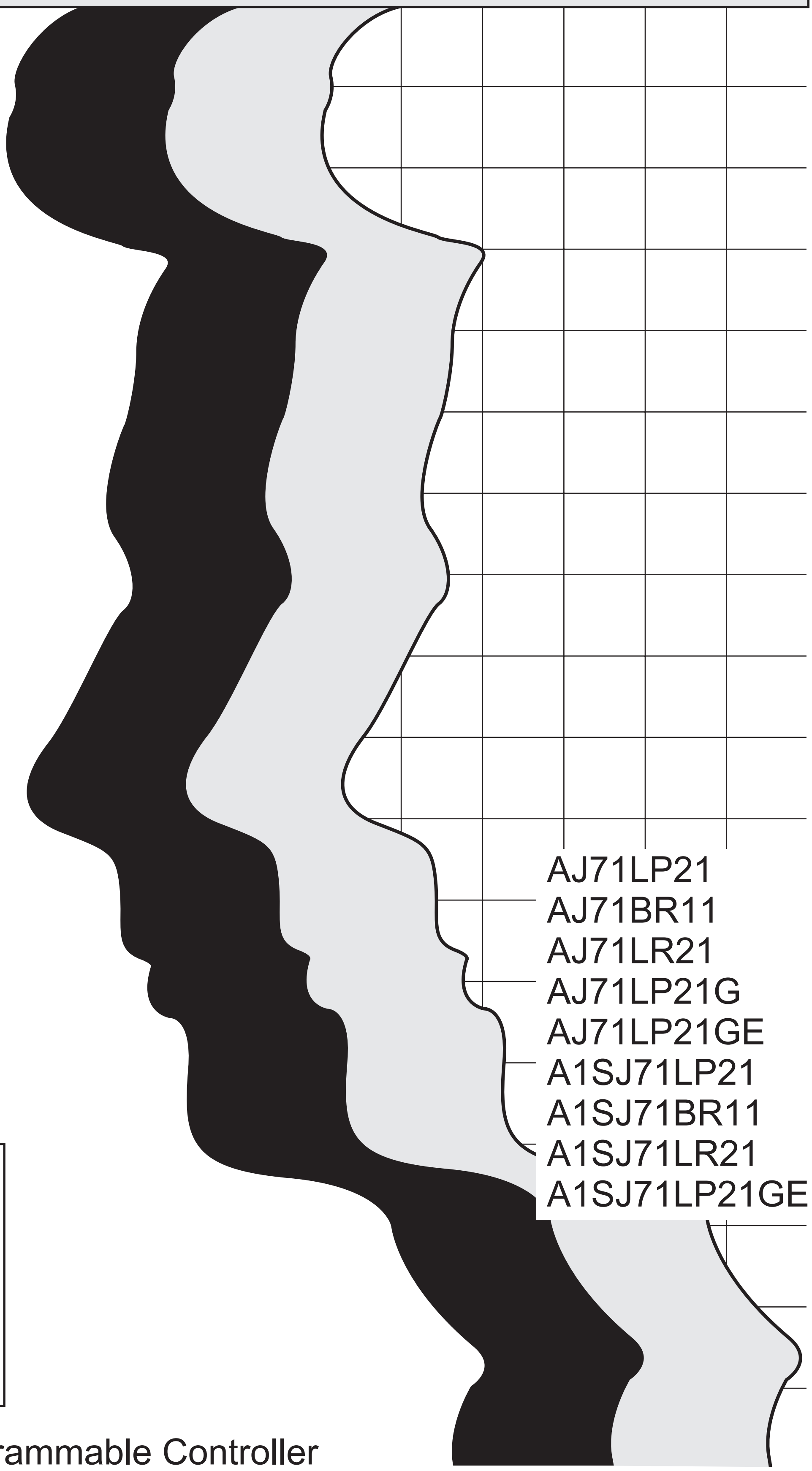
MITSUBISHI

Type MELSECNET/10 Network System (PLC to PLC network)

Reference Manual



AJ71LP21
AJ71BR11
AJ71LR21
AJ71LP21G
AJ71LP21GE
A1SJ71LP21
A1SJ71BR11
A1SJ71LR21
A1SJ71LP21GE

A
MELSEC

Mitsubishi Programmable Controller

• SAFETY PRECAUTIONS •

(Always read before starting use.)

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

⚠ WARNING	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠ CAUTION	Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

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

Please keep this manual in a safe place for future reference and also pass this on to the end user.

[Design Precautions]

⚠ WARNING

- When there are communication problems with the data link, the communication problem station will enter the following condition. Build an interlock circuit into the sequence program that will make sure the system operates safety 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.

⚠ CAUTION

- Do not bundle the control wires and communication cables with the main circuit or power wires, or install them close to each other. They should be installed at least 100 mm (3.94 in.) away from each other. Failure to do so may generate noise that may cause malfunctions.

[Installation Precautions]

⚠ CAUTION

- Use the programmable controller in an environment that meets the general specifications contained in CPU module user's manual. Using this programmable controller in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.
- When installing the AJ71LP21 (G, GE), AJ71LR21, AJ71BR11, fully insert the projection on the bottom of the module into the hole in the base unit and press the module into position. Not installing the module correctly could result in malfunction, damage, or drop of some pieces of the product.
  If using the product in a vibratory environment, tighten the module with the screws.
  Tighten the screws to a torque in the specified range.
  Tightening the screws too little could result in drop of some pieces of the product, short-circuit, and malfunction.
  Tightening the screws too much could result in drop of some pieces of the product, short-circuit, or malfunction due to the breakage of a screw or the module.
- When installing the A1SJ71LP21 (GE), A1SJ71LR21, A1SJ71BR11, fully insert the projection on the bottom of the module into the hole in the base unit, press the module into position, and tighten the module fixing screws.
  Not installing the module correctly or not fixing it with the screws could result in malfunction, damage, or drop of some pieces of the product.
  Tighten the screws to a torque in the specified range.
  Tightening the terminal screws too little could result in drop of some pieces of the product, short-circuit, and malfunction.
  Tightening the terminal screws too much could result in drop of some pieces of the product, short-circuit, or malfunction due to the breakage of a screw or the module.
- Do not directly touch the printed circuit board, the conducting parts and electronic parts of the module.It may cause damage or erroneous operation.
- Before handling the module, touch a grounded metal object to discharge the static electricity from the human body. Failure to do so may cause malfunction or failure of the module.
- Completely turn off the externally supplied power used in the system before mounting or removing the module.Not doing so could result in damage to the product.

[Wiring Precautions]

⚠ WARNING

- Completely turn off the external supplied power used in the system when placing wiring. Not completely turning off all power could result in electric shock or damage to the product.

[Wiring Precautions]

⚠ CAUTION

- Be careful not to let foreign particles such as chaff and wire chips get inside the module. They may cause a fire, mechanical breakdown or malfunction.
- Properly solder the parts of a soldering-type coaxial cable connector. Incomplete soldering may result in malfunction.
- Crimp the parts of a crimping-type coaxial cable connector with proper force at a proper position. Failure to do so may cause drop of the cable or malfunction.
- Make sure to place the communication and power cables to be connected to the module in a duct or fasten them using a clamp. If the cables are not placed in a duct or fastened with a clamp, their positions may become unstable and may move, or they may be pulled inadvertently. This may damage the module and the cables or cause the module to malfunction because of faulty cable connections.
- When disconnecting the communication and power cables from the module, do not pull the cables by hand. When disconnecting a cable with a connector, hold the connector to the module by hand and pull it out to remove the cable. If a cable is pulled while being connected to the module, it may cause the module to malfunction or damage the module and cables.

[Setup and Maintenance Precautions]

⚠ WARNING

- Do not touch the terminals while the power is on. Doing so may cause malfunctions.

[Setup and Maintenance Precautions]

⚠ CAUTION

- Please read this manual thoroughly and confirm the safety before starting online operations (especially, program modifications, forced outputs, and operating status modifications), which are performed by connecting the GX Developer via the MELSECNET/10 network system to a running CPU module of other station. Performing incorrect online operations may damage the machinery or result in accidents.
- Never disassemble or modify the module. This may cause breakdowns, malfunctions, injuries or fire.
- When using a wireless communication device such as a mobile phone, keep a distance of 25cm (9.84inch) or more from the programmable controller in all directions.
  Failure to do so may cause malfunctions.
- Before mounting or dismounting the module, make sure to shut off all phases of the external power supply. Failure to do so may damage the module or result in malfunctions.
- After the firs use of the product, do not mount/remove the module to/from the base unit more than 50 times (IEC 61131-2 compliant) respectively.
  Exceeding the limit of 50 times may cause malfunction.
- Always make sure to touch the grounded metal to discharge the electricity charged in the body, etc., before handling the module.
  Failure to do so may cause a failure or malfunctions of the module.

[Disposal Precautions]

⚠ CAUTION

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

●CONDITIONS OF USE FOR THE PRODUCT●

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

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.
MITSUBISHI SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI'S USER, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.
("Prohibited Application")
Prohibited Applications include, but not limited to, the use of the PRODUCT in;
- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

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

REVISIONS

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

Print Date	*Manual Number	Revision
Sep., 1993	IB (NA)-66440-A	First edition
Jul., 2001	IB (NA)-66440-B	Model additions AISJ71LP21, AISJ71BR11, AISJ71LR21, AJ71LR21, AJ71LP21G, AJ71LP21GE, AISJ71LP21GE Section number changes Section 3.1→Section 3.2, Section 3.2→Section 3.3, Section 3.3→Section 3.4, Section 12.4→Section 12.5 Additions Safety Instructions, WARRANTY, Section 9.2.4, Section 12.4 Partial additions Section 1.1, Section 1.2.2, Section 1.5.2, Section 2.1, Section 2.2, Section 2.3.1, Section 3.1, Section 3.2.1, Section 3.2.2, Section 3.2.3, Section 3.3.2, Section 3.4.1, Section 3.4.2, Section 3.4.3, Section 3.4.4, Section 3.4.5, Chapter 8, Section 8.4, Section 8.5.2, Section 9.2.1, Section 10.1.4, Section 11.2, Section 12.1, Section 12.2.1, Section 12.3.1, Section 13.1
Jun., 2003	IB (NA)-66440-C	Partial additions SAFETY PRECAUTIONS, Section 3.3.2, Section 7.1.2, Section 13.2, Section 13.2.1
Oct., 2004	IB (NA)-66440-D	Partial corrections SAFETY PRECAUTIONS, Section 1.1, Section 1.2.2, Section 1.5, Section 2.1, Section 2.2, Section 2.3.1, Section 2.3.2, Section 3.2.1, Section 3.2.2, Section 3.3.1, Section 3.3.2, Chapter 4, Section 7.2.2, Section 8.3, Section 8.4, Section 9.2.1, Section 12.2.1, Section 12.3.1, WARRANTY
Mar., 2006	IB (NA)-66440-E	Partial corrections SAFETY PRECAUTIONS, Section 1.2.2, Section 2.3.1, Section 3.3, Section 7.3, Section 8.1.5, Section 9.2.1, Section 11.2, Section 13.1
Aug., 2006	IB (NA)-66440-F	Partial corrections Section 2.1, Section 2.2, Section 3.2.2, Section 3.2.3, Section 3.3.2

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

Print Date	*Manual Number	Revision
Jun., 2007	IB (NA)-66440-G	Partial additions Section 3.2.2, Section 3.3.2 Partial corrections Section 7.7.2
Nov., 2012	IB (NA)-66440-H	Partial additions SAFETY PRECAUTIONS, Section 1.1, Section 2.1, Section 2.3, Section 3.2.1, Section 3.2.2, Section 3.3.1, Section 3.3.2, Section 7.2, Section 12.3.1, Section 12.5, Appendix 1.7 Partial corrections Section 2.3.2

Japanese Manual Version SH-3476-N

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

DETAILED INFORMATION

OVERVIEW OF MANUAL

This manual gives the system configuration, specifications, functions, settings, and programming of the MELSECNET/10 network system (PLC to PLC network).
This manual is divided into two major parts; PART 1 GUIDANCE (Sections 1 to 6) and PART 2 DETAILED INFORMATION (Sections 7 to 13 and Appendix).

GUIDANCE

- **Section 1** — **General Description**
  Features and configuration of the system.
- **Section 2** — **Specifications**
  Performance specifications and cable specifications.
- **Section 3** — **Settings and Connections of the Network Module**
  Setting, connection, and checking procedures of the network module.
- **Section 4** — **Data Link with a Two-Tier System**
  Settings and data link procedures for a two-tier system.
- **Section 5** — **Data Link with a Multi-Tier System**
  Settings and data link procedures for a multi-tier system.
- **Section 6** — **Network Monitor**
  Network monitor using peripheral devices.

DETAILED INFORMATION

- **Section 7** — **System Configuration**
  Details of system configuration and parameter settings.
- **Section 8** — **Functions**
  Details of functions.
- **Section 9** — **Communication Processing and Processing Time of the Data Link**
  Transmission and receive processings and processing time of the data link.
- **Section 10** — **Network Settings**
  Contents and settings of parameters.
- **Section 11** — **Composite System**
  Composite data link with AnN/AnACPU or MELSECNET(II).
- **Section 12** — **Programming**
  Lists of special relays and registers and programming procedures.
- **Section 13** — **Troubleshooting**
  Corrective actions to be taken.
- **Appendix** — **Appendix**
  Network parameter setting sheets

GUIDANCE: Read this part first if you are installing and operating the MELSECNET/10 system for the first time. This part gives general description of the MELSECNET/10.

DETAILED INFORMATION:
Read this part after obtaining a general understanding of the MELSECNET/10. This part gives detailed information necessary for system designing and programming and for operating a composite system with AnN/AnACPU or MELSECNET(II).

Reference Manuals

Refer to the following manuals if necessary:

- MELSECNET, MELSECNET/B Data Link System Reference Manual
  General description, specifications, names of parts, and settings of the MELSECNET and MELSECNET/B are given. (IB-66350)
- A2U/A2U-S1/A3U/A4UCPU User's Manual
  General description, specifications, and functions of the AnUCPU are given. (IB-66436)
- A2ASCPU (S1) User's Manual
  General description, specifications, and functions of the A2USCPU are given. (IB-66455)
- A2USHCPU-S1 User's Manual
  General description, specifications, and functions of the A2USHCPU-S1 are given. (IB-66789)
- ACPU/QCPU-A (A mode) Programming Manual (Fundamentals)
  Memory allocation when setting MELSECNET/10 parameters is explained. (IB-66249)
- AnSHCPU/AnACPU/AnUCPU/QCPU-A (A mode) Programming Manual (Dedicated Instructions)
  Dedicated instructions used with the MELSECNET/10 are explained. (IB-66251)
- SW4IVD-GPPA GPP Function Software Package Operating Manual
  Network setting, network monitoring, and network diagnosis procedures are explained. (IB-66855)

COMPLIANCE WITH EMC AND LOW VOLTAGE DIRECTIVES

(1) Method of ensuring compliance

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

- User's manual for the CPU module used
- User's manual (hardware) for the CPU module or base unit used

(2) Additional measures

(a) For the AJ71LP21, AJ71LP21G, AJ71LP21GE, A1SJ71LP21, and A1SJ71LP21GE

No additional measures are necessary for the compliance of this product with EMC and Low Voltage Directives.

(b) For the AJ71BR11, AJ71LR21, A1SJ71BR11, and A1SJ71LR21

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

GUIDANCE

1. GENERAL DESCRIPTION

The MELSECNET/10 network system will achieve a high-speed, large-capacity data link.

1.1 Features

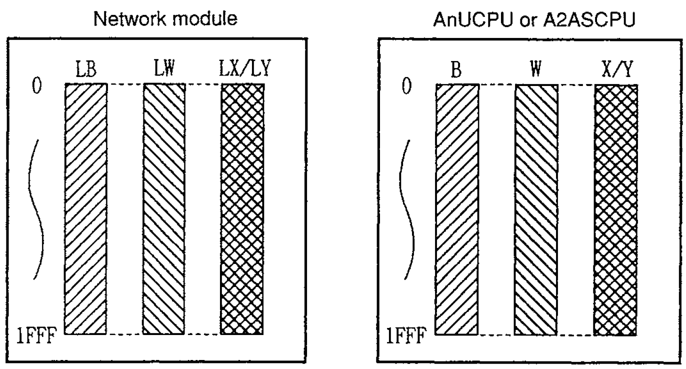
(1) High transmission speed

(a) Transmission speed is 10M BPS.

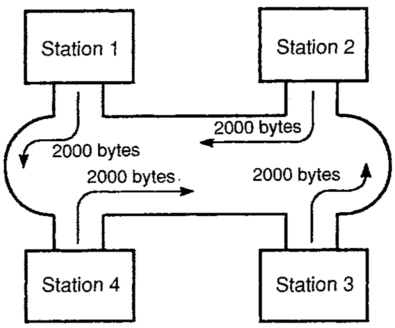
(b) A multiplex transmission function (using forward/reverse loop) allows transmission at 20M BPS in an optical loop system.

(2) Increased link device capacities

(a) The network module has 8192 points for each link device, the link relays (LB), link registers (LW) and link inputs/outputs (LX/LY).
The AnUCPU and A2ASCPU needed to build MELSECNET/10 also have 8192 points for each link device, the link relays (LB), link registers (LW) and link inputs/outputs (LX/LY).

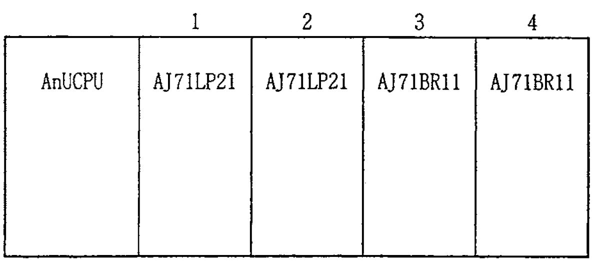


(b) One station (network module) on the network can send (write as the host) a maximum point of 2000 bytes to the link devices, LB,LW and LY.



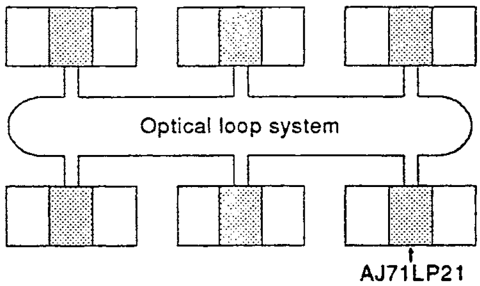
(3) Large-scale, flexible system configuration

(a) A single AnUCPU or A2ASCPU accepts up to four network modules.



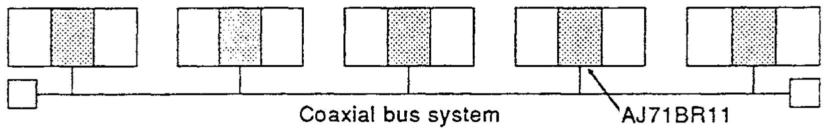
(b) Both the optical loop method and the coaxial bus method can be used to build a network system.

1) The optical loop method is used to build a network system with relatively long station-to-station distance and total distance. Fiber-optic cables are not affected by external noise along the transmission channel.



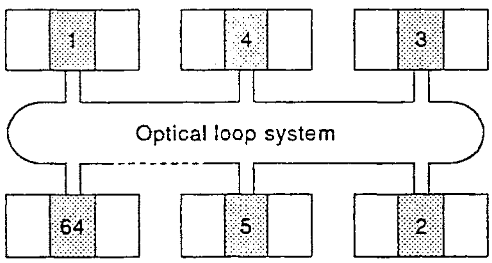
SI cable	H	300m (984ft.)	30km (98425ft.)
	L	500m (1640ft.)	
H-PCF cable		1km (3281ft.)	
Brode-band H-PCF cable		1km (3281ft.)	
QSI cable		1km (3281ft.)	
GI cable		2km (6562ft.)	

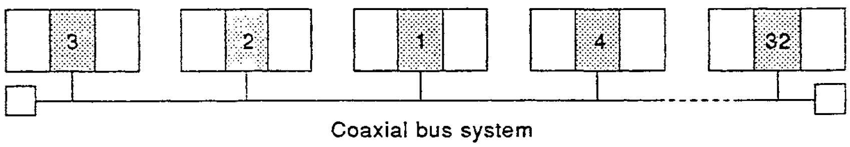
2) The coaxial bus method allows cable connections to be easily done.



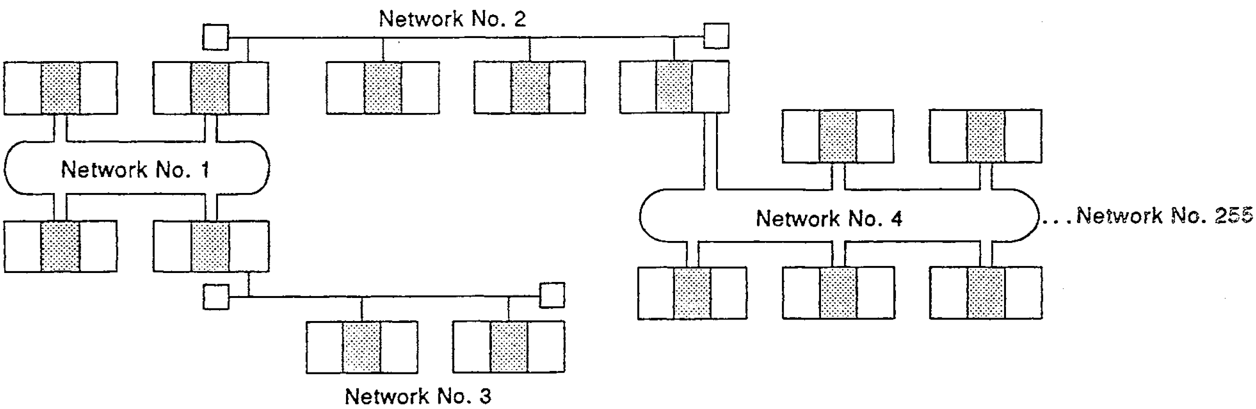
Cable	Station-to-station	Total distance
3C-2V	300 m (0.19 mil.)	300 m (0.19 mil.)
5C-2V	500 m (0.31 mil.)	500 m (0.31 mil.)
5C-FB	500 m (0.31 mil.)	500 m (0.31 mil.)

(c) One optical loop network system can link up to 64 stations. One coaxial bus network system can link up to 32 stations. Station numbers can be set regardless of the connecting order of the stations.



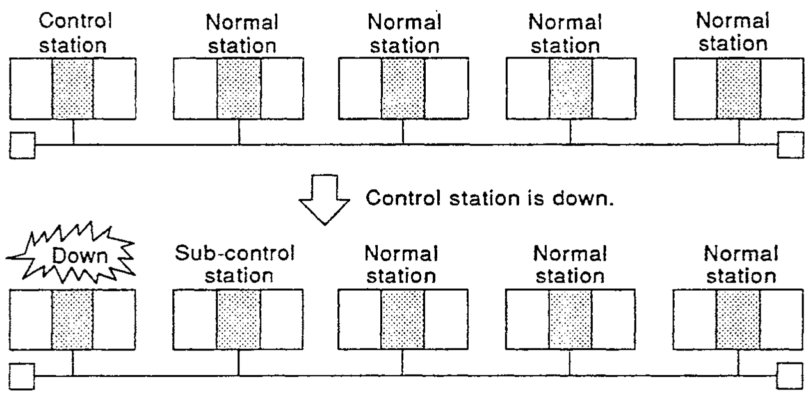


(d) One system can be expanded up to 255 networks.



(4) Prevention of the network from going down when the control station is down

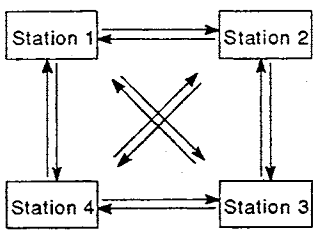
The MELSECNET/10 network system introduces a new relationship of control and normal stations rather than the conventional master and local stations. This new networking method allows normal station to take over the management of the network as a sub-control station when the control station is down (Control station shift function).
The control station uses preset common parameters to control the network. Normal stations execute data link according to settings of the common parameters of the control station.



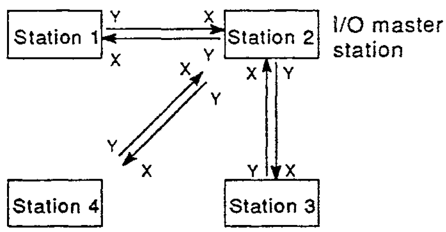
(5) Cyclic data link

Data link between the stations in a network is executed cyclically by using link relay (B), link register (W), and input (X) and output (Y) devices.
The data of link relay (B) and link register (W) transmitted by one station is received by all stations in the network (1 : n communication).
The data of input (X) and output (Y) devices transmitted by one station is received by one designated station in the network (1 : 1 communication).

<1 : n communication>

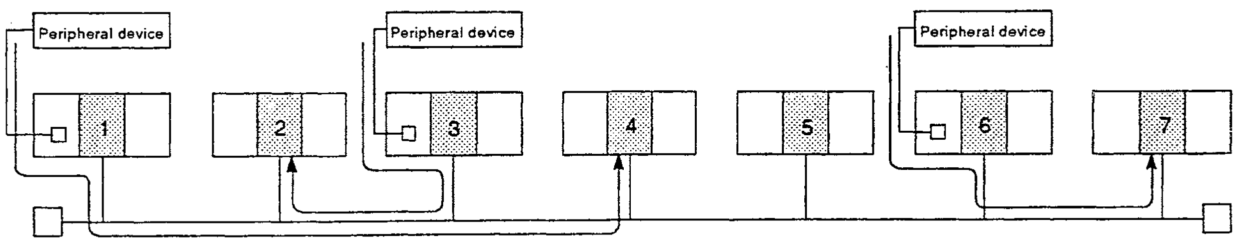


<1 : 1 communication>

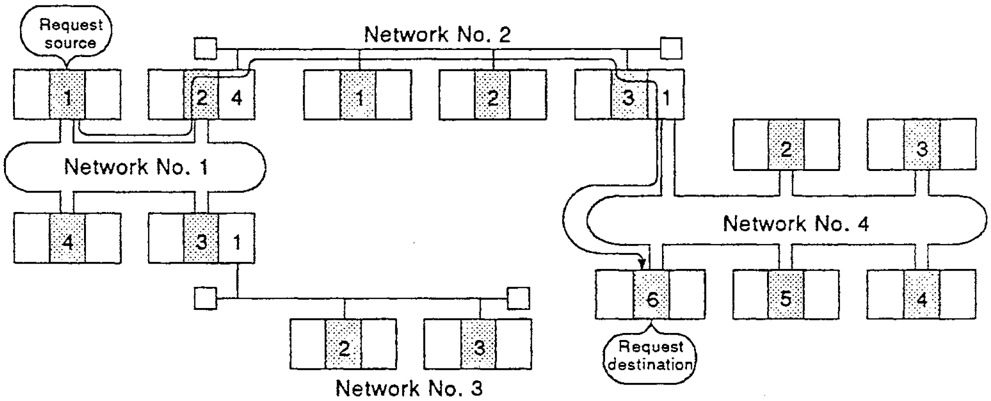


(6) Transient transmission

(a) Monitoring using peripheral devices or personal computers and program up/down loading between stations are possible (N : N communication).
By using a ZNRD/ZNWR instruction with an AnUCPU, data read/write in word units is possible with other stations.

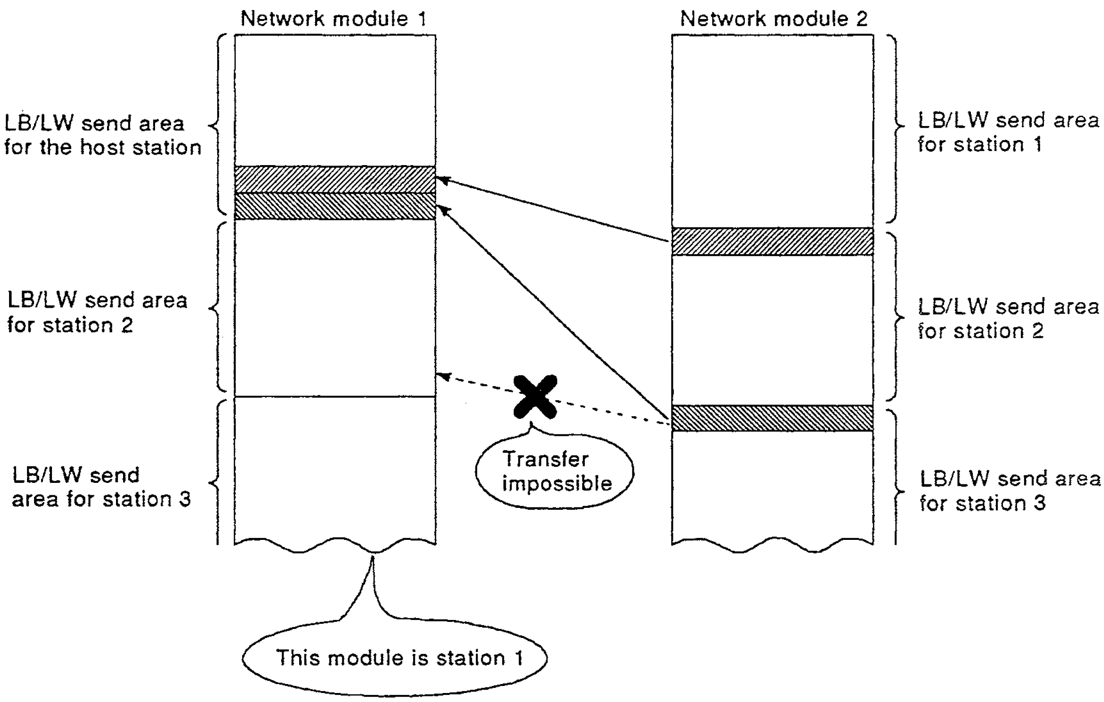


(b) Routing function
In a multi-tier system, transient transmission to the stations in an other network is possible.
For example, in the system configuration shown below, station 1 in network No. 1 can gain access to station 6 in network No. 4.



(7) Data communications between networks

When several network modules are installed to one AnUCPU, linked data in a network can be transferred to an other network by using a data link transfer function.
For example, in the figure shown below, LB/LW data for stations 2 and 3 in network module 2 can be transferred to station 1 in network module 1.

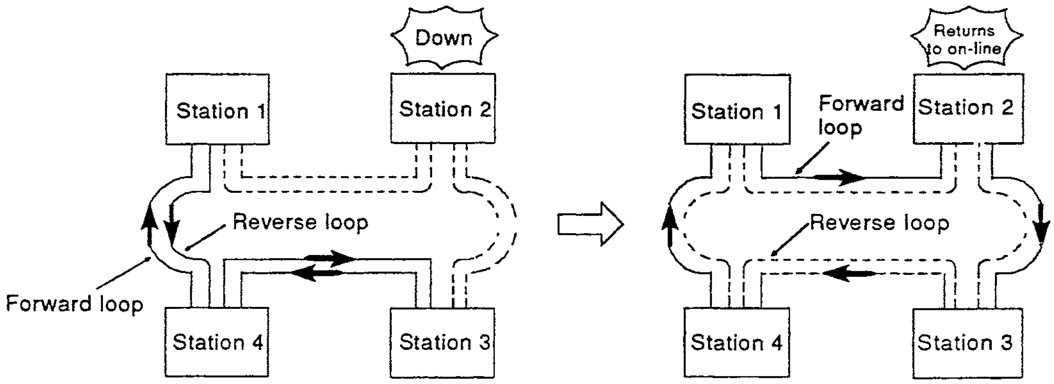


(8) Improved RAS functions

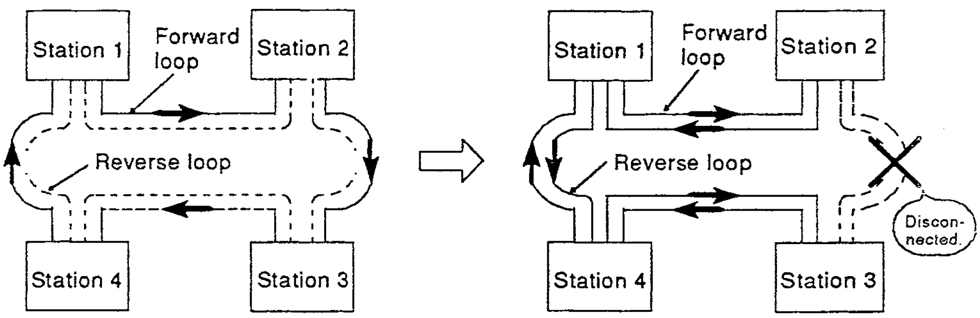
The RAS functions such as control station takeover, automatic on-line return, loopback, network monitor, and network diagnosis improve the reliability of data link.

(a) Control station shift function
This function allows a normal station to take over the control of the network as a sub-control station when the control station is down.

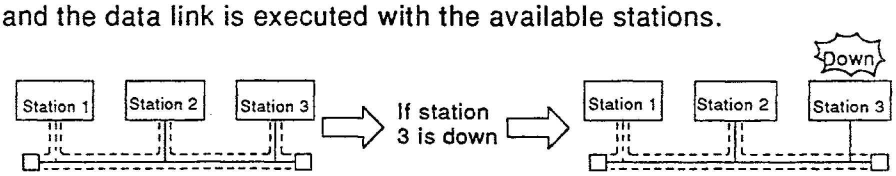
(b) Automatic on-line return function
When an off-line station is recovered from a fault, it automatically returns to on-line and restarts communications.



(c) Loopback function (optical loop system, coaxial loop system)
When a station becomes faulty or a cable is disconnected, the faulty part is bypassed by using the forward and reverse loops to maintain the data link with available stations.



(d) Station separation function (coaxial bus system)
When a station is down due to power failure, the station is separated and the data link is executed with the available stations.



(e) Diagnosis
Hardware, cable connections, and settings related to the data link can be checked by the network monitor and diagnosis functions using peripheral devices and by the off-line diagnosis using the switch settings of the network module.

RAS: Abbreviation of Reliability, Availability, and Serviceability. This is in reference to the comprehensive usability of automated equipment.

REMARK

The RAS functions are made valid by any of the following faults.

- Cable breakage
- Station power-off
- Network setting error
- Fault that can be detected by the self diagnostics of the CPU module

If the network module has failed, some failures may not activate the RAS functions.

(9) Composite network with AnS/AnN/AnACPU

AnS/AnN/AnACPU can be used with MELSECNET/10.
One or more AnUCPU/A2ASCPU stations are necessary to build a MELSECNET/10 network system.
The MELSECNET/10 network system can use cables which have been used for MELSECNET(II). However, the distance pf connection will vary.

1.2 System Configuration

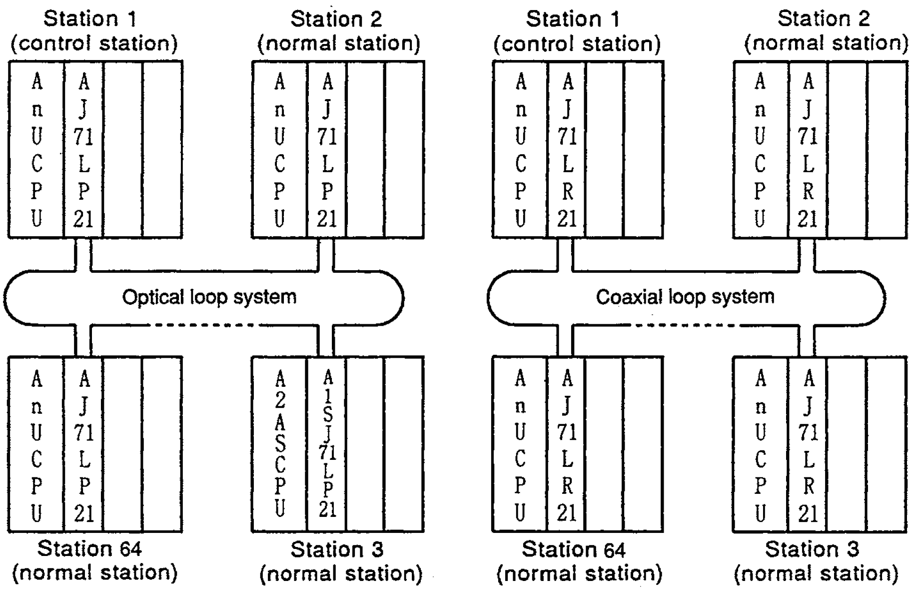
The following gives the system configuration examples which can be built with MELSECNET/10.

1.2.1 Configuration of a two-tier system

A two-tier system consists of a control station and normal stations connected by fiber-optic cables or coaxial cables.

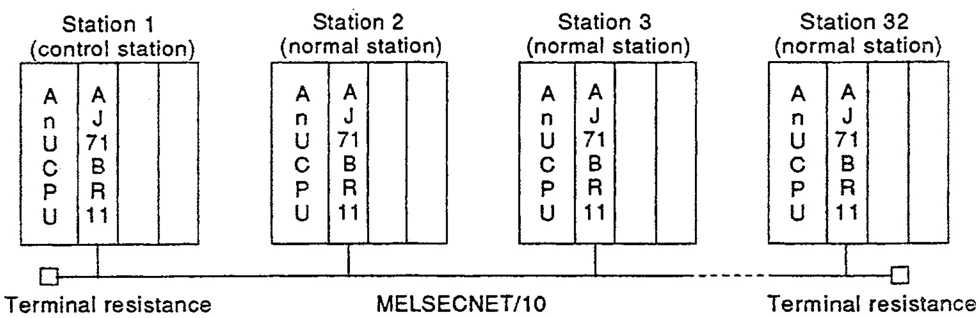
(1) Optical loop system

An optical loop system can be built with one control station and up to 63 normal stations. The AnUCPU or A2ASCPU allows any station to be set as a control station.
In the system configuration shown below, station 1 is set as the control station.



(2) Coaxial bus system

A coaxial bus system can be built with one control station and up to 31 normal stations. The AnUCPU or A2ASCPU allows any station to be set as a control station.
In the system configuration shown below, station 1 is set as the control station.

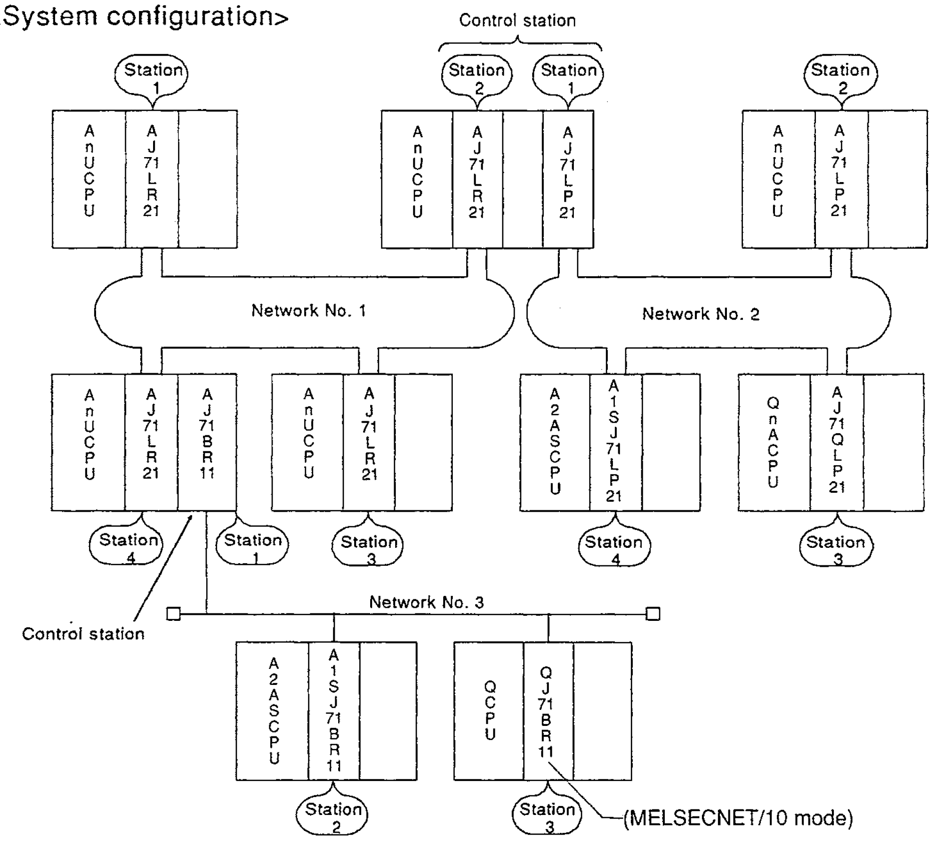


The control station uses preset common parameters to control the network. Normal stations execute data link according to settings of the common parameters of the control station.

1.2.2 Configuration of a multi-tier system

A multi-tier system consists of several networks connected to each other.
To connect networks, it is necessary to install two or more network modules to each AnUCPU.
Up to four network modules can be installed to one AnUCPU and A2ASCPU. It is possible to set the four network modules as control stations.
The network also accepts the MELSECNET/10 network modules designed for QCPU and QnACPU.
Refer to the corresponding MELSECNET/10 Reference Manuals for the MELSECNET/10 network modules designed for QCPU and QnACPU.

<System configuration>



REMARK

The following table shows MELSECNET/10 interface boards that connect a personal computer as a control station/normal station, and network connection modules that connect a GOT as a normal station, which are designed for MELSECNET/10

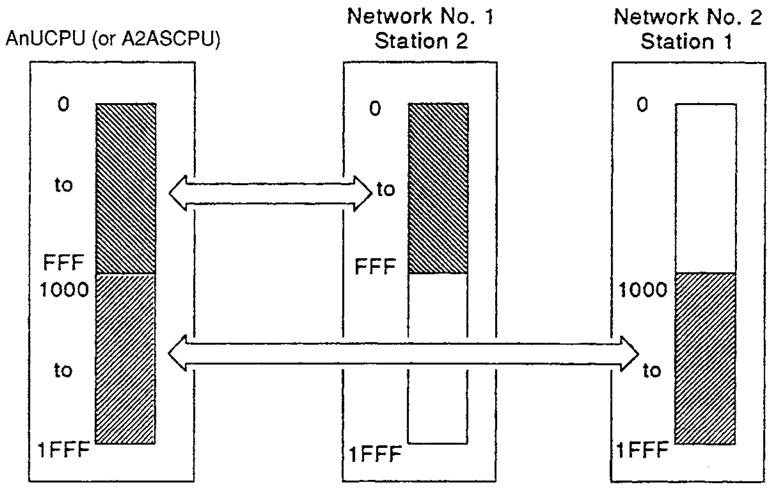
Type	Network Form	Target Personal Computer/GOT	Station Type
A70BDE-J71QLP23 **Q80BD-J71LP21(S)-25**	Optical loop	DOS/V personal computer	**Control station/ normal station**
Q80BD-J71LP21G			
A70BDE-J71QLP23GE **Q80BD-J71LP21GE**			
A70BDE-J71QBR13 **Q80BD-J71BR11**	Coaxial bus		
A70BDE-J71QLR23	Coaxial loop		
A7GT-J71LP23 **A9GT-QJ71LP23**	Optical loop		
A7GT-J71BR13 **A9GT-QJ71BR13**	Coaxial bus	A985GOT, A975GOT, A970GOT, A960GOT, A956GOT, A956WGOT	**Normal station**

Refer to the manuals of the corresponding models for the specifications and handling of the MELSECNET/10 interface boards and network connection modules.

(1) Cyclic transmission

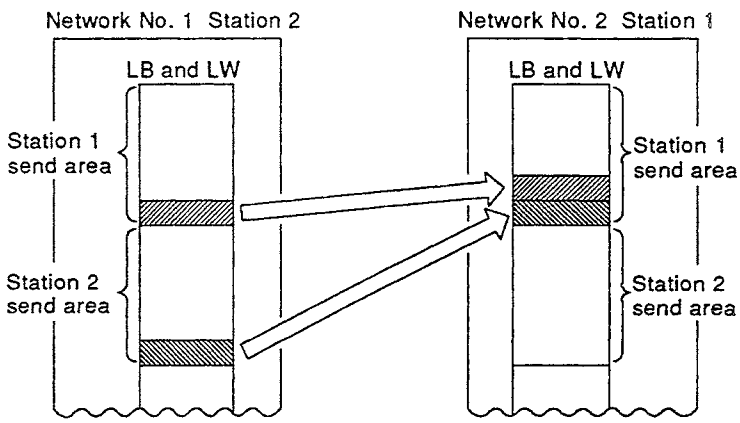
(a) Setting of network refresh parameters

Both a network module and an AnUCPU (or A2ASCPU) module are provided with 8192 link device poins (LB, LW, LX, LY, and B, W, X, Y). The link devices of a network module need to correspond with the link devices of the AnUCPU.
For example, link devices LB0 to FFF of a network module in station 2 in network No. 1 correspond with B0 to FFF of the AnUCPU, and LB1000 to 1FFF of a network module in station 1 in network No. 2 correspond with B1000 to 1FFF of the AnUCPU, as shown below.



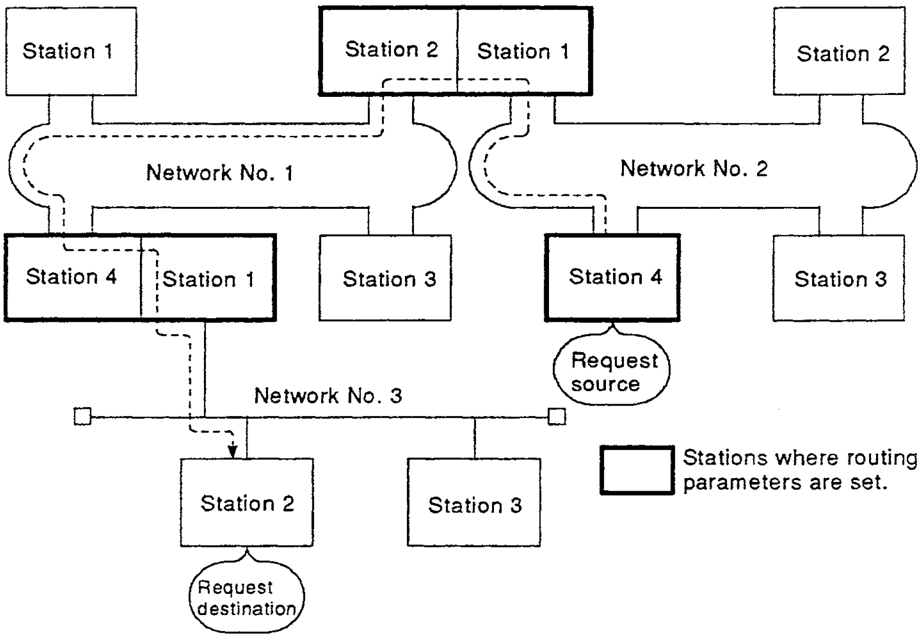
(b) Setting of the transfer parameter for data link

Linked data in a network can be transferred to an other network.
For example, LB and LW data in 1 and 2 in network No. 1 can be transferred to a network module in station 1 in network No. 2, as shown below.



(2) Transient transmission

Routing parameters can be used to execute transient transmission to the stations in an other network.
For example, a transient transmission is possible from station 4 in network No. 2 to station 2 in network No. 3.



1.3 Abbreviations Used in Paragraphs, Tables and Figures

(1) MELSECNET/10

(a) Abbreviations

1) PLC to PLC network

Name		Abrv.	
Control station		Mp	.... AnU/A2ASCPU
Sub-control station		S	.... AnU/A2ASCPU
Normal station	Station which can become a sub-control station	Ns	.... AnU/A2ASCPU
	Station which cannot become a sub-control station	N	.... AnS/AnN/AnACPU

2) Remote I/O network (to be provided in future)

Name	Abrv.
Master station	M_R
Remote I/O station	R

(b) Coding rule

[ ] [ ] [ ] - [ ]

Group No. (1 to 9)
Station number (1 to 64)
Abbreviation
Network number (1 to 255)

Note that "-[ ]" is indicated only when group designation is used.

Example: To indicate a control station with station number 18 in PLC to PLC network No. 3 in group No. 4:
Code: 3Mp18-4

POINT

(1) Network numbers are used to enable transient transmission. The numbers should basically be given in ascending order beginning with 1.

(2) Group numbers are used to enable transient transmission (ZNWR instruction) in units of groups.

(2) MELSECNET(II)

(a) Abbreviations

	Name	Abrv.
2-tier	Master station	M
	Local station	L
	Remote station	R

	Name	Abrv.
3-tier	Master station	m
	Local station	l
	Remote station	r

(b) Coding rule

<Master station>

[ ]

└ Abbreviation

<Local/remote station>

[ ] [ ]

└ Station number (1 to 64)

└ Abbreviation

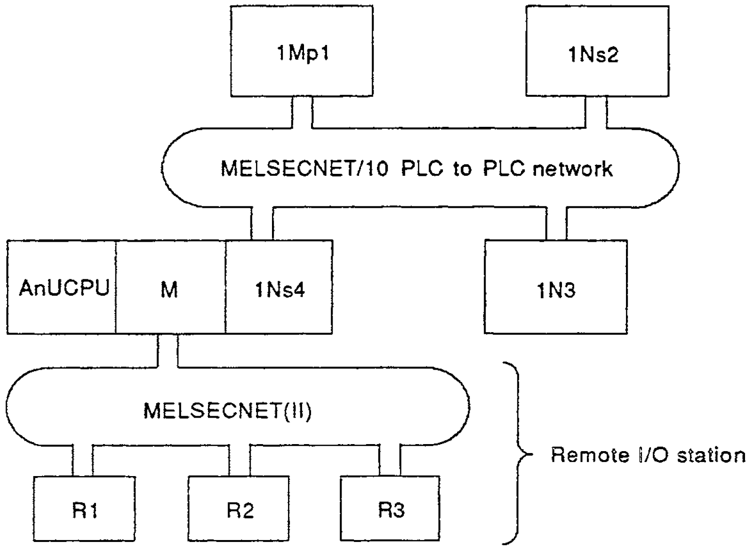
Example: To indicate a remote station with station number 27 in a two-tier system:
Code: R27

1.4 PLC to PLC Network and Remote I/O Network

The MELSECNET/10 network system is designed to provide two kinds of network methods; PLC to PLC network and remote I/O network. The remote I/O network will be available in the future.

(1) PLC to PLC network

The relationship between stations linked by this network method conforms to that of the master and local stations of the MELSECNET(II).
Remote I/O stations cannot be connected to a PLC to PLC network.



(2) Remote I/O network (to be provided in the future)

The relationship between stations linked by this network method will conforms to that of the master and remote stations of the MELSECNET(II).

REMARK

Remember at this time, a remote I/O system must be built with MELSECNET(II).

1.5 Applicable CPUs

The table below gives the types of programmable controller CPUs in which network modules can be installed, the number of modules to be installed, link device range, and abbreviations used in this manual.

<table>
<tr><th>Network Module
Programmable controller CPU</th><th>AJ71LP21
AJ71BR11
AJ71LR21
AJ71LP21G</th><th>A1SJ71LP21
A1SJ71BR11
A1SJ71LR21</th><th>Abbreviation of programmable controller CPU</th><th>Link Device Usable Range</th></tr>
<tr><td>A1SCPU
A1SJCPU (S3)
A1SCPUC24-R2
A2SCPU
A1SJHCPU
A1SJHCPU-S8
A1SHCPU
A2SHCPU
A2SHCPU-S1</td><td colspan="2">1 module</td><td>AnSCPU</td><td>B/W0~3FF</td></tr>
<tr><td>A1CPU (P21/R21)
A1NCPU (P21/R21)
A2CPU (P21/R21)
A2NCPU (P21/R21)
A2CPU (P21/R21) -S1
A2NCPU (P21/R21) -S1
A3CPU (P21/R21)
A3NCPU (P21/R21)
A3HCPU (P21/R21)
A3MCPU (P21/R21)
A73CPU (P21/R21)</td><td rowspan="2">1 module</td><td rowspan="2">Unusable</td><td>AnNCPU</td><td>B/W0~3FF</td></tr>
<tr><td>A2ACPU (P21/R21)
A2ACPU (P21/R21) -S1
A3ACPU (P21/R21)</td><td>AnACPU</td><td>B/W0~FFF</td></tr>
<tr><td>A2ASCPU
A2ASCPU-S1
A2ASCPU-S30
A2ASCPU-S60
A2USHCPU-S1</td><td colspan="2">4 modules</td><td rowspan="2">A2ASCPU</td><td rowspan="2">B/W0~1FFF</td></tr>
<tr><td>Q02CPU-A
Q02HCPU-A
Q06HCPU-A</td><td>Unusable</td><td>4 modules</td></tr>
<tr><td>A2UCPU
A2UCPU-S1
A3UCPU
A4UCPU</td><td>4 modules</td><td>Unusable</td><td>AnUCPU</td><td>B/W0~1FFF</td></tr>
</table>

2. SPECIFICATIONS

This section gives the performance specifications and cable specifications of the network system.
Refer to the manual for the programmable controller CPU used with the network system for the general specifications.

2.1 Performance Specifications

Table 2.1 gives the performance specifications of the network system.

Table 2.1 Performance Specifications

Item		Optical Loop System: AJ71LP21,A1SJ71LP21	Optical Loop System: AJ71LP21G	Optical Loop System: AJ71LP21GE,A1SJ71LP21GE	Coaxial Loop System (AJ71LR21,A1SJ71LR21)	Coaxial Bus System (AJ71BR11,A1SJ71BR11)
Max. number of link points per network	LX/LY	8192 points				
	LB	8192 points				
	LW	8192 points				
Max. number of link points per station		$\left\{\frac{B+Y}{8}\right\} + (2\times W) \leqq 2000$ bytes				
Communication speed		10MBPS (20MBPS equivalent for multiplex transmission)				10MBPS
Communication method		Token-ring mode				Token-bus mode
Synchronization system		Frame synchronization system				
Encoding system		NRZI coding (Non Return to Zero Inverted)			Manchester coding	
Transmission path form		Duplex loop				Simplex bus
Transmission format		HDLC conformance (frame form)				
Max. number of networks		255 (The sum total of PLC to PLC network and remote I/O network)				
Max. number of groups		9 (Only in a PLC to PLC network)				
Number of connected stations per network		64 stations (Control station: 1, normal station: 63)				32 stations (Control station: 1, normal station: 31)
Overall distance of single network (Inter station distance) *1		SI cable: 30km (500m between stations); QSI cable, H-PCF cable, Broadband H-PCF cable: 30km (1km between stations)	GI-50/125: 30km (2km between stations)	GI-62.5/125: 30km (2km between stations)	3C-2V: 19.2km (300m between stations); 5C-2V, 5C-FB: 30km (500m between stations)	3C-2V: 300m (300m between stations); 5C-2V, 5C-FB: 500m (500m between stations); Can be increased to max. 2.5km using the repeater module (A6BR10, A6BR10-DC).
Error control system		CRC ($X^{16}+X^{12}+X^5+1$) retry after time-out				
RAS functions		· Loopback function based on error detection or cable breakage (optical/coaxial loop system only) · Diagnostic function such as host link line check · System fault prevention by shifting of control station · Error detection by special link relays and registers · Network monitoring and various diagnostic functions				
Transient transmission		· N:N communication (e.g. monitoring, program upload/download) · ZNRD/ZNWR instruction (N:N)				
Current consumption (5VDC)		0.65A			AJ71LR21 : 1.20A A1SJ71LR21 : 1.14A	0.80A
Weight		AJ71LP21 : 0.31kg *2 A1SJ71LP21 : 0.18kg	AJ71LP21G : 0.31kg *3 AJ71LP21GE : 0.31kg A1SJ71LP21GE : 0.18kg		AJ71LR21 : 0.45kg A1SJ71LR21 : 0.30kg	AJ71BR11 : 0.45kg A1SJ71BR11 : 0.33kg
Number of occupied I/O points		32 points				

*1 When a coaxial bus system is built, the cable length between stations is restricted by the number of connected stations. See Section 3.2.2.

*2 **The weight of the AJ71LP21 of hardware version P or earlier is 0.45kg.**
The weight of the A1SJ71LP21 of hardware version F or earlier is 0.33kg.

*3 **The weight of the AJ71LP21G of hardware version K or earlier is 0.45kg.**
The weight of the AJ71LP21GE of hardware version F or earlier is 0.45kg.
The weight of the A1SJ71LP21GE of hardware version B or earlier is 0.33kg.

2.2 Optical fiber cable specifications

The following shows the specifications for the optical fiber cable used in the MELSECNET/H loop system. Confirm the details of the optical fiber specifications by the cable that is being used.
The optical fiber cables and connectors are dedicated parts. Optical fiber cable with connectors are sold by Mitsubishi System Service. (A catalogue of optical fiber cables is available.)
Mitsubishi System Service can also provide installation. Contact your nearest representative for details.

Table 2.2 Optical fiber cable specifications

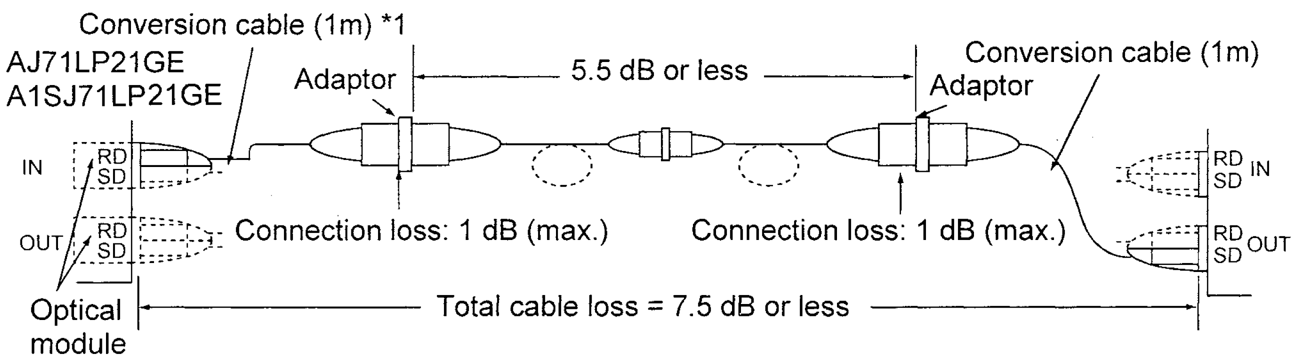
Item	SI (Multi-particulate glass)	H-PCF (Plastic-clad)	Broad-band H-PCF (Plastic-clad)	QSI (Quartz glass)	GI-50/125 (Quartz glass)	GI-62.5/125 (Quartz glass)
Interstation distance	500 m	1 km	1 km	1 km	2 km	2 km
Transmission loss	12 dB/km	6 dB/km	5 dB/km	5.5 dB/km	3 dB/km	3 dB/km
Core diameter	200 μ m	200 μ m	200 μ m	185 μ m	50 μ m	62.5 μ m
Clad diameter	220 μ m	250 μ m	250 μ m	230 μ m	125 μ m	125 μ m
Primary membrane	250 μ m	—	—	250 μ m	—	—
Applicable connector	F06/F08 or equivalent (JIS C5975/5977 conformance)					

REMARK

Prepare the following types of optical cables.
- A type: Cable for connection inside control panel.
- B type: Cable for connections between outside control panels.
- C type: Cable for outdoor connections.
- D type: Cable for outdoor connections that have been reinforced.

There are special cables available for moveable applications and resistance to heat.
Contact your Mitsubishi System Service for details.

(1) Cable loss of GI-62.5/125 optical fiber cable



*1: Conversion cable

Conversion Type	Cable
CA type ↔ FC type	AGE-1P-CA/FC1.5M-A
CA type ↔ ST type	AGE-1P-CA/ST1.5M-A
CA type ↔ SMA type	AGE-1P-CA/SMA1.5M-A

Purchased from: Mitsubishi Electric Europe GmbH

2.3 Coaxial Cable

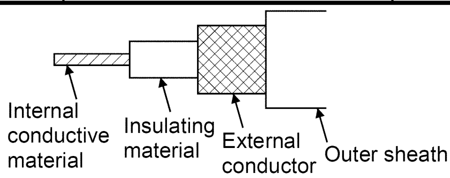
This section gives the specifications of coaxial cable used for the coaxial data link.

Use the following high frequency coaxial cables:
- 3C-2V (JIS C 3501 compliant)
- 5C-2V (JIS C 3501 compliant)
- 5C-FB (JIS C 3502 compliant)

2.3.1 Coaxial cable

Table 2.3 gives the specifications of the coaxial cable.
Select coaxial cables that meet the operating ambient temperature (0 to 55℃) shown in the general specifications of the programmable controller.

Table 2.3 coaxial cable

Item	3C-2V	5C-2V	5C-FB
Structure			
Cable diameter	5.4 mm (0.21 inches)	7.4 mm (0.29 inches)	7.7 mm (0.3 inches)
Minimum allowable bend radius	22 mm (0.87 inches) or more	30 mm (1.18 inches) or more	30 mm (1.18 inches) or more
Internal conductor diameter	0.5 mm (0.02 inches) (annealed copper wire)	0.8 mm (0.03 inches) (annealed copper wire)	1.05 mm (0.04 inches) (annealed copper wire)
Insulating material diameter	3.1 mm (0.12 inches) (polyethylene)	4.9 mm (0.19 inches) (polyethylene)	5.0 mm (0.19 inches) (polyethylene)
External conductor diameter	3.8 mm (0.15 inches) (single annealed copper wire mesh)	5.6 mm (0.22 inches) (single annealed copper wire mesh)	5.7 mm (0.22 inches) (aluminum foil tape and annealed copper wire mesh)
Applicable connector plug	3C-2V connector plug The following connector plugs are recommended: • BNC-P-3-NiCAu[*1] (Manufactured by DDK Ltd.) • BCP-C3B[*2] (Manufactured by Canare Electric Co., Ltd.)	5C-2V connector plug The following connector plugs are recommended: • BNC-P-5-NiCAu[*1] (Manufactured by DDK Ltd.) • BCP-C5B[*2] (Manufactured by Canare Electric Co., Ltd.)	5C-FB connector plug BCP-C5FA[*2] (manufactured by Canare Electric Co., Ltd.) is recommended.

*1 This connector plug is a soldering-type connector plug.
*2 This connector plug is a crimping-type connector plug.

REMARKS

To order or for inquiries regarding connector plugs and coaxial cables, contact your local Mitsubishi representative.

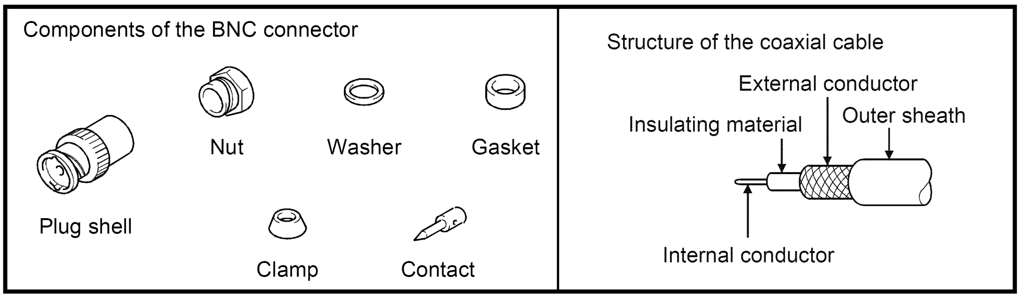
2.3.2 Connector for the coaxial cable

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

(1) Using a BNC connector manufactured by DDK Ltd.
The following explains how to connect the BNC-P-3-NiCAu or BNC-P-5-NiCAu to the cable.

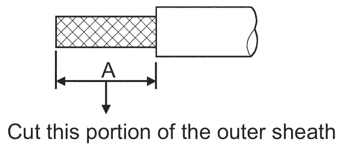
CAUTION	• Correctly solder coaxial cable connectors. Incorrect soldering may result in malfunction.

(a) Structure of the BNC connector and coaxial cable



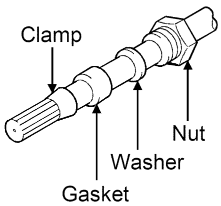
(b) How to connect the BNC connector and the coaxial cable

1) Cut the portion of the outer sheath of the coaxial cable as shown in the figure below.

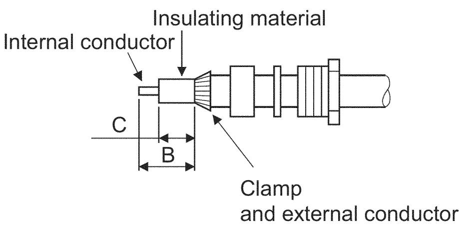


Cable	A
3C-2V	15mm (0.59 inches)
5C-2V, 5C-2V-CCY	10mm (0.39 inches)

2) Fit the nut, washer, gasket, and clamp onto the coaxial cable, as shown below, and then loosen the external conductor.

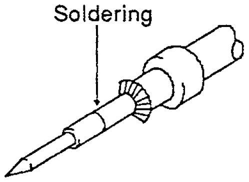


3) Cut the external conductor, insulating material and internal conductor to the dimensions shown below. Note that the external conductor must be cut to the same dimension as the tapered section of the clamp and smoothed down to the clamp.

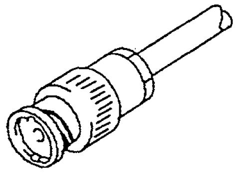


Cable	B	C
3C-2V	6mm (0.24 inches)	3mm (0.12 inches)
5C-2V, 5C-2V-CCY	7mm (0.28 inches)	5mm (0.20 inches)

4) Solder the contact to the internal conductor.



5) Insert the connector assembly shown in 4) into the plug shell and screw the nut into the plug shell.



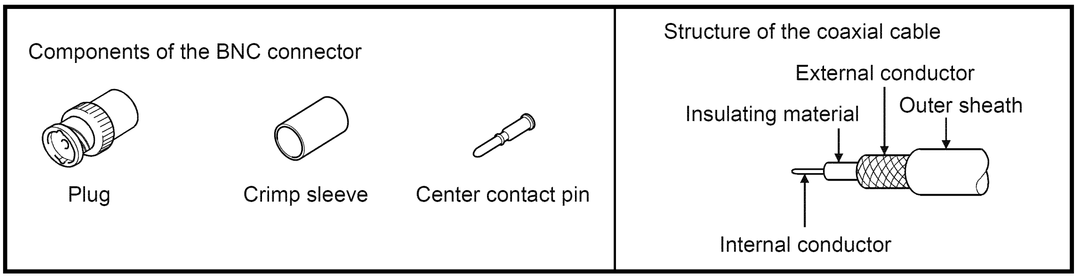
IMPORTANT

(1) Use caution as follows when soldering the contact to the internal conductive material.
- Soldered part must not have excess solder mound.
- The tail end of the contact must come into close contact with the cut end of the insulating material. The contact must not be cutting in the insulating material.
- Apply solder quickly so that the insulating material may not be deformed by heat.

(2) Before connecting or disconnecting the coaxial connector, touch a grounded metal object to discharge the static electricity from the human body. Failure to do so may result in a module malfunction.

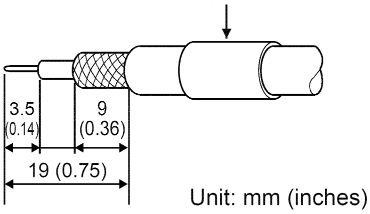
(2) Using a BNC connector manufactured by Canare Electric Co., Ltd.
The following explains how to connect the BCP-C3B, BCP-C5B, or BCP-C5FA to the cable.

(a) Structure of the BNC connector and coaxial cable

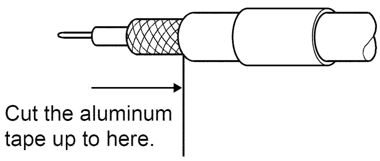


(b) How to connect the BNC connector and the coaxial cable

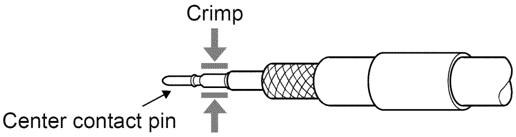
1) Thread a coaxial cable through a crimping sleeve as shown in the figure below.
When using a cable with aluminum tape, cut the tape as shown in the figure below.



When cutting the tape, make a clean cut, without leaving any stray pieces or loose strands. Failure to do so may cause a short circuit or result in an improper crimp.



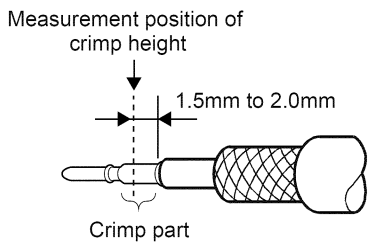
2) Insert a center contact pin into the internal conductor. Crimp the pin using a crimp tool to seal the gap between the center contact pin and the insulating material.

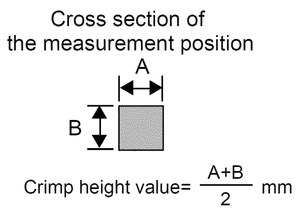


POINT

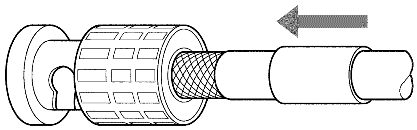
(1) Use a crimp tool specified for a BNC connector.
(2) Do not crimp the junction of the insulating material and the center contact pin.
(3) Horizontally insert the center contact pin into the insulating material and crimp the pin. If the pin is on the tilt, straight it.

3) After the crimp, check the crimp height of the crimp part. When the crimp height at the measurement position is between 1.4mm and 1.5mm, the pin is properly crimped.
If the crimp height is not between 1.4mm and 1.5mm, adjust the crimp tool and crimp the center contact pin again.

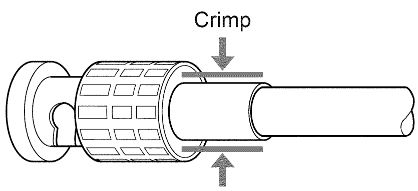




4) Hold the root of the coaxial cable and fully insert the cable into a plug.
After inserting the cable, pull it lightly to check that the center contact pin is fixed.
Move the crimp sleeve until it contacts with the plug.



5) Crimp the crimp sleeve using the crimp tool with attention paid to the orientations of the crimp tool and connector.
Do not pull the cable when crimping the sleeve.



POINT

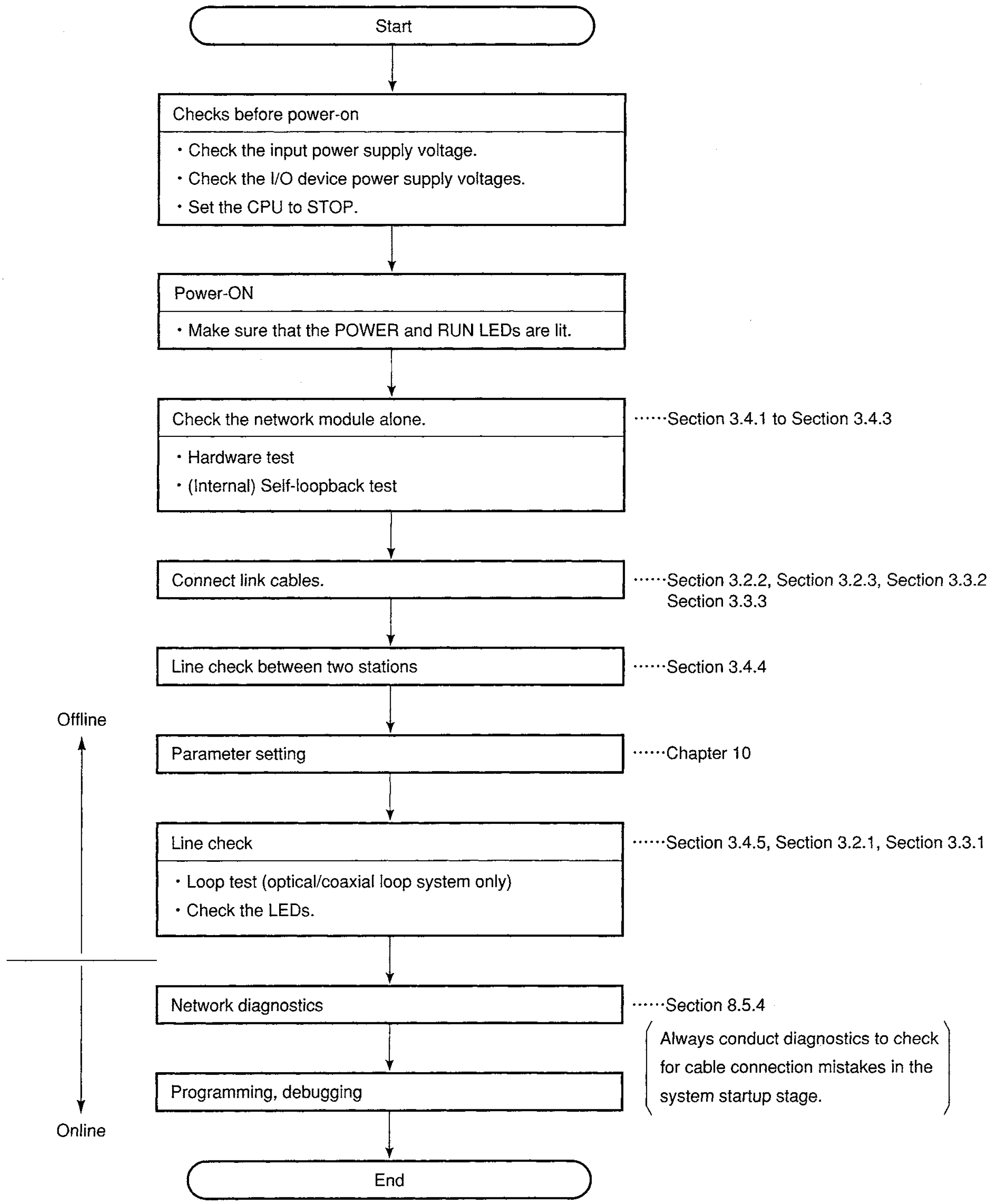
Before connecting or disconnecting the coaxial connector, touch a grounded metal object to discharge the static electricity from the human body. Failure to do so may result in a module malfunction.

3. SETTINGS AND CONNECTIONS OF THE NETWORK MODULE

This chapter describes the procedure, setting, connection, tests or similar for data link.

3.1 Pre-operation Procedure

The following flowchart provides a data link procedure.

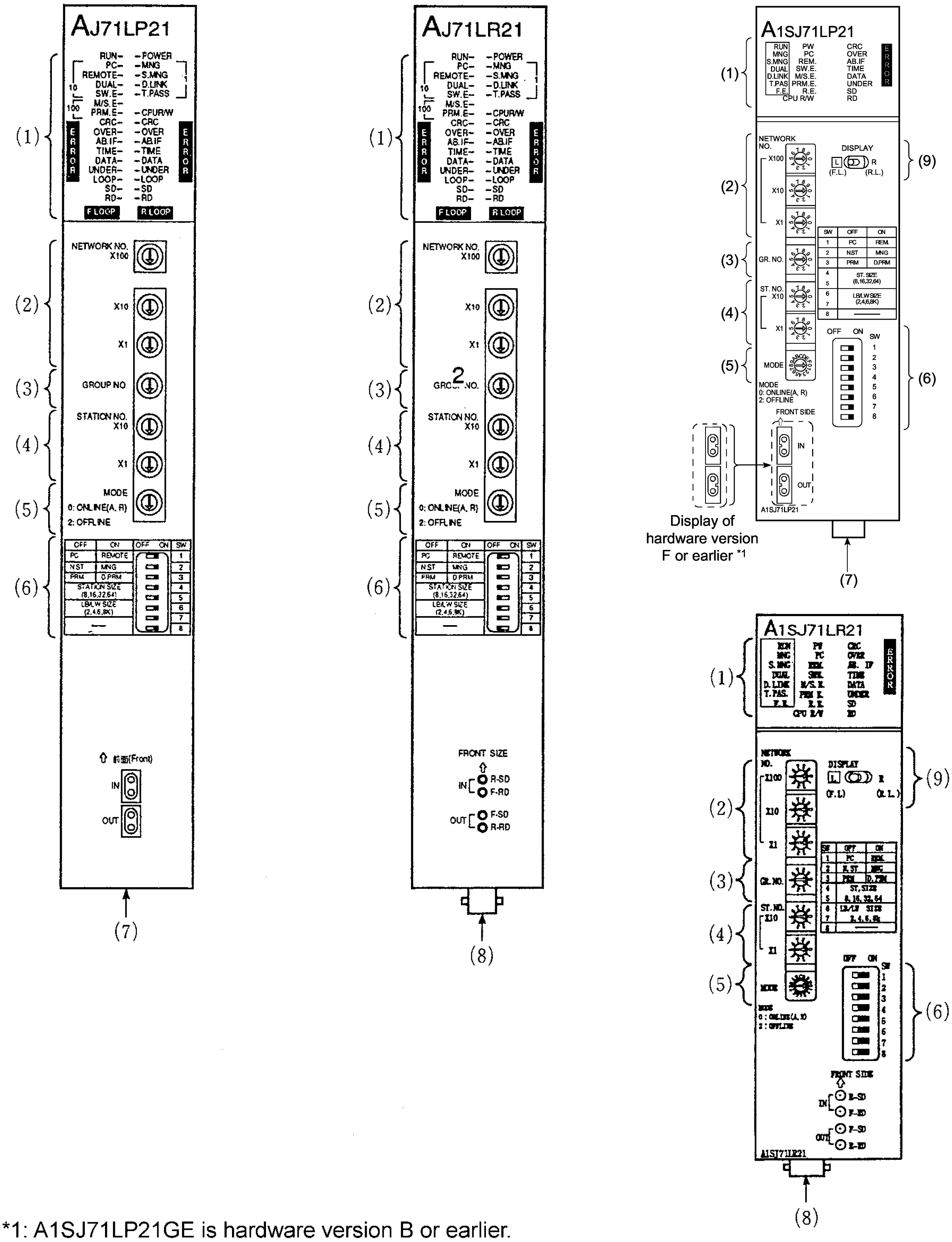


3.2 Names of Parts and Connections of the Optical/Coaxial Loop System

3.2.1 Names of Parts and settings

This section explains the part names and settings of the AJ71LP21 and A1SJ71LP21 designed for use in optical loop systems and the AJ71LR21 and A1SJ71LR21 designed for use in coaxial loop systems.
The AJ71LP21G and AJ71LP21GE are identical to the AJ71LP21. The A1SJ71LP21GE is identical to the A1SJ71LP21.

