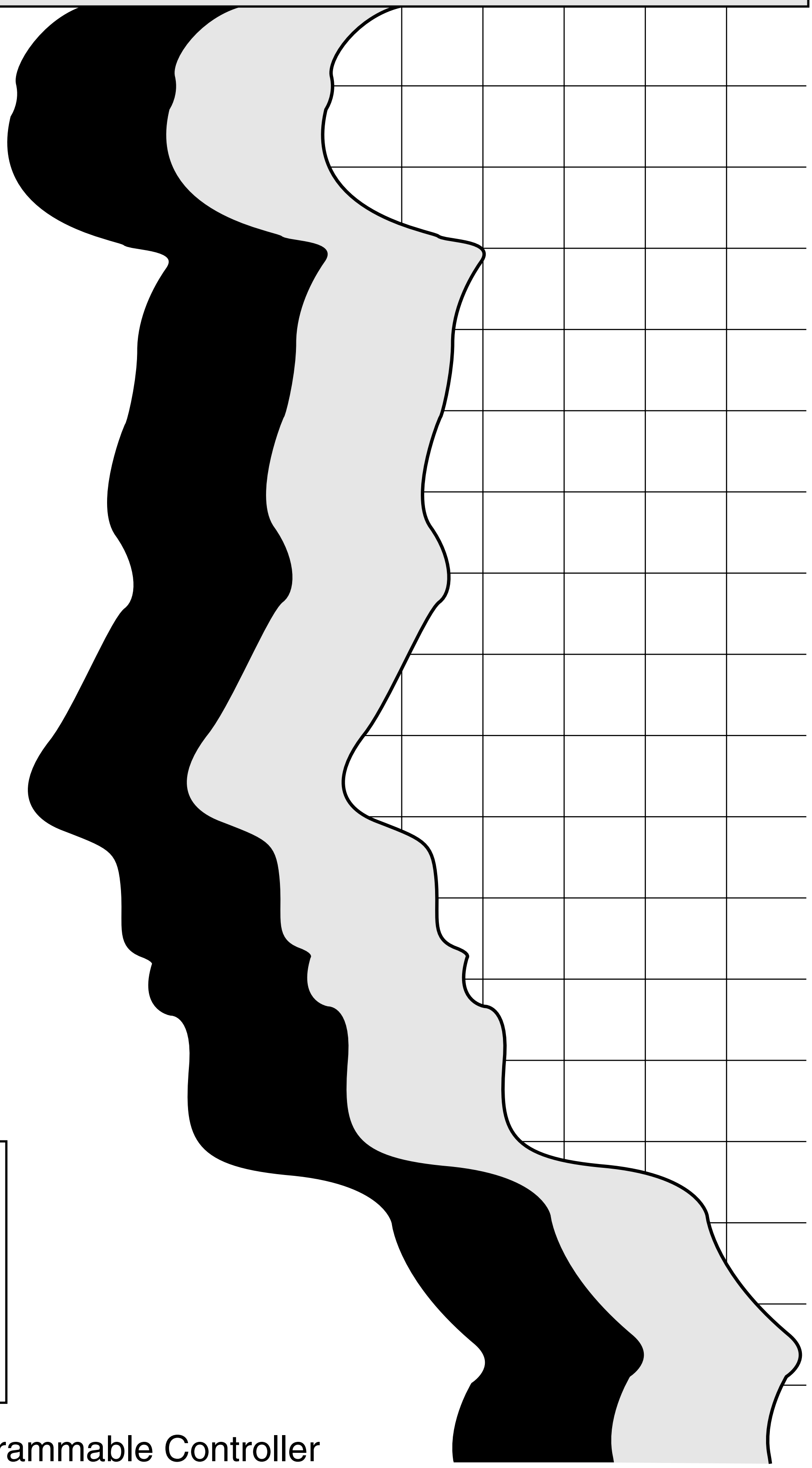
MITSUBISHI

Type MELSECNET, MELSECNET/B Data Link System

Reference Manual



A MELSEC

Mitsubishi Programmable Controller

● SAFETY PRECAUTIONS ●

(Read these precautions before using this product.)

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

In this manual, the safety precautions are classified into two levels: "⚠ 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.

Under some circumstances, failure to observe the precautions given under "⚠ CAUTION" may lead to serious consequences.
Observe the precautions of both levels because they are important for personal and system safety.
Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

[Design Precautions]

⚠WARNING

- For the operating status of each station after a communication failure, refer to this manual. Malfunction due to a communication failure may result in an accident.

- When controlling a running programmable controller (data modification) by connecting a peripheral device or GX Developer to a CPU module or by connecting a programmable controller to a special function module, create an interlock circuit in the sequence program so that the entire system will function safely all the time.
  For other forms of control (such as program modification or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding.
  Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure.
  To prevent this, configure an interlock circuit in the sequence program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.

⚠CAUTION

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 100mm (3.94 inches) or more between them. Failure to do so may result in malfunction due to noise.

[Installation Precautions]

⚠CAUTION

- Use the programmable controller in an environment that meets the general specifications in the user's manual for the CPU module used. Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.

- Fully insert the protection on the bottom of the module into the hole in the base unit and press the module into position.
  (To fix an AnS series module to the base unit, tighten the screws within the specified torque range).
  Incorrect mounting may cause malfunction, failure or drop of the module.

- Shut off the external power supply (all phases) used in the system before mounting or removing the module. Failure to do so may result in damage to the product.

- Do not directly touch any conductive parts and electronic components of the module.
  Doing so can cause malfunction or failure of the module.

[Wiring Precautions]

⚠WARNING

- Completely turn off the externally supplied power used in the system when installing or placing wiring.
  Failure to do so may result in electric shock or damage to the product.

⚠CAUTION

- Correctly solder coaxial cable connectors.
  Incomplete soldering may result in malfunction.
- Prevent foreign matter such as dust or wire chips from entering the module.
  Such foreign matter can cause a fire, failure, or malfunction.
- Place the cables in a duct or clamp them.
  If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact.
- When disconnecting the cable from the module, do not pull the cable by the cable part.
  For the cable with connector, hold the connector part of the cable.
  For the cable connected to the terminal block, loosen the terminal screw.
  Pulling the cable connected to the module may result in malfunction or damage to the module or cable.

[Startup and Maintenance Precautions]

⚠CAUTION

- Please read this manual thoroughly and confirm the safety before starting online operations (especially, program modifications, forced outputs, and operating status modifications), which are performed by connecting the GX Developer via the MELSECNET network system to a running CPU module of other station.
  Improper operation may damage machines or cause accidents.

- Do not disassemble or modify the module.
  Doing so may cause failure, malfunction, injury, or a fire.

- Use any radio communication device such as a cellular phone or PHS (Personal Handy-phone System) more than 25cm (9.85 inches) away in all directions from the programmable controller.
  Failure to do so may cause malfunction.

- Shut off the external power supply (all phases) used in the system before mounting or removing the module. Failure to do so may result in damage to the product.

- Do not touch any terminal while power is on.
  Doing so may cause malfunctions.

- Shut off the external power supply (all phases) used in the system before cleaning the module or retightening the terminal screws or module mounting screws.
  Failure to do so may cause the module to fail or malfunction.
  Undertightening can cause drop of the screw, short circuit or malfunction.
  Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.

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

[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
Dec., 1991	IB(NA)66350 - A	First edition
Jul., 1993	IB(NA)66350 - B	Correction CONTENTS, Section 1, 1.1, 1.2.2 to 1.2.4, 1.3.1, 1.3.2, 2.1.2, 2.2.2, 3.1.2, 3.2.2, 4, 4.1.1, 4.1.2, 5.2, 5.3, 5.3.1, 5.3.2, 5.3.7, 5.3.8, 5.5.1, 5.6, 6.2, 6.2.1 to 6.2.3, 6.3, 6.4, 8.8.2, 8.5.1, 8.5.2, 8.6, 8.7.2, 9.3.1, 10.3.1
Oct., 2003	IB(NA)66350 - C	Equivalent to Japanese version H Overall reexamination
Apr., 2007	IB(NA)66350 - D	Correction The following link modules are added. A1SJ71AP23Q/R23Q, A1SJ71AT23BQ Addition ABOUT MANUALS, COMPLIANCE WITH THE EMC AND LOW VOLTAGE DIRECTIVES, Section 1.2.5 Correction SAFETY PRECAUTIONS, Chapter 1, Section 1.1, 1.2.3, 1.3.1, 1.2.4, 1.3.2, 2.1.2, 2.2.3, 3.1.2, 3.2.3, 4.1.2, 4.1.3, 4.2.2, 4.2.3, 4.3.2, 4.3.3, 4.4.2, 4.4.3, 5.1, 5.2, 5.3.1, 5.3.2, 5.3.3, 5.3.8, 5.4.1, 5.5.1, 6.1.2, 6.2.1, 6.2.2, 6.2.3, 7.2, 7.4.2, 7.4.3, 7.5, 7.6.1, 7.6.3, 7.6.4, 7.7.1, 7.7.3, 7.8, 7.9.1, 7.9.2, 7.9.3, 7.9.4, 7.10.1, 7.10.2, 7.10.3, 7.10.4, 7.10.5, 7.11.1, 8.1, 8.3, 8.4, 8.4.1, 8.4.2, 8.4.3, 8.5.1, 8.5.2, 8.7.2, 8.7.3, Chapter 9, Section 9.1, 9.2.1, 9.2.2, 9.3.1, 9.3.2, 9.4, 9.5, 9.6, 9.7, 9.7.1, 9.8, 9.8.2, 9.9, 10.1.1, 10.1.2, 10.1.3, 10.3.1, 10.3.2, 10.3.3, 10.3.4, 10.4, 10.5
Oct., 2007	IB(NA)66350 - E	Correction Section 4.3.3, 5.2
Sep., 2010	IB(NA)66350 - F	The following CPU modules are added. Q02CPU-A, Q02HCPU-A, Q06HCPU-A Correction SAFETY PRECAUTIONS, Section 5.1, 5.3.1, 5.4.1, 5.5.2, 10.3.3, 10.4 Addition CONDITIONS OF USE FOR THE PRODUCT
Feb., 2012	IB(NA)66350 - G	Correction SAFETY PRECAUTIONS, COMPLIANCE WITH EMC AND LOW VOLTAGE DIRECTIVES, Section 5.1, 10.3.3

Japanese Manual Version IB-68277-N

INTRODUCTION

Thank you for choosing the Mitsubishi MELSEC-A Series of General Purpose Programmable Controllers.
Before using the equipment, please read this manual carefully to develop full familiarity with the functions and performance of the A series programmable controller you have purchased, so as to ensure correct use.

CONTENTS

ABOUT MANUALS

The following manual is also related to this product.
Order it by referring to the table below as necessary.

Related manual

Manual name	Manual No. (Model code)
MELSECNET, MELSECNET/B Local Station Data Link Module User's Manual This manual explains specifications, functions, preparatory procedures before operation, programming, and troubleshooting of the MELSECNET or MELSECNET/B local station data link module. (Sold separately)	SH-080670ENG (13JR98)

COMPLIANCE WITH EMC AND LOW VOLTAGE DIRECTIVES

(1) Method of ensuring compliance
To ensure that Mitsubishi 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 used
- User's manual (hardware) for the CPU module or base unit used

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

1 OVERVIEW

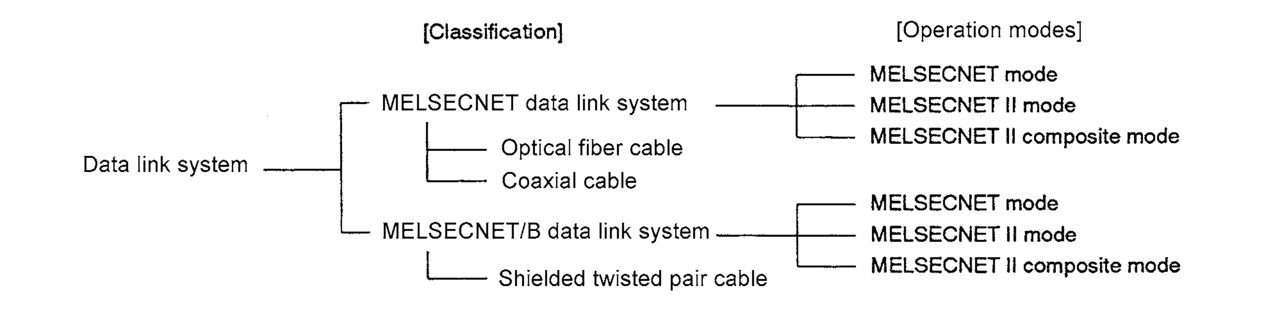
This manual describes the performance, functions, and programming procedure for the MELSEC-A Series MELSECNET, MELSECNET/B Data Link System.
When applying the following program examples to the actual system, make sure to examine the applicability and confirm that it will not cause system control problems.

(1) MELSECNET data link system
MELSECNET data link system is a system to connect link modules via optical fiber cable or coaxial cable and to control them.
The system can be configured in the MELSEC-A series.
The only difference between a system using optical fiber cable and a system using coaxial cable is a distance between link modules. Other functions/operations are the same.

(2) MELSECNET/B data link system
MELSECNET/B data link system is a system to connect link modules via inexpensive twisted pair cable and control them.
The system can be configured in the MELSEC-A series.

(3) Operation mode
The following three operation modes are available with the MELSECNET and MELSECNET/B data link system. The operation mode is determined by the configuration of the connected data link modules and the link parameter settings.
- MELSECNET mode
- MELSECNET Ⅱ mode
- MELSECNET Ⅱ composite mode

Refer to the manual for the individual link modules for details on the performance, functions, and operation of the link modules connected to the data link system.



1.1 Contents of This Manual

This manual explains the MELSECNET data link system and the MELSECNET/B data link system.
The MELSECNET data link system is explained in Chapter 2 and the MELSECNET/B data link system is explained in Chapter 3.
Other chapters explain both systems.

POINT

(1) To avoid misunderstanding, the table in the top right of a page indicates which system is being explained.
In addition, when the MELSECNET data link and the MELSECNET/B data link partly differ, the item mainly explains the MELSECNET data link, and the description unrelated to MELSECNET/B data link is underlined.
When using the MELSECNET/B data link, skip the underlined sentences/ phrases.

(2) This manual is described based on the screen examples of the SW□GP-GPPA.
When using GX Developer or any other peripheral, some of the screen displays or functions may be different from those of this manual.
Refer to the manual for the product in use.

1.2 Basic Information about Data Link Systems

This section gives the basic information for using the MELSECNET and the MELSECNET/B data link systems.
Read this section carefully before going on to Chapter 2.

1.2.1 Master, local, and remote I/O stations

In a data link system, link modules are classified into master stations, local stations, and remote I/O stations as shown below:

(1) Master stations........... Controls slave stations (local stations and remote I/O stations) connected to data link system.
Sets link parameter for the MELSECNET data link system and the MELSECNET/B data link system.
A data link system must contain one master station.

(2) Local stations.............. Controls I/O and special function modules of the host station in a program of the host station.

(3) Remote I/O stations.... Controls the I/O module and special function module of the host station in a program of master station via MELSECNET(/B).
As for the I/O module and special function module connected to remote I/O station, online I/O module cannot be replaced.

POINTS

(1) Set the link parameters for the MELSECNET and MELSECNET/B data link systems to the master stations only.
The link parameters need not be set to the local and remote I/O stations.

(2) When the MELSECNET and MELSECNET/B data link systems are used with the QnA or AnUCPU, the "number of modules" and "network refresh parameters" must be set to the master and local stations.
For the network parameter setting method, refer to the operating manual of the used GPP function software package or GX Developer.
In addition, the QnACPU can confirm the contents of the link special relays (M9200 to M9255) and link special registers (D9200 to D9255) using the special relays (SM1200 to SM1255) and special registers (SD1200 to SD1255).

(3) The software versions of the master station link modules that allow remote I/O stations to be connected in the MELSECNET/B data link systems are indicated below.
A1SJ71T21B............ "B" or later
A1SJ71AT21B.......... "A" or later
AJ71AT21B.............. "B" or later

REMARK

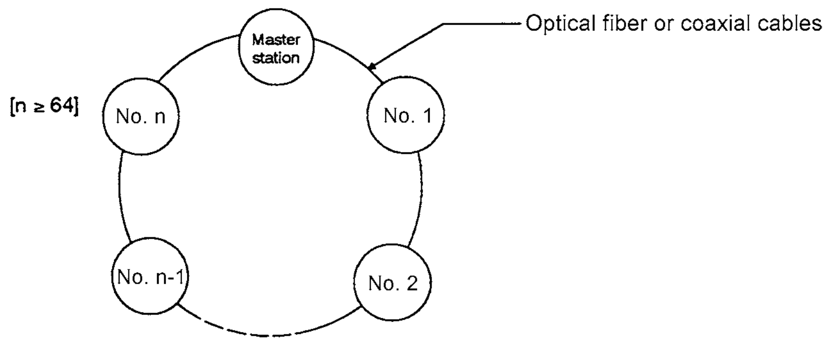
1) *: Online I/O module replacement means replacing an I/O module without occurrence of "UNIT VERIFY ERROR" while the programmable controller is ON.

1.2.2 Outline of the MELSECNET and MELSECNET/B data link systems

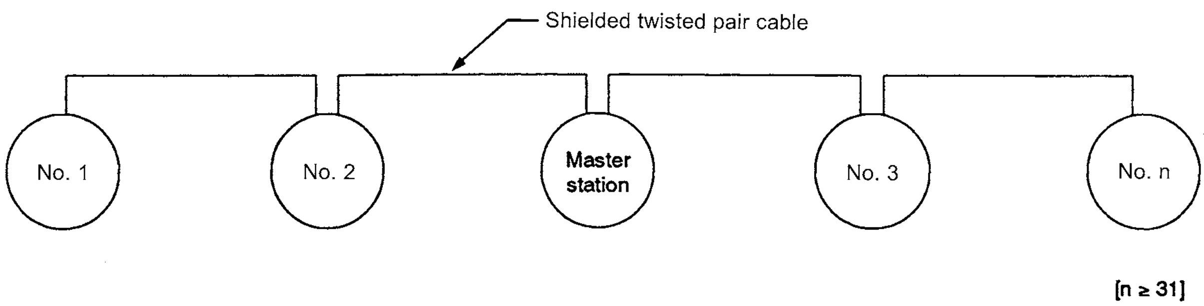
Use a MELSEC-A series programmable controller CPU to establish a data link system via optical fiber, coaxial or twisted-wire pair cables.

The MELSECNET data link system is a system to connect link modules via optical fiber cables or coaxial cables.
The MELSECNET/B data link system is a system to connect link modules via twisted-wire pair cables.

(1) MELSECNET data link system
In the MELSECNET data link systems, up to 64 slave stations (local and remote I/O stations) can be connected to a master station.
By using optical fiber or coaxial cables, connect slave station No.1 to the master station and slave station No. 2 to slave station 1 .., creating a loop system until station n is connected to the master station.



(2) MELSECNET/B data link systems
In the MELSECNET/B data link system, up to 31 slave stations (local and remote I/O stations) can be connected to the master station.
There is no restriction on order of connection and station order of the master station, local station and remote I/O station.
In addition, it is unnecessary to create a loop system, since each station has electrical connection.



1.2.3 Differences between the MELSECNET and MELSECNET/B data link systems

The following table shows differences between the MELSECNET and MELSECNET/B data link systems.

Table 1.1 Differences between the MELSECNET data link system and MELSECNET/B data link system

Item	MELSECNET data link system			MELSECNET/B data link system
	Optical data link system		Coaxial cable data link system	Shielded twisted pair cable data link system
	SI or H-PCF type optical fiber cable	GI type optical fiber cable		
Communication speed	1.25MBPS			125kBPS/250kBPS/500kBPS/1MBPS
Transmission path	Duplex loop			Bus system
Overall cable distance	Max.10 km (Between stations: 1 km)	Max.10 km (Between stations: 2 km)	Max. 10km (Between stations: 500m)	Varies depending on the communications speed 125kBPS: 1200m 250kBPS: 600m 500kBPS: 400m 1MBPS: 200m
Number of stations	Up to 65 (1 master station, 64 local/remote I/O stations)			Up to 32 (1 master station, 31 local/ remote I/O stations)
Modulation method	CMI method			NRZI method
RAS functions	The loopback function activated by detection of an error or cable disconnection, and the diagnostic function such as a link line check of the host station.			The diagnostic function such as a link line check of the host station.
Cable used	Optical fiber cable		Coaxial cable	Shielded twisted pair cable
Transmission loss	Max.12 dB/km	Max.3 dB/km	-	-
Sending level	-17 to -11dBm (peak value)	-17 to -10dBm (peak value)	-	-
Receiving level	-32 to -11dBm (peak value)	-29 to -10dBm (peak value)	-	-

1.2.4 Differences among the MELSECNET mode, MELSECNET Ⅱ mode, and MELSECNET Ⅱ composite mode

The data link system has the MELSECNET mode, the MELSECNET Ⅱ mode, or the MELSECNET Ⅱ composite mode.

In the MELSECNET mode, the data link system operates within the range of B/W0 to 3FF regardless of the link module used for the master station.

In the MELSECNET Ⅱ mode, the following link modules are used as the master and local stations and B/W400 and later are used for data link.
- AnACPUP21/R21
- AnACPU+AJ71AP21/R21/T21B
- AnUCPU+AJ71AP21/R21/T21B
- QnACPU+AJ71AP21/R21/T21B
- A2ASCPU(S1)+A1SJ71AP21/R21/T21B
- A2USHCPU-S1+A1SJ71AP21/R21/T21B
- Q2AS(H)CPU(S1)+A1SJ71AP21/R21/T21B
- QCPU-A+A1SJ71AP21/R21/T21B
- QCPU+A1SJ71AP23Q/R23Q/T23BQ(Local station only)

The following describes the major differences between the MELSECNET mode and the MELSECNET Ⅱ mode:
- The data link device range has been increased from B/W0 to 3FF (1024 points) to B/W0 to FFF (4096 points) in the MELSECNET Ⅱ mode.
- The maximum number of link points per station (master station and local station) has been increased from 1024 bytes to 2048 bytes in the MELSECNET Ⅱ mode.
- Connection of remote I/O stations is impossible in the MELSECNET Ⅱ mode.

The MELSECNET Ⅱ composite mode has the almost same function as that of the MELSECNET Ⅱ mode, and it is a mode which can connect to link module and remote I/O station of the MELSECNET mode.

The following describes the major differences among the three modes:

(1) Link modules that can be used as the master station (Refer to Table 1.2 for the link module model name.)
 (a) MELSECNET mode
 MELSECNET mode-compatible data link modules
 (A MELSECNET Ⅱ mode-compatible data link module can also be used as the master station for MELSECNET mode.)

 (b) MELSECNET Ⅱ mode
 MELSECNET Ⅱ mode-compatible link modules

 (c) MELSECNET Ⅱ composite mode
 MELSECNET Ⅱ mode-compatible data modules

(2) Link modules that can be used as the local station (Refer to Table 1.2 for the link module model name.)

(a) MELSECNET mode
MELSECNET mode- and MELSECNET Ⅱ mode-compatible data link modules

(b) MELSECNET Ⅱ mode
MELSECNET Ⅱ mode-compatible data link modules

(c) MELSECNET Ⅱ composite mode
MELSECNET mode- and MELSECNET Ⅱ mode-compatible data link modules

(3) Possibility of connecting remote I/O stations

(a) MELSECNET mode
Possible to connect

(b) MELSECNET Ⅱ mode
Impossible to connect

(c) MELSECNET Ⅱ composite mode
Possible to connect

(4) Data link device range
The following describes the data link device range for each operation mode.
The data link range for inputs (X) and outputs (Y) is determined by the data link module used as the master station. The maximum value is indicated below. For example, if an A2NCPU or A2ACPU is used as the master station, the X/Y range that can be used for data link is 0 to 1FF (512 points).

(a) MELSECNET mode
X/Y : 0 to 7FF (2048 points)
B : 0 to 3FF (1024 points)
W : 0 to 3FF (1024 points)

The data link range for link relays (B) and link registers (W) is B/W0 to 3FF (1024 points) when a MELSECNET Ⅱ compatible data link module is connected to the local station.

(b) MELSECNET Ⅱ mode
X/Y : 0 to 7FF (2048 points)
B : 0 to FFF (4096 points)
W : 0 to FFF (4096 points)

(c) MELSECNET Ⅱ composite mode
X/Y : 0 to 7FF (2048 points)
B : 0 to FFF (4096 points)
W : 0 to FFF (4096 points)

The data link range for link relays (B) and link registers (W) that can be data linked by the MELSECNET-compatible local station is B/W0 to 3FF (1024 points).

(5) Link parameter types and the number of link points per station

(a) MELSECNET mode

1) Link parameter is only one type.

2) Maximum number of link points per station

Master station and local station : 1024 bytes/station

Remote I/O station : 512 bytes/station (I/O is 512 points of X/Y0 to 1FF per station)

(b) MELSECNET Ⅱ mode

1) Link parameter

Link parameter is divided into two types (first/second half link parameter).
Data link is also possible by setting the first half link parameter only.

2) Maximum link points per station

- For stations with only first half link parameters set:
  Master station and local station: 1024 bytes/station
- For stations with both first and second link parameters set:
  Master station and local station: 2048 bytes/station

(c) MELSECNET Ⅱ composite mode

1) Link parameter

Link parameter is divided into two types (first/second half link parameter).
(When setting first half link parameter only, its function is the same as that of the MELSECNET mode.)

- First half link parameters should be assigned to master stations, local stations, and remote I/O stations.
- Second half link parameters should be assigned to master and local stations that are compatible with MELSECNET Ⅱ mode only.
  Second half link parameters cannot be assigned to remote I/O stations or MELSECNET mode-compatible local stations.

2) Maximum link points per station

- For stations with only first half link parameters set:
  Master station and local station: 1024 bytes/station
  Remote I/O station : 512 bytes/station (I/O is 512 points of X/Y0 to 1FF per station)
- For stations with both first and second link parameters set:
  Master station and local station: 2048 bytes/station

The information mentioned above (1) to (5) is summarized in Table 1.2.

Table 1.2 MELSECNET (Ⅱ) Data Link Function Overview

<table>
<tr><th colspan="3" rowspan="3">Item</th><th colspan="5">Operation mode</th></tr>
<tr><th colspan="5">MELSECNET data link system</th></tr>
<tr><th>MELSECNET mode</th><th colspan="2">MELSECNET Ⅱ composite mode</th><th colspan="2">MELSECNET Ⅱ mode</th></tr>
<tr><td colspan="3">Data link modules that can be used as a master station</td><td>A0J2HCPUP21/R21
AnNCPUP21/R21
AnNCPUP21-S3
A2NCPUP21-S4
AnACPUP21/R21
AnACPUP21-S3
A2ACPUP21-S4
AnACPU+AJ71AP21(S3)/R21
AnUCPU+AJ71AP21(S3)/R21
QnACPU+AJ71AP21(S3)/R21
AnSCPU+A1SJ71AP21/R21
AnASCPU+A1SJ71AP21/R21
QnASCPU+A1SJ71AP21/R21
QCPU-A+A1SJ71AP21/R21
A80BD-A2USH-S1+A1SJ71AP21/R21
A2CCPUP21/R21</td><td colspan="4">AnACPUP21/R21
AnACPUP21-S3
A2ACPUP21-S4
AnACPU+AJ71AP21(S3)/R21
AnUCPU+AJ71AP21(S3)/R21
QnACPU+AJ71AP21(S3)/R21
AnASCPU+A1SJ71AP21/R21
QnASCPU+A1SJ71AP21/R21
QCPU-A+A1SJ71AP21/R21
A80BD-A2USH-S1+A1SJ71AP21/R21</td></tr>
<tr><td colspan="3">Data link modules that can be used as a local station</td><td>A0J2HCPUP21/R21
AnNCPUP21/R21
AnNCPUP21-S3
A2NCPUP21-S4
Computer+A70BD-J71AP22
PC9800+A98BD-J71AP22
AnACPUP21/R21
AnACPUP21-S3
A2ACPUP21-S4</td><td colspan="2">AnACPU+AJ71AP21(S3)/R21
AnUCPU+AJ71AP21(S3)/R21
QnACPU+AJ71AP21(S3)/R21
AnSCPU+A1SJ71AP21/R21
AnASCPU+A1SJ71AP21/R21
QnASCPU+A1SJ71AP21/R21
QCPU-A+A1SJ71AP21/R21
QCPU+A1SJ71AP23Q/R23Q
A80BD-A2USH-S1+
A1SJ71AP21/R21
A2CCPUP21/R21</td><td colspan="2">AnACPUP21/R21
AnACPUP21-S3
A2ACPUP21-S4
AnACPU+AJ71AP21(S3)/R21
AnUCPU+AJ71AP21(S3)/R21
QnACPU+AJ71AP21(S3)/R21
AnASCPU+A1SJ71AP21/R21
QnASCPU+A1SJ71AP21/R21
QCPU-A+A1SJ71AP21/R21
QCPU+A1SJ71AP23Q/R23Q
A80BD-A2USH-S1+
A1SJ71AP21/R21</td></tr>
<tr><td colspan="3">Connection of remote I/O stations</td><td>Possible</td><td colspan="2">Possible</td><td colspan="2">Impossible</td></tr>
<tr><td rowspan="6">Device range</td><td rowspan="3">Parameter (first half)</td><td>X/Y</td><td>0 to 7FF</td><td colspan="2">0 to 7FF</td><td colspan="2">0 to 7FF</td></tr>
<tr><td>B</td><td>0 to 3FF</td><td colspan="2">0 to 3FF</td><td colspan="2">0 to FFF</td></tr>
<tr><td>W</td><td>0 to 3FF</td><td colspan="2">0 to 3FF</td><td colspan="2">0 to FFF</td></tr>
<tr><td rowspan="3">Parameter (second half)</td><td>X/Y</td><td>-</td><td colspan="2">-</td><td colspan="2">-</td></tr>
<tr><td>B</td><td>-</td><td colspan="2">α to FFF</td><td colspan="2">α to FFF</td></tr>
<tr><td>W</td><td>-</td><td colspan="2">α to FFF</td><td colspan="2">α to FFF</td></tr>
<tr><td colspan="3">Link parameter type</td><td>1 type</td><td colspan="2">2 types (Link parameters, first and second halves)</td><td colspan="2">2 types (Link parameters, first and second halves)</td></tr>
<tr><td rowspan="3">Max. number of link points per station</td><td colspan="2" rowspan="2">Master/local station</td><td rowspan="2">1024 bytes/station</td><td>Setting of first half only</td><td>1024 bytes/ station</td><td>Setting of first half only</td><td>1024 bytes/ station</td></tr>
<tr><td>Setting of both first and second halves</td><td>2048 bytes/ station</td><td>Setting of both first and second halves</td><td>2048 bytes/ station</td></tr>
<tr><td colspan="2">Remote I/O station</td><td colspan="3">512 bytes/station
(I/O: 512 points (X/Y0 to 1FF) /station)</td><td colspan="2">-</td></tr>
</table>

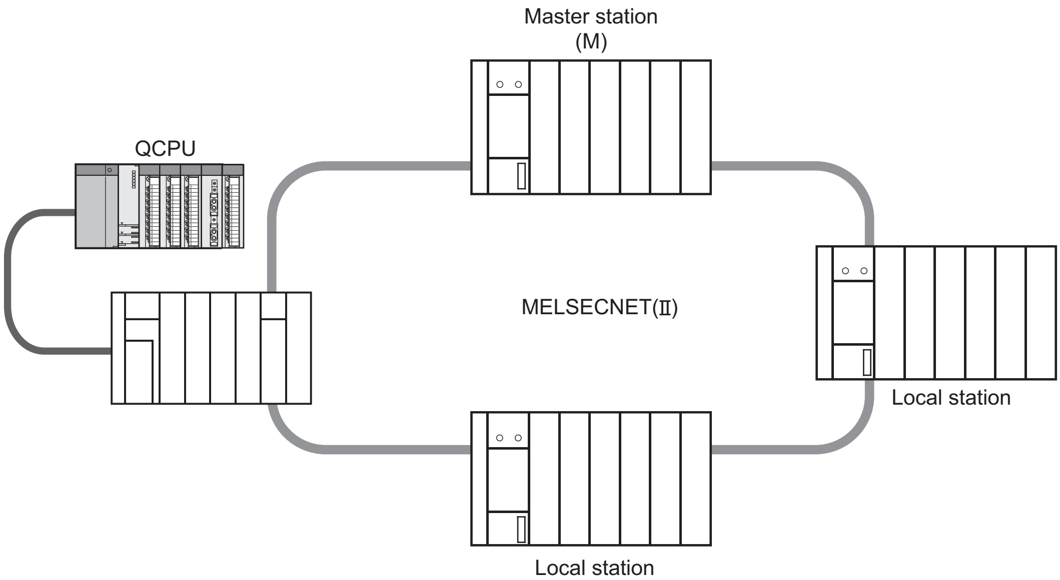
Table 1.2 MELSECNET (Ⅱ) Data Link Function Overview (Continued)

<table>
<tr><td colspan="5">Operation mode</td></tr>
<tr><td colspan="5">MELSECNET/B data link system</td></tr>
<tr><td>MELSECNET mode</td><td colspan="2">MELSECNET Ⅱ
composite mode</td><td colspan="2">MELSECNET Ⅱ mode</td></tr>
<tr><td>AnNCPU+AJ71AT21B
AnACPU+AJ71AT21B
AnUCPU+AJ71AT21B
QnACPU+AJ71AT21B
AnSCPU+A1SJ71AT21B
AnASCPU+A1SJ71AT21B
QnASCPU+A1SJ71AT21B
QCPU-A+A1SJ71AT21B
A80BD-A2USH-S1+A1SJ71AT21B</td><td colspan="4">AnACPU+AJ71AT21B
AnUCPU+AJ71AT21B
QnACPU+AJ71AT21B
AnASCPU+A1SJ71AT21B
QnASCPU+A1SJ71AT21B
QCPU-A+A1SJ71AT21B
A80BD-A2USH-S1+A1SJ71AT21B</td></tr>
<tr><td colspan="3">AnNCPU+AJ71AT21B
AnACPU+AJ71AT21B
AnUCPU+AJ71AT21B
QnACPU+AJ71AT21B
AnSCPU+A1SJ71AT21B
AnASCPU+A1SJ71AT21B
QnASCPU+A1SJ71AT21B
QCPU-A+A1SJ71AT21B
QCPU+A1SJ71AT23BQ
A80BD-A2USH-S1+A1SJ71AT21B</td><td colspan="2">AnACPU+AJ71AT21B
AnUCPU+AJ71AT21B
QnACPU+AJ71AT21B
AnASCPU+A1SJ71AT21B
QnASCPU+A1SJ71AT21B
QCPU-A+A1SJ71AT21B
QCPU+A1SJ71AT23BQ
A80BD-A2USH-S1+A1SJ71AT21B</td></tr>
<tr><td>Possible</td><td colspan="2">Possible</td><td colspan="2">Impossible</td></tr>
<tr><td>0 to 7FF</td><td colspan="2">0 to 7FF</td><td colspan="2">0 to 7FF</td></tr>
<tr><td>0 to 3FF</td><td colspan="2">0 to 3FF</td><td colspan="2">0 to FFF</td></tr>
<tr><td>0 to 3FF</td><td colspan="2">0 to 3FF</td><td colspan="2">0 to FFF</td></tr>
<tr><td>-</td><td colspan="2">-</td><td colspan="2">-</td></tr>
<tr><td>-</td><td colspan="2">α to FFF</td><td colspan="2">α to FFF</td></tr>
<tr><td>-</td><td colspan="2">α to FFF</td><td colspan="2">α to FFF</td></tr>
<tr><td>1 type</td><td colspan="2">2 types (Link parameters, first and second halves)</td><td colspan="2">2 types (Link parameters, first and second halves)</td></tr>
<tr><td rowspan="2">1024 bytes/station</td><td>Setting of first half only</td><td>1024 bytes/station</td><td>Setting of first half only</td><td>1024 bytes/station</td></tr>
<tr><td>Setting of both first and second halves</td><td>2048 bytes/station</td><td>Setting of both first and second halves</td><td>2048 bytes/station</td></tr>
<tr><td colspan="3">512 bytes/station
(I/O :512 points (X/Y0 to 1FF) /station)</td><td colspan="2">-</td></tr>
</table>

α : "The last number in first half" + 1
("0" if the first half range is "0".)

1.2.5 Differences between QCPU and A/QnACPU local stations

(1) When using an QCPU local station
This module replaces or adds a part of the existing MELSECNET (Ⅱ) data link system to QCPU.



(2) Differences between QCPU and A/QnACPU local stations
When replacing an A/QnACPU local station with a QCPU one, pay attention to the following point.

For details, refer to the MELSECNET, MELSECNET/B Local Station Data Link Module User's Manual.

Table 1.3 Differences between QCPU and A/QnACPU local stations

Item	Description	
	QCPU local station	A/QnACPU local station
Link refresh	Refreshes data with the sequence program. Link parameter setting (refresh parameters) is not required.	Automatically refreshes data at either of the following timing. • Upon completion of link scan • Only after execution of the END instruction in the sequence program For the AnUCPU, QnACPU, A2US(H)CPU(S1), Q2AS(H)CPU(S1) and QCPU-A, refresh ranges can be changed with refresh parameters.
	Does not refresh data when the CPU module is in STOP status.	
Operation after power OFF → ON, or resetting CPU module (CPU module is in STOP.)	Starts data communication with other stations by executing the program for refresh (Y10 = ON) with the CPU module set to RUN. Until then, the master station treats the QCPU local station as a faulty station (relevant bit in D9228 to D9231 is turned ON).	Starts data communications with other stations.

Table 1.3 Differences between QCPU and A/QnACPU local stations (Continued)

Item	Description	
	QCPU local station	A/QnACPU local station
LRDP/LWTP instruction receive processing	Handles the received instruction with the sequence program.	The system handles the received instruction. (The program for receiving LRDP/LWTP instruction is not required.)
	If the LRDP/LWTP instruction is received when the CPU module is in STOP status, sends an error response to the master station (4: LRDP/LWTP inexecutable on the station).	
Access from peripheral to host station	The following are not available. • Buffer memory batch monitor/test • Network diagnostics of GX Developer	Not particularly restricted.
Access from peripheral to other stations *1	Unable to access other stations. • Master station → QCPU local station • QCPU local station → Master station	• The master station can access A/QnACPU local stations. • A/QnACPU local stations can access the master station.
Network diagnostics of GX Developer	Unable to use the network diagnostics of GX Developer. The data link status or fault location can be checked by refreshing the special relay (for link) and special register (for link) of the local module into CPU module devices.	Can use the network diagnostics of GX Developer.
Forward loop test Reverse loop test	Place the QCPU local station into RUN status (Y10 = ON) to conduct the test. If the test is conducted in STOP status (Y10 = OFF), the master station treats the QCPU local station as a faulty station (relevant bit in D9228 to D9231 is turned ON). However, the test is normally conducted.	Place the A/QnACPU local station into STOP status to conduct the test.
Replacement for special relay (for link)	LRDP instruction receive request (Buffer memory address: ACH)	LRDP instruction completion (M9204)
	LWTP instruction receive request (Buffer memory address: AEH)	LWTP instruction completion (M9205)
	Hardware failure (RUN LED: OFF)	Link card failure (M9211)
	Link status (X0)	Link status (M9240)

*1 When replacing with a QCPU local station, the following alternative solution can be applied to GOT communications.

Table 1.4 Alternative solution for GOT communications

Before replacement	Alternative solution
GOT is connected to master station to access A/QnACPU local station.	• Send/receive the link data of the devices that are used for access from the GOT. Change the setting so that the GOT can access the devices refreshed on the host station. • If the number of link points is insufficient, install another local module to the QA1S6☐B extension base unit where the QCPU local station is mounted.
GOT is connected to A/QnACPU local station to access master station.	

1.3 Applicable Link Modules and General Names

1.3.1 Applicable link modules

This manual explains the link modules shown below.
The link modules compatible with MELSECNET Ⅱ mode also support the MELSECNET mode.

MELSECNET data link system

(1) CPU modules
   (a) Link modules compatible with MELSECNET mode
   A0J2HCPUP21/R21
   A1NCPUP21/R21
   A1NCPUP21-S3
   A2NCPUP21/R21(S1)
   A2NCPUP21-S3
   A2NCPUP21/R21-S1
   A2NCPUP21-S4
   A3NCPUP21/R21
   A3NCPUP21-S3
   A2CCPUP21/R21
   (b) Link modules compatible with MELSECNET Ⅱ mode
   A2ACPUP21/R21(S1)
   A2ACPUP21-S3
   A2ACPUP21/R21-S1
   A2ACPUP21-S4
   A3ACPUP21/R21
   A3ACPUP21-S3

(2) The following link modules are installed to a base unit.
   (a) Link modules compatible with MELSECNET mode (Installed in the CPU slot)
   AJ72P25/R25 (for remote I/O station)
   AJ72P25-S3 (for remote I/O station)
   (b) Link modules compatible with MELSECNET Ⅱ mode (Installed in an I/O slot)
   AJ71AP21/R21 (for master station/local station)
   A1SJ71AP21/R21 (for master station/local station)
   AJ71AP21-S3 (for master station/local station)

(3) The following link modules are used independently, without being installed to a base unit.
   (a) Link modules compatible with MELSECNET mode
   A0J2P25/R25 (for remote I/O station)
   A0J2P25-S3 (for remote I/O station)

MELSECNET/B data link system

(1) The following link modules are installed to a base unit.
  (a) Link module compatible with MELSECNET mode (Installed in the CPU slot)
      A1SJ72T25B (for remote I/O station)
      AJ72T25B (for remote I/O station)
  (b) Link module compatible with MELSECNET Ⅱ mode (Installed in an I/O slot)
      A1SJ71AT21B (for master station/local station)
      AJ71AT21B (for master station/local station)

POINT
Although the following link modules can be connected to the MELSECNET data link system, they are not discussed in this manual. Graphic operation terminal A6BSW-S3, S4, S5 (bypass switch) Personal computer board Refer to the manual for these link modules for details.

1.3.2 General names of CPU modules

This manual describes CPU modules using the following generic names.

(1) AnNCPU
AnNCPU is general name for the following link modules:
1) A1NCPU 3) A2NCPU-S1
2) A2NCPU 4) A3NCPU

(2) AnACPU
AnACPU is general name for the following link modules:
1) A2ACPU 3) A3ACPU
2) A2ACPU-S1

(3) AnUCPU
AnUCPU is general name for the following link modules:
1) A2UCPU 3) A3UCPU
2) A2UCPU-S1 4) A4UCPU

(4) QnACPU
QnACPU is general name for the following link modules:
1) Q2ACPU 3) Q3ACPU
2) Q2ACPU-S1 4) Q4ACPU

(5) ACPU
ACPU is general name for all the CPUs listed in items (1) to (4), A0J2HCPU and A2CCPU.

(6) AnSCPU
AnSCPU is general name for the following link modules:
1) A1SJHCPU 3) A2SHCPU
2) A1SHCPU

(7) AnASCPU
AnASCPU is general name for the following link modules:
1) A2ASCPU 3) A2USHCPU-S1
2) A2ASCPU-S1

(8) QnASCPU
QnASCPU is general name for the following link modules:
1) Q2ASCPU 3) Q2ASHCPU
2) Q2ASCPU-S1 4) Q2ASHCPU-S1

(9) AnNCPUP21/R21
AnNCPUP21/R21 is general name for the following link modules:
1) A1NCPUP21/R21 5) A2NCPUP21-S3
2) A1NCPUP21-S3 6) A2NCPUP21-S4
3) A2NCPUP21/R21 7) A3NCPUP21/R21
4) A2NCPUP21/R21-S1 8) A3NCPUP21-S3

(10) AnACPUP21/R21

AnACPUP21/R21 is general name for the following link modules:

1) A2ACPUP21/R21	4) A2ACPUP21-S4
2) A2ACPUP21/R21-S1	5) A3ACPUP21/R21
3) A2ACPUP21-S3	6) A3ACPUP21-S3

(11) QCPU-A

QCPU-A is general name for the following CPU modules:

1) Q02CPU-A	3) Q06HCPU-A
2) Q02HCPU-A	

(12) QCPU

QCPU is general name for the following CPU modules:

1) Q02CPU	4) Q12HCPU
2) Q02HCPU	5) Q25HCPU
3) Q06HCPU	

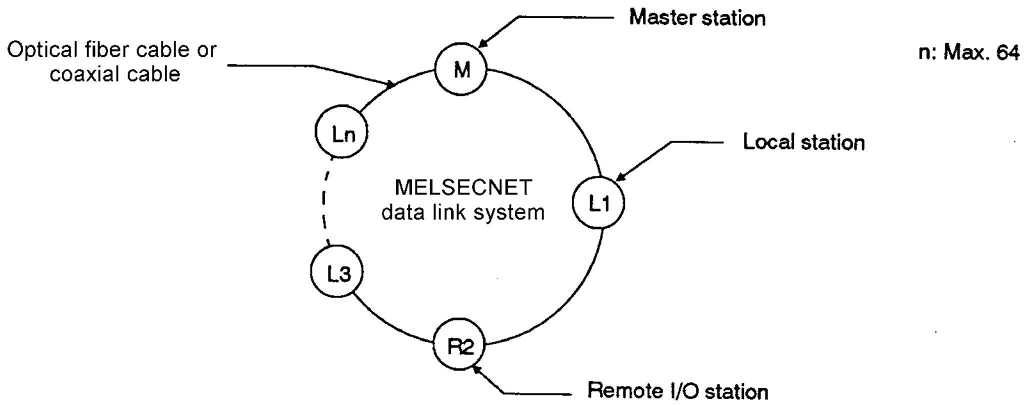
2 TWO-TIER SYSTEM IN THE MELSECNET DATA LINK SYSTEM

This section describes the MELSECNET data link system.

2.1 Outline of the MELSECNET Data Link System

2.1.1 Configuration of the data link system

The MELSECNET data link system connects link modules via optical fiber or coaxial cables.
In the MELSECNET data link system, up to 64 slave (local and remote I/O) stations can be connected to a link module used as the master station.
There is no restriction on combinations of local and remote I/O stations.



(1) Master station
The master station is the link module which controls the whole MELSECNET data link system.
The total number of slave stations (up to 64) connected to MELSECNET data link system and the device (B, W, X, Y) to perform data link are set to the programmable controller CPU of the master station using link parameter.
The master station controls data communications in the MELSECNET data link system by using the set link parameters.

(2) Slave stations
There are two kinds of slave stations: local stations and remote I/O stations.
(a) Local stations
When two or more programmable controller CPUs are used for data link, local stations are used to increase the number of I/O points and the program capacity in a large-scale system.
(b) Remote I/O stations
Remote I/O stations are used to reduce wiring costs when data must be frequently input/output from/to devices that are far away from a programmable controller CPU.
The programmable controller CPU in the master station controls the input and output of remote I/O stations.
The number of I/O points is 512 points (X/Y0 to 1FF) per station.

REMARK

Master stations, local stations, and remote I/O stations are expressed in the following symbols.

- Master station...............M
- Local station..................L (Local station No. n: Ln)
- Remote I/O station........R (remote I/O station No. n: Rn)

2.1.2 Features of the data link system

The following describes features of MELSECNET data link system.

(1) Cyclic transmission function
The cyclic transmission is a function to periodically communicate data between a master station and slave stations (local stations and remote I/O stations).
Either 1 : n or 1 : 1 data communications are enabled by the cyclic transmission.

(a) 1 : n data communications
This is data communications between the master station and all local stations/ between local stations.
ON/OFF data and 16-bit data can both be communicated:
1) ON/OFF data is communicated using the link relay (B).
2) 16-bit data is communicated using the link register (W).

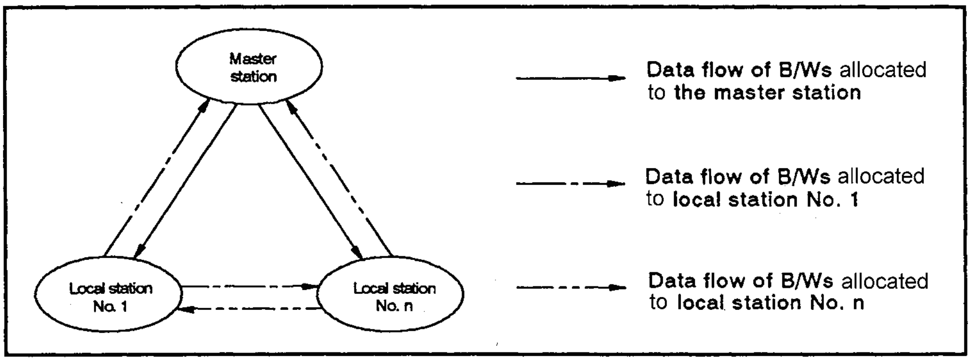


Fig 2.1 Flow of data by B/W communication

(b) 1 : 1 data communications
This is 1 : 1 data communications between the master station and a local station/ between the master station and a remote I/O station.
ON/OFF data can be communicated using inputs (X) and outputs (Y).

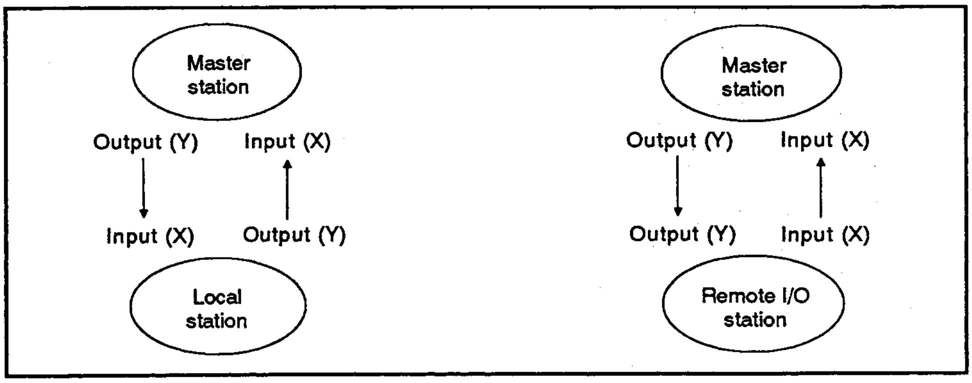


Fig 2.2 Flow of input (X) and output (Y) communication data

(2) Transient transmission function
The transient transmission function reads/writes data from/to a device in a local station by the master station programmable controller CPU or communicates data between a peripheral device connected to a programmable controller CPU and a programmable controller CPU in another station.

The transient transmission includes the following.

(a) Communication between master station and local station
The device (T, C, D, W) of a local station is read/written from the programmable controller CPU of the master station.
The master station uses LRDP and LWTP*1 instructions in a sequence program.

(b) Communication between master station and remote I/O station
The content of buffer memory of the special function module connected from remote I/O station is read/written from the programmable controller CPU of the master station.
The master station uses RFRP and RTOP*1 instructions in a sequence program.

(c) Access of peripheral device and special function module to/from other station
Access of the peripheral device and special function module connected to the programmable controller CPU to/from other station is performed.
The accessible station varies as shown in Table 2.1, depending on which one of the master station, local station and remote I/O station is connected to peripheral device or mounts special function module.
For the function executable in the peripheral device and special function module, refer to the manual for the peripheral device and special function module in use.

Table 2.1 Accessible Stations With a Peripheral Device

Access target station	Station where peripheral device is connected		
	Master Station	Local Station	Remote I/O Station
Master Station	Accessible	Accessible	Accessible
Local Station	Accessible	Not accessible	Not accessible
Remote I/O Station	Accessible*2	Not accessible	Not accessible

REMARK

* 1
- When the AnACPU(P21/R21), AnUCPU, A2US(H)CPU(S1) or QCPU-A is used, the LRDP/LWTP/RFRP/RTOP instructions of the dedicated instructions can also be used.
(For details of the instructions, refer to the Type AnSHCPU/AnACPU/AnUCPU/QCPU-A (A Mode) Programming Manual (Dedicated Instructions) IB-66251.)
- When the QnACPU, Q2AS(H)CPU(S1) is used, the ZNRD/ZNWR/RFRP/RTOP instructions of the data link instructions can also be used.
(For details on the instructions, refer to the QnACPU Programming Manual (Common Instructions).)

* 2
- Not accessible when using GX Developer.

(3) Improved RAS (Reliability, Availability, Serviceability) functions

(a) Loopback function

If a cable breaks or the power supply to a slave station is turned off, the affected slave station is disconnected from the data link so that normal link operations are able to continue for other stations.

In the MELSECNET data link system, the optical fiber cables or coaxial cables are doubled to make the loopback function possible. This double configuration allows data link operations to continue by switching the loop from forward to reverse if a cable breaks or the power to a slave station is turned off. (Refer to Section 5.3.4.)

(b) Automatic return function

If an error occurs in a slave station, the corresponding station is disconnected from the data link system.

When a slave station (local station, remote I/O station) is disconnected from the link due to an occurrence of a problem, it is automatically connected into the link when the station recovers the normal operating conditions. (Refer to Section 5.3.3.)

(c) Error detection

1) The data link operation status is stored in special relays (M) and special registers (D) in a programmable controller CPU.
   Read these special relays (M) and special registers (D) to check the data link operation status.
2) Use the link monitor function of a peripheral device (A6GPP, A6PHP, A6HGP) to check the data link operation status.

(d) Self-diagnostics function

The self-diagnostics function checks the link module hardware, the optical fiber cable or coaxial cable connection status, etc.

REMARK

The errors that make the RAS functions valid are only cable breakage, slave station power-off, data link setting error, and the errors that can be detected by the self-diagnostics of the CPU module.

The RAS functions may not work depending on the fault of the data link module.

(4) Using MELSECNET mode and MELSECNET Ⅱ mode-compatible modules in the same network

The link module which can be connected to MELSECNET data link system includes the MELSECNET mode-compatible link module and the MELSECNET Ⅱ mode-compatible link module.

The MELSECNET data link system even allows MELSECNET mode-compatible modules and MELSECNET Ⅱ mode-compatible modules to be used in the same network.

The MELSECNET Ⅱ mode-compatible link module can also be connected to the data link system of the operating MELSECNET mode.

The MELSECNET data link system has parameters for setting its operation mode so that various combinations of system configuration are possible.

The operation mode includes MELSECNET mode, MELSECNET Ⅱ mode, and MELSECNET Ⅱ composite mode.

Refer to Section 1.2 for details on the differences between these modes.

2.2 MELSECNET Data Link System

2.2.1 Overall configuration

(1) Two-tier system
In a two-tier system, up to 64 stations (local and remote I/O stations) can be connected to the master station with optical fiber cable or coaxial cable.
In a two-tier system, a master station is referred to as "master station" and a local station or a remote I/O station is referred to as "slave station".

(2) System configuration
(a) Fig 2.3 shows the configuration of the two-tier system.

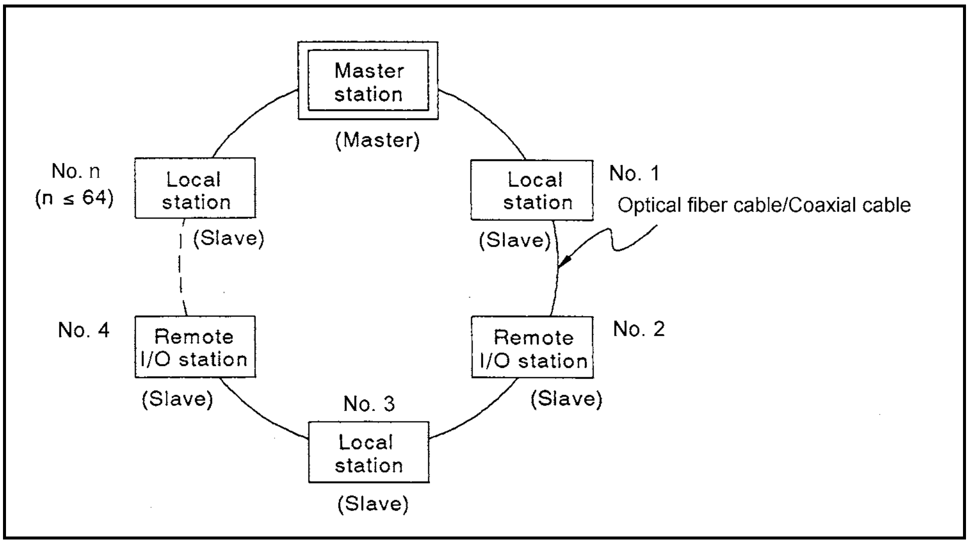
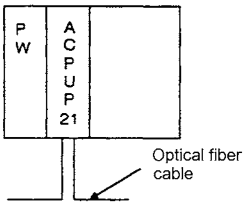
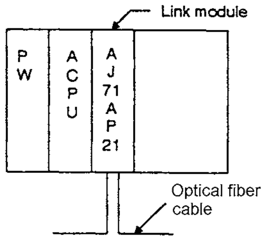
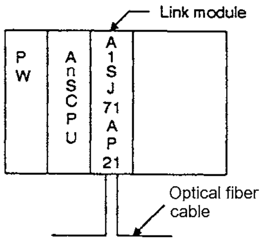
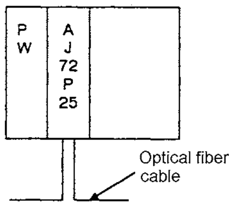
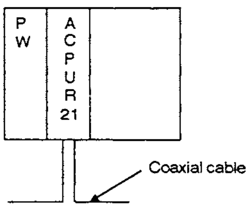
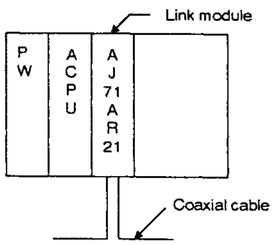


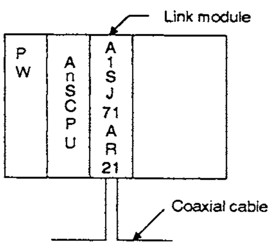
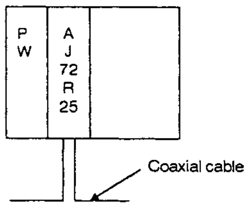
Fig 2.3 Two-Tier System

POINT
Remote I/O stations cannot be connected if the MELSECNET Ⅱ mode is used.

(b) The following table shows the configurations of the master station/local station and the remote I/O station.

<table>
<tr><th rowspan="2">Type of cable</th><th colspan="2">Master stations / Local stations</th><th rowspan="2">Remote I/O station</th></tr>
<tr><th>CPU module with a link function</th><th>CPU module + link module</th></tr>
<tr><td>Optical fiber cable</td><td>
</td><td>


</td><td>
</td></tr>
<tr><td>Coaxial cable</td><td>
</td><td>


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

2.2.2 Precautions when operating the data link system

The following describes the precautions for performing data link.

(1) Optical fiber cable and coaxial cable cannot be mixed in the same loop.
The same type of cable must be used for links within the same loop of the two-tier system. Optical fiber cable and coaxial cable cannot be mixed.

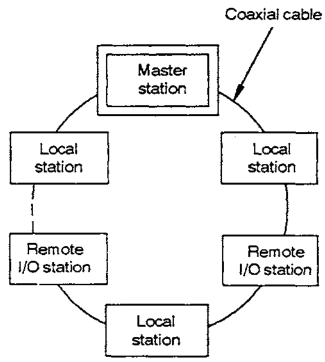
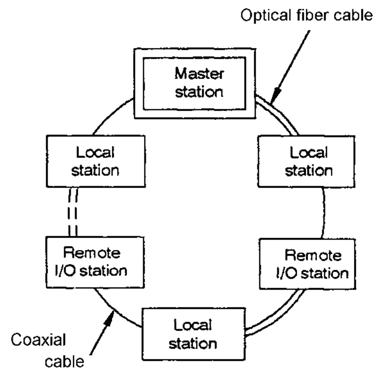
Connection using one type of cable (Permitted)	Connection using both optical fiber cable and coaxial cable within a single loop (Not permitted)
	

Fig 2.4 Possibility of connection between link modules

(2) Number of link device points
The number of link device points (X, Y, B, W) that can be used for each local or remote I/O station is limited. (For details, refer to Section 7.3.)

(3) Link parameter settings
Set the link parameters in the master station to operate data link.
The link parameters include the number of slave stations connected to the MELSECNET data link system, the link device assignments, and the monitoring time.

(a) Number of slave stations.......... The total number of local and remote I/O stations connected to the MELSECNET data link system.

(b) Link device assignment........... It is a setting of the range for link data communications for each station (master, local, and remote I/O stations).
For details, refer to Chapter 7.

(c) Monitoring time..........................The maximum allowable time that local stations and remote I/O stations take to determine whether the master station is operating normally.
(For details, refer to Section 7.5.)

(4) Operation mode in the MELSECNET data link system
Operation mode is determined according to the type of link module which is connected to the MELSECNET data link system and link parameter setting.
For details, refer to Section 1.2.4.

2.2.3 Applicable modules

The following describes link modules which can be used in the MELSECNET.

(1) Data link module using optical fiber cable
The data link modules that can be connected with optical fiber cable are listed in Table 2.2.

Table 2.2 Data Link Modules Connectable with Optical Fiber Cable

○: Applicable

Module	Model	Applicable optical fiber cable type		Description	Applicable system								Remarks
					Two-tier system								
					MELSECNET mode			MELSECNET II mode		MELSECNET II composite mode			
		SI	GI		M	L	R	M	L	M	L	R	
CPU module	A0J2HCPUP21	○		CPU module with the link function	○	○					○		Use the station number setting switch to set the selection of master or local station.
	A2CCPUP21												
	A1NCPUP21												
	A1NCPUP21-S3		○										
	A2NCPUP21	○											
	A2NCPUP21-S3		○										
	A2NCPUP21-S1	○											
	A2NCPUP21-S4		○										
	A3NCPUP21	○											
	A3NCPUP21-S3		○										
	A2ACPUP21	○		CPU module with the link function	○	○		○	○	○	○		
	A2ACPUP21-S3		○										
	A2ACPUP21-S1	○											
	A2ACPUP21-S4		○										
	A3ACPUP21	○											
	A3ACPUP21-S3		○										
Data link module	A1SJ71AP21	○		Module for data link, used with any of the following CPUs: AnSCPU, AnUSCPU, QnASCPU, QCPU-A	○	○		*1 ○	*1 ○	*1 ○	○		Installed in an I/O slot in a base unit.
	A1SJ71AP21-S3		○										
	AJ71AP21	○		Module for data link, used with a CPU module without the link function (ACPU)	○	○		*2 ○	*2 ○	*2 ○	○		
	AJ71AP21-S3		○										
	A0J2P25	○		Compact type module for remote I/O stations			○					○	
	A0J2P25-S3		○										
	AJ72P25	○		Module for remote I/O stations, which is to be mounted on the following base units: A32B(-S1), A35B, A38B									Installed in the CPU slot of a main base unit.
	AJ72P25-S3		○										
	A1SJ71AP23Q	○		Module for data link, used with a QCPU module		○			○		○		• Used only for local stations. • Installed in an I/O slot in an extension base unit.

REMARK

(1) The M, L and R stations in Table 2.2 indicate the following stations.
  a) M station.......... Master station
  b) L station........... Local station
  c) R station........... Remote I/O station

(2) *1: Applicable only when used in combination with the A2US(H)CPU(S1), Q2AS(H)CPU(S1) or QCPU-A.

(3) *2: Applicable only when used in combination with the AnACPU, AnUCPU or QnACPU.

(2) Data link module using coaxial cable
The data link modules that can be connected with coaxial cable are listed in Table 2.3.

Table 2.3 Data Link Modules Connectable with Coaxial Cable

○: Applicable

<table>
<tr><th rowspan="4">Module</th><th rowspan="4">Model</th><th rowspan="4">Description</th><th colspan="8">Applicable system</th><th rowspan="4">Remarks</th></tr>
<tr><th colspan="8">Two-tier system</th></tr>
<tr><th colspan="3">MELSECNET mode</th><th colspan="2">MELSEC NET Ⅱ mode</th><th colspan="3">MELSECNET Ⅱ composite mode</th></tr>
<tr><th>M</th><th>L</th><th>R</th><th>M</th><th>L</th><th>M</th><th>L</th><th>R</th></tr>
<tr><td rowspan="2">CPU module</td><td>A0J2HCPUR21
A2CCPUR21
A1NCPUR21
A2NCPUR21
A2CPUR21-S1
A2NCPUR21-S1
A3NCPUR21</td><td>CPU module with the link function</td><td>○</td><td>○</td><td></td><td></td><td></td><td></td><td>○</td><td></td><td rowspan="2">Use the station number setting switch to set the selection of master or local station.</td></tr>
<tr><td>A2ACPUR21
A2ACPUR21-S1
A3ACPUR21</td><td>CPU module with the link function</td><td>○</td><td>○</td><td></td><td>○</td><td>○</td><td>○</td><td>○</td><td></td></tr>
<tr><td rowspan="5">Data link module</td><td>A1SJ71AR21</td><td>Module for data link, used with any of the following CPUs: AnSCPU, AnUSCPU, QnASCPU, QCPU-A</td><td>○</td><td>○</td><td></td><td>*1 ○</td><td>*1 ○</td><td>*1 ○</td><td>○</td><td></td><td rowspan="2">Installed in an I/O slot in a base unit.</td></tr>
<tr><td>AJ71AR21</td><td>Module for data link, used with a CPU module without the link function (ACPU)</td><td>○</td><td>○</td><td></td><td>*2 ○</td><td>*2 ○</td><td>*2 ○</td><td>○</td><td></td></tr>
<tr><td>A0J2R25</td><td>Compact type module for remote I/O stations</td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2">○</td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2">○</td><td></td></tr>
<tr><td>AJ72R25</td><td>Module for remote I/O stations, which is to be mounted on the following base units: A32B(-S1), A35B, A38B</td><td>Installed in the CPU slot of a main base unit.</td></tr>
<tr><td>A1SJ71AR23Q</td><td>Module for data link, used with a QCPU module</td><td></td><td>○</td><td></td><td></td><td>○</td><td></td><td>○</td><td></td><td>• Used only for local stations.
• Installed in an I/O slot in an extension base unit.</td></tr>
</table>

REMARK

(1) The M, L and R stations in Table 2.3 indicate the following stations.
a) M station.......... Master station
b) L station........... Local station
c) R station........... Remote I/O station

(2) *1: Applicable only when used in combination with the A2US(H)CPU(S1), Q2AS(H)CPU(S1) or QCPU-A.
(3) *2: Applicable only when used in combination with the AnACPU, AnUCPU or QnACPU.

MEMO

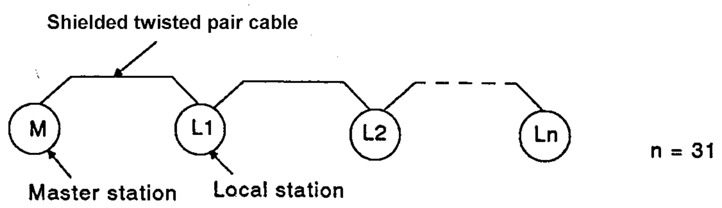
3 TWO-TIER SYSTEM IN THE MELSECNET/B DATA LINK SYSTEM

This section describes the MELSECNET/B data link system.

3.1 Outline of the MELSECNET/B Data Link System

3.1.1 Configuration of the data link system

The MELSECNET/B data link system is a system to connect link modules using shielded twisted pair cable.
Up to 31 slave stations (local station and remote I/O station) can be used in a system which has one link module as the master station.



(1) Master station
Master station is the link module that controls the whole MELSECNET/B data link system.
The number of connected slave stations (Max. 31) and the device (B, W, X, Y) ranges for data communications are set with link parameters at the programmable controller CPU in the master station.
The master station controls data communications in a MELSECNET/B data link system in accordance with these set link parameters.

(2) Slave stations
Slave stations include a local station and a remote I/O station.
(a) Local station
When two or more programmable controller CPUs are used for data link, local stations are used to increase the number of I/O points and the program capacity in a large-scale system.

(b) Remote I/O station
Remote I/O stations are used to reduce wiring cost when data must be frequently input/output from/to devices that are far away from the programmable controller CPU.
The programmable controller CPU in the master station controls the input and output of remote I/O stations.
The number of I/O points is 512 points (X/Y0 to 1FF) per station.

REMARK

Master stations, local stations, and remote I/O stations are expressed in the following symbols.
- Master station.............. M
- Local station................ L (Local station No. n: Ln)
- Remote I/O station....... R (remote I/O station No. n: Rn)

3.1.2 Features of the data link system

The features of the MELSECNET/B data link system are described below.

(1) Cyclic transmission function
The cyclic transmission is a function to periodically communicate data between a master station and slave stations (local stations and remote I/O stations)
Either 1 : n or 1 : 1 data communications are enabled by the cyclic transmission function.

(a) 1 : n data communications
This is data communications between the master station and all local stations/ between local stations.
ON/OFF data and 16-bit data can both be communicated:
1) ON/OFF data is communicated using the link relay (B).
2) 16-bit data is communicated using the link register (W).

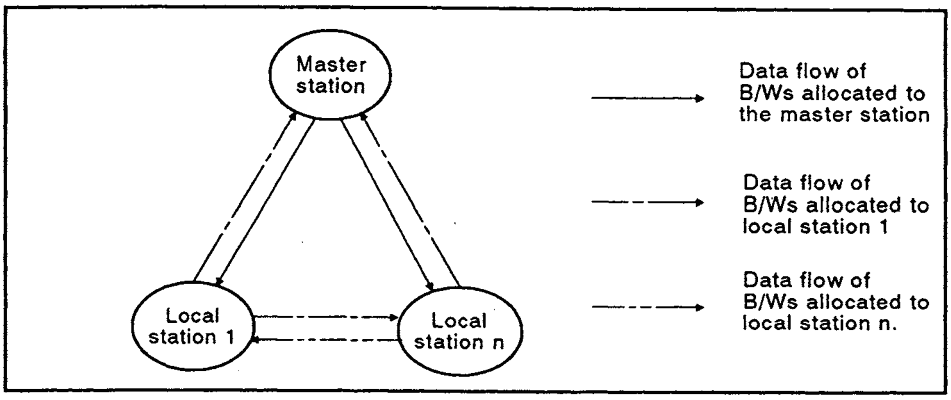


Fig 3.1 Flow of data by B/W communication

(b) 1 : 1 data communications
This is 1 : 1 data communications between a master station and a local station.
ON/OFF data can be communicated using inputs (X) and outputs (Y).

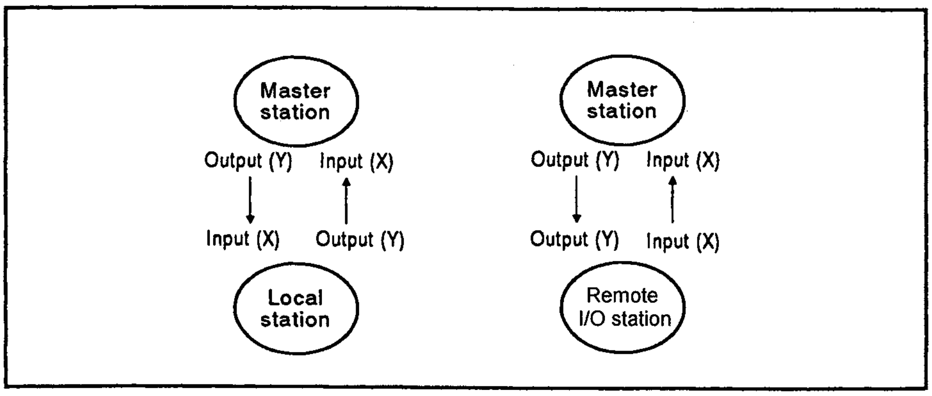


Fig 3.2 Flow of input (X) and output (Y) communication data

(2) Transient transmission function
The transient transmission function (a) reads/writes data from/to a device in a local station by using a master station programmable controller CPU, and (b) communicates data between a peripheral device connected to a programmable controller CPU and a programmable controller CPU in another station.
The transient transmission function executes the following types of processings:

(a) Communications between a master station and a local station
Read/write for devices (T, C, D and W) in a local station by a master station programmable controller CPU.
LRDP/LWTP*1 instructions in a sequence program are used for this processing at the master station.

(b) Communications between a master station and a remote I/O station
Read/write of data from/to the buffer memory of a special-function module connected to a remote I/O station is performed from a master station programmable controller CPU.
RFRP/RTOP*1 instructions in a sequence program are used at the master station.

(c) Access between a peripheral device or special-function module and another station
Another station is accessed from a peripheral device or special-function module connected to a programmable controller CPU.
As Table 3.1 shows, the accessible station varies depending on the peripheral device or special-function module installed in a master, local or remote I/O station.
However, the stations in Table 3.1 are basically accessible.
The manual of the used peripheral device or special-function module gives details about the functions that can be executed by that peripheral device or special-function module.

Table 3.1 Communicating Stations Available to Peripheral Devices and Special-Function Modules

Access target station	Station where a peripheral device is connected		
	Master Station	Local Station	Remote I/O Station
Master Station	Accessible	Accessible	Accessible
Local Station	Accessible	Not accessible	Not accessible
Remote I/O Station	Accessible*2	Not accessible	Not accessible

REMARK

*1
- When the AnACPU(P21/R21), AnUCPU, A2US(H)CPU(S1) or QCPU-A is used, the LRDP/LWTP/RFRP/RTOP instructions of the dedicated instructions can also be used.
  (For details of the instructions, refer to the Type AnSHCPU/AnACPU/AnUCPU/QCPU-A (A Mode) Programming Manual (Dedicated Instructions) IB-66251.)
- When the QnACPU, Q2AS(H)CPU(S1) is used, the ZNRD/ZNWR/RFRP/RTOP instructions of the data link instructions can also be used.
  (For details on the instructions, refer to the QnACPU Programming Manual (Common Instructions).)

*2
- Not accessible when using GX Developer.

(3) Improved RAS (Reliability, Availability, Serviceability) functions
  (a) Automatic return function
  When a slave station (local station) where an error occurred returns to the link-enabled state, the station automatically restarts the data link operation. (Refer to Section 5.3.3.)

  (b) Error detection
  1) The data link operating state is stored in special relays (M) and special registers (D) in a programmable controller CPU.
  The data link operating state can be checked by reading the data stored in the special relays (M) and special registers (D).
  2) The data link operating state can also be checked by using the link monitor function at a peripheral device (A6GPP, A6PHP, or A6HGP).

  (c) Self-diagnostics function
  The self-diagnostics function of the data link module checks the link module hardware and shielded twisted pair cable connections.

(4) Three operating modes can be selected by setting the CPU module
To satisfy various system configuration requirements, different operating modes can be selected for the MELSECNET/B data link system by setting link parameters.
The MELSECNET/B data link system has the following three operation modes: MELSECNET mode, MELSECNET Ⅱ mode, and MELSECNET Ⅱ composite mode.
Section 1.2 gives details about the differences among these modes.

(5) Switching the communication speed is enabled.
The communication speed can be set to 125kbps, 250kbps, 500kbps, or 1Mbps.
The total link distance can be changed by switching the communication speed.
For the relationship between the communication speed and total link distance, refer to Table 1.1.

3.2 MELSECNET/B Data Link System

3.2.1 Overall configuration

(1) Two-tier system
The two-tier system is a system to connect up to 31 local stations and remote I/O stations to a master station via shielded twisted pair cables.
In a two-tier system, a master station is referred to as "master station" and a local station or a remote I/O station is referred to as "slave station".

(2) System configuration
Fig 3.3 shows the configuration of the two-tier system.

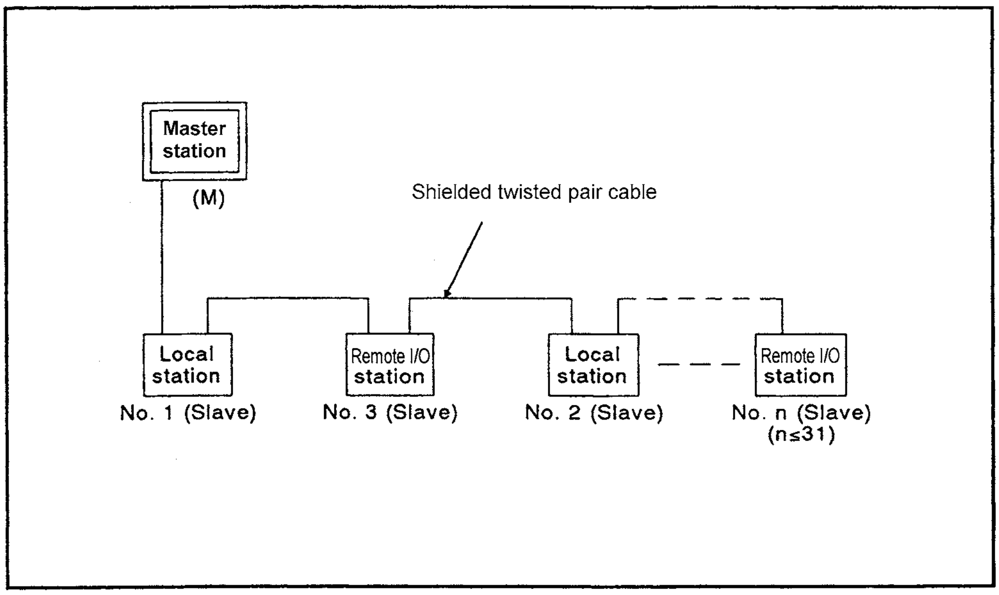


Fig 3.3 Two-tier system

POINT
(1) Remote I/O stations cannot be connected if the MELSECNET II mode is used. (2) The connection order or station order of master stations, local stations and remote I/O stations can be freely decided in the MELSECNET/B data link system.

3.2.2 Precautions when operating the data link system

The following describes the precautions for performing data link.

(1) Number of link device points for one station
Note that the number of link device (X, Y, B, W) points that can be used at a local station and a remote I/O station is limited. (For details, refer to Section 7.3.)

(2) Link parameter setting
Set the link parameters in the master station to perform data link.
The link parameters include the number of slave stations connected in the MELSECNET/B data link system, the link device assignment, and the watchdog monitoring time.

(a) Number of slave stations........... The total number of the local stations and remote I/O stations connected to the MELSECNET/B data link system.

(b) Link device assignment............. The range of link data communications is set at each master station, local station, and remote I/O station.
For details, refer to Chapter 7.

(c) Monitoring time........................ It is used for local stations and remote I/O stations to judge whether a master station is operating normally.
For details, refer to Section 7.5.

(3) The operating mode of a MELSECNET/B data link system
The operating mode is determined by the type of link modules connected to the MELSECNET/B data link system and the link parameter settings. For details, refer to Section 1.2.4.

(4) Shielded twisted pair cable
The shielded twisted pair cable used for the MELSECNET/B data link system is KNPEV-SB0.5SQ×1P.
For details, refer to Section 5.6.

3.2.3 System devices

Table 3.2 shows the link modules that can be used in the MELSECNET/B Data Link System.

Table 3.2 List of link modules

○: Available

<table>
<tr><th rowspan="4">Link module</th><th rowspan="4">CPU module</th><th colspan="2" rowspan="3">Description</th><th colspan="8">Applicable system</th><th rowspan="4">Remarks</th></tr>
<tr><th colspan="8">Two-tier system</th></tr>
<tr><th colspan="3">MELSECNET mode</th><th colspan="2">MELSECNET II mode</th><th colspan="3">MELSECNET II composite mode</th></tr>
<tr><th>Program capacity</th><th>Number of I/O points</th><th>M</th><th>L</th><th>R</th><th>M</th><th>L</th><th>M</th><th>L</th><th>R</th></tr>
<tr><td rowspan="16">AJ71AT21B</td><td>A0J2HCPU</td><td>8k steps</td><td>336 points</td><td rowspan="5">○</td><td rowspan="5">○</td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5">○</td><td rowspan="5"></td><td rowspan="29">Use the station number setting switch to set the selection of master or local station.</td></tr>
<tr><td>A1NCPU</td><td>6k steps</td><td>256 points</td></tr>
<tr><td>A2NCPU</td><td>14k steps</td><td>512 points</td></tr>
<tr><td>A2NCPU-S1</td><td>14k steps</td><td>1024 points</td></tr>
<tr><td>A3NCPU</td><td>30k steps</td><td>2048 points</td></tr>
<tr><td>A2ACPU</td><td>14k steps</td><td>512 points</td><td rowspan="11">○</td><td rowspan="11">○</td><td rowspan="11"></td><td rowspan="11">○</td><td rowspan="11">○</td><td rowspan="11">○</td><td rowspan="11">○</td><td rowspan="11"></td></tr>
<tr><td>A2ACPU-S1</td><td>14k steps</td><td>1024 points</td></tr>
<tr><td>A3ACPU</td><td>30k steps</td><td>2048 points</td></tr>
<tr><td>A2UCPU</td><td>14k steps</td><td>512 points</td></tr>
<tr><td>A2UCPU-S1</td><td>14k steps</td><td>1024 points</td></tr>
<tr><td>A3UCPU</td><td>30k steps</td><td>2048 points</td></tr>
<tr><td>A4UCPU</td><td>30k steps</td><td>4096 points</td></tr>
<tr><td>Q2ACPU</td><td>28k steps</td><td>512 points</td></tr>
<tr><td>Q2ACPU-S1</td><td>60k steps</td><td>1024 points</td></tr>
<tr><td>Q3ACPU</td><td>92k steps</td><td>2048 points</td></tr>
<tr><td>Q4ACPU</td><td>128k steps</td><td>4096 points</td></tr>
<tr><td rowspan="13">A1SJ71 AT21B</td><td>A1SJHCPU</td><td rowspan="2">8k steps</td><td rowspan="2">256 points</td><td rowspan="3">○</td><td rowspan="3">○</td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3">○</td><td rowspan="3"></td></tr>
<tr><td>A1SHCPU</td></tr>
<tr><td>A2SHCPU</td><td>14k steps</td><td>512 points</td></tr>
<tr><td>A2ASCPU</td><td>14k steps</td><td>512 points</td><td rowspan="7">○</td><td rowspan="7">○</td><td rowspan="7"></td><td rowspan="7">○</td><td rowspan="7">○</td><td rowspan="7">○</td><td rowspan="7">○</td><td rowspan="7"></td></tr>
<tr><td>A2ASCPU-S1</td><td>14k steps</td><td>1024 points</td></tr>
<tr><td>A2USHCPU-S1</td><td>30k steps</td><td>1024 points</td></tr>
<tr><td>Q2ASCPU</td><td>28k steps</td><td>512 points</td></tr>
<tr><td>Q2ASCPU-S1</td><td>60k steps</td><td>1024 points</td></tr>
<tr><td>Q2ASHCPU</td><td>28k steps</td><td>512 points</td></tr>
<tr><td>Q2ASHCPU-S1</td><td>60k steps</td><td>1024 points</td></tr>
<tr><td>Q02CPU-A</td><td>30k steps</td><td rowspan="3">4096 points</td><td rowspan="3">○</td><td rowspan="3">○</td><td rowspan="3"></td><td rowspan="3">○</td><td rowspan="3">○</td><td rowspan="3">○</td><td rowspan="3">○</td><td rowspan="3"></td></tr>
<tr><td>Q02HCPU-A</td><td>30k steps</td></tr>
<tr><td>Q06HCPU-A</td><td>60k steps</td></tr>
<tr><td rowspan="5">A1SJ71AT23QB</td><td>Q02CPU</td><td>28k steps</td><td rowspan="5">4096 points</td><td rowspan="5"></td><td rowspan="5">○</td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5">○</td><td rowspan="5"></td><td rowspan="5">○</td><td rowspan="5"></td><td rowspan="5">• Used only for local stations.
• Installed in an I/O slot in an extension base unit.</td></tr>
<tr><td>Q02HCPU</td><td>28k steps</td></tr>
<tr><td>Q06HCPU</td><td>60k steps</td></tr>
<tr><td>Q12HCPU</td><td>124k steps</td></tr>
<tr><td>Q25HCPU</td><td>252k steps</td></tr>
</table>

Table 3.2 List of link modules (Continued)

○: Available

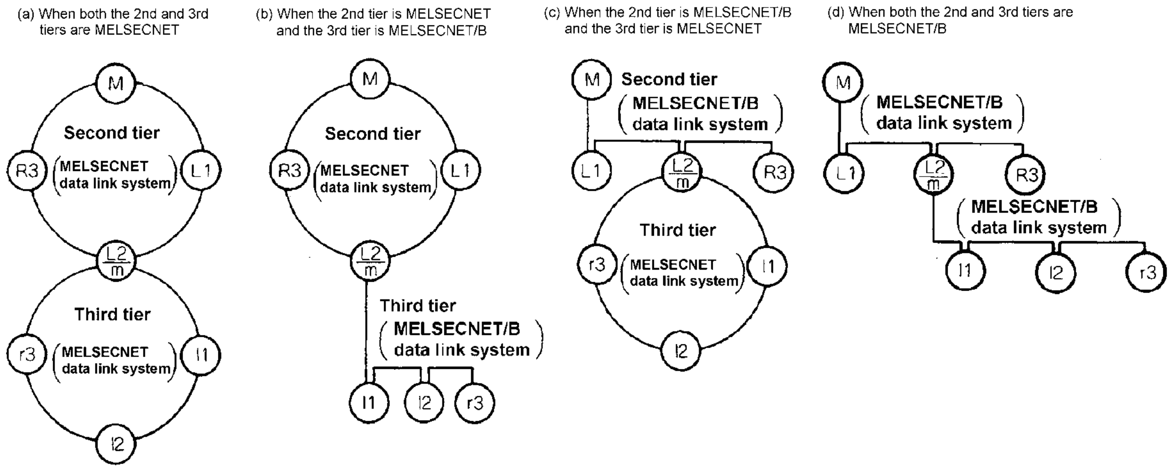
<table>
<tr><th rowspan="4">Link module</th><th rowspan="4">CPU module</th><th colspan="2" rowspan="3">Description</th><th colspan="8">Applicable system</th><th rowspan="4">Remarks</th></tr>
<tr><th colspan="8">Two-tier system</th></tr>
<tr><th colspan="3">MELSECNET mode</th><th colspan="2">MELSEC NETⅡ mode</th><th colspan="3">MELSECNET Ⅱ composite mode</th></tr>
<tr><th>Program capacity</th><th>Number of I/O points</th><th>M</th><th>L</th><th>R</th><th>M</th><th>L</th><th>M</th><th>L</th><th>R</th></tr>
<tr><td>AJ72T25B</td><td>-</td><td colspan="2">Module for remote I/O stations, which is to be mounted to the following base unit:
A32B(-S1), A35B, A38B</td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2">○</td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2">○</td><td rowspan="2">Installed in the CPU slot of a main base unit.</td></tr>
<tr><td>A1SJ72T25B</td><td>-</td><td colspan="2">Module for remote I/O stations, which is to be mounted to the following base unit:
A1S32B, A1S33B, A1S35B, A1S38B</td></tr>
</table>

REMARK

(1) The M, L and R stations in Table 3.2 indicate the following stations.
 a) M station...... Master station
 b) L station........Local station
 c) R station........Remote I/O station

4 COMPOSITION OF A THREE-TIER SYSTEM

In a three-tier system, a local station in the second tier is used as a master station for the third tier and connects with the slave stations.
MELSECNET data link system and MELSECNET/B data link system can be used for the second and third tiers. The combinations are shown in Fig 4.1.



M: Master station for the second tier, L1 and L2: Second-tier local stations, R3: Second-tier remote I/O station
m: Master station for the third tier, l1 and l2: Third-tier local stations, r3: Third-tier remote I/O station

Refer to Section 4.1	Refer to Section 4.2	Refer to Section 4.3	Refer to Section 4.4

Fig 4.1 Three-tier systems

POINT

(1) When the AnUCPU, QnACPU, A2ASCPU(S1), A2USHCPU-S1, Q2AS(H)CPU(S1), or QCPU-A is used, the three-tier system can be configured with the MELSECNET/B data link system.
When other CPU modules are used, the three-tier system cannot be configured only with the MELSECNET/B data link system.
(2) Local and remote I/O stations in the third tier are referred to sub-slave stations and are controlled by the master station in the third tier.

4.1 Three-Tier System Using the MELSECNET Data Link System

When the second and third tiers are configured with MELSECNET data link system, connect the stations using optical fiber cables or coaxial cables.

(a) Up to 64 local and remote I/O stations can be connected to a master station for the second tier.
(b) For the third tier, up to 64 local and remote I/O stations can be connected to the master station, which is the local station for the second tier.

4.1.1 System configuration

Fig 4.2 shows the configuration of the three-tier system.

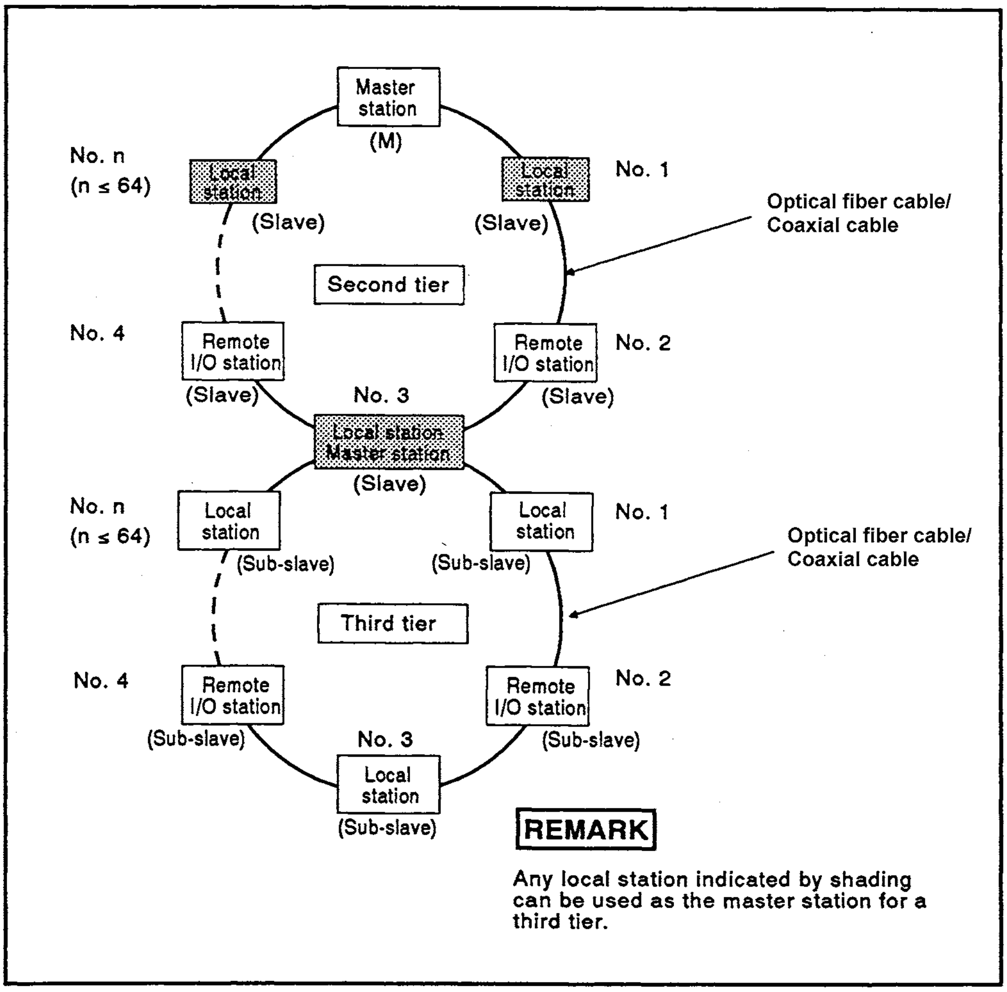
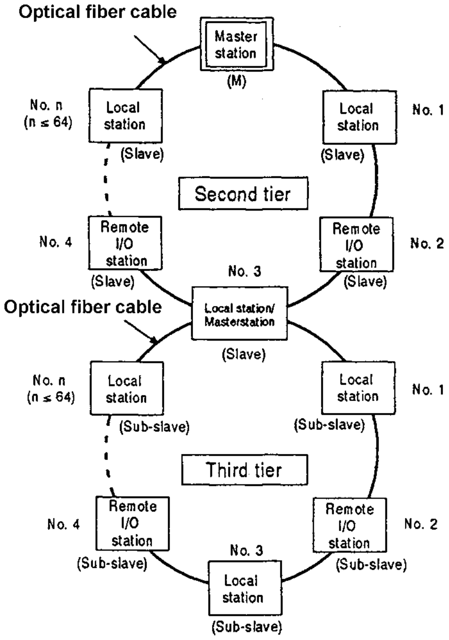
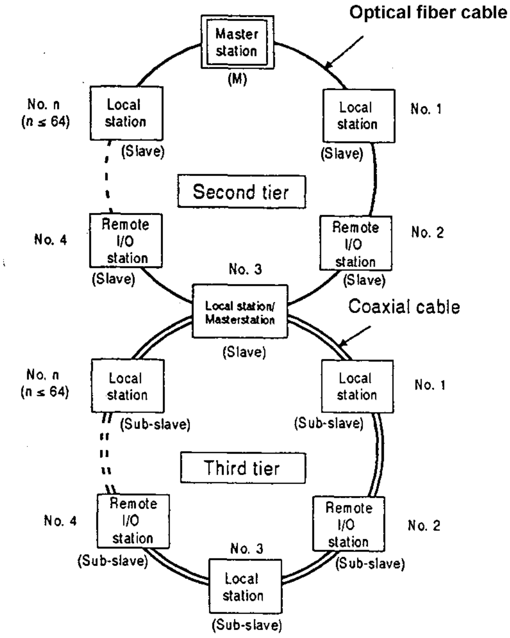


Fig 4.2 Three-tier system configured with MELSECNET data link system

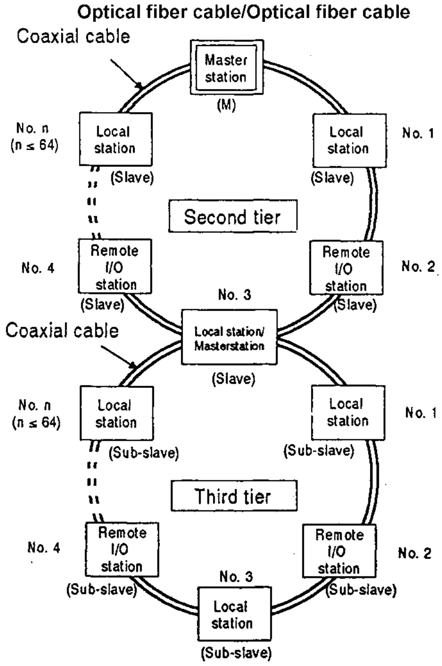
In the three-tier system, optical fiber cables and coaxial cables can be used together for the second and third tiers.
Combinations of the optical fiber cables and coaxial cables for each tier are shown below.



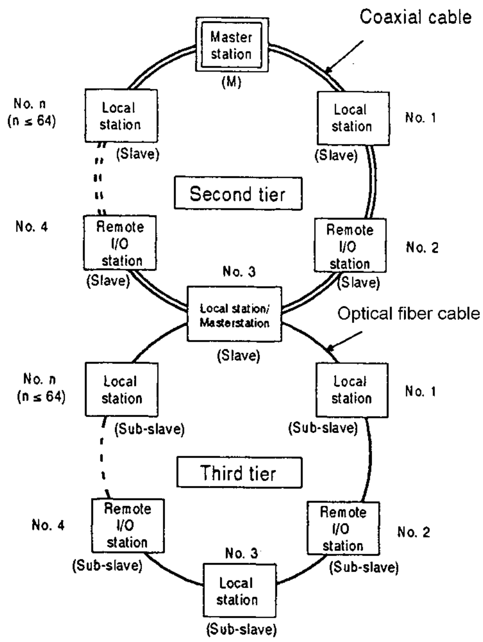
Optical fiber cable/Optical fiber cable



Optical fiber cable/Coaxial cable



Coaxial cable/Coaxial cable



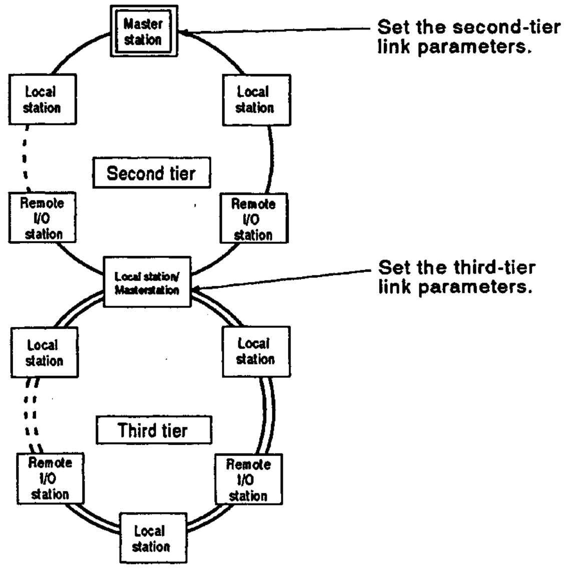
Coaxial cable/Optical fiber cable

POINT
(1) In MELSECNET data link system, up to three tiers can be configured. (2) Remote I/O stations cannot be connected if the MELSECNET Ⅱ mode is used.

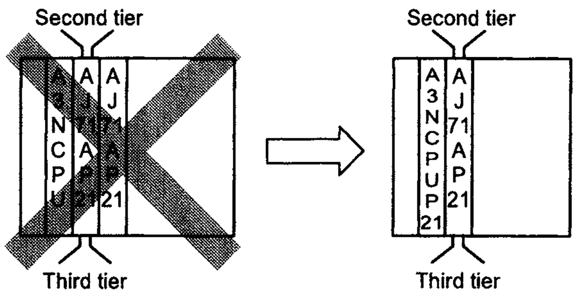
4.1.2 Precautions when operating data link system

This section explains precautions for three-tier system using MELSECNET data link.

(1) Setting link parameters
In the three-tier system, setting link parameters to CPU modules for the master stations in the second and third tiers is required.
For link parameter setting, refer to Section 5.3.7 and Chapter 7.

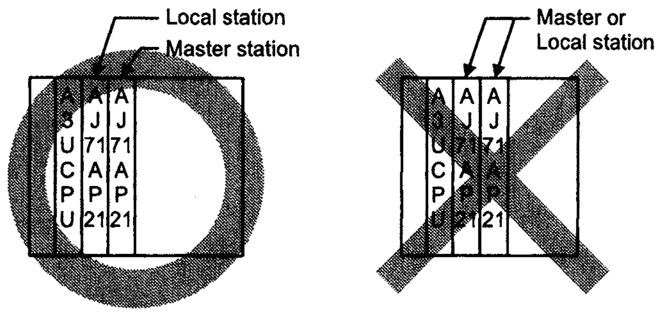


(2) Restriction on use of link modules
(a) For the CPU module other than the AnUCPU, A2ASCPU(S1), A2USHCPU-S1, QnACPU, Q2AS(H)CPU(S1), and QCPU-A
Only one of the following link modules can be used with a CPU module.
When configuring the three-tier system, use a CPU module having a link function with any of the following link modules.
- AJ71AP21
- AJ71AP21-S3
- A1SJ71AP21
- AJ71AR21
- A1SJ71AR21

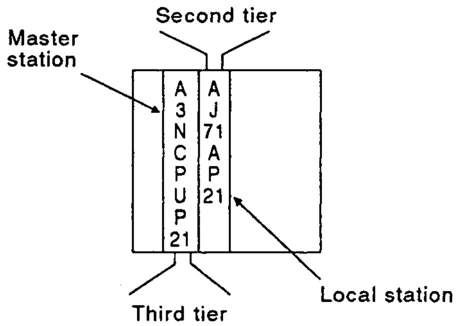


(b) For the CPU module any of the AnUCPU, A2ASCPU(S1), A2US(H)CPU(S1), QnACPU, Q2AS(H)CPU(S1), and QCPU-A
Up to two of the following link modules (one as a master station and the other as a local station) can be used with a CPU module.
(The two modules cannot be used only for master stations or local stations.)

- AJ71AP21
- AJ71AP21-S3
- A1SJ71AP21
- AJ71AR21
- A1SJ71AR21



(3) When using a CPU module with link function as a master station for the third tier
In a three-tier system including a CPU module with link function and a data link module, the CPU module can be used as a master station for the third tier and the data link module as a local station in the second tier.



Note that the following AnACPUP21/R21 versions and later can be used as a master station for the third tier.

When configuring a three-tier system with a version earlier than that, use the AnACPUP21/R2 as a local station in the second tier, and a data link module as a master station for the third tier.

CPU module with link function	Version
A2ACPUP21	107CX
A2ACPUR21	107BX
A2ACPUP21-S1	107BY
A2ACPUR21-S1	107BY
A3ACPUP21	107CZ
A3ACPUR21	107BZ

4.1.3 System devices

Table 4.1 Link modules available for the three-tier system

○: Available

Module	Model	Applicable system																Remarks
		MELSECNET data link																
		Second tier								Third tier								
		MELSECNET mode			MELSECNET II mode		MELSECNET II composite mode			MELSECNET mode			MELSECNET II mode		MELSECNET II composite mode			
		M	L	R	M	L	M	L	R	L/m	ℓ	r	L/m	ℓ	L/m	ℓ	r	
CPU module with link function	A0J2HCPUP21	○	○					○			○					○		These cannot be used as a master station for the third tier.
	A0J2HCPUR21																	
	A2CCPUP21																	
	A2CCPUR21																	
	A1NCPUP21	○	○					○		○	○					○		Use the station number setting switch to set the selection of master or local station.
	A1NCPUP21-S3																	
	A1NCPUR21																	
	A2NCPUP21																	
	A2NCPUP21-S3																	
	A2NCPUR21																	
	A2NCPUP21-S1																	
	A2NCPUP21-S4																	
	A2NCPUR21-S1																	
	A3NCPUP21																	
	A3NCPUP21-S3																	
	A3NCPUR21																	
	A2ACPUP21	○	○		○	○	○	○		○	○		○	○	○	○		
	A2ACPUP21-S3																	
	A2ACPUR21																	
	A2ACPUP21-S1																	
	A2ACPUP21-S4																	
	A2ACPUR21-S1																	
	A3ACPUP21																	
	A3ACPUP21-S3																	
	A3ACPUR21																	

REMARK

(1) The definitions of L/m station, ℓ station, and r station in Table 4.1 are as follows.

a) L/m station .... Local station in the second tier/master station in the third tier

b) ℓ station .... Local station in the third tier

c) r station .... Remote I/O station in the third tier

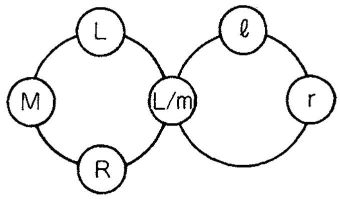


Table 4.1 Link modules available for the three-tier system (Continued)

○: Available

Module	Model		Applicable system: MELSECNET data link — Second tier: MELSECNET mode M	MELSECNET mode L	MELSECNET mode R	MELSECNET II mode M	MELSECNET II mode L	MELSECNET II composite mode M	MELSECNET II composite mode L	MELSECNET II composite mode R	Third tier: MELSECNET mode L/m	MELSECNET mode ℓ	MELSECNET mode r	MELSECNET II mode L/m	MELSECNET II mode ℓ	MELSECNET II composite mode L/m	MELSECNET II composite mode ℓ	MELSECNET II composite mode r	Remarks
CPU module + link module	A1SJHCPU A1SHCPU A2SHCPU	A1SJ71AP21/R21	○	○					○			○					○		Use the station number setting switch to set the selection of master or local station.
	A2ASCPU A2ASCPU-S1 A2USHCPU-S1		○	○		○	○	○	○		○	○		○	○	○	○		
	A0J2HCPU A1NCPU A2NCPU A2NCPU-S1 A3NCPU	AJ71AP21/R21 AJ71AP21-S3	○	○					○			○					○		
	A2ACPU A2ACPU-S1 A3ACPU		○	○		○	○	○	○			○			○		○		
	A2UCPU A2UCPU-S1 A3UCPU A4UCPU		○	○		○	○	○	○		○	○		○	○	○	○		
	Q2ASCPU Q2ASCPU-S1 Q2ASHCPU Q2ASHCPU-S1	A1SJ71AP21/R21	○	○		○	○	○	○		○	○		○	○	○	○		
	Q2ACPU Q2ACPU-S1 Q3ACPU Q4ACPU	AJ71AP21/R21 AJ71AP21-S3	○	○		○	○	○	○		○	○		○	○	○	○		
	Q02CPU-A Q02HCPU-A Q06HCPU-A	A1SJ71AP21/R21	○	○		○	○	○	○		○	○		○	○	○	○		
	Q02CPU Q02HCPU Q06HCPU Q12HCPU Q25HCPU	A1SJ71AP23Q/R23Q		○			○		○			○			○		○		• Used only for local stations. • Installed in an I/O slot in an extension base unit.

