

MELSEC A Series

Programmable Logic Controller

Reference Manual

MELSECNET

MELSECNET/B Data Link System



● SAFETY PRECAUTIONS ●


(Read these precautions before using.)

When using Mitsubishi equipment, thoroughly read this manual and the associated manuals introduced in this manual.

Also pay careful attention to safety and handle the module properly. These precautions apply only to Mitsubishi equipment. Refer to the CPU module user's manual for a description of the PC system safety precautions.

These ● SAFETY PRECAUTIONS ● classify the safety precautions into two categories: "DANGER" and "CAUTION".

 DANGER	Procedures which may lead to a dangerous condition and cause death or serious injury if not carried out properly.
 CAUTION	Procedures which may lead to a dangerous condition and cause superficial to medium injury, or physical damage only, if not carried out properly.

Depending on circumstances, procedures indicated by  CAUTION may also be linked to serious results.

In any case, it is important to follow the directions for usage.

Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

[DESIGN PRECAUTIONS]

DANGER

- Install a safety circuit external to the PC that keeps the entire system safe even when there are problems with the external power supply or the PC module. Otherwise, trouble could result from erroneous output or erroneous operation.
 - (1) Outside the PC, construct mechanical damage preventing interlock circuits such as emergency stop, protective circuits, positioning upper and lower limits switches and interlocking forward /reverse operations.
 - (2) When the PC detects the following problems, it will stop calculation and turn off all output.
 - The power supply module has over current protection equipment and over voltage protection equipment.
 - The PC CPUs self-diagnostic functions, such as the watchdog timer error, detect problems. In addition, all output will be turned on when there are problems that the PC CPU cannot detect, such as in the I/O controller. Build a fail safe circuit exterior to the PC that will make sure the equipment operates safely at such times. See Section 8.1 of this user's manual for example fail safe circuits.

See this user's manual for example fail safe circuits.

- (3) Output could be left on or off when there is trouble in the outputs module relay or transistor. So build an external monitoring circuit that will monitor any single outputs that could cause serious trouble.
- When overcurrent which exceeds the rating or caused by short-circuited load flows in the output module for a long time, it may cause smoke or fire. To prevent this, configure an external safety circuit, such as fuse.
 - Build a circuit that turns on the external power supply when the PC main module power is turned on. If the external power supply is turned on first, it could result in erroneous output or erroneous operation.
 - When there are communication problems with the data link, the communication problem station will enter the following condition.

Build an interlock circuit into the PC program that will make sure the system operates safely by using the communication state information. Not doing so could result in erroneous output or erroneous operation.

 - (1) For the data link data, the data prior to the communication error will be held.
 - (2) The MELSECNET (II,B,/10) remote I/O station will turn all output off.
 - (3) The MELSECNET/MINI-S3 remote I/O station will hold the output or turn all output off depending on the E.C. remote setting.

Refer to the data link manuals regarding the method for setting the communication problem station and the operation status when there are communication problem.

- When configuring a system, do not leave any slots vacant on the base. Should there be any vacant slots, always use a blank cover (A1SG60) or dummy module (A1SG62).

When the extension base A1S52B, A1S55B or A1S58B is used, attach the dustproof cover supplied with the product to the module installed in slot 0.

If the cover is not attached, the module's internal parts may be dispersed when a short-circuit test is performed or overcurrent/overvoltage is accidentally applied to the external I/O area.

CAUTION

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

[DESIGN PRECAUTIONS]

CAUTION

- When controlling items like lamp load, heater or solenoid valve using an output module, large current (approximately ten times greater than that present in normal circumstances) may flow when the output is turned OFF→ON. Take measures such as replacing the module with one having sufficient rated current.

[INSTALLATION PRECAUTIONS]

DANGER

- Use the PC in an environment that meets the general specifications contained in this manual. Using this PC in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.
- Install so that the pegs on the bottom of the module fit securely into the base unit peg holes, and use the specified torque to tighten the module's fixing screws. Not installing the module correctly could result in erroneous operation, damage, or pieces of the product falling.
- Tightening the screws too far may cause damages to the screws and/or the module, resulting in fallout, short circuits, or malfunction.
- When installing more cables, be sure that the base unit and the module connectors are installed correctly. After installation, check them for looseness. Poor connections could result in erroneous input and erroneous output.
- Correctly connect the memory cassette installation connector to the memory cassette. After installation, be sure that the connection is not loose. A poor connection could result in erroneous operation.
- Do not directly touch the module's conductive parts or electronic components. Doing so could cause erroneous operation or damage of the module.

[WIRING PRECAUTIONS]

DANGER

- Completely turn off the external power supply when installing or placing wiring. Not completely turning off all power could result in electric shock or damage to the product.
- When turning on the power supply or operating the module after installation or wiring work, be sure that the module's terminal covers are correctly attached. Not attaching the terminal cover could result in electric shock.

CAUTION

- Be sure to ground the FG terminals and LG terminals to the protective ground conductor. Not doing so could result in electric shock or erroneous operation.
- When wiring in the PC, be sure that it is done correctly by checking the product's rated voltage and the terminal layout. Connecting a power supply that is different from the rating or incorrectly wiring the product could result in fire or damage.

[WIRING PRECAUTIONS]

CAUTION

- Do not connect multiple power supply modules in parallel. Doing so could cause overheating, fire or damage to the power supply module. If the terminal screws are too tight, it may cause falling, short circuit or erroneous operation due to damage of the screws or module.
- Tighten the terminal screws with the specified torque. If the terminal screws are loose, it could result in short circuits, fire, or erroneous operation.
- Tightening the terminal screws too far may cause damages to the screws and/or the module, resulting in fallout, short circuits, or malfunction.
- Be sure there are no foreign substances such as sawdust or wiring debris inside the module. Such debris could cause fires, damage, or erroneous operation.
- External connections shall be crimped or pressure welded with the specified tools, or correctly soldered. For information regarding the crimping and pressure welding tools, see the I/O module's user's manual. Imperfect connections could result in short circuit, fires, or erroneous operation.

[STARTUP AND MAINTENANCE PRECAUTIONS]

DANGER

- Do not touch the terminals while power is on. Doing so could cause shock or erroneous operation.
- Correctly connect the battery. Also, do not charge, disassemble, heat, place in fire, short circuit, or solder the battery. Mishandling of battery can cause overheating or cracks which could result in injury and fires.
- Switch all phases of the external power supply off when cleaning the module or tightening the terminal screws. Not doing so could result in electric shock. If the screws are too tight, it may cause falling, short circuit or erroneous operation due to damage of the screws or modules.
- Tightening the screws too far may cause damages to the screws and/or the module, resulting in fallout, short circuits, or malfunction.

CAUTION

- The online operations conducted for the CPU module being operated, connecting the peripheral device (especially, when changing data or operation status), shall be conducted after the manual has been carefully read and a sufficient check of safety has been conducted. Operation mistakes could cause damage or trouble of the module.
- Do not disassemble or modify the modules. Doing so could cause trouble, erroneous operation, injury, or fire.
- Switch all phases of the external power supply off before mounting or removing the module. If you do not switch off the external power supply, it will cause failure or malfunction of the module.

[DISPOSAL PRECAUTIONS]

CAUTION

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

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

INTRODUCTION

Thank you for choosing the Mitsubishi MELSEC-A Series of General Purpose Programmable Controllers. Please read this manual carefully so that the equipment is used to its optimum. A copy of this manual should be forwarded to the end User.

CONTENTS

1. FOREWORD	1-1 ~ 1-13
1.1 Contents of This Manual	1-2
1.2 Basic Information About Data Link Systems	1-3
1.2.1 Master, local, and remote I/O stations	1-3
1.2.2 Outline of the MELSECNET and MELSECNET/B data link systems	1-4
1.2.3 Performance differences between the MELSECNET and MELSECNET/B data link systems	1-5
1.2.4 The MELSECNET mode, MELSECNET II mode, and MELSECNET II composite mode	1-6
1.3 Applicable Link Modules and General Names	1-11
1.3.1 Applicable link modules	1-11
1.3.2 General names of CPU	1-12
2. TWO-TIER SYSTEM IN THE MELSECNET DATA LINK SYSTEM	2-1 ~ 2-9
2.1 Outline of the MELSECNET Data Link System	2-1
2.1.1 Configuration of the data link system	2-1
2.1.2 Features of the data link system	2-2
2.2 MELSECNET Data Link System	2-5
2.2.1 Overall configuration	2-5
2.2.2 Precautions when operating the data link system	2-7
2.2.3 Data link modules	2-8
3. A TWO-TIER SYSTEM USING THE MELSECNET/B DATA LINK SYSTEM	3-1 ~ 3-7
3.1 Basic Information About the MELSECNET/B Data Link System	3-1
3.1.1 Composition of the MELSECNET/B data link system	3-1
3.1.2 Features of the data link system	3-2
3.2 MELSECNET/B Data Link System	3-5
3.2.1 Overall configuration	3-5
3.2.2 Precautions when operating a data link system	3-6
3.2.3 System devices	3-7
4. COMPOSITION OF A THREE-TIER SYSTEM	4-1 ~ 4-16
4.1 Using the MELSECNET Data Link System to Make a Three-Tier System	4-2
4.1.1 System configuration	4-2
4.1.2 Precautions when using data links	4-4
4.1.3 System devices	4-6
4.2 Data Link System When the Second Tier is MELSECNET and the Third Tier is MELSECNET/B	4-8
4.2.1 System configuration	4-8
4.2.2 Precautions when using data links	4-9
4.2.3 System devices	4-10
4.3 Data Link System When the Second Tier is MELSECNET/B and the Third Tier is MELSECNET	4-12

4.3.1	System configuration	4-12
4.3.2	Precautions when using data link	4-13
4.3.3	System devices	4-15
5.	SPECIFICATIONS	5-1 ~ 5-40
5.1	General Specifications	5-1
5.2	Performance Specifications	5-2
5.3	Functions	5-4
5.3.1	Cyclic transmission function	5-6
5.3.2	Transient transmission function	5-15
5.3.3	Automatic return function	5-18
5.3.4	Loopback function	5-19
5.3.5	Fault detection function	5-23
5.3.6	Self-diagnosis function	5-27
5.3.7	Extensive use of link relays (B) and link registers (W) in a three-tier system	5-28
5.3.8	MELSECNET II mode and MELSECNET II composite mode	5-31
5.4	Fiber-Optic Cable Specifications	5-35
5.4.1	SI-type fiber-optic cable	5-35
5.4.2	How to obtain fiber-optic cables	5-36
5.5	Coaxial Cable	5-37
5.5.1	Coaxial cable	5-37
5.5.2	Connector for the coaxial cable	5-38
5.6	Twisted-Wire Pair Cable	5-40
6.	LINK DATA SEND/RECEIVE PROCESSING AND PROCESSING TIME	6-1 ~ 6-18
6.1	Link Data Communication Processing	6-1
6.1.1	Communication processing outline	6-1
6.1.2	Link refresh execution timing	6-2
6.1.3	Link data during a communication error	6-4
6.2	Transmission Delay Time	6-6
6.2.1	Transmission delay time in a two-tier system	6-7
6.2.2	Link refresh time	6-9
6.2.3	Link data communication time	6-13
6.3	Transmission Delay Time in Three-tier System	6-16
6.4	Time to Access Another Station from an External Device	6-18
7.	LINK PARAMETERS	7-1 ~ 7-75
7.1	Link Parameter Outline	7-1
7.1.1	Link parameters to be set for the MELSECNET mode	7-2
7.1.2	Link parameters to be set for the MELSECNET II mode	7-4
7.1.3	Link parameters to be set for the MELSECNET II composite mode	7-6
7.2	WDT for Link	7-9
7.3	General Link Parameter Information	7-11
7.3.1	Maximum number of link points per station	7-11

7.3.2	Determining the link relay (B) allocation range	7-12
7.3.3	Determining the link register (W) allocation range	7-13
7.3.4	Determining the input (X) and output (Y) allocation range	7-15
7.4	Link Parameters in the MELSECNET Mode	7-16
7.4.1	Device allocation for a local system and link parameter setting example	7-16
7.4.2	Device allocation for a remote I/O system and link parameter setting example	7-22
7.4.3	Device allocation for a local/remote I/O system and link parameter setting example	7-27
7.5	Link Parameters in the MELSECNET II Mode	7-34
7.6	Link Parameters in the MELSECNET II Composite Mode	7-40
7.6.1	Device allocation for a local system	7-40
7.6.2	Device allocation for a remote I/O system	7-41
7.6.3	Device allocation for the local/remote I/O system	7-43
7.6.4	Link parameter setting example	7-46
7.7	Allocating Link Devices for a Three-Tier System	7-52
7.7.1	Common information	7-52
7.7.2	Using the MELSECNET mode in the second tier	7-56
7.7.3	Using the MELSECNET II mode in the second tier	7-58
7.7.4	Using the MELSECNET II composite mode in the second tier	7-60
7.7.5	Link parameter setting example	7-62
7.8	Allocating Inputs and Outputs to the Master Station in a Remote I/O System	7-71
7.8.1	I/O allocation restrictions	7-71
7.8.2	I/O allocation example	7-73
8.	BEFORE STARTING OPERATION	8-1 ~ 8-25
8.1	General Preparatory Steps before Starting Operation	8-1
8.2	Setting the Link Module Station Numbers	8-2
8.2.1	Setting the link module station numbers in the MELSECNET data link system	8-2
8.2.2	Setting the link module station numbers in the MELSECNET/B data link system	8-5
8.3	Setting the Communication Speed (Baud Rate)	8-7
8.4	Fiber-Optic/Coaxial Cable Connection	8-8
8.4.1	Precautions	8-8
8.4.2	Fiber-optic cable connections	8-10
8.4.3	Coaxial cable connection	8-12
8.5	Twisted-Wire Pair Cable Connections	8-14
8.5.1	Precautions when connecting twisted-wire pair cables	8-14
8.5.2	Connecting twisted-wire pair cables	8-15
8.6	Power ON Procedure	8-16
8.7	Self-Diagnosis Function	8-17
8.7.1	Self-loopback test	8-18
8.7.2	Station-to-station test	8-20
8.7.3	Forward loop test and reverse loop test	8-22

9.	PROGRAMMING	9-1 ~ 9-55
9.1	Precautions on Writing Programs	9-1
9.2	Special Link Relays	9-4
9.2.1	Special link relays effective only for the master station	9-4
9.2.2	Special link relays effective only for local stations	9-9
9.3	Special Link Registers	9-12
9.3.1	Special link registers effective only for the master station	9-12
9.3.2	Special link registers effective only for local stations	9-22
9.4	Data Link Program Using Inputs (X) and Outputs (Y)	9-24
9.4.1	MELSECNET data link system	9-24
9.4.2	MELSECNET/B data link system	9-27
9.5	Data Link Program Using Link Relays (B)	9-29
9.5.1	MELSECNET data link system	9-29
9.5.2	MELSECNET/B data link system	9-31
9.6	Data Link Program Using Link Registers (W)	9-33
9.6.1	MELSECNET data link system	9-33
9.6.2	MELSECNET/B data link system	9-35
9.7	Read/Write Program for a Word Device from the Master Station to a Local Station	9-37
9.7.1	MELSECNET data link system	9-37
9.7.2	MELSECNET/B data link system	9-40
9.8	Read/Write Program from a Remote I/O Station to a Special Function Module	9-43
9.8.1	Read program (RFRP instruction)	9-44
9.8.2	Write program (RTOP instruction)	9-48
9.9	Fault Detection Program	9-52
9.9.1	MELSECNET data link system	9-52
9.9.2	MELSECNET/B data link system	9-54
10.	TROUBLESHOOTING	10-1 ~ 10-30
10.1	GPP Link Monitor Function	10-1
10.1.1	Master station link monitor	10-2
10.1.2	Local station link monitor	10-8
10.1.3	Remote I/O station link monitor	10-11
10.2	Monitoring the Special Relays and Special Registers Used for the Link	10-16
10.3	Troubleshooting Flowchart	10-17
10.3.1	General troubleshooting flowchart	10-17
10.3.2	Troubleshooting flowchart for when the data link is disabled throughout the entire system	10-18
10.3.3	Troubleshooting flowchart for when the data link is disabled at a specific station	10-20
10.3.4	Troubleshooting flowchart for when a data send/receive error occurs	10-22
10.3.5	Troubleshooting flowchart for when unspecified number of slave stations become faulty	10-27
10.4	Error LED Indicators	10-28
10.5	Replacing a Faulty Station's Link Module	10-29

1. FOREWORD

This manual describes the performance, functions, and programming procedure for the MELSEC-A Series MELSECNET, MELSECNET/B Data Link System.

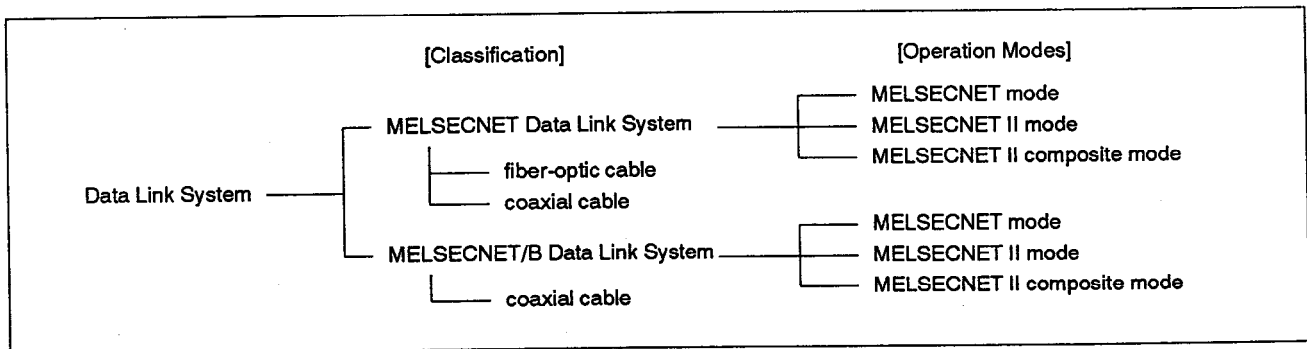
- (1) The MELSECNET Data Link System can use either fiber-optic cable or coaxial cable to link stations. The only difference between a system using fiber-optic cable and a system using coaxial cable is the allowable distance between two adjacent stations. Otherwise, the functions and operations are completely identical.
- (2) The MELSECNET/B Data Link System controls link modules by using inexpensive twisted-wire pair cables.

This system can be made up of MELSEC-A series modules.

- (3) 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. The three modes are as follows:

- 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 to be connected to the Data Link System.



REMARK

In this manual, the term "MELSECNET (II) Data Link System" refers to the system involving all of the available operation modes - MELSECNET mode, MELSECNET II mode, and MELSECNET composite mode.

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 Section 2 and the MELSECNET/B Data Link System is explained in Section 3.

Other sections discuss both systems.

POINT

To avoid misunderstanding, the box in the upper right hand corner of a page indicates which system is being explained, as shown below:

However, when both systems are discussed on the same page, the MELSECNET Data Link is usually being discussed and the explanations (i.e., for a remote I/O station which does not exist in the MELSECNET/B Data Link System) are underlined.

When the MELSECNET/B Data Link System is used, ignore the underlined parts.

A circle is drawn in the box corresponding to the data link system discussed on the page.

Xxxxx	Xxxxx			Xxxxxxx		
Xxxx	xxxx	xxxx	xxxxx	xxxxxx	xxxxx	xxxxx
Xxx	o			o		

7. Xxxx xxx xxxxxxx xxxxxxxx xxx

MELSEC-A

7.1.1 Xxxxxx xxxx xxxxx xxxx xxxxxx xxx

Xxxxx xxx xxxxx xxx xxxx xxxx xxxx xxx xxxxx xxxxx xxx xxxxx xxxxxx
 Xxx xx xxx xxxxxxx xxxxx xxx xxx xxx xxx xxx xxx xxx xxx xxx

(1) Xxxxx xxxx xxxx xxx xx
 Xxxxxx xxx xxx xxx xxx xxx xxx xxxxx xxx xxx xxx xxx xxx

(2) Xxxxx xxxx xxxx xxxxxx
 Xxxxx xxx xxxx xxx xxxxx xxx xxx xxx xxxxx x xx xxxx xxx xxx xxx xx
 xxx xxx xxxx xxxxx xxxxx xxx

(3) Xxxxx xxx xxxx xxx xxxxx xxx xxx
 Xxxxx xxx xxxx xxxxx xxxxx x xxxx xxxxxxx xxxxxx xxxxx xxx xxxxx xxxxx xxx
 xxxxx xxxxx xxxxx xxxxx xxx xxxxx xxx xxx

When the MELSECNET/B Data Link System is used, ignore this part.

1. FOREWORD

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode						
Applicability	o	o	o	o	o	o

MELSEC-A

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 the next section.

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

Used to control slave stations (local stations and remote I/O stations).

A data link system must contain one master station.

(2) Local stations

Used to control I/O and special-function modules of the self by executing a program (to process the link data in B, W, and Y) in the self.

(3) Remote I/O stations

Used to control the I/O and special-functions modules of the self.

Remote I/O stations cannot be used in the MELSECNET/B Data Link System.

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

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

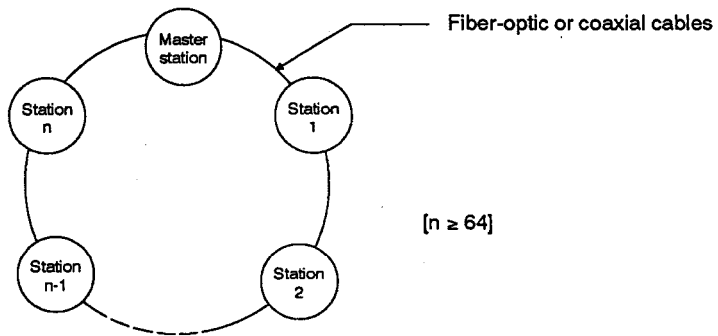
The MELSECNET Data Link System connects link modules using fiber-optic cables or coaxial cables.

The MELSECNET/B Data Link System connects link modules using twisted-wire pair cables.

(1) MELSECNET Data Link System

In the MELSECNET Data Link System, up to 64 slave stations (local and remote I/O stations) can be connected to a master station.

By using fiber-optic or coaxial cables, connect slave station 1 to the master station and slave station 2 to slave station 1..., creating a loop system until station n is connected to the master station.

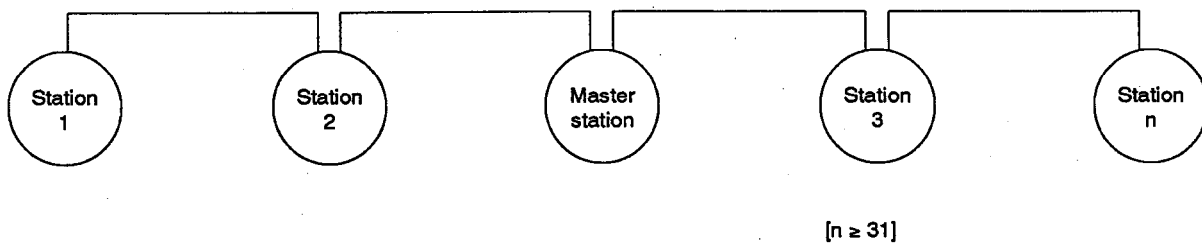


(2) MELSECNET/B Data Link System

In the MELSECNET/B Data Link System, up to 31 local stations can be connected to the master station.

(There are no remote I/O stations in the MELSECNET/B Data Link System.)

The master station and local stations are connected (by twisted-wire pair cables) as shown below:



1.2.3 Performance differences between the MELSECNET and MELSECNET/B data link systems

The following table gives the performance differences between the MELSECNET and MELSECNET/B Data Link Systems:

Table 1.1 Performance Differences between the MELSECNET Data Link System and MELSECNET/B Data Link System

Items	MELSECNET Data Link System		MELSECNET/B Data Link System
	Fiber-Optic Cable Data Link System	Coaxial Cable Data Link System	Twisted-wire Pair Cable Data Link System
Communication speeds	1.25 MBPS		125 KBPS/250 KBPS/ 500 KBPS/1 MBPS
Communication methods	Duplex loop		Bus system
Overall loop distances	Max.10 km (1 km station intervals)	Max.10 km (500 m station intervals)	Varies depending on the communications speed 125 KBPS: 1200 m 250 KBPS: 600 m 500 KBPS: 400 m 1 MBPS: 200 m
Number of connected stations	Max.65 units (1 master station, 64 local/remote I/O stations)		Max.32 units (1 master station, 31 local stations)
Demodulation methods	CMI method		NRZI method
RAS functions	The loopback function when an error or cable disconnection is detected, and the diagnostic function to check the link line of the self.		The diagnostic function to check the link line of the self.
Connector	Two-core optical connector plug (CA9003)	<ul style="list-style-type: none"> • BNC-P-3-Ni, BNC-P-5 equivalent • BNC-P-5DV-SA(01) 	Terminal block
Cable used	S1-200/250	3C-2V, 5C-2V or equivalent	Shielded twisted-wire pair cable
Transmission loss	Max.12 dB/km	—	—
Sending level	-17 to -11 dBm (peak value)	—	—
Receiving level	-32 to -11 dBm (peak value)	—	—

1.2.4 The MELSECNET mode, MELSECNET II mode, and MELSECNET II composite mode

The Data Link System can operate in the MELSECNET mode, 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 independently of the link module used for the master module.

In the MELSECNET II mode, the data link system operates by using an A[]ACPUP21/R21 or an A[]ACPU + AJ71AP21/R21 as the master station and local stations within the range of B/W400 and above.

The following describes the major improvements made to the MELSECNET mode (MELSECNET Data Link System) for the MELSECNET II mode:

- The data link device range was increased from B/W0 through to 3FF (1024 points) to B/W0 through FFF (4096 points) in the MELSECNET II mode.
- The maximum number of link points per station (master station and local station) was increased from 1024 bytes to 2048 bytes in the MELSECNET II mode.
- Connection of remote I/O stations is now impossible in the MELSECNET II mode.

In the MELSECNET II composite mode, the data link system works in much the same way as in the MELSECNET II mode.

In the MELSECNET II composite mode, the data link system can use (a) a link module in the MELSECNET mode, and (b) a remote I/O station.

The following describes the major differences between the three modes:

- (1) Data link modules that can be used as the master station
 - (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 operation.)
 - (b) MELSECNET II mode
MELSECNET (II) mode-compatible data link modules
 - (c) MELSECNET II composite mode
MELSECNET (II) mode-compatible data link modules
- (2) Data link modules that can be used as a local station
 - (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) Possible to connect remote I/O stations

(a) MELSECNET mode

Yes

(b) MELSECNET II mode

No

(c) MELSECNET II composite mode

Yes

(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 here. 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 as a 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) if a MELSECNET-compatible data link module is connected as a local station is B/W0 to 3FF (2048 points).

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

(a) MELSECNET mode

1) Link parameter

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

(b) MELSECNET II mode

1) Link parameter

Two types (first half and second half)

Data link is only possible by setting the first half parameter.

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

Two types (first half and second half)

If only the first half link parameters are set, the data link will function in the same way as 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.

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

- For stations with both first and second link parameters set:

Master station and local station : 2048 bytes/station

The information discussed above is summarized in Table 1.2.

Table 1.2 MELSECNET (II) Data Link Function Overview

Operation Mode		MELSECNET Mode	MELSECNET II Composite Mode	MELSECNET II Mode		
Item						
	Data link modules that can be used as a master station	A0J2HCPUP21/R21 A1CPUP21/R21 A2CPUP21/R21 (S1) A3CPUP21/R21 A1NCPUP21/R21 A2NCPUP21/R21 (S1) A2CCPUP21/R21 A3NCPUP21/R21 A3HCPUP21/R21 A3MCPUP21/R21 A73CPUP21/R21 ACPU + AJ71AP21/R21 A2ACPUP21/R21 (S1) A3ACPUP21/R21	A2ACPUP21/R21 (S1) A3ACPUP21/R21 A2ACPU (S1) + AJ71AP21/R21 A3ACPU + AJ71AP21/R21			
	Data link modules that can be used as a local station	A0J2CPUP23/R23 A0J2HCPUP21/R21 A1CPUP21/R21 A2CPUP21/R21 (S1) A3CPUP21/R21 A1NCPUP21/R21 A2NCPUP21/R21 (S1) A2CCPUP21/R21 A3NCPUP21/R21 A3HCPUP21/R21 A3MCPUP21/R21 A73CPUP21/R21	A2ACPUP21/R21 (S1) A3ACPUP21/R21 ACPU + AJ71AP21/R21	A2ACPUP21/R21 (S1) A3ACPUP21/R21 A2ACPU (S1) + AJ71AP21/R21 A3ACPU + AJ71AP21/R21		
Possible to connect remote I/O stations		Yes	Yes	No		
Device range	Parameter (first half)	X.Y	0 to 7FF	0 to 7FF	0 to 7FF	
		B	0 to 3FF	0 to 3FF	0 to FFF	
		W	0 to 3FF	0 to 3FF	0 to FFF	
	Parameter (second half)	X.Y	—	—	—	
		B	—	α to FFF	α to FFF	
		W	—	α to FFF	α to FFF	
Link parameter type		1 type	2 types (Link parameter first half, second half)	2 types (Link parameter first half, second half)		
Max. number of link points per station	Master/local stations	1024 bytes/station	Setting of only first half link parameters	1024 bytes/station	Setting of only first half link parameters	1024 bytes/station
			Setting of both first and second half link parameters	2048 bytes/station	Setting of both first and second half link parameters	2048 bytes/station
	Remote I/O stations	512 bytes/station		—		

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

1. FOREWORD

MELSEC-A

Operation Mode		MELSECNET/B Data Link System				
		MELSECNET Mode		MELSECNET II Composite Mode		
Item		MELSECNET Mode		MELSECNET II Mode		
Data link modules that can be used as a master station		A1SCPU + A1SJ71T21B A1CPU + AJ71AT21B A2CPU (S1) + AJ71AT21B A3CPU + AJ71AT21B A1NCPUs + AJ71AT21B A2NCPUs (S1) + AJ71AT21B A3NCPUs + AJ71AT21B A3HCPUs + AJ71AT21B A3MCPUs + AJ71AT21B A73CPUs + AJ71AT21B A2ACPU (S1) + AJ71AT21B A3ACPU + AJ71AT21B		A2ACPU + AJ71AT21B A3ACPU + AJ71AT21B		
Data link modules that can be used as a local station		A1SCPU + A1SJ71T21B A1CPU + AJ71AT21B A2CPU (S1) + AJ71AT21B A3CPU + AJ71AT21B A1NCPUs + AJ71AT21B A2NCPUs (S1) + AJ71AT21B A3NCPUs + AJ71AT21B A3HCPUs + AJ71AT21B A3MCPUs + AJ71AT21B A73CPUs + AJ71AT21B A2ACPU (S1) + AJ71AT21B A3ACPU + AJ71AT21B		A2ACPU (S1) + AJ71AT21B A3ACPU + AJ71AT21B		
Possible to connect remote I/O stations		No		No		
Device range	Parameter (first half)	X.Y	0 to 7FF	0 to 7FF	0 to 7FF	
		B	0 to 3FF	0 to 3FF	0 to FFF	
		W	0 to 3FF	0 to 3FF	0 to FFF	
	Parameter (second half)	X.Y	—	—	—	
		B	—	α to FFF	α to FFF	
		W	—	α to FFF	α to FFF	
Link parameter type		1 type		2 types (Link parameter first half, second half)		
Max. number of link points per station	Master/local stations	1024 bytes/station	Setting of only first half link parameters	1024 bytes/station	Setting of only first half link parameters	1024 bytes/station
			Setting of both first and second half link parameters	2048 bytes/station	Setting of both first and second half link parameters	2048 bytes/station
Remote I/O stations		—		—		

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

1.3 Applicable Link Modules and General Names**1.3.1 Applicable link modules****MELSECNET Data Link System****(1) CPU units****(a) Link modules compatible with MELSECNET mode**

A0J2CPUP23/R23	
A0J2HCPUP21/R21	A1CPUP21/R21
A1NCPUP21/R21	A2CPUP21/R21
A2NCPUP21/R21	A2CPUP21/R21-S1
A2CCPUP21/R21	A3CPUP21/R21
A2NCPUP21/R21-S1	
A3NCPUP21/R21	
A3HCPUP21/R21	
A3MCPUP21/R21	
A73CPUP21/R21	

(b) Link modules compatible with MELSECNET II mode

A2ACPUP21/R21
A2ACPUP21/R21-S1
A3ACPUP21/R21

(2) The following link modules can only be used for the MELSECNET Data Link System, installed in an I/O slot of the main or extension base unit:**(a) Link modules compatible with MELSECNET**

AJ71P22/R22 (for master station)
A0J2P25/R25 (for remote I/O station)
AJ72P25/R25 (for remote I/O station)

(b) Link modules compatible with MELSECNET (II)

AJ71AP22/R22 (for master station)
AJ71AP21/R21 (for master station/local station)

MELSECNET/B Data Link System**(1) The following link modules can only be used for the MELSECNET/B Data Link System, installed in an I/O slot of the main or extension base unit:****(a) Link module that supports the MELSECNET mode**

A1SJ71T21B (for master station/local station):
Only used with an A1SCPU

(b) Link module that supports the MELSECNET II mode

AJ71AT21B (for master station/local station)

POINT

Although the following link modules can be connected to the MELSEC-NET (II) data link system, they are not discussed in this manual:

MELSEC-LM

A6BSW-S3, S4, S5 (bypass switch)

Refer to the manual for these link modules for details.

1.3.2 General names of CPU

(1) AnCPU

AnCPU refers to the following CPU modules:

- (a) A1CPU
- (b) A2CPU
- (c) A2CPU-S1
- (d) A3CPU

(2) AnNCP

AnNCP refers to the following link modules:

- (a) A1NCP
- (b) A2NCP
- (c) A2NCP-S1
- (d) A3NCP
- (e) A73CPU

(3) AnACP

AnACP refers to the following link modules:

- (a) A2ACP
- (b) A2ACP-S1
- (c) A3ACP

(4) ACP

ACP refers to all the CPUs listed in items (1), (2), and (3).

(5) AnCPUP21/R21

AnCPUP21/R21 refers to the following link modules:

- (a) A1CPUP21/R21
- (b) A2CPUP21/R21

(c) A2CPUP21/R21-S1

(d) A3CPUP21/R21

(6) AnNCPUP21/R21

AnNCPUP21/R21 refers to the following link modules:

(a) A1NCPUP21/R21

(b) A2NCPUP21/R21

(c) A2NCPUP21/R21-S1

(d) A3NCPUP21/R21

(e) A73CPUP21/R21

(7) AnACPUP21/R21

AnACPUP21/R21 refers to the following link modules:

(a) A2ACPUP21/R21

(b) A2ACPUP21/R21-S1

(c) A3ACPUP21/R21

(8) ACPU

ACPU refers to all of the CPU listed in Items (5), (6), and (7).

2. TWO-TIER SYSTEM IN THE MELSECNET DATA LINK SYSTEM

MELSEC-A

2. TWO-TIER SYSTEM IN THE MELSECNET DATA LINK SYSTEM

This section describes the MELSECNET Data Link System.

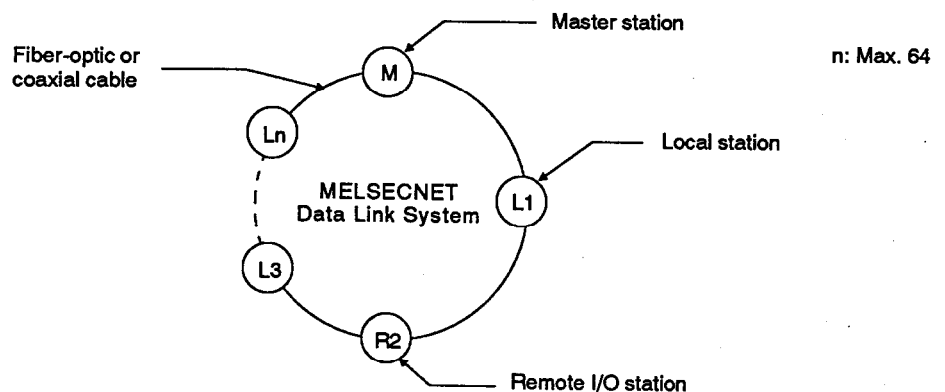
2.1 Outline of the MELSECNET Data Link System

2.1.1 Configuration of the data link system

The MELSECNET Data Link System connects link modules via fiber-optic 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.

Within the total range of 64 stations in total, combinations of local and remote I/O stations can be set without restrictions.



(1) Master station

The master station is the link module which controls the whole MELSECNET Data Link System.

The number of slave stations (Max. 64) connected and the device (B, W, X, Y) range for data linking are set using link parameters at the PC CPU in the master station.

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 PC CPUs are connected in a data link system, local stations are used to increase (a) the number of I/O points, and (b) the program capacity.

(b) Remote I/O stations

Remote I/O stations are used to decrease wiring costs when data must frequently input/output from/to devices that are far away from a PC CPU.

The PC CPU in the master station controls the input and output of remote I/O stations.

2. TWO-TIER SYSTEM IN THE MELSECNET DATA LINK SYSTEM

MELSEC-A

2.1.2 Features of the data link system

(1) Cyclic transmission function

The cyclic transmission function periodically communicates data between a master station and slave stations (local stations and remote I/O stations).

Either 1 : n or 1 : 1 data communications is enabled by using the cyclic transmission function.

(a) 1 : n data communications

This refers to data communications (a) between the master station and all local stations, and (b) 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).

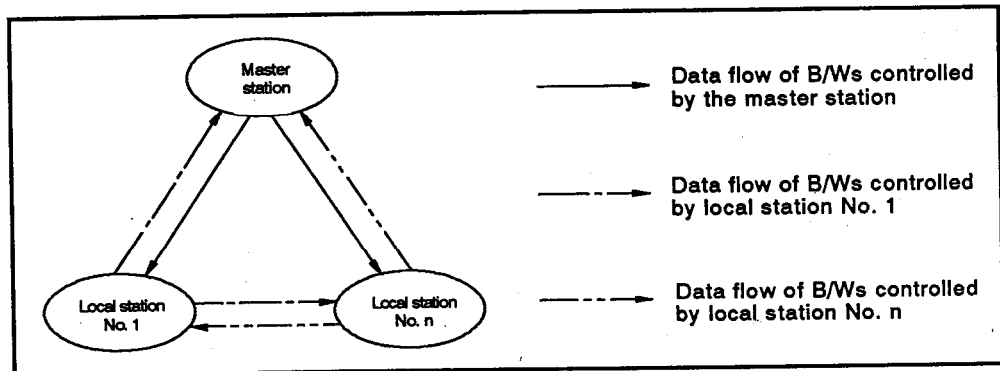


Fig. 2.1 B/W Data Flow in MELSECNET

(b) 1 : 1 data communications

This refers to 1 : 1 data communications (a) between the master station and a local station, and (b) between the master station and a remote I/O station.

ON/OFF data can be communicated using inputs (X) and outputs (Y).

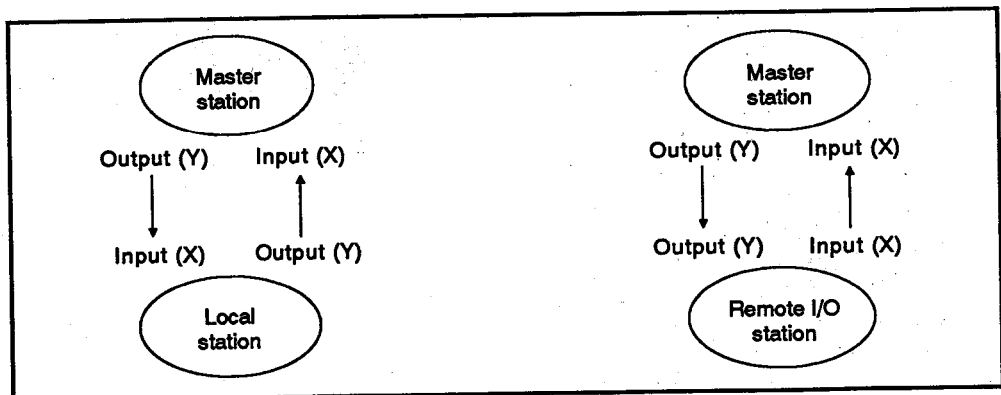


Fig. 2.2 X/Y Data Flow in MELSECNET (II)

(2) Transient transmission function

The transient transmission function reads/writes data from/to a device in a local station by the master station PC CPU or communicates data between a peripheral device connected to a PC CPU and a PC CPU in another station.

The transient transmission function executes the following types of processing:

- (a) Read/write for devices (T, C, D, W) in a local station by the master station PC CPU

LORP and LWTP instructions in a sequence program are used for this processing.

- (b) Read/write for buffer memory in a special function module loaded to a remote I/O station by the master station

RFRP and RTOP instructions in a sequence program are used for this processing.

- (c) Accesses another station from a device such as a peripheral device or special-function module that is connected to the PC CPU.

The accessible station varies depending on which peripheral device or special-function module is installed in the master station, local station, or remote I/O station as shown in Table 2.1.

Table 2.1, however, gives stations which are generally accessible.

The manual of the used peripheral device or special-function module gives details about the functions that can be executed by the peripheral device or special-function module.

Table 2.1 Accessible Stations With a Peripheral Device

	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	Not accessible	Not accessible

(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 fiber-optic 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 (see Section 5.3.4).

(b) Automatic return function

When a slave station (local station, remote I/O station), 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 (See 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 PC 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-diagnosis function

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

(4) Mixing MELSECNET mode-compatible modules and MELSECNET II mode-compatible modules

Modules intended for use in the MELSECNET mode and MELSECNET II mode Data Link System can be used in the MELSECNET Data Link System.

The MELSECNET Data Link System even allows MELSECNET mode-compatible modules and MELSECNET II mode-compatible modules to be used in the same network MELSECNET mode-compatible modules can also be used in the MELSECNET Data Link System.

The MELSECNET Data Link System has parameters for setting its operation mode so that any combination of system configurations is possible.

The MELSECNET Data Link System has the following three operation modes: MELSECNET mode, MELSECNET II mode, and MELSECNET II composite mode.

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

2. TWO-TIER SYSTEM IN THE MELSECNET DATA LINK SYSTEM

MELSEC-A

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 fiber-optic cable or coaxial cable. Local and remote I/O stations are called slave stations.

(2) System configuration

The configuration of the two-tier system is illustrated in Fig. 2.1.

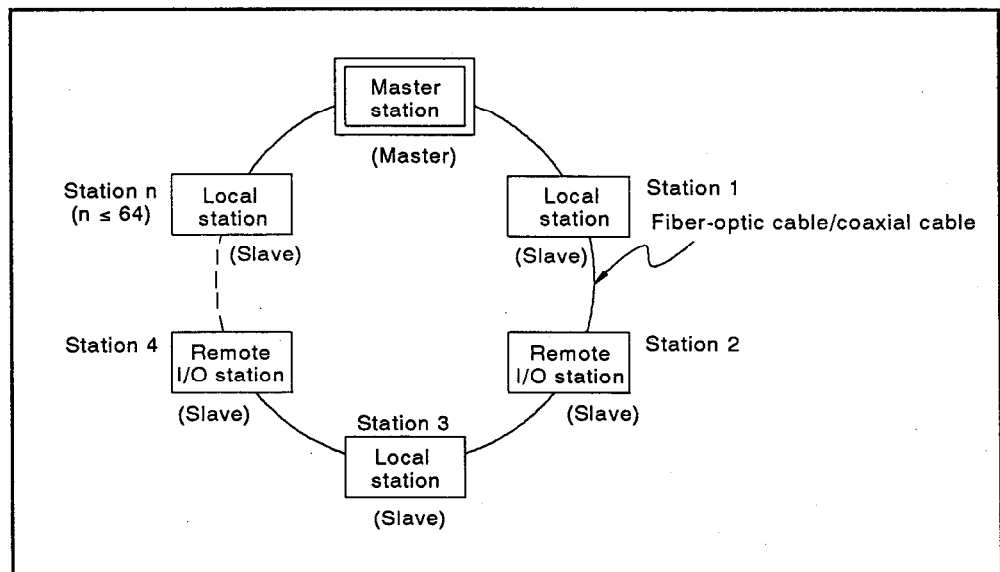


Fig. 2.3 Typical Two-Tier System

POINT

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

2. TWO-TIER SYSTEM IN THE MELSECNET DATA LINK SYSTEM

MELSEC-A

(a) The following table gives the configuration of a master station, local station, and remote I/O station.

Type of Cable	Master and Local Stations		Remote I/O Station
	CPU Module with a Link Function	CPU Module + Link Module	
Fiber-optic cable			
Coaxial cable			

2. TWO-TIER SYSTEM IN THE MELSECNET DATA LINK SYSTEM

MELSEC-A

2.2.2 Precautions when operating the data link system

- (1) Fiber-optic 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. Fiber-optic cable and coaxial cable cannot be mixed.

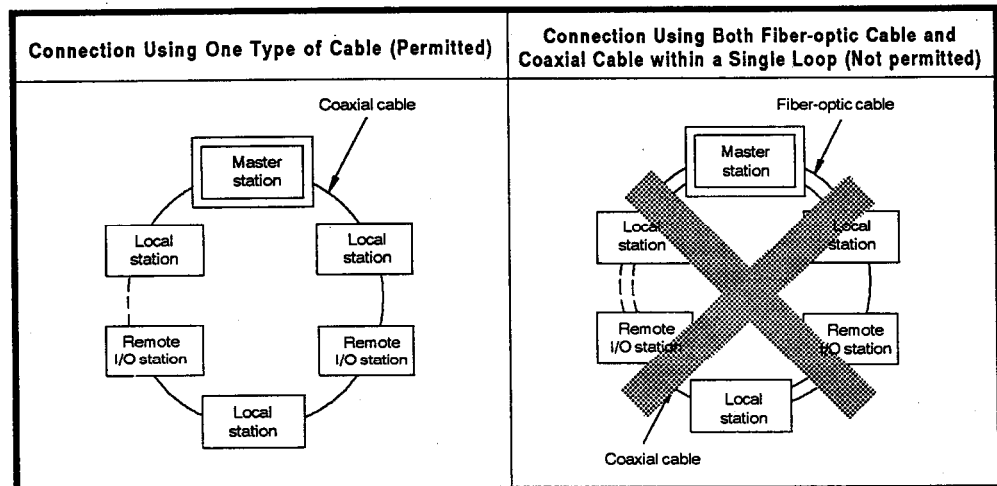


Fig. 2.5 Link Module Connection in Individual Links

- (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. Refer to Section 7.3.1 for more details.

- (3) Link parameter settings

Set the link parameters in the master station to operate the data link system. The link parameters include the number of slave stations connected to the master station, the link device assignments, and the watchdog monitoring time.

- (a) Number of slave stations

The total number of local and remote I/O stations connected in the MELSECNET Data Link System.

- (b) Link device assignment

The range of link devices used for link data communication for each station (master, local, and remote I/O).

- (c) Watchdog monitoring time

The maximum allowable time that local stations and remote I/O stations will take to determine whether the master station is operating normally.

- (4) Operation mode in the MELSECNET data link system

Operation mode is determined according to the link unit which is connected to the MELSECNET data link system and link parameter setting. Section 1.2.4 gives details.

2. TWO-TIER SYSTEM IN THE MELSECNET DATA LINK SYSTEM

MELSEC-A

2.2.3 Data link modules

(1) For a system using fiber-optic cable

The data link modules that can be connected with fiber-optic cable are listed in Table 2.2.

Table 2.2 Data Link Modules Connectable with Fiber-Optic Cable

Module/ Unit	Type	Description	Applicable System									Remark
			Two-tier System									
			*1			*2			*3			
			M	L	R	M	L	M	L	R		
CPU unit	A0J2CPUP23	Program capacity: 7K steps I/O points: 336 points		o						o		For local station only
	A0J2HCPUP21	Program capacity: 8K steps I/O points: 336 points										For master or local station: selection is determined by the setting of the station number setting switch
	A2CCPUP21	Program capacity: 8K steps I/O points: 512 points										
	A1CPUP21	Program capacity: 6K steps I/O points: 256 points										
	A1NCPUP21											
	A2CPUP21	Program capacity: 14K steps I/O points: 512 points	o	o						o		
	A2NCPUP21											
	A2CPUP21-S1	Program capacity: 14K steps I/O points: 1024 points										
	A2NCPUP21-S1											
	A3CPUP21	Program capacity: 30K steps I/O points: 2048 points										
	A3NCPUP21											
	A3HCPUP21											
	A3MCPUP21											
	A73CPUP21											
A2ACPUP21	Program capacity: 14K steps I/O points: 512 points											
A2ACPUP21-S1	Program capacity: 14K steps I/O points: 1024 points	o	o		o	o	o	o	o	o		
A3ACPUP21	Program capacity: 30K steps I/O points: 2048 points											
Data link module	AJ71AP21	A module for constructing a data link when used together with a CPU without a link function (A[]CPU)	o	o		o	o	o	o	o	To be loaded into an I/O slot in the base unit.	
	A0J2P25	Compact module For a remote I/O station										
	AJ72P25	Building-block module For a remote I/O station			o					o		
Program-less monitor device	A6CGT-MP	On-line monitoring module	o	o						o	Cannot be used as the master station for the third tier	

o : Applicable
 *1 : MELSECNET Mode
 *2 : MELSECNET II Mode
 *3 : MELSECNET II Composite Mode

REMARK

1. In Table 2.2, M, L, and R represent the following:

M: Master station
 L: Local station
 R: Remote I/O station

2. TWO-TIER SYSTEM IN THE MELSECNET DATA LINK SYSTEM

MELSEC-A

(2) For a system 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

Module/ Unit	Type	Description	Applicable System									Remark	
			Two-tier System										
			*1			*2			*3				
			M	L	R	M	L	M	L	R			
CPU unit	A0J2CPUR23	Program capacity: 7K steps I/O points: 338 points		o							o		For local station only
	A0J2HCPUR21	Program capacity: 8K steps I/O points: 336 points											For master or local station: selection is determined by the setting of the station number setting switch
	A2CCPUR21	Program capacity: 8K steps I/O points: 512 points											
	A1CPUR21	Program capacity: 6K steps I/O points: 256 points											
	A1NCPUR21												
	A2CPUR21	Program capacity: 14K steps I/O points: 512 points											
	A2NCPUR21		o	o							o		
	A2CPUR21-S1	Program capacity: 14K steps I/O points: 1024 points											
	A2NCPUR21-S1												
	A3CPUR21	Program capacity: 30K steps I/O points: 2048 points											
	A3NCPUR21												
	A3HCPUR21												
	A3MCPUR21												
	A73CPUR21												
A2ACPUR21	Program capacity: 14K steps I/O points: 512 points												
A2ACPUR21-S1	Program capacity: 14K steps I/O points: 1024 points	o	o		o	o	o	o	o	o			
A3ACPUR21	Program capacity: 30K steps I/O points: 2048 points												
Data link module	AJ71AR21	Building block-type module for the master station of a three-tier system.	o	o		o	o	o	o	o			To be loaded into an I/O slot in the base unit.
	A0J2R25	Compact module For a remote I/O station											
	AJ72R25	Building-block module For a remote I/O station			o							o	
Program-less monitor device	A6CGT-MP	On-line monitoring module	o	o							o		Cannot be used as the master station for the third tier

o : Applicable
 *1 : MELSECNET Mode
 *2 : MELSECNET II Mode
 *3 : MELSECNET II Composite Mode

REMARK

1. In Table 2.2, M, L, and R represent the following:

- M: Master station
- L: Local station
- R: Remote I/O station

3. A TWO-TIER SYSTEM USING THE MELSECNET/B DATA LINK SYSTEM

MELSEC-A

3. A TWO-TIER SYSTEM USING THE MELSECNET/B DATA LINK SYSTEM

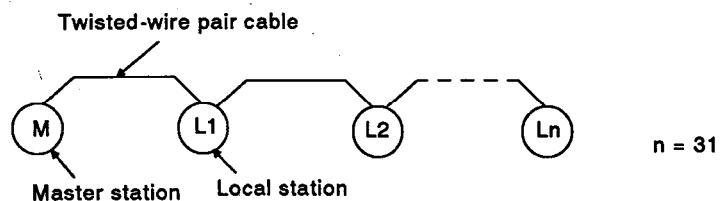
This section explains the MELSECNET/B Data Link System.

3.1 Basic Information About the MELSECNET/B Data Link System

3.1.1 Composition of the MELSECNET/B data link system

The MELSECNET/B Data Link System connects link modules using twisted-wire pair cables.

Up to 31 local stations can be used in a link which has one link module as the master station.



(1) Master station

The link module that controls the whole MELSECNET/B Data Link System is called a master station.

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 PC 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

Local stations are the only kind of slave station.

When two or more PC CPUs are connected in a data link system, local stations are used to increase (a) the number of I/O points, and (b) the program capacity.

3. A TWO-TIER SYSTEM USING THE MELSECNET/B DATA LINK SYSTEM

MELSEC-A

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 function periodically communicates data between a master station and slave stations (local stations).

Either 1 : n or 1 : 1 data communications is enabled by using the cyclic transmission function.

(a) 1 : n data communications

This refers to data communications (a) between the master station and all local stations, and (b) 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).

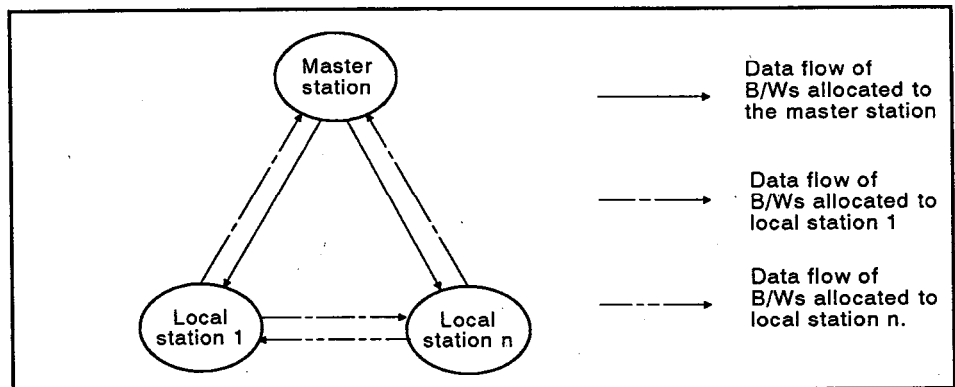


Fig. 3.1 B/W Data Flow

(b) 1 : 1 data communications

This refers to 1 : 1 data communications between a master station and a local station.

ON/OFF data can be communicated using inputs (X) and outputs (Y).

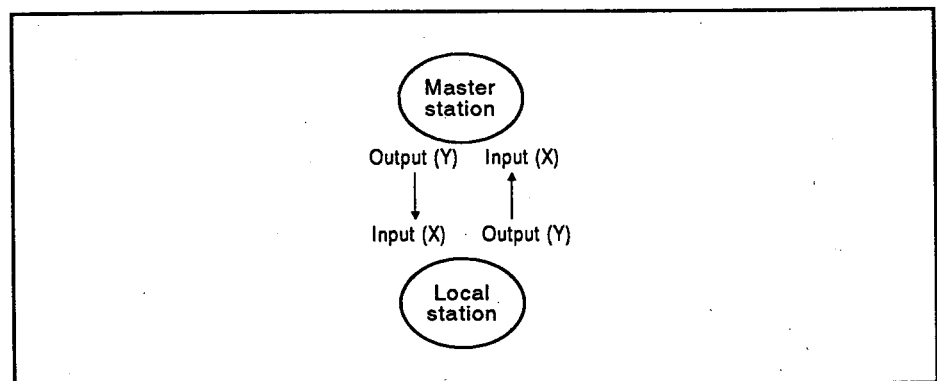


Fig. 3.2 Input (X) and Output (Y) Data Communications

3. A TWO-TIER SYSTEM USING THE MELSECNET/B DATA LINK SYSTEM

MELSEC-A

(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 PC CPU, and (b) communicates data between a peripheral device connected to a PC CPU and a PC 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 PC CPU.

LRDP/LWTP instructions in a sequence program are used for this processing at the master station.

(b) 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 PC CPU.

As Table 3.1 shows, the accessible station varies depending on the peripheral device or special-function module installed in a master or local 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

	Master Station	Local Station
Master station	Accessible	Accessible
Local station	Accessible	Not accessible

3. A TWO-TIER SYSTEM USING THE MELSECNET/B DATA LINK SYSTEM

MELSEC-A

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

(a) Automatic online 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 (see 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 PC CPU.

The data link operating state (error detection) can be checked by reading the data stored in the special relays (M) and special registers (D).

- 2) The data link operating state (error detection) can also be checked by using the link monitor function at a peripheral device (A6GPP, A6PHP, or A6HGP).

(c) Self-diagnosis function

The self-diagnosis function of the data link module checks the link module hardware and twisted-wire 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 125K bps, 250K bps, 500K bps, or 1M bps.

The total link distance can be changed by switching the communication speed.

3. A TWO-TIER SYSTEM USING THE MELSECNET/B DATA LINK SYSTEM

MELSEC-A

3.2 MELSECNET/B Data Link System

3.2.1 Overall configuration

(1) Two-tier system

In a two-tier system, up to 31 local stations can be connected to a master station by twisted-wire pair cables.

In a two-tier system, the relationship between a master station and local stations is analogous to a parent/child relationship.

(2) System configuration

Fig. 3.4 shows the system configuration of a two-tier system.

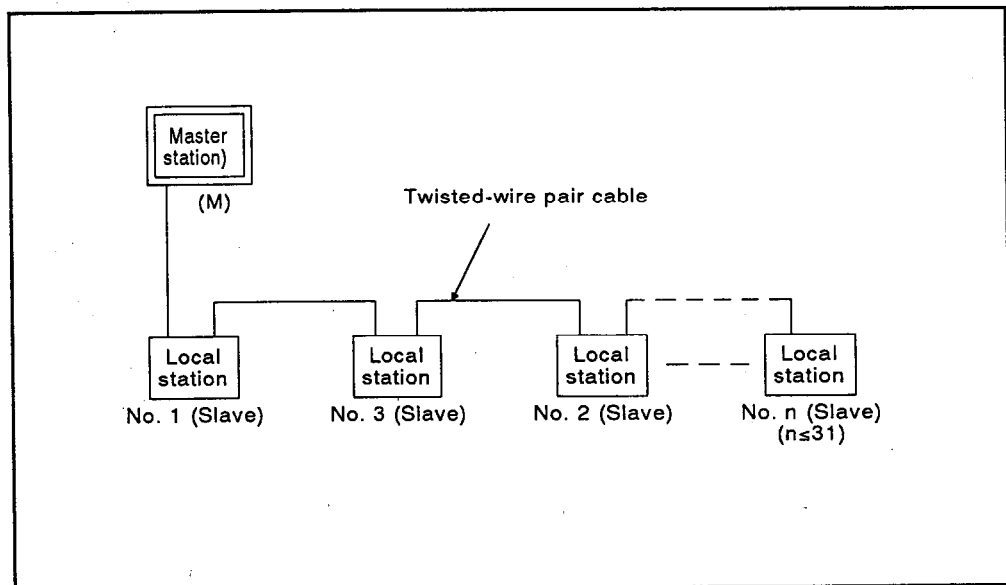


Fig. 3.3 Two-Tier System

POINTS

- (1) Remote I/O stations cannot be connected to a MELSECNET/B Data Link System.
- (2) The order of all stations (including master stations) can be freely decided in the MELSECNET/B Data Link System.

3. A TWO-TIER SYSTEM USING THE MELSECNET/B DATA LINK SYSTEM

MELSEC-A

3.2.2 Precautions when operating a data link system

This section explains the precautions to take when operating a data link system.

(1) Number of link device points for one station

The number of link devices (X, Y, B, W) points that can be used at a local station is limited (see Section 7.3.1).

(2) Link parameter settings

Set the link parameters in the master station to operate the data link system.

The link parameters include the number of slave stations connected in the MELSECNET/B Data Link System, the link device allocations, and the watchdog monitoring time.

(a) Number of slave stations

The total number of local stations connected in the MELSECNET/B Data Link System.

(b) Link device allocations

The range of link devices used for data communications is set at each master and local station (see Section 7).

(c) Watchdog monitoring time

The maximum allowable time that local stations can take to determine whether a master station is operating normally (see Section 7.2).

(3) The operating mode of a MELSECNET/B Data Link System

The operating mode must be determined by the type of link modules used and the link parameter settings (see Section 1.2.4).

(4) Twisted-wire pair cable

The twisted-wire pair cable used for a MELSECNET/B Data Link System is KNPEV-SB 0.5SQ X 1P (see Section 5.6).

3. A TWO-TIER SYSTEM USING THE MELSECNET/B DATA LINK SYSTEM

MELSEC-A

3.2.3 System devices

Table 3.2 shows the data link modules that can be used in the MELSEC-NET/B(II) Data Link System.

Table 3.2 Data Link Modules

O: Available

Data Link Module	CPU Module	Specifications	Two-Tier Systems						Remarks
			MELSEC-NET Mode		MELSEC-NET II Mode		MELSEC-NET II Composite Mode		
			M station	L station	M station	L station	M station	L station	
AJ71AT21B	A1CPU	Program capacity: 6K steps Number of I/O points: 256							Use the station number setting switch to set master and local stations.
	A1NCP								
	A2CPU	Program capacity: 14K steps Number of I/O points: 512							
	A2NCP								
	A2CPU-S1	Program capacity: 14K steps Number of I/O points: 1024	O	O				O	
	A2NCP-S1								
	A3CPU	Program capacity: 30K steps Number of I/O points: 2048							
	A3NCP								
	A3HCP								
	A3MCP								
	A73CPU								
	A2ACPU	Program capacity: 14K steps Number of I/O points: 512							
	A2ACPU-S1	Program capacity: 14K steps Number of I/O points: 1024	O	O	O	O	O	O	
A3ACPU	Program capacity: 30K steps Number of I/O points: 2048								
A1SJ71T21B	A1SCPU	Program capacity: 8K steps Number of I/O points: 256	O	O				O	

REMARK

In this table, M stands for master station and L stands for local station.

4. COMPOSITION OF A THREE-TIER SYSTEM

In a three-tier system, a local station in the second tier is used as the master station for the third tier.

MELSECNET Data Link Systems and MELSECNET/B Data Link Systems can be used for the second and the third tiers. The allowable combinations are shown in Fig. 4.1 below.

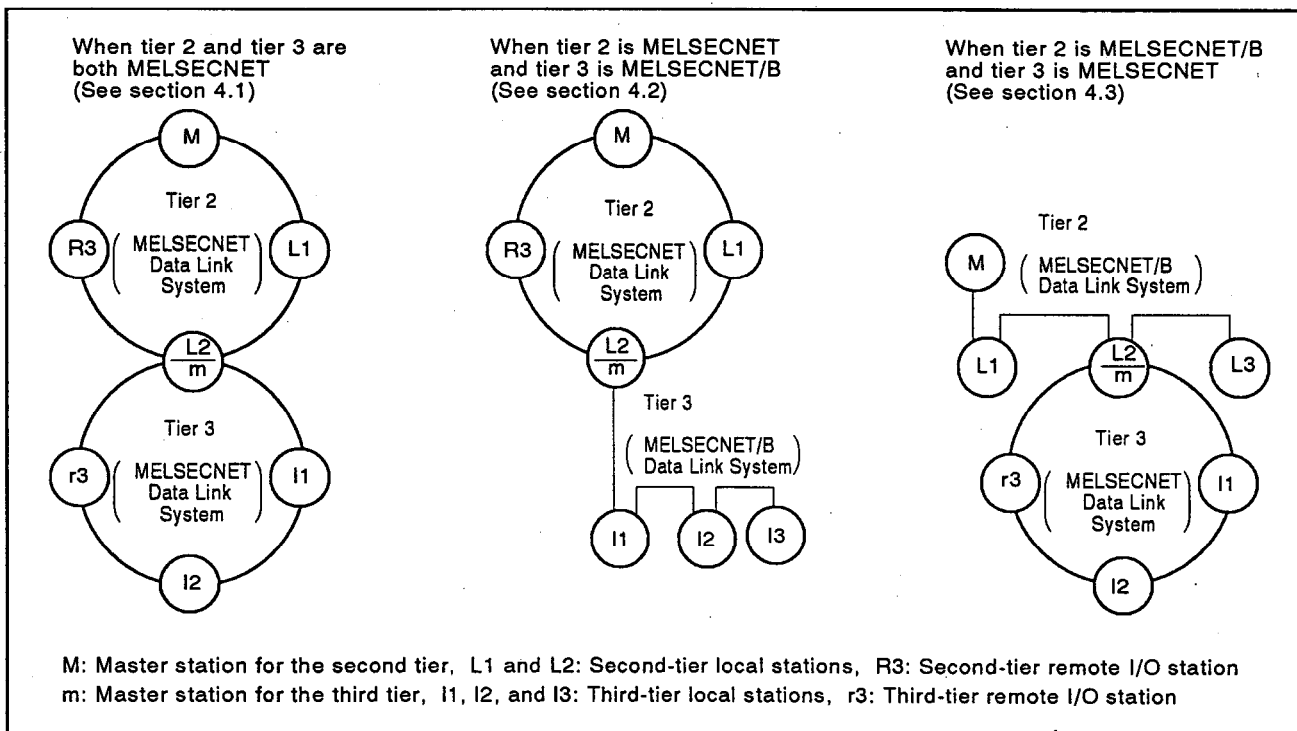


Fig. 4.1 Three-Tier Systems

POINTS

- (1) A three-tier system cannot be composed of just MELSECNET/B Data Link Systems.
- (2) Third-tier local and remote I/O stations are called sub-slave stations and are controlled by the master station for the third tier.

4. COMPOSITION OF A THREE-TIER SYSTEM

MELSEC-A

4.1 Using the MELSECNET Data Link System to Make a Three-Tier System

When MELSECNET Data Link Systems are used for the second and third tiers, fiber-optic or coaxial cables are used for connecting the stations.

- (1) Up to 64 local and remote I/O stations can be connected to the master station for the second tier.
- (2) Up to 64 local and remote I/O stations can be connected in the third tier when a second-tier local station is used as the master station for the third tier.

4.1.1 System configuration

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

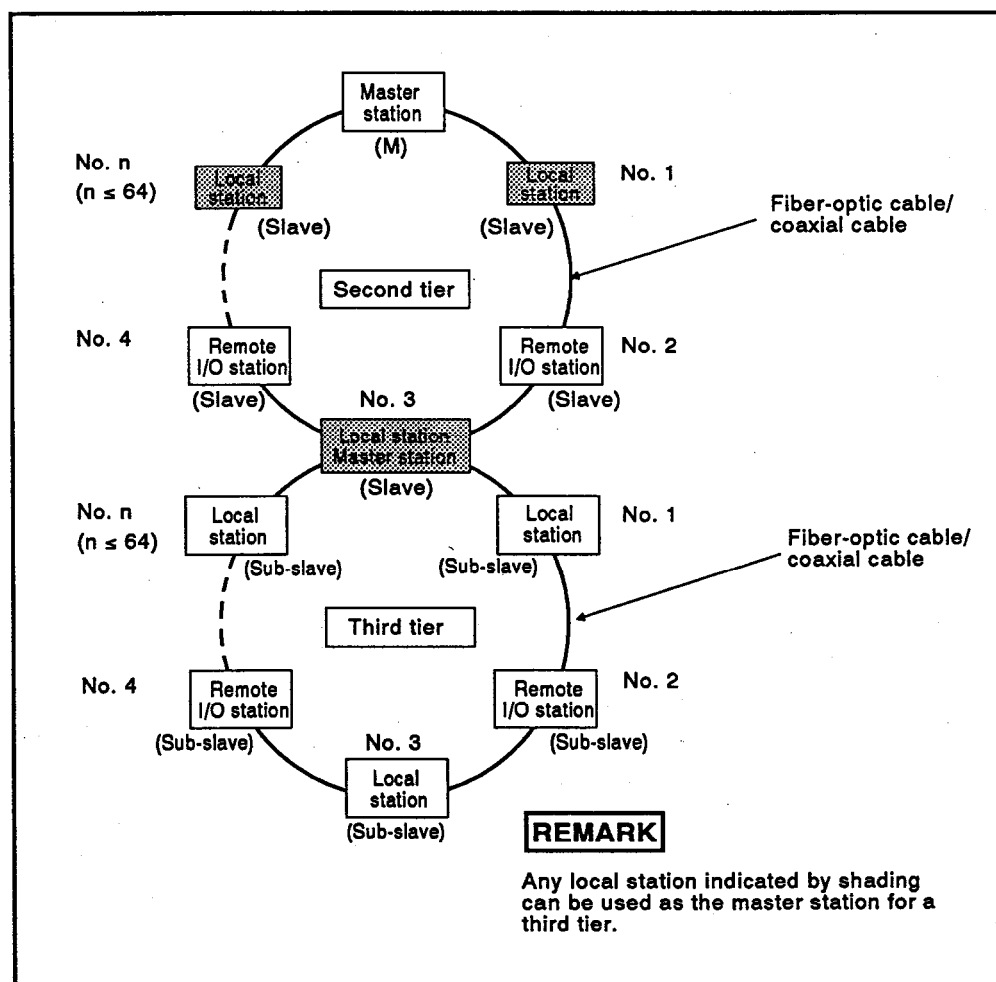


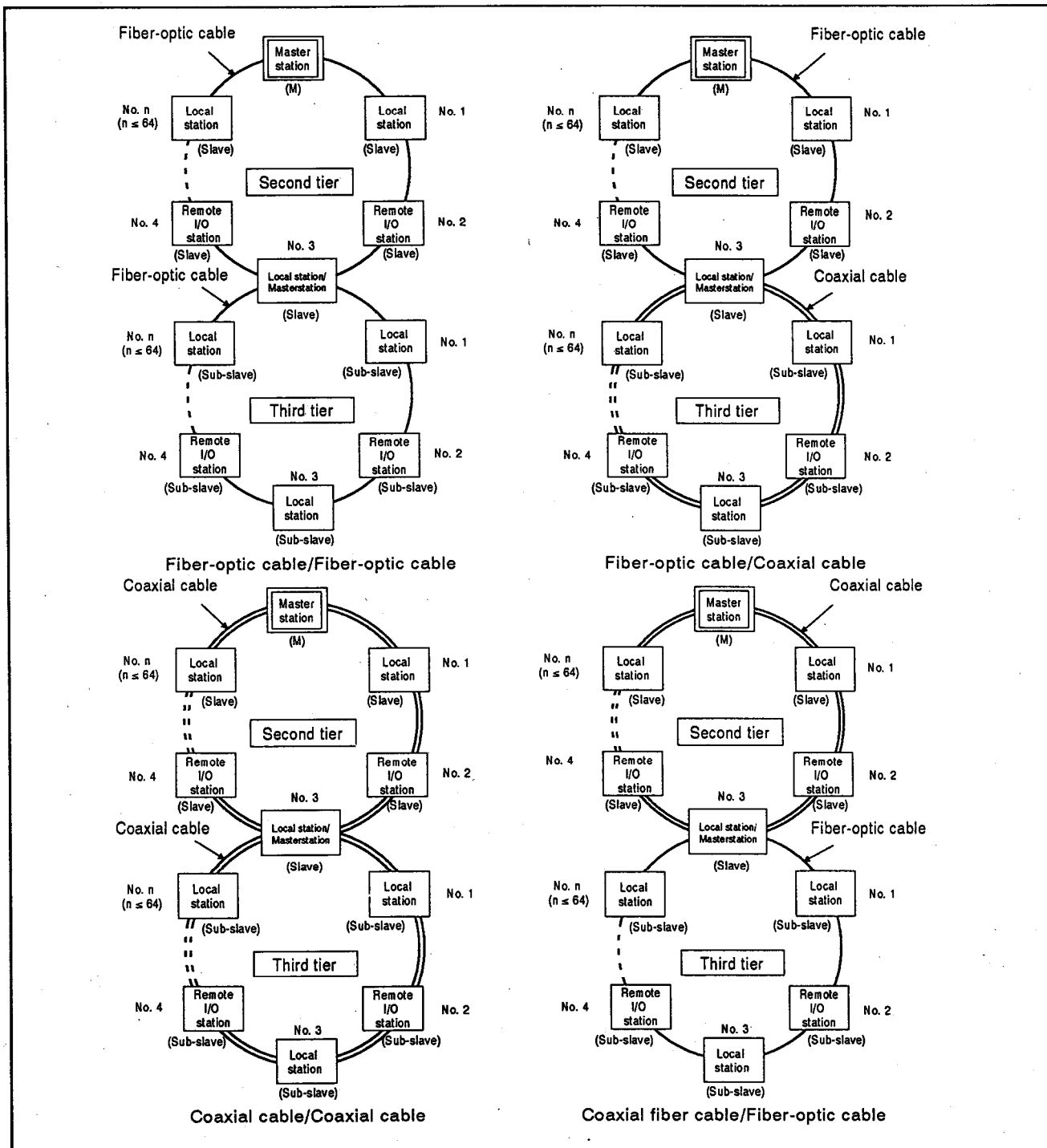
Fig. 4.2 MELSECNET Three-Tier System

4. COMPOSITION OF A THREE-TIER SYSTEM

MELSEC-A

In a three-tier system, the second and third tiers can use both fiber-optic and coaxial cables.

Combinations of fiber-optic and coaxial cables classified by tier are shown below.



POINTS

- (1) The maximum number of tiers in a MELSECNET Data Link System is three.
- (2) Remote I/O stations cannot be connected when the MELSECNET II mode is used.

4. COMPOSITION OF A THREE-TIER SYSTEM

MELSEC-A

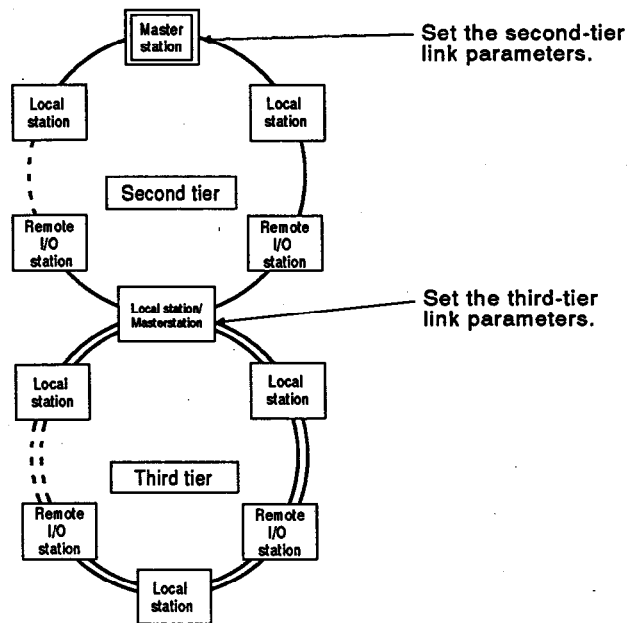
4.1.2 Precautions when using data links

This section explains the precautions to take when making a three-tier system using MELSECNET data links.

(1) Setting link parameters

In a three-tier system, it is necessary to set link parameters at both CPU modules in the master stations for the second and third tiers.

Sections 5.3.7 and 7 give details about setting link parameters.

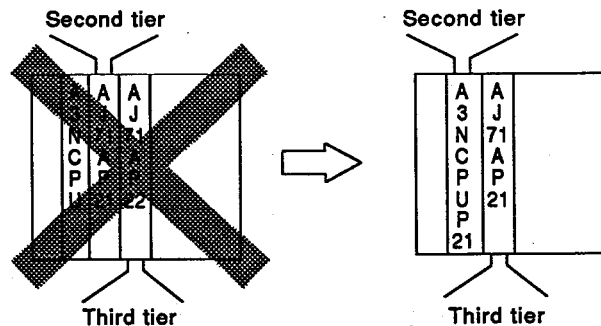


(2) Limitations on link modules

Any of the link modules listed below can be used with a CPU module.

However, when constructing a three-tier system, only one of these link modules can be used with a CPU module which has a link function.

- AJ71AP21
- AJ71AP22
- AJ71P22
- AJ71AR21
- AJ71AR22
- AJ71R22

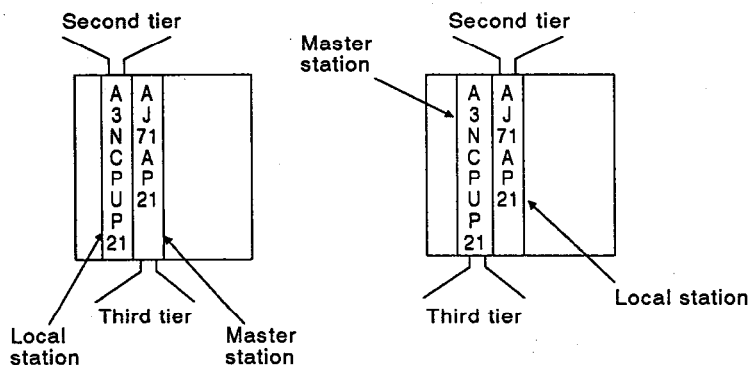


4. COMPOSITION OF A THREE-TIER SYSTEM

MELSEC-A

- (3) When a CPU module which has a link function is used as a master station

When a CPU module which has a link function is used with an AJ71AP21/R21 in a three-tier system, the CPU module which has the link function can be used as a master station and the AJ71AP21/R21 can be used as a local station.



An A[]CPUP21/R21 or A[]ACPUP21/R21 whose model is as given below (or is later) can be used as a master station for the third tier.

(CPU modules with a link function which are older than the models given below can only be used as a local station.)

POINT

Three-tier system cannot be constructed using an A[]CPUP21/R21 whose model is as given below or before.

When constructing a three-tier system using an A[]ACPUP21/R21 whose model is as given below or before, it can only be used as a local station for the second tier.

CPU Modules With a Link Function	Model	CPU Modules With a Link Function	Model
A1CPUP21	602SE	A2ACPUP21	107CX
A1CPUR21	602YE	A2ACPUR21	107BX
A2CPUP21	602EE	A2ACPUP21-S1	107BY
A2CPUR21	602GE	A2ACPUR21-S1	107BY
A3CPUP21	602DE	A3ACPUP21	107CZ
A3CPUR21	602GE	A3ACPUR21	107BZ

4. COMPOSITION OF A THREE-TIER SYSTEM

MELSEC-A

4.1.3 System devices

Table 4.1 Link Modules Which Can be Used in a Three-Tier System

O: Available

Article Name	Type of Module	Applicable System															Remarks				
		MELSECNET Data Links																			
		Second Tier									Third Tier										
		MELSECNET Mode			MELSECNET II Mode			MELSECNET II Composite Mode			MELSECNET Mode			MELSECNET II Mode				MELSECNET II Composite Mode			
		M station	L station	R station	M station	L station	R station	M station	L station	R station	M station	L station	R station	M station	L station	R station		M station	L station	R station	
CPU module with a link function	A0J2CPUP23		O															O	Only for local stations		
	A0J2CPUR23																				
	A0J2HCPUP21																		These cannot be used as a master station for the third tier.		
	A0J2HCPUR21	O	O																	O	
	A2CCPUP21																				
	A2CCPUR21																				
	A1CPUP21																				
	A1CPUR21																				
	A1NCPUP21																				
	A1NCPUR21																				
	A2CPUP21																				
	A2CPUR21																				
	A2NCPUP21																				
	A2NCPUR21																				
	A2CPUP21-S1																				
	A2CPUR21-S1																				
	A2NCPUP21-S1																				
	A2NCPUR21-S1	O	O																	O	Use the station number setting switch to set the selection of master and local stations.
	A3CPUP21																				
	A3CPUR21																				
	A3NCPUP21																				
	A3NCPUR21																				
	A3HCPUP21																				
	A3HCPUR21																				
	A3MCPUP21																				
	A3MCPUR21																				
	A73CPUP21																				
	A73CPUR21																				
	A2ACPUP21																				
	A2ACPUR21																				
A2ACPUP21-S1	O	O																			
A2ACPUR21-S1																					
A3ACPUP21																					
A3ACPUR21																					

4. COMPOSITION OF A THREE-TIER SYSTEM

MELSEC-A

Table 4.1 Link Modules Which Can be Used in a Three-Tier System

O: Available

Article Name	Type of Module	Applicable System															Remarks			
		MELSECNET Data Links																		
		Second Tier									Third Tier									
		MELSECNET Mode			MELSECNET II Mode			MELSECNET II Composite Mode			MELSECNET Mode			MELSECNET II Mode				MELSECNET II Composite Mode		
		M station	L station	R station	M station	L station	R station	M station	L station	R station	M station	L station	R station	M station	L station	R station		M station	L station	R station
CPU module + Link module	A1CPU																			Use the station number setting switch to set the selection of master and local stations.
	A1SCPU																			
	A1NCPU																			
	A2CPU																			
	A2NCPU																			
	A2CPU-S1																			
	A2NCPU-S1																			
	A3CPU																			
	A3NCPU																			
	A3HCPU																			
	A3MCPUCPU																			
	A73CPU																			
	A2ACPU																			
	A2ACPU-S1																			
A2ACPU																				
Link module	AJ71AP21																			Installed in the I/O slots of a base unit.
	AJ71AR21																			
	AJ71P22																			
	AJ71R22																			
	AJ71AP22																			
	AJ71AR22																			
	A0J2P25																			
	A0J2R25																			
	AJ72P25																			
	AJ72R25																			
Programless monitor device	A6CGT-MP																			These cannot be used as a master station for the third tier.
	A6CGT-MR																			

4. COMPOSITION OF A THREE-TIER SYSTEM

MELSEC-A

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

When 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 by fiber-optic cables or coaxial cables, and the third tier is connected by twisted-wire pair cables.

- (1) Up to 64 local and remote I/O stations can be connected to a master station for the second tier.
- (2) Up to 31 local stations can be connected in the third tier when a second-tier local station is used as the master station for the third tier.

4.2.1 System configuration

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

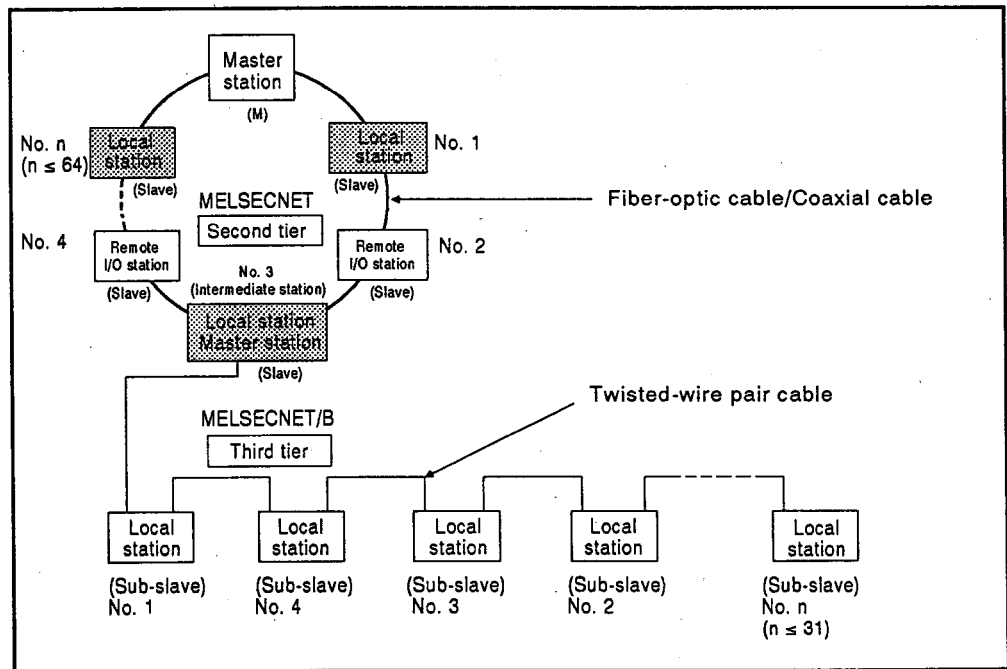


Fig. 4.3 Three-Tier System When the Second Tier is a MELSECNET Data Link System

POINTS

- (1) Remote I/O stations cannot be connected to a MELSECNET/B Data Link System.
- (2) The order of all stations (including master stations) can be freely designated in a MELSECNET/B Data Link System.

4. COMPOSITION OF A THREE-TIER SYSTEM

MELSEC-A

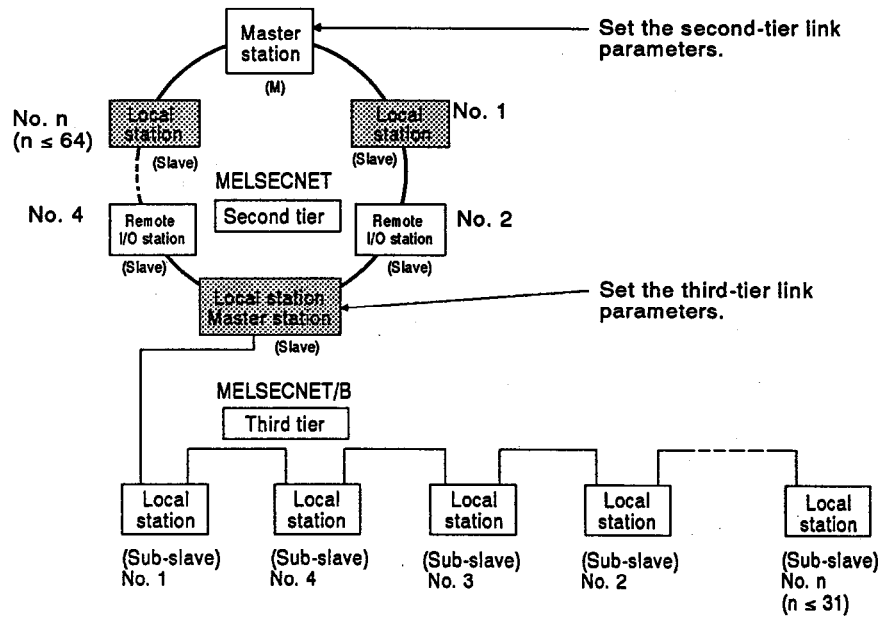
4.2.2 Precautions when using data links

This section explains the precautions to take when making a three-tier system.

(1) Setting link parameters

In a three-tier system, it is necessary to set link parameters at both CPU modules in the master stations for the second and third tiers.

Sections 5.3.7 and 7 give details about setting link parameters.

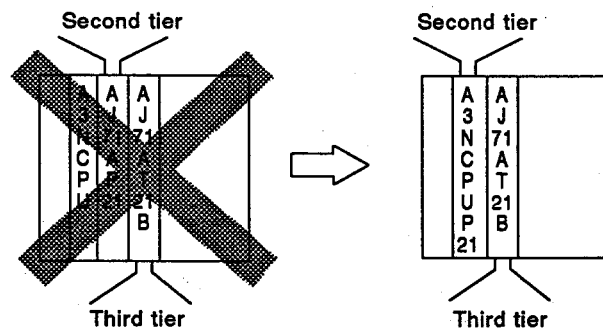


(2) Limitations on link modules

Any of the link modules listed below can be used with a CPU module.

However, when constructing a three-tier system, only one of these link modules can be used with a CPU module which has a link function.

- AJ71AP21
- AJ71AP22
- AJ71P22
- AJ71AR21
- AJ71AR22
- AJ71R22
- AJ71AT21B
- A1SJ71T21B



4. COMPOSITION OF A THREE-TIER SYSTEM

MELSEC-A

4.2.3 System devices

Table 4.2 Link Modules Which Can be Used in a Three-Tier System

O: Available

Article Name	Type of Module	Applicable System															Remarks																	
		MELSECNET Data Links									MELSECNET/B Data Links																							
		Second Tier									Third Tier																							
		MELSECNET Mode			MELSECNET II Mode			MELSECNET II Composite Mode			MELSECNET Mode			MELSECNET II Mode				MELSECNET II Composite Mode																
		M station	L station	R station	M station	L station	M station	M station	L station	R station	M station	L station	R station	M station	L station	M station		M station	L station	R station														
CPU module with a link function	A0J2CPUP23		O																														Only for local stations	
	A0J2CPUR23																																	
	A0J2HCPUP21																																	
	A0J2HCPUR21																																	
	A2CCPUP21	O	O																															
	A2CCPUR21																																	
	A1CPUP21																																	
	A1CPUR21																																	
	A1NCPUP21																																	
	A1NCPUR21																																	
	A2CPUP21																																	
	A2CPUR21																																	
	A2NCPUP21																																	
	A2NCPUR21																																	
	A2CPUP21-S1																																	
	A2CPUR21-S1																																	
	A2NCPUP21-S1																																	
	A2NCPUR21-S1	O	O																															
	A3CPUP21																																	
	A3CPUR21																																	
	A3NCPUP21																																	
	A3NCPUR21																																	
	A3HCPUP21																																	
	A3HCPUR21																																	
	A3MCPUP21																																	
	A3MCPUR21																																	
	A73CPUP21																																	
	A73CPUR21																																	
	A2ACPUP21																																	
	A2ACPUR21																																	
A2ACPUP21-S1																																		
A2ACPUR21-S1	O	O				O	O			O	O																							
A3ACPUP21																																		
A3ACPUR21																																		

4. COMPOSITION OF A THREE-TIER SYSTEM

MELSEC-A

Table 4.2 Link Modules Which Can be Used in a Three-Tier System

O: Available

Article Name	Type of Module	Applicable System															Remarks						
		MELSECNET Data Links									MELSECNET/B Data Links												
		Second Tier									Third Tier												
		MELSECNET Mode			MELSECNET II Mode			MELSECNET II Composite Mode			MELSECNET Mode			MELSECNET II Mode				MELSECNET II Composite Mode					
		M station	L station	R station	M station	L station	R station	M station	L station	R station	M station	L station	R station	M station	L station	R station		M station	L station	R station			
CPU module + Link module	A1CPU	AJ71AP21/R21																			Use the station number setting switch to set the selection of master and local stations.		
	A1SCPU																						
	A1NCPU																						
	A2CPU																						
	A2NCPU																						
	A2CPU-S1																						
	A2NCPU-S1																						
	A3CPU																						
	A3NCPU																						
	A3HCPU																						
	A3MCPU																						
	A73CPU																						
	A2ACPU		AJ71AP21/R21																				
	A2ACPU-S1																						
	A3ACPU																						
A1SCPU	A1S71T21B																						
A1CPU	AJ71AT21B																						
A1NCPU																							
A2CPU																							
A2NCPU																							
A2CPU-S1																							
A2NCPU-S1																							
A3CPU																							
A3NCPU																							
A3HCPU																							
A3MCPU																							
A73CPU																							
Link module		A2ACPU	AJ71AT21B																				
		A2ACPU-S1																					
		A3ACPU																					
		AJ71AT21B																			Installed in the I/O slots of a base unit.		
	A0J2P25																						
	A0J2R25																						
	AJ72P25																						
AJ72R25																							
Programless monitor device	A6CGT-MP																						
	A6CGT-MR																			These cannot be used as a master station for the third tier.			

4. COMPOSITION OF A THREE-TIER SYSTEM

MELSEC-A

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

When 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 by twisted-wire pair cables, and the third tier is connected by fiber-optic cables or coaxial cables.

- (1) Up to 31 local stations can be connected to a master station for the second tier.
- (2) Up to 31 local stations can be connected in the third tier when a second-tier local station is used as the master station for the third tier.

4.3.1 System configuration

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

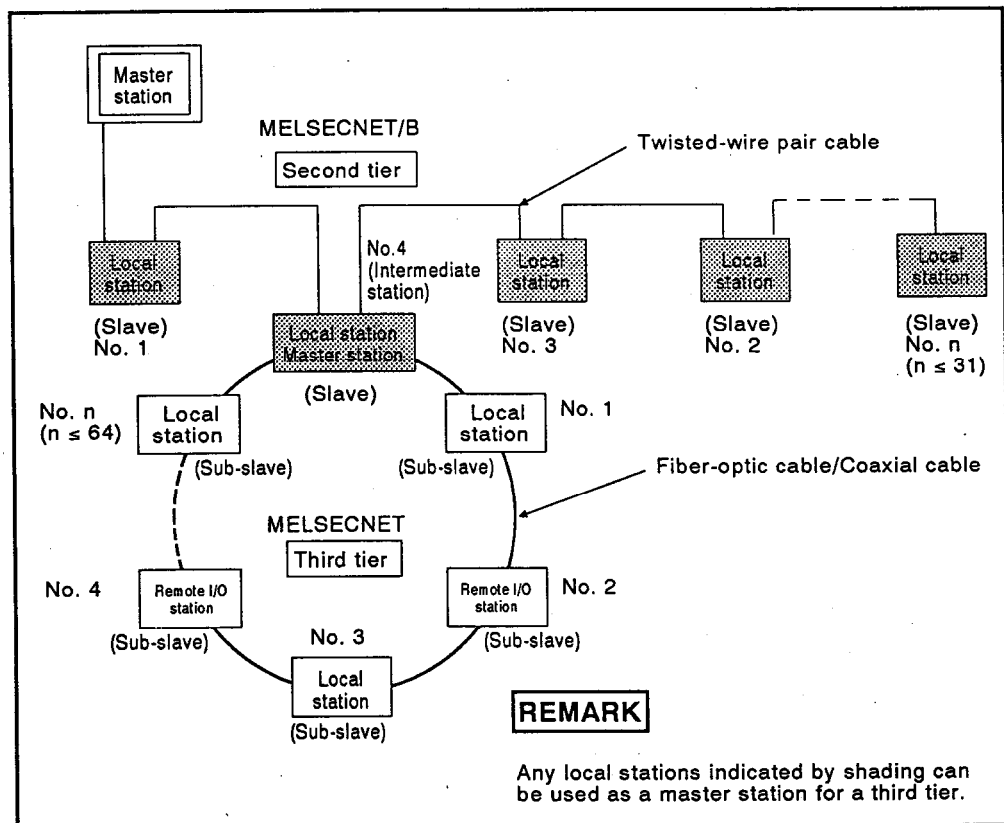


Fig. 4.4 Three-Tier System When the Second Tier is a MELSECNET/B Data Link System

POINTS

- (1) Remote I/O stations cannot be connected to a MELSECNET/B Data Link System.
- (2) The order of all stations (including master stations) can be freely designated in a MELSECNET/B Data Link System.

