function are described.

**Table 6.1 Programs added according to function**

| Function | Reference section |
|---|---|
| Initial setting for the frame function | Section 6.7 |
| Initial setting for the monitoring-based transmission function | |
| Initial setting for the flow control function | |
| Initial setting for the ASCII-binary conversion function | |
| Initial setting for the RW refresh function | |
| Send cancel function | Section 6.8 |
| Forced receive completion function | |
| OS reception area clear function | |
| $E^2$PROM function setting | |

(2) System configuration for program

The following shows the system configuration for the program described in this chapter.

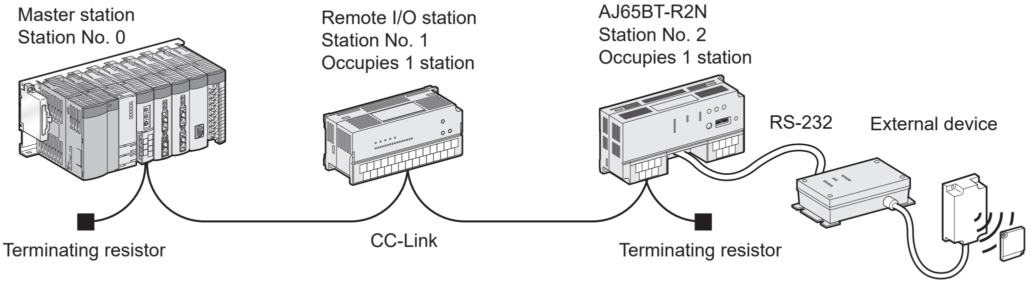


**Figure 6.1 System configuration for program**

(a) Master station

**Table 6.2 Master station information**

| Item | | Description |
|---|---|---|
| Station No. | | 0 |
| Data link transmission speed | | 156kbps |
| CC-Link version | | Ver.1 |
| Start I/O No. | | 0000H (Mounting position of master module) |
| All connect count | | 2 |
| Auto refresh target device | RX | X100 to X13F |
| | RY | Y100 to Y13F |
| | RWr | RCPU, QCPU, LCPU: W0 to W7<br>QnACPU: D500 to D507 |
| | RWw | RCPU, QCPU, LCPU: W100 to W107<br>QnACPU: D600 to D607 |
| | SB | RCPU, QCPU, LCPU: SB0 to SB1F<br>QnACPU: D704 to D735 |
| | SW | RCPU, QCPU, LCPU: SW0 to SW1FF<br>QnACPU: D700 to D1211 |

(b) Remote I/O station

**Table 6.3 Remote I/O station information**

| Item | Description |
|---|---|
| Station No. | 1 |
| Data link transmission speed | 156kbps |
| CC-Link version | Ver.1 |
| No. of occupied stations | Occupies 1 station |

(c) AJ65BT-R2N

**Table 6.4 AJ65BT-R2N information**

| Item | | Description |
|---|---|---|
| Station No. | | 2 |
| Data link transmission speed | | 156kbps |
| RS-232 transmission speed | | 300bps |
| CC-Link version | | Ver.1 |
| No. of occupied stations | | Occupies 1 station |
| Mode setting switch | Using send/receive buffer communication function | 0 (Mode 0) |
| | Using buffer memory auto-refresh function | 1 (Mode1) |
| Send buffer size | Using send/receive buffer communication function | 64 words*1 |
| | Using buffer memory auto-refresh function | 0 word |
| Receive buffer size | Using send/receive buffer communication function | 64 words*1 |
| | Using buffer memory auto-refresh function | 0 word |
| Auto-refresh buffer size | Using send/receive buffer communication function | 0 word |
| | Using buffer memory auto-refresh function | 1536 words*2 |

* 1 When sending/receiving data of 59 words or more, change each buffer size in [Station information setting] (☞ Section 6.1.2 (2)(b)).

* 2 When sending/receiving data of 512 words or more, change the auto-refresh buffer size in [Station information setting] (☞ Section 6.1.2 (2)(b)) and change the auto-refresh buffer assignment.

(d) Sendable transmission

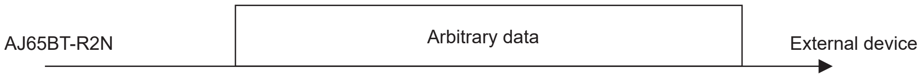


**Figure 6.2 Sendable message**

**Table 6.5 Information of sendable message**

| Item | | Description |
|---|---|---|
| Start frame | | None*1 |
| End frame | | None*1 |
| Data size (including above frames) | Using send/receive buffer communication function | 58 words or less*2 |
| | Using buffer memory auto-refresh function | 511 words or less*3 |

* 1 If required by the external device, each of the frames can be sent.

* 2 When sending/receiving data of 59 words or more, change each buffer size in [Station information setting] (☞ Section 6.1.2 (2)(b)).

* 3 When sending/receiving data of 512 words or more, change the auto-refresh buffer size in [Station information setting] (☞ Section 6.1.2 (2)(b)) and change the auto-refresh buffer assignment.

(e) Receivable message

**Figure 6.3 Receivable message**

**Table 6.6 Information of receivable message**

| Item | | Description |
|---|---|---|
| Start frame | | None |
| End frame | | CR(0DH)＋LF(0AH) |
| Data size (including above frames) | Using send/receive buffer communication function | 58 words or less*1 |
| | Using buffer memory auto-refresh function | 509 words or less*2 |

* 1 When sending/receiving data of 59 words or more, change each buffer size in [Station information setting] (☞ Section 6.1.2 (2)(b)).

* 2 When sending/receiving data of 510 words or more, change the auto-refresh buffer size in [Station information setting] (☞ Section 6.1.2 (2)(b)) and change the auto-refresh buffer assignment.

**Remark**

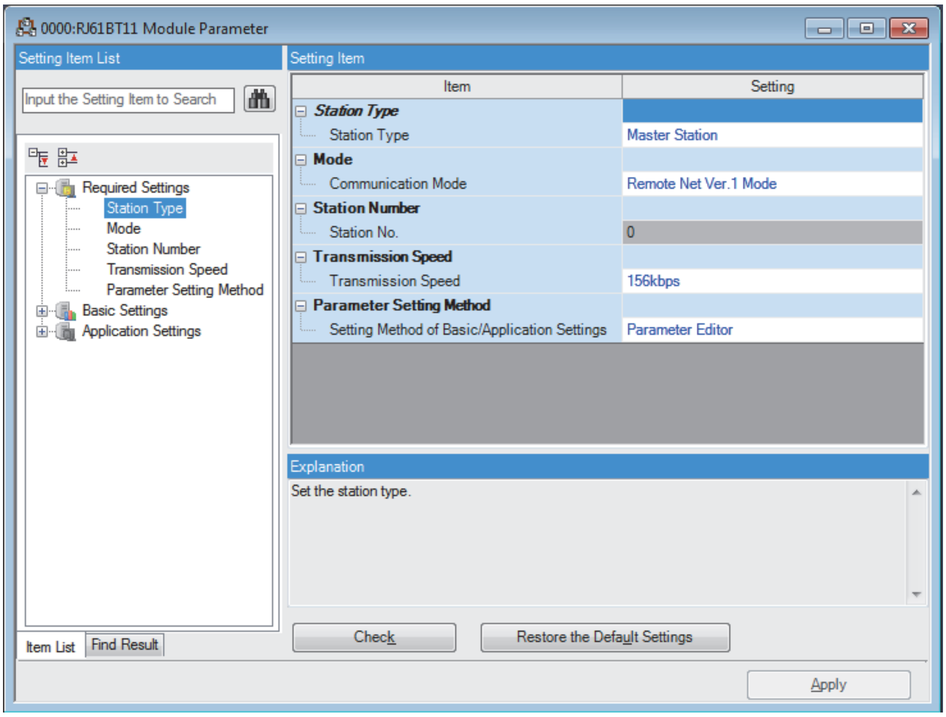
Receive data must not contain CR(0DH)＋LF(0AH).
If CR(0DH)＋LF(0AH) is included, the CR(0DH)＋LF(0AH) is regarded as the end frame, resulting in termination of the reception.

## 6.1 Setting of Each Station

### 6.1.1 Setting RJ61BT11

When using the RJ61BT11, the parameters must be set.
Set the following using GX Works3

(1) Required settings



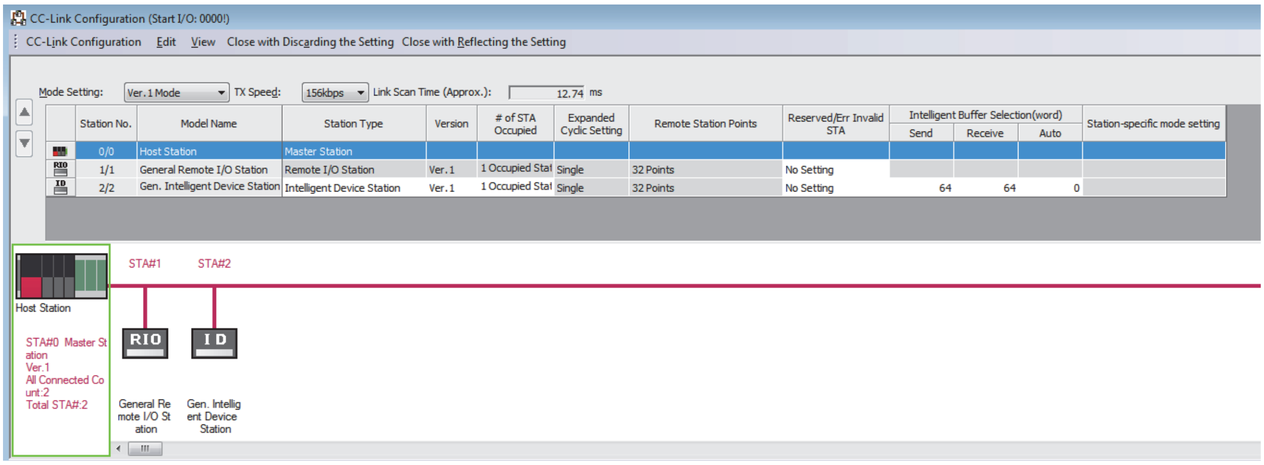
| Item | Setting |
|---|---|
| **Station Type** | |
| Station Type | Master Station |
| **Mode** | |
| Communication Mode | Remote Net Ver.1 Mode |
| **Station Number** | |
| Station No. | 0 |
| **Transmission Speed** | |
| Transmission Speed | 156kbps |
| **Parameter Setting Method** | |
| Setting Method of Basic/Application Settings | Parameter Editor |

Set the station type.

**Figure 6.4 [Required Settings] dialog box**

(2) Basic settings

(a) Network configuration setting



CC-Link Configuration (Start I/O: 0000!)

CC-Link Configuration Edit View Close with Discarding the Setting Close with Reflecting the Setting

Mode Setting: Ver.1 Mode TX Speed: 156kbps Link Scan Time (Approx.): 12.74 ms

| | Station No. | Model Name | Station Type | Version | # of STA Occupied | Expanded Cyclic Setting | Remote Station Points | Reserved/Err Invalid STA | Intelligent Buffer Selection(word) | | | Station-specific mode setting |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Send | Receive | Auto | |
| | 0/0 | Host Station | Master Station | | | | | | | | | |
| RIO | 1/1 | General Remote I/O Station | Remote I/O Station | Ver.1 | 1 Occupied Stat | Single | 32 Points | No Setting | | | | |
| ID | 2/2 | Gen. Intelligent Device Station | Intelligent Device Station | Ver.1 | 1 Occupied Stat | Single | 32 Points | No Setting | 64 | 64 | 0 | |

**Figure 6.5 [CC-Link Configuration] dialog box**

For the intelligent buffer select (word), set the following.

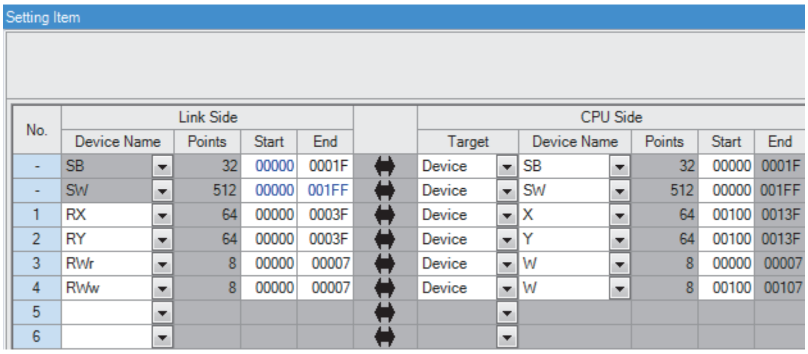
**Table 6.7 CC-Link configuration setting example**

<table>
<tr><th rowspan="2">Item</th><th colspan="2">Set value</th></tr>
<tr><th>Station No. 1</th><th>Station No. 2</th></tr>
<tr><td>Intelligent buffer select (word)</td><td>—</td><td>•Using send/receive buffer communication function
<table>
<tr><th>Send</th><th>Receive</th><th>Automatic</th></tr>
<tr><td>64[*1]</td><td>64[*1]</td><td>0</td></tr>
</table>
•Using buffer memory auto-refresh function
<table>
<tr><th>Send</th><th>Receive</th><th>Automatic</th></tr>
<tr><td>0</td><td>0</td><td>1536[*2]</td></tr>
</table>
</td></tr>
</table>

[*1] When sending/receiving data of 59 words or more, change the value to "(Send/receive data size) ＋ 6 words".

[*2] When sending/receiving data of 512 words or more, change the auto-refresh buffer size and the auto-refresh buffer assignments.

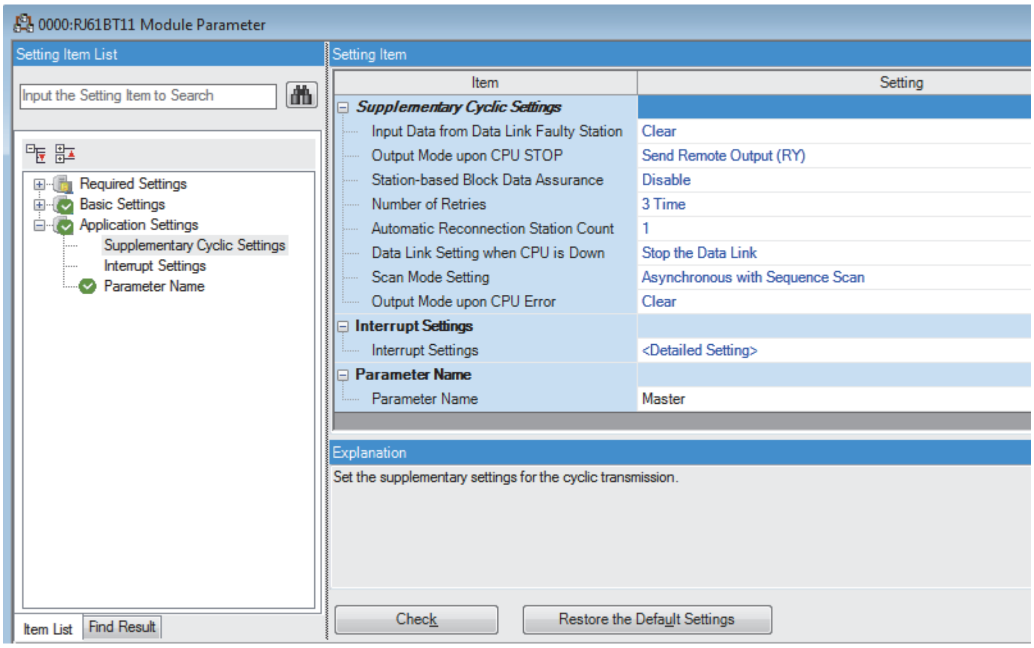
(b) Refresh setting



| No. | Link Side |  |  |  |  | CPU Side |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|
|  | Device Name | Points | Start | End |  | Target | Device Name | Points | Start | End |
| - | SB | 32 | 00000 | 0001F | ⇔ | Device | SB | 32 | 00000 | 0001F |
| - | SW | 512 | 00000 | 001FF | ⇔ | Device | SW | 512 | 00000 | 001FF |
| 1 | RX | 64 | 00000 | 0003F | ⇔ | Device | X | 64 | 00100 | 0013F |
| 2 | RY | 64 | 00000 | 0003F | ⇔ | Device | Y | 64 | 00100 | 0013F |
| 3 | RWr | 8 | 00000 | 00007 | ⇔ | Device | W | 8 | 00000 | 00007 |
| 4 | RWw | 8 | 00000 | 00007 | ⇔ | Device | W | 8 | 00100 | 00107 |
| 5 |  |  |  |  | ⇔ |  |  |  |  |  |
| 6 |  |  |  |  | ⇔ |  |  |  |  |  |

Figure 6.6 [Refresh Setting] dialog box

(3) Application settings



| Item | Setting |
|---|---|
| **Supplementary Cyclic Settings** |  |
| Input Data from Data Link Faulty Station | Clear |
| Output Mode upon CPU STOP | Send Remote Output (RY) |
| Station-based Block Data Assurance | Disable |
| Number of Retries | 3 Time |
| Automatic Reconnection Station Count | 1 |
| Data Link Setting when CPU is Down | Stop the Data Link |
| Scan Mode Setting | Asynchronous with Sequence Scan |
| Output Mode upon CPU Error | Clear |
| **Interrupt Settings** |  |
| Interrupt Settings | <Detailed Setting> |
| **Parameter Name** |  |
| Parameter Name | Master |

Explanation

Set the supplementary settings for the cyclic transmission.

Figure 6.7 [Application Settings] dialog box

## 6.1.2 Setting QJ61BT11N or QJ61BT11

When using the QJ61BT11N or QJ61BT11, the switches and parameters must be set.

(1) Switch setting

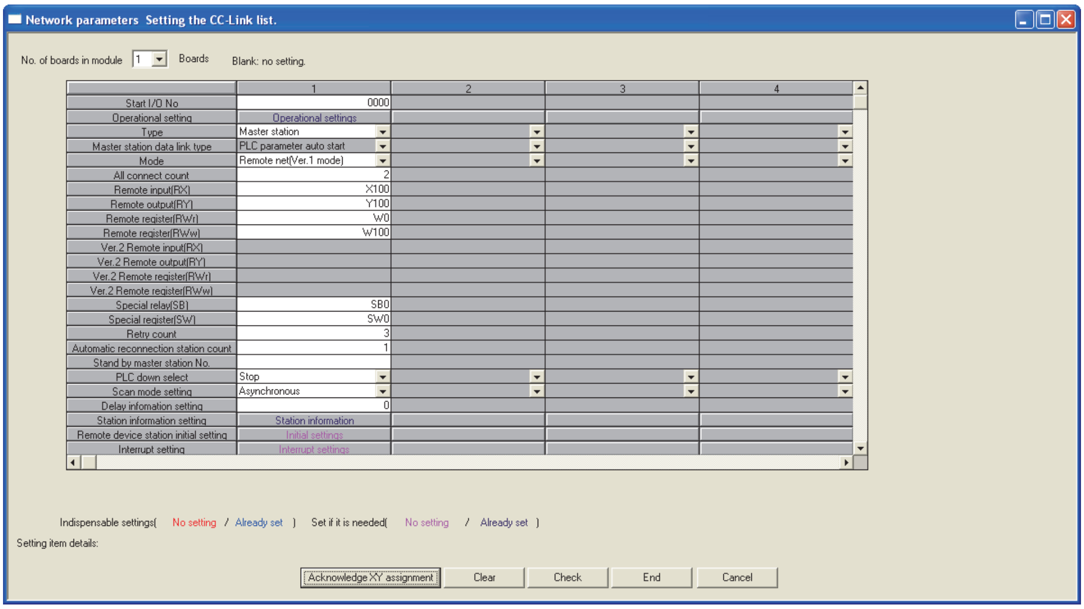
Switch setting for the master station is performed with the switches on the master module.

**Table 6.8 Setting example for each switch**

| Item | Description | Set value |
|---|---|---|
| Station No. setting switch | Master station | 0 |
| Transmission speed/mode setting switch | 156kbps | 0 |

(2) Parameter setting

Set the following using the engineering tool.
This section describes the parameter setting of when GX Developer is used.
When GX Works2 is used, refer to the following.
☞MELSEC-Q CC-Link System Master/Local Module User's Manual



Network parameters Setting the CC-Link list.

No. of boards in module 1 Boards Blank: no setting.

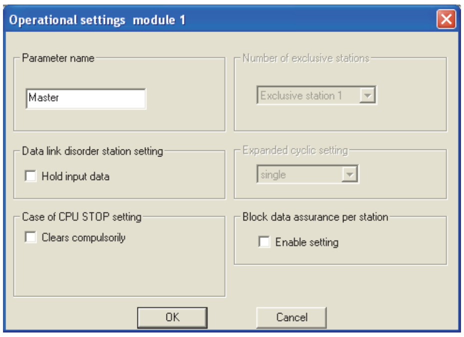
| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Start I/O No | 0000 | | | |
| Operational setting | Operational settings | | | |
| Type | Master station | | | |
| Master station data link type | PLC parameter auto start | | | |
| Mode | Remote net(Ver.1 mode) | | | |
| All connect count | 2 | | | |
| Remote input(RX) | X100 | | | |
| Remote output(RY) | Y100 | | | |
| Remote register(RWr) | W0 | | | |
| Remote register(RWw) | W100 | | | |
| Ver.2 Remote input(RX) | | | | |
| Ver.2 Remote output(RY) | | | | |
| Ver.2 Remote register(RWr) | | | | |
| Ver.2 Remote register(RWw) | | | | |
| Special relay(SB) | SB0 | | | |
| Special register(SW) | SW0 | | | |
| Retry count | 3 | | | |
| Automatic reconnection station count | 1 | | | |
| Stand by master station No. | | | | |
| PLC down select | Stop | | | |
| Scan mode setting | Asynchronous | | | |
| Delay infomation setting | 0 | | | |
| Station information setting | Station information | | | |
| Remote device station initial setting | Initial settings | | | |
| Interrupt setting | Interrupt settings | | | |

Indispensable settings( No setting / Already set ) Set if it is needed( No setting / Already set )

Setting item details:

Figure 6.8 [Setting the CC-Link list] dialog box

(a) Operational setting



Operational settings module 1

Parameter name: Master

Number of exclusive stations: Exclusive station 1

Data link disorder station setting
☐ Hold input data

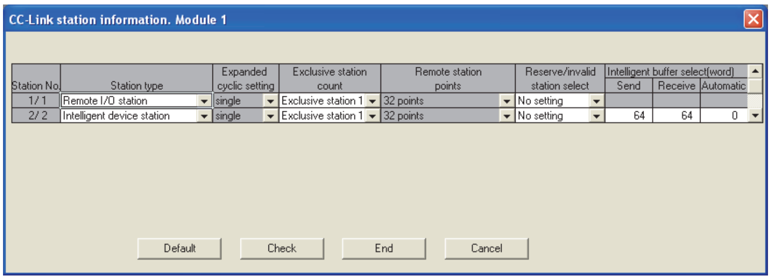
Expanded cyclic setting: single

Case of CPU STOP setting
☐ Clears compulsorily

Block data assurance per station
☐ Enable setting

Figure 6.9 [Operational settings module 1] dialog box

(b) Station information setting



CC-Link station information. Module 1

| Station No. | Station type | Expanded cyclic setting | Exclusive station count | Remote station points | Reserve/invalid station select | Intelligent buffer select(word) | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Send | Receive | Automatic |
| 1/ 1 | Remote I/O station | single | Exclusive station 1 | 32 points | No setting | | | |
| 2/ 2 | Intelligent device station | single | Exclusive station 1 | 32 points | No setting | 64 | 64 | 0 |

Figure 6.10 [Station information Module 1] dialog box

For the intelligent buffer select (word), set the following.

Table 6.9 Station information setting example

<table>
<tr><th rowspan="2">Item</th><th colspan="2">Set value</th></tr>
<tr><th>Station No. 1</th><th>Station No. 2</th></tr>
<tr><td>Intelligent buffer select (word)</td><td>—</td><td>•Using send/receive buffer communication function
<table><tr><th>Send</th><th>Receive</th><th>Automatic</th></tr><tr><td>64[*1]</td><td>64[*1]</td><td>0</td></tr></table>
•Using buffer memory auto-refresh function
<table><tr><th>Send</th><th>Receive</th><th>Automatic</th></tr><tr><td>0</td><td>0</td><td>1536[*2]</td></tr></table></td></tr>
</table>

[*1] When sending/receiving data of 59 words or more, change the value to "(Send/receive data size) ＋6 words".

[*2] When sending/receiving data of 512 words or more, change the auto-refresh buffer size and the auto-refresh buffer assignments.

## 6.1.3 Setting L26CPU-BT, L26CPU-PBT, or LJ61BT11

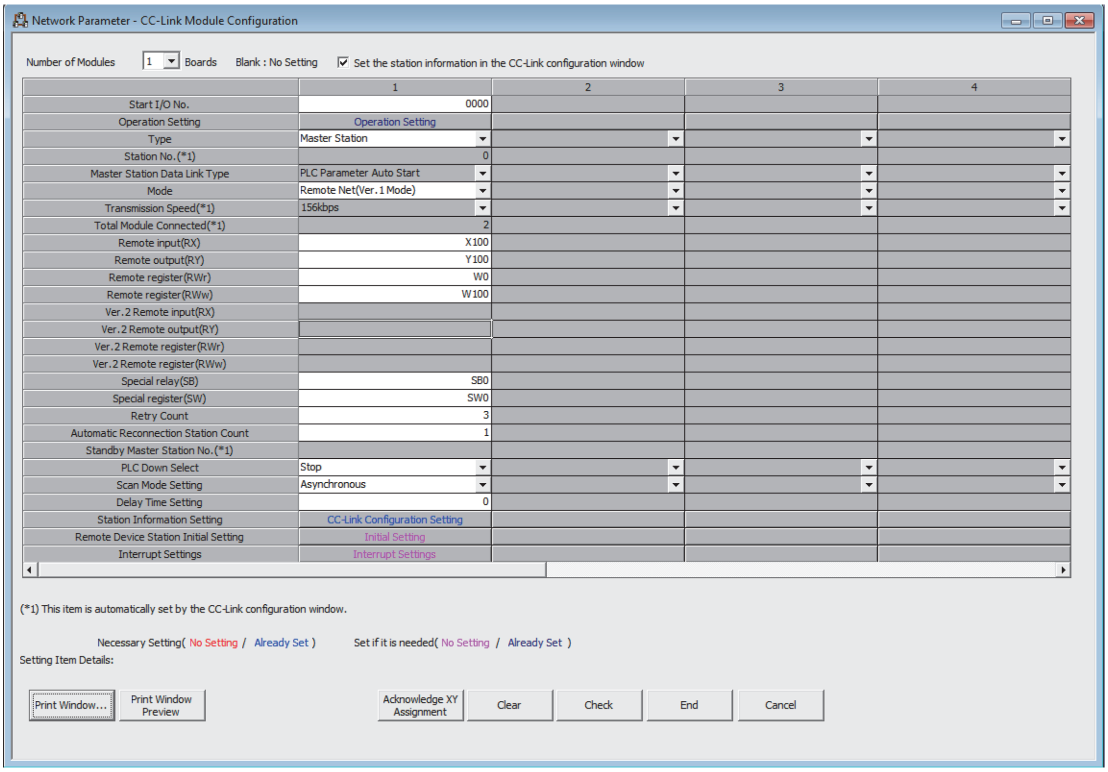
When using the L26CPU-BT, L26CPU-PBT, or LJ61BT11, the parameters must be set.

**Remark**

This manual describes the program examples in which the I/O numbers of X/Y00 to X/Y1F are assigned for a master module. I/O numbers must be assigned to apply the program examples introduced in this manual to an actual system.
For I/O number assignment, refer to the following.
☞MELSEC-L CPU Module User's Manual (Function Explanation, Program Fundamentals)

### (1) Parameter setting

Set the following using GX Works2.



Number of Modules 1 Boards Blank : No Setting ☑ Set the station information in the CC-Link configuration window

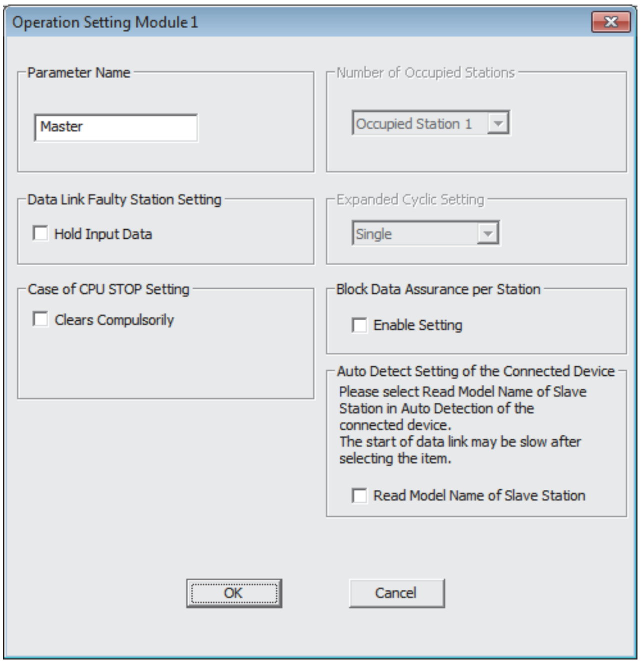
|  | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Start I/O No. | 0000 |  |  |  |
| Operation Setting | Operation Setting |  |  |  |
| Type | Master Station |  |  |  |
| Station No.(*1) | 0 |  |  |  |
| Master Station Data Link Type | PLC Parameter Auto Start |  |  |  |
| Mode | Remote Net(Ver.1 Mode) |  |  |  |
| Transmission Speed(*1) | 156kbps |  |  |  |
| Total Module Connected(*1) | 2 |  |  |  |
| Remote input(RX) | X100 |  |  |  |
| Remote output(RY) | Y100 |  |  |  |
| Remote register(RWr) | W0 |  |  |  |
| Remote register(RWw) | W100 |  |  |  |
| Ver.2 Remote input(RX) |  |  |  |  |
| Ver.2 Remote output(RY) |  |  |  |  |
| Ver.2 Remote register(RWr) |  |  |  |  |
| Ver.2 Remote register(RWw) |  |  |  |  |
| Special relay(SB) | SB0 |  |  |  |
| Special register(SW) | SW0 |  |  |  |
| Retry Count | 3 |  |  |  |
| Automatic Reconnection Station Count | 1 |  |  |  |
| Standby Master Station No.(*1) |  |  |  |  |
| PLC Down Select | Stop |  |  |  |
| Scan Mode Setting | Asynchronous |  |  |  |
| Delay Time Setting | 0 |  |  |  |
| Station Information Setting | CC-Link Configuration Setting |  |  |  |
| Remote Device Station Initial Setting | Initial Setting |  |  |  |
| Interrupt Settings | Interrupt Settings |  |  |  |

(*1) This item is automatically set by the CC-Link configuration window.

Necessary Setting( No Setting / Already Set ) Set if it is needed( No Setting / Already Set )
Setting Item Details:

Figure 6.11 [Setting the CC-Link list] dialog box

(a) Operational setting



Operation Setting Module 1

Parameter Name: Master

Number of Occupied Stations: Occupied Station 1

Data Link Faulty Station Setting

☐ Hold Input Data

Expanded Cyclic Setting: Single

Case of CPU STOP Setting

☐ Clears Compulsorily

Block Data Assurance per Station

☐ Enable Setting

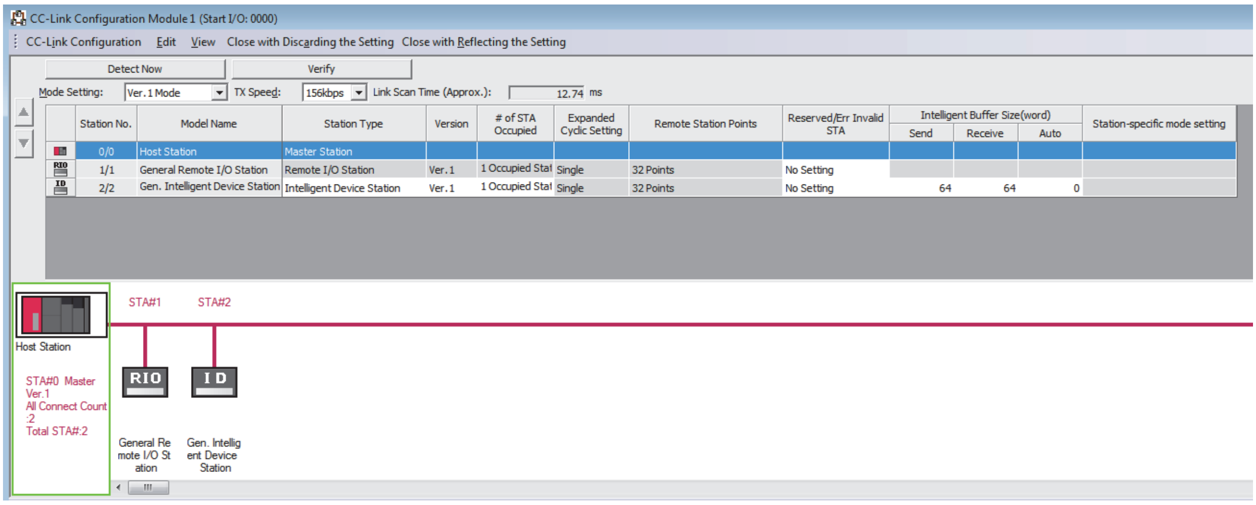
Auto Detect Setting of the Connected Device

Please select Read Model Name of Slave Station in Auto Detection of the connected device.
The start of data link may be slow after selecting the item.

☐ Read Model Name of Slave Station

**Figure 6.12 [Operational settings module 1] dialog box**

(b) CC-Link configuration setting



CC-Link Configuration Module 1 (Start I/O: 0000)

Mode Setting: Ver.1 Mode

TX Speed: 156kbps

Link Scan Time (Approx.): 12.74 ms

| | Station No. | Model Name | Station Type | Version | # of STA Occupied | Expanded Cyclic Setting | Remote Station Points | Reserved/Err Invalid STA | Intelligent Buffer Size(word) | | | Station-specific mode setting |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Send | Receive | Auto | |
| | 0/0 | Host Station | Master Station | | | | | | | | | |
| RIO | 1/1 | General Remote I/O Station | Remote I/O Station | Ver.1 | 1 Occupied Stat | Single | 32 Points | No Setting | | | | |
| ID | 2/2 | Gen. Intelligent Device Station | Intelligent Device Station | Ver.1 | 1 Occupied Stat | Single | 32 Points | No Setting | 64 | 64 | 0 | |

**Figure 6.13 [CC-Link Configuration Module 1] dialog box**

For the intelligent buffer select (word), set the following.

**Table 6.10 CC-Link configuration setting example**

<table>
<tr><th rowspan="2">Item</th><th colspan="2">Set value</th></tr>
<tr><th>Station No. 1</th><th>Station No. 2</th></tr>
<tr><td>Intelligent buffer select (word)</td><td>—</td><td>•Using send/receive buffer communication function
<table><tr><th>Send</th><th>Receive</th><th>Automatic</th></tr><tr><td>64[*1]</td><td>64[*1]</td><td>0</td></tr></table>
•Using buffer memory auto-refresh function
<table><tr><th>Send</th><th>Receive</th><th>Automatic</th></tr><tr><td>0</td><td>0</td><td>1536[*2]</td></tr></table></td></tr>
</table>

[*1] When sending/receiving data of 59 words or more, change the value to "(Send/receive data size) ＋6 words".

[*2] When sending/receiving data of 512 words or more, change the auto-refresh buffer size and the auto-refresh buffer assignments.

## 6.1.4 Setting AJ61QBT11 or A1SJ61QBT11

When using the AJ61QBT11 or A1SJ61QBT11, the switches and parameters must be set.

### (1) Switch setting

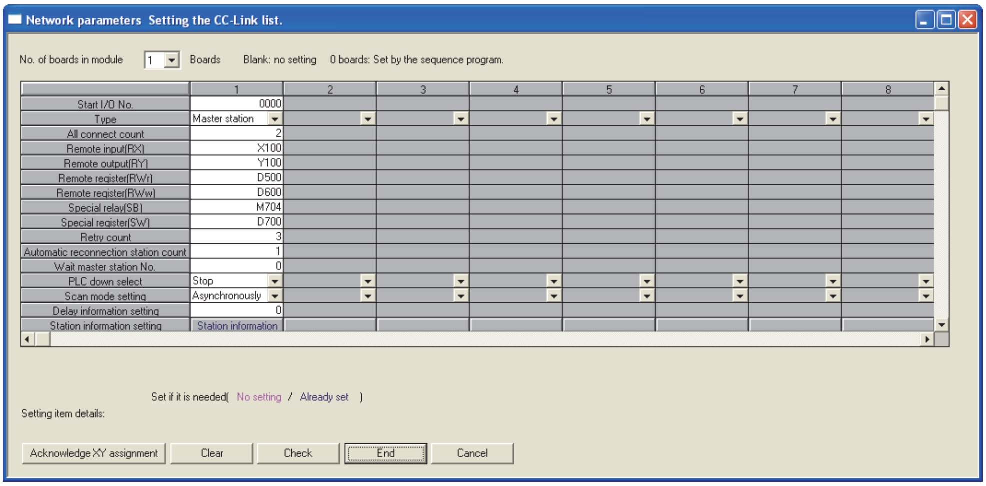
Switch setting for the master station is performed with the switches on the master module.

**Table 6.11 Setting for the AJ61QBT11 or A1SJ61QBT11**

| Item | | Description | Set value |
|---|---|---|---|
| Station No. setting switch | | Master station | 0 |
| Mode setting switch | | Online (Remote net mode) | 0 |
| Transmission speed setting switch | | 156kbps | 0 |
| Condition setting switch | SW1 | Station type: Master station/local station | OFF |
| | SW2, SW3 | Use prohibited | OFF |
| | SW4 | Input data status of data link error station: Cleared | OFF |
| | SW5, SW6 | No. of occupied stations: Invalid | OFF |
| | SW7, SW8 | Use prohibited | OFF |

### (2) Parameter setting

Set parameters for the master station in GX Developer.



Network parameters Setting the CC-Link list.

No. of boards in module 1 Boards Blank: no setting 0 boards: Set by the sequence program.

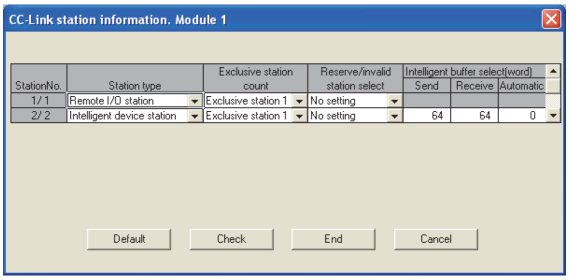
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Start I/O No. | 0000 | | | | | | | |
| Type | Master station | | | | | | | |
| All connect count | 2 | | | | | | | |
| Remote input(RX) | X100 | | | | | | | |
| Remote output(RY) | Y100 | | | | | | | |
| Remote register(RWr) | D500 | | | | | | | |
| Remote register(RWw) | D600 | | | | | | | |
| Special relay(SB) | M704 | | | | | | | |
| Special register(SW) | D700 | | | | | | | |
| Retry count | 3 | | | | | | | |
| Automatic reconnection station count | 1 | | | | | | | |
| Wait master station No. | 0 | | | | | | | |
| PLC down select | Stop | | | | | | | |
| Scan mode setting | Asynchronously | | | | | | | |
| Delay information setting | 0 | | | | | | | |
| Station information setting | Station information | | | | | | | |

Set if it is needed( No setting / Already set )

Setting item details:

**Figure 6.14 [Setting the CC-Link list] dialog box**

(a) Station information setting


CC-Link station information. Module 1

| StationNo. | Station type | Exclusive station count | Reserve/invalid station select | Intelligent buffer select(word) Send | Receive | Automatic |
|---|---|---|---|---|---|---|
| 1/ 1 | Remote I/O station | Exclusive station 1 | No setting | | | |
| 2/ 2 | Intelligent device station | Exclusive station 1 | No setting | 64 | 64 | 0 |

Figure 6.15 [Station information Module 1] dialog box

For the intelligent buffer select (word), set the following.

Table 6.12 Station information setting example

<table>
<tr><th rowspan="2">Item</th><th colspan="2">Set value</th></tr>
<tr><th>Station No. 1</th><th>Station No. 2</th></tr>
<tr><td>Intelligent buffer select (word)</td><td>—</td><td>•Using send/receive buffer communication function<table><tr><th>Send</th><th>Receive</th><th>Automatic</th></tr><tr><td>64*1</td><td>64*1</td><td>Arbitrary</td></tr></table>•Using buffer memory auto-refresh function<table><tr><th>Send</th><th>Receive</th><th>Automatic</th></tr><tr><td>Arbitrary</td><td>Arbitrary</td><td>1536*2</td></tr></table></td></tr>
</table>

* 1 When sending/receiving data of 59 words or more, change the value to "(Send/receive data size) ＋6 words".

* 2 When sending/receiving data of 512 words or more, change the auto-refresh buffer size and the auto-refresh buffer assignments.

## 6.1.5 Remote I/O station setting

For the setting method, refer to the manual for the remote I/O station.

**Table 6.13 Remote I/O station setting example**

| Item | Set value |
|---|---|
| Station No. | 1 |
| Transmission speed | 156kbps |

## 6.1.6 AJ65BT-R2N setting

Perform the AJ65BT-R2N settings with each switch of AJ65BT-R2N.

**Table 6.14 AJ65BT-R2N setting example**

| Item | | Description | Set value |
|---|---|---|---|
| Station No. setting switch | | Station No. 2 | × 10: 0<br>× 1: 2 |
| Data link transmission speed setting switch | | 156kbps | 0 |
| Mode setting switch | | •Using send/receive buffer communication function (Mode 0) | 0 |
| | | •Using buffer memory auto-refresh function (Mode 1) | 1 |
| RS-232 transmission setting switches | SW1 to SW4 | Transmission speed: 300bps | OFF |
| | SW5 | Data bit length: 8 | ON |
| | SW6, SW7 | Parity bit: None | OFF |
| | SW8 | Stop bit length: 1 | OFF |

## 6.2 Entire Send/Receive Program Structure

The programs in this section can be executed when the following system configuration and settings have been set.

☞ CHAPTER 6 (2) System configuration for program

☞ Section 6.1 Setting of Each Station

### 6.2.1 For the send/receive buffer communication function

(1) Overview of program examples

(a) Mode setting switch check program ((3) in this section - **1**)
Whether the mode setting switch is set correctly or not is checked.

(b) AJ65BT-R2N initial setting program ((3) in this section - **2**)

1) When AJ65BT-R2N initial setting start flag (M20) is turned ON, settings are configured so that data reception is completed by the frame function upon receipt of CR(0DH)＋LF(0AH).
2) The AJ65BT-R2N is initialized.

☞ Section 6.3.1 For the send/receive buffer communication function

(c) Program for sending data to external device ((3) in this section - **3**)
If Send execute flag (X22) is turned ON, the character string "ABCDEF" is sent from the master station to the external device.

☞ Section 6.4.1 For the send/receive buffer communication function

(d) Program for receiving data from external device ((3) in this section - **4**)
When data are received from the external device, the received data are read out from the AJ65BT-R2N to the master station.

☞ Section 6.5.1 For the send/receive buffer communication function

(e) Error handling program ((3) in this section - **5**)

1) When an error occurs during initialization setting or data transfer, an error code will be read out from the AJ65BT-R2N to the master module if Error code read flag (X23) is turned ON.
2) The error is canceled when Error clear flag (X24) is turned ON after the cause of the error has been eliminated.

☞ Section 6.6.1 For the send/receive buffer communication function

(f) Supplementary program for QnA dedicated instructions ((3) in this section to **6**)
When using the RIRD, RIWT, RIRCV or RISEND instruction in the QnACPU, execute this program immediately before the END instruction in order to prevent malfunctions.
If this program is not executed, a target-related error (4B00H) may occur in the CPU module.
When using the QCPU, this program is unnecessary.

(2) Devices used in the program example

Table 6.15 Devices used in the program example

| Device | Description | Device | Description |
|---|---|---|---|
| X0 | Module error (Master station) | M2 | Operation complete flag |
| X1 | Own station data link status (Master station) | M3 | Operation failed flag |
| X0F | Module ready (Master station) | M10 | Device that is turned ON for one scan after completion of GP.RIWT |
| X22 | Send execute flag | M11 | Device that is turned ON for one scan after failure of writing by GP.RIWT |
| X23 | Error code read flag | M20 | AJ65BT-R2N initial setting start flag |
| X24 | Error clear flag | M120 | Buffer memory access exclusion check flag |
| X120 | Send complete signal | M125 | Sending flag |
| X121 | Send failed signal | M130 | Receiving flag |
| X122 | Normal receive data read request signal | M135 | Error handling flag |
| X123 | Error receive data read request signal | M155 | Device that is turned ON for one scan after completion of GP.RIRD |
| X124 | Initialization complete signal | M156 | Device that is turned ON for one scan after failure of reading by GP.RIRD |
| X125 | Initialization failed signal | M160 | Device that is turned ON for one scan after completion of GP.RIRD |
| X128 | E$^2$PROM function failed signal | M161 | Device that is turned ON for one scan after failure of reading by GP.RIRD |
| K1X134 | Mode setting switch status signal (X134 to X137) | M180 | Device that is turned ON for one scan after completion of GP.RIWT |
| X13A | Error status signal | M181 | Device that is turned ON for one scan after failure of writing by GP.RIWT |
| X13B | Remote station ready signal | M190 | Device that is turned ON for one scan after completion of GP.RIRD |
| K8Y120 | Remote output (Y120 to Y13F) | M191 | Device that is turned ON for one scan after failure of reading by GP.RIRD |
| Y120 | Send request signal | M1002 | AJ65BT-R2N mode normal flag |
| Y121 | Send cancel request signal | M1003 | AJ65BT-R2N mode error flag |
| Y122 | Receive data read completion signal | D0 to D4 | Control data of GP.RIWT instruction |
| Y123 | Forced receive completion request signal | D10 to D13 | Initial setting data or No. of send data and send data |
| Y124 | Initialization request signal | D30 to D34 | Control data of GP.RIRD instruction |
| Y126 | OS reception area clear request signal | D35 to D39 | |
| Y127 | E$^2$PROM function request signal | D200 | No. of receive data |
| Y139 | Initial data read request signal | From D201 | Receive data |
| Y13A | Error reset request signal | D400 to D402 | AJ65BT-R2N error code |
| M0 | Operation start request flag | D900 | Master module RY(n+1)E, RY(n+1)F |
| M1 | Initial setting write completion flag | SW80.1 | Other station data link status (Station No.2) |

(3) Program example

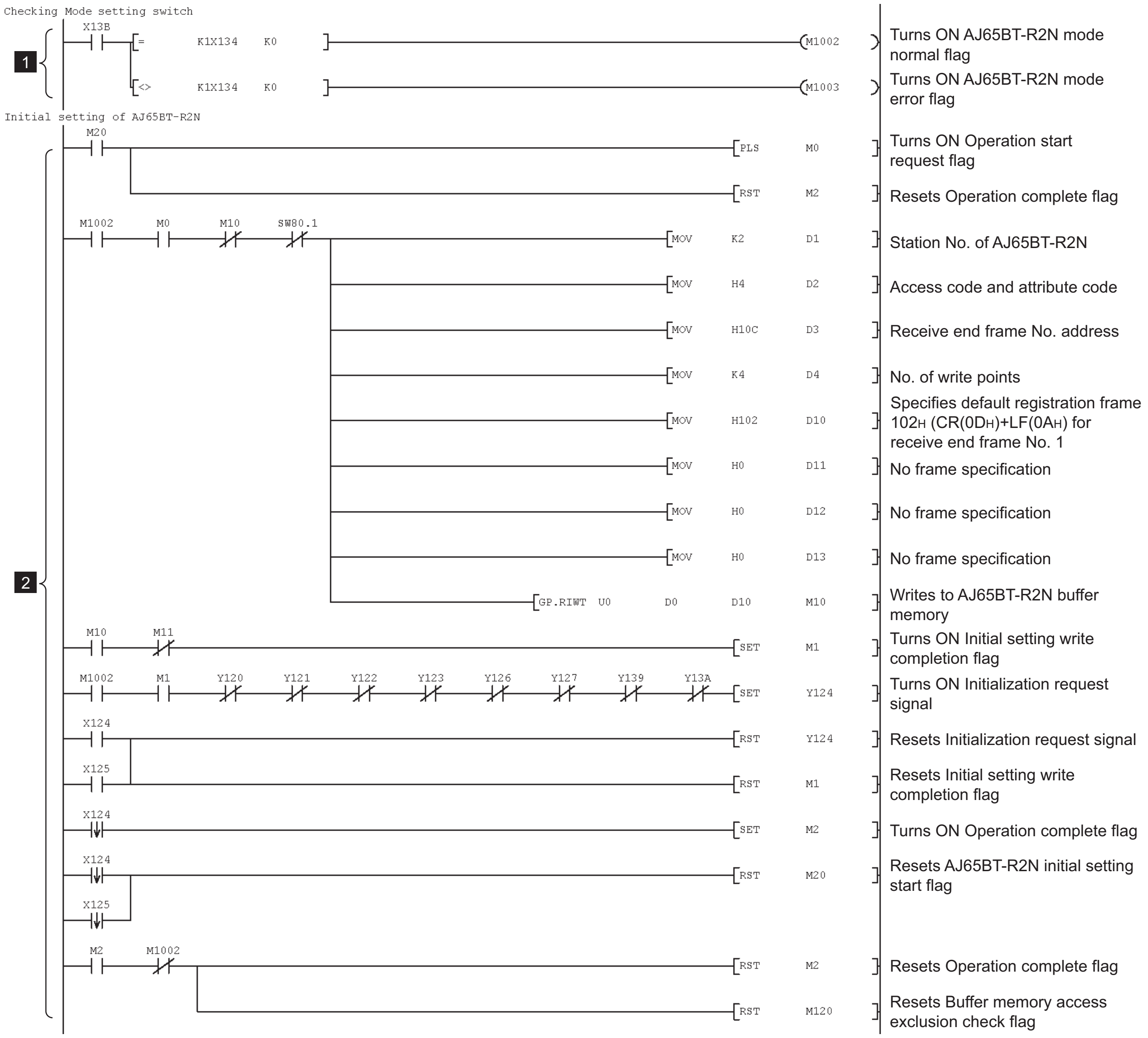


Figure 6.16 Program example

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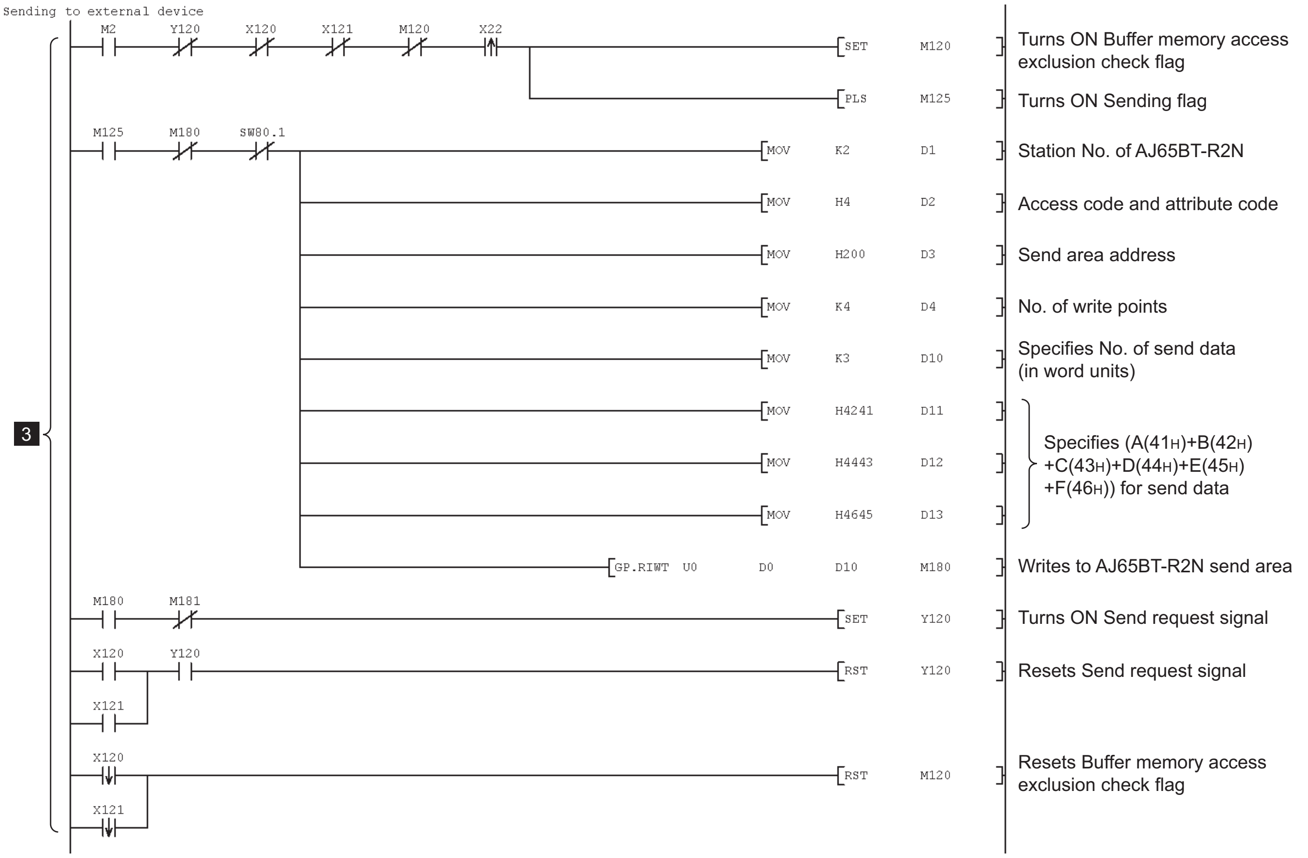

Turns ON Buffer memory access exclusion check flag

Turns ON Sending flag

Station No. of AJ65BT-R2N

Access code and attribute code

Send area address

No. of write points

Specifies No. of send data (in word units)

Specifies $A(41_H)+B(42_H)$ $+C(43_H)+D(44_H)+E(45_H)$ $+F(46_H)$) for send data

Writes to AJ65BT-R2N send area

Turns ON Send request signal

Resets Send request signal

Resets Buffer memory access exclusion check flag

Figure 6.16 Program example (Continued)

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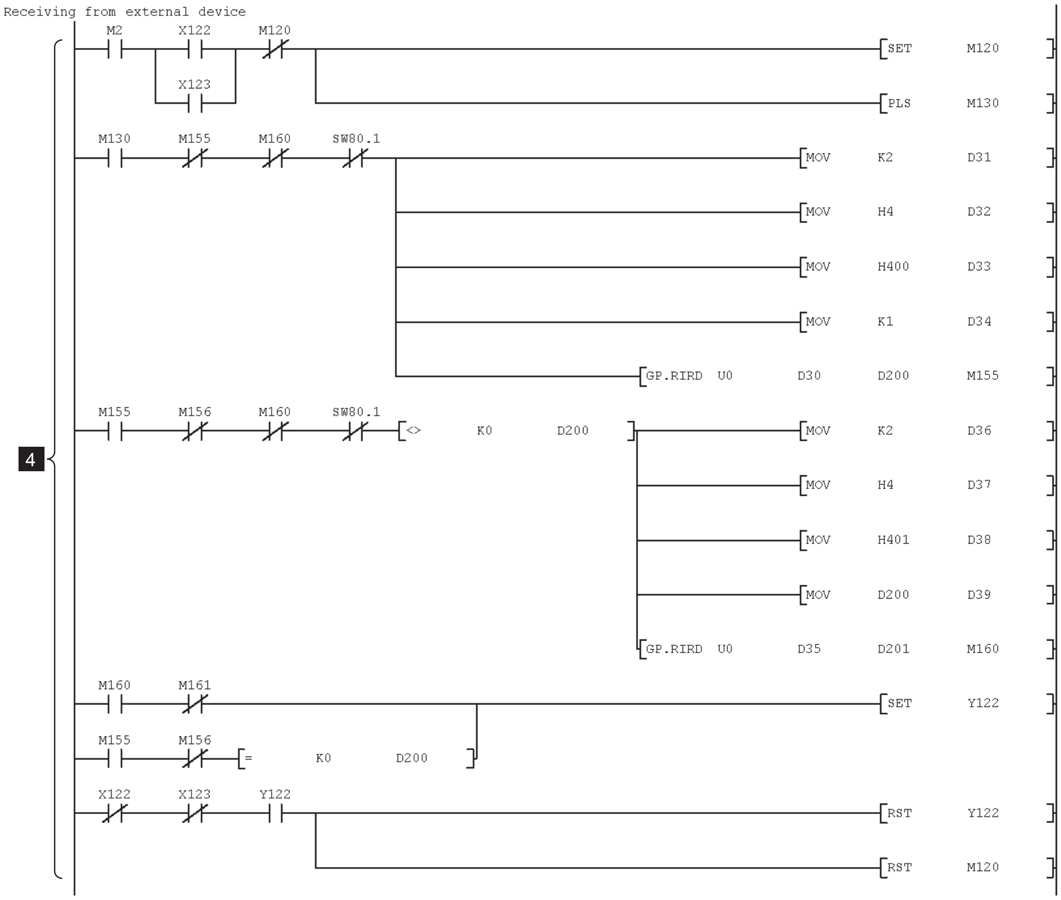

Turns ON Buffer memory access exclusion check flag

Turns ON Receiving flag

Station No. of AJ65BT-R2N

Access code and attribute code

Receive data size specification area (in words units) address

No. of read points

Reads from AJ65BT-R2N buffer memory

Station No. of AJ65BT-R2N

Access code and attribute code

Receive data area address

No. of receive data (in word units)

Reads from AJ65BT-R2N buffer memory

Turns ON Receive data read completion signal

Resets Receive data read completion signal

Resets Buffer memory access exclusion check flag

Figure 6.16 Program example (Continued)

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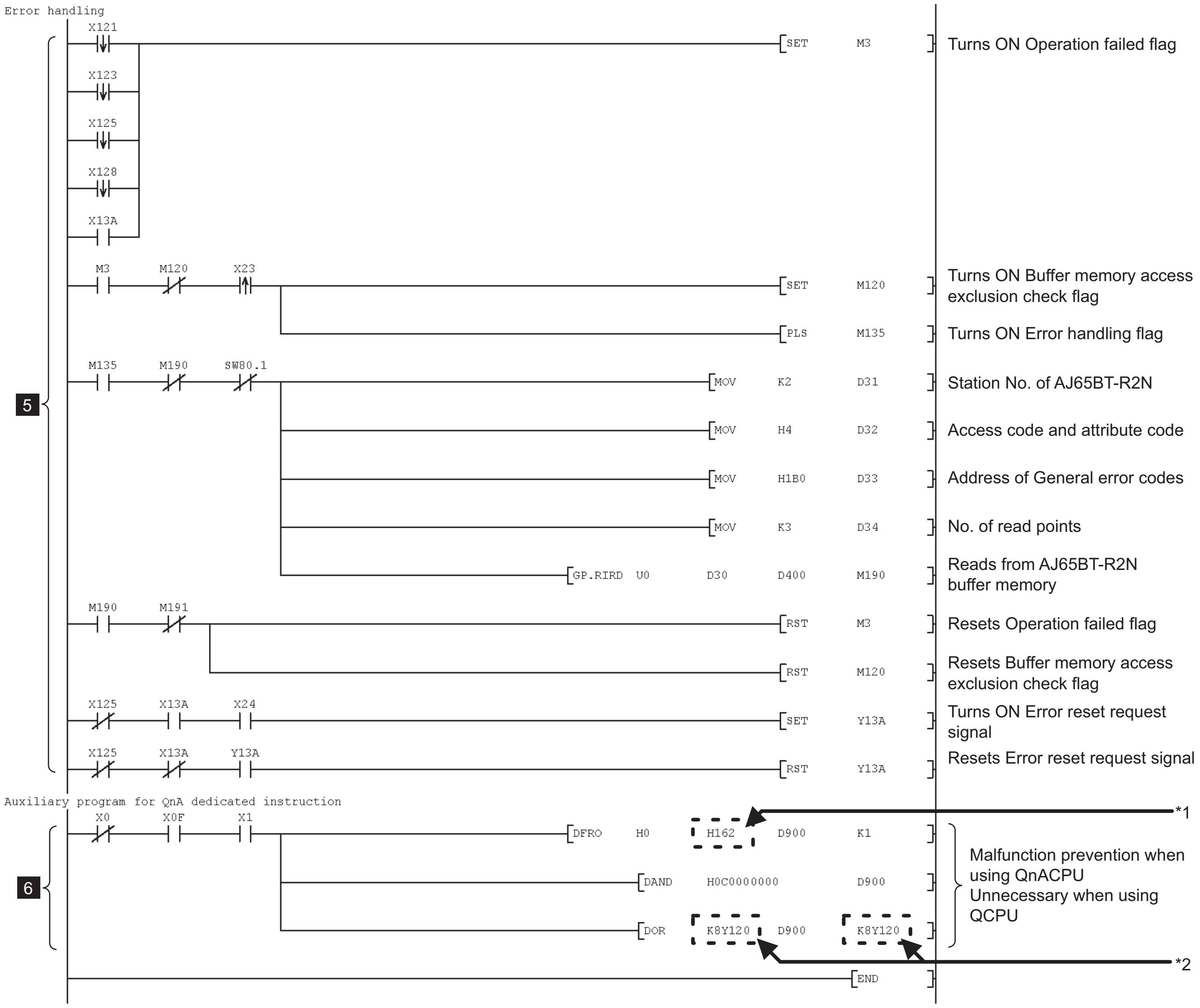


*1 Master module buffer memory address to which the AJ65BT-R2N remote output (RY) was assigned.
Correct the remote output (RY) assignment if it is different from that of the program example.

*2 Auto-refresh target device of AJ65BT-R2N
Correct the auto-refresh target device if it is different from that of the program example.

Figure 6.16 Program example (Continued)

## 6.2.2 For the buffer memory auto-refresh function

(1) Overview of program examples

(a) Mode setting switch check program ((3) in this section - 1)
Whether the mode setting switch is set correctly or not is checked.

(b) AJ65BT-R2N initial setting program ((3) in this section - 2)

1) Initial data are read from the AJ65BT-R2N to the master module.
2) By the frame function, reception is completed when CR(0D$_H$)+LF(0A$_H$) is received.
3) The AJ65BT-R2N is initialized.

☞ Section 6.3.2 For the buffer memory auto-refresh function

(c) Program for sending data to external device ((3) in this section - 3)
If Send execute flag (X22) is turned ON, the character string "ABCDEF" is sent from the master station to the external device.

☞ Section 6.4.2 For the buffer memory auto-refresh function

(d) Program for receiving data from external device ((3) in this section - 4)
When data are received from the external device, the received data are read out from the AJ65BT-R2N to the master station.

☞ Section 6.5.2 For the buffer memory auto-refresh function

(e) Error handling program ((3) in this section - 5)

1) When an error occurs during initialization setting or data transfer, an error code will be read out from the AJ65BT-R2N to the master module if Error code read flag (X23) is turned ON.
2) The error is canceled when Error clear flag (X24) is turned ON after the cause of the error has been eliminated.

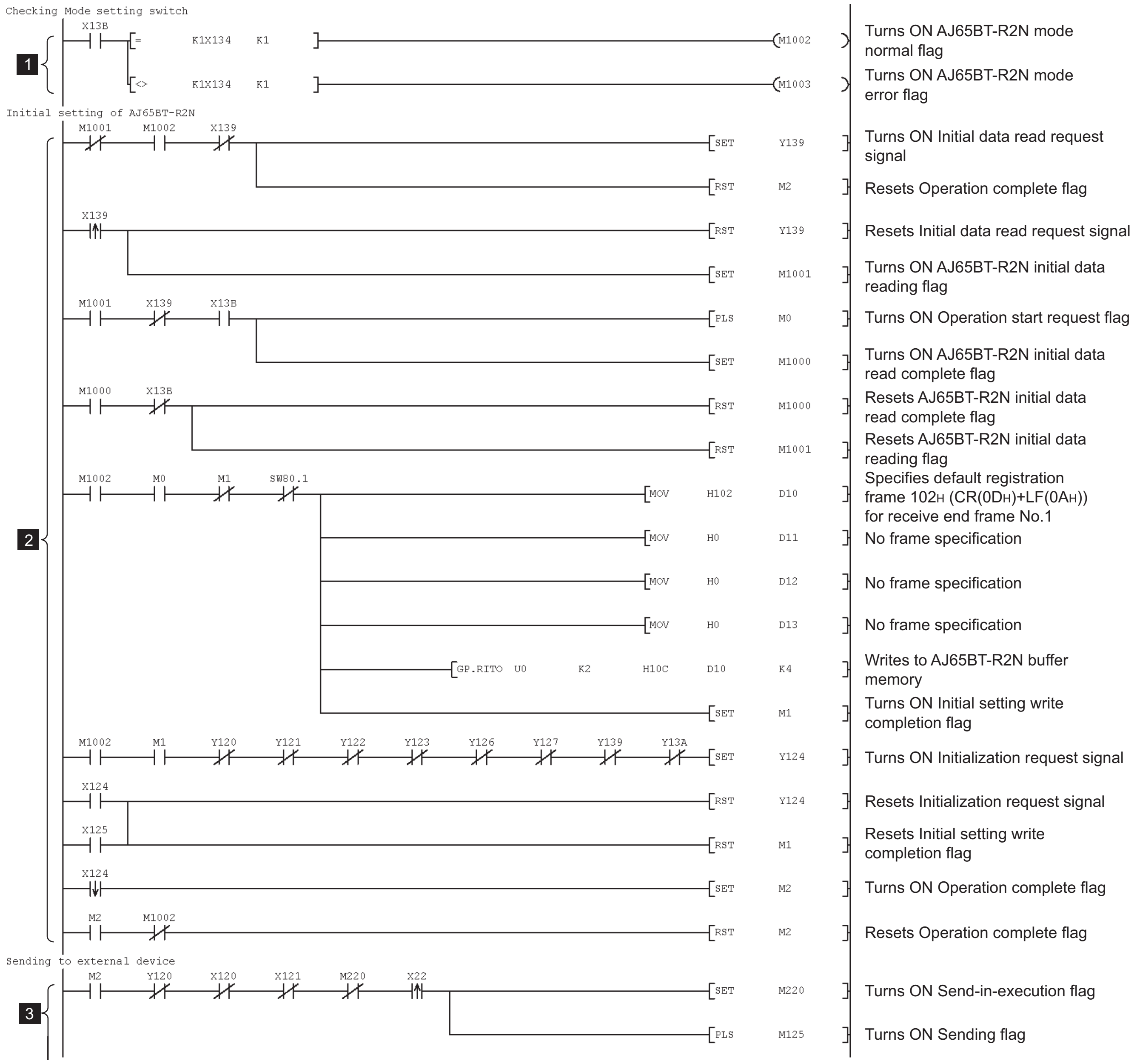
☞ Section 6.6.2 For the buffer memory auto-refresh function

(2) Devices used in the program example

Table 6.16 Devices used in the program example

| Device | Description | Device | Description |
|---|---|---|---|
| X22 | Send execute flag | Y127 | E$^2$PROM function request signal |
| X23 | Error code read flag | Y139 | Initial data read request signal |
| X24 | Error clear flag | Y13A | Error reset request signal |
| X120 | Send complete signal | M0 | Operation start request flag |
| X121 | Send failed signal | M1 | Initial setting write completion flag |
| X122 | Normal receive data read request signal | M2 | Operation complete flag |
| X123 | Error receive data read request signal | M3 | Operation failed flag |
| X124 | Initialization complete signal | M125 | Sending flag |
| X125 | Initialization failed signal | M130 | Receiving flag |
| X128 | E$^2$PROM function failed signal | M135 | Error handling flag |
| K1X134 | Mode setting switch status signal (X134 to X137) | M220 | Send-in-execution flag |
| X139 | Initial data read completion signal | M1000 | AJ65BT-R2N initial data read complete flag |
| X13A | Error status signal | M1001 | AJ65BT-R2N initial data reading flag |
| X13B | Remote station ready signal | M1002 | AJ65BT-R2N mode normal flag |
| Y120 | Send request signal | M1003 | AJ65BT-R2N mode error flag |
| Y121 | Send cancel request signal | D10 to D13 | Initial setting data or No. of send data and send data |
| Y122 | Receive data read completion signal | D200 | No. of receive data |
| Y123 | Forced receive completion request signal | From D201 | Receive data |
| Y124 | Initialization request signal | D400 to D402 | AJ65BT-R2N error code |
| Y126 | OS reception area clear request signal | SW80.1 | Other station data link status (Station No.2) |

(3) Program example



Turns ON AJ65BT-R2N mode normal flag

Turns ON AJ65BT-R2N mode error flag

Turns ON Initial data read request signal

Resets Operation complete flag

Resets Initial data read request signal

Turns ON AJ65BT-R2N initial data reading flag

Turns ON Operation start request flag

Turns ON AJ65BT-R2N initial data read complete flag

Resets AJ65BT-R2N initial data read complete flag

Resets AJ65BT-R2N initial data reading flag

Specifies default registration frame 102H (CR(0DH)+LF(0AH)) for receive end frame No.1

No frame specification

No frame specification

No frame specification

Writes to AJ65BT-R2N buffer memory

Turns ON Initial setting write completion flag

Turns ON Initialization request signal

Resets Initialization request signal

Resets Initial setting write completion flag

Turns ON Operation complete flag

Resets Operation complete flag

Turns ON Send-in-execution flag

Turns ON Sending flag

**Figure 6.17 Program example**

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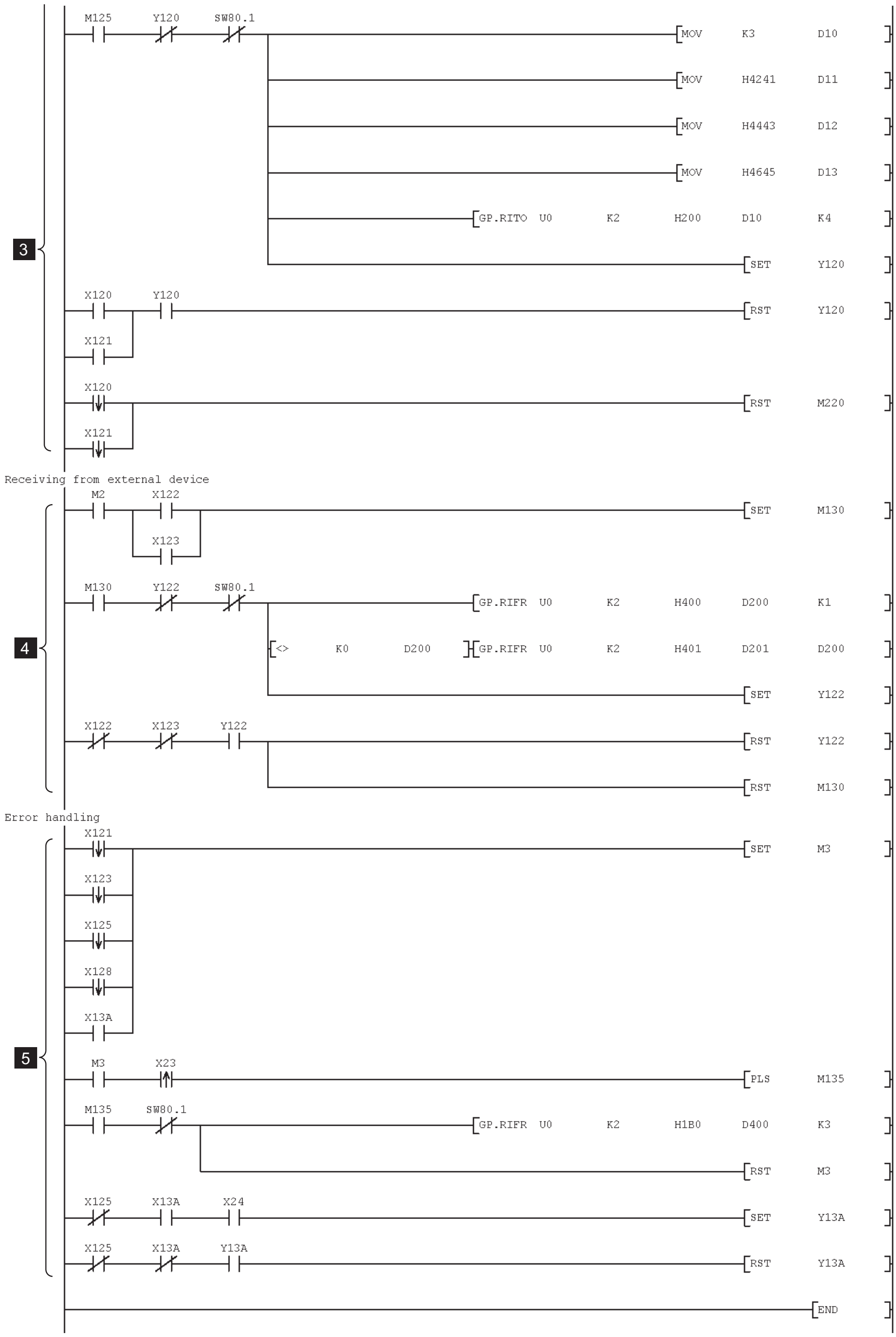


Specifies No. of send data (in word units)

Specifies (A(41H)+B(42H) +C(43H)+D(44H)+E(45H) +F(46H)) for send data

Writes to AJ65BT-R2N send area

Turns ON Send request signal

Resets Send request signal

Resets Send-in-execution flag

Turns ON Receiving flag

Reads No. of receive data (in word units) and receive data from AJ65BT-R2N receive area.

Turns ON Receive data read completion signal

Resets Receive data read completion signal

Resets Receiving flag

Turns ON Operation failed flag

Error handling flag

Reads AJ65BT-R2N error code from AJ65BT-R2N buffer memory

Resets Operation failed flag

Turns ON Error reset request signal

Resets Error reset request signal

Figure 6.17 Program example (Continued)

## 6.3 Initial Setting for AJ65BT-R2N

### 6.3.1 For the send/receive buffer communication function

(1) Overview of program examples

1) When AJ65BT-R2N initial setting start flag (M20) is turned ON, settings are configured so that data reception is completed by the frame function upon receipt of CR(0DH)＋LF(0AH).
2) The AJ65BT-R2N is initialized.

(2) Processing in the program example

1) Default registration frame 102H (CR(0DH)＋LF(0AH)) is written to Receive start frame No. 1 (R2N 10CH).
2) After writing is normally completed, Initialization request signal (Y124) is turned ON to complete the initial setting.

(3) Devices used in the program example

**Table 6.17 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X124 | Initialization complete signal | Section 6.3.1 | — |
| X125 | Initialization failed signal | Section 6.3.1 | — |
| X13B | Remote station ready signal | Section 6.3.1 | — |
| Y120 | Send request signal | — | Section 6.4.1 |
| Y121 | Send cancel request signal | — | — |
| Y122 | Receive data read completion signal | — | Section 6.5.1 |
| Y123 | Forced receive completion request signal | — | — |
| Y124 | Initialization request signal | Section 6.3.1 | — |
| Y126 | OS reception area clear request signal | — | — |
| Y127 | E$^2$PROM function request signal | — | — |
| Y139 | Initial data read request signal | — | — |
| Y13A | Error reset request signal | — | Section 6.6.1 |
| M0 | Operation start request flag | Section 6.3.1 | — |
| M1 | Initial setting write completion flag | Section 6.3.1 | — |
| M2 | Operation complete flag | Section 6.3.1 | — |
| M10 | Device that is turned ON for one scan after completion of GP.RIWT | Section 6.3.1 | — |
| M11 | Device that is turned ON for one scan after failure of writing by GP.RIWT | Section 6.3.1 | — |
| M20 | AJ65BT-R2N initial setting start flag | — | — |
| M1002 | AJ65BT-R2N mode normal flag | — | Section 6.2.1 (3) 1 |
| D0 to D4 | Control data of GP.RIWT instruction | — | — |
| D10 to D13 | Initial setting data | — | — |
| SW80.1 | Other station data link status (Station No.2) | — | — |

(4) Program example

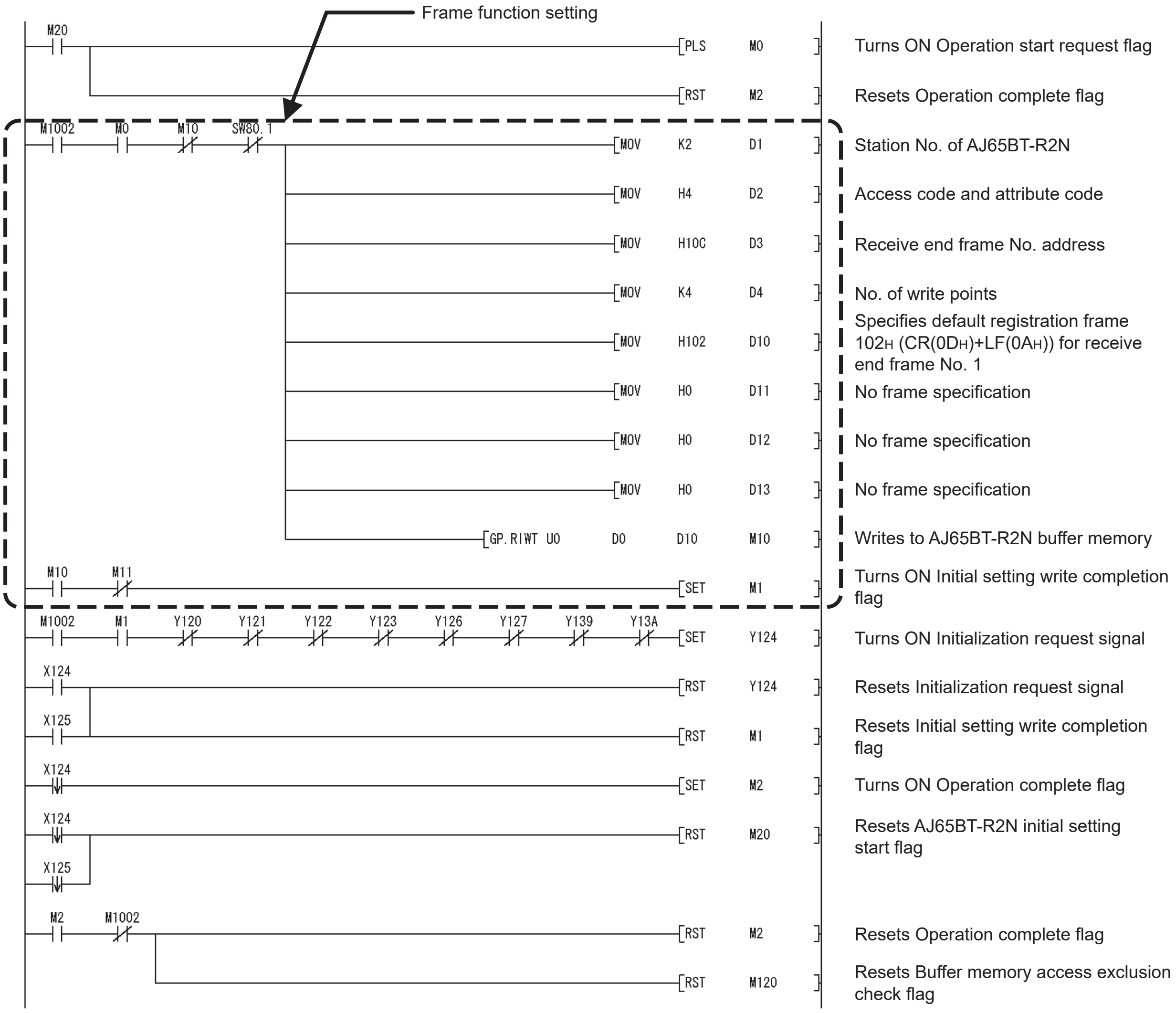


**Figure 6.18 Program example**

(a) Setting of any other function

When changing the frame function setting to other than the above or when using any other function, refer to the section below and modify the area enclosed by the dotted line.

☞ Section 6.7 Initial Settings for Other Functions

### 6.3.2 For the buffer memory auto-refresh function

(1) Overview of program example

1) Initial data are read from the AJ65BT-R2N to the master module.

2) By the frame function, reception is completed when CR(0DH)+LF(0AH) is received.

3) The AJ65BT-R2N is initialized.

**☒Point**

Be sure to perform reading of initial data before making initial settings.

(2) Processing in the program example

1) The initial data are read out.

2) Default registration frame 102H (CR(0DH)+LF(0AH)) is written to Receive start frame No.1 (R2N 10CH).

3) After writing is normally completed, Initialization request signal (Y124) is turned ON to complete the initial setting.

(3) Devices used in the program example

**Table 6.18 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X124 | Initialization complete signal | Section 6.3.2 | — |
| X125 | Initialization failed signal | Section 6.3.2 | — |
| X139 | Initial data read completion signal | Section 6.3.2 | — |
| X13B | Remote station ready signal | Section 6.3.2 | — |
| Y120 | Send request signal | — | Section 6.4.2 |
| Y121 | Send cancel request signal | — | — |
| Y122 | Receive data read completion signal | — | Section 6.5.2 |
| Y123 | Forced receive completion request signal | — | — |
| Y124 | Initialization request signal | Section 6.3.2 | — |
| Y126 | OS reception area clear request signal | — | — |
| Y127 | $E^2$PROM function request signal | — | — |
| Y139 | Initial data read request signal | Section 6.3.2 | — |
| Y13A | Error reset request signal | — | Section 6.6.2 |
| M0 | Operation start request flag | Section 6.3.2 | — |
| M1 | Initial setting write completion flag | Section 6.3.2 | — |
| M2 | Operation complete flag | Section 6.3.2 | — |
| M1000 | AJ65BT-R2N initial data read complete flag | Section 6.3.2 | — |
| M1001 | Internal processing flag for AJ65BT-R2N initial data read | Section 6.3.2 | — |
| M1002 | AJ65BT-R2N mode normal flag | — | Section 6.2.2 (3) 1 |
| D10 to D13 | Initial setting data | — | — |
| SW80.1 | Other station data link status (Station No.2) | — | — |

(4) Program example

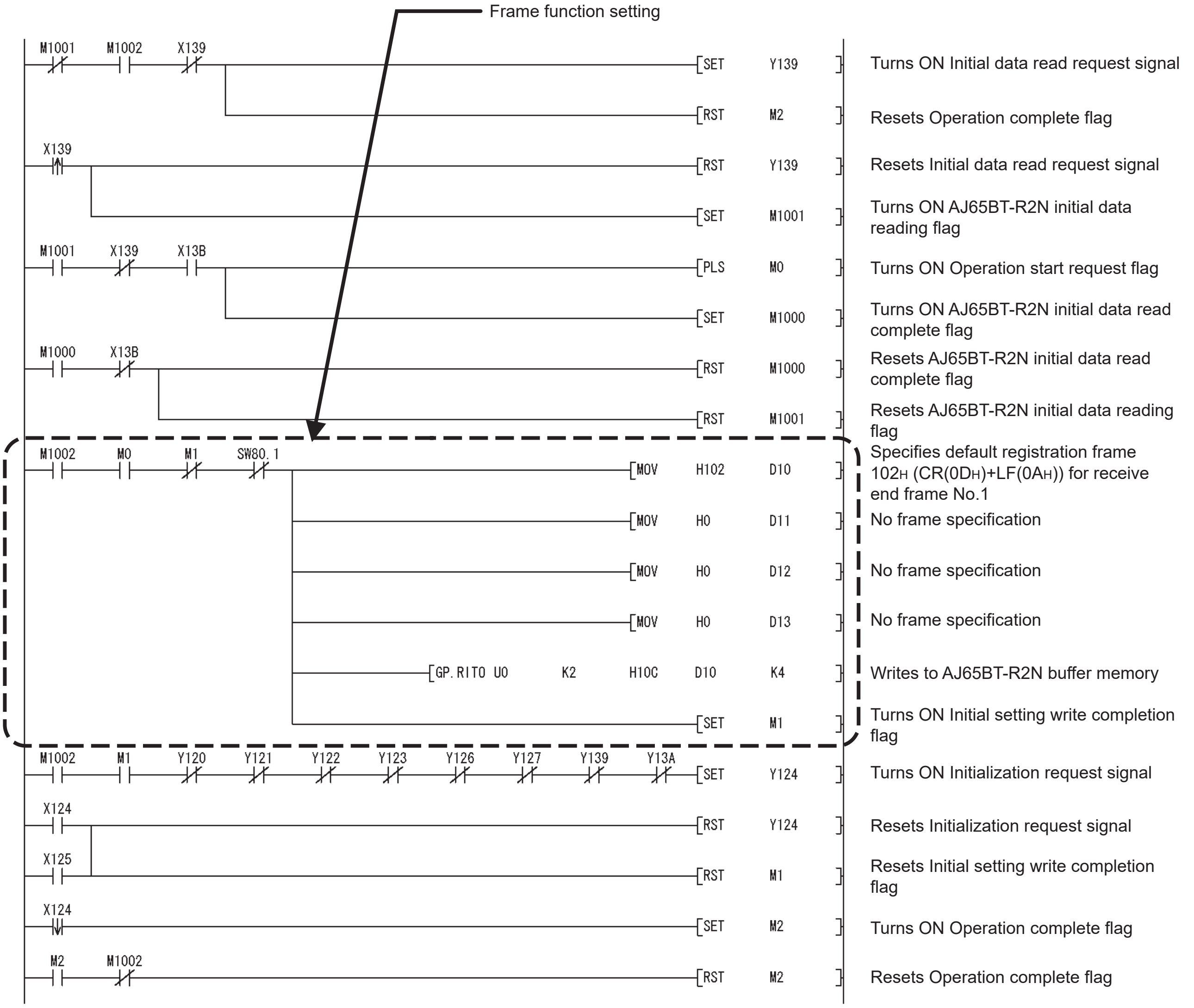


**Figure 6.19 Program example**

(a) Setting of any other function

When changing the frame function setting to other than the above or when using any other function, refer to the section below and modify the area enclosed by the dotted line.

☞ Section 6.7 Initial Settings for Other Functions

## 6.4 Sending to External Device

### 6.4.1 For the send/receive buffer communication function

(1) Overview of program example

If Send execute flag (X22) is turned ON, the character string "ABCDEF" is sent from the master station to the external device.

(2) Processing in the program example

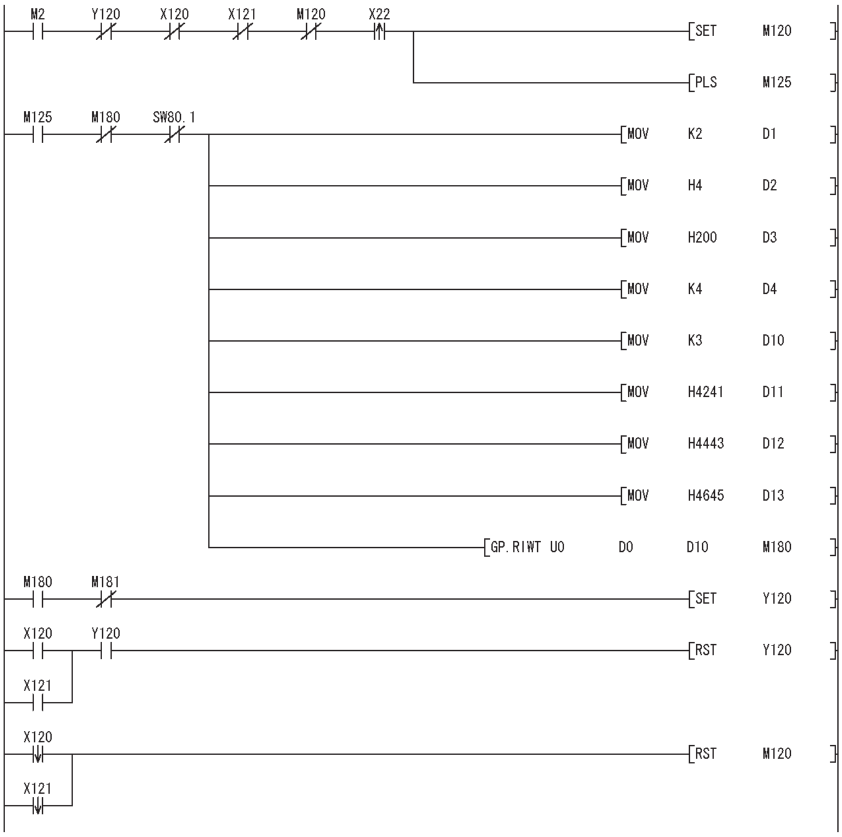
1) No. of send data (3) is written to Send data size specification area (R2N 200H) and the send data ("ABCDEF") is written to Send data area (R2N 201H).
2) Send request signal (Y120) is turned ON to send data to the external device.
3) Send request signal (Y120) is turned OFF to complete the transmission.

(3) Devices used in the program example

**Table 6.19 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X22 | Send execute flag | — | — |
| X120 | Send complete signal | Section 6.4.1 | — |
| X121 | Send failed signal | Section 6.4.1 | — |
| Y120 | Send request signal | Section 6.4.1 | — |
| M2 | Operation complete flag | — | Section 6.3.1 |
| M120 | Buffer memory access exclusion check flag | Section 6.4.1 | Section 6.5.1,<br>Section 6.6.1 |
| M125 | Sending flag | Section 6.4.1 | — |
| M180 | Device that is turned ON for one scan after completion of GP.RIWT | Section 6.4.1 | — |
| M181 | Device that is turned ON for one scan after failure of writing by GP.RIWT | Section 6.4.1 | — |
| D0 to D4 | Control data of GP.RIWT instruction | — | — |
| D10 to D13 | No. of send data, send data | — | — |
| SW80.1 | Other station data link status (Station No.2) | — | — |

(4) Program example



Turns ON Buffer memory access exclusion check flag

Turns ON Sending flag

Station No. of AJ65BT-R2N

Access code and attribute code

Send area address

No. of write points

Specifies No. of send data (in word units)

Specifies (A($41_H$)+B($42_H$)+C($43_H$) +D($44_H$)+E($45_H$)+F($46_H$)) for send data

Writes to AJ65BT-R2N send area

Turns ON Send request signal

Resets Send request signal

Resets Buffer memory access exclusion check flag

**Figure 6.20 Program example**

## ☒Point

When sending data of 481 words or more to the external device using the GP.RIWT instruction, divide the send data into parts with 480 words or less and write them to the AJ65BT-R2N.
With the GP.RIWT instructions, data with 481 words or more cannot be written to the AJ65BT-R2N at one time.

## 6.4.2 For the buffer memory auto-refresh function

### (1) Overview of program example

If Send execute flag (X22) is turned ON, the character string "ABCDEF" is sent to the external device.

### (2) Processing in the program example

1) No. of send data (3) is written to Send data size specification area (R2N 200H) and the send data ("ABCDEF") is written to Send data area (R2N 201H).
2) Send request signal (Y120) is turned ON to send data to the external device.
3) Send request signal (Y120) is turned OFF to complete the transmission.

### (3) Devices used in the program example

**Table 6.20 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X22 | Send execute flag | — | — |
| X120 | Send complete signal | Section 6.4.2 | — |
| X121 | Send failed signal | Section 6.4.2 | — |
| Y120 | Send request signal | Section 6.4.2 | — |
| M2 | Operation complete flag | — | Section 6.3.2 |
| M125 | Sending flag | Section 6.4.2 | — |
| M220 | Send-in-execution flag | Section 6.4.2 | — |
| D10 to D13 | No. of send data, send data | — | — |
| SW80.1 | Other station data link status (Station No.2) | — | — |

### (4) Program example

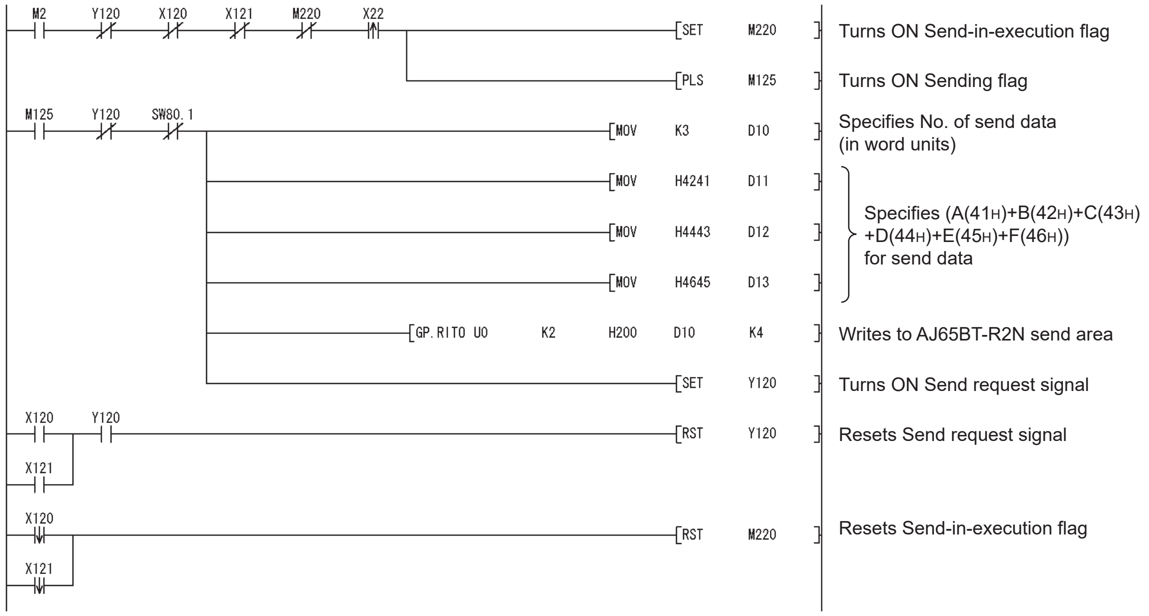


Figure 6.21 Program example

**☒Point**

When sending data of 4097 words or more to the external device using the GP.RITO instruction, divide the send data into parts with 4096 words or less and write them to the AJ65BT-R2N.
With the GP.RITO instructions, data with 4097 words or more cannot be written to the AJ65BT-R2N at one time.

## 6.5 Receiving from External Device

### 6.5.1 For the send/receive buffer communication function

(1) Overview of program example

When data is received to the AJ65BT-R2N from the external device, the received data is read to the master station word device (D200).

(2) Processing in the program example

1) No. of receive data is read from Receive data size specification area ($\boxed{\text{R2N}}$ 400H) to the master station word device (D200).
2) The receive data is read from Receive data area($\boxed{\text{R2N}}$ 401H) to the master station word device (D201 or later).
3) Receive data read completion signal (Y122) is turned ON → OFF to terminate the reception.

(3) Devices used in the program example

**Table 6.21 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X122 | Normal receive data read request signal | — | — |
| X123 | Error receive data read request signal | — | — |
| Y122 | Receive data read completion signal | Section 6.5.1 | — |
| M2 | Operation complete flag | — | Section 6.3.1 |
| M120 | Buffer memory access exclusion check flag | Section 6.5.1 | Section 6.4.1,<br>Section 6.6.1 |
| M130 | Receiving flag | Section 6.5.1 | — |
| M155 | Device that is turned ON for one scan after completion of GP.RIRD | Section 6.5.1 | — |
| M156 | Device that is turned ON for one scan after failure of reading by GP.RIRD | Section 6.5.1 | — |
| M160 | Device that is turned ON for one scan after completion of GP.RIRD | Section 6.5.1 | — |
| M161 | Device that is turned ON for one scan after failure of reading by GP.RIRD | Section 6.5.1 | — |
| D30 to D34 | Control data of GP.RIRD instruction | — | — |
| D35 to D39 | | — | — |
| D200 | No. of receive data | — | — |
| D201 or later | Receive data | — | — |
| SW80.1 | Other station data link status (Station No.2) | — | — |

(4) Program example

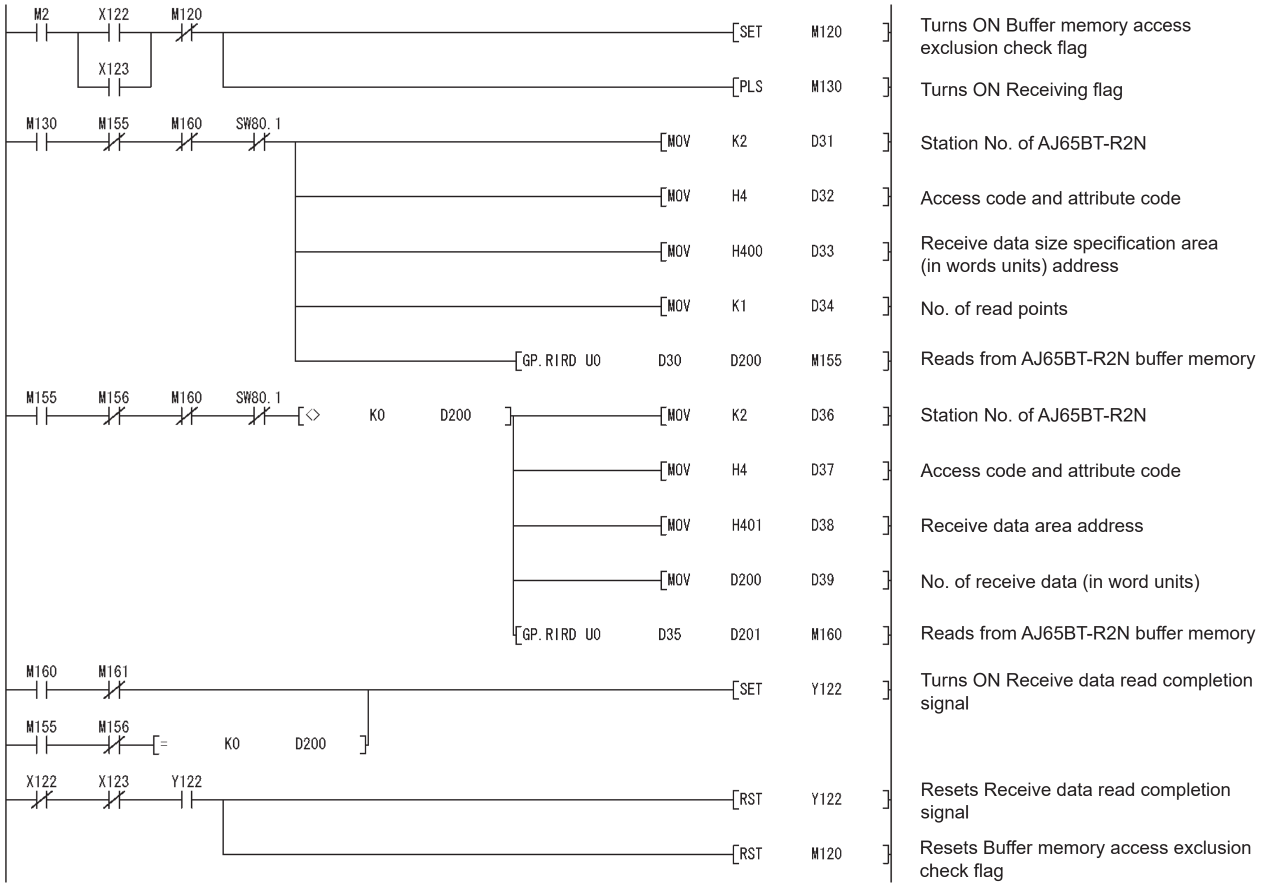


**Figure 6.22 Program example**

## ☒Point

When receiving data of 481 words or more from the external device using the GP.RIRD instruction, divide the receive data into parts with 480 words or less and read them to the AJ65BT-R2N.

With the GP.RIRD instructions, data with 481 words or more cannot be read from the AJ65BT-R2N at one time.

## 6.5.2 For the buffer memory auto-refresh function

### (1) Overview of program example

When the AJ65BT-R2N receives data from the external device, the received data are read out to the master station word device (D200).

### (2) Processing in the program example

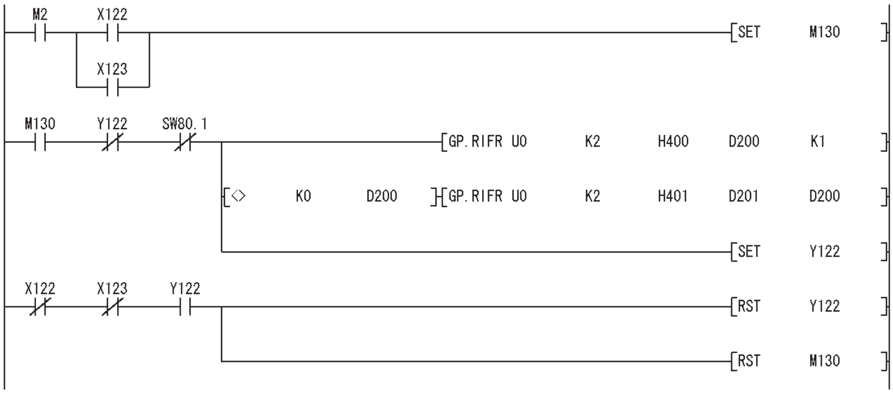
1) No. of receive data is read from Receive data size specification area (R2N 400H) to the master station word device (D200).
2) The receive data is read from Receive data area(R2N 401H) to the master station word device (D201 or later).
3) Receive data read completion signal (Y122) is turned ON → OFF to terminate the reception.

### (3) Devices used in the program example

**Table 6.22 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X122 | Normal receive data read request signal | — | — |
| X123 | Error receive data read request signal | — | — |
| Y122 | Receive data read completion signal | Section 6.5.2 | — |
| M2 | Operation complete flag | — | Section 6.3.2 |
| M130 | Receiving flag | Section 6.5.2 | — |
| D200 or later | No. of receive data, receive data | — | — |
| SW80.1 | Other station data link status (Station No.2) | — | — |

### (4) Program example



Turns ON Receiving flag

Reads No. of receive data (in word units) and receive data from AJ65BT-R2N receive area.

Turns ON Receive data read completion signal

Resets Receive data read completion signal

Resets Receiving flag

**Figure 6.23 Program example**

## ☒Point

When receiving data of 4097 words or more from the external device using the GP.RIFR instruction, divide the receive data into parts with 4096 words or less and read them to the AJ65BT-R2N.

With the GP.RIFR instructions, data with 4097 words or more cannot be read from the AJ65BT-R2N at one time.

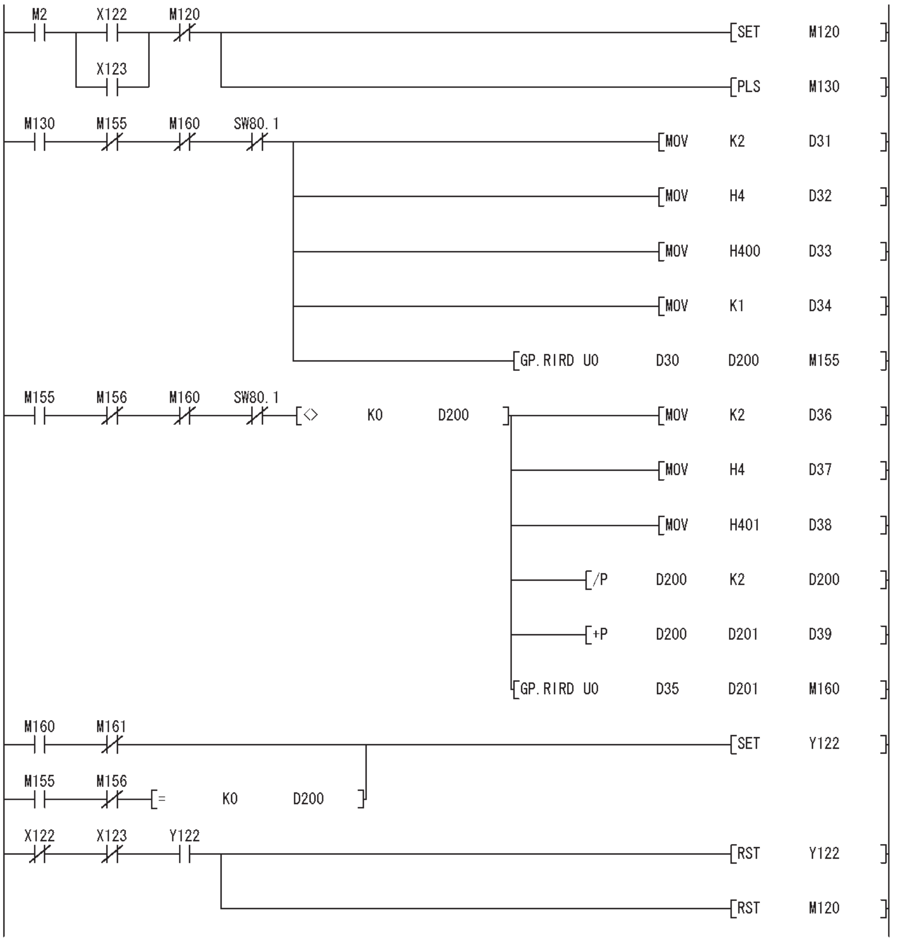
## 6.5.3 Precautions when receiving from external device

### (1) Precautions for specification in byte units

The setting in Word/byte specification (R2N 102H) influences the number of the data handled by the following buffer memory areas.

- No. of receive end data (R2N 111H)
- No. of actual send data (R2N 1B4H)
- No. of data stored in OS reception area (R2N 1B6H)
- Send data size specification area (R2N 200H (at default))
- Receive data size specification area (R2N 400H (at default))

In the case of byte specification, to use any of the above memory values as set data of a dedicated instruction, the byte data must be changed to word data as shown below.



Reads No. of receive data (in byte units)

Changes No. of receive data (in byte units) to No. of words (fractions rounded up) and specifies it as No. of read points in GP.RIRD instruction

**Figure 6.24 Program example of receiving when specified in byte units**

## 6.6 Error Handling of AJ65BT-R2N

### 6.6.1 For the send/receive buffer communication function

(1) Overview of program example

1) When an error occurs during initialization setting or data transfer, an error code will be read out from the AJ65BT-R2N to the master module if Error code read flag (X23) is turned ON.

2) The error is canceled when Error clear flag (X24) is turned ON after the cause of the error has been eliminated.

(2) Processing in the program example

1) If any of the signals below are turned ON and Error code read flag (X23) is turned ON, an error code will be read out from the AJ65BT-R2N to the master module.
   - Send failed signal (X121)
   - Error receive data read request signal (X123)
   - Initialization failed signal (X125)
   - $E^2$PROM function failed signal (X128)

2) If Error clear flag (X24) is turned ON after the cause of the error has been eliminated, Error reset request signal (RY(n+1)A) will be turned ON and the error will be cleared.

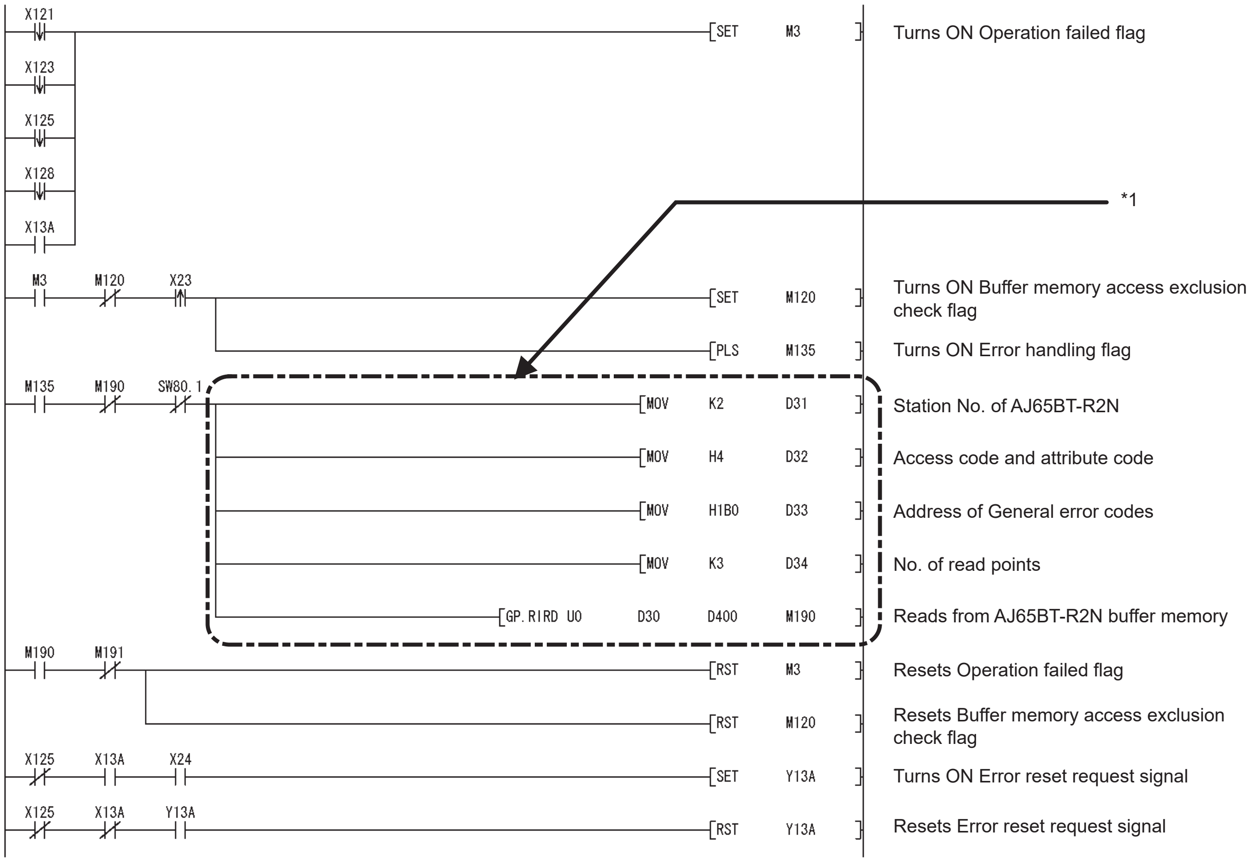
3) This turns off the ERR.LED, and error handling is complete when Error code storage area (R2N 1A8H to 1B2H) is cleared.

(3) Devices used in the program example

**Table 6.23 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X23 | Error code read flag | — | — |
| X24 | Error clear flag | — | — |
| X121 | Send failed signal | — | Section 6.4.1 |
| X123 | Error receive data read request signal | — | — |
| X125 | Initialization failed signal | — | Section 6.3.1 |
| X128 | $E^2$PPROM function failed signal | — | — |
| X13A | Error status signal | Section 6.6.1 | — |
| Y13A | Error reset request signal | Section 6.6.1 | — |
| M3 | Operation failed flag | Section 6.6.1 | — |
| M120 | Buffer memory access exclusion check flag | Section 6.6.1 | Section 6.4.1,<br>Section 6.5.1 |
| M135 | Error handling flag | Section 6.6.1 | — |
| M190 | Device that is turned ON for one scan after completion of GP.RIRD | Section 6.6.1 | — |
| M191 | Device that is turned ON for one scan after failure of reading by GP.RIRD | Section 6.6.1 | — |
| D30 to D34 | Control data of GP.RIRD instruction | — | — |
| D400 to D402 | AJ65BT-R2N error code | — | — |
| SW80.1 | Other station data link status (Station No.2) | — | — |

(4) Program example



*1 Modify this according to the system being used and processing executed, etc.

Figure 6.25 Program example

## 6.6.2 For the buffer memory auto-refresh function

### (1) Overview of program example

1) When an error occurs during initialization setting or data transfer, an error code will be read out from the AJ65BT-R2N to the master module if Error code read flag (X23) is turned ON.
2) The error is canceled when Error clear flag (X24) is turned ON after the cause of the error has been eliminated.

### (2) Processing in the program example

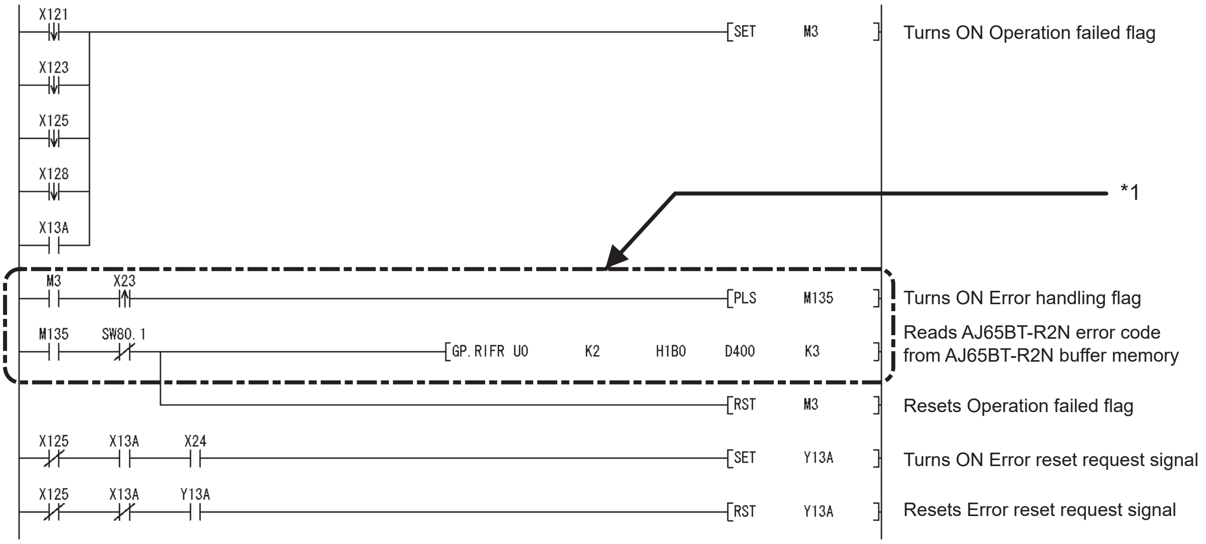
1) If any of the signals below are turned ON and Error code read flag (X23) is turned ON, an error code will be read out from the AJ65BT-R2N to the master module.
    - Send failed signal (X121)
    - Error receive data read request signal (X123)
    - Initialization failed signal (X125)
    - $E^2$PROM function failed signal (X128)
2) If Error clear flag (X24) is turned ON after the cause of the error has been eliminated, Error reset request signal (RY(n+1)A) will be turned ON and the error will be cleared.
3) This turns off the ERR.LED, and error handling is complete when Error code storage area (R2N 1A8H to 1B2H) is cleared.

### (3) Devices used in the program example

**Table 6.24 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X23 | Error code read flag | — | — |
| X24 | Error clear flag | — | — |
| X121 | Send failed signal | — | Section 6.4.2 |
| X123 | Error receive data read request signal | — | — |
| X125 | Initialization failed signal | — | Section 6.3.2 |
| X128 | $E^2$PROM function failed signal | — | — |
| X13A | Error status signal | Section 6.6.2 | — |
| Y13A | Error reset request signal | Section 6.6.2 | — |
| M3 | Operation failed flag | Section 6.6.2 | — |
| M135 | Error handling flag | Section 6.6.2 | — |
| D400 to D402 | AJ65BT-R2N error code | — | — |
| SW80.1 | Other station data link status (Station No.2) | — | — |

(4) Program example



*1 Modify this according to the system being used and processing executed, etc.

**Figure 6.26 Program example**

## 6.7 Initial Settings for Other Functions

This section explains programs for the initial setting of the functions listed below.

**Table 6.25 List of other functions**

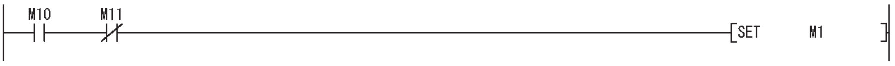
| Function | Reference section |
|---|---|
| Initial setting for the frame function | Section 6.7.1 |
| Initial setting for the monitoring-based transmission function | Section 6.7.2 |
| Initial setting for the flow control function | Section 6.7.3 |
| Initial setting for the ASCII-binary conversion function | Section 6.7.4 |
| Initial setting for the RW refresh function | Section 6.7.5 |

Only the initial setting program is extracted for each function.
When using each function, apply the extracted program to the program given in the following section.

☞ Section 6.3 Initial Setting for AJ65BT-R2N

**Remark**

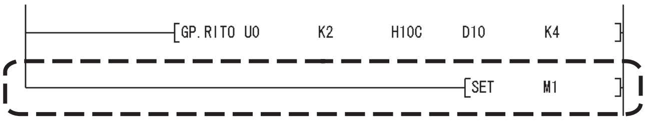
(1) When using more than one of the above functions during use of the send/receive buffer communication function, modify the program as follows:
- Avoid any duplicate settings with the devices (M10 to M17) that turn ON after completion of the GP.RIWT instruction.
- For the GP.RIWT instruction used at the end of initial setting, specify M10 as the device that turns ON after completion of the instruction.
- Have the following program, which is included in each program, executed one time at the end of all initial setting procedures.



Turns ON Initial setting write completion flag

Figure 6.27 Program executed only at the end of initial setting

(2) When using more than one of the above functions during use of the buffer memory auto-refresh function, modify the program as follows:
- Have the program part enclosed as shown below, which is included in each program, executed one time at the end of all initial setting procedures.



Turns ON Initial setting write completion flag

Figure 6.28 Program executed only at the end of initial setting

## 6.7.1 Initial setting for the frame function

### (1) For the send/receive buffer communication function

(a) Overview of program example
Reception is completed when ETX(03H) or NUL(00H) is received.

(b) Devices used in the program example

**Table 6.26 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 6.3.1 |
| M1 | Initial setting write completion flag | Section 6.7.1 | Section 6.3.1 |
| M10 | Device that is turned ON for one scan after completion of GP.RIWT | Section 6.7.1 | Section 6.3.1 |
| M11 | Device that is turned ON for one scan after failure of writing by GP.RIWT | Section 6.7.1 | Section 6.3.1 |
| M1002 | AJ65BT-R2N mode normal flag | — | Section 6.2.1 (3) 1 |
| D0 to D4 | Control data of GP.RIWT instruction | — | — |
| D10 to D13 | Receive end frame No. 1 to 4 | — | — |
| SW80.1 | Other station data link status (Station No.2) | — | — |

(c) Program example

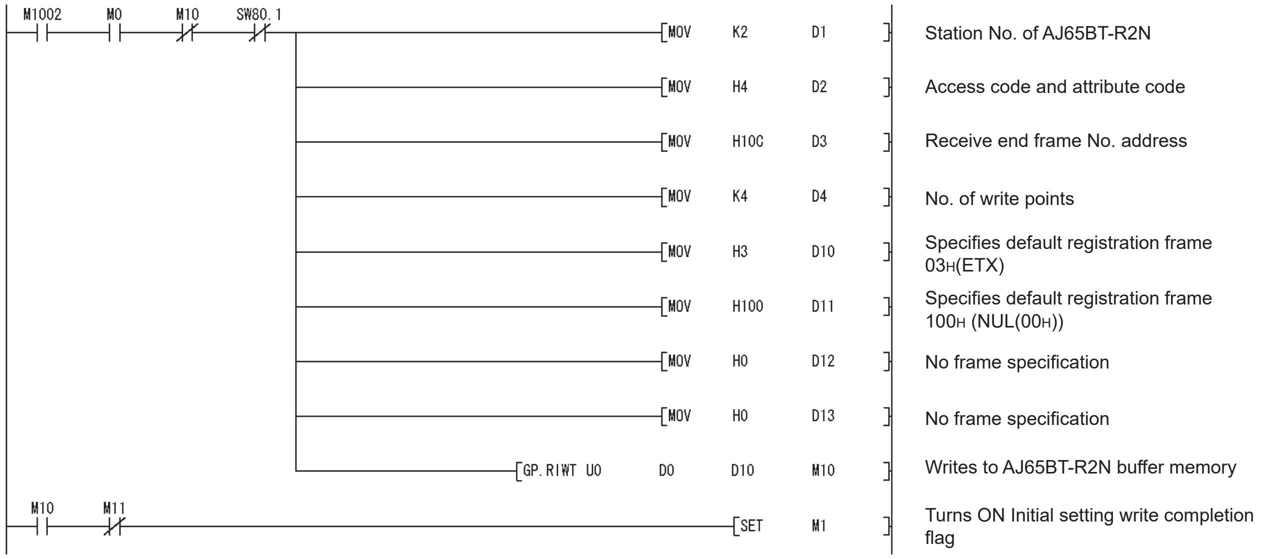


**Figure 6.29 Program example**

(2) For the buffer memory auto-refresh function

(a) Overview of program example
Reception is completed when ETX(03H) or NUL(00H) is received.

(b) Devices used in the program example

**Table 6.27 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 6.3.2 |
| M1 | Initial setting write completion flag | Section 6.7.1 | Section 6.3.2 |
| M1002 | AJ65BT-R2N mode normal flag | — | Section 6.2.2 (3) 1 |
| D10 to D13 | Receive end frame No. 1 to 4 | — | — |
| SW80.1 | Other station data link status (Station No.2) | — | — |

(c) Program example

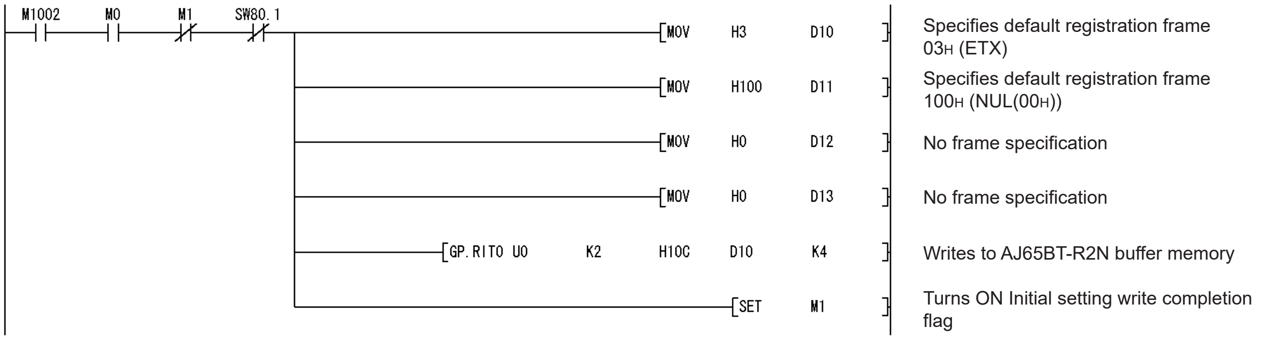


**Figure 6.30 Program example**

## 6.7.2 Initial setting for the monitoring-based transmission function

### (1) For the send/receive buffer communication function

(a) Overview of program example

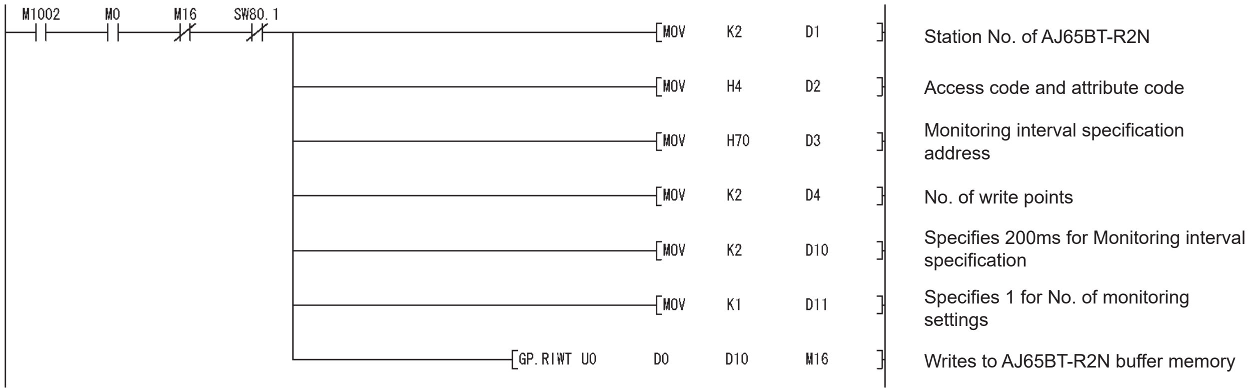
- The monitoring interval is set to 200ms and the send timeout time is set to 500ms.
- Data are sent when RX5 of the module on station No.1 turns ON.
- STX(02H)＋User registration frame (3E8H)＋ETX(03H) is set as the send data.