Table 4.1 Link modules available for the three-tier system (Continued)

○: Available

Module	Model		Applicable system																Remarks
			MELSECNET data link																
			Second tier								Third tier								
			MELSECNET mode			MELSECNET II mode		MELSECNET II composite mode			MELSECNET mode			MELSECNET II mode		MELSECNET II composite mode			
			M	L	R	M	L	M	L	R	L/m	ℓ	r	L/m	ℓ	L/m	ℓ	r	
CPU module with link function + link module	A1NCPUP21	AJ71AP21/ R21 AJ71AP21-S3									*1 ○								Use the station number setting switch to set the selection of master or local station.
	A1NCPUP21-S3																		
	A1NCPUR21																		
	A2NCPUP21																		
	A2NCPUP21-S3																		
	A2NCPUR21																		
	A2NCPUP21-S1																		
	A2NCPUP21-S4																		
	A2NCPUR21-S1																		
	A3NCPUP21																		
	A3NCPUP21-S3																		
	A3NCPUR21																		
	A2ACPUP21	AJ71AP21/ R21 AJ71AP21-S3 AJ72AP21/ R21									*2 ○			*2 ○		*2 ○			
	A2ACPUR21																		
	A2ACPUP21-S1																		
	A2ACPUR21-S1																		
	A3ACPUP21																		
	A3ACPUR21																		
Data link module	A0J2P25				○					○			○					○	
	A0J2P25-S3																		
	A0J2R25																		
	AJ72P25																		
	AJ72P25-S3																		
	AJ72R25																		

*1: MELSECNET and MELSECNET II composite modes can be used for the second tier.

*2: MELSECNET, MELSECNET II, and MELSECNET II composite modes can be used for the second tier.

Table 4.1 Link modules available for the three-tier system (Continued)

○: Available

<table>
<tr><th rowspan="5">Module</th><th rowspan="5" colspan="2">Model</th><th colspan="16">Applicable system</th><th rowspan="5">Remarks</th></tr>
<tr><th colspan="16">MELSECNET data link</th></tr>
<tr><th colspan="8">Second tier</th><th colspan="8">Third tier</th></tr>
<tr><th colspan="3">MELSECNET mode</th><th colspan="2">MELSECNET II mode</th><th colspan="3">MELSECNET II composite mode</th><th colspan="3">MELSECNET mode</th><th colspan="2">MELSECNET II mode</th><th colspan="3">MELSECNET II composite mode</th></tr>
<tr><th>M</th><th>L</th><th>R</th><th>M</th><th>L</th><th>M</th><th>L</th><th>R</th><th>L/m</th><th>ℓ</th><th>r</th><th>L/m</th><th>ℓ</th><th>L/m</th><th>ℓ</th><th>r</th></tr>
<tr><td rowspan="20">CPU module + link modules (two)</td><td>A2ASCPU +A1SJ71AP21</td><td rowspan="12">A1SJ71AP21 A1SJ71AR21</td><td rowspan="20"></td><td rowspan="20"></td><td rowspan="20"></td><td rowspan="20"></td><td rowspan="20"></td><td rowspan="20"></td><td rowspan="20"></td><td rowspan="20"></td><td rowspan="20">*2 ○</td><td rowspan="20"></td><td rowspan="20"></td><td rowspan="20">*2 ○</td><td rowspan="20"></td><td rowspan="20">*2 ○</td><td rowspan="20"></td><td rowspan="20"></td><td rowspan="20">Use the station number setting switch to set the selection of master or local station.</td></tr>
<tr><td>A2ASCPU +A1SJ71AR21</td></tr>
<tr><td>A2ASCPU-S1 +A1SJ71AP21</td></tr>
<tr><td>A2ASCPU-S1 +A1SJ71AR21</td></tr>
<tr><td>A2USHCPU-S1 +A1SJ71AP21</td></tr>
<tr><td>A2USHCPU-S1 +A1SJ71AR21</td></tr>
<tr><td>Q02CPU-A +A1SJ71AP21</td></tr>
<tr><td>Q02CPU-A +A1SJ71AR21</td></tr>
<tr><td>Q02HCPU-A +A1SJ71AP21</td></tr>
<tr><td>Q02HCPU-A +A1SJ71AR21</td></tr>
<tr><td>Q06HCPU-A +A1SJ71AP21</td></tr>
<tr><td>Q06HCPU-A +A1SJ71AR21</td></tr>
<tr><td>A2UCPU +AJ71AP21(S3)</td><td rowspan="8">AJ71AP21 AJ71AP21-S3 AJ71AR21</td></tr>
<tr><td>A2UCPU +AJ71AR21</td></tr>
<tr><td>A2UCPU-S1 +AJ71AP21(S3)</td></tr>
<tr><td>A2UCPU-S1 +AJ71AR21</td></tr>
<tr><td>A3UCPU +AJ71AP21(S3)</td></tr>
<tr><td>A3UCPU +AJ71AR21</td></tr>
<tr><td>A4UCPU +AJ71AP21(S3)</td></tr>
<tr><td>A4UCPU +AJ71AR21</td></tr>
</table>

*2: MELSECNET, MELSECNET II or MELSECNET II composite modes can be used for the second tier.

4.2 Data Link System when the Second Tier is MELSECNET and the Third Tier is MELSECNET/B

In the system that the second tier is a MELSECNET data link system and the third tier is a MELSECNET/B data link system, the second tier is connected with optical fiber cables or coaxial cables, and the third tier is connected with shielded twisted pair cables.

(a) Up to 64 local and remote I/O stations can be connected to a master station for the second tier.
(b) For the third tier, up to 31 local and remote I/O stations can be connected to the master station, which is the local station for the second tier.

4.2.1 System configuration

Fig 4.3 shows the configuration of the three-tier system.

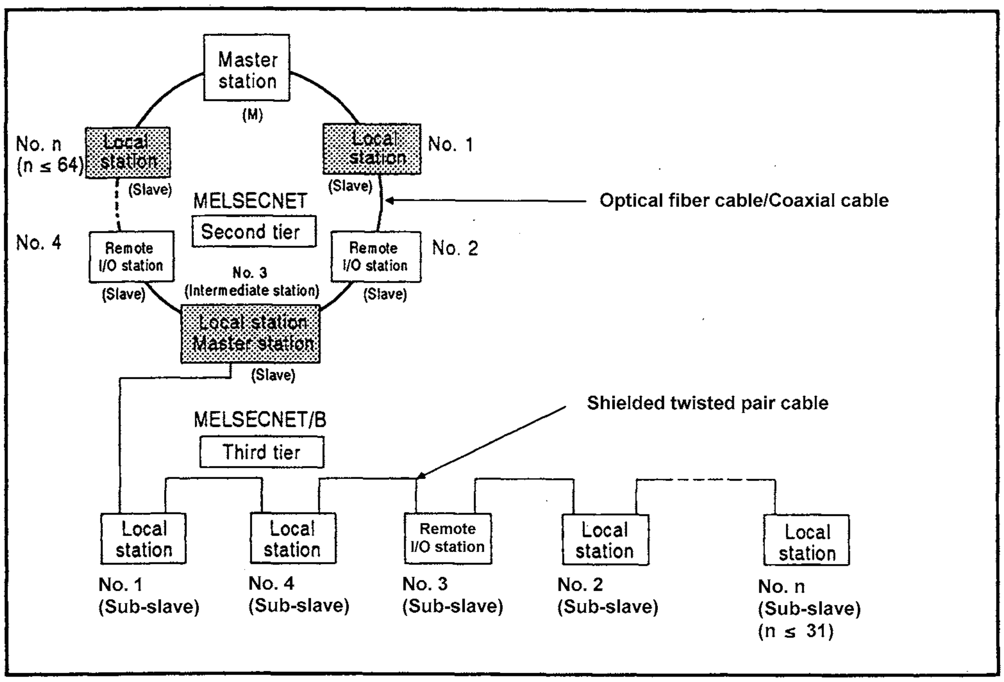


Fig 4.3 Three-tier system when the second tier is MELSECNET data link system

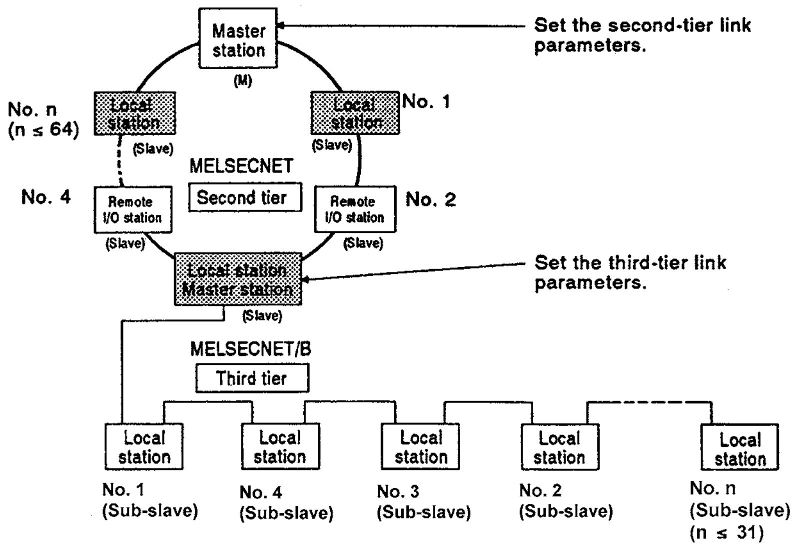
POINT

(1) Remote I/O stations cannot be connected if the MELSECNET II mode is used.
(2) MELSECNET/B data link system has no restriction on the order of stations (including master stations).

4.2.2 Precautions when using data link

This section explains precautions for configuring a three-tier system.

(1) Setting link parameters
In the three-tier system, setting link parameters to CPU modules for the master stations in the second and third tiers is required.
For link parameter setting, refer to Section 5.3.7 and Chapter 7.



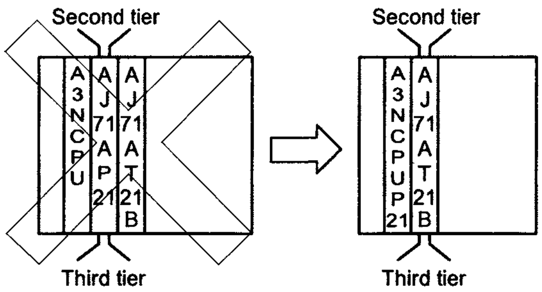
(2) Restriction on use of link modules

(a) For the CPU module other than the AnUCPU, A2ASCPU(S1), A2USHCPU-S1, QnACPU, Q2AS(H)CPU(S1), and QCPU-A

Only one of the following link modules can be used with a CPU module.

When configuring the three-tier system, use a CPU module having a link function with any of the following link modules.

- AJ71AP21
- AJ71AP21-S3
- A1SJ71AP21
- AJ71AR21
- A1SJ71AR21
- AJ71AT21B
- A1SJ71AT21B



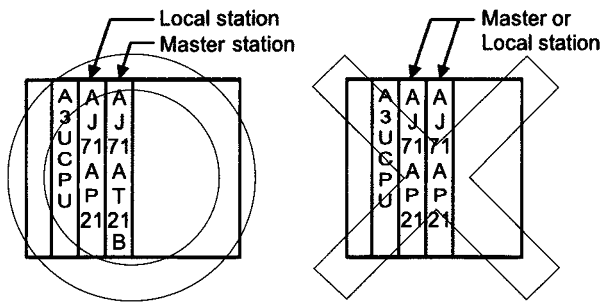
(b) For the CPU module any of the AnUCPU, A2ASCPU(S1), A2USHCPU-S1, QnACPU, Q2AS(H)CPU(S1), and QCPU-A

Up to two of the following link modules (one as a master station and the other as a local station) can be used with a CPU module.

(The two modules cannot be used only for master stations or local stations.)

[For local station]
- AJ71AP21
- AJ71AP21-S3
- A1SJ71AP21
- AJ71AR21
- A1SJ71AR21

[For master station]
- AJ71AT21B
- A1SJ71AT21B



4.2.3 System devices

Table 4.2 Link modules available for the three-tier system

○: Available

<table>
<tr><th rowspan="5">Module</th><th rowspan="5">Model</th><th colspan="16">Applicable system</th><th rowspan="5">Remarks</th></tr>
<tr><th colspan="8">MELSECNET data link</th><th colspan="8">MELSECNET/B data link</th></tr>
<tr><th colspan="8">Second tier</th><th colspan="8">Third tier</th></tr>
<tr><th colspan="3">MELSECNET mode</th><th colspan="2">MELSECNET II mode</th><th colspan="3">MELSECNET II composite mode</th><th colspan="3">MELSECNET mode</th><th colspan="2">MELSECNET II mode</th><th colspan="3">MELSECNET II composite mode</th></tr>
<tr><th>M</th><th>L</th><th>R</th><th>M</th><th>L</th><th>M</th><th>L</th><th>R</th><th>L/m</th><th>ℓ</th><th>r</th><th>L/m</th><th>ℓ</th><th>L/m</th><th>ℓ</th><th>r</th></tr>
<tr><td rowspan="25">CPU module with link function</td><td>A0J2HCPUP21</td><td rowspan="4">○</td><td rowspan="4">○</td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4">○</td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4">These cannot be used as a master station for the third tier.</td></tr>
<tr><td>A0J2HCPUR21</td></tr>
<tr><td>A2CCPUP21</td></tr>
<tr><td>A2CCPUR21</td></tr>
<tr><td>A1NCPUP21</td><td rowspan="12">○</td><td rowspan="12">○</td><td rowspan="12"></td><td rowspan="12"></td><td rowspan="12"></td><td rowspan="12"></td><td rowspan="12">○</td><td rowspan="12"></td><td rowspan="12"></td><td rowspan="12"></td><td rowspan="12"></td><td rowspan="12"></td><td rowspan="12"></td><td rowspan="12"></td><td rowspan="12"></td><td rowspan="12"></td><td rowspan="21">Use the station number setting switch to set the selection of master or local station.</td></tr>
<tr><td>A1NCPUP21-S3</td></tr>
<tr><td>A1NCPUR21</td></tr>
<tr><td>A2NCPUP21</td></tr>
<tr><td>A2NCPUP21-S3</td></tr>
<tr><td>A2NCPUR21</td></tr>
<tr><td>A2NCPUP21-S1</td></tr>
<tr><td>A2NCPUP21-S4</td></tr>
<tr><td>A2NCPUR21-S1</td></tr>
<tr><td>A3NCPUP21</td></tr>
<tr><td>A3NCPUP21-S3</td></tr>
<tr><td>A3NCPUR21</td></tr>
<tr><td>A2ACPUP21</td><td rowspan="9">○</td><td rowspan="9">○</td><td rowspan="9"></td><td rowspan="9">○</td><td rowspan="9">○</td><td rowspan="9">○</td><td rowspan="9">○</td><td rowspan="9"></td><td rowspan="9"></td><td rowspan="9"></td><td rowspan="9"></td><td rowspan="9"></td><td rowspan="9"></td><td rowspan="9"></td><td rowspan="9"></td><td rowspan="9"></td></tr>
<tr><td>A2ACPUP21-S3</td></tr>
<tr><td>A2ACPUR21</td></tr>
<tr><td>A2ACPUP21-S1</td></tr>
<tr><td>A2ACPUP21-S4</td></tr>
<tr><td>A2ACPUR21-S1</td></tr>
<tr><td>A3ACPUP21</td></tr>
<tr><td>A3ACPUP21-S3</td></tr>
<tr><td>A3ACPUR21</td></tr>
</table>

REMARK

(1) The definitions of L/m station, ℓ station, and r station in Table 4.2 are as follows.

a) L/m station .... Local station in the second tier/master station in the third tier

b) ℓ station .... Local station in the third tier

c) r station .... Remote I/O station in the third tier

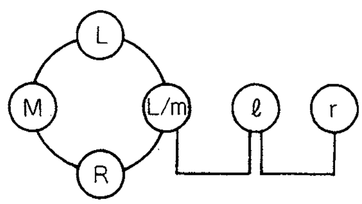


Table 4.2 Link modules available for the three-tier system (Continued)

○: Available

Module	Model		Applicable system																Remarks
			MELSECNET data link								MELSECNET/B data link								
			Second tier								Third tier								
			MELSECNET mode			MELSECNET Ⅱ mode		MELSECNET Ⅱ composite mode			MELSECNET mode			MELSECNET Ⅱ mode		MELSECNET Ⅱ composite mode			
			M	L	R	M	L	M	L	R	L/m	ℓ	r	L/m	ℓ	L/m	ℓ	r	
CPU module + link module	A0J2HCPU A1NCPU A2NCPU A2NCPU-S1 A3NCPU	AJ71AP21/R21 AJ71AP21-S3	○	○					○										Use the station number setting switch to set the selection of master or local station.
	A2ACPU A2ACPU-S1 A3ACPU A2UCPU A2UCPU-S1 A3UCPU A4UCPU Q2ACPU Q2ACPU-S1 Q3ACPU Q4ACPU	AJ71AP21/R21 AJ71AP21-S3	○	○		○	○	○	○										
	Q02CPU Q02HCPU Q06HCPU Q12HCPU Q25HCPU	A1SJ71AP23Q/R23Q		○			○		○										• Used only for local stations. • Installed in an I/O slot in an extension base unit.
	A1SJHCPU A1SHCPU A2SHCPU	A1SJ71AT21B										○					○		Use the station number setting switch to set the selection of master or local station.
	A1NCPU A2NCPU A2NCPU-S1 A3NCPU	AJ71AT21B																	

Table 4.2 Link modules available for the three-tier system (Continued)

○: Available

Module	Model		Applicable system																Remarks
			MELSECNET data link								MELSECNET/B data link								
			Second tier								Third tier								
			MELSECNET mode			MELSECNET II mode		MELSECNET II composite mode			MELSECNET mode			MELSECNET II mode		MELSECNET II composite mode			
			M	L	R	M	L	M	L	R	L/m	ℓ	r	L/m	ℓ	L/m	ℓ	r	
CPU module + link module	A2ASCPU	A1SJ71AT21B										○			○		○		Use the station number setting switch to set the selection of master or local station.
	A2ASCPU-S1																		
	A2USHCPU-S1																		
	Q2ASCPU																		
	Q2ASCPU-S1																		
	Q2ASHCPU																		
	Q2ASHCPU-S1																		
	A2ACPU	AJ71AT21B																	
	A2ACPU-S1																		
	A3ACPU																		
	A2UCPU																		
	A2UCPU-S1																		
	A3UCPU																		
	A4UCPU																		
	Q2ACPU																		
	Q2ACPU-S1																		
	Q3ACPU																		
	Q4ACPU																		
	Q02CPU-A	A1SJ71AT21B										○			○		○		
	Q02HCPU-A																		
	Q06HCPU-A																		
	Q02CPU	A1SJ71AT23BQ										○			○		○		• Used only for local stations. • Installed in an I/O slot in an extension base unit.
	Q02HCPU																		
	Q06HCPU																		
	Q12HCPU																		
	Q25HCPU																		
Link module	A0J2P25				○					○									
	A0J2P25-S3																		
	A0J2R25																		
	AJ72P25																		
	AJ72R25																		
	A1SJ72T25B												○					○	
	AJ72T25B																		

Table 4.2 Link modules available for the three-tier system (Continued)

○: Available

Module	Model		Applicable system																Remarks
			MELSECNET data link								MELSECNET/B data link								
			Second tier								Third tier								
			MELSECNET mode			MELSECNET Ⅱ mode		MELSECNET Ⅱ composite mode			MELSECNET mode			MELSECNET Ⅱ mode		MELSECNET Ⅱ composite mode			
			M	L	R	M	L	M	L	R	L/m	ℓ	r	L/m	ℓ	L/m	ℓ	r	
CPU module with link function + link module	A1NCPUP21 A1NCPUP21-S3 A1NCPUR21 A2NCPUP21 A2NCPUP21-S3 A2NCPUR21 A2NCPUP21-S1 A2NCPUP21-S4 A2NCPUR21-S1 A3NCPUP21 A3NCPUP21-S3 A3NCPUR21	AJ71AT21B									*1 ○								Use the station number setting switch to set the selection of master or local station.
	A2ACPUP21 A2ACPUR21 A2ACPUP21-S1 A2ACPUR21-S1 A3ACPUP21 A3ACPUR21	AJ71AT21B									*2 ○			*2 ○		*2 ○			
CPU module + link modules (two)	A2ASCPU +A1SJ71AP21 A2ASCPU +A1SJ71AR21 A2ASCPU-S1 +A1SJ71AP21 A2ASCPU-S1 +A1SJ71AR21	A1SJ71AT21B									*2 ○			*2*3 ○		*2*3 ○			

*1: MELSECNET and MELSECNET Ⅱ composite modes can be used for the second tier.

*2: MELSECNET, MELSECNET Ⅱ, and MELSECNET Ⅱ composite modes can be used for the second tier.

*3: Applicable when the A1SJ71AT21B is used.

Table 4.2 Link modules available for the three-tier system (Continued)

○: Available

<table>
<tr><th rowspan="5">Module</th><th rowspan="5" colspan="2">Model</th><th colspan="16">Applicable system</th><th rowspan="5">Remarks</th></tr>
<tr><th colspan="8">MELSECNET data link</th><th colspan="8">MELSECNET/B data link</th></tr>
<tr><th colspan="8">Second tier</th><th colspan="8">Third tier</th></tr>
<tr><th colspan="3">MELSECNET mode</th><th colspan="2">MELSECNET Ⅱ mode</th><th colspan="3">MELSECNET Ⅱ composite mode</th><th colspan="3">MELSECNET mode</th><th colspan="2">MELSECNET Ⅱ mode</th><th colspan="3">MELSECNET Ⅱ composite mode</th></tr>
<tr><th>M</th><th>L</th><th>R</th><th>M</th><th>L</th><th>M</th><th>L</th><th>R</th><th>L/m</th><th>ℓ</th><th>r</th><th>L/m</th><th>ℓ</th><th>L/m</th><th>ℓ</th><th>r</th></tr>
<tr><td rowspan="16">CPU module + link modules (two)</td><td>A2USHCPU-S1 +A1SJ71AP21</td><td rowspan="16">A1SJ71AT21B</td><td rowspan="16"></td><td rowspan="16"></td><td rowspan="16"></td><td rowspan="16"></td><td rowspan="16"></td><td rowspan="16"></td><td rowspan="16"></td><td rowspan="16"></td><td rowspan="16">*2 ○</td><td rowspan="16"></td><td rowspan="16"></td><td rowspan="16">*2*3 ○</td><td rowspan="16"></td><td rowspan="16">*2*3 ○</td><td rowspan="16"></td><td rowspan="16"></td><td rowspan="16">Use the station number setting switch to set the selection of master or local station.</td></tr>
<tr><td>A2USHCPU-S1 +A1SJ71AR21</td></tr>
<tr><td>Q2ASCPU +A1SJ71AP21</td></tr>
<tr><td>Q2ASCPU +A1SJ71AR21</td></tr>
<tr><td>Q2ACPU-S1 +A1SJ71AP21</td></tr>
<tr><td>Q2ACPU-S1 +A1SJ71AR21</td></tr>
<tr><td>Q2ASHCPU +A1SJ71AP21</td></tr>
<tr><td>Q2ASHCPU +A1SJ71AR21</td></tr>
<tr><td>Q2ASHCPU-S1 +A1SJ71AP21</td></tr>
<tr><td>Q2ASHCPU-S1 +A1SJ71AR21</td></tr>
<tr><td>Q02CPU-A +A1SJ71AP21</td></tr>
<tr><td>Q02CPU-A +A1SJ71AR21</td></tr>
<tr><td>Q02HCPU-A +A1SJ71AP21</td></tr>
<tr><td>Q02HCPU-A +A1SJ71AR21</td></tr>
<tr><td>Q06HCPU-A +A1SJ71AP21</td></tr>
<tr><td>Q06HCPU-A +A1SJ71AR21</td></tr>
</table>

*2: MELSECNET, MELSECNET Ⅱ, and MELSECNET Ⅱ composite modes can be used for the second tier.

*3: Applicable when the A1SJ71AT21B is used.

Table 4.2 Link modules available for the three-tier system (Continued)

○: Available

Module	Model		Applicable system																Remarks
			MELSECNET data link								MELSECNET/B data link								
			Second tier								Third tier								
			MELSECNET mode			MELSECNET Ⅱ mode		MELSECNET Ⅱ composite mode			MELSECNET mode			MELSECNET Ⅱ mode		MELSECNET Ⅱ composite mode			
			M	L	R	M	L	M	L	R	L/m	ℓ	r	L/m	ℓ	L/m	ℓ	r	
CPU module + link modules (two)	A2UCPU +AJ71AP21 (S3)	AJ71AT21B									*1 ○			*1 ○		*1 ○			Use the station number setting switch to set the selection of master or local station.
	A2UCPU +AJ71AR21																		
	A2UCPU-S1 +AJ71AP21 (S3)																		
	A2UCPU-S1 +AJ71AR21																		
	A3UCPU +AJ71AP21 (S3)																		
	A3UCPU +AJ71AR21																		
	A4UCPU +AJ71AP21 (S3)																		
	A4UCPU +AJ71AR21																		
	Q2ACPU +AJ71AP21 (S3)																		
	Q2ACPU +AJ71AR21																		
	Q2ACPU-S1 +AJ71AP21 (S3)																		
	Q2ACPU-S1 +AJ71AR21																		
	Q3ACPU +AJ71AP21 (S3)																		
	Q3ACPU +AJ71AR21																		
	Q4ACPU +AJ71AP21 (S3)																		
	Q4ACPU +AJ71AR21																		

*1: MELSECNET and MELSECNET Ⅱ composite modes can be used for the second tier.

4.3 Data Link System when the Second Tier is MELSECNET/B and the Third Tier is MELSECNET

In the system that the second tier is a MELSECNET/B data link system and the third tier is a MELSECNET data link system, the second tier is connected with shielded twisted pair cables, and the third tier is connected with optical fiber cables or coaxial cables.

(a) Up to 31 local and remote I/O stations can be connected to a master station for the second tier.

(b) For the third tier, up to 64 local and remote I/O stations can be connected to the master station, which is the local station for the second tier.

4.3.1 System configuration

Fig 4.4 shows the configuration of the three-tier system.

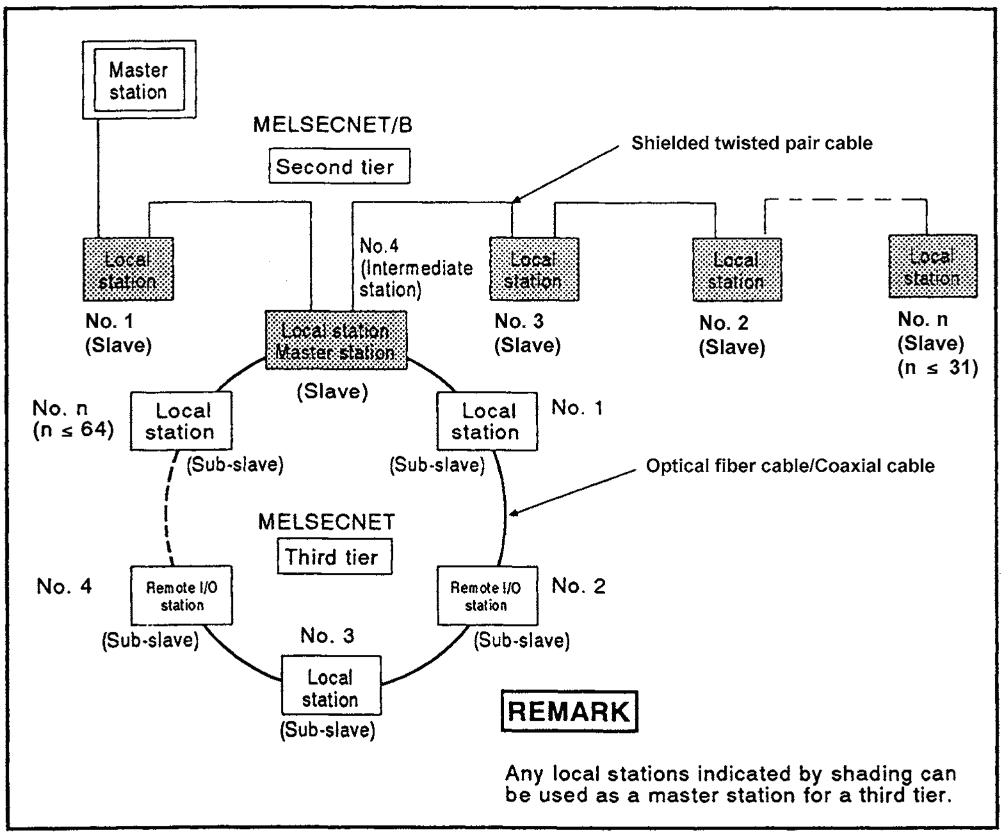


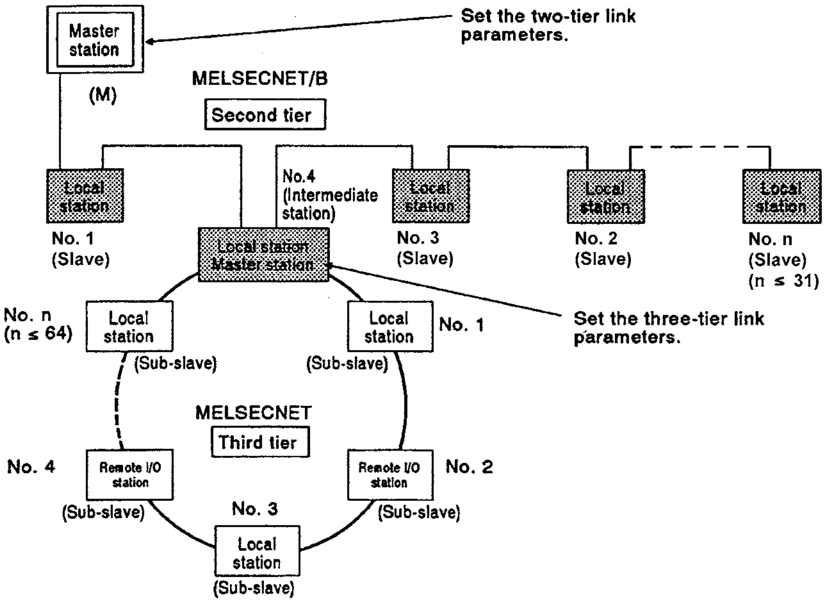
Fig 4.4 Three-tier system when the second tier is MELSECNET/B data link system

POINT
(1) Remote I/O stations cannot be connected in MELSECNET II mode. (2) MELSECNET/B data link system has no restriction on the order of stations (including master stations).

4.3.2 Precautions when operating the data link system

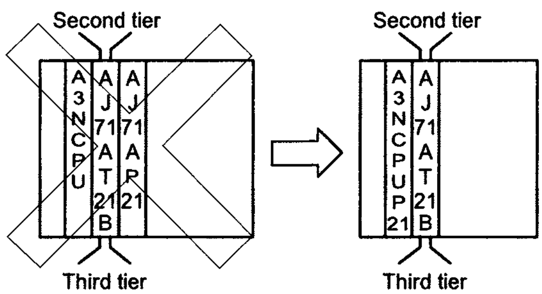
This section explains precautions for configuring a three-tier system.

(1) Setting link parameters
In the three-tier system, setting link parameters to CPU modules for the master stations in the second and third tiers is required.
For link parameter setting, refer to Section 5.3.7 and Chapter 7.



(2) Restriction on use of link modules
(a) For the CPU module other than the AnUCPU, A2ASCPU(S1), A2USHCPU-S1, QnACPU, Q2AS(H)CPU(S1), and QCPU-A
Only one of the following link modules can be used with a CPU module.
When configuring the three-tier system, use a CPU module having a link function with any of the following link modules.

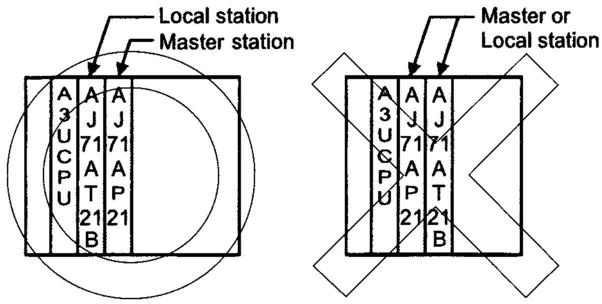
- AJ71AP21
- AJ71AP21-S3
- A1SJ71AP21
- AJ71AR21
- A1SJ71AR21
- AJ71AT21B
- A1SJ71AT21B



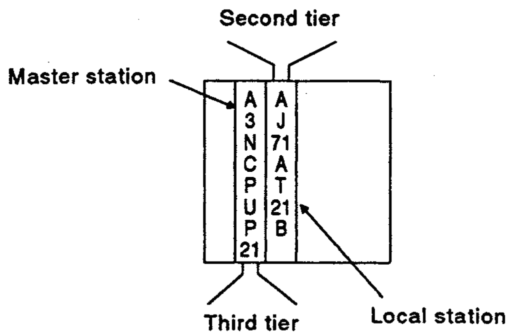
(b) For the CPU module any of the AnUCPU, A2ASCPU(S1), A2USHCPU-S1, QnACPU, Q2AS(H)CPU(S1), and QCPU-A
Up to two of the following link modules (one as a master station and the other as a local station) can be used with a CPU module.
(The two modules cannot be used only for master stations or local stations.)

[For local station]
- AJ71AP21
- AJ71AP21-S3
- A1SJ71AP21
- AJ71AR21
- A1SJ71AR21

[For master station]
- AJ71AT21B
- A1SJ71AT21B



(3) When using a CPU module with link function as a master station for the third tier
When a CPU module with link function is used with the AJ71AT21B in a three-tier system, the CPU module can be used as a master station for the third tier and the AJ71AT21B can be used as a local station in the second tier.



Note that the following AnACPUP21/R21 versions and later can be used as a master station for the third tier.

When a version earlier than that is used, construction of a three-tier system where the AJ71AT21B is in the second tier and the CPU module is in the third tier is not possible.

CPU module with link function	Version
A2ACPUP21	107CX
A2ACPUR21	107BX
A2ACPUP21-S1	107BY
A2ACPUR21-S1	107BY
A3ACPUP21	107CZ
A3ACPUR21	107BZ

4.3.3 System devices

Table 4.3 Link modules available for the three-tier system

○: Available

<table>
<tr><th rowspan="5">Module</th><th rowspan="5">Model</th><th colspan="16">Applicable system</th><th rowspan="5">Remarks</th></tr>
<tr><th colspan="8">MELSECNET/B data link</th><th colspan="8">MELSECNET data link</th></tr>
<tr><th colspan="8">Second tier</th><th colspan="8">Third tier</th></tr>
<tr><th colspan="3">MELSECNET mode</th><th colspan="2">MELSECNET II mode</th><th colspan="3">MELSECNET II composite mode</th><th colspan="3">MELSECNET mode</th><th colspan="2">MELSECNET II mode</th><th colspan="3">MELSECNET II composite mode</th></tr>
<tr><th>M</th><th>L</th><th>R</th><th>M</th><th>L</th><th>M</th><th>L</th><th>R</th><th>L/m</th><th>ℓ</th><th>r</th><th>L/m</th><th>ℓ</th><th>L/m</th><th>ℓ</th><th>r</th></tr>
<tr><td rowspan="24">CPU module with link function</td><td>A0J2HCPUP21</td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4">○</td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4">○</td><td rowspan="4"></td><td rowspan="4">These cannot be used as a master station for the third tier.</td></tr>
<tr><td>A0J2HCPUR21</td></tr>
<tr><td>A2CCPUP21</td></tr>
<tr><td>A2CCPUR21</td></tr>
<tr><td>A1NCPUP21</td><td rowspan="11"></td><td rowspan="11"></td><td rowspan="11"></td><td rowspan="11"></td><td rowspan="11"></td><td rowspan="11"></td><td rowspan="11"></td><td rowspan="11"></td><td rowspan="11">○</td><td rowspan="11">○</td><td rowspan="11"></td><td rowspan="11"></td><td rowspan="11"></td><td rowspan="11"></td><td rowspan="11">○</td><td rowspan="11"></td><td rowspan="20">Use the station number setting switch to set the selection of master or local station.</td></tr>
<tr><td>A1NCPUP21-S3</td></tr>
<tr><td>A1NCPUR21</td></tr>
<tr><td>A2NCPUP21</td></tr>
<tr><td>A2NCPUP21-S3</td></tr>
<tr><td>A2NCPUR21</td></tr>
<tr><td>A2NCPUP21-S1</td></tr>
<tr><td>A2NCPUP21-S4</td></tr>
<tr><td>A2NCPUR21-S1</td></tr>
<tr><td>A3NCPUP21</td></tr>
<tr><td>A3NCPUP21-S3</td></tr>
<tr><td>A3NCPUR21</td></tr>
<tr><td>A2ACPUP21</td><td rowspan="9"></td><td rowspan="9"></td><td rowspan="9"></td><td rowspan="9"></td><td rowspan="9"></td><td rowspan="9"></td><td rowspan="9"></td><td rowspan="9"></td><td rowspan="9">○</td><td rowspan="9">○</td><td rowspan="9"></td><td rowspan="9">○</td><td rowspan="9">○</td><td rowspan="9">○</td><td rowspan="9">○</td><td rowspan="9"></td></tr>
<tr><td>A2ACPUP21-S3</td></tr>
<tr><td>A2ACPUR21</td></tr>
<tr><td>A2ACPUP21-S1</td></tr>
<tr><td>A2ACPUP21-S4</td></tr>
<tr><td>A2ACPUR21-S1</td></tr>
<tr><td>A3ACPUP21</td></tr>
<tr><td>A3ACPUP21-S3</td></tr>
<tr><td>A3ACPUR21</td></tr>
</table>

REMARK

(1) The definitions of L/m station, ℓ station, and r station in Table 4.3 are as follows.

a) L/m station .... Local station in the second tier/master station in the third tier

b) ℓ station .... Local station in the third tier

c) r station .... Remote I/O station in the third tier

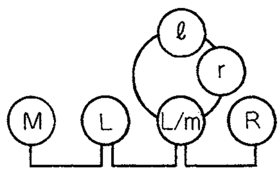


Table 4.3 Link modules available for the three-tier system (Continued)

○: Available

Module	Model		Applicable system																Remarks
			MELSECNET/B data link								MELSECNET data link								
			Second tier								Third tier								
			MELSECNET mode			MELSECNET II mode		MELSECNET II composite mode			MELSECNET mode			MELSECNET II mode		MELSECNET II composite mode			
			M	L	R	M	L	M	L	R	L/m	ℓ	r	L/m	ℓ	L/m	ℓ	r	
CPU module + link module	A1SCPU	AJ71AP21/R21 AJ71AP21-S3										○					○		Use the station number setting switch to set the selection of master or local station.
	A1NCPU																		
	A2NCPU																		
	A2NCPU-S1																		
	A3NCPU																		
	A2ACPU	AJ71AP21/R21 AJ71AP21-S3										○			○		○		
	A2ACPU-S1																		
	A3ACPU																		
	A2UCPU																		
	A2UCPU-S1																		
	A3UCPU																		
	A4UCPU																		
	Q2ACPU																		
	Q2ACPU-S1																		
	Q3ACPU																		
	Q4ACPU																		
	Q02CPU	A1SJ71AP23Q/R23Q										○			○		○		• Used only for local stations. • Installed in an I/O slot in an extension base unit.
	Q02HCPU																		
	Q06HCPU																		
	Q12HCPU																		
	Q25HCPU																		
	A1SJHCPU	A1SJ71AT21B	○	○					○										
	A1SHCPU																		
	A2SHCPU																		
	A2ASCPU																		
	A2ASCPU-S1																		
	A2USHCPU-S1																		
	Q2ASCPU																		
	Q2ASCPU-S1																		
	Q2ASHCPU																		
	Q2ASHCPU-S1																		
	A1NCPU	AJ71AT21B	○	○					○										Use the station number setting switch to set the selection of master or local station.
	A2NCPU																		
	A2NCPU-S1																		
	A3NCPU																		

Table 4.3 Link modules available for the three-tier system (Continued)

○: Available

<table>
<tr><th rowspan="5">Module</th><th rowspan="5" colspan="2">Model</th><th colspan="16">Applicable system</th><th rowspan="5">Remarks</th></tr>
<tr><th colspan="8">MELSECNET/B data link</th><th colspan="8">MELSECNET data link</th></tr>
<tr><th colspan="8">Second tier</th><th colspan="8">Third tier</th></tr>
<tr><th colspan="3">MELSECNET mode</th><th colspan="2">MELSECNET Ⅱ mode</th><th colspan="3">MELSECNET Ⅱ composite mode</th><th colspan="3">MELSECNET mode</th><th colspan="2">MELSECNET Ⅱ mode</th><th colspan="3">MELSECNET Ⅱ composite mode</th></tr>
<tr><th>M</th><th>L</th><th>R</th><th>M</th><th>L</th><th>M</th><th>L</th><th>R</th><th>L/m</th><th>ℓ</th><th>r</th><th>L/m</th><th>ℓ</th><th>L/m</th><th>ℓ</th><th>r</th></tr>
<tr><td rowspan="19">CPU module + link module</td><td>A2ACPU</td><td rowspan="11">AJ71AT21B</td><td rowspan="11">○</td><td rowspan="11">○</td><td rowspan="11"></td><td rowspan="11">○</td><td rowspan="11">○</td><td rowspan="11">○</td><td rowspan="11">○</td><td rowspan="11"></td><td rowspan="11"></td><td rowspan="11"></td><td rowspan="11"></td><td rowspan="11"></td><td rowspan="11"></td><td rowspan="11"></td><td rowspan="11"></td><td rowspan="11"></td><td rowspan="11">Installed in an I/O slot in an base unit.</td></tr>
<tr><td>A2ACPU-S1</td></tr>
<tr><td>A3ACPU</td></tr>
<tr><td>A2UCPU</td></tr>
<tr><td>A2UCPU-S1</td></tr>
<tr><td>A3UCPU</td></tr>
<tr><td>A4UCPU</td></tr>
<tr><td>Q2ACPU</td></tr>
<tr><td>Q2ACPU-S1</td></tr>
<tr><td>Q3ACPU</td></tr>
<tr><td>Q4ACPU</td></tr>
<tr><td>Q02CPU-A</td><td rowspan="3">A1SJ71AT21B</td><td rowspan="3">○</td><td rowspan="3">○</td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3">○</td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3"></td></tr>
<tr><td>Q02HCPU-A</td></tr>
<tr><td>Q06HCPU-A</td></tr>
<tr><td>Q02CPU</td><td rowspan="5">A1SJ71AT23BQ</td><td rowspan="5"></td><td rowspan="5">○</td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5">○</td><td rowspan="5"></td><td rowspan="5">○</td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5">• Used only for local stations.
• Installed in an I/O slot in an extension base unit.</td></tr>
<tr><td>Q02HCPU</td></tr>
<tr><td>Q06HCPU</td></tr>
<tr><td>Q12HCPU</td></tr>
<tr><td>Q25HCPU</td></tr>
<tr><td rowspan="7">Data link module</td><td colspan="2">A0J2P25</td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5">○</td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5">○</td><td rowspan="5"></td></tr>
<tr><td colspan="2">A0J2P25-S3</td></tr>
<tr><td colspan="2">A0J2R25</td></tr>
<tr><td colspan="2">AJ72P25</td></tr>
<tr><td colspan="2">AJ72R25</td></tr>
<tr><td colspan="2">A1SJ72T25B</td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2">○</td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2">○</td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td></tr>
<tr><td colspan="2">AJ72T25B</td></tr>
</table>

Table 4.3 Link modules available for the three-tier system (Continued)

○: Available

Module	Model		Applicable system																Remarks
			MELSECNET/B data link								MELSECNET data link								
			Second tier								Third tier								
			MELSECNET mode			MELSECNET II mode		MELSECNET II composite mode			MELSECNET mode			MELSECNET II mode		MELSECNET II composite mode			
			M	L	R	M	L	M	L	R	L/m	ℓ	r	L/m	ℓ	L/m	ℓ	r	
CPU module with link function + link module	A1NCPUP21	AJ71AT21B									*1 ○								Use the station number setting switch to set the selection of master or local station.
	A1NCPUP21-S3																		
	A1NCPUR21																		
	A2NCPUP21																		
	A2NCPUP21-S3																		
	A2NCPUR21																		
	A2NCPUP21-S1																		
	A2NCPUP21-S4																		
	A2NCPUR21-S1																		
	A3NCPUP21																		
	A3NCPUP21-S3																		
	A3NCPUR21																		
	A2ACPUP21										*2 ○			*2 ○		*2 ○			
	A2ACPUP21-S3																		
	A2ACPUR21																		
	A2ACPUP21-S1																		
	A2ACPUP21-S4																		
	A2ACPUR21-S1																		
	A3ACPUP21																		
	A3ACPUP21-S3																		
	A3ACPUR21																		
CPU module with link function + link modules (two)	A2ASCPU +A1SJ71AP21	A1SJ71AT21B									*2 ○			*2*3 ○		*2*3 ○			
	A2ASCPU +A1SJ71AR21																		
	A2ACPU-S1 +A1SJ71AP21																		
	A2ACPU-S1 +A1SJ71AR21																		
	A2USHCPU-S1 +A1SJ71AP21																		
	A2USHCPU-S1 +A1SJ71AR21																		
	Q2ASCPU +A1SJ71AP21																		
	Q2ASCPU +A1SJ71AR21																		
	Q2ASCPU-S1 +A1SJ71AP21																		
	Q2ASCPU-S1 +A1SJ71AR21																		

*1: MELSECNET and MELSECNET II composite modes can be used for the second tier.

*2: MELSECNET, MELSECNET II, and MELSECNET II composite modes can be used for the second tier.

*3: Applicable when the A1SJ71AT21B is used.

Table 4.3 Link modules available for the three-tier system (Continued)

○: Available

Module	Model		Applicable system																Remarks
			MELSECNET/B data link								MELSECNET data link								
			Second tier								Third tier								
			MELSECNET mode			MELSECNET Ⅱ mode		MELSECNET Ⅱ composite mode			MELSECNET mode			MELSECNET Ⅱ mode		MELSECNET Ⅱ composite mode			
			M	L	R	M	L	M	L	R	L/m	ℓ	r	L/m	ℓ	L/m	ℓ	r	
CPU module with link function + link modules (two)	Q2ASHCPU +A1SJ71AP21 Q2ASHCPU +A1SJ71AR21 Q2ASHCPU-S1 +A1SJ71AP21 Q2ASHCPU-S1 +A1SJ71AR21 Q02CPU-A +A1SJ71AP21 Q02CPU-A +A1SJ71AR21 Q02HCPU-A +A1SJ71AP21 Q02HCPU-A +A1SJ71AR21 Q06HCPU-A +A1SJ71AP21 Q06HCPU-A +A1SJ71AR21	A1SJ71AT21B									*2 ○			*2*3 ○		*2*3 ○			Use the station number setting switch to set the selection of master or local station.
	A2UCPU +AJ71AP21(S3) A2UCPU +AJ71AR21 A2UCPU-S1 +AJ71AP21(S3) A2UCPU-S1 +AJ71AR21 A3UCPU +AJ71AP21(S3) A3UCPU +AJ71AR21 A4UCPU +AJ71AP21(S3) A4UCPU +AJ71AR21 Q2ACPU +AJ71AP21(S3) Q2ACPU +AJ71AR21 Q2ACPU-S1 +AJ71AP21(S3) Q2ACPU-S1 +AJ71AR21 Q3ACPU +AJ71AP21(S3) Q3ACPU +AJ71AR21 Q4ACPU +AJ71AP21(S3) Q4ACPU +AJ71AR21	AJ71AT21B									*1 ○			*1 ○		*1 ○			

*1: MELSECNET and MELSECNET Ⅱ composite modes can be used for the second tier.

*2: MELSECNET, MELSECNET Ⅱ, and MELSECNET Ⅱ composite modes can be used for the second tier.

*3: Applicable when the A1SJ71AT21B is used.

4.4 Three-Tier System using the MELSECNET/B Data Link System

When the second and third tiers are configured with MELSECNET/B data link system, connect the stations using shielded twisted pair cables.

(a) Up to 31 local and remote I/O stations can be connected to a master station for the second tier.

(b) For the third tier, up to 31 local and remote I/O stations can be connected to the master station, which is the local station for the second tier.

4.4.1 System configuration

Fig 4.5 shows the configuration of the three-tier system.

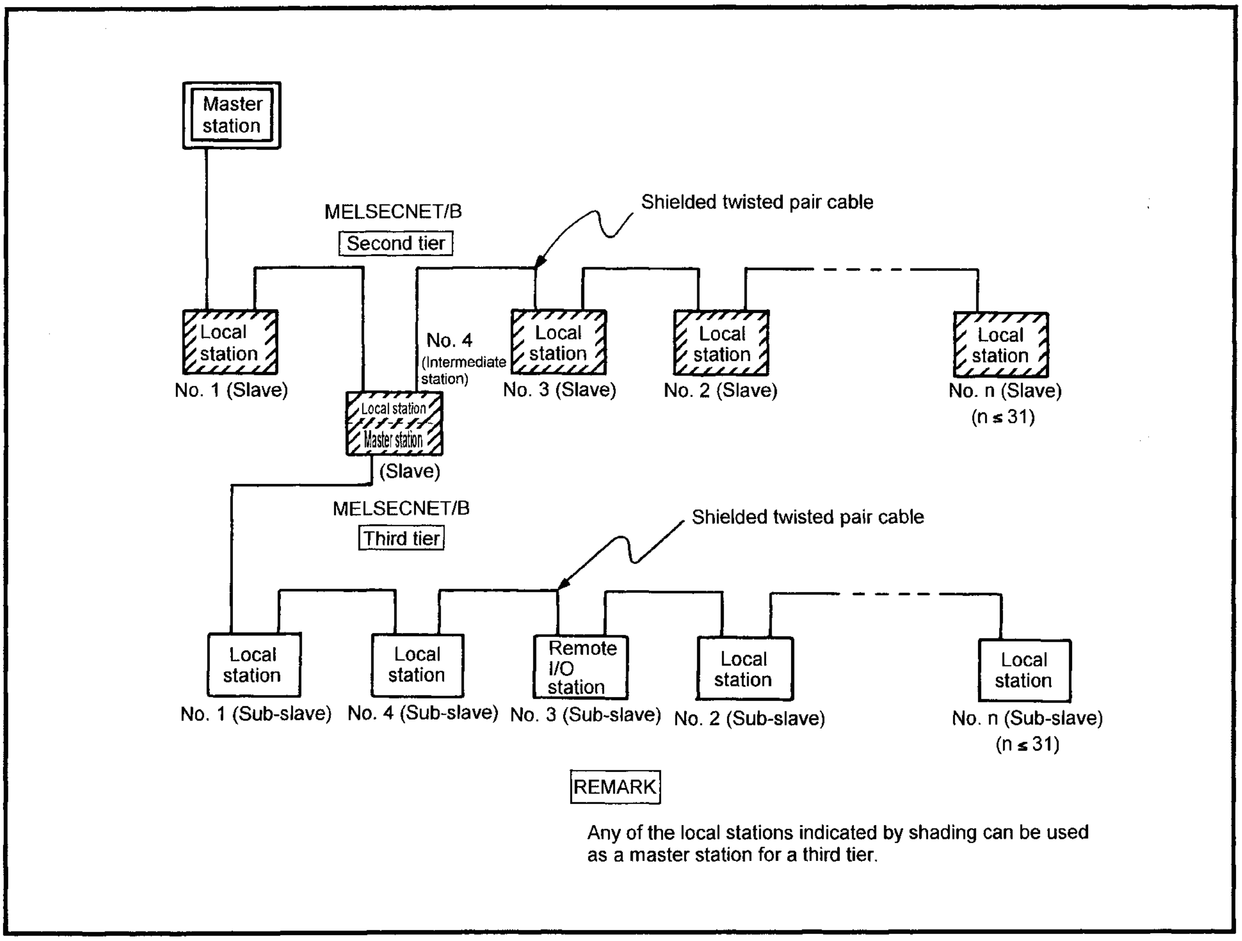


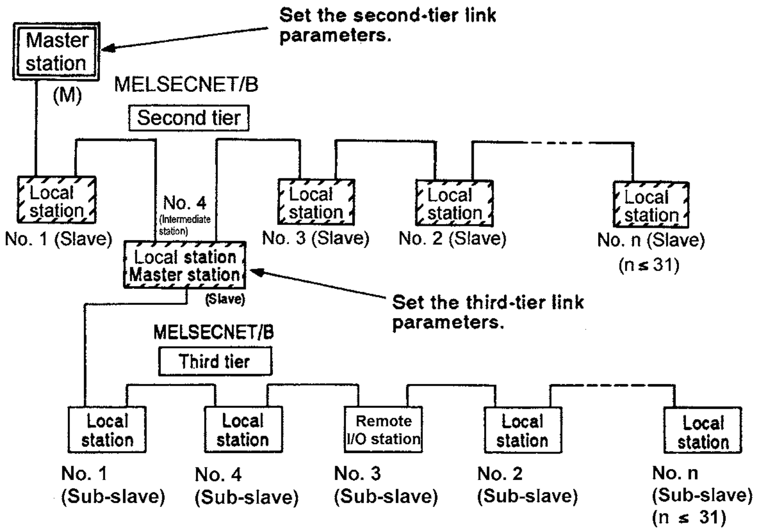
Fig 4.5 Three-tier system configured with MELSECNET/B data link system

POINT
(1) Remote I/O stations cannot be connected in MELSECNET II mode. (2) MELSECNET/B data link system has no restriction on the order of stations (including master stations).

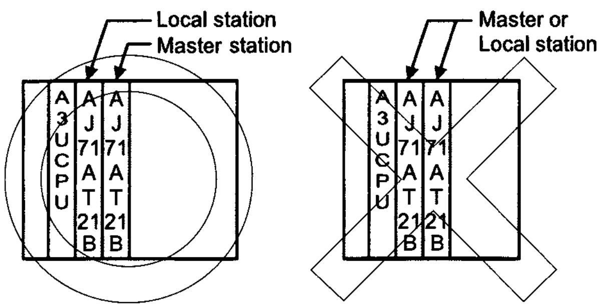
4.4.2 Precautions when using data link

This section explains precautions for configuring a three-tier system.

(1) Setting link parameters
In the three-tier system, setting link parameters to CPU modules for the master stations in the second and third tiers is required.
For link parameter setting, refer to Section 5.3.7 and Chapter 7.



(2) Restriction on use of link modules
Up to two of the following link modules (one as a master station and the other as a local station) can be used with a CPU module.
(The two modules cannot be used only for master stations or local stations.)
- AJ71AT21B
- A1SJ71AT21B



4.4.3 System devices

Table 4.4 Link modules available for the three-tier system

○: Available

Module	Model		Applicable system: MELSECNET/B data link																		Remarks
			Second tier								Third tier										
			MELSECNET mode			MELSECNET II mode		MELSECNET II composite mode			MELSECNET mode			MELSECNET II mode		MELSECNET II composite mode					
			M	L	R	M	L	M	L	R	L/m	ℓ	r	L/m	ℓ	L/m	ℓ	r			
CPU module	A1SJHCPU A1SHCPU A2SHCPU	A1SJ71T21B	○	○					○			○					○				
CPU module	A1NCPU A2NCPU A2NCPU-S1 A3NCPU	AJ71AT21B	○	○					○			○					○				
CPU module	A2ASCPU A2ASCPU-S1 A2USHCPU-S1 Q2ASCPU Q2ASCPU-S1 Q2ASHCPU Q2ASHCPU-S1	A1SJ71AT21B	○	○		○	○	○	○			○			○		○				• Use the station number setting switch to set the selection of master or local station. • Installed in an I/O slot in a base unit.
CPU module	A2ACPU A2ACPU-S1 A3ACPU A2UCPU A2UCPU-S1 A3UCPU A4UCPU Q2ACPU Q2ACPU-S1 Q3ACPU Q4ACPU	AJ71AT21B	○	○		○	○	○	○			○			○		○				
CPU module	Q02CPU-A Q02HCPU-A Q06HCPU-A	A1SJ71AT21B	○	○		○	○	○	○			○			○		○				
CPU module	Q02CPU Q02HCPU Q06HCPU Q12HCPU Q25HCPU	A1SJ71AT23BQ		○			○		○			○			○		○				• Used only for local stations. • Installed in an I/O slot in an extension base unit.
Data link module	A1SJ71T25B AJ72T25B				○					○			○					○			

REMARK

(1) The definitions of L/m station, ℓ station, and r station in Table 4.4 are as follows.

a) L/m station .... Local station in the second tier/master station in the third tier

b) ℓ station .... Local station in the third tier

c) r station .... Remote I/O station in the third tier

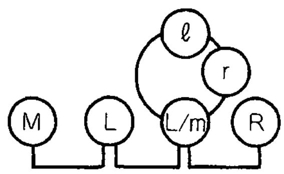


Table 4.4 Link modules available for the three-tier system (Continued)

○: Available

Module	Model		Applicable system																Remarks
			MELSECNET/B data link																
			Second tier								Third tier								
			MELSECNET mode			MELSECNET Ⅱ mode		MELSECNET Ⅱ composite mode			MELSECNET mode			MELSECNET Ⅱ mode		MELSECNET Ⅱ composite mode			
			M	L	R	M	L	M	L	R	L/m	ℓ	r	L/m	ℓ	L/m	ℓ	r	
CPU module with link function + link modules (two)	A2ASCPU +A1SJ71AT21B	A1SJ71 AT21B									*2 ○			*1*2 ○		*1*2 ○			• Use the station number setting switch to set the selection of master or local station. • Installed in an I/O slot in a base unit.
	A2ASCPU-S1 +A1SJ71AT21B																		
	A2USHCPU-S1 +A1SJ71AT21B																		
	Q2ASCPU +A1SJ71AT21B																		
	Q2ACPU-S1 +A1SJ71AT21B																		
	Q2ASHCPU +A1SJ71AT21B																		
	Q2ASHCPU-S1 +A1SJ71AT21B																		
	Q02CPU-A +A1SJ71AT21B																		
	Q02HCPU-A +A1SJ71AT21B																		
	Q06HCPU-A +A1SJ71AT21B																		
	A2UCPU +AJ71AT21B	AJ71AT21B									*2 ○			*2 ○		*2 ○			
	A2UCPU-S1 +AJ71AT21B																		
	A3UCPU +AJ71AT21B																		
	A4UCPU +AJ71AT21B																		
	Q2ACPU +AJ71AT21B																		
	Q2ACPU-S1 +AJ71AT21B																		
	Q3ACPU +AJ71A+21B																		
	Q4ACPU +AJ71AT21B																		

*1: Applicable when the A1SJ71AT21B is used.

*2: MELSECNET, MELSECNET Ⅱ or MELSECNET Ⅱ composite modes can be used for the second tier.

5 SPECIFICATIONS

This chapter describes the general specifications of the data link system and the performance specifications and functions of the link modules.

5.1 General Specifications

For general specifications, refer to the user's manual for the CPU module used.

5.2 Performance Specifications

The following shows the performance specifications of the data link system.

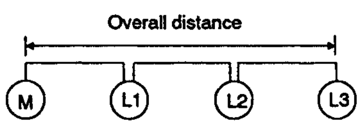
Table 5.1 Performance specifications

Item		MELSECNET data link system		
		Optical data link system		
		MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Max. number of link points used per station	Input (X)	Up to the maximum I/O points allowed for master station CPU module *2 (Total number of slave station link points) = (Available link points for master station)		
	Output (Y)			
Max. number of link points per system	B	1024 points (128 bytes)	4096 points (512 bytes)	
	W	1024 points (2048 bytes)	4096 points (8192 bytes)	
Max. number of link points per station	Master station Local station	1024 bytes	1024 bytes (link parameters; first half) 1024 bytes (link parameters; second half)	
	Remote I/O station	512 bytes Number of I/O points : 512 points	-	512 bytes Number of I/O points : 512 points
Communication speed		1.25Mbps		
Communications method		Half-duplex bit serial		
Synchronization method		Frame synchronization		
Transmission path		Duplex loop		
Overall cable distance *1		For SI or H-PCF type optical fiber cable : Up to 10km (32810ft.) (Between stations: 1km (3281ft.)) For GI type optical fiber cable : Up to 10km (32810ft.) (Between stations: 2km (6562ft.))		
Number of connectable stations		Up to 65 stations/loop (1 master station, 64 local/remote I/O stations)		
Modulation method		CMI		
Transmission format		Conforms to HDLC (frame method)		
Error control system		Retry by CRC (generating polynomial $X^{16} + X^{12} + X^{5} + 1$) and timeout		
RAS functions		The loopback function activated by detection of an error or cable disconnection The diagnostic functions such as link line check of the host station		
Cable used		Optical fiber cable		
Transmission loss		SI: Max. 12dB/km GI: Max. 3dB/km		
Sending level		SI: -17 to -11 dBm (peak value) GI: -17 to -10 dBm (peak value)		
Receiving level		SI: -32 to -11 dBm (peak value) GI: -29 to -10 dBm (peak value)		

REMARK

*1: Overall distances

- MELSECNET .... The overall cable distance means a distance from OUT of the master station to IN of the master station via a slave stations.
- MELSECNET/B....... Distance between the farthest link modules.



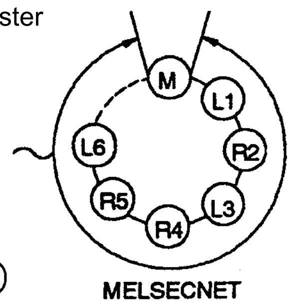


Table 5.1 Performance specifications (Continued)

MELSECNET data link system			MELSECNET/B data link system		
Coaxial cable data link			Shielded twisted pair cable data link system		
MELSECNET mode	MELSECNET Ⅱ mode	MELSECNET Ⅱ composite mode	MELSECNET mode	MELSECNET Ⅱ mode	MELSECNET Ⅱ composite mode
Up to the maximum I/O points allowed for master station CPU module *2 (Total number of slave station link points) = (Available link points for master station)					
1024 points (128 bytes)	4096 points (512 bytes)		1024 points (128 bytes)	4096 points (512 bytes)	
1024 points (2048 bytes)	4096 points (8192 bytes)		1024 points (2048 bytes)	4096 points (8192 bytes)	
1024 bytes	1024 bytes (link parameters; first half) 1024 bytes (link parameters; second half)		1024 bytes	1024 bytes (link parameters; first half) 1024 bytes (link parameters; second half)	
512 bytes Number of I/O points : 512 points	-	512 bytes Number of I/O points : 512 points	512 bytes Number of I/O points : 512 points	-	512 bytes Number of I/O points : 512 points
1.25Mbps			125kbps/250kbps/500kbps/1Mbps		
Half-duplex bit serial					
Frame synchronization					
Duplex loop			Bus system		
Up to 10km (32810ft.) (Between stations: 500m (1640.5ft.))			Varies depending on the communication speed (125kbps: 1200m, 250kbps: 600m, 500kbps: 400m, 1Mbps: 200m)		
Up to 65 stations/loop (1 master station, 64 local/remote I/O stations)			Up to 32 stations/loop (1 master station. 31 local/remote I/O stations)		
CMI			NRZI method		
Conforms to HDLC (frame method)					
Retry by CRC (generating polynomial $X^{16} + X^{12} + X^5 + 1$) and timeout					
The loopback function activated by detection of an error or cable disconnection The diagnostic functions such as link line check of the host station			The diagnostic functions such as link line check of the host station		
Coaxial cable			Shielded twisted pair cable		
-			-		
-			-		
-			-		

*2: The A1SHCPU, A1SJHCPU, A2SHCPU, A2ASCPU(S1), A2USHCPU-S1, Q2ASCPU(S1),Q2ASHCPU(S1), A2UCPU(S1), A3UCPU, A4UCPU, Q2ACPU(S1), Q3ACPU, Q4ACPU, Q4ARCPU, Q02CPU-A, Q02HCPU-A, Q06HCPU-A can use up to 2048 points.

5.3 Functions

The following shows the functions of the data link system.

Table 5.2 List of data link system functions

Item	Description	
	MELSECNET data link system	
Cyclic transmission function	(1) Function to periodically communicate data between the master station and the slave stations (local station and remote I/O station). (2) The cyclic transmission function includes the following two communications. • One-to-one communication between the master station and a slave station • Communication between the master station and all local stations (a) One-to-one communication between the master station and a slave station Inputs (X) and outputs (Y) are used for communication between the master station and a remote I/O station and communication between the master station and a local station. (b) Communication between the master station and all local stations Link relays (B) and link registers (W) are used for communication between the master station and a local station and communication between two local stations.	
Transient transmission function	(1) Function to communicate only when it is requested. (2) The transient transmission function includes the following three types. (a) The master station executes an LRDP or LWTP instruction to read/write devices (T,C,D,W) of the local station. (b) The master station executes an RFRP or RTOP instruction to read/write buffer memory of a special function module mounted to a remote I/O station. (c) Peripheral devices installed to the programmable controller CPU accesses to other stations.	
Automatic return function	Even if a local station or a remote I/O station is disconnected from the data link system due to a fault, this function automatically returns the disconnected station to the system when the normal operation state is restored.	
Loopback function	(1) Because of double configuration of optical fiber cable and coaxial cable, when a cable breaks or a local or remote I/O station is disconnected from the system, the faulty part is removed so that the normal operation can be maintained by normally operating stations.	
Error detection	(1) Faulty parts can be detected by reading data of the special relays and special registers.	
Self-diagnostics function	(1) Checks link module hardware and optical fiber cable/coaxial cable.	
Extensive use of link relays (B) and link registers (W) in three-tier system	(1) The link relays (B) and link registers (W) that can be used in a three-tier system are as follows: · MELSECNET mode.......................B/W0 to 3FF (1024 points) · MELSECNET Ⅱ mode · MELSECNET Ⅱ composite mode ....B/W0 to FFF (4096 points) (2) Function to redundantly use the same device number in the three-tier system if the available number of points of link relays (B) and link registers (W) in the three-tier system is not sufficient.	
MELSECNET mode/ MELSECNET Ⅱ mode/ MELSECNET Ⅱ composite mode	(1) The data link system includes three different operation modes: MELSECNET mode, MELSECNET Ⅱ mode, and MELSECNET Ⅱ composite mode. (2) The above-mentioned operation mode can be selected and used depending on the data link module to be used. The data link for the entire MELSECNET Ⅱ device range (B/W0 to FFF) while maintaining compatibility with the conventional MELSECNET mode.	

Table 5.2 List of data link system functions (Continued)

Description MELSECNET/B data link system	Reference section
	Section 5.3.1
	Section 5.3.2
	Section 5.3.3
-	Section 5.3.4
	Section 5.3.5
(1) Checks link module hardware and shielded twisted pair cables.	Section 5.3.6
	Section 5.3.7
	Section 5.3.8

5.3.1 Cyclic transmission function

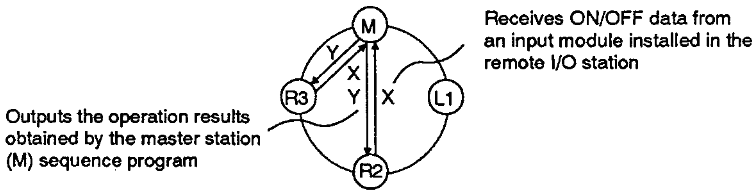
The cyclic transmission function is a function to periodically communicate data between the master station and the slave stations (local station or remote I/O station).
The cyclic transmission function includes the following two communications.

- One-to-one communication between the master station and slave stations
- Communication between the master station and all local stations.

(1) One-to-one communication
Inputs (X) and outputs (Y) are used for communication between the master station and a remote I/O station and communication between the master station and a local station.

(a) Communication between the master station and a remote I/O station

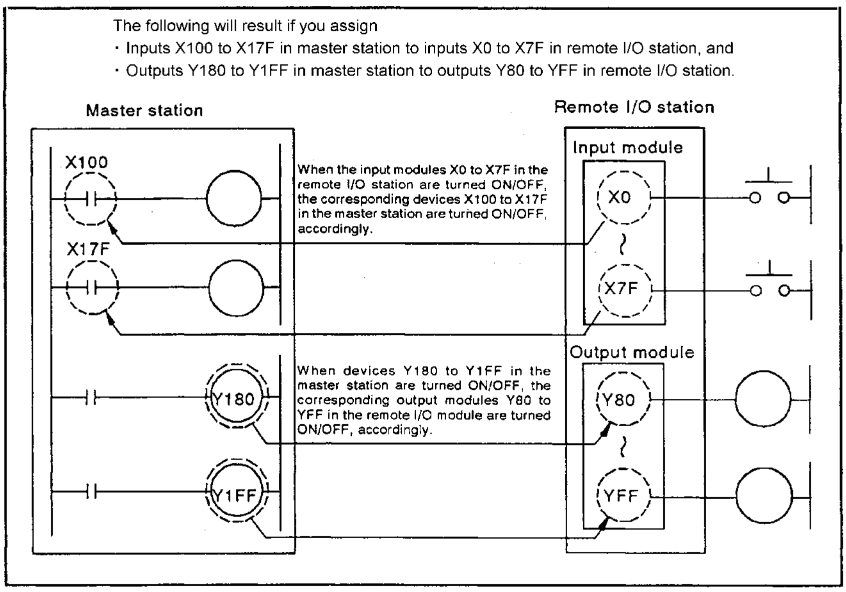
1) A master station receives ON/OFF data (inputs (X)) from an input module installed in a remote I/O station, and the master station outputs the operation results (outputs (Y)) (obtained by the master station sequence program) to the output module installed in the remote I/O station.



2) For communication between the master and remote I/O stations, the number of I/O points of the remote I/O station must be assigned to the I/O number used on the master station by link parameters of the master station beforehand.

a) When the input module in the remote I/O station is turned ON, the input (X) of the master station assigned by the link parameter is also turned ON.

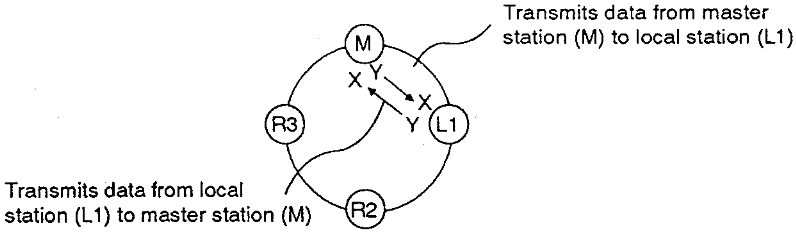
b) When the output (Y) assigned with the link parameter of the master station is turned ON, the output module on the remote I/O station turns ON.



(b) Communication between the master station and a local station

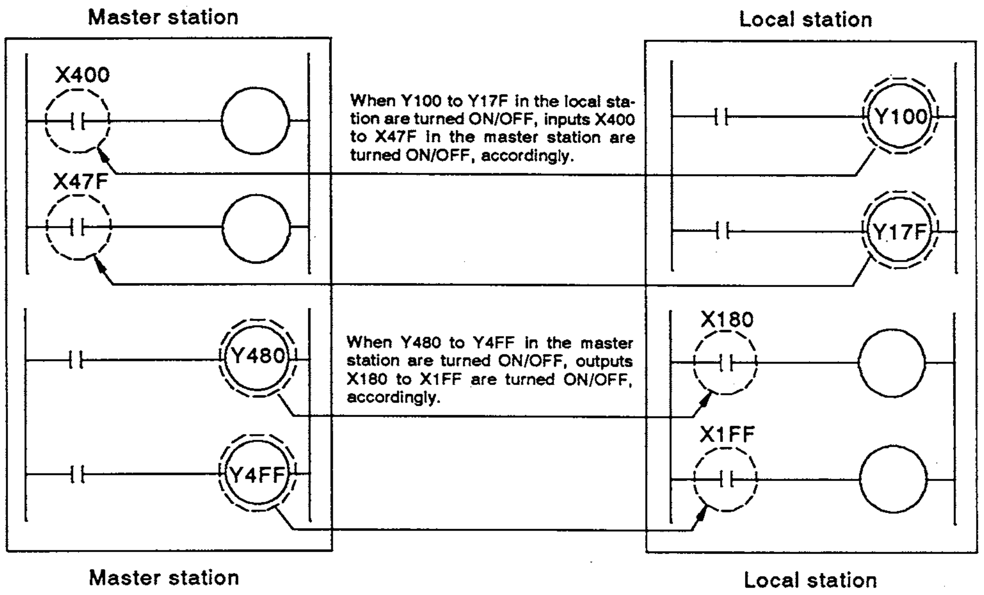
1) Communicates data between the master station and a local station using some of I/O points in the master station and local stations for the data link. (Communication between local stations or communication between a local station and a remote I/O station is not possible.)

2) As for communication between the master station and a local station, the sender uses outputs (Y), and receiver uses inputs (X).



3) When communicating between the master station and a local station, assign the inputs and outputs used for the data link by a link parameter.
The link parameter defines the correspondence between the master station inputs (X) and the local station outputs (Y) and between the master station outputs (Y) and the local station inputs (X).

The following will result if you assign
- Inputs X400 to X47F in master station to outputs Y100 to Y17F in local station, and
- Outputs Y480 to Y4FF in master station to inputs X180 to X1FF in local station.



(2) Communication between the master station and all local stations
Link relays (B) and link registers (W) are used for communication between the master station and a local station or communication between local stations.
Link relays (B) and link registers (W) are used by the master station and all local stations in common.

Link relays (B) and link registers (W) send data to other station, using the range assigned to the host station with a link parameter.
- Link relays (B) are internal relays for the data link and are used for sending ON/OFF data.
- Link registers (W) are data registers for the data link and are used for sending 16-bit data.
- Link relays (B) and link registers (W) handle different types of data.
  However, the range of communicating with other stations in the data link system is the same.

The following explains the range in which communication is possible with link relays (B) and link registers (W) when using the MELSECNET mode.
In the MELSECNET II mode and MELSECNET II composite mode, although the function is basically the same, stations with which communication is possible partly differ between the range assigned to the first half of the link parameter and the range assigned to the second half of the link parameter. (For details, refer to Section 5.3.8.)

(a) Two-tier system configuration
1) The master station and local stations can read the entire range of link relays (B) and link registers (W) assigned by the link parameter.
The read/write range of each station is explained by showing Fig 5.1 as an example.

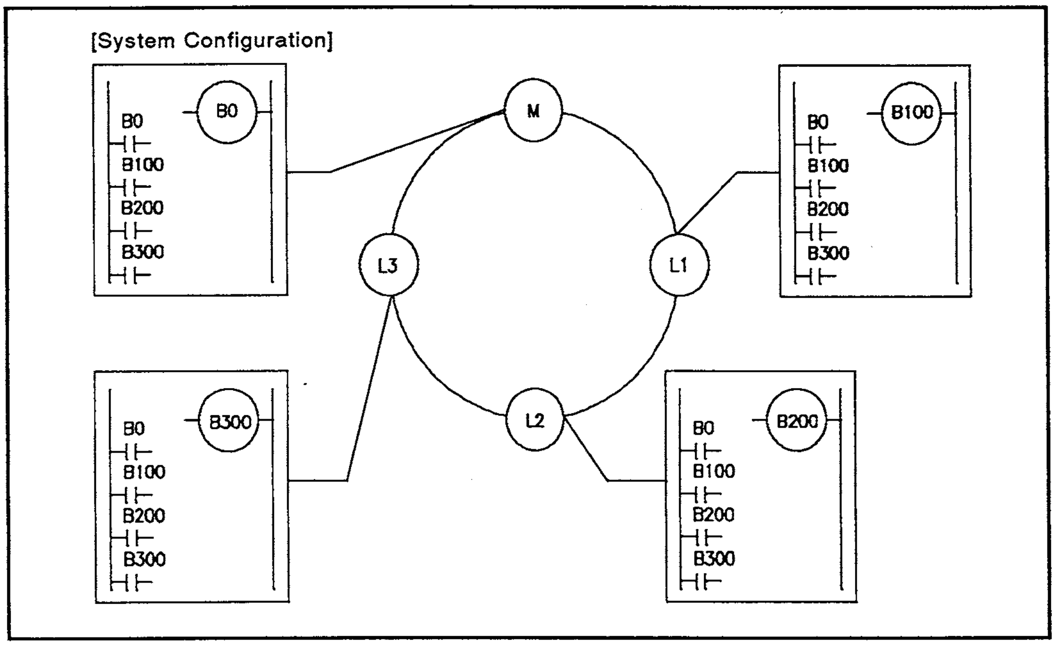


Fig 5.1 Two-tier system configuration

[Link parameter setting range]

B/W0 100 200 300 380 3FF

M	L1	L2	L3	Vacant

[Read/write permitted range]

(R) = Reading range (W) = Writing range

** = Usable as internal relays (M) or data registers (D)

Master station (M)

B/W0 100 200 300 380 3FF

M (W)	L1 (R)	L2 (R)	L3 (R)	**

When B0 is turned ON in the M station, for example, B0 in the L1, L2, and L3 stations is also turned ON.

Local station No. 1 (L1)

B/W0 100 200 300 380 3FF

M (R)	L1 (W)	L2 (R)	L3 (R)	**

When B100 is turned ON in the L1 station, for example, B100 in the M, L2, and L3 stations is also turned ON.

Local station No. 2 (L2)

B/W0 100 200 300 380 3FF

M (R)	L1 (R)	L2 (W)	L3 (R)	**

When B200 is turned ON in the L2 station, for example, B200 in the M, L1, and L3 stations is also turned ON.

Local station No. 3 (L3)

B/W0 100 200 300 380 3FF

M (R)	L1 (R)	L2 (R)	L3 (W)	**

When B300 is turned ON in the L3 station, for example, B300 in the M, L1, and L2 stations is also turned ON.

REMARK

To simplify the example, the same number is assigned to link relays (B) and link registers (W). In actual use, the number can be separately assigned to link relays (B) and link registers (W).

(b) Three-tier system configuration

1) In the configuration of the three-tier system, the link parameters are set in the master station for the second tier and the master station for the third tier.

2) The master station and local stations for the second tier (including the master station for the third tier) can read the range assigned by the link parameters of the master station for the second tier.

3) The local stations for the third tier can read the entire range assigned by the link parameters of the master station for the third tier and the range assigned to host station (the master station for the second tier) by the link parameters of the master station for the second tier.
The range assigned to the local stations for the second tier and the range assigned by link parameters of the master station for other third tier cannot be read.

The read/write range of each station is explained by showing Fig 5.2 as an example.

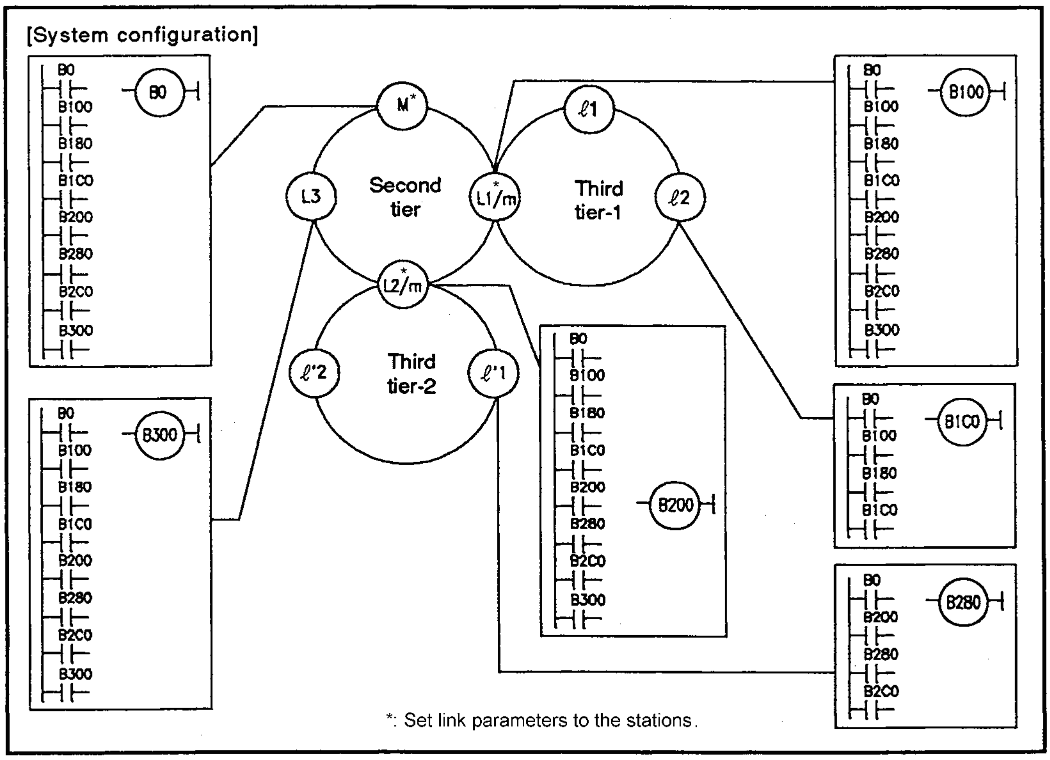
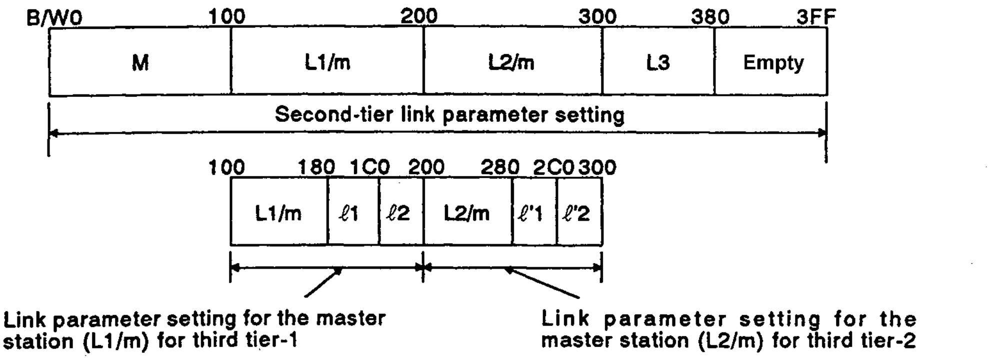


Fig 5.2 Three-Tier system configuration

[Link parameter setting range]



[Read/write permitted range]

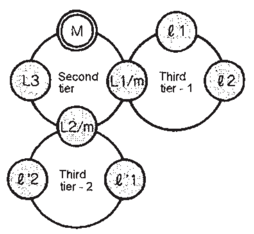
(R) = Reading range (W) = Writing range ** = Internal relays (M) and data registers (D) area

Master station (M) for the second tier

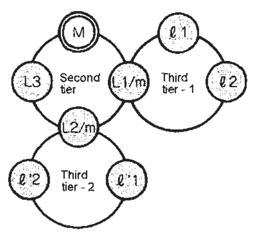
1) The M station writes data to the devices in the B/W0 to FF range and sends it to the other stations.
   When B0 is turned ON in the M station, for example, B0 in other stations are also turned ON.
2) The M station can receive data written to the devices in the B/W100 to 37F range by other stations.
3) Devices in the B/W380 to 3FF range can be used instead of internal relays (M) and data registers (D).

B/W0	100	180	1C0	200	280	2C0	300	380 (to 3FF)
M (W)	L1/m (R)	ℓ1 (R)	ℓ2 (R)	L2/m (R)	ℓ'1 (R)	ℓ'2 (R)	L3 (R)	**

[Range where data can be received, range where data can be sent]



[Range where M can receive data]*



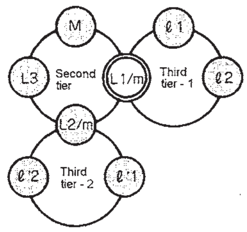
[Range where M can send data]*

Local station No. 1 (Master station (L1/m) for third tier-1)

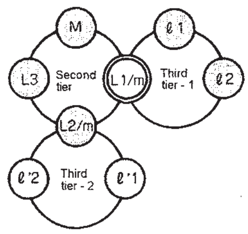
1) The L1/m station writes data to the devices in the B/W100 to 17F range and sends it to the other stations.
When B100 is turned ON in the L1/m station, for example, B100 in other stations are also turned ON. (Except for ℓ'1 and ℓ'2 stations)
2) The L1/m station can receive data written to the devices in the B/W0 to B/WFF range and the B/W180 to 37F range by other stations.
3) Devices in the B/W380 to 3FF range can be used instead of internal relays (M) and data registers (D).

B/W0	100	180	1C0	200	280	2C0	300	380 3FF
M (R)	L1/m (W)	ℓ1 (R)	ℓ2 (R)	L2/m (R)	ℓ'1 (R)	ℓ'2 (R)	L3 (R)	**

[Range where data can be received, range where data can be sent]



[Range where L1/m can receive data]*



[Range where L1/m can send data]*

REMARK

1) To simplify the example, the same number is assigned to link relays (B) and link registers (W). In actual use, the number can be separately assigned to link relays (B) and link registers (W).
2) *: ● indicates the range where data can be received.

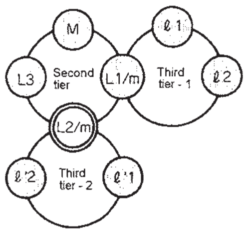
Local station No. 2 (Master station (L2/m) for third tier-2)

1) The L2/m station writes data to the devices in the B/W200 to 27F range and sends to other stations.
When B200 is turned ON in the L2/m station, for example, B200 in other stations are also turned ON. (Except for ℓ 1 and ℓ 2 stations)
2) The L2/m station can receive data written to the devices in the range of B/W0 to 1FF and B/W280 to 37F by other station.
3) Devices in the range of B/W380 to 3FF can be used instead of internal relays (M) and data registers (D).

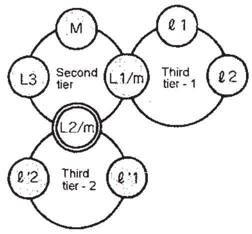
B/W0 100 180 1C0 200 280 2C0 300 380 3FF

M (R)	L1/m (R)	ℓ1 (R)	ℓ2 (R)	L2/m (W)	ℓ'1 (R)	ℓ'2 (R)	L3 (R)	**

[Range where data can be received, range where data can be sent]



[Range where L2/m can receive data]*



[Range where L2/m can send data]*

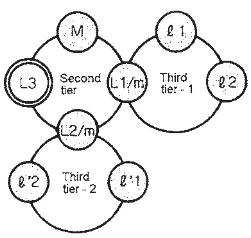
Local station No. 3 (L3)

1) The L3 station writes data to the devices in the range of B/W300 to 37F and sends it to other stations.
When B300 is turned ON in the L3 station, for example, B300 in other stations are also turned ON. (Except for ℓ 1, ℓ 2, ℓ '1 and ℓ '2 stations.)
2) The L3 station can receive data written to the devices in the range of B/W0 to 2FF by other station.
3) Devices in the range of B/W380 to 3FF can be used instead of internal relays (M) and data registers (D).

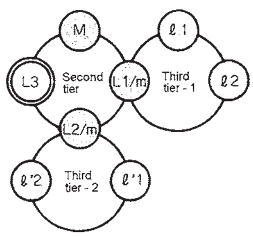
B/W0 100 180 1C0 200 280 2C0 300 380 3FF

M (R)	L1/m (R)	ℓ1 (R)	ℓ2 (R)	L2/m (R)	ℓ'1 (R)	ℓ'2 (R)	L3 (W)	**

[Range where data can be received, range where data can be sent]



[Range where L3 can receive data]*



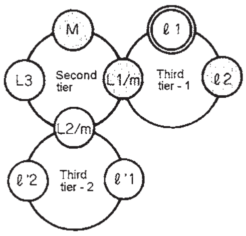
[Range where L3 can send data]*

Local station No. 1 (ℓ 1) in the third tier-1

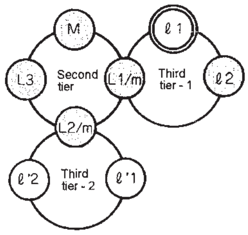
1) The ℓ 1 station writes data to the devices in the range of B/W180 to 1BF and sends it to the other stations.
   When B180 is turned ON in the ℓ 1 station, for example, B180 in other stations are also turned ON. (Except for ℓ '1 and ℓ '2 stations)
2) The ℓ 1 station can receive data written to the devices in the range of B/W0 to 17F and B/W1C0 to 1FF by other stations.
3) Devices in the range of B/W200 to 3FF can be used instead of internal relays (M) and data registers (D).

B/W0	100	180	1C0	200	280	2C0	300	380–3FF
M (R)	L1/m (R)	ℓ1 (W)	ℓ2 (R)	L2/m **	ℓ'1 **	ℓ'2 **	L3 **	**

[Range where data can be received, range where data can be sent]



[Range where ℓ1 can receive data]*



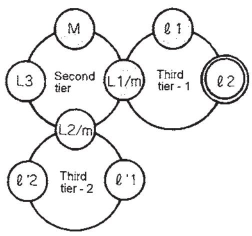
[Range where ℓ1 can send data]*

Local station No. 2 (ℓ 2) in third tier-1

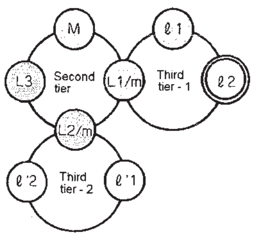
1) The ℓ 2 station writes data to the devices in the range of B/W1C0 to 1FF and sends it to the other stations.
   When B1C0 is turned ON in the ℓ 2 station, for example, B1C0 in other stations are also turned ON. (Except for ℓ '1 and ℓ '2 stations)
2) The ℓ 2 station can receive data written to the devices in the range of B/W0 to 1BF by other stations.
3) Devices in the range of B/W200 to 3FF can be used instead of internal relays (M) and data registers (D).

B/W0	100	180	1C0	200	280	2C0	300	380–3FF
M (R)	L1/m (R)	ℓ1 (R)	ℓ2 (W)	L2/m **	ℓ'1 **	ℓ'2 **	L3 **	**

[Range where data can be received, range where data can be sent]



[Range where ℓ2 can receive data]*



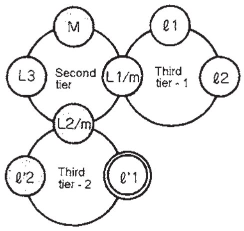
[Range where ℓ2 can send data]*

Local station No. 1 (ℓ '1) in third tier-2

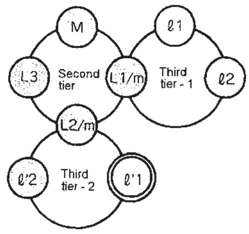
1) The ℓ '1 station writes data to the devices in the range of B/W280 to 2BF and sends it to other stations.
   When B280 is turned ON in the ℓ '1 station, for example, B280 in other stations are also turned ON. (Except for ℓ 1 and ℓ 2 stations)
2) The ℓ '1 station can receive data written to the devices in the range of B/W0 to FF, B/W200 to 27F, and B/W2C0 to 2FF by other station.
3) Devices in the range of B/W100 to 1FF and B/W300 to 3FF can be used instead of internal relays (M) and data registers (D).

B/W0	100	180	1C0	200	280	2C0	300	380 3FF
M (R)	L1/m **	ℓ1 **	ℓ2 **	L2/m (R)	ℓ'1 (W)	ℓ'2 (R)	L3 **	**

[Range where data can be received, range where data can be sent]



[Range where ℓ'1 can receive data]*



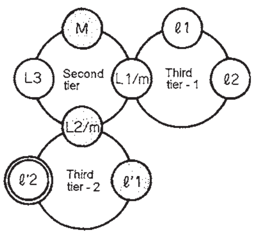
[Range where ℓ'1 can send data]*

Local station No. 2 (ℓ '2) in third tier-2

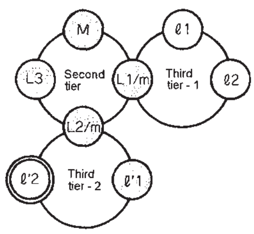
1) The ℓ '2 station writes data to the devices in the range of B/W2C0 to 2FF and sends it to other stations.
   When B2C0 is turned ON in the ℓ '2 station, for example, B2C0 in other stations are also turned ON. (Except for ℓ 1 and ℓ 2 stations)
2) The ℓ '2 station can receive data written to the devices in the range of B/W0 to FF and B/W200 to 2BF by other station.
3) Devices in the range of B/W100 to 1FF and B/W300 to 3FF can be used instead of internal relays (M) and data registers (D).

B/W0	100	180	1C0	200	280	2C0	300	380 3FF
M (R)	L1/m **	ℓ1 **	ℓ2 **	L2/m (R)	ℓ'1 (R)	ℓ'2 (W)	L3 **	**

[Range where data can be received, range where data can be sent]



[Range where ℓ'2 can receive data]*



[Range where ℓ'2 can send data]*

REMARK

1) *: ● indicates the range where data can be received.

5.3.2 Transient transmission function

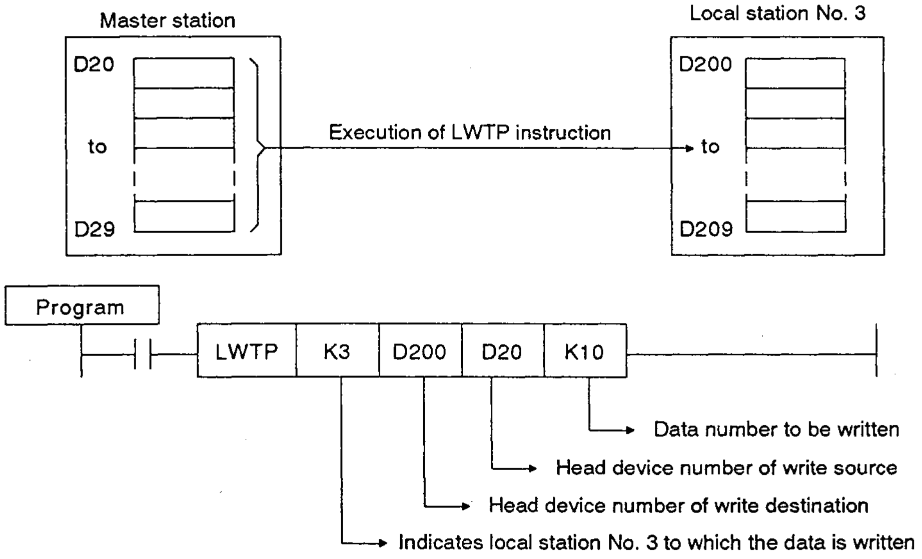
The transient transmission is a function to:

- Read/write from/to devices (T, C, D, and W) in a local station from the master station;
- Read/write the buffer memory of a special function module in a remote I/O station from the master station;
- Enable communications from a peripheral device connected to the programmable controller CPU to the other programmable controllers.

(1) Read/write of devices (T, C, D, and W) from the master station to a local station
The transient transmission function reads/writes the link registers (W) whose range is not set by link parameters or the devices (T, C, D) where cyclic transmission is not possible.

An LRDP or LWTP instruction is executed in the master station sequence program to read/write devices (T, C, D, and W) of a local station. (Refer to Section 9.7 for details on the LRDP and LWTP instructions.)

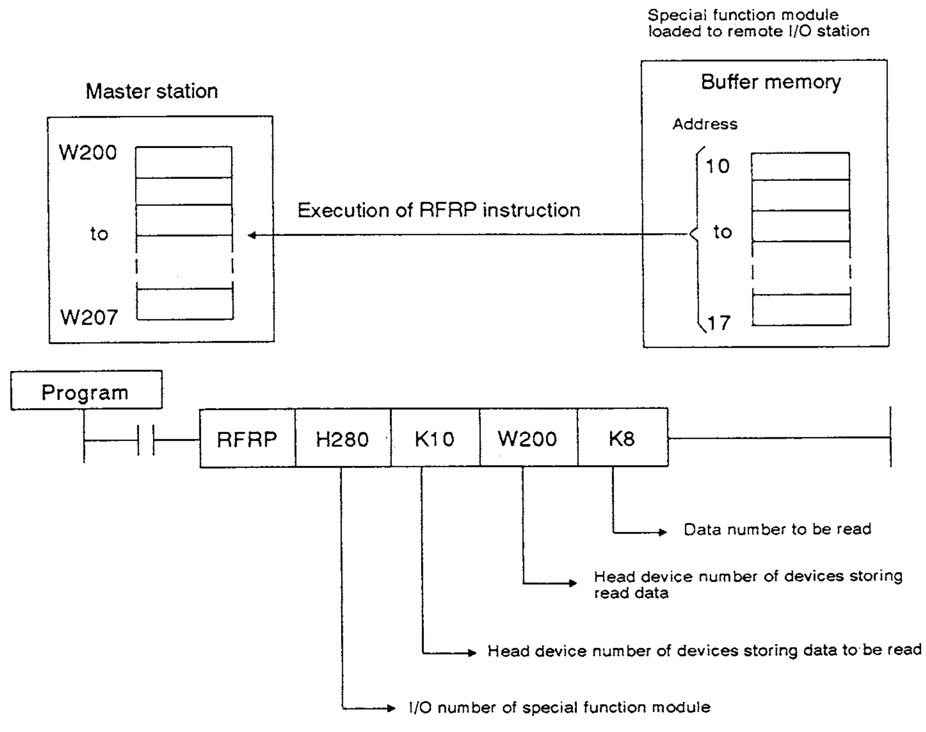
Example:
The following results when writing data from D20 through D29 in the master station to D200 through D209 in local station No. 3:



(2) Read/write of buffer memory in a special function module installed to a remote I/O station
Use RFRP or RTOP instruction to read/write buffer memory of a special function module installed to a remote I/O station from the master station.
Data communication can be executed between the master station and a remote I/O station only when RFRP or RTOP instruction is executed.

To use RFRP or RTOP instruction, link registers (W) are assigned to the remote I/O station with the link parameter.
The buffer memory data is read or data is written to the buffer memory in the special function module loaded to the remote I/O station with the link registers. (Refer to Section 9.8 for details on RFRP and RTOP instructions.)

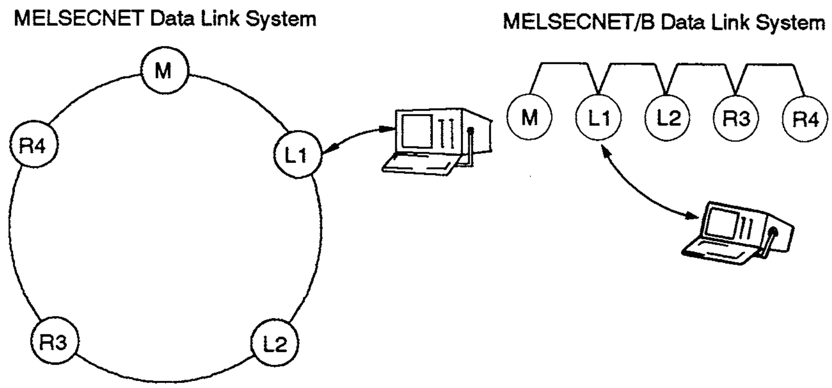
Example:
The following results when reading data of the buffer memory (address 10 to 17) from a special function module (X/Y280 to X/Y29F) loaded in remote I/O station No.1 to W200 to 207.



(3) Accessing other station with a peripheral device connected to programmable controller CPU
When accessing to other station from the peripheral device, the station which can be accessed depends on types of access source station (master station, local station, or remote I/O station).
The basic concept is illustrated in Fig 5.3. For details on the executable functions, refer to the manuals for the peripheral device and module to be used.

(1) Accessible station when connecting peripheral devices

- When peripheral device is connected to the master station, host station, a local station, and a remote I/O station are accessible.
- When peripheral device is connected to a local station, host station and the master station are accessible.
- When peripheral device is connected to a remote I/O station, the master station is only accessible.



Access source station	Access target station				
	M	L1	L2	R3	R4
M	○	○	○	○*1	○*1
L1	○	○	×	×	×
L2	○	×	○	×	×
R3	○	×	×	×	×
R4	○	×	×	×	×

*1: Not accessible when using GX Developer.

Fig 5.3 Accessibility between link modules

In the system configuration in Fig 5.3, an A6GPP connected to local station No. 1 (L1) can execute the following operations for the master station.

- Program read/write
- Monitor
- Test
- Remote RUN/STOP/PAUSE

5.3.3 Automatic return function

(1) Automatic return function
If an error occurs to a local station or a remote I/O station, it is disconnected from the data link system to maintain the data link with the normally operating stations.
The disconnected local station or remote I/O station is automatically returned to the system when the normal operation state is restored.
The function that makes this possible is the automatic return function.

(2) Setting with/without automatic return function
The link module connected to the data link system can select whether or not to use the automatic return function for each station.
Refer to the user's manual for each link module for details on whether or not to use the automatic return function.

(3) Method for reconnecting a disconnected station with/without automatic return function
The method for reconnecting a disconnected station varies depending on whether the automatic return function is enabled or not.
(a) When data link stops due to an error in the master station
1) Automatic return function is set for the master station:
After resetting the master station, reset all of the local and remote I/O stations for which the automatic return function is set.

2) Automatic return function is not set for the master station:
After resetting all of the local and remote I/O stations for which the automatic return function is set, reset the master station.

(b) When a local or remote I/O station is disconnected due to an error

Master station	Local/Remote I/O station	Conditions for return
Enabled	Enabled	Returns automatically after the error is removed.
	Disabled	Reset the disconnected station and the local and remote I/O stations that do not have the automatic return function.
Disabled	Enabled	Reset the disconnected station and the local and remote I/O stations that do not have the automatic return function, and then reset the master station.
	Disabled	

Enabled: Automatic return function selected
Disabled: Automatic return function not selected

5.3.4 Loopback function

(1) Loopback function

The MELSECNET data link system has a double configuration of link cables (optical fiber or coaxial).

The loopback function uses the double configuration to isolate the faulty part and maintain the data link with the normally operating stations when a cable is broken or a local station or remote I/O station is disconnected.

POINT

(1) In the MELSECNET data link system, the station number of slave stations and sub-slave stations should be set in order (from the station No.1 to the station No. n in the forward loop direction) for the loopback function. (For details, refer to Section 8.2.)