4. COMPOSITION OF A THREE-TIER SYSTEM

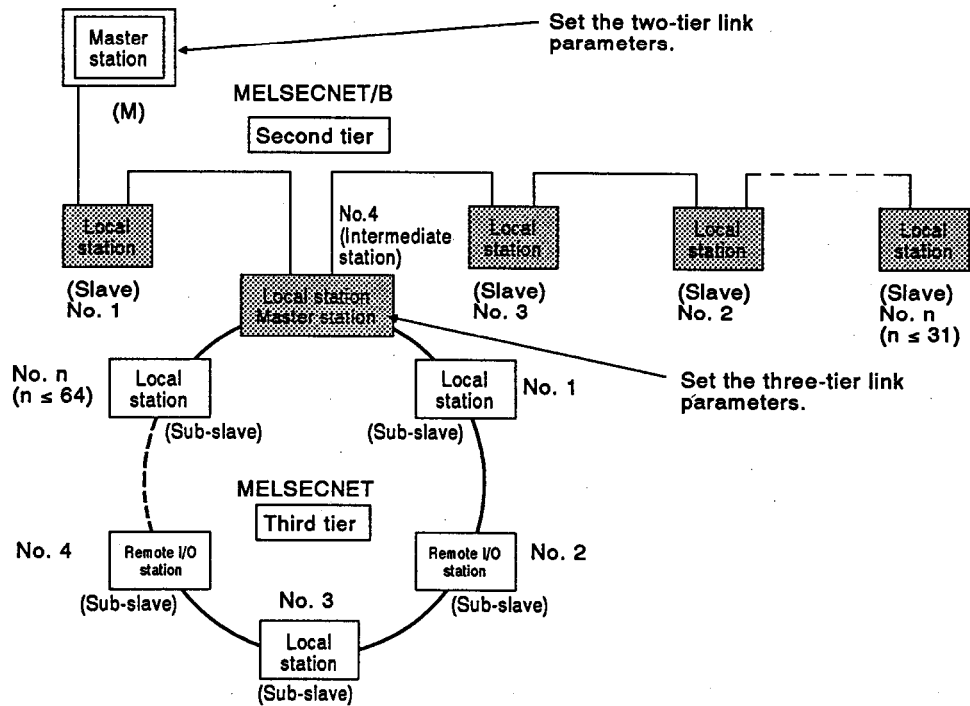
4.3.2 Precautions when using data link

This section explains the precautions to take when making a three-tier system.

(1) Setting link parameters

In a three-tier system, it is necessary to set link parameters at both CPU modules in the master stations for the second and third tiers.

Sections 5.3.7 and 7 give details about setting link parameter settings.

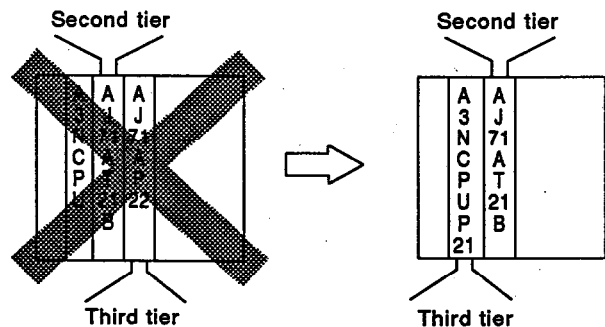


(2) Limitations on link modules

Any of the link modules listed below can be used with a CPU module.

However, when constructing a three-tier system, only one of these link modules can be used with a CPU module which has a link function.

- AJ71AP21
- AJ71AP22
- AJ71P22
- AJ71AR21
- AJ71AR22
- AJ71R22
- AJ71AT21B
- A1SJ71T21B

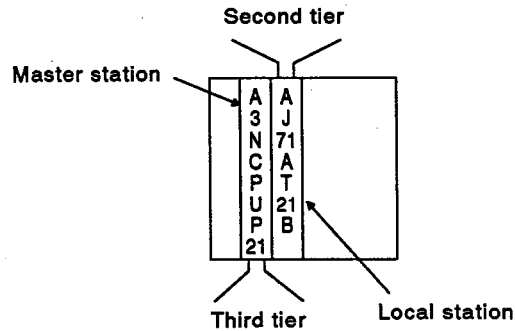


4. COMPOSITION OF A THREE-TIER SYSTEM

MELSEC-A

- (3) When a CPU module with a link function is used as a master station

In a three-tier system where a CPU module with a link function and an AJ71AT21B are used together, the CPU module with a link function can be used as a master station for the third tier and the AJ71AT21B can be used as a local station for the second tier.



An A[]CPUP21/R21 or A[]ACPUP21/R21 whose model is as given below (or is later) can be used as a master station for the third tier.

(CPU modules with a link function which are older than the following models cannot be used in a three-tier system whose second tier is a MELSECNET Data Link System and third tier is a MELSECNET/B Data Link System.)

CPU Module With a Link Function	Model	CPU Module With a Link Function	Model
A1CPUP21	602SE	A2ACPUP21	107CX
A1CPUR21	602YE	A2ACPUR21	107BX
A2CPUP21	602EE	A2ACPUP21-S1	107BY
A2CPUR21	602GE	A2ACPUR21-S1	107BY
A3CPUP21	602DE	A3ACPUP21	107CZ
A3CPUR21	602GE	A3ACPUR21	107BZ

4. COMPOSITION OF A THREE-TIER SYSTEM

MELSEC-A

Table 4.3 Link Modules Which Can be Used in a Three-Tier System

O: Available

Article Name	Type of Module	Applicable System															Remarks				
		MELSECNET/B Data Links						MELSECNET Data Links													
		Second Tier						Third Tier													
		MELSECNET Mode		MELSECNET II Mode		MELSECNET II Composite Mode		MELSECNET Mode			MELSECNET II Mode			MELSECNET II Composite Mode							
		M station	L station	M station	L station	M station	L station	M station	L station	R station	M station	L station	M station	L station	R station						
CPU module + Link module	A1CPU	AJ71AP21/R21																		Use the station number setting switch to set the selection of master and local stations.	
	A1SCPU																				
	A1NCP																				
	A2CPU																				
	A2NCP																				
	A2CPU-S1																				
	A2NCP-S1																				
	A3CPU																				
	A3NCP																				
	A3HCP																				
	A3MCP																				
	A73CPU																				
	A2ACPU		AJ71AP21/R21																		
	A2ACPU-S1																				
	A3ACPU																				
	A1SCPU	A1SJ71T21B																			
	A1CPU	AJ71AT21B																			
	A1NCP																				
	A2CPU																				
	A2NCP																				
A2CPU-S1																					
A2NCP-S1																					
A3CPU																					
A3NCP																					
A3HCP																					
A3MCP																					
A73CPU																					
A2ACPU	AJ71AT21B																				
A2ACPU-S1																					
A3ACPU																					
Data link module	A0J2P25																				
	A0J2R25																				
	AJ72P25																				
	AJ72R25																				
Programless monitor device	A6CGT-MP																				
	A6CGT-MR																				

5. SPECIFICATIONS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	○	○	○	○	○	○
Applicability	○	○	○	○	○	○

MELSEC-A

5. SPECIFICATIONS

5.1 General Specifications

(1) ACPU, data link module, and programless monitor

Table 5.1 General Specifications

Item	Specifications				
Operating ambient temperature	0 to 55°C				
Storage ambient temperature	-20 to 75°C				
Operating ambient humidity	10 to 90% RH (dewing unallowable)				
Storage ambient humidity	10 to 90% RH (dewing unallowable)				
Vibration resistance	Conforms to *JIS C 0911	Frequency	Acceleration	Amplitude	Sweep Count
		10 to 55 Hz	—	0.075 mm (0.003 in)	10 times ** (1 octave/minute)
		55 to 150 Hz	1 g	—	
Shock resistance	Conforms to JIS C 0912 (10 g x 3 times in 3 directions)				
Noise durability	By noise simulator of 1500 Vpp noise voltage, 1 μs noise width and 25 to 60 Hz noise frequency				
Dielectric withstand voltage	1500 VAC for 1 minute across AC external terminals and ground				
Insulation resistance	5 MΩ or larger by 500 VDC insulation resistance tester across AC external terminals and ground				
Grounding	Class 3 grounding; grounding is not required when it is impossible.				
Operating atmosphere	Free of corrosive gases. Dust should be minimal.				
Cooling method	Self-cooling				

REMARK

One octave marked ** indicates a change from the initial frequency to double or half frequency. For example, any of the changes from 10 Hz to 20 Hz, from 20 Hz to 40 Hz, from 40 Hz to 20 Hz, and 20 Hz to 10 Hz are referred to as one octave.

Note: *JIS : Japanese Industrial Standard

5. SPECIFICATIONS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	o	o	o	o	o	o
Applicability	o	o	o	o	o	o

MELSEC-A

5.2 Performance Specifications

Table 5.2 gives the performance specifications of the MELSECNET and MELSECNET/B Data Link Systems.

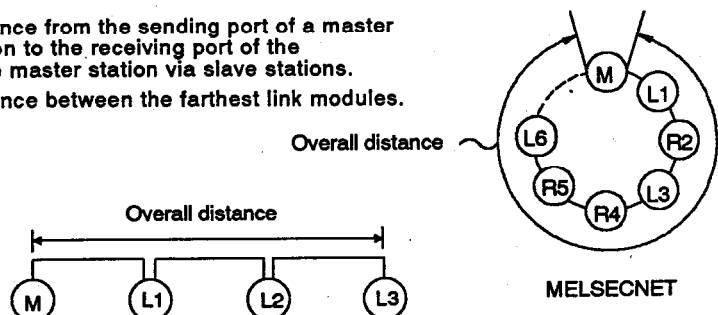
Table 5.2 MELSECNET and MELSECNET/B Performance Specifications

Item		MELSECNET Data Link System		
		Fiber-Optic Cable Data Link		
		MELSECNET Mode	MELSECNET II Mode	MELSECNET II Composite Mode
Max. number of link points used per station	Input (X)	Up to the maximum number of link module I/O points used (Total number of slave station link points) = (Max.number of usable master station link points)		
	Output (Y)			
Max. number of link points in one system	B	1024 points (128 bytes)	4096 points (512 bytes)	
	W	1024 points	4096 points (8192 bytes)	
Max. number of link points per station	Master station	1024 bytes		1024 bytes (link parameters; first half)
	Local station			1024 bytes (link parameters; second half)
	Remote I/O station	512 bytes	—	512 bytes
System's allowable momentary power failure time		Within 20/10 msec *		
Communication speed		1.25M bps		
Communications method		Half-duplex bit serial		
Synchronous method		Frame synchronous		
Transmission path method		Duplex loop		
Overall loop distance *1		Max. 10 km (32810 ft) (1 km (3281 ft) station intervals)		
Number of connectable stations		Max. 65 stations/loop (1 master station, 64 local/remote I/O stations)		
Demodulation method		CMI		
Transmission format		Conforms to HDLC (frame method)		
Error control system		Retry due to CRC (generating polynomial $X^{16} + X^{12} + X^5 + 1$) and time over		
RAS function		The loopback function checks error detection and cable breakage. The diagnostic function checks the self link line		
Connector		Two-core optical plug (CA9003)		
Cable used		S1-200/250		
Transmission loss		Max. 12 dBm/km		
Sending level		-17 to -11 dBm (peak value)		
Receiving level		-32 to -11 dBm (peak value)		

REMARK

*1: Overall distances

- MELSECNET :Distance from the sending port of a master station to the receiving port of the same master station via slave stations.
- MELSECNET/B :Distance between the farthest link modules.



5. SPECIFICATIONS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	o	o	o	o	o	o
Applicability	o	o	o	o	o	o

MELSEC-A

Table 5.2 MELSECNET and MELSECNET/B Performance Specifications (Continued)

MELSECNET Data Link System			MELSECNET/B Data Link System		
Coaxial Cable Data Link			Shielded Twisted-Wire Pair 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 number of link module I/O points used (Total number of slave station link points) = (Max.number of usable master station link points)					
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	—	512 bytes	—		
Within 20/10 msec *			20 msec		
1.25M bps			125K bps/250K bps/500K bps/1M bps		
Half-duplex bit serial					
Frame synchronous					
Duplex loop			Bus system		
Max. 10 km (32810 ft) (500 m (1640.5 ft) station intervals)			Varies depending on the communication speed (125K bps: 1200 m, 250K bps: 600 m, 500K bps: 400 m, 1M bps: 200 m)		
Max. 65 stations/loop (1 master station, 64 local/remote I/O stations)			Max. 32 stations/loop (1 master station, 31 local stations)		
CMI			NRZI method		
Conforms to HDLC (frame method)					
Retry due to CRC (generating polynomial $X^{16} + X^{12} + X^5 + 1$) and time over					
The loopback function checks error detection and cable breakage. The diagnostic function checks the self link line			The diagnostic function checks the self link line		
*2 BNC-P-3-Ni, BNC-P-5, BNC-P-5DV-SA(01) equivalent			Terminal block		
*2 3C-2V, 5C-2V equivalent			Shielded twisted-wire pair cable		
—			—		
—			—		
—			—		

*2: Consult nearest Mitsubishi representative with connector.

5. SPECIFICATIONS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	o	o	o	o	o	o
Applicability	o	o	o	o	o	o

MELSEC-A

5.3 Functions

Table 5.3 gives the functions of the MELSECNET and MELSECNET/B Data Link Systems.

Table 5.3 Data Link System Functions

Item	Description
	MELSECNET Data Link System
Cyclic transmission function	<p>(1) The cyclic transmission function periodically communicates data between the master station and the slave stations (local station or remote I/O station).</p> <p>(2) Two pieces of data are required for the cyclic transmission function. One is the device that will be used for one-to-one communication between the master station and a local station, and the other is the device that will be used for communication between the master station and all local stations.</p> <p>(a) Devices used for one-to-one communication</p> <p>Inputs (X) and outputs (Y) are used for communication between the master station and a local station and the master station and a remote I/O station.</p> <p>(b) Devices used for communication between the master station and all local stations</p> <p>Link relays (B) and link registers (W) are used for communication between the master station and a local station or for communication between two local stations.</p>
Transient transmission function	<p>The transient transmission function executes communication upon receiving a request.</p> <p>(1) The master station executes an LRDP or LWTP instruction for read/write processing for the local station devices (T, C, D, W).</p> <p>(2) The master station executes an RFRP or RTOP instruction for read/write processing for the buffer memory area of a special function module loaded to a remote I/O station.</p> <p>(3) Access of a station from a device loaded in a PC CPU.</p>
Automatic return function	<p>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.</p>
Loopback function	<p>Because of double configuration, if a cable breaks or a local or remote I/O station is disconnected from the system, the faulty loop or station is removed from the link so that the link is maintained with the normally operating stations.</p>
Error detection	<p>By reading the special relays and special registers, link errors are detected.</p>
Self-diagnostic function	<p>The self-diagnostic function checks link module hardware and link cables (fiber-optic cable/coaxial cable).</p>
Extensive use of link relays (B) and link registers (W) in the three-tier system	<p>(1) The range of link relays (B) and link registers (W) that can be used in a three-tier MELSECNET (II) Data Link System is as follows:</p> <p>MELSECNET mode : 1024 points (B/W0 to 3FF)</p> <p>MELSECNET II/MELSECNET II composite mode : 4096 points (B/W0 to FFF)</p> <p>(2) This function allows the use of the same device number in the third-tier loop if the available number of link relays and link registers in the third-tier loop is not sufficient.</p>
MELSECNET mode/ MELSECNET II mode/ MELSECNET II composite mode	<p>(1) The MELSECNET (II) Data Link System includes three different operation modes: MELSECNET mode, MELSECNET II mode, and MELSECNET II composite mode.</p> <p>(2) The operation mode should be selected to meet the data link module to be used.</p> <p>This feature allows data link for the entire MELSECNET II device range (B/W0 to FFF, 4096 points) while maintaining interchangeability with the conventional MELSECNET mode.</p>

5. SPECIFICATIONS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Applicability	o	o	o	o	o	o

MELSEC-A

Description	Reference Section
MELSECNET/B Data Link System	
<p>(1) The cyclic transmission function periodically communicates data between the master station and the slave stations (local station or remote I/O station).</p> <p>(2) Two pieces of data are required for the cyclic transmission function. One is the device that will be used for one-to-one communication between the master station and a local station, and the other is the device that will be used for communication between the master station and all local stations.</p> <p>(a) Devices used for one-to-one communication</p> <p>Inputs (X) and outputs (Y) are used for communication between the master station and a local station and <u>the master station and a remote I/O station.</u></p> <p>(b) Devices used for communication between the master station and all local stations</p> <p>Link relays (B) and link registers (W) are used for communication between the master station and a local station or for communication between two local stations.</p>	5.3.1
<p>The transient transmission function executes communication upon receiving a request.</p> <p>(1) The master station executes an LRDP or LWTP instruction for read/write processing for the local station devices (T, C, D, W).</p> <p>(2) <u>The master station executes an RFRP or RTOP instruction for read/write processing for the buffer memory area of a special function module loaded to a remote I/O station.</u></p> <p>(3) Access of a station from a device loaded in a PC CPU.</p>	5.3.2
<p>If a local station or a <u>remote I/O station</u> 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.</p>	5.3.3
—	5.3.4
<p>By reading the special relays and special registers, link errors are detected.</p>	5.3.5
<p>This function checks link module hardware and twisted-wire pair cables.</p>	5.3.6
<p>(1) The range of link relays (B) and link registers (W) that can be used in a three-tier MELSECNET (II) Data Link System is as follows:</p> <p style="padding-left: 40px;">MELSECNET mode : 1024 points (B/W0 to 3FF)</p> <p style="padding-left: 40px;">MELSECNET II/MELSECNET II composite mode : 4096 points (B/W0 to FFF)</p> <p>(2) This function allows the use of the same device number in the third-tier loop if the available number of link relays and link registers in the third-tier loop is not sufficient.</p>	5.3.7
<p>(1) The MELSECNET (II) Data Link System includes three different operation modes: MELSECNET mode, MELSECNET II mode, and MELSECNET II composite mode.</p> <p>(2) The operation mode should be selected to meet the data link module to be used.</p> <p>This feature allows data link for the entire MELSECNET II device range (B/W0 to FFF, 4096 points) while maintaining interchangeability with the conventional MELSECNET mode.</p>	5.3.8

5.3.1 Cyclic transmission function

The cyclic transmission function periodically communicates data between the master station and the slave stations (local station or remote I/O station).

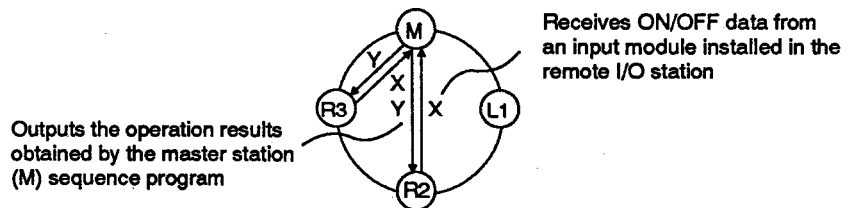
Two types of devices are required to execute the cyclic transmission function: devices (x = input, y = output) used for one-to-one communication between the master station and a local/remote I/O station and devices (B = link relays, W = link resistors) used for communication between the master station and all local stations.

(1) Devices used for one-to-one communication

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

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

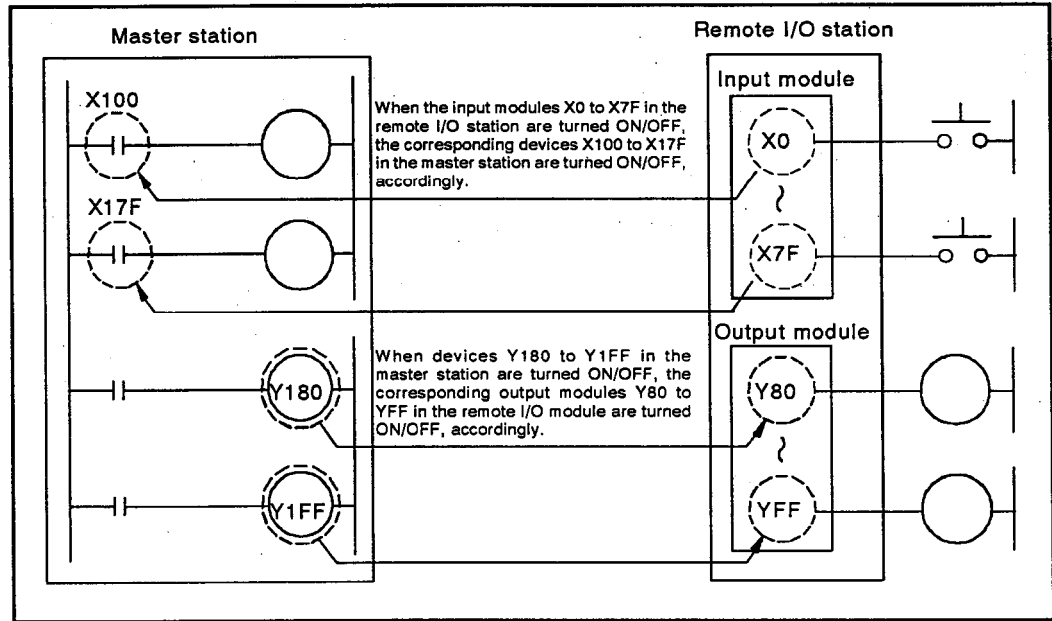
- 1) A master station receives ON/OFF data (inputs (X)) from an input module installed in a remote I/O station, and the master station outputs the operation results (outputs (Y)) (obtained by the master station sequence program) to the output module installed in the remote I/O station.



- 2) Use link parameters to allocate the ON/OFF data of the I/O modules loaded to the remote I/O station to the inputs (X) and outputs (Y) of the master station.

When the input module in the remote I/O station is turned ON, the input (X) allocated by the link parameter is also turned ON. When the output (Y) is turned ON by the master station, the output module in the remote I/O station turns ON.

Assume that inputs X100 to X17F in the master station are allocated to inputs X0 to X7F in the remote I/O station and that outputs Y180 to Y1FF in the master station are allocated to outputs Y80 to YFF in the remote I/O station. When input module X0 in the remote I/O station is turned ON, device X100 in the master station is turned ON. When device Y180 in the master station is turned ON, output module Y80 in the remote I/O station is turned ON.

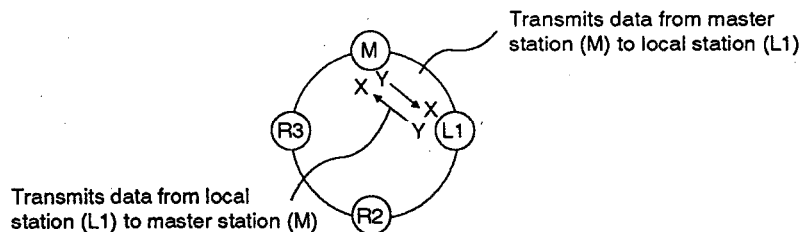


(b) Communication between the master station and a local station

- 1) Communicates data between a master station and a local station using some of I/O points in the master station and local stations for the data link.

(Data communications between local stations or between a local station and a remote I/O station is not possible.)

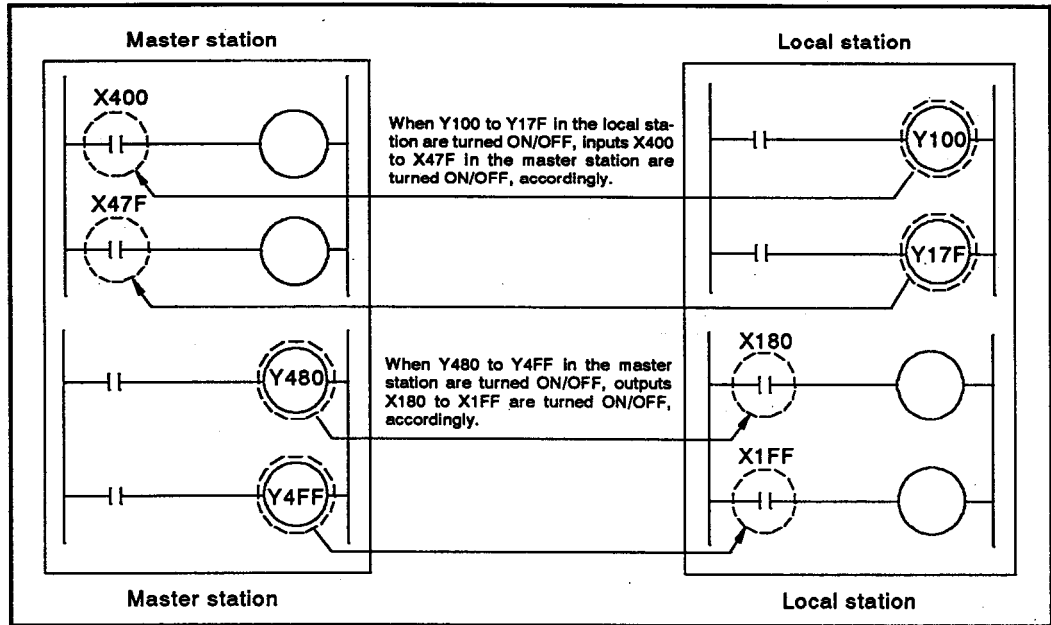
- 2) During data communications between a master station and a local station, the transmitter uses outputs (Y), and receiver inputs (X).



- 3) The inputs and outputs used for the data link are allocated 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).

Assume that inputs X400 to X47F in the master station are allocated to outputs Y100 to Y17F in a local station and that outputs Y480 to Y4FF in the master station are allocated to inputs X180 to X1FF in the local station. When output Y100 in the local station is turned ON, input X400 in the master station is turned ON. When output Y480 in the master station is turned ON, input X180 in the local station is turned ON.



(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 for communication between two local stations.

Link relays (B) and link registers (W) are used by the master station and every local station.

Link relays (B) and link registers (W), using the range allocated to the station with a link parameter, send data to other station.

- 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 device numbers usable for communication with other stations of the MELSECNET (II) data link system.

The following explains the range in which communication is possible with link relays (B) and link registers (W) in 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 will differ partly between the range allocated to the first half of the link parameter and the range allocated to the second half of the link parameter. Refer to Section 5.3.8 for more details.

(a) Two-tier system

- 1) The master station and the local stations can read the entire range of link relays (B) and link registers (W) allocated by the link parameter.

The read/write range of each station in the link is explained by the link example illustrated in Fig. 5.1.

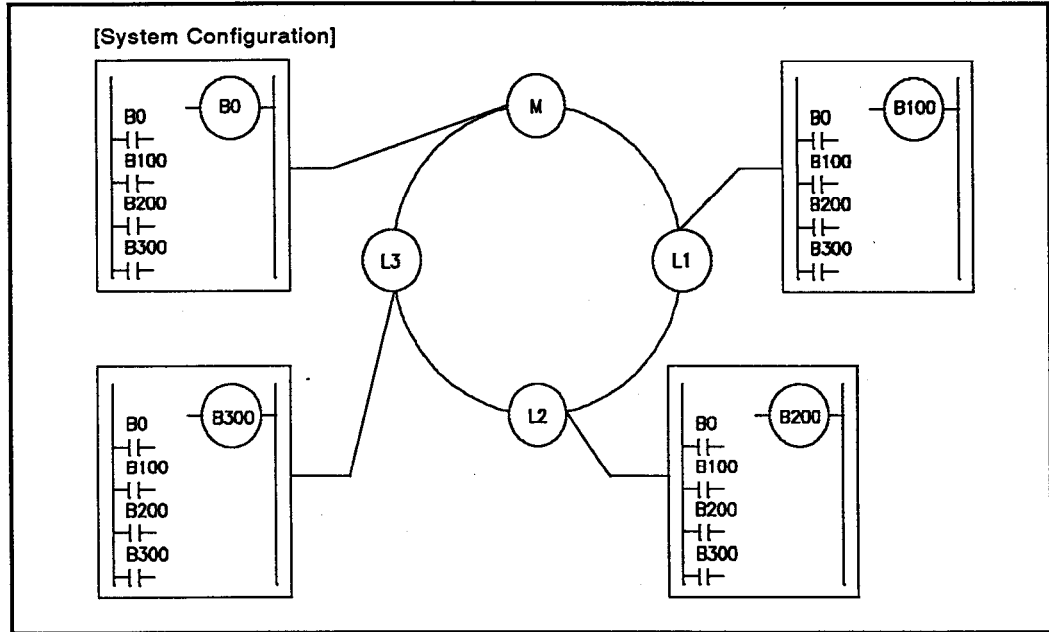


Fig. 5.1 Two-tier System Configuration

5. SPECIFICATIONS

MELSEC-A

[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

** = Internal relays (M) and data registers (D) area

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

In order to simplify the example, the same number of link relays (B) and link registers (W) were allocated. In actual use, different numbers of link relays (B) and link registers (W) can be allocated.

(b) Three-tier 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 the local stations (including the master station for the third tier) in the second tier can read the entire range allocated by the link parameters set on the master station for the second tier.

The L1/m station in Fig. 5.2, for example, can read the B/W0 to B/W37F range.

- 3) The local stations in the third tier can read the entire range allocated by the link parameters set on the master station for the third tier and the range allocated by the link parameters set on the master station for the second tier.

The range allocated to the local stations in the second tier and the range allocated by the master station for different third tiers cannot be read.

The I1 station in Fig. 5.2, for example, can read the B/W100 to B/W1FF range, which is allocated by the link parameters set on the L1/m, and the B/W0 to B/WFF range, which is allocated by the master station for the second tier.

The read/write range of each station in the link is explained by the link example illustrated in Fig. 5.2.

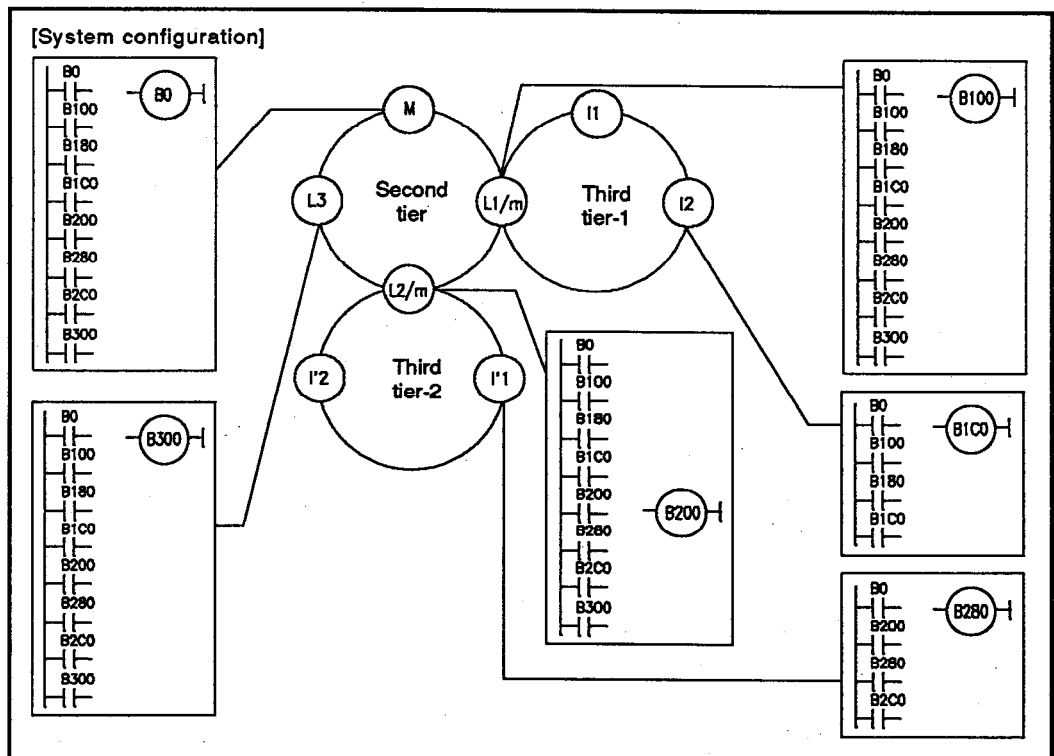
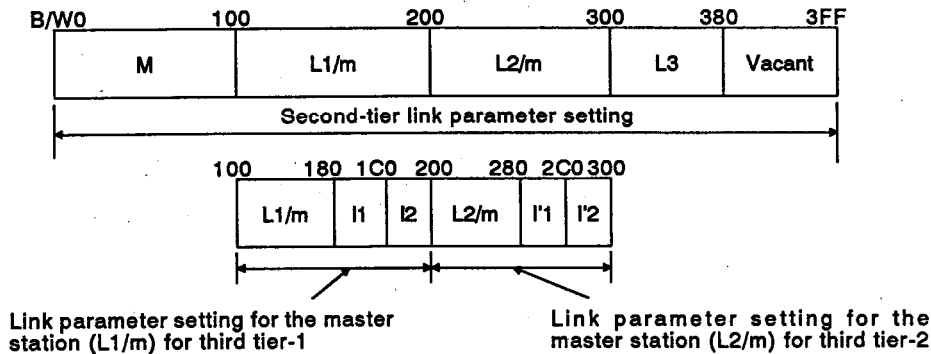


Fig. 5.2 Three-Tier System Configuration

[Link parameter setting range]



REMARK

In order to simplify the example, the same number of link relays (B) and link registers (W) were allocated. In actual use, different numbers of link relays (B) and link registers (W) can be allocated.

[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 B/WFF range and sends it to the other stations.
- 2) The M station can receive data written to the devices in the B/W100 to B/W37F range by other stations.
- 3) Devices in the B/W380 to B/W3FF 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 (W)	L1/m (R)	I1 (R)	I2 (R)	L2/m (R)	I'1 (R)	I'2 (R)	L3 (R)	**	

When B0 is turned ON in the M station, for example, B0 in L1/m station, I1 station, I2 station, L2/m station, I'1 station, I'2 station, and L3 station is turned ON.

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 B/W17F range and sends it to the other 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 B/W37F range by other stations.
- 3) Devices in the B/W380 to B/W3FF 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)	I1 (R)	I2 (R)	L2/m (R)	I'1 (R)	I'2 (R)	L3 (R)	**	

When B100 is turned ON in the L1/m station, for example, B100 in the M station, I1 station, I2 station, L2/m station, and L3 station is turned ON. Note that B100 in I'1 and I'2 stations is not turned ON.

5. SPECIFICATIONS

MELSEC-A

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 B/W27F range and sends to other stations.
- 2) The L2/m station can receive data written to the devices in the B/W0 to B/W1FF range and the B/W280 to B/W37F range by other station.
- 3) Devices in the B/W380 to B/W3FF 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 (R)	I1 (R)	I2 (R)	L2/m (W)	I'1 (R)	I'2 (R)	L3 (R)	**	

When B200 is turned ON in the L2/m station, for example, B200 in the M station, L1/m station, I'1 station, I'2 station, and L3 station is turned ON. Note that B200 in I1 and I2 stations is not turned ON.

Local station No. 3 (L3)

- 1) The L3 station writes data to the devices in the range of B/W300 to B/W37F range and sends to other stations.
- 2) The L3 station can receive data written to the devices in the B/W0 to B/W2FF range and the B/W280 to B/W37F range by other station.
- 3) Devices in the range of B/W380 to B/W3FF 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)	I1 (R)	I2 (R)	L2/m (R)	I'1 (R)	I'2 (R)	L3 (W)	**	

When B300 is turned ON in the L3 station, for example, B300 in the M station, L1/m station, and L2/m station is turned ON. Note that B300 in the I1 station, I2 station, I'1 station, and I'2 station is not turned ON.

Local station No. 1 (I1) in the third tier-1

- 1) The I1 station writes data to the devices in the B/W180 to B/W1BF range and sends it to the other stations.
- 2) The I1 station can receive data written to the devices in the B/W0 to B/W17F range and the B/W1C0 to B/W1FF range by other stations.
- 3) Devices in the B/W200 to B/W3FF 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 (R)	I1 (W)	I2 (R)	L2/m **	I'1 **	I'2 **	L3 **	**	

When B180 is turned ON in the I1 station, for example, B180 in the M station, L1/m station, I2 station, L2/m station, and L3 station is turned ON. Note that B180 in the I'1 and I'2 stations is not turned on.

Local station No. 2 (I2) in third tier-1

- 1) The I2 station writes data to the devices in the B/W1C0 to B/W1FF range and sends it to the other stations.
- 2) The I2 station can receive data written to the devices in the B/W0 to B/W1BF range by other stations.
- 3) Devices in the B/W200 to B/W3FF 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 (R)	I1 (R)	I2 (W)	L2/m **	I'1 **	I'2 **	L3 **	**	

When B1C0 is turned ON in the I2 station, for example, B1C0 in the M station, L1/m station, I1 station, L2/m station, and L3 station is turned ON. Note that B1C0 in I'1 and I'2 stations is not turned ON.

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

- 1) The I'1 station writes data to the devices in the B/W280 to B/W2BF range and sends it to other stations.
- 2) The I'1 station can receive data written to the devices in the B/W0 to B/WFF range, the B/W200 to B/W27F range and the B/W2C0 to B/W2FF range by other station.
- 3) Devices in the B/W100 to B/W1FF range and the B/W300 to B/W3FF 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 **	I1 **	I2 **	L2/m (R)	I'1 (W)	I'2 (R)	L3 **	**	

When B280 is turned ON in the I'1 station, for example, B280 in the M station, L1/m station, L2/m station, I'2 station, and L3 station is turned ON. Note that B280 in I1 and I2 stations is not turned ON.

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

- 1) The I'2 station writes data to the devices in B/W2C0 to B/W2FF range and sends it to other stations.
- 2) The I'2 station can receive data written to the devices in the B/W0 to B/WFF range and the B/W200 to B/W2BF range by other station.
- 3) Devices in the B/W100 to B/W1FF range and the B/W300 to B/W3FF 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 **	I1 **	I2 **	L2/m (R)	I'1 (R)	I'2 (W)	L3 **	**	

When B2C0 is turned ON in the I'2 station, for example, B2C0 in the M station, L1/m station, L2/m station, I'1 station, and L3 station is turned ON. Note that B2C0 in the I1 station and I2 station, is not turned ON.

5. SPECIFICATIONS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	o	o	o	o	o	o
Applicability	o	o	o	o	o	o

MELSEC-A

5.3.2 Transient transmission function

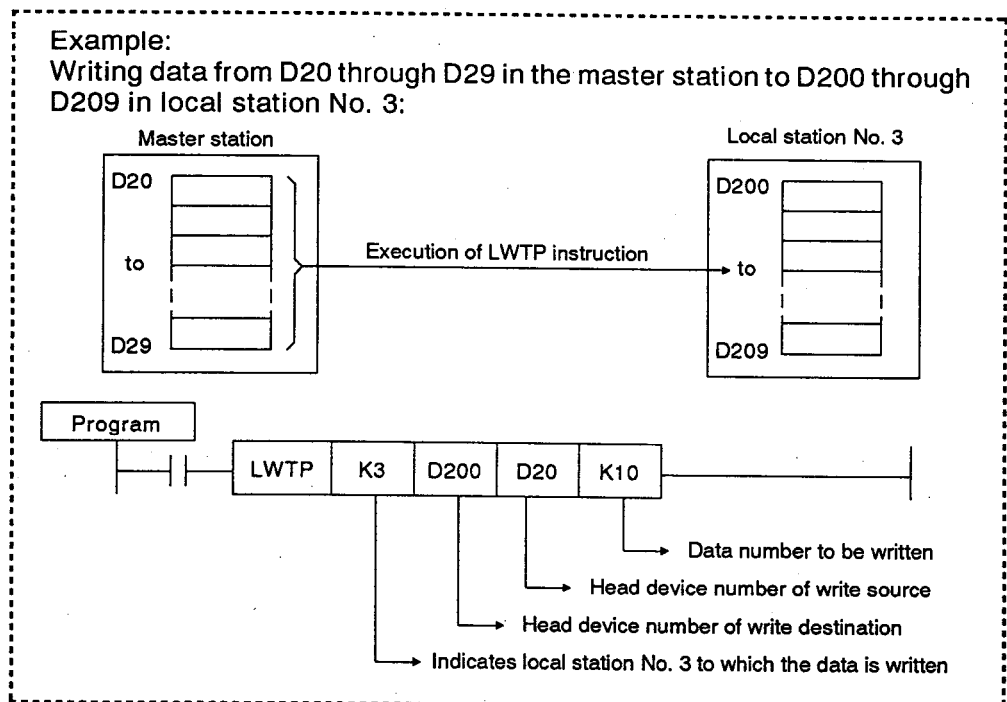
The transient transmission function is used by the PC CPU in any master station to:

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

- (1) Read/write of devices (T, C, D, and W) in a local station by the master station

The transient transmission function reads data from or writes data to the link registers in the range set by the link parameter or to the devices (T, C, D) for which cyclic transmission is not possible.

An LRDP or LWTP instruction in the master station sequence program is executed for this read/write operation. Refer to Section 7.7 for more details on the LRDP and LWTP instructions.



(2) Read/write of buffer memory in a special function module loaded to a remote I/O station

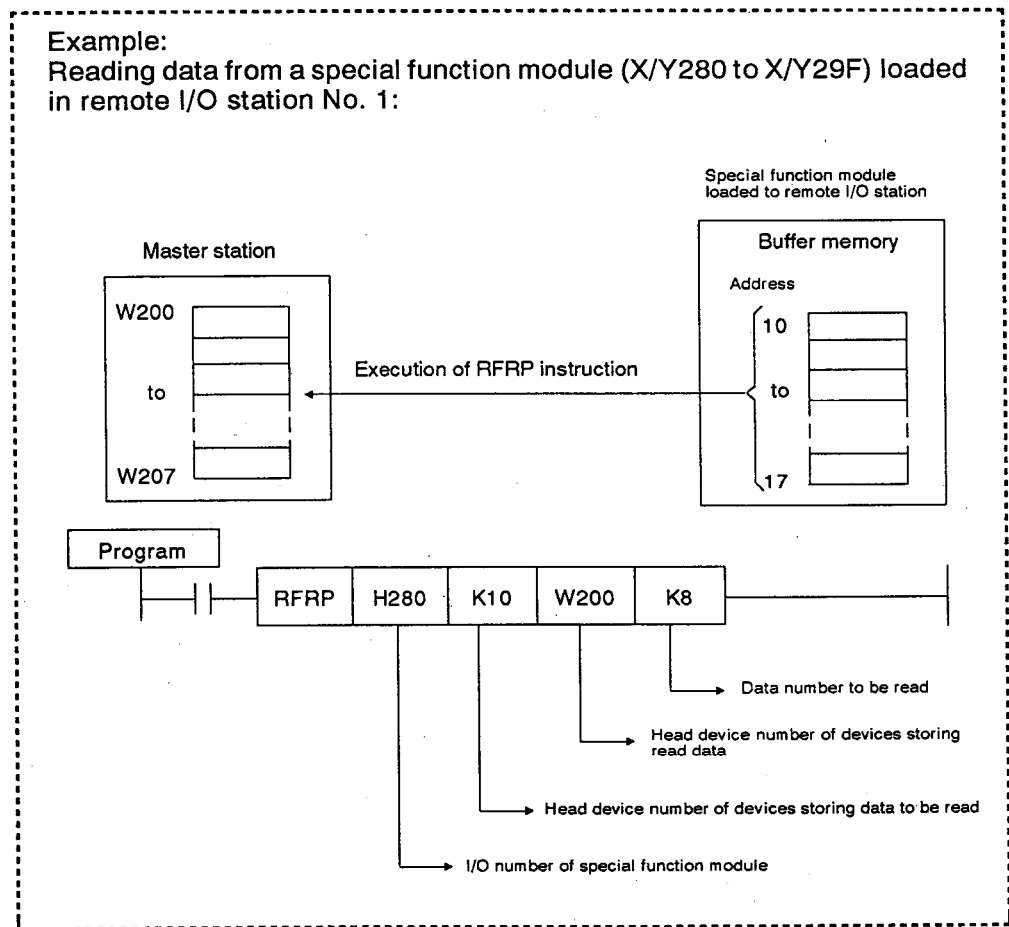
Use an RFRP or RTOP instruction for the read/write operation for a special function module loaded to a remote I/O station.

Data communication can only be executed between the master station and a remote I/O station when an RFRP or RTOP instruction is executed.

In order to use these instructions, link registers (W) must be allocated 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 the RFRP and RTOP instructions.

Example:
Reading data from a special function module (X/Y280 to X/Y29F) loaded in remote I/O station No. 1:



5. SPECIFICATIONS

MELSEC-A

(3) Accessing another station with a peripheral device connected to PC CPU

The type of access source station (master station, local station, or remote I/O station) determines whether a station can be accessed.

The basic concept is illustrated in Fig. 5.3 Refer to the manuals for the peripheral device and module used for this operation for details on the executable functions.

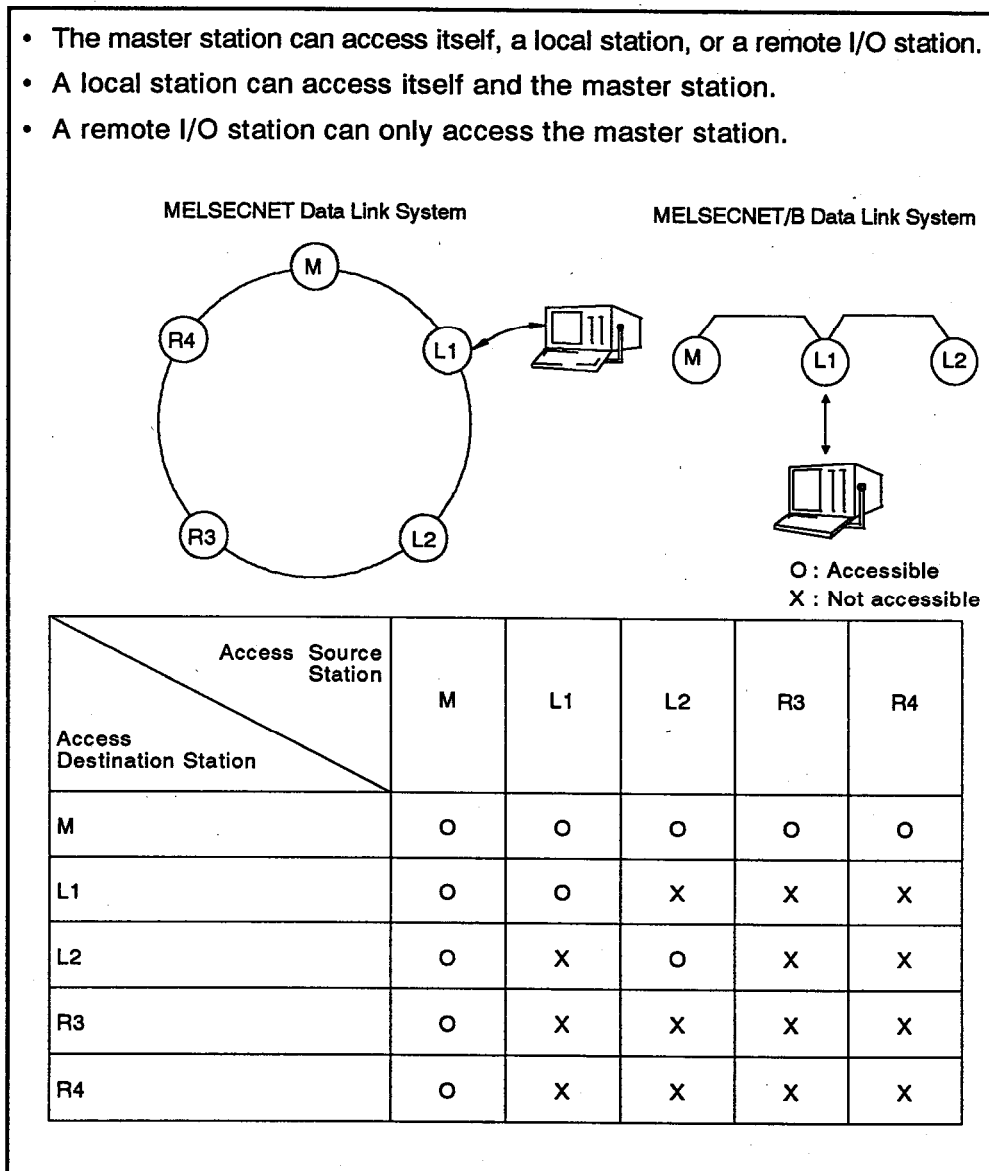


Fig. 5.3 Accessibility Chart

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

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

5. SPECIFICATIONS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Applicability	○	○	○	○	○	○

MELSEC-A

5.3.3 Automatic return function

(1) Automatic return function

If a local station or a remote I/O station is disconnected from the data link system due to a fault, it is disconnected from the link to maintain the link with the normally operating stations.

The disconnected 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 for the use of automatic return function

It is possible to select whether or not the automatic return function will be set for use in the link modules for each station.

Refer to the User's Manual for the individual link module for details on the setting procedure.

(3) Returning disconnected station to data link

The method in which the disconnected station is returned to the data link varies depending on whether the automatic return function is set.

(a) Data link stopped due to an error in the master station

1) Automatic return function is set for the master station:

First, reset the master station. Then, reset all of the local and remote I/O stations for which the automatic return function is not set.

2) Automatic return function is not set for the master station:

First, reset all of the local and remote I/O stations for which the automatic return function is not set. Then, reset the master station.

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

Master Station Setting	Local/Remote I/O Station Setting	Conditions for Return
AR	AR	Returns automatically after the error is removed.
	UR	First, reset the master station. Then, reset all of the local and remote I/O stations for which the automatic return function is not set.
UR	AR	First, reset all of the local and remote I/O stations for which the automatic return function is not set.
	UR	Then, reset the master station.

AR: Automatic return function selected

UR: Automatic return function not selected

5. SPECIFICATIONS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	○	○	○	×	×	×
Applicability	○	○	○	×	×	×

MELSEC-A

5.3.4 Loopback function

(1) Loopback function

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

The loopback function uses the double configuration to isolate the error location 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.

(2) Data link operating normally

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.

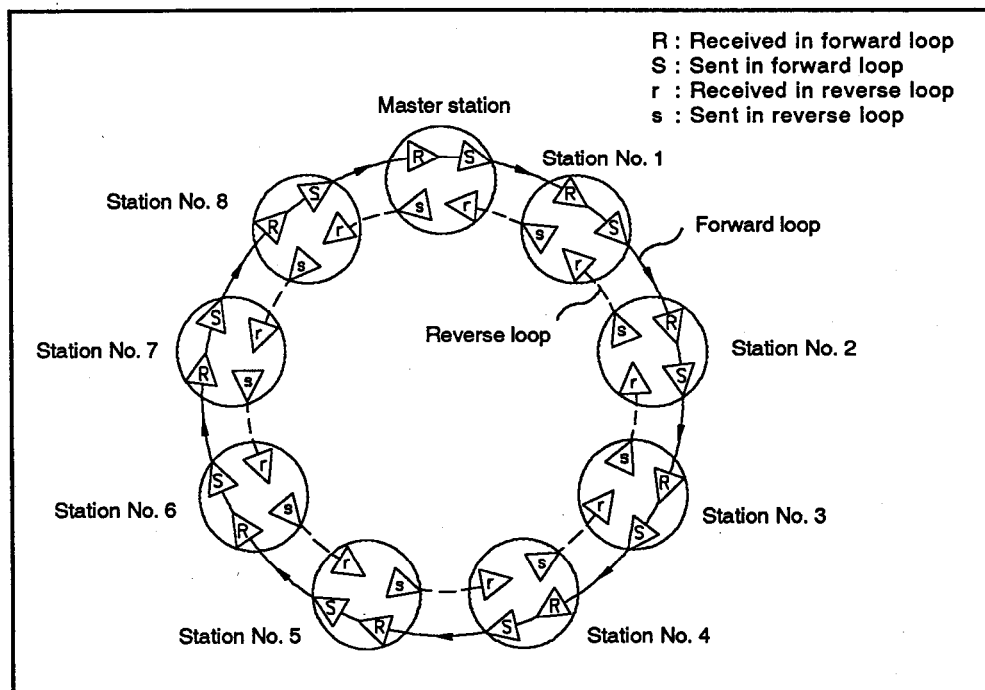


Fig. 5.4 Normal Data Link (When one master station and eight slave stations are used)

POINT

In the MELSECNET Data Link System, slave station and sub-slave station numbers should be assigned in order (station numbers ascending in the forward loop direction) for the loopback function.

(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.

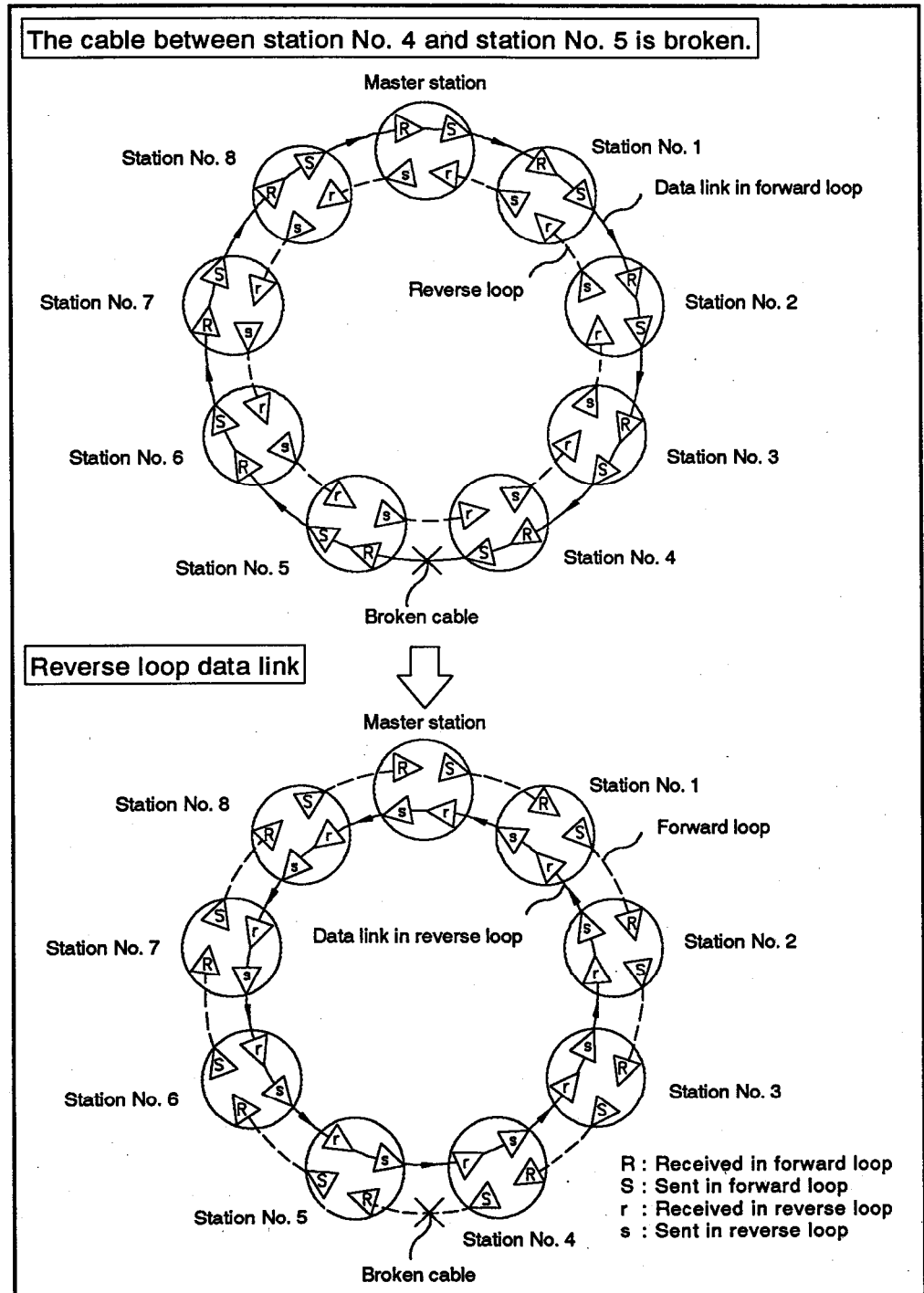


Fig. 5.5 Reverse Loop Data Link (When one master station and eight slave stations are used)

(4) Data link when both the forward and reverse loops are faulty

If both the forward and reverse loop is disabled due to broken cable or a faulty cable connector, the data link is still maintained in the loopback mode. At the broken cable, the link loops back toward the master station. Because of the establishment of the data link in the loopback mode, the stations ahead of the point where the link loops back are disconnected from the data link.

When the faulty point is corrected, the data link in the forward loop is recovered. The station will remain disconnected or return to the data link according to the setting of the automatic return function.

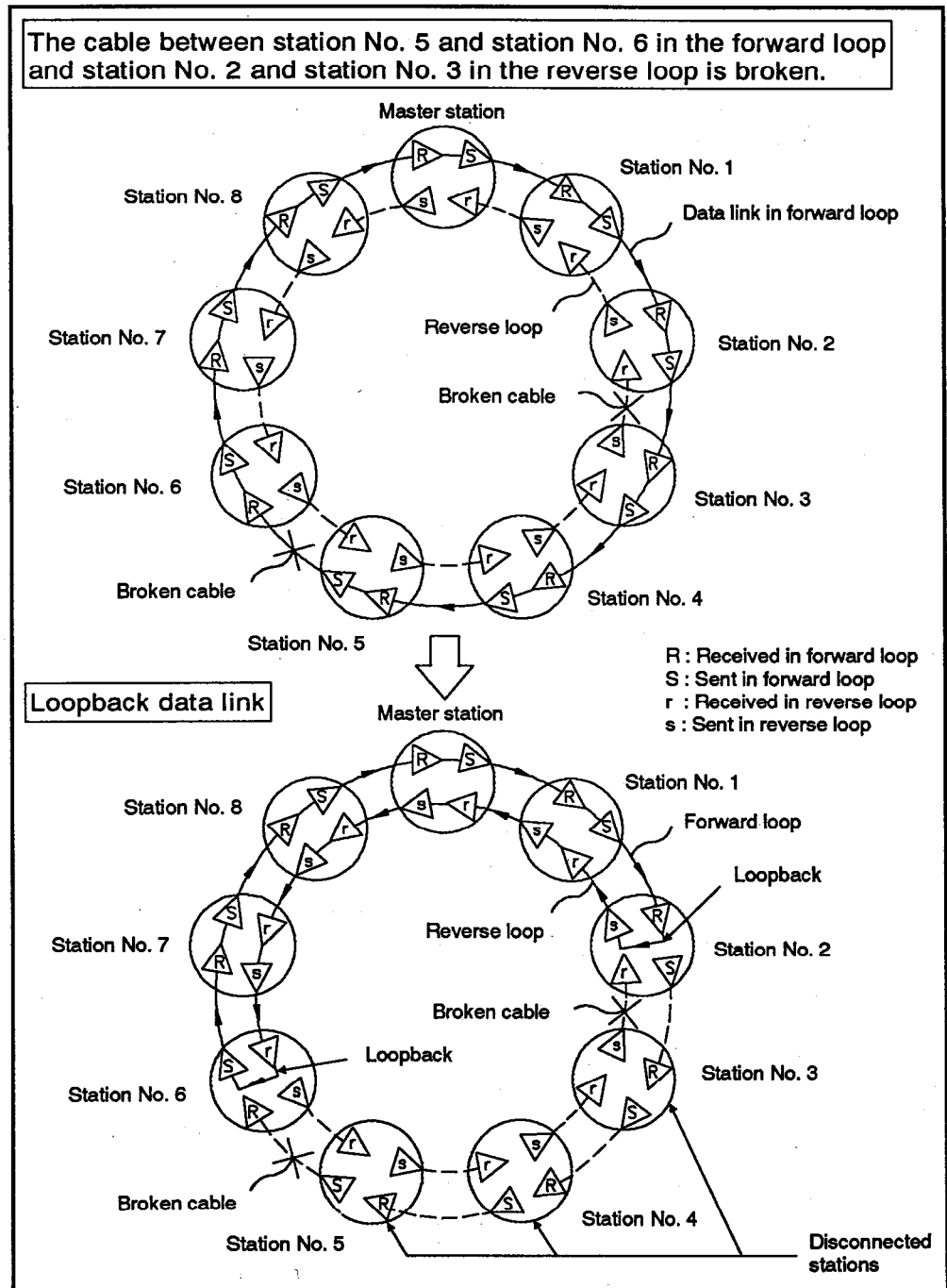


Fig. 5.6 Loopback Data Link (When one master station and eight slave stations are used)

- (5) Data link when a power failure occurs with 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 data link is maintained with the normally operating stations in the loopback mode. At the point at which the power failure has occurred, the link loops back toward the master station. The station at which 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. The station will remain disconnected or return to the data link according to the setting of the automatic return function.

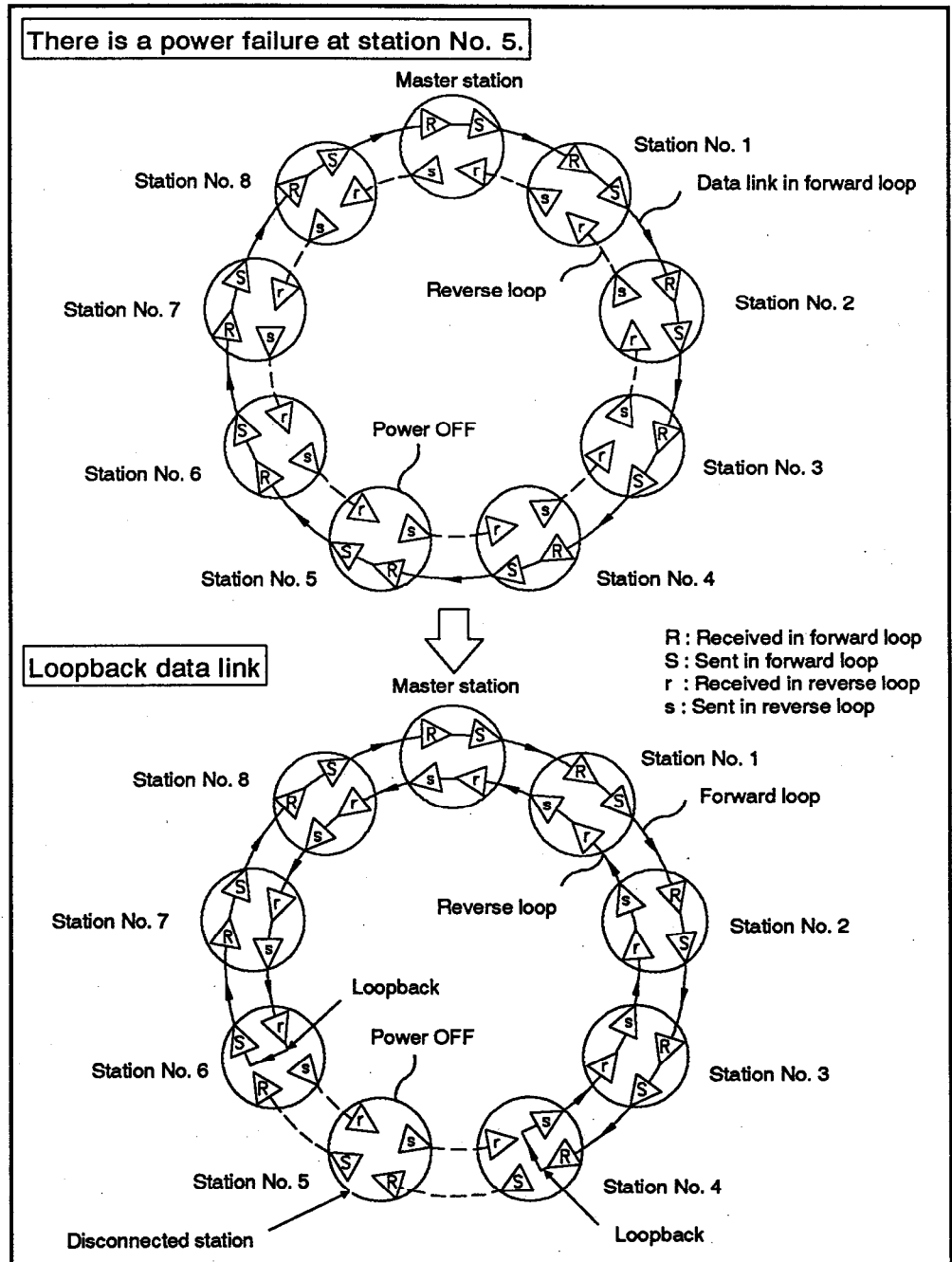


Fig. 5.7 Local Station or Remote Station Power Failure Data Link (When one master station and eight slave stations are used)

5. SPECIFICATIONS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode						
Applicability	o	o	o	o	o	o

MELSEC-A

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.

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

When a MELSECNET Data Link System is used

- (1) Events checked by the master station
 - (a) Data communication status between the master station and a slave station (local station and remote I/O station)
 - Stations at which a communication error is detected (D9228 to D9231).
 - Stations at which initial communication, necessary for starting communication, has not been completed (D9224 to D9227).
 - The operation status (RUN/STEP-RUN or STOP/PAUSE) of a local station (D9212 to D9215).
 - (b) Link parameter error
 - Whether the link parameter is set or the set data is correct for the station itself (M9206).
 - Compatibility (whether the B/W allocation range overlaps) between the link parameters set on a slave station (master station for the third tier) and those set for the station itself (M9207).
 - (c) Number of communication error occurrences
 - The accumulated number of retries attempted after the occurrence of transmission errors (D9210).
 - The accumulated number of receive error occurrences (D9240).
 - (d) Link card hardware error (M9210)
 - (e) Mode setting switch in the link card
 - Whether the mode setting switch is set for online (0, 1) or offline test mode (2 - 7) (M9224).
 - (f) Data link status (M9225, M9226)
 - Forward loop error (M9225)
 - Reverse loop error (M9226)
 - Whether data is sent via the forward loop, reverse loop, or forward/reverse loop (D9204).
 - The stations where loopback occurs (D9205, D9206).
 - Points at which 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
 - Whether cyclic communication is executed normally (M9246).
 - Whether cyclic communication is executed normally with the master station for the third tier (if the local station is in the second tier) (M9247).
 - Whether the link parameters are received from the master station (M9250).
 - Whether the station can communicate with the master station (M9251).
 - (b) Data communication status with other stations
 - A faulty station in the link other than the station itself (D9252 to D9255).
 - The operation status (RUN/STEP-RUN or STOP/PAUSE) of local stations other than the station itself.
 - (c) Number of receive error occurrences
 - The accumulated number of receive error occurrences (D9245).
 - (d) Link card hardware error (M9211)
 - (e) The setting position of mode setting switch in the link card (M9240)
 - (f) Data link status
 - Forward loop error (M9241)
 - Reverse loop error (M9242)
 - Loopback in the station itself (M9243)

When a MELSECNET/B Data Link System is used

- (1) States that can be checked by a master station
 - (a) Data communication state between a master station and a local station
 - Stores the numbers of stations in which a communications error is detected (D9228 and D9229).
 - Stores the stations which have not completed initial communications for the purpose of starting data communications (D9224 and D9225).
 - Stores the operating state (RUN/STEP-RUN or STOP/PAUSE) of a local station (D9212 and D9213).
 - (b) Link parameter error
 - Checks if (a) the link parameters for the self are not set, or (b) the set data contains an error (M9206).
 - Checks the consistency of link parameters set for a slave station (master station for the third tier) with the self link parameters (if the B/W allocation range overlaps) (M9207).
 - (c) Number of communications errors
 - Stores the accumulated number of retries attempted after the occurrence of transmission errors (D9210).
 - Stores the accumulated number of receive errors (D9240).
 - (d) Link card hardware fault (M9210)
 - (e) Link card mode switch setting state
 - Checks if the mode switch is set to online (0 or 1) or offline (2 to 7) (M9224).
 - (f) Data link state
 - Stores the data link state (D9204).

- (2) States that can be checked by a local station
 - (a) Data communications state of the master station
 - Checks if cyclic data communications is correctly executed (M9246).
 - Checks if the master station for the second tier is correctly executing cyclic data communications when the self is a local station for the third tier (M9247).
 - Checks if link parameters are received from a master station (M9250).
 - Checks if the self is communicating data (M9251)
 - (b) Data communications with another station
 - Checks if there are faulty local stations (other than the self) (D9252 and D9253).
 - Checks the operating status (RUN/STEP-RUN or STOP/PAUSE) of local stations (other than the self).
 - (c) Number of receive errors
 - Checks the number of receive errors (D9245).
 - (d) Link card hardware fault (M9211)
 - (e) Link card mode switch setting (M9240)

5. SPECIFICATIONS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode						
Applicability	0	0	0	0	0	0

MELSEC-A

5.3.6 Self-diagnosis function

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

The self-diagnosis function includes the following tests.

(1) Self loopback test

Checks the link module hardware independently, including the send/receive circuit for data communication

(2) Station-to-station test

Checks the cable and link module hardware for the two neighboring stations (master station ↔ local station, local station ↔ local station, etc.)

(3) Forward loop/reverse loop test

Checks the data link line for the forward loop, reverse loop, and loopback mode when the MELSECNET (II) Data Link System has been connected.

REMARK

The following cables are used for a data link:

- MELSECNET Data Link System : Fiber-optic cable
: Coaxial cable
- MELSECNET/B Data Link System : Shielded twisted-wire pair cable

5. SPECIFICATIONS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	□	□	□	□	□	□
Applicability	□	□	□	□	□	□

MELSEC-A

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:

- MELSECNET mode: B/W0 to B/W 3FF (1024 points)
- MELSECNET II mode: B/W0 to B/W FFF (4096 points)
- MELSECNET II composite mode: B/W0 to B/W FFF (4096 points)

When there are two or more master stations in the second tier as illustrated in Fig. 5.8, the link relay and link register range 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.

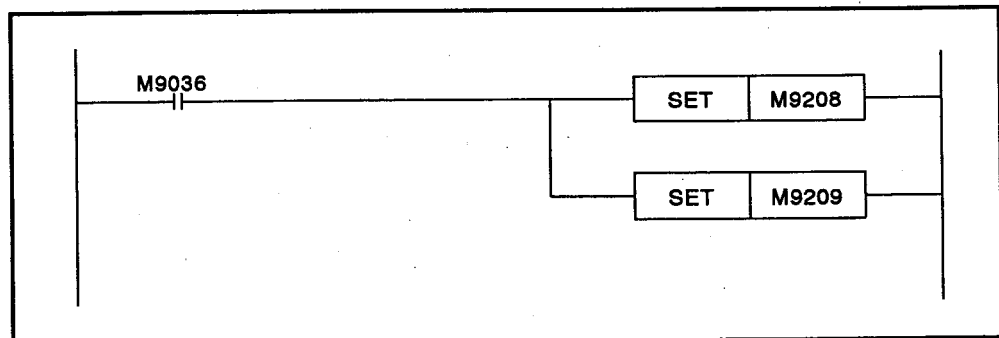
This section describes the link relay (B) and link register (W) range that can be expanded and the device range that can be used for data communication.

(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. Both of these special relays must be turned ON to use the expanded link relays and link registers.

M9208	<ul style="list-style-type: none"> • Set whether the B/W data controlled master station for the third tier is sent to the local stations (sub-slave stations) in the third tier. • ON : Not sent • OFF : Sent
M9209	<ul style="list-style-type: none"> • Turn this ON when device ranges are not to be checked. • 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, both of them should remain ON; never turn these special relays ON or OFF during control.



5. SPECIFICATIONS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	o	o	o	o	o	o
Applicability	o	o	o	o	o	o

MELSEC-A

(2) Expanded link relay (B) and link register (W) range

The device range that is not allocated to the link parameters for the second tier can be allocated to the link parameters for the third tier (third tier-1, third tier-2, ... third tier-n). For this allocation, the same range can be allocated to different data link.

When 512 points of B/W0 to B/W1FF are used for the second tier (as illustrated in Fig. 3.12), the device range of B/W200 to B/W3FF can be allocated to the third-tier-1 link and also to the third-tier-2 link.

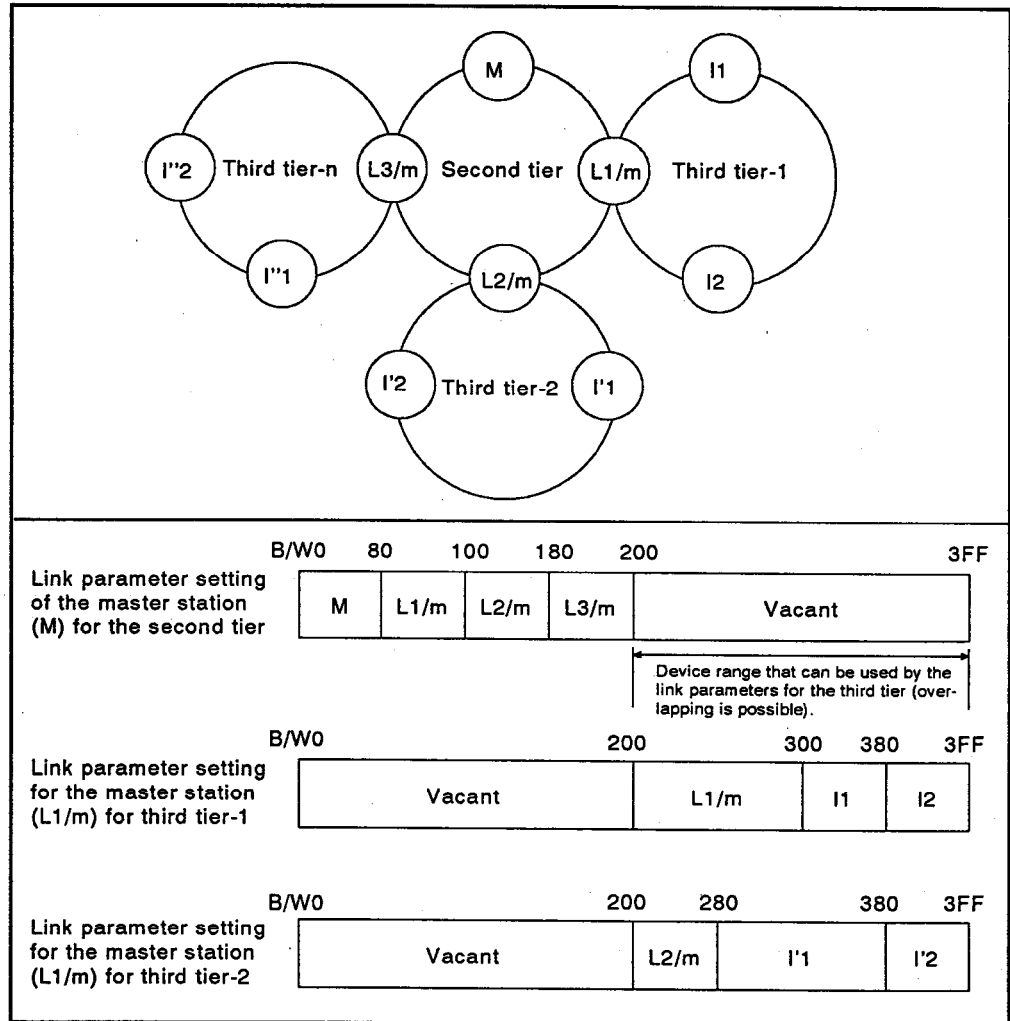


Fig. 5.8 Expanded Link Relay (B) and Link Register (W) Ranges

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

- (a) Link relays (B) and link registers (W) used by the second-tier link cannot be used for sending data to the local stations in 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, because they are local stations in the same link.

- (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 and the local stations in the second-tier link.

The master station for the third tier can only receive data from the local stations in the link in which it is connected.

For example, L1/m can only receive data from I1 and I2.

The expanded link relay (B) and link register (W) device range that can be used for communication in the system configuration from Fig. 5.8 is summarized in Table 5.5.

Table 5.5 Communication Range when the Link Relay (B) and Link Register (W) Ranges are Expanded

			*1								Remark
*4	*3	*2	M	L1/m	L2/m	L3/m	I1	I2	I'1	I'2	
Master station (M) for the second tier	M	B/W0 to 7F	○	○	○	○					Reading is only possible for the stations (M, L1/m, L2/m, L3) connected in the second-tier link. Reading of data from the local stations (I1, I2, I'1, I'2) in the third-tier link is not possible.
	L1/m	B/W80 to FF	○	○	○	○					
	L2/m	B/W100 to 17F	○	○	○	○					
	L3	B/W180 to 1FF	○	○	○	○					
Master station (L1/m) for third-tier-1	L1/m	B/W200 to 2FF		○			○	○			Reading is only possible for the stations (L1/m, I1, I2) connected in the third-tier-1 link. Reading of data from other stations (M, L2/m, L3, I'1, I'2) is not possible.
	I1	B/W300 to 37F		○			○	○			
	I2	B/W380 to 3FF		○			○	○			
Master station (L1/m) for third-tier-2	L2/m	B/W200 to 27F			○				○	○	Reading is only possible for the stations (L2/m, I'1, I'2) connected in the third-tier-2 link. Reading of data from other stations (M, L1/m, L3, I1, I2) is not possible.
	I1	B/W280 to 37F			○				○	○	
	I2	B/W380 to 3FF			○				○	○	

*1 : Receive (data read) range
 *2 : Device range
 *3 : Send (data write) range
 *4 : Link parameter setting station

POINT

Write a program for the master station for the third tier that recognizes the communication range for the stations in the second-tier link and those in the third-tier link.

With L1/m in Table 5.5, for example, the device range B/W80 to B/WFF is used for communication with the stations (M, L2/m, L3) connected in the second-tier link. Use device range B/W200 to B/W2FF for communication with the stations (I1, I2) in the third-tier-1 link.

5. SPECIFICATIONS

Data Link System	MELSECNET			MELSECNETB		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode						
Applicability		o	o		o	o

MELSEC-A

5.3.8 MELSECNET II mode and MELSECNET II composite mode

When a MELSECNET II mode-compatible link module is used as a 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.

POINT

In the MELSECNET II mode, if a MELSECNET-compatible data link module is used as a slave station, communication with this station will stop.

(1) MELSECNET II mode

Select the MELSECNET II mode when only MELSECNET (II)-compatible data link modules are connected in the data link.

Remote I/O stations cannot be used in this mode.

If a remote I/O station is used, select the MELSECNET II composite mode.

(a) Up to 4096 data link points in the range of B/W0 to B/WFFF are possible.

(b) The maximum number of link points per master station or local station is 2048 bytes (up to 1024 bytes in the MELSECNET mode).

In the MELSECNET II mode, the first half link parameter and the second half link parameter can be allocated. Up to 1024 bytes can be allocated for each, meaning that up to 2048 bytes can be used for data link.

(c) It is possible to operate the data link system 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 to the first half range.

If the maximum number of link points per station is 1024 bytes or less, use the devices with only the first half link parameter. This will reduce the handshake processing load in sequence programs. Refer to Section 9.1 for more details.

POINT

If both the first and second half link parameters are allocated, the station for which only the first or second half link parameter device range allocation is made can read all of the data allocated to the first and second half link parameters.

With the link parameter setting illustrated in Fig. 5.9, only the first half link parameter is allocated for L3. However, L3 can read devices that are allocated to the second half link parameters used by other station.

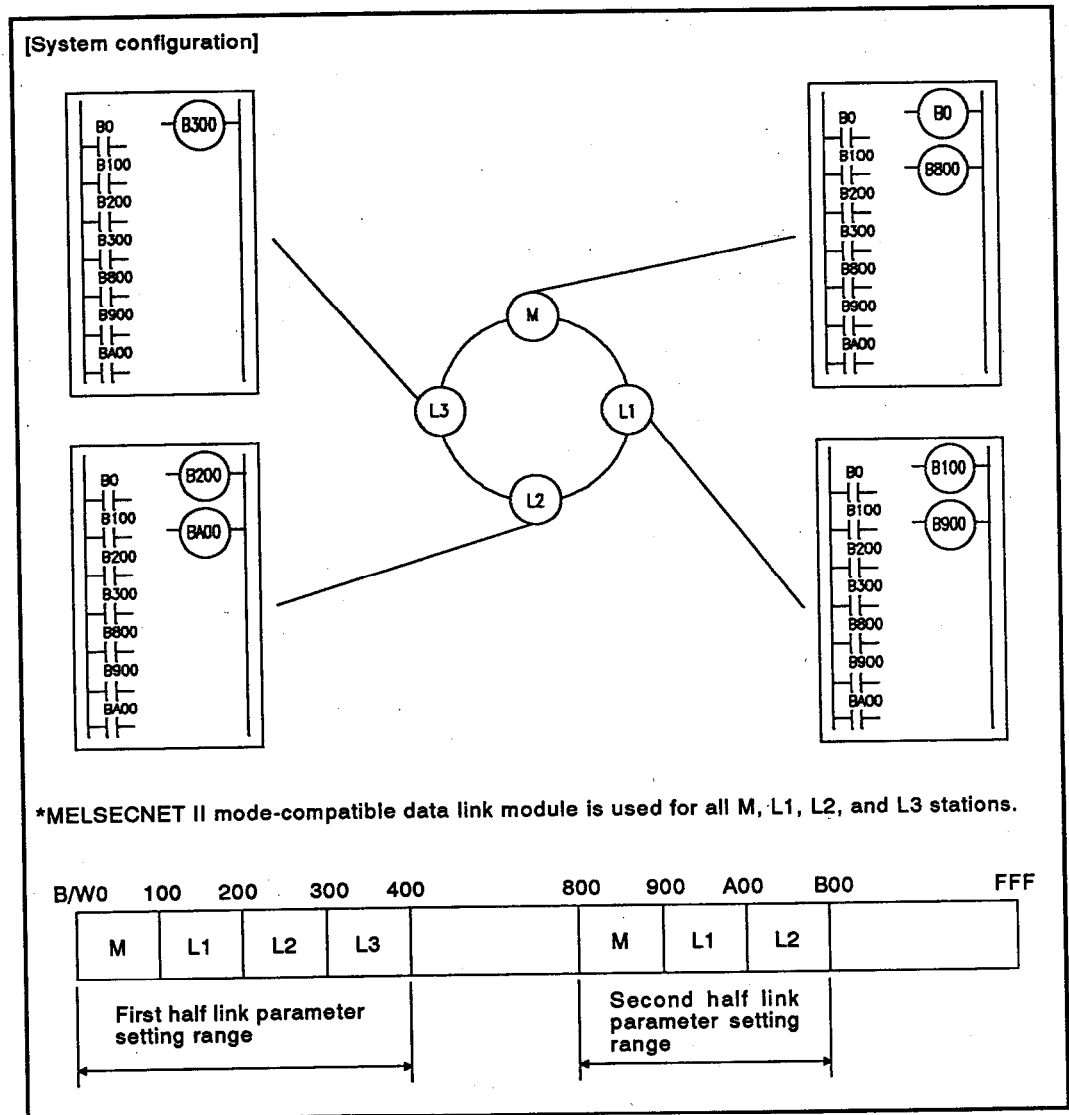


Fig. 5.9 System Using MELSECNET II Mode

(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) Up to 4096 points in the range of B/W0 to B/WFFF are possible for the data link.
- (b) The maximum number of link points per master station or local station is 2048 bytes.

In the MELSECNET II composite mode, the first half link parameter and the second half link parameter can be allocated. Up to 1024 bytes can be allocated for each, meaning that up to 2048 bytes can be used for data link (1024 bytes for MELSECNET mode-compatible local station and 512 bytes for MELSECNET mode-compatible remote I/O station).

POINT

A MELSECNET mode-compatible local station can only read the device range (link relays and link registers) allocated to the first half link parameter. Devices allocated to the second half link parameter cannot be read.

L1 in Fig. 5.10, for example, cannot read the devices in the range of B/W300 to B/W4FF because it uses a MELSECNET mode-compatible data link module.

MELSECNET II mode-compatible master stations and local stations can read the devices in the range allocated to both the first and second half link parameters.

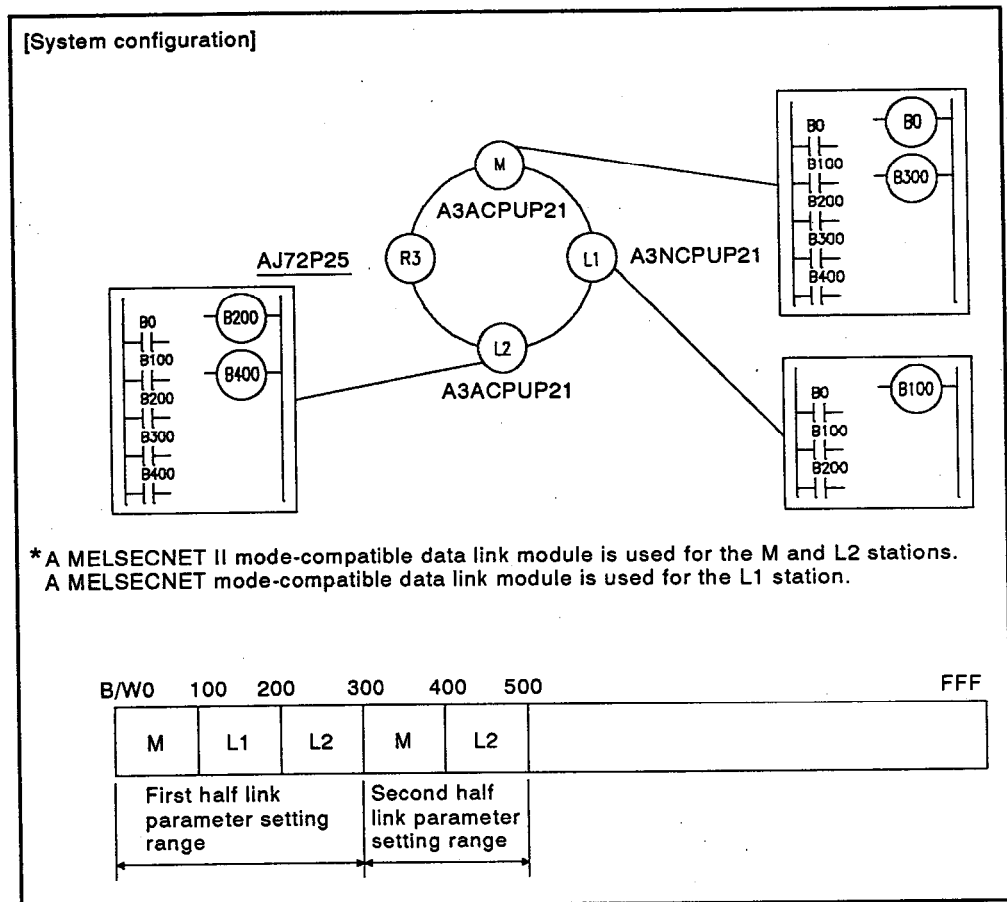


Fig. 5.10 System Using MELSECNET II Composite Mode

REMARKS

- (1) When a MELSECNET mode-compatible data link module is used for the master station, the system operates in the MELSECNET mode even if a MELSECNET II mode-compatible data link module is connected as a local station.
- (2) When the MELSECNET mode link parameter is set while using an MELSECNET II mode-compatible data link module, the system will operate in the MELSECNET mode.
- (3) When only the first half link parameter is set in the MELSECNET II composite mode, the system will operate in the MELSECNET mode.

Data Link System	MELSECNET			MELSECNET/B		
Operating Mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Applicability	○	○	○	○	○	○

5. SPECIFICATIONS

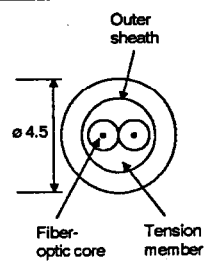
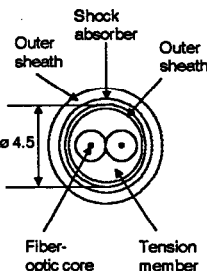
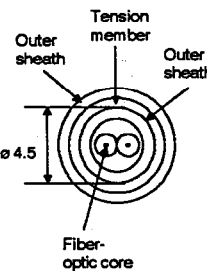
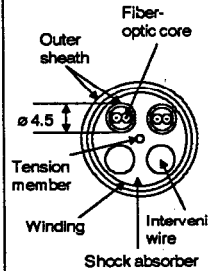
MELSEC-A

5.4 Fiber-Optic Cable Specifications

Fiber-optic cables require specialized techniques and special tools for fitting the connector plugs to the cable. When purchasing connector plugs, make sure that they are compatible with the sockets.

5.4.1 SI-type fiber-optic cable

Table 5.6 SI-type Fiber-optic Cable

Item	Standard Cable for Indoor Cabling	Reinforced Cable for Indoor Cabling	Standard Cable for Outdoor Cabling	Reinforced Cable for Outdoor Cabling
Construction				
Cable diameter	4.5 mm (0.18 in)	8.5 mm (0.33 in)	8.5 mm (0.33 in)	14 mm (0.55 in)
Allowable bending radius	50 mm (1.97 in) or more	85 mm (3.35 in) or more	85 mm (3.35 in) or more	140 mm (5.51 in) or more
	4.5 mm (0.18 in) dia. When cable is extended	45 mm (1.77 in) or more 90 mm (3.54 in) or more	45 mm (1.77 in) or more 170 mm (6.69 in) or more	45 mm (1.77 in) or more 280 mm (11.02 in) or more
Allowable tensile load	Cable	20 kg (44 lb)	20 kg (44 lb)	40 kg (88 lb)
	4.5 mm (0.18 in) dia. Connector	20 kg (44 lb)	20 kg (44 lb)	20 kg (44 lb)
Ambient temperature	-10 to 70°C		-20 to 60°C	
Transmission loss	L type: Maximum 12 dBm/km, *H type: Maximum 24 dBm/km			
Transmission band	Minimum 5 MKz/km			
Core diameter	200 μm (SI type multi-component glass fiber)			
Clad diameter	250 μm (SI type multi-component glass fiber)			
Number of cores	2 cores			2 core x (1 to 4) pieces
Weight	15 kg/km	50 kg/km	40 kg/km	170 kg/km
Applicable connector	2-core optical connector plug (CA9003)			
Purchase order type	A-2P-[]M-A	A-2P-[]M-B	A-2P-[]M-C	A-2P-[]M-[]D

Remark

(1) Enter the cable length required in [].

- A-2P-[] M-A
- A-2P-[] M-B
- A-2P-[] M-C
- A-2P-[] M-[]D

Specify length. (Unit: m (ft))
Example : 20 m (65.62 ft)
A-2P-20M-A

Specify the number of 2-core cords.
Example : Two 2-core cords of 30 m (98.43 ft) length.
A-2P-30M-2D

(2) * = An H-type fiber-optic cable can be used when the distance between two stations is less than 500 m (1640.5 ft).