(b) Devices used in the program example

**Table 6.28 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 6.3.1 |
| M1 | Initial setting write completion flag | Section 6.7.2 | Section 6.3.1 |
| M10 | Device that is turned ON for one scan after completion of GP.RIWT | Section 6.7.2 | Section 6.3.1 |
| M11 | Device that is turned ON for one scan after failure of writing by GP.RIWT | Section 6.7.2 | Section 6.3.1 |
| M12 | Device that is turned ON for one scan after completion of GP.RIWT | Section 6.7.2 | — |
| M13 | Device that is turned ON for one scan after failure of writing by GP.RIWT | Section 6.7.2 | — |
| M14 | Device that is turned ON for one scan after completion of GP.RIWT | Section 6.7.2 | — |
| M15 | Device that is turned ON for one scan after failure of writing by GP.RIWT | Section 6.7.2 | — |
| M16 | Device that is turned ON for one scan after completion of GP.RIWT | Section 6.7.2 | — |
| M17 | Device that is turned ON for one scan after failure of writing by GP.RIWT | Section 6.7.2 | — |
| M1002 | AJ65BT-R2N mode normal flag | — | Section 6.2.1 (3) 1 |
| D0 to D4 | Control data of GP.RIWT instruction | — | — |
| D10 to D14 | Monitoring-based transmission function set values | — | — |
| SW80.1 | Other station data link status (Station No.2) | — | — |

(c) Program example



```
[MOV    K2    D1 ]    Station No. of AJ65BT-R2N
[MOV    H4    D2 ]    Access code and attribute code
[MOV    H70   D3 ]    Monitoring interval specification address
[MOV    K2    D4 ]    No. of write points
[MOV    K2    D10]    Specifies 200ms for Monitoring interval specification
[MOV    K1    D11]    Specifies 1 for No. of monitoring settings
[GP.RIWT U0   D0    D10   M16]    Writes to AJ65BT-R2N buffer memory
```

Figure 6.31 Program example

(Continued to next page)

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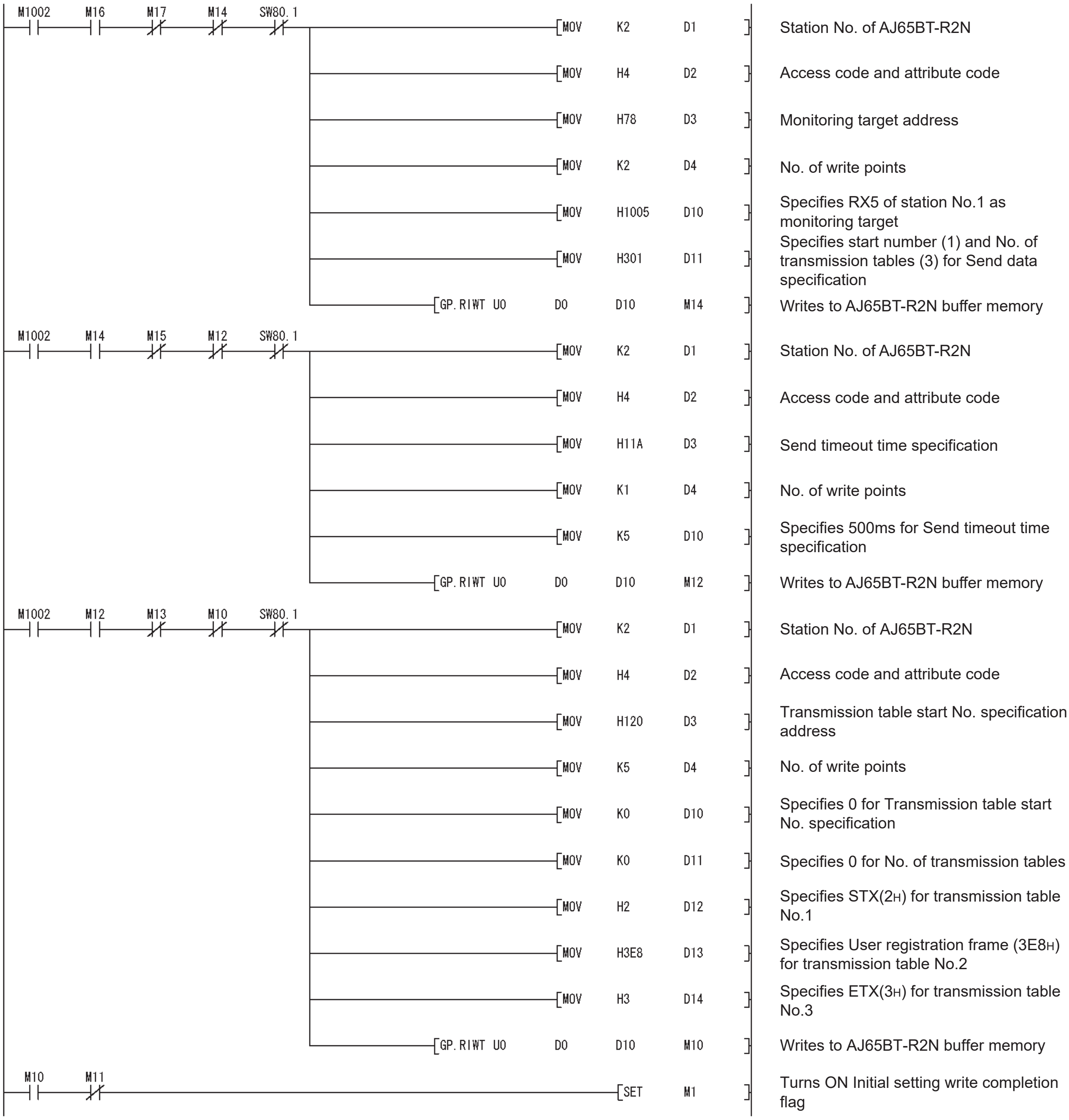


```
M1002   M16    M17    M14    SW80.1
-| |----| |----|/|----|/|----|/|--+----------------[MOV   K2     D1   ]  Station No. of AJ65BT-R2N
                                  +----------------[MOV   H4     D2   ]  Access code and attribute code
                                  +----------------[MOV   H78    D3   ]  Monitoring target address
                                  +----------------[MOV   K2     D4   ]  No. of write points
                                  +----------------[MOV   H1005  D10  ]  Specifies RX5 of station No.1 as
                                  |                                      monitoring target
                                  +----------------[MOV   H301   D11  ]  Specifies start number (1) and No. of
                                  |                                      transmission tables (3) for Send data
                                  |                                      specification
                                  +------[GP.RIWT U0   D0     D10    M14  ]  Writes to AJ65BT-R2N buffer memory
M1002   M14    M15    M12    SW80.1
-| |----| |----|/|----|/|----|/|--+----------------[MOV   K2     D1   ]  Station No. of AJ65BT-R2N
                                  +----------------[MOV   H4     D2   ]  Access code and attribute code
                                  +----------------[MOV   H11A   D3   ]  Send timeout time specification
                                  +----------------[MOV   K1     D4   ]  No. of write points
                                  +----------------[MOV   K5     D10  ]  Specifies 500ms for Send timeout time
                                  |                                      specification
                                  +------[GP.RIWT U0   D0     D10    M12  ]  Writes to AJ65BT-R2N buffer memory
M1002   M12    M13    M10    SW80.1
-| |----| |----|/|----|/|----|/|--+----------------[MOV   K2     D1   ]  Station No. of AJ65BT-R2N
                                  +----------------[MOV   H4     D2   ]  Access code and attribute code
                                  +----------------[MOV   H120   D3   ]  Transmission table start No. specification
                                  |                                      address
                                  +----------------[MOV   K5     D4   ]  No. of write points
                                  +----------------[MOV   K0     D10  ]  Specifies 0 for Transmission table start
                                  |                                      No. specification
                                  +----------------[MOV   K0     D11  ]  Specifies 0 for No. of transmission tables
                                  +----------------[MOV   H2     D12  ]  Specifies STX(2H) for transmission table
                                  |                                      No.1
                                  +----------------[MOV   H3E8   D13  ]  Specifies User registration frame (3E8H)
                                  |                                      for transmission table No.2
                                  +----------------[MOV   H3     D14  ]  Specifies ETX(3H) for transmission table
                                  |                                      No.3
                                  +------[GP.RIWT U0   D0     D10    M10  ]  Writes to AJ65BT-R2N buffer memory
M10     M11
-| |----|/|----------------------------------------[SET   M1          ]  Turns ON Initial setting write completion
                                                                         flag
```

Figure 6.31 Program example (Continued)

(2) For the buffer memory auto-refresh function

(a) Overview of program example

- The monitoring interval is set to 200ms and the send timeout time is set to 500ms.
- Data are sent when RX5 of the module on station No.1 turns ON.
- STX(02H) + User registration frame (3E8H) + ETX(03H) is set as the send data.

(b) Devices used in the program example

**Table 6.29 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 6.3.2 |
| M1 | Initial setting write completion flag | Section 6.7.2 | Section 6.3.2 |
| M1002 | AJ65BT-R2N mode normal flag | — | Section 6.2.2 (3) 1 |
| D10 to D14 | Monitoring-based transmission function set values | — | — |
| SW80.1 | Other station data link status (Station No.2) | — | — |

(c) Program example

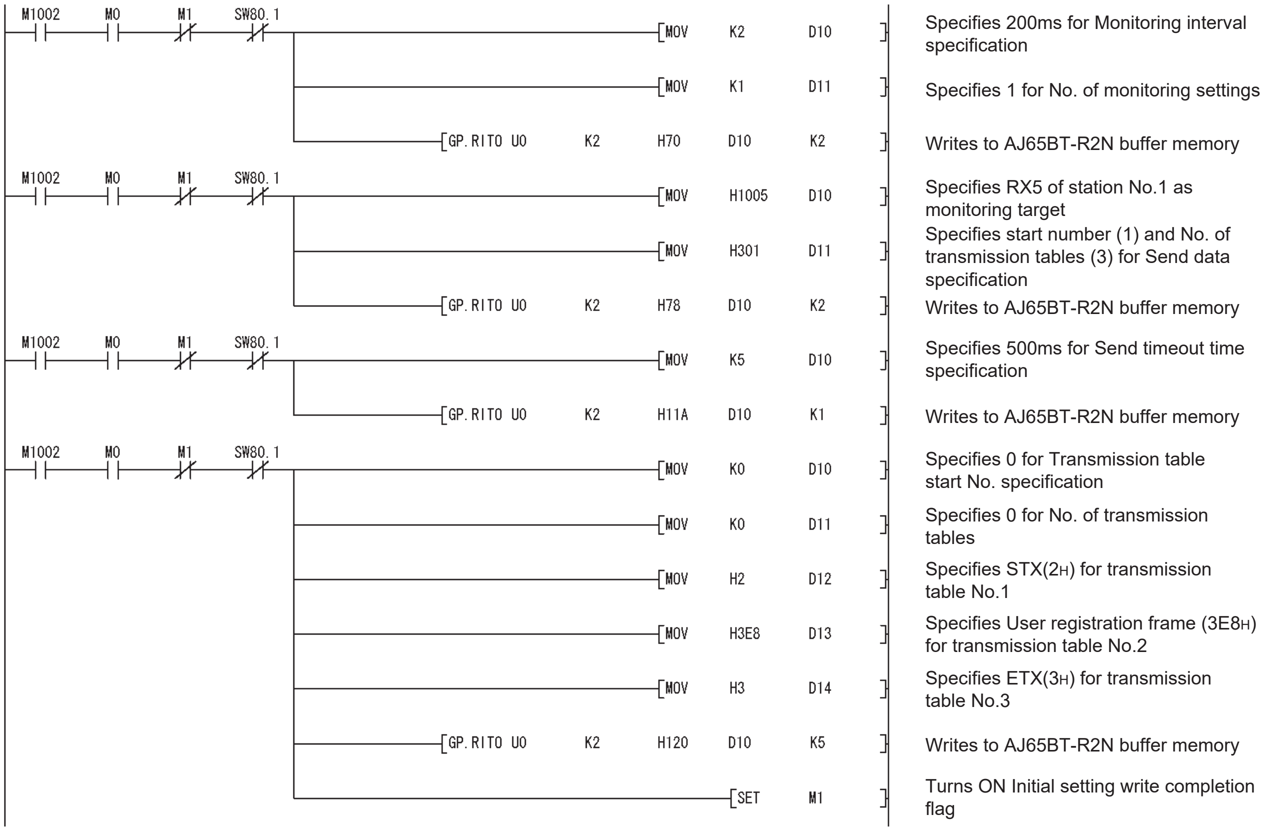


**Figure 6.32 Program example**

## 6.7.3 Initial setting for the flow control function

### (1) For the send/receive buffer communication function

(a) Overview of program example
The flow control is performed by the DC code control.

(b) Devices used in the program example

**Table 6.30 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 6.3.1 |
| M1 | Initial setting write completion flag | Section 6.7.3 | Section 6.3.1 |
| M10 | Device that is turned ON for one scan after completion of GP.RIWT | Section 6.7.3 | Section 6.3.1 |
| M11 | Device that is turned ON for one scan after failure of writing by GP.RIWT | Section 6.7.3 | Section 6.3.1 |
| M1002 | AJ65BT-R2N mode normal flag | — | Section 6.2.1 (3) 1 |
| D0 to D4 | Control data of GP.RIWT instruction | — | — |
| D10 | Flow control function set value | — | — |
| SW80.1 | Other station data link status (Station No.2) | — | — |

(c) Program example

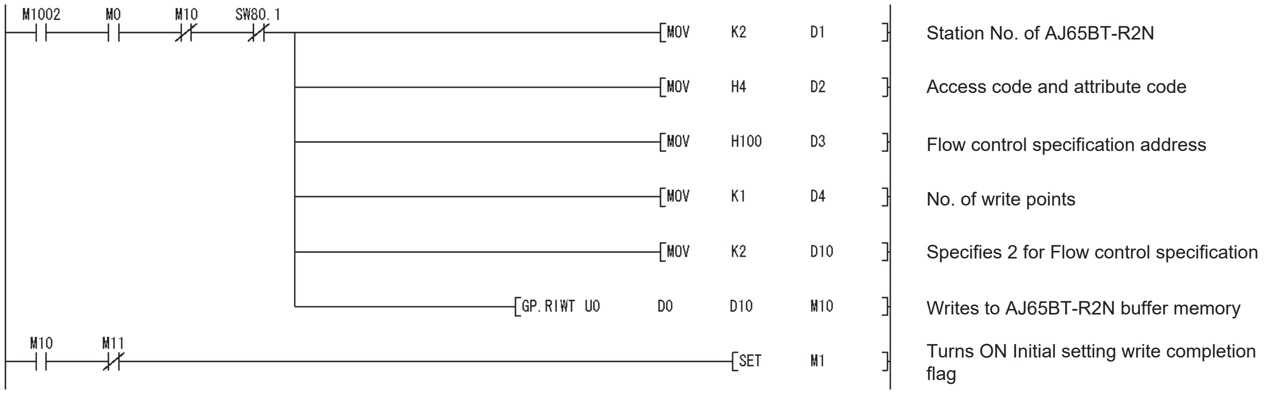


**Figure 6.33 Program example**

(2) For the buffer memory auto-refresh function

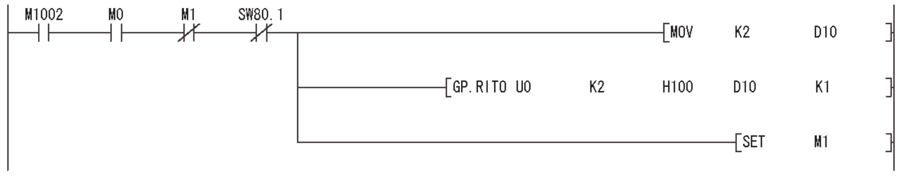
(a) Overview of program example
The flow control is performed by the DC code control.

(b) Devices used in the program example

**Table 6.31 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 6.3.2 |
| M1 | Initial setting write completion flag | Section 6.7.3 | Section 6.3.2 |
| M1002 | AJ65BT-R2N mode normal flag | — | Section 6.2.2 (3) 1 |
| D10 | Flow control function set value | — | — |
| SW80.1 | Other station data link status (Station No.2) | — | — |

(c) Program example



Specifies 2 for Flow control specification

Writes to AJ65BT-R2N buffer memory

Turns ON Initial setting write completion flag

**Figure 6.34 Program example**

## 6.7.4 Initial setting for the ASCII-binary conversion function

### (1) For the send/receive buffer communication function

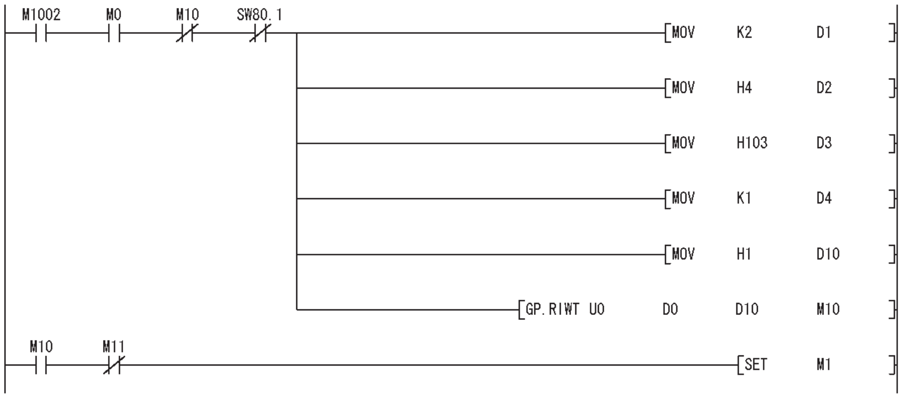
(a) Overview of program example
The ASCII-binary conversion function is used.

(b) Devices used in the program example

**Table 6.32 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 6.3.1 |
| M1 | Initial setting write completion flag | Section 6.7.4 | Section 6.3.1 |
| M10 | Device that is turned ON for one scan after completion of GP.RIWT | Section 6.7.4 | Section 6.3.1 |
| M11 | Device that is turned ON for one scan after failure of writing by GP.RIWT | Section 6.7.4 | Section 6.3.1 |
| M1002 | AJ65BT-R2N mode normal flag | — | Section 6.2.1 (3) 1 |
| D0 to D4 | Control data of GP.RIWT instruction | — | — |
| D10 | ASCII-binary conversion function set value | — | — |
| SW80.1 | Other station data link status (Station No.2) | — | — |

(c) Program example



Station No. of AJ65BT-R2N

Access code and attribute code

ASCII-binary conversion specification address

No. of write points

Specifies 1 for ASCII-binary conversion specification

Writes to AJ65BT-R2N buffer memory

Turns ON Initial setting write completion flag

**Figure 6.35 Program example**

(2) For the buffer memory auto-refresh function

(a) Overview of program example
The ASCII-binary conversion function is used.

(b) Devices used in the program example

**Table 6.33 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 6.3.2 |
| M1 | Initial setting write completion flag | Section 6.7.4 | Section 6.3.2 |
| M1002 | AJ65BT-R2N mode normal flag | — | Section 6.2.2 (3) 1 |
| D10 | ASCII-binary conversion function set value | — | — |
| SW80.1 | Other station data link status (Station No.2) | — | — |

(c) Program example

Specifies 1 for ASCII-binary conversion specification

Writes to AJ65BT-R2N buffer memory

Turns ON Initial setting write completion flag

**Figure 6.36 Program example**

## 6.7.5 Initial setting for the RW refresh function

### (1) For the send/receive buffer communication function

(a) Overview of program example

- The remote register (RW) assignments are changed to those listed below so that the assigned buffer memories can be monitored.

**Table 6.34 Devices used in the program example**

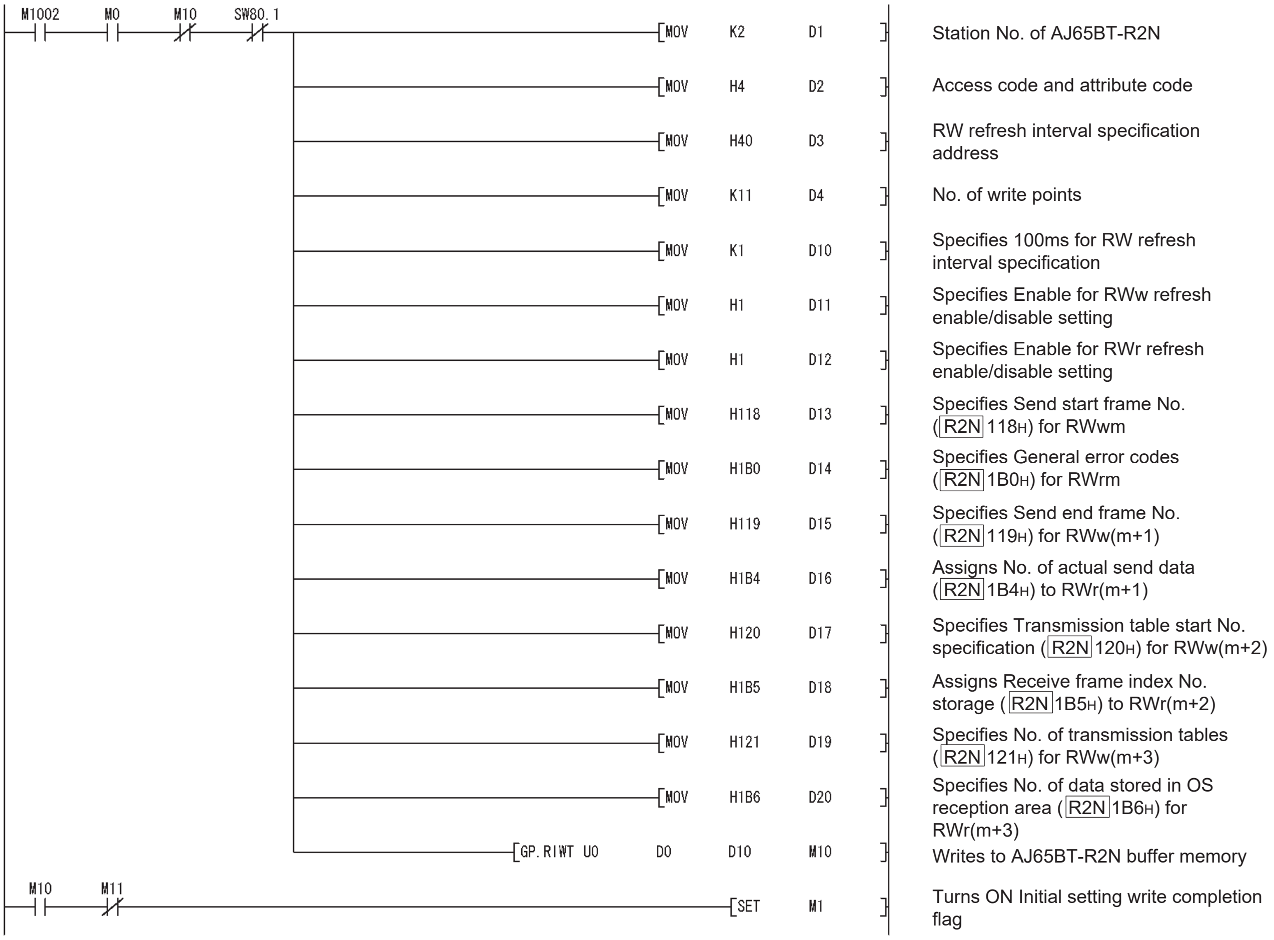
| Device | Buffer memory | Device | Buffer memory |
|---|---|---|---|
| RWrm | General error codes (R2N 1B0$_H$) | RWwm | Send start frame No. (R2N 118$_H$) |
| RWr(m+1) | No. of actual send data (R2N 1B4$_H$) | RWw(m+1) | Send end frame No. (R2N 119$_H$) |
| RWr(m+2) | Receive frame index No. storage (R2N 1B5$_H$) | RWw(m+2) | Transmission table start No. specification (R2N 120$_H$) |
| RWr(m+3) | No. of data stored in OS reception area (R2N 1B6$_H$) | RWw(m+3) | No. of transmission tables (R2N 121$_H$) |

(b) Devices used in the program example

**Table 6.35 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 6.3.1 |
| M1 | Initial setting write completion flag | Section 6.7.5 | Section 6.3.1 |
| M10 | Device that is turned ON for one scan after completion of GP.RIWT | Section 6.7.5 | Section 6.3.1 |
| M11 | Device that is turned ON for one scan after failure of writing by GP.RIWT | Section 6.7.5 | Section 6.3.1 |
| M1002 | AJ65BT-R2N mode normal flag | — | Section 6.2.1 (3) 1 |
| D0 to D4 | Control data of GP.RIWT instruction | — | — |
| D10 to D20 | RW refresh function set values | — | — |
| SW80.1 | Other station data link status (Station No.2) | — | — |

(c) Program example



| | |
|---|---|
| MOV K2 D1 | Station No. of AJ65BT-R2N |
| MOV H4 D2 | Access code and attribute code |
| MOV H40 D3 | RW refresh interval specification address |
| MOV K11 D4 | No. of write points |
| MOV K1 D10 | Specifies 100ms for RW refresh interval specification |
| MOV H1 D11 | Specifies Enable for RWw refresh enable/disable setting |
| MOV H1 D12 | Specifies Enable for RWr refresh enable/disable setting |
| MOV H118 D13 | Specifies Send start frame No. (R2N 118H) for RWwm |
| MOV H1B0 D14 | Specifies General error codes (R2N 1B0H) for RWrm |
| MOV H119 D15 | Specifies Send end frame No. (R2N 119H) for RWw(m+1) |
| MOV H1B4 D16 | Assigns No. of actual send data (R2N 1B4H) to RWr(m+1) |
| MOV H120 D17 | Specifies Transmission table start No. specification (R2N 120H) for RWw(m+2) |
| MOV H1B5 D18 | Assigns Receive frame index No. storage (R2N 1B5H) to RWr(m+2) |
| MOV H121 D19 | Specifies No. of transmission tables (R2N 121H) for RWw(m+3) |
| MOV H1B6 D20 | Specifies No. of data stored in OS reception area (R2N 1B6H) for RWr(m+3) |
| GP.RIWT U0 D0 D10 M10 | Writes to AJ65BT-R2N buffer memory |
| SET M1 | Turns ON Initial setting write completion flag |

**Figure 6.37 Program example**

## (2) For the buffer memory auto-refresh function

### (a) Overview of program example

- The remote register (RW) assignments are changed to those listed below so that the assigned buffer memories can be monitored.

**Table 6.36 Devices used in the program example**

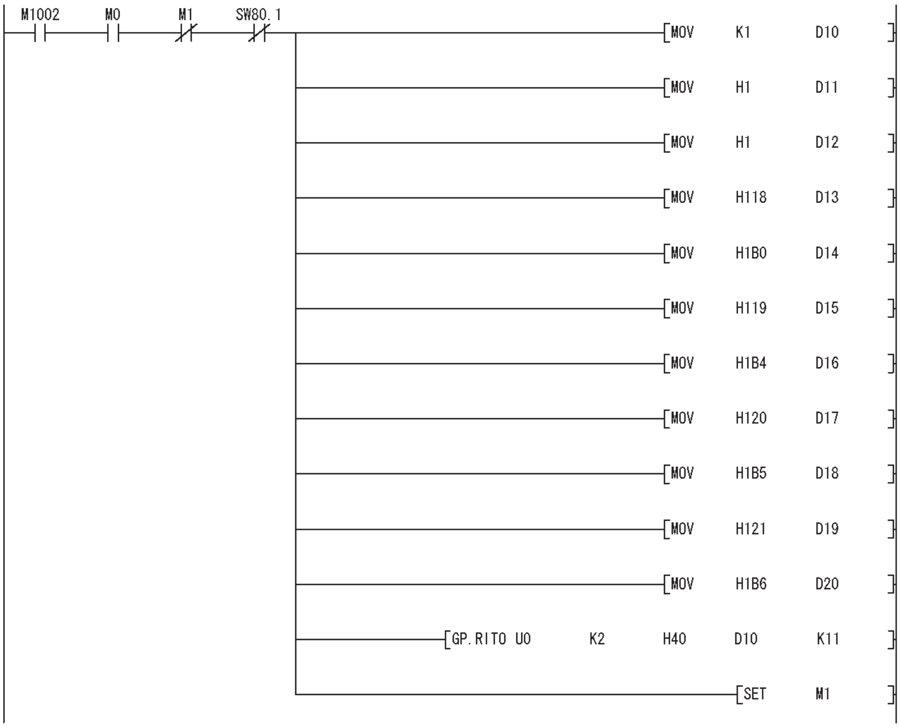
| Device | Buffer memory | Device | Buffer memory |
|---|---|---|---|
| RWrm | General error codes (R2N 1B0$_H$) | RWwm | Send start frame No. (R2N 118$_H$) |
| RWr(m+1) | No. of actual send data (R2N 1B4$_H$) | RWw(m+1) | Send end frame No. (R2N 119$_H$) |
| RWr(m+2) | Receive frame index No. storage (R2N 1B5$_H$) | RWw(m+2) | Transmission table start No. specification (R2N 120$_H$) |
| RWr(m+3) | No. of data stored in OS reception area (R2N 1B6$_H$) | RWw(m+3) | No. of transmission tables (R2N 121$_H$) |

### (b) Devices used in the program example

**Table 6.37 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 6.3.2 |
| M1 | Initial setting write completion flag | Section 6.7.5 | Section 6.3.2 |
| M1002 | AJ65BT-R2N mode normal flag | — | Section 6.2.2 (3) 1 |
| D10 to D20 | RW refresh function set values | — | — |
| SW80.1 | Other station data link status (Station No.2) | — | — |

### (c) Program example



Specifies 100ms for RW refresh interval specification

Specifies Enable for RWw refresh enable/disable setting

Specifies Enable for RWr refresh enable/disable setting

Specifies Send start frame No. (R2N 118$_H$) for RWwm

Specifies General error codes (R2N 1B0$_H$) for RWrm

Specifies Send end frame No. (R2N 119$_H$) for RWw(m+1)

Assigns No. of actual send data (R2N 1B4$_H$) to RWr(m+1)

Specifies Transmission table start No. specification (R2N 120$_H$) for RWw(m+2)

Assigns Receive frame index No. storage (R2N 1B5$_H$) to RWr(m+2)

Specifies No. of transmission tables (R2N 121$_H$) for RWw(m+3)

Specifies No. of data stored in OS reception area (R2N 1B6$_H$) for RWr(m+3)

Writes to AJ65BT-R2N buffer memory

Turns ON Initial setting write completion flag

Figure 6.38 Program example

## 6.8 Other Functions

This section explains programs for executing the functions below.
Execute each program in this section after AJ65BT-R2N initialization.

**Table 6.38 List of other functions**

| Function | Reference section |
|---|---|
| Send cancel function | Section 6.8.1 |
| Forced receive completion function | Section 6.8.2 |
| OS reception area clear function | Section 6.8.3 |
| E$^2$PROM function setting | Section 6.8.4 |

### 6.8.1 Send cancel function

The same program example can be used for the send/receive buffer communication function and buffer memory auto-refresh function.

(1) Overview of program example

Transmission is canceled when Send cancel execute flag (X25) is turned ON after a send request and before send completion.

(2) Processing in the program example

1) After turn-ON of Send request signal (Y120), Send cancel request signal (Y121) is turned ON before Send complete signal (X120) or Send failed signal (X121) turns ON.
2) Send request signal (Y120) and Send cancel request signal (Y121) are turned OFF after turn-ON of Send complete signal (X120) or Send failed signal (X121).

(3) Devices used in the program example

**Table 6.39 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X25 | Send cancel execute flag | — | — |
| X120 | Send complete signal | Section 6.8.1 | Section 6.4.1 |
| X121 | Send failed signal | Section 6.8.1 | Section 6.4.1 |
| Y120 | Send request signal | — | Section 6.4.1 |
| Y121 | Send cancel request signal | Section 6.8.1 | — |

(4) Program example

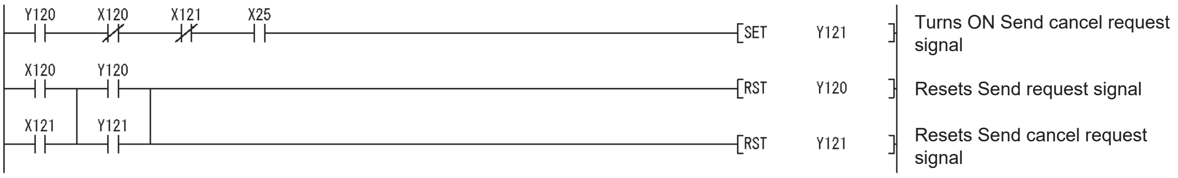


**Figure 6.39 Program example**

## 6.8.2 Forced receive completion function

### (1) For the send/receive buffer communication function

(a) Overview of program example

When Forced receive completion execute flag (X26) turns ON before reception completion, the receive processing is forcibly completed at the point and data that have been received are read out.

(b) Processing in the program example

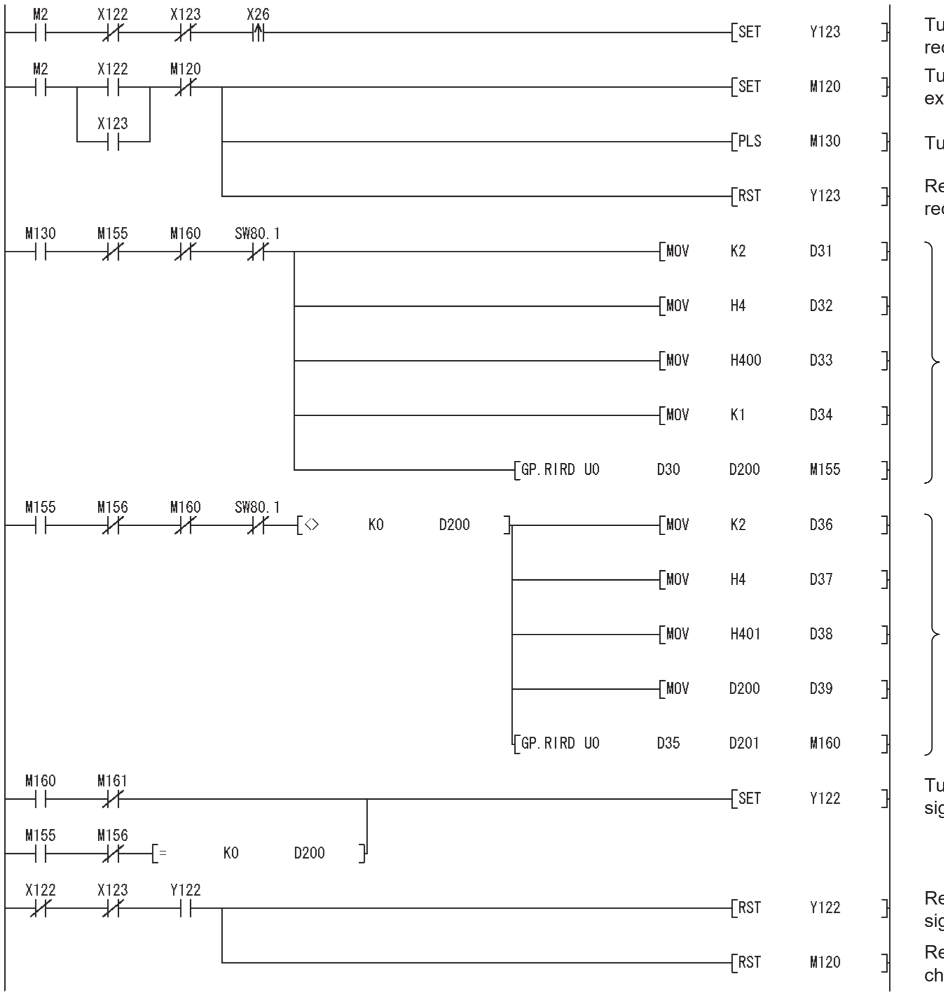
1) Forced receive completion request signal (Y123) is turned ON to forcibly terminate reception.
2) Received data are read from Receive data size specification area (R2N 400H) and Receive data area (R2N 401H) to the master station word device (D200).
3) Receive data read completion signal (Y122) is turned OFF to terminate the reception.

(c) Devices used in the program example

**Table 6.40 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X26 | Forced receive completion execute flag | — | — |
| X122 | Normal receive data read request signal | Section 6.8.2 | — |
| X123 | Error receive data read request signal | Section 6.8.2 | — |
| Y122 | Receive data read completion signal | Section 6.8.2 | Section 6.5.1 |
| Y123 | Forced receive completion request signal | Section 6.8.2 | — |
| M2 | Operation complete flag | — | Section 6.3.1 |
| M120 | Buffer memory access exclusion check flag | Section 6.8.2 | Section 6.4.1,<br>Section 6.5.1,<br>Section 6.6.1 |
| M130 | Receiving flag | Section 6.8.2 | Section 6.5.1 |
| M155 | Device that is turned ON for one scan after completion of GP.RIRD | Section 6.8.2 | Section 6.5.1 |
| M156 | Device that is turned ON for one scan after failure of reading by GP.RIRD | Section 6.8.2 | Section 6.5.1 |
| M160 | Device that is turned ON for one scan after completion of GP.RIRD | Section 6.8.2 | Section 6.5.1 |
| M161 | Device that is turned ON for one scan after failure of reading by GP.RIRD | Section 6.8.2 | Section 6.5.1 |
| D30 to D34 | Control data of GP.RIRD instruction | — | — |
| D35 to D39 | | — | — |
| D200 | No. of receive data | — | — |
| From D201 | Receive data | — | — |
| SW80.1 | Other station data link status (Station No.2) | — | — |

(d) Program example



Turns ON Forced receive completion request signal

Turns ON Buffer memory access exclusion check flag

Turns ON Receiving flag

Resets Forced receive completion request signal

Reads No. of receive data from AJ65BT-R2N receive data size specification area (in word units)

Reads receive data from AJ65BT-R2N receive data area

Turns ON Receive data read completion signal

Resets Receive data read completion signal

Resets Buffer memory access exclusion check flag

**Figure 6.40 Program example**

### (2) For the buffer memory auto-refresh function

(a) Overview of program example

When Forced receive completion execute flag (X26) turns ON before reception completion, the receive processing is forcibly completed at the point and data that have been received are read out.

(b) Processing in the program example

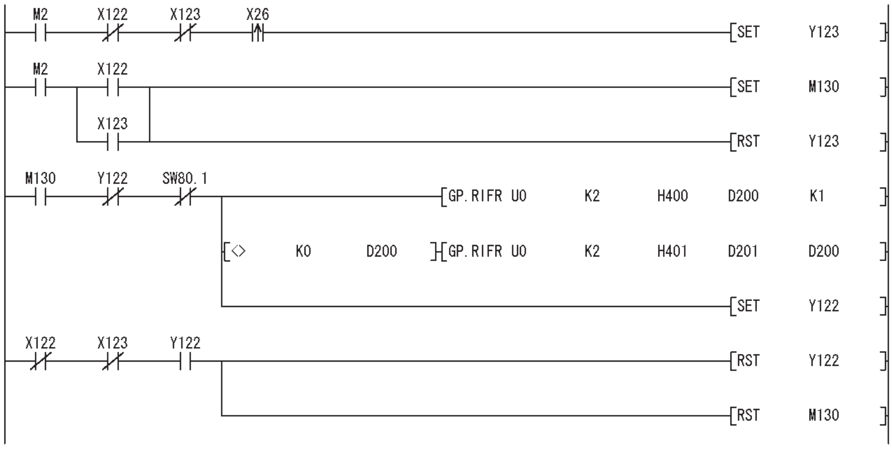
1) Forced receive completion request signal (Y123) is turned ON to forcibly terminate reception.
2) Received data are read from Receive data size specification area ($\boxed{\text{R2N}}$400$_{\text{H}}$) and Receive data area ($\boxed{\text{R2N}}$401$_{\text{H}}$) to the master station word device (D200).
3) Receive data read completion signal (Y122) is turned OFF to terminate the reception.

(c) Devices used in the program example

**Table 6.41 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X26 | Forced receive completion execute flag | — | — |
| X122 | Normal receive data read request signal | Section 6.8.2 | — |
| X123 | Error receive data read request signal | Section 6.8.2 | — |
| Y122 | Receive data read completion signal | Section 6.8.2 | Section 6.5.2 |
| Y123 | Forced receive completion request signal | Section 6.8.2 | — |
| M2 | Operation complete flag | — | Section 6.3.2 |
| M130 | Receiving flag | Section 6.8.2 | Section 6.5.2 |
| D200 | No. of receive data | — | — |
| From D201 | Receive data | — | — |
| SW80.1 | Other station data link status (Station No.2) | — | — |

(d) Program example



Turns ON Forced receive completion request signal

Turns ON Receiving flag

Resets Forced receive completion request signal

Reads No. of receive data (in word units) and receive data from AJ65BT-R2N receive area

Turns ON Receive data read completion signal

Resets Receive data read completion signal

Resets Receiving flag

**Figure 6.41 Program example**

### 6.8.3 OS reception area clear function

The same program example can be used for the send/receive buffer communication function and buffer memory auto-refresh function.

(1) Overview of program example

The OS reception area is cleared when the AJ65BT-R2N fails to receive data from the external device.

(2) Processing in the program example

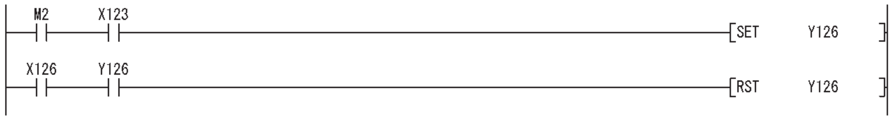
When Error receive data read request signal (X123) is ON, OS reception area clear request signal (Y126) is turned ON to clear the OS reception area.

(3) Devices used in the program example

**Table 6.42 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X123 | Error receive data read request signal | — | — |
| X126 | OS reception area cleared signal | Section 6.8.3 | — |
| Y126 | OS reception area clear request signal | Section 6.8.3 | — |
| M2 | Operation complete flag | — | Section 6.3.2 |

(4) Program example



Turns ON OS reception area clear request signal

Resets OS reception area clear request signal

**Figure 6.42 Program example**

### 6.8.4 E$^2$PROM function setting

☒**Point**

(1) Do not execute registration to E$^2$PROM each time the AJ65BT-R2N is started up.

Doing so may cause the maximum number of writes to E$^2$PROM (service life) to be reached earlier.

(2) Execute the E$^2$PROM function after initialization of the AJ65BT-R2N is normally completed.

For E$^2$PROM function sample programs, refer to the following.

☞ Section 6.9.1 Program example for changing auto-refresh buffer assignments

## 6.9 Program Examples

This section gives program examples for the following processing.

**Table 6.43 Program example**

| Description | Reference section |
|---|---|
| Program example for changing auto-refresh buffer assignments | Section 6.9.1 |
| Program example for sending/receiving data with GP.RISEND/GP.RIRCV instruction | Section 6.9.2 |
| Program example for receiving data when a receive timeout occurs | Section 6.9.3 |

### 6.9.1 Program example for changing auto-refresh buffer assignments

(1) Overview of program examples

- When Operation start request flag (M0) is turned ON, the assignments are changed so that the AJ65BT-R2N auto-refresh buffer size is 80H, and they are registered to the $E^2$PROM.
  When the auto-refresh buffer size changes to 80H, the buffer memory auto-refresh function can be used with up to 20 AJ65BT-R2Ns connected.
- The AJ65BT-R2N operates with the auto-refresh buffer size setting changed to 80H after restart.

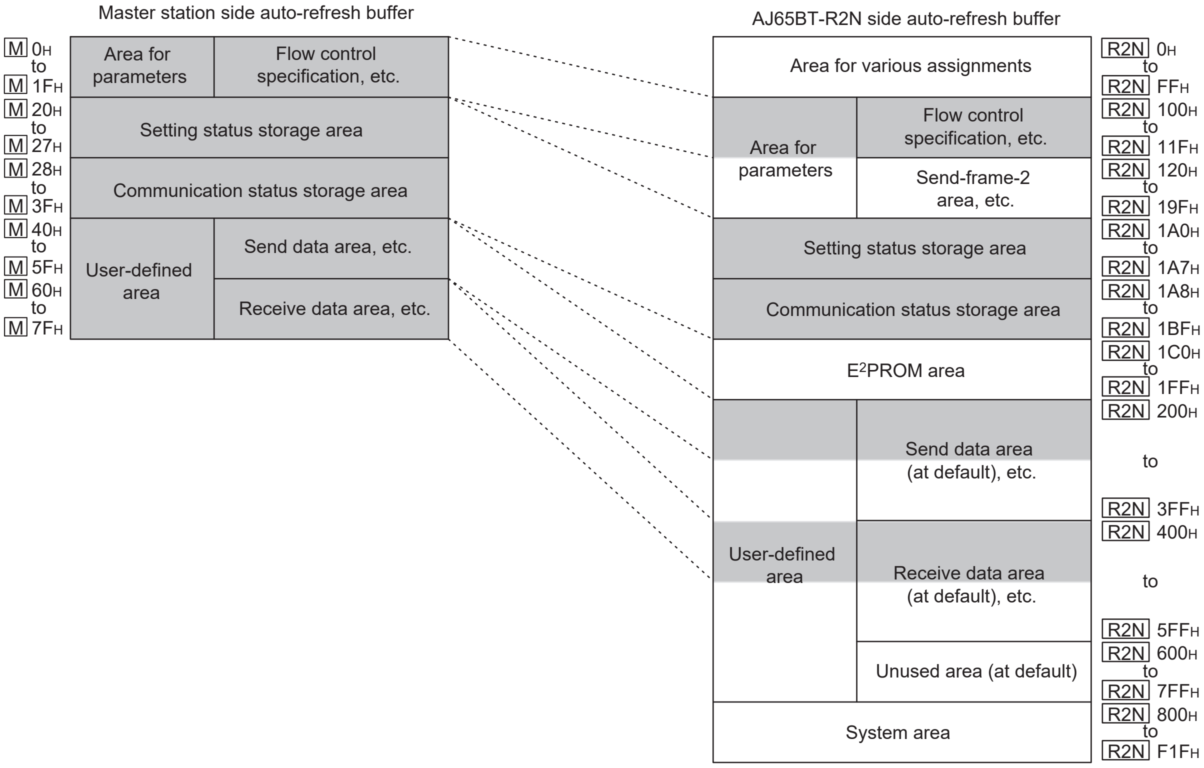


**Figure 6.43 Auto-refresh buffer after assignment change**

(2) For the send/receive buffer communication function

(a) Devices used in the program example

**Table 6.44 Devices used in the program example**

| Device | Description | Device | Description |
|---|---|---|---|
| X0 | Module error (Master station) | M1 | Initial setting write completion flag |
| X0F | Module ready (Master station) | M2 | Operation complete flag |
| X1 | Own station data link status (Master station) | M3 | Operation failed flag |
| X23 | Error code read flag | M10 | Device that is turned ON for one scan after completion of GP.RIWT |
| X24 | Error clear flag | M11 | Device that is turned ON for one scan after failure of writing by GP.RIWT |
| X27 | $E^2$PROM function setting flag | M12 | Device that is turned ON for one scan after completion of GP.RIWT |
| X124 | Initialization complete signal | M13 | Device that is turned ON for one scan after failure of writing by GP.RIWT |
| X125 | Initialization failed signal | M14 | Device that is turned ON for one scan after completion of GP.RIWT |
| X127 | $E^2$PROM function complete signal | M15 | Device that is turned ON for one scan after failure of writing by GP.RIWT |
| X128 | $E^2$PROM function failed signal | M20 | AJ65BT-R2N initial setting start flag |
| K1X134 | Mode setting switch status signal (X134 to X137) | M120 | Buffer memory access exclusion check flag |
| X13A | Error status signal | M135 | Error handling flag |
| X13B | Remote station ready signal | M190 | Device that is turned ON for one scan after completion of GP.RIRD |
| K8Y120 | Remote output (Y120 to Y13F) | M191 | Device that is turned ON for one scan after failure of reading by GP.RIRD |
| Y120 | Send request signal | M1002 | AJ65BT-R2N mode normal flag |
| Y121 | Send cancel request signal | M1003 | AJ65BT-R2N mode error flag |
| Y122 | Receive data read completion signal | M1004 | $E^2$PROM function setting pulse signal |
| Y123 | Forced receive completion request signal | D0 to D4 | Control data of GP.RIWT instruction |
| Y124 | Initialization request signal | D10 to D45 | Set values |
| Y126 | OS reception area clear request signal | D30 to D34 | Control data of GP.RIRD instruction |
| Y127 | $E^2$PROM function request signal | D400 to D402 | AJ65BT-R2N error code |
| Y139 | Initial data read request signal | D900 | Master module RY(n+1)E, RY(n+1)F |
| Y13A | Error reset request signal | SW80.1 | Other station data link status (Station No.2) |
| M0 | Operation start request flag | — | |

(b) Program example

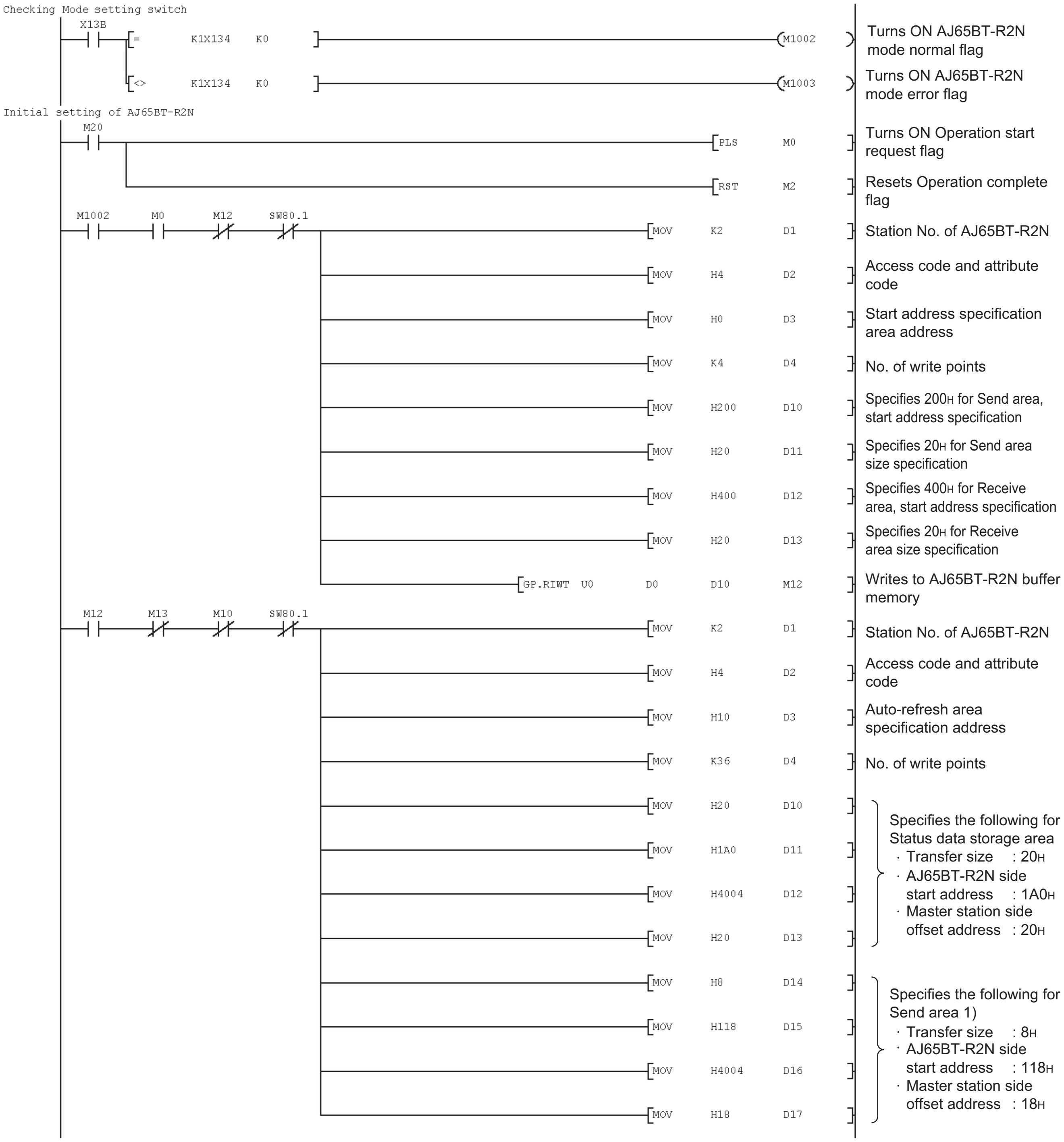


**Figure 6.44 Program example for changing auto-refresh buffer assignments**

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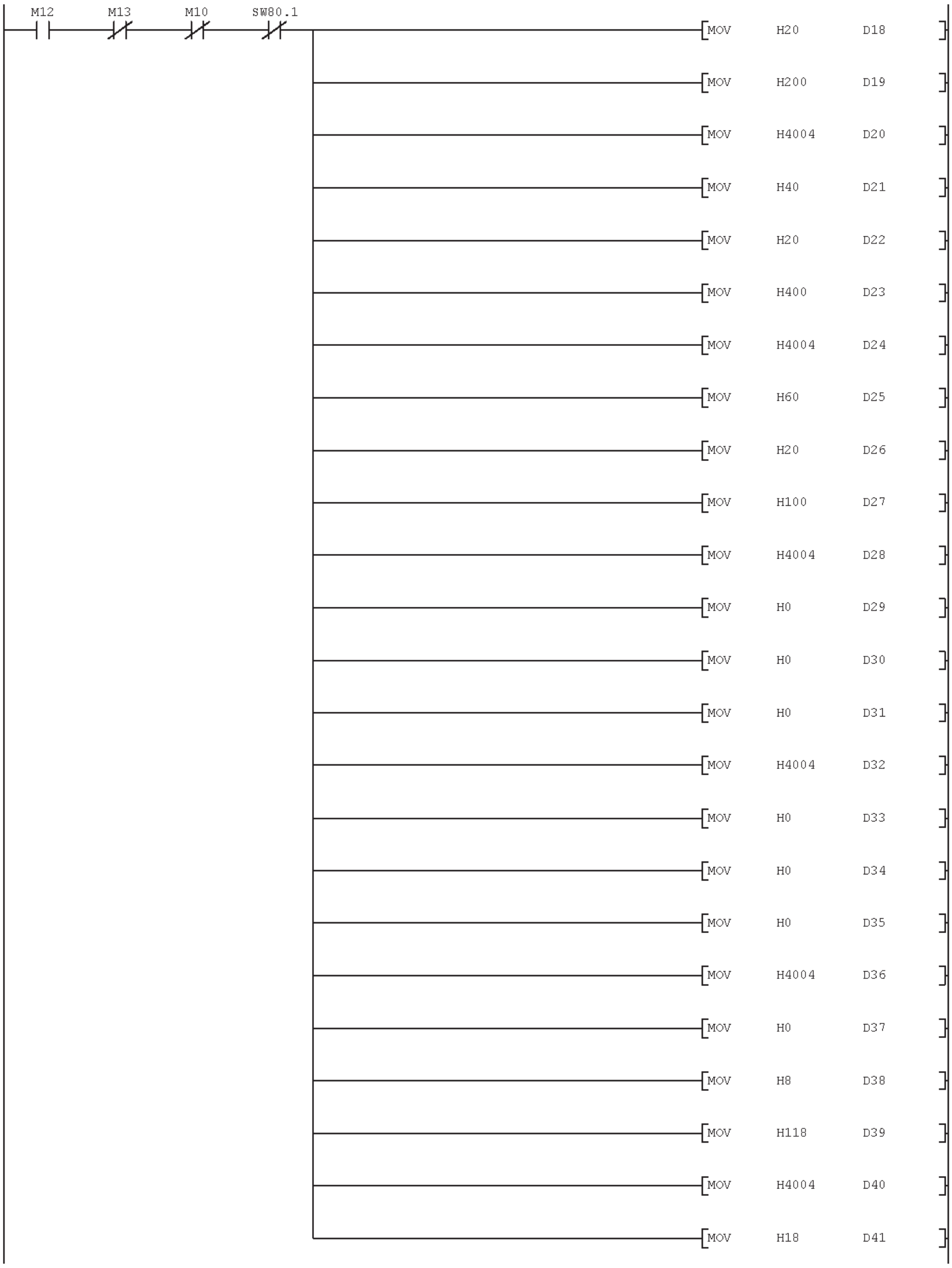

Specifies the following for Send area 2)
- Transfer size : 20H
- AJ65BT-R2N side start address : 200H
- Master station side offset address : 40H

Specifies the following for Receive area
- Transfer size : 20H
- AJ65BT-R2N side start address : 400H
- Master station side offset address : 60H

Specifies the following for Initial setting area
- Transfer size : 20H
- AJ65BT-R2N side start address : 100H
- Master station side offset address : 0H

Specifies the following for E$^2$PROM function area
- Transfer size : 0H
- AJ65BT-R2N side start address : 0H
- Master station side offset address : 0H

Specifies the following for User registration frame area
- Transfer size : 0H
- AJ65BT-R2N side start address : 0H
- Master station side offset address : 0H

Specifies the following for Monitoring-based transmission area 1)
- Transfer size : 8H
- AJ65BT-R2N side start address : 118H
- Master station side offset address : 18H

Figure 6.44 Program example for changing auto-refresh buffer assignments (Continued)

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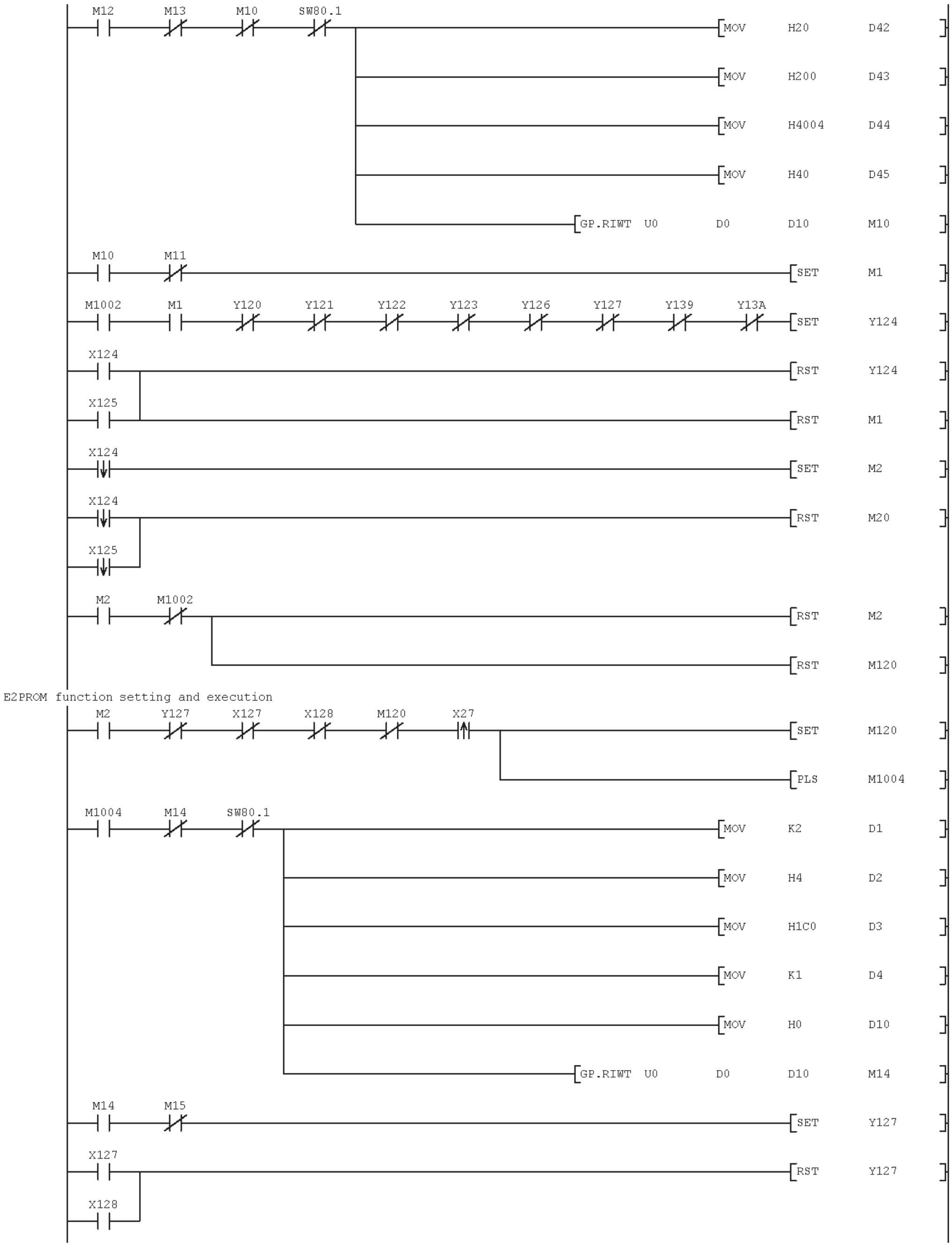

Specifies the following for Monitoring-based transmission area 2)
- Transfer size : 20H
- AJ65BT-R2N side start address : 200H
- Master station side offset address : 40H

Writes to AJ65BT-R2N buffer memory

Turns ON Initial setting write completion flag

Turns ON Initialization request signal

Resets Initialization request signal

Resets Initial setting write completion flag

Turns ON Operation complete flag

Resets AJ65BT-R2N initial setting start flag

Resets Operation complete flag

Resets Buffer memory access exclusion check flag

Turns ON Buffer memory access exclusion check flag

Turns ON E$^2$PROM function setting pulse signal

Station No. of AJ65BT-R2N

Access code and attribute code

E$^2$PROM function specification address

No. of write points

Sets 0 (registration of set buffer memory values) for E$^2$PROM function specification

Writes to AJ65BT-R2N buffer memory

Turns ON E$^2$PROM function request signal

Resets E$^2$PROM function request signal

Figure 6.44 Program example for changing auto-refresh buffer assignments (Continued)

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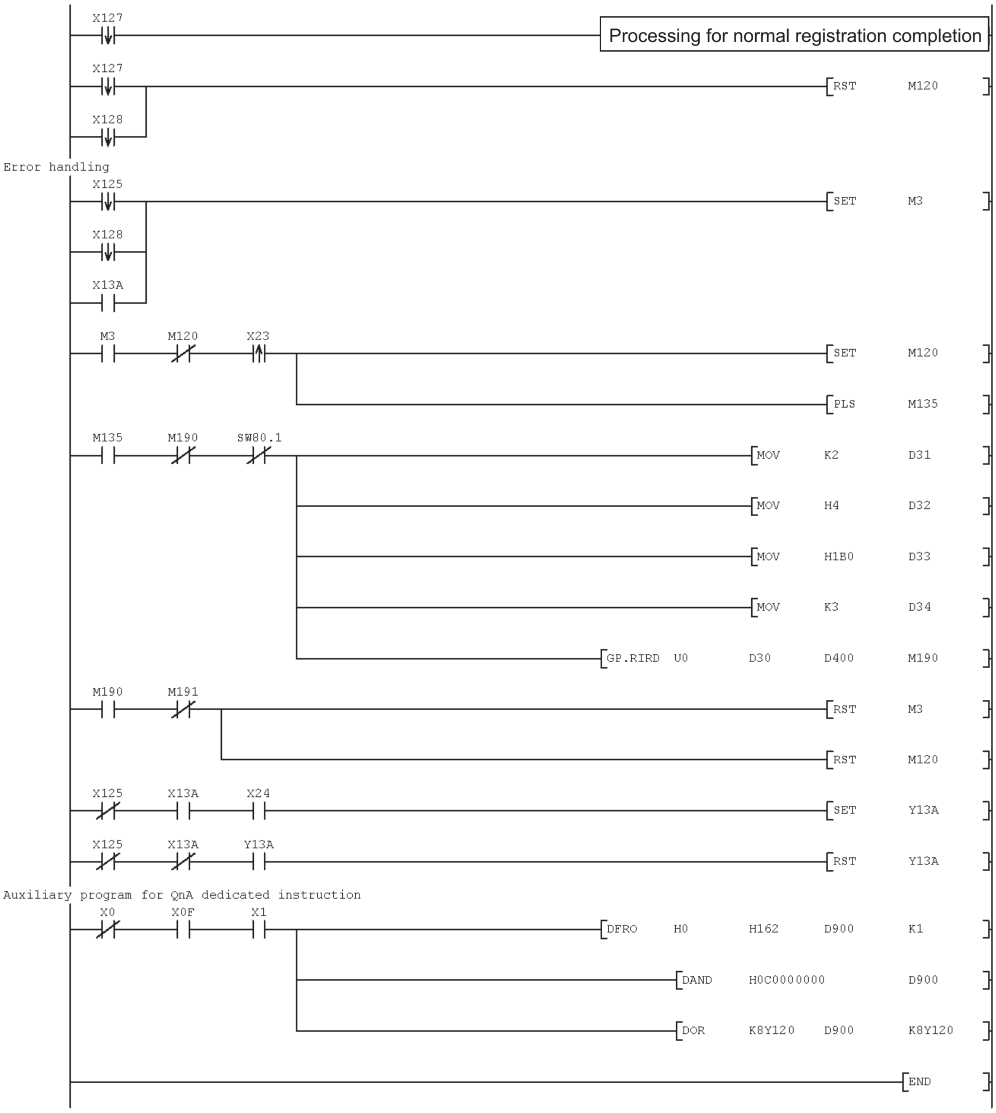

Resets Buffer memory access exclusion check flag

Turns ON Operation failed flag

Turns ON Buffer memory access exclusion check flag

Turns ON Error handling flag

Station No. of AJ65BT-R2N

Access code and attribute code

Address of General error codes

No. of read points

Reads from AJ65BT-R2N buffer memory

Resets Operation failed flag

Resets Buffer memory access exclusion check flag

Turns ON Error reset request signal

Resets Error reset request signal

Malfunction prevention when using QnACPU
Unnecessary when using QCPU

Figure 6.44 Program example for changing auto-refresh buffer assignments (Continued)

(3) For the buffer memory auto-refresh function

(a) Devices used in the program example

**Table 6.45 Devices used in the program example**

| Device | Description | Device | Description |
|---|---|---|---|
| X23 | Error code read flag | Y139 | Initial data read request signal |
| X24 | Error clear flag | Y13A | Error reset request signal |
| X27 | E$^2$PROM function setting flag | M0 | Operation start request flag |
| X124 | Initialization complete signal | M1 | Initial setting write completion flag |
| X125 | Initialization failed signal | M2 | Operation complete flag |
| X127 | E$^2$PROM function complete signal | M3 | Operation failed flag |
| X128 | E$^2$PROM function failed signal | M135 | Error handling flag |
| K1X134 | Mode setting switch status signal (X134 to X137) | M270 | E$^2$PROM function setting-in-process flag |
| X139 | Initial data read completion signal | M1000 | AJ65BT-R2N initial data read complete flag |
| X13A | Error status signal | M1001 | AJ65BT-R2N initial data reading flag |
| X13B | Remote station ready signal | M1002 | AJ65BT-R2N mode normal flag |
| Y120 | Send request signal | M1003 | AJ65BT-R2N mode error flag |
| Y121 | Send cancel request signal | M1004 | E$^2$PROM function setting pulse signal |
| Y122 | Receive data read completion signal | D10 to D45 | Set values |
| Y123 | Forced receive completion request signal | D400 to D402 | AJ65BT-R2N error code |
| Y124 | Initialization request signal | W4 to W6 | |
| Y126 | OS reception area clear request signal | SW80.1 | Other station data link status (Station No.2) |
| Y127 | E$^2$PROM function request signal | — | |

(b) Program example

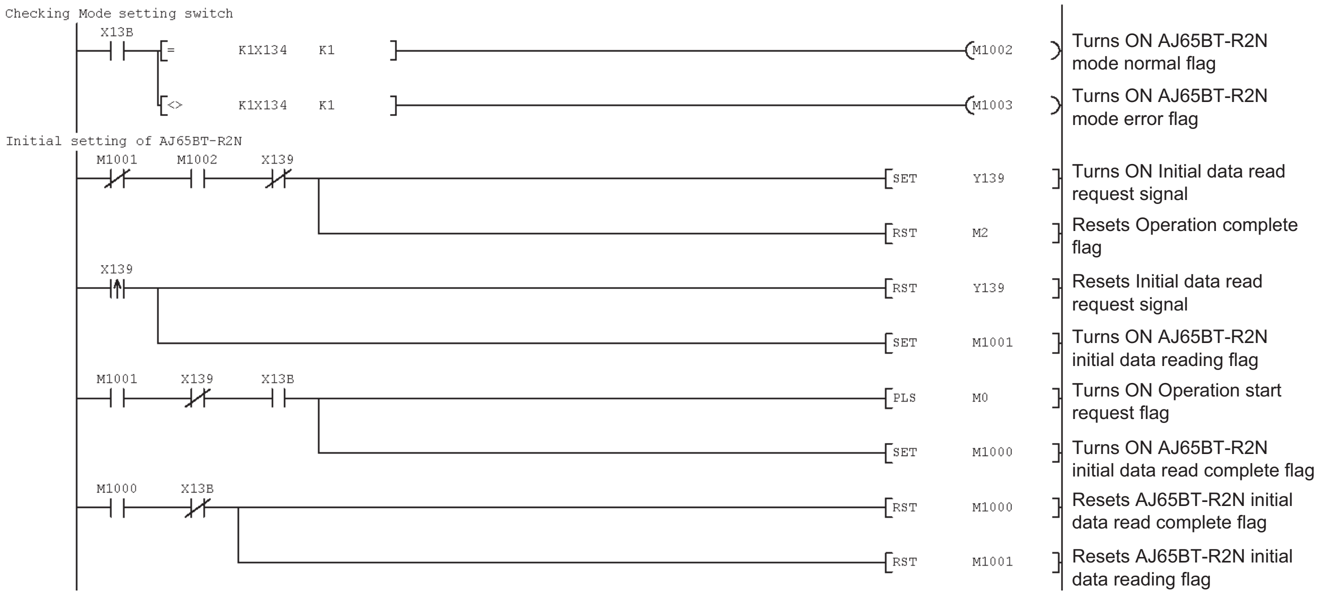

**Figure 6.45 Program example for changing auto-refresh buffer assignments**

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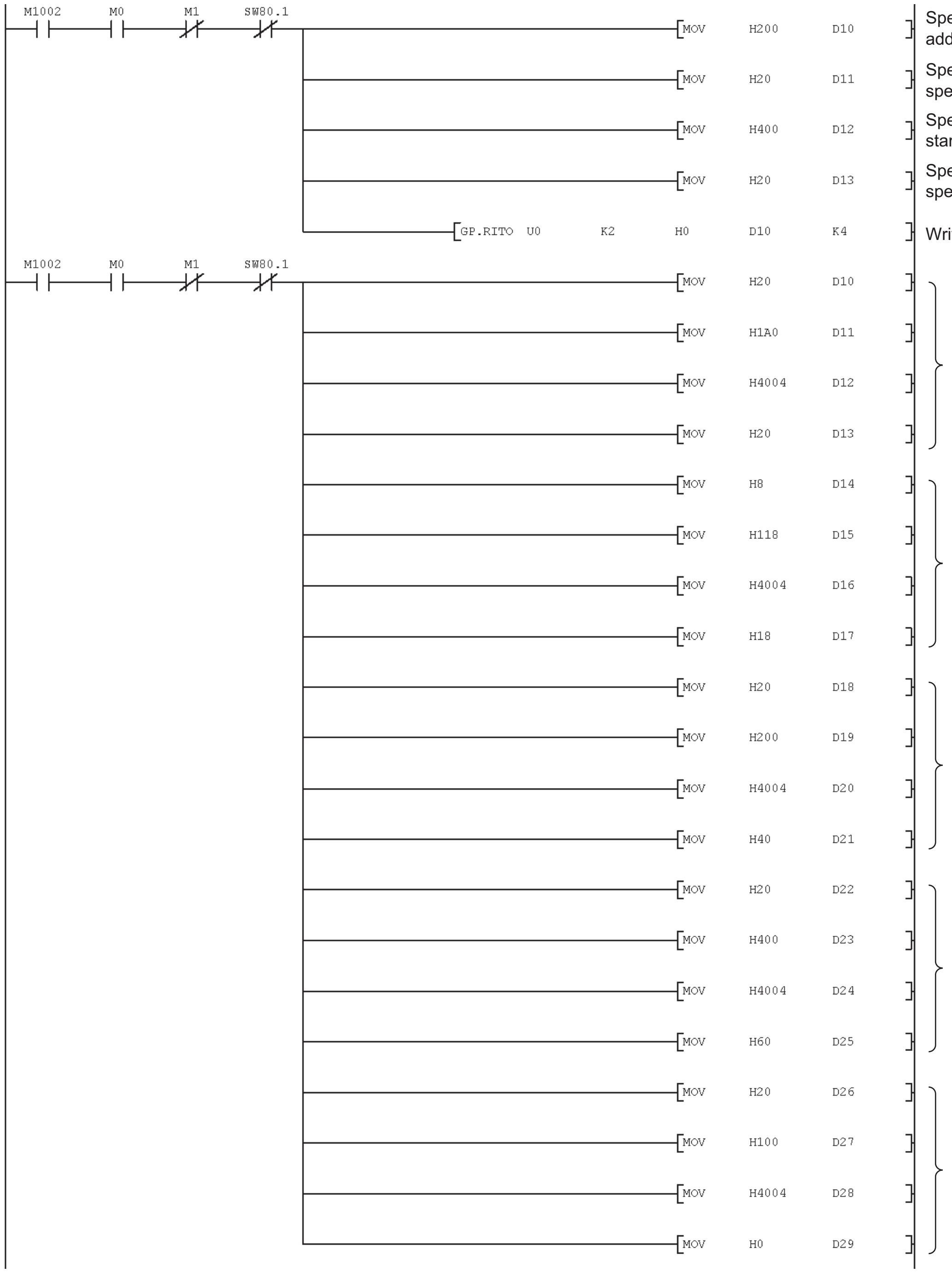

```
M1002  M0  M1  SW80.1
-| |---| |---|/|---|/|--+--[MOV H200 D10]
                        +--[MOV H20 D11]
                        +--[MOV H400 D12]
                        +--[MOV H20 D13]
                        +--[GP.RITO U0 K2 H0 D10 K4]
M1002  M0  M1  SW80.1
-| |---| |---|/|---|/|--+--[MOV H20 D10]
                        +--[MOV H1A0 D11]
                        +--[MOV H4004 D12]
                        +--[MOV H20 D13]
                        +--[MOV H8 D14]
                        +--[MOV H118 D15]
                        +--[MOV H4004 D16]
                        +--[MOV H18 D17]
                        +--[MOV H20 D18]
                        +--[MOV H200 D19]
                        +--[MOV H4004 D20]
                        +--[MOV H40 D21]
                        +--[MOV H20 D22]
                        +--[MOV H400 D23]
                        +--[MOV H4004 D24]
                        +--[MOV H60 D25]
                        +--[MOV H20 D26]
                        +--[MOV H100 D27]
                        +--[MOV H4004 D28]
                        +--[MOV H0 D29]
```

Specifies 200H for Send area, start address specification

Specifies 20H for Send area size specification

Specifies 400H for Receive area, start address specification

Specifies 20H for Receive area size specification

Writes to AJ65BT-R2N buffer memory

Specifies the following for Status data storage area
- Transfer size : 20H
- AJ65BT-R2N side start address : 1A0H
- Master station side offset address : 20H

Specifies the following for Send area 1)
- Transfer size : 8H
- AJ65BT-R2N side start address : 118H
- Master station side offset address : 18H

Specifies the following for Send area 2)
- Transfer size : 20H
- AJ65BT-R2N side start address : 200H
- Master station side offset address : 40H

Specifies the following for Receive area
- Transfer size : 20H
- AJ65BT-R2N side start address : 400H
- Master station side offset address : 60H

Specifies the following for Initial setting area
- Transfer size : 20H
- AJ65BT-R2N side start address : 100H
- Master station side offset address : 0H

Figure 6.45 Program example for changing auto-refresh buffer assignments (Continued)

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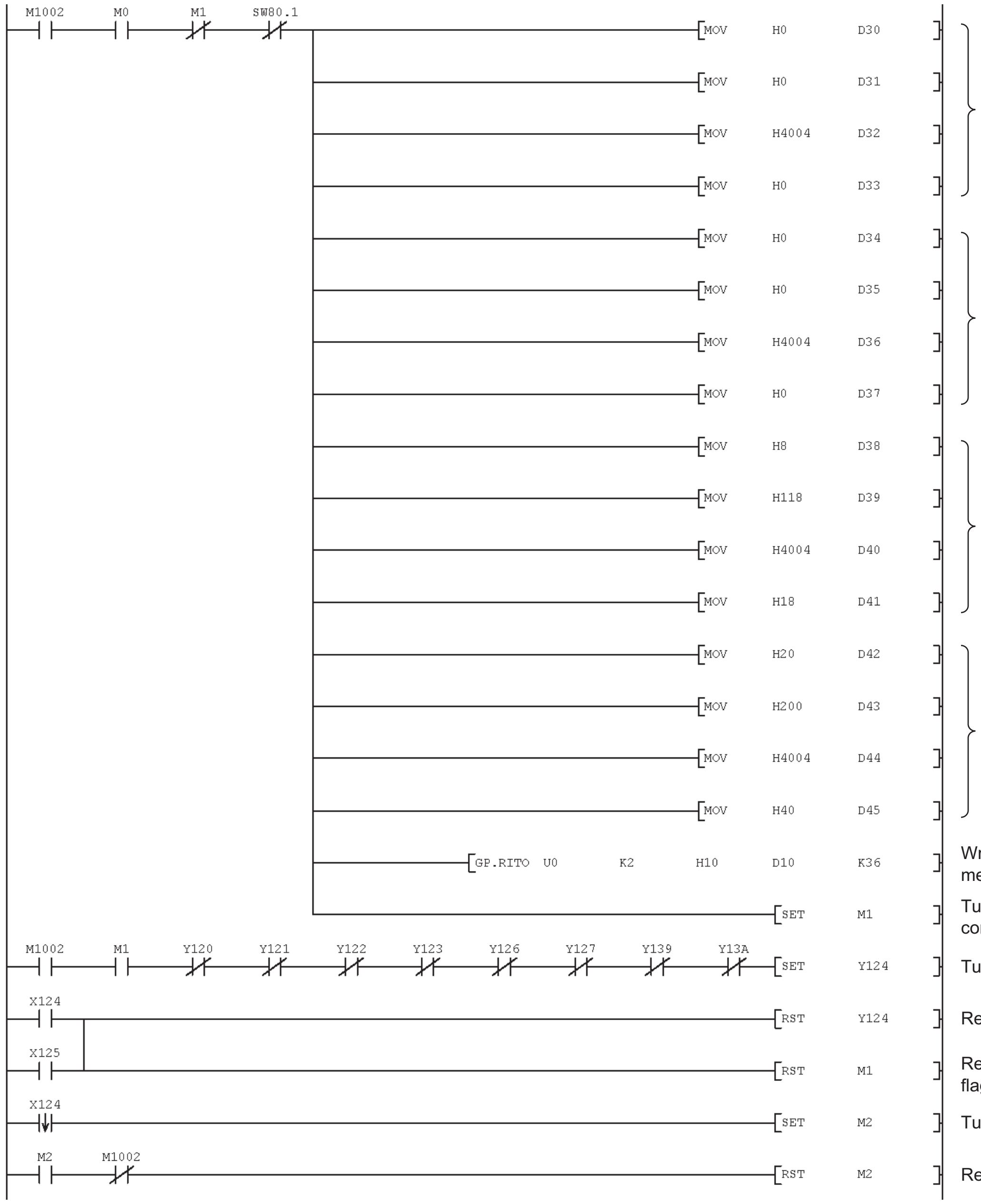

Specifies the following for E²PROM function area
· Transfer size: 0H
· AJ65BT-R2N side start address : 0H
· Master station side offset address : 0H

Specifies the following for User registration frame area
· Transfer size: 0H
· AJ65BT-R2N side start address : 0H
· Master station side offset address : 0H

Specifies the following for Monitoring-based transmission area 1)
· Transfer size: 8H
· AJ65BT-R2N side start address : 118H
· Master station side offset address : 18H

Specifies the following for Monitoring-based transmission area 2)
· Transfer size: 20H
· AJ65BT-R2N side start address : 200H
· Master station side offset address : 40H

Writes to AJ65BT-R2N buffer memory

Turns ON Initial setting write completion flag

Turns ON Initialization request signal

Resets Initialization request signal

Resets Initial setting write completion flag

Turns ON Operation complete flag

Resets Operation complete flag

Figure 6.45 Program example for changing auto-refresh buffer assignments (Continued)

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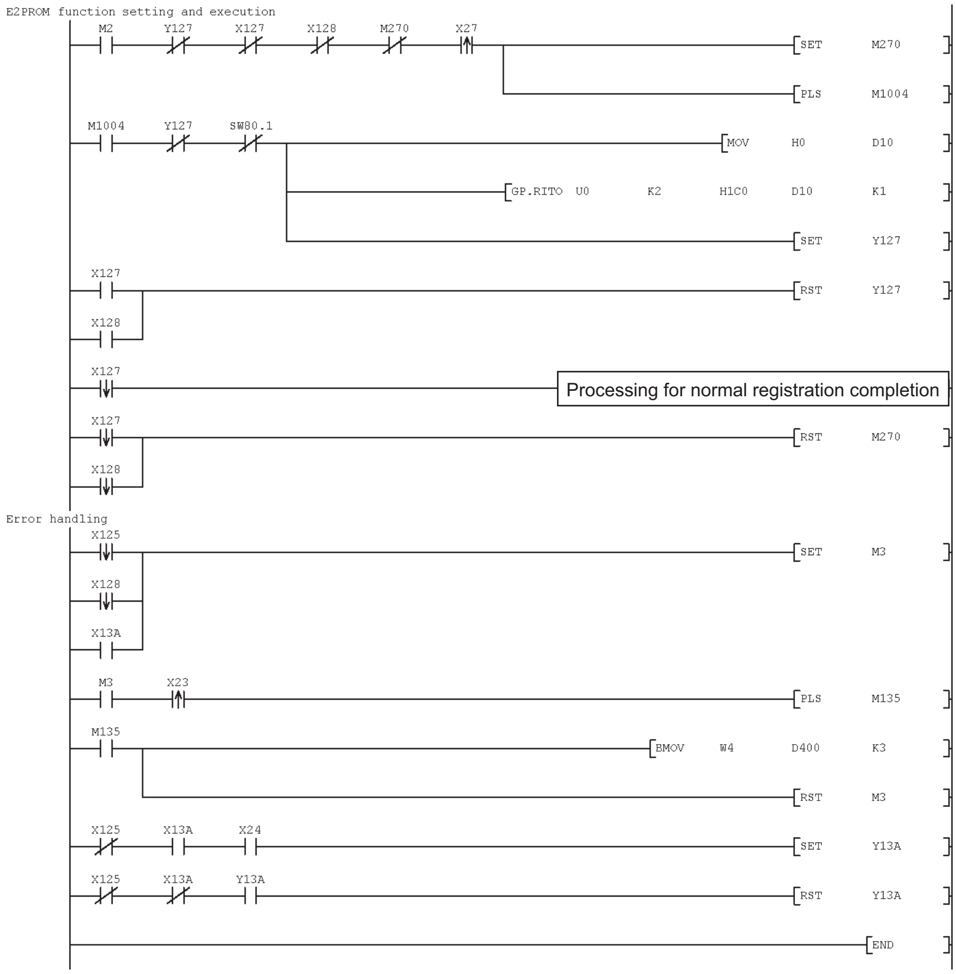


Turns ON E$^2$PROM function setting-in -process flag

Turns ON E$^2$PROM function setting pulse signal

Sets 0 (registration of set buffer memory values) for E$^2$PROM function specification

Writes to AJ65BT-R2N buffer memory

Turns ON E$^2$PROM function request signal

Resets E$^2$PROM function request signal

Resets E$^2$PROM function setting-in -process flag

Turns ON Operation failed flag

Turns ON Error handling flag

Reads error code

Resets Error handling flag

Turns ON Error reset request signal

Resets Error reset request signal

Figure 6.45 Program example for changing auto-refresh buffer assignments (Continued)

## 6.9.2 Program example for sending/receiving data with GP.RISEND/ GP.RIRCV instruction

The GP.RISEND and GP.RIRCV instructions are dedicated instructions for sending/ receiving data using the send/receive buffer communication function.
For this reason, this program example can only be used when using the send/receive buffer communication function.

### (1) Overview of program example

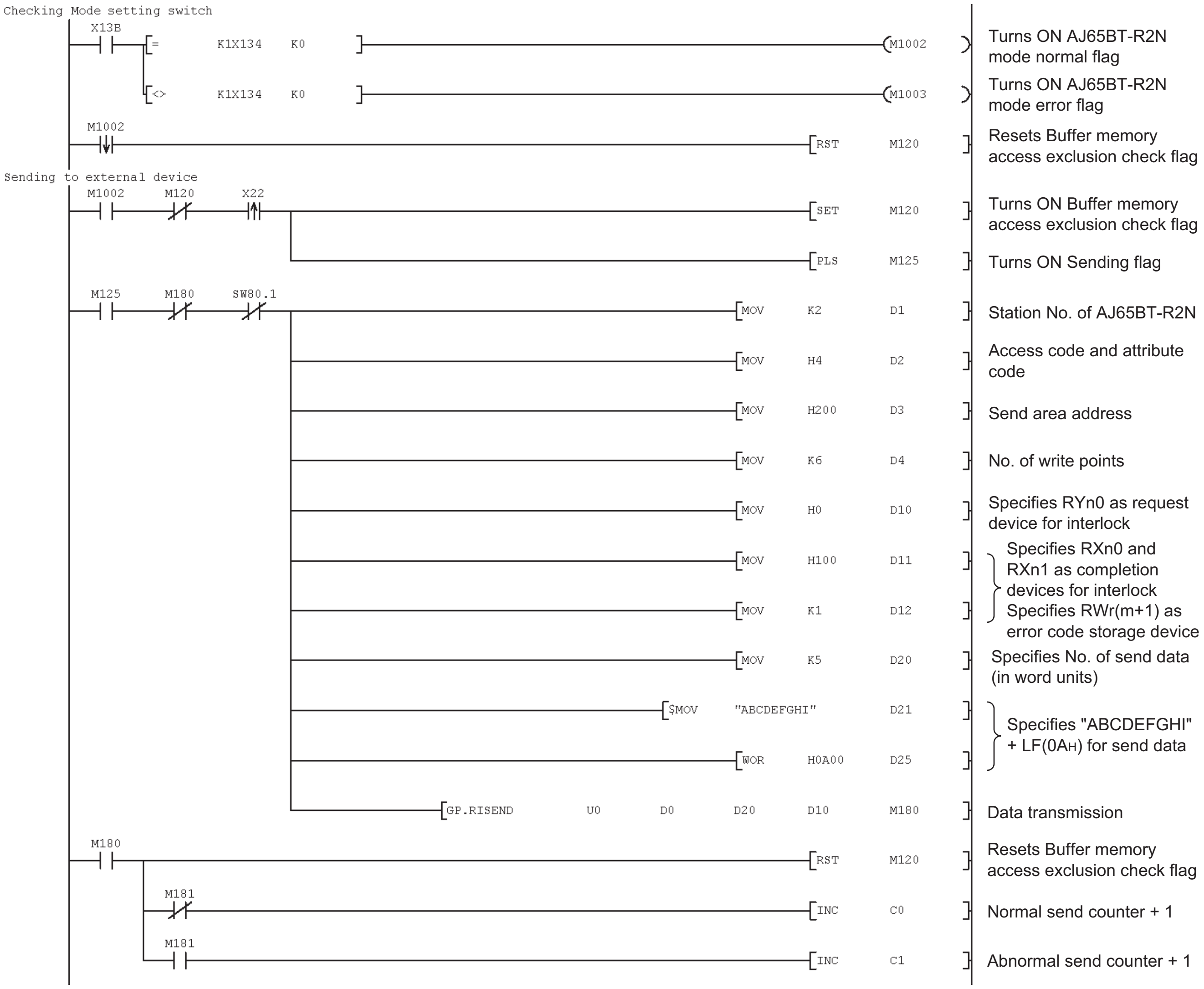
- When Operation send execute flag (X22) is turned ON, a character string "ABCDEFGHI"+LF (0AH) is sent with the GP.RISEND instruction.
- When the AJ65BT-R2N receives data from the external device, six words of the received data are read out to the word device (D50) with the GP.RIRCV instruction.

### (2) Devices used in the program example

Table 6.46 Devices used in the program example

| Device | Description | Device | Description |
|---|---|---|---|
| X0 | Module error (Master station) | M160 | Device that is turned ON for one scan after completion of GP.RIRCV |
| X0F | Module ready (Master station) | M161 | Device that is turned ON for one scan after failure of writing by GP.RIRCV |
| X1 | Own station data link status (Master station) | M180 | Device that is turned ON for one scan after completion of GP.RISEND |
| X22 | Send execute flag | M181 | Device that is turned ON for one scan after failure of writing by GP.RISEND |
| X23 | Error code read flag | M190 | Device that is turned ON for one scan after completion of GP.RIRD |
| X24 | Error clear flag | M191 | Device that is turned ON for one scan after failure of reading by GP.RIRD |
| X121 | Send failed signal | M1002 | AJ65BT-R2N mode normal flag |
| X122 | Normal receive data read request signal | M1003 | AJ65BT-R2N mode error flag |
| X123 | Error receive data read request signal | C0 | Normal send counter |
| X125 | Initialization failed signal | C1 | Abnormal send counter |
| X128 | $E^2$PROM function failed signal | C2 | Normal receive counter |
| K1X134 | Mode setting switch status signal (X134 to X137) | C3 | Abnormal receive counter |
| X13A | Error status signal | D0 to D4 | Control data of GP.RISEND instruction |
| X13B | Remote station ready signal | D10 to D12 | Interlock signal storage device for GP.RISEND |
| K8Y120 | Remote output (Y120 to Y13F) | D20 to D25 | No. of send data, send data |
| Y13A | Error reset request signal | D30 to D34 | Control data of GP.RIRCV or GP.RIRD instruction |
| M3 | Operation failed flag | D40 to D42 | Interlock signal storage device for GP.RISEND |
| M120 | Buffer memory access exclusion check flag | D50 to D55 | No. of receive data, receive data |
| M125 | Sending flag | D400 to D402 | AJ65BT-R2N error code |
| M130 | Receiving flag | D900 | Master module RY(n+1)E, RY(n+1)F |
| M135 | Error handling flag | SW80.1 | Other station data link status (Station No.2) |

(3) Program example



Turns ON AJ65BT-R2N mode normal flag

Turns ON AJ65BT-R2N mode error flag

Resets Buffer memory access exclusion check flag

Turns ON Buffer memory access exclusion check flag

Turns ON Sending flag

Station No. of AJ65BT-R2N

Access code and attribute code

Send area address

No. of write points

Specifies RYn0 as request device for interlock

Specifies RXn0 and RXn1 as completion devices for interlock

Specifies RWr(m+1) as error code storage device

Specifies No. of send data (in word units)

Specifies "ABCDEFGHI" + LF(0AH) for send data

Data transmission

Resets Buffer memory access exclusion check flag

Normal send counter + 1

Abnormal send counter + 1

**Figure 6.46 Program example for sending/receiving data with GP.RISEND/GP.RIRCV instruction**

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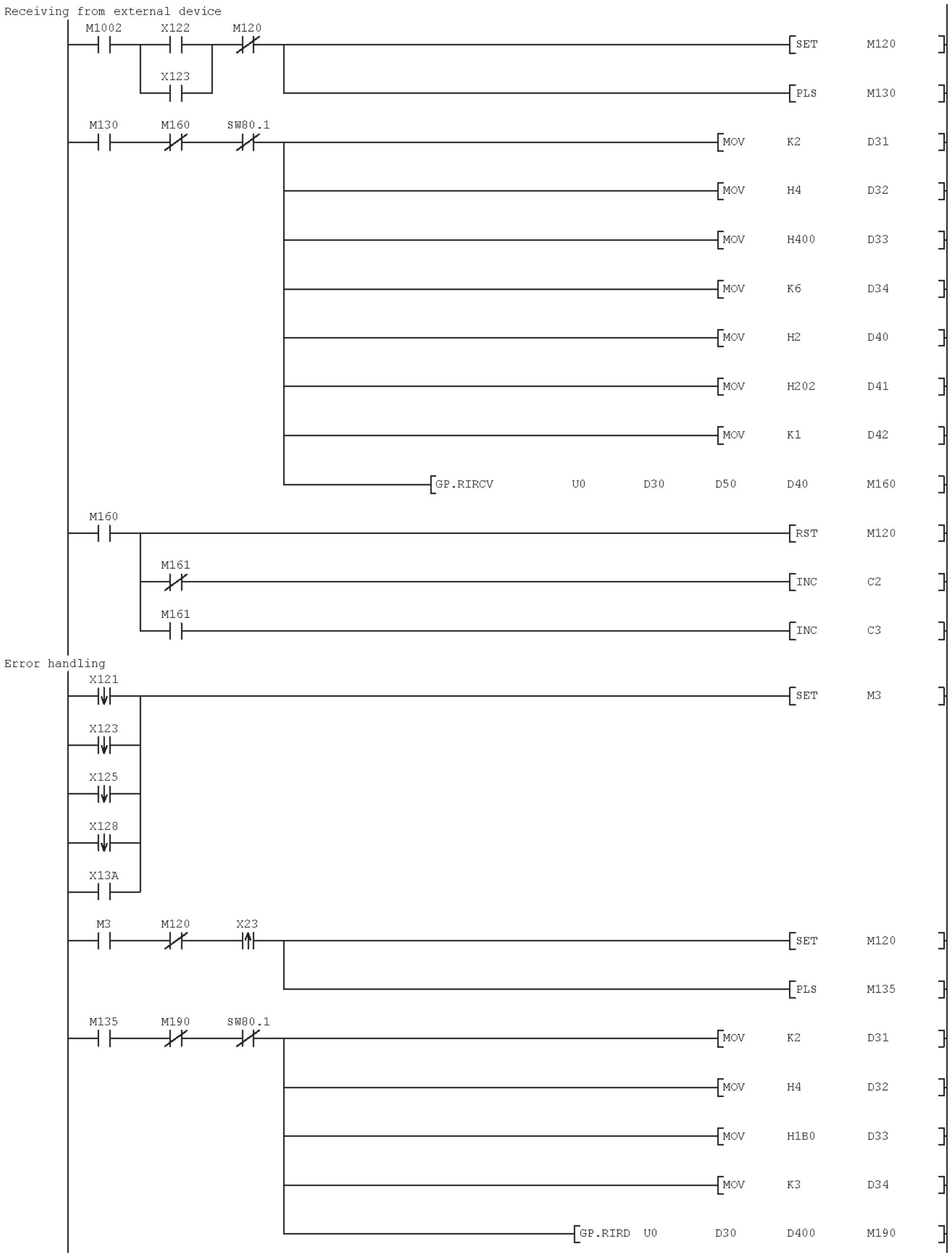

Turns ON Buffer memory access exclusion check flag

Turns ON Receiving flag

Station No. of AJ65BT-R2N

Access code and attribute code

Receive area address

No. of read points

Specifies RYn2 as request device for interlock

Specifies RXn2 and RXn3 as completion devices for interlock

Specifies RWr (m+2) as error code storage device

Data reception

Turns ON Buffer memory access exclusion check flag

Normal receive counter + 1

Abnormal receive counter + 1

Turns ON Error handling flag

Turns ON Buffer memory access exclusion check flag

Turns ON Error handling flag

Station No. of AJ65BT-R2N

Access code and attribute code

Address of General error codes

No. of read points

Reads from AJ65BT-R2N buffer memory

Figure 6.46 Program example for sending/receiving data with GP.RISEND/GP.RIRCV instruction (Continued)

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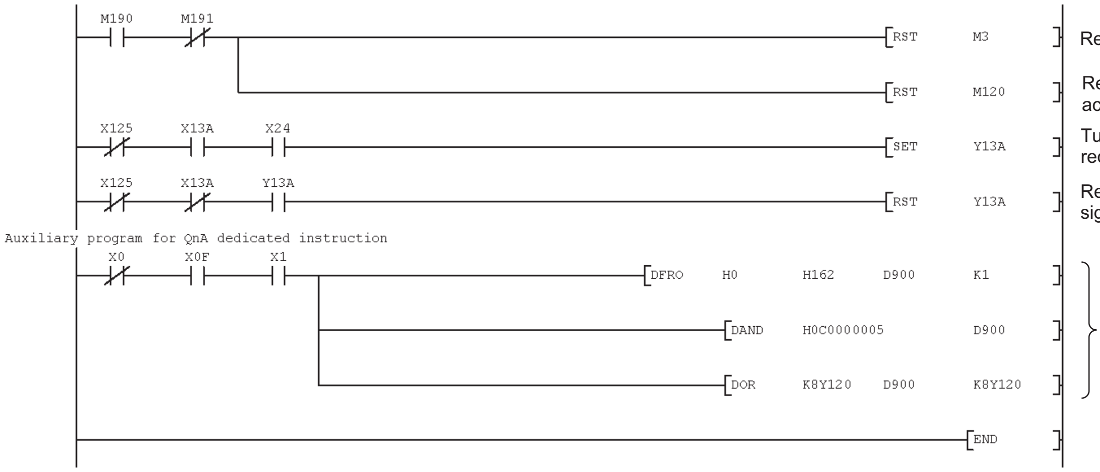

Resets Error handling flag

Resets Buffer memory access exclusion check flag

Turns ON Error reset request signal

Resets Error reset request signal

Malfunction prevention when using QnACPU
Unnecessary when using QCPU

Figure 6.46 Program example for sending/receiving data with GP.RISEND/GP.RIRCV instruction (Continued)

## ☒Point

When sending/receiving data of 481 words or more to/from the external device using a GP.RISEND or GP.RIRCV instruction, divide the data into parts, each of which contains 480 words or less, to write and read to the AJ65BT-R2N.
With GP.RISEND and GP.RIRCV instructions, data of 481 words or more cannot be written or read out to the AJ65BT-R2N at one time.

## 6.9.3 Program example for receiving data when a receive timeout occurs

### (1) Overview of program example

- The receive timeout time is set to 200ms.
- If a receive timeout error (BB21H) occurs, data received up to that point are read out from the AJ65BT-R2N buffer memory to word devices of the master station.
- After reading is completed, the error is cleared.

### (2) For the send/receive buffer communication function

(a) Devices used in the program example

**Table 6.47 Devices used in the program example**

| Device | Description | Device | Description |
|---|---|---|---|
| X0 | Module error (Master station) | M10 | Device that is turned ON for one scan after completion of GP.RIWT |
| X1 | Own station data link status (Master station) | M11 | Device that is turned ON for one scan after failure of writing by GP.RIWT |
| X0F | Module ready (Master station) | M20 | AJ65BT-R2N initial setting start flag |
| X23 | Error code read flag | M22 | Error clear request |
| X24 | Error clear flag | M120 | Buffer memory access exclusion check flag |
| X122 | Normal receive data read request signal | M130 | Receiving flag |
| X123 | Error receive data read request signal | M135 | Error handling flag |
| X124 | Initialization complete signal | M155 | Device that is turned ON for one scan after completion of GP.RIRD |
| X125 | Initialization failed signal | M156 | Device that is turned ON for one scan after failure of reading by GP.RIRD |
| K1X134 | Mode setting switch status signal | M160 | Device that is turned ON for one scan after completion of GP.RIRD |
| X13A | Error status signal | M161 | Device that is turned ON for one scan after failure of reading by GP.RIRD |
| X13B | Remote station ready signal | M165 | Device that is turned ON for one scan after completion of GP.RIRD |
| K8Y120 | Remote output (Y120 to Y13F) | M166 | Device that is turned ON for one scan after failure of reading by GP.RIRD |
| Y120 | Send request signal | M190 | Device that is turned ON for one scan after completion of GP.RIRD |
| Y121 | Send cancel request signal | M191 | Device that is turned ON for one scan after failure of reading by GP.RIRD |
| Y122 | Receive data read completion signal | M1002 | AJ65BT-R2N mode normal flag |
| Y123 | Forced receive completion request signal | M1003 | AJ65BT-R2N mode error flag |
| Y124 | Initialization request signal | D0 to D4 | Control data of GP.RIWT instruction |
| Y126 | OS reception area clear request signal | D10 | Receive timeout time set value |
| Y127 | $E^2$PROM function request signal | D30 to D34 | Control data of GP.RIRD instruction |
| Y139 | Initial data read request signal | D35 to D39 | |
| Y13A | Error reset request signal | D200 | No. of receive data |
| M0 | Operation start request flag | From D201 | Receive data |
| M1 | Initial setting write completion flag | D400 | Error code |
| M2 | Operation complete flag | D900 | Master module RY(n+1)E, RY(n+1)F |
| M3 | Operation failed flag | SW80.1 | Other station data link status (Station No.2) |

(b) Program example

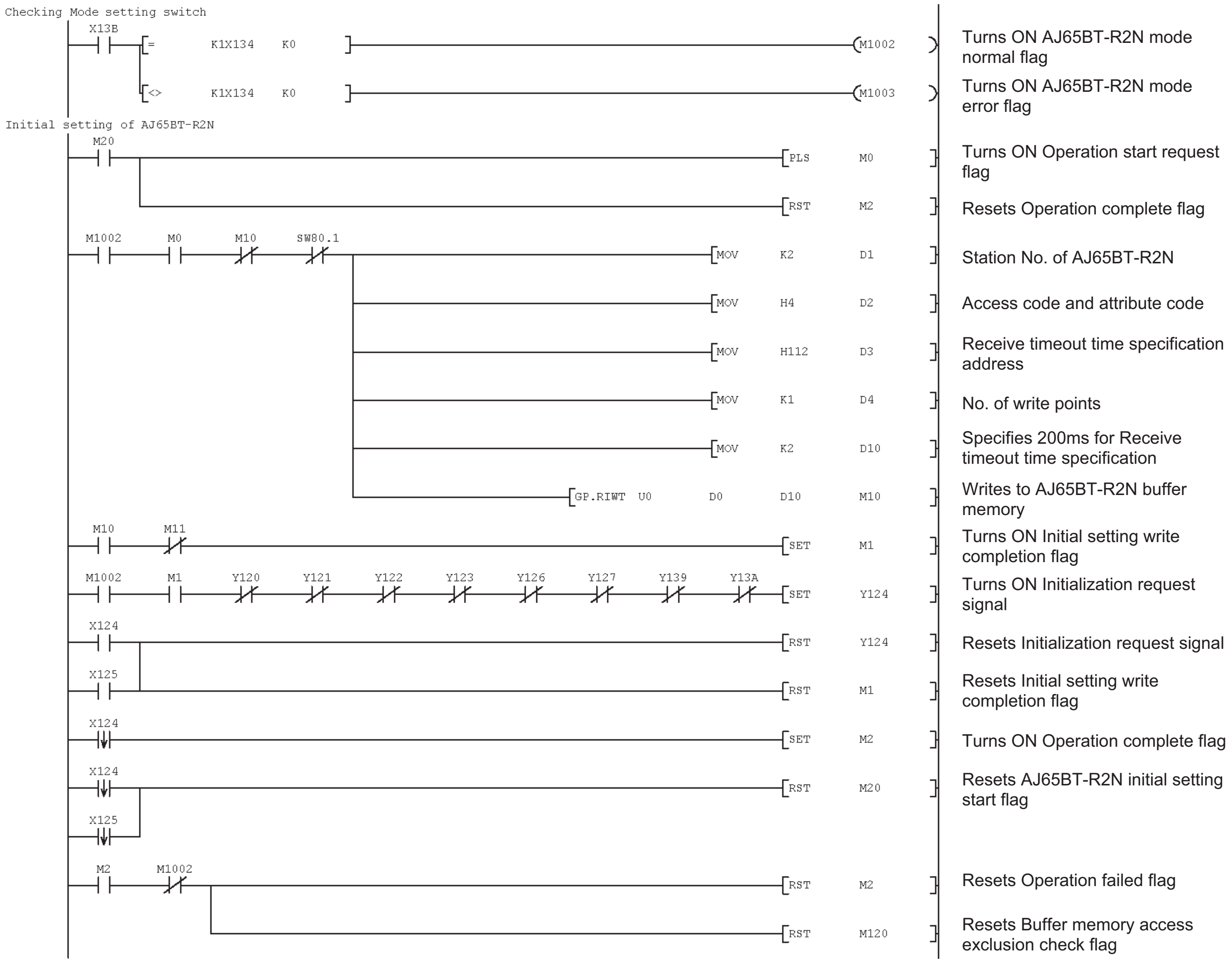

**Figure 6.47 Program example for receiving data when a receive timeout occurs**

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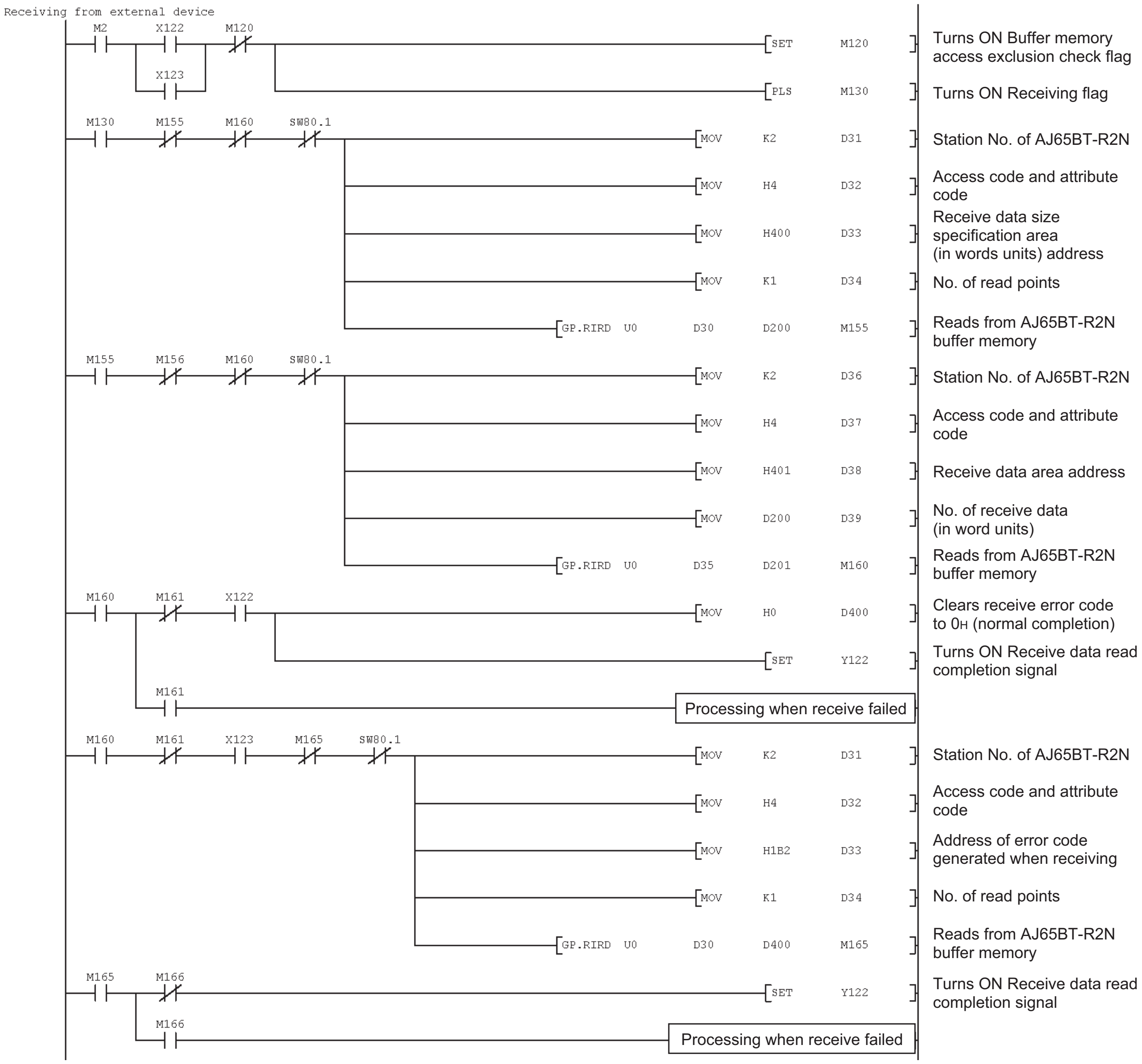

Figure 6.47 Program example for receiving data when a receive timeout occurs (Continued)

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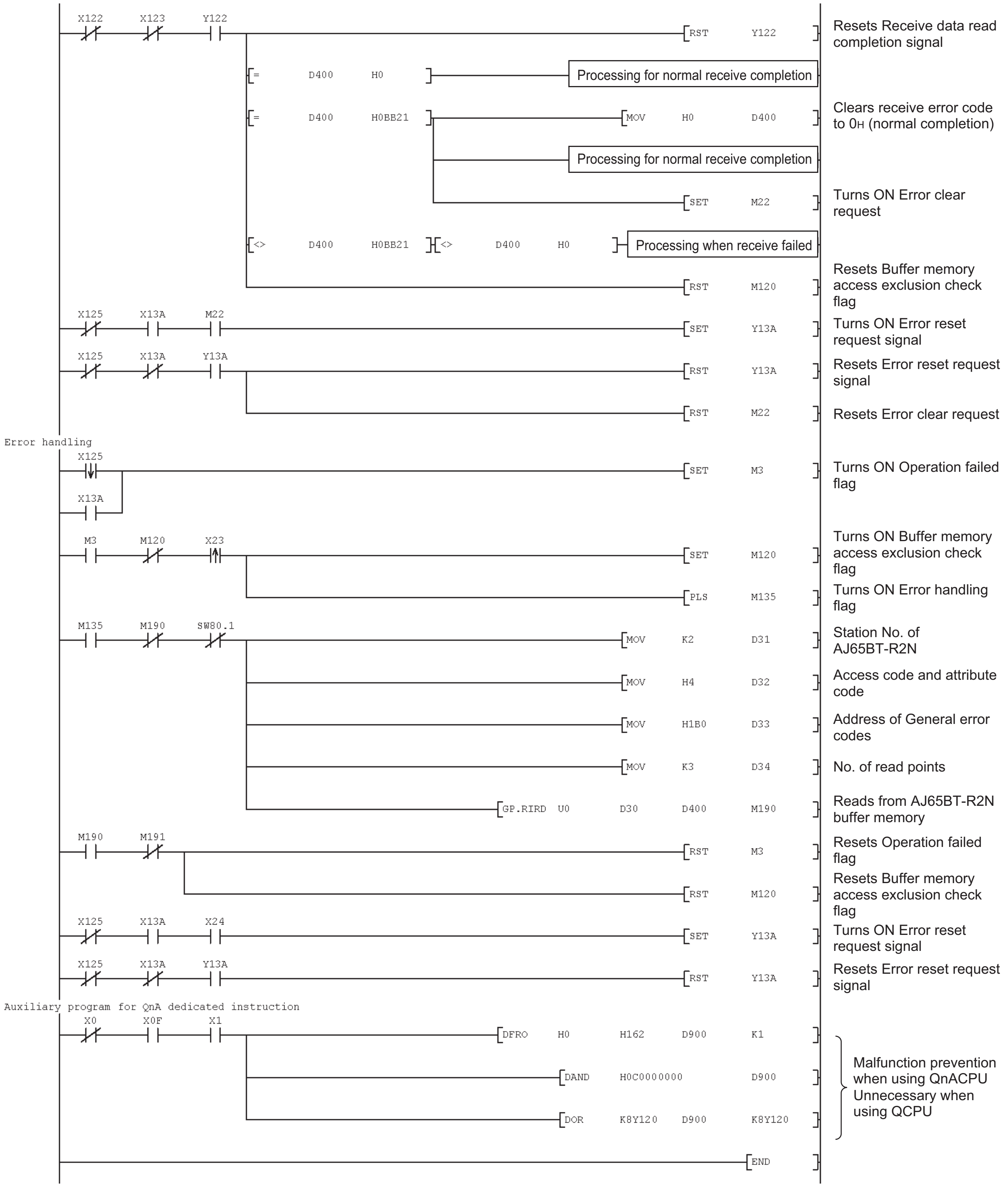


Figure 6.47 Program example for receiving data when a receive timeout occurs (Continued)

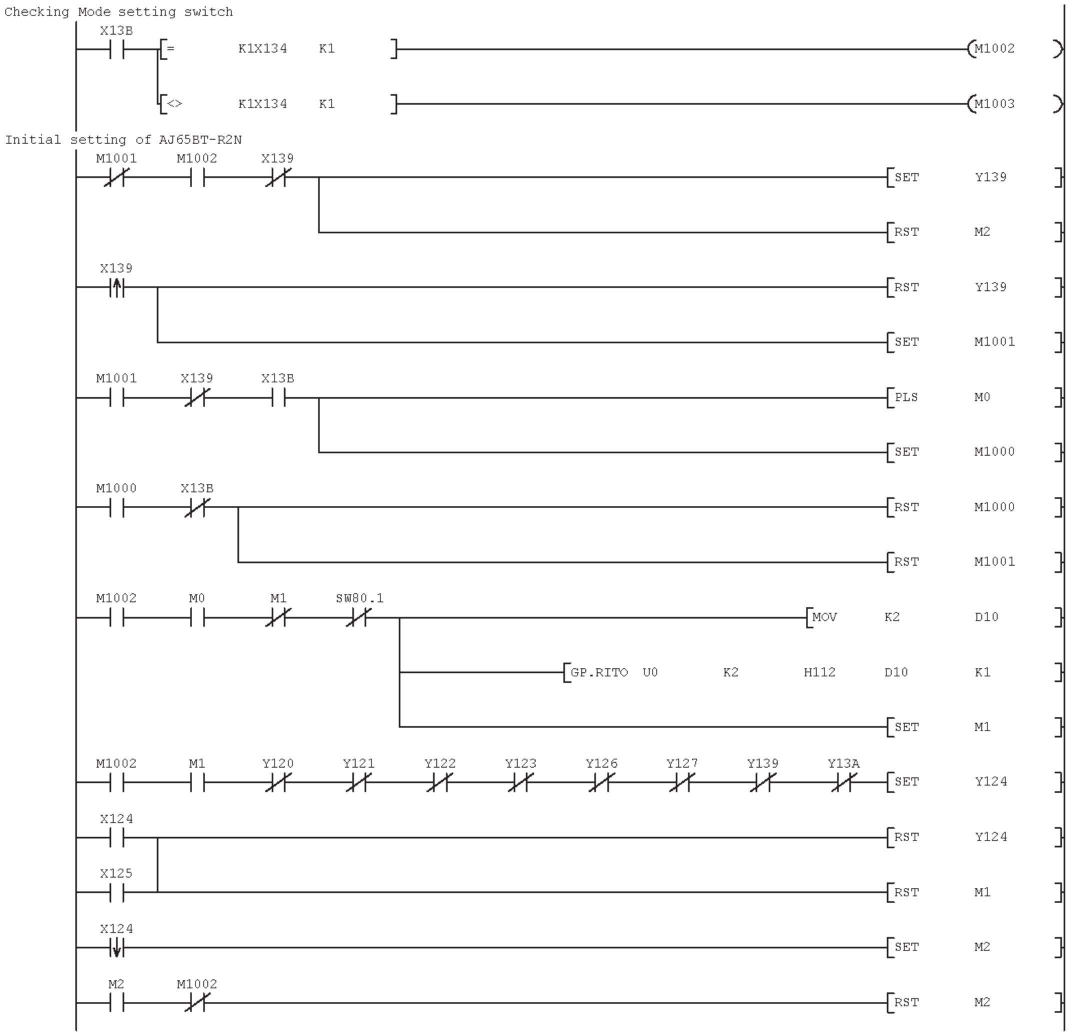
### (3) For the buffer memory auto-refresh function

#### (a) Devices used in the program example

**Table 6.48 Devices used in the program example**

| Device | Description | Device | Description |
|---|---|---|---|
| X23 | Error code read flag | Y139 | Initial data read request signal |
| X24 | Error clear flag | Y13A | Error reset request signal |
| X122 | Normal receive data read request signal | M0 | Operation start request flag |
| X123 | Error receive data read request signal | M1 | Initial setting write completion flag |
| X124 | Initialization complete signal | M2 | Operation complete flag |
| X125 | Initialization failed signal | M3 | Operation failed flag |
| K1X134 | Mode setting switch status signal (X134 to X137) | M22 | Error clear request |
| X139 | Initial data read completion signal | M135 | Error handling flag |
| X13A | Error status signal | M1000 | AJ65BT-R2N initial data read complete flag |
| X13B | Remote station ready signal | M1001 | AJ65BT-R2N initial data reading flag |
| Y120 | Send request signal | M1002 | AJ65BT-R2N mode normal flag |
| Y121 | Send cancel request signal | M1003 | AJ65BT-R2N mode error flag |
| Y122 | Receive data read completion signal | D10 | Receive timeout time set value |
| Y123 | Forced receive completion request signal | D200 | No. of receive data |
| Y124 | Initialization request signal | From D201 | Receive data |
| Y126 | OS reception area clear request signal | D400 | Error code |
| Y127 | $E^2$PROM function request signal | SW80.1 | Other station data link status (Station No.2) |

(b) Program example



Turns ON AJ65BT-R2N mode normal flag

Turns ON AJ65BT-R2N mode error flag

Turns ON Initial data read request signal

Resets Operation complete flag

Resets Initial data read request signal

Turns ON AJ65BT-R2N initial data reading flag

Turns ON Operation start request flag

Turns ON AJ65BT-R2N initial data read complete flag

Resets AJ65BT-R2N initial data read complete flag

Resets AJ65BT-R2N initial data reading flag

Specifies 200ms for Receive timeout time specification

Writes to AJ65BT-R2N buffer memory

Turns ON Initial setting write completion flag

Turns ON Initialization request signal

Resets Initialization request signal

Resets Initial setting write completion flag

Turns ON Operation complete flag

Resets Operation complete flag

**Figure 6.48 Program example for receiving data when a receive timeout occurs**

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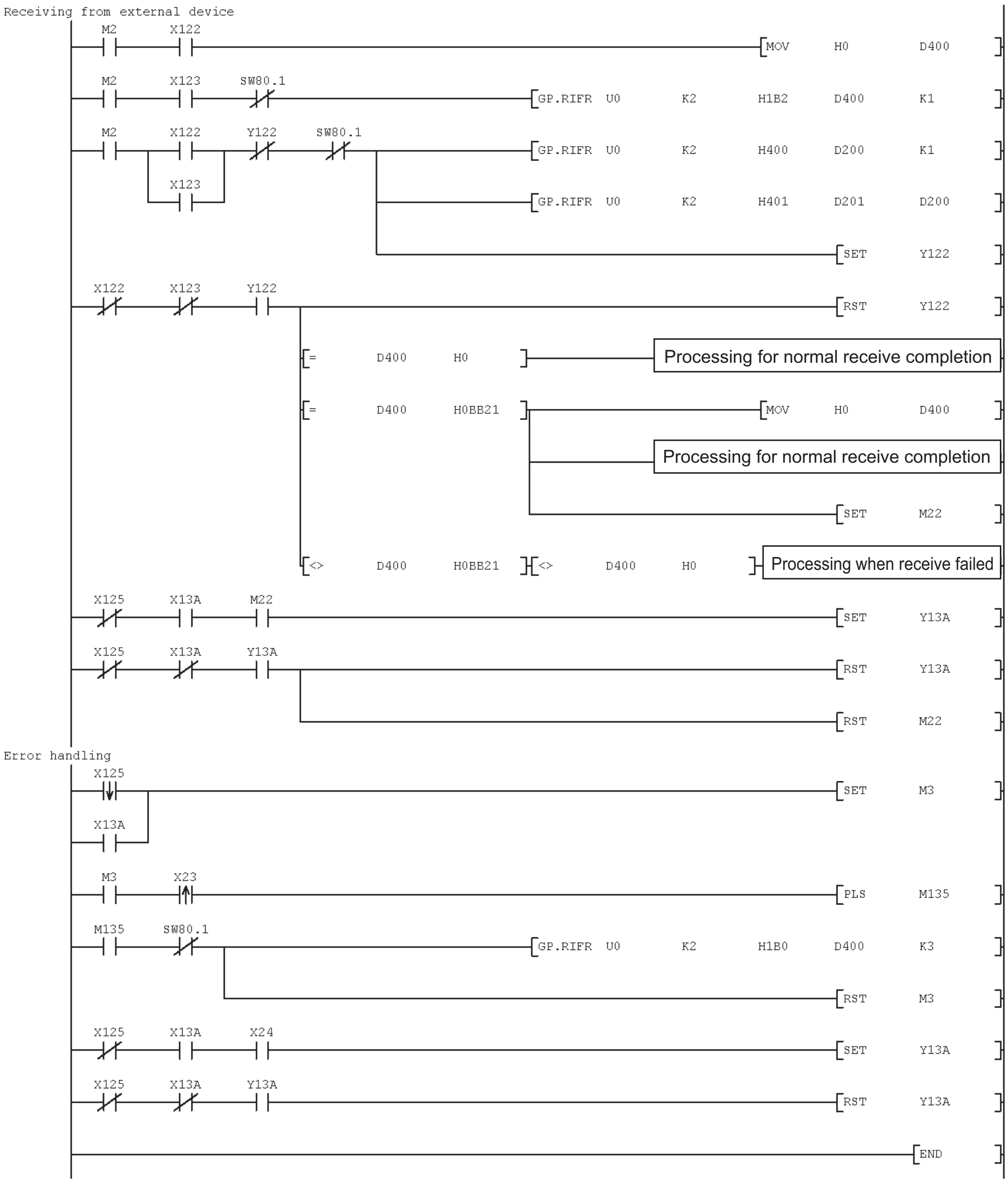

Clears receive error code to 0H (normal completion)

Reads error code generated when receiving

Reads No. of receive data (in word units) and receive data from AJ65BT-R2N receive area

Turns ON Receive data read completion signal

Resets Receive data read completion signal

Clears receive error code to 0H (normal completion)

Turns ON Error clear request

Turns ON Error reset request signal

Resets Error reset request signal

Resets Error clear request

Turns ON Operation failed flag

Turns ON Error handling flag

Reads General error codes

Resets Operation failed flag

Turns ON Error reset request signal

Resets Error reset request signal

Figure 6.48 Program example for receiving data when a receive timeout occurs (Continued)

# CHAPTER 7 PROGRAMMING WHEN USING DEDICATED INSTRUCTIONS IN ACPU/QCPU (A MODE)

(1) How to read this chapter

The configuration of this chapter is as follows.
For details of dedicated instructions, refer to the Type AnSHCPU/AnACPU/AnUCPU/QCPU-A (A Mode) Programming Manual (Dedicated Instructions).