(2) The loopback function may not work depending on the fault of the data link module.

Identify the faulty data link module in the following method.

1) Check the LED indications ("RUN LED" off, "ERROR LED" on) of all data link modules for the faulty station.
   Refer to Section 10.4 for the ERROR LED indications.
2) Turn off all stations power supply, and turn them on in order, starting with the master station.
   At this time, check that which station stops the normal data link.
   Replace the fault-detected data link module and then make sure that a data link returns to normal.

(2) Normal data link

Under normal operating status, the data link uses the forward loop. Loop data is sent/ received in the following order: master station, station No. 1, station No. 2, etc.

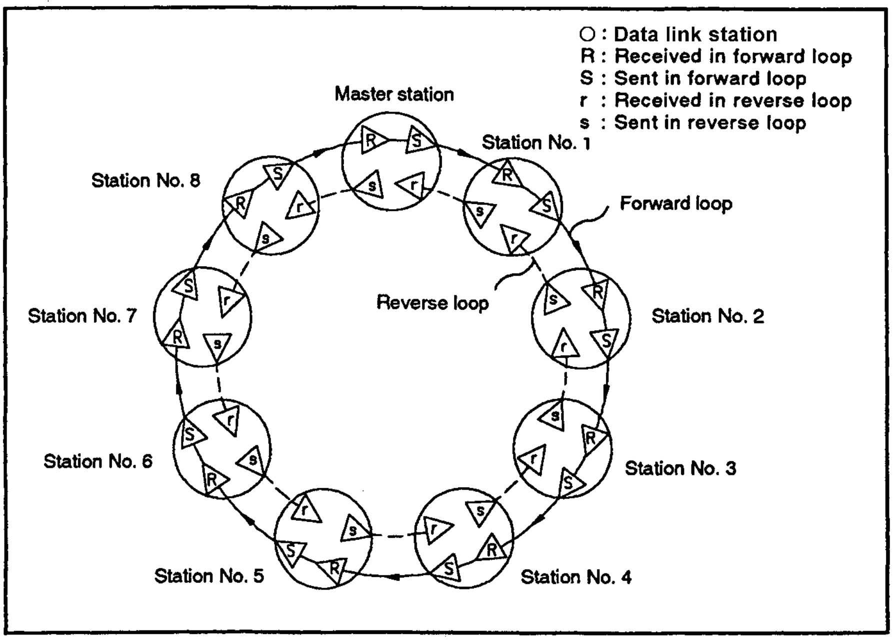


Fig 5.4 Normal data link (When one master station and eight slave stations are used)

(3) Data link when the forward loop is faulty
If data link using the forward loop is disabled due to a broken cable or a problem with a forward loop cable connector, the loop is automatically switched from "forward" to "reverse" to maintain the data link.
In the reverse loop, link data is sent in the following order:
master station → station No. n → station No. (n-1), ...
Data link operation when a forward loop cable is broken or disconnected is illustrated in Fig 5.5.

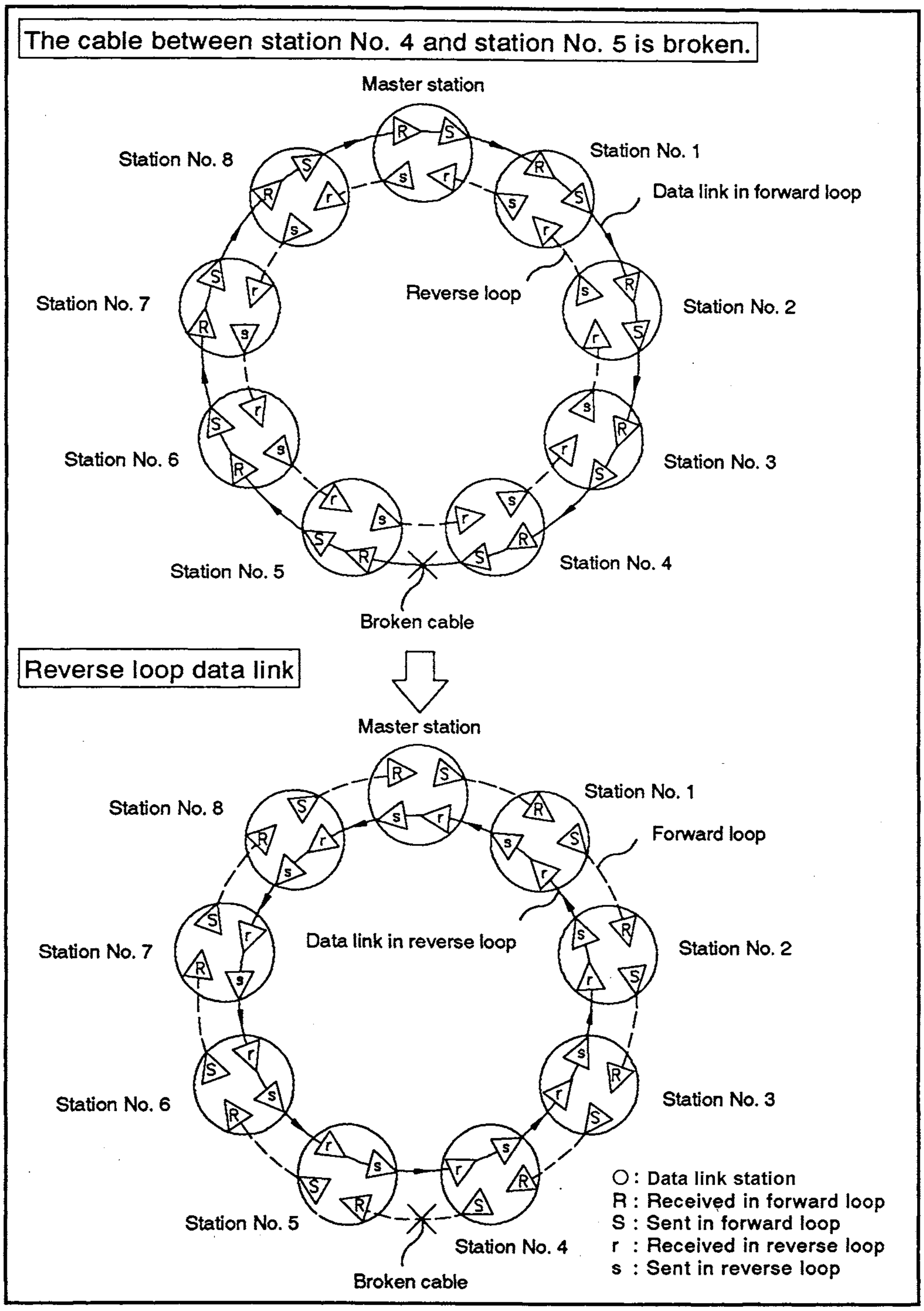


Fig 5.5 Reverse loop data link (When one master station and eight slave stations are used)

(4) Data link when both the forward and reverse loops are faulty
When a fault occurs to the cables of forward and reverse loops and the cable connecting connector, the link loops back toward the master station in front of faulty station, and data link is maintained by the normally operating. (Faulty stations are all disconnected.)

When the faulty part is returned to normal, the data link in the forward loop is recovered. Whether the station will remain disconnected or return to the data link depending on the setting of the automatic return function. (Refer to Section 5.3.3.)

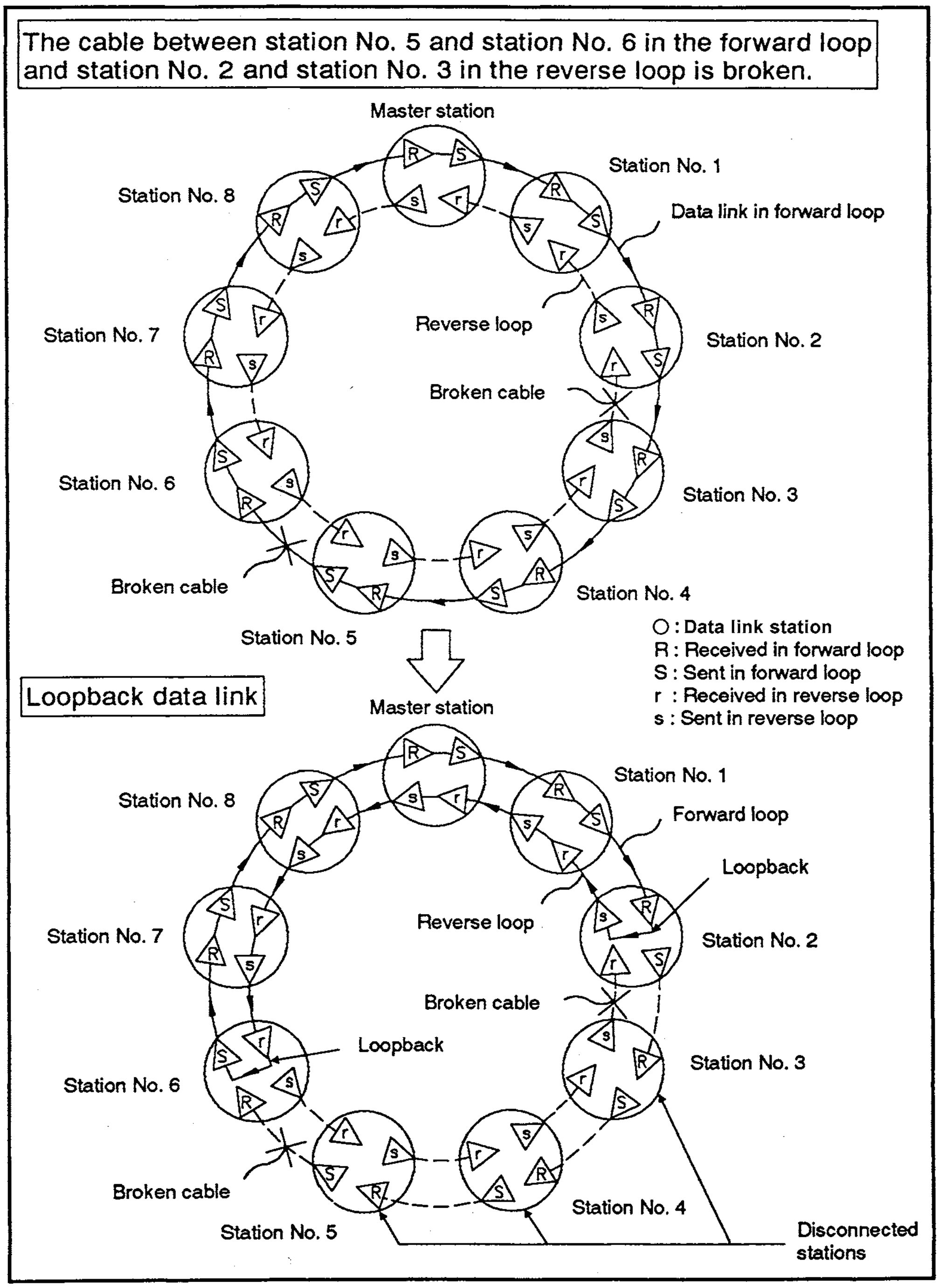


Fig 5.6 Data link when forward/reverse loop is faulty
(When one master station and eight slave stations are used)

(5) Data link when a power failure occurs to local station or remote I/O station
If the data link is disabled due to power failure at a local station or a remote I/O station, the link loops back toward the master station, and the data link is maintained by the normally operating stations. (The station where the power failure occurred is disconnected from the data link.)

When the power supply to the disconnected station is turned on, the data link in the forward loop recovers. Whether the station will remain disconnected or return to the data link is depending on the setting of the automatic return function. (Refer to Section 5.3.3.)

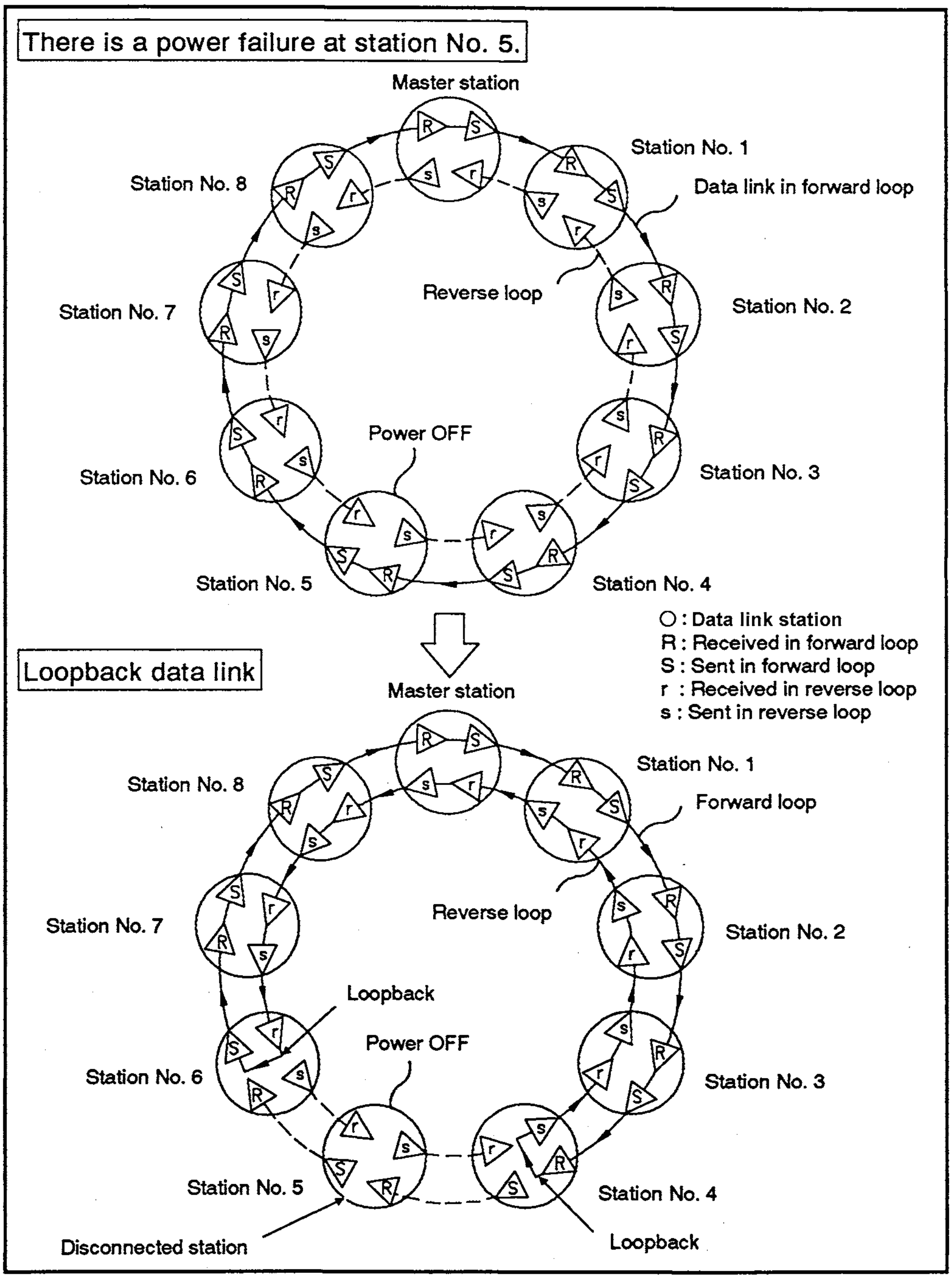


Fig 5.7 Local station or remote I/O station power failure data link
(When one master station and eight slave stations are used)

5.3.5 Fault detection function

In the data link system, the data link operation status is stored in the special relays (M) and special registers (D) so that it can be easily checked with a sequence program and peripheral device.

Some special relays (M) and special registers (D) can be read by the master station, while some can be read by a local station.
For details of special relays and special registers, refer to Section 9.2.

The following describes the major events that are detected by the fault detection function.

When MELSECNET data link system is used

(1) Events checked by the master station
  (a) Data communication status with a slave station (local station and remote I/O station)
    - Stores stations at which a communication error occurs. (D9228 to D9231)
    - Stores stations at which initial communication, necessary for starting communication, has not been completed. (D9224 to D9227)
    - Stores the operation status (RUN/STEP-RUN or STOP/PAUSE) of a local station. (D9212 to D9215)

  (b) Link parameter error
    - Checks whether the link parameter is set or the data is correct. (M9206)
    - Checks consistency (whether the B/W assignment range overlaps) between the link parameters set on a slave station (master station for the third tier) and those set for the host station.(M9207)

  (c) Number of communication error occurrences
    - The accumulated number of retries due to transmission errors. (D9210)
    - The accumulated number of receive error occurrences. (D9240)

  (d) Link card hardware error (M9210)

  (e) Mode setting switch setting status in the link card
    - Whether the mode setting switch is set for online (0 or 1) or offline test mode (2 to 7). (M9224)

  (f) Data link status
    - Forward loop error (M9225)
    - Reverse loop error (M9226)
    - Stores information whether data is sent via the forward loop, reverse loop, or forward/reverse loop. (D9204)
    - Stores the stations where loopback occurs. (D9205, D9206)
    - Stores information at which points errors occur in the forward loop line and reverse loop line. (D9232 to D9239)

(2) Events checked by local stations
(a) Data communication status with the master station
- Checks if cyclic communication is executed normally.(M9246)
- Checks if cyclic communication is executed normally from the master station for the second tier when the host station is a local station for the third tier. (M9247)
- Checks if the link parameters are received from the master station. (M9250)
- Checks if the host station can communicate data. (M9251)

(b) Data communication status with other stations
- Check a faulty local station other than the host station. (D9252 to D9255)
- The operation status of local stations other than the host station. (RUN/STEP-RUN or STOP/PAUSE)

(c) Number of receive errors
- The accumulated number of receive error occurrences. (D9245)

(d) Link card hardware error (M9211)

(e) Mode setting switch setting status in the link card (M9240)

(f) Data link status
- Forward loop error (M9241)
- Reverse loop error (M9242)
- Loopback in the host station (M9243)

When MELSECNET/B data link system is used

(1) Events checked by the master station
  (a) Data communication status with a slave station (local station and remote I/O station)
    - Stores stations in which a communication error occurs. (D9228, D9229)
    - Stores stations at which initial communication, necessary for starting communication, has not been completed. (D9224 and D9225)
    - Stores the operating state (RUN/STEP-RUN or STOP/PAUSE) of a local station. (D9212, D9213)

  (b) Link parameter error
    - Checks if the link parameters for the host station is not set, or the data has an error. (M9206)
    - Checks consistency (whether the B/W assignment range overlaps) between link parameters set for a slave station (master station for the third tier) and those set for the host station. (M9207)

  (c) Number of communication errors
    - Stores the accumulated number of retries due to transmission errors. (D9210)
    - Stores the accumulated number of receive errors. (D9240)

  (d) Link card hardware fault (M9210)

  (e) Mode setting switch setting status of link card
    - Checks if the mode switch is set to online (0 or 1) or offline (2 to 7). (M9224)

  (f) Data link status
    Stores the data link status. (D9204)

(2) Events checked by a local station
  (a) Data communications status with the master station
  - Checks if cyclic data communications is normally executed. (M9246)
  - Checks if cyclic communication is executed normally from the master station for the second tier when the host station is a local station for the third tier. (M9247)
  - Checks if link parameters are received from the master station. (M9250)
  - Checks if the host station can communicate data. (M9251)

  (b) Data communications with another station
  - Check a faulty local station other than the host station. (D9252, D9253)
  - The operation status of local stations other than the host station. (RUN/STEP-RUN or STOP/PAUSE)

  (c) Number of receive errors
  - Checks the number of receive error occurrences (D9245).

  (d) Link card hardware error (M9211)

  (e) Mode setting switch setting status in the link card (M9240)

5.3.6 Self-diagnostics function

The self-diagnostics function is a function to check the link module hardware and detect errors like breaking of the cables for data link.
The self-diagnostics function includes the following three tests.

(1) Self loopback test
Checks the link module hardware independently, including the send/receive circuit for transmission system.

(2) Station-to-station test
Checks the wiring of cable and the link module hardware for the two adjacent stations (master station between local station, local station between local station, etc.)

(3) Forward loop/reverse loop test (Applicable only when MELSECNET data link system is used)
Checks the data link line for the forward loop, reverse loop, and loopback mode when wiring of the all MELSECNET data link system has been connected

REMARK

1) *: The cables for the data link are as follows:

· MELSECNET data link system — Optical fiber cable / Coaxial cable
· MELSECNET/B data link system .... Shielded twisted pair cable

2) Refer to Section 8.7 for the self-diagnostics test method

5.3.7 Extensive use of link relays (B) and link registers (W) in a three-tier system

Number of link relay (B) and link register (W) points that can be used in a system is as follows:

- MELSECNET mode .... B/W0 to B/W3FF (1024 points)
- MELSECNET Ⅱ mode .... B/W0 to B/WFFF (4096 points)
- MELSECNET Ⅱ composite mode ......B/W0 to B/WFFF (4096 points)

In a system with two or more master stations for the third tier as illustrated in Fig 5.8, when the link relay and link register exceeds the above-mentioned points, they can be expanded. In this case, the communication range that can be used is different from the communication range that can be used without expanding the range.

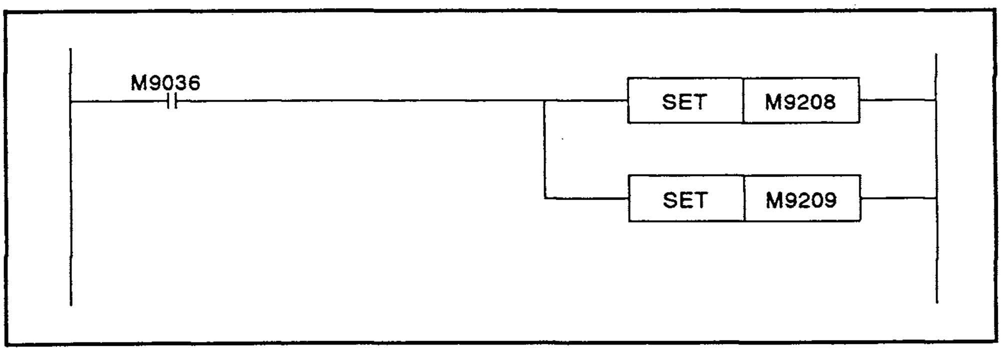
This section describes the link relay (B) and link register (W) range that can be expanded and the device range that can be used for data communication.

(1) Using expanded link relays (B) and link registers (W)

(a) Use the master station for the third tier to turn ON special relays M9208 and M9209 when expanding to use link relays and link registers.
(It is not allowed to turn ON either one of M9208 or M9209.)

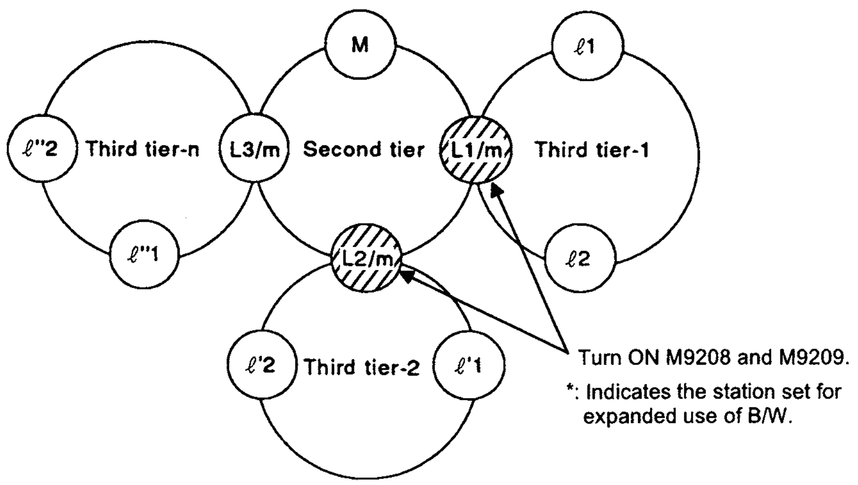
M9208	• Set whether to send B/W data controlled by the second-tier master station to local stations (sub-slave stations) in the third tier or not. · ON ....Not send · OFF...................... Send
M9209	• This turns ON when B/W data consistency is not checked between the second and third tiers. · ON ....Link parameters for the second and third tiers are not checked. · OFF.........................Link parameters for the second and third tiers are checked.

(b) Use the SET instruction to turn ON special relays M9208 and M9209 as illustrated below. Once turned ON, do not turn these special relays ON or OFF during control.



(2) Expanded link relay (B) and link register (W) range
The device range that is not assigned to the link parameters for the second tier can be assigned to the link parameters for the third tier (third tier-1, third tier-2, ... third tier-n). For this assignment, the same range can be assigned to different data link. For example, when 512 points of B/W0 to 1FF are used for the second tier as illustrated in Fig 5.8, the device range of B/W200 to 3FF can be redundantly assigned to the third-tier-1 link and also to the third-tier-2 link.

System configuration



Link parameter assignment

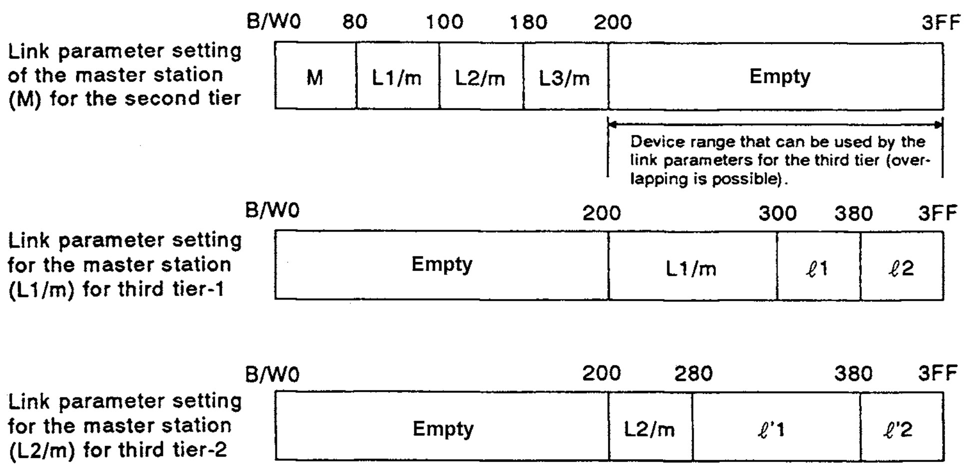


Fig 5.8 Expanded use example of link relay (B) and link register (W)

POINT
Since the L3/m station has not been set for expanded use of B/W, its communication range is as described in Section 5.3.1.

(3) Data communication range with expanded link relays (B) and link registers (W)

(a) Link relays (B) and link registers (W) used by the two-tier link cannot be used for sending data to the local stations connected to any of the third-tier links.
They can be used to send data to the master stations (L1/m, L2/m, ..., Ln/m) for the third tiers. This is because these master stations execute communication with the master station for the second tier as local stations for the second tier.

(b) The devices in the range set by the link parameters for the master station for the third tier cannot be used for sending data to the master station for the second tier and the local stations for the two-tier link.
The master station for the third tier can only receive data from the local stations connected to the host station.
For example, L1/m can only receive data from ℓ1 and ℓ2.

The expanded link relay (B) and link register (W) device range that can be used for communication in the system configuration in Fig 5.8 is shown in Table 5.3.

Table 5.3 Communication range when the link relay (B) and link register (W) ranges are expanded

Link parameter setting station	Sending (data write) station	Device range	Receive (data read) range								
			M	L1/m	L2/m	L3/m	ℓ1	ℓ2	ℓ'1	ℓ'2	Remarks
Master station (M) for the second tier	M	B/W0 to 7F	○	○	○	○					Only the stations connected to the second tier (M, L1/m, L2/m, L3/m) can be read. Reading of data from the local stations (ℓ1, ℓ2, ℓ'1, ℓ'2) in the third-tier link is not possible.
	L1/m	B/W80 to FF	○	○	○	○					
	L2/m	B/W100 to 17F	○	○	○	○					
	L3/m	B/W180 to 1FF	○	○	○	○					
Master station (L1/m) for the third-tier-1	L1/m	B/W200 to 2FF		○			○	○			Only the stations connected to the third tier - 1 (L1/m, ℓ1, ℓ2) can be read. Reading of the other stations (M, L2/m, L3/m, ℓ'1, ℓ'2) is not possible.
	ℓ1	B/W300 to 37F		○			○	○			
	ℓ2	B/W380 to 3FF		○			○	○			
Master station (L2/m) for the third-tier-2	L2/m	B/W200 to 27F			○				○	○	Only the stations connected to the third tier - 2 (L2/m, ℓ'1, ℓ'2) can be read. Reading of the other stations (M, L1/m, L3/m, ℓ1, ℓ2) is not possible.
	ℓ1	B/W280 to 37F			○				○	○	
	ℓ2	B/W380 to 3FF			○				○	○	

POINT

Distinguish between the device range to communicate with the stations in the two-tier link and the device range to communicate with the stations in the three-tier link and write a program.
As for L1/m station in Table 5.3, for example, use the device range B/W80 to FF for communication with the stations (M, L2/m, L3/m) connected to the two-tier link.
Use device range B/W200 to 2FF for communication with the stations (ℓ1, ℓ2) connected to the three-tier-1 link.

5.3.8 MELSECNET Ⅱ mode and MELSECNET Ⅱ composite mode

When a MELSECNET Ⅱ mode-compatible link module is used as the master station, the operation mode for the MELSECNET data link system can be selected in the MELSECNET Ⅱ mode or the MELSECNET Ⅱ composite mode depending on the system configuration.

POINT

(1) When the MELSECNET Ⅱ mode is used, if a MELSECNET mode-compatible link module is used as a slave station, communication with this station will stop.

(1) MELSECNET Ⅱ mode
Select the MELSECNET Ⅱ mode only when modules for data link are all MELSECNET Ⅱ mode-compatible link modules.
Remote I/O stations cannot be connected.
When connecting a remote I/O station, use the MELSECNET Ⅱ composite mode.

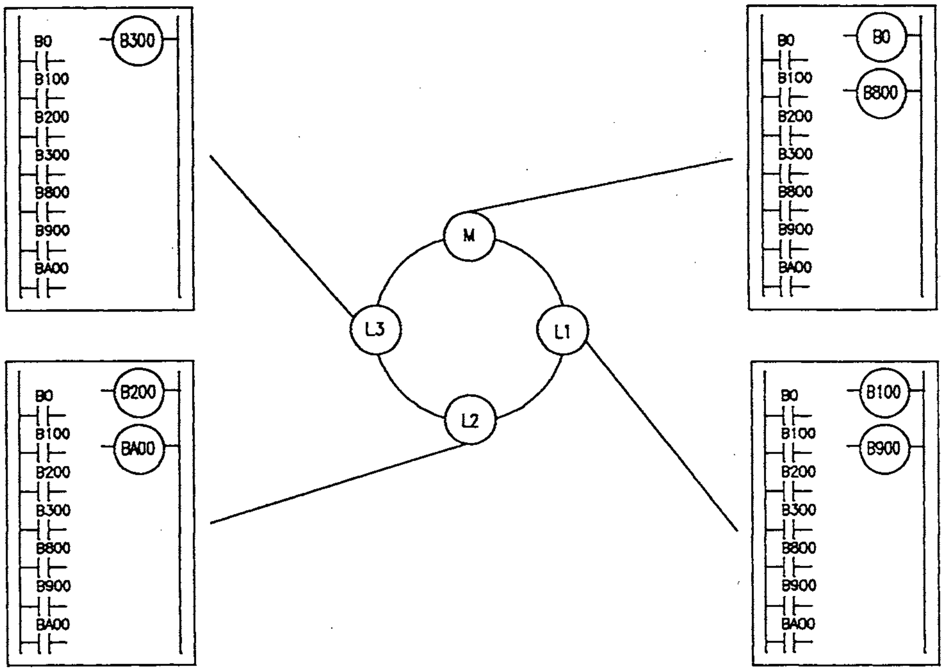
(a) As for link relay (B) and link register (W), data link is possible up to 4096 points in the range of B/W0 to FFF.

(b) The maximum number of link points per master station or local station is 2048 bytes. The MELSECNET Ⅱ mode has the first half link parameter and the second half link parameter.
Since up to 1024 bytes can be assigned, up to 2048 bytes can be used for data link. (Up to 1024 bytes can be used for the MELSECNET mode.)

(c) Data link is possible, using only a first half link parameter.
In this case, data sent from other stations can be received at the same time because data send/receive processing is executed at a time as when using the first half link parameter.
If the maximum number of link points per station is 1024 bytes or less, perform data link with the first half link parameter only. This will reduce the handshake processing of sequence programs. (Refer to Section 9.1.)

(d) The station for which only the first or second half link parameter is assigned can read all of the data assigned to the first and second half link parameters.
In the link parameter setting illustrated in Fig 5.9, although only the first half link parameter is assigned for L3 station, it can read devices that are assigned to the second half link parameters used by other station.

[System configuration]



*MELSECNET II mode-compatible data link module is used for all M, L1, L2, and L3 stations.

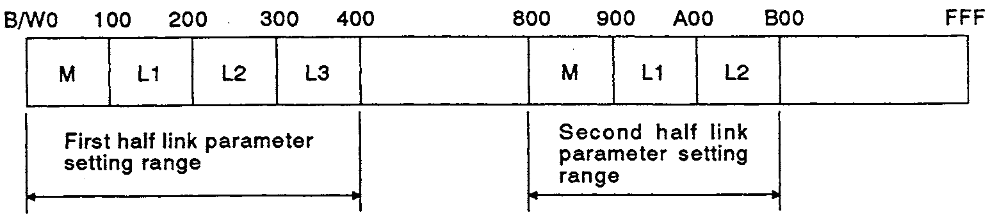


Fig 5.9 System using MELSECNET Ⅱ mode

(2) MELSECNET Ⅱ composite mode
In the MELSECNET Ⅱ composite mode, MELSECNET mode-compatible local stations and remote I/O stations can be connected to the master station (MELSECNET Ⅱ mode-compatible data link module).
By selecting the MELSECNET Ⅱ composite mode, data link modules used in the MELSECNET mode (previous MELSECNET data link system) and those compatible with the MELSECNET Ⅱ mode can be used within the same data link.

(a) As for link relays (B) and link registers (W), data link is possible up to 4096 points in the range of B/W0 to FFF.

(b) The maximum number of link points per master station or MELSECNET Ⅱ mode-compatible local station is 2048 bytes.
The MELSECNET Ⅱ mode has the first half link parameter and the second half link parameter. Since up to 1024 bytes can be assigned, up to 2048 bytes can be used for data link.
In this regard, however, the MELSECNET mode-compatible local station is up to 1024 bytes which is the same as that of MELSECNET mode and the MELSECNET mode-compatible remote I/O station is up to 512 bytes.

POINT

A MELSECNET mode-compatible local station can only read the range of link relays (B) and link registers (W) assigned to the first half link parameter. Devices assigned to the second half link parameter cannot be read.
L1 station in Fig 5.10, for example, cannot read the devices in the range of B/W300 to 4FF because it is used for a MELSECNET mode-compatible data link module.
MELSECNET Ⅱ mode-compatible master stations and local stations can read the range assigned to both the first and second half link parameters.

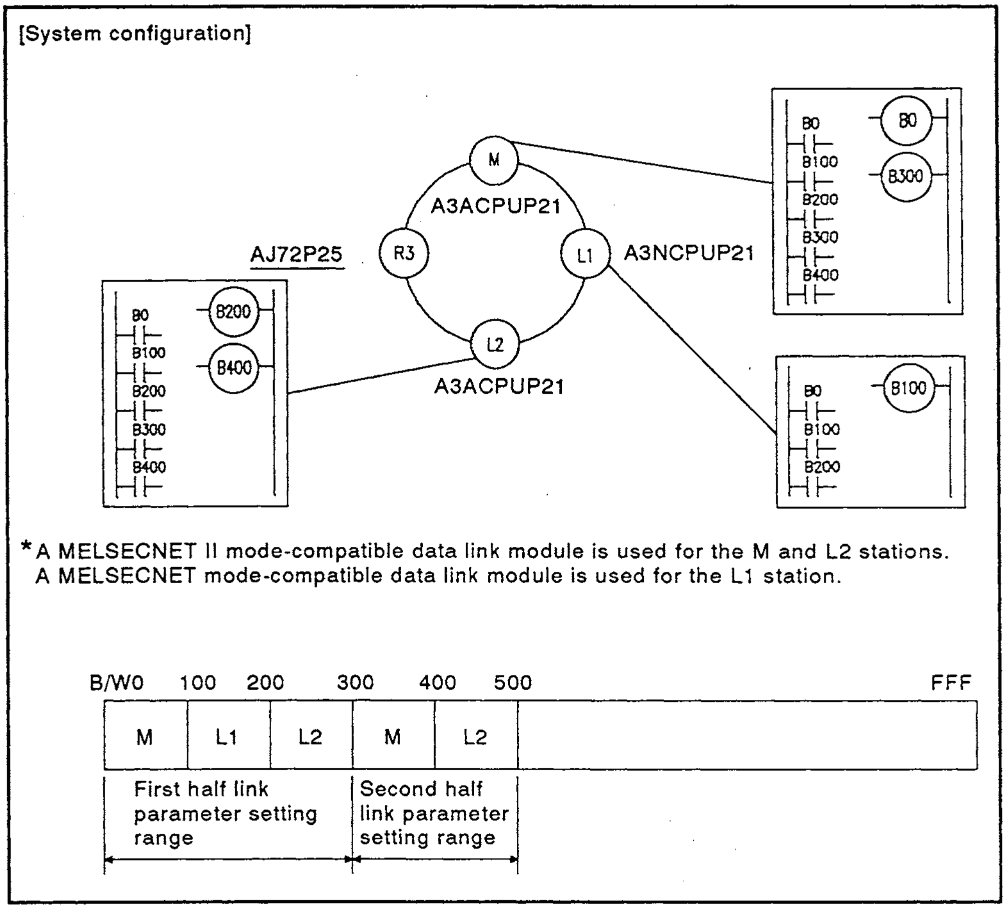


Fig 5.10 System using MELSECNET II composite mode

REMARK

(1) When a MELSECNET mode-compatible link module is used for the master station, the system operates in the MELSECNET mode even if a MELSECNET II mode-compatible link module is connected to a local station.

(2) When the MELSECNET mode link parameter is set using a MELSECNET II mode-compatible link module, the system operates in the MELSECNET mode.

(3) When only the first half link parameter is set using the MELSECNET II composite mode, the system operates in the MELSECNET mode.

5.4 Optical Fiber Cable Specifications

The following shows the optical fiber cable specifications used for optical data link of the MELSECNET.

Special skills and tools are required for connecting optical fiber cables to connectors. In addition, dedicated connector plugs are also needed. When purchasing any of the connector plugs, please consult your local Mitsubishi Electric System & Service Co., Ltd.

5.4.1 SI/GI-type optical fiber cable

The Table 5.4 shows specifications of SI/GI-type optical fiber cable.

Table 5.4 SI/GI-type optical fiber cable

Item	SI (Multi particulate glass)	H-PCF (Plastic clad)	GI (Quartz glass)
Distance between stations	1km	1km	2km
Transmission loss	12dB/km	6dB/km	3dB/km
Core diameter	200μm	200μm	50μm
Clad diameter	220μm	250μm	125μm
Primary membrane	250μm	-	-
Applicable connector	F06/F08 or equivalent (Compliant with JIS C5975/5977)		

REMARK

(1) The optical cables include the following types.
A type: Cable for inside control panel connection.
B type: Cable for connection between outside control panels.
C type: Cable for outdoor connections.
D type: Cable for reinforced outdoor connections.
There are special cables available for moveable applications and resistance to heat.
Contact your Mitsubishi Electric System & Service Co., Ltd. for details.

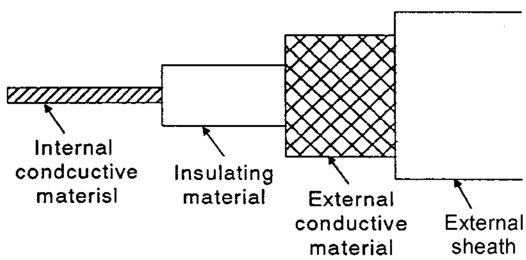
5.5 Coaxial Cable Specifications

This section describes the specifications of coaxial cable used for the coaxial data link.
The high-frequency coaxial cables "3C-2V" and "5C-2V" (conforming to JIS C 3501) are used as coaxial cables.

5.5.1 Coaxial cable specifications

The specifications of the coaxial cable are shown in Table 5.5.
Select coaxial cables that meet the operating ambient temperature (0 to 55℃) shown in the general specifications of the programmable controller.

Table 5.5 Coaxial cable

Item	3C-2V	5C-2V
Structure		
Cable diameter	5.4mm (0.21inch)	7.4mm (0.29inch)
Allowable bend radius	22mm (0.87inch) or more	30mm (1.18inch) or more
Internal conductor diameter	0.5mm (0.02inch) (Annealed copper wire)	0.8mm (0.03inch) (Annealed copper wire)
Insulator diameter	3.1mm (0.12inch) (Polyethylene)	4.9mm (0.19inch) (Polyethylene)
External conductor diameter	3.8mm (0.15inch) (Single annealed copper wire mesh)	5.6mm (0.22inch) (Single annealed copper wire mesh)
Applicable connector plug	Connector plug for 3C-2V (BNC-P-3-Ni is recommended.)	Connector plug for 5C-2V (BNC-P-5 or BNC-P-5DV-SA(01) is recommended.)

REMARK

Consult nearest Mitsubishi representative with connector plug.

5.5.2 Connector for the coaxial cable

The following explains the structure and connecting procedures of the BNC connector (connector plug for the coaxial cable).

(1) Structure of the BNC connector and the coaxial cable
Fig 5.11 shows the structure of the BNC connector and the coaxial cable.

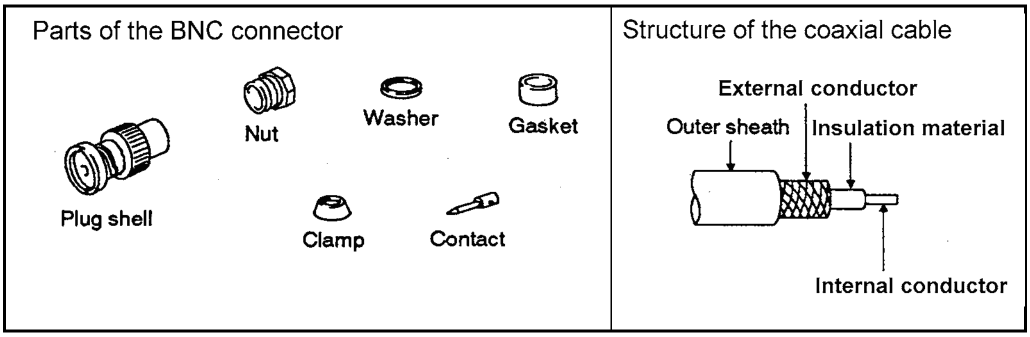
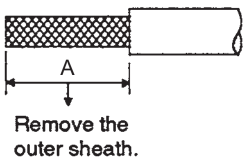


Fig 5.11 Structure of the BNC connector and the coaxial cable

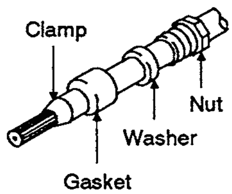
(2) Procedure for connecting the BNC connector and the coaxial cable
The following describes the procedure for connecting the BNC connector and the coaxial cable.

(a) Remove the outer sheath of the coaxial cable to specified dimensions as shown below. Use caution not to damage the external conductor.



Applicable cable	A
3C-2V	15mm
5C-2V	10mm

(b) Slip a nut, a washer, a gasket, and a clamp on the coaxial cable, and loosen the external conductor as shown below.



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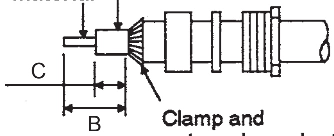
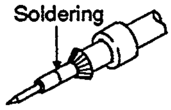
(c) Cut the external conductor, insulator, and internal conductor to specified dimensions as shown right.
As for the external conductor, cut it as the same dimension as that of taper part and smooth down it on the clamp.



Applicable cable	B	C
3C-2V	6mm	3mm
5C-2V	7mm	5mm

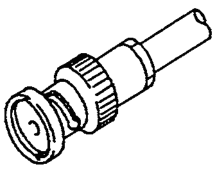
↓

(d) Solder the contact to the tip of the internal conductor.



↓

(e) Insert the contact assembly to the plug shell, and engage the plug shell with the nut.



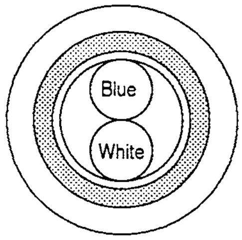
POINT

(1) Use caution as follows when soldering the contact to the internal conductor.
   (a) Solder must not be pumped up at soldering part.
   (b) The tail end of the contact and the cut end of the insulator must contact close to each other. Also, the contact must not cut in the insulator.
   (c) Apply solder quickly so that the insulator may not deform.
(2) Before connecting or disconnecting the coaxial cable connector, be sure to touch a grounded metal object to discharge the static electricity from the human body.
   Failure to do so may harm the module.

5.6 Twisted Pair Cable Specifications

This section explains the twisted pair cable for the MELSECNET/B data link system.

Table 5.6 Shielded twisted pair cable

Model name	KNPEV-SB 0.5SQ × 1P
Cable type	Shielded twisted pair cable
Number of cores	2
Conductive resistance (20℃)	39.4 Ω/km or lower
Insulation resistance (20℃)	10 MΩ・km or higher
Dielectric withstand voltage (V-min)	1000 V AC for one minute
Electrostatic capacity (1kHz)	70 nF/km or less (on average)
Characteristic impedance (100kHz)	110 ± 10Ω
Cross section	

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6 LINK DATA SEND/RECEIVE PROCESSING AND PROCESSING TIME

This chapter describes how link data are sent or received in the data link system and it's processing time.

6.1 Link Data Communication Processing

6.1.1 Communication processing outline

In the data link system, the link data set at the link parameters of the master station is communicated repeatedly.

(1) Link module configuration
- (a) A link module used in a master station or local station has the link data storage area which communicates the link data to other stations and the data memory storage area used for processing of the host station.
- (b) A link module used in a remote I/O station has the link data storage area which stores the link data to be communicated to the master station.

(2) Link data communication

Link data communication includes a link scan and a link refresh.
- (a) A link scan is communications of link data between link modules (between link data storage areas).
- (b) A link refresh is communications of data link within a link module.
  1) Link refresh for a master station or local station is executed when link data is communicated between the link data storage area and the data memory storage area.
  2) Link refresh for a remote I/O station is executed when link data is communicated between the link data storage area and the I/O module or special function module.

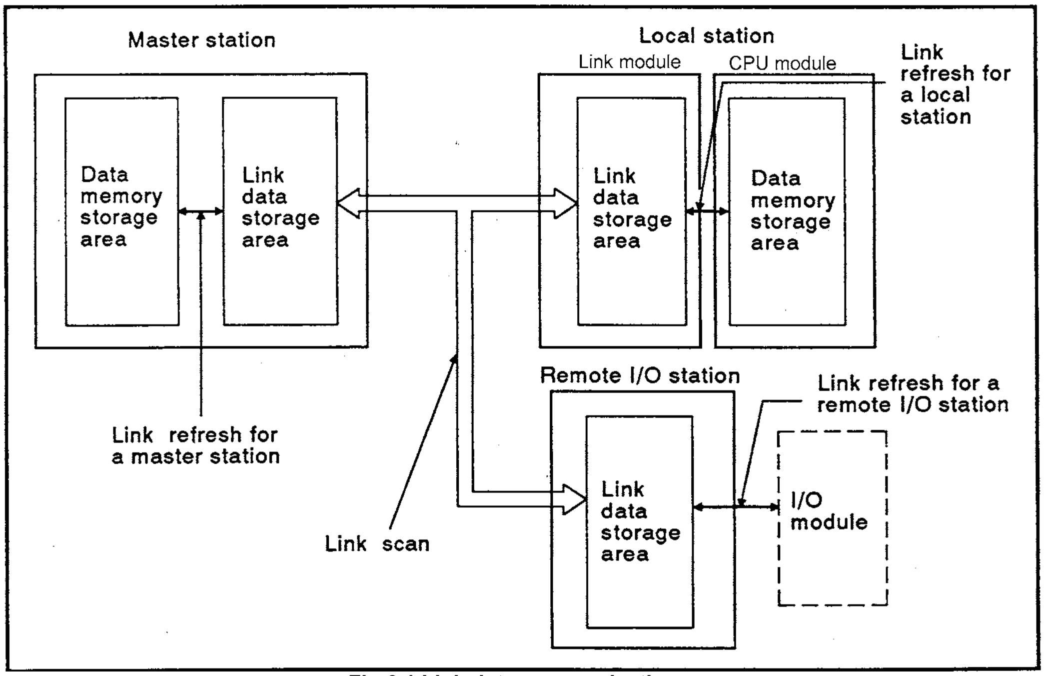


Fig 6.1 Link data communications

6.1.2 Link refresh execution timing

The link refresh executing timing can be divided into the following three types.

(1) Immediately after the completion of a link scan
A link refresh will be executed when a link scan is completed. The sequence program will be interrupted.

(2) After the execution of an END instruction in sequence program
A link refresh will be executed only after an END instruction has been executed in a sequence program.

(3) At setting time
A link refresh will be executed at the time defined by the user beforehand.

For (1) or (3), data containing both old and new data fragments may be transferred because a link refresh can be executed during sequence program operation.

To prevent the above, use a handshake between the sending station and the receiving station. (Refer to Section 9.1.)

The Table 6.1 shows classification of link modules by link refresh timing.

Table 6.1 Link module classification by link refresh timing

Link module name	Link refresh timing		
	After the completion of a link scan	After the execution of an END instruction	At preset intervals
A1SHCPU + A1SJ71AP21/R21 A2SHCPU + A1SJ71AP21/R21 A0J2HCPUP21/R21 AnNCPUP21(S3)/R21 A2CCPUP21/R21	○	○*1	-
A2USCPU(S1) + A1SJ71AP21/R21 A2USHCPU-S1 + A1SJ71AP21/R21 Q2ASCPU(S1) + A1SJ71AP21/R21 Q2ASHCPU(S1) + A1SJ71AP21/R21 AnACPUP21(S3)/R21 AnUCPU + AJ71AP21(S3)/R21 Q2ACPU(S1) + AJ71AP21(S3)/R21 Q3ACPU + AJ71AP21(S3)/R21 Q4ACPU + AJ71AP21(S3)/R21 Q02CPU-A +A1SJ71AP21/R21	-	○	-

Table 6.1 Link module classification by link refresh timing (Continued)

Link module name	Link refresh timing		
	After the completion of a link scan	After the execution of an END instruction	At preset intervals
Q02HCPU-A +A1SJ71AP21/R21	-	○	-
Q06HCPU-A +A1SJ71AP21/R21	-	○	-
A0J2P25(S3)/R25	○	-	-
AJ72P25(S3)/R25	○	-	-

○: Applicable

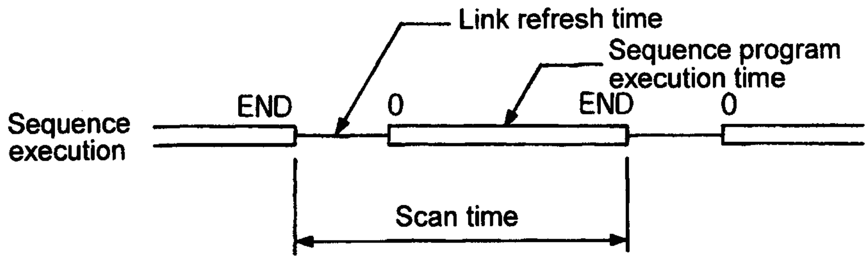
POINT

(1) *1............... The link refresh will be executed only after the execution of an END instruction in a sequence program when the programs steps between step 0 and the END instruction are set by the sequence program as a link-refresh inhibited zone.
The link-refresh inhibited zone can be set by EI/DI instruction.
For details of EI/DI instruction, refer to the Type ACPU/QCPU-A (A Mode) Programming Manual (Common Instructions).

(2) The link refresh timing of the following modules is the same as that of the CPU module.
- A1SJ71AT21B
- AJ71AT21B
- A1SJ71AP21/R21
- AJ71AP21/R21
- AJ71AP21-S3
- AJ71P22/R22
- AJ71AP22/R22

(3) A link scan does not influence the processing time (for example, scan time for the ACPU) of a master station or local station, since link scan is executed in parallel with master and local station processing.

(4) The processing time (scan time) of the master and local stations is increased by the link refresh time.
The following chart shows an example of executing link refresh processing after END processing.



(5) Link data communication is possible in any of the following ACPU states: RUN, STOP, PAUSE, STEP-RUN.

6.1.3 Link data during a communication error

The following describes how the link data used for data link is processed when a communication error occurs. (The same applies to a communication error of the station connected to the bypass switch.)

- If a master or local station has the communication error, link data just before the communication error will be held in the station.
- If the communication error occurs on a remote I/O station, all of the output modules mounted on the station turns OFF.
- Normally operating station will hold link data received before occurrence of the communication error.

The following describes how the link data of normally operating station and abnormally operating station is handled, dividing into the master station, local station, and remote I/O station.

(1) When a communication error occurs at a master station
  (a) Communications with all slave stations are stopped.
  (b) The master station either turns ON M9210 or stores "5" in D9204.
  The data received from a slave station is maintained in a state just before the occurrence of the communication error.
  The link special relays M9224 to M9239 and link special registers D9202 to D9242 of the master station, the data is maintained in a state just before the occurrence of the communication error.
  (c) The local stations turn ON M9250 and M9251.
  At devices in the range of the data link, data is maintained in a state just before the occurrence of the communication error.
  (d) At remote I/O stations, all of the points of the output modules and special function modules installed to the host station are turned OFF.

(2) When a communication error occurs at a local station
  (a) The local station at which the communication error occurred, either M9211 or M9250 and M9251 are turned ON.
  Communication with other normally operating stations continues.
  The link special relays (M) M9240 to M9255 (except M9250 and M9251) and link special registers (D) D9243 to D9255 of the local station hold data in the state just before the communication error.
  (b) The master station can recognize the station number at which the communication error has occurred by reading the data in M9237 and D9228 to D9231.
  At the link devices which receive data from the local station at which the communication error has occurred, the data is maintained in a state just before the occurrence of communication error.

(c) Normally operating local stations can recognize the station number at which the communication error has occurred by reading the data in M9255 and D9252 to D9255.
At the link devices which receive data from the station at which the communication error has occurred, the data is maintained in a state just before the occurrence of communication error.

(d) All remote I/O stations operate normally.

(3) When a communication error occurs at a remote I/O station

(a) At the remote I/O station, all of the output points of the output modules and special function modules installed to the host station are turned OFF.

(b) The master station can recognize the station number at which the communication error has occurred by reading the data in M9231 and D9228 to D9231.
At the link devices which receive data from the remote I/O station at which the communication error has occurred, the data is maintained in a state just before the occurrence of communication error.

(c) All local stations operate normally.

6.2 Transmission Delay Time in Two-Tier System

Calculate the transmission delay time in MELSECNET and MELSECNET/B data link system using the following times for the formulas given in Section 6.3.

- Link refresh time for the master, local, and remote I/O stations
- Link scan time
- Scan time for the master and local stations

(1) Link refresh time for the master, local, and remote I/O stations ($\alpha 1$ to $\alpha 3$)
Link refresh time is time required for link refresh. (Refer to Section 6.1.1.)
Calculate the link refresh time using the formulas given in Section 6.2.2.

(2) Link scan time (LS)
Link scan time is time required for link scan. (Refer to Section 6.1.1.)
Calculate the link scan time using the formulas given in Section 6.2.2.
When data link is being executed, link scan time can be checked by monitoring link or data link special registers (D9207 to D9209) with a peripheral device.

(3) Scan time for the master and local stations (M, L)
Scan time is defined as the time required for operating a sequence program from step 0 to the next step 0.
It can be checked by monitoring ladder or special registers (D9017 to D9019) with a peripheral device.

REMARK

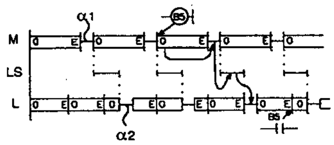
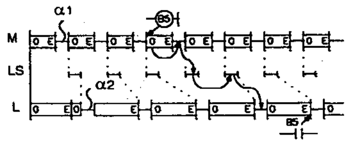
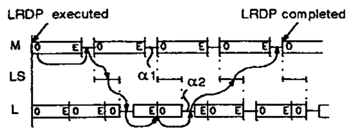
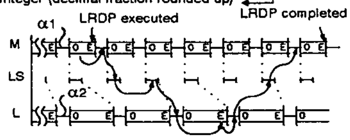
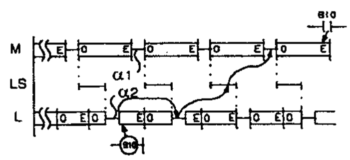
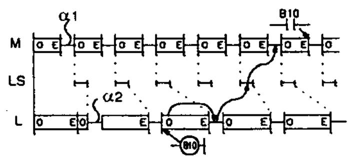
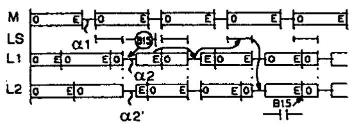
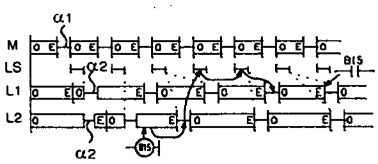
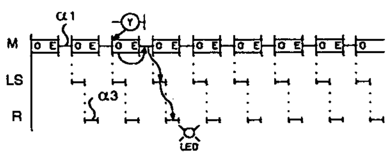
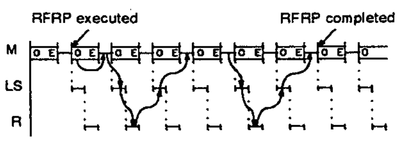
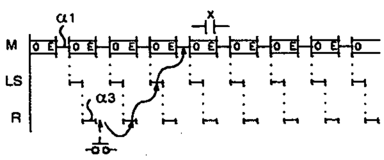
1) Refer to Section 9.3.1 for details of the data link special registers.
2) Refer to the Type ACPU/QCPU-A (A Mode) Programming Manual (Common Instructions) for details of the special registers (D9017 to D9019)

6.2.1 Transmission delay time in a two-tier system

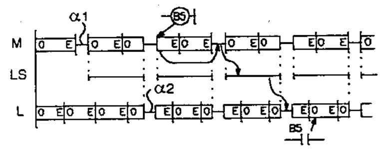
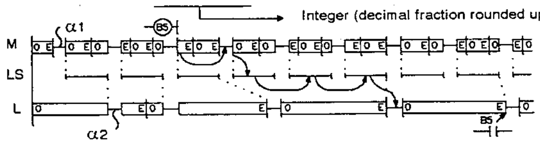
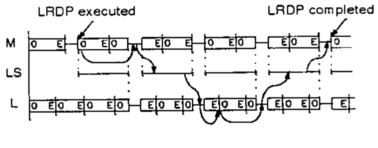
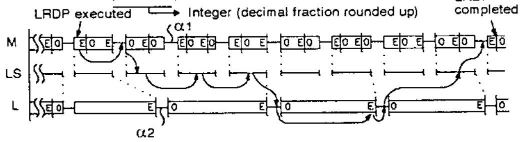
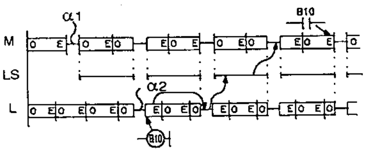
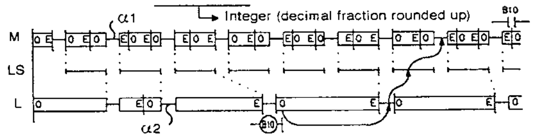
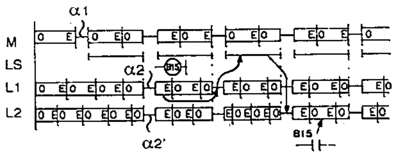
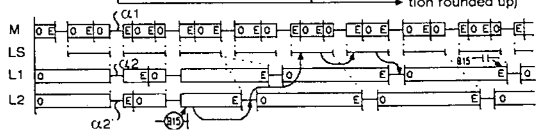
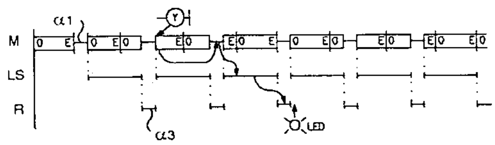
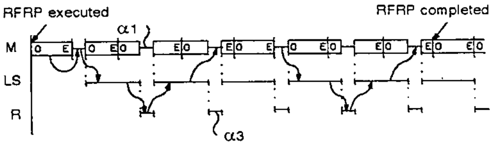
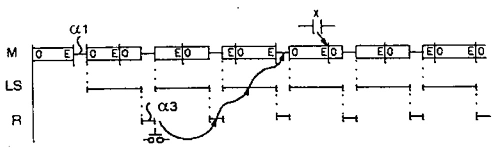
This section shows the maximum transmission delay times of a data link in a link data system.

(1) The following table shows the transmission delay times when the CPU of the type that immediately makes a link refresh after link scan is used.

Table 6.2 Maximum transmission delay time

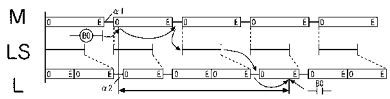
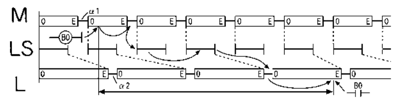
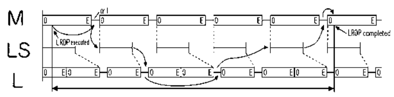
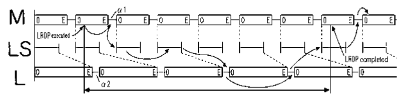
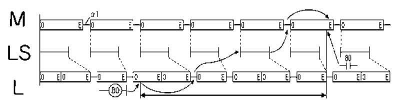
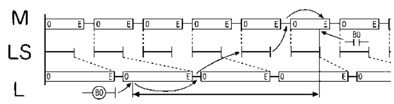
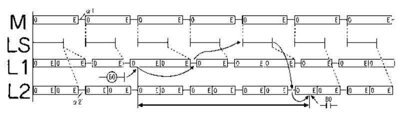
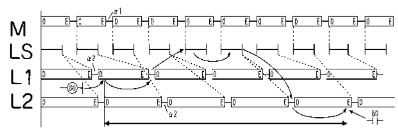
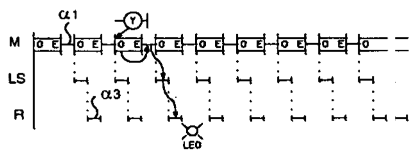
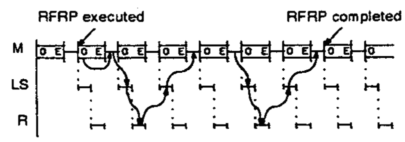
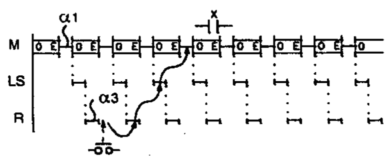
		L < LS < M , LS < L < M	LS < M < L	
Master station to local station	Link relay (B) Link register(W) Output (Y)	$M+\alpha_1+LS+\alpha_2+L$ 	$M+\alpha_1+(L+\alpha_2)\times 2$ 	
	LRDP or LWTP instruction	$M\times 4+\alpha_1\times 4$ 	$(M+\alpha_1)\times 2+(M+\alpha_1)\times\left(\frac{(L+\alpha_2)\times 2}{M+\alpha_1}\right)$ Integer (decimal fraction rounded up) 	
Local station to master station	Link relay (B) Link register (W) Input (X)	$M\times 4+\alpha_1\times 3-LS-\alpha_2$ 	$M\times 2+\alpha_1+(L+\alpha_2)\times 2-LS$ 	
Local station to local station	Link relay (B) Link register (W)	$M\times 2+\alpha_1\times 2-\alpha_2+\alpha_2'+L2$ 	$(L2+\alpha_2)\times 2+(L1+\alpha_2')\times 2$ 	
Master station to remote I/O station	Output (Y)	$M+\alpha_1+LS+\alpha_3$ 		
	RFRP or RTOP instruction	$M\times 6+\alpha_1\times 6$ 		
Remote I/O station to master station	Input (X)	$M\times 4+\alpha_1\times 3-\alpha_3-LS$ 		

M : Sequence program scan time for the master station
L : Sequence program scan time for a local station
LS : Data communication (send/receive) time
α_1: Link refresh time for the master station
α_2: Link refresh time for a local station
α_3: I/O refresh time for a remote I/O station

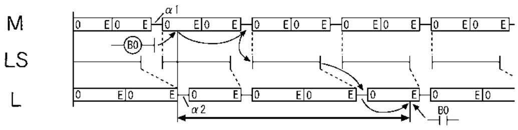
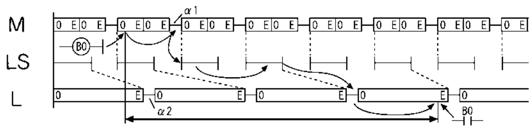
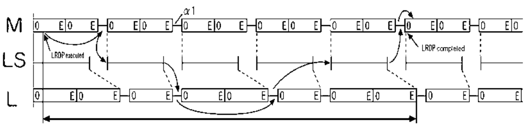
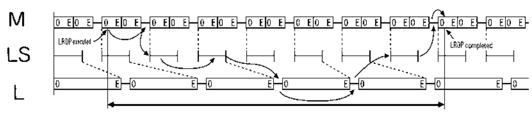
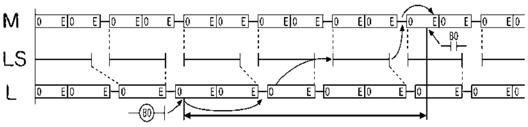
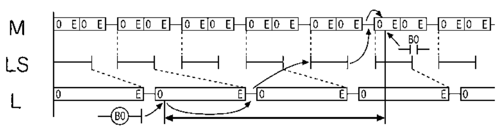
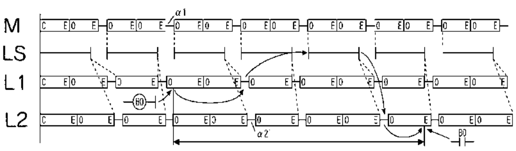
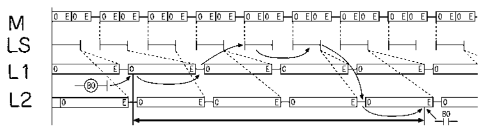
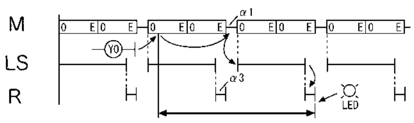
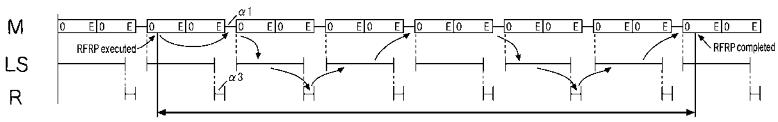
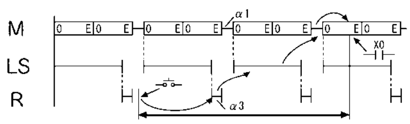
	$M < L < LS$, $L < M < LS$	$M < LS < L$
	$LS \times 2 + \alpha_1 + \alpha_2 + L$ 	$LS + \alpha_1 + L + \alpha_2 + \left(\frac{L + \alpha_2 - \alpha_1}{LS + \alpha_1}\right) \times (LS + \alpha_1)$ → Integer (decimal fraction rounded up) 
	$LS \times 4 + \alpha_1 \times 4$ LRDP executed LRDP completed 	$(LS + \alpha_1) \times 2 + \left(\frac{L + \alpha_2}{LS + \alpha_1}\right) \times (LS + \alpha_1) + M$ LRDP executed → Integer (decimal fraction rounded up) LRDP completed 
	$M + \alpha_1 \times 3 + LS \times 2 - \alpha_2$ 	$(LS + \alpha_1) \times 2 + M + \left(\frac{L + \alpha_2 - \alpha_1}{LS + \alpha_1}\right) \times (LS + \alpha_1) + \alpha_1$ → Integer (decimal fraction rounded up) 
	$LS \times 2 + \alpha_1 \times 2 + LS + \alpha'_2 - \alpha_2$ 	$LS \times 2 + \alpha_1 + \left(\frac{LS + \alpha_2 - \alpha_1}{LS + \alpha_1}\right) \times (LS + \alpha_1) + \left(\frac{L1 + \alpha'_2 - \alpha_1}{LS + \alpha_1}\right) \times (LS + \alpha_1) + \alpha_2 + L1$ → Integer (decimal fraction rounded up) 
	$LS \times 2 + \alpha_1 + \alpha_3$ 	
	$M + LS \times 5 + \alpha_1 \times 6$ RFRP executed RFRP completed 	
	$M + LS \times 2 + \alpha_1 \times 3 - \alpha_3$ 	

(2) The following shows the transmission delay times when the CPU of the type that makes a link refresh after END processing is used.

Table 6.3 Maximum transmission delay time

		L < LS < M, LS < L < M	LS < M< L	
Master station to local station	Link relay (B) Link register (W) Output (Y)	$M+\alpha 1+LS+L\times 2+\alpha 2$ 	$M+\alpha 1+L\times 3+\alpha 2\times 2$ 	
	LRDP or LWTP instruction	$M\times 5+\alpha 1\times 5$ 	$(M+\alpha 1)\times 3+(L+\alpha 2)\times 3$ 	
Local station to master station	Link relay (B) Link register (W) Input (Y)	$M\times 4+\alpha 1\times 3+L$ 	$M\times 3+\alpha 1\times 2+L+\alpha 2$ 	
Local station to local station	Link relay (B) Link register (W)	$M\times 2+\alpha 1\times 2+L1+LS+L2\times 2+\alpha 2'$ 	$M+\alpha 1+L1+\alpha 2+L2\times 3+\alpha 2'\times 2$ 	
Master station to remote I/O station	Output (Y)	$M+\alpha_1+LS+\alpha_3$ 		
	RFRP or RTOP instruction	$M\times 6+\alpha_1\times 6$ 		
Remote I/O station to master station	Input (X)	$M\times 4+\alpha_1\times 3-\alpha_3-LS$ 		

M : Sequence program scan time for the master station
L : Sequence program scan time for a local station
LS : Data communication (send/receive) time
α_1: Link refresh time for the master station
α_2: Link refresh time for a local station
α_3: I/O refresh time for a remote I/O station

<table>
<tr><td></td><td>M < L < LS, L < M < LS</td><td>M < LS < L</td></tr>
<tr><td></td><td>M+ α1+LS×2+L×2+ α2
</td><td>M+ α1+LS+L×3+ α2×2
</td></tr>
<tr><td></td><td>(M+ α1)×5+LS×5
</td><td>(M+ α1)×3+LS×3+(L+ α2)×3
</td></tr>
<tr><td></td><td>M×4+ α1×3+LS×3+L
</td><td>M×3+ α1×2+LS×2+L+ α2
</td></tr>
<tr><td></td><td>(M+ α1)×2+LS×3+L1+L2×2+ α2'
</td><td>M+ α1+LS+L1+ α2+L2×3+ α2'×2
</td></tr>
<tr><td></td><td colspan="2">M+ α1+LS×2+ α3
</td></tr>
<tr><td></td><td colspan="2">(M+ α1)×6+LS×6
</td></tr>
<tr><td></td><td colspan="2">M×3+ α1×2+LS×2
</td></tr>
</table>

6.2.2 Link refresh time

The following describes the method used for calculating the link refresh processing time.

The symbols used for calculating the link refresh processing time are listed below:

B :Total number of link relays (B) used in all stations

W :Total number of link registers (W) used in all stations

X_0 :Total number of link inputs (X) assigned to the master station

Y_0 :Total number of link outputs (Y) assigned to the master station

X_1 :Number of link inputs (X) used in the corresponding station

Y_1 :Number of link outputs (Y) used in the corresponding station

α_1 to α_3: Link refresh time

K_{M1}, K_{L1} , K_{R1}: Constants

K_{M2}, K_{L2}, K_{R2}: Bit device constants

K_{M3}, K_{L3}: Word device constants

REMARK

The refresh range of the AnUCPU, QnACPU, A2US(H)CPU(S1), Q2AS(H)CPU(S1), or QCPU-A is determined by the network refresh parameter and the link parameter. (Refer to Section 7.3.)

When a MELSECNET data link system is used

(1) Master station

Use the following formula to calculate the link refresh time α_1 required for the master station.

In the MELSECNET II mode or MELSECNET II composite mode, the number of B/W points is all of the points that are set with the first and second half link parameters.

$$\alpha_1 = k_{M1} + k_{M2} \times \frac{B + X_0 + Y_0}{2048} + k_{M3} \times \frac{W}{1024} \text{ [ms]}$$

	Model		K_{M1}	K_{M2}	K_{M3}
Master station for the second tier	A0J2HCPUP21/R21	-	1.59	1.1	5.02
	AnNCPUP21/R21	-	0.8	1.0	4.1
	A2ACPUP21(S1)/R21	-	0.26	0.18	1.45
	A3ACPUP21/R21	-	0.20	0.14	1.09
	-	AnNCPUP21/R21 + AJ71AP21(S3)/R21	0.8	1.2	6.4
	-	A2ACPU(S1) + AJ71AP21(S3)/R21	0.54	0.54	4.32
	-	A3ACPU + AJ71AP21(S3)/R21	0.48	0.52	4.16
	-	A2UCPU(S1) + AJ71AP21(S3)/R21	0.54	0.54	4.32
	-	A3UCPU + AJ71AP21(S3)/R21	0.48	0.52	4.16
	-	A4UCPU + AJ71AP21(S3)/R21	0.48	0.51	4.16
	-	A1SCPU + A1SJ71AP21/R21	1.52	1.53	6.57
	-	A1SJCPU-S3 + A1SJ71AP21/R21	1.14	1.53	6.68
	-	A2SCPU + A1SJ71AP21/R21	1.06	1.49	6.60
	-	A1SHCPU + A1SJ71AP21/R21	0.55	0.51	3.82
	-	A1SJHCPU + A1SJ71AP21/R21	0.55	0.51	3.82
	-	A2SHCPU + A1SJ71AP21/R21	0.56	0.58	4.20
	-	A2CCPUP21/R21	1.59	1.11	5.02
	-	A2ASCPU(S1) + A1SJ71AP21/R21	0.66	0.64	4.38
	-	A2USHCPU-S1 + A1SJ71AP21/R21	0.45	0.51	4.31
	-	Q2ASCPU(S1) + A1SJ71AP21/R21	0.95	0.51	4.53
	-	Q2ASHCPU(S1) + A1SJ71AP21/R21	0.51	0.53	4.18
	-	Q2ACPU(S1) + AJ71AP21(S3)/R21	0.97	0.51	4.56
	-	Q3ACPU + AJ71AP21(S3)/R21	0.81	0.61	4.37
	-	Q4ACPU + AJ71AP21(S3)/R21	0.43	0.82	4.54
Master station for the third tier	AnNCPUP21/R21	-	0.8	1.2	6.4
	A2ACPUP21(S1)/R21	-	0.54	0.54	4.32
	A3ACPUP21/R21	-	0.48	0.52	4.16
	-	AnNCPUP21/R21 + AJ71AP21(S3)/R21	0.8	1.2	6.4
	-	A2ACPU(S1) + AJ71AP21(S3)/R21	0.54	0.54	4.32
	-	A3ACPU + AJ71AP21(S3)/R21	0.48	0.52	4.16
	-	A2UCPU(S1) + AJ71AP21(S3)/R21	0.54	0.54	4.32
	-	A3UCPU + AJ71AP21(S3)/R21	0.48	0.52	4.16
	-	A4UCPU + AJ71AP21(S3)/R21	0.48	0.51	4.16
	-	A2ASCPU(S1) + A1SJ71AP21/R21	0.34	1.02	4.42
	-	A2USHCPU-S1 + A1SJ71AP21/R21	0.28	0.41	4.02
	-	Q2ASCPU(S1) + A1SJ71AP21/R21	0.43	1.28	5.30
	-	Q2ASHCPU(S1) + A1SJ71AP21/R21	0.28	0.83	4.17
	-	Q2ACPU(S1) + AJ71AP21(S3)/R21	0.50	1.12	5.26
	-	Q3ACPU + AJ71AP21(S3)/R21	0.39	1.00	5.83
	-	Q4ACPU + AJ71AP21(S3)/R21	0.45	0.82	3.89

POINT

Two types of link refresh (link refresh of a local station for the second tier and link refresh of a master station for the third tier) are executed for the master station for the third tier.

(2) Local stations

Use the following formula to calculate the link refresh time α_2 required for a local station.

When the link operates in the MELSECNET II mode or the MELSECNET II composite mode, the number of B/W points is all points set with the first half and second half link parameters.

$$\alpha_2 = K_{L1} + K_{L2} \times \frac{B + X_1 + Y_1}{2048} + K_{L3} \times \frac{W}{1024} \text{ [ms]}$$

Model		K_{L1}	K_{L2}	K_{L3}
AnNCPUP21(S3)/R21	-	0.4	1.0	4.1
A2ACPUP21(S3)/R21(S1)	-	0.16	0.18	1.45
A3ACPUP21(S3)/R21	-	0.13	0.14	1.09
-	AnNCPUP21/R21 + AJ71AP21(S3)/R21	0.8	1.2	6.4
-	A2ACPU(S1) + AJ71AP21(S3)/R21	0.54	0.54	4.32
-	A3ACPU + AJ71AP21(S3)/R21	0.48	0.52	4.16
-	A2UCPU(S1) + AJ71AP21(S3)/R21	0.54	0.54	4.32
-	A3UCPU + AJ71AP21(S3)/R21	0.48	0.52	4.16
-	A4UCPU + AJ71AP21(S3)/R21	0.48	0.51	4.16
-	A0J2HCPUP21/R21	1.00	1.20	5.05
-	A1SCPU + A1SJ71AP21/R21	1.09	1.36	6.53
-	A1SJCPU-S3 + A1SJ71AP21/R21	0.77	1.30	6.58
-	A2SCPU + A1SJ71AP21/R21	0.65	1.44	6.54
-	A1SHCPU + A1SJ71AP21/R21	0.30	0.59	3.86
-	A1SJHCPU + A1SJ71AP21/R21	0.30	0.59	3.86
-	A2SHCPU + A1SJ71AP21/R21	0.32	0.64	4.23
-	A2CCPUP21/R21	1.00	1.20	5.05
-	A2ASCPU(S1) + A1SJ71AP21/R21	0.47	0.64	4.41
-	A2USHCPU-S1 + A1SJ71AP21/R21	0.29	0.51	4.05
-	Q2ASCPU(S1) + A1SJ71AP21/R21	0.78	0.59	4.51
-	Q2ASHCPU(S1) + A1SJ71AP21/R21	0.34	0.54	4.20
-	Q2ACPU(S1) + AJ71AP21(S3)/R21	0.80	0.55	4.53
-	Q3ACPU + AJ71AP21(S3)/R21	0.74	0.50	4.28
-	Q4ACPU + AJ71AP21(S3)/R21	0.31	0.68	4.36

(3) Remote I/O stations

Use the following formula to calculate the I/O refresh time α_3 required for a remote I/O station.

$$\alpha_3 = K_{R1} + K_{R2} \times \frac{X_1 + Y_1}{256} \text{ [ms]}$$

Model	K_{R1}	K_{R2}
AJ72P25(S3)/R25	0.6	0.9

When a MELSECNET/B data link system is used

(1) Master station

Use the following formula to calculate the link refresh time α_1 required for a master station.

When the link operates in the MELSECNET II mode or the MELSECNET II composite mode, the number of B/W points is all of the points set with the first half and second half link parameters.

$$\alpha_1 = K_{M1} + K_{M2} \times \frac{B + X_0 + Y_0}{2048} + K_{M3} \times \frac{W}{1024} \text{ [ms]}$$

	Model		K_{M1}	K_{M2}	K_{M3}
	CPU module	Link module			
Master station for the second tier	A1SCPU	A1SJ71AT21B	1.34	1.15	6.47
	A1SJCPU-S3		1.34	1.15	6.47
	A2SCPU		1.22	1.20	6.60
	A1SHCPU		0.62	0.48	3.79
	A1SJHCPU		0.62	0.48	3.79
	A2SHCPU		0.51	0.64	4.24
	A2ASCPU(S1)		0.69	0.47	4.38
	A2USHCPU-S1		0.44	0.51	4.05
	Q2ASCPU(S1)		0.95	0.68	4.60
	Q2ASHCPU(S1)		0.49	0.60	4.21
	AnNCPU	AJ71AT21B	0.8	1.2	6.4
	A2ACPU(S1)		0.54	0.54	4.32
	A3ACPU		0.48	0.52	4.16
	A2UCPU(S1)		0.54	0.54	4.32
	A3UCPU		0.48	0.52	4.16
	A4UCPU		0.48	0.51	4.16
	Q2ACPU(S1)		0.94	0.70	4.61
	Q3ACPU		0.91	0.52	4.24
	Q4ACPU		0.54	0.56	4.17
Master station for the third tier	A2ASCPU(S1)	A1SJ71AT21B	0.38	0.93	4.29
	A2USHCPU-S1		0.26	0.81	4.00
	Q2ASCPU(S1)		0.48	1.50	4.98
	Q2ASHCPU(S1)		0.31	0.98	4.39
	AnNCPU	AJ71AT21B	0.8	1.2	6.4
	A2ACPU(S1)		0.54	0.54	4.32
	A3ACPU		0.48	0.52	4.16
	A2UCPU(S1)		0.54	0.54	4.32
	A3UCPU		0.48	0.52	4.16
	A4UCPU		0.48	0.52	4.16
	Q2ACPU(S1)		0.48	1.50	4.98
	Q3ACPU		0.40	1.20	4.65
	Q4ACPU		0.31	0.98	4.39

POINT

At the master station for the third tier, link refresh processings for local stations for the second tier and master station for the third tier are executed.

(2) Local stations

Use the following formula to calculate the link refresh time $\alpha 2$ required for a local station.

When the link operates in the MELSECNET Ⅱ mode or the MELSECNET Ⅱ composite mode, the number of B/W points is all points set with the first half and second half link parameters.

$$\alpha_2 = K_{L1} + K_{L2} \times \frac{B + X_1 + Y_1}{2048} + K_{L3} \times \frac{W}{1024} \text{ [ms]}$$

Model		K_{L1}	K_{L2}	K_{L3}
CPU module	Link module			
A1SCPU	A1SJ71AT21B	0.82	1.18	6.52
A1SJCPU-S3		0.82	1.18	6.52
A2SCPU		0.86	0.98	6.43
A1SHCPU		0.33	0.64	3.86
A1SJHCPU		0.33	0.64	3.86
A2SHCPU		0.32	0.67	4.22
A2ASCPU(S1)		0.47	0.54	4.22
A2USHCPU-S1		0.29	0.54	4.04
Q2ASCPU(S1)		0.76	0.69	4.50
Q2ASHCPU(S1)		0.41	0.51	4.13
AnNCPU	AJ71AT21B	0.8	1.2	6.4
A2ACPU(S1)		0.54	0.54	4.32
A3ACPU		0.48	0.52	4.16
A2UCPU(S1)		0.54	0.54	4.32
A3UCPU		0.48	0.52	4.16
A4UCPU		0.48	0.51	4.16
Q2ACPU(S1)		0.80	0.59	4.56
Q3ACPU		0.71	0.57	4.31
Q4ACPU		0.38	0.56	4.19

(3) Remote I/O stations

Use the following formula to calculate the I/O refresh time $\alpha 3$ required for a remote I/O station.

$$\alpha 3 = K_{R1} + K_{R2} \times \frac{X_1 + Y_1}{256} \text{ [ms]}$$

Model	K_{R1}	K_{R2}
A1SJ72T25B	0.04	0.8
AJ72T25B		

6.2.3 Link data communication time (link scan)

The following describes the method used for calculating the link data communication time.

When a MELSECNET data link system is used

(1) In the MELSECNET mode

$$LS = K + K_R \times (\text{Total number of remote I/O stations}) + K_L \times (\text{Total number of local stations}) + K_B \ [\text{ms}]$$

(2) In the MELSECNET II mode

$$LS = K + K_L \times [\text{Total number of local stations} + \text{Number of local stations allocated to second half link parameters}] + K_B \ [\text{ms}]$$

(3) In the MELSECNET II composite mode

$$LS = K + K_R \times [\text{Total number of remote I/O stations}] + K_L \ [\text{Total number of local stations} + \text{Number of local stations allocated to second half link parameters}] + K_B \ [\text{ms}]$$

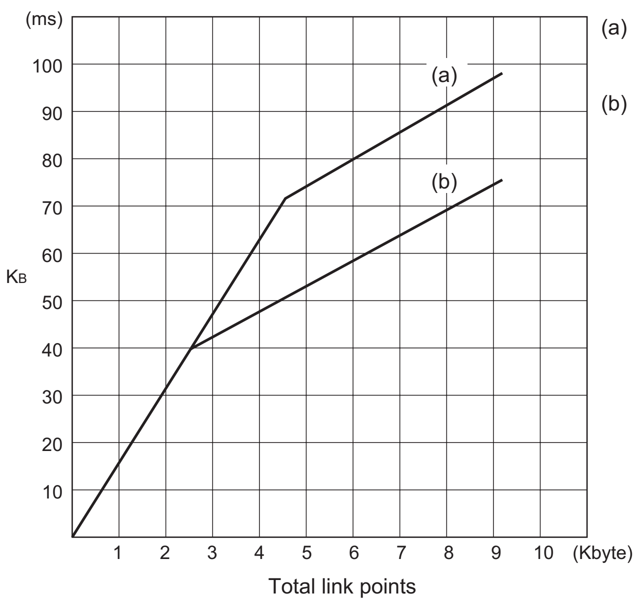
(4) Find K, K_L and K_R in the calculation expression from the following.

Total number of slave stations	1 to 8	9 to 16	17 to 24	25 to 32	33 to 40	41 to 48	49 to 56	57 to 64
K	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
K_R	1.3	1.3	1.4	1.4	1.5	1.5	1.6	1.6
K_L	2.0	2.0	2.1	2.1	2.2	2.2	2.3	2.3

(5) Calculate the total number of link points (bytes) and use the following graph to obtain the K_B value in the calculation expression.

$$\text{Total number of link points} = \frac{B + X_0 + Y_0 + (W \times 16)}{8192}$$

B : Total points for link relays (B) that are used on all stations
W : Total points for link registers (W) that are used on all stations
Xo : Total points for link inputs (X) that are assigned to master station
Yo : Total points for link outputs (Y) that are assigned to master station



(a) When the first and latter halves of link parameters are set
(b) When only the first half of link parameters is set

When a MELSECNET/B data link system is used

(1) In the MELSECNET mode

LS = K + K_R x (Total number of remote I/O stations) + K_L x (Total number of local stations) + K_B [ms]

(2) In the MELSECNET II mode

LS = K + K_L x [Total number of local stations +
Number of local stations allocated to second half link parameters] + K_B [ms]

(3) In the MELSECNET II composite mode

LS = K + K_R x [Total number of remote I/O stations] + K_L x
[Total number of local stations + Number of local stations allocated to second half link parameters] + K_S [ms]

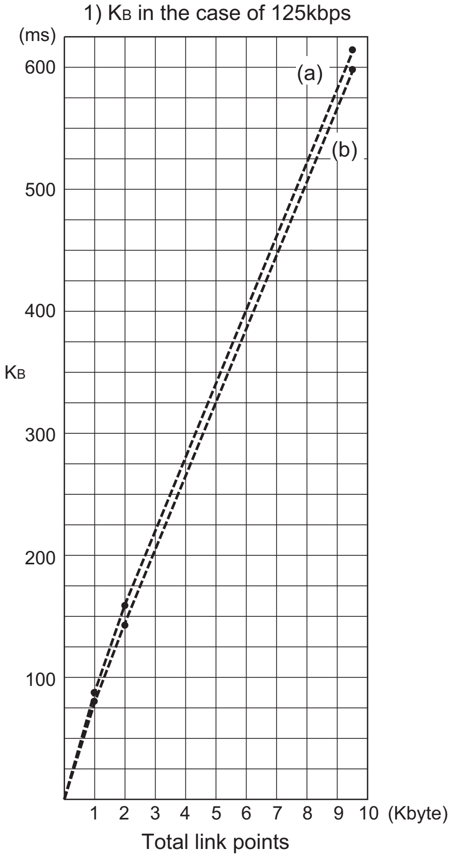
(4) K, K_L and K_R values in the calculation expression vary depending on the communication speed of MELSECNET/B data link system. Find them from the following.

Communication speed setting (BPS)	Constant	Total number of slave station			
		1 to 8	9 to 16	17 to 24	25 to 31
125K	K	6.7	7.2	7.7	8.2
	K_L	3.8	3.8	3.9	3.9
	K_R	3.9	3.9	4.0	4.0
250K	K	5.8	6.3	6.8	7.3
	K_L	3.1	3.1	3.2	3.2
	K_R	3.1	3.2	3.3	3.3
500K	K	5.8	6.3	6.8	7.3
	K_L	2.7	2.7	2.8	2.8
	K_R	2.9	2.9	3.0	3.0
1M	K	5.8	6.3	6.8	7.3
	K_L	2.6	2.6	2.7	2.7
	K_R	2.8	2.8	2.9	2.9

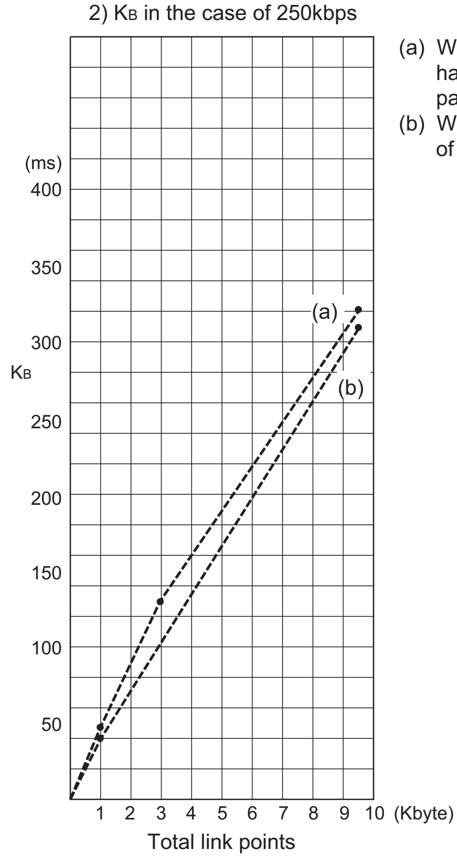
(5) By calculating the total number of link points (bytes) and from one of the graphs 1) to 4) on the next page, obtain a K_B value used for the calculation expression.

$$(\text{Total number of link points}) = \frac{B + X_0 + Y_0 + (W + 16)}{8192}$$

1) KB in the case of 125kbps

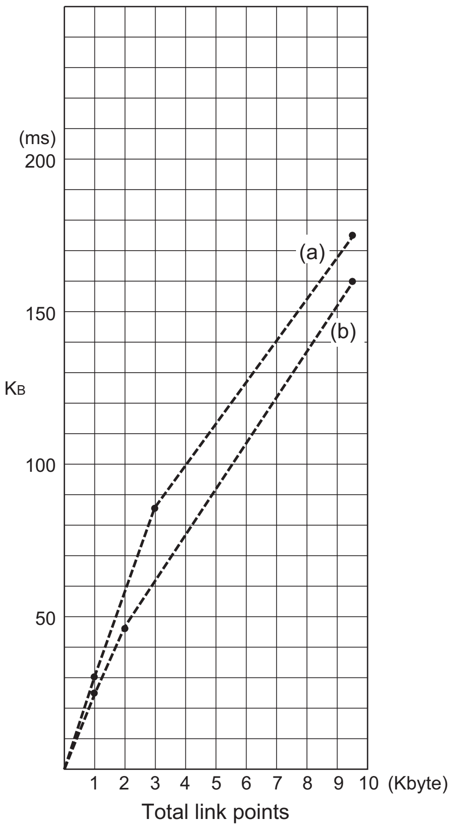


2) KB in the case of 250kbps

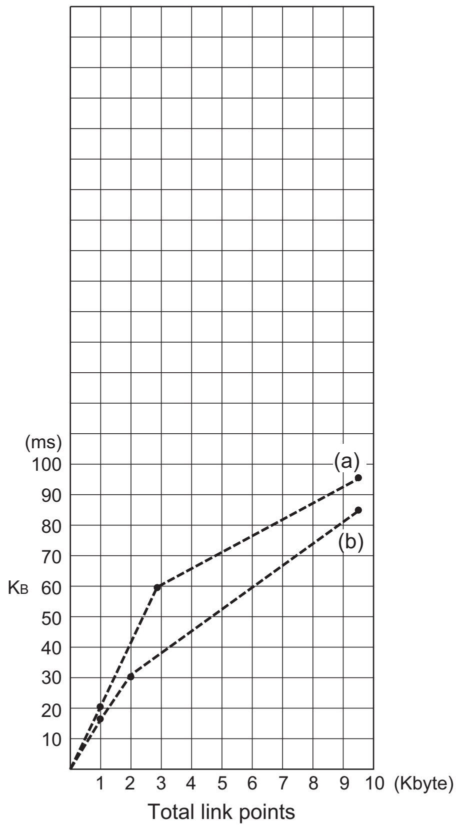


(a) When the first and latter halves of link parameters are set
(b) When only the first half of link parameters is set

3) KB in the case of 500kbps



4) KB in the case of 1Mbps



6.3 Transmission Delay Time in Three-Tier System

Calculate the transmission delay time for a three-tier system by adding the following delay factors to the transmission delay time.

(1) The transmission delay time from the master station/local station for the second tier to the master station for the third tier.
Use the formulas in Section 6.2.3 to obtain this delay time.

(2) The transmission delay time from the master station for the third tier to the local station for the third tier.
Use the formulas in Section 6.2.3 to obtain this delay time.

(3) The time required for sending the data received from the second tier to the third tier.
Add either the scan time for the master station for the third tier or the link scan time for the third tier, whichever is longer.
However, if the master station for the third tier has selected the mode in which the link refresh is executed only after the execution of an END instruction of a sequence program and the link scan time for the third tier is longer, add the following factor:

(Three-tier link scan time) + (Scan time for the master station for the third tier)

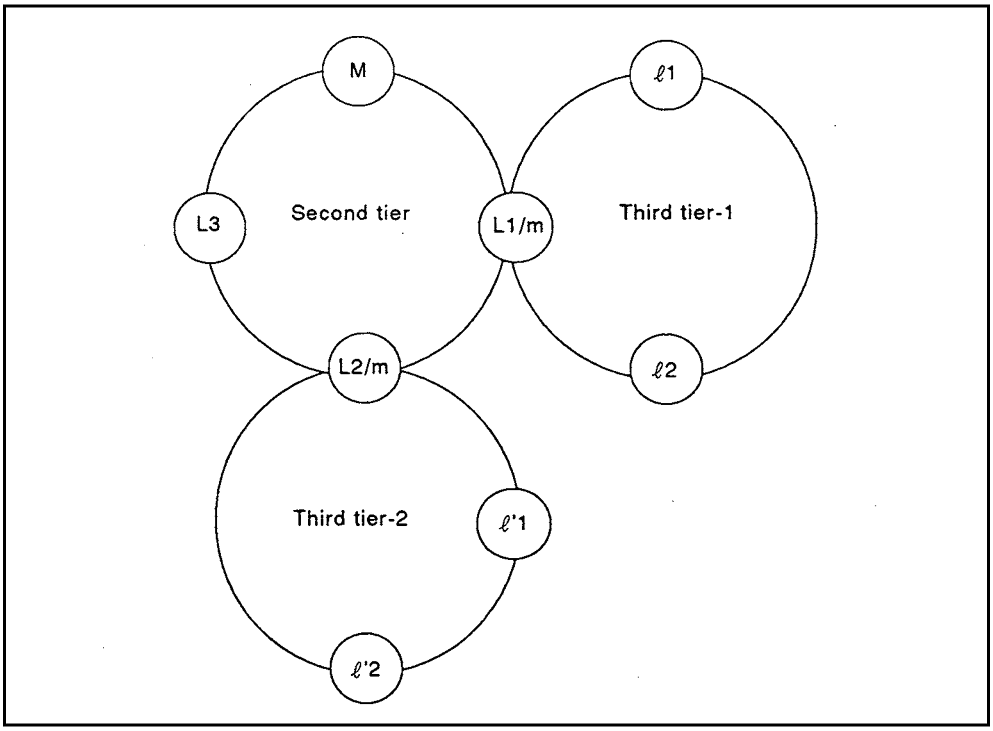


Fig 6.2 Three-tier system

Examples:

(1) To transmit B/W data from M to ℓ1
   (a) If (L1/m scan time) > (third tier-1 link scan time)
      (Transmission delay time from M to L1/m) + (Transmission delay time from L1/m to ℓ1) + (L1/m scan time)

   (b) If (L1/m scan time) < (third tier-1 link scan time)
      (Transmission delay time from M to L1/m) + (Transmission delay time from L1/m to ℓ1) + (third tier-1 link scan time)

(2) To transmit B/W data from ℓ1 to M
   (a) If (L1/m scan time) > (third tier-1 link scan time)
      (Transmission delay time from ℓ1 to L1/m) + (Transmission delay time from L1/m to M) + (L1/m scan time)

   (b) If (L1/m scan time) < (third tier-1 link scan time)
      (Transmission delay time from ℓ1 to L1/m) + (Transmission delay time from L1/m to M) + (third tier-1 link scan time)

(3) To transmit B/W data from ℓ'1 to L3
   (a) If (L2/m scan time) > (third tier-2 link scan time)
      (Transmission delay time from ℓ'1 to L2/m) + (Transmission delay time from L2/m to L3) + (L2/m scan time)

   (b) If (L2/m scan time) < (third tier-2 link scan time)
      (Transmission delay time from ℓ'1 to L2/m) + (Transmission delay time from L2/m to L3) + (third tier-2 link scan time)

When the master station for the third tier executes link refresh after the execution of an END instruction of a sequence program, add the L1/m scan time to the values obtained with calculation in (1)(b) or (2)(b). If (3)(b) is used for the calculation, add the L2/m scan time.

6.4 Time to Access Another Station from a Peripheral Device

This section describes the processing time when accessing to other station from a peripheral device.
(For the processing time of LRDP/LWTP and RFRP/RTOP, refer to Section 6.2.3.)
When a MELSECNET/B data link system is used, the transmission processing time varies depending on the set communication speed and the total number of stations.

To transfer a sequence program (6K steps) to other station from a peripheral device using a MELSECNET/B data link system, the processing time requires.

- 4 minutes and 7 seconds (to write to other station) *1
- 2 minutes and 1 seconds (to read from other station) *2
- 1 minutes and 56 seconds (to verify with other station) *2

The above data can be applied when the communication speed is set to 1MBPS and the total number of stations is 32.
If either a larger sequence program is sent or the communication speed is set slower, the processing time will become longer than above-mentioned values.
If the total number of stations is less than 32, the processing time becomes shorter than the above.

REMARK

1) *1......... When the CPU module to which a sequence program is written is set to STOP.
2) *2......... When the CPU module is set to RUN.

7 DATA LINK SETTINGS

This chapter describes the setting of the number of modules and the setting of the network refresh parameters and link parameters, which are required for communications with other stations in the data link system.

7.1 Data Link Settings Overview

Set the number of modules and the network refresh parameters only when the AnUCPU, QnACPU, A2ASCPU(S1), A2USHCPU-S1, Q2AS(H)CPU(S1) or QCPU-A is used.
The data link system can use any of the three operation modes according to the combination of link modules to be connected.
The operation mode can be selected by link parameter settings.

- MELSECNET mode
- MELSECNET Ⅱ mode
- MELSECNET Ⅱ composite mode

Set the link parameters by using a peripheral device, and store them in the programmable controller CPU of a master station.
Use the following peripheral device or software which is compatible with the AnACPU or later to set link parameters for the MELSECNET Ⅱ mode or the MELSECNET Ⅱ composite mode.

- A6GPP + SW5GP-GPPAE system FD
- A6PHP + SW5GP-GPPAE system FD
- IBM PC/AT + SW0IX-GPPAE system FD
- GX Developer

The following describes link parameters required to use each operation mode.

POINT

(1) For the AnUCPU, A2ASCPU(S1) or A2USHCPU-S1 use the following peripheral device or software compatible with the AnUCPU or later.
- A6GPP + SW0GP-GPPAUE system FD
- A6PHP + SW0GP-GPPAUE system FD
- GX Developer

(2) For the QnACPU or Q2AS(H)CPU(S1), use the following software compatible with the QnACPU.
- IBM PC/AT + SW0IX-GPPAUE system FD
- GX Developer

(3) For the software compatible with the QCPU-A, refer to "Software package" in QCPU-A (A Mode) User's Manual SH-080065.

(4) When using MELSECNET and MELSECNET/10 in combination, refer to the AnUCPU or QnACPU corresponding MELSECNET/10 Reference Manual.

7.2 Setting of the Number of Modules

Set the number of the data link modules installed to the AnUCPU, QnACPU, A2ASCPU(S1), A2USHCPU-S1, Q2AS(H)CPU(S1) or QCPU-A and head I/O numbers etc.
Settings must be made to the master and local stations.

(1) Setting items

(a) Number of network modules

Set the total number of the MELSECNET (Ⅱ) data link modules and MELSECNET/10 network modules that are installed to the AnUCPU, QnACPU, A2US(H)CPU(S1), Q2AS(H)CPU(S1) or QCPU-A.
The setting range is 1 to 4.
Note that the number of mountable data link modules is limited to two.

(b) Valid module number for other station access

Set which module will be the target of other station access from the peripheral device (SW4GP-GPPA, SW0SRXV-GPPA, etc.) or special function module (AJ71C24-S8, AD51H-S3, etc.) incompatible with the AnUCPU, QnACPU, A2ASCPU(S1), A2USHCPU-S1, Q2AS(H)CPU(S1) or QCPU-A.
The setting range is 1 to 4.

(c) Head I/O Number

Set the head I/O number (first 3 digits of 4-digit hexadecimal) of the data link module installed.
For example, set “5” if the I/O numbers are X/Y50 to 6F.
*: In GX Developer, set it in 4 digits. In the above example, enter “0050”.

(d) Network module type name

Select the type of the data link module installed from the followings.

5: MELSECNET Ⅱ (master station)
6: MELSECNET Ⅱ (local station)

(e) Network No.

This setting is not required for the MELSECNET Ⅱ.

(2) Setting example

An example of setting the number of modules is shown below.