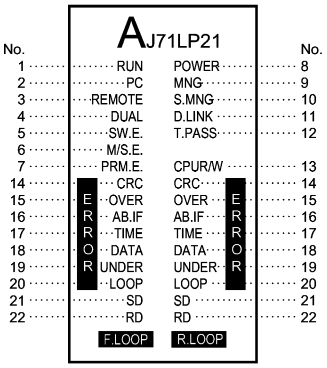
<Front view>



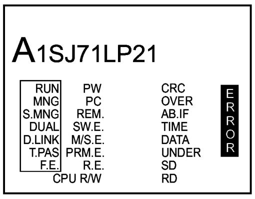
*1: A1SJ71LP21GE is hardware version B or earlier.

Table 3.1 Names of Parts and Settings

No.	Name	Description			
		No.	Name	State	Description
(1)	LED	1	RUN	Lit	Normal state
				Unlit	WDT error, SP. UNIT ERROR
		2	PC	Lit (No. 5 to 7 are not lit when normal.)	Setting for a PLC to PLC network is made. (SW1: OFF)
		3	REMOTE		Setting for a remote I/O network is made. (SW1: ON)
		4	DUAL		Executing multiplex transmission. (Unlit: Multiplex transmission not executed.)
		5	SW.E		Switch settings with (2) to (6) have abnormality.
		6 *1	M/S.E		Two same station numbers or two control stations are set in a network.
		7	PRM.E		Matching error between common parameters and station-specific parameters. Parameters received from the sub-control station do not match with the parameters in the host station (received from the control station).
		8	POWER		Power is supplied. (Unlit: Power is not supplied.)
		9	MNG		Setting for the control station is made. (Unlit: Normal station)
		10	S.MNG		The station has become a sub-control station.
		11	D.LINK		Data link is operative. (Unlit: Data link is inoperative.)
		12	T.PASS		Joining baton passing.
		13	CPU R/W		Communicating with the CPU.
		14	CRC	Lit (Unlit when normal.)	Code check error in received data. <Causes> Timing when the station which is sending data to a specific station is set off-line, hardware fault, cable fault, noise, etc.
		15	OVER		Processing of received data delayed. <Causes> Hardware fault, cable fault, noise, etc.
		16	AB. IF		• "1"s in the number larger than specified are received consecutively. • Received data length is shorter than specified. <Causes> Timing when the station which is sending data to a specific station is set off-line, WDT setting is too short, cable fault, noise, etc.
		17	TIME		Data link WDT times out. <Causes> WDT setting is too short, cable fault, noise, etc.
		18	DATA		Abnormal data larger than 2 kbytes are received. <Causes> Cable fault, noise, etc.
		19	UNDER		Internal processing of send data is not at constant intervals. <Causes> Hardware fault
		20	LOOP		The forward or reverse loop is faulty. <Causes> Power to the adjacent station is OFF. Cable breakage or not connected, etc.
			F.E.		The forword loop is faulty.
			R.E.		The Reverse loop is faulty.
		21	SD	Dimly lit	Sending data.
		22	RD		Receiving data.



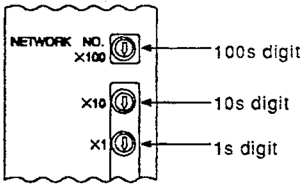
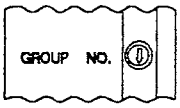
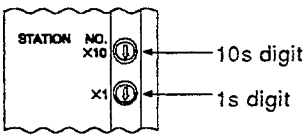
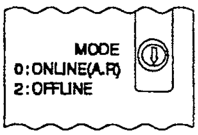
AJ71LR21 also has the same LED indications.



A1SJ71LR21 also has the same LED indications.

*1 ... The M/S.E LED does not light in some cases due to the condition of channels and cable connections even in the situation when two same station numbers or two control stations exist in a network. Execute on-line diagnosis as well as visually check the system.

Table 3.1 Names of Parts and Settings (Continued)

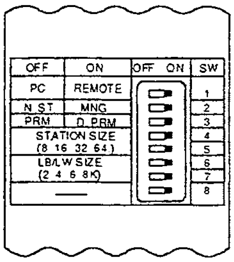
<table>
<tr><th>No.</th><th>Name</th><th>Description</th></tr>
<tr><td>(2)
*2</td><td>Network number setting switches
</td><td>Setting of network number (Factory setting: 1)
<Setting range>
1 to 255: Network number
Other than 1 to 255: Setting error (SW.E LED is lit.) ... Offline status</td></tr>
<tr><td>(3)
*2</td><td>Group number setting switch
</td><td>Setting of group number (Factory setting: 0)
<Setting> range
0: No group setting
1 to 9: Group number</td></tr>
<tr><td>(4)
*2</td><td>Station number setting switches
</td><td>Setting of station number (Factory setting: 1)
<Setting range>
1 to 64: Station number
Other than 1 to 64: Setting error (SW.E LED is lit.)</td></tr>
<tr><td>(5)
*2</td><td>Mode select switch

*4 (modes D to F)</td><td>Setting of mode (Factory setting: 0)
<table>
<tr><th>Mode</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td>On-line (Automatic on-line return is set.)</td><td>Automatic on-line return during data link is enabled.</td></tr>
<tr><td>1</td><td colspan="2">Unusable</td></tr>
<tr><td>2</td><td>Off-line</td><td>Host station is set off-line. *3</td></tr>
<tr><td>3</td><td>Test mode 1</td><td>Loop test (Forward loop)</td></tr>
<tr><td>4</td><td>Test mode 2</td><td>Loop test (Reverse loop)</td></tr>
<tr><td>5</td><td>Test mode 3</td><td>Station-to-station test (Master station)</td></tr>
<tr><td>6</td><td>Test mode 4</td><td>Station-to-station test (Slave station)</td></tr>
<tr><td>7</td><td>Test mode 5</td><td>Self-loopback test</td></tr>
<tr><td>8</td><td>Test mode 6</td><td>Internal self-loopback test</td></tr>
<tr><td>9</td><td>Test mode 7</td><td>Hardware test</td></tr>
<tr><td>A</td><td>—</td><td>Unusable</td></tr>
<tr><td>B</td><td>—</td><td>Unusable</td></tr>
<tr><td>C</td><td>—</td><td>Unusable</td></tr>
<tr><td>D</td><td>Test mode 8</td><td>Network number confirmation (LED indication)</td></tr>
<tr><td>E</td><td>Test mode 9</td><td>Group number confirmation (LED indication)</td></tr>
<tr><td>F</td><td>Test mode 10</td><td>Station number confirmation (LED indication)</td></tr>
</table></td></tr>
</table>

*2 ... After changing settings, reset the ACPU.
Resetting of the ACPU is not necessary for mode settings D, E, and F.

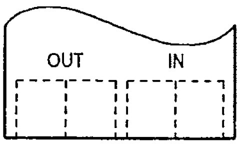
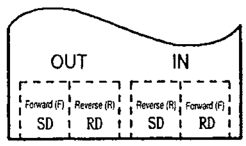
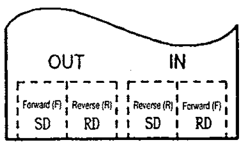
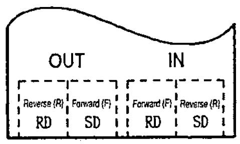
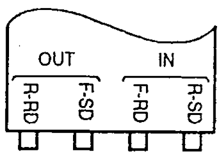
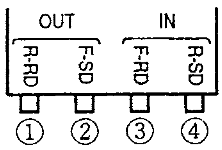
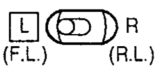
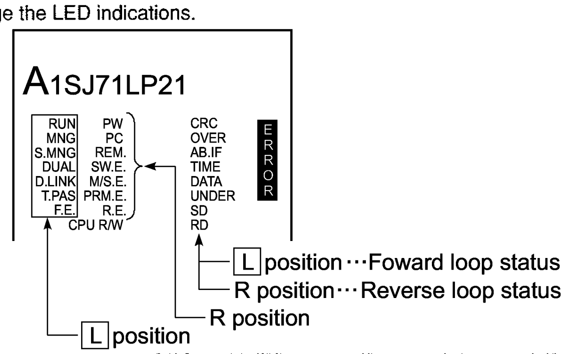
*3 ... For the MELSECNET/10, set the network parameters in the AnUCPU, even in the offline mode. If the network parameters are not set, the AnUCPU will result in a network parameter error.

*4 ... Resetting of the ACPU is not necessary for mode settings D to F.
These tests can be performed on AJ71LP21 and AJ71LR21.

Table 3.1 Names of Parts and Settings (Continued)

No.	Name	Description
(6) *5	Condition setting switches 	Setting of operating conditions (Factory setting: all set to OFF)

SW	Description	OFF				ON			
1	Network type	PLC to PLC network (PC)				Remote I/O network (REMOTE)			
2	Station type	Normal station (N.ST)				Control station (MNG)			
3	Parameters	Common parameters (PRM)				Default parameters (D.PRM)			
4 (*6)	Number of stations (valid when SW3 is ON)	OFF	8 stations	OFF	16 stations	ON	32 stations	ON	64 stations
5 (*6)		OFF		ON		OFF		ON	
6 (*6)	Total number of B/W points (valid when SW3 is ON)	OFF	2k points	OFF	4k points	ON	6k points	ON	8k points
7 (*6)		OFF		ON		OFF		ON	
8	Not used	—				—			

No.	Name	Description
(7)	Connector 	Used to connect fiber-optic cables. Hardware version G or later *7  Hardware version F or earlier *8  AJ71LP21  A1SJ71LP21
(8)	Connector 	Used to connect coaxial cables.  1) Connect with IN R-SD of the next station. 2) Connect with IN F-RD of the next station. 3) Connect with OUT F-SD of the previous station. 4) Connect with OUT R-RD of the previous station.
(9)	LED indication select switch 	Used to change the LED indications. 

*5 ... After changing settings, reset the ACPU.

*6 ... Setting 8 stations and 8k points will result in SW.E.
This is because the number of link points per station is 2176 bytes, exceeding 2000 bytes.

*7 ... A1SJ71LP21GE is hardware version C or later.

*8 ... A1SJ71LP21GE is hardware version B or earlier.

3.2.2 Precautions for cable connections

(1) **The following gives precautions for connecting optical-fiber cables and network modules in a optical loop system.**

(a) The types of optical fiber cables that can be used vary depending on the distance between stations.

Type	Distance between stations (m (ft.))		
	AJ71LP21 A1SJ71LP21	AJ71LP21G	AJ71LP21GE
SI fiber-optic cable	500 (1641)	Must not be used	Must not be used
H-PCF fiber-optic cable	1000 (3281)		
Broad-band H-PCF fiber-optic cable	1000 (3281)		
QSI fiber-optic cable	1000 (3281)		
GI-50/125 fiber-optic cable	Must not be used	2000 (6562)	Must not be used
GI-62.5/125 fiber-optic cable	Must not be used	Must not be used	2000 (6562)

(b) When connecting an optical fiber cable, check the specifications of the cable for restrictions on the bending radius.

(c) Maintain the bending radius of the optical fiber cable within the allowable range using a tool for securing the optical fiber cable bending radius.
Contact Mitsubishi Electric System Service, Inc, for the tool.

(d) When laying the optical-fiber cables, do not touch the fiber cores of the cable and module connectors, and do not let dust or particles collect on them.
If oil from hands, dust or particles adhere to the cores, the accumulated transmission loss may cause malfunctions in the data link.
Also, do not remove the cover from the module connector until an optical fiber cable is connected.

(e) When attaching or detaching the optical fiber cable to/from the module, pull or insert the cable by holding the cable connector securely with your hand.

(e) Connect the cable and module connectors securely until you hear a "click" sound.

(g) Please wire IN/OUT of the connector for the cable correctly.
Please do loopback test, the set confirmation test, and the bureau order confirmation test after wiring. It might be generated that a baton abnormal passing cannot be generated when miswiring and the downed bureau which cannot do the loopback of an arbitrary bureau do the row again even by the reclosing of the power supply.

(h) Completely turn off the externally supplied power used in the system when connecting or disconnecting the cable.

(2) The following gives precautions for connecting coaxial cables and network modules in a coaxial loop system.

(a) Restrictions on the interstation cable length

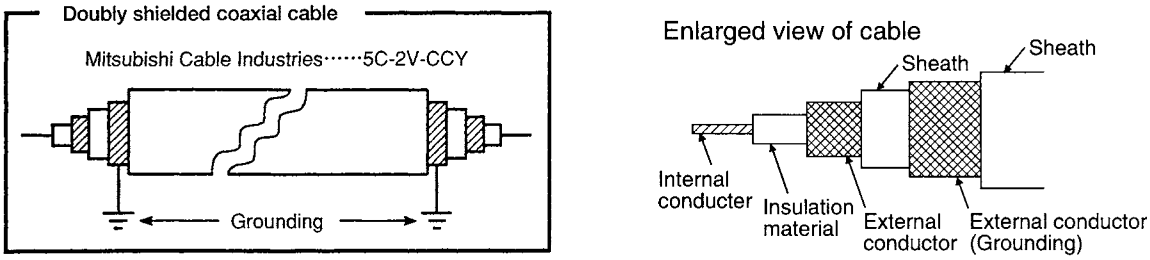
1) For connection between network modules, use the cable length given in the following table depending on the cable type.

Cable Type	Interstation Cable Length	Overall Distance
3C-2V	300 m	19.2 km
5C-2V	500 m	30.0 km
5C-FB	500 m	30.0 km

(b) Notes on cabling

1) Run coaxial cables at least 100mm away from the other power and control cables and so forth.

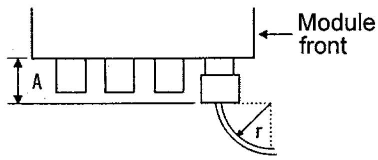
2) In a place having much noise, examine running doubly shielded coaxial cables.



The 5C-2V connector plug can be applied to the doubly shielded coaxial cable.
Connect the 5V-2C connector plug to the coaxial cable in the inside of the doubly shielded coaxial cable.
Ground the shield part in the outside of the doubly shielded coaxial cable as shown above.

(c) A coaxial cable connected is restricted to the following bending radius.

Cable Type	Allowable bending radius r [mm] (inch)	Connector A[mm] (inch)
3C-2V	23 (0.91)	35 (1.38)
5C-2V	30 (1.18)	
5C-FB	30 (1.18)	



(d) Do not pull the connected coaxial cables.
Doing so can cause poor contact or cable disconnection.

(e) Please wire SD/RD of the connector for the cable correctly.
Please do loopback test, the set confirmation test, and the bureau order confirmation test after wiring. It might be generated that a baton abnormal passing cannot be generated when miswiring and the downed bureau which cannot do the loopback of an arbitrary bureau do the row again even by the reclosing of the power supply.

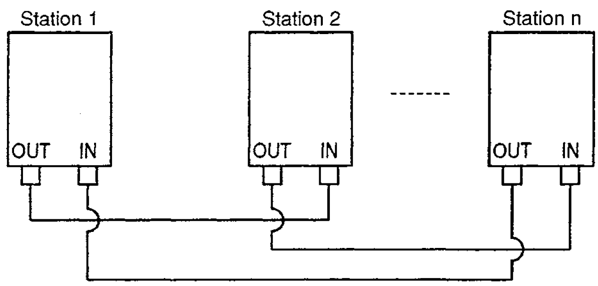
(f) Completely turn off the externally supplied power used in the system when connecting or disconnecting the cable.

3.2.3 Connecting method

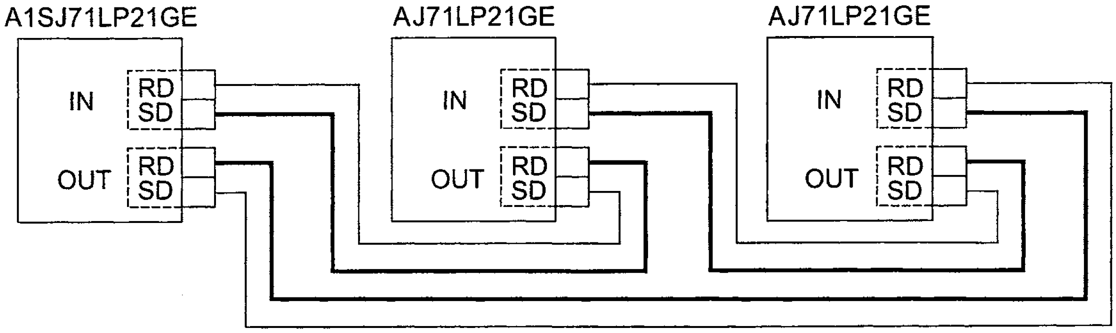
Stations need not be connected in station number order.

(1) Optical loop system
(AJ71LP21, A1SJ71LP21, AJ71LP21G, A1SJ71LP21GE, AJ71LP21GE)
Connect fiber-optic cables as shown below.

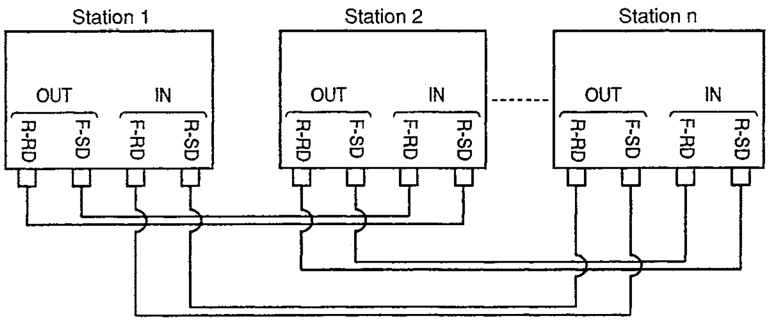
(a) AJ71LP21, A1SJ71LP21, AJ71LP21G



(b) A1SJ71LP21GE, AJ71LP21GE

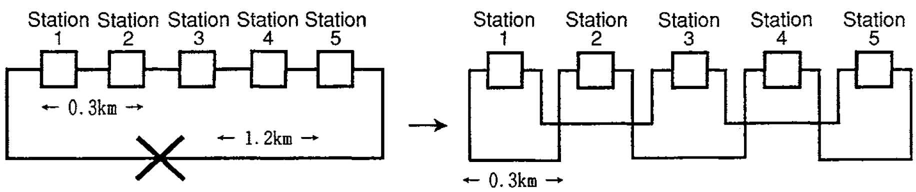


(2) Coaxial loop system (AJ71LR21, A1SJ71LR21)
Connect coaxial cables as shown below.



REMARK

If the limit of the inter-station distance is exceeded in an optical or coaxial loop system, changing the cable connection sequence as shown below can reduce the inter-station distance.



Station No. 1 and station No. 5 can be connected.

3.3 Names of Parts and Connections of the Coaxial Bus System

3.3.1 Names of parts and settings

This section gives the names of parts and settings of the AJ71BR11/A1SJ71BR11 used with a coaxial bus system.

<Front view>

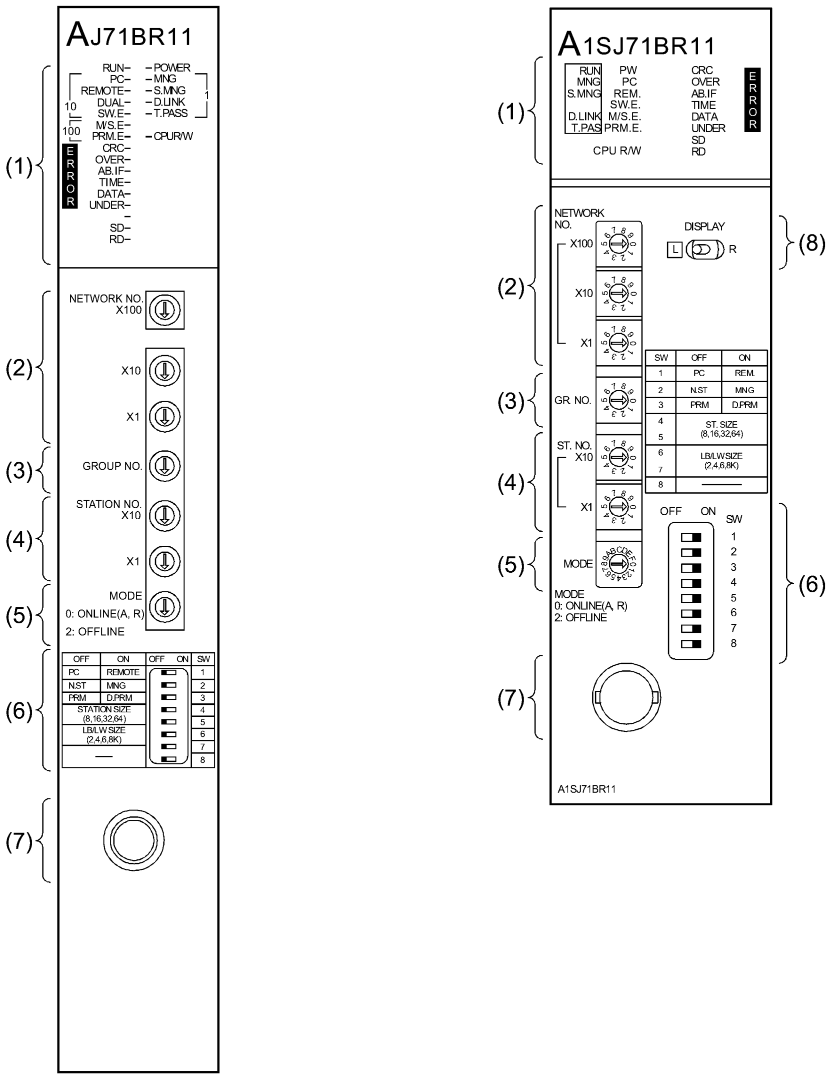
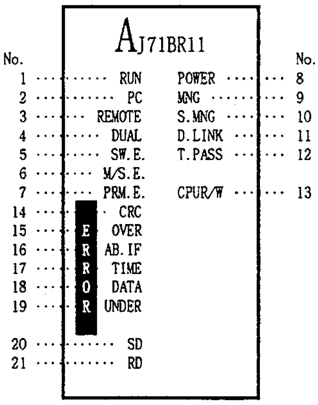
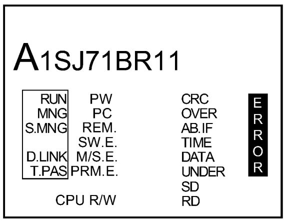


Table 3.3 Names of Parts and Settings

No.	Name	Description
(1)	LED	(see below)



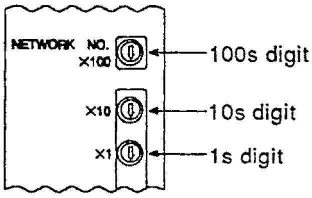
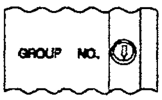
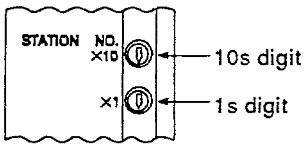
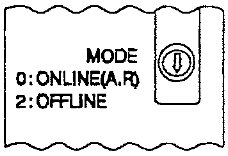


No.	Name	State	Description
1	RUN	Lit	Normal state
		Unlit	WDT error, SP. UNIT ERROR
2	PC	Lit	Setting for a PLC to PLC network is made. (SW1: OFF)
3	REMOTE	Lit	Setting for a remote I/O network is made. (SW1: ON)
4	DUAL	Always unlit	————
5	SW. E	Lit (No. 5 to 7 are not lit when normal.)	Switch settings with (2) to (6) have abnormality.
6 *1	M/S. E		Two same station numbers or two control stations are set in a network.
7	PRM. E		Matching error between common parameters and station-specific parameters. Parameters received from the sub-control station do not match with the parameters in the host station (received from the control station).
8	POWER		Power is supplied. (Unlit: Power is not supplied.)
9	MNG		Setting for the control station is made. (Unlit: Normal station)
10	S. MNG		The station has become a sub-control station.
11	D. LINK		Data link is operative. (Unlit: Data link is inoperative.)
12	T. PASS		Joining baton passing.
13	CPU R/W		Communicating with the CPU.
14	CRC	Lit (Unlit when normal.)	Code check error in received data. <Causes> Timing when the station which is sending data to a specific station is set off-line, hardware fault, cable fault, noise, etc.
15	OVER		Processing of received data delayed. <Causes> Hardware fault, cable fault, noise, etc.
16	AB. IF		• "1"s in the number larger than specified are received consecutively. • Received data length is shorter than specified. <Causes> Timing when the station which is sending data to a specific station is set off-line, WDT setting is too short, cable fault, noise, etc.
17	TIME		Data link WDT times out. <Causes> WDT setting is too short, cable fault, noise, etc.
18	DATA		Abnormal data larger than 2 kbytes are received. <Causes> Cable fault, noise, etc.
19	UNDER		Internal processing of send data is not at constant intervals. <Causes> Hardware fault
20	SD	Dimly lit	Sending data.
21 *2	RD		Receiving data.

*1 ... The M/S.E LED does not light in some cases due to the condition of channels and cable connections even in the situation when two same station numbers or two control stations exist in a network.

*2 ... Without a terminating resistor, this LED may always be on even if data link is not performed. (This is not a network module fault.)

Table 3.3 Names of Parts and Settings (Continued)

<table>
<tr><th>No.</th><th>Name</th><th>Description</th></tr>
<tr><td>(2)
*3</td><td>Network number setting
</td><td>Setting of network number (Factory setting: 1)
<Setting range>
1 to 255: Network number
Other than 1 to 255: Setting error (SW.E LED is lit.) ... Offline status</td></tr>
<tr><td>(3)
*3</td><td>Group number setting switch
</td><td>Setting of group number (Factory setting: 0)
<Setting range>
0: No group setting
1 to 9: Group number</td></tr>
<tr><td>(4)
*3</td><td>Station number setting switches
</td><td>Setting of station number (Factory setting: 1)
<Setting range>
1 to 32: Station number
Other than 1 to 32: Setting error (SW.E LED is lit. Note that it is not lit when any of 33 to 64 is set.)</td></tr>
<tr><td>(5)
*3</td><td>Mode select switch
</td><td>Setting of mode (Factory setting: 0)
<table>
<tr><th></th><th>Mode</th><th>Name</th><th>Description</th></tr>
<tr><td></td><td>0</td><td>On-line (Automatic on-line return is set.)</td><td>Automatic on-line return during data link is enabled.</td></tr>
<tr><td></td><td>1</td><td colspan="2">Unusable</td></tr>
<tr><td></td><td>2</td><td>Off-line</td><td>Host station is set off-line. *4</td></tr>
<tr><td rowspan="2">*5</td><td>3</td><td>Test mode 1</td><td>Unusable</td></tr>
<tr><td>4</td><td>Test mode 2</td><td>Unusable</td></tr>
<tr><td></td><td>5</td><td>Test mode 3</td><td>Station-to-station test (Master station)</td></tr>
<tr><td></td><td>6</td><td>Test mode 4</td><td>Station-to-station test (Slave station)</td></tr>
<tr><td></td><td>7</td><td>Test mode 5</td><td>Self-loopback test</td></tr>
<tr><td></td><td>8</td><td>Test mode 6</td><td>Internal self-loopback test</td></tr>
<tr><td></td><td>9</td><td>Test mode 7</td><td>Hardware test</td></tr>
<tr><td></td><td>A</td><td>——</td><td>Unusable</td></tr>
<tr><td></td><td>B</td><td>——</td><td>Unusable</td></tr>
<tr><td></td><td>C</td><td>——</td><td>Unusable</td></tr>
<tr><td rowspan="3">*6</td><td>D</td><td>Test mode 8</td><td>Network number confirmation (LED indication)</td></tr>
<tr><td>E</td><td>Test mode 9</td><td>Group number confirmation (LED indication)</td></tr>
<tr><td>F</td><td>Test mode 10</td><td>Station number confirmation (LED indication)</td></tr>
</table></td></tr>
</table>

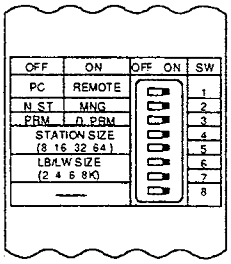
*3 ... After changing settings, reset the ACPU.
Resetting of the ACPU is not necessary for mode settings D,E,and F.

*4 ... For the MELSECNET/10, set the network parameters to the AnUCPU, even in the offline mode. If the network parameters are not set, the AnUCPU will result in a network parameter error.

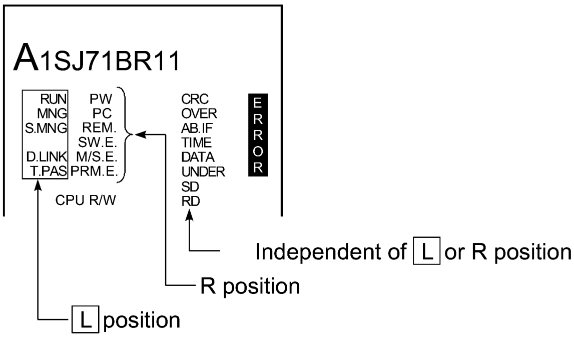
*5 ... If either of these is set, the SW.E. will turn on.

*6 ... Resetting of the ACPU is not necessary for mode settings D to F.
These tests can be performed on AJ71BR11.

Table 3.3 Names of Parts and Settings (Continued)

<table>
<tr><th>No.</th><th>Name</th><th>Description</th></tr>
<tr><td>(6)
*7</td><td>Condition setting switches


*8</td><td>Setting of operating conditions (Factory setting: all set to OFF)
<table>
<tr><th>SW</th><th>Description</th><th colspan="4">OFF</th><th colspan="4">ON</th></tr>
<tr><td>1</td><td>Network type</td><td colspan="4">PLC to PLC network (PC)</td><td colspan="4">Remote I/O network (REMOTE)</td></tr>
<tr><td>2</td><td>Station type</td><td colspan="4">Normal station (N. ST)</td><td colspan="4">Control station (MNG)</td></tr>
<tr><td>3</td><td>Parameters</td><td colspan="4">Common parameters (PRM)</td><td colspan="4">Default parameters (D. PRM)</td></tr>
<tr><td>4</td><td rowspan="2">Number of stations (valid when SW3 is ON)</td><td>OFF</td><td rowspan="2">8 stations</td><td>OFF</td><td rowspan="2">16 stations</td><td>ON</td><td rowspan="2">32 stations</td><td>ON</td><td rowspan="2">64 stations</td></tr>
<tr><td>5</td><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td></tr>
<tr><td>6</td><td rowspan="2">Total number of B/W points (valid when SW3 is ON)</td><td>OFF</td><td rowspan="2">2k points</td><td>OFF</td><td rowspan="2">4k points</td><td>OFF</td><td rowspan="2">6k points</td><td>ON</td><td rowspan="2">8k points</td></tr>
<tr><td>7</td><td>OFF</td><td>ON</td><td>ON</td><td>ON</td></tr>
<tr><td>8</td><td>Not used</td><td colspan="4">—</td><td colspan="4">—</td></tr>
</table></td></tr>
<tr><td>(7)</td><td>Connector</td><td>Used to connect an F type connector.</td></tr>
<tr><td>(8)</td><td>LED indication select switch
DISPLAY

</td><td>Used to change the LED indications.

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

*7 . . . After changing settings, reset the ACPU.

*8 . . . Setting 8 stations and 8k points will result in SW.E.
This is because the number of link points per station is 2176 bytes, exceeding 2000 bytes.

3.3.2 Precautions for cable connections

The following gives the precautions to be observed when connecting coaxial cables to a network module.

(1) Restrictions on inter-station cable lengths

(a) When connecting between the network modules, the cable lengths indicated in the table below should be used according to the number of stations connected.
A communication error may occur if a cable length other than the lengths indicated in the table is used.

Number of stations connected / Station-to-station cable length	2 to 9 stations			10 to 33 stations		
Cable type	3C - 2V	5C - 2V	5C-FB	3C - 2V	5C - 2V	5C-FB
0 to 1 m (3.28 ft.)	× (cable less than 1m (3.28 ft.) in length cannot be used.)					
1 (3.28 ft.) to 5 m (16.41 ft.)	○	○	○	○	○	○
5 (16.41 ft.) to 13 m (42.65 ft.)	○	○	○	×	×	×
13 (42.65 ft.) to 17 m (55.78 ft.)	○	○	○	○	○	○
17 (55.78 ft.) to 25 m (82.03 ft.)	○	○	○	×	×	×
25 (82.03 ft.) to 300 m (984.3 ft.)	○	○	○	○	○	○
300 (984.3 ft.) to 500 m (1640.5 ft.)	×	○	○	×	○	○

○: Allowed ×: Not allowed

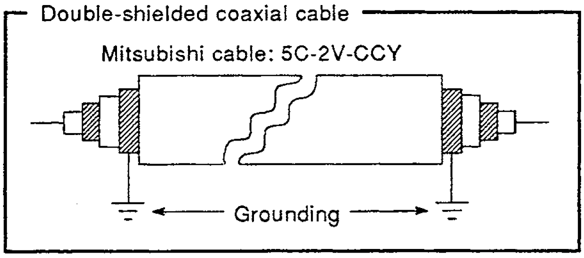
(b) If the number of stations increase due to system expansion or similar, carry out wiring after considering the restrictions.

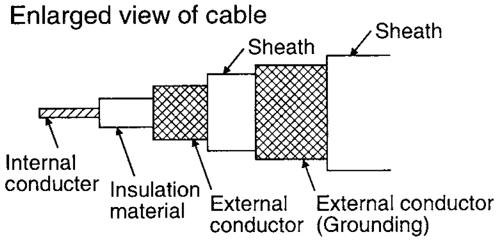
(c) When using a repeater module (models A6BR10 or A6BR10-DC), use the station-to-station cable length indicated by "10 to 33" stations, regardless of the number of stations connected or the number of repeater modules.

(2) Cautions on cabling

(a) Coaxial cable must be laid providing a 100 mm(3.94 inch) or more clearance to power cables or control cables.

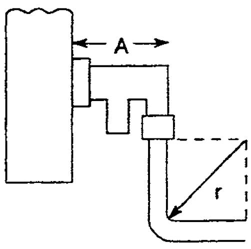
(b) Where intensive influence by noise is expected, use of double-shielded coaxial cables is recommended.





A 5C-2V connector plug can be applied to the doubly shielded coaxial cable. Connect the 5V-2C connector plug to the coaxial cable in the inside of the doubly shielded coaxial cable.
Ground the shield part in the outside of the doubly shielded coaxial cable as shown above.

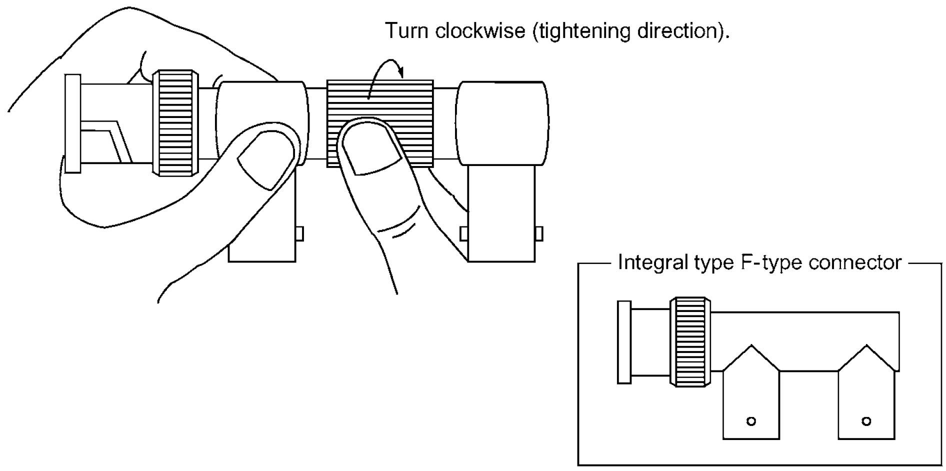
(3) Coaxial cables have the following limitations on the bending radius:



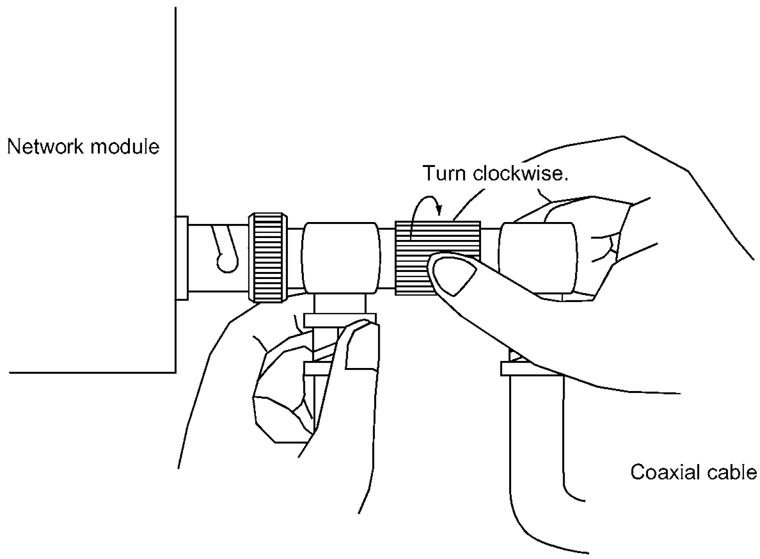
Cable Type	Allowable Bending Radius r [mm] (inch)	Connector A [mm] (inch)
3C-2V	23 (0.91)	50 (1.97)
5C-2V	30 (1.18)	
5C-FB	30 (1.18)	

(4) Do not pull connected coaxial cable. Contact failure and cable disconnection may occur.

(5) There are integral type and separate type F-type connectors. In the case of the separate type F-type connector, tighten the ring of the connector until the ring is tight before connecting the connector to the network module.
If the ring is loose, a communication error may occur.



After connecting the F-type connector to the network module, retighten its ring periodically.
Retighten it with both hands as shown below.



(6) A white oxide, which may be deposited on the F-type connector depending on the operating environment, is not produced in the fitting portion, posing no functional problems.

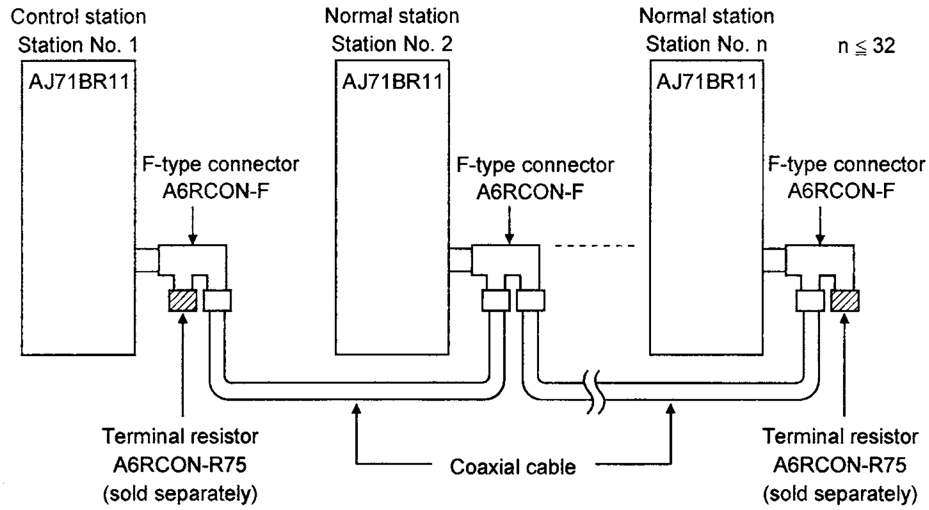
(7) Make sure to connect a terminal resistor to both terminal stations of the coaxial bus type network system.

(8) Completely turn off the externally supplied power used in the system when connecting or disconnecting the cable.

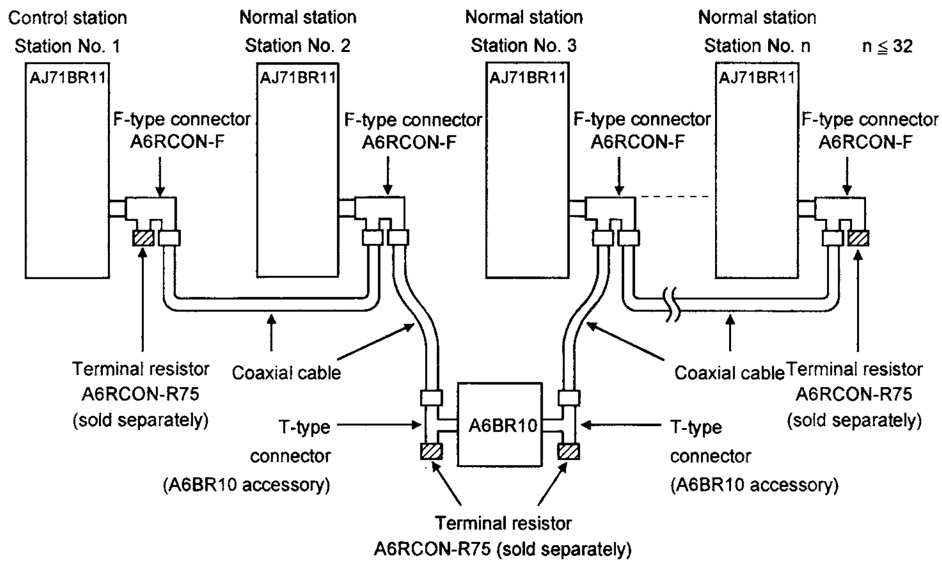
3.3.3 Connecting method

Connect the coaxial cables as shown below. It is not necessary to connect them in the order of station numbers.
Connect terminal resistances **(sold separately: A6CON-R75)** to the stations connected to the ends of the bus.
The F-type connector (A6RCON-F) comes with the module (AJ71BR11, A1SJ71BR11).

1) Without a repeater module



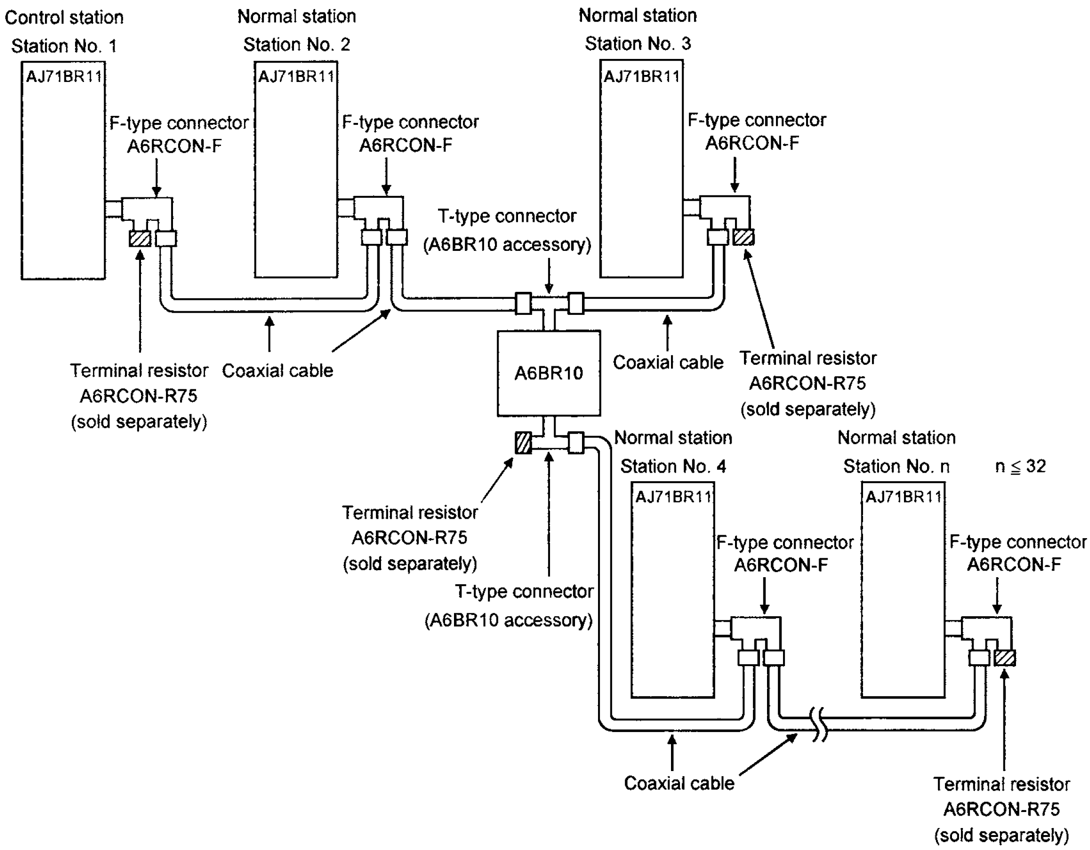
2) With a repeater module (series connection)



REMARK

For details about the repeater module (A6BR10), see the following user's manual attached to the product:
Model A6BR10/A6BR10-DC MELSECNET/10 Coaxial Bus System Repeater Module User's Manual (IB-66499)

3) **With a repeater module (branch connection)**

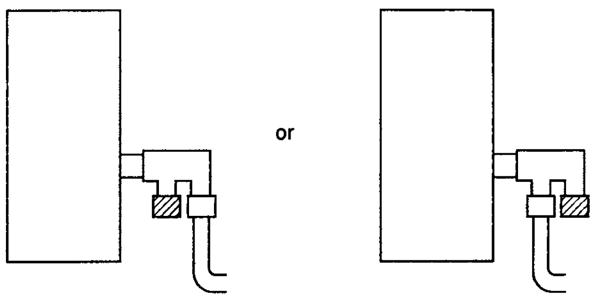


POINT

(1) By setting stations that will be connected in future (stations that are included in the number of stations but not actually connected) as reserved stations, a communication error can be prevented and the link scan time will not be affected.

(2) The two connectors of the F-type connector are not dedicated to IN and OUT. A coaxial cable can be connected to either of them.

(3) A terminal resistor can be placed on either side of the F-type connector.

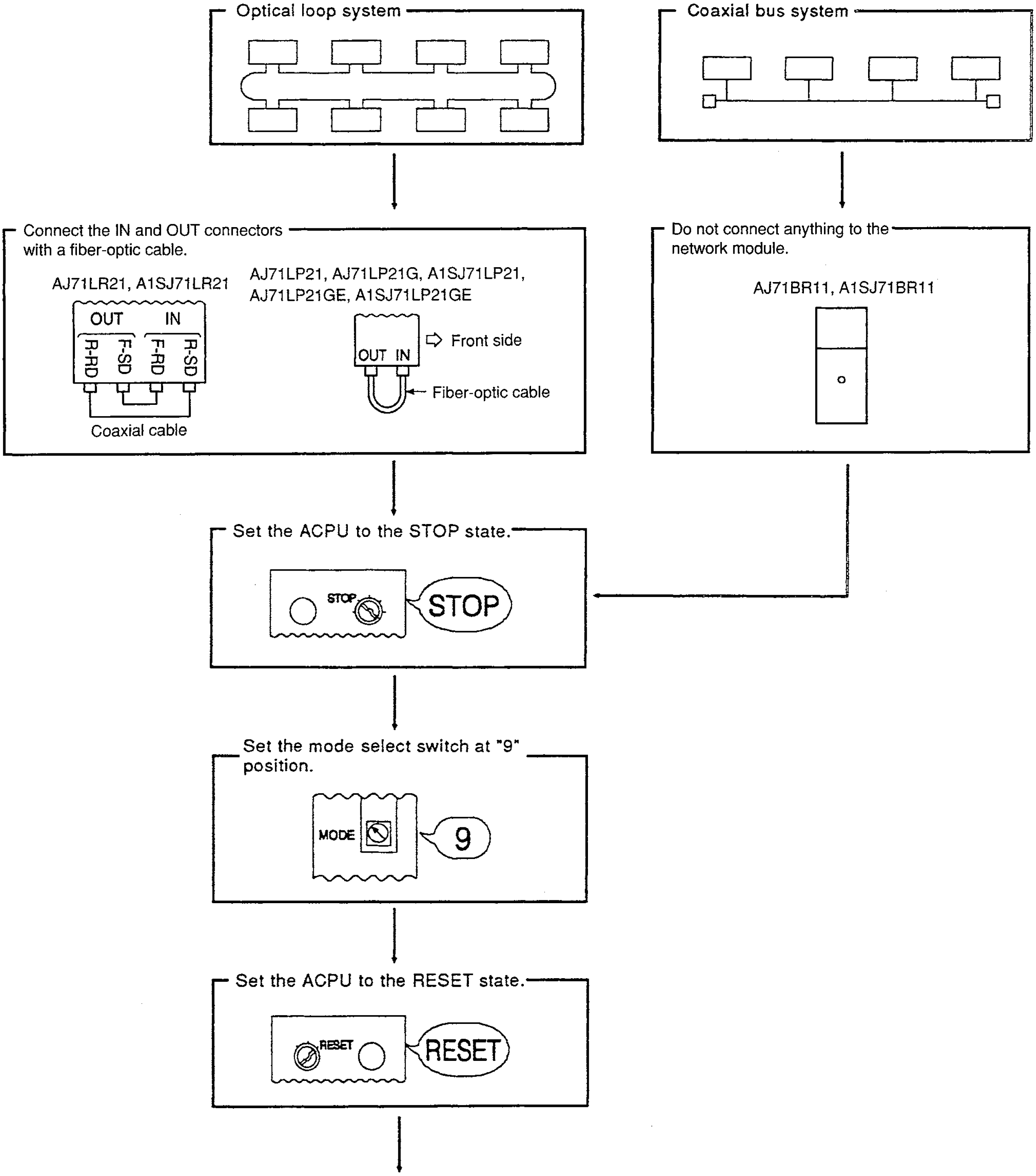


3.4 Checking the Network Module and Connections (Off-Line Check)

This section gives the checking items for the network module and connections before starting data link.
Start checking with Section 3.3.1 and then proceed with the following sections.

3.4.1 Hardware test

Check hardware inside the network module in the order given below.



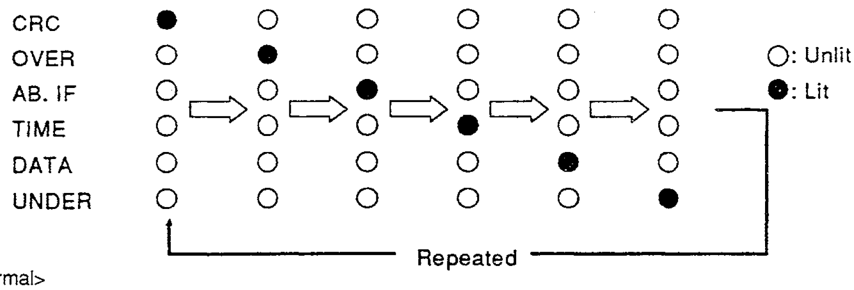
To the next page.

From the previous page.

Hardware test is executed!

The test results are indicated by the LEDs.

<When normal>
The CRC, OVER, AB.IF, TIME, DATA, and UNDER LEDs light in that order.



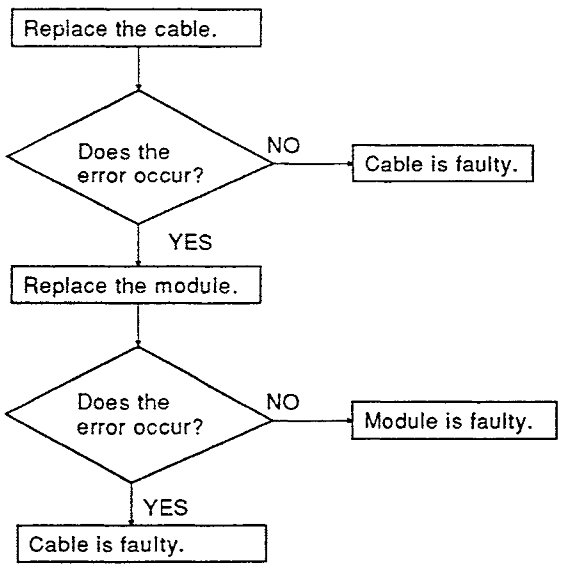
<When abnormal>
For both the optical loop system (AJ71LP21, AJ71LP21G, A1SJ71LP21, AJ71LP21GE, A1SJ71LP21GE, AJ71LR21, A1SJ71LR21) and the coaxial bus system (AJ71BR11, A1SJ71BR11):
When the following errors occur, corresponding LED will light. Replace the network module.

1) CRC is lit: ROM check error
2) OVER is lit: RAM check error
3) AB.IF is lit: Timer or interrupt function check error

For the optical loop system (AJ71LP21) only

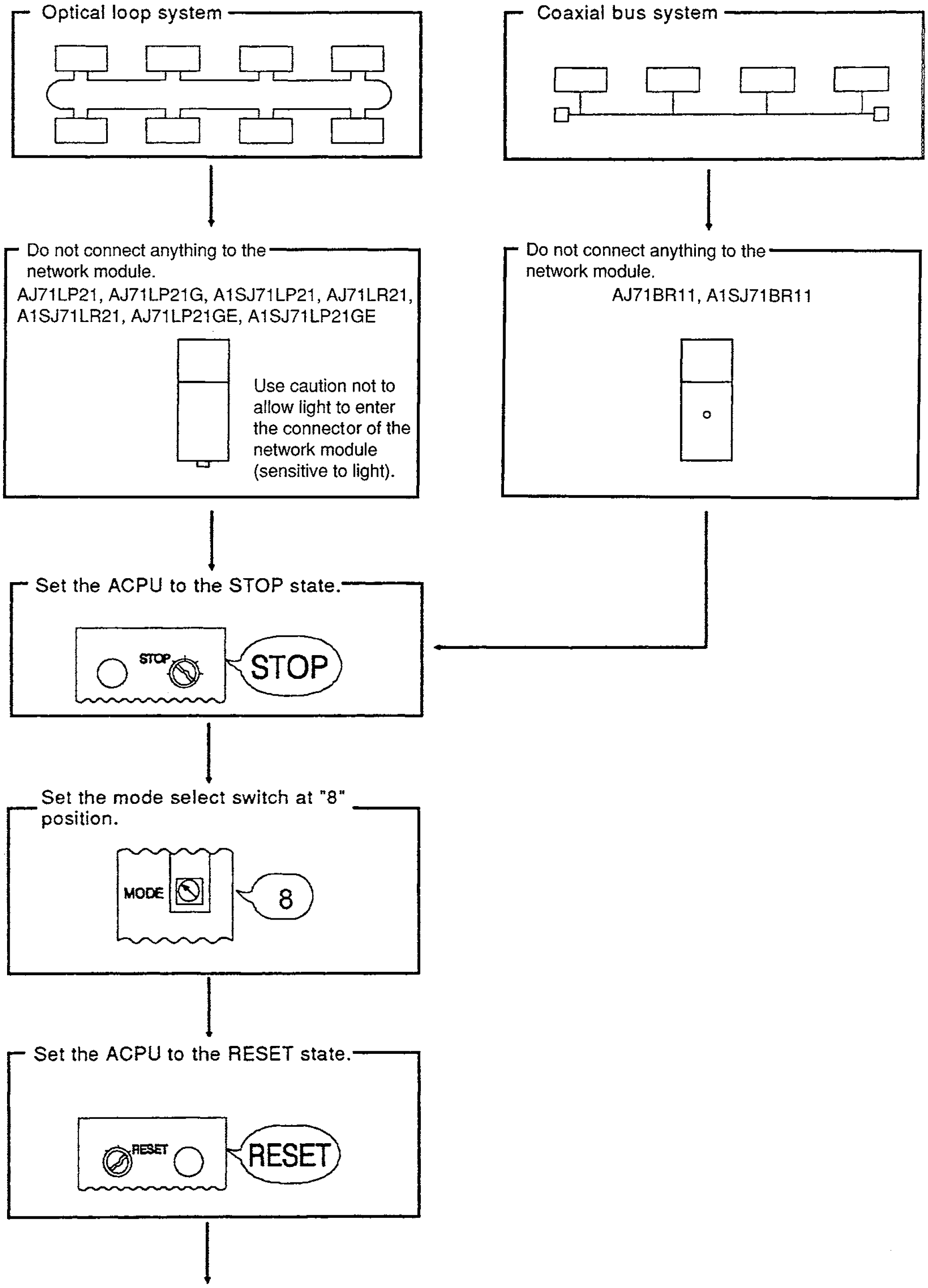
1) TIME is lit : Forward loop open cable check error
2) DATA is lit : Reverse loop open cable check error

When an open cable check error occurs, locate the cause by following the flowchart given below.



3.4.2 Internal self-loopback test

Check hardware including the send and receive circuits for transmissions in a single network module in the order given below.



To the next page.

From the previous page.

Internal self-loopback test is executed!

The test results are indicated by the LEDs.

<When normal>
The CRC, OVER, AB.IF, TIME, DATA, and UNDER LEDs light in that order.

CRC	●	○	○	○	○	○
OVER	○	●	○	○	○	○
AB. IF	○	○	●	○	○	○
TIME	○	○	○	●	○	○
DATA	○	○	○	○	●	○
UNDER	○	○	○	○	○	●

○: Unlit
●: Lit

Repeated

<When abnormal>
For the optical loop system (AJ71LP21, AJ71LP21G, A1SJ71LP21G, A1SJ71LR21, AJ71LP21GE, A1SJ71LP21GE)

1) ERROR LED is lit
   - Hardware failure

For the coaxial bus system (AJ71BR11, A1SJ71BR11)

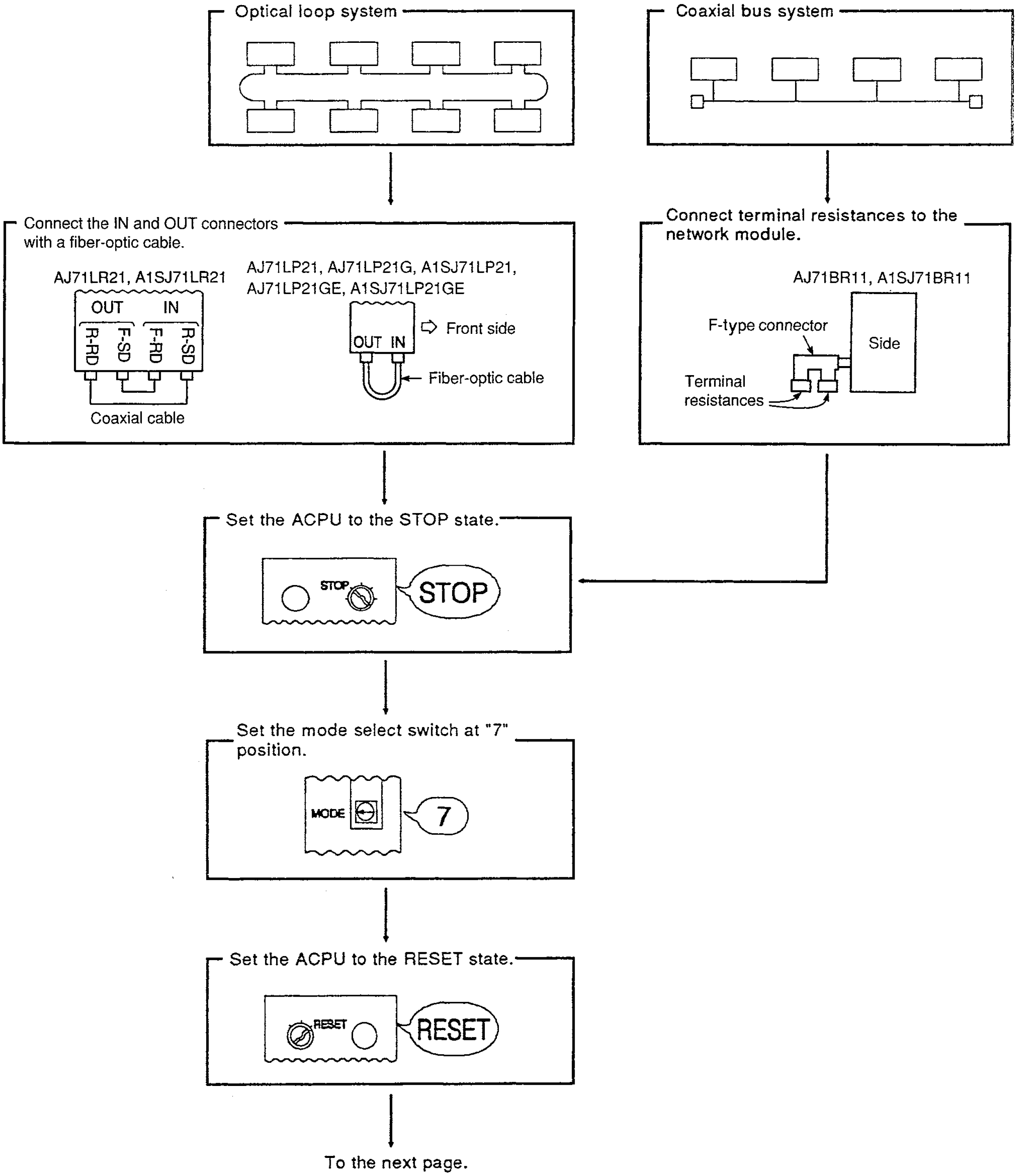
1) ERROR LED is lit
   - Hardware failure

REMARK

When an error occurs with the coaxial bus system, the M/S.E or PRM.E LED other than the ERROR LEDs (CRC, OVER, AB.IF, TIME, DATA, UNDER).
When asking for repairs of the network module, please inform the state of LEDs.

3.4.3 Self-loopback test

Check hardware including the send and receive circuits for transmissions in a single network module in the order given below.
Conduct this test to check the cables when the result of the internal self-loopback test is normal.



From the previous page.

Self-loopback test is executed!

The test results are indicated by the LEDs.

<When normal>
The CRC, OVER, AB.IF, TIME, DATA, and UNDER LEDs light in that order.

CRC	●	○	○	○	○	○
OVER	○	●	○	○	○	○
AB. IF	○	○	●	○	○	○
TIME	○	○	○	●	○	○
DATA	○	○	○	○	●	○
UNDER	○	○	○	○	○	●

Repeated

○: Unlit
●: Lit

<When abnormal>
For the optical loop system (AJ71LP21, AJ71LP21G, A1SJ71LP21, AJ71LR21, A1SJ71LR21, AJ71LP21GE, A1SJ71LP21GE)

1) TIME is lit
   - Forward loop cable is broken.
   - The send and receive sides of the forward loop are not connected with a cable.
   - The forward loop send side is connected to the reverse loop send side, and the forward loop receive side is connected to the reverse loop receive side.
2) DATA is lit:
   - Reverse loop cable is broken.
   - The send and receive sides of the reverse loop are not connected with a cable.
3) CRC, UNDER, and AB.IF of the forward and reverse sides flash:
   - Cable is faulty.
4) ERROR LED other than the above is lit:
   - Hardware fault
   - Cable disconnected during the test.
   - Cable broke during the test.

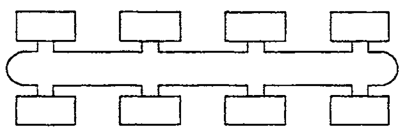
For the coaxial bus system (AJ71BR11, A1SJ71BR11)

1) TIME is lit:
   - Connector is disconnected.
2) CRC, UNDER, and AB.IF flash:
   - Connector is faulty.
3) ERROR LED other than the above is lit:
   - Hardware fault
   - Connector disconnected during the test.

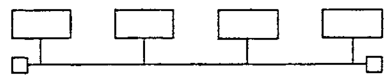
3.4.4 Station-to-station test

Check the channel between two adjacent stations in the order given below.

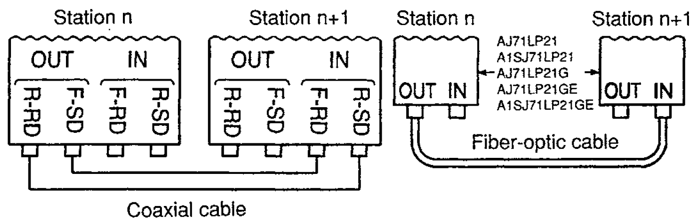
Optical loop system



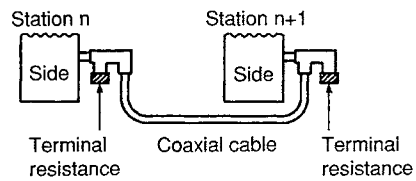
Coaxial bus system



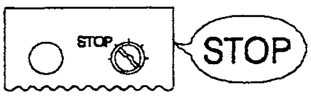
Connect the IN and OUT connectors of two adjacent network modules with a fiber-optic cable.



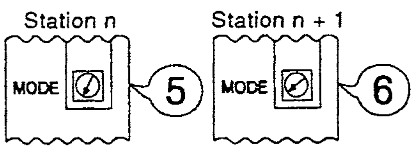
Connect two adjacent network modules with a coaxial cable.



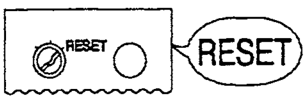
Set the ACPU to the STOP state.



Set the mode select switch at "5 (master station)" and "6 (slave station)".



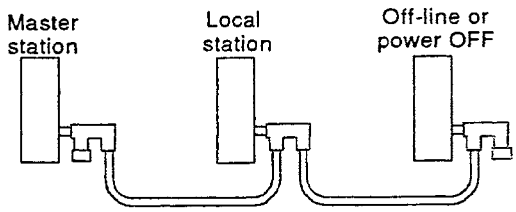
Set the ACPU in the master and slave stations to the RESET state.



To the next page.

POINT

To conduct a station-to-station test when three or more stations are connected to a coaxial bus, set the stations which are not tested to off-line or turn the power to those stations OFF.

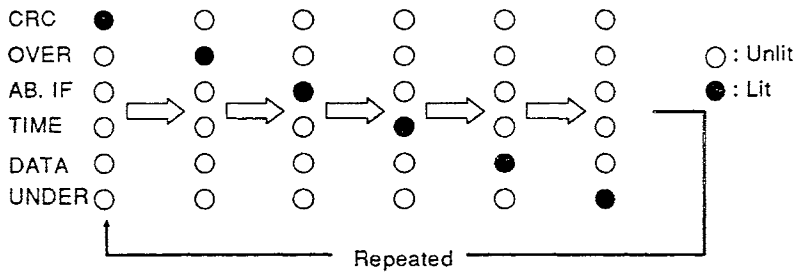


From the previous page.

Station-to-station test is executed!

The test results are indicated by the LEDs.

<When normal>
The CRC, OVER, AB.IF, TIME, DATA, and UNDER LEDs light in that order.



<When abnormal>
For the optical loop system (AJ71LP21, AJ71LP21G, A1SJ71LP21, AJ71LR21, A1SJ71LR21, AJ71LP21GE, A1SJ71LP21GE)

1) TIME is lit:
   - Forward loop cable is broken.
   - The send and receive sides of the forward loop are not connected with a cable.
   - The forward loop send side is connected to the reverse loop send side, and the forward loop receive side is connected to the reverse loop receive side.
2) DATA is lit:
   - Reverse loop cable is broken.
   - The send and receive sides of the reverse loop are not connected with a cable.
3) CRC, OVER, and AB.IF of the master station flash:
   - Cable is faulty.
4) ERROR LED other than the above is lit:
   - Hardware fault
   - Cable disconnected during the test.
   - Cable broke during the test.

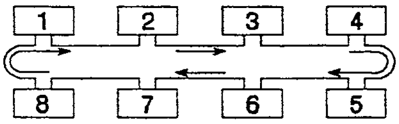
For the coaxial bus system (AJ71BR11, A1SJ71BR11)

1) TIME is lit:
   - Cable is broken.
2) CRC, OVER, and AB.IF flash:
   - Cable is faulty.
3) ERROR LED other than the above is lit:
   - Hardware fault
   - Cable disconnected during the test.
   - Cable broke during the test.

3.4.5 Forward loop / reverse loop test (Optical and Coaxial loop system only)

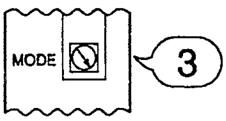
Check the channel after connecting all stations with fiber-optic cables in the order given below.

Forward loop test



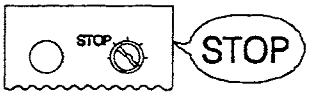
↓

Set the mode select switch of the testing station at "3".
AJ71LP21, AJ71LP21G, A1SJ71LP21, AJ71LR21, A1SJ71LR21, AJ71LP21GE, A1SJ71LP21GE



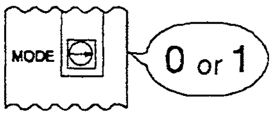
↓

Set all ACPUs to the STOP state.



↓

Set the mode select switch of the stations other than the testing station at "0" or "1".



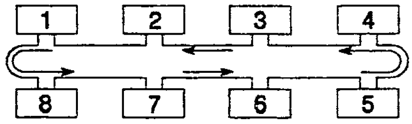
↓

Set the ACPU in the testing station to the RESET state.

↓

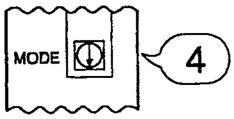
To the next page.

Reverse loop test



↓

Set the mode select switch of the testing station at "4".
AJ71LP21, AJ71LP21G, A1SJ71LP21, AJ71LR21, A1SJ71LR21, AJ71LP21GE, A1SJ71LP21GE



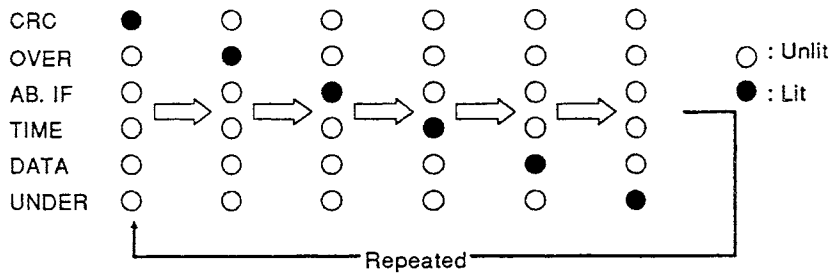
→ (to "Set all ACPUs to the STOP state.")

From the previous page.

Forward loop / reverse loop test is executed!

The test results are indicated by the LEDs.

<When normal>
The CRC, OVER, AB.IF, TIME, DATA, and UNDER LEDs light in that order.



<When abnormal>

1) TIME, DATA, and UNDER LEDs of the forward and reverse loop sides flash:
   - Either the fiber-optic cable or other stations have fault, and the loopback operation is executed.
2) CRC, OVER, and AB.IF of the forward and reverse loop sides flash:
   - Cable is faulty.
3) TIME and DATA LEDs of the forward and reverse loop sides flash:
   - Incorrect connections. Check the cable connections at the stations before and after the station where the error occurred.

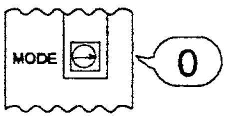
POINT

When a fault is found by the forward / reverse loop test, check the loop by executing a reverse / forward loop operation or loopback operation.

3.4.6 Checking the network numbers, group numbers, and station numbers

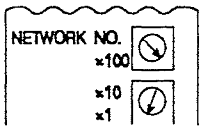
Check the numbers with the LEDs on the front side of the network module in the order given below.

Select mode 0 or 1, and turn ON the power.



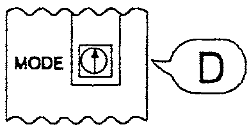
↓

Check the network number.



↓

Set the mode select switch of the network module at "D".



↓

To the top of the right column.

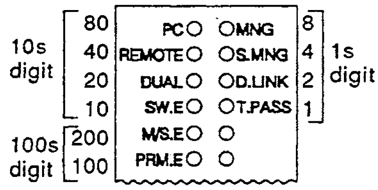
From the bottom of the left column.

↓

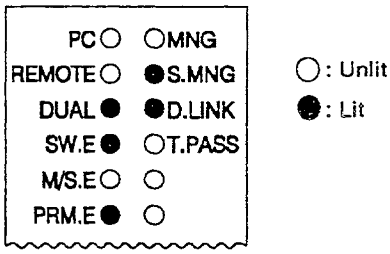
The network number is indicated by the LEDs on the network module.

The network number is indicated in the BCD codes.

Indicating LEDs and corresponding numbers are as given below.



Example: Network number 136 is indicated as follows:



↓

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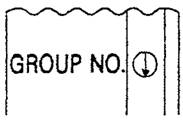
REMARK

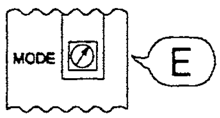
This test cannot be made on the A1SJ71LP21, A1SJ71LR21 and A1SJ71BR11.

From the previous page.

Check the group number.



Set the mode select switch of the network module at "E".



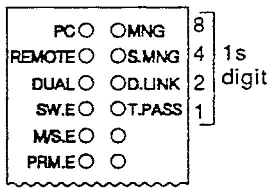
To the top of the right column.

From the bottom of the left column.

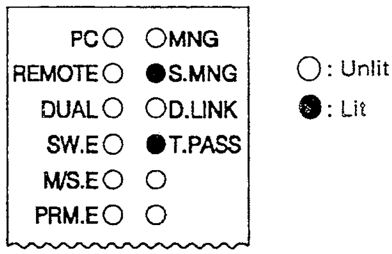
The group number is indicated by the LEDs on the network module.

The group number is indicated in the BCD codes.

Indicating LEDs and corresponding numbers are as given below.



Example: Group number 5 is indicated as follows:



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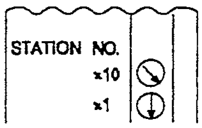
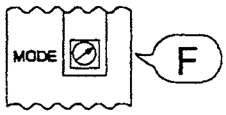
Check the station number.



Set the mode select switch of the network module at "F".



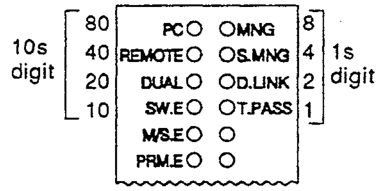
To the top of the right column.

From the bottom of the left column.

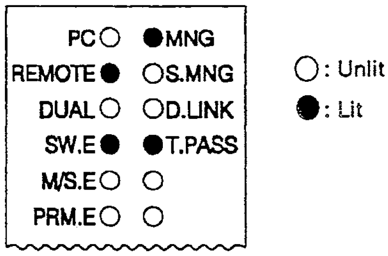
The station number is indicated by the LEDs on the network module.

The station number is indicated in the BCD codes.

Indicating LEDs and corresponding numbers are as given below.



Example: Station number 59 is indicated as follows:



4. DATA LINK WITH A TWO-TIER SYSTEM

This section describes parameter settings, cyclic transmission function, and transient transmission function used with a two-tier system.

The following parameters are used to specify the transmission range in each station:

(1) Default parameters .... Settings made with switches on the network module.

(2) Common parameters ... Settings made with peripheral devices.

Table 4.1 gives settings made with peripheral devices and network module in a two-tier system.