5. SPECIFICATIONS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode						
Applicability	○	○	○			

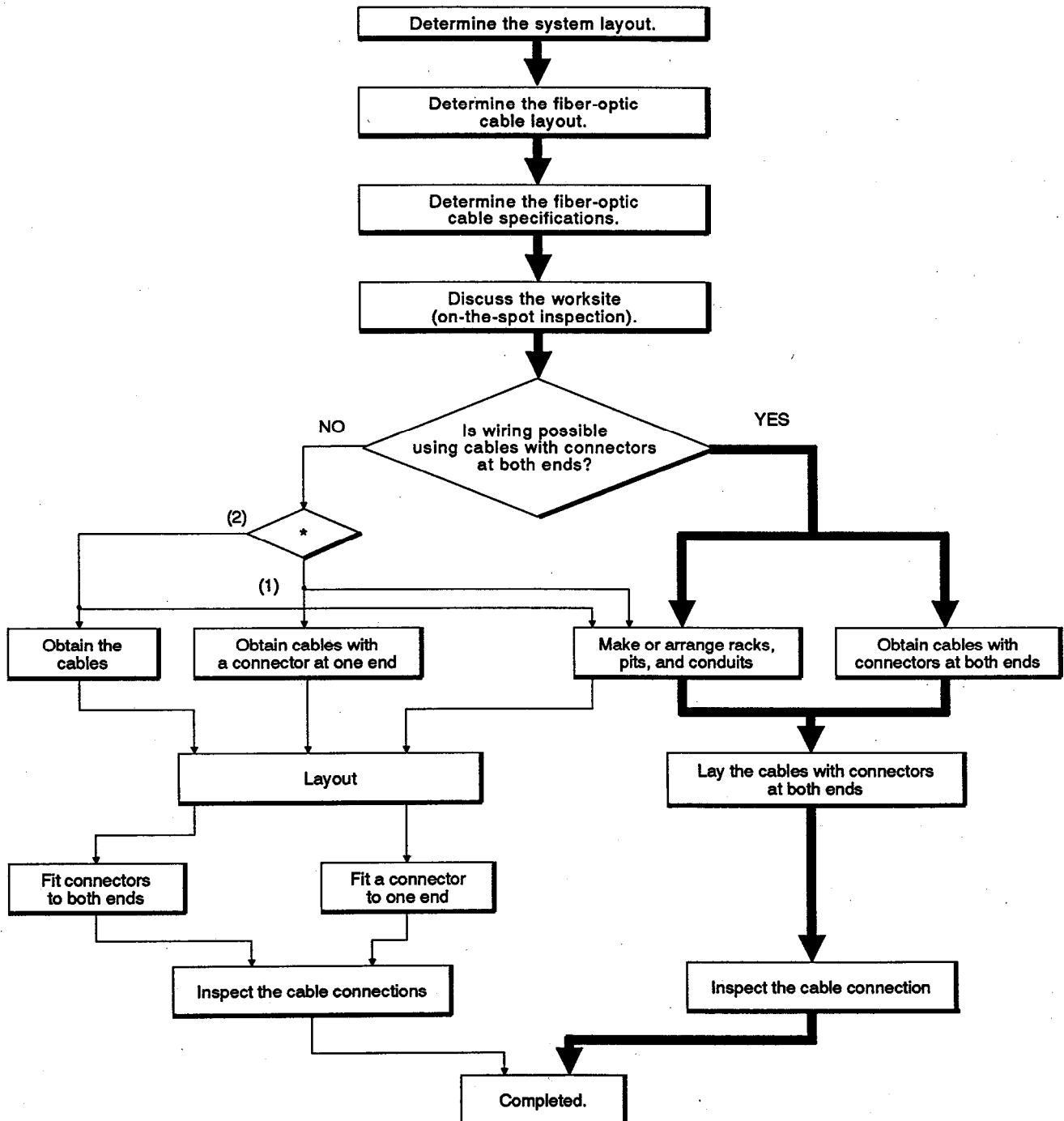
MELSEC-A

5.4.2 How to obtain fiber-optic cables

- (1) Order fiber-optic cables from your nearest Mitsubishi representative.

(Consult your nearest Mitsubishi representative when the connectors must be fitted after the conduit work.)

- (2) Flow chart showing conduit work and fiber-optic cable connections



- *
 (1) Connectors must be fitted to one end at the worksite.
 (2) Connectors must be fitted to both ends at the worksite.

5. SPECIFICATIONS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Applicability	○	○	○			

MELSEC-A

5.5 Coaxial Cable

This section gives the specifications of coaxial cable used for the coaxial data link.

The coaxial cables used are high-frequency coaxial cables "3C-2V" and "5C-2V" (conforming to JIS C 3501).

5.5.1 Coaxial cable

Table 5.7 Coaxial Cable

Item	3C-2V	5C-2V
Construction		
Cable diameter	5.4 mm (0.21 in)	7.4 mm (0.29 in)
Allowable bending radius	22 mm (0.87 in) or more	30 mm (1.18 in) or more
Internal conductive material diameter	0.5 mm (0.02 in) (Annealed copper wire)	0.8 mm (0.03 in) (Annealed copper wire)
Insulating material diameter	3.1 mm (0.12 in) (Polyethylene)	4.9 mm (0.19 in) (Polyethylene)
External conductive material diameter	3.8 mm (0.15 in) (Single annealed copper wire mesh)	5.6 mm (0.22 in) (Single annealed copper wire mesh)
Used jack type	227161-4	
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. SPECIFICATIONS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	□	□	□	□	□	□
Applicability	□	□	□	□	□	□

MELSEC-A

5.5.2 Connector for the coaxial cable

The following explains the structure and connecting procedures of the connector for the coaxial cable.

(1) Structure of the BNC connector and the coaxial cable

Fig. 5.8 shows the structure of the BNC connector and the coaxial cable.

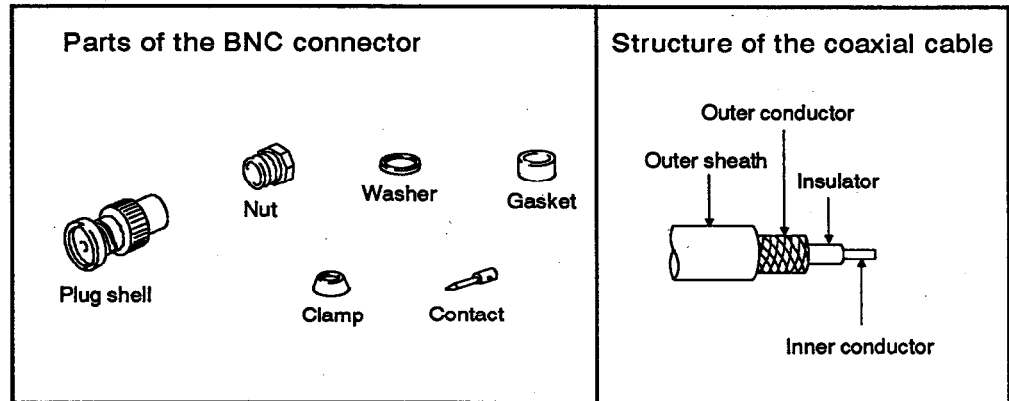
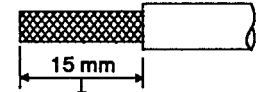


Fig. 5.8 Structure of the BNC Connector and the Coaxial Cable

(2) Connecting the BNC connector with the coaxial cable

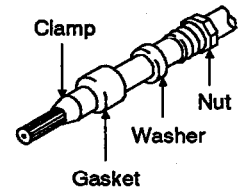
The following describes the procedure for connecting the BNC connector with the coaxial cable.

- (a) Remove the outer sheath at the end of the coaxial cable as shown. Use caution not to damage the outer conductor.



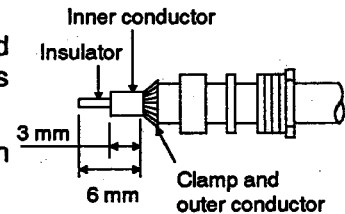
Remove the outer sheath.

- (b) Slip a nut, a washer, a gasket, and a clamp on the coaxial cable, and loosen the outer conductor.

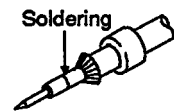


- (c) Cut the outer conductor, insulator, and inner conductor to specified dimensions as shown.

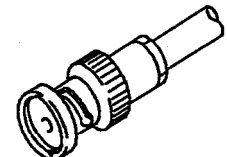
Cut the outer conductor and spread it on the taper of the clamp.



- (d) Solder the contact to the tip of the inner conductor.



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



POINT

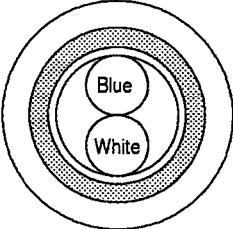
Use caution as follows when soldering the contact to the inner conductor.

- (a) Solder must not be protruding.
- (b) The tail end of the contact and the cut end of the insulator must contact close to each other or the contact must not be cutting in the insulator.
- (c) Apply solder quickly so that the insulator may not deform.

5.6 Twisted-Wire Pair Cable

This section gives the specifications of the twisted-wire pair cable for a MELSECNET/B Data Link System.

Table 5.8 Shielded Twisted-Wire Pair Cable

Model Name	KNPEV-SB 0.5 SQ X 1P
Type of cable	Shielded twisted-wire pair cable
Number of cores	2
Conductive resistance (20°C)	3.94 MΩ/km or lower
Insulation resistance (20°C)	10 MΩkm or higher
Dielectric withstand voltage (V-min)	1000 VAC for one minute
Electrostatic capacity (1 KHz)	70 nF/km or less (on average)
Characteristic impedance (100 KHz)	110 ± 10Ω
Cross section	

REMARK

Consult nearest Mitsubishi representative with twisted-wire pair cable.

6. LINK DATA SEND/RECEIVE PROCESSING AND PROCESSING TIME

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	○	○	○	○	○	○
Applicability	○	○	○	○	○	○

MELSEC-A

6. LINK DATA SEND/RECEIVE PROCESSING AND PROCESSING TIME

6.1 Link Data Communication Processing

6.1.1 Communication processing outline

In the Data Link System, the link data set as the link parameters on the master station is communicated repeatedly.

(1) Link module configuration

- (a) A link module used in a master station or local station has a link data storage area, in which the link data to be communicated to other stations is stored, and the data memory storage area, in which the data used for processing within the station is stored.
- (b) A link module used in a remote I/O station has a link data storage area in which the link data to be communicated to other stations is stored.

(2) Link data communication

Link data communication is executed in a link scan or a link refresh.

- (a) A link scan is executed when link data is communicated between link modules (link data storage areas).
- (b) A link refresh is executed when link data is communicated 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 an I/O module or special function module.

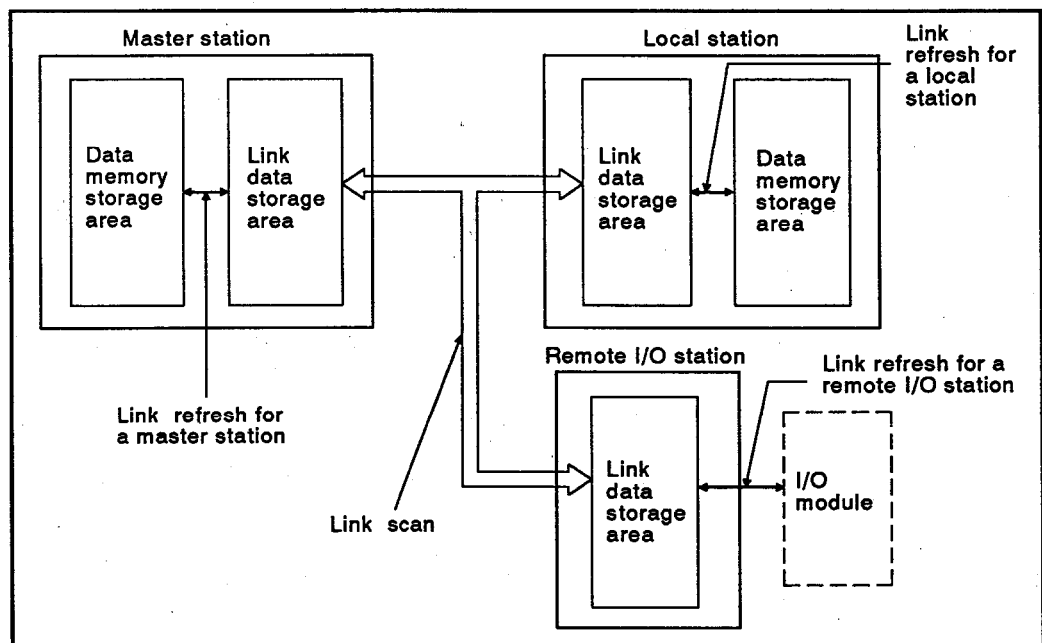


Fig. 6.1 Link Data Communications

6. LINK DATA SEND/RECEIVE PROCESSING AND PROCESSING TIME

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Applicability	○	○	○	○	○	○

MELSEC-A

6.1.2 Link refresh execution timing

- (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 preset intervals

A link refresh will be executed in intervals defined by the user.

When a link refresh is executed as described in Item (1) or (3), only some of the communicated data will be updated because the link refresh is being executed during sequence program operation.

To prevent such a problem, use handshake processing between the data send station and data receive station to control communication. Refer to Section 9.1 for more details.

The link refresh execution timing possible for each link module is listed in Table 6.1.

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
A0J2CPUP23/R23	○	—	—
AnCPUP21/R21			
AnNCPUP21/R21			
A1SCPU + AJ71AP21/R21	○	○*	—
A0J2HCPUP21/R21			
A2CCPUP21/R21			
A3HCPUP21/R21			
A3MCPUP21/R21	—	○	—
AnACPUP21/R21			
A0J2P25/R25			
AJ72P25/R25	○	—	—
A6CGT-MP/MR			

POINT

- (1) An asterisk marks the cases in which a link refresh will be executed only after the execution of an END instruction in a sequence program in which the programs steps between step 0 and the END instruction are set by the sequence program as a link-refresh inhibited zone.
- (2) The link refresh timing for the following modules is the same as the link refresh timing for the CPU module used as the master station for the first tier.
 - A1SJ71T21B
 - AJ71AT21B
 - AJ71AP21/R21
 - AJ71P22/R22
 - AJ71AP22/R22
- (3) A link scan does not influence the processing time (example: ACPU scan time) of a master station or local station. It is executed in parallel with master and local station processing.
- (4) A link refresh causes the processing time of a master station and local station to be extended by the link refresh time because it is executed by interrupting the master and local station processing.
- (5) Link data communication is possible in any of the following ACPU states: RUN, STOP, PAUSE, STEP-RUN.

6. LINK DATA SEND/RECEIVE PROCESSING AND PROCESSING TIME

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	○	○	○	○	○	○
Applicability	○	○	○	○	○	○

MELSEC-A

6.1.3 Link data during a communication error

The following describes how link data is processed when a communication error occurs.

- At the master station or local station at which the communication error occurred, operation processing continues and the data is maintained as it was just before the occurrence of the communication error.
- If the communication error occurs with an output module loaded to a remote I/O station, all output points are turned OFF.
- In the link device range of a normally operating station at which link data is received from a station at which a communication error has occurred, the data is maintained as it was just before the occurrence of the communication error. Operation processing is executed with this data.

The following describes how the link data is processed according to the station (master, local, or remote I/O station) at which a communication error has occurred.

(1) When a communication error occurs at a master station

- (a) Communications with all slave stations (local and remote I/O stations) are stopped.
- (b) At the master station at which the communication error occurred, either M9210 is turned ON or "5" is set to D9204.

The data received from a slave station is maintained as it was just before the occurrence of the communication error. Operation processing is executed with this data.

In the special relays (M9224 to M9239) and special registers (D9202 to D9242) of the master station, the data is maintained as it was just before the occurrence of the communication error.

- (c) At the local stations, M9250 and M9251 are turned ON.

At devices in the range of the data link, data is maintained as it was just before the occurrence of the communication error.

Operation processing is executed with this data.

- (d) At the remote I/O stations, all of the output points of the output modules and special function modules loaded to that station are turned OFF.

(2) When a communication error occurs at a local station

- (a) At the local station at which the communication error occurred, either M9211 is turned ON or M9250 and M9251 are turned ON.

Communication with normally operating stations continues.

In the special relays (M9240 to M9255) and special registers (D9243 to D9255) of the local station, the data is maintained as it was just before the occurrence of the communication error.

6. LINK DATA SEND/RECEIVE PROCESSING AND PROCESSING TIME

MELSEC-A

- (b) The master station recognizes 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 as it was just before the occurrence of communication error.

- (c) Normally operating local stations 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 local station at which the communication error has occurred, the data is maintained as it was 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 loaded to that station are turned OFF.

- (b) The master station recognizes 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 local station at which the communication error has occurred, the data is maintained as it was 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 6.3.1.

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

(1) Link refresh processing time required for the master, local, and remote I/O stations

Link refresh processing time is required for link refresh (see Section 6.1.1).

Calculate the link refresh processing time using the formulas given in Section 6.2.2.

(2) Link scan time

Link scan time is required for link scan (see 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 required for the master and local stations

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.

6. LINK DATA SEND/RECEIVE PROCESSING AND PROCESSING TIME

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	o	o	o	o	o	o
Applicability	o	o	o	o	o	o

MELSEC-A

6.2.1 Transmission delay time in a two-tier system

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 instruction 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 (Y)	$M \times 4 + \alpha_1 \times 3 - LS - \alpha_2$ 	$M \times 2 + \alpha_1 + (L + \alpha_2) \times 2 - LS$
	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 instruction 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 in the master station
 L : Sequence program scan time in 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 : Link refresh time for a remote I/O station

6. LINK DATA SEND/RECEIVE PROCESSING AND PROCESSING TIME

MELSEC-A

$M < L < LS, L < M < LS$	$M < LS < L$
<p>$LS \times 2 + \alpha_1 + \alpha_2 + L$</p>	<p>$LS + \alpha_1 + L + \alpha_2 + \left(\frac{L + \alpha_2 - \alpha_1}{LS + \alpha_1}\right) \times (LS + \alpha_1)$</p> <p>Integer (decimal fraction rounded up)</p>
<p>$LS \times 4 + \alpha_1 \times 4$</p> <p>LRDP executed LRDP completed</p>	<p>$(LS + \alpha_1) \times 2 + \left(\frac{L + \alpha_2}{LS + \alpha_1}\right) \times (LS + \alpha_1) + M$</p> <p>LRDP executed Integer (decimal fraction rounded up) LRDP completed</p>
<p>$M + \alpha_1 \times 3 + LS \times 2 - \alpha_2$</p>	<p>$(LS + \alpha_1) \times 2 + M + \left(\frac{L + \alpha_2 - \alpha_1}{LS + \alpha_1}\right) \times (LS + \alpha_1) + \alpha_1$</p> <p>Integer (decimal fraction rounded up)</p>
<p>$LS \times 2 + \alpha_1 \times 2 + LS + \alpha_2' - \alpha_2$</p>	<p>$LS \times 2 + \alpha_1 + \left(\frac{LS + \alpha_2 - \alpha_1}{LS + \alpha_1}\right) \times (LS + \alpha_1) + \left(\frac{L + \alpha_2' - \alpha_1}{LS + \alpha_1}\right) \times (LS + \alpha_1) + \alpha_2 + L + 1$</p> <p>Integer (decimal fraction rounded up)</p>
<p>$LS \times 2 + \alpha_1 + \alpha_3$</p>	<p>$M + LS \times 5 + \alpha_1 \times 6$</p> <p>RFRP executed RFRP completed</p>
<p>$M + LS \times 2 + \alpha_1 \times 3 - \alpha_3$</p>	<p>$M + LS \times 2 + \alpha_1 \times 3 - \alpha_3$</p>

6. LINK DATA SEND/RECEIVE PROCESSING AND PROCESSING TIME

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	○	○	○			
Applicability	○	○	○			

MELSEC-A

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) allocated to the master station

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

X_1 : Total number of link inputs (X) allocated to the station in question

Y_1 : Total number of link outputs (Y) allocated to the station in question

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

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:

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

When the link operates in the MELSECNET II mode or the MELSECNET II composite mode, the total number of link relays (B) and link registers (W) is the sum of the link relays (B) and link registers (W) points set with the first half and the second half link parameter.

	Module Name			K_{M1}	K_{M2}	K_{M3}
Master station for the second tier	AnCPUP21/R21	AnCPU+AJ71AP21/R21		1.8	1.8	6.6
	AnNCPUP21/R21	AnNCPU+AJ71AP21/R21		0.8	1.0	4.1
	A2ACPUP21/R21 (S1)	A2ACPU(S1)+AJ71AP21/R21		0.26	0.18	1.45
	A3ACPUP21/R21	A3ACPU+AJ71AP21/R21		0.20	0.14	1.09
	A3HCPUP21/R21	A3HCPU+AJ71AP21/R21		0.49	0.19	1.54
	A3MCPUP21/R21	A3MCPU+AJ71AP21/R21		0.49	0.19	1.54
Master station for the third tier	AnCPUP21/R21	AnCPU+AJ71AP21/R21	AnCPU+AJ71AP22/R22	1.8	1.8	6.6
	AnNCPUP21/R21	AnNCPU+AJ71AP21/R21	AnNCPU+AJ71AP22/R22	0.8	1.2	6.4
	A2ACPUP21/R21 (S1)	A2ACPU(S1)+AJ71AP21/R21	A2ACPU(S1)+AJ71AP22/R22	0.54	0.54	4.32
	A3ACPUP21/R21	A3ACPU+AJ71AP21/R21	A3ACPU+AJ71AP22/R22	0.48	0.52	4.16
	A3HCPUP21/R21	A3HCPU+AJ71AP21/R21	A3HCPU+AJ71AP22/R22	0.67	0.61	4.87
	A3MCPUP21/R21	A3MCPU+AJ71AP21/R21	A3MCPU+AJ71AP22/R22	0.67	0.61	4.87

POINT

Two types of link refresh are executed for the master station for the third tier: link refresh as a local station in the second tier and link refresh as a master station for the third tier.

6. LINK DATA SEND/RECEIVE PROCESSING AND PROCESSING TIME

MELSEC-A

(2) Local stations

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

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

When the link operates in the MELSECNET II mode or the MELSECNET II composite mode, the total number of link relays (B) and link registers (W) is the sum of the link relays (B) and link registers (W) points set with the first half and the second half link parameter.

Module Name		K _{L1}	K _{L2}	K _{L3}
AnCPUP21/R21	AnCPU+AJ71AP21/R21	0.6	1.8	6.6
AnNCPUP21/R21	AnNCPU+AJ71AP21/R21	0.4	1.0	4.1
A2ACPUP21/R21 (S1)	A2ACPU(S1)+AJ71AP21/R21	0.16	0.18	1.45
A3ACPUP21/R21	A3ACPU+AJ71AP21/R21	0.13	0.14	1.09
A3HCPUP21/R21	A3HCPU+AJ71AP21/R21	0.21	0.19	1.54
A3MCPUP21/R21	A3MCPU+AJ71AP21/R21	0.21	0.19	1.54

(3) Remote I/O stations

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

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

Module Name	K _{R1}	K _{R2}
AJ72P25/R25	0.6	0.9

6. LINK DATA SEND/RECEIVE PROCESSING AND PROCESSING TIME

MELSEC-A

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 total number of link relay (B) and link register (W) points is the sum of the link relay (B) and link register (W) points set with the first half and second half link parameters.

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

	Module Name		KM1	KM2	KM3
	CPU Module	Link Module			
Master station for the second tier	A1SCPU	A1SJ71T21B	0.8	1.0	4.1
	AnCPU	AJ71AT21B	1.8	1.8	6.6
	AnNCP		0.8	1.0	4.1
	A2ACPU(S1)		0.26	0.18	1.45
	A3ACPU		0.20	0.14	1.09
	A3HCPU		0.49	0.19	1.54
	A3MCP		0.49	0.19	1.54
Master station for the third tier	AnCPUP21/R21	AJ71AT21B	1.8	1.8	6.6
	AnNCPUP21/R21(S1)		0.8	1.2	6.4
	A2ACPUP21/R21 (S1)		0.54	0.54	4.32
	A3ACPUP21/R21		0.48	0.52	4.16
	A3HCPUP21/R21		0.67	0.61	4.87
	A3MCPUP21/R21		0.67	0.61	4.87

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.

6. LINK DATA SEND/RECEIVE PROCESSING AND PROCESSING TIME

MELSEC-A

(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 total number of link relay (B) and link register (W) points is the sum of the link relay (B) and link register (W) points set with the first half and second half link parameters.

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

Module Name		KL1	KL2	KL3
CPU Module	Link Module			
A1SCPU	A1SJ71T21B	0.4	1.0	4.1
AnCPU	AJ71AT21B	0.6	1.8	6.6
AnNCP		0.4	1.0	4.1
A2ACPU(S1)		0.16	0.18	1.45
A3ACPU		0.13	0.14	1.09
A3HCPU		0.21	0.19	1.54
A3MCP		0.21	0.19	1.54

6. LINK DATA SEND/RECEIVE PROCESSING AND PROCESSING TIME

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Applicability	○	○	○			

MELSEC-A

6.2.3 Link data communication time (link scan)

When a MELSECNET Data Link System is used

(1) In the MELSECNET mode

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

(2) In the MELSECNET II mode

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

(3) In the MELSECNET II composite mode

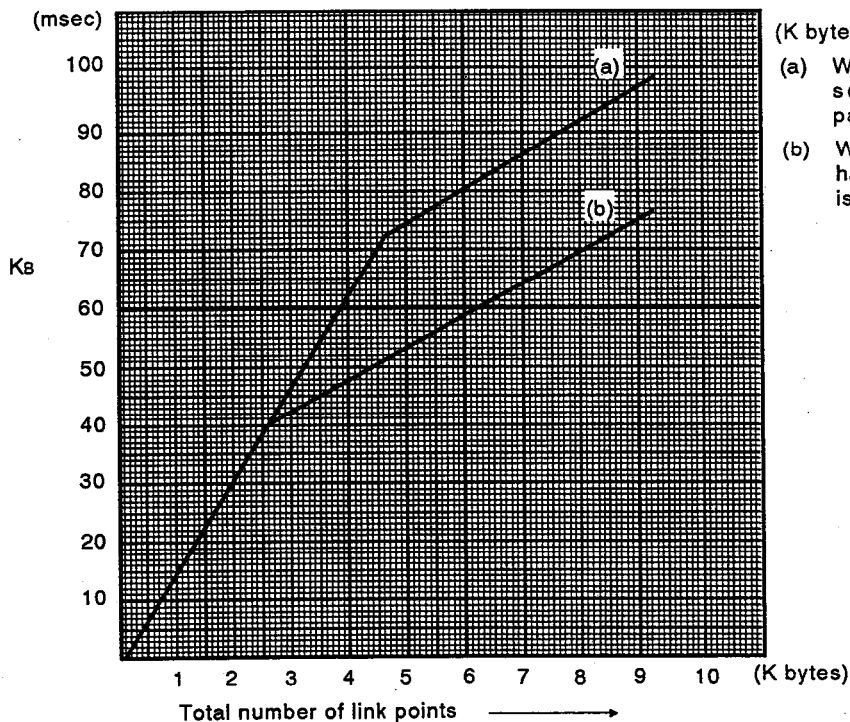
$$LS = K + K_R \times [\text{Total number of remote I/O stations}] + K_L [\text{Total number of local stations} + \text{Number of local stations allocated to second half link parameters}] + K_B \text{ [msec]}$$

(4) Refer to the following table for the K, K_R, and K_L values.

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.

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



6. LINK DATA SEND/RECEIVE PROCESSING AND PROCESSING TIME

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	○	○	○	○	○	○
Applicability				○	○	○

MELSEC-A

When a MELSECNET/B Data Link System is used

(1) In the MELSECNET mode

$$LS = K + KL \times (\text{Total number of local stations}) + Kb \text{ [msec]}$$

(2) In the MELSECNET II mode

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

(3) In the MELSECNET II composite mode

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

(4) The following table gives the K and KL values (used in the above formulas).

(These values vary depending on the baud rate setting.)

[msec]

Baud Rate Setting	Constant	Total Number of Local Stations			
		1 to 8	9 to 16	17 to 24	25 to 31
125K	K	6.7	7.2	7.7	8.2
	KL	3.8	3.8	3.9	3.9
250K	K	5.8	6.3	6.8	7.3
	KL	3.1	3.1	3.2	3.2
500K	K	5.8	6.3	6.8	7.3
	KL	2.7	2.7	2.8	2.8
1M	K	5.8	6.3	6.8	7.3
	KL	2.6	2.6	2.7	2.7

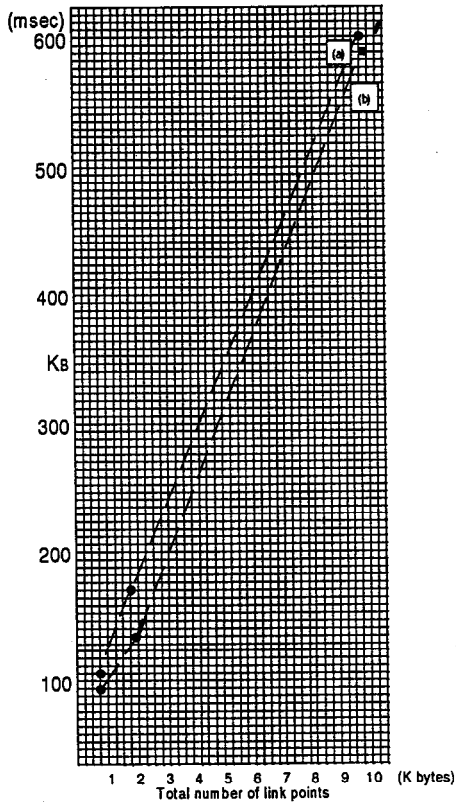
(5) Calculate the total number of link points (bytes), and use one of the graphs shown on the next page to obtain the Kb value.

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

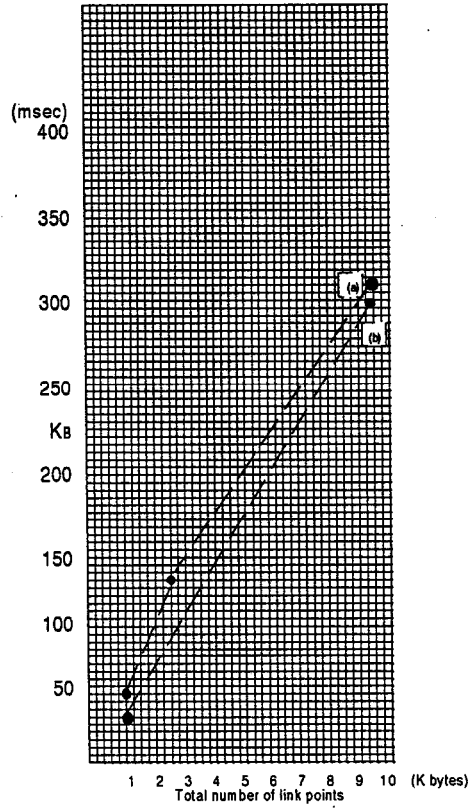
6. LINK DATA SEND/RECEIVE PROCESSING AND PROCESSING TIME

MELSEC-A

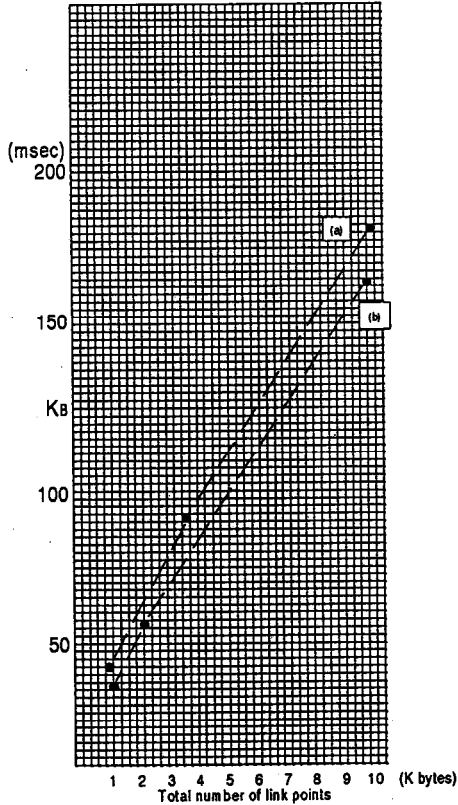
(1) Baud rate is set to 125K bps



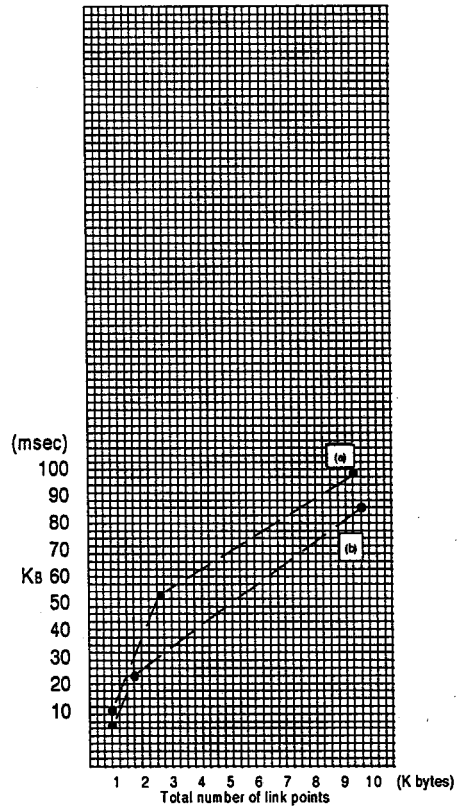
(2) Baud rate is set to 250K bps



(3) Baud rate is set to 500K bps



(4) Baud rate is set to 1M bps



6. LINK DATA SEND/RECEIVE PROCESSING AND PROCESSING TIME

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II compatible mode	MELSECNET mode	MELSECNET II mode	MELSECNET II compatible mode
Applicability	○	○	○	○	○	○

MELSEC-A

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 obtained for the two-tier system.

- (1) The transmission delay time between the master station for the second tier/local station in the second tier and 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 between the master station for the third tier and the local station in 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 after the execution of an END instruction and the link scan time for the third tier is longer than the scan time for the master station for the third tier, add the following factor:

(Third tier scan time) + (Scan time for the master station for the third tier)

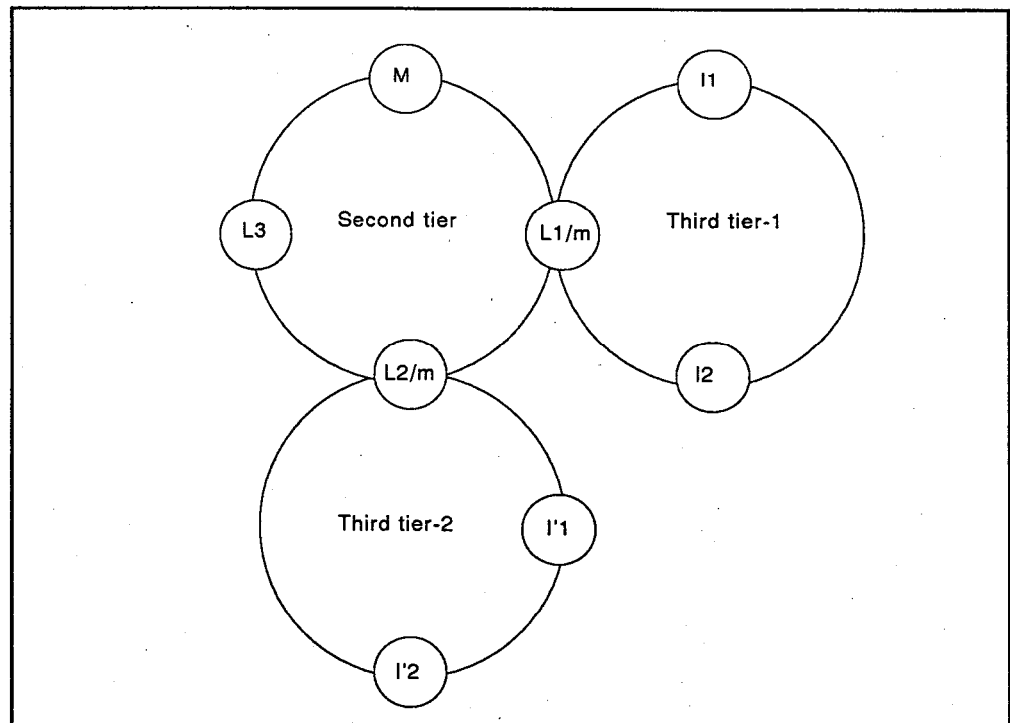


Fig. 6.2 Three-Tier System

6. LINK DATA SEND/RECEIVE PROCESSING AND PROCESSING TIME

MELSEC-A

Examples:

- (1) To transmit B/W data from M to I1
 - (a) If (L1/m scan time) > (third tier-1 scan time)
(Transmission delay time from M to L1/m) + (Transmission delay time from L1/m to I1) + (L1/m scan time)
 - (b) If (L1/m scan time) < (third tier-1 scan time)
(Transmission delay time from M to L1/m) + (Transmission delay time from L1/m to I1) + (third tier-1 scan time)
- (2) To transmit B/W data from I1 to M
 - (a) If (L1/m scan time) > (third tier-1 scan time)
(Transmission delay time from I1 to L1/m) + (Transmission delay time from L1/m to M) + (L1/m scan time)
 - (b) If (L1/m scan time) < (third tier-1 scan time)
(Transmission delay time from I1 to L1/m) + (Transmission delay time from L1/m to M) + (third tier-1 scan time)
- (3) To transmit B/W data from I'1 to L3
 - (a) If (L2/m scan time) > (third tier-2 scan time)
(Transmission delay time from I'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 scan time)
(Transmission delay time from I'1 to L2/m) + (Transmission delay time from L2/m to L3) + (third tier-2 scan time)

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

6.4 Time to Access Another Station from an External Device

This section describes the processing time when one station is accessed from another station.

(Section 6.2.3 gives details about the processing time of LRDP/LWTP and RFRP/RTOP.)

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 another station from an external device using a MELSECNET/B Data Link System requires:

- 4 min 7 sec (Write to another station) *1
- 2 min 1 sec (Read from another station) *2
- 1 min 56 sec (Verification with another station) *2

The above data can be applied when the communication speed is set to 1M bps 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.

If the total number of stations is less than 32, the processing time becomes shorter.

REMARKS

(1) *1: When the PC CPU (to which a sequence program is written) is set to STOP.

(2) *2: When the PC CPU is set to RUN.

7. LINK PARAMETERS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode						
Applicability	○	○	○	○	○	○

MELSEC-A

7. LINK PARAMETERS

7.1 Link Parameter Outline

The Data Link System can use any of the three operation modes listed below. The required operation can be selected according to the combinations of the data link modules connected in the link.

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

The following sections describe the link parameters to be set when using these operation modes.

Set the link parameters by using a peripheral device, and store them in the PC CPU of a master station.

Use the following peripheral devices (corresponding to an AnACPU) to set link parameters for the MELSECNET II mode or the MELSECNET II composite mode:

- A6GPP + SW4GP-GPPAE system FD
- A6PHP + SW4GP-GPPAE system FD
- IBM PC/AT + SW0IX-GPPAE system FD

7. LINK PARAMETERS

Data Link System	MELSECNET			MELSECNET/R		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode						
Applicability	□			□		

MELSEC-A

7.1.1 Link parameters to be set for the MELSECNET mode

When the MELSECNET mode is used, only one type of link parameter should be used.

On the LINK screen, set the data for the following items.

(1) Slave PC station

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

(2) WDT for link

Refer to Section 7.2 for details.

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

(3) Master station allocation

Allocate the device range (B/W0 to B/W3FF) 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 each slave station (local station or remote I/O station) to be connected.

(5) Local station allocation

(a) Allocate the device range (B/W0 to B/W3FF) to be used by a local station for writing data to the link relays (B) and link registers (W).

(b) Allocate the link range to be established with the outputs (Y) of a master station and the inputs (X) of a local station and the link range to be established with the inputs (X) of the master station and the outputs (Y) of a local station.

(6) Remote I/O station allocation

(a) Allocate the number of I/O module points to be loaded to each remote I/O stations.

(b) Allocate the link registers (W) to be used by the special function modules loaded in each of the remote I/O station for read/write processing.

7. LINK PARAMETERS

MELSEC-A

REMARK

The GPP link parameter setting screen is illustrated below.

* LINK *						M : B ↔ ALL	L : B 000-27F
MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms	M : W ↔ ALL	L : W 000-2BF
		B	W			M : W → ALL	R : W 300-341
M	4	000-00F	000-0FF	200	XXXX	M : W ← ALL <th>R : W 360-39F</th>	R : W 360-39F
						M : Y → ALL <th>L : X 680-77F</th>	L : X 680-77F
						M : Y → ALL <th>R : Y 230-59F</th>	R : Y 230-59F
						M : X ← ALL <th>L : Y 600-77F</th>	L : Y 600-77F
						M : X ← ALL <th>R : X 200-4BF</th>	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

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Applicability		○			○	

7. LINK PARAMETERS

MELSEC-A

7.1.2 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 by a station (master station or local station).

(1) First half link parameters

(a) Slave PC station

Allocate the total number of local stations to be connected. Remote I/O stations cannot be connected.

(b) WDT for link

Allocate the watchdog time. The watchdog time is the reference time used by the system to determine whether communication between the master station and every local station is being executed normally.

(c) Master station allocation

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

(d) Local station allocation

1) Allocate 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) Allocate the link range to be established with the outputs (Y) of a master station and the inputs (X) of a local station and the link range to be established with the inputs (X) of the master station and the outputs (Y) of a local station.

(2) Second half link parameters

(a) Master station allocation

Allocate 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 allocation

Allocate 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 allocated with the second half link parameters begins after the range allocated with the first half link parameters: "(final device number allocated with the first half link parameters) + 1".

If 0 points are allocated with the first half link parameters, allocation with the second half link parameters can begin from B0/W0.

7. LINK PARAMETERS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode						
Applicability		o			o	

MELSEC-A

POINT

- The following link parameters can be set in the MELSECNET II mode:
- 1024 bytes in the first half.
 - 1024 bytes in the second half.

(3) Link parameter setting screens

The following shows the link parameter setting screens.

(a) First half link parameters

* MELSECNET II MODE LINK *						M : B1 ↔ ALL	L : B1 000-8FF
MASTER	SLAVE PC STATIONS	FIRST M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms	M : W1 ↔ ALL	L : W1 000-4FF
		B	W			M : B2 ↔ ALL	L : B2 C00-CFF
M	3	000-0FF	000-0FF	200	XXXX	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
L : LOCAL R : REMOTE
PRESS <SSN> TO SELECT 1ST/2ND RANGE OF B/W

(b) Second half link parameters

* MELSECNET II MODE LINK *						M : B1 ↔ ALL	L : B1 1000-8FF
MASTER	SLAVE PC STATIONS	SECOND M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms	M : W1 ↔ ALL	L : W 000-4FF
		B	W			M : B2 ↔ ALL	L : B2 C00-CFF
M	3	C00-CFF	800-8FF	200	XXXX	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
L : LOCAL R : REMOTE
PRESS <SSN> TO SELECT 1ST/2ND RANGE OF B/W

7. LINK PARAMETERS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode			0			0
Applicability			0			0

MELSEC-A

7.1.3 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 B/W3FF, and the system will operate on the same level as the MELSECNET mode system.

Allocate the range of addresses B/W 400 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 should be set for the first half link parameters.

(1) Slave PC station

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

(2) WDT for link

Refer to Section 7.2 for details.

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

(3) Master station allocation

Allocate the device range (B/W0 to B/W3FF) 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 each slave station (local station for the MELSECNET mode or remote I/O station for the MELSECNET II mode) to be connected.

(5) Local station allocation

(a) Allocate the device range (B/W0 to B/W3FF) to be used by a local station for writing data to the link relays (B) and link registers (W).

(b) Allocate the link range to be established with the outputs (Y) of a master station and the inputs (X) of a local station and the link range to be established with the inputs (X) of the master station and the outputs (Y) of a local station.

(6) Remote I/O station allocation

- (a) Allocate the number of I/O module points to be loaded to each remote I/O station.
- (b) Allocate the link registers (W) to be used by the special function modules loaded in each of the remote I/O station for read/write processing.

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 allocation

Allocate 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 allocation

Allocate 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 allocated with the second half link parameters begins after the range allocated with the first half link parameters: "(final device number allocated with the first half link parameters) + 1".

If 0 points are allocated with the first half link parameters, allocation with the second half link parameters can begin from B0/W0.

7. LINK PARAMETERS

MELSEC-A

Link parameter setting examples

The following shows link parameter setting screens.

(a) First half link parameters

* MELSECNET II MULTI MODE LINK *						M : B1 ↔ ALL	L : B1 000-37F
MASTER	SLAVE PC STATIONS	FIRST M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms	M : W1 ↔ ALL	L : W1 000-2BF
		B	W			M : B2 ↔ ALL	L : B2 800-8FF
M	4	000-OFF	000-OFF	200	XXXX	M : W2 ↔ ALL	R : W2 800-AFF
						M : W ← ALL	R : W 300-341
						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
PRESS <SSN> TO SELECT 1ST/2ND RANGE OF B/W

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

(b) Second half link parameters

* MELSECNET II MULTI MODE LINK *						M : B1 ↔ ALL	L : B1 -
MASTER	SLAVE PC STATIONS	SECOND M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms	M : W1 ↔ ALL	L : W1 -
		B	W			M : B2 ↔ ALL	L : B2 800-AFF
M	4	800-8FF	800-8FF	200	XXXX	M : W2 ↔ ALL	L : W2 800-AFF
						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
PRESS <SSN> TO SELECT 1ST/2ND RANGE OF B/W

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

7. LINK PARAMETERS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	o	o	o	o	o	o
Applicability	o	o	o	o	o	o

MELSEC-A

7.2 WDT for Link

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

- (1) If the link scan is repeatedly executed within the set watchdog time and the data link is established, 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 set watchdog 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 as it was just before the occurrence of the communication error.
 - 3) The value "5" is stored to special register D9204.
 - (b) Local stations
 - 1) The ERROR LED "TIME" in the data link module lights.
 - 2) Receive data is maintained as it was just before the occurrence of the communication error.
 - 3) Special relay M9251 (link stop) is turned ON.
 - (c) Remote I/O stations
 - 1) The ERROR LED "TIME" in the data link module lights.
 - 2) All output modules loaded to the remote I/O stations are turned OFF.

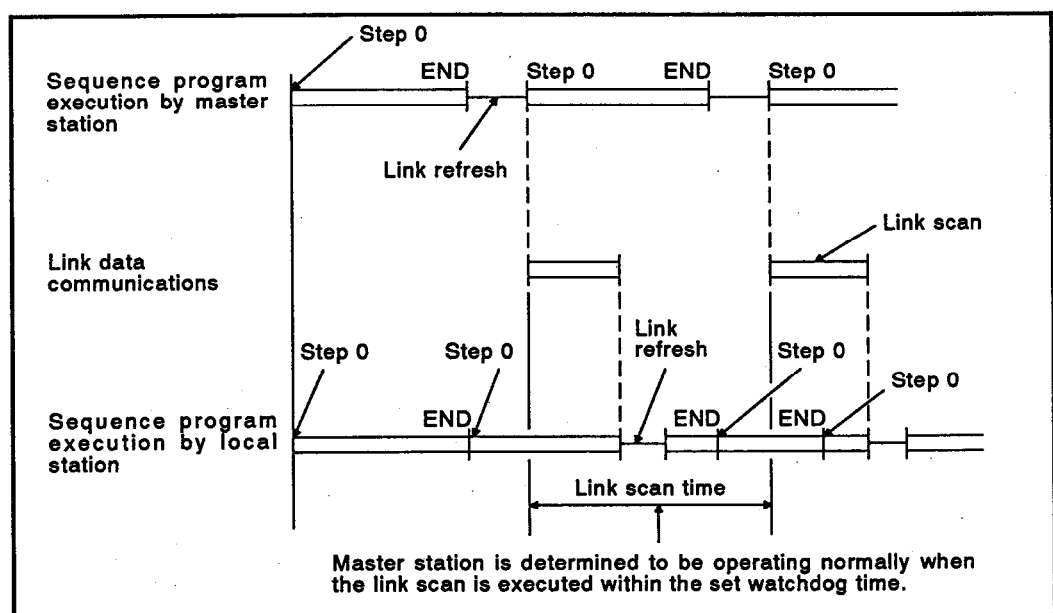


Fig. 7.1 Watchdog Time

(3) Setting the watchdog time

The watchdog time can be set between 10 and 2000 msec in units of 10 msec. The usual setting is 2000 msec.

The shortest watchdog time setting will turn off the outputs of a remote I/O station at which a communication error has occurred with as short a delay as possible.

Use following procedure to set the smallest watchdog time is described below.

- (a) Set "200" (2000 msec) to "WDT for link" and write the setting to the master station.
- (b) Use the link monitor function of the master station to operate the system and monitor link scan execution. Refer to Section 10.1.1 for details on the link scan function.
- (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.
- (e) Display the LINK screen and set the new data to "WDT for link" and write the setting to the master station.

New data = (Maximum link scan time) + 50 msec

7. LINK PARAMETERS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode						
Applicability	○	○	○	○	○	○

MELSEC-A

7.3 General Link Parameter Information

7.3.1 Maximum number of link points per station

(1) Master station and local stations

(a) MELSECNET mode

A maximum of 1024 bytes of link points can be used by a master or local station. Use the following formula to calculate the maximum number of link points for each individual station:

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

(b) MELSECNET II mode or MELSECNET II composite mode

A maximum of 1024 bytes of link points can be allocated with the first half link parameters and a maximum of 1024 bytes can be allocated with the second half link parameters used by a master or local station. Use the following formula to calculate the maximum number of link points for each individual station:

First half link parameters

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

Second half link parameters

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

(2) Remote I/O stations

A maximum of 512 input points (X), a maximum of 512 output points (Y), and a maximum of 512 bytes of total link data can be allocated to a remote I/O station. Use the following formula to calculate the maximum number of link points for each individual station:

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

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

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

7. LINK PARAMETERS

Data Link System	MELSECNET			MELSECNET/β		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Applicability	○	○	○	○	○	○

MELSEC-A

7.3.2 Determining the link relay (B) allocation range

- (1) Allocate link relays (B) in units of 16 points (B[][]0 to B[][]F).
- (2) The device range that can be allocated with the second half link parameters begins after the range allocated with the first half link parameters: "(final device number allocated with the first half link parameters) + 1".

If 0 points are allocated with the first half link parameters, allocation with the second half link parameters can begin from B0.

7. LINK PARAMETERS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	○	○	○	○	○	○
Applicability	○	○	○	○	○	○

MELSEC-A

7.3.3 Determining the link register (W) allocation range

Link registers (W) are used for communications between a master station and a local station and between a master station and a remote I/O station.

Allocate the link register in one-point units.

Allocate the link registers to (a) the area for communications between a master and local station, and (b) the area for communications between a master and remote I/O station separately, as shown below.

(1) Make the following divisions to make allocations with the link parameters in the MELSECNET mode or with the first half link parameters in the MELSECNET II composite mode:

- (a) The area used by a master or local station to write data to itself (referred to as the "M/L area" in this manual).
- (b) The area used by a special function module loaded to a remote I/O station for read/write (RFRP, RTOP instruction) (referred to as the "M/R area" in this manual).

Make the following divisions to split the M/R area into a read area and a write area:

- 1) The area used to read data from a remote I/O station to the master station (referred to as the "M ← R area" in this manual)
- 2) The area used to write data from the master station to a remote I/O station (referred to as the "M → R area" in this manual)

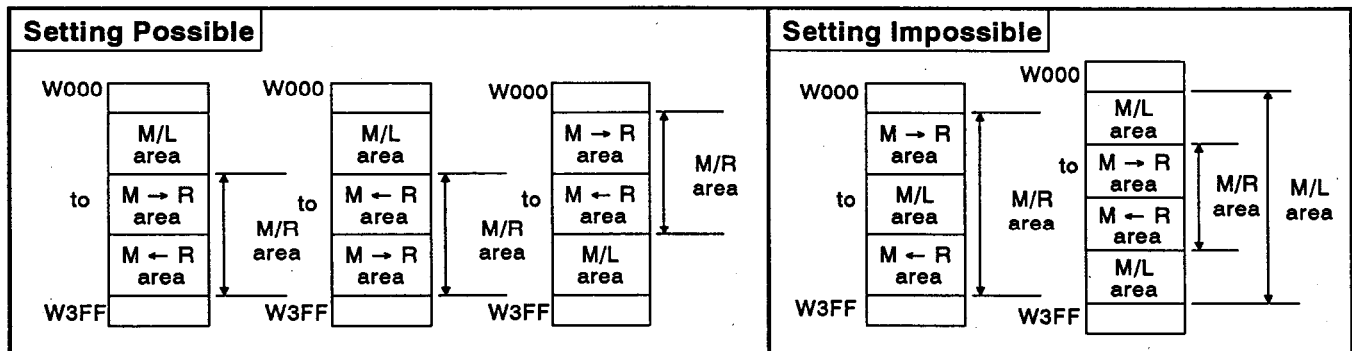


Fig. 7.2 Link Register (W) Allocation Range

3) Consider the range used by the system when allocating the M → R area.

The system uses the M → R area to execute RFRP/RTOP instructions.

[Number of points used by the system]

Each link register (W) point is used for one special function module loaded to a remote I/O station.

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Applicability	○	○	○	○	○	○

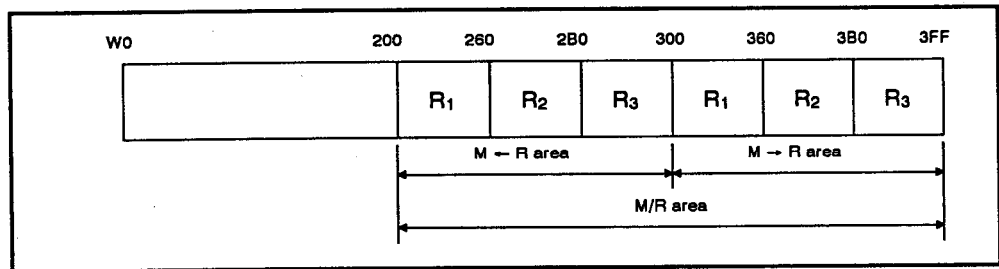
7. LINK PARAMETERS

MELSEC-A

[Range used by the system]

The range used by the system begins at the M → R area head device number allocated to each remote I/O station to one point less than the total number of use points: "number of use points - 1".

For example, when three special function modules are loaded to remote I/O station 2, the range W360 to W362 in the M → R area W360 to W3AF is used by the system.



- (2) The device range that can be allocated with the second half link parameters begins after the range allocated with the first half link parameters: "(final device number allocated with the first half link parameters) + 1".

If 0 points are allocated with the first half link parameters, allocation with the second half link parameters can begin from B0.

Data Link System	MELSECNET			MELSECNET/B		
Operating Mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Applicability	○	○	○	○	○	○

7. LINK PARAMETERS

MELSEC-A

7.3.4 Determining the input (X) and output (Y) allocation range

Make the following divisions to the range that follows the range used by the master station I/O (I/O module loaded) to make allocation with the link parameters in the MELSECNET mode or with the first half link parameters in the MELSECNET II composite mode:

- (1) The area used for communication between the master station and a local station (referred to as the "M/L area" in this manual).
- (2) The area used for communication between the master station and a remote I/O station (referred to as the "M/R area" in this manual).

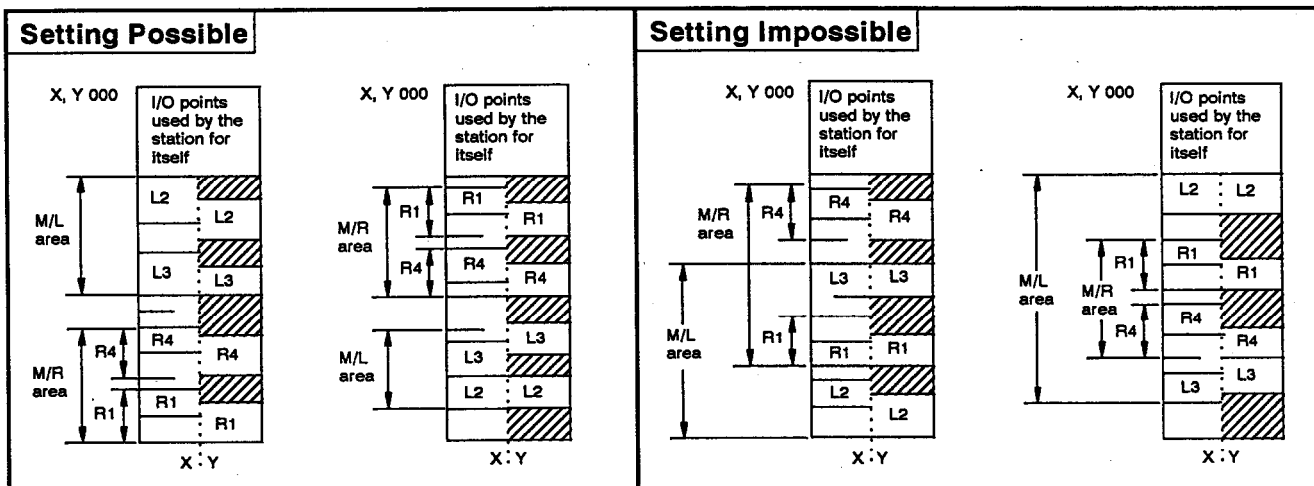
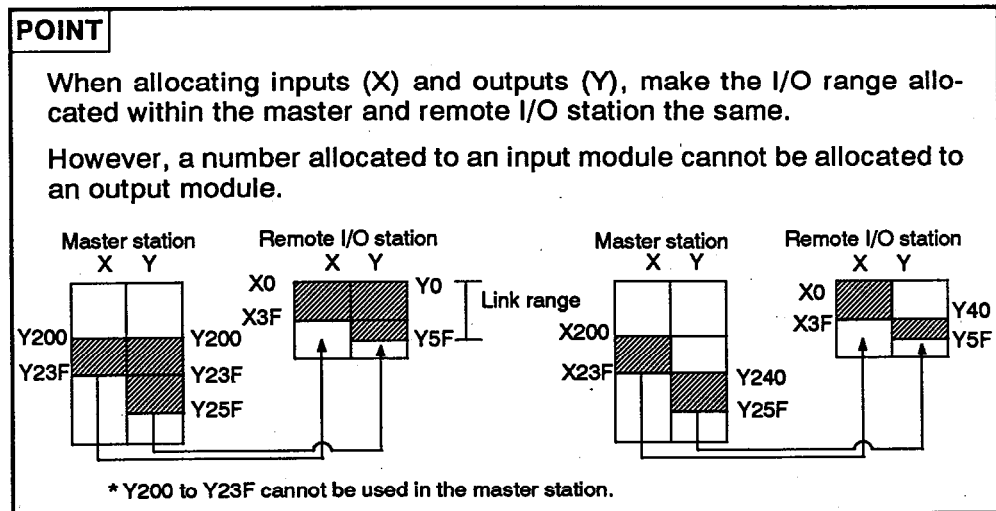


Fig. 7.3 Input (X) and Output (Y) Allocation Range

- (3) Inputs (X) and outputs (Y) are allocated in units of 16 points (X[][]0 to X[][]F and Y[][]0 to Y[][]F).



REMARK

- (1) Inputs (X) and outputs (Y) are allocated with the first half link parameters in the MELSECNET II mode.
- (2) However, because remote I/O stations cannot be connected in the MELSECNET II mode, the range does not need to be divided as described above.

Since remote I/O stations cannot be connected in a MELSECNET/B data link system, the range does not need to be divided for M/L and M/R.

7. LINK PARAMETERS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	o			o		
Applicability						

MELSEC-A

7.4 Link Parameters in the MELSECNET Mode

Possible system configurations in the MELSECNET mode:

- System consisting of a master station and local stations (referred to as a "local system" in this manual).
- System consisting of a master station and remote I/O stations (referred to as a "remote I/O system" in this manual).
- System consisting of a master station, local stations, and remote I/O stations (referred to as a "local/remote I/O system" in this manual).

7.4.1 Device allocation for a local system and link parameter setting example

Allocation for a local system

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

- (1) Determine the link relay (B) and link register (W) allocation range for each master station and local station (refer to Sections 7.3.2 and 7.3.3).
- (2) If the number of link relay (B) points is insufficient, check the use of inputs (X) and outputs (Y) for one-to-one data communication between the master station and a local station (refer to Section 7.3.4).
- (3) Make sure that the number of link points per station does not exceed the following limits (refer to Section 7.3.1):
 - Master station : 1024 bytes
 - Local station : 1024 bytes

Link parameter setting example

Fig. 7.4 shows a link parameter setting of a local system when the MELSEC-NET mode is used.

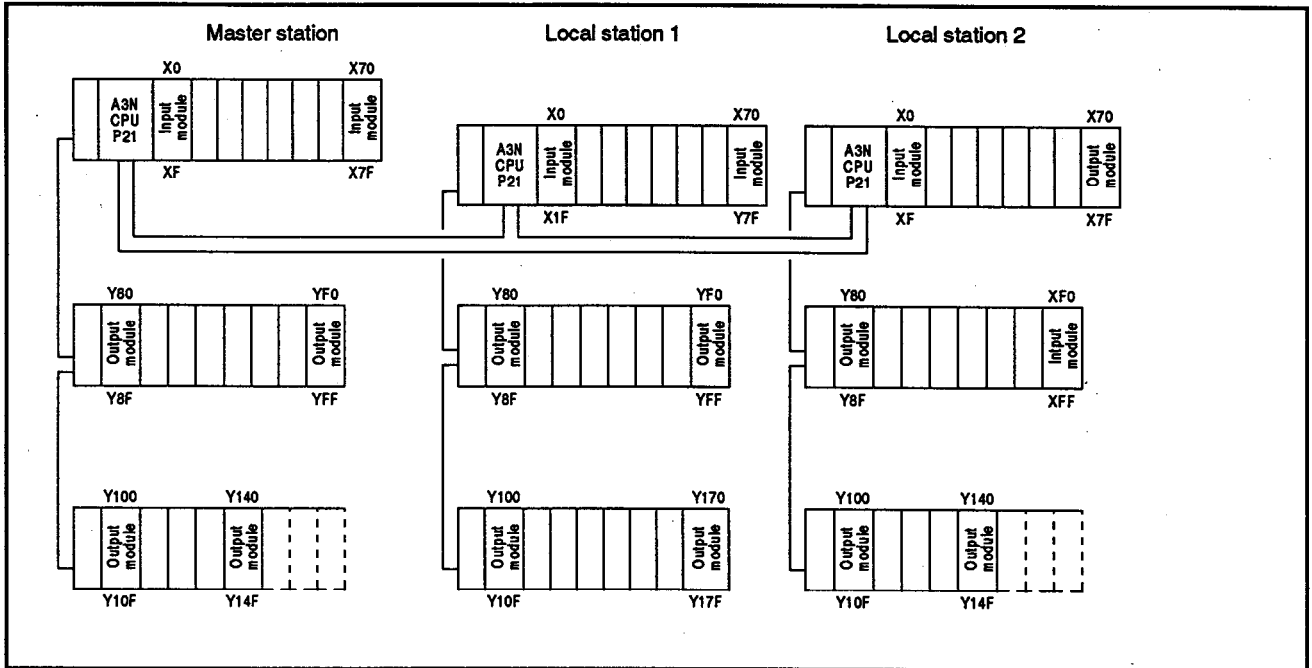


Fig. 7.4 System Configuration Example

7. LINK PARAMETERS

MELSEC-A

(1) Allocating link relay (B)

(a) To allocate 256 points to a master station, 128 points to local station 1, and 128 points to local station 2:

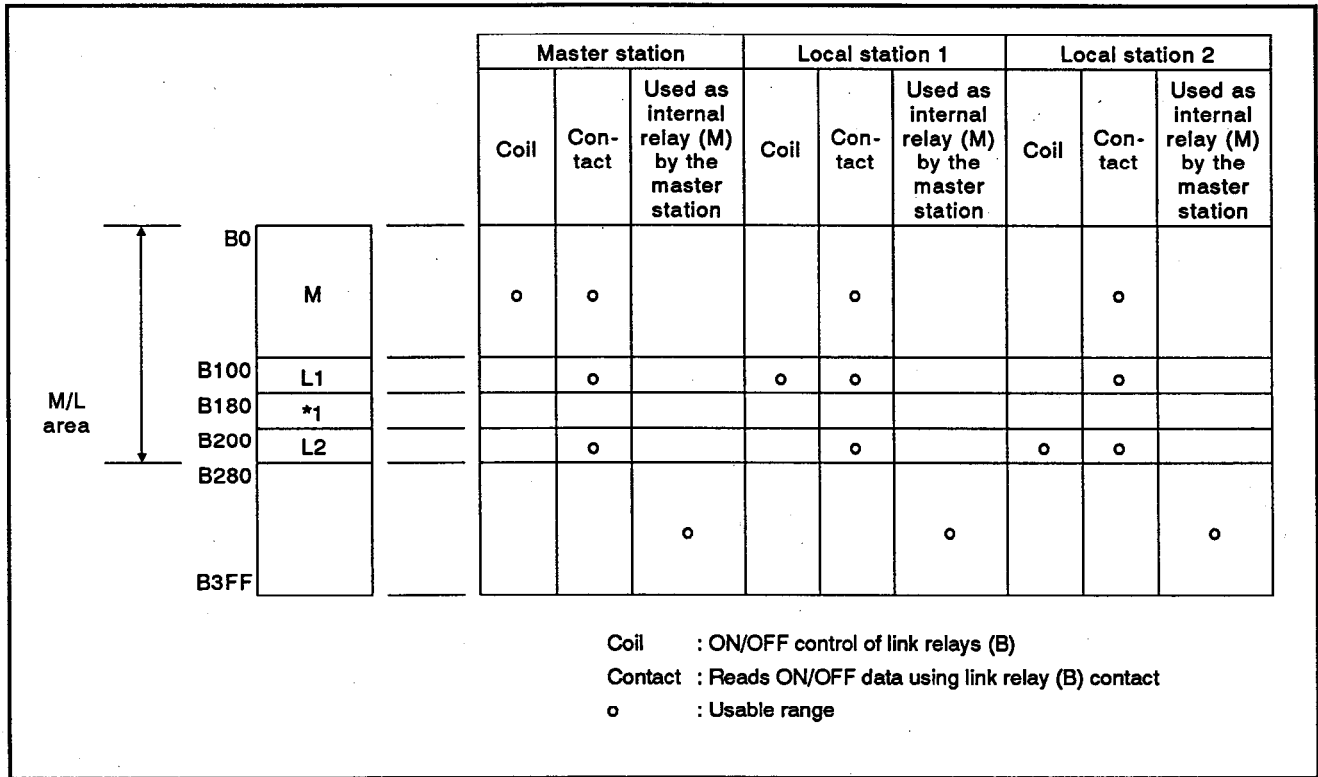


Fig. 7.5 Link Relay (B) Allocation Example

(b) The vacant area marked with an asterisk in the M/L area in Fig. 7.5 cannot be used in place of internal relay (M).

The M/L area is the range (B0 to 27F) from the minimum device number to the maximum device number allocated by the link parameters.

7. LINK PARAMETERS

(2) Allocating link register (W)

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

To allocate 256 points to the master station, 128 points to local station 1, and 196 points to local station 2.

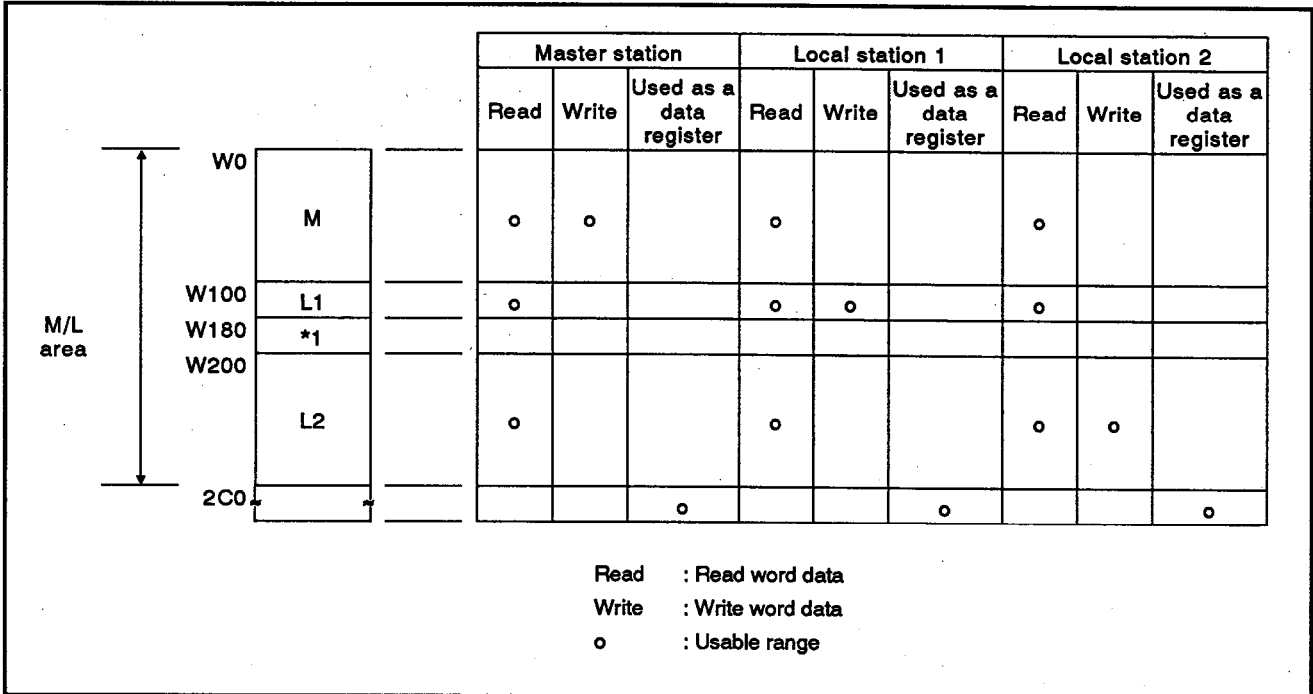


Fig. 7.6 Link Register (W) Allocation Example

(b) In Fig. 7.6, the vacant area marked with *1 cannot be used as a data register (D) by the master station and local stations.

(3) Allocating inputs (X) and outputs (Y)

(a) The I/O range used for data link by a master station

The master station uses the I/O devices in the X/Y0 to X/Y14F range for itself.

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

(b) Allocation for local stations

In this example, inputs (X) and outputs (Y) are not required because there is a vacant area in the link relay (B) allocation. However, to simplify the explanation, 128 input (X) points and 128 output (Y) points have been allocated.

1) Local station 1

Local station 1 uses the I/O devices in the X/Y0 to X/Y17F range for itself.

The X/Y180 to X/Y7FF range can be used for the data link.

2) Local station 2

Local station 2 uses I/O devices in the X/Y0 to X/Y14F range for itself.

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

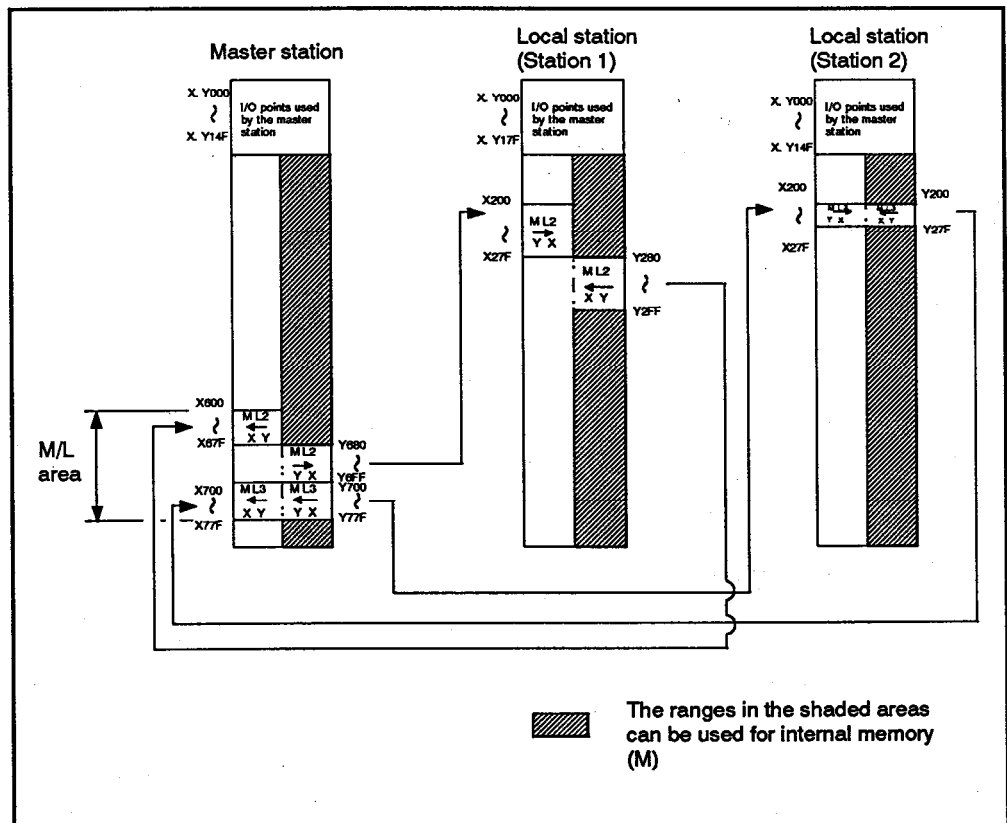


Fig.7.7 Inputs (X) and Outputs (Y) Allocation Example

7. LINK PARAMETERS

MELSEC-A

(4) Link parameter setting

When the allocation of (1) to (3) is executed, set the link parameters as shown below.

* LINK *						M : B	↔	ALL	L : B	000-27F
MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTER- MITTENT 10ms	M : W	↔	ALL	L : W	000-2BF
		B	W			M : W	→	ALL	R : W	-
M	2	000-OFF	000-OFF	200	XXXX	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 M : MASTER L : LOCAL R : REMOTE

R : REMOTE

7. LINK PARAMETERS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode				X		
Applicability	o			X		

MELSEC-A

7.4.2 Device allocation for a remote I/O system and link parameter setting example

Allocation for a remote I/O system

- (1) Determine the first device number of the I/O module loaded to a remote I/O station.

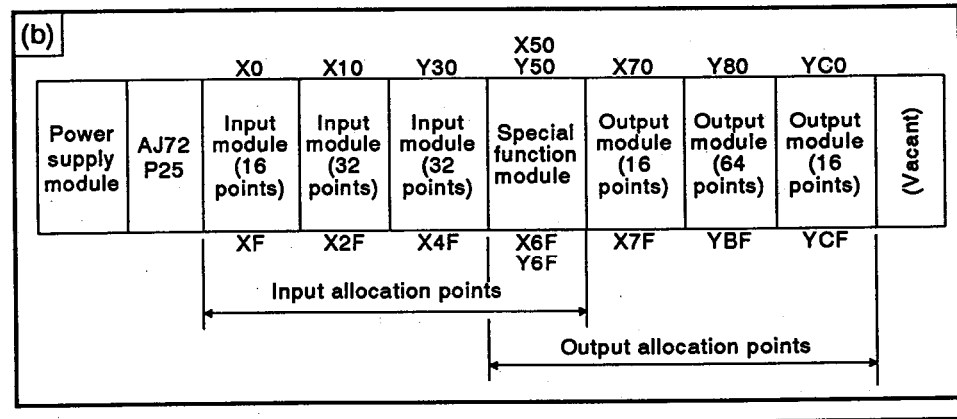
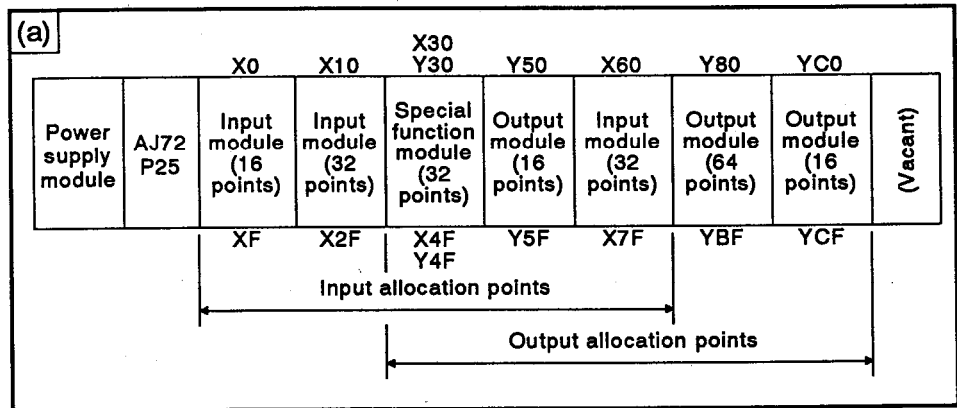
The I/O numbers that can be allocated to a remote I/O station begins after the I/O numbers used for master station I/O (refer to Section 7.3.4).

- (2) When a special function module is loaded to a remote I/O station, determine the link register (W) allocation range (M/R area) to be used for buffer memory read/write (RFRP/RTOP instruction) (refer to Section 7.3.3).
- (3) Make sure that the number of link points per station does not exceed the following limit (refer to Section 7.3.1):

- Remote I/O station : 512 bytes

POINT

- (1) If the M → R area used by the system to execute an RFRP/RTOP instruction is mistakenly used by a user program, data will not be able to be read/written correctly.
- (2) The number of link points can be reduced by loading modules to a remote I/O station in groups of input modules, special function modules, and output modules as illustrated below. If the modules are loaded as illustrated in Item (b), a reduction of 16 input allocation points and 32 output allocation points can be achieved.



Link parameter setting example

Fig. 7.8 shows a link parameter setting of a remote I/O system when the MELSECNET mode is used.

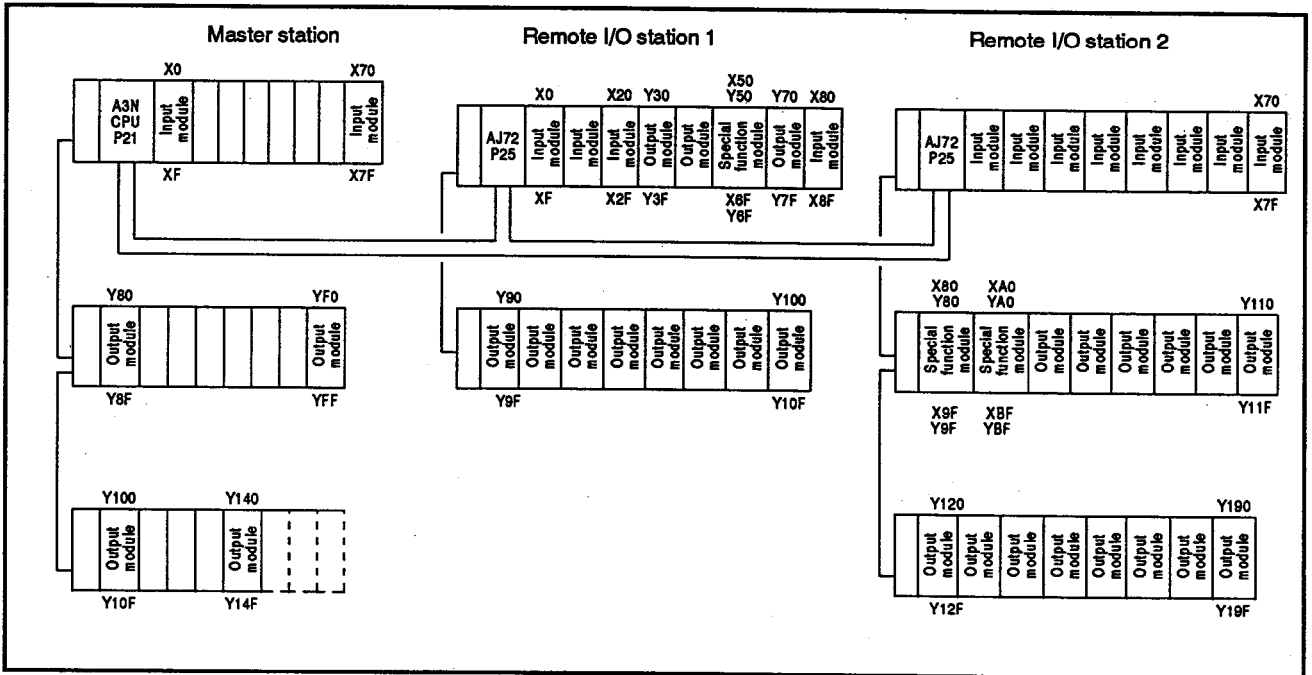


Fig. 7.8 System Configuration Example

(1) Allocating link relay (B)

Data link cannot be executed by using a link relay in a remote I/O system.

(2) Allocating link register (W)

(a) Allocation for remote I/O stations (M → R area, M ← R area)

1) Allocate the following number of points for remote I/O station 1 so that commands in a user program can be executed:

16 points for the RTOP command and 16 points for the RFRP command.

Station 1 requires 17 points (16 points (for RTOP) + 1 point (for OS)) for the M → R area because a special-function module is installed.

2) Allocate the following number of points for remote I/O station 2 so that commands in a user program can be executed:

32 points for the RTOP command and 32 points for the RFRP command.

Station 2 requires 34 points (32 points (for RTOP) + 2 points (for OS)) for the M → R area because two special-function modules are installed.

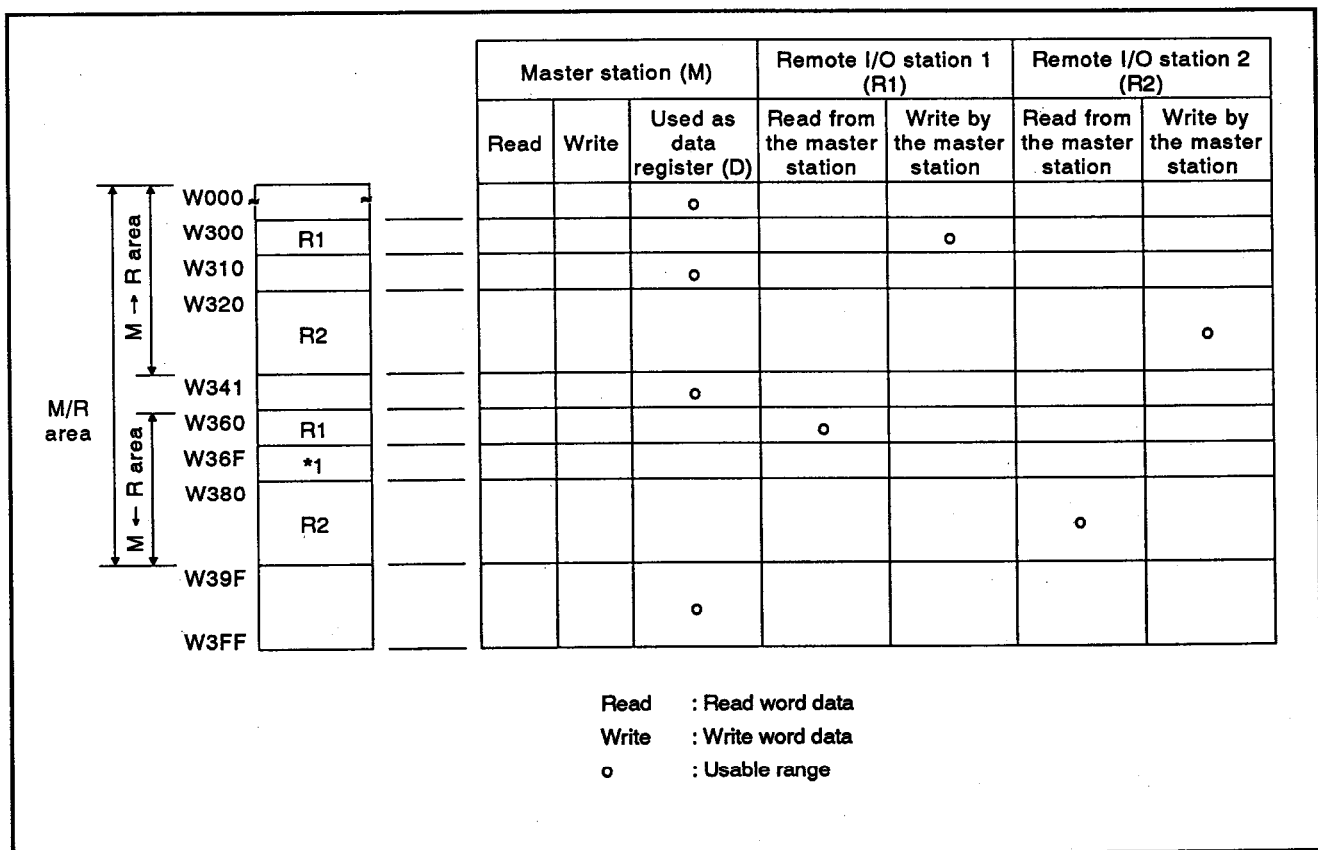


Fig. 7.9 Link Register (W) Allocation Example

(b) In Fig. 7.9, the vacant area marked with *1 in the M ← R area cannot be used as a data register by the master station.

(3) Allocating inputs (X) and outputs (Y)

(a) Input and output range used for data link by master station

The master station uses I/O devices in the X/Y0 to X/Y14F range for itself. The X/Y150 to X/Y7FF range can be used for the data link.

(b) Remote I/O stations

1) Station 1

Inputs (X): X0 to X8F

Outputs (Y): Y30 to Y10F

2) Station 2

Inputs (X): X0 to XBF

Outputs (Y): Y80 to Y19F

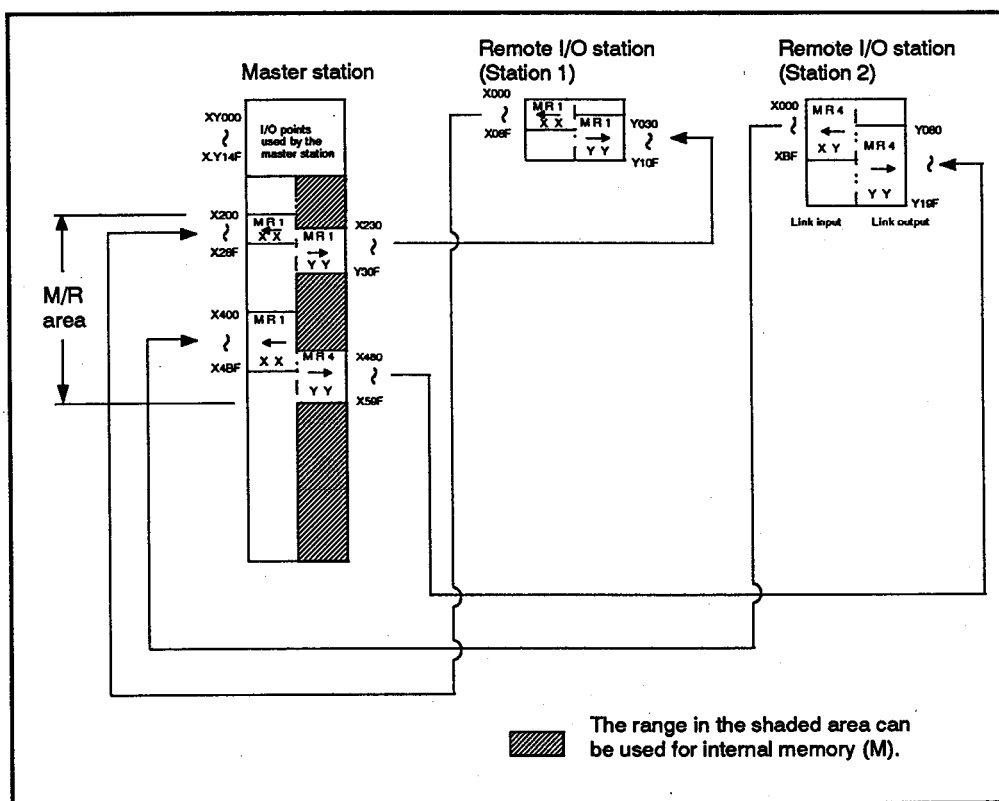


Fig.7.10 Inputs (X) and Outputs (Y) Allocation Example

7. LINK PARAMETERS

MELSEC-A

(4) Link parameter setting

When the allocation of (1) to (3) is executed, set the link parameters as shown in the figure below.

* LINK *						M : B	↔	ALL	L : B	-
MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTER- MITTENT 10ms	M : W	↔	ALL	L : W	-
		B	W			M : W	→	ALL	R : W	300-341
M	2	-	-	200	XXXX	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. LINK PARAMETERS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Applicability	o		o			

MELSEC-A

7.4.3 Device allocation for a local/remote I/O system and link parameter setting example

Allocation for a local/remote I/O system

- (1) Determine the link relay (B) allocation range for each master station and local station (refer to Section 7.3.2).
- (2) When a special function module is loaded to a remote I/O station, link registers (W) are required for buffer memory read/write (RFRP/RTOP instruction).

Divide the link registers (W) and allocate them to 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)(refer to Section 7.3.3).

- (3) For the allocation of the M/L area, determine the allocation range by dividing the area for each of a master station and local station.
- (4) Divide the M/R area into the M ← R area and the M → R area to allocate it.

To connect more than one remote I/O station, allocate an M ← R area and an M → R area to each remote I/O station.

- (a) For example, to connect three remote I/O stations, divide the M ← R area and M → R area into three stations as illustrated below.

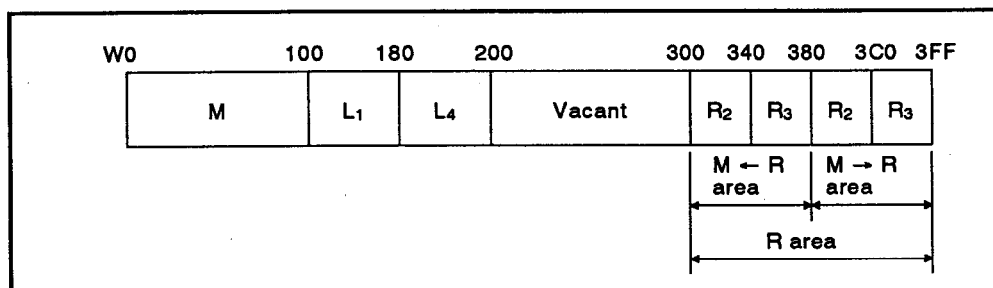


Fig. 7.11 Link Register (W) Allocation Example

- (b) Consider the range used by the system when allocating the M → R area.

The system uses the M → R area to execute RFRP/RTOP instructions.

- 1) Number of points used by the system

Each link register (W) point is used for one special function module loaded to a remote I/O station.

- 2) Range used by the system

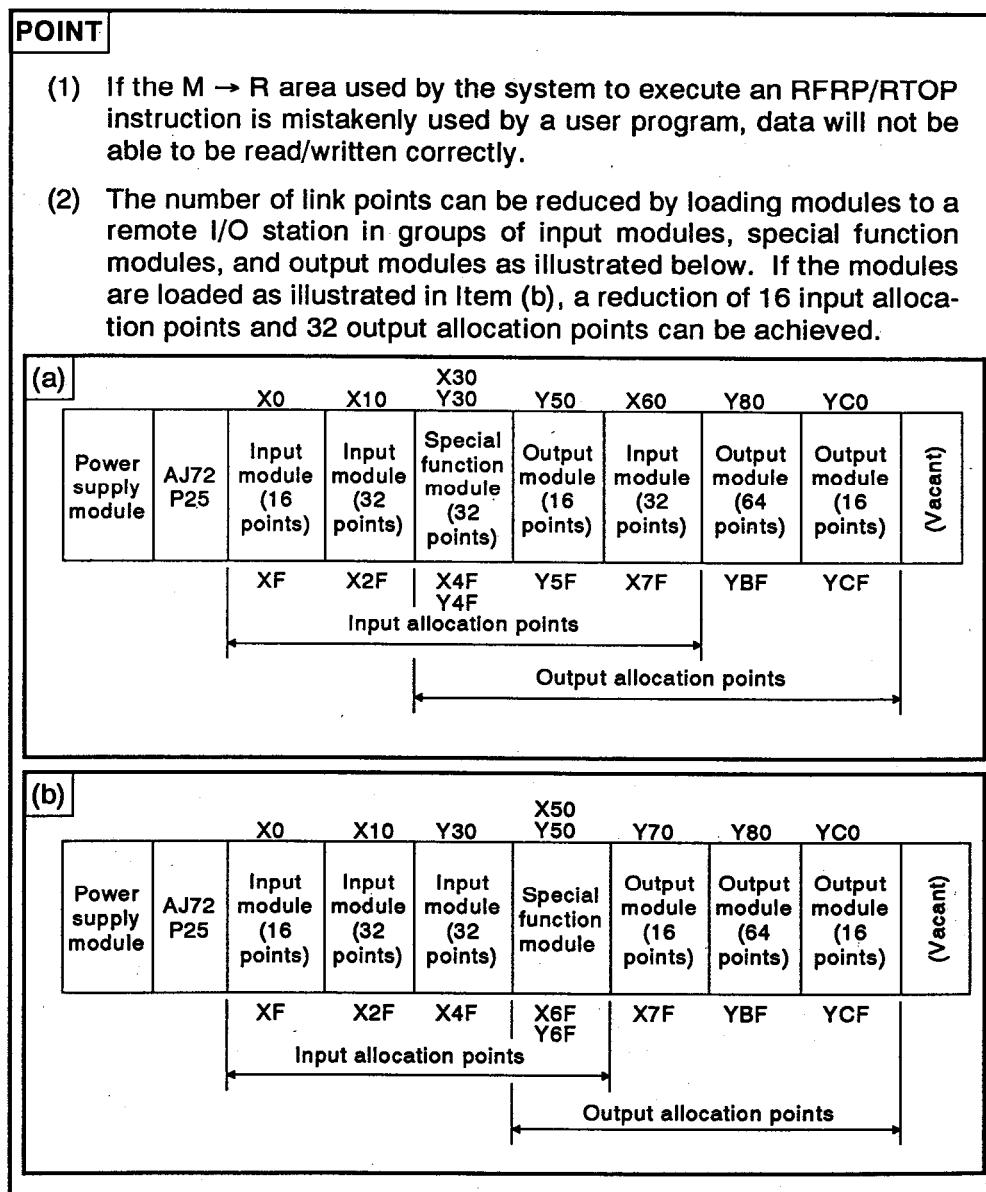
The range used by the system begins at the M → R area head device number allocated to each remote I/O station to one point less than the total number of use points: "number of use points - 1".