(a) System configuration example

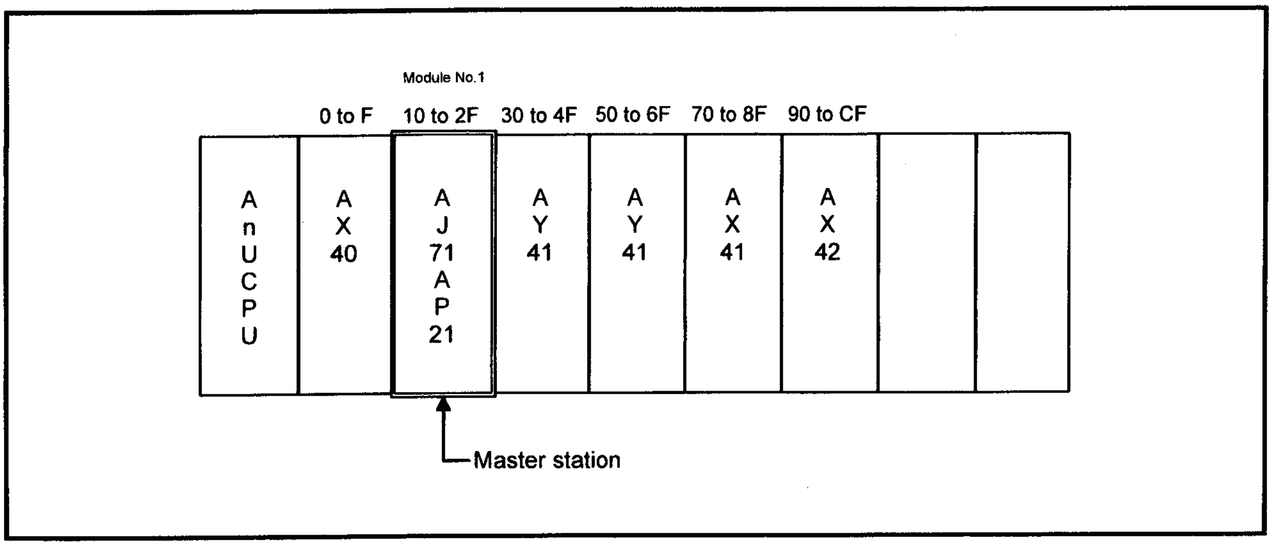


Fig 7.1 System configuration example

(b) Setting screen

Fig 7.2 shows the setting screen for the above system configuration example.

<MODULES>

NO OF MODULES (1-4) [1]

MODULE NO. ACCESSED BY GPP [ ]

	MODULE 1	MODULE 2	MODULE 3	MODULE 4
I/O No.	[01]	[ ]	[ ]	[ ]
NETWORK MODULE TYPE	MELSECNET II MASTER STATION			
NETWORK NO.	-----	[ ]	[ ]	[ ]

End:SET Esc:CLOSE

Fig 7.2 Screen for setting the number of modules

7.3 Network Refresh Parameters

The network refresh parameters are set to transfer the link device (LB, LW, LX, LY) which are stored in the data link module to the devices that can be used in a sequence program. In the network refresh parameters, set the head link device number of the data link module, the head device number of the AnUCPU, QnACPU, A2ASCPU(S1), A2USHCPU-S1, Q2AS(H)CPU(S1) or QCPU-A, and the transfer size. The devices refreshed by this setting are those in the transfer size that begins with the head link device number and in the range assigned using the link parameter.

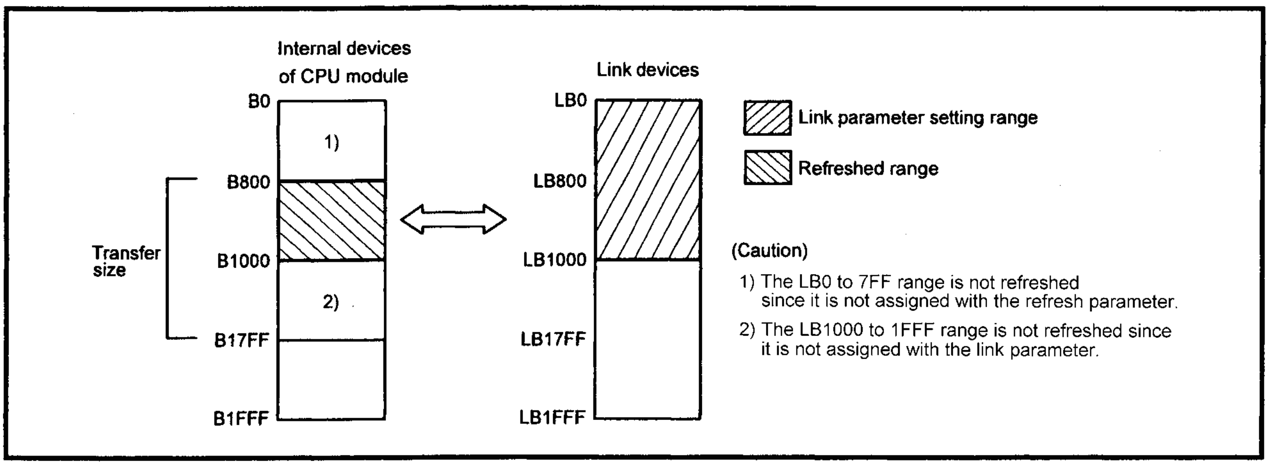
For example, LB800 to FFF of the data link module are refreshed by B800 to FFF of the AnUCPU, QnACPU, A2ASCPU(S1), A2USHCPU-S1, Q2AS(H)CPU(S1) or QCPU-A in the following settings.

<Network refresh parameters>

Head device No.	: B800
Head link device No.	: LB800
Transfer size	: 4096 points (1000H)

<Link parameter>

Assignment range	: LB0 to FFF



POINT
Between data link modules, do not set the parameter for transfer between data links. Use the parameter for transfer between data links when transferring link device data between the data link module (MELSECNET) and network module (MELSECNET/10).

(1) Default values

The default values of the network refresh parameters are assigned according to the setting of the number of modules.

No settings are required unless specific changes must be made to the default values.

Table 7.1 shows the default values. The module Nos. correspond to the numbers in the setting of the number of modules.

When a MELSECNET Ⅱ data link module is mounted, it is always assigned to the area of module No. 1. If two MELSECNET Ⅱ data link modules are mounted, they are assigned to the area for one module.

Table 7.1 Default values of network refresh parameters

Number of mounted modules	Module	
	Module No. 1	Module No. 2
1	LB/LW0 to FFF → B/W0 to FFF LX/LY0 to 7FF → X/Y0 to 7FF	-
2	-	-

When a MELSECNET Ⅱ data link module is mounted, the default values of the network refresh parameters are assigned as follows:

1) Always assigned to the area of module No. 1.
2) If two MELSECNET Ⅱ data link modules are mounted, they are assigned to the area for one module.
3) The MELSECNET Ⅱ data link module is not refreshed since it does not have SB/SW.
   The data link information of the MELSECNET Ⅱ is stored into M/D9200 to 9255.
4 LX/LY000 to 7FF of the MELSECNET Ⅱ is assigned to the area of X/Y000 to 7FF.

For example, when the MELSECNET Ⅱ master station is set as the network module No. 1 in the setting of the number of modules as shown in the example in Fig 7.3 , the default values of the network refresh parameters are assigned as follows.

1) The MELSECNET Ⅱ master station set to module No. 1 in the setting of the number of modules is assigned to the area of module No. 1 shown in Table 7.1.

	Module No. 1	Module No. 2	Module No. 3
Head I/O No.	[01]	[ ]	[ ]
Network module type	MELSECNETⅡ master station	-	-
Network No.	-	-	-
Refresh range (Default values)	LB/LW0 to FFF→B/W0 to FFF LX/LY0 to 7FF→X/Y0 to 7FF	-	-

Fig 7.3 Default ranges of network refresh parameters

(2) Setting items

The setting items of the network refresh parameters include the refresh ranges of LB, LW, LX, LY, SB and SW and the setting of the error history area.

The following describes each setting item.

Table 7.2 shows the network refresh parameter setting items of the MELSECNET II.

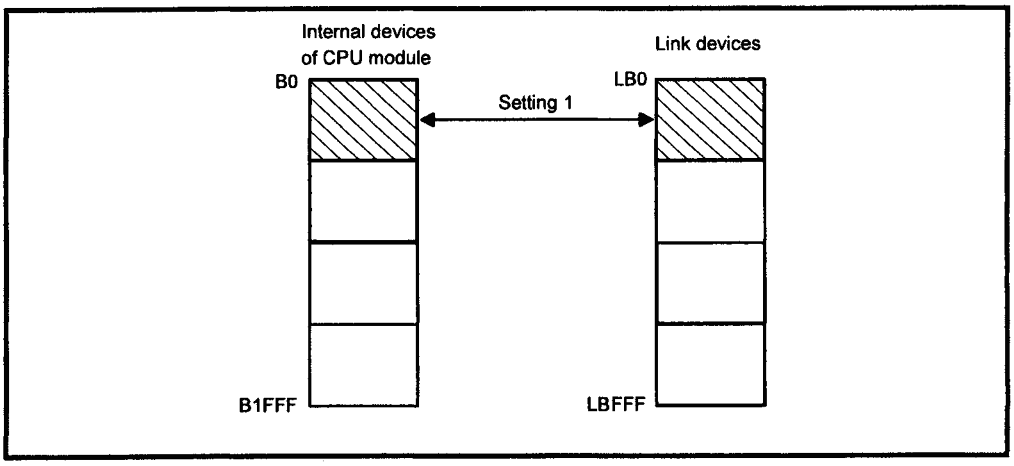
Table 7.2 Network refresh parameter setting items

Item	MELSECNET/10		MELSECNET II	
	Setting 1	Setting 2	Setting 1	Setting 2
LB ⇔ B transfer	○	○	○	×
LW ⇔ W transfer	○	○	○	×
LX ⇔ X transfer	○	○	○	×
LY ⇔ Y transfer	○	○	○	×
SB transfer device	○	×	×	×
SW transfer device	○	×	×	×
LB → extension file register transfer	○	×	×	×
LW → extension file register transfer	○	×	×	×
Error history area setting	○	×	×	×

○ :Available × : N/A

(a) Refresh range setting for LB

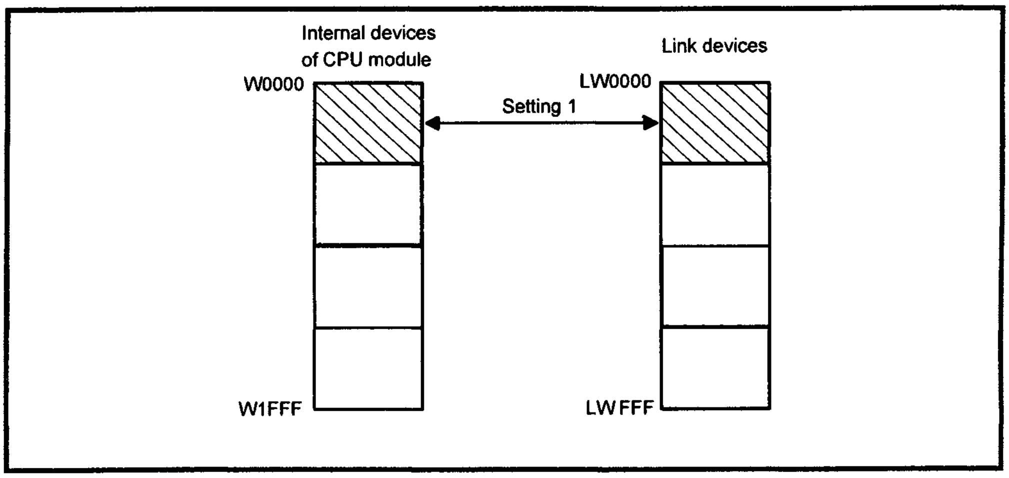
1) The refresh destinations of LB are the link relay (B).



2) The transfer size is in units of 16 points.

(b) Refresh range setting for LW

1) The refresh destinations of LW are the link register (W).



2) The transfer size is in units of 1 point.

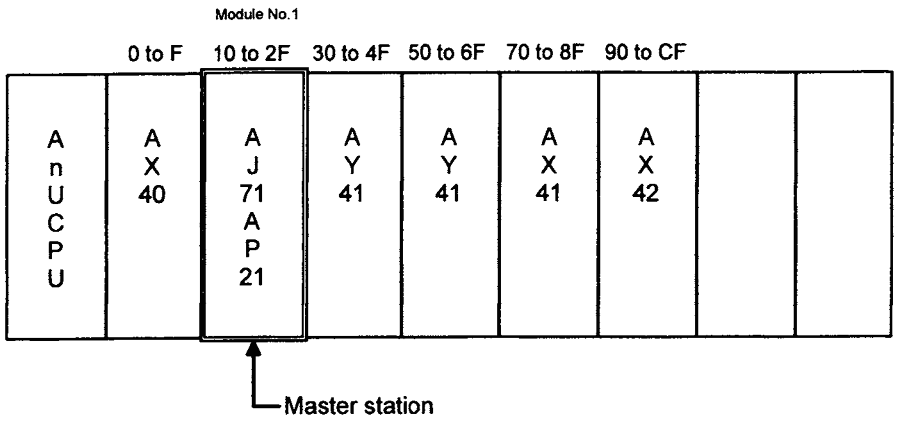
(c) Refresh range setting for LX/LY

1) The refresh destination of LX is the input (X), and that of LY is the output (Y) The actual I/O and later can be set as the refresh destination.
Since this area is also used for MELSECNET/10, MELSECNET/MINI, CC-Link, etc., assign it without overlapping.

2) The transfer size is in units of 16 points.

(3) Setting example

In the system configuration exemplified in Fig 7.4, an example of setting the network refresh parameters to assign the refresh ranges in Table 7.3 is shown below.



Setting of the number of modules

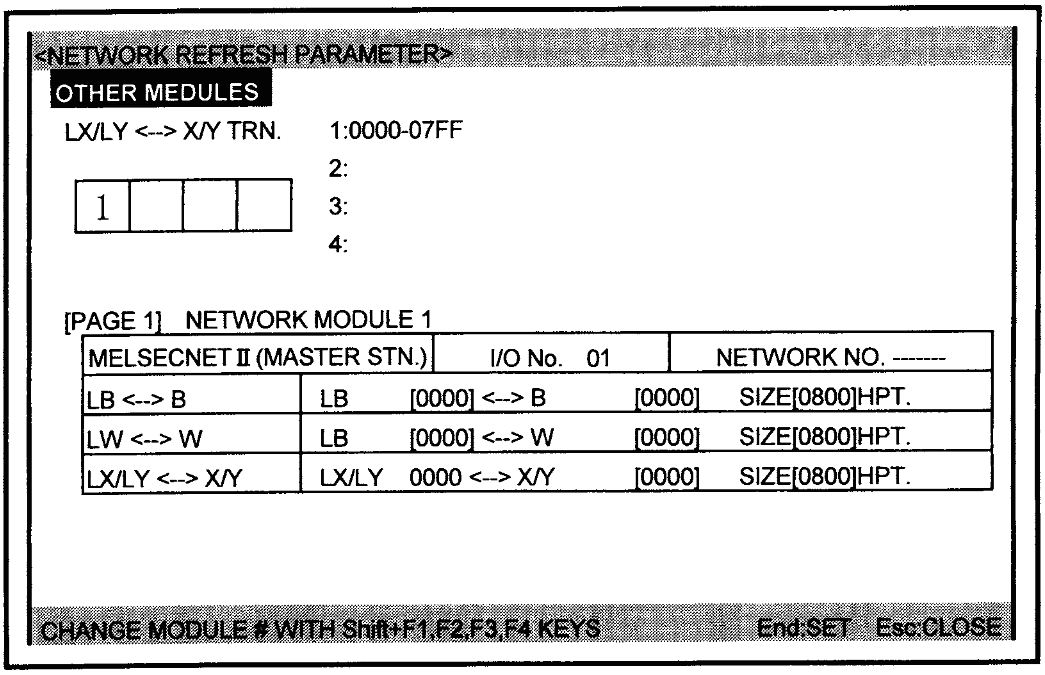
	Module No. 1	Module No. 2	Module No. 3	Module No. 4
Head I/O No.	[01]	[ ]	[ ]	[ ]
Network module type	MELSECNET II master station			
Network No.	——	[ ]	[ ]	[ ]

Fig 7.4 System configuration example

Table 7.3 Refresh ranges

Module type	MELSECNETII master station Module No. 1	Module No. 2	Module No. 3
Refresh range	LB/LW0 to FFF→ B/W0 to FFF LX/LY0 to 7FF→ X/Y0 to 7FF	-	-

(a) Setting screens
Setting of network module No. 1



7.4 Link Parameters

7.4.1 Link parameters to be set for the MELSECNET mode

When the MELSECNET mode is used, only one type of link parameter is used.
On the link parameter setting screen, set the data for the following items.

(1) Total link slave stations
The total number of slave stations (local stations, remote I/O stations) to be connected.

(2) Monitoring time (Refer to Section 7.5.)
The monitoring time is used by the system to determine whether communication between the master station and all slave stations (local stations and remote I/O stations) is being executed normally.

(3) Master station assignment
Assign the device range (B/W0 to 3FF) to be used by the master station for writing data to the link relays (B) and link registers (W).

(4) Slave station type
Set the type of slave station (local station or remote I/O station) to be connected per station number.

(5) Local station assignment
(a) Assign the device range (B/W0 to 3FF) to be used by a local station for writing data to the link relays (B) and link registers (W).
(b) Assign the link range using the outputs (Y) of the master station and inputs (X) of a local station, and the inputs (X) of the master station and outputs (Y) of a local station.

(6) Remote I/O station assignment
(a) Assign the range of I/O module installed in the remote I/O station. Set it in units of 16 points.
(b) Assign the link registers (W) to read/write the special function modules installed to the remote I/O station.

REMARK

The GPP link parameter setting screen is shown below.

* LINK *

MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms
		B	W		
M	4	000-00F	000-0FF	200	XXXX

M : B ↔ ALL L : B 000-27F
M : W ↔ ALL L : W 000-2BF
M : W → ALL R : W 300-341
M : W ← ALL R : W 360-39F
M : Y → ALL L : X 680-77F
M : Y → ALL R : Y 230-59F
M : X ← ALL L : Y 600-77F
M : X ← ALL R : X 200-4BF

L/R NO.	M ← L		M → R	M ← R	M → L/R		M ← L/R	
	B	W	W	W	Y	X/Y	X	Y/X
R 1	------	------	300-310	360-36F	230-30F	030-10F	200-28F	000-08F
L 2	100-17F	100-17F	------	------	680-6FF	200-27F	600-67F	280-2FF
L 3	200-27F	200-2BF	------	------	700-77F	200-27F	700-77F	200-27F
R 4	------	------	320-341	380-39F	480-59F	080-19F	400-4BF	000-0BF
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

↑
L : LOCAL
R : REMOTE

M : MASTER L : LOCAL R : REMOTE

7.4.2 Link parameters to be set for the MELSECNET Ⅱ mode

When the MELSECNET Ⅱ mode is used, two types of link parameter (first half and second half) are provided.

The system can be operated in the MELSECNET Ⅱ mode with only the first half link parameters set.

The settings of the second half link parameters are only effective when more than 1024 bytes of link data are to be used per a station (master station or local station).

(1) First half link parameters

(a) Total slave stations

The number of local stations to be connected. (Remote I/O stations cannot be connected.)

(b) Monitoring time

The time used by the system to determine whether communication between the master station and all slave stations (local stations) is being executed normally.

(c) Master station assignment

Assign the device range (B/W0 to FFF) to be used by the master station for writing data from the master station to the link relays (B) and link registers (W).

(d) Local station assignment

1) Assign the device range (B/W0 to B/WFFF) to be used by a local station for writing data to the link relays (B) and link registers (W).

2) Assign the link range using the outputs (Y) of the master station and inputs (X) of a local station, and the inputs (X) of the master station and outputs (Y) of a local station.

(2) Second half link parameters

(a) Master station assignment

Assign the device range to be used by the master station for writing data to the link relays (B) and link registers (W).

(b) Local station assignment

Assign the device range to be used by the local station for writing data to the link relays (B) and link registers (W).

REMARK

The device range that can be assigned to the second half link parameters is the range assigned to the first half link parameters: "(final device number) + 1 " or later.

(Example: If the range of B0 to FF is assigned to the first link parameters, "B100" or later can be assigned to the second half parameters.)

If 0 point is assigned to the first half link parameters, assignment of the second half link parameters can be started with B/W0.

POINT

(1) The following can be set in the MELSECNET Ⅱ mode:

- 1024 bytes in the first half link parameters
- 1024 bytes in the second half link parameters

(3) Link parameter setting screens

The following shows the link parameter setting screens.

(a) First half link parameters

* MELSECNET II MODE LINK *

MASTER	SLAVE PC STATIONS	FIRST M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms
		B	W		
M	3	000-0FF	000-0FF	200	XXXX

M : B1 ↔ ALL L : B1 000-8FF
M : W1 ↔ ALL L : W1 000-4FF
M : B2 ↔ ALL L : B2 C00-CFF
M : W2 ↔ ALL L : W2 800-8FF
M : W → ALL R : W -
M : W ← ALL R : W -
M : Y → ALL L : X 280-37F
M : Y → ALL R : Y -
M : X ← ALL L : Y 200-37F
M : X ← ALL R : X -

L/R NO.	FIRST M ← L				M → L		M ← L	
	B	W			Y	X	X	Y
L 1 II	200-2FF	200-2FF	-------	-------	280-2FF	100-17F	200-27F	180-1FF
L 2 II	300-4FF	300-3FF	-------	-------	-	-	-	-
L 3 II	500-8FF	400-4FF	-------	-------	300-37F	100-17F	300-37F	100-17F
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	

↑

L : LOCAL
R : REMOTE

M : MASTER L : LOCAL R : REMOTE

PRESS <SSN> TO SELECT 1ST/2ND RENGE OF B/W

(b) Second half link parameters

* MELSECNET II MODE LINK *

MASTER	SLAVE PC STATIONS	SECOND M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms
		B	W		
M	3	C00-CFF	800-8FF	200	XXXX

M : B1 ↔ ALL L : B1 1000-8FF
M : W1 ↔ ALL L : W 000-4FF
M : B2 ↔ ALL L : B2 C00-CFF
M : W2 ↔ ALL L : W2 800-8FF
M : W → ALL R : W -
M : W ← ALL R : W -
M : Y → ALL L : X 280-37F
M : Y → ALL R : Y -
M : X ← ALL L : Y 200-37F
M : X ← ALL R : X -

L/R NO.	SECOND M ← L				M → L		M ← L	
	B	W			Y	X	X	Y
L 1 II	-	-	-------	-------	-------	-------	-------	-------
L 2 II	-	-	-------	-------	-------	-------	-------	-------
L 3 II	-	-	-------	-------	-------	-------	-------	-------
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

↑

L : LOCAL
R : REMOTE

M : MASTER L : LOCAL R : REMOTE

PRESS <SSN> TO SELECT 1ST/2ND RENGE OF B/W

7.4.3 Link parameters to be set for the MELSECNET Ⅱ composite mode

When the MELSECNET Ⅱ composite mode is used, two types of link parameters (first half and second half) are provided.

The system can be operated in the MELSECNET Ⅱ composite mode with only the first half link parameters set. In this case, however, the device range used for data link is B/W0 to 3FF, and the system will operate on the same level as the MELSECNET mode system.

Assign the range of B/W400 to FFF of the link relays (B) and link registers (W) to the second half link parameters.

First half link parameters

(The same data as that set for the MELSECNET mode is set for the first half link parameters.)

(1) Link total slave stations
The number of slave stations (local stations, remote I/O stations) to be connected.

(2) Monitoring time (Refer to Section 7.5.)
The time used by the system to determine whether communication between the master station and all slave station (local stations and remote I/O stations) is being executed normally.

(3) Master station assignment
Assign the device range (B/W0 to 3FF) to be used by the master station for writing data to the link relays (B) and link registers (W).

(4) Slave station type
Set the type of slave station (the local station for the MELSECNET mode or the local station/remote I/O station for the MELSECNET Ⅱ mode) per station number.

(5) Local station assignment
(a) Assign the device range (B/W0 to 3FF) to be used by a local station for writing data to the link relays (B) and link registers (W).
(b) Assign the link range using the outputs (Y) of a master station and inputs (X) of a local station, and the inputs (X) of the master station and outputs (Y) of a local station.

(6) Remote I/O station assignment
(a) Assign the number of points of the I/O module or special function module to be installed to the remote I/O station.
(b) Assign the link registers (W) to be used for reading/writing the special function modules installed to the remote I/O station.

Second half link parameters

(The same data as that set for the MELSECNET Ⅱ mode should be set for the second half link parameters.)

(1) Master station assignment
Assign the device range to be used by the master station for writing data to the link relays (B) and link registers (W).

(2) Local station assignment
Assign the device range to be used by the local station for writing data to the link relays (B) and link registers (W).

REMARK

The device range that can be assigned to the second half link parameters is the range assigned to the first half link parameters: "(final device number) + 1".
(Example: If the range of B0 to FF is assigned to the first link parameters, "B100" or later can be assigned to the second half parameters.)
If 0 point is assigned to the first half link parameters, assignment of the second half link parameters can be started with B/W0.

Link parameter setting screen

The following shows link parameter setting screens.

(a) First half link parameters

* MELSECNET II MULTI MODE LINK *

MASTER	SLAVE PC STATIONS	FIRST M → ALL L B	W	W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms
M	4	000-0FF	000-0FF	200	XXXX

M : B1 ↔ ALL L : B1 000-37F
M : W1 ↔ ALL L : W1 000-2BF
M : B2 ↔ ALL R : B2 800-8FF
M : W2 ↔ ALL R : W2 800-AFF
M : W → ALL R : W 300-341
M : W ← ALL R : W 360-39F
M : Y → ALL L : X 680-77F
M : Y → ALL R : Y 230-59F
M : X ← ALL L : Y 600-77F
M : X ← ALL R : X 200-4BF

L/R NO.	FIRST M ← L B	W	M → R W	M ← R W	M → L/R Y	X/Y	M ← L/R X	Y/X
R 1	-------	-------	300-310	360-36F	230-30F	030-10F	200-28F	000-08F
L 2	100-1FF	100-1FF	-------	-------	680-6FF	200-27F	600-67F	280-2FF
L 3 II	280-37F	240-2BF	-------	-------	700-77F	200-27F	700-77F	200-27F
R 4	------	-------	320-341	380-39F	480-59F	080-19F	400-4BF	000-0BF
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-		-	-	-	-

↑

M : MASTER L : LOCAL R : REMOTE

PRESS <SSN> TO SELECT 1ST/2ND RENGE OF B/W

L : LOCAL
R : REMOTE
* : MELSECNET II (LOCAL)

(b) Second half link parameters

* MELSECNET II MULTI MODE LINK *

MASTER	SLAVE PC STATIONS	SECOND M → ALL L B	W	W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms
M	4	800-8FF	800-8FF	200	XXXX

M : B1 ↔ ALL L : B1 -
M : W1 ↔ ALL L : W1 -
M : B2 ↔ ALL L : B2 800-AFF
M : W2 ↔ ALL L : W2 800-AFF
M : W → ALL R : W -
M : W ← ALL R : W -
M : Y → ALL L : X -
M : Y → ALL R : Y -
M : X ← ALL L : Y -
M : X ← ALL R : X -

L/R NO.	SECOND M ← L B	W	M → R W	M ← R W	M → L/R Y	X/Y	M ← L/R X	Y/X
R 1	-------	-------	-------	-------	-------	-------	-------	-------
L 2	-	-	-------	-------	-------	-------	-------	-------
L 3 II	A00-AFF	A00-AFF	-------	-------	-------	-------	-------	-------
R 4	-------	-------	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

↑

M : MASTER L : LOCAL R : REMOTE

PRESS <SSN> TO SELECT 1ST/2ND RENGE OF B/W

L : LOCAL
R : REMOTE
* : MELSECNET II (LOCAL)

7.5 Monitoring Time Setting

The monitoring time is the reference time used by the system to determine whether communication between the master station and all slave stations (local stations and remote I/O stations) is being executed normally.

(1) If the link scan is repeatedly executed within the monitoring time (set time), the local stations and remote I/O stations determine that the master station is operating normal (data link normal).

(2) If the link scan is not repeated within the monitoring time, the local and remote I/O stations determine that the master station is faulty (data link error) and the following processing is executed.
   (a) Master station
      1) Communication with all slave stations stops.
         If the automatic return function is selected, communication is retried.
      2) Receive data is maintained in a status just before the occurrence of the communication error.
      3) The value "5" is stored to data link special register D9204.
   (b) Local stations
      1) The ERROR LED "TIME" of the link module lights.
      2) Receive data is maintained in a status just before the occurrence of the communication error.
      3) Data link special relay M9251 (link stop) is turned ON.
   (c) Remote I/O stations
      1) The ERROR LED "TIME" of the link module lights.
      2) All output modules installed to the remote stations are turned OFF.

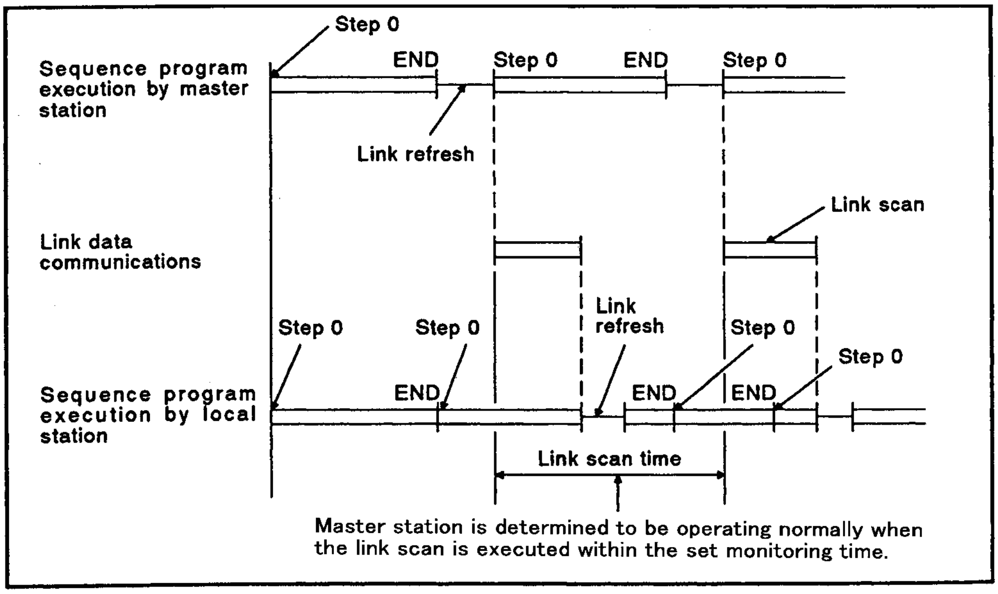


Fig 7.5 Monitoring Time

REMARK

(1) For details of data link special register, refer to Section 9.3.
(2) For details of data link special relay, refer to Section 9.2.

(3) Setting the monitoring time
The monitoring time can be set between 10 to 2000ms in units of 10ms. (The usual setting is 2000ms.)
Setting the minimum value to monitoring time is valid for the case to immediately turn off the output of remote I/O stations where communication error occurred.
Use the following procedure to set the minimum value to monitoring time.

(a) Set "200" (2000ms) to monitoring time and write the setting to the master station.

(b) Perform data link in the actual system and monitor the link scan by link monitor of GPP connected to the master station. (Refer to Section 10.1.1 for the link monitor.)

(c) Turn off the power supply to one of the slave stations so that the system operates in the loopback mode.

(d) Read the maximum link scan time value.

(e) Add 50ms to the maximum link scan time value read out and set it as monitoring time. When using the A70BD-J71P21/R21 or A7BD-J71AP21/R21 as a master station, add 250ms to the maximum link scan time value and set it as monitoring time.

7.6 Common Element

The following describes the common information to know before assigning link parameters.

7.6.1 Maximum number of link points per station

The maximum number of link points (number of points assigned to a station by link parameters) of "B, W, X, Y" that can be used for data link of a station (master, local or remote I/O station) in the data link system.

(1) Maximum number of link points per station (master station and local stations)

(a) MELSECNET mode

Up to 1024 bytes of link points can be used by a station (master or local station).
Use the following formula to calculate the maximum number of link points.

$$\frac{\text{(B points)} + \text{(Y points)}}{8} + \{2 \times \text{(W points)}\} \leq 1024 \text{ bytes}$$

(b) MELSECNET II mode or MELSECNET II composite mode

Up to 1024 bytes of link points can be assigned to the first half link parameters and up to 1024 bytes can be assigned to the second half link parameters used by a station (master or local station).
Use the following formula to calculate the maximum number of link points.

First half link parameters

$$\frac{\text{(B points)} + \text{(Y points)}}{8} + \{2 \times \text{(W points)}\} \leq 1024 \text{ bytes}$$

Second half link parameters

$$\frac{\text{(B points)}}{8} + \{2 \times \text{(W points)}\} \leq 1024 \text{ bytes}$$

(2) Maximum number of link points per remote I/O station
The maximum number of link points which can be assigned to a remote I/O station is 512 I/O points (X/Y0 to 1FF) or less, and the total link data size must be set to 512 bytes.
Use the following formula to calculate the maximum number of link points.

$$\frac{(\text{X points}) + (\text{Y points})}{8} + \{2 \times (\text{W points})\} \leq 512 \text{ bytes}$$

$$(\text{X points}) \leq 512 \text{ bytes}$$

$$(\text{Y points}) \leq 512 \text{ bytes}$$

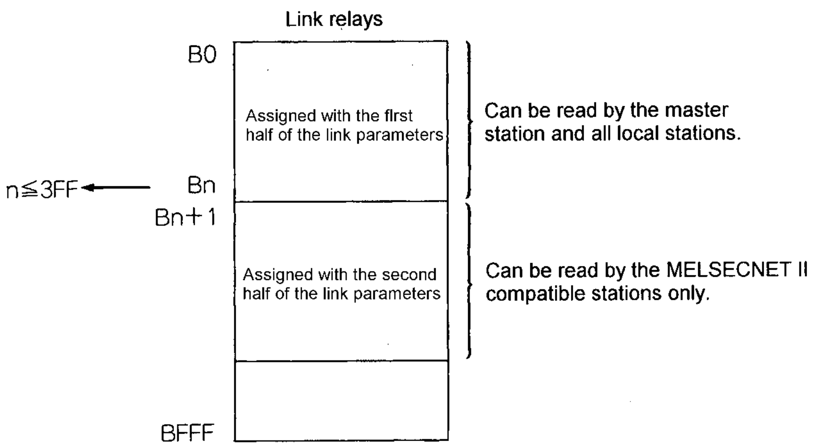
Note that the maximum number of I/O points that can be used in a remote I/O station is 512 points for the total of input, output, and special function modules.

7.6.2 Determining the link relay (B) assignment range

Assign link relays (B) as follows:

(1) Assign link relays (B) in units of 16 points (B□□0 to B□□F).

(2) The device range that can be assigned to the second half link parameters is the range assigned to the first half link parameters: "(final device number allocated with the first half link parameters) + 1 " or later.
(Example: If the range of B0 to FF is assigned to the first link parameters, "B100" or later can be assigned to the second half parameters.)
If 0 point is assigned to the first half link parameters, assignment to the second half link parameters can be started with B000.



7.6.3 Determining the link register (W) assignment range

Link registers (W) are used for communications between the master station and a local station and between the master station and a remote I/O station.
Assign the link register in units of 1 point.
Assign the link registers to the area for communications between the master and a local station, and the area for communications between the master and a remote I/O station separately, as shown below.

(1) When assigning the link parameters of the MELSECNET mode and the first half link parameters of the MELSECNET II composite mode
  (a) The area used by the master or local station to write data to host station (hereinafter referred to as the "M/L area".)
  (b) The area used to read/write from the special function module installed to a remote I/O station (RFRP/RTOP instruction) (hereinafter referred to as the "M/R area".)
    1) Further divide M/R area into a read area and a write area and assign them.
      a) The area used to read data from a remote I/O station to the master station (hereinafter referred to as the "M ← R area")
      b) The area used to write data from the master station to a remote I/O station (hereinafter referred to as the "M → R area")

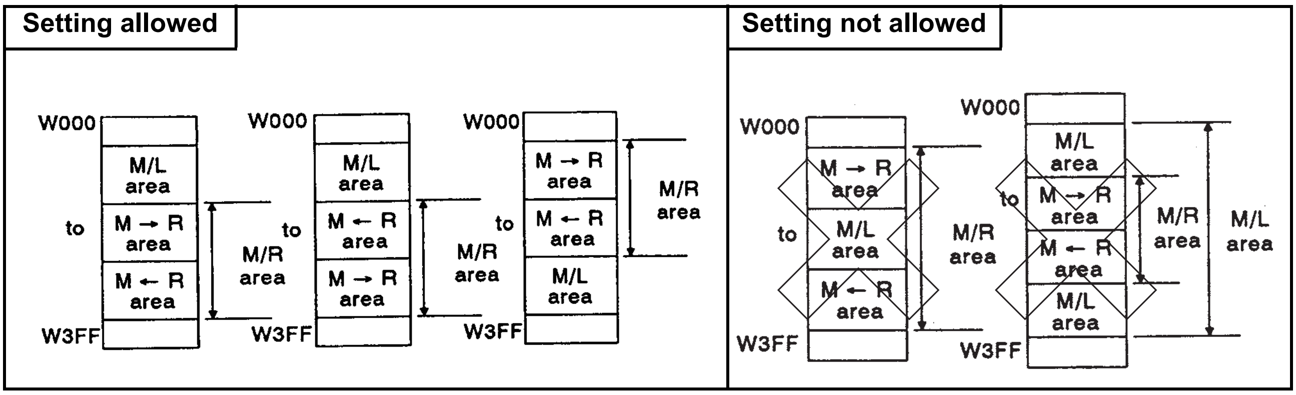


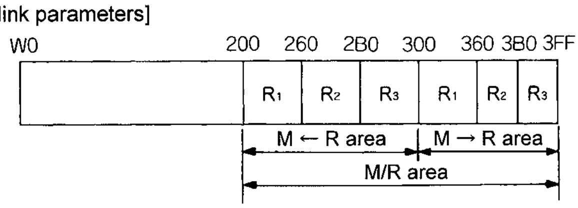
Fig 7.6 Link register (W) assignment range

2) The system uses the M → R area to execute RFRP/RTOP instructions.
Consider the range used by the system when assigning the M → R area.
[Number of points used by the system]
The link register (W) 1 point is used for one special function module installed to a remote I/O station.
[Range used by the system]
The range used by the system begins at the M → R area head device number assigned to each remote I/O station to "number of use points -1 ".

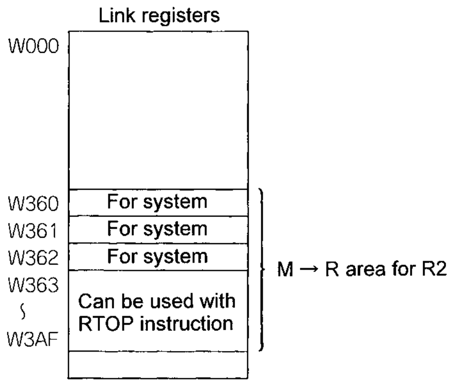
Example

When three special function modules are installed to remote I/O station No.2 with link parameters set as shown below, W360 to 362 in the M → R area (W360 to 3AF) are used by the system.

[Setting of link parameters]



[Assignment of remote I/O station No. 2]



(2) The device range that can be assigned to the second half link parameters is the range assigned to the first half link parameters: "(final device number) + 1 " or later.
(Example: If the range of B0 to FF is assigned to the first link parameters, "B100" or later can be assigned to the second half parameters.)
If 0 point is assigned to the first half link parameters, assignment of the second half link parameters can be started with W000.

POINT
(1) When only the RFRP instruction is used, set the M → R area used by the system in the link parameter. (2) If the M → R area used by the system is used incorrectly in a user program, data cannot be read/written correctly, when the RFRP/RTOP instruction is executed.

7.6.4 Determining the input (X) and output (Y) assignment range

Assignment of input (X) and output (Y) can be executed to the link parameter of MELSECNET mode and the first half link parameters of MELSECNET II composite mode. Input (X) and output (Y) which can be used in the data link is the range installing the I/O module and special function module by the master station or local station or later.

(1) Divide inputs and outputs as shown below and assign them.
   (a) The area used for communication between the master station and a local station (hereinafter referred to as the "M/L area").
   (b) The area used for communication between the master station and a remote I/O station (hereinafter referred to as the "M/R area").

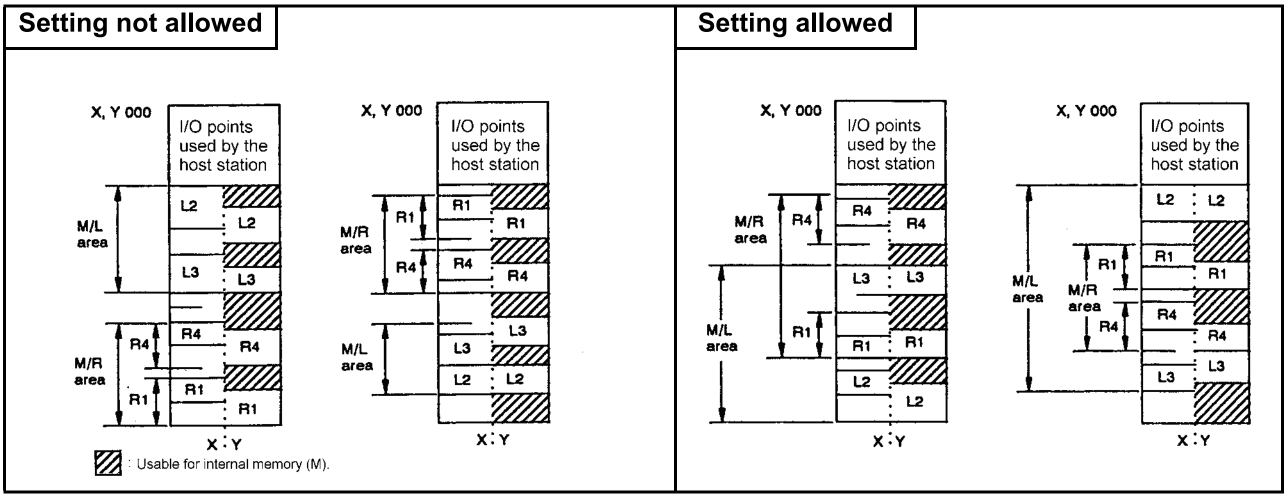
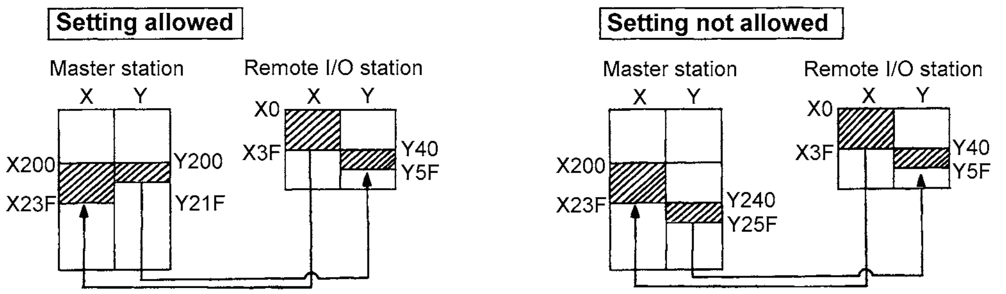


Fig 7.7 Input (X) and output (Y) assignment range

(2) Inputs (X) and outputs (Y) are assigned to each station in units of 16 points (X□□0 to X□□F and Y□□0 to Y□□F).

POINT

When assigning inputs (X) and outputs (Y), identical I/O ranges must be assigned to the master and remote I/O station.



REMARK

1) Inputs (X) and outputs (Y) are assigned to the first half link parameters in the MELSECNET II mode.
2) Since remote I/O stations cannot be connected in a MELSECNET II mode, the area does not need to be divided for M/L and M/R.

7.7 Link Parameters in the MELSECNET Mode

The following describes the link parameter setting when the MELSECNET mode is used. (When the MELSECNET composite mode is used, the first half link parameters can be set in a similar way.)

The system configuration in the MELSECNET mode includes the following three types.

- System consisting of the master station and local stations (hereinafter Referred to as a "local system").
- System consisting of a master station and remote I/O stations (hereinafter referred to as a "remote I/O system").
- System consisting of a master station, local stations, and remote I/O stations (hereinafter referred to as a "local/remote I/O system").

Concept and precautions at link parameter setting are described per each system configuration.

7.7.1 Local system assignment and link parameter setting example

The following describes the assignment of link relays, link registers, inputs, and outputs and the link parameter setting.

Assignment for a local system

When setting link parameters of the local system, the following points must be considered.

(1) Determine the link relay (B) and link register (W) assignment range for each master station and local station. (Refer to Section 7.6.2 and Section 7.6.3.)

(2) If the number of link relay (B) points is insufficient, examine to substitute inputs (X) and outputs (Y) for the information communicated between the master station and a local station (one to one). (Refer to Section 7.6.4.)

(3) Make sure that the number of link points per station is as follows. (Refer to Section 7.6.1.)
•Master station................ 1024 bytes or less
•Local station.................. 1024 bytes or less

Link parameter setting example

Fig 7.8 shows a link parameter setting of a local system when the MELSECNET mode is used.

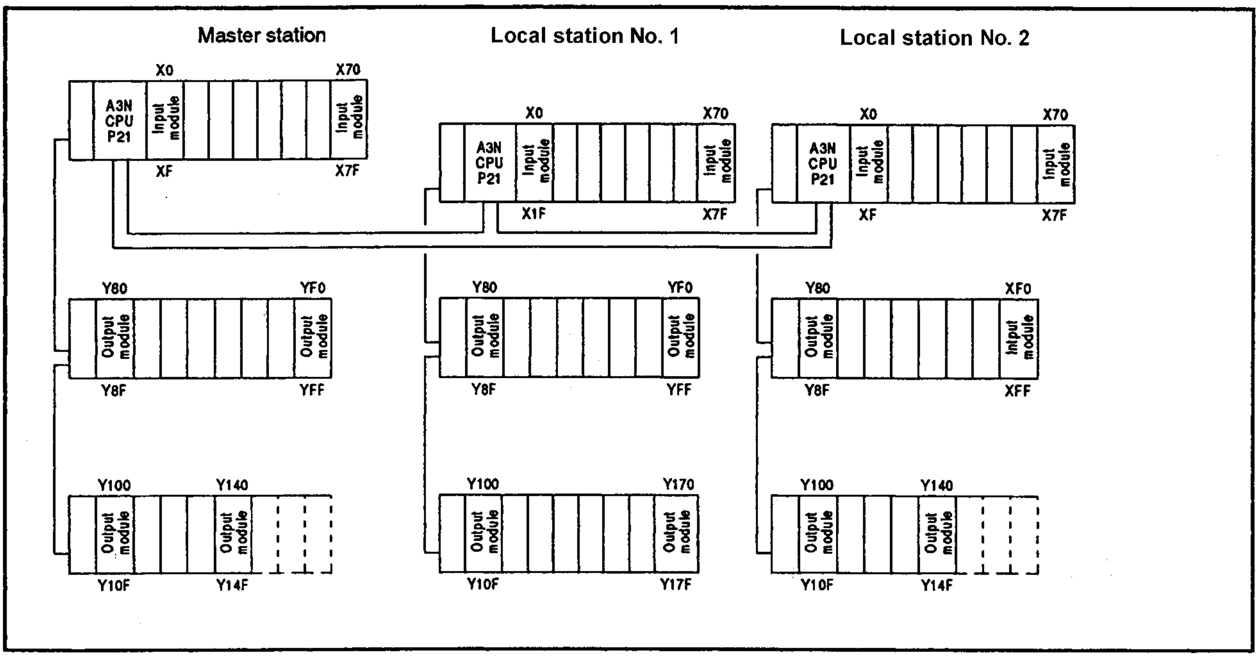


Fig 7.8 System configuration example

(1) Assignment of link relay (B)

(a) Fig 7.9 shows the case when assigning 256 points to the master station, 128 points to local station No.1, 128 points to local station No.2, and 128 points empty area between local station No.1 and local station No.2.

		Master station			Local station No. 1			Local station No. 2		
		Coil	Con-tact	Used as internal relay (M) by the host station	Coil	Con-tact	Used as internal relay (M) by the host station	Coil	Con-tact	Used as internal relay (M) by the host station
M/L area: B0	M	o	o			o			o	
M/L area: B100	L1		o		o	o			o	
M/L area: B180	*1									
M/L area: B200	L2		o			o		o	o	
B280 to B3FF				o			o			o

Coil : ON/OFF control of link relays (B)

Contact : Reads ON/OFF data using link relay (B) contact

O : Usable range

Fig 7.9 Link relay (B) assignment example

(b) The empty area marked with *1 in the M/L area in Fig 7.9 cannot be used as a substitute for internal relay (M) in the master station and all local stations.
The M/L area is the range (B0 to 27F) from the minimum device number to the maximum device number assigned by the link parameters.

(2) Assignment of link register (W)

(a) Assignment for the master station and local stations (M/L area)

Fig 7.10 shows the case when assigning 256 points to the master station, 128 points to local station No.1, 196 points to local station No.2, and 128 points empty area between local station No.1 and local station No.2.

M/L area		Master station			Local station No. 1			Local station No. 2		
		Read	Write	Used as a data register (D) by the host station	Read	Write	Used as a data register (D) by the host station	Read	Write	Used as a data register (D) by the host station
W0	M	o	o		o			o		
W100	L1	o			o	o		o		
W180	*1									
W200	L2	o			o			o	o	
2C0				o			o			o

Read : Read word data
Write : Write word data
O : Usable range

Fig 7.10 Link register (W) assignment example

(b) The empty area marked with *1 in the M/L area in Fig 7.10 cannot be used as a substitute for data register (D) in the master station and all local stations.

The M/L area is the range of the smallest to the largest device number (W0 to 2BF) assigned by the link parameters.

(3) Assignment of inputs (X) and outputs (Y)

(a) The range used for data link by the master station

The master station uses the X/Y0 to X/Y14F range as inputs and outputs of host station.

The X/Y150 to X/Y7FF range can be used for the data link.

(b) Assignment for local stations

In this example, inputs (X) and outputs (Y) are not required because there is an empty area in the link relay (B) assignment. However, to explain the assignment example of local station, 128 input (X) points and 128 output (Y) points have been assigned.

1) Assignment of local station No.1

Local station No.1 uses the X/Y0 to 17F range as inputs and outputs for host station.

The X/Y180 to X/Y7FF range can be used for the data link.

2) Assignment of local station No.2

Local station No.2 uses the X/Y0 to X/Y14F range as inputs and outputs for host station.

The X/Y150 to X/Y7FF range can be used for the data link.

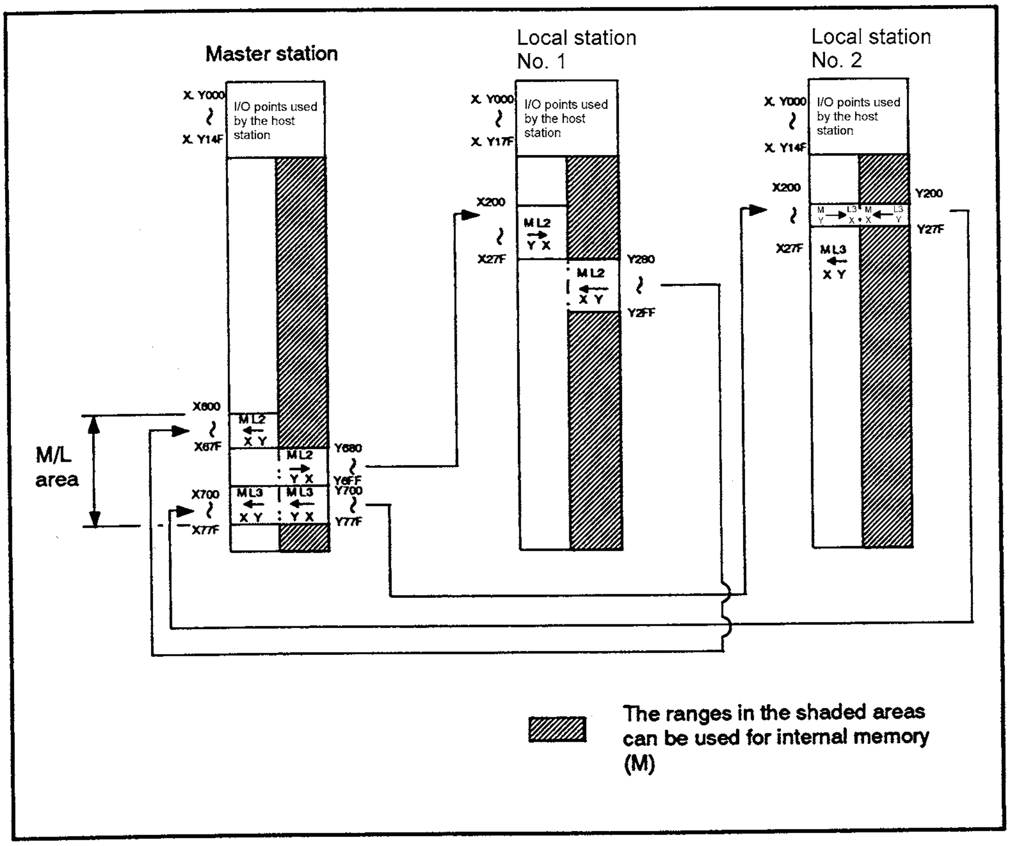


Fig 7.11 Inputs (X) and outputs (Y) assignment example

(4) Link parameter setting
When the assignment of (1) to (3) is executed, set the link parameters as shown below.

* LINK *

MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms
		B	W		
M	2	000-0FF	000-0FF	200	XXXX

M : B	↔	ALL	L : B	000-27F
M : W	↔	ALL	L : W	000-2BF
M : W	→	ALL	R : W	-
M : W	←	ALL	R : W	-
M : Y	→	ALL	L : X	680-77F
M : Y	→	ALL	R : Y	-
M : X	←	ALL	L : Y	600-77F
M : X	←	ALL	R : X	-

L/R NO.	M ← L		M → R	M ← R	M → L/R		M ← L/R	
	B	W	W	W	Y	X/Y	X	Y/X
L 1	100-17F	100-17F	-------	-------	680-6FF	200-27F	600-67F	280-2FF
L 2	200-27F	200-2BF	-------	-------	700-77F	200-27F	700-77F	200-27F
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

↑
L : LOCAL
R : REMOTE

M : MASTER L : LOCAL R : REMOTE

7.7.2 Remote I/O system assignment and link parameter setting example

The following describes the assignment of link relays, link registers, inputs, and outputs and link parameters used for the remote I/O system.

Assignment for a remote I/O system

For the link parameter setting of a remote I/O station, consider the following points for the assignment.

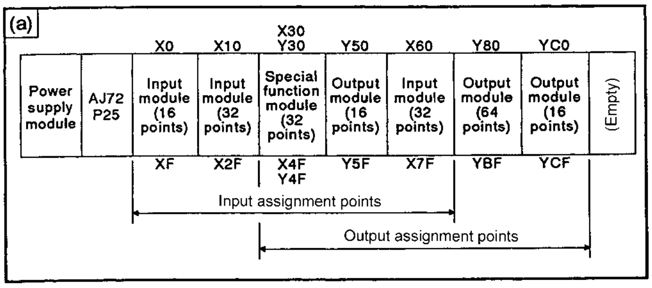
(1) Determine what number of master station the device number of I/O module installed to the remote I/O station is assigned.
The I/O numbers that can be assigned to a remote I/O station is the I/O numbers used for master station as I/O of host station. (Refer to Section 7.6.4.)

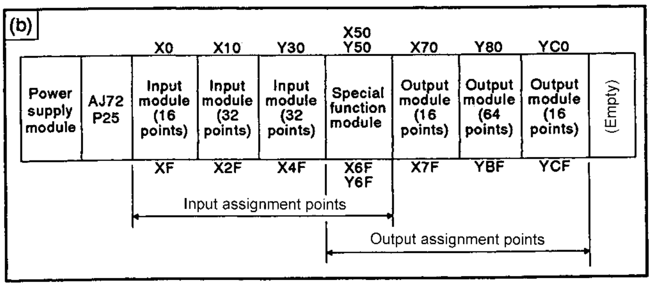
(2) When a special function module is installed to a remote I/O station, determine the link register (W) assignment range (M/R area) to be used for reading/writing buffer memory (RFRP/RTOP instruction). (Refer to Section 7.6.4.)

(3) Make sure that the number of link points per station is as follows. (Refer to Section 7.6.1.)
- Remote I/O station................ 512 bytes
  (Inputs and outputs are less than 512 points of X/Y0 to 1FF)

POINT

(1) If the M → R area used by the system is used incorrectly in a user program, data cannot be read/written correctly, when the RFRP/RTOP instruction is executed.
(2) The number of link points can be reduced by mounting modules to a remote I/O station in groups of input modules, special function modules, and output modules as shown below. If the installation of I/O modules is changed from (a) to (b), a reduction of 16 input assignment points and 32 output assignment points can be achieved.





Link parameter setting example

Fig 7.12 shows a link parameter setting of a remote I/O system when the MELSECNET mode is used.

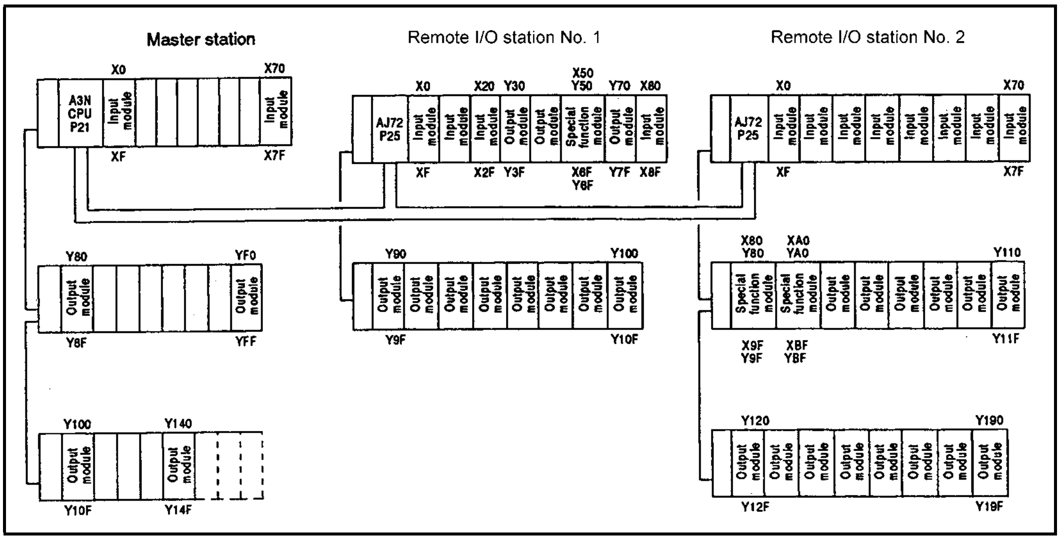


Fig 7.12 System configuration example

(1) Assignment of link relay (B)
Data link cannot be executed by using a link relay in a remote I/O system.
(Setting at link parameter is unnecessary.)

(2) Assignment of link register (W)
   (a) Assignment for remote I/O stations (M → R area, M ← R area)
      1) Assign 16 points for the RTOP instruction and 16 points for the RFRP instruction in the user program of the master station as remote I/O station No.1.
         No.1 requires 17 points (16 points (for RTOP) + 1 point (for OS)) for the M → R area because one special function module is installed.
      2) Assign 32 points for the RTOP instruction and 32 points for the RFRP instruction in the user program of the master station as remote I/O station No.2.
         No.2 requires 34 points (32 points (for RTOP) + 2 points (for OS)) for the M → R area because two special function modules are installed.

M/R area	Address	Assignment	Master station (M) Read	Master station (M) Write	Master station (M) Used as a data register (D) by the host station	Remote I/O station No. 1 (R1) Read from the master station	Remote I/O station No. 1 (R1) Write by the master station	Remote I/O station No. 2 (R2) Read from the master station	Remote I/O station No. 2 (R2) Write by the master station
	W000				o				
M → R area	W300	R1					o		
M → R area	W310				o				
M → R area	W320	R2							o
	W341				o				
M ← R area	W360	R1				o			
M ← R area	W36F	*1							
M ← R area	W380	R2						o	
	W39F–W3FF				o				

Read : Read word data
Write : Write word data
O : Usable range

Fig 7.13 Link register (W) assignment example

   (b) In Fig 7.13, the empty area marked with *1 in the M ← R area cannot be used as a data register (D) by the master station.

(3) Assignment of inputs (X) and outputs (Y)
(a) Input and output range used for data link by master station
The master station uses the X/Y0 to X/Y14F range as I/O of host station. The X/Y150 to 7FF range can be used for the data link.

(b) Assignment of remote I/O stations
1) Assignment of remote I/O station No.1
Inputs (X) : X0 to 8F
Outputs (Y) : Y30 to 10F
2) Assignment of remote I/O station No.2
Inputs (X) : X0 to BF
Outputs (Y) : Y80 to 19F

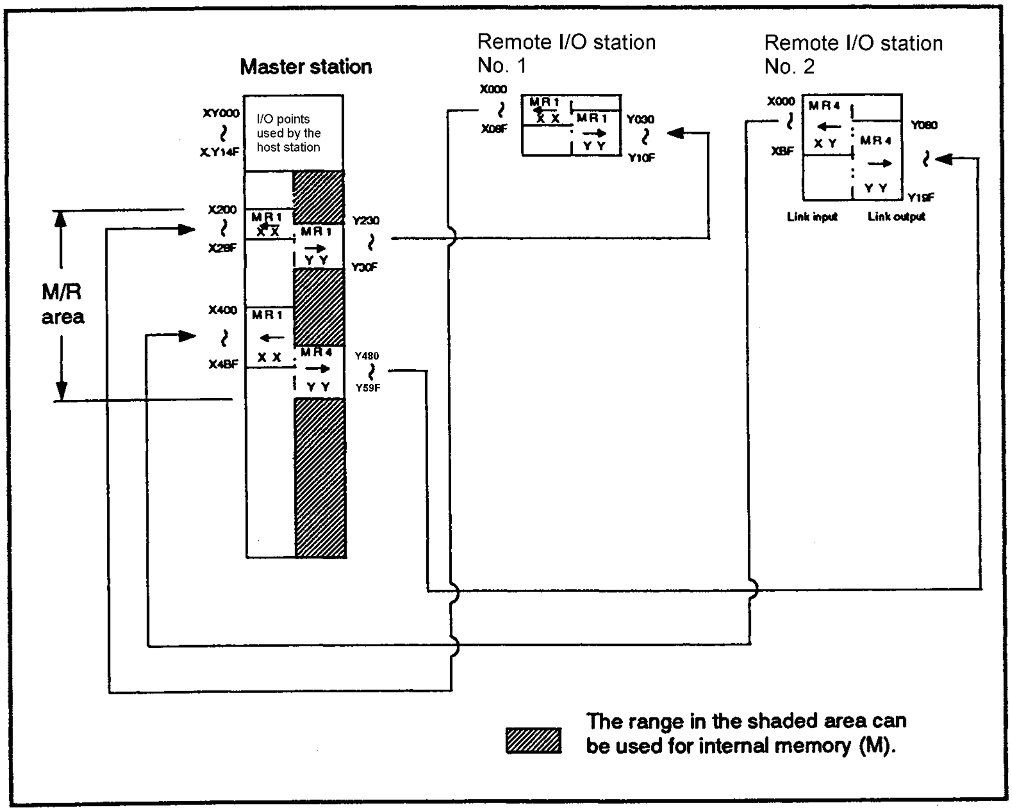


Fig 7.14 Inputs (X) and outputs (Y) assignment example

(4) Link parameter setting
When the assignment of (1) to (3) is executed, set the link parameters as shown in the figure below.

* LINK *

MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms
		B	W		
M	2	-	-	200	XXXX

M : B	↔	ALL	L : B		-
M : W	↔	ALL	L : W		-
M : W	→	ALL	R : W		300-341
M : W	←	ALL	R : W		-
M : Y	→	ALL	L : X		-
M : Y	→	ALL	R : Y		230-59F
M : X	←	ALL	L : Y		-
M : X	←	ALL	R : X		200-4BF

L/R NO.	M ← L		M → R	M ← R	M → L/R1		M ← L/R	
	B	W	W	W	Y	X/Y	X	Y/X
R 1	-------	-------	300-310	360-36F	230-30F	030-10F	200-28F	000-08F
R 2	-------	-------	320-341	380-39F	480-59F	080-19F	400-4BF	000-0BF
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

↑
L : LOCAL
R : REMOTE

M : MASTER L : LOCAL R : REMOTE

7.7.3 Local/remote I/O system assignment and link parameter setting example

The following describes the assignment of link relays, link registers, inputs, and outputs and the link parameters.

Assignment for a local/remote I/O system

When setting link parameters of local/remote I/O system, consider the following points for assignment.

(1) Determine the link relay (B)/link register (W) assignment range for each master station and local station. (Refer to Section 7.6.2 and Section 7.6.3.)
Determine the assignment range, dividing M/L area into the one for the master station and the one for the local station.

(2) When a special function module is installed to a remote I/O station, link registers (W) are required for reading/writing (RFRP/RTOP instruction) buffer memory.
M/R area is divided into the area for M ← R and the area for M → R to assign. (Refer to Section 7.6.3.)
Divide link registers (W) into the M/L area (for communication between the master station and local stations) and the M/R area (for communication between the master station and remote I/O stations) and assign them. (Refer to Section 7.6.3.)

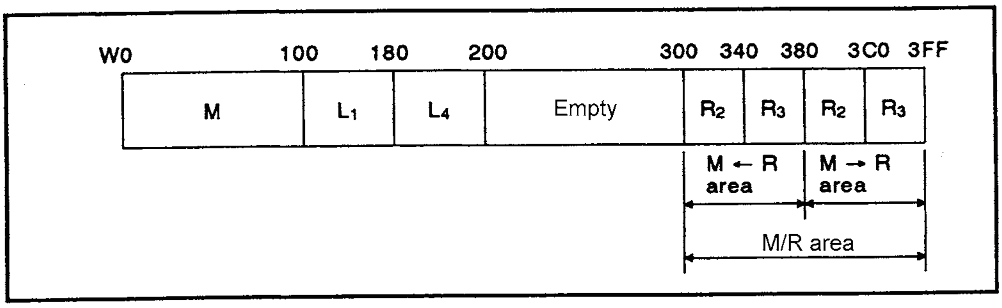


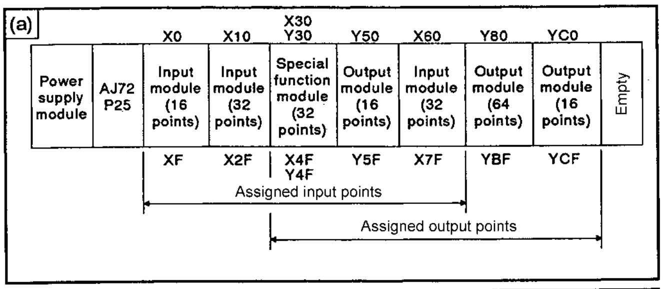
Fig 7.15 Link register (W) assignment example

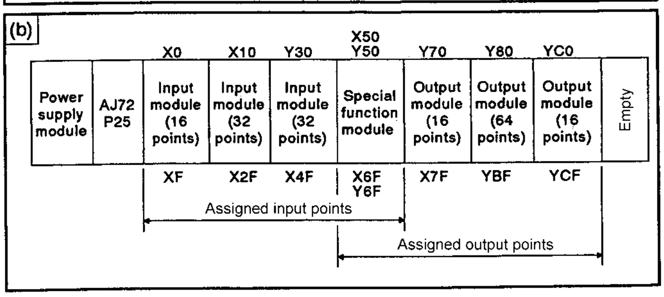
(3) Assign the input (X) and output (Y) range used for data link to the I/O number used in the I/O module and special function module by the master station I/O. (Refer to Section 7.6.4)
   (a) Divide the area used for data link into an M/R area (for communication between the master station and a remote I/O station) and an M/L area (for communication between the master station and a local station) to assign the range.
   (b) The M/L area is used when the number of link relay (B) points is insufficient. Therefore, it is not necessary to assign the M/L area when there is sufficient number of link relay (B) points.

(4) Make sure that the number of link points per station is as follows. (Refer to Section 7.6.1.)
   - Master station................. 1024 bytes or less
   - Local station................... 1024 bytes or less
   - Remote I/O station......... 512 bytes or less
     (Inputs and outputs is 512 points or less of X/Y0 to 1FF)

POINT

(1) If the M → R area used by the system is used incorrectly in a user program, data cannot be read/written correctly, when the RFRP/RTOP instruction is executed.
(2) The number of link points can be reduced by mounting modules to a remote I/O station in groups of input modules, special function modules, and output modules as shown below. If the installation of I/O modules is changed from (a) to (b), a reduction of 16 input assignment points and 32 output assignment points can be achieved.





Link parameter setting example

The following explains the procedure for setting link parameters when a local/remote I/O system is used in the MELSECNET mode.

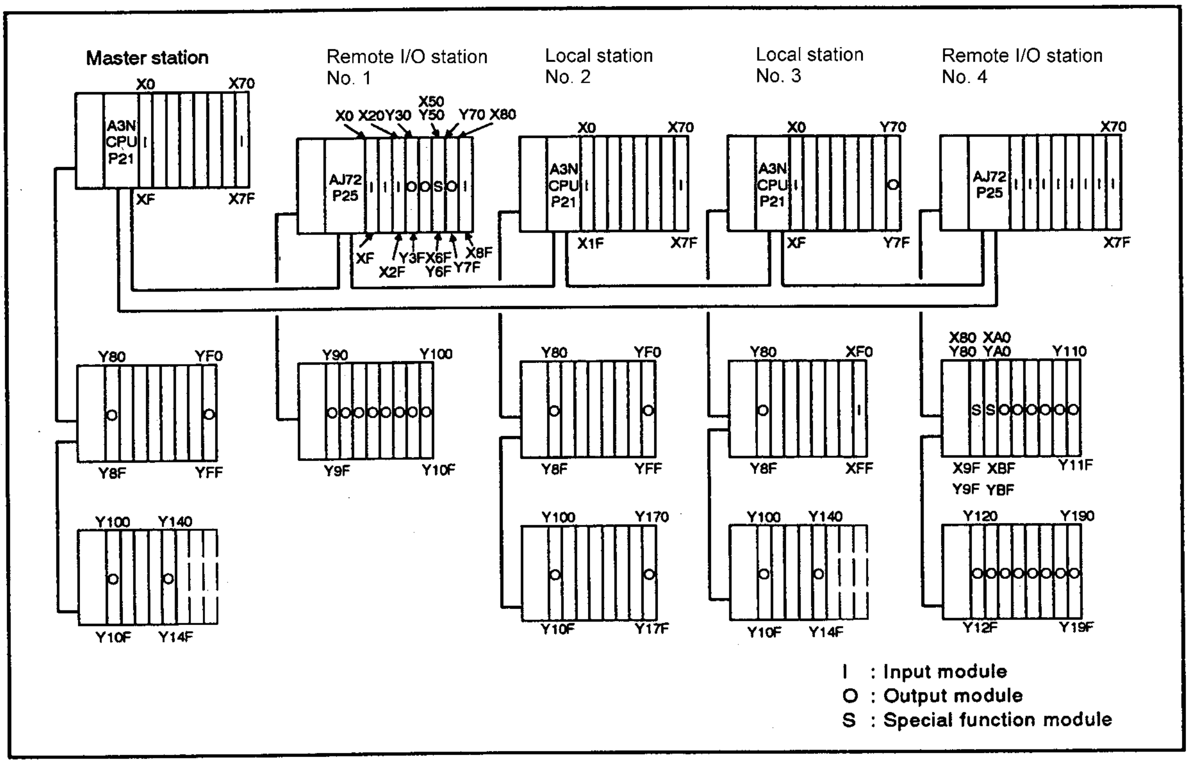


Fig 7.16 System configuration example

(1) Assignment of link relays (B)

(a) Fig 7.17 shows the case when assigning 256 points to the master station, 128 points to local station No.2, 128 points to local station No.3, and 128 points empty area between local station No.2 and local station No.3.

	Master station			Local station No. 2			Local station No. 3		
Device range (M/L area: B0 to B280)	Coil	Contact	Used as internal relays (M) by the host station	Coil	Contact	Used as internal relays (M) by the host station	Coil	Contact	Used as internal relays (M) by the host station
B0 – B100: M	o	o			o			o	
B100 – B180: L2		o		o	o			o	
B180 – B200: *1									
B200 – B280: L3		o			o		o	o	
B280 – B3FF			o			o			o

Coil : ON/OFF control of link relays (B)
Contact : Reads ON/OFF data using link relay (B) contact
O : Usable range

Fig 7.17 Link relay (B) assignment example

(b) The empty area marked with *1 in the M/L area in Fig 7.17 cannot be used as a substitute for internal relays (M) in the master station and all local stations.
The M/L area is the range (B0 to 27F) from the minimum device number to the maximum device number assigned by the link parameters.

(2) Assignment of link registers (W)

(a) Assignment for the master station and local stations (M/L area)

256 points to the master station, 128 points to local station No.2, and 196 points to local station No.3 are assigned

(b) Assignment for the remote I/O stations (M → R area, M ← R area)

Assign 16 points for the RTOP instruction and 16 points for the RFRP instruction in the user program of the master station as remote I/O station No.1.

No.1 requires 17 points (16 points (for RTOP) + 1 point (for OS)) for the M → R area because one special function module is installed.

Assign 32 points for the RTOP instruction and 32 points for the RFRP instruction in the user program of the master station for the remote I/O station No.4. For No.4, 34 points (32 points for RTOP + 2 points for OS) are required for the M → R area, because two special function modules are installed.

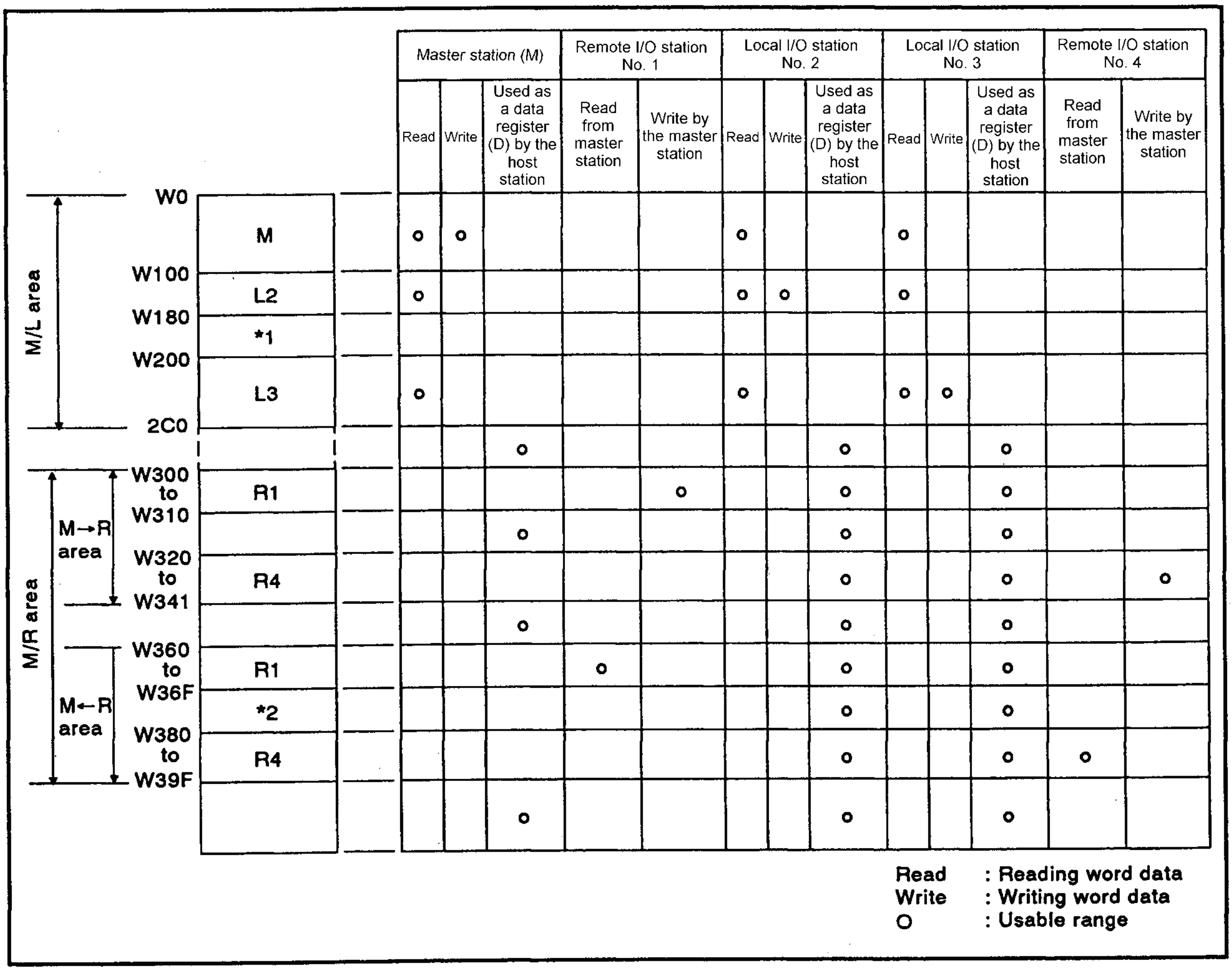


Fig 7.18 Link register (W) assignment example

(c) The empty area marked with *1 in the M/L area in Fig 7.18 cannot be used as a substitute for data register (D) in the master station and all local stations.

In addition, empty area of M ← R area marked with *2 cannot be used as a data register (D) by the master station.

(3) Assignment of inputs (X) and outputs (Y)
    (a) Input and output range used for data link by the master station
        The master station uses the X/Y0 to X/Y14F range as I/O of host station.
        For the data link, the X/Y150 to X/Y7FF range can be used.
    (b) Assignment of remote I/O stations
        1) Assignment of remote I/O station No.1
           Inputs (X): X0 to 8F
           Outputs (Y): Y30 to 10F
        2) Assignment of remote I/O station No.4
           Inputs (X): X0 to BF
           Outputs (Y): Y80 to 19F

    (c) Assignment of local stations
        In this example, inputs (X) and outputs (Y) are not required because there is empty area in the link relay (B) assignment. However, to simplify the explanation, 128 input (X) points and 128 output (Y) points are assigned.
        1) Assignment of local station No.2
           Local station No.2 uses the X/Y0 to X/Y17F range as I/O of host station. For the data link, the X/Y180 to X/Y7FF range can be used.
        2) Assignment of local station No.3
           Local station No.3 uses the X/Y0 to X/Y14F range as I/O of host station. For the data link, the X/Y150 to X/Y7FF range can be used.

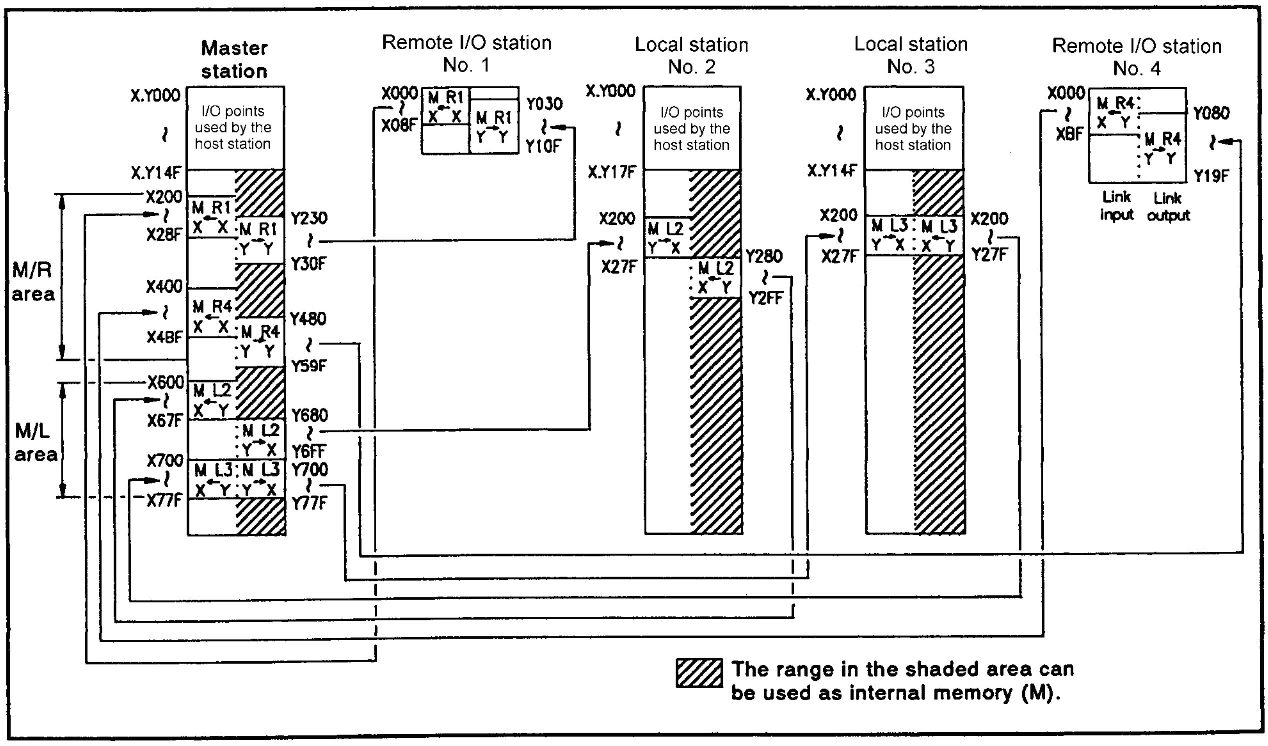


Fig 7.19 Input (X) and output (Y) assignment example

(4) Link parameter setting example

When the assignment of (1) to (3) is executed, set the link parameters as shown in the figure below.

* LINK *

MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms
		B	W		
M	4	000-0FF	000-0FF	200	XXXX

M : B	↔	ALL	L : B	000-27F
M : W	↔	ALL	L : W	000-2BF
M : W	→	ALL	R : W	300-341
M : W	←	ALL	R : W	360-39F
M : Y	→	ALL	L : X	680-77F
M : Y	→	ALL	R : Y	230-59F
M : X	←	ALL	L : Y	600-77F
M : X	←	ALL	R : X	200-4BF

L/R NO.	M ← L		M → R	M ← R	M → L/R		M ← L/R	
	B	W	W	W	Y	X/Y	X	Y/X
R 1	-------	-------	300-310	360-36F	230-30F	030-10F	200-28F	000-08F
L 2			-------	-------	680-6FF	200-27F	600-67F	280-2FF
L 3	100-17F	100-17F	-------		700-77F	200-27F	700-77F	200-27F
R 4	200-27F	200-2BF	320-341	-------	480-59F	080-19F	400-4BF	000-0BF
	-------	-------	-		-	-	-	-
	-	-	-	380-39F	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-		-				
				-				

↑
L : LOCAL
R : REMOTE

M : MASTER L : LOCAL R : REMOTE

7.8 Link Parameters in the MELSECNET II Mode

The following describes link parameter setting when the MELSECNET II mode is used. When setting the link parameters, consider the following points for assignment.

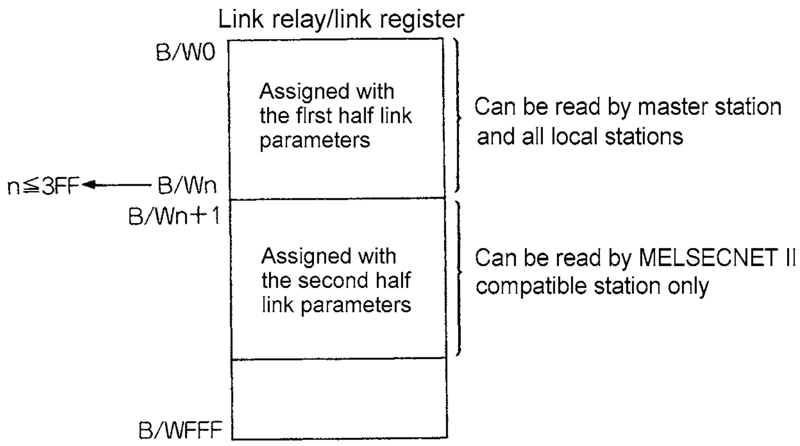
(1) Determine whether to assign both the first and second half link parameters.

(a) If both the first and second half link parameters are assigned, up to 2048 bytes can be used for each station.
If the link range is less than 1024 bytes per station, setting of only the first half link parameters is required.

(b) Using only the first half link parameters makes handshakes easy.
Handshake processing is required when both first and second half link parameters are set. (For handshake processing, refer to Section 9.1(4).)

(c) The setting range of the first half link parameters is B0 to FFF and W0 to FFF.

(d) The range that available for the second half link parameters is the range assigned to the first half link parameters: (final device number) + 1.
If 0 point is set for the first half link parameters, assignment of the second half link parameters can be started with B/W0.



(2) Determine the link relay (B) and link register (W) assignment range for each master station and local station. (Refer to Section 7.6.2 and Section 7.6.3.)

(3) If the number of link relay (B) points is insufficient, examine to substitute inputs (X) and outputs (Y) for (one-to-one) data communicated between the master station and a local.

(4) Make sure that the number of link points per station is as follows. (Refer to Section 7.6.1.)

- Master station's first half link parameters................... 1024 bytes or less
- Master station's second half link parameters............. 1024 bytes or less
- Local station's first half link parameters..................... 1024 bytes or less
- Local station's second half link parameters................ 1024 bytes or less

Link parameter setting example

The link parameter setting of the system configuration shown in Fig 7.20 is explained when the MELSECNET II mode is used.

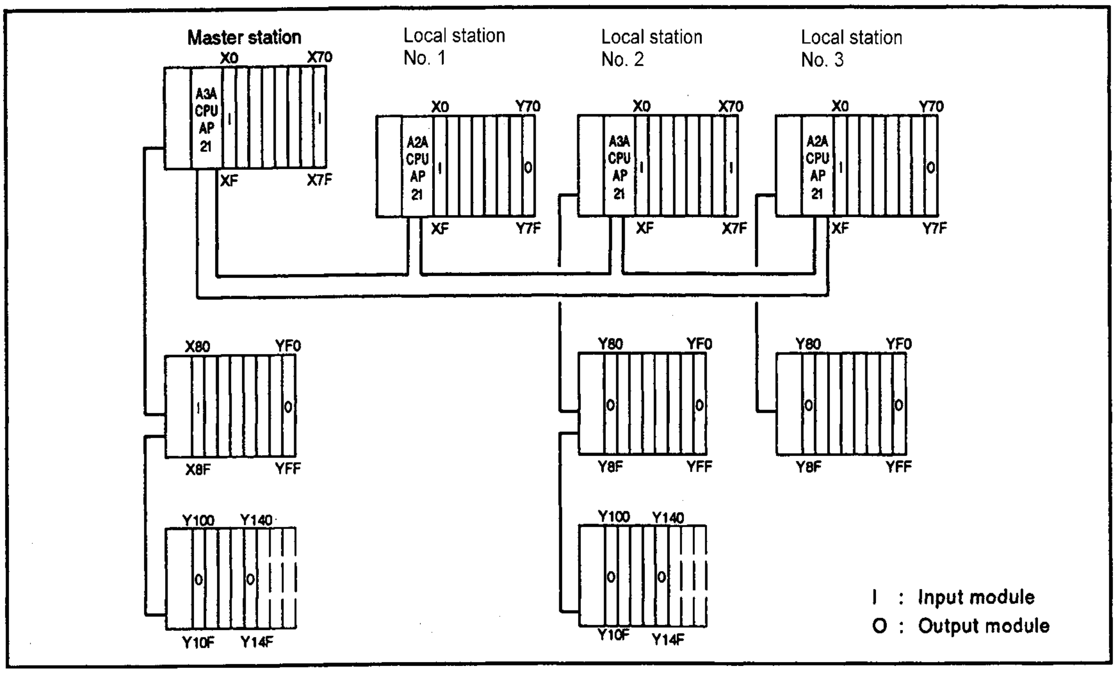


Fig 7.20 Local system configuration example

(1) Number of assigned points
- (a) Link relays (B) 512 points and link registers (W) 512 points for the master station
- (b) Link relays (B) 256 points and link registers (W) 256 points for the local station No.1
- (c) Link relays (B) 512 points and link registers (W) 256 points for the local station No.2
- (d) Link relays (B) 1024 points and link registers (W) 256 points for local station No.3

(2) Examine the ranges to be assigned with the first and second half link parameters
- (a) Because the number of master station link points is 1088 bytes **(512/8 + (512 × 2) = 1088)**, both the first and second half link parameters are required.
  To simplify this explanation, the number of link relays (B) and link registers (W) are halved and assigned with the first and second half link parameters each.
  Although it is possible to assign the link relays (B) only with the first half link parameters and the link registers (W) only with the second half link parameters, assign the link relays (B) used for handshake processing with both the first and second half link parameters.
- (b) Only the first half link parameters are required for the local stations (No.1 to 3) because each station uses less than 1024 link points.

(3) Assignment of link relays (B)

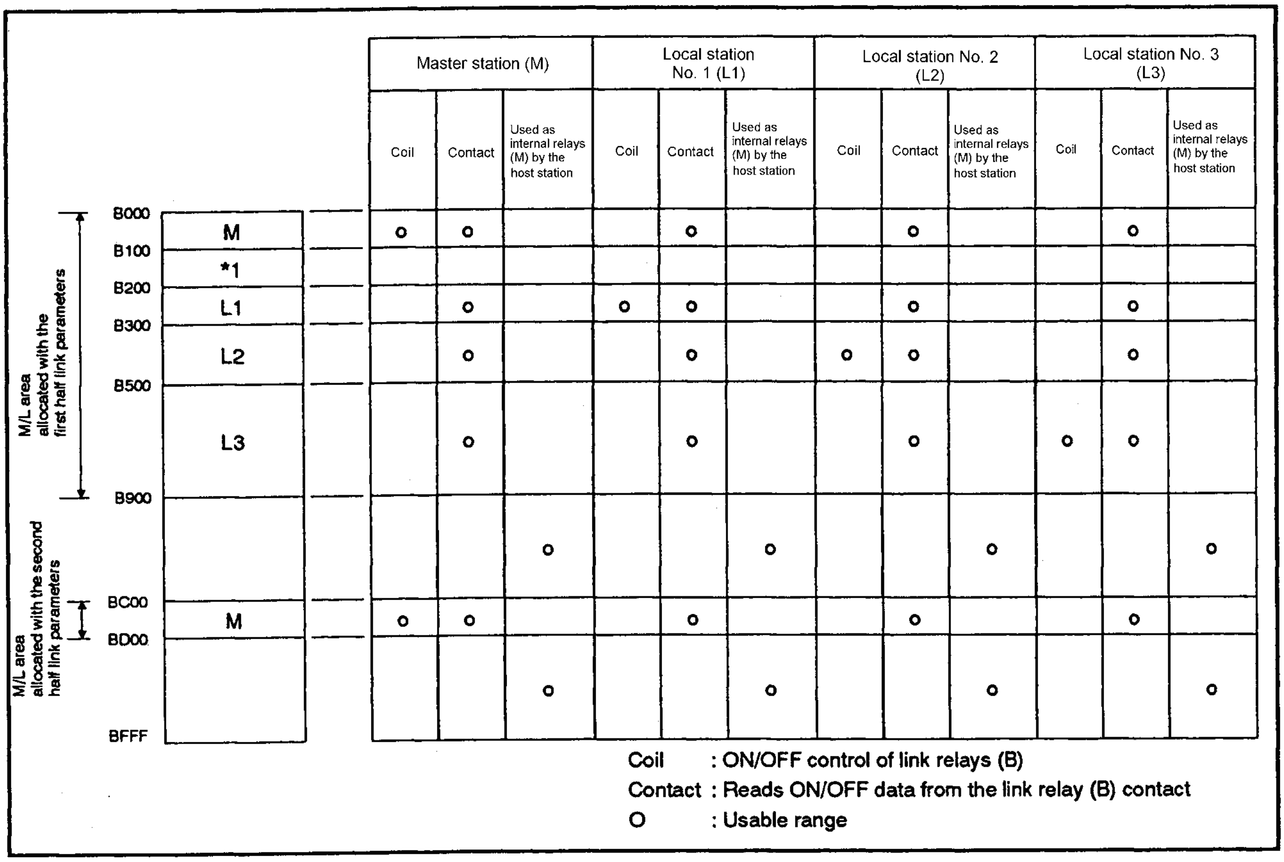


Fig 7.21 Link relay (B) assignment example

(a) The empty area marked with *1 in the M/L area for the first half link parameters in Fig 7.21 assigned cannot be used as a substitute for internal relays (M) in the master station and all local stations.
This is also true for any empty area in the M/L area assigned with the second half link parameters.

(b) The range that can be assigned with second half link parameters is the range assigned with the first half link parameters: (final device number) + 1 or later.
(Example: If the range of B0 to FF is assigned to the first link parameters, "B100" or later can be assigned to the second half parameters)
In Fig 7.21, since the range of B000 to 8FF is assigned to the first half link parameters, B900 or later can be assigned to the second half link parameter.

(4) Assignment of link registers (W)

Area	Address	Assignment	Master station (M)			Local station No. 1 (L1)			Local station No. 2 (L2)			Local station No. 3 (L3)		
			Read	Write	Used as a data register (D) by the host station	Read	Write	Used as a data register (D) by the host station	Read	Write	Used as a data register (D) by the host station	Read	Write	Used as a data register (D) by the host station
M/L area for the first half link parameterstation	W000	M	O	O		O			O			O		
	W100	*1												
	W200	L1	O			O	O		O			O		
	W300	L2	O			O			O	O		O		
	W400	L3	O			O			O			O	O	
	W500				O			O			O			O
M/L area for the second half link parameter	W800	M	O	O		O			O			O		
	W900–WFFF				O			O			O			O

Read : Reading word data
Write : Writing word datat
O : Usable range

Fig 7.22 Link register (W) assignment example

(a) The empty area marked with *1 in the M/L area for the first half link parameters in Fig 7.22 cannot be used as a substitute for data registers (D) in the master station and all local stations.
This is also true for any empty area in the M/L area assigned with the second half link parameters.

(b) The range that can be assigned with the second half link parameters is the range assigned with the first half link parameters: (final device number) + 1 or later.
In Fig 7.22, since the range of W000 to 4FF is assigned to the first half link parameters, W500 or later can be assigned to the second half link parameters.

(5) Assignment of inputs (X) and outputs (Y)
In this system example, inputs (X) and outputs (Y) are not to be used because there is an empty area in the link relay (B) assignment. However, to simplify the explanation, 128 input (X) points and 128 output (Y) points each are assigned to local stations No.1 and No.3.
(Inputs (X) and outputs (Y) are not set for local station No.2.)
(a) Range used for data link by master station
The master station uses the X/Y0 to 14F range as I/O of host station.
For data link, the X/Y150 to 7FF range can be used.

(b) Input and output range used for data link by local station No.1
The local station No.1 uses the X/Y0 to 7F range as I/O of host station.
For the data link, the X/Y80 to 1FF range can be used.

(c) Input and output range used for data link by local station No.3
The local station No.3 uses the X/Y0 to FF range as I/O of host station.
For the data link, the X/Y100 to 7FF range can be used.

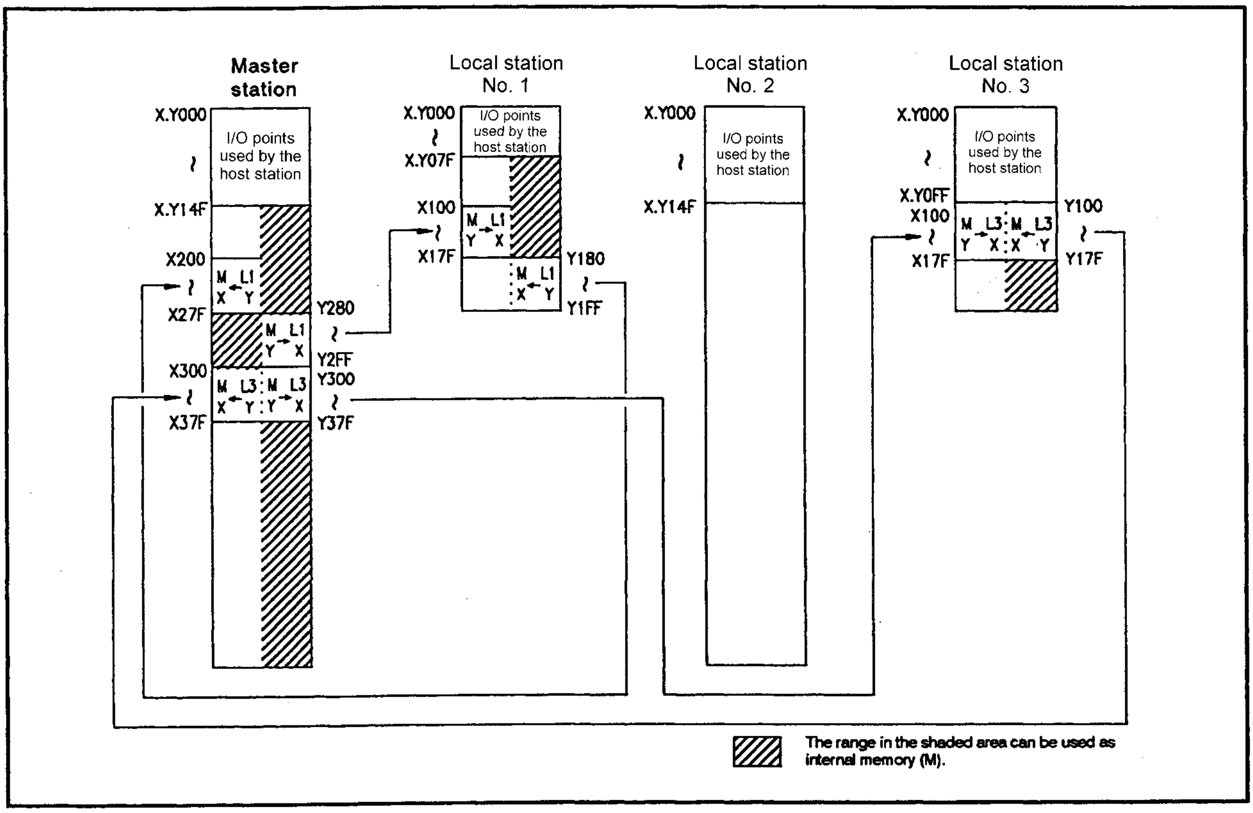


Fig 7.23 Input (X) and output (Y) assignment example

(6) Link parameter setting

Set the link parameters assigned as (1) to (5) as follows:

(a) First half link parameters

* MELSECNET II MODE LINK *

MASTER	SLAVE PC STATIONS	FIRST M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms
		B	W		
M	3	000-0FF	000-0FF	200	XXXX

M : B1	↔	ALL	L : B1	000-8FF
M : W1	↔	ALL	L : W1	000-4FF
M : B2	↔	ALL	L : B2	C00-CFF
M : W2	↔	ALL	L : W2	800-8FF
M : W	→	ALL	R : W	-
M : W	←	ALL	R : W	-
M : Y	→	ALL	L : X	280-37F
M : Y	→	ALL	R : Y	-
M : X	←	ALL	L : Y	200-37F
M : X	←	ALL	R : X	-

L/R NO.	FIRST M ← L				M → L		M ← L	
	B	W			Y	X	X	Y
L 1 II	200-2FF	200-2FF	-------	------	280-2FF	100-17F	200-27F	180-1FF
L 2 II	300-4FF	300-3FF	-------	------	-	-	-	-
L 3 II	500-8FF	400-4FF	-------	------	300-37F	100-17F	300-37F	100-17F
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

M : MASTER L : LOCAL R : REMOTE

PRESS <SSN> TO SELECT 1ST/2ND RANGE OF B/W

(b) Second half link parameters

* MELSECNET II MODE LINK *

MASTER	SLAVE PC STATIONS	SECOND M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms
		B	W		
M	3	C00-CFF	800-8FF	200	XXXX

M : B1	↔	ALL	L : B1	000-8FF
M : W1	↔	ALL	L : W1	000-4FF
M : B2	↔	ALL	L : B2	C00-CFF
M : W2	↔	ALL	L : W2	800-8FF
M : W	→	ALL	R : W	-
M : W	←	ALL	R : W	-
M : Y	→	ALL	L : X	280-37F
M : Y	→	ALL	R : Y	-
M : X	←	ALL	L : Y	200-37F
M : X	←	ALL	R : X	-

L/R NO.	SECOND M ← L				M → L		M ← L	
	B	W			Y	X	X	Y
L 1 II	-	-	-------	-------	-------	-------	-------	-------
L 2 II	-	-	-------	-------	-------	-------	-------	-------
L 3 II	-	-	-------	-------	-------	-------	-------	-------
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

M : MASTER L : LOCAL R : REMOTE

PRESS <SSN> TO SELECT 1ST/2ND RANGE OF B/W

7.9 Link Parameters in the MELSECNET II Composite Mode

The following describes the link parameter setting when the MELSECNET II composite mode is used.

The system configuration in the MELSECNET II composite mode includes the following three types.

- System consisting of a master station and local stations (Local system)
- System consisting of a master station and remote I/0 stations (Remote I/O system)
- System consisting of a master station, local stations, and remote I/O stations (Local/ remote I/O system)

7.9.1 Local system assignment

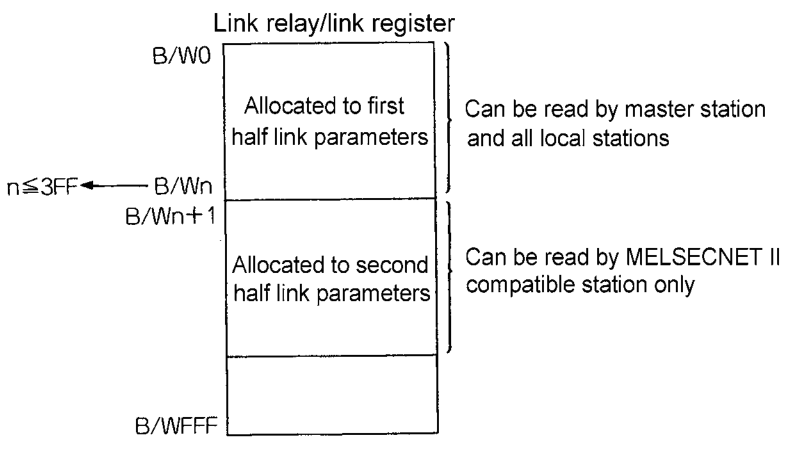
When setting link parameters of a local system, consider the following points for assignment.

(1) Examine the link relay (B) and link register (W) range to be assigned with the first and second half link parameters for each MELSECNET II mode-compatible station.
As for MELSECNET mode-compatible stations, only first half link parameters is set.

(a) The device range assigned with the first half link parameters can be read by the master station and all local stations. However, the range assigned with the second half link parameters can only be read by MELSECNET II mode-compatible stations.
Examine the assignment range according to the station with which data communication will be executed.

(b) The setting range of the first half link parameters is B0 to 3FF and W0 to 3FF.

(c) The device range that can be assigned with the second half link parameters is the range assigned with the first half link parameters: "(final device number) + 1 " or later.
(Example: If the range of B0 to FF is assigned to the first link parameters, "B100" or later can be assigned to the second half parameters)
If 0 point is assigned with the first half link parameters, assignment with the second half link parameters can be started with B/W0.