Table 4.1 Settings made with Peripheral Devices and Network Module

Setting Item			Transmission Range Setting with Each Station				Reference Section
			Default Parameter Setting		Common Parameter Setting		
			Control Station	Normal Station	Control Station	Normal Station	
Settings with peripheral devices	Number of modules		☆	☆	☆	☆	—
	Common parameter		X	X	☆	X	—
	Network refresh parameter		O	O	O	O	10. 1. 2
	Station-specific parameter		Δ	Δ	Δ	Δ	10. 1. 4
	Transfer parameter for data link		X	X	X	X	—
	Routing parameter		X	X	X	X	—
Settings with network module	Network number		☆	☆	☆	☆	—
	Group number		Δ	Δ	Δ	Δ	8. 2. 3
	Station number		☆	☆	☆	☆	—
	Mode		☆("0" is set.)	☆("0" is set.)	☆("0" is set.)	☆("0" is set.)	—
	Condition settings	Network type	OFF	OFF	OFF	OFF	3. 1. 1 3. 2. 1
		Station type	ON	OFF	ON	OFF	
		Used parameter	ON	OFF	OFF	OFF	
		Number of stations	8/16/32/64 stations	OFF	OFF	OFF	
		Total B/W points	2/4/6/8k points	OFF	OFF	OFF	

☆: Must always be set. O: Change if necessary. (default setting is provided)
Δ: Set if necessary. X: Setting not necessary.

Operation procedures with a two-tier system are as given below.

START
↓
Connect network modules with fiber-optic cables or coaxial cables.
↓
Set the switches of the network module.
↓
Turn ON the power to all stations.
↓
Set parameters with peripheral devices.
↓
Check cyclic transmission.
↓
Check transient transmission.

4.1 Communications by Setting Default Parameters

The transmission range in each station can be allocated easily by setting the number of stations and total B/W points with the switches on the network module.
Use the condition setting switches located at the front side of the network module.
Communications with B/W points are possible. Communications with X/Y points are impossible.
Table 4.2 gives the number of B/W points per station according to settings of the total number of B/W points and the number of stations.

Table 4.2 Number of B/W Points per Station

Total Number of Points / Number of Stations	2k Points (2048 Points)	4k Points (4096 Points)	6k Points (6144 Points)	8k Points (8192 Points)
8 stations	256 points	512 points	768 points	Setting error
16 stations	128 points	256 points	384 points	512 points
32 stations	64 points	128 points	192 points	256 points
64 stations	32 points	64 points	96 points	128 points

Refer to the system configuration below.

<System configuration>

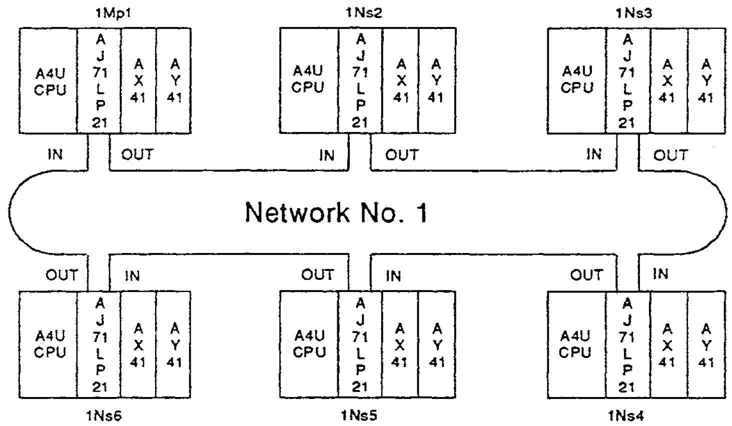


Fig. 4.1 System Configuration Example

The number of B/W send points in each station is set for 256 points.

	0 to FF	100 to 1FF	200 to 2FF	300 to 3FF	400 to 4FF	500 to 5FF
B and W	1Mp1	1Ns2	1Ns3	1Ns4	1Ns5	1Ns6

POINT

Difference between "default parameters" and "common parameters"

The number of points of link relay (B) and link registers (W) set with default parameters are allocated uniformly to all stations.

The number of points of link relay (B) and link register (W) set with common parameters by peripheral devices can be allocated as necessary to an individual station.
Link input (X) and link output (Y) can also be allocated with common parameters.

4.1.1 Settings with the network module

Set the network number, group number, etc. with the rotary switches and dip switches located at the front side of the network module.
Refer to Sections 3.1.1 or 3.2.1 for details on settings.

The following are the examples of settings:

(1) Setting data

(a) Network number 1

(b) Group number ....0 (no group setting)

(c) Station number ....1 to 6

(d) Mode ....0 (automatic on-line return is set)

(e) Network type ....PLC to PLC network

(f) Station type ....Control station (station number 1), Normal station (station numbers 2 to 6)

(g) Parameters used ....Default parameters

(h) Number of stations ....8 stations

(i) Total number of B/W points ...2k points

The B and W points are uniformly allocated in the order of station numbers according to (h) and (i) settings as shown below.

	0 to FF	100 to 1FF	200 to 2FF	300 to 3FF	400 to 4FF	500 to 5FF	600 to 6FF	700 to 7FF	800 to 1FFF
B and W	1Mp1	1Ns2	1Ns3	1Ns4	1Ns5	1Ns6	Station 7	Station 8	Vacant

Since stations 7 and 8 do not actually exist, areas 600 to 7FF cannot be used as internal memory.

(2) Switch settings with the network module

Settings with condition setting switches 3 to 7 are valid only on the control station. Settings made with the same switches on the normal stations are not valid at all.

AJ71LP21 Switch Settings

Station	NETWORK No.	GROUP No.	STATION No.	MODE	Condition Setting Switches							
					1	2	3	4	5	6	7	8
					Network Type	Station Type	Parameter Used	Number of Stations		Total Number of B/W Points		Not Used
1Mp1	1	0	1	0	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF
1Ns2	1	0	2	0	OFF	OFF	valid (all OFF)					OFF
1Ns3	1	0	3	0	OFF	OFF						OFF
1Ns4	1	0	4	0	OFF	OFF						OFF
1Ns5	1	0	5	0	OFF	OFF						OFF
1Ns6	1	0	6	0	OFF	OFF						OFF

4.1.2 Setting parameters with the peripheral devices

To execute data link using default parameters, it is necessary to set the number of modules and the network refresh parameters with the control station and normal stations by using the peripheral devices.

(1) Number of modules

Set the number of modules and the head I/O numbers as given below.
Set the type of network module with the control station and normal stations as follows:
Control station ....1 : MELSECNET/10 (default parameters)
Normal stations ...... 3 : MELSECNET/10 (normal station)

SET NUMBER OF MODULES

NUMBER OF NETWORK MODULES (1-4) [1]

EFFECTIVE MODULE NUMBER [1]

	MODULE No.1	MODULE No.2	MODULE No.3	MODULE No.4
HEAD I/O No.	[00]	[ ]	[ ]	[ ]
NETWORK MODULE TYPE	[1]	[ ]	[ ]	[ ]
	1 : MELSECNET/10 (DEFAULT PARAMETER) 2 : MELSECNET/10 (CONTROL STATION) 3 : MELSECNET/10 (NORMAL STATION)		4 : MELSECNET/10 (REMOTE I/O) 5 : MELSECNET II (MASTER STATION) 6 : MELSECNET II (LOCAL STATION)	
NETWORK No.	[1]	[ ]	[ ]	[ ]

(2) Network refresh parameters

When the number of modules is set, the following default values will be set.

NETWORK REFRESH PARAMETER OF MELSECNET/10

[SETTING 1] NETWORK MODULE NUMBER [1]

LB ↔ B TRANSFER	HEAD LB No. [0000] ↔ HEAD B [0000] TRANSFER SIZE [2000] H POINTS
LW ↔ W TRANSFER	HEAD LW No. [0000] ↔ HEAD W [0000] TRANSFER SIZE [2000] H POINTS
LX ↔ X TRANSFER	HEAD LX No. [0000] ↔ HEAD X [0000] TRANSFER SIZE [0000] H POINTS
LY ↔ Y TRANSFER	HEAD LY No. [0000] ↔ HEAD Y [0000] TRANSFER SIZE [0000] H POINTS
SB TRANSFER DEVICE	HEAD SB No. [0000] ↔ DESTINATION [Y1C00] TRANSFER SIZE [100] H POINTS
SW TRANSFER DEVICE	HEAD SW No. [0000] ↔ DESTINATNION [D7168] TRANSFER SIZE [100] H POINTS
LB ↔ EXTENSION TRANSFER	HEAD LB No. [0000] ↔ BLOCK [0] HEAD No. [0] TRANSFER SIZE [0000] H POINTS
LW ↔ EXTENISON TRANSFER	HEAD LW No. [0000] ↔ BLOCK [0] HEAD No. [0] TRANSFER SIZE [0000] H POINTS
ERROR AREA	[0] 0: HOLD 1 : OVERWRITE

The following gives an example of procedures for starting up a peripheral device and writing to the CPU:
The example assumes that an IBM PC/AT * is used.
The procedure for setting the number of modules with the control station is different from that with a normal station.
*: IBM is a registered trademark of International Business Machines Corporation.

<Procedure> <Key operation>

(1) Turn ON the IBM PC/AT.

(2) Start up SW[ ]IX-GPPAE.

(3) Select "CREATE" in the initial setting menu. [1]

(4) Select the CPU type (A4UCPU). . . . . [D]

(5) Execute setting to a file. . . . . [Enter]

```
SET TO FILE?

          YES          NO
```

(6) Create a file. . . . . [C] [Enter]

```
<CREATE>
SYSTEM        [C] [NET10 ]
COMMENT           [       ]
SUB-SYSTEM        [SYSTEM-1]
COMMENT           [       ]
COMMENT(GPP)      [              ]
                              Esc:Close
```

Drive name
[N] [E] [T] [1] [0] [Enter]
System name
[Enter]
[S] [Y] [S] [T] [E] [M] [-] [1]
Sub-system name
[Enter]
[Enter]
[Enter]

To the next page.

From the previous page.

<Procedure> <Key operation>

(7) Execute writing to the file. .... [Enter]

```
WRITE TO FILE?

        YES        NO
```

(8) Select "PARAMETER" in the menu. .... [2]

```
<MENU>
1: PROGRAMMING
2: PARAMETER
3: ON-LINE
4: DOCUMENTATION
5: PRINTER
6: FILE MAINTENANCE
```

(9) Select "NETWORK/LINK" in the PARAMETER menu. [3]

```
<PARAMETER>
1: MEMORY CAPACITY
2: LATCH RANGE
3: NETWORK/LINK
4: I/O LOCATION
5: AUXILIARY
```

(10) Select "DATA LINK PARAMETER" in the NETWORK/LINK SETTING menu. ... [1]

```
<NETWORK/LINK SETTING>
1: DATA LINK PARAMETER
2: ROUTING PARAMETER
Esc: Close
```

To the next page.

From the previous page.

(11)Set the number of modules.

(a) Control station

<Setting screen>

<SET NUMBER OF MODULES>

NUMBER OF NETWORK MODULES (1-4) [1]

EFFECTIVE MODULE NUMBER [1]

	MODULE NO. 1	MODULE NO. 2	MODULE NO. 3	MODULE NO. 4
HEAD I/O NO.	[00]	[ ]	[ ]	[ ]
NETWORK MODULE TYPE	MELSECNET/10 DEFAULT			
NETWORK NO.	[1]	[ ]	[ ]	[ ]

End: SET Esc: Close

<Key operation>

[1] (NUMBER OF NETWORK MODULES) [Enter]

[1] (EFFECTIVE MODULE NUMBER) [Enter]

[0] (HEAD I/O NO.) [Enter]

<HEAD I/O NO.>
SET HIGHER 2 DIGIT OF HEAD I/O NO.
A2U (0-3F) A3U (0-7F) A4U (0-FF)

[1] (NETWORK MODULE TYPE) [Enter]

<NETWORK MODULE TYPES>
SELECT CLASSIFICATION OF NETWORK
1: MELSECNET/10 (DEFAULT PARAMETER)
2: MELSECNET/10 (CONTROL STATION)
3: MELSECNET/10 (NORMAL STATION)
4: MELSECNET/10 (REMOTE I/O MASTER)
5: MELSECNET II (MASTER STATION)
6: MELSECNET II (LOCAL STATION)

[1] (NETWORK No.) [Enter]

<NETWORK NO.>
SET NETWORK NUMBER (1-255)

[END] (SET)

To the next page.

From the previous page.

(b) Normal station

<Setting screen>

<SET NUMBER OF MODULES>

NUMBER OF NETWORK MODULES (1-4) [1]

EFFECTIVE MODULE NUMBER [1]

	MODULE No. 1	MODULE NO. 2	MODULE NO. 3	MODULE NO. 4
HEAD I/O NO.	[00]	[ ]	[ ]	[ ]
NETWORK MODULE TYPE	MELSECNET/10 NORMAL STATION			
NETWORK NO.	[1]	[ ]	[ ]	[ ]

End: SET Esc: Close

<Key operation>

[1] (NUMBER OF NETWORK MODULES) [Enter]

[1] (EFFECTIVE MODULE NUMBER) [Enter]

[0] (HEAD I/O NO.) [Enter]

<HEAD I/O NO.>
SET HIGHER 2 DIGIT OF HEAD I/O NO.
A2U (0-3F) A3U (0-7F) A4U (0-FF)

[1] (NETWORK MODULE TYPE) [Enter]

<NETWORK MODULE TYPES>
SELECT CLASSIFICATION OF NETWORK
1: MELSECNET/10 (DEFAULT PARAMETER)
2: MELSECNET/10 (CONTROL STATION)
3: MELSECNET/10 (NORMAL STATION)
4: MELSECNET/10 (REMOTE I/O MASTER)
5: MELSECNET II (MASTER STATION)
6: MELSECNET II (LOCAL STATION)

[1] (NETWORK NO.) [Enter]

<NETWORK NO.>
SET NETWORK NUMBER (1-255)

[END] (SET)

To the next page.

From the previous page.

<Procedure> <Key operation>

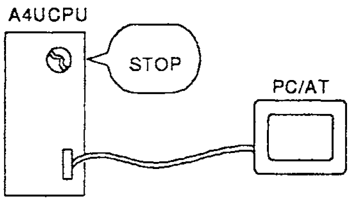
(12)Not setting the station specific parameter. .... [→] [Enter]

SET TO STATION SPECIFIC PARAMETER?
YES **NO**

(13)End parameter setting. .... [END] [Esc] [Esc]

(14)Select "ON-LINE". .... [3]

(15)Connect the PC/AT to the A4UCPU.



(16)Select "PC". .... [1]

(17)Select "WRITE". .... [2]

(18)Select "PARAMETER + NETWORK PARAMETER (AnU)". .... [F3]

(19)Execute writing to the A4UCPU. .... [Enter]

EXECUTE?
YES NO

(20)"COMPLETED" will be displayed when writing to the A4UCPU is completed.

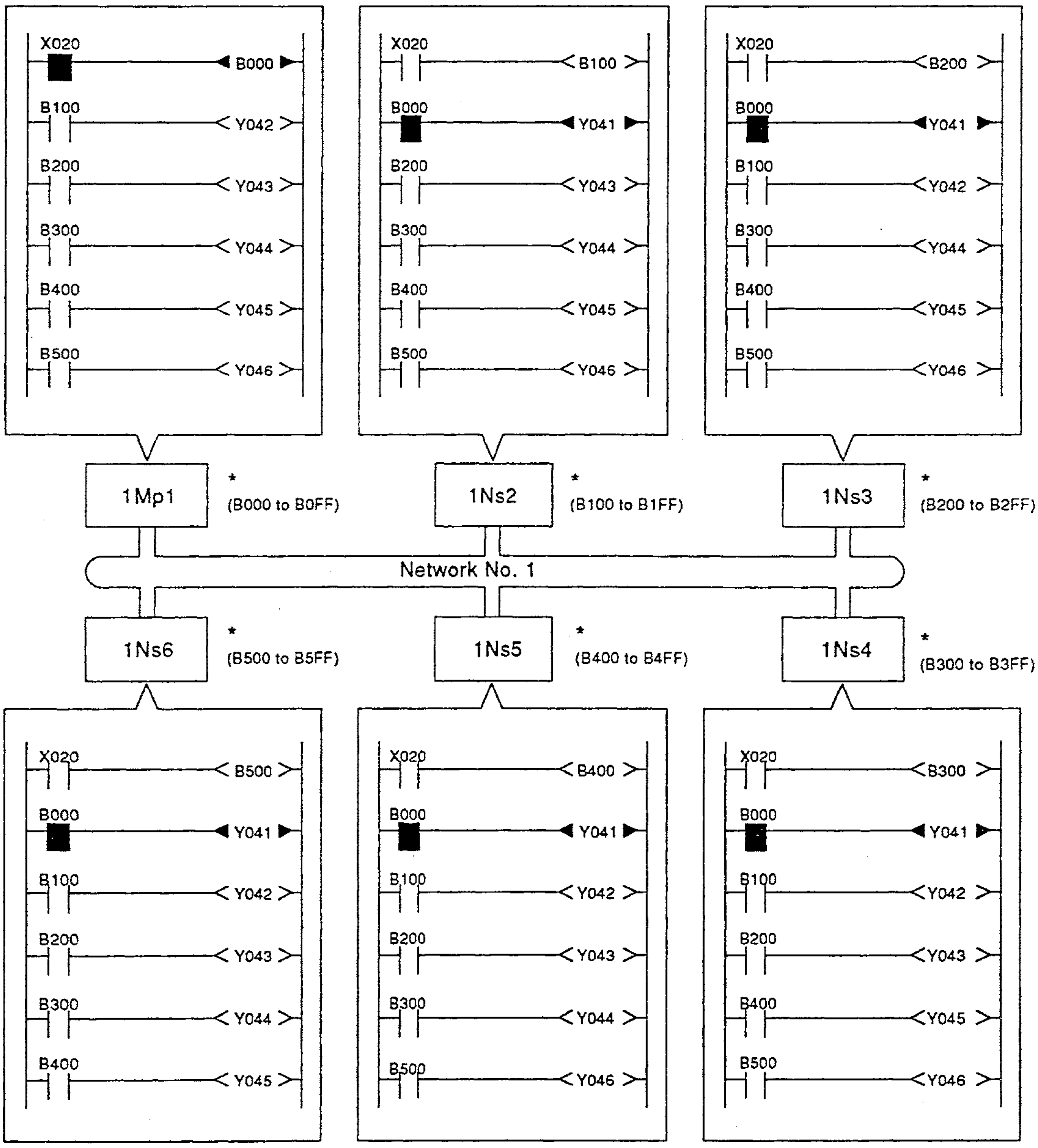
4.1.3 Confirming the cyclic transmission function

Confirm that the data link information of B/W is transmitted to other stations.

(1) Cyclic transmission with device B

Write the following programs to each A4UCPU to confirm.

For example, when X020 at 1Mp1 is turned ON, contact B000 for 1Ns2 to 1Ns6 is turned ON and output Y041 is turned ON.
Confirm in the same way that the contact for link relay (B) in the other stations is turned ON when link relay (B) at the host station is turned ON.

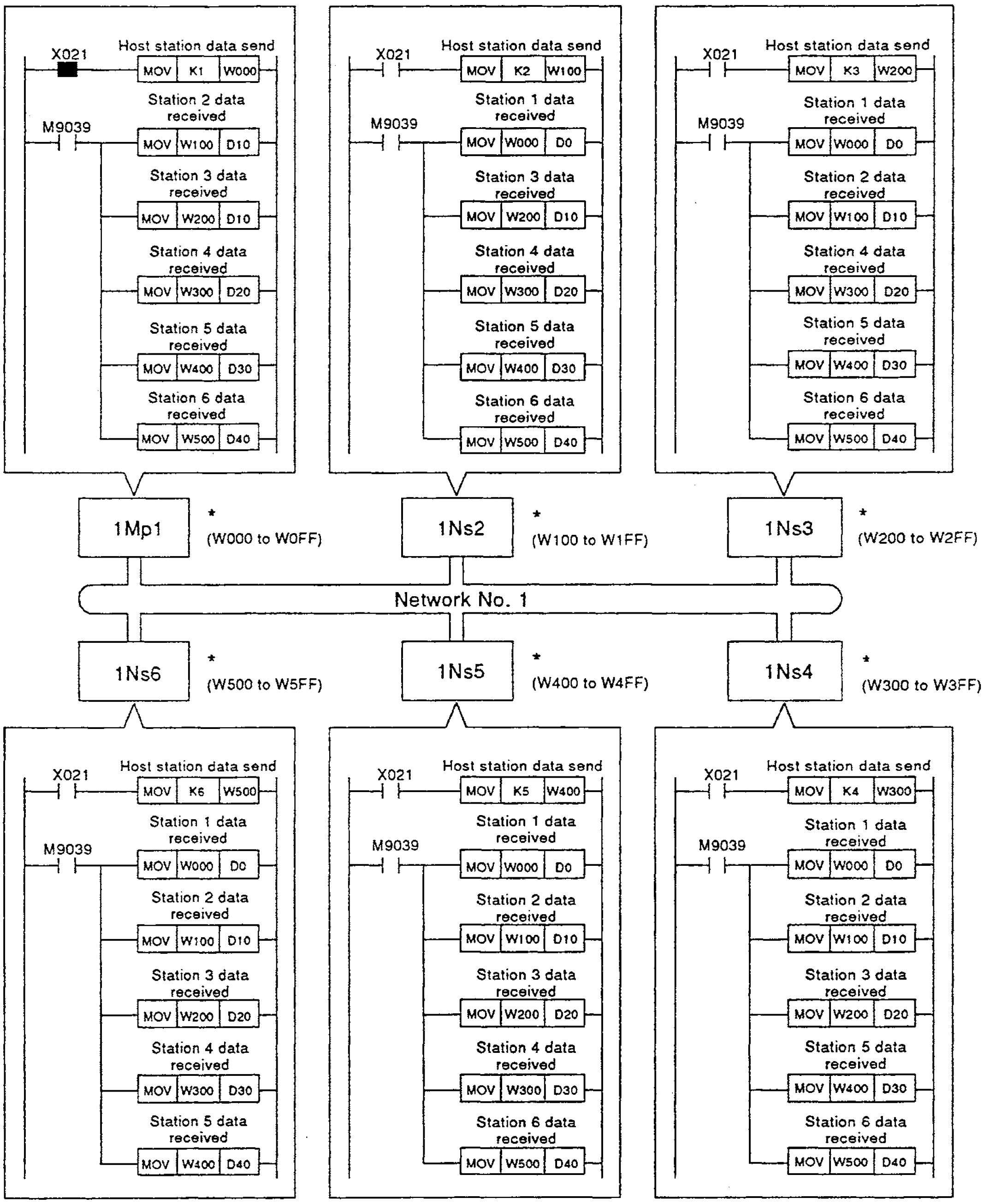


*: Value in ( ) indicates the device allocation range with which the host station can execute sending.

(2) Cyclic transmission with device W

Write the following programs to each A4UCPU to confirm.

For example, when X021 at 1Mp1 is turned ON, "1" is stored to D0 in 1Ns2 to 1Ns6.
Confirm in the same way that the contents of other station's link register (W) are stored to the host station.

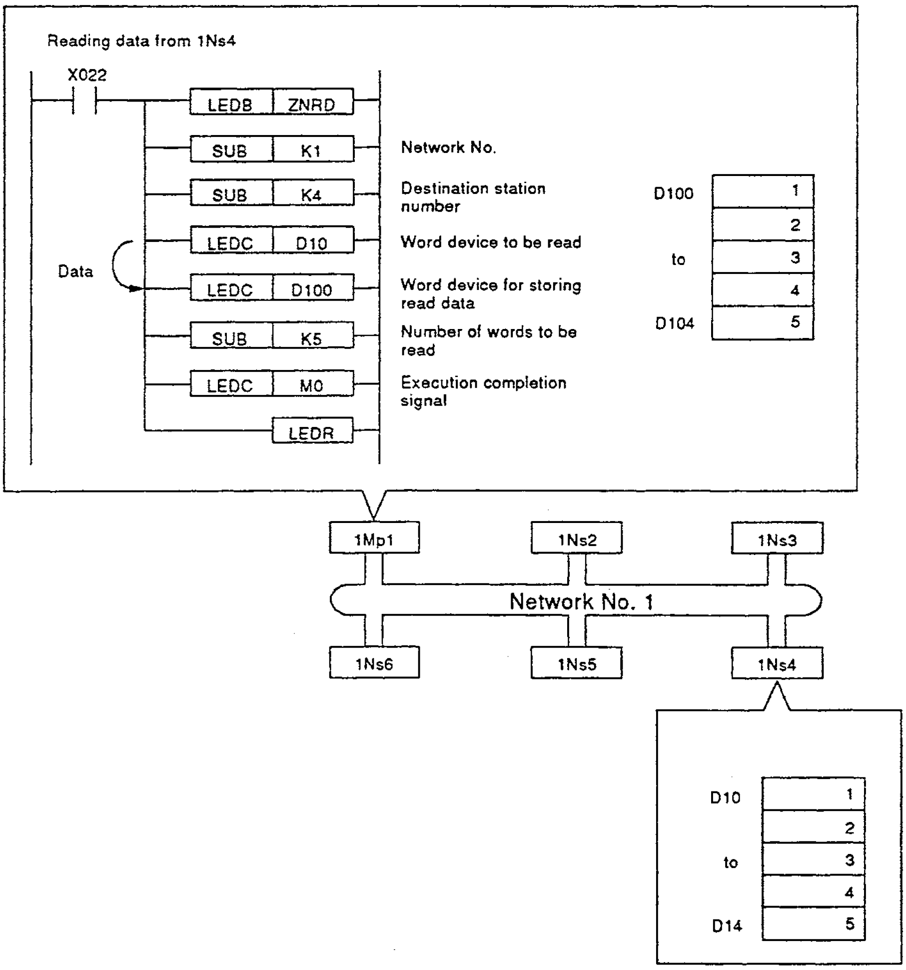


*: Value in ( ) indicates the device allocation range with which the host station can execute sending.

4.1.4 Confirming the transient transmission function

Use ZNRD and ZNWR instructions to read and write word data between designated stations.
Write the following programs to each A4UCPU to confirm. Refer to the AnA/AnUCPU Programming Manual (Dedicated Instructions) for details of the instructions.

For example, when data in 1Ns4 is read by 1Mp1, contents of D10 to D14 in 1Ns4 are stored to D100 to D104 in 1Mp1.



4.2 Communications by Setting Common Parameters

Device ranges of B, W, X, and Y used in each station can be set with each station. The device range setting can be made more minutely compared with setting with default parameters.
Write common parameter settings to the control station (Mp).

Refer to the system configuration below.
For the X/Y allocation and communications, refer to Section 8.1.2 in PART 2 DETAILED INFORMATION.

<System configuration>

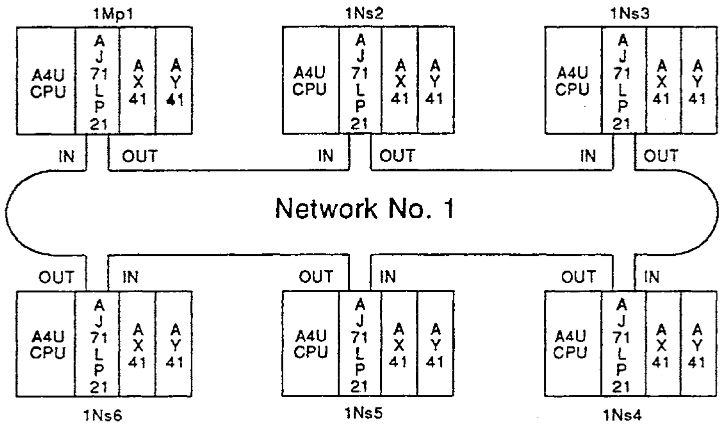


Fig. 4.1 System Configuration Example

The LB/LW transmission ranges for each station are allocated as shown below.

	0 to FF	100 to 2FF	300 to 37F	380 to 3FF	400 to 4FF	500 to 57F
LB and LW	1Mp1	1Ns2	1Ns3	1Ns4	1Ns5	1Ns6

4.2.1 Common parameters

Set the common parameters to conduct cyclic transmission with link relay (B), link register (W), link input (X), and link output (Y).
Use a peripheral device to set the common parameters.

(1) The following items are provided:

(a) Total number of link stations

(b) Watchdog time

(c) Transmission range in each station .... LB/LW

(d) I/O master station setting

(e) Transmission range in each station (M → L) ... LY/LX

(f) Transmission range in each station (M ← L) ... LX/LY

These examples are not applicable.

(2) Fill in the total number of link stations, watchdog time, and LB/LW allocation ranges in the network setting sheets attached at the end of this manual.
The watchdog time setting is 2000 msec (max.).

SETTING THE LB/LW TRANSMISSION RANGES IN EACH STATION

NETWORK MODULE NUMBER
1

TOTAL NUMBER OF LINK STATIONS	W.D.T. × 10 ms
6	200

RESERVE	STATION NUMBER	TRANSMISSION RANGE OF EACH STATION	
		LB	LW
	1	0 to FF	0 to FF
	2	100 to 2FF	100 to 2FF
	3	300 to 37F	300 to 37F
	4	380 to 3FF	380 to 3FF
	5	400 to 4FF	400 to 4FF
	6	500 to 57F	500 to 57F
	7	—	—
	8	—	—
	9	—	—
	0	—	—

4.2.2 Settings with the network module

Set the network number, group number, etc. with the rotary switches and dip switches located at the front side of the network module.
Refer to Sections 3.1.1 or 3.2.1 for details on settings.

The following are examples of settings:

(1) Setting data

(a) Network No. 1

(b) Group No. .... 0 (no group setting)

(c) Station No. .... 1 to 6

(d) Mode .... 0 (automatic on-line return is set)

(e) Network type .... PLC to PLC network

(f) Station type .... Control station (station number 1),
Normal station (station numbers 2 to 6)

(g) Parameters used .... Common parameters

(2) Switch settings with the network module

Settings with condition setting switches 3 to 7 are valid only on the control station. Settings made with the same switches on the normal stations are not valid at all.

AJ71LP21 Switch Settings

<table>
<tr><th rowspan="3">Station</th><th rowspan="3">NETWORK No.</th><th rowspan="3">GROUP No.</th><th rowspan="3">STATION No.</th><th rowspan="3">MODE</th><th colspan="8">Condition Setting Switches</th></tr>
<tr><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th></tr>
<tr><th>Network Type</th><th>Station Type</th><th>Parameter Used</th><th colspan="2">Number of Stations</th><th colspan="2">Total Number of B/W Points</th><th>Not Used</th></tr>
<tr><td>1Mp1</td><td>1</td><td>0</td><td>1</td><td>0</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td></tr>
<tr><td>1Ns2</td><td>1</td><td>0</td><td>2</td><td>0</td><td>OFF</td><td>OFF</td><td colspan="5" rowspan="5">Invalid (all OFF)</td><td>OFF</td></tr>
<tr><td>1Ns3</td><td>1</td><td>0</td><td>3</td><td>0</td><td>OFF</td><td>OFF</td><td>OFF</td></tr>
<tr><td>1Ns4</td><td>1</td><td>0</td><td>4</td><td>0</td><td>OFF</td><td>OFF</td><td>OFF</td></tr>
<tr><td>1Ns5</td><td>1</td><td>0</td><td>5</td><td>0</td><td>OFF</td><td>OFF</td><td>OFF</td></tr>
<tr><td>1Ns6</td><td>1</td><td>0</td><td>6</td><td>0</td><td>OFF</td><td>OFF</td><td>OFF</td></tr>
</table>

4.2.3 Setting parameters with the peripheral devices

To execute data link using default parameters, it is necessary to set the number of modules and the network refresh parameters with the control station and normal stations by using the peripheral devices.

(1) Number of modules

Set the number of modules and the head I/O numbers as given below.

SET NUMBER OF MODULES

NUMBER OF NETWORK MODULES (1-4) [1]

EFFECTIVE MODULE NUMBER [1]

	MODULE NO.1	MODULE NO.2	MODULE NO.3	MODULE NO.4
HEAD I/O NO.	[00]	[ ]	[ ]	[ ]
NETWORK MODULE TYPE	[2]	[ ]	[ ]	[ ]
	1 : MELSECNET/10 (DEFAULT PARAMETER) 2 : MELSECNET/10 (CONTROL STATION) 3 : MELSECNET/10 (NORMAL STATION) 4 : MELSECNET/10 (REMOTE I/O) 5 : MELSECNET II (MASTER STATION) 6 : MELSECNET II (LOCAL STATION)			
NETWORK NO.	[1]	[ ]	[ ]	[ ]

(2) Network refresh parameters

When the number of modules is set, the following default values will be set.

NETWORK REFRESH PARAMETER OF MELSECNET/10

[SETTING 1] NETWORK MODULE NUMBER [1]

LB ↔ B TRANSFER	HEAD LB NO. [0000] ↔ HEAD B [0000] TRANSFER SIZE [2000] H POINTS
LW ↔ W TRANSFER	HEAD LW NO. [0000] ↔ HEAD W [0000] TRANSFER SIZE [2000] H POINTS
LX ↔ X TRANSFER	HEAD LX NO. [0000] ↔ HEAD X [0000] TRANSFER SIZE [0000] H POINTS
LY ↔ Y TRANSFER	HEAD LY NO. [0000] ↔ HEAD Y [0000] TRANSFER SIZE [0000] H POINTS
SB TRANSFER DEVICE	HEAD SB NO. [0000] ↔ DESTINATION [Y1C00] TRANSFER SIZE [100] H POINTS
SW TRANSFER DEVICE	HEAD SW NO. [0000] ↔ DESTINATNION [D7168] TRANSFER SIZE [100] H POINTS
LB ↔ EXTENSION TRANSFER	HEAD LB NO. [0000] ↔ BLOCK [0] HEAD No. [0] TRANSFER SIZE [0000] H POINTS
LW ↔ EXTENISON TRANSFER	HEAD LW NO. [0000] ↔ BLOCK [0] HEAD No. [0] TRANSFER SIZE [0000] H POINTS
ERROR AREA	[0] 0: HOLD 1 : OVERWRITE

The following gives an example of procedures for starting up a peripheral device and writing to the CPU:
The example assumes that an IBM PC/AT is used.
The procedures are conducted with the control station (1Mp1). For the procedures conducted with the normal stations (1Ns2 to 1Ns6), refer to Section 4.1.2.

<Procedure> <Key operation>

(1) Turn ON the IBM PC/AT.

(2) Start up SW[ ]IX-GPPAE.

(3) Select "CREATE"
in the initial setting menu. ....[1]

(4) Select the CPU type (A4UCPU). ....[D]

(5) Execute setting to a file. ....[Enter]

```
SET TO FILE?

          YES          NO
```

(6) Create a file. ....[C] [Enter]
Drive name

```
<CREATE>
SYSTEM        [C] [NET10 ]
COMMENT           [       ]
SUB-SYSTEM        [SYSTEM-1]
COMMENT           [       ]
COMMENT(GPP)      [                ]
                                Esc:Close
```

[N] [E] [T] [1] [0] [Enter]
System name

[Enter]

[S] [Y] [S] [T] [E] [M] [-] [1]
Sub-system name

[Enter] [Enter] [Enter]

To the next page.

From the previous page.

<Setting items> <Key operation>

(7) Execute writing to the file. . . . .[Enter]

```
WRITE TO FILE?

          YES          NO
```

(8) Select "PARAMETER" in the menu. . . . .[2]

```
<MENU>
1: PROGRAMMING
2: PARAMETER
3: ON-LINE
4: DOCUMENTATION
5: PRINTER
6: FILE MAINTENANCE
```

(9) Select "NETWORK/LINK" in the PARAMETER menu. . . . .[3]

```
<PARAMETER>
1: MEMORY CAPACITY
2: LATCH RANGE
3: NETWORK/LINK
4: I/O LOCATION
5: AUXILIARY
```

(10) Select "DATA LINK PARAMETER" in the NETWORK/LINK SETTING menu. . . . .[1]

```
<NETWORK/LINK SETTING>
1: DATA LINK PARAMETER
2: ROUTING PARAMETER
                Esc: Close
```

To the next page.

From the previous page.

(11)Set the number of modules.

<Setting screen>

<SET NUMBER OF MODULES>

NUMBER OF NETWORK MODULES (1-4) [1]

EFFECTIVE MODULE NUMBER [1]

	MODULE NO. 1	MODULE NO. 2	MODULE NO. 3	MODULE NO. 4
HEAD I/O NO.	[00]	[ ]	[ ]	[ ]
NETWORK MODULE TYPE	MELSECNET/10 CONTROL STATION			
NETWORK NO.	[1]	[ ]	[ ]	[ ]

End: SET Esc: Close

<Key operation>

[1] (NUMBER OF NETWORK MODULES) [Enter]

[1] (EFFECTIVE MODULE NUMBER) [Enter]

[0] (HEAD I/O NO.) [Enter]

<HEAD I/O NO.>
SET HIGHER 2 DIGIT OF HEAD I/O NO.
A2U (0-3F) A3U (0-7F) A4U (0-FF)

[2] (NETWORK MODULE TYPE)

<NETWORK MODULE TYPES>
SELECT CLASSIFICATION OF NETWORK
1: MELSECNET/10 (DEFAULT PARAMETER)
2: MELSECNET/10 (CONTROL STATION)
3: MELSECNET/10 (NORMAL STATION)
4: MELSECNET/10 (REMOTE I/O MASTER)
5: MELSECNET II (MASTER STATION)
6: MELSECNET II (LOCAL STATION)

[1] (NETWORK NO.) [Enter]

<NETWORK NO.>
SET NETWORK NUMBER (1-255)

[END] (SET)

To the next page.

From the previous page.

(12)Set common parameters.

<Setting screen>

<COMMON PARAMETER (MELSECNET/10) PC TO PC NET> PARA. NAME:

NETWORK MODULE NO.
1

REFRESH PARAMETER SETTING

			Size
LB ↔ B(1)	0000	- 1FFF	8192
LB ↔ B(2)		-	
LW ↔ W(1)	0000	- 1FFF	8192
LW ↔ W(2)		-	

TOTAL NUMBER OF LINK STATIONS	W.D.T. ×10ms
6	200

STATION NUMBER	RANGE OF EACH STATION	
	LB	LW
1	000- FF	000- FF
2	100-2FF	100-2FF
3	300-37F	300-37F
4	380-3FF	380-3FF
5	400-4FF	400-4FF
6	500-57F	500-57F
	—	—

Page Up/Page Down Change module: Shift + F1, F2, F3, F4, End: Check SET Esc: Close

<Key operation>

[6] (TOTAL NUMBER OF LINK STATIONS) [→]

[2] [0] [0] (W.D.T.) [Enter]

[0] [→] [F] [F] [→] [0] [→] [F] [F] (RANGE SETTING OF STATION NUMBER 1) [ENTER]

Set for stations 2 to 6 in the same way.

[END] (CHECK SET DATA)

[END] (SET)

To the next page.

From the previous page.

<Procedure> <Key operation>

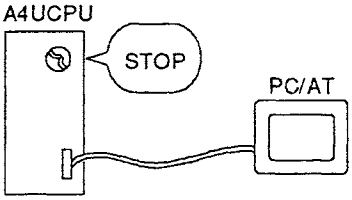
(13)Not setting the station specific parameter. . . . .[→] [Enter]

SET TO STATION SPECIFIC PARAMETER?
YES **NO**

(14)End parameter setting. . . . .[End] [Esc] [Esc]

(15)Select "ON-LINE". . . . .[3]

(16)Connect the PC/AT to the A4UCPU.



(17)Select "PC". . . . .[1]

(18)Select "WRITE". . . . .[2]

(19)Select "PARAMETER + NETWORK PARAMETER (AnU)". . . . .[F3]

(20)Execute writing to the A4UCPU. . . . .[Enter]

EXECUTE?
YES NO

(21)"COMPLETED" will be displayed when writing to the A4UCPU is completed.

To Simplify the Setting Procedures for LB, LW, LX, and LY When there are Many Link Stations

Perform as follows:

(1) To allocate uniformly to all stations
Select F7 (uniform allocation) in the common parameter screen.

(2) To allocate different numbers of points to specific stations
Select F8 (specific points allocation) in the common parameter screen.

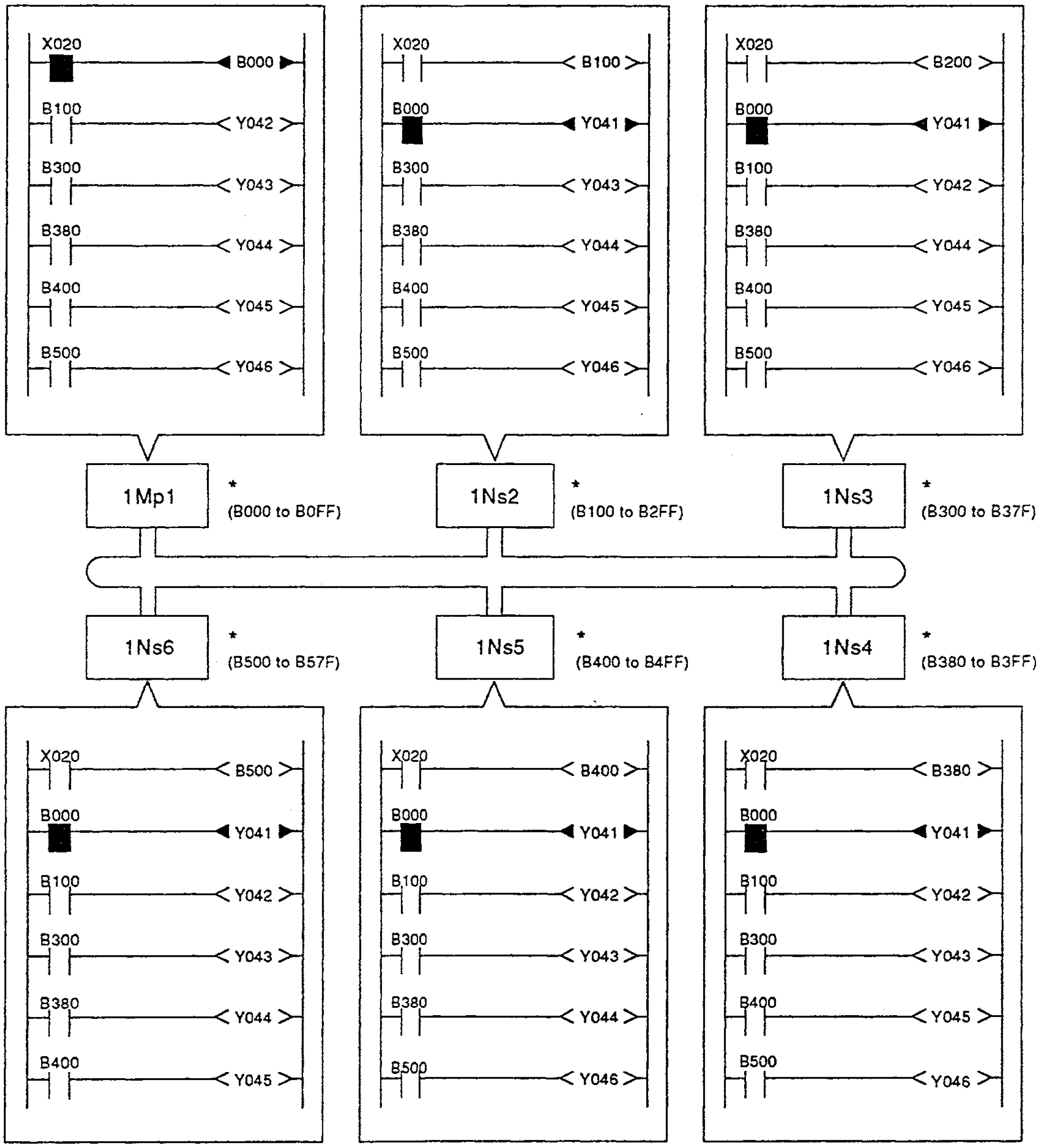
4.2.4 Confirming the cyclic transmission function

Confirm that the data link information of B/W is transmitted to other stations.

(1) Cyclic transmission with device B

Write the following programs to each A4UCPU to confirm.

For example, when X020 at 1Mp1 is turned ON, contact B000 for 1Ns2 to 1Ns6 is turned ON and output Y061 is turned ON.
Confirm in the same way that the contact for link relay (B) in the other stations is turned ON when link relay (B) at the host station is turned ON.

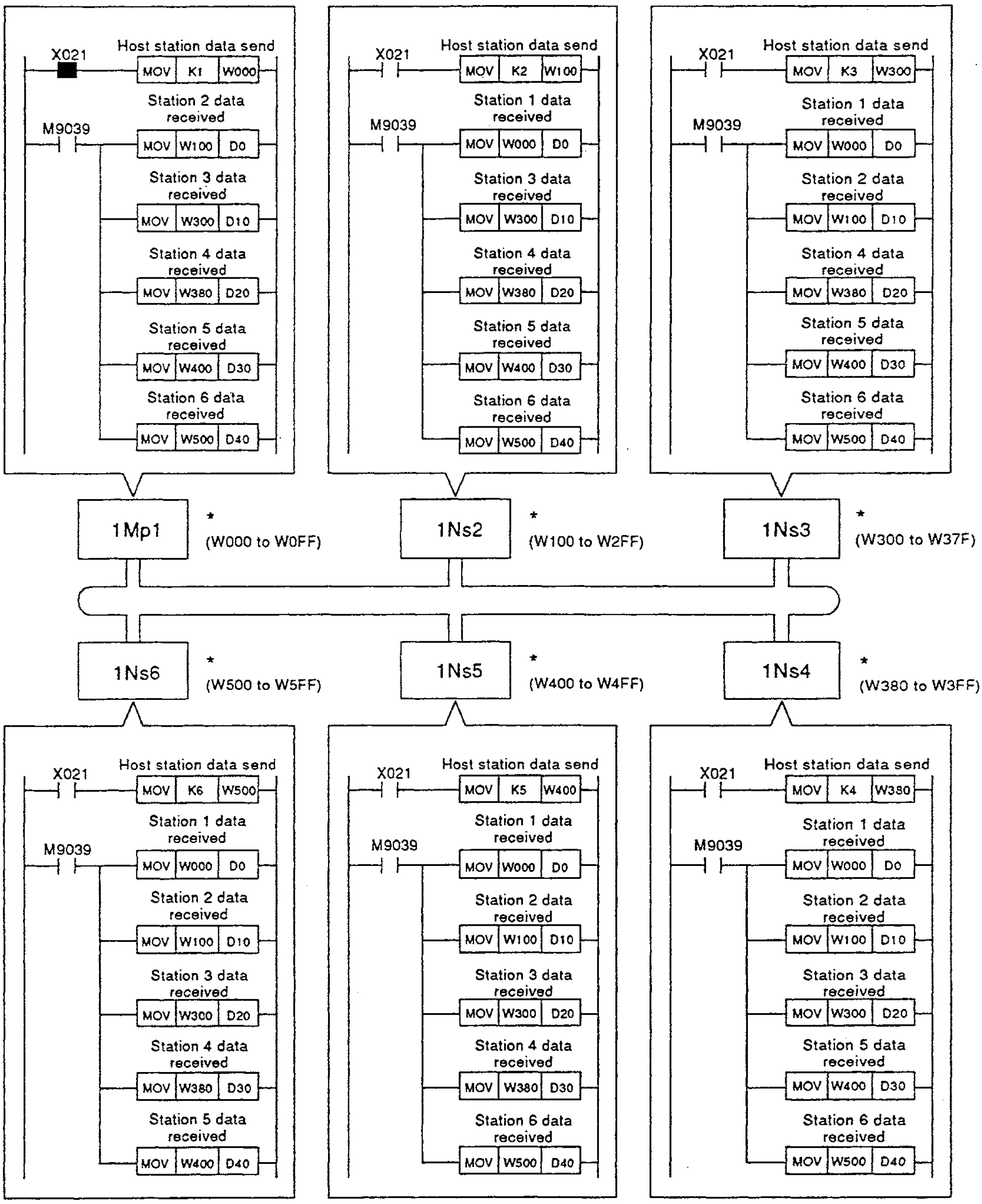


*: Value in ( ) indicates the device allocation range with which the host station can execute sending.

(2) Cyclic transmission with device W

Write the following programs to each A4UCPU to confirm.

For example, when X021 at 1Mp1 is turned ON, "1" is stored to D0 in 1Ns2 to 1Ns6.
Confirm in the same way that the contents of other station's link register (W) are stored to the host station.



*: Value in ( ) indicates the device allocation range with which the host station can execute sending.

4.2.5 Confirming the transient transmission function

Confirm the transient transmission function by following the procedure explained for the communications by setting the default parameters. Refer to the programs mentioned in Section 4.1.3.
Use ZNRD and ZNWR instructions to read and write word data between designated stations.

5. DATA LINK WITH A MULTI-TIER SYSTEM

This section gives the parameter setting items and contents, peripheral device operations, and communication confirmation with a multi-tier system.
To operate a multi-tier system, the following settings in addition to those set with a two-tier system are required:

(1) "TRANSFER PARAMETER FOR DATA LINK" used for sending link data of a network to other networks.

(2) "ROUTING PARAMETER" used for making access to an other station in an other network.

5.1 Setting the Network Refresh Parameters

The network refresh parameters are used for transferring data of link devices (LB, LW, LX, LY) and data link communication condition devices (SB, SW) which are stored in the network module to the devices which can be used with sequence programs.
The network refresh parameters are allocated with default values according to the set number of modules. Default settings do not change unless intentionally changed.

Refer to the following system configuration for settings of network refresh parameters.

<System configuration>

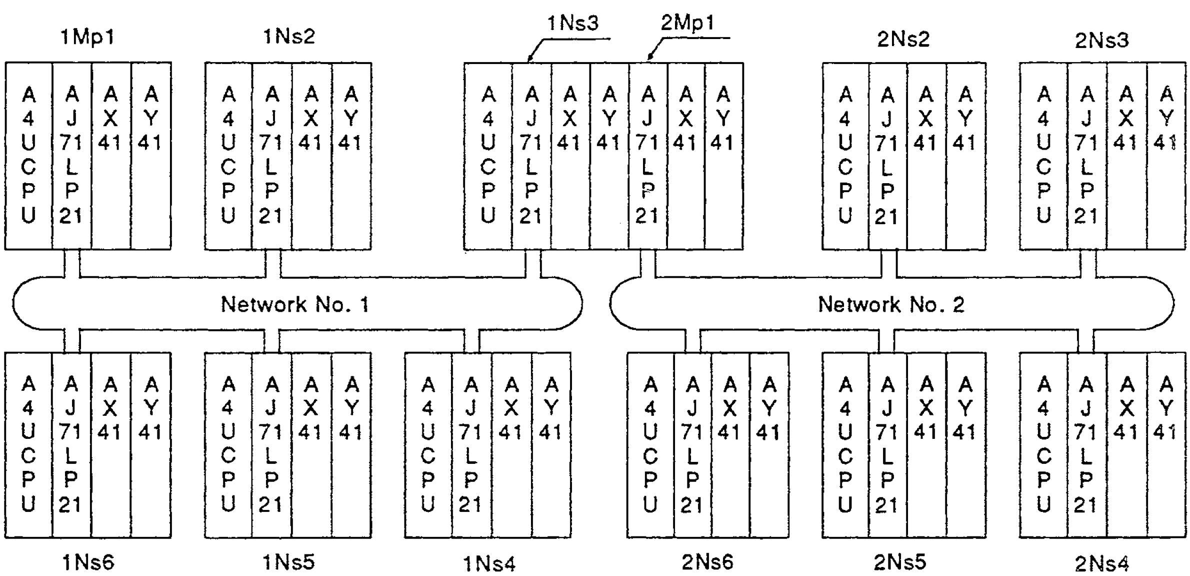
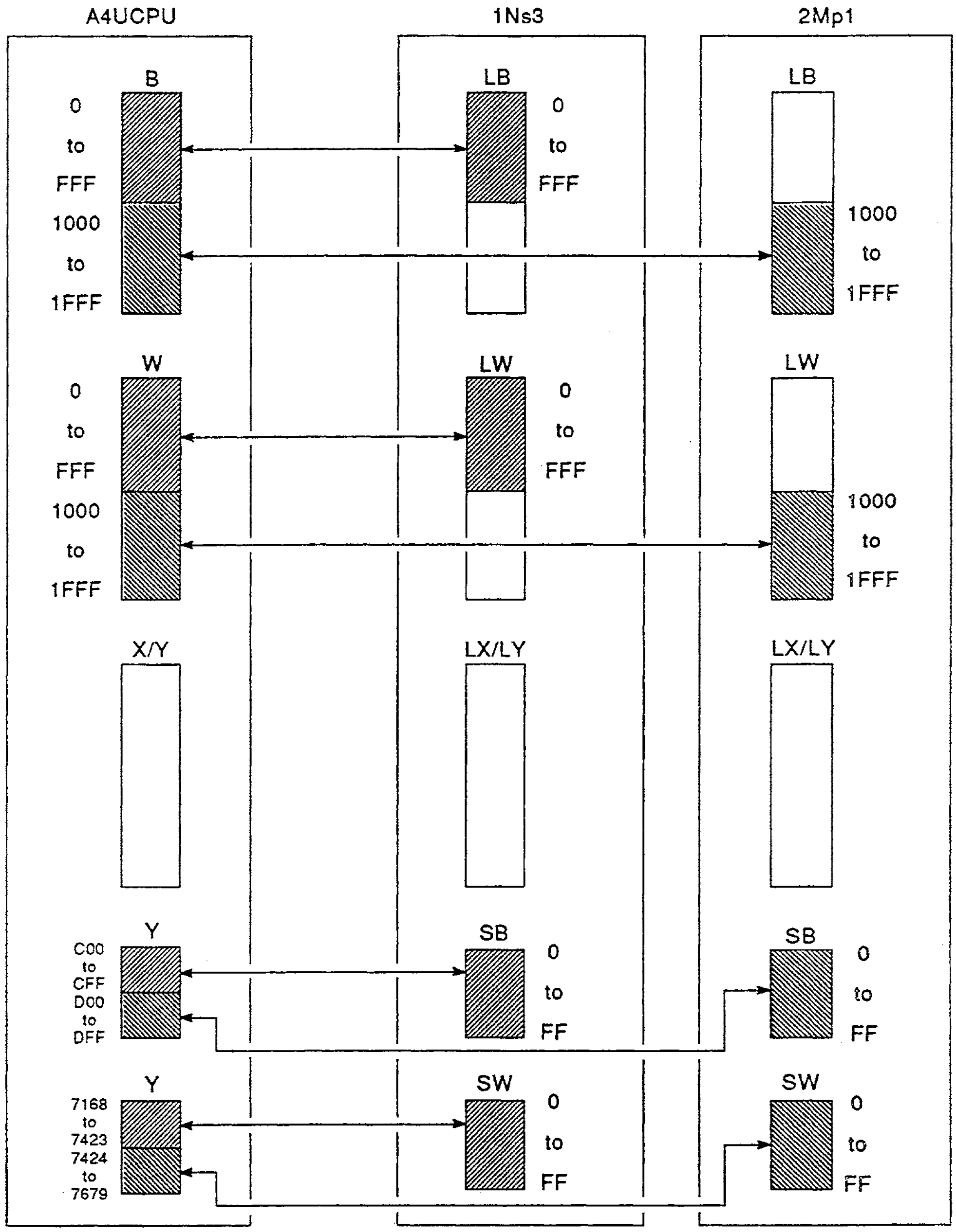


Fig. 5.1 shows the default values of network refresh parameters when two network modules are installed to the AnUCPU in 1Ns3 and 2Mp1.



The LX/LY devices are not transferred by default values.

Fig. 5.1 Default Values of Network Refresh Parameters

5.1.1 Designating the network refresh parameter ranges

Since stations 1Ns3 and 2Mp1 shown in Fig. 5.1 have two network modules, it is necessary to set the network refresh parameters.
The following network refresh parameters for devices need to be set. Note that settings with LX and LY are not explained here. For details, refer to Section 10.1.2.

(1) Refresh settings for LB/LW

(a) Device data of LB/LW 0 to FFF in 1Ns3 are refreshed to B/W 0 to FFF in the A4UCPU, and that of LB/LW 1000 to 1FFF in 2Mp1 are refreshed to B/W 1000 to 1FFF in the A4UCPU, as shown below.

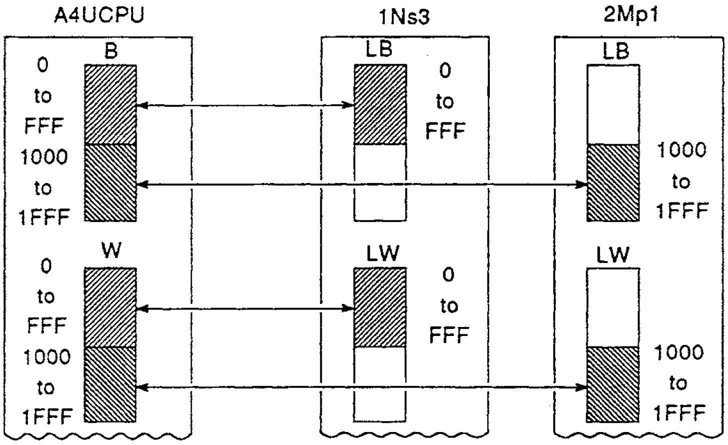


Fig. 5.2 LB/LW Refresh Ranges

(b) When setting with common parameters, allocate the refresh ranges used in each network so that the ranges do not overlap with each other.

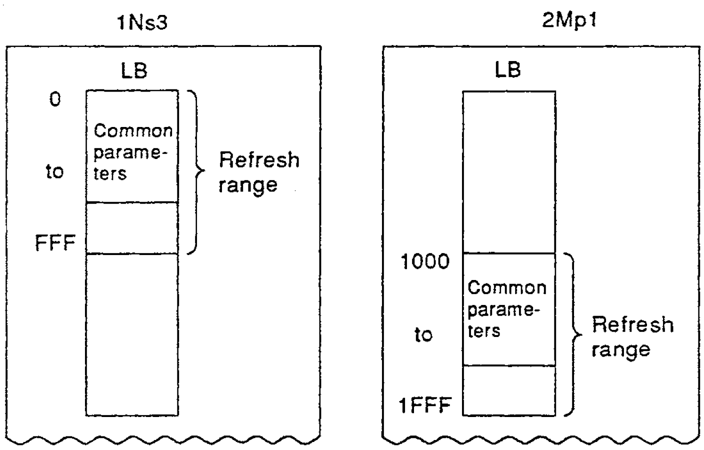


Fig. 5.3 Allocation with Common Parameters

REMARK

It is recommended that the total number of link device points used with all networks do not exceed 8192 points.

5.1.2 Setting the network refresh parameters by using a peripheral device

The following explains the setting procedures for the number of modules and network refresh parameters by using a peripheral device.
The procedures for turning ON the power to the module and those before setting the number of modules and common parameter setting are described in Section 4.2.3.

(1) Number of modules

<Setting operation>

<SET NUMBER OF MODULES>

NUMBER OF NETWORK MODULES (1-4) [2]

EFFECTIVE MODULE NUMBER [1]

Set a special function module number for which the network number cannot be designated or a module number (order of installation) which is effective when making access to an other station by using an instruction.

	MODULE NO. 1	MODULE NO. 2	MODULE NO. 3	MODULE NO. 4
HEAD I/O NO.	[00]	[06]	[ ]	[ ]
NETWORK MODULE TYPE	MELSECNET/10 NORMAL STATION	MELSECNET/10 CONTROL STATION		
NETWORK NO.	[1]	[2]	[ ]	[ ]

End: SET Esc: Close

<Key operation>

[2] (NUMBER OF NETWORK MODULES) [Enter]

[1] (EFFECTIVE MODULE NUMBER) [Enter]

[0] (HEAD I/O NO.) [Enter]

[3] (NETWORK MODULE TYPE)

[1] (NETWORK NO.) [Enter]

Make settings with the second module by following the same procedure.

[End] (SET)

↓

To the next page.

From the previous page.

↓

<Procedure> <Key operation>

(a) Set the common parameters............... Refer to Section 4.2.3 (13).

(b) Complete the common parameter....... [End] (Check)
settings. [End] (SET)

(c) Not setting the station specific .... [→] [Enter]
parameter.

SET TO STATION SPECIFIC PARAMETER ?

YES NO

(d) Not setting the transfer parameter...... [→] [Enter]
for data link.

SET TO TRANSFER PARAMETERS FOR
DATA LINK?

YES NO

(e) Confirm the network refresh.............. [Enter]
parameter settings.

<NETWORK PARAMETER>

NUMBER OF NETWORK MODULES SETTING: 2

O : REQUIRED SETTING ● : SET
Δ : SET IF IT IS REQUIRED ▲ : SET

NETWORK PARAMETER CAPACITY 4KB	NO. 1 NET/10 (N)	NO. 2 NET/10 (C)		
NETWORK REFRESH PARAMETER	●	●		
MELSECNET II	X	X		
COMMON/REMOTE I/O PARAMETER	X	●		
STATION SPECIFIC PARAMETER	Δ	Δ		
I/O ASSIGNMENT	X	X		
TRANSFER PARAMETER FOR DATA LINK	Δ			

End : Check END Esc : Close

↓

To the next page.

From the previous page.

↓

(2) Confirm the network refresh parameter settings.

<Setting screen>
Network module 1

<NETWORK REFRESH PARAMETER>

SETTING FOR OTHER MODULES
LB↔B TRANSFER

1	2		

1:
2:
3:
4:

SETTING 1	NETWORK MODULE NO. 1	
MELSECNET/10 (NORMAL)	HEAD I/O NO. 00	NETWORK NO. 1

LB↔B TRANSFER	HEAD LB [0000]↔HEAD B [0000]	TRANSFER SIZE [1000] H POINTS
LW↔W TRANSFER	HEAD LW [0000]↔HEAD W [0000]	TRANSFER SIZE [1000] H POINTS
LX↔X TRANSFER	HEAD LX [0000]↔HEAD X [0000]	TRANSFER SIZE [0000] H POINTS
LY↔Y TRANSFER	HEAD LY [0000]↔HEADY [0000]	TRANSFER SIZE [0000] H POINTS
SB TRANSFER DEVICE	HEAD SB [0000]→DESTINATION [Y1C00]	TRANSFER SIZE [100] H POINTS
SW TRANSFER DEVICE	HEAD SW [0000]→DESTINATION [D7168]	TRANSFER SIZE [100] H POINTS
LB↔EXTENSION R TRANSFER	HEAD LB [0000]↔BLOCK [0] HEAD NO. [0]	TRANSFERSIZE [0000] H POINTS
LW↔EXTENSION R TRANSFER	HEAD LW [0000]↔BLOCK [0] HEAD NO. [0]	TRANSFER SIZE [0000] H POINTS
ERROR AREA	OVERWRITE	

Change module number: Shift + F1, F2, F3, F4   End: SET Esc: Close

↓

Press [F2] while pressing down [Shift].

<Setting screen>
Network module 2

<NETWORK REFRESH PARAMETER>

SETTING FOR OTHER MODULES
LB↔B TRANSFER

1	2		

1:
2:
3:
4:

SETTING 1	NETWORK MODULE NO. 2	
MELSECNET/10 (CONTROL)	HEAD I/O NO. 06	NETWORK NO. 2

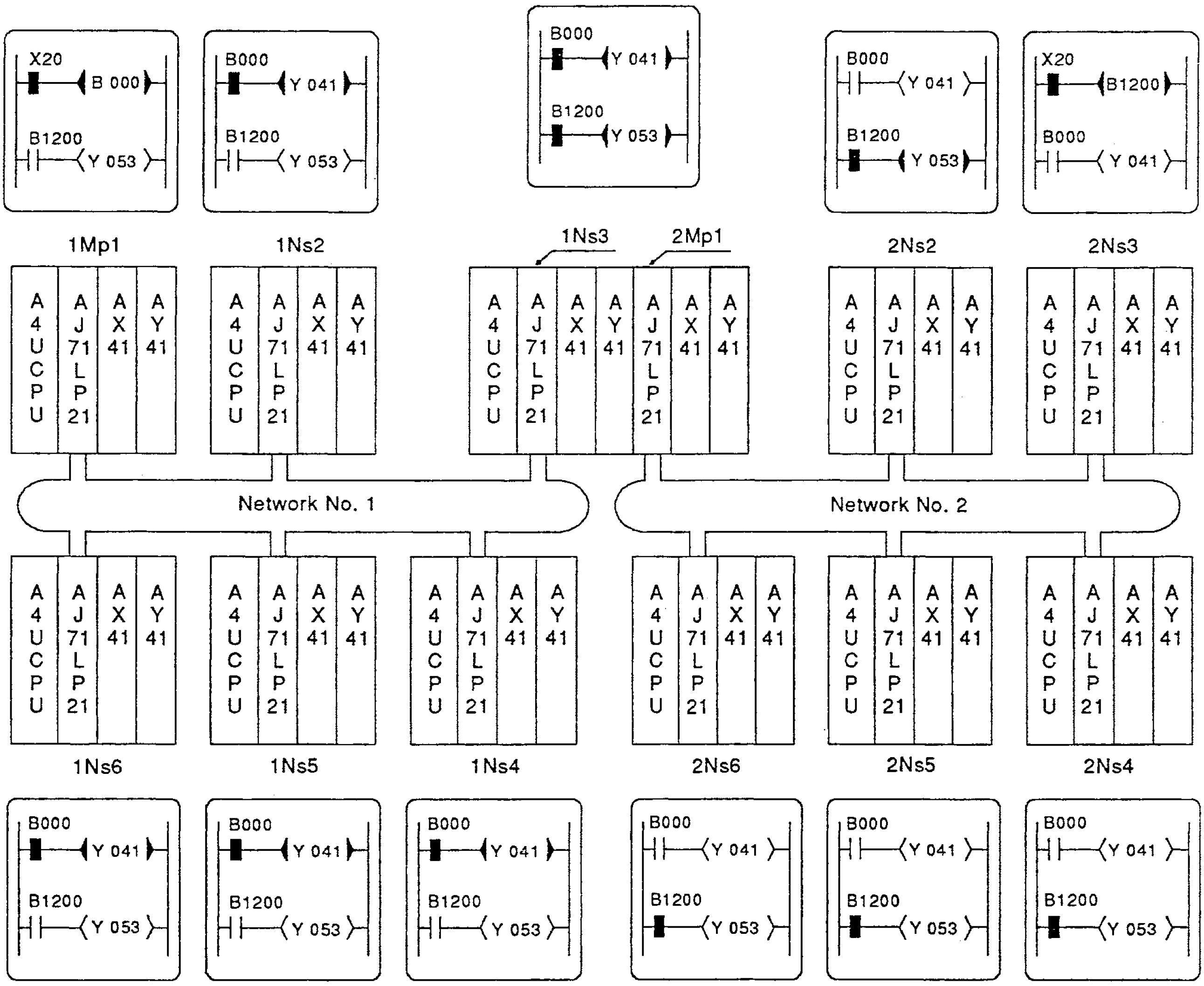
LB↔B TRANSFER	HEAD LB [1000]↔HEAD B [1000]	TRANSFER SIZE [1000] H POINTS
LW↔W TRANSFER	HEAD LW [1000]↔HEAD W [1000]	TRANSFER SIZE [1000] H POINTS
LX↔X TRANSFER	HEAD LX [0000]↔HEAD X [0000]	TRANSFER SIZE [0000] H POINTS
LY↔Y TRANSFER	HEAD LY [0000]↔HEADY [0000]	TRANSFER SIZE [0000] H POINTS
SB TRANSFER DEVICE	HEAD SB [0000]→DESTINATION [Y1D00]	TRANSFER SIZE [100] H POINTS
SW TRANSFER DEVICE	HEAD SW [0000]→DESTINATION [D7424]	TRANSFER SIZE [100] H POINTS
LB↔EXTENSION R TRANSFER	HEAD LB [0000]↔BLOCK [0] HEAD NO. [0]	TRANSFERSIZE [0000] H POINTS
LW↔EXTENSION R TRANSFER	HEAD LW [0000]↔BLOCK [0] HEAD NO. [0]	TRANSFER SIZE [0000] H POINTS
ERROR AREA	OVERWRITE	

Change module number: Shift + F1, F2, F3, F4   End: SET Esc: Close

5.1.3 Confirming the ranges of data transfer

Write the following programs to each A4UCPU to confirm.

For example, when X20 at 1Mp1 in network number 1 is turned ON, B0 at all stations connected to network number 1 turns ON. B0 at 2Ns2 to 2Ns6 (2Mp1 is excluded since it is connected also to network number 1) connected to network number 2 does not turn ON.
When X20 at 2Ns3 in network number 2 is turned ON, B1200 at all stations connected to network number 2 turns ON. B1200 at 1Mp1 to 1Ns2 and 1Ns4 to 1Ns6 (1Ns3 is excluded since it is connected also to network number 2) connected to network number 1 does not turn ON.
The above proves that data is transferred to only the stations connected to the network.
To transfer data to an other network, it is necessary to set the transfer parameter for data link as mentioned in Section 5.2.

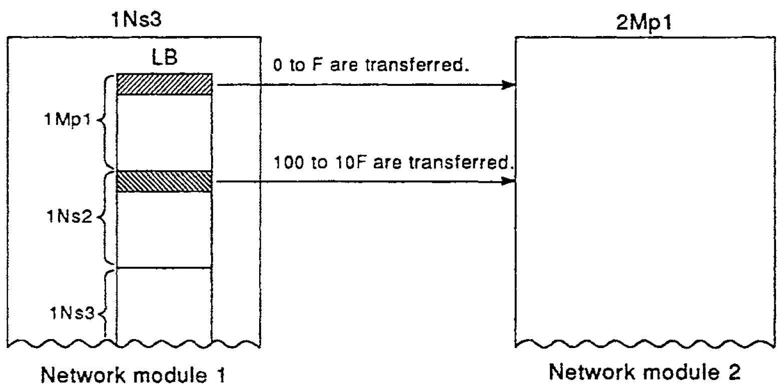


5.2 Setting the Transfer Parameter for Data Link

The transfer parameter for data link is used to transfer data of link devices (LB, LW) stored in the network modules, when two or more network modules are installed to the AnUCPU, to an other network module.
Link devices LX and LY cannot be transferred across networks.
This data transfer is possible by a combination of the MELSECNET/10 and MELSECNET/10 modules or the MELSECNET/10 and MELSECNET (II or /B) modules.
Refer to the system configuration given in Section 5.1 for the following explanations.

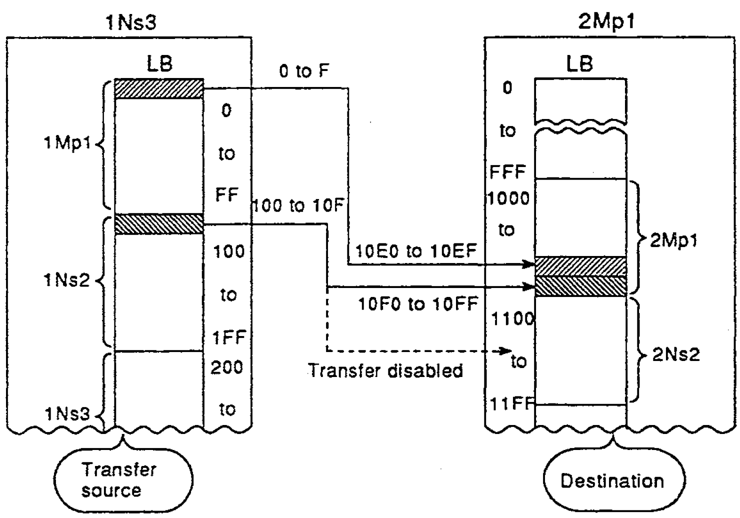
5.2.1 Designating the ranges of transfer parameter for data link

Data of link devices LB and LW are transferred between 1Ns3 and 2Mp1 network modules shown in Fig. 5.1.
For example, LB 0 to F (data in 1Mp1) and LB 100 to 10F (data in 1Ns2) in network module 1 are transferred to network module 2, as shown below.



(1) Setting LB and LW in the transfer source and destination

Since data in network module 1 is transferred, the transmission range set with 2Mp1 in network module 2 receives the transferred data. Set the transmission range at 2Mp1 when used as the host station so that the range is not turned ON/OFF by the sequence program.



(2) Fill in the data to be set in the network setting sheets attached to the end of this manual.

No.	Transfer	1 NET[10] (00)		Transfer	2 NET[10] (06)		Transfer	3
1	Source	LB	0–F	Destination	LB	10E0–10EF		L
2	Source	LB	100–10F	Destination	LB	10F0–10FF		L
3		L	–		L	–		L

5.2.2 Setting the transfer parameter for data link by using a peripheral device

The following gives the procedures for setting the transfer parameter for data link by using a peripheral device.
The procedures for turning ON the power to the module and setting the number of modules and common parameters are described in Section 4.2.3.

(1) Set the transfer parameter for data link.

<Setting screen>

<TRANSFER PARAMETER FOR DATA LINK>

NO	1 NET/10 (00)	2 NET/10 (06)	3	4
1	LB0000 – 000F→	→LB10E0 – 10EF	-	–
2	LB0100 – 010F→	→LB10F0 – 10FF	-	–
3	–	–	-	–
4	–	–	-	–
5	–	–	-	–
6	–	–	-	–
7	–	–	-	–
8	–	–	-	–
9	–	–	-	–
10	–	–	-	–
11	–	–	-	–
12	–	–	-	–

End:SET Esc:Close

<Key operation>

[F1] (Setting LB and LW in the transfer source)
[B] [→] [F] [→]

[F2] (Setting LB and LW in the transfer destination)
[1] [0] [E] [0] [→] [Enter]

Set other items by following the same procedure.

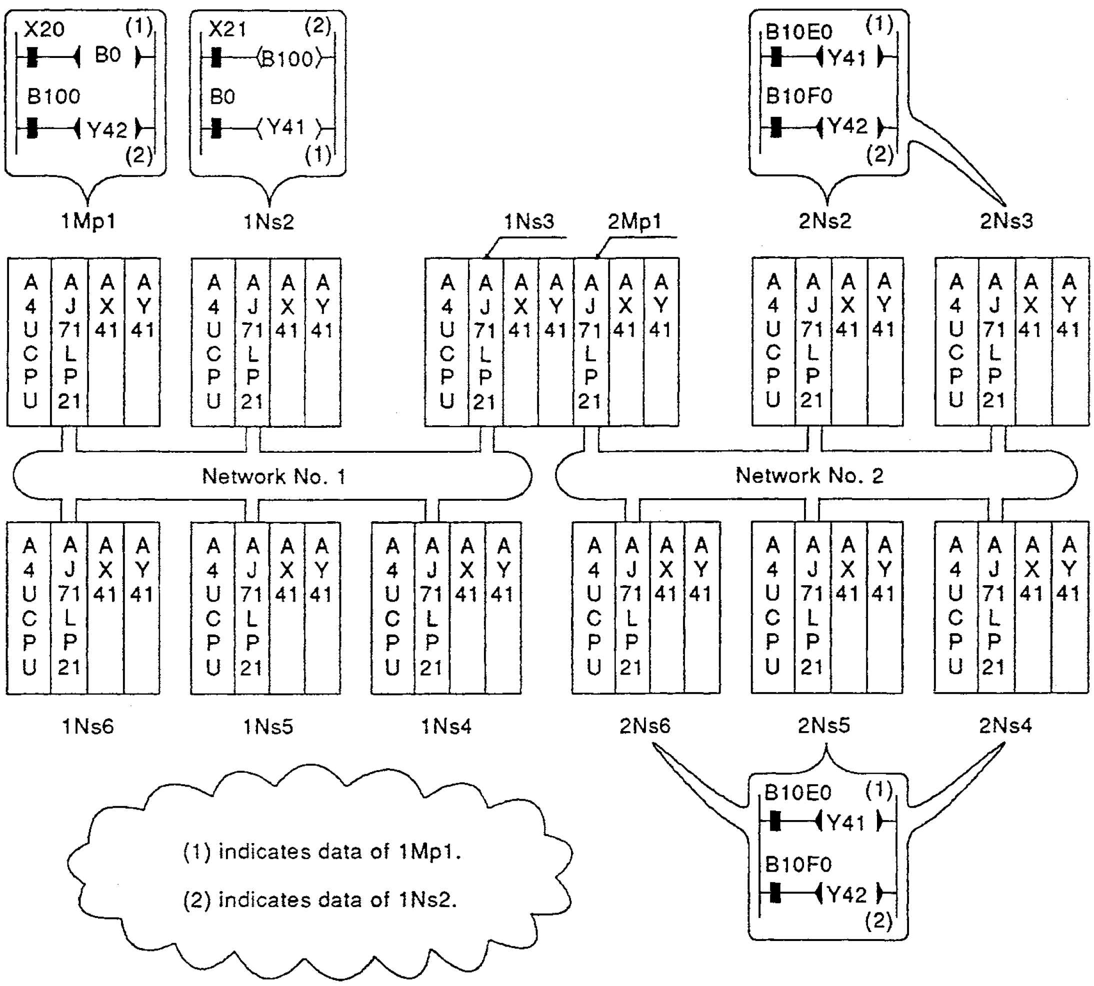
POINT

Make settings for the transfer source and the destination in that order.