For example, when three special function modules are loaded to remote I/O station 2, the range W380 to W381 in the M → R area W380 to W3BF is used by the system as illustrated in Fig. 7.11.

7. LINK PARAMETERS

MELSEC-A

- (5) Allocate the input (X) and output (Y) range used for data link following the range used by the master station I/O.
 - (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 allocate 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 allocate 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 does not exceed the following limits (refer to Section 7.3.1):
 - Master station : 1024 bytes
 - Local station : 1024 bytes
 - Remote I/O station : 512 bytes



Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	○			○		
Applicability	○			○		

7. LINK PARAMETERS

MELSEC-A

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.

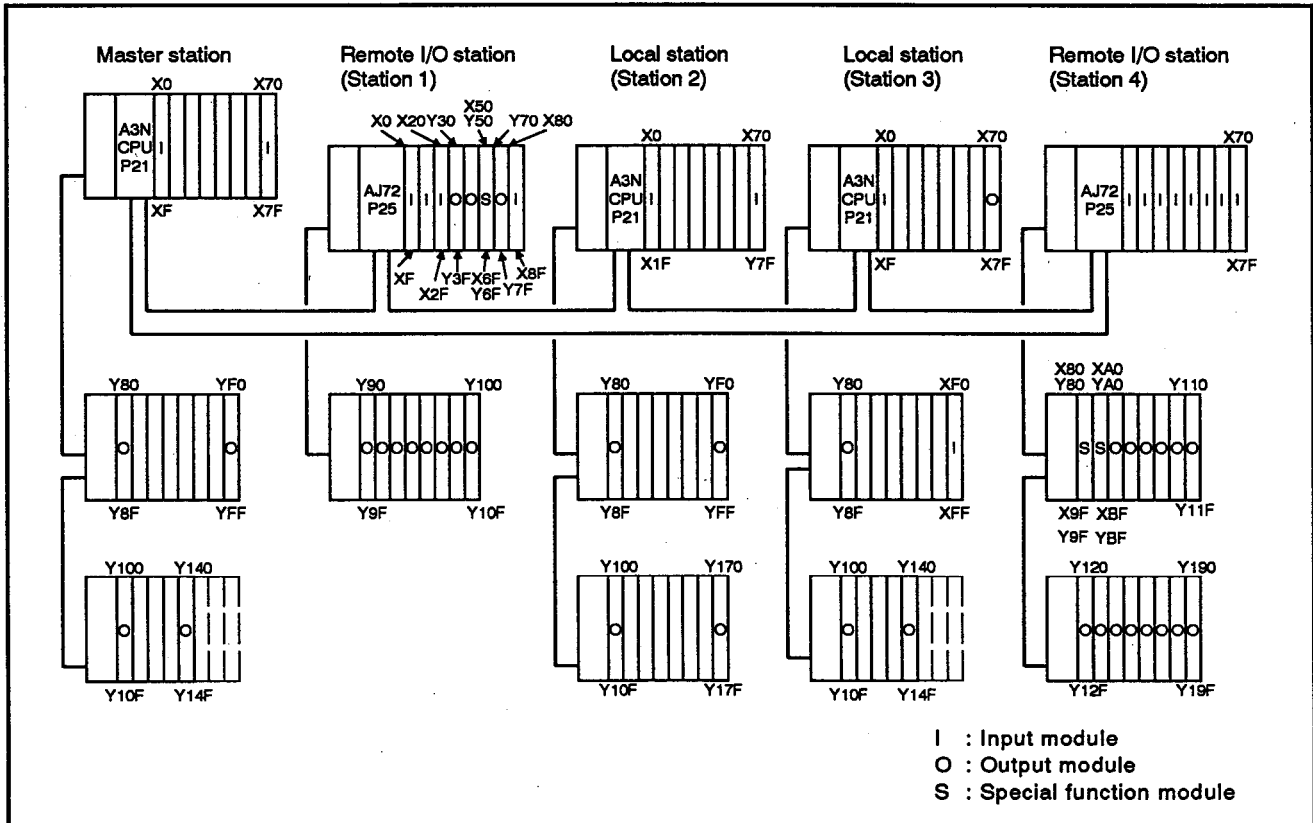


Fig. 7.12 System Configuration Example

7. LINK PARAMETERS

MELSEC-A

(1) Allocating link relays (B)

- (a) To allocate 256 points to the master station, 128 points to station 2 (local station), and 128 points to station 3 (local station)

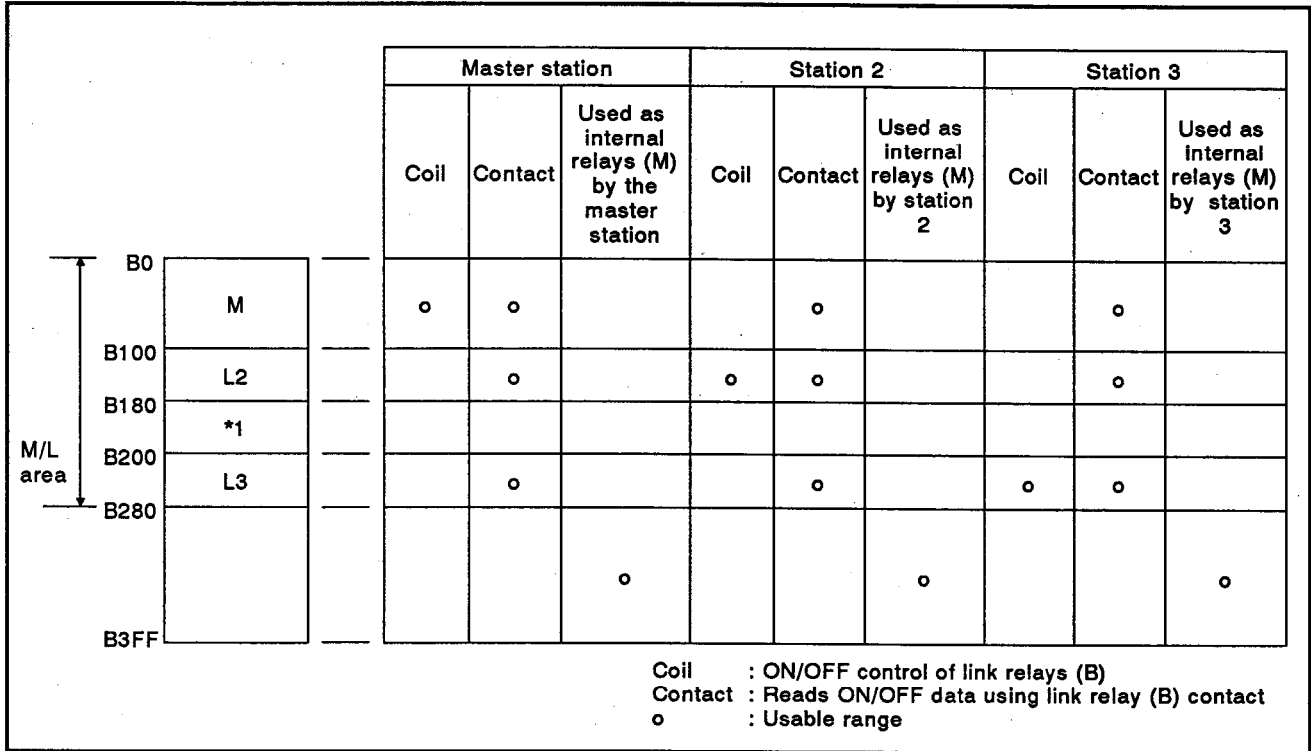


Fig. 7.13 Link Relay (B) Allocation Example

- (b) The vacant area marked with an asterisk in the M/L area cannot be used in place of internal relays (M).

The M/L area is the range (B0 to B27F) from the minimum device number to the maximum device number allocated with the link parameters.

(2) Allocating link registers (W)

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

To allocate 256 points to the master station, 128 points to station 2 (local station), and 196 points to station 3 (local station)

(b) Allocation for the remote I/O station (M → R area, M ← R area)

For station 1 (remote I/O station), 16 points each are allocated to execute the RTOP instruction and the RFRP instruction. For station 1, 17 points (16 points for RTOP + 1 points for OS) are required for the M → R area, because one special function module is loaded.

For station 4 (remote I/O station), 32 points each are allocated to execute the RTOP instruction and the RFRP instruction. For station 2, 34 points (32 points for RTOP + 2 points for OS) are required for the M → R area, because two special function modules are loaded.

		Master station			Station 1 (remote I/O station)		Station 2 (local I/O station)		Station 3 (local I/O station)		Station 4 (remote I/O station)			
		Read	Write	Used as a data register (D) by the master station	Read from master station	Write by master station	Read	Write	Used as a data register (D) by station 2	Read	Write	Used as a data register (D) by station 3	Read from master station	Write by master station
M/L area	W0													
	M	o	o				o		o					
	W100													
	L2	o					o	o	o					
	*1													
W200														
L3	o						o		o	o				
2C0														
M/R area	M → R area	W300 to W310			o				o		o			
		R1				o			o		o			
		W320 to W341			o					o		o		
	M ← R area	R4							o		o			o
		W360 to W36F			o					o		o		
		R1				o				o		o		
	*2								o		o			
	W380 to W39F								o		o	o		
	R4								o		o			
					o					o		o		

Read : Reading word data
 Write : Writing word data
 o : Usable range

Fig. 7.14 Link Register (W) Allocation Example

(c) In Fig. 7.14, the M/L area marked with “*1” cannot be used as a data register (D) by the master station and local stations.

The vacant area of M ← R area marked with “*2” cannot be used as a data register (D) by the master station.

(3) Allocating inputs (X) and outputs (Y)

(a) Input and output range used for data link by the master station

The master station uses I/O devices in the X/Y0 to X/Y14F range for itself. For the data link, the X/Y150 to X/Y7FF range can be used.

(b) Remote I/O stations

1) Station 1

Inputs (X) : X0 to X8F
Outputs (Y) : Y30 to Y10F

2) Station 4

Inputs (X) : X0 to XBF
Outputs (Y) : Y80 to Y19F

(c) Local stations

In this system example, inputs (X) and outputs (Y) are not required because there is vacant area in the link relay (B) allocation. However, to simplify the explanation, 128 input (X) points and 128 output (Y) points are allocated.

1) Station 2

Local station 2 uses I/O devices in the X/Y0 to X/Y17F range for itself. For the data link, the X/Y180 to X/Y7FF range can be used.

2) Station 3

Local station 3 uses I/O devices in the X/Y0 to X/Y14F range for itself. For the data link, the X/Y150 to X/Y7FF range can be used.

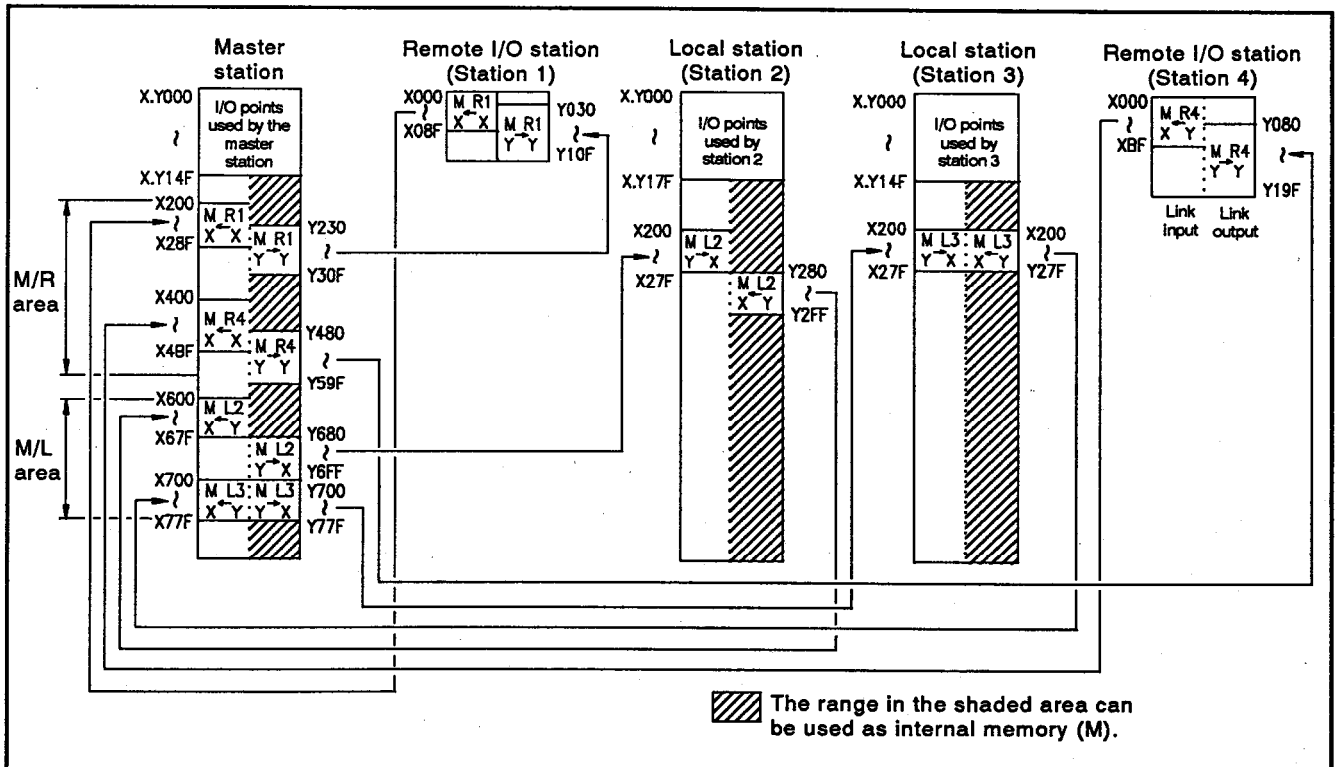


Fig. 7.15 Input (X) and Output (Y) Allocation Example

7. LINK PARAMETERS

MELSEC-A

(4) Link parameter setting example

* LINK *						M : B ↔ ALL	L : B 000-27F
MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms	M : W ↔ ALL	L : W 000-2BF
		B	W			M : W → ALL	R : W 300-341
M	4	000-OFF	000-OFF	200	XXXX	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. LINK PARAMETERS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Applicability		○			○	

MELSEC-A

7.5 Link Parameters in the MELSECNET II Mode

- (1) Determine whether both the first and second half link parameters are required.
 - (a) If allocations are made with both the first and second half link parameters, up to 2048 bytes can be allocated to each station.
If the link range is less than 1024 bytes per station, only the first half link parameters are required.
 - (b) Handshake processing is easier when the system is operated with only first half link parameters.
Handshake processing is required when both first and second half link parameters are set (refer to Section 9.1, Item (4), for details on handshake processing).
 - (c) The setting range of the first half link parameters is B0 to BFFF and W0 to WFFF.
 - (d) The device range that can be allocated with the second half link parameters begins after the range allocated with the first half link parameters: "(final device number allocated with the first half link parameters) + 1".
If 0 points are allocated with the first half link parameters, allocation with the second half link parameters can begin from B0/W0.
- (2) Determine the link relay (B) and link register (W) allocation range for each master station and local station (refer to Sections 7.3.2 and 7.3.3).
- (3) If the number of link relay (B) points is insufficient, check the use of inputs (X) and outputs (Y) for one-to-one data communication between the master station and a local station.
- (4) Make sure that the number of link points per station does not exceed the following limits (refer to Section 7.3.1):
 - Master station first half link parameters : 1024 bytes
 - Master station second half link parameters : 1024 bytes
 - Local station first half link parameters : 1024 bytes
 - Local station second half link parameters : 1024 bytes

Link parameter setting example

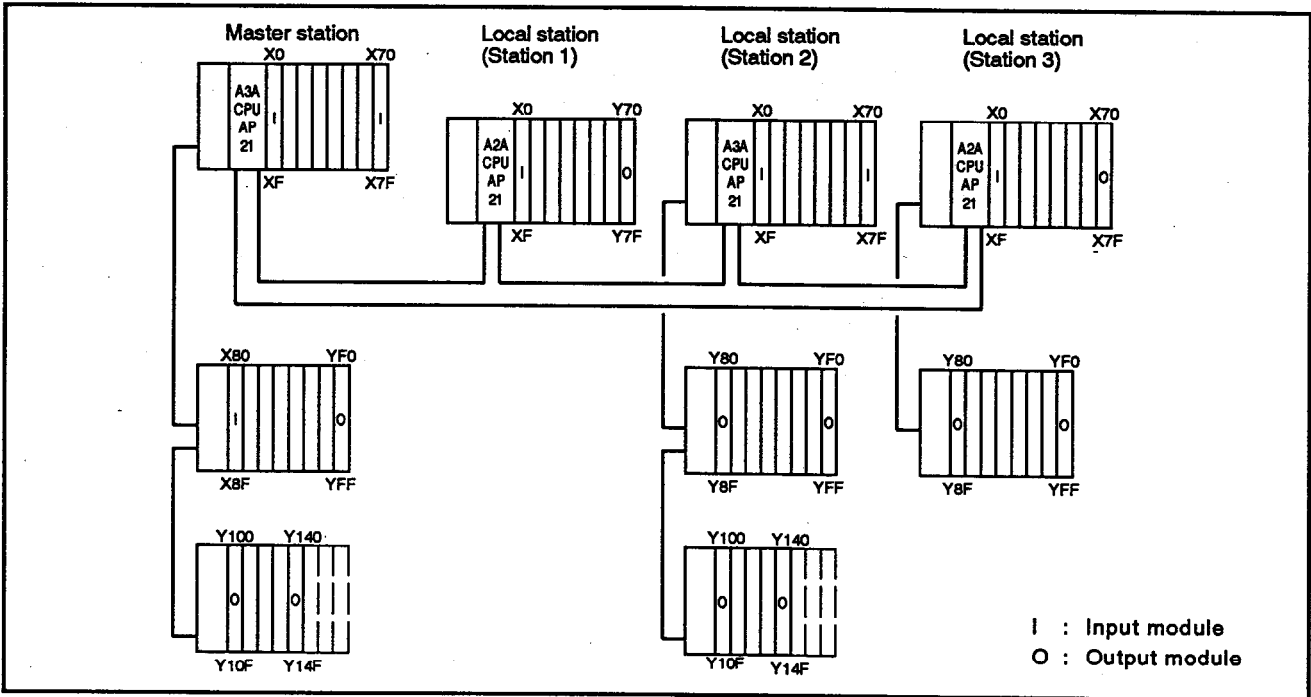


Fig. 7.16 Local System Configuration Example

(1) Number of allocation points

(a) Master station:

Link relays (B) 512 points Link registers (W) 512 points

(b) Local station (station 1)

Link relays (B) 256 points Link registers (W) 256 points

(c) Local station (station 2)

Link relays (B) 512 points Link registers (W) 256 points

(d) Local station (station 3)

Link relays (B) 1024 points Link registers (W) 256 points

(2) Checking the ranges to be allocated with the first and second half link parameters

(a) Because the number of master station link points is 1088 bytes ($512/8 + (5112 \times 2) = 1088$), 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 allocated with the first and second half link parameters. Although it is possible to allocate the link relays (B) with the first half link parameters and the link registers (W) with the second half link parameters, the link relays (B) used for handshake processing must be allocated with both the first and second half link parameters.

(b) Only the first half link parameters are required for the local stations (station 1 to station 3) because each station uses less than 1024 link points.

(3) Allocating link relays (B)

		Master station (M)			Local station (Station 1) (L1)			Local station (Station 2) (L2)			Local station (Station 3) (L3)			
		Coil	Contact	Used as internal relays (M) by the master station	Coil	Contact	Used as internal relays (M) by station 1	Coil	Contact	Used as internal relays (M) by station 2	Coil	Contact	Used as internal relays (M) by station 3	
M/L area allocated with the first half link parameters	B000	M	o	o			o			o			o	
	B100	*1												
	B200	L1		o		o	o		o			o		
	B300	L2		o		o		o	o			o		
	B500	L3		o		o		o		o		o	o	
M/L area allocated with the second half link parameters	B900			o			o			o			o	
	BC00	M	o	o			o		o			o		
	BD00			o			o			o			o	
	BFFF													

Coil : ON/OFF control of link relays (B)
 Contact : Reads ON/OFF data from the link relay (B) contact
 o : Usable range

Fig. 7.17 Link Relay (B) Allocation Example

(a) The vacant area marked with an asterisk in the M/L area allocated with the first half link parameters cannot be used in place of internal relays (M).

This is also true for the vacant area in the M/L area allocated with the second half link parameters.

(b) The device range that can be allocated with second half link parameters begins after the range allocated with the first half link parameters: "(final device number allocated with the first half link parameters) + 1".

In Fig. 7.17, the link range can be allocated with the second half link parameters after B900 because the B000 to B8FF range is allocated with the first half link parameters.

(4) Allocating link registers (W)

		Master station (M)			Local station (Station 1) (L1)			Local station (Station 2) (L2)			Local station (Station 3) (L3)		
		Read	Write	Used as a data register (D) by the master station	Read	Write	Used as a data register (D) by station 1	Read	Write	Used as a data register (D) by station 2	Read	Write	Used as a data register (D) by station 3
M/L area allocated with the first half link parameters	W000	M											
	W100	*1											
	W200												
	W300	L1											
	W400	L2											
M/L area allocated with the second half link parameters	W500	L3											
	W600												
	W900	M											
	WFFF												

Read : Reading word data
 Write : Writing word data
 o : Usable range

Fig. 7.18 Link Register (W) Allocation Example

(a) The vacant area marked with an asterisk in the M/L area allocated with the first half link parameters cannot be used in place of data registers (D).

This is also true for the vacant area in the M/L area allocated with the second half link parameters.

(b) The device range that can be allocated with the second half link parameters begins after the range allocated with the first half link parameters: "(final device number allocated with the first half link parameters) + 1".

In Fig. 7.18, the link range can be allocated with the second half link parameters after W500 because the W000 to W4FF range is allocated with the first half link parameters.

7. LINK PARAMETERS

(5) Allocating inputs (X) and outputs (Y)

In this system example, inputs (X) and outputs (Y) are not required because there is vacant area in the link relay (B) allocation. However, to simplify the explanation, 128 input (X) points and 128 output (Y) points are allocated to local stations 1 and 3.

(a) Input and output range used for data link by master station

The master station uses I/O devices in the X/Y0 to X/Y14F range for itself. For the data link, the X/Y150 to X/Y7FF range can be used.

(b) Local station 1

- For station 1 : X/Y0 to X/Y7F
- For data link : X/Y180 to X/Y1FF

(c) Local station 3

- For station 1 : X/Y0 to X/YFF
- For data link : X/Y180 to X/Y7FF

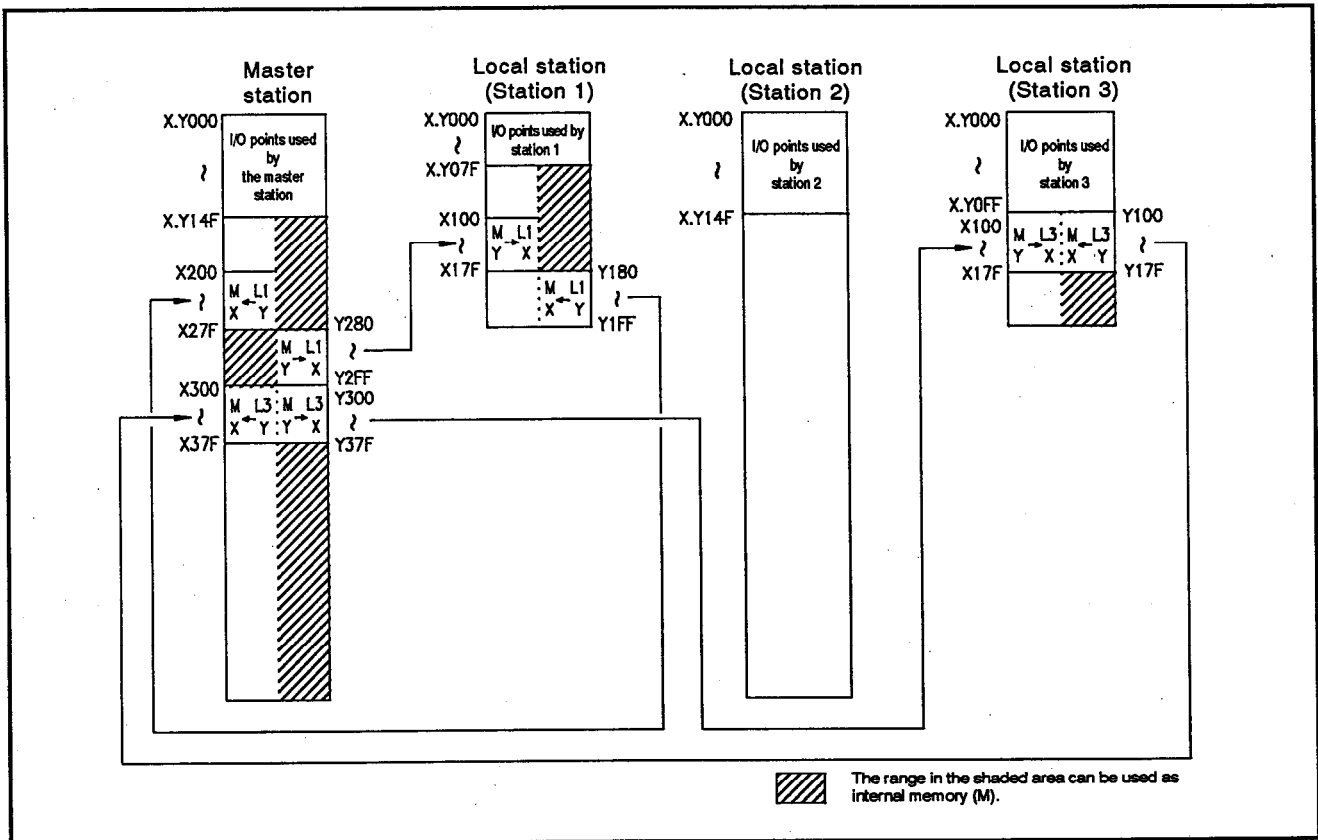


Fig. 7.19 Input (X) and Output (Y) Allocation Example

7. LINK PARAMETERS

MELSEC-A

(6) Link parameter setting example

(a) First half link parameters

* MELSECNET II MODE LINK *						M : B1 ↔ ALL	L : B1 000-8FF
MASTER	SLAVE PC STATIONS	FIRST M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms	M : W1 ↔ ALL	L : W1 000-4FF
		B	W			M : B2 ↔ ALL	L : B2 C00-CFF
M	3	000-0FF	000-0FF	200	XXXX	M : W2 ↔ ALL	L : W2 800-8FF
						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 *						M : B1 ↔ ALL	L : B1 000-8FF
MASTER	SLAVE PC STATIONS	SECOND M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms	M : W1 ↔ ALL	L : W1 000-4FF
		B	W			M : B2 ↔ ALL	L : B2 C00-CFF
M	3	C00-CFF	800-8FF	200	XXXX	M : W2 ↔ ALL <td style="font-size: small;">L : W2 800-8FF</td>	L : W2 800-8FF
						M : W ← ALL <td style="font-size: small;">R : W .</td>	R : W .
						M : Y → ALL <td style="font-size: small;">L : X 280-37F</td>	L : X 280-37F
						M : Y → ALL <td style="font-size: small;">R : Y .</td>	R : Y .
						M : X ← ALL <td style="font-size: small;">L : Y 200-37F</td>	L : Y 200-37F
						M : X ← ALL <td style="font-size: small;">R : X .</td>	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

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode						
Applicability		o			o	

7. LINK PARAMETERS

MELSEC-A

7.6 Link Parameters in the MELSECNET II Composite Mode

Possible system configurations in the MELSECNET II composite mode:

- System consisting of a master station and local stations (referred to as a "local system" in this manual).
- System consisting of a master station and remote I/O stations (referred to as a "remote I/O system" in this manual).
- System consisting of a master station, local stations, and remote I/O stations (referred to as a "local/remote I/O system" in this manual).

7.6.1 Device allocation for a local system

- (1) Determine the link relay (B) and link register (W) range to be allocated with the first and second half link parameters for each MELSECNET II mode-compatible station.

Only first half link parameters are required for MELSECNET mode-compatible stations.

- (a) The device range allocated with the first half link parameters can be read by the master station and all local stations. However, the range allocated with the second half link parameters can only be read by MELSECNET II mode-compatible stations.

Determine the allocation range according to the station with which communication will be executed.

- (b) The setting range of the first half link parameters is B0 to B3FF and W0 to W3FF.
 - (c) The device range that can be allocated with the second half link parameters begins after the range allocated with the first half link parameters: "(final device number allocated with the first half link parameters) + 1".
If 0 points are allocated with the first half link parameters, allocation with the second half link parameters can begin from B0/W0.
- (2) If the number of link relay (B) points is insufficient, check the use of inputs (X) and outputs (Y) for one-to-one data communication between the master station and a local station (refer to Section 7.3.4).
 - (3) Make sure that the number of link points per station does not exceed the following limits (refer to Section 7.3.1):

- Master station first half link parameters : 1024 bytes
- Master station second half link parameters : 1024 bytes
- Local station first half link parameters : 1024 bytes
- Local station second half link parameters : 1024 bytes

7. LINK PARAMETERS

Data Link System	MELSECNET			MELSECNET/R		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode						
Applicability	o		o			

MELSEC-A

7.6.2 Device allocation for a remote I/O system

- (1) Determine the first device number of the I/O module loaded to a remote I/O station.

The I/O numbers that can be allocated to a remote I/O station begin after the I/O numbers used for master station I/O (refer to Section 7.3.4).

- (2) When a special function module is loaded to a remote I/O station, determine the link register (W) allocation range (M/R area) to be used for buffer memory read/write (RFRP/RTOP instruction) (refer to Section 7.3.3). For the M/R area, the W0 to W3FF range can be used for the M/R area.

- (a) Divide the M/R area into the M ← R area and the M → R area to allocate it.

To connect more than one remote I/O station, allocate an M ← R area and an M → R area to each remote I/O station.

For example, to connect three remote I/O stations, divide the M ← R area and M → R area into three stations as illustrated below.

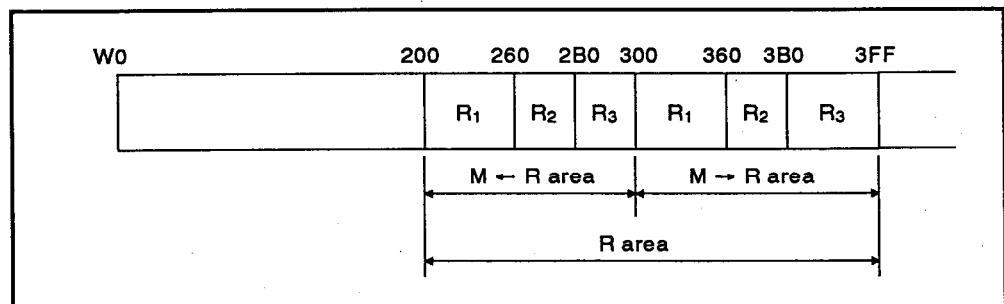


Fig. 7.20 Link Register (W) Allocation Example

- (b) Consider the range used by the system when allocating the M → R area.

The system uses the M → R area to execute RFRP/RTOP instructions.

- 1) Number of points used by the system

Each link register (W) point is used for one special function module loaded to a remote I/O station.

- 2) Range used by the system

The range used by the system begins at the M ← R area head device number allocated to each remote I/O station to one point less than the total number of use points: "number of use points - 1".

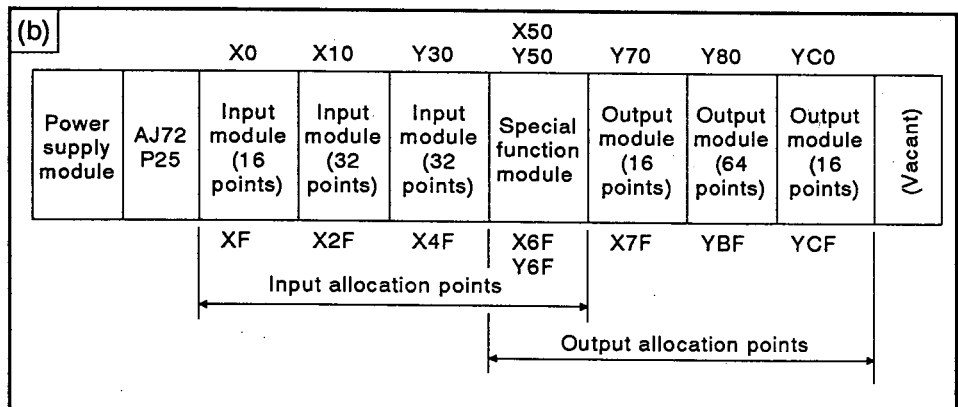
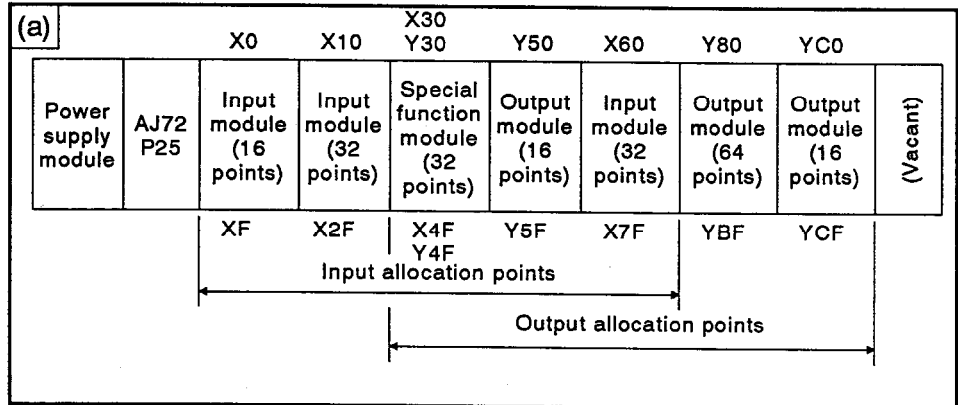
For example, when three special function modules are loaded to remote I/O station 2, the range W360 to W362 in the M → R area W360 to W3AF is used by the system as illustrated in Fig. 7.20.

- (3) Make sure that the number of link points per station does not exceed the following limit (refer to Section 7.3.1):

- Remote I/O station : 512 bytes

POINTS

- (1) If the M → R area used by the system to execute an RFRP/RTOP instruction is mistakenly used by a user program, data will not be able to be read/written correctly.
- (2) The number of link points can be reduced by loading modules to a remote I/O station in groups of input modules, special function modules, and output modules as illustrated below. If the modules are loaded as illustrated in Item b, a reduction of 16 input allocation points and 32 output allocation points can be achieved.



REMARK

The same concept is used to set the link parameters for a remote I/O system configured in the MELSECNET II composite mode and a remote I/O system configured in the MELSECNET mode.

7. LINK PARAMETERS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode			0			X
Applicability						

MELSEC-A

7.6.3 Device allocation for the local/remote I/O system

- (1) Determine the link relay (B) allocation range for each master station and local station (refer to Section 7.3.2).

- (a) Determine the link relay (B) allocation range with the first and second half link parameters for each MELSECNET II mode-compatible station.

The device range allocated with the first half link parameters can be read by the master station and all local stations. However, the range allocated with the second half link parameters can only be read by MELSECNET II mode-compatible stations.

Determine the allocation range according to the station with which communication will be executed.

- (b) The setting range of the first half link parameters is B0 to B3FF.
- (c) The device range that can be allocated with the second half link parameters begins after the range allocated with the first half link parameters: "(final device number allocated with the first half link parameters) + 1".

If 0 points are allocated with the first half link parameters, allocation with the second half link parameters can begin from B0.

- (2) When a special function module is loaded to a remote I/O station, link registers (W) are required for buffer memory read/write (RFRP/RTOP instruction).

Divide the link registers (W) in the W0 to W3FF range and allocate them with the first half link parameters so that they can be allocated to 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).

- (3) For allocation of the M/L area, determine the allocation range by dividing the area for each of a master station and local station.

- (a) Determine the link register (W) allocation range of the first and second half link parameters for each MELSECNET II mode-compatible station.

The device range allocated with the first half link parameters can be read by the master station and all local stations. However, the range allocated with the second half link parameters can only be read by MELSECNET II mode-compatible stations.

Determine the allocation range according to the station with which communication will be executed.

- (b) The setting range of the first half link parameters is W0 to W3FF.
- (c) The device range that can be allocated with the second half link parameters begins after the range allocated with the first half link parameters: "(final device number allocated with the first half link parameters) + 1".

If 0 points are allocated with the first half link parameters, allocation with the second half link parameters can begin from B0/W0.

- (4) Divide the M/R area into the M ← R area and the M → R area to allocate it.

Only the W0 to W3FF range can be used for the M/R area.

- (a) To connect more than one remote I/O station, allocate an M ← R area and an M → R area to each remote I/O station.

For example, to connect two remote I/O stations, divide the M ← R area and M → R area into two stations as illustrated below.

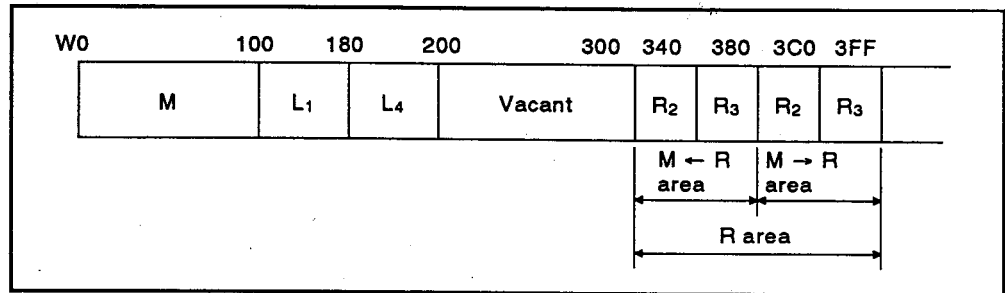


Fig. 7.21 Link Register (W) Allocation Example

- (b) Consider the range used by the system when allocating the M → R area.

The system uses the M R area to execute RFRP/RTOP instructions.

- 1) Number of points used by the system

Each link register (W) point is used for one special function module loaded to a remote I/O station.

- 2) Range used by the system

The range used by the system begins at the M → R area head device number allocated to each remote I/O station to one point less than the total number of use points: "number of use points - 1".

For example, when two special function modules are loaded to remote I/O station 3, the range W380 to W381 in the M → R area W380 to W3BF is used by the system as illustrated in Fig. 7.21.

- (5) Allocate the input (X) and output (Y) range used for data link following the range used by the master station I/O.

- (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 allocate 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 allocate the M/L area when there is sufficient number of link relay (B) points.

7. LINK PARAMETERS

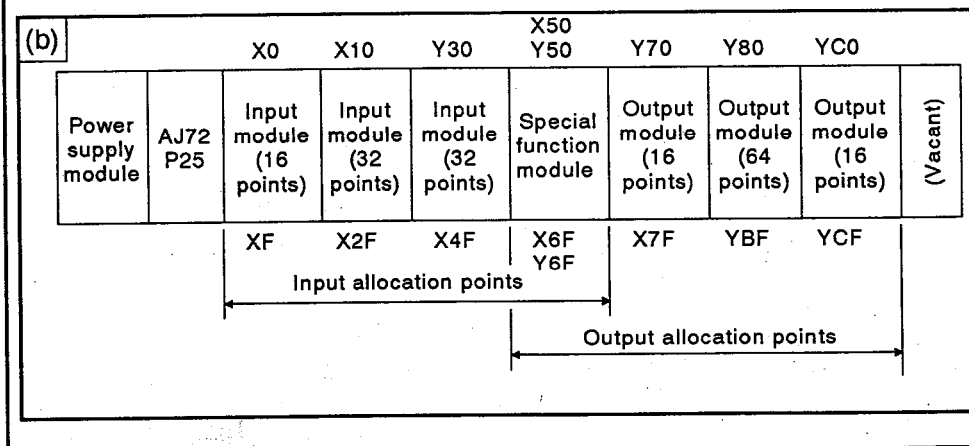
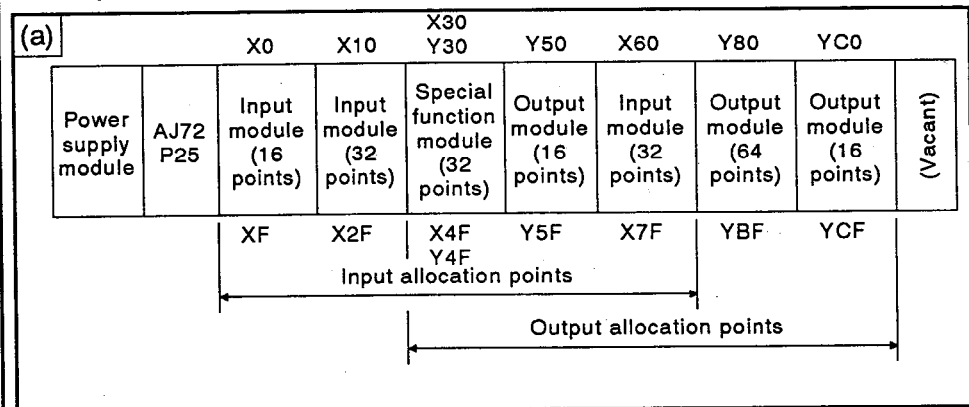
MELSEC-A

(6) Make sure that the number of link points per station does not exceed the following limits (refer to Section 7.3.1):

- Master station first half link parameters : 1024 bytes
- Master station second half link parameters : 1024 bytes
- Local station first half link parameters : 1024 bytes
- Local station second half link parameters : 1024 bytes
- Remote I/O stations : 512 bytes

POINTS

- (1) If the M → R area used by the system to execute an RFRP/RTOP instruction is mistakenly used by a user program, data will not be able to be read/written correctly.
- (2) The number of link points can be reduced by loading modules to a remote I/O station in groups of input modules, special function modules, and output modules as illustrated below. If the modules are loaded as illustrated in Item b, a reduction of 16 input allocation points and 32 output allocation points can be achieved.



REMARK

When all of the local stations are MELSECNET II mode-compatible, the master station and all of the local stations can be allocated with the second half link parameters to simplify handshake processing (refer to Section 9.1, Item (4), for details on handshake processing).

7. LINK PARAMETERS

Data Link System	MELSECNET			MELSECNET/B	
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode
Operating Mode					
Applicability			o		

MELSEC-A

7.6.4 Link parameter setting example

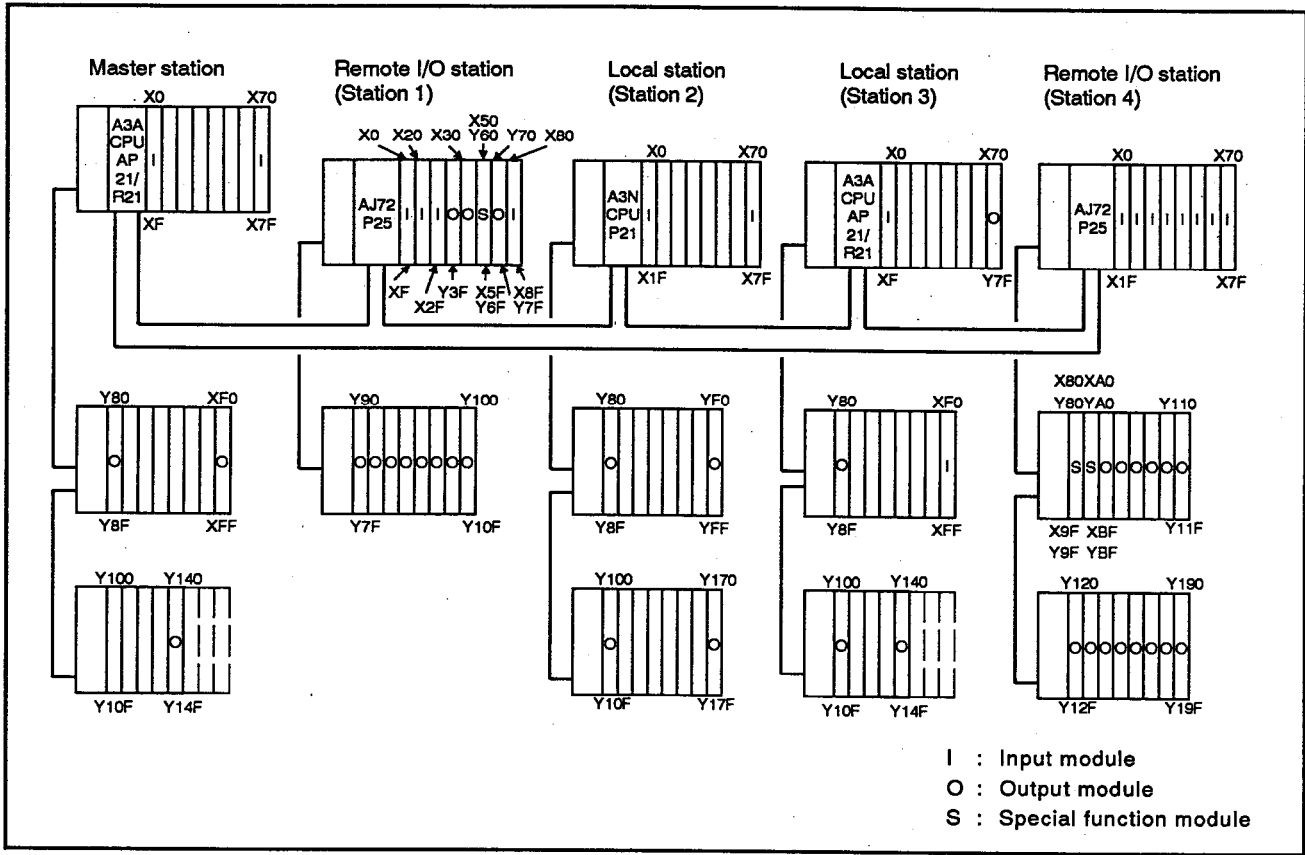


Fig. 7.22 Local/Remote I/O System Configuration Example

(1) Number of allocation points

(a) When a MELSECNET II mode-compatible PC CPU is loaded to the master station, the link relays (B) and link registers (W) should be allocated as follows:

For communication with stations 2 and 3 (all local stations):

Use the first half link parameters.

Link relays (B) 256 points Link registers (W) 256 points

For communication with station 3 (MELSECNET II mode-compatible local station):

Use the second half link parameters.

Link relays (B) 256 points Link registers (W) 256 points

(b) When a MELSECNET mode-compatible PC CPU is loaded to local station 2, the link relays (B) and link registers (W) should be allocated as follows:

Use the first half link parameters.

Link relays (B) 256 points Link registers (W) 256 points

(c) When a MELSECNET II mode-compatible PC CPU is loaded to local station, the link relays (B) and link registers (W) should be allocated as follows:

For communication with the master station and local station 2 (master and all local stations):

Use the first half link parameters.

Link relays (B) 256 points Link registers (W) 128 points

For communication with the master station (MELSECNET II mode-compatible station):

Use the second half link parameters.

Link relays (B) 256 points Link registers (W) 256 points

(2) Allocating link relays (B)

(a) Allocate the following number of link relay (B) points with the first half link parameters:

256 points for the master station, 256 points for local station 2, and 256 points for local station 3.

Allocate the following number of link relay (B) points with the second half link parameters:

256 points for the master station and 256 points for local station 3.

		Master station (M)			Local station 2 (L2)			Local station 3 (L3)		
		Coil	Contact	Used as internal relays (M) by the master station	Coil	Contact	Used as internal relays (M) by L2	Coil	Contact	Used as internal relays (M) by L3
M/L area allocated with the first half link parameters	B0	M	o			o			o	
	B100	L2		o	o				o	
	B200	*1								
	B280	L3		o		o		o	o	
	B380			o		o				o
	B400									o
M/L area allocated with the second half link parameters	B800	M	o						o	
	B900	*1								
	BA00	L3		o				o	o	
	BB00									o
	BFFF									

Coil : ON/OFF control of link relays (B)
 Contact : Reads ON/OFF data from the link relay (B) contact
 o : Usable range

Fig. 7.23 Link Relay (B) Allocation Example

- (b) The vacant areas marked with an asterisk in the M/L area allocated with the first half link parameters cannot be used in place of internal relays (M).
- (c) The device range that can be allocated with the second half link parameters begins after the range allocated with the first half link parameters: "(final device number allocated with the first half link parameters) + 1".

In Fig. 7.23, the link range can be allocated with the second half link parameters after B900 because the B000 to B37F range is allocated with the first half link parameters.

- (d) Because local station 2 is a MELSECNET mode-compatible station, it cannot use the B400 to BFFF range.

(3) Allocating link registers (W)

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

Allocate the following number of link register (W) points with the first half link parameters:

256 points for the master station (M), 256 points for local station 2 (L2), and 128 points for local station 3 (L3).

Allocate the following number of link register (W) points with the second half link parameters:

256 points for the master station (M) and 256 points for local station 3 (L3).

(b) Allocation for remote I/O stations (M → R area, M ← R area)

Allocate the following number of points for remote I/O station 1 (L1) so that instructions in a user program can be executed:

16 points for the RTOP instruction and 16 points for the RFRP instruction. Station 1 requires 17 points for the M → R area because a special function module is loaded.

Allocate the following number of points for remote I/O station 4 (L4) so that instructions in a user program can be executed:

32 points for the RTOP instruction and 32 points for the RFRP instruction. Station 4 requires 34 points for the M → R area because two special function modules are loaded.

Address	Station	Master station (M)			Remote I/O station 1 (R1)		Local station 2 (L2)			Local station 3 (L3)			Remote I/O station (R4)	
		Read	Write	Used as a data register (D) by the master station	Read from master station	Write by master station	Read	Write	Used as a data register (D) by station 2	Read	Write	Used as a data register (D) by station 3	Read from master station	Write by master station
W0	M	o	o						o					
W100	L2	o						o	o					
W200	*1													
W240	L3	o								o	o			
W2C0				o								o		
W300	R1					o			o			o		
W311				o					o			o		
W320	R4				o				o			o		
W342				o					o			o		
W360	R1								o			o		o
W370	*2								o			o		
W380	R4								o			o	o	
W3A0				o					o			o		
W400				o								o		
W800	M	o	o								o			
W900	*1													
WA00	L3	o								o	o			
WB00				o								o		
WFFF														

Read : Reading word data
 Write : Writing word data
 o : Usable range

Fig. 7.24 Link Register (W) Allocation Example

- (c) In Fig. 7.24, the M/L area marked with “*1” and the M ← R area marked with “*2” cannot be used as a data register (D).
- (d) Because local station 2 is a MELSECNET-compatible station, it cannot use the B400 to BFFF range.

(4) Allocating inputs (X) and outputs (Y)

(a) Input and output range used for data link by master station

The master station uses I/O devices in the X/Y0 to X/Y14F range for itself. For the data link, the X/Y150 to X/Y7FF range can be used.

(b) Remote I/O stations

1) Station 1

- Inputs (X) : X0 to X8F
- Outputs (Y) : Y30 to Y10F

2) Station 4

- Inputs (X) : X0 to XBF
- Outputs (Y) : Y80 to Y19F

(c) Local stations

In this system example, inputs (X) and outputs (Y) are not required because there is vacant area in the link relay (B) allocation. However, to simplify the explanation, 128 input (X) points and 128 output (Y) points are allocated.

1) Station 2

Local station 2 uses I/O devices in the X/Y0 to X/Y17F range for itself. For the data link, the X/Y180 to X/Y7FF range can be used.

2) Station 3

Local station 3 uses I/O devices in the X/Y0 to X/Y14F range for itself. For the data link, the X/Y150 to X/Y7FF range can be used.

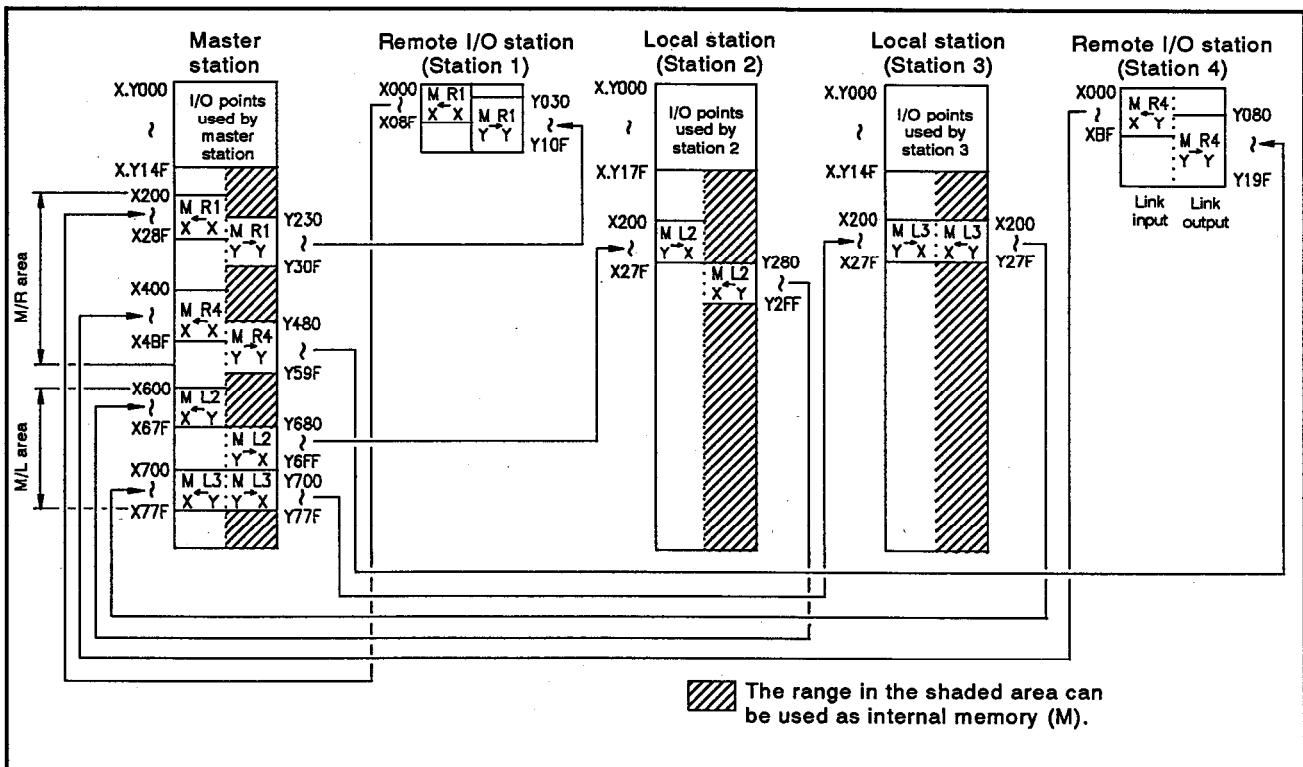


Fig. 7.25 Input (X) and Output (Y) Allocation Example

7. LINK PARAMETERS

MELSEC-A

(5) Link parameter setting

(a) First half link parameters

* MELSECNET II MULTI MODE LINK *						M : B1 ↔ ALL	L : B1 000-37F
MASTER	SLAVE PC STATIONS	FIRST M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms	M : W1 ↔ ALL	L : W1 000-2BF
		B	W			M : B2 ↔ ALL	L : B2 C00-CFF
M	4	000-0FF	000-0FF	200	XXXX	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
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

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

M : MASTER L : LOCAL R : REMOTE
 PRESS <SSN> TO SELECT 1ST/2ND RANGE OF B/W

(b) Second half link parameters

* MELSECNET II MULTI MODE LINK *						M : B1 ↔ ALL	L : B1 -
MASTER	SLAVE PC STATIONS	SECOND M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms	M : W1 ↔ ALL	L : W1 -
		B	W			M : B2 ↔ ALL	L : B2 800-AFF
M	4	800-8FF	800-8FF	200	XXXX	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	-----	-----	-----	-----	-----	-----	-----	-----
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

↑ LOCAL
 R : REMOTE
 * : MELSECNET-II (LOCAL)

M : MASTER L : LOCAL R : REMOTE
 PRESS <SSN> TO SELECT 1ST/2ND RANGE OF B/W

7.7 Allocating Link Devices for a Three-Tier System

7.7.1 Common information

- (1) The link relay (B) and link register (W) range allocated to the master station for the third tier is the device range that can be allocated to the local stations in the second tier.

The link register (W) range allocated with the link parameters for the second tier and the vacant areas is the range (M/R area) that can be allocated to the remote I/O stations in the third tier.

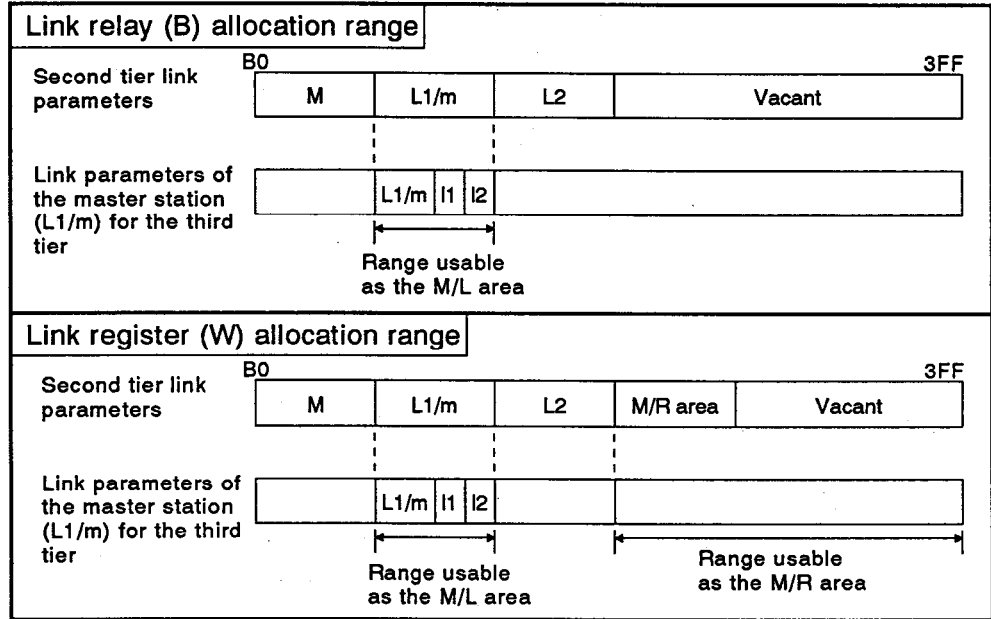


Fig. 7.26 Allocating Link Relays (B) and Link Registers (W)

- (2) The input (X) and output (Y) range that can be allocated to the master station for the third tier is the area following the I/O range allocated for the use by the station itself. This is the same range as that allocated for the master station for the second tier.

If inputs (X) and outputs (Y) are used to establish a data link between the master station for the second tier and the master station for the third tier, the allocation range of the master station for the third tier should exclude this range.

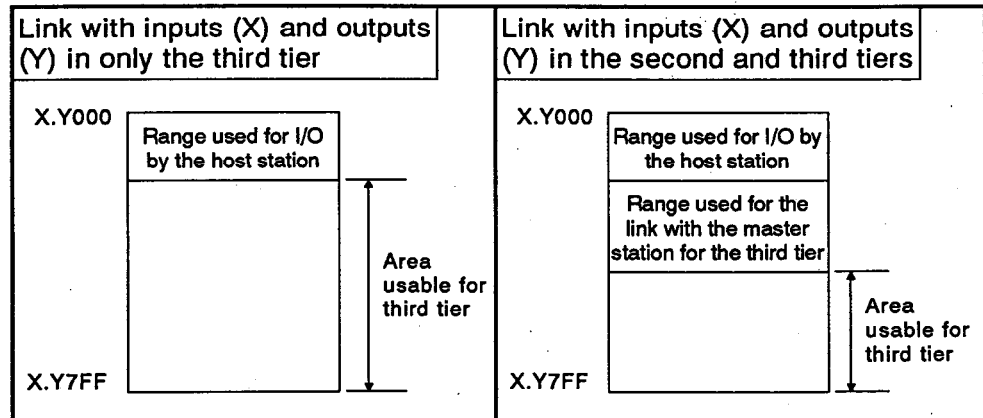


Fig. 7.27 Allocating Inputs (X) and Outputs (Y)

- (3) Table 7.1 lists the operation mode combinations according to the operation modes set for the second tier and the third tier.

Table 7.1 Operation Mode Combinations

Second Tier Operation Mode / Third Tier Operation Mode	MELSECNET Mode	MELSECNET II Mode	MELSECNET II Composite Mode
MELSECNET mode	(1)	(4)	(7)
MELSECNET II mode	(2)	(5)	(8)
MELSECNET II 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 allocated with the first and second half link parameters are as indicated below.

- (a) The range allocated with the first half link parameters for the second tier should be allocated with the first half link parameters for the third tier.

The range allocated with the second half link parameters for the second tier should be allocated with the second half link parameters for the third tier.

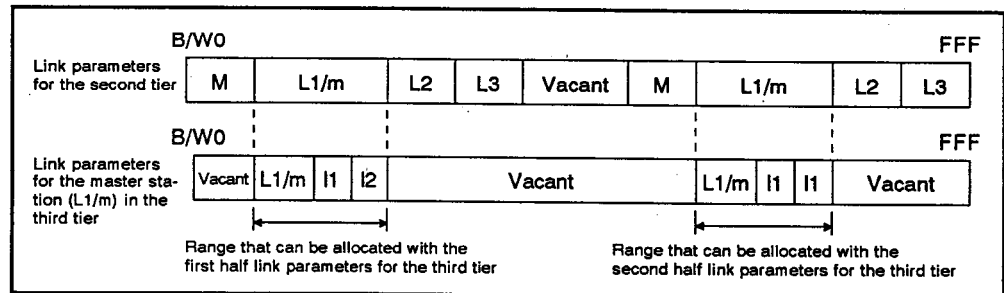


Fig. 7.28 When First and Second Half Link Parameters are Used for Device Allocation in the Second Tier

- (b) When the selected mode only provides one type of link parameter (MELSECNET mode is selected by the master station for the second tier) or when the second half link parameters are not used for device allocation, the device range that can be allocated with the second half link parameters begins after the range allocated with the first half link parameters: "(final device number allocated with the first half link parameters) + 1".

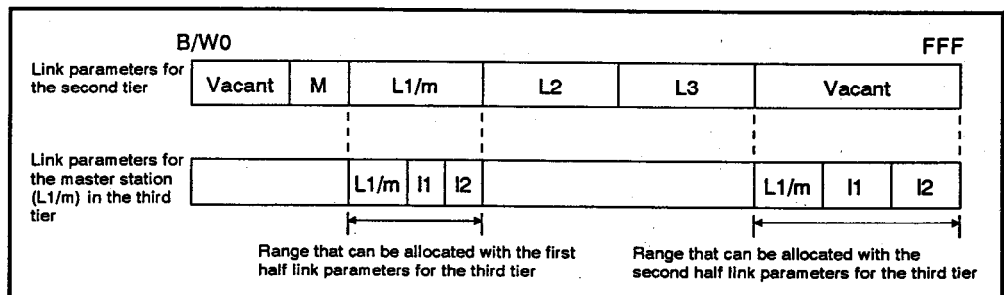


Fig. 7.29 When Only First Half Link Parameters are Used for Device Allocation in the Second Tier

- (5) In a three-tier system, link relays (B) and link registers (W) can be allocated for the use in the third tier.

In the MELSECNET Data Link System, the link device ranges allocated for the second tier and the third tier are compared to check the correctness of the set ranges. This check is called the "matching" check.

In the matching check, the link relay (B) and link register (W) range allocated with the link parameters for the third tier are checked for whether or not it is within the range allocated for the use by the master station for the third tier. The results of the match check are stored to M9235 and D9220 to D9223 in the master station for the second tier and to M9270 in the master station for the third tier.

- (a) The match check is executed using the parameters described in Table 5.2 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.

Table 7.2 Match Check of Link Parameter Settings

Second Tier Operation Mode and Link Parameters Third Tier Operation Mode and Link Parameters		MELSECNET Mode Link Parameters	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		o	o	x	o	x
MELSECNET II mode	First half link parameters	o	o	x	o	x
	Second half link parameters	x	x	o	x	o
MELSECNET II composite mode	First half link parameters	o	o	x	o	x
	Second half link parameters	x	x	o	x	o

o: Match check is executed
x: Match check is not executed

- (b) The following matching check is executed when there are differences between the types of link parameters set for the second tier and the types 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 matching 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 matching 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 match 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 for whether or not the device range begins after the range allocated with the first half link parameters for the second tier.

- (c) When the range of link relays (B) and link registers (W) is extended (M9208 and M9209 ON), the matching check will not be executed.

Make sure that the link parameters allocated to the third tier are not also allocated to the second tier.

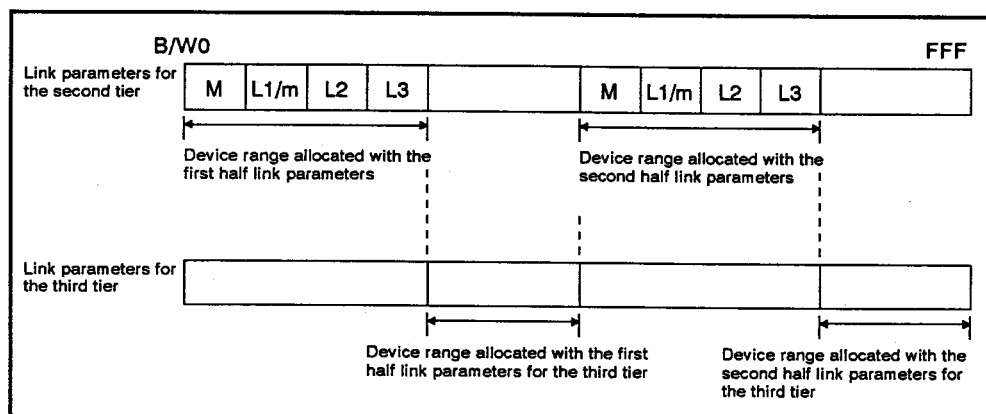


Fig. 7.30 Device Range Allocation when the Link Relay (B) and Link Register (W) Range is Extended

7. LINK PARAMETERS

Data Link System	MELSECNET			MELSECNET II		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	o			o		
Applicability	o			o		

MELSEC-A

7.7.2 Using the MELSECNET mode in the second tier

(1) MELSECNET mode used in the third tier

- (a) The range allocated for the master station for the third tier with the link parameters for the second tier is used for the M/L area of the third tier.
- (b) The M/R area and the vacant area of the second tier is used for the M/R area of the third tier.

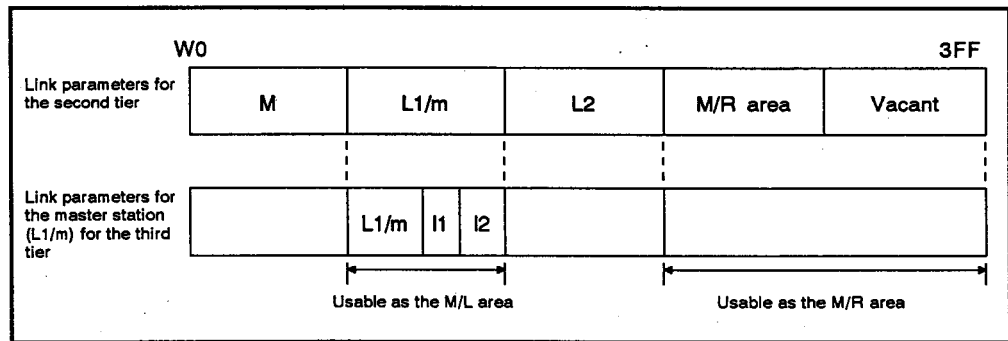


Fig. 7.31 Allocating Areas for a System Using the MELSECNET Mode for Both Tiers

(2) MELSECNET II mode used in the third tier

- (a) The range allocated with the link parameters for the second tier for the master station for the third tier is used for the first half link parameters for the third tier.
- (b) The vacant area that begins after the M/L area allocated with the link parameters for the second tier and the M/R area allocated with the same parameters is used for the second half link parameters for the third tier.

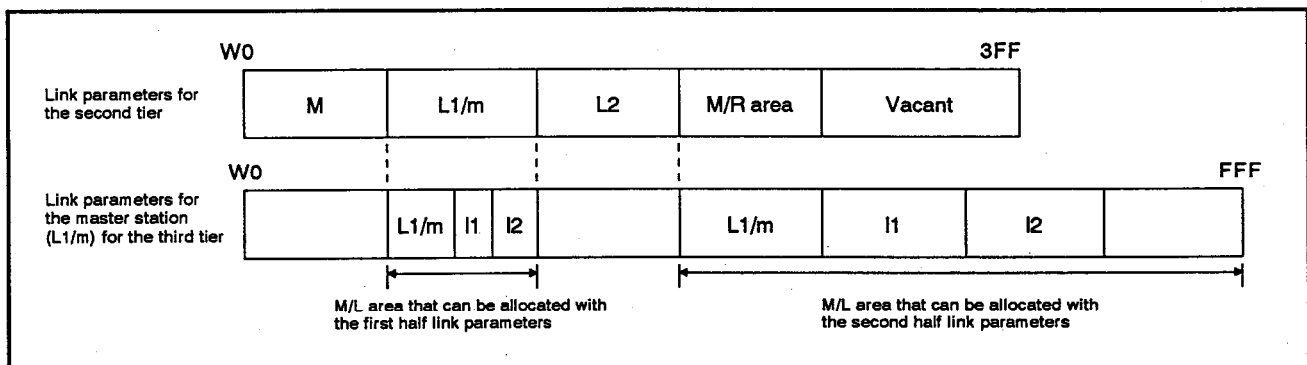


Fig. 7.32 Allocating Areas for a System Using the MELSECNET Mode and the MELSECNET II Mode

(3) MELSECNET II composite mode used in the third tier

(a) First half link parameters for the third tier

- 1) The range allocated for 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 vacant area in the W0 to W3FF range is used for the M/R area.

(b) The second half link parameters for the third tier can handle the vacant area that begins after the M/L area using the link parameters for the second tier as well as the M/R area for the second tier.

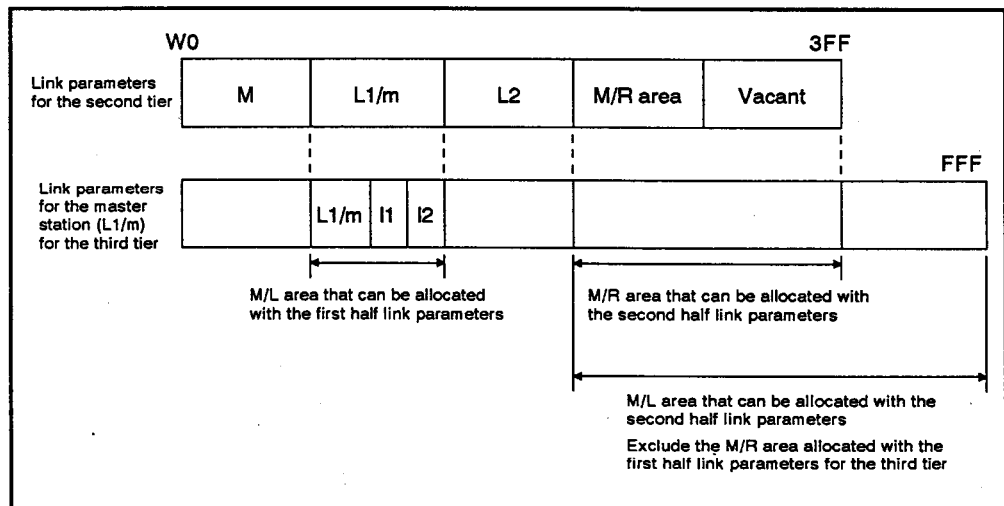


Fig. 7.33 Allocating Areas for a System Using the MELSECNET II Mode and the MELSECNET II Composite Mode

POINT

When connecting a remote I/O station in the third tier, allocate the device range with the range to be allocated for the M/R area for the third tier with the link parameters for the second tier.

The range that can be used for the M/R area is also the W0 to W3FF range when the MELSECNET II composite mode is used in the third tier. Therefore, the same action should be taken.

7. LINK PARAMETERS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode						
Applicability		o			o	

MELSEC-A

7.7.3 Using the MELSECNET II mode in the second tier

(1) MELSECNET mode used in the third tier

- (a) The range allocated for the master station for the third tier with the first half link parameters for the second tier is used for the M/L area of the third tier.

The area allocated for the master station for the third tier with the second half link parameters for the third tier cannot be used.

- (b) The area within the vacant area in the W0 to W3FF range allocated with the link parameters is used for the second tier for the M/R area for the third tier.

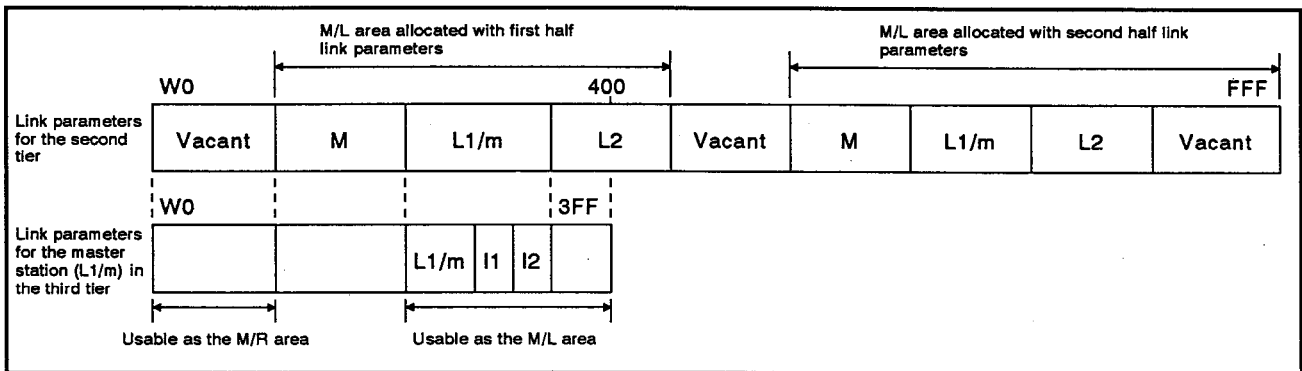


Fig. 7.34 Allocating Areas for a System Using the MELSECNET II Mode and the MELSECNET Mode

(2) MELSECNET II mode used in the third tier

- (a) The range allocated for the master station with the first half link parameter for the second tier is used for the first half link parameters for the third tier.

- (b) The area allocated for the master station in 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 with the second half link parameters, use the area that begins after the M/L area allocated with the first half link parameters for the second tier.

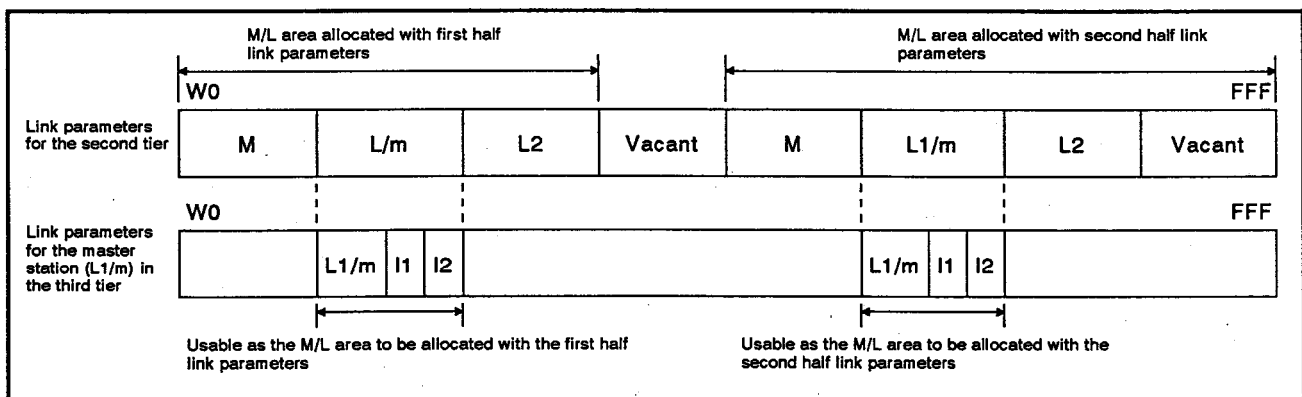


Fig. 7.35 Allocating Areas for a System Using the MELSECNET II Mode for Both Tiers

(3) MELSECNET II composite mode used in the third tier

(a) First half link parameter for the third tier

- 1) The range allocated for 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 area within the vacant area in the W0 to W3FF range allocated with the link parameters is used for the second tier for the M/R area.

(b) The area allocated for 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.

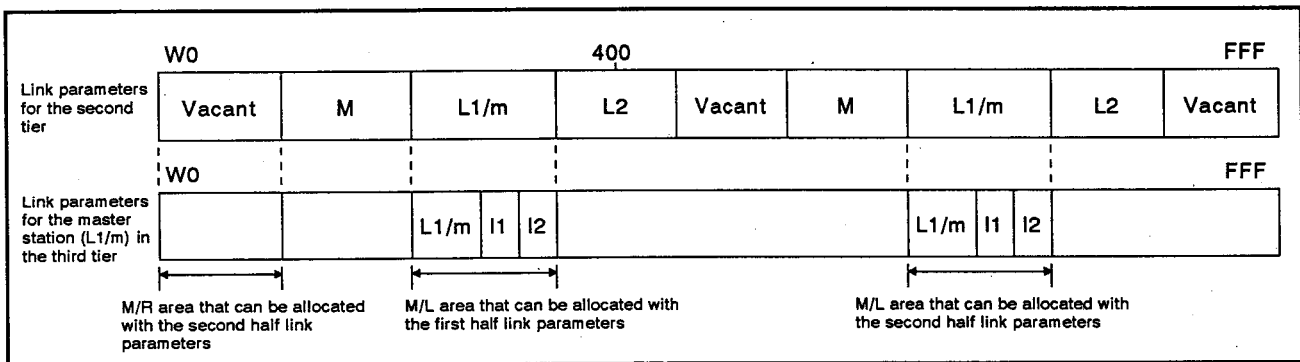


Fig. 7.36 Allocating Areas for a System Using the MELSECNET Mode II and the MELSECNET II Composite Mode

POINT

When the MELSECNET mode or the MELSECNET II composite mode is selected as the operation mode for the third tier, consider the following when allocating device ranges:

- (1) The device range allocated for the master station in the third tier should be in the B0 to B3FF range and the W0 to W3FF range. If the device range exceeds this range, that is, if the B400 to BFFF range or W400 to WFFF range is allocated for the master station, the area cannot be allocated with the first half link parameter (including the MELSECNET mode link parameter) for the third tier.
- (2) When an M/R area is required for the third tier, provide a vacant area in the W0 to W3FF range with the link parameters for the second tier.

7. LINK PARAMETERS

Data Link System	MELSECNET			MELSECNET/B	
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode			o		o
Applicability			o		o

MELSEC-A

7.7.4 Using the MELSECNET II composite mode in the second tier

(1) MELSECNET mode used in the third tier

- (a) The range allocated for the master station for the third tier with the first half link parameters for the second tier is used for the M/L area.
- (b) The area within the vacant area in the W0 to W3FF range allocated with the link parameters for the second tier is used for the M/R area.

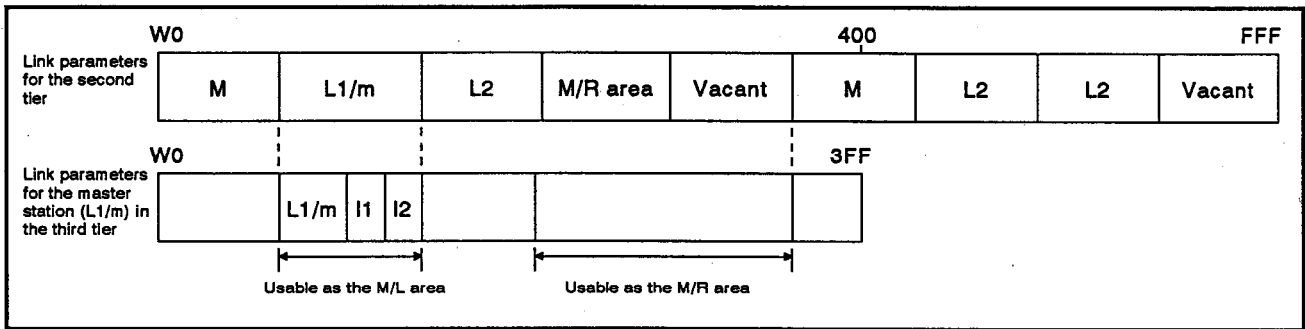


Fig. 7.37 Allocating Areas for a System Using the MELSECNET II Composite Mode and the MELSECNET Mode

(2) MELSECNET II mode used in the third tier

- (a) The range allocated for the master station with the first half link parameter for the second tier is used for the first half link parameters for the third tier.
- (b) The area allocated for the master station in 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.

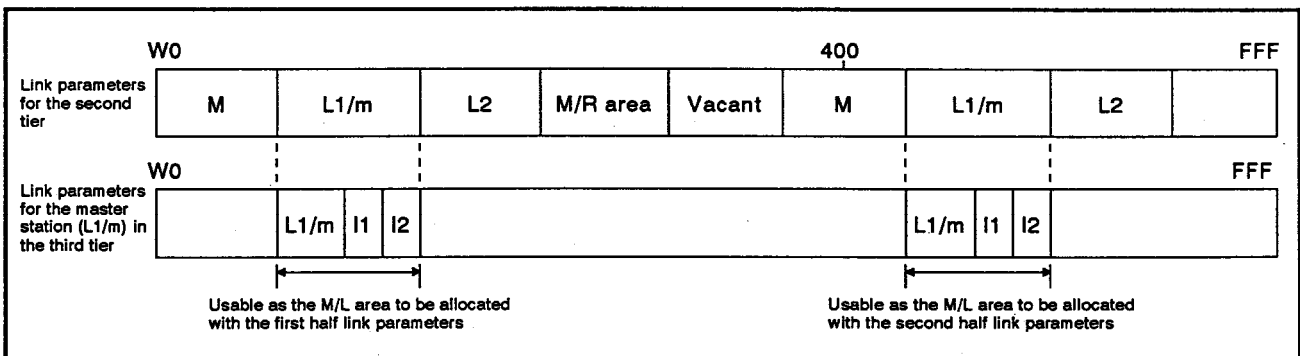


Fig. 7.38 Allocating Areas for a System Using the MELSECNET II Composite Mode and the MELSECNET II Mode

(3) MELSECNET II composite mode used in the third tier

(a) First half link parameter for the third tier

- 1) The range allocated for 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 in the second tier and the vacant area in the W0 to W3FF range is used for the M/R area.

(b) The area allocated for 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.

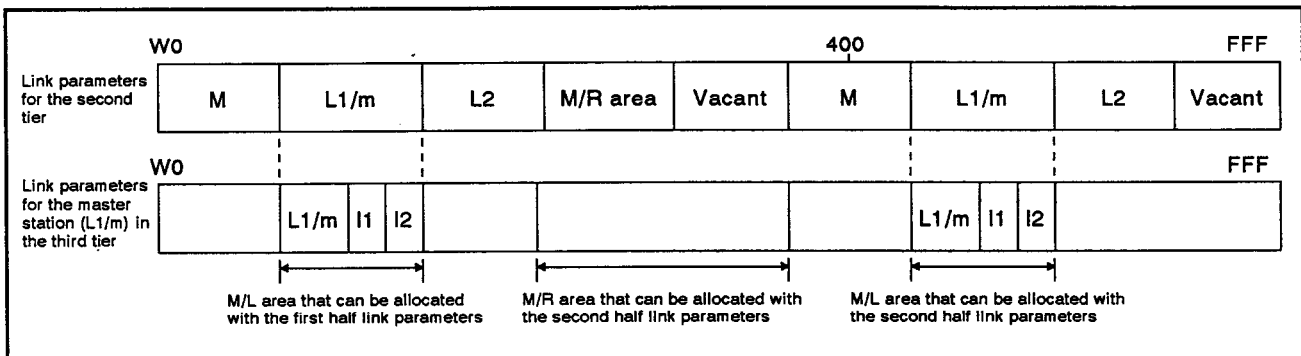


Fig. 7.39 Allocating Areas for a System Using the MELSECNET II Mode for Both Tiers

POINT

When the MELSECNET mode or the MELSECNET II composite mode is selected as the operation mode for the third tier, consider the following when allocating device ranges:

- (1) The device range allocated for the master station in the third tier should be in the B0 to B3FF range and the W0 to W3FF range. If the device range exceeds this range, that is, if the B400 to BFFF range or W400 to WFFF range is allocated for the master station, the area cannot be allocated with the first half link parameter (including the MELSECNET mode link parameter) for the third tier.
- (2) When the M/R area is required for the third tier, either provide a vacant area in the W0 to W3FF range with the link parameter for the second tier or use the M/R area for the second tier.

7. LINK PARAMETERS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode						
Applicability	o	o	o	o	o	o

MELSEC-A

7.7.5 Link parameter setting example

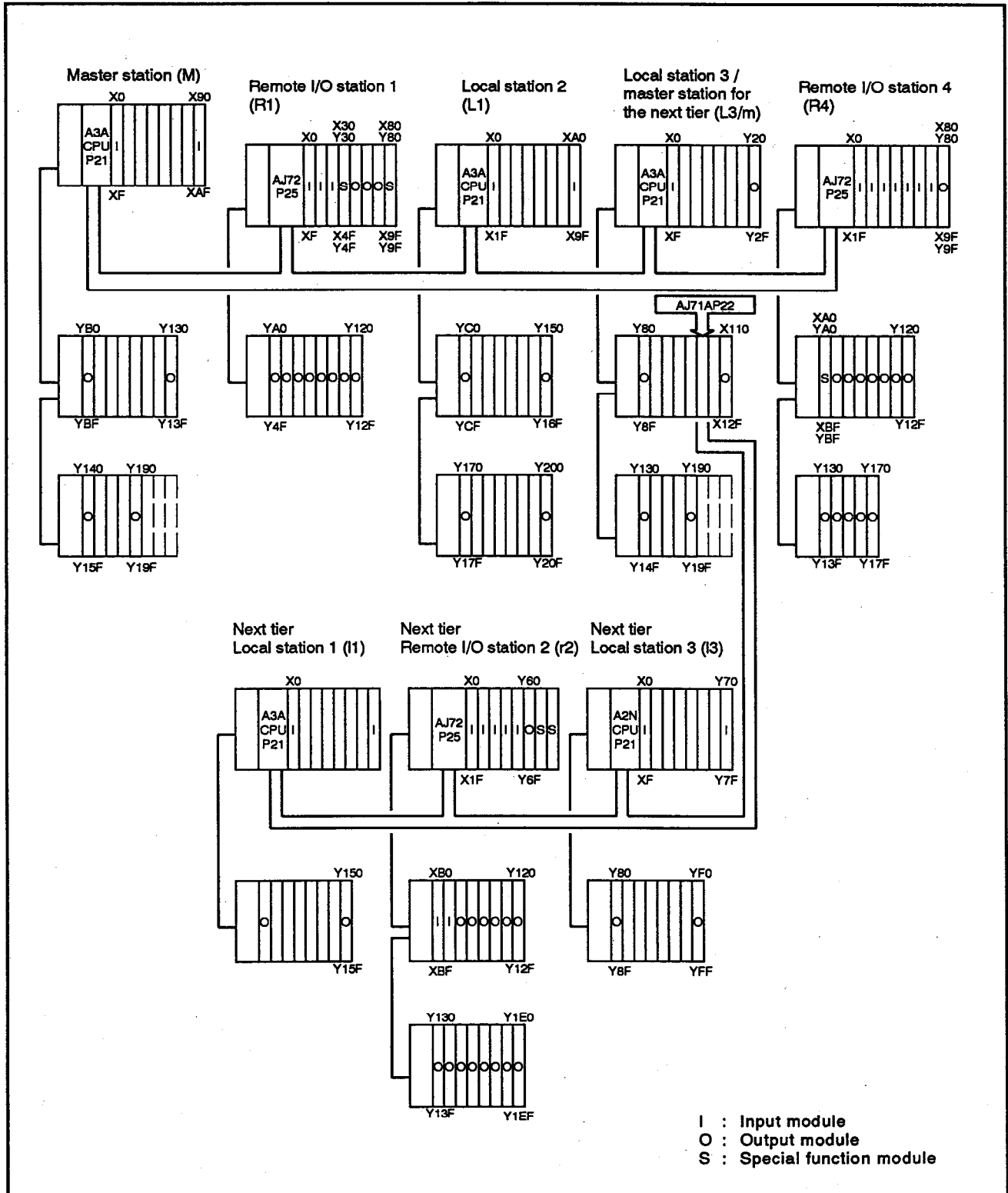


Fig. 7.40 Three-Tier Configuration Example

Table 7.3 Device Allocation at Each Station

		First Half Link Parameter				Second Half Link Parameter	
		M ↔ L		M → R	M ← R	B	W
		B	W				
M		256	256			256	256
R1				34	32		
L2		128	128			128	128
L3/m	m	128	128			128	128
	l1	128	128			128	128
	r2			34	32		
	l3	128	128				
R4				34	32		

- (1) Checking the operation mode to be used
 - (a) Operation mode of the second tier: MELSECNET II composite mode
 This is because all of the slave stations (local stations and remote I/O stations) are either MELSECNET mode-compatible or MELSECNET II mode-compatible.
 - (b) Operation mode of the third tier: MELSECNET II composite mode
 This is because all of the slave stations (local stations and remote I/O stations) are either MELSECNET mode-compatible or MELSECNET II mode-compatible.
- (2) Checking the device range to be allocated to the master station in the third tier with the link parameters for the second tier
 - (a) The following number of device points should be allocated:

First half link parameters:
 Link relay (B): 384 points Link registers (W): 384 points

Second half link parameters:
 Link relay (B): 256 points Link register (W): 256 points
 - (b) The following M/R areas are required:

M → R area: 34 points
 M ← R area: 32 points

A vacant area of at least 66 link register (W) points is required for the allocation of the M/R area for the third tier with the first half link parameters for the second tier.

Note: In the system configuration illustrated in Fig. 7.40, 132 points are allocated for the M/R area for the second tier. An M/R area of this range can be allocated.