(2) If the number of link relay (B) points is insufficient, examine to substitute inputs (X) and outputs (Y) for data communicated between the master station and a local station (one-to-one). (Refer to Section 7.6.4.)

(3) Make sure that the number of link points per station is as follows. (Refer to Section 7.6.1.)

- Master station first half link parameters............... 1024 bytes or less
- Master station second half link parameters.......... 1024 bytes or less
- Local station first half link parameters.................. 1024 bytes or less
- Local station second half link parameters............. 1024 bytes or less

7.9.2 Remote I/O system assignment

When setting link parameters of a remote I/O system, consider the following points for assignment.

(1) Determine what number of master station the device number of I/O module installed to the remote I/O station is assigned.
The I/O numbers that can be assigned to a remote I/O station is the I/O numbers used for master station as I/O of host station. (Refer to Section 7.6.4.)

(2) When a special function module is installed to a remote I/O station, determine the link register (W) assignment range (M/R area) to be used for reading/writing buffer memory (RFRP/RTOP instruction). The W0 to 3FF range can be used for the M/R area. (Refer to Section 7.6.3.)
(a) Divide the M/R area into the M ← R area and the M → R area to be assigned.
When connecting more than one remote I/O station, assign an M ← R area and an M → R area to each remote I/O station.
For example, when connecting three remote I/O stations, divide the M ← R area and → R area into three stations as shown in Fig 7.24.

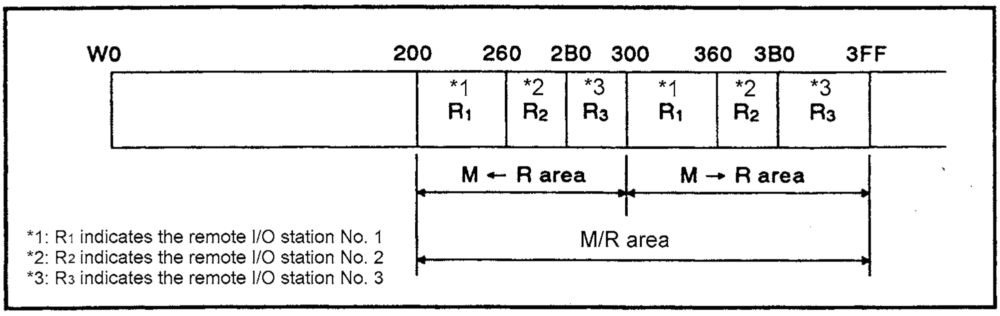


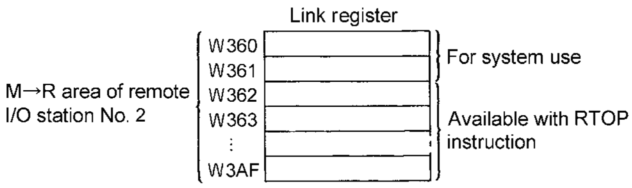
Fig 7.24 Link register (W) assignment example

(b) Consider the range used by the system when assigning the M → R area.
The system uses the M → R area to execute RFRP/RTOP instructions.
1) Number of points used by the system
The link register (W) 1 point is used for one special function module installed to a remote I/O station.

2) Range used by the system

The range used by the system is from the head device number of M → R area assigned from each remote I/O station to "number of use points - 1 ".

For example, when three special function modules are installed to remote I/O station No.2, the range W360 to 362 in the M → R area W360 to W3AF shown below is used by the system.



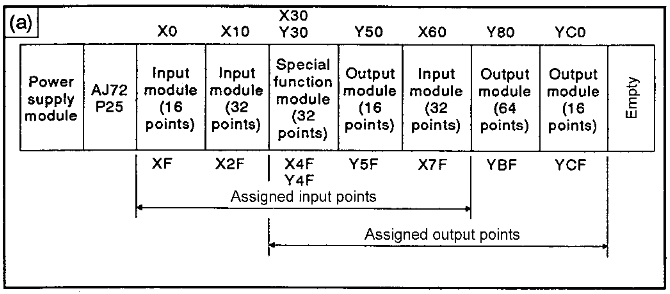
(3) Make sure that the number of link points per station is as follows. (Refer to Section 7.6.1.)

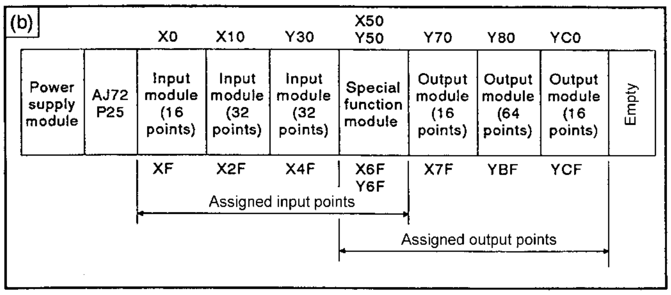
- Remote I/O station........... 512 bytes or less
  (Inputs and outputs are 512 points of X/Y0 to 1FF)

POINT

(1) If the M → R area used by the system is used incorrectly in a user program, data cannot be read/written correctly, when the RFRP/RTOP instruction is executed.

(2) The number of link points can be reduced by mounting modules to a remote I/O station in groups of input modules, special function modules, and output modules as shown below. If the installation of I/O modules is changed from (a) to (b), a reduction of 16 input assignment points and 32 output assignment points can be achieved.





REMARK

The same concept is used to set the link parameters of a remote I/O system configured in the MELSECNET II composite mode and that of a remote I/O system configured in the MELSECNET mode.

7.9.3 Local/remote I/O system assignment

When setting link parameters of a local/remote I/O system, consider the following points for assignment.

(1) Link relay assignment
For link relay (B), determine an assigned range for each of master and local stations. (Refer to Section 7.4.3.)

(a) Examine the link relay (B) assignment range with the first and second half link parameters for each MELSECNET II mode-compatible station.
The device range assigned with the first half link parameters can be read by the master station and all local stations. However, the range assigned with the second half link parameters can only be read by MELSECNET II mode-compatible stations.
Determine the assignment range according to the station with which data communication will be executed.

(b) The setting range of the first half link parameters is B0 to 3FF.

(c) The device range that can be assigned with the second half link parameters is the range assigned with the first half link parameters: "(final device number) + 1" or later.
(Example: If the range of B0 to FF is assigned to the first link parameters, "B100" or later can be assigned to the second half parameters)
If 0 point is assigned with the first half link parameters, assignment with the second half link parameters can be started with B0.

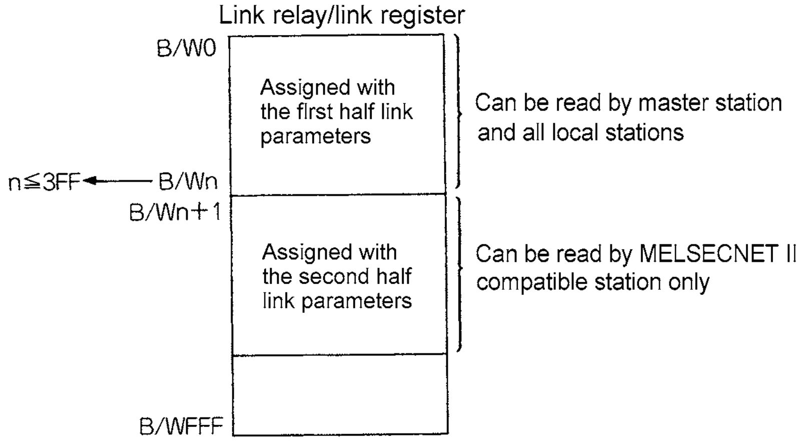
(2) When a special function module is installed to a remote I/O station
Link registers (W) are required for reading/writing buffer memory (RFRP/RTOP instruction).
Divide the link registers (W) in the W0 to 3FF range to be assigned with the first half link parameters into the M/L area (for communication between the master station and a local station) and the M/R area (for communication between the master station and a remote I/O station) and assign them.

(3) Link register assignment
For the M/L area of link registers (W), determine an assigned range for each of master and local stations.

(a) Examine the link register (W) assignment range of the first and second half link parameters for each MELSECNET II mode-compatible station.
The device range assigned with the first half link parameters can be read by the master station and all local stations. However, the range assigned with the second half link parameters can only be read by MELSECNET II mode-compatible stations.
Determine the assignment range according to the station with which data communication will be executed.

(b) The device range that can be assigned with the first half link parameters is W0 to 3FF.

(c) The device range that can be assigned with the second half link parameters is the range assigned with the first half link parameters: "(final device) + 1 " or later. (Example: If the range of B0 to FF is assigned to the first link parameters, "B100" or later can be assigned to the second half parameters)
If 0 point is assigned with the first half link parameters, assignment with the second half link parameters can be started with W0.



(4) Divide the M/R area in link register (W) into the M ← R area and the M → R area and assign them.
Only the W0 to 3FF range can be used for the M/R area.
(a) When connecting more than one remote I/O station, assign an M ←R area and an M → R area to each remote I/O station.
For example, when connecting two remote I/O stations, divide the M ← R area and M → R area into two stations as illustrated below and assign them.

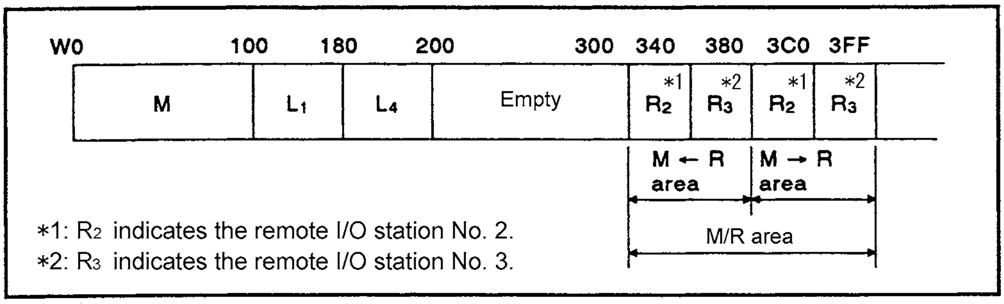
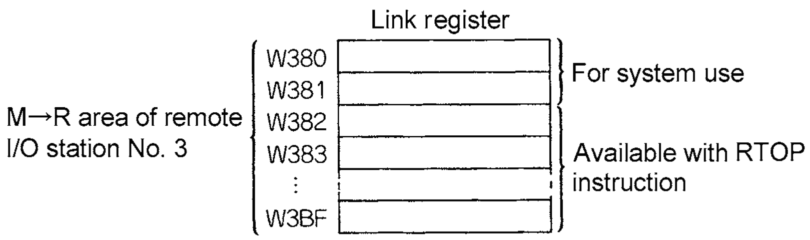


Fig 7.25 Link register (W) assignment example

(b) Consider the range used by the system when assigning the M → R area.
The system uses the M → R area to execute the RFRP/RTOP instructions.

1) Number of points used by the system
The link register (W) 1 point is used for one special function module installed to a remote I/O station.

2) Range used by the system
The range used by the system is from the head device number of M → R area assigned to each remote I/O station to "number of use points - 1 ".
For example, when two special function modules are installed to remote I/O station No.3, the range W380 to 381 in the M → R area W380 to 3BF is used by the system as shown below.



(5) Assign the input (X) and output (Y) range used for data link to the I/O number used by the master station as I/O of host station.

(a) Divide the area used for data link into an M/R area (for communication between the master station and a remote I/O station) and an M/L area (for communication between the master station and a local station) to assign.

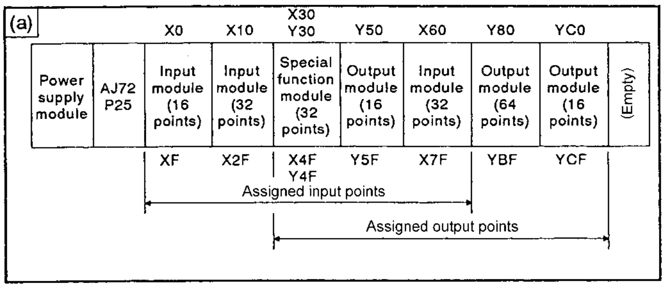
(b) The M/L area is used when the number of link relay (B) points is insufficient. Therefore, it is not necessary to assign the M/L area when there is sufficient number of link relay (B) points.

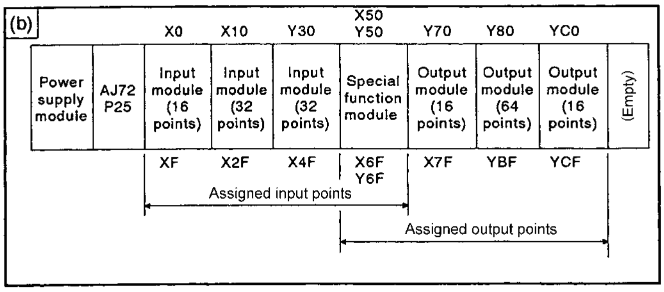
(6) Make sure that the number of link points per station is as follows. (Refer to Section 7.6.1.)

- Master station first half link parameters......... 1024 bytes or less
- Master station second half link parameters... 1024 bytes or less
- Local station first half link parameters........... 1024 bytes or less
- Local station second half link parameters..... 1024 bytes or less
- Remote I/O stations...................................... 512 bytes or less
(Inputs and outputs are 512 points of X/Y0 to 1FF)

POINT

(1) If the M → R area used by the system is used incorrectly in a user program, data cannot be read/written correctly, when the RFRP/RTOP instruction is executed.
(2) The number of link points can be reduced by mounting modules to a remote I/O station in groups of input modules, special function modules, and output modules as shown below. If the installation of I/O modules is changed from (a) to (b), a reduction of 16 input assignment points and 32 output assignment points can be achieved.





REMARK

When all of the local stations are MELSECNET II mode-compatible data link module, the master station and all of the local stations can be assigned with the second half link parameters, which can simplify handshake processing mentioned in Section 9.1 (4).

7.9.4 Link parameter setting example

The following describes the link parameter setting system configuration shown in Fig 7.26, using the MELSECNET II composite mode.

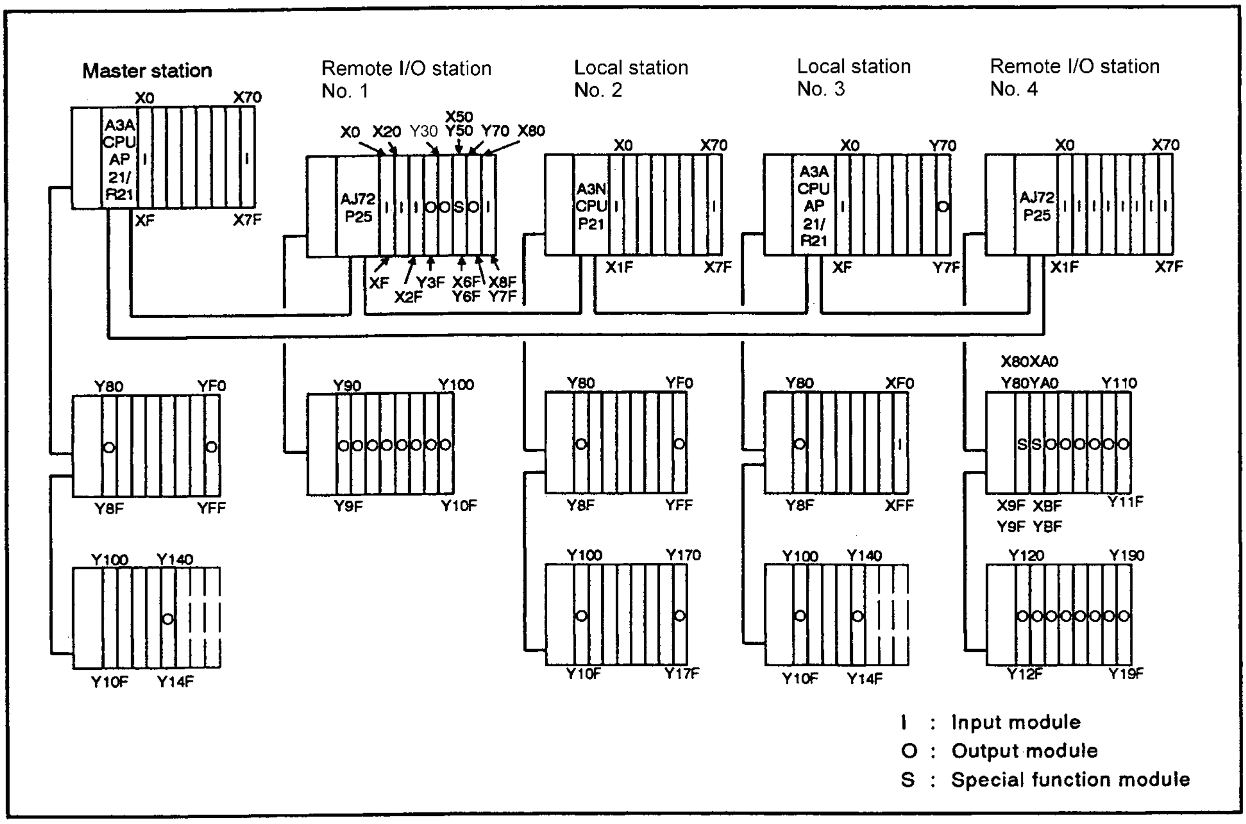


Fig 7.26 Local/remote I/O system configuration example

(1) Number of assigned points

(a) Master station is the MELSECNET II mode-compatible station.
Link relays (B) 256 points and link registers (W) 256 points are assigned with the first half link parameters to communicate with local station No.2/No.3 (all local stations).
In addition, link relays (B) 256 points and link registers (W) 256 points are assigned with the second half link parameters to communicate with local station No.3 (MELSECNET II compatible station).

(b) Local station No.2 is MELSECNET mode-compatible station.
Link relays (B) 256 points and link registers (W) 256 points are assigned with the first half link parameters.

(c) Local station No.3 is MELSECNET II mode-compatible station.
Link relays (B) 256 points and link registers (W) 128 points are assigned with the first half link parameters to communicate with master station/local station No.2 (master station and all local stations).
In addition, link relays (B) 256 points and link registers (W) 256 points are assigned with the second half link parameters to communicate with the master station (master MELSECNET II mode-compatible station).

(2) Assignment of link relays (B)

(a) Assign 256 points for the master station, 256 points for local station No.2, and 256 points for local station No.3 with the first half link parameters.
Assign 256 points for the master station and 256 points for the local station No.3 with the second half link parameters.

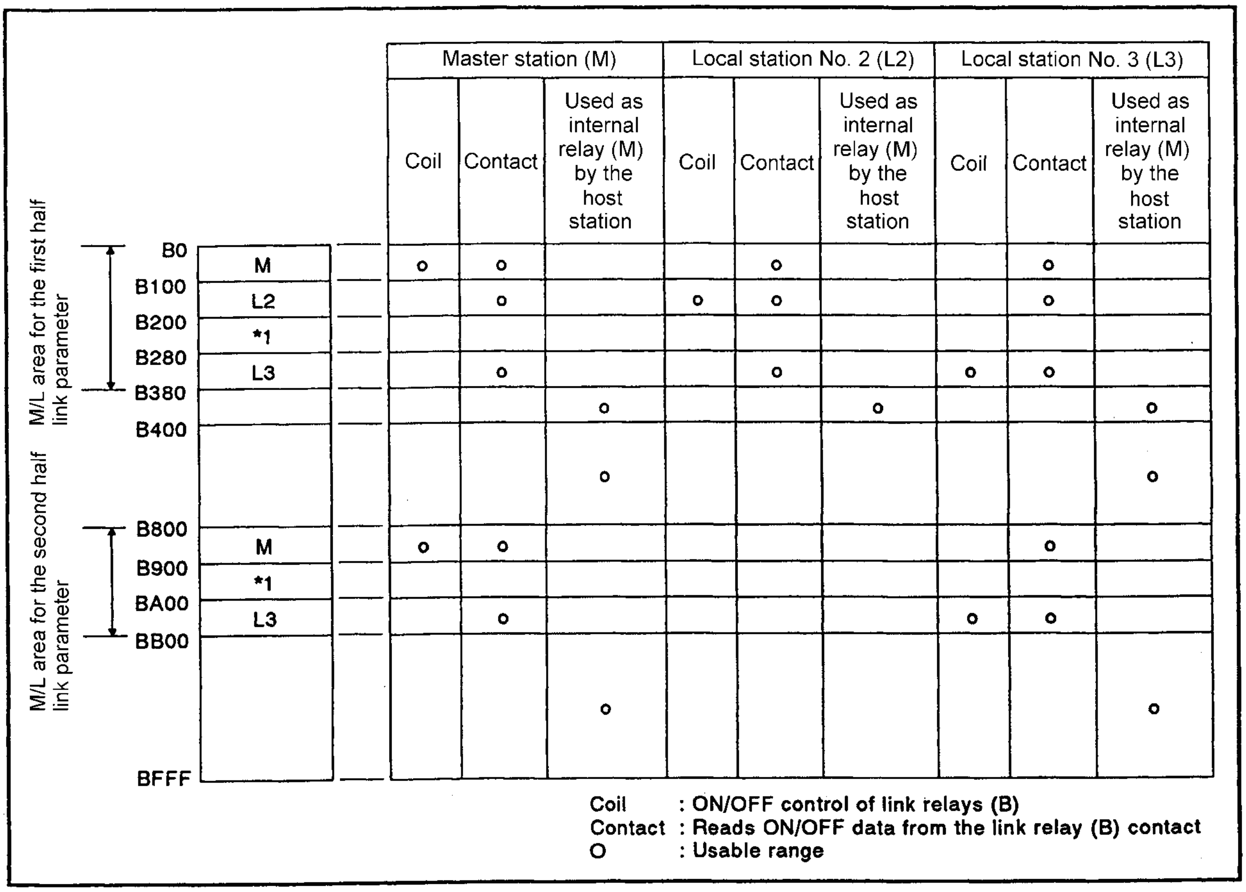


Fig 7.27 Link relay (B) assignment example

(b) The empty area marked with *1 in the M/L area for the first/second half link parameters in Fig 7.27 cannot be used as a substitute for internal relays (M) in the master station and all local stations.

(c) The device range that can be assigned with the second half link parameters is the range assigned with the first half link parameters: "(final device number allocated with the first half link parameters) + 1 " or later.
In Fig 7.27, since the range of B000 to 37F is assigned to the first half link parameters, B380 or later can be assigned to the second half link parameters.

(d) Since local station No.2 is a MELSECNET mode-compatible station, the B400 to FFF range cannot be used.

(3) Assignment of link registers (W)

(a) Assignment for the master station and local stations (M/L area)

Assign 256 points for the master station (M), 256 points for local station No.2 (L2), and 128 points for local station No.3 (L3) with the first half link parameters. Assign 256 points for the master station (M) and 256 points for local station No.3 (L3) with the second half link parameters.

(b) Assignment for remote I/O stations (M → R area, M ← R area)

16 points for the RTOP instruction and 16 points for the RFRP instruction are required for the remote I/O station No.1 (R1). No.1 requires 17 points (16 points (for RTOP instruction) + 1 point (for system)) for the M → R area since one special function module is installed.

32 points for the RTOP instruction and 32 points for the RFRP instruction are required for the remote I/O station No.4. No.4 requires 34 points (32 points (for RTOP instruction) + 2 points (for system)) for the M → R area since two special function modules are installed.

Area	Device	Assignment	Master station (M)			Remote I/O station No. 1 (R1)		Local station No. 2 (L2)			Local station No. 3 (L3)			Remote I/O station No. 4 (R4)	
			Read	Write	Used as a data register (D) by the host station	Read from master station	Write by master station	Read	Write	Used as a data register (D) by the host station	Read	Write	Used as a data register (D) by the host station	Read from master station	Write by master station
M/L area for the first half link parameter	W0	M	o	o				o			o				
	W100	L2	o					o	o		o				
	W200	*1													
	W240	L3	o					o			o	o			
	W2C0				o					o			o		
M/R area, M→R area	W300	R1					o			o			o		
	W311				o					o			o		
	W320	R4				o				o			o		
	W342				o					o			o		
M/R area, M←R area	W360	R1								o			o		o
	W370	*2								o			o		
	W380	R4								o			o	o	
	W3A0				o					o			o		
	W400				o								o		
M/L area for the second half link parameter	W800	M	o	o							o				
	W900	*1													
	WA00	L3	o								o	o			
	WB00–WFFF				o								o		

Read : Reading word data
Write : Writing word data
O : Usable range

Fig 7.28 Link register (W) assignment example

(c) The empty areas marked with *1 (in the M/L area) and *2 (in the M ← area) in Fig. 7.28 cannot be used as a substitute for data register (D) in the master station and all local stations.

(d) Since local station No.2 is a MELSECNET-compatible station, the B400 to FFF range cannot be used.

(4) Assignment of inputs (X) and outputs (Y)

(a) Input and output range can be used for data link by master station
The master station uses the X/Y0 to X/Y14F range as I/O of host station. For the data link, the X/Y150 to X/Y7FF range can be used.

(b) Assignment of remote I/O stations
1) Assignment of remote I/O station No.1
Assignment range of inputs (X): X0 to 8F
Assignment range of outputs (Y): Y30 to 10F
2) Assignment of remote I/O station No.4
Assignment range of inputs (X): X0 to BF
Assignment range of outputs (Y): Y80 to 19F

(c) Assignment of local stations
In this example, inputs (X) and outputs (Y) are not required because there is empty area in the link relay (B) assignment. However, to simplify the explanation, 128 input (X) points and 128 output (Y) points are assigned.
1) Assignment of local station No.2
Local station No.2 uses the X/Y0 to 17F range as I/O station of host station. For the data link, the X/Y180 to 7FF range can be used.
2) Assignment of local station No.3
Local station No.3 uses the X/Y0 to 14F range as I/O station for host station. For the data link, the X/Y150 to 7FF range can be used.

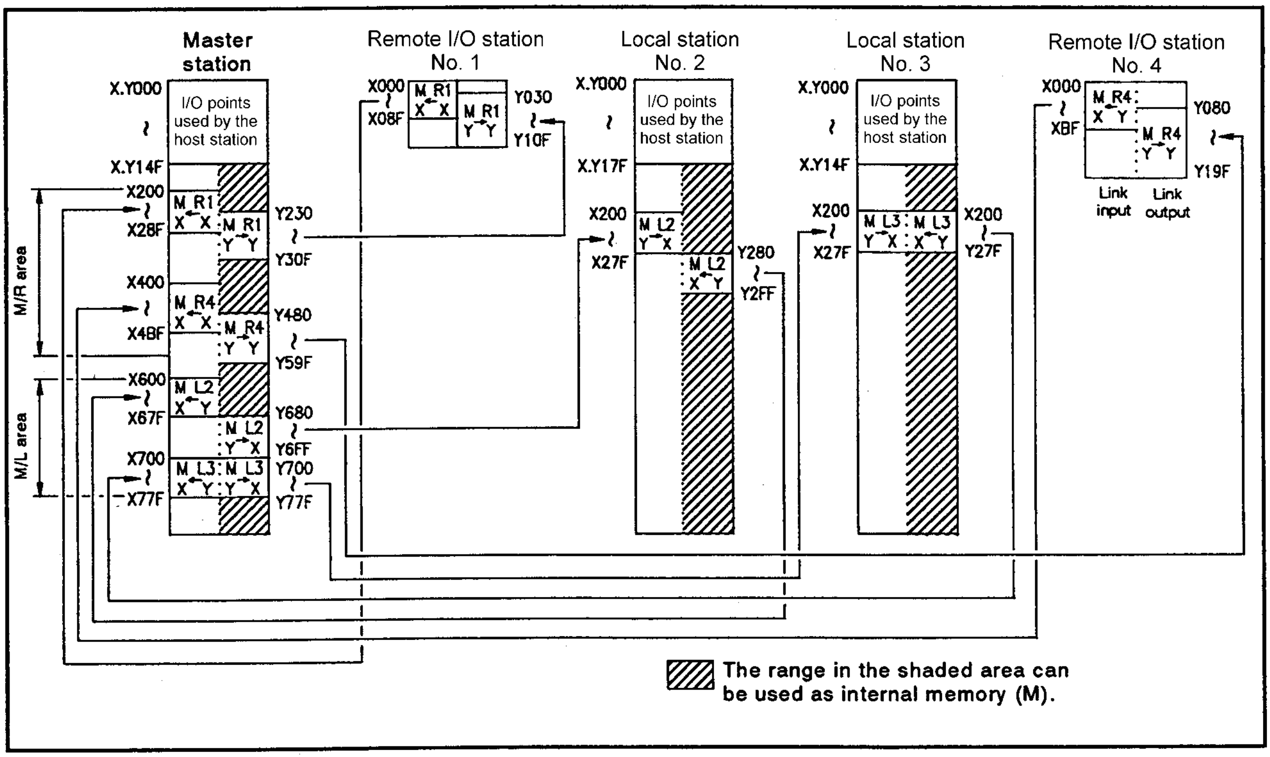


Fig 7.29 Input (X) and output (Y) assignment example

(5) Link parameter setting
When the assignment of (1) to (4) is executed, set the link parameters as shown in the figure below.

(a) First half link parameters

* MELSECNET II MULTI MODE LINK *

MASTER	SLAVE PC STATIONS	FIRST M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms
		B	W		
M	4	000-0FF	000-0FF	200	XXXX

M : B1	↔	ALL	L : B1	000-37F
M : W1	↔	ALL	L : W1	000-2BF
M : B2	↔	ALL	L : B2	C00-CFF
M : W2	↔	ALL	L : W2	800-8FF
M : W	→	ALL	R : W	300-341
M : W	←	ALL	R : W	360-39F
M : Y	→	ALL	L : X	680-77F
M : Y	→	ALL	R : Y	230-59F
M : X	←	ALL	L : Y	600-77F
M : X	←	ALL	R : X	200-4BF

L/R NO.	FIRST M ← L		M → R	M ← R	M → L/R		M ← L/R	
	B	W	W	W	Y	X/Y	X	Y/X
R 1	-------	-------	300-310	360-36F	230-30F	030-10F	200-28F	000-08F
L 2	100-1FF	100-1FF	-------	-------	680-6FF	200-27F	600-67F	280-2FF
L 3 II	280-37F	240-2BF	-------	-------	700-77F	200-27F	700-77F	200-27F
R 4	-------	-------	320-341	380-39F	480-59F	080-19F	400-4BF	000-0BF
:	:	:	:	:	:	:	:	:

M : MASTER L : LOCAL R : REMOTE

↑
L : LOCAL
R : REMOTE
* : MELSECNET-II (LOCAL)

PRESS <SSN> TO SELECT 1ST/2ND RANGE OF B/W

(b) Second half link parameters

* MELSECNET II MULTI MODE LINK *

MASTER	SLAVE PC STATIONS	SECOND M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms
		B	W		
M	4	800-8FF	800-8FF	200	XXXX

M : B1	↔	ALL	L : B1	-
M : W1	↔	ALL	L : W1	-
M : B2	↔	ALL	L : B2	800-AFF
M : W2	↔	ALL	L : W2	800-AFF
M : W	→	ALL	R : W	-
M : W	←	ALL	R : W	-
M : Y	→	ALL	L : X	-
M : Y	→	ALL	R : Y	-
M : X	←	ALL	L : Y	-
M : X	←	ALL	R : X	-

L/R NO.	SECOND M ← L		M → R	M ← R	M → L/R		M ← L/R	
	B	W	W	W	Y	X/Y	X	Y/X
R 1	-------	-------	-------	-------	-------	-------	-------	-------
L 2	-------	-------	-------	-------	-------	-------	-------	-------
L 3 II	A00-AFF	A00-AFF	-------	-------	-------	-------	-------	-------
R 4	-------	-------	-------	-------	-------	-------	-------	-------
:	:	:	:	:	:	:	:	:

M : MASTER L : LOCAL R : REMOTE

↑
L : LOCAL
R : REMOTE
* : MELSECNET-II (LOCAL)

PRESS <SSN> TO SELECT 1ST/2ND RANGE OF B/W

7.10 Three-Tier System Assignment

The following describes the link parameter setting required to use the three-tier system.
The link parameter setting of the three-tier system is basically similar to that of the two-tier system described in Section 7.7 to 7.9.
Set the link parameters according to the operation mode used for each tier.

7.10.1 Common element

The following describes the common elements to know before setting link parameters for the third tier.

(1) The link relay (B) and link register (W) range assigned to the master station and local stations for the third tier is the device range assigned to the host station by link parameters for the second tier.
The link register (W) range which can be assigned to the remote I/O station for the third tier is the range assigned to the remote I/O station for the second tier and empty area.

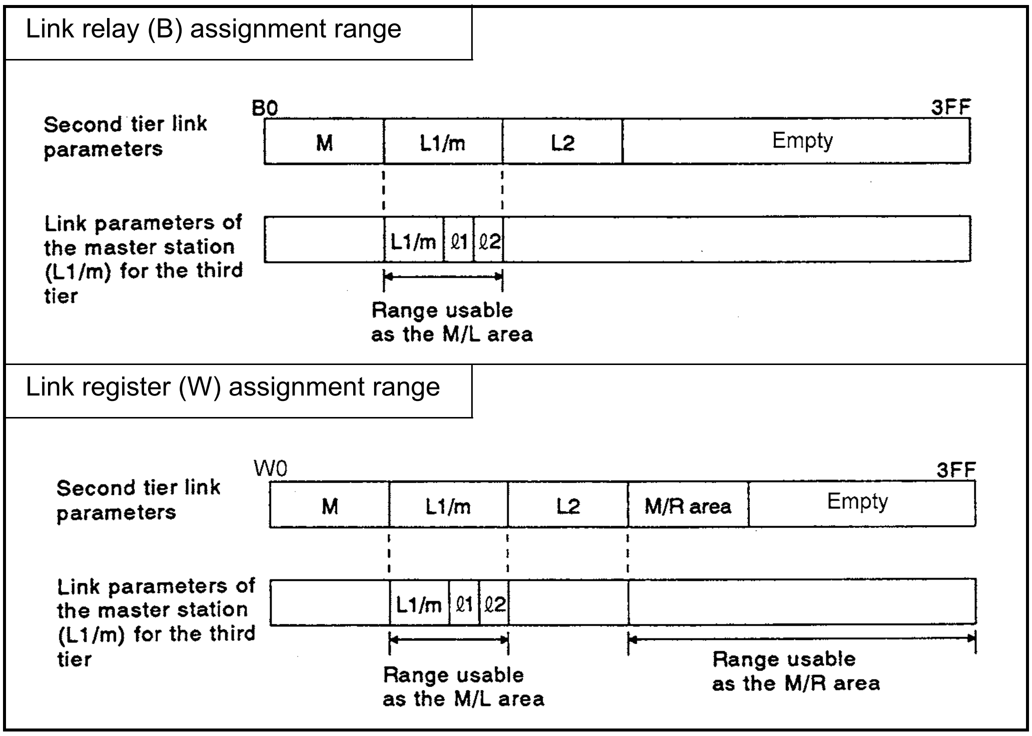


Fig 7.30 Assignment of link relays (B) and link registers (W)

(2) The input (X) and output (Y) range that can be assigned to the master station for the third tier can use the area starting from the I/O use range of host station. This is the same range as assignment range of the master station for the second tier.
If inputs (X) and outputs (Y) are used to establish data link between the master station for the third tier and the master station for the second tier, the assignment range of the master station for the third tier should exclude this range.

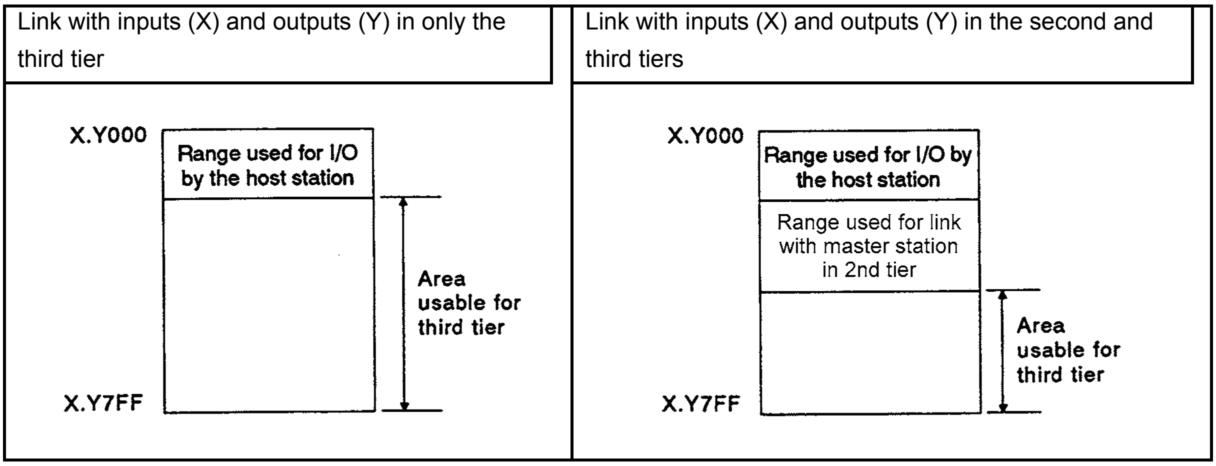


Fig 7.31 Assignment of inputs (X) and outputs (Y) (When A3NCPU is used)

(3) Table 7.4 lists the nine types of combinations ((1) to (9)) depending on the operation modes set for the second tier and the third tier.

Table 7.4 Operation mode combinations for second/third tier

Third tier operation mode	Second tier operation mode		
	MELSECNET mode	MELSECNETII mode	MELSECNETII composite mode
MELSECNET mode	1)	4)	7)
MELSECNETII mode	2)	5)	8)
MELSECNETII composite mode	3)	6)	9)

(4) When the MELSECNET Ⅱ mode or MELSECNET Ⅱ composite mode is selected, the link relay (B) and link register (W) range that can be assigned with the first and second half link parameters is as shown below.

(a) Assign the range assigned with the first half link parameters for the second tier with the first half link parameters for the third tier.
Assign the range assigned with the second half link parameters for the second tier with the second half link parameters for the third tier.

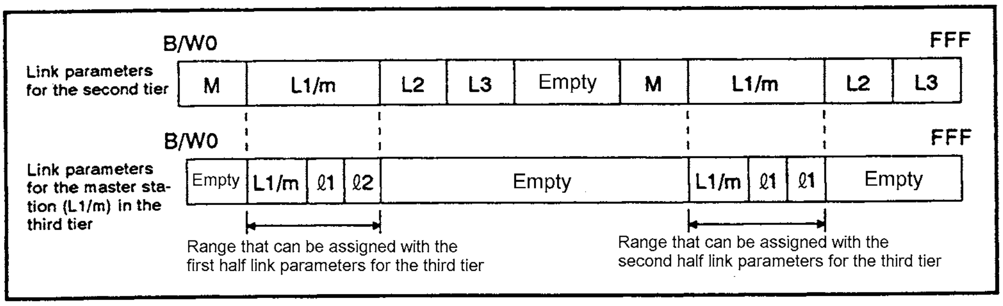


Fig 7.32 When both first and second half link parameters are assigned for second tier

(b) When the selected mode only provides one type of link parameter (the second tier is used for MELSECNET mode) or when the second half link parameters are not assigned, the device range that can be assigned with the second half link parameters is the range assigned with the first half link parameters: "(final device number) + 1" or later.
(Example: If the range of B0 to FF is assigned to the first half link parameters for second tier, "B100"or later can be assigned to the second link parameters for the third tier.)

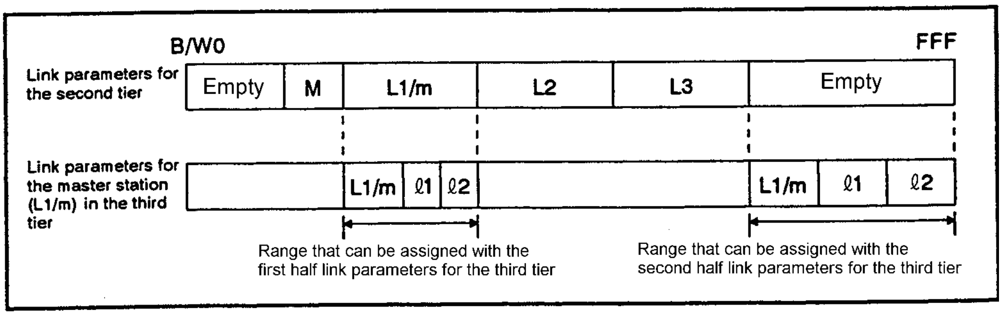


Fig 7.33 When only first half link parameters for the second tier are assigned

(5) In the three-tier system, link relays (B) and link registers (W) can be assigned to the ranges explained in (1) and (4).
In the MELSECNET data link system, range check of link parameters for second tier and link parameters for third tier is performed. This check is called the consistency check.
In the consistency check, the link relay (B) and link register (W) range assigned with the link parameters for the third tier are checked whether or not to be within the range assigned by the host station (master station for the third tier) using link parameters for the second tier. The check results are stored to M9235 and D9220 to 9223 in the master station for the second tier and to M9270 in the master station for the third tier.

(a) The consistency check is executed using the parameters shown in Table 7.5 according to the operation mode combinations of the second and third tiers.
For example, if the operation mode of the second tier is the MELSECNET Ⅱ composite mode and the operation mode of the third tier is the MELSECNET Ⅱ mode, the first half link parameters for the second tier is compared with the first half link parameters for the third tier and the second half link parameters for the second tier are compared with the second half link parameters for the third tier.

○ : Consistency check is executed
× : Consistency check is not executed

Table 7.5 Consistency check of link parameter settings

Third tier operation mode and link parameters		Second tier operation mode and link parameters				
		MELSECNET mode link parameter	MELSECNET Ⅱ mode		MELSECNET Ⅱ composite mode	
			First half link parameters	Second half link parameters	First half link parameters	Second half link parameters
MELSECNET mode link parameters		○	○	×	○	×
MELSECNET Ⅱ mode	First half link parameters	○	○	×	○	×
	Second half link parameters	×	×	○	×	○
MELSECNET Ⅱ composite mode	First half link parameters	○	○	×	○	×
	Second half link parameters	×	×	○	×	○

(b) The following consistency check is executed when there is difference between the number of link parameters set for the second tier and the number of link parameters set for the third tier.

1) When two types of link parameters are set for the second tier and one type of link parameters is set for the third tier:
The consistency check is executed on the first half link parameters for the second tier and the first half link parameters for the third tier (including the MELSECNET mode).
The consistency check is not executed for the second half link parameters for the second tier.

2) When one type of link parameters is set for the second tier and two types of link parameters are set for the third tier:
The consistency check is executed on the first half link parameters (including the MELSECNET mode) for the second tier and the first half link parameters for the third tier.
The second half link parameters for the third tier are checked whether or not to begin after the final device number assigned with the first half link parameters for the second tier.

(c) When the range of link relays (B) and link registers (W) is extended (turning M9208 and M9209 ON to use), the consistency check will not be executed.
Make sure that the link parameters assigned to the third tier are not also assigned to the second tier.

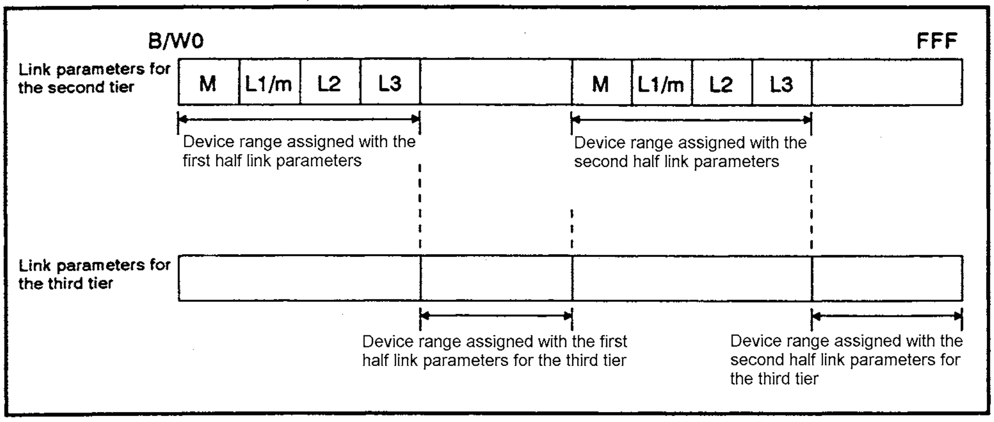


Fig 7.34 Assignment when link relay (B) and link register (W) range is extended

7.10.2 Using the MELSECNET mode in the second tier

The link relay (B) and link register (W) range which can be assigned to the third tier is described per operation mode used in the third tier. Since the assignment of M/L area for link relay (B) is the same as that of M/L area for link register (W), the assignment of the link register (W) is only explained.
The link assignment range of input (X) and output (Y) is the same regardless of combinations of operation modes. Refer to Section 7.10.1 (5).

(1) MELSECNET mode used in the third tier
 (a) The range assigned to the master station for the third tier with the link parameters for the second tier is used for the M/L area for the third tier.

 (b) The M/R area and the empty area of the second tier is used for the M/R area of the third tier.

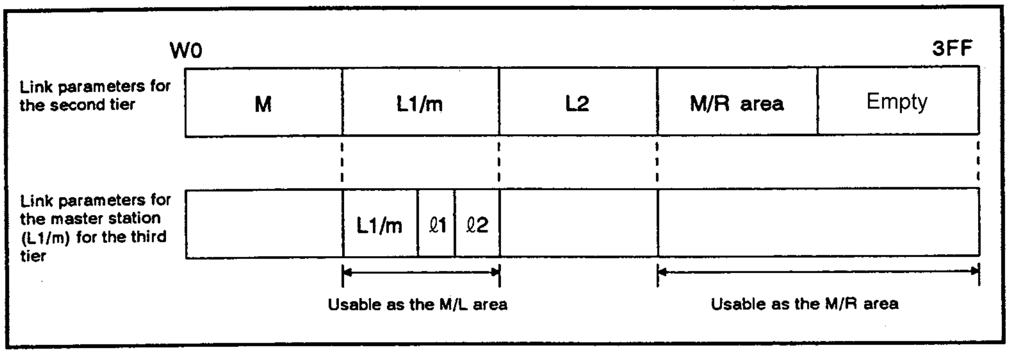


Fig 7.35 Assignment when the MELSECNET mode is used for the third tier

(2) MELSECNET II mode used in the third tier
 (a) The range assigned to the master station for the third tier with the link parameters for the second tier is used for the first half link parameters for the third tier.

 (b) The empty area that begins after the M/L area assigned with the link parameters for the second tier and the M/R area are used for the second half link parameters for the third tier.

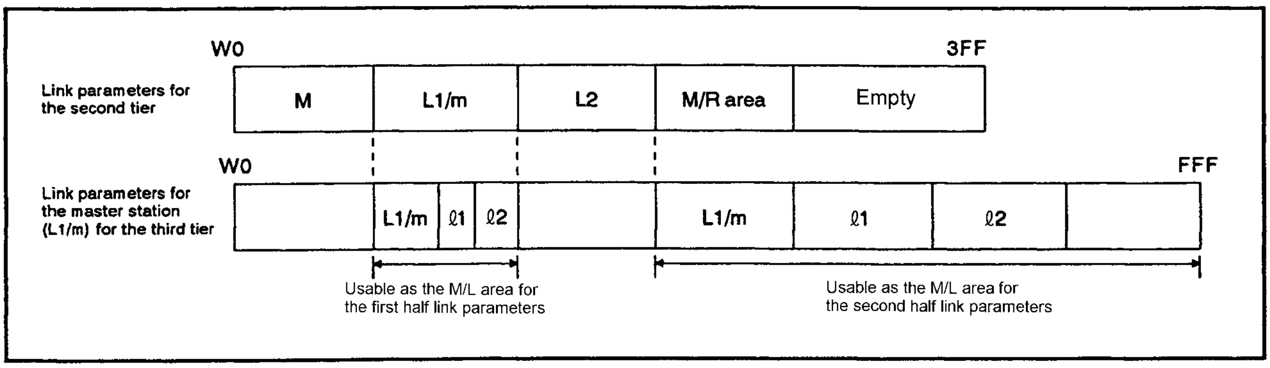


Fig 7.36 Assignment when the MELSECNET II mode is used for the third tier

(3) MELSECNET II composite mode used in the third tier
   (a) First half link parameters for the third tier
      1) The range assigned to the master station for the third tier with the link parameters for the second tier is used for the M/L area.
      2) The M/R area in the second tier and the empty area in the W0 to 3FF range is used for the M/R area.

   (b) The second half link parameters for the third tier can handle the empty area that begins after the M/L area using the link parameters for the second tier.
   However, exclude the range used as M/R area in the first half link parameters for the third tier.

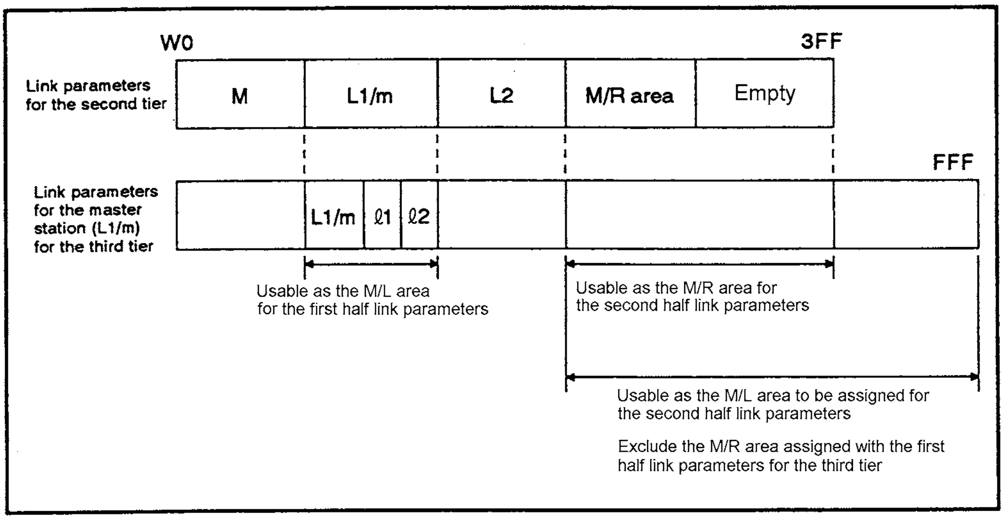


Fig 7.37 Assignment when the MELSECNET II composite mode is used for the third tier

POINT
When connecting a remote I/O station to the third tier, consider the range to be assigned to the M/R area for the third tier with the link parameters for the second tier and assign it. Even when the MELSECNET composite mode is used for the third tier, the range which can be used as M/R area is the W0 to 3FF range. Therefore, the similar attention should be paid.

7.10.3 Using the MELSECNET II mode in the second tier

The link relay (B) and link register (W) range which can be assigned to the third tier is described per operation mode used in the third tier. Since the assignment of M/L area for link relay (B) is the same as that of M/L area for link register (W), the assignment of the link register (W) is only explained.
The link assignment range of input (X) and output (Y) is the same regardless of combinations of operation modes. Refer to Section 7.10.1 (5).

(1) MELSECNET mode used in the third tier
   (a) The range assigned to the master station for the third tier with the first half link parameters for the second tier is used for the M/L area for the third tier.
   The range assigned to the master station for the third tier with the second half link parameters for the second tier cannot be used.
   (b) The empty area within the W0 to 3FF range assigned with link parameters for the second tier is used for the M/R area for the third tier.

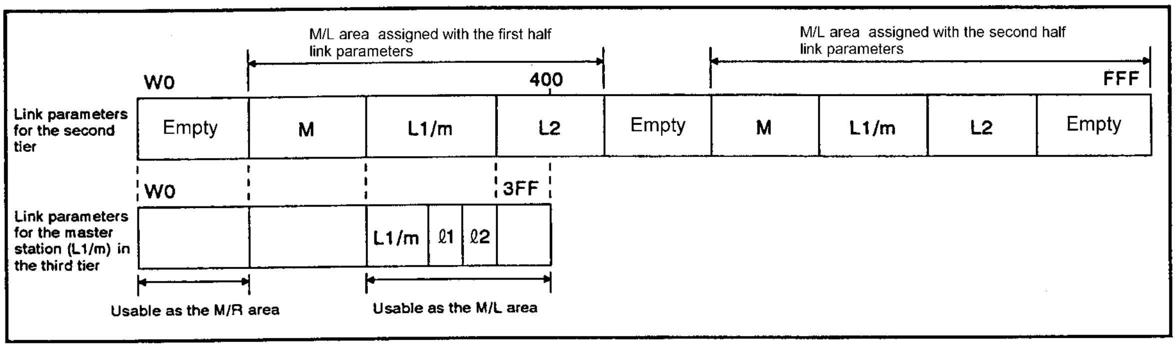


Fig 7.38 Assignment when the MELSECNET mode is used for the third tier

(2) MELSECNET II mode used in the third tier
   (a) The range assigned to the master station for the third tier with the first half link parameters for the second tier is used for the first half link parameters for the third tier.
   (b) The range assigned to the master station for the second tier with the second half link parameters for the second tier is used for the second half link parameters for the third tier. If no area is set to the second half link parameters, use the area that begins after the M/L area assigned to the first half link parameters for the second tier.

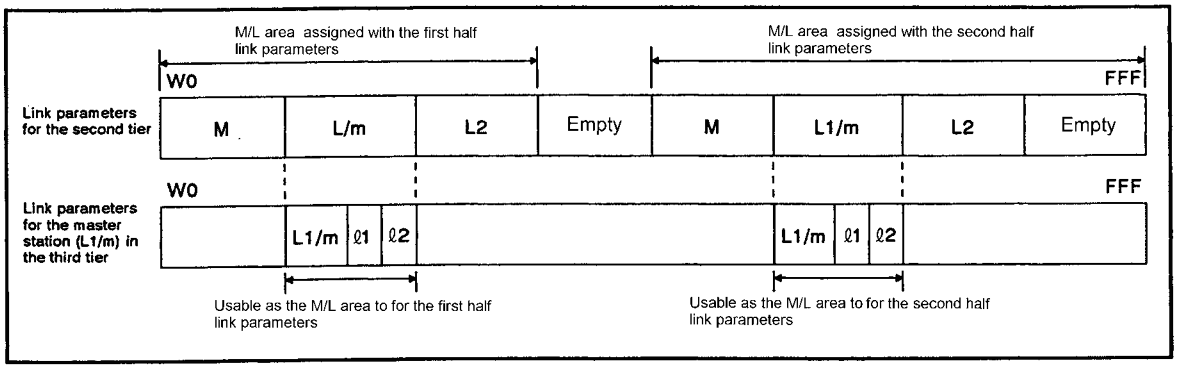


Fig 7.39 Assignment when the MELSECNET II mode is used for the third tier

(3) MELSECNET II composite mode used in the third tier
  (a) First half link parameters for the third tier
    1) The range assigned to the master station for the third tier with the first half link parameters for the second tier is used for the M/L area.
    2) The empty area within the W0 to 3FF range assigned with link parameters for the second tier is used for the M/R area.

  (b) The area assigned to the master station for the third tier with the second half link parameters for the second tier is used for the second half link parameters for the third tier.

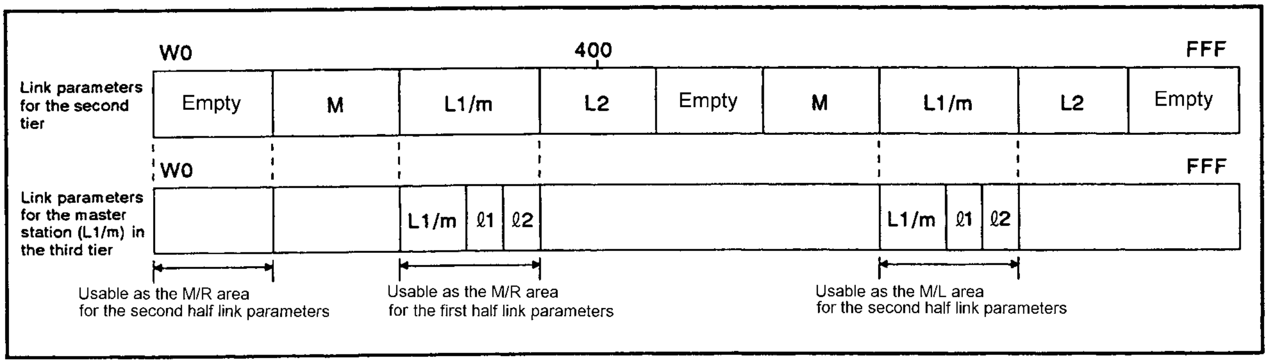


Fig 7.40 Assignment when the MELSECNET II composite mode is used for the third tier

POINT
When the MELSECNET mode or the MELSECNET II composite mode is selected as the operation mode for the third tier, consider the following points when setting link parameters for the second tier. (1) The device range assigned to the master station for the third tier is within the B0 to 3FF range and the W0 to 3FF range. If the B400 to FFF range or W400 to FFF range is assigned to the master station, the area cannot be used for the first half link parameters (including the MELSECNET mode link parameter) for the third tier. (2) When an M/R area is required for the third tier, provide an empty area in the W0 to 3FF range with the link parameters for the second tier.

7.10.4 Using the MELSECNET Ⅱ composite mode in the second tier

The link relay (B) and link register (W) range which can be assigned to the third tier is described per operation mode used in the third tier. Since the assignment of M/L area for link relay (B) is the same as that of M/L area for link register (W), the assignment of the link register (W) is only explained.
The link assignment range of input (X) and output (Y) is the same regardless of combinations of operation modes. Refer to Section 7.10.1 (5).

(1) MELSECNET mode used in the third tier
  (a) The range assigned to the master station for the third tier with the first half link parameters for the second tier is used for the M/L area for the third tier.

  (b) The empty area within the W0 to 3FF range assigned with link parameters for the second tier is used for the M/R area for the third tier.

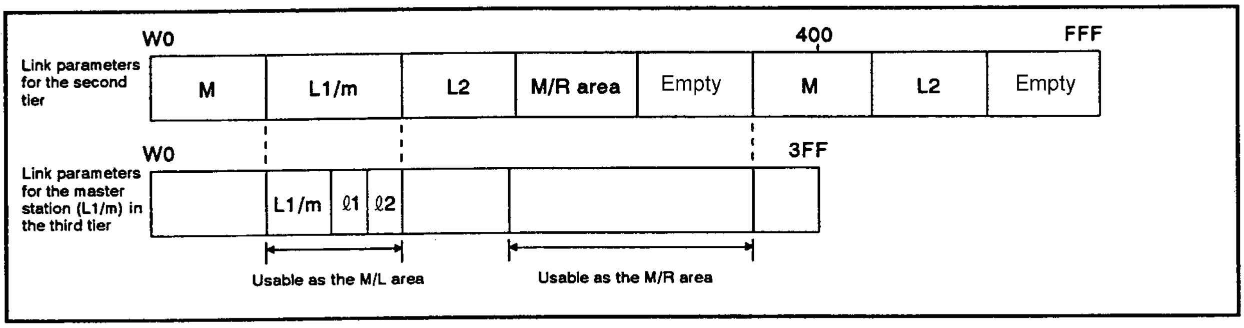


Fig 7.41 Assignment when the MELSECNET mode is used for the third tier

(2) MELSECNET Ⅱ mode used in the third tier
  (a) The range assigned to the master station for the third tier with the first half link parameters for the second tier is used for the first half link parameters for the third tier.

  (b) The range assigned to the master station for the third tier with the second half link parameters for the second tier is used for the second half link parameters for the third tier.

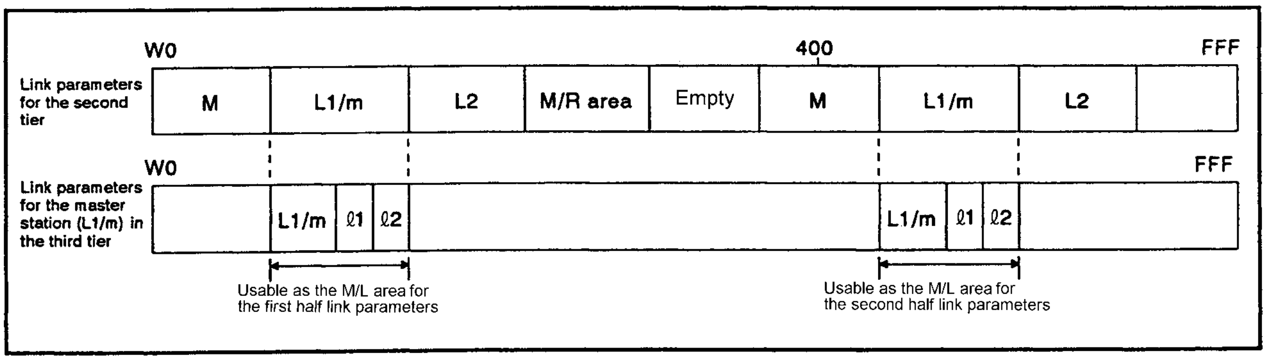


Fig 7.42 Assignment when the MELSECNET Ⅱ mode is used for the third tier

(3) MELSECNET II composite mode used in the third tier

(a) First half link parameters for the third tier

1) The range assigned to the master station for the third tier with the first half link parameters for the second tier is used for the M/L area.

2) The M/R area for the second tier and an empty area in the W0 to 3FF range is used for the M/R area.

(b) The range assigned to the master station for the third tier with the second half link parameters for the second tier is used for the second half link parameters for the third tier.

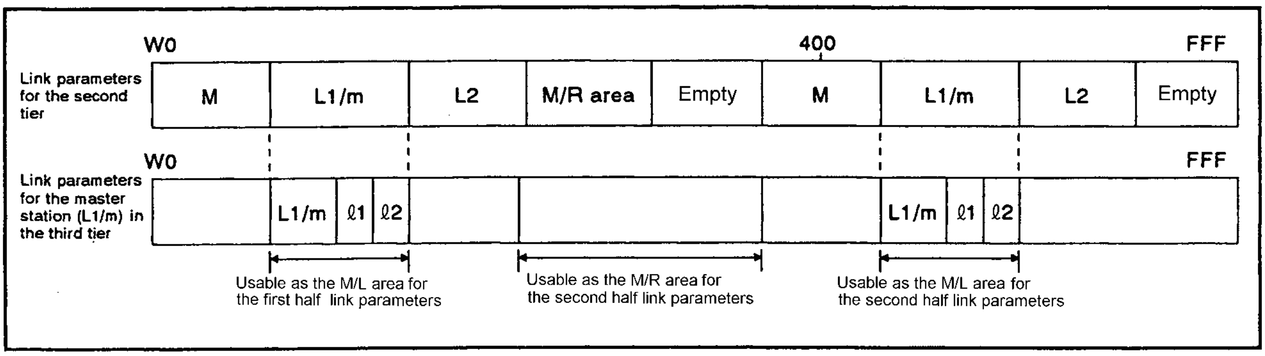


Fig 7.43 Assignment when the MELSECNET composite mode is used for the third tier

POINT
When the MELSECNET mode or the MELSECNET II composite mode is selected as the operation mode for the third tier, consider the following points when assigning device ranges. (1) The device range assigned to the master station for the third tier is within the B0 to 3FF range and the W0 to 3FF range. If the B400 to FFF range or W400 to FFF range is assigned to the master station for the third tier, the area cannot be used for the first half link parameters (including the MELSECNET mode link parameter) for the third tier. (2) When the M/R area is required for the third tier, either provide an empty area in the W0 to 3FF range with the link parameter for the second tier or use the M/R area for the second tier.

7.10.5 Link parameter setting example

The following describes the link parameters for the third tier, exemplifying the system configuration shown in Fig 7.44. (The link parameter setting for the second tier is the same as explained in Section 7.7 to 7.9.)
The number of assignment points for each station is the number of points shown in Table 7.6.

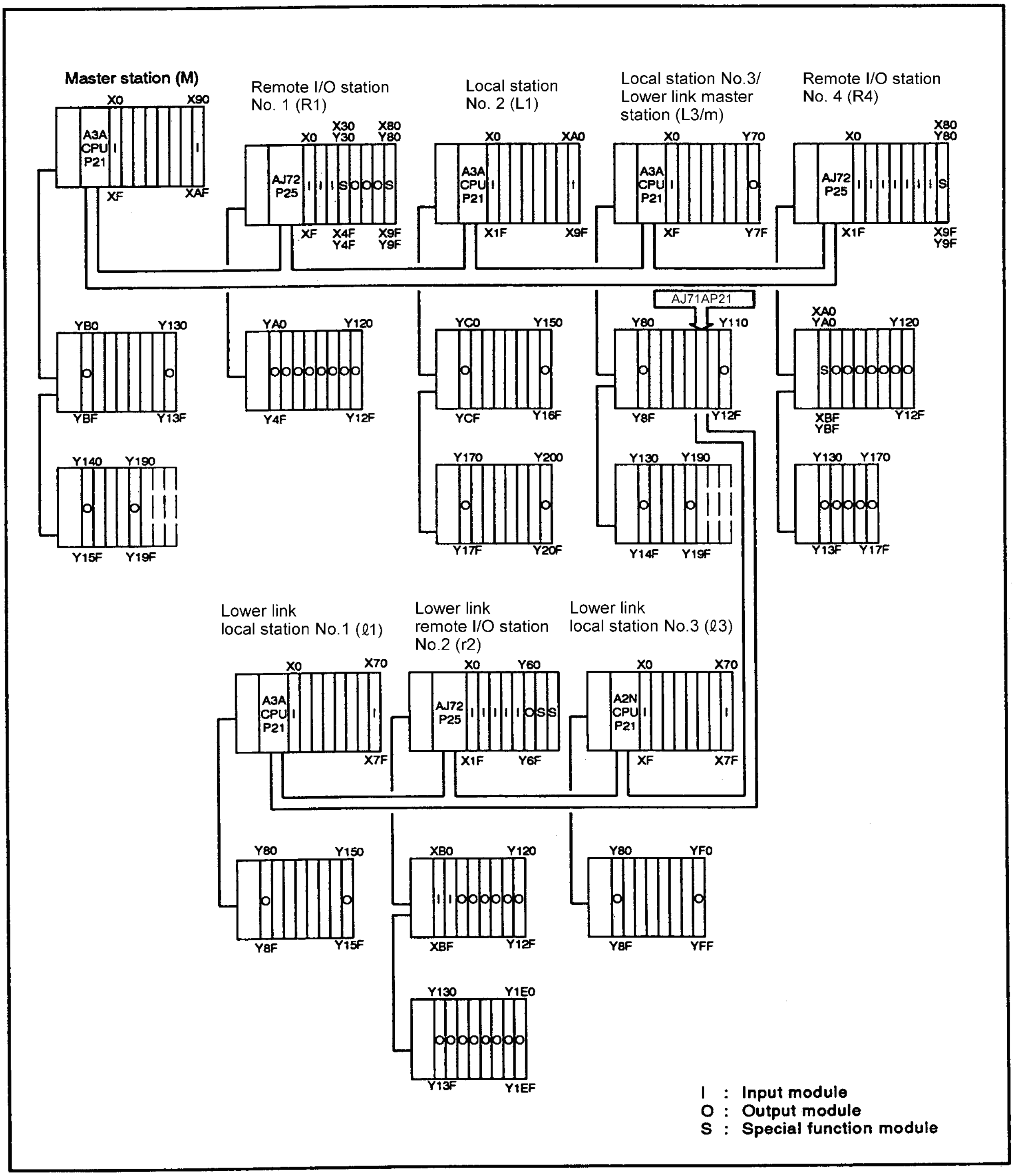


Fig 7.44 Three-tier system configuration example

Table 7.6 Number of assignment point for each station

<table>
<tr><th colspan="2" rowspan="3"></th><th colspan="4">First half link parameter</th><th colspan="2">Second half link parameter</th></tr>
<tr><th colspan="2">M⇔L</th><th rowspan="2">M→R</th><th rowspan="2">M←R</th><th rowspan="2">B</th><th rowspan="2">W</th></tr>
<tr><th>B</th><th>W</th></tr>
<tr><td colspan="2">M</td><td>256</td><td>256</td><td></td><td></td><td>256</td><td>256</td></tr>
<tr><td colspan="2">R1</td><td></td><td></td><td>34</td><td>32</td><td></td><td></td></tr>
<tr><td colspan="2">L2</td><td>128</td><td>128</td><td></td><td></td><td>128</td><td>128</td></tr>
<tr><td rowspan="4">L3/m</td><td>m</td><td>128</td><td>128</td><td></td><td></td><td>128</td><td>128</td></tr>
<tr><td>ℓ1</td><td>128</td><td>128</td><td></td><td></td><td>128</td><td>128</td></tr>
<tr><td>r2</td><td></td><td></td><td>34</td><td>32</td><td></td><td></td></tr>
<tr><td>ℓ3</td><td>128</td><td>128</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="2">R4</td><td></td><td></td><td>34</td><td>32</td><td></td><td></td></tr>
</table>

(1) Checking the operation mode to be used

(a) Operation mode of the second tier: MELSECNET II composite mode
This is because the slave stations (local stations and remote I/O stations) are connected to either MELSECNET mode-compatible station or MELSECNET II mode-compatible station.

(b) Operation mode of the third tier: MELSECNET II composite mode
This is because the slave stations (local stations and remote I/O stations) are connected to either MELSECNET mode-compatible station or MELSECNET II mode-compatible station.

(2) Checking the range assigned to the master station for the third tier with the link parameters for the second tier

(a) According to the number of assignment point in Table 7.6, 384 points for link relay (B) and 384 points for Link registers (W) are required for the first half link parameters, and 256 points for link relay (B) and 256 points for link register (W) are required for the second half link parameters.

(b) 34 points for M → R area and 32 points for M ← R area are required for the M/R area.
At least 66 points for the empty area of link register (W) is required for the assignment of the M/R area for the third tier with the first half link parameters for the second tier.
In the system configuration shown in Fig 7.44, since M/R area for the second tier also has 132 points, this range can also be used for assignment.

(3) Assignment of link relays (B)

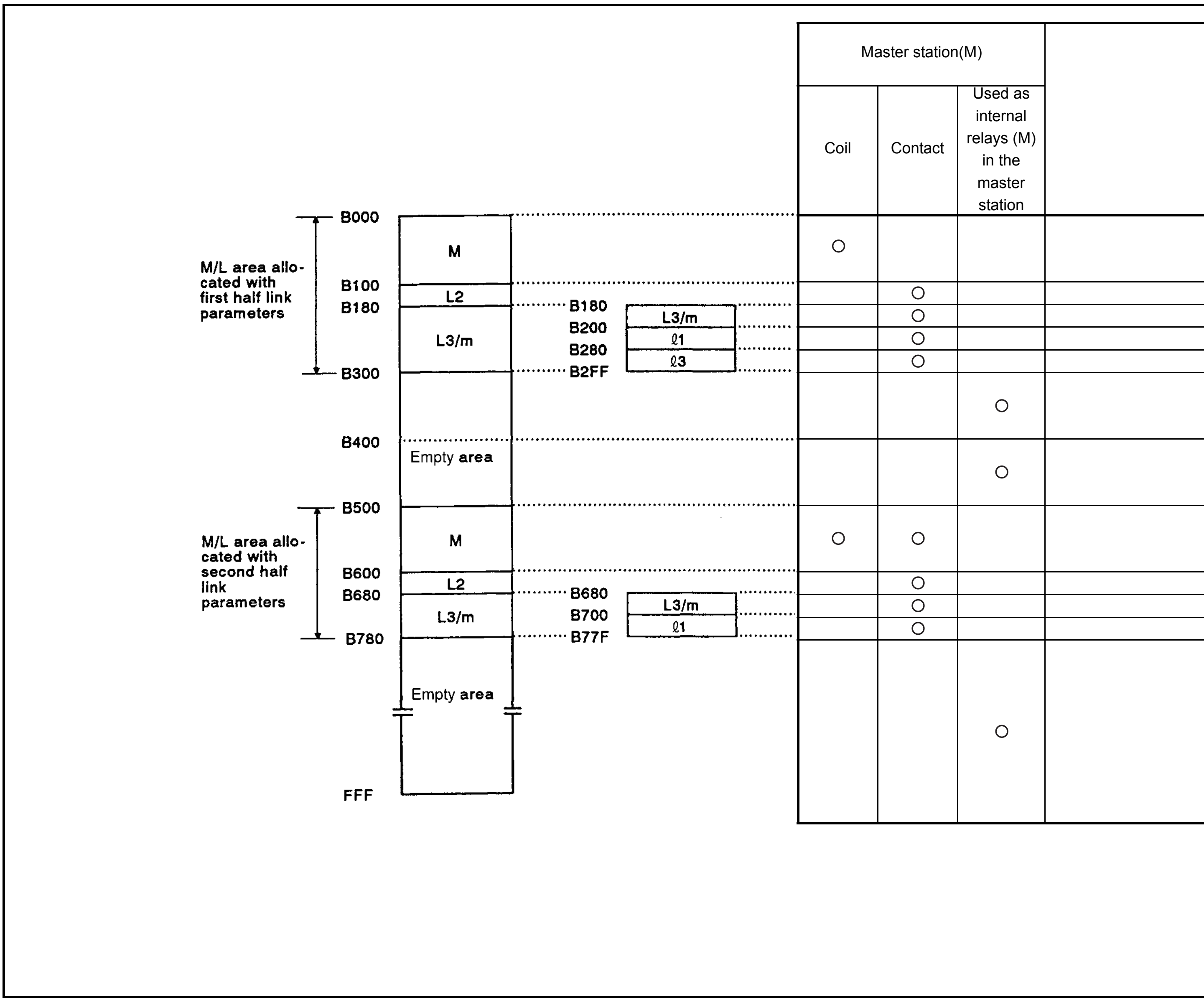


Fig 7.45 Link relays (B) assignment example

Local station No. 2(L2)			Link using local station No. 3(L3/m) as the master station for the third tier								
			Master station (L3/m)			Local station No. 1 (ℓ1)			Local station No. 3 (ℓ3)		
Coil	Contact	Used as internal relays (M) in the master station	Coil	Contact	Used as internal relays (M) in the master station	Coil	Contact	Used as internal relays (M) in the master station	Coil	Contact	Used as internal relays (M) in the master station
	○			○			○			○	
○	○			○				○			
	○		○	○			○			○	
	○			○		○	○			○	
	○			○			○		○	○	
		○			○			○			○
		○			○			○			
	○			○			○				
○	○			○				○			
	○		○	○			○				
	○			○		○	○				
		○			○			○			

Coil: Performs ON/OFF control of link relays (B).
Contact: Reads ON/OFF data using contacts of link relays (B).
○: Usable range

Fig 7.45 Link relays (B) assignment example (Continued)

(4) Assignment of link registers (W)

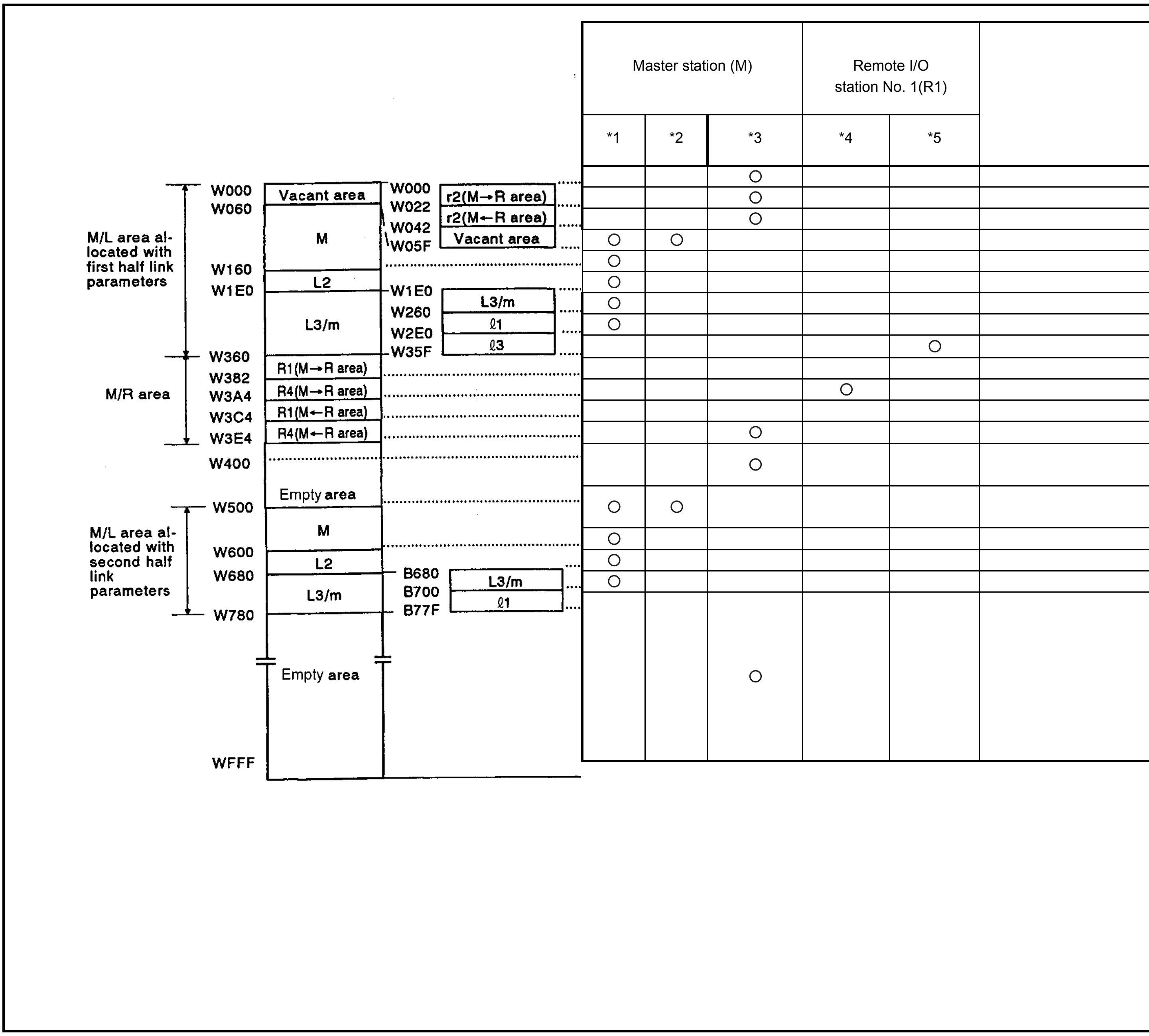


Fig 7.46 Link registers (W) assignment example

(a) An empty area in the W0 to 5F range is used to assign an M/R area for the third tier with the link parameters for the second tier.
The assignment can also be made by using the M/R area for the second tier W360 to 3E3.

	Local station No. 2(L2)			Link using local station No. 3 (L3/m) as the master station for the third tier												Remote I/0 station No. 4 (R4)	
				Master station (L3/m)			Local station No. 1 (ℓ1)			Remote I/O station No. 2 (r2)		Local station No. 3(ℓ1)				
	*1	*2	*3	*1	*2	*3	*1	*2	*3	*4	*5	*1	*2	*3	*4	*5
			○						○		○			○		
			○						○	○				○		
			○			○			○					○		
	○			○			○					○				
	○	○		○					○					○		
	○			○	○		○					○				
	○			○			○	○				○				
	○			○			○					○	○			
			○			○			○					○		
			○			○			○					○		○
			○			○			○					○		
			○			○			○					○	○	
			○			○			○					○		
			○			○			○							
	○			○			○									
	○	○		○					○							
	○			○	○		○									
	○			○			○	○								
			○			○			○							

*1 : Read ...... Reading word data
*2 : Write ...... Writing word data
*3 : Used as a data register (D) in the master station
*4 : Read from master station
*5 : Write from master station
○: Usable range

Fig 7.46 Link registers (W) assignment example (Continued)

(5) Inputs (X) and outputs (Y)

(a) A memory map for the assignment example of inputs and outputs is shown in Fig 7.47.

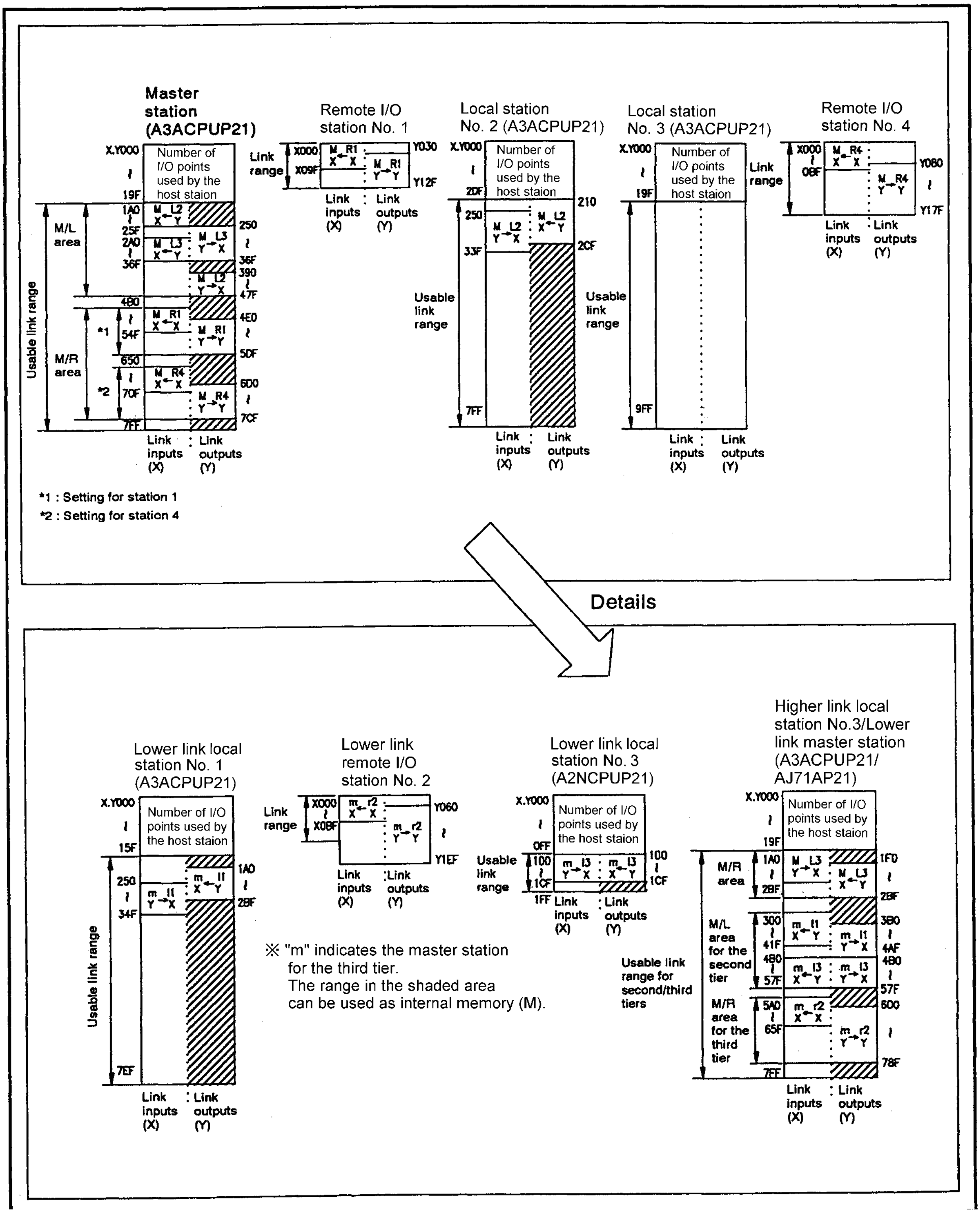


Fig 7.47 Inputs/outputs assignment example

(6) Link parameter setting

The following shows the link parameters assigned as (1) to (4).

(a) First half link parameters for the second tier

* MELSECNET II MULTI MODE LINK *

MASTER	SLAVE PC STATIONS	FIRST M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms
		B	W		
M	4	000-0FF	060-15F	200	XXXX

M : B1	↔	ALL	L : B1	000-2FF
M : W1	↔	ALL	L : W1	060-35F
M : B2	↔	ALL	L : B2	500-77F
M : W2	↔	ALL	L : W2	500-77F
M : W	→	ALL	R : W	360-3A3
M : W	←	ALL	R : W	3A4-3E3
M : Y	→	ALL	L : X	250-47F
M : Y	→	ALL	R : Y	4E0-7CF
M : X	←	ALL	L : Y	1A0-36F
M : X	←	ALL	R : X	4B0-70F

L/R NO.	FIRST M ← L		M → R	M ← R	M → L/R		M ← L/R	
	B	W	W	W	Y	X/Y	X	Y/X
R 1	-------	-------	360-381	3A4-3C3	4E0-5DF	030-12F	4B0-54F	000-09F
L 2 II	100-17F	160-1DF	-------	-------	390-47F	250-33F	1A0-25F	210-2CF
L 3 II	180-2FF	1E0-35F	-------	-------	250-36F	1A0-2BF	2A0-36F	1F0-2BF
R 4	-------	-------	382-3A3	3C4-3E3	6D0-7CF	080-17F	650-70F	000-0BF

M : MASTER L : LOCAL R : REMOTE

L : LOCAL
R : REMOTE
* : MELSECNET-II (LOCAL)

PRESS <SSN> TO SELECT 1ST/2ND RANGE OF B/W

(b) Second half link parameters for the second tier

* MELSECNET II MULTI MODE LINK *

MASTER	SLAVE PC STATIONS	SECOND M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms
		B	W		
M	4	500-5FF	500-5FF	200	XXXX

M : B1	↔	ALL	L : B1	000-2FF
M : W1	↔	ALL	L : W1	060-35F
M : B2	↔	ALL	L : B2	500-77F
M : W2	↔	ALL	L : W2	500-77F
M : W	→	ALL	R : W	360-3A3
M : W	←	ALL	R : W	3A4-3E3
M : Y	→	ALL	L : X	250-47F
M : Y	→	ALL	R : Y	4E0-7CF
M : X	←	ALL	L : Y	1A0-36F
M : X	←	ALL	R : X	4B0-70F

L/R NO.	SECOND M ← L		M → R	M ← R	M → L/R		M ← L/R	
	B	W	W	W	Y	X/Y	X	Y/X
R 1	-------	-------	-------	-------	-------	-------	-------	-------
L 2 II	600-67F	600-67F	-------	-------	-------	-------	-------	-------
L 3 II	680-77F	680-77F	-------	-------	-------	-------	-------	-------
R 4	-------	-------	-------	-------	-------	-------	-------	-------

M : MASTER L : LOCAL R : REMOTE

L : LOCAL
R : REMOTE
* : MELSECNET-II (LOCAL)

PRESS <SSN> TO SELECT 1ST/2ND RANGE OF B/W

(c) First half link parameters for the third tier

* MELSECNET II MULTI MODE LINK *

MASTER	SLAVE PC STATIONS	FIRST M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms
		B	W		
M	3	180-1FF	1E0-25F	200	XXXX

M : B1 ↔ ALL L : B1 180-2FF
M : W1 ↔ ALL L : W1 1E0-35F
M : B2 ↔ ALL L : B2 680-77F
M : W2 ↔ ALL L : W2 680-7FF
M : W → ALL R : W 000-021
M : W ← ALL R : W 022-041
M : Y → ALL L : X 3B0-57F
M : Y → ALL R : Y 600-78F
M : X ← ALL L : Y 300-57F
M : X ← ALL R : X 5A0-65F

L/R NO.	FIRST M ← L		M → R	M ← R	M → L/R		M ← L/R	
	B	W	W	W	Y	X/Y	X	Y/X
L 1 II	200-27F	260-2DF	-------	-------	3B0-4AF	250-34F	300-41F	1A0-2BF
R 2	-------	-------	000-021	022-041	600-78F	060-1EF	5A0-65F	000-0BF
L 3	280-2FF	2E0-35F	-------	-------	4B0-57F	100-1CF	4B0-57F	100-1CF

M : MASTER L : LOCAL R : REMOTE

L : LOCAL
R : REMOTE
* : MELSECNET-II (LOCAL)

PRESS <SSN> TO SELECT 1ST/2ND RANGE OF B/W

(d) Second half link parameters for the third tier

* MELSECNET II MULTI MODE LINK *

MASTER	SLAVE PC STATIONS	SECOND M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms
		B	W		
M	3	680-6FF	680-6FF	200	XXXX

M : B1 ↔ ALL L : B1 180-2EF
M : W1 ↔ ALL L : W1 1E0-35F
M : B2 ↔ ALL L : B2 680-77F
M : W2 ↔ ALL L : W2 680-7FF
M : W → ALL R : W 000-021
M : W ← ALL R : W 022-041
M : Y → ALL L : X 3B0-57F
M : Y → ALL R : Y 600-78F
M : X ← ALL L : Y 300-57F
M : X ← ALL R : X 5A0-65F

L/R NO.	SECOND M ← L		M → R	M ← R	M → L/R		M ← L/R	
	B	W	W	W	Y	X/Y	X	Y/X
L 1 II	700-77F	700-7FF	-------	-------	-------	-------	-------	-------
R 2	-------	-------	-------	-------	-------	-------	-------	-------
L 3	-------	-------	-------	-------	-------	-------	-------	-------

M : MASTER L : LOCAL R : REMOTE

L : LOCAL
R : REMOTE
* : MELSECNET-II (LOCAL)

PRESS <SSN> TO SELECT 1ST/2ND RANGE OF B/W

7.11 Assignment of Inputs and Outputs to the Master Station in a Remote I/O System

When a remote I/O system is configured with the MELSECNET data link system, there are restrictions on the I/O assignment for the master station.
The following describes the I/O assignment of master station which consists of a remote I/O station.
In case of the master station/local station which links to local stations only, I/O assignment can be executed in the same manner as for an independent system.

REMARK

I/O addresses are automatically assigned by the programmable controller CPU.
A peripheral device is not particularly required for I/O assignment. However, I/O assignment with a peripheral device enables followings.

- Saving I/O points (16 points) occupied by an empty slot.
- Reserving number of I/O points (32, 48, or 64 points) at an empty area for the system expansion in the future.

7.11.1 I/O assignment restrictions

(1) I/O assignment must be made from the head address (X/Y0) to the final address assigned to the remote I/O station.
Failure to complete I/O assignment up to the final address will cause an error in the master station.
The I/O range to be assigned differs depending on the order of the M/L area and the M/R area set by the link parameters.
(a) If the M/L area is assigned after the M/R area, it is not necessary to assign inputs and outputs to the local station setting range. (Refer to Fig 7.48 (a).)
(b) If the M/L area is assigned after the M/R area, it is necessary to assign inputs and outputs to the local station setting range. (Refer to Fig 7.48 (b).)

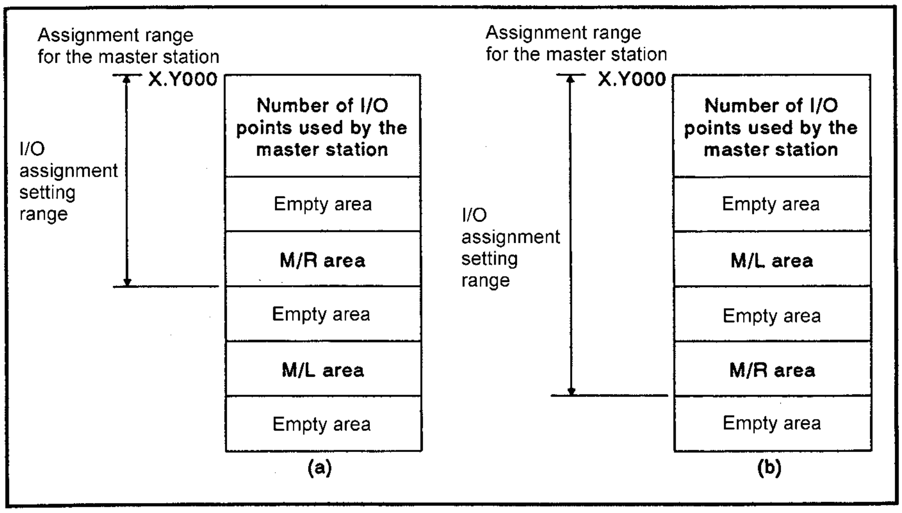


Fig 7.48 I/O assignment setting range

REMARK

In the I/O assignment setting, the device range is set with the assumption that the input modules or output modules are installed in the area of "M/L area" or that empty slots exist in the "empty area (range marked by *)" Fig 7.48.

(2) As for I/O assignment of remote I/O station, a slot in which a module is installed cannot be assigned as an empty slot (S1: 0 point, S2: 16 points, S3: 32 points, S4: 48 points, S5: 64 points). If assigned to an empty slot, a "UNIT VERIFY ERROR" will occur.

	*1	*1	*1	*2	*1
AJ72P25	Input module 16 points	Output module 32 points	Special function module 32 points	Empty	Input module 16 points

- Slots marked with "1" cannot be assigned as an empty slot (S1, S2, S3, S4, or S5) because an input or output module is loaded.
- The slot marked with "*2" can be assigned as an empty slot.

(3) If slot 0 in a remote I/O station is empty, at least 16 points (S2, S3, S4, S5) must be assigned to an empty slot.
If S1 is set for an empty slot, a "UNIT VERIFY ERROR" will occur.

AJ72P25	Empty	Input module 16 points	Output module 32 points	Special function module 32 points	Input module 16 points

The empty slot cannot be set as a 0 point empty slot.

(4) When assigning inputs and outputs to a special function module, set the number of points of the module actually installed. If the wrong number of points is set, and the RFRP or RTOP instruction is executed, an error will occur.

POINT

I/O assignment cannot be used to change the number of I/O points for an input/ output module connected to the A0J2P25(S3)/R25 (compact type remote I/O station module).
Assign the same number of I/O points that is assigned to a remote I/O station configured with the A0J2P25(S3)/R25.

7.11.2 I/O assignment example

The following describes the I/O assignment of I/O number for a remote I/O station by GPP. The I/O assignment of remote I/O station is set on the "I/O LOCATING" screen of GPP parameters and is store to the master station.

The following describes the procedure for setting "0 point" for an "empty slot" part (the shaded slots in Fig 7.49) in the master station and remote I/O stations, exemplifying the system shown in Fig 7.49.

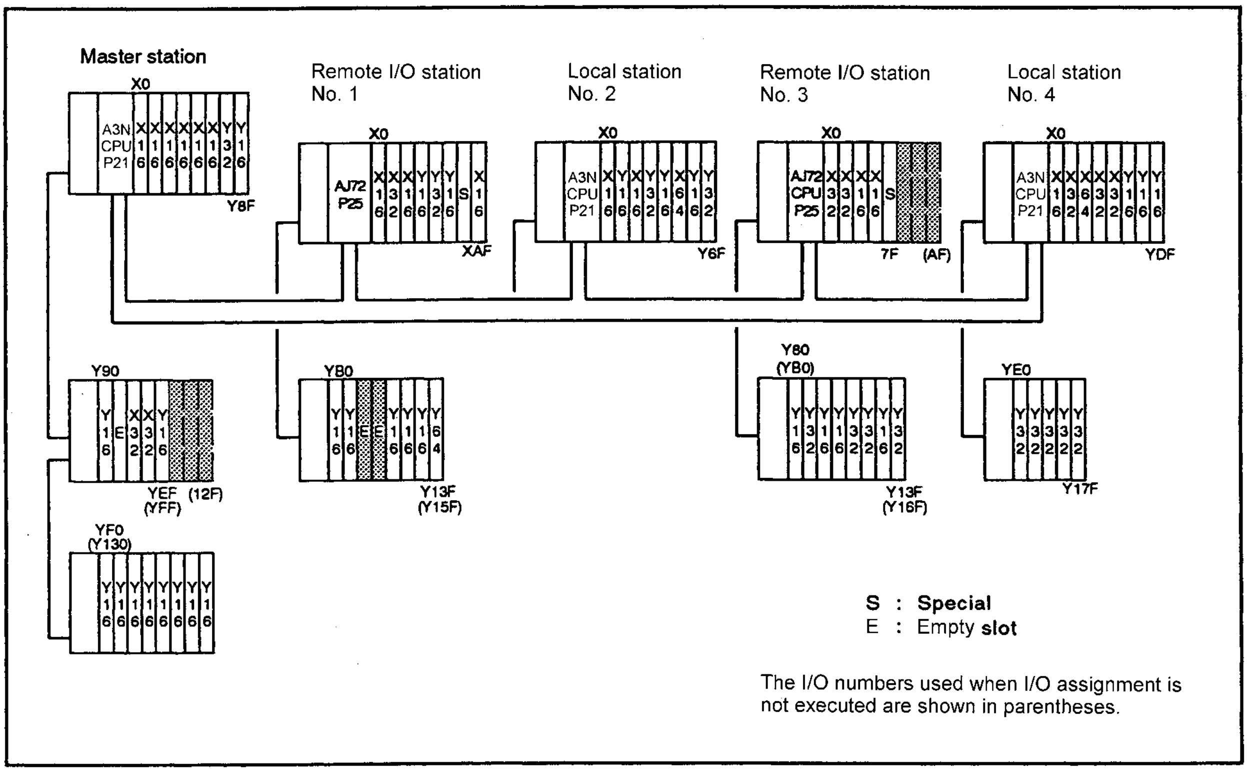


Fig 7.49 System example

The I/O assignment is set from the head address (X/Y0) to the final address of M/R area. The I/O assignment range varies depending on the ranges assigned for the M/L area and the M/R area.
Refer to the I/O assignment example in Fig 7.49.

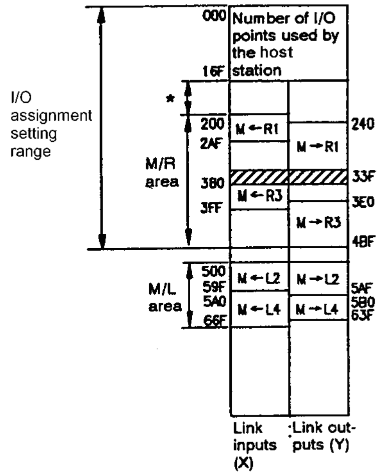
(1) When the M/L area is assigned after the M/R area

When the M/L area is assigned after the M/R area with the link parameters, the I/O assignment is as shown in the following example.

(a) Link parameter assignment example

Fig 7.50 shows the link parameter I/O assignment.

Master station assignment range



* The range marked with "*" is assumed to be used for any input and/or output modules mounted, or as empty slots.

Fig 7.50 Assignment example

(b) I/O assignment example

* I/O ALLOCATION *

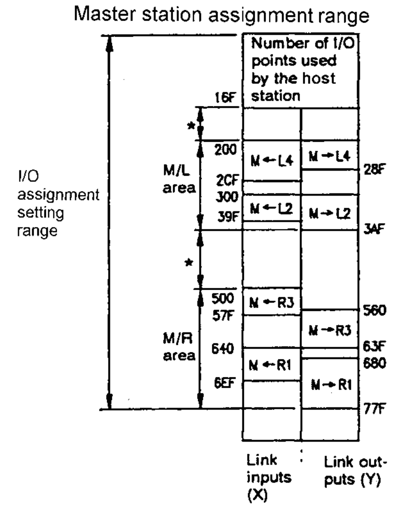
SLT NO.	I/O UNT	SLT NO.	I/O UNT	SLT NO.	I/O UNT	SLT NO.	I/O UNT	SLT NO.	I/O UNT	SLT NO.	I/O UNT	SLT NO.	I/O UNT	SLT NO.	I/O UNT
0	X16	16	Y16	32	Y16	48	F32	64		80		96		112	
1	X16	17	Y16	33	F32	49	S 0	65		81		97		113	
2	X16	18	Y16	34	X16	50	S 0	66		82		98		114	
3	X16	19	Y16	35	Y16	51	S 0	67		83		99		115	
4	X16	20	Y16	36	Y16	52	Y16	68		84		100		116	
5	X16	21	Y16	37	S 0	53	Y32	69		85		101		117	
6	Y32	22	Y16	38	S 0	54	Y16	70		86		102		118	
7	Y16	23	Y16	39	Y16	55	Y16	71		87		103		119	
8	Y16	24	S64	40	Y16	56	Y32	72		88		104		120	
9	S 0	25	S64	41	Y16	57	Y32	73		89		105		121	
10	X32	26	S16	42	Y64	58	Y16	74		90		106		122	
11	X32	27	X16	43	S64	59	Y32	75		91		107		123	
12	Y16	28	X32	44	X32	60		76		92		108		124	
13	S 0	29	X16	45	X32	61		77		93		109		125	
14	S 0	30	X16	46	X16	62		78		94		110		126	
15	S 0	31	Y32	47	X16	63		79		95		111		127	

VACANCY(S)
1 : 0 PT.
2 : 16 PT.
3 : 32 PT.
4 : 48 PT.
5 : 64 PT.
X(X)
6 : 16 PT.
7 : 32 PT.
8 : 48 PT.
9 : 64 PT.
Y(Y)
A : 16 PT.
B : 32 PT.
C : 48 PT.
D : 64 PT.
S-UNIT(F)
E : 16 PT.
F : 32 PT.
G : 48 PT.
H : 64 PT.

PRESS <END>, WHEN SET

Slot numbers 0 to 23........Assignment of I/O modules in the master station
24 to 26........Range marked with an asterisk (the 170 to 1FF range)
27 to 42........Assignment of remote I/O station No.1
43........"Empty" area between remote I/O stations No.1 and No.3 (shaded area)
44 to 59........Assignment of remote I/O station No.3

(2) When the M/R area is assigned after the M/L area
When the M/R area is assigned after the M/L area with the link parameters, the I/O assignment is as shown in the following example.
(a) Assignment example by link parameter
Fig 7.51 shows the I/O assignment by link parameters.



* The range marked with "*" and "Local station setting range" are assumed to be used for any input and/or output modules mounted, or as empty slots.

Fig 7.51 Assignment example

(b) I/O assignment example

* I/O ALLOCATION *

SLT NO.	I/O UNT	SLT NO.	I/O UNT	SLT NO.	I/O UNT	SLT NO.	I/O UNT	SLT NO.	I/O UNT	SLT NO.	I/O UNT	SLT NO.	I/O UNT	SLT NO.	I/O UNT
0	X16	16	Y16	32	S64	48	Y32	64	Y16	80		96		112	
1	X16	17	Y16	33	S64	49	Y16	65	S 0	81		97		113	
2	X16	18	Y16	34	S64	50	Y16	66	S 0	82		98		114	
3	X16	19	Y16	35	S64	51	Y32	67	Y16	83		99		115	
4	X16	20	Y16	36	S64	52	Y32	68	Y16	84		100		116	
5	X16	21	Y16	37	S64	53	Y16	69	Y16	85		101		117	
6	X16	22	Y16	38	S16	54	Y32	70	Y64	86		102		118	
7	X16	23	Y16	39	X32	55	X16	71		87		103		119	
8	X16	24	S64	40	X32	56	X32	72		88		104		120	
9	S 0	25	S64	41	X16	57	X16	73		89		105		121	
10	X32	26	S64	42	X16	58	Y32	74		90		106		122	
11	X32	27	S64	43	F32	59	Y16	75		91		107		123	
12	Y16	28	S64	44	S 0	60	Y16	76		92		108		124	
13	S 0	29	S64	45	S 0	61	F32	77		93		109		125	
14	S 0	30	S64	46	S 0	62	X16	78		94		110		126	
15	S 0	31	S64	47	Y16	63	Y16	79		95		111		127	

VACANCY(S)
1 : 0 PT.
2 : 16 PT.
3 : 32 PT.
4 : 48 PT.
5 : 64 PT.
X(X)
6 : 16 PT.
7 : 32 PT.
8 : 48 PT.
9 : 64 PT.
Y(Y)
A : 16 PT.
B : 32 PT.
C : 48 PT.
D : 64 PT.
S-UNIT(F)
E : 16 PT.
F : 32 PT.
G : 48 PT.
H : 64 PT.