5.2.3 Confirming that data is transferred to other network

Write the following programs to each A4UCPU to confirm.

For example, when X20 at 1Mp1 in network number 1 is turned ON, B10E0 at all stations connected to network number 2 turns ON.
When X21 at 1Ns2 in network number 1 is turned ON, B10F0 at all stations connected to network number 2 turns ON.



The above indicates that data in 1Mp1 and 1Ns2 in network number 1 are transferred to network number 2.

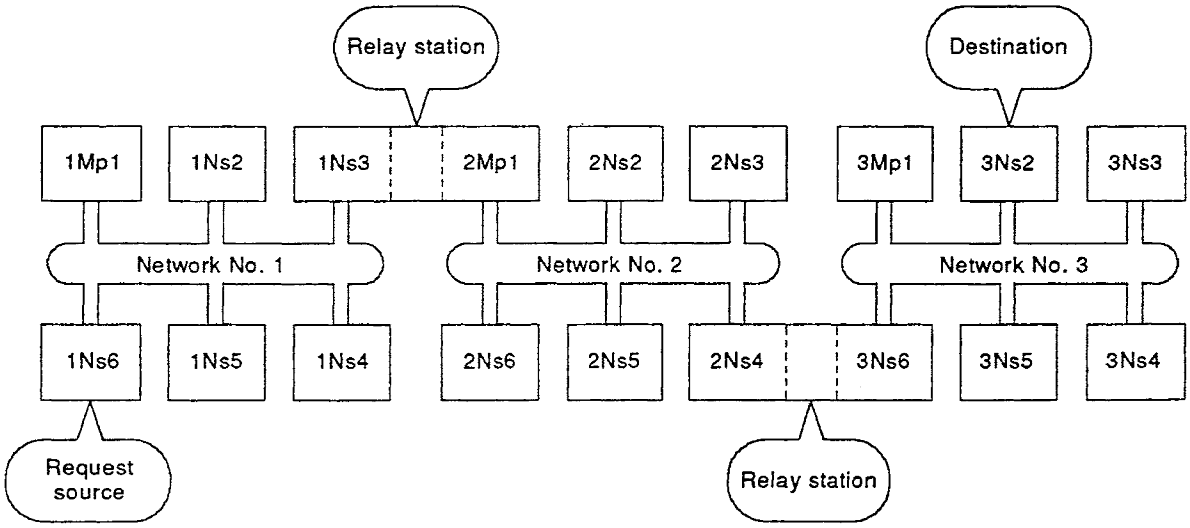
5.3 Setting Routing Parameter

The routing parameter is used for executing transient transmission to the stations in other network.
This parameter needs to be set at the request source and relay station for transient transmission.

The following example assumes that word device data in 1Ns6 is written to 3Ns2.

Refer to the following system configuration for the explanation of routing parameter.

<System configuration>



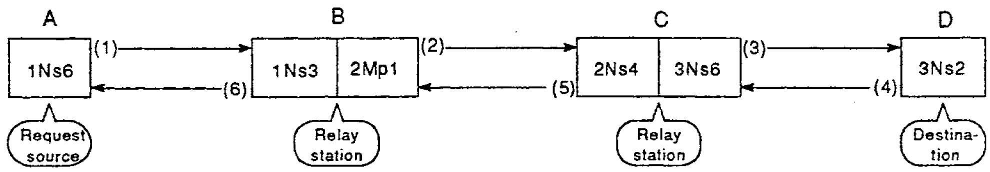
5.3.1 Setting the routing parameter

The routing parameter is used to designate the route for transient transmission. Select the shortest route (the smallest number of relay stations) to obtain the best result.

(1) Setting procedures

Follow the basic rule of setting; "to make access to the destination station in network No.( ), it is necessary to access station Δ in network No.[ ]".

(a) Routing from 1Ns6 to 3Ns2 is as follows:



(b) Positions of settings

It is necessary to set the routing parameter with A (request source) and B and C (relay stations).
Setting with D (destination) is not necessary.

POINT

Since it is not necessary to set the routing parameter with the destination, transient transmission can be executed to any station whenever it is requested by setting it with the request source once after the routing parameter is set with all relay stations in the network.

(c) Contents of setting

The following settings are required:

1) Settings with 1Ns6

To make access to a station in network number 2, it is necessary to access station 3 in network number 1 first. And, to make access to a station in network number 3, it is necessary to access station 3 in network number 1.

Destination Network No.	Relay Network No.	Relay Station No.
1	—	—
2	1	3
3	1	3

Since destination network number 1 is directly connected, it is not necessary to make settings with it.

2) Settings with 1Ns3 (2Mp1)

To make access to a station in network number 3, it is necessary to access station 4 in network number 2 first.

Destination Network No.	Relay Network No.	Relay Station No.
1	—	—
2	—	—
3	2	4

Since destination network numbers 1 and 2 are connected to each other, it is not necessary to make settings with them.

3) Settings with 2Ns4 (3Ns6)

To make access to a station in network number 1, it is necessary to access station 1 in network number 2 first.

Destination Network No.	Relay Network No.	Relay Station No.
1	2	1
2	—	—
3	—	—

Since destination network numbers 2 and 3 are connected to each other, it is not necessary to make settings with them.

(2) Fill in setting data in the network setting sheets attached at the end of this manual.

(a) Settings with 1Ns6

Routing parameter

No.	Destination Network No.	Relay Network No.	Relay Station No.
1	2	1	3
2	3	1	3

(b) Settings with 1Ns6 (2Mp1)

Routing parameter

No.	Destination Network No.	Relay Network No.	Relay Station No.
1	3	2	4

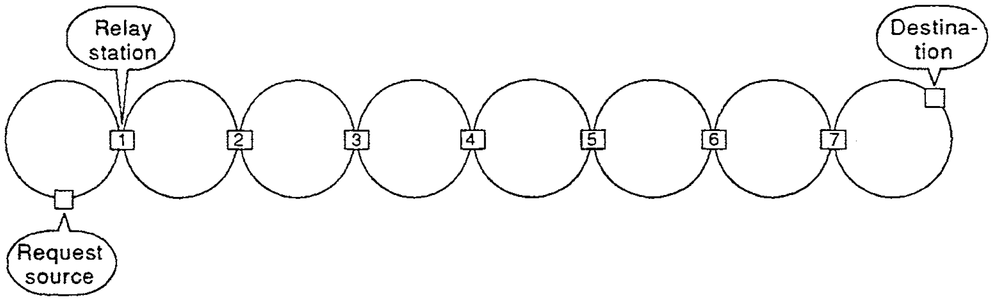
(c) Settings with 2Ns4 (3Ns6)

Routing parameter

No.	Destination Network No.	Relay Network No.	Relay Station No.
1	1	2	1

(3) Up to seven stations can be set as relay stations with the routing function.

Transient transmission using eight relay stations or more is not possible.



5.3.2 Setting the routing parameter by using a peripheral device

Set the "ROUTING PARAMETER" by using a peripheral device as mentioned below.

(1) Set the routing parameter (Settings with 1Ns6 in network number 1).

<Setting screen>

<ROUTING PARAMETER>

NO	DESTINATION NETWORK NO.	RELAY DESTINATION NETWORK NO.	RELAY DESTINATION STATION NO.
1	2	1	3
2	3	1	3
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

Page Up Page Down End: SET Esc: Close

<Key operation>

[2] (DESTINATION NETWORK NO.) [Enter]

[1] (RELAY DESTINATION NETWORK NO.) [Enter]

[3] (RELAY DESTINATION STATION NO.) [Enter]

Make other settings by following the same procedure.

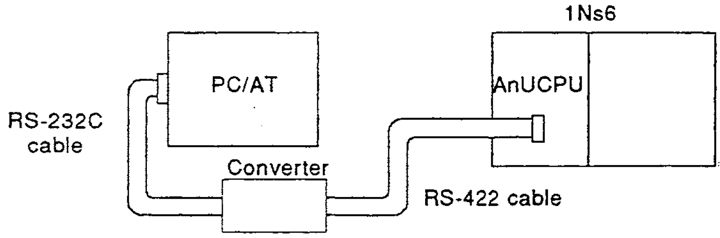
[End] (SET)

5.3.3 Confirming routing parameter settings

Confirm that the routing parameter has been correctly set by the "communication test" of the network diagnosis with a peripheral device.

This test allows to know the relay stations used with transient transmission. The following gives the procedures with a peripheral device when a PC/AT is used.

(1) Connect the AnUCPU in 1Ns6 to the PC/AT by using an RS-422 cable via a converter.



(2) Start up SW[ ]IX-GPPAE to display the MENU screen.

```
[MENU]
1: PROGRAMMING
2: PARAMETER
```

(3) Follow the key operations given below when the MENU screen is displayed.

[3] (ON-LINE)

[3] (NETWORK DIAGNOSIS)

[4] (COMMUNICATION TEST)

[3] (NETWORK NO.)

[Enter] (DECISION)

[2] (Station number)

[F1] (Network module 1)

```
EXECUTE?

          YES          NO
```

[←] (YES)

[Enter] (Execute)

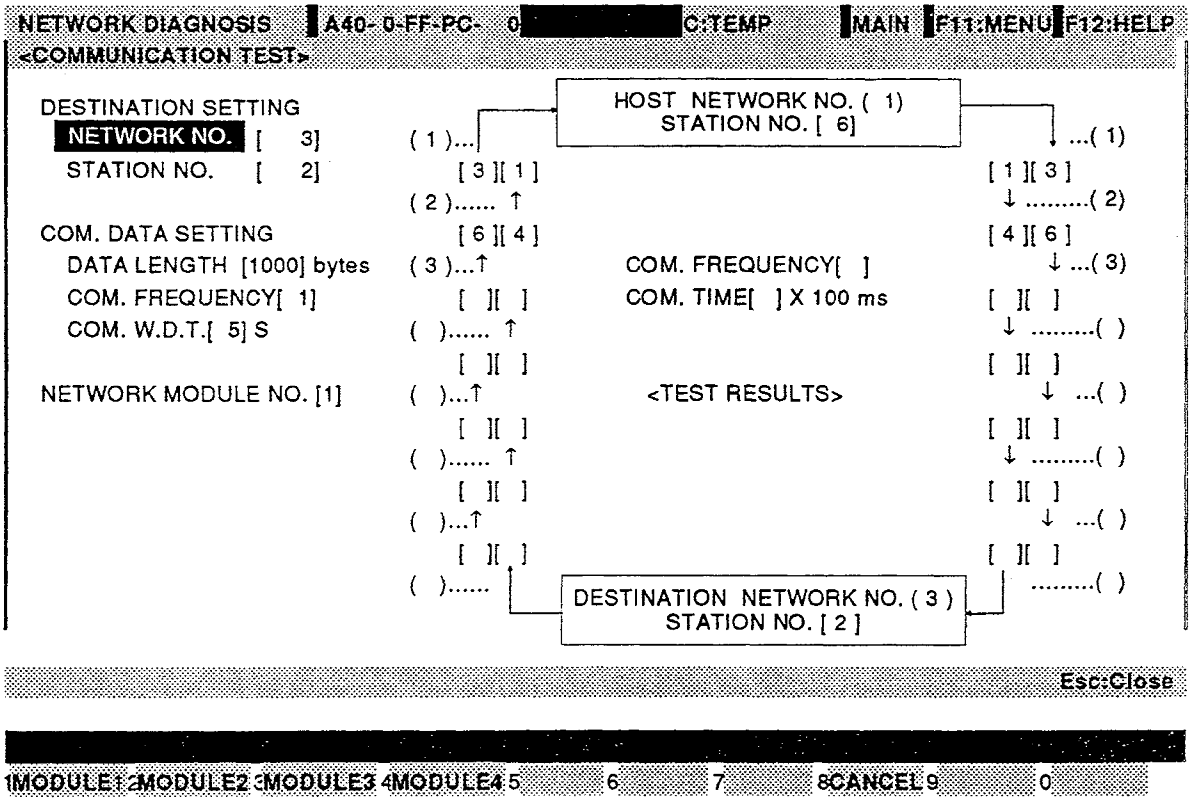
↓

To the next page.

From the previous page.

↓

Communication test results



When the test results are given as shown above, routing parameter settings are correct.

Interpreting the screen

```
HOST NETWORK NO. [ 1]
STATION NO. [ 6]
        ↓ ...( 1) ←—— Network number
[ 1 ][ 3 ] ←—— Station number
 ↓ .........( 2)
[ 4 ][ 6 ]
        ↓ ...( 3)
```

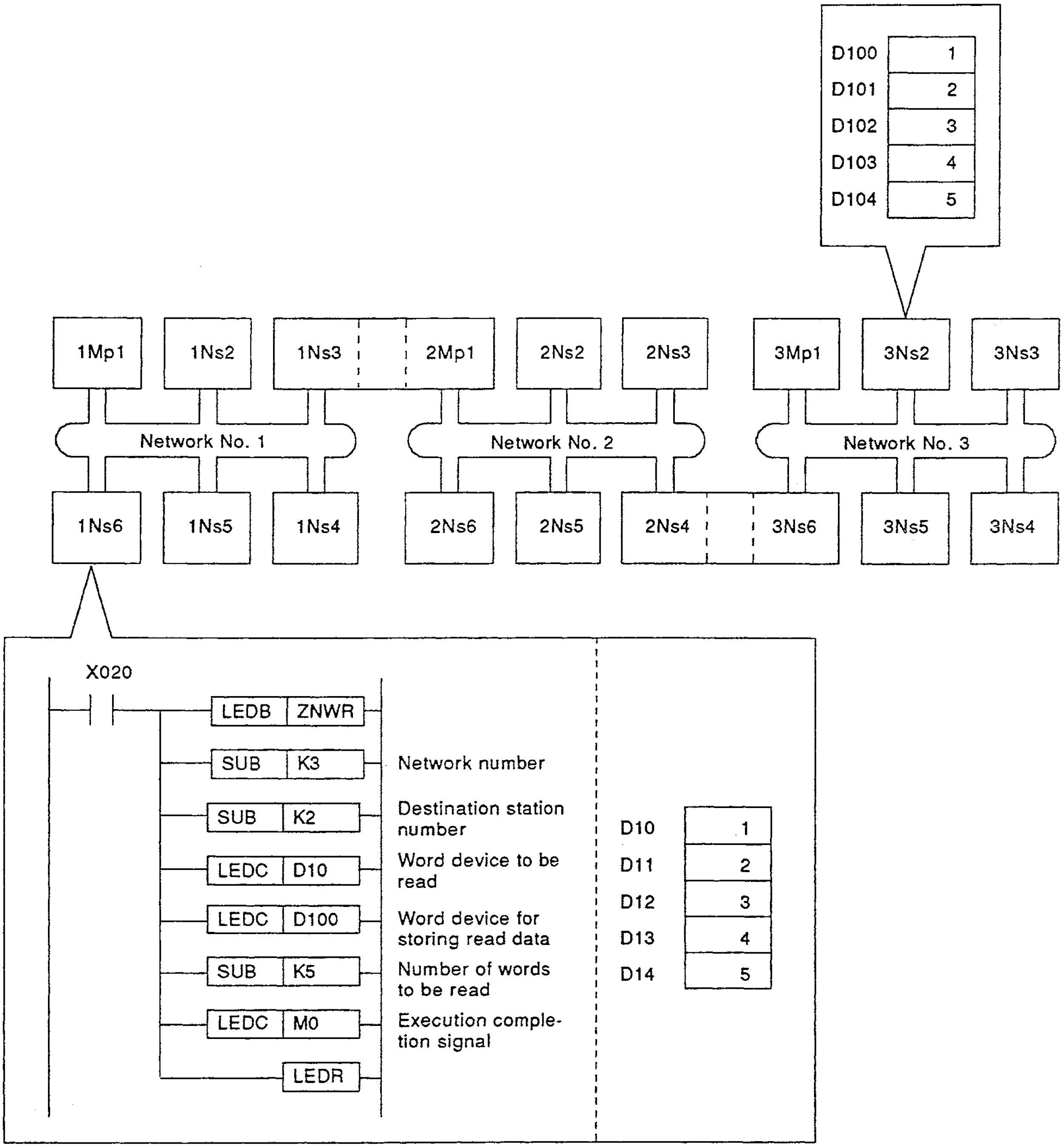
The above indicates the route used for transient transmission.
The route is also indicated as shown below.

1Ns6	→	1Ns3	2Mp1	→	2Ns4	3Ns6	→	Destination

5.3.4 Accessing an other network by using the transient transmission function

Write the following programs to each AnUCPU to confirm.

For example, when X20 at 1Ns6 in network number 1 is turned ON, contents of D10 to D14 are stored to D100 to D104 at 3Ns2 in network number 3.



6. NETWORK MONITOR

The operating condition of the MELSECNET/10 network can be checked by the network monitor function by using a peripheral device.
The network monitor function is used to locate a faulty station when an error occurs.
The following operations are provided with the network monitor function.

- Network monitor
  - Line monitor
    - Line monitor
    - Detailed line monitor
    - Line monitor another station
  - Condition monitor
    - Condition monitor
    - Detailed condition monitor
    - Test monitor
  - Error list monitor
    - Error list monitor
    - Loop switch data display
    - Transient transmission error

This section gives the interpretation for the screens used with the network monitor operation.
SB[ ][ ][ ][ ] and SW[ ][ ][ ][ ] mentioned in the explanations indicate the special relay (SB) and special register (SW) used with the network monitor function.

REMARK

The network monitor function is disabled when the off-line test with a network module is executed. (Correct display data cannot be obtained.)

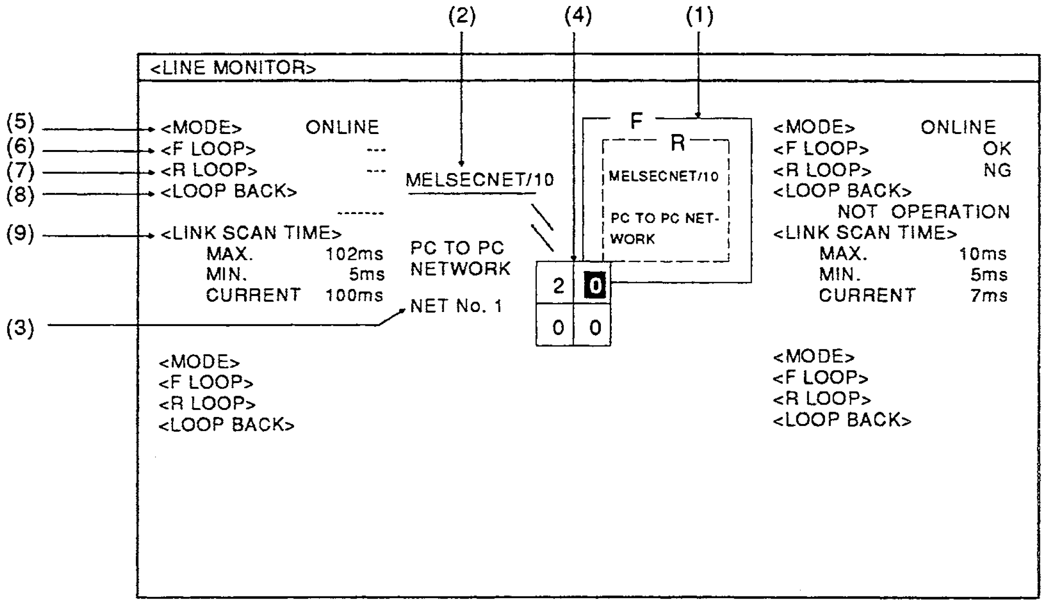
6.1 Line Monitor

The conditions of the line, data link, CPU, and parameters used with a network to which a peripheral device is connected can be checked.

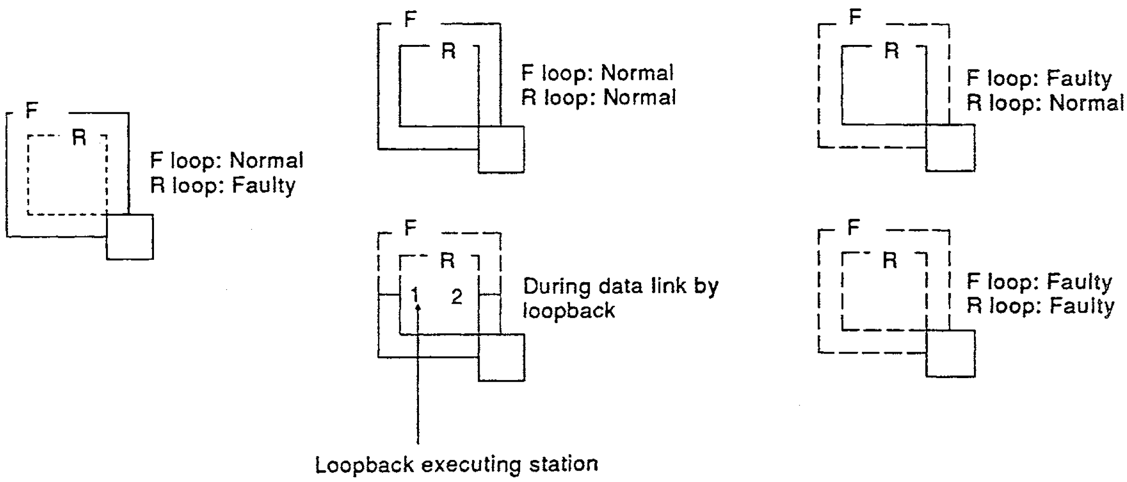
6.1.1 Checking the line condition and link scan time (Line monitor)

The condition of the network can be checked with a network diagram.

Check points in the screen
- Mode
- F/R loop condition
- Loopback condition
- Link scan time



(1) Line condition .... The condition of the loop and bus is displayed.
- Optical loop system



• Coaxial bus system

The same display is given regardless of the condition of the cable.

(2) Network type .... The type of the network is displayed. (SB0040)

- MELSECNET/10 PC-to-PC network
- MELSECNET/10 remote I/O network (provided in the future)

(3) Network number .... Network number is displayed. (SW0040)

(4) Station number .... The host station number is displayed. (SW0042)
The control station is highlighted. (SB0044)

(5) MODE .... Mode of the host station is displayed. (SW0043)

- On-line — Automatic on-line return is set.
- Off-line
  - Station-to-station test (master)
  - Station-to-station test (slave)
  - Self-loopback test
  - Self-loopback test (internal)
- Loop test
  - Forward loop test
  - Reverse loop test

Only the control station can execute monitoring.

(6) F LOOP .... The forward loop condition is displayed. (SB0091)

- OK: Normal
- NG: Faulty

"--" is displayed when the bus system is monitored.

(7) R LOOP .... The reverse loop condition is displayed. (SB0095)

- OK: Normal
- NG: Faulty

"--" is displayed when the bus system is monitored.

(8) LOOPBACK .... The loopback executing condition is displayed. (SW0090)

- Executed
- Not executed

"------" is displayed when the bus system is monitored.

(9) LINK SCAN TIME ...... The maximum, minimum, and current values of the link scan time of the host station are displayed. (SW006B/SW006C/SW006D)
The displayed values differ on the control station and normal stations according to the set condition of constant link scan.

<table>
<tr><th>Constant Link Scan</th><th>Control Station</th><th>Normal Station</th></tr>
<tr><td>Not set</td><td colspan="2" rowspan="1">Actual maximum, minimum, and current values are displayed.</td></tr>
<tr><td>Set</td><td></td><td>Constant scan ± 2 msec</td></tr>
</table>

6.1.2 Checking the condition of the control station and data link (Detailed line monitor)

Check points in the screen

- Host station number, network number, group number
- Settings and operating condition of the control station
- Data link data
- Constant link scan
- F/R loops and loopback condition
- Parameter settings with the host station

```
<DETAILED LINE MONITOR NETWORK MODULE NO.1>
(1)  HOST STATION NO.              2                  CONSTANT LINK SCAN        100 ms                 (15)
(2)  NETWORK NO.                   1
(3)  GROUP NO.                     1                  LOOP BACKD DATA
                                                        F LOOP                  --                     (16)
     CONTROL STATION DATA                               R LOOP                  --                     (17)
(4)    DESIGNATED CONTROL STA.     1                    F LOOP BACK STA.        --                     (18)
(5)    PRESENT CONTROL STA.        1                    R LOOP BACK STA.        --                     (19)
(6)    COM. DATA                   COM. (TO CONTROL)    LOOP SWITCHING FREQ.    --                     (20)
(7)    COM. (TO SUB-CONTROL)       EXIST
(8)    I/O MASTER SATAION NO.                         HOST CONDITION
         BLOCK 1                   NONE                 PARAMETER SETTING       COMMON PARAMETER       (21)
         BLOCK 2                   NONE                 LB/LW COM. STOPPED      HOLD                   (22)
     DATA LINK DATA                                     LX.COM. STOPPED         HOLD                   (23)
(9)    TOTAL NO. OF LINK STATIONS  8                    LB/LW DATA LINK STOPPED HOLD                   (24)
(10)   MAX. NORMAL COM. STATIONS   3                    LX COM. STOPPED         HOLD                   (25)
(11)   MAX. DATA LINK STATIONS     0                    RESERVE STA. SETTING    EXIST                  (26)
(12)   COM. CONDITION              STOP (OTHER)         COM. MODE               CONSTANT LINK SCAN     (27)
(13)   CAUSE OF COM. STOP          NORMAL               TRANSMISSION SETTING    --------------         (28)
(14)   CAUSE OF DATA LINK STOP     ALL (1 STATION)      TRANSMISSION CONDITION  --------------         (29)
```

(1) HOST STATION NO. ... The host station number is displayed. (SW0042)

(2) NETWORK NO. .... The network number of the host station is displayed. (SW0040)

(3) GROUP NO. .... The group number of the host station is displayed. (SW0041)

(4) DESIGNATED CONTROL STATION .... The station number set for the control station is displayed. (SW0057)

(5) PRESENT CONTROL STATION .... The station number that is actually controlling the network is displayed. (SW0056) When the host station is down, this does not change.

(6) COMMUNICATION DATA ..... The type of station which is controlling the network is displayed. (SB0044, SB0048)

- Communication (to control)
- Communication (to sub-control)

When the host station is the control station and it is down, this automatically changes to "communication (to sub-control)".

(7) COMMUNICATION (TO SUB-CONTROL) ..... Whether or not communication by sub-control station is executed is displayed. (SB0058)
- Exist
- No

(8) I/O MASTER STATION NUMBER .... The I/O master station numbers for X/Y communication block 1 and block 2 are displayed.
(SB005C, SB005D, SW005C, SW005D)
"None" is displayed for the block with which setting is not made

(9) TOTAL NUMBER OF LINK STATIONS ... The total number of link stations set with the common parameter is displayed.

(10) MAXIMUM NORMAL COMMUNICATION STATIONS .... The maximum station number which is normally executing baton passing (transient transmission possible). (SW005A)
The T.PASS LED is lit.

(11) MAXIMUM DATA LINK STATION .... The maximum station number which is normally executing data link (cyclic and transient transmissions). (SW005B)
The D.LINK and T.PASS LEDs are lit.

(12) COMMUNICATION CONDITION ..... Communication condition of the host station is displayed. (SW0047)

- Executing data link
- Data link Stop (Other) .... Cyclic transmission is stopped by another station.
- Data link Stop (Host) .... Cyclic transmission is stopped by the host station.
- Baton passing (no area) .... The B/W send areas are not set with the host station.
- Baton passing (parameter error) .... There is a parameter error with the host station.
- Baton passing (parameter not received) .... Common parameters are not yet received.
- Off-line (no baton passing) .... Station numbers overlap. Cable is not connected.
- Off-line (line fault) .... Cable is not connected.
- Executing test .... On-line or off-line test is being executed.

(13)CAUSE OF COMMUNICATION STOP ...... Cause of communication stop (transient transmission) at the host station is displayed. (SW0048)

- Normal
- Baton overlap .... More than one baton has been received.
- Baton passing time out ... The baton failed to return within specified time.
- Executing on-line test ..... On-line test is being executed.
- Baton passing at other station is executed. ...... Baton passing at other than the host station is executed.
- Same station number exists. .... The station numbers overlap.
- Control station overlap .... More than one control station is set.
- Other (error code) .... Refer to the error codes list.
- Executing off-line test ..... Off-line test is being executed.
- Other (error code) .... Refer to the error codes list.

(14)CAUSE OF DATA LINK STOP ...... Cause of data link stop (cyclic transmission) at the host station is displayed. (SW0049)

- Normal
- Stop (Other station) (station [ ]) ... Cyclic transmission is stopped by another station.
- Stop (Host) .... Cyclic transmission is stopped by the host station.
- All stations (stations [ ]) .... Cyclic transmission at all stations is stopped.
- No parameter .... Parameters are not yet received.
- Parameter error ...... There is a parameter error.
- Specific parameter matching error .... There is a matching error between common parameters and station specific parameters.
- I/O allocation error .... The I/O allocation with the remote I/O network has an error.
- Other (error code) .... Refer to the error codes list.

(15)CONSTANT LINK SCAN ...... Set conditions of constant link scan are displayed. (SW0068)

(16)F LOOP .... The F loop condition is displayed. (SB0099, SW0090)

- Normal
- Loopback transmission
- Data link impossible

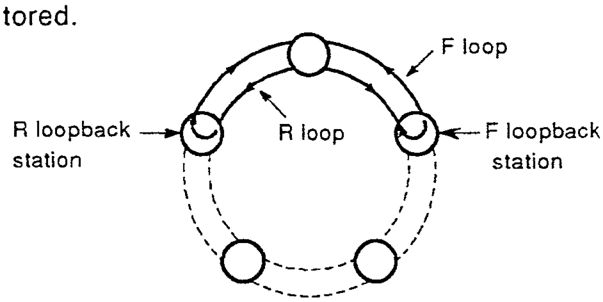
"--" is displayed when the bus system is monitored.

(17)R LOOP .... The R loop condition is displayed. (SB009A, SW0090)

- Normal
- Loopback transmission
- Data link impossible

"--" is displayed when the bus system is monitored.

(18)F LOOPBACK STATION .... The loopback station number in the F loop is displayed. (SW0099)
"--" is displayed when the bus system is monitored.



(19)R LOOPBACK STATION .... The loopback station number in the R loop is displayed. (SW009A)
"--" is displayed when the bus system is monitored.

(20)LOOP SWITCHING FREQUENCY ..... The number of times of loop switching and loopback operations is displayed. (SW00CE)
"--" is displayed when the bus system is monitored.

(21)PARAMETER SETTING .... The parameter settings with the host station are displayed. (SW0054)

- Common parameter
- Common + specific
- Default parameter
- Default + specific

(22)LB/LW COMMUNICATION STOPPED ..... The LB/LW condition when communications stopped is displayed.

(23)LX COMMUNICATION STOPPED .. The LX condition when communications stopped is displayed.

(24)LB/LW DATA LINK STOPPED ..... The LB/LW condition when data link stopped is displayed.

(25)LX DATA LINK STOPPED .... The LX condition when data link stopped is displayed.

(26)RESERVE STATION SETTING .... The set condition of reserve station is displayed. (SB0064)

- Set
- None

(27)COMMUNICATION MODE ..... The link scan condition is displayed. (SB0068)

- Normal mode
- Constant link scan

(28)TRANSMISSION SETTING .... The setting condition of multiplex transmission is displayed. (SB0069)

- Normal transmission
- Multiplex transmission

"----------" is displayed when the bus system is monitored.

(29)TRANSMISSION CONDITION .... The condition of multiplex transmission is displayed. (SB006A)

- Normal transmission
- Multiplex transmission

"----------" is displayed when the bus system is monitored.

6.1.3 Checking the condition of communication, data link, CPU, and loop (Line monitor of another station)

The condition of the communication, data link, CPU, parameters, loop, and reserve stations at each station can be checked.

<LINE MONITOR OTHER STATION NETWORK MODULE NO.1>

F1	COM. CONDITION OF EACH STATION
F2	DATA LINK CONDITION OF EACH STATION
F3	PARAMETER CONDITION OF EACH STATION
F4	CPU OPE. CONDITION OF EACH STATION
F5	CPU RUN OPERATION OF EACH STATION
F6	LOOP CONDITION OF EACH STATION
F7	RESERVE DESIGNATION OF EACH STATION

Indication of items F1 to F4 and F6 shown above is highlighted when there is a faulty station, that of F5 is highlighted when there is a STOP station, and that of F7 is highlighted when there is a reserve station.

(1) Communication condition of each station

The condition of transient transmission is displayed. (SW0070 to 73) The condition display is given for the total number of link stations set with the common parameter.

Normal display ..... Normal station, reserve station
Highlighted .... Faulty station

<COM. CONDITION OF EACH STATION>

■ : ERROR

1 2 3 4 5 6 7 8

(2) Data link condition of each station

The condition of cyclic transmission and transient transmission is displayed. (SW0074 to 77)
The condition display is given for the total number of link stations set with the common parameter.

Normal display ..... Normal station, reserve station
Highlighted .... Faulty station

<DATA LINK CONDITION OF EACH STATION>

■ : NOT OPERATION

1 2 3 4 5 6 7 8

(3) Parameter condition of each station

(a) The parameter communication condition is displayed. (SW0078 to 7B)

The condition display is given for the total number of link stations set with the common parameter.

Normal display ..... Other than during parameter communication, reserve station
Highlighted .... During parameter communication

(b) The parameter condition is displayed. (SW007C to 7F)

The condition display is given for the total number of link stations set with the common parameter.

Normal display ..... Parameter normal, reserve station, non-connected station
Highlighted .... Parameter error

```
<PARAMETER CONDITION OF EACH STATION>
(a) → <COMMUNICATION CONDITION>        ■ : COMMUNICATION
   1  2  3  4  5  6  7  8

(b) → <ERROR CONDITION>                ■ : PARA. ERROR
   1  2  3  4  5  6  7  8
```

(4) CPU operation condition of each station

The CPU operation condition is displayed. (SW0080 to 83)
The condition display is given for the total number of link stations set with the common parameter.

Normal display ..... CPU normal, reserve station, non-connected station
Highlighted .... The CPU cannot communicate with the network module.

```
<CPU OPE. CONDITION OF EACH STATION>
                                       ■ : ERROR
 1  2  3  4  5  6  7  8
```

(5) CPU RUN operation of each station

The CPU RUN or STOP state is displayed. (SW0084 to 87)
The condition display is given for the total number of link stations set with the common parameter.

RUN .... RUN, STEP RUN
STOP .... STOP, PAUSE, ERROR, non-connected station
Reserve station is displayed as "--------".

<CPU RUN OPERATION OF EACH STATION>

1	RUN	17	------------	33	------------	49	------------
2	RUN	18	------------	34	------------	50	------------
3	RUN	19	------------	35	------------	51	------------
4	STOP	20	------------	36	------------	52	------------
5	------------	21	------------	37	------------	53	------------
6	STOP	22	------------	38	------------	54	------------
7	------------	23	------------	39	------------	55	------------
8	STOP	24	------------	40	------------	56	------------
9	------------	25	------------	41	------------	57	------------

(6) Loop condition of each station (Optical loop system only)

The forward/reverse loop condition is displayed.
(SW0091 to 94, SW0095 to 98)
The condition display is given for the total number of link stations set with the common parameter.

Normal display ..... Normal, reserve station
Highlighted .... Faulty, non-connected station

<LOOP CONDITION OF EACH STATION>

<FORWARD-LOOP CONDITION> ■ : FORWARD-LOOP ERROR

1 2 3

<REVERSE-LOOP CONDITION> ■ : REVERSE-LOOP ERROR

1 2 3

(7) Reserve designation of each station

The reserve station designating condition is displayed.
The condition display is given for the total number of link stations set with the common parameter.

Normal display ..... Non-reserved station
Highlighted .... Reserved station

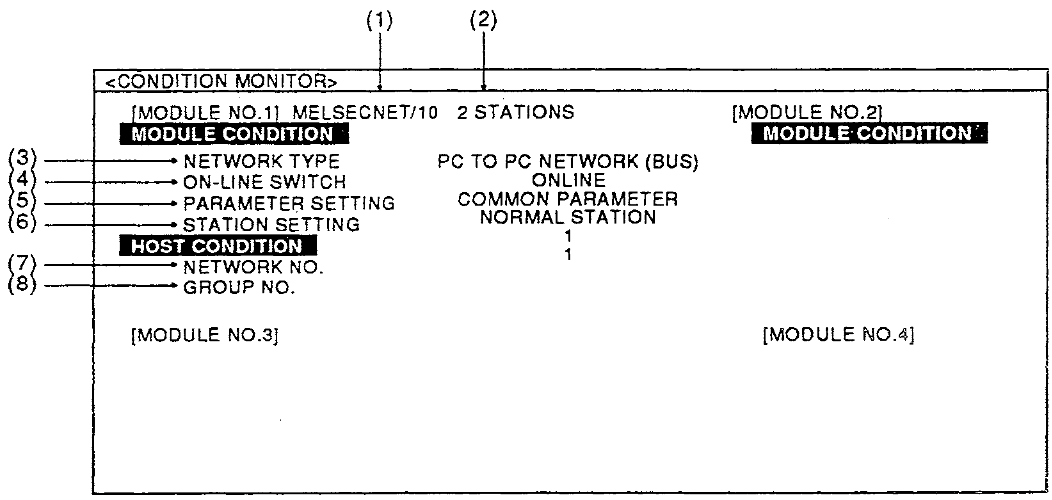
```
&lt;RESERVE DESIGNATION OF EACH STATION&gt;

                                          ■ : RESERVE STATION

  1   2   3   4   5   6   7   8
```

6.2 Condition Monitor

The switch and parameter settings and conditions of data link, on-line/off-line test, etc. of the host station can be checked.

6.2.1 Checking the module conditions of the host station (Condition monitor)

Check points in the screen
- Network type
- Mode
- Parameter setting condition
- Station setting
- Network number
- Group number



(1) MODULE TYPE .... The type of module of the host station is displayed.

- MELSECNET/10

(2) STATION NUMBER ..... The host station number is displayed. (SW0042)

(3) NETWORK TYPE .... The type of the network of the host station is displayed. (SB0040, SW0046)

- PC-to-PC network (Loop)
- PC-to-PC network (Bus)

(4) ON-LINE SWITCH ...... The mode select switch condition of the host station is displayed. (SW0043)

- On-line
- Other than on-line

(5) PARAMETER SETTING .... The parameter settings with the host station are displayed. (SW0054)

- Common parameter
- Common + specific
- Default parameter
- Default + specific

Display is left blank when a normal station has not received common parameters.

(6) STATION SETTING ..... The station type setting with the host station is displayed. (SB0044, SB0048)

- Control station
- Normal station
- Sub-control station

(7) NETWORK NUMBER ... The network number of the host station is displayed. (SW0040)

(8) GROUP NUMBER ...... The group number of the host station is displayed. (SW0041)

6.2.2 Checking the switch and parameter settings and data link condition of the host station (Detailed condition monitor)

Check points in the screen

- Switch settings
- Parameter settings
- Data link condition
- Data link start/stop condition
- LRDP/ZNRD, LWTP/ZNWR condition

```
<DETAILED CONDITION MONITOR NETWORK NO.1>
     HOST CONDITION                                                DATA LINK DATA
(1)  MODULE CLASSIFICATION      COAXIAL-SINGLE              TOTAL NO. OF LINK STATIONS        8              (19)
(2)  NETWORK TYPE               PC TO PC NETWORK (BUS)      MAX. NORMAL COM. STATION          3              (20)
(3)  MODULE CONDITION           NORMAL                      MAX. DATA LINK STATION            0              (21)
(4)  ON-LINE SWITCH             ONLINE                      COM. CONDITION                    STOP (OTHER)   (22)
(5)  SWITCH SETTING             NORMAL                      CAUSE OF COM. STOP                NORMAL         (23)
(6)  STATION SETTING            NORMAL STATION              CAUSE OF DATA LINK STOP           (1 STATION)    (24)
(7)  STATION NUMBER             2
(8)  TOTAL NO. OF B/W POINTS    ———                         DATA LINK CONDITION (HOST)
(9)  USED PARAMETER             COMMON PARAMETER            START CONDITIONS                  NO DESIGNATION (25)
(10) PARAMETER ERROR            NONE                        STOP CONDITION                    NO DESIGNATION (26)
(11) LB/LW COM. STOPPED         HOLD
(12) LX COM. STOPPED            HOLD                        DATA LINK CONDITION (ALL)
(13) LB/LW DATA LINK STOPPED    HOLD                        START CONDITIONS                  COMPLETED      (27)
(14) LX DATA LINK STOPPED       HOLD                        STOP CONDITION                    NO DESIGNATION (28)
(15) RESERVE STA. SETTING       EXIST
(16) COM. MODE                  CONSTANT LINK SCAN          EXEC. CONDITION OF LINK INSTN.
(17) TRANSMISSION SETTING       NORMAL TRANSMISSION         LRDP/ZNRD                         NOT EXECUTED   (29)
(18) TRANSMISSION CONDITION     NORMAL TRANSMISSION         LWTP/ZNWR                         NOT EXECUTED   (30)
```

(1) MODULE CLASSIFICATION .... The type of the module is displayed. (SW0046)

Left	Right
Optical Coaxial	Single Duplex

(2) NETWORK TYPE .... The type of network is displayed. (SB0040, SW0046)

- PC-to-PC network (Loop)
- PC-to-PC network (Bus)
- Remote I/O network

(3) MODULE CONDITION ... The status of communications with the CPU module is displayed. (SW0020)

- Normal
- Error code

(4) ON-LINE SWITCH ...... The mode select switch condition is displayed. (SW0043)

- On-line (Automatic on-line return is set)
- Loop test (Forward loop)
- Loop test (Reverse loop)
- Station-to-station test (master)
- Station-to-station test (slave)
- Self-loopback test
- Self-loopback test (internal)

(5) SWITCH SETTING ..... The switch setting conditions of the module are displayed. (SB0045, SW0045)

- Normal
- Error code

(6) STATION SETTING ..... The station type is displayed. (SB0044)

- Control station
- Normal station

(7) STATION NUMBER ..... The station number is displayed. (SW0042)

(8) TOTAL NUMBER OF B/W POINTS ...... The total number of B/W points set with the default parameter is displayed. (SW0054)

(9) USED PARAMETER .... The parameter setting conditions with the host station are displayed. (SW0054)

- Common parameter
- Common + specific
- Default parameter
- Default + specific

Display is left blank when a normal station has not received common parameters.

(10) PARAMETER ERROR ... The error condition of the parameter set with the host station is displayed. (SW0055)

(11) LB/LW COMMUNICATION STOPPED ...... The LB/LW condition when communications stopped is displayed.

- Hold

(12) LX COMMUNICATION STOPPED .... The LX condition when communications stopped is displayed.

(13) LB/LW DATA LINK STOPPED ..... The LB/LW condition when data link stopped is displayed.

(14)LX DATA LINK STOPPED .... The LX condition when data link stopped is displayed.

(15)RESERVE STATION SETTING .... The set condition of reserve station is displayed. (SB0064)

- Set
- None

(16)COMMUNICATION MODE ..... The link scan condition is displayed. (SB0068)

- Normal mode
- Constant link scan

(17)TRANSMISSION SETTING .... The setting condition of multiplex transmission is displayed. (SB0069)

- Normal transmission
- Multiplex transmission

"----------" is displayed when the bus system is monitored.

(18)TRANSMISSION CONDITION .... The condition of multiplex transmission is displayed.(SB006A)

- Normal transmission
- Multiplex transmission

"----------" is displayed when the bus system is monitored.

(19)TOTAL NUMBER OF LINK STATIONS .... The total number of link stations set with the common parameter is displayed.

(20)MAX. NORMAL COMMUNICATION STATION .... The maximum station number which is normally executing baton passing (transient transmission possible). (SW005A)
The T.PASS LED is lit.

(21)MAX. DATA LINK STATION .... The maximum station number which is normally executing data link (cyclic and transient transmissions). (SW005B)
The D.LINK and T.PASS LEDs are lit.

(22)COMMUNICATION CONDITION ..... Communication condition of the host station is displayed. (SW0047)

- Data link
- Data link Stop (Other) .... Cyclic transmission is stopped by an other station.
- Data link Stop (Host) .. Cyclic transmission is stopped by the host station.
- Baton passing (no area) .... The B/W send areas are not set with the host station.

- Baton passing (parameter error) .... There is a parameter error with the host station.
- Baton passing (parameter not received) .... Common parameters are not yet received.
- Off-line (no baton passing) .... Station numbers overlap. Cable is not connected.
- Off-line (line fault) ..... Cable is not connected.
- Executing test .... On-line or off-line test is being executed.

(23)CAUSE OF COMMUNICATION STOP .. Cause of communication stop (transient transmission) at the host station is displayed. (SW0048)

- Normal
- Baton overlap .... More than one baton has been received.
- Baton passing time out .... The baton failed to return within the specified time.
- Executing on-line test ..... On-line test is being executed.
- Baton passing at other station is executed. ..... Baton passing at an other than the host station is executed.
- Same station number exists. .. The station numbers overlap.
- Control station overlap .... More than one control station is set.
- Executing off-line test ..... Off-line test is being executed.
- Other (error code) ..... Refer to the error codes list.

(24)CAUSE OF DATA LINK STOP ...... Cause of data link stop (cyclic/transient transmission) at the host station is displayed. (SW0049)

- Normal
- Stop (Other station) (station [ ]) ... Cyclic transmission is stopped by other station.
- Stop (Host) .... Cyclic transmission is stopped by the host station.
- All stations (stations [ ]) .... Cyclic transmission at all stations is stopped.
- No parameter .... Parameters are not yet received.
- Parameter error .... There is a parameter error.
- Specific parameter matching error .... There is a matching error between common parameters and station specific parameters.

- I/O allocation error .... The I/O allocation with the remote I/O network has an error.
- Other (error code) ..... Refer to the error codes list.

(25)START CONDITION .... The cyclic start condition from the host station to the host station is displayed. (SB0000, SB004C, SB004D, SW004D)

- No designation
- Not completed
- Completed
- Error (error code)

(26)STOP CONDITION ..... The cyclic stop condition from the host station to the host station is displayed. (SB0001, SB004E, SB004F, SW004F)

- No designation
- Not completed
- Completed
- Error (error code)

(27)START CONDITION .... The cyclic start condition from the host station to the system is displayed. (SB0002, SB0050, SB0051, SW0051)

- No designation
- Not completed
- Completed
- Error (error code)

(28)STOP CONDITION ..... The cyclic stop condition from the host station to the system is displayed. (SB0003, SB0052, SB0053, SW0053)

- No designation
- Not completed
- Completed
- Error (error code)

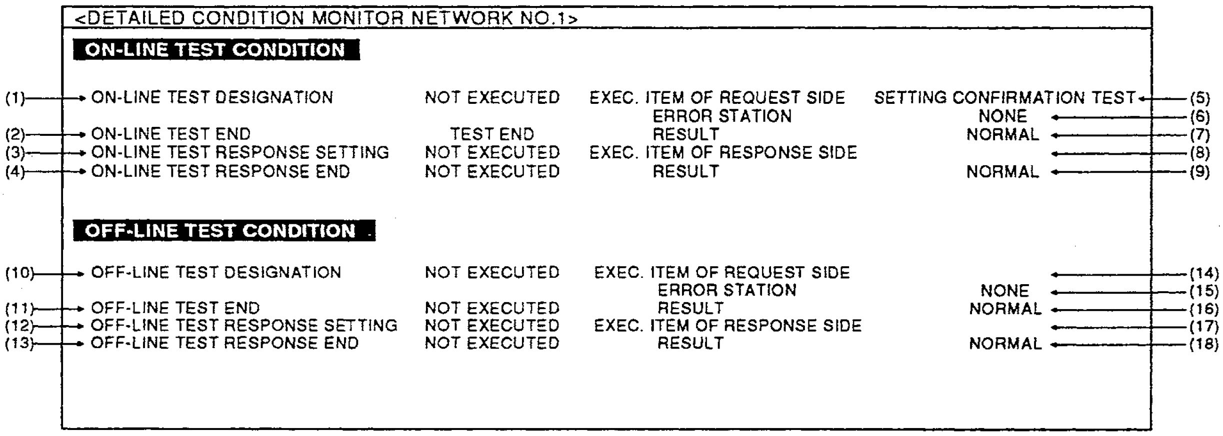
(29)LRDP/ZNRD .... The executing condition of LRDP/ZNRD instructions from the host station is displayed. (SB0030, SB0031, SW0031)

- No designation
- Not completed
- Completed
- Error (error code)

(30)LWTP/ZNWR .... The executing condition of LWTP/ZNWR instructions from the host station is displayed. (SB0032, SB0033, SW0033)

- No designation
- Not completed
- Completed
- Error (error code)

6.2.3 Checking the on-line/off-line test conditions of the host station (Test monitor)



(1) ON-LINE TEST DESIGNATION .... The on-line test designation condition of the host station is displayed. (SB00A8)

- Not executed
- Accepted

(2) ON-LINE TEST END .... The on-line test end condition of the host station is displayed. (SB00A9)

- Not executed
- Accepted

(3) ON-LINE TEST RESPONSE SETTING .... The on-line test response setting condition of the host station is displayed. (SB00AA)

- Not executed
- Accepted

(4) ON-LINE TEST RESPONSE END .... The on-line test response end condition of the host station is displayed. (SB00AB)

- Not executed
- Accepted

(5) EXECUTION ITEM OF REQUEST SIDE ...... The execution items when the host station is on the on-line test request side are displayed. (SW00A8)

- Loop test
- Setting confirmation test
- Station order confirmation test
- Communication test

(6) ERROR STATION ...... The error station number found in the test is displayed. (SW00AB)

(7) RESULT .... The test result when the host station is on the test request side is displayed. (SW00A9)

(8) EXECUTION ITEM OF RESPONSE SIDE ...... The execution items when the host station is on the on-line test response side are displayed. (SW00AA)

- Loop test
- Setting confirmation test
- Station order confirmation test
- Communication test

(9) RESULT .... The test result when the host station is on the test response side is displayed. (SW00AB)

(10) OFF-LINE TEST DESIGNATION .... The off-line test designation condition of the host station is displayed. (SB00AC)

- Not executed
- Accepted

(11) OFF-LINE TEST END ... The off-line test end condition of the host station is displayed. (SB00AD)

- Not executed
- Accepted

(12) OFF-LINE TEST RESPONSE SETTING .... The off-line test response setting condition of the host station is displayed. (SB00AE)

- Not executed
- Accepted

(13) OFF-LINE TEST RESPONSE END .... The off-line test response end condition of the host station is displayed. (SB00AF)

- Not executed
- Accepted

(14) EXECUTION ITEM OF REQUEST SIDE ...... The execution items when the host station is on the off-line test request side are displayed. (SW00AC)

- Forward loop test
- Reverse loop test
- Station-to-station test (master)
- Station-to-station test (slave)
- Self-loopback test

Only the control station can execute monitor.

(15) ERROR STATION ...... The error station number found in the test is displayed. (SW00AC)

(16) RESULT .... The test result when the host station is on the test request side is displayed. (SW00AD)

(17)EXECUTION ITEM OF RESPONSE SIDE ...... The execution items when the host station is on the off-line test response side are displayed. (SW00AE)

- Forward loop test
- Reverse loop test
- Station-to-station test (master)
- Station-to-station test (slave)

Only the control station can execute monitor.

(18)RESULT .... The test result when the host station is on the test response side is displayed. (SW00AF)

6.3 Error List Monitor

The lists of loop errors, communication errors, and transient transmission errors can be checked.

6.3.1 Checking the accumulated number of times of line errors (Error list monitor)

```
<ERROR LIST MONITOR NETWORK NO.1>
(1) → LOOP SWITCHING FREQUENCY   0    TRANSIENT TRANSMISSION ERROR   0 ← (2)

      FORWARD LOOP                     REVERSE LOOP

(3) → RETRY FREQUENCY            0    RETRY FREQUENCY                0
(4) → LINE ERROR                 0    LINE ERROR                     0
      COM. ERR. FREQUENCY             COM. ERR. FREQUENCY
(5) →   UNDER                    0      UNDER                        0
(6) →   CRC                      0      CRC                          0
(7) →   OVER                     0      OVER                         0
(8) →   SHORT FLAME              0      SHORT FLAME                  0
(9) →   ABORT                    0      ABORT                        0
(10)→   TIME OUT                 0      TIME OUT                     0
(11)→   2K-BYTE ERROR RECEIVE    0      2K-BYTE ERROR RECEIVE        0
(12)→   DPLL ERROR               0      DPLL ERROR                   0
```

(1) LOOP SWITCHING FREQUENCY ..... The number of times of loop switching and loopback operations is displayed. (SW00CE)

(2) TRANSIENT TRANSMISSION ERROR ... The number of times of occurrences of the transient transmission errors is displayed. (SW00EE)

(3) RETRY FREQUENCY ... The number of times of retries (retransmission when communication is not successful) is displayed. (SW00C8, SW00C9)

(4) LINE ERROR .... The number of times of occurrences of the line errors is displayed. (SW00CC, SW00CD)

(5) UNDER .... The number of times of occurrences of the UNDER errors is displayed. (SW00B8, SW00C0)

(6) CRC .... The number of times of occurrences of the CRC errors is displayed. (SW00B9, SW00C1)

(7) OVER .... The number of times of occurrences of the OVER errors is displayed. (SW00BA, SW00C2)

(8) SHORT FRAME .... The number of times of occurrences of the short frame errors (data text is too short) is displayed. (SW00BB, SW00C3)

(9) ABORT .... The number of times of occurrences of the AB.IF errors is displayed. (SW00BC, SW00C4)

(10) TIME OUT .... The number of times of occurrences of the TIME errors is displayed. (SW00BD, SW00C5)

(11)2K-BYTE ERROR RECEIVE ...... The number of times of occurrences of the DATA errors is displayed. (SW00BE, SW00C6)

(12)DPLL ERROR .... The number of times of occurrences of the DPLL errors (data cannot be correctly recognized for synchronization or modulation) is displayed. (SW00BF, SW00C7)

6.3.2 Checking the factors for loop switching (Loop switching data display)

(2) (3)

<LOOP SWITCHING DATA DISPLAY>

(1)

	SWITCHING REQUEST STATION	SWITCHING FACTOR	CONDITION AFTER SWITCHING
1	1	F LOOP H/W ERROR	LOOPBACK TRANSMISSION
2	1	R LOOP H/W ERROR	LOOPBACK TRANSMISSION
3	1	F LOOP FORCED ERROR	REVERSE LOOP TRANSMISSION
4	1	R LOOP FORCED ERROR	FORWARD LOOP TRANSMISSION
5	1	F LOOP CONTINUOUS COM. ERROR	REVERSE LOOP TRANSMISSION
6	1	R LOOP CONTINUOUS COM. ERROR	FORWARD LOOP TRANSMISSION
7	1	FATAL ERROR	
8			
9			
10			
11			
12			
13			
14			
15			
16			

(1) SWITCHING REQUEST STATION .... The station number which requests loop switching or loopback is displayed. (SW00E0 to E7)

(2) SWITCHING FACTORS .... The factor for executing loop switching or loopback is displayed. (SW00D0 to DF)

- F loop H/W error ...... Cable or optical module is faulty.
- R loop H/W error ...
- F loop forced error .... Forced error for executing loopback.
- R loop forced error ..
- F loop continuous communication error ..... Normal and abnormal conditions repeat alternately and communication condition is instable.
- R loop continuous communication error ..
- Fatal error .... Down.

(3) CONDITIONS AFTER SWITCHING ... The condition of data link after loop switching is displayed. (SW00D0 to DF)

- Normal .... Returned to the initial state.
- Multiplex transmission
- Forward loop transmission
- Reverse loop transmission
- Loopback transmission

6.3.3 Checking errors occurred with transient transmission (Transient transmission error)

Error factors are stored in SW00F0 to FF.
Refer to the error codes list for details.

<TRANSIENT TRANSMISSION ERROR>

	ERROR CODE	ERROR CLASSIFICATION
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

6.3.4 Clearing error history contents

(a) →	F1	RETRY COUNTER CLEAR
(b) →	F2	COMM. ERROR COUNTER CLEAR
(c) →	F3	FORWARD TRANSM. ERROR CLEAR
(d) →	F4	REVERSE TRANSM. ERROR CLEAR
(e) →	F5	LOOP SWITCH COUNTER CLEAR
(f) →	F6	TRANSIENT TRANSMISSION ERROR CLEAR

(a) RETRY COUNTER CLEAR ...... Clears item (3) in Section 6.3.1. (SB0005)

(b) COMMUNICATION ERROR COUNTER CLEAR ...... Clears items (5) through (12) in Section 6.3.1.(SB0006)

(c) FORWARD TRANSMISSION ERROR CLEAR ..... Clears item (4) in Section 6.3.1. (SB0007)

(d) REVERSE TRANSMISSION ERROR CLEAR ..... Clears item (4) in Section 6.3.1. (SB0008)

(e) LOOP SWITCH COUNTER CLEAR ...... Clears item (1) in Section 6.3.1. (SB0009)

(f) TRANSIENT TRANSMISSION ERROR CLEAR .... Clears item (2) in Section 6.3.1. (SB000A)

DETAILED INFORMATION

7. SYSTEM CONFIGURATION

This section gives the system configurations built with MELSECNET/10, usable device ranges, and parameter setting items.
Table 7.1 gives the system configurations which can be built with MELSECNET/10.

Table 7.1 System Configurations

System		Description	Reference
Two-tier system	AnUCPU only	Two-tier system of MELSECNET/10 with AnUCPU installed to all stations	7.1.1
	AnUCPU AnACPU AnNCPU Composite	Two-tier system of MELSECNET/10 with AnUCPU, AnACPU, and AnNCPU installed	7.1.2
Multi-tier system	MELSECNET/10 only	Multi-tier system to which more than one MELSECNET/10 is connected	7.2.1
	MELSECNET/10 MELSECNET (II) Composite	Multi-tier system to which MELSECNET/10 and MELSECNET(II) are connected (with AnUCPU)	7.2.2
System in which MELSECNET/10 and MELSECNET(II) are connected with AnN/AnACPU		System in which MELSECNET/10 and MELSECNET(II) are connected with AnN/AnACPU	7.3

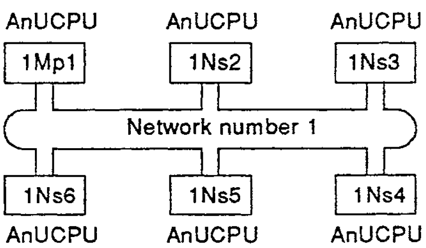
7.1 Two-Tier System

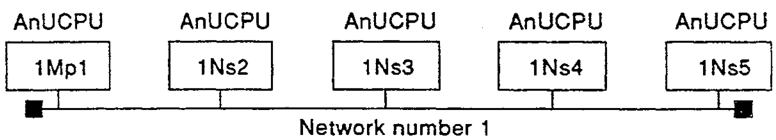
7.1.1 Two-tier system with AnUCPU + AJ71LP21 (AJ71BR11)

This system configuration assumes that only the AnUCPU is connected to MELSECNET/10.

(1) System configuration

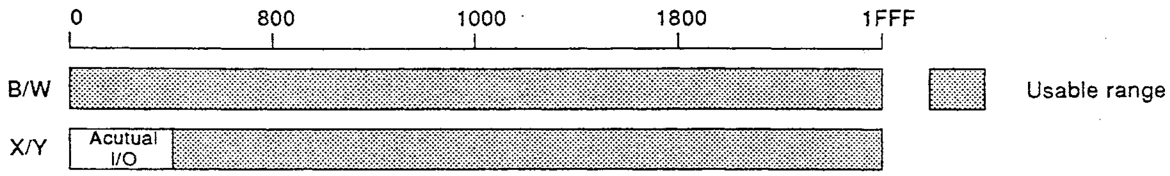
The maximum number of stations connected by using the AnUCPU + AJ71LP21 is 64, and that by using the AnUCPU + AJ71BR11 is 32.
One station is set as the control station, and the other stations are set as normal stations which can become a sub-control station.
In the figures shown below, station 1 is set as the control station, and stations 2 and after are set as normal stations.





(2) Usable device ranges

All of B/W 0 to 1FFF (8192 points) can be used.
As for the X/Y ranges, the range after actual I/O points (the I/O device number ranges in which I/O modules and special function modules are actually installed) in 0 to 1FFF (8192 points) can be used.



(3) Maximum number of link points per station

The AnUCPU can be allocated with 2000 bytes per station.

$$\frac{B+Y}{8} + (2 \times W) \leq 2000 \text{ [bytes]}$$

(4) Parameter setting items

Table 7.2 gives the parameters set with the control (Mp) station and normal (Ns) stations.

Table 7.2 Parameter Setting Items

Item	Control Station (Mp)	Normal Station (Ns)	Reference Section
Number of modules	☆	☆	10.1.1
Common parameter	☆	X	10.1.3
Network refresh parameter	O	O	10.1.2
Station specific parameter	Δ	Δ	10.1.4
Transfer parameter for data link	X	X	—
Routing parameter	X	X	—

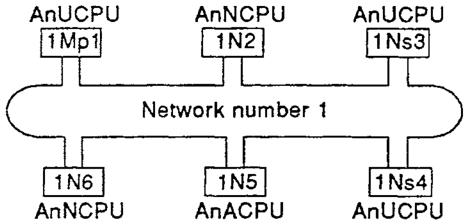
☆: Must always be set. O: Change if necessary. (default setting is provided)
Δ: Set if necessary. X: Setting not necessary.

7.1.2 Two-tier system with AnUCPU + AnACPU + AnNCPU + AJ71LP21 (AJ71BR11)

This system configuration assumes that the AnUCPU, AnACPU, and AnNCPU are connected to MELSECNET/10.

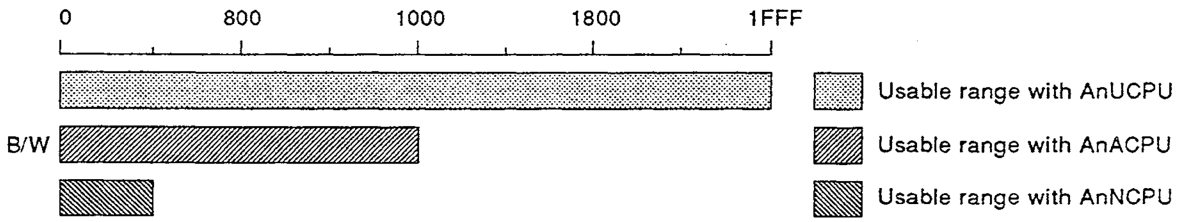
(1) System configuration

The MELSECNET/10 system requires at least one control station with the AnUCPU.
To use the control station shift function, two or more AnUCPU stations are needed.
In the figures shown below, stations 1, 3, and 4 are AnUCPU stations.

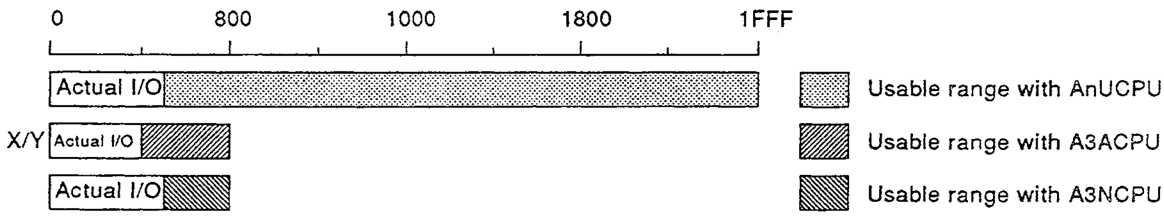


(2) Usable device ranges

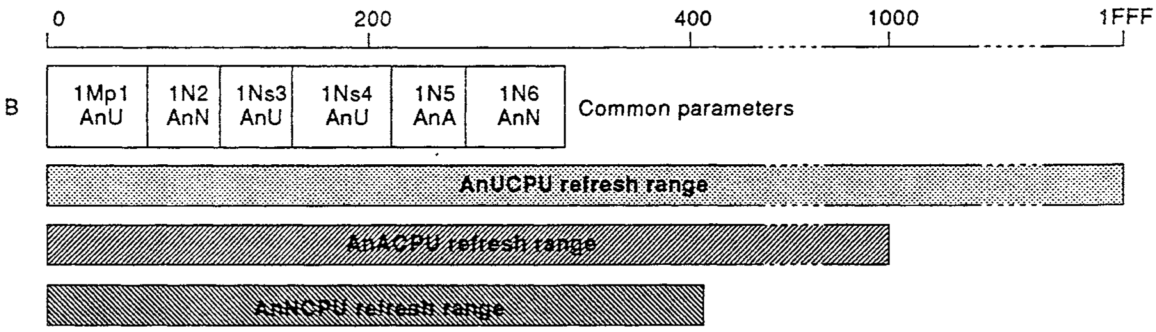
(a) Usable B/W device range with the AnUCPU is 0 to 1FFF (8192 points), that with the AnACPU is 0 to FFF (4096 points), and that with the AnNCPU is 0 to 3FF (1024 points). Therefore, the device range which all stations can use for sending and receiving is B/W 0 to FFF when the system includes an AnACPU, and B/W 0 to 3FF when the system includes an AnNCPU.



(b) As for the X/Y device ranges, the range beginning after that used for actual I/O points to the last device number can be used.
All types of AnUCPU can use X/Y 0 to 1FFF. AnACPU and AnNCPU can use X/Y points within the CPU's I/O point range.
The example shown below assumes that the AnUCPU, A3ACPU, and A3NCPU are used.



(c) To allow all stations to execute data sending and receiving in a composite system, it is necessary to allocate the common parameters within the smallest refresh range usable with a CPU connected to the system.
In the example below, the common parameters are allocated to B0 to 3FF which is usable with the AnNCPU.



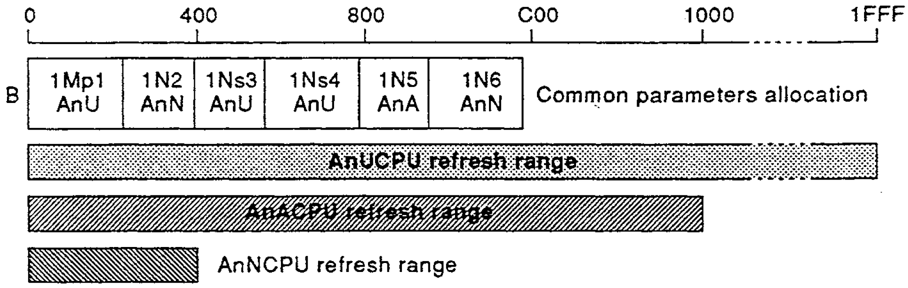
POINT

When the common parameters are set exceeding the device range B 000 to 3FF which can be used with all stations for sending and receiving, the data transmission will be executed as mentioned below.

(1) The AnUCPU stations can receive data from all stations and can send data to all stations.

(2) The AnACPU stations can receive data from all stations and can send data to all stations since the common parameters are allocated within B 000 to FFF range.

(3) The AnNCPU station 1N2 can receive data from 1Mp1 and can send data to all stations. Station 1N6 can receive data from 1Mp1 and 1N2, but cannot send data.



(3) Maximum number of link points per station

The AnUCPU, AnACPU, and AnNCPU can be allocated with 2000 bytes per station.

$$\frac{B+Y}{8} + (2 \times W) \leq 2000 \text{ [bytes]}$$

(4) Parameter setting items

Table 7.3 gives the parameters set with the control (Mp) station and AnUCPU normal (Ns) stations, and AnN/AnACPU normal (N) stations.

Table 7.3 Parameter Setting Items

Item	Control Station (Mp)	Normal Station (Ns)	Normal Station (N)	Reference Section
Number of modules	☆	☆	—	10.1.1
Common parameter	☆	X	—	10.1.3
Network refresh parameter	O	O	—	10.1.2
Station specific parameter	Δ	Δ	—	10.1.4
Transfer parameter for data link	X	X	—	—
Routing parameter	X	X	—	—

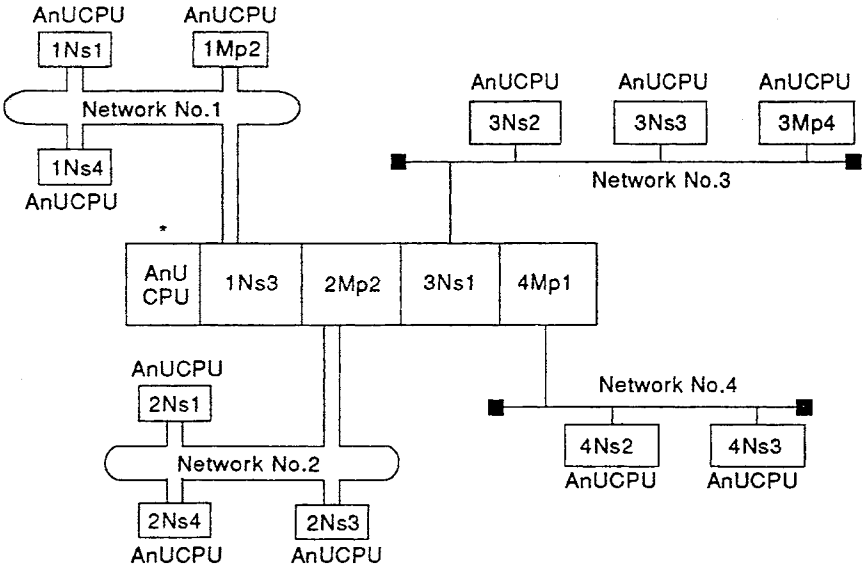
☆: Must always be set. O: Change if necessary. (default setting is provided)
Δ: Set if necessary. X: Setting not necessary. —: Setting not provided.

7.2 Multi-Tier System

7.2.1 Multi-tier system with MELSECNET/10 only

(1) System configuration

Up to four MELSECNET/10 network modules can be installed to an AnUCPU.
In the following system, four network modules have been installed to the AnUCPU indicated by the * symbol in which to connect the four networks.

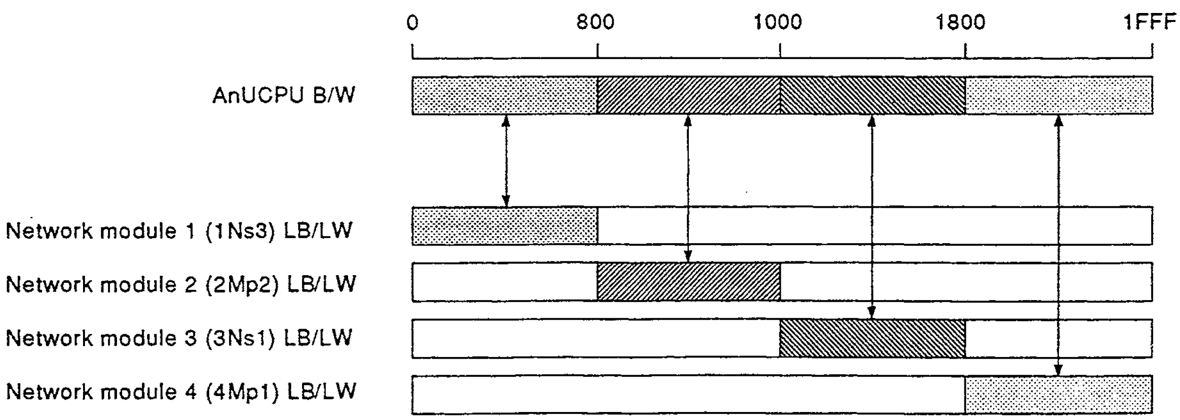


(2) Usable device ranges

The usable device ranges for the AnUCPU indicated by the * symbol are explained below. For information in regard other AnUCPUs, refer to Section 7.1.1.

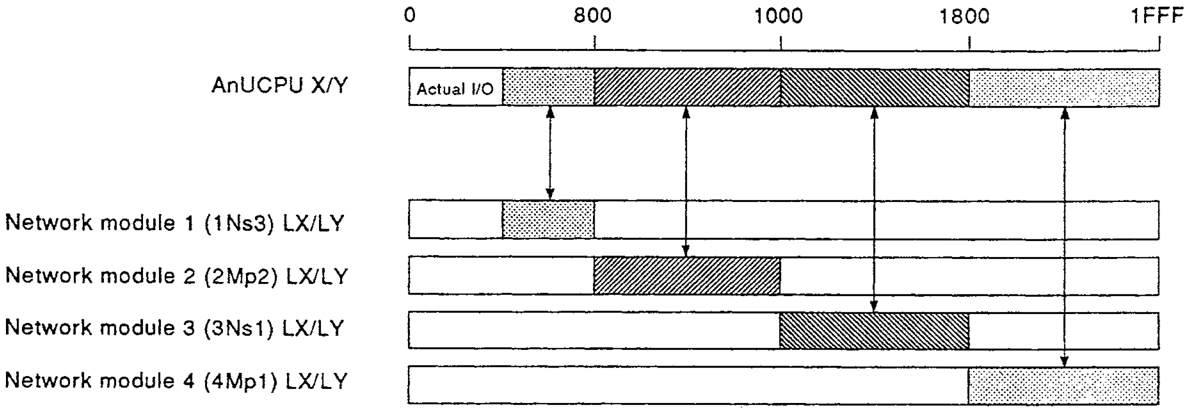
(a) B/W device ranges

Each network module has the LB/LW ranges of 0 to 1FFF (8192 points). The AnUCPU has the B/W ranges of 0 to 1FFF (8192 points). By allocating the device range used with each network module within the AnUCPU's device ranges as shown below, it is easy to create and understand sequence programs.
The common parameters of each network must be set within the refresh range.



(b) X/Y device ranges

Each network module has the LX/LY ranges of 0 to 1FFF (8192 points). The AnUCPU has the X/Y ranges of 0 to 1FFF (8192 points). By allocating the device range used with each network module within the AnUCPU's device ranges as shown below, it is easy to create and understand sequence programs. The common parameters of each network must be set within the refresh range.



(3) Maximum number of link points per station

The AnUCPU can be allocated with 2000 bytes per station.

$$\frac{LB + LY}{8} + (2 \times LW) \leq 2000 \text{ [bytes]}$$

(4) Parameter setting items

Table 7.4 gives the parameters set with the control (Mp) station and normal (Ns) stations.

Table 7.4 Parameter Setting Items

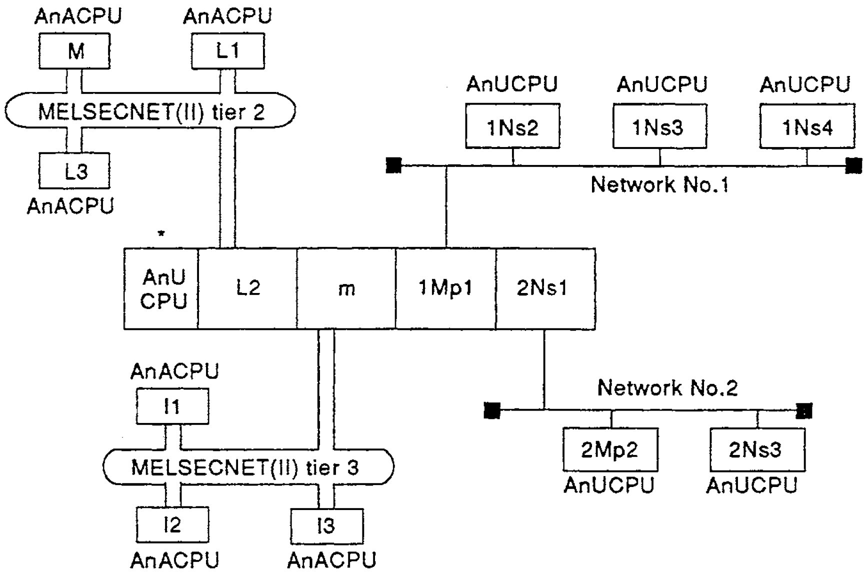
Item	AnUCPU with the * Symbol		AnUCPU Other Than that with the * Symbol		Reference Section
	Control Station (Mp)	Normal Station (Ns)	Control Station (Mp)	Normal Station (Ns)	
Number of modules	☆		☆	☆	10.1.1
Common parameter	☆	X	☆	X	10.1.3
Network refresh parameter	O	O	O	O	10.1.2
Station specific parameter	△	△	△	△	10.1.4
Transfer parameter for data link	△		X	X	10.1.5
Routing parameter	X		△	△	10.2

☆: Must always be set. O: Change if necessary. (default setting is provided)
△: Set if necessary. X: Setting not necessary.