(3) Allocating link relays (B)

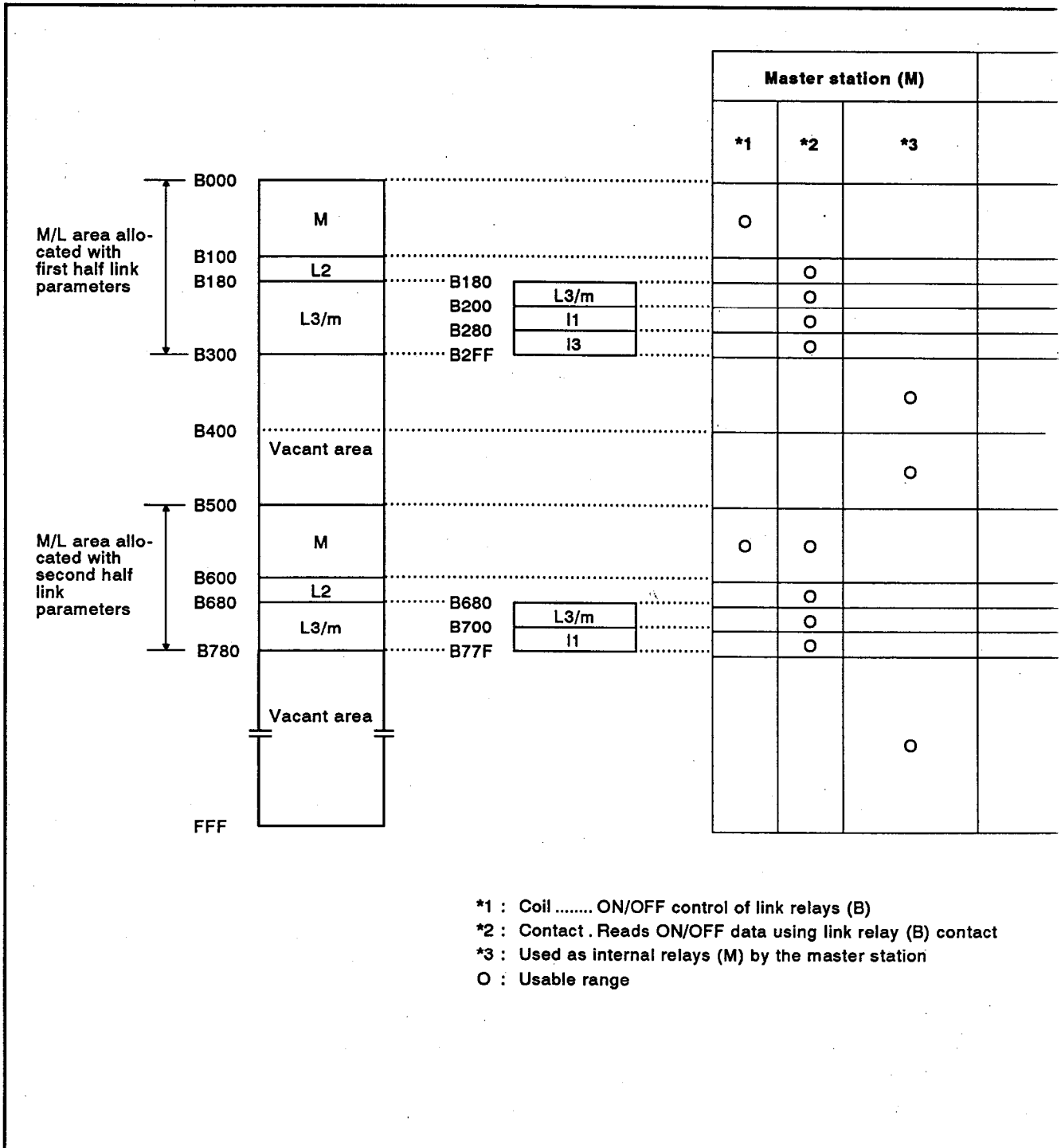


Fig. 7.41 Allocation Example of Link Relays (B)

7. LINK PARAMETERS

MELSEC-A

	Local station 2 (L2)			Link using local station 3 (L3/m) as the master station for the third tierMaster station (L3/m)								
	*1	*2	*4	Master station (L3/m)			Local station 1 (I1)			Local station 3 (I3)		
	*1	*2	*4	*1	*2	*5	*1	*2	*6	*1	*2	*7
		○			○				○			○
	○	○			○				○			
		○		○	○			○			○	
		○			○		○	○			○	
		○			○			○		○	○	
			○			○			○			○
			○			○			○			
		○			○			○				
	○	○			○				○			
		○		○	○			○				
		○			○		○	○				
			○			○			○			

- *1 : CoilON/OFF control of link relays (B)
- *2 : Contact.. Reads ON/OFF data using link relay (B) contact
- *3 : Used as internal relays (M) by the master station
- *4 : Used as internal relays (M) by L2
- *5 : Used as internal relays (M) by L3/m
- *6 : Used as internal relays (M) by I1
- *7 : Used as internal relays (M) by I3
- : Usable range

(4) Allocating link registers (W)

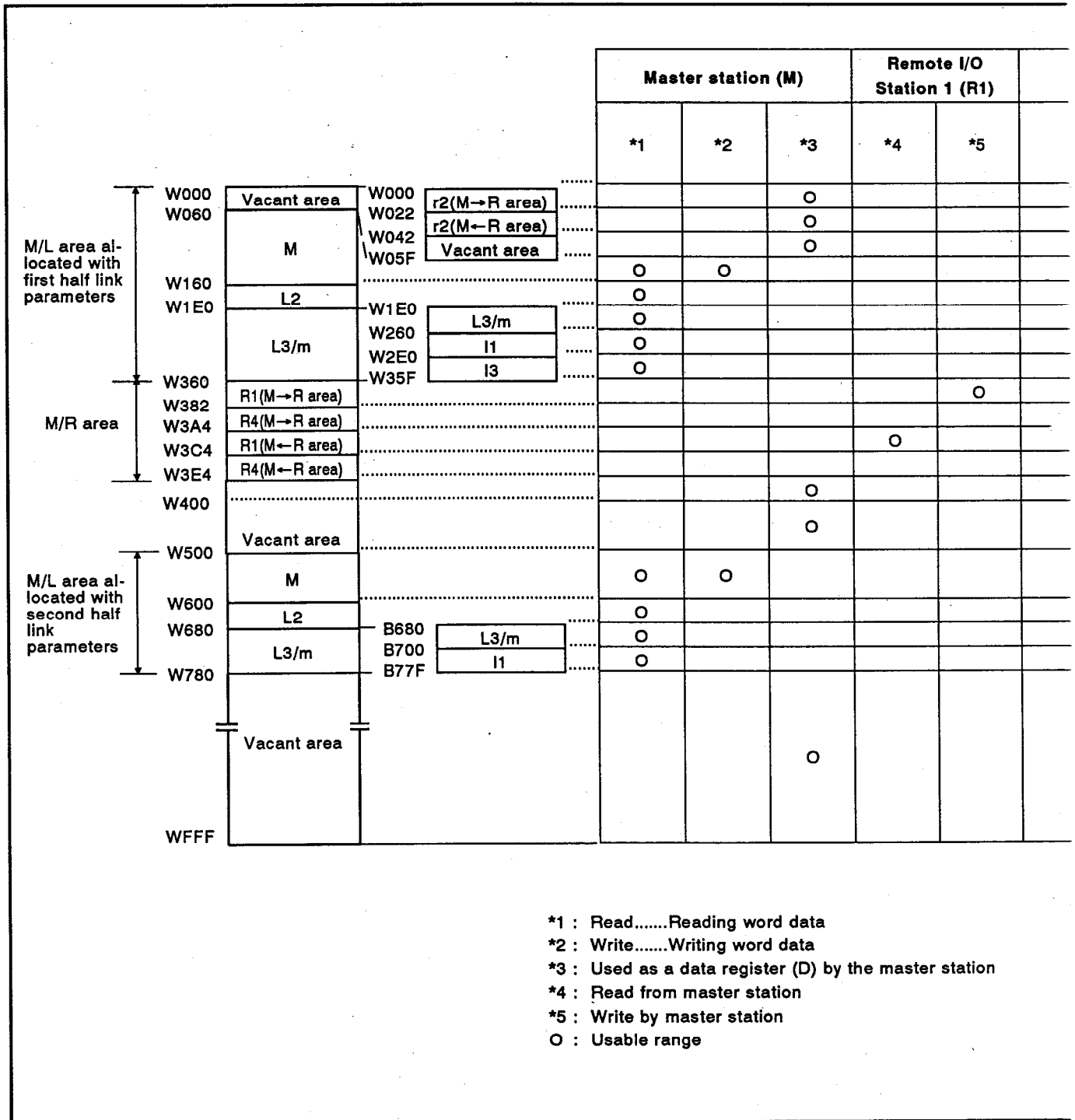


Fig. 7.42 Allocation Example of Link Registers (W)

(a) Provide a vacant area in the W0 to W5F range with the link parameters for the third tier to allocate an M/R area for the third tier. It is possible to allocate The M/R area can be allocated with W360 to W3E3 (the M/R area for the second tier).

7. LINK PARAMETERS

MELSEC-A

	Local station 2 (L2)			Link using local station 3 (L3/m) as the master station for the second tier Master station											Remote I/O station 4 (R4)	
	*1	*2	*6	Master station (L3/m)			Local station 1 (I1)			Remote I/O station 2 (r2)		Local station 3 (I3)			*4	*5
			○						○		○			○		
			○						○	○				○		
			○			○			○					○		
	○			○			○						○			
	○	○		○					○					○		
	○			○	○		○						○			
	○			○			○	○					○			
	○			○			○						○	○		
			○			○			○					○		
			○			○			○					○		○
			○			○			○					○	○	
			○			○			○					○		
			○			○			○					○		
			○			○			○					○		
			○			○			○					○		
	○			○			○									
	○	○		○					○							
	○			○	○		○									
	○			○			○	○								
			○			○			○							

- *1 : ReadReading word data
- *2 : WriteWriting word data
- *3 : Used as a data register (D) by the master station
- *4 : Read from master station
- *5 : Write by master station
- *6 : Used as a data register (D) by L2
- *7 : Used as a data register (D) by L3/m
- *8 : Used as a data register (D) by I1
- *9 : Used as a data register (D) by I3
- : Usable range

7. LINK PARAMETERS

MELSEC-A

(4) Inputs (X) and outputs (Y)

(a) A memory map, after the allocation of inputs and outputs, is illustrated in Fig. 7.43.

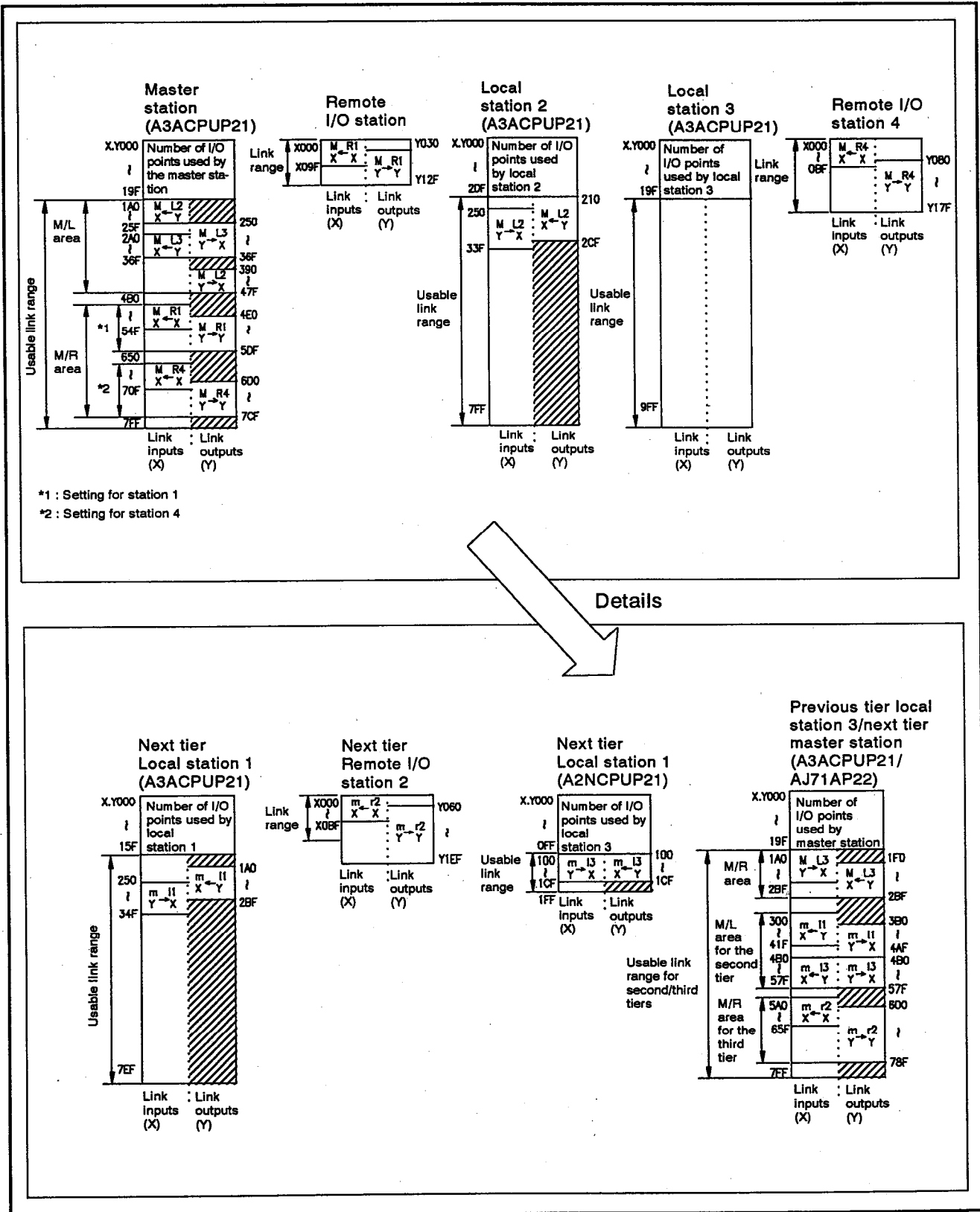


Fig. 7.43 Allocation Example of Inputs/Outputs

7. LINK PARAMETERS

MELSEC-A

(5) Link parameter setting

(a) First half link parameters for the second tier

* MELSECNET II MULTI MODE LINK *						M : B1 ↔ ALL	L : B1 000-2FF
MASTER	SLAVE PC STATIONS	FIRST M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms	M : W1 ↔ ALL	L : W1 060-35F
		B	W			M : B2 ↔ ALL	L : B2 500-77F
M	4	000-0FF	060-15F	200	XXXX	M : W2 ↔ ALL	L : W2 500-77F
						M : W → ALL	R : W 360-3A3
						M : W ← ALL	R : W 3A4-3E3
						M : Y → ALL	R : 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	1F0-28F
R 4	-----	-----	382-3A3	3C4-3E3	6D0-7CF	080-17F	650-70F	000-0BF

M : MASTER L : LOCAL R : REMOTE
PRESS <SSN> TO SELECT 1ST/2ND RANGE OF B/W

↑ LOCAL
R : REMOTE
* : MELSECNET-II (LOCAL)

(b) Second half link parameters for the second tier

* MELSECNET II MULTI MODE LINK *						M : B1 ↔ ALL	L : B1 000-2FF
MASTER	SLAVE PC STATIONS	SECOND M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms	M : W1 ↔ ALL	L : W1 060-35F
		B	W			M : B2 ↔ ALL	L : B2 500-77F
M	4	500-5FF	500-5FF	200	XXXX	M : W2 ↔ ALL	L : W2 500-77F
						M : W → ALL	R : W 360-3A3
						M : W ← ALL	R : W 3A4-3E3
						M : Y → ALL	R : 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
PRESS <SSN> TO SELECT 1ST/2ND RANGE OF B/W

↑ LOCAL
R : REMOTE
* : MELSECNET-II (LOCAL)

7. LINK PARAMETERS

MELSEC-A

(c) First half link parameters for the third tier

* MELSECNET II MULTI MODE LINK *						M : B1 ↔ ALL	L : B1 180-2FF
MASTER	SLAVE PC STATIONS	FIRST M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms	M : W1 ↔ ALL	L : W1 1E0-35F
		B	W			M : B2 ↔ ALL	L : B2 680-77F
M	3	180-1FF	1E0-25F	200	XXXX	M : W2 ↔ ALL <th>L : W2 680-7FF</th>	L : W2 680-7FF
						M : W → ALL	R : W 000-021
						M : W ← ALL	R : W 022-041
						M : Y → ALL	R : 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 *						M : B1 ↔ ALL	L : B1 180-2EF
MASTER	SLAVE PC STATIONS	SECOND M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms	M : W1 ↔ ALL	L : W1 1E0-35F
		B	W			M : B2 ↔ ALL	L : B2 680-77F
M	3	680-6FF	680-6FF	200	XXXX	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	700-77F	-----	-----	-----	-----	-----	-----
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. LINK PARAMETERS

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode						
Applicability	o		o			

MELSEC-A

7.8 Allocating Inputs and Outputs to the Master Station in a Remote I/O System

When a remote I/O system is configured with the MELSECNET (II) Data Link System, there are restrictions for allocating inputs and outputs for the master station.

If the master station has only local stations linked to it, the allocation of inputs and outputs is done in the same manner as for an independent system.

REMARK

I/O addresses are automatically allocated by the PC CPU.

A peripheral device is not required to allocate inputs and outputs. However, allocating inputs and outputs with a peripheral device has the following advantages:

- Saving I/O points (16 points) occupied by a vacant area.
- Reserving I/O points (32, 48, or 64 points) at vacant areas for future system expansion.

7.8.1 I/O allocation restrictions

- (1) Inputs and outputs must be allocated from the head address (X0/Y0) to the final address allocated to the remote I/O station.

Allocated I/O ranges differ 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 allocated after the M/R area, it is not necessary to allocate inputs and outputs to the local station setting range (see Fig. 7.43(a)).
- (b) If the M/L area is allocated after the M/R area, it is necessary to allocate inputs and outputs to the local station setting range (see Fig. 7.43(b)).

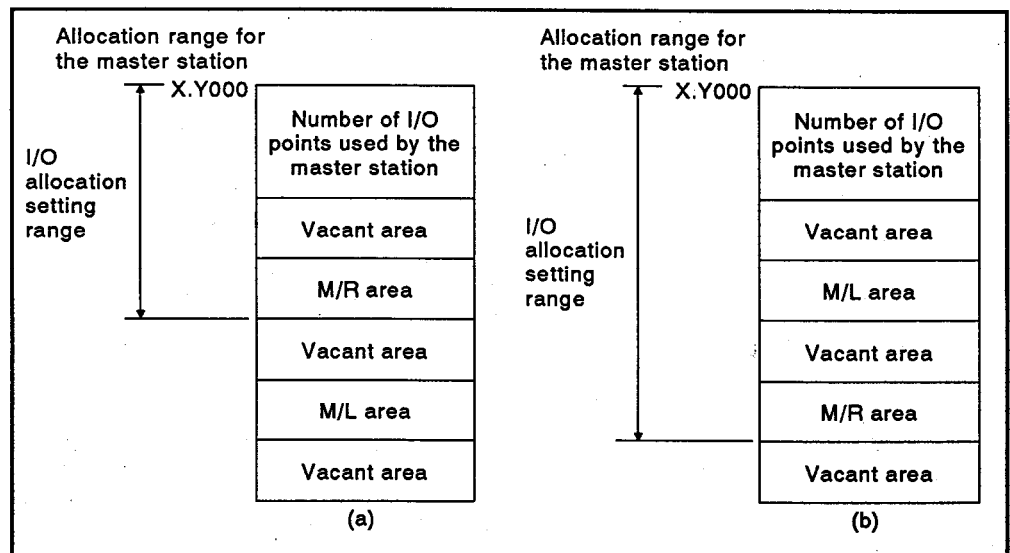


Fig. 7.43 I/O Allocation Setting Range

REMARK

When allocating inputs and outputs, the device range is set with the assumption that the input modules or output modules are loaded or that vacant slots exist corresponding to the ranges marked by asterisks in both items of Fig. 7.43 and in the "M/L area" in Item b of Fig. 7.43.

- (2) When allocating inputs and outputs to a remote I/O station, a slot in which a module is loaded cannot be allocated as a vacant slot (S1: 0 points, S2: 16 points, S3: 32 points, S4: 48 points, S5: 64 points). If this is attempted, 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	Vacant	Input module 16 points

- Slots marked with "*1" cannot be allocated as a vacant slot (S1, S2, S3, S4, or S5) because an input or output module is loaded.
- The slot marked with "*2" can be allocated as a vacant slot.

- (3) If slot 0 in a remote I/O station is vacant, a vacant slot of at least 16 points (S2, S3, S4, S5) must be allocated.

If S1 is set for such a vacant slot position, a "UNIT VERIFY ERROR" will occur.

AJ72P25	Vacant	Input module 16 points	Output module 32 points	Special function module 32 points	Input module 16 points
---------	--------	---------------------------	----------------------------	--------------------------------------	---------------------------

The vacant slot cannot be set as a 0 point vacant slot.

- (4) When allocating inputs and outputs to a special function module, set the number of points of the module actually loaded. If an RFRP or RTOP instruction is executed and the wrong number of points set, an error will occur.

POINT

I/O allocation cannot be used to change the number of input or output points for an input or output module connected to an A0J2P25/R25 (compact remote I/O station module).

Allocate the same number of input and output points that are allocated to a remote I/O station configured with an A0J2P25/R25.

Data Link System	MELSECNET			MELSECNET/R	
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II composite mode
Operating Mode	0		0		
Applicability	0		0		

7. LINK PARAMETERS

MELSEC-A

7.8.2 I/O allocation example

When making allocations for a remote I/O station, first allocate inputs and outputs to the master station, and then set them with the "I/O LOCATING" screen on the A6GPP.

The following describes the procedure for setting "0 points" for a vacant slot (the shaded slots in Fig. 7.44) in the master station and the remote I/O stations. The system illustrated in Fig. 7.44 is used as an example.

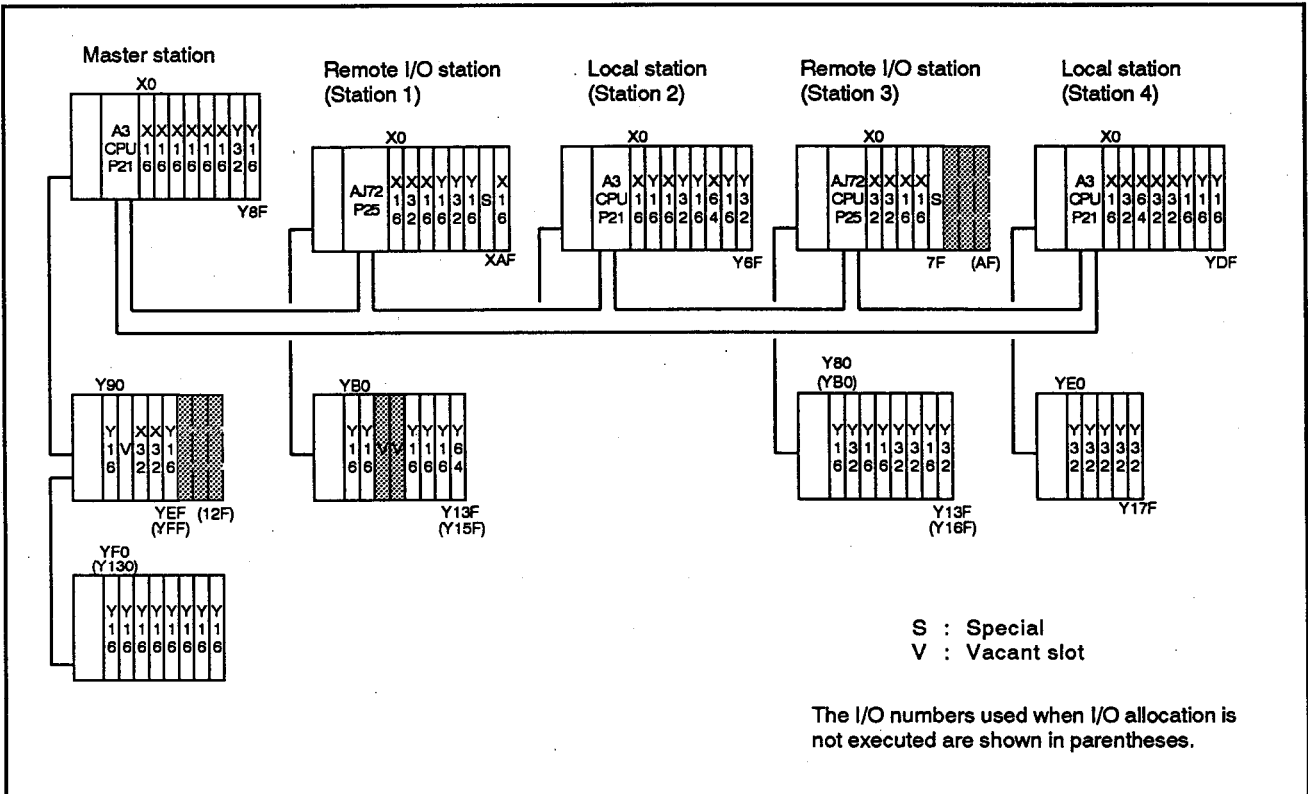


Fig. 7.44 System Example

The I/O allocation range varies depending on the ranges allocated for the M/L area and the M/R area.

Refer to the I/O allocation example in Fig. 7.44.

(1) When the M/L area is allocated after the M/R area

When the M/L area is allocated after the M/R area in the link parameters, the I/O allocation is shown in the following example

(a) Link parameter I/O allocation example

Fig. 7.45 shows the link parameter I/O allocation

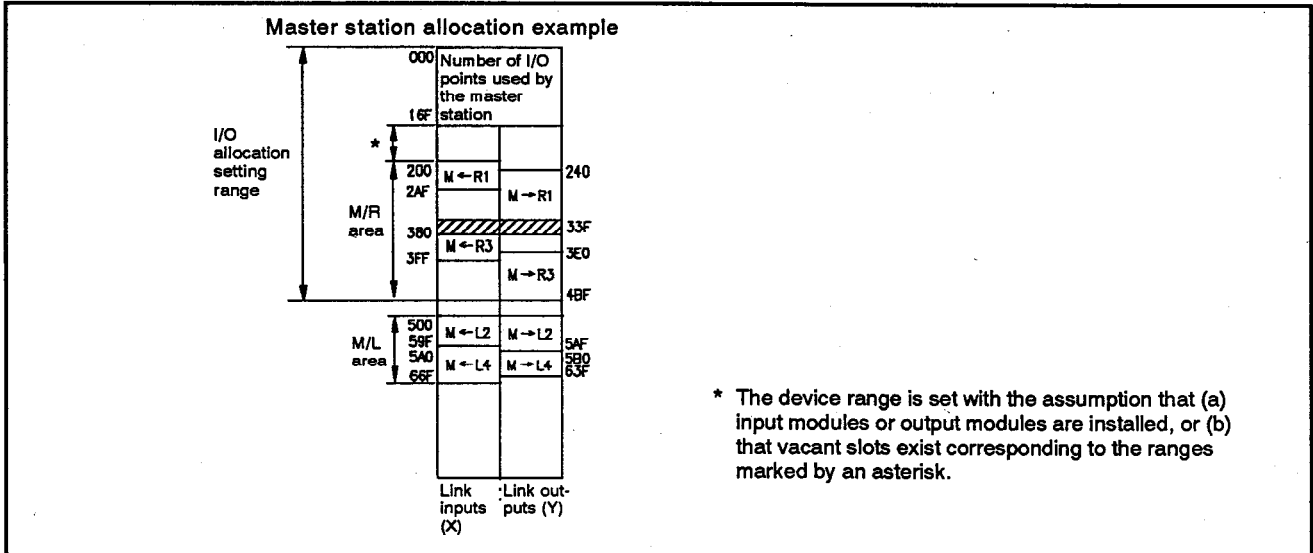


Fig. 7.45 Allocation Example

When allocating inputs and outputs, the device range is set with the assumption that the input modules or output modules are loaded or that vacant slots exist corresponding to the ranges marked by asterisks in both items of Fig. 7.45 and in the "ML area" in Item (b) of Fig. 7.45.

(b) I/O allocation 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	VACANCY(S)
0	X16	16	Y16	32	Y16	48	F32	64		80		96		1 : 0 PT.
1	X16	17	Y16	33	F32	49	S 0	65		81		97		2 : 16 PT.
2	X16	18	Y16	34	X16	50	S 0	66		82		98		3 : 32 PT.
3	X16	19	Y16	35	Y16	51	S 0	67		83		99		4 : 48 PT.
4	X16	20	Y16	36	Y16	52	Y16	68		84		100		5 : 64 PT.
5	X16	21	Y16	37	S 0	53	Y32	69		85		101		X(X)
6	Y32	22	Y16	38	S 0	54	Y16	70		86		102		6 : 16 PT.
7	Y16	23	Y16	39	Y16	55	Y16	71		87		103		7 : 32 PT.
8	Y16	24	S64	40	Y16	56	Y32	72		88		104		8 : 48 PT.
9	S 0	25	S64	41	Y16	57	Y32	73		89		105		9 : 64 PT.
10	X32	26	S16	42	Y64	58	Y16	74		90		106		Y(Y)
11	X32	27	X16	43	S64	59	Y32	75		91		107		A : 16 PT.
12	Y16	28	X32	44	X32	60		76		92		108		B : 32 PT.
13	S 0	29	X16	45	X32	61		77		93		109		C : 48 PT.
14	S 0	30	X16	46	X16	62		78		94		110		D : 64 PT.
15	S 0	31	Y32	47	X16	63		79		95		111		S-UNIT(F)
														E : 16 PT.
														F : 32 PT.
														G : 48 PT.
														H : 64 PT.

PRESS <END>, WHEN SET

Slot numbers

- 0 to 23 : Allocation of I/O modules in the master station
- 24 to 26 : Range marked with an asterisk (170 to 1FF) in Fig. 7.45, Item (a)
- 27 to 42 : Allocation for remote I/O station 1

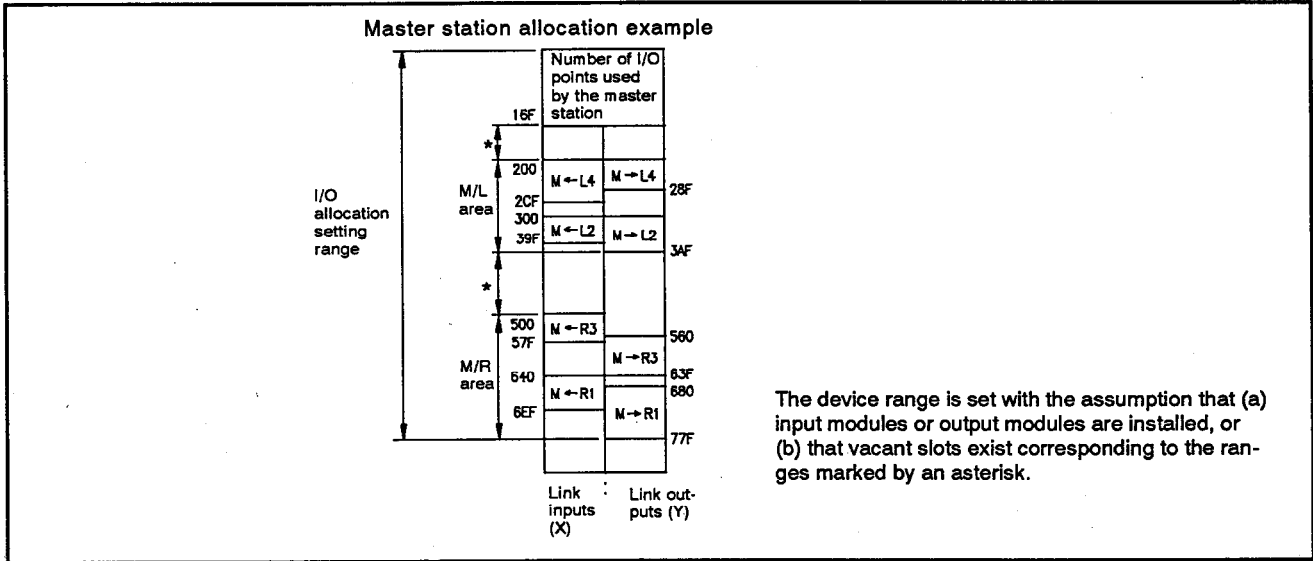
- 43 : Vacant slot between remote I/O stations 1 and 3 (shaded area in Fig. 7.45, Item (a))
- 44 to 59 : Allocation for remote I/O station 3

(2) When the M/R area is allocated after the M/L area

When the M/R area is allocated after the M/L area in the link parameters, the I/O allocation is as shown in the following example.

(a) Link parameter I/O allocation example

Fig. 7.46 shows the link parameter I/O allocation



The device range is set with the assumption that (a) input modules or output modules are installed, or (b) that vacant slots exist corresponding to the ranges marked by an asterisk.

Fig. 7.46 Allocation Example

(b) I/O allocation 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	VACANCY(S)
0	X16	16	Y16	32	S64	48	Y32	64	Y16	80		96	112	1 : 0 PT.
1	X16	17	Y16	33	S64	49	Y16	65	S 0	81		97	113	2 : 16 PT.
2	X16	18	Y16	34	S64	50	Y16	66	S 0	82		98	114	3 : 32 PT.
3	X16	19	Y16	35	S64	51	Y32	67	Y16	83		99	115	4 : 48 PT.
4	X16	20	Y16	36	S64	52	Y32	68	Y16	84		100	116	5 : 64 PT.
5	X16	21	Y16	37	S64	53	Y16	69	Y16	85		101	117	6 : 16 PT.
6	X16	22	Y16	38	S16	54	Y32	70	Y64	86		102	118	7 : 32 PT.
7	X16	23	Y16	39	X32	55	X16	71		87		103	119	8 : 48 PT.
8	X16	24	S64	40	X32	56	X32	72		88		104	120	9 : 64 PT.
9	S 0	25	S64	41	X16	57	X16	73		89		105	121	A : 16 PT.
10	X32	26	S64	42	X16	58	Y32	74		90		106	122	B : 32 PT.
11	X32	27	S64	43	F32	59	Y16	75		91		107	123	C : 48 PT.
12	Y16	28	S64	44	S 0	60	Y16	76		92		108	124	D : 64 PT.
13	S 0	29	S64	45	S 0	61	F32	77		93		109	125	S-UNIT(F)
14	S 0	30	S64	46	S 0	62	X16	78		94		110	126	E : 16 PT.
15	S 0	31	S64	47	Y16	63	Y16	79		95		111	127	F : 32 PT.
														G : 48 PT.
														H : 64 PT.

PRESS <END>, WHEN SET

Slot numbers

- 0 to 23 : Allocation of I/O modules in the master station
- 24 to 26 : Range marked with an asterisk in both items of Fig. 7.46 and the local station setting range in Fig. 7.46, Item (b) (170 to 4FF)
- 39 to 54 : Allocation for remote I/O station 3
- 55 to 70 : Allocation for remote I/O station 1

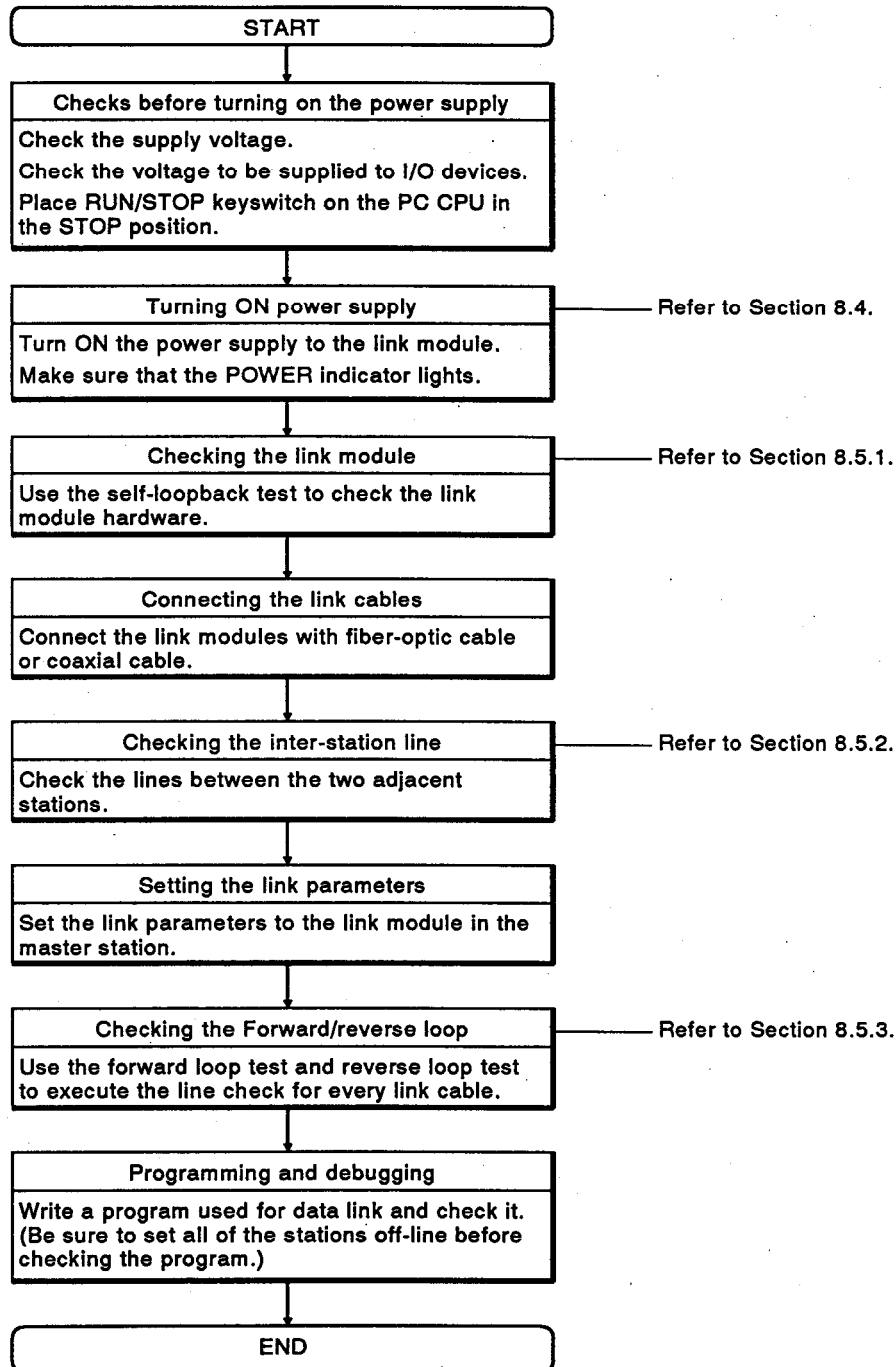
8. BEFORE STARTING OPERATION

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	○	○	○	○	○	○
Applicability	○	○	○	○	○	○

MELSEC-A

8. BEFORE STARTING OPERATION

8.1 General Preparatory Steps before Starting Operation



Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	o	o	o			
Applicability	o	o	o			

8. BEFORE STARTING OPERATION

MELSEC-A

8.2 Setting the Link Module Station Numbers

8.2.1 Setting the link module station numbers in the MELSECNET data link system

Station numbers are assigned in ascending order in the forward loop direction, beginning with "00" (assigned to the master station). The maximum station number is "64".

In a three-tier system, the master station in each tier is assigned to station number "00". Slave station numbers are assigned in the ascending order in the forward loop direction.

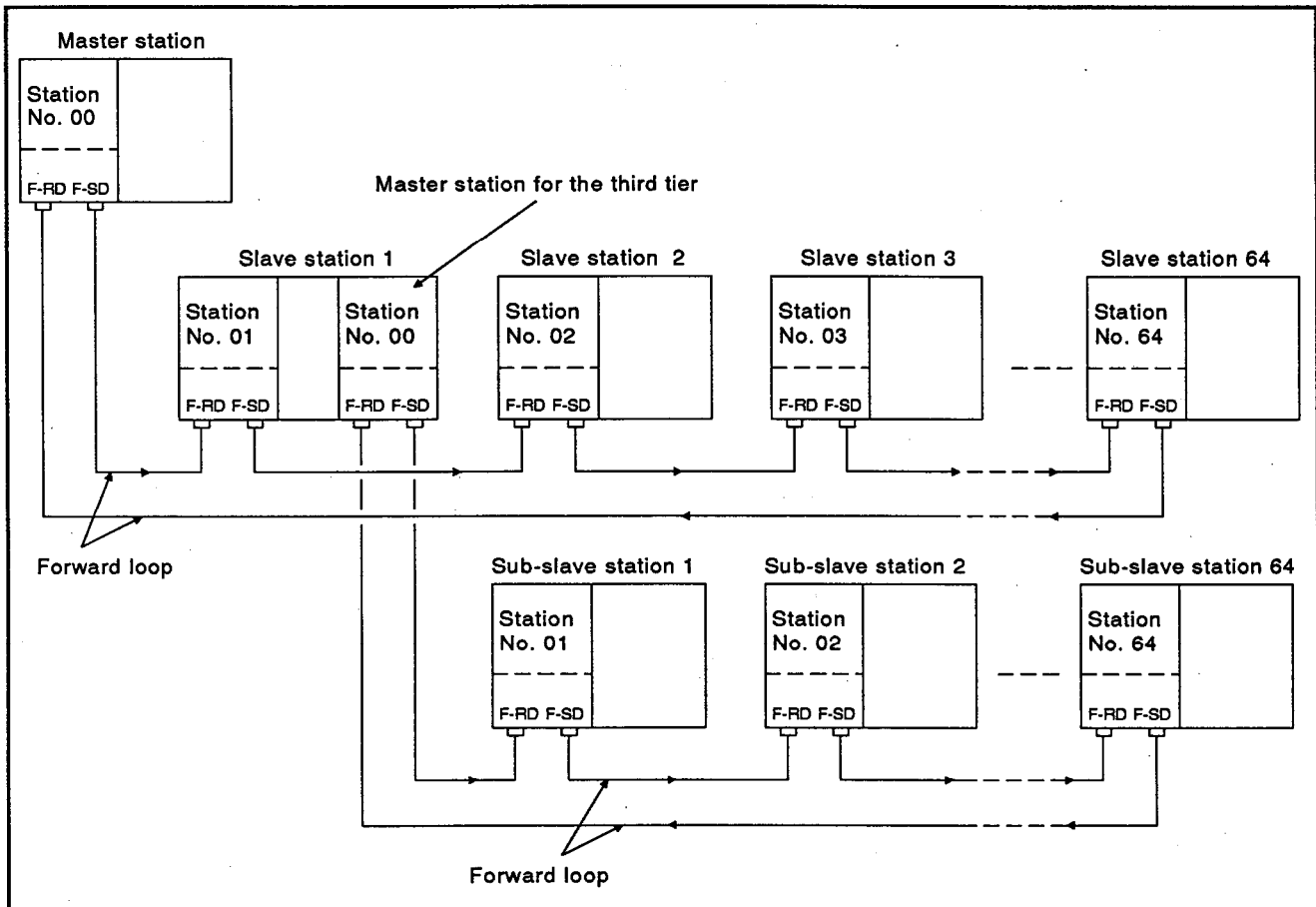


Fig. 8.1 Setting Link Module Station Numbers

REMARK

Refer to the manual for individual link modules for details on the procedure for setting the link module station numbers.

8. BEFORE STARTING OPERATION

MELSEC-A

Precautions on setting the link module station numbers

- (1) The station numbers must be consecutive.

If station numbers are not consecutive, more time will be required for the system to switch to the loopback mode when the power supply to a slave station is turned off. This means the loopback processing will not be executed within the period set for the watchdog timer, which, in turn, causes the entire data link system to stop.

Therefore, never skip station numbers as illustrated in Fig. 8.2.

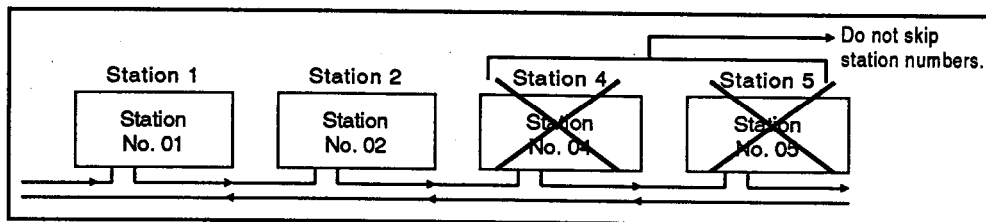
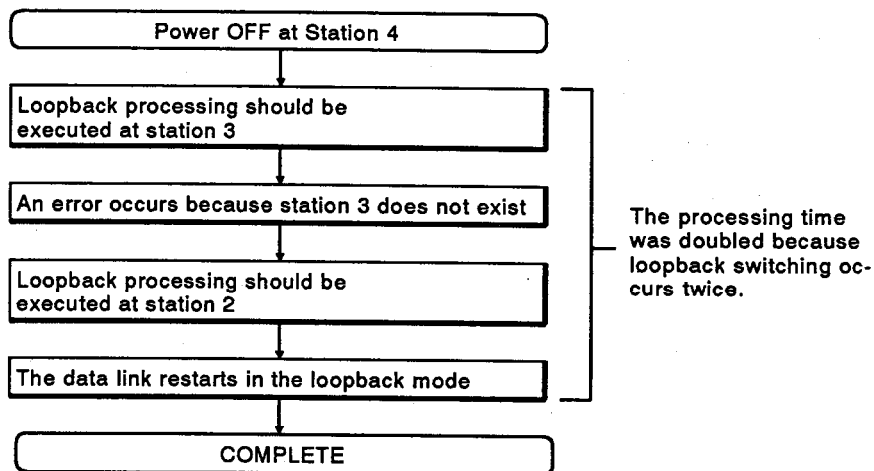


Fig. 8.2 Station Numbers Not Set Consecutively

Example:

The following flowchart illustrates the sequence that occurs when the system shown is Fig. 8.2 switches to the loopback mode due to the power supply at station 4 being turned off.



- (2) Station numbers must be in ascending order.

Never set station numbers in the descending order as illustrated in Fig. 8.3.

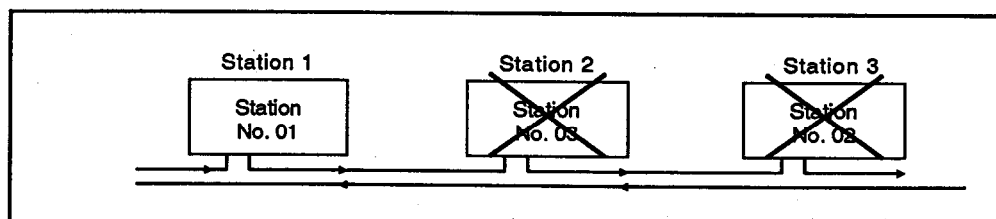


Fig. 8.3 Station Numbers Not Set in Ascending Order

8. BEFORE STARTING OPERATION

MELSEC-A

- (3) The station numbers in a single loop must all be different.

If the same station number is assigned to more than one station in the same loop, the link data of the station closer to the receive end of the master station becomes effective and the link data of the other station is ignored.

Therefore, never set the same station number twice in the same loop as illustrated in Fig. 8.4.

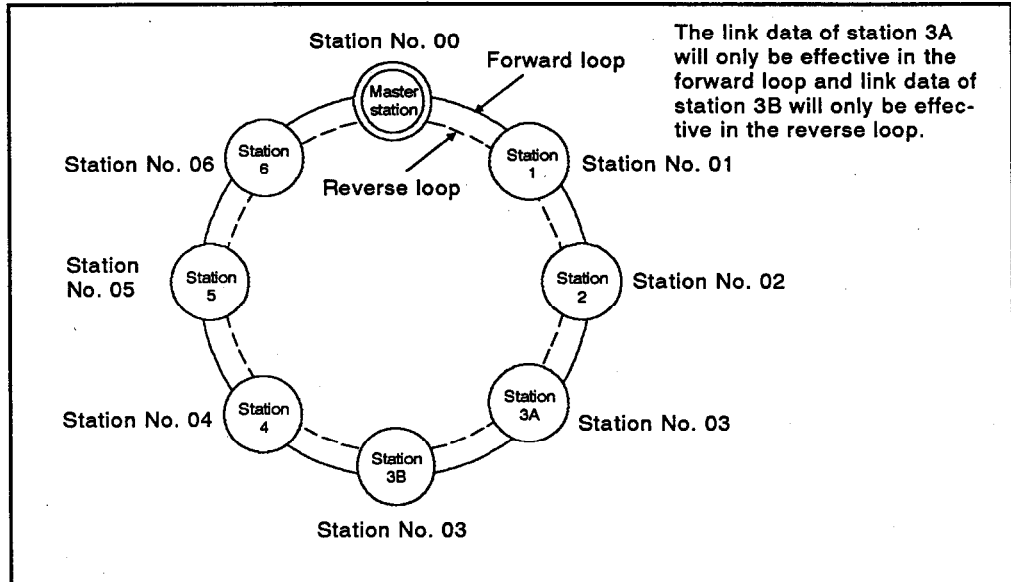


Fig. 8.4 All Stations Not Assigned to Different Station Numbers

- (4) The number of slave stations set with the link parameters must agree with the number of slave stations actually connected in the system.
- (a) If the set number of slave stations is greater than the actual number of slave stations, the slave stations not actually present in the system will be considered as faulty stations.
- (b) If the set number of slave stations is less than the actual number of slave stations, the data link will only be executed with the slave stations set with the link parameters. All other slave stations will be treated as off-line mode stations.

8. BEFORE STARTING OPERATION

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode				○	○	○
Applicability				○	○	○

MELSEC-A

8.2.2 Setting the link module station numbers in the MELSECNET/B data link system

Set the master station number to 00 and a slave station number to 02, followed by other slave stations to 02...n ($n \leq 31$).

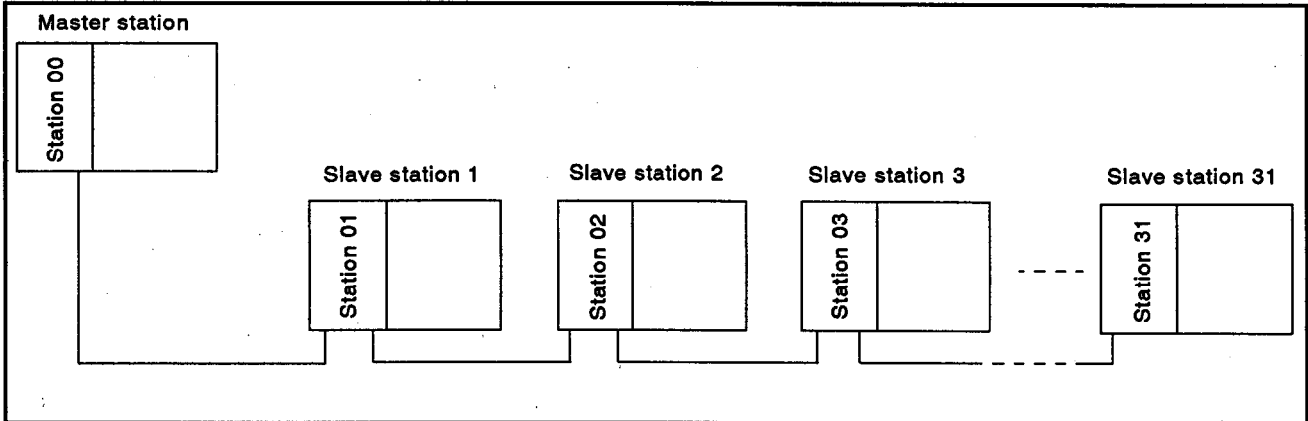


Fig. 8.5 Setting Link Module Station Numbers

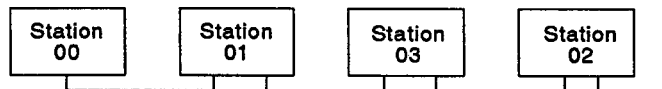
REMARK

The manual of the used link module gives details about setting station numbers.

POINT

In the MELSECNET/B Data Link System, slave station numbers can be set in descending order as shown:

Master station Slave station 1 Slave station 2 Slave station 3

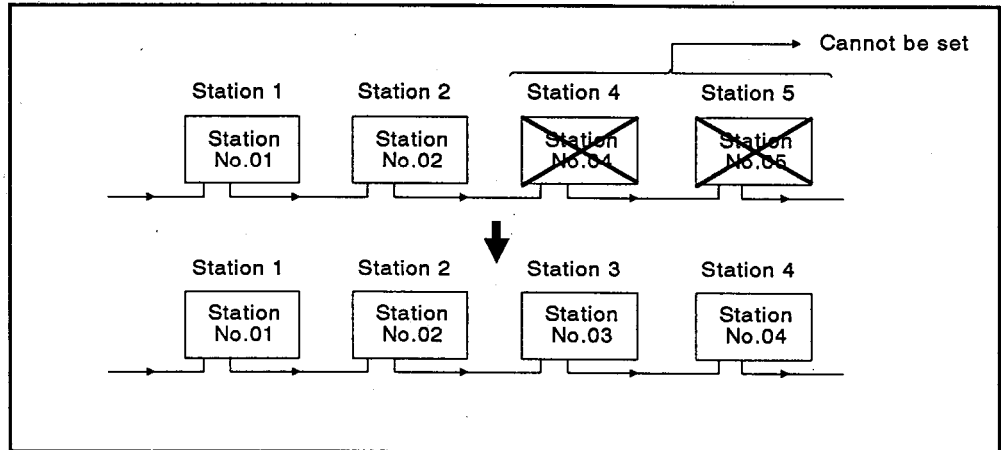


Precautions when setting station numbers

This section gives the precautions to take when setting station numbers.

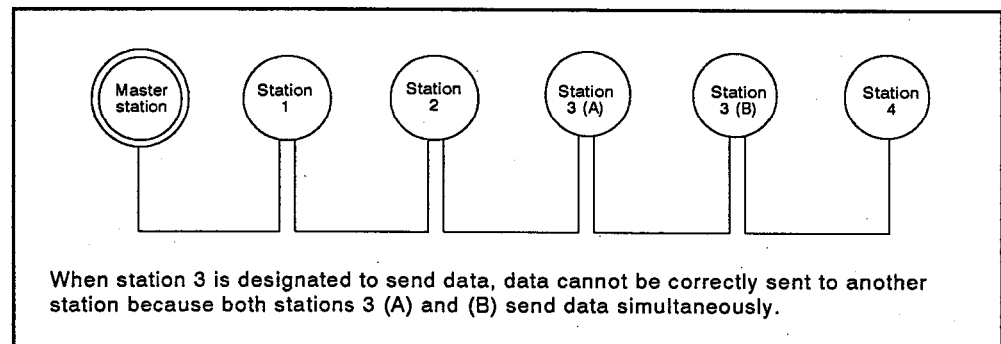
(1) Station numbers must be set consecutively

If station numbers are not set consecutively, the incorrectly set station numbers will be treated as faulty stations.



(2) The station numbers in a single loop must all be different.

If the same station number is allocated to more than one station in the same loop, data cannot be correctly sent because the stations with the same station number send data at the same time when they are designated.



(3) The number of slave stations set by the link parameters must match the number of slave stations actually used in the system.

- (a) If the set number of slave stations is greater than the actual number of slave stations, the slave stations not actually used in the system will be considered as faulty stations.
- (b) If the number of slave stations set is less than the actual number of slave stations, the data link will only be enabled with the slave stations set by the link parameters.

All other slave stations will be treated as off-line mode stations.

8.3 Setting the Communication Speed (Baud Rate)

The overall loop distance of the MELSECNET/B Data Link System is determined by the communication speed (baud rate).

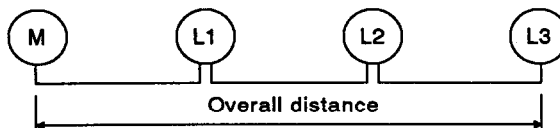
The relationship between set communication speeds and overall loop distances is shown in Table 8.1.

Table 8.1 Communication Speeds and Overall Loop Distances

Communication Speed (M bps)	Overall Loop 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 the master station and the last slave station.



8. BEFORE STARTING OPERATION

Data Link System	MELSECNET			MELSECNETR		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	○	○	○			
Applicability	○	○	○			

MELSEC-A

8.4 Fiber-Optic/Coaxial Cable Connection

8.4.1 Precautions

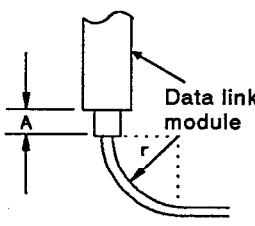
(1) Securing space for the cables

The radius of the fiber-optic cables or coaxial cables must not be smaller than the allowable bend radius.

When connecting a fiber-optic cable or coaxial cable to a link module, make sure that there is enough space for the cable to be bent to a larger radius than the allowable bend radius.

Table 8.1 Allowable Bend Radius

Cable	Cable	Connector A (mm)	Allowable Bend Radius r (mm)
Coaxial cable	3C-2V	30	23
	5C-2V		30
Fiber-optic cable	Standard cable for indoor use	45	45
	Reinforced cable for indoor use		85
	Standard cable for outdoor use		85
	Reinforced cable for outdoor use		140



(2) Doubling the link cables

Connect the fiber-optic cables or coaxial cables in a doubled configuration.

If the cables are not connected in both the forward or reverse loop or if the final station is not connected to the master station, the data link will be maintained at normally operating, correctly connected stations. However, if any problem occurs in the data link, it will be disabled as described on the next page.

8. BEFORE STARTING OPERATION

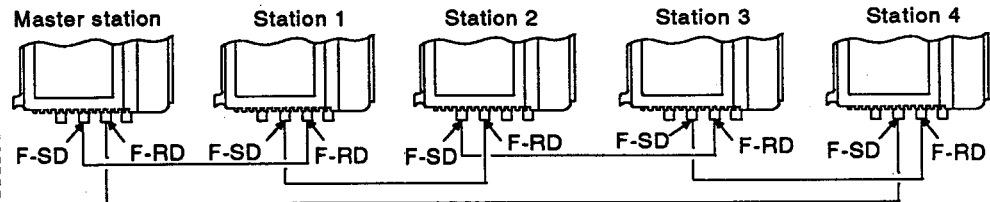
MELSEC-A

- (a) If the cables are connected in either the forward loop or the reverse loop, the data link will be disabled at all stations.

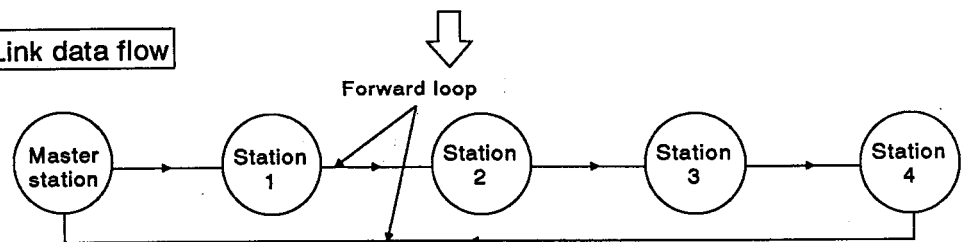
Example

In the following illustration, all stations in the data link will become disabled if the power supply to one station is turned off. The faulty station will not be detected by the link monitor.

Connection in forward loop only



Link data flow

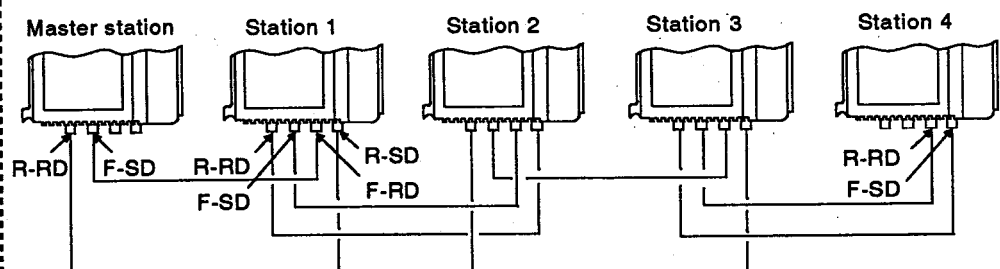


- (b) If cables between F-RD of the master station and F-SD of the final station and between R-SD of the master station and R-RD of the final station are not connected, the data link will be established in the loopback mode. Therefore, when a problem occurs in a station, data link between that station and the final station is disabled.

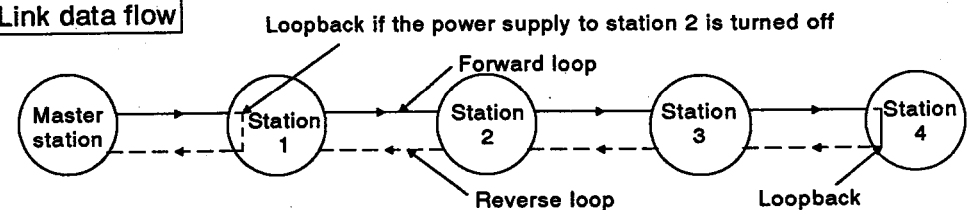
Example

In the following illustration, stations 2, 3, and 4 will be disabled if the power supply to station 2 is turned off.

Connection diagram when cables are not connected between F-RD of the master station and F-SD of the final station and between R-SD of the master station and R-RD of the final station



Link data flow



8. BEFORE STARTING OPERATION

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	o	o	o	o	o	o
Applicability	o	o	o	o	o	o

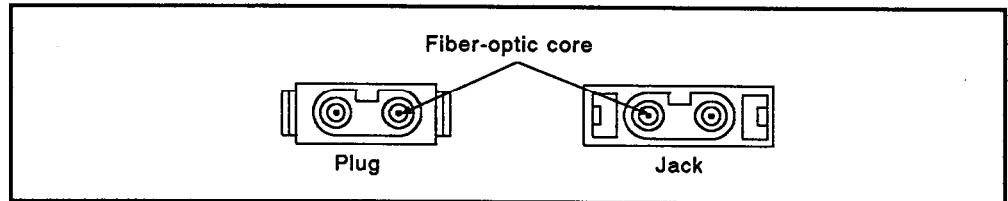
MELSEC-A

(3) Fiber-optic cables

When connecting fiber-optic cables, be very careful not to touch the fiber-optic cores of the plugs or jacks. Always protect them from dust and dirt.

Dirt, dust, or oil may adhere to the fiber-optic cores if they are touched. This will cause transmission loss to be increased and might preclude data link from operating normally.

Always store fiber-optic cables with protective caps on the plugs and sockets.



(4) Coaxial cables

The routing of the coaxial cables must be determined in advance so that the cable is kept separate from the main circuit line, which carry high voltage current.

Connecting (shorting) the FG terminals on the power supply module (the base unit where a link module is also installed) makes the system more resistant to extraneous noise.

8.4.2 Fiber-optic cable connections

(1) Connecting data link modules with fiber-optic cables

Connect the OUT connector of a data link module to the IN connector of the next data link module in order as illustrated in Fig. 8.6. The OUT connector in the final station should be connected to the IN connector of the master station.

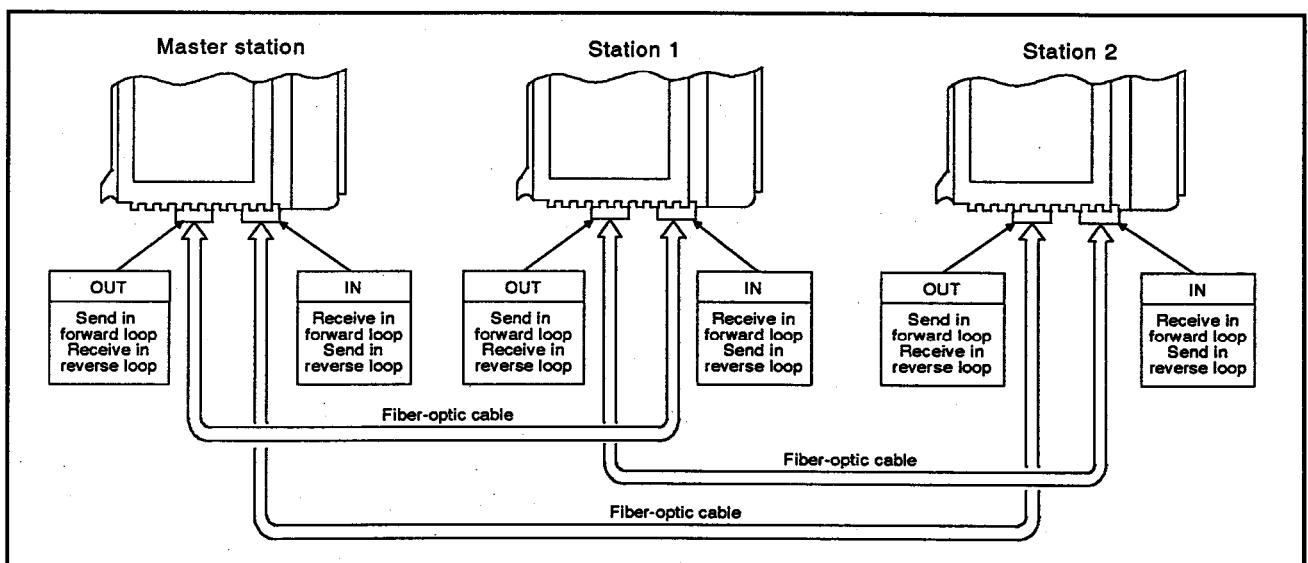


Fig. 8.6 Connecting Data Link Modules with Fiber-Optic Cables

8. BEFORE STARTING OPERATION

MELSEC-A

(2) Connecting fiber-optic cables

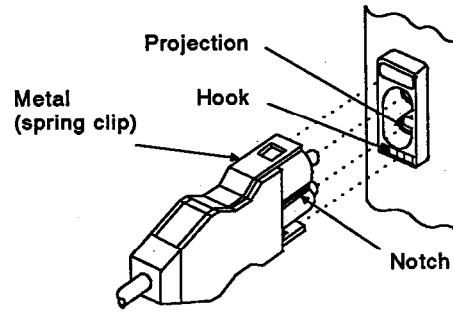
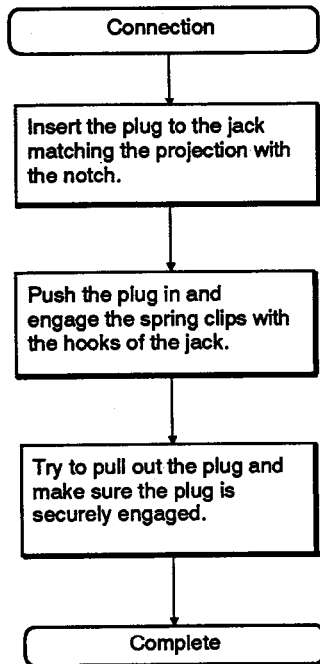


Fig. 8.7

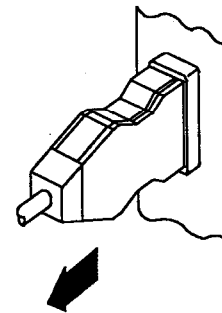


Fig. 8.8

(3) Disconnecting fiber-optic cables

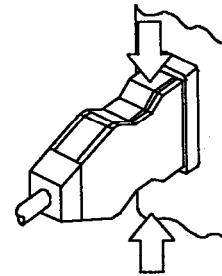
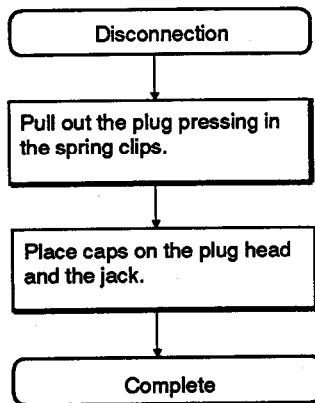


Fig. 8.9

8. BEFORE STARTING OPERATION

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode						
Applicability	o	o	o			

MELSEC-A

8.4.3 Coaxial cable connection

(1) Connecting data link modules with coaxial cables

Connect the F-SD connector of a data link module to the F-RD connector of the next module and connect the R-RD connector of a data link module to the R-SD connector of the next module in order. The F-SD connector and R-RD connector of the final station should be connected to the F-RD connector and R-SD connector of the master station, respectively.

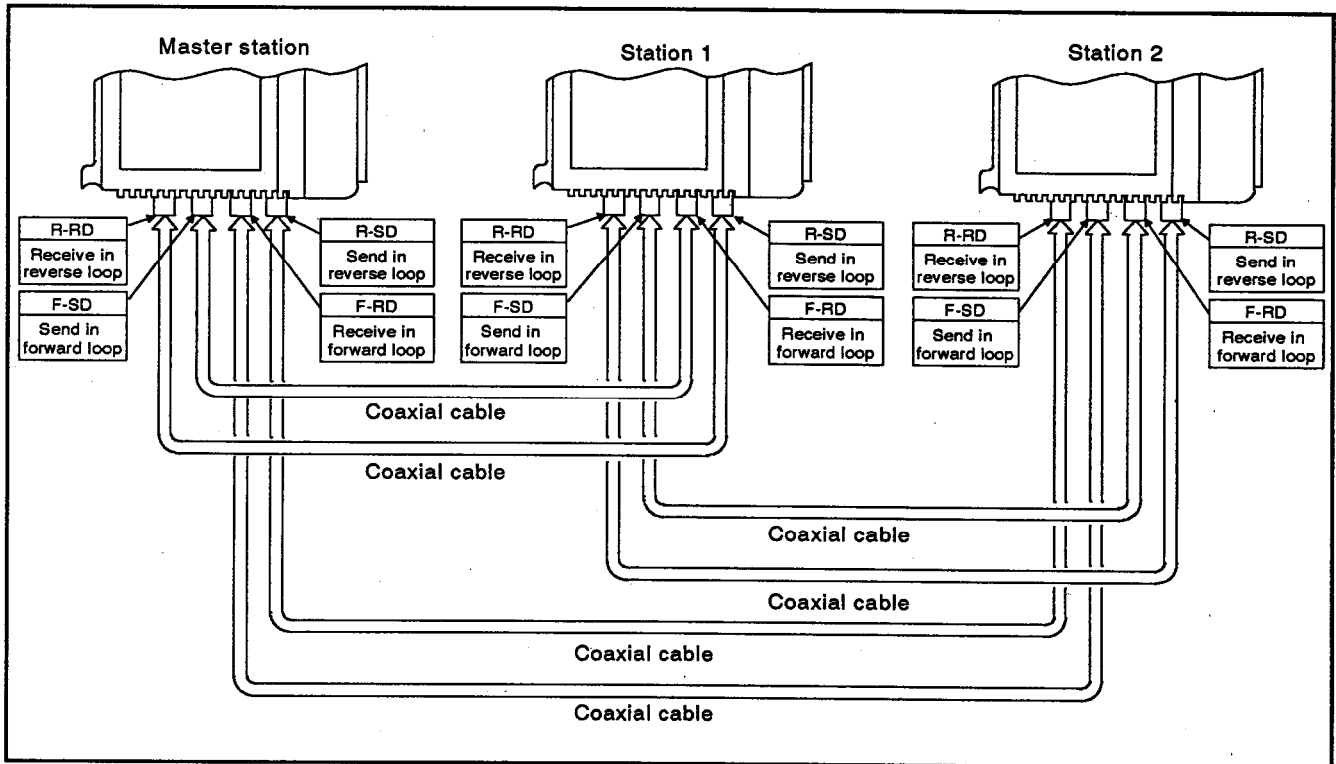


Fig. 8.10 Connecting Data Link Modules with Coaxial Cables

(2) Connecting coaxial cables

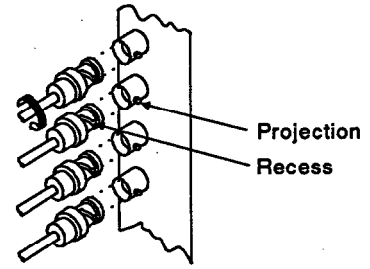
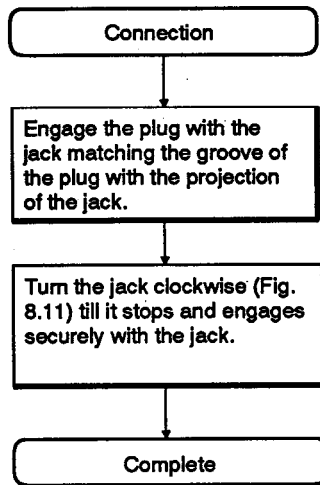


Fig. 8.11

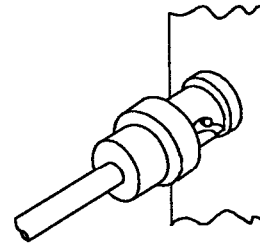


Fig. 8.12

(3) Disconnecting coaxial cable

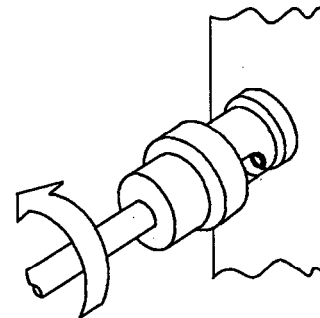
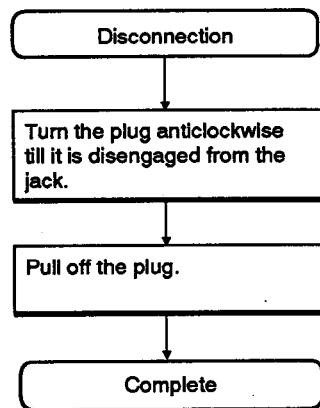


Fig. 8.13

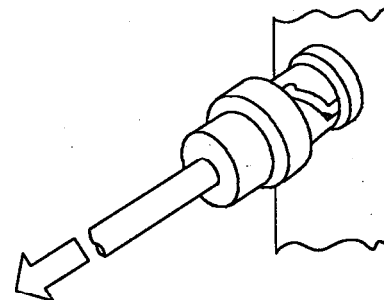


Fig. 8.14

8.5 Twisted-Wire Pair Cable Connections

This section explains how to connect twisted-wire pair cables.

8.5.1 Precautions when connecting twisted-wire pair cables

This section describes the precautions to take when connecting twisted-wire pair cables used for the MELSECNET/B Data Link System.

(1) Laying twisted-wire pair cables

When laying twisted-wire pair cables, follow the precautions given below to prevent extraneous noise and surge induction:

- (a) Do not bundle twisted-wire pair cables with a high-tension or load-bearing cable.

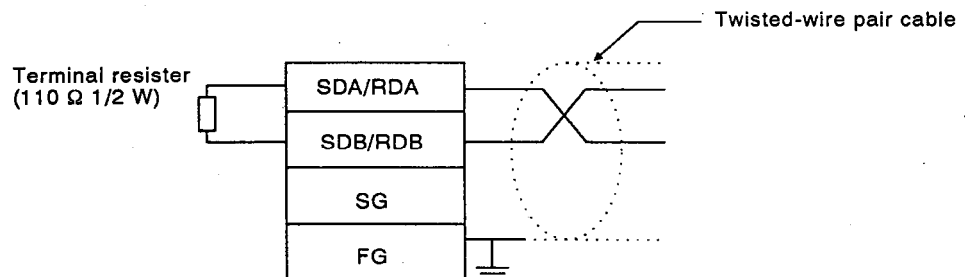
Keep the twisted-wire pair cables away (100 mm or more) from main circuit, high-tension, or load-bearing cables.

- (b) Wire the remote module terminal block so there is enough distance between twisted-wire pair cables and the power supply and I/O signal cables.

- (c) Do not use any part of a twisted-wire pair cable to supply power.

(2) Connecting a terminal resistor

It is necessary to connect a terminal resistor (110 Ω , 1/2 W) between SDA/RDA and SDB/RDB at both end stations of a MELSECNET/B Data Link System.



8. BEFORE STARTING OPERATION

MELSEC-A

8.5.2 Connecting twisted-wire pair cables

Use twisted-wire pair cables to connect link modules as shown in Fig. 8.15.
Attach terminal resistors to both end stations.

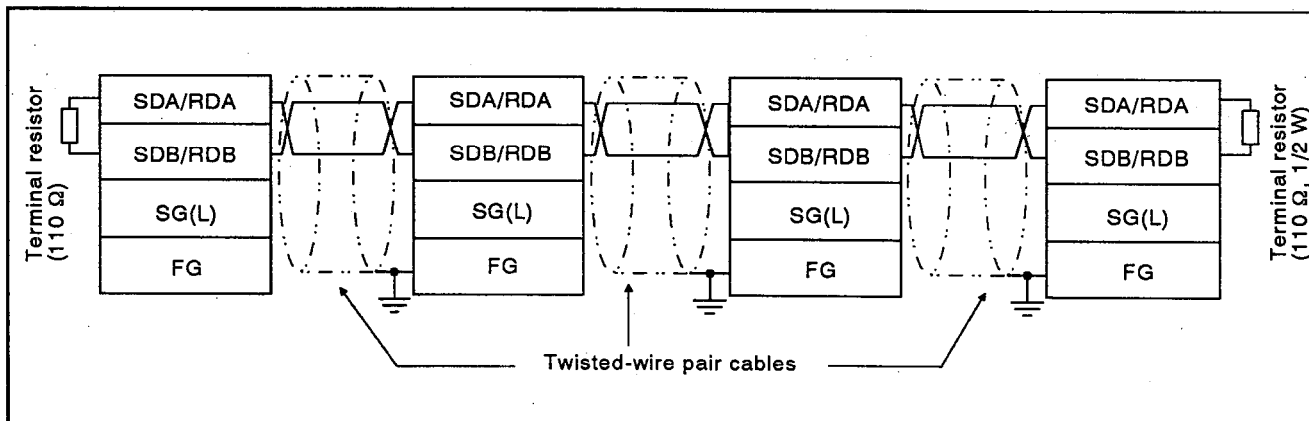


Fig. 8.15 Connections Using Twisted-Wire Pair Cables

REMARKS

- (1) Use M4-size screws to connect twisted-wire pair cable to the terminal block.
Use a crimp terminal which matches the M4 screw.
- (2) The tightening torque is 8 to 14 kg-cm.

8. BEFORE STARTING OPERATION

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode						
Applicability	○	○	○	○	○	○

MELSEC-A

8.6 Power ON Procedure

The power supply to the MELSECNET Data Link System must either be turned on to the entire system simultaneously or from the lowest tier to the highest tier.

(1) Two-tier system

In a two-tier system, turn on the power supply in the following order:

Slave stations (slave stations in the second tier) → Master station (master station for the second tier)

(2) Three-tier system

In the three-tier system, turn on the power supply in the following order:

Sub-slave stations (slave stations in the third tier) → Slave stations (slave stations in the second tier) → Master station (master station for the second tier)

REMARKS

- (1) If the automatic return function is set for the master station and all of the slave stations, the power to the data link system does not to be turned on in the procedures other than those described above.

For example, if the automatic return function is set for the master station for the second tier and the master station for the third tier, the power supply can be turned on in the following order: Master station (master station for the second tier) → Slave stations (slave stations in the second tier including the master station for the third tier) → Sub-slave stations (local stations in the third tier).

- (2) If the power supply to all stations is turned on simultaneously, a faulty station might be detected because of the differences in the power ON timing for the master station and the local stations.

If this occurs when the automatic return function is not set for the master station, communication might not be started normally. If the automatic return function is set for the master station, retry processing is executed and the number of retries is stored in D9210.

8. BEFORE STARTING OPERATION

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II compatible mode	MELSECNET mode	MELSECNET II mode	MELSECNET II compatible mode
Applicability	○	○	○	○	○	○

MELSEC-A

8.7 Self-Diagnosis Function

- (1) The self-diagnosis function checks the data link module hardware and the fiber-optic cables and coaxial cables for breakage.

The following is checked by the self-diagnosis function:

Check Item	Description	MEL- SECNET	MEL- SEC- NET/B
Forward loop test	Every fiber-optic cable or coaxial cable in the data link system is checked. The forward loop, in which the data link is established during normal operation, is also checked.	○	
Reverse loop test	Every fiber-optic cable or coaxial cable in the data link system is checked. The reverse loop, in which the data link is established when an error occurs, is also checked.	○	
Station-to-station test (master station)	The fiber-optic cables or coaxial cables connecting the two stations are checked. For this check, the station with the lower station number is designated as the master station and the station with the higher number is designated as the slave station.	○	○
Station-to-station test (slave station)		○	○
Self-loopback test	The hardware of each individual link module, including the transmission and receive circuits, is checked.	○	○

8.7.1 Self-loopback test

(1) Self-loopback test

(a) The self-loopback test checks the hardware of each individual link module, including the transmission and receive circuits (forward loop and reverse loop).

1) In the MELSECNET Data Link System, connect the send and receive ports of the self with a fiber-optic or coaxial cable, as shown in Fig. 8.16.

2) In the MELSECNET/B Data Link System, perform this test with a single link module.

(b) If the data sent from the send end of the forward/reverse loop cannot be received at the receive end within the specified period, the loop is determined to be faulty.

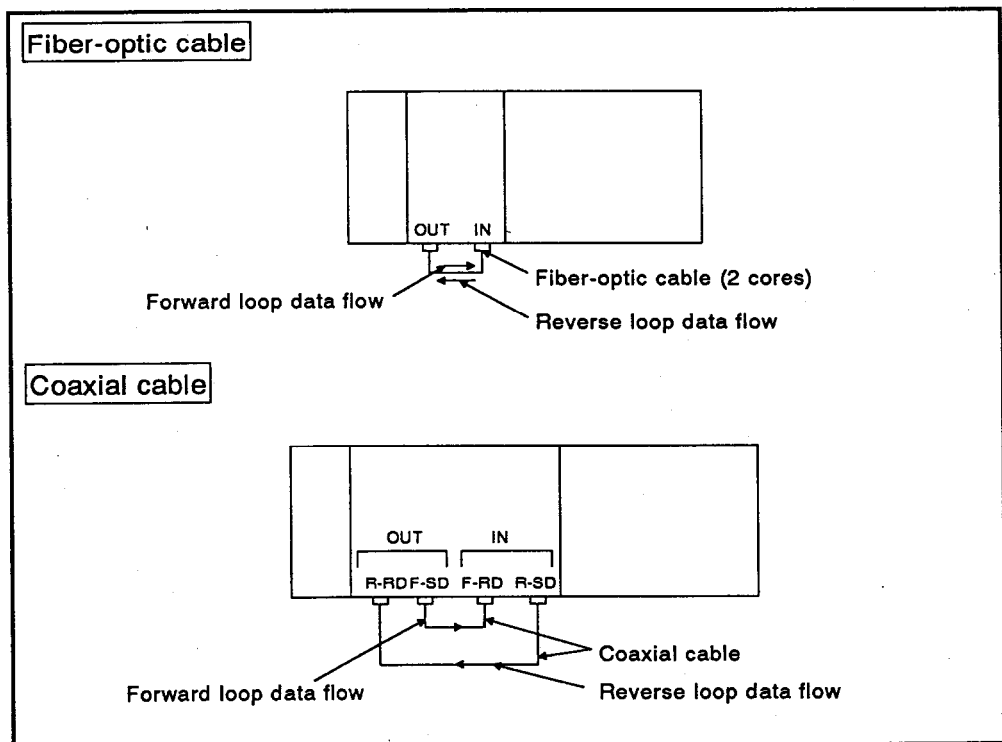
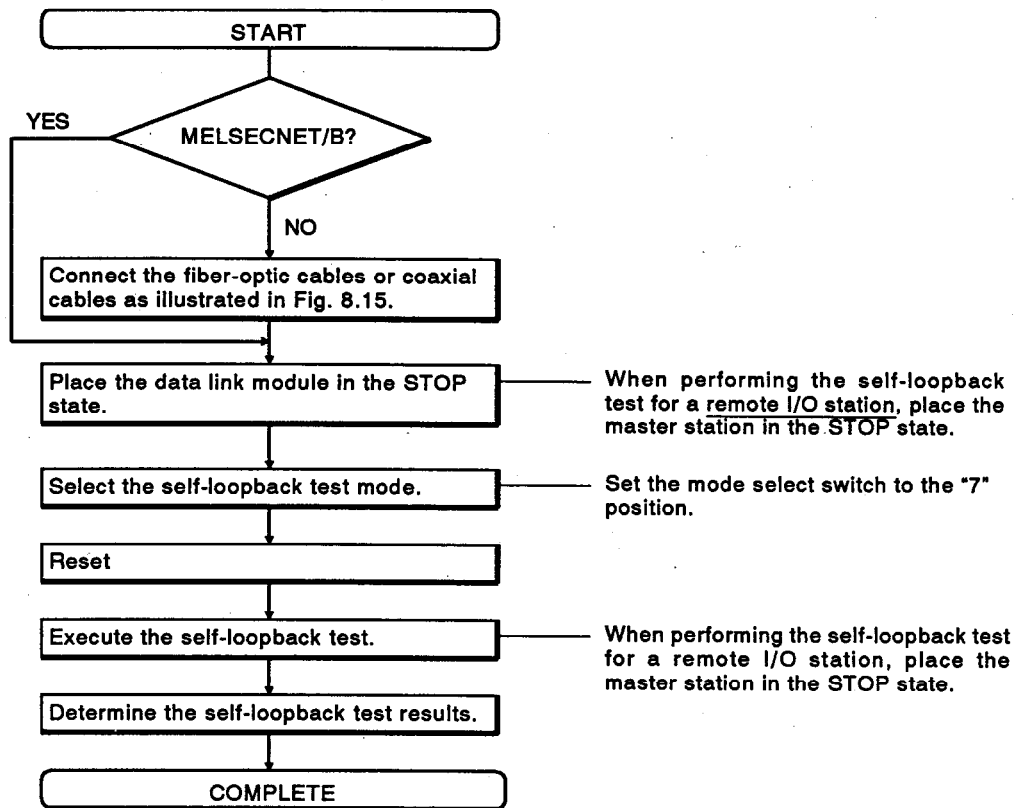


Fig. 8.16 Self-loopback Test

(2) Test sequence



(3) Test results

The test results are indicated by the LED indicators.

(a) Normal

If the test results are normal, the following LED indicators flash in order: CRC, OVER, AB.IF, TIME, DATA, UNDER

(b) Error

If an error is found, the corresponding LED indicator lights and the test is discontinued.

1) When the F.LOOP, R.LOOP, and TIME LED indicators are lit:

- i) The forward loop cable is broken.
- ii) The forward loop send end and receive end are not connected.
- iii) The forward loop send end is connected to the reverse loop send end and the reverse loop receive end is connected to the forward loop receive end.

(c) When the F.LOOP, R.LOOP, and DATA LED indicators are lit:

- 1) The reverse loop cable is broken.
- 2) The reverse loop send end and receive end are not connected.

(d) When an ERROR LED other than those stated above is lit:

- 1) The hardware is faulty.
- 2) A cable was disconnected during the test.
- 3) A cable was broken during the test.

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	o	o	o	o	o	o
Applicability	o	o	o	o	o	o

8. BEFORE STARTING OPERATION

MELSEC-A

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.

If the data sent from the master station link module is not returned from the slave station link module within the specified period, the loop is determined to be faulty.

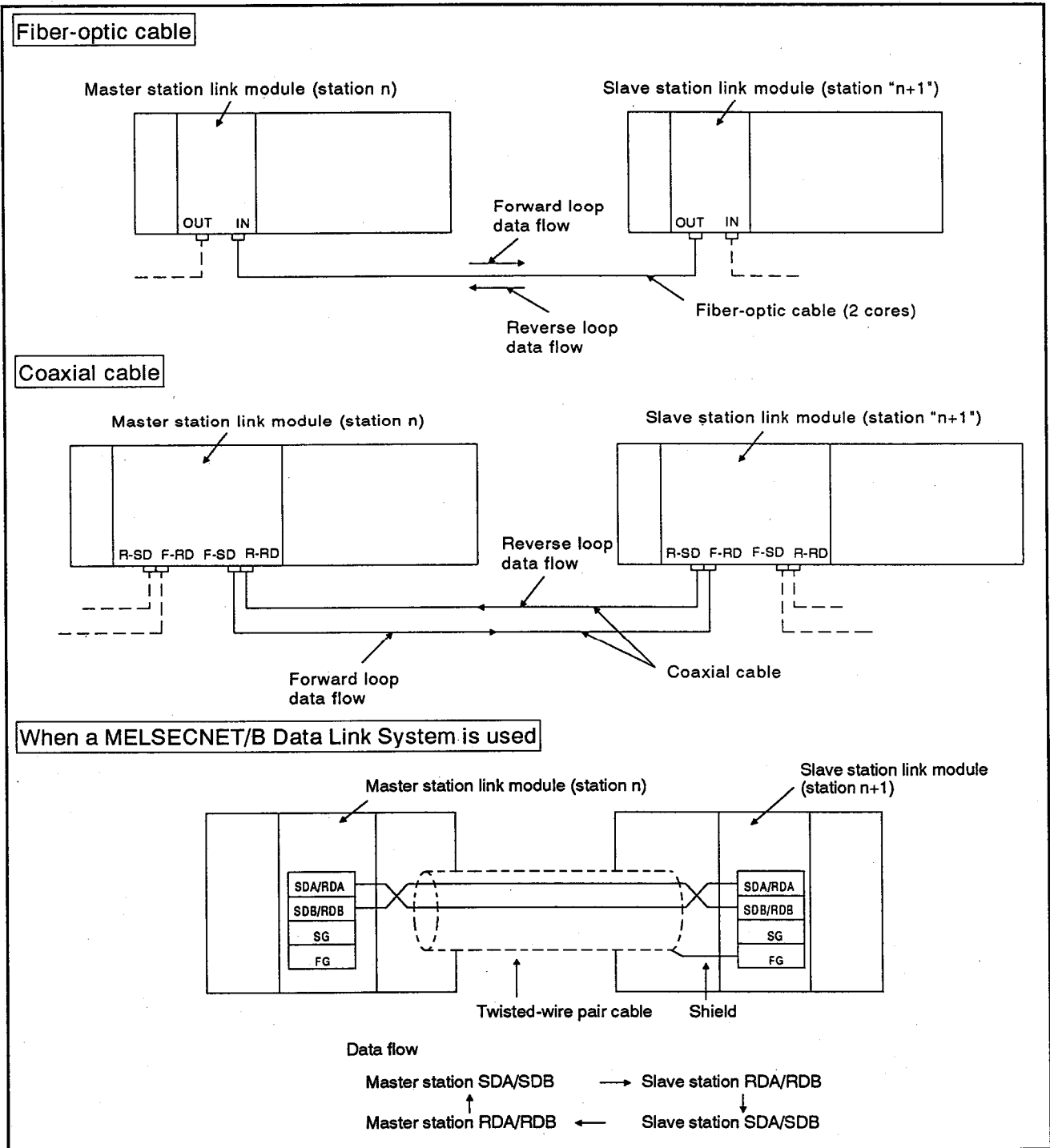
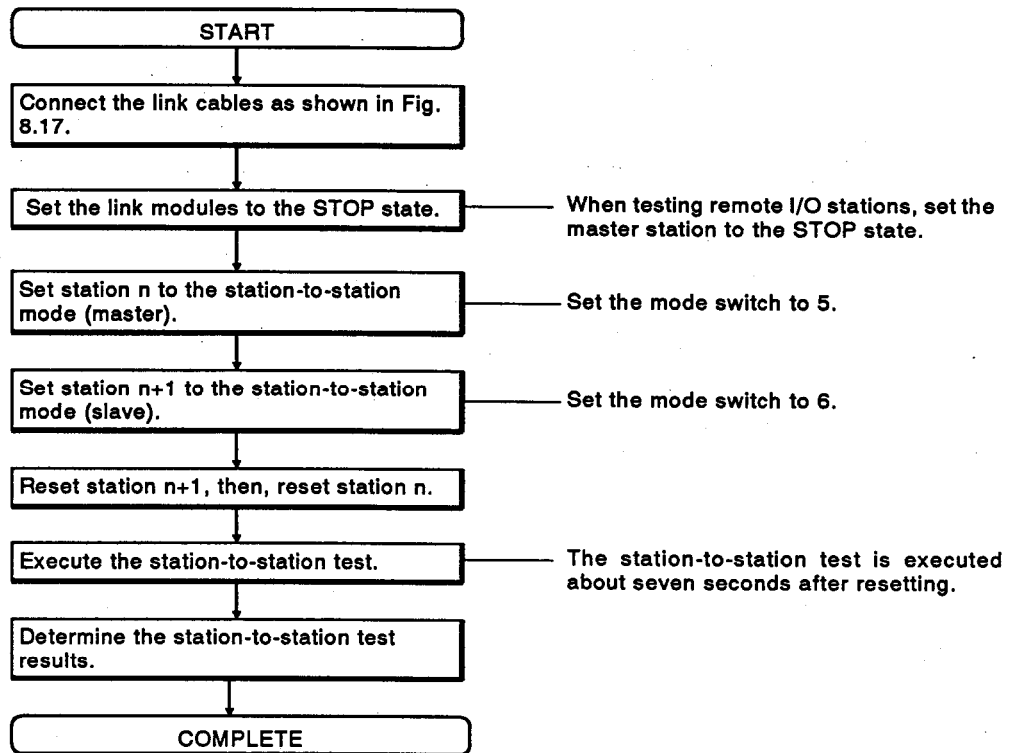


Fig. 8.17 Station-to-Station Test

(2) Test sequence



(3) Test results

The test results are indicated by the LED indicators.

(a) Normal

If the test results are normal, the following LED indicators flash in order: CRC, OVER, AB.IF, TIME, DATA, UNDER

(b) Error

If an error is found, the corresponding LED indicator lights and the test is discontinued.

- 1) When the F.LOOP, R.LOOP, and TIME LED indicators are lit:
 - i) The forward loop cable is broken.
 - ii) The forward loop send end and receive end are not connected.
 - iii) The forward loop send end is connected to the reverse loop send end and the reverse loop receive end is connected to the forward loop receive end.
- 2) When the F.LOOP, R.LOOP, and DATA LED indicators are lit:
 - i) The reverse loop cable is broken.
 - ii) The reverse loop send end and receive end are not connected.
- 3) When an ERROR LED other than those stated above is lit:
 - i) The hardware is faulty.
 - ii) A cable was disconnected during the test.
 - iii) A cable was broken during the test.

8. BEFORE STARTING OPERATION

Data Link System	MELSECNET			MELSECNET/B	
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II composite mode
Operating Mode					
Applicability	o	o	o		

MELSEC-A

8.7.3 Forward loop test and reverse loop test

(1) Forward loop test

- (a) The forward loop test checks the forward loop after the stations are connected with fiber-optic cable or coaxial cable.
- (b) If the data sent from the send end of the master station in the forward loop cannot be received in the forward loop at the receive end of the master station within the specified period, the loop is determined to be faulty.