PRESS <END>, WHEN SET

Slot numbers 0 to 23........Assignment of I/O modules in the master station
24 to 38........Range marked with an asterisk and "local station setting range" (the 170 to 4FF range)
39 to 54........Assignment of remote I/O station No.3
55 to 70........Assignment of remote I/O station No.1

8 PROCEDURES TO OPERATION

This chapter describes procedures for data link and startup, station number setting, and precautions for wiring.

8.1 Preparatory Steps before Operation

This section describes a procedure for data link.

START

↓

Checks before turning on the power supply

Check the input power supply voltage.
Check the voltage to be supplied to I/O devices.
Set the RUN/STOP key switch on the CPU module to STOP.

↓

Turning ON power supply — Refer to Section 8.6.

Turn ON the power supply to the link module.
Check that the POWER LED is on.

↓

Checking the link module — Refer to Section 8.7.1.

Use the self-loopback test to check the link module hardware.

↓

Connecting the link cables

Connect link modules with link cables.

↓

Checking the inter-station line — Refer to Section 8.7.2.

Check the lines between the two adjacent stations.

↓

Setting the link parameters

Set the link parameters to the link module in the master station.

↓

Checking the Forward/reverse loop — Refer to Section 8.7.3.

Use the forward loop test and reverse loop test to execute the line check for every link cable.

↓

Programming and debugging

Write a program used for data link and check it.
(Be sure to set all of the stations off-line before checking the program.)

↓

END

8.2 Setting the Link Module Station Numbers

This section describes the station number setting for link modules and precautions for it.

8.2.1 Setting the link module station numbers in the MELSECNET data link system

Assign station numbers from the master station (set "00" to the master station) in ascending order to the forward loop direction. The settable maximum station number is "64".
In a three-tier system, assign station numbers from the master stations of each tier (set "00" to the master stations) in ascending order to the forward loop direction. The settable maximum station number is "64".

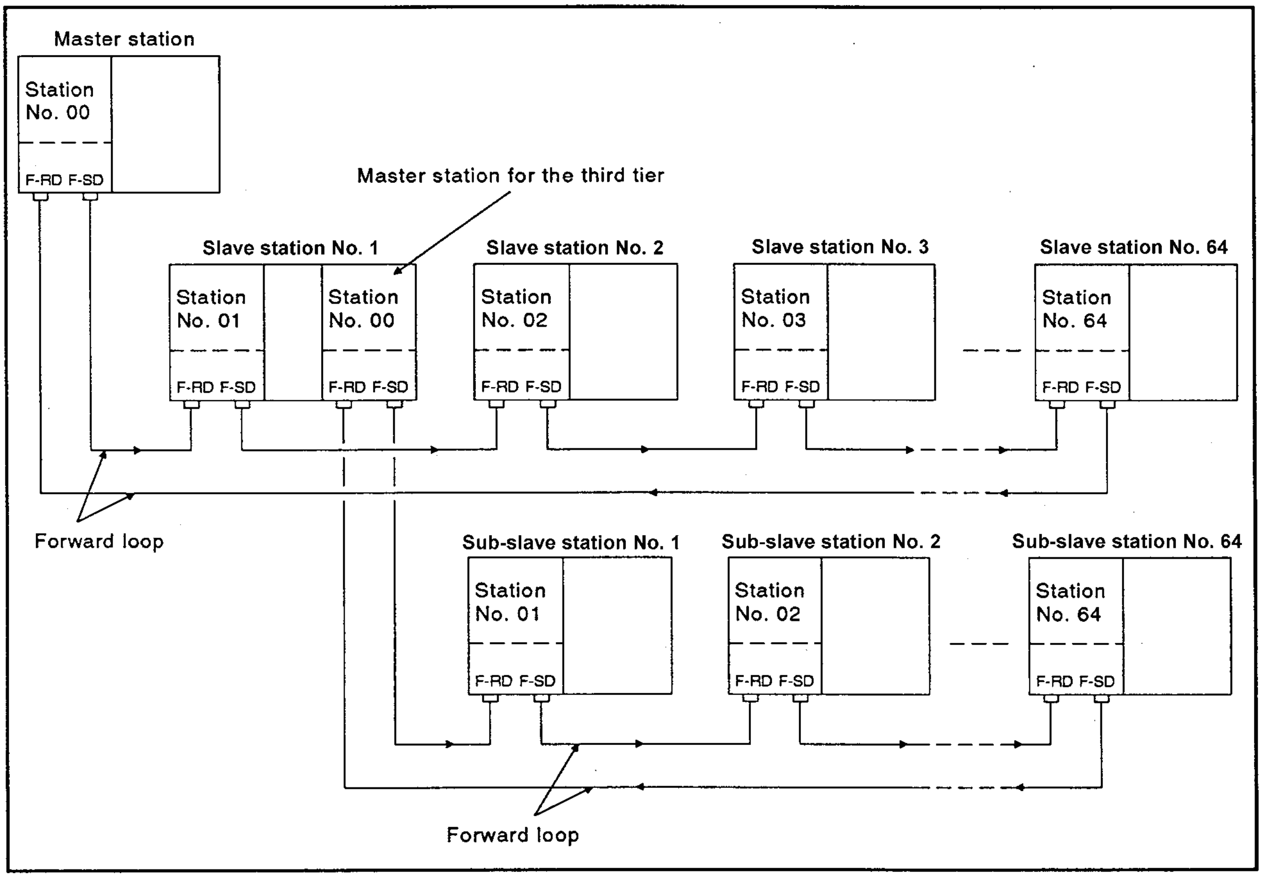


Fig 8.1 Setting link module station numbers

REMARK

For station number setting of the link modules, refer to the manual for each link module.

Precautions for setting the link module station numbers

The following shows the precautions for station number setting.

(1) Station numbers have to be consecutive.
Station numbers cannot be skipped as Fig 8.2.
If station numbers are not set consecutively, the time taken for the system to switch to the loopback mode when the slave station is powered off is increased.
Therefore, the loopback processing is not performed within the monitoring time set in link parameter, which may cause the entire data link system to stop.

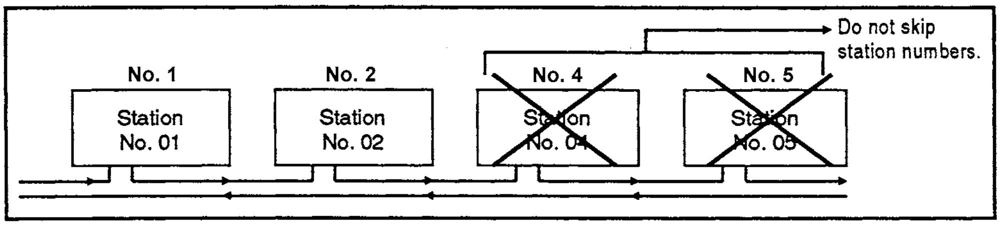
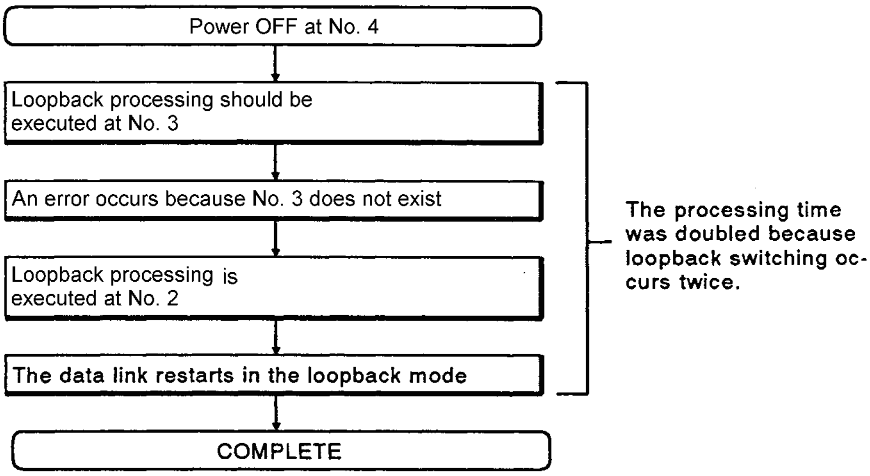


Fig 8.2 When not setting station numbers consecutively

Example:
The following flowchart shows how loopback switching occurs when power of No.4 is turned off in the system shown in Fig. 8.2.



(2) Station numbers have to be set in ascending order.
Station numbers cannot be set in descending order as Fig 8.3.

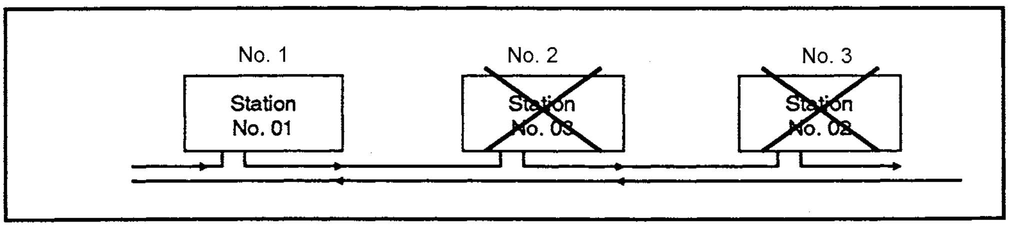
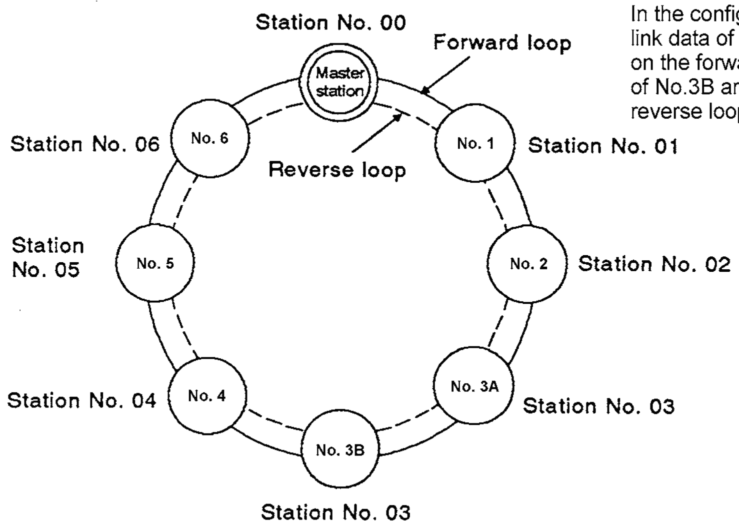


Fig 8.3 When setting station numbers in descending order

(3) The station numbers in the same loop have to be all different.
If the same station number is assigned to another station in the same loop, the link module closer to the receiving port of the master station is applied, and the link data in the other station is ignored. Therefore, the setting as Fig 8.4 cannot be made.



In the configuration shown left, link data of No.3A are effective on the forward loop, and link data of No.3B are effective on the reverse loop.

Fig 8.4 When setting the same station number

(4) When the number of slave stations set with link parameter differs from the actual number of slave stations
 (a) When the set number of slave stations is greater than the actual number of slave stations, the slave stations do not exist in the system are treated as communication faulty stations.

 (b) If the set number of slave stations is less than the actual number of slave stations, the data link is only performed to the slave stations set with the link parameters.
 All other slave stations are processed as off-line mode stations.

8.2.2 Setting the link module station numbers in the MELSECNET/B data link system

Assign station number from the master station (set "00" to the master station) in ascending order to the forward loop direction. The settable maximum station number is "31".

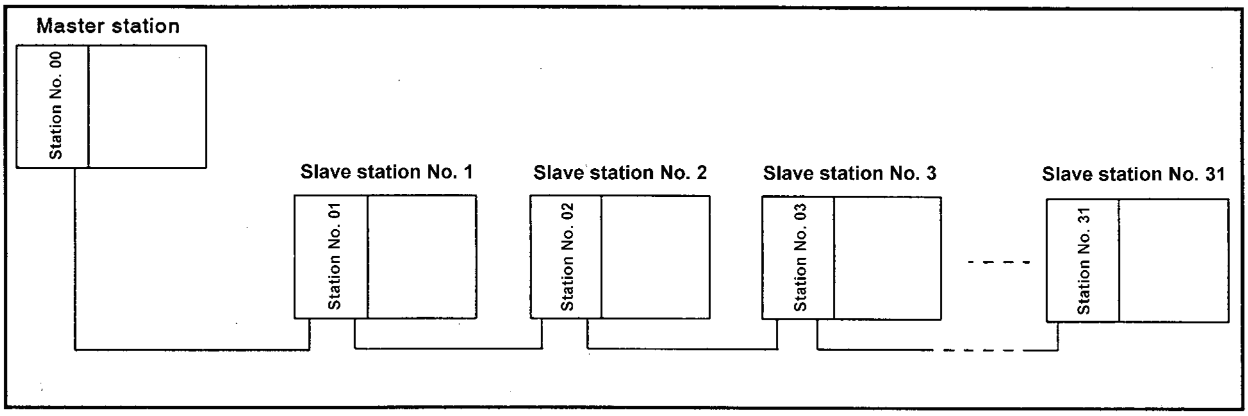


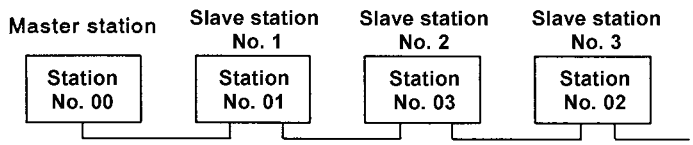
Fig 8.5 Setting link module station numbers

REMARK

For station number setting of the link modules, refer to the manual for each link module.

POINT

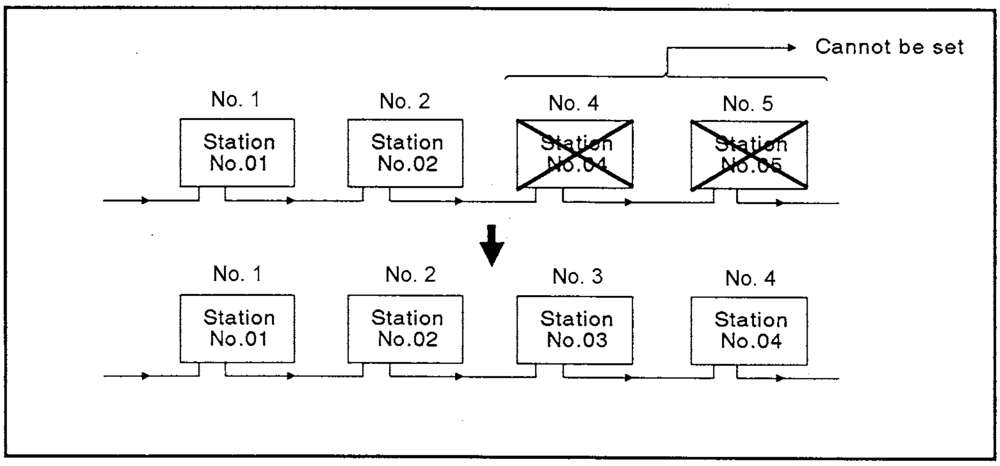
In the MELSECNET/B data link system, the slave station numbers can be set in descending order as the figure below.



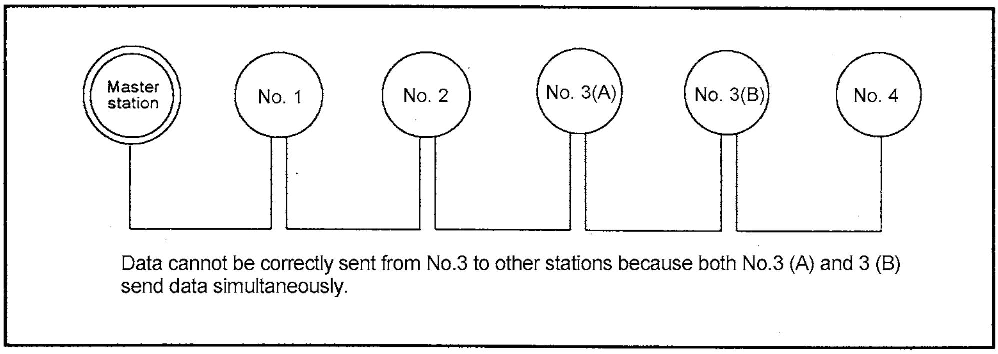
Precautions for setting the link module station numbers

The following shows the precautions for station number setting.

(1) Station numbers have to be consecutive.
If station numbers are not set consecutively, the stations with incorrect station numbers are treated as communication faulty stations.



(2) The station numbers in the same loop have to be all different.
If the same station number is assigned to another station in the same loop, since the stations with the same station number send data simultaneously, communications are failed.



(3) When the number of slave stations set with link parameter differs from the actual number of slave stations
(a) When the set number of slave stations is greater than the actual number of slave stations, the slave stations do not exist in the system are treated as communication faulty stations.

(b) If the set number of slave stations is less than the actual number of slave stations, the data link is only performed to the slave stations set with the link parameters.
All other slave stations are processed as off-line mode stations.

8.3 Setting Communication Speed

The overall distance of the MELSECNET/B data link system depends on the communication speed.

Set the communication speed with the switch setting of link modules.
(For the setting, refer to the manual for the link module.)

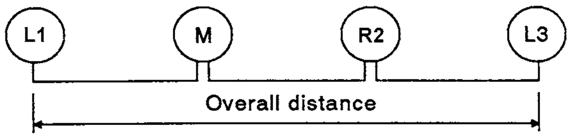
The relationship between set communication speeds and overall distances is shown in Table 8.1.

Table 8.1 Communication speeds and overall distances

Communication speed (M bps)	Overall cable distance (m) (ft)
0.125	1200 (3937.2)
0.250	600 (1968.6)
0.500	400 (1312.4)
1.00	200 (656.2)

REMARK

The overall distance refers to the distance between link modules connected to both ends.



8.4 Optical Fiber Cable/Coaxial Cable Wiring

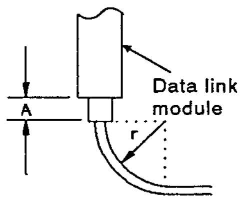
This section describes a method for connecting optical fiber cables or coaxial cables with link modules.

8.4.1 Precautions for wiring

The following describes wiring precautions for optical fiber cables and coaxial cables for MELSECNET.

(1) Securing space for the cables
The minimum allowable bend radius for optical fiber cables and coaxial cables are defined.
To connect a coaxial cable with a data link module, ensure the space for bending equal to or larger than the minimum allowable bend radius in Table 8.2.
For the connector A and allowable bend radius r of optical fiber cables, contact Mitsubishi Electric System & Service Co., Ltd.

Table 8.2 Minimum allowable bend radius

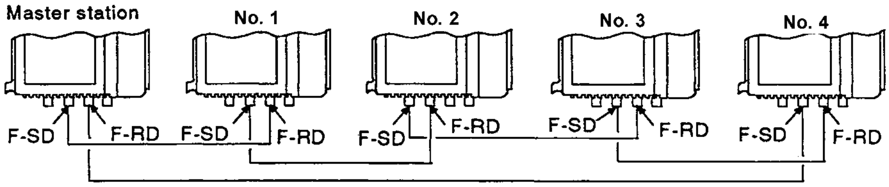
	Cable		Connector A (mm)	Allowable bend radius r (mm)
	Coaxial cable	3C-2V	30	23
		5C-2V		30

(2) Doubling link cables
Connect the optical fiber cables or coaxial cables in duplex loop.
If the cables are not connected using both the forward and reverse loop or if the final station is not connected with the master station and therefore the cables are not connected in duplex loop, the data link is maintained only at normal operation but disabled in case of an error.

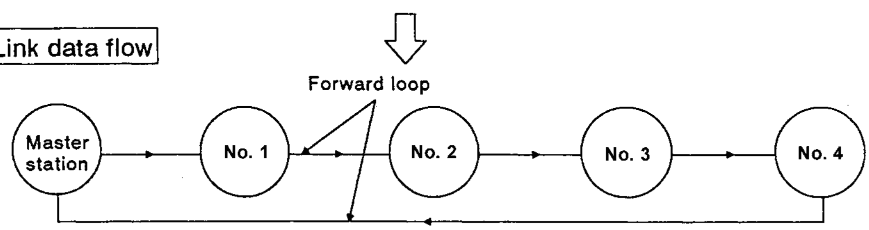
(a) Connecting cables only in forward loop or reverse loop disables data link to all stations.

Example
In the following diagram, if the No. 1 is powered off,the data link to all stations is disabled; and the faulty station cannot be detected with the link monitor.

Connection only in forward loop



Link data flow

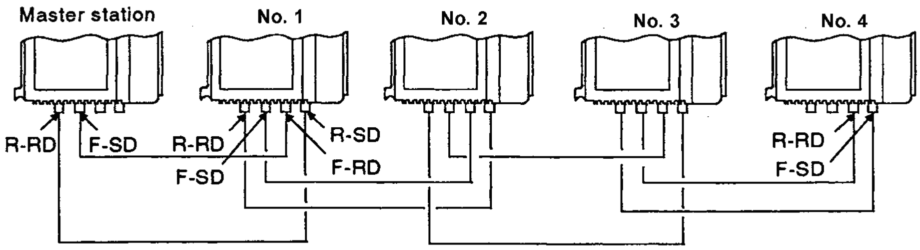


(b) If cables are not connected between F-RD on the master station and F-SD on the final station, and between R-SD on the master station and R-RD on the final station, the data link is established in the loopback mode. Therefore, in case of an error, data link between the faulty station and the final station is disabled.

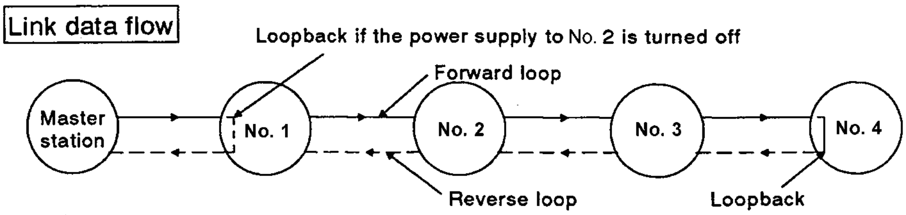
Example

In the following diagram, if the No. 2 is powered off, data link between No. 2, 3, and 4 is disabled.

Connection when cables are not connected between F-RD on the master station and F-SD on the final station, and between R-SD on the masterstation and R-RD on the final station



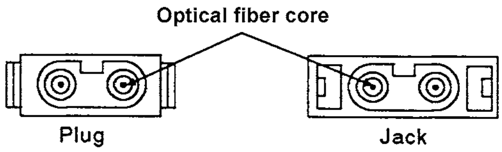
Link data flow



(3) Optical fiber cable wiring

(a) When wiring optical fiber cables, do not touch the optical fiber cores of the plugs or jacks and protect them from dust and dirt.
Attached dirt, dust, or oil may cause increase in transmission loss, resulting in data link fault.
In addition, do not remove the connector cover before cable connection.
When storing the optical fiber cable, attach the connector cover to protect the connector from dust and dirt.

(b) When connecting/disconnecting an optical fiber cable, be sure to shut off all phases of the external power supply used by the system.



(4) Coaxial cable wiring

(a) Keep a distance of 100 mm (3.94inch) or more between coaxial cables and other power and control cables.
Grounding FG of the power supply module of the base unit, where the link module is mounted, is effective for preventing noise.

(b) When connecting/disconnecting a coaxial cable, be sure to shut off all phases of the external power supply used by the system.

8.4.2 Optical fiber cables connections

This section describes methods for connecting optical fiber cables with link modules.

(1) Connecting link modules with optical fiber cables
Connect an optical fiber cable to a link module from the OUT connector to IN connector of the next station as shown in Fig 8.6 (Connect the cable from the OUT connector of the final station to the IN connector of the master station).

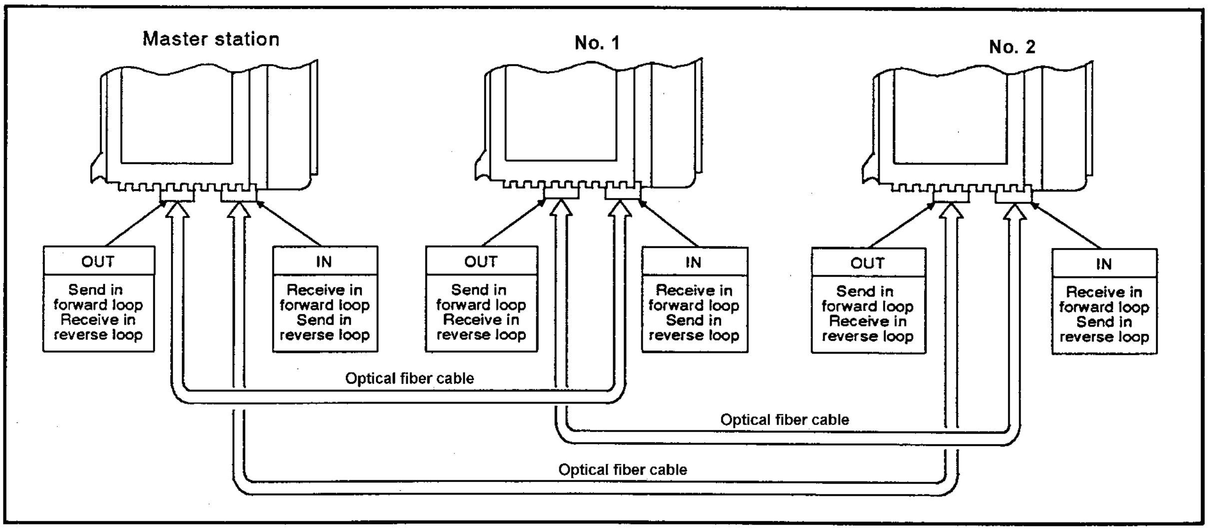


Fig 8.6 Connecting link modules with optical fiber cables

(2) Connecting optical fiber cables
The following flowchart shows a method for connecting optical fiber cables.

Connection

↓

Turn OFF the power supply.

↓

Insert a plug, fitting a projection of the jack into a ditch of the plug.

↓

Plug the plug until the plug fixing hole fits the hook of jack.

↓

Slightly pull the plug in the arrow direction to make sure that it is installed properly.

↓

End

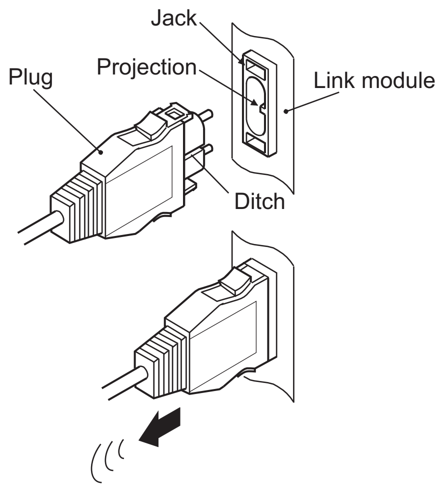


Fig 8.7

(3) Disconnecting optical fiber cables
The following flowchart shows a method for disconnecting optical fiber cables.

Disconnection
↓
Turn OFF the power supply.
↓
Pull out a fixing part of a plug in the arrow direction.
↓
Cover the plug and jack with covers which covered them before connection and store them.
↓
End

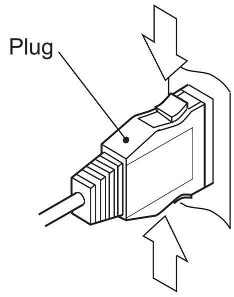


Fig 8.8

8.4.3 Coaxial cable connections

This section describes methods for connecting coaxial cables with link modules.

(1) Connecting link modules with coaxial cables
Connect the F-SD connector on a link module to the F-RD connector on the next module and connect the R-RD connector on a link module to the R-SD connector of the next module. (Connect the F-SD connector and R-RD connector of the final station with the F-RD connector and R-SD connector of the master station, respectively.)

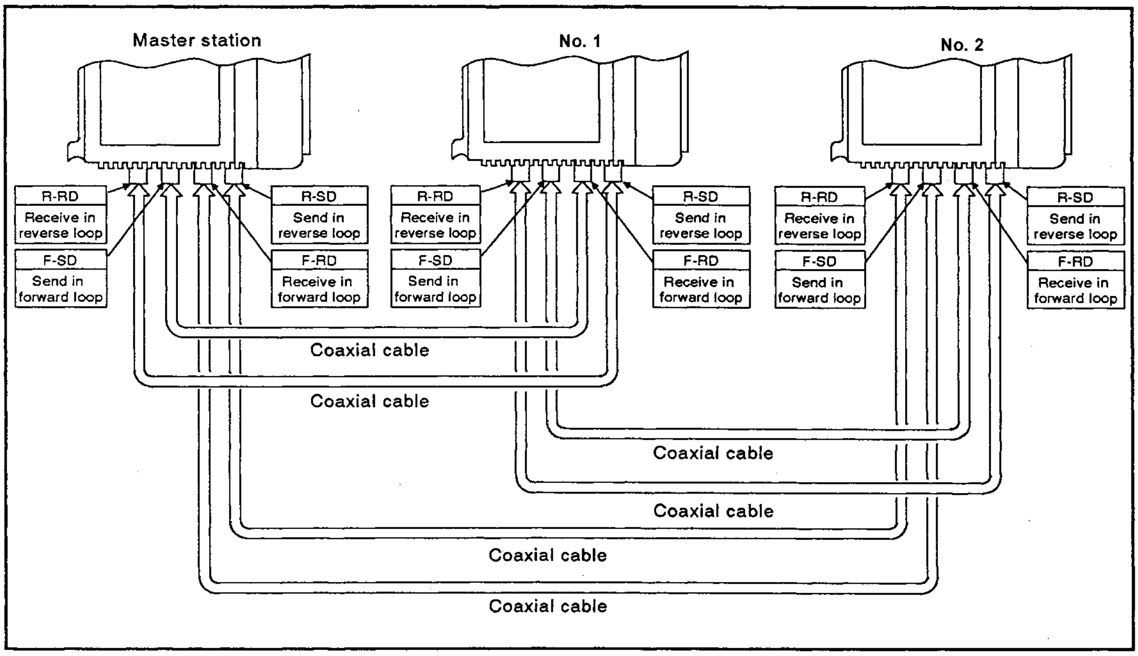
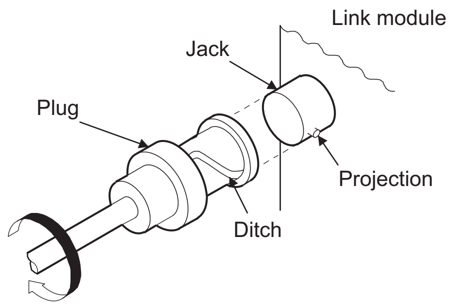


Fig 8.9 Connecting link modules with coaxial cables

(2) Connecting coaxial cables
The following flowchart shows a method for connecting coaxial cables.

Connection
↓
Turn OFF the power supply.
↓
Insert a plug, fitting a projection of the jack into a ditch of the plug.
↓
Rotate the plug in the arrow direction (clockwise) properly until it comes to the position shown below.
↓
End



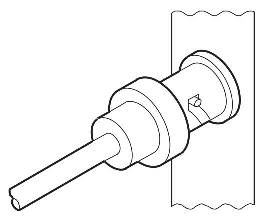


Fig 8.10

(3) Disconnecting coaxial cable

The following flowchart shows a method for disconnecting coaxial cables.

Disconnection

↓

Turn OFF the power supply.

↓

Rotate a plug in the arrow direction to loosen the connection.

↓

Hold the plug and pull it out in the arrow direction shown below.

↓

End

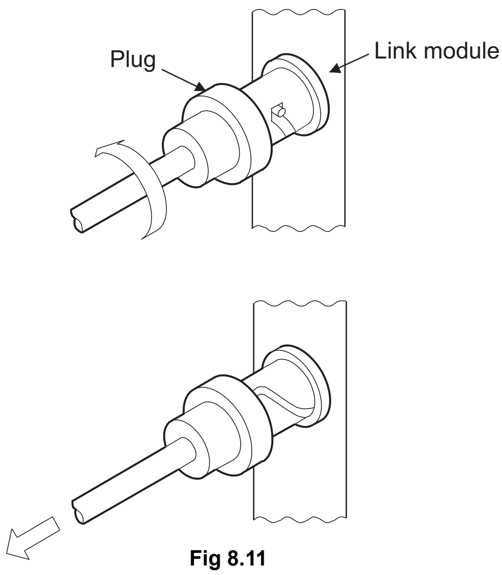


Fig 8.11

8.5 Shielded Twisted Pair Cable Wiring

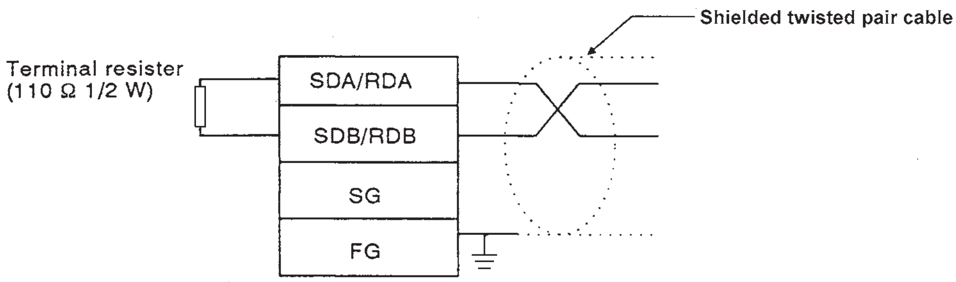
This section describes a connection method for shielded twisted pair cables.

8.5.1 Precautions for wiring

The following shows the precautions when wiring shielded twisted pair cables in MELSECNET/B data link system.

(1) Laying shielded twisted pair cables
When laying shielded twisted pair cables, follow the precautions below to prevent extraneous noise and surge induction.
- (a) Do not install shielded twisted pair cables together with the main circuit, high-voltage cable, or load carrying wire, or bring them close to each other (Keep a distance of 100 mm (3.94inch) or more between them).
- (b) Connect remote module terminal block so that enough distance can be secured between shielded twisted pair cables and the module power or I/O signal cables.
- (c) Do not use any part of shielded twisted pair cables (e.g. One pair of the cables from three pairs of them) to supply power.
- (d) When connecting/disconnecting a shielded twisted pair cable, be sure to shut off all phases of the external power supply used by the system.

(2) Connecting a terminal resistor
Connecting a terminal resistor came with the data link module (110 Ω, 1/2 W) between SDA/RDA and SDB/RDB at both end stations of a MELSECNET/B data link system is required.



8.5.2 Connecting shielded twisted pair cables

Wire shielded twisted pair cables to link modules as shown in Fig 8.12.
Connect terminal resistors to both end stations.

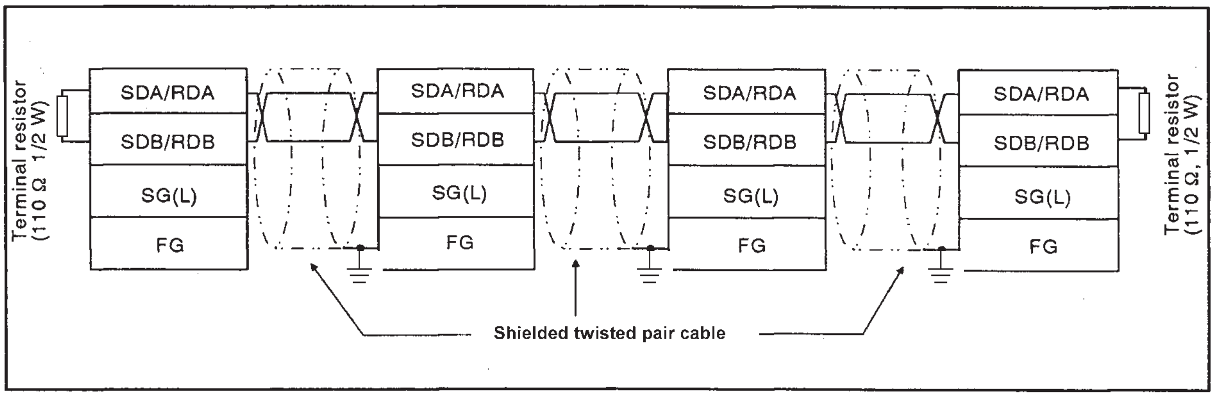


Fig 8.12 Connecting shielded twisted pair cables to link modules

REMARK

Use M4-size terminal screws for terminal blocks that connect shielded twisted pair cables. Select solderless terminals suitable for the terminal screws.
The tightening torque range is from 78 to 118 N・cm.

8.6 Startup Procedure

In MELSECNET data link system, the power supplies have to be turned on simultaneously or in the order of system from lowest to highest.

(1) Two-tier system
Power on the system in the following order: All slave stations → Master station

(2) Three-tier system
Power on the system in the following order: All sub-slave stations (slave stations in the third tier) → All slave stations in the second tier → Master station for the second tier

REMARK

(1) If the automatic return function is set for the master station and all of the slave stations, other startup procedures are also applicable.
For example, if the automatic return function is set to the master station for the second tier and the master station for the third tier, the power supplies can be turned on in the following order: Master station for the second tier → Local stations in the second tier (including the master station for the third tier) → Local stations in the third tier.

(2) If all stations are powered on simultaneously, a faulty station may be detected because of the difference on startup timing between the master station and slave stations. If this occurs when the automatic return function is not set for the master station, communications may not be started normally. If it is set, the number of retries is stored in D9210 for retry processing.

8.7 Self-diagnostics Test

(1) The self-diagnostics test checks link module hardware and link cables for wire break. The following five items are checked with the self-diagnostics test:

Test name	Description	MELSECNET	MELSECNET/B
Forward loop test	Checks optical fiber cables or coaxial cables in the entire data link system. This test also checks the forward loop, through which data link is usually performed.	○	×
Reverse loop test	Checks optical fiber cables or coaxial cables in the entire data link system. This test also checks the reverse loop, which is used for loopback in the event of an error.	○	×
Station-to-station test (Testing station)	Checks line connection between two stations, by setting the lower-numbered station as the testing station and another station as the tested station.	○	○
Station-to-station test (Tested station)		○	○
Self-loopback test	Checks the hardware of each link module, including the transmission and receive circuits.	○	○

○: Executable, ×: Not executable

8.7.1 Self-loopback test

(1) Self-loopback test

(a) The self-loopback test checks the hardware of each link module, including the transmission and receiving circuits in transmission system.

1) In the MELSECNET data link system, connect the send and receive ends on the host station with an optical fiber cable or coaxial cables as shown in Fig 8.13.

2) In the MELSECNET/B data link system, perform this test to a single link module.
(Connecting SDA/RDA and SDB/RDB are not required.)

(b) When the receive end cannot receive data sent from the send end in a given time, the loop is determined to be faulty.

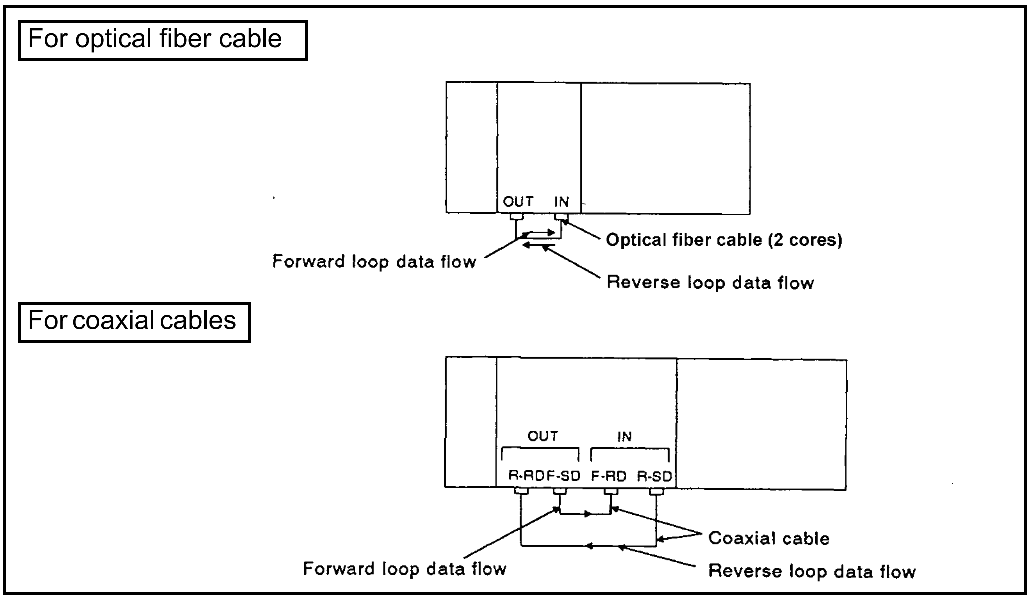
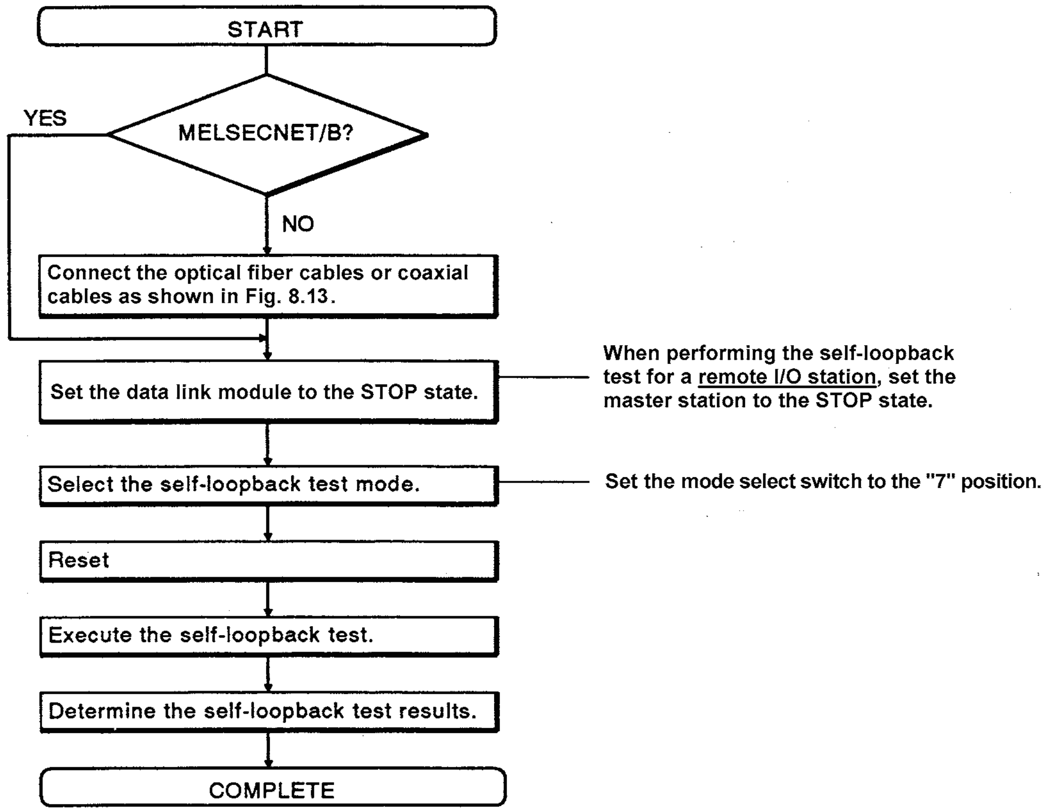


Fig 8.13 Self-loopback test

(2) Test procedure

The following flowchart shows the operation procedure for self-loopback test.



(3) Test result

The LEDs on the link module indicate the test result.

The descriptions of the LEDs are as follows.

(a) Normal....... The following LEDs flash in order:
CRC, OVER, AB.IF, TIME, DATA, UNDER

(b) Error........... The corresponding LEDs turn ON and the test is discontinued.

1) When the F.LOOP, R.LOOP and TIME LEDs turn ON:
   a) The forward loop cable is broken.
   b) The sending and receiving ends of the forward loop are not connected with a cable.
   c) The sending end of the forward loop is connected to the sending end of the reverse loop, and the receiving end of the forward loop is connected to the receiving end of the reverse loop.

(2) When the F.LOOP, R.LOOP, and DATA LEDs turn ON:
   a) The reverse loop cable is broken.
   b) The sending and receiving ends of the reverse loop are not connected with a cable.

(3) When an ERROR LED other than 1) and 2) turns ON:
   a) Hardware error
   b) The cable was disconnected during the test.
   c) A cable was broken during the test.

8.7.2 Station to station test

(1) Station to station test
The station to station test checks the cable connections of two adjacent stations.
When the data sent from the master station link module is not returned from the slave station link module in a given time, the loop is determined to be faulty.

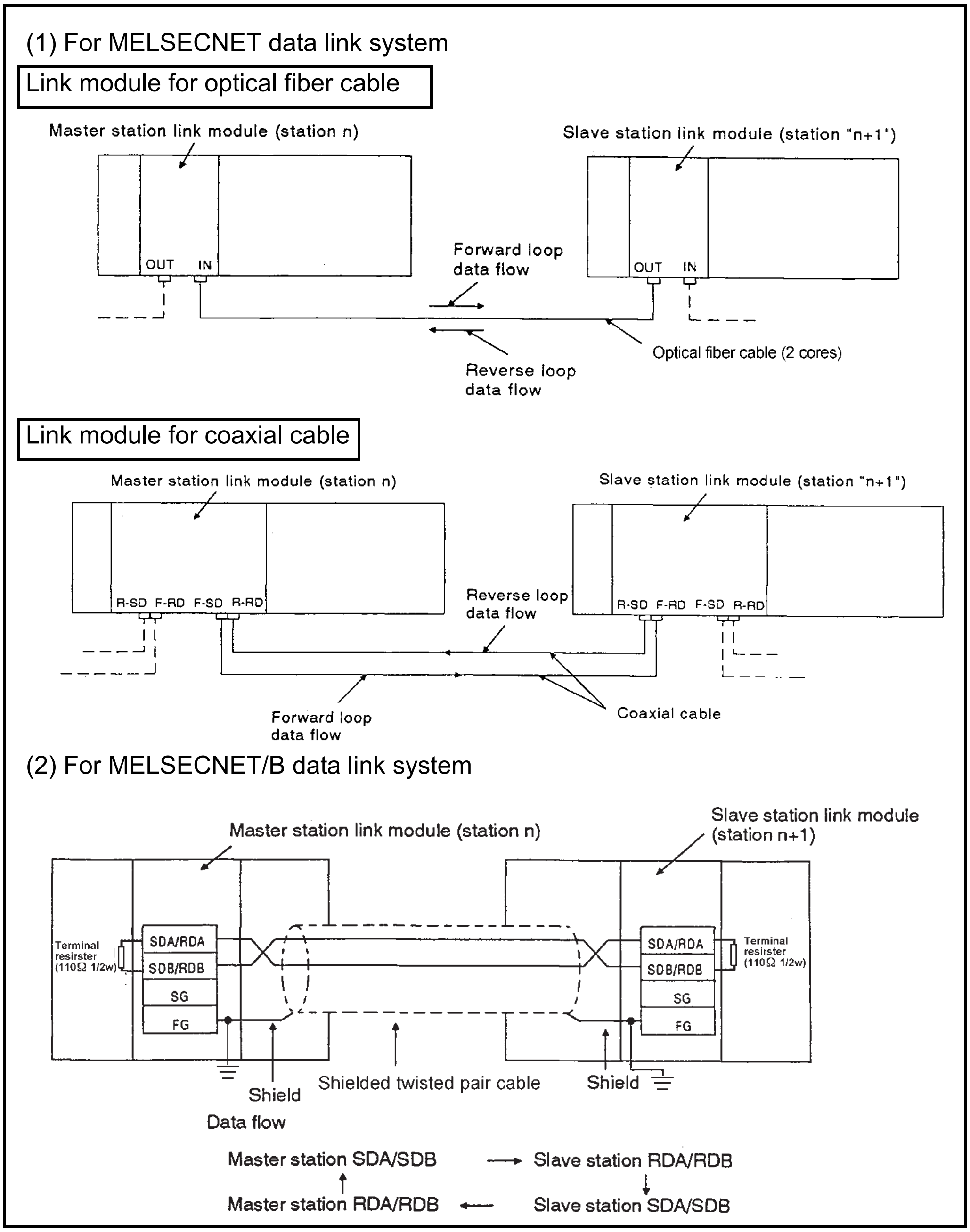
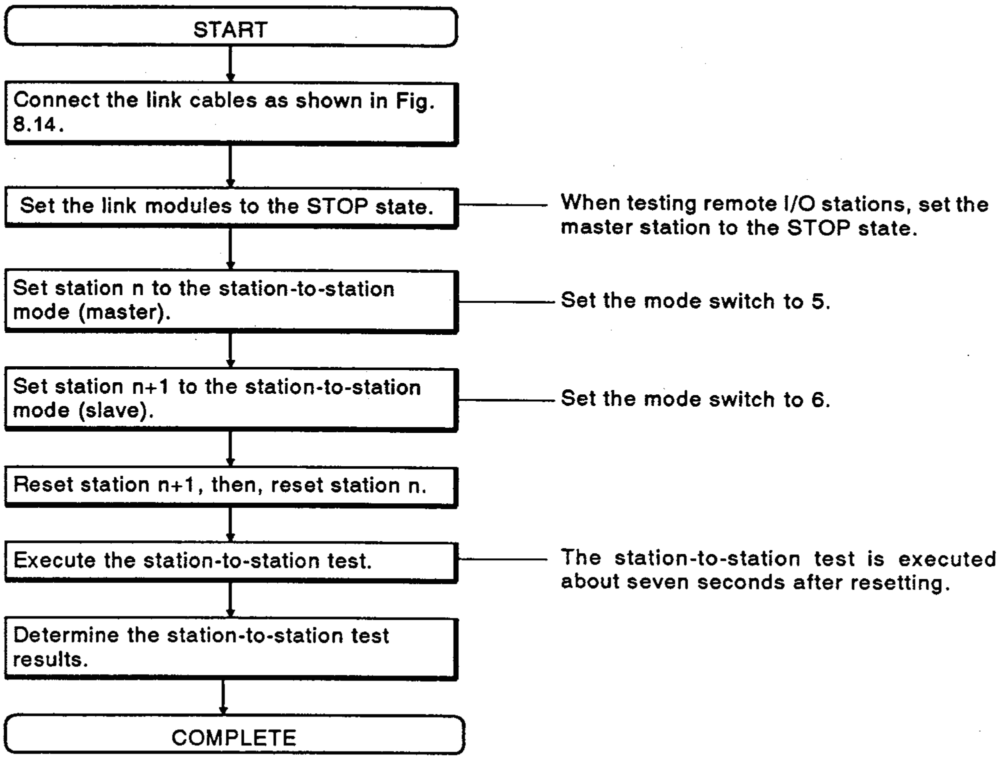


Fig 8.14 Station to station test

(2) Test procedure

The following flowchart shows the operation procedure for station to station test.



(3) Test result

The LEDs indicate the test result.

The descriptions of the LEDs are as follows.

(a) Normal... The following LEDs flash in order:
CRC, OVER, AB.IF, TIME, DATA, UNDER

(b) Error........The corresponding LEDs turn ON and the test is discontinued.

1) When the F.LOOP and TIME LEDs turn ON:
   a) The forward loop cable is broken.
   b) The sending and receiving ends of the forward loop are not connected with a cable.

(2) When the F.LOOP, R.LOOP, and TIME LEDs turn ON:
   a) The reverse loop cable is broken.
   b) The sending and receiving ends of the reverse loop are not connected with a cable.
   c) The sending end of the forward loop is connected to the sending end of the reverse loop, and the receiving end of the forward loop is connected to the receiving end of the reverse loop.

(3) When an ERROR LED other than 1) and 2) turns ON:
   a) Hardware error
   b) The cable was disconnected during the test.
   c) A cable was broken during the test.

8.7.3 Forward loop test and reverse loop test

POINT
The forward/reverse loop tests require data link parameter. Write data link parameter setting of only the total number of slave stations to the master station.

(1) Forward loop test

(a) The forward loop test checks the forward loop in MELSECNET data link system after optical fiber cables or coaxial cables are laid down.

(b) When the receive end of the forward loop in the master station cannot receive data sent from the send end of the forward loop in the master station, the loop is determined to be faulty.

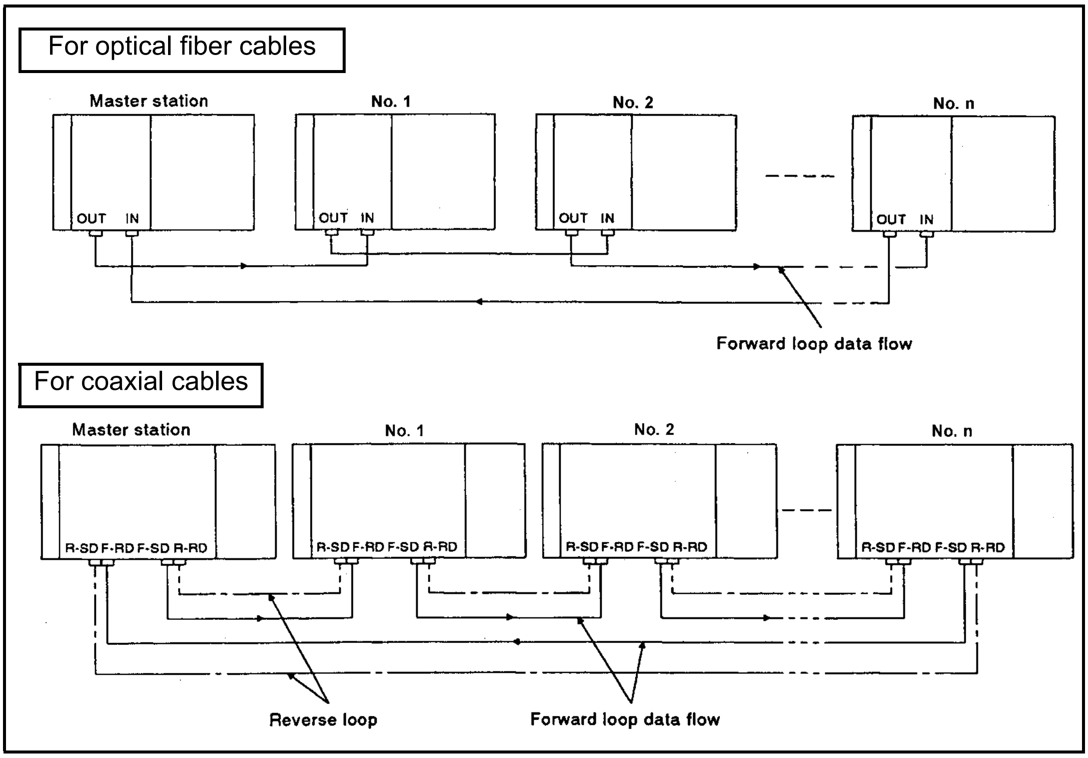


Fig 8.15 Forward loop test

(2) Reverse loop test

(a) The reverse loop test checks the reverse loop in MELSECNET data link system after optical fiber cables or coaxial cables are laid down.

(b) When the receive end of the reverse loop in the master station cannot receive data sent from the send end of the reverse loop in the master station, the loop is determined to be faulty.

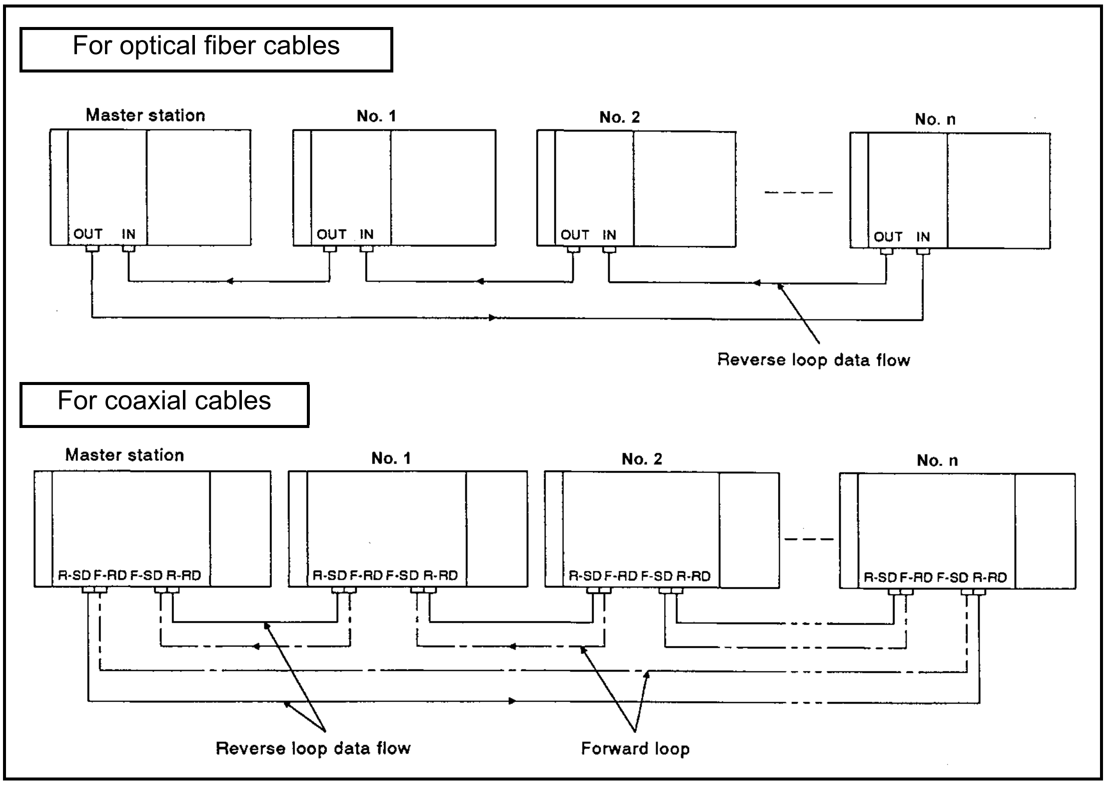
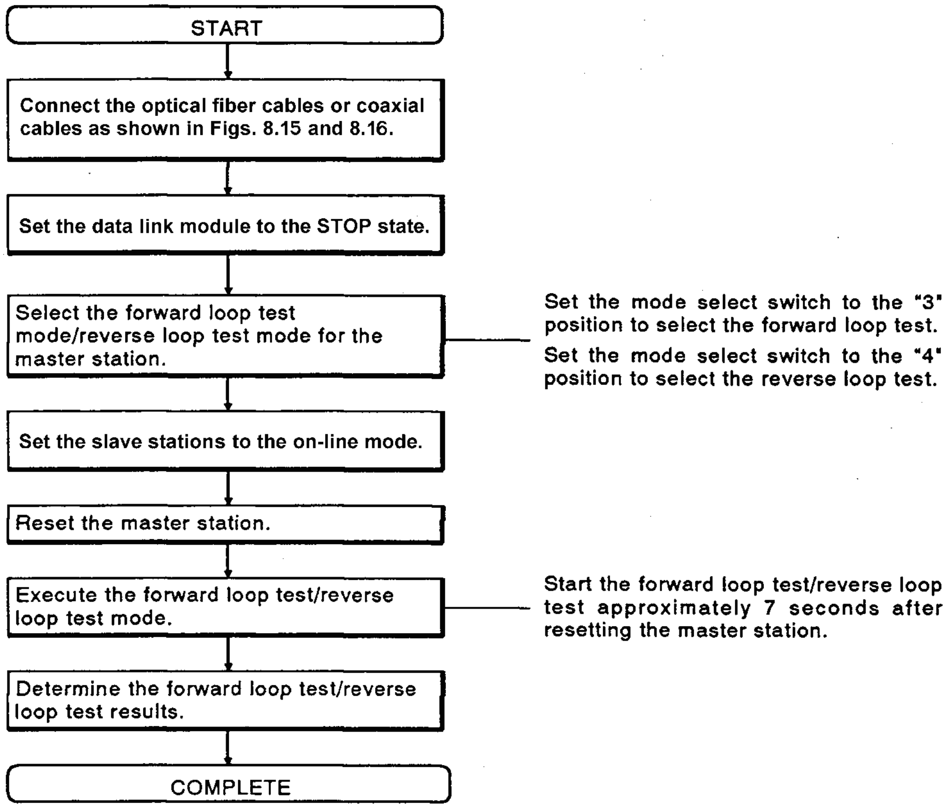


Fig 8.16 Reverse loop test

(3) Test procedure

The following flowchart shows the operation procedure for forward loop test/reverse loop test.



(4) Test result

The LEDs on the link module of the master station or the GPP link monitor function show(s) the test result.

(a) For GPP link monitor, refer to Section 10.1.

(b) The descriptions of the LEDs are as follows.

1) Normal.....The following LEDs flash in order:
CRC, OVER, AB.IF, TIME, DATA, UNDER

2) Error........ The corresponding LEDs flash and the test is discontinued.

a) When the TIME, DATA and UNDER LEDs flash:

- Hardware failure
- Disconnection of the optical fiber/coaxial cables, or loopback due to a slave station error
- The master station (00) setting is made for more than one station.
- The monitoring time set is too short.

POINT
In case of forward/reverse loop error, the data link will be established in the reverse/forward loop or the loopback mode. The forward/reverse loop data link is recovered when the loop returns to normal. The LEDs remain in the error status even after the recovery, reset the master station and execute the forward loop test/reverse loop test again.

9 PROGRAMMING

This chapter describes methods for programming the master and local stations to perform data link among CPU modules.

9.1 Precautions for Creating Programs

(1) Used link devices

The device numbers assigned to each station with link parameter can be used for link devices (B, W, X, Y) to be used in data link programs.

(2) Writing fail safe programs

Using special link relays (M9200 to M9255) and special link registers (D9200 to D9255), an interlock should be provided for data link programs among communication stations so that the other stations data can be used only when the data link is performed normally.

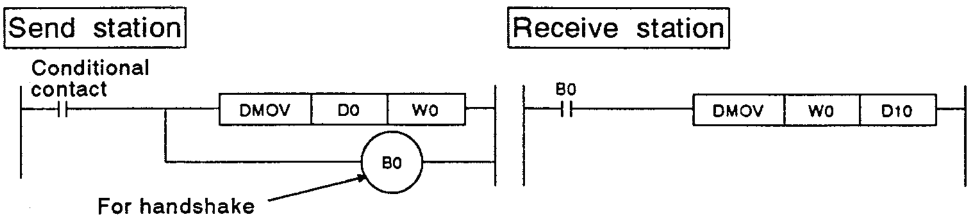
(3) Data link method for data of two or more words

When writing data of two or more words to the link registers, employ the following procedure to prevent sending/receiving the data in which the old and new data are mixed.

(a) When using a module that executes link refresh immediately after link scan (such as the AnNCPUP21/R21 and the A0J2CPUP23/R23), executing handshake processing with link relays are recommended so that the link register data can be read by other stations after the data is written to the link registers.

Example

(1) The following shows a program for sending W0 and W1 data to another station:



(a) At the sending station, B0 turns ON when data in D0 and D1 are transferred to W0 and W1.

(b) At the receiving station, data are read while B0 is ON.

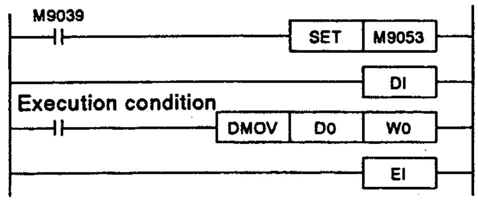
POINT
Link refresh is performed at the master station and local stations even while an instruction is processed. In a program example above, if link refresh is performed when the D0 data is being transmitted to W0, the new data and old data is stored to W0 and W1 respectively, and sent to the receive station.

(b) Set link refresh disable area as shown below when using a module which can make rink refresh execution disable setting such as the AnNCPUP21/R21 by using ON/OFF of M9053 and the DI/EI instructions.

Example

(1) The following shows a program for sending W0 and W1 data to another station

Send station



Enables a link refresh disable area to be created with DI/EI

Sets the link refresh disable area

(c) The module that performs link refresh only after the execution of the END instruction in the sequence program (A3HCPU, A3MCPU, AnACPU, AnUCPU, A2USCPU(S1), QnACPU, QnAS(H)CPU(S1), QCPU-A), even if data of two words or more are sent to link registers, the old and new data are not mixed.

(4) Precautions when using the MELSECNET II mode or the MELSECNET II composite mode

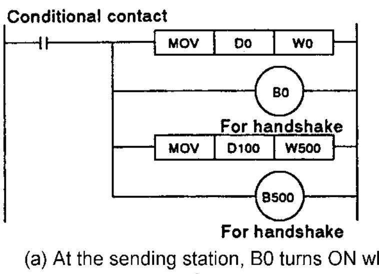
The timing to be link refreshed may differ between the device range assigned with the first half of the link parameters and that assigned with the last half of the link parameters.

Handshake processing is required to receive the data written at the same timing.

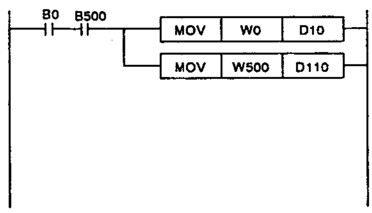
Example

(1) In the following program, when W0 to WFF and B0 to BFF are assigned with the first half link parameters and W500 to W5FF and B500 to B5FF are assigned with the second half link parameters, data written to W0 and W500 at the same time are received.

Send station



Receive station



(a) At the sending station, B0 turns ON when D0 data are transferrd to W0, and B500 turns ON when D100 data are transferrd to W500.

(2) At the receiving station, W0 and W500 data are transferd to D10 and D110 respectively when B0 and B500 turn ON.

(5) Read/write of the special function module installed to the remote I/O station

(a) Execute the RFRP or RTOP instruction after initial communications of remote I/O stations.

The completion of initial communications can be checked with special link registers (D9224 to D9227). (Refer to the ladder examples in Section 9.8.)

If the RFRP or RTOP instruction is executed before the completion of initial communications, an "OPERATION ERROR" occurs.

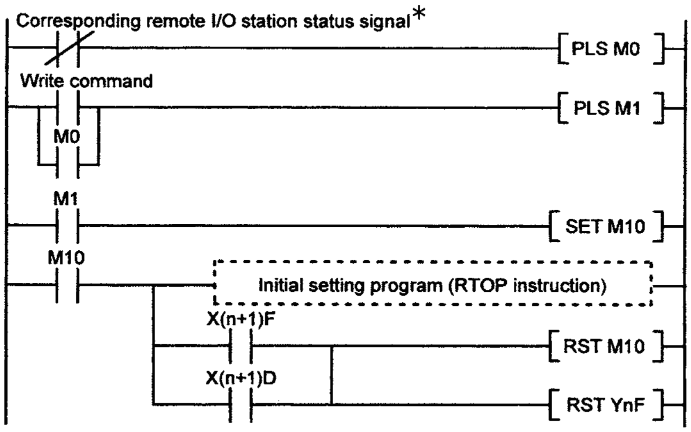
(b) If a receive error occurs while the RFRP or RTOP instruction is being executed, the handshake signals (YnE, YnF) may remain ON.
Therefore, create a ladder so that the handshake signals (YnE, YnF) and the special function module error signal (X(n+1)D) are turned OFF in case of a communication error. (Refer to the ladder examples in Section 9.8.)

(6) Link data in cut-off stations
If a local station and/or remote I/O station is cut-off during data link due to power-on or reset operation, the data immediately before the cut-off are retained in other stations.

(7) Instructions that cannot be used in data link programs
Pulse instructions (PLS, SFTP, etc.) cannot be used for outputting data to a remote I/O station or communications between the master station and local stations.
Create a program with referring to the transmission delay time described in Section 6.2.

(8) Precautions for transient transmission execution using link instructions
(a) LRDP, LWTP.... These instructions can only be executed at one point in the same system. They cannot be executed simultaneously at two or more points.
(b) RFRP, RTOP.... These instructions cannot be executed at two or more points in a special function module.

(9) If initial settings have been made in a program for the buffer memory in the special function module on the remote I/O station, create the program so that when only that remote I/O station is reset (by powering it off or by turning on the reset switch of the network module on the remote I/O station), the master station will detect the status and initial settings will be made to the special function module again.
Initial settings are made to the special function module when:
(a) Setting sampling period specification and set data setting request with the A/D converter module, A616AD.
(b) Setting the number of channels and averaging processing specification with the A/D converter module, A68AD.



*: The operating status of the remote I/O station can be checked using remote I/O station error (D9228 to D9231) of special link registers. To use the remote I/O station error in a program, develop it in bit devices M, L, etc. using the MOV instruction. (Example: [MOV D9228 K4M1000], and the contents of D9228 are developed in M1000 to M1015.)

9.2 Special Link Relays

Special link relays are internal relays controlled by turning ON/OFF due to various causes during data link. Monitoring or using them in a sequence program can check data link errors.

9.2.1 Special link relays enabled only for the master station

Table 9.1 and Table 9.2 show the special relays controlled only when the host station is set to the master station.

Table 9.1 MELSECNET special link relays list

Device Number	Name	Data	Description
M9200	LRDP instruction received	OFF : Unreceived ON : Received	• Turned ON when an LRDP (word device read) instruction is received. • Used in a user program as an interlock for an LRDP instruction. • Remains ON after the completion of word device read processing called by an LRDP instruction. Turned OFF with an RST instruction in a user program.
M9201	LRDP instruction completed	OFF : Uncompleted ON : Completed	• Turned ON after an LRDP (word device read) instruction has been executed. The execution results are stored in D9200. • Used as a conditional contact to reset M9200 and M9201 after the completion of word device read processing called by an LRDP instruction. • Turned OFF with an RST instruction in a user program after it has been turned ON.
M9202	LWTP instruction received	OFF : Unreceived ON : Received	• Turned ON when an LWTP (word device write) instruction is received. • Used in a user program as an interlock for an LWTP instruction. • Remains ON after the completion of word device write processing called by an LWTP instruction. Turned OFF with an RST instruction in a user program.
M9203	LWTP instruction completed	OFF : Uncompleted ON : Completed	• Turned ON after an LWTP (word device write) instruction has been executed. The execution results are stored in D9201. • Used as a conditional contact to reset M9202 and M9203 after the completion of word device write processing called by an LWTP instruction. • Turned OFF with an RST instruction in a user program after it has been turned ON.
M9206	Link parameter error in the host station	OFF : Normal ON : Error	• Turned ON when no link parameter of the host station is set or any of the settings is incorrect. • To turn it OFF, use the RST instruction in the user program.
M9207	Link parameter inconsistency with the master station	OFF : Normal ON : Error	• Turned ON if a lower tier link uses device ranges (B, W) outside the range that is set to be used by the master station in the upper tier link. • Check is executed only when M9209 is OFF.
M9208	B and W transmission range for the master station (lower tier master stations only)	OFF : Send to the second and third tiers ON : Send to the second tier only	• Sets whether the B and W data controlled by the master station in the upper tier is sent to the local stations (sub-slave stations) in the lower tier. • OFF : B and W data in the master station is sent to the sub-slave stations. • ON : B and W data in the master station is not sent to the sub-slave stations.

Table 9.1 MELSECNET special link relays list (Continued)

Device Number	Name	Data	Description
M9209	Link parameter check instruction (lower tier link master stations only)	OFF : Check executed ON : Check not executed	• Turned ON when the link devices (B and W) used by the upper tier and lower tier are not compared for "match". • When M9209 is OFF, the link parameters for the upper tier and lower tier are checked.
M9210	Link card error (master station)	OFF : Normal ON : Error	• Turned ON when the link card hardware is faulty.
M9224	Link status	OFF : Offline ON : Online, station-to-station test, or self-loopback test	• Turned ON when the master station is offline, in the station-to- station test mode, or in the self-loopback test mode. • Turned OFF when the master station is reset after being placed in the online mode.
M9225	Forward loop error	OFF : Normal ON : Error	• Turned ON when any of the following errors occurs on the forward loop line between the master station and the final station: • Cable disconnection • Forward loop receiver error of the master station link module • Forward loop transmitter error of the link module on the final local station • Turned ON when the station-to-station test, including the final station, is executed during the data link. • Turned OFF automatically when the error state is eliminated.
M9226	Reverse loop error	OFF : Normal ON : Error	• Turned ON when any of the following errors occurs on the reverse loop line between the master station and station No.1 : • Cable disconnection • Reverse loop receiver error of the master station link module • Reverse loop transmitter error of the link module on station No.1 • Turned ON when the station-to-station test was executed at station No.1, during data link execution. • Turned OFF automatically when the error state is eliminated.
M9227	Loop test status	OFF : Unexecuted ON : Forward loop test or reverse loop test being executed	• Turned ON when a forward loop test or reverse loop test is being executed for the master station.
M9232	Local station operating status	OFF : RUN or STEP RUN status ON : STOP or PAUSE status	• ON/OFF status depends on the operation status of the local station. • Turned ON when the status of any local station in the loop changes to STOP or PAUSE. • Turned OFF automatically when the status of all local stations changes to RUN or STEP RUN. (That is, M9232 is turned OFF when bits D9212 to D9215 are all OFF.)

Table 9.1 MELSECNET special link relays list (Continued)

Device Number	Name	Data	Description
M9233	Local station error detected	OFF : No error ON : Error detected	• Turned ON when a local station in the executed loop detects an error in another station (M9255 ON). • Turned OFF automatically when the faulty station is returned to the normal state or the data link returns to the normal status by switching the loop line. (That is, M9233 is turned OFF when bits D9216 to D9219 are all OFF.)
M9235	Local station or remote I/O station parameter error detected‘	OFF : No error ON : Error detected	• For local station: Parameter inconsistency was detected since devices other than the link relay (B) and link register (W)ranges, (which are assigned to the lower link master station) are assigned to link parameters for the lower link with link parameters for the upper link. For remote I/O station : Error in I/O assignment, or neither inputs (X) nor outputs (Y) are set with the link parameters. • Turned OFF when the error is eliminated by correcting the link parameters. (That is, M9235 is turned OFF when bits D9220 to D9223 are all OFF.)
M9236	Local station or remote I/O station initial communication status	OFF : Not communi-cating ON : Communi-cating	• Turned ON while a local station and/or remote I/O station is communicating the initial setting data (link parameter) to the master station to execute data link processing. • Automatically turned OFF when the communication for initial data setting has been completed. (That is, M9236 is turned OFF when bits D9224 to D9227 are all OFF.)
M9237	Local station or remote I/O station error	OFF : Normal ON : Error	• Turned ON when an error occurs with one local station or remote I/O station within the loop. (The relay is turned ON while a station-to-station test is being executed for a local station or a remote I/O station and the data link is operating.) • Automatically turned OFF when the faulty station returns to the normal status or the data link returns to the normal status by switching the loop line. (That is, M9237 is turned OFF when bits D9228 to D9231 are all OFF.)
M9238	Local station or remote I/O station forward/reverse loop error	OFF : Normal ON : Error	• Turned ON when an error occurs in the forward loop line or reverse loop line of the local stations and remote I/O stations. (That is, M9238 is turned OFF when bits D9232 to D9239 are all OFF.)

Table 9.2 MELSECNET/B special link relays list

Device Number	Name	Data	Description
M9200	LRDP instruction received	OFF : Unreceived ON : Received	• Turned ON when an LRDP (word device read) instruction is received. • Used in a user program as an interlock for an LRDP instruction. • Remains ON after the completion of word device read processing called by an LRDP instruction. Turned OFF with an RST instruction in a user program.
M9201	LRDP instruction completed	OFF : Uncompleted ON : Completed	• Turned ON after an LRDP (word device read) instruction has been executed. The execution results are stored in D9200. • Used as a conditional contact to reset M9200 and M9201 after the completion of word device read processing called by an LRDP instruction. • Turned OFF with an RST instruction in a user program after it has been turned ON.
M9202	LWTP instruction received	OFF : Unreceived ON : Received	• Turned ON when an LWTP (word device write) instruction is received. • Used in a user program as an interlock for an LWTP instruction. • Remains ON after the completion of word device write processing called by an LWTP instruction. Turned OFF with an RST instruction in a user program.
M9203	LWTP instruction completed	OFF : Uncompleted ON : Completed	• Turned ON after an LWTP (word device write) instruction has been executed. The execution results are stored in D9201. • Used as a conditional contact to reset M9202 and M9203 after the completion of word device write processing called by an LWTP instruction. • Turned OFF with an RST instruction in a user program.
M9206	Link parameter error in the host station	OFF : Normal ON : Error	• Turned ON when no link parameter of the host station is set, or any of the settings is incorrect. • Turned OFF with an RST instruction in a user program.
M9207	Link parameter inconsistency with the master station	OFF : Normal ON : Error	• Turned ON if a lower tier link uses device ranges (B, W) outside the range that is set to be used by the master station in the upper tier link. • Check is executed only when M9209 is OFF.
M9208	B and W transmission range for the master station (lower tier master stations only)	OFF : Send to the second and third tiers ON : Send to the second tier only	• Sets whether the B and W data controlled by the master station in the upper tier is sent to the local stations (sub-slave stations) in the lower tier. • OFF : B and W data in the master station is sent to the sub-slave stations. • ON : B and W data in the master station is not sent to the sub-slave stations.
M9209	Link parameter check instruction (lower tier link master stations only)	OFF : Check executed ON : Check not executed	• Turned ON when the link devices (B and W) used by the upper tier and lower tier are not compared for "match". • When M9209 is OFF, the link parameters for the upper tier and lower tier are checked.
M9210	Link card error (master station)	OFF : Normal ON : Error	• Turned ON when the link card hardware is faulty.
M9224	Link status	OFF : Offline ON : Online, station-to-station test, or self-loopback test	• Turned ON when the master station is offline, in the station-to- station test mode, or in the self-loopback test mode. • Turned OFF when the master station is reset after being placed in the online mode.

Table 9.2 MELSECNET/B special link relays list (Continued)

Device Number	Name	Data	Description
M9232	Local station operating status	OFF : RUN or STEP RUN status ON : STOP or PAUSE status	• ON/OFF status depends on the operation status of the local station. • Turned ON when the status of any local station in the loop changes to STOP or PAUSE. • Turned OFF automatically when the status of all local stations changes to RUN or STEP RUN. (That is, M9232 is turned OFF when bits D9212 to D9215 are all OFF.)
M9233	Local station error detected	OFF : No error ON : Error detected	• Turned ON when a local station in the executed loop detects an error in another station (M9255 ON). • Automatically turned OFF when the faulty station is returned to the normal state. (That is, M9233 is turned OFF when bits D9216 to D9219 are all OFF.)
M9235	Local station parameter error detected	OFF : No error ON : Error detected	• Turned ON when the bit device range (link relays and link registers) outside the range allocated to a master station for the lower tier is allocated with the link parameters for the lower tier. • Turned OFF when the error is eliminated by correcting the link parameters. (That is, M9235 is turned OFF when bits D9220 and D9221 are all OFF.)
M9236	Local station initial communications status	OFF : Not communi-cating ON : Communi-cating	• Turned ON while a local station is communicating the initial setting data (link parameters) to a master station to execute data link processing. • Automatically turned OFF when the communication for initial data setting has been completed. (That is, M9236 is turned OFF when bits D9224 and D9225 are all OFF.)
M9237	Local station error	OFF : Normal ON : Error	• Turned ON when an error occurs at one local station within the loop. (The relay is turned ON while a station-to-station test is being executed for a local station and the data link is operating.) • Automatically turned OFF when the faulty station returns to normal. (That is, M9237 is turned OFF when bits D9228 and D9229 are all OFF.)

9.2.2 Special link relays enabled only for local stations

Table 9.3 and Table 9.4 show the special relays controlled only when the host station is set to local station.

Table 9.3 MELSECNET special link relays list

Device Number	Name	Data	Description
M9204	LRDP instruction completed	OFF : Uncompleted ON : Completed	• Turned ON by a local station upon the completion of word device read processing called by an LRDP instruction.
M9205	LWTP instruction completed	OFF : Uncompleted ON : Completed	• Turned ON by a local station upon the completion of word device write processing called by an LWTP instruction.
M9211	Link card error (local station)	OFF : Normal ON : Error	• Turned ON when the link card hardware is faulty.
M9240	Link status	OFF : Online ON : Offline, station-to-station test, or self-loopback test	• Turned ON when the host station is in offline, station-to-station test, or self-loopback test mode. • Turned OFF when the host station is reset after being placed in the online mode.
M9241	Forward loop line error	OFF : Normal ON : Error	• Turned ON when any of the following errors occurs in the forward loop line between the host station and the preceding station: • Cable disconnection • Forward loop receiver error of the host station link module • Forward loop transmitter error of the link module on the preceding station • Turned OFF automatically when the error state is eliminated.
M9242	Reverse loop line error	OFF : Normal ON : Error	• Turned ON when any of the following occurs in the reverse loop line between the host station and the next station: • Cable disconnection • Reverse loop receiving part error in the data link module of the station itself • Reverse loop sending part error in the data link module of the next station • Turned OFF automatically when the error state is eliminated.
M9243	Loopback execution	OFF : Not-executed ON : Executed	• Turned ON when loopback is executed by the host station.
M9246	Data unreceived	OFF : Received ON : Unreceived	• Turned ON when the data from the master station has not been received.
M9247	Data unreceived	OFF : Received ON : Unreceived	• In the three-tier system, M9247 is turned ON when a sub-slave station has not received data from the master station for the third tier. (That is, M9247 is ON while M9208 is ON.)
M9250	Parameter unreceived	OFF : Received ON : Unreceived	• Turned ON when the link parameters have not been received from the master station. • Automatically turned OFF when the link parameter is received. • The master station sends the link parameters to each local station every time the loop line is switched. • Only effective while the loop line in which the data link is executed is online.

Table 9.3 MELSECNET special link relays list (Continued)

Device Number	Name	Data	Description
M9251	Link halt	OFF : Normal ON : Halt	• ON/OFF status depends on whether the station itself stopped the data link. • Turned ON when the data link is established in neither the forward loop line nor the reverse loop line. • Automatically turned OFF when the data link returns to the normal state. • Only effective while the loop line in which the data link is executed is online.
M9252	Loop test status	OFF : Not executed ON : Forward loop test or reverse loop test is being executed.	• Turned ON while the host station itself is in the forward loop test mode or the reverse loop test mode.
M9253	Master station operating status	OFF : RUN or STEP RUN status ON : STOP or PAUSE status	• Controlled according to the operation status of the master station. • Turned ON when the status of a master station is either STOP or PAUSE. • Turned OFF when the status of the master station changes to RUN or STEP RUN.
M9254	Operating status of local stations except host	OFF : RUN or STEP RUN status ON : STOP or PAUSE status	• Controlled according to the operation status of a local station other than the host station. • Turned ON when the status of a local station other than the host station in the loop is either STOP or PAUSE. • Not turned ON when the status of the host station itself is either STOP or PAUSE. • Automatically turned OFF when the status of a local station other than the host station in the loop changes to RUN or STEP RUN. (That is, M9254 is turned OFF when bits D9248 to D9251 are all OFF.)
M9255	Error status of local stations except host	OFF : Normal ON : Error	• Controlled by detecting an error of a local station other than the host station. • Turned ON if an error occurs in one local station other than the host station in the loop. • Automatically turned OFF when the faulty station returns to the normal state or the data link returns to the normal state by switching the loop line. (That is, M9255 is turned OFF when bits D9252 to D9255 are all OFF.)

Table 9.4 MELSECNET/B special link relays list

Device Number	Name	Data	Description
M9204	LRDP instruction completed	OFF : Uncompleted ON : Completed	• Turned ON by a local station upon the completion of word device read processing called by an LRDP instruction.
M9205	LWTP instruction completed	OFF : Uncompleted ON : Completed	• Turned ON by a local station upon the completion of word device write processing called by an LWTP instruction.
M9211	Link card error (local station)	OFF : Normal ON : Error	• Turned ON when the link card hardware is faulty.
M9240	Link status	OFF : Online ON : Offline, station-to-station test, or self-loopback test	• Turned ON when the host station is in offline, station-to-station test, or self-loopback test mode. • Turned OFF when the host station is reset after being placed in the online mode.
M9246	Data unreceived	OFF : Received ON : Unreceived	• Turned ON when the data from the master station has not been received.
M9247	Data unreceived	OFF : Received ON : Unreceived	• Turned ON when a sub-slave station has not received data from the master station in the three-tire system. (That is, M9247 is ON while M9208 is ON.)
M9250	Parameter unreceived	OFF : Received ON : Unreceived	• Turned ON when the link parameters have not been received from the master station. • Automatically turned OFF when the link parameter is received. • Only valid while the loop line in which the data link is executed is online.
M9251	Link halt	OFF : Normal ON : Halt	• Controlled by whether the host station stopped the data link or not. • Automatically turned OFF when the data link returns to the normal status. • Only effective while the loop line in which the data link is executed is online.
M9253	Master station operating status	OFF : RUN or STEP RUN status ON : STOP or PAUSE status	• Controlled according to the operation status of a master station. • Turned ON when the status of the master station is either STOP or PAUSE. • Turned OFF when the status of the master station changes to RUN or STEP RUN.
M9254	Operating status of local stations except host	OFF : RUN or STEP RUN status ON : STOP or PAUSE status	• Controlled according to the operation status of a local station other than the host station. • Turned ON when the status of a local station other than the host station in the loop is either STOP or PAUSE. • Not turned ON even if the status of the host station is either STOP or PAUSE. • Automatically turned OFF when the status of a local station other than the host station in the loop changes to RUN or STEP RUN. (That is, M9254 is turned OFF when bits D9248 and D9249 are OFF.)
M9255	Error status of local stations except host	OFF : Normal ON : Error	• Controlled by detecting by an error of a local station other than the host station. • Turned ON if an error occurs in one local station other than the host station in the loop. • Automatically turned OFF when the faulty station returns to the normal state or the data link returns to the normal state by switching the loop line. (That is, M9255 is turned OFF when bits D9252 to D9253 are all OFF.)

9.3 Special Link Registers

Special link registers store causes of errors that occur at the time of data link in the form of value. Monitoring special link registers enables to detect the area with error or the cause of error.

9.3.1 Special link registers enabled only for the master station

Table 9.5 and Table 9.6 show the special registers controlled only when the host station is set to the master station.

Table 9.5 List of MELSECNET special link registers

Device Number	Name	Data	Description
D9200	LRDP execution result	0 : Normal 2 : LRDP instruction setting fault 3 : Corresponding station error 4 : LRDP cannot be executed in the corresponding station	Stores the execution result of an LRDP (word device read) instruction (M9201 ON). • LRDP instruction setting fault: .... Faulty setting of the LRDP instruction constant, source, and/or target • Corresponding station error: . The designated station is not executing data link processing • LRDP instruction cannot be executed by the corresponding station: .... A remote I/O station is connected to the station designated with the LRDP instruction, or a local station of the QCPU specified by LRDP instruction is in STOP status.
D9201	LWTP execution result	0 : Normal 2 : LWTP instruction setting fault 3 : Corresponding station error 4 : LWTP cannot be executed in the corresponding station	Stores the execution result of an LWTP (word device write) instruction (M9203 ON). • LWTP instruction setting fault: .... Faulty setting of the LWTP instruction constant, source, and/or target • Corresponding station error: . The designated station is not executing data link processing • LWTP instruction cannot be executed by the correspopnding station: .... A remote I/O station is connected to the station designated with the LWTP instruction, or a local station of the QCPU specified by LWTP instruction is in STOP status.

Table 9.5 List of MELSECNET special link registers (Continued)

<table>
<tr><th>Device Number</th><th>Name</th><th>Data</th><th>Description</th></tr>
<tr><td>D9202</td><td rowspan="4">Local station link type</td><td>Stores the status of No.1 to No.16</td><td rowspan="4">Stores whether a slave station is compatible with the MELSECNET mode or MELSECNET Ⅱ mode.
• MELSECNET Ⅱ-compatible station : "1"
• MELSECNET-compatible station : "0"
<table>
<tr><th rowspan="2">DEVICE NUMBER</th><th colspan="16">Bit</th></tr>
<tr><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>D9202</td><td>L16</td><td>L15</td><td>L14</td><td>L13</td><td>L12</td><td>L11</td><td>L10</td><td>L9</td><td>L8</td><td>L7</td><td>L6</td><td>L5</td><td>L4</td><td>L3</td><td>L2</td><td>L1</td></tr>
<tr><td>D9203</td><td>L32</td><td>L31</td><td>L30</td><td>L29</td><td>L28</td><td>L27</td><td>L26</td><td>L25</td><td>L24</td><td>L23</td><td>L22</td><td>L21</td><td>L20</td><td>L19</td><td>L18</td><td>L17</td></tr>
<tr><td>D9241</td><td>L48</td><td>L47</td><td>L46</td><td>L45</td><td>L44</td><td>L43</td><td>L42</td><td>L41</td><td>L40</td><td>L39</td><td>L38</td><td>L37</td><td>L36</td><td>L35</td><td>L34</td><td>L33</td></tr>
<tr><td>D9242</td><td>L64</td><td>L63</td><td>L62</td><td>L61</td><td>L60</td><td>L59</td><td>L58</td><td>L57</td><td>L56</td><td>L55</td><td>L54</td><td>L53</td><td>L52</td><td>L51</td><td>L50</td><td>L49</td></tr>
</table>
• If a local station goes down, data before the failure will be held. When contents of D9224 to D9227 and D9228 to D9231 are ORed and the relevant bit is "1", the corresponding bit in the above special registers is enabled.
• Even If the host station (master station) goes down, the data before the failure will be also held</td></tr>
<tr><td>D9203</td><td>Stores the status of No.17 to No.32</td></tr>
<tr><td>D9241</td><td>Stores the status of No.33 to No.48</td></tr>
<tr><td>D9242</td><td>Stores the status of No.49 to No.64</td></tr>
</table>

Table 9.5 List of MELSECNET special link registers (Continued)

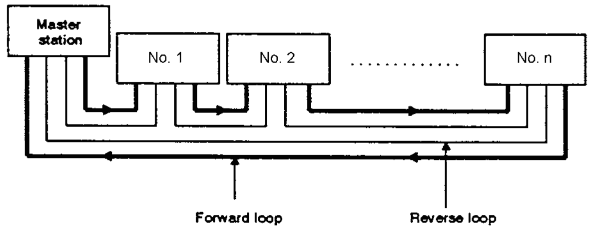
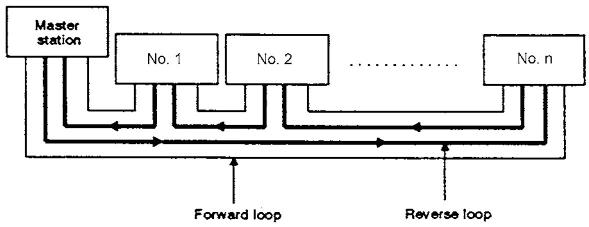
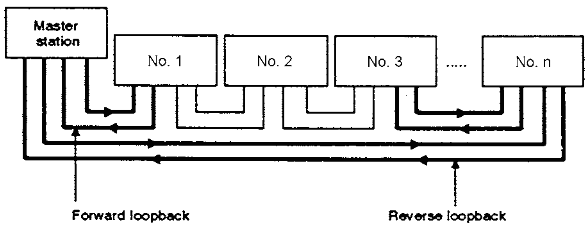
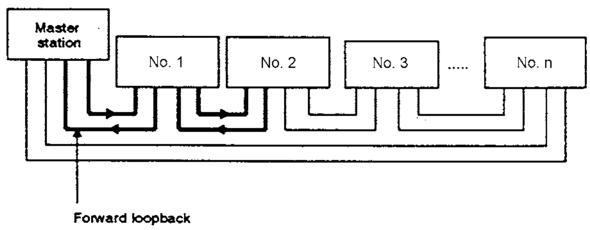
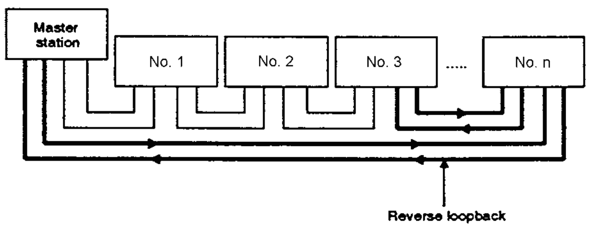
Device Number	Name	Data	Description
D9204	Link status	0 : Data link in forward loop 1 : Data link in reverse loop 2 : Loopback in forward/ reverse direction 3 : Loopback in forward direction 4 : Loopback in reverse direction 5 : Data link impossible	Stores the current path of the data link. (1) Forward loop  (2) Reverse loop  • Forward/reverse loop  • Forward loopback  • Reverse loopback  • When "5" is stored, the monitoring time setting may be too small. • The data in D9204 is updated each time the link status changes. • Even if power of the station connected to the bypass switch is turned OFF, the data link status being executed on the forward or reverse loop is kept.

Table 9.5 List of MELSECNET special link registers (Continued)

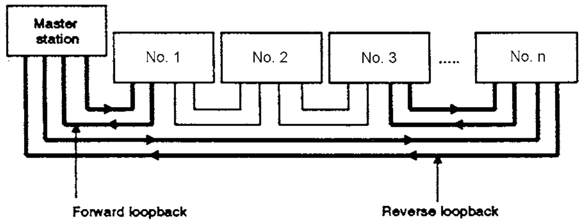
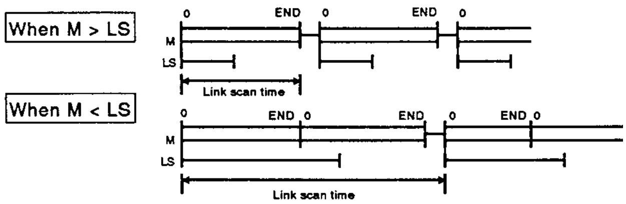
Device Number	Name	Data	Description
D9205	Loopback execution station	Station executing forward loopback	• Stores the number of local station or remote I/O station at which loopback is being executed.  Example: "1" is stored in D9205 and "3" is stored in D9206. • The values stored in D9205 and D9206 are not reset to "0" when the data link returns to the normal state (data link in forward loop). • Reset the programmable controller CPU to return the set values to "0".
D9206	Loopback execution station	Station executing reverse loopback	
D9207	Link scan time	Maximum value	• Stores the time used for data link processing (link scan time) by all of the local stations and remote I/O stations in the loop currently being used for data link. (in 10ms unit) • Link scan time definition:  M : Sequence program scan time by master station LS : Link scan time (data link processing)
D9208		Minimum value	
D9209		Current value	
D9210	Retry count	Total number stored	• Stores the total number of retries conducted when a transmission error occurs. • Definition of retry processing: If data is lost or becomes unreliable due to the occurrence of a data transmission processing error, the same data is sent again. • Counting stops if the number of retries exceeds the maximum limit "FFFF$_H$". • Execute reset operation to clear the data to "0".
D9211	Loop switching count	Total number stored	• Stores the total number of times that the forward loop is switched to a reverse loop or to loopback. • Counting stops if the number of switches exceeds the maximum limit "FFFF$_H$". • Execute reset operation to clear the data to "0".