7.2.2 Multi-tier system with MELSECNET/10 and MELSECNET(II)

(1) System configuration

Up to two MELSECNET(II) data link modules can be installed to an AnUCPU, and up to four modules when combined with MELSECNET/10 network modules can be installed to an AnUCPU.
In the following system, two data link modules and two network modules are installed to the AnUCPU indicated by the * symbol in which to connect the MELSECNET/10 and MELSECNET(II) networks.

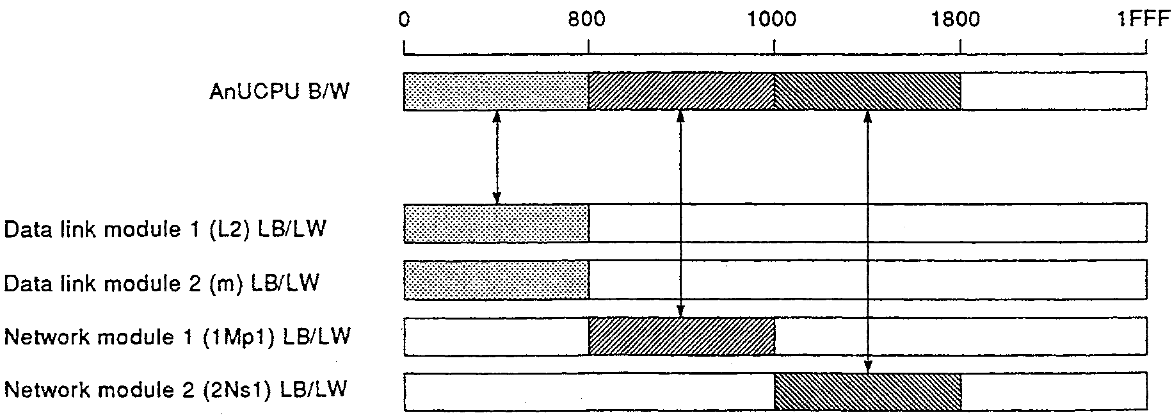


(2) Usable device ranges

The usable device ranges for the AnUCPU indicated by the * symbol are explained below. For information in regard to the other AnUCPUs, refer to Section 7.1.1.

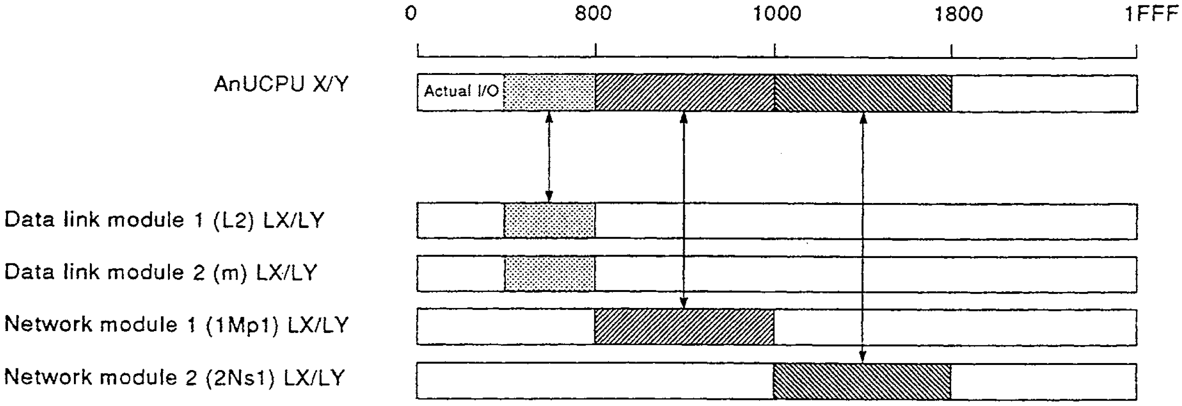
(a) B/W device ranges

Two data link modules have the LB/LW ranges of 0 to FFF (4096 points) in total.
Each network module has the LB/LW ranges of 0 to 1FFF (8192 points). The AnUCPU has the B/W ranges of 0 to 1FFF (8192 points).
By allocating the device range used with each network module within the AnUCPU's device ranges as shown below, it is easy to create and understand sequence programs.
The common parameters and MELSECNET(II) parameters of each network must be set within the refresh range.



(b) X/Y device ranges

Two data link modules have the LX/LY ranges of 0 to 7FF (2048 points) in total.
Each network module has the LX/LY ranges of 0 to 1FFF (8192 points). The AnUCPU has the X/Y ranges of 0 to 1FFF (8192 points). By allocating the device range used with each network module within the AnUCPU's device ranges as shown below, it is easy to create and understand sequence programs.



(3) Maximum number of link points per station

The AnUCPU can be allocated with 2000 bytes per station.

$$\frac{LB + LY}{8} + (2 \times LW) \leq 2000 \text{ [bytes]}$$

(4) Parameter setting items

Table 7.5 gives the parameters set with the control (Mp) station and normal (Ns) stations.

Table 7.5 Parameter Setting Items

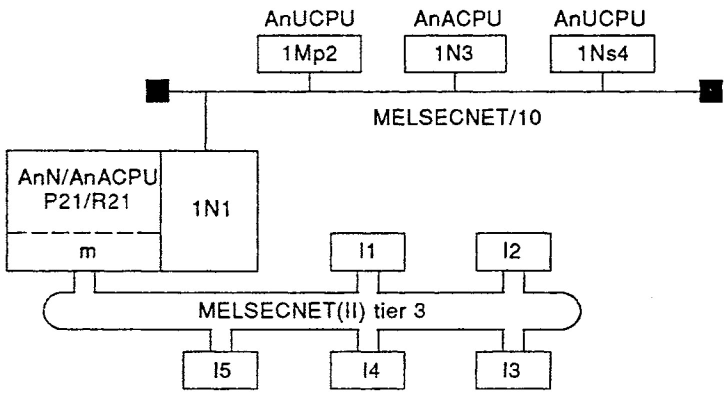
Item		AnUCPU with the * Symbol				AnUCPU Other Than that with the * Symbol		Reference Section
		Control Station (Mp)	Normal Station (Ns)	L2	m	Control Station (Mp)	Normal Station (Ns)	
Number of modules		◎				◎	◎	10.1.1
Common parameter	For MELSECNET/10	◎	X	X	X	◎	X	10.1.3
	For MELSECNET (II) (MELSECNET (II) parameter)	X	X	X	◎	X	X	*
Network refresh parameter		O	O	X	O	O	O	10.1.2
Station specific parameter		Δ	Δ	X	X	Δ	Δ	10.1.4
Transfer parameter for data link		Δ				X	X	10.1.5
Routing parameter		Δ		X		Δ	Δ	10.2

◎: Must always be set. O: Change if necessary. (default setting is provided)
Δ: Set if necessary. X: Setting not necessary.
* For setting the MELSECNET(II) parameters, refer to the "MELSECNET, MELSECNET/B Data Link System Reference Manual".

7.3 System Configuration with MELSECNET/10 and MELSECNET(II) Connected by the AnN/AnACPU

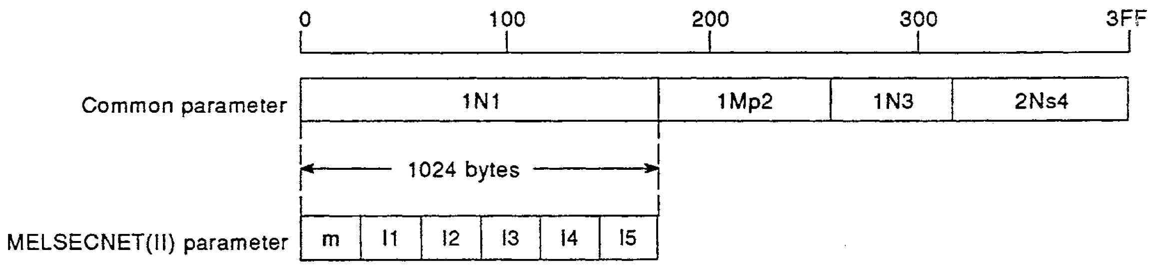
(1) System configuration

When the AnN/AnACPU is used as the intermediate station between a MELSECNET/10 network and a MELSECNET(II) network, it is necessary to install the AJ71LP21(AJ71BR11) to the AnN/AnACPU which has a data link function.
In that case, a three-tier system is built with the MELSECNET/10 set as the higher link and the MELSECNET(II) set as the lower link. The AnN/AnACPU station is set as a normal station for the MELSECNET/10 and as a master station for the MELSECNET(II).
Since the AnN/AnACPU cannot be used as a control station for the MELSECNET/10, it is impossible to set the MELSECNET(II) as the higher link and the MELSECNET/10 as the lower link.

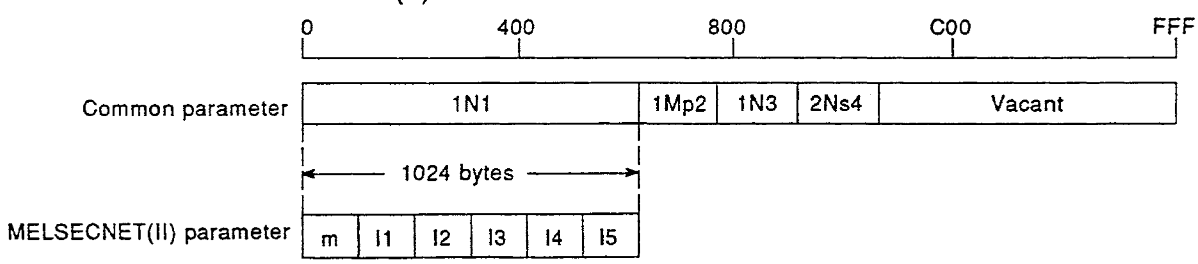


(2) Usable device ranges

(a) When the AnNCPU is used as the intermediate station between a MELSECNET/10 network and a MELSECNET(II) network, the device range B/W0 to 3FF can be used in a similar way to the MELSECNET data link.



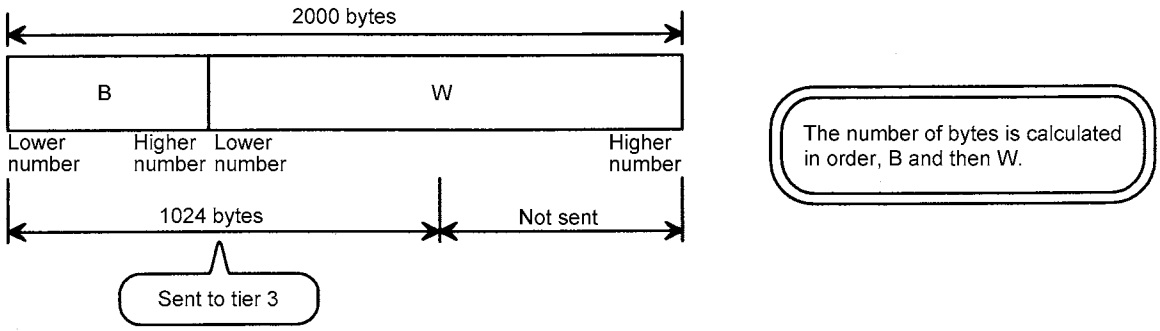
(b) When the AnUCPU is used as the intermediate station between a MELSECNET/10 network and a MELSECNET(II) network, the device range B/W0 to FFF can be used in a similar way to the MELSECNET(II) data link.



(3) Setting the common parameters and MELSECNET(II) parameters

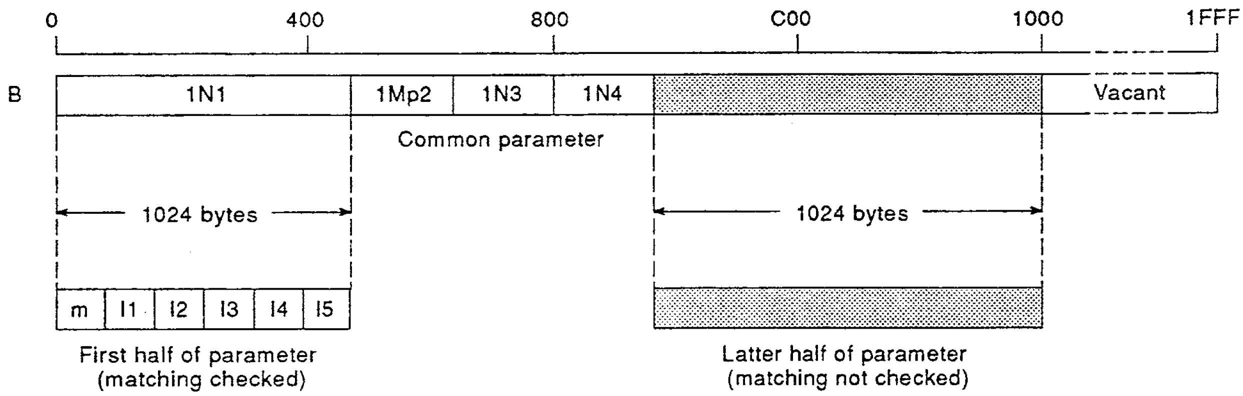
(a) Set the MELSECNET(II) parameters to the range allocated to 1N1 with the common parameters. The maximum number of link points allocated to 1N1 is 1024 bytes.

(b) Although up to 2000 bytes can be allocated to 1Mp2 (master station on tier 2), only 1024 bytes at maximum can be sent to tier 3. (Data exceeded over 1024 bytes cannot be sent to tier 3.)
The number of link points for one station is calculated in order, B and then W, as shown below.



Example: When the send range of 1Mp2 is allocated to B100 to 2FF (512 points) and W100 to 2FF (512 points):
The total link points for the send range of 1Mp2 is
512 / 8 + 512 x 2 = 1088 bytes
Therefore, data in W3E0 to 3FF (32 points), which are exceeded over 1024 bytes, cannot be sent to tier 3.

(c) A matching check is executed with the common parameter and the first half of the MELSECNET(II) parameters. The latter half of the MELSECNET(II) parameters is not checked.
When setting the latter half of the MELSECNET(II) parameters, set the parameter to "the range beginning with the last address +1 of the MELSECNET/10 common parameter to FFF".



7.4 Precautions for System Configuration

When the control station shift function or loopback function is executed, a station may temporarily be set off-line. The following explains the processing of data received from an off-line station and the network module settings to return to on-line when the network returns to the normal state.

(1) The following are considered as the reasons why a control station or normal station is set to off-line temporarily in the MELSECNET/10 network system:

   (a) When the control station is down and a sub-control station takes over the control of the system.

   (b) When the down control station returns to normal and takes over the control from the sub-control station.

   (c) When the control station ACPU is switched from STOP to RUN.

   (d) When the power to the control station or normal station ACPU (network module) is turned ON/OFF.

   (e) When the control station or normal station ACPU (network module) is reset.

   (f) When the data link cable is broken or connected/disconnected.

(2) Data received from an off-line station does not change from that just before the suspension of communication, and operation continues with the data.

(3) Even when data link is temporarily suspended as explained in (1) above, communications can continue by the automatic on-line return function without resetting the ACPU.

8. FUNCTIONS

This section gives the functions available with MELSECNET/10.
The functions of MELSECNET/10 are as listed below.

- Functions
  - Cyclic transmission functions
    - Communications with B/W (N : N communication)
    - Communications with X/Y (1 : N communication)
    - Constant link scan function
    - Data link stop/restart function
    - Data link transfer function
  - Transient transfer functions
    - N : N communication function
    - Transient transfer frequency designation function
    - Routing function
    - Group function
  - Control station shift function
  - Multiplex transmission function
  - RAS functions
    - Automatic on-line return function
    - Loopback function
    - Station separation function
    - Diagnosis functions
      - On-line diagnosis
        - Loop test
        - Setting confirmation test
        - Station order confirmation test
        - Communication test
      - Off-line diagnosis
        - Hardware test
        - Self-loopback test
        - Internal self-loopback test
        - Station-to-station test
        - Forward loop/reverse loop test
      - Network monitor
        - Line monitor
        - Condition monitor
        - Error list monitor
        - Network test
    - Data link condition detection function

8.1 Cyclic Transmission Function

The cyclic transmission function executes data communications periodically between the stations connected to a MELSECNET/10 network.

8.1.1 Communications with B/W (N : N communication)

This function allows data transmission to all MELSECNET/10 stations using the link relay (B) and link register (W) ranges which are allocated to the host station with the control station's common parameters or default parameters.
Link relay (B) is used to send and receive ON/OFF data, and link register (W) is used to send and receive 16-bit data.
In Fig. 8.1 below, when B0 at 1Mp1 is turned ON, the contacts for B0 at 1Ns2 and 1N3 turn ON.

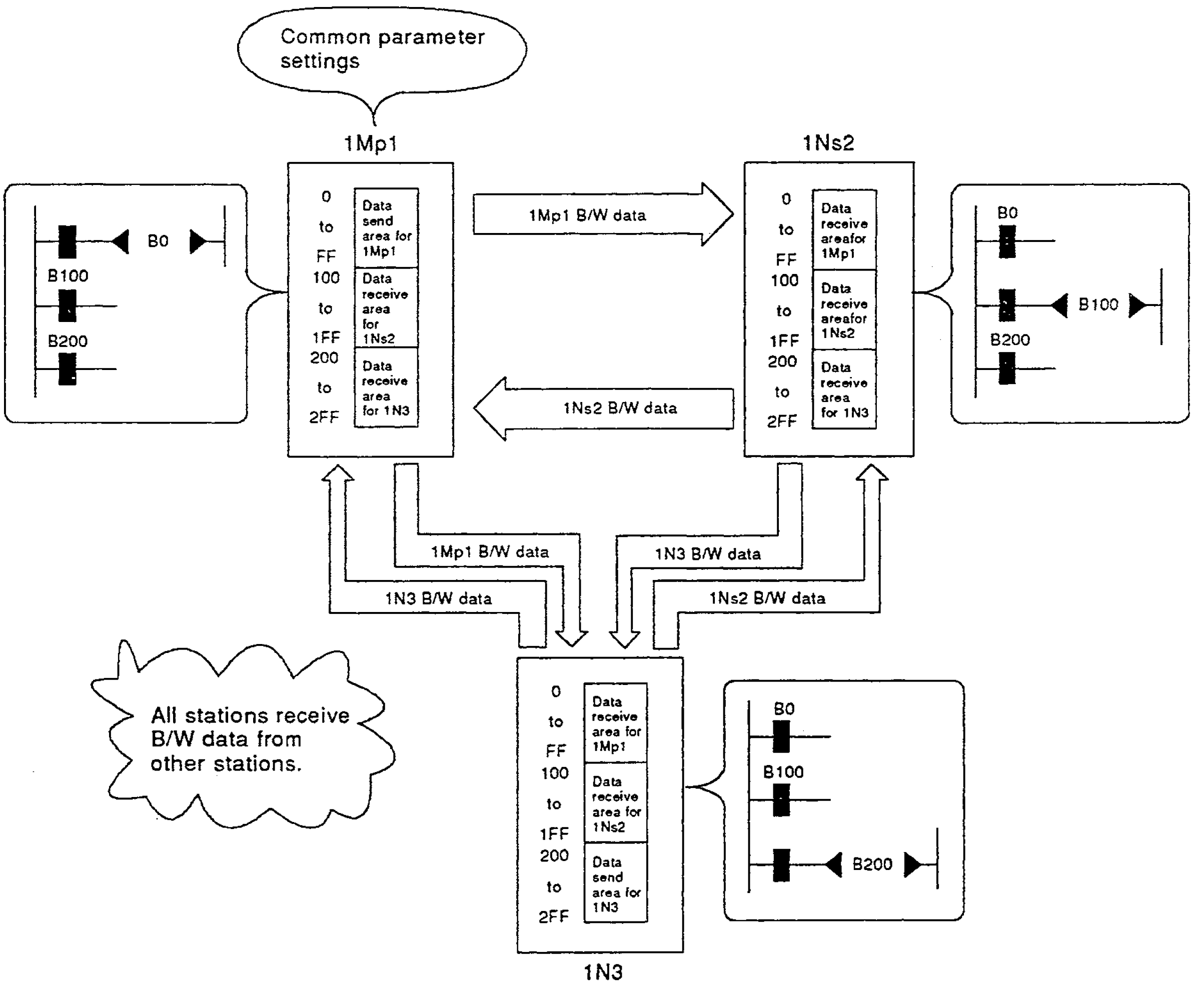


Fig. 8.1 Communications with B/W

8.1.2 Communications with X/Y (1 : N communication)

This function allows data communications between an I/O master station and other stations (up to 63 stations in an optical loop system, and up to 31 stations in a coaxial bus system).
Data communications are executed by using the input (X) and output (Y) device ranges after the actual I/O range in the host station.
For communications with X/Y, set the I/O master station number and data communication range by using the common parameter at the control station.
Up to two I/O master stations can be set selecting from the stations connected to the network.

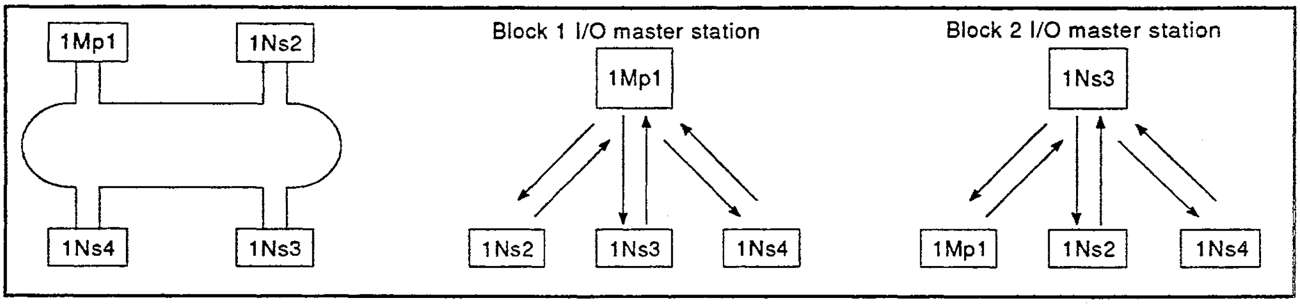


Fig. 8.2 I/O Master Stations

For example, Fig. 8.3 shows the allocation required for X/Y communications between 1Mp1 (I/O master) station and 1Ns2 station, and between 1Mp1 (I/O master) station and 1Ns3 station.
When Y1000 at 1Mp1 is turned ON, XA00 at 1Ns2 turns ON. When YC00 at 1Ns3 is turned ON, X1200 at 1Mp1 turns ON.

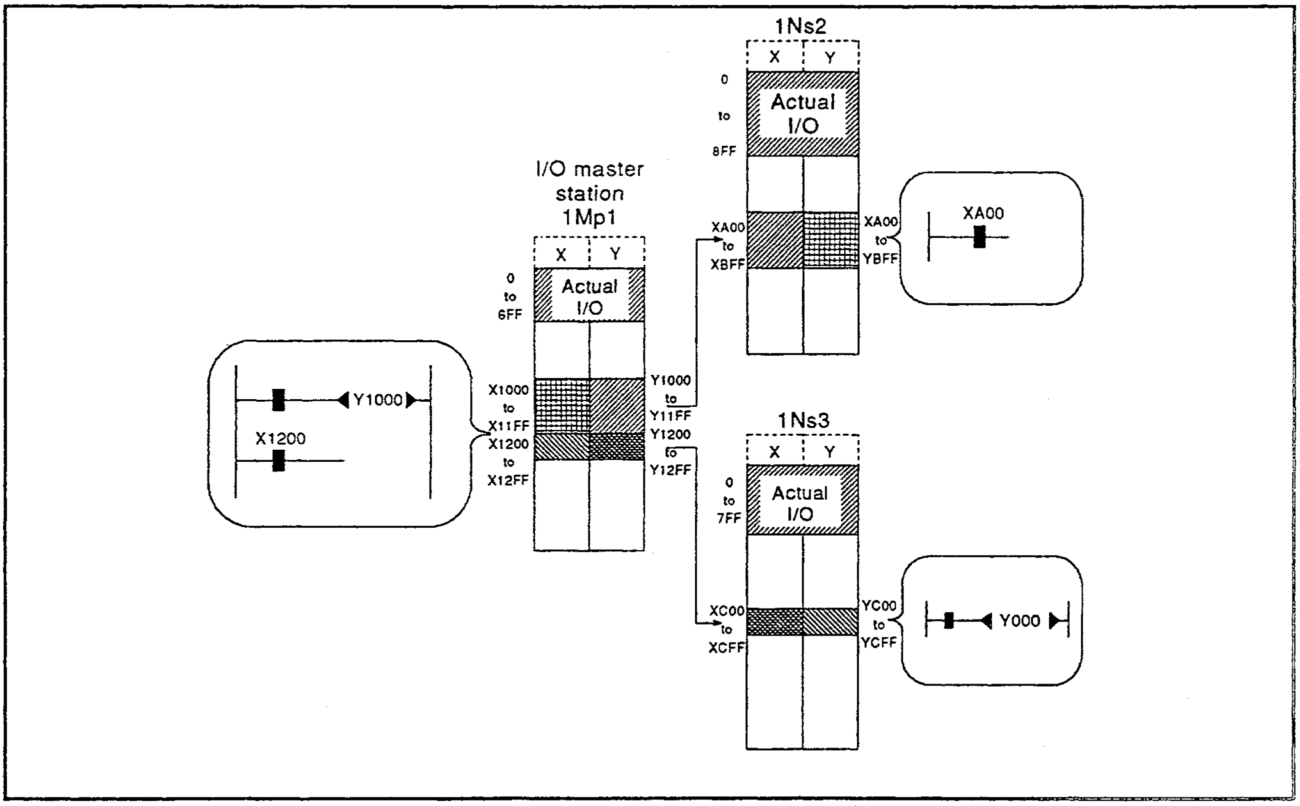


Fig. 8.3 Communications with X/Y

POINTS

(1) Any station, regardless of the control or normal station, with an AnUCPU can be set as àn I/O master station.
The AnN/AnACPU stations cannot be set as the I/O master station.

(2) Device ranges after the actual I/O range in the host station can be used for communications with X/Y.
Note that this device range is used also for the allocations mentioned below. The allocated areas must not overlap.

(a) When two I/O master stations are set and used

(b) When more than one network module is installed and another I/O master station is set with another network module

(c) When MELSECNET remote I/O stations are allocated

(d) When MELSECNET/MINI automatic refresh setting is made

Actual I/O
Area used for MELSECNET remote I/O
Area used for MELSECNET/MINI automatic refresh
Area used for communications between the I/O master station and another station in another network

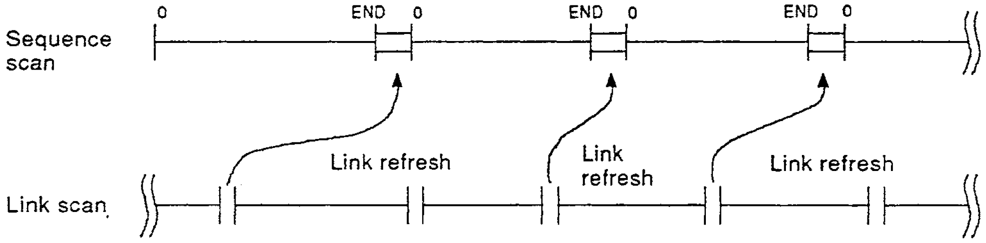
(3) To execute communications with X/Y between an I/O master station and an AnN/AnACPU station, the I/O master station must be a control station in block 1.

8.1.3 Constant link scan function

This function maintains the link scan time at a constant value by preventing it from fluctuating due to the transient transmission function or noise.
If the response time is long in the transient transmission function, setting the constant link scan function may be effective for the reduction of the response time.
The constant link scan time must be set as "(the link scan time when all stations are normal) +4 msec or over".
To execute the constant link scan function, it is necessary to set the common parameter for "expansion setting".
Default setting is 0 msec (constant link scan function is not set).

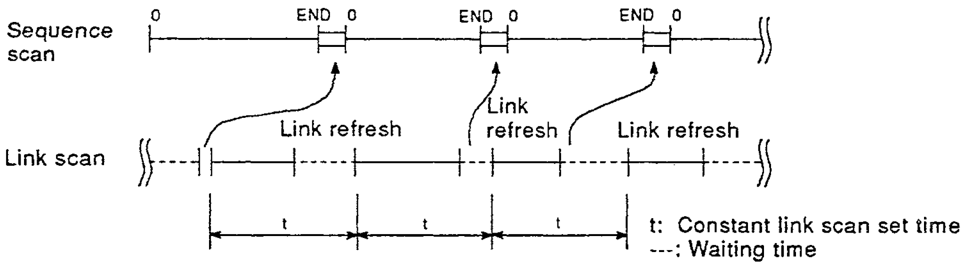
(1) When constant link scan is not set (0 ms)

Since link scanning is repeated, the link scan time becomes equal to actual scan time.



(2) When constant link scan is set (1 to 500 ms)

(a) When actual link scan time is shorter than the constant link scan set time, the link scan time is maintained at a constant length.



(b) When actual link scan time is longer than the constant link scan set time, processing is done at the link scan time and the constant link scan cannot be maintained.
The following factors are considered:

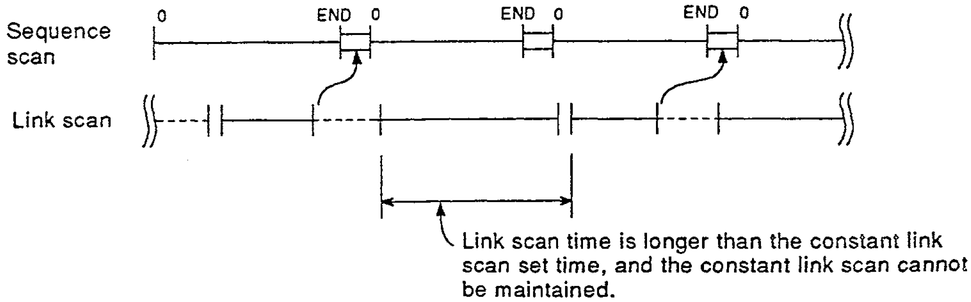
1) The network control station is started.

2) A station is down or reset.

3) The channel is instable. (communication is intermittent)

4) Loop switching occurred. (optical loop only)

5) Cable is connected or disconnected. (coaxial bus only)



8.1.4 Data link stop/restart function

Data link can be stopped and restarted by using a sequence program or peripheral device (network test).
This function is used to temporarily stop the cyclic transmission during data link.

(1) Method for stopping and restarting

(a) Using a peripheral device

Use the network test of the network monitor function. Read the GPP Function Software Package Operating Manual for the procedure.

(b) Using a sequence program

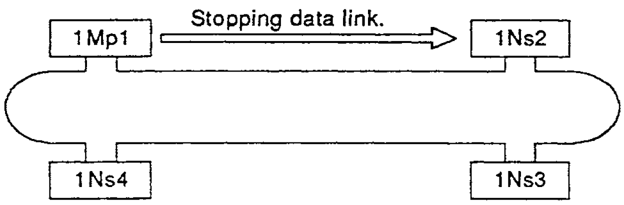
Use the special relay (SB000 to 003) and special register (SW000 to 004).

(2) Data link stop and restart operations

The following example assumes when 1Mp1 requests to stop data link to 1Ns2 and to restart data link:

(a) Stopping data link

Use a peripheral device or sequence program to stop data link at 1Ns2.

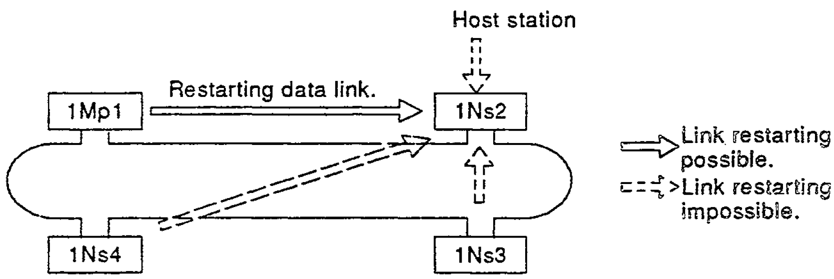


(b) Restarting data link

Either "link start" or "forced link start" can be used.

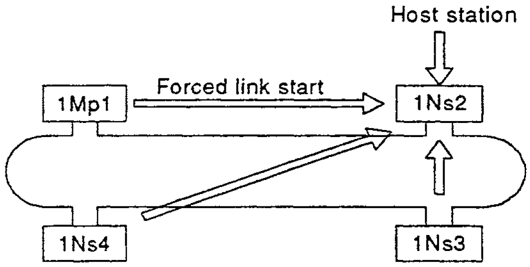
1) Link start

Only the station (1Mp1) that requested to stop data link can restart data link for the stopped station (1Ns2). Either a peripheral device or sequence program can be used.
Stations (host, 1Ns3, 1Ns4) other than the request station cannot make restarting.



2) Forced link start

Any station (including the host) can restart data link for the stopped station (1Ns2).
This method is used when the request station is down. Either the host or other stations can request restarting.
However, when all stations are stopping, forced starting for 2 specific station (host or designated station) is impossible.



POINTS

(1) The data link stop and restart function stops the cyclic transmission only. Transient transmission can be continued.

(2) A data-link stopped station is treated not as a faulty station but as a stop station.

8.1.5 Data link transfer function

When more than one network (data link) module is installed to one AnUCPU, data in the link device ranges in a network can be transferred to another network.
This function can replace when data transfer is accomplished by using the MOV instruction of a sequence program.

(1) To use the data link transfer function, it is necessary to set the "transfer parameter for data link".

(2) Data in the link relay (LB) and link register (LW) in each network (data link) module can be transferred across networks. Data in the link input (X) and link output (Y) devices cannot be transferred across networks.

(3) Data to be transferred must be set in the host station transmission range of the transferring network module.

(4) When transferring data to more than one network, the device range of the transfer source can be set with the same numbers.
For example, data received from network number 1 can be transferred to network numbers 2 and 3.
Fig. 8.4 shows the data transfer between network number 1 and network number 2. The transfer parameter for data link is set at the AnUCPU in the intermediating station. Data of B0 turned ON by 1Mp1 station is received by the intermediate station at 1Ns3 station and transferred to area LB1000 allocated at 2Mp1 station in the intermediate station. Therefore, the ON/OFF status of B0 in 1Mp1 station can be monitored as B1000 data at 2Ns2 and 2Ns3 station.
Since B1000 (destination device) in the intermediate station does not turn ON, it is necessary to use B0 (transfer source device).
Destination devices at the intermediate station do not turn ON.

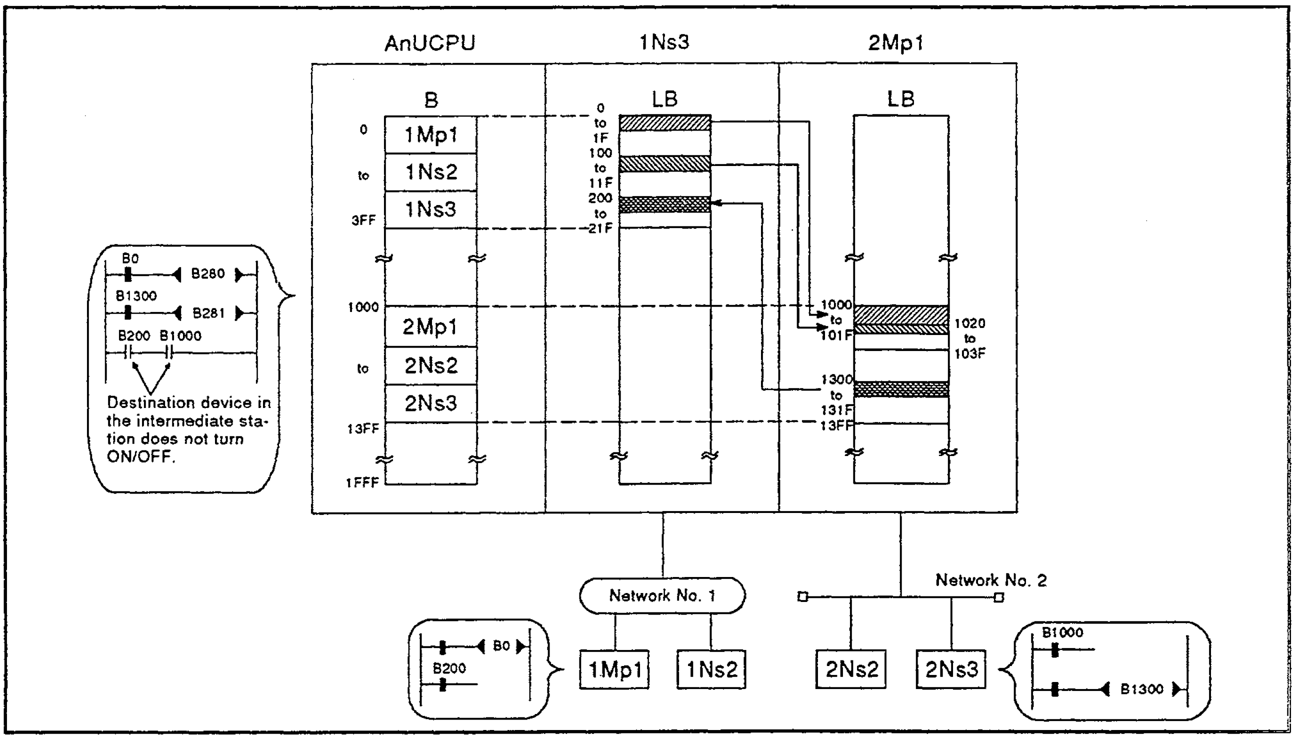


Fig. 8.4 Data Link Transfer Function

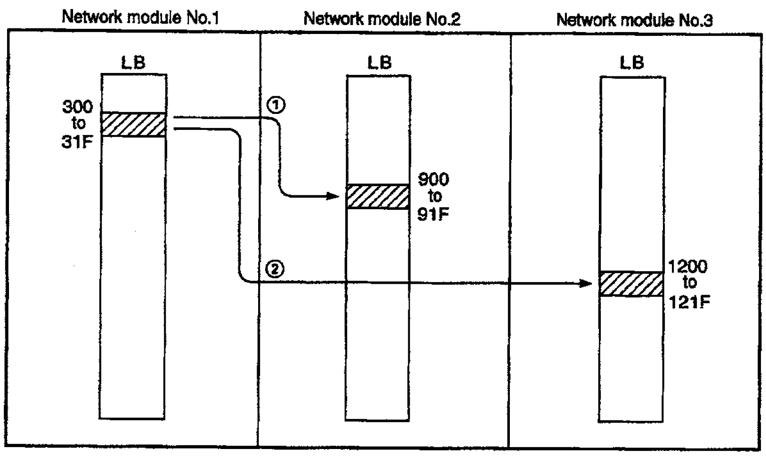
(5) Table 8.1 gives the combinations used for data link transfer.

Table 8.1 Combinations Used for Transfer

CPU Type	Combination	Transfer
AnUCPU	MELSECNET/10 ↔ MELSECNET/10	Possible
	MELSECNET/10 ↔ MELSECNET II	Possible
	MELSECNET II ↔ MELSECNET II	Impossible
AnN/AnACPU	CPU with data link function ↔ MELSECNET/10	Impossible
	CPU with data link function ↔ MELSECNET II	Impossible

Parameter setting impossible

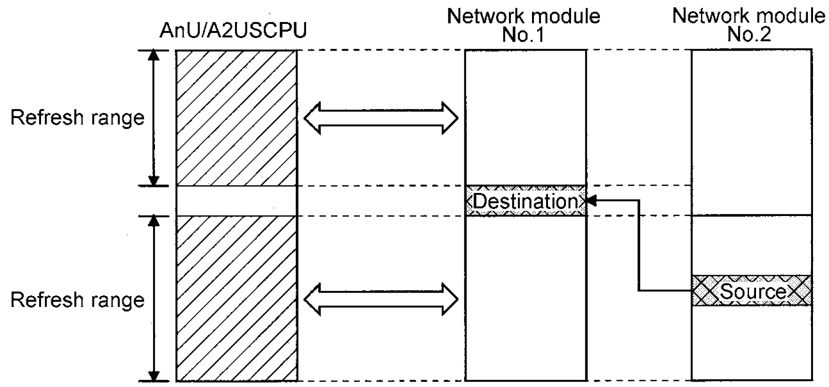
(6) The number of destinations with LB and LW ranges is 24 in total.
As an example shown below, the area from LB300 to 31F of the network module 1 can be transferred to the area from LB900 to 91F of the network module 2 and from LB1200 to 121F of the network module 3.
In this case, two range settings are necessary.



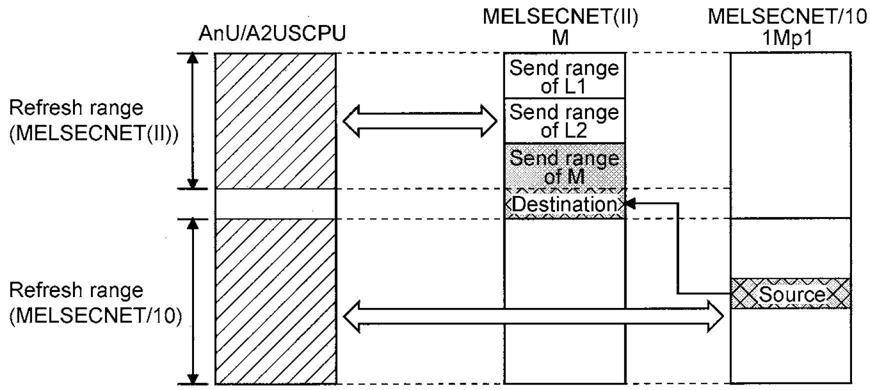
POINT

(1) When setting the transfer parameter for data link, do not include the device range of the transfer destination in the refresh range.
Doing so may cause correct data not to be sent to another station.

(a) Inter data link transfer between two MELSECNET/10s



(b) Inter data link transfer from MELSECNET/10 to MELSECNET(II)
Allocate the host send range to the end of the area with the MELSECNET(II) link parameter.



(2) Use the sequence program to supplement the inter data link transfer function.

8.2 Transient Transmission Function

The transient transmission function allows communications between specific stations only when a communication request is made.
To make a request for transient transmission, sequence programs (LRDP, LWTP, ZNRD, and ZNWR), peripheral device, or special function modules can be used.
In a MELSECNET/10 system, transient transmission is possible between the stations in a network or across networks.

(1) Fig. 8.5 shows transient transmission is executed from 1Ns2 to 1Ns3.

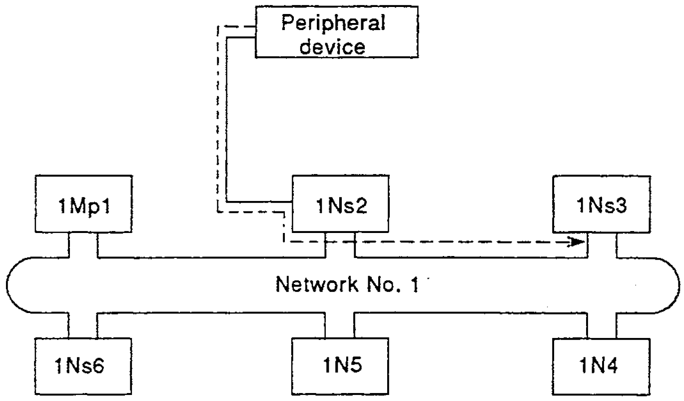


Fig. 8.5 Transient Transmission

(2) Fig. 8.6 shows transient transmission is executed from 1Ns2 in network number 1 to 3Mp1 in network number 3.
It is necessary to set the "routing parameter" at the request source and relay stations.

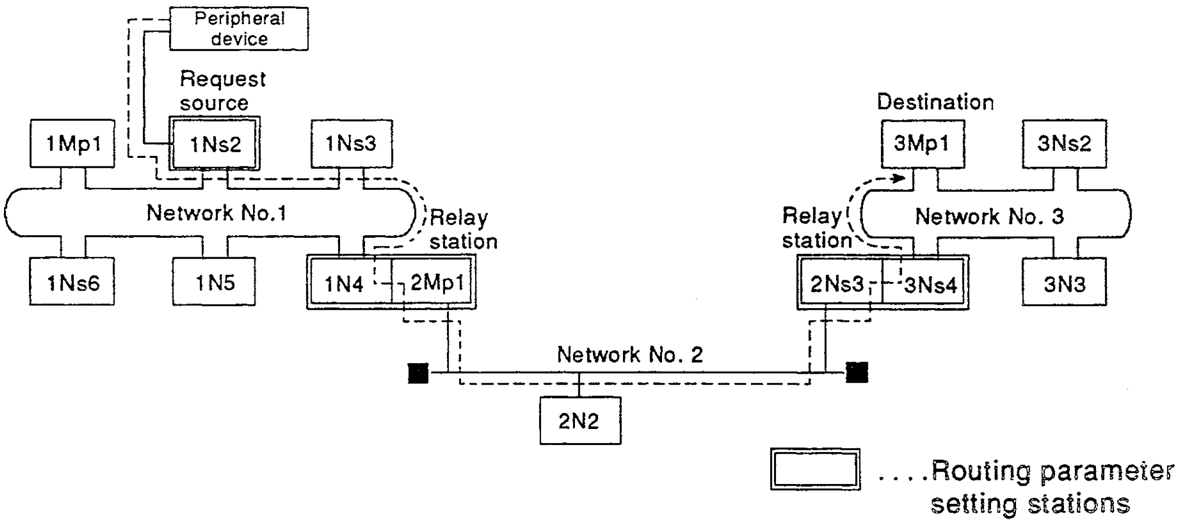


Fig. 8.6 Transient Transmission Across Networks

8.2.1 N : N communication function

In a MELSECNET/10 system, the N : N transient transmission is possible between the AnUCPU stations only.
The AnN/AnACPU station can execute transient transmission to the control station only. Transient transmission cannot be executed to sub-control stations or the AnUCPU normal stations.
Table 8.2 gives the possible for transient transmission execution with the system configuration shown in Fig. 8.7.

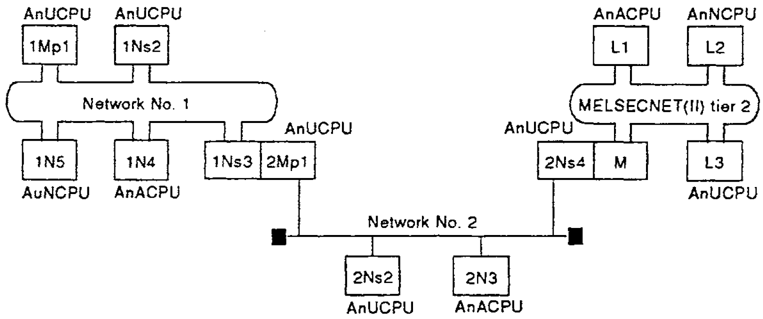


Fig. 8.7 System Configuration

Table 8.2 Possible Ranges for Transient Transmission

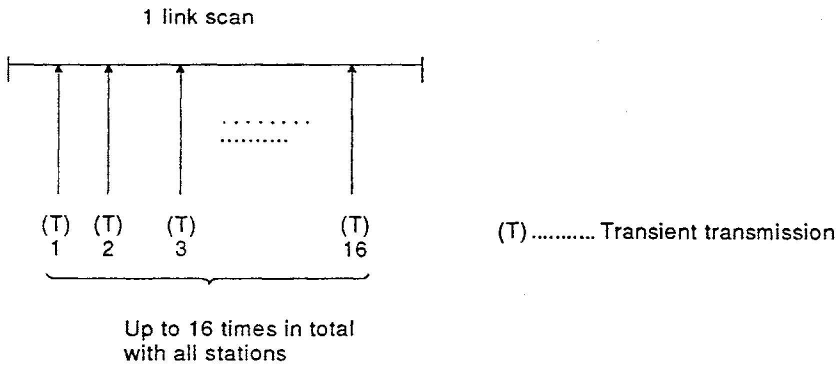
Request Source \ Destination			Network No. 1						Network No. 2			MELSECNET(II)			
			1Mp1	1Ns2	1N4	1N5	1Ns3 (Intermediate Station)	2Mp1 (Intermediate Station)	2Ns2	2N3	2Ns4 (Intermediate Station)	M (Intermediate Station)	L1	L2	L3
Network No. 1	1Mp1		Host	O	O	O	O	*1	O	O	O	X	X	X	X
Network No. 1	1Ns2		O	Host	O	O	O	*1	O	O	O	X	X	X	X
Network No. 1	1N4		O	X	Host	X	X	X	X	X	X	X	X	X	X
Network No. 1	1N5		O	X	X	Host	X	X	X	X	X	X	X	X	X
Network No. 1	1Ns3	Intermediate Station	O	O	O	O	Host	Host	O	O	O	X	X	X	X
Network No. 2	2Mp1	Intermediate Station	O	O	O	O	Host	Host	O	O	O	X	X	X	X
Network No. 2	2Ns2		O	O	O	O	*2	O	Host	O	O	X	X	X	X
Network No. 2	2N3		X	X	X	X	X	O	X	Host	X	X	X	X	X
Network No. 2	2Ns4	Intermediate Station	O	O	O	O	*2	O	O	O	Host	X	X	X	X
MELSECNET (II)	M	Intermediate Station	X	X	X	X	X	X	X	X	X	Host	O	O	O
MELSECNET (II)	L1		X	X	X	X	X	X	X	X	X	O	Host	X	X
MELSECNET (II)	L2		X	X	X	X	X	X	X	X	X	O	X	Host	X
MELSECNET (II)	L3		X	X	X	X	X	X	X	X	X	O	X	X	Host

O: Possible, X: Impossible

*1: Possible by designating 1Ns3.
(When the intermediate station is the destination, the station closest to the request source must be designated.)
*2: Possible by designating 2Mp1.
(When the intermediate station is the destination, the station closest to the request source must be designated.)

8.2.2 Transient transmission frequency designation function

This function allows for the execution of transient transmission at higher speeds by changing the transient transmission frequency in one link scan. Default setting is 2 times. It can be extended up to 16 times. And, transient transmission can be executed up to 2 times per station in one link scan.
The transient transmission frequency in one link scan can be changed with the "expansion setting" of the common parameter.
In a system where several stations execute frequently transient transmission, increase the frequency setting so that several stations can execute transient transmission in one link scan. This can shorten the waiting time for transient transmission.



8.2.3 Routing function

The routing function allows an AnUCPU station to execute transient transmission to a station in another network.
To use the routing function, it is necessary to set the "routing parameters" so that the network number corresponds to the station which serves as the bridge.
The routing function via MELSECNET(II) cannot be used.

(1) The routing parameters need to be set at the AnUCPU request source and relay stations.

(a) The request source needs settings for accessing the destination.

(b) The relay station needs settings for accessing from the request source to the destination and that from the destination to the request source.

(c) The destination does not need settings.

For example, as shown in Fig. 8.8, to execute transient transmission from 1Ns3 to 3N4, the routing parameters need to be set at the AnUCPU in 1Ns3 which executes transient transmission, and in 1Ns4, 2Mp1, 2Ns4, and 3Ns5 which serve as the bridges.

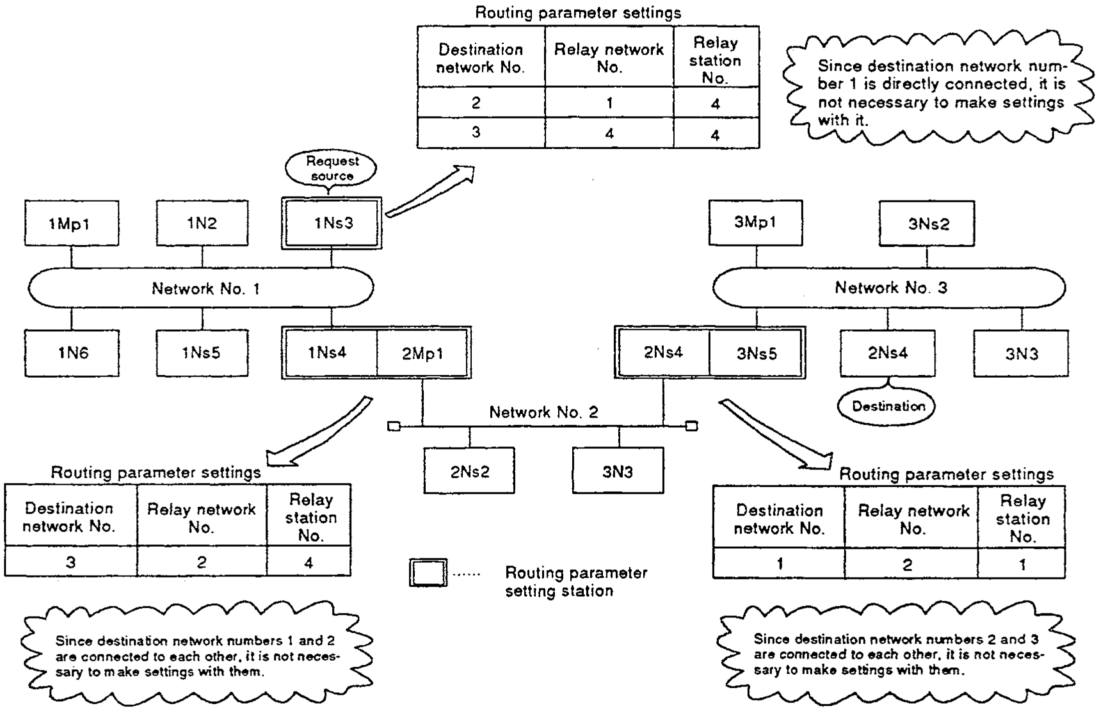


Fig. 8.8 Routing Function

(2) Up to 16 "destination network numbers" can be set with the AnUCPU.

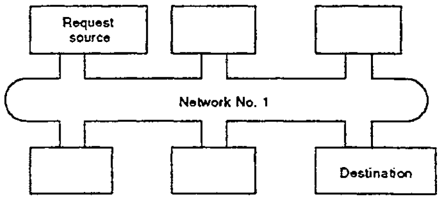
When the host station is the request source or when making access to other stations via the host station, a total of 16 network numbers can be used with the routing function.

(3) Positions and contents of routing parameter settings

The positions and contents of routing parameter settings for transient transmission vary according to the type of system.

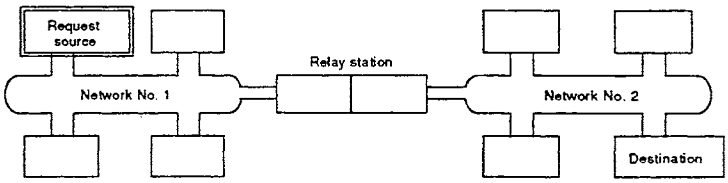
(a) Two-tier system

Since transient transmission is executed within the same network, it is not necessary to set the routing parameter.



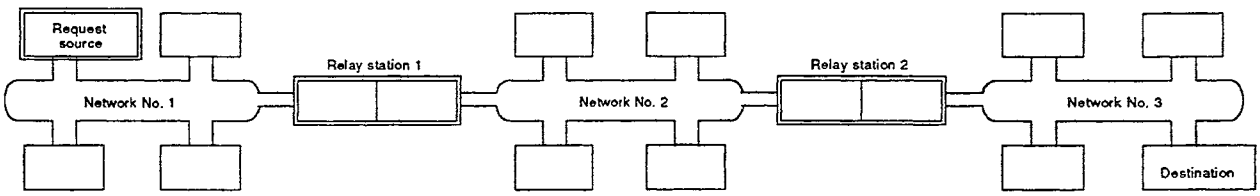
(b) Multi-tier system 1 . . . Two networks

Set the routing parameter at the request source station only.
Make settings at the request source for accessing the destination (network number 2).



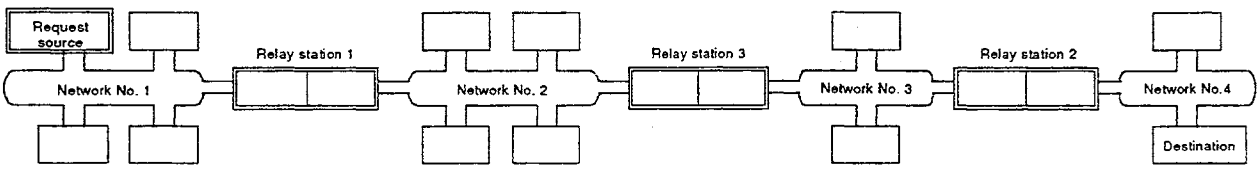
(c) Multi-tier system 2 . . . Three networks

Set the routing parameter at the request source and relay stations.
Make settings at the request source for accessing the destination (network number 3).
Make settings at relay station 1 for accessing the destination (network number 3).
Make settings at relay station 2 for accessing the request source (network number 1).



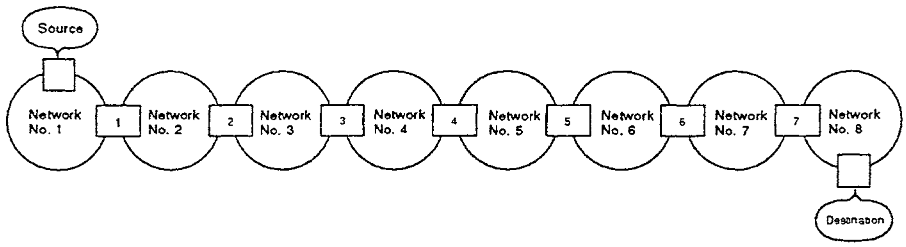
(d) Multi-tier system 3 . . . Four networks or more

Set the routing parameter at the request source and relay stations.
Make settings at the request source for accessing the destination (network number 4).
Make settings at relay station 1 (closest to the source) for accessing the destination (network number 4).
Make settings at relay station 2 (closest to the destination) for accessing the request source (network number 1).
Make settings at relay station 3 (other than relay stations 1 and 2) for accessing the destination (network number 4) and the request source (network number 1).

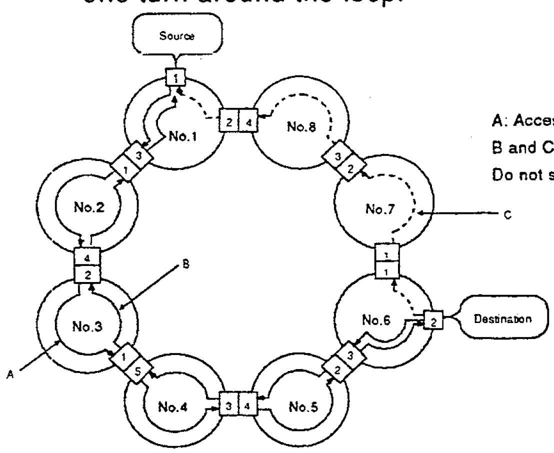


POINT

(1) The routing function can use up to seven relay stations as shown below.



(2) When networks are connected in a loop as shown below, set the routing parameter so that the same relay stations are used for accessing the destination and for accessing the source.
Do not set the routing parameter in which the access route makes one turn around the loop.



A: Access route from the source to the destination
B and C: Access route from the destination to the source
Do not set the routing parameter to make the access route C.

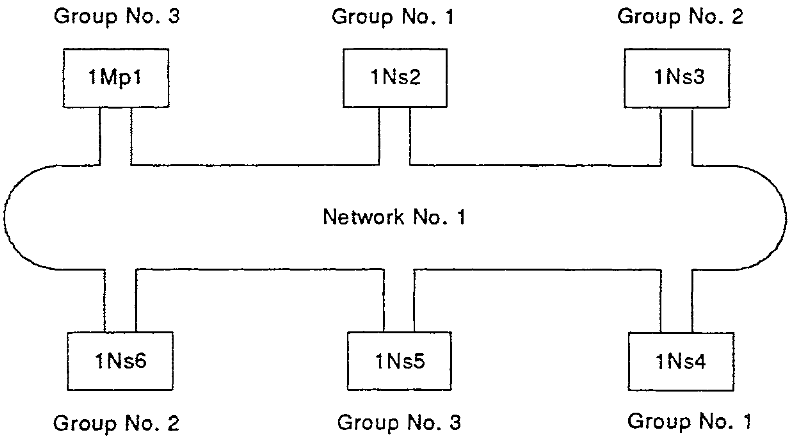
8.2.4 Group function

The group function is used to write word device data from a station to a specific group of stations by transient transmission.
Stations in a network can be divided into several groups of stations.
Use the group number setting switch on the front side of the network module.
For details of the program using a ZNWR instruction, refer to the AnACPU/AnUCPU Programming Manual (Dedicated Instructions).

<Example>

Writing data from 1Mp1 to each group of stations in the system configuration shown below:

(1) System configuration



(2) Result of the ZNWR instruction execution

Data corresponding to each group number is written to 1Ns2 to 1Ns6.

1Mp1 (ZNWR Instruction Execution Station)	Device Conditions in Each Station					
	1Mp1 Group No. 3	1Ns2 Group No. 1	1Ns3 Group No. 2	1Ns4 Group No. 1	1Ns5 Group No. 3	1Ns6 Group No. 2
D0 [123] →Writing to D100 in group number 1 D10 [456] →Writing to D100 in group number 2 D20 [789] →Writing to D100 in group number 3	D100 [789]	D100 [123]	D100 [456]	D100 [123]	D100 [789]	D100 [456]

(3) Confirmation of the completion of writing

Since a ZNWR instruction is completed by giving a request to the network module when a group number and a network number are designated with the destination of writing, it is impossible to confirm that writing has been successfully completed.
If writing is executed consecutively, a "receive buffer full (error code: F222)" error may sometimes be generated. To prevent this error, make the ZNWR instruction execution interval longer.

8.3 Control Station Shift Function

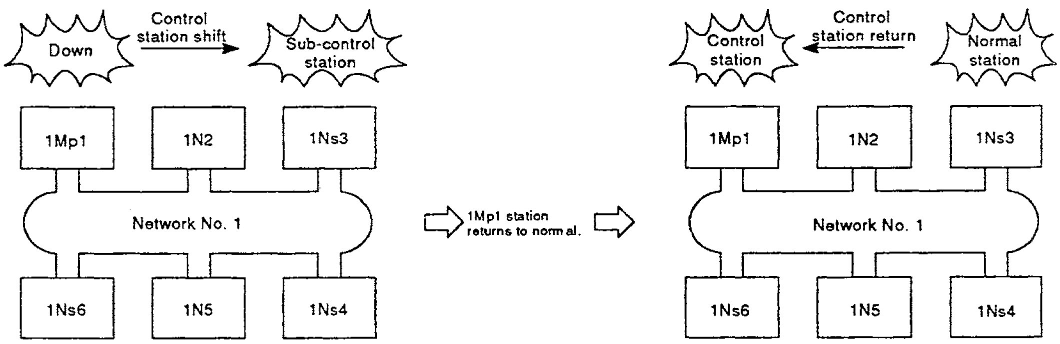
When the control station in which the common parameters are registered in a MELSECNET/10 system is down, a normal station becomes a sub-control station to continue data link.

(1) The **AnU/A2ASCPU** normal station can become a sub-control station.

(2) Cyclic transmission is temporarily suspended when the control shifts to a sub-control station. **The time for control station shift varies depending on the number of connected stations.**

(3) All stations are regarded as faulty stations during the suspension period. For the conditions during the communication error, refer to Section **9.1.3.**

(4) When the control station is restored, the control returns from the sub-control station to the control station. Cyclic transmission is temporarily suspended also in this case. The sub-control station returns to a normal station after the control has shifted.



(5) By using "communication error setting" of the common parameter, it is possible to set the control station not to shift even when it is down.

REMARK

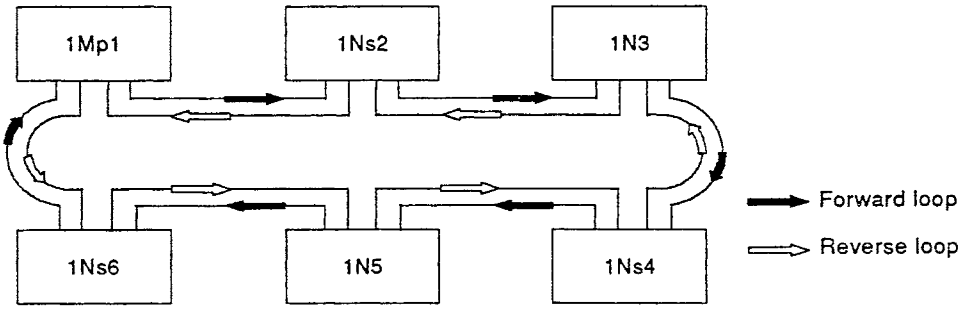
(1) When data link at the control station is stopped, the control does not shift to a sub-control station.

(2) When the control station is down, the control shifts to an **AnU/A2ASCPU** normal station whose data link is suspended (by a peripheral device or sequence program).

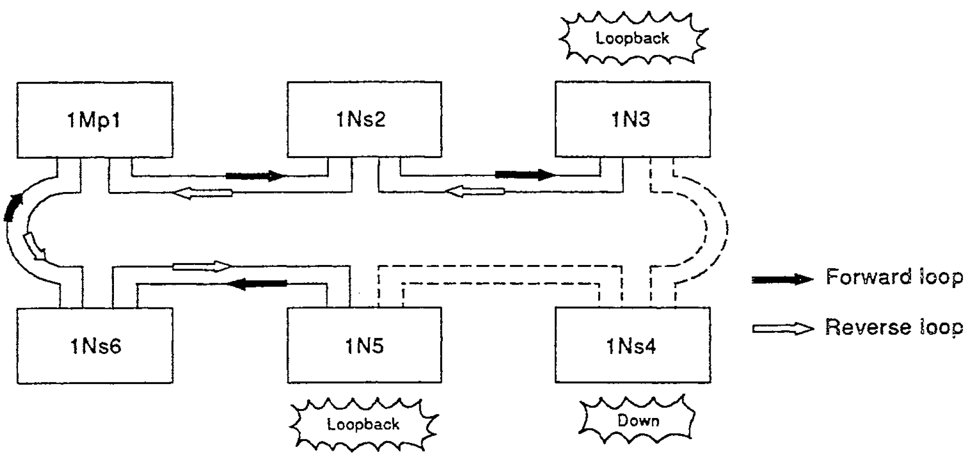
8.4 Multiplex Transmission Function (Optical Loop System)

The multiplex transmission function allows a high speed transmission using a duplex channel (forward and reverse loops) in an optical loop system.
To use this function, make settings with the "expansion setting" of the common parameter.

(1) The multiplex transmission function uses both loops to execute efficient and high speed transmissions.



(2) When an error occurs in the transmission channel during multiplex transmission, either the forward loop or the reverse loop is used to execute normal or loopback operation for continued data link.
The transmission speed in that case is 10 MBPS.



REMARK

The multiplex transmission function is effective in reducing the link scan time when the total number of link stations is 16 or more and the link device size allocated with the common parameter is 2048 bytes or more.
The link scan time becomes 1.1 to 1.3 times shorter when compared with that when the multiplex transmission function is not used.
If the multiplex transmission function is used in the configuration where the number of connected stations or the assigned link devices is less than the above, the link scan time may be increased compared to the case where the function is not used.

8.5 RAS Function

The RAS function stands for Reliability, Availability, and Serviceability.
This is referred to as comprehensive usability of automated equipment.

8.5.1 Automatic on-line return function

When an off-line station is recovered from a fault, it automatically returns to on-line and restarts data link.
Data link and returning are done as follows.

(1) When the control station is down

The control station is set off-line. The normal stations continue data link according to the setting for the control station shift function as follows.

(a) When the control station shift function is set

The sub-control station takes over the control of data link, and both the cyclic transmission and transient transmission can be executed.

(b) When the control station shift function is not set

The control does not shift to a sub-control station, the cyclic transmission is discontinued, but transient transmission can be continued.

Table 8.3 Data Link when the Control Station is Down

Control Station Shift Function Is Set	Control Station Shift Function Is Not Set
Data link is continued by the sub-control station.	The cyclic transmission is suspended until the control station recovers. Transient transmission is continued.

(2) When the control station recovers

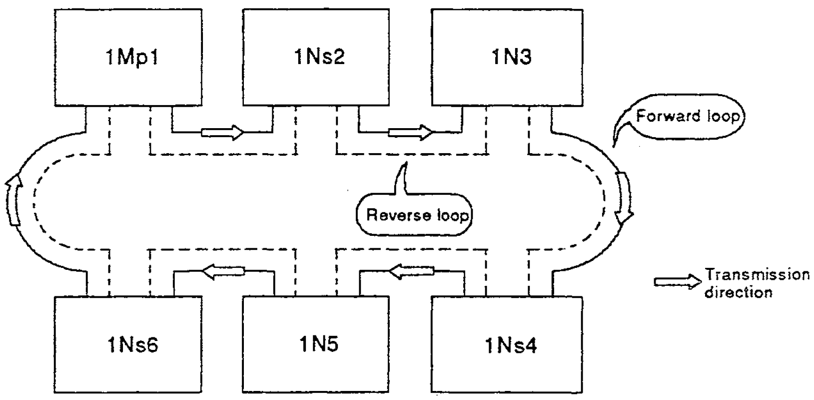
Data link is restarted according to the parameter settings with the control station.

8.5.2 Loopback function (Optical loop system)

The optical loop system uses a duplex channel. When an error or fault occurs in the channel, the erroneous or faulty part is bypassed by switching the forward and reverse loops or by executing loopback operation to maintain the data link with the available stations.

(1) When normal

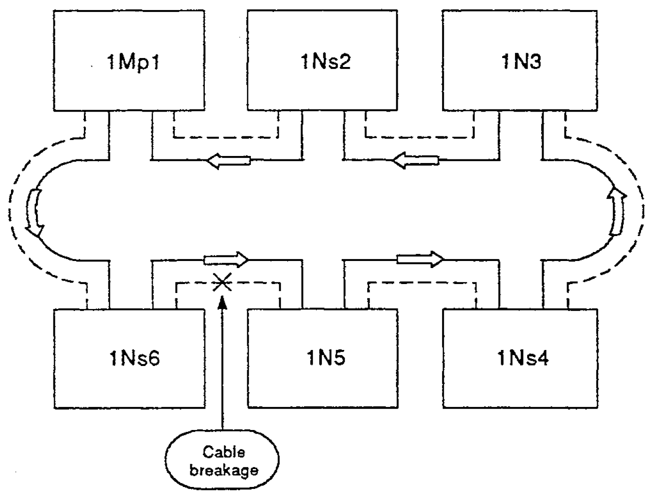
Either the forward loop or the reverse loop is used for data link.



(2) When abnormal

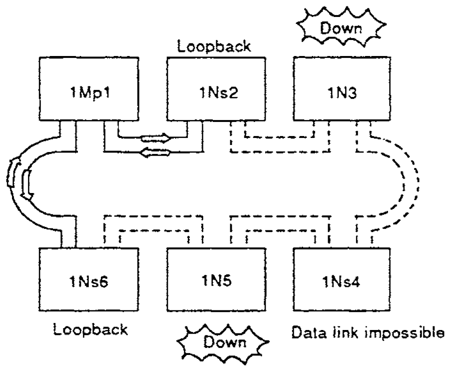
(a) Forward loop (reverse loop) is faulty

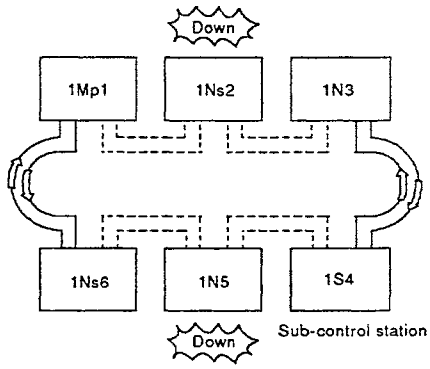
The reverse (forward) loop is used to continue data link.



(b) Stations are down

Down stations are excepted and data link is continued.
When two or more stations are down, the stations between the down stations are also excluded from data link.
However, when there is an AnUCPU station between down stations, the AnUCPU station becomes a sub-control station and data link can be continued.

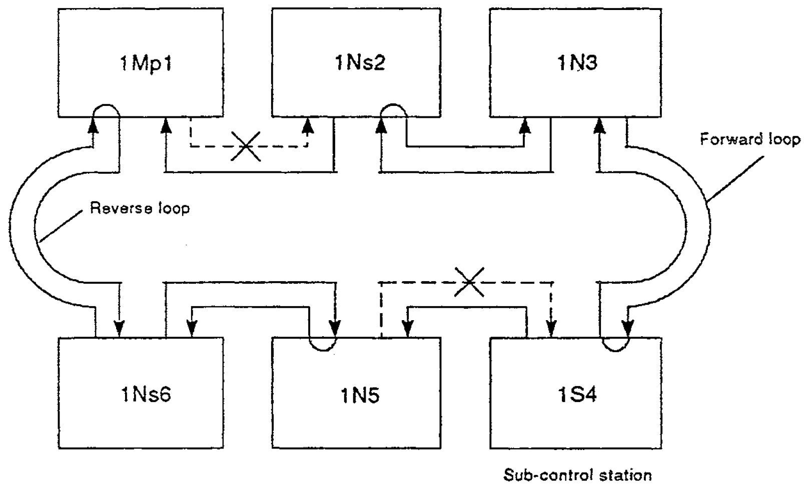




(3) Precautions for using the optical loop system

(a) When a cable is connected or disconnected, the loop may sometimes be switched.

(b) When the loopback operation is executed due to cable breakage, both the forward and reverse loops sometimes become normal depending on the conditions of the cable breakage.
When a forward loop cable between stations 1Mp1 and 1Ns2 and a reverse loop cable between stations 1S4 and 1N5 break, data link is continued by the loops of 1Mp1-1Ns6-1N5 and 1Mp2-1Ns3-1S4 stations (see below).
Since the receive side cables of the loopback stations (reverse loop of 1Mp1 and forward loop of 1N5) in the 1Mp1-1Ns6-1N5 loop are normal, both the forward and reverse loops are normal.
In the 1Ns2-1Ns3-1S4 loop, both the forward and reverse loops are faulty.



(4) If the network module is faulty, the loopback function may not be performed depending on the fault. In that case, data link may stop.
To identify the faulty network module, use the following procedure.

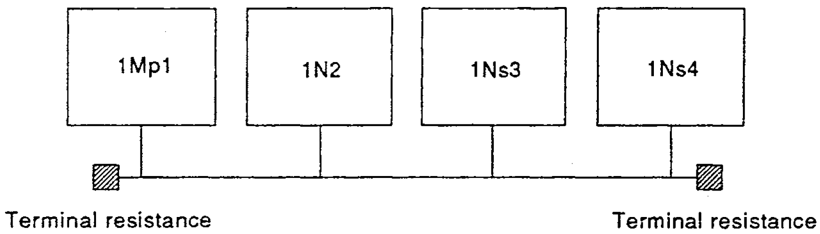
1) Check the LED indications (off of the RUN LED, on of the ERROR LED) of all network modules for a faulty station.

2) Power off all stations and power them on in due order, starting with the control station. At that time, confirm the station up to which normal data link is performed.
Replace the network module where a fault was detected, and make sure that data link is restored to normal.

8.5.3 Station separation function (Coaxial bus system)

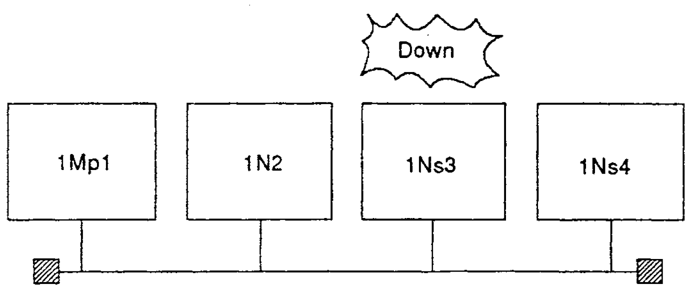
When a station is down due to power failure, the station is separated and data link is executed with the available stations.
However, when the cable is disconnected, terminal resistance is disconnected and normal communications cannot be executed.