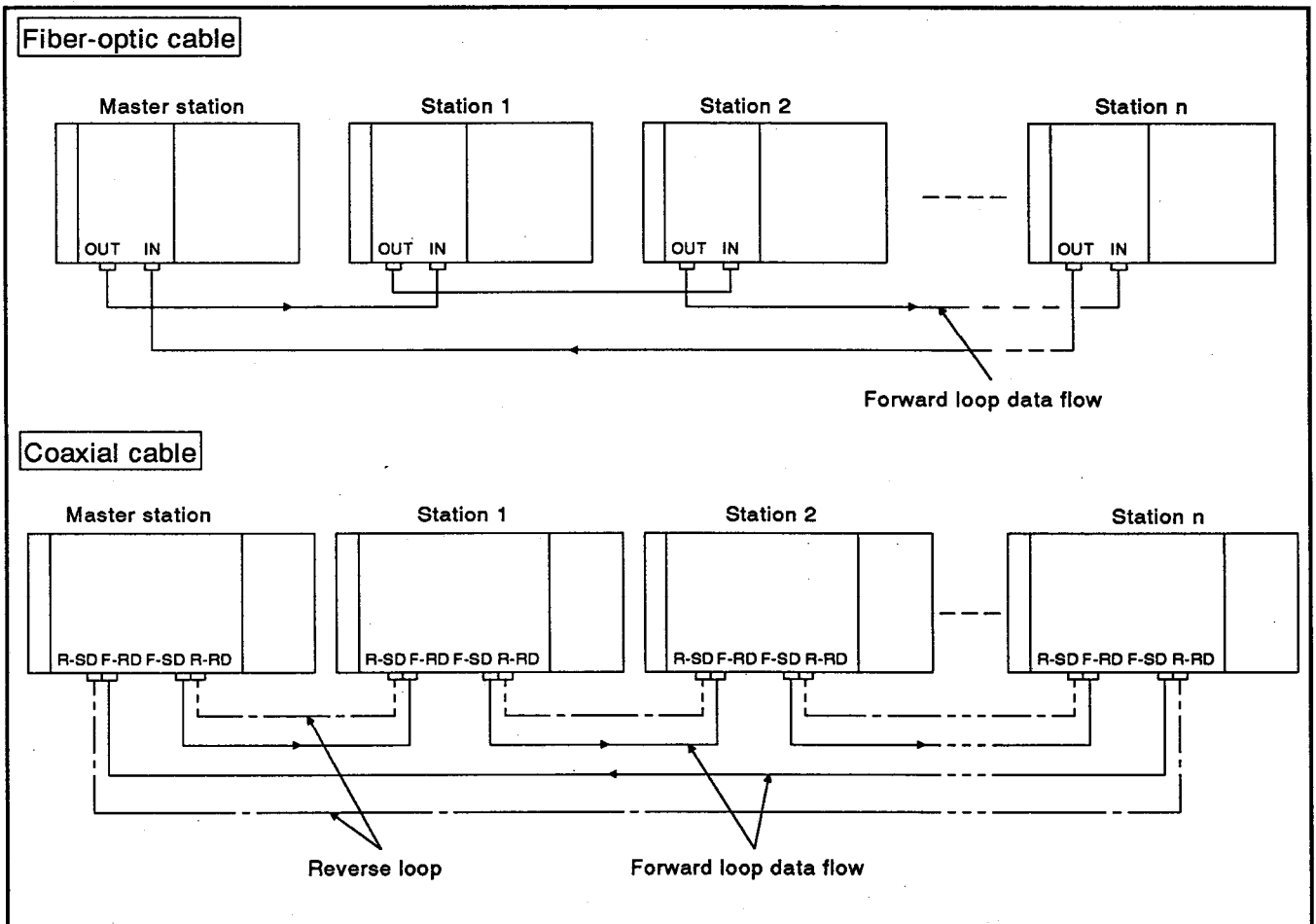


Fig. 8.18 Forward Loop Test

8. BEFORE STARTING OPERATION

MELSEC-A

(2) Reverse loop test

- (a) The reverse loop test checks the reverse loop after the stations are connected with fiber-optic cable or coaxial cable.
- (b) If the data sent from the send end of the master station in the reverse loop cannot be received in the reverse loop at the receive end of the master station within the specified period, the loop is determined to be faulty.

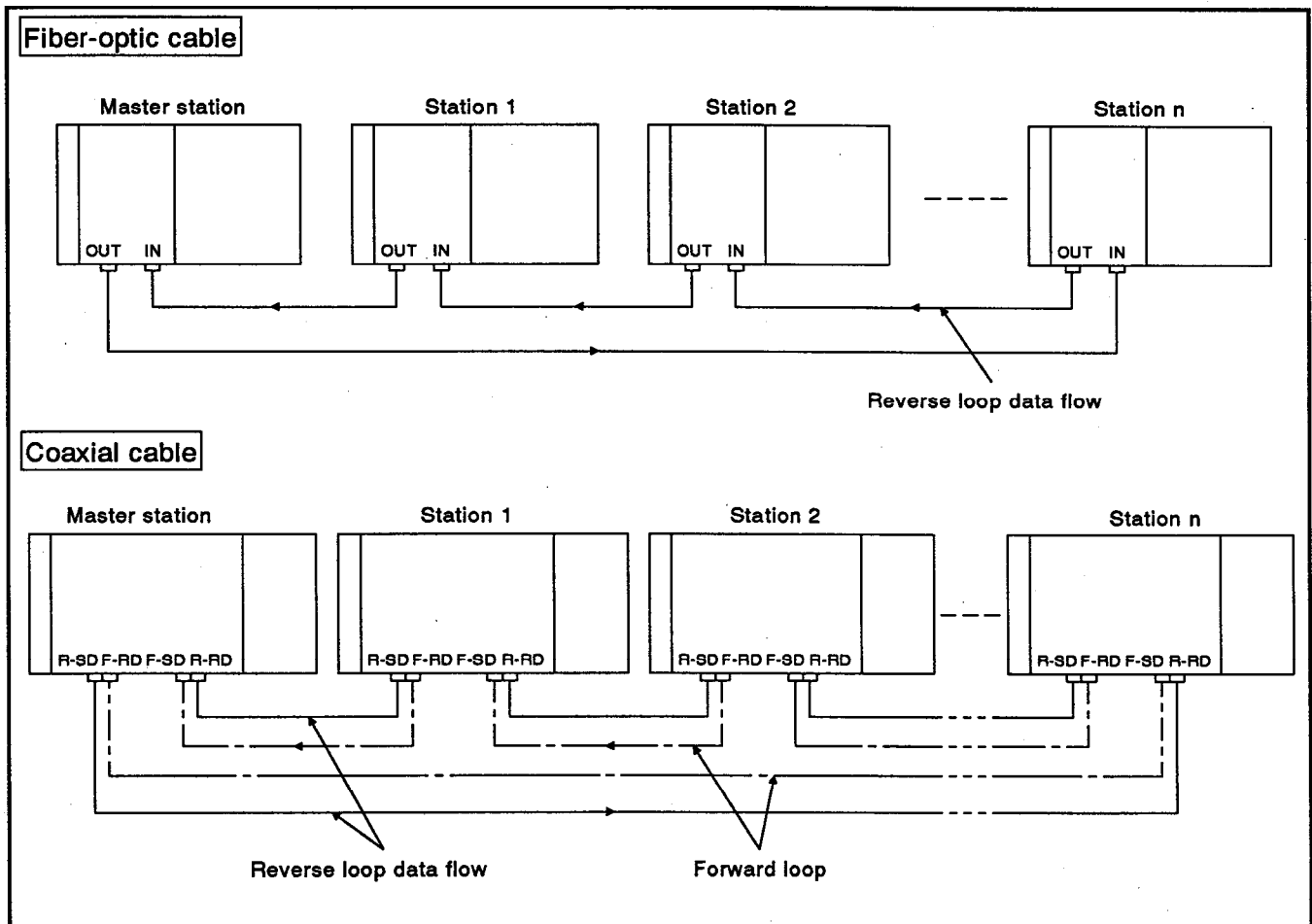
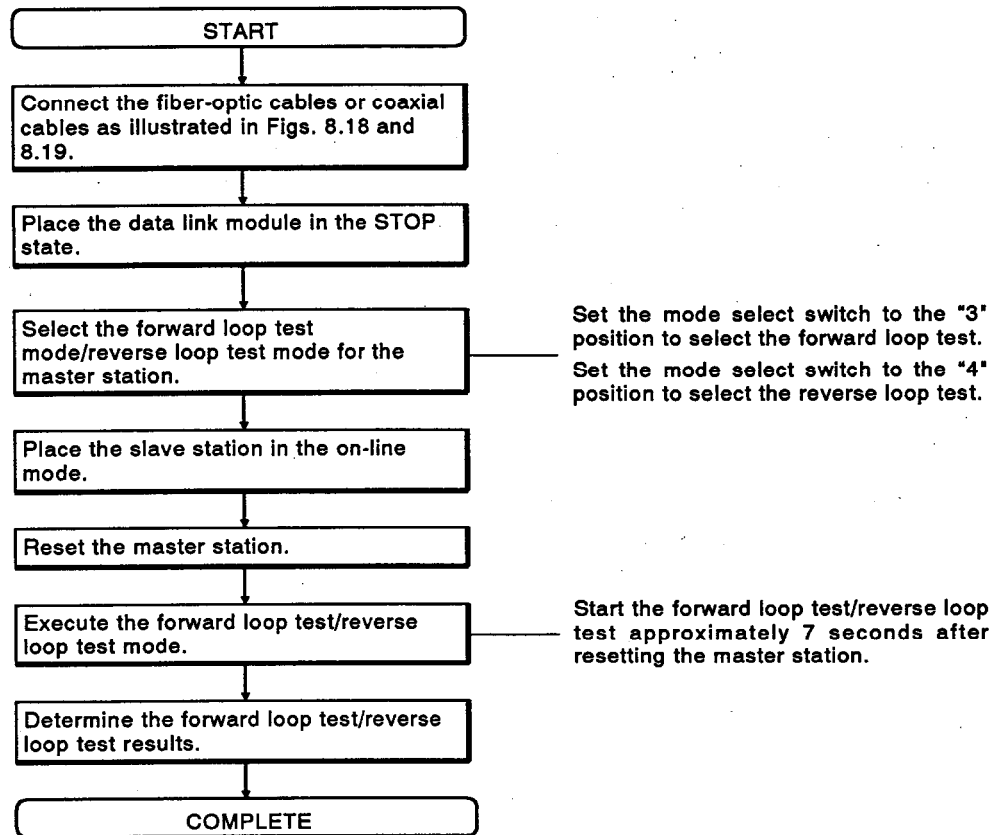


Fig. 8.19 Reverse Loop Test

(3) Test sequence



(4) Test results

The test results are indicated by the LED indicators on the data link module or by the link monitor function of the GPP.

- (a) Refer to Section 8.1 for details on the link monitor function of the GPP.
- (b) The following describes the LED indicators.

1) Normal

If the test results are normal, the following LED indicators flash in order:

CRC, OVER, AB.IF, TIME, DATA, UNDER

2) Error

If an error is found, the corresponding LED indicator lights and the test is discontinued.

i) When the TIME and DATA LED indicators are lit:

- The setting for the watchdog timer is too short.

ii) When the TIME, DATA, and UNDER LED indicators are lit:

- Either the fiber-optic cable/coaxial cable is broken or a slave station is faulty.
- The master station (00) setting is made for more than one station.

POINT

If forward/reverse loop is faulty, the data link will be established in the reverse/forward loop or the loopback mode.

The forward/reverse loop data link will be recovered when the cause of the error is eliminated. The LED indicator will remain in the error state (lit) even after the forward/reverse loop data link is recovered. Reset the master station and execute the forward loop test and the reverse loop test before starting system operation.

9. PROGRAMMING

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	○	○	○	○	○	○
Applicability	○	○	○	○	○	○

MELSEC-A

9. PROGRAMMING

9.1 Precautions on Writing Programs

(1) Link devices to be used

Only the link devices (B, W, X, Y) allocated to each station with a link parameter can be used in a data link program.

(2) Writing failsafe programs

Interlock should be taken between the stations so that the data from other stations will only be used when the data link is operating normally. Use special relays M9200 to M9255 and special registers D9200 to D9255 to interlock.

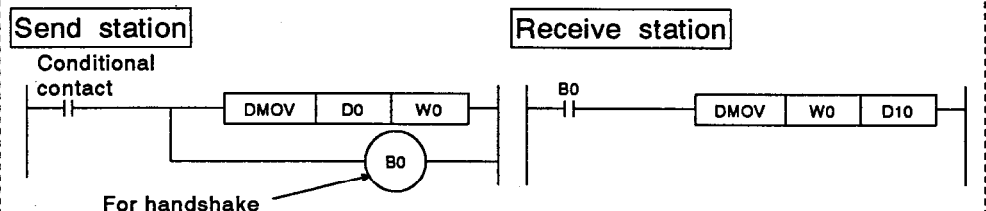
(3) Data link with the data of two or more words

Use the following procedure when writing two or more words of data to the link registers.

- (a) When using a data link module that executes link refresh immediately upon the completion of a link scan, such as the AnCPUP21/R21 or the A0J2CPUP23/R23, it is recommended to use the link relays to execute handshake processing so that the link register data can be read by other stations after the data is written to the link registers.

Example

A program to send the W0 and W1 data to another station:



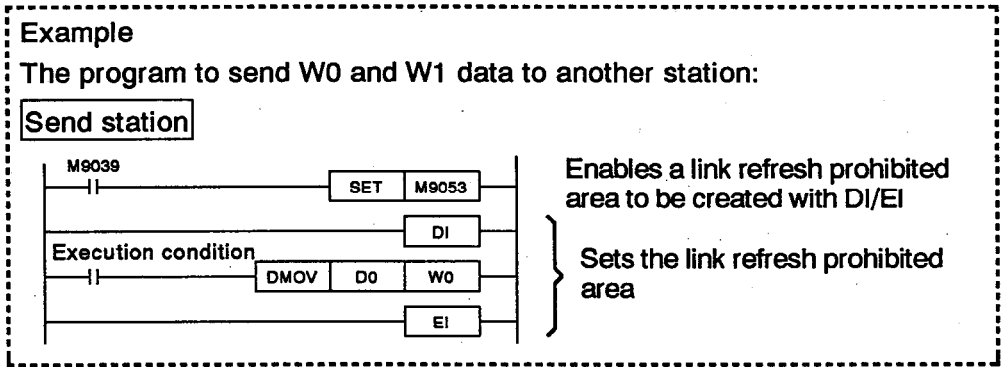
- (1) At the send station, B0 is turned ON when the data in D0 and D1 are transmitted to W0 and W1.
 (2) At the receive station, the data is read while B0 is ON.

POINT

A link refresh is executed at the master station and local stations while an instruction is executed.

With an program example above, if a link refresh is executed when the D0 data is being transmitted to W0, the updated data for W0 is sent to the receive station. The data for W1 is sent to the receive station but it is not updated.

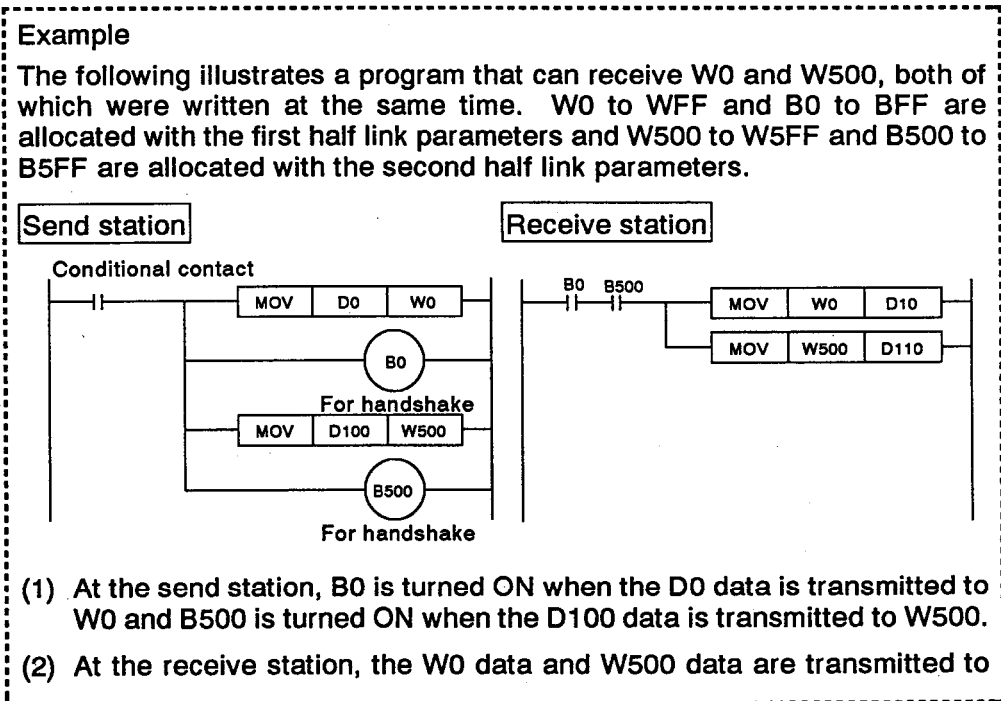
- (b) Write the program as shown on the next page when a CPU, such as the AnNCPUP21/R21, with which link refresh execution disable setting is made with the ON/OFF switching of M9053 and the DI/EI instructions is used.



(4) Precautions on using the MELSECNET II mode or the MELSECNET II composite mode

The time required for a link refresh to be executed may vary between the device range allocated with the first half link parameters and that allocated with the second half link parameters.

Handshake processing is required to receive the data written at the same time.



(5) Read/write of the special function module loaded in the remote I/O station

- (a) Execute an RFRP or RTOP instruction after the remote I/O station has completed initial communications (refer to the ladder example in Section 9.8).

If an RFRP or RTOP instruction is executed before the completion of initial communications, an "OPERATION ERROR" will occur.

- (b) If a receive error occurs while an RFRP or RTOP instruction is being executed, the handshake signal (YnE, YnF) might remain ON.

Therefore, the circuit must be written so that the handshake signal (YnE, YnF) and the special function module error signal X_{n+1D} are turned OFF when a communication error occurs.

(6) Link data in disconnected stations

If a local station and/or remote I/O station is disconnected from the link due to power being turned off or reset operation, the data is maintained as it was just before the station was disconnected and retained by the other stations.

(7) Instructions that cannot be used in a data link program

Pulse instructions (PLS, SFTP, etc.) cannot be used for outputting the data to a remote I/O station or for communication between the master station and local stations.

Consider the transmission delay time (refer to Section 6.2) when writing the program.

(8) Precautions on executing transient transmission using link instructions

(a) LRDP, LWTP:

These instructions can only be used at one point within a same system. Two or more points cannot be executed simultaneously.

(b) RFRP, RTOP:

These instructions cannot be executed at two or more points for a single special function module.

9. PROGRAMMING

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Applicability	○	○	○	○	○	○

MELSEC-A

9.2 Special Link Relays

9.2.1 Special link relays effective only for the master station

Table 9.1 MELSECNET Data Link Special Link Relays

Device Number	Name	Data	Description
M9200	LRDP instruction received	OFF : Unreceived ON : Received	<ul style="list-style-type: none"> • 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. <p>Turned OFF with an RST instruction in a user program.</p>
M9201	LRDP instruction completed	OFF : Uncompleted ON : Completed	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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. <p>Turned OFF with an RST instruction in a user program.</p>
M9203	LWTP instruction completed	OFF : Uncompleted ON : Completed	<ul style="list-style-type: none"> • 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 station itself	OFF : Normal ON : Error	<ul style="list-style-type: none"> • Turned ON when link parameter of the station itself is not set or the setting is incorrect. • Automatically turned OFF when link parameter is set correctly.
M9207	Link parameter check result	OFF : Normal ON : Error	<ul style="list-style-type: none"> • Goes ON if a lower tier link uses device ranges (B, W) outside the range set by a master station, in the upper tier link, for itself. • Check is executed only when M9209 is ON.
M9208	B and W transmission range for the master station (lower tier master stations only)	OFF : To the second and third tiers ON : To the second tier only	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • To be turned ON when the link devices (B and W) used by the upper tier and the link devices (B and W) used by the lower tier are not compared for "match". • When M9209 is OFF, the link parameters for the upper tier and the link parameters for the lower tier are checked.

Table 9.1 MELSECNET Data Link Special Link Relays (Continued)

Device Number	Name	Data	Description
M9210	Link card error (master station)	OFF : Normal ON : Error	<ul style="list-style-type: none"> • Turned ON when the link card hardware is faulty.
M9224	Link status	OFF : Offline ON : Online, station-to-station test, or self-loopback test	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Turned ON when any of the following occurs in the forward loop line between the master station and the final station: <ul style="list-style-type: none"> • Broken cable • Forward loop receive end error in the master station data link module • Forward loop send end error in the data link module of 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	<ul style="list-style-type: none"> • Turned ON when any of the following occurs in the forward loop line between the master station and the final station 1: <ul style="list-style-type: none"> • Broken cable • Reverse loop receive end error in the master station data link module • Reverse loop send end error in the data link module of the final local station • Turned ON when the station-to-station test, including station 1, is executed during the data link. • Turned OFF automatically when the error state is eliminated.
M9227	Loop test status	OFF : Not being executed ON : Forward loop test or reverse loop test being executed	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Turned ON in the following cases: <ul style="list-style-type: none"> Local station : The device range (link relays and link registers) outside the range allocated to the master station in the lower tier is allocated with the link parameters for the lower tier. Remote I/O station : Error in I/O allocation 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.

Table 9.1 MELSECNET Data Link Special Link Relays (Continued)

Device Number	Name	Data	Description
M9236	Local station or remote I/O station initial communication status	OFF : Not communicating ON : Communicating	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 Data Link Special Link Relays

Device Number	Name	Data	Description
M9200	LRDP instruction received	OFF : Unreceived ON : Received	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 station itself	OFF : Normal ON : Error	<ul style="list-style-type: none"> • Turned ON when link parameter of the station itself is not set or the setting is incorrect. • Turned OFF with an RST instruction in a user program.
M9207	Link parameter check result	OFF : Normal ON : Error	<ul style="list-style-type: none"> • Goes ON if a lower tier link uses device ranges (B, W) outside the range set by a master station, in the upper tier link, for itself. • Check is executed only when M9209 is ON.
M9208	B and W transmission range for the master station (lower tier master stations only)	OFF : To the second and third tiers ON : To the second tier only	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • To be turned ON when the link devices (B and W) used by the upper tier and the link devices (B and W) used by the lower tier are not compared for "match". • When M9209 is OFF, the link parameters for the upper tier and the link parameters for the lower tier are checked.
M9210	Link card error (master station)	OFF : Normal ON : Error	<ul style="list-style-type: none"> • Turned ON when the link card hardware is faulty.
M9224	Link status	OFF : Offline ON : Online, station-to-station test, or self-loopback test	<ul style="list-style-type: none"> • 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 Data Link Special Link Relays (Continued)

Device Number	Name	Data	Description
M9232	Local station operating status	OFF : RUN or STEP RUN status ON : STOP or PAUSE status	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 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 parameter error detected	OFF : No error ON : Error detected	<ul style="list-style-type: none"> • 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 to D9223 are all OFF.
M9236	Local station initial communications status	OFF : Not communicating ON : Communicating	<ul style="list-style-type: none"> • 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 to D9227 are all OFF.
M9237	Local station error	OFF : Normal ON : Error	<ul style="list-style-type: none"> • 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. PROGRAMMING

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	o	o	o	o	o	o
Applicability	o	o	o	o	o	o

MELSEC-A

9.2.2 Special link relays effective only for local stations

Table 9.3 MELSECNET Data Link Special Link Relays

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 LRDP 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 station itself is offline, in the station-to-station test mode, or in the self-loopback test mode. • Turned OFF when the station itself is reset after being placed in the online mode.
M9241	Forward loop error	OFF : Normal ON : Error	• Turned ON when any of the following occurs in the forward loop line between the station itself and the preceding station: • Broken cable • Forward loop receive end error in the station itself data link module • Forward loop send end error in the data link module of the preceding station • Turned OFF automatically when the error state is eliminated.
M9242	Reverse loop error	OFF : Normal ON : Error	• Turned ON when any of the following occurs in the reverse loop line between the station itself and the next station: • Broken cable • Reverse loop receive end error in the data link module of the station itself • Reverse loop send end error in the data link module of the next station • Turned OFF automatically when the error state is eliminated.
M9243	Loopback executed	ON : Not-executed OFF : Executed	• Turned ON when loopback is executed by the station itself.
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 the data from the master station for the third tier has not been received by a sub-slave station. 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.
M9251	Link break	OFF : Normal ON : Break	• 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. • Turned OFF automatically when the data link returns to the normal state. • Only effective while the loop line in which the data link is executed is online.

Table 9.3 MELSECNET Data Link Special Link Relays (Continued)

Device Number	Name	Data	Description
M9252	Loop test status	OFF : Not executed ON : Forward loop test or reverse loop test is being executed.	<ul style="list-style-type: none"> Remains ON while the 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	<ul style="list-style-type: none"> ON/OFF status depends on 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 other local stations	OFF : RUN or STEP RUN status ON : STOP or PAUSE status	<ul style="list-style-type: none"> ON/OFF status depends on the operation status of a local station other than the station itself. Turned ON when the status of a local station in the loop (other than the station itself) is either STOP or PAUSE. Not turned ON when the status of the station itself is either STOP or PAUSE. Automatically turned OFF when the status of a local station in the loop (other than the station itself) changes to RUN or STEP RUN.
M9255	Error status of other local stations	OFF : Normal ON : Error	<ul style="list-style-type: none"> ON/OFF status depends on the operation status of a local station other than the station itself. Turned ON when an error occurs with one local station in the loop (other than the station itself). 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 Data Link Special Link Relays

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 LRDP 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 station itself is offline, in the station-to-station test mode, or in the self-loopback test mode. • Turned OFF when the station itself 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	• In the three-tier system, M9247 is turned ON when the data from the master station for the third tier has not been received by a sub-slave station. 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 effective while the loop line in which the data link is executed is online.
M9251	Link break	OFF : Normal ON : Break	• ON/OFF status depends on whether the station itself stopped the data link. • 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	• ON/OFF status depends on 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 other local stations	OFF : RUN or STEP RUN status ON : STOP or PAUSE status	• ON/OFF status depends on the operation status of a local station other than the station itself. • Turned ON when the status of a local station in the loop (other than the station itself) is either STOP or PAUSE. • Not turned ON when the status of the station itself is either STOP or PAUSE. • Automatically turned OFF when the status of a local station in the loop (other than the station itself) changes to RUN or STEP RUN. That is, M9254 is turned OFF when bits D9248 and D9249 are OFF.
M9255	Error status of other local stations	OFF : Normal ON : Error	• ON/OFF status depends on the operation status of a local station other than the station itself. • Turned ON when an error occurs with one local station in the loop (other than the station itself). • 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. PROGRAMMING

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	○	○	○	○	○	○
Applicability	○	○	○	○	○	○

MELSEC-A

9.3 Special Link Registers

9.3.1 Special link registers effective only for the master station

Table 9.5 MELSECNET Data Link 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). <ul style="list-style-type: none"> 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: the station designated with the LRDP instruction is set with the link parameters as a remote I/O station. 																																																																																																					
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). <ul style="list-style-type: none"> 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 corresponding station: the station designated with the LWTP instruction is set with the link parameters as a remote I/O station. 																																																																																																					
D9202	Local station link type	Stores the status of station 1 to station 16	Stores whether a slave station is compatible with the MELSECNET mode or MELSECNET II mode. <ul style="list-style-type: none"> MELSECNET II-compatible station : "1" MELSECNET-compatible station : "0" 																																																																																																					
D9203		Stores the status of station 17 to station 32																																																																																																						
D9241		Stores the status of station 33 to station 48																																																																																																						
D9242		Stores the status of station 49 to station 64																																																																																																						
			<table border="1"> <thead> <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> </thead> <tbody> <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> </tbody> </table>	DEVICE NUMBER	Bit																b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	D9202	L16	L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1	D9203	L32	L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17	D9241	L48	L47	L46	L45	L44	L43	L42	L41	L40	L39	L38	L37	L36	L35	L34	L33	D9242	L64	L63	L62	L61	L60	L59	L58	L57	L56	L55	L54	L53	L52	L51	L50	L49
DEVICE NUMBER	Bit																																																																																																							
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																								
D9202	L16	L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1																																																																																								
D9203	L32	L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17																																																																																								
D9241	L48	L47	L46	L45	L44	L43	L42	L41	L40	L39	L38	L37	L36	L35	L34	L33																																																																																								
D9242	L64	L63	L62	L61	L60	L59	L58	L57	L56	L55	L54	L53	L52	L51	L50	L49																																																																																								

Table 9.5 MELSECNET Data Link Special Link Registers (Continued)

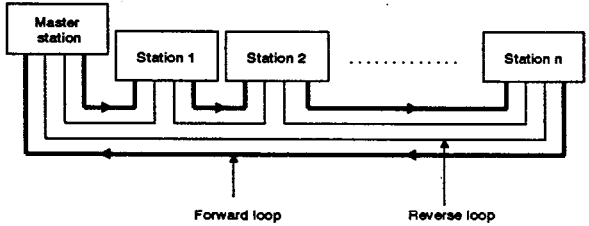
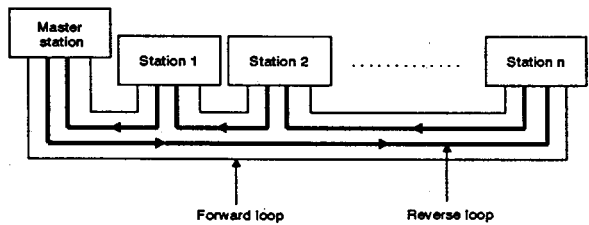
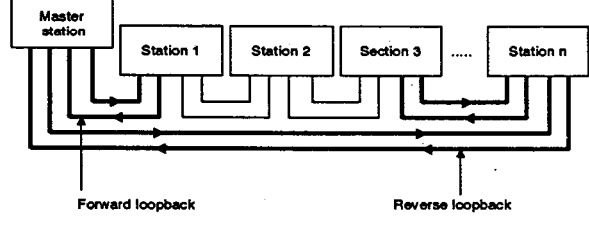
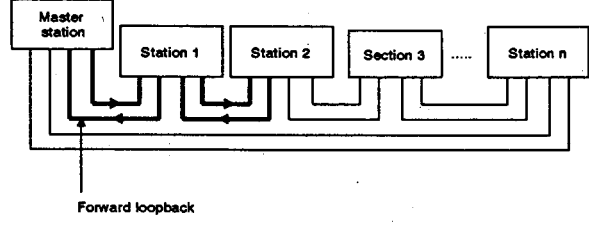
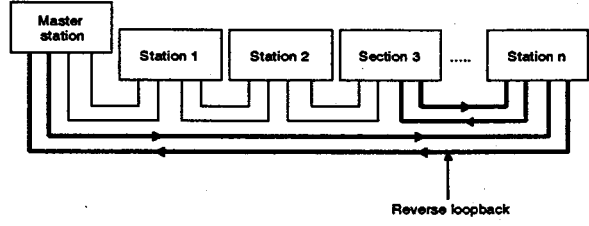
Device Number	Name	Data	Description
D9204	Link status	<p>0 : Data link in forward loop 1 : Data link in reverse loop 2 : Loopback in forward/reverse direction 3 : Loopback in forward direction 4 : Loopback in reverse direction 5 : Data link impossible</p>	<p>Stores the current path of the data link.</p> <p>(1) Forward loop</p>  <p>(2) Reverse loop</p>  <p>• Forward/reverse loop</p>  <p>• Forward loopback</p>  <p>• Reverse loopback</p>  <p>• "5" is stored because the watchdog timer setting is too small. • The data in D9204 is updated each time the link status changes.</p>

Table 9.5 MELSECNET Data Link Special Link Registers (Continued)

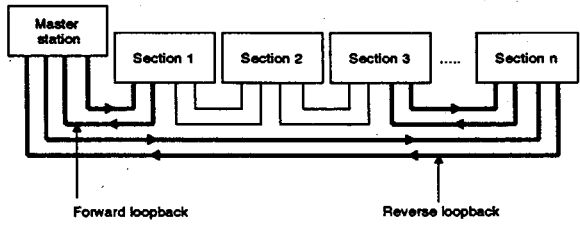
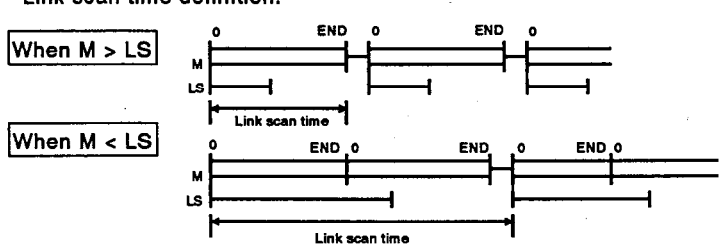
Device Number	Name	Data	Description
D9205	Loopback execution station	Station executing forward loopback	<ul style="list-style-type: none"> Stores the number of local station or remote I/O station at which loopback is being executed. 
D9206	Loopback execution station	Station executing reverse loopback	<ul style="list-style-type: none"> 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 PC CPU to return the set values to "0".
D9207	Link scan time	Maximum value	<ul style="list-style-type: none"> 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. Link scan time definition: 
D9208		Minimum value	
D9209		Current value	
			<p>M : Sequence program scan time by master station LS : Link scan time (data link processing)</p>
D9210	Retry count	Total number stored	<ul style="list-style-type: none"> 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 "FFFFH". Execute reset operation to clear the data to "0".
D9211	Loop switching count	Total number stored	<ul style="list-style-type: none"> 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 "FFFFH". Execute reset operation to clear the data to "0".

Table 9.5 MELSECNET Data Link Special Link Registers (Continued)

Device Number	Name	Data	Description																																																																																																						
D9212	Local station operation status	Stores the status of station 1 to station 16	<ul style="list-style-type: none"> Stores the status of all local stations that are in STOP or PAUSE. <table border="1"> <thead> <tr> <th>DEVICE NUMBER</th> <th colspan="16">Bit</th> </tr> <tr> <th></th> <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> </thead> <tbody> <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> </tbody> </table>	DEVICE NUMBER	Bit																	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	D9212	L16	L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1	D9213	L32	L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17	D9214	L48	L47	L46	L45	L44	L43	L42	L41	L40	L39	L38	L37	L36	L35	L34	L33	D9215	L64	L63	L62	L61	L60	L59	L58	L57	L56	L55	L54	L53	L52	L51	L50	L49
DEVICE NUMBER		Bit																																																																																																							
		b15		b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																							
D9212		L16		L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1																																																																																							
D9213		L32		L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17																																																																																							
D9214	L48	L47	L46	L45	L44	L43	L42	L41	L40	L39	L38	L37	L36	L35	L34	L33																																																																																									
D9215	L64	L63	L62	L61	L60	L59	L58	L57	L56	L55	L54	L53	L52	L51	L50	L49																																																																																									
D9213	Stores the status of station 17 to station 32																																																																																																								
D9214	Stores the status of station 33 to station 48																																																																																																								
D9215	Stores the status of station 49 to station 64																																																																																																								
D9216	Local station error detection	Stores the status of station 1 to station 16	<ul style="list-style-type: none"> Stores the numbers of the station that detect the occurrence of an error at another station. <table border="1"> <thead> <tr> <th>DEVICE NUMBER</th> <th colspan="16">Bit</th> </tr> <tr> <th></th> <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> </thead> <tbody> <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> </tbody> </table>	DEVICE NUMBER	Bit																	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	D9216	L16	L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1	D9217	L32	L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17	D9218	L48	L47	L46	L45	L44	L43	L42	L41	L40	L39	L38	L37	L36	L35	L34	L33	D9219	L64	L63	L62	L61	L60	L59	L58	L57	L56	L55	L54	L53	L52	L51	L50	L49
DEVICE NUMBER		Bit																																																																																																							
		b15		b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																							
D9216		L16		L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1																																																																																							
D9217		L32		L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17																																																																																							
D9218	L48	L47	L46	L45	L44	L43	L42	L41	L40	L39	L38	L37	L36	L35	L34	L33																																																																																									
D9219	L64	L63	L62	L61	L60	L59	L58	L57	L56	L55	L54	L53	L52	L51	L50	L49																																																																																									
D9217	Stores the status of station 17 to station 32																																																																																																								
D9218	Stores the status of station 33 to station 48																																																																																																								
D9219	Stores the status of station 49 to station 64																																																																																																								
D9220	Local station parameter mismatched or remote I/O station input/output allocation error	Stores the status of station 1 to station 16	<ul style="list-style-type: none"> 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 border="1"> <thead> <tr> <th>DEVICE NUMBER</th> <th colspan="16">Bit</th> </tr> <tr> <th></th> <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> </thead> <tbody> <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> </tbody> </table>	DEVICE NUMBER	Bit																	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	D9220	L/R 16	L/R 15	L/R 14	L/R 13	L/R 12	L/R 11	L/R 10	L/R 9	L/R 8	L/R 7	L/R 6	L/R 5	L/R 4	L/R 3	L/R 2	L/R 1	D9221	L/R 32	L/R 31	L/R 30	L/R 29	L/R 28	L/R 27	L/R 26	L/R 25	L/R 24	L/R 23	L/R 22	L/R 21	L/R 20	L/R 19	L/R 18	L/R 17	D9222	L/R 48	L/R 47	L/R 46	L/R 45	L/R 44	L/R 43	L/R 42	L/R 41	L/R 40	L/R 39	L/R 38	L/R 37	L/R 36	L/R 35	L/R 34	L/R 33	D9223	L/R 64	L/R 63	L/R 62	L/R 61	L/R 60	L/R 59	L/R 58	L/R 57	L/R 56	L/R 55	L/R 54	L/R 53	L/R 52	L/R 51	L/R 50	L/R 49
DEVICE NUMBER		Bit																																																																																																							
		b15		b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																							
D9220		L/R 16		L/R 15	L/R 14	L/R 13	L/R 12	L/R 11	L/R 10	L/R 9	L/R 8	L/R 7	L/R 6	L/R 5	L/R 4	L/R 3	L/R 2	L/R 1																																																																																							
D9221	L/R 32	L/R 31	L/R 30	L/R 29	L/R 28	L/R 27	L/R 26	L/R 25	L/R 24	L/R 23	L/R 22	L/R 21	L/R 20	L/R 19	L/R 18	L/R 17																																																																																									
D9222	L/R 48	L/R 47	L/R 46	L/R 45	L/R 44	L/R 43	L/R 42	L/R 41	L/R 40	L/R 39	L/R 38	L/R 37	L/R 36	L/R 35	L/R 34	L/R 33																																																																																									
D9223	L/R 64	L/R 63	L/R 62	L/R 61	L/R 60	L/R 59	L/R 58	L/R 57	L/R 56	L/R 55	L/R 54	L/R 53	L/R 52	L/R 51	L/R 50	L/R 49																																																																																									
D9221	Stores the status of station 17 to station 32																																																																																																								
D9222	Stores the status of station 33 to station 48																																																																																																								
D9223	Stores the status of station 49 to station 64																																																																																																								

Table 9.5 MELSECNET Data Link Special Link Registers (Continued)

Device Number	Name	Data	Description																																																																																																				
D9224	Initial communication between local and/or remote I/O stations	Stores the status of station 1 to station 16	<ul style="list-style-type: none"> Stores the number of the local or remote I/O stations communicating initial data (link parameters) 																																																																																																				
D9225		Stores the status of station 17 to station 32																																																																																																					
D9226		Stores the status of station 33 to station 48																																																																																																					
D9227		Stores the status of station 49 to station 64																																																																																																					
<table border="1"> <thead> <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> </thead> <tbody> <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> </tbody> </table>				DEVICE NUMBER	Bit																b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	D9224	L/R 16	L/R 15	L/R 14	L/R 13	L/R 12	L/R 11	L/R 10	L/R 9	L/R 8	L/R 7	L/R 6	L/R 5	L/R 4	L/R 3	L/R 2	L/R 1	D9225	L/R 32	L/R 31	L/R 30	L/R 29	L/R 28	L/R 27	L/R 26	L/R 25	L/R 24	L/R 23	L/R 22	L/R 21	L/R 20	L/R 19	L/R 18	L/R 17	D9226	L/R 48	L/R 47	L/R 46	L/R 45	L/R 44	L/R 43	L/R 42	L/R 41	L/R 40	L/R 39	L/R 38	L/R 37	L/R 36	L/R 35	L/R 34	L/R 33	D9227	L/R 64	L/R 63	L/R 62	L/R 61	L/R 60	L/R 59	L/R 58	L/R 57	L/R 56	L/R 55	L/R 54	L/R 53	L/R 52	L/R 51	L/R 50
DEVICE NUMBER	Bit																																																																																																						
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																							
D9224	L/R 16	L/R 15	L/R 14	L/R 13	L/R 12	L/R 11	L/R 10	L/R 9	L/R 8	L/R 7	L/R 6	L/R 5	L/R 4	L/R 3	L/R 2	L/R 1																																																																																							
D9225	L/R 32	L/R 31	L/R 30	L/R 29	L/R 28	L/R 27	L/R 26	L/R 25	L/R 24	L/R 23	L/R 22	L/R 21	L/R 20	L/R 19	L/R 18	L/R 17																																																																																							
D9226	L/R 48	L/R 47	L/R 46	L/R 45	L/R 44	L/R 43	L/R 42	L/R 41	L/R 40	L/R 39	L/R 38	L/R 37	L/R 36	L/R 35	L/R 34	L/R 33																																																																																							
D9227	L/R 64	L/R 63	L/R 62	L/R 61	L/R 60	L/R 59	L/R 58	L/R 57	L/R 56	L/R 55	L/R 54	L/R 53	L/R 52	L/R 51	L/R 50	L/R 49																																																																																							
D9228	Local station or remote I/O station error	Stores the status of station 1 to station 16	<ul style="list-style-type: none"> Stores the number of the station (local station or remote I/O station) in the data link that is determined by the 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. 																																																																																																				
D9229		Stores the status of station 17 to station 32																																																																																																					
D9230		Stores the status of station 33 to station 48																																																																																																					
D9231		Stores the status of station 49 to station 64																																																																																																					
<table border="1"> <thead> <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> </thead> <tbody> <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> </tbody> </table>			DEVICE NUMBER	Bit																b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	D9228	L/R 16	L/R 15	L/R 14	L/R 13	L/R 12	L/R 11	L/R 10	L/R 9	L/R 8	L/R 7	L/R 6	L/R 5	L/R 4	L/R 3	L/R 2	L/R 1	D9229	L/R 32	L/R 31	L/R 30	L/R 29	L/R 28	L/R 27	L/R 26	L/R 25	L/R 24	L/R 23	L/R 22	L/R 21	L/R 20	L/R 19	L/R 18	L/R 17	D9230	L/R 48	L/R 47	L/R 46	L/R 45	L/R 44	L/R 43	L/R 42	L/R 41	L/R 40	L/R 39	L/R 38	L/R 37	L/R 36	L/R 35	L/R 34	L/R 33	D9231	L/R 64	L/R 63	L/R 62	L/R 61	L/R 60	L/R 59	L/R 58	L/R 57	L/R 56	L/R 55	L/R 54	L/R 53	L/R 52	L/R 51	L/R 50	L/R 49
DEVICE NUMBER	Bit																																																																																																						
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																							
D9228	L/R 16	L/R 15	L/R 14	L/R 13	L/R 12	L/R 11	L/R 10	L/R 9	L/R 8	L/R 7	L/R 6	L/R 5	L/R 4	L/R 3	L/R 2	L/R 1																																																																																							
D9229	L/R 32	L/R 31	L/R 30	L/R 29	L/R 28	L/R 27	L/R 26	L/R 25	L/R 24	L/R 23	L/R 22	L/R 21	L/R 20	L/R 19	L/R 18	L/R 17																																																																																							
D9230	L/R 48	L/R 47	L/R 46	L/R 45	L/R 44	L/R 43	L/R 42	L/R 41	L/R 40	L/R 39	L/R 38	L/R 37	L/R 36	L/R 35	L/R 34	L/R 33																																																																																							
D9231	L/R 64	L/R 63	L/R 62	L/R 61	L/R 60	L/R 59	L/R 58	L/R 57	L/R 56	L/R 55	L/R 54	L/R 53	L/R 52	L/R 51	L/R 50	L/R 49																																																																																							
<ul style="list-style-type: none"> When data is not received within the specified length of time, the bit corresponding to the station number of the local station is set. <p>Example: When an error at station 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".</p> <ul style="list-style-type: none"> 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 watchdog timer 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". 																																																																																																							

Table 9.5 MELSECNET Data Link Special Link Registers (Continued)

Device Number	Name	Data	Description																																																																																																																																																																																																																																																																																																																	
D9232	Local station or remote I/O station loop error	Stores the status of station 1 to station 8	<ul style="list-style-type: none"> 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 border="1"> <thead> <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> </thead> <tbody> <tr> <td>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></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><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>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></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></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>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></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><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>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></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></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>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></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><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>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></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></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>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></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><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>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></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></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </tbody> </table> <p>F: Forward loop line R: Reverse loop line</p>	DEVICE NUMBER	Bit																b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	D9232	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F		L/R 8	L/R 7	L/R 6	L/R 5	L/R 4	L/R 3	L/R 2	L/R 1									D9233	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F		L/R 16	L/R 15	L/R 14	L/R 13	L/R 12	L/R 11	L/R 10	L/R 9									D9234	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F		L/R 24	L/R 23	L/R 22	L/R 21	L/R 20	L/R 19	L/R 18	L/R 17									D9235	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F		L/R 32	L/R 31	L/R 30	L/R 29	L/R 28	L/R 27	L/R 26	L/R 25									D9236	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F		L/R 40	L/R 39	L/R 38	L/R 37	L/R 36	L/R 35	L/R 34	L/R 33									D9237	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F		L/R 48	L/R 47	L/R 46	L/R 45	L/R 44	L/R 43	L/R 42	L/R 41									D9238	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F		L/R 56	L/R 55	L/R 54	L/R 53	L/R 52	L/R 51	L/R 50	L/R 49									D9239	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F		L/R 64	L/R 63	L/R 62	L/R 61	L/R 60	L/R 59	L/R 58	L/R 57								
DEVICE NUMBER		Bit																																																																																																																																																																																																																																																																																																																		
		b15		b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																																																																																																																																																																																																																																		
D9232		R		F	R	F	R	F	R	F	R	F	R	F	R	F	R	F																																																																																																																																																																																																																																																																																																		
		L/R 8		L/R 7	L/R 6	L/R 5	L/R 4	L/R 3	L/R 2	L/R 1																																																																																																																																																																																																																																																																																																										
D9233		R		F	R	F	R	F	R	F	R	F	R	F	R	F	R	F																																																																																																																																																																																																																																																																																																		
		L/R 16		L/R 15	L/R 14	L/R 13	L/R 12	L/R 11	L/R 10	L/R 9																																																																																																																																																																																																																																																																																																										
D9234		R		F	R	F	R	F	R	F	R	F	R	F	R	F	R	F																																																																																																																																																																																																																																																																																																		
		L/R 24		L/R 23	L/R 22	L/R 21	L/R 20	L/R 19	L/R 18	L/R 17																																																																																																																																																																																																																																																																																																										
D9235		R		F	R	F	R	F	R	F	R	F	R	F	R	F	R	F																																																																																																																																																																																																																																																																																																		
	L/R 32	L/R 31	L/R 30	L/R 29	L/R 28	L/R 27	L/R 26	L/R 25																																																																																																																																																																																																																																																																																																												
D9236	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F																																																																																																																																																																																																																																																																																																				
	L/R 40	L/R 39	L/R 38	L/R 37	L/R 36	L/R 35	L/R 34	L/R 33																																																																																																																																																																																																																																																																																																												
D9237	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F																																																																																																																																																																																																																																																																																																				
	L/R 48	L/R 47	L/R 46	L/R 45	L/R 44	L/R 43	L/R 42	L/R 41																																																																																																																																																																																																																																																																																																												
D9238	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F																																																																																																																																																																																																																																																																																																				
	L/R 56	L/R 55	L/R 54	L/R 53	L/R 52	L/R 51	L/R 50	L/R 49																																																																																																																																																																																																																																																																																																												
D9239	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F																																																																																																																																																																																																																																																																																																				
	L/R 64	L/R 63	L/R 62	L/R 61	L/R 60	L/R 59	L/R 58	L/R 57																																																																																																																																																																																																																																																																																																												
D9233		Stores the status of station 9 to station 16																																																																																																																																																																																																																																																																																																																		
D9234		Stores the status of station 17, to station 24																																																																																																																																																																																																																																																																																																																		
D9235		Stores the status of station 25 to station 32																																																																																																																																																																																																																																																																																																																		
D9236		Stores the status of station 33 to station 40	<ul style="list-style-type: none"> 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. <p>Example: When an error is detected in the forward loop line at station 5, "1" is set for bit 8 of D9232. When D9232 is monitored, its value is "256 (100H)".</p> <p>This error will have been caused by one of the following:</p> <ol style="list-style-type: none"> A faulty connection of the forward loop cable connecting station 4 and station 5 A fault of the forward loop receive end of data link module in station 5 A fault of the forward loop send end of data link module in station 4 																																																																																																																																																																																																																																																																																																																	
D9237		Stores the status of station 41 to station 48																																																																																																																																																																																																																																																																																																																		
D9238		Stores the status of station 49 to station 56	<ul style="list-style-type: none"> 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. 																																																																																																																																																																																																																																																																																																																	
D9239		Stores the status of station 57 to station 64	<ul style="list-style-type: none"> 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. 																																																																																																																																																																																																																																																																																																																	
D9240	Receive error detection count	Stores the total number of receive error occurrences	<ul style="list-style-type: none"> 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". 																																																																																																																																																																																																																																																																																																																	

Table 9.6 MELSECNET/B Data Link Special Link Registers

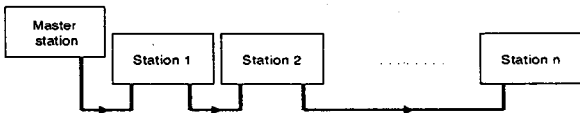
Device Number	Name	Data	Description																																																																			
D9200	LRDP execution result	0 : Normal 2 : LRDP instruction setting fault 3 : Corresponding station error	Stores the execution result of an LRDP (word device read) instruction (M9201 ON). <ul style="list-style-type: none"> 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. 																																																																			
D9201	LWTP execution result	0 : Normal 2 : LWTP instruction setting fault 3 : Corresponding station error	Stores the execution result of an LWTP (word device write) instruction (M9203 ON). <ul style="list-style-type: none"> 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. 																																																																			
D9202	Local station link type	Stores the status of station 1 to station 16	Stores whether a slave station is compatible with the MELSECNET mode or MELSECNET II mode. <ul style="list-style-type: none"> MELSECNET II-compatible station : "1" MELSECNET-compatible station : "0" <table border="1"> <thead> <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> </thead> <tbody> <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> </tbody> </table>	DEVICE NUMBER	Bit																b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	D9202	L16	L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1	D9203	0	L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17
DEVICE NUMBER		Bit																																																																				
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																						
D9202	L16	L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1																																																						
D9203	0	L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17																																																						
D9203		Stores the status of station 17 to station 31																																																																				
D9204	Link status	0 : Data link 5 : Data link impossible	Stores the current path of the data link. (1) Forward loop  <ul style="list-style-type: none"> "5" is stored because the watchdog timer setting is too small. The data in D9204 is updated each time the link status changes. 																																																																			

Table 9.6 MELSECNET/B Data Link Special Link Registers (Continued)

Device Number	Name	Data	Description
D9207	Link scan time	Maximum value	<ul style="list-style-type: none"> 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. Link scan time definition: <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> <p>When $M > LS$</p> </div> <div> </div> </div>
D9208		Minimum value	
D9209		Current value	
D9210	Retry count	Total number stored	<ul style="list-style-type: none"> 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 "FFFFH". Execute reset operation to clear the data to "0".

Table 9.6 MELSECNET/B Data Link Special Link Registers (Continued)

Device Number	Name	Data	Description																																																																				
D9212	Local station operation status	Stores the status of station 1 to station 16	<ul style="list-style-type: none"> Stores the status of all local stations that are in STOP or PAUSE. <table border="1"> <thead> <tr> <th>DEVICE NUMBER</th> <th colspan="16">Bit</th> </tr> <tr> <th></th> <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> </thead> <tbody> <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> </tbody> </table>	DEVICE NUMBER	Bit																	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	D9212	L16	L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1	D9213	0	L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17
DEVICE NUMBER		Bit																																																																					
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																							
D9212	L16	L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1																																																							
D9213	0	L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17																																																							
D9213		Stores the status of station 17 to station 31																																																																					
D9216	Local station error detection	Stores the status of station 1 to station 16	<ul style="list-style-type: none"> Stores the numbers of the station that detect the occurrence of an error at another station. <table border="1"> <thead> <tr> <th>DEVICE NUMBER</th> <th colspan="16">Bit</th> </tr> <tr> <th></th> <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> </thead> <tbody> <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> </tbody> </table>	DEVICE NUMBER	Bit																	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	D9216	L16	L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1	D9217	0	L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17
DEVICE NUMBER		Bit																																																																					
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																							
D9216	L16	L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1																																																							
D9217	0	L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17																																																							
D9217		Stores the status of station 17 to station 31																																																																					
D9220	Local station parameter mismatched or remote I/O station input/output allocation error	Stores the status of station 1 to station 16	<ul style="list-style-type: none"> 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 border="1"> <thead> <tr> <th>DEVICE NUMBER</th> <th colspan="16">Bit</th> </tr> <tr> <th></th> <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> </thead> <tbody> <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> </tbody> </table>	DEVICE NUMBER	Bit																	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	D9220	L/R 16	L/R 15	L/R 14	L/R 13	L/R 12	L/R 11	L/R 10	L/R 9	L/R 8	L/R 7	L/R 6	L/R 5	L/R 4	L/R 3	L/R 2	L/R 1	D9221	L/R 0	L/R 31	L/R 30	L/R 29	L/R 28	L/R 27	L/R 26	L/R 25	L/R 24	L/R 23	L/R 22	L/R 21	L/R 20	L/R 19	L/R 18	L/R 17
DEVICE NUMBER		Bit																																																																					
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																							
D9220	L/R 16	L/R 15	L/R 14	L/R 13	L/R 12	L/R 11	L/R 10	L/R 9	L/R 8	L/R 7	L/R 6	L/R 5	L/R 4	L/R 3	L/R 2	L/R 1																																																							
D9221	L/R 0	L/R 31	L/R 30	L/R 29	L/R 28	L/R 27	L/R 26	L/R 25	L/R 24	L/R 23	L/R 22	L/R 21	L/R 20	L/R 19	L/R 18	L/R 17																																																							
D9221		Stores the status of station 17 to station 31	<ul style="list-style-type: none"> 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". 																																																																				

Table 9.6 MELSECNET/B Data Link Special Link Registers (Continued)

Device Number	Name	Data	Description																																																																			
D9224	Initial communication between local stations	Stores the status of station 1 to station 16	<ul style="list-style-type: none"> Stores the number of the local stations communicating initial setting data (link parameters) <table border="1"> <thead> <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> </thead> <tbody> <tr> <td>D9224</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>D9225</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> </tbody> </table>	DEVICE NUMBER	Bit																b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	D9224	L16	L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1	D9225	0	L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17
DEVICE NUMBER		Bit																																																																				
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																						
D9224	L16	L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1																																																						
D9225	0	L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17																																																						
D9225	Stores the status of station 17 to station 31	<ul style="list-style-type: none"> When a local station is communicating initial setting data (link parameters), the bit corresponding to the station number is set. Example: When station 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". 																																																																				
D9228	Local station error	Stores the status of station 1 to station 16	<ul style="list-style-type: none"> Stores the number of the local station 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 border="1"> <thead> <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> </thead> <tbody> <tr> <td>D9228</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>D9229</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> </tbody> </table>	DEVICE NUMBER	Bit																b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	D9228	L16	L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1	D9229	0	L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17
DEVICE NUMBER		Bit																																																																				
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																						
D9228	L16	L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1																																																						
D9229	0	L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17																																																						
D9229	Stores the status of station 17 to station 31	<ul style="list-style-type: none"> 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 station 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. When the master station becomes faulty or the setting for the watchdog timer is too small, "1" is set for the bits corresponding to all local stations. When a master station becomes faulty or the setting for the watching timer is too small, 1 is set for the bits corresponding to all local stations. When the faulty station returns to normal, the bit is automatically reset to "0". 																																																																				
D9240	Receive error detection count	Stores the total number of receive errors	<ul style="list-style-type: none"> 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". 																																																																			

9. PROGRAMMING

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	○	○	○	○	○	○
Applicability	○	○	○	○	○	○

MELSEC-A

9.3.2 Special link registers effective only for local stations

Table 9.7 MELSECNET Data Link Special Link Registers

Device Number	Name	Data	Description																																																																																																					
D9243	Station number data of the station itself	Stores a station number (0 to 64)	<ul style="list-style-type: none"> Stores the station number assigned to the local station itself. Used by a local station to check its own station number. 																																																																																																					
D9244	Slave station number data	Stores a slave station number	<ul style="list-style-type: none"> Used by a local station to check the total number of slave stations in the loop. 																																																																																																					
D9245	Receive error detection count	Stores the total number of receive error occurrences	<ul style="list-style-type: none"> 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". 																																																																																																					
D9248	Local station operating status	Stores the status of station 1 to station 16	<ul style="list-style-type: none"> Stores the number of the local stations, excluding the station itself, whose status is either STOP or PAUSE. <table border="1"> <thead> <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> </thead> <tbody> <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> </tbody> </table> <ul style="list-style-type: none"> When the status of a local station is either STOP or PAUSE, the corresponding bits are set. 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 station 7 and local station 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. 	DEVICE NUMBER	Bit																b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	D9248	L16	L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1	D9249	L32	L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17	D9250	L48	L47	L46	L45	L44	L43	L42	L41	L40	L39	L38	L37	L36	L35	L34	L33	D9251	L64	L63	L62	L61	L60	L59	L58	L57	L56	L55	L54	L53	L52	L51	L50	L49
DEVICE NUMBER		Bit																																																																																																						
		b15		b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																						
D9248		L16		L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1																																																																																						
D9249		L32		L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17																																																																																						
D9250	L48	L47	L46	L45	L44	L43	L42	L41	L40	L39	L38	L37	L36	L35	L34	L33																																																																																								
D9251	L64	L63	L62	L61	L60	L59	L58	L57	L56	L55	L54	L53	L52	L51	L50	L49																																																																																								
D9249	Stores the status of station 17 to station 32																																																																																																							
D9250	Stores the status of station 33 to station 48																																																																																																							
D9251	Stores the status of station 49 to station 64																																																																																																							
D9252	Local station error status	Stores the status of station 1 to station 16	<ul style="list-style-type: none"> Stores the number of the local station in the loop at which a fault is detected. Only a faulty local station can be detected by another local station. The bit status of remote I/O station always remains "0". <table border="1"> <thead> <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> </thead> <tbody> <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> </tbody> </table> <ul style="list-style-type: none"> Only a faulty local station can be detected by another local station. The bit status of remote I/O station always remains "0". When a fault is detected at a local station (other than the station itself) the corresponding bit is set. Example: When local station 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". 	DEVICE NUMBER	Bit																b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	D9252	L16	L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1	D9253	L32	L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17	D9254	L48	L47	L46	L45	L44	L43	L42	L41	L40	L39	L38	L37	L36	L35	L34	L33	D9255	L64	L63	L62	L61	L60	L59	L58	L57	L56	L55	L54	L53	L52	L51	L50	L49
DEVICE NUMBER		Bit																																																																																																						
		b15		b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																																																						
D9252		L16		L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1																																																																																						
D9253		L32		L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17																																																																																						
D9254	L48	L47	L46	L45	L44	L43	L42	L41	L40	L39	L38	L37	L36	L35	L34	L33																																																																																								
D9255	L64	L63	L62	L61	L60	L59	L58	L57	L56	L55	L54	L53	L52	L51	L50	L49																																																																																								
D9253	Stores the status of station 17 to station 32																																																																																																							
D9254	Stores the status of station 33 to station 48																																																																																																							
D9255	Stores the status of station 49 to station 64																																																																																																							

Table 9.8 MELSECNET Data Link Special Link Registers

Device Number	Name	Data	Description																																																																				
D9243	Station number data of the station itself	Stores a station number (0 to 64)	<ul style="list-style-type: none"> Stores the station number assigned to the local station itself. Used by a local station to check its own station number. 																																																																				
D9244	Slave station number data	Stores a slave station number	<ul style="list-style-type: none"> Used by a local station to check the total number of slave stations in the loop. 																																																																				
D9245	Receive error detection count	Stores the total number of receive errors	<ul style="list-style-type: none"> 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". 																																																																				
D9248	Local station operating status	Stores the status of station 1 to station 16	<ul style="list-style-type: none"> Stores the number of the local stations, excluding the station itself, whose status is either STOP or PAUSE. <table border="1"> <thead> <tr> <th>DEVICE NUMBER</th> <th colspan="16">Bit</th> </tr> <tr> <th></th> <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> </thead> <tbody> <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> </tbody> </table> <ul style="list-style-type: none"> When the status of a local station is either STOP or PAUSE, the corresponding bits are set. 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 station 7 and local station 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. 	DEVICE NUMBER	Bit																	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	D9248	L16	L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1	D9249	0	L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17
DEVICE NUMBER		Bit																																																																					
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																							
D9248	L16	L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1																																																							
D9249	0	L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17																																																							
D9249		Stores the status of station 17 to station 31																																																																					
D9252	Local station error status	Stores the status of station 1 to station 16	<ul style="list-style-type: none"> Stores the number of the local station in the loop at which a fault is detected. Only a faulty local station can be detected by another local station. The bit status of remote I/O station always remains "0". <table border="1"> <thead> <tr> <th>DEVICE NUMBER</th> <th colspan="16">Bit</th> </tr> <tr> <th></th> <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> </thead> <tbody> <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> </tbody> </table> <ul style="list-style-type: none"> When a fault is detected at a local station (other than the station itself) the corresponding bit is set. Example: When local station 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". 	DEVICE NUMBER	Bit																	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	D9252	L16	L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1	D9253	0	L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17
DEVICE NUMBER		Bit																																																																					
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0																																																							
D9252	L16	L15	L14	L13	L12	L11	L10	L9	L8	L7	L6	L5	L4	L3	L2	L1																																																							
D9253	0	L31	L30	L29	L28	L27	L26	L25	L24	L23	L22	L21	L20	L19	L18	L17																																																							
D9253		Stores the status of station 17 to station 31																																																																					

9. PROGRAMMING

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	o			o		
Applicability	o			o		

MELSEC-A

9.4 Data Link Program Using Inputs (X) and Outputs (Y)

9.4.1 MELSECNET data link system

[System configuration]

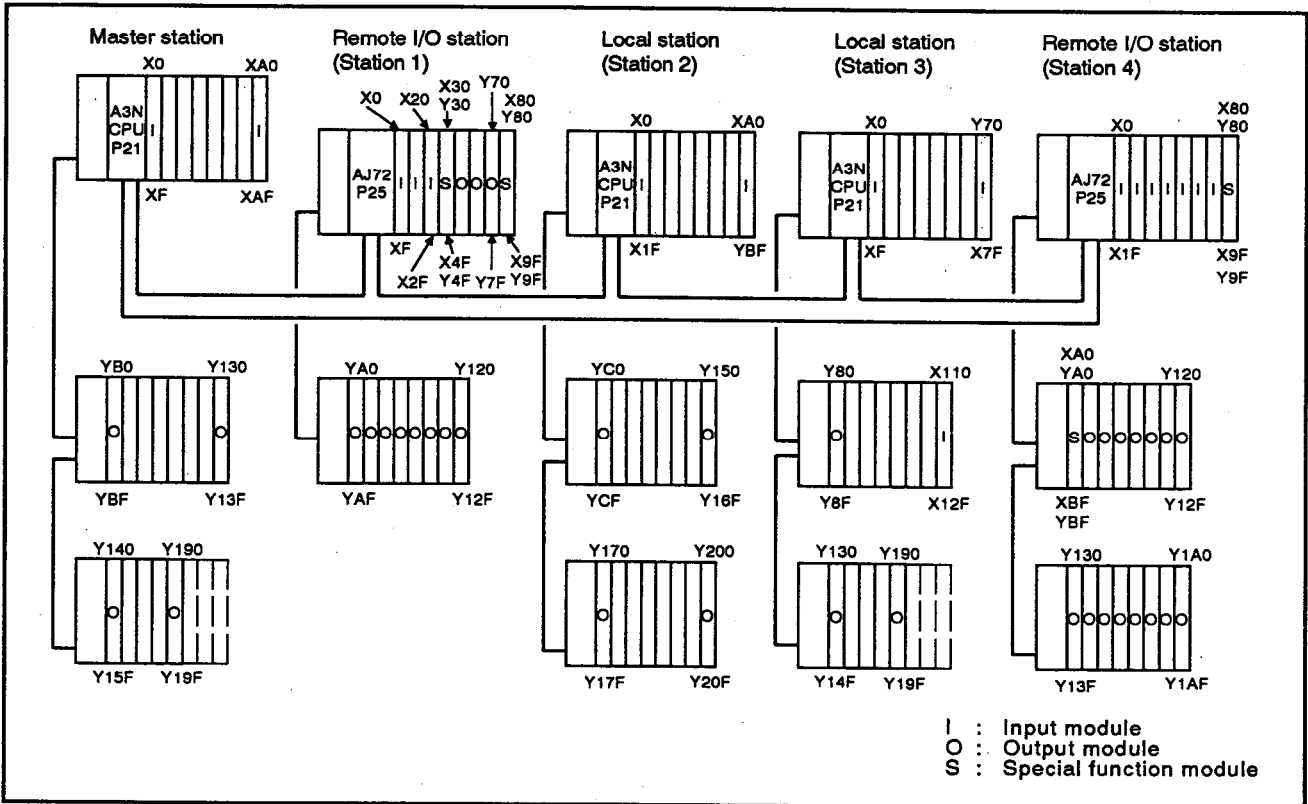


Fig. 9.1 System Configuration

[Link device allocation]

* LINK *						M : B ↔ ALL L : B 000-15F			
MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms	M : W ↔ ALL L : W 000-186		M : W → ALL R : W 200-294	
		B	W			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	4	000-05F	000-083	20	XXXX				
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

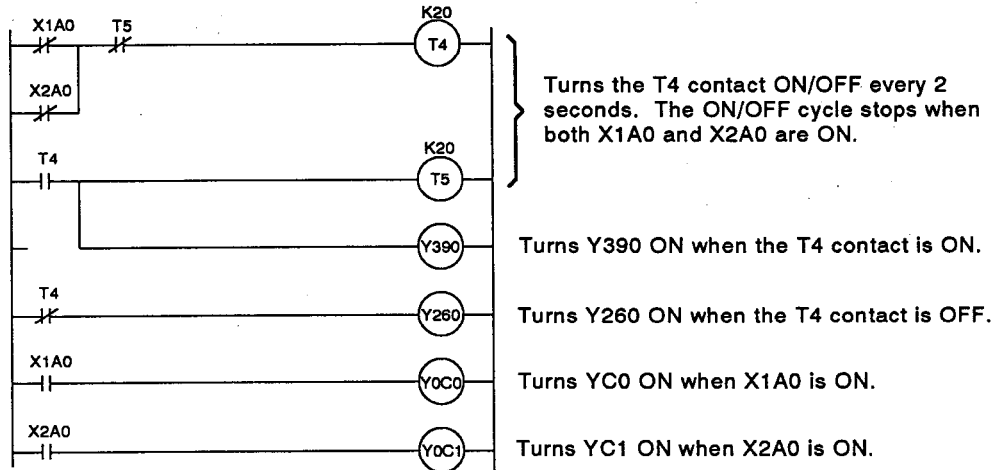
Fig. 9.2 Link Device Allocation

[Program example 1] Data link between the master station and a local station

Master station program

To turn Y260 (X1B0 of local station 3) ON when the T4 contact is OFF and to turn Y390 (X250 of local station 2) ON when the T4 contact is ON.

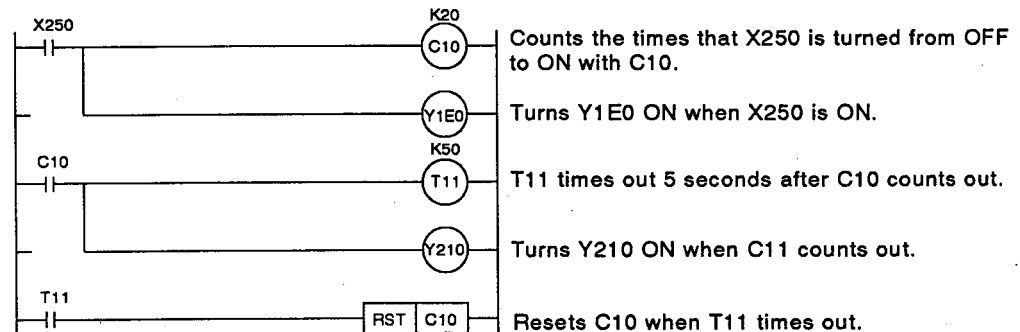
To turn YC0 ON when X1A0 (Y210 of local station 2) is ON, and to turn YC1 ON when X2A0 (Y300 of local station 3) ON.



Local station 2 program

To turn Y1E0 ON when X250 (Y390 of the master station) is ON.

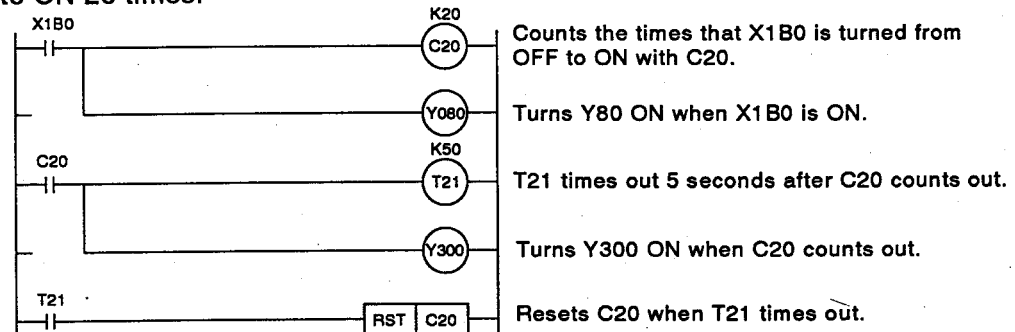
To turn Y210 (X1A0 of the master station) ON when X250 is turned from OFF to ON 20 times.



Local station 3 program

To turn Y80 ON when X1B0 (Y260 of the master station) is ON.

To turn Y300 (X2A0 of the master station) ON when X1B0 is turned from OFF to ON 20 times.

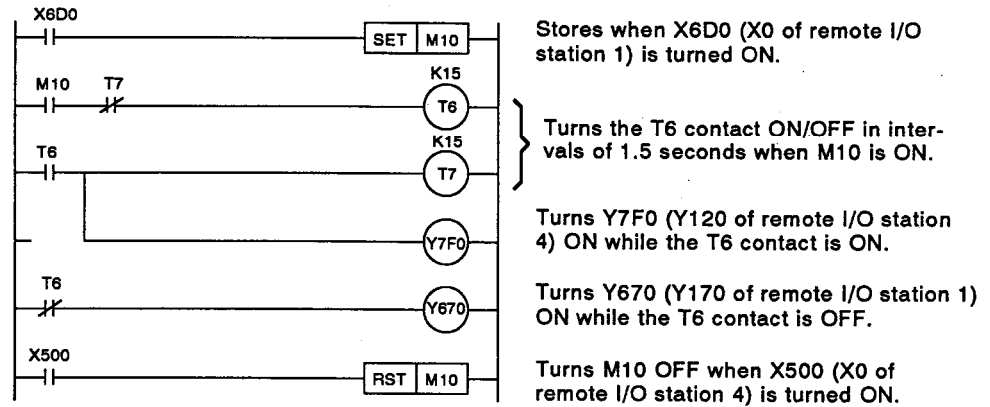


[Program example 2]

Master station program

To flash Y120 (Y7F0 of the master station) of remote I/O station 1 and to flash Y170 (Y670 of the master station) of remote I/O station 4 at intervals of 1 second by turning X0 (X6D0 of master station) of remote I/O station 1 ON.

Flashing stops when X0 (X500 of the master station) of remote I/O station 4 is turned ON.



Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Applicability				o	o	o

9. PROGRAMMING

MELSEC-A

9.4.2 MELSECNET/B data link system

[System configuration]

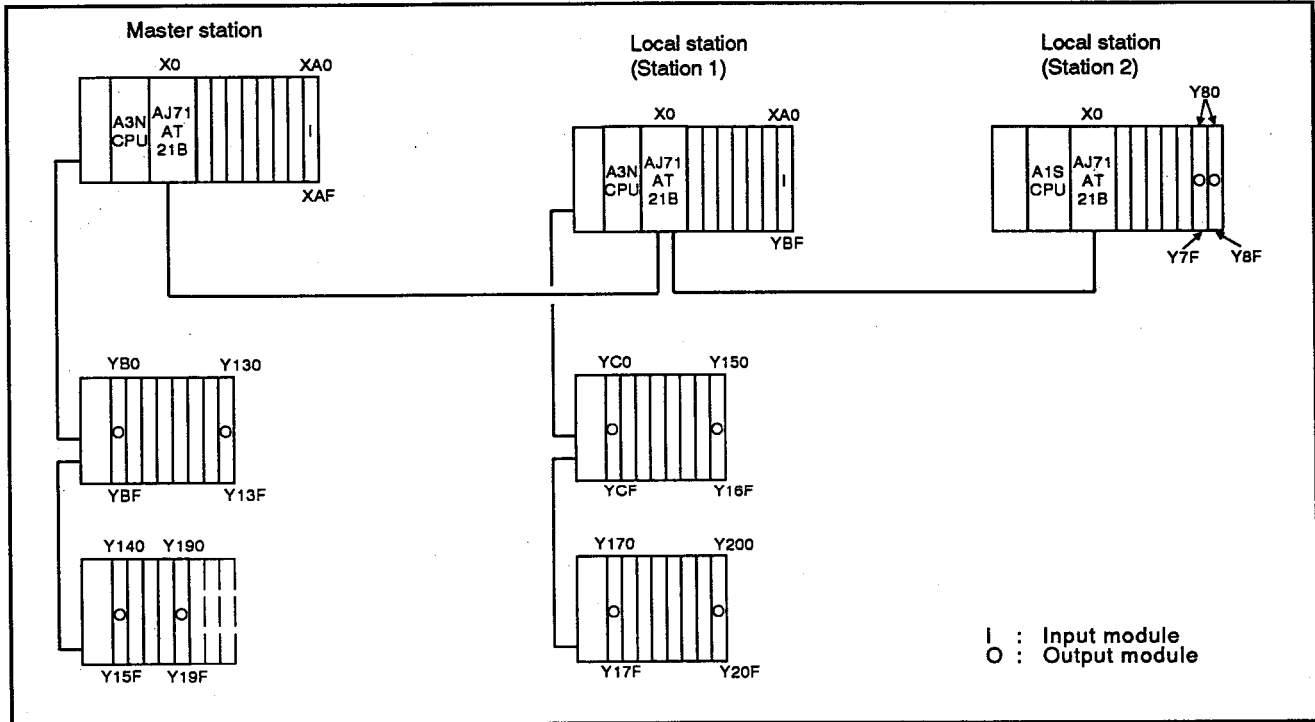


Fig. 9.3 System Configuration

[Link device Allocation]

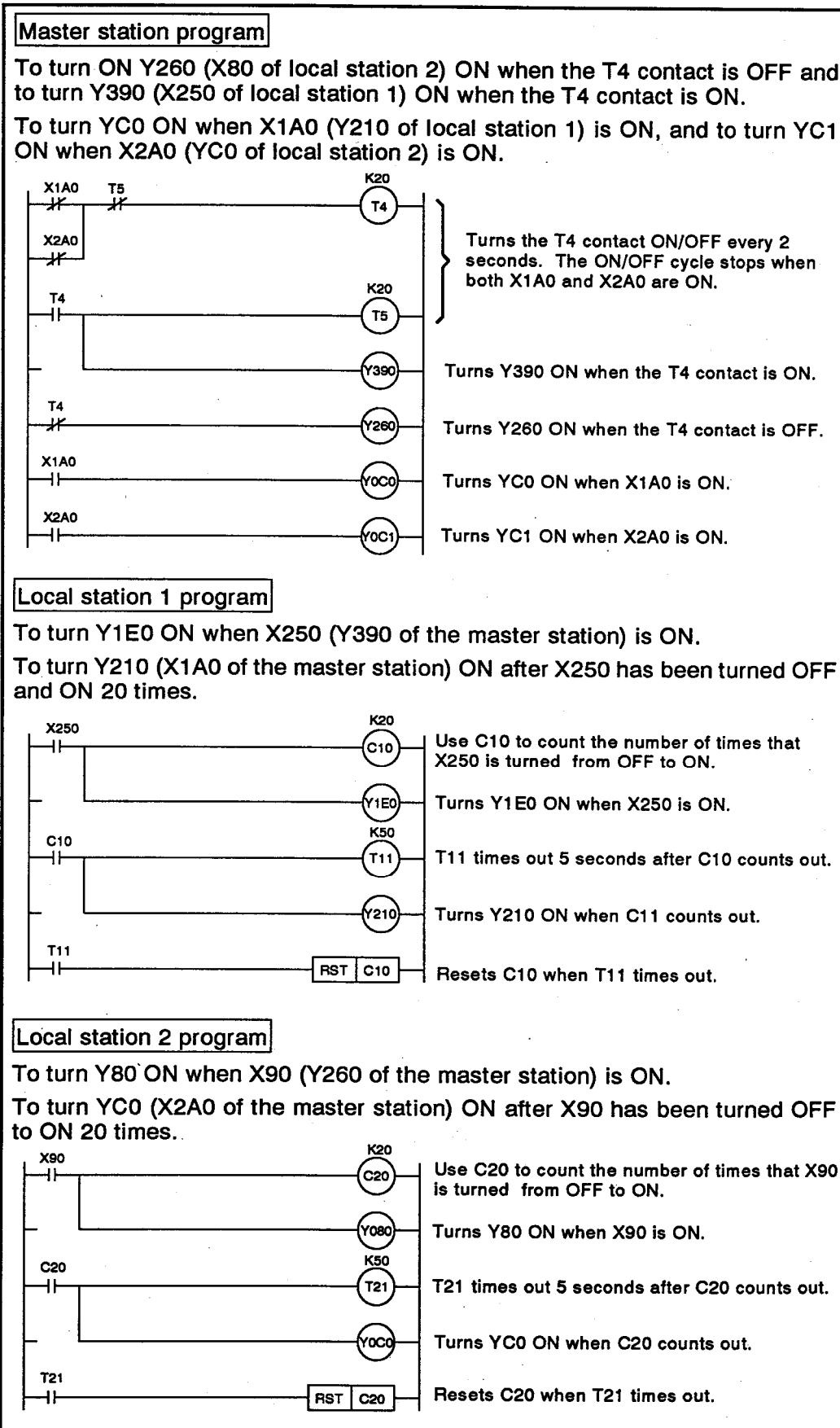
* LINK *						M : B ↔ ALL L : B 000-15F			
MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms	M : W → ALL L : W 000-186			
		B	W			M : W → ALL R : W -	M : Y → ALL L : X 260-47F	M : Y → ALL R : W -	M : X → ALL L : Y 1A0-3BF
M	4	000-05F	000-083	20	XXXX	M : X ← ALL L : X -			
L/R 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	060-08F	0A0-0FF	-----	-----	390-47F	250-33F	1A0-25F	210-2CF	
L 2	0E0-15F	100-186	-----	-----	260-28F	090-0BF	2A0-2DF	0C0-0FF	
.	
.	
.	
.	

TOTAL MEMORY : 16K BYTES

M : MASTER L : LOCAL R : REMOTE

Fig. 9.4 Link Device Allocation

[Program example 1] Data link between the master station and a local station



9. PROGRAMMING

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	o					
Applicability						

MELSEC-A

9.5 Data Link Program Using Link Relays (B)

9.5.1 MELSECNET data link system

[System configuration]

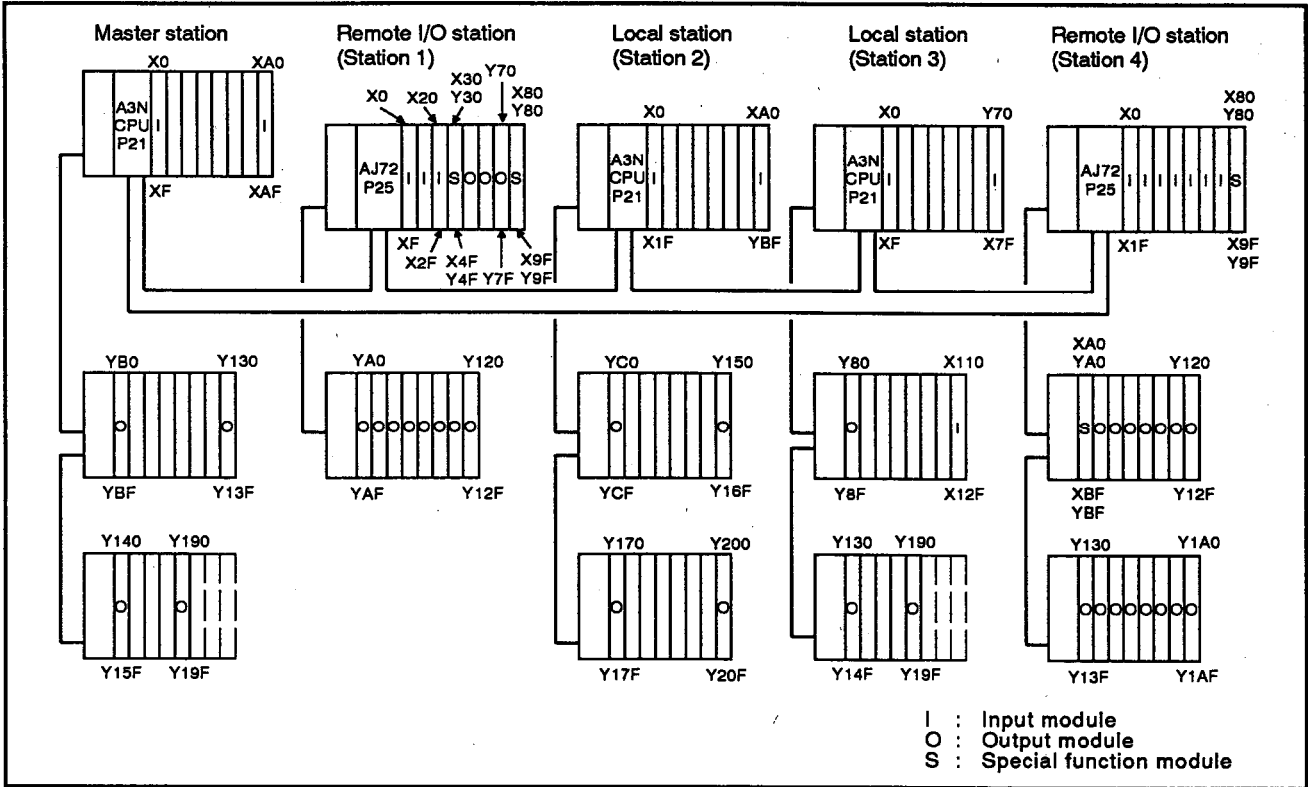


Fig. 9.5 System Configuration

[Link device allocation]

* LINK *						M : B ↔ ALL L : B 000-15F			
MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTERMITTENT 10ms	M : W ↔ ALL L : W 000-186			
		B	W			M : W → ALL R : W 200-294			
M	4	000-05F	000-083	20	XXXX	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

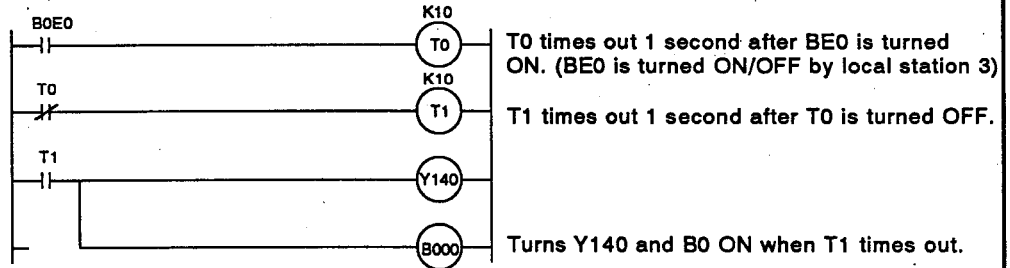
Fig. 9.6 Link Device Allocation

[Program example]

Master station program

To turn Y140 and B0 ON when T1 times out and to turn Y140 and B0 OFF 1 second after BE0 is turned ON.

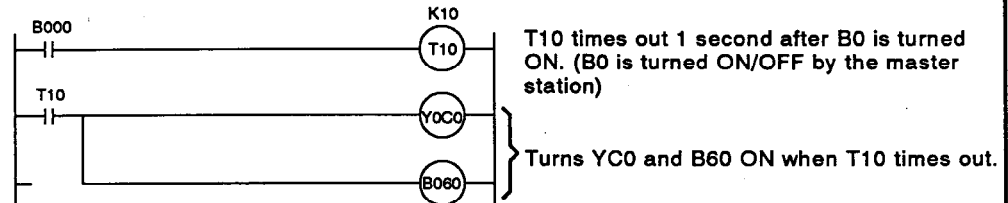
(B0: Instruction to turn YC0 of local station 2 ON/OFF)



Local station 2 program

To turn YC0 and B60 ON 1 second after B0 of the master station is turned ON.

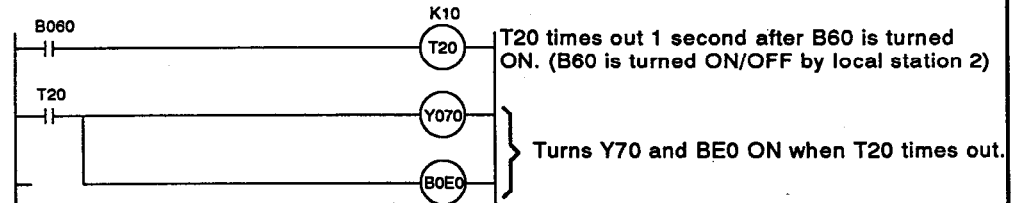
(B60: Instruction to turn Y70 of local station 3 ON/OFF)



Local station 3 program

To turn Y70 and BE0 ON 1 second after B60 of the local station 2 is turned ON, and to turn Y70 and BE0 OFF when B60 is turned OFF.

(BE0: Instruction to turn Y140 and B0 of the master station ON/OFF)



9. PROGRAMMING

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode						
Applicability				o		

MELSEC-A

9.5.2 MELSECNET/B data link system

This section explains the programs used to turn ON Y140 of the master station, YC0 of local station 2, and Y70 of local station 3 sequentially by means link relays.

[System configuration]

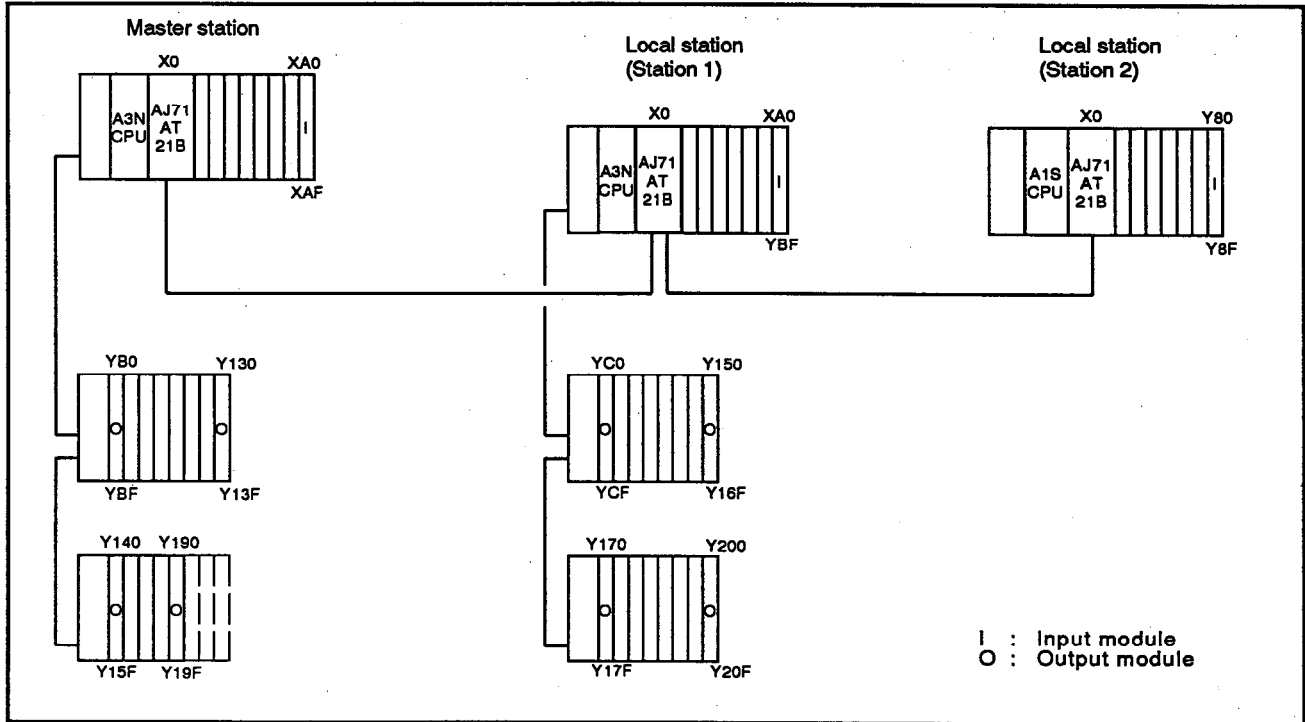


Fig. 9.7 System Configuration

[Link device Allocation]

* LINK *						M : B ↔ ALL L : B 000-15F			
MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms	M : W ↔ ALL L : W 000-186		M : X ↔ ALL L : X 1A0-3BF	
		B	W			M : W → ALL R : W 200-294	M : Y → ALL R : Y -		
M	4	000-05F	000-083	20	XXXX	M : W ← ALL R : W 300-3C1	M : Y → ALL R : Y -	M : X ← ALL R : X 1A0-3BF	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	060-08F	0A0-0FF	-----	-----	390-47F	250-33F	1A0-25F	210-2CF	
L 2	0E0-15F	100-186	-----	-----	260-28F	090-0BF	2A0-2DF	0C0-0FF	
	
	
	
	
	

TOTAL MEMORY : 16K BYTES

M : MASTER L : LOCAL R : REMOTE

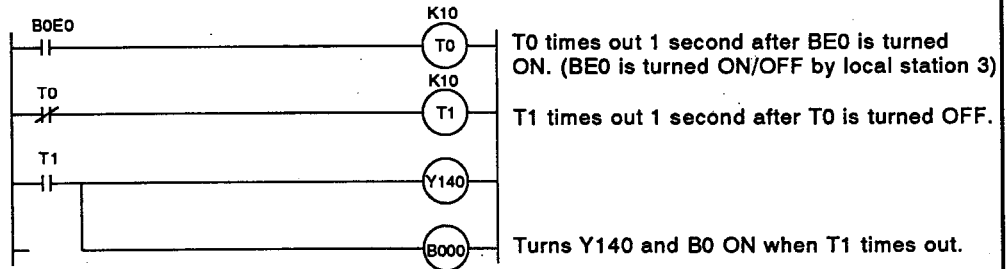
Fig. 9.8 Link Device Allocation]

[Program example]

Master station program

To turn Y140 and B0 ON when T1 times out and to turn Y140 and B0 OFF 1 second after BE0 is turned ON.

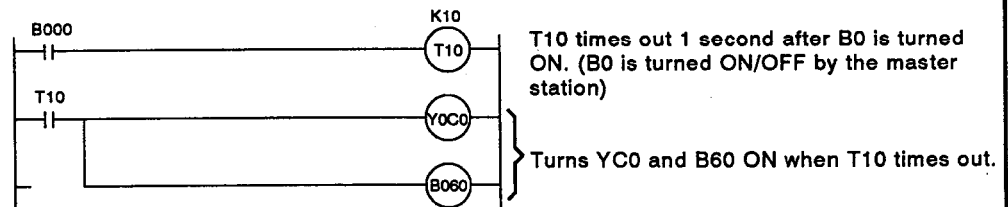
(B0: Instruction to turn YC0 of local station 2 ON/OFF)



Local station 2 program

To turn YC0 and B60 ON 1 second after B0 of the master station is turned ON, and to turn YC0 and B60 OFF when B0 is tuened OFF.

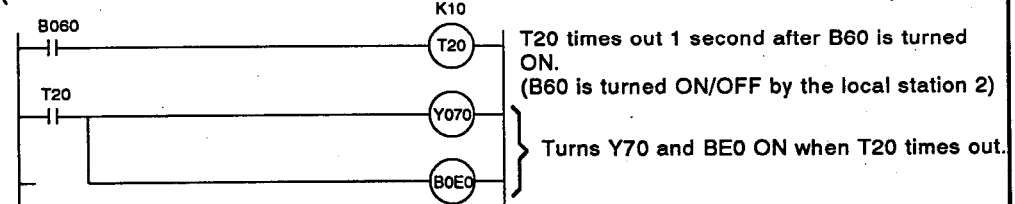
(B60: Instruction to turn Y70 of local station 3 ON/OFF)



Local station 3 program

To turn Y70 and BE0 ON 1 second after B60 of the local station 2 is turned ON, and to turn Y70 and BE0 OFF when B60 is turned OFF.