(a) System configuration

This explains the system where the programs described in this chapter are executed.

☞ CHAPTER 7 (2) System configuration for program

(b) Setting of each station

This explains the setting of the master station, remote I/O station and AJ65BT-R2N.

☞ Section 7.1 Setting of each station

(c) Executable programs

Various programs are shown, which can be operated when the settings and system configuration are the same as those given in this chapter.

- Send/Receive program

  ☞ Section 7.2 Entire Send/Receive Program Structure
- Program for changing the auto-refresh buffer assignments and registering the assignment settings to $E^2$PROM

  ☞ Section 7.9.1 Program example for changing auto-refresh buffer assignments
- Program for sending or receiving data with RISEND and RIRCV instructions

  ☞ Section 7.9.2 Program example for sending/receiving data with RISEND/RIRCV instruction
- Program for receiving data when a receive timeout occurs

  ☞ Section 7.9.3 Program example for receiving data when a receive timeout occurs

(d) Each program processing

Each processing in a program is explained.

☞ Section 7.3 Initial Setting for AJ65BT-R2N to Section 7.6 Error Handling of AJ65BT-R2N

(e) Programs used according to function

Programs used according to function are described.

Table 7.1 Programs added according to function

| Function | Reference section |
|---|---|
| Initial setting for the frame function | Section 7.7 |
| Initial setting for the monitoring-based transmission function | |
| Initial setting for the flow control function | |
| Initial setting for the ASCII-binary conversion function | |
| Initial setting for the RW refresh function | |
| Send cancel function | Section 7.8 |
| Forced receive completion function | |
| OS reception area clear function | |
| E$^2$PROM function setting | |

(2) System configuration for program

The following shows the system configuration for the program described in this chapter.

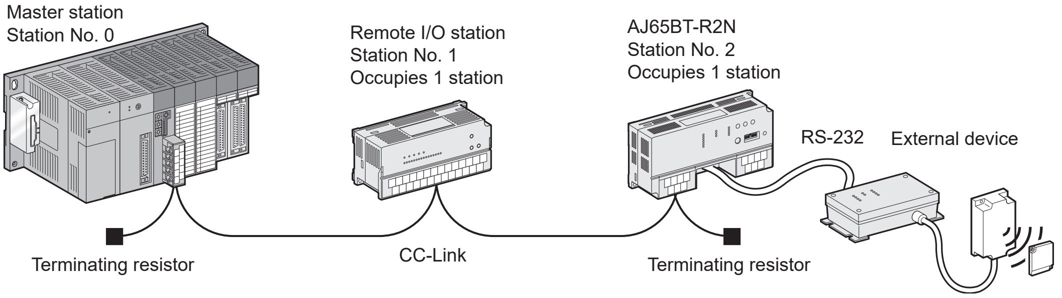

**Figure 7.1 System configuration for program**

(a) Master station

**Table 7.2 Information of master station**

| Item | Description |
|---|---|
| Station No. | 0 |
| Data link transmission speed | 156kbps |
| Start I/O No. | 0000$_H$ (Mounting position of master module) |
| All connect count | 2 |
| Input (X) that reads from RXn0 to RX(n+1)F of AJ65BT-R2N | X120 to X13F |
| Output (Y) that writes to RYn0 to RY(n+1)F of AJ65BT-R2N | Y120 to Y13F |

(b) Remote I/O station

**Table 7.3 Information of remote I/O station**

| Item | Description |
|---|---|
| Station No. | 1 |
| Data link transmission speed | 156kbps |
| No. of occupied stations | Occupies 1 station |

(c) AJ65BT-R2N

**Table 7.4 Information of AJ65BT-R2N**

| Item | | Description |
|---|---|---|
| Station No. | | 2 |
| Data link transmission speed | | 156kbps |
| RS-232 transmission speed | | 300bps |
| No. of occupied stations | | Occupies 1 station |
| Mode setting switch | Using send/receive buffer communication function | 0 (Mode 0) |
| | Using buffer memory auto-refresh function | 1 (Mode 1) |
| Send buffer size | Using send/receive buffer communication function | 64 words[*1] |
| | Using buffer memory auto-refresh function | 0 word |
| Receive buffer size | Using send/receive buffer communication function | 64 words[*1] |
| | Using buffer memory auto-refresh function | 0 word |
| Auto-refresh buffer size | Using send/receive buffer communication function | 0 word |
| | Using buffer memory auto-refresh function | 1536 words[*2] |

* 1 When sending/receiving the following data or more, change the buffer size by the sequence program (☞ Section 7.1.1 (2)).
When using the RIWT or RIRD instruction: 60 words
When using the RISEND or RIRCV instruction: 59 words

* 2 When sending/receiving data of 512 words or more, change the auto-refresh buffer size in the sequence program (☞ Section 7.1.1 (2)) and change the auto-refresh buffer assignment.

(d) Sendable message

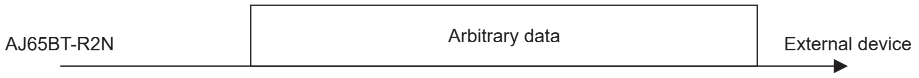

**Figure 7.2 Sendable message**

**Table 7.5 Information of sendable message**

| Item | | Description |
|---|---|---|
| Start frame | | None[*1] |
| End frame | | None[*1] |
| Data size (including above frames) | Using send/receive buffer communication function | •When using RIWT or RIRD instruction: 59 words or less[*2]<br>•When using RISEND or RIRCV instruction: 58 words or less[*2] |
| | Using buffer memory auto-refresh function | 511 words or less[*3] |

* 1 If required by the external device, each of the frames can be sent.

* 2 When sending/receiving the data mentioned above or more, change the buffer size by the sequence program (☞ Section 7.1.1 (2)).

* 3 When sending/receiving data of 512 words or more, change the auto-refresh buffer size in the sequence program (☞ Section 7.1.1 (2)) and change the auto-refresh buffer assignment.

(e) Receivable message

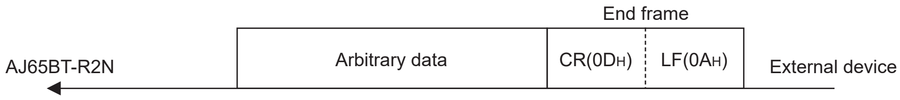

**Figure 7.3 Receivable message**

**Table 7.6 Information of receivable message**

| Item | | Description |
|---|---|---|
| Start frame | | None |
| End frame | | CR(0DH)＋LF(0AH) |
| Data size (including above frames) | Using send/receive buffer communication function | •When using RIWT or RIRD instruction: 59 words or less*1<br>•When using RISEND or RIRCV instruction: 58 words or less*1 |
| | Using buffer memory auto-refresh function | 509 words or less*2 |

* 1 When sending/receiving the data mentioned above or more, change the buffer size by the sequence program (☞ Section 7.1.1 (2)).

* 2 When sending/receiving data of 510 words or more, change the auto-refresh buffer size in the sequence program (☞ Section 7.1.1 (2)) and change the auto-refresh buffer assignment.

**Remark**

Receive data must not contain CR(0DH)＋LF(0AH).
If CR(0DH)＋LF(0AH) is included, the CR(0DH)＋LF(0AH) is regarded as the end frame, resulting in termination of the reception.

## 7.1 Setting of each station

### 7.1.1 Setting AJ61BT11 or A1SJ61BT11

When using the AJ61BT11 or A1SJ61BT11, the switches and parameters must be set.

(1) Switch setting

Switch setting for the master station is performed with the switches on the master module.

**Table 7.7 Each switch setting example**

| Item | | Description | Set value |
|---|---|---|---|
| Station No. setting switch | | Master station | 0 |
| Mode setting switch | | Online (Remote net mode) | 0 |
| Transmission speed setting switch | | 156kbps | 0 |
| Condition setting switch | SW1 | Station type: Master station/local station | OFF |
| | SW2, SW3 | Use prohibited | OFF |
| | SW4 | Input data status of data link error station: Cleared | OFF |
| | SW5, SW6 | No. of occupied stations: Invalid | OFF |
| | SW7 | Use prohibited | OFF |
| | SW8 | Module mode: Intelli. mode | OFF |

(2) Parameter setting

Set parameters for the master station with the sequence program (dedicated instructions).

```
M100
[MOV  K0     D100]   Synchronous mode enable/disable
[MOV  K2     D101]   No. of modules connected
[MOV  H101   D102]   Slave station setting information of remote I/O station
[MOV  H2102  D103]   Slave station setting information of AJ65BT-R2N
[MOV  H40    D104]   Send buffer size
[MOV  H40    D105]   Receive buffer size
[MOV  H0     D106]   Auto-refresh buffer size
[LEDB RLPA]          Dedicated instruction name
[SUB  H0]            Start I/O No. of master module
[LEDC D100]          Link parameter storage device
[LEDC M101]          Device that is turned ON for one scan after execution of RLPA instruction
[LEDR]               Dedicated instruction completion
```

**Figure 7.4 Network parameters setting example (When using the send/receive buffer communication function)**

**Table 7.8 Network parameters setting example**

| Item | | Set value | | |
|---|---|---|---|---|
| Synchronous mode valid/invalid | | 0 (When synchronous mode is invalid) | | |
| Number of stations connected for communication | | 2 | | |
| Slave station setting information | | **Slave station type** | **No. of occupied slave stations** | **Station No.** |
| | Remote I/O station | 0 (Remote I/O station) | 1 | 1 |
| | AJ65BT-R2N | 2 (Intelligent device station) | 1 | 2 |
| Send buffer size of AJ65BT-R2N | | •When using send/receive buffer communication function: 40H[*1*2]<br>•When using buffer memory auto-refresh function: 0H | | |
| Receive buffer size of AJ65BT-R2N | | •When using send/receive buffer communication function: 40H[*1*2]<br>•When using buffer memory auto-refresh function: 0H | | |
| Auto-refresh buffer size of AJ65BT-R2N | | •When using send/receive buffer communication function: 0H<br>•When using buffer memory auto-refresh function: 600H[*3] | | |

* 1 When using a RIWT or RIRD instruction to send/receive data of 60 words or more, change the value to "(Send/receive data size) ＋5 words".

* 2 When using a RISEND or RIRCV instruction to send/receive data of 59 words or more, change the value to "(Send/receive data size) ＋6 words".

* 3 When sending/receiving data of 512 words or more, change the auto-refresh buffer size and the auto-refresh buffer assignments.

## 7.1.2 Remote I/O station setting

For the setting method, refer to the manual for the remote I/O station.

**Table 7.9 Remote I/O station setting example**

| Item | Set value |
|---|---|
| Station No. | 1 |
| Transmission speed | 156kbps |

## 7.1.3 AJ65BT-R2N setting

Perform the AJ65BT-R2N settings with each switch of the AJ65BT-R2N.

**Table 7.10 AJ65BT-R2N setting example**

| Item | | Description | Set value |
|---|---|---|---|
| Station No. setting switch | | Station No. 2 | ×10: 0<br>×1: 2 |
| Data link transmission speed setting switch | | 156kbps | 0 |
| Mode setting switch | | •Using send/receive buffer communication function (Mode 0) | 0 |
| | | •Using buffer memory auto-refresh function (Mode 1) | 1 |
| RS-232 transmission setting switches | SW1 to SW4 | Transmission speed: 300bps | OFF |
| | SW5 | Data bit length: 8 | ON |
| | SW6, SW7 | Parity bit: None | OFF |
| | SW8 | Stop bit length: 1 | OFF |

## 7.2 Entire Send/Receive Program Structure

The programs in this section can be executed when the following system configuration and settings have been set.

☞ CHAPTER 7 (2) System configuration for program

☞ Section 7.1 Setting of each station

### 7.2.1 For the send/receive buffer communication function

(1) Overview of program examples

(a) Initial setting program for master station ((3) in this section - 1)
Parameters of the master station are set.

☞ Section 7.1.1 (2) Parameter setting

(b) Program for reading remote input (RX) ((3) in this section - 2)
Remote input (RXn0 to RX(n+1)F) of the AJ65BT-R2N is read out to the input (X120 to X13F) of the programmable controller CPU.

(c) Mode setting switch check program ((3) in this section - 3)
Whether the mode setting switch is set correctly or not is checked.

(d) AJ65BT-R2N initial setting program ((3) in this section - 4)

1) When AJ65BT-R2N initial setting start flag (M20) is turned ON, settings are configured so that data reception is completed by the frame function upon receipt of CR(0DH)＋LF(0AH).
2) The AJ65BT-R2N is initialized.

☞ Section 7.3.1 For the send/receive buffer communication function

(e) Program for sending data to external device ((3) in this section - 5)
If Send execute flag (X22) is turned ON, the character string "ABCDEF" is sent from the master station to the external device.

☞ Section 7.4.1 For the send/receive buffer communication function

(f) Program for receiving data from external device ((3) in this section - 6)
When data are received from the external device, the received data are read out from the AJ65BT-R2N to the master station.

☞ Section 7.5.1 For the send/receive buffer communication function

(g) Error handling program ((3) in this section - 7)

1) When an error occurs during initialization setting or data transfer, an error code will be read out from the AJ65BT-R2N to the master module if Error code read flag (X23) is turned ON.
2) The error is canceled when Error clear flag (X24) is turned ON after the cause of the error has been eliminated.

☞ Section 7.6.1 For the send/receive buffer communication function

(h) Program for writing data to remote output (RY) ((3) in this section - 8)

1) When using the RIRD, RIWT, RIRCV or RISEND instruction, execute this program immediately before END instruction in order to prevent malfunctions. Failure to do so may cause the remote I/O (RX, RY) not to operate properly.

2) The output (Y120 to Y13F) of the programmable controller CPU is written to the remote output (RYn0 to RY(n+1)F) of the AJ65BT-R2N.

(2) Devices used in the program example

**Table 7.11 Devices used in the program example**

| Device | Description | Device | Description |
|---|---|---|---|
| X0 | Module error (Master station) | Y124 | Initialization request signal |
| X1 | Own station data link status (Master station) | Y126 | OS reception area clear request signal |
| X0F | Module ready (Master station) | Y127 | $E^2$PROM function request signal |
| X22 | Send execute flag | Y139 | Initial data read request signal |
| X23 | Error code read flag | Y13A | Error reset request signal |
| X24 | Error clear flag | M0 | Operation start request flag |
| K4X120 | Remote input (X120 to X12F) | M1 | Initial setting write completion flag |
| X120 | Send complete signal | M2 | Operation complete flag |
| X121 | Send failed signal | M3 | Operation failed flag |
| X122 | Normal receive data read request signal | M10 | Device that is turned ON for one scan after completion of RIWT |
| X123 | Error receive data read request signal | M11 | Device that is turned ON for one scan after failure of writing by RIWT |
| X124 | Initialization complete signal | M20 | AJ65BT-R2N initial setting start flag |
| X125 | Initialization failed signal | M21 | AJ65BT-R2N initial setting start pulse signal |
| X128 | $E^2$PROM function failed signal | M22 | Operation complete pulse signal |
| K1X134 | Mode setting switch status signal (X134 to X137) | M25 | Send completion pulse signal |
| X13A | Error status signal | M30 | Operation failed pulse signal |
| X13B | Remote station ready signal | M100 | Master station parameter setting start pulse signal |
| K4Y18 | Output (Y18 to Y27) (Master station) | M101 | Device that is turned ON for one scan after completion of RLPA |
| Y1C | Buffer memory bank switching specification (Master station) | M102 | Device that is turned ON for one scan after failure of writing by RLPA |
| Y1D | | M120 | Buffer memory access exclusion check flag |
| K8Y120 | Remote output (Y120 to Y13F) | M125 | Sending flag |
| Y120 | Send request signal | M130 | Receiving flag |
| Y121 | Send cancel request signal | M135 | Error handling flag |
| Y122 | Receive data read completion signal | M155 | Device that is turned ON for one scan after completion of RIRD |
| Y123 | Forced receive completion request signal | M156 | Device that is turned ON for one scan after failure of reading by RIRD |

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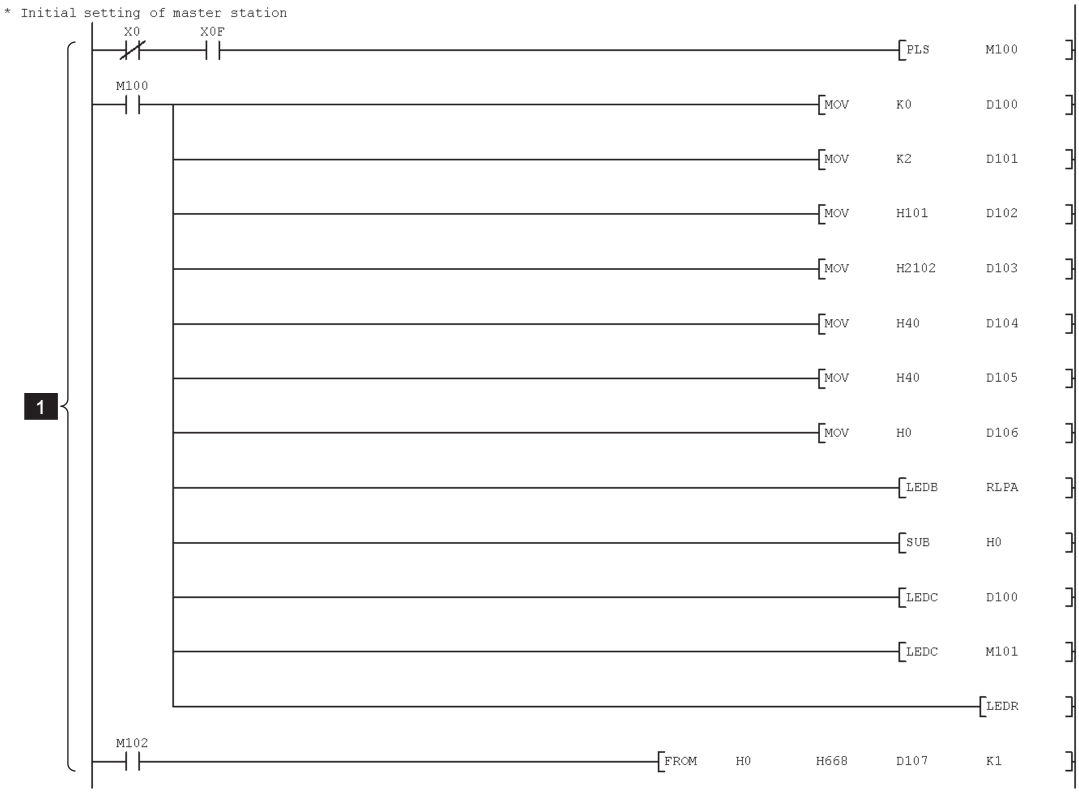
Table 7.11 Devices used in the program example (Continued)

| Device | Description | Device | Description |
|---|---|---|---|
| M160 | Device that is turned ON for one scan after completion of RIRD | M901 | Other station data link status (Station No.2) |
| M161 | Device that is turned ON for one scan after failure of reading by RIRD | M9036 | Always ON |
| M180 | Device that is turned ON for one scan after completion of RIWT | M9052 | SEG instruction switching |
| M181 | Device that is turned ON for one scan after failure of writing by RIWT | D0 to D7 | Control data of RIWT instruction, and set values or send data |
| M190 | Device that is turned ON for one scan after completion of RIRD | D30 to D34 | Control data of RIRD instruction, and No. of receive data (in word units) |
| M191 | Device that is turned ON for one scan after failure of reading by RIRD | From D35 | Control data of RIRD instruction, and receive data |
| M220 | Send execution pulse signal | D100 to D106 | Network parameters of master station |
| M230 | Error handling execution pulse signal | D107 | Error code in Network parameters setting |
| M502 | AJ65BT-R2N mode normal flag | D130 to D136 | Control data of RIRD instruction, and error code of AJ65BT-R2N |
| M503 | AJ65BT-R2N mode error flag | D900 | RY(n+1)E, RY(n+1)F of master module |
| K4M900 | Other station data link status (SW0080) | — | |

## (3) Program example



Turns ON Master station parameter setting start pulse signal

Synchronous mode enable/disable

No. of modules connected

Slave station setting information of remote I/O station

Slave station setting information of AJ65BT-R2N

Send buffer size

Receive buffer size

Auto-refresh buffer size

Dedicated instruction name

Start I/O No. of master module

Link parameter storage device

Device that is turned ON for one scan after execution of RLPA instruction

Dedicated instruction completion

Reads error code from master module buffer memory

**Figure 7.5 Program example**

(Continued to next page)

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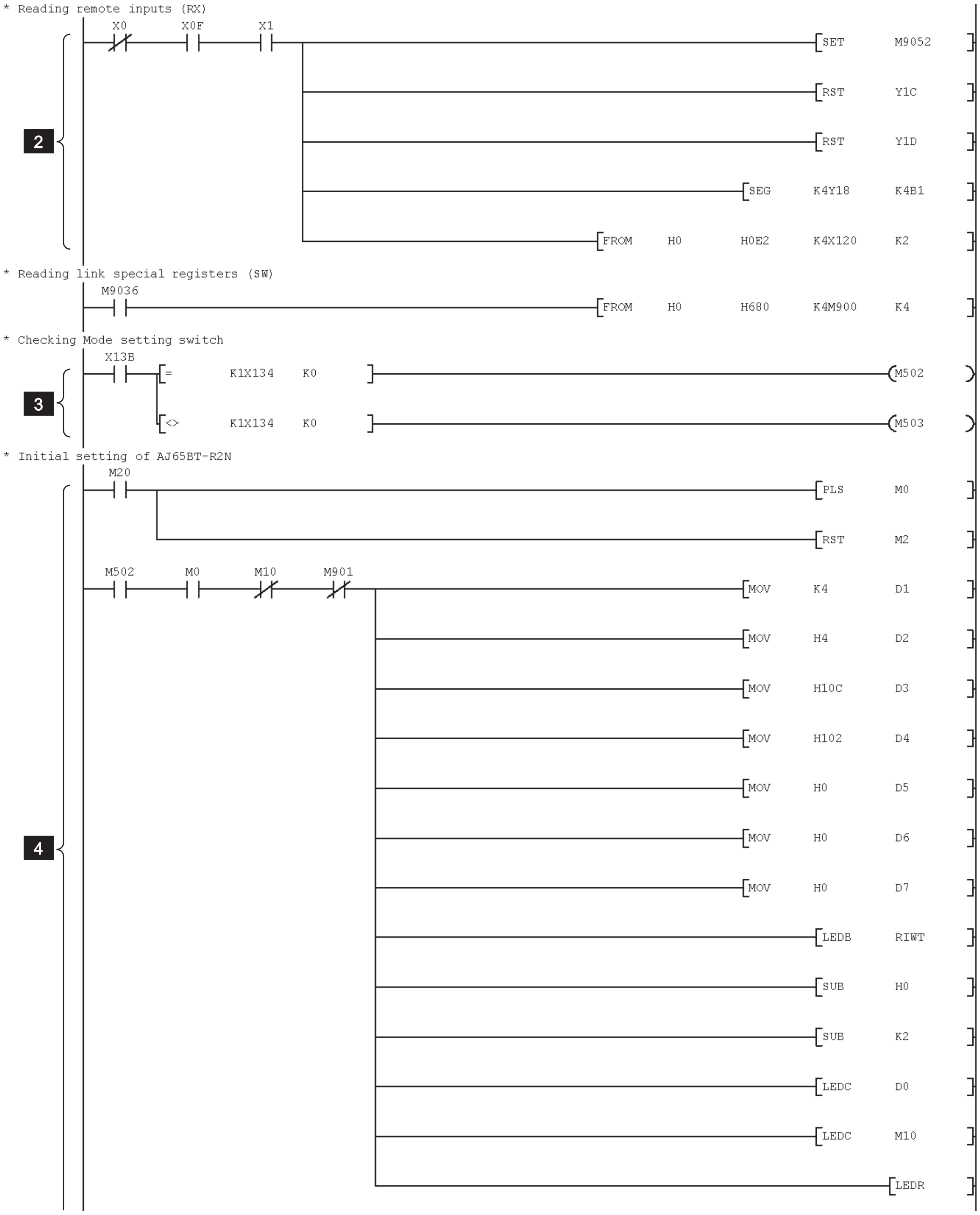

Switches master module buffer memory to bank 0

Reads remote input (RXn0 to RX(n+1)F) to X120 to X13F

Reads link special register (SW0080) to M900 to M916

Turns ON AJ65BT-R2N mode normal flag

Turns ON AJ65BT-R2N mode error flag

Turns ON Operation start request flag

Resets Operation complete flag

No. of write points

Access code and attribute code

Receive end frame No. address

Specifies default registration frame 102H (CR(0DH)+LF(0AH) for receive end frame No.1

No frame specification

No frame specification

No frame specification

Dedicated instruction name

Start I/O No. of master module

Station No. of AJ65BT-R2N

Control data storage device

Device that is turned ON for one scan after execution of RIWT instruction

Dedicated instruction completion

Figure 7.5 Program example (Continued)

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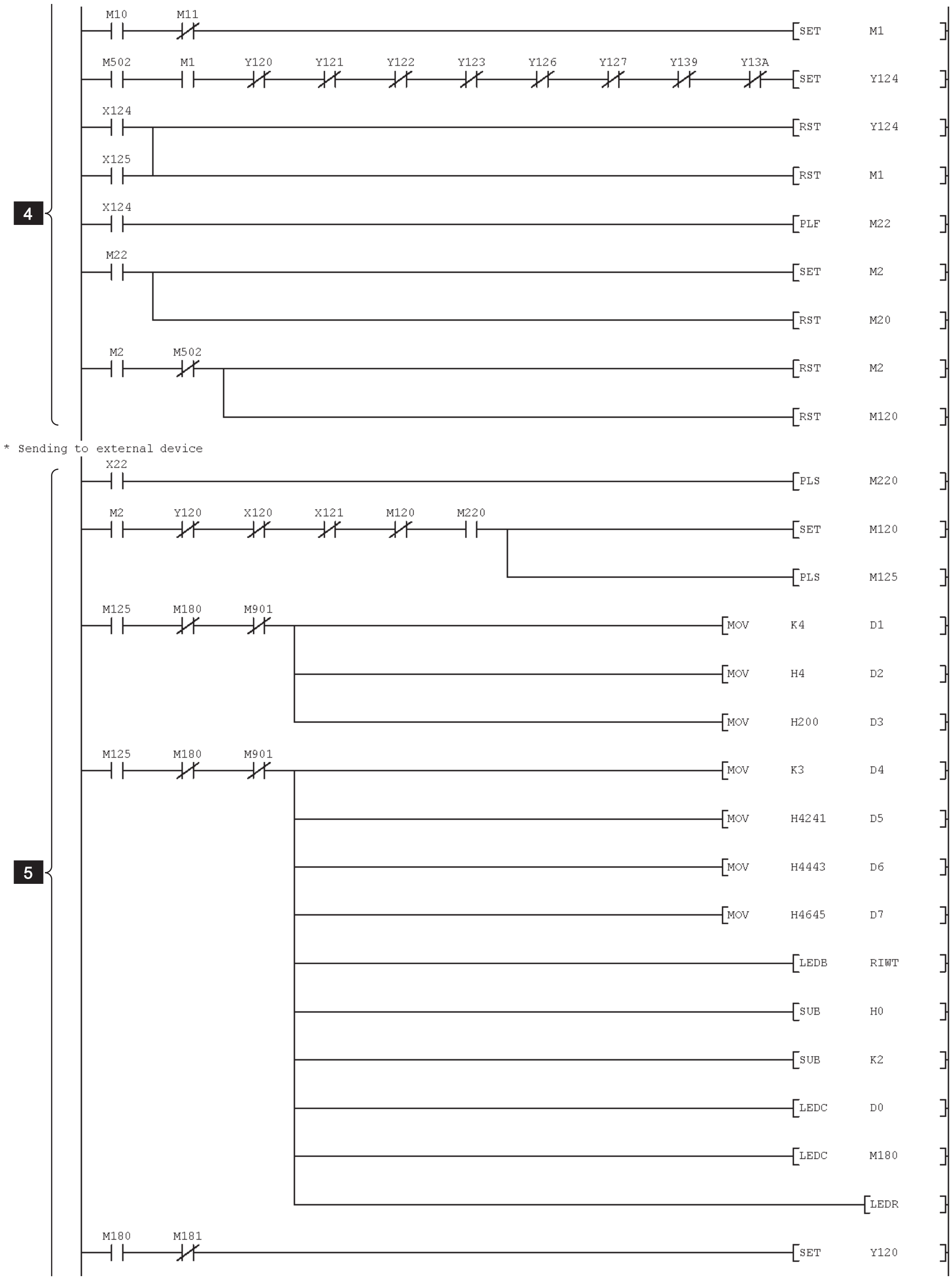

Turns ON Initial setting write completion flag

Turns ON Initialization request signal

Resets Initialization request signal

Resets Initial setting write completion flag

Turns ON Operation complete pulse signal

Turns ON Operation complete flag

Resets AJ65BT-R2N initial setting start flag

Resets Operation complete flag

Resets Buffer memory access exclusion check flag

Turns ON Send execution pulse signal

Turns ON Buffer memory access exclusion check flag

Turns ON Sending flag

No. of write points

Access code and attribute code

Send area address

Specifies No. of send data (in word units)

Specifies (A(41H) +B(42H)+C(43H)+D(44H) +E(45H)+F(46H)) for send data

Dedicated instruction name

Start I/O No. of master module

Station No. of AJ65BT-R2N

Control data storage device

Device that is turned ON for one scan after execution of RIWT instruction

Dedicated instruction completion

Turns ON Buffer memory access exclusion check flag

Figure 7.5 Program example (Continued)

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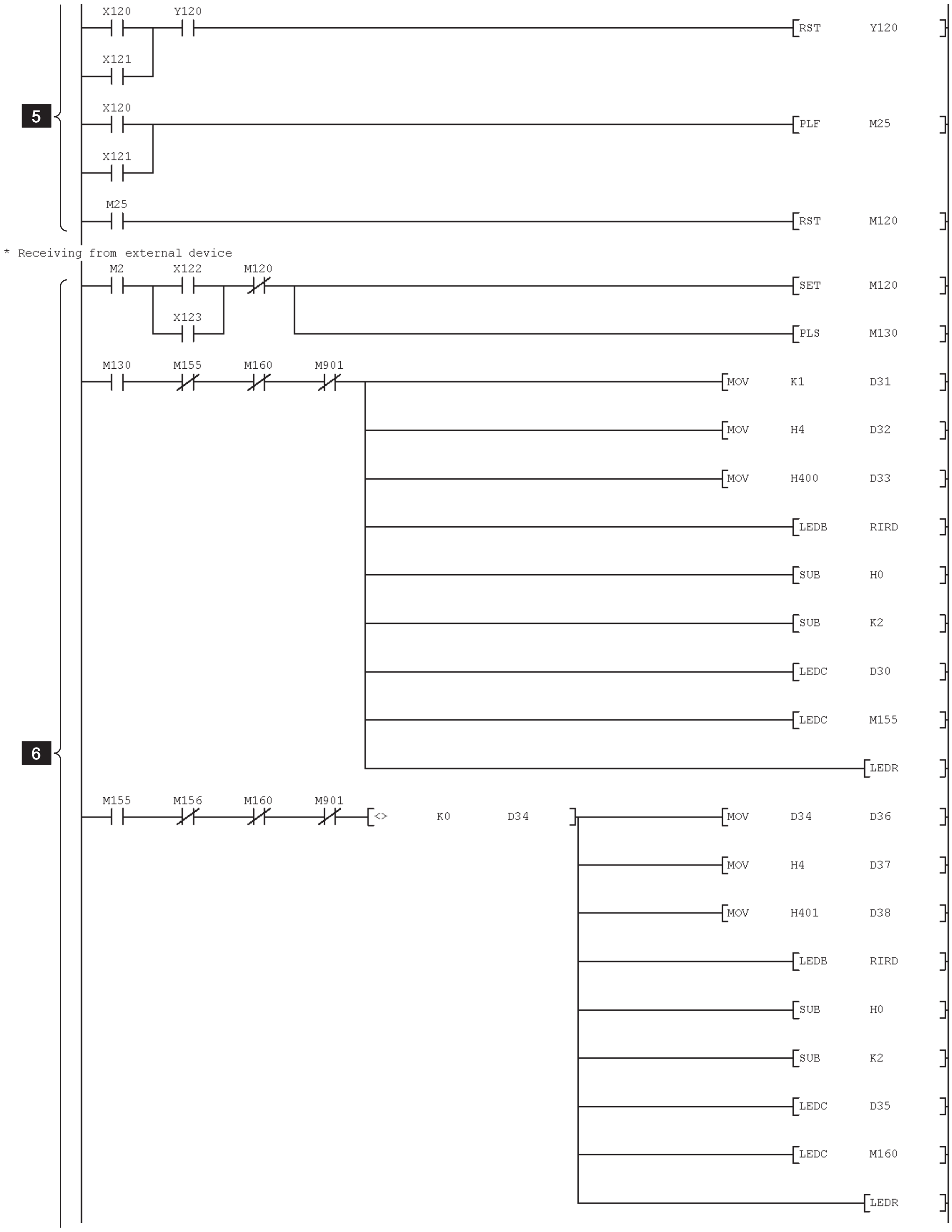

Resets Send request signal

Turns ON Send completion pulse signal

Resets Buffer memory access exclusion check flag

Turns ON Buffer memory access exclusion check flag

Turns ON Receiving flag

No. of read points

Access code and attribute code

Receive data size specification area (in words units) address

Dedicated instruction name

Start I/O No. of master module

Station No. of AJ65BT-R2N

Control data storage device

Device that is turned ON for one scan after execution of RIRD instruction

Dedicated instruction completion

No. of receive data (in word units)

Access code and attribute code

Receive data area address

Dedicated instruction name

Start I/O No. of master module

Station No. of AJ65BT-R2N

Control data storage device

Device that is turned ON for one scan after execution of RIRD instruction

Dedicated instruction completion

Figure 7.5 Program example (Continued)

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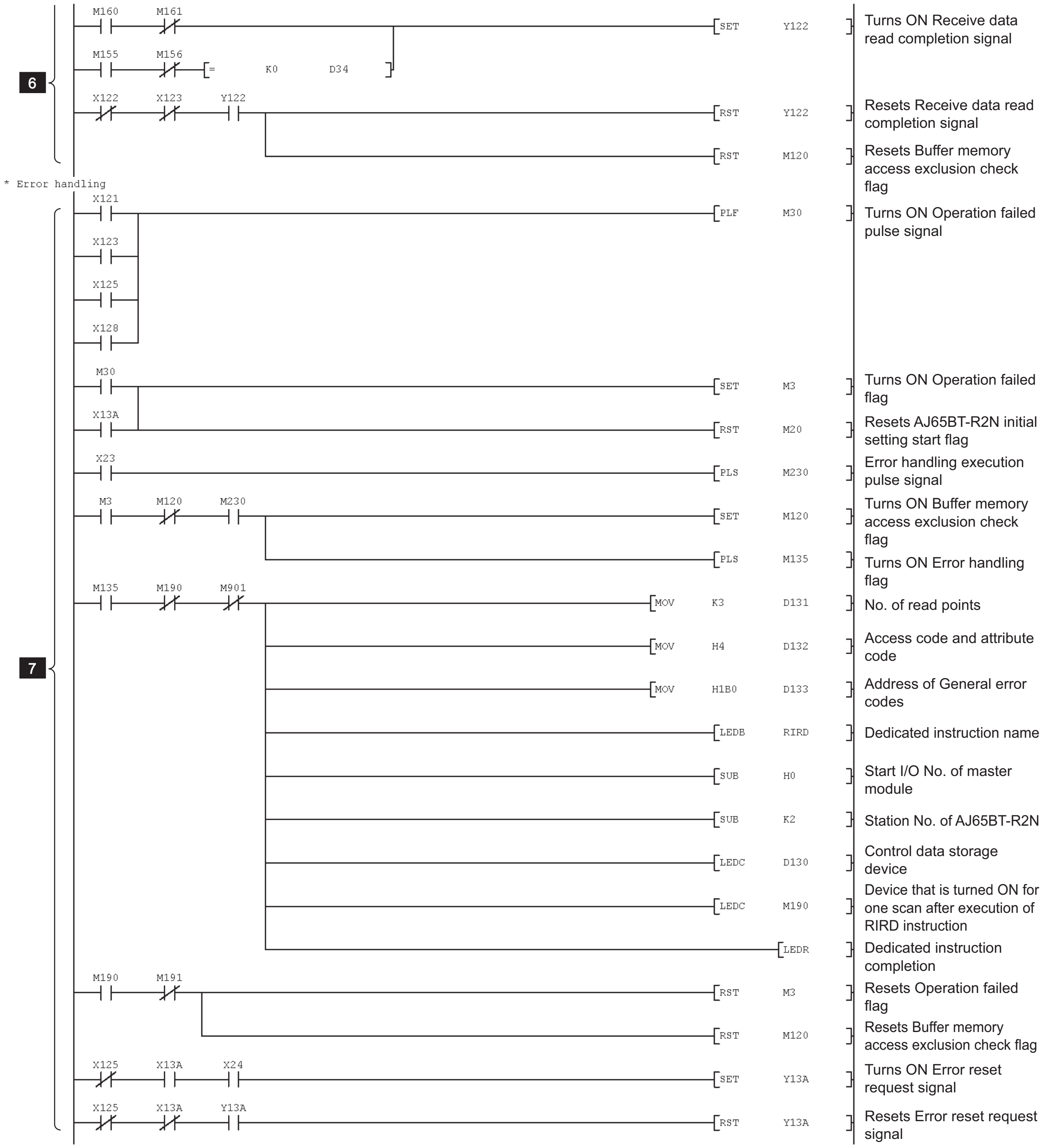

Figure 7.5 Program example (Continued)

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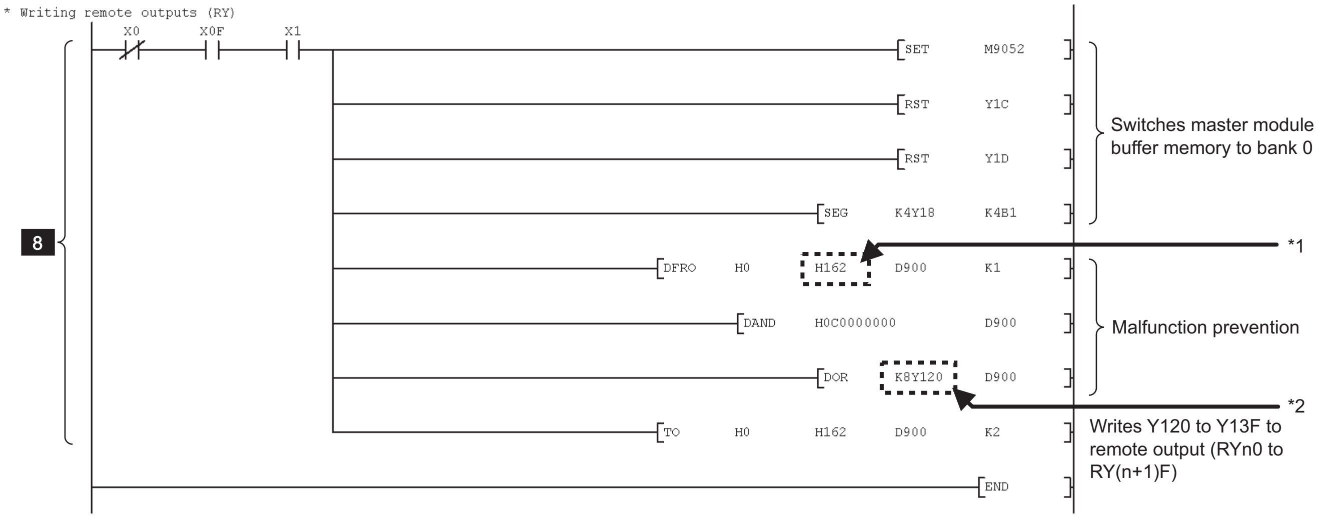


Switches master module buffer memory to bank 0

Malfunction prevention

Writes Y120 to Y13F to remote output (RYn0 to RY(n+1)F)

*1 Master module buffer memory address to which the AJ65BT-R2N remote output (RY) was assigned.
Correct the remote output (RY) assignment if it is different from that of the program example.

*2 Auto-refresh target device of AJ65BT-R2N.
Correct the auto-refresh target device if it is different from that of the program example.

Figure 7.5 Program example (Continued)

## 7.2.2 For the buffer memory auto-refresh function

(1) Overview of program example

(a) Initial setting program for master station ((3) in this section - 1)
Parameters of the master station are set.

☞ Section 7.1.1 (2) Parameter setting

(b) Program for reading remote input (RX) ((3) in this section - 2)
Remote input (RXn0 to RX(n+1)F) of the AJ65BT-R2N is read out to the input (X120 to X13F) of the programmable controller CPU.

(c) Mode setting switch check program ((3) in this section - 3)
Whether the mode setting switch is set correctly or not is checked.

(d) AJ65BT-R2N initial setting program ((3) in this section - 4)

1) Initial data are read from the AJ65BT-R2N to the master module.
2) By the frame function, reception is completed when CR(0DH)+LF(0AH) is received.
3) The AJ65BT-R2N is initialized.

☞ Section 7.3.2 For the buffer memory auto-refresh function

(e) Program for sending data to external device ((3) in this section - 5)
If Send execute flag (X22) is turned ON, the character string "ABCDEF" is sent from the master station to the external device.

☞ Section 7.4.2 For the buffer memory auto-refresh function

(f) Program for receiving data from external device ((3) in this section - 6)
When data are received from the external device, the received data are read out from the AJ65BT-R2N to the master station.

☞ Section 7.5.2 For the buffer memory auto-refresh function

(g) Error handling program ((3) in this section - 7)

1) When an error occurs during initialization setting or data transfer, an error code will be read out from the AJ65BT-R2N to the master module if Error code read flag (X23) is turned ON.
2) The error is canceled when Error clear flag (X24) is turned ON after the cause of the error has been eliminated.

☞ Section 7.6.2 For the buffer memory auto-refresh function

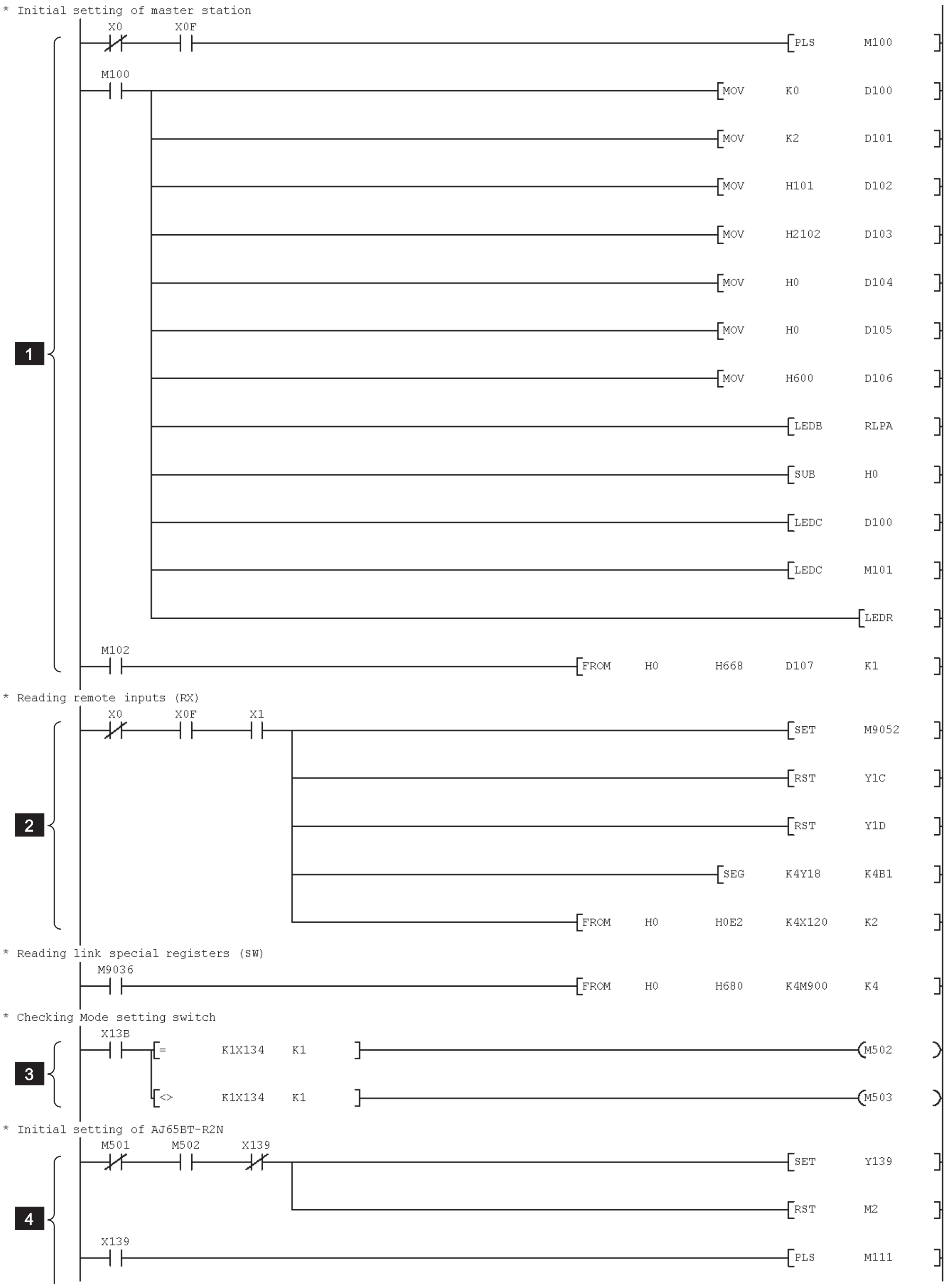
(h) Program for writing data to remote output (RY) ((3) in this section - 8)
The output (Y120 to Y13F) of the programmable controller CPU is written to the remote output (RYn0 to RY(n+1)F) of the AJ65BT-R2N.

(2) Devices used in the program example

**Table 7.12 Devices used in the program example**

| Device | Description | Device | Description |
|---|---|---|---|
| X0 | Module error (Master station) | M0 | Operation start request flag |
| X1 | Own station data link status (Master station) | M1 | Initial setting write completion flag |
| X0F | Module ready (Master station) | M2 | Operation complete flag |
| X22 | Send execute flag | M3 | Operation failed flag |
| X23 | Error code read flag | M22 | Operation complete pulse signal |
| X24 | Error clear flag | M25 | Send completion pulse signal |
| K4X120 | Remote input (X120 to X12F) | M30 | Operation failed pulse signal |
| X120 | Send complete signal | M100 | Master station parameter setting start pulse signal |
| X121 | Send failed signal | M101 | Device that is turned ON for one scan after completion of RLPA |
| X122 | Normal receive data read request signal | M102 | Device that is turned ON for one scan after failure of writing by RLPA |
| X123 | Error receive data read request signal | M111 | Initial data read completion pulse signal |
| X124 | Initialization complete signal | M120 | Send-in-process flag |
| X125 | Initialization failed signal | M125 | Sending flag |
| X128 | E$^2$PROM function failed signal | M130 | Receiving flag |
| K1X134 | Mode setting switch status signal (X134 to X137) | M135 | Error handling flag |
| X139 | Initial data read completion signal | M220 | Send execution pulse signal |
| X13A | Error status signal | M230 | Error handling execution pulse signal |
| X13B | Remote station ready signal | M500 | AJ65BT-R2N initial data read complete flag |
| K4Y18 | Output (Y18 to Y27) (Master station) | M501 | AJ65BT-R2N initial data reading flag |
| Y1C | Buffer memory bank switching specification (Master station) | M502 | AJ65BT-R2N mode normal flag |
| Y1D | | M503 | AJ65BT-R2N mode error flag |
| K8Y120 | Remote output (Y120 to Y13F) | K4M900 | Other station data link status (SW0080) |
| Y120 | Send request signal | M901 | Other station data link status (Station No.2) |
| Y121 | Send cancel request signal | M9036 | Always ON |
| Y122 | Receive data read completion signal | M9052 | SEG instruction switching |
| Y123 | Forced receive completion request signal | D10 to D13 | Set values, or No. of send data (in word units) and send data |
| Y124 | Initialization request signal | D100 to D106 | Network parameters of master station |
| Y126 | OS reception area clear request signal | D107 | Error code in Network parameters setting |
| Y127 | E$^2$PROM function request signal | D200 | No. of receive data |
| Y139 | Initial data read request signal | From D201 | Receive data |
| Y13A | Error reset request signal | D400 to D402 | AJ65BT-R2N error code |

(3) Program example



Turns ON Master station parameter setting start pulse signal

Synchronous mode enable/disable

No. of modules connected

Slave station setting information of remote I/O station

Slave station setting information of AJ65BT-R2N

Send buffer size

Receive buffer size

Auto-refresh buffer size

Dedicated instruction name

Start I/O No. of master module

Link parameter storage device

Device that is turned ON for one scan after execution of RLPA instruction

Dedicated instruction completion

Reads error code from master module buffer memory

Switches master module buffer memory to bank 0

Reads remote input (RXn0 to RX(n+1)F) to X120 to X13F

Reads link special register (SW0080) to M900 to M916

Turns ON AJ65BT-R2N mode normal flag

Turns ON AJ65BT-R2N mode error flag

Turns ON AJ65BT-R2N initial setting start pulse signal

Turns ON Operation start request flag

Turns ON Initial data read completion pulse signal

**Figure 7.6 Program example**

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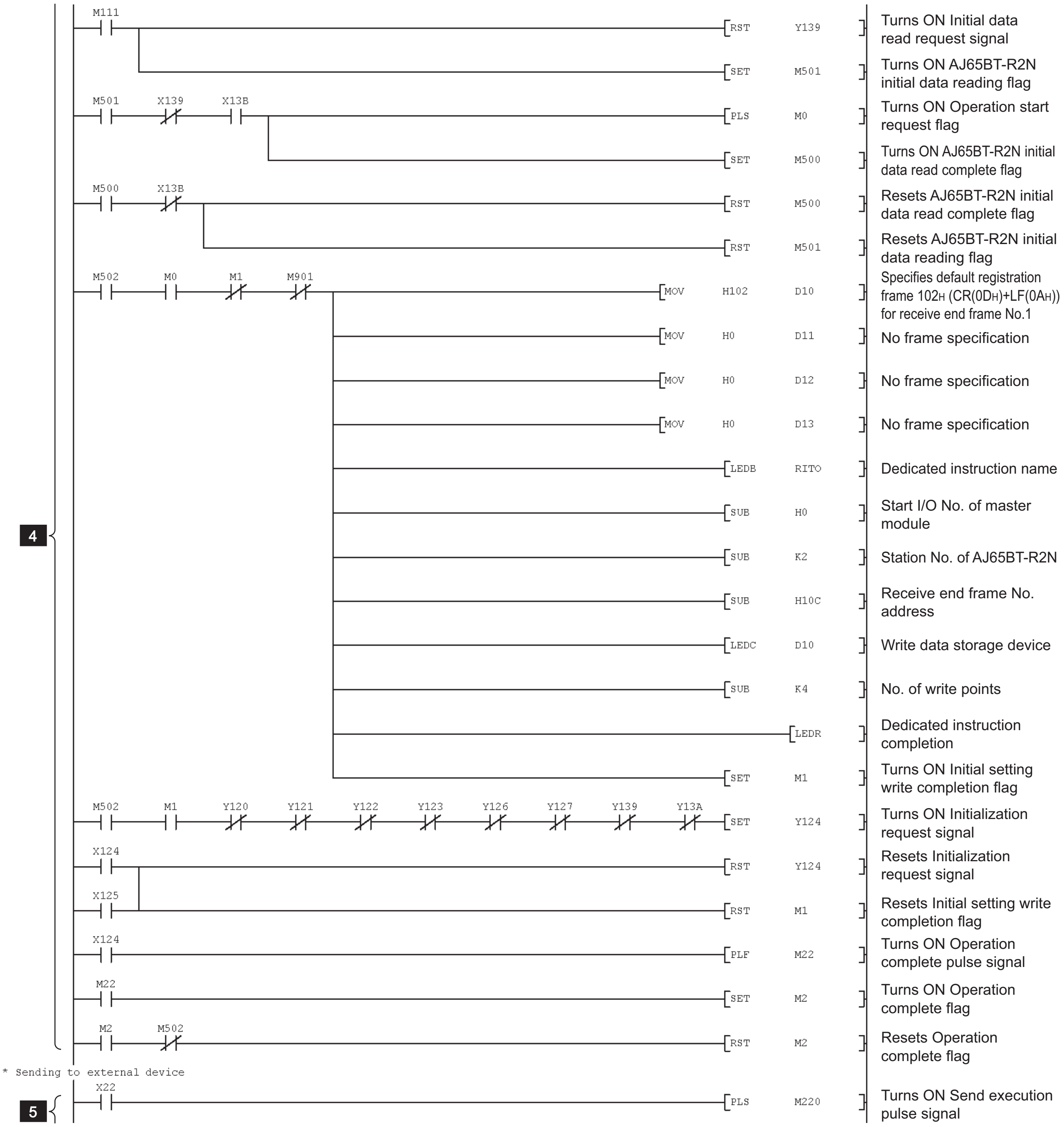

Figure 7.6 Program example (Continued)

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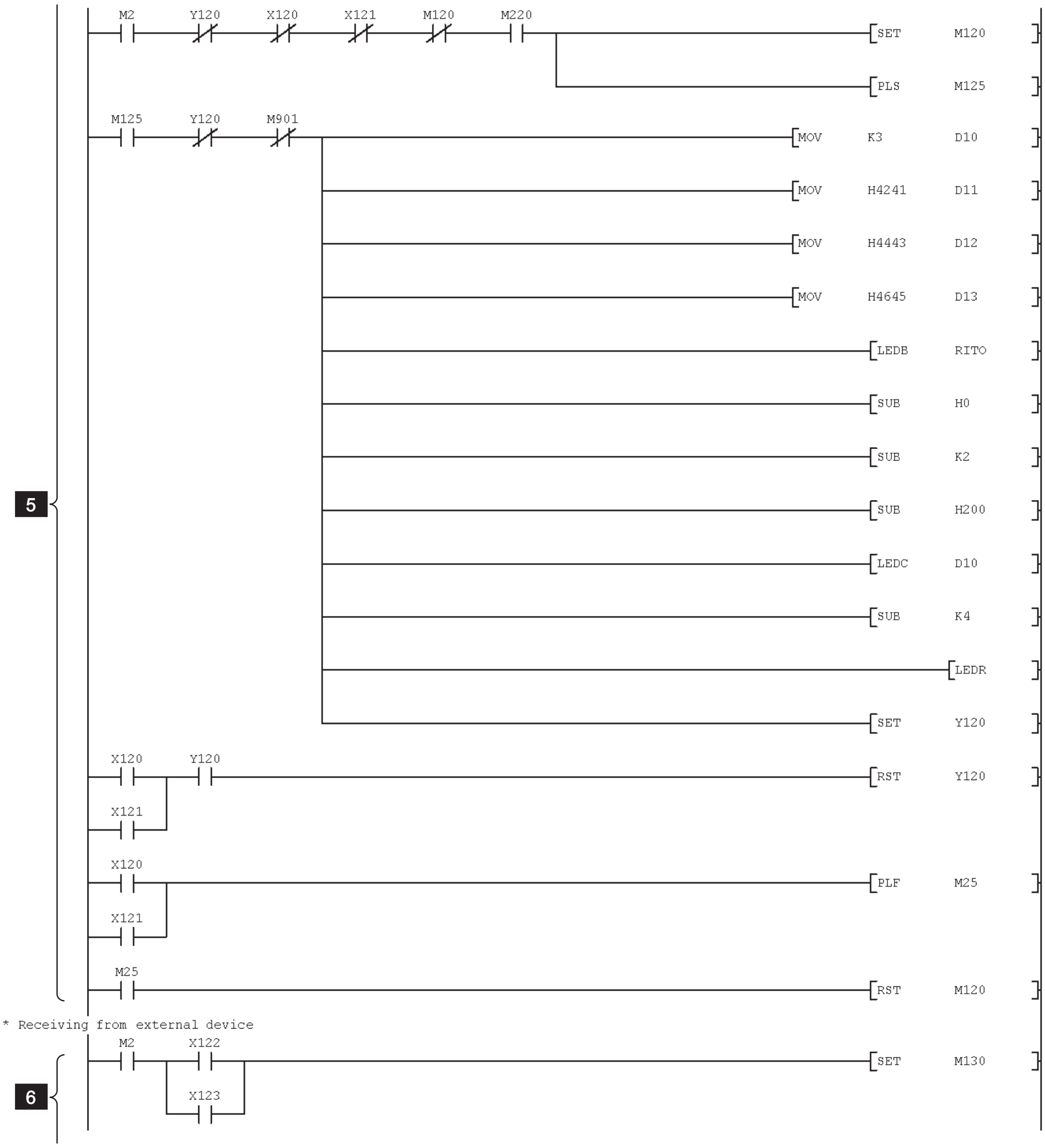

Turns ON Send-in-process flag

Turns ON Sending flag

Specifies No. of send data (in word units)

Specifies (A(41H)+B(42H)+C(43H) +D(44H)+E(45H)+F(46H)) for send data

Dedicated instruction name

Start I/O No. of master module

Station No. of AJ65BT-R2N

Send area address

Write data storage device

No. of write points

Dedicated instruction completion

Turns ON Send request signal

Resets Send request signal

Turns ON Send completion pulse signal

Resets Send-in-process flag

Turns ON Receiving flag

Figure 7.6 Program example (Continued)

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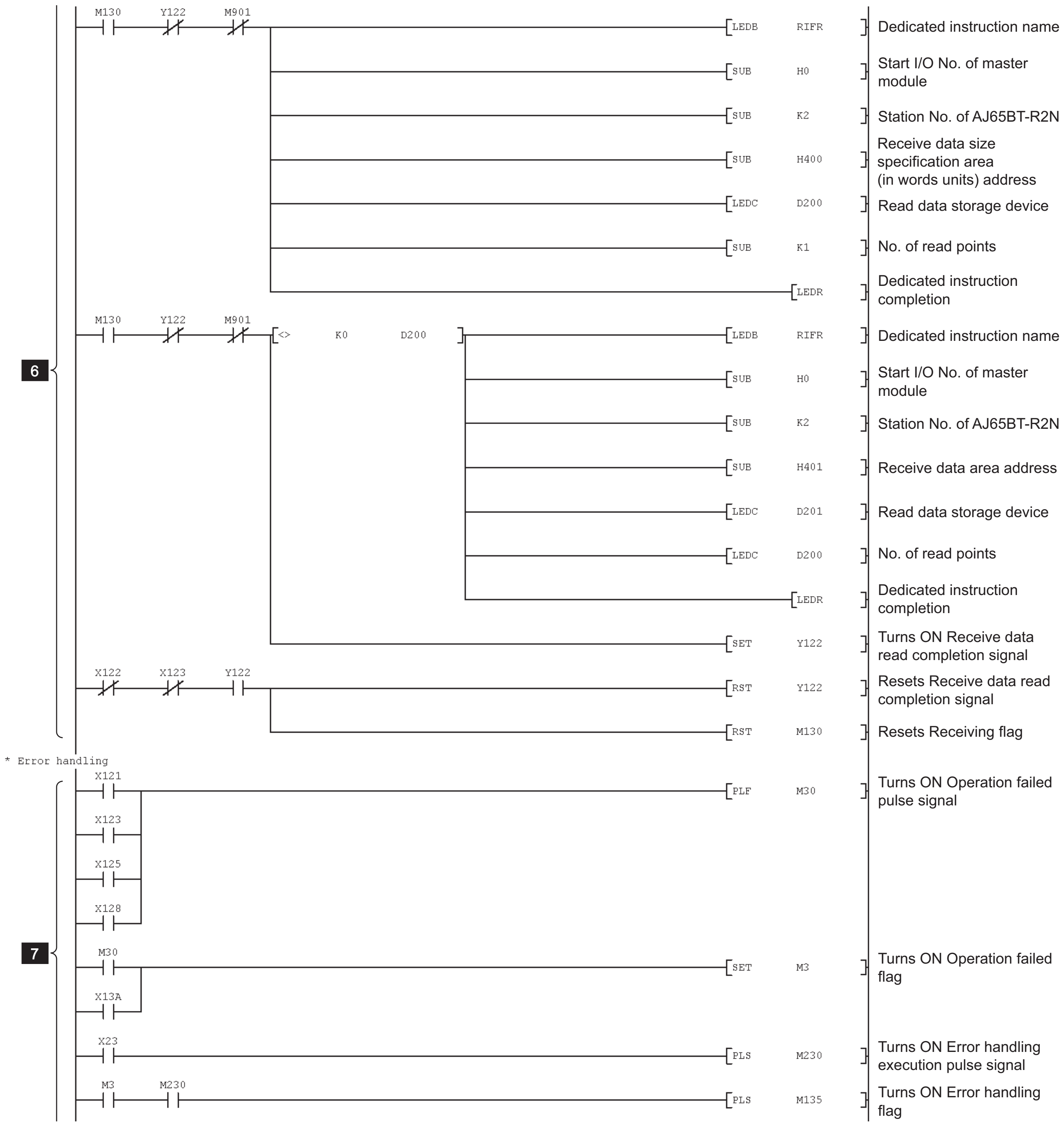

Figure 7.6 Program example (Continued)

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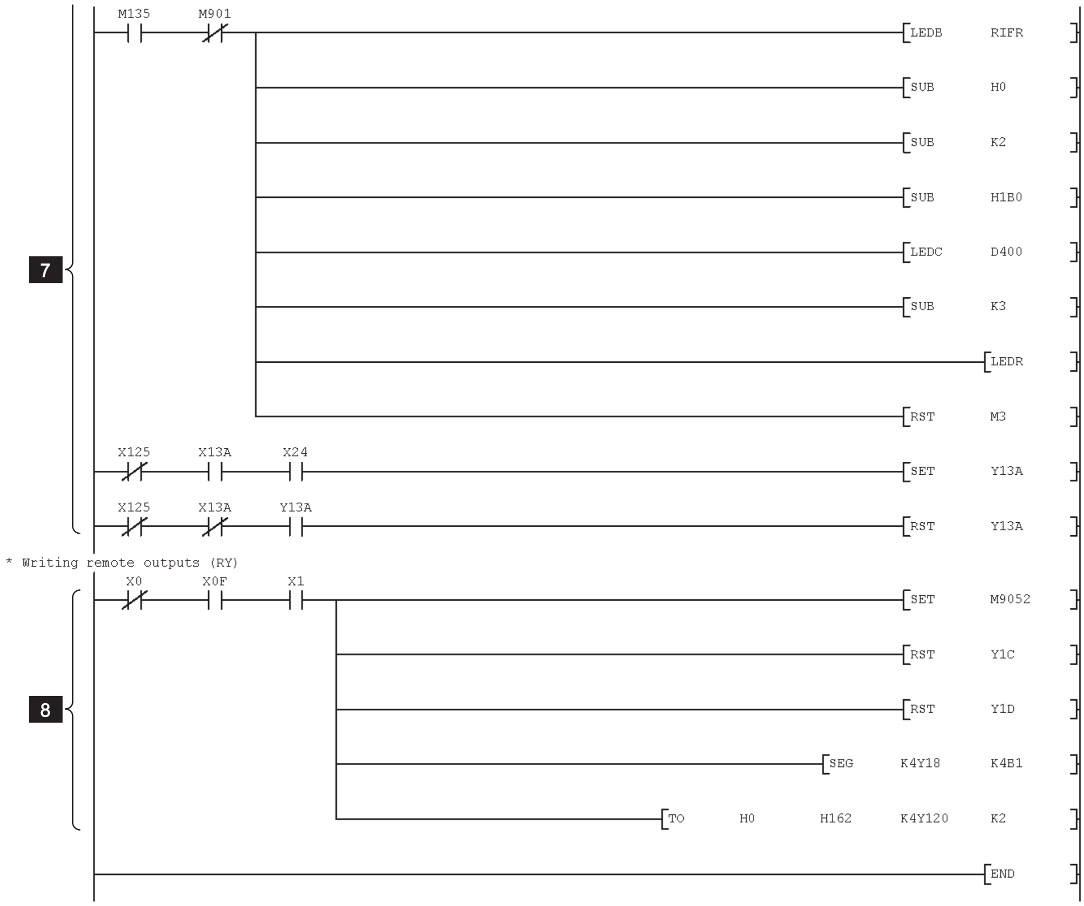

Dedicated instruction name

Start I/O No. of master module

Station No. of AJ65BT-R2N

Address of General error codes

Read data storage device

No. of read points

Dedicated instruction completion

Resets Operation failed flag

Turns ON Error reset request signal

Resets Error reset request signal

Switches master module buffer memory to bank 0

Writes Y120 to Y13F to remote output (RYn0 to RY(n+1)F)

Figure 7.6 Program example (Continued)

## 7.3 Initial Setting for AJ65BT-R2N

### 7.3.1 For the send/receive buffer communication function

(1) Overview of program example

1) When AJ65BT-R2N initial setting start flag (M20) is turned ON, settings are configured so that data reception is completed by the frame function upon receipt of CR(0DH)＋LF(0AH).
2) The AJ65BT-R2N is initialized.

(2) Processing in the program example

1) Default registration frame 102H (CR(0DH)＋LF(0AH)) is written to Receive start frame No. 1 ( R2N 10CH).
2) After writing is normally completed, Initialization request signal (Y124) is turned ON to complete the initial setting.

(3) Devices used in the program example

**Table 7.13 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X124 | Initialization complete signal | Section 7.3.1 | — |
| X125 | Initialization failed signal | Section 7.3.1 | — |
| Y120 | Send request signal | — | Section 7.4.1 |
| Y121 | Send cancel request signal | — | — |
| Y122 | Receive data read completion signal | — | Section 7.5.1 |
| Y123 | Forced receive completion request signal | — | — |
| Y124 | Initialization request signal | Section 7.3.1 | — |
| Y126 | OS reception area clear request signal | — | — |
| Y127 | $E^2$PROM function request signal | — | — |
| Y139 | Initial data read request signal | — | — |
| Y13A | Error reset request signal | — | Section 7.6.1 |
| M0 | Operation start request flag | Section 7.3.1 | — |
| M1 | Initial setting write completion flag | Section 7.3.1 | — |
| M2 | Operation complete flag | Section 7.3.1 | — |
| M10 | Device that is turned ON for one scan after completion of RIWT | Section 7.3.1 | — |
| M11 | Device that is turned ON for one scan after failure of writing by RIWT | Section 7.3.1 | — |
| M20 | AJ65BT-R2N initial setting start flag | — | — |
| M21 | AJ65BT-R2N initial setting start pulse signal | Section 7.3.1 | — |
| M22 | Operation complete pulse signal | Section 7.3.1 | — |
| M120 | Buffer memory access exclusion check flag | — | Section 7.4.1,<br>Section 7.5.1,<br>Section 7.6.1 |
| M502 | AJ65BT-R2N mode normal flag | — | Section 7.2.1 (3) 1 |
| M901 | Other station data link status (Station No.2) | — | — |
| D0 to D3 | Control data of RIWT instruction | — | — |
| D4 to D7 | Initial setting data | — | — |

(4) Program example

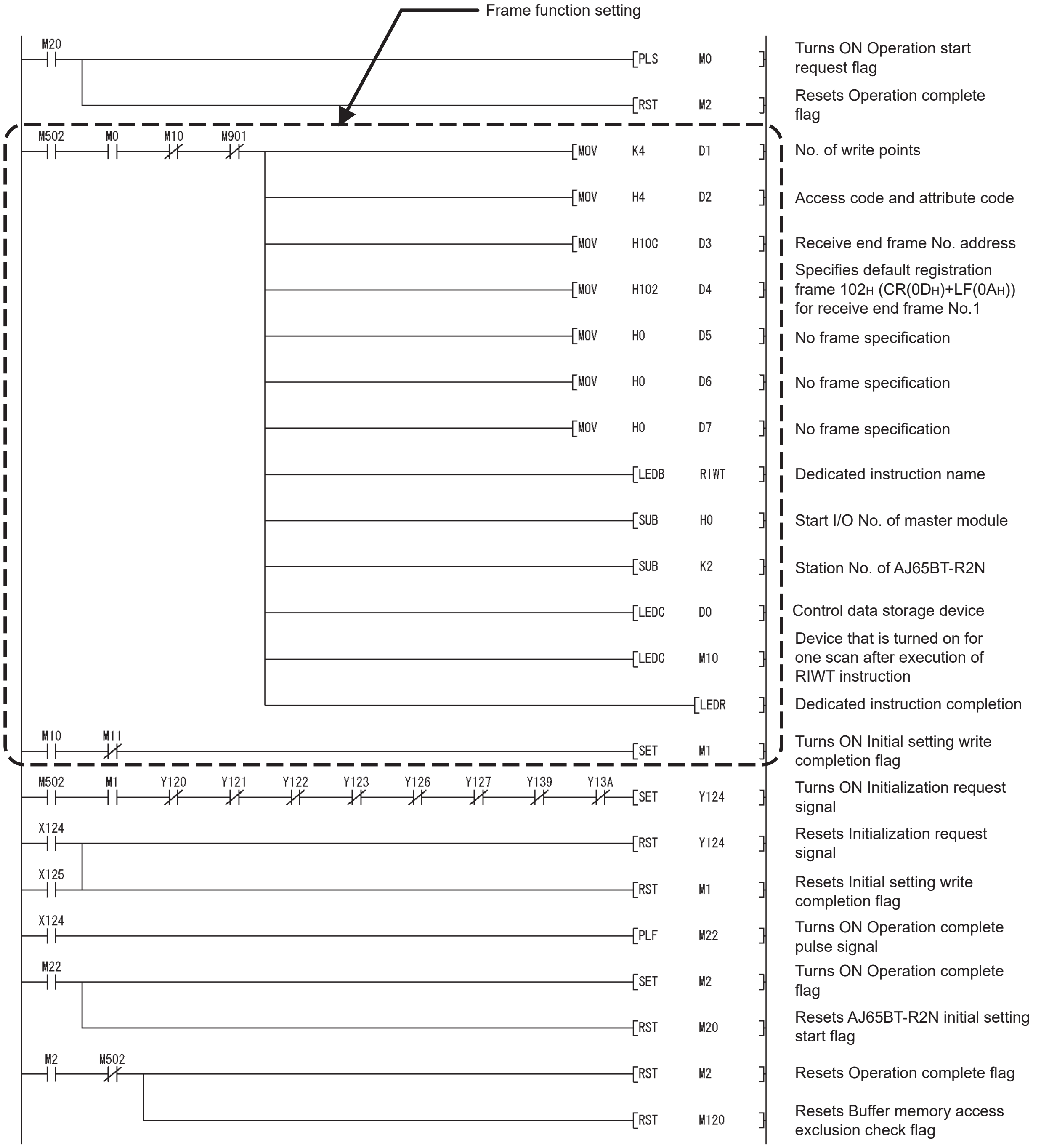

**Figure 7.7 Program example**

(a) Setting of any other function

When changing the frame function setting to other than the above or when using any other function, refer to the section below and modify the area enclosed by the dotted line.

☞ Section 7.7 Initial Settings for Other Functions

## 7.3.2 For the buffer memory auto-refresh function

(1) Overview of program example

1) Initial data are read from the AJ65BT-R2N to the master module.
2) By the frame function, reception is completed when CR(0DH)＋LF(0AH) is received.
3) The AJ65BT-R2N is initialized.

**☒Point**

Make sure to read initial data before performing the initial setting.

(2) Processing in the program example

1) Initial data are read out.
2) Default registration frame 102H (CR(0DH)＋LF(0AH)) is written to Receive start frame No. 1 (R2N 10CH).
3) After writing is normally completed, Initialization request signal (Y124) is turned ON to complete the initial setting.

(3) Devices used in the program example

**Table 7.14 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X124 | Initialization complete signal | Section 7.3.2 | — |
| X125 | Initialization failed signal | Section 7.3.2 | — |
| X139 | Initial data read completion signal | Section 7.3.2 | — |
| X13B | Remote station ready signal | Section 7.3.2 | — |
| Y120 | Send request signal | — | Section 7.4.2 |
| Y121 | Send cancel request signal | — | — |
| Y122 | Receive data read completion signal | — | Section 7.5.2 |
| Y123 | Forced receive completion request signal | — | — |
| Y124 | Initialization request signal | Section 7.3.2 | — |
| Y126 | OS reception area clear request signal | — | — |
| Y127 | $E^2$PROM function request signal | — | — |
| Y139 | Initial data read request signal | Section 7.3.2 | — |
| Y13A | Error reset request signal | — | Section 7.6.2 |
| M0 | Operation start request flag | Section 7.3.2 | — |
| M1 | Initial setting write completion flag | Section 7.3.2 | — |
| M2 | Operation complete flag | Section 7.3.2 | — |
| M22 | Operation complete pulse signal | Section 7.3.2 | — |
| M111 | Initial data read completion pulse signal | — | — |
| M500 | AJ65BT-R2N initial data read complete flag | Section 7.3.2 | — |
| M501 | AJ65BT-R2N initial data reading flag | Section 7.3.2 | — |
| M502 | AJ65BT-R2N mode normal flag | — | Section 7.2.2 (3) 3 |

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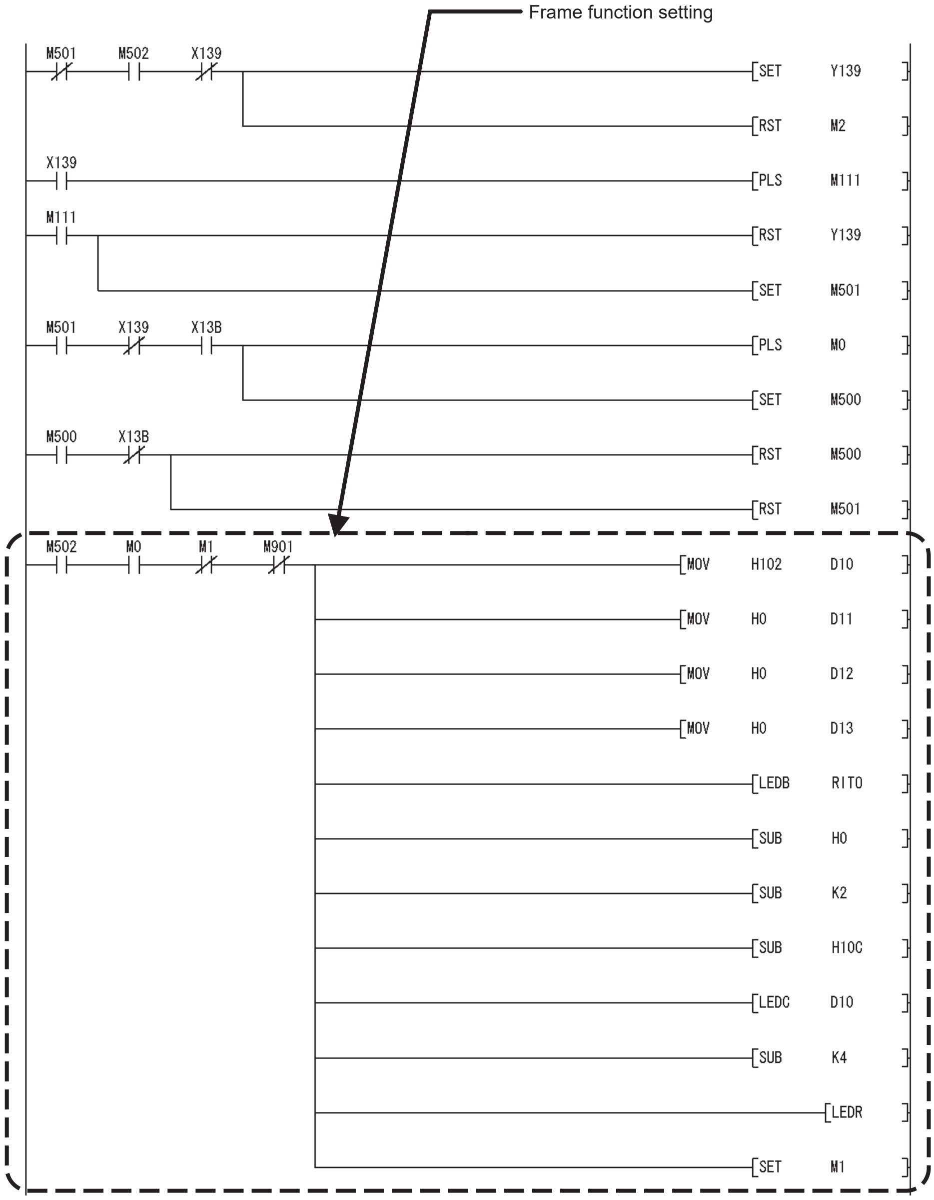
Table 7.14 Devices used in the program example (Continued)

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M901 | Other station data link status (Station No.2) | — | — |
| D10 to D13 | Initial setting data | — | — |

(4) Program example



Turns ON AJ65BT-R2N initial setting start pulse signal

Turns ON Operation start request flag

Turns ON Initial data read completion pulse signal

Turns ON Initial data read request signal

Turns ON AJ65BT-R2N initial data reading flag

Turns ON Operation start request flag

Turns ON AJ65BT-R2N initial data read complete flag

Resets AJ65BT-R2N initial data read complete flag

Resets AJ65BT-R2N initial data reading flag

Specifies default registration frame 102H (CR(0DH)+LF(0AH)) for receive end frame No.1

No frame specification

No frame specification

No frame specification

Dedicated instruction name

Start I/O No. of master module

Station No. of AJ65BT-R2N

Receive end frame No. address

Write data storage device

No. of write points

Dedicated instruction completion

Turns ON Initial setting write completion flag

**Figure 7.8 Program example**

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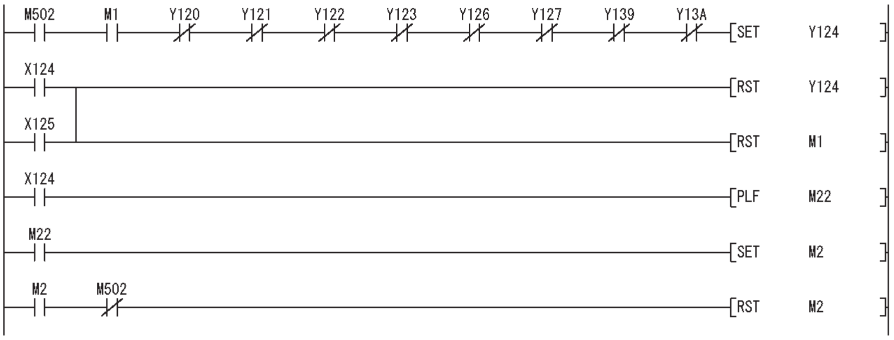


Turns ON Initialization request signal

Resets Initialization request signal

Resets Initial setting write completion flag

Turns ON Operation complete pulse signal

Turns ON Operation complete flag

Resets Operation complete flag

Figure 7.8 Program example (Continued)

(a) Setting of any other function
When changing the frame function setting to other than the above or when using any other function, refer to the section below and modify the area enclosed by the dotted line.

☞ Section 7.7 Initial Settings for Other Functions

## 7.4 Sending to External Device

### 7.4.1 For the send/receive buffer communication function

(1) Overview of program example

If Send execute flag (X22) is turned ON, the character string "ABCDEF" is sent from the master station to the external device.

(2) Processing in the program example

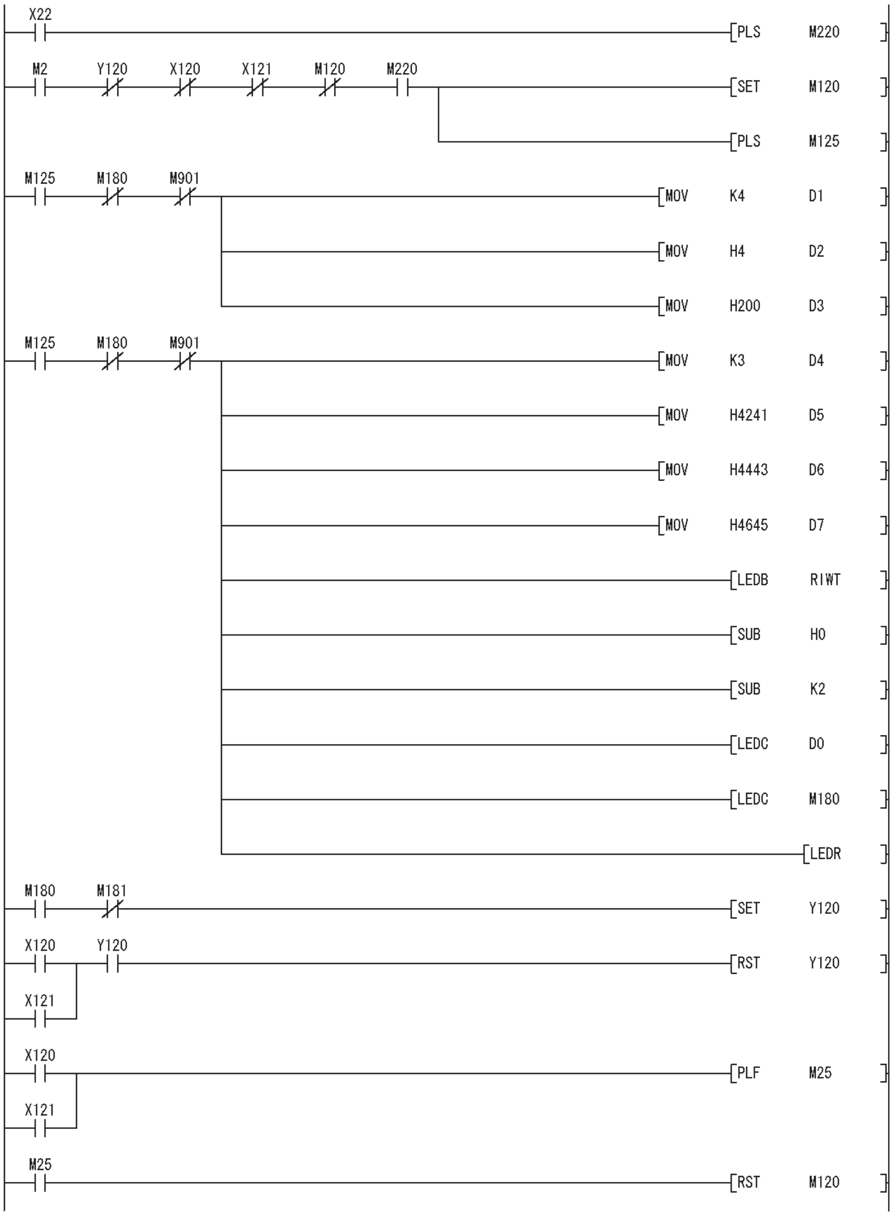
1) No. of send data (3) is written to Send data size specification area (R2N 200H) and the send data ("ABCDEF") is written to Send data area (R2N 201H).
2) Send request signal (Y120) is turned ON to send the data to the external device.
3) Send request signal (Y120) is turned OFF to complete the transmission.

(3) Devices used in the program example

**Table 7.15 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X22 | Send execute flag | — | — |
| X120 | Send complete signal | Section 7.4.1 | — |
| X121 | Send failed signal | Section 7.4.1 | — |
| Y120 | Send request signal | Section 7.4.1 | — |
| M2 | Operation complete flag | — | Section 7.3.1 |
| M25 | Send completion pulse signal | Section 7.4.1 | — |
| M120 | Buffer memory access exclusion check flag | Section 7.4.1 | Section 7.5.1,<br>Section 7.6.1 |
| M125 | Sending flag | Section 7.4.1 | — |
| M180 | Device that is turned ON for one scan after completion of RIWT | Section 7.4.1 | — |
| M181 | Device that is turned ON for one scan after failure of writing by RIWT | Section 7.4.1 | — |
| M220 | Send execution pulse signal | Section 7.4.1 | — |
| M901 | Other station data link status (Station No.2) | — | — |
| D0 to D7 | Control data of RIWT instruction, No. of send data and send data | — | — |

(4) Program example



Turns ON Send execution pulse signal

Turns ON Buffer memory access exclusion check flag

Turns ON Sending flag

No. of write points

Access code and attribute code

Send area address

Specifies No. of send data (in word units)

Specifies (A(41H)+B(42H) +C(43H)+D(44H)+E(45H) +F(46H)) for send data

Dedicated instruction name

Start I/O No. of master module

Station No. of AJ65BT-R2N

Control data storage device

Device that is turned ON for one scan after execution of RIWT instruction

Dedicated instruction completion

Turns ON Buffer memory access exclusion check flag

Resets Send request signal

Turns ON Send completion pulse signal

Resets Buffer memory access exclusion check flag

**Figure 7.9 Program example**

## ☒Point

When sending data of 481 words or more to the external device using the RIWT instruction, divide the send data into parts, each of which contains 480 words or less, to write them to the AJ65BT-R2N.
With the RIWT instruction, data of 481 words or more cannot be written to the AJ65BT-R2N at one time.

## 7.4.2 For the buffer memory auto-refresh function

### (1) Overview of program example

If Send execute flag (X22) is turned ON, the character string "ABCDEF" is sent to the external device.

### (2) Processing in the program example

1) No. of send data (3) is written to Send data size specification area (R2N 200H) and the send data ("ABCDEF") is written to Send data area (R2N 201H).
2) Send request signal (Y120) is turned ON to send the data to the external device.
3) Send request signal (Y120) is turned OFF to complete the transmission.

### (3) Devices used in the program example

**Table 7.16 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X22 | Send execute flag | — | — |
| X120 | Send complete signal | Section 7.4.2 | — |
| X121 | Send failed signal | Section 7.4.2 | — |
| Y120 | Send request signal | Section 7.4.2 | — |
| M2 | Operation complete flag | — | Section 7.3.2 |
| M25 | Send completion pulse signal | Section 7.4.2 | — |
| M120 | Send-in-process flag | Section 7.4.2 | — |
| M125 | Sending flag | Section 7.4.2 | — |
| M220 | Send execution pulse signal | Section 7.4.2 | — |
| M901 | Other station data link status (Station No.2) | — | — |
| D10 to D13 | No. of send data and send data | — | — |

(4) Program example

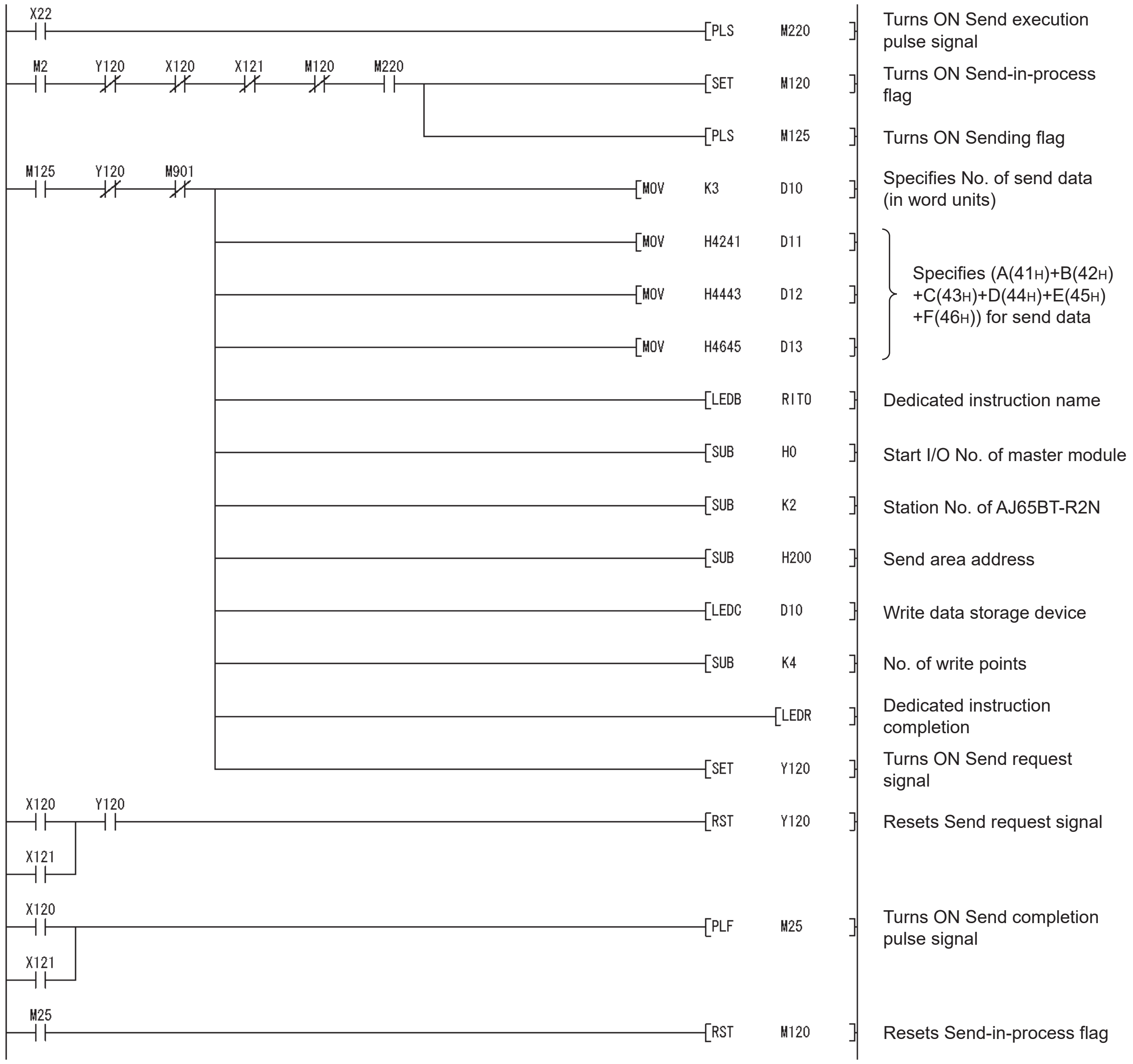


**Figure 7.10 Program example**

## ☒Point

When sending data of 4097 words or more to the external device using the RITO instruction, divide the send data into parts, each of which contains 4096 words or less, to write them to the AJ65BT-R2N.
With the RITO instruction, data of 4097 words or more cannot be written to the AJ65BT-R2N at one time.

## 7.5 Receiving from External Device

### 7.5.1 For the send/receive buffer communication function

(1) Overview of program example

If the AJ65BT-R2N receives data from the external device, the received data are read out to the master station word device (D39).

(2) Processing in the program example

1) No. of receive data is read from Receive data size specification area (R2N 400H) to the master station word device (D34).
2) The receive data are read from Receive data area (R2N 401H) to the master station word device (from D39).
3) Receive data read completion signal (Y122) is turned ON→OFF to terminate the reception.

(3) Devices used in the program example

**Table 7.17 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X122 | Normal receive data read request signal | — | — |
| X123 | Error receive data read request signal | — | — |
| Y122 | Receive data read completion signal | Section 7.5.1 | — |
| M2 | Operation complete flag | — | Section 7.3.1 |
| M120 | Buffer memory access exclusion check flag | Section 7.5.1 | Section 7.4.1,<br>Section 7.6.1 |
| M130 | Receiving flag | Section 7.5.1 | — |
| M155 | Device that is turned ON for one scan after completion of RIRD | Section 7.5.1 | — |
| M156 | Device that is turned ON for one scan after failure of reading by RIRD | Section 7.5.1 | — |
| M160 | Device that is turned ON for one scan after completion of RIRD | Section 7.5.1 | — |
| M161 | Device that is turned ON for one scan after failure of reading by RIRD | Section 7.5.1 | — |
| M901 | Other station data link status (Station No.2) | — | — |
| D30 to D34 | Control data of RIRD instruction, and No. of receive data (in word units) | — | — |
| From D35 | Control data of RIRD instruction, and receive data | — | — |

(4) Program example

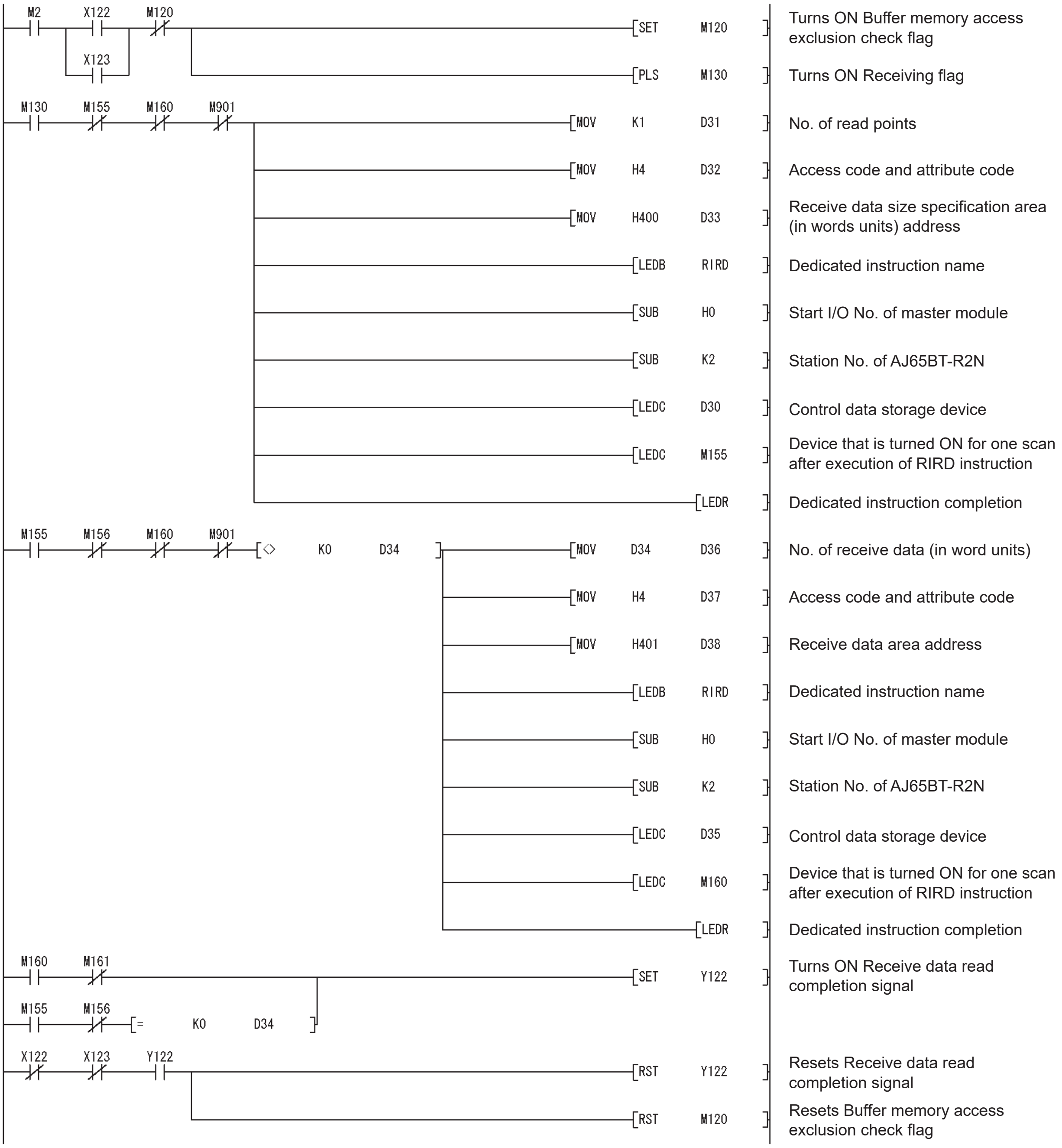


**Figure 7.11 Program example**

## ☒Point

When receiving data of 481 words or more from the external device using the RIRD instruction, divide the receive data into parts, each of which contains 480 words or less, to read them from the AJ65BT-R2N.
With the RIRD instructions, data of 481 words or more cannot be read from the AJ65BT-R2N at one time.

## 7.5.2 For the buffer memory auto-refresh function

(1) Overview of program example

When the AJ65BT-R2N receives data from the external device, the received data are read out to the master station word device (D200).

(2) Processing in the program example

1) No. of receive data is read from Receive data size specification area (R2N 400H) to the master station word device (D200).
2) The receive data are read from Receive data area(R2N 401H) to the master station word device (D201 or later).
3) Receive data read completion signal (Y122) is turned ON → OFF to terminate the reception.

(3) Devices used in the program example

**Table 7.18 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X122 | Normal receive data read request signal | — | — |
| X123 | Error receive data read request signal | — | — |
| Y122 | Receive data read completion signal | Section 7.5.2 | — |
| M2 | Operation complete flag | — | Section 7.3.2 |
| M130 | Receiving flag | Section 7.5.2 | — |
| M901 | Other station data link status (Station No.2) | — | — |
| D200 | No. of receive data | — | — |
| From D201 | Receive data | — | — |

(4) Program example

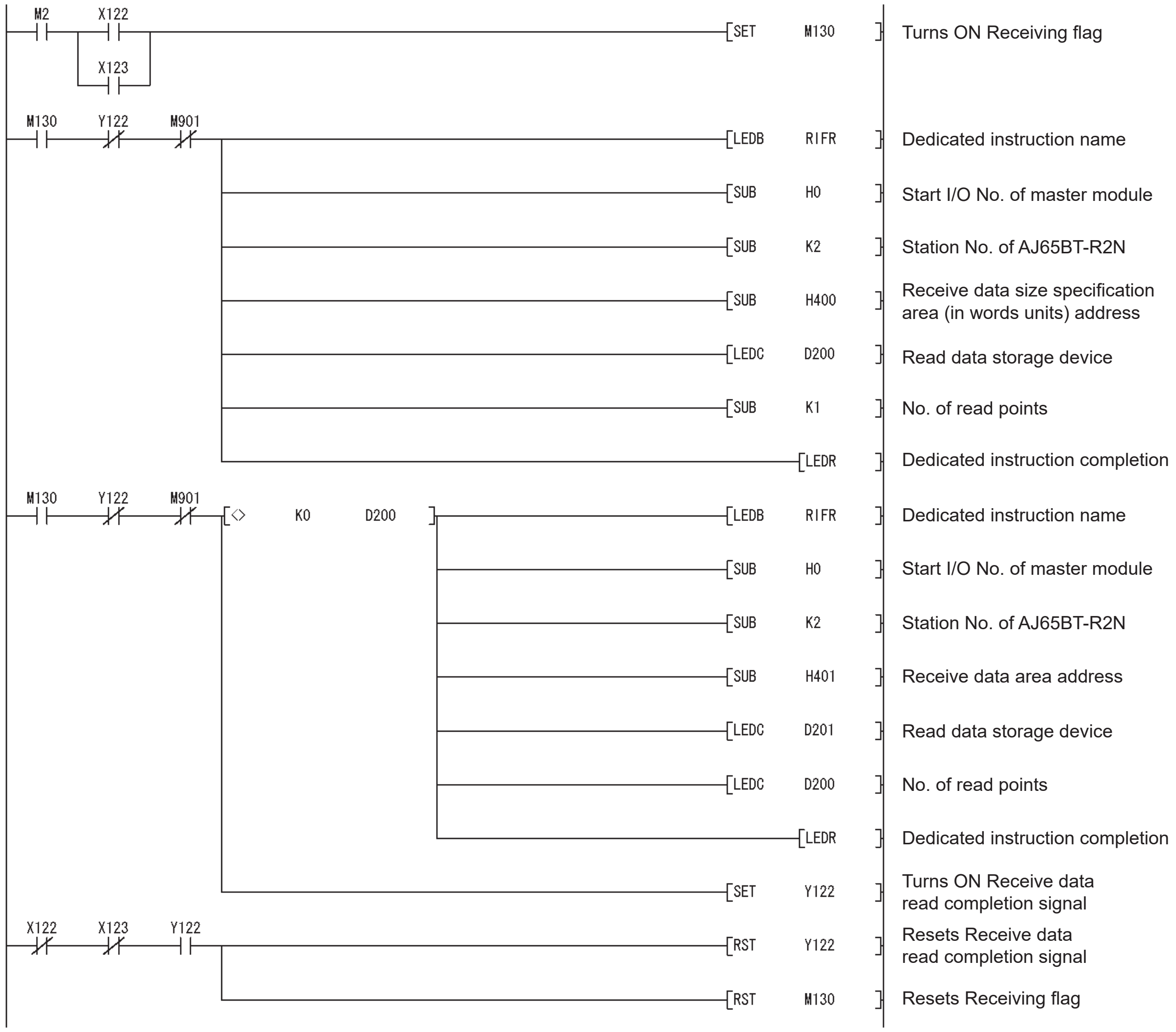


**Figure 7.12 Program example**

## ☒Point

When receiving data of 4097 words or more from the external device using the RIFR instruction, divide the receive data into parts, each of which contains 4096 words or less, to read them from the AJ65BT-R2N.
With the RIFR instructions, data of 4097 words or more cannot be read from the AJ65BT-R2N at one time.

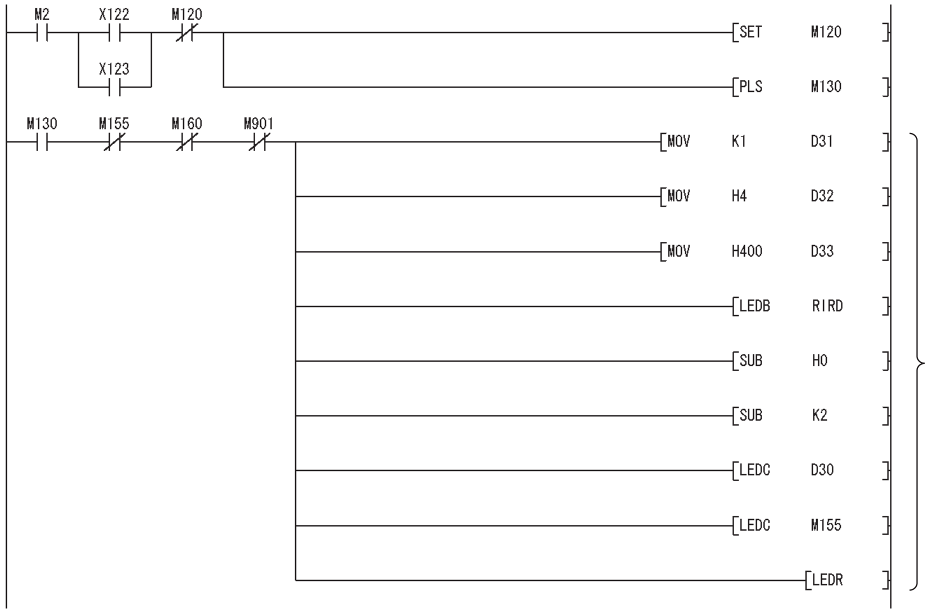
## 7.5.3 Precautions when receiving data from external device

### (1) Precautions for specification in byte units

The setting in Word/byte specification (R2N 102H) influences the number of the data handled by the following buffer memory areas.

- No. of receive end data (R2N 111H)
- No. of actual send data (R2N 1B4H)
- No. of data stored in OS reception area (R2N 1B6H)
- Send data size specification area (R2N 200H (at default))
- Receive data size specification area (R2N 400H (at default))

In the case of byte specification, to use any of the above memory values as set data of a dedicated instruction, the byte data must be changed to word data as shown below.



Reads No. of receive data (in byte units)

**Figure 7.13 Receive program example in the case of byte specification**

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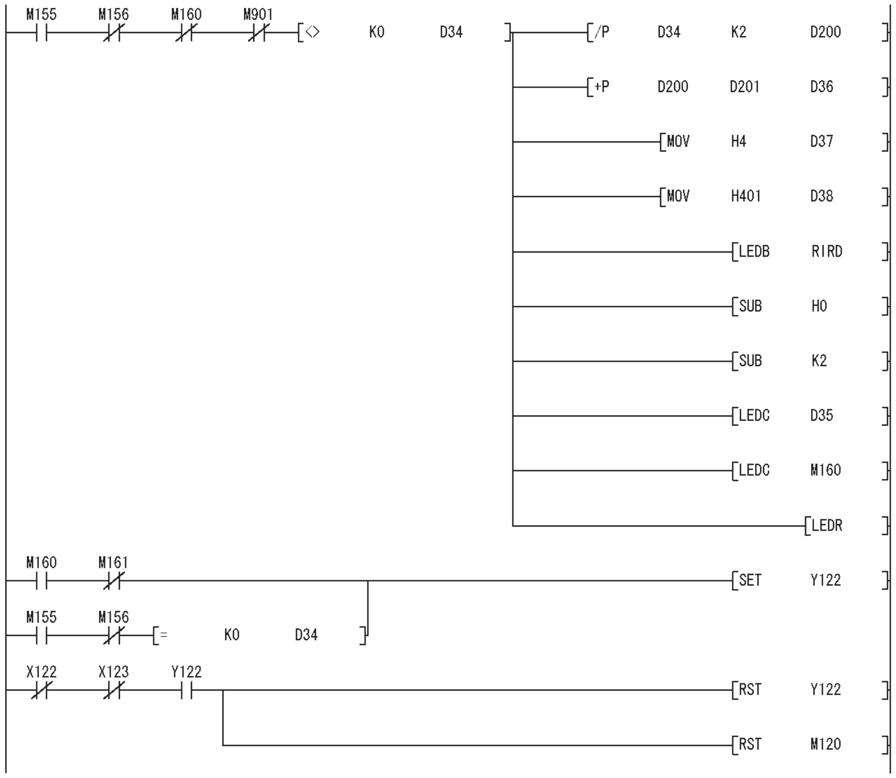


Changes No. of receive data (in byte units) to No. of words (fractions rounded up) and specifies as No. of read points in RIRD instruction

Figure 7.13 Receive program example in the case of byte specification (Continued)

## 7.6 Error Handling of AJ65BT-R2N

### 7.6.1 For the send/receive buffer communication function

(1) Overview of program example

1) When an error occurs during initialization setting or data transfer, an error code will be read out from the AJ65BT-R2N to the master module if Error code read flag (X23) is turned ON.

2) The error is canceled when Error clear flag (X24) is turned ON after the cause of the error has been eliminated.

(2) Processing in the program example

1) If any of the signals below are turned ON and Error code read flag (X23) is turned ON, an error code will be read out from the AJ65BT-R2N to the master module.
   - Send failed signal (X121)
   - Error receive data read request signal (X123)
   - Initialization failed signal (X125)
   - $E^2$PROM function failed signal (X128)

2) If Error clear flag (X24) is turned ON after the cause of the error has been eliminated, Error reset request signal (RY(n+1)A) will be turned ON and the error will be cleared.

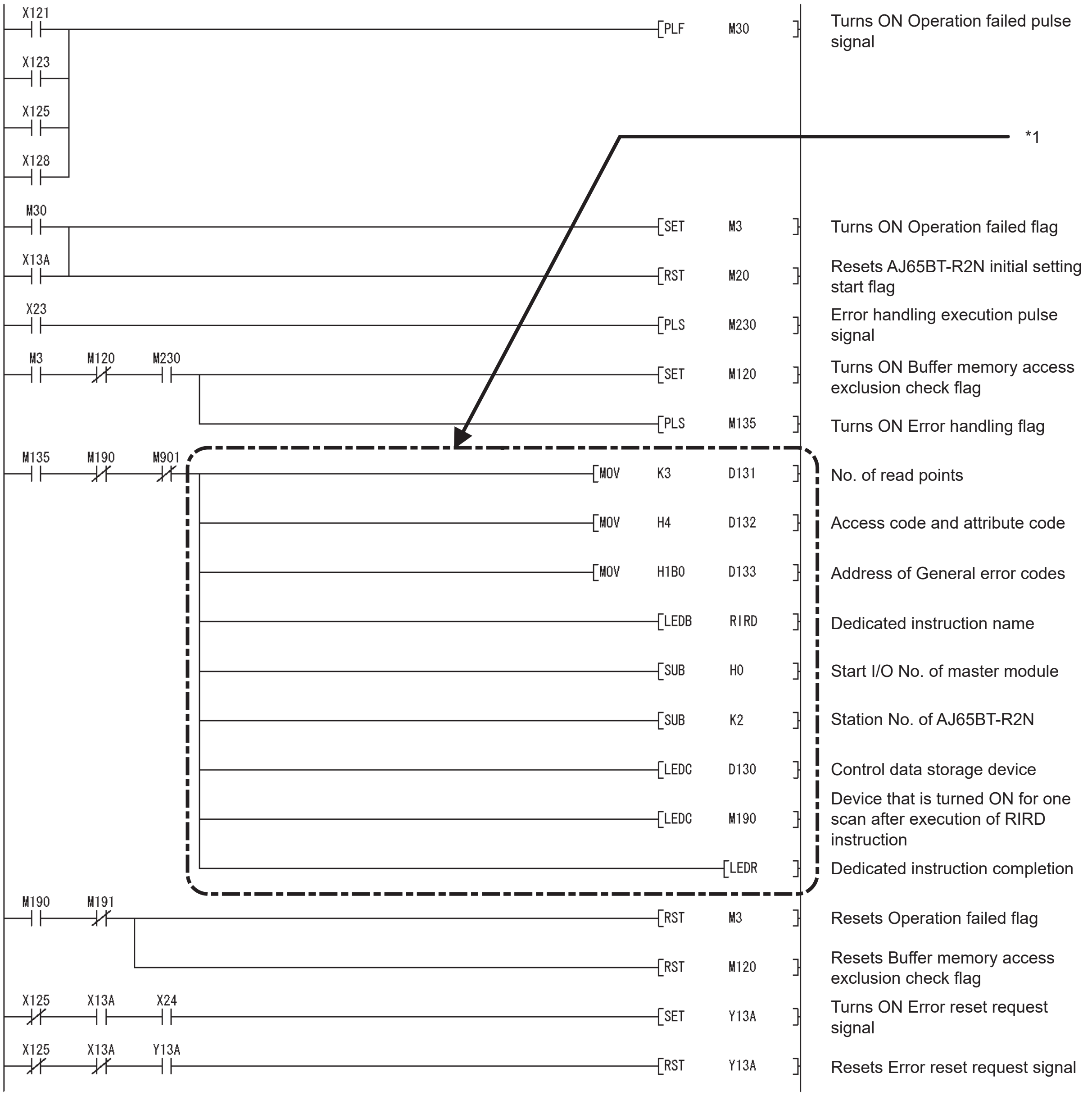
3) This turns off the ERR.LED, and error handling is complete when Error code storage area (R2N 1A8H to 1B2H) is cleared.

(3) Devices used in the program example

**Table 7.19 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X23 | Error code read flag | — | — |
| X24 | Error clear flag | — | — |
| X121 | Send failed signal | — | Section 7.4.1 |
| X123 | Error receive data read request signal | — | — |
| X125 | Initialization failed signal | — | Section 7.3.1 |
| X128 | $E^2$PPROM function failed signal | — | — |
| X13A | Error status signal | Section 7.6.1 | — |
| Y13A | Error reset request signal | Section 7.6.1 | — |
| M3 | Operation failed flag | Section 7.6.1 | — |
| M20 | AJ65BT-R2N initial setting start flag | — | — |
| M30 | Operation failed pulse signal | Section 7.6.1 | — |
| M120 | Buffer memory access exclusion check flag | Section 7.6.1 | Section 7.4.1,<br>Section 7.5.1 |
| M135 | Error handling flag | — | — |
| M190 | Device that is turned ON for one scan after completion of RIRD | Section 7.6.1 | — |
| M191 | Device that is turned ON for one scan after failure of reading by RIRD | Section 7.6.1 | — |
| M230 | Error handling execution pulse signal | Section 7.6.1 | — |
| M901 | Other station data link status (Station No.2) | — | — |
| D130 to D133 | Control data of RIRD instruction | — | — |

(4) Program example



*1 Modify this according to the system being used and processing executed, etc.

**Figure 7.14 Program example**

## 7.6.2 For the buffer memory auto-refresh function

### (1) Overview of program example

1) When an error occurs during initialization setting or data transfer, an error code will be read out from the AJ65BT-R2N to the master module if Error code read flag (X23) is turned ON.
2) The error is canceled when Error clear flag (X24) is turned ON after the cause of the error has been eliminated.

### (2) Processing in the program example

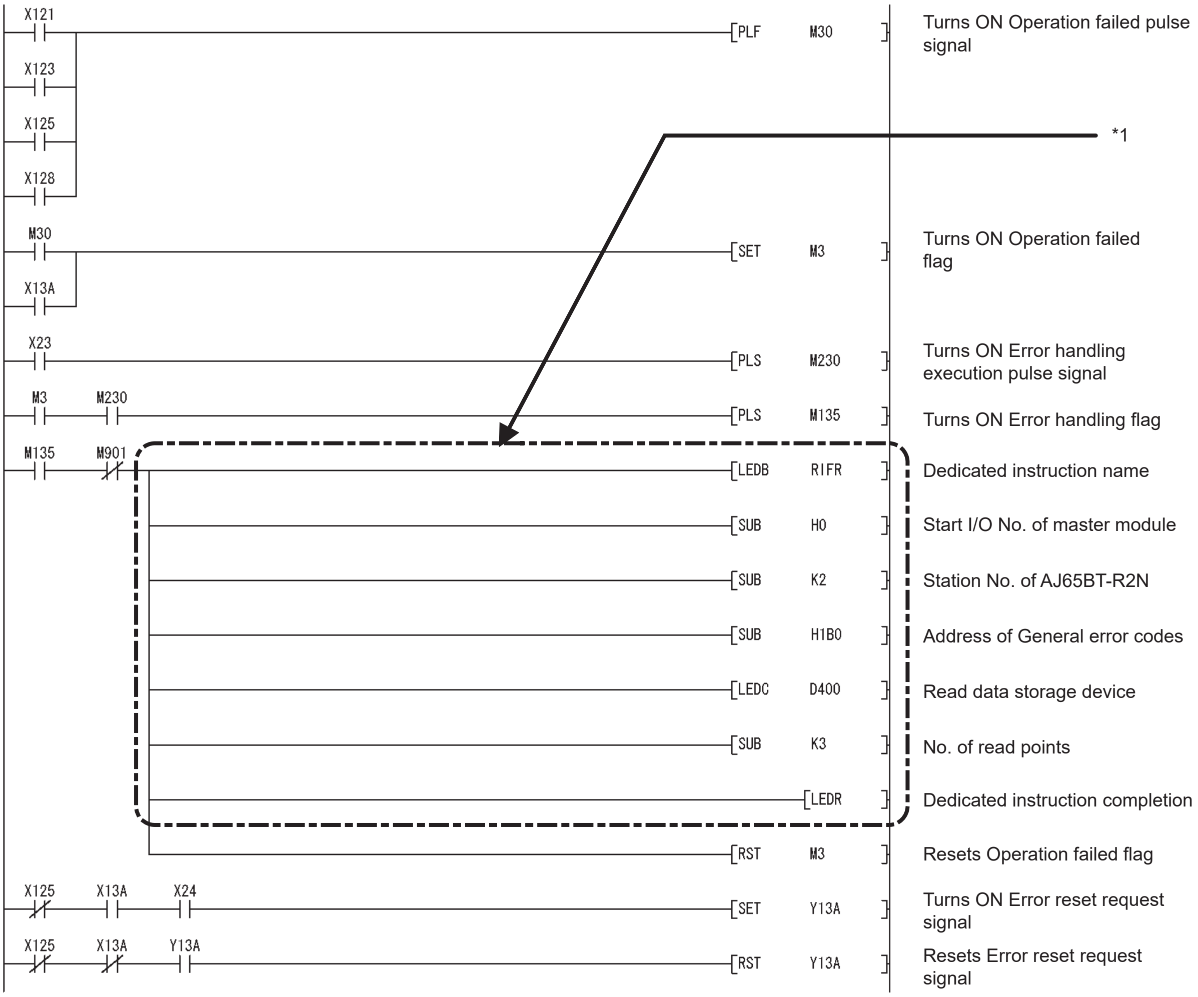
1) If any of the signals below are turned ON and Error code read flag (X23) is turned ON, an error code will be read out from the AJ65BT-R2N to the master module.
   - Send failed signal (X121)
   - Error receive data read request signal (X123)
   - Initialization failed signal (X125)
   - $E^2$PROM function failed signal (X128)
2) If Error clear flag (X24) is turned ON after the cause of the error has been eliminated, Error reset request signal (RY(n+1)A) will be turned ON and the error will be cleared.
3) This turns off the ERR.LED, and error handling is complete when Error code storage area (R2N 1A8H to 1B2H) is cleared.

### (3) Devices used in the program example

**Table 7.20 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X23 | Error code read flag | — | — |
| X24 | Error clear flag | — | — |
| X121 | Send failed signal | — | Section 7.4.2 |
| X123 | Error receive data read request signal | — | — |
| X125 | Initialization failed signal | — | Section 7.3.2 |
| X128 | $E^2$PROM function failed signal | — | — |
| X13A | Error status signal | Section 7.6.2 | — |
| Y13A | Error reset request signal | Section 7.6.2 | — |
| M3 | Operation failed flag | Section 7.6.2 | — |
| M30 | Operation failed pulse signal | Section 7.6.2 | — |
| M135 | Error handling flag | Section 7.6.2 | — |
| M230 | Error handling execution pulse signal | Section 7.6.2 | — |
| M901 | Other station data link status (Station No.2) | — | — |
| D400 to D402 | AJ65BT-R2N error code | — | — |

(4) Program example



*1 Modify this according to the system being used and processing executed, etc.

**Figure 7.15 Program example**

## 7.7 Initial Settings for Other Functions

This section explains programs for the initial setting of the functions listed below.

**Table 7.21 List of other functions**

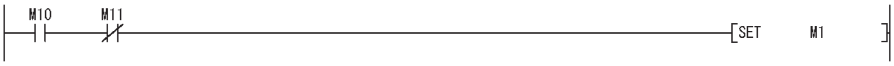
| Function | Reference section |
|---|---|
| Initial setting for the frame function | Section 7.7.1 |
| Initial setting for the monitoring-based transmission function | Section 7.7.2 |
| Initial setting for the flow control function | Section 7.7.3 |
| Initial setting for the ASCII-binary conversion function | Section 7.7.4 |
| Initial setting for the RW refresh function | Section 7.7.5 |

Only the initial setting program is extracted for each function.
When using each function, apply the extracted program to the program given in the following section.

☞ Section 7.3 Initial Setting for AJ65BT-R2N

**Remark**

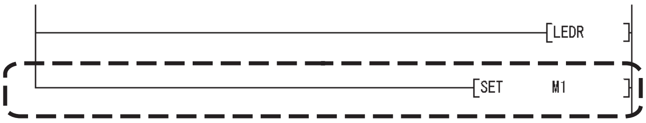
(1) When using more than one of the above functions during use of the send/receive buffer communication function, modify the program as follows:
- Avoid any duplicate settings with the devices (M10 to M17) that turn ON after completion of the RIWT instruction.
- For the RIWT instruction used at the end of initial setting, specify M10 as the device that turns ON after completion of the instruction.
- Have the following program, which is included in each program, executed one time at the end of all initial setting procedures.



Turns ON Initial setting write completion flag

**Figure 7.16 Program executed only at the end of initial setting**

(2) When using more than one of the above functions during use of the buffer memory auto-refresh function, modify the program as follows:
- Have the program part enclosed as shown below, which is included in each program, executed one time at the end of all initial setting procedures.



Dedicated instruction completion

Turns ON Initial setting write completion flag

**Figure 7.17 Program executed only at the end of initial setting**

## 7.7.1 Initial setting for the frame function

### (1) For the send/receive buffer communication function

(a) Overview of program example

Reception is completed when ETX(03H) or NUL(00H) is received.

(b) Devices used in the program example

**Table 7.22 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 7.3.1 |
| M1 | Initial setting write completion flag | Section 7.7.1 | Section 7.3.1 |
| M10 | Device that is turned ON for one scan after completion of RIWT | Section 7.7.1 | Section 7.3.1 |
| M11 | Device that is turned ON for one scan after failure of writing by RIWT | Section 7.7.1 | Section 7.3.1 |
| M502 | AJ65BT-R2N mode normal flag | — | Section 7.2.1 (3) 3 |
| M901 | Other station data link status (Station No.2) | — | — |
| D0 to D3 | Control data of RIWT instruction | — | — |
| D4 to D7 | Receive end frame No.1 to 4 | — | — |

(c) Program example

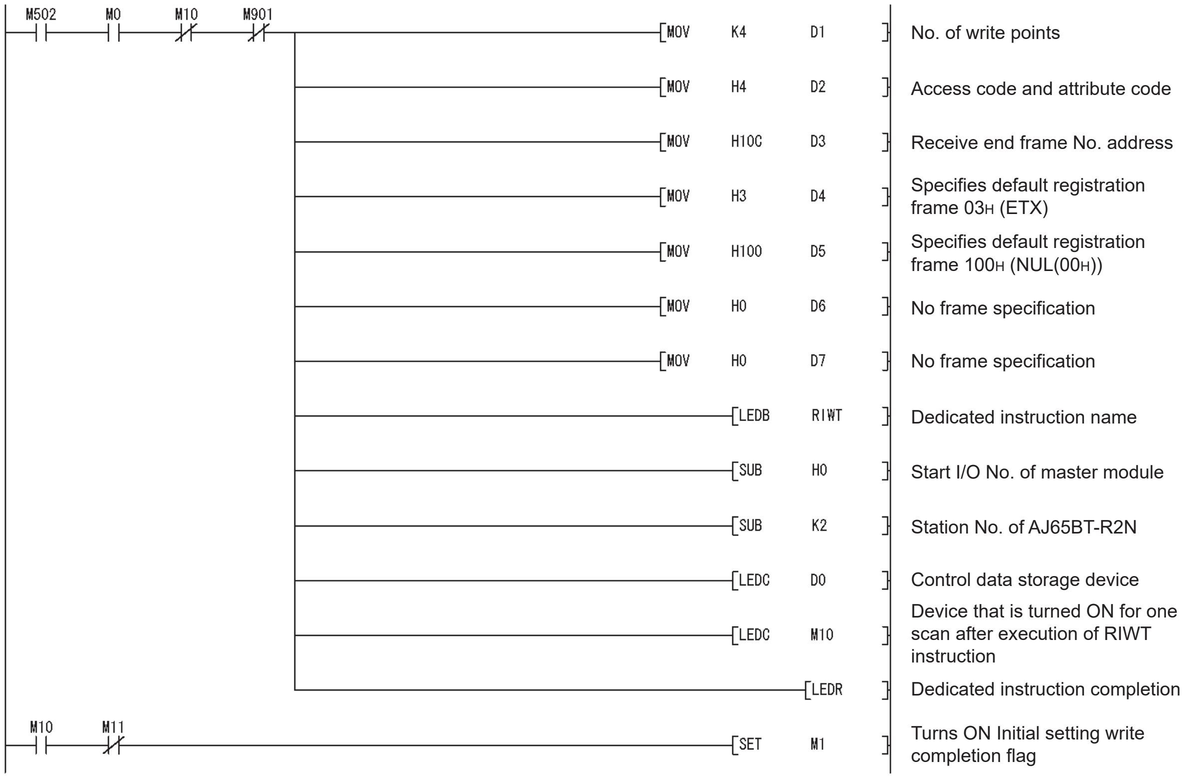


**Figure 7.18 Program example**

## (2) For the buffer memory auto-refresh function

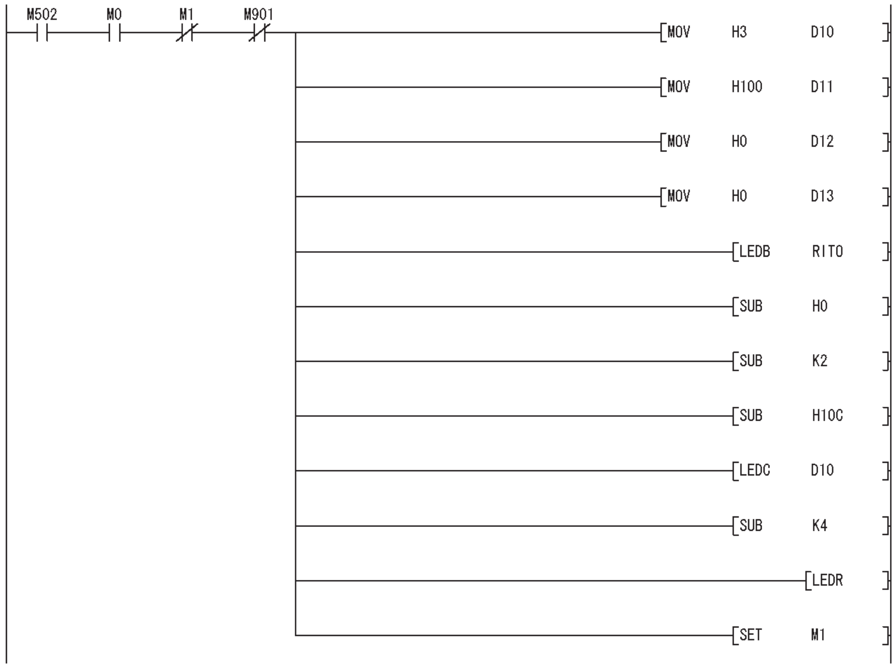
(a) Overview of program example
Reception is completed when ETX(03H) or NUL(00H) is received.