(1) When normal



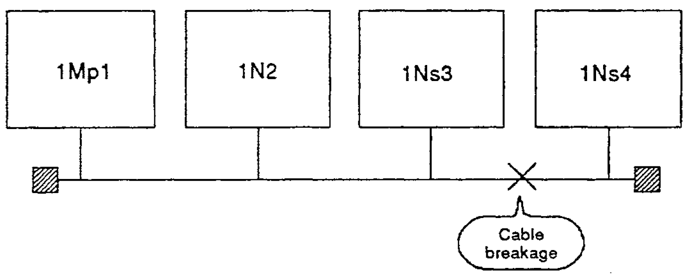
(2) When abnormal

Down station is excluded and data link is continued.



POINT

When the cable is disconnected, terminal resistance is also disconnected and data link becomes impossible.



8.5.4 Diagnosis function

The diagnosis function allows for confirmation of the MELSECNET/10 channel conditions and switch settings with the network module.
The following methods are provided with MELSECNET/10:
- On-line diagnosis by conducting a test using a peripheral device during data link
- Off-line diagnosis by setting the network module in test mode

POINT

The on-line and off-line loop test must be conducted when the network module is on-line (the "T.PASS" LED is lit). If the test is conducted at an off-line station, an error occurs.

(1) On-line diagnosis

The network diagnosis function of the peripheral device is useful for checking the channel conditions. This function can be used when a peripheral device is connected to an AnUCPU.
When a problem occurs during the system operation, this function can be used when the network module is on-line.
There are four on-line diagnosis functions as given in Table 8.5. The Data link is temporarily suspended when the loop test, setting confirmation test, or station order confirmation test are conducted.
For detailed descriptions of operating procedures and screen displays, refer to the GPP Function Operating Manual.

Table 8.5 On-Line Diagnosis Functions

Item	Optical Loop System	Coaxial Bus System	Data Link Test (Cyclic And Transient Transmission)
Loop test	O	X	Suspended
Setting confirmation test	O	O	Suspended
Station order confirmation test	O	X	Suspended
Communication test	O	O	Continue

O: Possible X: Impossible

POINTS

(1) Conduct the on-line diagnosis when the system is just started up.
If the on-line diagnosis is conducted when the system is in normal operation, make sure of the following conditions:

(a) There is no problem if data link is discontinued due to the on-line diagnosis.

(b) No station is reset nor switched to RUN/STOP. (This is because the on-line diagnosis is sometimes abnormally completed.)

(2) The setting confirmation test, station order confirmation test, and communication test must be conducted after confirming that the loops are normal by the loop test.

(a) Loop test (Optical loop system only)

When the optical loop cable connections are completed, check the forward and reverse loops. The loopback executing station can also be checked during the loopback operation.

For example, in the system condition shown in Fig. 8.9 below, when the loop test is conducted by using a peripheral device connected to station 1, the monitor screen shown in Fig. 8.10 below is displayed indicating that station 5 is faulty, and stations 2 and 4 are executing loopback operation.

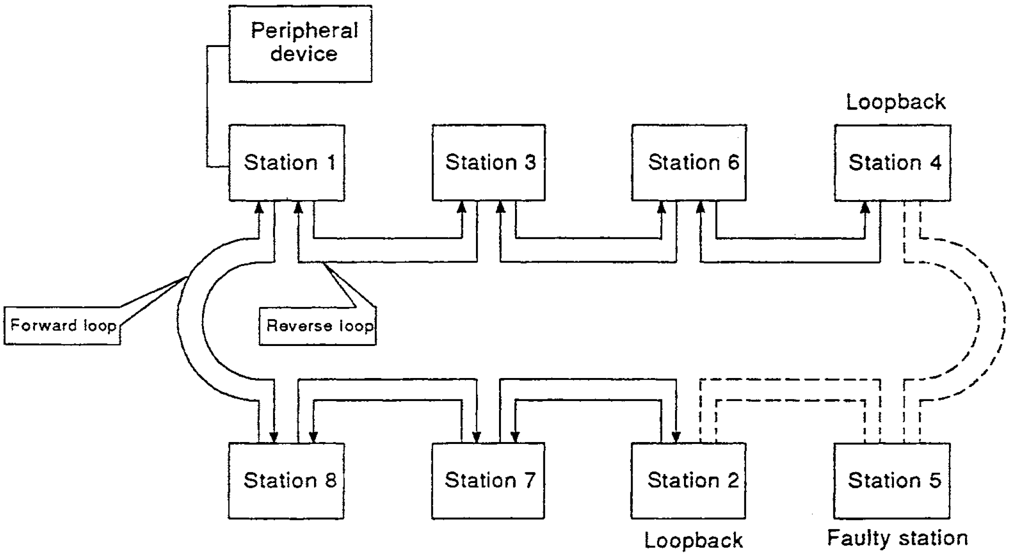


Fig. 8.9 System Condition

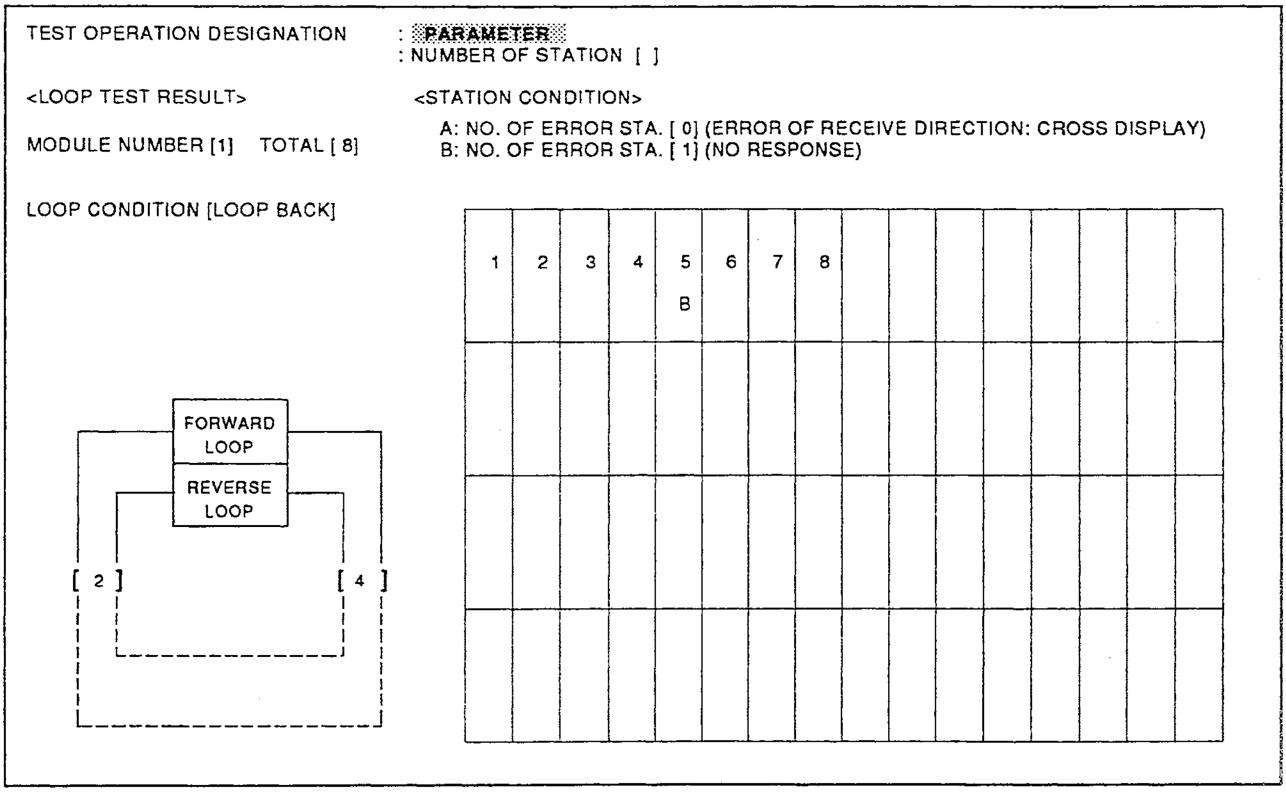


Fig. 8.10 Loop Test Display Screen

(b) Setting confirmation test

Switch settings with the network module can be checked.
The following checking items are provided:

1) Control station overlap check
2) Station number overlap check
3) Matching check between the network number set with the number of modules at the control station and the network number set with the switch at the host station.

For example, in the system condition shown in Fig. 8.11 below, when the setting confirmation test is conducted by using a peripheral device connected to station 1, the monitor screen shown in Fig. 8.12 below is displayed, and the set conditions of each station can be checked.
Both station 1 and station 6 are set for the control station, and station 5 is indicated with network number and group number since there is no setting error with the station.

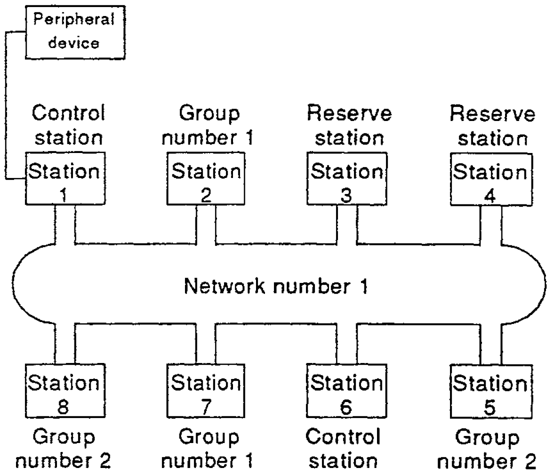


Fig. 8.11 System Condition

<PC TO PC NETWORK> TEST OPERATION DESIGNATION: PARAMETER/NO. OF STA. [ ]
MODULE NO. [1] HOST NO. [1] NETWORK NO. [1] CONTROL STA. NO. [1] TOTAL [8]

(STATION NO.)	1	2	3	4	5	6	7	8								
(NETWORK NO.)	A	1			1	A	1	1								
(GROUP NO.)		1	D	D	2		1	2								
(STATION NO.)																
(NETWORK NO.)																
(GROUP NO.)																
(STATION NO.)																
(NETWORK NO.)																
(GROUP NO.)																
(STATION NO.)																
(NETWORK NO.)																
(GROUP NO.)																

A: CONTROL ST. OVERLAPPING B: ST. NO. OVERLAPPING C: NETWORK NO. ERROR D: RESERVE STATION E: ERROR STA.

Fig. 8.12 Setting Confirmation Test Display Screen

(c) Station order confirmation test (Optical loop system only)

Station numbers in an optical loop system can be checked.
The following checks can be done according to the loop condition (displayed on the test result screen as shown in Fig. 8.14 below):

1) Forward and reverse loops

Station numbers connected in the forward loop direction and those connected in the reverse loop direction both beginning with the host station.

2) Forward loop

Station numbers connected in the forward loop direction beginning with the host station.

3) Reverse loop

Station numbers connected in the reverse loop direction beginning with the host station.

4) Loopback

Station numbers connected in the forward loop direction beginning with the host station.

For example, in the system condition shown in Fig. 8.13 below, when the station order confirmation test is conducted by using a peripheral device connected to station 1, the monitor screen shown in Fig. 8.14 below is displayed indicating the station numbers connected in the forward loop direction and stations 2 and 4 are executing the loopback operation.

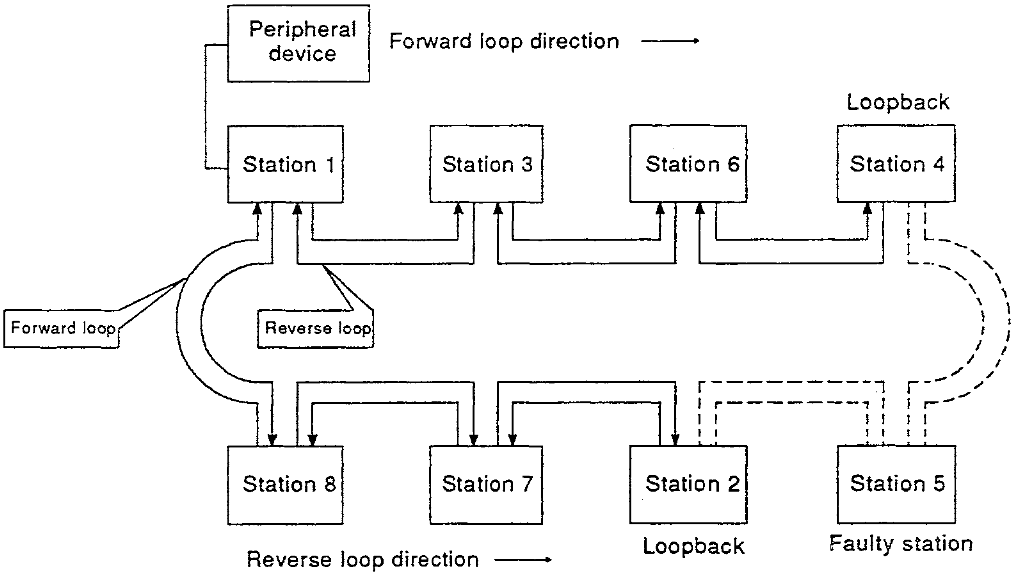


Fig. 8.13 System Condition

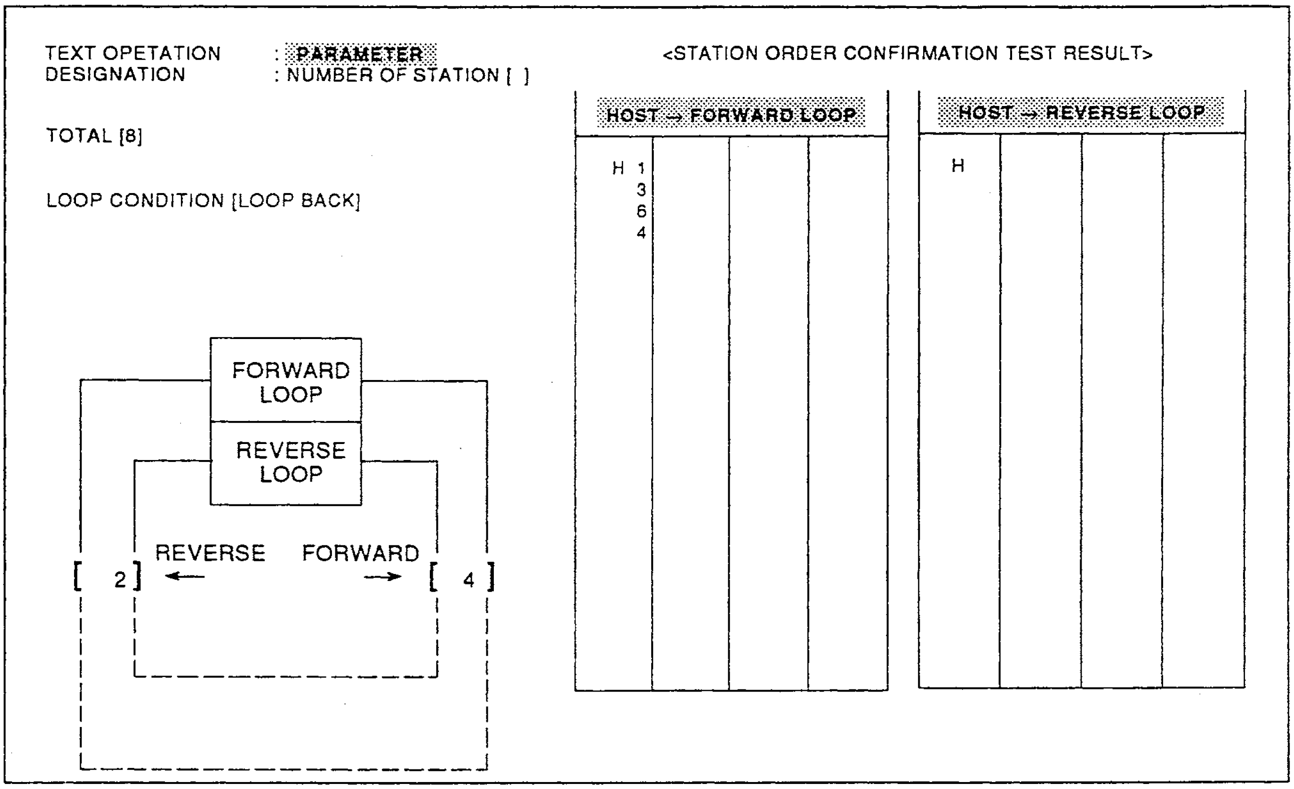


Fig. 8.14 Station Order Confirmation Test Display Screen

(d) Communication test

Communications between the host station and the destination (designated with network number and station number) can be checked. Also, when the destination is in other network, the relay network number and station number are displayed during this test so that the routing parameter settings can be checked.
For example, in the system condition shown in Fig. 8.15 below, when the communication test is conducted by using a peripheral device connected to station 4 in network number 1 to station 6 in network number 4, the monitor screen shown in Fig. 8.16 below is displayed indicating that the routing parameters are not correctly set.

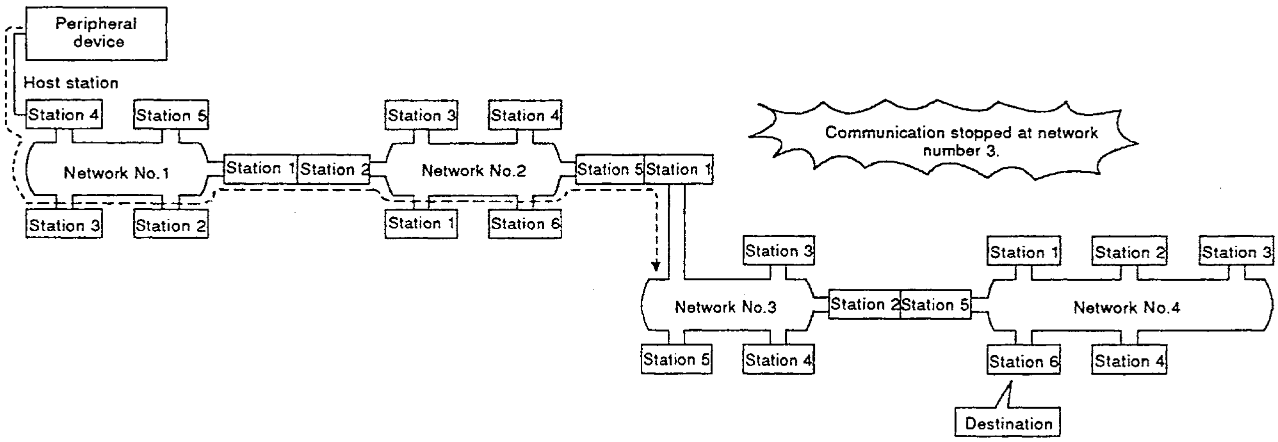


Fig. 8.15 System Condition

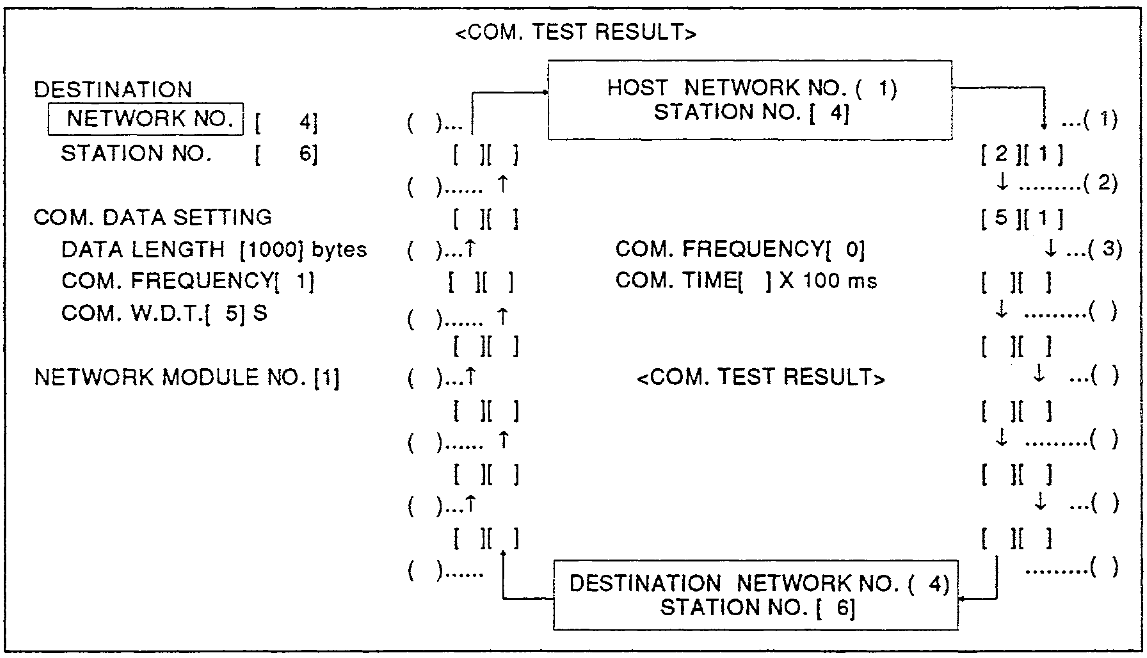


Fig. 8.16 Communication Test Display Screen

As shown in the system condition shown in Fig. 8.17 below, when the communication test is conducted by using a peripheral device connected to station 4 in network number 1 to station 6 in network number 4, the monitor screen shown in Fig. 8.18 below is displayed indicating that normal communications can be done according to the routing parameter settings.

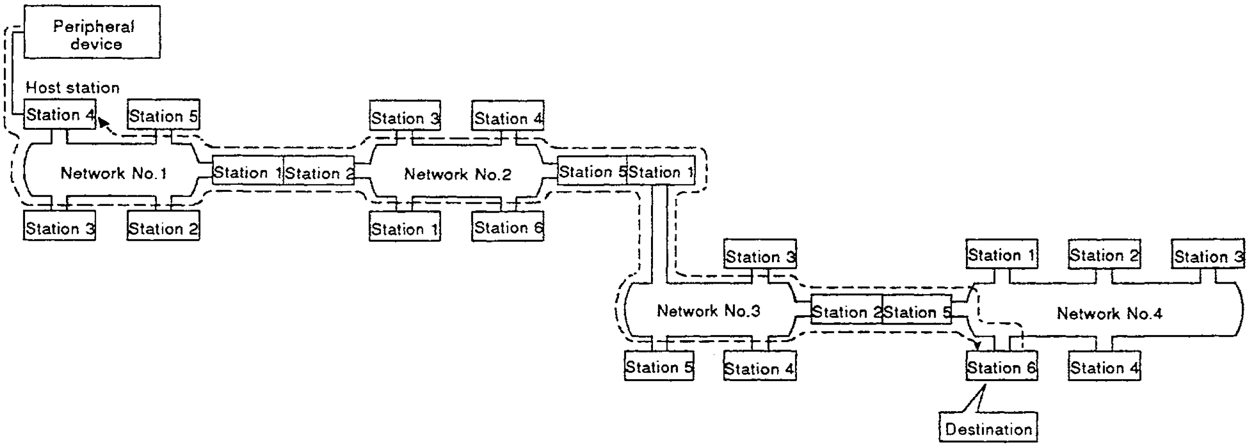


Fig. 8.17 System Condition

```
                                   <COM. TEST RESULT>
                                           HOST  NETWORK NO. ( 1)
DESTINATION                                    STATION NO. [ 4]
 NETWORK NO.   [    4]        ( 1)...                                          ...( 1)
 STATION NO.   [    6]            [ 1 ][ 2 ]                               [ 2 ][ 1 ]
                              ( 2)......  ↑                                 ↓ .........( 2)
COM. DATA SETTING                 [ 1 ][ 5 ]                               [ 5 ][ 1 ]
 DATA LENGTH  [1000] bytes    ( 3)...↑          COM. FREQUENCY[ 0]              ↓ ...( 3)
 COM. FREQUENCY[  1]              [ 2 ][ 5 ]    COM. TIME[  ] X 100 ms     [ 5 ][ 2 ]
 COM. W.D.T.[ 5] S            ( 4)......  ↑                                 ↓ ........( 4)
                                  [  ][  ]                                 [  ][  ]
NETWORK MODULE NO. [1]        (   )...↑             <COM. TEST RESULT>          ↓ ...(   )
                                  [  ][  ]                                 [  ][  ]
                              (   )......  ↑                                ↓ .........(   )
                                  [  ][  ]                                 [  ][  ]
                              (   )...↑                                         ↓ ...(   )
                                  [  ][  ]                                 [  ][  ]
                              (   )......      DESTINATION  NETWORK NO. ( 4)     .........(   )
                                                      STATION NO. [ 6]
```

Fig. 8.18 Communication Test Display Screen

(2) Off-line diagnosis

Hardware of the network module and data link cables can be checked by setting the network module in test mode when the system is started up.
Table 8.6 gives the test functions provided with the off-line diagnosis function.
For the procedure of specific test, refer to Section 3.3.

Table 8.6 Off-Line Diagnosis Functions

Item	Optical Loop System	Coaxial Bus System
Hardware test	O	O
Self-loopback test	O	O
Internal self-loopback test	O	O
Station-to-station test	O	O
Forward loop/reverse loop test	O	—

O: Possible —: Impossible

(a) Hardware test

This test is used to check hardware inside the network module.

(b) Self-loopback test

Hardware including the send and receive circuits for transmissions in a single network module and link cables are checked.

(c) Internal self-loopback test

Hardware including the send and receive circuits for transmissions in a single network module is checked.

(d) Station-to-station test

Channels between two adjacent stations are checked.

(e) Forward loop/reverse loop test (optical loop system only)

Channels after connecting all stations with fiber-optic cables are checked for the conditions of the forward and reverse loops.

(3) Network monitor function

The operating condition of MELSECNET/10 network can be checked by the network monitor functions by using a peripheral device.
The operating conditions of MELSECNET/10 are stored in special relays (SB) and special registers (SW) all the time during the operation.
For detailed descriptions of operating procedures and screen displays of the peripheral device, refer to the GPPA Function Operating Manual.

(a) Line Monitor .... Refer to Section 6.1.

The network channel conditions and data link conditions at each station can be checked.

Line monitor .... The channel conditions, mode, and link scan time are displayed.

Detailed line monitor .... Control station data, data link data, loopback data, and the host station condition are displayed.

Line monitor other station .... Communicating conditions, data link conditions, CPU RUN condition, and loop condition of each station are displayed.

(b) Condition monitor .... Refer to Section 6.2.

Conditions of the host station can be checked.

Condition monitor .... Switch settings of the host station module are displayed.

Detailed condition monitor .... Switch settings, parameters, and data link conditions of the host station are displayed.

Test monitor .... The on-line and off-line test conditions are displayed.

(c) Error list monitor ..... Refer to Section 6.3.

Conditions of errors can be checked.

Error list monitor .... Loop switching, retry frequency, and communication error frequency are displayed.

Loop switch data display ..... Loop switching factors and conditions after loop switching are displayed in a list.

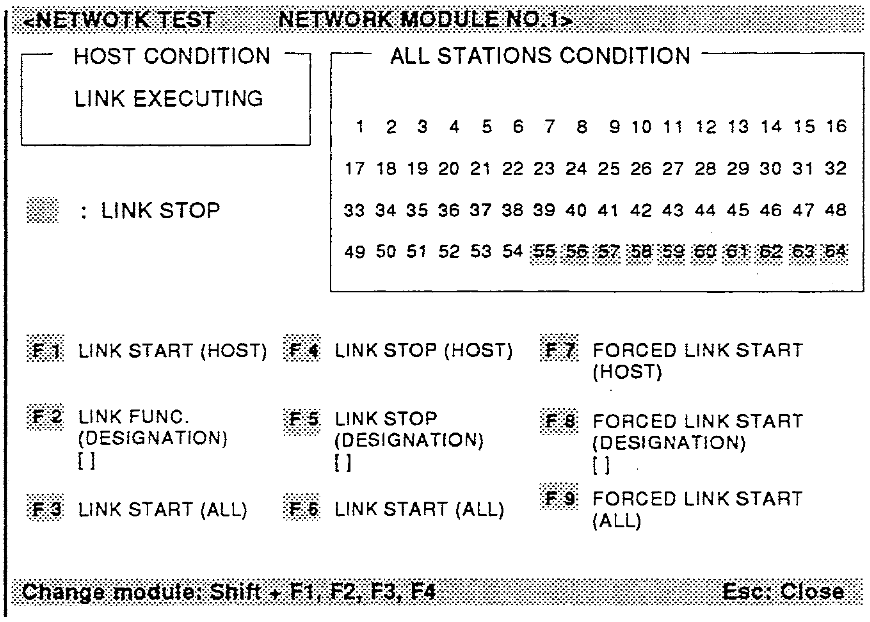
Transient transmission error display
.... Error factors in transient transmission are displayed in a list.

Error list clear by error item
.... Error list areas are cleared by error item.

Transient transmission error
.... Setting for latching/clearing the transient transmission error list areas is made.

(e) Network test

Data link can be stopped and restarted.



8.5.5 Data link condition detection function

MELSECNET/10 allows the operating conditions of data link to be monitored easily by using a peripheral device.
The operating conditions of data link are stored in special relays (SB 0 to FF) and special registers (SW 0 to FF) in the network module.
This function can also be used as an interlock in a sequence program.
For the details of special relays and registers and their uses, refer to Section 12.

9. COMMUNICATION PROCESSING AND PROCESSING TIME OF THE DATA LINK

This chapter contains information on the communication method for link data and the processing time of the data link.

9.1 Link Data Communication Processing

9.1.1 Overview of communication processing

The data link between the stations in a MELSECNET/10 network system is operated in accordance with the network parameters (number of communicating stations, range of devices used for data communication, etc.) set at the control station.
Described here is the data flow when data that has been written (sent) to the link relays and link registers allocated to the AnUCPU at the host station and is read (received) by an AnUCPU at another station.

One of two types of processing can be used to transmit link device data to another station; link refresh and link scan.

(a) Link refresh

This is the processing whereby data is transmitted between an AnUCPU and a network module.

- The data of the devices allocated to the host station is written to the refresh data storage area of the network module.
  The data received from the other station is written from the refresh data storage area of the network module to the device memory storage area of the AnUCPU.
- The device range executed link refresh is desided according to the network refresh paraneter and the common parameter. (See section 10.1.2).
- LInk refresh is executed with END instruction.

(b) Link scan

This is the processing whereby data is communicated between the network module in the host station and the network module in another station.

- The data of the devices in the device range allocated using the common parameters is continually communicated with the other station.
- Data received from the other station is stored in the link data storage area.
- On completion of one link scan, data is transmitted between the refresh data storage area and the link data storage area.
  If station specific parameters have not been set, data is stored in the refresh data storage area in accordance with the device range set in the common parameters. If station-specific parameters have been set, the data in the range of devices set in the common parameters is stored with its order changed in accordance with the station specific parameters. (For details on station specific parameters, see section 10.1.4).
- Data communication is asynchronous with AnUCPU scanning.

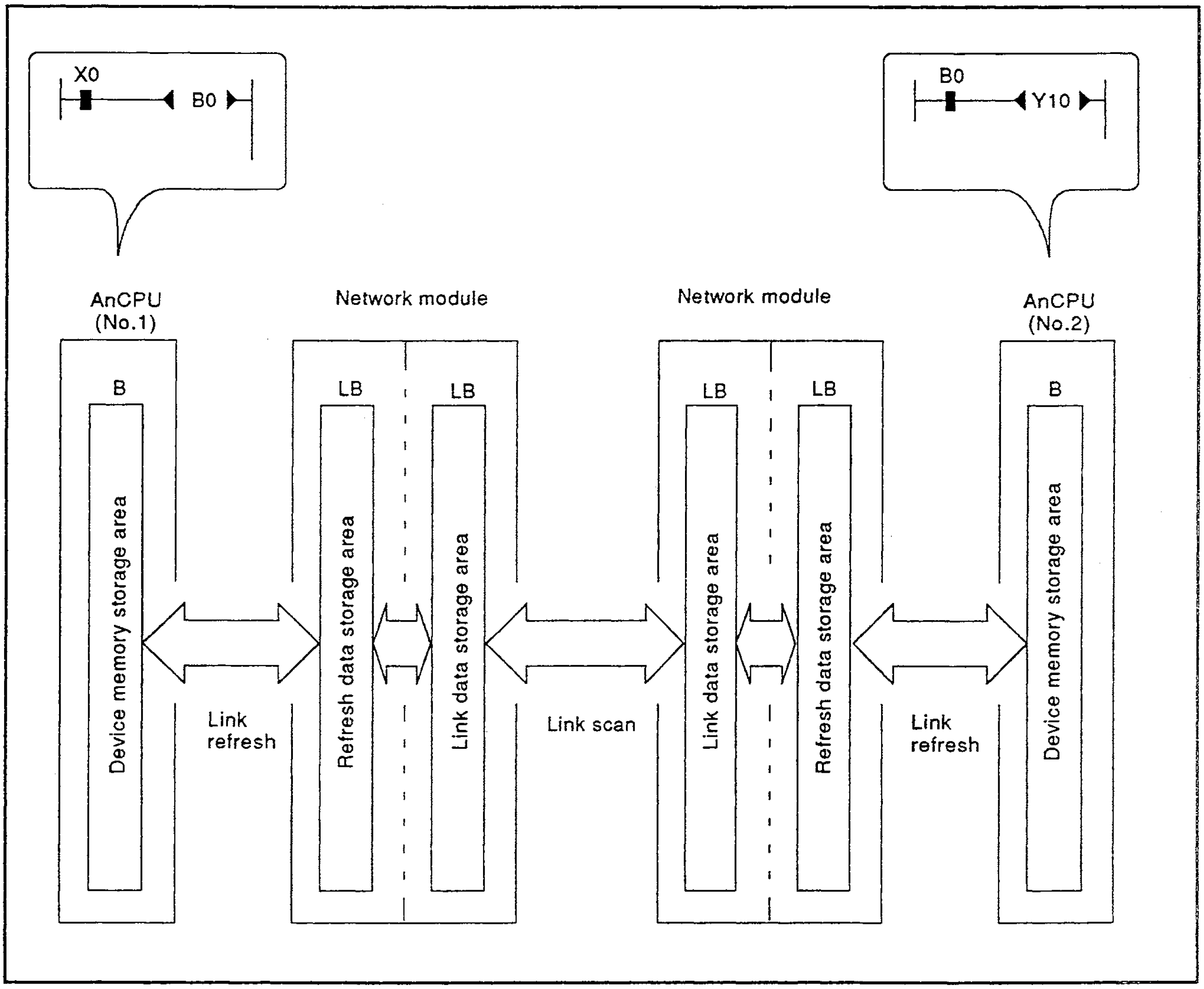


Fig. 9.1 Flow of Cyclic Transmission Data

9.1.2 Timing for link refresh processing

There are two types of timing for link refresh, as indicated below.

(1) Link refresh executed immediately on completion of a link scan

On completion of a link scan, execution of the sequence program is suspended and link refresh is executed.

(2) Link refresh executed only on execution of a sequence program END instruction

Even when a link scan is completed, link refresh is not executed until the sequence program has executed the END instruction.

Table 9.1 shows the types of link refresh timing used by the various link modules.

Table 9.1 Classification of Link Modules According to Link Refresh Timing

Link Module	Link refresh timing		
	Executed Immediately on Completion of a Link Scan	Executed Only on Execution of a Sequence Program END Instruction	Executed at Set Intervals
AnCPU	O	—	—
AnNCPU	O	O*	—
A1SCPU			
A3HCPU	—	O	—
A3MCPU			
AnACPU			
AnUCPU			

POINT

(1) *....If the period between step 0 and the END instruction of the sequence program is set as a period in which link refresh is inhibited, link refresh will only be executed after execution of the END instruction.

(2) Link data communication is executed when the ACPU is in any of the following states: "RUN", "STOP", "PAUSE", "STEP-RUN".

9.1.3 Link data of stations at which a communication error has occurred or communication is stopped

If a communication error occurs or communication is stopped at a station in the data link, the data received from the relevant station is preserved.

(1) When a communication error occors at one of the stations, the link data that is preserved is as follows:

(a) Of the data stored at the stations at which communication is normal, only that received from the station at which the communication error has occurred is preserved.

(b) Of the data stored at the station at which the communication error has occurred, all the data received from other stations is preserved.
For example, in Fig. 9.2 below, if a communication error occurs at station 1Ns2, the data received from station 1Ns2 by stations 1Mp1 and 1N3 immediately before the communication error occurred will be preserved at these stations. In addition, station 1Ns2 will preserve the data it received from stations 1Mp1 and 1N3 immediately before the communication error occurred.

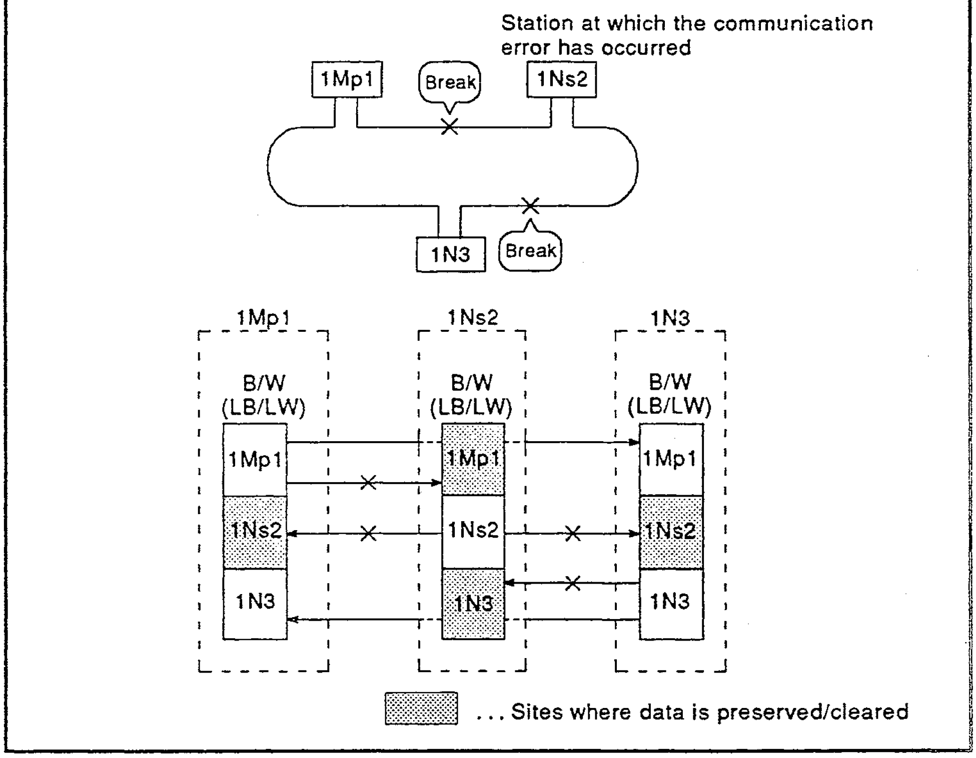


Fig. 9.2 Treatment of Link Data when a Communication Error Occurs

(2) When communication is stopped at a station, the link data that is preserved is as follows.

(a) Of the data stored at the stations at which communication is normal, only that received from the station at which communication is stopped is preserved.

(b) Of the data stored at the station at which communication is stopped, all data received from other stations is preserved.

9.2 Transmission Delay Time

9.2.1 Transmission delay in a two-tier system

The transmission delay time in the MELSECNET/10 data link system is calculated on the basis of the following factors.

- Sequence program scan time for the sending station and receiving station
- Link scan time
- Link refresh time

by using the formulae presented below.

(1) Transmission delay time for a two-tier system (within the same network)

(a) B/W/X/Y transmission delay time (TD1)

$T_{D1} = S_T + \alpha_T + (L_S \times 3) + (S_R \times 2) + \alpha_R$

S_T: Sequence program scan time for the sending station

S_R: Sequence program scan time for the receiving station

*1 α_T: Link refresh time for the sending station

*1 α_R: Link refresh time for the receiving station

L_S: Link scan time

*1 If two or more network modules are installed, this is the total link refresh time for all the network modules.

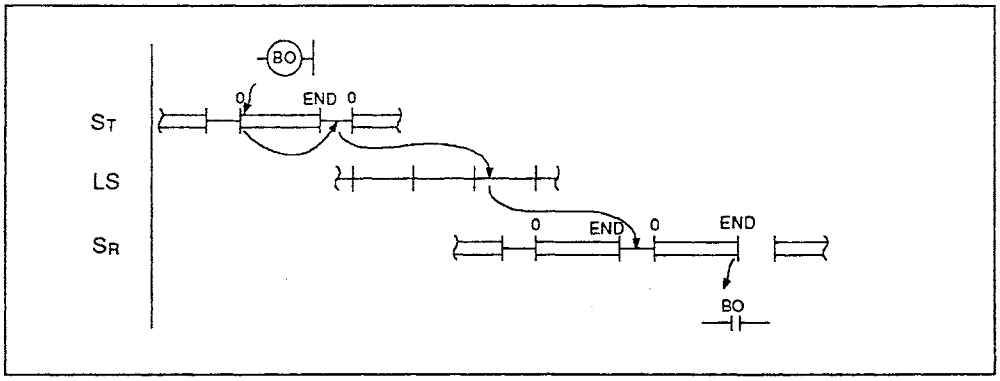


Fig. 9.3 Transmission Delay for B/W/X/Y

(b) Time until completion of a ZNRD/ZNWR instruction (T_{D2})

$$T_{D2} = (S_T \times 2) + (\alpha_T \times 2) + (LS \times 6) + (S_R \times 2) + (\alpha_R \times 2)$$

$$+ \left\{ \underbrace{\frac{\text{(Number of simultaneous transient transmission requests)}}{\text{(Max. number of transient transmissions)}}}_{\text{Integer (decimal fraction rounded up)}} - 1 \right\} \times LS \times 2$$

Number of simultaneous transient transmission requests:
This is the total number of transmission requests made by stations in the samne network in one link scan.

Max. number of transient transmissions:
This is the maximum number of transient transmissions possible in one link scan. It is set by the common prameter extension settings.

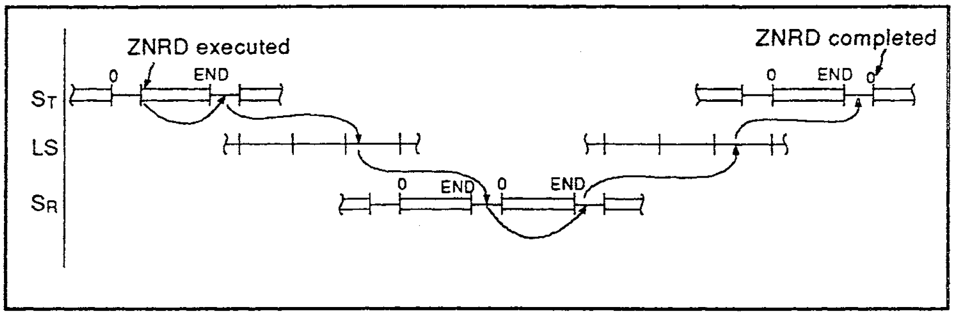


Fig.9.4 Instruction Process for ZNRD/ZNWT

REMARK

When transient transmissions are executed from two or more stations at the same time, it is possible to shorten the ZNRD/ZNWR instruction execution time by setting a higher value for the maximum number of transient transmissions in one scan.
For example, assuming that the number of stations at which ZNRD/ZNWR instructions is executed is seven, if the setting for the maximum number of transient transmissions in one scan is changed from the default of "2" to "7" or higher, the required time (link scan time: LS x 6) will be shortened.

(2) Link refresh time

The link refresh time can be calculated from the number of assigned link device points and the used CPU module type.

a) A2ASCPU, AnUCPU, QnCPU-A

$$\alpha T,\ \alpha R = K_{M1} + K_{M2} \times \left(\frac{B+X+Y+SB+(W+SW)\times 16}{8} \right) + \alpha E + \alpha L \ [\text{ms}]$$

$$\alpha E = K_{M3}$$
$$\alpha L = K_{M4} + K_{M5} \times \left(\frac{B+W\times 16}{8} \right)$$

$\alpha T, \alpha R$: Link refresh time
B : Total number of link relay (B) points used at all stations*1
W : Total number of link register (W) points used at all stations*1
X : Number of link input (X) points used at the host
Y : Number of link output (Y) points used at the host
SB : Number of link special relay (SB) points
SW : Number of link special register (SW) points
αE : Extended file register (R) transfer time*2
αL : Inter-data link transfer time*2
K_{M1}, K_{M2}, K_{M3}, K_{M4}, K_{M5}: Constant

Table 9.2 Constants for Link Refresh Time

CPU \ Constant	K_{M1}	K_{M2}	K_{M3}	K_{M4}	K_{M5}
A2UCPU(S1) A2ASCPU(S1)	1.3	0.0025	2.6	2.6	0.0045
A3U, A4UCPU A2USHCPU-S1	1.0	0.0025	2.0	2.0	0.0045
Q02CPU-A	0.6	0.0025	1.2	1.2	0.0045
Q02HCPU-A Q06HCPU-A	0.3	0.0025	0.6	0.6	0.0045

*1: From the first to the last points of the used device.
(Any free space existing midway is also included in the number of points.)
*2: Set 0 when not in use.

Refresh is performed for the transfer size data starting from the first link device number and in the data range assigned with the common parameter.

b) Other than A2ASCPU, AnUCPU and QnCPU-A

$$\alpha T,\ \alpha R = K_{M1} + K_{M2} \times \left(\frac{B+X+Y}{2048} \right) + K_{M3} \times \left(\frac{W}{1024} \right) \ [\text{ms}]$$

$\alpha T, \alpha R$: Link refresh time
B : Total number of link relay (B) points used at all stations*1
W : Total number of link register (W) points used at all stations*1
X : Number of link input (X) points used at the host
Y : Number of link output (Y) points used at the host
K_{M1}, K_{M2}, K_{M3}: Constant

Table 9.2 Constants for Link Refresh Time

CPU \ Constant	K_{M1}	K_{M2}	K_{M3}
AnCPU	1.8	1.8	6.6
AnSCPU AnNCPU	0.8	1.2	6.4
AnSHCPU	0.7	0.8	6.0
A3H,A3MCPU	0.67	0.61	4.87
A2ACPU	0.54	0.54	4.32
A3ACPU	0.48	0.52	4.16

*1 : From the first to the last points of the used device.
(Any free space existing midway is also included in the number of points.)

(3) Link scan time

The link scan time is calculated on the basis of the number of points allocated for link devices and the number of stations connected in the network.
Use the following formula to calculate link scan time:

$$LS = K_B + (0.75 \times (\text{total number of points})) + \left[\frac{B + Y + (W \times 16)}{8} \times 0.001\right] + (T \times 0.001) \quad [\text{ms}]$$

LS : Link scan time
B : Total number of link relay (B) points used in all stations
W : Total number of link register (W) points used in all stations
X : Number of link input (X) points allocated to all stations
Y : Number of link output (Y) points allocated to all stations
T : Maximum data length (bytes) transmissible by transient transmission in one link scan
When transient transmissions are executed from two or more stations at the same time, calculate the total data length:
(Max. number of transient transmissions) x
(Max. transient transmission data length)
K_B : Constant

Table 9.3 Constants for Link Scan Time

Total Number of Points	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_B	4.0	4.5	4.9	5.3	5.7	6.2	6.6	7.0

9.2.2 Transmission delay in communication between data links

In multi-tier systems, determine the transmission delay when the inter-data link transfer function is used to transmit data to another network on the basis of the following factors.

(Transmission delay time in inter-data link transfer) = (Processing time from the sending station to the intermediate station) + (Processing time from the intermediate station to the receiving station) − (Intermediate station scan time)

(1) Processing time from the sending station to the intermediate station

This is the time taken for the data to be transmitted from the station in which it is written (the sending station) to the intermediate station, which transmits data between data links; to take the example in Fig. 9.5, this is the time taken for the transfer of data from station 1MP1 to station 1Ns3. Calculate this processing time by using the formula for calculating the transmission delay time in a two-tier system given in section 9.2.1.

(2) Processing time from the intermediate station to the receiving station

This is the time taken for the data to be transmitted from the intermediate station to the station that will read the received data (receiving station); to take the example in Fig. 9.5, it is the time taken for the transfer of data from station 2MP1 to station 2Ns3.
Calculate this processing time by using the formula for calculating the transmission delay time in a two-tier system given in section 9.2.1.

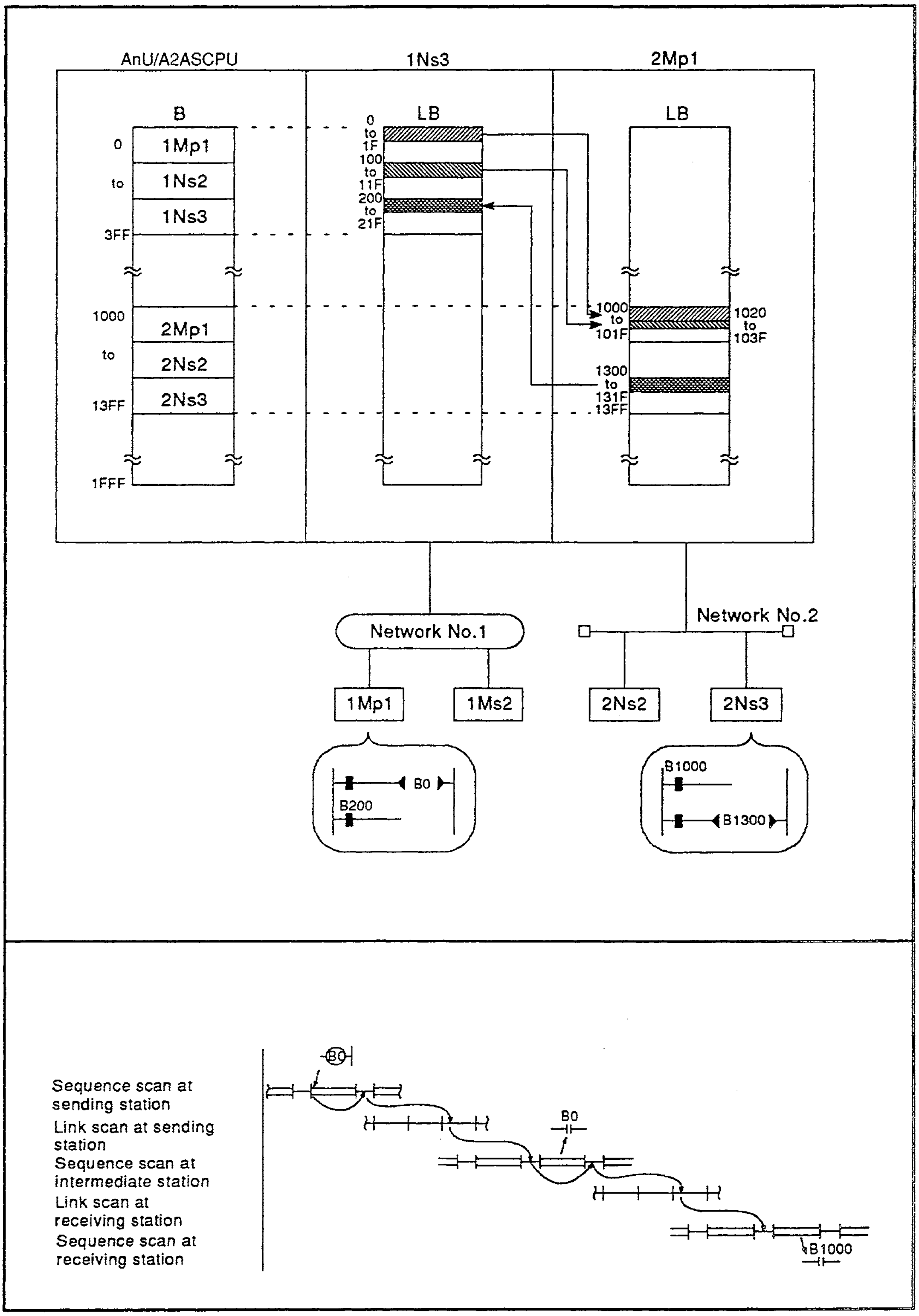


Fig. 9.5 Transmission Delay in Inter-Data Link Transfer

9.2.3 Transmission delay time due to routing

In a multi-tier system, determine the processing time required to access stations in other networks using AnUCPU ZNRD/ZNWR instructions by adding the transmission delay factors indicated below.

(Transmission delay time due to routing) =
(Processing time from request source to intermediate station) +
(Processing time from intermediate station to request destination)

(1) Processing time from request source to intermediate station

This is the transmission delay time taken for data to be transmitted from the request source (station executing the ZNRD/ZNWR instruction) to the intermediate station that routes the data; in the example in Fig. 9.6, it is the time taken for data transmission from station 1Mp1 to station 1Ns3. Calculate this processing time by using the formula for calculating the transmission delay time in a two-tier system given in section 9.2.1.

(2) Processing time from the intermediate station to the request destination

This is the transmission delay time taken for data to be transmitted from the intermediate station to the request destination (the station accessed by the ZNRD/ZNWR instruction); in the example in Fig. 9.6, it is the time taken for data transmission from station 2Mp1 to station 2Ns3.
Calculate this processing time by using the formula for calculating the transmission delay time in a two-tier system given in section 9.2.1.

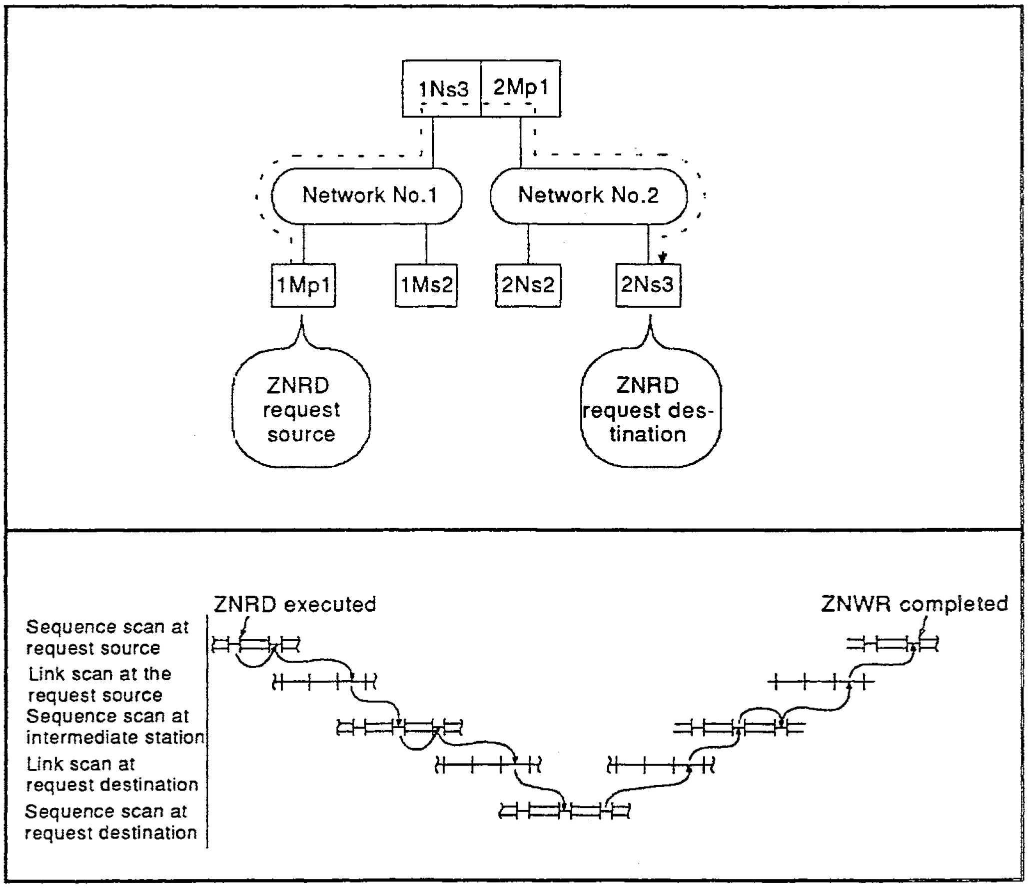


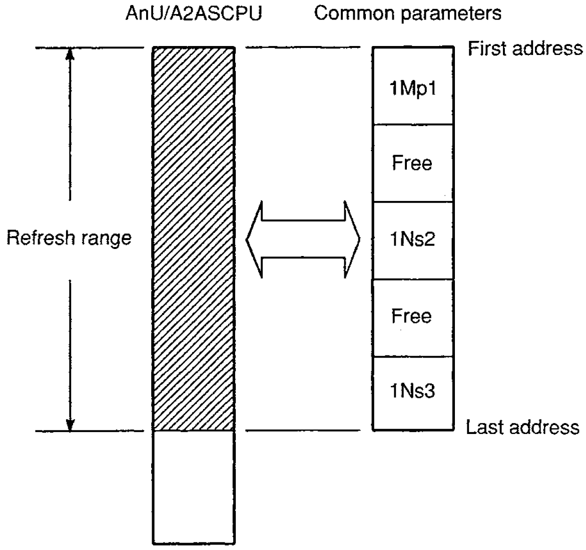
Fig. 9.6 Transmission Delay Due to Routing

9.2.4 How to reduce the link refresh time

The link refresh time can be reduced by setting the network refresh and common parameters to decrease the number of refresh points to the AnU/A2ASCPU.

(1) Concept of refresh range

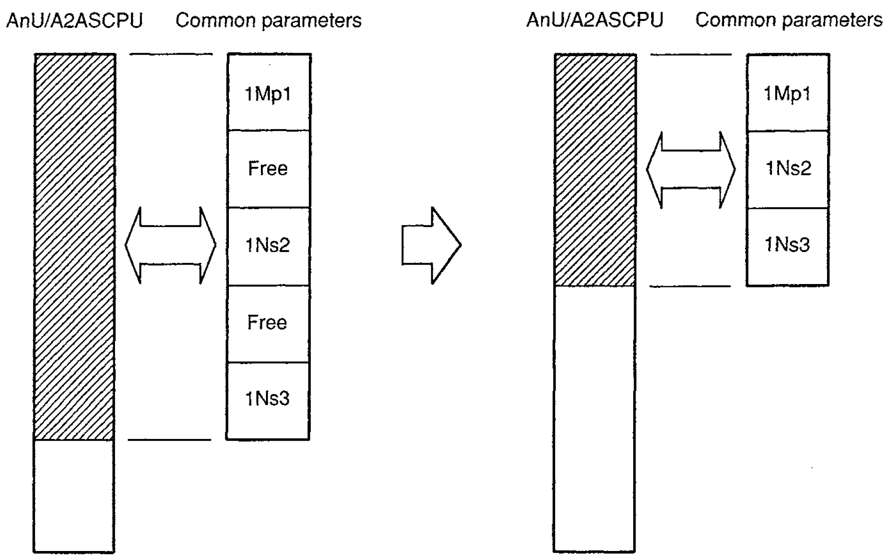
The all station (1Mp1 to 1Ns3) range "first address to last address" set in the common parameters is refreshed.
The free spaces are also refreshed.



(2) How to reduce the link refresh time

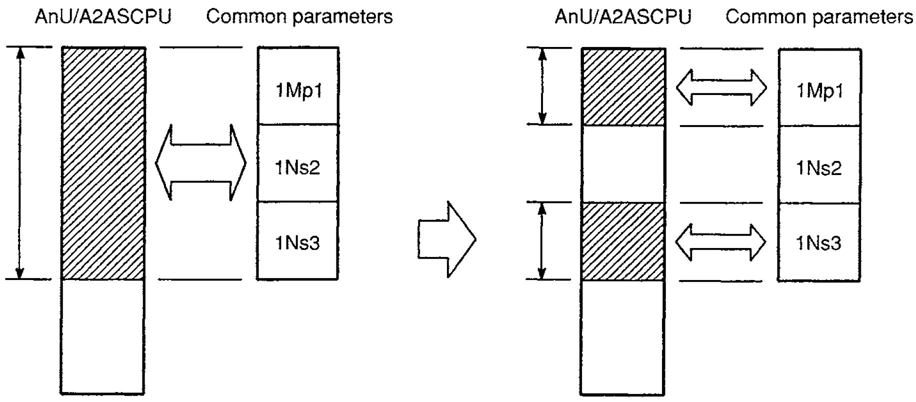
(a) By common parameter setting
Set the ranges of the stations (1Mp1, 1Ns2, 1Ns3) without free spaces.

<Before change> <After change>



(b) By network refresh parameter setting
Since you can set "two" network refresh parameters, refresh only the areas necessary for the host.

<Before change> <After change>



↕ ····· Network refresh parameter setting range

10. NETWORK SETTINGS

The network settings (parameter settings) have to be set before a MELSECNET/10 network can be put into operation. This chapter describes the settings that can be made at AnUCPUs. For details on the parameters for composite systems comprising AnN/AnUCPUs, see chapter 11.

- Network settings
  - Data link parameters
    - "Set number of modules" settings
    - Network refresh parameters
    - Common parameters
    - Station specific parameters
    - Transfer parameters for data link
  - Routing parameters
  - Default parameters (common parameters set by switch settings)

Note that it is not possible to set data link parameters for AnNCPUs and AnACPUs connected in a MELSECNET/10 network.
For details on the procedures used to set the various parameters, refer to the operating manual for the GPP function software package.

10.1 Data Link Parameters

These are the parameters set in order to execute cyclic transmission using B/W and X/Y devices. There are five types of data link parameters: the "set number of modules" settings, the network refresh parameters, the common parameters, the station specific parameters, and the transfer parameters for data link.
The parameters that have to be set for the control station and normal stations in different system configurations are described in chapter 7.

10.1.1 "Set number of modules" settings

These settings include the number of network modules mounted on the AnUCPU, and the head I/O numbers of modules.
It is essential to set these settings for the control station and for normal stations.

(1) Setting item

(a) Number of network modules
Set the number of network modules and data link modules mounted on the AnUCPU.
Setting range: 1 to 4.

(b) Effective module number
Set the module to be accessed when the system is accessed from a peripheral device (SW4GP-GPPAEE, SW0IX-GPPAE, etc.) or special function module (AJ71C24-S8, AD51H-S3, etc.) that is not AnUCPU-compatible.
Setting range: 1 to 4.

(c) Head I/O number
Set the head I/O numbers for the mounted network modules and data link modules (set the highest 3 digits of the four-digit hexadecimal expression of the I/O numbers).
For example, if the head I/O number is X/Y50 to 6F, set "5".

(d) Network module type
Set the type of the mounted network module or data link module (select one of the types indicated below).
1: MELSECNET/10 (default parameters)
.... Common parameters set by switch settings.
2: MELSECNET/10 (control station)
.... Common parameters set by peripheral device.
3: MELSECNET/10 (normal station)
4: MELSECNET/10 (remote I/O master) .... Conventional plan
5: MELSECNET II (master station)
6: MELSECNET II (local station)

(e) Network number
Set the network number within the range 1 to 255. Set the same number as has been set using the network module's network number setting switches.
There is no need to set this number if the network module type is MELSECNET II.

REMARK

When configuring a data link using the default parameters, set "1: MELSECNET/10 (default parameters)" for the control station and "3: MELSECNET/10 (normal station)" for normal stations.

(2) Setting example

An example showing how to set the "set number of modules" settings is presented below.

(a) Example system configuration

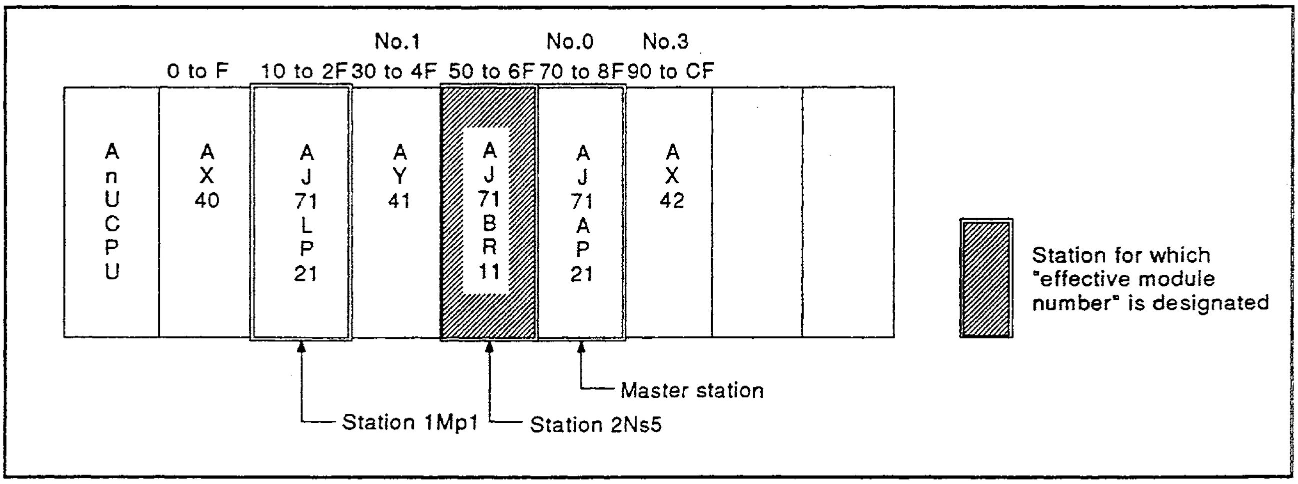


Fig. 10.1 Example System Configuration

(b) Setting screen

Figure 10.2 shows the setting screen that corresponds to the example system configuration shown above.

<SET NUMBER OF MODULES>

NUMBER OF NETWORK MODULES (1-4) [3]

EFFECTIVE MODULE NUMBER [2]

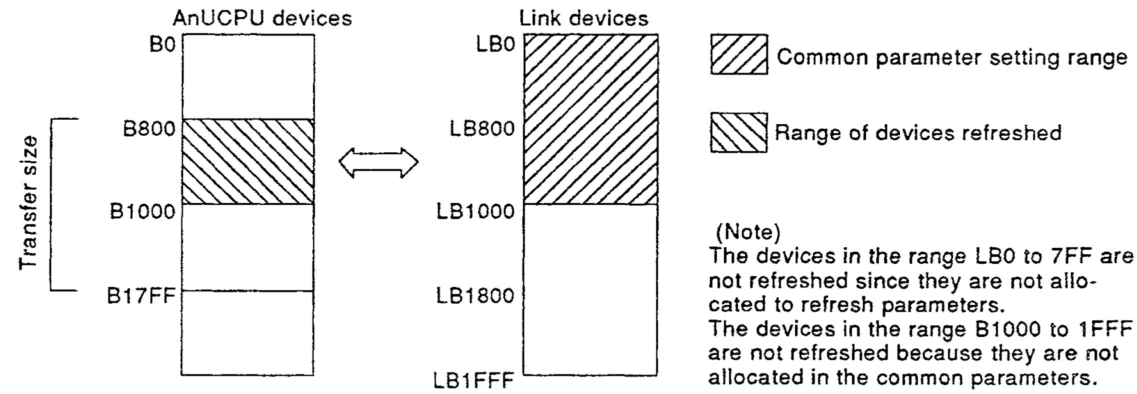
	MODULE NO. 1	MODULE NO. 2	MODULE NO. 3	MODULE NO. 4
HEAD I/O NO.	[01]	[05]	[07]	[ ]
NETWORK MODULE TYPE	MELSECNET/10 CONTROL STATION	MELSECNET/10 NORMAL STATION	MELSECNET II MASTER STATION	
NETWORK NO.	[1]	[2]	----	[ ]

End: SET Esc: Close

Fig. 10.2 Number of Modules Setting Screen

10.1.2 Network refresh parameters

The network refresh parameters are used to transfer the link devices (LB, LW, LX, LY) and data link communication statuses (SB, SW) stored in a network module to devices that can be used by the sequence program.
The settings made for the network refresh parameters are the head link device number of the network module, the head device number of the AnUCPU, and the transfer size. The following will be refreshed in accordance with these settings: the number of points specified by the "transfer size", starting from the set head link device number, and the range of points allocated in the common parameters.
For example, if the settings are as follows...
Head link device number: LB800
Head device number: B800
Transfer size: 4096 points
Common parameter allocation range: LB0 to 0FFF
...the data stored in devices LB800 to FFF of the network module will be stored in devices B800 to FFF of the AnUCPU.



(Note)
The devices in the range LB0 to 7FF are not refreshed since they are not allocated to refresh parameters.
The devices in the range B1000 to 1FFF are not refreshed because they are not allocated in the common parameters.

(1) Defaults

The defaults for the network refresh parameters are allocated in accordance with the "set number of modules" settings.
If the defaults can be used, there is no need to set the network refresh parameters.
The defaults are indicated in Table 10.1. The module numbers correspond to the numbers set in the "set number of modules" settings.
Note that a MELSECNET II data link module is always allocated to the module No.1 area. If two MELSECNET II data link modules are installed, they will share the module No.1 area.

Table 10.1 Defaults for Network Refresh Parameters

No. of Modules Installed \ Module	Module No.1	Module No.2	Module No.3	Module No.4
1	LB/LW0 to 1FFF→ B/W0 to 1FFF SB0 to FF→ Y1C00 to 1CFF SW0 to FF→ D7168 to 7423	—	—	—
2	LB/LW0 to FFF→ B/W0 to FFF SB0 to FF→ Y1C00 to 1CFF SW0 to FF→ D7168 to 7423	LB/LW1000 to 1FFF→ B/W0 to 1FFF SB0 to FF→ Y1D00 to 1DFF SW0 to FF→ D7424 to 7679	—	—
3	LB/LW0 to 7FF→ B/W0 to 7FF SB0 to FF→ Y1C00 to 1CFF SW0 to FF→ D7168 to 7423	LB/LW800 to FFF→ B/W800 to FFF SB0 to FF→ Y1D00 to 1DFF SW0 to FF→ D7424 to 7679	LB/LW1000 to 17FF→ B/W1000 to 17FF SB0 to FF→ Y1E00 to 1EFF SW0 to FF→ D7680 to 7935	—
4	LB/LW0 to 7FF→ B/W0 to 7FF SB0 to FF→ Y1C00 to 1CFF SW0 to FF→ D7168 to 7423	LB/LW800 to FFF→ B/W800 to FFF SB0 to FF→ Y1D00 to 1DFF SW0 to FF→ D7424 to 7679	LB/LW1000 to 17FF→ B/W1000 to 17FF SB0 to FF→ Y1E00 to 1EFF SW0 to FF→ D7680 to 7935	LB/LW1800 to 1FFF→ B/W1800 to 1FFF SB0 to FF→ Y1F00 to 1FFF SW0 to FF→ D7936 to 8191

When a MELSECNET II data link module is installed, the defaults for the network refresh parameters are allocated to it in the following way:

1) The module is allocated the module No.1 area.
2) If two MELSECNET II data link modules are installed they will share the same module area.
3) Since there is no SB/SW data stored in a MELSECNET II data link module, this data is not refreshed.
   The MELSECNET II data link information is stored in devices M/D9200 to 9255.
4) The data of MELSECNET II devices LX/LY000 to 7FF is allocated to the area X/Y000 to 7FF.

For example, if, as shown in the example in Figure 10.3, a MELSECNET II master station is set as network module No.3 in the "set number of modules" settings, the defaults for the network refresh parameters will be allocated as follows.

1) The MELSECNET II master station set as module No. 3 in the "set number of modules" settings is allocated to the module No.1 area in Table 10.1.
2) The MELSECNET/10 control station set as module No.1 in the "set number of modules settings is allocated to the module No.2 area in Table 10.1.
3) The MELSECNET/10 normal station set as module No.2 in the "set number of modules" settings is allocated to the module No.3 area in Table 10.1.

"Set Number of Modules" Settings

	Module No.1	Module No.2	Module No.3	Module No.4
Head I/O No.	[01]	[05]	[07]	[ ]
Network module type	MELSECNET/10 control station	MELSECNET/10 normal station	MELSECNET II master station	
Network No.	[1]	[2]	----	[ ]

Defaults for Network Refresh Parameters

Module Type	MELSECNET/10 Control Station (Module No.1)	MELSECNET/10 Normal Station (Module No.2)	MELSECNET II Master Station (Module No.3)
Refresh range	LB/LW800 to FFF→ B/W800 to FFF SB0 to FF→ Y1D00 to 1DFF SW0 to FF→ D7424 to 7679	LB/LW1000 to 17FF→ B/W1000 to 17FF SB0 to FF→ Y1E00 to 1EFF SW0 to FF→ D7680 to 7935	LB/LW0 to 7FF→ B/W0 to 7FF

Fig. 10.3 Default Ranges for Network Refresh Parameters

(2) Item to be set

The following are set in the network refresh parameters: the refresh ranges for LB, LW, LX, LY, SB, and SW, and the error list area setting. Each of these settings is described below.
Table 10.2 shows the network refresh parameter settings for MELSEC-NET/10 and MELSECNET II.

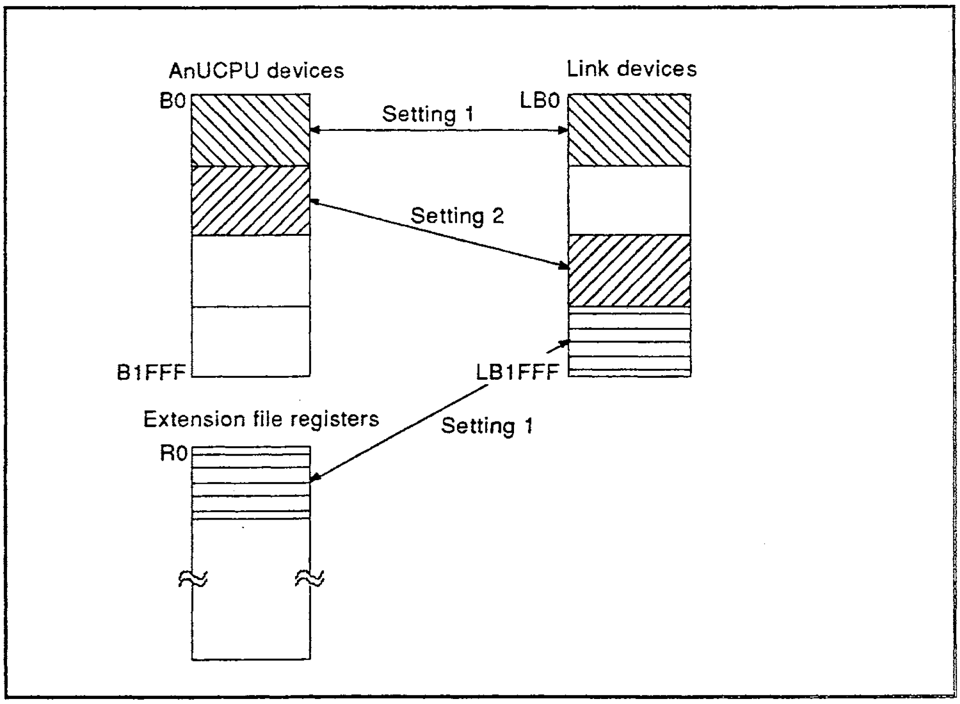
Table 10.2 Network Refresh Parameter Settings.

Item	MELSECNET/10		MELSECNET II	
	Setting 1	Setting 2	Setting 1	Setting 2
LB ↔ B transfer	O	O	O	×
LW ↔ W transfer	O	O	O	×
LX ↔ X transfer	O	O	O	×
LY ↔ Y transfer	O	O	O	×
SB transfer device	O	×	×	×
SW transfer device	O	×	×	×
LB ↔ extension file register transfer	O	×	×	×
LW ↔ extension file register transfer	O	×	×	×
Error list area setting	O	×	×	×

O: Setting possible ×: Setting not possible

(a) LB refresh range setting

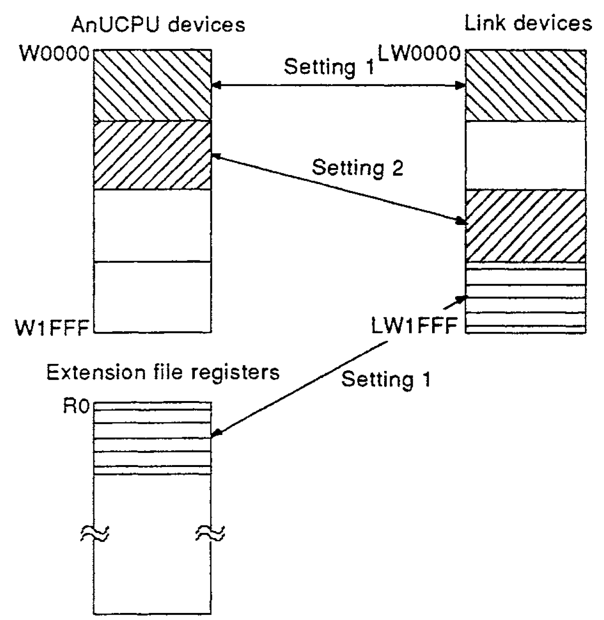
1) The LB refresh destinations are link relays (B) and extension file registers (R).
Two ranges can be set for "LB ↔ B transfer"; setting 1 and setting 2. "LB ↔ extension file register transfer" can also be set.