Table 9.5 List of MELSECNET special link registers (Continued)

<table>
<tr><th>Device Number</th><th>Name</th><th>Data</th><th>Description</th></tr>
<tr><td>D9212</td><td rowspan="4">Local station operating status</td><td>Stores the status of No.1 to No.16</td><td rowspan="4">• Stores the station No. of STOP- or PAUSE-status local station(s) as shown below.
<table>
<tr><th rowspan="2">DEVICE NUMBER</th><th colspan="16">Bit</th></tr>
<tr><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>D9212</td><td>L16</td><td>L15</td><td>L14</td><td>L13</td><td>L12</td><td>L11</td><td>L10</td><td>L9</td><td>L8</td><td>L7</td><td>L6</td><td>L5</td><td>L4</td><td>L3</td><td>L2</td><td>L1</td></tr>
<tr><td>D9213</td><td>L32</td><td>L31</td><td>L30</td><td>L29</td><td>L28</td><td>L27</td><td>L26</td><td>L25</td><td>L24</td><td>L23</td><td>L22</td><td>L21</td><td>L20</td><td>L19</td><td>L18</td><td>L17</td></tr>
<tr><td>D9214</td><td>L48</td><td>L47</td><td>L46</td><td>L45</td><td>L44</td><td>L43</td><td>L42</td><td>L41</td><td>L40</td><td>L39</td><td>L38</td><td>L37</td><td>L36</td><td>L35</td><td>L34</td><td>L33</td></tr>
<tr><td>D9215</td><td>L64</td><td>L63</td><td>L62</td><td>L61</td><td>L60</td><td>L59</td><td>L58</td><td>L57</td><td>L56</td><td>L55</td><td>L54</td><td>L53</td><td>L52</td><td>L51</td><td>L50</td><td>L49</td></tr>
</table>• If a local station goes down, data before the failure will be held. When contents of D9224 to D9227 and D9228 to D9231 are ORed and the relevant bit is "0", the corresponding bit in the above special registers is enabled.
• Even If the host station (master station) goes down, the data before the failure will be also held.
• When the status of a local station changes to STOP or PAUSE, the corresponding bit is "1".The bit status of remote I/O station always remains "0", indicating RUN.
Example:When the operation status of No. 7 changes to the STOP, "1" is set to bit 6 of D9212. When D9212 is monitored, its value is "64 (40_H)".</td></tr>
<tr><td>D9213</td><td>Stores the status of No.17 to No.32</td></tr>
<tr><td>D9214</td><td>Stores the status of No.33 to No.48</td></tr>
<tr><td>D9215</td><td>Stores the status of No.49 to No.64</td></tr>
<tr><td>D9216</td><td rowspan="4">Local station error detection status</td><td>Stores the status of No.1 to No.16</td><td rowspan="4">• Stores the numbers of the station that detect the occurrence of an error at another station.
<table>
<tr><th rowspan="2">DEVICE NUMBER</th><th colspan="16">Bit</th></tr>
<tr><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>D9216</td><td>L16</td><td>L15</td><td>L14</td><td>L13</td><td>L12</td><td>L11</td><td>L10</td><td>L9</td><td>L8</td><td>L7</td><td>L6</td><td>L5</td><td>L4</td><td>L3</td><td>L2</td><td>L1</td></tr>
<tr><td>D9217</td><td>L32</td><td>L31</td><td>L30</td><td>L29</td><td>L28</td><td>L27</td><td>L26</td><td>L25</td><td>L24</td><td>L23</td><td>L22</td><td>L21</td><td>L20</td><td>L19</td><td>L18</td><td>L17</td></tr>
<tr><td>D9218</td><td>L48</td><td>L47</td><td>L46</td><td>L45</td><td>L44</td><td>L43</td><td>L42</td><td>L41</td><td>L40</td><td>L39</td><td>L38</td><td>L37</td><td>L36</td><td>L35</td><td>L34</td><td>L33</td></tr>
<tr><td>D9219</td><td>L64</td><td>L63</td><td>L62</td><td>L61</td><td>L60</td><td>L59</td><td>L58</td><td>L57</td><td>L56</td><td>L55</td><td>L54</td><td>L53</td><td>L52</td><td>L51</td><td>L50</td><td>L49</td></tr>
</table>• If a local station goes down, data before the failure will be held. When contents of D9224 to D9227 and D9228 to D9231 are ORed and the relevant bit is "0", the corresponding bit in the above special registers is enabled.
• Even If the host station (master station) goes down, the data before the failure will be also held.
• When a normally operating local station detects an error at another local station, the bit corresponding to the normally operating station is set to "1". The bit status of remote I/O station always remains "0".
Example:When No. 5 detects that No. 4 is faulty, "1" is set to bit 4 of D9216. When D9216 is monitored, its value is "16 (10_H)".
• When the faulty station recovers normal operating status or when the loop line is switched so that the data link returns to normal operating status, the corresponding bit is automatically reset to "0".</td></tr>
<tr><td>D9217</td><td>Stores the status of No.17 to No.32</td></tr>
<tr><td>D9218</td><td>Stores the status of No.33 to No.48</td></tr>
<tr><td>D9219</td><td>Stores the status of No.49 to No.64</td></tr>
</table>

<table>
<tr><th>Device Number</th><th>Name</th><th>Data</th><th>Description</th></tr>
<tr><td>D9220</td><td rowspan="4">Local station parameter mismatched or remote I/O station input/output allocation error</td><td>Stores the status of No.1 to No.16</td><td rowspan="4">
• Stores the numbers of the stations at which a link parameter error sent from the master station is detected by another local or remote I/O station.
<table>
<tr><th rowspan="2">DEVICE NUMBER</th><th colspan="16">Bit</th></tr>
<tr><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>D9220</td><td>L/R 16</td><td>L/R 15</td><td>L/R 14</td><td>L/R 13</td><td>L/R 12</td><td>L/R 11</td><td>L/R 10</td><td>L/R 9</td><td>L/R 8</td><td>L/R 7</td><td>L/R 6</td><td>L/R 5</td><td>L/R 4</td><td>L/R 3</td><td>L/R 2</td><td>L/R 1</td></tr>
<tr><td>D9221</td><td>L/R 32</td><td>L/R 31</td><td>L/R 30</td><td>L/R 29</td><td>L/R 28</td><td>L/R 27</td><td>L/R 26</td><td>L/R 25</td><td>L/R 24</td><td>L/R 23</td><td>L/R 22</td><td>L/R 21</td><td>L/R 20</td><td>L/R 19</td><td>L/R 18</td><td>L/R 17</td></tr>
<tr><td>D9222</td><td>L/R 48</td><td>L/R 47</td><td>L/R 46</td><td>L/R 45</td><td>L/R 44</td><td>L/R 43</td><td>L/R 42</td><td>L/R 41</td><td>L/R 40</td><td>L/R 39</td><td>L/R 38</td><td>L/R 37</td><td>L/R 36</td><td>L/R 35</td><td>L/R 34</td><td>L/R 33</td></tr>
<tr><td>D9223</td><td>L/R 64</td><td>L/R 63</td><td>L/R 62</td><td>L/R 61</td><td>L/R 60</td><td>L/R 59</td><td>L/R 58</td><td>L/R 57</td><td>L/R 56</td><td>L/R 55</td><td>L/R 54</td><td>L/R 53</td><td>L/R 52</td><td>L/R 51</td><td>L/R 50</td><td>L/R 49</td></tr>
</table>
• If a local station goes down, data before the failure will be held.
When contents of D9224 to D9227 and D9228 to D9231 are ORed and the relevant bit is "0", the corresponding bit in the above special registers is enabled.
• Even If the host station (master station) goes down, the data before the failure will be also held.
• Example:When local station No. 5 is set as a remote I/O station, "1" is set for bit 4 of D9220. When D9220 is monitored, its value is "16 (10_H)".
• When the link parameter settings is corrected and the status of the master station is switched from STOP to RUN, the bit is automatically reset to "0".
</td></tr>
<tr><td>D9221</td><td>Stores the status of No.17 to No.32</td></tr>
<tr><td>D9222</td><td>Stores the status of No.33 to No.48</td></tr>
<tr><td>D9223</td><td>Stores the status of No.49 to No.64</td></tr>
</table>

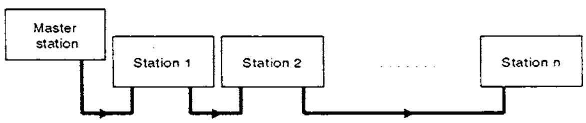
Table 9.5 List of MELSECNET special link registers (Continued)

<table>
<tr><th>Device Number</th><th>Name</th><th>Data</th><th>Description</th></tr>
<tr><td>D9224</td><td rowspan="4">Initial communication between local and/ or remote I/O stations</td><td>Stores the status of No.1 to No.16</td><td rowspan="4">• Stores station Nos. of local stations or remote I/O stations, which are exchanging initial setting data for data link processing, into the corresponding bits in D9224 to D9227 as shown below.
<table>
<tr><th rowspan="2">DEVICE NUMBER</th><th colspan="16">Bit</th></tr>
<tr><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>D9224</td><td>L/R 16</td><td>L/R 15</td><td>L/R 14</td><td>L/R 13</td><td>L/R 12</td><td>L/R 11</td><td>L/R 10</td><td>L/R 9</td><td>L/R 8</td><td>L/R 7</td><td>L/R 6</td><td>L/R 5</td><td>L/R 4</td><td>L/R 3</td><td>L/R 2</td><td>L/R 1</td></tr>
<tr><td>D9225</td><td>L/R 32</td><td>L/R 31</td><td>L/R 30</td><td>L/R 29</td><td>L/R 28</td><td>L/R 27</td><td>L/R 26</td><td>L/R 25</td><td>L/R 24</td><td>L/R 23</td><td>L/R 22</td><td>L/R 21</td><td>L/R 20</td><td>L/R 19</td><td>L/R 18</td><td>L/R 17</td></tr>
<tr><td>D9226</td><td>L/R 48</td><td>L/R 47</td><td>L/R 46</td><td>L/R 45</td><td>L/R 44</td><td>L/R 43</td><td>L/R 42</td><td>L/R 41</td><td>L/R 40</td><td>L/R 39</td><td>L/R 38</td><td>L/R 37</td><td>L/R 36</td><td>L/R 35</td><td>L/R 34</td><td>L/R 33</td></tr>
<tr><td>D9227</td><td>L/R 64</td><td>L/R 63</td><td>L/R 62</td><td>L/R 61</td><td>L/R 60</td><td>L/R 59</td><td>L/R 58</td><td>L/R 57</td><td>L/R 56</td><td>L/R 55</td><td>L/R 54</td><td>L/R 53</td><td>L/R 52</td><td>L/R 51</td><td>L/R 50</td><td>L/R 49</td></tr>
</table>
• When a local station or a remote I/O station is communicating initial setting data (link parameters), the bit corresponding to the station number is set to "1".
Example: When No. 23 and No. 45 are communicating initial setting data (link parameters), "1" is set to bit 6 of D9225 and bit 12 of D9226. When D9225 is monitored, its value is "64 (40_H)"and when D9226 is monitored, its value is "4096 (1000_H)".
• When the communication of initial setting data is complete, the bit is automatically reset to "0".</td></tr>
<tr><td>D9225</td><td>Stores the status of No.17 to No.32</td></tr>
<tr><td>D9226</td><td>Stores the status of No.33 to No.48</td></tr>
<tr><td>D9227</td><td>Stores the status of No.49 to No.64</td></tr>
<tr><td>D9228</td><td rowspan="4">Local station or remote I/O station error</td><td>Stores the status of No.1 to No.16</td><td rowspan="4">• The master station detects the number of a faulty local or remote I/O station on data linking loop, and the information is stored in the corresponding bit of the data register as shown below.
• A station is determined to be faulty if the data returned from it to the master station is not received within the specified length of time.
<table>
<tr><th rowspan="2">DEVICE NUMBER</th><th colspan="16">Bit</th></tr>
<tr><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>D9228</td><td>L/R 16</td><td>L/R 15</td><td>L/R 14</td><td>L/R 13</td><td>L/R 12</td><td>L/R 11</td><td>L/R 10</td><td>L/R 9</td><td>L/R 8</td><td>L/R 7</td><td>L/R 6</td><td>L/R 5</td><td>L/R 4</td><td>L/R 3</td><td>L/R 2</td><td>L/R 1</td></tr>
<tr><td>D9229</td><td>L/R 32</td><td>L/R 31</td><td>L/R 30</td><td>L/R 29</td><td>L/R 28</td><td>L/R 27</td><td>L/R 26</td><td>L/R 25</td><td>L/R 24</td><td>L/R 23</td><td>L/R 22</td><td>L/R 21</td><td>L/R 20</td><td>L/R 19</td><td>L/R 18</td><td>L/R 17</td></tr>
<tr><td>D9230</td><td>L/R 48</td><td>L/R 47</td><td>L/R 46</td><td>L/R 45</td><td>L/R 44</td><td>L/R 43</td><td>L/R 42</td><td>L/R 41</td><td>L/R 40</td><td>L/R 39</td><td>L/R 38</td><td>L/R 37</td><td>L/R 36</td><td>L/R 35</td><td>L/R 34</td><td>L/R 33</td></tr>
<tr><td>D9231</td><td>L/R 64</td><td>L/R 63</td><td>L/R 62</td><td>L/R 61</td><td>L/R 60</td><td>L/R 59</td><td>L/R 58</td><td>L/R 57</td><td>L/R 56</td><td>L/R 55</td><td>L/R 54</td><td>L/R 53</td><td>L/R 52</td><td>L/R 51</td><td>L/R 50</td><td>L/R 49</td></tr>
</table>
• When data is not received within the specified length of time, the bit corresponding to the station number of the local station is set.
Example: When an error at No. 3 causes it to fail to return the data to the master station, "1" is set for bit 2 of D9228. When D9228 is monitored, its value is "4".
• When the loop line becomes faulty, "1" is set for the bits if the stations downstream the faulty point or for all local stations.
• When the master station becomes faulty or the setting for the monitoring time is too small, "1" is set for the bits corresponding to all local stations.
• When the faulty station recovers normal operating status or when the loop line is switched so that the data link returns to normal operating status, the bit is automatically reset to "0".</td></tr>
<tr><td>D9229</td><td>Stores the status of No.17 to No.32</td></tr>
<tr><td>D9230</td><td>Stores the status of No.33 to No.48</td></tr>
<tr><td>D9231</td><td>Stores the status of No.49 to No.64</td></tr>
</table>

Table 9.5 List of MELSECNET special link registers (Continued)

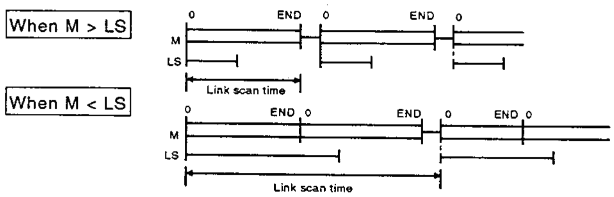
<table>
<tr><th>Device Number</th><th>Name</th><th>Data</th><th>Description</th></tr>
<tr><td>D9232</td><td rowspan="8">Local station or remote I/O station loop error</td><td>Stores the status of No.1 to No.8</td><td rowspan="8">
• Stores the station number of the local and remote I/O stations at which an error is detected in the forward loop line or reverse loop line.
<table>
<tr><td rowspan="2">DEVICE NUMBER</td><td colspan="16">Bit</td></tr>
<tr><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr>
<tr><td rowspan="2">D9232</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td></tr>
<tr><td colspan="2">L/R 8</td><td colspan="2">L/R 7</td><td colspan="2">L/R 6</td><td colspan="2">L/R 5</td><td colspan="2">L/R 4</td><td colspan="2">L/R 3</td><td colspan="2">L/R 2</td><td colspan="2">L/R 1</td></tr>
<tr><td rowspan="2">D9233</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td></tr>
<tr><td colspan="2">L/R 16</td><td colspan="2">L/R 15</td><td colspan="2">L/R 14</td><td colspan="2">L/R 13</td><td colspan="2">L/R 12</td><td colspan="2">L/R 11</td><td colspan="2">L/R 10</td><td colspan="2">L/R 9</td></tr>
<tr><td rowspan="2">D9234</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td></tr>
<tr><td colspan="2">L/R 24</td><td colspan="2">L/R 23</td><td colspan="2">L/R 22</td><td colspan="2">L/R 21</td><td colspan="2">L/R 20</td><td colspan="2">L/R 19</td><td colspan="2">L/R 18</td><td colspan="2">L/R 17</td></tr>
<tr><td rowspan="2">D9235</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td></tr>
<tr><td colspan="2">L/R 32</td><td colspan="2">L/R 31</td><td colspan="2">L/R 30</td><td colspan="2">L/R 29</td><td colspan="2">L/R 28</td><td colspan="2">L/R 27</td><td colspan="2">L/R 26</td><td colspan="2">L/R 25</td></tr>
<tr><td rowspan="2">D9236</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td></tr>
<tr><td colspan="2">L/R 40</td><td colspan="2">L/R 39</td><td colspan="2">L/R 38</td><td colspan="2">L/R 37</td><td colspan="2">L/R 36</td><td colspan="2">L/R 35</td><td colspan="2">L/R 34</td><td colspan="2">L/R 33</td></tr>
<tr><td rowspan="2">D9237</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td></tr>
<tr><td colspan="2">L/R 48</td><td colspan="2">L/R 47</td><td colspan="2">L/R 46</td><td colspan="2">L/R 45</td><td colspan="2">L/R 44</td><td colspan="2">L/R 43</td><td colspan="2">L/R 42</td><td colspan="2">L/R 41</td></tr>
<tr><td rowspan="2">D9238</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td></tr>
<tr><td colspan="2">L/R 56</td><td colspan="2">L/R 55</td><td colspan="2">L/R 54</td><td colspan="2">L/R 53</td><td colspan="2">L/R 52</td><td colspan="2">L/R 51</td><td colspan="2">L/R 50</td><td colspan="2">L/R 49</td></tr>
<tr><td rowspan="2">D9239</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td></tr>
<tr><td colspan="2">L/R 64</td><td colspan="2">L/R 63</td><td colspan="2">L/R 62</td><td colspan="2">L/R 61</td><td colspan="2">L/R 60</td><td colspan="2">L/R 59</td><td colspan="2">L/R 58</td><td colspan="2">L/R 57</td></tr>
</table>
F: Forward loop line
R: Reverse loop line
• If a local station goes down, data before the failure will be held. When contents of D9224 to D9227 and D9228 to D9231 are ORed and the relevant bit is "0", the corresponding bit in the above special registers is enabled.
• Even If the host station (master station) goes down, the data before the failure will be also held.
• When an error is detected at a local station and/or remote I/O station in the forward loop line or the reverse loop line, the corresponding bit is set to "1".
Example: When an error is detected in the forward loop line at No. 5, "1" is set for bit 8 of D9232. When D9232 is monitored, its value is "256 (100H)".
This error will have been caused by one of the following:
(a) A faulty connection of the forward loop cable connecting No. 4 and No. 5
(b) A fault of the forward loop receiver of link module on No.5
(c) A fault of the forward loop transmitter of link module on No.4
• With errors other than loop line errors, such as hardware errors and data communication errors, only the error involved with the loop line currently being used will be detected. The error status is retained.
• When data link is executed again with the loop line in which an error was detected, the bit data is automatically reset to "0" provided that the fault has been removed.
</td></tr>
<tr><td>D9233</td><td>Stores the status of No.9 to No.16</td></tr>
<tr><td>D9234</td><td>Stores the status of No.17 to No.24</td></tr>
<tr><td>D9235</td><td>Stores the status of No.25 to No.32</td></tr>
<tr><td>D9236</td><td>Stores the status of No.33 to No.40</td></tr>
<tr><td>D9237</td><td>Stores the status of No.41 to No.48</td></tr>
<tr><td>D9238</td><td>Stores the status of No.49 to No.56</td></tr>
<tr><td>D9239</td><td>Stores the status of No.57 to No.64</td></tr>
<tr><td>D9240</td><td>Receive error detection count</td><td>Stores the total number of receive error occurrences</td><td>• Stores the number of times that the following errors are detected in the loop line currently being used:
"CRC", "AB.IF", "OVER"
• Counting stops if the number of receive error occurrences exceeds the maximum limit "FFFFH".
• Execute the reset operation to clear the data to "0".</td></tr>
</table>

Table 9.6 List of MELSECNET/B special link registers

<table>
<tr><th>Device Number</th><th>Name</th><th>Data</th><th>Description</th></tr>
<tr><td>D9200</td><td>LRDP execution result</td><td>0 : Normal
2 : LRDP instruction setting fault
3 : Corresponding station error
4 : LRDP can be executed in the corresponding station</td><td>Stores the execution result of an LRDP (word device read) instruction (M9201 ON).
• LRDP instruction setting fault: .... Faulty setting of the LRDP instruction constant, source, and/or target
• Corresponding station error: . The designated station is not executing data link processing
• LRDP cannot be executed in the corresponding station:..... As the station designated with the LRDP instruction, a remote I/O station is connected. Or the local station for the QCPU specified by the LRDP instruction is in STOP status.</td></tr>
<tr><td>D9201</td><td>LWTP execution result</td><td>0 : Normal
2 : LWTP instruction setting fault
3 : Corresponding station error
4 : LWTP cannot be executed in the corresponding station</td><td>Stores the execution result of an LWTP (word device write) instruction (M9203 ON).
• LWTP instruction setting fault: .... Faulty setting of the LWTP instruction constant, source, and/or target
• Corresponding station error: . The designated station is not executing data link processing
• LWTP cannot be executed in the corresponding station:..... As the station designated with the LWTP instruction, a remote I/O station is connected. Or the local station for the QCPU specified by the LWTP instruction is in STOP status.</td></tr>
<tr><td>D9202</td><td rowspan="2">Local station link type</td><td>Stores the status of No.1 to No.16</td><td rowspan="2">Stores whether a slave station is compatible with the MELSECNET mode or MELSECNET Ⅱ mode.
• MELSECNET Ⅱ-compatible station : "1"
• MELSECNET-compatible station : "0"
<table>
<tr><th rowspan="2">DEVICE NUMBER</th><th colspan="16">Bit</th></tr>
<tr><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>D9202</td><td>L16</td><td>L15</td><td>L14</td><td>L13</td><td>L12</td><td>L11</td><td>L10</td><td>L9</td><td>L8</td><td>L7</td><td>L6</td><td>L5</td><td>L4</td><td>L3</td><td>L2</td><td>L1</td></tr>
<tr><td>D9203</td><td>0</td><td>L31</td><td>L30</td><td>L29</td><td>L28</td><td>L27</td><td>L26</td><td>L25</td><td>L24</td><td>L23</td><td>L22</td><td>L21</td><td>L20</td><td>L19</td><td>L18</td><td>L17</td></tr>
</table></td></tr>
<tr><td>D9203</td><td>Stores the status of No.17 to No.31</td></tr>
<tr><td>D9204</td><td>Link status</td><td>0 : Data link
5 : Data link impossible</td><td>Stores the current path of the data link.
(1) Forward loop


• "5" is stored because the watchdog timer setting is too small.
• The data in D9204 is updated each time the link status changes.</td></tr>
</table>

Table 9.6 List of MELSECNET/B special link registers (Continued)

<table>
<tr><th>Device Number</th><th>Name</th><th>Data</th><th>Description</th></tr>
<tr><td>D9207</td><td rowspan="3">Link scan time</td><td>Maximum value</td><td rowspan="3">• Stores the time used for data link processing (link scan time) by all of the local stations and remote I/O stations in the loop currently being used for data link. (in 10ms unit)
• Link scan time definition:


M : Sequence program scan time by master station
LS : Link scan time (data link processing)</td></tr>
<tr><td>D9208</td><td>Minimum value</td></tr>
<tr><td>D9209</td><td>Current value</td></tr>
<tr><td>D9210</td><td>Retry count</td><td>Total number stored</td><td>• Stores the total number of retries conducted when a transmission error occurs.
• Definition of retry processing:
If data is lost or becomes unreliable due to the occurrence of a data transmission processing error, the same data is sent again.
• Counting stops if the number of retries exceeds the maximum limit "FFFF$_H$".
• Execute reset operation to clear the data to "0".</td></tr>
</table>

Table 9.6 List of MELSECNET/B special link registers (Continued)

<table>
<tr><th>Device Number</th><th>Name</th><th>Data</th><th>Description</th></tr>
<tr><td>D9212</td><td rowspan="2">Local station operating status</td><td>Stores the status of No.1 to No.16</td><td rowspan="2">• Stores the station No. of all local stations that are in a STOP or PAUSE status.
<table>
<tr><td rowspan="2">DEVICE NUMBER</td><td colspan="16">Bit</td></tr>
<tr><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr>
<tr><td>D9212</td><td>L16</td><td>L15</td><td>L14</td><td>L13</td><td>L12</td><td>L11</td><td>L10</td><td>L9</td><td>L8</td><td>L7</td><td>L6</td><td>L5</td><td>L4</td><td>L3</td><td>L2</td><td>L1</td></tr>
<tr><td>D9213</td><td>0</td><td>L31</td><td>L30</td><td>L29</td><td>L28</td><td>L27</td><td>L26</td><td>L25</td><td>L24</td><td>L23</td><td>L22</td><td>L21</td><td>L20</td><td>L19</td><td>L18</td><td>L17</td></tr>
</table>
• When the status of a local station changes to STOP or PAUSE, the corresponding bit is set to "1".
Example: When the operation status of No. 7 changes to the STOP status, "1" is set to bit 6 of D9212. When D9212 is monitored, its value is "64 (40H)".</td></tr>
<tr><td>D9213</td><td>Stores the status of No.17 to No.31</td></tr>
<tr><td>D9216</td><td rowspan="2">Local station error detection status</td><td>Stores the status of No.1 to No.16</td><td rowspan="2">• Stores the numbers of the station that detect the occurrence of an error at another station.
<table>
<tr><td rowspan="2">DEVICE NUMBER</td><td colspan="16">Bit</td></tr>
<tr><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr>
<tr><td>D9216</td><td>L16</td><td>L15</td><td>L14</td><td>L13</td><td>L12</td><td>L11</td><td>L10</td><td>L9</td><td>L8</td><td>L7</td><td>L6</td><td>L5</td><td>L4</td><td>L3</td><td>L2</td><td>L1</td></tr>
<tr><td>D9217</td><td>0</td><td>L31</td><td>L30</td><td>L29</td><td>L28</td><td>L27</td><td>L26</td><td>L25</td><td>L24</td><td>L23</td><td>L22</td><td>L21</td><td>L20</td><td>L19</td><td>L18</td><td>L17</td></tr>
</table>
• When a normally operating local station detects an error at another local station, the bit corresponding to the normally operating station is set to "1". The bit status of remote I/O station always remains "0".
Example: When No. 5 detects that No. 4 is faulty, "1" is set to bit 4 of D9216. When D9216 is monitored, its value is "16 (10H)".
• When the faulty station recovers normal operating status or when the loop line is switched so that the data link returns to normal operating status, the corresponding bit is automatically reset to "0".</td></tr>
<tr><td>D9217</td><td>Stores the status of No.17 to No.31</td></tr>
<tr><td>D9220</td><td rowspan="2">Local station parameter mismatched or remote I/O station input/output allocation error</td><td>Stores the status of No.1 to No.16</td><td rowspan="2">• Stores the numbers of the stations at which a link parameter error sent from the master station is detected by another local or remote I/O station.
<table>
<tr><td rowspan="2">DEVICE NUMBER</td><td colspan="16">Bit</td></tr>
<tr><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr>
<tr><td>D9220</td><td>L/R 16</td><td>L/R 15</td><td>L/R 14</td><td>L/R 13</td><td>L/R 12</td><td>L/R 11</td><td>L/R 10</td><td>L/R 9</td><td>L/R 8</td><td>L/R 7</td><td>L/R 6</td><td>L/R 5</td><td>L/R 4</td><td>L/R 3</td><td>L/R 2</td><td>L/R 1</td></tr>
<tr><td>D9221</td><td>L/R 0</td><td>L/R 31</td><td>L/R 30</td><td>L/R 29</td><td>L/R 28</td><td>L/R 27</td><td>L/R 26</td><td>L/R 25</td><td>L/R 24</td><td>L/R 23</td><td>L/R 22</td><td>L/R 21</td><td>L/R 20</td><td>L/R 19</td><td>L/R 18</td><td>L/R 17</td></tr>
</table>
Example: When local station No. 5 is set as a remote I/O station in the link parameter settings "1" is set to bit 4 of D9220. When D9220 is monitored, its value is "16 (10H)".
• When the link parameter settings is corrected and the status of the master station is switched from STOP to RUN, the bit is automatically reset to "0".</td></tr>
<tr><td>D9221</td><td>Stores the status of No.17 to No.31</td></tr>
</table>

Table 9.6 List of MELSECNET/B special link registers (Continued)

<table>
<tr><th>Device Number</th><th>Name</th><th>Data</th><th>Description</th></tr>
<tr><td>D9224</td><td rowspan="2">Initial communication between local stations/remote I/O stations</td><td>Stores the status of No.1 to No.16</td><td rowspan="2">• Stores station Nos. of local stations or remote I/O stations communicating initial setting data for data link processing into the corresponding bits in D9224 to D9227 as shown below.
<table>
<tr><th rowspan="2">DEVICE NUMBER</th><th colspan="16">Bit</th></tr>
<tr><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>D9224</td><td>L/R16</td><td>L/R15</td><td>L/R14</td><td>L/R13</td><td>L/R12</td><td>L/R11</td><td>L/R10</td><td>L/R9</td><td>L/R8</td><td>L/R7</td><td>L/R6</td><td>L/R5</td><td>L/R4</td><td>L/R3</td><td>L/R2</td><td>L/R1</td></tr>
<tr><td>D9225</td><td>0</td><td>L/R31</td><td>L/R30</td><td>L/R29</td><td>L/R28</td><td>L/R27</td><td>L/R26</td><td>L/R25</td><td>L/R24</td><td>L/R23</td><td>L/R22</td><td>L/R21</td><td>L/R20</td><td>L/R19</td><td>L/R18</td><td>L/R17</td></tr>
</table>
• When a local stations/remote I/O stations is communicating initial setting data (link parameters), the bit corresponding to the station number is set.
Example: When No. 23 is communicating initial setting data (link parameters), 1 is set to bit 6 of D9225.
When D9225 is monitored, its value is 64 (40_H).
• When the initial setting data has been communicated, the bit is automatically reset to "0".</td></tr>
<tr><td>D9225</td><td>Stores the status of No.17 to No.31</td></tr>
<tr><td>D9228</td><td rowspan="2">Local station/ remote I/O station error</td><td>Stores the status of No.1 to No.16</td><td rowspan="2">• Stores the number of the local stations/remote I/O stations in the data link that is determined by a master station to be faulty.
• A station is determined to be faulty if the data returned from it to the master station is not received within the specified length of time.
<table>
<tr><th rowspan="2">DEVICE NUMBER</th><th colspan="16">Bit</th></tr>
<tr><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>D9228</td><td>L/R16</td><td>L/R15</td><td>L/R14</td><td>L/R13</td><td>L/R12</td><td>L/R11</td><td>L/R10</td><td>L/R9</td><td>L/R8</td><td>L/R7</td><td>L/R6</td><td>L/R5</td><td>L/R4</td><td>L/R3</td><td>L/R2</td><td>L/R1</td></tr>
<tr><td>D9229</td><td>0</td><td>L/R31</td><td>L/R30</td><td>L/R29</td><td>L/R28</td><td>L/R27</td><td>L/R26</td><td>L/R25</td><td>L/R24</td><td>L/R23</td><td>L/R22</td><td>L/R21</td><td>L/R20</td><td>L/R19</td><td>L/R18</td><td>L/R17</td></tr>
</table>
• When data is not received within the specified length of time, the bit corresponding to the station number of the local station/ remote I/O station is set.
Example: When an error at No. 3 causes it to fail to return the data to the master station, "1" is set for bit 2 of D9228.
When D9228 is monitored, its value is "4".
• When the loop line becomes faulty, "1" is set for the bits of the stations after the fault or for all local stations/remote I/O stations.
• When the master station becomes faulty or the setting for the monitoring time is too small, "1" is set for the bits corresponding to all local stations/remote I/O stations.
• When the faulty station returns to normal, the bit is automatically reset to "0".</td></tr>
<tr><td>D9229</td><td>Stores the status of No.17 to No.31</td></tr>
<tr><td>D9240</td><td>Receive error detection count</td><td>Stores the total number of receive errors</td><td>• Stores the number of times that the following errors are detected in the loop line currently being used:
"CRC", "AB.IF", "OVER"
• Counting stops if the number of receive error occurrences exceeds the maximum limit "$FFFF_H$".
• Execute the reset operation to clear the data to "0".</td></tr>
</table>

9.3.2 Special link registers effective only for local stations

Table 9.7 and Table 9.8 show the special registers controlled only when the host station is set to the master station.

Table 9.7 List of MELSECNET special link registers

<table>
<tr><th>Device Number</th><th>Name</th><th>Data</th><th>Description</th></tr>
<tr><td>D9243</td><td>Station number data of the station itself</td><td>Stores a station number (0 to 64)</td><td>• Stores the station number assigned to the host station.
• Used by a local station to check the host station number.</td></tr>
<tr><td>D9244</td><td>Slave station number data</td><td>Stores a slave station number</td><td>• Used by a local station to check the total number of slave stations in the loop.</td></tr>
<tr><td>D9245</td><td>Receive error detection count</td><td>Stores the accumulated total number of receive error occurrences</td><td>• Stores the accumulated number of times that the following errors are detected in the loop line currently being used:
"CRC", "OVER", "AB.IF"
• Errors are counted up to "FFFF$_H$" and then counting is stopped.
• Execute the reset operation to clear the data to "0".</td></tr>
<tr><td>D9248</td><td rowspan="4">Local station operating status</td><td>Stores the status of No.1 to No.16</td><td rowspan="4">• Stores station numbers of the local stations, excluding the host station, whose status is either STOP or PAUSE.
<table>
<tr><th rowspan="2">DEVICE NUMBER</th><th colspan="16">Bit</th></tr>
<tr><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>D9248</td><td>L16</td><td>L15</td><td>L14</td><td>L13</td><td>L12</td><td>L11</td><td>L10</td><td>L9</td><td>L8</td><td>L7</td><td>L6</td><td>L5</td><td>L4</td><td>L3</td><td>L2</td><td>L1</td></tr>
<tr><td>D9249</td><td>L32</td><td>L31</td><td>L30</td><td>L29</td><td>L28</td><td>L27</td><td>L26</td><td>L25</td><td>L24</td><td>L23</td><td>L22</td><td>L21</td><td>L20</td><td>L19</td><td>L18</td><td>L17</td></tr>
<tr><td>D9250</td><td>L48</td><td>L47</td><td>L46</td><td>L45</td><td>L44</td><td>L43</td><td>L42</td><td>L41</td><td>L40</td><td>L39</td><td>L38</td><td>L37</td><td>L36</td><td>L35</td><td>L34</td><td>L33</td></tr>
<tr><td>D9251</td><td>L64</td><td>L63</td><td>L62</td><td>L61</td><td>L60</td><td>L59</td><td>L58</td><td>L57</td><td>L56</td><td>L55</td><td>L54</td><td>L53</td><td>L52</td><td>L51</td><td>L50</td><td>L49</td></tr>
</table>
• If a local station except for the host station goes down, data before the failure will be held.
When the corresponding bit in D9252 to D9255 is "0", the relevant bit in the above special registers is validated.
• Even If the host station (master station) goes down, the data before the failure will be also held.
• When the status of a local station is either STOP or PAUSE, the corresponding bit is set to "1". When the status of the local station changes to RUN or STEP RUN, the bit is automatically reset to "0". The bit status of remote I/O station always remains "0".
Example:When the statuses of local stations No.7 and No.15 are either STOP or PAUSE, "1" is set to bit 6 and bit 14 of D9248. When D9248 is monitored, its value is "16448 (4040$_H$)".
• The bit corresponding to the host station is not set to "1" regardless of the status of the station itself. (Always "0" is stored)</td></tr>
<tr><td>D9249</td><td>Stores the status of No.17 to No.32</td></tr>
<tr><td>D9250</td><td>Stores the status of No.33 to No.48</td></tr>
<tr><td>D9251</td><td>Stores the status of No.49 to No.64</td></tr>
<tr><td>D9252</td><td rowspan="4">Local station error status</td><td>Stores the status of No.1 to No.16</td><td rowspan="4">• Stores station Nos. of faulty local stations except for the host station in the loop, into the corresponding bits in the special registers (for link) as shown below
• Only a faulty local station can be detected by another local station. The bit status of remote I/O station always remains "0".
<table>
<tr><th rowspan="2">DEVICE NUMBER</th><th colspan="16">Bit</th></tr>
<tr><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>D9252</td><td>L16</td><td>L15</td><td>L14</td><td>L13</td><td>L12</td><td>L11</td><td>L10</td><td>L9</td><td>L8</td><td>L7</td><td>L6</td><td>L5</td><td>L4</td><td>L3</td><td>L2</td><td>L1</td></tr>
<tr><td>D9253</td><td>L32</td><td>L31</td><td>L30</td><td>L29</td><td>L28</td><td>L27</td><td>L26</td><td>L25</td><td>L24</td><td>L23</td><td>L22</td><td>L21</td><td>L20</td><td>L19</td><td>L18</td><td>L17</td></tr>
<tr><td>D9254</td><td>L48</td><td>L47</td><td>L46</td><td>L45</td><td>L44</td><td>L43</td><td>L42</td><td>L41</td><td>L40</td><td>L39</td><td>L38</td><td>L37</td><td>L36</td><td>L35</td><td>L34</td><td>L33</td></tr>
<tr><td>D9255</td><td>L64</td><td>L63</td><td>L62</td><td>L61</td><td>L60</td><td>L59</td><td>L58</td><td>L57</td><td>L56</td><td>L55</td><td>L54</td><td>L53</td><td>L52</td><td>L51</td><td>L50</td><td>L49</td></tr>
</table>
• Bits corresponding to the station Nos. of faulty local stations (except for host station) turn to "1".
Example:When local station No. 12 is faulty, "1" is set to bit 11 of D9252. When D9252 is monitored, its value is "2048 (500$_H$)".
• When the faulty station recovers normal operating status or when the loop line is switched so that the data link returns to normal operating status, the bit is automatically reset to "0".</td></tr>
<tr><td>D9253</td><td>Stores the status of No.17 to No.32</td></tr>
<tr><td>D9254</td><td>Stores the status of No.33 to No.48</td></tr>
<tr><td>D9255</td><td>Stores the status of No.49 to No.64</td></tr>
</table>

Table 9.8 List of MELSECNET/B special link registers

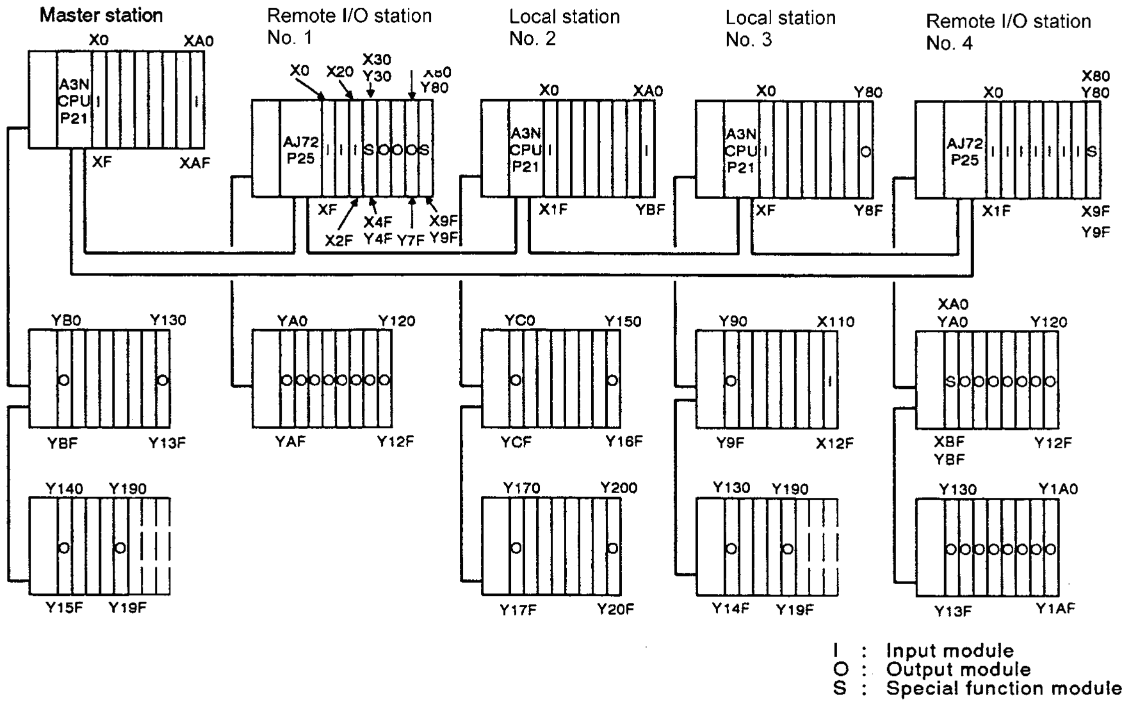
<table>
<tr><th>Device Number</th><th>Name</th><th>Data</th><th>Description</th></tr>
<tr><td>D9243</td><td>Station number data of the station itself</td><td>Stores a station number
(0 to 64)</td><td>• Stores the station number assigned to the host station itself.
• Used by a local station to check the host station number.</td></tr>
<tr><td>D9244</td><td>Slave station number data</td><td>Stores a slave station number</td><td>• Used by a local station to check the total number of slave stations in the loop.</td></tr>
<tr><td>D9245</td><td>Receive error detection count</td><td>Stores the accumulated total number of receive errors</td><td>• Stores the accumulated number of times that the following errors are detected in the loop line currently being used:
"CRC", "OVER", "AB.IF"
• Errors are counted up to "FFFFH" and then counting is stopped.
• Execute the reset operation to clear the data to "0".</td></tr>
<tr><td>D9248</td><td rowspan="2">Local station operating status</td><td>Stores the status of
No.1 to No.16</td><td rowspan="2">• Stores station numbers of the local stations, excluding the host station , whose status is either STOP or PAUSE.
<table>
<tr><th rowspan="2">DEVICE NUMBER</th><th colspan="16">Bit</th></tr>
<tr><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>D9248</td><td>L16</td><td>L15</td><td>L14</td><td>L13</td><td>L12</td><td>L11</td><td>L10</td><td>L9</td><td>L8</td><td>L7</td><td>L6</td><td>L5</td><td>L4</td><td>L3</td><td>L2</td><td>L1</td></tr>
<tr><td>D9249</td><td>0</td><td>L31</td><td>L30</td><td>L29</td><td>L28</td><td>L27</td><td>L26</td><td>L25</td><td>L24</td><td>L23</td><td>L22</td><td>L21</td><td>L20</td><td>L19</td><td>L18</td><td>L17</td></tr>
</table>
• If a local station except for the host station goes down, data before the failure will be held.
When the corresponding bit in D9252 to D9255 is "0", the relevant bit in the above special registers is validated.
• Even If the host station (master station) goes down, the data before the failure will be also held.
• When the status of a local station is either STOP or PAUSE, the corresponding bit is set to "1". When the status of the local station changes to RUN or STEP RUN, the bit is automatically reset to "0". The bit status of remote I/O station always remains "0".
Example: When the statuses of local stations No.7 and No.15 are either STOP or PAUSE, "1" is set to bit 6 and bit 14 of D9248. When D9248 is monitored, its value is "16448 (4040H)".
• The bit corresponding to the station itself is not set regardless of the status of the station itself. (always "0" is stored)</td></tr>
<tr><td>D9249</td><td>Stores the status of
No.17 to No.31</td></tr>
<tr><td>D9252</td><td rowspan="2">Local station error status</td><td>Stores the status of
No.1 to No.16</td><td rowspan="2">• Detects station Nos. of faulty local stations except for the host station in the loop and then stores the data into the corresponding bits in the special registers (for link) as shown below.
• Error detection is performed only for local stations other than the host station. The status of remote I/O stations remains "0".
<table>
<tr><th rowspan="2">DEVICE NUMBER</th><th colspan="16">Bit</th></tr>
<tr><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>D9252</td><td>L16</td><td>L15</td><td>L14</td><td>L13</td><td>L12</td><td>L11</td><td>L10</td><td>L9</td><td>L8</td><td>L7</td><td>L6</td><td>L5</td><td>L4</td><td>L3</td><td>L2</td><td>L1</td></tr>
<tr><td>D9253</td><td>0</td><td>L31</td><td>L30</td><td>L29</td><td>L28</td><td>L27</td><td>L26</td><td>L25</td><td>L24</td><td>L23</td><td>L22</td><td>L21</td><td>L20</td><td>L19</td><td>L18</td><td>L17</td></tr>
</table>
• Bits corresponding to the station Nos. of faulty local stations (except for host station) turn to "1".
Example:When local No. 12 is faulty, "1" is set to bit 11 of D9252. When D9252 is monitored, its value is "2048 (500H)".
• When the faulty station recovers normal operating status or when the loop line is switched so that the data link returns to normal operating status, the bit is automatically reset to "0".</td></tr>
<tr><td>D9253</td><td>Stores the status of
No.17 to No.31</td></tr>
</table>

9.4 Data Link Program Using Link Inputs (X) and Link Outputs (Y)

This section explains the programming method for data link between the master station and local station and between the master station and remote I/O station using link inputs (X) and link outputs (Y).

[System configuration]

[For MELSECNET data link system]



[For MELSECNET/B data link system]

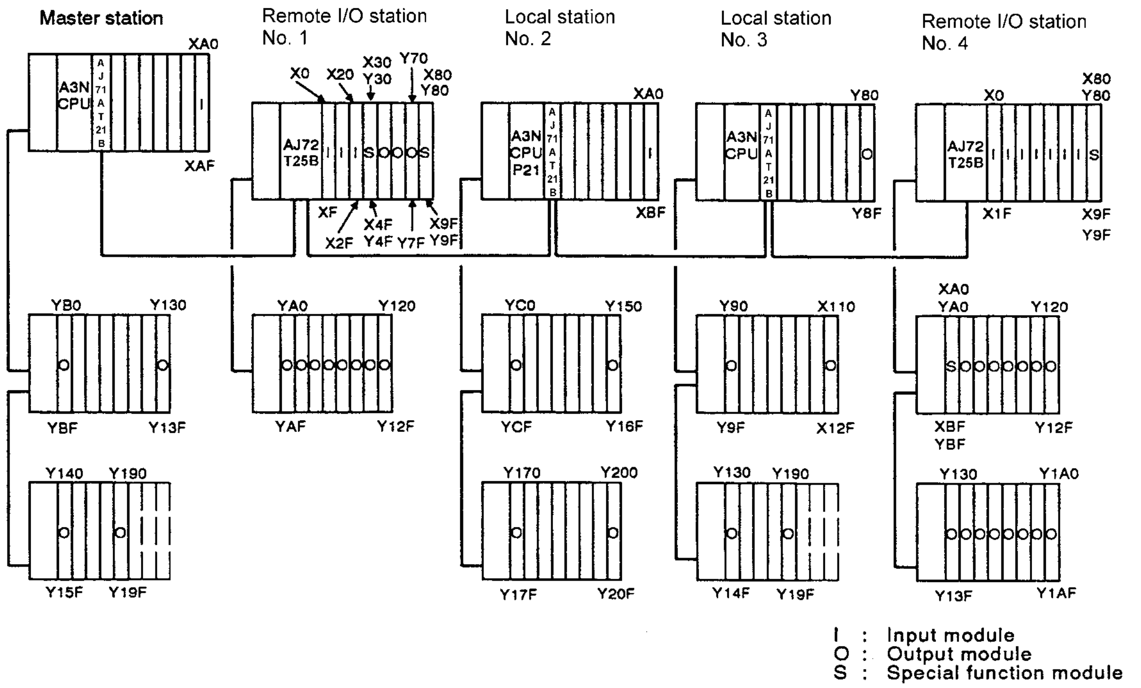


Fig 9.1 System configuration

[Link device assignment]

* LINK *

MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms
		B	W		
M	4	000-05F	000-083	20	XXXX

M : B	↔	ALL	L : B	000-15F
M : W	↔	ALL	L : W	000-186
M : W	→	ALL	R : W	200-294
M : W	←	ALL	R : W	300-3C1
M : Y	→	ALL	L : X	260-47F
M : Y	→	ALL	R : Y	580-7FF
M : X	←	ALL	L : Y	1A0-3BF
M : X	←	ALL	R : X	500-76F

L/R NO.	M ← L		M → R	M ← R	M → L/R1		M ← L/R	
	B	W	W	W	Y	X/Y	X	Y/X
R 1	-------	-------	200-23F	300-33F	700-7FF	030-12F	6D0-76F	000-09F
L 2	060-18F	0A0-0FF	-------	-------	390-47F	250-33F	1A0-25F	210-2CF
L 3	0E0-15F	100-186	-------	-------	260-36F	1B0-2BF	2A0-3BF	300-41F
R 4	-------	-------	250-294	340-3C1	580-6AF	080-1AF	500-5BF	000-0BF
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

M : MASTER L : LOCAL R : REMOTE

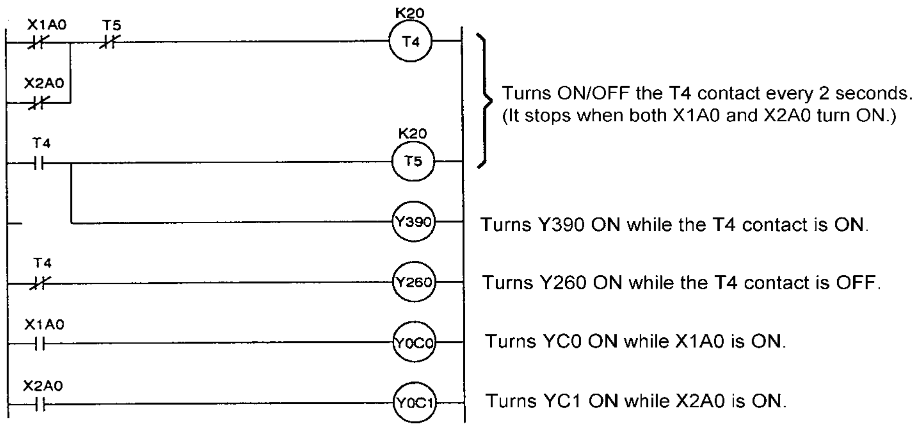
L : LOCAL
R : REMOTE

Fig 9.2 Link device assignment

[Program example 1] ..... Data link between the master station and a local station

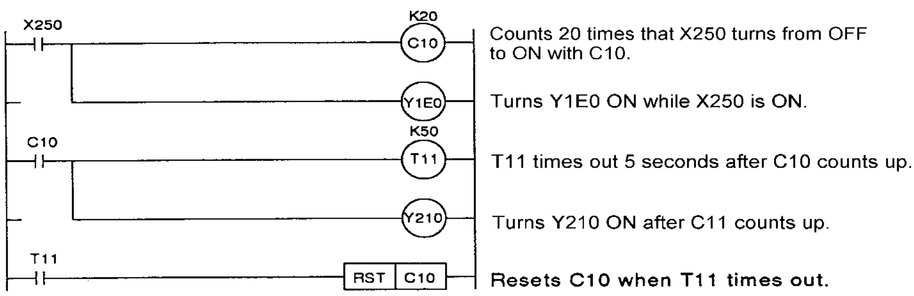
Master station program

Turn Y260 (X1B0 of local station No.3) ON while the T4 contact is OFF and turn Y390 (X250 of local station No.2) ON while the T4 contact is ON.
Turn YC0 ON while X1A0 (Y210 of local station No.2) is ON, and turn YC1 ON while X2A0 (Y300 of local station No.3) is ON.



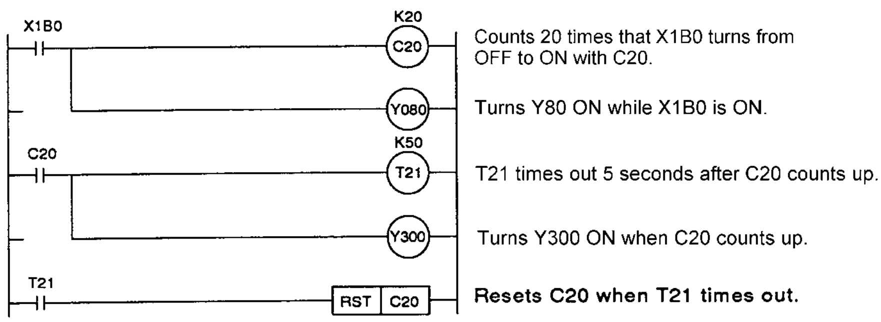
Local station No.2 program

Turn Y1E0 ON while X250 (Y390 of the master station) is ON.
Turn Y210 (X1A0 of the master station) ON when X250 is ON for 20 times.



Local station No.3 program

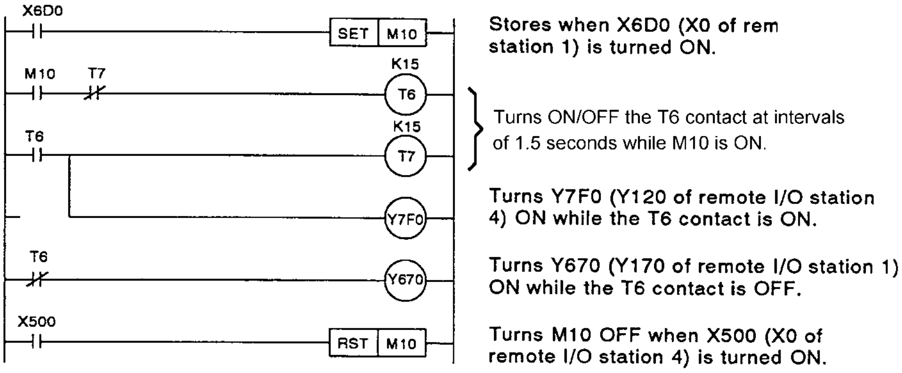
Turn Y80 ON while X1B0 (Y260 of the master station) is ON.
Turn Y300 (X2A0 of the master station) ON when X1B0 is turned ON for 20 times.



[Program example No.2]..... Data link between the master station and a remote I/O station

Master station program

When X0 (X6D0 of master station) of remote I/O station No.1 is turned ON, Y120 (Y7F0 of the master station) of remote I/O station No.1 and Y170 (Y670 of the master station) of remote I/O station No.4 flash every 1 second.
In addition, flashing stops when X0 (X500 of the master station) of remote I/O station No.4 is turned ON.

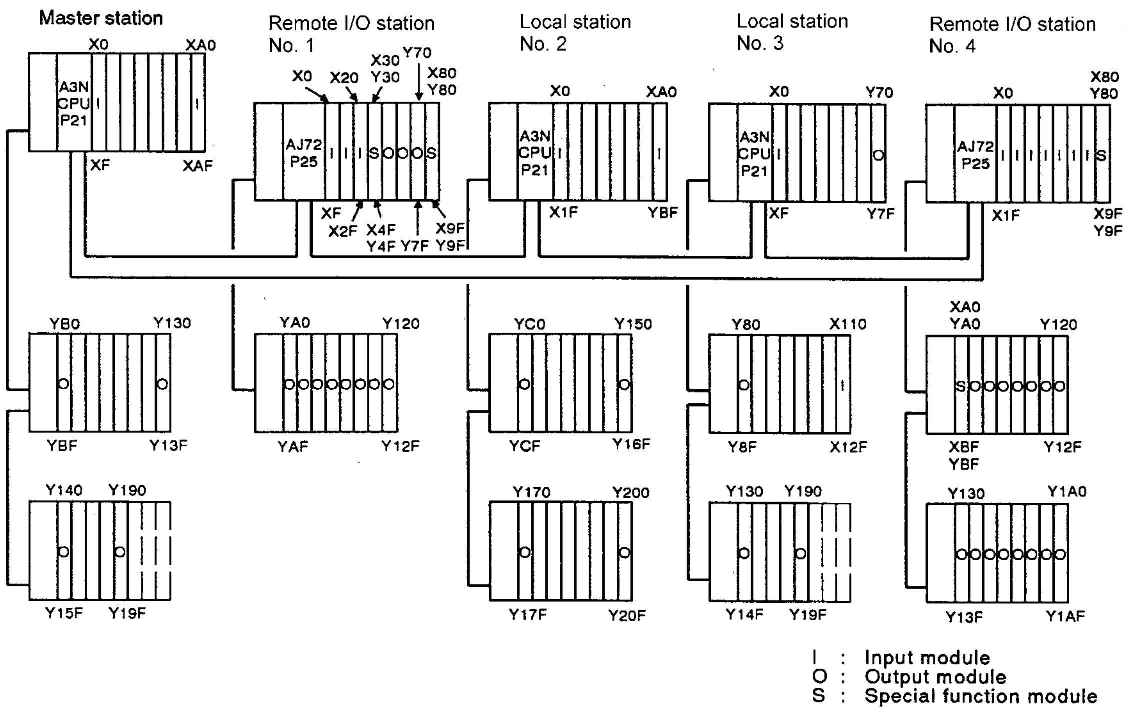


9.5 Data Link Program Using Link Relays (B)

This section presents a program for sequentially turning ON "Y140" of the master station, "YC0" of local station No.2, and "Y70" of local station No.3 by link relays.

[System configuration]

[For MELSECNET data link system]



[For MELSECNET/B data link system]

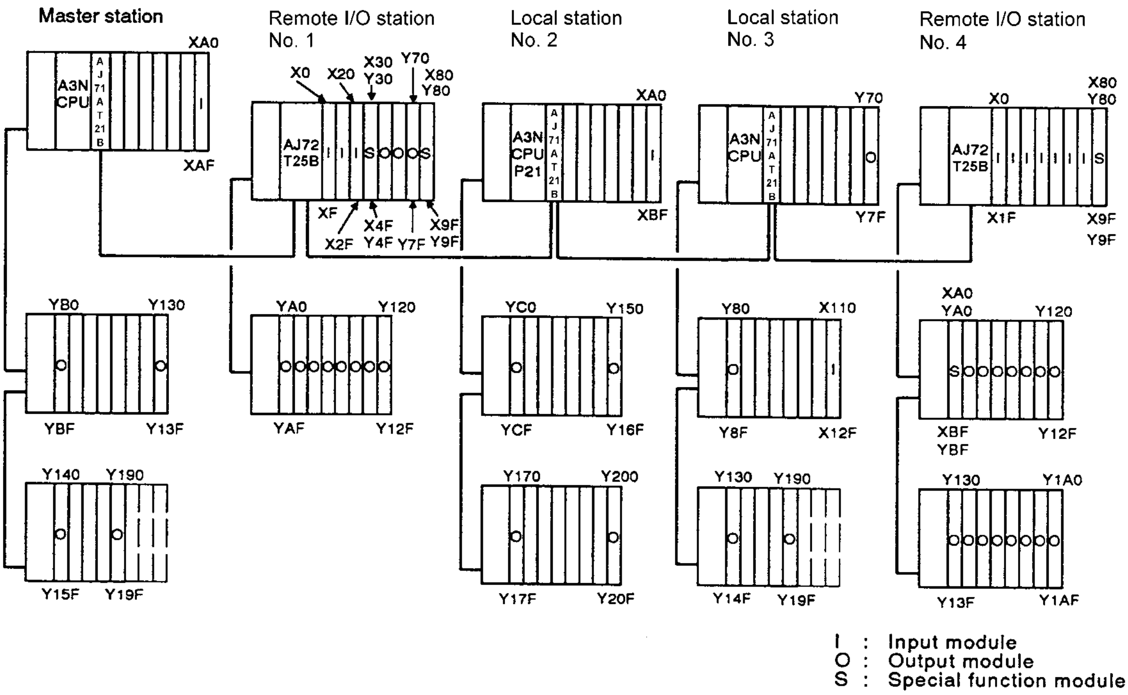


Fig 9.3 System configuration

[Link device assignment]

* LINK *

MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms
		B	W		
M	4	000-05F	000-083	20	XXXX

M : B	↔	ALL	L : B	000-15F
M : W	↔	ALL	L : W	000-186
M : W	→	ALL	R : W	200-294
M : W	←	ALL	R : W	300-3C1
M : Y	→	ALL	L : X	260-47F
M : Y	→	ALL	R : Y	580-7FF
M : X	←	ALL	L : Y	1A0-3BF
M : X	←	ALL	R : X	500-76F

L/R NO.	M ← L		M → R	M ← R	M → L/R1		M ← L/R	
	B	W	W	W	Y	X/Y	X	Y/X
R 1	-------	-------	200-23F	300-33F	700-7FF	030-12F	6D0-76F	000-09F
L 2	060-18F	0A0-0FF	-------	-------	390-47F	250-33F	1A0-25F	210-2CF
L 3	0E0-15F	100-186	-------	-------	260-36F	1B0-2BF	2A0-3BF	300-41F
R 4	-------	-------	250-294	340-3C1	580-6AF	080-1AF	500-5BF	000-0BF
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

↑
L : LOCAL
R : REMOTE

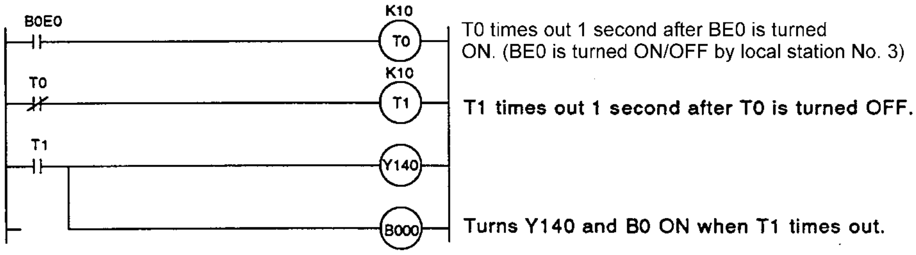
M : MASTER L : LOCAL R : REMOTE

Fig 9.4 Link device assignment

[Program example]

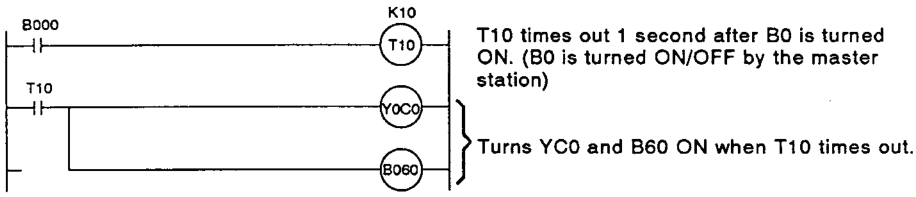
Master station program

Turn Y140 and B0 ON when T1 times out and turn Y140 and B0 OFF 1 second after BE0 is turned ON.
(B0: ON/OFF instruction for YC0 of local station No.2)



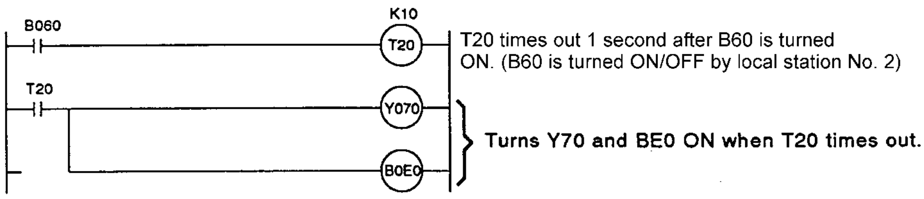
Local station No.2 program

Turn YC0 and B60 ON 1 second after B0 of the master station is turned ON.
(B60: ON/OFF instruction for Y70 of local station No.3)



Local station No.3 program

Turn Y70 and BE0 ON 1 second after B60 of the local station No.2 is turned ON, and turn Y70 and BE0 OFF when B60 is turned OFF.
(BE0: ON/OFF instruction for Y140 and B0 of the master station)

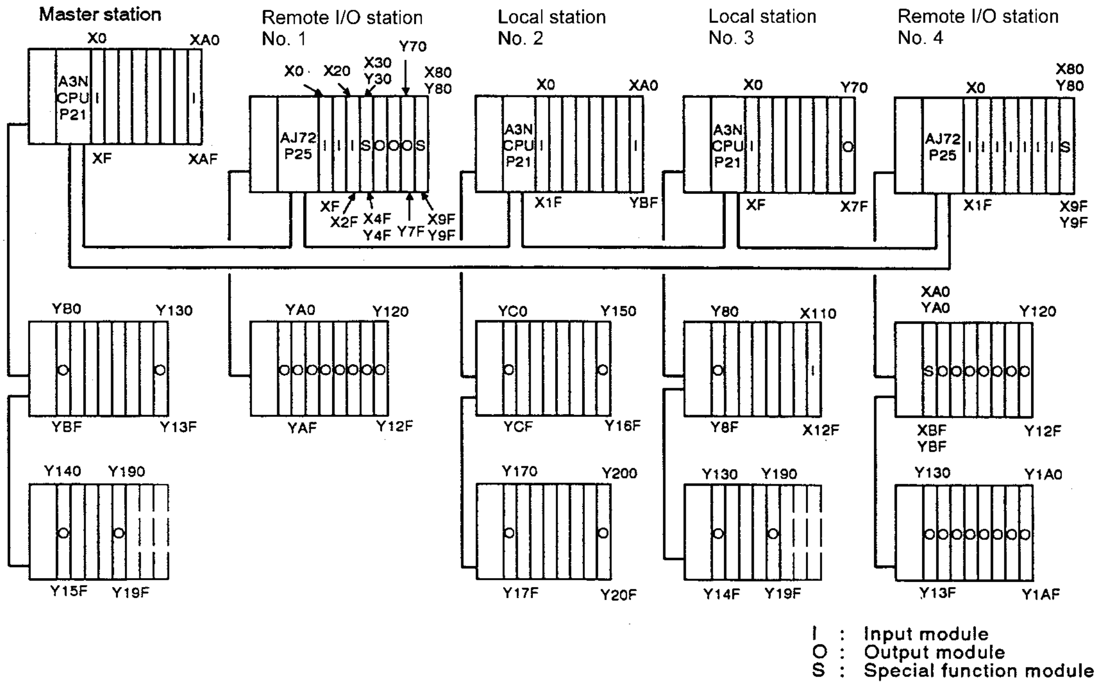


9.6 Data Link Program Using Link Registers (W)

The following describes a program where the link register contents (0 to 10) written by the master station are read by the local station No.2 and "YD0" to "YD2" are turned ON/OFF according to the contents.

[System configuration]

[For MELSECNET data link system]



[For MELSECNET/B data link system]

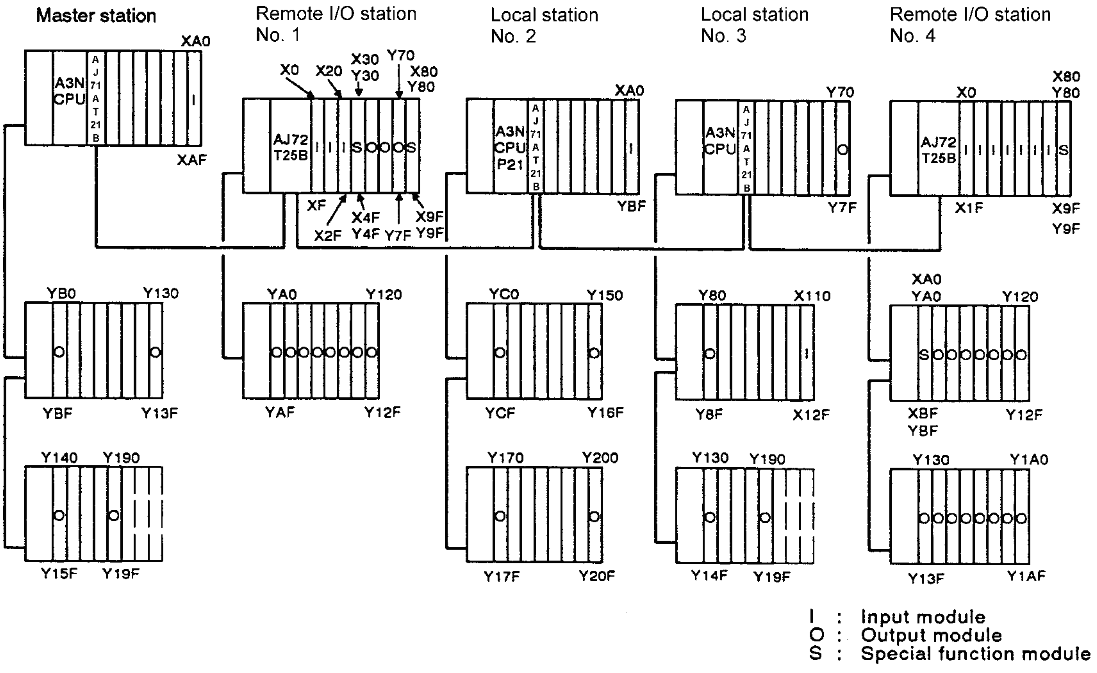


Fig 9.5 System configuration

[Link device assignment]

∗ LINK ∗

MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms
		B	W		
M	4	000-05F	000-083	20	XXXX

M : B	↔	ALL	L : B	000-15F
M : W	↔	ALL	L : W	000-186
M : W	→	ALL	R : W	200-294
M : W	←	ALL	R : W	300-3C1
M : Y	→	ALL	L : X	260-47F
M : Y	→	ALL	R : Y	580-7FF
M : X	←	ALL	L : Y	1A0-3BF
M : X	←	ALL	R : X	500-76F

L/R NO.	M ← L		M → R	M ← R	M → L/R1		M ← L/R	
	B	W	W	W	Y	X/Y	X	Y/X
R 1	-------	-------	200-23F	300-33F	700-7FF	030-12F	6D0-76F	000-09F
L 2	060-18F	0A0-0FF	-------	-------	390-47F	250-33F	1A0-25F	210-2CF
L 3	0E0-15F	100-186	-------	-------	260-36F	1B0-2BF	2A0-3BF	300-41F
R 4	-------	-------	250-294	340-3C1	580-6AF	080-1AF	500-5BF	000-0BF
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

↑
L : LOCAL
R : REMOTE

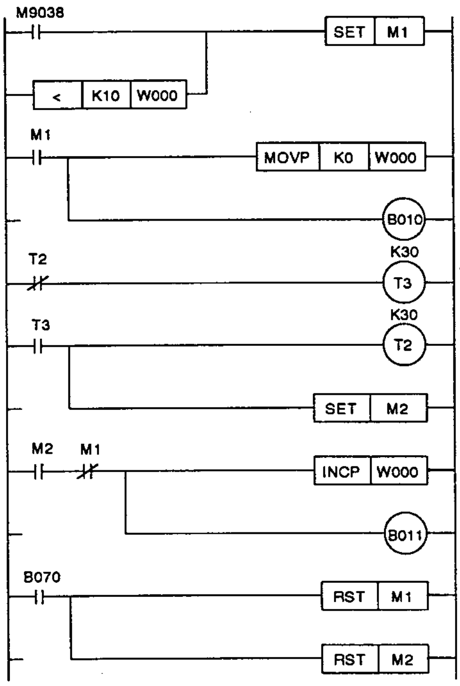
M : MASTER L : LOCAL R : REMOTE

Fig 9.6 Link device assignment

[Program example]

Master station program

A program to store "0 to 10" to W0.
(B10 and B11 are used for handshaking of the master station and local station No.2.)



Turns the initialization flag (M1) of W0 ON at the start of CPU module run and 10 < W0.

Initializes W0 data to "0".

Turns B10 ON when the initialization of the W0 data has been completed.

The value of W0 is increased by "1" every 6 seconds.

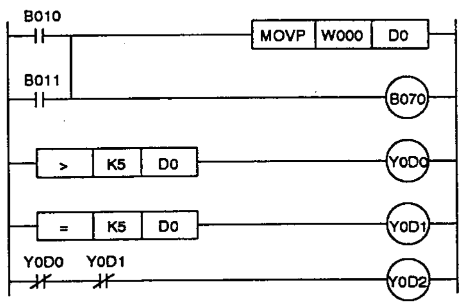
Turn B11 ON when an INCP instruction has been executed (addition of "1" to W0 data).

Turns M1 and M2 OFF when the W0 data has been read by local station No. 2 (B70 turned ON)

Local station No.2 program

Turn YD0, YD1, and YD2 ON when the W0 data is transferred from the master station

ON conditions:	YD0 ..... W0 < 5
	YD1 ..... W0 = 5
	YD2 ..... W0 > 5



Transfers W0 data to D0 by initialization of W0 on the master station or upon completion of INCP instruction execution.

Turns B70 ON upon completion of transferring W0 data to D0.

Turns YD0 ON if D0 < 5.

Turns YD1 ON if D0 = 5.

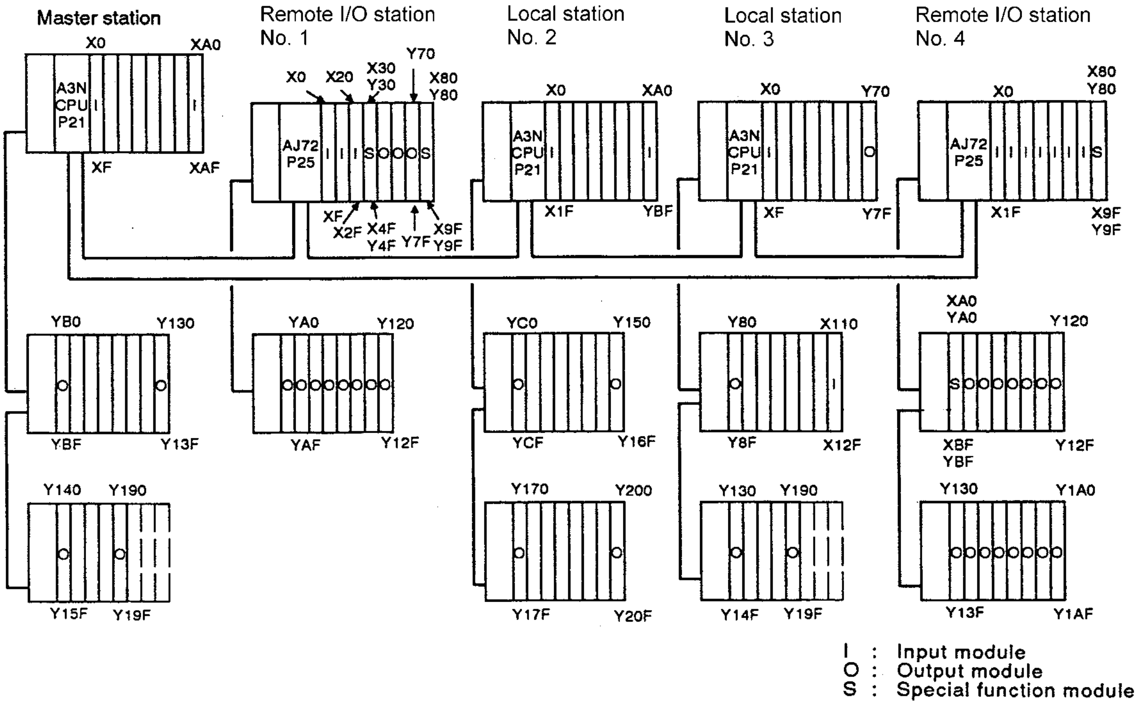
Turns YD2 ON if D0 > 5 (both YD0 and YD1 OFF).

9.7 Read/Write Program for a Word Device from the Master Station to a Local Station

The following describes a program where data is read from/written to the word device of the local station from the master station using the LRDP/LWTP instruction.

[System configuration]

[For MELSECNET data link system]



[For MELSECNET/B data link system]

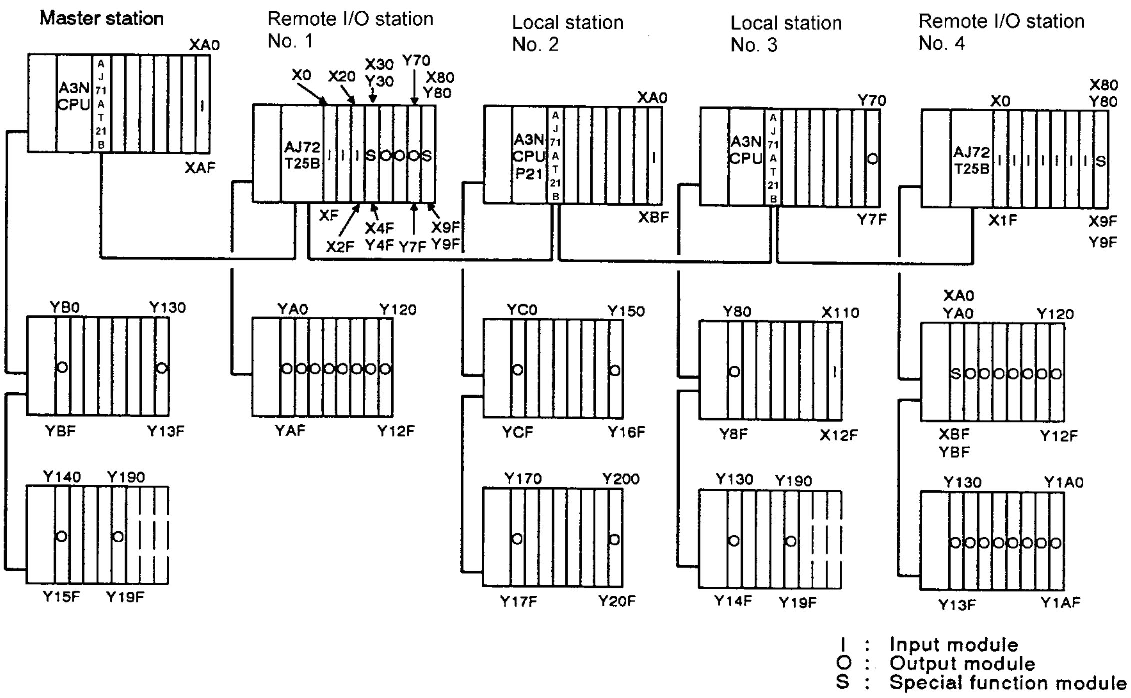


Fig 9.7 System configuration

[Link device assignment]

* LINK *

MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms
		B	W		
M	4	000-05F	000-083	20	XXXX

M : B	↔	ALL	L : B	000-15F
M : W	↔	ALL	L : W	000-186
M : W	→	ALL	R : W	200-294
M : W	←	ALL	R : W	300-3C1
M : Y	→	ALL	L : X	260-47F
M : Y	→	ALL	R : Y	580-7FF
M : X	←	ALL	L : Y	1A0-3BF
M : X	←	ALL	R : X	500-76F

L/R NO.	M ← L		M → R	M ← R	M → L/R1		M ← L/R	
	B	W	W	W	Y	X/Y	X	Y/X
R 1	-------	-------	200-23F	300-33F	700-7FF	030-12F	6D0-76F	000-09F
L 2	060-18F	0A0-0FF	-------	-------	390-47F	250-33F	1A0-25F	210-2CF
L 3	0E0-15F	100-186	-------	-------	260-36F	1B0-2BF	2A0-3BF	300-41F
R 4	-------	-------	250-294	340-3C1	580-6AF	080-1AF	500-5BF	000-0BF
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

↑
L : LOCAL
R : REMOTE

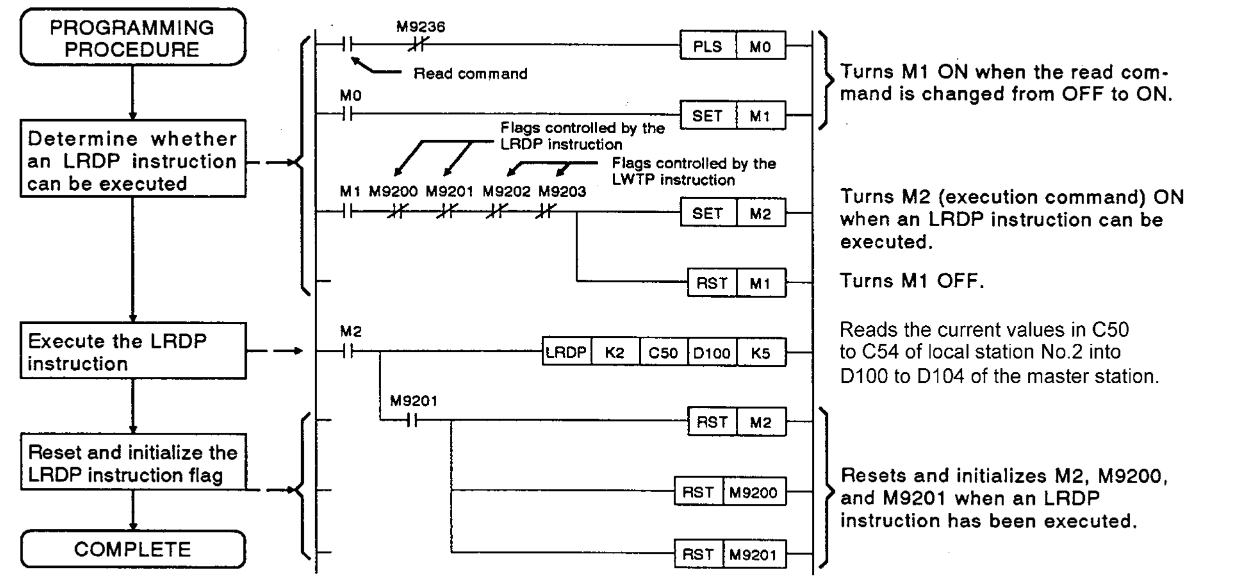
M : MASTER L : LOCAL R : REMOTE

Fig 9.8 Link device assignment

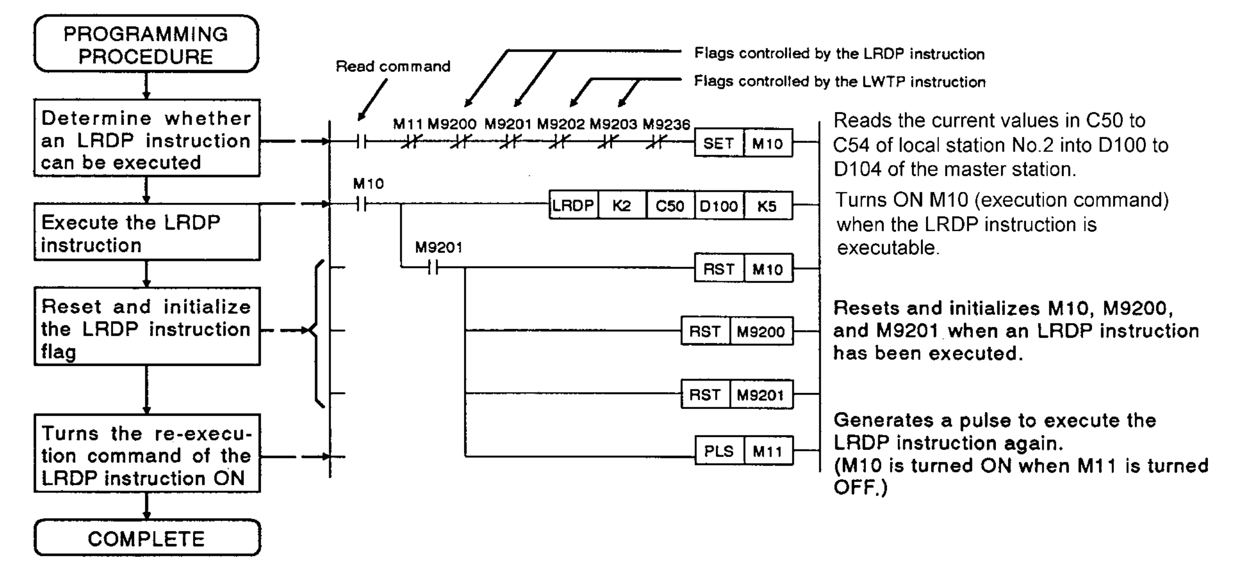
(1) Read program (LRDP instruction)
The following describes program where the present value of C50 to C55 of local station No.2 is read to D100 to D105 of the master station.
(For system configuration and link parameter setting, refer to Fig 9.7 and Fig 9.8.)

[Program example]

Executed only when the read command is turned ON



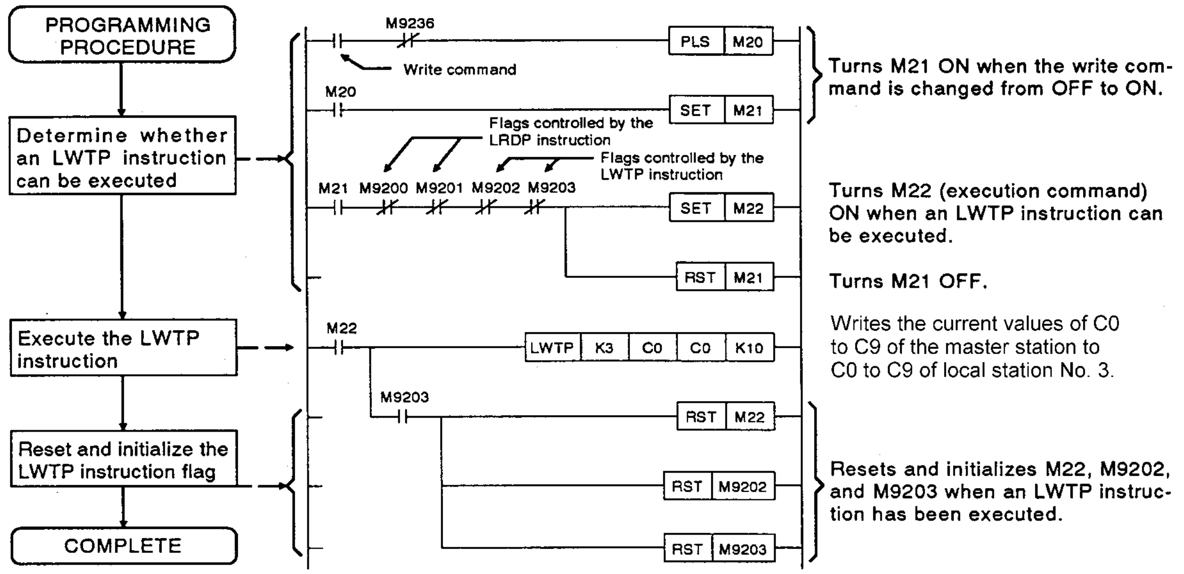
Executed while the read command is ON



(2) Write program (LWTP instruction)
The following describes the program where the present value of C0 to C9 of the master station is written to C0 to C9 of the local station No.3.
(For system configuration and link parameter setting, refer to Fig 9.7 and Fig 9.8.)

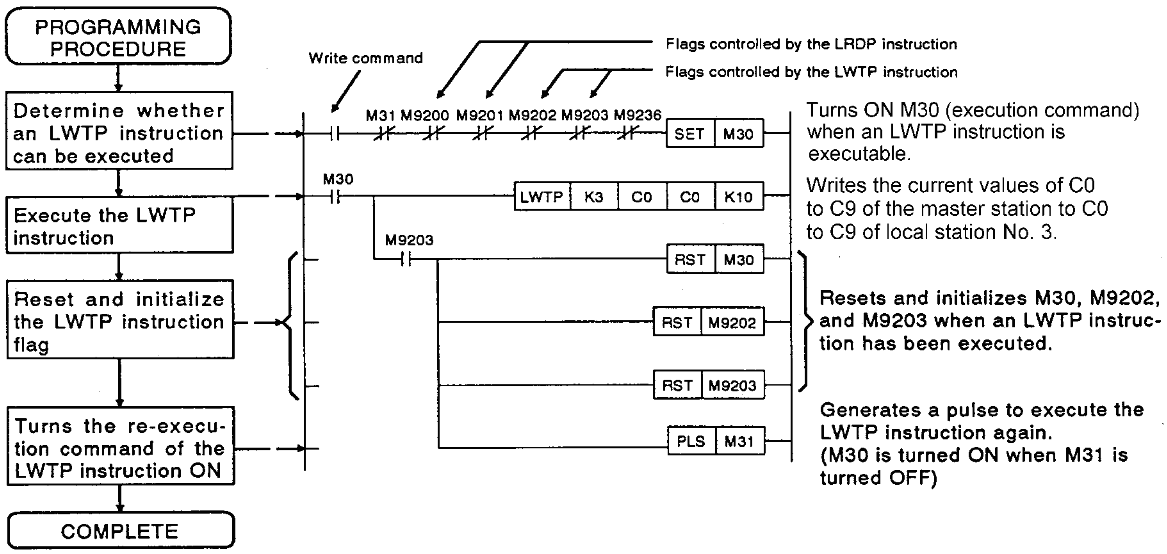
[Program example]

For execution only when the write command status is changed from OFF to ON



Executed while the write command is ON

Turns ON M10 (execution command) when the LRDP instruction is executable.



9.8 Read/Write Program from a Remote I/O Station to a Special Function Module

This section describes the programming method to read/write data of a special function module installed to a remote I/O station from the master station.

[System configuration]

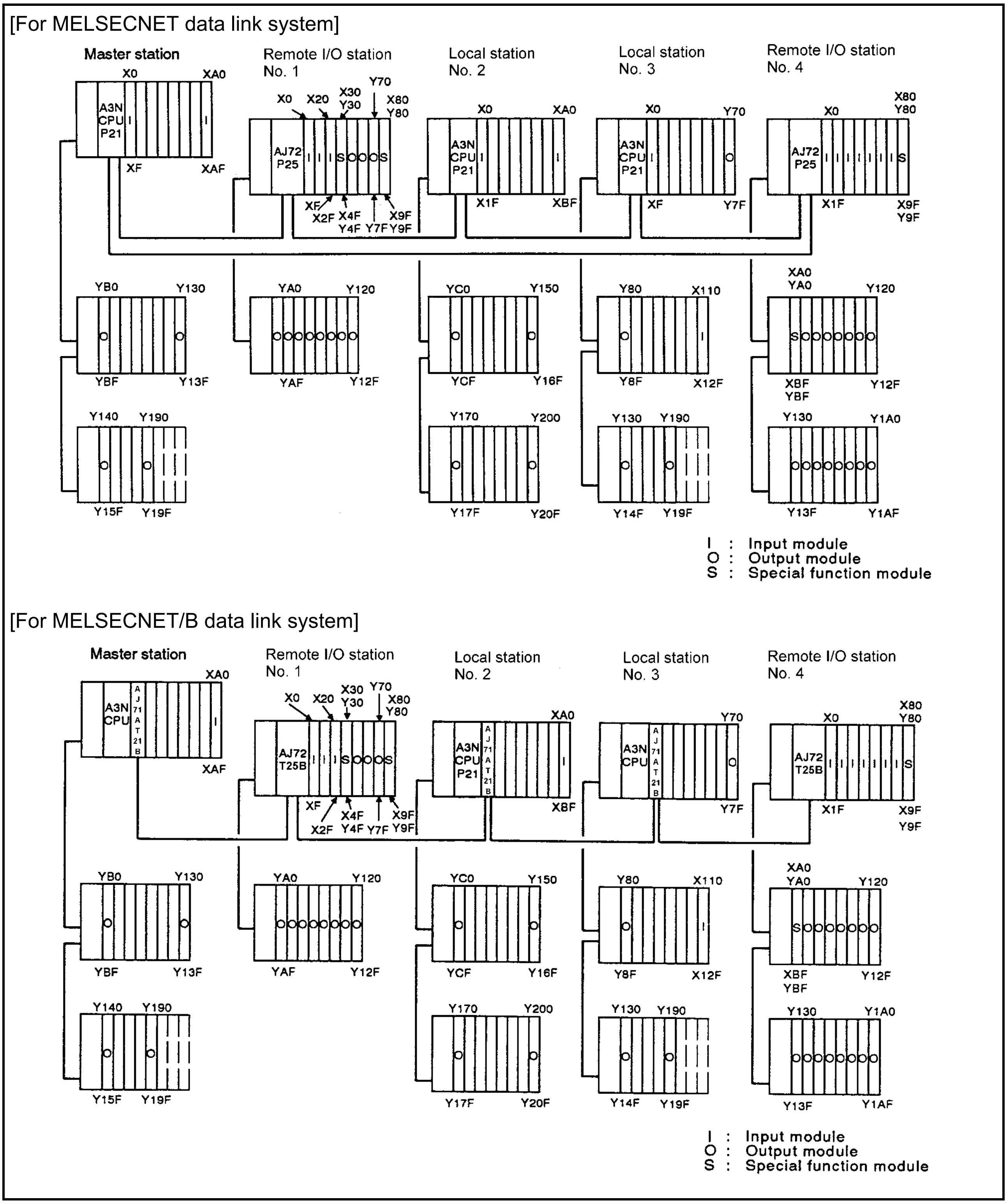


Fig 9.9 System configuration

[Link device assignment]

* LINK *

MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms
		B	W		
M	4	000-05F	000-083	20	XXXX

M : B	↔	ALL	L : B	000-15F
M : W	↔	ALL	L : W	000-186
M : W	→	ALL	R : W	200-294
M : W	←	ALL	R : W	300-3C1
M : Y	→	ALL	L : X	260-47F
M : Y	→	ALL	R : Y	580-7FF
M : X	←	ALL	L : Y	1A0-3BF
M : X	←	ALL	R : X	500-76F

L/R NO.	M ← L		M → R	M ← R	M → L/R1		M ← L/R	
	B	W	W	W	Y	X/Y	X	Y/X
R 1	-------	-------	200-23F	300-33F	700-7FF	030-12F	6D0-76F	000-09F
L 2	060-18F	0A0-0FF	-------	------	390-47F	250-33F	1A0-25F	210-2CF
L 3	0E0-15F	100-186	-------	-------	260-36F	1B0-2BF	2A0-3BF	300-41F
R 4	-------	-------	250-294	340-3C1	580-6AF	080-1AF	500-5BF	000-0BF
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮

L : LOCAL
R : REMOTE

M : MASTER L : LOCAL R : REMOTE

Fig 9.10 Link device assignment

REMARK

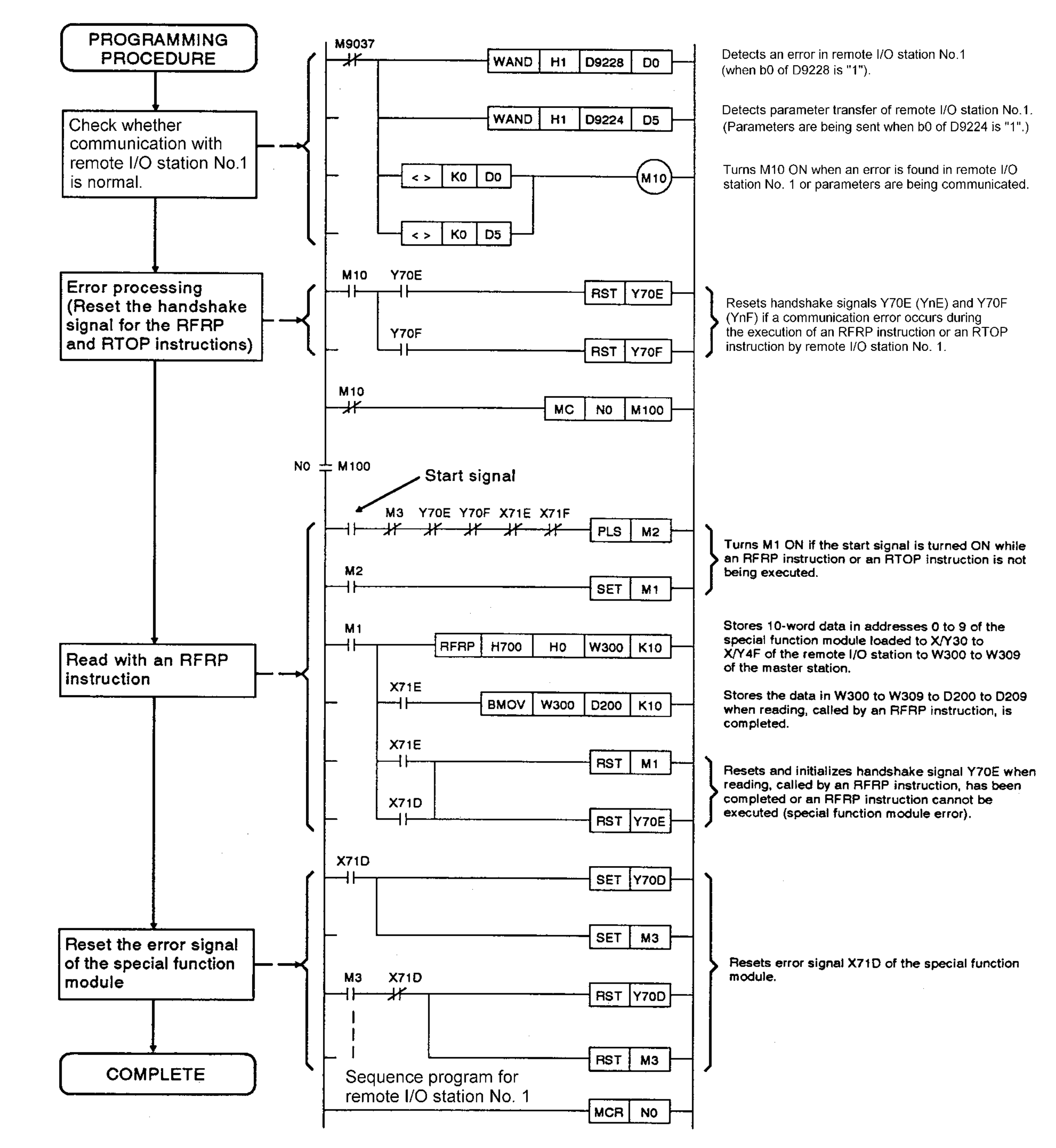
In the M → R area of remote I/O stations No.1 and No.4, two points (W200 and W201, W250 and W251) from the head device are used by the system. These points cannot be used for a user program. (Refer to Section 7.6.3.)

9.8.1 Read program (RFRP instruction)

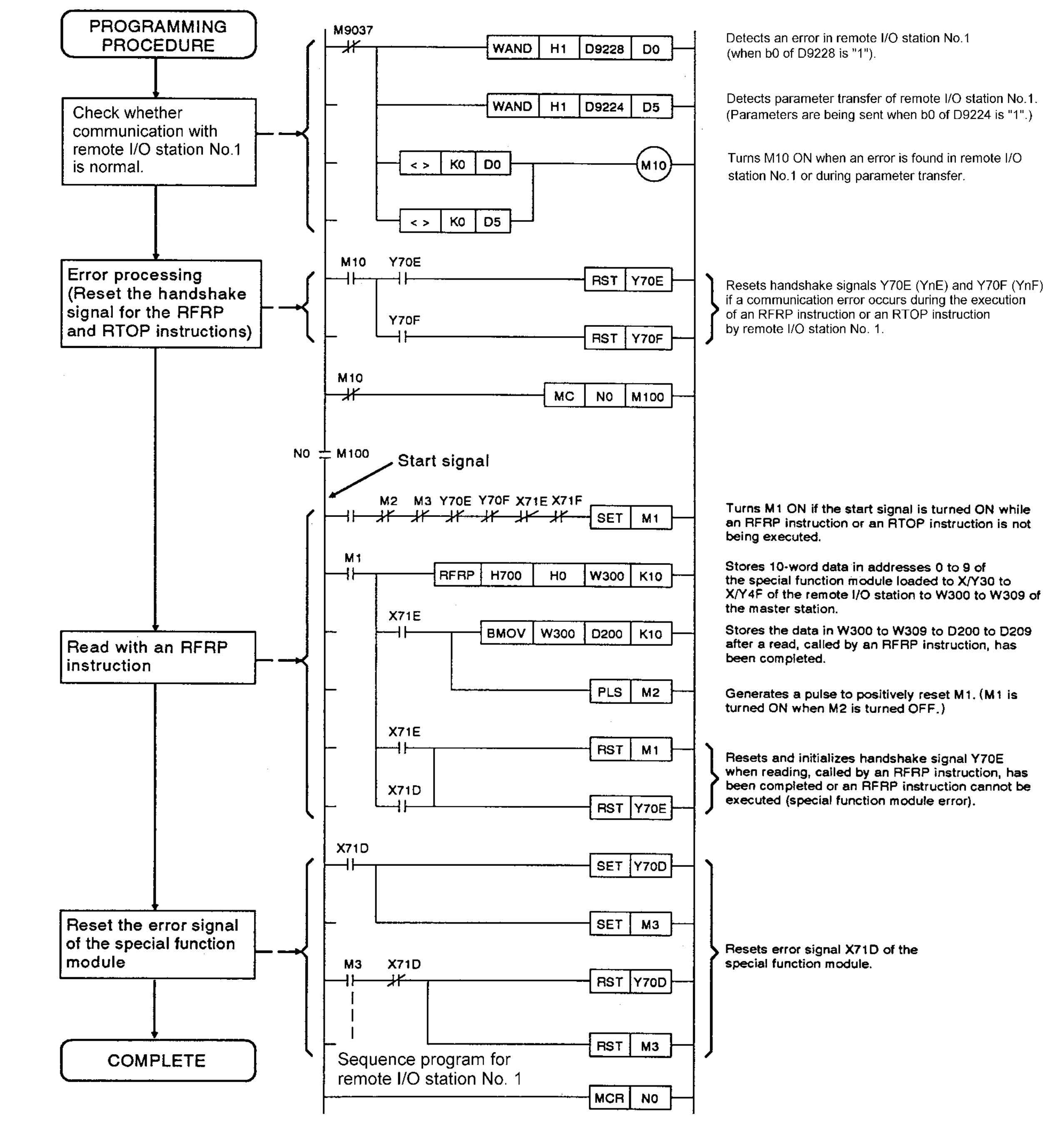
This is a program to read the data of the special function module mounted on the remote I/O station No. 1.
(For system configuration and link parameter setting, refer to Fig 9.9 and Fig 9.10.)

[Program example]

(1) Executed only once when the start signal is turned ON

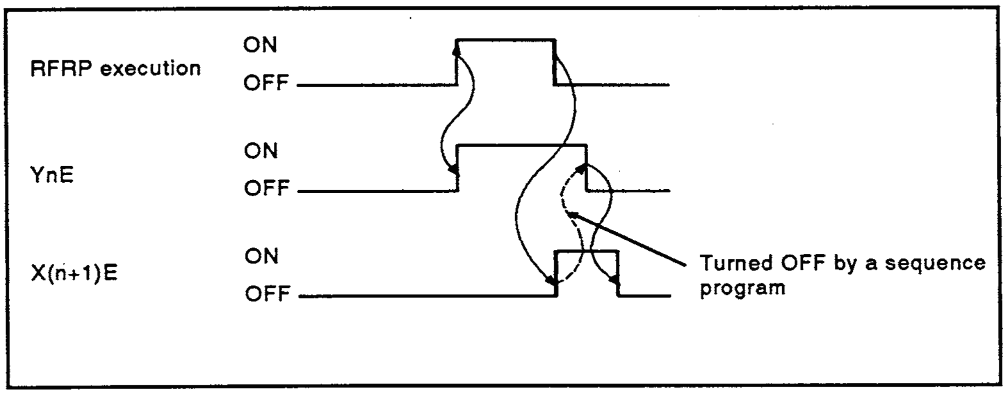


(2) Executed always while the start signal is ON



NOTE

(1) To execute an RFRP instruction, always interlock with YnE and X(n+1) E (n: the device number of the master station that corresponds to the I/O number of the slot in which a special function module is installed. It is first 2 digits of the 3-digit representation for the first half link parameters 16 points of 32 occupied points.), and at the same time, do not execute an RFRP or RTOP instruction at two or more positions within a single special function module.
Turn ON/OFF YnE and X(n+1) E as shown below:



(2) The RFRP execution start signal must be always turned ON by the SET instruction. If an OUT or PLS instruction is used, the RFRP instruction will not be executed correctly.

(3) Reset and initialize YnE and the RFRP execution start signal after the execution is completed.
When failing to do so, reading cannot be executed again.

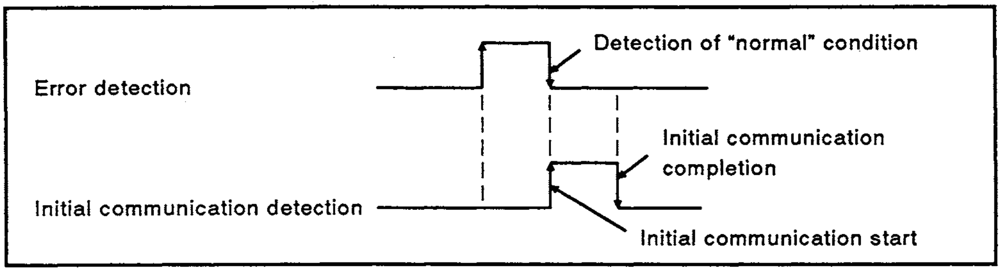
(4) Refer to the manual for each special function module for addresses where each data of the special function module is stored.

(5) Write an error detection circuit in a sequence program to check the operation from error occurrence to initial communication completion when an error occurs to a local or remote I/O station.

(a) Whether an error has occurred in a local or remote I/O station or not can be determined by 1/0 of bit corresponding to the specified station of D9228 to D9231. (When the bit corresponding to the specified station is "1", it means that an error occurs.)

(b) Whether the initial communication is being executed or not can be determined by 1/0 of bit corresponding to the specified station of D9224 to D9227. (When the bit corresponding to the specified station is "1", it means that initial communication is being executed.)

(c) The occurrence of an error and the execution of initial communication in a local station or a remote I/O station are detected in the following timing.



(d) The error detection program must be written before the initial communication detection program.
If initial communication detection program is written first, the occurrence of errors and the execution of initial communication may not be detected.

(6) When RFRP and RTOP instructions cannot be executed because the special function module is faulty, X(n+1)D is turned ON.

(a) When YnD is turned ON, X(n+1)D is turned OFF .

(b) If X(n+1)D is turned ON, a special function module might be faulty or the module might not be mounted correctly. Check the special function module at which the error occurred.

(7) Write the following timing circuit to turn YnD ON/OFF with SET/RST instruction.

(a) Turn YnD ON, when X(n+1)D is turned ON.

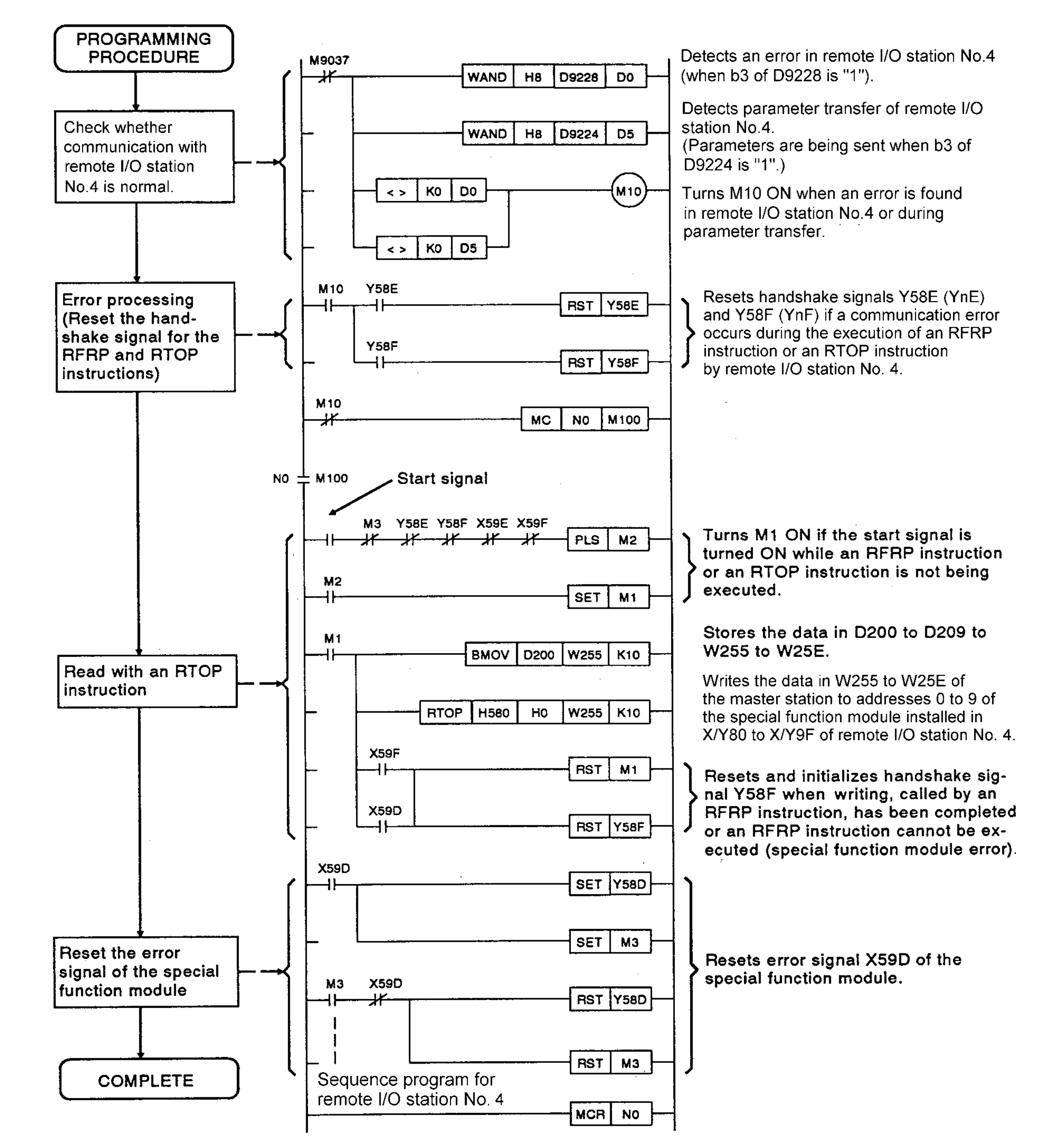
(b) Turn YnD OFF only once, when X(n+1)D is turned OFF

9.8.2 Write program (RTOP instruction)

The following shows the program where data is written to the special function module installed to remote I/O station No.4.
(For system configuration and link parameter setting, refer to Fig 9.9 and Fig 9.10.)