(b) Devices used in the program example

**Table 7.23 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 7.3.2 |
| M1 | Initial setting write completion flag | Section 7.7.1 | Section 7.3.2 |
| M502 | AJ65BT-R2N mode normal flag | — | Section 7.2.2 (3) 3 |
| M901 | Other station data link status (Station No.2) | — | — |
| D10 to D13 | Receive end frame No.1 to 4 | — | — |

(c) Program example



Specifies default registration frame 03H (ETX)

Specifies default registration frame 100H (NUL(00H))

No frame specification

No frame specification

Dedicated instruction name

Start I/O No. of master module

Station No. of AJ65BT-R2N

Receive end frame No. address

Write data storage device

No. of write points

Dedicated instruction completion

Turns ON Initial setting write completion flag

Figure 7.19 Program example

## 7.7.2 Initial setting for the monitoring-based transmission function

(1) For the send/receive buffer communication function

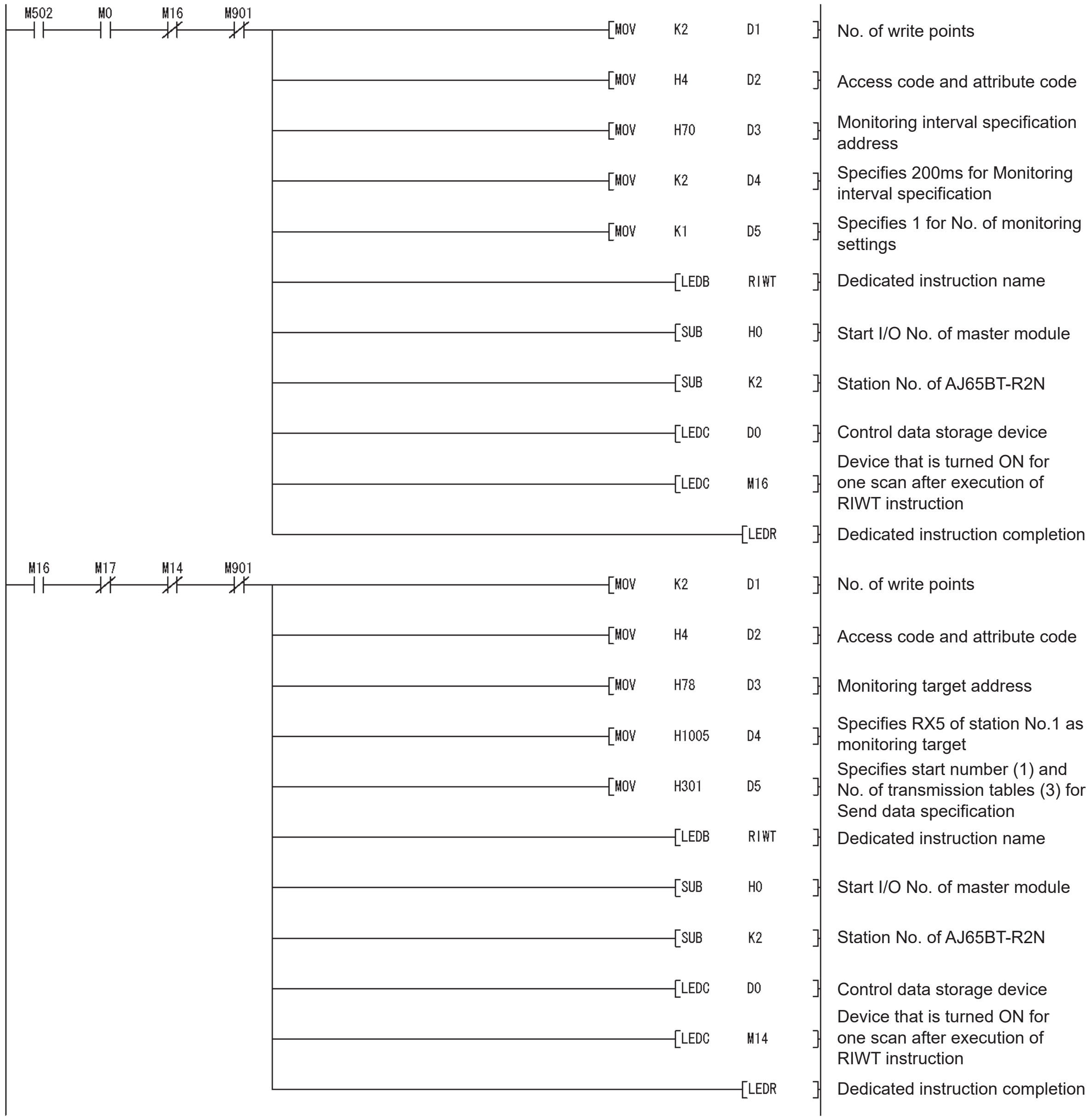
(a) Overview of program example
- The monitoring interval is set to 200ms and the send timeout time is set to 500ms.
- Data are sent when RX5 of the module of station No.1 turns ON.
- STX (02H) + User registration frame (3E8H) + ETX(03H) is set as the send data.

(b) Devices used in the program example

**Table 7.24 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 7.3.1 |
| M1 | Initial setting write completion flag | Section 7.7.2 | Section 7.3.1 |
| M10 | Device that is turned ON for one scan after completion of RIWT | Section 7.7.2 | Section 7.3.1 |
| M11 | Device that is turned ON for one scan after failure of writing by RIWT | Section 7.7.2 | Section 7.3.1 |
| M12 | Device that is turned ON for one scan after completion of RIWT | Section 7.7.2 | — |
| M13 | Device that is turned ON for one scan after failure of writing by RIWT | Section 7.7.2 | — |
| M14 | Device that is turned ON for one scan after completion of RIWT | Section 7.7.2 | — |
| M15 | Device that is turned ON for one scan after failure of writing by RIWT | Section 7.7.2 | — |
| M16 | Device that is turned ON for one scan after completion of RIWT | Section 7.7.2 | — |
| M17 | Device that is turned ON for one scan after failure of writing by RIWT | Section 7.7.2 | — |
| M502 | AJ65BT-R2N mode normal flag | — | Section 7.2.1 (3) 3 |
| M901 | Other station data link status (Station No.2) | — | — |
| D0 to D4 | Control data of RIWT instruction | — | — |
| D5 to D8 | Monitoring-based transmission function set values | — | — |

(c) Program example



```
M502 M0 M16 M901
[MOV   K2     D1   ]  No. of write points
[MOV   H4     D2   ]  Access code and attribute code
[MOV   H70    D3   ]  Monitoring interval specification address
[MOV   K2     D4   ]  Specifies 200ms for Monitoring interval specification
[MOV   K1     D5   ]  Specifies 1 for No. of monitoring settings
[LEDB  RIWT        ]  Dedicated instruction name
[SUB   H0          ]  Start I/O No. of master module
[SUB   K2          ]  Station No. of AJ65BT-R2N
[LEDC  D0          ]  Control data storage device
[LEDC  M16         ]  Device that is turned ON for one scan after execution of RIWT instruction
[LEDR              ]  Dedicated instruction completion
M16 M17 M14 M901
[MOV   K2     D1   ]  No. of write points
[MOV   H4     D2   ]  Access code and attribute code
[MOV   H78    D3   ]  Monitoring target address
[MOV   H1005  D4   ]  Specifies RX5 of station No.1 as monitoring target
[MOV   H301   D5   ]  Specifies start number (1) and No. of transmission tables (3) for Send data specification
[LEDB  RIWT        ]  Dedicated instruction name
[SUB   H0          ]  Start I/O No. of master module
[SUB   K2          ]  Station No. of AJ65BT-R2N
[LEDC  D0          ]  Control data storage device
[LEDC  M14         ]  Device that is turned ON for one scan after execution of RIWT instruction
[LEDR              ]  Dedicated instruction completion
```

**Figure 7.20 Program example**

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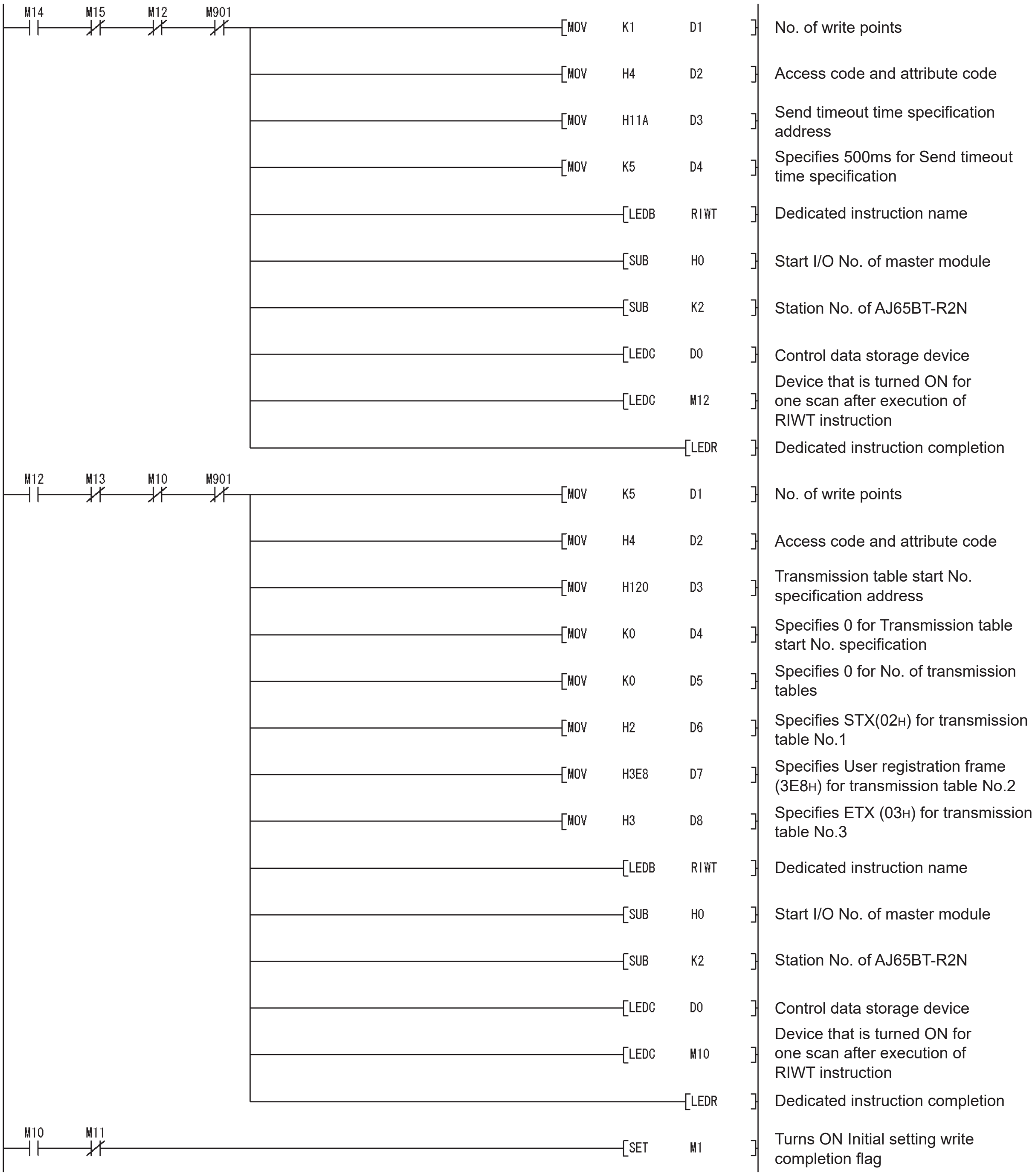

```
M14  M15  M12  M901
-| |--|/|--|/|--|/|--+--[MOV   K1    D1 ]   No. of write points
                     +--[MOV   H4    D2 ]   Access code and attribute code
                     +--[MOV   H11A  D3 ]   Send timeout time specification address
                     +--[MOV   K5    D4 ]   Specifies 500ms for Send timeout time specification
                     +--[LEDB  RIWT     ]   Dedicated instruction name
                     +--[SUB   H0       ]   Start I/O No. of master module
                     +--[SUB   K2       ]   Station No. of AJ65BT-R2N
                     +--[LEDC  D0       ]   Control data storage device
                     +--[LEDC  M12      ]   Device that is turned ON for one scan after execution of RIWT instruction
                     +--[LEDR           ]   Dedicated instruction completion
M12  M13  M10  M901
-| |--|/|--|/|--|/|--+--[MOV   K5    D1 ]   No. of write points
                     +--[MOV   H4    D2 ]   Access code and attribute code
                     +--[MOV   H120  D3 ]   Transmission table start No. specification address
                     +--[MOV   K0    D4 ]   Specifies 0 for Transmission table start No. specification
                     +--[MOV   K0    D5 ]   Specifies 0 for No. of transmission tables
                     +--[MOV   H2    D6 ]   Specifies STX(02H) for transmission table No.1
                     +--[MOV   H3E8  D7 ]   Specifies User registration frame (3E8H) for transmission table No.2
                     +--[MOV   H3    D8 ]   Specifies ETX (03H) for transmission table No.3
                     +--[LEDB  RIWT     ]   Dedicated instruction name
                     +--[SUB   H0       ]   Start I/O No. of master module
                     +--[SUB   K2       ]   Station No. of AJ65BT-R2N
                     +--[LEDC  D0       ]   Control data storage device
                     +--[LEDC  M10      ]   Device that is turned ON for one scan after execution of RIWT instruction
                     +--[LEDR           ]   Dedicated instruction completion
M10  M11
-| |--|/|---------------[SET   M1       ]   Turns ON Initial setting write completion flag
```

Figure 7.20 Program example (Continued)

(2) For the buffer memory auto-refresh function

(a) Overview of program example

- The monitoring interval is set to 200ms and the send timeout time is set to 500ms.
- Data are sent when RX5 of the module of station No.1 turns ON.
- STX (02H)＋User registration frame (3E8H)＋ETX(03H) is set as the send data.

(b) Devices used in the program example

**Table 7.25 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 7.3.2 |
| M1 | Initial setting write completion flag | Section 7.7.2 | Section 7.3.2 |
| M502 | AJ65BT-R2N mode normal flag | — | Section 7.2.2 (3) 3 |
| M901 | Other station data link status (Station No.2) | — | — |
| D10 to D14 | Monitoring-based transmission function set values | — | — |

(c) Program example

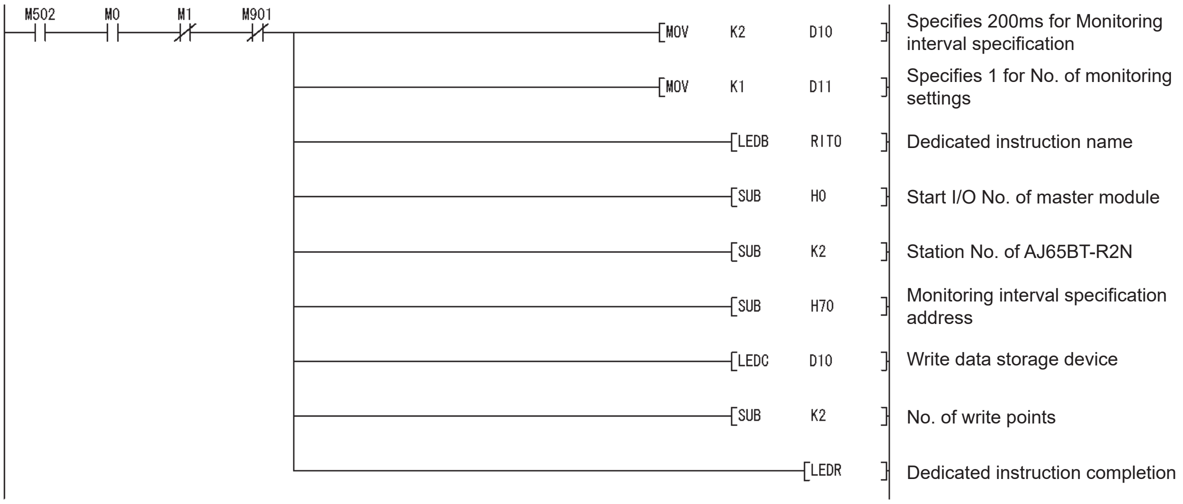

**Figure 7.21 Program example**

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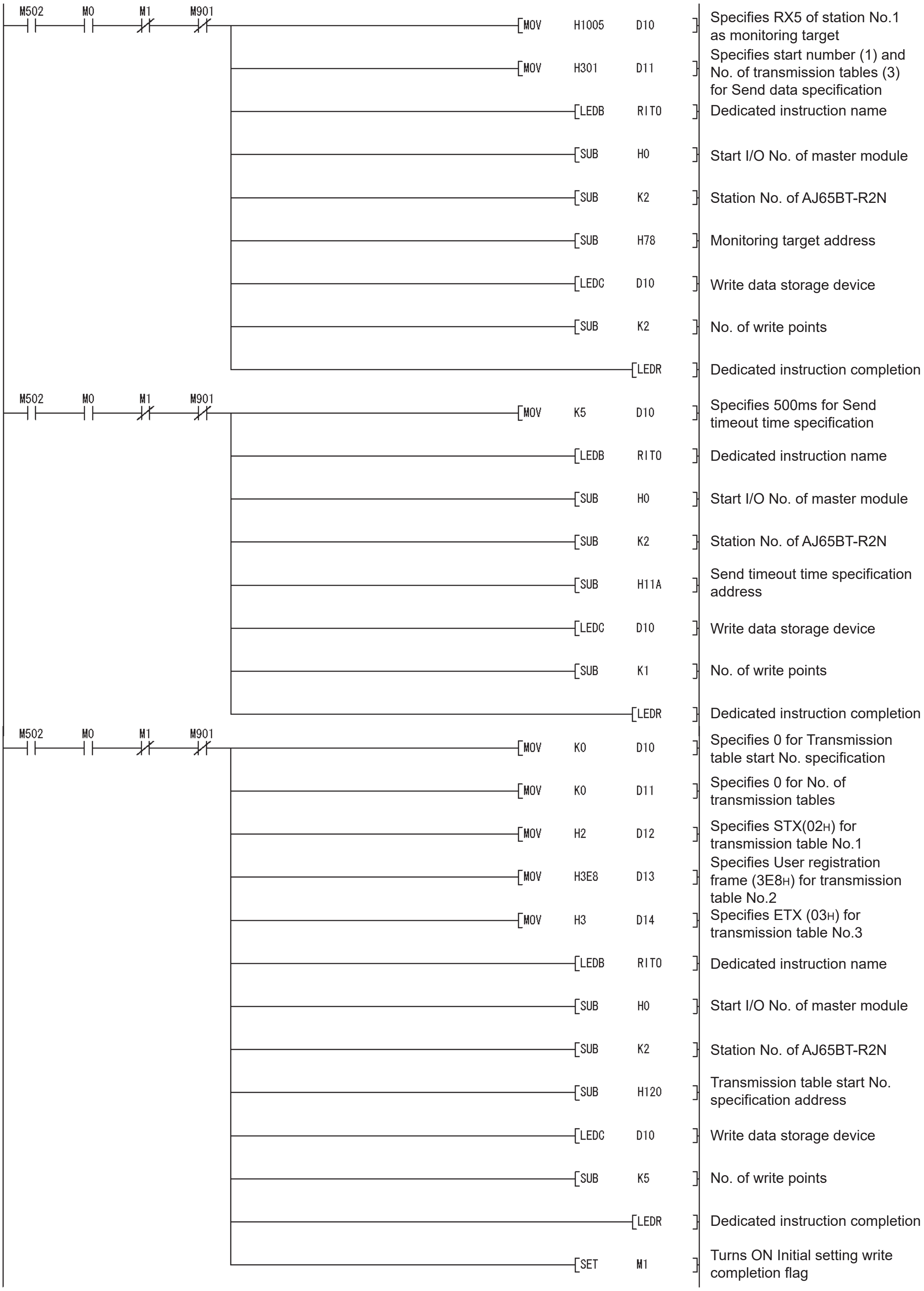


```
M502  M0  M1  M901
─┤├───┤├──┤/├──┤/├─┬─[MOV  H1005 D10 ]  Specifies RX5 of station No.1 as monitoring target
                   ├─[MOV  H301  D11 ]  Specifies start number (1) and No. of transmission tables (3) for Send data specification
                   ├─[LEDB RIT0      ]  Dedicated instruction name
                   ├─[SUB  H0        ]  Start I/O No. of master module
                   ├─[SUB  K2        ]  Station No. of AJ65BT-R2N
                   ├─[SUB  H78       ]  Monitoring target address
                   ├─[LEDC D10       ]  Write data storage device
                   ├─[SUB  K2        ]  No. of write points
                   └─[LEDR           ]  Dedicated instruction completion
M502  M0  M1  M901
─┤├───┤├──┤/├──┤/├─┬─[MOV  K5    D10 ]  Specifies 500ms for Send timeout time specification
                   ├─[LEDB RIT0      ]  Dedicated instruction name
                   ├─[SUB  H0        ]  Start I/O No. of master module
                   ├─[SUB  K2        ]  Station No. of AJ65BT-R2N
                   ├─[SUB  H11A      ]  Send timeout time specification address
                   ├─[LEDC D10       ]  Write data storage device
                   ├─[SUB  K1        ]  No. of write points
                   └─[LEDR           ]  Dedicated instruction completion
M502  M0  M1  M901
─┤├───┤├──┤/├──┤/├─┬─[MOV  K0    D10 ]  Specifies 0 for Transmission table start No. specification
                   ├─[MOV  K0    D11 ]  Specifies 0 for No. of transmission tables
                   ├─[MOV  H2    D12 ]  Specifies STX(02H) for transmission table No.1
                   ├─[MOV  H3E8  D13 ]  Specifies User registration frame (3E8H) for transmission table No.2
                   ├─[MOV  H3    D14 ]  Specifies ETX (03H) for transmission table No.3
                   ├─[LEDB RIT0      ]  Dedicated instruction name
                   ├─[SUB  H0        ]  Start I/O No. of master module
                   ├─[SUB  K2        ]  Station No. of AJ65BT-R2N
                   ├─[SUB  H120      ]  Transmission table start No. specification address
                   ├─[LEDC D10       ]  Write data storage device
                   ├─[SUB  K5        ]  No. of write points
                   ├─[LEDR           ]  Dedicated instruction completion
                   └─[SET  M1        ]  Turns ON Initial setting write completion flag
```

Figure 7.21 Program example (Continued)

## 7.7.3 Initial setting for the flow control function

### (1) For the send/receive buffer communication function

(a) Overview of program example

The flow control is performed by the DC code control.

(b) Devices used in the program example

**Table 7.26 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 7.3.1 |
| M1 | Initial setting write completion flag | Section 7.7.3 | Section 7.3.1 |
| M10 | Device that is turned ON for one scan after completion of RIWT | Section 7.7.3 | Section 7.3.1 |
| M11 | Device that is turned ON for one scan after failure of writing by RIWT | Section 7.7.3 | Section 7.3.1 |
| M502 | AJ65BT-R2N mode normal flag | — | Section 7.2.1 (3) 3 |
| M901 | Other station data link status (Station No.2) | — | — |
| D0 to D3 | Control data of RIWT instruction | — | — |
| D4 | Flow control function set value | — | — |

(c) Program example

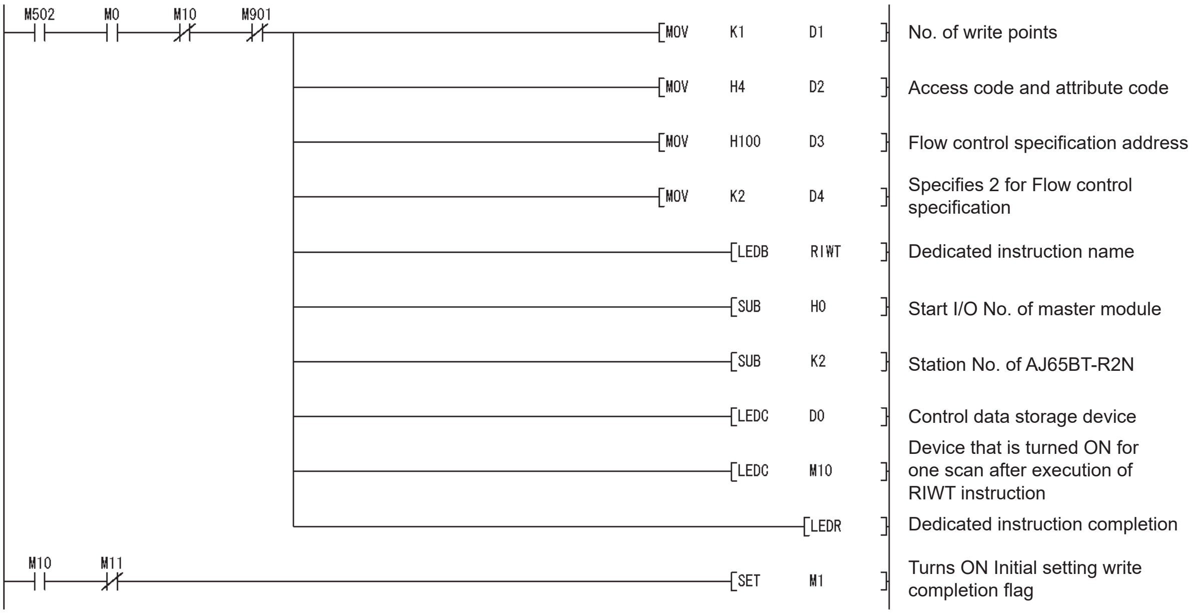


**Figure 7.22 Program example**

(2) For the buffer memory auto-refresh function

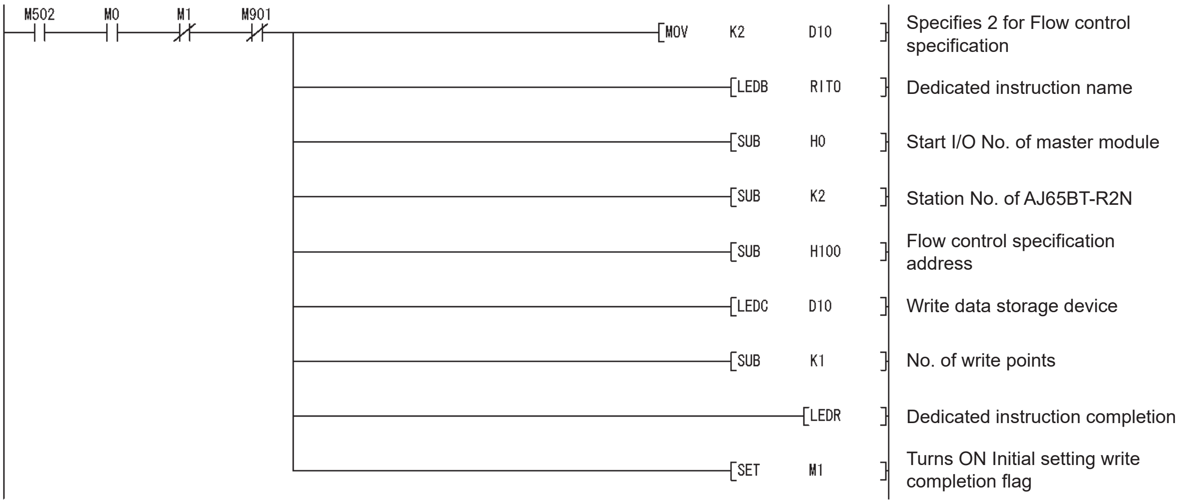
(a) Overview of program example
The flow control is performed by the DC code control.

(b) Devices used in the program example

**Table 7.27 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 7.3.2 |
| M1 | Initial setting write completion flag | Section 7.7.3 | Section 7.3.2 |
| M502 | AJ65BT-R2N mode normal flag | — | Section 7.2.2 (3) 3 |
| M901 | Other station data link status (Station No.2) | — | — |
| D10 | Flow control function set value | — | — |

(c) Program example



Specifies 2 for Flow control specification

Dedicated instruction name

Start I/O No. of master module

Station No. of AJ65BT-R2N

Flow control specification address

Write data storage device

No. of write points

Dedicated instruction completion

Turns ON Initial setting write completion flag

**Figure 7.23 Program example**

## 7.7.4 Initial setting for the ASCII-binary conversion function

### (1) For the send/receive buffer communication function

(a) Overview of program example

The ASCII-binary conversion function is used.

(b) Devices used in the program example

**Table 7.28 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 7.3.1 |
| M1 | Initial setting write completion flag | Section 7.7.4 | Section 7.3.1 |
| M10 | Device that is turned ON for one scan after completion of RIWT | Section 7.7.4 | Section 7.3.1 |
| M11 | Device that is turned ON for one scan after failure of writing by RIWT | Section 7.7.4 | Section 7.3.1 |
| M502 | AJ65BT-R2N mode normal flag | — | Section 7.2.1 (3) 3 |
| M901 | Other station data link status (Station No.2) | — | — |
| D0 to D3 | Control data of RIWT instruction | — | — |
| D4 | ASCII-binary conversion function set value | — | — |

(c) Program example

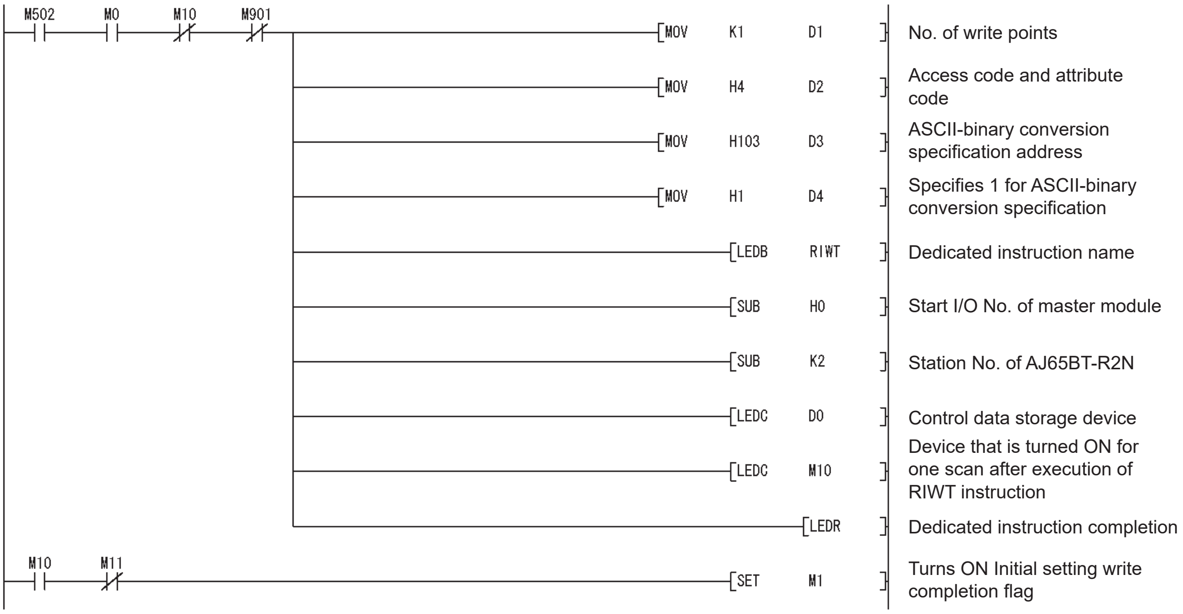


**Figure 7.24 Program example**

(2) For the buffer memory auto-refresh function

(a) Overview of program example
The ASCII-binary conversion function is used.

(b) Devices used in the program example

**Table 7.29 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 7.3.2 |
| M1 | Initial setting write completion flag | Section 7.7.4 | Section 7.3.2 |
| M502 | AJ65BT-R2N mode normal flag | — | Section 7.2.2 (3) 3 |
| M901 | Other station data link status (Station No.2) | — | — |
| D10 | ASCII-binary conversion function set value | — | — |

(c) Program example

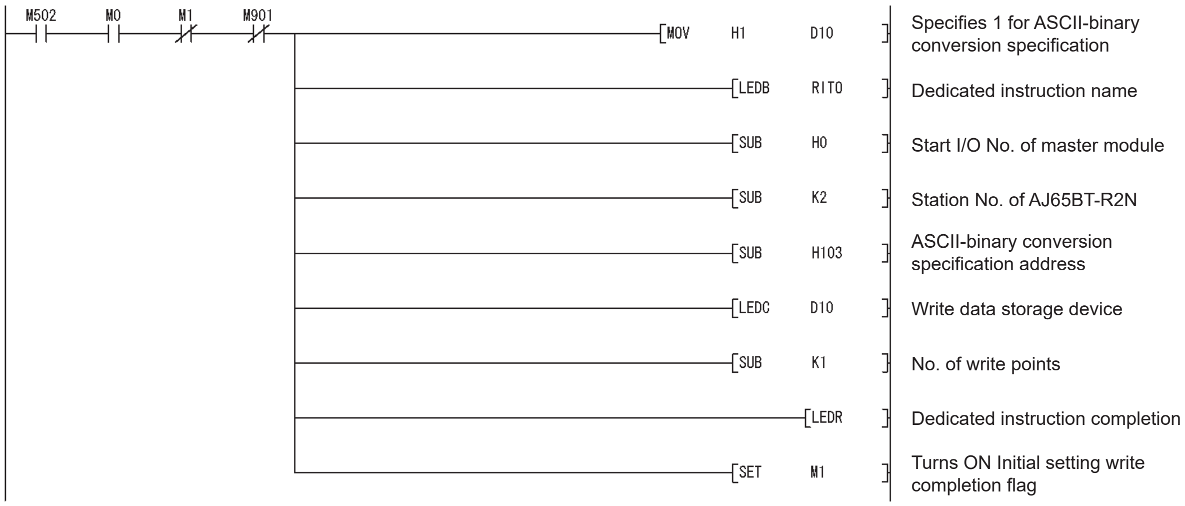


**Figure 7.25 Program example**

## 7.7.5 Initial setting for the RW refresh function

### (1) For the send/receive buffer communication function

(a) Overview of program example

- The remote register (RW) assignments are changed to those listed below so that the assigned buffer memories can be monitored.

**Table 7.30 Devices used in the program example**

| Device | Buffer memory | Device | Buffer memory |
|---|---|---|---|
| RWrm | General error codes ( R2N 1B0$_H$) | RWwm | Send start frame No. ( R2N 118$_H$) |
| RWr(m+1) | No. of actual send data ( R2N 1B4$_H$) | RWw(m+1) | Send end frame No. ( R2N 119$_H$) |
| RWr(m+2) | Receive frame index No. storage ( R2N 1B5$_H$) | RWw(m+2) | Transmission table start No. specification ( R2N 120$_H$) |
| RWr(m+3) | No. of data stored in OS reception area ( R2N 1B6$_H$) | RWw(m+3) | No. of transmission tables ( R2N 121$_H$) |

(b) Devices used in the program example

**Table 7.31 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 7.3.1 |
| M1 | Initial setting write completion flag | Section 7.7.5 | Section 7.3.1 |
| M10 | Device that is turned ON for one scan after completion of RIWT | Section 7.7.5 | Section 7.3.1 |
| M11 | Device that is turned ON for one scan after failure of writing by RIWT | Section 7.7.5 | Section 7.3.1 |
| M502 | AJ65BT-R2N mode normal flag | — | Section 7.2.1 (3) 3 |
| M901 | Other station data link status (Station No.2) | — | — |
| D0 to D3 | Control data of RIWT instruction | — | — |
| D4 to D14 | RW refresh function set values | — | — |

(c) Program example

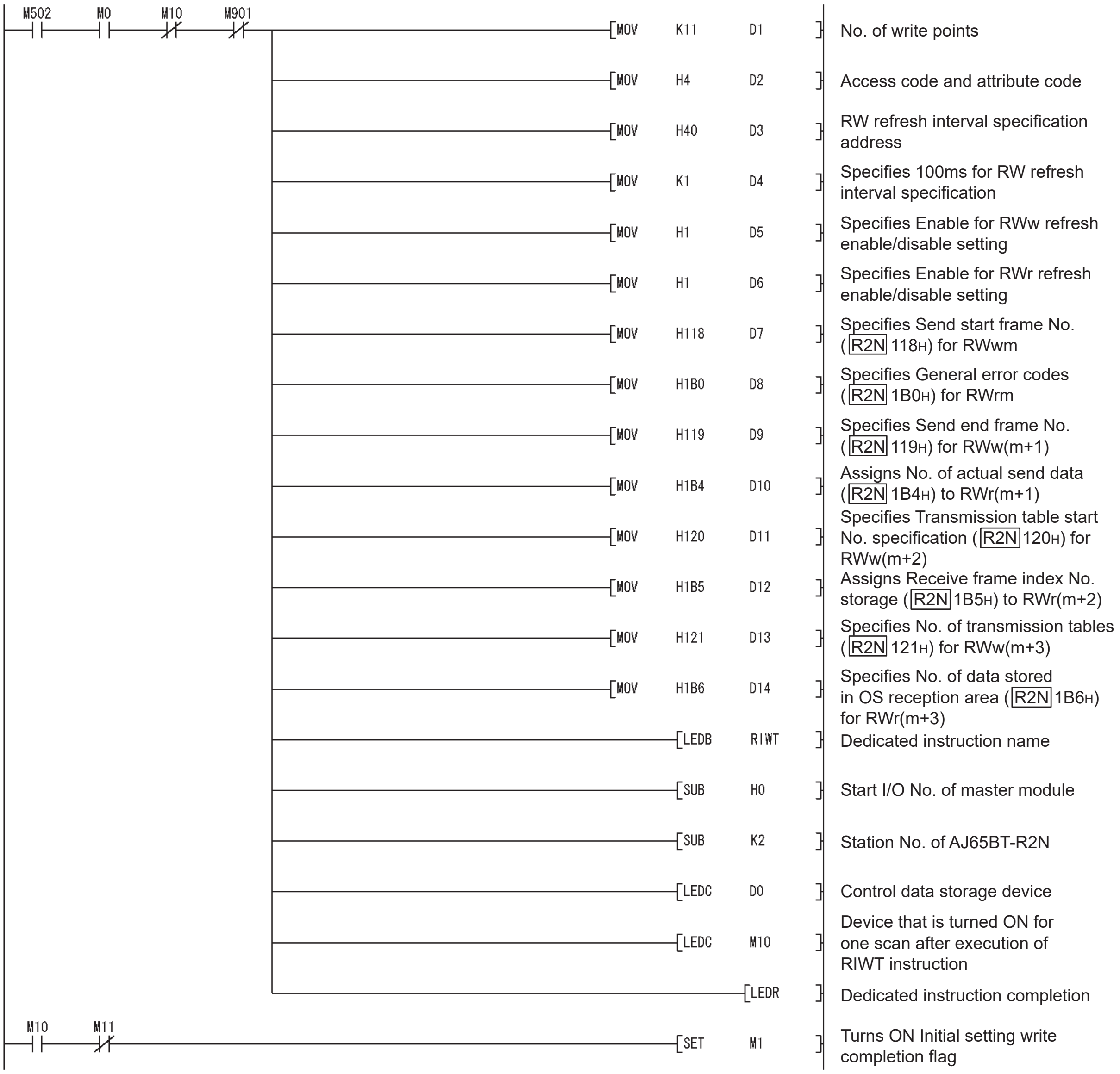


**Figure 7.26 Program example**

(2) For the buffer memory auto-refresh function

(a) Overview of program example

- The remote register (RW) assignments are changed to those listed below so that the assigned buffer memories can be monitored.

**Table 7.32 Devices used in the program example**

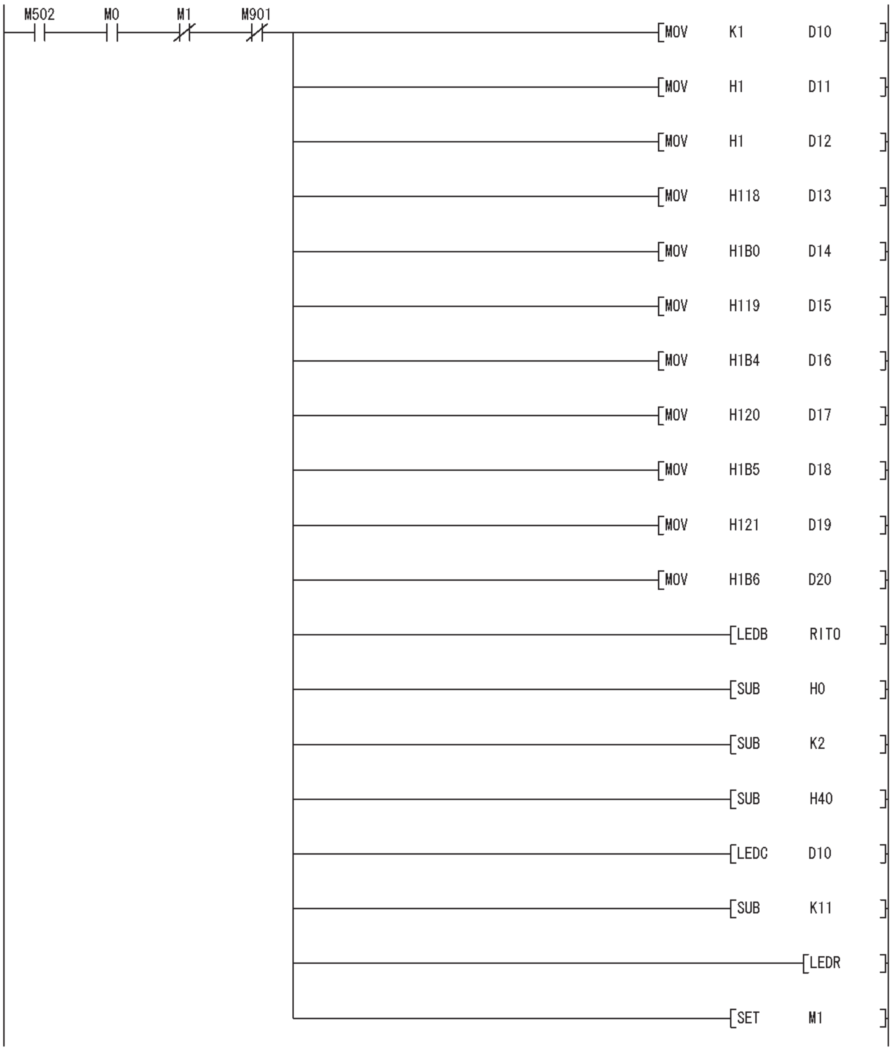
| Device | Buffer memory | Device | Buffer memory |
|---|---|---|---|
| RWrm | General error codes (R2N 1B0$_H$) | RWwm | Send start frame No. (R2N 118$_H$) |
| RWr(m+1) | No. of actual send data (R2N 1B4$_H$) | RWw(m+1) | Send end frame No. (R2N 119$_H$) |
| RWr(m+2) | Receive frame index No. storage (R2N 1B5$_H$) | RWw(m+2) | Transmission table start No. specification (R2N 120$_H$) |
| RWr(m+3) | No. of data stored in OS reception area (R2N 1B6$_H$) | RWw(m+3) | No. of transmission tables (R2N 121$_H$) |

(b) Devices used in the program example

**Table 7.33 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 7.3.2 |
| M1 | Initial setting write completion flag | Section 7.7.5 | Section 7.3.2 |
| M502 | AJ65BT-R2N mode normal flag | — | Section 7.2.2 (3) 3 |
| M901 | Other station data link status (Station No.2) | — | — |
| D10 to D20 | RW refresh function set values | — | — |

(c) Program example



| | | | |
|---|---|---|---|
| MOV | K1 | D10 | Specifies 100ms for RW refresh interval specification |
| MOV | H1 | D11 | Specifies Enable for RWw refresh enable/disable setting |
| MOV | H1 | D12 | Specifies Enable for RWr refresh enable/disable setting |
| MOV | H118 | D13 | Specifies Send start frame No. (R2N 118H) for RWwm |
| MOV | H1B0 | D14 | Specifies General error codes (R2N 1B0H) for RWrm |
| MOV | H119 | D15 | Specifies Send end frame No. (R2N 119H) for RWw(m+1) |
| MOV | H1B4 | D16 | Assigns No. of actual send data (R2N 1B4H) to RWr(m+1) |
| MOV | H120 | D17 | Specifies Transmission table start No. specification (R2N 120H) for RWw(m+2) |
| MOV | H1B5 | D18 | Assigns Receive frame index No. storage (R2N 1B5H) to RWr(m+2) |
| MOV | H121 | D19 | Specifies No. of transmission tables (R2N 121H) for RWw(m+3) |
| MOV | H1B6 | D20 | Specifies No. of data stored in OS reception area (R2N 1B6H) for RWr(m+3) |
| LEDB | RITO | | Dedicated instruction name |
| SUB | H0 | | Start I/O No. of master module |
| SUB | K2 | | Station No. of AJ65BT-R2N |
| SUB | H40 | | RW refresh interval specification address |
| LEDC | D10 | | Write data storage device |
| SUB | K11 | | No. of write points |
| LEDR | | | Dedicated instruction completion |
| SET | M1 | | Turns ON Initial setting write completion flag |

**Figure 7.27 Program example**

## 7.8 Other Functions

This section explains programs for executing the functions below.
Execute each program in this section after AJ65BT-R2N initialization.

**Table 7.34 List of other functions**

| Function | Reference section |
|---|---|
| Send cancel function | Section 7.8.1 |
| Forced receive completion function | Section 7.8.2 |
| OS reception area clear function | Section 7.8.3 |
| $E^2$PROM function setting | Section 7.8.4 |

### 7.8.1 Send cancel function

The same program example can be used for the send/receive buffer communication function and buffer memory auto-refresh function.

(1) Overview of program example

Transmission is canceled when Send cancel execute flag (X25) is turned ON after a send request and before send completion.

(2) Processing in the program example

1) After turn-ON of Send request signal (Y120), Send cancel request signal (Y121) is turned ON before Send complete signal (X120) or Send failed signal (X121) turns ON.
2) Send request signal (Y120) and Send cancel request signal (Y121) are turned OFF after turn-ON of Send complete signal (X120) or Send failed signal (X121).

(3) Devices used in the program example

**Table 7.35 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X25 | Send cancel execute flag | — | — |
| X120 | Send complete signal | Section 7.8.1 | Section 7.4.1 |
| X121 | Send failed signal | Section 7.8.1 | Section 7.4.1 |
| Y120 | Send request signal | — | Section 7.4.1 |
| Y121 | Send cancel request signal | Section 7.8.1 | — |

(4) Program example

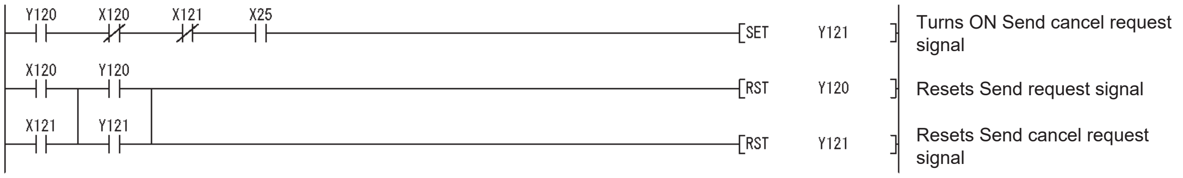


**Figure 7.28 Program example**

## 7.8.2 Forced receive completion function

### (1) For the send/receive buffer communication function

(a) Overview of program example
When Forced receive completion execute flag (X26) turns ON before reception completion, the receive processing is forcibly completed at the point and data that have been received are read out.

(b) Processing in the program example

1) Forced receive completion request signal (Y123) is turned ON to forcibly terminate reception.

2) Received data are read from Receive data size specification area ($\boxed{\text{R2N}}$ $400_H$) and Receive data area ($\boxed{\text{R2N}}$ $401_H$) to the master station word devices (areas starting from D39).

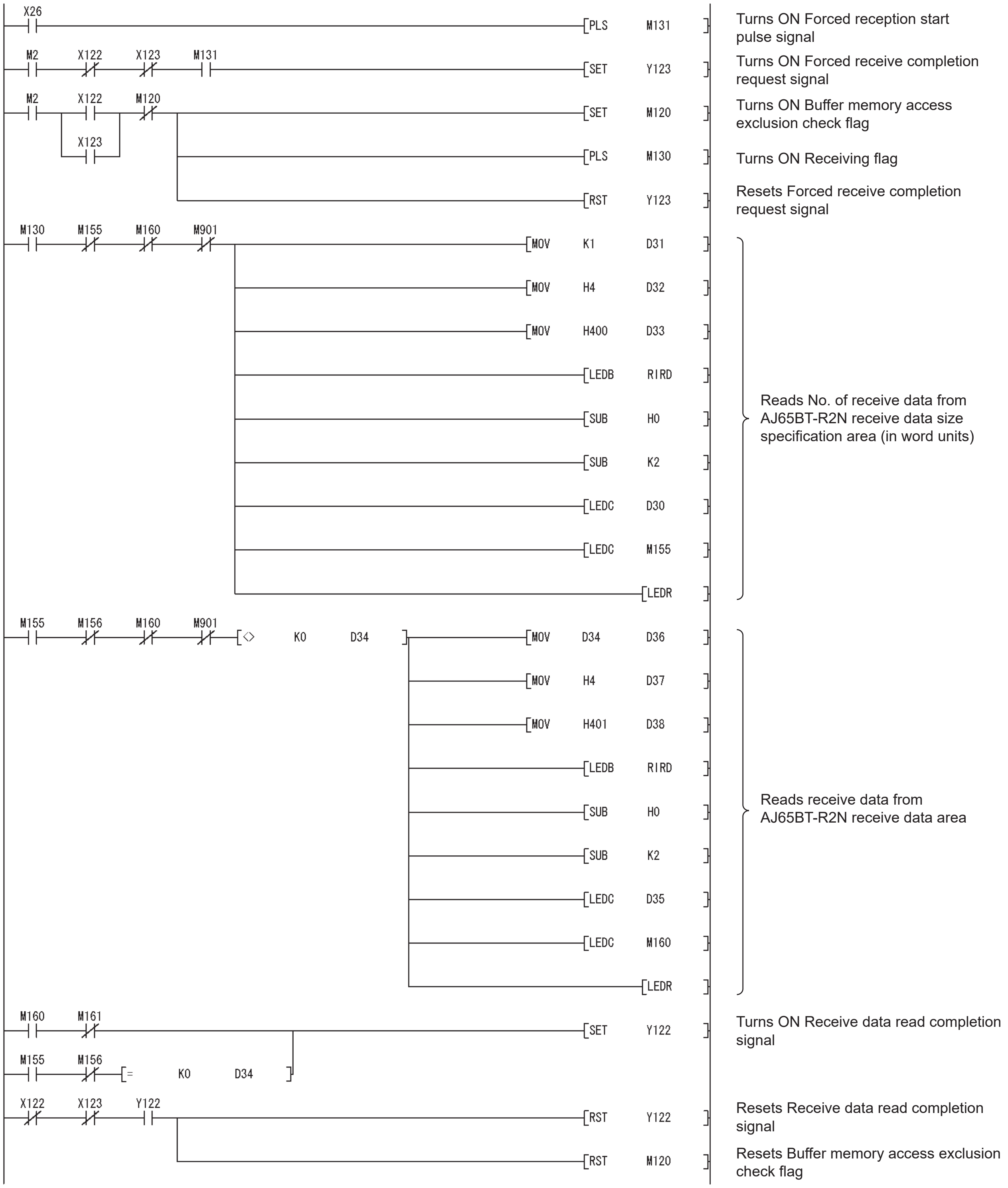
3) Receive data read completion signal (Y122) is turned OFF to terminate the reception.

(c) Devices used in the program example

**Table 7.36 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X26 | Forced receive completion execute flag | — | — |
| X122 | Normal receive data read request signal | Section 7.8.2 | — |
| X123 | Error receive data read request signal | Section 7.8.2 | — |
| Y122 | Receive data read completion signal | Section 7.8.2 | Section 7.5.1 |
| Y123 | Forced receive completion request signal | Section 7.8.2 | — |
| M2 | Operation complete flag | — | Section 7.3.1 |
| M120 | Buffer memory access exclusion check flag | Section 7.8.2 | Section 7.4.1,<br>Section 7.5.1,<br>Section 7.6.1 |
| M130 | Receiving flag | Section 7.8.2 | Section 7.5.1 |
| M131 | Forced reception start pulse signal | Section 7.8.2 | — |
| M135 | Forced receiving flag | Section 7.8.2 | — |
| M155 | Device that is turned ON for one scan after completion of RIRD | Section 7.8.2 | Section 7.5.1 |
| M156 | Device that is turned ON for one scan after failure of reading by RIRD | Section 7.8.2 | Section 7.5.1 |
| M160 | Device that is turned ON for one scan after completion of RIRD | Section 7.8.2 | Section 7.5.1 |
| M161 | Device that is turned ON for one scan after failure of reading by RIRD | Section 7.8.2 | Section 7.5.1 |
| D30 to D364 | Control data of RIRD instruction, and No. of receive data (in word units) | — | — |
| From D35 | Control data of RIRD instruction, and receive data | — | — |

(d) Program example



Turns ON Forced reception start pulse signal

Turns ON Forced receive completion request signal

Turns ON Buffer memory access exclusion check flag

Turns ON Receiving flag

Resets Forced receive completion request signal

Reads No. of receive data from AJ65BT-R2N receive data size specification area (in word units)

Reads receive data from AJ65BT-R2N receive data area

Turns ON Receive data read completion signal

Resets Receive data read completion signal

Resets Buffer memory access exclusion check flag

**Figure 7.29 Program example**

(2) For the buffer memory auto-refresh function

(a) Overview of program example
When Forced receive completion execute flag (X26) turns ON before reception completion, the receive processing is forcibly completed at the point and data that have been received are read out.

(b) Processing in the program example

1) Forced receive completion request signal (Y123) is turned ON to forcibly terminate reception.

2) Received data are read from Receive data size specification area (R2N 400H) and Receive data area (R2N 401H) to the master station word device (D200).

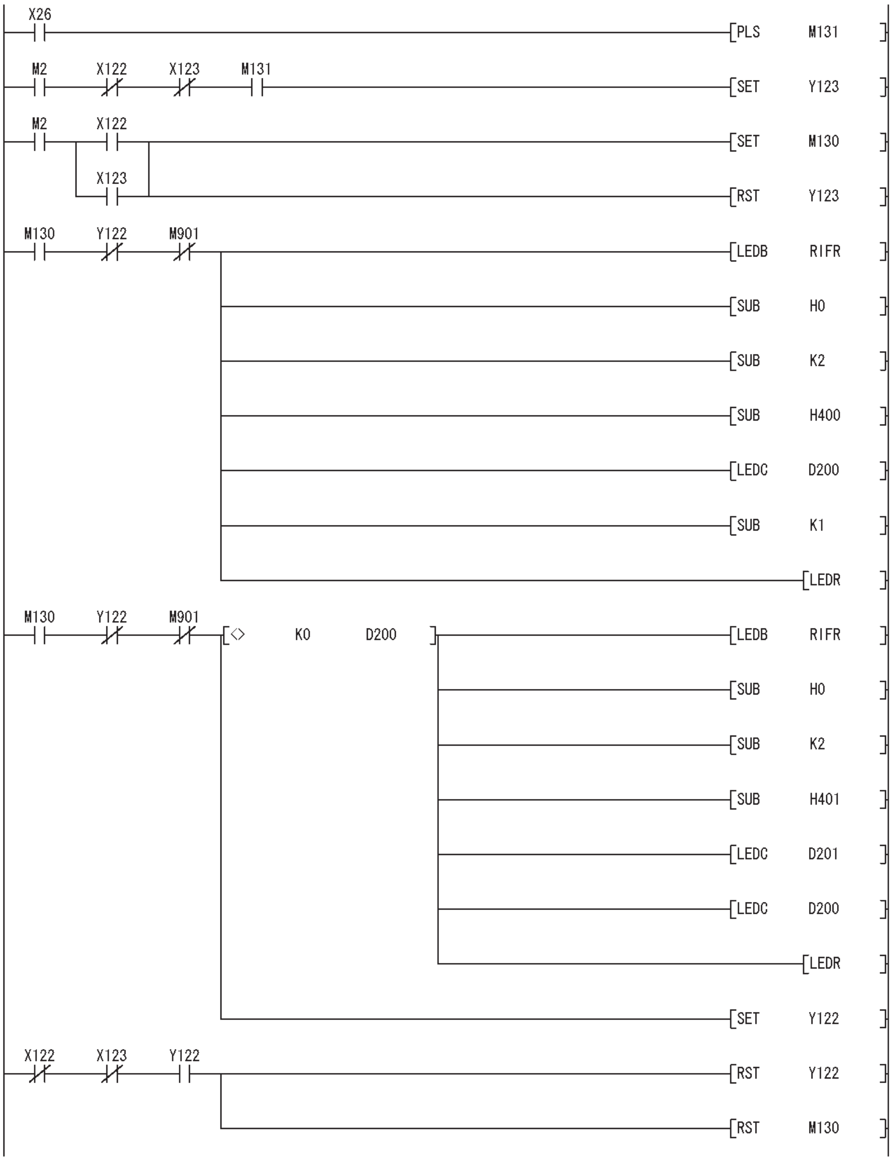
3) Receive data read completion signal (Y122) is turned OFF to terminate the reception.

(c) Devices used in the program example

**Table 7.37 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X26 | Forced receive completion execute flag | — | — |
| X122 | Normal receive data read request signal | Section 7.8.2 | — |
| X123 | Error receive data read request signal | Section 7.8.2 | — |
| Y122 | Receive data read completion signal | Section 7.8.2 | Section 7.5.2 |
| Y123 | Forced receive completion request signal | Section 7.8.2 | — |
| M2 | Operation complete flag | — | Section 7.3.2 |
| M130 | Receiving flag | Section 7.8.2 | Section 7.5.2 |
| M901 | Other station data link status (Station No.2) | — | — |
| D200 | No. of receive data | — | — |
| From D201 | Receive data | — | — |

(d) Program example



Turns ON Forced reception start pulse signal

Turns ON Forced receive completion request signal

Turns ON Receiving flag

Resets Forced receive completion request signal

Reads No. of receive data from AJ65BT-R2N receive data size specification area (in word units)

Reads receive data from AJ65BT-R2N receive data area

Turns ON Receive data read completion signal

Resets Receive data read completion signal

Resets Receiving flag

Figure 7.30 Program example

## 7.8.3 OS reception area clear function

The same program example can be used for the send/receive buffer communication function and buffer memory auto-refresh function.

(1) Overview of program example

The OS reception area is cleared when the AJ65BT-R2N fails to receive data from the external device.

(2) Processing in the program example

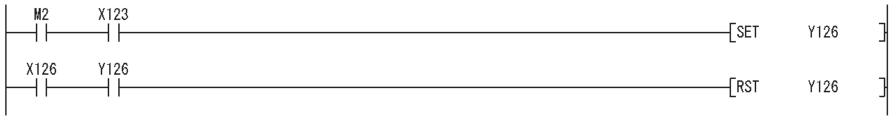
When Error receive data read request signal (X123) is ON, OS reception area clear request signal (Y126) is turned ON to clear the OS reception area.

(3) Devices used in the program example

**Table 7.38 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X123 | Error receive data read request signal | — | — |
| X126 | OS reception area cleared signal | Section 7.8.3 | — |
| Y126 | OS reception area clear request signal | Section 7.8.3 | — |
| M2 | Operation complete flag | — | Section 7.3.2 |

(4) Program example



Turns ON OS reception area clear request signal

Resets OS reception area clear request signal

**Figure 7.31 Program example**

## 7.8.4 E$^2$PROM function setting

☒ **Point**

(1) Do not execute registration to E$^2$PROM each time the AJ65BT-R2N is started up.

Doing so may cause the maximum number of writes to E$^2$PROM (service life) to be reached earlier.

(2) Execute the E$^2$PROM function after initialization of the AJ65BT-R2N is normally completed.

For E$^2$PROM function sample programs, refer to the following.

☞ Section 7.9.1 Program example for changing auto-refresh buffer assignments

## 7.9 Program Example

This section gives program examples for the following processing.

**Table 7.39 Program example**

| Description | Reference section |
|---|---|
| Program example for changing auto-refresh buffer assignments | Section 7.9.1 |
| Program example for sending/receiving data with RISEND/RIRCV instruction | Section 7.9.2 |
| Program example for receiving data when a receive timeout occurs | Section 7.9.3 |

### 7.9.1 Program example for changing auto-refresh buffer assignments

(1) Overview of program example

- When Operation start request flag (M0) is turned ON, the assignments are changed so that the AJ65BT-R2N auto-refresh buffer size is 80H, and they are registered to the E$^2$PROM.
  When the auto-refresh buffer size changes to 80H, the buffer memory auto-refresh function can be used with up to 20 AJ65BT-R2Ns connected.
- The AJ65BT-R2N operates with the auto-refresh buffer size setting changed to 80H after restart.

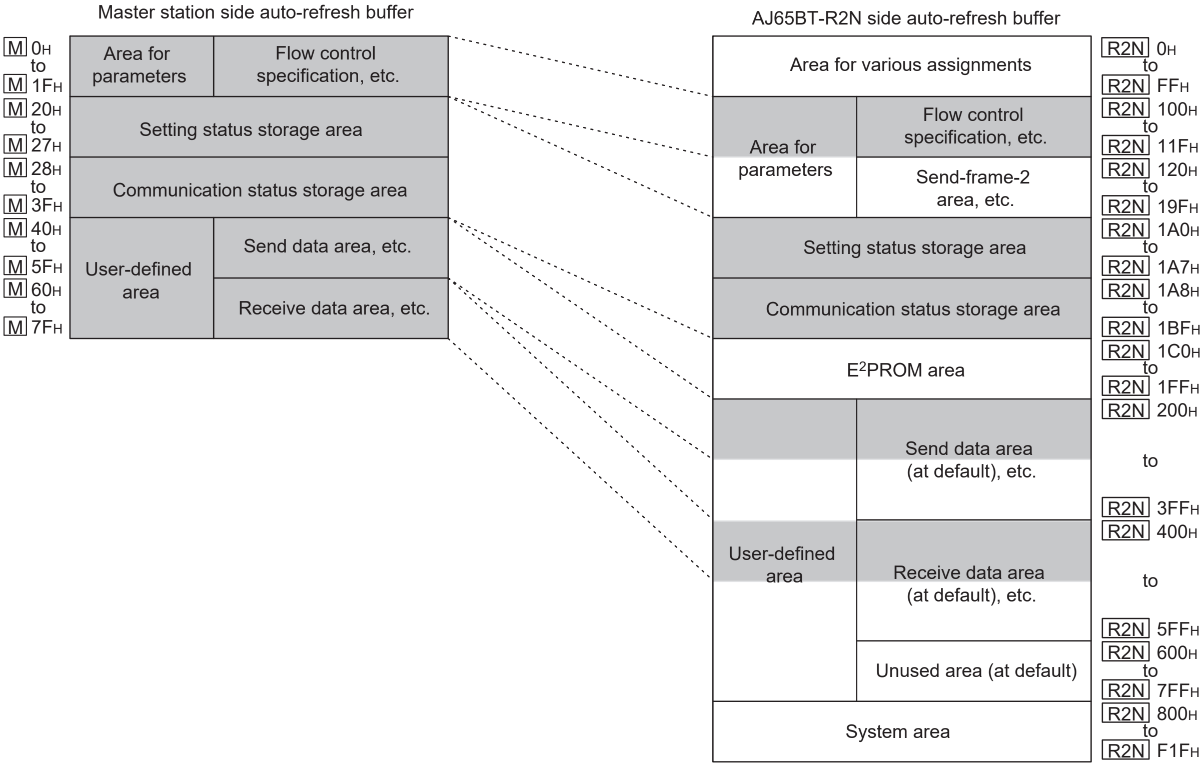


Figure 7.32 Auto-refresh buffer after assignment change

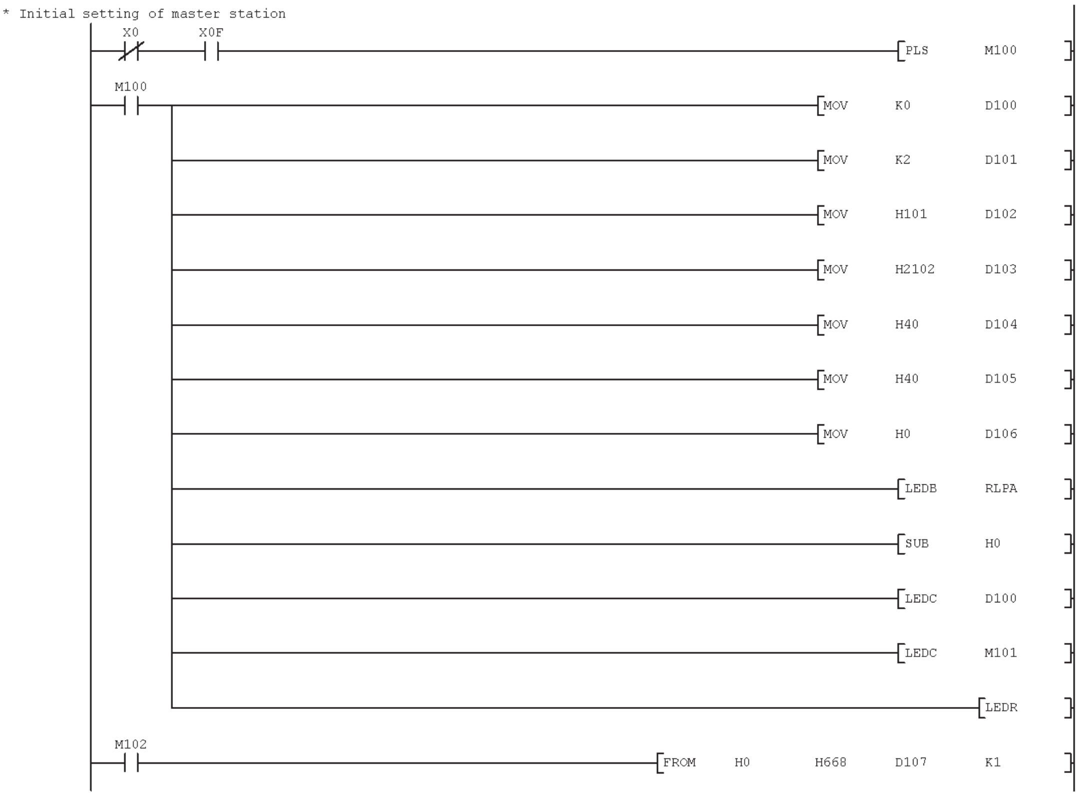
(2) For the send/receive buffer communication function

(a) Devices used in the program example

**Table 7.40 Devices used in the program example**

| Device | Description | Device | Description |
|---|---|---|---|
| X0 | Module error (Master station) | M10 | Device that is turned ON for one scan after completion of RIWT |
| X1 | Own station data link status (Master station) | M11 | Device that is turned ON for one scan after failure of writing by RIWT |
| X0F | Module ready (Master station) | M12 | Device that is turned ON for one scan after completion of RIWT |
| X23 | Error code read flag | M13 | Device that is turned ON for one scan after failure of writing by RIWT |
| X24 | Error clear flag | M14 | Device that is turned ON for one scan after completion of RIWT |
| X27 | E2PROM function execute flag | M15 | Device that is turned ON for one scan after failure of writing by RIWT |
| K4X120 | Remote input (X120 to X12F) | M20 | AJ65BT-R2N initial setting start flag |
| X124 | Initialization complete signal | M22 | Operation complete pulse signal |
| X125 | Initialization failed signal | M27 | E$^2$PROM function execution start pulse signal |
| X127 | E$^2$PROM function complete signal | M28 | E$^2$PROM function complete pulse signal |
| X128 | E$^2$PROM function failed signal | M29 | E$^2$PROM function execute completion pulse signal |
| K1X134 | Mode setting switch status signal (X134 to X137) | M30 | Operation failed pulse signal |
| X13A | Error status signal | M100 | Master station parameter setting start pulse signal |
| X13B | Remote station ready signal | M101 | Device that is turned ON for one scan after completion of RLPA |
| K4Y18 | Output (Y18 to Y27) (Master station) | M102 | Device that is turned ON for one scan after failure of writing by RLPA |
| Y1C | Buffer memory bank switching specification (Master station) | M120 | Buffer memory access exclusion check flag |
| Y1D |  | M135 | Error handling flag |
| KBY120 | Remote output (Y120 to Y13F) | M190 | Device that is turned ON for one scan after completion of RIRD |
| Y120 | Send request signal | M191 | Device that is turned ON for one scan after failure of reading by RIRD |
| Y121 | Send cancel request signal | M230 | Error handling execution pulse signal |
| Y122 | Receive data read completion signal | M502 | AJ65BT-R2N mode normal flag |
| Y123 | Forced receive completion request signal | M503 | AJ65BT-R2N mode error flag |
| Y124 | Initialization request signal | M504 | E$^2$PROM function setting start pulse signal |
| Y126 | OS reception area clear request signal | K4M900 | Other station data link status (SW0080) |
| Y127 | E$^2$PROM function request signal | M901 | Other station data link status (Station No.2) |
| Y139 | Initial data read request signal | M9036 | Always ON |
| Y13A | Error reset request signal | M9052 | SEG instruction switching |
| M0 | Operation start request flag | D0 to D39 | Control data of RIWT instruction, and set values |
| M1 | Initial setting write completion flag | D100 to D106 | Network parameters of master station |
| M2 | Operation complete flag | D107 | Error code in Network parameters setting |
| M3 | Operation failed flag | D130 to D136 | Control data of RIRD instruction, and error code of AJ65BT-R2N |
| M4 | E$^2$PROM function failed flag | D900 | Master module RY(n+1)E, RY(n+1)F |

(b) Program example



Turns ON Master station parameter setting start pulse signal

Synchronous mode enable/disable

No. of modules connected

Slave station setting information of remote I/O station

Slave station setting information of AJ65BT-R2N

Send buffer size

Receive buffer size

Auto-refresh buffer size

Dedicated instruction name

Start I/O No. of master module

Link parameter storage device

Device that is turned ON for one scan after execution of RLPA instruction

Dedicated instruction completion

Reads error code from master module buffer memory

Figure 7.33 Program example for changing auto-refresh buffer assignments

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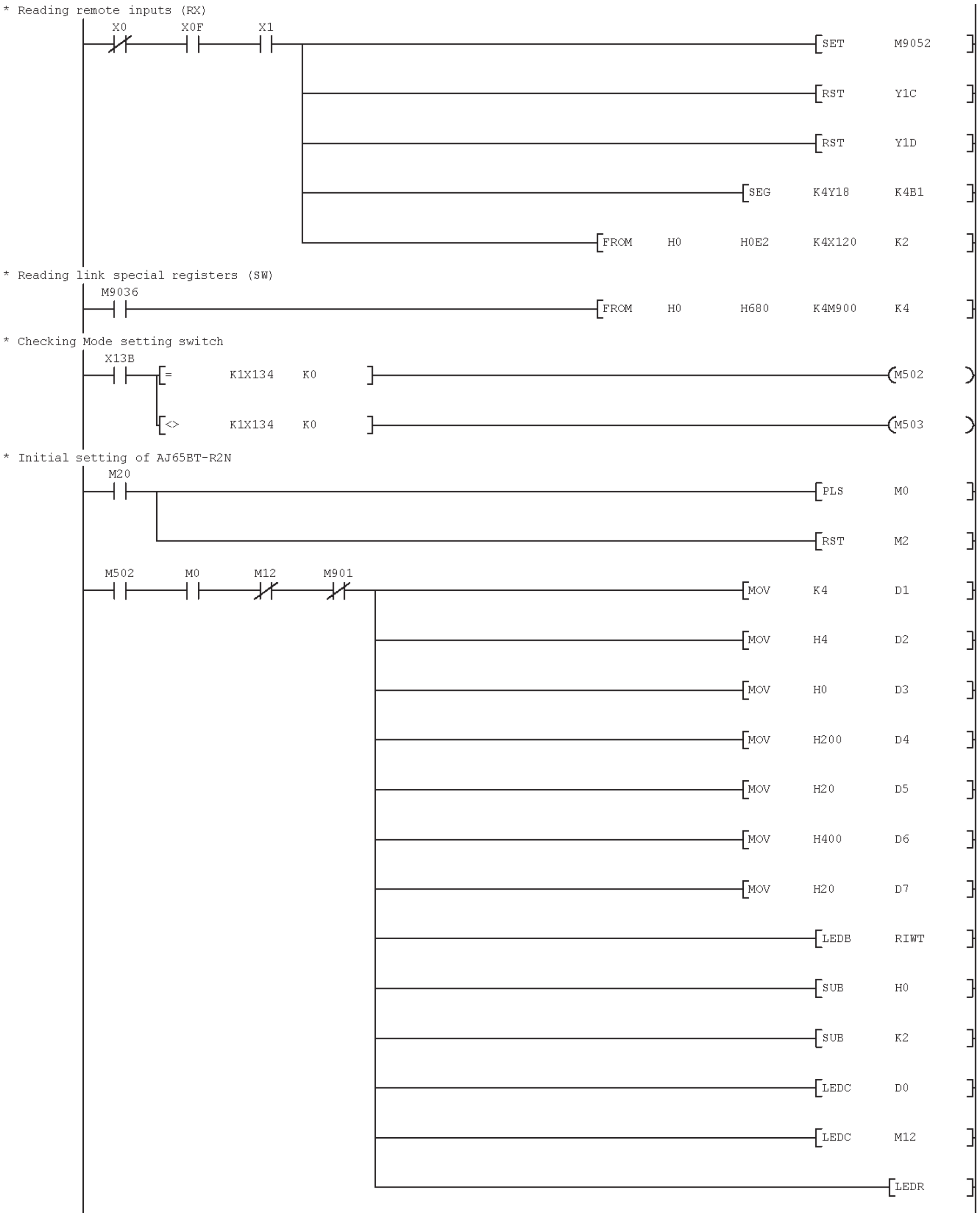

Switches master module buffer memory to bank 0

Reads remote input (RXn0 to RX(n+1)F) to X120 to X13F

Reads link special register (SW0080) to M900 to M916

Turns ON AJ65BT-R2N mode normal flag

Turns ON AJ65BT-R2N mode error flag

Turns ON Operation start request flag

Resets Operation complete flag

No. of write points

Access code and attribute code

Start address specification area address

Specifies 200H for Send area, start address specification

Specifies 20H for Send area size specification

Specifies 400H for Receive area, start address specification

Specifies 20H for Receive area size specification

Dedicated instruction name

Start I/O No. of master module

Station No. of AJ65BT-R2N

Control data storage device

Device that is turned ON for one scan after execution of RIWT instruction

Dedicated instruction completion

Figure 7.33 Program example for changing auto-refresh buffer assignments (Continued)

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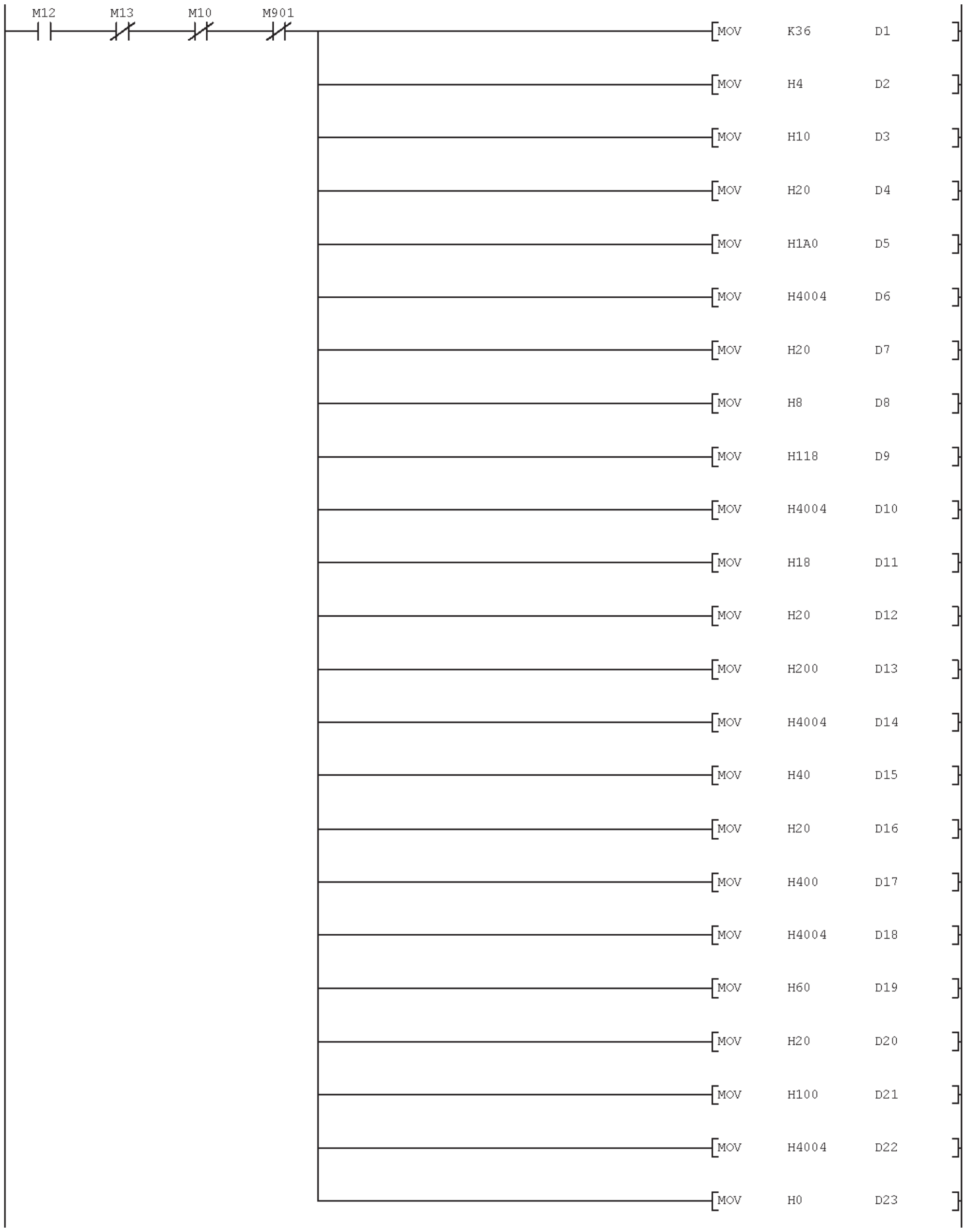

No. of write points

Access code and attribute code

Auto-refresh area specification address

Specifies the following for Status data storage area
- Transfer size : 20H
- AJ65BT-R2N side start address : 1A0H
- Master station side offset address : 20H

Specifies the following for Send area 1)
- Transfer size : 8H
- AJ65BT-R2N side start address : 118H
- Master station side offset address : 18H

Specifies the following for Send area 2)
- Transfer size : 20H
- AJ65BT-R2N side start address : 200H
- Master station side offset address : 40H

Specifies the following for Receive area
- Transfer size : 20H
- AJ65BT-R2N side start address : 400H
- Master station side offset address : 60H

Specifies the following for Initial setting area
- Transfer size : 20H
- AJ65BT-R2N side start address : 100H
- Master station side offset address : 0H

Figure 7.33 Program example for changing auto-refresh buffer assignments (Continued)

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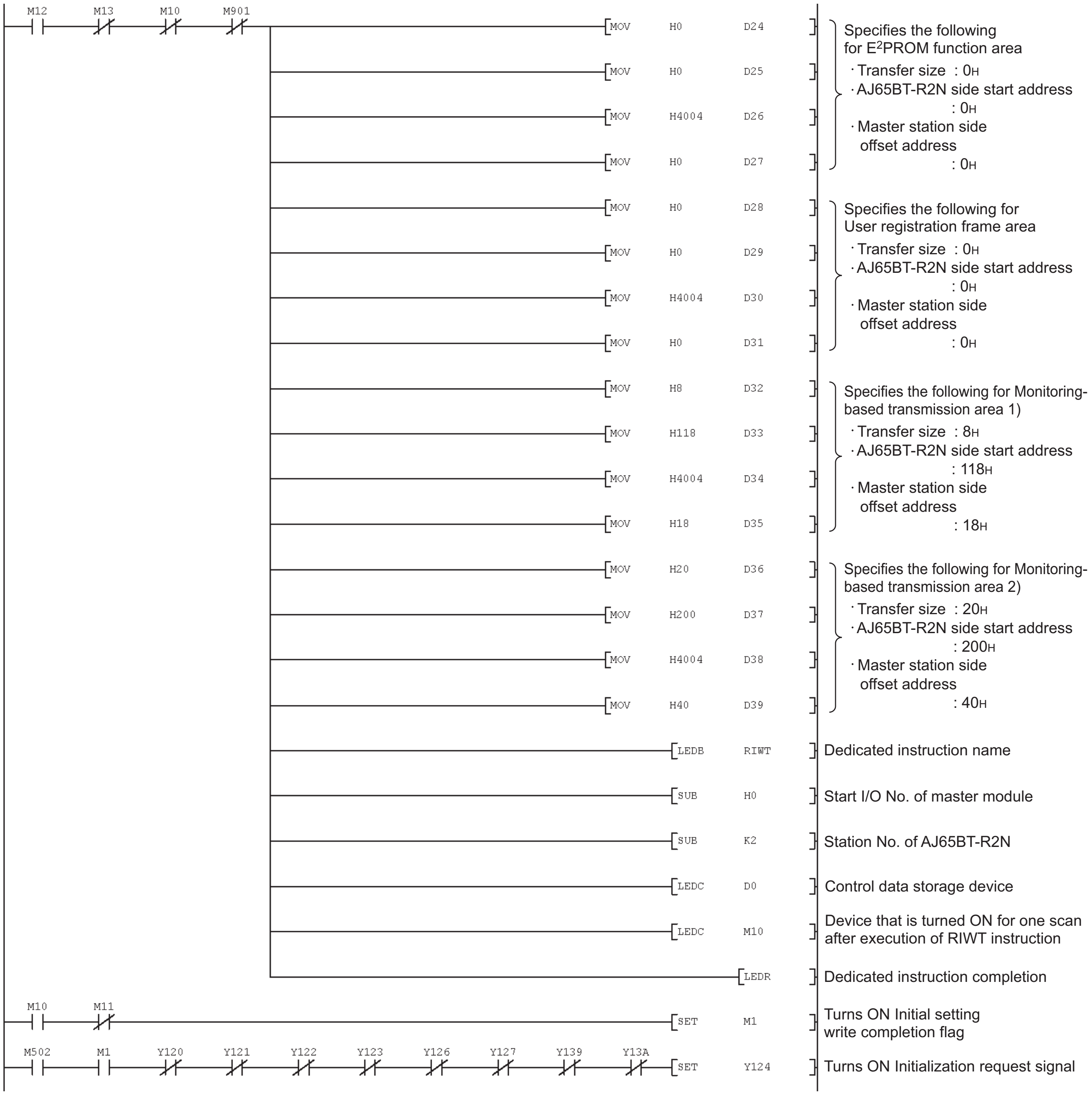

Figure 7.33 Program example for changing auto-refresh buffer assignments (Continued)

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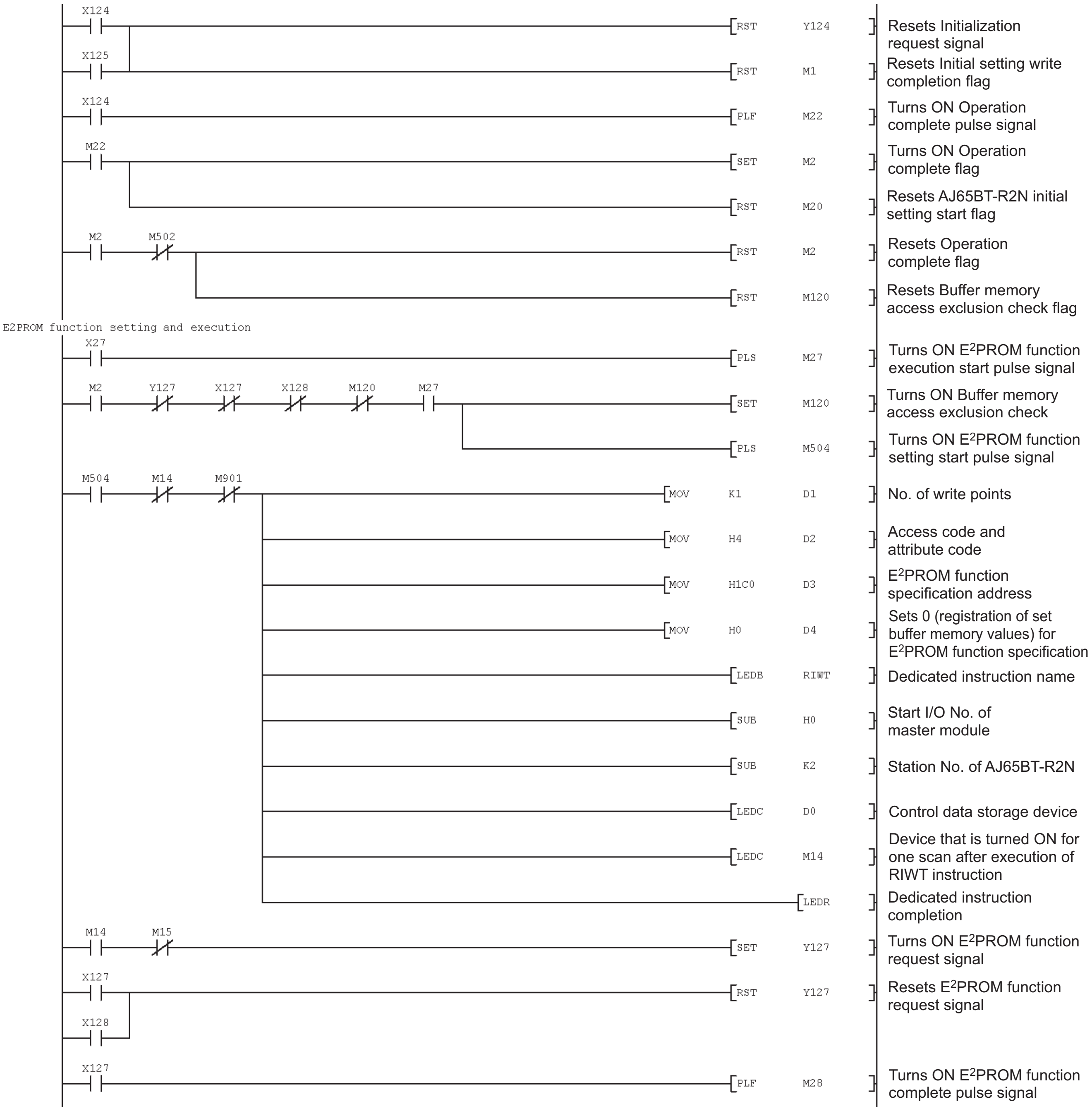

Figure 7.33 Program example for changing auto-refresh buffer assignments (Continued)

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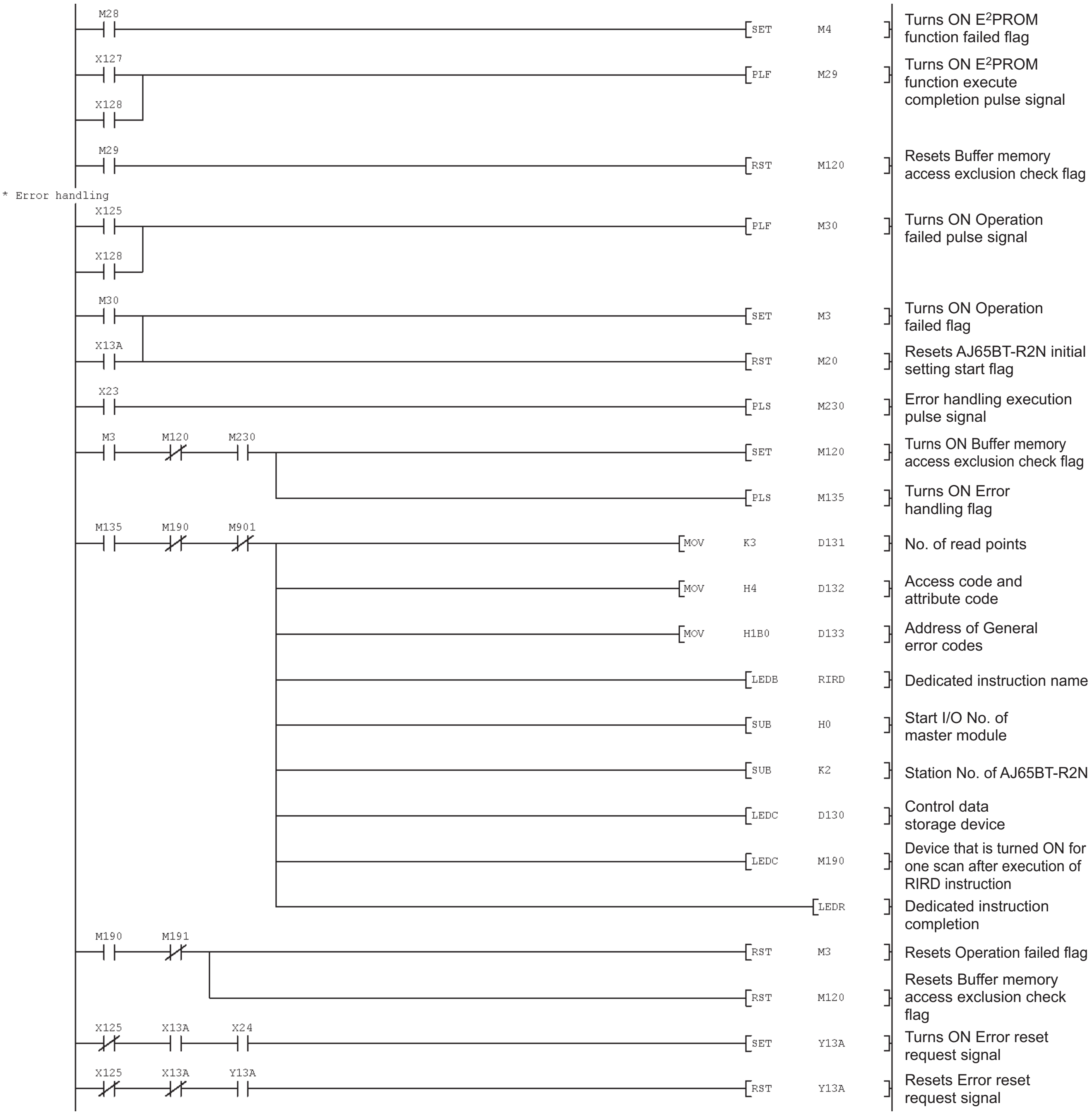

Figure 7.33 Program example for changing auto-refresh buffer assignments (Continued)

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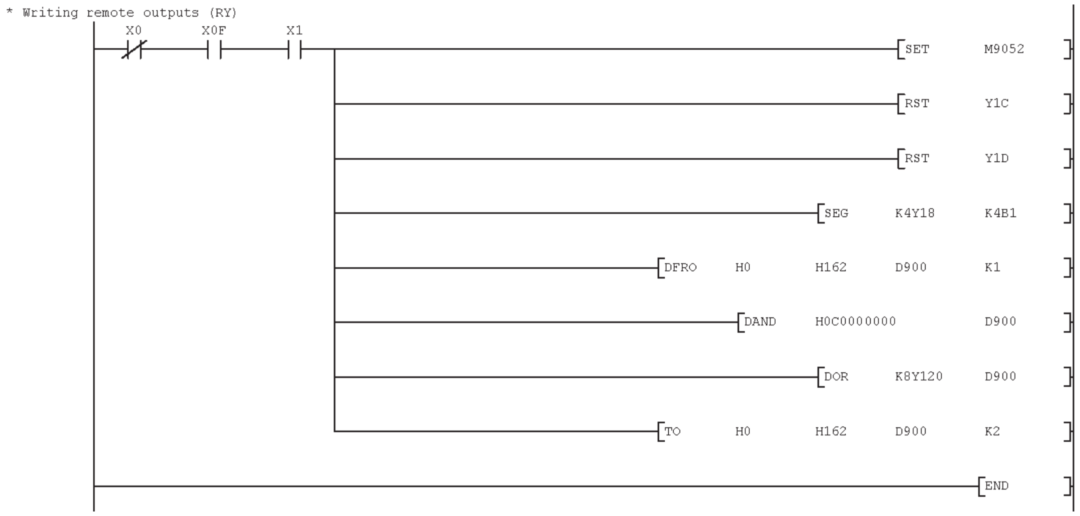

Switches master module buffer memory to bank 0

Malfunction prevention

Writes Y120 to Y13F to remote output (RYn0 to RY(n+1)F)

Figure 7.33 Program example for changing auto-refresh buffer assignments (Continued)

## (3) For the buffer memory auto-refresh function

### (a) Devices used in the program example

**Table 7.41 Devices used in the program example**

| Device | Description | Device | Description |
|---|---|---|---|
| X0 | Module error (Master station) | M1 | Initial setting write completion flag |
| X1 | Own station data link status (Master station) | M2 | Operation complete flag |
| X0F | Own station data link status (Master station) | M3 | Operation failed flag |
| X23 | Error code read flag | M4 | $E^2$PROM function failed flag |
| X24 | Error clear flag | M22 | Operation complete pulse signal |
| X27 | $E^2$PROM function execute flag | M27 | $E^2$PROM function execution start pulse signal |
| K4X120 | Remote input (X120 to X12F) | M28 | $E^2$PROM function complete pulse signal |
| X124 | Initialization complete signal | M29 | $E^2$PROM function execute completion pulse signal |
| X125 | Initialization failed signal | M30 | Operation failed pulse signal |
| X127 | $E^2$PROM function complete signal | M100 | Master station parameter setting start pulse signal |
| X128 | $E^2$PROM function failed signal | M101 | Device that is turned ON for one scan after completion of RLPA |
| K1X134 | Mode setting switch status signal (X134 to X137) | M102 | Device that is turned ON for one scan after failure of writing by RLPA |
| X139 | Initial data read completion signal | M111 | Initial data read completion pulse signal |
| Y13A | Error reset request signal | M135 | Error handling flag |
| X13B | Remote station ready signal | M230 | Error handling execution pulse signal |
| K4Y18 | Output (Y18 to Y27) (Master station) | M270 | $E^2$PROM function in-execution flag |
| Y1C | Buffer memory bank switching specification (Master station) | M500 | AJ65BT-R2N initial data read complete flag |
| Y1D | | M501 | AJ65BT-R2N initial data reading flag |
| KBY120 | Remote output (Y120 to Y13F) | M502 | AJ65BT-R2N mode normal flag |
| Y120 | Send request signal | M503 | AJ65BT-R2N mode error flag |
| Y121 | Send cancel request signal | M504 | $E^2$PROM function setting start pulse signal |
| Y122 | Receive data read completion signal | K4M900 | Other station data link status (SW0080) |
| Y123 | Forced receive completion request signal | M901 | Other station data link status (Station No.2) |
| Y124 | Initialization request signal | M9036 | Always ON |
| Y126 | OS reception area clear request signal | M9052 | SEG instruction switching |
| Y127 | $E^2$PROM function request signal | D10 to D45 | Set values |
| Y139 | Initial data read request signal | D100 to D106 | Network parameters of master station |
| Y13A | Error reset request signal | D107 | Error code in Network parameters setting |
| M0 | Operation start request flag | D400 to D402 | AJ65BT-R2N error code |

(b) Program example

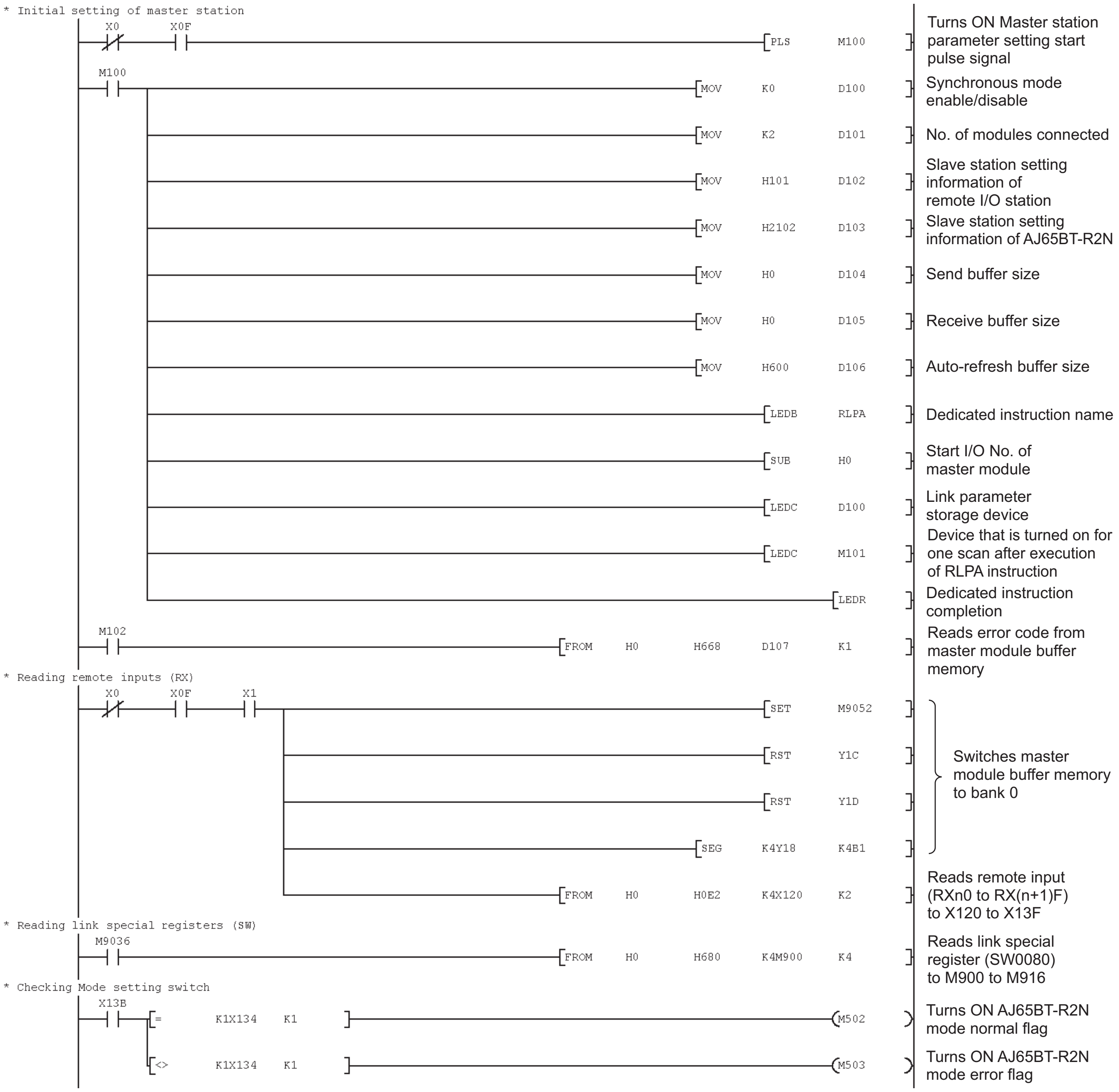

**Figure 7.34 Program example for changing auto-refresh buffer assignments**

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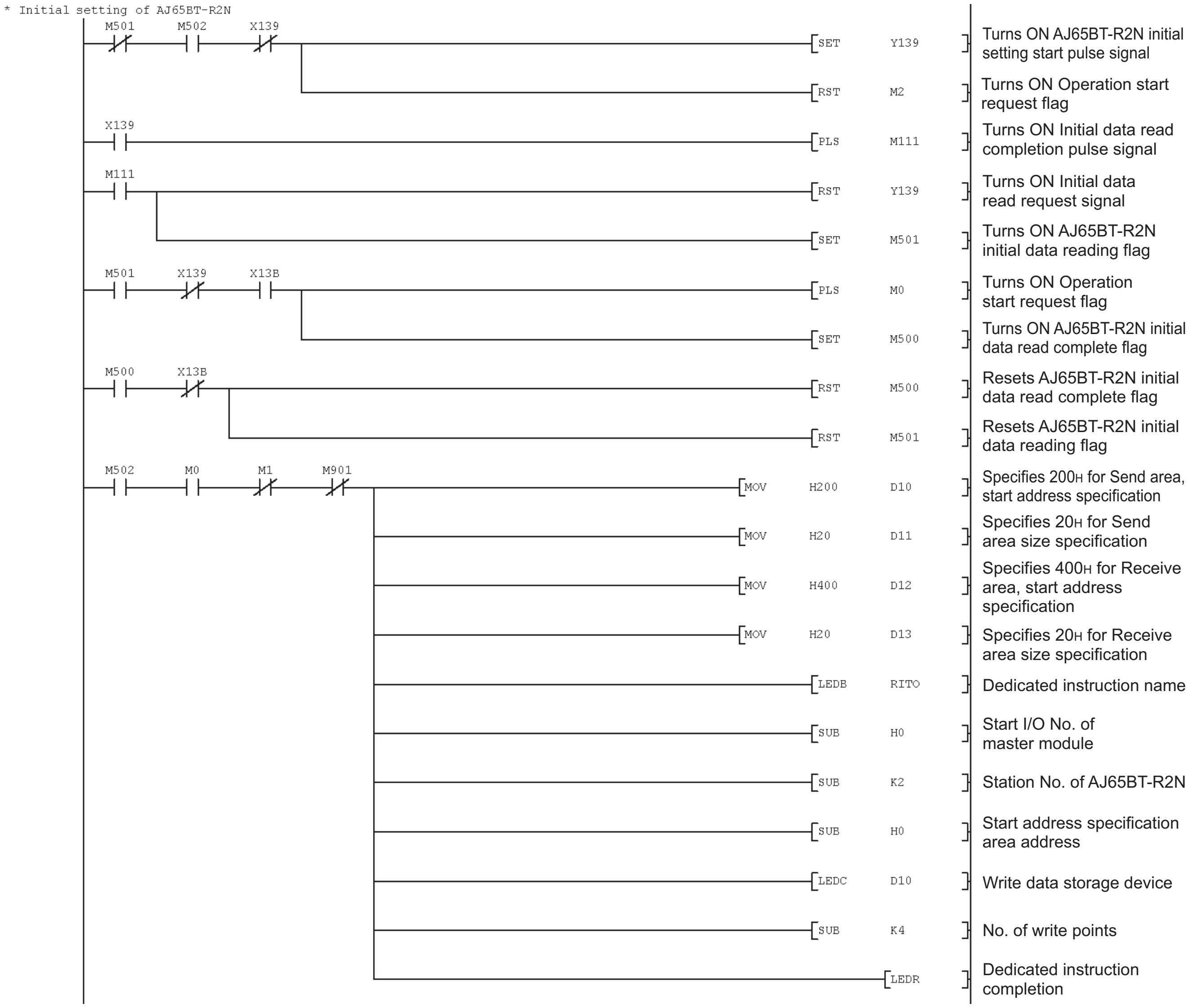

Figure 7.34 Program example for changing auto-refresh buffer assignments (Continued)

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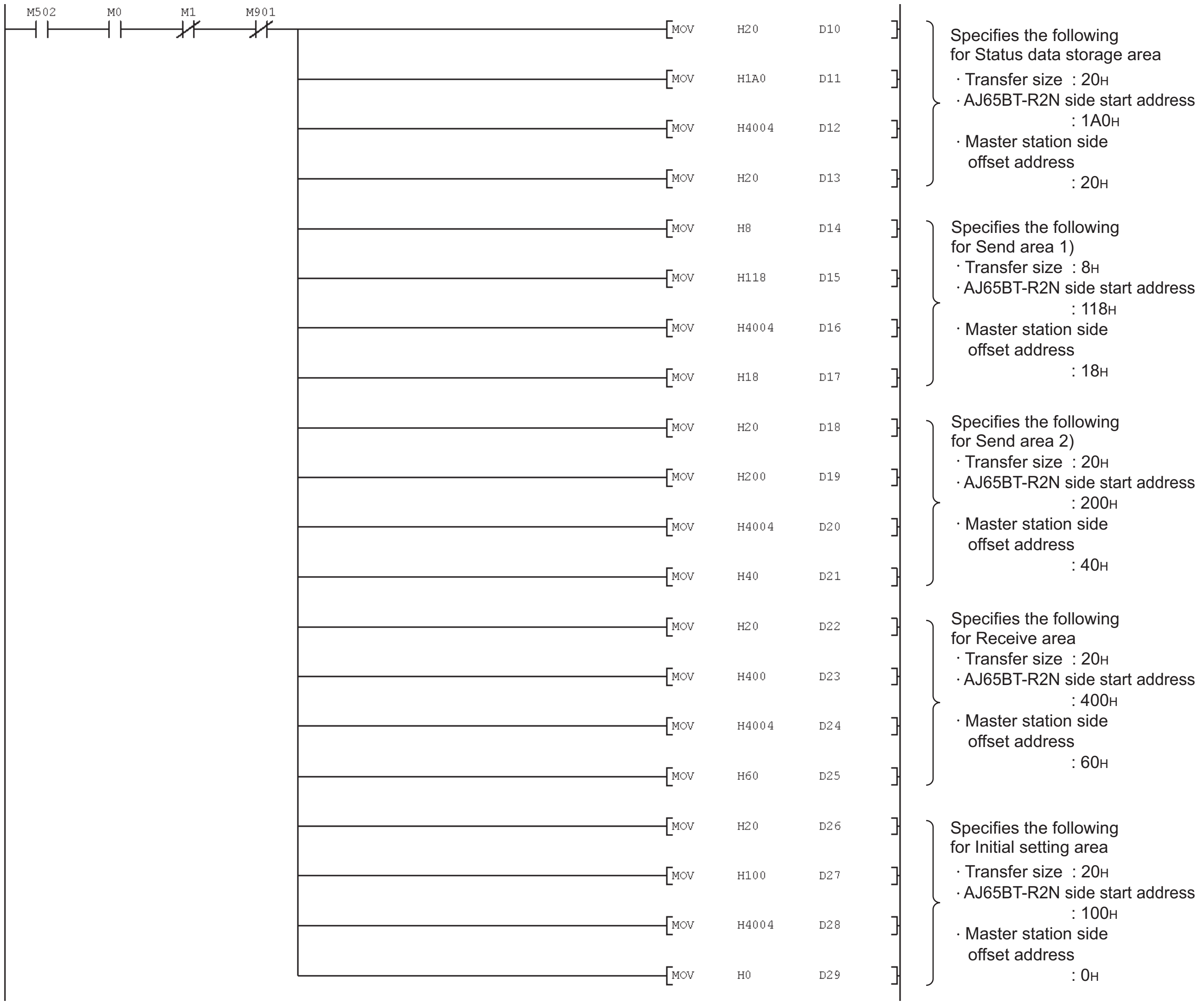

Specifies the following for Status data storage area
- Transfer size : 20H
- AJ65BT-R2N side start address : 1A0H
- Master station side offset address : 20H

Specifies the following for Send area 1)
- Transfer size : 8H
- AJ65BT-R2N side start address : 118H
- Master station side offset address : 18H

Specifies the following for Send area 2)
- Transfer size : 20H
- AJ65BT-R2N side start address : 200H
- Master station side offset address : 40H

Specifies the following for Receive area
- Transfer size : 20H
- AJ65BT-R2N side start address : 400H
- Master station side offset address : 60H

Specifies the following for Initial setting area
- Transfer size : 20H
- AJ65BT-R2N side start address : 100H
- Master station side offset address : 0H

Figure 7.34 Program example for changing auto-refresh buffer assignments (Continued)

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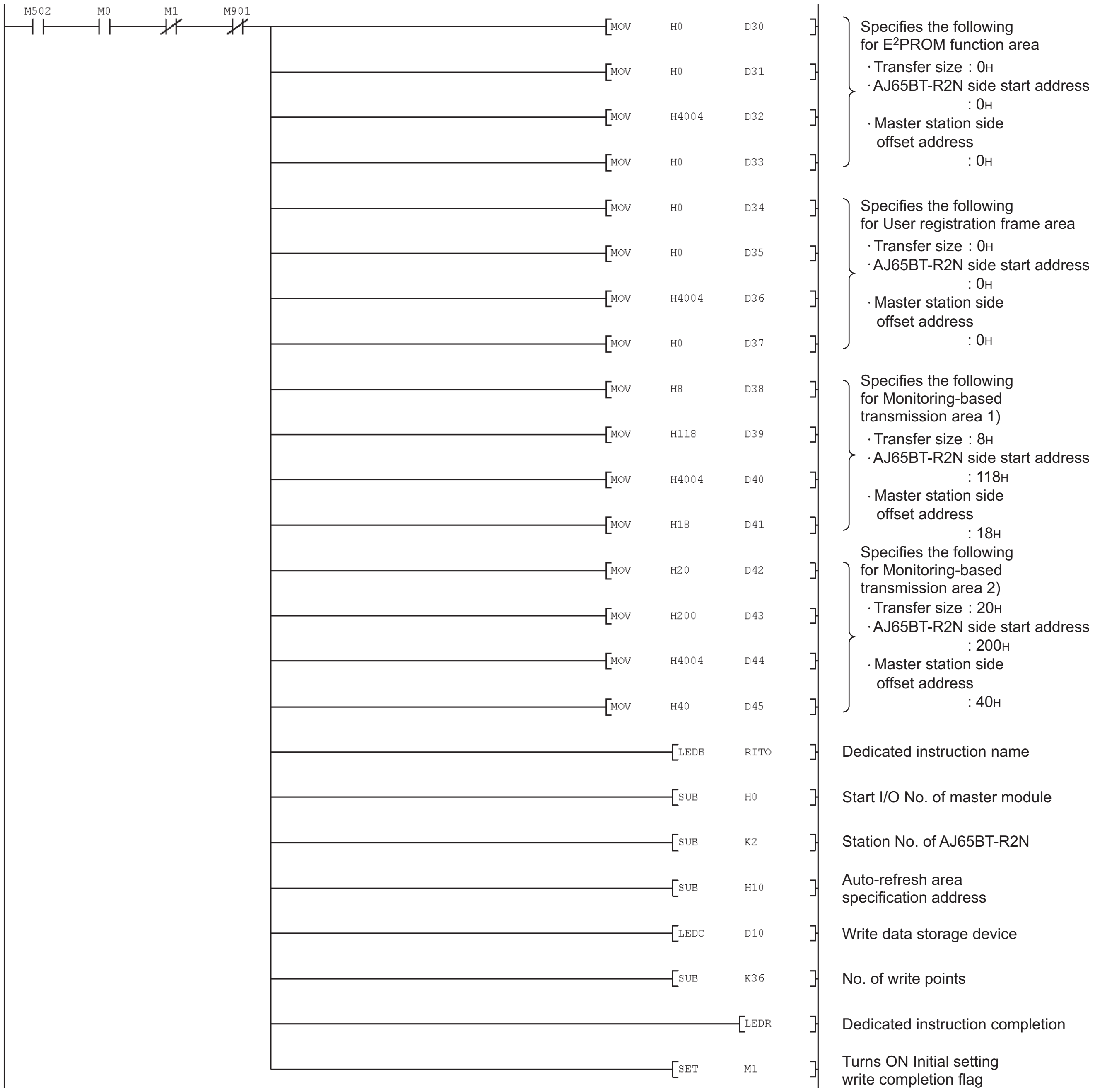

Figure 7.34 Program example for changing auto-refresh buffer assignments (Continued)

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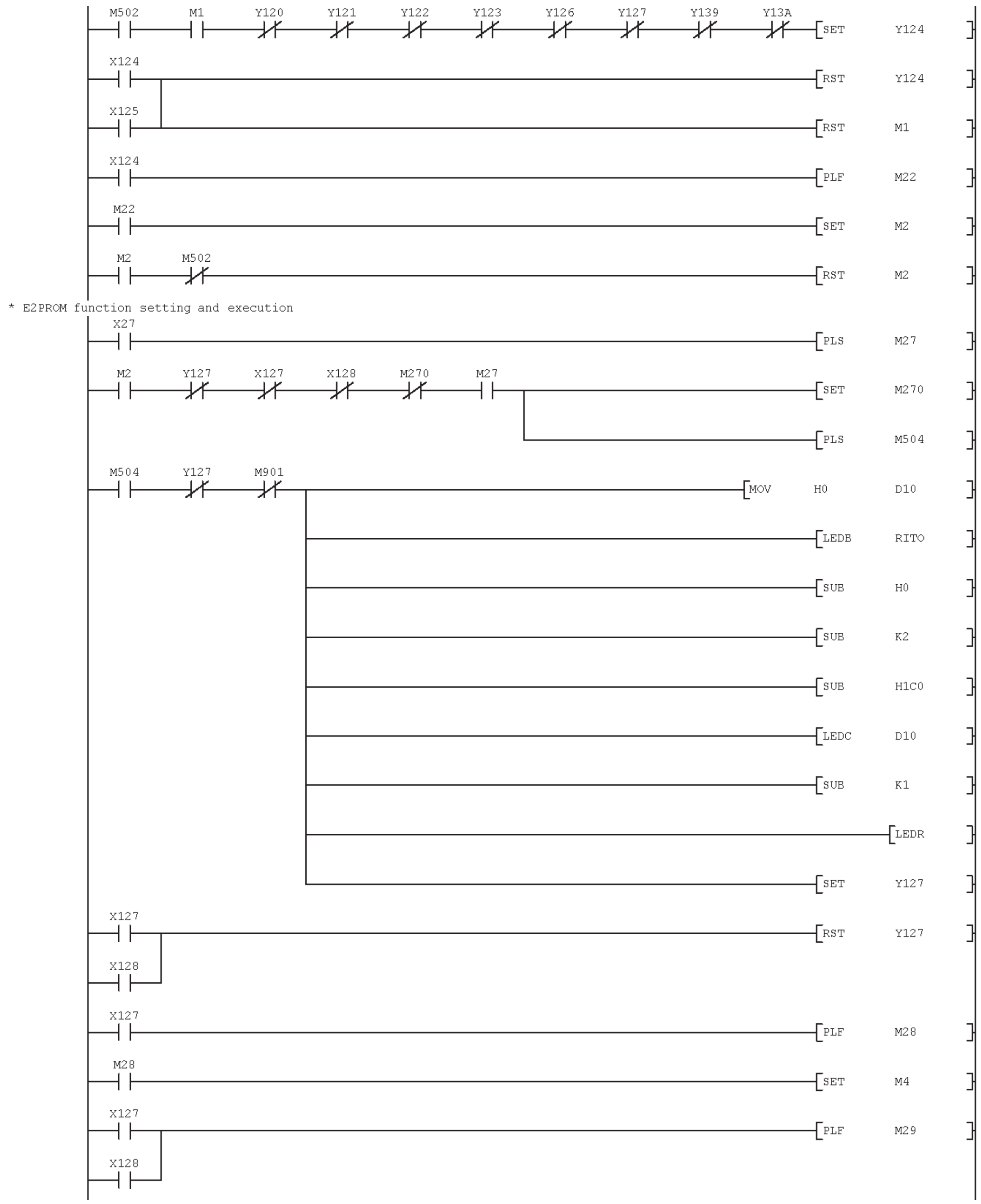

Turns ON Initialization request signal

Resets Initialization request signal

Resets Initial setting write completion flag

Turns ON Operation complete pulse signal

Turns ON Operation complete flag

Resets Operation complete flag

Turns ON $E^2$PROM function execution start pulse signal

Turns ON $E^2$PROM function in-execution flag

Turns ON $E^2$PROM function setting start pulse signal

Sets 0 (registration of set buffer memory values) for $E^2$PROM function specification

Dedicated instruction name

Start I/O No. of master module

Station No. of AJ65BT-R2N

$E^2$PROM function specification address

Write data storage device

No. of write points

Dedicated instruction completion

Turns ON $E^2$PROM function request signal

Resets $E^2$PROM function request signal

Turns ON $E^2$PROM function complete pulse signal

Turns ON $E^2$PROM function failed flag

Turns ON $E^2$PROM function execute completion pulse signal

Figure 7.34 Program example for changing auto-refresh buffer assignments (Continued)

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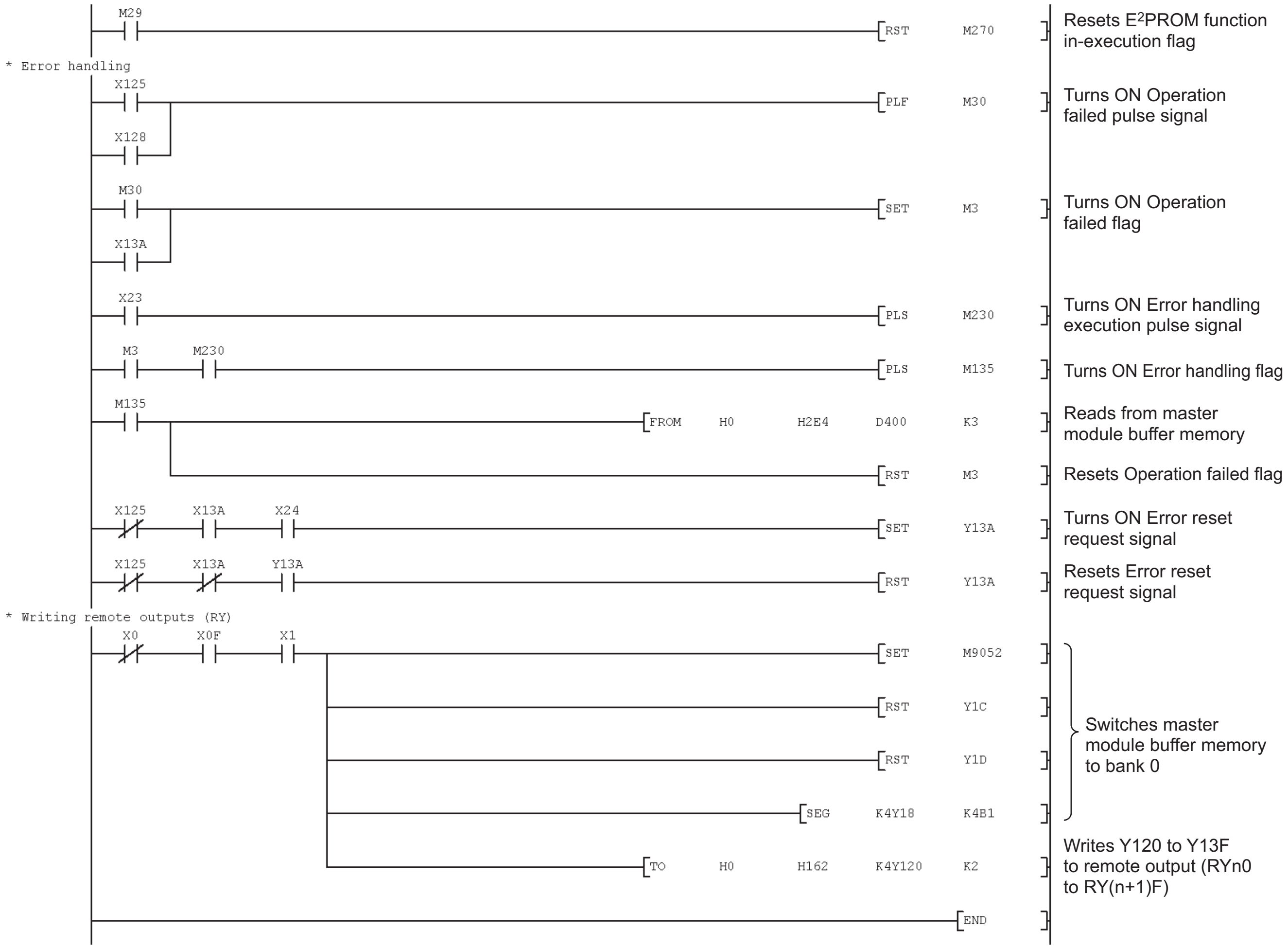

Resets E²PROM function in-execution flag

Turns ON Operation failed pulse signal

Turns ON Operation failed flag

Turns ON Error handling execution pulse signal

Turns ON Error handling flag

Reads from master module buffer memory

Resets Operation failed flag

Turns ON Error reset request signal

Resets Error reset request signal

Switches master module buffer memory to bank 0

Writes Y120 to Y13F to remote output (RYn0 to RY(n+1)F)

Figure 7.34 Program example for changing auto-refresh buffer assignments (Continued)

## 7.9.2 Program example for sending/receiving data with RISEND/RIRCV instruction

The RISEND and RIRCV instructions are dedicated instructions for sending/receiving using the send/receive buffer communication function.
For this reason, this program example can only be used when using the send/receive buffer communication function.

### (1) Overview of program example

- When Operation send execute flag (X22) is turned ON, a character string "ABCDEFGHI"＋LF (0AH) is sent with the RISEND instruction.
- When the AJ65BT-R2N receives data from the external device, six words of the received data are read out to the word device (D50) with the RIRCV instruction.