(BE0: Instruction to turn Y140 and B0 of the master station ON/OFF)



9. PROGRAMMING

Data Link System	MELSECNET			MELSECNET/R		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode						
Applicability	○					

MELSEC-A

9.6 Data Link Program Using Link Registers (W)

9.6.1 MELSECNET data link system

[System configuration]

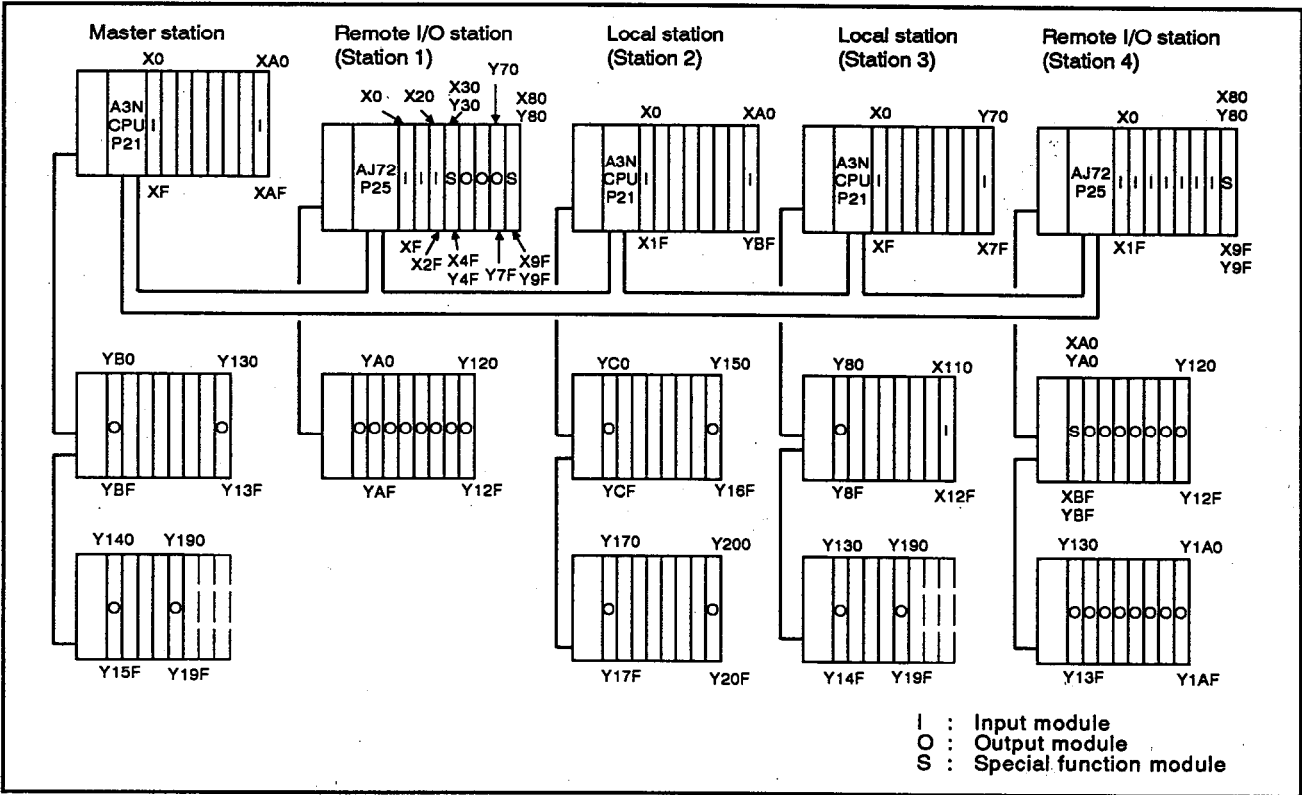


Fig. 9.9 System Configuration

[Link device allocation]

* LINK *					
MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTERMITTENT 10ms
		B	W		
M	4	000-05F	000-083	20	XXXX

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	030-12E	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

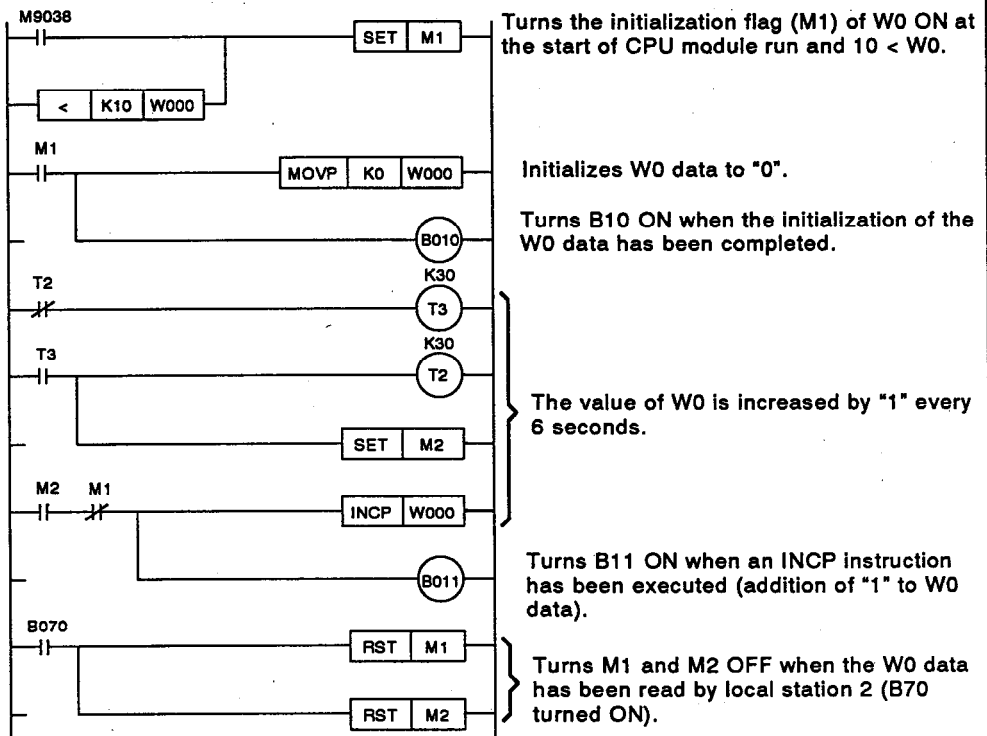
Fig. 9.10 Link Device Allocation

[Program example]

Master station program

To store "0 to 10" to W0

(B10 and B11 are used for handshaking between the master station and local station 2)



Local station 2 program

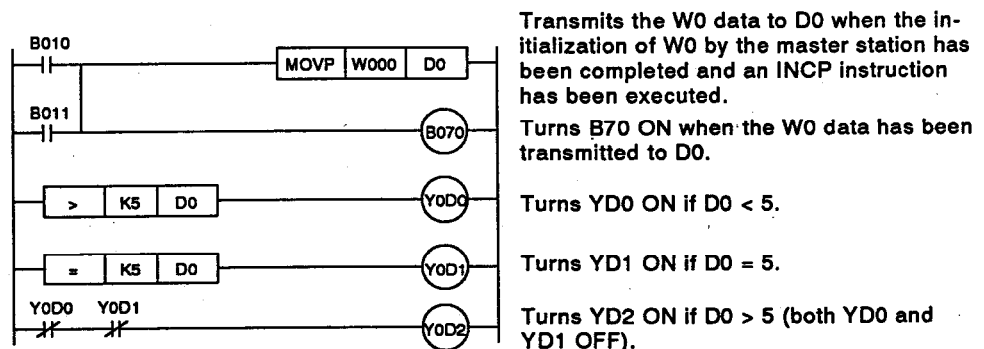
To turn YD0, YD1, and YD2 ON when the W0 data is sent from the master station

ON conditions:

YD0 $W0 < 5$

YD1 $W0 = 5$

YD2 $W0 > 5$



9. PROGRAMMING

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode						
Applicability				o		

MELSEC-A

9.6.2 MELSECNET/B data link system

This section explains the programs used by local station 2 to read link register data (0 to 10) written by the master station, and to turn YD0, YD1, and YD2 ON/OFF depending on the data.

[System configuration]

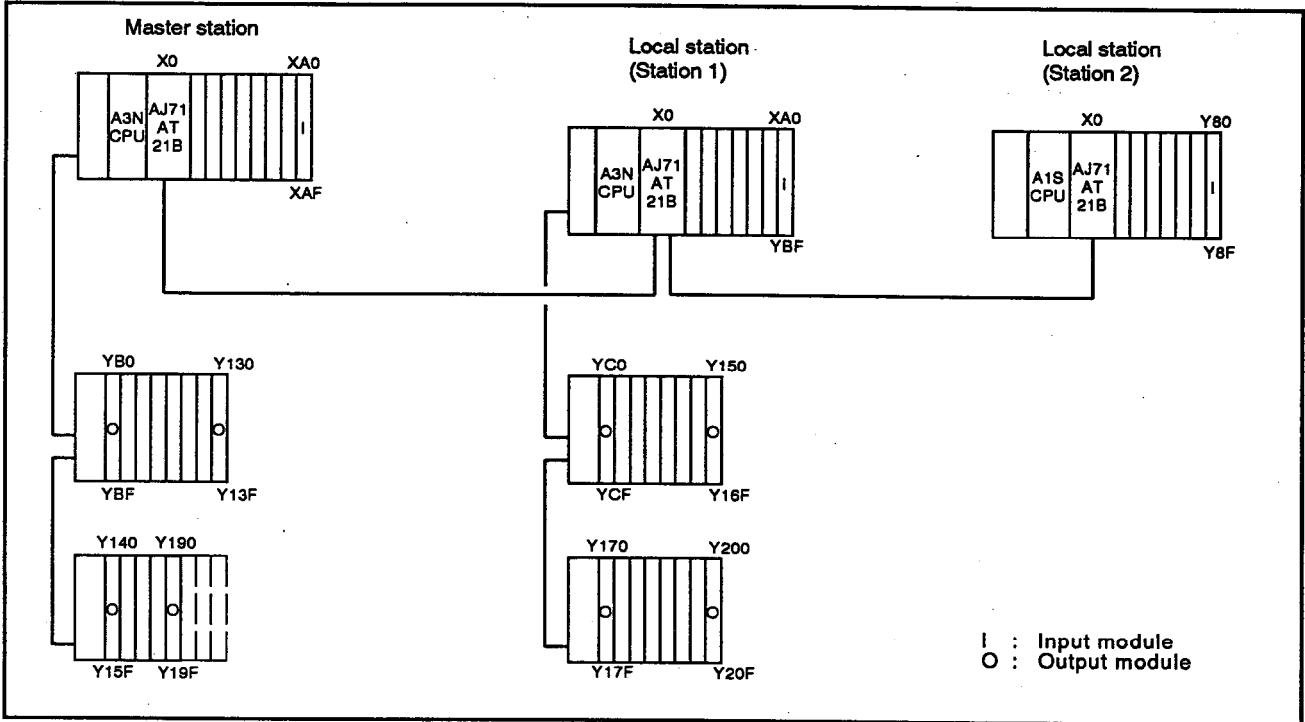


Fig. 9.11 System Configuration

[Link device allocation]

* LINK *						M : B ↔ ALL L : B 000-15F			
MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms	M : W ↔ ALL L : W 000-186			
		B	W			M : W → ALL R : W -			
M	4	000-05F	000-083	20	XXXX	M : Y → ALL L : X 300-3C1			
						M : Y → ALL R : Y 260-47F			
						M : X ← ALL L : Y 1A0-3BF			
						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	060-08F	0A0-0FF	.....	.....	390-47F	250-33F	1A0-25F	210-2CF
L 2	0E0-15F	100-186	.....	.....	260-28F	090-0BF	2A0-2DF	0C0-0FF
.
.
.
.
.

TOTAL MEMORY : 16K BYTES

M : MASTER L : LOCAL R : REMOTE

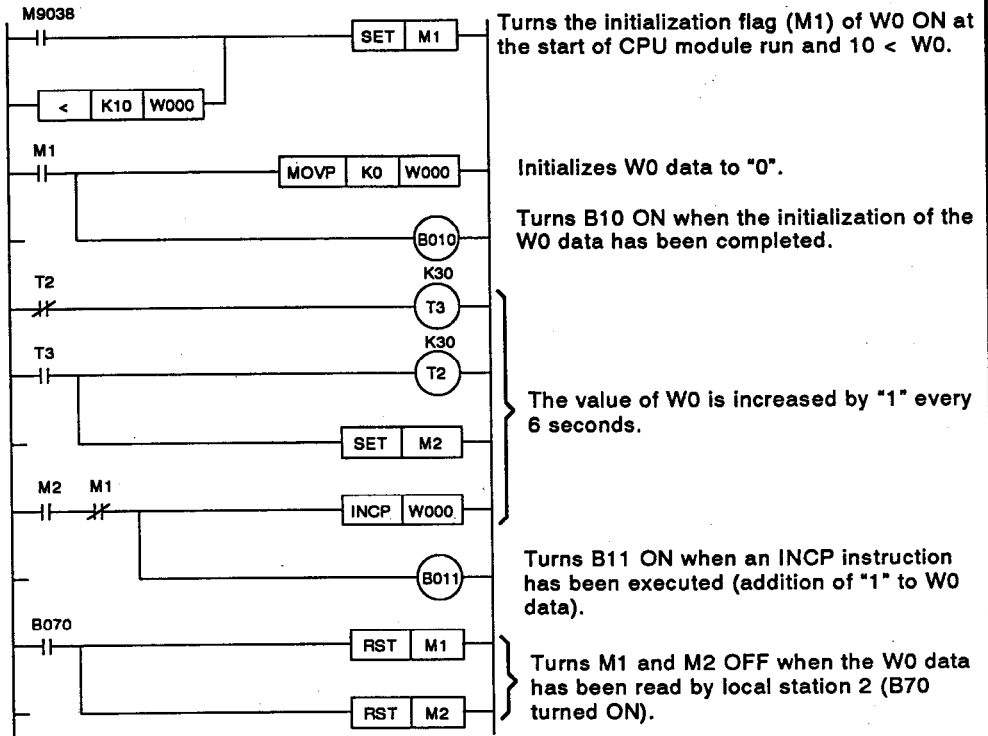
Fig. 9.12 Link Device Allocation

[Program example]

Master station program

To store "0 to 10" to W0

(B10 and B11 are used for handshaking between the master station and local station 2)



Local station 2 program

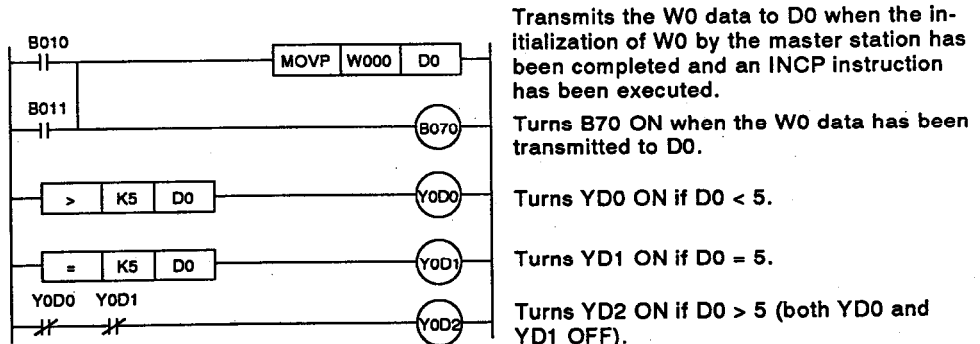
To turn YD0, YD1, and YD2 ON when the W0 data is sent from the master station

ON conditions:

YD0 $W0 < 5$

YD1 $W0 = 5$

YD2 $W0 > 5$



Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Applicability	o					

9. PROGRAMMING

MELSEC-A

9.7 Read/Write Program for a Word Device from the Master Station to a Local Station

9.7.1 MELSECNET data link system

[System configuration]

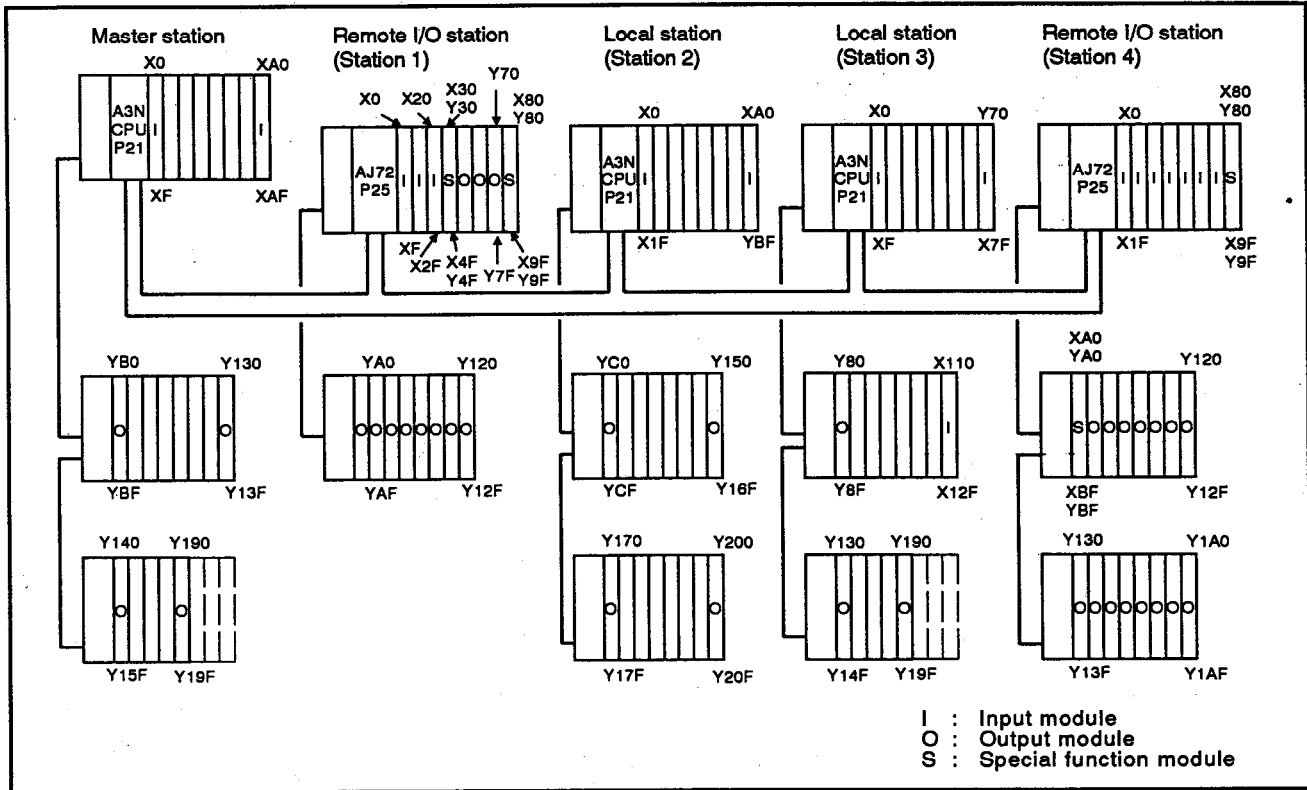


Fig. 9.13 System Configuration

[Link device allocation]

* LINK *						M : B ↔ ALL	L : B 000-15F
MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTERMITTENT 10ms	M : W ↔ ALL	L : W 000-186
		B	W			M : W → ALL	R : W 200-294
M	4	000-05F	000-083	20	XXXX	M : W ← ALL <th>R : W 300-3C1</th>	R : W 300-3C1
						M : Y → ALL <th>L : X 260-47F</th>	L : X 260-47F
						M : Y → ALL <th>R : Y 580-7FF</th>	R : Y 580-7FF
						M : X ← ALL <th>L : Y 1A0-3BF</th>	L : Y 1A0-3BF
						M : X ← ALL <th>R : X 500-76F</th>	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

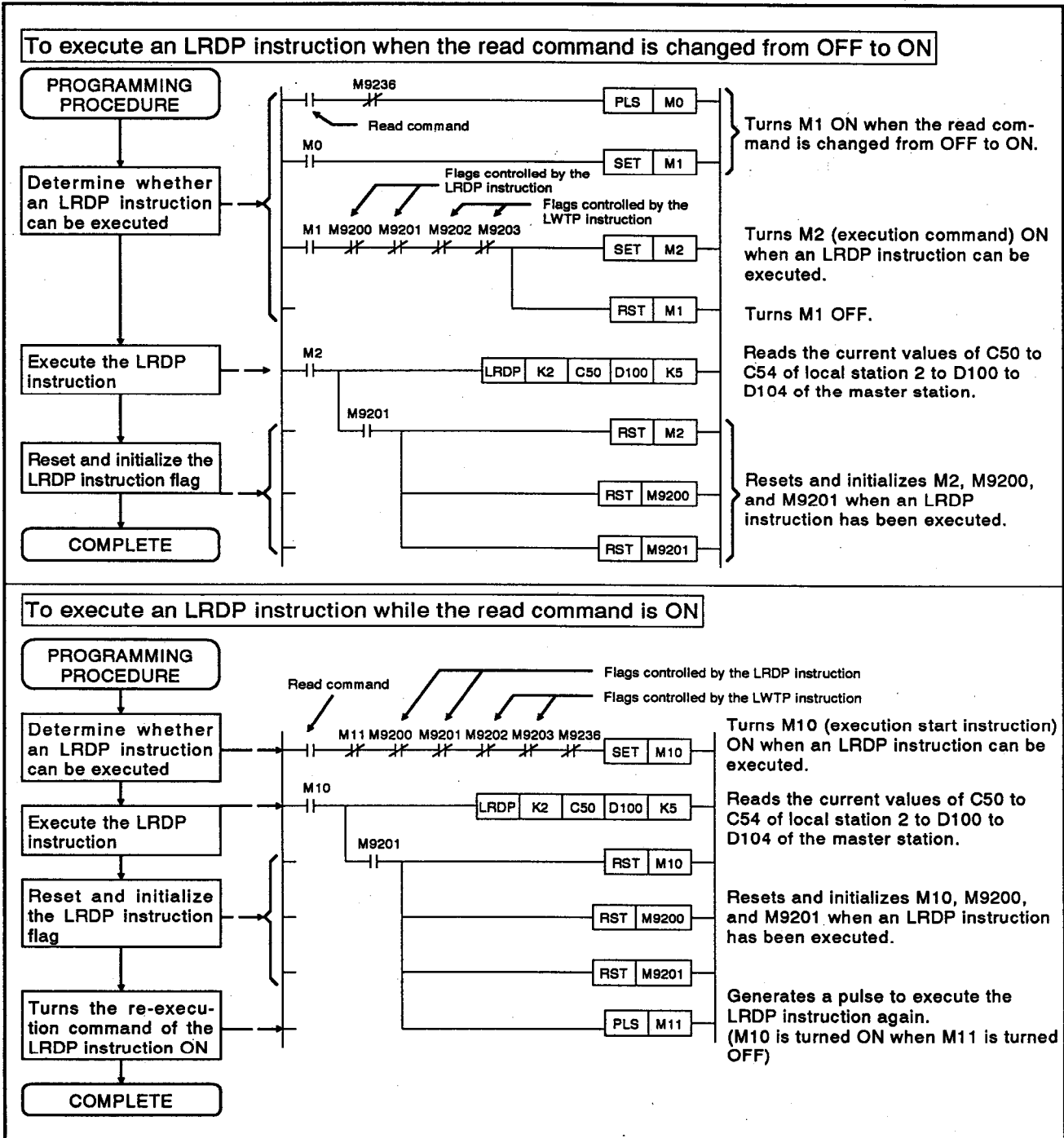
↑
L : LOCAL
R : REMOTE

M : MASTER L : LOCAL R : REMOTE

Fig. 9.14 Link Device Allocation

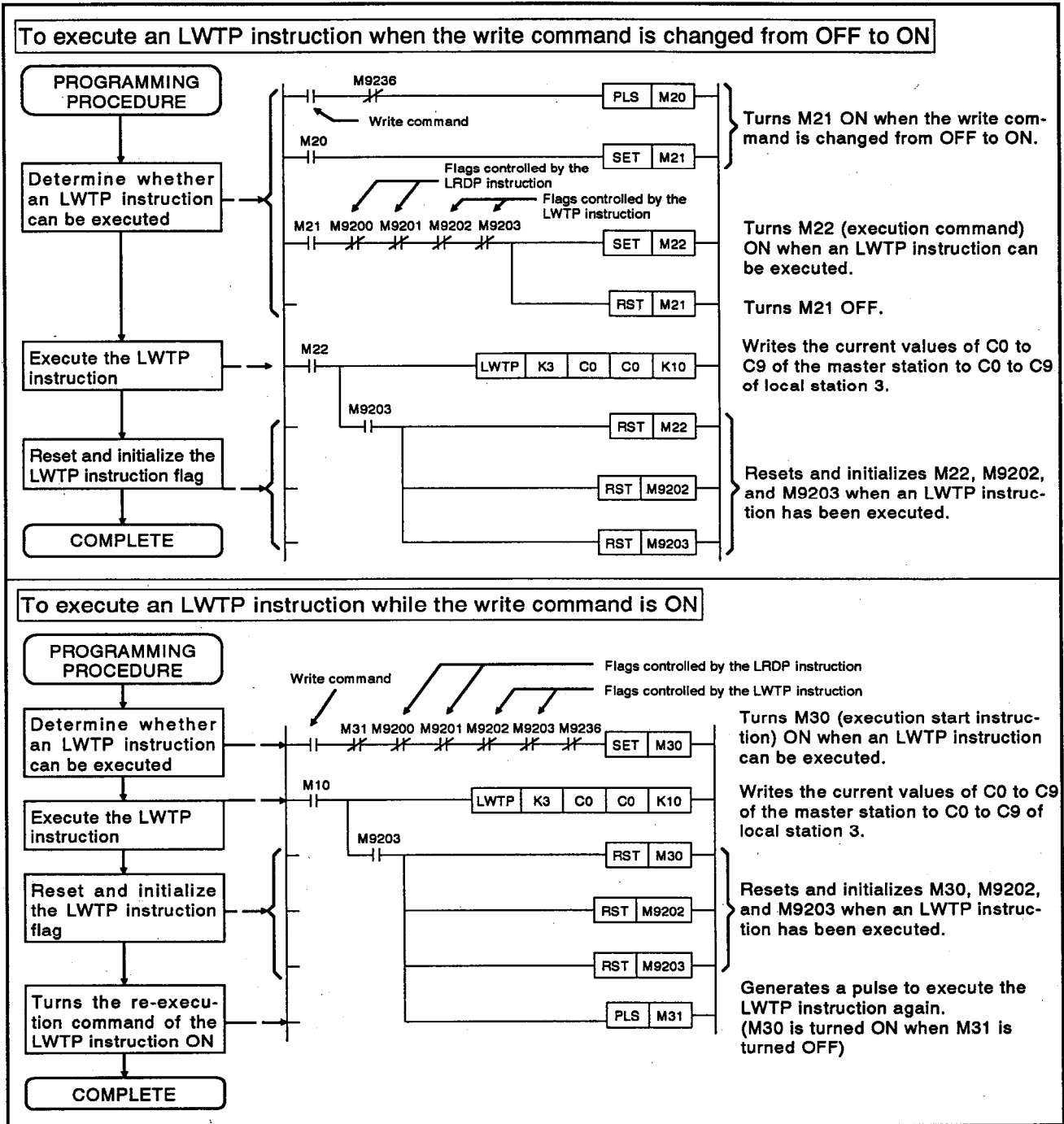
(1) Read program (LRDP instruction)

[Program example]



(2) Write program (LWTP instruction)

[Program example]



9. PROGRAMMING

Data Link System	MELSECNET			MELSECNET/B	
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II composite mode
Operating Mode				o	o
Applicability				o	o

MELSEC-A

9.7.2 MELSECNET/B data link system

This section explains the programs used by a master station to read/write current values in the timer (T) and counter (C) as well as the data in data register (D) and link register (W) from/to local stations.

[System configuration]

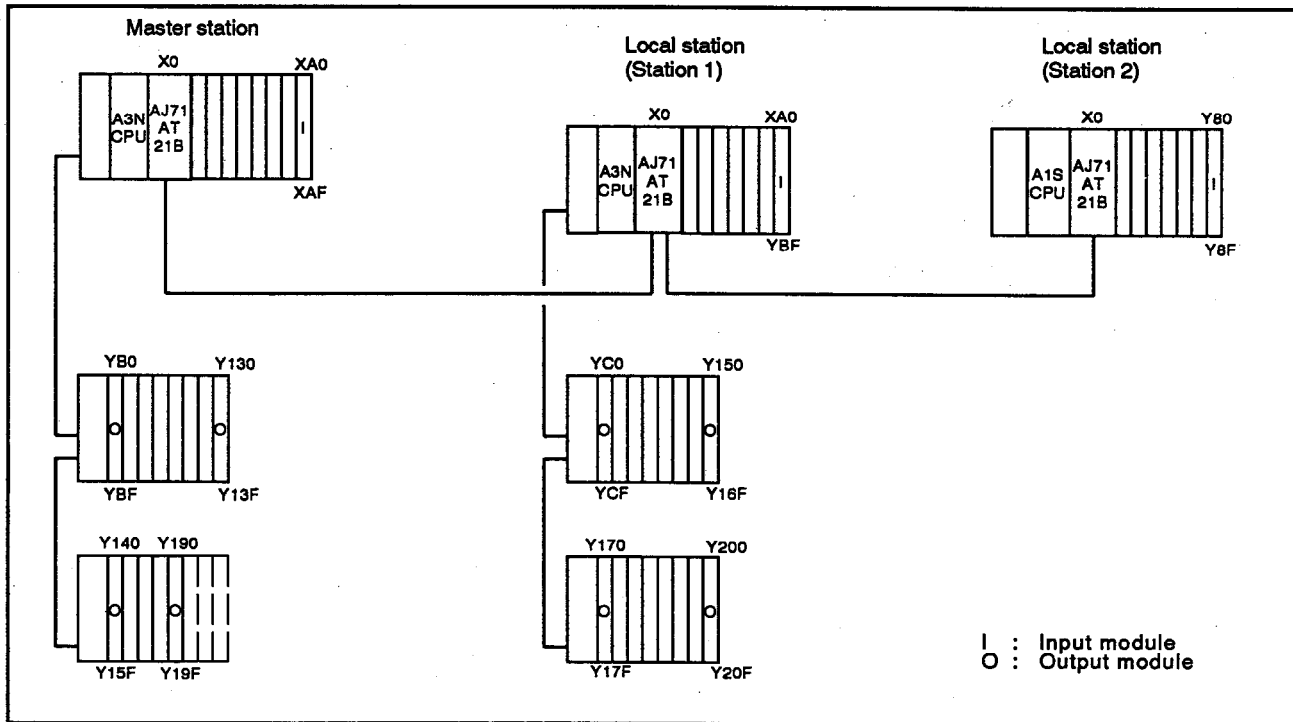


Fig. 9.15 System Configuration

[Link device allocation]

* LINK *						M : B	↔	ALL	L : B	000-15F
MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms	M : W	↔	ALL	L : W	000-186
		B	W			M : W	→	ALL	R : W	200-294
M	4	000-05F	000-083	20	XXXX	M : W	← <td>ALL <td>R : W <td>300-3C1</td> </td></td>	ALL <td>R : W <td>300-3C1</td> </td>	R : W <td>300-3C1</td>	300-3C1
						M : Y	→ <td>ALL <td>L : X <td>260-47F</td> </td></td>	ALL <td>L : X <td>260-47F</td> </td>	L : X <td>260-47F</td>	260-47F
						M : Y	→ <td>ALL <td>R : Y <td>580-7FF</td> </td></td>	ALL <td>R : Y <td>580-7FF</td> </td>	R : Y <td>580-7FF</td>	580-7FF
						M : X	← <td>ALL <td>L : Y <td>1A0-3BF</td> </td></td>	ALL <td>L : Y <td>1A0-3BF</td> </td>	L : Y <td>1A0-3BF</td>	1A0-3BF
						M : X	← <td>ALL <td>R : X <td>500-76F</td> </td></td>	ALL <td>R : X <td>500-76F</td> </td>	R : X <td>500-76F</td>	500-76F

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	060-08F	0A0-0FF	-----	-----	390-47F	250-33F	1A0-25F	210-2CF
L 2	0E0-15F	100-186	-----	-----	260-28F	090-0BF	2A0-2DF	0C0-0FF
.
.
.
.

TOTAL MEMORY : 16K BYTES

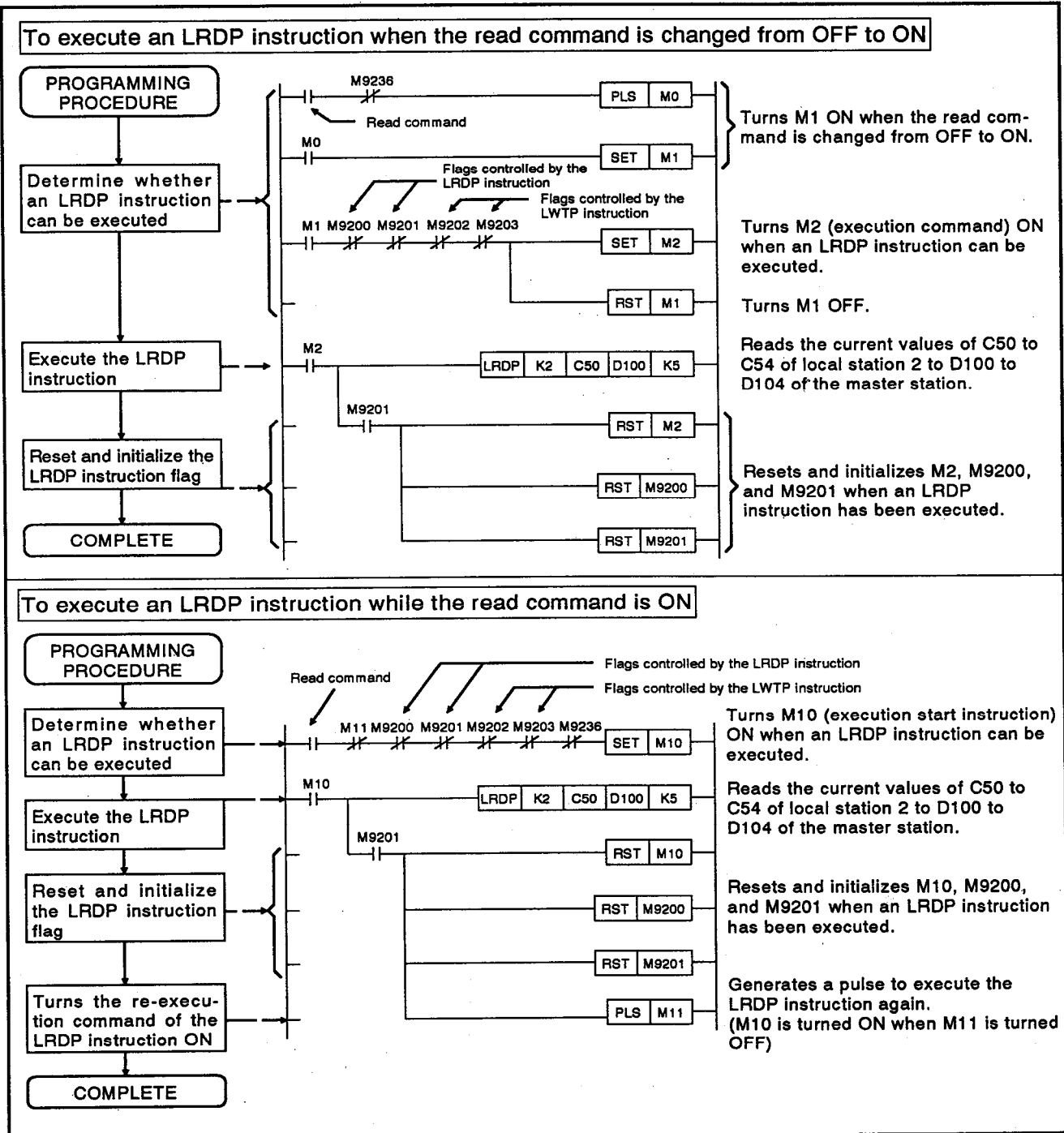
M : MASTER L : LOCAL R : REMOTE

Fig. 9.16 Link Device Allocation

(1) Read program (LRDP instruction)

This section explains the programs used to read the current values in C50 to C55 in local station 2 to D100 to D105 in the maaster station. (See Fig. 7.7 and 7.8 for the system configuration and link parameter allocation.)

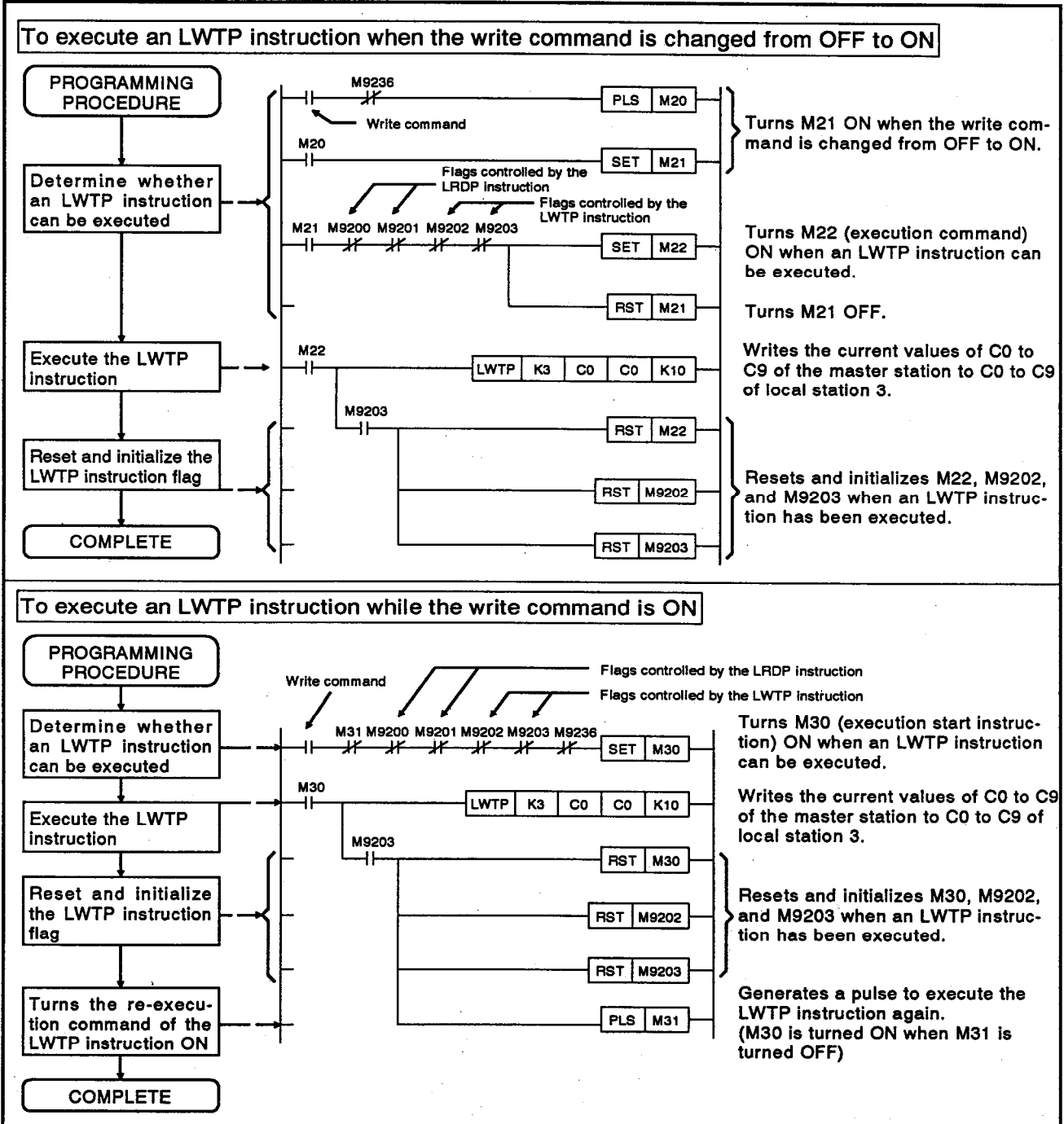
[Program example]



(2) Write program (LWTP instruction)

This section explains the programs used to write the current values in C0 to C9 in a master station to C0 to C9 in local station 3.
(See Fig. 7.7 and 7.8 for the system configuration and link parameter allocation.)

[Program example]



Data Link System	MELSECNET			MELSECNET/R		
Operating Mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Applicability	○					

9. PROGRAMMING

MELSEC-A

9.8 Read/Write Program from a Remote I/O Station to a Special Function Module

[System configuration]

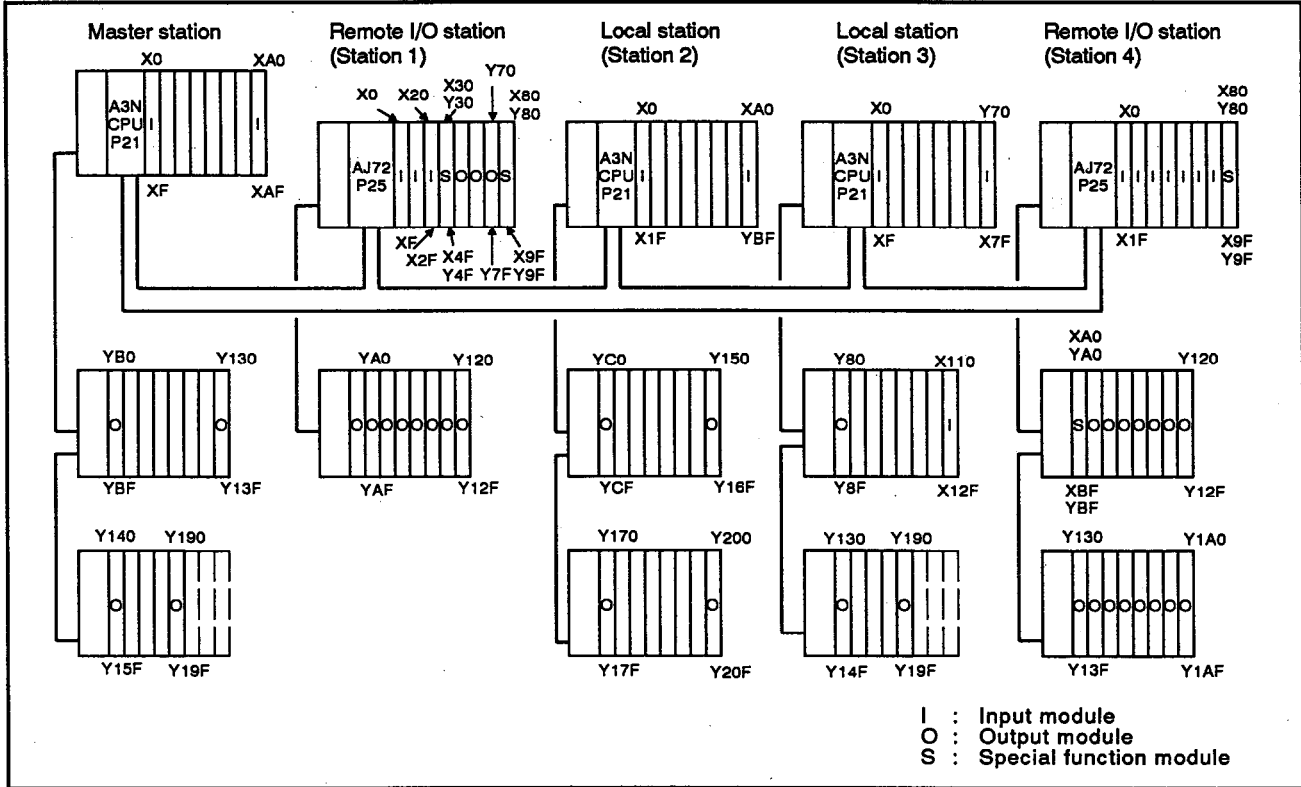


Fig. 9.17 System Configuration

[Link device allocation]

* LINK *						M : B	↔	ALL	L : B	000-15F
MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTERMITTENT 10ms	M : W	↔	ALL	L : W	000-186
		B	W			M : W	→	ALL	R : W	200-294
M	4	000-05F	000-083	20	XXXX	M : W <td>→ <th>ALL</th> <th>R : W</th> <th>300-3C1</th> </td>	→ <th>ALL</th> <th>R : W</th> <th>300-3C1</th>	ALL	R : W	300-3C1
						M : Y <td>→ <th>ALL</th> <th>L : X</th> <th>260-47F</th> </td>	→ <th>ALL</th> <th>L : X</th> <th>260-47F</th>	ALL	L : X	260-47F
						M : Y <td>→ <th>ALL</th> <th>R : Y</th> <th>580-7FF</th> </td>	→ <th>ALL</th> <th>R : Y</th> <th>580-7FF</th>	ALL	R : Y	580-7FF
						M : X <td>← <th>ALL</th> <th>L : Y</th> <th>1A0-3BF</th> </td>	← <th>ALL</th> <th>L : Y</th> <th>1A0-3BF</th>	ALL	L : Y	1A0-3BF
						M : X <td>← <th>ALL</th> <th>R : X</th> <th>500-76F</th> </td>	← <th>ALL</th> <th>R : X</th> <th>500-76F</th>	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

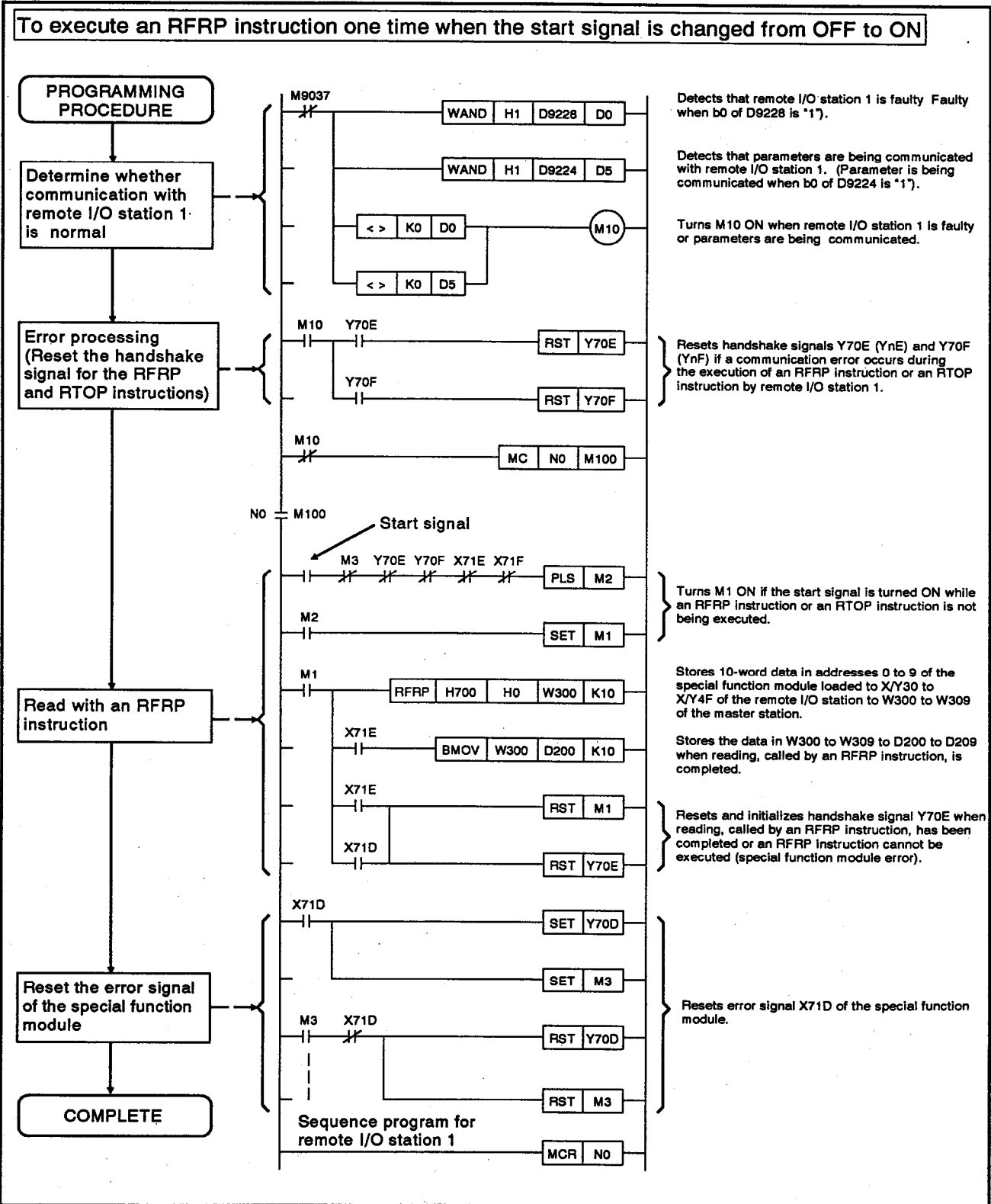
Fig. 9.18 Link Device Allocation

REMARK

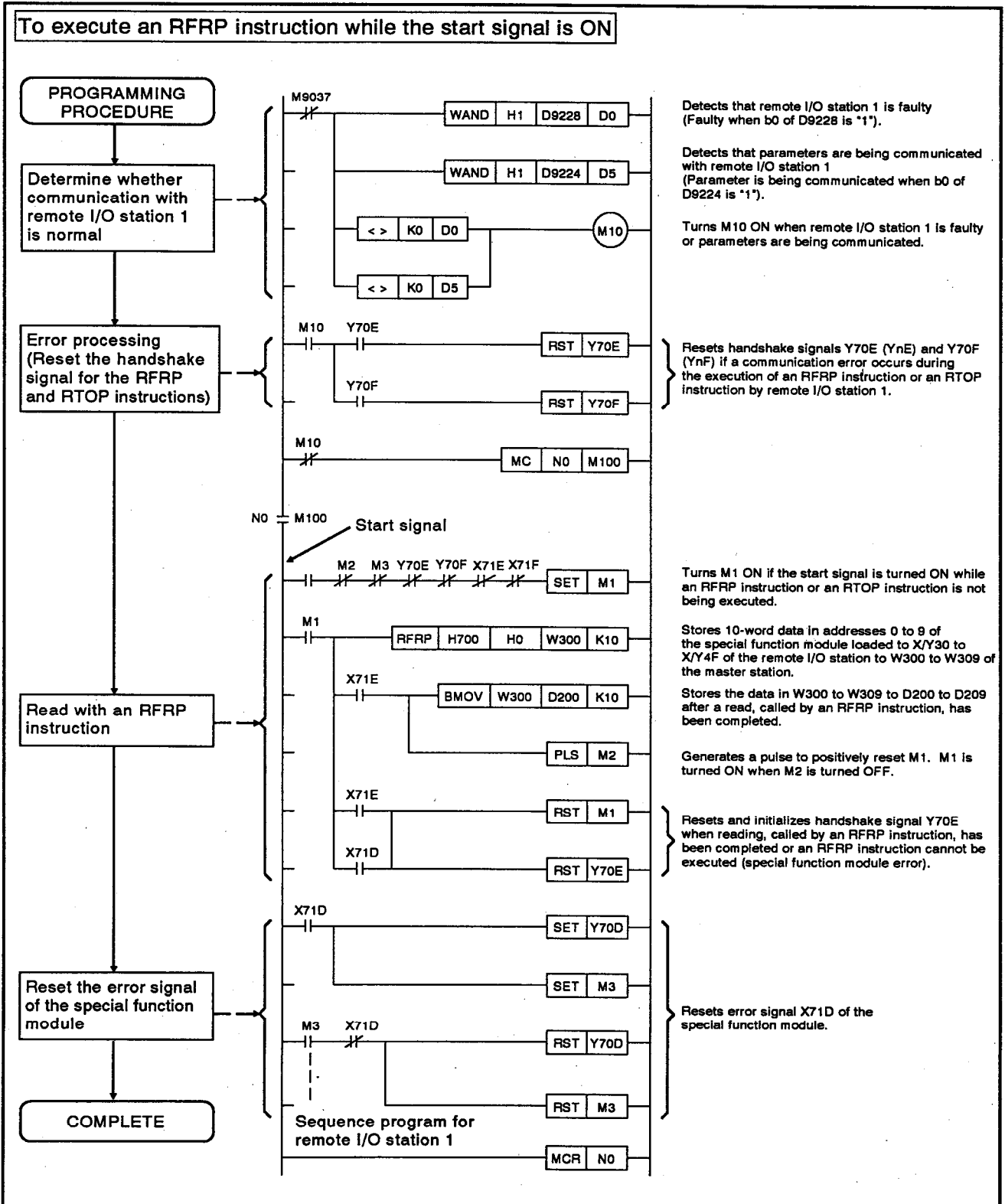
In the M → R area of remote I/O stations 1 and 4, two points (W200 and W201, W250 and W251) from the head device are used by the system. These points cannot be used for a user program. Refer to Section 7.3.3 for more details.

9.8.1 Read program (RFRP instruction)

[Program example 1]



[Program example 2]

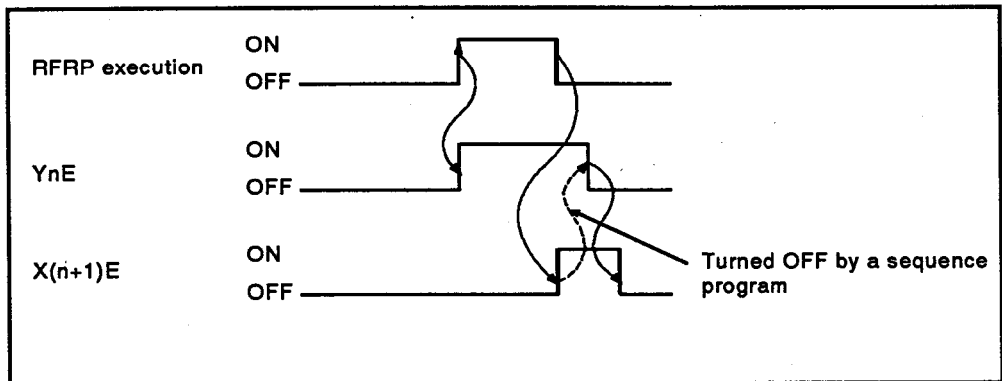


[Precautions]

- (1) To execute an RFRP instruction, always take interlock for YnE and X(n+1)E*. Also, be careful not to designate an RFRP and RTOP instruction at two or more positions within a single special function module.

* "n" is the device number of the master station that corresponds to the I/O number of the slot in which a special function module is loaded. "n" is also the upper two digits of the three digits displayed for the 16 points of the first half link parameters.

YnE and X(n+1)E are turned ON/OFF as illustrated below:



- (2) The RFRP start signal must be turned ON by a SET instruction.

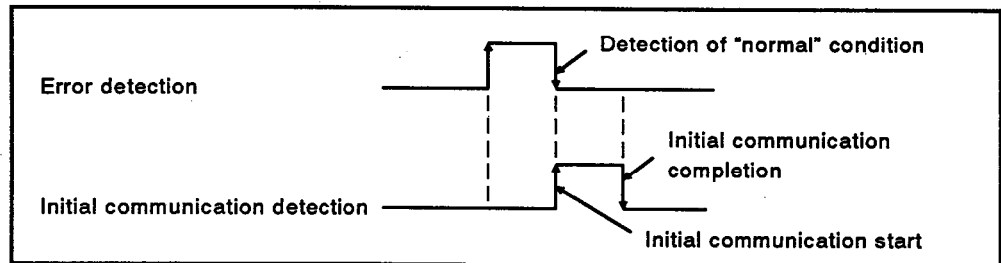
If an OUT or PLS instruction is used, the RFRP instruction will not be executed correctly.

- (3) YnE and the RFRP start signal must be reset after reading is complete.

Reading cannot be executed again if YnE and the RFRP instruction have not been reset.

- (4) Refer to the manual for the individual special function module for details on buffer memory addresses.

- (5) Write an error detection circuit in a sequence program to check the operation from when an error has occurred to when the initial communication is completed when a local or remote I/O station has caused an error.
 - (a) The bit in D9228 to D9231 corresponds to a local station or a remote I/O station and can be used to determine whether an error has occurred in that station. "1" indicates the occurrence of error.
 - (b) The bit in D9224 to D9227 corresponds to a local station or a remote I/O station and can be used to determine whether initial communication is being executed by that station. "1" indicates 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 according to 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 will 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) X(n+1)D is turned OFF if YnD is turned ON.
 - (b) If X(n+1)D is turned ON, a special function module might be faulty or the module might not be loaded correctly. Check the special function module at which the error occurred.
- (7) Write the following circuit to turn YnD ON/OFF:
 - (a) YnD is turned ON when X(n+1)D is turned ON.
 - (b) YnD is turned OFF one time when X(n+1)D is turned OFF.

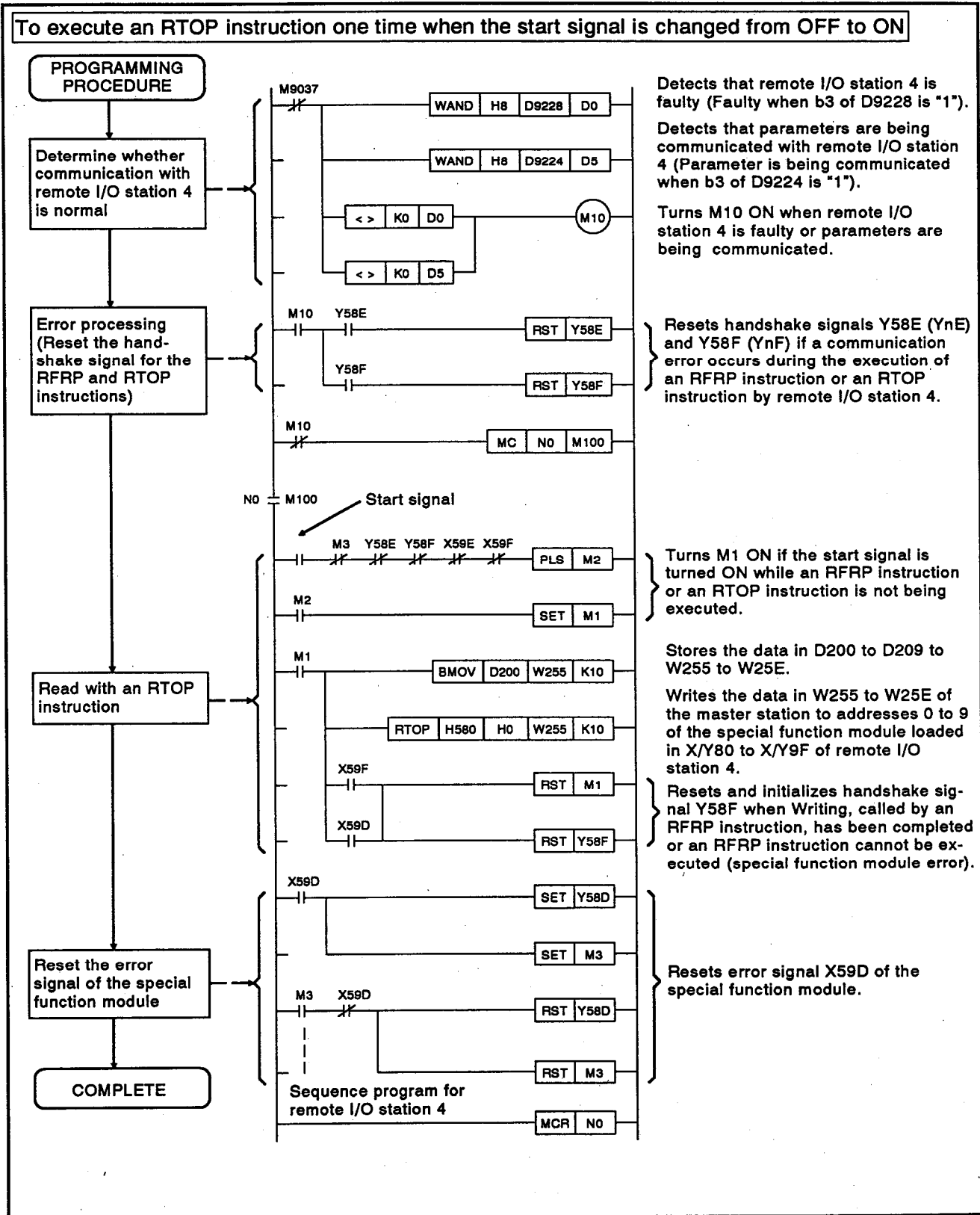
Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode A	MELSECNET II mode	MELSECNET II compatible mode	MELSECNET mode A	MELSECNET II mode	MELSECNET II compatible mode
Applicability	○		○			

9. PROGRAMMING

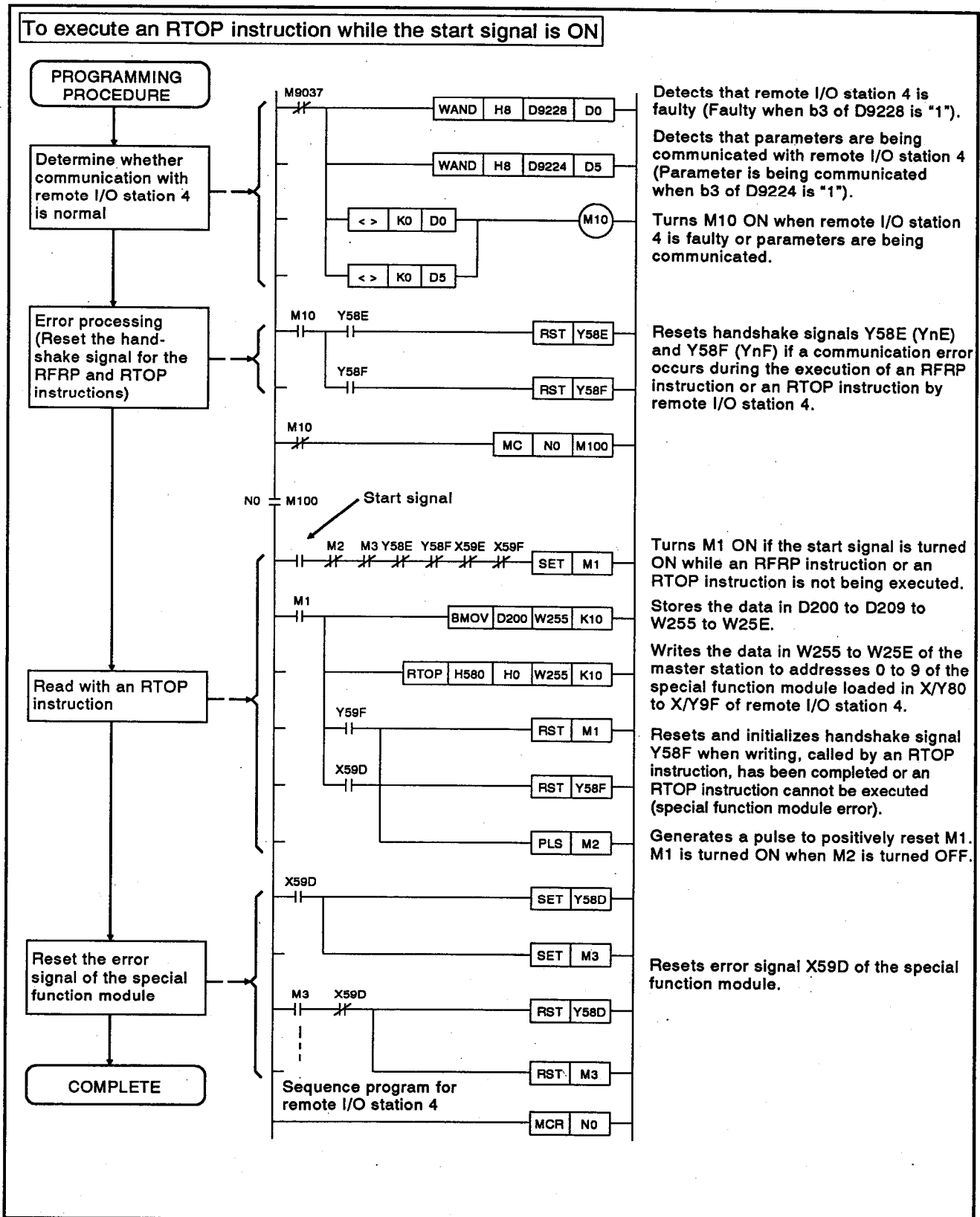
MELSEC-A

9.8.2 Write program (RTOP instruction)

[Program example 1]



[Program example 2]

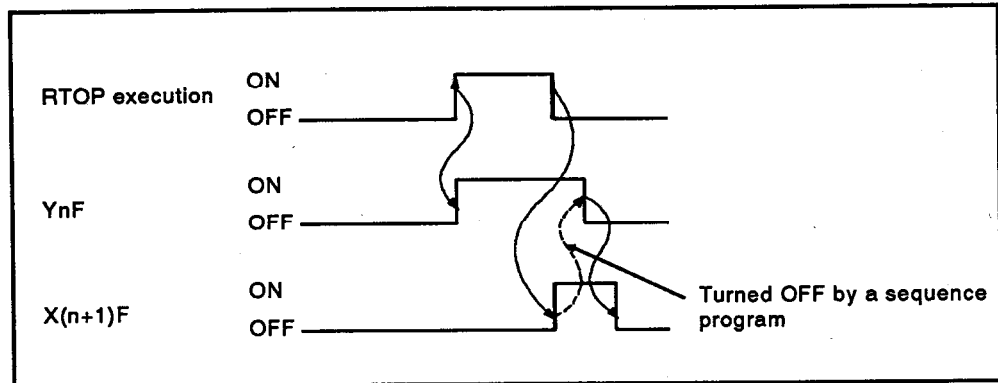


[Precautions]

- (1) To execute an RTOP instruction, always take interlock for YnF and X(n+1)F*. Also, be careful not to designate an RFRP and RTOP instruction at two or more positions within a single special function module.

* "n" is the device number of the master station that corresponds to the I/O number of the slot in which a special function module is loaded. "n" is also the upper two digits of the three digits displayed for the 16 points of the first half link parameters.

YnF and X(n+1)F are turned ON/OFF as illustrated below:



- (2) The RTOP start signal must be turned ON by a SET instruction.

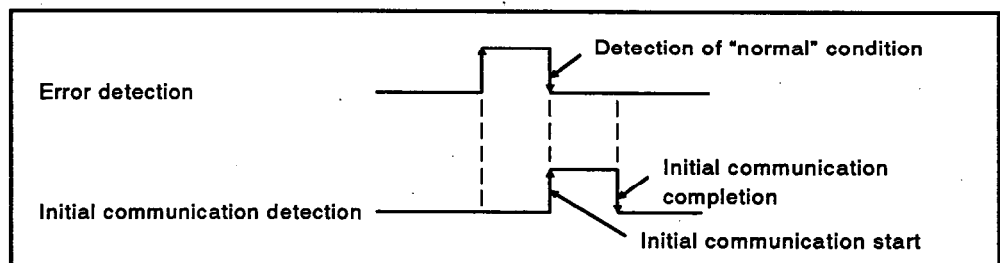
If an OUT or PLS instruction is used, the RTOP instruction will not be executed correctly.

- (3) YnF and the RTOP start signal must be reset after reading is complete.

Reading cannot be executed again if YnF and the RTOP instruction have not been reset.

- (4) Refer to the manual for the individual special function module for details on buffer memory addresses.

- (5) Write an error detection circuit in a sequence program to check the operation from when an error has occurred to when the initial communication is completed when a local or remote I/O station has caused an error.
- (a) The bit in D9228 to D9231 corresponds to a local station or a remote I/O station and can be used to determine whether an error has occurred in that station. "1" indicates the occurrence of error.
 - (b) The bit in D9224 to D9227 corresponds to a local station or a remote I/O station and can be used to determine whether initial communication is being executed by that station. "1" indicates 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 according to 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 will 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) X(n+1)D is turned OFF if YnD is turned ON.
 - (b) If X(n+1)D is turned ON, a special function module might be faulty or the module might not be loaded correctly. Check the special function module at which the error occurred.
- (7) Write the following circuit to turn YnD ON/OFF:
- (a) YnD is turned ON when X(n+1)D is turned ON.
 - (b) YnD is turned OFF one time when X(n+1)D is turned OFF.

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Applicability	○	○	○	○	○	○

9. PROGRAMMING

MELSEC-A

9.9 Fault Detection Program

9.9.1 MELSECNET data link system

[System configuration]

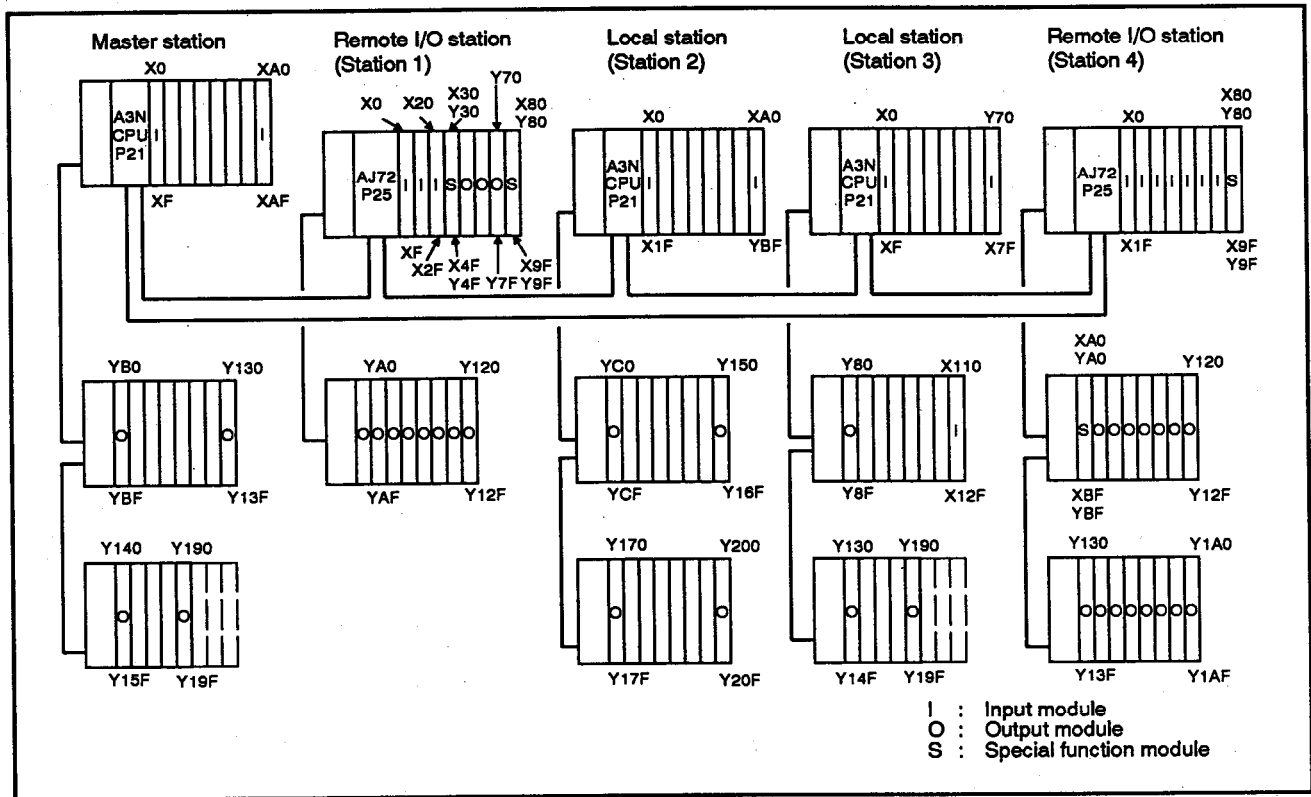


Fig. 9.19 System Configuration

[Link device allocation]

* LINK *						M : B ↔ ALL	L : B 000-15F
MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTER-MITTENT 10ms	M : W ↔ ALL	L : W 000-186
		B	W			M : W → ALL	R : W 200-294
M	4	000-05F	000-083	20	XXXX	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

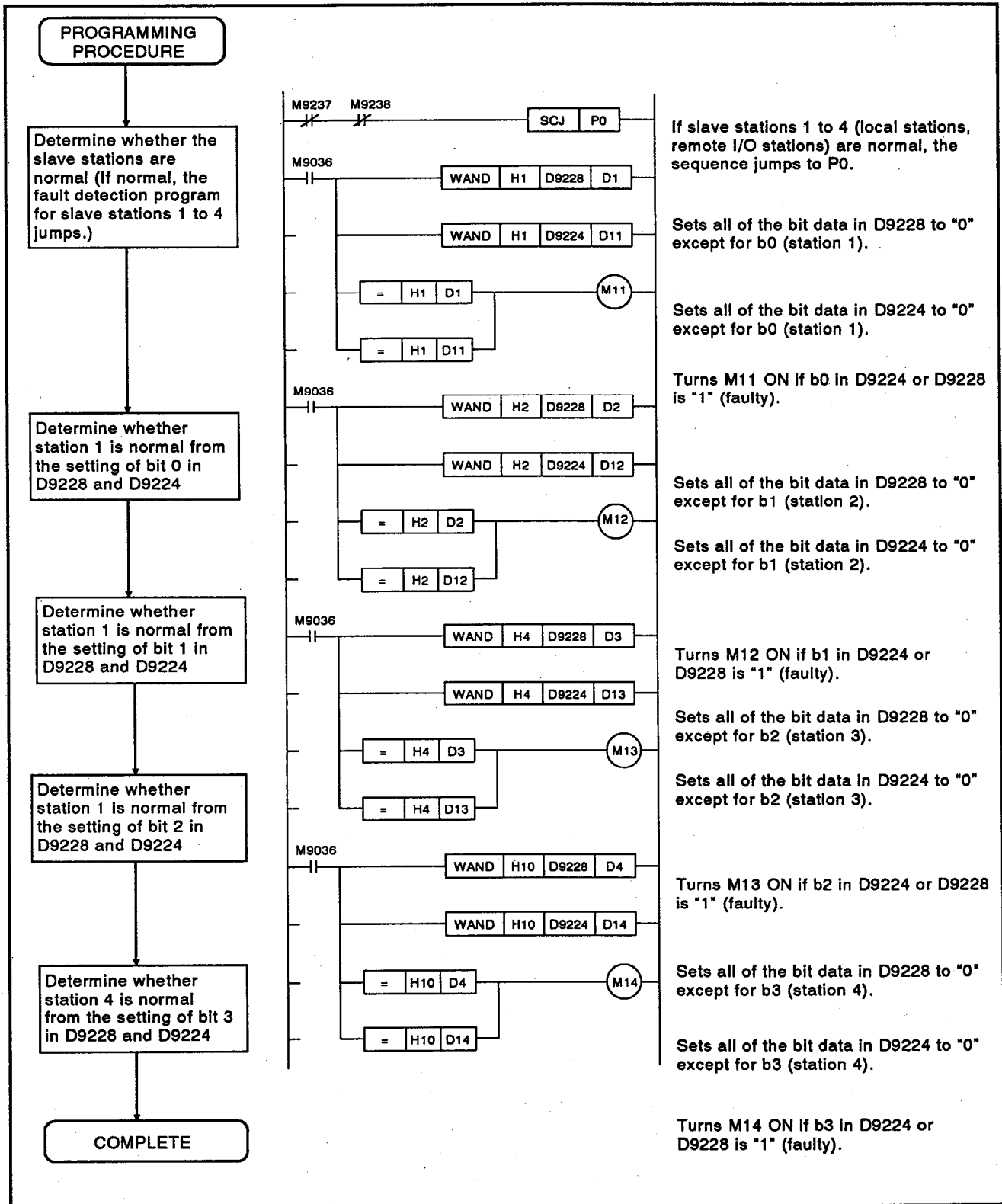
L/R NO.	M ← L		M → R	M ← R	M → L/R1		M ← L/R	
	B	W	W	W	Y	X/Y	X	Y/X
R 1	-----	-----	200-23F	300-33F	700-7FF	030-12F	6D0-76F	000-09F
L 2	060-18F	0A0-0FF	-----	-----	390-47F	250-33F	1A0-25F	210-2CF
L 3	0E0-15F	100-186	-----	-----	260-36F	1B0-2BF	2A0-3BF	300-41F
R 4	-----	-----	250-294	340-3C1	580-6AF	080-1AF	500-5BF	000-0BF

L ↑ LOCAL
 R ↓ REMOTE

M : MASTER L : LOCAL R : REMOTE

Fig. 9.20 Link Device Allocation

[Program example]



9. PROGRAMMING

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode				o	o	o
Applicability						

MELSEC-A

9.9.2 MELSECNET/B data link system

This section explains the program used by a master station to detect which station is faulty when a fault occurs in local station 1 or 2.

[System configuration]

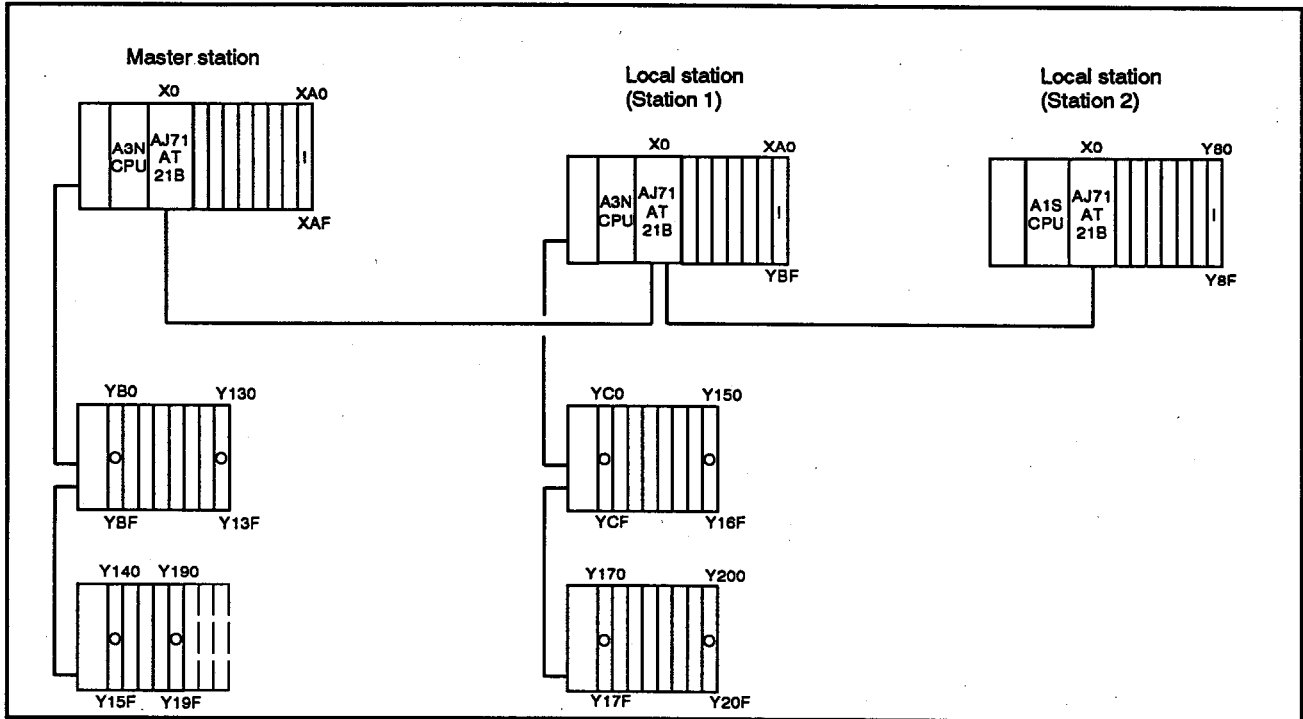


Fig. 9.21 System Configuration

[Link device allocation]

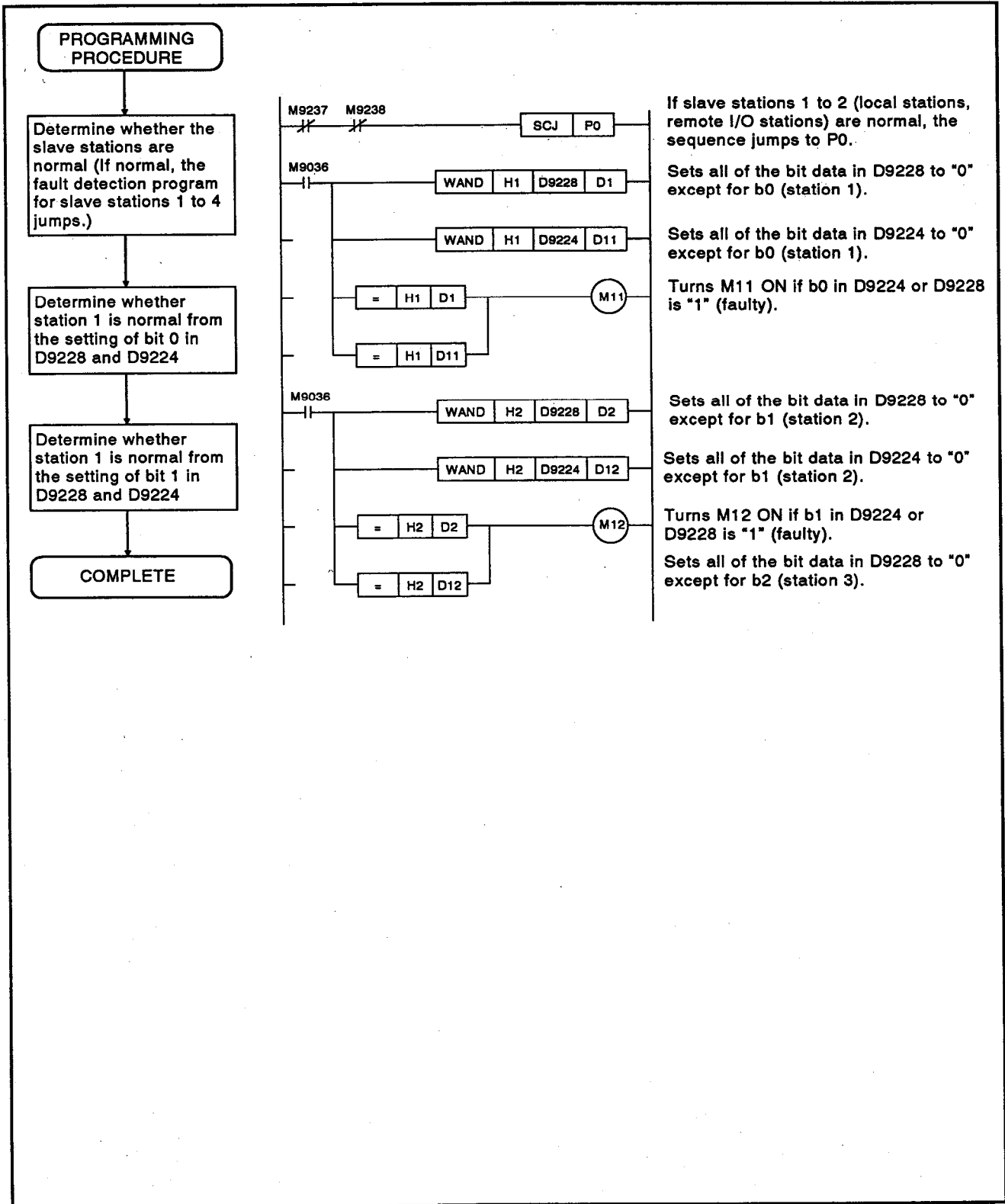
* LINK *						M : B ↔ ALL L : B 000-15F			
MASTER	SLAVE PC STATIONS	M → ALL L		W.D.T. FOR LINK 10ms	INTERMITTENT 10ms	M : W ↔ ALL L : W 000-186	M : W → ALL R : W 200-294	M : W ← ALL R : W 300-3C1	M : Y → ALL L : X 260-47F
		B	W			M : Y → ALL L : X 260-47F	M : Y → ALL R : Y 580-7FF	M : X → ALL L : Y 1A0-3BF	M : X ← ALL R : X 500-76F
M	4	000-05F	000-083	20	XXXX				
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	060-08F	0A0-0FF	-----	-----	390-47F	250-33F	1A0-25F	210-2CF	
L 2	0E0-15F	100-186	-----	-----	260-28F	090-0BF	2A0-2DF	0C0-0FF	
.	
.	
.	
.	

TOTAL MEMORY : 16K BYTES

M : MASTER L : LOCAL R : REMOTE

Fig. 9.22 Link Device Allocation

[System configuration]



10. TROUBLESHOOTING

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Applicability	○	○	○	○	○	○

MELSEC-A

10. TROUBLESHOOTING

To improve the reliability of the system, it is very important to use reliable equipment. In addition to this, the maintainability of each piece of equipment is another very important factor.

If a problem occurs during the data link operation, check the link status following the steps below:

- (1) Use the GPP function of the A6GPP, A6PHP, or IBM PC/AT to execute link monitoring, and locate the fault.

When an A7PU is used, monitor the special link relays and link registers to locate the faulty point.

- (2) Check the LED and confirm what kind of fault occurred.

The corresponding ERROR LED on the link module goes ON when a hardware fault occurs.

- (3) Check the data link cable connections.

Refer to Section 8.2 for details on checking the cable connections.

10.1 GPP Link Monitor Function

The link monitoring function (one of the GPP functions) checks several aspects of the data link operation. These are the data link system loop state, master and slave station states, and the scan time.

- (a) Master station link monitor

Connect the A6GPP/A6PHP/IBM PC/AT to the master station.

- (b) Local station link monitor

Connect the A6GPP/A6PHP/IBM PC/AT to a local station.

- (c) Remote I/O station link monitor

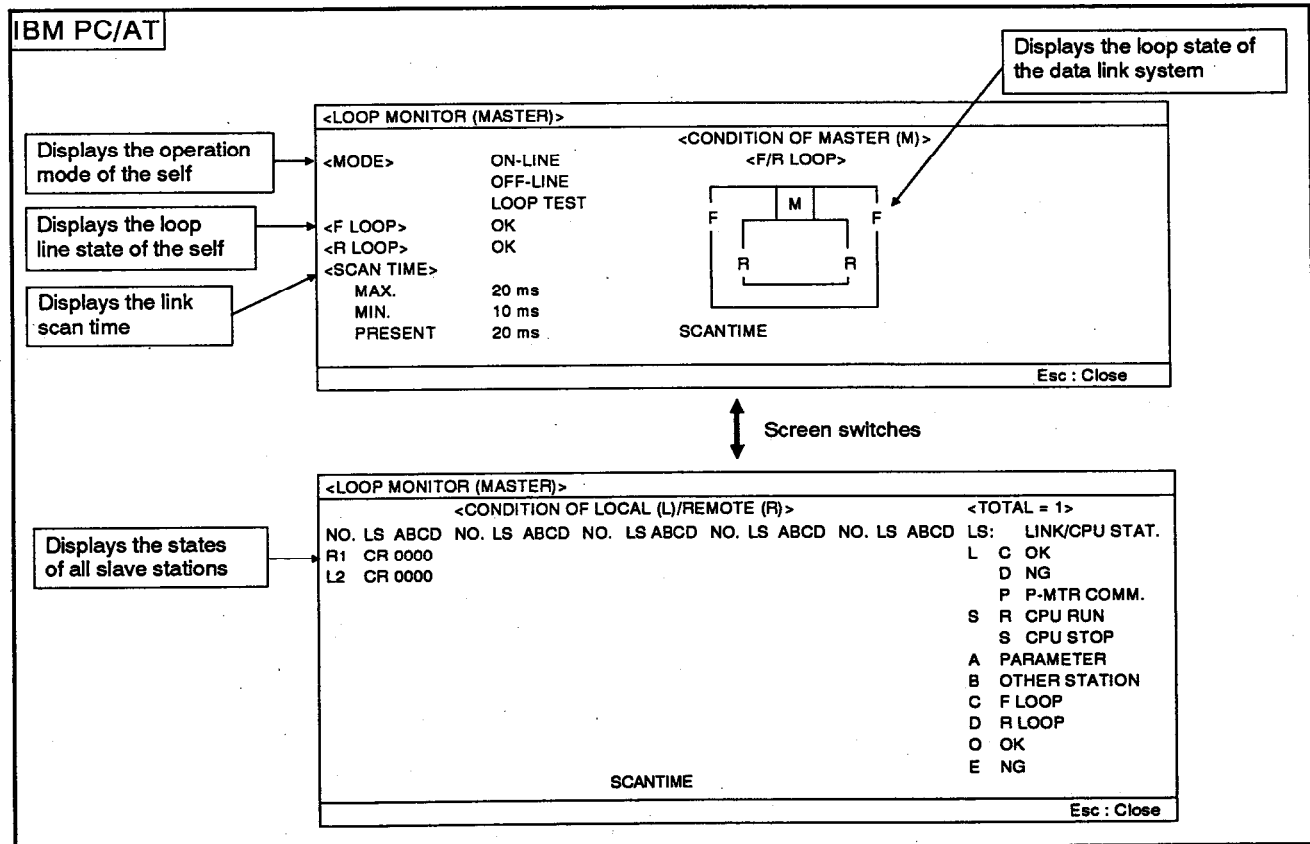
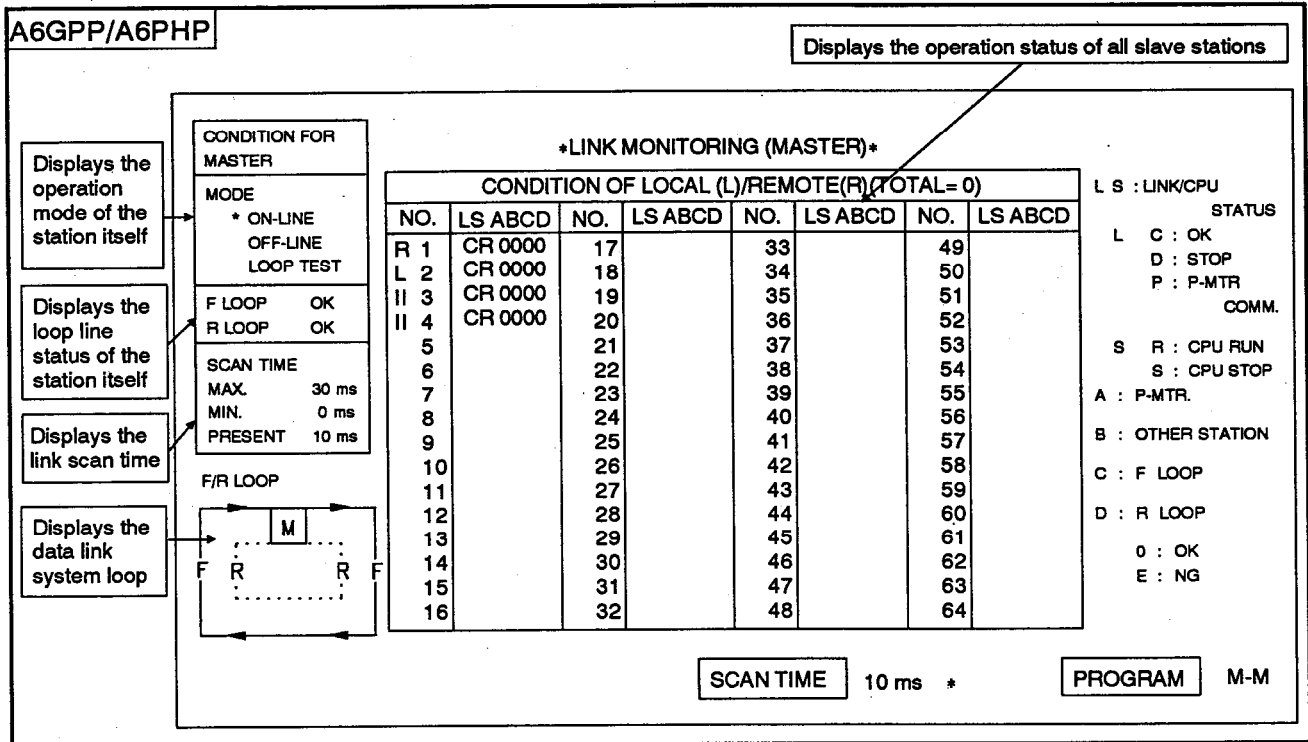
Connect the A6GPP/A6PHP/IBM PC/AT to a remote I/O station.