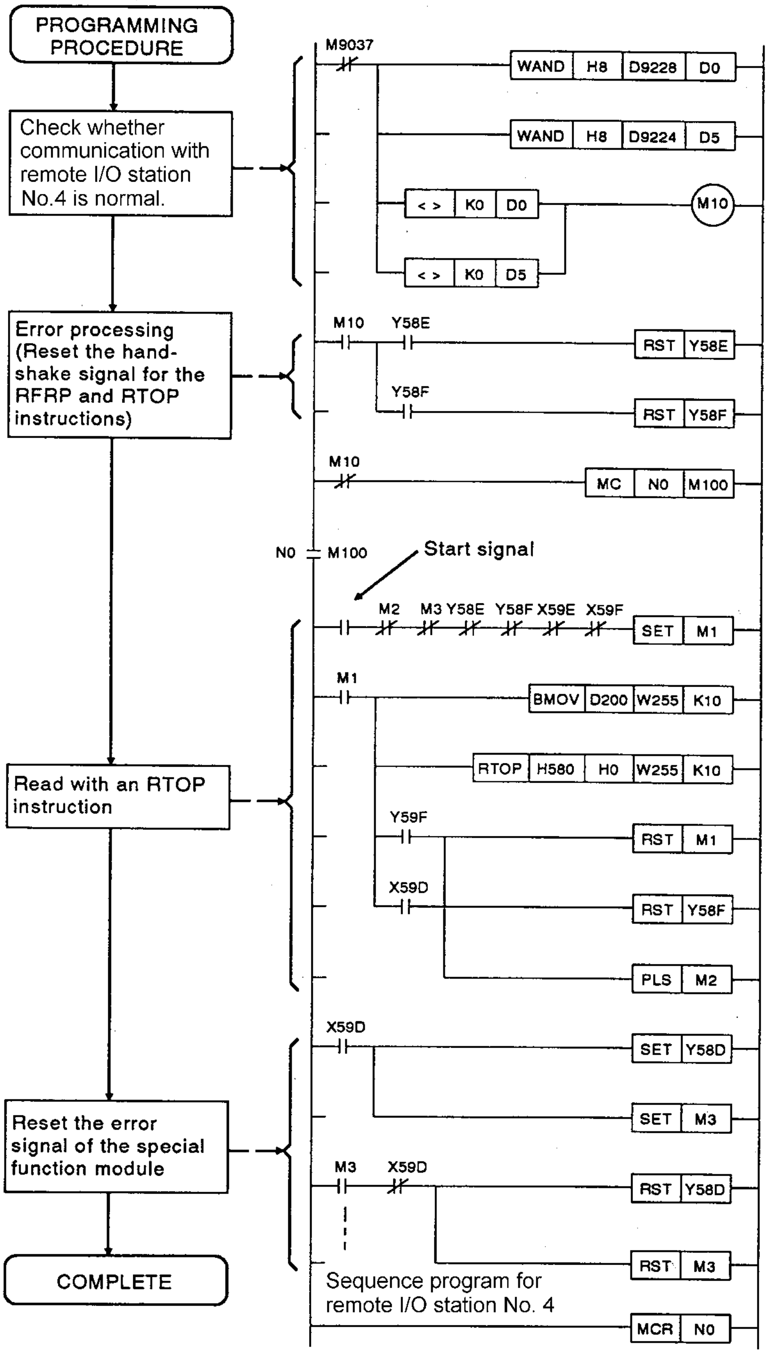
[Program example]

(1) Executed only once when the start signal is turned ON



(2) Executed always while the start signal is ON

To execute an RTOP instruction while the start signal is ON



Detects an error in remote I/O station No.4 (when b3 of D9228 is "1").

Detects parameter transfer of remote I/O station No.4.
(Parameters are being sent when b3 of D9224 is "1".)

Turns M10 ON when an error is found in remote I/O station No.4 or during parameter transfer.

Resets handshake signals Y58E (YnE) and Y58F (YnF) if a communication error occurs during execution of RFRP or RTOP instruction at remote I/O station No.4.

Turns M1 ON if the start signal is turned ON while an RFRP instruction or an RTOP instruction is not being executed.

Stores the data in D200 to D209 to W255 to W25E.

Writes the data in W255 to W25E of the master station to addresses 0 to 9 of the special function module installed in X/Y80 to X/Y9F of remote I/O station No. 4.

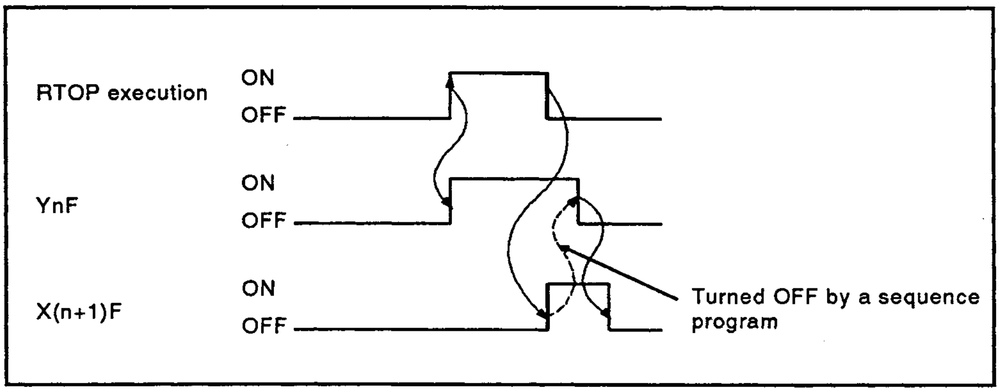
Resets and initializes handshake signal Y58F when writing, called by an RTOP instruction, has been completed or an RTOP instruction cannot be executed (special function module error).

Generates a pulse to reset M1.
(M1 turns ON when M2 turns OFF from ON.)

Resets error signal X59D of the special function module.

PRECAUTIONS

(1) To execute an RTOP instruction, always interlock with YnF and X(n+1)F (n: the device number of the master station that corresponds to the I/O number of the slot in which a special function module is installed. It is first 2 digits of the 3-digit representation for the first half link parameters 16 points of 32 occupied points.), and at the same time, do not execute an RFRP or RTOP instruction at two or more positions within a single special function module.
Turn ON/OFF YnF and X(n+1)F as shown below:



(2) The RTOP execution start signal must be always turned ON by the SET instruction. If an OUT or PLS instruction is used, the RTOP instruction will not be executed correctly.

(3) Reset and initialize YnF and the RTOP execution start signal after the execution is completed.
When failing to do so, reading cannot be executed again.

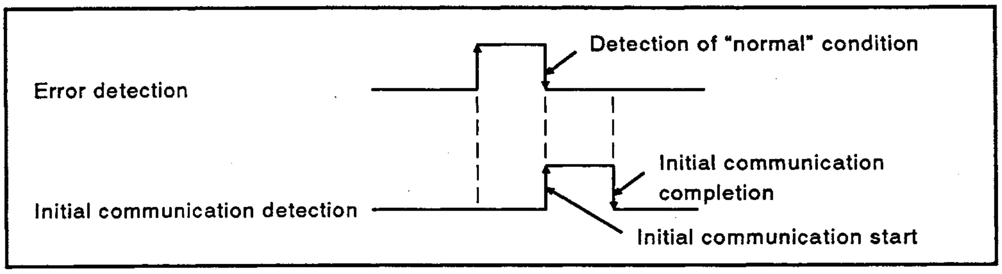
(4) Refer to the manual for each special function module for addresses where each data of the special function module is stored.

(5) Write an error detection circuit in a sequence program to check the operation from error occurrence to initial communication completion when an error occurs to a local or remote I/O station.

(a) Whether an error has occurred in a local or remote I/O station or not can be determined by 1/0 of bit corresponding to the specified station of D9228 to D9231. (When the bit corresponding to the specified station is "1", it means that an error occurs.)

(b) Whether the initial communication is being executed or not can be determined by 1/0 of bit corresponding to the specified station of D9224 to D9227. (When the bit corresponding to the specified station is "1", it means that initial communication is being executed.)

(c) The occurrence of an error and the execution of initial communication in a local station or a remote I/O station are detected in the following timing.



(d) The error detection program must be written before the initial communication detection program.
If initial communication detection program is written first, the occurrence of errors and the execution of initial communication may not be detected.

(6) When RFRP and RTOP instructions cannot be executed because the special function module is faulty, X(n+1)D is turned ON.

(a) When YnD is turned ON, X(n+1)D is turned OFF.

(b) If X(n+1)D is turned ON, a special function module might be faulty or the module might not be mounted correctly. Check the special function module at which the error occurred.

(7) Write the following timing circuit to turn YnD ON/OFF with SET/RST instruction.

(a) Turn YnD ON, when X(n+1)D is turned ON.

(b) Turn YnD OFF only once, when X(n+1)D is turned OFF.

9.9 Fault Detection Program

The following shows a program with which a faulty station is detected by the master station when an error occurs in any of the local/remote I/O stations No. 1 to 4.

[System configuration]

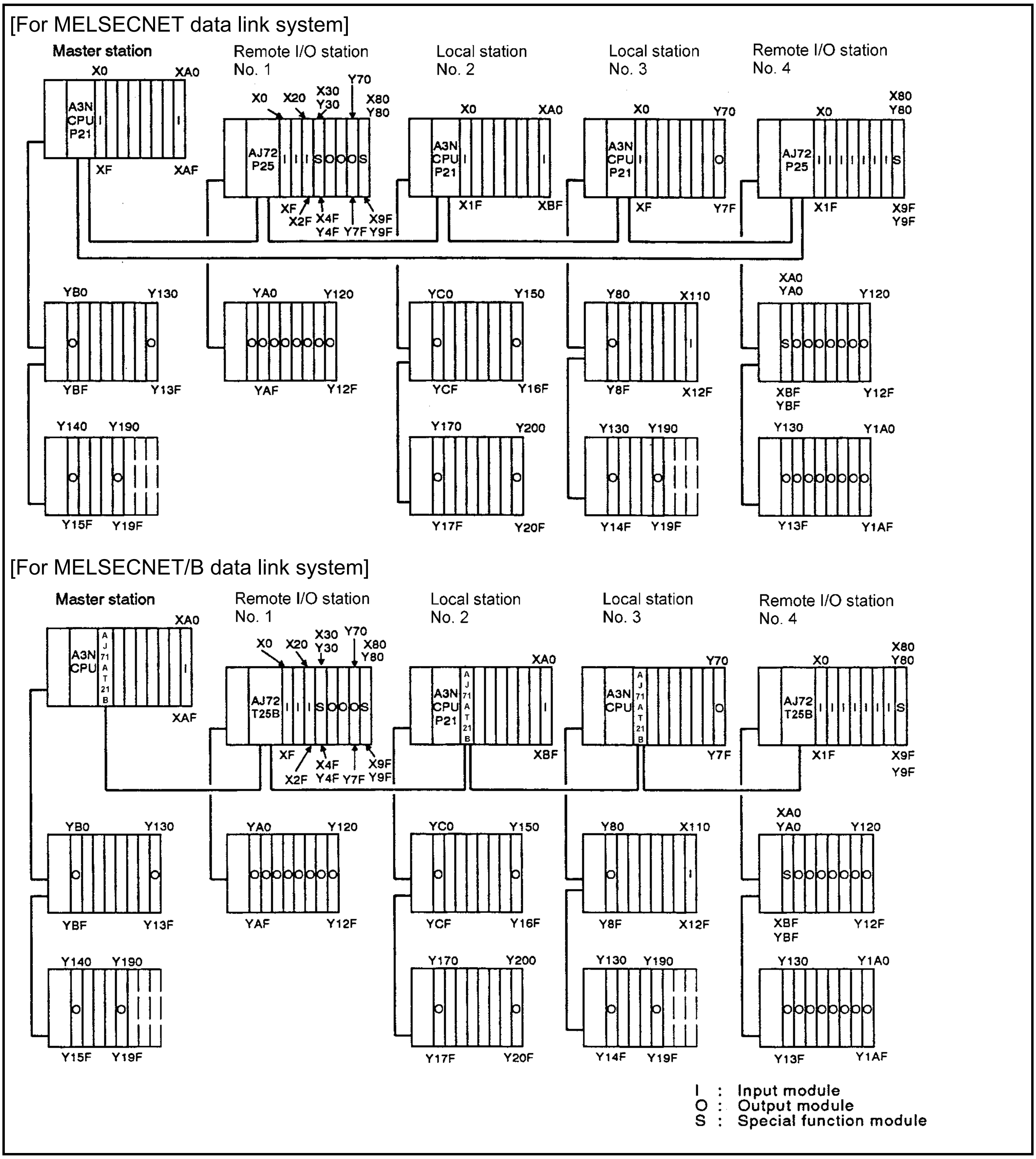


Fig 9.11 System configuration

[Link device assignment]

* LINK *

MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms
		B	W		
M	4	000-05F	000-083	20	XXXX

M : B	↔	ALL	L : B	000-15F
M : W	↔	ALL	L : W	000-186
M : W	→	ALL	R : W	200-294
M : W	←	ALL	R : W	300-3C1
M : Y	→	ALL	L : X	260-47F
M : Y	→	ALL	R : Y	580-7FF
M : X	←	ALL	L : Y	1A0-3BF
M : X	←	ALL	R : X	500-76F

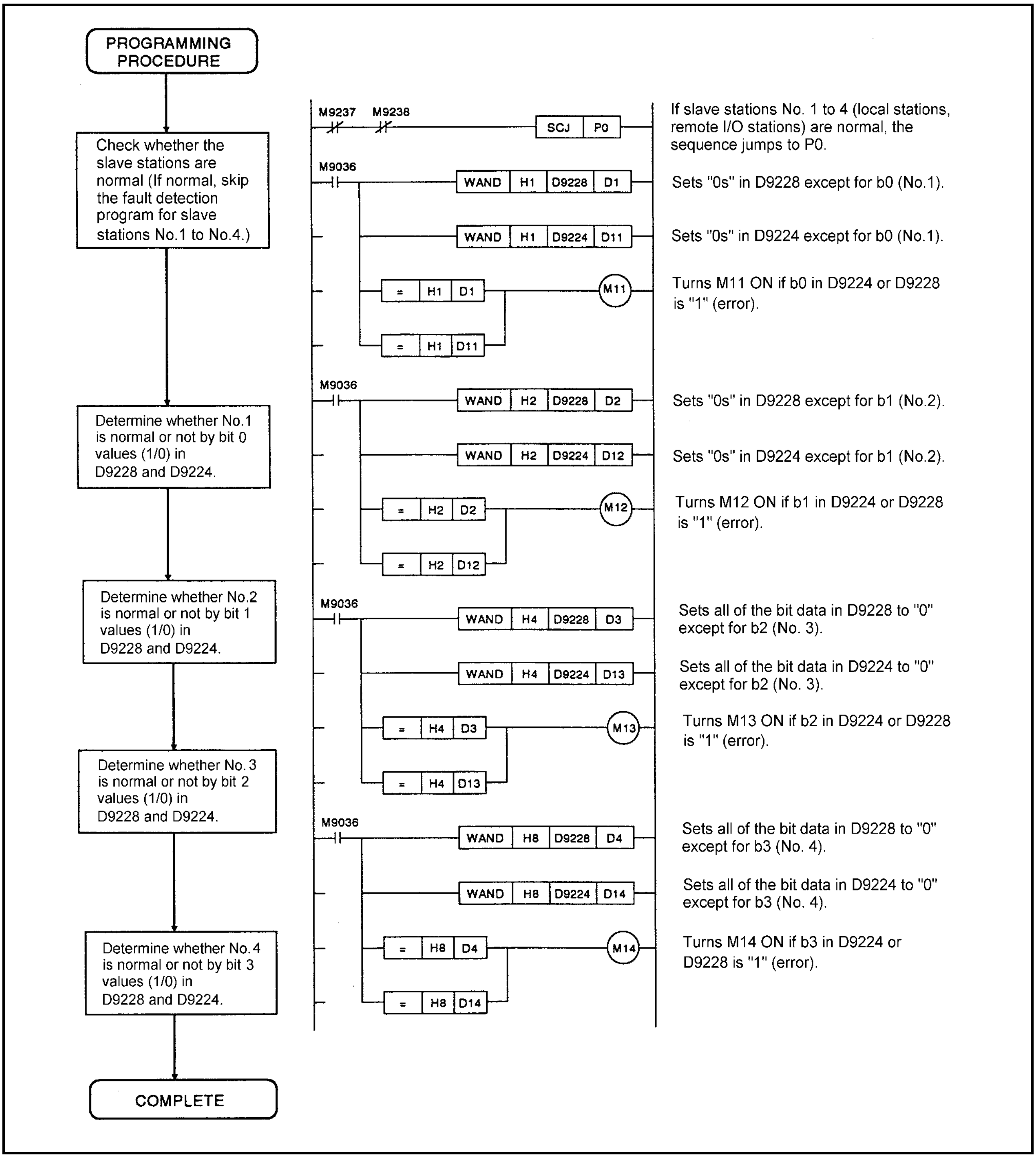
L/R NO.	M ← L		M → R	M ← R	M → L/R1		M ← L/R	
	B	W	W	W	Y	X/Y	X	Y/X
R 1	-------	-------	200-23F	300-33F	700-7FF	030-12F	6D0-76F	000-09F
L 2	060-18F	0A0-0FF	-------	-------	390-47F	250-33F	1A0-25F	210-2CF
L 3	0E0-15F	100-186	-------	-------	260-36F	1B0-2BF	2A0-3BF	300-41F
R 4	-------	-------	250-294	340-3C1	580-6AF	080-1AF	500-5BF	000-0BF
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

↑
L : LOCAL
R : REMOTE

M : MASTER L : LOCAL R : REMOTE

Fig 9.12 Link device assignment

[Program example]



10 TROUBLESHOOTING

To improve the reliability of the system, it is very important to use reliable equipment. In addition, the other very important factor is whether or not to recover from failure immediately and certainly.

If a problem occurs during the data link operation, check the link status, following the steps below:

(1) Perform link monitor by GPP and check the faulty parts
When the A7PU is used, monitor the special link relays and special link registers to check the faulty parts.

(2) Check the LED indicator of link module
The "ERROR" LED on the link module turns ON when an error occurs.
Check the content of error by "ERROR" LED which is turned ON.

(3) Check the connection status of data link cable
Refer to Section 8.2 to check whether the station number setting and cable connection order are not wrong.

10.1 Link Monitor by GPP

The link status of the data link system loop state, master or slave station status, and the scan time can be checked by using GPP.

Link monitor includes the following three types.

(a) Master station link monitor.............. Link monitor when connecting GPP to the master station.
Refer to Section 10.1.1

(b) Local station link monitor................. Link monitor when connecting GPP to local stations.
Refer to Section 10.1.2

(c) Remote I/O station link monitor....... Link monitor when connecting GPP to remote I/O stations.
Refer to Section 10.1.3

10.1.1 Master station link monitor

The following describes the link monitor when connecting GPP to the master station.

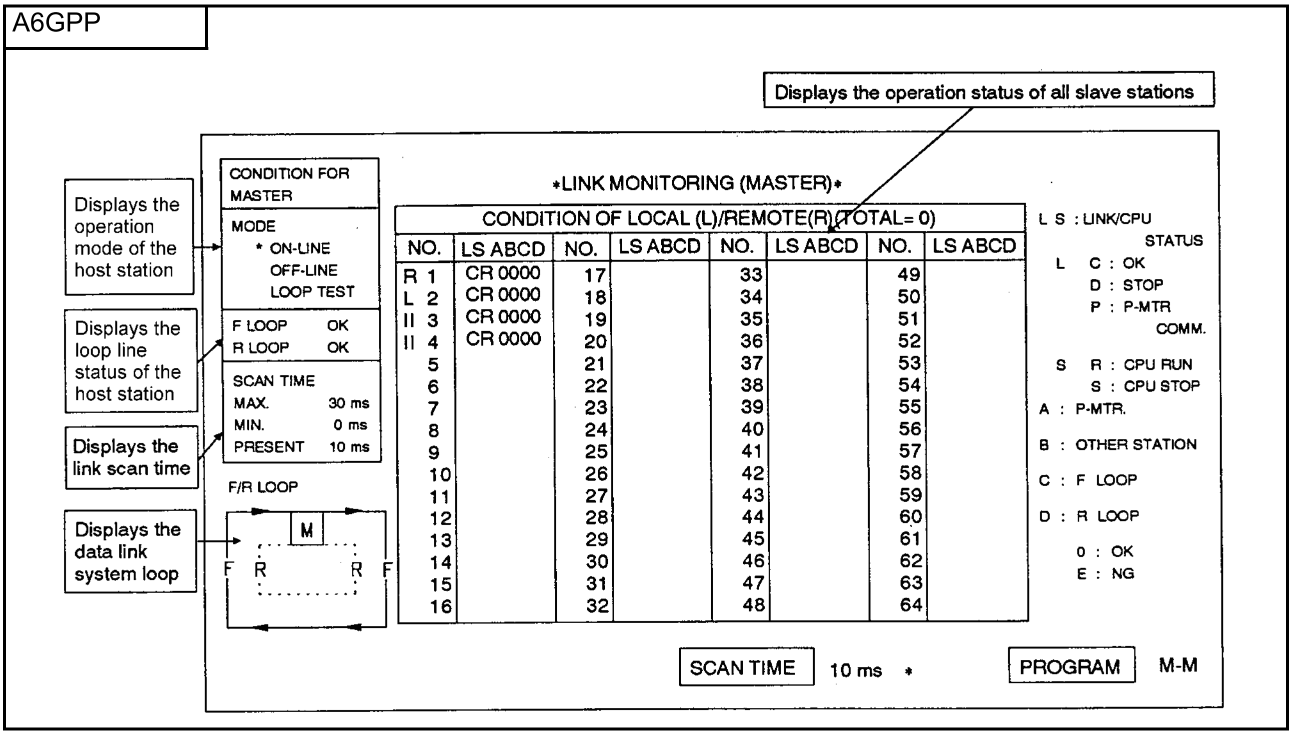
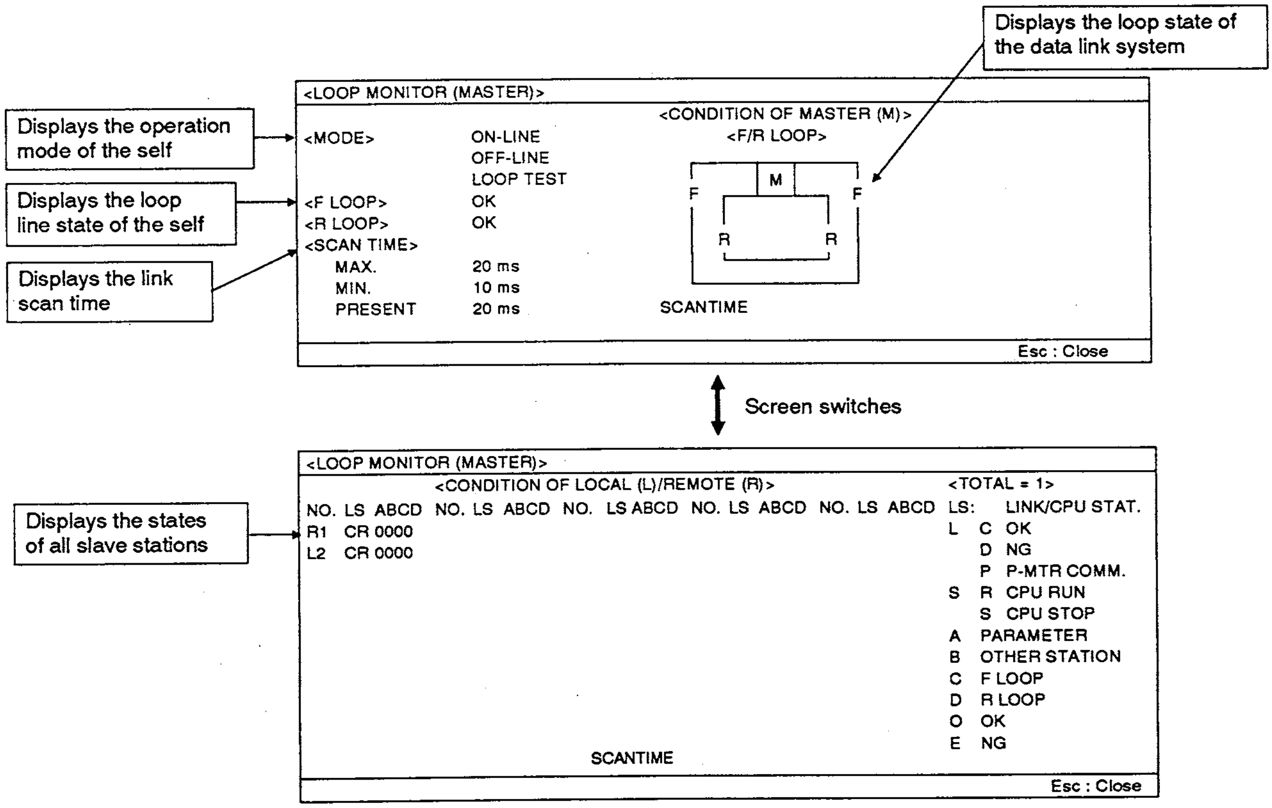


Fig 10.1 Master station link monitor screen (when connecting to master station)



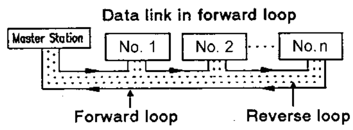
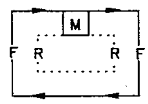
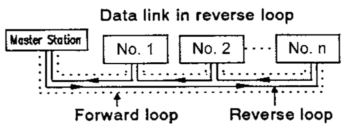
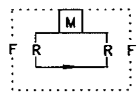
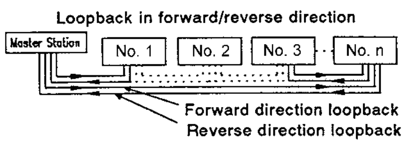
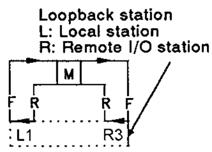
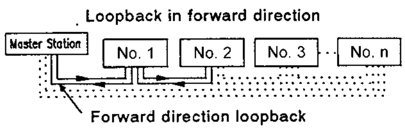
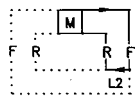
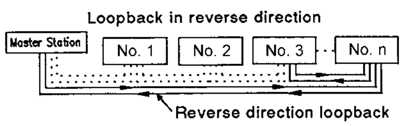
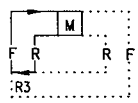
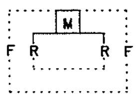
(1) Displaying host station operation mode (M9224, M9227)
  (a) Displays operation status of the master station
    1) ON-LINE: Master station mode setting is ON-LINE (with/without automatic return function).
    2) OFF-LINE: Master station mode setting is OFF-LINE, SELF-LOOPBACK TEST, or STATION-TO-STATION TEST.
    3) LOOP TEST: Master station mode setting is FORWARD LOOP TEST or REVERSE LOOP TEST.

(2) Displaying loop line status of the host station (M9225, M9226)
  (a) Displays the forward loop line (F loop) and reverse loop line (R loop) status of the master station.
    1) OK: Loop line is normal.
    2) NG: Loop line is faulty.

(3) Displaying link scan time (D9207 to D9209)
  (a) Displays the time required for data link between the master station and all slave stations.
    1) MAX.: Displays the maximum value of time required for data link.
    2) MIN.: Displays the minimum value of time required for data link.
    3) PRESENT: Displays the present value of time required for data link.

(4) Displaying loop status of data link system (D9204 to D9206)
  (a) The Table 10.1 shows the present loop status.

Table 10.1 Data link status display

Data link status	GPP/PHP display screen
	
	
	
	
	
Data link disabled	

(b) The loop status and loopback execution station are the same as the following registers:
1) Loop status:......................... D9204
2) Loopback execution station:... D9205, D9206

(5) Operation status of all slave stations (local and remote I/O stations)
The status of all of the slave stations in the system is displayed as follows:

"L" column: Describes status of present data link
"C": Communicating normally (D9224 to D9227)
"D": Disconnected due to communication stop (D9224 to D9227)
The possible causes to be disconnected are as follows:
1) The power supply to the disconnected station is OFF.
2) The disconnected station is reset.
3) An error that causes operation stop to the programmable controller CPU.
4) A MELSECNET-compatible local or remote I/O station is connected to a station number where MELSECNET Ⅱ-compatible station (local station) is set with link parameters.
5) The station is disconnected due to loopback processing.
Check the loopback with the display of loop status of the data link system described in (4).
6) Incorrect cable wiring (For the optical fiber cable, the IN/OUT connection is incorrect.)
"P": Parameter communication with master station(D9228 to D9231)
Link parameter communication is executed only once at the time of starting communications.
Possible causes to display "P" continuously are as follows:
1) A remote I/O station is connected to a station number set as the MELSECNET mode local station with the link parameters.
2) A local station is connected to a station number set as a remote I/O station.
3) A remote I/O station is connected to a station number set as a MELSECNET-compatible local station in the MELSECNET Ⅱ composite mode with link parameters.

"S" column: Displays present CPU operation status (D9212 to D9215)
"R": Run status
"S": Stop status
Only "R" is displayed for a remote I/O station.

"A" column: An error will occur to the master station for the third tier if there is an error in the third tier link parameters set for the corresponding station.(D9220 to D9223)
When the both inputs (X) and outputs (Y) are not set to a remote I/O station with link parameters or when I/O assignment of the master station and installation position of the I/O module of the host station are wrong, an error will occur.
"0": Normal
"E": Error

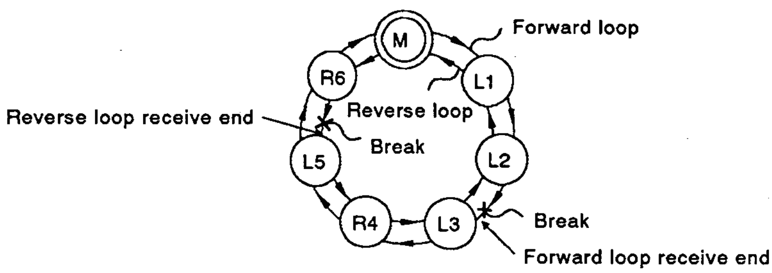
"B" column: Displays whether a local station has detected an error at other local stations.(D9216 to D9219)
"0": Error has not been detected.
"E": Error has been detected.
Only "0" is displayed for a remote I/O station.

"C" column: Displays the forward loop line status of each slave station.(D9232 to D9239)
"0": Normal
"E": Error

"D" column: Displays the reverse loop line status of each slave station.(D9232 to D9239)
"0": Normal
"E": Error

POINT

(1) In the MELSECNET data link system, forward/reverse loop errors of the master station and slave stations are detected at the receive end.
Possible causes for forward/reverse loop errors are as follows:
(a) Broken or loose loop cable connection
(b) Hardware failure at receive end
(c) Hardware failure at send end
In the system configuration shown below, if the forward loop of L3 becomes faulty, the forward loop cable that connects L2 to L3 might be broken or loose, the hardware at the forward loop send end of L2 might be faulty, or the hardware at the forward loop receive end of L3 might be faulty.
If the cable that connects L5 and R6 is broken or loose, a reverse loop error for L5 will occur.



(2) If the status of a slave station displayed in "L" column is "D", the previous data in the "S", "A", "B", "C", and "D" columns will remain unchanged.

10.1.2 Local station link monitor

The following describes the link monitor when connecting GPP to the local station.

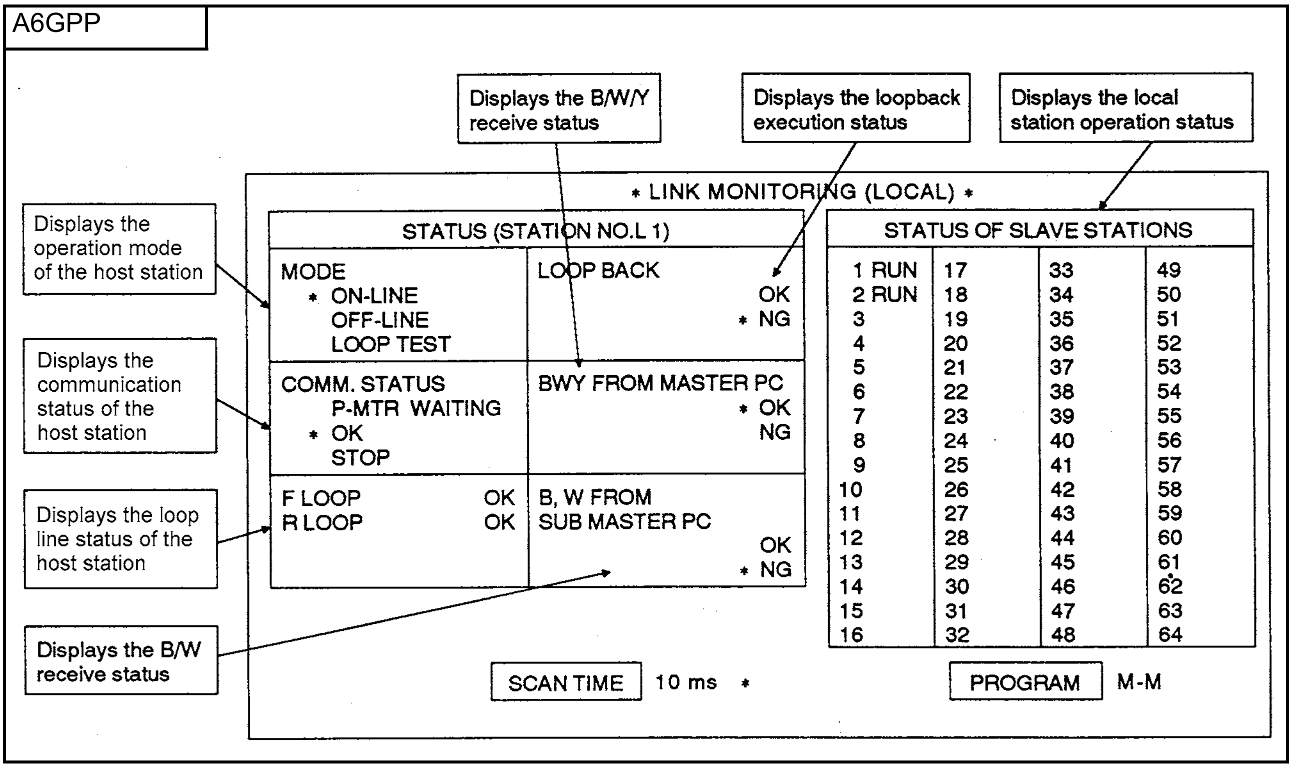
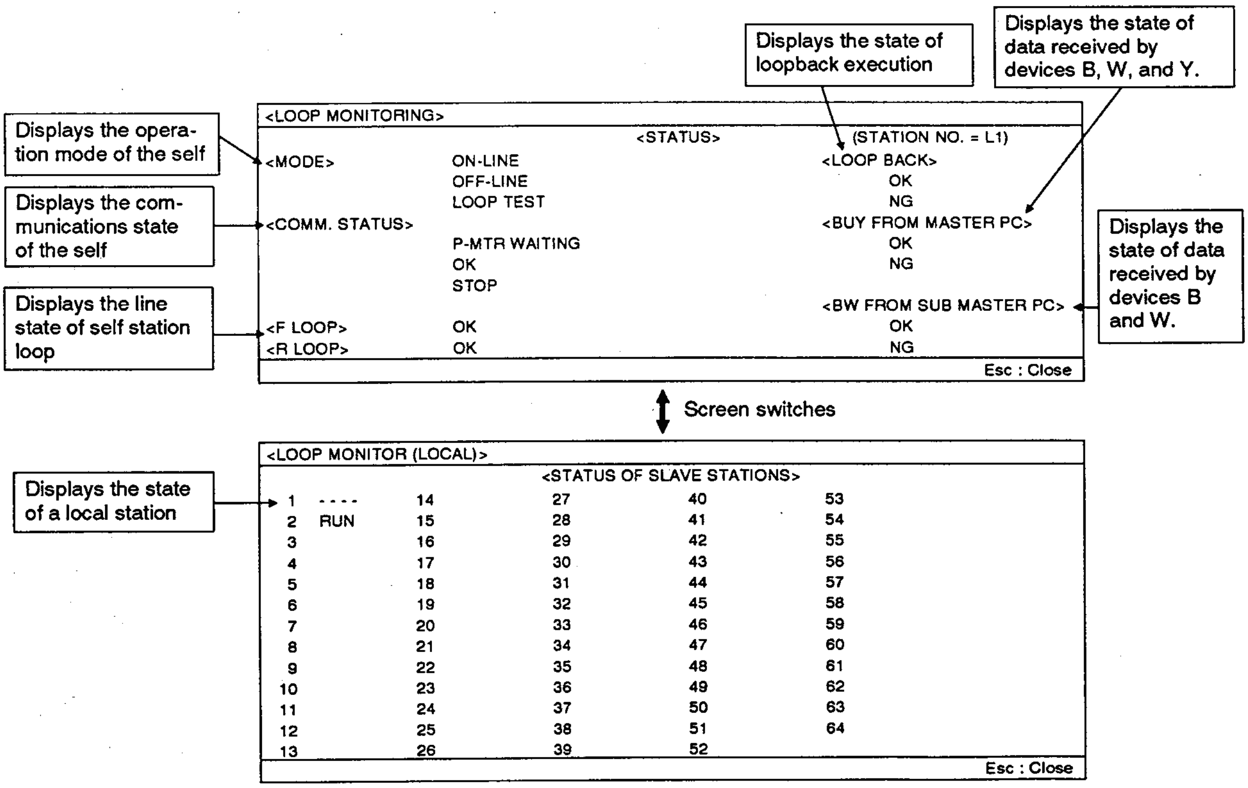


Fig 10.2 Local station link monitor screen (when connecting to local station)



(1) Displaying operation mode of the host station
   (a) Displays the operation status of host station
      1) ON-LINE........Host station mode setting is ON-LINE (automatic return function set/not set).
      2) OFF-LINE......Host station mode setting is OFF-LINE, SELF-LOOPBACK TEST, or STATION-TO-STATION TEST.
      3) LOOP TEST...Host station mode setting is FORWARD LOOP TEST or REVERSE LOOP TEST.
   (b) The operation display is the same as contents in M9240 and M9252.

(2) Displaying communication status of the host station
   (a) Displays the communication status of the host station.
      1) P-MTR WAITING.........Awaiting parameter data to be sent from the master station.
      2) OK...............................Normal communication is being executed.
      3) STOP...........................The host station is disconnected and communication has been stopped.
   (b) The communication status is the same as contents in M9250 and M9251.

(3) Displaying loop line status of the host station
   (a) Displays the forward loop line (F loop) and reverse loop line (R loop) status of the host station.
      Only “OK” is displayed when a MELSECNET/B data link system is used.
      1) OK.........Loop line is normal.
      2) NG.........Loop line is faulty.
   (b) The loop line status is the same as contents in M9241 and M9242.

(4) Displaying loopback execution status
   (a) Displays whether loopback has been executed by the host station or not.
      1) OK (executed).........Loopback has been executed by the host station.
      2) NG (not executed)...Loopback has not been executed by the host station.
   (b) The loopback execution status is the same as content in M9243.

(5) Displaying B/W/Y receive status
   (a) Displays whether the link relays (B), link registers (W), and link outputs (Y) are being received from the master station.
      1) OK (receiving).........B, W, and Y are being received from the master station by the cyclic communication.
      2) NG (not receiving)...B, W, and Y cannot be being received from the master station due to disconnection of host station.
   (b) The B/W/Y receive status is the same as content in M9246.

(6) Displaying B/W receive status (local station in three-tier system) (M9247)
   (a) Displays whether a local station in the three-tier system is receiving the link relays (B) and link registers (W) from the master station in the two-tier system.
      1) OK (receiving).........B and W are being received from the master station in the two-tier system by the cyclic communication.
      2) NG (not receiving)...The local station is in a status in which B and W are not being received from the master station in the two-tier system.
         Reception will be disabled when M9247 is turned ON.

(7) Displaying local station operation status (D9248 to 9251, D9252 to D9255)
   (a) Displays the operation status of the local station.
      1) RUN: Station in RUN status
      2) STOP: Station in STOP status
      3) DOWN: Station is disconnected from the link due to power supply OFF
   (b) The operation status of the station number part of remote I/O stations will always be RUN regardless of normal status or power supply OFF etc.

10.1.3 Remote I/O station link monitor

This section describes the following link monitor when connecting GPP to a remote I/O station.

(a) Loop monitor...... Displays the data link status of the host station.

(b) Batch monitor..... Can batch monitor the devices that communicate data by host station.

Loop Monitor

The following describes the loop monitor when connecting GPP to a remote I/O station.

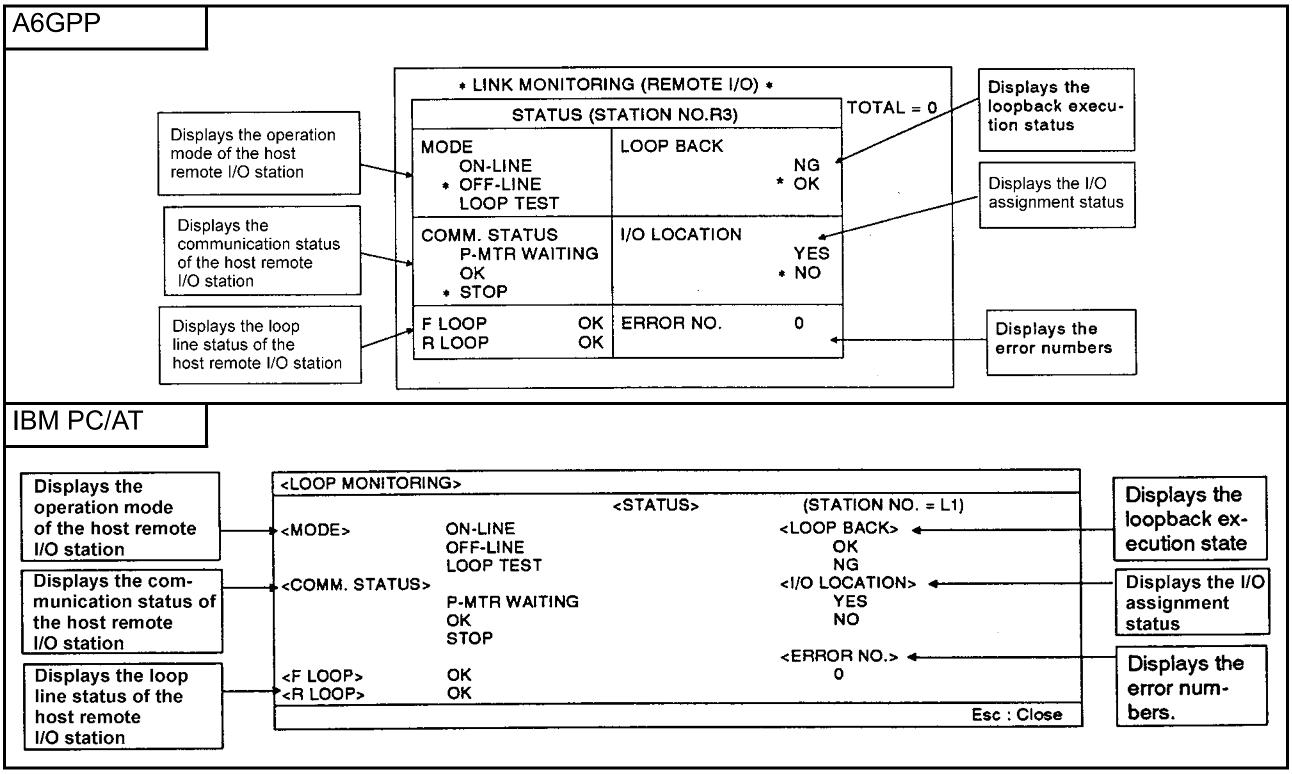


Fig 10.3 Loop monitor screen

(1) Displaying operation mode of the host station

(a) Displays the operation status of the host station

1) ON-LINE..............Mode setting of host station is ON-LINE (with/without automatic return function).

2) OFF-LINE............Mode setting of host station is OFF-LINE, SELF-LOOPBACK TEST, or STATION-TO-STATION TEST.

3) LOOP TEST.........Mode setting of host station is FORWARD LOOP TEST or REVERSE LOOP TEST.

(2) Displaying communication status of the host station

(a) Displays the communication status of the host station.

1) P-MTR WAITING...Awaiting parameter data to be sent from the master station.

2) OK.........................Normal communication is being executed.

3) STOP.....................The host station is disconnected and communication has been stopped.

(3) Displaying loop line status of the host station
 (a) Displays the forward loop line (F loop) and reverse loop line (R loop) status of the host station.
  1) OK.........Loop line is normal.
  2) NG.........Loop line is faulty.

(4) Displaying loopback execution status
 (a) Displays whether loopback has been executed by the host station or not.
  1) OK (executed).........Loopback has been executed by the host station.
  2) NG (not executed)....Loopback has not been executed by the host station.

(5) Displaying I/O assignment status
 (a) Displays whether I/O assignment has been performed by the master station or not.
  1) YES.........I/O assignment has been performed by the master station.
  2) NO...........I/O assignment has not been performed by the master station.

(6) Displaying error numbers
 (a) Displays error numbers when the following errors occur.

Error Number	Error Description	Counter Measure
10	A special function module other than 32-point modules is loaded on a remote I/O station.	Remove the special function module (any other than 32-point modules) from the remote I/O station.
11	Special function module hardware error.	Replace the special function module.
12	The number of words read by an RFRP instruction exceeds the link register (W) range specified with the link parameters.	• Change the link register (W) range set with the link parameters. • Change the number of words to be read by the RFRP instruction.
13	The number of words to be written by the RTOP instruction exceeds the link register (W) range specified with the parameters.	• Change the link register (W) range set with the parameters. • Change the number of words to be written by the RTOP instruction.
14	The RFRP instruction was executed when a special function module has a hardware failure.	• Special function module hardware failure
15	The RTOP instruction was executed when a special function module has a hardware failure.	• Special function module hardware failure
20	Fuse blown in an I/O module	Replace the fuse in the I/O module loaded to the remote I/O station.
21	I/O module verification error (The I/O module information of the remote I/O station is different from that recognized at power-up.) (1) An I/O module is not secure. (2) An I/O module was removed, or another I/O module was loaded during operation.	• Check and/or replace the I/O module. • Reset the master station or the remote I/O station.
22	Neither inputs (X) nor outputs (Y) have been specified with the parameters.	Check the I/O modules ON the remote I/O station and set the parameters again.
23	I/O assignment error in GPP,A7LMS(GPP function)	Check the link assignment for the I/O modules and the master station and correct the I/O assignment.
24	Remote I/O station specification error.	Check if local station data are set for a remote I/O station number with link parameters, and correct the settings.

(7) Displaying station number
Displays the station number of the remote I/O station connected to the GPP.

(8) Displaying number of slave stations
Displays the total number of local and remote I/O stations connected in the loop.

Batch Monitor

The following describes the batch monitor when connecting GPP to a remote I/O station.

A6GPP

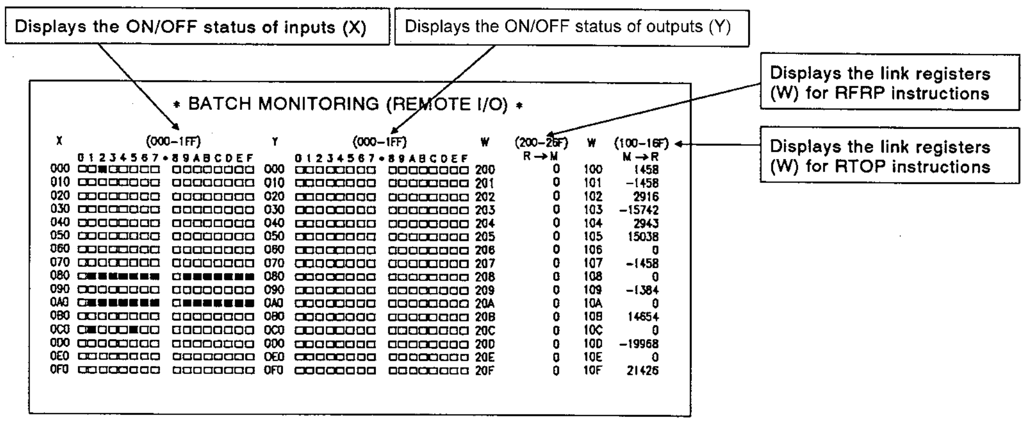


Fig 10.4 Batch monitor screen

REMARK

Use SW□SRV-GPPA/SW□IVD-GPPA when connecting a peripheral device to the remote I/O station.
GX Developer cannot be connected to the remote I/O station.

(1) Displaying ON/OFF status of inputs (X)

(a) Displays the ON/OFF status of inputs (X) sent from a remote I/O station to the master station.

1) ■.........ON status

2) □.........OFF status

(b) If the remote I/O station is online, the device numbers at the master station are used for the display.
If the remote I/O station is offline, the device numbers at the host station are used for the display.

(2) Displaying ON/OFF status of outputs (Y)

(a) Displays the ON/OFF status of outputs (Y) sent from the master station to a remote I/O station.

1) ■.........ON status

2) □.........OFF status

(b) If the remote I/O station is online, the device numbers at the master station are used for the display.
If the remote I/O station is offline, the device numbers at the host station are used for the display.

(3) Displaying link registers (W) for RFRP instructions

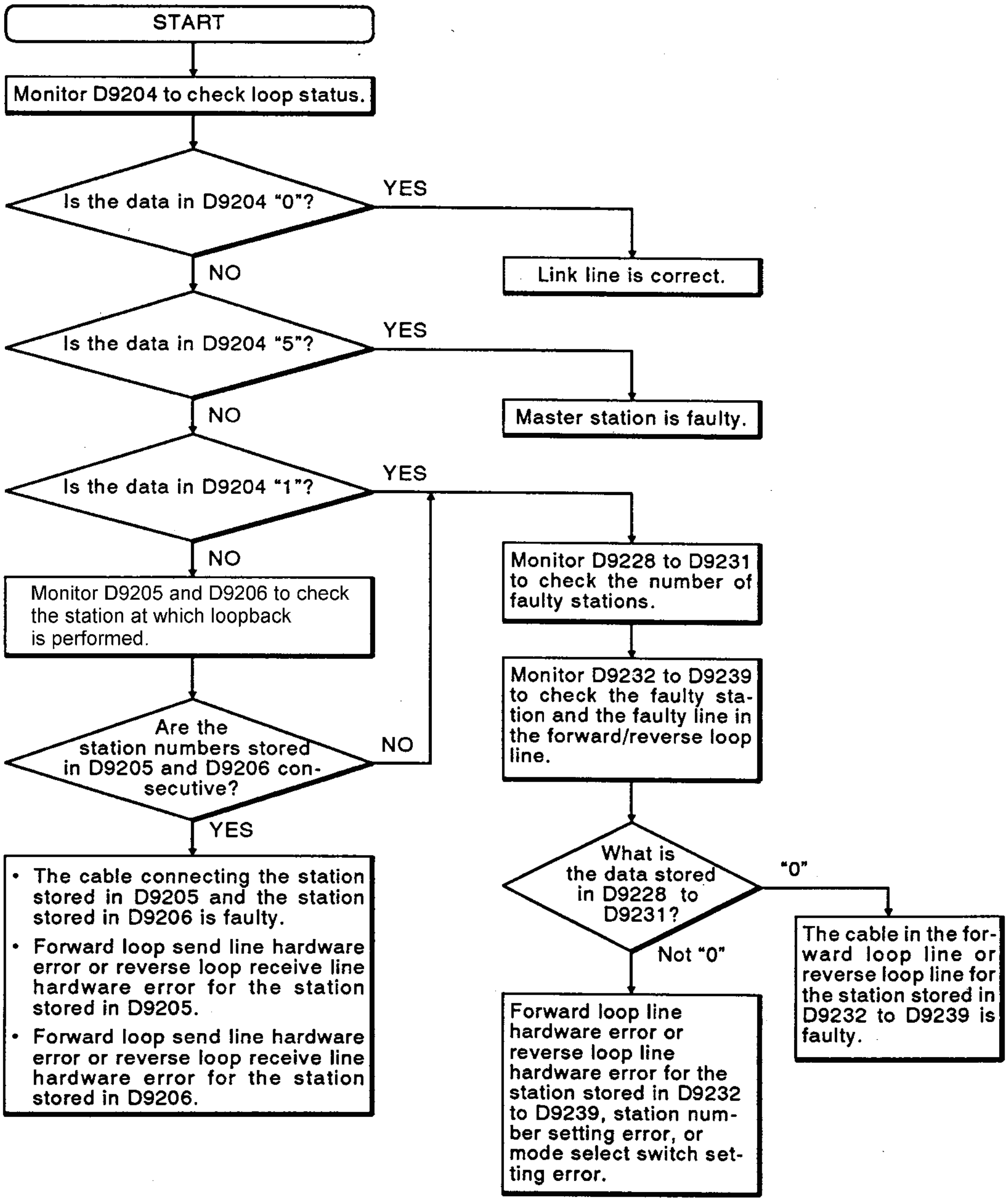
(a) Displays the data in the area set for data transmission from the host station to the master station by link parameter setting.

(4) Displaying link registers (W) for RTOP instructions

(a) Displays the data in the area set for data transmission from the master station to the host station by link parameter setting.

10.2 Monitoring the Special Link Relays and Special Link Registers

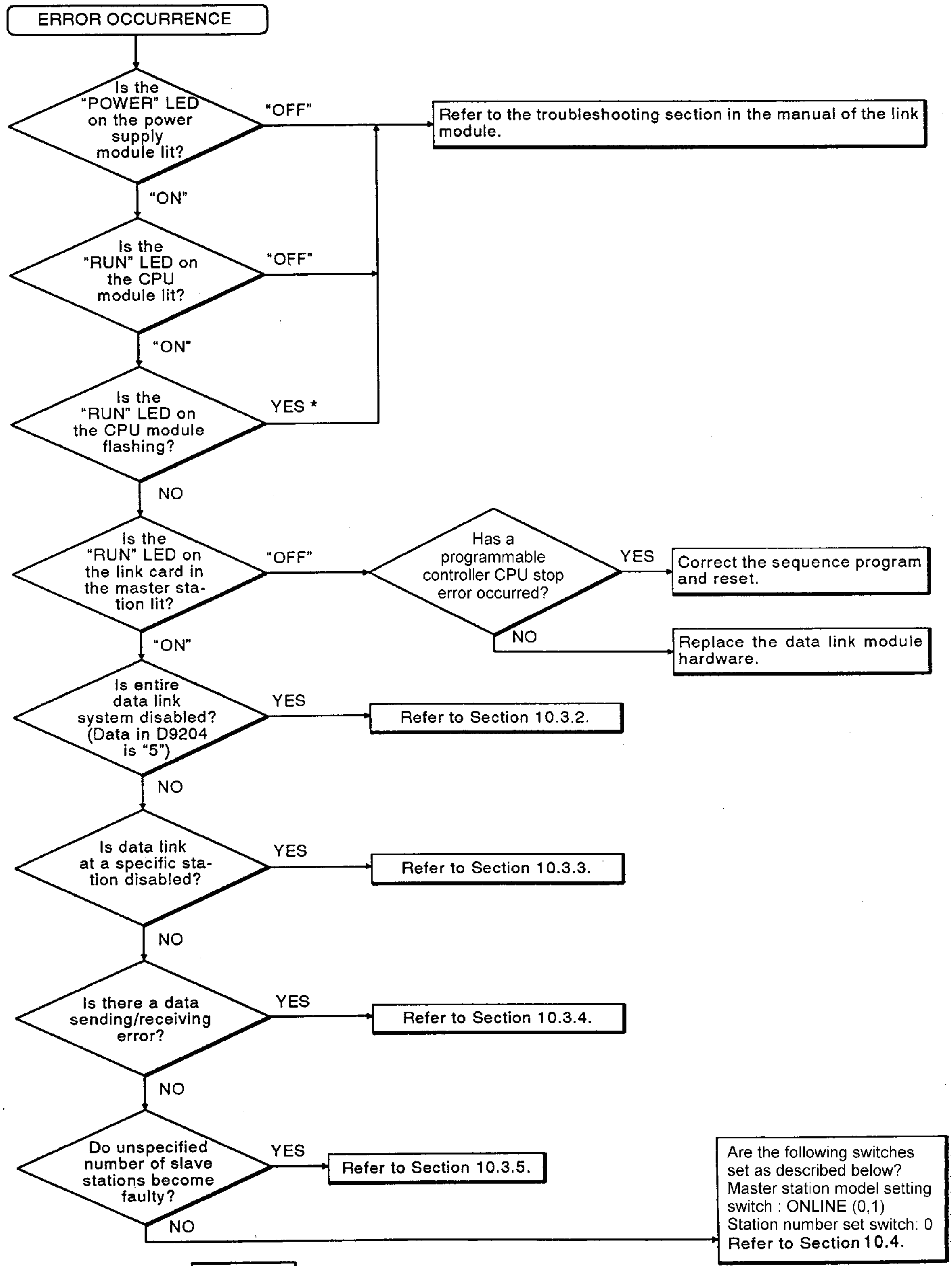
Faulty stations in the MELSECNET data link system can be detected by using the A7PU to monitor the special link relays and special link registers.
When the GPP/IBM PC/AT is available, detect them by using the link monitoring in Section 10.1.
Refer to Section 9.2 and Section 9.3 for details on special link relays and special link registers.



10.3 Procedure for Troubleshooting

The following describes the simple procedure for troubleshooting.

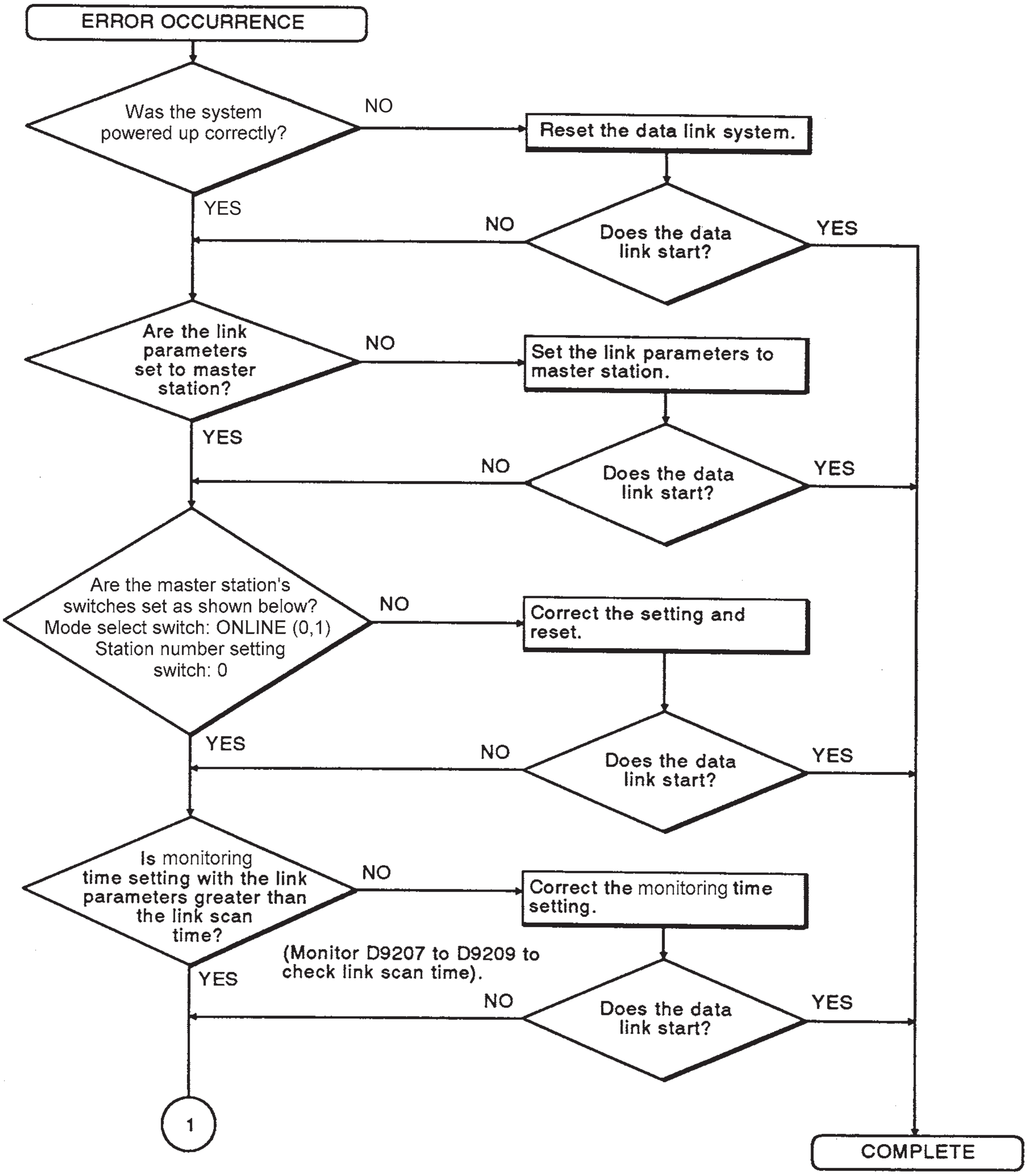
10.3.1 Troubleshooting flowchart

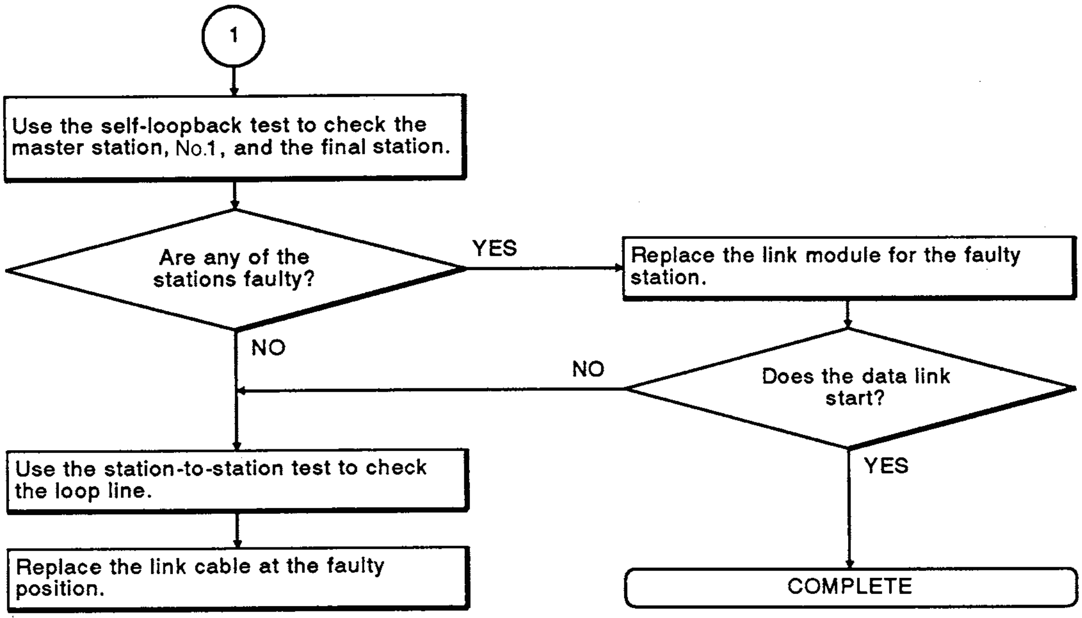


REMARK

*: When mode setting, station number setting, or baud rate setting for link module is not normal, "SP UNIT LAY ERR" causes by switching a CPU module from STOP to RUN.

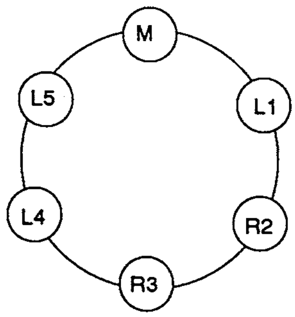
10.3.2 Flowchart for when "the data link is disabled throughout the entire system"





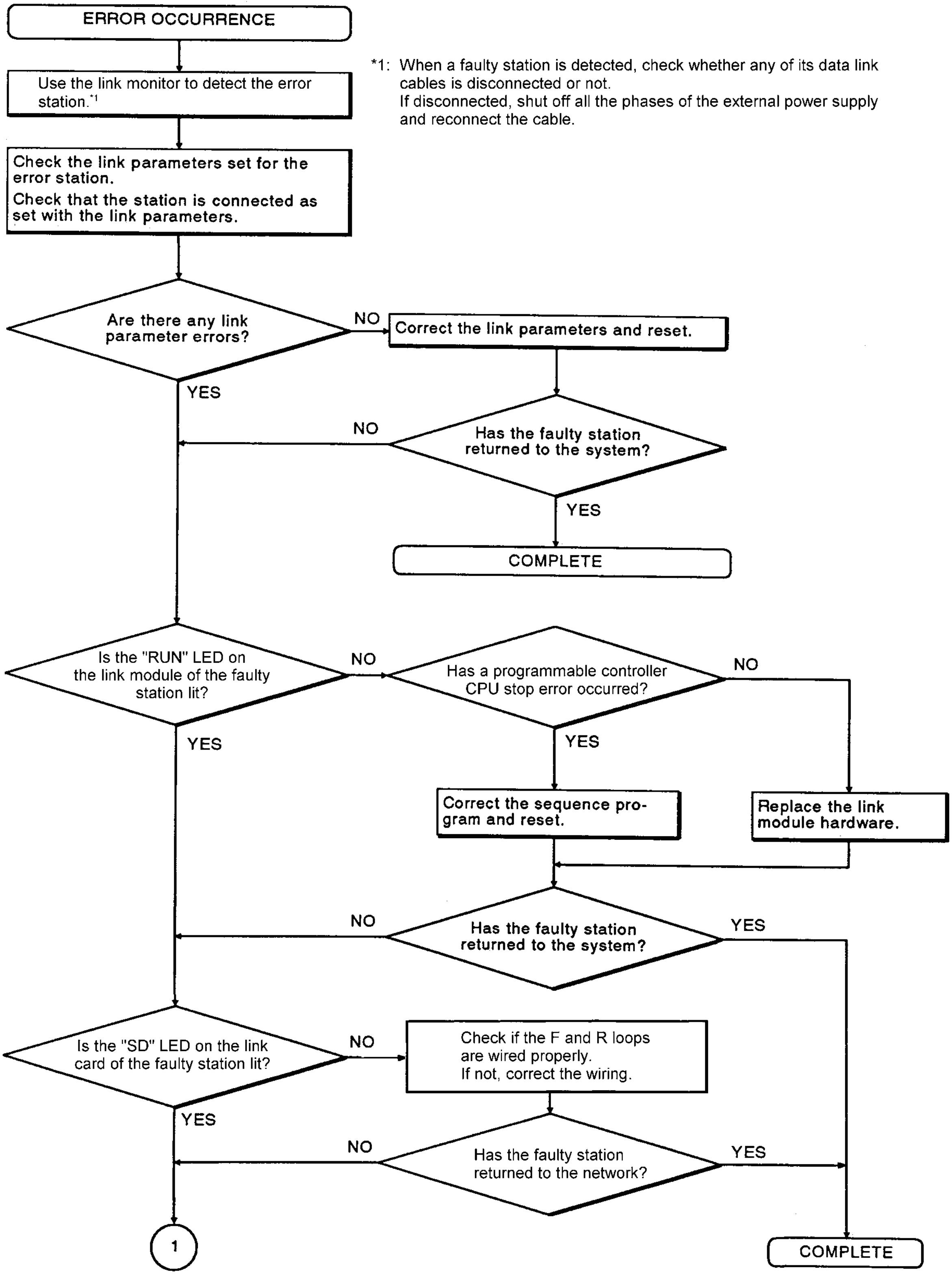
POINT

(1) In the MELSECNET data link, if the power supply of the local or remote I/O station on both sides of a normally operating local or remote I/O station is turned off simultaneously (within 100 ms), the data link for the entire system might be disabled.
If the "automatic return function" is set for these stations, data communication resumes immediately. However, if the automatic return function is not set for these stations, they will remain disconnected. To return them to the data link, perform reset operation.
Example:

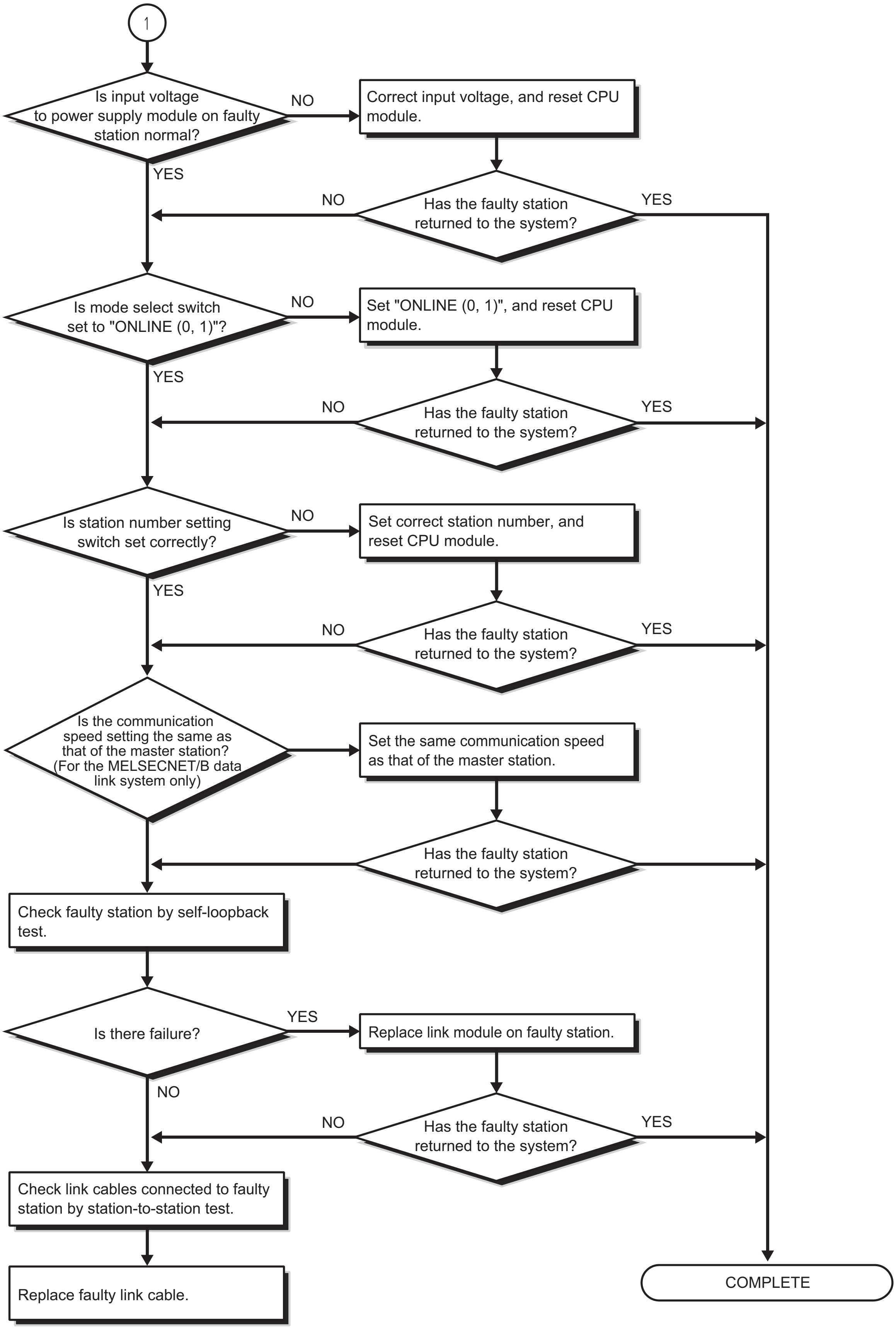


If the power supply to L1 and R3 is turned off simultaneously (within 100 ms) while R2 is operating normally, the data link for the entire system might be disabled.

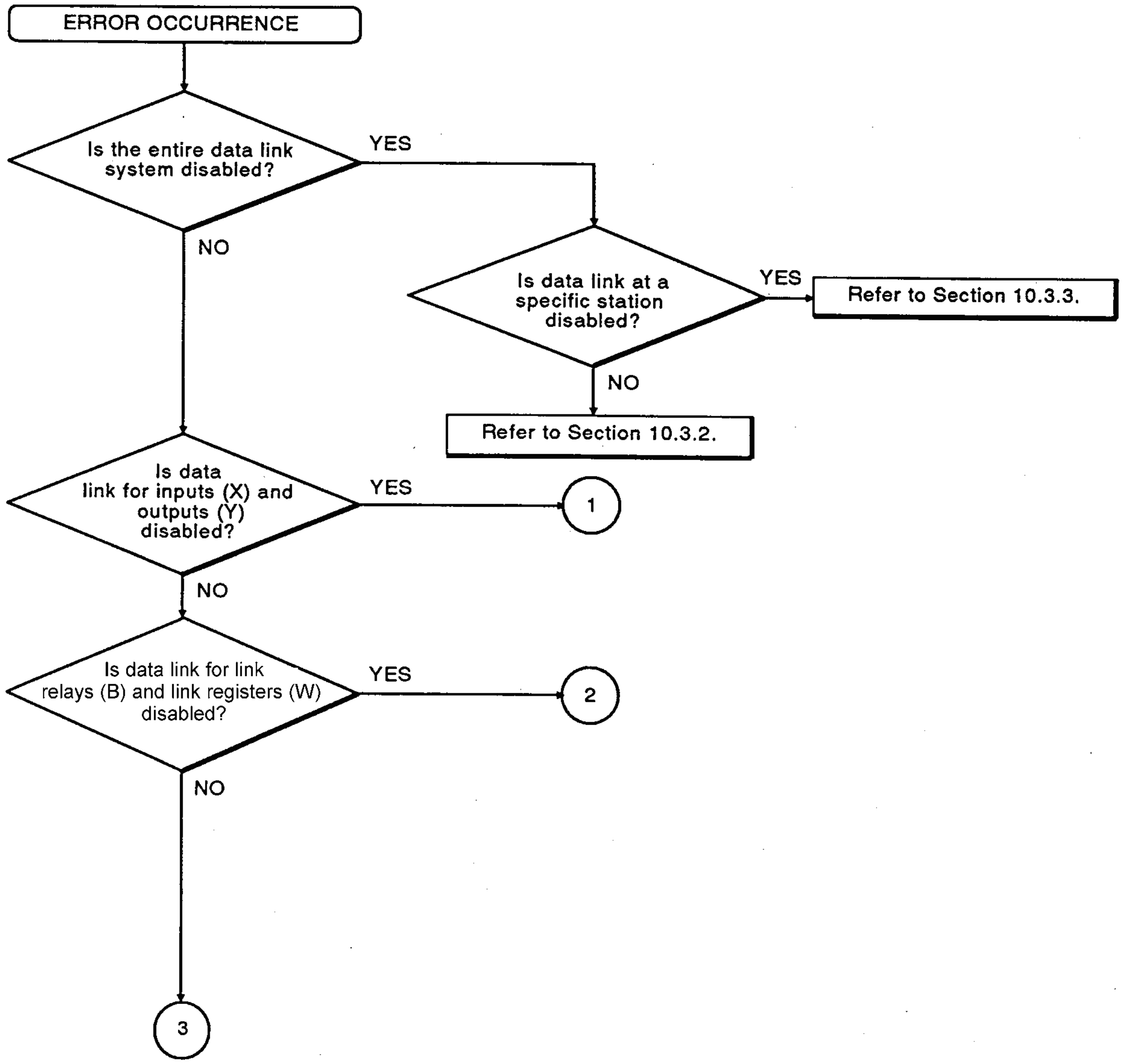
10.3.3 Flowchart for when "the data link is disabled at a specific station"

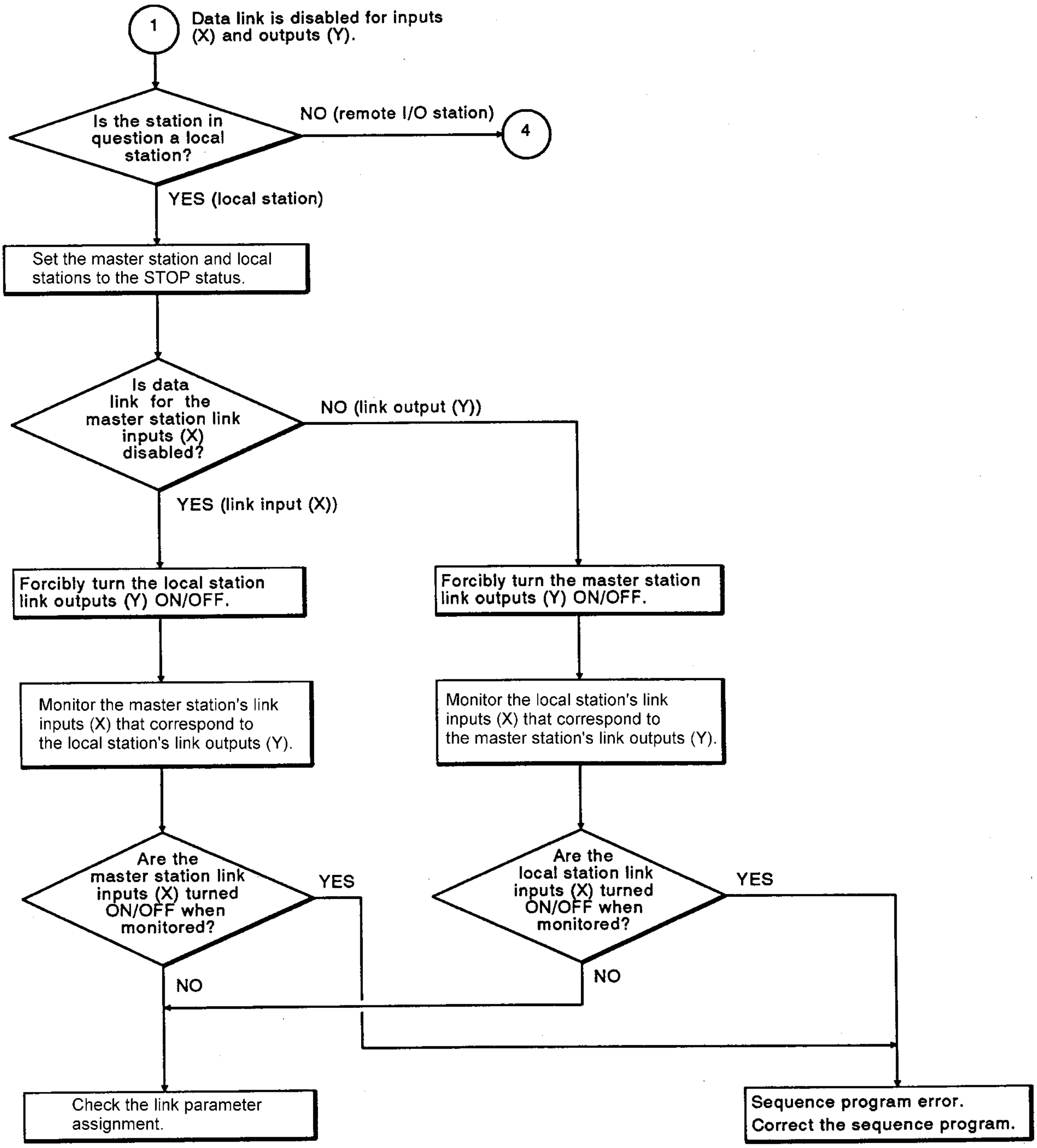


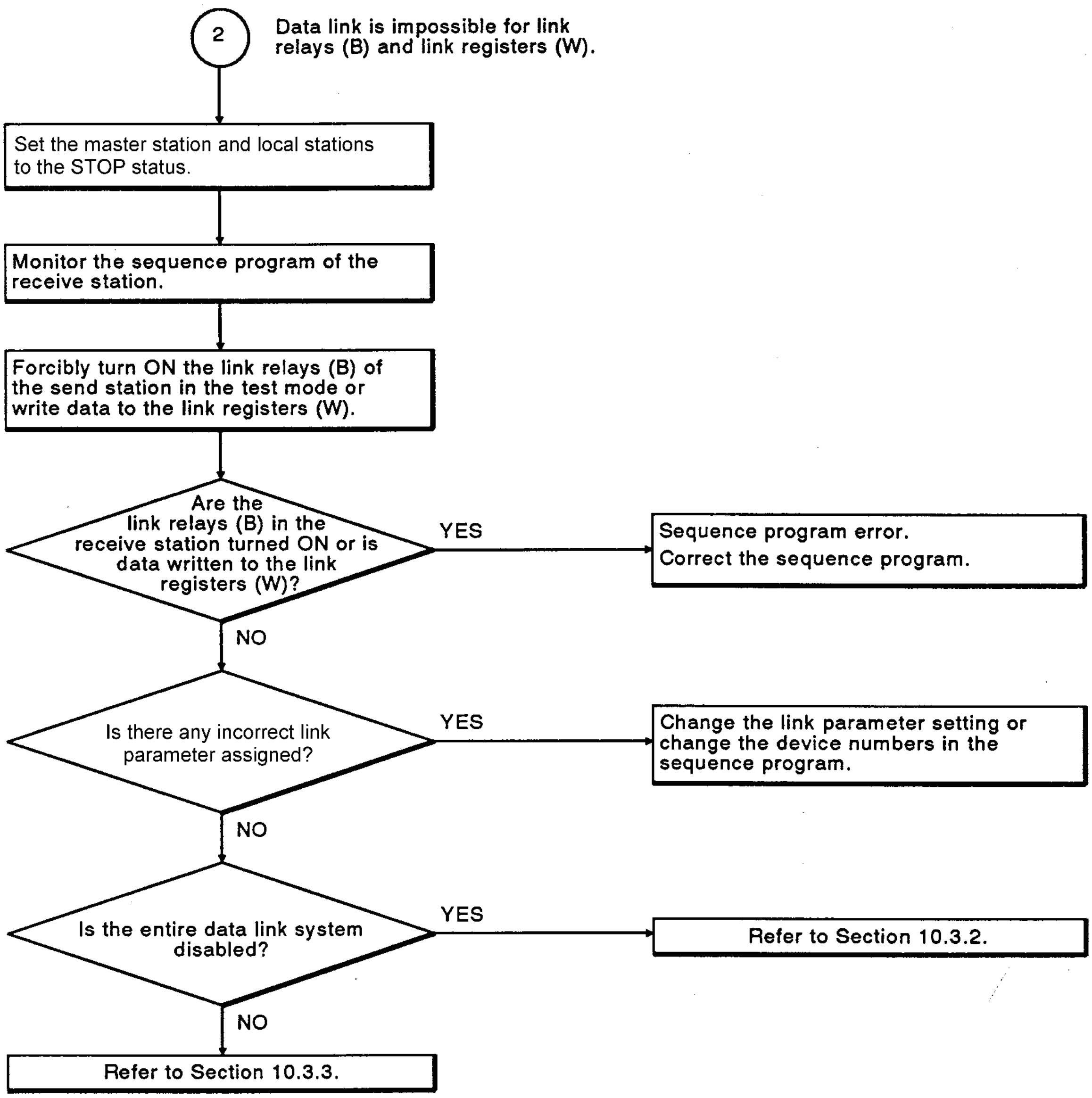
*1: When a faulty station is detected, check whether any of its data link cables is disconnected or not.
If disconnected, shut off all the phases of the external power supply and reconnect the cable.

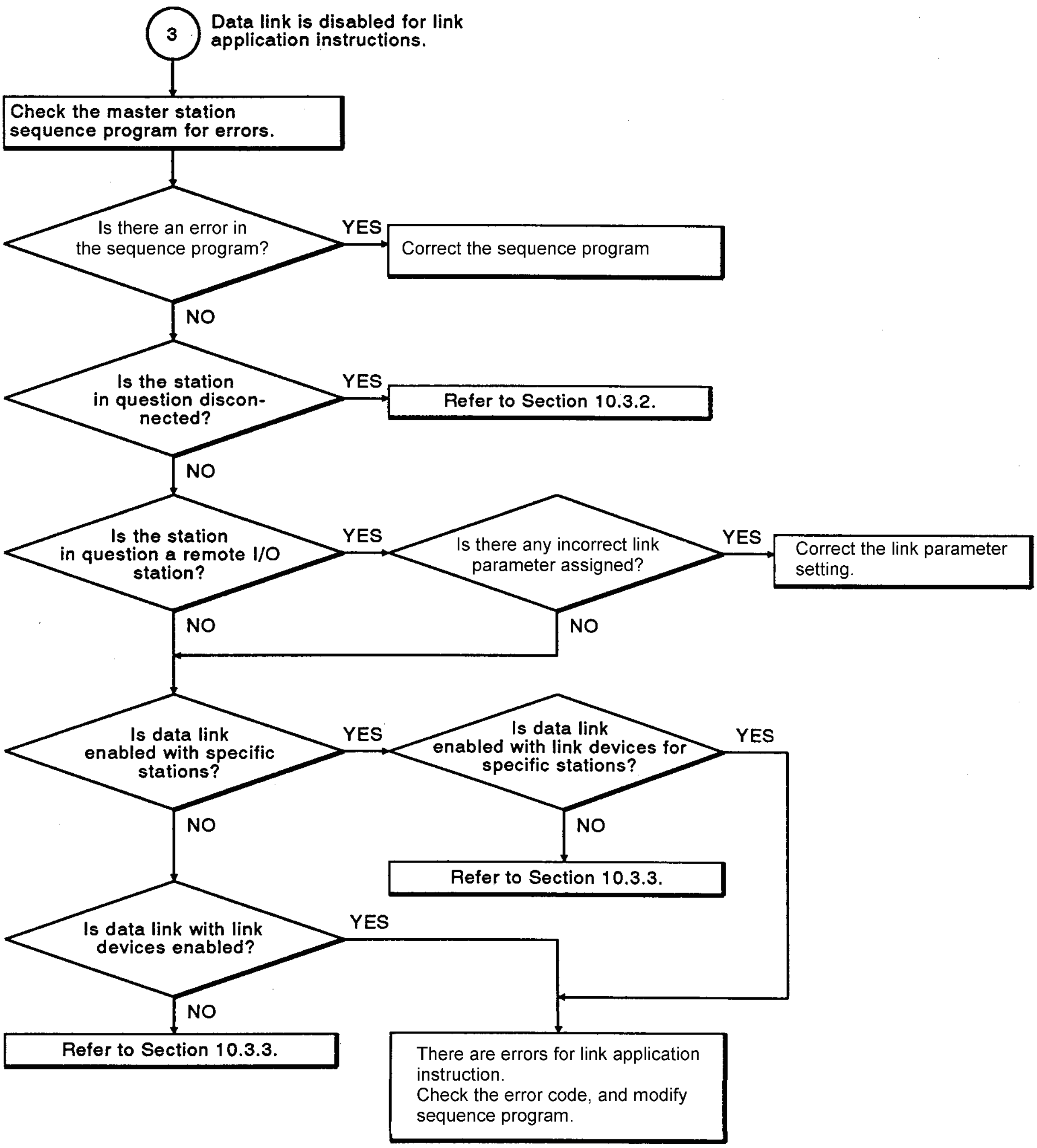

1
Is input voltage to power supply module on faulty station normal?
NO
Correct input voltage, and reset CPU module.
YES
NO
Has the faulty station returned to the system?
YES
Is mode select switch set to "ONLINE (0, 1)"?
NO
Set "ONLINE (0, 1)", and reset CPU module.
YES
NO
Has the faulty station returned to the system?
YES
Is station number setting switch set correctly?
NO
Set correct station number, and reset CPU module.
YES
NO
Has the faulty station returned to the system?
YES
Is the communication speed setting the same as that of the master station? (For the MELSECNET/B data link system only)
Set the same communication speed as that of the master station.
Has the faulty station returned to the system?
Check faulty station by self-loopback test.
Is there failure?
YES
Replace link module on faulty station.
NO
NO
Has the faulty station returned to the system?
YES
Check link cables connected to faulty station by station-to-station test.
Replace faulty link cable.
COMPLETE

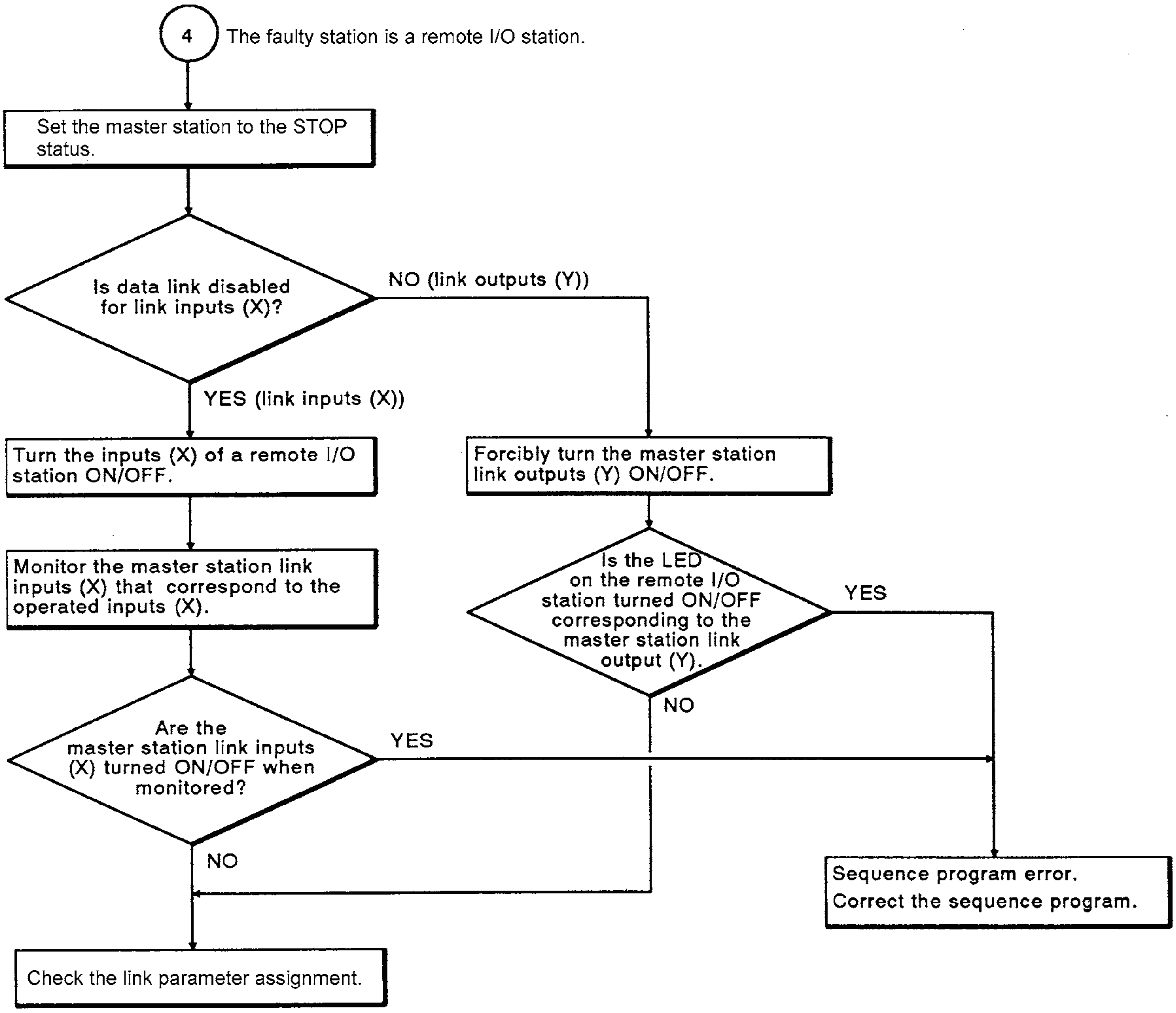
10.3.4 Flowchart for when "the data communication error occurs"



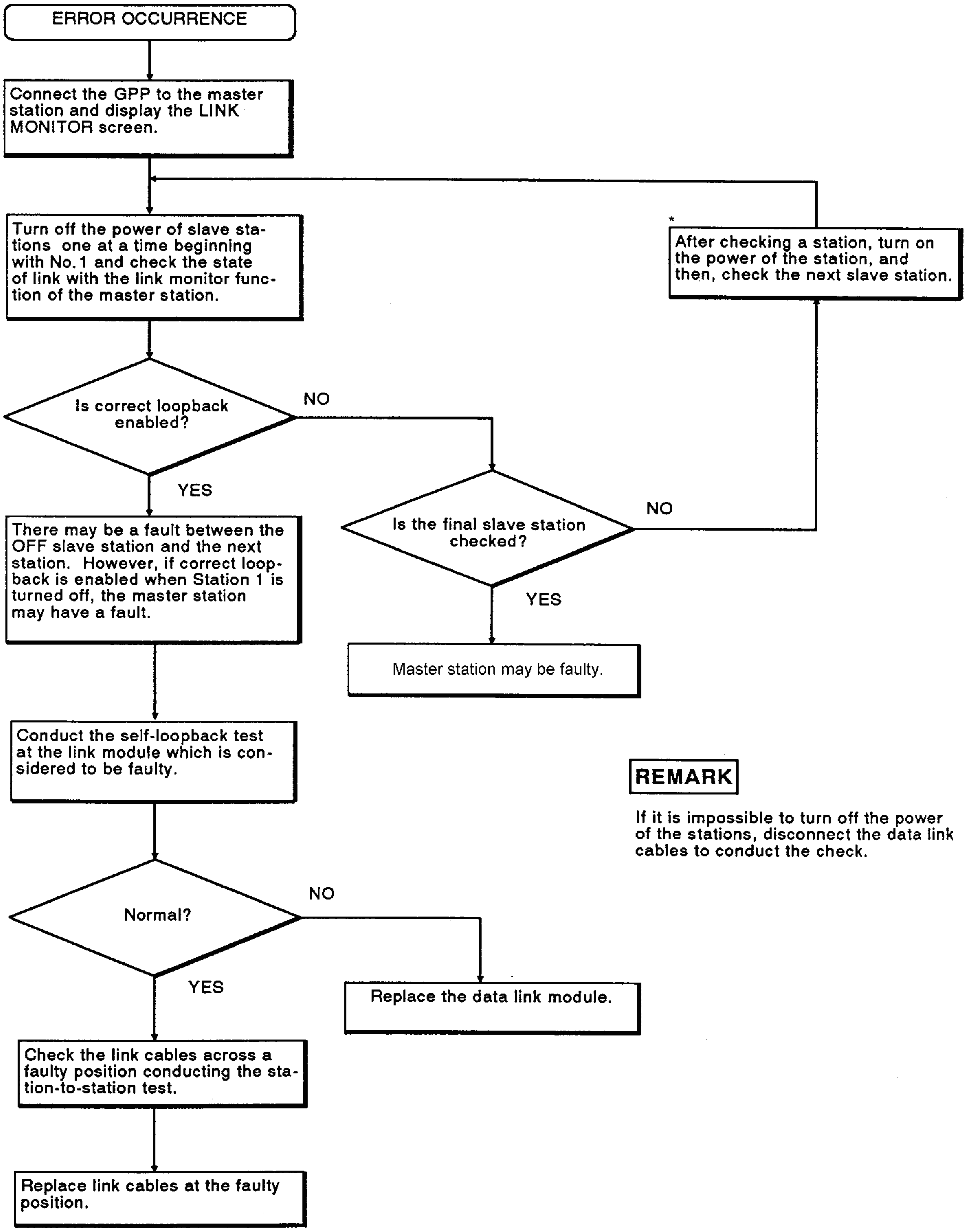

1
Data link is disabled for inputs (X) and outputs (Y).
Is the station in question a local station?
NO (remote I/O station)
4
YES (local station)
Set the master station and local stations to the STOP status.
Is data link for the master station link inputs (X) disabled?
NO (link output (Y))
YES (link input (X))
Forcibly turn the local station link outputs (Y) ON/OFF.
Forcibly turn the master station link outputs (Y) ON/OFF.
Monitor the master station's link inputs (X) that correspond to the local station's link outputs (Y).
Monitor the local station's link inputs (X) that correspond to the master station's link outputs (Y).
Are the master station link inputs (X) turned ON/OFF when monitored?
YES
Are the local station link inputs (X) turned ON/OFF when monitored?
YES
NO
NO
Check the link parameter assignment.
Sequence program error. Correct the sequence program.


2
Data link is impossible for link relays (B) and link registers (W).
Set the master station and local stations to the STOP status.
Monitor the sequence program of the receive station.
Forcibly turn ON the link relays (B) of the send station in the test mode or write data to the link registers (W).
Are the link relays (B) in the receive station turned ON or is data written to the link registers (W)?
YES
Sequence program error.
Correct the sequence program.
NO
Is there any incorrect link parameter assigned?
YES
Change the link parameter setting or change the device numbers in the sequence program.
NO
Is the entire data link system disabled?
YES
Refer to Section 10.3.2.
NO
Refer to Section 10.3.3.


3
Data link is disabled for link application instructions.
Check the master station sequence program for errors.
Is there an error in the sequence program?
YES
Correct the sequence program
NO
Is the station in question discon-nected?
YES
Refer to Section 10.3.2.
NO
Is the station in question a remote I/O station?
YES
Is there any incorrect link parameter assigned?
YES
Correct the link parameter setting.
NO
NO
Is data link enabled with specific stations?
YES
Is data link enabled with link devices for specific stations?
YES
NO
NO
Refer to Section 10.3.3.
Is data link with link devices enabled?
YES
NO
Refer to Section 10.3.3.
There are errors for link application instruction.
Check the error code, and modify sequence program.


4
The faulty station is a remote I/O station.
Set the master station to the STOP status.
Is data link disabled for link inputs (X)?
NO (link outputs (Y))
YES (link inputs (X))
Turn the inputs (X) of a remote I/O station ON/OFF.
Forcibly turn the master station link outputs (Y) ON/OFF.
Monitor the master station link inputs (X) that correspond to the operated inputs (X).
Is the LED on the remote I/O station turned ON/OFF corresponding to the master station link output (Y).
YES
NO
Are the master station link inputs (X) turned ON/OFF when monitored?
YES
NO
Sequence program error.
Correct the sequence program.
Check the link parameter assignment.

10.3.5 Flowchart for when "the unspecified number of slave stations become faulty"



REMARK

If it is impossible to turn off the power of the stations, disconnect the data link cables to conduct the check.

10.4 ERROR LED

The following describes LED which turns ON when an error occurs during data link execution.

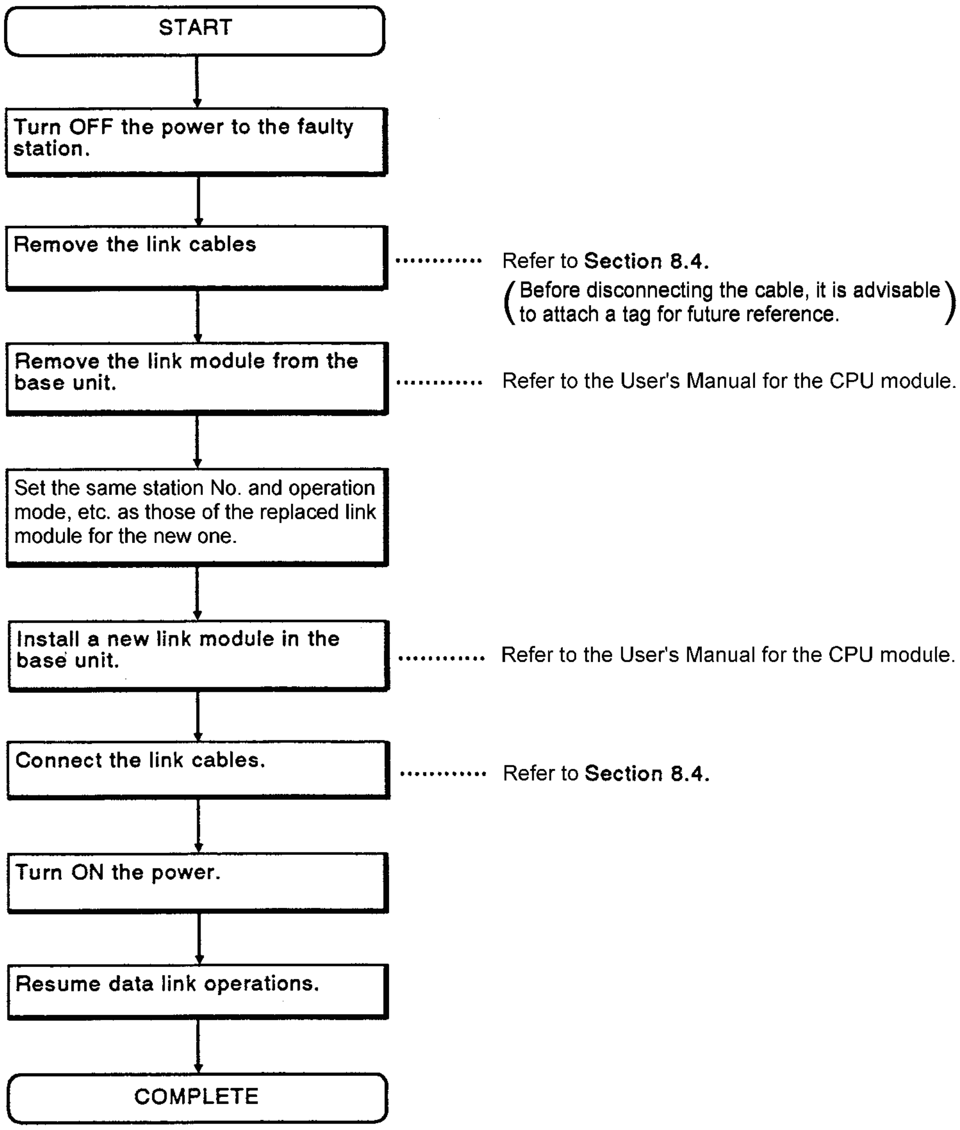
Indication	Name	Error-detected status	Description
CRC	CRC error (Cyclic redundancy check)	ON	Code check error of receive data <Cause> • Data-sending station was disconnected at the timing. • Cable fault, noise, etc.
OVER	Overrun error		Received data were overwritten with another data received next due to delay in loading. <Cause> Hardware failure in receiving part of link module In the system composites with local stations and remote I/O stations, the "OVER" LED of remote I/O stations are turned ON dimly. However, note that the module is not faulty.
AB.IF	Abort invalid frame error		"1" has been received consecutively more than stipulated times. Receive data length is shorter than stipulated length. <Cause> • Data-sending station was disconnected at the timing. • Monitoring time too short, cable fault, noise, etc.
TIME	Time check error		Data link monitoring time is over. <Cause> Monitoring time too short, cable fault, noise, etc.
DATA	Data check error		Data containing erroneous code have been received. <Cause> Cable fault, noise, etc.
UNDER	Underrun error		Internal processing of send data is not executed constantly. <Cause> Hardware failure in sending part of link module
F.LOOP	Forward loop error		Forward loop line has an error. Adjacent station was powered OFF. <Cause> Forward loop cable disconnection, or incomplete cable connection
R.LOOP	Reverse loop error		Reverse loop line has an error. Adjacent station was powered OFF. <Cause> Reverse loop cable disconnection, or incomplete cable connection

10.5 Replacing a Faulty Station of Link Module

This section explains how to replace the link module of a faulty station in data link system.

When a MELSECNET data link system is used

Since the link cables are doubled in a MELSECNET data link system, the loopback function can continue data link operations even if power supply to one station (local or remote I/O station) is turned OFF.
Replace the link module of a faulty station as shown below:



When a MELSECNET/B data link system is used

In a MELSECNET/B data link system, since the link cables for both send and receive operations are connected to the same terminal block, data link operations can be continued even if power supply to one of the local stations is turned OFF.
Replace the link module of a faulty station as shown below:

START

↓

Turn OFF the power to the faulty station.

↓

Remove the link module terminal block from the link module.

↓

Remove the link module from the base unit. .... Refer to the User's Manual for the CPU module.

↓

Install a new link module in the base unit. .... Refer to the User's Manual for the CPU module.

↓

Attach the terminal block to the link module.

↓

Turn ON the power.

↓

Resume data link operations.

↓

COMPLETE

MEMO

INDEX

WARRANTY

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 of damages caused by any cause found not to be the responsibility of Mitsubishi, loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products, special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products, 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.

IB(NA)66350 - G

Type MELSECNET, MELSECNET/B Data Link System

Reference Manual

MODEL	MELSECNET/B-R-E
MODEL CODE	13JF70
IB(NA)-66350-G(1202)MEE	

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