### (2) Devices used in the program example

**Table 7.42 Devices used in the program example**

| Device | Description | Device | Description |
|---|---|---|---|
| X0 | Module error (Master station) | M120 | Buffer memory access exclusion check flag |
| X1 | Own station data link status (Master station) | M125 | Sending flag |
| X0F | Module ready (Master station) | M130 | Receiving flag |
| X22 | Send execute flag | M135 | Error handling flag |
| X23 | Error code read flag | M160 | Device that is turned ON for one scan after completion of RIRCV |
| X24 | Error clear flag | M161 | Device that is turned ON for one scan after failure of reading by RIRCV |
| K4X120 | Remote input (X120 to X12F) | M180 | Device that is turned ON for one scan after completion of RISEND |
| X121 | Send failed signal | M181 | Device that is turned ON for one scan after failure of reading by RISEND |
| X122 | Normal receive data read request signal | M190 | Device that is turned ON for one scan after completion of RIRD |
| X123 | Error receive data read request signal | M191 | Device that is turned ON for one scan after failure of reading by RIRD |
| X125 | Initialization failed signal | M220 | Send execution pulse signal |
| X128 | E$^2$PROM function failed signal | M230 | Error handling execution pulse signal |
| K1X134 | Mode setting switch status signal (X134 to X137) | M502 | AJ65BT-R2N mode normal flag |
| X13A | Error status signal | M503 | AJ65BT-R2N mode error flag |
| X13B | Remote station ready signal | K4M900 | Other station data link status (SW0080) |
| K4Y18 | Output (Y18 to Y27) (Master station) | M901 | Other station data link status (Station No.2) |
| Y1C | Buffer memory bank switching specification (Master station) | M9036 | Always ON |
| Y1D | | M9052 | SEG instruction switching |
| K8Y120 | Remote output (Y120 to Y13F) | C0 | Normal send counter |
| Y13A | Error reset request signal | C1 | Abnormal send counter |
| M3 | Operation failed flag | C2 | Normal receive counter |
| M30 | Operation failed pulse signal | C3 | Abnormal receive counter |
| M52 | AJ65BT-R2N error pulse signal | D0 to D4 | Control data of RISEND instruction |
| M100 | Master station parameter setting start pulse signal | D5 to D10 | No. of send data and send data |
| M101 | Device that is turned ON for one scan after completion of RLPA | D15 to D16 | Link devices for handshake |
| M102 | Device that is turned ON for one scan after failure of writing by RLPA | D30 to D42 | Control data of RIRCV instruction, and receive data |

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Table 7.42 Devices used in the program example (Continued)

| Device | Description | Device | Description |
|---|---|---|---|
| D45 to D46 | Link devices for handshake | D130 to D136 | Control data of RIRD instruction, and error code of AJ65BT-R2N |
| D100 to D106 | Network parameters of master station | D900 | Master module RY(n+1)E, RY(n+1)F |
| D107 | Error code in Network parameters setting | — | |

(3) Program example

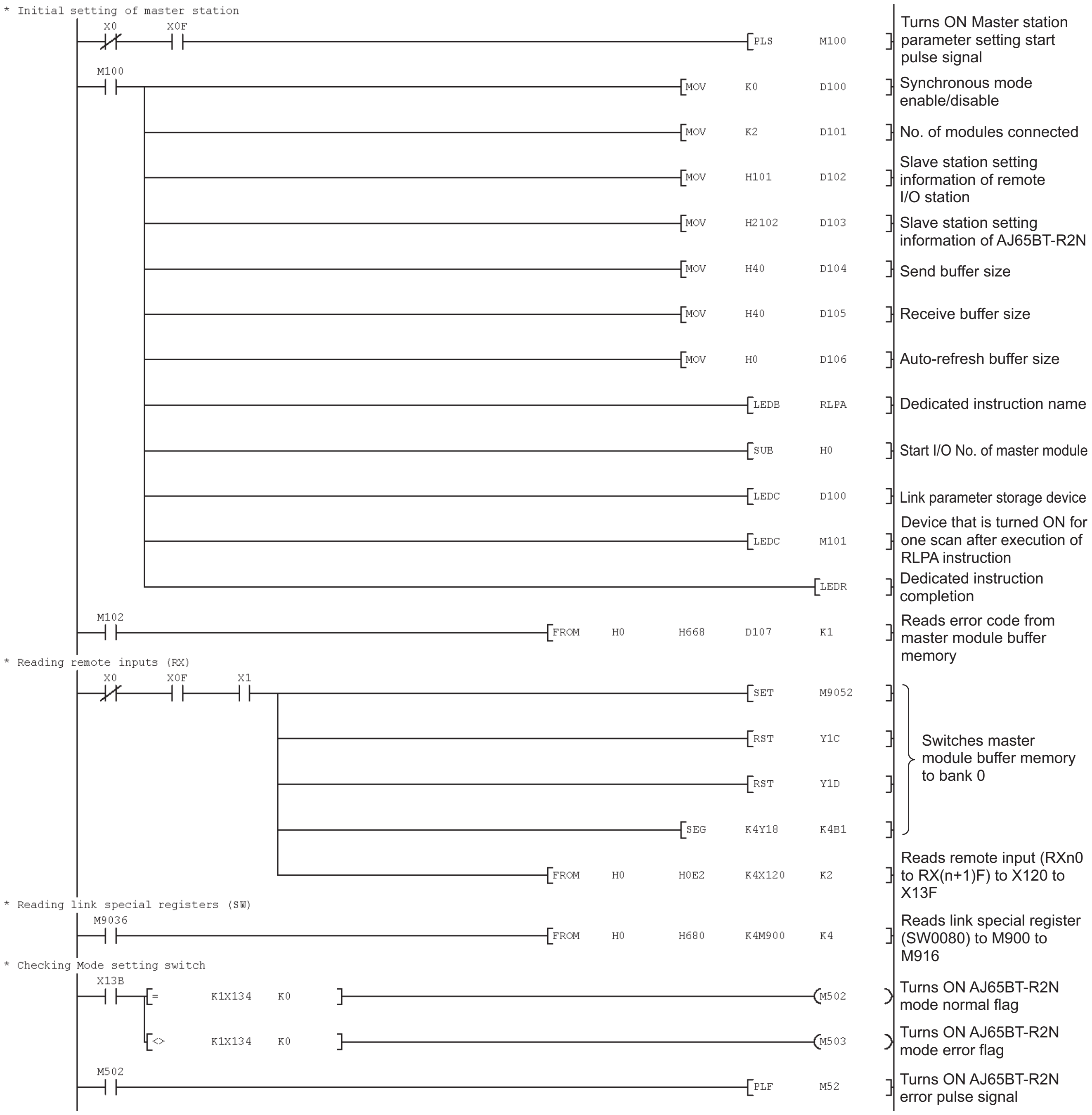

**Figure 7.35 Program example for sending/receiving data with RISEND/RIRCV instruction**

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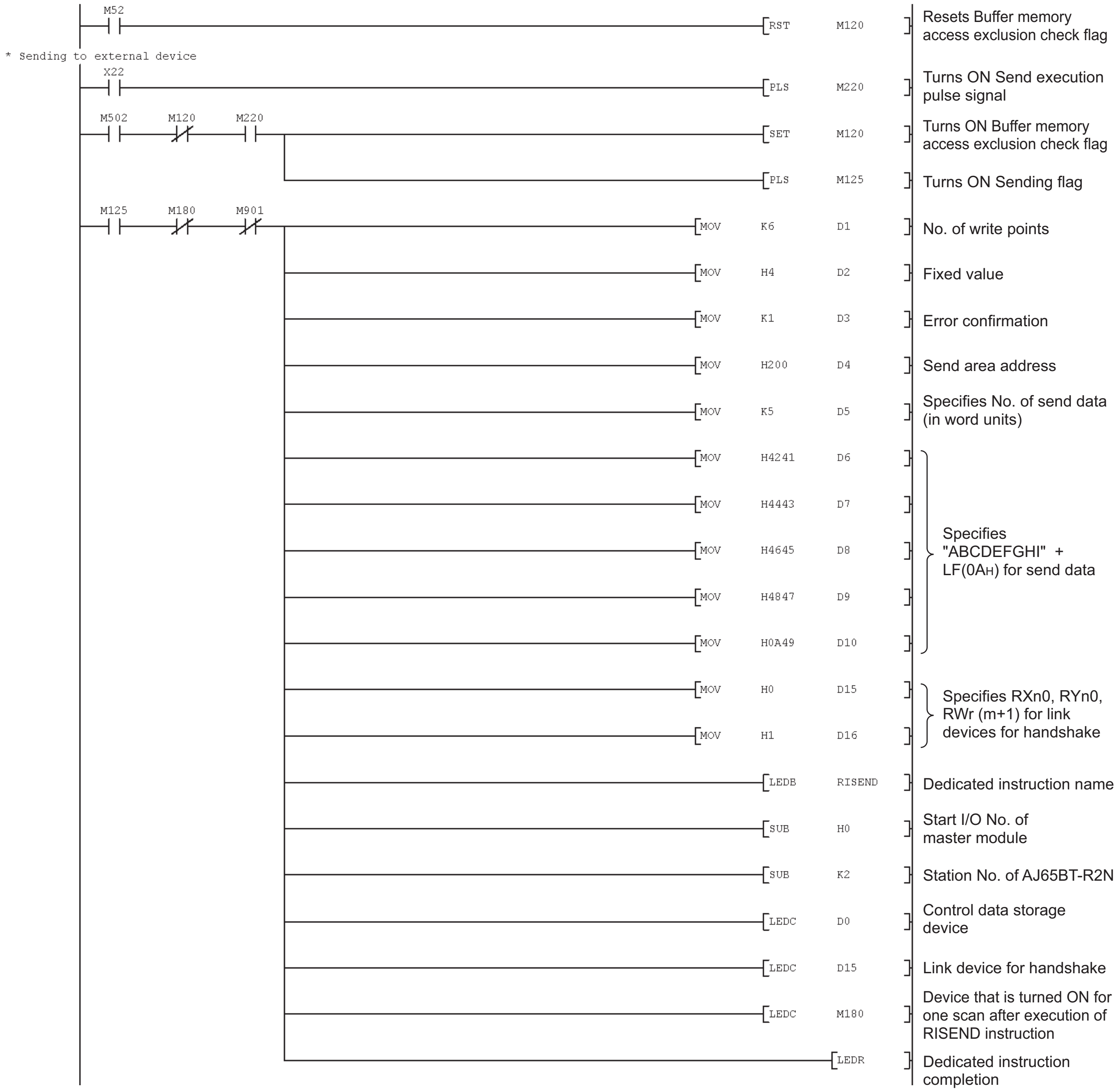

```
   M52
--| |------------------------------------------[RST    M120    ]  Resets Buffer memory access exclusion check flag
* Sending to external device
   X22
--| |------------------------------------------[PLS    M220    ]  Turns ON Send execution pulse signal
   M502    M120    M220
--| |-----|/|-----| |--+-----------------------[SET    M120    ]  Turns ON Buffer memory access exclusion check flag
                       +-----------------------[PLS    M125    ]  Turns ON Sending flag
   M125    M180    M901
--| |-----|/|-----|/|--+---------------[MOV  K6      D1      ]  No. of write points
                       +---------------[MOV  H4      D2      ]  Fixed value
                       +---------------[MOV  K1      D3      ]  Error confirmation
                       +---------------[MOV  H200    D4      ]  Send area address
                       +---------------[MOV  K5      D5      ]  Specifies No. of send data (in word units)
                       +---------------[MOV  H4241   D6      ]  )
                       +---------------[MOV  H4443   D7      ]  |
                       +---------------[MOV  H4645   D8      ]  > Specifies "ABCDEFGHI" + LF(0AH) for send data
                       +---------------[MOV  H4847   D9      ]  |
                       +---------------[MOV  H0A49   D10     ]  )
                       +---------------[MOV  H0      D15     ]  ) Specifies RXn0, RYn0, RWr (m+1) for link
                       +---------------[MOV  H1      D16     ]  ) devices for handshake
                       +-----------------------[LEDB   RISEND  ]  Dedicated instruction name
                       +-----------------------[SUB    H0      ]  Start I/O No. of master module
                       +-----------------------[SUB    K2      ]  Station No. of AJ65BT-R2N
                       +-----------------------[LEDC   D0      ]  Control data storage device
                       +-----------------------[LEDC   D15     ]  Link device for handshake
                       +-----------------------[LEDC   M180    ]  Device that is turned ON for one scan after execution of RISEND instruction
                       +-------------------------------[LEDR   ]  Dedicated instruction completion
```

Figure 7.35 Program example for sending/receiving data with RISEND/RIRCV instruction (Continued)

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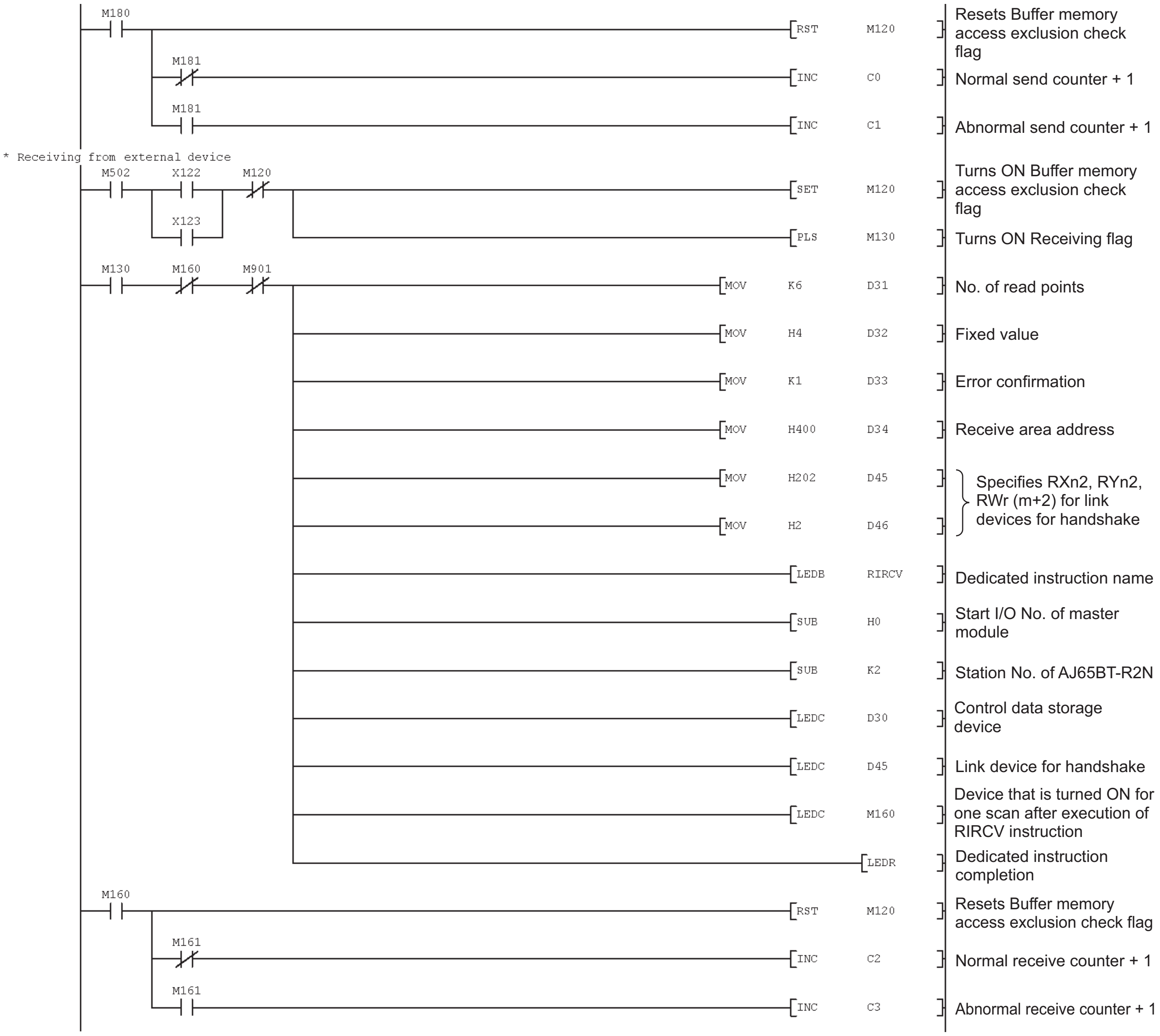

Figure 7.35 Program example for sending/receiving data with RISEND/RIRCV instruction (Continued)

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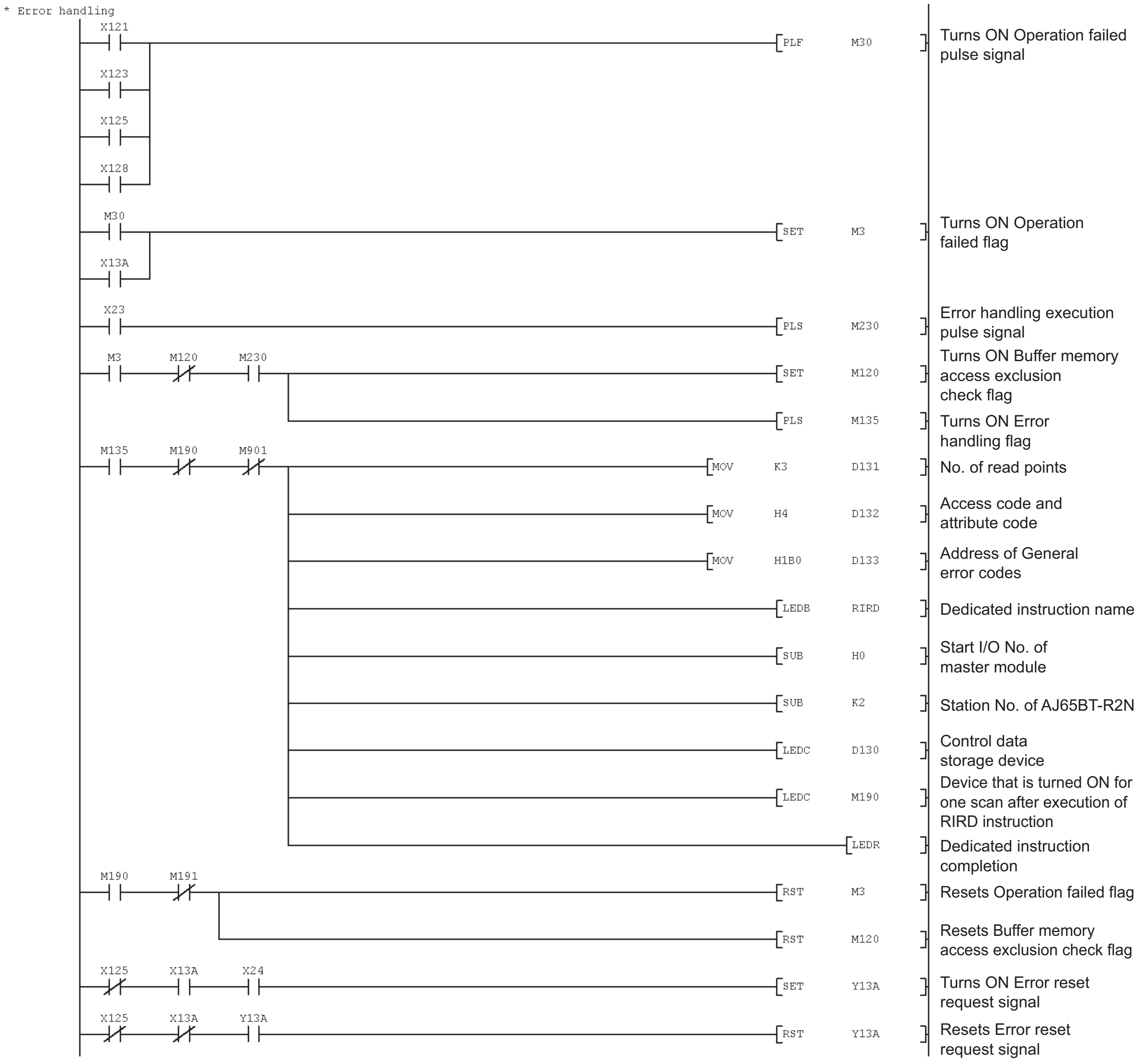

Figure 7.35 Program example for sending/receiving data with RISEND/RIRCV instruction (Continued)

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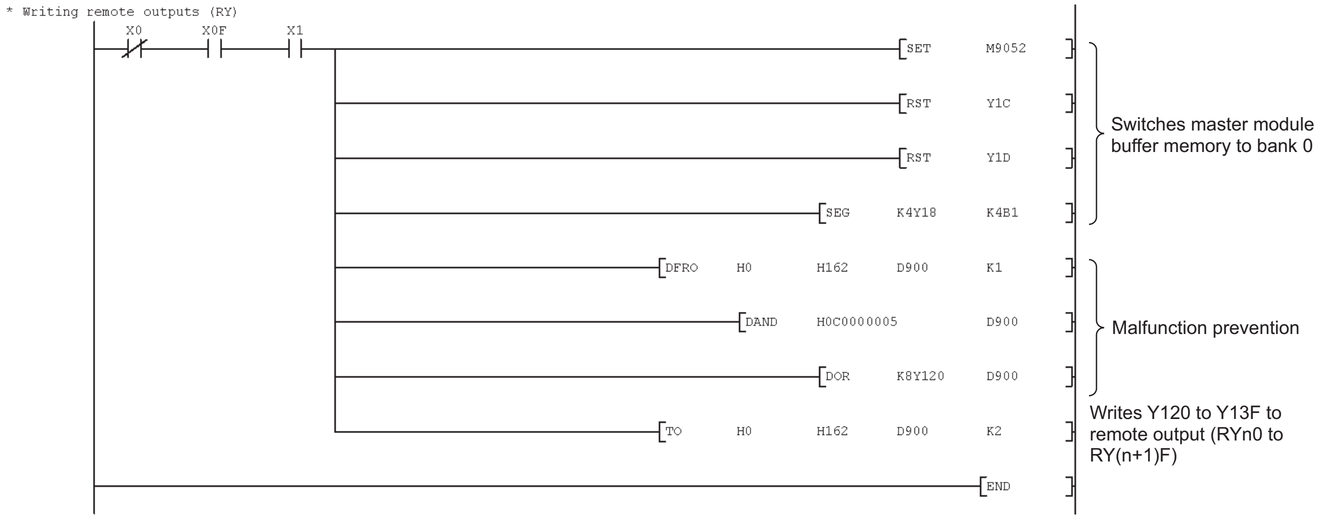

Switches master module buffer memory to bank 0

Malfunction prevention

Writes Y120 to Y13F to remote output (RYn0 to RY(n+1)F)

Figure 7.35 Program example for sending/receiving data with RISEND/RIRCV instruction (Continued)

## ☒Point

When sending/receiving data of 481 words or more to/from the external device using a RISEND or RIRCV instruction, divide the data into parts, each of which contains 480 words or less, to write and read to the AJ65BT-R2N.
With RISEND and RIRCV instructions, data of 481 words or more cannot be written or read to the AJ65BT-R2N at one time.

### 7.9.3 Program example for receiving data when a receive timeout occurs

(1) Overview of program example

- The receive timeout time is set to 200ms.
- If a receive timeout error (BB21H) occurs, data received up to that point are read out from the AJ65BT-R2N buffer memory to word devices of the master station.
- After reading is completed, the error is cleared.

(2) For the send/receive buffer communication function

(a) Devices used in the program example

**Table 7.43 Devices used in the program example**

| Device | Description | Device | Description |
|---|---|---|---|
| X0 | Module error (Master station) | Y127 | $E^2$PROM function request signal |
| X1 | Own station data link status (Master station) | Y139 | Initial data read request signal |
| X0F | Module ready (Master station) | Y13A | Error reset request signal |
| X23 | Error code read flag | M0 | Operation start request flag |
| X24 | Error clear flag | M1 | Initial setting write completion flag |
| K4X120 | Remote input (X120 to X12F) | M2 | Operation complete flag |
| X122 | Normal receive data read request signal | M3 | Operation failed flag |
| X123 | Error receive data read request signal | M10 | Device that is turned ON for one scan after completion of RIWT |
| X124 | Initialization complete signal | M11 | Device that is turned ON for one scan after failure of writing by RIWT |
| X125 | Initialization failed signal | M20 | AJ65BT-R2N initial setting start flag |
| K1X134 | Mode setting switch status signal (X134 to X137) | M22 | Error clear request |
| X13A | Error status signal | M24 | Operation complete pulse signal |
| X13B | Remote station ready signal | M30 | Operation failed pulse signal |
| K4Y18 | Output (Y18 to Y27) (Master station) | M100 | Master station parameter setting start pulse signal |
| Y1C | Buffer memory bank switching specification (Master station) | M101 | Device that is turned ON for one scan after completion of RLPA |
| Y1D | | M102 | Device that is turned ON for one scan after failure of writing by RLPA |
| K8Y120 | Remote output (Y120 to Y13F) | M120 | Buffer memory access exclusion check flag |
| Y120 | Send request signal | M130 | Receiving flag |
| Y121 | Send cancel request signal | M135 | Error handling flag |
| Y122 | Receive data read completion signal | M155 | Device that is turned ON for one scan after completion of RIRD |
| Y123 | Forced receive completion request signal | M156 | Device that is turned ON for one scan after failure of reading by RIRD |
| Y124 | Initialization request signal | M160 | Device that is turned ON for one scan after completion of RIRD |
| Y126 | OS reception area clear request signal | M161 | Device that is turned ON for one scan after failure of reading by RIRD |

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Table 7.43 Devices used in the program example (Continued)

| Device | Description | Device | Description |
|---|---|---|---|
| M165 | Device that is turned ON for one scan after completion of RIRD | M9036 | Always ON |
| M166 | Device that is turned ON for one scan after failure of reading by RIRD | M9052 | SEG instruction switching |
| M190 | Device that is turned ON for one scan after completion of RIRD | D0 to D4 | Control data of RIWT instruction, and set values |
| M191 | Device that is turned ON for one scan after failure of reading by RIRD | From D30 | Control data of RIRD instruction, and receive data |
| M230 | Error handling execution pulse signal | D100 to D106 | Network parameters of master station |
| M502 | AJ65BT-R2N mode normal flag | D107 | Error code in Network parameters setting |
| M503 | AJ65BT-R2N mode error flag | D130 to D136 | Control data of RIRD instruction, and error code of AJ65BT-R2N |
| K4M900 | Other station data link status (SW0080) | D396 to D400 | Control data of RIRD instruction, and error code reported when receiving |
| M901 | Other station data link status (Station No.2) | D900 | Master module RY(n+1)E, RY(n+1)F |

(b) Program example

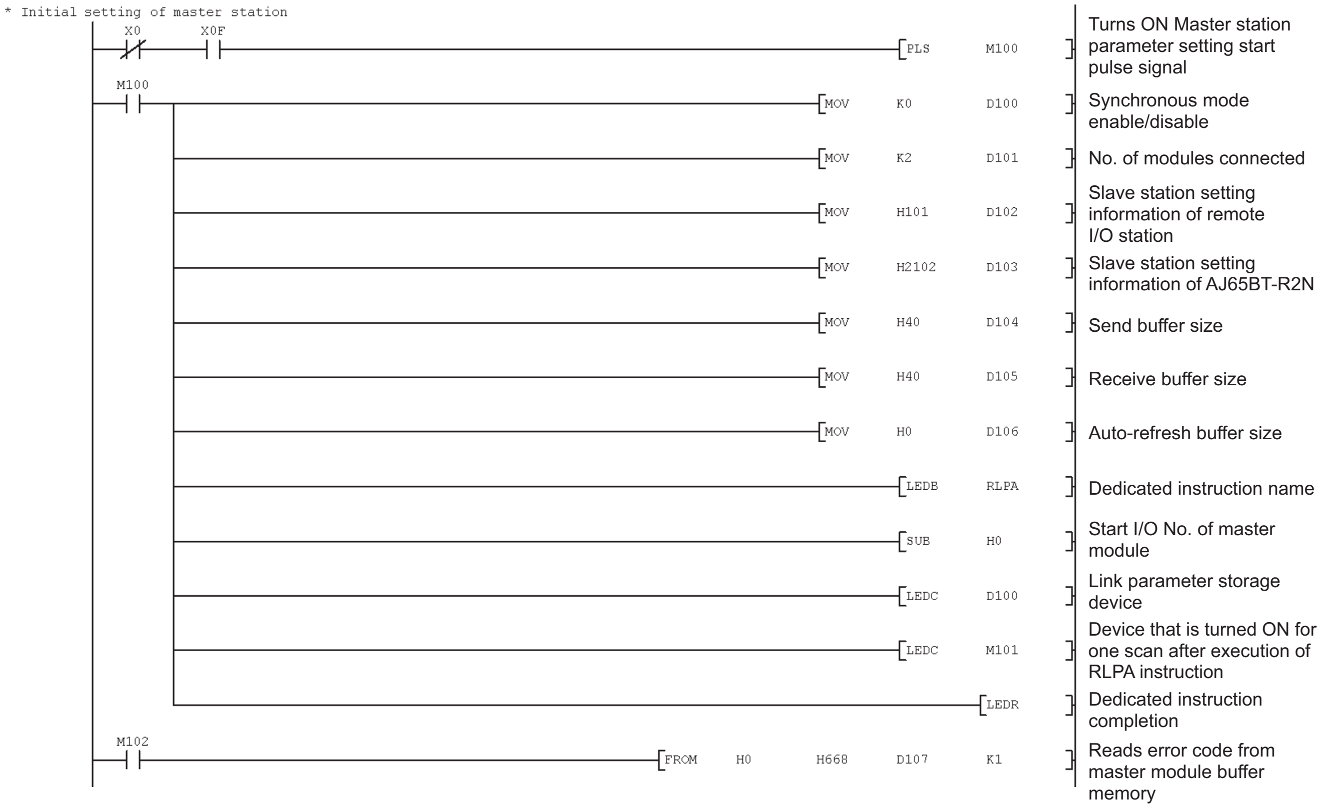

**Figure 7.36 Program example for receiving data when a receive timeout occurs**

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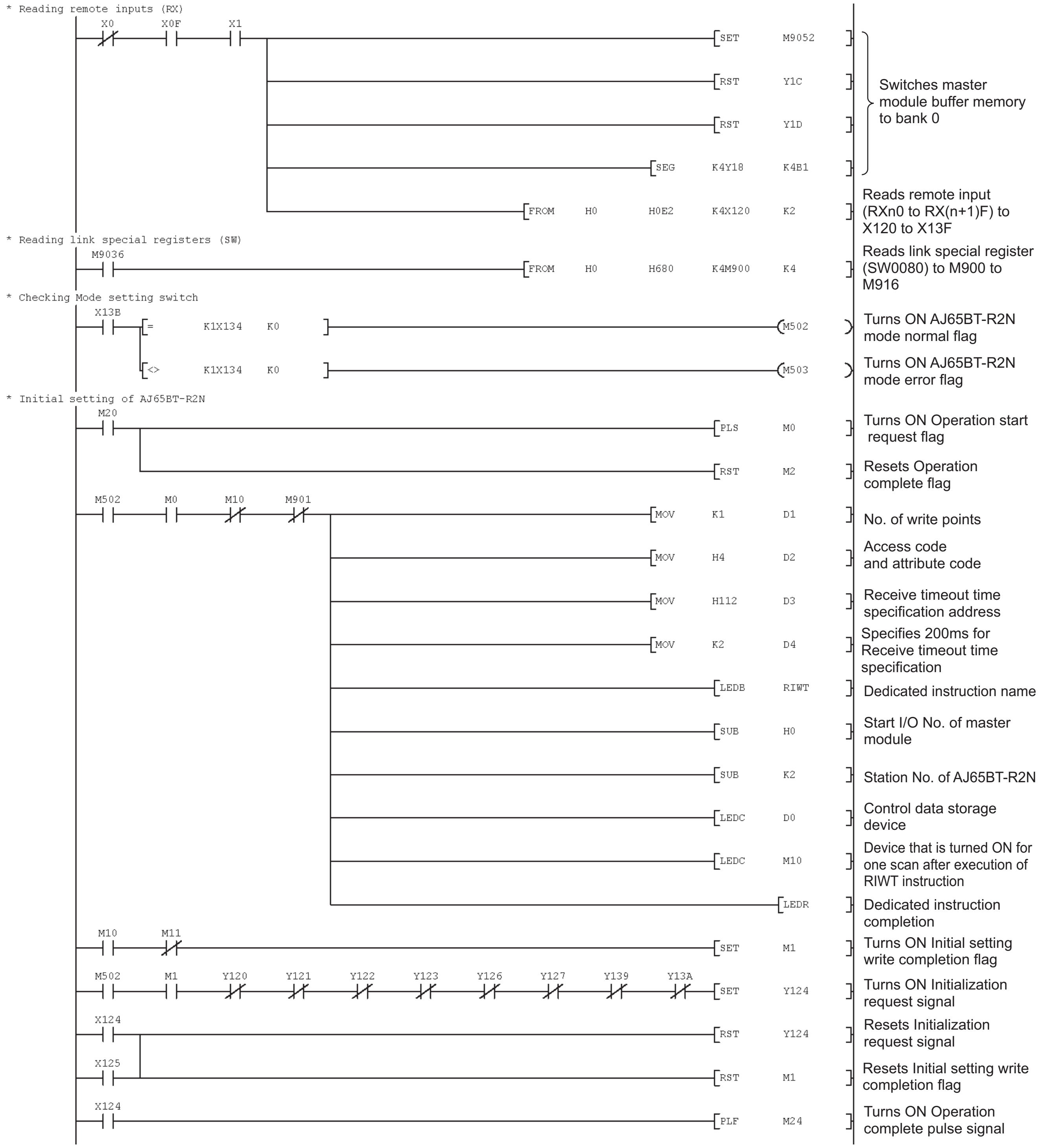

Figure 7.36 Program example for receiving data when a receive timeout occurs (Continued)

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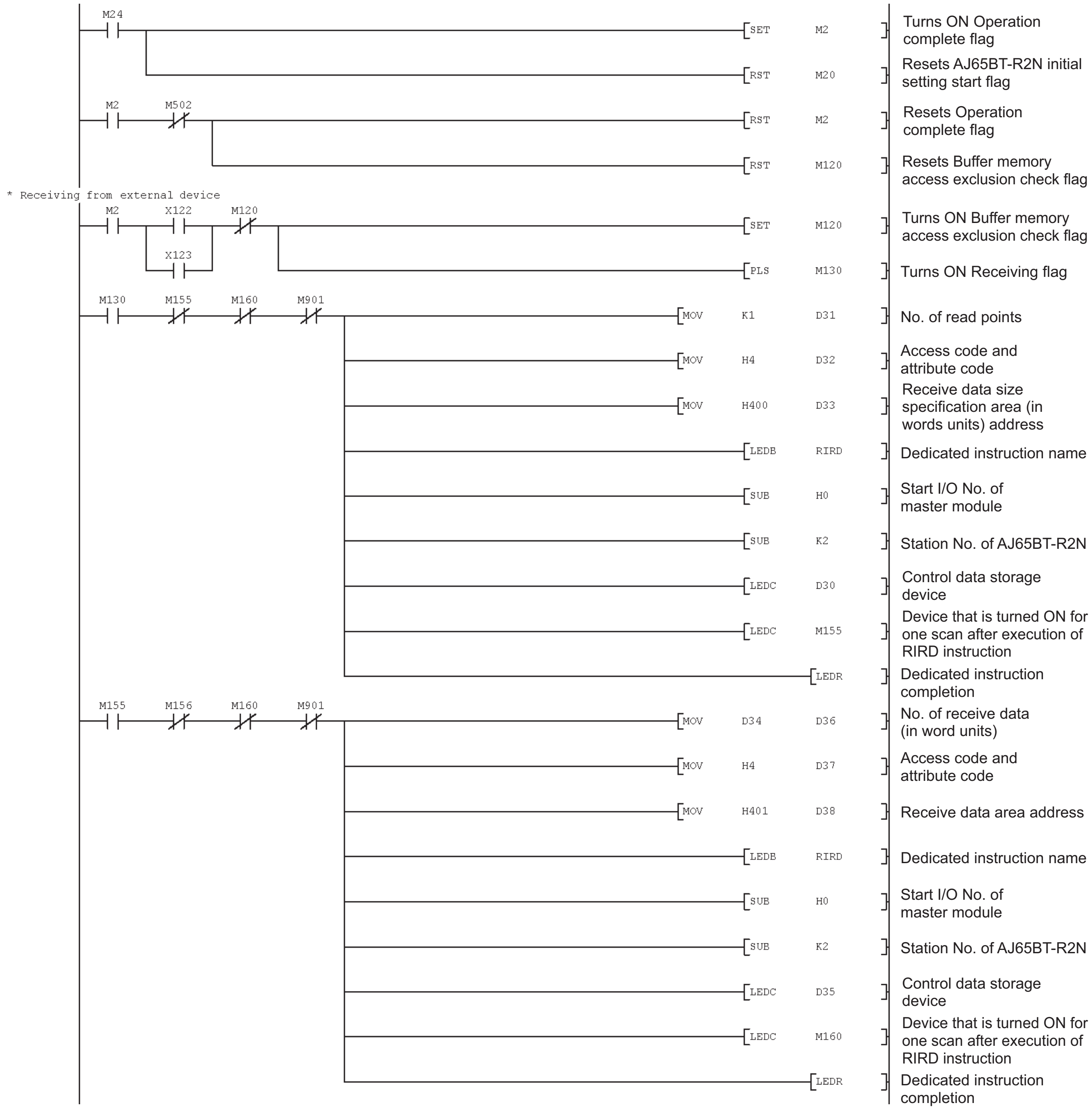

Figure 7.36 Program example for receiving data when a receive timeout occurs (Continued)

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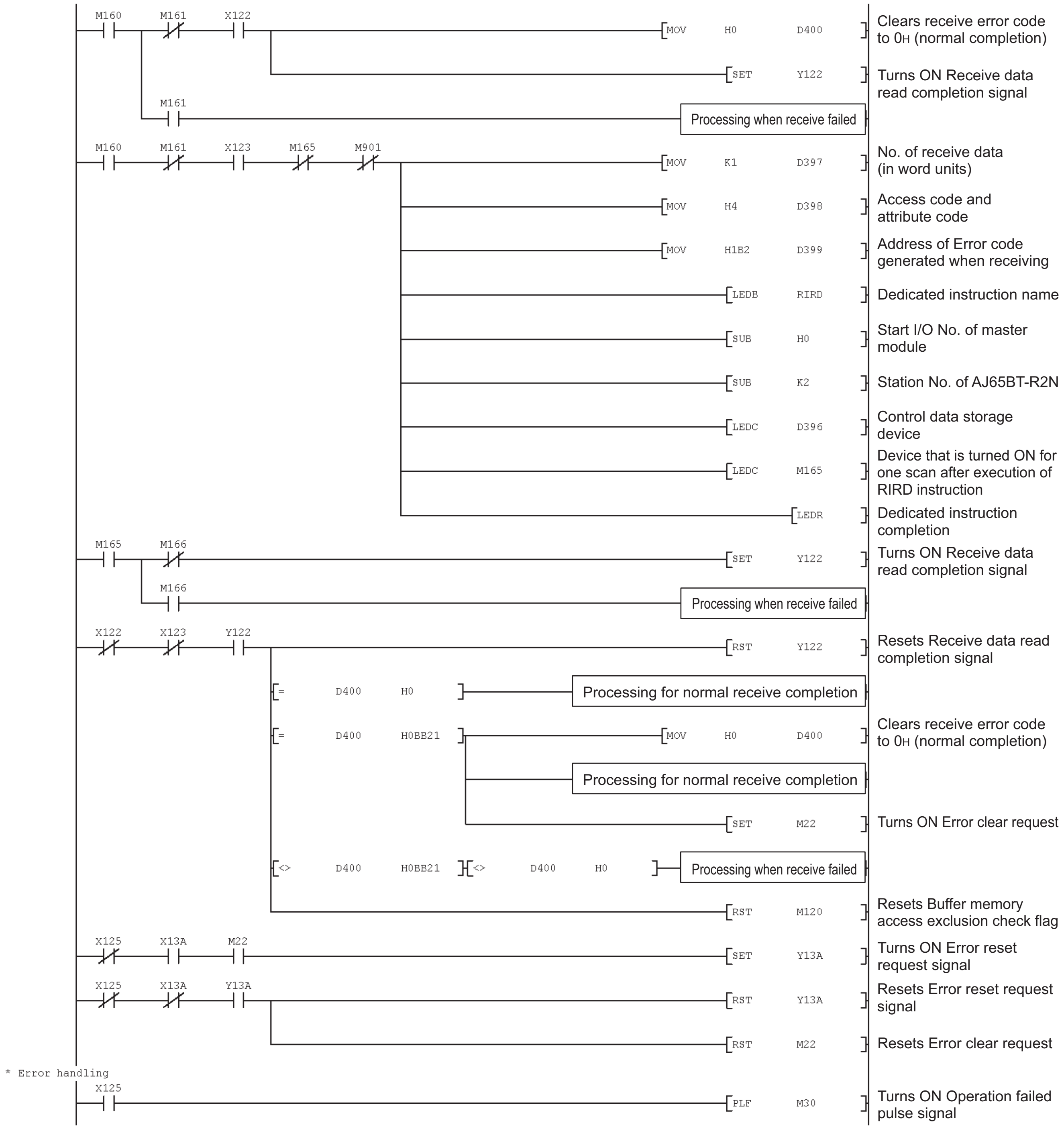

Figure 7.36 Program example for receiving data when a receive timeout occurs (Continued)

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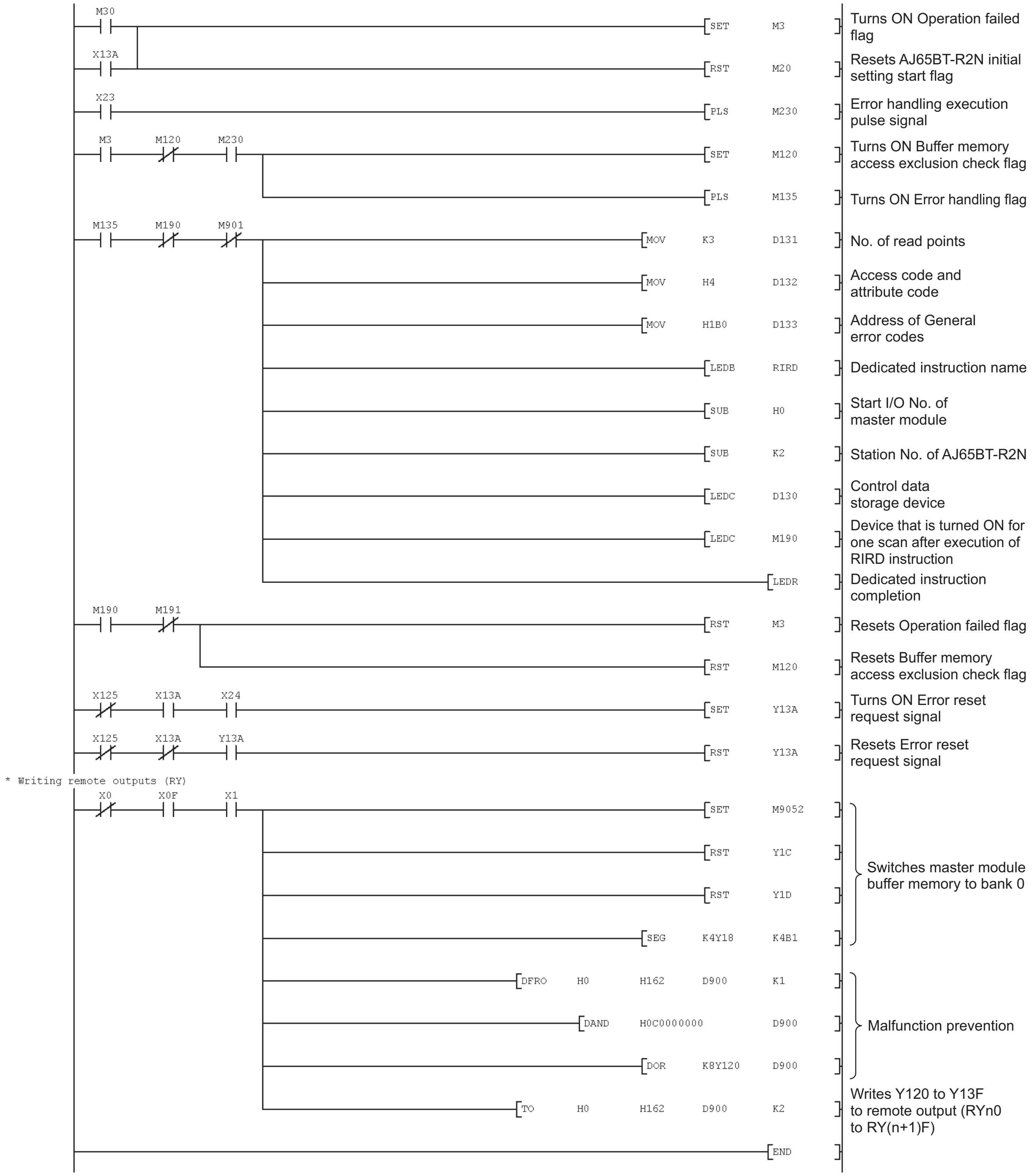


Figure 7.36 Program example for receiving data when a receive timeout occurs (Continued)

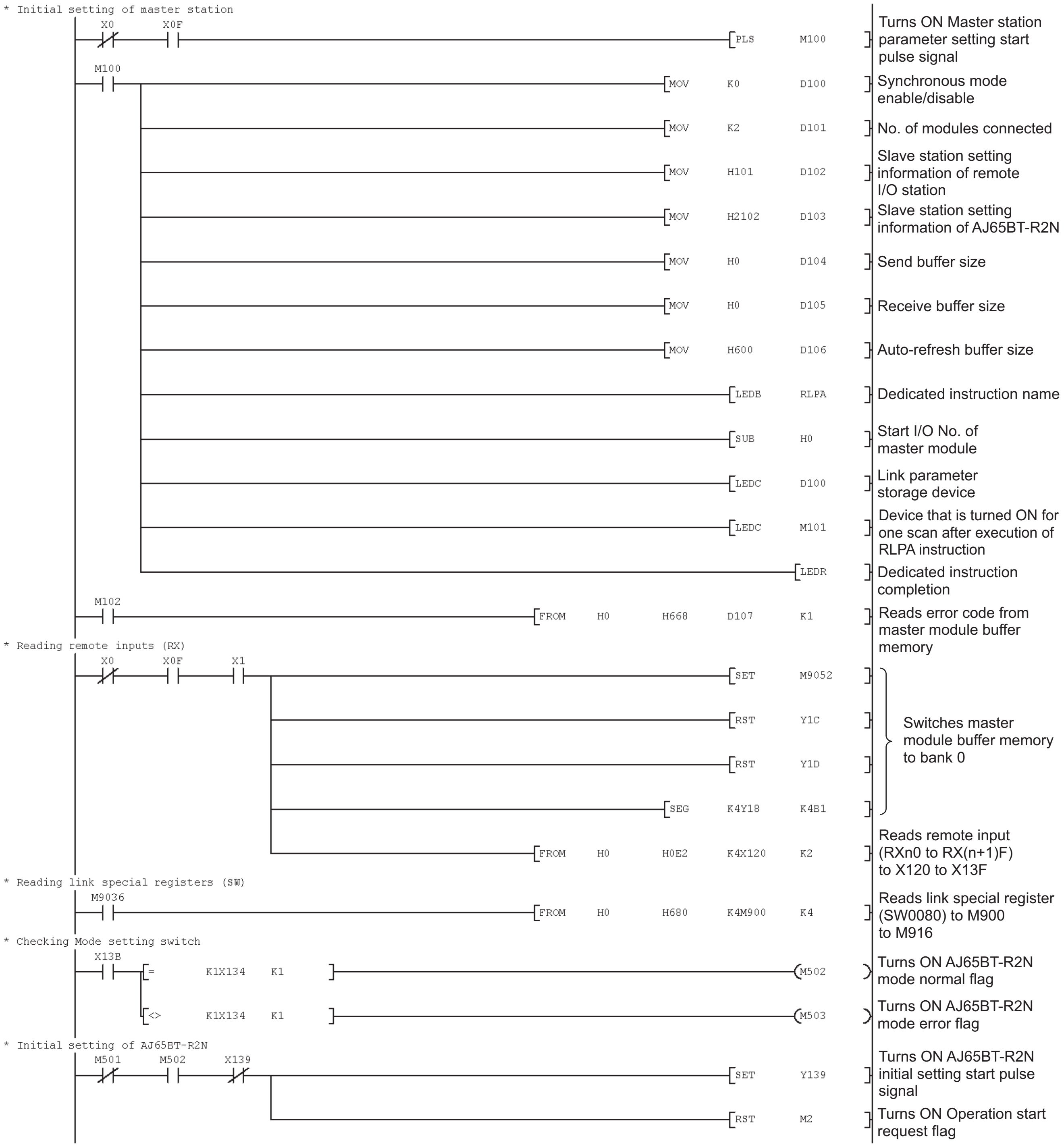
### (3) For the buffer memory auto-refresh function

(a) Devices used in the program example

**Table 7.44 Devices used in the program example**

| Device | Description | Device | Description |
|---|---|---|---|
| X0 | Module error (Master station) | M0 | Operation start request flag |
| X1 | Own station data link status (Master station) | M1 | Initial setting write completion flag |
| X0F | Module ready (Master station) | M2 | Operation complete flag |
| X23 | Error code read flag | M3 | Operation failed flag |
| X24 | Error clear flag | M22 | Error clear request |
| K4X120 | Remote input (X120 to X12F) | M24 | Operation complete pulse signal |
| X122 | Normal receive data read request signal | M30 | Operation failed pulse signal |
| X123 | Error receive data read request signal | M100 | Master station parameter setting start pulse signal |
| X124 | Initialization complete signal | M101 | Device that is turned ON for one scan after completion of RLPA |
| X125 | Initialization failed signal | M102 | Device that is turned ON for one scan after failure of writing by RLPA |
| K1X134 | Mode setting switch status signal (X134 to X137) | M111 | Initial data read completion pulse signal |
| X13A | Error status signal | M135 | Error handling flag |
| X13B | Remote station ready signal | M230 | Error handling execution pulse signal |
| K4Y18 | Output (Y18 to Y27) (Master station) | M500 | AJ65BT-R2N initial data read complete flag |
| Y1C | Buffer memory bank switching specification (Master station) | M501 | AJ65BT-R2N initial data reading flag |
| Y1D | | M502 | AJ65BT-R2N mode normal flag |
| K4Y120 | Remote output (Y120 to Y12F) | M503 | AJ65BT-R2N mode error flag |
| Y120 | Send request signal | K4M900 | Other station data link status (SW0080) |
| Y121 | Send cancel request signal | M901 | Other station data link status (Station No.2) |
| Y122 | Receive data read completion signal | M9036 | Always ON |
| Y123 | Forced receive completion request signal | M9052 | SEG instruction switching |
| Y124 | Initialization request signal | D10 | Set value |
| Y126 | OS reception area clear request signal | D100 to D106 | Network parameters of master station |
| Y127 | E$^2$PROM function request signal | D107 | Error code in Network parameters setting |
| Y139 | Initial data read request signal | From D200 | No. of receive data, receive data |
| Y13A | Error reset request signal | D400 to D402 | AJ65BT-R2N error code |

(b) Program example



```
* Initial setting of master station
X0(b) X0F                                   [PLS   M100                ]  Turns ON Master station parameter setting start pulse signal
M100                                        [MOV   K0      D100        ]  Synchronous mode enable/disable
                                            [MOV   K2      D101        ]  No. of modules connected
                                            [MOV   H101    D102        ]  Slave station setting information of remote I/O station
                                            [MOV   H2102   D103        ]  Slave station setting information of AJ65BT-R2N
                                            [MOV   H0      D104        ]  Send buffer size
                                            [MOV   H0      D105        ]  Receive buffer size
                                            [MOV   H600    D106        ]  Auto-refresh buffer size
                                            [LEDB  RLPA                ]  Dedicated instruction name
                                            [SUB   H0                  ]  Start I/O No. of master module
                                            [LEDC  D100                ]  Link parameter storage device
                                            [LEDC  M101                ]  Device that is turned ON for one scan after execution of RLPA instruction
                                            [LEDR                      ]  Dedicated instruction completion
M102                                        [FROM  H0  H668  D107  K1  ]  Reads error code from master module buffer memory
* Reading remote inputs (RX)
X0(b) X0F X1                                [SET   M9052               ]  Switches master module buffer memory to bank 0
                                            [RST   Y1C                 ]
                                            [RST   Y1D                 ]
                                            [SEG   K4Y18   K4B1        ]
                                            [FROM  H0  H0E2  K4X120  K2]  Reads remote input (RXn0 to RX(n+1)F) to X120 to X13F
* Reading link special registers (SW)
M9036                                       [FROM  H0  H680  K4M900  K4]  Reads link special register (SW0080) to M900 to M916
* Checking Mode setting switch
X13B  [=   K1X134  K1]                      (M502)                        Turns ON AJ65BT-R2N mode normal flag
      [<>  K1X134  K1]                      (M503)                        Turns ON AJ65BT-R2N mode error flag
* Initial setting of AJ65BT-R2N
M501(b) M502 X139(b)                        [SET   Y139                ]  Turns ON AJ65BT-R2N initial setting start pulse signal
                                            [RST   M2                  ]  Turns ON Operation start request flag
```

**Figure 7.37 Program example for receiving data when a receive timeout occurs**

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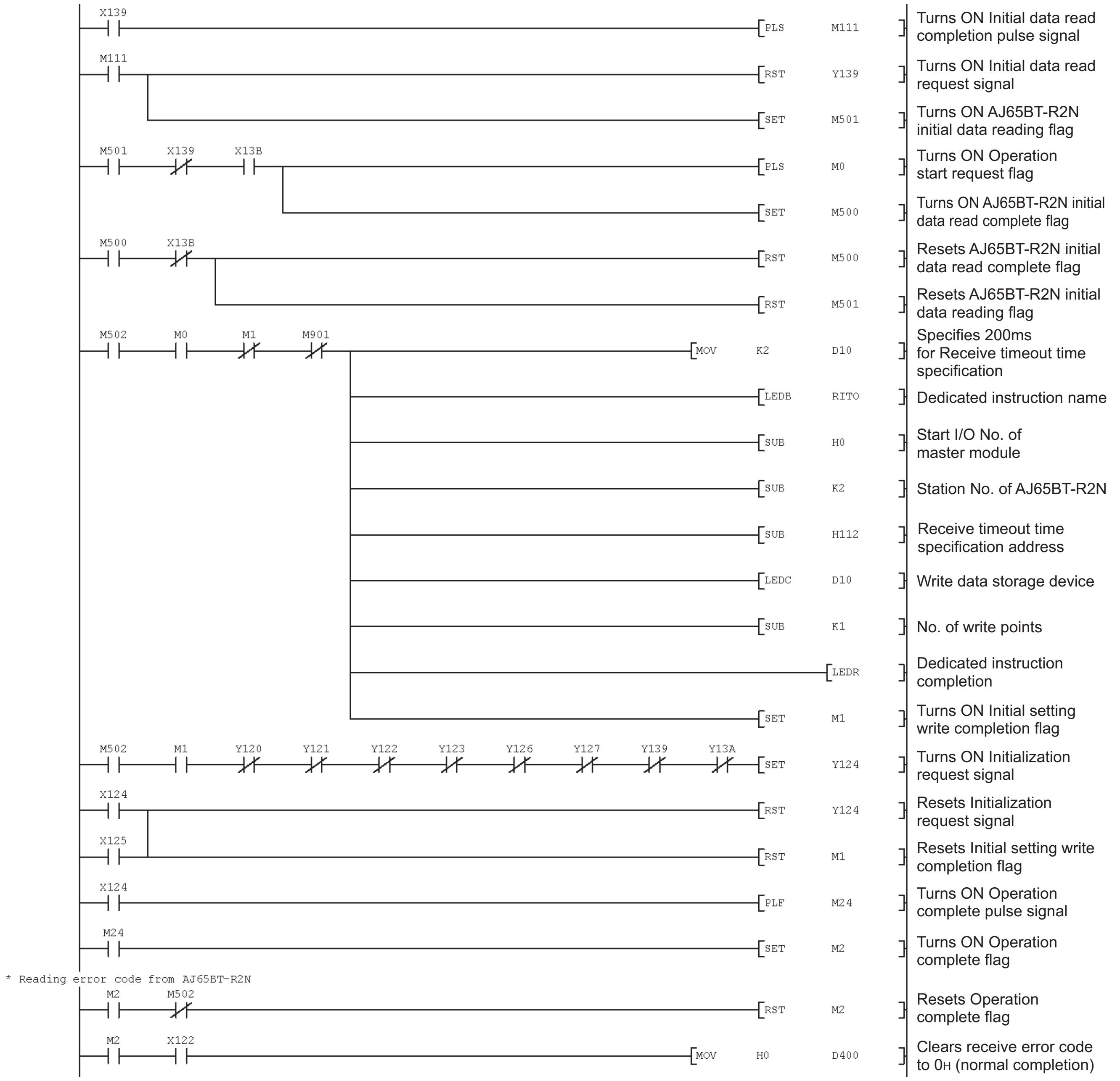

Figure 7.37 Program example for receiving data when a receive timeout occurs (Continued)

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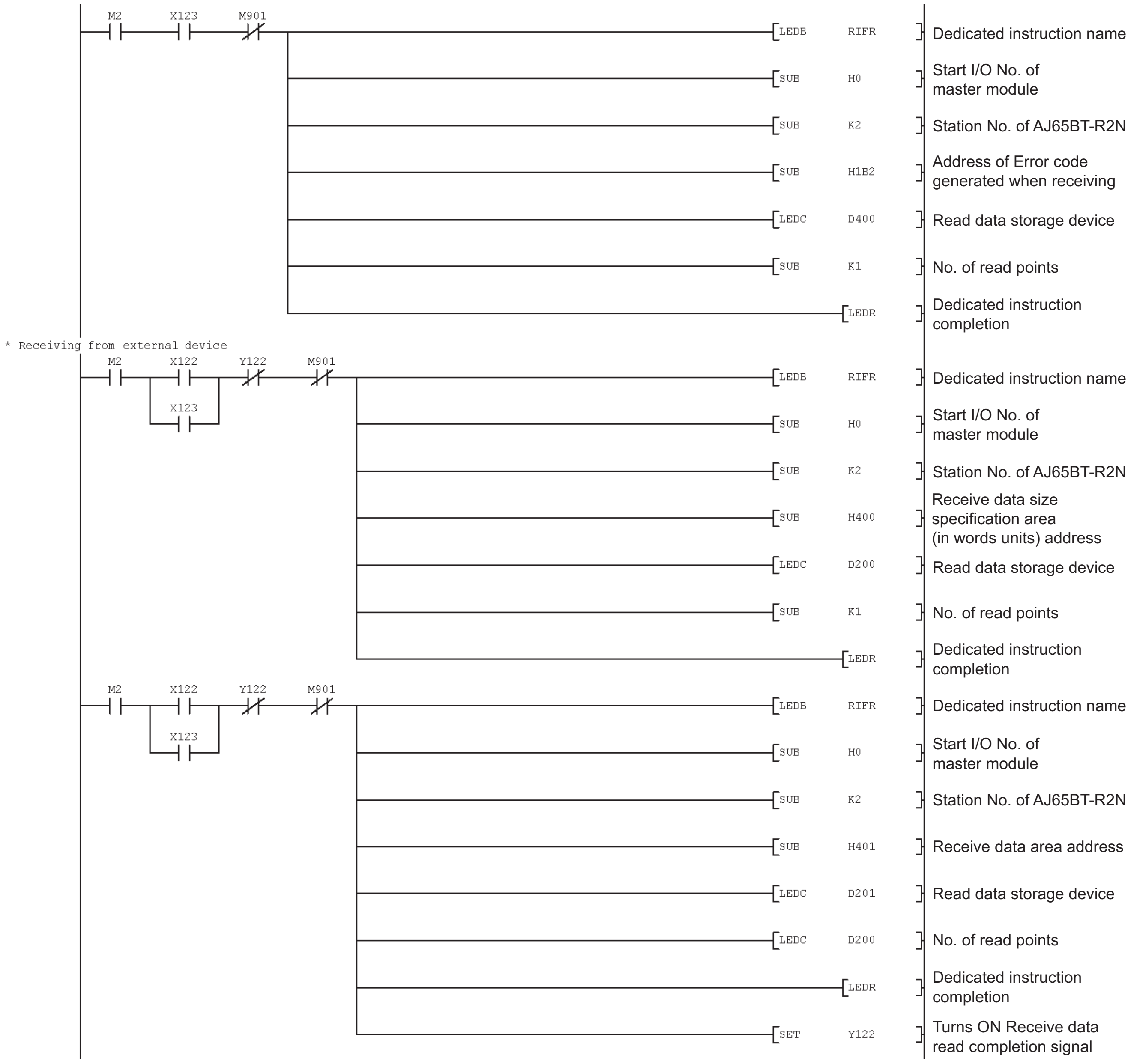

Figure 7.37 Program example for receiving data when a receive timeout occurs (Continued)

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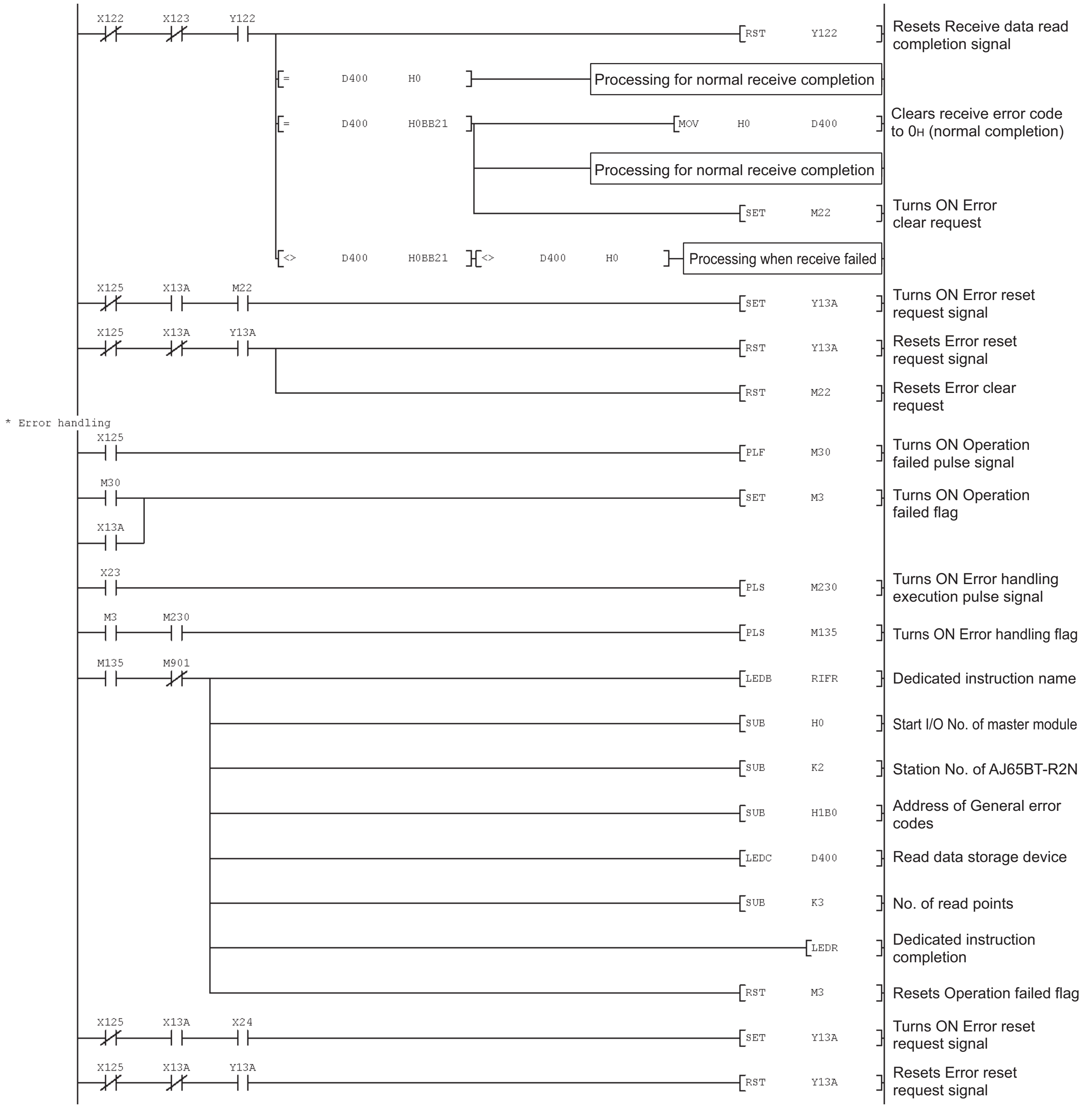

Figure 7.37 Program example for receiving data when a receive timeout occurs (Continued)

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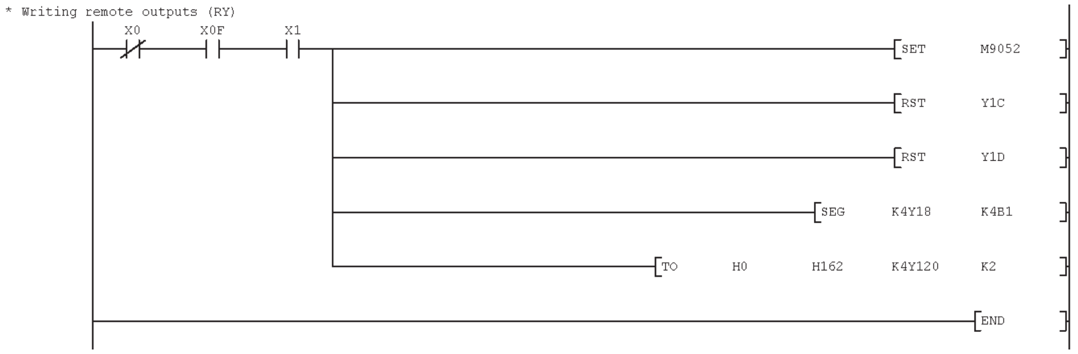


Switches master module buffer memory to bank 0

Writes Y120 to Y13F to remote output (RYn0 to RY(n+1)F)

Figure 7.37 Program example for receiving data when a receive timeout occurs (Continued)

# CHAPTER 8 PROGRAMMING WHEN USING FROM/TO INSTRUCTION IN ACPU/QCPU (A MODE)

(1) How to read this chapter

(a) System configuration
This explains the system for executing the programs described in this chapter.

☞ CHAPTER 8 (2) System configuration for program

(b) Setting of each station
This explains the setting of the master station, remote I/O station and AJ65BT-R2N.

☞ Section 8.1 Setting of Each Station

(c) Executable programs
Various programs are shown, which can be operated when the settings and system configuration are the same as those given in this chapter.

- Send/Receive program

  ☞ Section 8.2 Entire Send/Receive Program Structure
- Program for changing the auto-refresh buffer assignments and registering the assignment settings to E$^2$PROM

  ☞ Section 8.9.1 Program example for changing auto-refresh buffer assignments
- Program for receiving data when a receive timeout occurs

  ☞ Section 8.9.2 Program example for receiving data when a receive timeout occurs

(d) Each program processing
Each processing in a program is explained.

☞ Section 8.3 Initial Setting for AJ65BT-R2N to Section 8.6 Error Handling of AJ65BT-R2N

(e) Programs used according to function
Programs used according to function are described.

**Table 8.1 Programs added according to function**

| Function | Reference section |
|---|---|
| Initial setting for the frame function | Section 8.7 |
| Initial setting for the monitoring-based transmission function | |
| Initial setting for the flow control function | |
| Initial setting for the ASCII-binary conversion function | |
| Initial setting for the RW refresh function | |
| Send cancel function | Section 8.8 |
| Forced receive completion function | |
| OS reception area clear function | |
| E$^2$PROM function setting | |

(2) System configuration for program

The following shows the system configuration for the program described in this chapter.

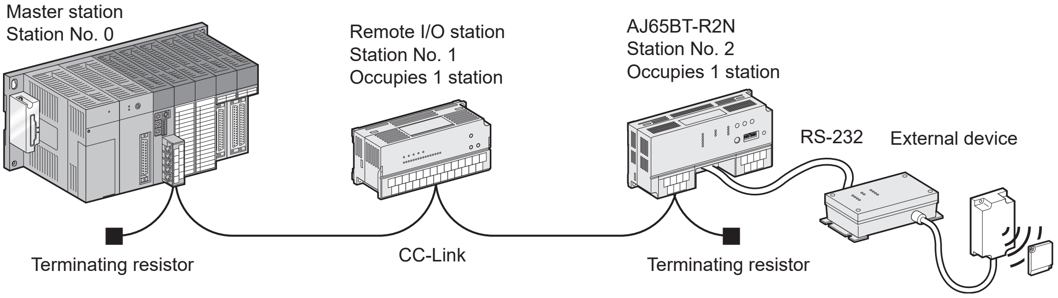


**Figure 8.1 System configuration for program**

(a) Master station

**Table 8.2 Information of master station**

| Item | Description |
|---|---|
| Station No. | 0 |
| Data link transmission speed | 156kbps |
| Start I/O No. | $0000_H$ (Mounting position of master module) |
| All connect count | 2 |
| Input (X) that reads from RXn0 to RX(n+1)F of AJ65BT-R2N | X120 to X13F |
| Output (Y) that writes to RYn0 to RY(n+1)F of AJ65BT-R2N | Y120 to Y13F |

(b) Remote I/O station

**Table 8.3 Information of remote I/O station**

| Item | Description |
|---|---|
| Station No. | 1 |
| Data link transmission speed | 156kbps |
| No. of occupied stations | Occupies 1 station |

### (c) AJ65BT-R2N

**Table 8.4 Information of AJ65BT-R2N**

| Item | | Description |
|---|---|---|
| Station No. | | 2 |
| Transmission speed of data link | | 156kbps |
| RS-232 transmission speed | | 300bps |
| No. of occupied stations | | Occupies 1 station |
| Mode setting switch | Using send/receive buffer communication function | 0 (Mode 0) |
| | Using buffer memory auto-refresh function | 1 (Mode 1) |
| Send buffer size | Using send/receive buffer communication function | 64 words[*1] |
| | Using buffer memory auto-refresh function | 0 word |
| Receive buffer size | Using send/receive buffer communication function | 64 words[*1] |
| | Using buffer memory auto-refresh function | 0 word |
| Auto-refresh buffer size | Using send/receive buffer communication function | 0 word |
| | Using buffer memory auto-refresh function | 1536 words[*2] |

* 1 When sending/receiving data of 57 words or more, change each buffer size by sequence program (☞ Section 8.1.1 (2)).

* 2 When sending/receiving data of 512 words or more, change the auto-refresh buffer size by the sequence program (☞ Section 8.1.1 (2)) and change the assignment of the auto-refresh buffer.

### (d) Sendable message

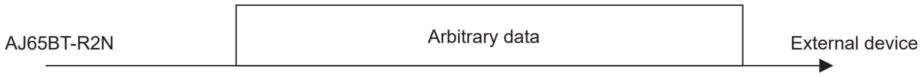


**Figure 8.2 Sendable message**

**Table 8.5 Information of sendable message**

| Item | | Description |
|---|---|---|
| Start frame | | None[*1] |
| End frame | | None[*1] |
| Data size (including above frames) | Using send/receive buffer communication function | 56 words or less[*2] |
| | Using buffer memory auto-refresh function | 511 words or less[*3] |

* 1 If required by the external device, each of the frames can be sent.

* 2 When sending/receiving the data mentioned above or more, change the buffer size by the sequence program (☞ Section 8.1.1 (2)).

* 3 When sending/receiving data of 512 words or more, change the auto-refresh buffer size by the sequence program (☞ Section 8.1.1 (2)) and change the assignment of the auto-refresh buffer.

(e) Receivable message

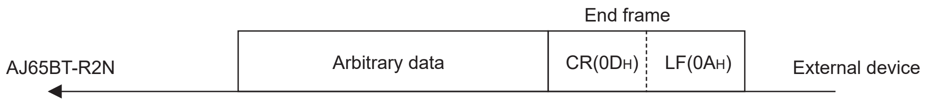


**Figure 8.3 Receivable message**

**Table 8.6 Information of receivable message**

| Item | | Description |
|---|---|---|
| Start frame | | None |
| End frame | | CR(0DH)＋LF(0AH) |
| Data size (including above frames) | Using send/receive buffer communication function | 56 words or less[1] |
| | Using buffer memory auto-refresh function | 509 words or less[1] |

* 1 When sending/receiving the data mentioned above or more, change the buffer size by the sequence program (☞ Section 8.1.1 (2)).

* 2 When sending/receiving data of 510 words or more, change the auto-refresh buffer size by the sequence program (☞ Section 8.1.1 (2)) and change the assignment of the auto-refresh buffer.

**Remark**

Receive data must not contain CR(0DH)＋LF(0AH).
If CR(0DH)＋LF(0AH) is included, the CR(0DH)＋LF(0AH) is regarded as the end frame, resulting in termination of the reception.

## 8.1 Setting of Each Station

### 8.1.1 Setting AJ61BT11 or A1SJ61BT11

When using the AJ61BT11 or A1SJ61BT11, the switches and parameters must be set.

(1) Switch setting

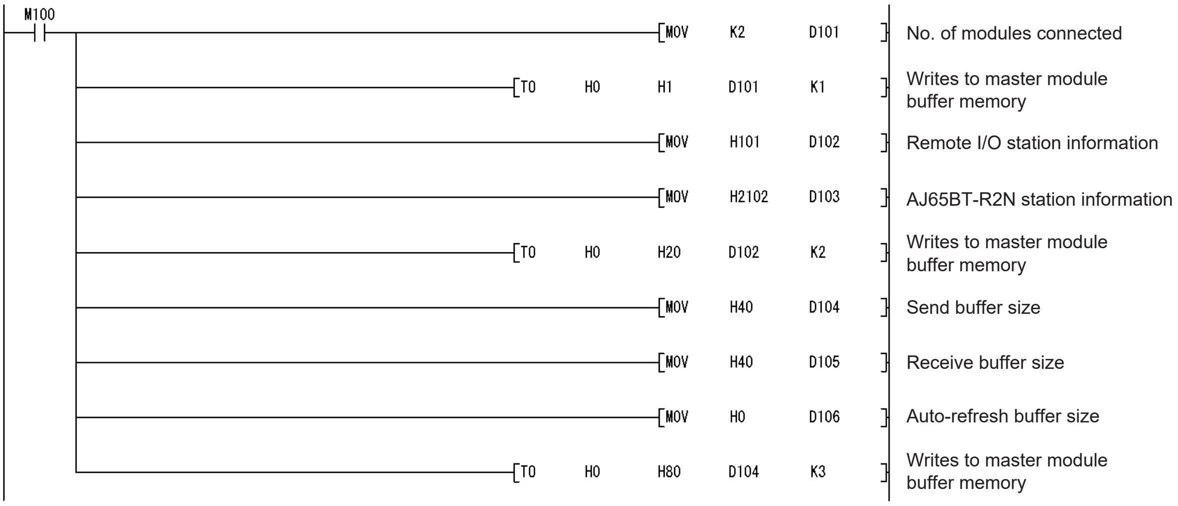
Switch setting for the master station is performed with the switches on the master module.

**Table 8.7 Each switch setting example**

| Item | | Description | Set value |
|---|---|---|---|
| Station No. setting switch | | Master station | 0 |
| Mode setting switch | | Online (Remote net mode) | 0 |
| Transmission speed setting switch | | 156kbps | 0 |
| Condition setting switch | SW1 | Station type: Master station/Local station | OFF |
| | SW2, SW3 | Use prohibited | OFF |
| | SW4 | Input data status of data link error station: Cleared | OFF |
| | SW5, SW6 | No. of occupied stations: Invalid | OFF |
| | SW7 | Use prohibited | OFF |
| | SW8 | Module mode: Intelli. mode | OFF |

(2) Parameter setting

Set parameters for the master station with the sequence program (dedicated instructions).



```
M100
[MOV   K2     D101      ]  No. of modules connected
[TO    H0     H1    D101   K1]  Writes to master module buffer memory
[MOV   H101   D102      ]  Remote I/O station information
[MOV   H2102  D103      ]  AJ65BT-R2N station information
[TO    H0     H20   D102   K2]  Writes to master module buffer memory
[MOV   H40    D104      ]  Send buffer size
[MOV   H40    D105      ]  Receive buffer size
[MOV   H0     D106      ]  Auto-refresh buffer size
[TO    H0     H80   D104   K3]  Writes to master module buffer memory
```

**Figure 8.4 Network parameters setting example (When using the send/receive buffer communication function)**

**Table 8.8 Network parameters setting example**

| Item | | Set value | | |
|---|---|---|---|---|
| Synchronous mode valid/invalid | | 0 (When synchronous mode is invalid) | | |
| Number of stations connected for communication | | 2 | | |
| Slave station setting information | | **Slave station type** | **No. of occupied slave stations** | **Station No.** |
| | Remote I/O station | 0 (Remote I/O station) | 1 | 1 |
| | AJ65BT-R2N | 2 (Intelligent device station) | 1 | 2 |
| Send buffer size of AJ65BT-R2N | | •When using send/receive buffer communication function: $40_H$*1<br>•When using buffer memory auto-refresh function: $0_H$ | | |
| Receive buffer size of AJ65BT-R2N | | •When using send/receive buffer communication function: $40_H$*1<br>•When using buffer memory auto-refresh function: $0_H$ | | |
| Auto-refresh buffer size of AJ65BT-R2N | | •When using send/receive buffer communication function: $0_H$<br>•When using buffer memory auto-refresh function: $600_H$*2 | | |

* 1 When sending/receiving data of 57 words or more, change the value to "(Send/receive data size) ＋8 words".

* 2 When sending/receiving data of 512 words or more, change the auto-refresh buffer size by the sequence program (☞ Section 8.1.1 (2)) and change the assignment of the auto-refresh buffer.

## 8.1.2 Remote I/O station setting

For the setting method, refer to the manual for the remote I/O station.

**Table 8.9 Remote I/O station setting example**

| Item | Set value |
|---|---|
| Station No. | 1 |
| Transmission speed | 156kbps |

## 8.1.3 AJ65BT-R2N setting

Perform the AJ65BT-R2N settings with each switch of the AJ65BT-R2N.

**Table 8.10 AJ65BT-R2N setting example**

| Item | | Description | Set value |
|---|---|---|---|
| Station No. setting switch | | Station No.2 | ×10:0<br>×1:2 |
| Data link transmission speed setting switch | | 156kbps | 0 |
| Mode setting switch | | •Using send/receive buffer communication function (Mode 0) | 0 |
| | | •Using buffer memory auto-refresh function (Mode 1) | 1 |
| RS-232 transmission setting switches | SW1 to SW4 | Transmission speed: 300bps | OFF |
| | SW5 | Data bit length: 8 | ON |
| | SW6, SW7 | Parity bit: None | OFF |
| | SW8 | Stop bit length: 1 | OFF |

## 8.2 Entire Send/Receive Program Structure

The programs in this section can be executed when the following system configuration and settings have been set.

☞ CHAPTER 8 (2) System configuration for program

☞ Section 8.1 Setting of Each Station

### 8.2.1 For the send/receive buffer communication function

(1) Overview of program example

(a) Initial setting program for master station ((3) in this section - **1**)
Parameters of the master station are set.
☞ Section 8.1.1 (2) Parameter setting

(b) Program for reading remote input (RX) ((3) in this section - **2**)
Remote input (RXn0 to RX(n+1)F) of the AJ65BT-R2N is read out to the input (X120 to X13F) of the programmable controller CPU.

(c) Mode setting switch check program ((3) in this section - **3**)
Whether the mode setting switch is set correctly or not is checked.

(d) AJ65BT-R2N initial setting program ((3) in this section - **4**)

1) When AJ65BT-R2N initial setting start flag (M20) is turned ON, settings are configured so that data reception is completed by the frame function upon receipt of CR($0D_H$)＋LF($0A_H$).
2) The AJ65BT-R2N is initialized.

☞ Section 8.3.1 For the send/receive buffer communication function

(e) Program for sending data to external device ((3) in this section - **5**)
If Send execute flag (X22) is turned ON, the character string "ABCDEF" is sent from the master station to the external device.
☞ Section 8.4.1 For the send/receive buffer communication function

(f) Program for receiving data from external device ((3) in this section - **6**)
When data are received from the external device, the received data are read out from the AJ65BT-R2N to the master station.
☞ Section 8.5.1 For the send/receive buffer communication function

(g) Error handling program ((3) in this section - **7**)

1) When an error occurs during initialization setting or data transfer, an error code will be read out from the AJ65BT-R2N to the master module if Error code read flag (X23) is turned ON.
2) The error is canceled when Error clear flag (X24) is turned ON after the cause of the error has been eliminated.

☞ Section 8.6.1 For the send/receive buffer communication function

(h) Program for writing remote output (RY) ((3) in this section - 8)
The programmable controller CPU output (Y120 to Y13F) is written to remote output (RYn0 to RY(n+1)F) of the AJ65BT-R2N.

(2) Devices used in the program example

**Table 8.11 Devices used in the program example**

| Device | Description | Device | Description |
|---|---|---|---|
| X0 | Module error (Master station) | M0 | Operation start request flag |
| X1 | Own station data link status (Master station) | M1 | Initial setting write completion flag |
| X6 | Data link start by parameters in buffer memory normally completed (Master station) | M2 | Operation complete flag |
| X7 | Data link start by parameters in buffer memory failed (Master station) | M3 | Operation failed flag |
| X0F | Module ready (Master station) | M10 | TO instruction executed flag |
| X22 | Send execute flag | M11 | Intelligent device station access request completion flag |
| X23 | Error code read flag | M20 | AJ65BT-R2N initial setting start flag |
| X24 | Error clear flag | M22 | Operation complete pulse signal |
| K4X120 | Remote input (X120 to X12F) | M25 | Send completion pulse signal |
| X120 | Send complete signal | M30 | Operation failed pulse signal |
| X121 | Send failed signal | M100 | Master station parameter setting start pulse signal |
| X122 | Normal receive data read request signal | M120 | Buffer memory access exclusion check flag |
| X123 | Error receive data read request signal | M125 | Sending flag |
| X124 | Initialization complete signal | M130 | Receiving flag |
| X125 | Initialization failed signal | M135 | Error handling flag |
| X128 | E$^2$PROM function failed signal | M155 | TO instruction executed flag |
| K1X134 | Mode setting switch status signal (X134 to X137) | M156 | Intelligent device station access request completion flag |
| X13A | Error status signal | M157 | Read request completion flag |
| X13B | Remote station ready signal | M158 | TO instruction executed flag |
| X13E | Intelligent device station access completion signal | M159 | Intelligent device station access request completion flag |
| Y0 | Refresh instruction (Master station) | M160 | Read request completion flag |
| Y6 | Request for data link start by parameters in buffer memory (Master station) | M180 | TO instruction executed flag |
| K4Y18 | Output (Y18 to Y27) (Master station) | M181 | Intelligent device station access request completion flag |
| Y1C | Buffer memory bank switching specification (Master station) | M190 | TO instruction executed flag |
| Y1D | | M191 | Intelligent device station access request completion flag |
| K8Y120 | Remote output (Y120 to Y13F) | M220 | Send execution pulse signal |
| Y120 | Send request signal | M230 | Error handling execution pulse signal |
| Y121 | Send cancel request signal | M502 | AJ65BT-R2N mode normal flag |
| Y122 | Receive data read completion signal | M503 | AJ65BT-R2N mode error flag |
| Y123 | Forced receive completion request signal | K4M900 | Other station data link status (SW0080) |
| Y124 | Initialization request signal | M901 | Other station data link status (Station No.2) |
| Y126 | OS reception area clear request signal | M9036 | Always ON |
| Y127 | E$^2$PROM function request signal | M9052 | SEG instruction switching |
| Y139 | Initial data read request signal | D0 to D10 | Control data of TO instruction, and set values or send data |
| Y13A | Error reset request signal | D30 to D36 | Control data of TO instruction |
| Y13E | Intelligent device station access request signal | D37 | No. of receive data |

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Table 8.11 Devices used in the program example (Continued)

| Device | Description | Device | Description |
|---|---|---|---|
| D40 to D46 | Control data of TO instruction | D137 to D139 | AJ65BT-R2N error code |
| D50 or later | Receive data | Z | No. of receive data |
| D101 to D106 | Master station network parameters | P0 | Switching to bank 0 |
| D107 | Error code in Network parameters setting | P1 | Switching to bank 1 |
| D130 to D136 | Control data of TO instruction | — | |

(3) Program example

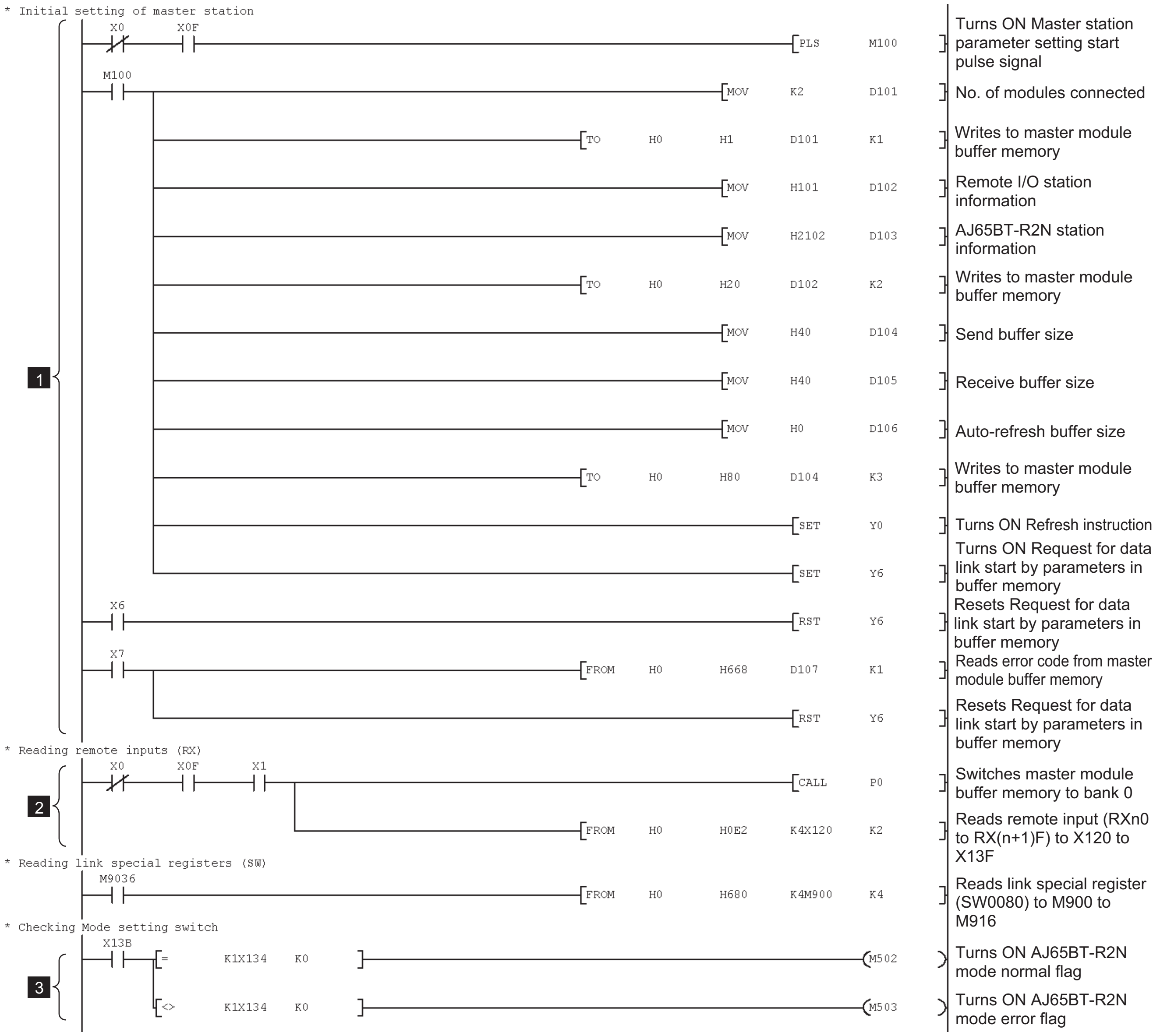

**Figure 8.5 Program example**

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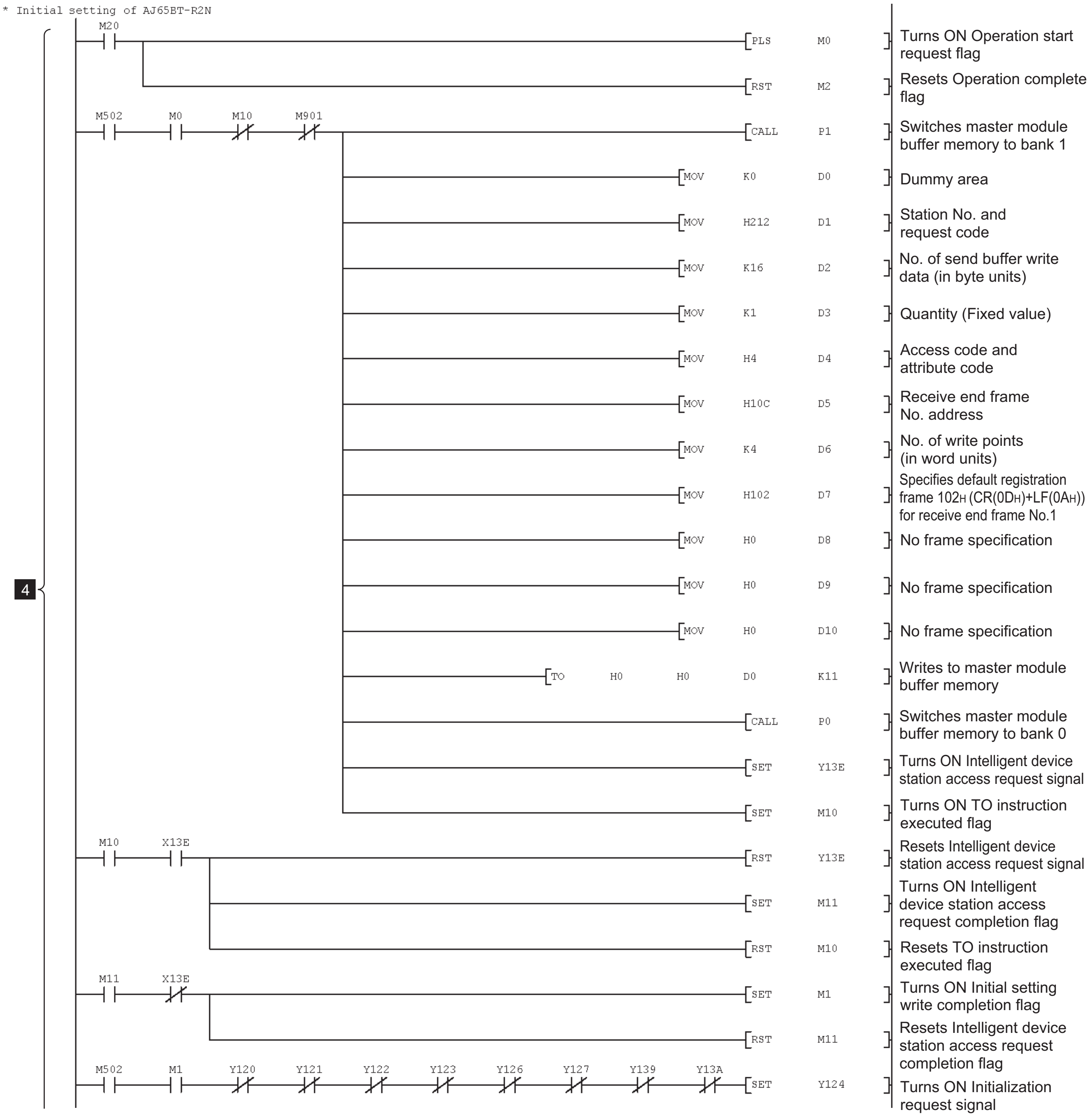

Figure 8.5 Program example (Continued)

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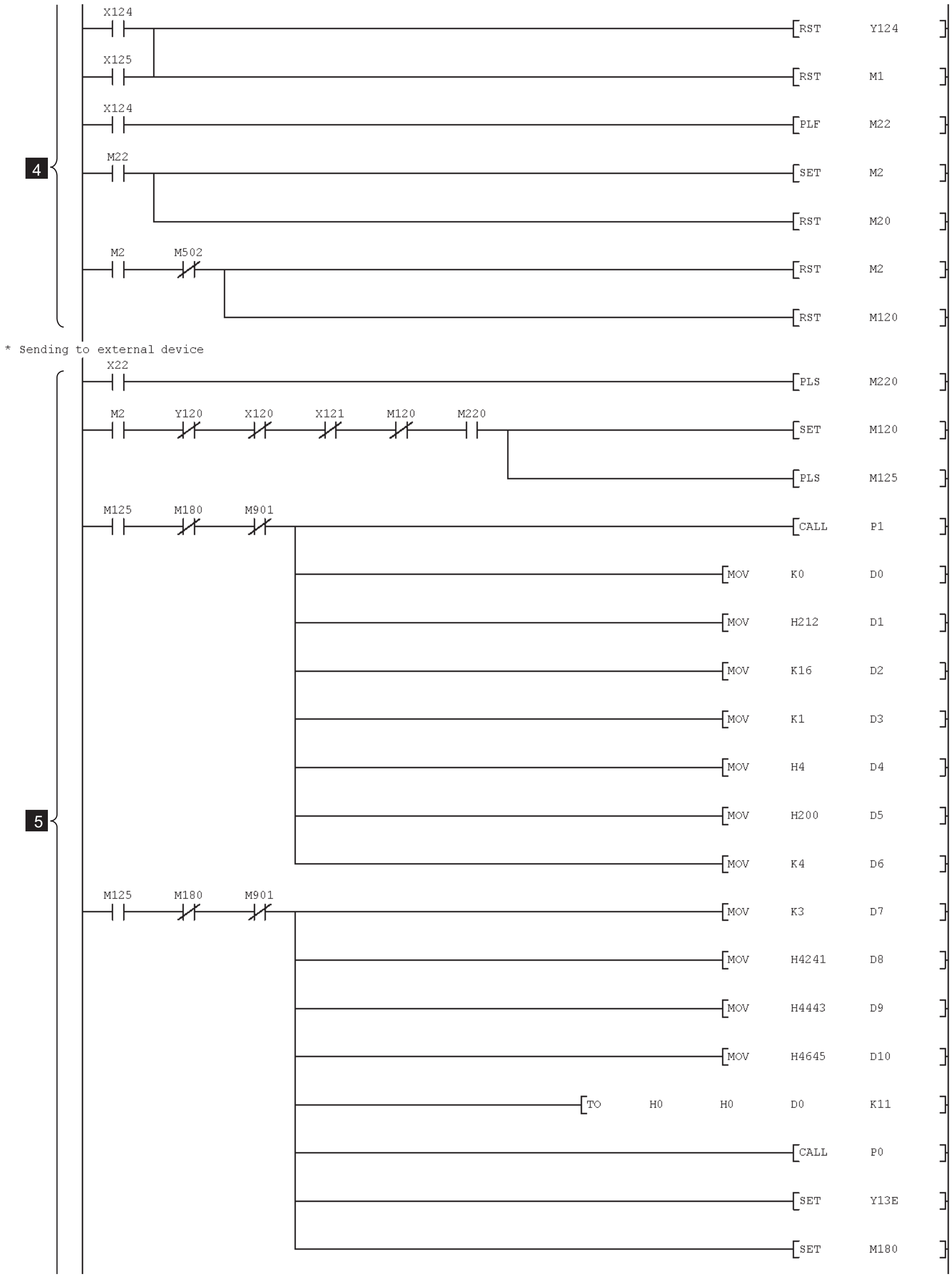

Resets Initialization request signal

Resets Initial setting write completion flag

Turns ON Operation complete pulse signal

Turns ON Operation complete flag

Resets AJ65BT-R2N initial setting start flag

Resets Operation complete flag

Resets Buffer memory access exclusion check flag

Turns ON Send execution pulse signal

Turns ON Buffer memory access exclusion check flag

Turns ON Sending flag

Switches master module buffer memory to bank 1

Dummy area

Station No. and request code

No. of send buffer write data (in byte units)

Quantity (Fixed value)

Access code and attribute code

Send area address

No. of write points (in word units)

Specifies No. of send data (in word units)

Specifies (A(41$_H$)+B(42$_H$)+C(43$_H$)+D(44$_H$)+E(45$_H$)+F(46$_H$)) for send data

Writes to master module buffer memory

Switches master module buffer memory to bank 0

Turns ON Intelligent device station access request signal

Turns ON TO instruction executed flag

Figure 8.5 Program example (Continued)

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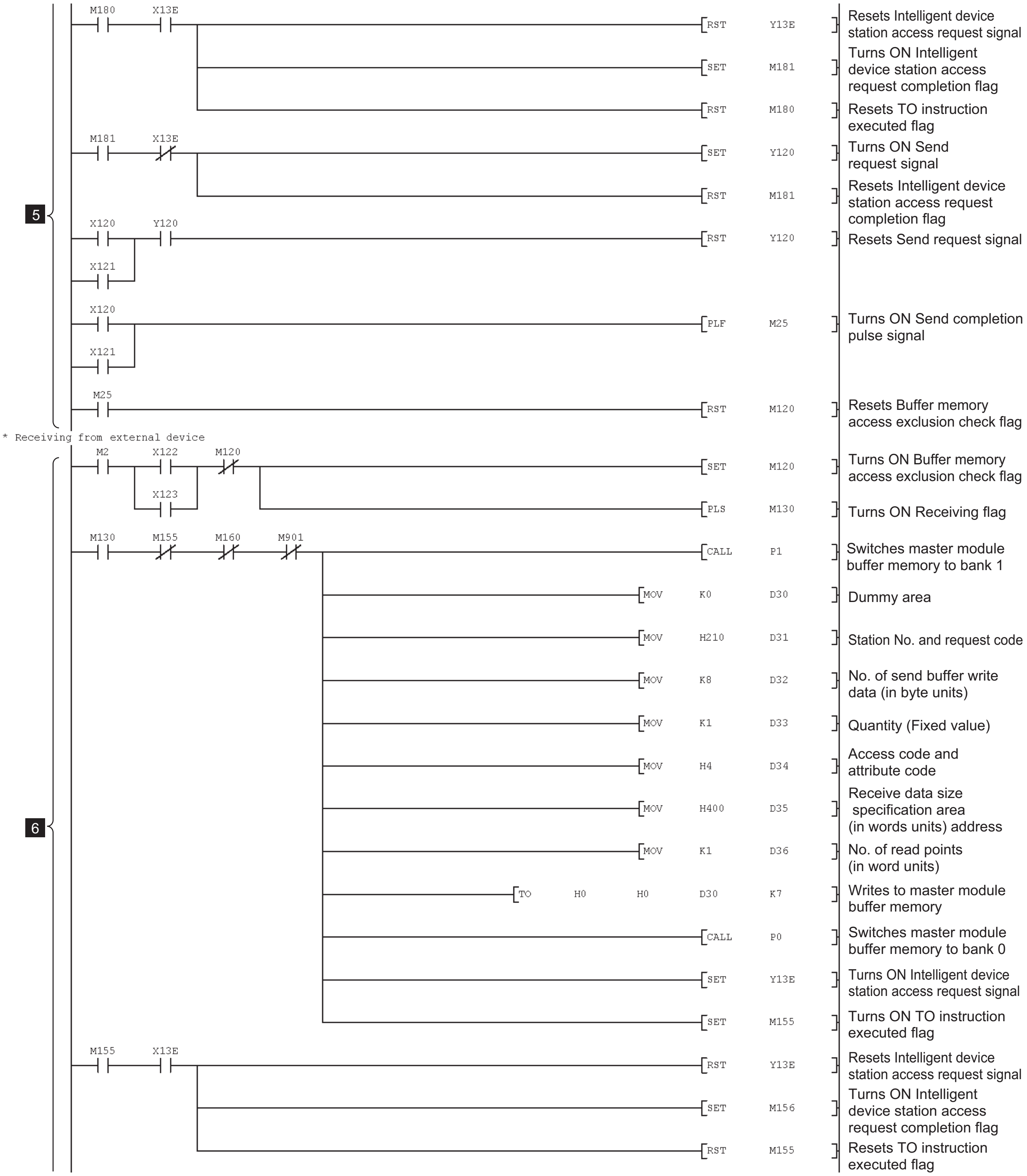

Figure 8.5 Program example (Continued)

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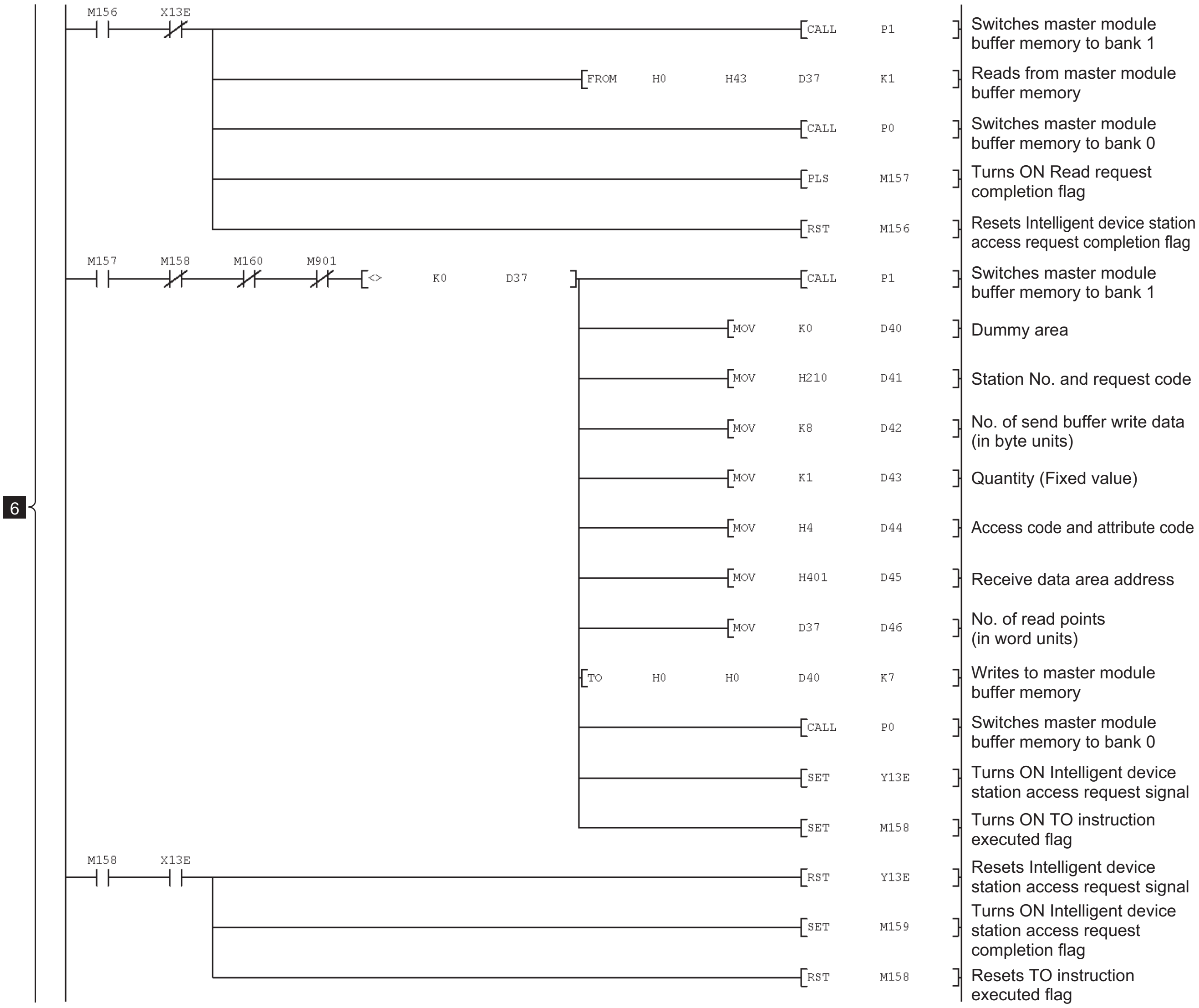

Figure 8.5 Program example (Continued)

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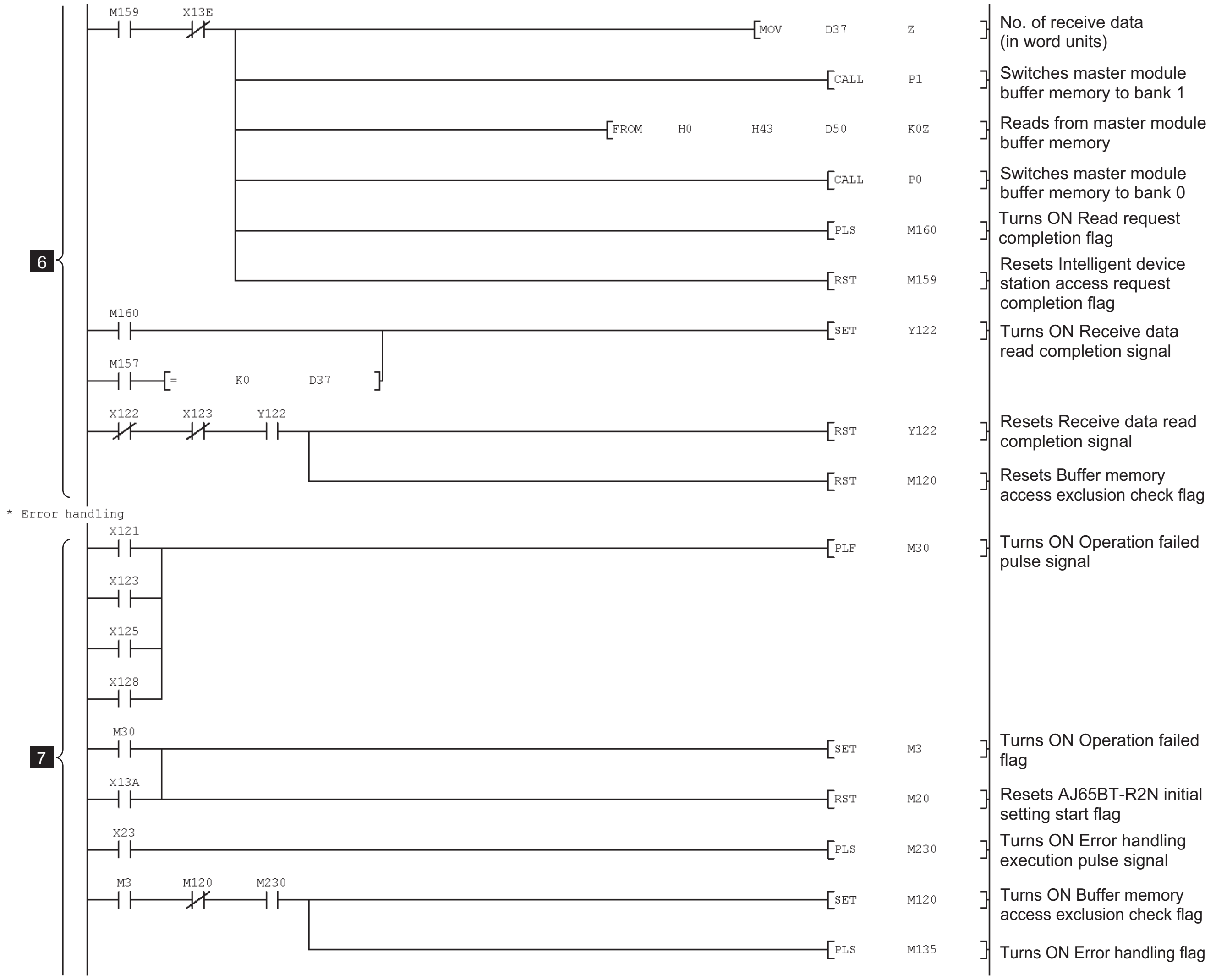

Figure 8.5 Program example (Continued)

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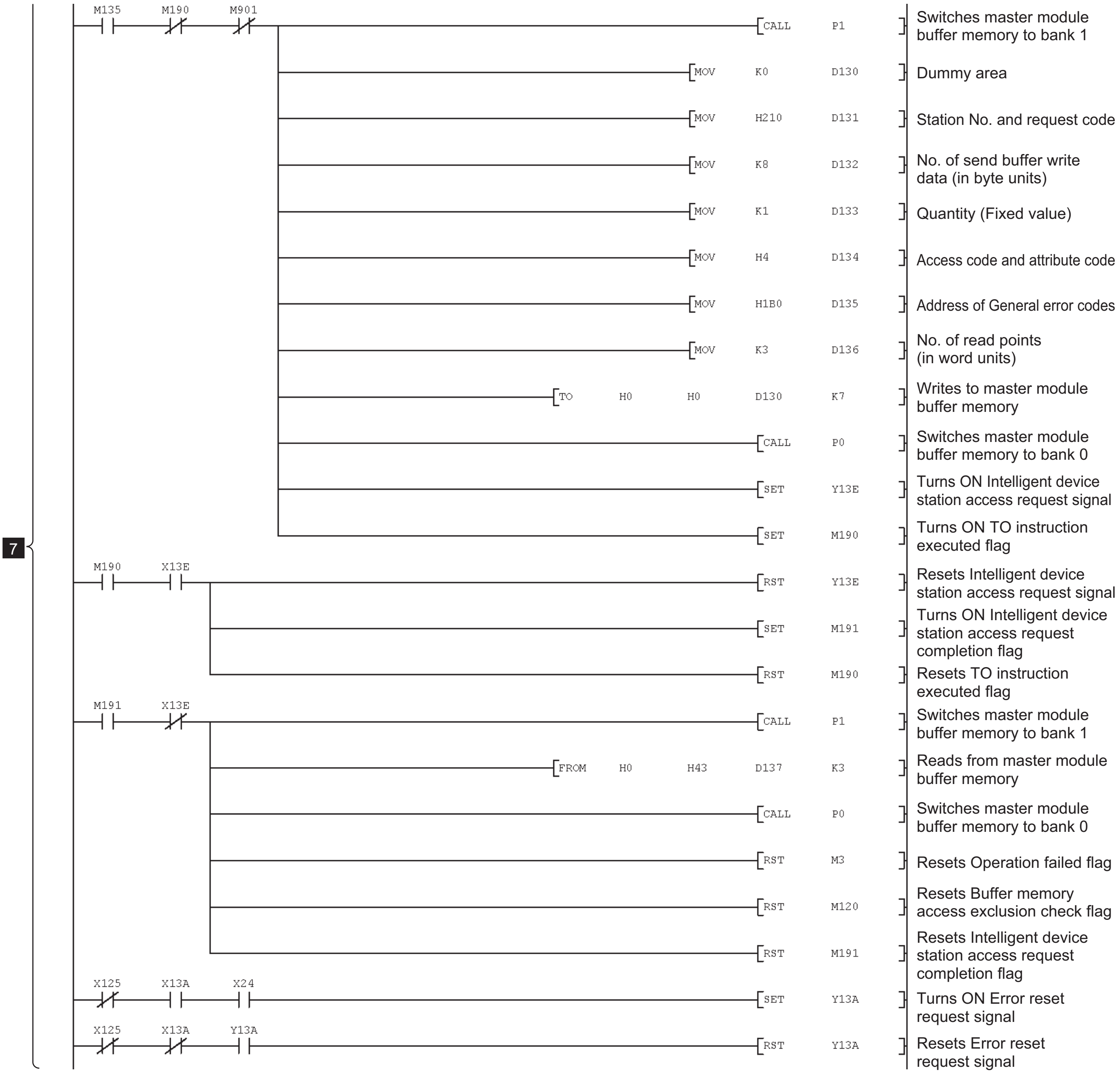

Figure 8.5 Program example (Continued)

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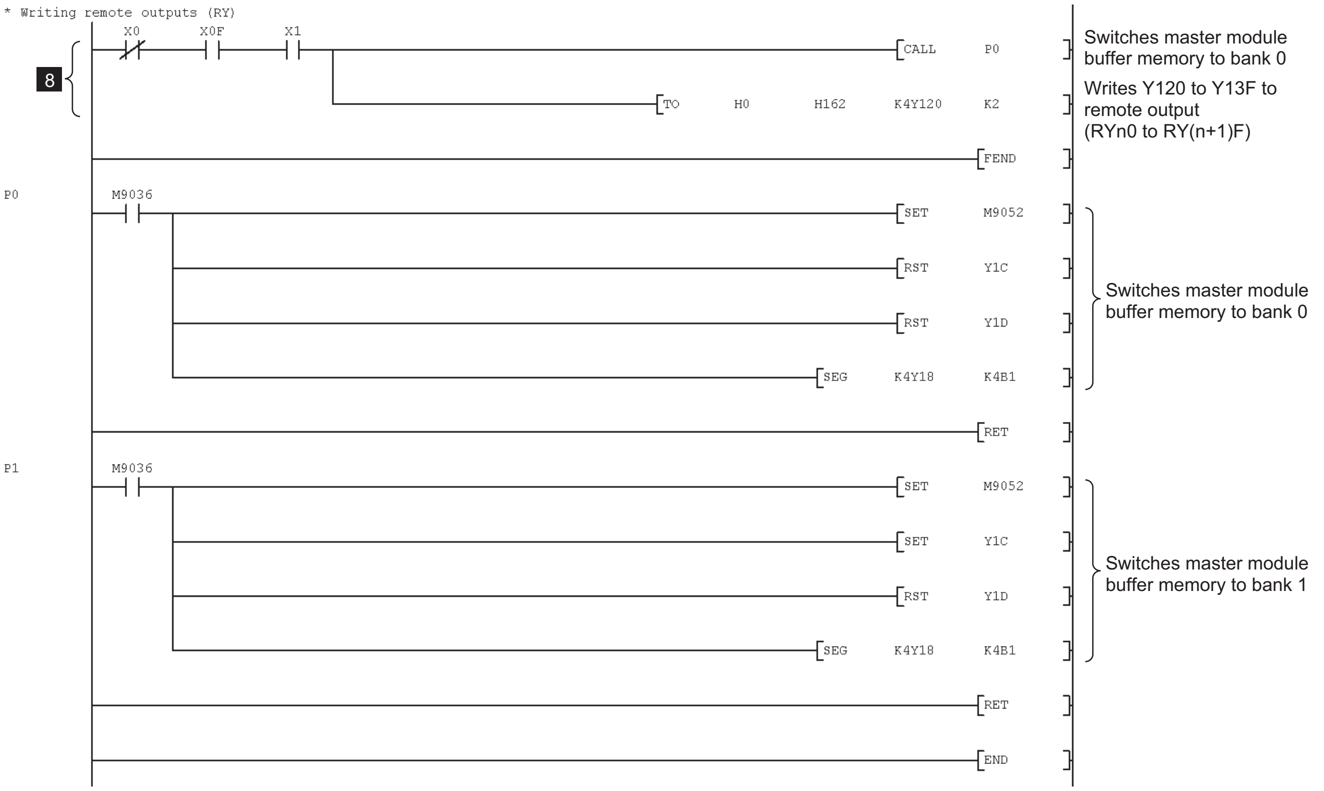

Switches master module buffer memory to bank 0

Writes Y120 to Y13F to remote output (RYn0 to RY(n+1)F)

Switches master module buffer memory to bank 0

Switches master module buffer memory to bank 1

Figure 8.5 Program example (Continued)

## 8.2.2 For buffer memory auto-refresh function

(1) Overview of program example

(a) Initial setting program for master station ((3) in this section - 1)
Parameters of the master station are set.

☞ Section 8.1.1 (2) Parameter setting

(b) Program for reading remote input (RX) ((3) in this section - 2)
Remote input (RXn0 to RX(n+1)F) of the AJ65BT-R2N is read out to the input (X120 to X13F) of the programmable controller CPU.

(c) Mode setting switch check program ((3) in this section - 3)
Whether the mode setting switch is set correctly or not is checked.

(d) AJ65BT-R2N initial setting program ((3) in this section - 4)

1) Initial data are read from the AJ65BT-R2N to the master module.
2) By the frame function, reception is completed when CR(0DH)＋LF(0AH) is received.
3) The AJ65BT-R2N is initialized.

☞ Section 8.3.2 For the buffer memory auto-refresh function

(e) Program for sending data to external device ((3) in this section - 5)
If Send execute flag (X22) is turned ON, the character string "ABCDEF" is sent from the master station to the external device.

☞ Section 8.4.2 For the buffer memory auto-refresh function

(f) Program for receiving data from external device ((3) in this section - 6)
When data are received from the external device, the received data are read out from the AJ65BT-R2N to the master station.

☞ Section 8.5.2 For the buffer memory auto-refresh function

(g) Error handling program ((3) in this section - 7)

1) When an error occurs during initialization setting or data transfer, an error code will be read out from the AJ65BT-R2N to the master module if Error code read flag (X23) is turned ON.
2) The error is canceled when Error clear flag (X24) is turned ON after the cause of the error has been eliminated.

☞ Section 8.6.2 For the buffer memory auto-refresh function

(h) Program for writing data to remote output (RY) ((3) in this section - 8)
The output (Y120 to Y13F) of the programmable controller CPU is written to the remote output (RYn0 to RY(n+1)F) of the AJ65BT-R2N.