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

(b) LW refresh range setting

1) The LW refresh destinations are link registers (W) and extension file registers (R).
Two ranges can be set for "LW ↔ W transfer"; setting 1 and setting 2. "LW ↔ extension file register transfer" can also be set.



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

(c) LX/LY refresh range setting

1) The LX refresh destinations are inputs (X) and the LY refresh destinations are outputs (Y).
The inputs/outputs that can be set as destinations are those from the actual I/O range onward.
Note that other allocations are also made in this area in the following cases and care must be taken to avoid double allocations.
   - When two I/O master stations are set.
   - When two or more network modules are installed and another network module is set as an I/O master station.
   - When a MELSECNET remote I/O station is allocated.
   - When allocations are made for the MELSECNET/MINI automatic refresh setting.

2) The transfer size is set in 16 point units.

(d) SB refresh range setting

1) The SB refresh destinations are inputs (X), outputs (Y), internal relays (M), latch relays (L), step relays (S), link relays (B), timers (T), counters (C), data registers (D), and link registers (W).

2) The transfer size is set in 16 point units.

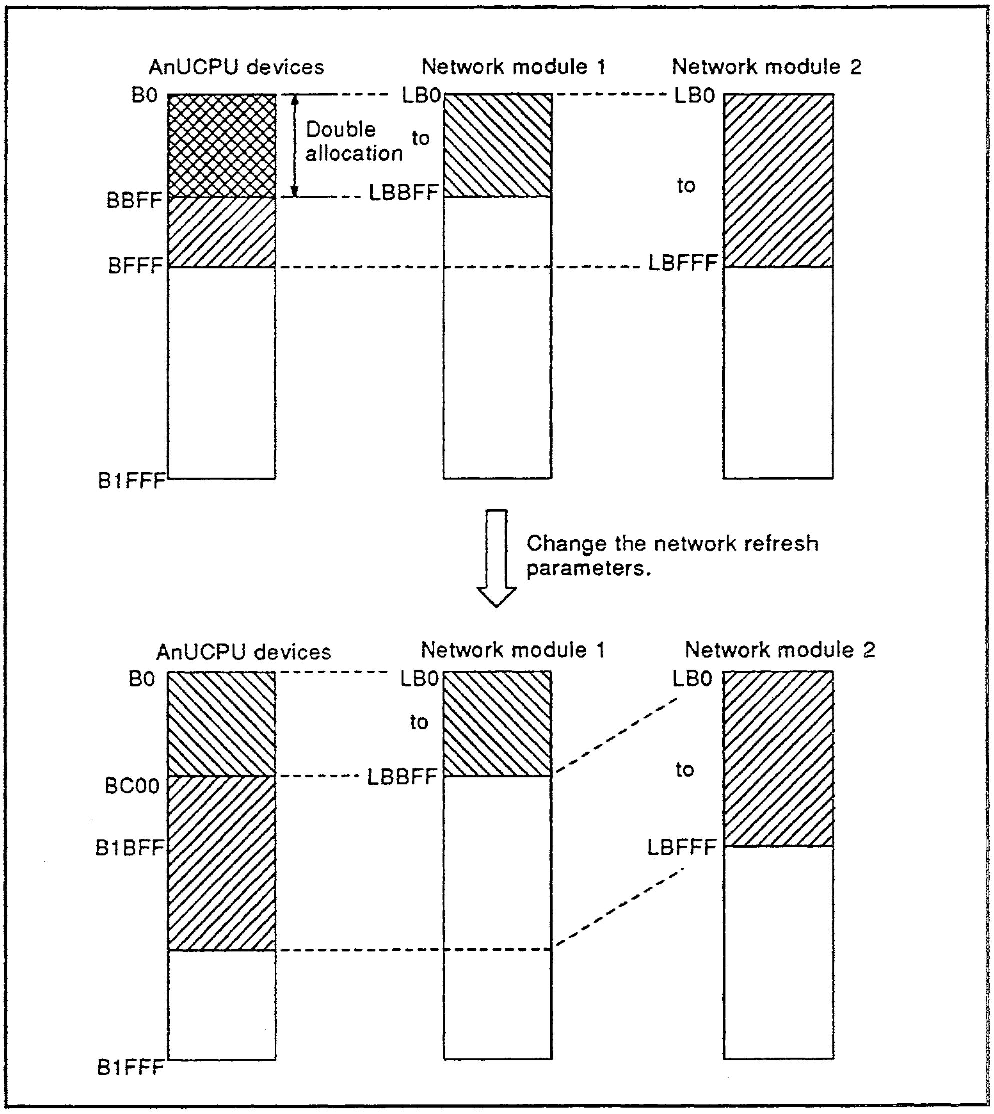
(e) SW refresh range setting

1) The SW refresh destinations are timers (T), counters (C), data registers (D), and link registers (W).

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

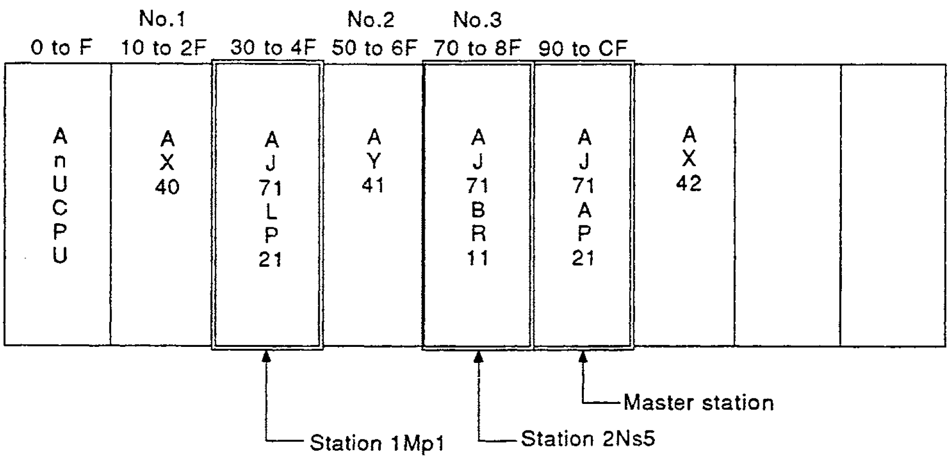
(f) Error list area setting
   1) This setting determines whether the data in the error list area (SB/SWC0 to FF) is overwritten or preserved.
   2) If OVERWRITE is set, the area will store the newest information. If HOLD is selected, the area will store the oldest information.

(3) Network refresh parameter settings when more than one network module is installed.
   (a) Network refresh parameters must be set for all the network modules and data link modules mounted to an AnCPU.
   (b) Take care to avoid double allocations when setting the device ranges for refresh destinations.



(4) Setting example

This example shows the network parameter settings made to allocate the refresh ranges indicated in Table 10.3 for the system configuration shown in Figure 10.4.



"Set Number of Modules" Settings

	Module No.1	Module No.2	Module No.3	Module No.4
Head I/O No.	[01]	[05]	[07]	[ ]
Network Module Type	MELSECNET/10 control station	MELSECNET/10 normal station	MELSECNET II master station	
Network No.	[1]	[2]	----	[ ]

Fig. 10.4 Example System Configuration

Table 10.3 Refresh Ranges

Module Type	MELSECNET/10 Control Station (Module No.1)	MELSECNET/10 Normal Station (Module No.2)	MELSECNET II Master Station (Module No.3)
Refresh range	LB/LW800 to FFF→ B/W800 to FFF SB0 to FF→ Y1D00 to 1DFF SW0 to FF→ D7424 to 7679	LB/LW1000 to 17FF→ B/W1000 to 17FF SB0 to FF→ Y1E00 to 1EFF SW0 to FF→ D7680 to 7935	LB/LW0 to 7FF→ B/W0 to 7FF LX/LY0 to 7FF→ X/Y0 to 7FF

(b) Setting screen

1) Settings for network module No.1

<NETWORK REFRESH PARAMETER>

SETTING FOR OTHER MODULES

ERROR AREA

1	2	3	

1: HOLD
2: HOLD
3:
4:

[SETTING 1] NETWORK MODULE NO. 1

<ERROR LIST AREA SETTING>

SET CONDITION (SW00F0 TO 00FF) OF ERROR LIST AREA.
0: HOLD 1: OVERWRITE

MELSECNET/10 (CONTROL)	HEAD I/O NO. 01	NETWORK NO. 1
LB↔B TRANSFER	HEAD LB [0800]↔HEAD B [0800]	TRANSFER SIZE [0800] H POINTS
LW↔W TRANSFER	HEAD LW [0800]↔HEAD W [0800]	TRANSFER SIZE [0800] H POINTS
LX↔X TRANSFER	HEAD LX [0000]↔HEAD X [0000]	TRANSFER SIZE [0000] H POINTS
LY↔Y TRANSFER	HEAD LY [0000]↔HEAD Y [0000]	TRANSFER SIZE [0000] H POINTS
SB TRANSFER DEVICE	HEAD SB [0000]→DESTINATION [Y1D00]	TRANSFER SIZE [100] H POINTS
SW TRANSFER DEVICE	HEAD SW [0000]→DESTINATION [D7424]	TRANSFER SIZE [100] H POINTS
LB↔EXTENSION TRANSFER	HEAD LB [0000]↔BLOCK [0] HEAD NO. [0]	TRANSFER SIZE [0000] H POINTS
LW↔EXTENSION TRANSFER	HEAD LW [0000]↔BLOCK [0] HEAD NO. [0]	TRANSFER SIZE [0000] H POINTS
ERROR AREA	HOLD	

Change module number: Shift + F1, F2, F3, F4 End: SET Esc: Close

2) Settings for network module No.2

<NETWORK REFRESH PARAMETER>

SETTING FOR OTHER MODULES

ERROR AREA

1	2	3	

1: HOLD
2: HOLD
3:
4:

[SETTING 1] NETWORK MODULE NO. 2

<ERROR LIST AREA SETTING>

SET CONDITION (SW00F0 TO 00FF) OF ERROR LIST AREA.
0: HOLD 1: OVERWRITE

MELSECNET/10 (NORMAL)	HEAD I/O NO. 05	NETWORK NO. 2
LB↔B TRANSFER	HEAD LB [1000]↔HEAD B [1000]	TRANSFER SIZE [0800] H POINTS
LW↔W TRANSFER	HEAD LW [1000]↔HEAD W [1000]	TRANSFER SIZE [0800] H POINTS
LX↔X TRANSFER	HEAD LX [0000]↔HEAD X [0000]	TRANSFER SIZE [0000] H POINTS
LY↔Y TRANSFER	HEAD LY [0000]↔HEAD Y [0000]	TRANSFER SIZE [0000] H POINTS
SB TRANSFER DEVICE	HEAD SB [0000]→DESTINATION [Y1E00]	TRANSFER SIZE [100] H POINTS
SW TRANSFER DEVICE	HEAD SW [0000]→DESTINATION [D7680]	TRANSFER SIZE [100] H POINTS
LB↔EXTENSION TRANSFER	HEAD LB [0000]↔BLOCK [0] HEAD NO. [0]	TRANSFER SIZE [0000] H POINTS
LW↔EXTENSION TRANSFER	HEAD LW [0000]↔BLOCK [0] HEAD NO. [0]	TRANSFER SIZE [0000] H POINTS
ERROR AREA	HOLD	

Change module number: Shift + F1, F2, F3, F4 End: SET Esc: Close

3) Settings for network module No.3

<NETWORK REFRESH PARAMETER>

SETTING FOR OTHER MODULES

LX/LY↔X/Y TRANSFER 1:

2:

1	2	3	

3: 0000-07FF

4:

[SETTING 1] NETWORK MODULE NO. 3

<LX/LY↔X/Y TRANSFER>

HEAD NO. OF LX/LY (SOURCE) : 0 (FIXED)
SET HEAD NO. AND TRANSFER SIZE (16 POINTS UNIT) OF LX/LY (SOURCE)

MELSECNET/II (MASTER)	HEAD I/O NO. 07	NETWORK NO. ----
LB↔B TRANSFER	HEAD LB [0000]↔HEAD B [0000]	TRANSFER SIZE [0800] H POINTS
LW↔W TRANSFER	HEAD LW [0000]↔HEAD W [0000]	TRANSFER SIZE [0800] H POINTS
LX/LY↔X/Y TRANSFER	HEAD LX/LY [0000]↔HEAD X/Y [0000]	TRANSFER SIZE [0800] H POINTS

Change module number: Shift + F1, F2, F3, F4 End: SET Esc: Close

10.1.3 Common parameters

These parameters are used to make settings including the ranges of LB/LW and LX/LY data that can be sent by each station in cyclic transmission.
They are also used for settings relating to transient transmission and communication errors.
These parameters must be set for control stations.

(1) Items to be set

(a) Total number of link stations

Set the total number of stations (including control stations and reserve stations) connected in the network.
The setting range is 1 to 64.

(b) W.D.T.

Set the watch dog time that is used to determine whether cyclic transmission between a control station (sub-control station) and a normal station has been completed normally.
The watch dog time can be set in the range 10 to 2000 ms but must be longer than the link scan time.
Usually, the default (2000 ms) is left unchanged.

(c) LB/LW transmission range for each station

1) Allocate the range for LBs that can be sent by each station in 16 point units (LB[ ][ ][ ]0 to [ ][ ][ ]F).

The setting range is LB0000 to 1FFF.

2) Allocate the range for LWs that can be sent by each station in 1 point units.

The setting range is LW0000 to 1FFF.

3) The maximum number of link points per station is 2000 bytes.

The total number of LB, LW and LY devices allocated to one station must conform to the following condition.

$$\boxed{\frac{LB + LY}{8} + (2 \times LW) \leq 2000 \text{ bytes}}$$

(d) I/O master station setting

Set the master station when X/Y communication is executed. There is no need to set anything here if X/Y communication is not executed.

1) Any AnUCPU station can be set as an I/O master station; it does not matter if it is a control station or a normal station.

It is not possible to set an AnNCPU or AnACPU as an I/O master station.

2) The I/O master station can be set at one of two locations - block 1 and block 2.

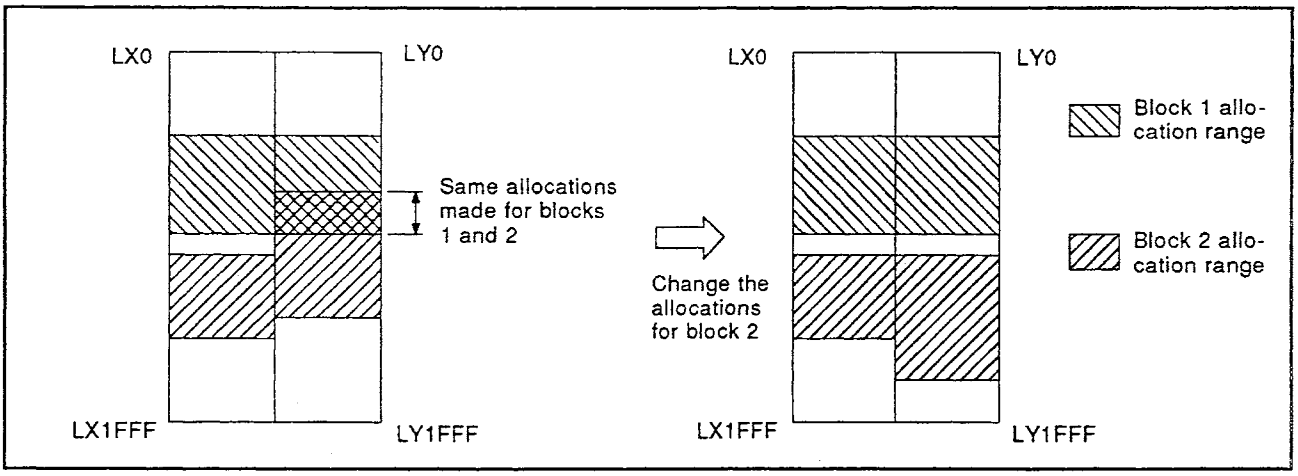
(e) LX/LY communication range for each station

1) This is the allocation set to perform 1 to 1 communication between an I/O master station and another station using LX and LY devices.

2) LX/LY devices are allocated in 16 point units (LX/LY[ ][ ][ ]0 to [ ][ ][ ]F).

The setting range is LX/LY0000 to 1FFF.

3) Do not set the same allocations for block 1 and block 2 when setting the device ranges allocated to each station.



(f) Setting reserve stations

1) Set reserve stations for station numbers at which stations are to be connected in the near future.

Since reserve stations cannot be accessed, they have no effect on link scan time.

2) The reserve station status can also be set for a station that is actually connected. In this case, the relevant station will not take part in cyclic transmission or transient transmission.

(g) Setting extensions

1) Constant link scan

Set this item to maintain a constant link scan time.
The setting range for the watch dog time is 10 to 2000 ms and a longer time must be set for the watch dog time than for the link scan time.
The link scan time is set in 10 ms units.

Setting	Constant Link Scan Function
0 ms	Not executed
1 to 500 ms	Executed in 1 to 500 ms range

2) Maximum number of transient transmissions per scan

- Set the number of transient transmissions that can be executed in one link scan (the total number of transient transmissions for all stations).
- The setting range is 1 to 16. (The default is "2".)

Setting a higher value for this item enables execution of transient transmissions from multiple stations.
The drawback is that the link scan time is lengthened.

3) Maximum number of returned stations per scan

- Set the number of stations that can be returned by the automatic return function (after clearance of a communication error) in one scan.
- The setting range is 1 to 16. (The default is "2".)

Setting a higher value for this item enables the return of multiple faulty stations during a single scan.
The drawback is that the link scan time is lengthened.

4) Multiplex transmission

- Set whether the multiplex transmission function is executed or not if using a fiber-optic loop system.
- The default specifies that multiplex transmission is not executed.

(h) Communication error setting

1) Data link operation by a sub control station when control station is down

- Set whether the control station shift function is to be executed or not.
- The default specifies that the function is effective.

REMARK

In order to make inputting the number of points allocated to each station easier, two operations are available when setting the common parameters for peripheral devices - "uniform allocation" and "allocation with number of points designation".

(1) Uniform allocation

Only the number of stations and number of points to be allocated are input.
All stations are automatically allocated the same number of points.
This operation is convenient when there are a large number of stations and the same number of points is to be set for each station.

(2) Allocation with number of points designation

Only the number of points to be allocated to each station is input.
The range of devices is automatically allocated at each station.
This operation is convenient because only the number of points to be allocated to each station has to be decided; there is no need to decide the device ranges.

(2) Setting example

(a) System configuration

The example presented here describes the common parameter settings for a system with the configuration shown in Fig. 10.5.

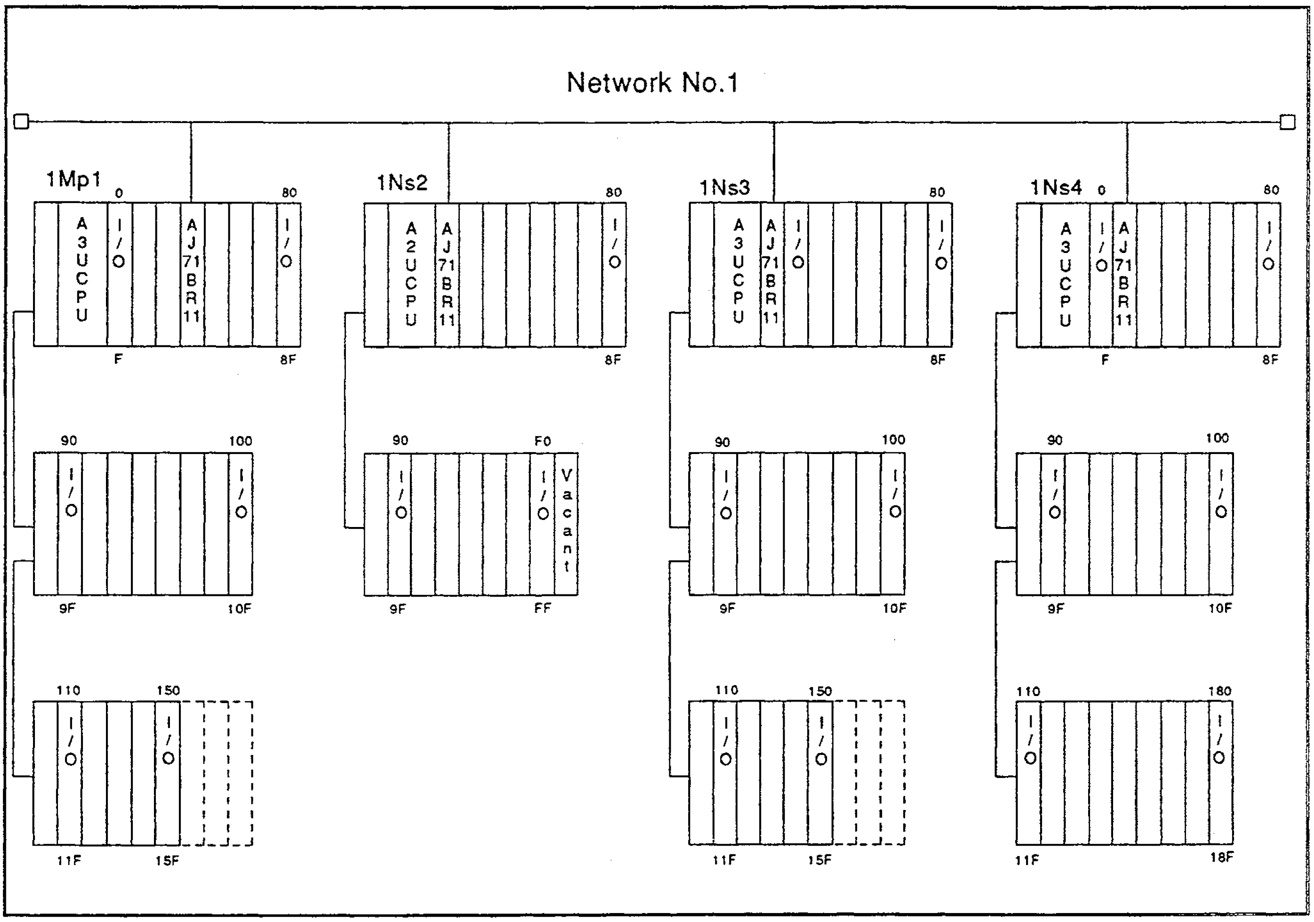


Figure 10.5 Example System Configuration

(b) LB/LW allocations

In this example, 512 points for LB/LW devices are to be allocated to each station.
Fig. 10.6 shows the send area (the range of points that the host station can write to and from in which data can be sent to the other station) and the receive area (the range of points that the other station can write to and from in which data can be received by the host station) for each station.
Fig. 10.7 shows the screen for setting the LB/LW common parameters.

		Station 1Mp1		Station 1Ns2		Station 1Ns3		Station 1Ns4	
		Send	Receive	Send	Receive	Send	Receive	Send	Receive
LB/LW0	1Mp1	o	o	x	o	x	o	x	o
LB/LW200	1Ns2	x		o		x		x	
LB/LW400	1Ns3	x		x		o		x	
LB/LW600	1Ns4	x		x		x		o	
LB/LW800		–	–	–	–	–	–	–	–

Receive: Indicates the area from which data written by another station can be received by the host station.
Send: Indicates the area that the host station can write to and from in which data can be received by other stations.

Fig. 10.6 Example LB/LW Allocations

<COMMON PARAMETER (MELSECNET/10) PC TO PC NETWORK> PARA. NAME:

NETWORK MODULE NO.
1

REFRESH PARAMETER SETTING — Size
LB ↔ B(1) 0000 - 1FFF 8192
LB ↔ B(2) -
LW ↔ W(1) 0000 - 1FFF 8192
LW ↔ W(2) -

TOTAL NUMBER OF LINK STATIONS	W.D.T. ×10ms
4	200

NORMAL STATION NO.	RANGE OF EACH STATION LB	RANGE OF EACH STATION LW
1	0000-01FF	0000-01FF
2	0200-03FF	0200-03FF
3	0400-05FF	0400-05FF
4	0600-07FF	0600-07FF
	—	—
	—	—
	—	—

Page Up/Page Down Change module: Shift + F1, F2, F3, F4, End: Check SET Esc: Close

Fig. 10.7 Screen for Setting LB/LW Common Parameters

(C) LX/LY allocations

In this example, 1Ns2 is regarded as the I/O master station and 256 points are allocated for communication with station 1Mp1 and station 1Ns4.
Fig. 10.8 shows possible LX/LY allocations in this case. The "actual I/O range" in the figure indicates the range of host station I/O device numbers used to install I/O modules and special function modules.
If the link area with the I/O master station is allocated in the area past the actual I/O range, it is possible to allocate LX/LY device numbers that are the same as the X/Y device numbers of the ACPU.
It is possible to use the actual I/O range as the link area with the I/O master station but in this case it is necessary to set the network refresh parameters so that the LX/LY devices in the link area are refreshed outside the actual I/O range.
Fig. 10.9 shows the screen on which the LX/LY common parameters are set.

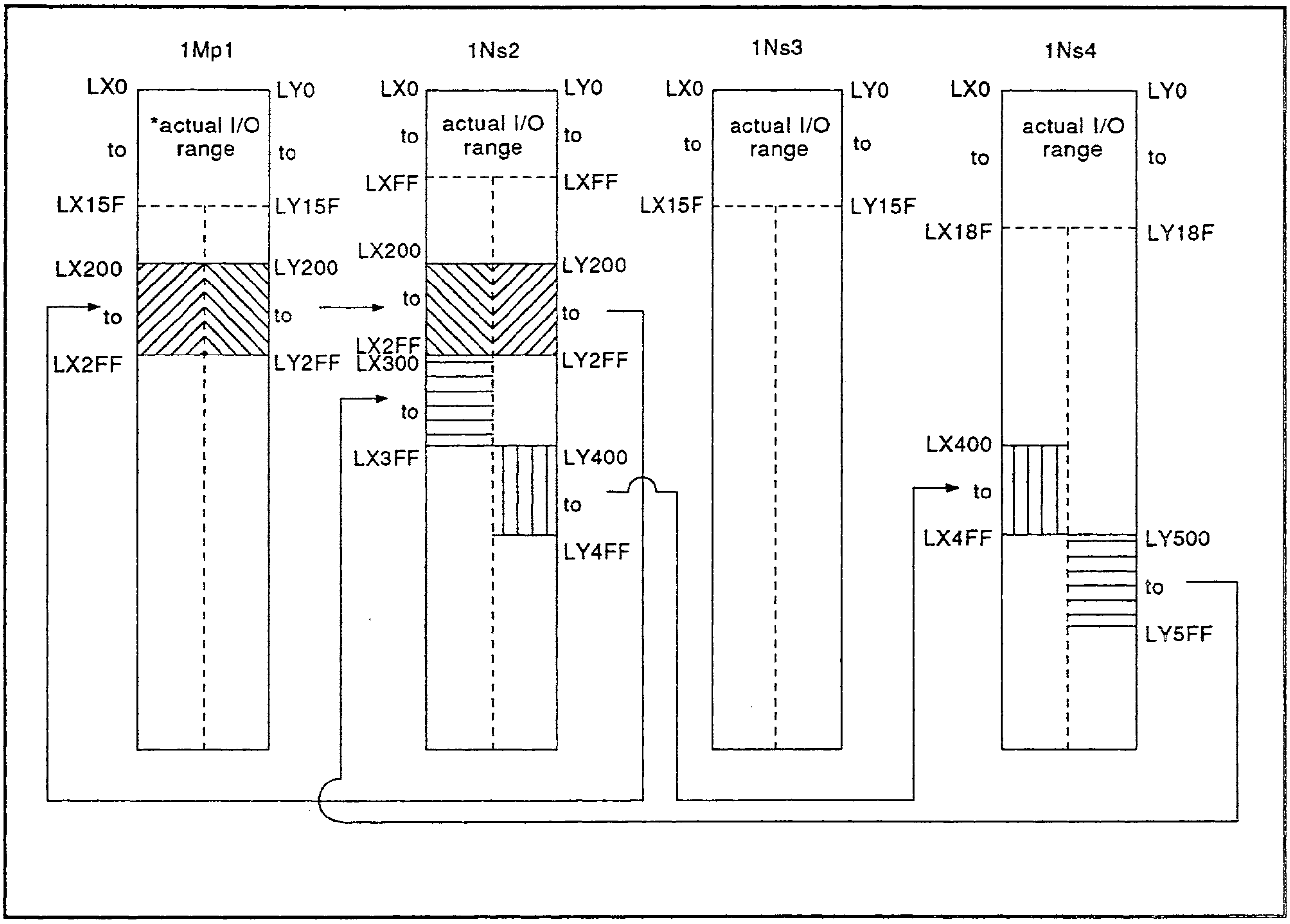


Fig. 10.8 LX/LY Allocation Range

<COMMON PARAMETER (MELSECNET/10) PC TO PC NETWORK> PARA. NAME:

NETWORK MODULE NO.
1

REFRESH PARAMETER SETTING		Size
LX ↔ X(1)	0200 - 02FF	256
LX ↔ X(2)	-	
LY ↔ Y(1)	0200 - 02FF	256
LY ↔ Y(2)	-	

TOTAL NUMBER OF LINK STATIONS	W.D.T. ×10ms
4	200

I/O MASTER STATION SETTEING
2

NORMAL STATION NO.	RANGE OF EACH STATIONS (M→L)		RANGE OF EACH STATIONS (M←L)	
	LY (1)	LX (1)	LX (1)	LY (1)
MASTER 1	0200-02FF	0200-02FF	0200-02FF	0200-02FF
2	—	—	—	—
3	—	—	—	—
4	0400-04FF	0400-04FF	0300-03FF	0500-05FF
	—	—	—	—
	—	—	—	—
	—	—	—	—

Page Up/Page Down Change module: Shift + F1, F2, F3, F4, End: Check SET Esc: Close

Fig. 10.9 Screen for Setting LX/LY Common Parameters

10.1.4 Station specific parameters

These are the parameters used to change the locations at which the LB/LW devices allocated to each station by the common parameters are stored in the network module.

If it becomes necessary to expand the LB/LW allocation range by changing the common parameters after a sequence program has already been created in accordance with the LB/LW range allocated to each station by the existing common parameters, the range can be expanded without changing the LB/LW range allocated to each station before the change by setting station specific parameters. This means that the range allocated before changing the common parameters can be used without alteration, which simplifies the changes to the sequence program.
For example, as shown in Fig. 10.10, if the range allocated to station 1Mp1 is to be extended by 128 points, the 128 point extension can be allocated to LB/LW 0400 to 047F without changing the LB/LW 0000 to 03FF range allocated before the change, by setting station specific parameters.

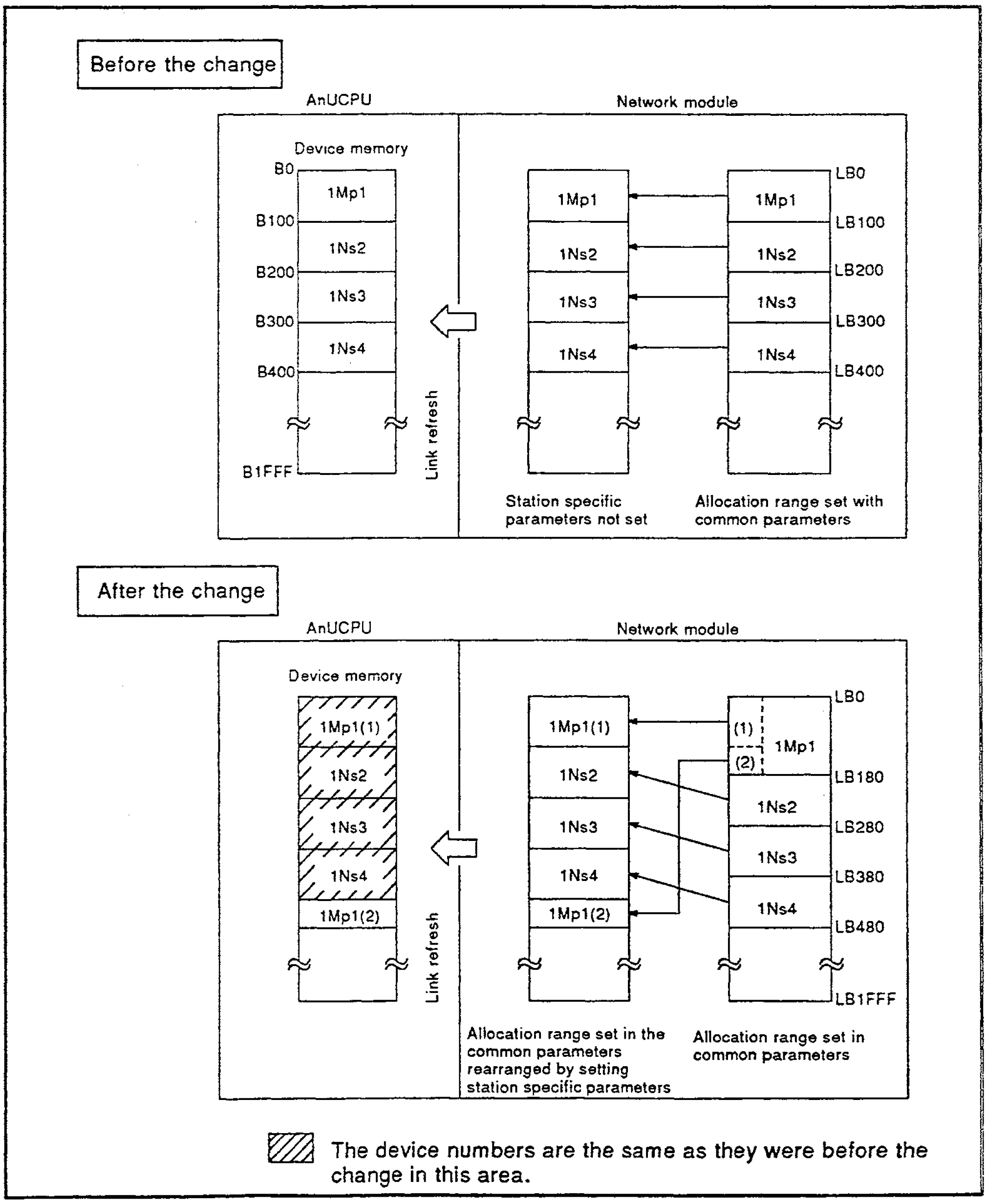


Fig. 10.10 Station Specific Parameter Setting Example

(1) Items to be set

(a) The station specific parameters can divide the LB/LW range allocated by the common parameters into two areas (setting 1, setting 2) for each station (station numbers 1 to 64)

Station specific parameters cannot be set for LX/LY or SB/SW devices.

(b) Station specific parameters are set only when it becomes necessary to change the allocation range set in the common parameters.

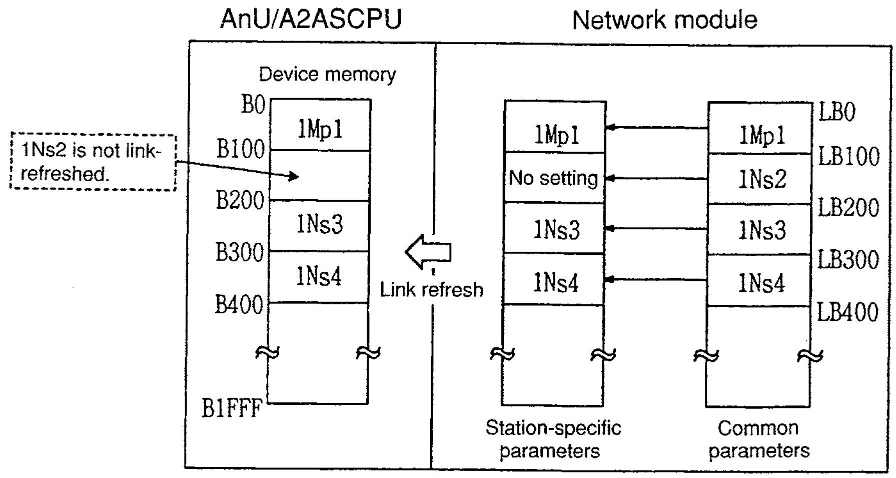
It is not necessary to set them if the range set by the common parameters is to be used without alteration.

(c) The station specific parameters can be set for control stations and normal stations.

However, they cannot be set for stations at which an AnNCPU or AnACPU is connected.

(d) The locations at which the range set by the common parameters is stored are only changed at stations for which station specific parameters are set.

For example, in the case of the system in Fig. 10.10, in order to set allocation to LB0400 to 047F at all the connected stations, the same station specific parameters would have to be set for stations 1Ms1, 1Ns2, 1Ns3, and 1Ns4.
In addition, the station that has no setting in its station-specific parameter setting field is not link-refreshed. (This is equivalent to the case where the number of link refresh points is set to 0.)



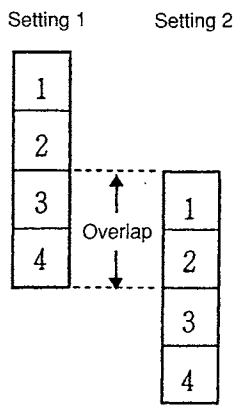
(e) When station specific parameters are set, the number of points allocated to each station must conform to the following formula.

Number of points for station specific parameter 1 (LB/LW setting 1)	+	Number of points for station specific parameter 2 (LB/LW setting 2)	≤	Number of points in common parameter setting

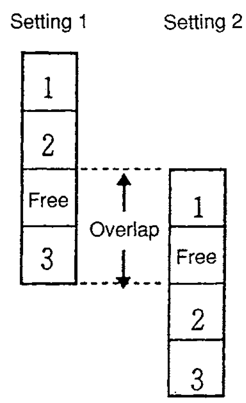
If the number of LB/LW points set in the station specific parameters exceeds the number of LB/LW points allocated to the host station by the common parameters of the control station, a matching error will occur (the PRM.E LED will light).

In addition, you cannot overlap the Setting 1 and Setting 2 ranges to make setting. In Setting 2, you may only set the last number or later of Setting 1.

[Example 1]



[Example 2]



(2) Setting example

This example shows the station specific parameter settings required to achieve the link device allocations shown in the "after the change" section of Fig. 10.10.
In this example the devices allocated to station 1Mp1 are increased by the 128 points from LB0 to 17F, while the device numbers allocated to stations 1Ns2, 1Ns3 and 1Ns4 are kept the same as they were before the change.

<STATION SPECIFIC PARAMETER (MELSECNET/10)> PARA. NAME:

NETWORK MODULE NO.
1

REFRESH PARAMETER SETTING

		Size
LY ↔ Y(1)	0000 - 1FFF	8192
LY ↔ Y(2)		

NO.	LB SET1	LB SET2	COMMON PARA. SET
1	0000-00FF	0400-047F	0000-017F
2	0100-01FF	—	0180-027F
3	0200-02FF	—	0280-037F
4	0300-03FF	—	0380-047F
5	—	—	—
6	—	—	—
7	—	—	—
8	—	—	—
9	—	—	—
10	—	—	—
11	—	—	—
12	—	—	—
13	—	—	—
14	—	—	—
15	—	—	—

Page Up/Page Down Change module: Shift + F1, F2, F3, F4, End: Check SET Esc: Close

10.1.5 Transfer parameters for data link

These are the parameters used for the function for data transfer between data links described in section 8.1.5.

(1) Information to be set

(a) Set the module number of the network module that is the transfer source and the LB/LW device range to be sent.

(b) Set the module number of the network module that is the transfer destination and the LB/LW device range that is to store the transferred data.

(c) Device numbers can be set within the range LB/LW0 to 1FFF, except in the case of MELSECNET II data link modules, for which the range is LB0 to FFF.

(2) Setting example

This example shows the transfer parameter for data link settings required to transfer data between network No.1 and network No.2.

(a) System configuration

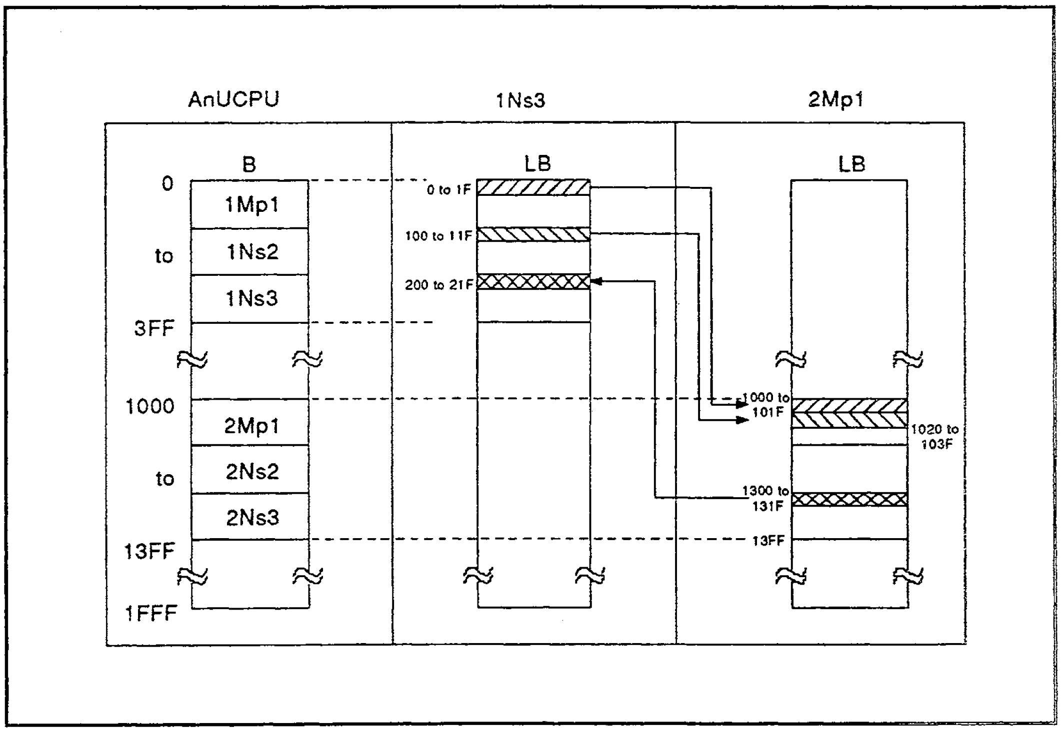


Fig. 10.11 Transfer Parameters for Data Link Setting Example

(b) Setting screen

<TRANSFER PARAMETER FOR DATA LINK>

NO.	1 NET/10 (00)	2 NET/10 (02)	3	4
1	LB0000 – 000F→	→LB1000 – 101F	–	–
2	LB0100 – 011F→	→LB1020 – 103F	–	–
3	LB0200 – 021F→	→LB1300 – 131F	–	–
4	–	–	–	–
5	–	–	–	–
6	–	–	–	–
7	–	–	–	–
8	–	–	–	–
9	–	–	–	–
10	–	–	–	–
11	–	–	–	–
12	–	–	–	–

End:SET Esc:Close

10.2 Routing Parameters

These are the parameters used to set the transmission route from the request source to the request destination when executing transient transmission to a station in another network.

(1) The information set using the routing parameters can be summarized as follows: "in order to reach the station in network No.( ), the data must pass through station No.Δ of network No.[ ] first".

(2) In the routing parameters, a relay destination network number and relay destination station number must be set for each transmission destination (request destination) network number.

<ROUTING PARAMETER>

NO.	DESTINATION NETWORK NO.	RELAY DESTINATION NETWORK NO.	RELAY DESTINATION STATION NO.
1			
2			
3			

Set the network number for the request destination here.

Set the number of the network through which the data must pass first before going to the request destination here.

Set the number of the relay station through which the data must pass before going to the request destination here.

(3) The settings made at each location for the routing function described in section 8.2.3 are shown in Fig. 10.12.

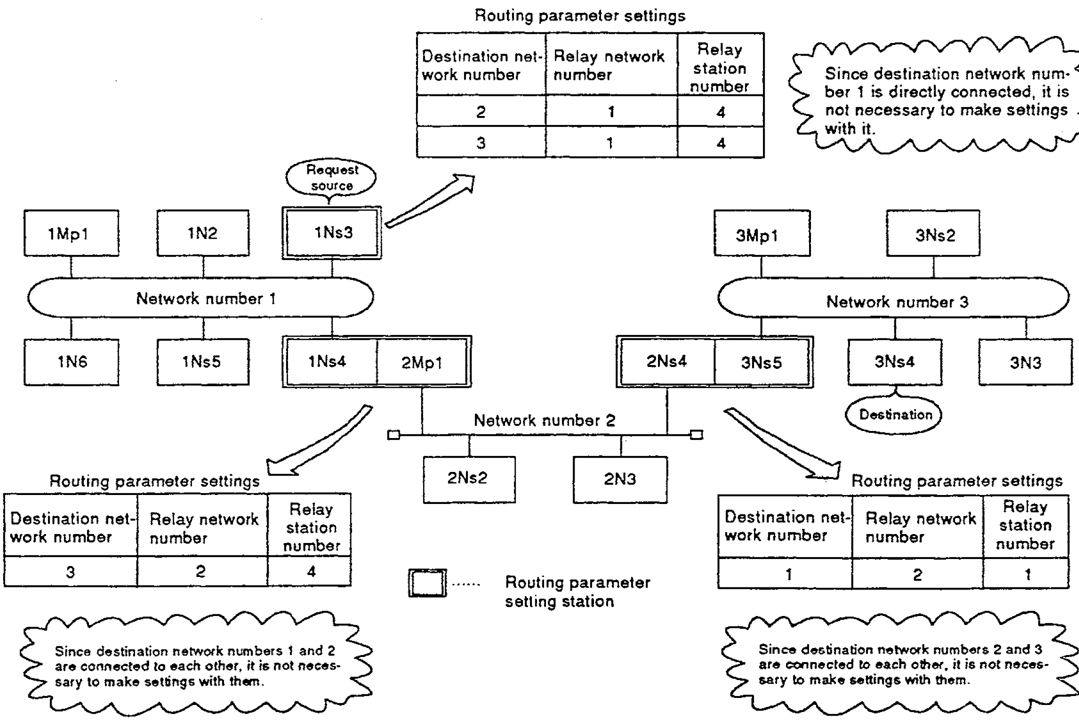


Fig. 10.12 Example System Configuration

(4) Setting example

This example shows the routing parameter settings required to execute a transient transmission from station 1Ns2 to station 3Ns3 in the system configuration shown in Fig. 10.12.

(a) CPU of 1Ns3 (request source)

<ROUTING PARAMETER>

NO.	DESTINATION NETWORK NO.	RELAY DESTINATION NETWORK NO.	RELAY DESTINATION STATION NO.
1	2	1	4
2	3	1	4
3			
4			

(b) AnUCPUs of 1Ns4 and 2Mp1 (relay stations)

<ROUTING PARAMETER>

NO.	DESTINATION NETWORK NO.	RELAY DESTINATION NETWORK NO.	RELAY DESTINATION STATION NO.
1	3	2	4
2			
3			
4			

(c) CPUs of 2Ns4 and 3Ns5 (relay stations)

<ROUTING PARAMETER>

NO.	DESTINATION NETWORK NO.	RELAY DESTINATION NETWORK NO.	RELAY DESTINATION STATION NO.
1	1	2	1
2			
3			
4			

10.3 Default Parameters

The LB/LW transmission range for each station executing cyclic transmission can be allocated using the condition setting switches (DIP switches) on the front face of the control station's network module. This makes it unnecessary to set the common parameters at a peripheral device.
For details on the setting method, see section 4.1.

(1) The default parameters set the total number of points and the total number of stations.

The number of LB/LW points that can be allocated to each station is indicated in Table 10.4.

Table 10.4 Number of LB/LW Points per Station

Total Number of Points / Total Number of Stations	2k Points (2048 Points)	4k Points (4096 Points)	6k Points (6144 Points)	8k Points (8192 Points)
8 stations	256 points	512 points	768 points	Setting error
16 stations	128 points	256 points	384 points	512 points
32 stations	64 points	128 points	192 points	256 points
64 stations	32 points	64 points	96 points	128 points

(2) Note that communication using the default parameters differs from communication on the basis of common parameters set at a peripheral device in the following respects.

(a) LX/LY communication is not possible.

(b) Device ranges are allocated uniformly in station number order.

(c) Communication errors will occur if stations that do not actually exist are set.

(d) If reserve stations are set, they will be ignored in processing.

(e) If extensions are set, processing will conform to the default values.

Item Set	Setting
Constant link scan	Not executed (0 ms)
Max. number of transient transmissions in one scan	2
Max. number of stations returned in one scan	2
Multiplex transmission	Not executed

(f) Communication error setting

Item Set	Setting
Control station shift function	Executed

(3) Setting example

If the following default parameters - total number of points: 4k, total number of stations: 8 - are set with the example system configuration shown in Fig. 10.13, the LB/LW ranges allocated to each station will be as shown in Table 10.5.

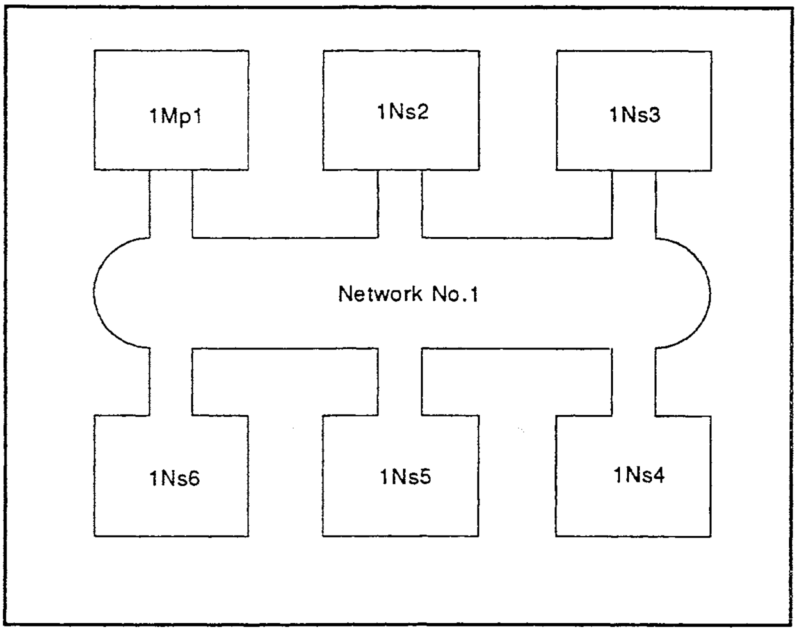


Fig. 10.13 Example System Configuration

Table 10.5 LB/LW Allocation Ranges When Using Default Parameters

Station No.	LB/LW Transmission Range	Remarks
1Mp1	0000 to 01FF	
1Ns2	0200 to 03FF	
1Ns3	0400 to 05FF	
1Ns4	0600 to 07FF	
1Ns5	0800 to 09FF	
1Ns6	0A00 to 0BFF	
Vacant (station No.7)	0C00 to 0DFF	Communication error at this station
Vacant (station No.8)	0E00 to 0FFF	Communication error at this station

11. COMPOSITE SYSTEMS

11.1 MELSECNET/10 Composite System Comprising AnS/AnN/AnACPUs

This section describes the device ranges that can be used for the data link when AnNCPUs and AnACPUs are connected in the same MELSECNET/10 network, and the restrictions that apply to such networks.

(1) AnACPUs and AnNCPUs cannot become MELSECNET/10 sub-control stations; they must be normal stations (N)
Since AnACPUs and AnNCPUs cannot be the type of normal station (Ns) that can become a control station (Mp) or sub-control station, one AnUCPU is required as the control station (Mp).
Note also that in order to make the control station shift function possible, at least two AnUCPUs are required.

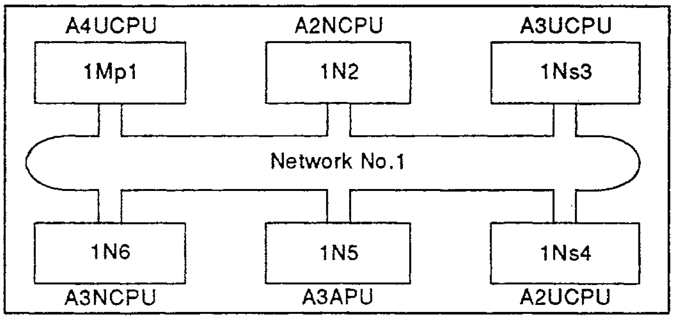


Fig. 11.1 Example of AnN/AnACPU Composite System

(2) The device ranges that can be used for the data link are the ranges of devices held by each AnN/AnSCPU or AnACPU.

(a) Situation with AnN/AnSCPUs

The usable range is the 1k points from B/W000 to 3FF, and X/Y000 to 7FF.
Note that the X/Y7FF range limit stated here applies in the case of the A3NCPU but in general the number of points will be limited to the number that the AnN/AnSCPU can control.

(b) Situation with AnACPUs

The usable range is the 4k points from B/W000 to FFF, and X/Y000 to 7FF.
Note that the X/Y7FF range limit stated here applies in the case of the A3ACPU but in general the number of points will be limited to the number that the AnACPU can control.

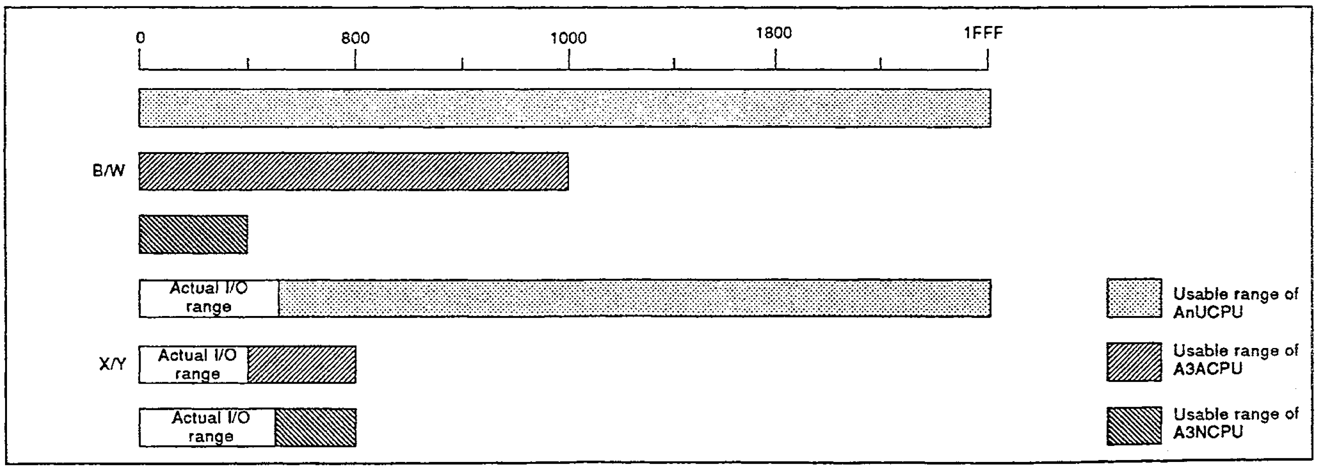


Fig. 11.2 Usable Devie Ranges

POINTS

(1) When transmitting data to all stations in a MELSECNET/10 network using link relays (B) and link registers (W), the usable range is limited by the ACPU with the smallest number of points allocated to the link relays and link registers.
For example, in the system shown in Fig. 11.1, since AnS/AnNCPUs are connected in the network, the range that can be used when transmitting data to all stations is the 1k points from B/W000 to 03FF. Data in the range B/W0400 to 1FFF cannot be read by AnNCPUs.

(2) X/Y communication in the data link is only possible if the control station is set in block 1 of the I/O master station using the common parameters.
X/Y communication is not possible with normal stations and with control stations set in block 2 of the I/O master station.

(3) Transient transmissions can only be made to the control station (Mp). Transient transmissions to normal stations (Ns, N) and sub-control stations (S) are not possible.
For example, the destination for transient transmissions from the A2NCPU (1N2) in the system configuration in Fig. 11.1 can only be the control station (1Mp1). If the control station goes down and 1Ns3 or 1Ns4 becomes the sub-control station, transient transmission to the sub-control system will not be possible.

Table 11.1 Range in Which Transient Transmission is Possible

Request Destination / Request Source	1Mp1	1N2	1Ns3	1Ns4	1N5	1N6
1Mp1	Host station	O	O	O	O	O
1N2	*1 O	Host station	X	X	X	X
1Ns3	O	O	Host station	O	O	O
1Ns4	O	O	O	Host station	O	O
1N5	*1 O	X	X	X	Host station	X
1N6	*1 O	X	X	X	X	Host station

*1 When accessing the control station from a special function module (AJ71C24-S8, AJ71UC24) mounted on an AnS/AnN/AnACPU, set "0" for the PC No.

(4) The data link cannot be started or stopped at a station to which an AnS/AnN/AnACPU is connected from a peripheral device or from the sequence program.

(5) MELSECNET/10 parameter settings (station specific parameters, transfer parameters for data link, routing parameters, etc.) cannot be set at stations to which AnS/AnN/AnACPUs are connected.

(6) The link monitor used to monitor stations to which AnS/AnN/AnACPUs are connected is that used for MELSECNET II local stations.
The MELSECNET/10 link monitor cannot be used for these stations.

11.2 Systems in Which MELSECNET/10 and MELSECNET II Networks are Connected

Connecting MELSECNET/10 and MELSECNET II networks results in the kind of combination shown in Fig. 11.3.
This section explains the device ranges that can be allocated to the data link, and the range in which transient transmission is possible, in each system.

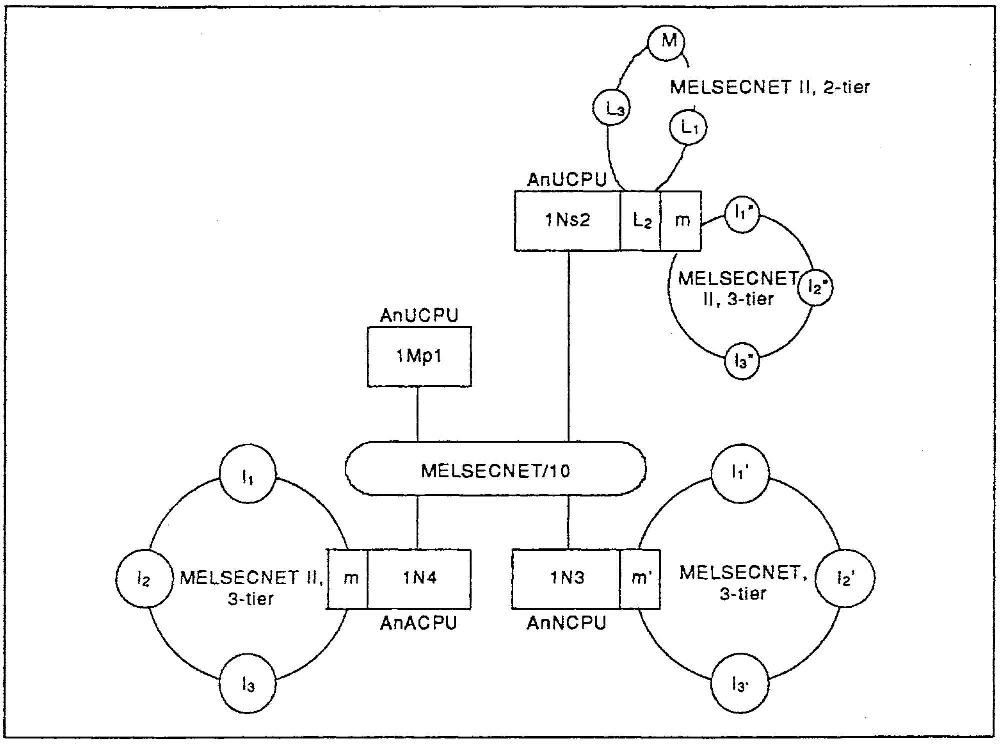


Fig. 11.3 Example of a System in Which MELSECNET/10 and MELSECNET II Networks are Connected

(1) Situation when an AnUCPU is set as the intermediate station

The conventional concept for a 3-tier MELSECNET II system no longer applies and each network becomes independent. Accordingly, the range of devices that can be used for the link and the range in which data can be transferred are as indicated below.

(a) Range of devices usable for the link

The maximum number of points that can be allocated in the case of MELSECNET/10 is the 8k points from LB/LW0000 to 1FFF. The maximum number of points that can be allocated in the case of MELSECNET II is the 4k points from B/W0000 to 0FFF. (In the case of MELSECNET, it is the 1k points from B/W0000 to 3FF).

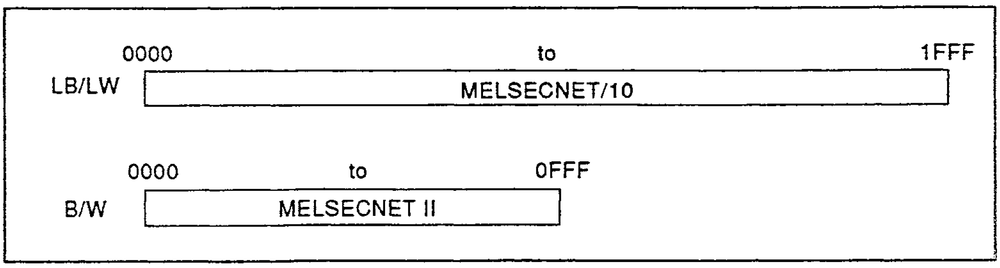


Fig. 11.4 Link Allocation Range With an AnUCPU as the Intermediate

(b) The link devices allocated in the MELSECNET II network are link refreshed in link relays (B) and link registers (W).
It is not possible to link refresh these devices in extension file registers.

(c) Data communication between MELSECNET/10 and MELSECNET II networks is executed by setting the transfer parameters for data link.

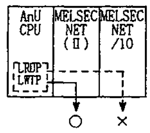
(d) The stations that can be accessed by transient transmission when different instructions, peripheral devices, and special function modules are used are indicated below.

1) ZNRD/ZNWR instruction

Other stations connected in the MELSECNET/10 network can be accessed.
However, when the CPU at the other station is the AnN/AnA/AnS(H), use the LRDP/LWTD instruction.
Other stations connected in a MELSECNET II network cannot be accessed.

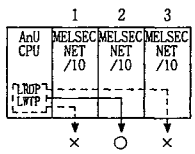
2) LRDP/LWTP instruction

Allows access to the other station connected to the data link module at the master station of the MELSECNET(II).



To access the other station in the absence of the MELSECNET(II) master station, set the "module number valid for other station access" in the module count setting since the network No. cannot be specified with the LRDP/LWTP instruction.

When the module number valid for other station access is 2



3) Peripheral devices (SW4IVD-GPPA-E etc.) and special function module (AJ71UC24) compatible with MELSECNET/10

Other stations that are connected in MELSECNET/10 and MELSECNET II networks can be accessed.
When accessing other stations connected in a MELSECNET II network, if the host station is a master station all the local stations can be accessed and if the host station is a local station the only station that can be accessed is the master station.

4) Peripheral devices (SW0IX-GPPAE, SW4GP-GPPAEE etc.) and special function modules (AJ71C24-S8, AD51-S3 etc.) not compatible with MELSECNET/10

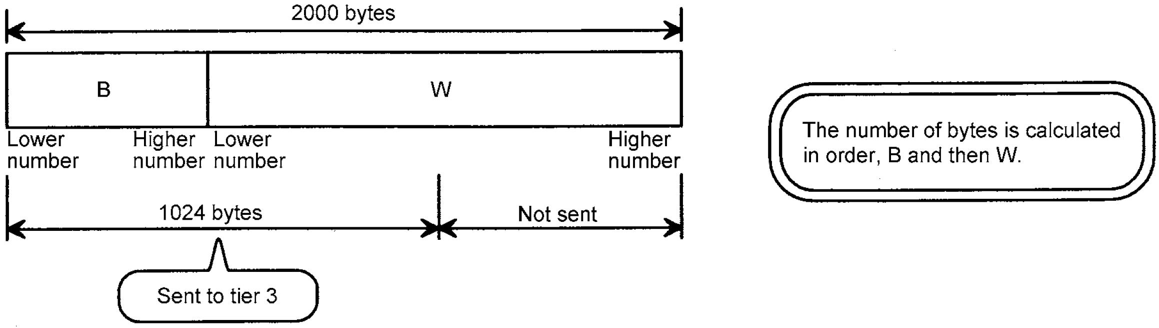
Other stations that are connected to the MELSECNET/10 network module set as the "effective module number" in the "set number of modules" settings can be accessed.
However, in the case of a system in which two MELSECNET II data link modules are installed to make a 3-tier configuration, if one of these data link modules is set as the "effective module number", the master station in the second tier and the local stations in the third tier can be accessed.
For example, in the case of the AnUCPU used to configure a MELSECNET II 3-tier system in Fig. 11.2, if the "L2" data link module is set as the "effective module number", the master station, station 11", station 12", and station 13" can be accessed.

(2) Situation when an AnN/AnACPU is used as the intermediate station

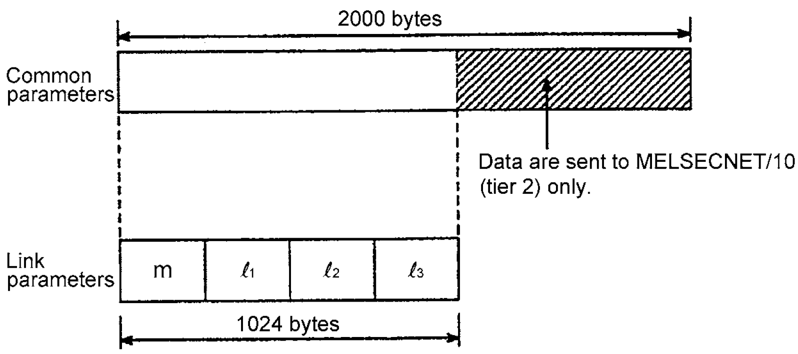
In this case the allocations are those for a conventional MELSECNET II Three-tier system with a MELSECNET/10 network as the higher tier and a MELSECNET II network as the lower tier.

(a) MELSECNET/10 common parameters

1) Data of up to 1024 bytes of station Mp on MELSECNET/10 (tier 2) are sent to tier 3. (Data exceeded over 1024 bytes cannot be sent to tier 3.)
The number of link points for one station is calculated in order, B and then W, as shown below.
(For a calculation example, refer to Section 7.3 (3) (b).)



2) Up to 2000 bytes can be allocated to an intermediate AnN/AnACPU station.
However, because only 1024 bytes at maximum can be allocated to the master station on MELSECNET(II) (tier 3), the remaining range can be used only by MELSECNET/10 (tier 2).



3) The range of link devices that can be used by an AnNCPU is B/W0 to 3FF. Link device B/W400 and higher devices cannot be used.

4) The range of link devices that can be used by an AnACPU is B/W0 to FFF. Link device B/W1000 and higher devices cannot be used.

(b) MELSECNET II link parameters

1) The link devices that can be allocated in the MELSECNET link parameters (or the first half of the MELSECNET II link parameters) are those in the range allocated to the host station using the MELSECNET/10 common parameters.
For example, the range of devices that station 1N4 in Fig. 11.5 can allocate to a three-tier MELSECNET II system is the range B900 to BFF allocated to station 1N4 using the MELSECNET/10 common parameters.

2) The range of devices that can be allocated in the second half of the MELSECNET II link parameters starts from the device whose number is one higher than the final device allocated using the MELSECNET/10 common parameters.
For example, if, as in Fig. 11.3, the range of devices allocated using the MELSECNET/10 common parameters is B0 to DFF, the range of devices that can be allocated in the second half of the MELSECNET II link parameters is BE00 to FFF.

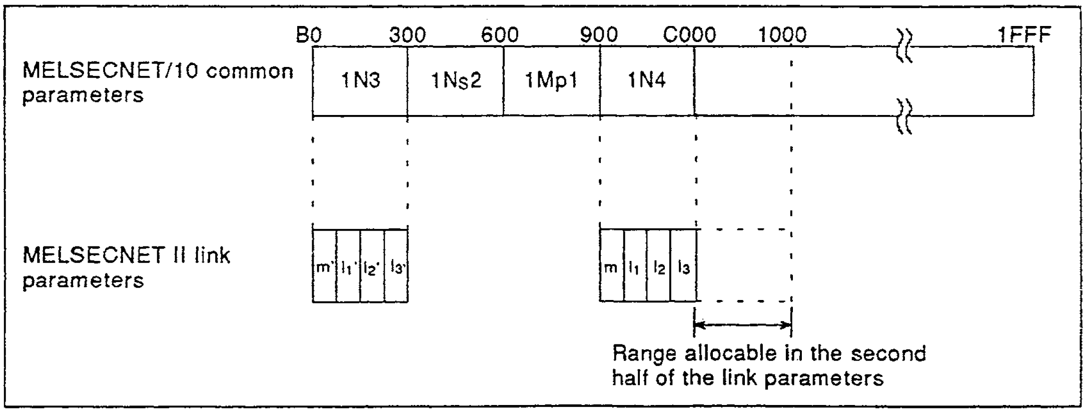
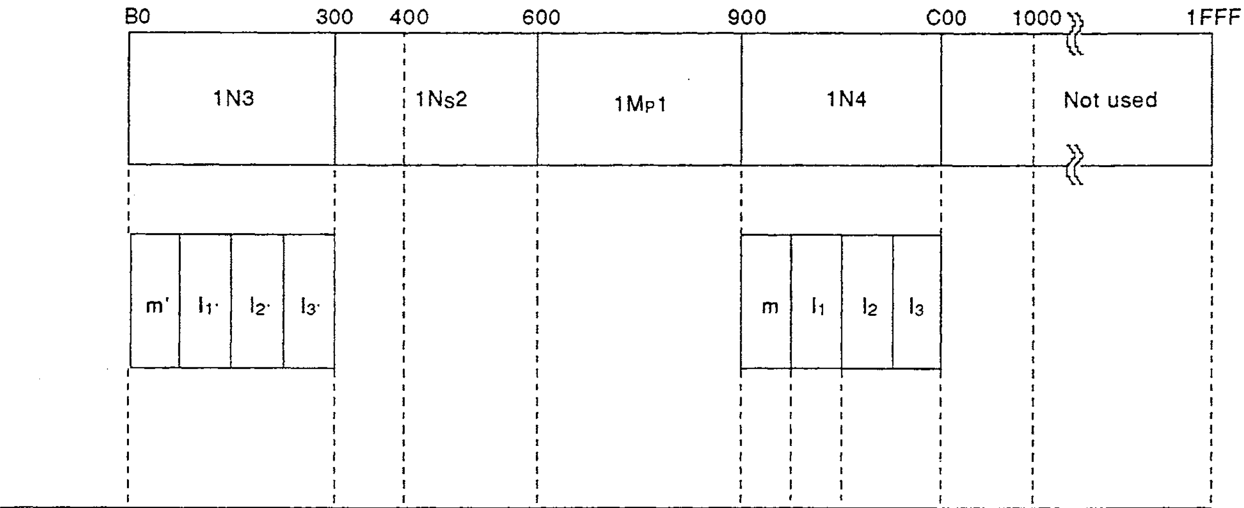


Fig. 11.5 Link Device Allocation Range with an AnN/AnACPU as the Intermediate

(c) Data communication between MELSECNET/10 and MELSECNET II networks follows the same pattern as MELSECNET II communication. The link data allocated to the control station can be read by sub-slave stations connected in the MELSECNET II network.
The link data allocated to slave stations connected to the MELSECNET II network can be read by control stations and normal stations connected in the MELSECNET/10 network.
Figure 11.6 shows the range in which data communication between MELSECNET/10 and MELSECNET II networks is possible when the intermediate station is an AnN/AnACPU, by reference to the system configuration shown in Fig. 11.3.



1Mp1	O	O	O	O	O		☆	O	O	O	O	▧	
1Ns2	O	O	O	O		☆	O	O	O	O	O	▧	
1N3 (m')	☆	O	O	O	O	—							
l1'	O	☆	O	O	▧	—							
l2'	O	O	☆	O	▧	—							
l3'	O	O	O	☆	▧	—							
1N4 (m)	O	O	O	O	O		O	☆	O	O	O	▧	—
l1	▧	▧	▧	▧	▧		O	O	☆	O	O	▧	—
l2	▧	▧	▧	▧	▧		O	O	O	☆	O	▧	—
l3	▧	▧	▧	▧	▧		O	O	O	O	☆	▧	—

☆: Can be written to O: Can be read from ▧ : Can be used for internal memory

Fig. 11.6 Data Communication Range with an AnN/AnACPU as the Intermediate Station

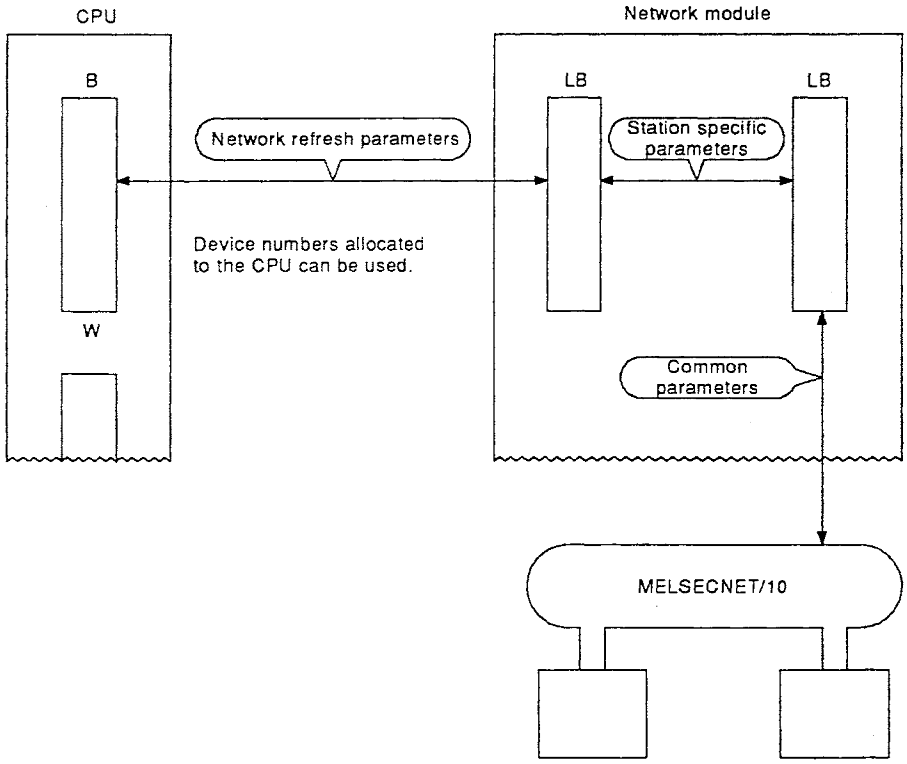
12. PROGRAMMING

This chapter describes the procedures used to program control stations and normal stations in order to operate the data link.
When applying the following program examples to the actual system, make sure to examine the applicability and confirm that it will not cause system control problems.