10. TROUBLESHOOTING

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	o	o	o	o	o	o
Applicability	o	o	o	o	o	o

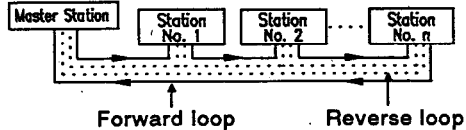
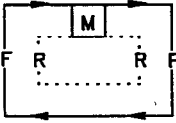
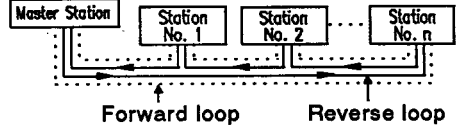
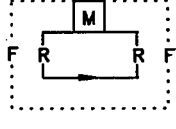
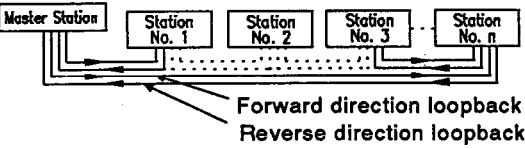
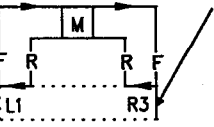
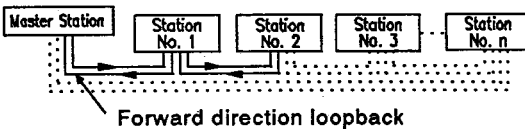
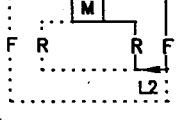
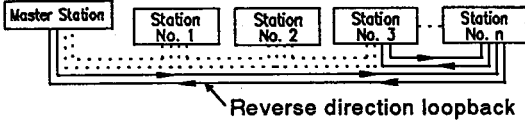
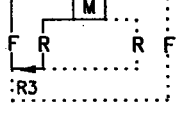
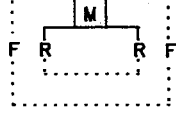
MELSEC-A

10.1.1 Master station link monitor



- (1) Host station operation mode
 - (a) Displays the master station operation status
 - 1) ONLINE:
Master station mode setting is ONLINE (automatic return function set/not set).
 - 2) OFFLINE:
Master station mode setting is OFFLINE, SELF-LOOPBACK TEST, or STATION-TO-STATION TEST.
 - 3) LOOP TEST:
Master station mode setting is FORWARD LOOP TEST or REVERSE LOOP TEST.
 - (b) The selected operation mode is stored in M9224 and M9227.
- (2) Loop line status of the station itself
 - (a) Displays the forward loop (F loop) and reverse loop (R loop) status of the master station.
 - 1) OK : Loop line is normal.
 - 2) NG : Loop line is faulty.
 - (b) The loop line status is stored in M9225 and M9226.
- (3) Link scan time
 - (a) Displays the required link scan time between the master station and a local station.
 - 1) AX : Displays the maximum link scan time.
 - 2) MIN : Displays the minimum link scan time.
 - 3) PRESENT : Displays the presently required link scan time.
 - (b) The link scan time is stored in D9207 to D9209.
- (4) Data link system loop status
 - (a) The table on the following page illustrates how the status of loop currently being used for the link is displayed.

Table 10.1 Data Link Status

Data Link Status	GPP/PHP Screen Display
<p style="text-align: center;">Data link in forward loop</p>  <p style="text-align: center;">Forward loop Reverse loop</p>	
<p style="text-align: center;">Data link in reverse loop</p>  <p style="text-align: center;">Forward loop Reverse loop</p>	
<p style="text-align: center;">Loopback in forward/reverse direction</p>  <p style="text-align: center;">Forward direction loopback Reverse direction loopback</p>	<p style="text-align: center;">Loopback station L: Local station R: Remote I/O station</p> 
<p style="text-align: center;">Loopback in forward direction</p>  <p style="text-align: center;">Forward direction loopback</p>	
<p style="text-align: center;">Loopback in reverse direction</p>  <p style="text-align: center;">Reverse direction loopback</p>	
<p style="text-align: center;">Data link impossible</p>	

(b) The loop line status and loopback station are stored in the following registers:

- 1) Loop line status : D9204
- 2) Loopback station : D9205, D9206

(5) Operation status of all slave stations (local and remote I/O stations)

The following describes how the status of all of the slave stations in the system is displayed:

"L" column: Status of present data link

"C": Communicating normally

"D": Disconnected due to communication stop

Possible causes for "D" being displayed:

- (1) The power supply to the disconnected station is FF.
- (2) The disconnected station was reset.
- (3) An error occurred that caused PC CPU operations to stop.
- (4) A MELSECNET-compatible local or remote I/O station has been connected to a station number that has been set with link parameters as a MELSECNET (II)-compatible station (local station).
- (5) The station was disconnected as part of loopback processing.

"P": Parameter communication with master station

Link parameter communication is only executed once when starting communications.

Possible causes for "P" being displayed continuously:

- (1) A remote I/O station is connected to a station number set with the link parameters as the MELSECNET mode local station.
- (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 with link parameters in the MELSECNET II composite mode.

"C" and "D" data are stored in special data registers D9224 to D9227.

(This data is the same as the data in D9224 and D9225 when a MELSECNET/B Data Link System is used.)

"P" data is stored in special data registers D9228 to D9231.

(This data is the same as the data in D9228 and D9229 when a MELSECNET/B Data Link System is used.)

"S" column: Present CPU operation status

"R" : Run status

"S" : Stop status

"R" will always be displayed for a remote I/O station.

The data displayed in the "S" column is stored in special data registers D9212 to D9215.

(This data is the same as the data in D9212 and D9213 when a MELSECNET/B Data Link System is used.)

"A" column: An error will occur with the master station for the third tier if there is an error in the third tier link parameters set for the station in question.

For example, an error will occur if neither inputs (X) nor outputs (Y) are set with the link parameters or if the I/O module is not loaded in the slots as allocated by the master station I/O allocation.

"0" : Normal

"E" : Error

The data displayed in the "A" column is stored in special data registers D9220 to D9223.

(This data is the same as the data in D9220 and D9221 when a MELSECNET/B Data Link System is used.)

"B" column: Displays whether a local station has detected an error at another local station.

"0" : Error has not been detected.

"E" : Error has been detected.

"0" will always be displayed for a remote I/O station.

The data displayed in the "B" column is stored in special data registers D9216 to D9219.

(This data is the same as the data in D9216 and D9217 when a MELSECNET/B Data Link System is used.)

"C" column: Displays the forward loop line status of each slave station.

"0" : Normal

"E" : Error

The data displayed in the "C" column is stored in special data registers D9232 to D9239.

(This data is the same as the data in D9232 to D9235 when a MELSECNET/B Data Link System is used.)

"D" column: Displays the reverse loop line status of each slave station.

"0" : Normal

"E" : Error

The data displayed in the "C" column is stored in special data registers D9232 to D9239.

(This data is the same as the data in D9232 to D9235 when a MELSECNET/B Data Link System is used.)

POINT

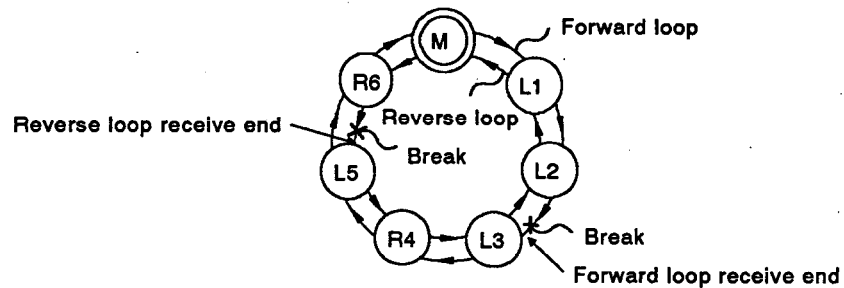
- (1) Forward/reverse loop errors of the master station and slave stations are detected at the receive end.

Possible causes for forward/reverse loop errors:

- (a) Broken or loose loop cable connection
- (b) Faulty hardware at receive end
- (c) Faulty hardware at send end

In the system configuration illustrated 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. TROUBLESHOOTING

Data Link System	MELSECNET			MELSECNET/β		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	○	○	○	○	○	○
Applicability	○	○	○	○	○	○

MELSEC-A

10.1.2 Local station link monitor

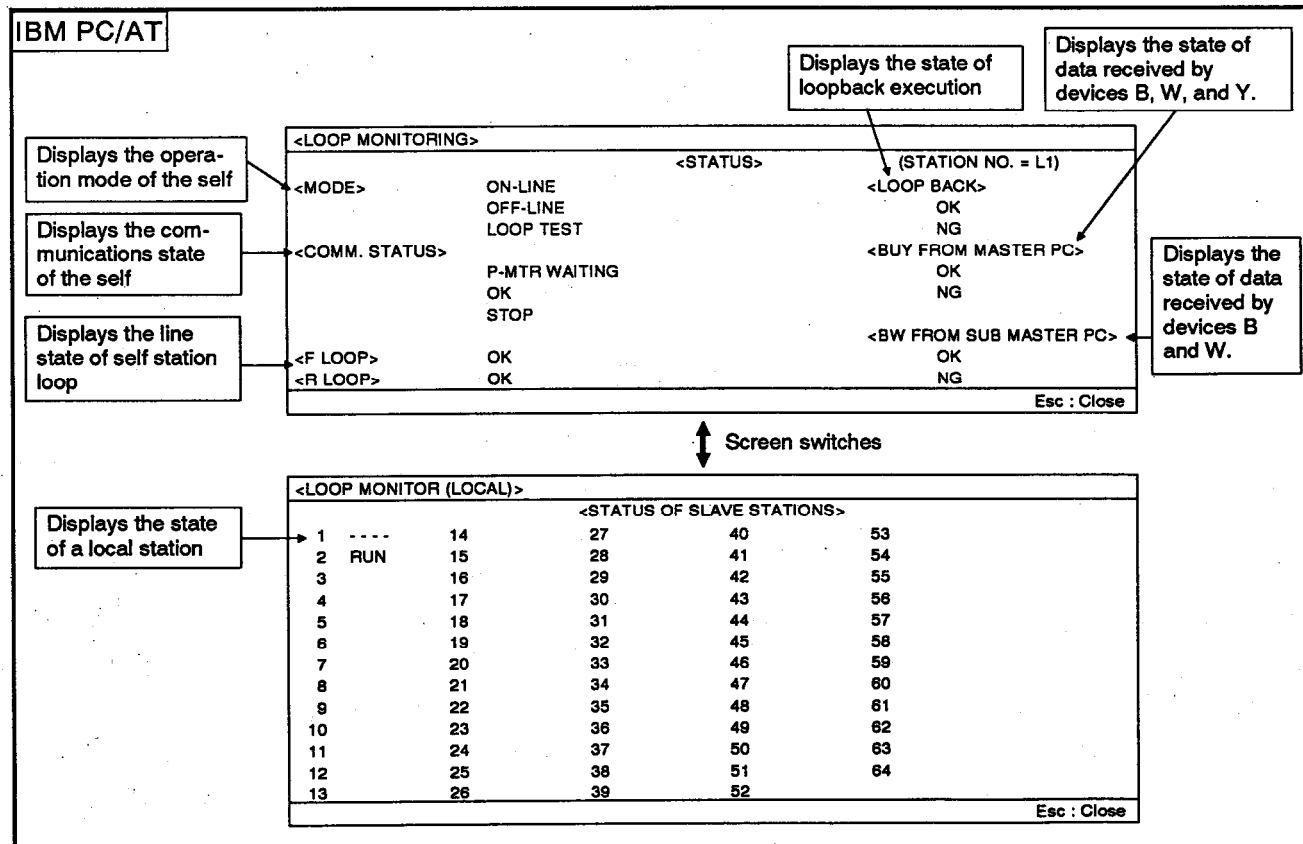
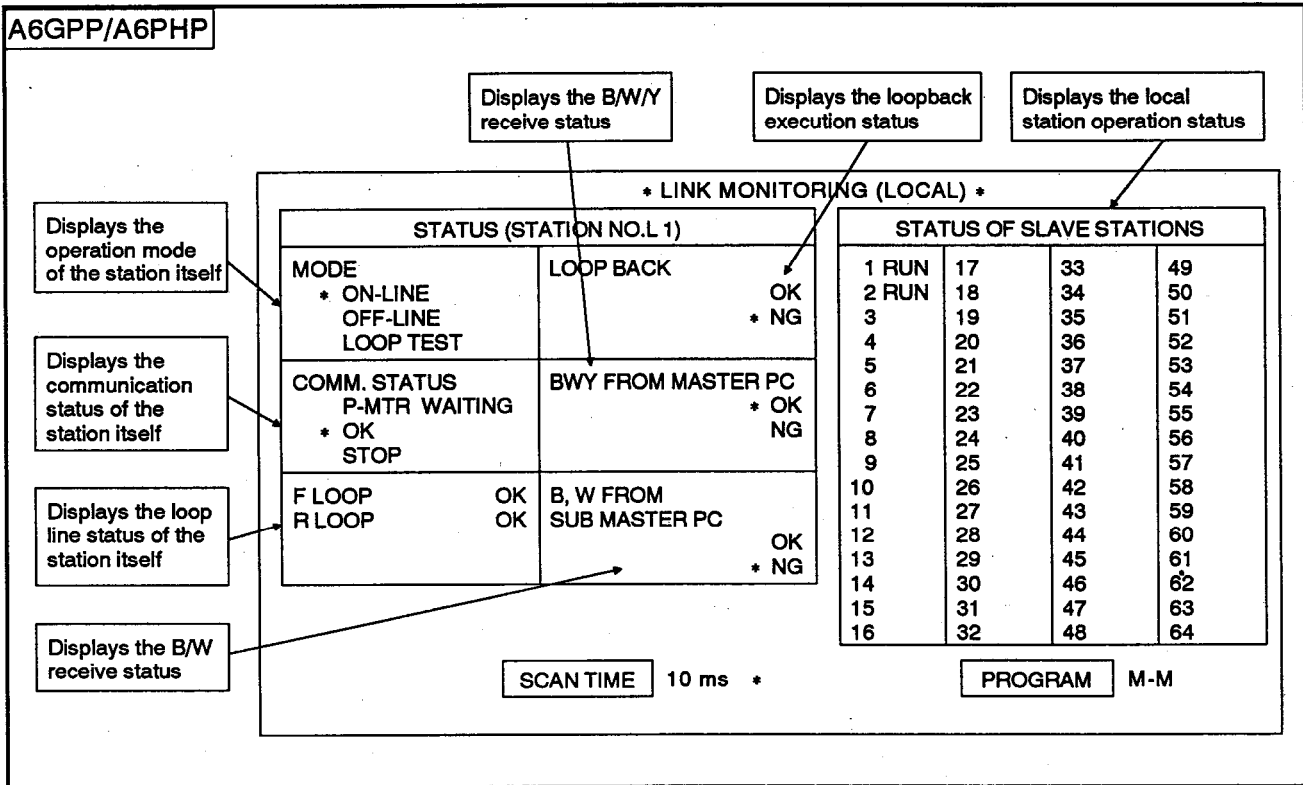


Fig. 10.2 Local Station Link Monitor Screen (A6GPP/A6PHP/IBM PC/AT connected to local station)

- (1) Operation mode of the station itself
 - (a) Displays the local station operation status
 - 1) ONLINE:
Local station mode setting is ONLINE (automatic return function set/not set).
 - 2) OFFLINE:
Local station mode setting is OFFLINE, SELF-LOOPBACK TEST, or STATION-TO-STATION TEST.
 - 3) LOOP TEST:
Local station mode setting is FORWARD LOOP TEST or REVERSE LOOP TEST.
 - (b) The selected operation mode is stored in M9240 and M9252.
- (2) Communication status of the station itself
 - (a) Displays the communication status of the host local station itself.
 - 1) P-MTR WAITING:
Awaiting parameter data to be sent from the master station.
 - 2) OK: Normal communication is being executed.
 - 3) STOP:
The local station itself is disconnected and communication has been stopped.
 - (b) The current communication status is stored in M9250 and M9251.
- (3) Loop line status of the station itself
 - (a) Displays the forward loop (F loop) and reverse loop (R loop) status of the local station itself.
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 stored in M9241 and M9242.
- (4) Loopback execution status
 - (a) Displays whether loopback has been executed by the local station itself.
 - 1) OK (executed):
Loopback has been executed by the local station itself.
 - 2) NG (not executed):
Loopback has not been executed by the local station itself.
 - (b) The loopback execution status is stored in M9243.

- (5) 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 in the cyclic communication mode.
 - 2) NG (not receiving):
The local station itself is disconnected and B, W, and Y are not being received from the master station.
 - (b) The B/W/Y receive status is stored in M9246.
- (6) B/W receive status (local station in three-tier system)
 - (a) Displays whether a local station in the third tier is receiving the link relays (B) and link registers (W) from the master station for the second tier.
 - 1) OK (receiving):
B and W are being received from the master station for the second tier in the cyclic communication mode.
 - 2) NG (not receiving):
The local station itself is in a status in which B and W are not being received from the master station for the second tier. Reception will be disabled when M9247 is turned ON.
 - (b) The B/W receive status is stored in M9247.
- (7) Local station operation status
 - (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
 - (b) The operation status of remote I/O stations will always be RUN.
 - (c) The data of local station operation status is stored in D9248 to D9251 and D9252 to D9255.
(This data is the same as the data in D9248, D9249, D9252, and D9253 when a MELSECNET/B Data Link System is used.)

Data Link System	MELSECNET			MELSECNET/R		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	a		a			
Applicability	a		a			

10. TROUBLESHOOTING

MELSEC-A

10.1.3 Remote I/O station link monitor

This section describes the link monitor data for the following two link monitor functions:

(a) Loop monitor:

The data link status of the remote I/O station itself.

(b) Batch monitor:

The data link status of the devices that are sent/received by the remote I/O stations themselves (batch monitored).

[Loop Monitor]

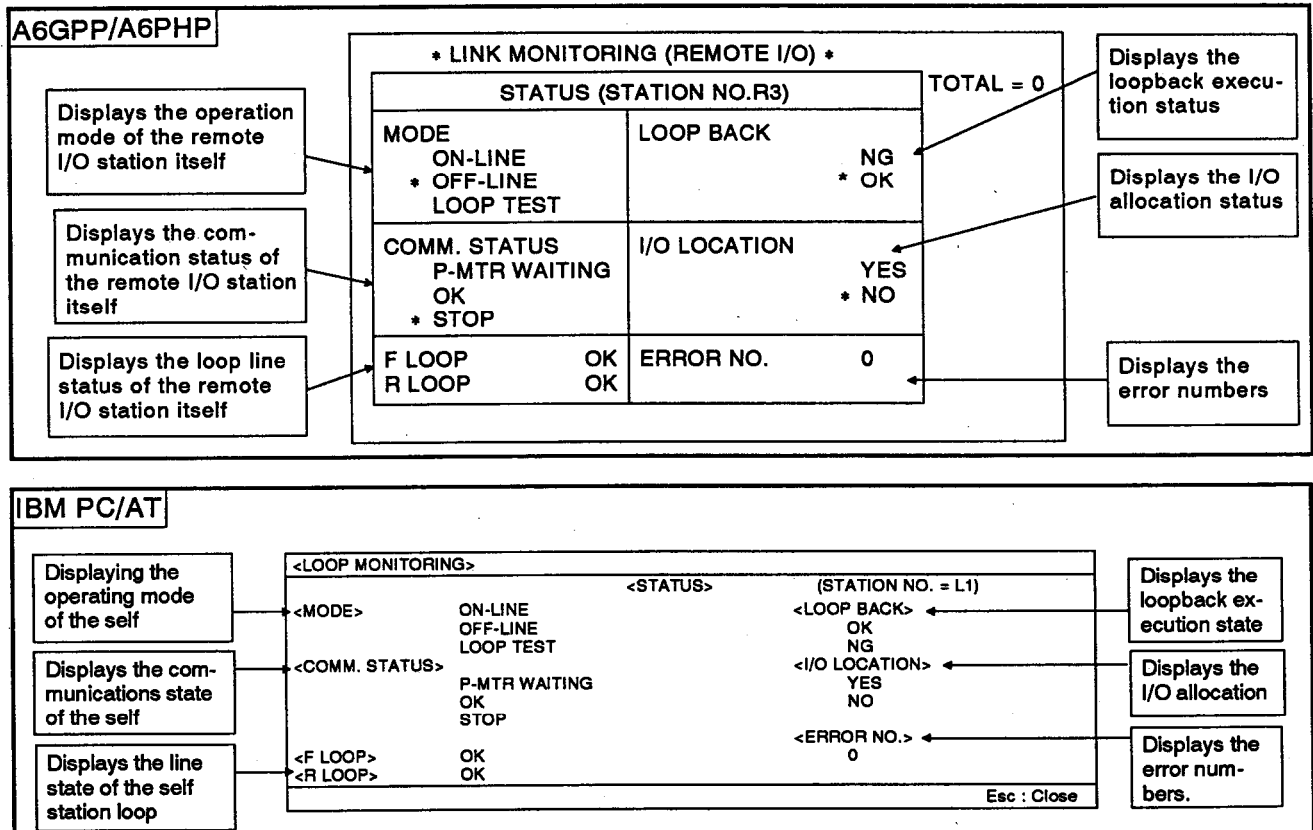


Fig. 10.3 Loop Monitor Screen

(1) Operation mode of the station itself

(a) Displays the remote I/O station operation status

1) ONLINE:

Remote I/O station mode setting is ONLINE (automatic return function set/not set).

2) OFFLINE:

Remote I/O station mode setting is OFFLINE, SELF-LOOPBACK TEST, or STATION-TO-STATION TEST.

3) LOOP TEST:

Remote I/O station mode setting is FORWARD LOOP TEST or REVERSE LOOP TEST.

- (2) Communication status of the station itself
 - (a) Displays the communication status of the remote I/O station itself.
 - 1) P-MTR WAITING:
Awaiting parameter data to be sent from the master station.
 - 2) OK: Normal communication is being executed.
 - 3) STOP:
The remote I/O station itself is disconnected and communication has been stopped.
- (3) Loop line status of the station itself
 - (a) Displays the forward loop (F loop) and reverse loop (R loop) status of the remote I/O station itself.
 - 1) OK: Loop line is normal.
 - 2) NG: Loop line is faulty.
- (4) Loopback execution status
 - (a) Displays whether loopback has been executed by the remote I/O station itself.
 - 1) OK (executed):
Loopback has been executed by the remote I/O station itself.
 - 2) NG (not executed):
Loopback has not been executed by the remote I/O station itself.
- (5) I/O allocation status
 - (a) Displays whether I/O allocation has been performed by the master station.
 - 1) YES:
I/O allocation has been performed by the master station.
 - 2) NO:
I/O allocation has not been performed by the master station.

(6) Error numbers

Error Number	Error Description	Counter Measure
10	A special function module loaded to a remote I/O station does not occupy 32 points.	Remove the special function modules that do not occupy 32 I/O points.
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.	<ul style="list-style-type: none"> • Change the link register (W) range set with the link parameters. • Change the number of words to be read by an RFRP instruction.
13	The number of words written by an RTOP instruction exceeds the link register (W) range specified with the link parameters.	<ul style="list-style-type: none"> • Change the link register (W) range set with the link parameters. • Change the number of words to be read by an RTOP instruction.
14	An RFRP instruction has been executed when a special function module was faulty.	Special function module hardware error.
15	An RTOP instruction has been executed when a special function module was faulty.	Special function module hardware error.
20	Blown fuse in the I/O module.	Replace the fuse in the I/O module loaded to the remote I/O station.
21	I/O module verify error (The I/O module data in the remote I/O station is different from the data recognized when the power was turned ON.) (1)The I/O module is not secure. (2)The I/O module has been removed or another I/O module has been loaded during operation.	<ul style="list-style-type: none"> • Check 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 in the remote I/O station and set the parameters again.
23	I/O allocation error.	Check the link allocation for the I/O modules and the master station and correct the I/O allocation.
24	Remote I/O station specification error.	Check if the remote I/O station number is set with the link parameters as a local station and correct the setting.

(7) Station number

Displays the station number of the remote I/O station to which the GPP is connected.

(8) Number of slave stations

Displays the total number of local and remote I/O stations connected in the loop.

[Batch Monitor]

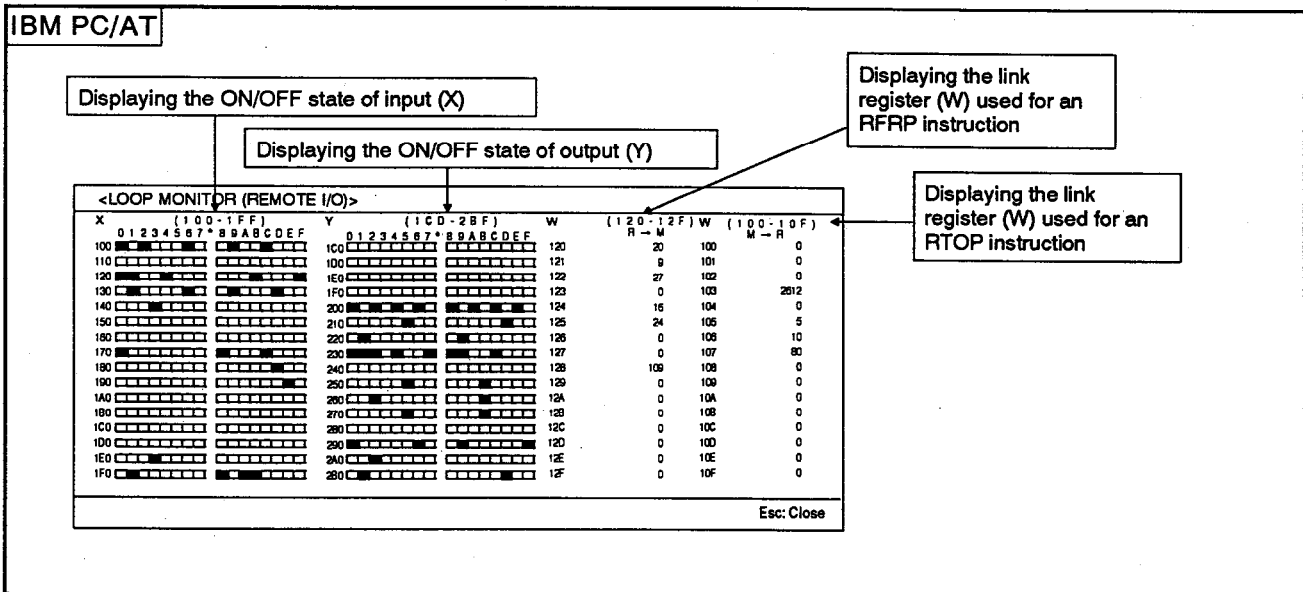
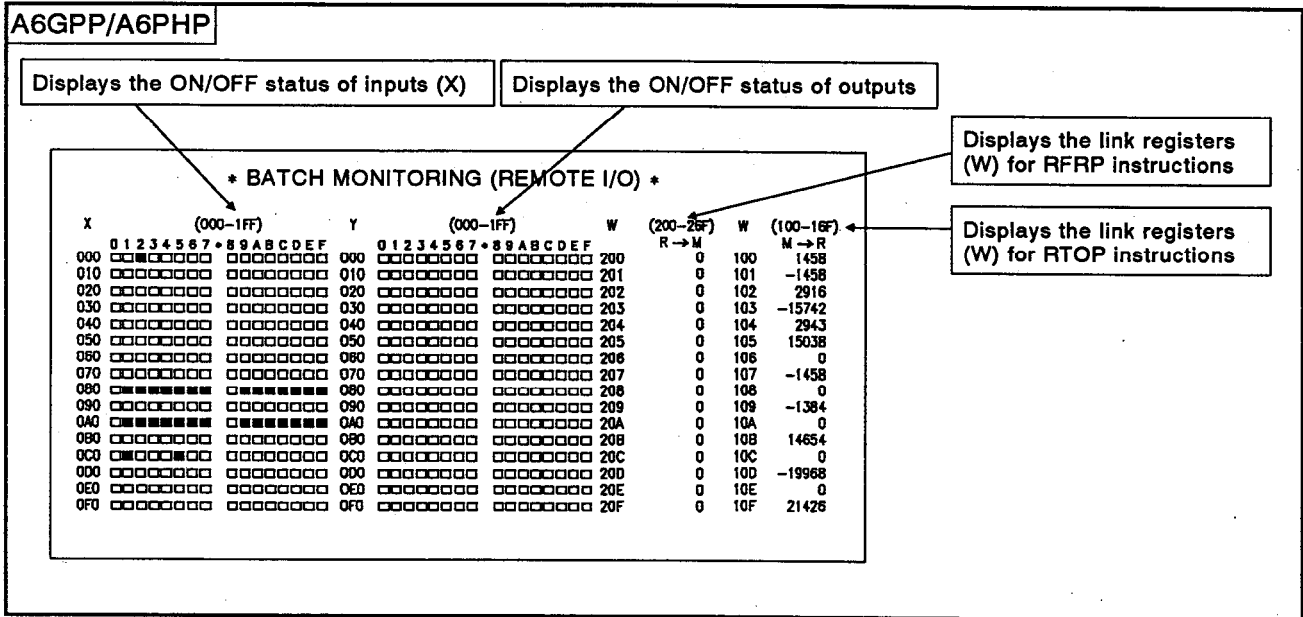


Fig. 10.4 Batch Monitor Screen

- (1) 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 remote I/O station are used for the display.

- (2) 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 remote I/O station itself are used for the display.
- (3) Link registers (W) for RFRP instructions
 - (a) Displays the data in the area set for data transmission from the remote I/O station itself to the master station.
- (4) Link registers (W) for RTOP instructions
 - (a) Displays the data in the area set for data transmission from the master station to the remote I/O station itself.

10. TROUBLESHOOTING

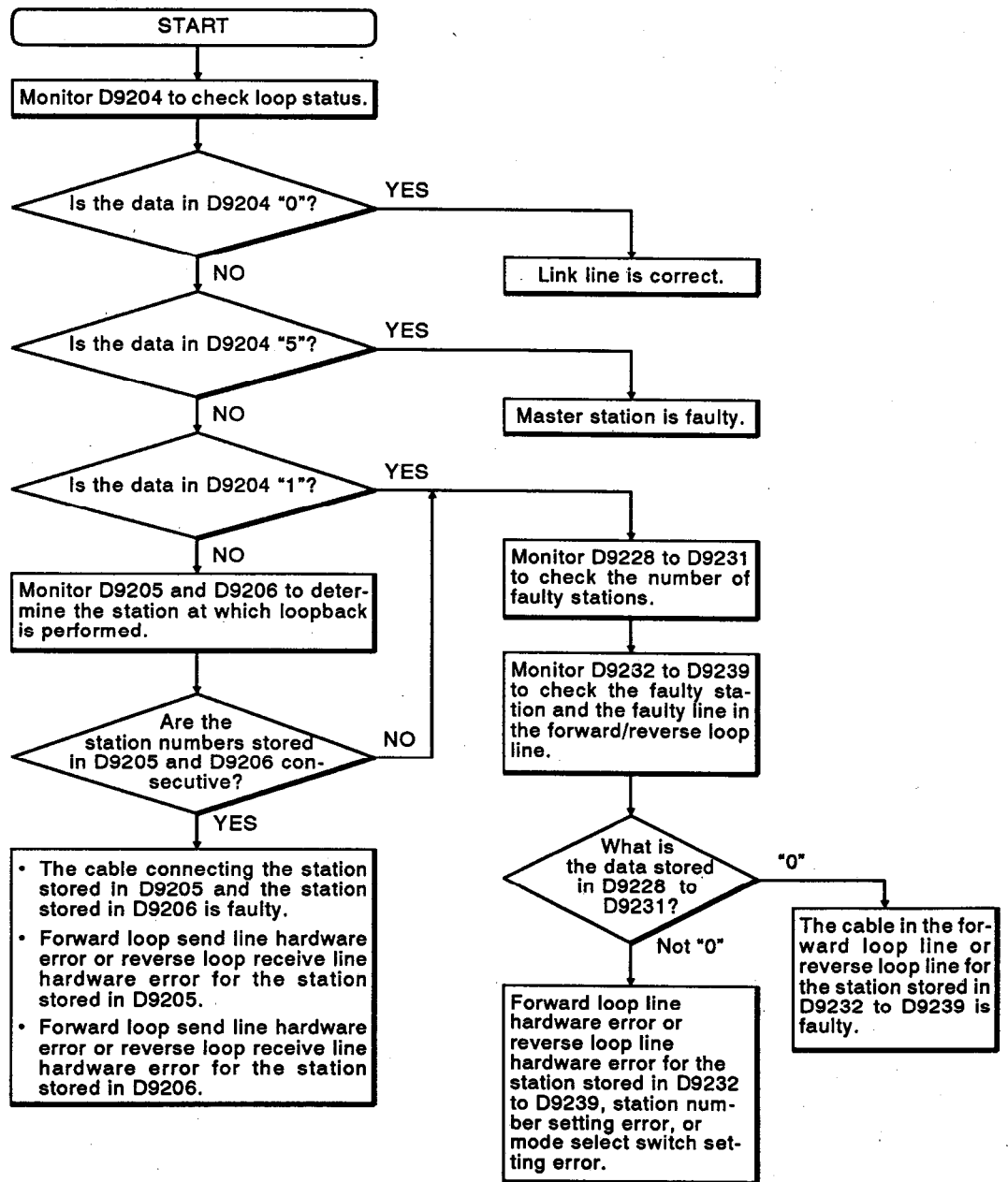
Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Applicability	○	○	○	○	○	○

MELSEC-A

10.2 Monitoring the Special Relays and Special Registers Used for the Link

Faulty stations in the MELSECNET Data Link System can be found by using an A7PU to monitor the special relays and special registers used for the link. When a A6GPP/A6PHP/IBM PC/AT is available, use the link monitoring function as explained in Section 10.1.

Refer to Sections 9.2 and 9.3 for details on special relays and special registers.



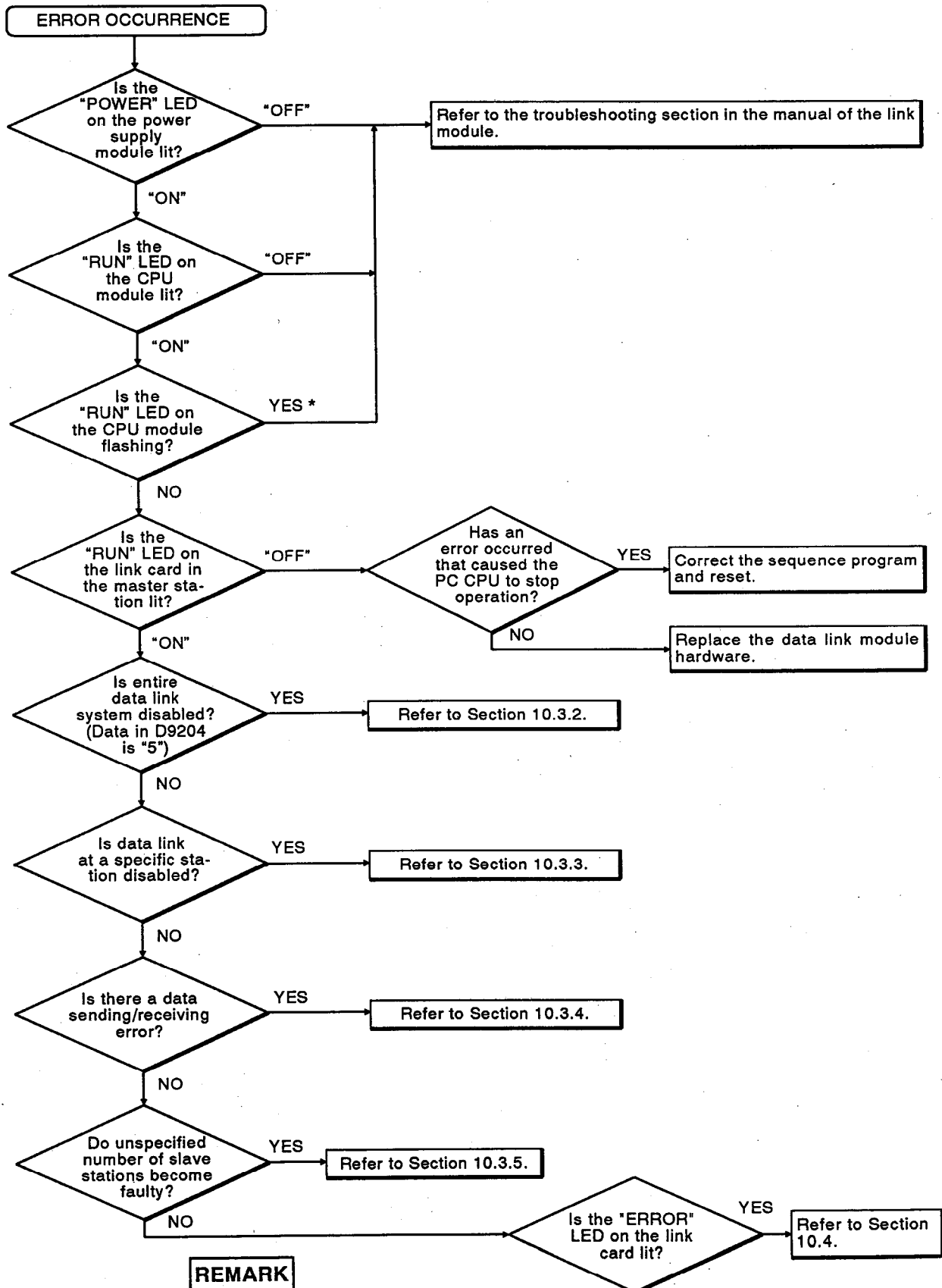
Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	○	○	○	○	○	○
Applicability	○	○	○	○	○	○

10. TROUBLESHOOTING

MELSEC-A

10.3 Troubleshooting Flowchart

10.3.1 General troubleshooting flowchart



REMARK

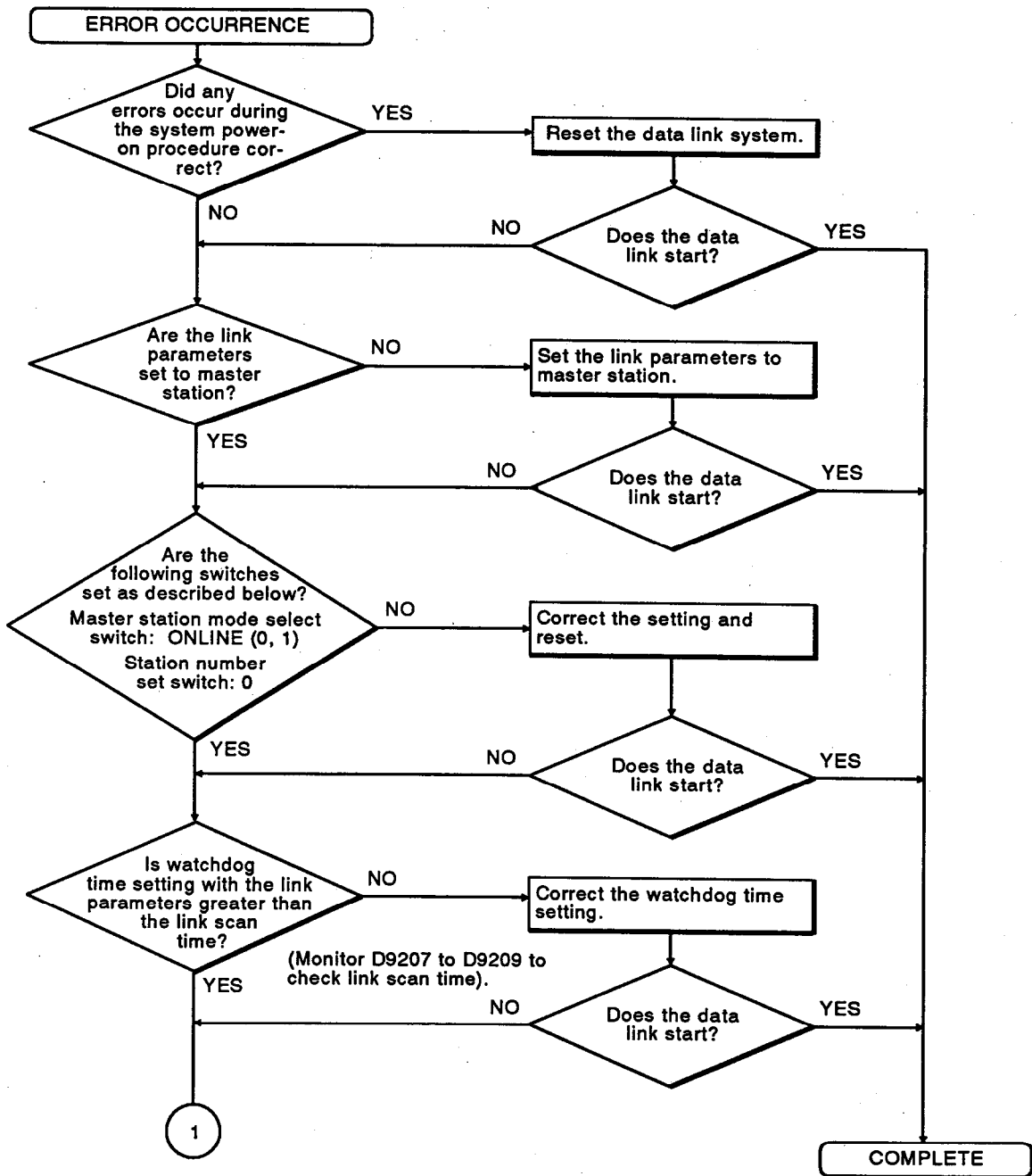
*: When mode setting, station number setting, or baud rate setting for link module is not normal, 'SP UNIT LAY ERR' causes by switching a CPU module from STOP to RUN.

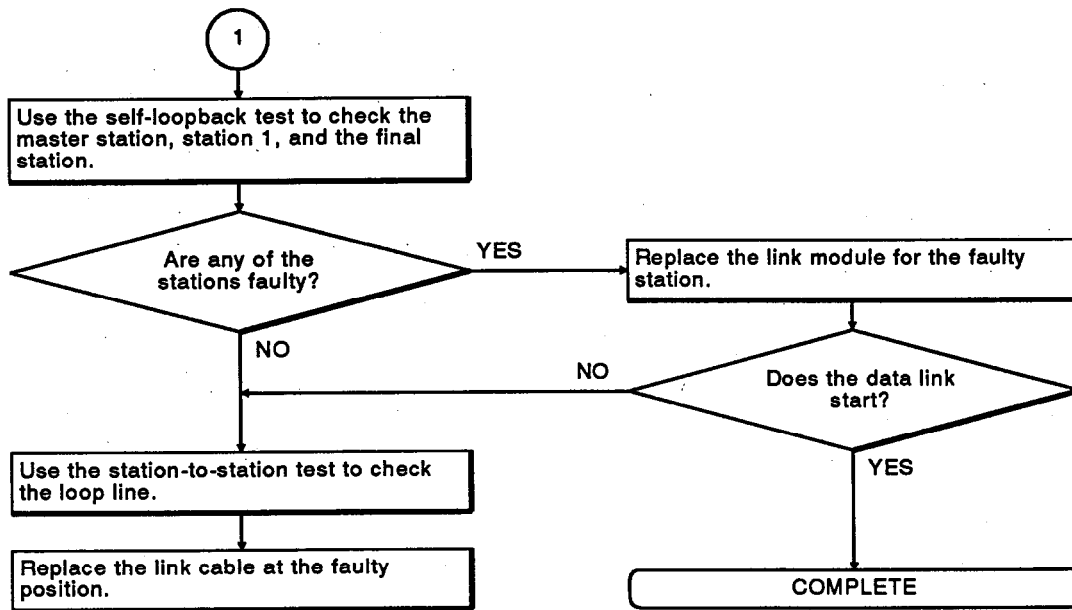
10. TROUBLESHOOTING

Data Link System	MELSECNET			MELSECNET/B		
Operating Mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Applicability	○	○	○	○	○	○

MELSEC-A

10.3.2 Troubleshooting flowchart for when the data link is disabled throughout the entire system



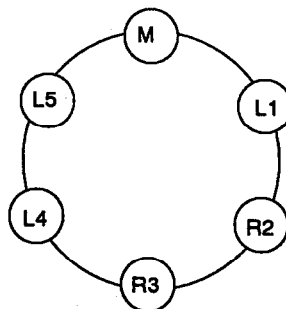


POINT

If the power supplies of the local and/or remote I/O stations on either side of a normally operating local or remote I/O station are turned off simultaneously (within 100 msec), 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. The CPU for each disconnected station must be reset in order to return them to the data link.

Example:



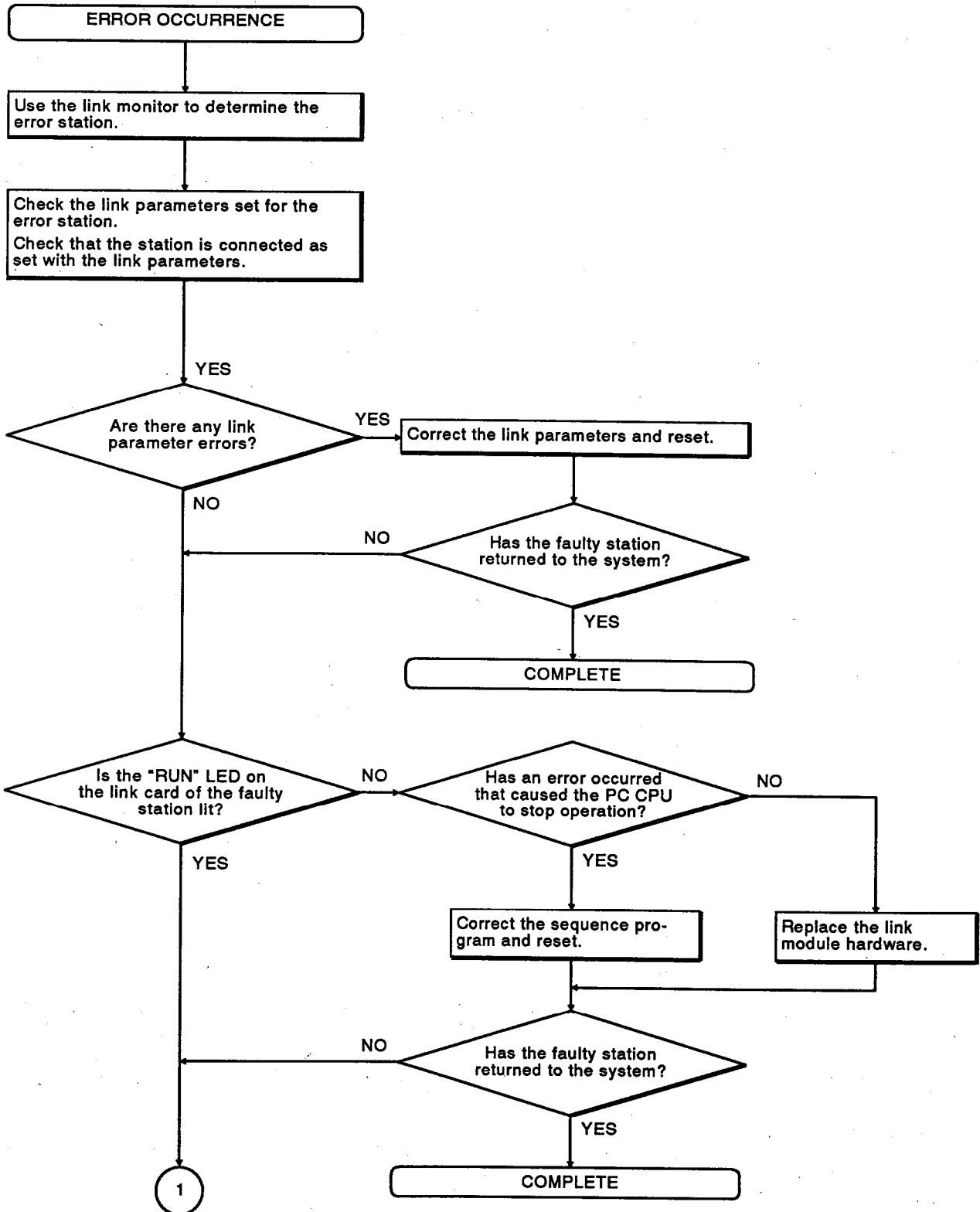
If power supply to L1 and R3 is turned off simultaneously (within 100 msec) while R2 is operating normally, the data link for the entire system might be disabled.

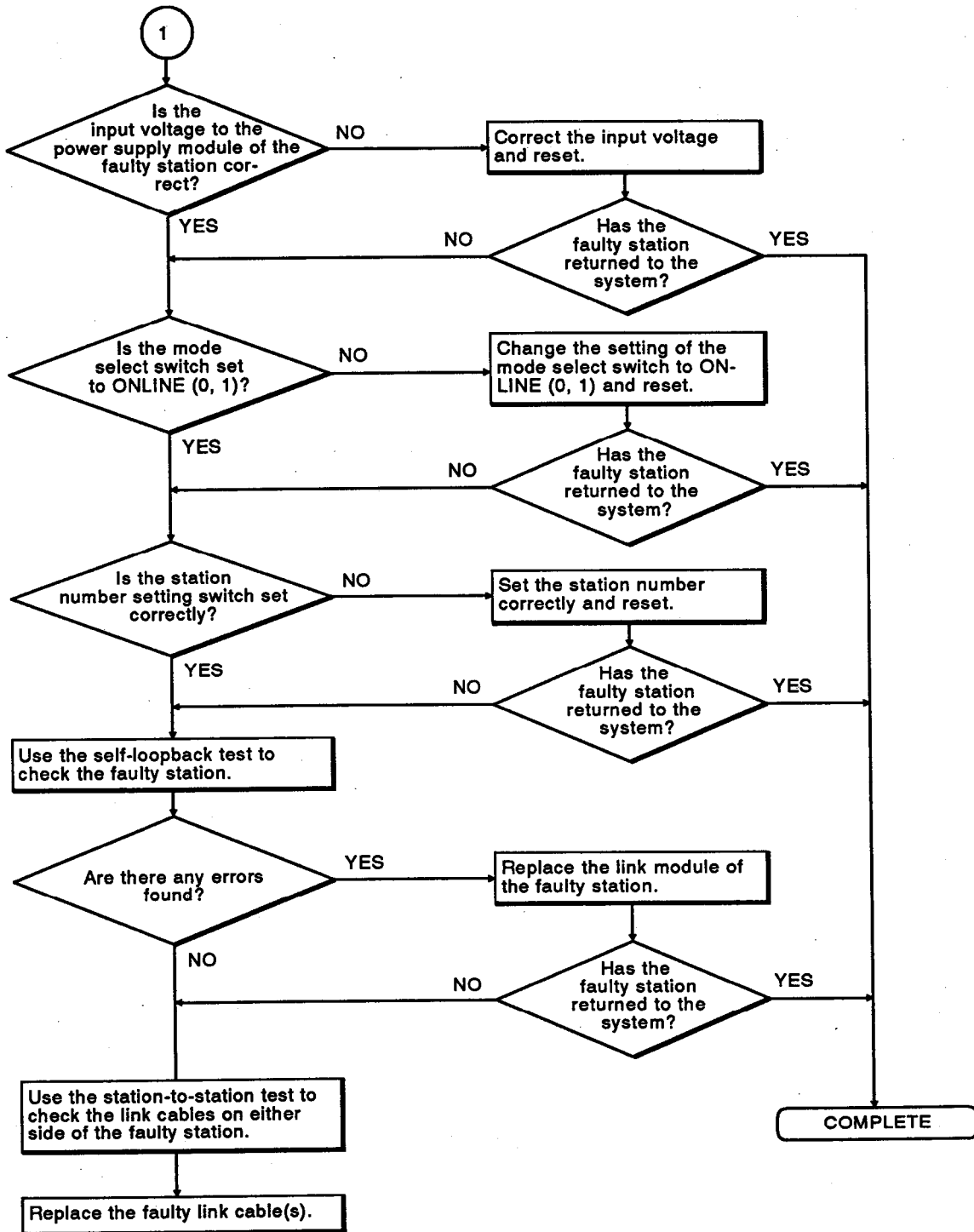
10. TROUBLESHOOTING

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	o	o	o	o	o	o
Applicability	o	o	o	o	o	o

MELSEC-A

10.3.3 Troubleshooting flowchart for when the data link is disabled at a specific station



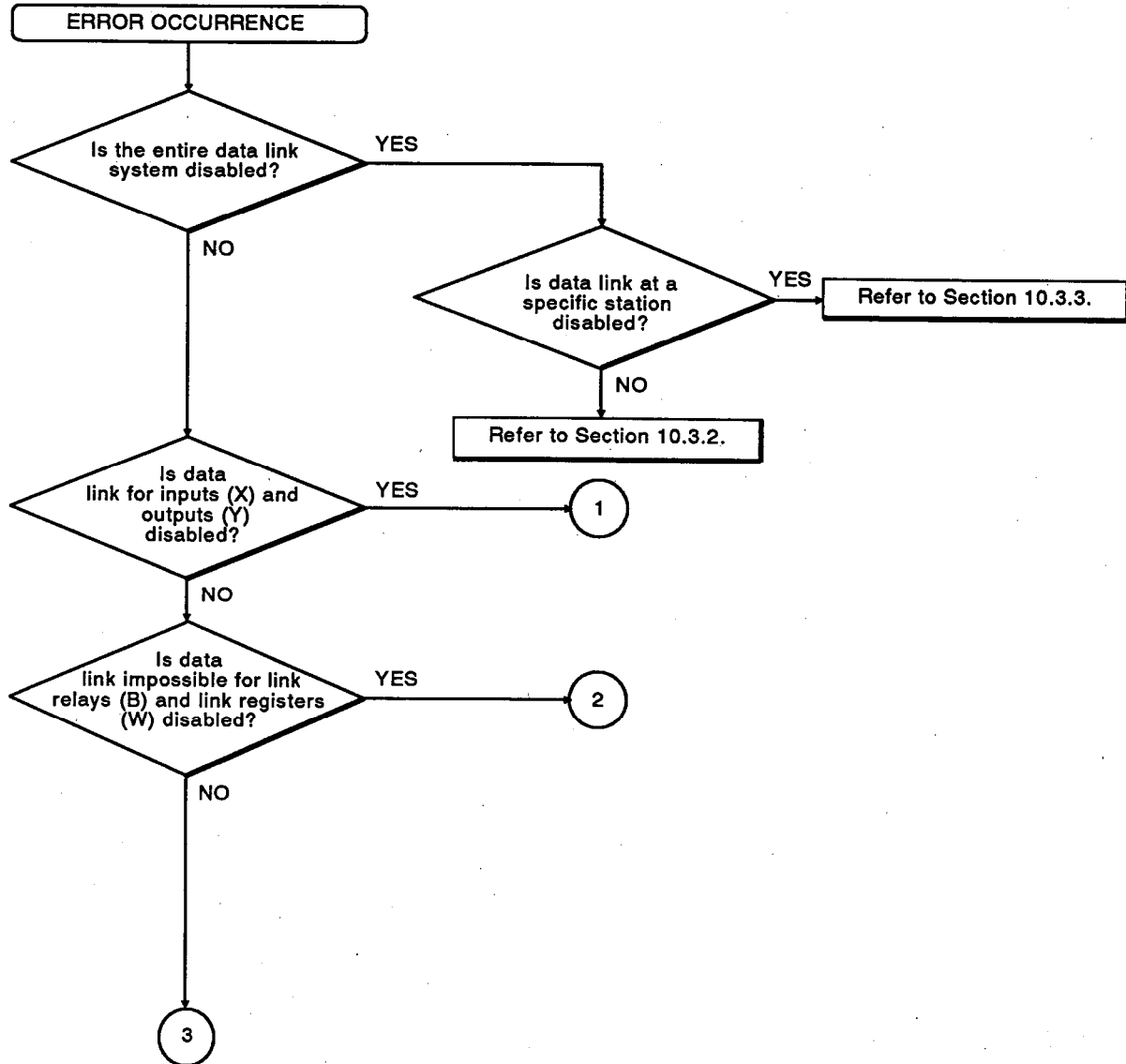


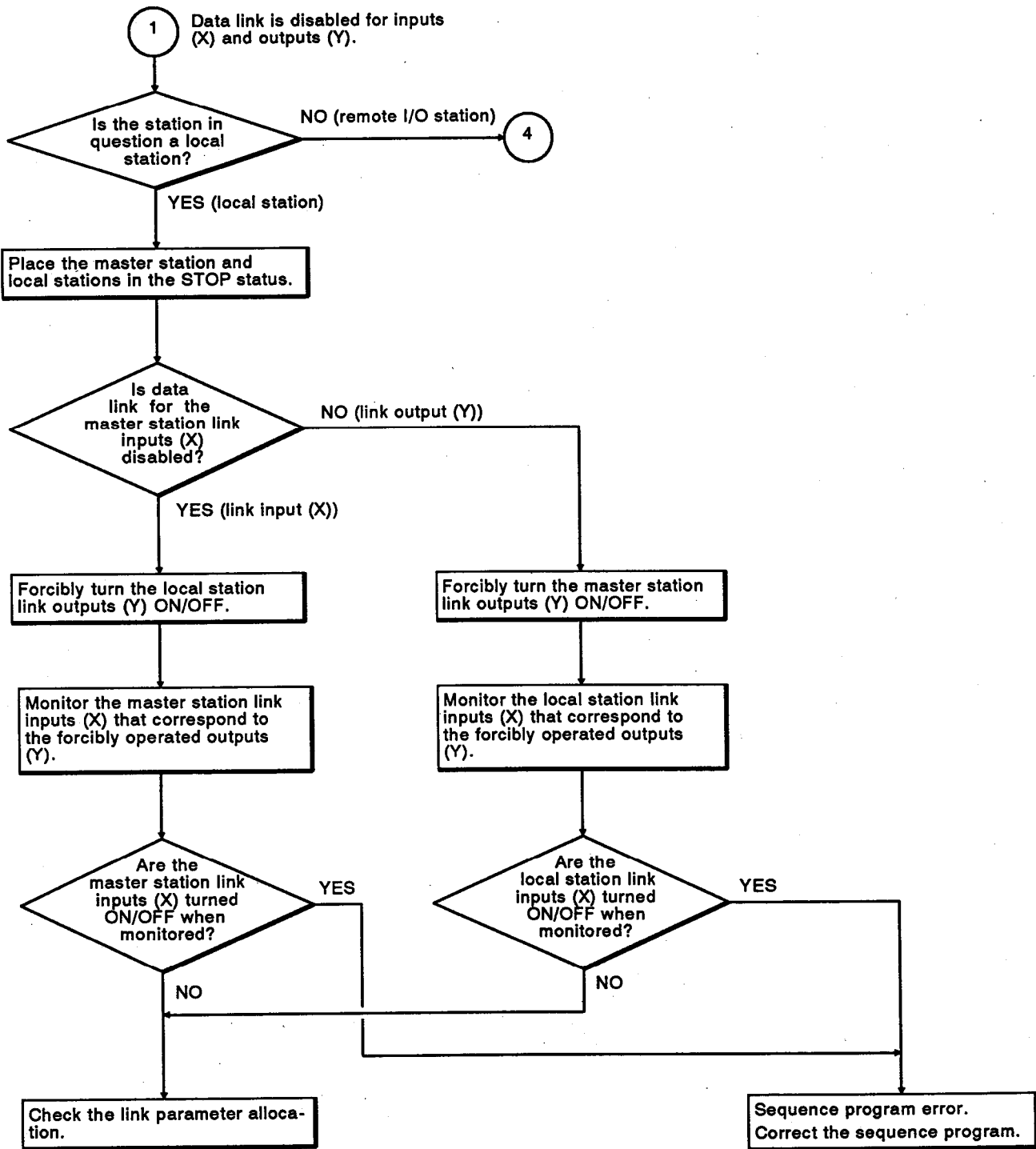
10. TROUBLESHOOTING

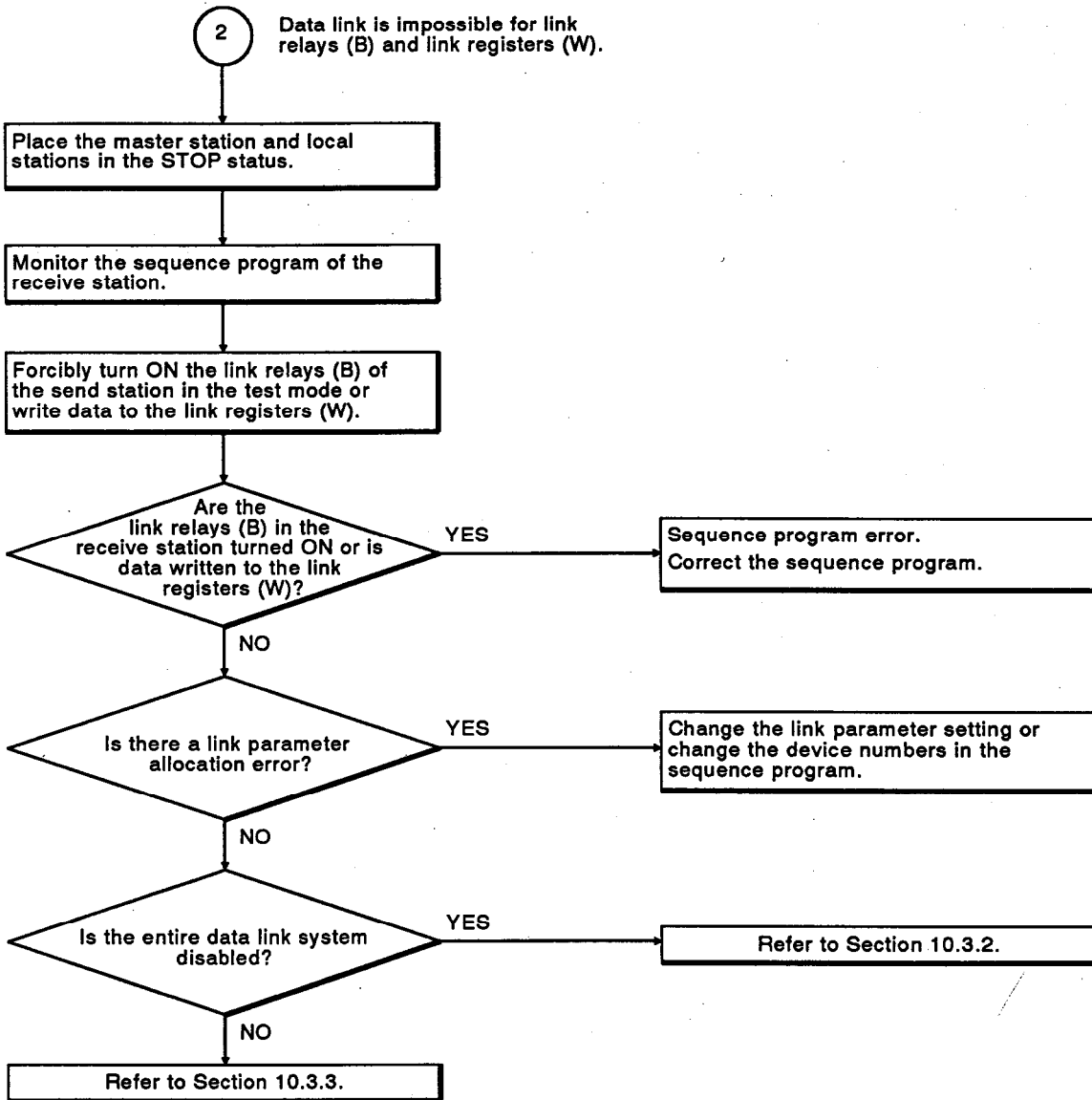
Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Operating Mode	○	○	○	○	○	○
Applicability	○	○	○	○	○	○

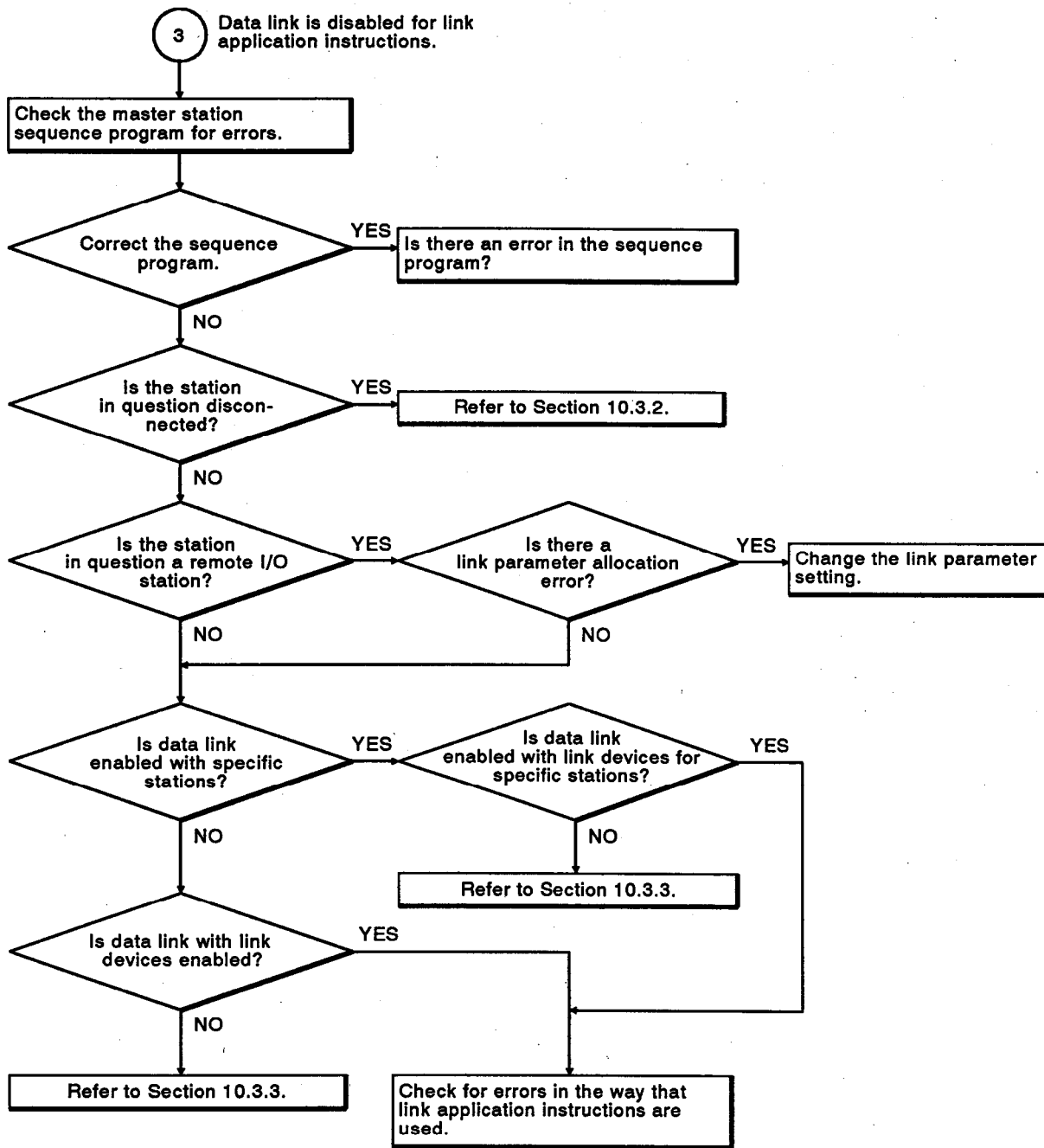
MELSEC-A

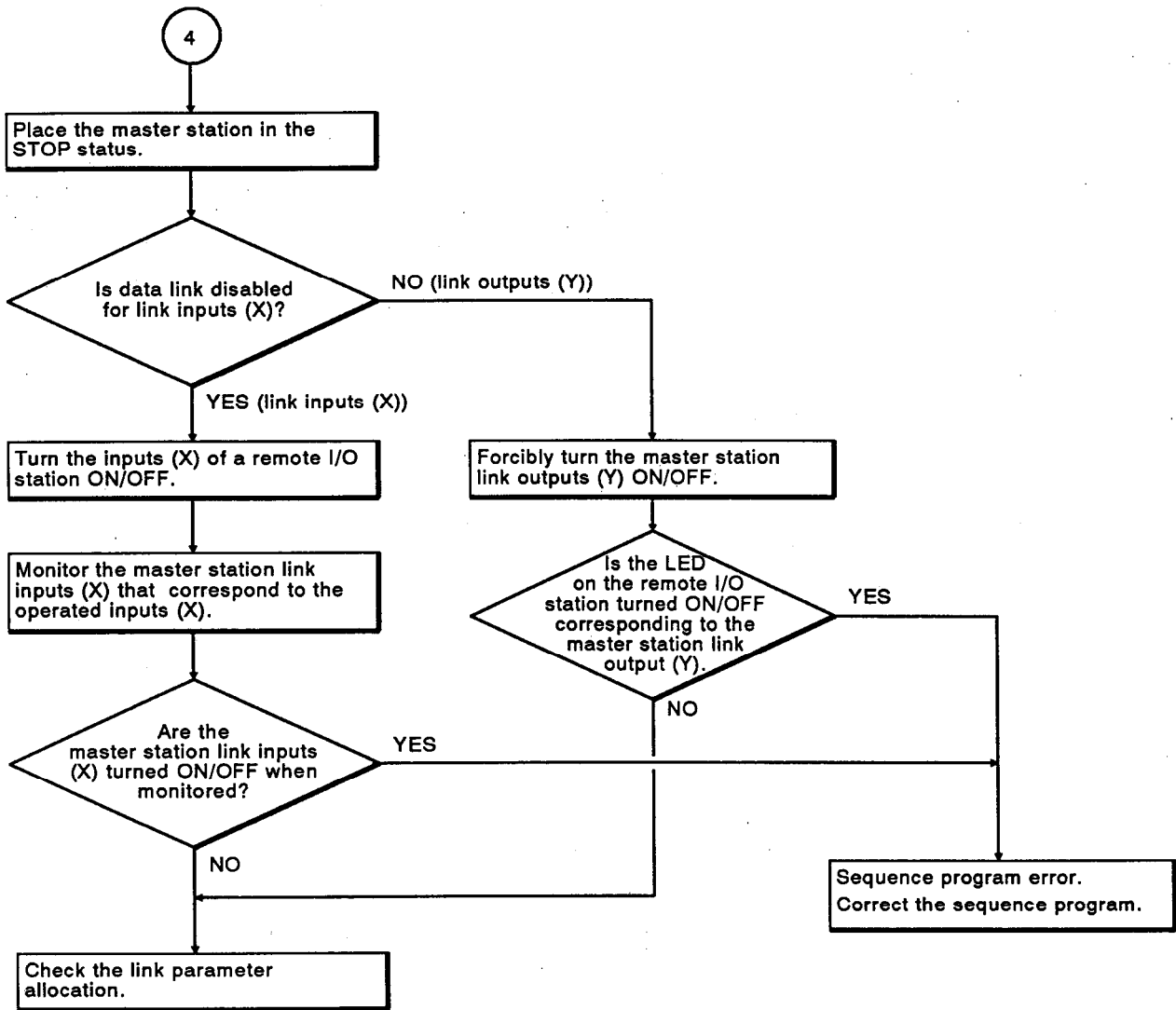
10.3.4 Troubleshooting flowchart for when a data send/receive error occurs









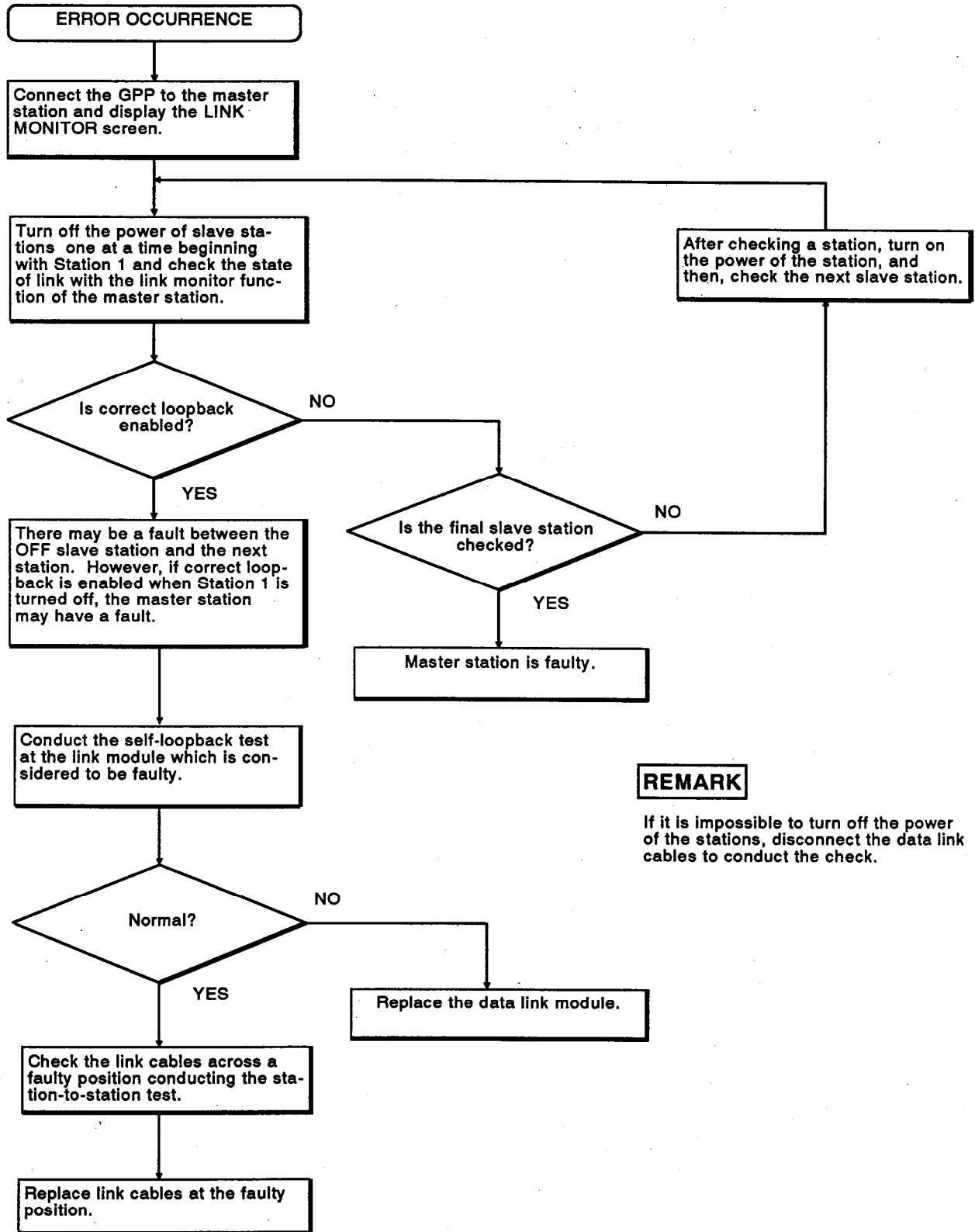


10. TROUBLESHOOTING

Data Link System	MELSECNET			MELSECNET/B		
	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Applicability	○	○	○			

MELSEC-A

10.3.5 Troubleshooting flowchart for when 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. TROUBLESHOOTING

Data Link System	MELSECNET			MELSECNET/B		
Operating Mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode	MELSECNET mode	MELSECNET II mode	MELSECNET II composite mode
Applicability	○	○	○	○	○	○

MELSEC-A

10.4 Error LED Indicators

Display	Error Name	Error Detection Status	Possible Causes
CRC	CRC error (cyclic redundancy check)	ON	<ul style="list-style-type: none"> The code of received data is checked. This error might occur depending on the timing in which the station sending the data is disconnected from the link. Cable fault, noise, etc. caused the error.
OVER	Overrun error	ON	<ul style="list-style-type: none"> A set of received data has overwritten the previous set of data before it was processed. A hardware error with the data link module receive circuit has occurred. Note: In a system in which local stations and remote I/O stations are connected, the "OVER" LED on the remote I/O station will be lit dimly when there is no error.
AB.IF	Abort invalid frame error	ON	<ul style="list-style-type: none"> "1" bits are received continuously and the limit is exceeded or the length of received data is shorter than the specified length. This error might occur depending on the timing in which the station sending the data is disconnected from the link. Short watchdog time setting, cable fault, noise, etc. caused the error.
TIME	Time check error	ON	<ul style="list-style-type: none"> The data link watchdog timer in the master station operates. An error has occurred at a local station or a remote I/O station. Short watchdog time setting, cable fault, noise, etc. caused the error.
DATA	Data check error	ON	<ul style="list-style-type: none"> Error code data is received (can only be lit in the test mode). Cable fault, noise, etc. caused the error.
UNDER	Underrun error	ON	<ul style="list-style-type: none"> Send data internal processing is not being performed at regular intervals. A hardware error with the data link module send circuit has occurred.
F.LOOP	Forward loop error	ON	<ul style="list-style-type: none"> The forward loop line has a fault or the power supply to the adjacent stations has been turned off. The forward loop line cable is broken or not connected.
R.LOOP	Reverse loop error	ON	<ul style="list-style-type: none"> The reverse loop line has a fault or the power supply to the adjacent stations has been turned off. The reverse loop line cable is broken or not connected.

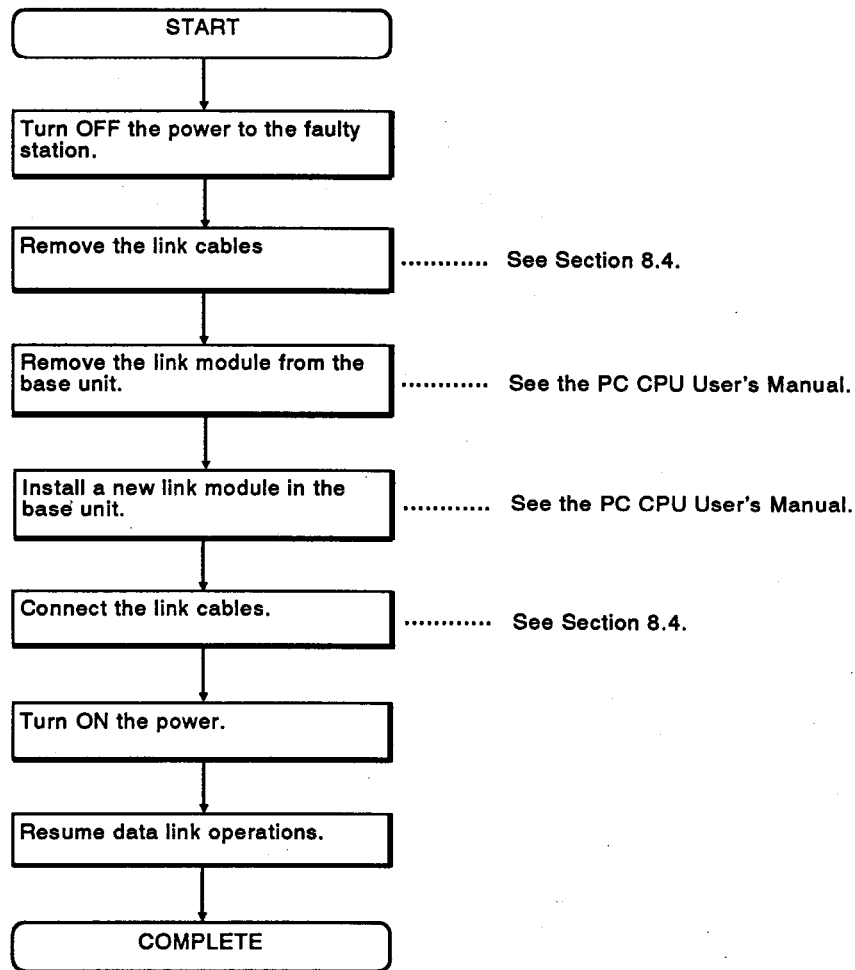
10.5 Replacing a Faulty Station's Link Module

This section explains how to replace the link module in a faulty station.

When a MELSECNET Data Link System is used

Since the link cables are doubled in a MELSECNET Data Link System, the loopback function enables data link operations even if power to a local or remote I/O station is turned OFF.

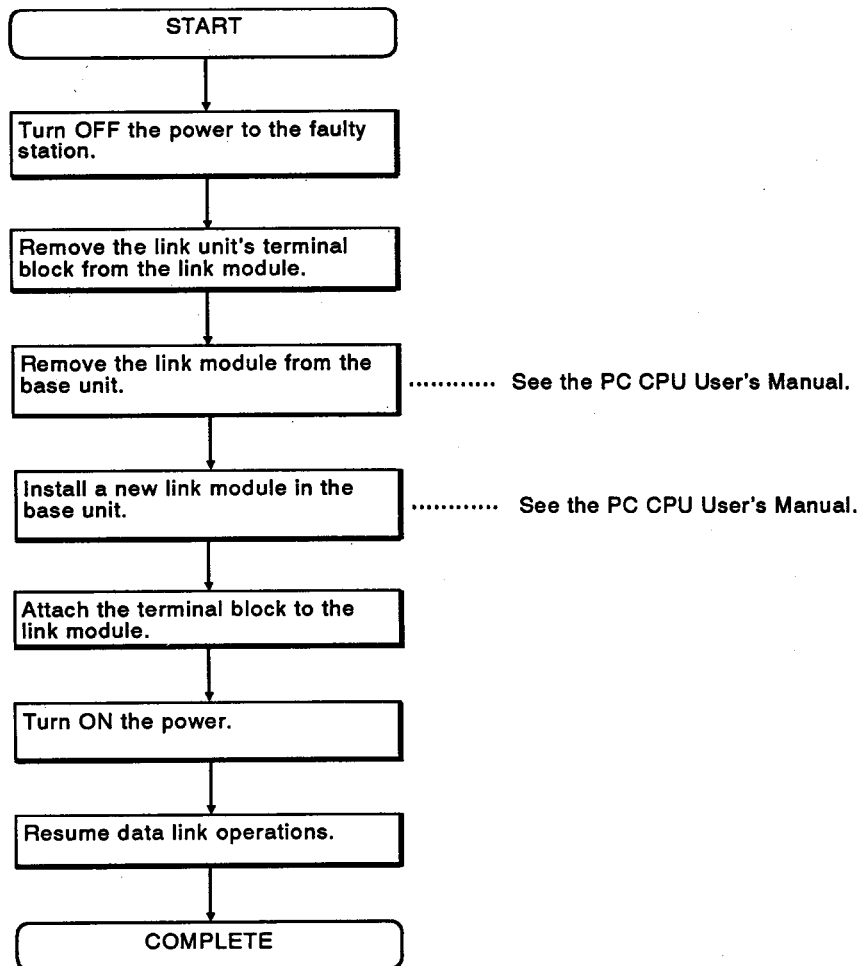
Replace the link module of a faulty station as given below:



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 continue even if power to one of the local stations is turned OFF.

Replace the faulty station's link module as shown below:



IMPORTANT

- (1) Design the configuration of a system to provide an external protective or safety interlocking circuit for the PCs.
- (2) The components on the printed circuit boards will be damaged by static electricity, so avoid handling them directly. If it is necessary to handle them take the following precautions.
 - (a) Ground human body and work bench.
 - (b) Do not touch the conductive areas of the printed circuit board and its electrical parts with and non-grounded tools etc.

Under no circumstances will Mitsubishi Electric be liable or responsible for any consequential damage that may arise as a result of the installation or use of this equipment.

All examples and diagrams shown in this manual are intended only as an aid to understanding the text, not to guarantee operation. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples.

Owing to the very great variety in possible applications of this equipment, you must satisfy yourself as to its suitability for your specific application.

HEADQUARTERS

MITSUBISHI ELECTRIC EUROPE B.V. **EUROPE**
 German Branch
 Gothaer Straße 8
D-40880 Ratingen
 Phone: +49 (0)2102 / 486-0
 Fax: +49 (0)2102 / 486-1120

MITSUBISHI ELECTRIC EUROPE B.V.-org.sl. **CZECH REP.**
 Czech Branch
 Avenir Business Park, Radlická 714/113a
CZ-158 00 Praha 5
 Phone: +420 - 251 551 470
 Fax: +420 - 251-551-471

MITSUBISHI ELECTRIC EUROPE B.V. **FRANCE**
 French Branch
 25, Boulevard des Bouvets
F-92741 Nanterre Cedex
 Phone: +33 (0)1 / 55 68 55 68
 Fax: +33 (0)1 / 55 68 57 57

MITSUBISHI ELECTRIC EUROPE B.V. **IRELAND**
 Irish Branch
 Westgate Business Park, Ballymount
IRL-Dublin 24
 Phone: +353 (0)1 4198800
 Fax: +353 (0)1 4198890

MITSUBISHI ELECTRIC EUROPE B.V. **ITALY**
 Italian Branch
 Viale Colleoni 7
I-20041 Agrate Brianza (MB)
 Phone: +39 039 / 60 53 1
 Fax: +39 039 / 60 53 312

MITSUBISHI ELECTRIC EUROPE B.V. **POLAND**
 Poland Branch
 Krakowska 50
PL-32-083 Balice
 Phone: +48 (0)12 / 630 47 00
 Fax: +48 (0)12 / 630 47 01

MITSUBISHI ELECTRIC EUROPE B.V. **RUSSIA**
 52, bid. 3 Kosmodamianskaya nab 8 floor
RU-115054 Moscow
 Phone: +7 495 721-2070
 Fax: +7 495 721-2071

MITSUBISHI ELECTRIC EUROPE B.V. **SPAIN**
 Spanish Branch
 Carretera de Rubí 76-80
E-08190 Sant Cugat del Vallés (Barcelona)
 Phone: 902 131121 // +34 935653131
 Fax: +34 935891579

MITSUBISHI ELECTRIC EUROPE B.V. **UK**
 UK Branch
 Travellers Lane
UK-Hatfield, Herts. AL10 8XB
 Phone: +44 (0)1707 / 27 61 00
 Fax: +44 (0)1707 / 27 86 95

MITSUBISHI ELECTRIC CORPORATION **JAPAN**
 Office Tower "Z" 14 F
 8-12,1 chome, Harumi Chuo-Ku
Tokyo 104-6212
 Phone: +81 3 622 160 60
 Fax: +81 3 622 160 75

MITSUBISHI ELECTRIC AUTOMATION, Inc. **USA**
 500 Corporate Woods Parkway
Vernon Hills, IL 60061
 Phone: +1 847 478 21 00
 Fax: +1 847 478 22 53

EUROPEAN REPRESENTATIVES

GEVA **AUSTRIA**
 Wiener Straße 89
AT-2500 Baden
 Phone: +43 (0)2252 / 85 55 20
 Fax: +43 (0)2252 / 488 60

TEHNIKON **BELARUS**
 Oktyabrskaya 16/5, Off. 703-711
BY-220030 Minsk
 Phone: +375 (0)17 / 210 46 26
 Fax: +375 (0)17 / 210 46 26

ESCO DRIVES & AUTOMATION **BELGIUM**
 Culliganlaan 3
BE-1831 Diegem
 Phone: +32 (0)2 / 717 64 30
 Fax: +32 (0)2 / 717 64 31

Koning & Hartman b.v. **BELGIUM**
 Woluwelaan 31
BE-1800 Vilvoorde
 Phone: +32 (0)2 / 257 02 40
 Fax: +32 (0)2 / 257 02 49

INEA BH d.o.o. **BOSNIA AND HERZEGOVINA**
 Aleja Lipa 56
BA-71000 Sarajevo
 Phone: +387 (0)33 / 921 164
 Fax: +387 (0)33 / 524 539

AKHNATON **BULGARIA**
 4 Andrej Ljapchev Blvd. Pb 21
BG-1756 Sofia
 Phone: +359 (0)2 / 817 6044
 Fax: +359 (0)2 / 97 44 06 1

INEA CR d.o.o. **CROATIA**
 Losinjka 4 a
HR-10000 Zagreb
 Phone: +385 (0)1 / 36 940 -01 / -02 / -03
 Fax: +385 (0)1 / 36 940 -03

AutoCont C.S. s.r.o. **CZECH REPUBLIC**
 Technologická 374/6
CZ-708 00 Ostrava-Pustkovec
 Phone: +420 595 691 150
 Fax: +420 595 691 199

Beijer Electronics A/S **DENMARK**
 Lykkegårdsvej 17
DK-4000 Roskilde
 Phone: +45 (0)46 / 75 76 66
 Fax: +45 (0)46 / 75 56 26

Beijer Electronics Eesti OÜ **ESTONIA**
 Pärnu mnt.160i
EE-11317 Tallinn
 Phone: +372 (0)6 / 51 81 40
 Fax: +372 (0)6 / 51 81 49

Beijer Electronics OY **FINLAND**
 Peltoie 37
FIN-28400 Ulvila
 Phone: +358 (0)207 / 463 540
 Fax: +358 (0)207 / 463 541

UTEKO **GREECE**
 5, Mavrogenous Str.
GR-18542 Piraeus
 Phone: +30 211 / 1206 900
 Fax: +30 211 / 1206 999

MELTRADE Kft. **HUNGARY**
 Fertő utca 14.
HU-1107 Budapest
 Phone: +36 (0)1 / 431-9726
 Fax: +36 (0)1 / 431-9727

Beijer Electronics SIA **LATVIA**
 Rītausmas iela 23
LV-1058 Rīga
 Phone: +371 (0)784 / 2280
 Fax: +371 (0)784 / 2281

Beijer Electronics UAB **LITHUANIA**
 Savanorių Pr. 187
LT-02300 Vilnius
 Phone: +370 (0)5 / 232 3101
 Fax: +370 (0)5 / 232 2980

EUROPEAN REPRESENTATIVES

ALFATRADE Ltd. **MALTA**
 99, Paola Hill
Malta- Paola PLA 1702
 Phone: +356 (0)21 / 697 816
 Fax: +356 (0)21 / 697 817

INTEHSIS srl **MOLDOVA**
 bld. Traian 23/1
MD-2060 Kishinev
 Phone: +373 (0)22 / 66 4242
 Fax: +373 (0)22 / 66 4280

HIFLEX AUTOM.TECHNIEK B.V. **NETHERLANDS**
 Wolweverstraat 22
NL-2984 CD Ridderkerk
 Phone: +31 (0)180 - 46 60 04
 Fax: +31 (0)180 - 44 23 55

Koning & Hartman b.v. **NETHERLANDS**
 Haarderbergweg 21-23
NL-1101 CH Amsterdam
 Phone: +31 (0)20 / 587 76 00
 Fax: +31 (0)20 / 587 76 05

Beijer Electronics AS **NORWAY**
 Postboks 487
NO-3002 Drammen
 Phone: +47 (0)32 / 24 30 00
 Fax: +47 (0)32 / 84 85 77

Fonseca S.A. **PORTUGAL**
 R. João Francisco do Casal 87/89
PT - 3801-997 Aveiro, Esgueira
 Phone: +351 (0)234 / 303 900
 Fax: +351 (0)234 / 303 910

Sirius Trading & Services srl **ROMANIA**
 Aleea Lacul Morii Nr. 3
RO-060841 Bucuresti, Sector 6
 Phone: +40 (0)21 / 430 40 06
 Fax: +40 (0)21 / 430 40 02

Craft Con. & Engineering d.o.o. **SERBIA**
 Bulevar Svetog Cara Konstantina 80-86
SER-18106 Nis
 Phone: +381 (0)18 / 292-24-4/5
 Fax: +381 (0)18 / 292-24-4/5

INEA SR d.o.o. **SERBIA**
 Izletnicka 10
SER-113000 Smederevo
 Phone: +381 (0)26 / 617 163
 Fax: +381 (0)26 / 617 163

SIMAP s.r.o. **SLOVAKIA**
 Jána Derku 1671
SK-911 01 Trenčín
 Phone: +421 (0)32 743 04 72
 Fax: +421 (0)32 743 75 20

PROCONT, spol. s r.o. Prešov **SLOVAKIA**
 Kúpeľná 1/A
SK-080 01 Prešov
 Phone: +421 (0)51 7580 611
 Fax: +421 (0)51 7580 650

INEA d.o.o. **SLOVENIA**
 Stegne 11
SI-1000 Ljubljana
 Phone: +386 (0)1 / 513 8100
 Fax: +386 (0)1 / 513 8170

Beijer Electronics AB **SWEDEN**
 Box 426
SE-20124 Malmö
 Phone: +46 (0)40 / 35 86 00
 Fax: +46 (0)40 / 93 23 01

Omni Ray AG **SWITZERLAND**
 Im Schörlí 5
CH-8600 Dübendorf
 Phone: +41 (0)44 / 802 28 80
 Fax: +41 (0)44 / 802 28 28

GTS **TURKEY**
 Bayraktar Bulvarı Nutuk Sok. No:5
TR-34775 Yukarı Dudullu-Ümraniye-İSTANBUL
 Phone: +90 (0)216 526 39 90
 Fax: +90 (0)216 526 39 95

CSC Automation Ltd. **UKRAINE**
 4-B, M. Raskovoyi St.
UA-02660 Kiev
 Phone: +380 (0)44 / 494 33 55
 Fax: +380 (0)44 / 494-33-66

EURASIAN REPRESENTATIVES

Kazpromautomatiks Ltd. **KAZAKHSTAN**
 Mustafina Str. 7/2
KAZ-470046 Karaganda
 Phone: +7 7212 / 50 11 50
 Fax: +7 7212 / 50 11 50

MIDDLE EAST REPRESENTATIVES

ILAN & GAVISH Ltd. **ISRAEL**
 24 Shenkar St., Kiryat Arie
IL-49001 Petah-Tiqva
 Phone: +972 (0)3 / 922 18 24
 Fax: +972 (0)3 / 924 0761

TEXEL ELECTRONICS Ltd. **ISRAEL**
 2 Ha'umanut, P.O.B. 6272
IL-42160 Netanya
 Phone: +972 (0)9 / 863 39 80
 Fax: +972 (0)9 / 885 24 30

CEG INTERNATIONAL **LEBANON**
 Cebaco Center/Block A Autostrade DORA
Lebanon - Beirut
 Phone: +961 (0)1 / 240 430
 Fax: +961 (0)1 / 240 438

AFRICAN REPRESENTATIVE

CBI Ltd. **SOUTH AFRICA**
 Private Bag 2016
ZA-1600 Isando
 Phone: +27 (0)11 / 977 0770
 Fax: +27 (0)11 / 977 0761