(2) Devices used in the program example

Table 8.12 Devices used in the program example

| Device | Description | Device | Description |
|---|---|---|---|
| X0 | Module error (Master station) | Y13A | Error reset request signal |
| X1 | Own station data link status (Master station) | M0 | Operation start request flag |
| X6 | Data link start by parameters in buffer memory normally completed (Master station) | M1 | Intelligent device station access request completion flag |
| X7 | Data link start by parameters in buffer memory failed (Master station) | M2 | Operation complete flag |
| X0F | Module ready (Master station) | M3 | Operation failed flag |
| X22 | Send execute flag | M22 | Operation complete pulse signal |
| X23 | Error code read flag | M25 | Send completion pulse signal |
| X24 | Error clear flag | M30 | Operation failed pulse signal |
| K4X120 | Remote input (X120 to X12F) | M100 | Master station parameter setting start pulse signal |
| X120 | Send complete signal | M111 | Initial data read request pulse signal |
| X121 | Send failed signal | M120 | Send-in-process flag |
| X122 | Normal receive data read request signal | M125 | Sending flag |
| X123 | Error receive data read request signal | M130 | Receiving flag |
| X124 | Initialization complete signal | M135 | Error handling flag |
| X125 | Initialization failed signal | M220 | Send execution pulse signal |
| X128 | E$^2$PROM function failed signal | M230 | Error handling execution pulse signal |
| K1X134 | Mode setting switch status signal (X134 to X137) | M500 | AJ65BT-R2N initial data read complete flag |
| X139 | Initial data read completion signal | M501 | AJ65BT-R2N initial data reading flag |
| X13A | Error status signal | M502 | AJ65BT-R2N mode normal flag |
| X13B | Remote station ready signal | M503 | AJ65BT-R2N mode error flag |
| Y0 | Refresh instruction (Master station) | K4M900 | Other station data link status (SW0080) |
| Y6 | Request for data link start by parameters in buffer memory (Master station) | M901 | Other station data link status (Station No.2) |
| K4Y18 | Output (Y18 to Y27) (Master station) | M9036 | Always ON |
| Y1C | Buffer memory bank switching specification (Master station) | M9052 | SEG instruction switching |
| Y1D | | D10 to D13 | Set value or send data |
| K4Y120 | Remote output (Y120 to Y12F) | D101 to D106 | Network parameters of master station |
| Y120 | Send request signal | D107 | Error code in Network parameters setting |
| Y121 | Send cancel request signal | D200 | No. of receive data |
| Y122 | Receive data read completion signal | D201 or later | Receive data |
| Y123 | Forced receive completion request signal | D400 to D402 | AJ65BT-R2N error code |
| Y124 | Initialization request signal | Z | No. of receive data |
| Y126 | OS reception area clear request signal | P0 | Switching to bank 0 |
| Y127 | E$^2$PROM function request signal | P2 | Switching to bank 2 |
| Y139 | Initial data read request signal | — | |

(3) Program example

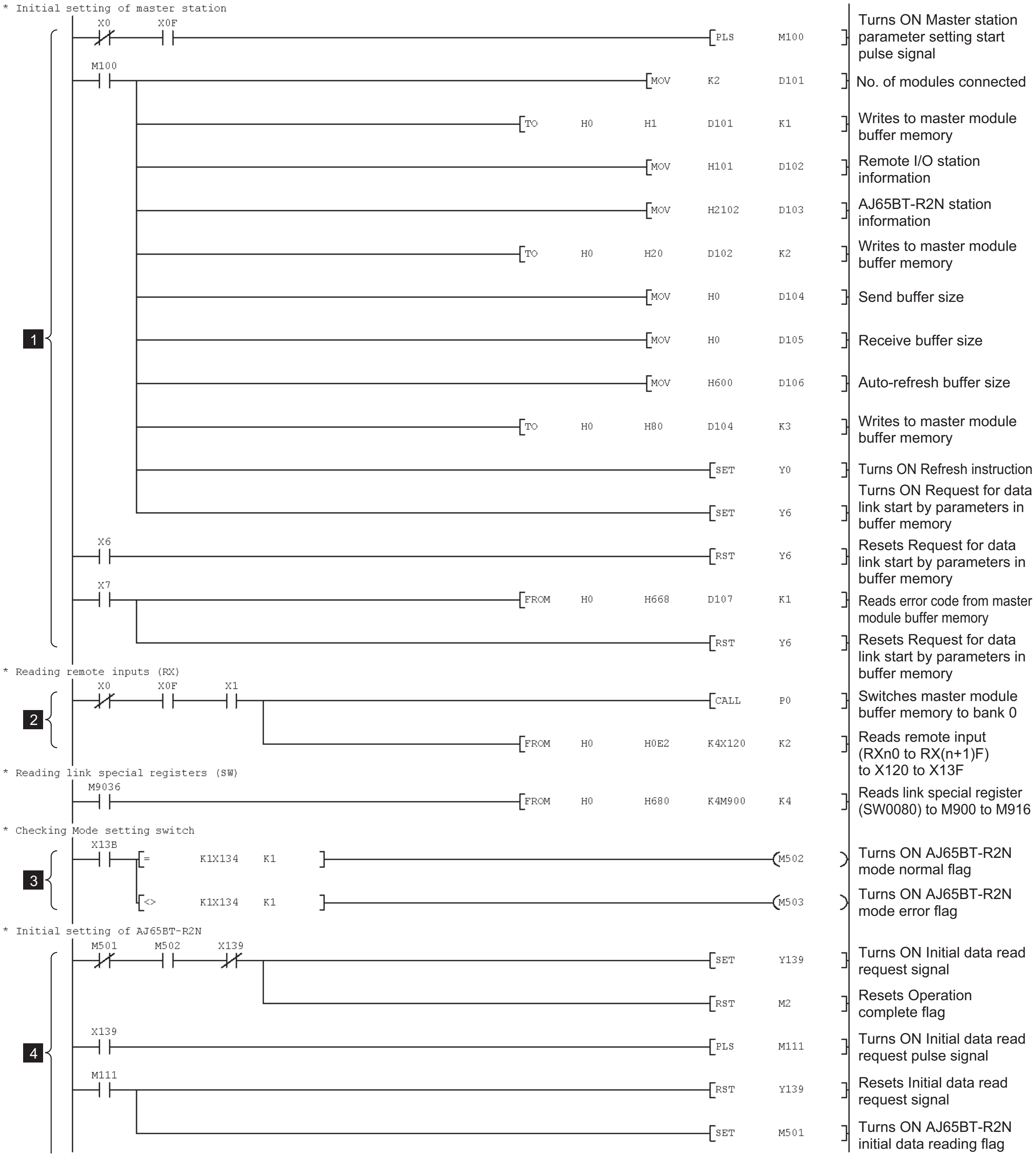

**Figure 8.6 Program example**

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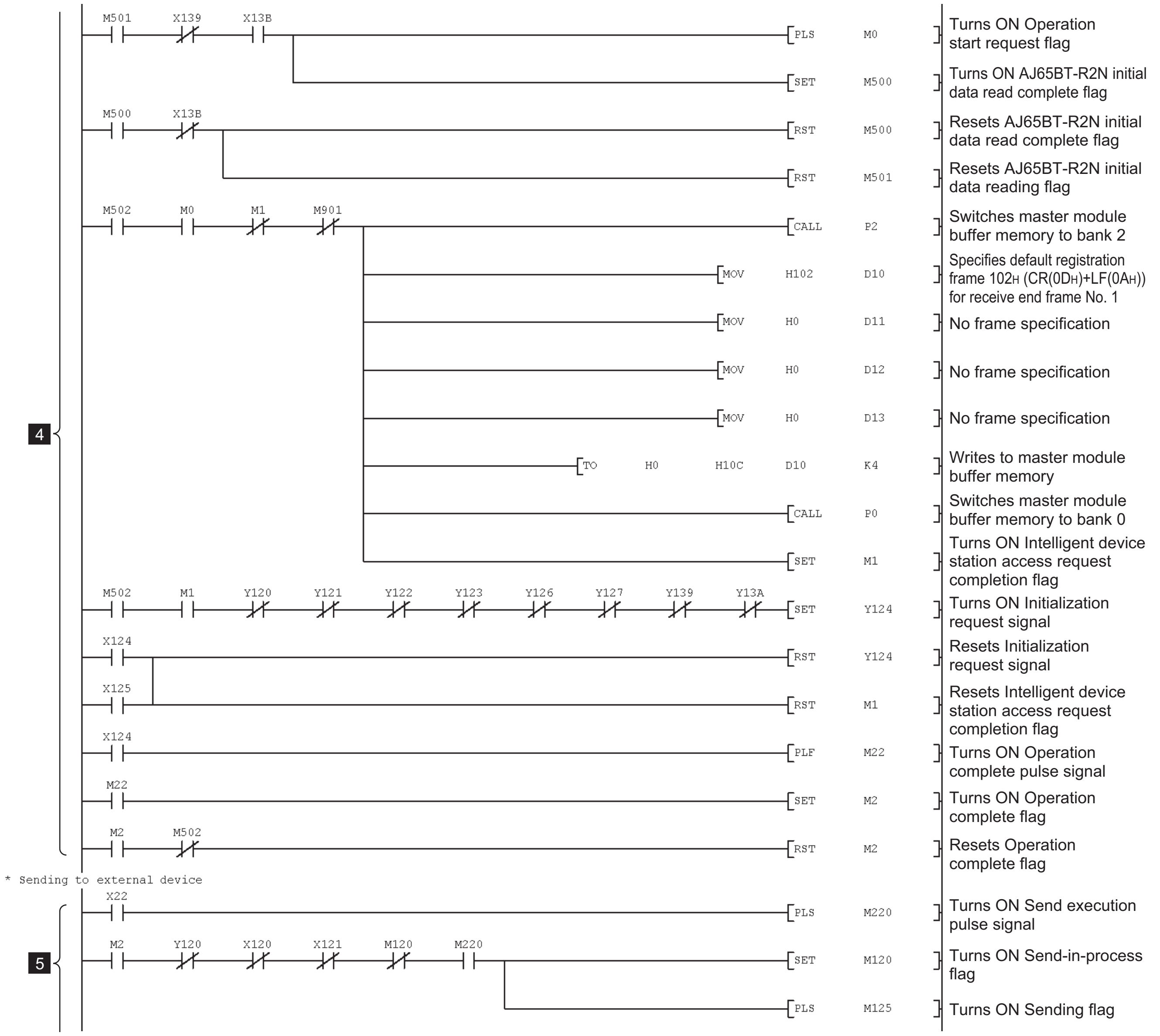

Figure 8.6 Program example (Continued)

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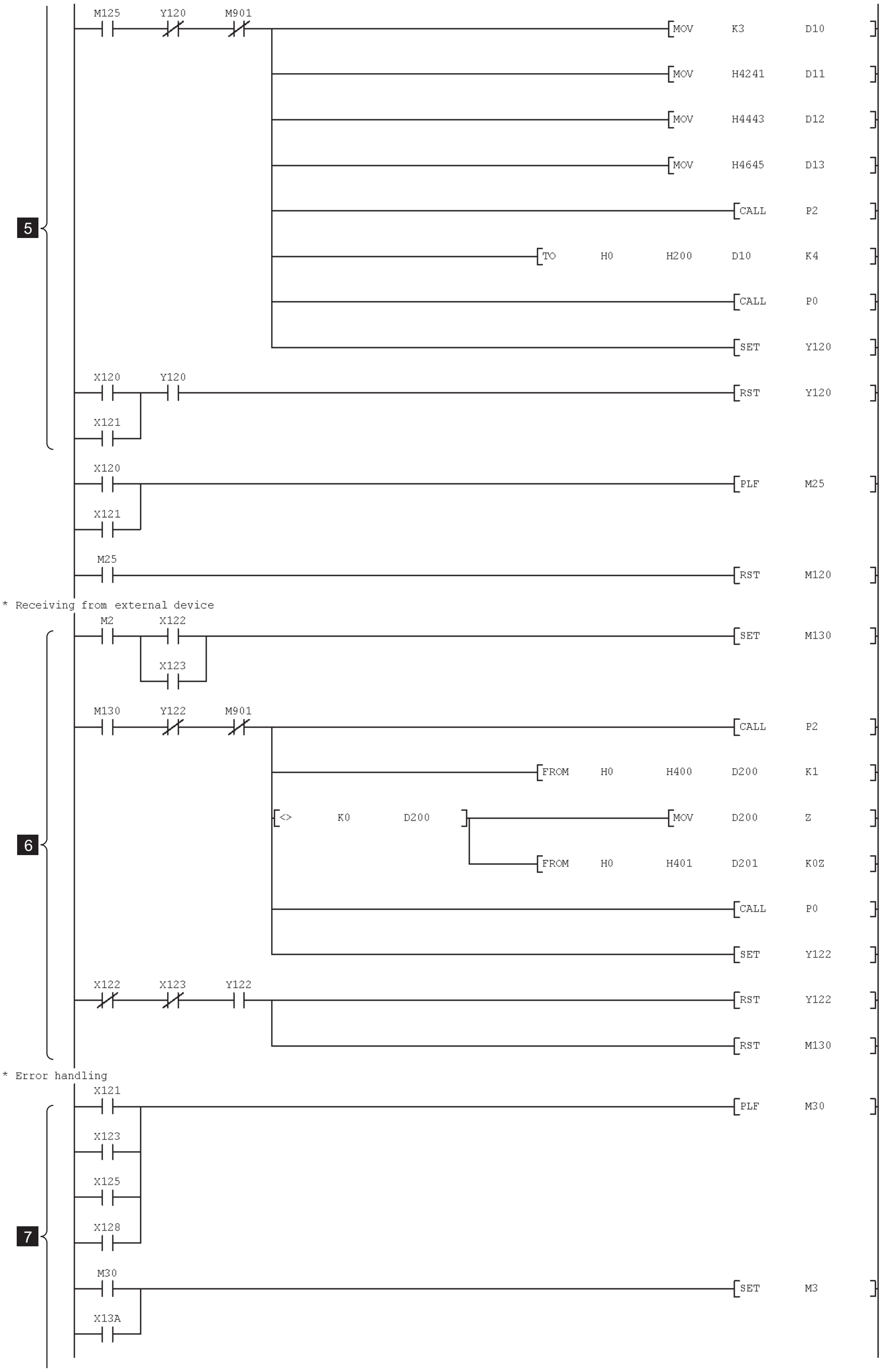

Specifies No. of send data (in word units)

Specifies (A(41H)+B(42H)+C(43H)+D (44H)+E(45H)+F(46H)) for send data

Switches master module buffer memory to bank 2

Writes to master module buffer memory

Switches master module buffer memory to bank 0

Turns ON Send request signal

Resets Send request signal

Turns ON Send completion pulse signal

Resets Send-in-process flag

Turns ON Receiving flag

Switches master module buffer memory to bank 2

Reads No. of receive data (in word units) and receive data from master module receive area

Switches master module buffer memory to bank 0

Turns ON Receive data read completion signal

Resets Receive data read completion signal

Resets Receiving flag

Turns ON Operation failed pulse signal

Turns ON Operation failed flag

Figure 8.6 Program example (Continued)

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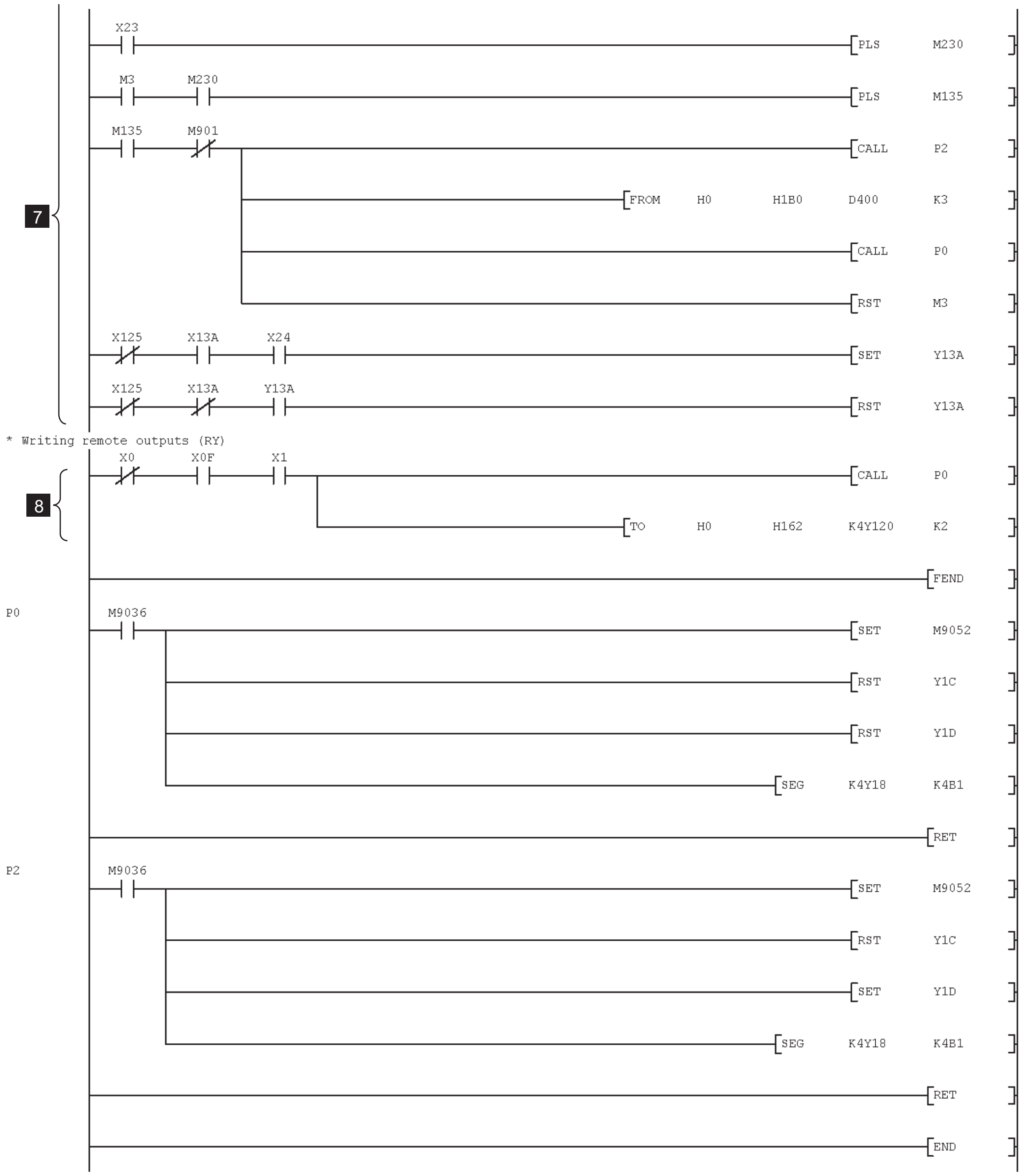


Turns ON Error handling execution pulse signal

Turns ON Error handling flag

Switches master module buffer memory to bank 2

Reads from master module buffer memory

Switches master module buffer memory to bank 0

Resets Operation failed flag

Turns ON Error reset request signal

Resets Error reset request signal

Switches master module buffer memory to bank 0

Writes Y120 to Y13F to remote output (RYn0 to RY(n+1)F)

Switches master module buffer memory to bank 0

Switches master module buffer memory to bank 2

Figure 8.6 Program example (Continued)

## 8.2.3 Precautions for programming

(1) Control data (When using send/receive buffer communication function)

If the buffer memory of the AJ65BT-R2N is accessed when using the send/receive buffer communication function, write control data, etc., to the master module.

(a) When writing to the buffer memory of the AJ65BT-R2N

When writing to the buffer memory of the AJ65BT-R2N, use the control data and the send buffer (buffer memory of the master module) for the data to be written. The completion status is stored into the receive buffer after sending data is completed.

The data specified in the send buffer are written to the buffer memory of the AJ65BT-R2N using the following remote I/O (RX, RY).

- Intelligent device station access request signal (RY(n+1)E)
- Intelligent device station access completion signal (RX(n+1)E)

(Example) Writing No. of receive end data and receive timeout time

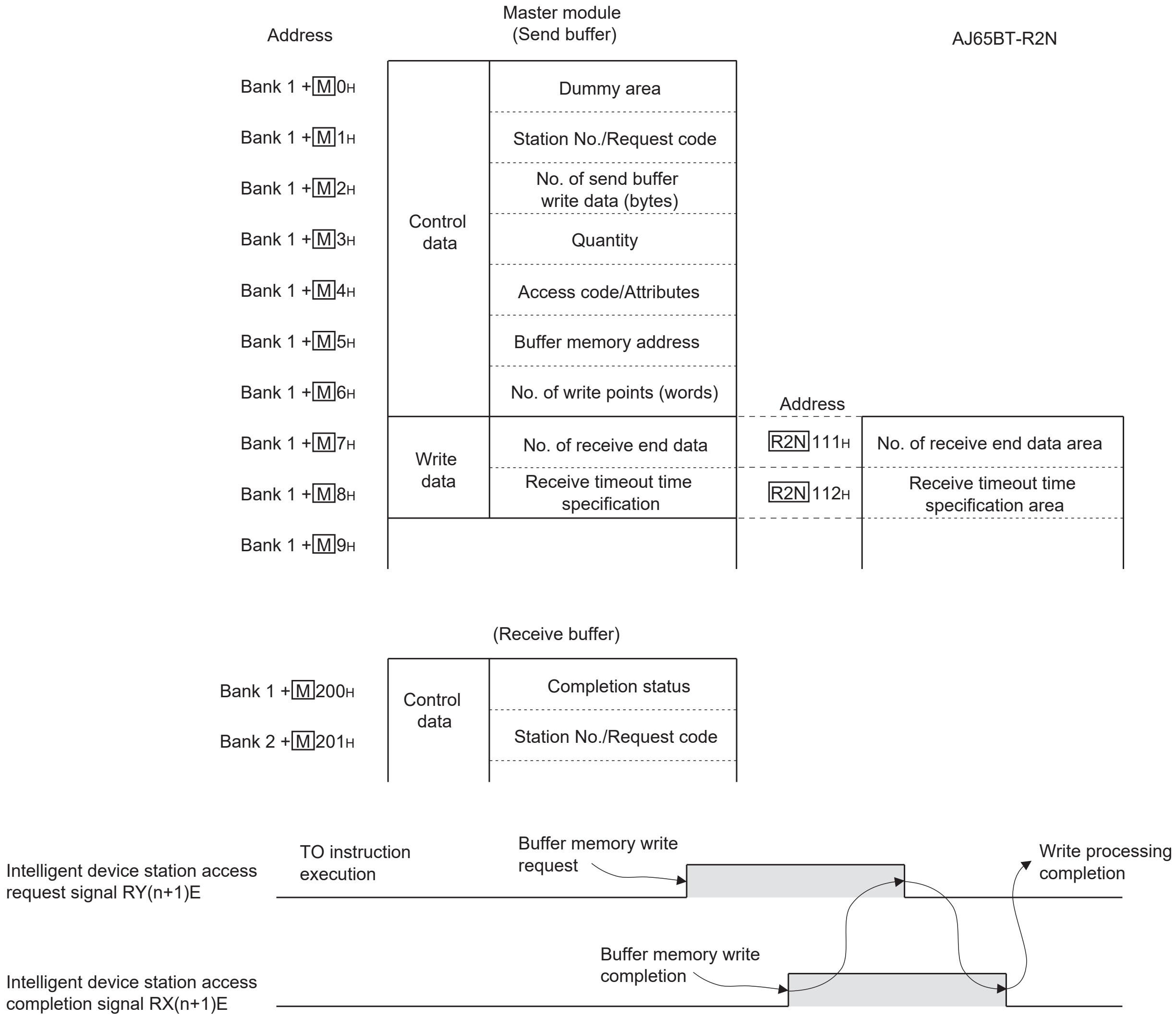
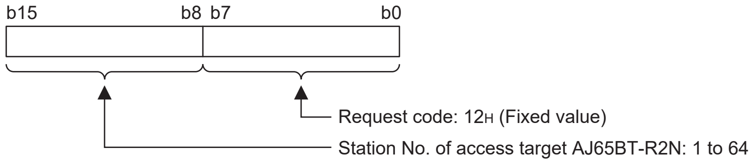


**Figure 8.7 Writing No. of receive end data and receive timeout time**

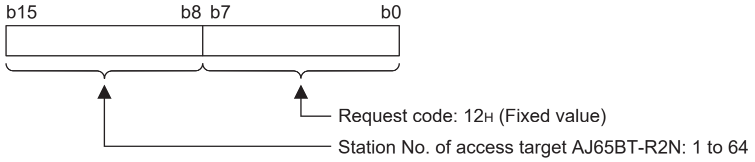
1) Specification of send buffer

Table 8.13 Specification of send buffer

| Item | | Description |
|---|---|---|
| Control data | Dummy area | 0 (Fixed value) |
| | Station No./Request code | Specify the station No. and request code as shown below.<br> |
| | No. of send buffer write data (bytes) | Specify the total number of bytes for the calculation formula below.<br>Set range: 8 ＋ (Data to be written) × 2 (Unit: words) |
| | Quantity | 1 (Fixed value) |
| | Access code/Attribute | $0004_H$ (Fixed) |
| | Buffer memory address | Specify the start address ($0_H$ or later) of the write destination buffer memory.<br>Setting range: $0_H$ to $7FF_H$ |
| | No. of write points (words) | Specify No. of data to be written to the buffer memory of the AJ65BT-R2N.<br>Setting range: $1_H$ to $480_H$ (Unit: words) |
| Write data | | Specify the data to be written to the buffer memory of the AJ65BT-R2N. |

2) Storage of receive buffer

Table 8.14 Specification of receive buffer

| Item | Description |
|---|---|
| Completion status | The completion status of the instruction is stored.<br>•$0_H$: Completed normally<br>•Other than $0_H$: Failed (Error code)<br>For details of error codes, refer to the following.<br>☞ Section 9.2 Error code list |
| Station No./Request code | The station No. and request code are stored as shown below.<br> |

(b) When reading from the buffer memory of the AJ65BT-R2N

When reading from the buffer memory of the AJ65BT-R2N, use the send buffer (buffer memory of master module) for the control data.
If received, the completion status and receive data are stored in the receive buffer.

The data specified in the send buffer are read from the buffer memory of the AJ65BT-R2N using the following remote I/O (RX, RY).

- Intelligent device station access request signal (RY(n+1)E)
- Intelligent device station access completion signal (RX(n+1)E)

(Example) Reading error information

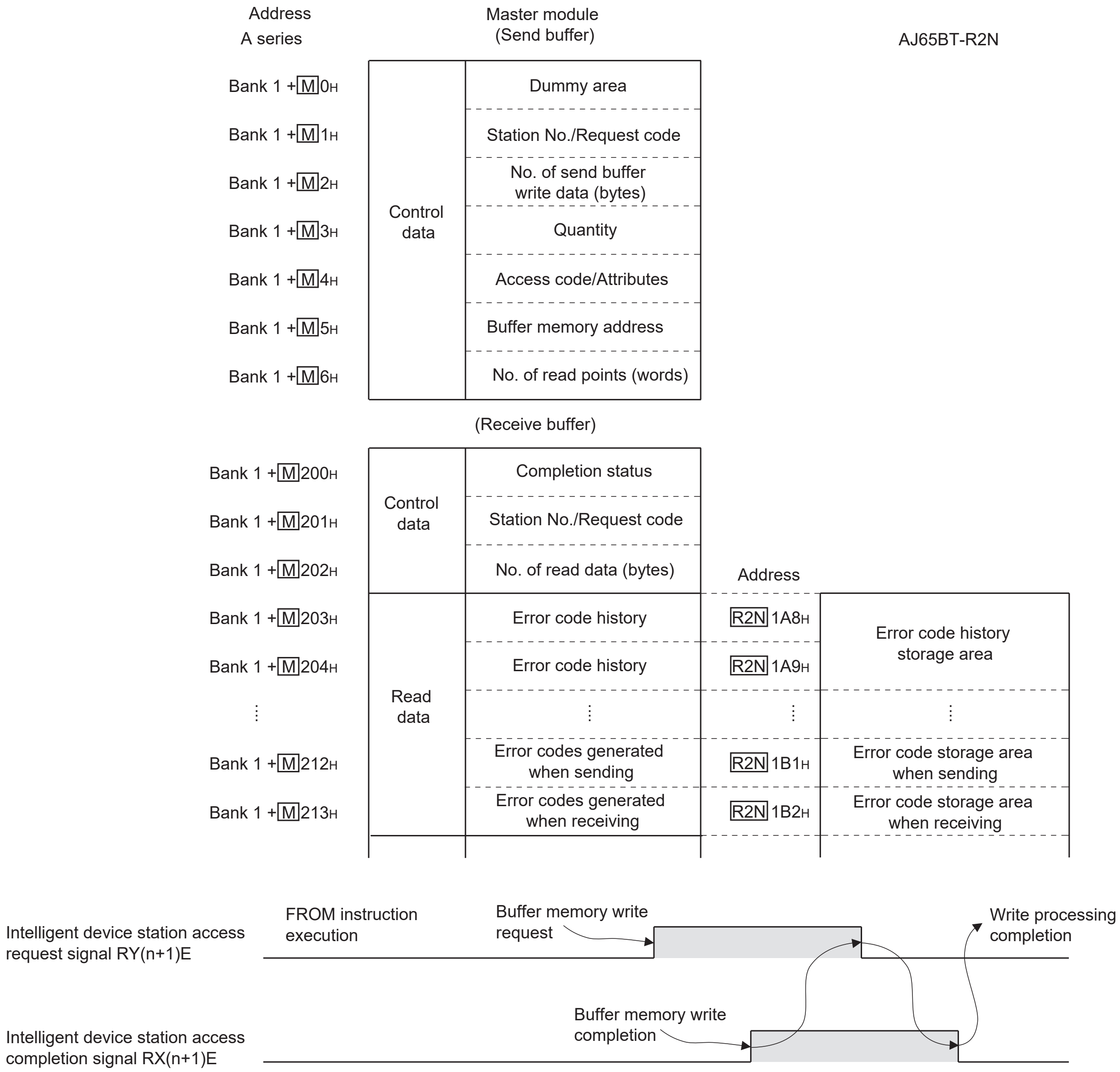
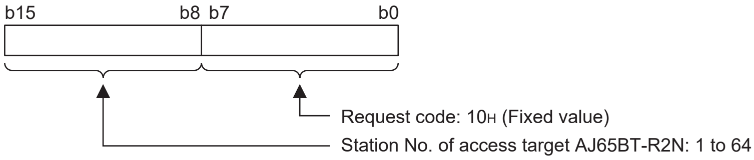


**Figure 8.8 Reading error information**

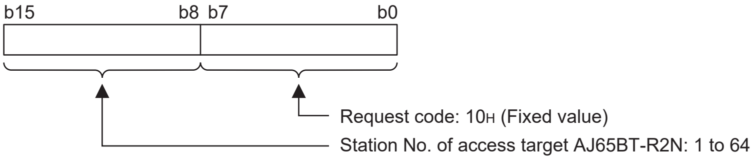
1) Specification of send buffer

**Table 8.15 Specification of send buffer**

| Item | | Description |
|---|---|---|
| Control data | Dummy area | 0 (Fixed value) |
| | Station No./Request code | Specify the station No. and request code as shown below.<br><br> |
| | No. of send buffer write data (bytes) | 8 (Fixed value) |
| | Quantity | 1 (Fixed value) |
| | Access code/Attribute | $0004_H$ (Fixed value) |
| | Buffer memory address | Specify the start address ($0_H$ or later) of the buffer memory to be read.<br>Setting range: $0_H$ to $7FF_H$ |
| | No. of read points (words) | Specify No. of data to be read from the buffer memory of the AJ65BT-R2N.<br>Setting range: $1_H$ to $480_H$ (Unit: words) |

2) Storage of receive buffer

**Table 8.16 Specification of receive buffer**

| Item | Description |
|---|---|
| Completion status | The completion status of the instruction is stored.<br>•$0_H$: Completed normally<br>•Other than $0_H$: Failed (Error code)<br>For details of error codes, refer to the following.<br>☞ Section 9.2 Error code list |
| Station No./Request code | The station No. and request code are stored as shown below.<br><br> |
| No. of read data | The total number of bytes of the read data is stored. (Unit: bytes) |
| Read data | The data read from the buffer memory of the AJ65BT-R2N is stored. |

(2) Switching banks of the AJ61BT11 or A1SJ61BT11

If using the AJ65BT-R2N, use the send/receive buffer or auto-refresh buffer of the master station.

For the AJ61BT11 or A1SJ61BT11, it is necessary to switch banks because the send/receive buffer and the auto-refresh buffer are separated by banks.

## ☒Point

When using the dedicated instructions (RIRD, RIWT, RISEND, and RIRCV), bank is automatically switched by the dedicated instruction.
The user does not have to switch banks.

- Buffer memory of AJ61BT11 or A1SJ61BT11

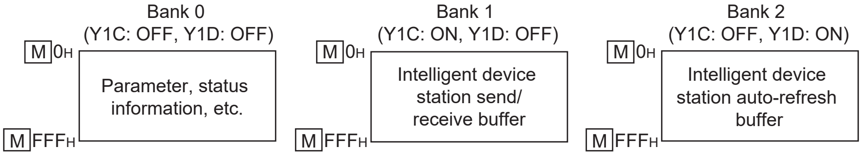


**Figure 8.9 Buffer memory of AJ61BT11 or A1SJ61BT11**

## ☒Point

Make sure to back to bank 0 after switching to bank 1 or bank 2 to read/write data.
If a bank is not switched to bank 0, information such as the remote I/O (RX, RY) and remote register (RWw, RWr) will not be updated.

(a) Program for switching banks

1) Program for switching to bank 0

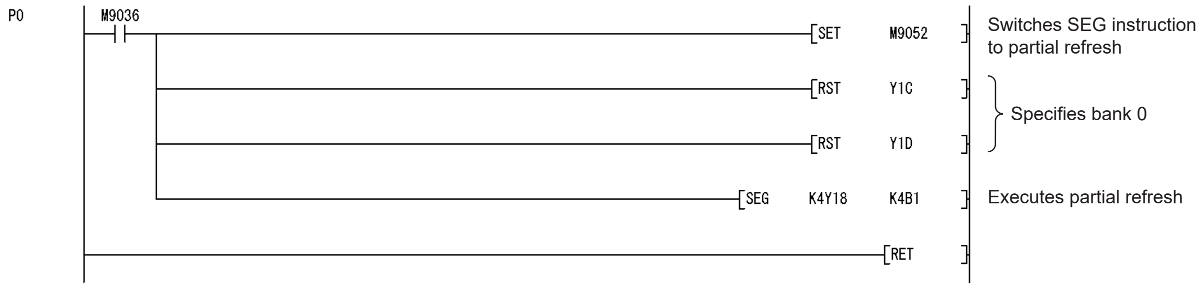


**Figure 8.10 Program for switching to bank 0**

2) Program for switching to bank 1

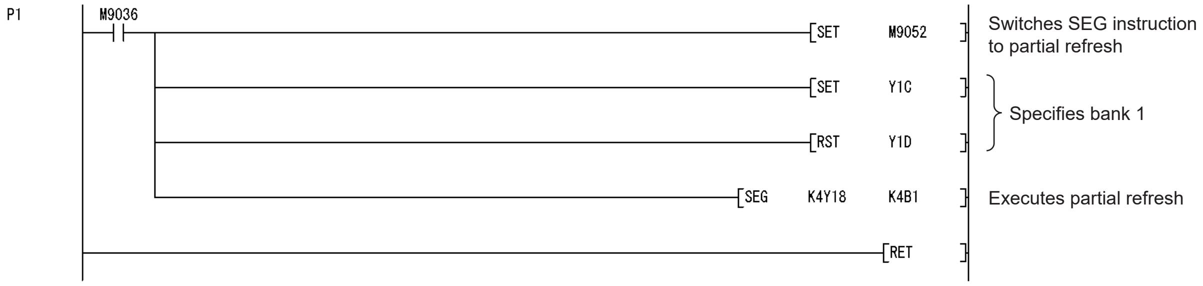


**Figure 8.11 Program for switching to bank 1**

3) Program for switching to bank 2

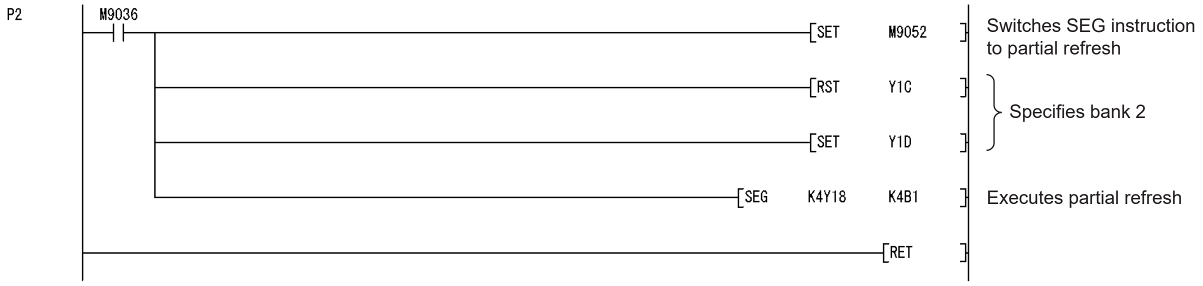


**Figure 8.12 Program for switching to bank 2**

**Remark**

The programs above are subroutine programs executed from the programs described in this chapter.

## 8.3 Initial Setting for AJ65BT-R2N

### 8.3.1 For the send/receive buffer communication function

(1) Overview of program example

1) When AJ65BT-R2N initial setting start flag (M20) is turned ON, settings are configured so that data reception is completed by the frame function upon receipt of CR(0DH)＋LF(0AH).

2) The AJ65BT-R2N is initialized.

(2) Processing in the program example

1) Default registration frame 102H (CR(0DH)＋LF(0AH)) is written to Receive start frame No.1 (R2N 10CH).

2) After writing is normally completed, Initialization request signal (Y124) is turned ON to complete the initial setting.

(3) Devices used in the program example

**Table 8.17 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X124 | Initialization complete signal | Section 8.3.1 | — |
| X125 | Initialization failed signal | Section 8.3.1 | — |
| X13E | Intelligent device station access completion signal | Section 8.3.1 | Section 8.4.1,<br>Section 8.5.1,<br>Section 8.6.1 |
| Y120 | Send request signal | — | Section 8.4.1 |
| Y121 | Send cancel request signal | — | — |
| Y122 | Receive data read completion signal | — | Section 8.5.1 |
| Y123 | Forced receive completion request signal | — | — |
| Y124 | Initialization request signal | Section 8.3.1 | — |
| Y126 | OS reception area clear request signal | — | — |
| Y127 | E$^2$PROM function request signal | — | — |
| Y139 | Initial data read request signal | — | — |
| Y13A | Error reset request signal | — | Section 8.6.1 |
| Y13E | Intelligent device station access request signal | Section 8.3.1 | Section 8.4.1,<br>Section 8.5.1,<br>Section 8.6.1 |
| M0 | Operation start request flag | Section 8.3.1 | — |
| M1 | Initial setting write completion flag | Section 8.3.1 | — |
| M2 | Operation complete flag | Section 8.3.1 | — |
| M10 | TO instruction executed flag | Section 8.3.1 | — |
| M11 | Intelligent device station access request completion flag | Section 8.3.1 | — |
| M20 | AJ65BT-R2N initial setting start flag | — | — |
| M22 | Operation complete pulse signal | Section 8.3.1 | — |
| M120 | Buffer memory access exclusion check flag | — | Section 8.4.1,<br>Section 8.5.1,<br>Section 8.6.1 |

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Table 8.17 Devices used in the program example (Continued)

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M502 | AJ65BT-R2N mode normal flag | — | Section 8.2.1 (3) 3 |
| M901 | Other station data link status (Station No.2) | — | — |
| D0 to D11 | Initial setting data | — | — |
| P0 | Switching to bank 0 (executing sample program in Section 8.2.3 (2)(a)) | — | — |
| P1 | Switching to bank 1 (executing sample program in Section 8.2.3 (2)(a)) | — | — |

(4) Program example

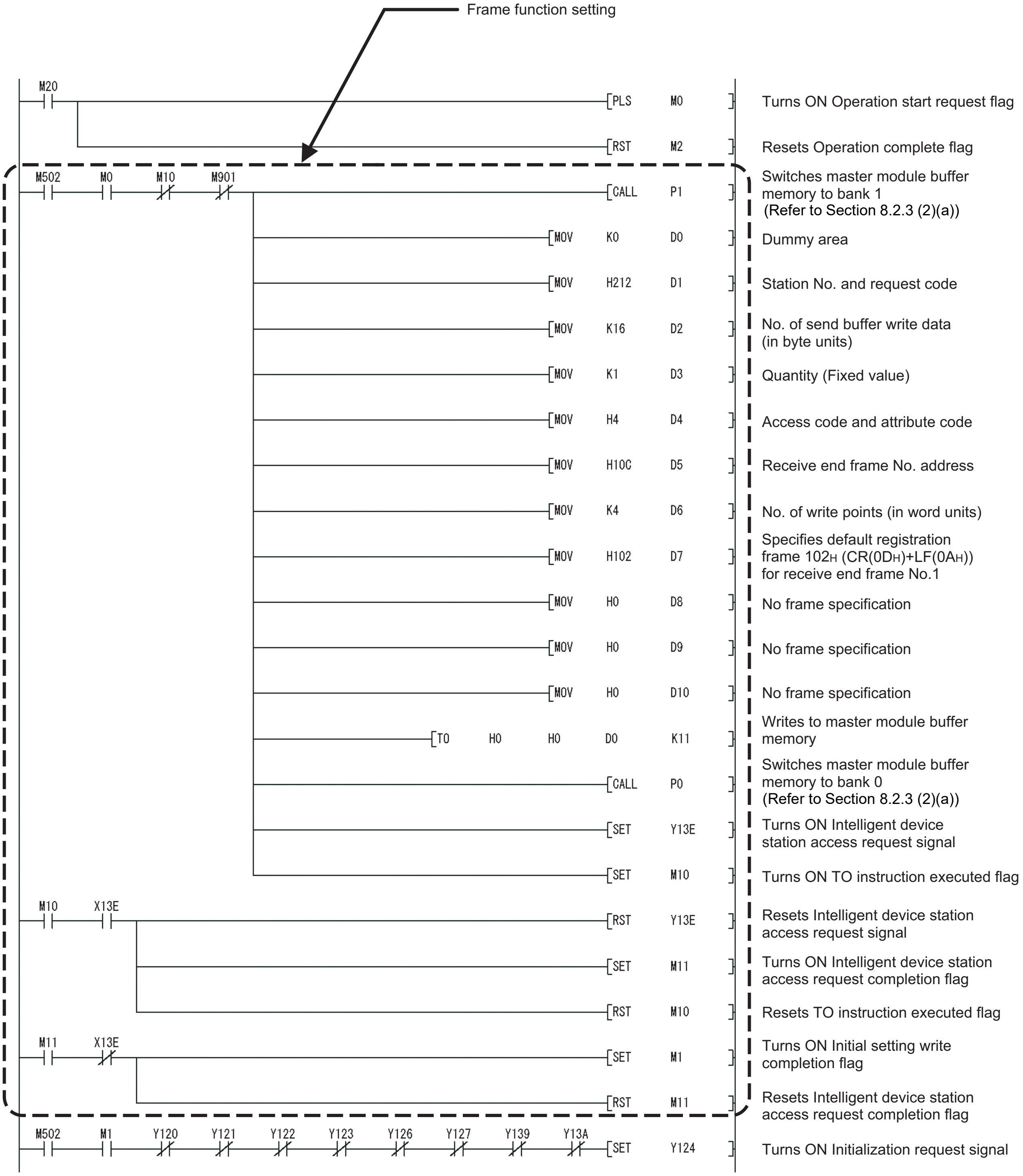

**Figure 8.13 Program example**

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Figure 8.13 Program example (Continued)

(a) Setting of any other function

When changing the frame function setting to other than the above or when using any other function, refer to the section below and modify the area enclosed by the dotted line.

☞ Section 8.7 Initial Settings for Other Functions

## 8.3.2 For the buffer memory auto-refresh function

(1) Overview of program example

1) Initial data are read from the AJ65BT-R2N to the master module.
2) By the frame function, reception is completed when CR($0D_H$)+LF($0A_H$) is received.
3) The AJ65BT-R2N is initialized.

### ☒Point

Make sure to read initial data before performing the initial setting.

(2) Processing in the program example

1) Initial data are read out.
2) Default registration frame $102_H$ (CR($0D_H$)+LF($0A_H$)) is written to Receive start frame No.1 ($\boxed{\text{R2N}}$ $10C_H$).
3) After writing is normally completed, Initialization request signal (Y124) is turned ON to complete the initial setting.

(3) Devices used in the program example

**Table 8.18 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X124 | Initialization complete signal | Section 8.3.2 | — |
| X125 | Initialization failed signal | Section 8.3.2 | — |
| X139 | Initial data read completion signal | Section 8.3.2 | — |
| X13B | Remote station ready signal | Section 8.3.2 | — |
| Y120 | Send request signal | — | Section 8.4.2 |
| Y121 | Send cancel request signal | — | — |
| Y122 | Receive data read completion signal | — | Section 8.5.2 |
| Y123 | Forced receive completion request signal | — | — |
| Y124 | Initialization request signal | Section 8.3.2 | — |
| Y126 | OS reception area clear request signal | — | — |
| Y127 | E$^2$PROM function request signal | — | — |
| Y139 | Initial data read request signal | Section 8.3.2 | — |
| Y13A | Error reset request signal | — | Section 8.6.2 |
| M0 | Operation start request flag | Section 8.3.2 | — |
| M1 | Intelligent device station access request completion flag | Section 8.3.2 | — |
| M2 | Operation complete flag | Section 8.3.2 | — |
| M22 | Operation complete pulse signal | Section 8.3.2 | — |
| M111 | Initial data read request pulse signal | Section 8.3.2 | — |
| M500 | AJ65BT-R2N initial data read complete flag | Section 8.3.2 | — |
| M501 | AJ65BT-R2N initial data reading flag | Section 8.3.2 | — |
| M502 | AJ65BT-R2N mode normal flag | — | Section 8.2.2 (3) 3 |
| M901 | Other station data link status (Station No.2) | — | — |
| D10 to D13 | Initial setting data | — | — |
| P0 | Switching to bank 0 (executing sample program in Section 8.2.3 (2)(a)) | — | — |
| P2 | Switching to bank 2 (executing sample program in Section 8.2.3 (2)(a)) | — | — |

(4) Program example

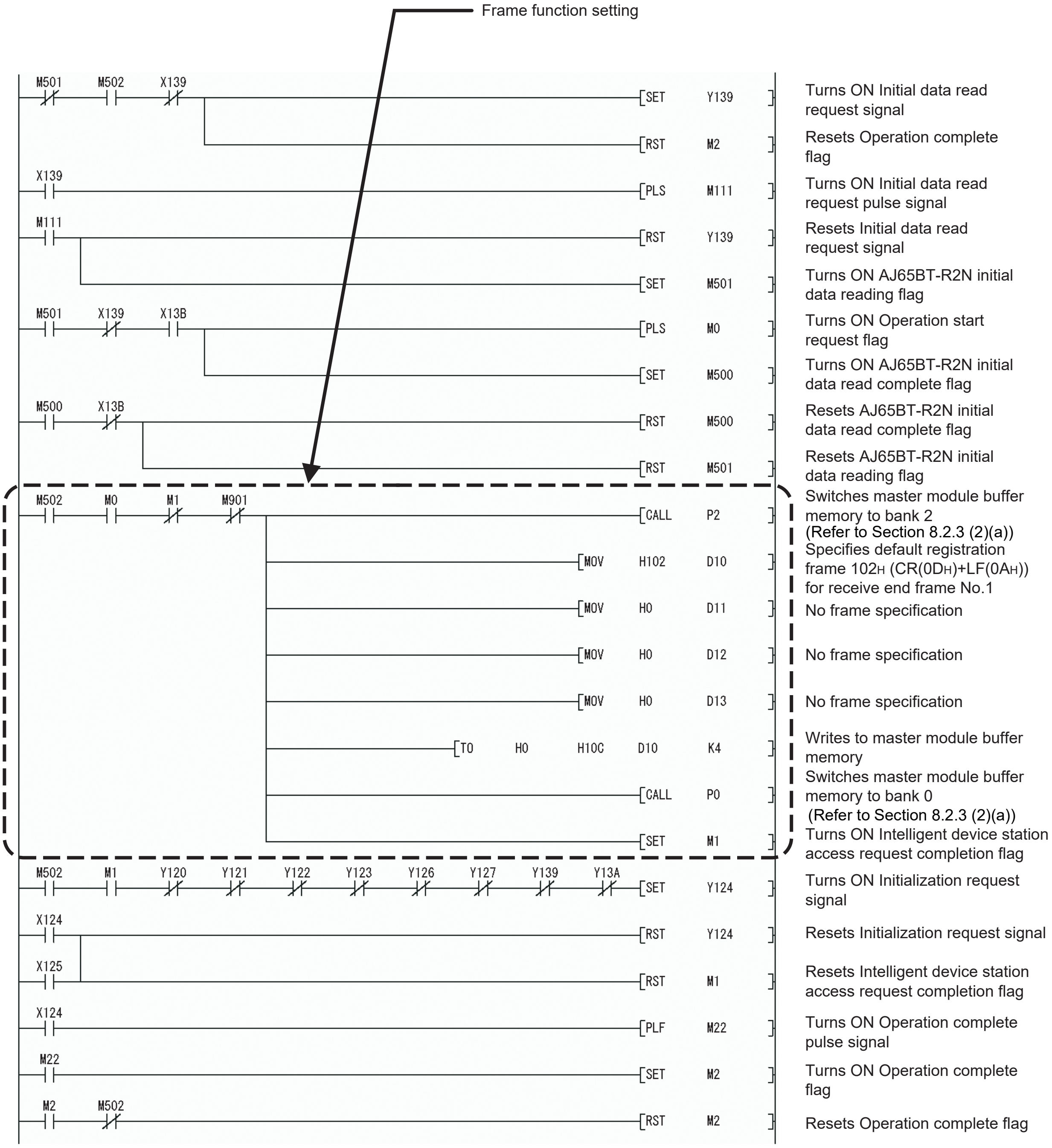

**Figure 8.14 Program example**

(a) Setting of any other function

When changing the frame function setting to other than the above or when using any other function, refer to the section below and modify the area enclosed by the dotted line.

☞ Section 8.7 Initial Settings for Other Functions

## 8.4 Sending to External Device

### 8.4.1 For the send/receive buffer communication function

(1) Overview of program example

If Send execute flag (X22) is turned ON, the character string "ABCDEF" is sent from the master station to the external device.

(2) Processing in the program example

1) No. of send data (3) is written to Send data size specification area (R2N 200H) and the send data ("ABCDEF") is written to Send data area (R2N 201H).
2) Send request signal (Y120) is turned ON to send the data to the external device.
3) Send request signal (Y120) is turned OFF to complete the transmission.

(3) Devices used in the program example

**Table 8.19 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X22 | Send execute flag | — | — |
| X120 | Send complete signal | Section 8.4.1 | — |
| X121 | Send failed signal | Section 8.4.1 | — |
| X13E | Intelligent device station access completion signal | Section 8.4.1 | Section 8.3.1,<br>Section 8.5.1,<br>Section 8.6.1 |
| Y120 | Send request signal | Section 8.4.1 | — |
| Y13E | Intelligent device station access request signal | Section 8.4.1 | Section 8.3.1,<br>Section 8.5.1,<br>Section 8.6.1 |
| M2 | Operation complete flag | — | Section 8.3.1 |
| M25 | Send completion pulse signal | Section 8.4.1 | — |
| M120 | Buffer memory access exclusion check flag | Section 8.4.1 | Section 8.5.1,<br>Section 8.6.1 |
| M125 | Sending flag | Section 8.4.1 | — |
| M180 | TO instruction executed flag | Section 8.4.1 | — |
| M181 | Intelligent device station access request completion flag | Section 8.4.1 | — |
| M220 | Send execution pulse signal | Section 8.4.1 | — |
| M901 | Other station data link status (Station No.2) | — | — |
| D0 to D10 | Control data of TO instruction and send data | — | — |
| P0 | Switching to bank 0 (executing sample program in Section 8.2.3 (2)(a)) | — | — |
| P1 | Switching to bank 1 (executing sample program in Section 8.2.3 (2)(a)) | — | — |

(4) Program example

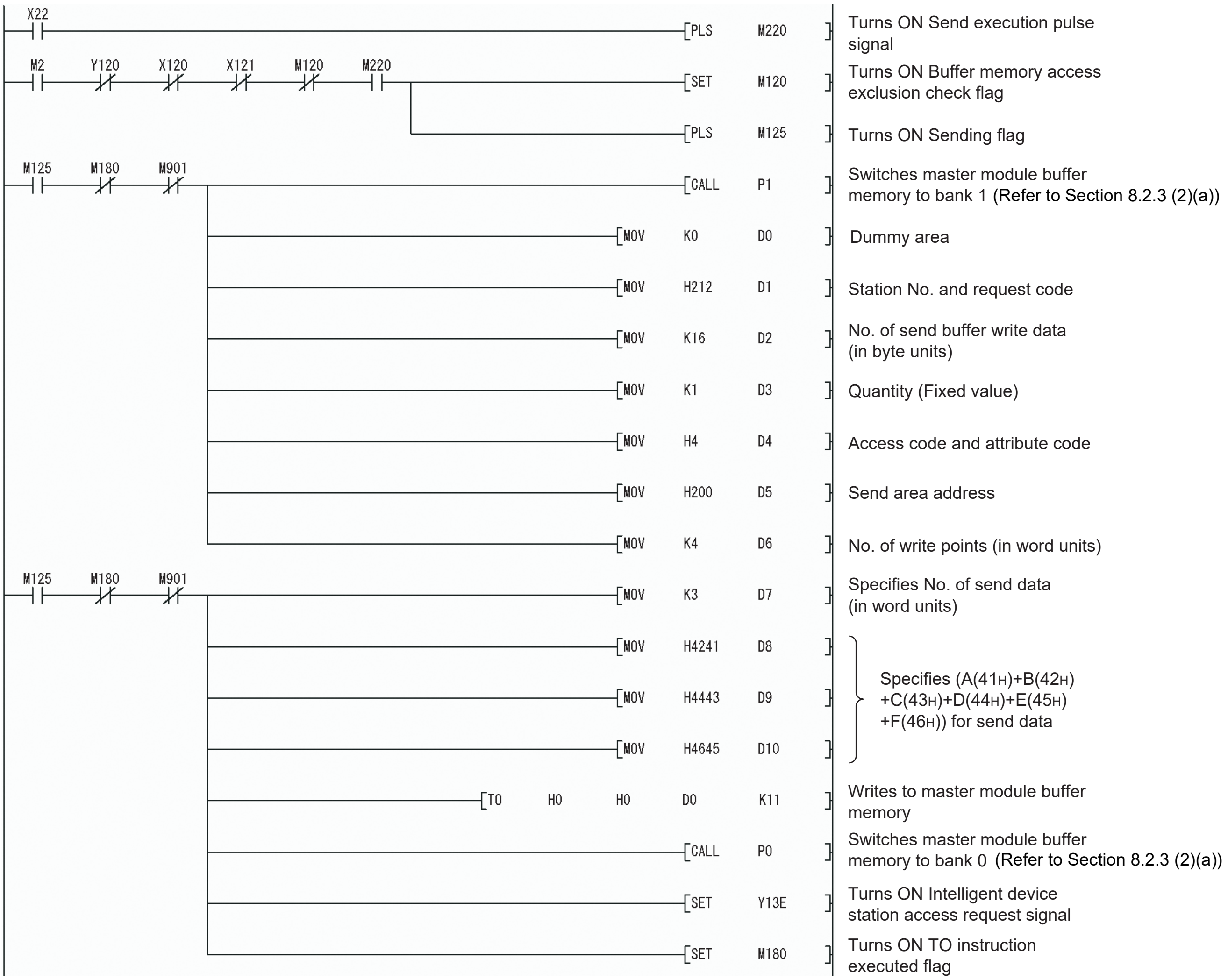

**Figure 8.15 Program example**

(Continued to next page)

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Resets Intelligent device station access request signal

Turns ON Intelligent device station access request completion flag

Resets TO instruction executed flag

Turns ON Send request signal

Resets Intelligent device station access request completion flag

Resets Send request signal

Turns ON Send completion pulse signal

Resets Buffer memory access exclusion check flag

Figure 8.15 Program example (Continued)

## ☒Point

When sending data of 481 words or more to the external device using the FROM/ TO instruction, divide the send data into parts with 480 words or less and write them to the AJ65BT-R2N.
With the FROM/TO instructions, data with 481 words or more cannot be written to the AJ65BT-R2N at one time.

## 8.4.2 For the buffer memory auto-refresh function

(1) Overview of program example

If Send execute flag (X22) is turned ON, the character string "ABCDEF" is sent to the external device.

(2) Processing in the program example

1) No. of send data (3) is written to Send data size specification area (R2N 200H) and the send data ("ABCDEF") is written to Send data area (R2N 201H).
2) Send request signal (Y120) is turned ON to send the data to the external device.
3) Send request signal (Y120) is turned OFF to complete the transmission.

(3) Devices used in the program example

**Table 8.20 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X22 | Send execute flag | — | — |
| X120 | Send complete signal | Section 8.4.2 | — |
| X121 | Send failed signal | Section 8.4.2 | — |
| Y120 | Send request signal | Section 8.4.2 | — |
| M2 | Operation complete flag | — | Section 8.3.2 |
| M25 | Send completion pulse signal | Section 8.4.2 | — |
| M120 | Send-in-process flag | Section 8.4.2 | — |
| M125 | Sending flag | Section 8.4.2 | — |
| M220 | Send execution pulse signal | Section 8.4.2 | — |
| M901 | Other station data link status (Station No.2) | — | — |
| D10 to D13 | No. of send data and send data | — | — |
| P0 | Switching to bank 0 (executing sample program in Section 8.2.3 (2)(a)) | — | — |
| P2 | Switching to bank 2 (executing sample program in Section 8.2.3 (2)(a)) | — | — |

(4) Program example

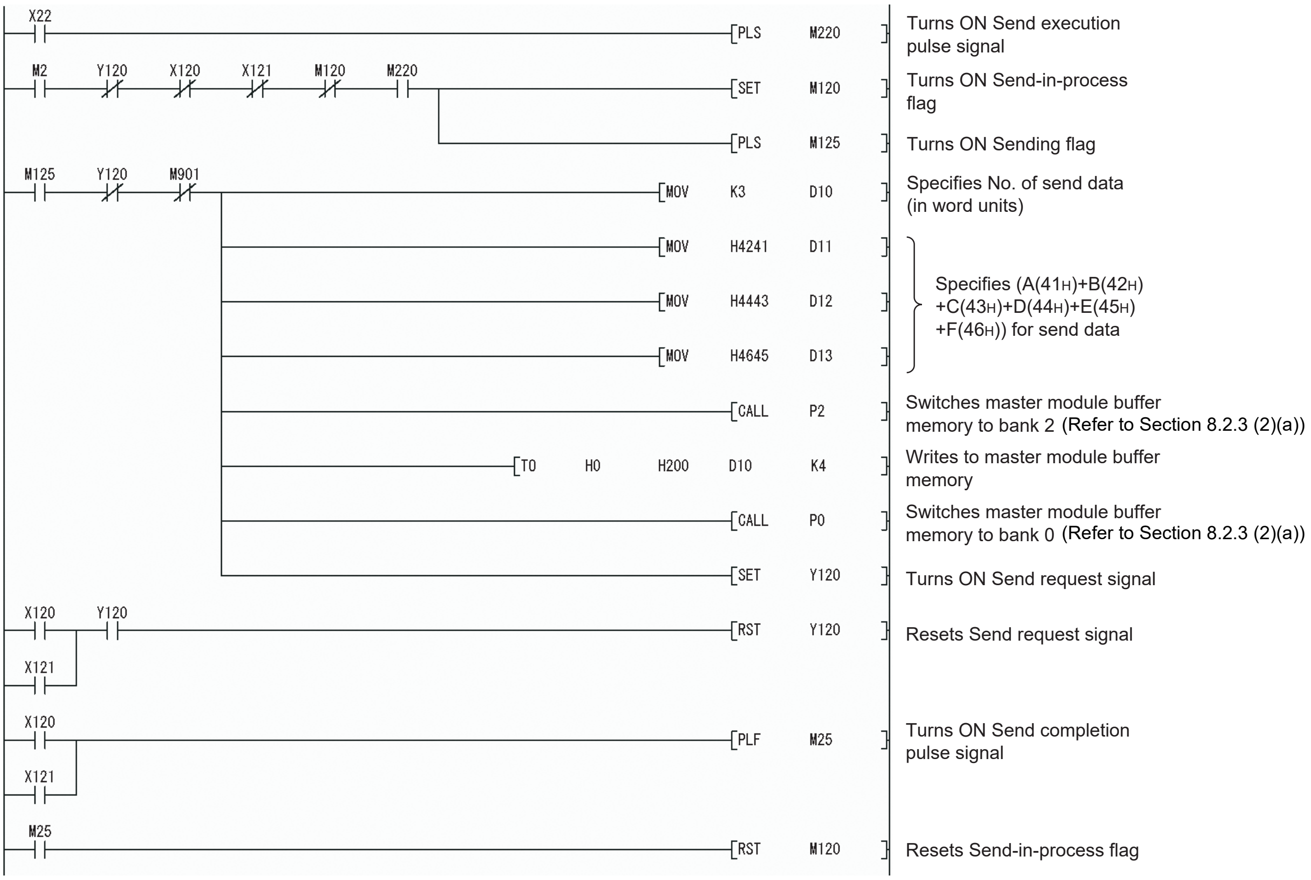


**Figure 8.16 Program example**

## 8.5 Receiving from External Device

### 8.5.1 For the send/receive buffer communication function

(1) Overview of program example

When data are received from the external device, the received data are read out from the AJ65BT-R2N to the master station.

(2) Processing in the program example

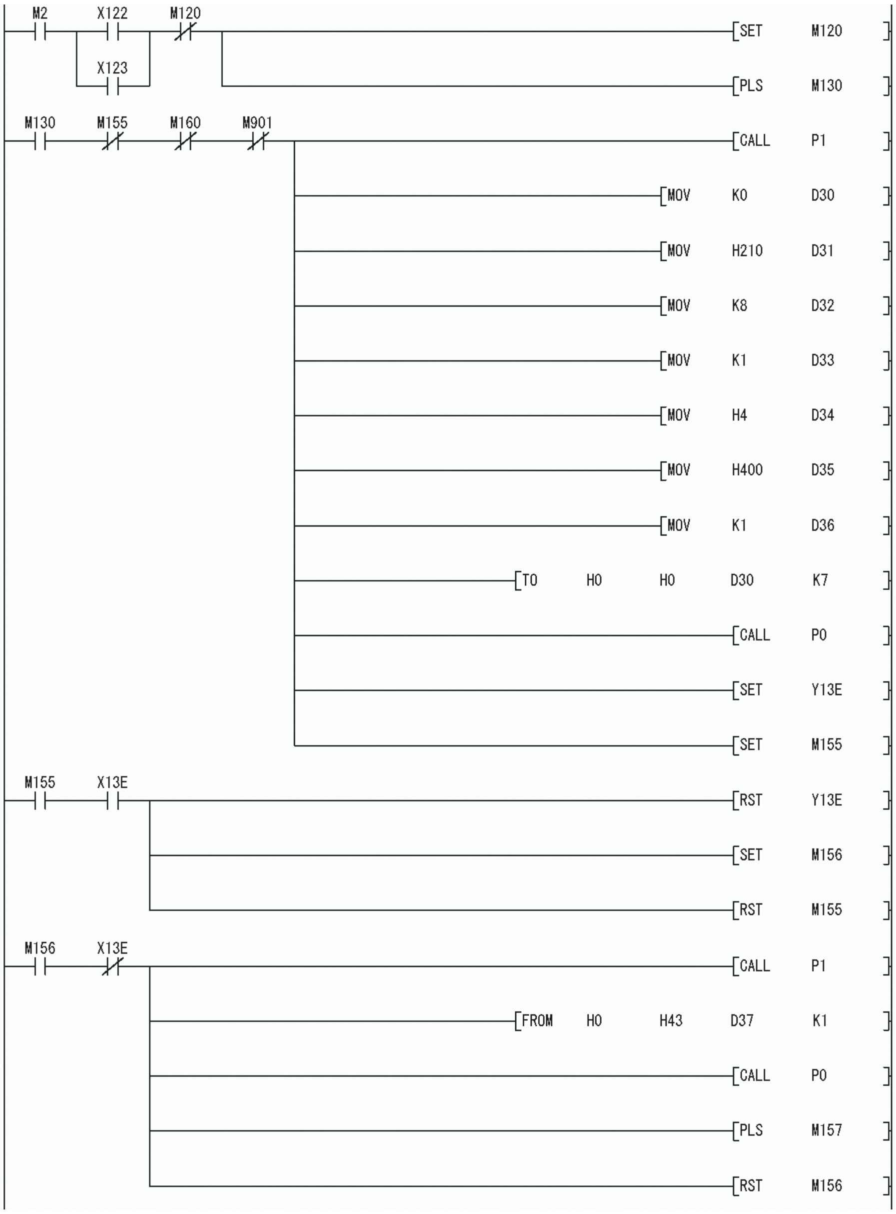
1) No. of receive data is read from Receive data size specification area ($\boxed{\text{R2N}}$ $400_H$) to the master station word device (D37).
2) The receive data are read from Receive data area ($\boxed{\text{R2N}}$ $401_H$) to the master station word device (D50 or later).
3) Receive data read completion signal (Y122) is turned ON→OFF to terminate the reception.

(3) Devices used in the program example

**Table 8.21 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X122 | Normal receive data read request signal | — | — |
| X123 | Error receive data read request signal | — | — |
| X13E | Intelligent device station access completion signal | Section 8.5.1 | Section 8.3.1,<br>Section 8.4.1,<br>Section 8.6.1 |
| Y122 | Receive data read completion signal | Section 8.5.1 | — |
| Y13E | Intelligent device station access request signal | Section 8.5.1 | Section 8.3.1,<br>Section 8.4.1,<br>Section 8.6.1 |
| M2 | Operation complete flag | — | Section 8.3.1 |
| M120 | Buffer memory access exclusion check flag | Section 8.5.1 | Section 8.4.1,<br>Section 8.6.1 |
| M130 | Receiving flag | Section 8.5.1 | — |
| M155 | TO instruction executed flag | Section 8.5.1 | — |
| M156 | Intelligent device station access request completion flag | Section 8.5.1 | — |
| M157 | Read request completion flag | Section 8.5.1 | — |
| M158 | TO instruction executed flag | Section 8.5.1 | — |
| M159 | Intelligent device station access request completion flag | Section 8.5.1 | — |
| M160 | Read request completion flag | Section 8.5.1 | — |
| M901 | Other station data link status (Station No.2) | — | — |
| D30 to D36 | Control data of TO instruction | — | — |
| D37 | No. of receive data | — | — |
| D40 to D46 | Control data of TO instruction | — | — |
| D50 or later | Receive data | — | — |
| Z | No. of receive data | — | — |
| P0 | Switching to bank 0 (executing sample program in Section 8.2.3 (2)(a)) | — | — |
| P1 | Switching to bank 1 (executing sample program in Section 8.2.3 (2)(a)) | — | — |

(4) Program example



Turns ON Buffer memory access exclusion check flag

Turns ON Receiving flag

Switches master module buffer memory to bank 1 (Refer to Section 8.2.3 (2)(a))

Dummy area

Station No. and request code

No. of send buffer write data (in byte units)

Quantity (Fixed value)

Access code and attribute code

Receive data size specification area (in words units) address

No. of read points (in word units)

Writes to master module buffer memory

Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a))

Turns ON Intelligent device station access request signal

Turns ON TO instruction executed flag

Resets Intelligent device station access request signal

Turns ON Intelligent device station access request completion flag

Resets TO instruction executed flag

Switches master module buffer memory to bank 1 (Refer to Section 8.2.3 (2)(a))

Reads from master module buffer memory

Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a))

Turns ON Read request completion flag

Resets Intelligent device station access request completion flag

**Figure 8.17 Program example**

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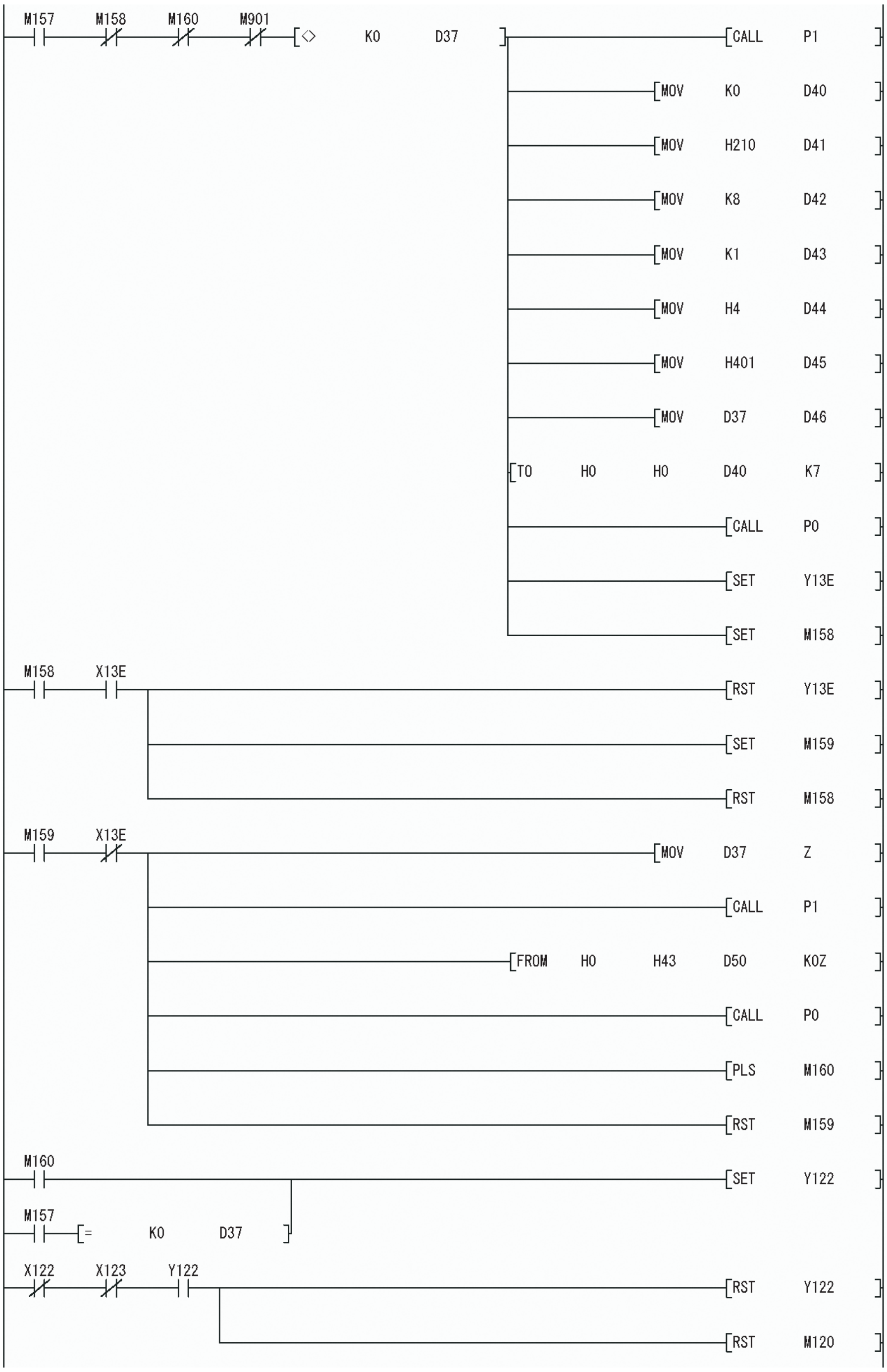


```
M157 M158 M160 M901 [<> K0 D37]  [CALL P1]          Switches master module buffer memory to bank 1 (Refer to Section 8.2.3 (2)(a))
                                 [MOV K0 D40]       Dummy area
                                 [MOV H210 D41]     Station No. and request code
                                 [MOV K8 D42]       No. of send buffer write data (in byte units)
                                 [MOV K1 D43]       Quantity (Fixed value)
                                 [MOV H4 D44]       Access code and attribute code
                                 [MOV H401 D45]     Receive data area address
                                 [MOV D37 D46]      No. of read points (in word units)
                                 [TO H0 H0 D40 K7]  Writes to master module buffer memory
                                 [CALL P0]          Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a))
                                 [SET Y13E]         Turns ON Intelligent device station access request signal
                                 [SET M158]         Turns ON TO instruction executed flag
M158 X13E                        [RST Y13E]         Resets Intelligent device station access request signal
                                 [SET M159]         Turns ON Intelligent device station access request completion flag
                                 [RST M158]         Resets TO instruction executed flag
M159 X13E                        [MOV D37 Z]        No. of receive data (in word units)
                                 [CALL P1]          Switches master module buffer memory to bank 1 (Refer to Section 8.2.3 (2)(a))
                                 [FROM H0 H43 D50 K0Z]  Reads from master module buffer memory
                                 [CALL P0]          Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a))
                                 [PLS M160]         Turns ON Read request completion flag
                                 [RST M159]         Resets Intelligent device station access request completion flag
M160                             [SET Y122]         Turns ON Receive data read completion signal
M157 [= K0 D37]
X122 X123 Y122                   [RST Y122]         Resets Receive data read completion signal
                                 [RST M120]         Resets Buffer memory access exclusion check flag
```

Figure 8.17 Program example (Continued)

**☒Point**

When receiving data of 481 words or more from the external device using the FROM/TO instruction, divide the receive data into parts with 480 words or less and read them from the AJ65BT-R2N.
With the FROM/TO instructions, data of 481 words or more cannot be read from the AJ65BT-R2N at one time.

## 8.5.2 For the buffer memory auto-refresh function

(1) Overview of program example

When the AJ65BT-R2N receives data from the external device, the received data are read out to the master station word device (D200).

(2) Processing in the program example

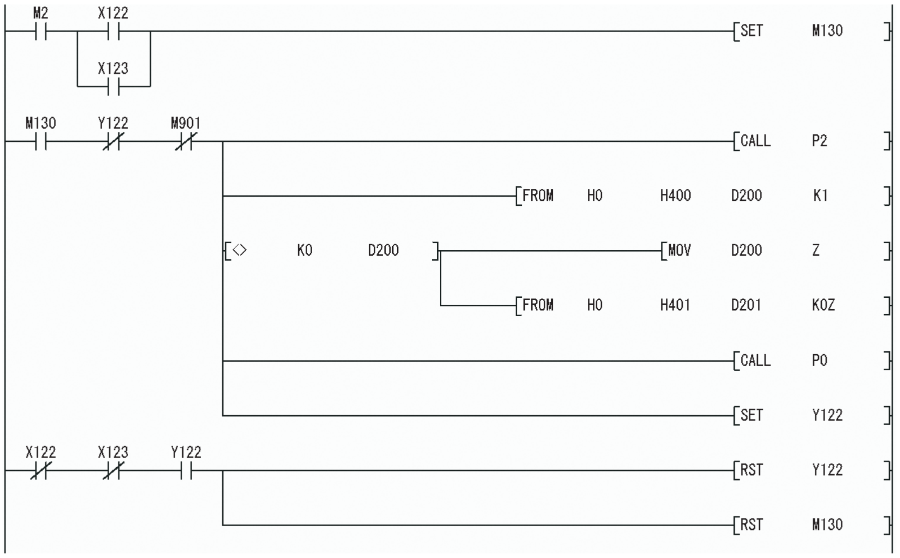
1) No. of receive data is read from Receive data size specification area (R2N 400H) to the master station word device (D200).
2) The receive data are read from Receive data area (R2N 401H) to the master station word device (D201 or later).
3) Receive data read completion signal (Y122) is turned ON → OFF to terminate the reception.

(3) Devices used in the program example

Table 8.22 Devices used in the program example

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X122 | Normal receive data read request signal | — | — |
| X123 | Error receive data read request signal | — | — |
| Y122 | Receive data read completion signal | Section 8.5.2 | — |
| M2 | Operation complete flag | — | Section 8.3.2 |
| M130 | Receiving flag | Section 8.5.2 | — |
| M901 | Other station data link status (Station No.2) | — | — |
| D200 | No. of receive data | — | — |
| D201 or later | Receive data | — | — |
| Z | No. of receive data | — | — |
| P0 | Switching to bank 0 (executing sample program in Section 8.2.3 (2)(a)) | — | — |
| P2 | Switching to bank 2 (executing sample program in Section 8.2.3 (2)(a)) | — | — |

(4) Program example



Turns ON Receiving flag

Switches master module buffer memory to bank 2 (Refer to Section 8.2.3 (2)(a))

Reads No. of receive data (in word units) and receive data from master module receive area

Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a))

Turns ON Receive data read completion signal

Resets Receive data read completion signal

Resets Receiving flag

**Figure 8.18 Program example**

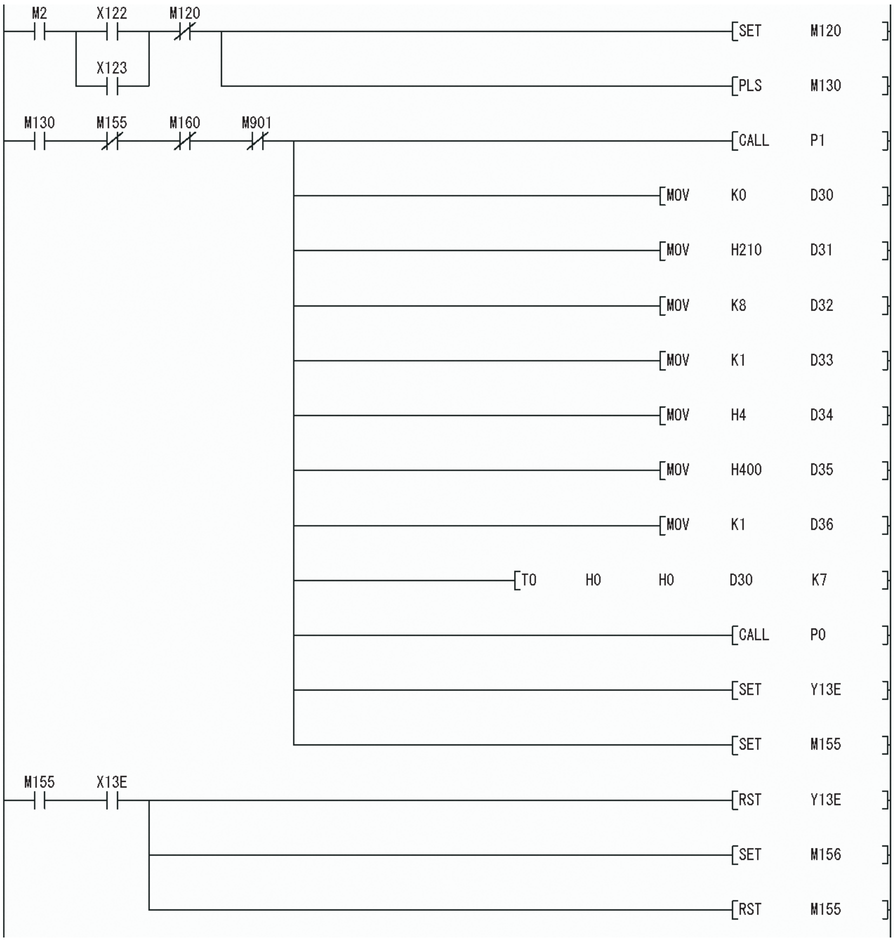
## 8.5.3 Precautions when receiving data from external device

### (1) Precautions for specification in byte units

The setting in Word/byte specification (R2N 102H) influences the number of the data handled by the following buffer memory areas.

- No. of receive end data (R2N 111H)
- No. of actual send data (R2N 1B4H)
- No. of data stored in OS reception area (R2N 1B6H)
- Send data size specification area (R2N 200H (at default))
- Receive data size specification area (R2N 400H (at default))

In the case of byte specification, to use any of the above memory values as set data of the FROM/TO instruction, the byte data must be changed to word data as shown below.



Refer to Section 8.2.3 (2)(a).

Reads No. of receive data (in byte units)

Refer to Section 8.2.3 (2)(a).

**Figure 8.19 Receive program example in the case of byte specification**

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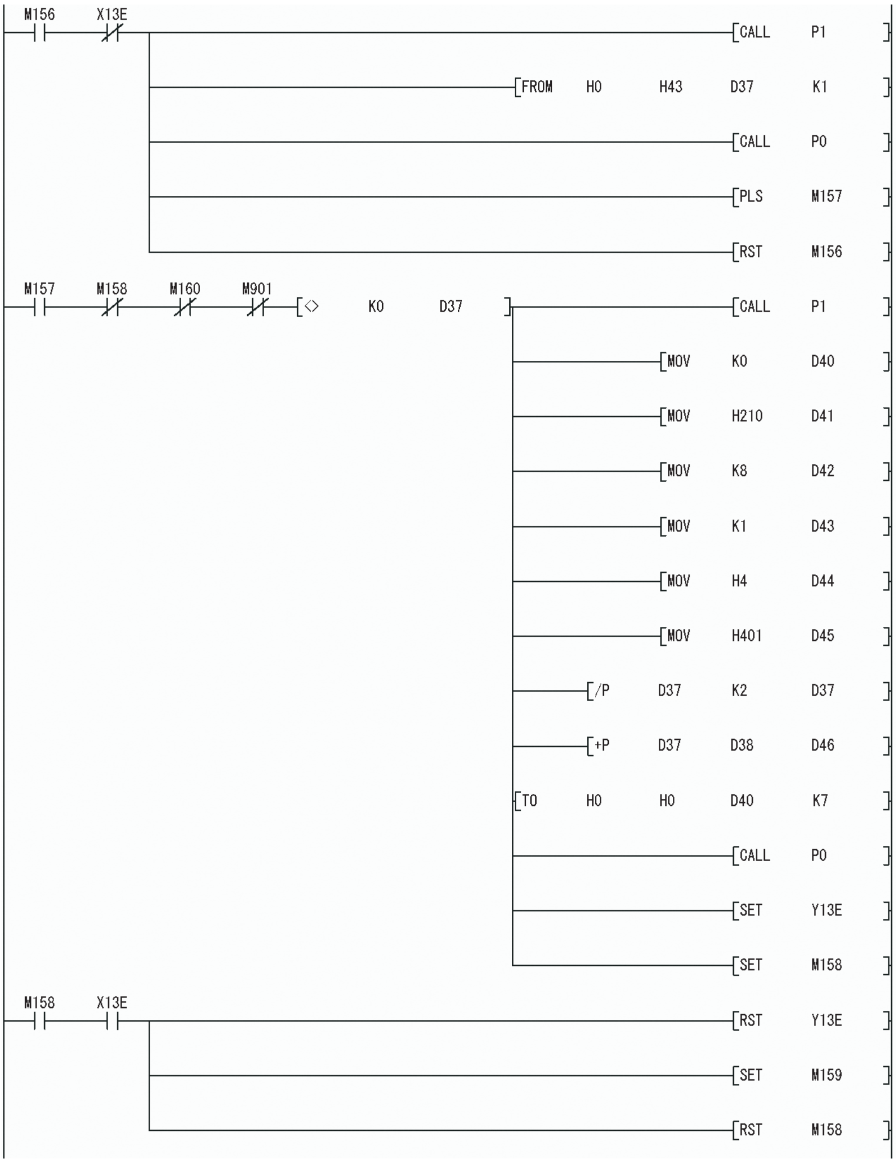

Refer to Section 8.2.3 (2)(a).

Refer to Section 8.2.3 (2)(a).

Refer to Section 8.2.3 (2)(a).

Changes No. of receive data (in byte units) to word units (fractions rounded up) and specifies as No. of read points in TO instruction

Refer to Section 8.2.3 (2)(a).

Figure 8.19 Receive program example in the case of byte specification (Continued)

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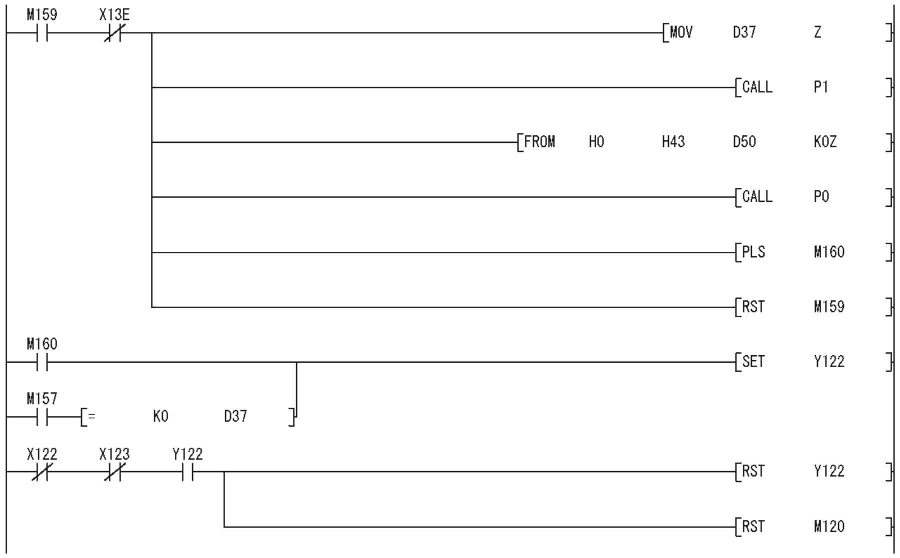

Refer to Section 8.2.3 (2)(a).

Refer to Section 8.2.3 (2)(a).

Figure 8.19 Receive program example in the case of byte specification (Continued)

## 8.6 Error Handling of AJ65BT-R2N

### 8.6.1 For the send/receive buffer communication function

(1) Overview of program example

1) When an error occurs during initialization setting or data transfer, an error code will be read out from the AJ65BT-R2N to the master module if Error code read flag (X23) is turned ON.

2) The error is canceled when Error clear flag (X24) is turned ON after the cause of the error has been eliminated.

(2) Program example processing description

1) If any of the signals below are turned ON and Error code read flag (X23) is turned ON, an error code will be read out from the AJ65BT-R2N to the master module.
   - Send failed signal (X121)
   - Error receive data read request signal (X123)
   - Initialization failed signal (X125)
   - $E^2$PROM function failed signal (X128)

2) If Error clear flag (X24) is turned ON after the cause of the error has been eliminated, Error reset request signal (RY(n+1)A) will be turned ON and the error will be cleared.

3) This turns off the ERR.LED, and error handling is complete when Error code storage area (R2N 1A8H to 1B2H) is cleared.

(3) Devices used in the program example

**Table 8.23 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X23 | Error code read flag | — | — |
| X24 | Error clear flag | — | — |
| X121 | Send failed signal | — | Section 8.4.1 |
| X123 | Error receive data read request signal | — | — |
| X125 | Initialization failed signal | — | Section 8.3.1 |
| X128 | $E^2$PROM function failed signal | — | — |
| X13A | Error status signal | Section 8.6.1 | — |
| X13E | Intelligent device station access completion signal | Section 8.6.1 | Section 8.3.1,<br>Section 8.4.1,<br>Section 8.5.1 |
| Y13A | Error reset request signal | Section 8.6.1 | — |
| Y13E | Intelligent device station access request signal | Section 8.6.1 | Section 8.3.1,<br>Section 8.4.1,<br>Section 8.5.1 |
| M3 | Operation failed flag | Section 8.6.1 | — |
| M20 | AJ65BT-R2N initial setting start flag | — | — |
| M30 | Operation failed pulse signal | Section 8.6.1 | — |

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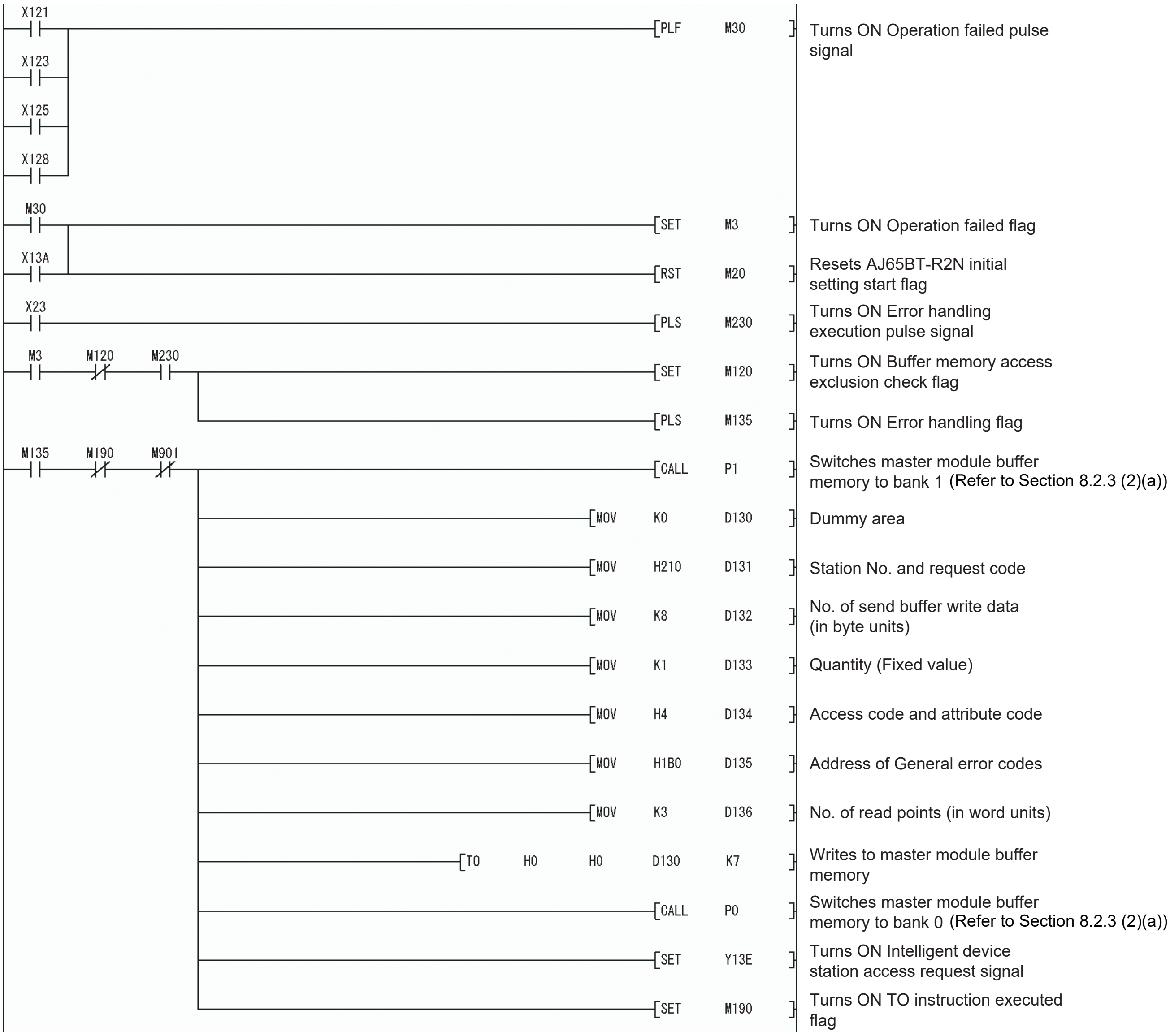
Table 8.23 Devices used in the program example (Continued)

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M120 | Buffer memory access exclusion check flag | Section 8.6.1 | Section 8.4.1,<br>Section 8.5.1 |
| M135 | Error handling flag | Section 8.6.1 | — |
| M190 | TO instruction executed flag | Section 8.6.1 | — |
| M191 | Intelligent device station access request completion flag | Section 8.6.1 | — |
| M230 | Error handling execution pulse signal | Section 8.6.1 | — |
| M901 | Other station data link status (Station No.2) | — | — |
| D130 to D136 | Control data of TO instruction | — | — |
| D137 to D139 | AJ65BT-R2N error code | — | — |
| P0 | Switching to bank 0 (executing sample program in Section 8.2.3 (2)(a)) | — | — |
| P1 | Switching to bank 1 (executing sample program in Section 8.2.3 (2)(a)) | — | — |

(4) Program example



Turns ON Operation failed pulse signal

Turns ON Operation failed flag

Resets AJ65BT-R2N initial setting start flag

Turns ON Error handling execution pulse signal

Turns ON Buffer memory access exclusion check flag

Turns ON Error handling flag

Switches master module buffer memory to bank 1 (Refer to Section 8.2.3 (2)(a))

Dummy area

Station No. and request code

No. of send buffer write data (in byte units)

Quantity (Fixed value)

Access code and attribute code

Address of General error codes

No. of read points (in word units)

Writes to master module buffer memory

Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a))

Turns ON Intelligent device station access request signal

Turns ON TO instruction executed flag

**Figure 8.20 Program example**

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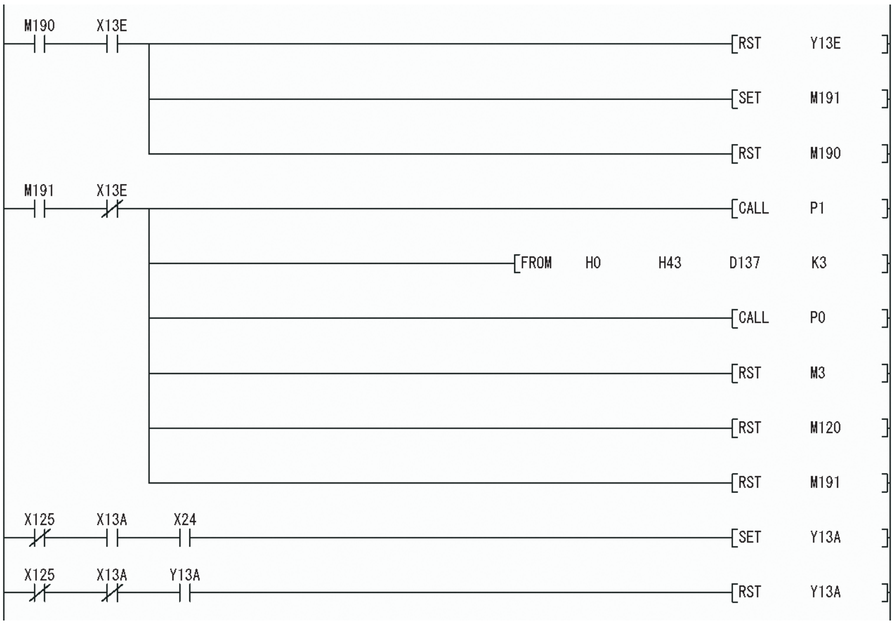


Resets Intelligent device station access request signal

Turns ON Intelligent device station access request completion flag

Resets TO instruction executed flag

Switches master module buffer memory to bank 1 (Refer to Section 8.2.3 (2)(a))

Reads from master module buffer memory

Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a))

Resets Operation failed flag

Resets Buffer memory access exclusion check flag

Resets Intelligent device station access request completion flag

Turns ON Error reset request signal

Resets Error reset request signal

Figure 8.20 Program example (Continued)

## 8.6.2 For the buffer memory auto-refresh function

(1) Overview of program example

1) When an error occurs during initialization setting or data transfer, an error code will be read out from the AJ65BT-R2N to the master module if Error code read flag (X23) is turned ON.

2) The error is canceled when Error clear flag (X24) is turned ON after the cause of the error has been eliminated.

(2) Processing in the program example

1) If any of the signals below are turned ON and Error code read flag (X23) is turned ON, an error code will be read out from the AJ65BT-R2N to the master module.
   - Send failed signal (X121)
   - Error receive data read request signal (X123)
   - Initialization failed signal (X125)
   - E$^2$PROM function failed signal (X128)

2) If Error clear flag (X24) is turned ON after the cause of the error has been eliminated, Error reset request signal (RY(n+1)A) will be turned ON and the error will be cleared.

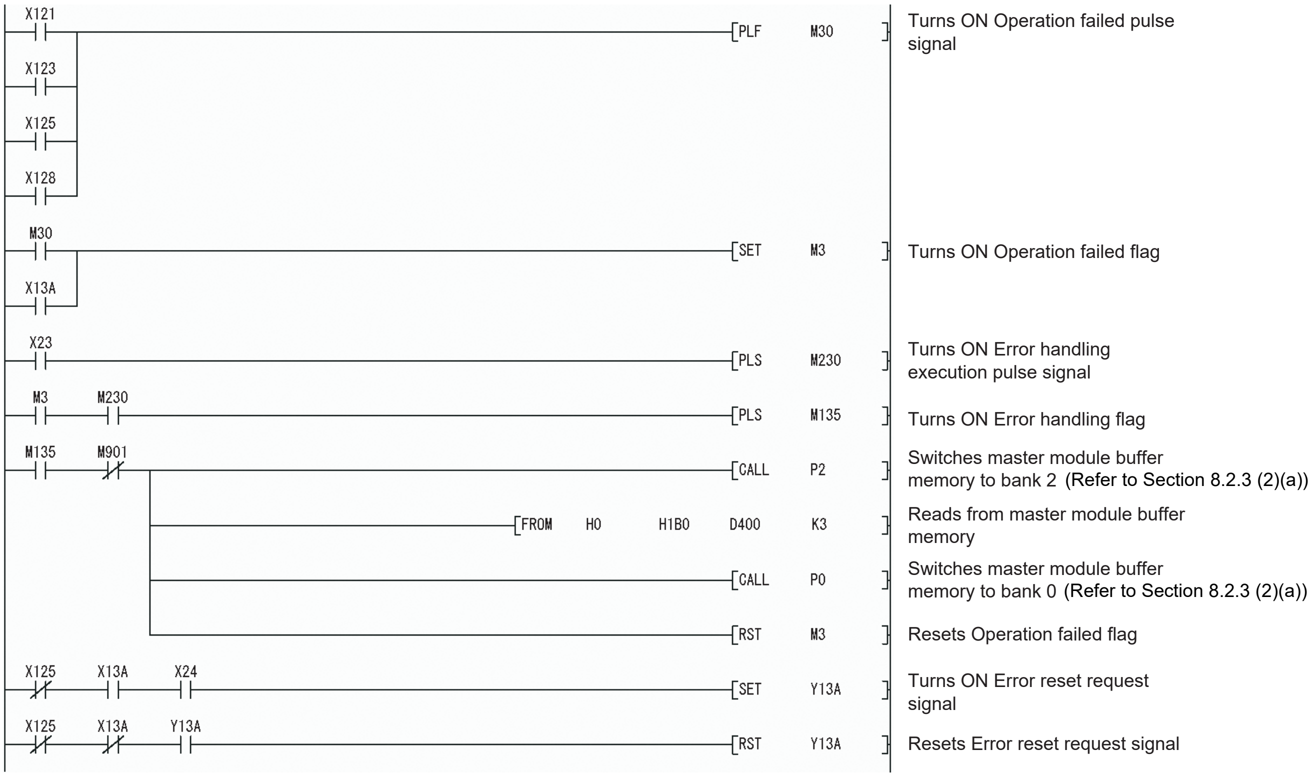
3) This turns off the ERR.LED, and error handling is complete when Error code storage area (R2N 1A8$_H$ to 1B2$_H$) is cleared.

(3) Devices used in the program example

**Table 8.24 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X23 | Error code read flag | — | — |
| X24 | Error clear flag | — | — |
| X121 | Send failed signal | — | Section 8.4.2 |
| X123 | Error receive data read request signal | — | — |
| X125 | Initialization failed signal | — | Section 8.3.2 |
| X128 | E$^2$PROM function failed signal | — | — |
| X13A | Error status signal | Section 8.6.2 | — |
| Y13A | Error reset request signal | Section 8.6.2 | — |
| M3 | Operation failed flag | Section 8.6.2 | — |
| M30 | Operation failed pulse signal | Section 8.6.2 | — |
| M135 | Error handling flag | Section 8.6.2 | — |
| M230 | Error handling execution pulse signal | Section 8.6.2 | — |
| M901 | Other station data link status (Station No.2) | — | — |
| D400 to D402 | AJ65BT-R2N error code | — | — |
| P0 | Switching to bank 0 (executing sample program in Section 8.2.3 (2)(a)) | — | — |
| P2 | Switching to bank 2 (executing sample program in Section 8.2.3 (2)(a)) | — | — |

(4) Program example



Turns ON Operation failed pulse signal

Turns ON Operation failed flag

Turns ON Error handling execution pulse signal

Turns ON Error handling flag

Switches master module buffer memory to bank 2 (Refer to Section 8.2.3 (2)(a))

Reads from master module buffer memory

Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a))

Resets Operation failed flag

Turns ON Error reset request signal

Resets Error reset request signal

Figure 8.21 Program example

## 8.7 Initial Settings for Other Functions

This section explains programs for the initial setting of the functions listed below.

**Table 8.25 List of other functions**

| Function | Reference section |
|---|---|
| Initial setting for the frame function | Section 8.7.1 |
| Initial setting for the monitoring-based transmission function | Section 8.7.2 |
| Initial setting for the flow control function | Section 8.7.3 |
| Initial setting for the ASCII-binary conversion function | Section 8.7.4 |
| Initial setting for the RW refresh function | Section 8.7.5 |

Only the initial setting program is extracted for each function.
When using each function, apply the extracted program to the program given in the following section.

☞ Section 8.3 Initial Setting for AJ65BT-R2N

**Remark**

(1) When using more than one of the above functions during use of the send/receive buffer communication function, modify the program as follows:
- Modify the program so that the following devices will not be duplicated.
  (a) Initial setting write completion flag (M1, M50, M53, M56)
  (b) TO instruction executed flag (M10, M51, M54, M57)
  (c) Intelligent device station access request completion flag (M11, M52, M55, M58)
- At the end of initial setting, turn ON Initial setting write completion flag (M1).

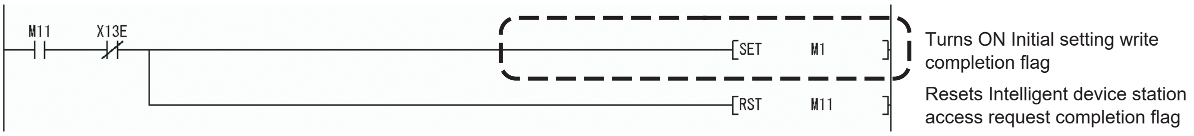


**Figure 8.22 Program executed only at the end of initial setting**

(2) When using more than one of the above functions during use of the buffer memory auto-refresh function, modify the program as follows:
- Have the program part enclosed as shown below, which is included in each program, executed one time at the end of all initial setting procedures.

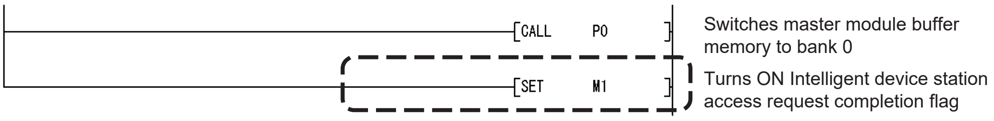


**Figure 8.23 Program executed only at the end of initial setting**

## 8.7.1 Initial setting for the frame function

### (1) For the send/receive buffer communication function

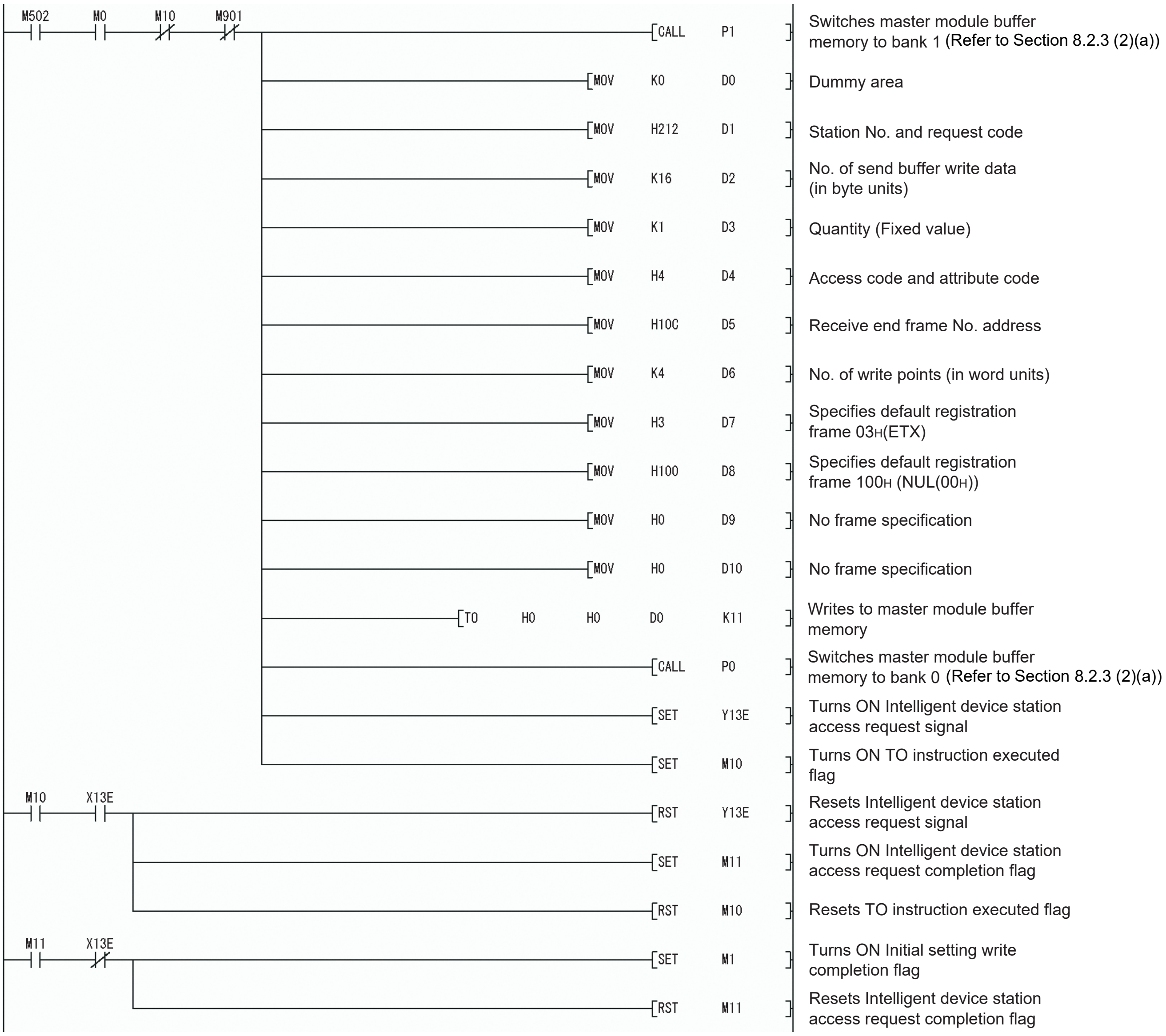
(a) Overview of program example
Reception is completed when ETX(03H) or NUL(00H) is received.

(b) Devices used in the program example

**Table 8.26 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X13E | Intelligent device station access completion signal | Section 8.7.1 | Section 8.3.1,<br>Section 8.4.1,<br>Section 8.5.1,<br>Section 8.6.1 |
| Y13E | Intelligent device station access request signal | Section 8.7.1 | Section 8.3.1,<br>Section 8.4.1,<br>Section 8.5.1,<br>Section 8.6.1 |
| M0 | Operation start request flag | — | Section 8.3.1 |
| M1 | Initial setting write completion flag | Section 8.7.1 | Section 8.3.1 |
| M10 | TO instruction executed flag | Section 8.7.1 | Section 8.3.1 |
| M11 | Intelligent device station access request completion flag | Section 8.7.1 | Section 8.3.1 |
| M502 | AJ65BT-R2N mode normal flag | — | Section 8.2.1 (3) 3 |
| M901 | Other station data link status (Station No.2) | — | — |
| D0 to D10 | Control data of TO instruction and Receive end frame No.1 to 4 | — | — |
| P0 | Switching to bank 0 (executing sample program in Section 8.2.3 (2)(a)) | — | — |
| P1 | Switching to bank 1 (executing sample program in Section 8.2.3 (2)(a)) | — | — |

(c) Program example



```
M502  M0  M10(b)  M901(b)
[CALL P1]            Switches master module buffer memory to bank 1 (Refer to Section 8.2.3 (2)(a))
[MOV K0 D0]          Dummy area
[MOV H212 D1]        Station No. and request code
[MOV K16 D2]         No. of send buffer write data (in byte units)
[MOV K1 D3]          Quantity (Fixed value)
[MOV H4 D4]          Access code and attribute code
[MOV H10C D5]        Receive end frame No. address
[MOV K4 D6]          No. of write points (in word units)
[MOV H3 D7]          Specifies default registration frame 03H(ETX)
[MOV H100 D8]        Specifies default registration frame 100H (NUL(00H))
[MOV H0 D9]          No frame specification
[MOV H0 D10]         No frame specification
[TO H0 H0 D0 K11]    Writes to master module buffer memory
[CALL P0]            Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a))
[SET Y13E]           Turns ON Intelligent device station access request signal
[SET M10]            Turns ON TO instruction executed flag
M10  X13E
[RST Y13E]           Resets Intelligent device station access request signal
[SET M11]            Turns ON Intelligent device station access request completion flag
[RST M10]            Resets TO instruction executed flag
M11  X13E(b)
[SET M1]             Turns ON Initial setting write completion flag
[RST M11]            Resets Intelligent device station access request completion flag
```

**Figure 8.24 Program example**

(2) For the buffer memory auto-refresh function

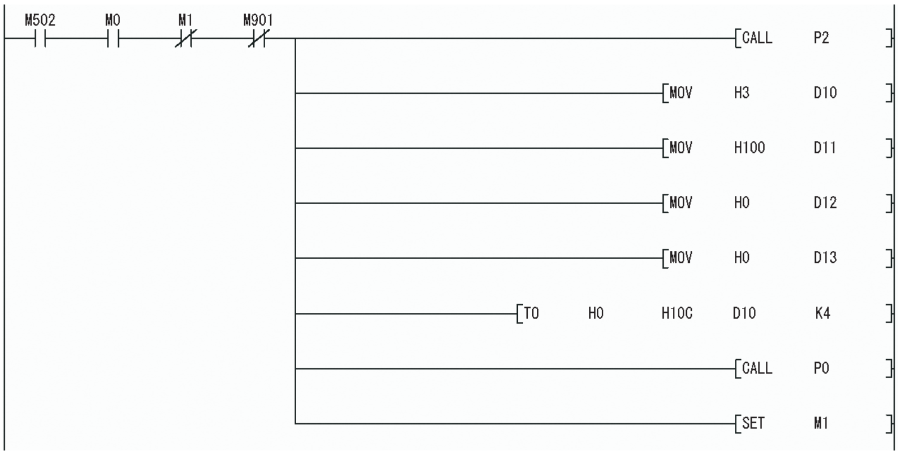
(a) Overview of program example
Reception is completed when ETX(03H) or NUL(00H) is received.

(b) Devices used in the program example

**Table 8.27 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 8.3.2 |
| M1 | Intelligent device station access request completion flag | Section 8.7.1 | Section 8.3.2 |
| M502 | AJ65BT-R2N mode normal flag | — | Section 8.2.2 (3) 3 |
| M901 | Other station data link status (Station No.2) | — | — |
| D10 to D13 | Receive end frame No.1 to 4 | — | — |
| P0 | Switching to bank 0 (executing sample program in Section 8.2.3 (2)(a)) | — | — |
| P2 | Switching to bank 2 (executing sample program in Section 8.2.3 (2)(a)) | — | — |

(c) Program example



Switches master module buffer memory to bank 2 (Refer to Section 8.2.3 (2)(a))

Specifies default registration frame 03H(ETX)

Specifies default registration frame 100H (NUL(00H))

No frame specification

No frame specification

Writes to master module buffer memory

Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a))

Turns ON Intelligent device station access request completion flag

Figure 8.25 Program example

## 8.7.2 Initial setting for the monitoring-based transmission function

(1) For the send/receive buffer communication function

(a) Overview of program example

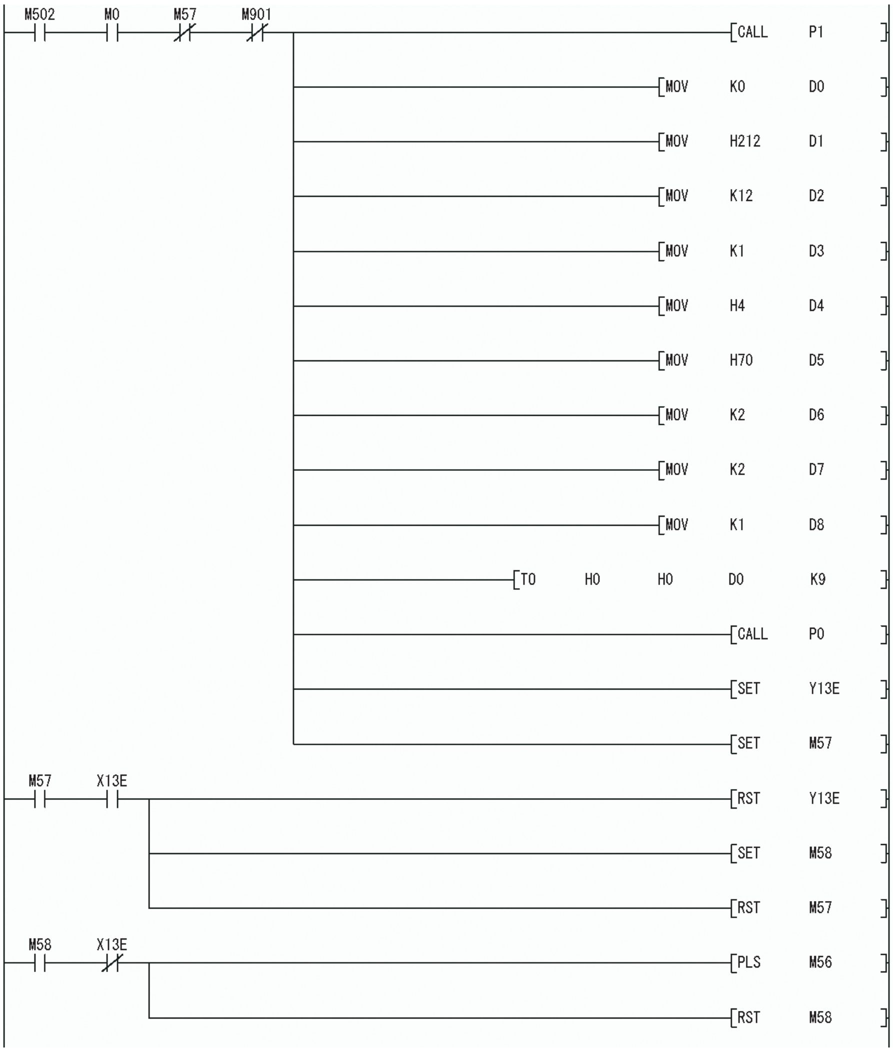
- The monitoring interval is set to 200ms and the send timeout time is set to 500ms.
- Data are sent when RX5 of the module of station No.1 turns ON.
- STX (02H) + User registration frame (3E8H) + ETX (03H) is set as the send data.

(b) Devices used in the program example

**Table 8.28 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X13E | Intelligent device station access completion signal | Section 8.7.2 | Section 8.3.1,<br>Section 8.4.1,<br>Section 8.5.1,<br>Section 8.6.1 |
| Y13E | Intelligent device station access request signal | Section 8.7.2 | Section 8.3.1,<br>Section 8.4.1,<br>Section 8.5.1,<br>Section 8.6.1 |
| M0 | Operation start request flag | — | Section 8.3.1 |
| M1 | Initial setting write completion flag | Section 8.7.2 | Section 8.3.1 |
| M10 | TO instruction executed flag | Section 8.7.2 | Section 8.3.1 |
| M11 | Intelligent device station access request completion flag | Section 8.7.2 | Section 8.3.1 |
| M50 | Initial setting write completion flag | Section 8.7.2 | — |
| M51 | TO instruction executed flag | Section 8.7.2 | — |
| M52 | Intelligent device station access request completion flag | Section 8.7.2 | — |
| M53 | Initial setting write completion flag | Section 8.7.2 | — |
| M54 | TO instruction executed flag | Section 8.7.2 | — |
| M55 | Intelligent device station access request completion flag | Section 8.7.2 | — |
| M56 | Initial setting write completion flag | Section 8.7.2 | — |
| M57 | TO instruction executed flag | Section 8.7.2 | — |
| M58 | Intelligent device station access request completion flag | Section 8.7.2 | — |
| M502 | AJ65BT-R2N mode normal flag | — | Section 8.2.1 (3) 3 |
| M901 | Other station data link status (Station No.2) | — | — |
| D0 to D11 | Control data of TO instruction and Monitoring-based transmission function set values | — | — |
| P0 | Switching to bank 0 (executing sample program in Section 8.2.3 (2)(a)) | — | — |
| P1 | Switching to bank 1 (executing sample program in Section 8.2.3 (2)(a)) | — | — |

(c) Program example



| | |
|---|---|
| [CALL P1] | Switches master module buffer memory to bank 1 (Refer to Section 8.2.3 (2)(a)) |
| [MOV K0 D0] | Dummy area |
| [MOV H212 D1] | Station No. and request code |
| [MOV K12 D2] | No. of send buffer write data (in byte units) |
| [MOV K1 D3] | Quantity (Fixed value) |
| [MOV H4 D4] | Access code and attribute code |
| [MOV H70 D5] | Monitoring interval specification address |
| [MOV K2 D6] | No. of write points (in word units) |
| [MOV K2 D7] | Specifies 200ms for Monitoring interval specification |
| [MOV K1 D8] | Specifies 1 for No. of monitoring settings |
| [TO H0 H0 D0 K9] | Writes to master module buffer memory |
| [CALL P0] | Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a)) |
| [SET Y13E] | Turns ON Intelligent device station access request signal |
| [SET M57] | Turns ON TO instruction executed flag |
| [RST Y13E] | Resets Intelligent device station access request signal |
| [SET M58] | Turns ON Intelligent device station access request completion flag |
| [RST M57] | Resets TO instruction executed flag |
| [PLS M56] | Turns ON Initial setting write completion flag |
| [RST M58] | Resets Intelligent device station access request completion flag |

**Figure 8.26 Program example**

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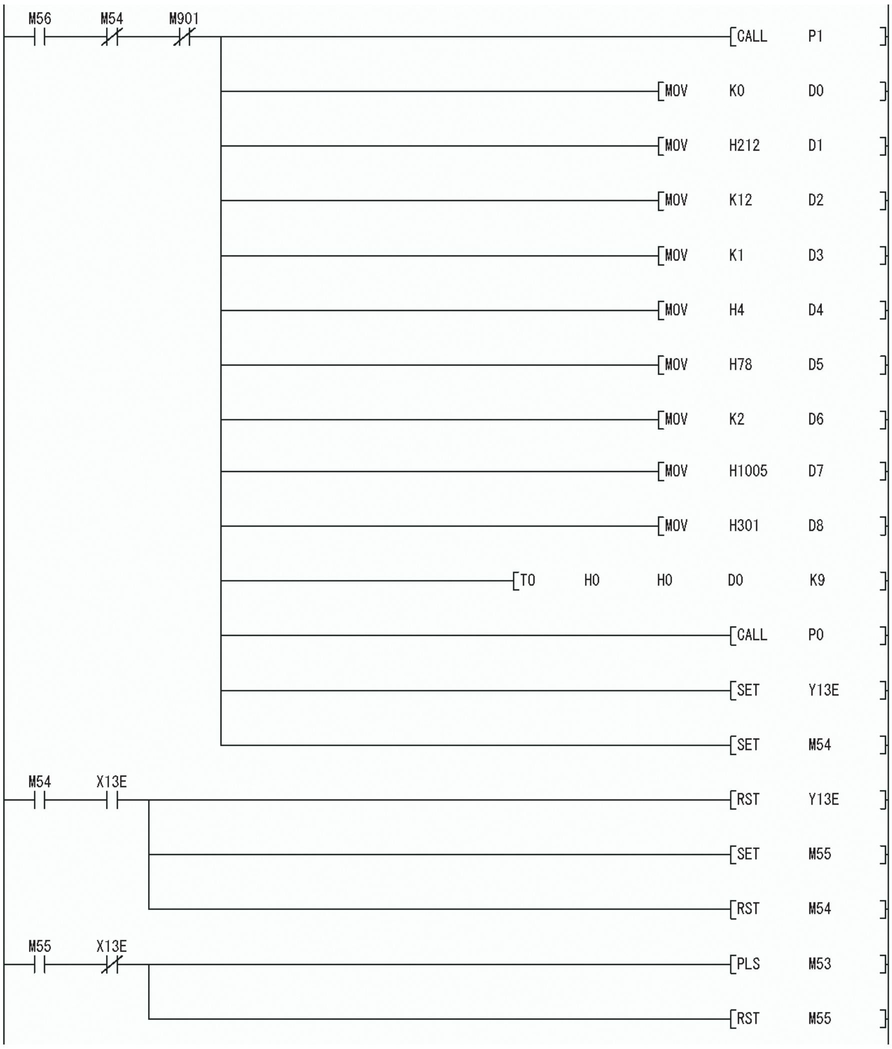

| | |
|---|---|
| [CALL P1] | Switches master module buffer memory to bank 1 (Refer to Section 8.2.3 (2)(a)) |
| [MOV K0 D0] | Dummy area |
| [MOV H212 D1] | Station No. and request code |
| [MOV K12 D2] | No. of send buffer write data (in byte units) |
| [MOV K1 D3] | Quantity (Fixed value) |
| [MOV H4 D4] | Access code and attribute code |
| [MOV H78 D5] | Monitoring target address |
| [MOV K2 D6] | No. of write points (in word units) |
| [MOV H1005 D7] | Specifies RX5 of station No.1 as monitoring target |
| [MOV H301 D8] | Specifies start number (1) and No. of transmission tables (3) for send data specification |
| [TO H0 H0 D0 K9] | Writes to master module buffer memory |
| [CALL P0] | Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a)) |
| [SET Y13E] | Turns ON Intelligent device station access request signal |
| [SET M54] | Turns ON TO instruction executed flag |
| [RST Y13E] | Resets Intelligent device station access request signal |
| [SET M55] | Turns ON Intelligent device station access request completion flag |
| [RST M54] | Resets TO instruction executed flag |
| [PLS M53] | Turns ON Initial setting write completion flag |
| [RST M55] | Resets Intelligent device station access request completion flag |

Figure 8.26 Program example (Continued)

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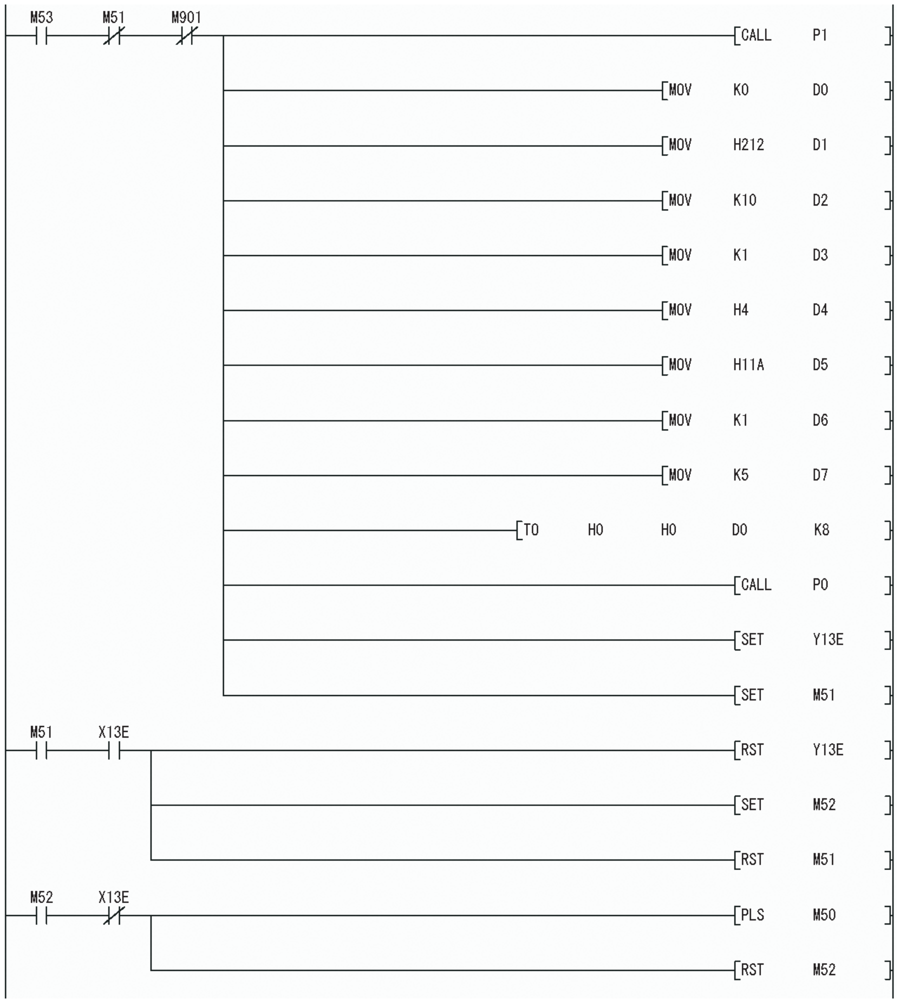

Switches master module buffer memory to bank 1 (Refer to Section 8.2.3 (2)(a))

Dummy area

Station No. and request code

No. of send buffer write data (in byte units)

Quantity (Fixed value)

Access code and attribute code

Send timeout time specification

No. of write points (in word units)

Specifies 500ms for Send timeout time specification

Writes to master module buffer memory

Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a))

Turns ON Intelligent device station access request signal

Turns ON TO instruction executed flag

Resets Intelligent device station access request signal

Turns ON Intelligent device station access request completion flag

Resets TO instruction executed flag

Turns ON Initial setting write completion flag

Resets Intelligent device station access request completion flag

Figure 8.26 Program example (Continued)

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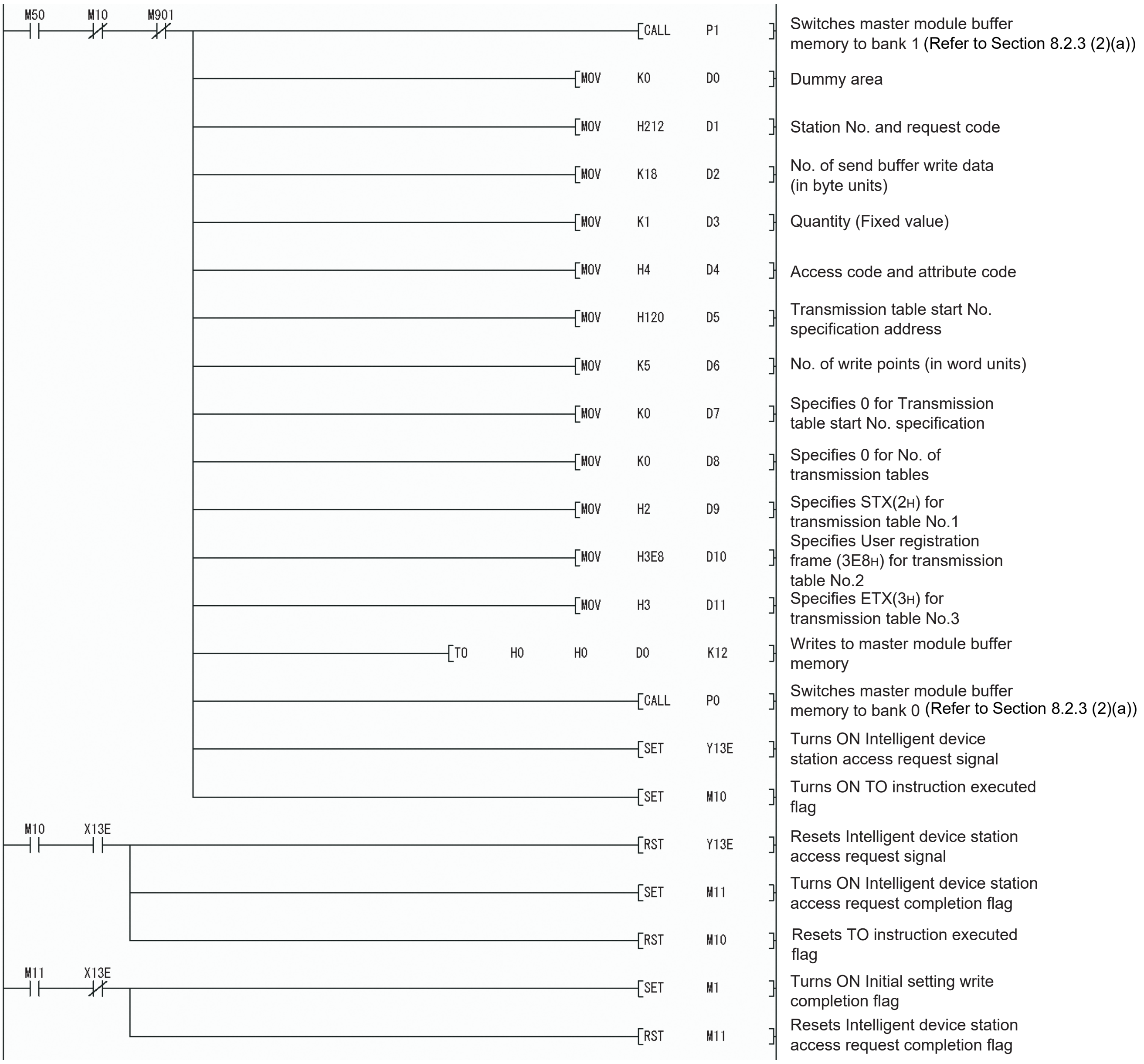


| | |
|---|---|
| [CALL P1] | Switches master module buffer memory to bank 1 (Refer to Section 8.2.3 (2)(a)) |
| [MOV K0 D0] | Dummy area |
| [MOV H212 D1] | Station No. and request code |
| [MOV K18 D2] | No. of send buffer write data (in byte units) |
| [MOV K1 D3] | Quantity (Fixed value) |
| [MOV H4 D4] | Access code and attribute code |
| [MOV H120 D5] | Transmission table start No. specification address |
| [MOV K5 D6] | No. of write points (in word units) |
| [MOV K0 D7] | Specifies 0 for Transmission table start No. specification |
| [MOV K0 D8] | Specifies 0 for No. of transmission tables |
| [MOV H2 D9] | Specifies STX(2H) for transmission table No.1 |
| [MOV H3E8 D10] | Specifies User registration frame (3E8H) for transmission table No.2 |
| [MOV H3 D11] | Specifies ETX(3H) for transmission table No.3 |
| [TO H0 H0 D0 K12] | Writes to master module buffer memory |
| [CALL P0] | Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a)) |
| [SET Y13E] | Turns ON Intelligent device station access request signal |
| [SET M10] | Turns ON TO instruction executed flag |
| [RST Y13E] | Resets Intelligent device station access request signal |
| [SET M11] | Turns ON Intelligent device station access request completion flag |
| [RST M10] | Resets TO instruction executed flag |
| [SET M1] | Turns ON Initial setting write completion flag |
| [RST M11] | Resets Intelligent device station access request completion flag |

Figure 8.26 Program example (Continued)

(2) For the buffer memory auto-refresh function

(a) Overview of program example

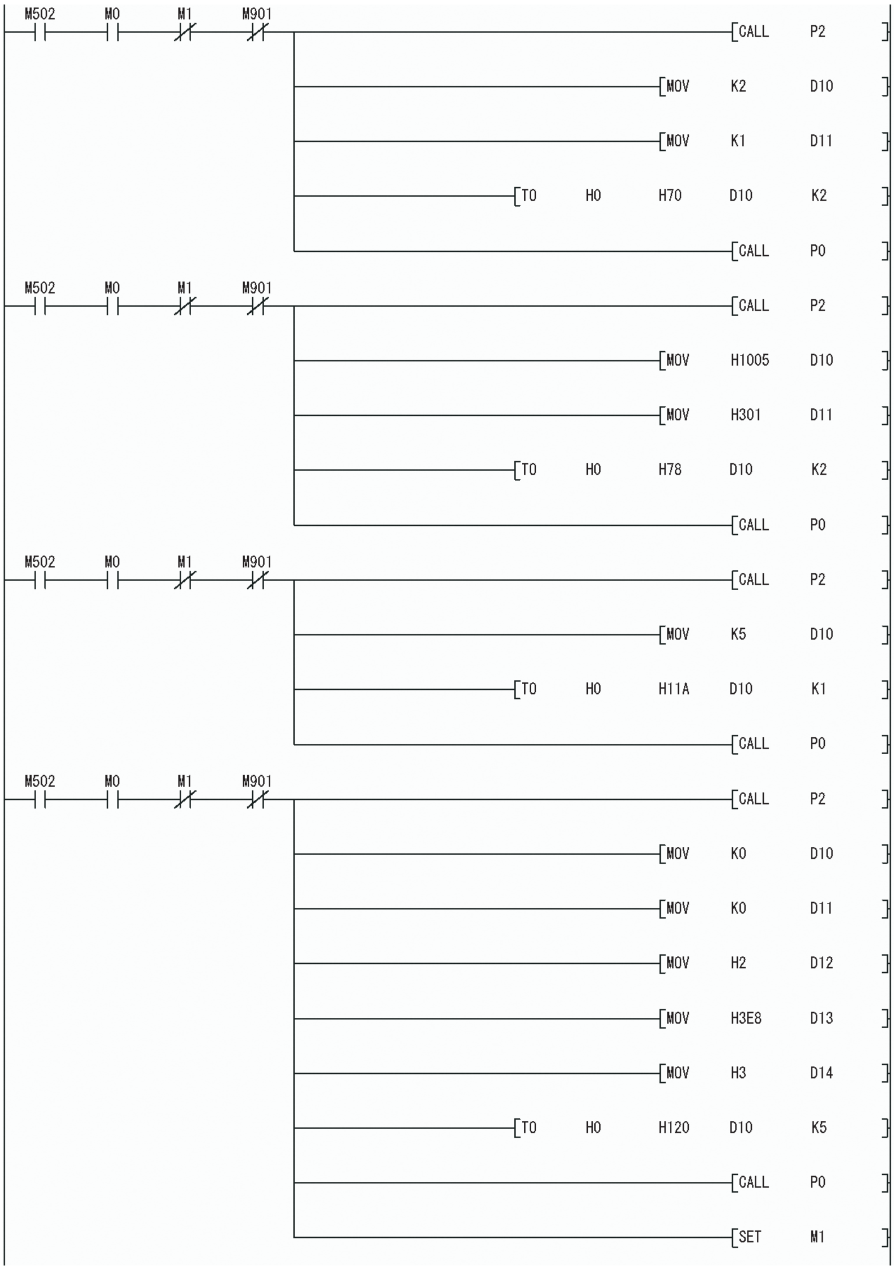
- The monitoring interval is set to 200ms and the send timeout time is set to 500ms.
- Data are sent when RX5 of the module of station No.1 turns ON.
- STX (02H) + User registration frame (3E8H) + ETX (03H) is set as the send data.

(b) Devices used in the program example

**Table 8.29 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 8.3.2 |
| M1 | Intelligent device station access request completion flag | Section 8.7.2 | Section 8.3.2 |
| M502 | AJ65BT-R2N mode normal flag | — | Section 8.2.2 (3) 3 |
| M901 | Other station data link status (Station No.2) | — | — |
| D10 to D14 | Monitoring-based transmission function set values | — | — |
| P0 | Switching to bank 0 (executing sample program in Section 8.2.3 (2)(a)) | — | — |
| P2 | Switching to bank 2 (executing sample program in Section 8.2.3 (2)(a)) | — | — |

(c) Program example



| | |
|---|---|
| [CALL P2] | Switches master module buffer memory to bank 2 (Refer to Section 8.2.3 (2)(a)) |
| [MOV K2 D10] | Specifies 200ms for Monitoring interval specification |
| [MOV K1 D11] | Specifies 1 for No. of monitoring settings |
| [TO H0 H70 D10 K2] | Writes to master module buffer memory |
| [CALL P0] | Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a)) |
| [CALL P2] | Switches master module buffer memory to bank 2 (Refer to Section 8.2.3 (2)(a)) |
| [MOV H1005 D10] | Specifies RX5 of station No.1 as monitoring target |
| [MOV H301 D11] | Specifies start number (1) and No. of transmission tables (3) for Send data specification |
| [TO H0 H78 D10 K2] | Writes to master module buffer memory |
| [CALL P0] | Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a)) |
| [CALL P2] | Switches master module buffer memory to bank 2 (Refer to Section 8.2.3 (2)(a)) |
| [MOV K5 D10] | Specifies 500ms for Send timeout time specification |
| [TO H0 H11A D10 K1] | Writes to master module buffer memory |
| [CALL P0] | Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a)) |
| [CALL P2] | Switches master module buffer memory to bank 2 (Refer to Section 8.2.3 (2)(a)) |
| [MOV K0 D10] | Specifies 0 for Transmission table start No. specification |
| [MOV K0 D11] | Specifies 0 for No. of transmission tables |
| [MOV H2 D12] | Specifies STX(2H) for transmission table No.1 |
| [MOV H3E8 D13] | Specifies User registration frame (3E8H) for transmission table No.2 |
| [MOV H3 D14] | Specifies ETX(3H) for transmission table No.3 |
| [TO H0 H120 D10 K5] | Writes to master module buffer memory |
| [CALL P0] | Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a)) |
| [SET M1] | Turns ON Intelligent device station access request completion flag |

**Figure 8.27 Program example**

## 8.7.3 Initial setting for the flow control function

### (1) For the send/receive buffer communication function

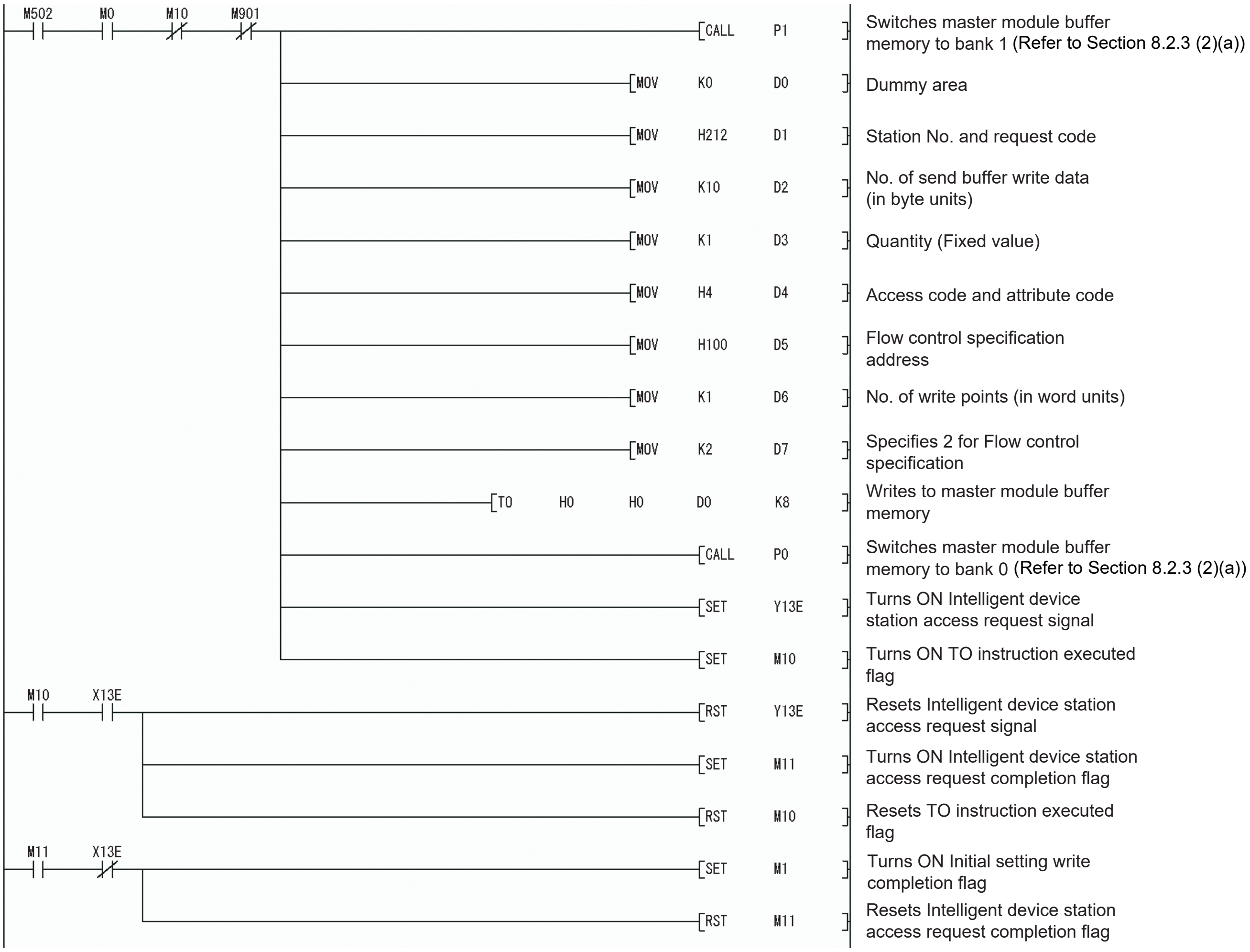
(a) Overview of program example
The flow control is performed by the DC code control.

(b) Devices used in the program example

**Table 8.30 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X13E | Intelligent device station access completion signal | Section 8.7.3 | Section 8.3.1,<br>Section 8.4.1,<br>Section 8.5.1,<br>Section 8.6.1 |
| Y13E | Intelligent device station access request signal | Section 8.7.3 | Section 8.3.1,<br>Section 8.4.1,<br>Section 8.5.1,<br>Section 8.6.1 |
| M0 | Operation start request flag | — | Section 8.3.1 |
| M1 | Initial setting write completion flag | Section 8.7.3 | Section 8.3.1 |
| M10 | TO instruction executed flag | Section 8.7.3 | Section 8.3.1 |
| M11 | Intelligent device station access request completion flag | Section 8.7.3 | Section 8.3.1 |
| M502 | AJ65BT-R2N mode normal flag | — | Section 8.2.1 (3) 3 |
| M901 | Other station data link status (Station No.2) | — | — |
| D0 to D7 | Control data of TO instruction and the flow control function set value | — | — |
| P0 | Switching to bank 0 (executing sample program in Section 8.2.3 (2)(a)) | — | — |
| P1 | Switching to bank 1 (executing sample program in Section 8.2.3 (2)(a)) | — | — |

(c) Program example



[CALL P1] Switches master module buffer memory to bank 1 (Refer to Section 8.2.3 (2)(a))

[MOV K0 D0] Dummy area

[MOV H212 D1] Station No. and request code

[MOV K10 D2] No. of send buffer write data (in byte units)

[MOV K1 D3] Quantity (Fixed value)

[MOV H4 D4] Access code and attribute code

[MOV H100 D5] Flow control specification address

[MOV K1 D6] No. of write points (in word units)

[MOV K2 D7] Specifies 2 for Flow control specification

[TO H0 H0 D0 K8] Writes to master module buffer memory

[CALL P0] Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a))

[SET Y13E] Turns ON Intelligent device station access request signal

[SET M10] Turns ON TO instruction executed flag

[RST Y13E] Resets Intelligent device station access request signal

[SET M11] Turns ON Intelligent device station access request completion flag

[RST M10] Resets TO instruction executed flag

[SET M1] Turns ON Initial setting write completion flag

[RST M11] Resets Intelligent device station access request completion flag

**Figure 8.28 Program example**

(2) For the buffer memory auto-refresh function

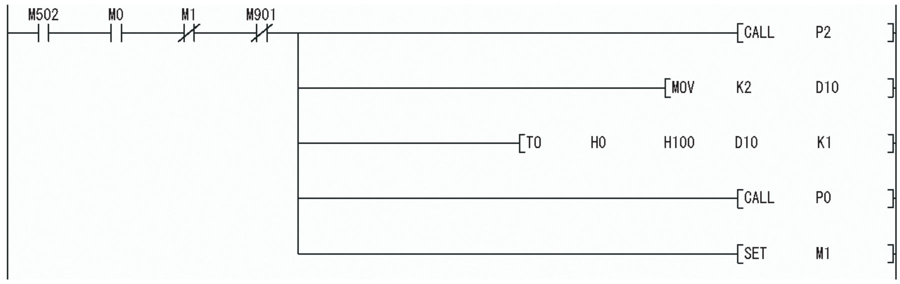
(a) Overview of program example
The flow control is performed by the DC code control.

(b) Devices used in the program example

**Table 8.31 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 8.3.2 |
| M1 | Intelligent device station access request completion flag | Section 8.7.3 | Section 8.3.2 |
| M502 | AJ65BT-R2N mode normal flag | — | Section 8.2.2 (3) 3 |
| M901 | Other station data link status (Station No.2) | — | — |
| D10 | Flow control function set value | — | — |
| P0 | Switching to bank 0 (executing sample program in Section 8.2.3 (2)(a)) | — | — |
| P2 | Switching to bank 2 (executing sample program in Section 8.2.3 (2)(a)) | — | — |

(c) Program example



Switches master module buffer memory to bank 2 (Refer to Section 8.2.3 (2)(a))

Specifies 2 for Flow control specification

Writes to master module buffer memory

Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a))

Turns ON Intelligent device station access request completion flag

**Figure 8.29 Program example**

## 8.7.4 Initial setting for the ASCII-binary conversion function

(1) For the send/receive buffer communication function

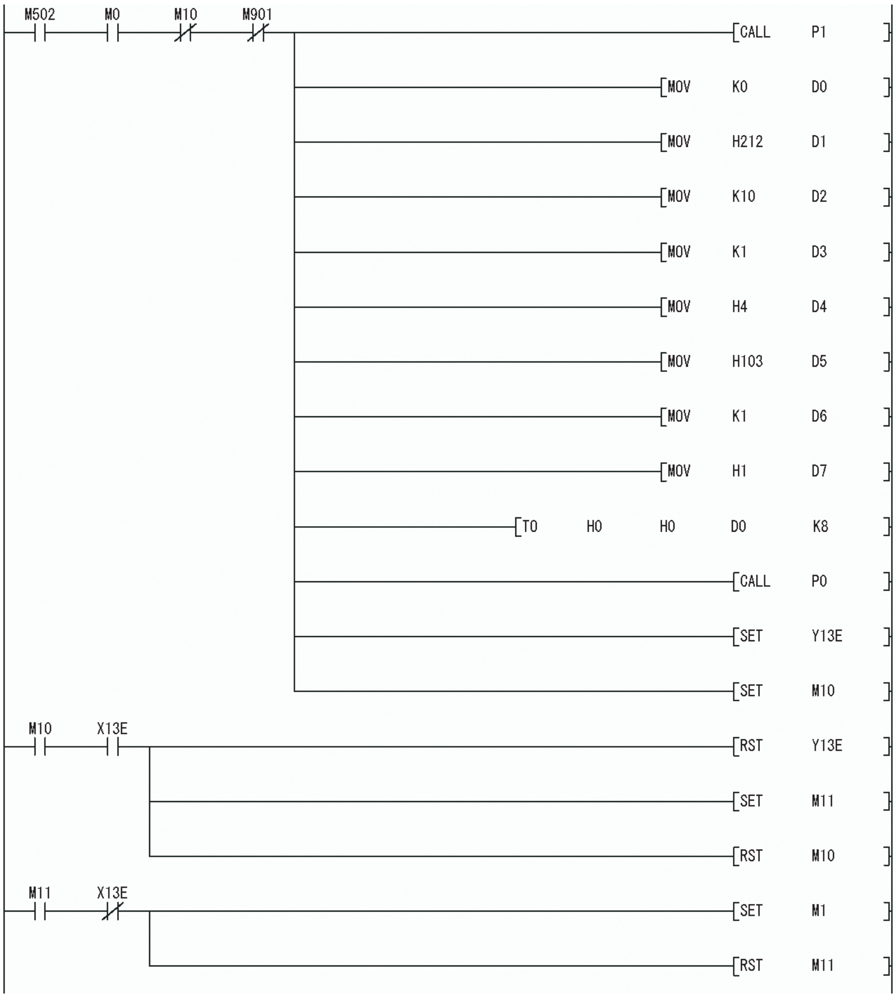
(a) Overview of program example
The ASCII-binary conversion function is used.

(b) Devices used in the program example

**Table 8.32 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X13E | Intelligent device station access completion signal | Section 8.7.4 | Section 8.3.1,<br>Section 8.4.1,<br>Section 8.5.1,<br>Section 8.6.1 |
| Y13E | Intelligent device station access request signal | Section 8.7.4 | Section 8.3.1,<br>Section 8.4.1,<br>Section 8.5.1,<br>Section 8.6.1 |
| M0 | Operation start request flag | — | Section 8.3.1 |
| M1 | Initial setting write completion flag | Section 8.7.4 | Section 8.3.1 |
| M10 | TO instruction executed flag | Section 8.7.4 | Section 8.3.1 |
| M11 | Intelligent device station access request completion flag | Section 8.7.4 | Section 8.3.1 |
| M502 | AJ65BT-R2N mode normal flag | — | Section 8.2.1 (3) 3 |
| M901 | Other station data link status (Station No.2) | — | — |
| D0 to D7 | Control data of TO instruction and ASCII-binary conversion function set value | — | — |
| P0 | Switching to bank 0 (executing sample program in Section 8.2.3 (2)(a)) | — | — |
| P1 | Switching to bank 1 (executing sample program in Section 8.2.3 (2)(a)) | — | — |

(c) Program example



Switches master module buffer memory to bank 1 (Refer to Section 8.2.3 (2)(a))

Dummy area

Station No. and request code

No. of send buffer write data (in byte units)

Quantity (Fixed value)

Access code and attribute code

ASCII-binary conversion specification address

No. of write points (in word units)

Specifies 1 for ASCII-binary conversion specification

Writes to master module buffer memory

Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a))

Turns ON Intelligent device station access request signal

Turns ON TO instruction executed flag

Resets Intelligent device station access request signal

Turns ON Intelligent device station access request completion flag

Resets TO instruction executed flag

Turns ON Initial setting write completion flag

Resets Intelligent device station access request completion flag

**Figure 8.30 Program example**

(2) For the buffer memory auto-refresh function

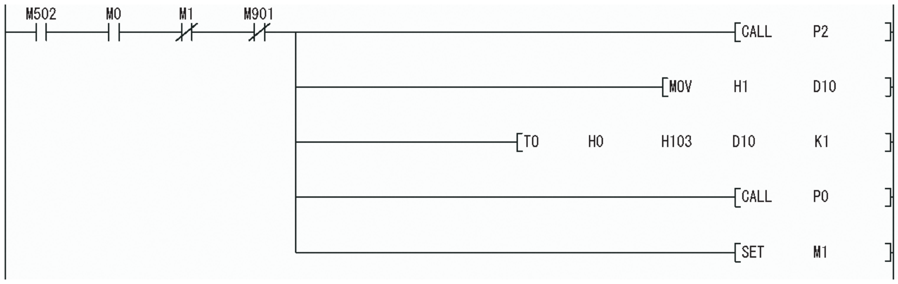
(a) Overview of program example
The ASCII-binary conversion function is used.

(b) Devices used in the program example

**Table 8.33 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 8.3.2 |
| M1 | Intelligent device station access request completion flag | Section 8.7.4 | Section 8.3.2 |
| M502 | AJ65BT-R2N mode normal flag | — | Section 8.2.2 (3) 3 |
| M901 | Other station data link status (Station No.2) | — | — |
| D10 | ASCII-binary conversion function set value | — | — |
| P0 | Switching to bank 0 (executing sample program in Section 8.2.3 (2)(a)) | — | — |
| P2 | Switching to bank 2 (executing sample program in Section 8.2.3 (2)(a)) | — | — |

(c) Program example



Switches master module buffer memory to bank 2 (Refer to Section 8.2.3 (2)(a))

Specifies 1 for ASCII-binary conversion specification

Writes to master module buffer memory

Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a))

Turns ON Intelligent device station access request completion flag

**Figure 8.31 Program example**

## 8.7.5 Initial setting for the RW refresh function

### (1) For the send/receive buffer communication function

(a) Overview of program examples

- The remote register (RW) assignments are changed to those listed below so that the assigned buffer memories can be monitored.

**Table 8.34 Devices used in the program example**

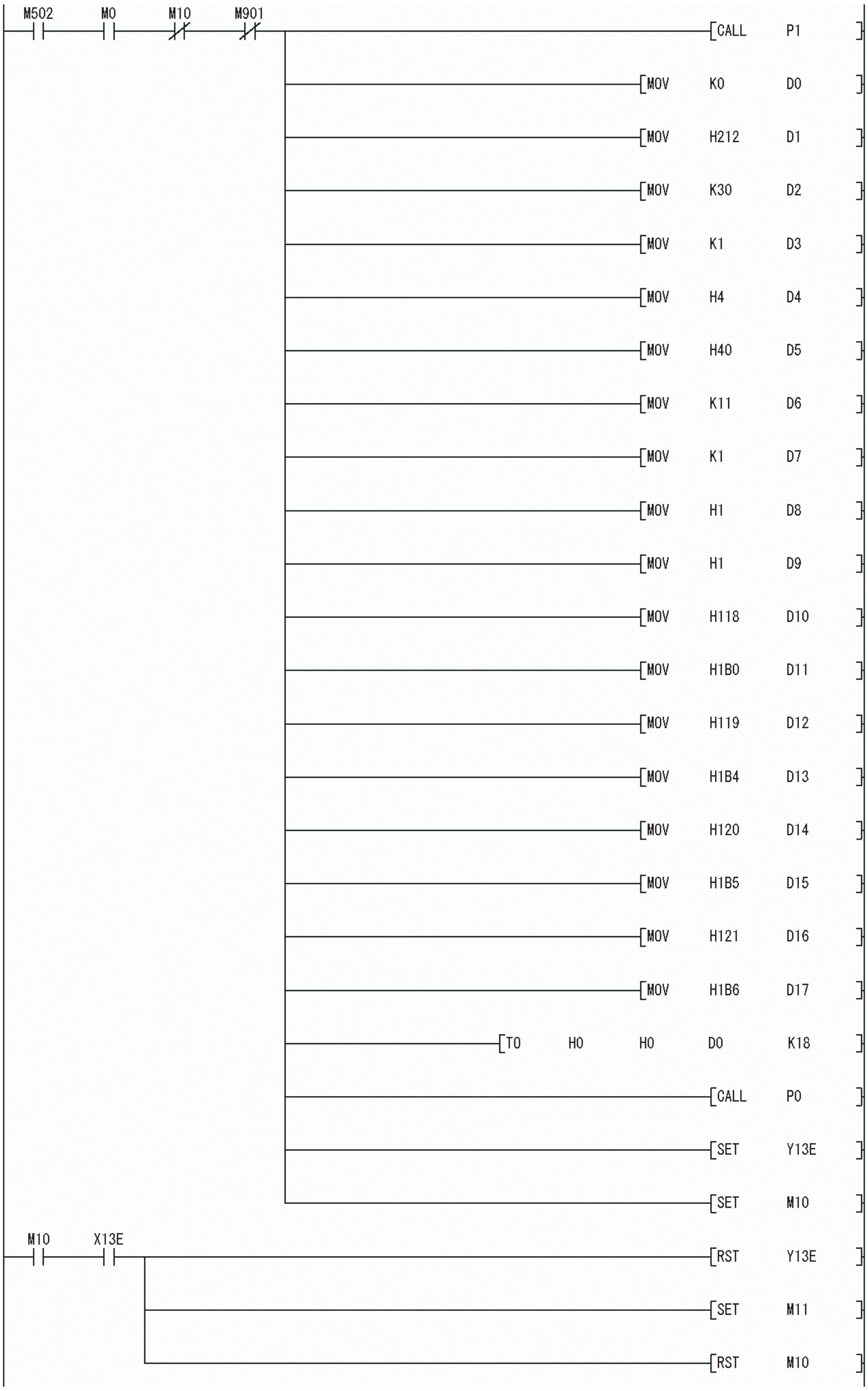
| Device | Buffer memory | Device | Buffer memory |
|---|---|---|---|
| RWrm | General error codes (R2N 1B0$_{H}$) | RWwm | Send start frame No. (R2N 118$_{H}$) |
| RWr(m+1) | No. of actual send data (R2N 1B4$_{H}$) | RWw(m+1) | Send end frame No. (R2N 119$_{H}$) |
| RWr(m+2) | Receive frame index No. storage (R2N 1B5$_{H}$) | RWw(m+2) | Transmission table start No. specification (R2N 120$_{H}$) |
| RWr(m+3) | No. of data stored in OS reception area (R2N 1B6$_{H}$) | RWw(m+3) | No. of transmission tables (R2N 121$_{H}$) |

(b) Devices used in the program example

**Table 8.35 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X13E | Intelligent device station access completion signal | Section 8.7.5 | Section 8.3.1,<br>Section 8.4.1,<br>Section 8.5.1,<br>Section 8.6.1 |
| Y13E | Intelligent device station access request signal | Section 8.7.5 | Section 8.3.1,<br>Section 8.4.1,<br>Section 8.5.1,<br>Section 8.6.1 |
| M0 | Operation start request flag | — | Section 8.3.1 |
| M1 | Initial setting write completion flag | Section 8.7.5 | Section 8.3.1 |
| M10 | TO instruction executed flag | Section 8.7.5 | Section 8.3.1 |
| M11 | Intelligent device station access request completion flag | Section 8.7.5 | Section 8.3.1 |
| M502 | AJ65BT-R2N mode normal flag | — | Section 8.2.1 (3) 3 |
| M901 | Other station data link status (Station No.2) | — | — |
| D0 to D17 | Control data of TO instruction and RW refresh function set value | — | — |
| P0 | Switching to bank 0 (executing sample program in Section 8.2.3 (2)(a)) | — | — |
| P1 | Switching to bank 1 (executing sample program in Section 8.2.3 (2)(a)) | — | — |

(c) Program example



| | |
|---|---|
| [CALL P1] | Switches master module buffer memory to bank 1 (Refer to Section 8.2.3 (2)(a)) |
| [MOV K0 D0] | Dummy area |
| [MOV H212 D1] | Station No. and request code |
| [MOV K30 D2] | No. of send buffer write data (in byte units) |
| [MOV K1 D3] | Quantity (Fixed value) |
| [MOV H4 D4] | Access code and attribute code |
| [MOV H40 D5] | RW refresh interval specification address |
| [MOV K11 D6] | No. of write points (in word units) |
| [MOV K1 D7] | Specifies 100ms for RW refresh interval specification |
| [MOV H1 D8] | Specifies Enable for RWw refresh enable/disable setting |
| [MOV H1 D9] | Specifies Enable for RWr refresh enable/disable setting |
| [MOV H118 D10] | Specifies Send start frame No. (R2N 118H) for RWwm |
| [MOV H1B0 D11] | Specifies General error codes (R2N 1B0H) for RWrm |
| [MOV H119 D12] | Specifies Send end frame No. (R2N 119H) for RWw(m+1) |
| [MOV H1B4 D13] | Assigns No. of actual send data (R2N 1B4H) to RWr(m+1) |
| [MOV H120 D14] | Specifies Transmission table start No. specification (R2N 120H) for RWw(m+2) |
| [MOV H1B5 D15] | Assigns Receive frame index No. storage (R2N 1B5H) to RWr(m+2) |
| [MOV H121 D16] | Specifies No. of transmission tables (R2N 121H) for RWw(m+3) |
| [MOV H1B6 D17] | Specifies No. of data stored in OS reception area (R2N 1B6H) for RWr(m+3) |
| [TO H0 H0 D0 K18] | Writes to master module buffer memory |
| [CALL P0] | Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a)) |
| [SET Y13E] | Turns ON Intelligent device station access request signal |
| [SET M10] | Turns ON TO instruction executed flag |
| [RST Y13E] | Resets Intelligent device station access request signal |
| [SET M11] | Turns ON Intelligent device station access request completion flag |
| [RST M10] | Resets TO instruction executed flag |

Figure 8.32 Program example

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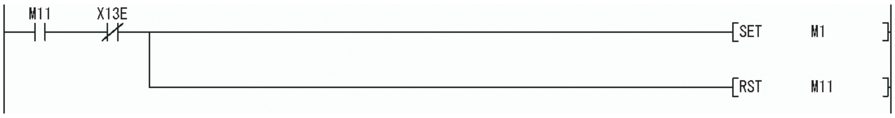


Turns ON Initial setting write completion flag

Resets Intelligent device station access request completion flag

Figure 8.32 Program example (Continued)

### (2) For the buffer memory auto-refresh function

#### (a) Overview of program example

- The remote register (RW) assignments are changed to those listed below so that the assigned buffer memories can be monitored.

**Table 8.36 Devices used in the program example**

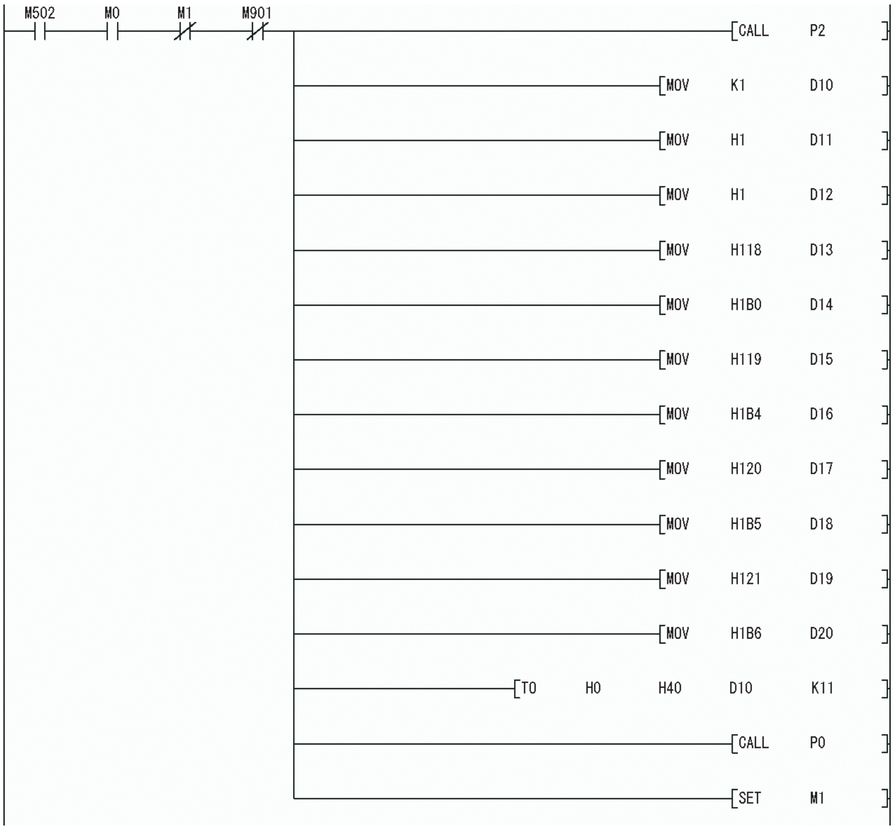
| Device | Buffer memory | Device | Buffer memory |
|---|---|---|---|
| RWrm | General error codes (R2N 1B0H) | RWwm | Send start frame No. (R2N 118H) |
| RWr(m+1) | No. of actual send data (R2N 1B4H) | RWw(m+1) | Send end frame No. (R2N 119H) |
| RWr(m+2) | Receive frame index No. storage (R2N 1B5H) | RWw(m+2) | Transmission table start No. specification (R2N 120H) |
| RWr(m+3) | No. of data stored in OS reception area (R2N 1B6H) | RWw(m+3) | No. of transmission tables (R2N 121H) |

#### (b) Devices used in the program example

**Table 8.37 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| M0 | Operation start request flag | — | Section 8.3.2 |
| M1 | Intelligent device station access request completion flag | Section 8.7.5 | Section 8.3.2 |
| M502 | AJ65BT-R2N mode normal flag | — | Section 8.2.2 (3) 3 |
| M901 | Other station data link status (Station No.2) | — | — |
| D10 to D20 | RW refresh function set value | — | — |
| P0 | Switching to bank 0 (executing sample program in Section 8.2.3 (2)(a)) | — | — |
| P2 | Switching to bank 2 (executing sample program in Section 8.2.3 (2)(a)) | — | — |

(c) Program example



| | |
|---|---|
| [CALL P2] | Switches master module buffer memory to bank 2 (Refer to Section 8.2.3 (2)(a)) |
| [MOV K1 D10] | Specifies 100ms for RW refresh interval specification |
| [MOV H1 D11] | Specifies Enable for RWw refresh enable/disable setting |
| [MOV H1 D12] | Specifies Enable for RWr refresh enable/disable setting |
| [MOV H118 D13] | Specifies Send start frame No. ($\boxed{\text{R2N}}$ $118_H$) for RWwm |
| [MOV H1B0 D14] | Specifies General error codes ($\boxed{\text{R2N}}$ $1B0_H$) for RWrm |
| [MOV H119 D15] | Specifies Send end frame No. ($\boxed{\text{R2N}}$ $119_H$) for RWw(m+1) |
| [MOV H1B4 D16] | Assigns No. of actual send data ($\boxed{\text{R2N}}$ $1B4_H$) to RWr(m+1) |
| [MOV H120 D17] | Specifies Transmission table start No. specification ($\boxed{\text{R2N}}$ $120_H$) for RWw(m+2) |
| [MOV H1B5 D18] | Assigns Receive frame index No. storage ($\boxed{\text{R2N}}$ $1B5_H$) to RWr(m+2) |
| [MOV H121 D19] | Specifies No. of transmission tables ($\boxed{\text{R2N}}$ $121_H$) for RWw(m+3) |
| [MOV H1B6 D20] | Specifies No. of data stored in OS reception area ($\boxed{\text{R2N}}$ $1B6_H$) for RWr(m+3) |
| [TO H0 H40 D10 K11] | Writes to master module buffer memory |
| [CALL P0] | Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a)) |
| [SET M1] | Turns ON Intelligent device station access request completion flag |

**Figure 8.33 Program example**

## 8.8 Other Functions

This section explains programs for executing the functions below.
Execute each program in this section after AJ65BT-R2N initialization.

**Table 8.38 List of other functions**

| Function | Reference section |
|---|---|
| Send cancel function | Section 8.8.1 |
| Forced receive completion function | Section 8.8.2 |
| OS reception area clear function | Section 8.8.3 |
| E$^2$PROM function setting | Section 8.8.4 |

### 8.8.1 Send cancel function

The same program example can be used for the send/receive buffer communication function and buffer memory auto-refresh function.

(1) Overview of program example

Transmission is canceled when Send cancel execute flag (X25) is turned ON after a send request and before send completion.

(2) Processing in the program example

1) After turn-ON of Send request signal (Y120), Send cancel request signal (Y121) is turned ON before Send complete signal (X120) or Send failed signal (X121) turns ON.
2) Send request signal (Y120) and Send cancel request signal (Y121) are turned OFF after turn-ON of Send complete signal (X120) or Send failed signal (X121).

(3) Devices used in the program example

**Table 8.39 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X25 | Send cancel execute flag | — | — |
| X120 | Send complete signal | Section 8.8.1 | Section 8.4.1 |
| X121 | Send failed signal | Section 8.8.1 | Section 8.4.1 |
| Y120 | Send request signal | — | Section 8.4.1 |
| Y121 | Send cancel request signal | Section 8.8.1 | — |

(4) Program example

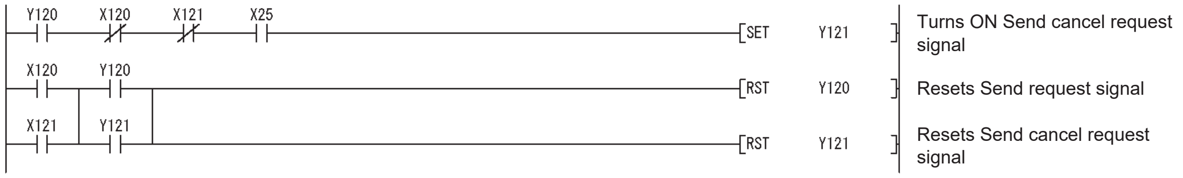


**Figure 8.34 Program example**

## 8.8.2 Forced receive completion function

(1) For the send/receive buffer communication function

(a) Overview of program example
When Forced receive completion execute flag (X26) turns ON before reception completion, the receive processing is forcibly completed at the point and data that have been received are read out.

(b) Program example processing description

1) Forced receive completion request signal (Y123) is turned ON to forcibly terminate reception.
2) Received data are read from Receive data size specification area (R2N 400H) and Receive data area (R2N 401H) to the master station word devices (areas starting from D39).
3) Receive data read completion signal (Y122) is turned OFF to terminate the reception.

(c) Devices used in the program example

**Table 8.40 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X26 | Forced receive completion execute flag | — | — |
| X122 | Normal receive data read request signal | Section 8.8.2 | — |
| X123 | Error receive data read request signal | Section 8.8.2 | — |
| X13E | Intelligent device station access completion signal | Section 8.8.2 | Section 8.3.1,<br>Section 8.4.1,<br>Section 8.5.1,<br>Section 8.6.1 |
| Y122 | Receive data read completion signal | Section 8.8.2 | Section 8.5.1 |
| Y123 | Forced receive completion request signal | Section 8.8.2 | — |
| Y13E | Intelligent device station access request signal | Section 8.8.2 | Section 8.3.1,<br>Section 8.4.1,<br>Section 8.5.1,<br>Section 8.6.1 |
| M2 | Operation complete flag | — | Section 8.3.1 |
| M120 | Buffer memory access exclusion check flag | Section 8.8.2 | Section 8.4.1,<br>Section 8.5.1,<br>Section 8.6.1 |
| M130 | Receiving flag | Section 8.8.2 | Section 8.5.1 |
| M131 | Forced reception start pulse signal | Section 8.8.2 | — |
| M155 | TO instruction executed flag | Section 8.8.2 | Section 8.5.1 |
| M156 | Intelligent device station access request completion flag | Section 8.8.2 | Section 8.5.1 |
| M157 | Read request completion flag | Section 8.8.2 | Section 8.5.1 |
| M158 | TO instruction executed flag | Section 8.8.2 | Section 8.5.1 |
| M159 | Intelligent device station access request completion flag | Section 8.8.2 | Section 8.5.1 |
| M160 | Read request completion flag | Section 8.8.2 | Section 8.5.1 |
| M901 | Other station data link status (Station No.2) | — | — |
| D30 to D36 | Control data of TO instruction | — | — |
| D37 | No. of receive data | — | — |

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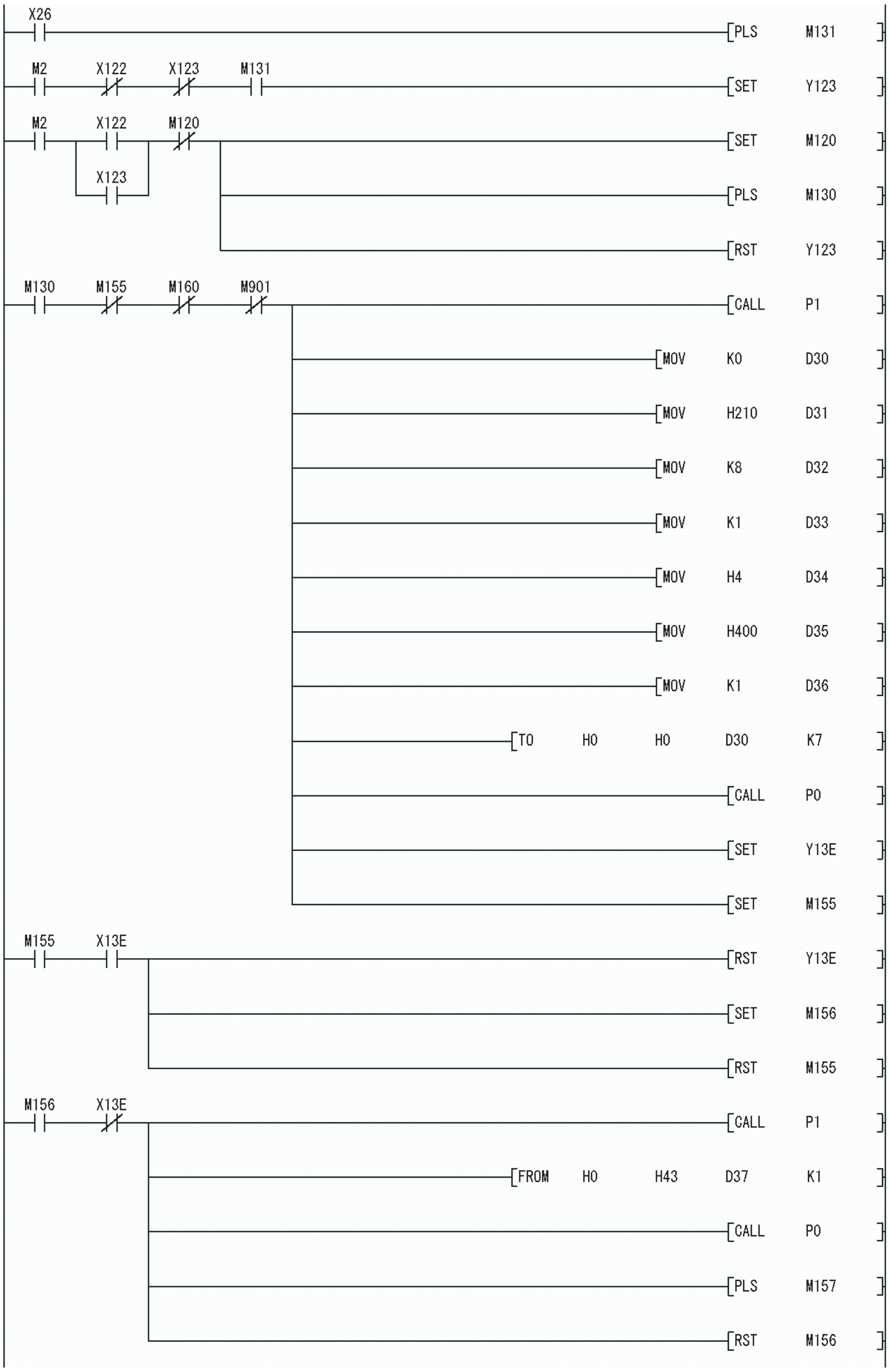
Table 8.40 Devices used in the program example (Continued)

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| D40 to D46 | Control data of TO instruction | — | — |
| D50 or later | Receive data | — | — |
| Z | No. of receive data | — | — |
| P0 | Switching to bank 0 (executing sample program in Section 8.2.3 (2)(a)) | — | — |
| P1 | Switching to bank 1 (executing sample program in Section 8.2.3 (2)(a)) | — | — |

(d) Program example



Turns ON Forced reception start pulse signal

Turns ON Forced receive completion request signal

Turns ON Buffer memory access exclusion check flag

Turns ON Receiving flag

Resets Forced receive completion request signal

Switches master module buffer memory to bank 1 (Refer to Section 8.2.3 (2)(a))

Dummy area

Station No. and request code

No. of send buffer write data (in byte units)

Quantity (Fixed value)

Access code and attribute code

Receive data size specification area (in words units) address

No. of read points (in word units)

Writes to master module buffer memory

Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a))

Turns ON Intelligent device station access request signal

Turns ON TO instruction executed flag

Resets Intelligent device station access request signal

Turns ON Intelligent device station access request completion flag

Resets TO instruction executed flag

Switches master module buffer memory to bank 1 (Refer to Section 8.2.3 (2)(a))

Reads from master module buffer memory

Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a))

Turns ON Read request completion flag

Resets Intelligent device station access request completion flag

**Figure 8.35 Program example**

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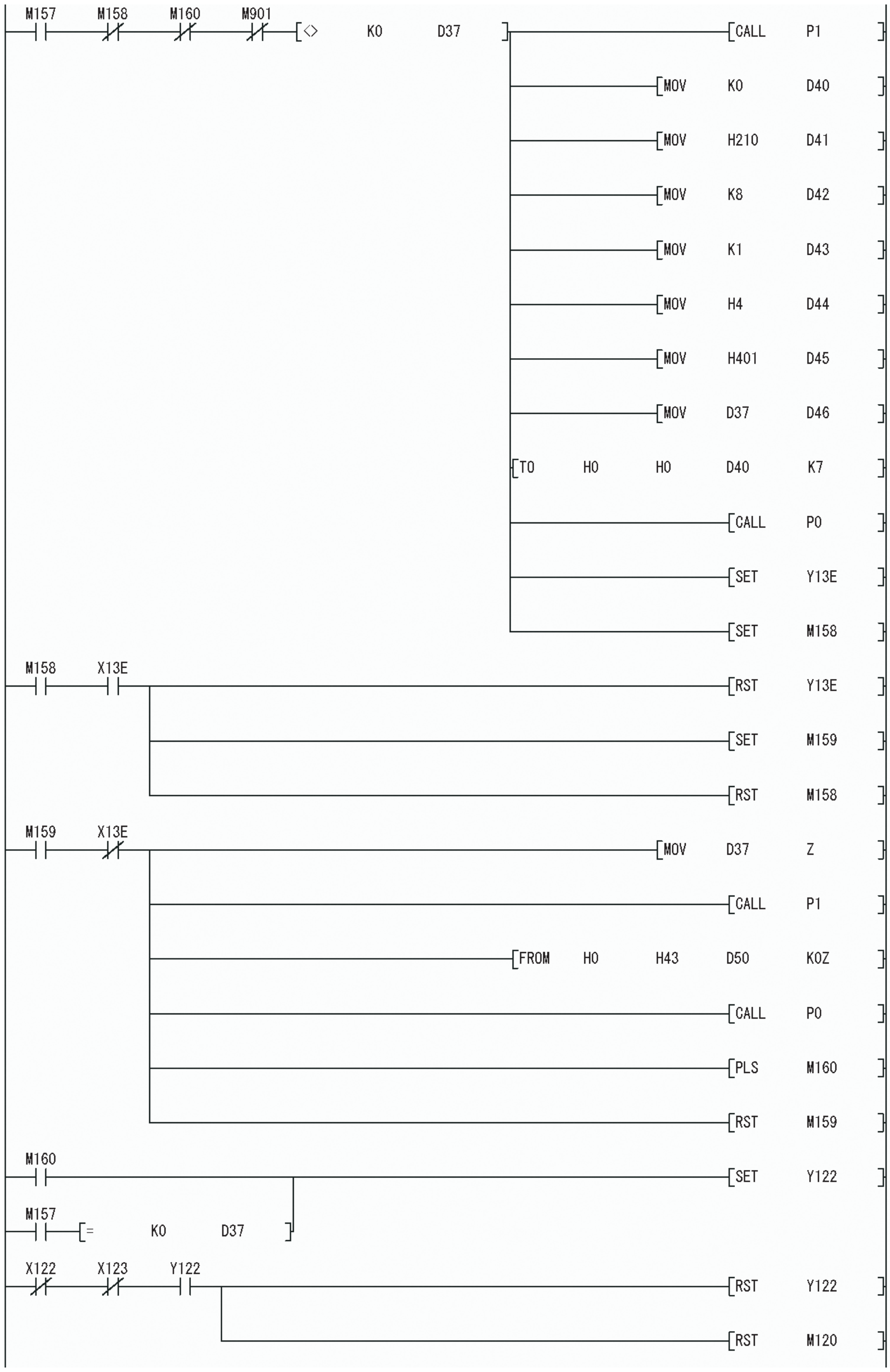


Switches master module buffer memory to bank 1 (Refer to Section 8.2.3 (2)(a))

Dummy area

Station No. and request code

No. of send buffer write data (in byte units)

Quantity (Fixed value)

Access code and attribute code

Receive data area address

No. of read points (in word units)

Writes to master module buffer memory

Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a))

Turns ON Intelligent device station access request signal

Turns ON TO instruction executed flag

Resets Intelligent device station access request signal

Turns ON Intelligent device station access request completion flag

Resets TO instruction executed flag

No. of receive data (in word units)

Switches master module buffer memory to bank 1 (Refer to Section 8.2.3 (2)(a))

Reads from master module buffer memory

Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a))

Turns ON Read request completion flag

Resets Intelligent device station access request completion flag

Turns ON Receive data read completion signal

Resets Receive data read completion signal

Resets Buffer memory access exclusion check flag

Figure 8.35 Program example (Continued)

(2) For the buffer memory auto-refresh function

(a) Overview of program example
When Forced receive completion execute flag (X26) turns ON before reception completion, the receive processing is forcibly completed at the point and data that have been received are read out.

(b) Processing in the program example

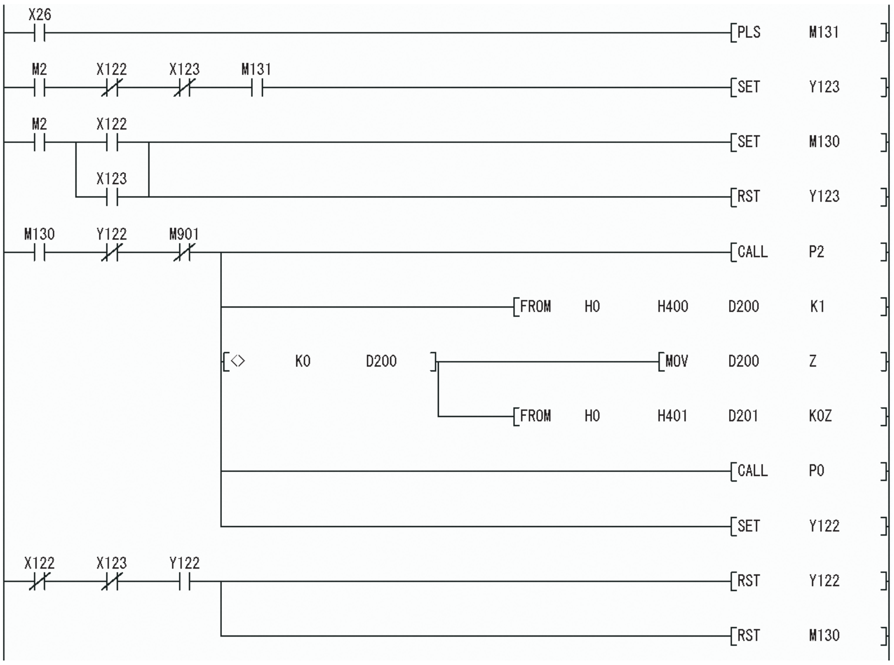
1) Forced receive completion request signal (Y123) is turned ON to forcibly terminate reception.
2) Received data are read from Receive data size specification area ($\boxed{\text{R2N}}$ 400H) and Receive data area ($\boxed{\text{R2N}}$ 401H) to the master station word device (D200).
3) Receive data read completion signal (Y122) is turned OFF to terminate the reception.

(c) Devices used in the program example

**Table 8.41 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X26 | Forced receive completion execute flag | — | — |
| X122 | Normal receive data read request signal | Section 8.8.2 | — |
| X123 | Error receive data read request signal | Section 8.8.2 | — |
| Y122 | Receive data read completion signal | Section 8.8.2 | Section 8.5.2 |
| Y123 | Forced receive completion request signal | Section 8.8.2 | — |
| M2 | Operation complete flag | — | Section 8.3.2 |
| M130 | Receiving flag | Section 8.8.2 | Section 8.5.2 |
| M131 | Forced reception start pulse signal | Section 8.8.2 | — |
| M901 | Other station data link status (Station No.2) | — | — |
| D200 | No. of receive data | — | — |
| D201 or later | Receive data | — | — |
| Z | No. of receive data | — | — |
| P0 | Switching to bank 0 (executing sample program in Section 8.2.3 (2)(a)) | — | — |
| P2 | Switching to bank 2 (executing sample program in Section 8.2.3 (2)(a)) | — | — |

(d) Program example



Turns ON Forced reception start pulse signal

Turns ON Forced receive completion request signal

Turns ON Receiving flag

Resets Forced receive completion request signal

Switches master module buffer memory to bank 2 (Refer to Section 8.2.3 (2)(a))

Reads No. of receive data (in word units) and receive data from master module receive area

Switches master module buffer memory to bank 0 (Refer to Section 8.2.3 (2)(a))

Turns ON Receive data read completion signal

Resets Receive data read completion signal

Resets Receiving flag

**Figure 8.36 Program example**

### 8.8.3 OS reception area clear function

The same program example can be used for the send/receive buffer communication function and buffer memory auto-refresh function.

(1) Overview of program example

The OS reception area is cleared when the AJ65BT-R2N fails to receive data from the external device.

(2) Processing in the program example

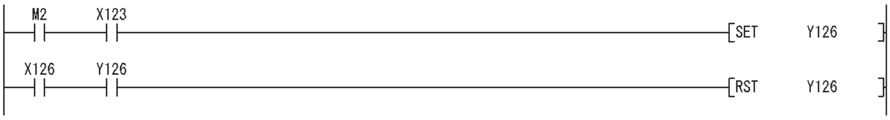
When Error receive data read request signal (X123) is ON, OS reception area clear request signal (Y126) is turned ON to clear the OS reception area.

(3) Devices used in the program example

**Table 8.42 Devices used in the program example**

| Device | Description | Reference section | |
|---|---|---|---|
| | | This program | Other programs |
| X123 | Error receive data read request signal | — | — |
| X126 | OS reception area cleared signal | Section 8.8.3 | — |
| Y126 | OS reception area clear request signal | Section 8.8.3 | — |
| M2 | Operation complete flag | — | Section 8.3.1 |

(4) Program example



Turns ON OS reception area clear request signal

Resets OS reception area clear request signal

**Figure 8.37 Program example**

### 8.8.4 E$^2$PROM function setting

**Point**

(1) Do not execute registration to E$^2$PROM each time the AJ65BT-R2N is started up.

Doing so may cause the maximum number of writes to E$^2$PROM (service life) to be reached earlier.

(2) Execute the E$^2$PROM function after initialization of the AJ65BT-R2N is normally completed.

For E$^2$PROM function sample programs, refer to the following.

☞ Section 8.9.1 Program example for changing auto-refresh buffer assignments

## 8.9 Program Example

This section gives program examples for the following processing.

**Table 8.43 Program example**

| Description | Reference section |
|---|---|
| Program example for changing auto-refresh buffer assignments | Section 8.9.1 |
| Program example for receiving data when a receive timeout occurs | Section 8.9.2 |

### 8.9.1 Program example for changing auto-refresh buffer assignments

(1) Overview of program example

- When Operation start request flag (M0) is turned ON, the assignments are changed so that the AJ65BT-R2N auto-refresh buffer size is 80H, and they are registered to the E$^2$PROM.
  When the auto-refresh buffer size changes to 80H, the buffer memory auto-refresh function can be used with up to 20 AJ65BT-R2Ns connected.
- The AJ65BT-R2N operates with the auto-refresh buffer size setting changed to 80H after restart.

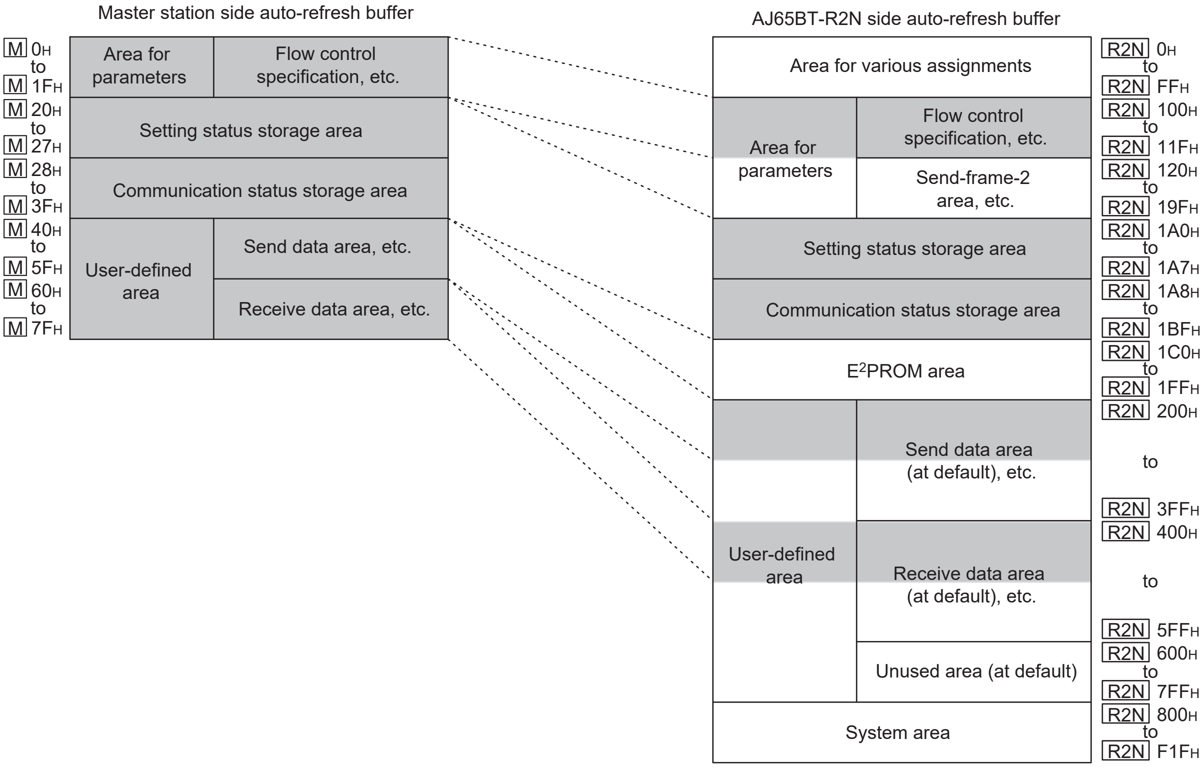


**Figure 8.38 Auto-refresh buffer after assignment change**

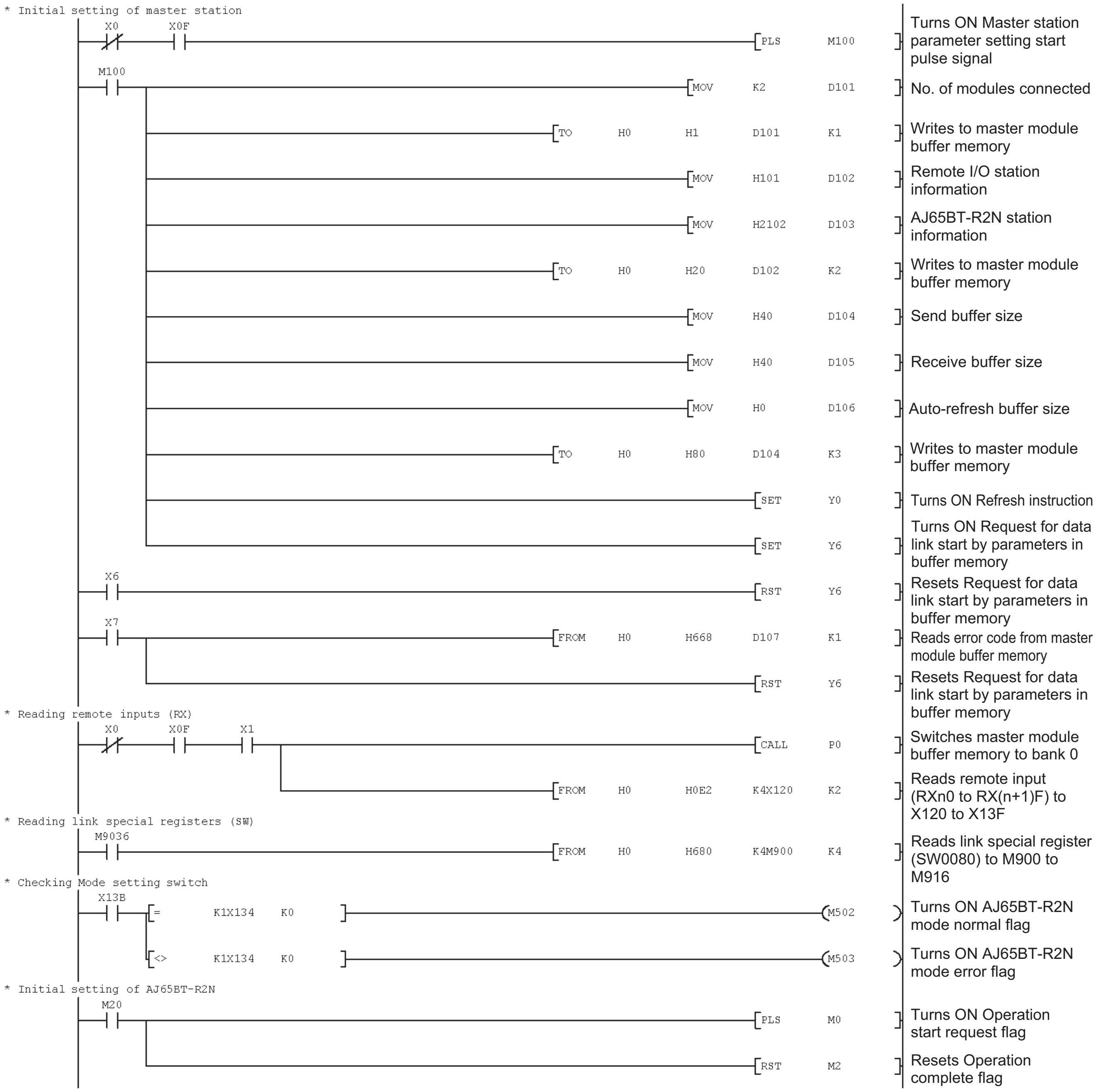
(2) For the send/receive buffer communication function

(a) Devices used in the program example

**Table 8.44 Devices used in the program example**

| Device | Description | Device | Description |
|---|---|---|---|
| X0 | Module error (Master station) | M4 | $E^2$PROM function failed signal |
| X1 | Own station data link status (Master station) | M10 | RIWT subroutine output completion flag |
| X6 | Data link start by parameters in buffer memory normally completed (Master station) | M15 | RIWT subroutine output completion flag |
| X7 | Data link start by parameters in buffer memory failed (Master station) | M20 | AJ65BT-R2N initial setting start flag |
| X0F | Module ready (Master station) | M22 | Operation complete pulse signal |
| X23 | Error code read flag | M27 | $E^2$PROM function execution start pulse signal |
| X24 | Error clear flag | M28 | $E^2$PROM function complete pulse signal |
| X27 | $E^2$PROM function execute flag | M29 | $E^2$PROM function execute completion pulse signal |
| K4X120 | Remote input (X120 to X12F) | M30 | Operation failed pulse signal |
| X124 | Initialization complete signal | M90 | RIWT subroutine execute flag |
| X125 | Initialization failed signal | M91 | RIWT subroutine execute flag |
| X127 | $E^2$PROM function complete signal | M92 | RIWT subroutine execute flag |
| X128 | $E^2$PPROM function failed signal | M100 | Master station parameter setting start pulse signal |
| K1X134 | Mode setting switch status signal (X134 to X137) | M120 | Buffer memory access exclusion check flag |
| X13A | Error status signal | M135 | Error handling flag |
| X13B | Remote station ready signal | M190 | TO instruction executed flag |
| X13E | Intelligent device station access completion signal | M191 | Intelligent device station access request completion flag |
| Y0 | Refresh instruction (Master station) | M200 | RIWT subroutine output completion flag |
| Y6 | Request for data link start by parameters in buffer memory (Master station) | M202 | RIWT subroutine in-execution flag |
| K4Y18 | Output (Y18 to Y27) (Master station) | M203 | RIWT completion status read start flag |
| Y1C | Buffer memory bank switching specification (Master station) | M204 | RIWT completion status read end flag |
| Y1D | | M230 | Error handling execution pulse signal |
| K4Y120 | Remote output (Y120 to Y12F) | M502 | AJ65BT-R2N mode normal flag |
| Y120 | Send request signal | M503 | AJ65BT-R2N mode error flag |
| Y121 | Send cancel request signal | M504 | $E^2$PROM function setting start pulse signal |
| Y122 | Receive data read completion signal | K4M900 | Other station data link status (SW0080) |
| Y123 | Forced receive completion request signal | M901 | Other station data link status (Station No.2) |
| Y124 | Initialization request signal | M9036 | Always ON |
| Y126 | OS reception area clear request signal | M9052 | SEG instruction switching |
| Y127 | $E^2$PROM function request signal | D0 to D39 | Control data of RIWT subroutine, set values, and $E^2$PROM function set value |
| Y139 | Initial data read request signal | D100 to D106 | Network parameters of master station |
| Y13A | Error reset request signal | D107 | Error code in Network parameters setting |
| Y13E | Intelligent device station access request signal | D130 to D137 | Control data of RIRD instruction and error code of AJ65BT-R2N |
| M0 | Operation start request flag | D200 to D207 | Devices for TO instruction in RIWT subroutine |
| M1 | RIWT subroutine output completion flag | P0 | Switching to bank 0 |
| M2 | Operation complete flag | P1 | RIWT subroutine |
| M3 | Operation failed flag | — | |

(b) Program example



```
* Initial setting of master station
X0 (NC)  X0F                          [PLS   M100                ]  Turns ON Master station parameter setting start pulse signal
M100                                  [MOV   K2     D101         ]  No. of modules connected
                       [TO    H0     H1     D101   K1            ]  Writes to master module buffer memory
                                      [MOV   H101   D102         ]  Remote I/O station information
                                      [MOV   H2102  D103         ]  AJ65BT-R2N station information
                       [TO    H0     H20    D102   K2            ]  Writes to master module buffer memory
                                      [MOV   H40    D104         ]  Send buffer size
                                      [MOV   H40    D105         ]  Receive buffer size
                                      [MOV   H0     D106         ]  Auto-refresh buffer size
                       [TO    H0     H80    D104   K3            ]  Writes to master module buffer memory
                                             [SET   Y0           ]  Turns ON Refresh instruction
                                             [SET   Y6           ]  Turns ON Request for data link start by parameters in buffer memory
X6                                           [RST   Y6           ]  Resets Request for data link start by parameters in buffer memory
X7                     [FROM  H0     H668   D107   K1            ]  Reads error code from master module buffer memory
                                             [RST   Y6           ]  Resets Request for data link start by parameters in buffer memory
* Reading remote inputs (RX)
X0 (NC)  X0F  X1                             [CALL  P0           ]  Switches master module buffer memory to bank 0
                       [FROM  H0     H0E2   K4X120 K2            ]  Reads remote input (RXn0 to RX(n+1)F) to X120 to X13F
* Reading link special registers (SW)
M9036                  [FROM  H0     H680   K4M900 K4            ]  Reads link special register (SW0080) to M900 to M916
* Checking Mode setting switch
X13B  [=   K1X134  K0]                       (M502               )  Turns ON AJ65BT-R2N mode normal flag
      [<>  K1X134  K0]                       (M503               )  Turns ON AJ65BT-R2N mode error flag
* Initial setting of AJ65BT-R2N
M20                                          [PLS   M0           ]  Turns ON Operation start request flag
                                             [RST   M2           ]  Resets Operation complete flag
```

Figure 8.39 Program example for changing auto-refresh buffer assignments

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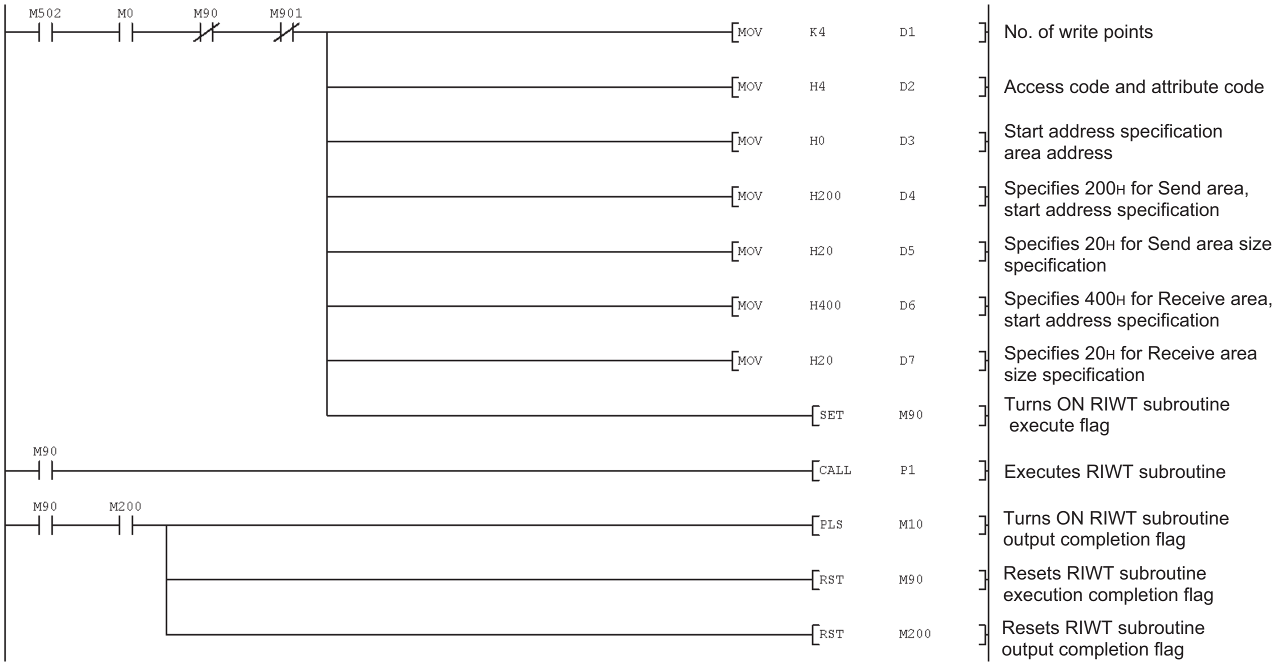

Figure 8.39 Program example for changing auto-refresh buffer assignments (Continued)

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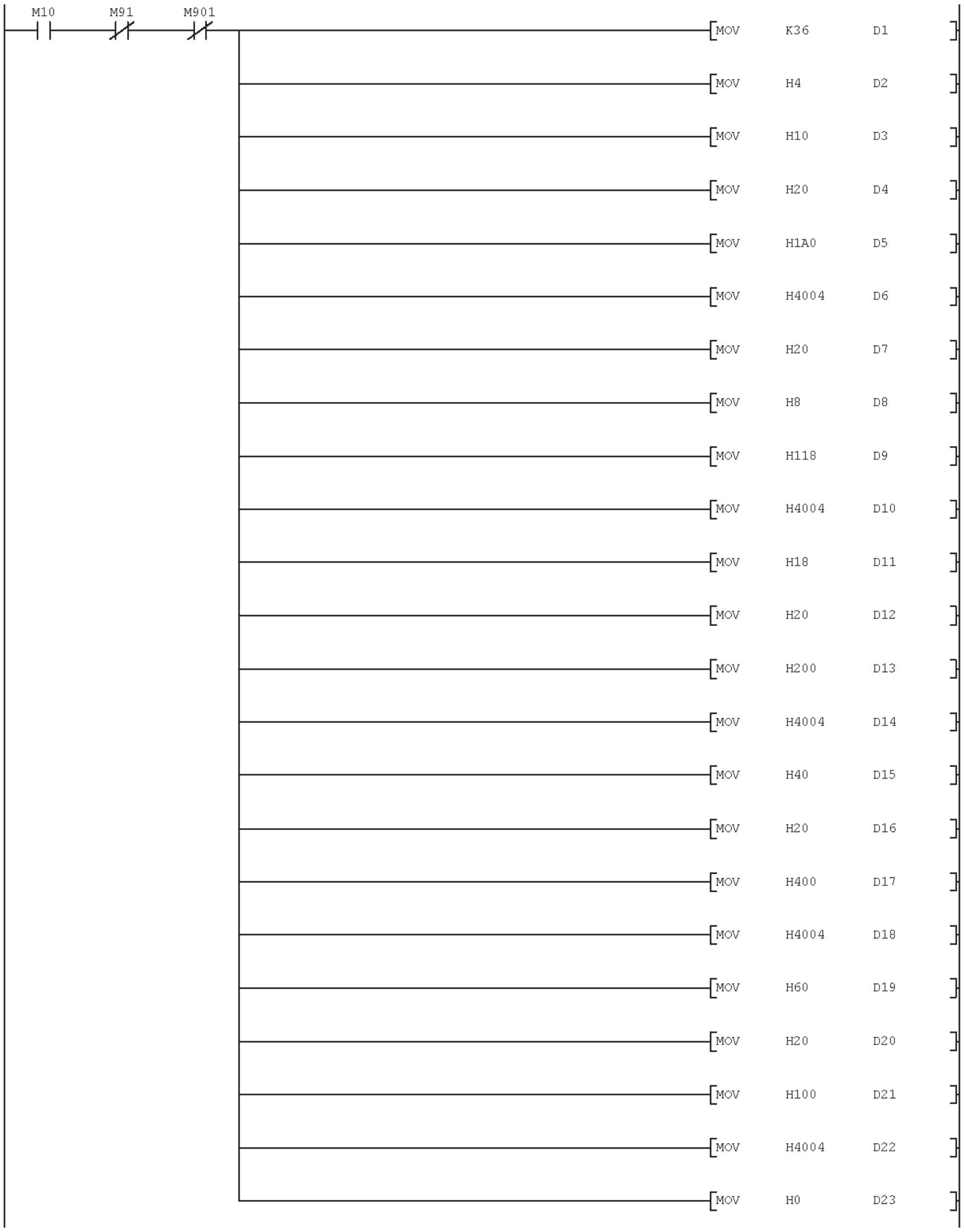

No. of write points

Access code and attribute code

Auto-refresh area specification address

Specifies the following for Status data storage area
- Transfer size : 20H
- AJ65BT-R2N side start address : 1A0H
- Master station side offset address : 20H

Specifies the following for Send area 1)
- Transfer size : 8H
- AJ65BT-R2N side start address : 118H
- Master station side offset address : 18H

Specifies the following for Send area 2)
- Transfer size : 20H
- AJ65BT-R2N side start address : 200H
- Master station side offset address : 40H

Specifies the following for Receive area
- Transfer size : 20H
- AJ65BT-R2N side start address : 400H
- Master station side offset address : 60H

Specifies the following for Initial setting area
- Transfer size : 20H
- AJ65BT-R2N side start address : 100H
- Master station side offset address : 0H

Figure 8.39 Program example for changing auto-refresh buffer assignments (Continued)

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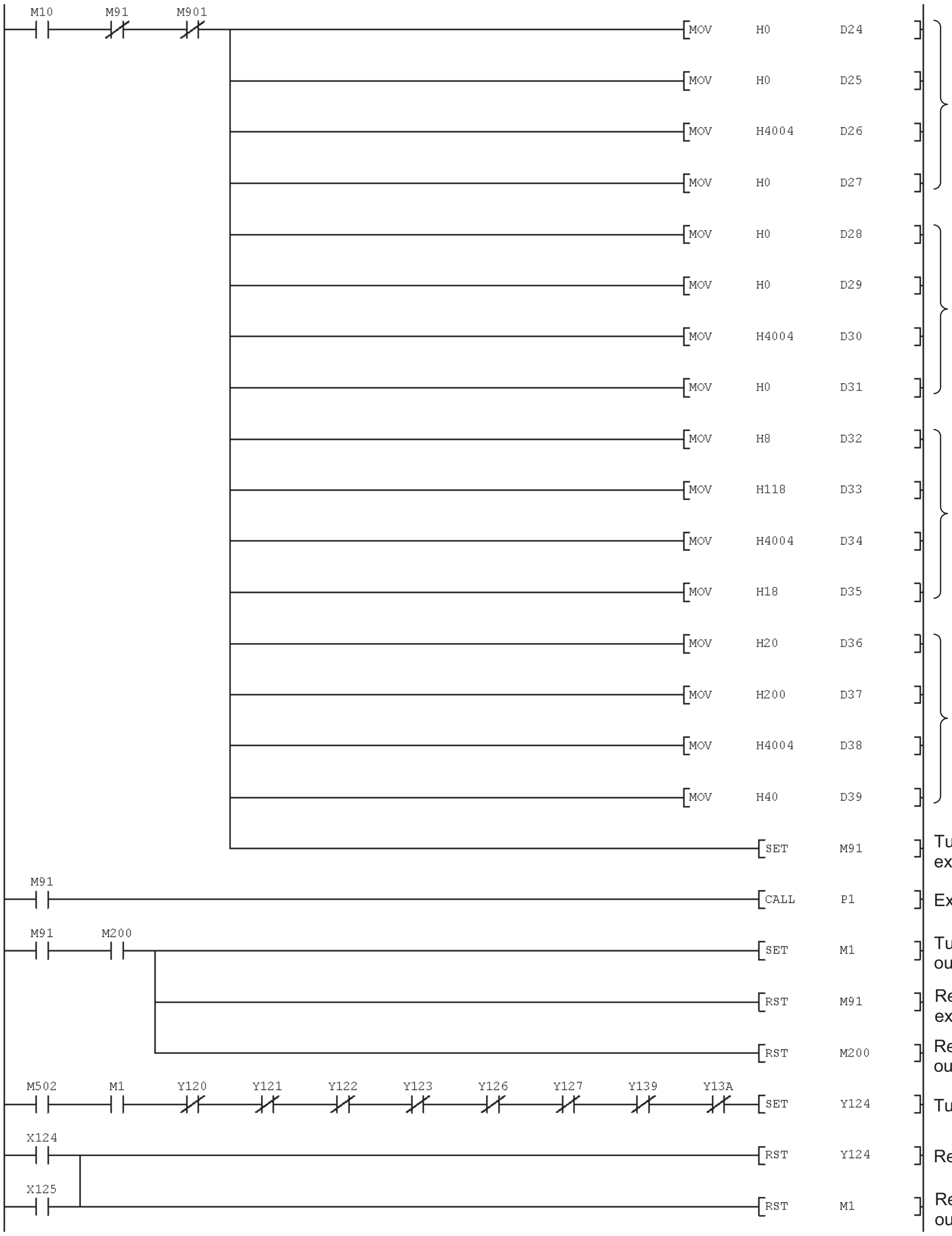

Specifies the following for E²PROM function area
- Transfer size : $0_H$
- AJ65BT-R2N side start address : $0_H$
- Master station side offset address : $0_H$

Specifies the following for User registration frame area
- Transfer size : $0_H$
- AJ65BT-R2N side start address : $0_H$
- Master station side offset address : $0_H$

Specifies the following for Monitoring-based transmission area 1)
- Transfer size : $8_H$
- AJ65BT-R2N side start address : $118_H$
- Master station side offset address : $18_H$

Specifies the following for Monitoring-based transmission area 2)
- Transfer size : $20_H$
- AJ65BT-R2N side start address : $200_H$
- Master station side offset address : $40_H$

Turns ON RIWT subroutine execute flag

Executes RIWT subroutine

Turns ON RIWT subroutine output completion flag

Resets RIWT subroutine execute flag

Resets RIWT subroutine output completion flag

Turns ON Initialization request signal

Resets Initialization request signal

Resets RIWT subroutine output completion flag

Figure 8.39 Program example for changing auto-refresh buffer assignments (Continued)

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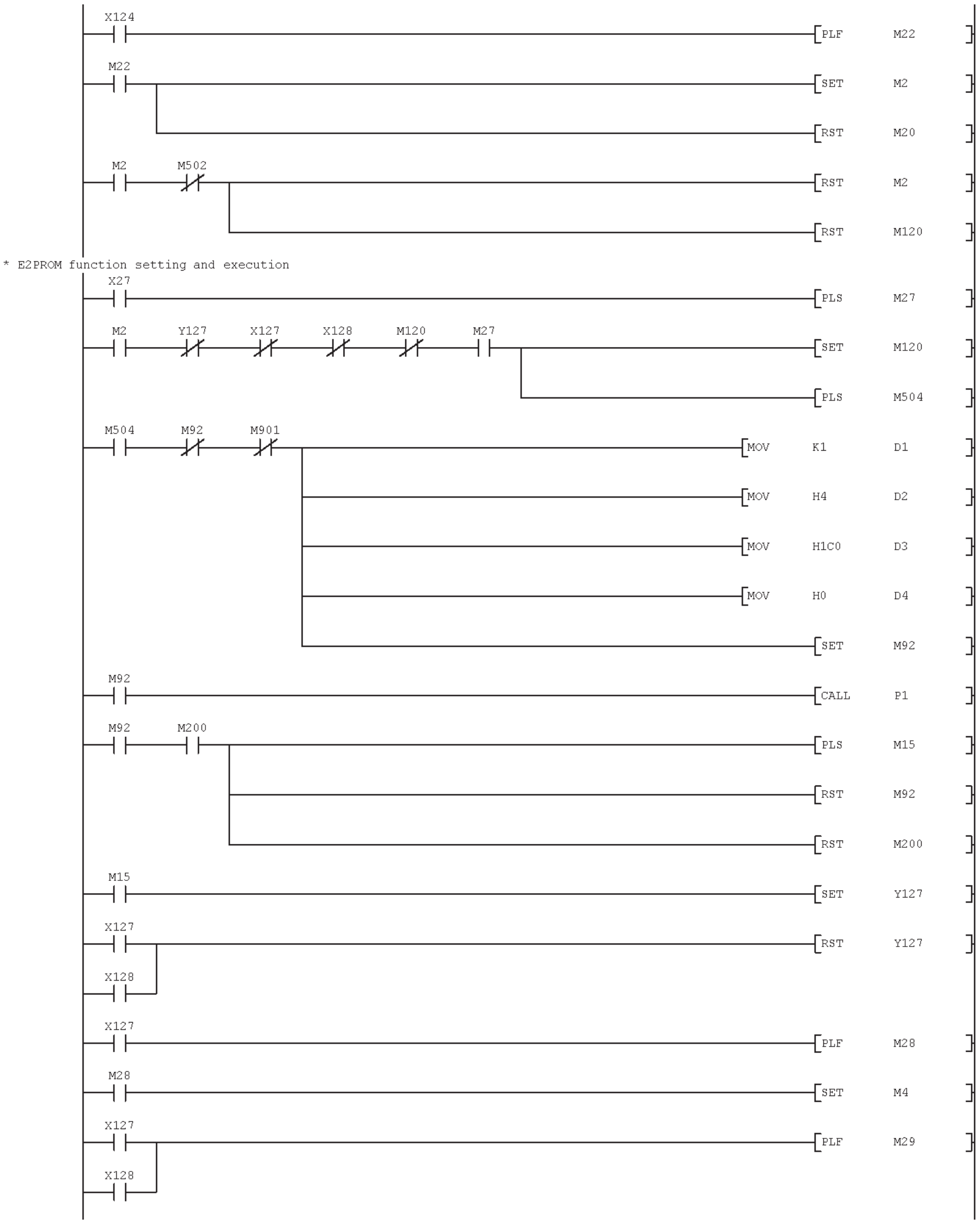

Turns ON Operation complete pulse signal

Turns ON Operation complete flag

Resets AJ65BT-R2N initial setting start flag

Resets Operation complete flag

Resets Buffer memory access exclusion check flag

Turns ON E$^2$PROM function execution start pulse signal

Turns ON Buffer memory access exclusion check flag

Turns ON E$^2$PROM function setting start pulse signal

No. of write points

Access code and attribute code

E$^2$PROM function specification address

Sets 0 (registration of set buffer memory values) for E$^2$PROM function specification

Turns ON RIWT subroutine execute flag

Executes RIWT subroutine

Turns ON RIWT subroutine output completion flag

Resets RIWT subroutine execute flag

Resets RIWT subroutine output completion flag

Turns ON E$^2$PROM function request signal

Resets E$^2$PROM function request signal

Turns ON E$^2$PROM function complete pulse signal

Turns ON E$^2$PROM function failed flag

Turns ON E$^2$PROM function execute completion pulse signal

Figure 8.39 Program example for changing auto-refresh buffer assignments (Continued)

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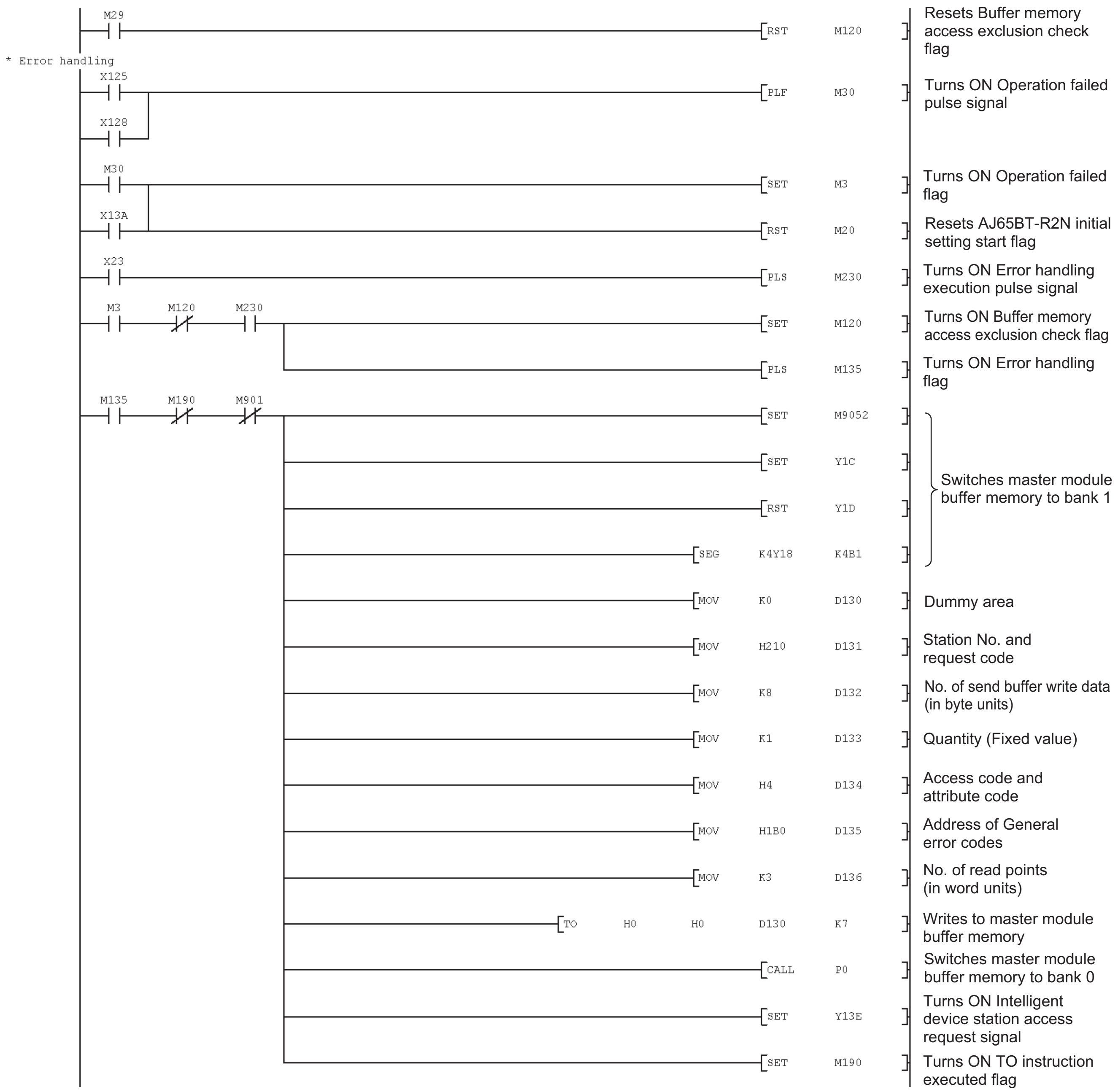

Figure 8.39 Program example for changing auto-refresh buffer assignments (Continued)

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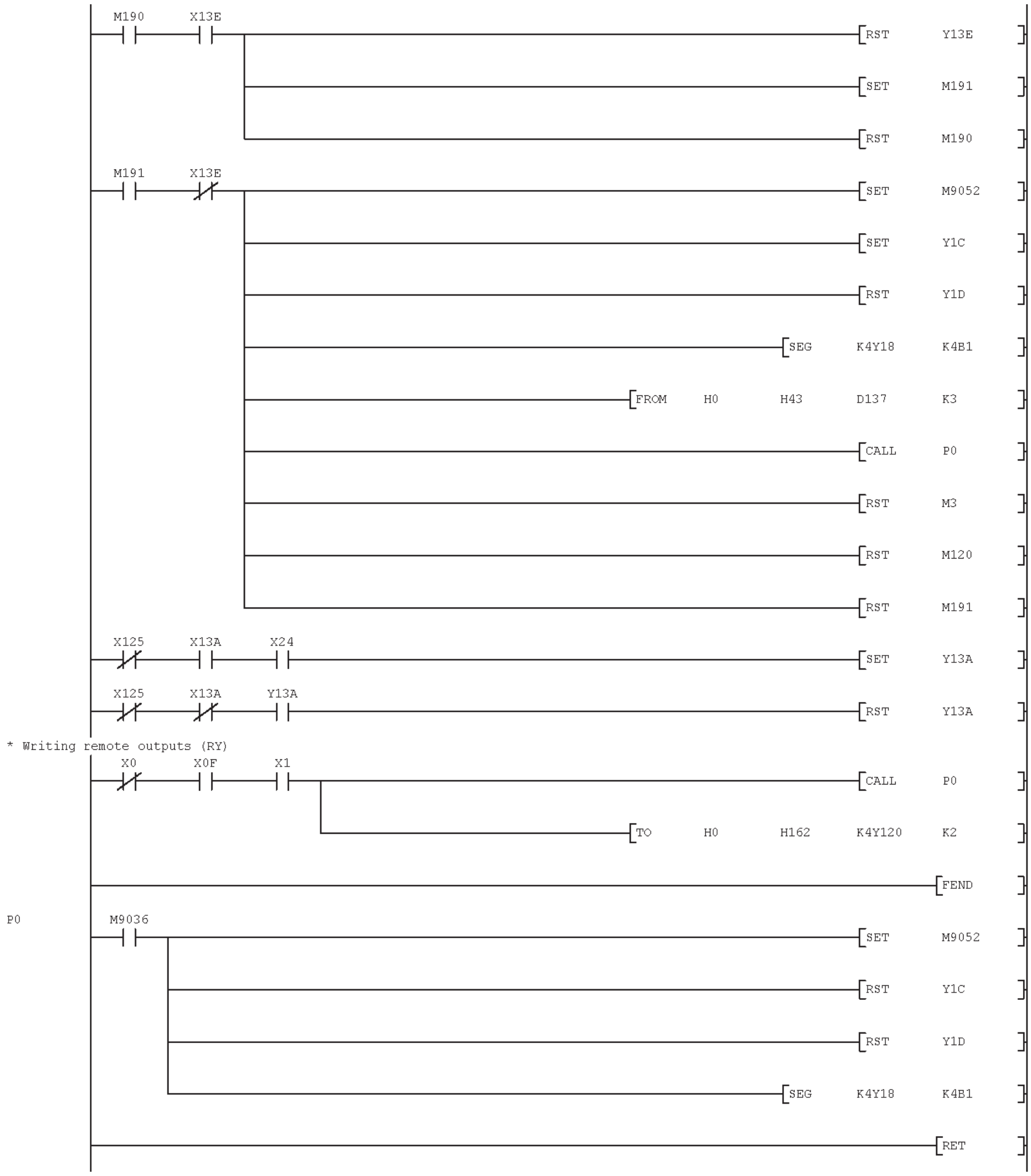

Resets Intelligent device station access request signal

Turns ON Intelligent device station access request completion flag

Resets TO instruction executed flag

Switches master module buffer memory to bank 1

Reads from master module buffer memory

Switches master module buffer memory to bank 0

Resets Operation failed flag

Resets Buffer memory access exclusion check flag

Resets Intelligent device station access request completion flag

Turns ON Error reset request signal

Resets Error reset request signal

Switches master module buffer memory to bank 0

Writes Y120 to Y13F to remote output (RYn0 to RY(n+1)F)

Switches master module buffer memory to bank 0

Figure 8.39 Program example for changing auto-refresh buffer assignments (Continued)

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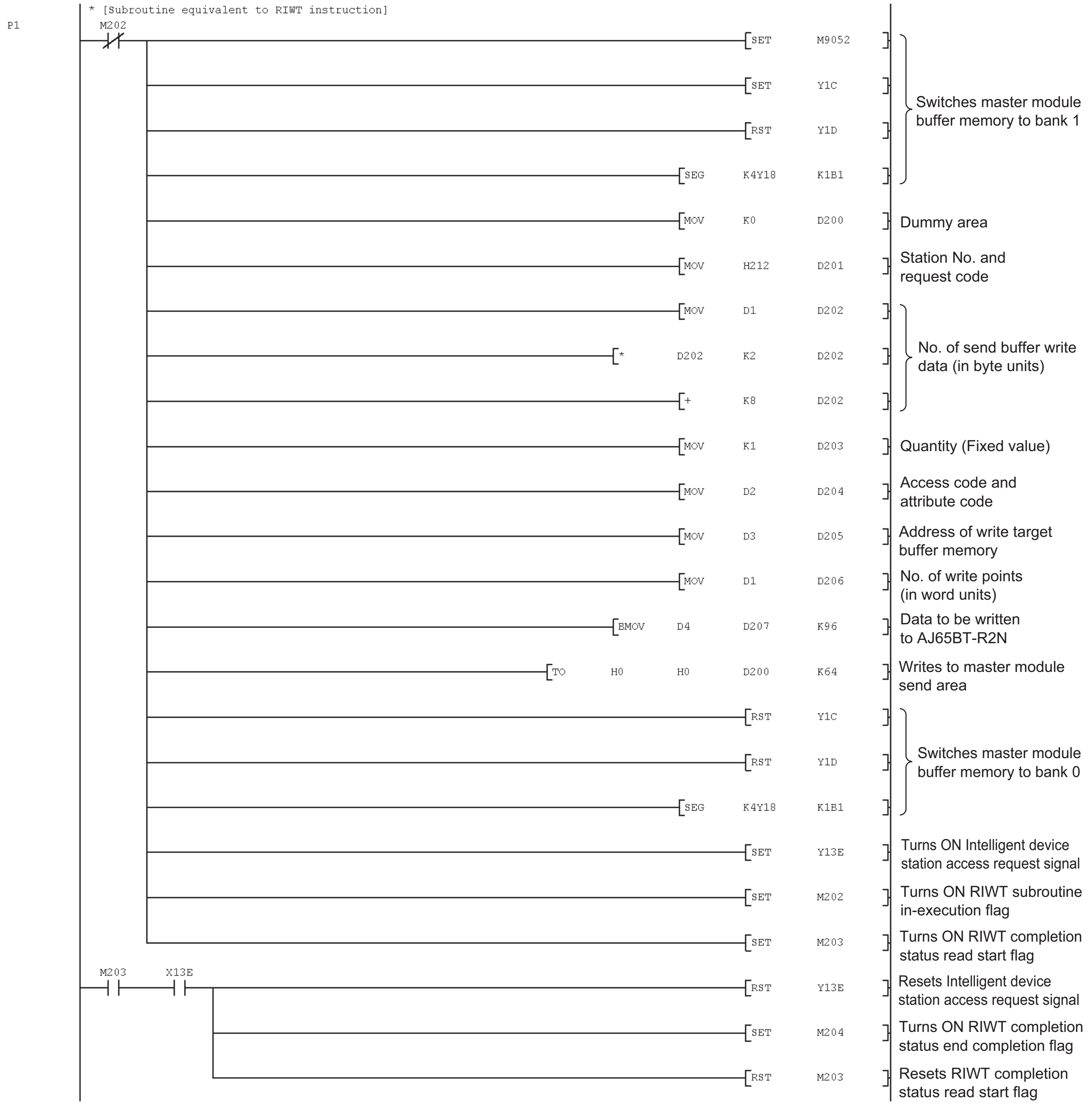

Figure 8.39 Program example for changing auto-refresh buffer assignments (Continued)

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Turns ON RIWT subroutine output completion flag

Resets RIWT subroutine in-execution flag

Resets RIWT completion status read end flag

Figure 8.39 Program example for changing auto-refresh buffer assignments (Continued)

### (3) For the buffer memory auto-refresh function

#### (a) Devices used in the program example

**Table 8.45 Devices used in the program example**

| Device | Description | Device | Description |
|---|---|---|---|
| X0 | Module error (Master station) | Y13A | Error reset request signal |
| X1 | Own station data link status (Master station) | M0 | Operation start request flag |
| X6 | Data link start by parameters in buffer memory normally completed (Master station) | M1 | Intelligent device station access request completion flag |
| X7 | Data link start by parameters in buffer memory failed (Master station) | M2 | Operation complete flag |
| X0F | Module ready (Master station) | M3 | Operation failed flag |
| X23 | Error code read flag | M4 | $E^2$PROM function failed signal |
| X24 | Error clear flag | M22 | Operation complete pulse signal |
| X27 | $E^2$PROM function execute flag | M27 | $E^2$PROM function execution start pulse signal |
| K4X120 | Remote input (X120 to X12F) | M28 | $E^2$PROM function complete pulse signal |
| X124 | Initialization complete signal | M29 | $E^2$PROM function execute completion pulse signal |
| X125 | Initialization failed signal | M30 | Operation failed pulse signal |
| X127 | $E^2$PROM function complete signal | M100 | Master station parameter setting start pulse signal |
| X128 | $E^2$PROM function failed signal | M111 | Initial data read completion pulse signal |
| K1X134 | Mode setting switch status signal (X134 to X137) | M135 | Error handling flag |
| X139 | Initial data read completion signal | M230 | Error handling execution pulse signal |
| X13A | Error status signal | M270 | $E^2$PROM function in-execution flag |
| X13B | Remote station ready signal | M500 | AJ65BT-R2N initial data read complete flag |
| Y0 | Refresh instruction (Master station) | M501 | AJ65BT-R2N initial data reading flag |
| Y6 | Request for data link start by parameters in buffer memory (Master station) | M502 | AJ65BT-R2N mode normal flag |
| K4Y18 | Output (Y18 to Y27) (Master station) | M503 | AJ65BT-R2N mode error flag |
| Y1C | Buffer memory bank switching specification (Master station) | M504 | $E^2$PROM function setting start pulse signal |
| Y1D | | K4M900 | Other station data link status (SW0080) |
| K4Y120 | Remote output (Y120 to Y12F) | M901 | Other station data link status (Station No.2) |
| Y120 | Send request signal | M9036 | Always ON |
| Y121 | Send cancel request signal | M9052 | SEG instruction switching |
| Y122 | Receive data read completion signal | D10 to D45 | Set value |
| Y123 | Forced receive completion request signal | D100 to D106 | Network parameters of master station |
| Y124 | Initialization request signal | D107 | Error code in Network parameters setting |
| Y126 | OS reception area clear request signal | D400 to D402 | AJ65BT-R2N error code |
| Y127 | $E^2$PROM function request signal | P0 | Switching to bank 0 |
| Y139 | Initial data read request signal | P2 | Switching to bank 2 |

(b) Program example

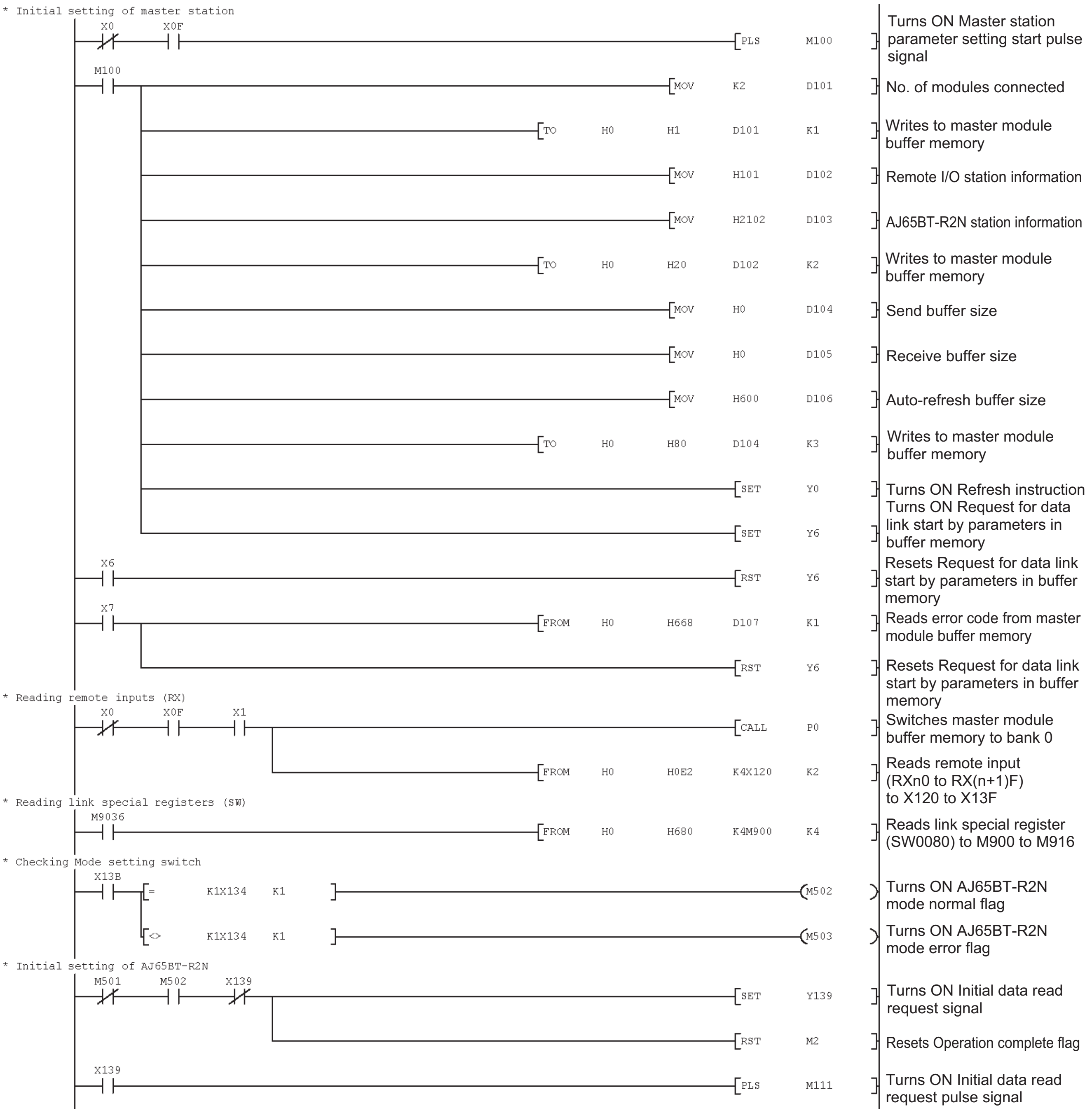

**Figure 8.40 Program example for changing auto-refresh buffer assignments**

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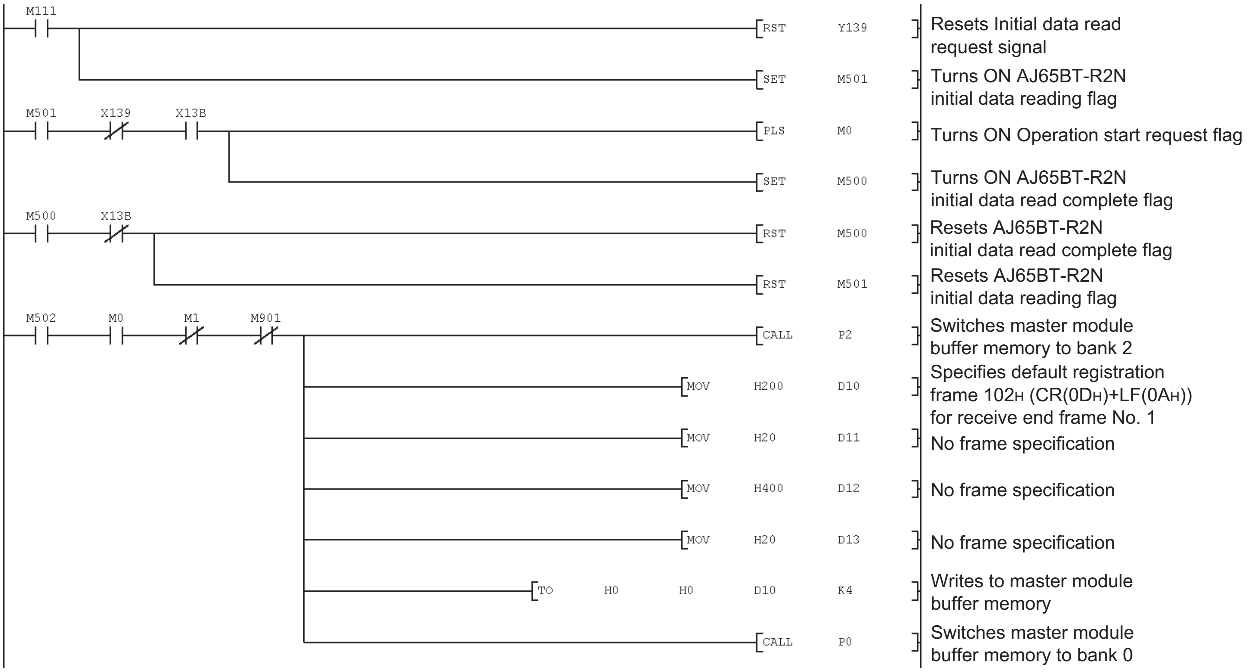

Figure 8.40 Program example for changing auto-refresh buffer assignments (Continued)

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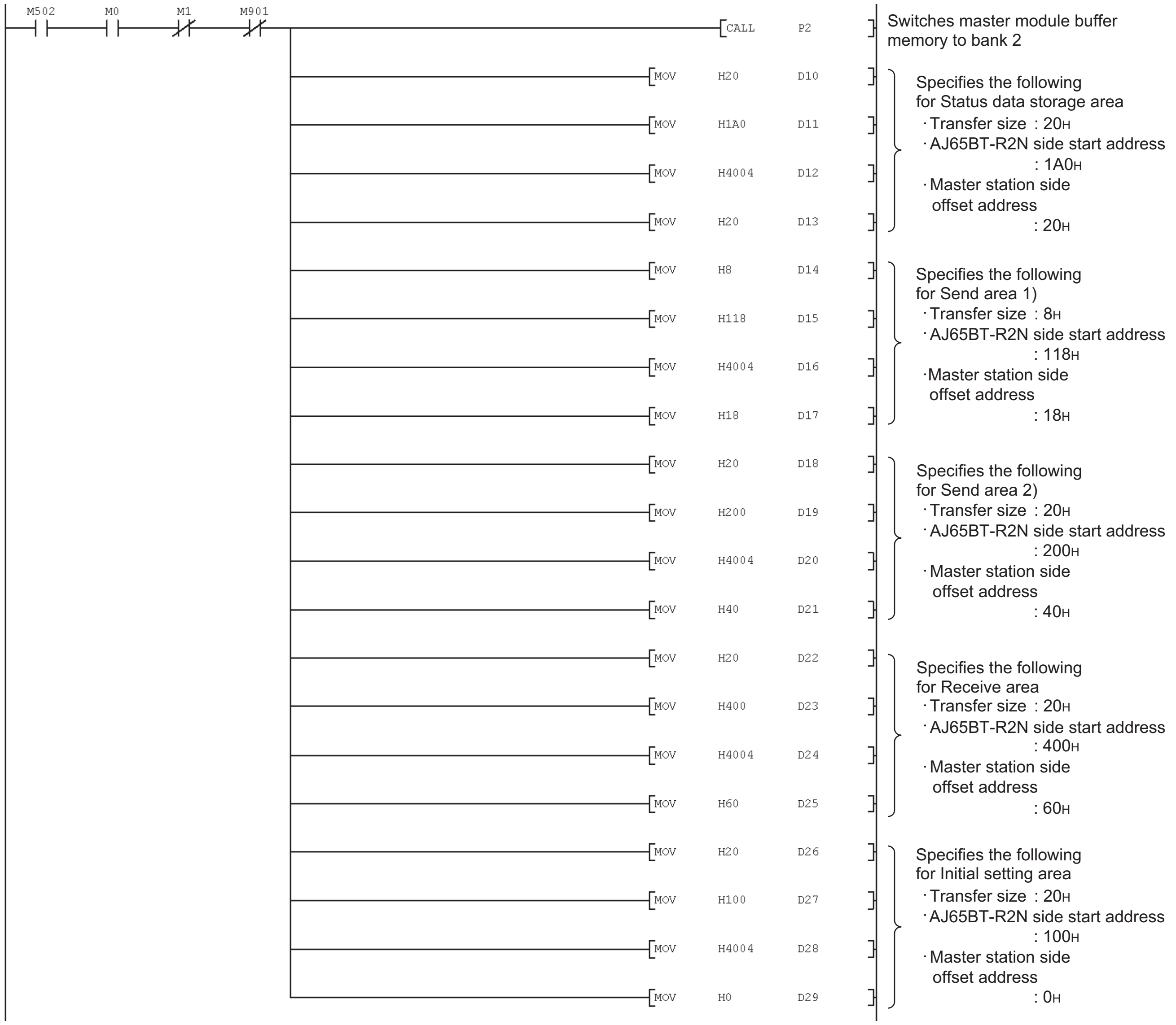

```
M502  M0  M1  M901
                                  [CALL  P2        ]
                             [MOV   H20     D10   ]
                             [MOV   H1A0    D11   ]
                             [MOV   H4004   D12   ]
                             [MOV   H20     D13   ]
                             [MOV   H8      D14   ]
                             [MOV   H118    D15   ]
                             [MOV   H4004   D16   ]
                             [MOV   H18     D17   ]
                             [MOV   H20     D18   ]
                             [MOV   H200    D19   ]
                             [MOV   H4004   D20   ]
                             [MOV   H40     D21   ]
                             [MOV   H20     D22   ]
                             [MOV   H400    D23   ]
                             [MOV   H4004   D24   ]
                             [MOV   H60     D25   ]
                             [MOV   H20     D26   ]
                             [MOV   H100    D27   ]
                             [MOV   H4004   D28   ]
                             [MOV   H0      D29   ]
```

Switches master module buffer memory to bank 2

Specifies the following for Status data storage area
- Transfer size : 20H
- AJ65BT-R2N side start address : 1A0H
- Master station side offset address : 20H

Specifies the following for Send area 1)
- Transfer size : 8H
- AJ65BT-R2N side start address : 118H
- Master station side offset address : 18H

Specifies the following for Send area 2)
- Transfer size : 20H
- AJ65BT-R2N side start address : 200H
- Master station side offset address : 40H

Specifies the following for Receive area
- Transfer size : 20H
- AJ65BT-R2N side start address : 400H
- Master station side offset address : 60H

Specifies the following for Initial setting area
- Transfer size : 20H
- AJ65BT-R2N side start address : 100H
- Master station side offset address : 0H

Figure 8.40 Program example for changing auto-refresh buffer assignments (Continued)

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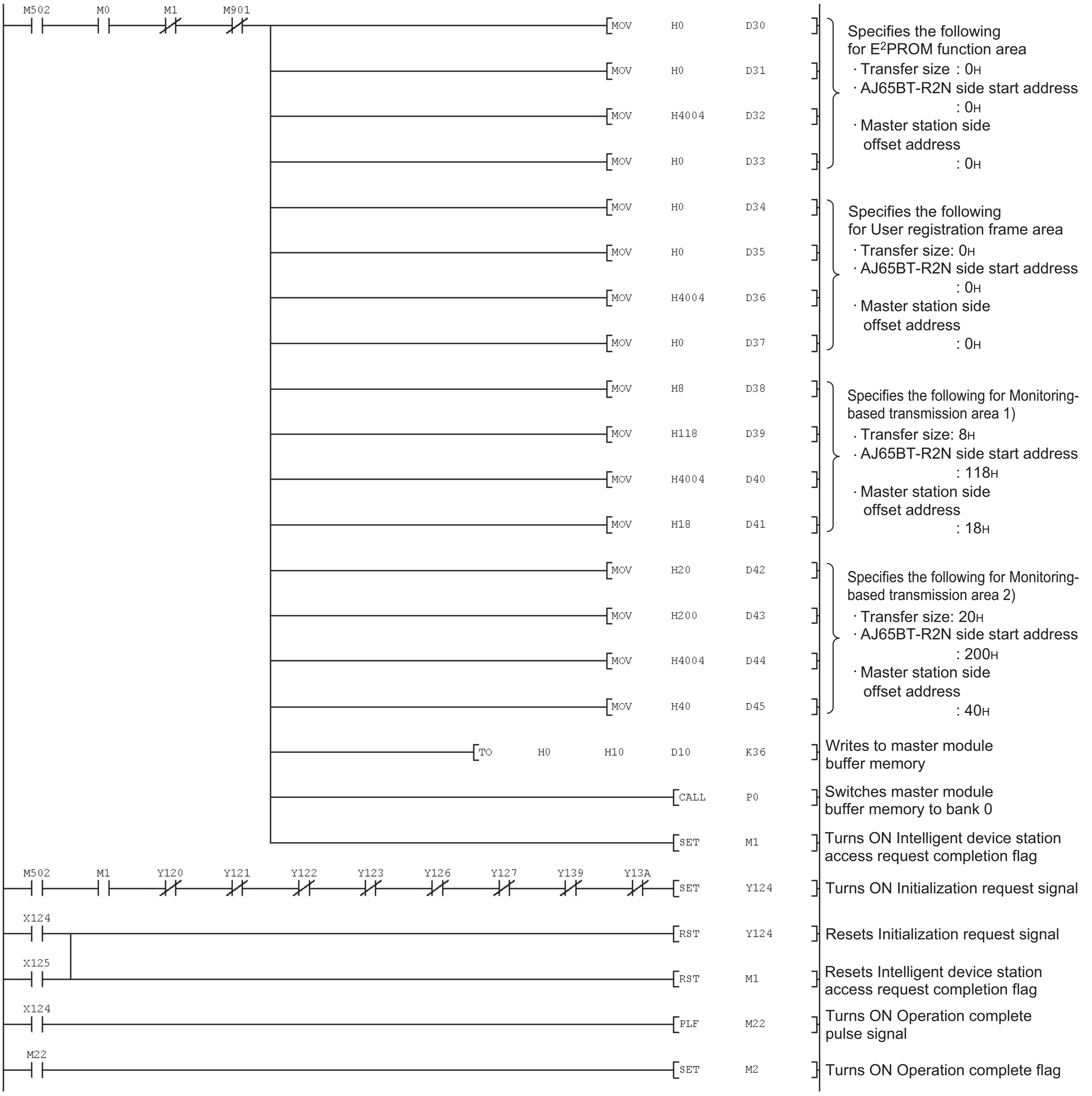

Specifies the following for E²PROM function area
- Transfer size : 0H
- AJ65BT-R2N side start address : 0H
- Master station side offset address : 0H

Specifies the following for User registration frame area
- Transfer size: 0H
- AJ65BT-R2N side start address : 0H
- Master station side offset address : 0H

Specifies the following for Monitoring-based transmission area 1)
- Transfer size: 8H
- AJ65BT-R2N side start address : 118H
- Master station side offset address : 18H

Specifies the following for Monitoring-based transmission area 2)
- Transfer size: 20H
- AJ65BT-R2N side start address : 200H
- Master station side offset address : 40H

Writes to master module buffer memory

Switches master module buffer memory to bank 0

Turns ON Intelligent device station access request completion flag

Turns ON Initialization request signal

Resets Initialization request signal

Resets Intelligent device station access request completion flag

Turns ON Operation complete pulse signal

Turns ON Operation complete flag

Figure 8.40 Program example for changing auto-refresh buffer assignments (Continued)

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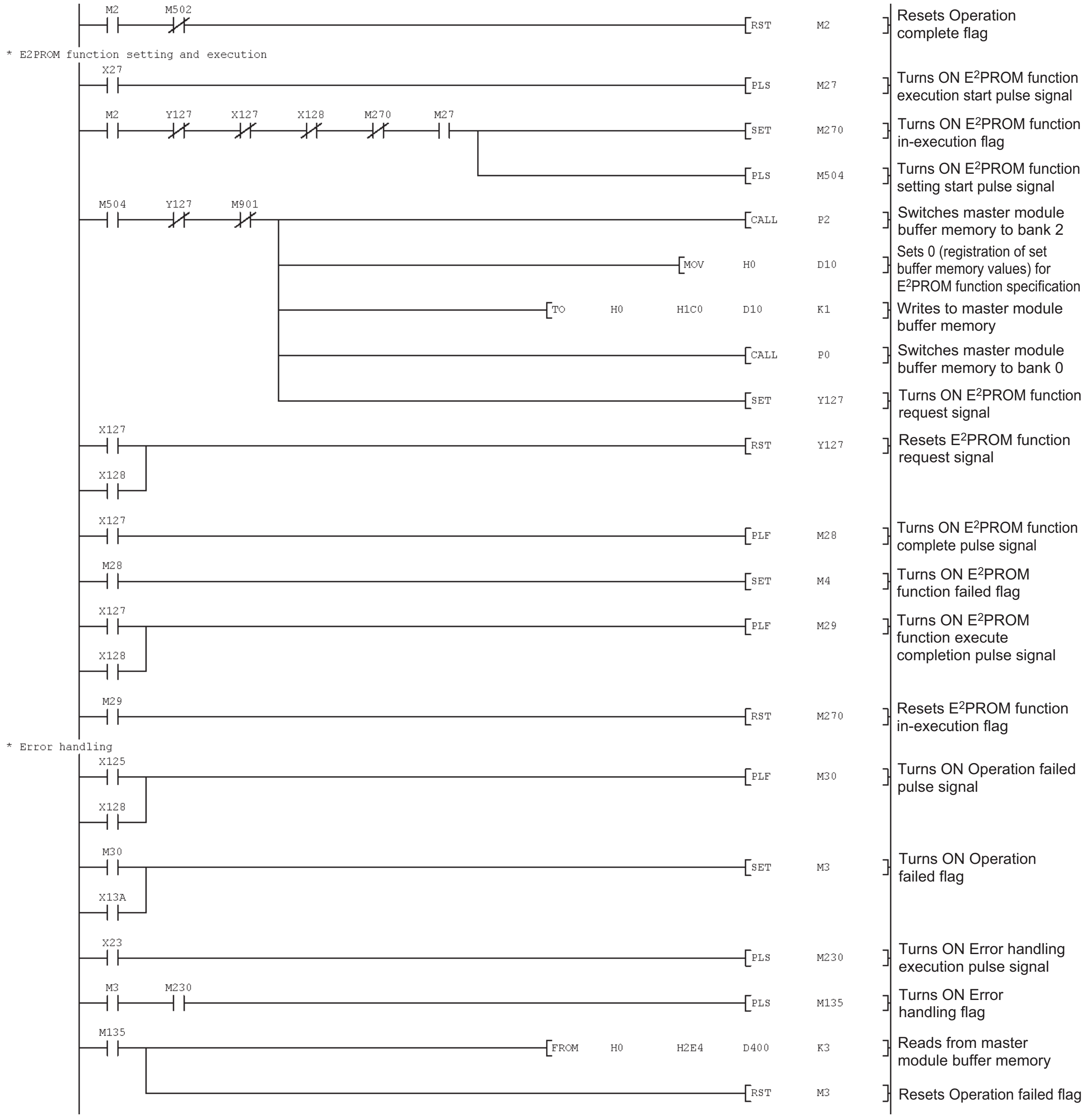

Figure 8.40 Program example for changing auto-refresh buffer assignments (Continued)

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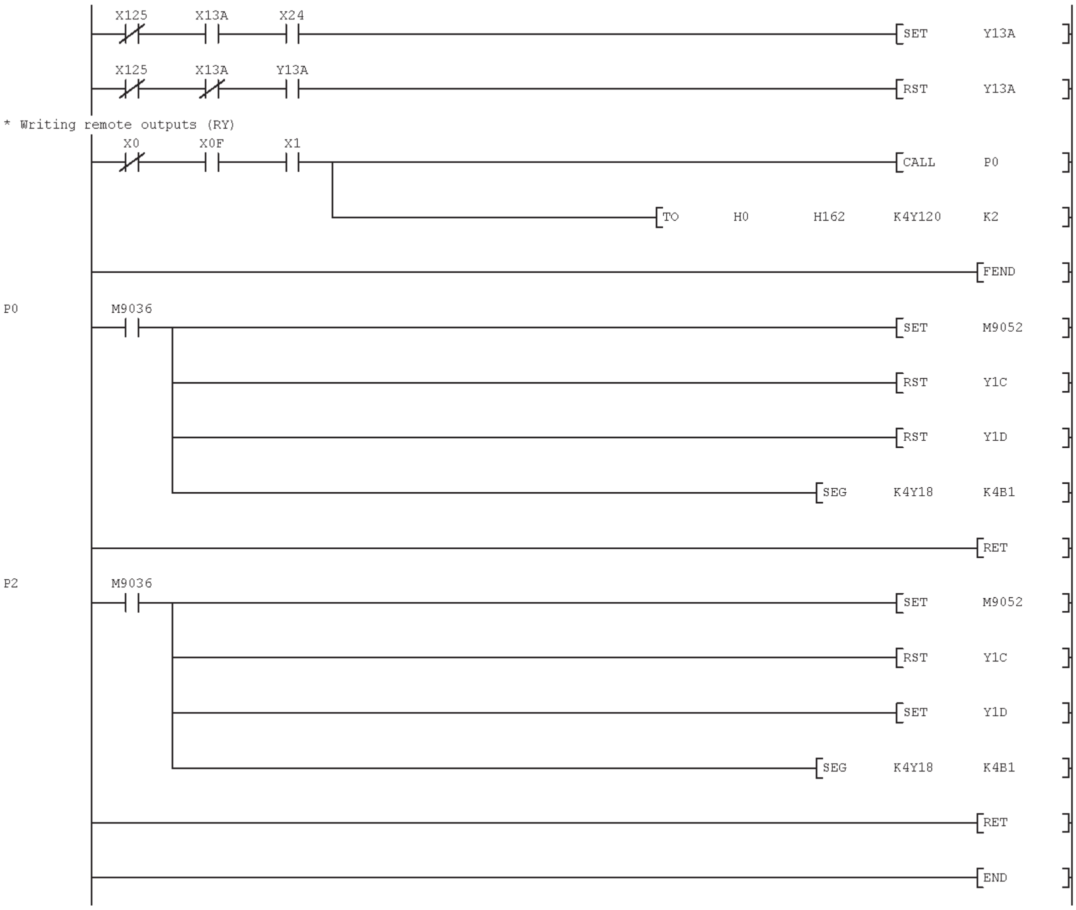

Turns ON Error reset request signal

Resets Error reset request signal

Switches master module buffer memory to bank 0

Writes Y120 to Y13F to remote output (RYn0 to RY(n+1)F)

Switches master module buffer memory to bank 0

Switches master module buffer memory to bank 2

Figure 8.40 Program example for changing auto-refresh buffer assignments (Continued)

## 8.9.2 Program example for receiving data when a receive timeout occurs

(1) Overview of program example

- The receive timeout time is set to 200ms.
- If a receive timeout error (BB21H) occurs, data received up to that point are read out from the AJ65BT-R2N buffer memory to word devices of the master station.
- After reading is completed, the error is cleared.

(2) For the send/receive buffer communication function

(a) Devices used in the program example

**Table 8.46 Devices used in the program example**

| Device | Description | Device | Description |
|---|---|---|---|
| X0 | Module error (Master station) | Y139 | Initial data read request signal |
| X1 | Own station data link status (Master station) | Y13A | Error reset request signal |
| X6 | Data link start by parameters in buffer memory normally completed (Master station) | Y13E | Intelligent device station access request signal |
| X7 | Data link start by parameters in buffer memory failed (Master station) | M0 | Operation start request flag |
| X0F | Module ready (Master station) | M1 | Intelligent device station access request completion flag |
| X23 | Error code read flag | M2 | Operation complete flag |
| X24 | Error clear flag | M3 | Operation failed flag |
| K4X120 | Remote input (X120 to X12F) | M6 | Received error code read request |
| X122 | Normal receive data read request signal | M10 | Sending flag |
| X123 | Error receive data read request signal | M20 | AJ65BT-R2N initial setting start flag |
| X124 | Initialization complete signal | M22 | Error clear request |
| X125 | Initialization failed signal | M24 | Operation complete pulse signal |
| K1X134 | Mode setting switch status signal (X134 to X137) | M30 | Operation failed pulse signal |
| X13A | Error status signal | M90 | RIWT subroutine execute flag |
| X13B | Remote station ready signal | M91 | RIWT subroutine execute flag |
| X13E | Intelligent device station access completion signal | M92 | RIRD subroutine execute flag |
| Y0 | Refresh instruction (Master station) | M93 | RIRD subroutine execute flag |
| Y6 | Request for data link start by parameters in buffer memory (Master station) | M100 | Master station parameter setting start pulse signal |
| K4Y18 | Output (Y18 to Y27) (Master station) | M120 | Buffer memory access exclusion check flag |
| Y1C | Buffer memory bank switching specification (Master station) | M135 | Error handling flag |
| Y1D | | M190 | TO instruction executed flag |
| K4Y120 | Remote output (Y120 to Y12F) | M191 | Intelligent device station access request completion flag |
| Y120 | Send request signal | M200 | RIWT subroutine output completion flag |
| Y121 | Send cancel request signal | M202 | Subroutine in-execution flag |
| Y122 | Receive data read completion signal | M203 | RIWT completion status read start flag |
| Y123 | Forced receive completion request signal | M204 | RIWT completion status read end flag |
| Y124 | Initialization request signal | M230 | Error handling execution pulse signal |
| Y126 | OS reception area clear request signal | M300 | RIRD subroutine output completion flag |
| Y127 | E$^2$PROM function request signal | M301 | RIRD subroutine output failed flag |

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Table 8.46 Devices used in the program example (Continued)

| Device | Description | Device | Description |
|---|---|---|---|
| M303 | RIRD completion status read start flag | D100 to D106 | Network parameters of master station |
| M304 | RIRD completion status read end flag | D107 | Error code in Network parameters setting |
| M502 | AJ65BT-R2N mode normal flag | D130 to D137 | Control data of RIRD instruction and error code of AJ65BT-R2N |
| M503 | AJ65BT-R2N mode error flag | D201 or later | Devices for TO instruction in RIWT subroutine |
| K4M900 | Other station data link status (SW0080) | D300 or later | Devices for TO instruction in RIRD subroutine |
| M901 | Other station data link status (Station No.2) | D340 | Completion status of receive processing |
| M9036 | Always ON | D400 | Error codes generated when receiving |
| M9052 | SEG instruction switching | P0 | Switching to bank 0 |
| D1 to D3 | Control data of the RIWT subroutine or RIRD subroutine | P1 | RIWT subroutine |
| D4 or later | Set values or receive data | P2 | RIRD subroutine |
| D34 | Receive data | — | |

(b) Program example

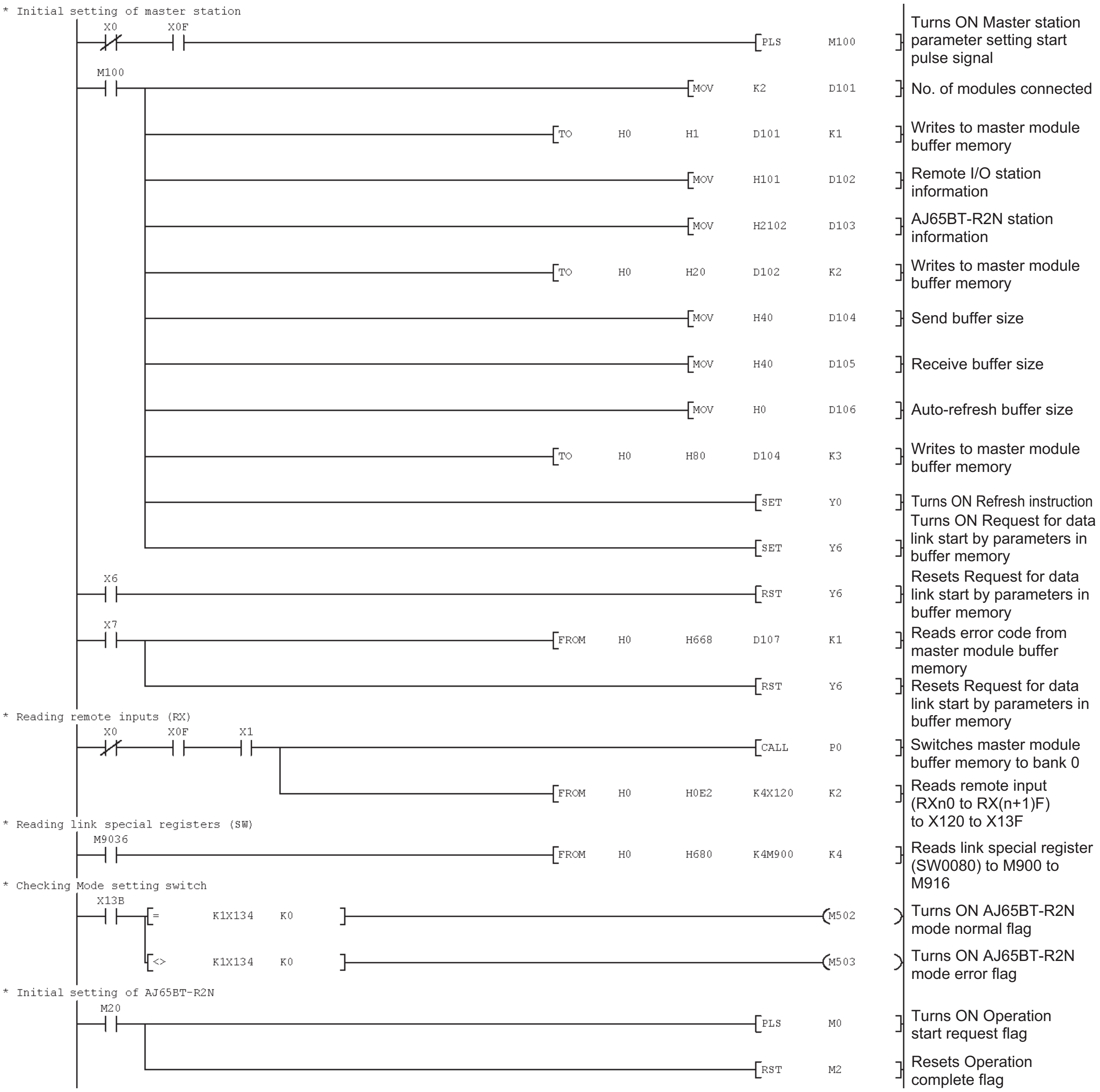

**Figure 8.41 Program example for receiving data when a receive timeout occurs**

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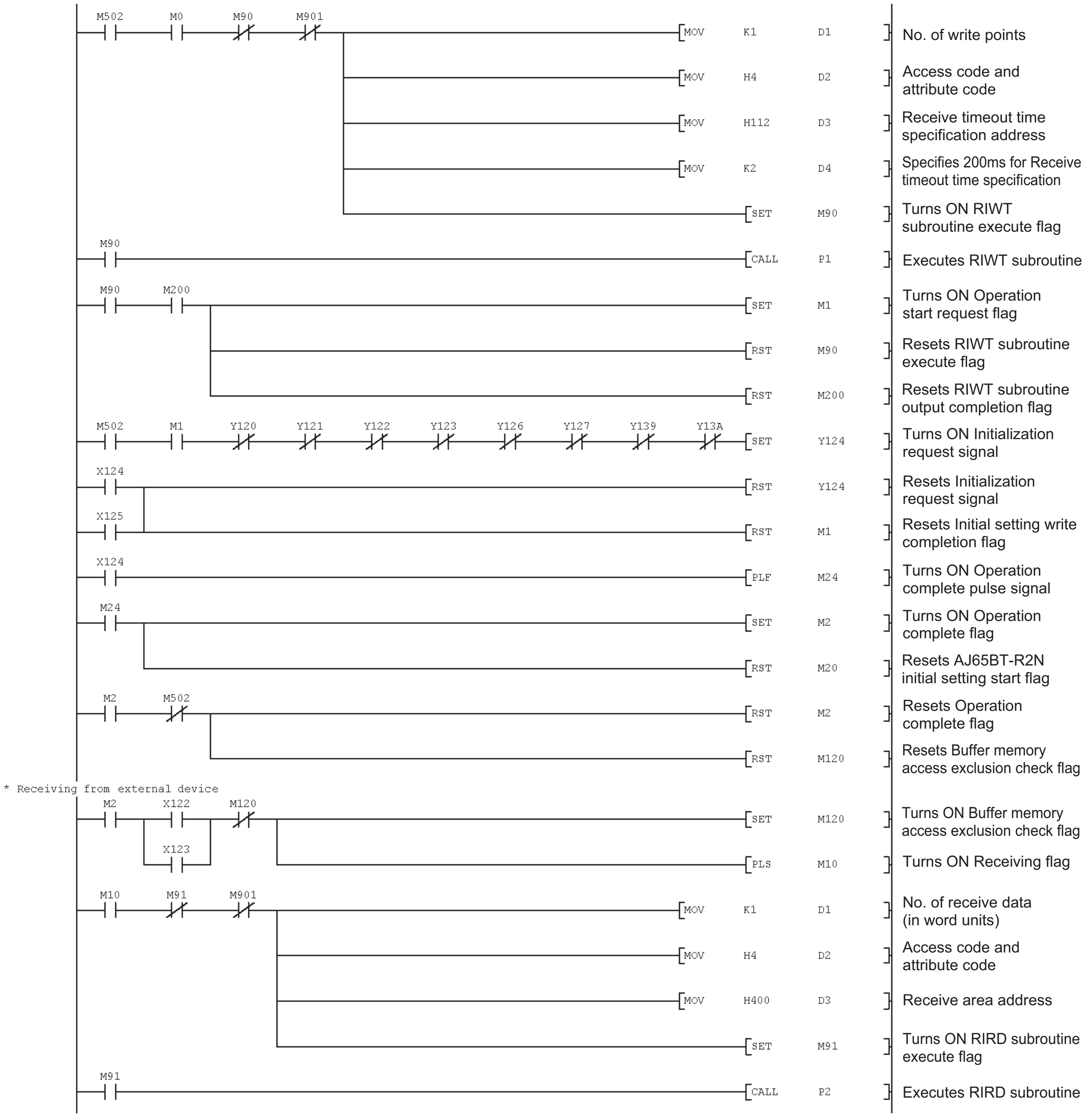

Figure 8.41 Program example for receiving data when a receive timeout occurs (Continued)

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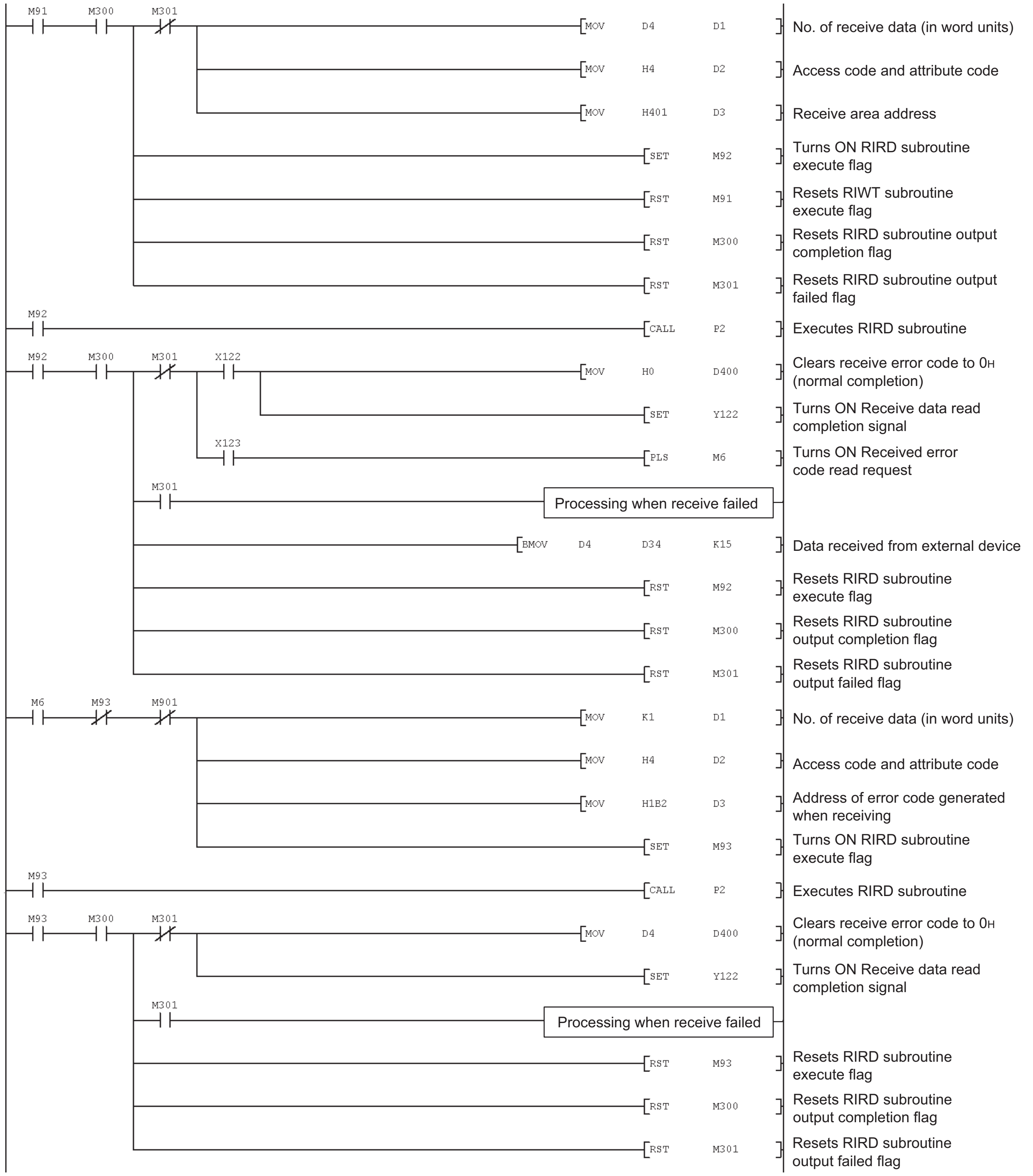

Figure 8.41 Program example for receiving data when a receive timeout occurs (Continued)

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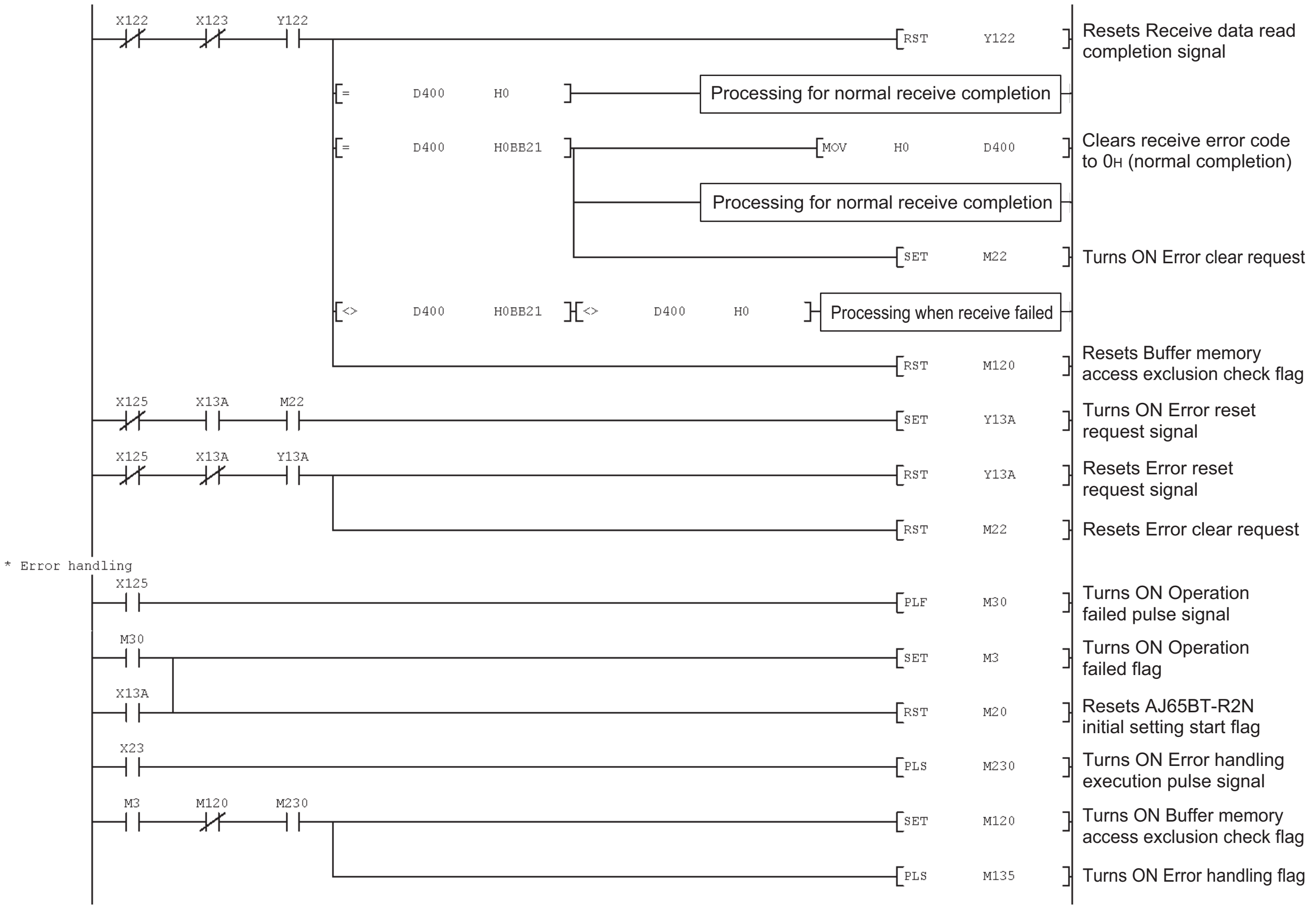

Figure 8.41 Program example for receiving data when a receive timeout occurs (Continued)

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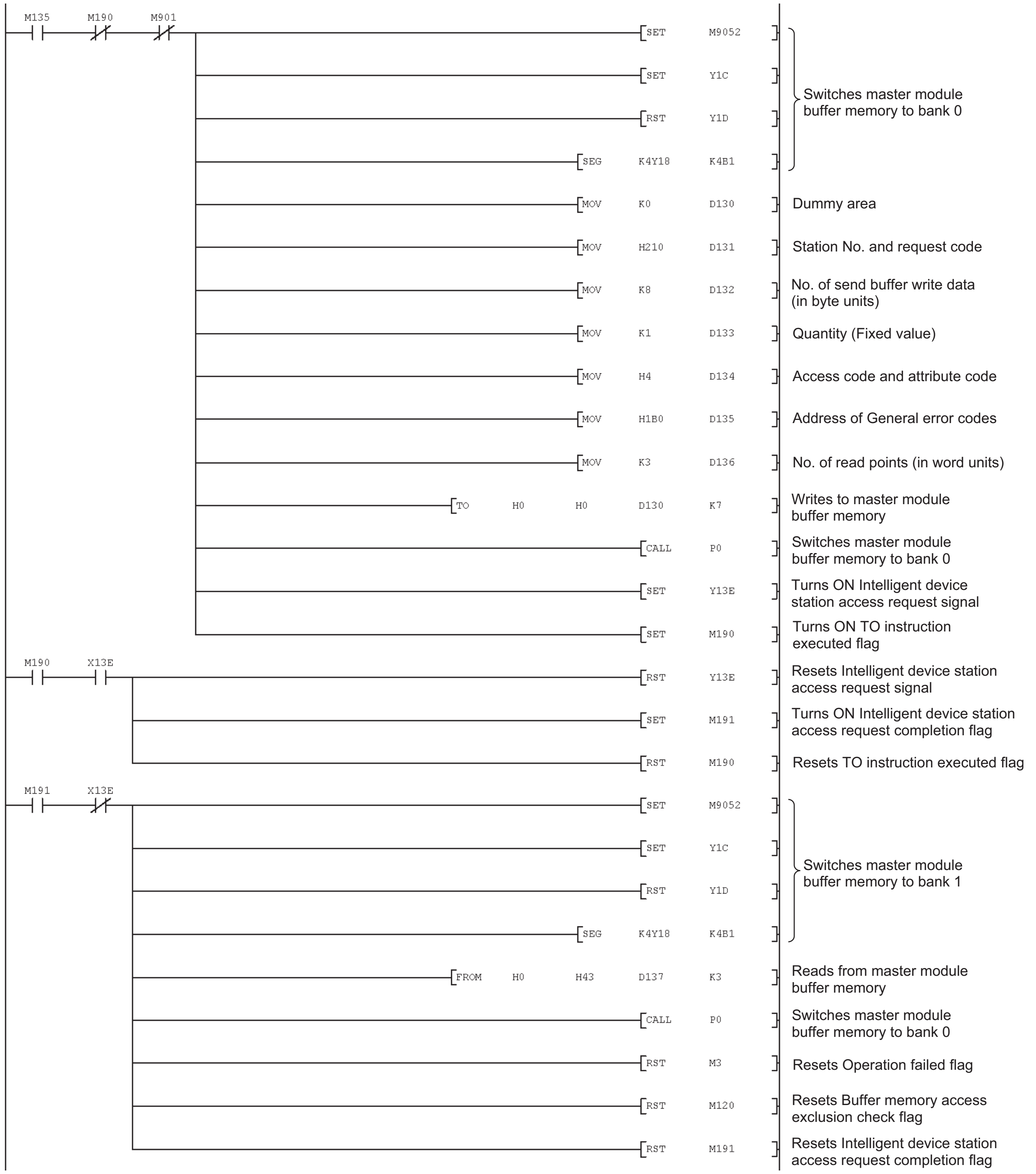

Figure 8.41 Program example for receiving data when a receive timeout occurs (Continued)

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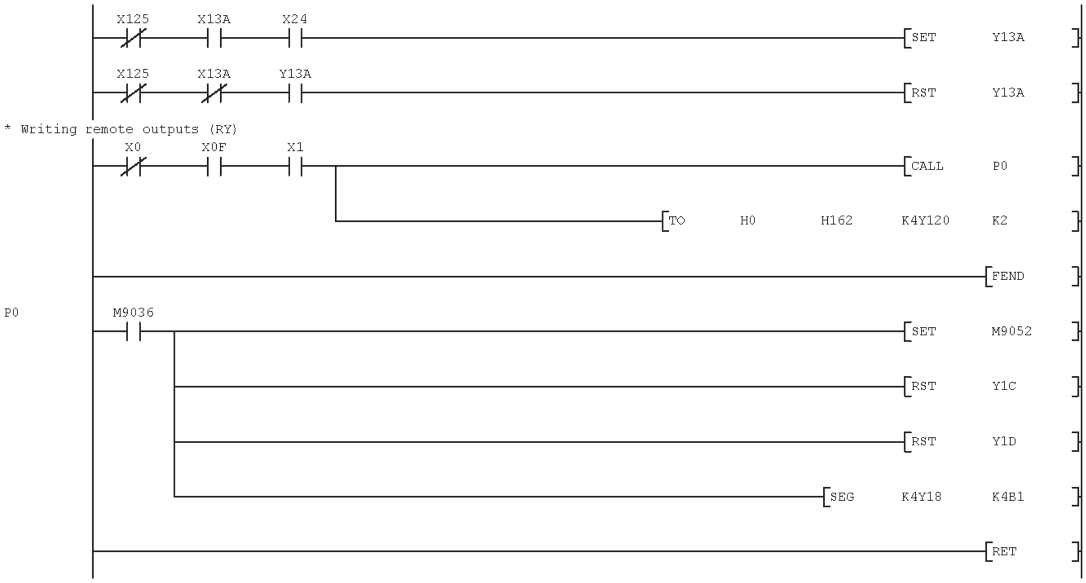

Turns ON Error reset request signal

Resets Error reset request signal

Switches master module buffer memory to bank 0

Writes Y120 to Y13F to remote output (RYn0 to RY(n+1)F)

Switches master module buffer memory to bank 0

Figure 8.41 Program example for receiving data when a receive timeout occurs (Continued)

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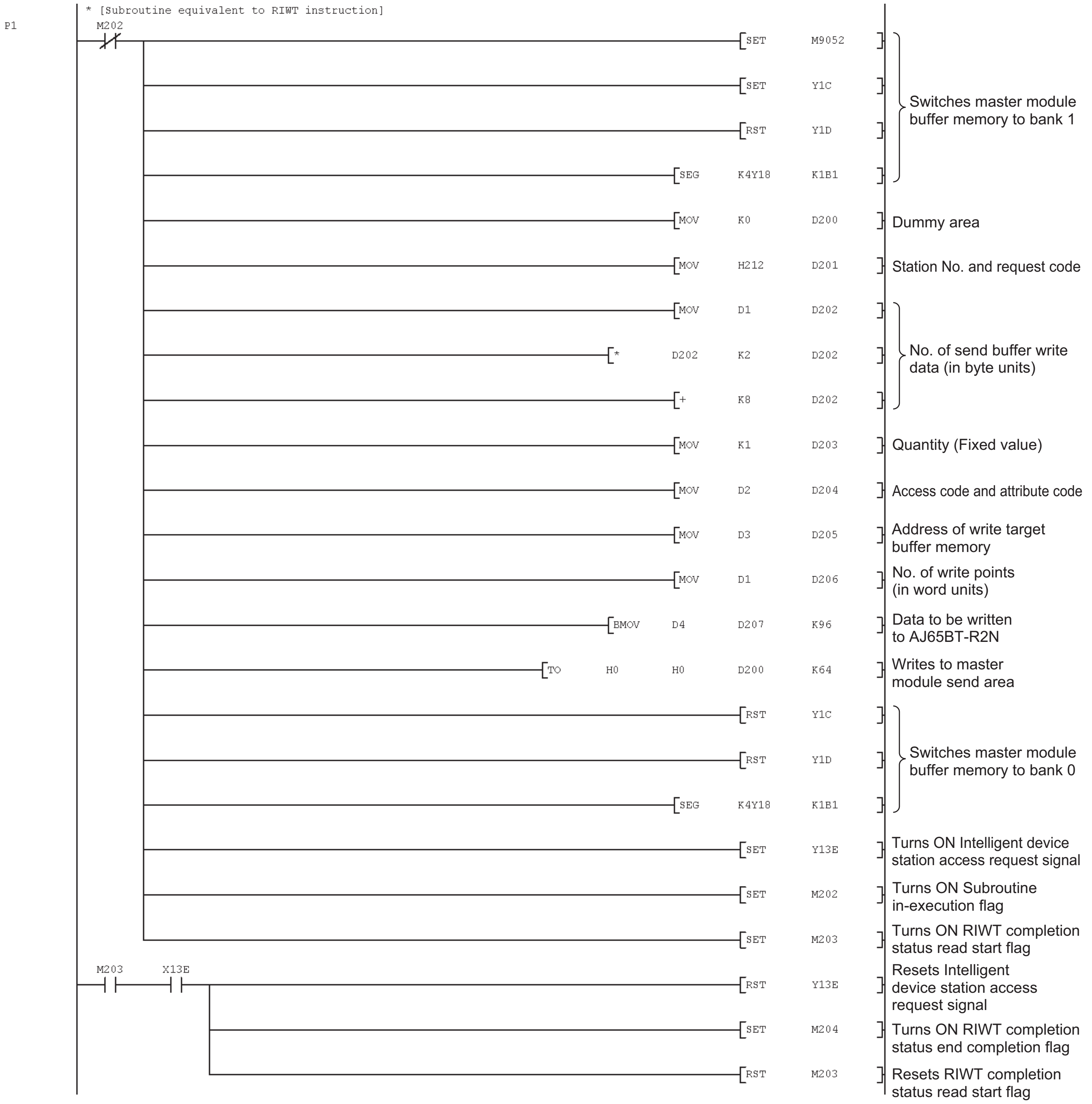

```
* [Subroutine equivalent to RIWT instruction]
P1   M202
     -|/|-
                                   [SET   M9052      ]
                                   [SET   Y1C        ]
                                   [RST   Y1D        ]
                                   [SEG   K4Y18  K1B1]
                                   [MOV   K0     D200]
                                   [MOV   H212   D201]
                                   [MOV   D1     D202]
                                   [*     D202   K2    D202]
                                   [+     K8     D202]
                                   [MOV   K1     D203]
                                   [MOV   D2     D204]
                                   [MOV   D3     D205]
                                   [MOV   D1     D206]
                                   [BMOV  D4     D207  K96]
                                   [TO    H0     H0    D200  K64]
                                   [RST   Y1C        ]
                                   [RST   Y1D        ]
                                   [SEG   K4Y18  K1B1]
                                   [SET   Y13E       ]
                                   [SET   M202       ]
                                   [SET   M203       ]
     M203  X13E
                                   [RST   Y13E       ]
                                   [SET   M204       ]
                                   [RST   M203       ]
```

Figure 8.41 Program example for receiving data when a receive timeout occurs (Continued)

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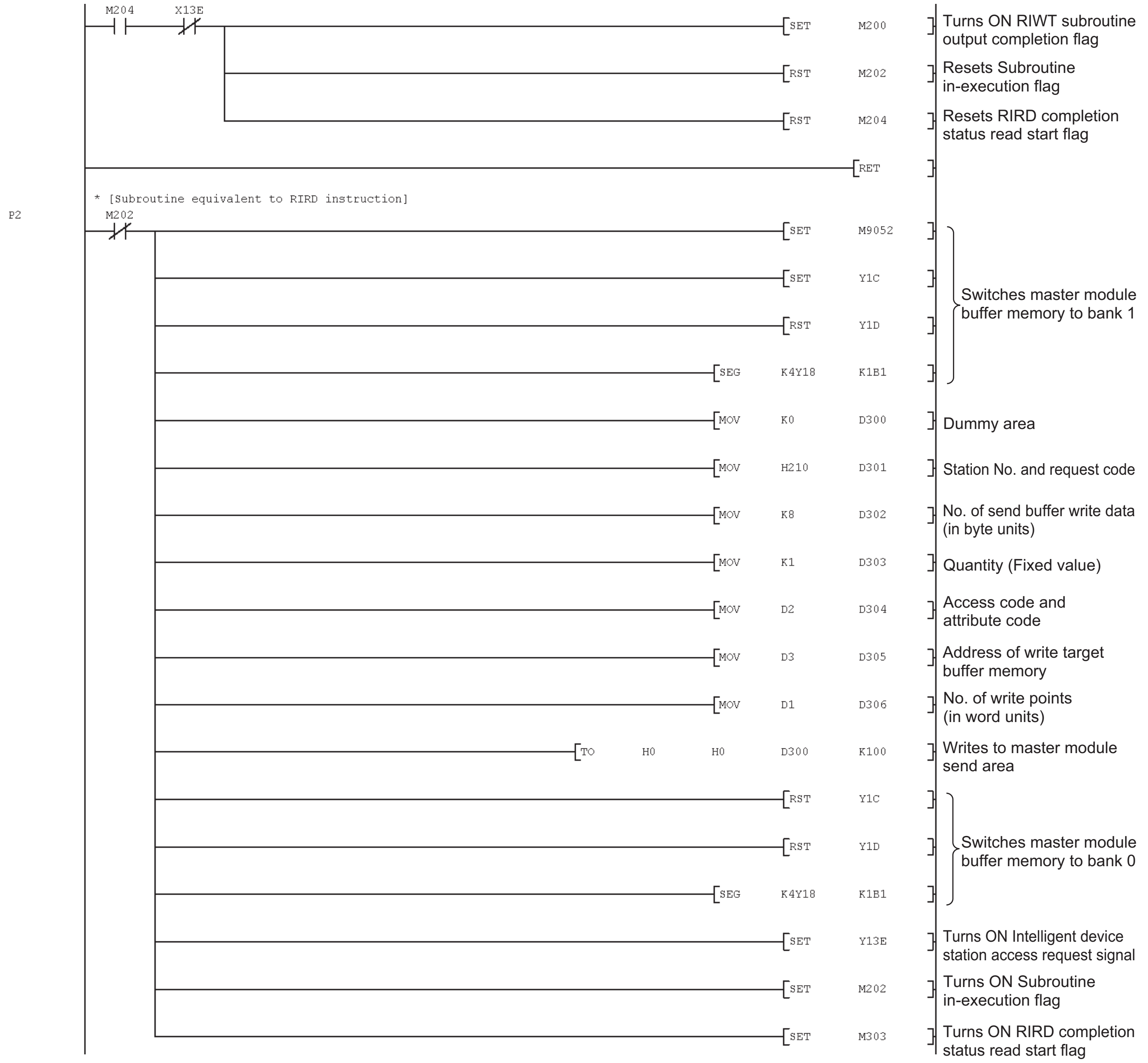

Figure 8.41 Program example for receiving data when a receive timeout occurs (Continued)

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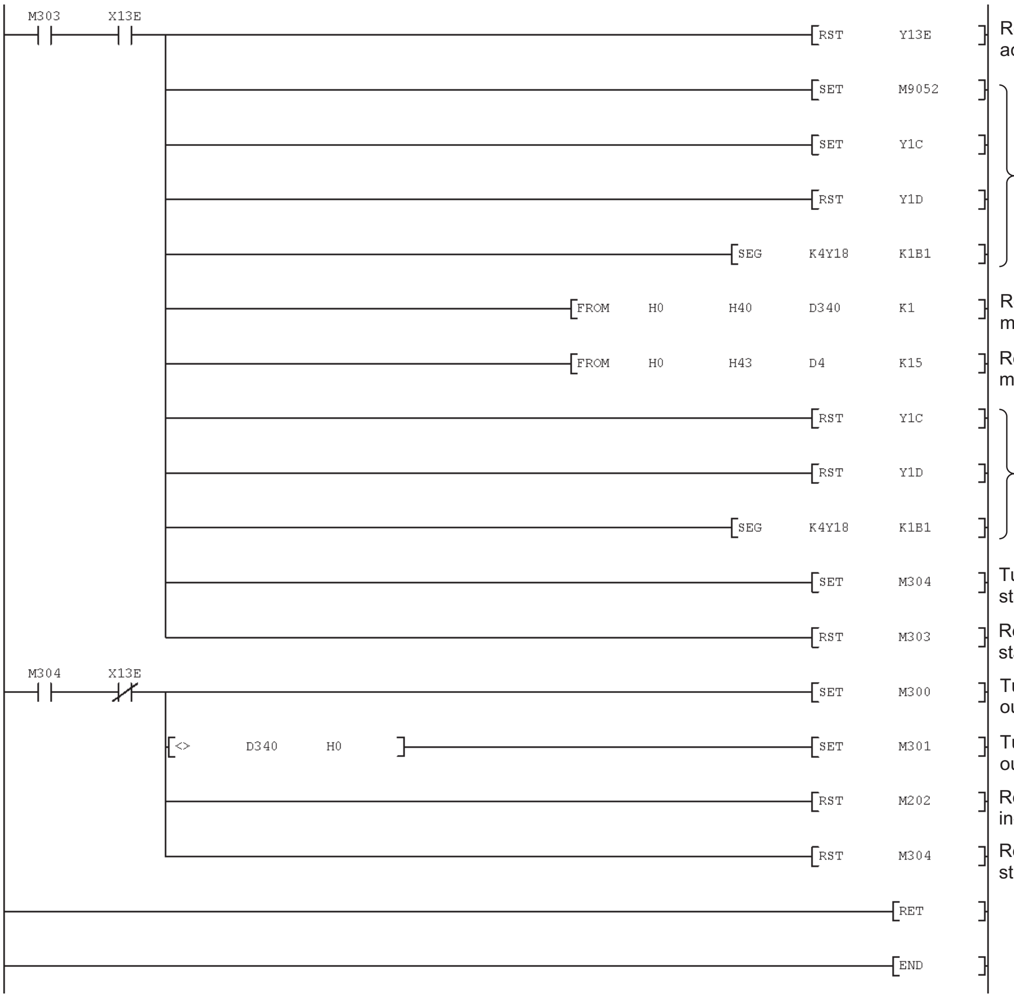

Resets Intelligent device station access request signal

Switches master module buffer memory to bank 1

Reads completion status from master module buffer memory

Reads receive data from master module buffer memory

Switches master module buffer memory to bank 0

Turns ON RIRD completion status read end flag

Resets RIRD completion status read start flag

Turns ON RIRD subroutine output completion flag

Turns ON RIRD subroutine output failed flag

Resets Subroutine in-execution flag

Resets RIRD completion status read end flag

Figure 8.41 Program example for receiving data when a receive timeout occurs (Continued)

(3) For the buffer memory auto-refresh function

(a) Devices used in the program example

Table 8.47 Devices used in the program example

| Device | Description | Device | Description |
|---|---|---|---|
| X0 | Module error (Master station) | Y13A | Error reset request signal |
| X1 | Own station data link status (Master station) | M0 | Operation start request flag |
| X6 | Data link start by parameters in buffer memory normally completed (Master station) | M1 | Initial setting write completion flag |
| X7 | Data link start by parameters in buffer memory failed (Master station) | M2 | Operation complete flag |
| X0F | Module ready (Master station) | M3 | Operation failed flag |
| X23 | Error code read flag | M22 | Error clear request |
| X24 | Error clear flag | M24 | Operation complete pulse signal |
| K4X120 | Remote input (X120 to X12F) | M30 | Operation failed pulse signal |
| X122 | Normal receive data read request signal | M100 | Master station parameter setting start pulse signal |
| X123 | Error receive data read request signal | M111 | Initial data read completion pulse signal |
| X124 | Initialization complete signal | M135 | Error handling flag |
| X125 | Initialization failed signal | M230 | Error handling execution pulse signal |
| X139 | Initial data read completion signal | M500 | AJ65BT-R2N initial data read complete flag |
| X13A | Error status signal | M501 | AJ65BT-R2N initial data reading flag |
| X13B | Remote station ready signal | M502 | AJ65BT-R2N mode normal flag |
| Y0 | Refresh instruction (Master station) | M503 | AJ65BT-R2N mode error flag |
| Y6 | Request for data link start by parameters in buffer memory (Master station) | K4M900 | Other station data link status (SW0080) |
| K4Y18 | Output (Y18 to Y27) (Master station) | M901 | Master station setting complete flag |
| Y1C | Buffer memory bank switching specification (Master station) | M9036 | Always ON |
| Y1D |  | M9052 | SEG instruction switching |
| K4Y120 | Remote output (Y120 to Y12F) | D10 | Set value |
| Y120 | Send request signal | D101 to D106 | Master station network parameters |
| Y121 | Send cancel request signal | D107 | Error code in Network parameters setting |
| Y122 | Receive data read completion signal | D201 or later | No. of receive data |
| Y123 | Forced receive completion request signal | D201 | Receive data |
| Y124 | Initialization request signal | D400 | AJ65BT-R2N error code |
| Y126 | OS reception area clear request signal | P0 | Switching to bank 0 |
| Y127 | E$^2$PROM function request signal | P2 | Switching to bank 2 |
| Y139 | Initial data read request signal | — | |

(b) Program example

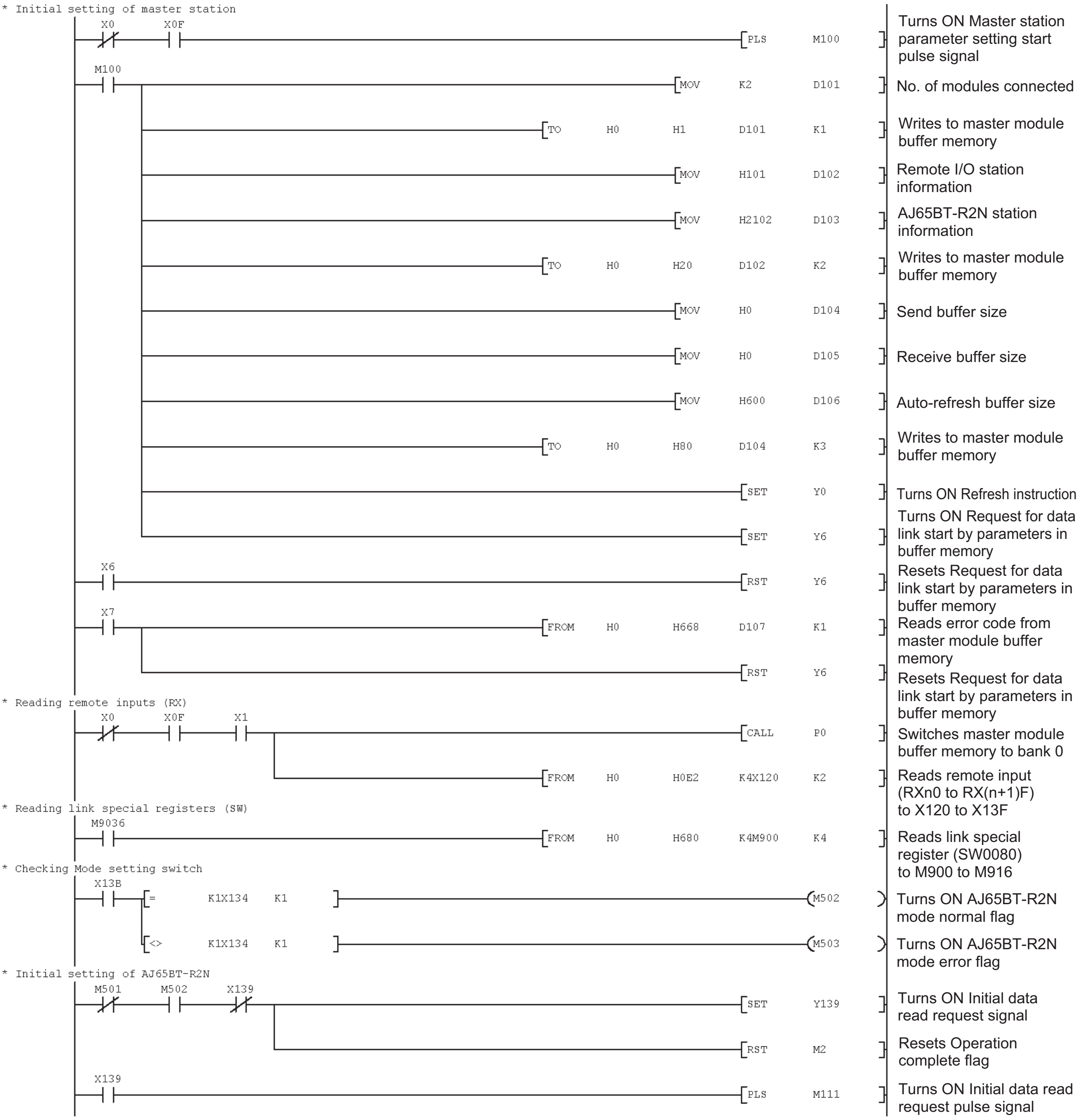

Figure 8.42 Program example for receiving data when a receive timeout occurs

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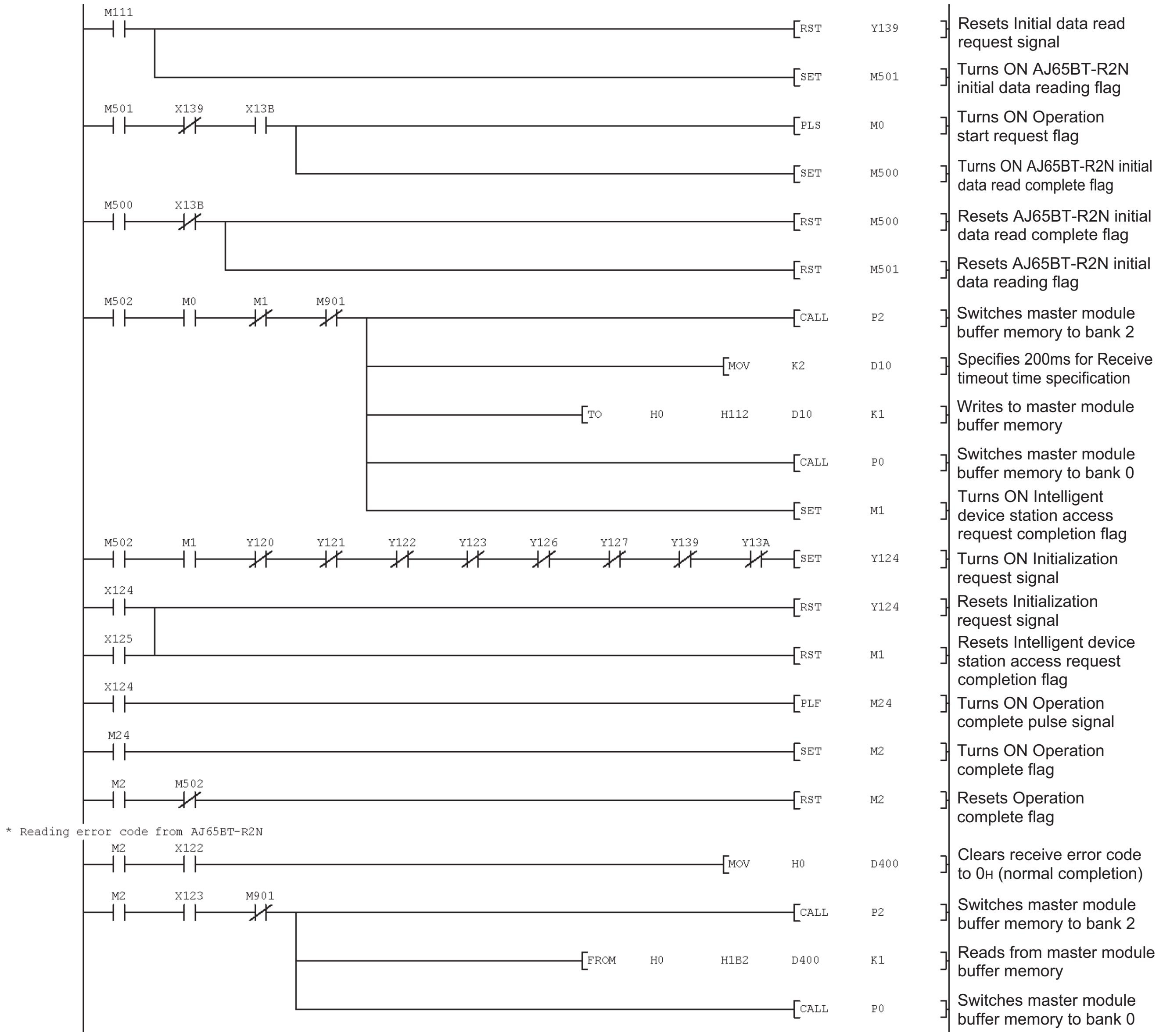

Figure 8.42 Program example for receiving data when a receive timeout occurs (Continued)

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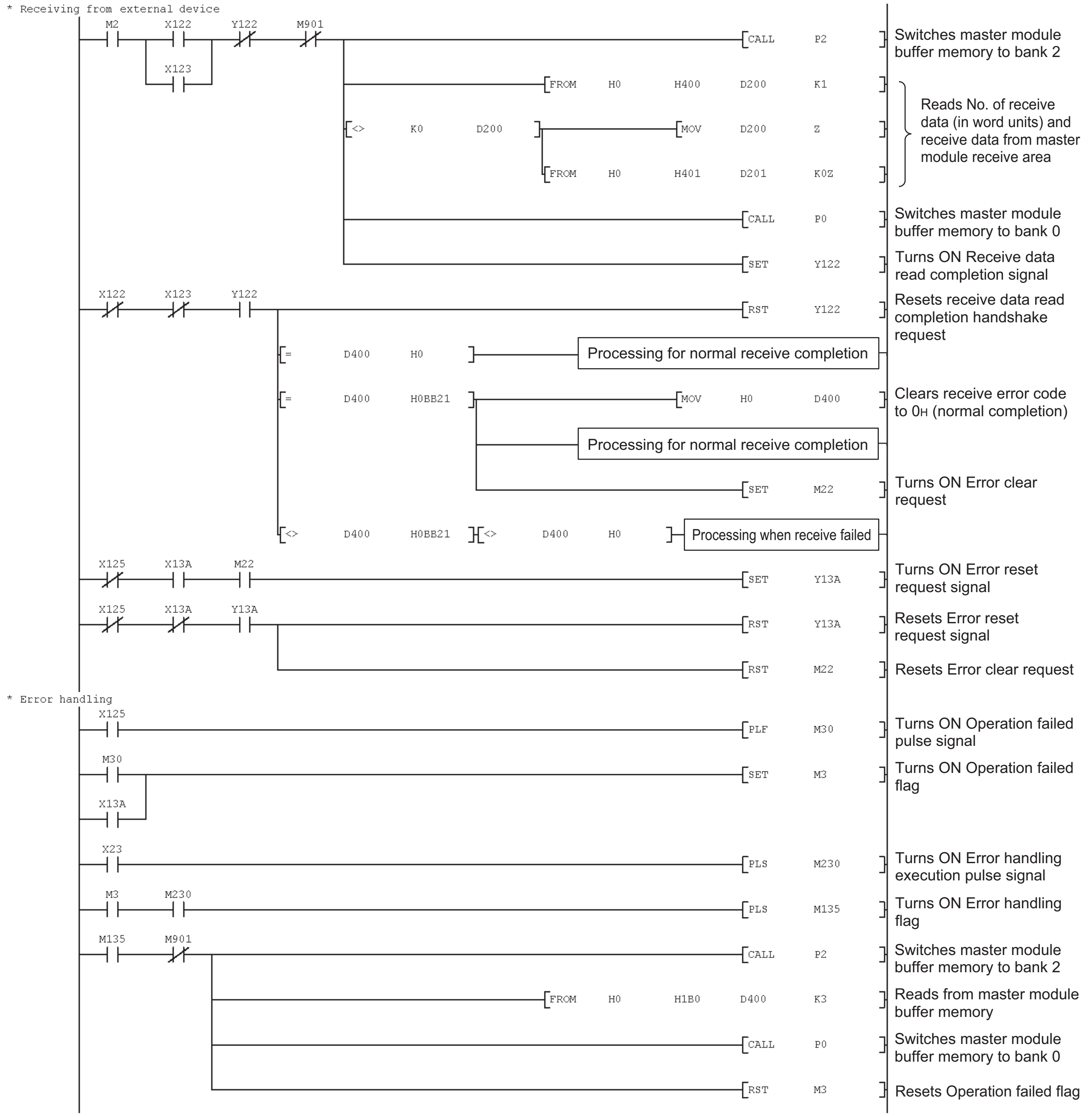

Switches master module buffer memory to bank 2

Reads No. of receive data (in word units) and receive data from master module receive area

Switches master module buffer memory to bank 0

Turns ON Receive data read completion signal

Resets receive data read completion handshake request

Clears receive error code to 0H (normal completion)

Turns ON Error clear request

Turns ON Error reset request signal

Resets Error reset request signal

Resets Error clear request

Turns ON Operation failed pulse signal

Turns ON Operation failed flag

Turns ON Error handling execution pulse signal

Turns ON Error handling flag

Switches master module buffer memory to bank 2

Reads from master module buffer memory

Switches master module buffer memory to bank 0

Resets Operation failed flag

Figure 8.42 Program example for receiving data when a receive timeout occurs (Continued)

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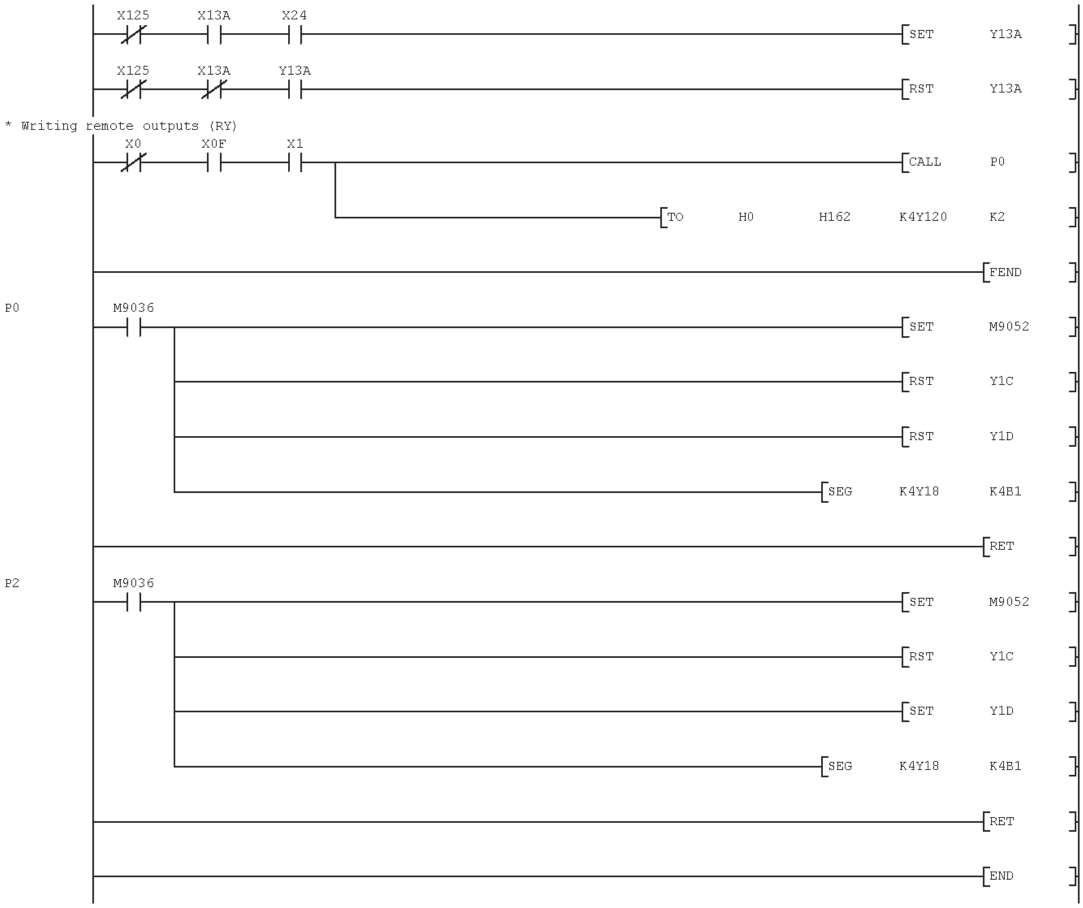

Turns ON Error reset request signal

Resets Error reset request signal

Switches master module buffer memory to bank 0

Writes Y120 to Y13F to remote output (RYn0 to RY(n+1)F)

Switches master module buffer memory to bank 0

Switches master module buffer memory to bank 2

Figure 8.42 Program example for receiving data when a receive timeout occurs (Continued)

# CHAPTER 9 TROUBLESHOOTING

This chapter describes the troubleshooting procedures and error codes of the AJ65BT-R2N.

## 9.1 Troubleshooting in Nonprocedural Protocol Mode

### (1) Troubleshooting lists

The troubleshooting lists for the AJ65BT-R2N are shown in this section.
If a problem arises, check the AJ65BT-R2N status, identify the symptom listed in the following tables, and take corrective actions.
For an error related to the programmable controller CPU, refer to the user's manual for the programmable controller CPU used.
For an error related to the master module, refer to the user's manual for the master module used.

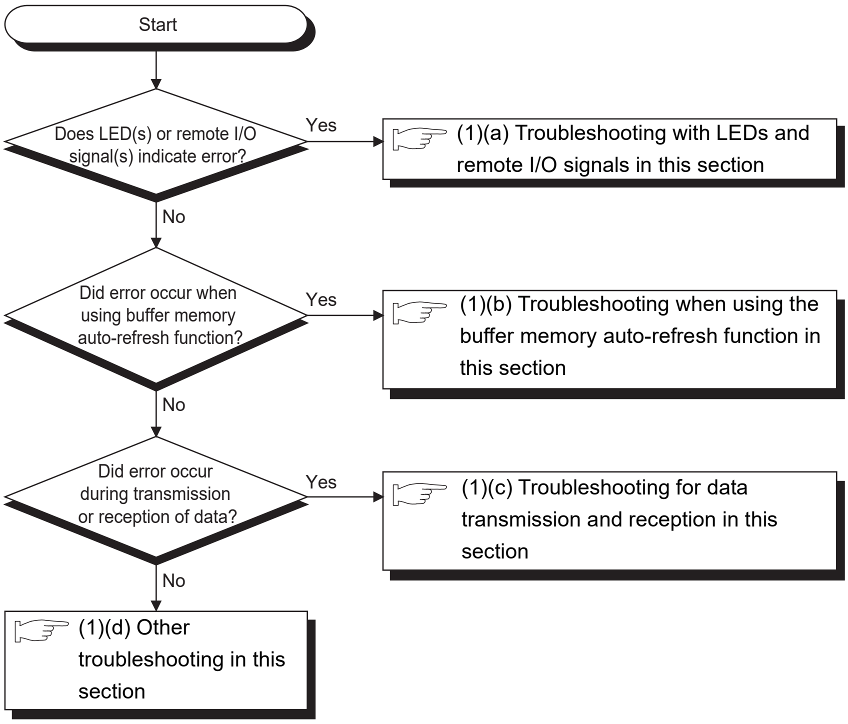

**Figure 9.1 Troubleshooting flowchart**

(a) Troubleshooting with LEDs and remote I/O signals

**Table 9.1 Troubleshooting with LEDs and remote I/O signals**

| Symptom | Cause | Action |
|---|---|---|
| RUN LED turned OFF. | Incorrect switch setting | •Correct the switch setting.<br>☞Section 5.4 Part Names and Settings |
| | A watchdog timer error has occurred. | •Reapply power to or reset the AJ65BT-R2N.<br>•If the RUN LED does not turn ON even after that, check the following.<br>(1) Check the conditions of the AJ65BT-R2N installation, terminal block, and wiring.<br>(2) Check if the system is used in an environment that satisfies the general specifications.<br>(3) Check if power capacity is sufficient<br>(4) The hardware may be faulty. Check if the hardware of the AJ65BT-R2N is normal, according to this manual.<br>☞Section 5.5.1 Hardware test<br>Or, replace the module and check the operation.<br>If the problem persists, the hardware of the AJ65BT-R2N may be faulty.<br>Please consult your local Mitsubishi representative, explaining a detailed description of the problem. |
| L RUN LED turned OFF. | A watchdog timer error has occurred. | •Reapply power to or reset the AJ65BT-R2N.<br>•If the L RUN LED does not turn ON even after that, check the following.<br>(1) Check the conditions of the AJ65BT-R2N installation, terminal block, and wiring.<br>(2) Check if the system is used in an environment that satisfies the general specifications.<br>(3) Check if power capacity is sufficient.<br>(4) The hardware may be faulty. Check if the hardware of the AJ65BT-R2N is normal, according to this manual.<br>☞Section 5.5.1 Hardware test<br>Or, replace the module and check the operation.<br>•If the problem persists, the hardware of the AJ65BT-R2N may be faulty.<br>Please consult your local Mitsubishi representative, explaining a detailed description of the problem. |
| | The CC-Link dedicated cable is disconnected or shorted. | •Check the CC-Link dedicated cable and correct the wiring. |
| | Master station has stopped data link. | •Check the master station for an error. |
| | 24V power is not supplied to the AJ65BT-R2N.<br>Or, the voltage is insufficient. | •Check the voltage of the 24V power supply. |
| | The station No. is duplicated. | •Change the station No. setting of the module whose station No. is duplicated, and reapply power to or reset the AJ65BT-R2N. |
| | The Station No. setting switches are set to 0 or 65 or more, or the Data link transmission speed setting switch is set to other than 0 to 4. | •Correct the setting of the Station No. setting switches and/or the Data link transmission speed setting switch, and reapply power to or reset the AJ65BT-R2N. |

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Table 9.1 Troubleshooting with LEDs and remote I/O signals (Continued)

| Symptom | Cause | Action |
|---|---|---|
| L ERR. LED is flashing at regular intervals. | The setting of the Station No. setting switches or the transmission speed setting switch has been changed during normal operation. | •Set the station No. or transmission speed back to the setting before the change, and then reapply power to or reset the AJ65BT-R2N.<br>•If the L RUN LED does not turn ON even after that, the hardware of the AJ65BT-R2N may be faulty. Please consult your local Mitsubishi representative, explaining a detailed description of the problem. |
| | The Station No. setting switches or the transmission speed setting switch is faulty. | •If the L ERR. LED started flashing while any of the switch settings has not been changed during normal operation, the hardware of the AJ65BT-R2N may be faulty.<br>Please consult your local Mitsubishi representative, explaining a detailed description of the problem. |
| L ERR. LED is flashing irregularly. | No terminating resistor is connected. | •Connect a terminating resistor, and reapply power or reset the module. |
| | AJ65BT-R2N or CC-Link dedicated cable is affected by noise. | •Ground both ends of the shield wire of the CC-Link dedicated cable through SLD and FG of respective modules.<br>•Securely ground the FG terminal of the AJ65BT-R2N.<br>•When using pipes for wiring, securely ground the pipes. |
| L ERR. LED turned ON. | An error occurred during communication between the master station and AJ65BT-R2N. | •Check the error code stored in the AJ65BT-R2N buffer memory, set correct data, and then reapply power to or reset the AJ65BT-R2N.<br>☞Section 9.2 Error code list |
| | The Station No. setting switches are set to 0 or 65 or more, or the Data link transmission speed setting switch is set to other than 0 to 4. | •Correct the setting of the Station No. setting switches and/or the Data link transmission speed setting switch, and reapply power to or reset the AJ65BT-R2N. |
| Although a send request was made, nothing is sent.<br>SD LED does not flash. | Transmission has been stopped because the CS (CTS) signal was turned OFF. | •Check the status of the CS (CTS) signal (RXn9) and DSR (DR) signal (RXnA).<br>•Correct the RS-232 cable connection.<br>•When the signal has been turned to OFF by the external device, check if the external device can receive data or not.<br>If not, place the external device in the ready-to-receive status, and turn ON the signal.<br>•Check the flow control specifications of the external device, and change the flow control to DC code control or disable it. |
| | In the DTR/DSR (ER/DR) control, transmission has been stopped because the DSR (DR) signal was turned OFF. | |
| | In the DC code control, transmission from the AJ65BT-R2N has been stopped because DC3 was sent from the external device to the AJ65BT-R2N. | •Check if the external device can receive data or not.<br>If DC3 was sent with the external device placed not in the ready-to-receive status, place it in the ready-to-receive status.<br>•Check the flow control specifications of the external device, and change the flow control to DTR/DSR (ER/DR) control or disable it. |

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Table 9.1 Troubleshooting with LEDs and remote I/O signals (Continued)

| Symptom | Cause | Action |
|---|---|---|
| Although a send request was made, nothing is sent.<br>SD LED does not flash. | A send error has occurred. | •Check the RS-232 ERR. LED, Send failed signal (RXn1) and Error status signal (RX(n+1)A).<br>If an error has occurred, an error code is stored in Error code history (R2N 1A8H to 1AFH) or Error codes generated when sending (R2N 1B1H).<br>☞Section 9.2 Error code list |
|  | The RS-232 cable is faulty. | •Correct the RS-232 cable connection. |
|  | The send request was not made correctly. | •Set a value in Send timeout time specification (R2N 11AH), and check if a send timeout error (BB11H) occurs or not.<br>If no send timeout time error (BB11H) is detected, modify the sequence program for the send request. |
|  | A CC-Link communication error has occurred. | •Check the indicator LEDs and take corrective actions.<br>☞Section 5.4 Part Names and Settings |
| RD LED does not flash during data transmission from external device. | Incorrect signal line connection | •Check if the SD and RD signal lines of the RS-232 cable are correctly connected between the AJ65BT-R2N and external device. |
|  | The send control signal of the external device is not ON. | •Wire the system so that the AJ65BT-R2N-side send signals such as DSR or CS will turn ON on the external device side. |
|  | In the flow control, free space in the OS reception area of the AJ65BT-R2N has been reduced to 64 bytes or less. | •Perform receive processing. |
|  | The transmission speed setting is not consistent. | •Set the same transmission speed for the AJ65BT-R2N and external device. |
| Although RD LED flashes during data transmission from external device, Normal receive data read request signal (RXn2) does not turn ON. | Fixed length data have not been received. | •Check if the external device has sent data of the fixed length set on the AJ65BT-R2N side. |
|  | Receive data specified with Receive end frame No. have not been received. | •Check if the end frame was sent during communication using registration frames or not. |
|  | The transmission speed setting, etc. is not consistent. | •Set the same settings such as the transmission speed for the AJ65BT-R2N and external device. |
| ERR.LED turns ON. | The Mode setting switch or the RS-232 transmission setting switches are set incorrectly. | •Read an error code from the buffer memory, identify the error, and correct the setting. |
|  | The AJ65BT-R2N detected an error during data transmission or reception. | •Read an error code from the buffer memory, and take corrective actions. |
| When Initialization failed signal (RXn5) is ON, Remote station ready signal (RX(n+1)B) turns OFF.<br>Also, after this, the error is not reset by Error reset request signal (RY(n+1)A). | When Initialization failed signal (RXn5) is ON, the operation is as described in the left. | •Ignore the OFF status of Remote station ready signal (RX(n+1)B), remove the cause of the initialization error, and make the initialization request again.<br>After normal completion of Initialization request signal (RYn4), make an error reset request.<br>☞Section 3.7.2 (15) Error reset request signal (RY(n+1)A) and Error status signal (RX(n+1)A) |

(b) Troubleshooting when using the buffer memory auto-refresh function

**Table 9.2 Troubleshooting when using the buffer memory auto-refresh function**

| Symptom | Cause | Action |
|---|---|---|
| Send/receive buffer size setting error (B904$_H$) occurs. | The auto-refresh buffer settings have not been configured in the master station. | •Select the master station in [Network parameters], and correct the auto-refresh buffer settings in [CC-Link station information. Module 1] - [Intelligent buffer select]. |
| | The auto-refresh buffer size is not sufficient for the master station. | |
| Data cannot be entered into the auto-refresh buffer.<br>Auto-refresh buffer data is 0. | Incorrect reference addresses were set for the auto-refresh buffer. | •For access with the RIFR/RITO instruction, check and correct the address specified for the instruction.<br>☞Section 3.8.1 Buffer memory list<br>•For access with the FROM/TO instruction, calculate the address as follows:<br>(Auto-refresh buffer start address) + (Start offset assigned to the target station) + (Address specified when accessing with RIFR/RITO)<br>•When accessing the auto-refresh buffer of an A series master module with the FROM/TO instruction, switch the bank. |
| | The auto-refresh buffer has not been set. | •Select the master station in [Network parameters], and correct the auto-refresh buffer settings in [CC-Link station information. Module 1] - [Intelligent buffer select]. |
| | Initialization data have not been written to the master station. | •Turn ON Initial data read request signal (RY(n+1)9), and write the initialization data to the master station. |
| | An error occurred while writing the initialization data to the master station. | •Check the RS-232 ERR. LED and Error status signal (RX(n+1)A).<br>If an error occurs, an error code is stored into Error code storage area (R2N 1A8$_H$ to 1B2$_H$).<br>•If a send/receive buffer size setting error (B904$_H$) has occurred, select the master station in [Network parameters], and correct the auto-refresh buffer settings in [CC-Link station information. Module 1] - [Intelligent buffer select].<br>•For any other errors, refer to the following.<br>☞Section 9.2 Error code list |

(c) Troubleshooting for data transmission and reception

**Table 9.3 Troubleshooting for data transmission and reception**

| Symptom | Cause | Action |
|---|---|---|
| AJ65BT-R2N does not receive data sent from the external device. | Receive data of the size specified in No. of receive end data (R2N 111$_H$) have not been received yet.<br>Or, receive data specified in Receive end frame No. (R2N 10C$_H$ to 10F$_H$) have not been received yet. | •Check the settings of No. of receive end data (R2N 111$_H$) and Receive end frame No. (R2N 10C$_H$ to 10F$_H$).<br>•If no setting or incorrect setting is identified, set it correctly.<br>The defaults of the AJ65BT-R2N are as follows:<br>•No. of receive end data (R2N 111$_H$): 0 (Not specified)<br>•Receive end frame No.1 (R2N 10C$_H$): 0A$_H$ (LF), or Receive end frame No.2 (R2N 10D$_H$): 0D$_H$ (CR) |
| | | •When No. of receive data or the last receive data is uncertain, utilize a receive timeout error (BB21$_H$) or Forced receive completion request signal (RYn3). |
| | | •Turn ON Forced receive completion request signal to check if the AJ65BT-R2N has received data.<br>•If the AJ65BT-R2N has not received any data, perform the following.<br>(1) Check if the RS-232 RD LED is flashing or not while the external device is sending data. If not, check the external device again for proper transmission.<br>(2) Correct the RS-232 cable connection. |
| | | •Check if the size of the data received from the external device is No. of receive end data or less. |
| | | •Check if the receive end frame is specified in the data received from the external device. |
| | After writing of No. of receive end data and receive end frame No. from the master station, Initialization request signal (RYn4) has not been turned ON. | •Turn ON Initialization request signal (RYn4) after writing No. of receive end data and receive end frame No.<br>Or, register these set values to E$^2$PROM, and reapply power to or reset the AJ65BT-R2N before starting data communication. |
| | When using No. of receive end data, the setting of Word/byte specification (R2N 102$_H$) is incorrect. | •Change the setting of Word/byte specification (R2N 102$_H$). |
| | No data have been received from the external device. | •Check if the RS-232 RD LED is flashing or not while the external device is sending data.<br>If not, check the external device for proper transmission.<br>•Correct the RS-232 cable connection. |

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Table 9.3 Troubleshooting for data transmission and reception (Continued)

| Symptom | Cause | Action |
|---|---|---|
| AJ65BT-R2N does not receive data sent from the external device. | The AJ65BT-R2N has an error. | •Check the RS-232 ERR. LED, Error receive data read request signal (RXn3) and Error status signal (RX(n+1)A).<br>If an error occurs, an error code is stored into Error codes generated when receiving (R2N 1B2$_H$).<br>•For a Receive data size exceeded error (BBA2$_H$), change the data size so that data can be entered into free space of the receive area.<br>•Any other error<br>☞Section 9.2 Error code list |
| | When Receive start frame No. is specified, data corresponding to the receive start frame have not been received yet. | •Check the setting of Receive start frame No. (R2N 108$_H$ to 10B$_H$).<br>•Check if the head of the data sent from the external device contains the data corresponding to the receive start frame. |
| | The RS-232 cable is faulty. | •Correct the RS-232 cable connection. |
| "Data + CR + LF" sent from the external device is divided into two and received by the AJ65BT-R2N as "Data + CR (0D$_H$)" and "LF (0A$_H$)". | Receive end frame No. (R2N 10C$_H$ to 10F$_H$) is set to "CR (0D$_H$)" or "LF(0A$_H$)". | •Change the Receive end frame No. (R2N 10C$_H$ to 10F$_H$) setting to "CR (0D$_H$) + LF (0A$_H$)". |
| Data that cannot be decoded are sent or received. | The parity bit setting is not consistent. | •Make the same parity bit setting for the AJ65BT-R2N and external device. |
| | The stop bit length setting is not consistent. | •Set the same stop bit length for the AJ65BT-R2N and external device. |
| | The transmission speed setting is not consistent. | •Set the same transmission speed for the AJ65BT-R2N and external device. |
| Which module, AJ65BT-R2N or external device, caused communication error is unknown. | — | •To find it out, check the following on the AJ65BT-R2N or master station side.<br>(1) Check the hardware.<br>•Check that the AJ65BT-R2N is installed securely.<br>•Check that the pins of the module are not defective.<br>(2) Perform the AJ65BT-R2N hardware test.<br>☞Section 5.5.1 Hardware test<br>•Make sure that no error is detected in the AJ65BT-R2N hardware test.<br>(3) Check the CPU status.<br>•Confirm that an error that will cause the operation stop has not been detected in the CPU. |

(d) Other troubleshooting

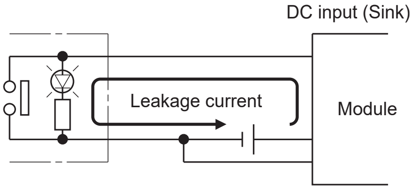
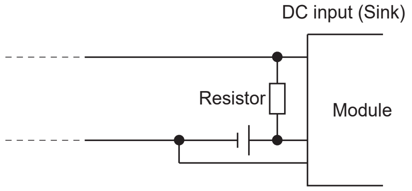
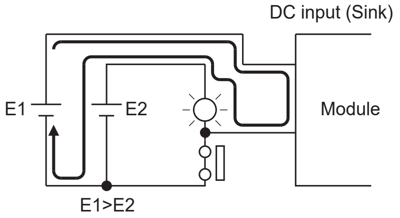
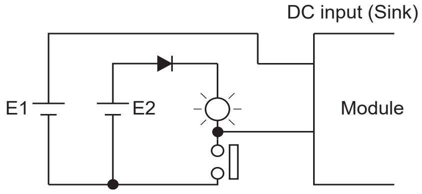
**Table 9.4 Other troubleshooting**

| Symptom | Cause | Action |
|---|---|---|
| "OPERATION ERROR" occurs when using dedicated instruction (RIRD/ RIWT/RISEND/RIRCV) | The send/receive buffer settings have not been configured in the master station. | •Select the master station in [Network parameters], and correct the send/receive buffer settings in [CC-Link station information. Module 1] - [Intelligent buffer select]. |
| | The send/receive buffer size is not sufficient for the master station. | |
| | The syntax or control data of the dedicated instruction has an error. | •Check the syntax or control data of the dedicated instruction.<br>☞Manual for the master module used |
| Changed buffer memory values do not become effective for data communication. | After writing of the AJ65BT-R2N buffer memory values from the master station, Initialization request signal (RYn4) has not been turned ON. | •Check if initialization is required or not after changing the buffer memory value(s).<br>☞Section 3.8.1 Buffer memory list<br>•After writing the AJ65BT-R2N buffer memory values from the master station, turn ON Initialization request signal (RYn4).<br>Or, register the set values to E$^2$PROM, reapply power to or reset the AJ65BT-R2N before starting data communication. |
| Although buffer memory values were changed and registered to E$^2$PROM, they are not updated even after reapplication of power or resetting. | After writing of the AJ65BT-R2N buffer memory values from the master station, Initialization request signal (RYn4) has not been turned ON. | •After writing the AJ65BT-R2N buffer memory values from the master station, turn ON Initialization request signal (RYn4), and then register them to the E$^2$PROM. |
| Communication is unstable. | Poor contact in the signal cable wiring | •Replace the cable, or secure the connections. |
| An external device detects a communication error at powering on the AJ65BT-R2N. | RS-232 communications of the AJ65BT-R2N may be unstable immediately after powering on the AJ65BT-R2N. | •Power on the order of the AJ65BT-R2N and external device. |

(2) Troubleshooting of the general-purpose input circuit

This section describes an error example of the general-purpose input circuit and corrective measures.

**Table 9.5 An error example of the general-purpose input circuit**

| No. | Symptom | Cause | Corrective action |
|---|---|---|---|
| Example 1 | Input signal does not turn OFF. | •Driven by the switch with LED indicator<br><br> | •Connect a proper resistor as shown below so that a voltage across the input terminal and COM1 will be higher than the OFF voltage.<br><br> |
| Example 2 | | •Writing by using two power supplies<br><br> | •Reduce the two power supplies to one.<br>•Connect a reverse-current preventive diode as shown below.<br><br> |

(a) Calculation for Example 1

A switch with LED indicator is connected to the AJ65BT-R2N, where leakage current of 4mA flows when 24V DC power is applied.

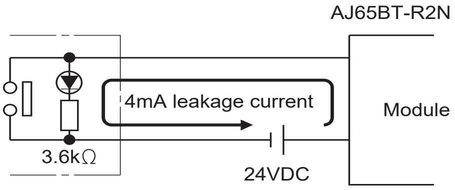


**Figure 9.2 Example 1**

1) Since the specified OFF current value of 1.7mA is not satisfied, the AJ65BT-R2N does not turn OFF.
   Therefore, connect a resistor as illustrated below.

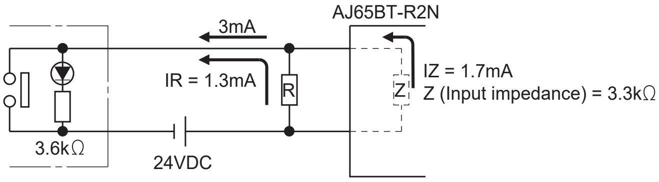


**Figure 9.3 Connecting a resistor**

2) The specified OFF current of 1.7mA for the AJ65BT-R2N is satisfied if a resistor (R), where a current of 1.3mA or more will flow, is connected. Therefore, a value for the resistor (R) can be calculated by the following formulas.

$I_R : I_Z = Z$ (Input impedance) : R (Resistance)

$R \leqq I_Z/I_R \times Z = 1.7/1.3 \times 3.3 \times 10^3 = 4.3$ [kΩ]
$R < 4.3$ [kΩ]

When the resistance R is 3.9kΩ, power consumption W of the resistor (R) is obtained from the following.

$W = (\text{Input voltage})^2 \div R$
$= 28.8^2 \div 3900$
$= 0.2$ [W]

3) Determine a power capacity of the resistor three to five times as much as the actual current consumption.
As a result, a resistor of 3.9 [kΩ] and 1.0 [W] is to be connected to the terminal in question.

(3) Troubleshooting when the master station's ERR. LED flashes

The following explains how to troubleshoot the system when the master station's ERR. LED flashes.

(a) Master station side troubleshooting

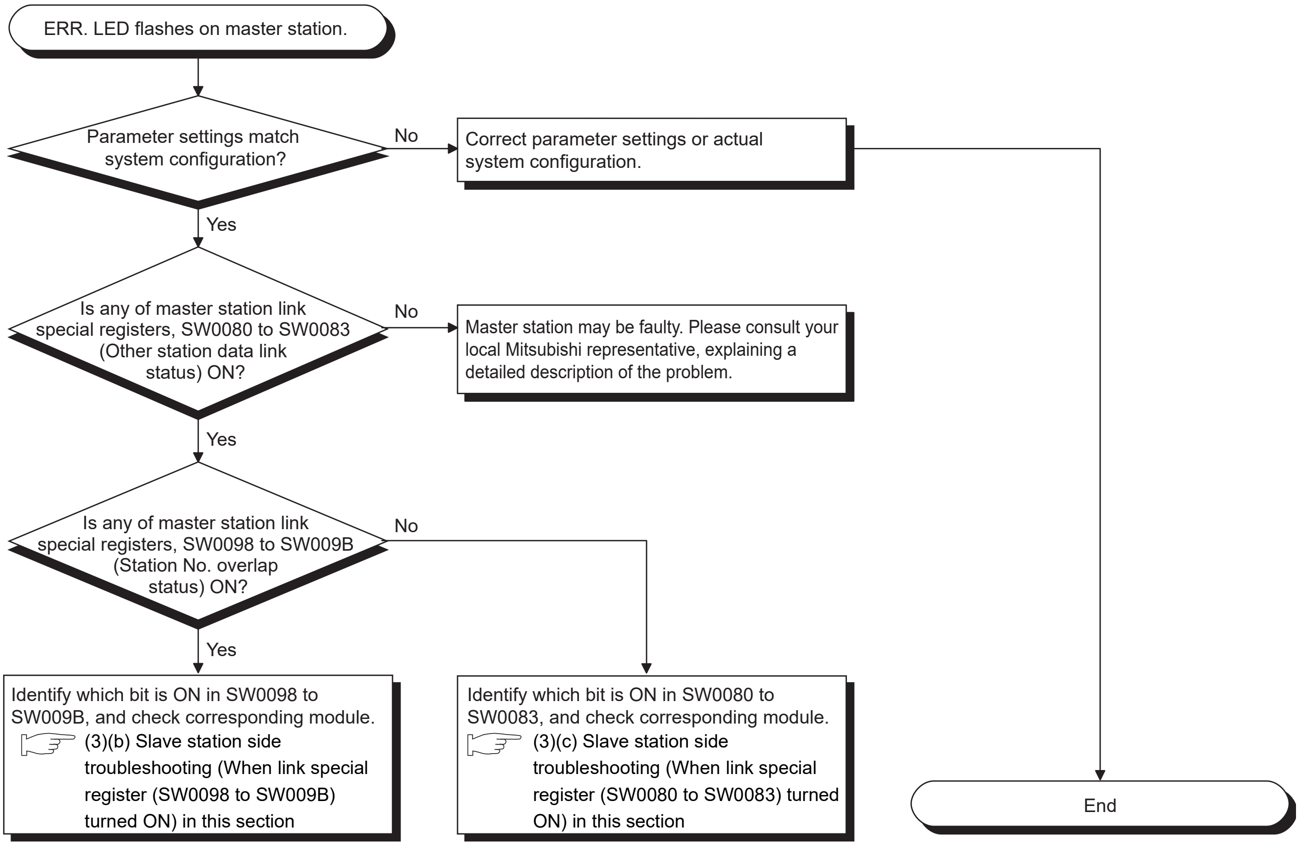


**Figure 9.4 Troubleshooting when the master station's ERR. LED flashes**

(b) Slave station side troubleshooting (When link special register (SW0098 to SW009B) turned ON)

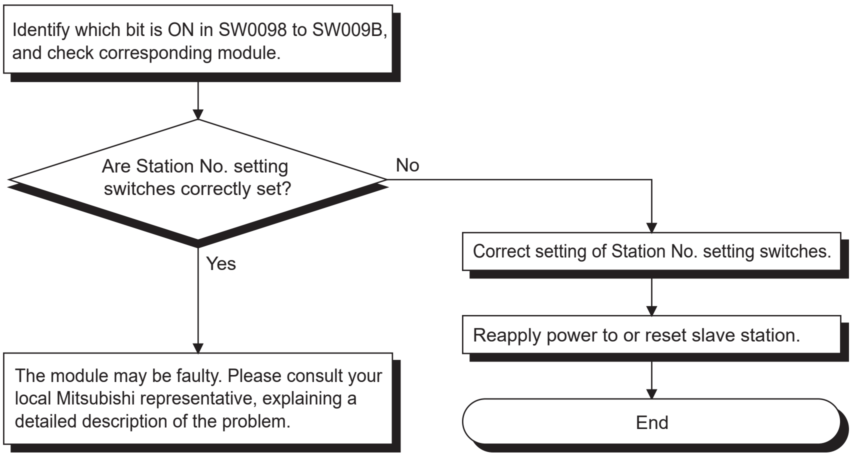


**Figure 9.5 When link special register (SW0098 to SW009B) turned ON**

(c) Slave station side troubleshooting (When link special register (SW0080 to SW0083) turned ON)

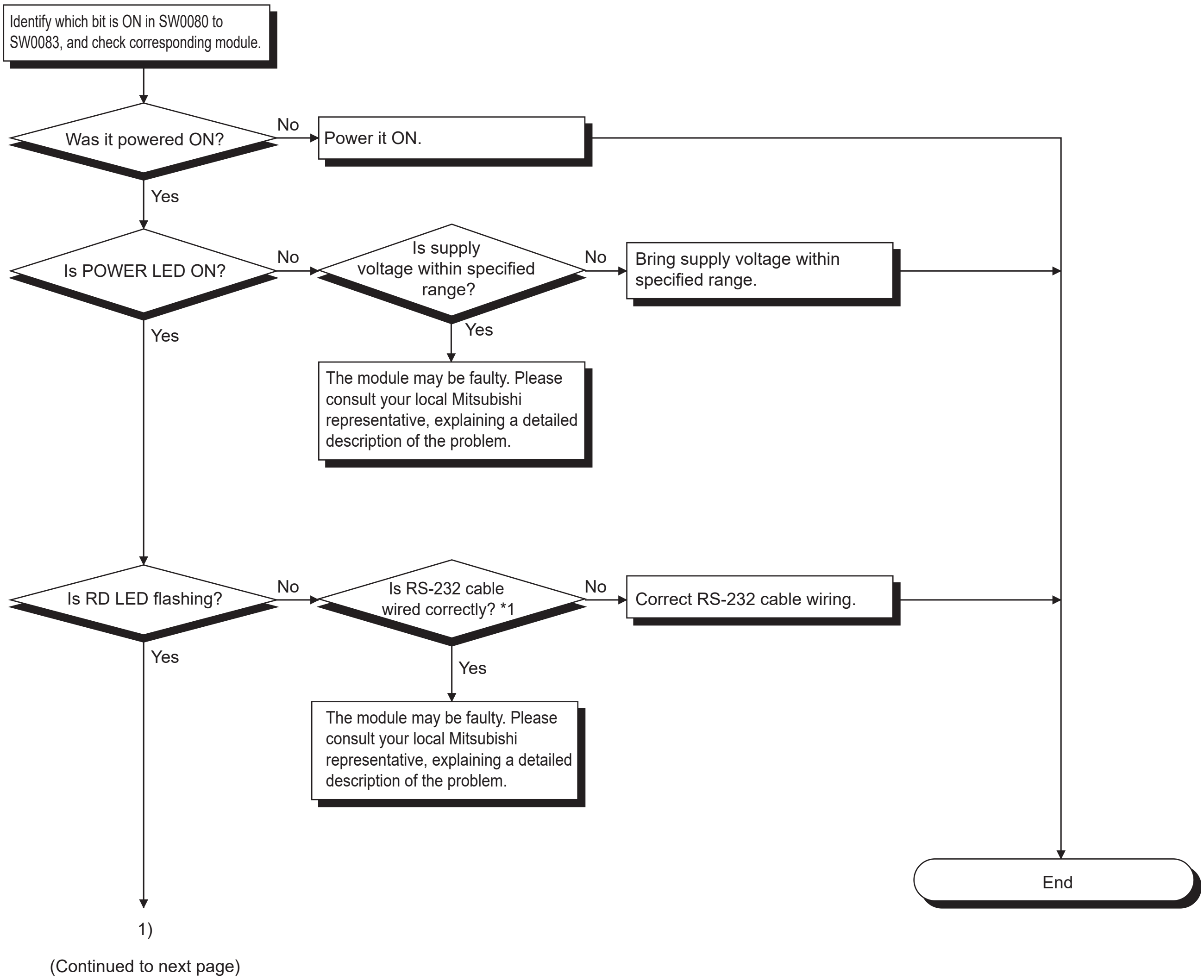
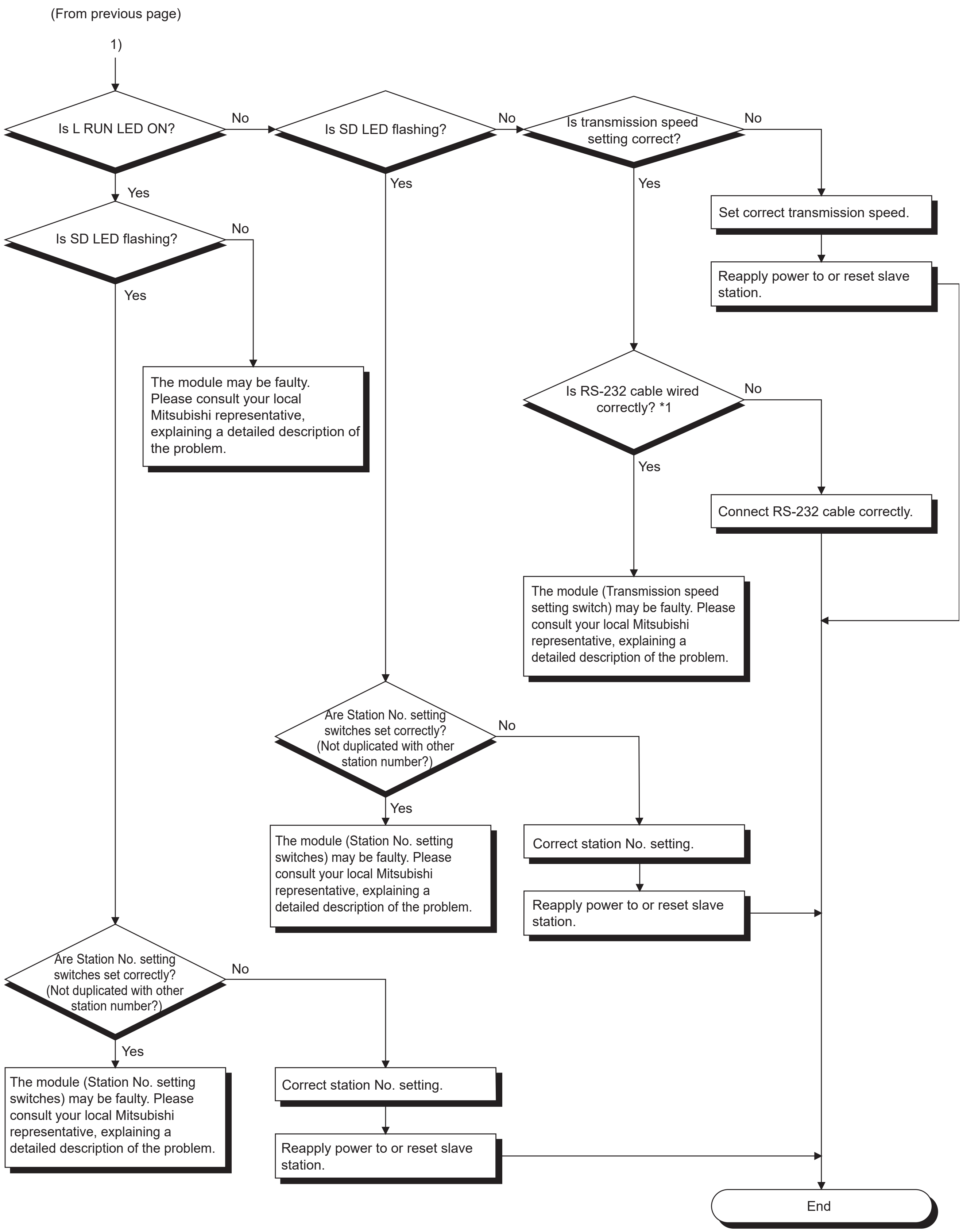


**Figure 9.6 When link special register (SW0080 to SW0083) turned ON**



*1 Check for short circuit, reverse connection, disconnection, terminating resistor, FG connection, overall cable distance, and block distance.

Figure 9.6 When link special register (SW0080 to SW0083) turned ON (Continued)

## 9.2 Error code list

### (1) Error code storage area

When an error occurs in the AJ65BT-R2N, programmable controller CPU or master module, an error code is stored in the Error code storage area of the AJ65BT-R2N, which is classified by function, and the ERR. LED turns ON.
Also, up to eight error codes generated in the past are stored in Error code history (R2N 1A8$_H$ to 1AF$_H$) in chronologic order.
When the RW refresh function is set to the default, error codes can be checked with the remote register.

**Table 9.6 Error code storage area**

| R2N Address | Name | Error code storage buffer memory | Remote register |
|---|---|---|---|
| 1A8$_H$ to 1AF$_H$ | Error code history | Up to eight error codes are stored in chronologic order from R2N 1A8$_H$.<br>Since error codes for the ninth and later errors are not stored, error clear operation is needed.<br>☞(2) Clearing errors in this section | — |
| 1B0$_H$ | General error codes | An error code is stored in the following cases.<br>•When Initialization failed signal (RXn5) turns ON<br>•When E$^2$PROM function failed signal (RXn8) turns ON<br>Error codes in any other cases are stored in Error codes generated when sending (R2N 1B1$_H$) and Error codes generated when receiving (R2N 1B2$_H$). | RWrm |
| 1B1$_H$ | Error codes generated when sending | An error code generated when Send failed signal (RXn1) turns ON is stored.<br>Error codes (BB11$_H$, BB92$_H$ to BB98$_H$) that occurred in the programmable controller CPU and master module will be stored. | RWr(m+1) |
| 1B2$_H$ | Error codes generated when receiving | An error code generated when Error receive data read request signal (RXn3) turns ON is stored.<br>Error codes (BB21$_H$, BB23$_H$ to BB2A$_H$, BBA2$_H$) that occurred in the programmable controller CPU and master module will be stored. | RWr(m+2) |

### (2) Clearing errors

By turning ON Error reset request signal (RY(n+1)A), the ERR. LED is turned OFF and the Error code storage area is cleared.

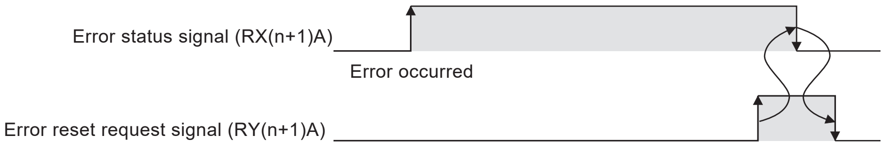


**Figure 9.7 Error reset request signal (RY(n+1)A) and Error status signal (RX(n+1)A)**

### ☒Point

Once Initialization failed signal (Xn5) has turned ON, even if Error reset request signal (RY(n+1)A) is turned ON, the error will not be reset.
For how to reset the error when Initialization failed signal (RXn5) turned ON, refer to the following.
☞Section 3.7.2 (15)(b) When Initialization failed signal (RXn5) is ON

(3) Error code list

**Table 9.7 Error code list**

| Error code | Error name | Cause | Action |
|---|---|---|---|
| 0001H to 4FFFH | Errors detected in the programmable controller CPU<br>☞User's manual for the programmable controller CPU used | | |
| B000H to B903H | Errors detected in the master module<br>☞User's manual for the master module used | | |
| B904H | Send/receive buffer size setting error | When the dedicated instruction is executed, the send/receive buffer size of the relevant station is out of range. | •Set the send/receive buffer size of the station within the allowable range. |
| B905H to BAFFH | Errors detected in the master module<br>☞User's manual for the master module used | | |
| BB07H | Auto-refresh timeout error | A timeout occurred in the buffer memory auto-refresh function. | •Increase the value set in Transient timeout time specification (R2N 105H). |
| BB11H | Send timeout error | A send timeout occurred. | •Check the flow control status, Flow control specification (R2N 100H), and the flow control specification of the external device.<br>•Correct the RS-232 cable connection.<br>•Increase the value set in Send timeout time specification (R2N 11AH). |
| BB21H | Receive timeout error | A receive timeout occurred. | •Check the flow control status, Flow control specification (R2N 100H), and the flow control specification of the external device.<br>•Correct the RS-232 cable connection.<br>•Increase the value set in Receive timeout time specification (R2N 112H).<br>•Reduce the value set in No. of receive end data (R2N 111H). |
| BB23H | RS-232 receive overrun error | An overrun error occurred during RS-232 reception. | •When 57600bps or 115200bps is used in Nonprocedural protocol mode, provide a communication method to prevent concurrent transmissions from the AJ65BT-R2N and external device.<br>•Set the transmission speed to 38400bps or less.<br>•Noise can be a cause of the error. If so, take measures against noise. |
| BB24H | RS-232 receive framing error | A framing error occurred during RS-232 reception. | •Check if the transmission specifications of the AJ65BT-R2N is the same as those of the external device.<br>•Noise can be a cause of the error. If so, take measures against noise. |
| BB25H | RS-232 receive parity error | A parity error occurred during RS-232 reception. | |
| BB26H | OS reception area overflow error | The OS reception area overflowed. | •Perform the flow control between the AJ65BT-R2N and external device.<br>•Check Flow control specification (R2N 100H) and the flow control specification of the external device.<br>•Correct the RS-232 cable connection. |

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Table 9.7 Error code list (Continued)

| Error code | Error name | Cause | Action |
|---|---|---|---|
| BB28$_H$ | Sum check error | The received sum check value is erroneous. | •Check the sum check code value in the user registration frame.<br>•Check if a sum check code value of data received from the external device is correct or not.<br>•Noise can be a cause of the error. If so, take measures against noise. |
| BB29$_H$ | Special character error | An unusable special character was specified in the start or end frame in frame reception. | •Check if any unusable special character is specified in Receive start frame No. (R2N 108$_H$ to 10B$_H$) and Receive end frame No. (R2N 10C$_H$ to 10F$_H$). |
| BB2A$_H$ | ASCII-binary conversion error | Data that cannot be converted from ASCII to binary were received. | •Check if data received from the external device can be converted from ASCII to binary data.<br>•Noise can be a cause of the error. If so, take measures against noise. |
| BB41$_H$ | Command error | A command (frame) that the AJ65BT-R2N does not support was used. | •Check if the set value is of a usable command (frame). |
| BB42$_H$ | Receive frame error | Data received at the AJ65BT-R2N are erroneous. | •Check if the settings such as the access code, No. of processing points, or attribute are correct. |
| BB81$_H$ | Start address specification error | An incorrect value is set in Send area, start address specification (R2N 0$_H$) or Receive area, start address specification (R2N 2$_H$). | •Refer to the buffer memory list, and set correct data.<br>☞Section 3.8.1 Buffer memory list |
| BB82$_H$ | Assignment specification error | An incorrect value is set in Area for various assignments (R2N 0$_H$ to F7$_H$). | |
| BB83$_H$ | Parameter error | An incorrect value is set in Area for parameters (R2N 100$_H$ to 19C$_H$). | |
| BB88$_H$ | E$^2$PROM function specification error | A value other than 0 to 4 was specified in E$^2$PROM function specification (R2N 1C0$_H$). | •Check the value specified in E$^2$PROM function specification (R2N 1C0$_H$). |
| BB89$_H$ | User registration frame No. error | In User registration frame No. (R2N 1C1$_H$), a value other than 3E8$_H$ to 4AF$_H$ (1000 to 1199) was specified. | •Check the value specified in User registration frame No. (R2N 1C1$_H$). |
| BB8A$_H$ | Registration frame byte error | In No. of user registration frame bytes (R2N 1C7$_H$), a value other than 1 to 80 was specified. | •Check the value specified in No. of user registration frame bytes (R2N 1C7$_H$). |
| BB8B$_H$ | Registration frame specification error | The user registration frame contains a special character that cannot be used. | •Check the contents of the user registration frame. |
| BB8C$_H$ | E$^2$PROM write error | An E$^2$PROM write timeout error occurred. | •The hardware of the AJ65BT-R2N may be faulty. Please consult your local Mitsubishi representative, explaining a detailed description of the problem. |
| BB8D$_H$ | User registration frame unregistered | The specified user registration frame No. is unregistered. | •Check if the specified user registration frame No. has been registered. |
| BB8E$_H$ | No. of writes to E$^2$PROM exceeded | Writing to the E$^2$PROM was performed 100 times or more after power-up or reset of the AJ65BT-R2N. | •Check the program for E$^2$PROM writing, and modify it to eliminate any unnecessary writing.<br>•Error resetting and reapplication of power or resetting makes it writable again. |
| BB92$_H$ | Send data size exceeded | The send data exceeded the maximum send data size. | •Reduce the total size of the data to be sent in frame transmission to 2048 bytes or less. |

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Table 9.7 Error code list (Continued)

| Error code | Error name | Cause | Action |
|---|---|---|---|
| BB93H | Send data size error | No. of send data exceeded the send area size.<br>Or, No. of send data is 0. | •Check the values set in Send data size specification area (R2N 200H at default) and Send area size specification (R2N 1H). |
| BB94H | Send cancel error | The transmission was canceled by Send cancel request signal (RYn1).<br>Or, at the time of the send request, Send cancel request signal (RYn1) has already been ON. | •Turn OFF Send cancel request signal (RYn1), and then make the send request. |
| BB95H | User registration frame send error | Unable to send the specified user registration frame. | •Check if the specified user registration frame No. has been registered. |
| BB96H | Special character error | An unusable special character was specified in the start or end frame in frame transmission. | •Set an appropriate value in Send start frame No. (R2N 118H). |
| BB97H | Transmission table information error | An invalid data were specified when sending a transmission table. | •Check the data specified in Transmission table specification (R2N 122H to 185H) and Monitoring setting - 1 to - 64 (R2N 78H to F7H). |
| BB98H | Registration frame transmission error | Data of the specified user registration frame No. contains a special character that cannot be sent. | •Check the registration data of the specified user registration frame No. |
| BBA2H | Receive data size exceeded | Receive data exceeded the receive area size (R2N 3H). | •Adjust the No. of receive data so that it is appropriate to the set value in Receive area size specification (R2N 3H). |
| BBC0H to BBE0H | Errors detected in the master module<br>☞User's manual for the master module used | | |
| BBE1H | System error | The OS of the AJ65BT-R2N detected an error. | •Take the following steps.<br>(1) Check the conditions of the AJ65BT-R2N installation, terminal block, and wiring.<br>(2) Check if the system is used in an environment that satisfies the general specifications.<br>(3) Check if power capacity is sufficient.<br>(4) The hardware may be faulty. Check if the AJ65BT-R2N hardware is normal or not, according to the manual. Or, replace the module and check the operation.<br>(5) If the problem cannot be solved by the above, please consult your local Mitsubishi representative, explaining a detailed description of the problem. |
| BBE2H to BFFFH | Errors detected in the master module<br>☞User's manual for the master module used | | |

# APPENDICES

## Appendix 1 Differences between AJ65BT-R2N and AJ65BT-R2

This section describes the comparison between the AJ65BT-R2N and the AJ65BT-R2 and how to replace the AJ65BT-R2 with the AJ65BT-R2N.

### (1) Function/control signal name changed from the AJ65BT-R2

The following shows the function name and control signal name that are changed from the AJ65BT-R2.

In Appendices, the function/control signal names used in the AJ65BT-R2N are described.

Read this manual replacing the function/control signal name of the AJ65BT-R2 with that of the AJ65BT-R2N.

**Table App.1 Function/control signal name changed from the AJ65BT-R2**

| Kind | AJ65BT-R2N | AJ65BT-R2 |
|---|---|---|
| Function name | •Nonprocedural protocol mode | •On-line mode |
| | •Nonprocedural communication function | •Non-procedural communication function |
| | •Send/receive buffer communication function | •When send/receive buffer used<br>•On-line mode (using transmission/reception buffer) |
| | •Buffer memory auto-refresh function | •Buffer memory auto-refresh<br>•On-line mode (using buffer memory automatic update function)<br>•Automatic update function |
| | •User registration frame function | •Frame addition |
| | •Send cancel function | •Transmission cancellation<br>•Transmission cancel request<br>•Transmission cancel |
| | •Forced receive completion function | •Forced reception complete<br>•Forced reception complete request |
| | •Flow control function | •Flow control |
| | •ASCII-binary conversion function | •ASCII-BIN conversion function<br>•ASCII-BIN conversion<br>•ASCII/binary conversion |
| | •RW refresh function | •RW update |
| | •AJ65BT-R2N initialization function | •R2 initialization |
| | •OS reception area clear function | •OS reception area clear<br>•Initialization of OS reception area |
| | •E$^2$PROM function | •Registering to EEPROM |
| | •RS-232 signal control function | •RS-232-C signal control |
| Control signal name | •DC1/DC3 (XON/XOFF) control | •DC1/DC3 control<br>•DC1/DC3 transmission control<br>•DC1/DC3 reception control |
| | •DTR/DSR(ER/DR) | •DTR/DSR |
| | •DTR(ER) | •ER(DTR) |
| | •DSR(DR) | •DR(DSR) |

## Appendix 1.1 Specifications comparisons

The following shows performance specifications, general-purpose I/O specifications, and function comparisons between the AJ65BT-R2N and the AJ65BT-R2.

### (1) Performance specifications comparisons

The table below shows performance specifications comparisons between the AJ65BT-R2N and the AJ65BT-R2.

**Table App.2 Performance specifications comparisons**

| Item | | | AJ65BT-R2N | AJ65BT-R2 |
|---|---|---|---|---|
| RS-232 | | | — | |
| | Interface | | RS-232 compliant (D-Sub 9P) | |
| | Communication method | | Full-duplex communication method | |
| | Synchronization method | | Asynchronous method | |
| | Transmission speed | | 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 (bps)<br>(Select with RS-232 transmission setting switches.)<br>(Partially restricted ☞ Section 3.2 Performance Specifications) | 300, 600, 1200, 2400, 4800, 9600, 19200 (bps)<br>(Select with RS-232 transmission setting switches.) |
| | Transmission distance | | Up to 15m | |
| | Data format | Start bit | 1 | |
| | | Data bit | 7/8 | |
| | | Parity bit | 1(Vertical parity)/None | |
| | | Stop bit | 1/2 | |
| | Error detection | Parity check | Checked (even/odd)/Not checked | |
| | Communication control (Flow control) | | DTR/DSR (ER/DR) control<br>DC1/DC3 control | |
| | OS reception area | | 5120 bytes | |
| CC-Link | | | — | |
| | Transmission path | | Bus (RS-485) | |
| | CC-Link station type | | Intelligent device station | |
| | Connection cable | | CC-Link dedicated cable/CC-Link high-performance cable/CC-Link Ver.1.10-compatible cable | |
| | No. of occupied stations | | 1 station (RX/RY: 32 points each, RWw/RWr: 4 points each) | |
| No. of writes to $E^2$PROM | | | Up to 100,000 times | |
| Withstand voltage | | | One minute at 500VAC between all external DC terminals and ground | |
| Insulation resistance | | | 500VDC between all external DC terminals and ground, 10MΩ or more with insulation resistance tester | |
| Noise immunity | | | DC type noise voltage: 500Vp-p<br>Tested by noise simulator of noise width of 1μs, and noise frequency of 25 to 60Hz | |
| Module fixing screw | | | M4 × 0.7mm × 16mm or larger<br>DIN-rail mounting is also possible. | |
| Applicable DIN rail | | | TH35-7.5Fe, TH35-7.5Al, TH35-15Fe (Compliant with IEC 60715) | |
| External power supply | | | 24VDC (Ripple ratio: 5% or less) (Allowable voltage range: 20.4 to 26.4VDC) | |
| | | | Current consumption: 0.11A | |
| Allowable momentary power failure time | | | 1ms | |
| External dimensions | | | 80(H) × 170(W) × 47(D) [mm] | 80(H) × 170(W) × 63.5(D) [mm] |
| Weight | | | 0.40kg | |

(2) General-purpose I/O specifications comparisons

The table below shows general-purpose I/O specifications comparisons between the AJ65BT-R2N and the AJ65BT-R2.

The comparison only describes the differences between the AJ65BT-R2N and the AJ65BT-R2.

(a) General-purpose input specifications

There are no differences between the AJ65BT-R2N and the AJ65BT-R2.

(b) General-purpose output specifications

1) Hardware version B or later, or production number (SERIAL) (first five digits) of "16041" or later

**Table App.3 Hardware version B or later, or production number (SERIAL) (first five digits) of "16041" or later**

| Item | | AJ65BT-R2N | AJ65BT-R2 |
|---|---|---|---|
| Max. inrush current | | 0.7A, 10ms or less | 0.4A, 10ms or less |
| Max. voltage drop at ON | | 0.1VDC(TYP.) 0.1A,<br>0.2VDC(MAX.) 0.1A | 1.5VDC(MAX.) 0.1A |
| Response time | OFF→ON | 1ms or less | 2ms or less |
| | ON→OFF | 1ms or less (Resistance load) | 2ms or less (Resistance load) |
| External power supply of output section | Voltage | 12/24VDC (Ripple ratio: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC) | |
| | Current | 10mA (at 24VDC) (MAX all points ON) | 50mA or less (TYP. 24VDC/common)<br>Excluding external load current |
| Protective function | | Provided<br>•Overheat protective function operates in unit of 1 point.<br>•Overload protective function operates in unit of 1 point. | Not provided |

2) Hardware version A

**Table App.4 Hardware version A**

| Item | | AJ65BT-R2N | AJ65BT-R2 |
|---|---|---|---|
| Terminal No. | TB4 | +24V | NC |
| Max. inrush current | | 0.7A, 10ms or less | 0.4A, 10ms or less |
| Max. voltage drop at ON | | 0.1VDC(TYP.) 0.1A,<br>0.2VDC(MAX.) 0.1A | 1.5VDC(MAX.) 0.1A |
| Response time | OFF→ON | 1ms or less | 2ms or less |
| | ON→OFF | 1ms or less (Resistance load) | 2ms or less (Resistance load) |
| External power supply of output section | Voltage | 12/24VDC (Ripple ratio: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC) | |
| | Current | 10mA (at 24VDC) (MAX all points ON) | 50mA or less (TYP. 24VDC/common)<br>Excluding external load current |
| Protective function | | Provided<br>•Overheat protective function operates in unit of 1 point.<br>•Overload protective function operates in unit of 1 point. | Not provided |
| Power supply input | | Present | Absent |

(3) Function comparisons

The table below shows function comparisons between the AJ65BT-R2N and the AJ65BT-R2.

**Table App.5 Function comparisons**

| Function | AJ65BT-R2N | AJ65BT-R2 | Changes from AJ65BT-R2 |
|---|---|---|---|
| Nonprocedural protocol mode | ○ | ○ | — |
| Nonprocedural communication function | ○ | ○ | Communication can be made in 38400bps, 57600bps, 115200bps.<br>(Partially restricted☞Section 3.2 Performance Specifications) |
| Send/receive buffer communication function | ○ | ○ | — |
| Buffer memory auto-refresh function | ○ | ○ | The buffer memory assignment size can be changed by Mode setting switch. |
| AJ65BT-R2N initialization function | ○ | ○ | — |
| E$^2$PROM function | ○ | ○ | — |
| User registration frame function | ○ | ○ | Special character codes ($04_H$, $5_H$, $0A_H$, $0B_H$, $11_H$, $E5_H$, $EB_H$) applicable for User registration frame are added. |
| Monitoring-based transmission function | ○ | ○ | — |
| Send cancel function | ○ | ○ | — |
| Forced receive completion function | ○ | ○ | — |
| Flow control function | ○ | ○ | — |
| ASCII-binary conversion function | ○ | ○ | — |
| RW refresh function | ○ | ○ | — |
| OS reception area clear function | ○ | ○ | — |
| RS-232 signal control function | ○ | ○ | — |
| MELSOFT connection mode | ○ | × | — |

○: Function provided, ×: No function

(4) Comparison of remote I/O and remote register

(a) Remote input

The comparison only describes the differences between the AJ65BT-R2N and the AJ65BT-R2.

**Table App.6 Comparison of remote input**

| Item | AJ65BT-R2N | AJ65BT-R2 |
|---|---|---|
| Nonprocedural protocol mode | — | |
| RX(n+1)4 | Mode setting switch status signal | Use prohibited |
| RX(n+1)5 | | |
| RX(n+1)6 | | |
| RX(n+1)7 | | |

(b) Remote output

There are no differences between the AJ65BT-R2N and the AJ65BT-R2.

(c) Remote register

There are no differences between the AJ65BT-R2N and the AJ65BT-R2.

(5) Comparison of buffer memory

The comparison only describes the differences between the AJ65BT-R2N and the AJ65BT-R2.

Table App.7 Comparison of buffer memory

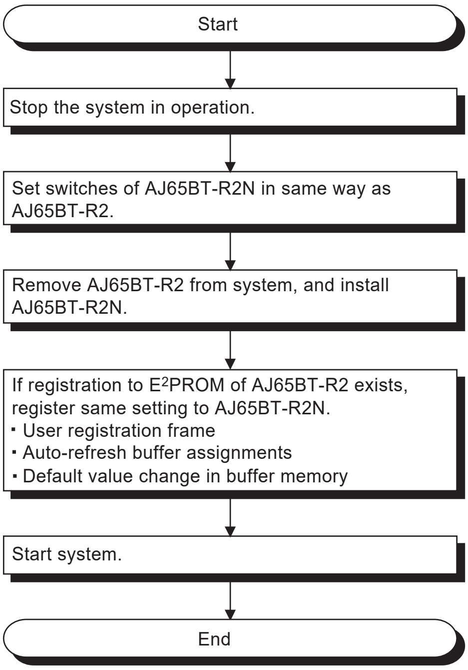
| R2N Address | Name | | | Default | | Initialization | |
|---|---|---|---|---|---|---|---|
| | | | | AJ65BT-R2N | AJ65BT-R2 | AJ65BT-R2N | AJ65BT-R2 |
| 0H | Start address specification area | | Send area, start address specification | *1 | 200H | Necessary | Necessary |
| 1H | | | Send area size specification | | 200H | | |
| 2H | | | Receive area, start address specification | | 400H | | |
| 3H | | | Receive area size specification | | 200H | | |
| 10H | Auto-refresh area specification | Status data storage area | Transfer size | | 20H | Necessary | Necessary |
| 11H | | | AJ65BT-R2N side start address | | 1A0H | | |
| 12H | | | Fixed value | | 4004H | | |
| 13H | | | Master station side offset address | | 1A0H | | |
| 14H | | Send area 1) | Transfer size | | 88H | | |
| 15H | | | AJ65BT-R2N side start address | | 118H | | |
| 16H | | | Fixed value | | 4004H | | |
| 17H | | | Master station side offset address | | 118H | | |
| 18H | | Send area 2) | Transfer size | | 200H | | |
| 19H | | | AJ65BT-R2N side start address | | 200H | | |
| 1AH | | | Fixed value | | 4004H | | |
| 1BH | | | Master station side offset address | | 200H | | |
| 1CH | | Receive area | Transfer size | | 200H | | |
| 1DH | | | AJ65BT-R2N side start address | | 400H | | |
| 1EH | | | Fixed value | | 4004H | | |
| 1FH | | | Master station side offset address | | 400H | | |
| 20H | | Initial setting area | Transfer size | | 1A0H | | |
| 21H | | | AJ65BT-R2N side start address | | 0H | | |
| 22H | | | Fixed value | | 4004H | | |
| 23H | | | Master station side offset address | | 0H | | |
| 24H | | $E^2$PROM function area | Transfer size | | 30H | | |
| 25H | | | AJ65BT-R2N side start address | | 1C0H | | |
| 26H | | | Fixed value | | 4004H | | |
| 27H | | | Master station side offset address | | 1C0H | | |
| 28H | | User registration frame area | Transfer size | | 29H | | |
| 29H | | | AJ65BT-R2N side start address | | 1C7H | | |
| 2AH | | | Fixed value | | 4004H | | |
| 2BH | | | Master station side offset address | | 1C7H | | |
| 2CH | | Monitoring-based transmission area 1) | Transfer size | | 88H | | |
| 2DH | | | AJ65BT-R2N side start address | | 118H | | |
| 2EH | | | Fixed value | | 4004H | | |
| 2FH | | | Master station side offset address | | 118H | | |
| 30H | | Monitoring-based transmission area 2) | Transfer size | | 200H | | |
| 31H | | | AJ65BT-R2N side start address | | 200H | | |
| 32H | | | Fixed value | | 4004H | | |
| 33H | | | Master station side offset address | | 200H | | |
| 102H | Word/byte specification | | | 0H | 0H | Not necessary | Necessary |

* 1 The default varies depending on mode to be selected.
The default of the AJ65BT-R2 is the same as that of Mode 0 of the AJ65BT-R2N.
For details, refer to the following.

☞ Section 3.8.1 (1) Area for various assignments (0H to FFH)

## Appendix 1.2 Procedures and precautions for replacing AJ65BT-R2 with AJ65BT-R2N

### (1) Procedures for replacing AJ65BT-R2 with AJ65BT-R2N



. . . ☞ Section 5.4 Part Names and Settings

**Figure App.1 Procedures for replacing AJ65BT-R2 with AJ65BT-R2N**

### ⊠Point

(1) There is no need to change the parameter settings of the master station.

(2) The RS-232 cable used in the AJ65BT-R2 is available for the AJ65BT-R2N.

(3) To use a general-purpose output on a module of hardware version A, the ＋24V input terminal must be wired on the general-purpose I/O terminal block.

(2) Precautions for replacing programs

A program created by the AJ65BT-R2 can be used in the AJ65BT-R2N without any changes.

The following describes precautions for using a program created by the AJ65BT-R2 in the AJ65BT-R2N.

(a) Performance at sending data

The performance of the AJ65BT-R2N in sending data is upgraded up to approx. 10% compared with that of the AJ65BT-R2.

Therefore, in some cases, the external device may not respond to the send request from the AJ65BT-R2N due to too early response of the AJ65BT-R2N.

The latent problem of the user side protocol seems to have been revealed.

Review the procedure and timing of the user side protocol.

The following table shows the possible problems and their corrective actions.

**Table App.8 Possible problems and their corrective actions**

| Problem | Cause | Corrective action |
|---|---|---|
| Since data is sent from the AJ65BT-R2N to the external device which is not ready to receive it, the external device side cannot deal with it. | The external device cannot respond since sending data starts earlier. | •Review the processing of the external device side so that it can receive data.<br>•Delay the start of sending data by the sequence program. |

# Appendix 2 Functions Added to and Modified from the Previous Version

This section describes the added and modified functions of the AJ65BT-R2N.

(1) Wiring of general-purpose output

For the hardware version B or later, or production number (SERIAL) (first five digits) of "16041" or later, the +24V wiring on the general-purpose I/O terminal block is not required.

For the specifications of general-purpose output for each version, refer to the following section.

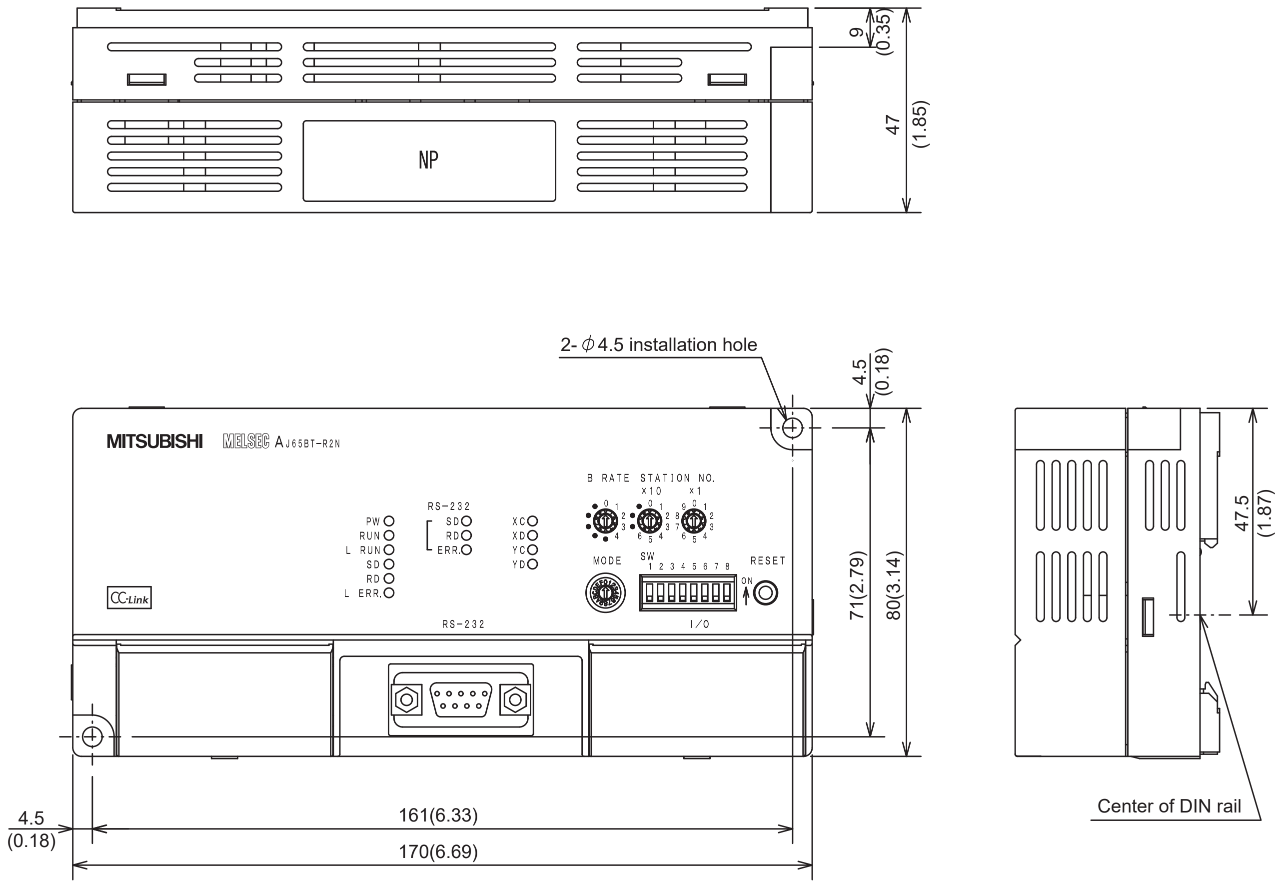
- Hardware version B or later, or production number (SERIAL) (first five digits) of "16041" or later
  Section 3.6.1 (3) General-purpose output specifications
- Hardware version A: Section 3.6.2 (3) General-purpose output specifications

**☒ Point**

An input of +24V to the NC (terminal block No. TB4) is allowed, just like in hardware version A.

The existing wiring can be used when replacing hardware version A with hardware version B or later, or production number (SERIAL) (first five digits) of "16041" or later.

# Appendix 3 External Dimensions



Unit: mm(inch)

**Figure App.2 External dimensions**

# Appendix 4 RS-232 Interfaces Used for the AJ65BT-R2N

The connectors listed below are used as RS-232 interface connectors.

**Table App.9 RS-232 interfaces used for the AJ65BT-R2N**

| Module model | Hardware version or production number (SERIAL) | Manufacturer | Model |
|---|---|---|---|
| AJ65BT-R2N | C or earlier | DDK Ltd. | 17JE-13090-37(D23A)-FA |
|  | D or later, or production number (SERIAL) (first five digits) of "16041" or later | OMRON Corporation | XM3F-0920-112 |

# INDEX

Please confirm the following product warranty details before using this product.

## 1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.

However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place. Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.

(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.

1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
2. Failure caused by unapproved modifications, etc., to the product by the user.
3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

## 2. Onerous repair term after discontinuation of production

(1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.

(2) Product supply (including repair parts) is not available after production is discontinued.

## 3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

## 4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

(1) Damages caused by any cause found not to be the responsibility of Mitsubishi.

(2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.

(3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.

(4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

## 5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

All other company names and product names used in this manual are either trademarks or registered trademarks of their respective companies.

SH(NA)-080685ENG-E(2001)MEE
MODEL: AJ65BT-R2N-U-NPP-E
MODEL CODE: 13JZ00

**MITSUBISHI ELECTRIC CORPORATION**

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Specifications subject to change without notice.