12.1 Precautions When Writing Programs

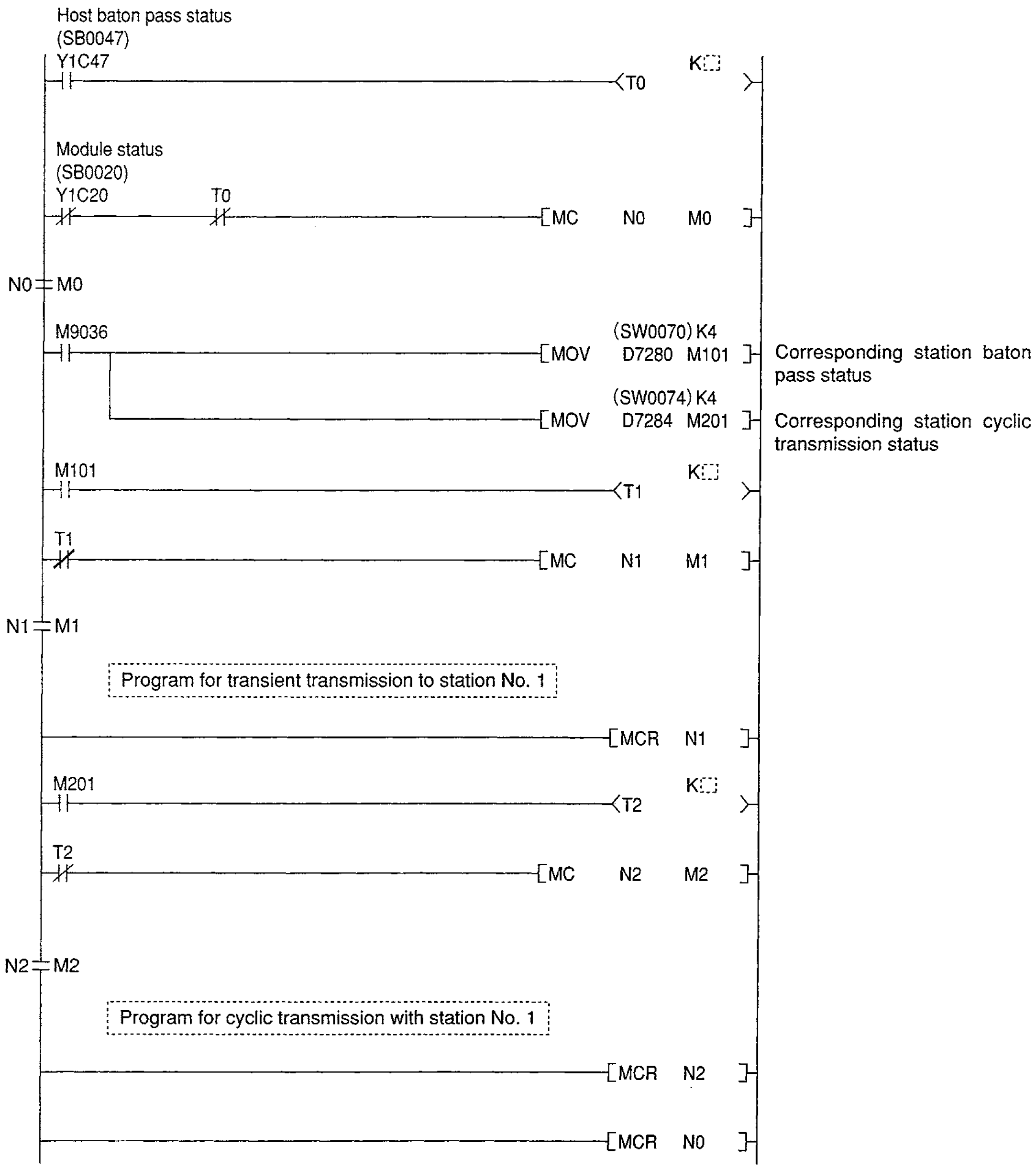
(1) Usable link devices

Only link devices (B, W, X, Y) whose device numbers have been allocated to the station CPUs using the link parameters (common parameters, network refresh parameters, station specific parameters) can be used in a data link program.



(2) Writing failsafe programs

The control station detects a communication error at power-on until the normal station powers on normally. The normal station detects a communication error at power-on until the control station powers on normally. A communication error may be detected if the control and normal stations are powered on at the same time.
In order not to use data at a communication error on detection of a communication error, we recommend you to use the data link special relays (SB00 to SBFF, M9200 to M9255) and data link special registers (SW00 to FF, D9200 to D9255) in the data link program to provide interlocks between communicating stations so that the other station data may be used only at normal data link.
An example program is shown on the next page. (This program specifies link refresh of SB00 to FF in Y1C00 to 1CFF, and link refresh of SW00 to FF in D7168 to D7423).



* As the constant K of the timer, set a value about five times larger than the link scan time.

If data link is performed normally, the baton pass status (SB0070, SW0070 to 73) and cyclic transmission status (SB0074, SW0074 to 77) signals may turn on (error) only instantaneously.
Hence, write a program that will use timers to bring about a completely abnormal status to stop control.
A value five times larger than the link scan time is merely a guideline.

REMARK

There are the following factors behind an error in baton pass status (SB0047, SW0070 to 73).

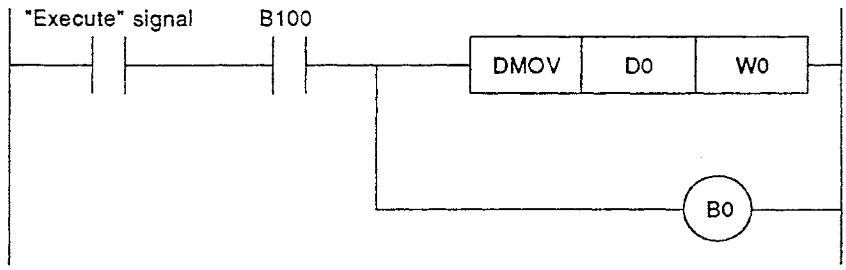
- Offline status (including test mode)
- Overlapping station numbers
- No setting of network refresh parameter (module type setting)
- Cable breakage

(3) Handling link data longer than 1 word

When dealing with link data with a length of one word or greater, old and new data can sometimes be mixed.
When reading/writing link data with a length of one word or longer in one go, write the program as follows.

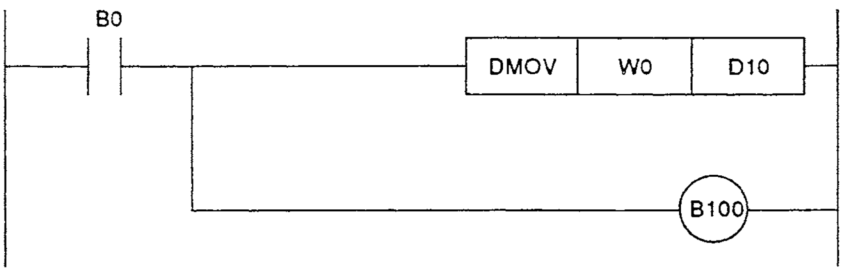
Use the link relays to execute handshake processing so that the data that is written to the link registers by the sending station can be read by the receiving station.

[Program for sending station]



(1) On input of the execute signal, the contents of D0 to D1 are stored in W0 to W1.
(2) On completion of data storage in W0 to W1, B0 comes ON.

[Program for receiving station]



(1) When B0 comes ON, the contents of W0 to W1 are stored in D10 to D11.
(2) On completion of data reception at the receiving station, B100 comes ON.

12.2 Special Link Relays (SB)

The special link relays are switched ON and OFF in accordance with a variety of factors that occur during data link operation. They can be used by the sequence program, or monitored, for purposes such as detection of faults in the data link.

12.2.1 Situation when a network module is mounted on an AnU/A2ASCPU

The special link relays (SB0000 to SB00FF) used when a network module is mounted on an AnU/A2ASCPU are shown in Table 12.1.
The figures in brackets in the "Number" column are in decimal notation. The decimal figures are convenient when transferring data to M devices, for example.

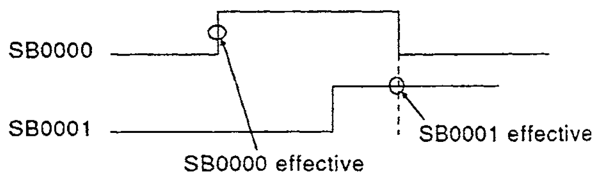
Table 12.1 List of Special Link Relays

Number	Necessity of ON/OFF Control in the Sequence Program	Name	Function	Device Use Possible?			
				Control Station		Normal Station	
				Optical/ coaxial Loop	Coaxial Bus	Optical/ coaxial Loop	Coaxial Bus
SB0000 (0) *1 *3	O	Link start (host station)	Restarts cyclic transmission at the host station. OFF: Start not designated ON: Start designated (at leading edge) *2	O	O	O	O
SB0001 (1) *1 *3	O	Link stop (host station)	Stops cyclic transmission at the host station. OFF: Stop not designated ON: Stop designated (at leading edge) *2	O	O	O	O
SB0002 (2) *1 *3	O	System link start	Restarts cyclic transmission in accordance with the contents of SW0000 to SW0004. OFF: Stop not designated ON: Stop designated (at leading edge) *2	O	O	O	O
SB0003 (3) *1 *3	O	System link stop	Stops cyclic transmission in accordance with the contents of SW0000 to SW0004. OFF: Stop not designated ON: Stop designated (at leading edge) *2	O	O	O	O
SB0005 (5)	O	Retry frequency clear	Clears the retry frequency (SW00C8, SW00C9) to zero. OFF: Clearance not designated ON: Clearance designated (effective while ON)	O	O	O	O
SB0006 (6) *1	O	Communication error count clear	Clears the communication error count (SW00B8 to SW00C7) to zero. OFF: Clearance not designated ON: Clearance designated (effective while ON)	O	O	O	O

Necessity of ON/OFF control in the sequence program
.... O: The user controls the ON/OFF status X: Switched ON and OFF automatically.

***1: Used in the network tests of peripheral devices.**

***2:** SB000 to SB003 become effective when a single point is switched ON.



***3: Valid only when SB0047 is off. When it turns on (error), the last data are retained.**

Table 12.1 List of Special Link Relays (Continued)

Number	Necessity of ON/OFF Control in the Sequence Program	Name	Function	Device Use Possible?			
				Control Station		Normal Station	
				Optical/ coaxial Loop	Coaxial Bus	Optical/ coaxial Loop	Coaxial Bus
SB0007 (7)	O	Forward loop transmis-sion error clear	Clears the forward loop line error detection count (SW00CC). OFF : Clearance not designated ON : Clearance designated (effective while ON)	O	X	O	X
SB0008 (8)	O	Reverse loop transmis-sion error clear	Clears the reverse loop line error detection count (SW00CD). OFF : Clearance not designated ON : Clearance designated (effective while ON)	O	X	O	X
SB0009 (9) *4	O	Loop switching count clear	Clears the loop switching count (SW00CE to E7) to zero. OFF : Clearance not designated ON : Clearance designated (effective while ON)	O	X	O	X
SB000A (10)	O	Transient transmis-sion error clear	Clears transient transmission errors (SW00EE, SW00EF) to zero. OFF : Clearance not designated ON : Clearance designated (effective while ON)	O	O	O	O
SB000B (11)	O	Transient transmis-sion error area setting	Specifies whether transient transmission errors (SB00F0 to FF) are overwritten or preserved. OFF : Overwrite ON : Hold	O	O	O	O
SB0020 (32)	X	Module status	Stores the status of communications between the network module and the CPU module. OFF : Normal ON : Error	O	O	O	O
SB0030 (48)	OX	LRDP/ ZNRD instruction reception status	Indicates the reception status for LRDP/ZNRD instructions. OFF : Not received ON : Received The ON status is maintained once set but can be changed to OFF by a RESET instruction.	O	O	O	O

Necessity of ON/OFF control in the sequence program
. . . .O: The user controls the ON/OFF status X: Switched ON and OFF automatically.

*4: SB0009 must remain ON until SW00CE becomes "0".

Table 12.1 List of Special Link Relays (Continued)

Number	Necessity of ON/OFF Control in the Sequence Program	Name	Function	Device Use Possible?			
				Control Station		Normal Station	
				Optical/ coaxial Loop	Coaxial Bus	Optical/ coaxial Loop	Coaxial Bus
SB0032 (50)	OX	LWTP/ ZNWR instruction reception status	Indicates the reception status for LWTP/ZNWR instructions. OFF : Not received ON : Received The ON status is maintained once set but can be changed to OFF by a RESET instruction.	O	O	O	O
SB0040 (64)	X	Network type (host station)	Indicates the type of network set using the switches on the host station network module. OFF : PLC to PLC network ON : Remote I/O network	O	O	O	O
SB0043 (67)	X	Online switch (host station)	Indicates the mode set using the switches on the host station network module. OFF : Online (mode setting = 0 or 1) ON : Other than online (mode setting not 0 or 1)	O	O	O	O
SB0044 (68)	X	Station setting (host station)	Indicates the station type set using the switches on the host station network module. OFF : Normal station ON : Control station	O	O	O	O

Necessity of ON/OFF control in the sequence program
....O: The user controls the ON/OFF status X: Switched ON and OFF automatically.

Table 12.1 List of Special Link Relays (Continued)

Number	Necessity of ON/OFF Control in the Sequence Program	Name	Function	Device Use Possible?			
				Control Station		Normal Station	
				Optical/ coaxial Loop	Coaxial Bus	Optical/ coaxial Loop	Coaxial Bus
SB0047 (71)	X	Baton passing status	Indicates the baton passing status of the host station. OFF : Normal ON : Error	O	O	O	O
SB0048 (72) *3	X	Control station status(host)	**Indicates the host's status.** OFF : Normal station ON : Control station (SB0044 is on) Sub-control station (SB0044 is OFF)	O	O	O	O
SB0049 (73)	X	Host station data link status	Indicates the data link status of the host station. OFF : Normal ON : Error (Set after completion of refresh processing)	O	O	O	O
SB004B (75)	X	Host station CPU status	Indicates the CPU status of the host station. OFF: Normal ON: Error	O	O	O	O
SB004C (76)	X	Cyclic transmis-sion start reception status	Indicates the cyclic transmission start reception status. OFF: Start signal not received (SB0000 is OFF) ON: Start signal received (SB0000 is ON)	O	O	O	O
SB004D (77)	X	Cyclic transmis-sion start completion status	Indicates the cyclic transmission start completion status. OFF: Not completed (SB0000 is OFF) ON: Start completed (SB0000 is ON)	O	O	O	O
SB004E (78)	X	Cyclic transmis-sion stop reception status	Indicates the cyclic transmission stop reception status. OFF: Stop signal not received (SB0001 is OFF) ON: Stop signal received (SB0001 is OFF)	O	O	O	O
SB004F (79)	X	Cyclic transmis-sion stop completion status	Indicates the cyclic transmission stop completion status. OFF: Stop not completed (SB0001 is OFF) ON: Stop completed (SB0001 is ON)	O	O	O	O

Necessity of ON/OFF control in the sequence program
....O: The user controls the ON/OFF status X: Switched ON and OFF automatically.

***3: Valid only when SB0047 is off. When it turns on (error), the last data are retained.**

Table 12.1 List of Special Link Relays (Continued)

Number	Necessity of ON/OFF Control in the Sequence Program	Name	Function	Device Use Possible?			
				Control Station		Normal Station	
				Optical/ coaxial Loop	Coaxial Bus	Optical/ coaxial Loop	Coaxial Bus
SB0050 (80)	X	Cyclic transmission start reception status	Indicates the cyclic transmission start reception status. OFF: Start signal not received (SB0002 is OFF) ON: Start signal received (SB0002 is ON)	O	O	O	O
SB0051 (81)	X	Cyclic transmission start completion status	Indicates the cyclic transmission start completion status. OFF: Not completed (SB0002 is OFF) ON: Start completed (SB0002 is ON)	O	O	O	O
SB0052 (82)	X	Cyclic transmission stop reception status	Indicates the cyclic transmission stop reception status. OFF: Stop signal not received (SB0003 is OFF) ON: Stop signal received (SB0003 is OFF)	O	O	O	O
SB0053 (83) *3	X	Cyclic transmission stop completion status	Indicates the cyclic transmission stop completion status. OFF: Stop not completed (SB0003 is OFF) ON: Stop completed (SB0003 is ON)	O	O	O	O
SB0054 (84)	X	Parameter reception status	Indicates the parameter reception status. OFF: Reception completed ON: Not received	O	O	O	O
SB0055 (85)	X	Received parameter error	Indicates the status of the received parameter. OFF: Parameter normal ON: Parameter error	O	O	O	O
SB0056 (86) *3	X	Communication data	Indicates the transient transmission status. OFF: Transient transmission by the control status ON: Transient transmission by a sub-control station	O	O	O	O
SB0058 (88)	X	**Operation designation at fault of control station**	**Indicates the setting of "With data link by sub control station when control station is down."** **OFF: Cyclic transmission made by sub control station when control station fails.** **ON: Cyclic transmission not made by sub control station when control station becomes faulty**	O	O	O	O
SB005C (92)	X	I/O master station (block 1)	Indicates the block 1 I/O master station setting (common parameter setting). (Effective when SB0049 is OFF) OFF: No setting ON: Set (the station number is stored in SW005C)	O	O	O	O

Necessity of ON/OFF control in the sequence program
....O: The user controls the ON/OFF status X: Switched ON and OFF automatically.

***3: Valid only when SB0047 is off. When it turns on (error), the last data are retained.**

Table 12.1 List of Special Link Relays (Continued)

Number	Necessity of ON/OFF Control in the Sequence Program	Name	Function	Device Use Possible?			
				Control Station		Normal Station	
				Optical/ coaxial Loop	Coaxial Bus	Optical/ coaxial Loop	Coaxial Bus
SB005D (93)	X	I/O master station (block 2)	Indicates the block 2 I/O master station setting (common parameter setting). (Effective when SB0049 is OFF) OFF: No setting ON: Set (the station number is stored in SW005D)	O	O	O	O
SB0064 (100)	X	Reserve station setting	Indicates whether a reserve station has been set. (Effective when SB0049 is OFF) OFF: No reserve station set ON: Reserve station(s) set OFF when SW0064 to 67 are all "0".	O	O	O	O
SB0068 (104)	X	Communication mode	Indicates the link scan mode (status set in the common parameter extension setting). (Effective when SB0049 is OFF) OFF: Normal mode ON: Constant scan mode	O	O	O	O
SB0069 (105)	X	Transmission setting	Indicates the transmission specification in the common parameter extension settings. (Effective when SB0049 is OFF) OFF: Normal transmission specified ON: Multiplex transmission specified	O	X	O	X
SB006A (106) *3	X	Transmission condition	Indicates the transmission condition. OFF: Normal transmission in progress ON: Multiplex transmission in progress	O	X	O	X

Necessity of ON/OFF control in the sequence program
....O: The user controls the ON/OFF status X: Switched ON and OFF automatically.

***3: Valid only when SB0047 is off. When it turns on (error), the last data are retained.**

Table 12.1 List of Special Link Relays (Continued)

Number	Necessity of ON/OFF Control in the Sequence Program	Name	Function	Device Use Possible?			
				Control Station		Normal Station	
				Optical/ coaxial Loop	Coaxial Bus	Optical/ coaxial Loop	Coaxial Bus
SB0070 (112) *3	X	Baton passing status at each station	Indicates the baton passing status at each station. (Reserve stations and stations with the highest and higher station numbers are not applicable.) OFF: All stations normal ON: Error at one or more stations OFF when SW0070 to 73 are all "0".	O	O	O	O
SB0074 (116) *3	X	Cyclic transmission status at each station	Indicates the cyclic transmission status at each station. (Reserve stations and stations with the highest and higher station numbers are not applicable.) OFF: Data link executed at all stations ON: Data link not executed at one or more stations OFF when SW0074 to 77 are all "0".	O	O	O	O
SB0078 (120) *3	X	Parameter communication status at each station	Indicates the parameter communication status at each station. (Reserve stations and stations with the highest and higher station numbers are not applicable.) OFF: Parameter communication not in progress ON: Parameter communication in progress OFF when SW0078 to 7B are all "0".	O	O	X	X
SB007C (124) *3	X	Parameter status at each station	Indicates the parameter status at each station. OFF: Parameter error at one or more stations ON: No parameter error at any station OFF when SW007C to 7F are all "0".	O	O	O	O
SB0080 (128) *3	X	CPU status at each station	Indicates the CPU status at each station. OFF: All stations normal ON: One or more faulty stations (including the host station) OFF when SW0080 to 83 are all "0".	O	O	O	O
SB0084 (132) *3	X	CPU RUN status at each station	Indicates the CPU status at each station. OFF: All stations in RUN or STEP RUN status ON: One or more stations (including host station) in STOP or PAUSE status OFF when SW0084 to 87 are all "0".	O	O	O	O
SB0090 (144)	X	Host station loop status	Indicates the loop status of the host station. OFF: Normal ON: Error OFF when SW0090 is "0".	O	X	O	X
SB0091 (145) *3	X	Forward loop status	Indicates the status of stations connected in a forward loop. OFF: All stations normal ON: One or more faulty stations OFF when SW0091 to 94 are all OFF.	O	X	O	X

Necessity of ON/OFF control in the sequence program
....O: The user controls the ON/OFF status X: Switched ON and OFF automatically.

***3: Valid only when SB0047 is off. When it turns on (error), the last data are retained.**

Table 12.1 List of Special Link Relays (Continued)

Number	Necessity of ON/OFF Control in the Sequence Program	Name	Function	Device Use Possible?			
				Control Station		Normal Station	
				Optical/ coaxial Loop	Coaxial Bus	Optical/ coaxial Loop	Coaxial Bus
SB0095 (149) *3	X	Reverse loop status	Indicates the status of stations connected in a reverse loop. OFF: All stations normal ON: One or more faulty stations OFF when SW0095 to 98 are all OFF.	O	X	O	X
SB0099 (153) *3	X	Forward loop loopback	Indicates loopback statuses in the system's forward loop. OFF: Loopback not executed ON: Executed at one or more stations (data identifying the stations stored in SW0099)	O	X	O	X
SB009A (154) *3	X	Reverse loop loopback	Indicates loopback statuses in the system's reverse loop. OFF: Loopback not executed ON: Executed at one or more stations (data identifying the stations stored in SW009A)	O	X	O	X
SB00A8 (168)	X	Online test designation	Indicates whether or not an online test is designated. OFF: Not designated ON: Designated	O	O	O	O
SB00A9 (169)	X	Online test completion	Indicates whether or not an online test is completed. OFF: Not completed ON: Completed	O	O	O	O
SB00AA (170)	X	Online test response designation	Indicates the online test response status. OFF: No response received ON: Response received	O	O	O	O
SB00AB (171)	X	Online test completion status	Indicates the completion status of the online test. OFF: Completed without response ON: Completed with response	O	O	O	O
SB00AC (172)	X	Offline test designation	Indicates whether or not an offline test is designated. OFF: Not designated ON: Designated	O	O	O	O
SB00AD (173)	X	Offline test completion	Indicates whether or not an online test is completed. OFF: Not completed ON: Completed	O	O	O	O
SB00AE (174)	X	**Offline testing Response designation**	**Indicates the response status for offline test. OFF: No response ON: Response**	O	O	O	O
SB00AF (175)	X	**Offline testing Response end**	**Indicates the response status for offline test end. OFF: No response end ON: Response end**	O	O	O	O

Necessity of ON/OFF control in the sequence program
. . . .O: The user controls the ON/OFF status X: Switched ON and OFF automatically.

***3: Valid only when SB0047 is off. When it turns on (error), the last data are retained.**

Table 12.1 List of Special Link Relays (Continued)

Number	Necessity of ON/OFF Control in the Sequence Program	Name	Function	Device Use Possible?			
				Control Station		Normal Station	
				Optical/ coaxial Loop	Coaxial Bus	Optical/ coaxial Loop	Coaxial Bus
SB00EE (238)	X	Transient error	Indicates the error status for transient transmission. OFF: No error ON: Error	O	O	O	O

Necessity of ON/OFF control in the sequence program
....O: The user controls the ON/OFF status X: Switched ON and OFF automatically.

12.2.2 Situation when a network module is mounted on an AnS/AnN/AnACPU

In contrast to the situation when a network module is mounted to an AnUCPU, the special relays (SB) are automatically allocated to the M devices of the CPU.
The special link relays are shown in Table 12.2.

Table 12.2 List of Special Link Relays

<table>
<tr><th rowspan="3">Number</th><th rowspan="3">Necessity of ON/OFF Control in the Sequence Program</th><th rowspan="3">Name</th><th rowspan="3">Function</th><th colspan="2">Device Use Possible?</th></tr>
<tr><th colspan="2">Normal Station</th></tr>
<tr><th>Optical/ coaxial Loop</th><th>Coaxial Bus</th></tr>
<tr><td>M9204</td><td>X</td><td>LRDP instruction completion</td><td>Indicates whether or not an AnUCPU station LRDP instruction has been completed.
OFF: Not completed
ON: Completed</td><td>O</td><td>O</td></tr>
<tr><td>M9205</td><td>X</td><td>LWTP instruction completion</td><td>Indicates whether or not an AnUCPU station LWTP instruction has been completed.
OFF: Not completed
ON: Completed</td><td>O</td><td>O</td></tr>
<tr><td>M9211</td><td>X</td><td>Module status</td><td>Indicates the hardware status of the network module.
OFF: Normal
ON: Error</td><td>O</td><td>O</td></tr>
<tr><td>M9240</td><td>X</td><td>Online host station status</td><td>Indicates the online status of the host station.
OFF: Online
ON: Offline, self-loopback test, station to station test
When the mode has been changed, the ON/OFF status can be changed by resetting the CPU.</td><td>O</td><td>O</td></tr>
<tr><td>M9241</td><td>X</td><td>Forward loop status</td><td>Indicates the line status for the forward loop.
OFF: Normal
ON: Error</td><td>O</td><td>O</td></tr>
<tr><td>M9242</td><td>X</td><td>Reverse loop status</td><td>Indicates the line status for the reverse loop.
OFF: Normal
ON: Error</td><td>O</td><td>O</td></tr>
<tr><td>M9243</td><td>X</td><td>Loopback</td><td>Indicates the loopback status for the host station.
OFF: Loopback not implemented
ON: Loopback implemented</td><td>O</td><td>X</td></tr>
</table>

Necessity of ON/OFF control in the sequence program
....O: The user controls the ON/OFF status X: Switched ON and OFF automatically.

Table 12.2 List of Special Link Relays (Continued)

Number	Necessity of ON/OFF Control in the Sequence Program	Name	Function	Device Use Possible? Normal Station: Optical/coaxial Loop	Device Use Possible? Normal Station: Coaxial Bus
M9246	X	Data not received (control station)	Indicates whether or not data has been received from the Control station. OFF: Received ON: Not received	O	O
M9250	X	Parameter not received	Indicates whether or not common parameters have been received from the control station. OFF: Received ON: Not received	O	O
M9251	X	Communication status	Indicates the communication status of the host station. OFF: Normal ON: Error	O	O
M9252	X	Loop test status	Indicates the execution status of the host station forward loop/reverse loop tests. OFF: Not executed ON: Forward loop/reverse loop test being executed	O	X
M9253	X	Control station operation status	Indicates the CPU status of the control station. OFF: RUN or STEP RUN ON: STOP or PAUSE	O	O
M9254	X	Other station operation status	Indicates the CPU status of other stations. OFF: All stations in RUN or STEP RUN status ON: One or more stations in STOP or PAUSE status	O	O
M9255	X	Other station communication status	Indicates the communication status of other stations OFF: All stations normal ON: Error at one or more stations	O	O

Necessity of ON/OFF control in the sequence program
....O: The user controls the ON/OFF status X: Switched ON and OFF automatically.

12.3 Special Link Registers (SW)

The special link registers are used to store data link information in numerical form.
The locations and causes of errors can be determined by monitoring these registers.

12.3.1 Situation when a network module is mounted on an AnU/A2ASCPU

The special link registers (SW0000 to SW00FF) used when a network module is mounted on an AnU/A2ASCPU are shown in Table 12.3.
The figures in brackets in the "Number" column are in decimal notation.
The decimal figures are convenient when transferring data to D devices, for example.

Table 12.3 List of Special Link Registers

<table>
<tr><th rowspan="3">Number</th><th rowspan="3">Necessity of ON/OFF Control in the Sequence Program</th><th rowspan="3">Name</th><th rowspan="3">Function</th><th colspan="4">Device Use Possible?</th></tr>
<tr><th colspan="2">Control Station</th><th colspan="2">Normal Station</th></tr>
<tr><th>Optical/ coaxial Loop</th><th>Coaxial Bus</th><th>Optical/ coaxial Loop</th><th>Coaxial Bus</th></tr>
<tr><td>SW0000
(0)
*1</td><td>O</td><td>Data link stop/start designation details</td><td>Sets the stations that stop and restart the data link.
00_H: Host station
01_H: All stations
02_H: Designated station
80_H: Host station (forced stop/ restart)
81_H: All stations (forced stop/ restart)
82_H: Designated station (forced stop/restart)</td><td>O</td><td>O</td><td>O</td><td>O</td></tr>
<tr><td>SW0001
(1)
•
SW0002
(2)
•
SW0003
(3)
•
SW0004
(4)
*1</td><td>O</td><td>Data link stop/start designation details</td><td>Set if "designated station" is specified (i.e., if 02H or 82H is set for SW0000).
Set the bit that corresponds to the station that will stop/restart the data link to "1".
0: data link stop/restart instruction is invalid.
1: data link stop/restart instruction is valid.<table><tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr><tr><td>SW0001</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW0002</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW0003</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW0004</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr></table>The figures 1 to 64 in the table are station numbers.</td><td>O</td><td>O</td><td>O</td><td>O</td></tr>
</table>

Necessity of setting data in the sequence program
....O: The user sets the data X: The data is set automatically.

***1: Used in the network tests of peripheral devices.**

Table 12.3 List of Special Link Registers (Continued)

Number	Necessity of ON/OFF Control in the Sequence Program	Name	Function	Device Use Possible?			
				Control Station		Normal Station	
				Optical/ coaxial Loop	Coaxial Bus	Optical/ coaxial Loop	Coaxial Bus
SW0020 (32)	X	Module status	Stores the status of communications between the network module and the CPU module. 0: Normal A value other than 0: The error code is stored. (refer to the manual for the CPU module used)	O	O	O	O
SW0031 (49)	X	LRDP/ ZNRD processing result	Stores the processing result when execution of an LRDP/ZNRD instruction is completed. 0: Normal 3: Time out error *10 More than 4: Error (refer to error codes)	O	O	O	O
SW0033 (51)	X	LWTP/ ZNWR processing result	Stores the processing result when execution of an LWDP/ZNWR instruction is completed. 0: Normal 3: Time out error *10 More than 4: Error (refer to error codes)	O	O	O	O
SW0040 (64)	X	Network No.	Stores the network number of the host station. Range: 1 to 64	O	O	O	O
SW0041 (65)	X	Group No.	Stores the group number of the host station. 0: No group designation 1 to 9: Group numbers	O	O	O	O
SW0042 (66)	X	Station No.	Stores the station number of the host station. Range: 1 to 64	O	O	O	O
SW0043 (67)	X	Online switch	Stores the mode switch status of the host station. Range: 0_H to F_H	O	O	O	O
SW0044 (68)	X	Station setting	Stores the statuses of the condition setting switches of the host station. 0: OFF 1: ON b15 to b8 b7 b6 b5 b4 b3 b2 b1 b0 SW0044 | 0 | to | 0 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | Numbers 1 to 8 in the table are the switch numbers.	O	O	O	O

Necessity of setting data in the sequence program
....O: The user sets the data X: The data is set automatically.

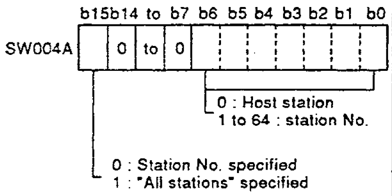
*10 Execute the ZNRD/ZNWR instruction for the A2UCPU(S1), A3UCPU, A4UCPU, or A2USCPU(S1) with the following version.
- EA2UCPU(S1), A3UCPU, A4UCPU: Version AY (manufactured since July, 1995) or later
- EA2USCPU(S1): Version CP (manufactured since July, 1995) or later

Table 12.3 List of Special Link Registers (Continued)

Number	Necessity of ON/OFF Control in the Sequence Program	Name	Function	Device Use Possible?			
				Control Station		Normal Station	
				Optical/ coaxial Loop	Coaxial Bus	Optical/ coaxial Loop	Coaxial Bus
SW0046 (70)	X	Module classification	Stores the type of network module at the host station. b15 b14 b13 to b2 b1 b0 SW0046 | | | 0 | to | 0 | | | 01 : Fiber-optic 10 : Coaxial cable 11 : Twisted pair 0 : Duplex 1 : Single 0 : Loop 1 : Bus	O	O	O	O
SW0047 (71)	X	Baton passing status	Stores the baton passing status of the host station. 0 : Data link in progress 1 : Data link stopped (instructed by other station) 2 : Data link stopped (instructed by host) 3 : Baton passing executed (parameter received (no transmission area in the host)) 4 : Baton passing executed (parameter error) 5 : Baton passing executed (parameters not received) 6 : Disconnection (no baton passing) 7 : Disconnection (line error) 11_H : Loop test 12_H : Setting confirmation test 13_H : Station order confirmation test 14_H : Communication test $1F_H$: Offline test FF_H : Resetting in progress	O	O	O	O

Necessity of setting data in the sequence program
....O: The user sets the data X: The data is set automatically.

Table 12.3 List of Special Link Registers (Continued)

Number	Necessity of ON/OFF Control in the Sequence Program	Name	Function	Device Use Possible?			
				Control Station		Normal Station	
				Optical/ coaxial Loop	Coaxial Bus	Optical/ coaxial Loop	Coaxial Bus
SW0048 (72)	X	Cause of baton passing stop	Stores information on the cause for a stop in baton passing. 0: Normal communication 1: Offline 2: Offline test More than 3: Stop cause (refer to the error codes)	O	O	O	O
SW0049 (73)	X	Cause of data link transmission stoppage	Stores information on the cause for a stop in data link transmission. 0 : Normal 1 : Stop designated 2 : No common parameters 3 : Error in common parameters 6 : Communication break stop	O	O	O	O
SW004A (74) *2	X	Data link stop request station	Stores information on the station that stopped data link operation at the host station. (Effective when SW0049 is "1".) 	O	O	O	O

Necessity of setting data in the sequence program
....O: The user sets the data X: The data is set automatically.

***2: Valid only when SB0047 is off. When it turns on (error), the last data are retained.**

Table 12.3 List of Special Link Registers (Continued)

Number	Necessity of ON/OFF Control in the Sequence Program	Name	Function	Device Use Possible?			
				Control Station		Normal Station	
				Optical/ coaxial Loop	Coaxial Bus	Optical/ coaxial Loop	Coaxial Bus
SW004D (77) *2	X	Data link start condition (host station)	Stores the result when data link operation has started. 0: Normal More than 1: Error (refer to the error codes)	O	O	O	O
SW004F (79)) *2	X	Data link stop condition (host station)	Stores the result when data link operation has stopped. 0: Normal More than 1: Error (refer to the error codes)	O	O	O	O
SW0051 (81) *2	X	Data link start condition (system)	Stores the result when data link operation has started. 0: Normal More than 1: Error (refer to the error codes)	O	O	O	O
SW0053 (83) *2	X	Data link stop status (system)	Stores the result when data link operation has stopped. 0: Normal More than 1: Error (refer to the error codes)	O	O	O	O
SW0054 (84)	X	Parameters (1)	Stores parameter information. (Effective when SB0054 and SB0055 are OFF.) 0: Only common parameters used 1: Common parameters and station specific parameters used 2:Only default parameters used 3: Default parameters and station specific parameters used	O	O	O	O
SW0055 (85)	X	Parameters (2)	Stores the parameter status. 0: Parameters normal More than 1: Parameter error (refer to the error codes)	O	O	O	O
SW0056 (86) *2	X	Present control station	Stores the station number of the station that is actually operating as the control station (includes sub-control stations). Range: 1 to 64	O	O	O	O

Necessity of setting data in the sequence program
....O: The user sets the data X: The data is set automatically.

***2: Valid only when SB0047 is off. When it turns on (error), the last data are retained.**

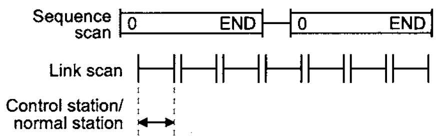
Table 12.3 List of Special Link Registers (Continued)

Number	Necessity of ON/OFF Control in the Sequence Program	Name	Function	Device Use Possible?			
				Control Station		Normal Station	
				Optical/ coaxial Loop	Coaxial Bus	Optical/ coaxial Loop	Coaxial Bus
SW0057 (87)	X	Designated control station	Stores the station number of the station that has been set as the control station. Range: 1 to 64	O	O	O	O
SW0059 (89))	X	Total number of link stations	Stores the highest station number set in the parameters. Range: 1 to 64 ("64" if no parameter setting)	O	O	O	O
SW005A (90) *2	X	Max. normal baton passing stations	Stores the highest station number in the number of stations that can execute baton passing normally. Range: 1 to 64	O	O	O	O
SW005B (91) *2	X	Max. cyclic transmission stations	Stores the highest station number in the maximum number of stations that can execute cyclic transmission. Range: 1 to 64	O	O	O	O
SW005C (92)	X	I/O master station (block 1)	Stores the station number of the I/O master station in block 1. 0: None 1 to 64: Station No. Becomes effective when SB0049 is OFF.	O	O	O	O
SW005D (93)	X	I/O master station (block 2)	Stores the station number of the I/O master station in block 2. 0: None 1 to 64: Station No. Becomes effective when SB0049 is OFF.	O	O	O	O
SW0064 (100) • SW0065 (101) • SW0066 (102) • SW0067 (103)	X	Reserve station specification	Stores information on the stations set as reserve stations. 0: Not reserve station 1: Reserve station Becomes effective when SB0049 is OFF. b15 b14 b13 b12 to b4 b3 b2 b1 b0 SW0064: 16 15 14 13 to 5 4 3 2 1 SW0065: 32 31 30 29 to 21 20 19 18 17 SW0066: 48 47 46 45 to 37 36 35 34 33 SW0067: 64 63 62 61 to 53 52 51 50 49 The figures 1 to 64 in the table are station numbers.	O	O	O	O

Necessity of setting data in the sequence program
. . . .O: The user sets the data X: The data is set automatically.

***2: Valid only when SB0047 is off. When it turns on (error), the last data are retained.**

Table 12.3 List of Special Link Registers (Continued)

Number	Necessity of ON/OFF Control in the Sequence Program	Name	Function	Device Use Possible?			
				Control Station		Normal Station	
				Optical/ coaxial Loop	Coaxial Bus	Optical/ coaxial Loop	Coaxial Bus
SW0068 (104)	X	Communi-cation mode	Stores the constant link scan setting. 0: No setting stored 1 to 500: Set time (ms) Becomes effective when SB0049 is OFF.	O	O	O	O
SW006B (107) *2	X	Max. link scan time	**Stores the maximum/minimum/current values of the link scan time (unit (ms)).** **The values for the control station and normal stations vary.**  When the constant scan is set, the values are as follows: Control station (Setting value) < (Measured link scan value + KB of the link scan time equation) → Measured link scan value + KB of the link scan time equation (Setting value) > (Measured link scan value + KB of the link scan time equation) → Measured link scan value Normal station → Constant link scan that has been set	O	O	O	O
SW006C (108) *2	X	Min. link scan time		O	O	O	O
SW006D (109) *2	X	Current link scan time		O	O	O	O

Necessity of setting data in the sequence program
. . . .O: The user sets the data X: The data is set automatically.

***2: Valid only when SB0047 is off. When it turns on (error), the last data are retained.**

Table 12.3 List of Special Link Registers (Continued)

<table>
<tr><th rowspan="3">Number</th><th rowspan="3">Necessity of ON/OFF Control in the Sequence Program</th><th rowspan="3">Name</th><th rowspan="3">Function</th><th colspan="4">Device Use Possible?</th></tr>
<tr><th colspan="2">Control Station</th><th colspan="2">Normal Station</th></tr>
<tr><th>Optical/ coaxial Loop</th><th>Coaxial Bus</th><th>Optical/ coaxial Loop</th><th>Coaxial Bus</th></tr>
<tr><td>SW0070
(112)
•
SW0071
(113)
•
SW0072
(114)
•
SW0073
(115)
*2</td><td>X</td><td>Baton passing status at each station</td><td>Indicates the baton passing status at each station (including the host station).
<Online>
0: Normal (including stations with the "highest" and higher station numbers, and reserve stations)
1: Error
<Offline>
0: Normal
1: Error (including stations with the "highest" and higher station numbers, and reserve stations)
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW0070</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW0071</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW0072</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW0073</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
The figure 1 to 64 in the table are station numbers.</td><td>O</td><td>O</td><td>O</td><td>O</td></tr>
<tr><td>SW0074
(116)
•
SW0075
(117)
•
SW0076
(118)
•
SW0077
(119)
*2</td><td>X</td><td>Cyclic transmission status at each station</td><td>Stores the cyclic transmission status at each station (including the host station).
0: Cyclic transmission in progress (including stations with the highest and higher station numbers, and reserve stations)
1: Cyclic transmission not executed
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW0074</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW0075</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW0076</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW0077</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
The figures 1 to 64 in the table are station numbers.</td><td>O</td><td>O</td><td>O</td><td>O</td></tr>
</table>

Necessity of setting data in the sequence program
.....O: The user sets the data X: The data is set automatically.

***2: Valid only when SB0047 is off. When it turns on (error), the last data are retained.**

Table 12.3 List of Special Link Registers (Continued)

<table>
<tr><th rowspan="3">Number</th><th rowspan="3">Necessity of ON/OFF Control in the Sequence Program</th><th rowspan="3">Name</th><th rowspan="3">Function</th><th colspan="4">Device Use Possible?</th></tr>
<tr><th colspan="2">Control Station</th><th colspan="2">Normal Station</th></tr>
<tr><th>Optical/ coaxial Loop</th><th>Coaxial Bus</th><th>Optical/ coaxial Loop</th><th>Coaxial Bus</th></tr>
<tr><td>SW0078
(120)
•
SW0079
(121)
•
SW007A
(122)
•
SW007B
(123)
*2</td><td>X</td><td>Parameter communi-cation status at each station</td><td>Stores the parameter communication status at each station.
0: Parameter communication not in progress (including stations with the "highest" and higher station numbers, and reserve stations)
1: Parameter communication in progress
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW0078</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW0079</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW007A</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW007B</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
The figures 1 to 64 in the table are station numbers.</td><td>O</td><td>O</td><td>X</td><td>X</td></tr>
<tr><td>SW007C
(124)
•
SW007D
(125)
•
SW007E
(126)
•
SW007F
(127)
*2</td><td>X</td><td>Parameter error status at each station</td><td>Stores the parameter status at each station.
0: Parameters normal (including stations with the "highest" and higher station numbers, and reserve stations)
1: Parameter error
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW007C</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW007D</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW007E</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW007F</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
The figures 1 to 64 in the table are station numbers.</td><td>O</td><td>O</td><td>X</td><td>X</td></tr>
</table>

Necessity of setting data in the sequence program
....O: The user sets the data X: The data is set automatically.

***2: Valid only when SB0047 is off. When it turns on (error), the last data are retained.**

Table 12.3 List of Special Link Registers (Continued)

Number	Necessity of ON/OFF Control in the Sequence Program	Name	Function	Device Use Possible?			
				Control Station		Normal Station	
				Optical/ coaxial Loop	Coaxial Bus	Optical/ coaxial Loop	Coaxial Bus
SW0080 (128) • SW0081 (129) • SW0082 (130) • SW0083 (131) *2	X	CPU operation status at each station	Stores the operation status of the CPU at each station (including the host station). 0 : Normal (including stations with the "highest" and higher station numbers, and reserve stations) 1 : Error b15 b14 b13 b12 to b4 b3 b2 b1 b0 SW0080: 16 15 14 13 to 5 4 3 2 1 SW0081: 32 31 30 29 to 21 20 19 18 17 SW0082: 48 47 46 45 to 37 36 35 34 33 SW0083: 64 63 62 61 to 53 52 51 50 49 The figures 1 to 64 in the table are station numbers.	O	O	O	O
SW0084 (132) • SW0085 (133) • SW0086 (134) • SW0087 (135) *2	X	CPU RUN status at each station	Stores information on CPU operation at each station (including the host station). 0 : RUN or STEP RUN (including stations with the "highest" and higher station numbers, and reserve stations) 1 : STOP, PAUSE, ERROR b15 b14 b13 b12 to b4 b3 b2 b1 b0 SW0084: 16 15 14 13 to 5 4 3 2 1 SW0085: 32 31 30 29 to 21 20 19 18 17 SW0086: 48 47 46 45 to 37 36 35 34 33 SW0087: 64 63 62 61 to 53 52 51 50 49 The figures 1 to 64 in the table are station numbers.	O	O	O	O

Necessity of setting data in the sequence program

....O: The user sets the data X: The data is set automatically.

***2: Valid only when SB0047 is off. When it turns on (error), the last data are retained.**

Table 12.3 List of Special Link Registers (Continued)

Number	Necessity Of On/off Control in the Sequence Program	Name	Function	Device Use Possible?			
				Control Station		Normal Station	
				Optical/ coaxial Loop	Coaxial Bus	Optical/ coaxial Loop	Coaxial Bus
SW0090 (144)	X	Loopback information	Stores information on the loop status at the host station. 0: Loop normal 1: Forward loop error 2: Reverse loop error 3: Loopback 4: Data link disabled	O	X	O	X
SW0091 (145) • SW0092 (146) • SW0093 (147) • SW0094 (148) *2	X	Forward loop status at each station	Stores the forward loop status at each station (including the host station). 0: Normal (including stations with the "highest" and higher station numbers, and reserve stations) 1: Error The status stored for disconnected stations is the status when the disconnection occurred. b15 b14 b13 b12 to b4 b3 b2 b1 b0 SW0091: 16 15 14 13 to 5 4 3 2 1 SW0092: 32 31 30 29 to 21 20 19 18 17 SW0093: 48 47 46 45 to 37 36 35 34 33 SW0094: 64 63 62 61 to 53 52 51 50 49 The figures 1 to 64 in the table are station numbers.	O	X	O	X

Necessity of setting data in the sequence program
. . . .O: The user sets the data X: The data is set automatically.

***2: Valid only when SB0047 is off. When it turns on (error), the last data are retained.**

Table 12.3 List of Special Link Registers (Continued)

<table>
<tr><th rowspan="3">Number</th><th rowspan="3">Necessity of ON/OFF Control in the Sequence Program</th><th rowspan="3">Name</th><th rowspan="3">Function</th><th colspan="4">Device Use Possible?</th></tr>
<tr><th colspan="2">Control Station</th><th colspan="2">Normal Station</th></tr>
<tr><th>Optical/ coaxial Loop</th><th>Coaxial Bus</th><th>Optical/ coaxial Loop</th><th>Coaxial Bus</th></tr>
<tr><td>SW0095 (149)
•
SW0096 (150)
•
SW0097 (151)
•
SW0098 (152)
*2</td><td>X</td><td>Reverse loop status at each station</td><td>Stores the reverse loop status at each station (including the host station).
0: Normal (including stations with the "highest" and higher station numbers, and reserve stations)
1: Error
The status stored for disconnected stations is the status when the disconnection occurred.
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW0095</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW0096</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW0097</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW0098</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
The figures 1 to 64 in the table are station numbers.</td><td>O</td><td>X</td><td>O</td><td>X</td></tr>
<tr><td>SW0099 (153)</td><td>X</td><td>Loopback stations (forward loop)</td><td>Stores the station numbers of stations at which loopback is executed in a forward loop.
Range: 1 to 64</td><td>O</td><td>X</td><td>O</td><td>X</td></tr>
<tr><td>SW009A (154)
*2</td><td>X</td><td>Loopback stations (reverse loop)</td><td>Stores the station numbers of stations at which loopback is executed in a reverse loop.
Range: 1 to 64</td><td>O</td><td>X</td><td>O</td><td>X</td></tr>
<tr><td>SW00A8 (168)</td><td>X</td><td>Online tests executed / faulty stations (at requesting station)</td><td>Stores information on the online tests executed at the requesting station and the station numbers of faulty stations. (Effective when SB00A9 is ON.)
<table>
<tr><th></th><th>b15 to b8</th><th>b7 to b0</th></tr>
<tr><td>SW00A8</td><td>to</td><td>to</td></tr>
<tr><td></td><td>Station numbers of faulty stations</td><td>Test numbers
10_H: Loop test
20_H: Setting confirmation test
30_H: Station order confirmation test
40_H: Communication test</td></tr>
</table>
The faulty station number to be stored is that of the station whose fault was detected when an online test was conducted. The station that had been disconnected before the online test was performed is not a target and will not be detected.</td><td>O</td><td>O</td><td>O</td><td>O</td></tr>
</table>

Necessity of setting data in the sequence program
....O: The user sets the data X: The data is set automatically.

***2: Valid only when SB0047 is off. When it turns on (error), the last data are retained.**

Table 12.3 List of Special Link Registers (Continued)

Number	Necessity of ON/OFF Control in the Sequence Program	Name	Function	Device Use Possible?			
				Control Station		Normal Station	
				Optical/ coaxial Loop	Coaxial Bus	Optical/ coaxial Loop	Coaxial Bus
SW00A9 (169)	X	Online test results (at requesting station)	Stores the online test results for the requesting station. (Effective when SB00A9 is ON.) 0: Test normal More than 1: Test error details	O	O	O	O
SW00AA (170)	X	Online tests executed (at responding stations)	Stores information on the online tests executed at the responding stations. (Effective when SB00AB is ON.) b15 to b8 b7 to b0 SW00AA: 0 to 0 | to Test numbers 10H: Loop test 20H: Setting confirmation test 30H: Station order confirmation test 40H: Communication test	O	O	O	O
SW00AB (171)	X	Online test result (at responding stations)	Stores the online test result for responding stations. (Effective when SB00AB is ON.) 0: Test normal More than 1: Test error details	O	O	O	O
SW00AC (172)	X	Offline tests executed / faulty stations (at requesting station)	**Stores the offline test items and faulty station on the requesting side. (Valid when the SB00AD is on.) Stations disconnected from the network are not included among the faulty stations because there is no response. Any given station number (0 to 64, 7DH) is saved in the maximum faulty station number (b8 to b15) for the loop test.** b15 to b8 b7 to b0 SW00AC: to | to Maximum faulty station number / Test numbers 3: Loop test (forward loop) 4: Loop test (reverse loop) 5: Station to station test (master station) 6: Station to station test (slave station) 7: Self-loopback test 8: Internal self-loopback test	O	O	O	O
SW00AD (173)	X	Offline test results (at requesting station)	Stores the offline test results for the requesting station. (Effective when SB00AD is ON.) 0: Test normal More than 1: Test error details	O	O	O	O
SW00AE (174)	X	**Off-line testing Execution item (Response side)**	**Stores the request-side offline test items and error stations. (Enabled when SB00AF is on.) When station breaks from network, it is not included with error stations because there is no response.** b15 to b8 b7 to b0 SW00AA: 0 to 0 | to Test numbers 3: Loop test (forward loop) 4: Loop test (reverse loop)	O	O	O	O
SW00AF (175)	X	**Off-line testing results (Response side)**	**Stores results of request-side offline test. (Enabled when SB00AF is on.)** 0: Test normal **Other than 0: Test error content (see the error codes in Section 13.1)**	O	O	O	O

Necessity of setting data in the sequence program
....O: The user sets the data X: The data is set automatically.

Table 12.3 List of Special Link Registers (Continued)

Number	Necessity of ON/OFF Control in the Sequence Program	Name	Function	Device Use Possible? Control Station Optical/ coaxial Loop	Control Station Coaxial Bus	Normal Station Optical/ coaxial Loop	Normal Station Coaxial Bus
SW00B8 (184) *3	X	UNDER on the forward loop side/ coaxial bus UNDER	Accumulates and stores the number of "UNDER" errors on the forward loop side for the optical loop, or the number of "UNDER" errors of the coaxial bus for the coaxial bus. Other than 0: Number of errors	O	O	O	O
SW00B9 (185) *3	X	CRC on the forward loop side/ coaxial bus CRC	Accumulates and stores the number of "CRC" errors on the forward loop side for the optical loop, or the number of "CRC" errors of the coaxial bus for the coaxial bus. Other than 0: Number of errors	O	O	O	O
SW00BA (186) *3	X	OVER on the forward loop side/ coaxial bus OVER	Accumulates and stores the number of "OVER" errors on the forward loop side for the optical loop, or the number of "OVER" errors of the coaxial bus for the coaxial bus. Other than 0: Number of errors	O	O	O	O
SW00BB (187) *3	X	Short frame on the forward loop side/ coaxial bus short frame	Accumulates and stores the number of "short frame" errors on the forward loop side for the optical loop, or the number of "short frame" errors of the coaxial bus for the coaxial bus. Other than 0: Number of errors	O	O	O	O
SW00BC (188) *3	X	Abort on the forward loop side (AB. IF)/ coaxial bus abort (AB. IF)	Accumulates and stores the number of "AB. IF" errors on the forward loop side for the optical loop, or the number of "AB. IF" errors of the coaxial bus for the coaxial bus. Other than 0: Number of errors	O	O	O	O
SW00BD (189) *3	X	Timeout on the forward loop side (TIME)/ coaxial bus timeout (TIME)	Accumulates and stores the number of "TIME" errors on the forward loop side for the optical loop, or the number of "TIME" errors of the coaxial bus for the coaxial bus. Other than 0: Number of errors	O	O	O	O
SW00BE (190) *3	X	Receiving 2k bytes or more on forward loop side (DATA)/ coaxial bus receiving 2k bytes or more (DATA)	Accumulates and stores the number of "DATA" errors on the forward loop side for the optical loop, or the number of "DATA" errors of the coaxial bus for the coaxial bus. Other than 0: Number of errors	O	O	O	O
SW00BF (191) *3	X	DPLL error on the forward loop side/ coaxial bus DPLL error	Accumulates and stores the number of "DPLL" errors on the forward loop side for the optical loop, or the number of "DPLL" errors of the coaxial bus for the coaxial bus. Other than 0: Number of errors	O	O	O	O

Necessity of setting data in the sequence program .... O: The user sets the data X: The data is set automatically.

***3: To reset the SW00B8 to SW00C7, turn on the SB0006.**
The number of times information stored in the SW00B8 to SW00C7 will not cause any problems if they are counted up gradually over a long period of time. If they are counted up rapidly in a short period of time (while monitoring with peripheral devices, etc.), the cable may be faulty.

Table 12.3 List of Special Link Registers (Continued)

Number	Necessity of ON/OFF Control in the Sequence Program	Name	Function	Device Use Possible? Control Station Optical/ coaxial Loop	Control Station Coaxial Bus	Normal Station Optical/ coaxial Loop	Normal Station Coaxial Bus
SW00C0 (192) *3	X	Reverse loop UNDER	Stores the cumulative total of UNDER errors for the reverse loop. More than 0 : Error count	O	O	O	O
SW00C1 (193) *3	X	Reverse loop CRC	Stores the cumulative total of CRC errors for the reverse loop. More than 0 : Error count	O	O	O	O
SW00C2 (194) *3	X	Reverse loop OVER	Stores the cumulative total of OVER errors for the reverse loop. More than 0 : Error count	O	O	O	O
SW00C3 (195) *3	X	Reverse loop short frame	Stores the cumulative total of "short frame" errors for the reverse loop. More than 0 : Error count	O	O	O	O
SW00C4 (196) *3	X	Reverse loop abort (AB. IF)	Stores the cumulative total of "AB. IF" errors for the reverse loop. More than 0 : Error count	O	O	O	O
SW00C5 (197) *3	X	Reverse loop time out (TIME)	Stores the cumulative total of "TIME" errors for the reverse loop. More than 0 : Error count	O	O	O	O
SW00C6 (198) *3	X	Reverse loop 2 kbytes error receive (DATA)	Stores the cumulative total of "DATA" errors for the reverse loop. More than 0 : Error count	O	O	O	O
SW00C7 (199) *3	X	Reverse loop DPLL error	Stores the cumulative total of DPLL errors for the reverse loop. More than 0 : Error count	O	O	O	O
SW00C8 (200) *4	X	**Number of retries on the forward loop side/ coaxial bus retries error**	**Accumulates and stores the number of retries on the forward loop side for the optical loop, or the number of retries of the coaxial bus for the coaxial bus. Other than 0 : Number of errors**	O	O	O	O
SW00C9 (201) *4	X	Reverse loop retry frequency	Stores the cumulative total of transmission retries in the reverse loop. More than 0 : Error count	O	O	O	O

Necessity of setting data in the sequence program .... O: The user sets the data X: The data is set automatically.

***3: To reset the SW00B8 to SW00C7, turn on the SB0006.**
The number of times information stored in the SW00B8 to SW00C7 will not cause any problems if they are counted up gradually over a long period of time. If they are counted up rapidly in a short period of time (while monitoring with peripheral devices, etc.), the cable may be faulty.

*4: The count may show a number of errors when the power is switched on or off due to resetting but this does not indicate a fault.
If the retry frequency before the data link was started is not required it can be cleared by using SB0005.

Table 12.3 List of Special Link Registers (Continued)

Number	Necessity of ON/OFF Control in the Sequence Program	Name	Function	Device Use Possible?			
				Control Station		Normal Station	
				Optical/ coaxial Loop	Coaxial Bus	Optical/ coaxial Loop	Coaxial Bus
SW00CC (204) *5	X	Forward loop line error count	Stores the cumulative total of errors detected in the forward loop line. More than 0 : Line error detection count	O	X	O	X
SW00CD (205) *6	X	Reverse loop line error count	Stores the cumulative total of errors detected in the reverse loop line. More than 0 : Line error detection count	O	X	O	X
SW00CE (206) *7	X	Loop switching frequency	Stores the cumulative total of loop switches made. More than 0 : Loop switching count	O	X	O	X
SW00CF (207) *7	X	Loop switching data pointer	Stores the pointer that sets the next loop switching data.	O	X	O	X
SW00D0 (208) to SW00DF (223) *7	X	Loop switching data	Stores the cause of loop switching and the condition after loop switching. A setting in the common parameters determines whether this data is overwritten or preserved. b15 to b8 b7 b6 b5 b4 b3 b2 b1 b0 SW00D0 to SW00DF [to] Switching factor Condition after switching <Switching factor> The bit corresponding to the relevant error is set to "1" All "0" : Normal recovery b0 : Forward loop hardware error b1 : Reverse loop hardware error b2 : Forward loop forced error b3 : Reverse loop forced error b4 : Forward loop continuous communication error b5 : Reverse loop continuous communication error b6 : Forward loop continuous line error b7 : Reverse loop continuous line error <Condition after switching> 0 : Duplex transmission 1 : Data link by forward loop 2 : Data link by reverse loop 3 : Data link by loopback	O	X	O	X

Necessity of setting data in the sequence program .... O: The user sets the data X: The data is set automatically.

*5: SW00CC is reset by switching SB0007 ON.
*6: SW00CD is reset by switching SB0008 ON.
*7: SW00CD to E7 are reset by switching SB0009 ON.

Table 12.3 List of Special Link Registers (Continued)

Number	Necessity of ON/OFF Control in the Sequence Program	Name	Function	Device Use Possible?			
				Control Station		Normal Station	
				Optical/ coaxial Loop	Coaxial Bus	Optical/ coaxial Loop	Coaxial Bus
SW00E0 (224) to SW00E7 (231) *7 *8	X	Switching request station	Stores the station number of the station that requested the loop switch. SW00E0 to SW00E7: b15 to b8: Stations for which the number of requests is odd; b7 to b0: Stations for which the number of requests is even	O	X	O	X
SW00EE (238) *9	X	Transient transmission error	Stores the cumulative total of transient transmission errors. More than 0 : Error count	O	O	O	O
SW00EF (239) *9	X	Transient transmission error pointer	Stores the pointer for storing the data for the next transient transmission error.	O	O	O	O
SW00F0 (240) to SW00FF (255) *2	X	Transient transmission error history	Stores the transient transmission error codes.	O	O	O	O

Necessity of setting data in the sequence program .... O: The user sets the data X: The data is set automatically.

***2: Valid only when SB0047 is off. When it turns on (error), the last data are retained.**

*7: SW00CD to E7 are reset by switching SB0009 ON.

*8: The loop switching request is made by the station that detects the loop error first, which means that a station other than one of those at either end of the loop may be stored as the loop switching request station.

*9: SW00EE to EF are reset by switching SW000A ON.

12.3.2 Situation when the network module is mounted on an AnS/AnN/AnACPU

In contrast to the situation when a network module is mounted to an AnUCPU, the special relays (SB) are automatically allocated to the D devices of the CPU.
The special link relays are shown in Table 12.4.

Table 12.4 List of Special Link Relays

<table>
<tr><th rowspan="3">Number</th><th rowspan="3">Necessity of ON/OFF Control in the Sequence Program</th><th rowspan="3">Name</th><th rowspan="3">Function</th><th colspan="2">Device Use Possible?</th></tr>
<tr><th colspan="2">Normal Station</th></tr>
<tr><th>Optical/ coaxial Loop</th><th>Coaxial Bus</th></tr>
<tr><td>D9243</td><td>X</td><td>Host station station No.</td><td>Stores the station number of the host station.
Range : 0 to 64</td><td>O</td><td>O</td></tr>
<tr><td>D9244</td><td>X</td><td>Highest station No.</td><td>Stores the highest station number set in the common parameters.
Range : 1 to 64
If the common parameters have not been received, "64" is set.</td><td>O</td><td>O</td></tr>
<tr><td>D9245</td><td>X</td><td>Communication error count</td><td>Stores the cumulative total of communication errors.
More than 0 : Communication error count</td><td>O</td><td>O</td></tr>
<tr><td>D9248
•
D9249
•
D9250
•
D9251</td><td>X</td><td>CPU RUN status at other stations</td><td>Stores the CPU RUN status at other stations.
0 : RUN or STEP RUN status (including stations with the "highest" and higher station numbers, and reserve stations)
1 : STOP, PAUSE, ERROR
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>M9248</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>M9249</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>M9250</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>M9251</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
The figures 1 to 64 in the table are station numbers.</td><td>O</td><td>O</td></tr>
</table>

Necessity of ON/OFF control in the sequence program
. . . .O: The user controls the ON/OFF status X: Switched ON and OFF automatically.

Table 12.4 List of Special Link Relays (Continued)

<table>
<tr><th rowspan="3">Number</th><th rowspan="3">Necessity of ON/OFF Control in the Sequence Program</th><th rowspan="3">Name</th><th rowspan="3">Function</th><th colspan="2">Device Use Possible?</th></tr>
<tr><th colspan="2">Normal Station</th></tr>
<tr><th>Optical/ coaxial Loop</th><th>Coaxial Bus</th></tr>
<tr><td>D9252
•
D9253
•
D9254
•
D9255</td><td>X</td><td>Data link condition at other stations</td><td>Stores the data link condition at other stations.
0 : Data link operating (including stations with the "highest" and higher station numbers, and reserve stations)
1 : Data link not operating
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>M9252</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>M9253</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>M9254</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>M9255</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
The figures 1 to 64 in the table are station numbers.</td><td>O</td><td>O</td></tr>
</table>

Necessity of ON/OFF control in the sequence program
....O: The user controls the ON/OFF status X: Switched ON and OFF automatically.

12.4 SB/SW Valid for Offline Diagnostics

During offline diagnostics, most SB/SW are invalid but the following SB/SW are valid. Note that valid SB/SW are only those of the control station.

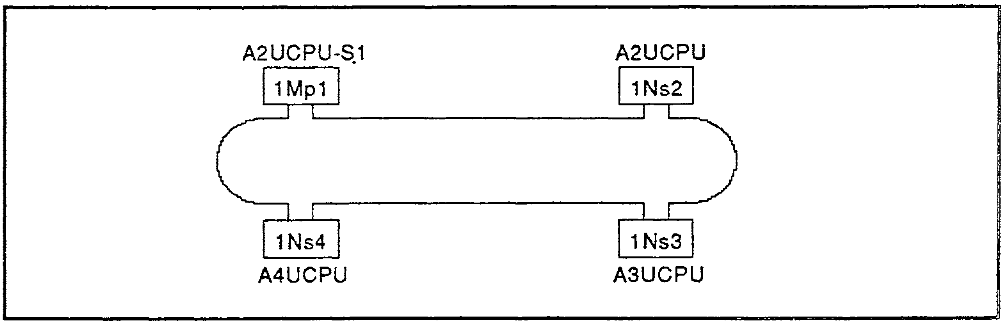
Valid SB/SW		Mode Setting Switch		
		3	4	5~8
SB	00AC	○	○	○
	00AD	○	○	○
SW	0047	×	×	○
	0048	×	×	○
	0049	×	×	○
	0070~73	○	○	×
	00AC	○	○	○
	00AD	○	○	○

○: Valid ×: Invalid

12.5 Program Example for Reading/Writing Data of Other Stations

This section presents an example of a program for reading/writing the data of other stations using ZNRD and ZNWR instructions.
The program example is explained through the system configuration indicated below and the link parameter settings.

<System Configuration>



<"Set Number of Modules" Settings>

NUMBER OF NETWORK MODULES (1-4)[1]

EFFECTIVE MODULE NUMBER[1]

	MODULE NO.1	MODULE NO.2	MODULE NO.3	MODULE NO.4
HEAD I/O NO.	[00]	[ ]	[ ]	[ ]
NETWORK MODULE TYPE	[2]	[ ]	[ ]	[ ]
	1 : MELSECNET/10 (DEFAULT PARAMETER) 2 : MELSECNET/10 (CONTROL STATION) 3 : MELSECNET/10 (NORMAL STATION)		4 : MELSECNET/10 (REMOTE I/O) 5 : MELSECNET II (MASTER STATION) 6 : MELSECNET II (LOCAL STATION)	
NETWORK No.	[1]	[ ]	[ ]	[ ]

<Network Refresh Parameters>

[SETTING 1] NETWORK MODULE NUMBER [1]

LB ↔ B TRANSFER	HEAD LB No. [0000] ↔ HEAD B [0000] TRANSFER SIZE [2000] H POINTS
LW ↔ W TRABSFER	HEAD LW No. [0000] ↔ HEAD W [0000] TRANSFER SIZE [2000] H POINTS
LX ↔ X TRANSFER	HEAD LX No. [0000] ↔ HEAD X [0000] TRANSFER SIZE [0000] H POINTS
LY ↔ Y TRANSFER	HEAD LY No. [0000] ↔ HEAD Y [0000] TRANSFER SIZE [0000] H POINTS
SB TRANSFER DEVICE	HEAD SB No. [0000] ↔ DESTINATION [Y1C00] TRANSFER SIZE [100] H POINTS
SW TRANSFER DEVICE	HEAD SW No. [0000] ↔ DESTINATNION [D7168] TRANSFER SIZE [100] H POINTS
LB ↔ EXTENSION TRANSFER	HEAD LB No. [ ] ↔ BLOCK [ ] HEAD No. [ ] TRANSFER SIZE [ ] H POINTS

<Common Parameters>

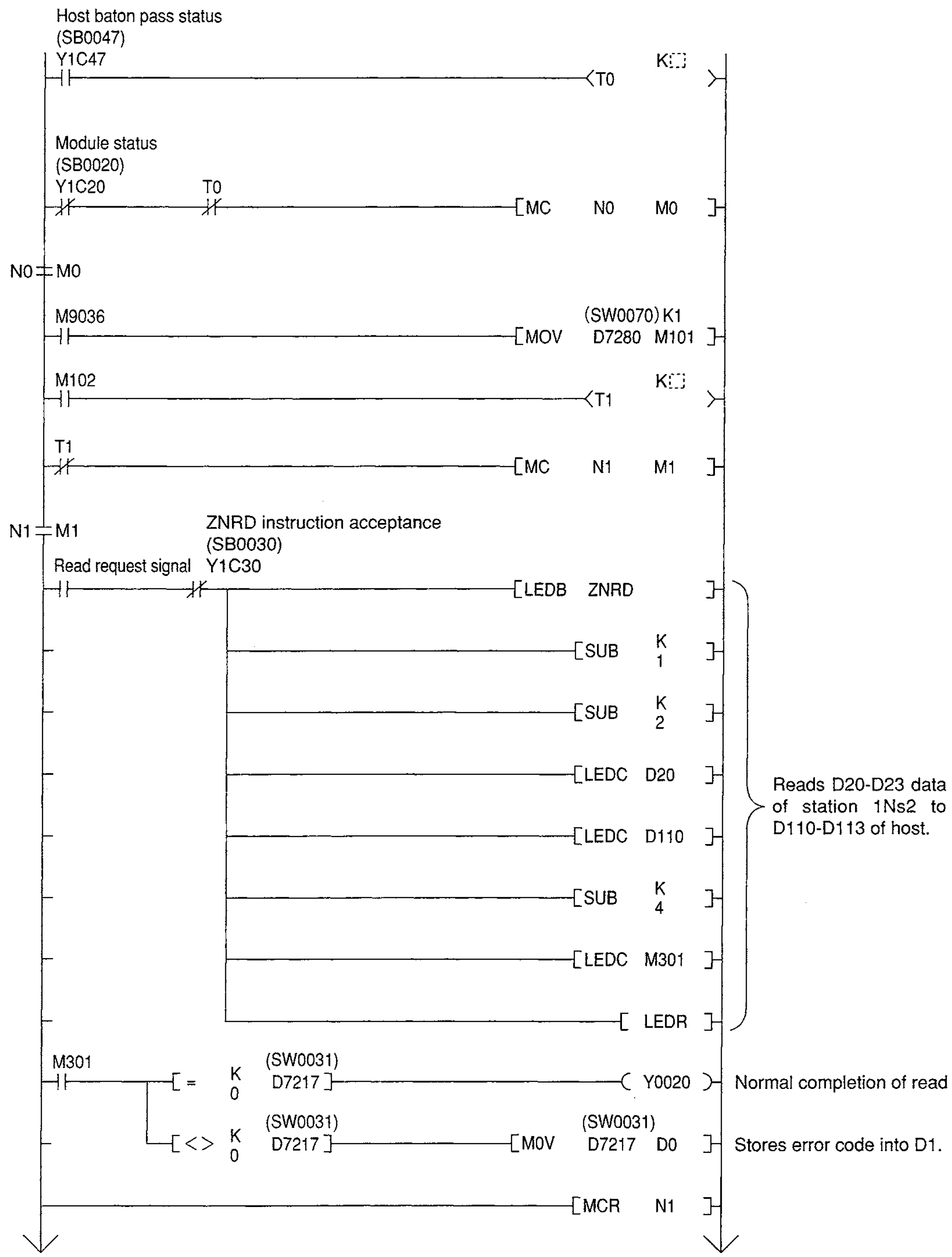
NETWORK MODULE NUMBER
1

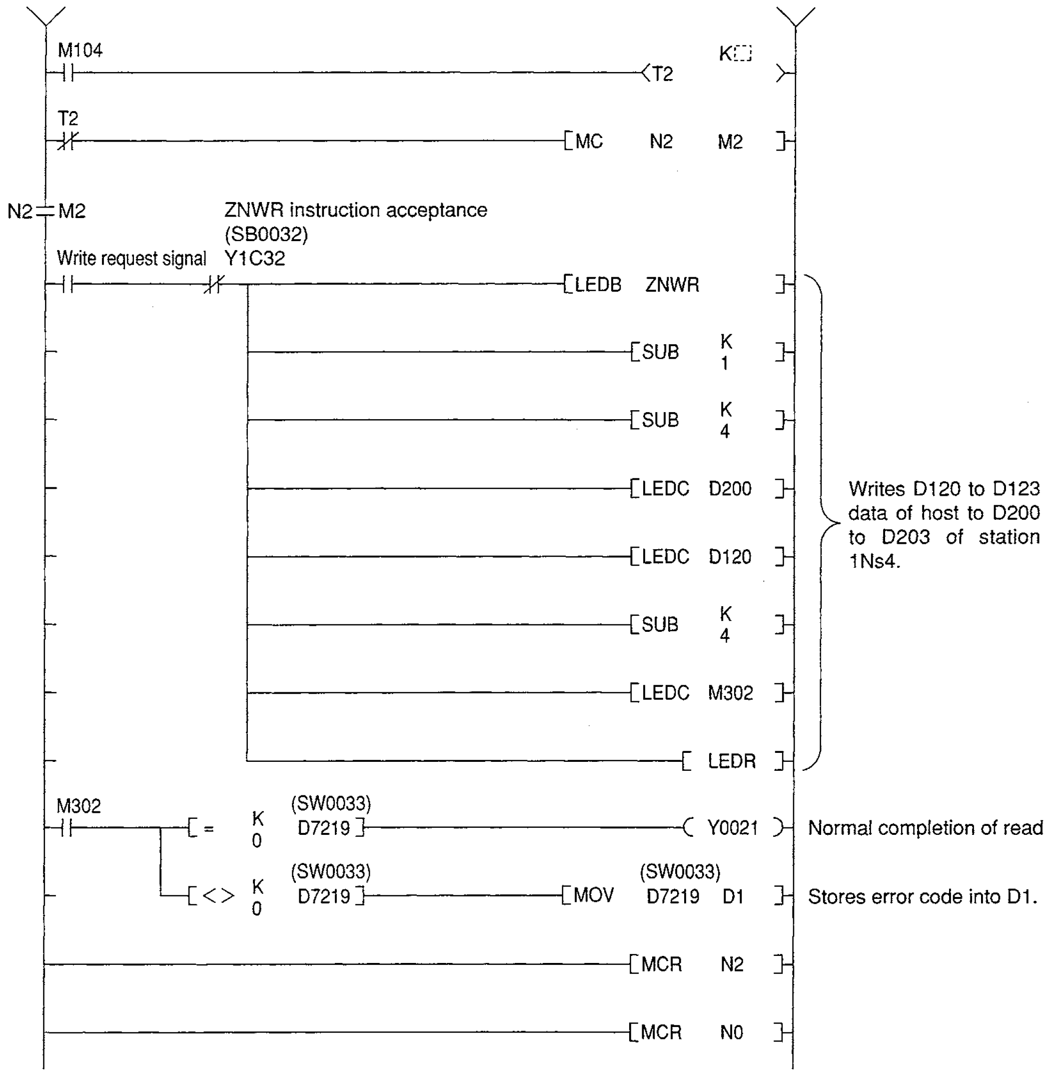
TOTAL NUMBER OF LINK STATIONS	W.D.T. X 10ms
4	200

RESERVE	STATION NUMBER	TRANSMISSION RANGE OF EACH STATION	
		LB	LW
	1	0000 — 01FF	0000 — 01FF
	2	0200 — 03FF	0200 — 03FF
	3	0400 — 05FF	0400 — 05FF
	4	0600 — 07FF	0600 — 07FF
	5	—	—

<Program Example>

An example program in which data D20 to D23 of station 1Ns2 is read into D110 to D113 of the host station, and the data of D120 to D123 is written to D200 to D203 of station 1Ns4 in accordance with the sequence program of station 1Mp1 is described here.
When writing a program for transient transmission, refer to the method for checking the link condition of the network module and the method for checking the execution result of ZNRD/ZNWR instructions.





∗ As the constant K of the timer, set a value about five times larger than the link scan time.

If data link is performed normally, the baton pass status (SB0070, SW0070 to 73) and cyclic transmission status (SB0074, SW0074 to 77) signals may turn on (error) only instantaneously.
Hence, write a program that will use timers to bring about a completely abnormal status to stop control.
A value five times larger than the link scan time is merely a guideline.

REMARK

(1) There are the following factors behind an error in baton pass status (SB0070, SW0070 to 73).
- Offline status (including test mode)
- Overlapping station numbers
- No setting of network refresh parameter (module type setting)
- Cable breakage

(2) For details on the ZNRD/ZNWR instructions, refer to the "Type AnSHCPU/AnACPU/AnUCPU/QCPU-A (A Mode) Programming Manual (Dedicated Instructions)".

13. TROUBLESHOOTING

In order to ensure that the system operates reliably it is of course essential to start it up properly, but another important factor is the ability to make a full recovery quickly when an error occurs.
This chapter deals with the detection of errors and the corrective action to take when errors are detected.

13.1 Error Codes

If normal communication is not possible when performing transient transmission from equipment such as a computer link module or a peripheral device, an error code (hexadecimal) will be stored.
The meanings of error codes and the appropriate corrective action to take in response to them are presented in Table 13.1.

Table 13.1 Error Code List

Error Code	Meaning	Corrective Action
4000 to 4FFF	(Error detected by the CPU module)	Take measures referring to the troubleshooting section of the CPU module User's Manual.
F101	Initial status	
F102	Initial status	
F103	Initial status (online test in progress)	
F104	Control station/sub-control station shift status	
F105	Initial status	
F106	Control station/sub-control station shift status	
F107	Baton passing error (baton missing)	Take measures so that SB0047 (baton pass status)/SB0049 (data link status) turns off (become normal). Check for cable fault, improper cable connection, noise, wiring mistake, absence of terminating resistor, etc. Conduct a setting confirmation test to check the network setting status for overlapping station numbers, overlapping control stations and so forth.
F108	Baton passing error (baton duplicated)	
F109	Initial status (online test in progress)	Wait until SB0047 (baton passing status)/SB0049 (data link status) is OFF (normal).
F10A	Initial status (online test/offline test in progress)	
F10B	Station number duplicated	Correct the station numbers.
F10C	Control station duplicated	Correct the control station setting.
F10D	Offline status	Set to online.
F10E	Receive error retry "over"	Check for cable faults, hardware faults, noise, miswiring, failure to connect a terminal resistor (in the case of a bus), setting of the same station number twice, and setting of more than one control station.
F10F	Transmission error retry "over"	
F110	Time out error	
F111	Error at relevant station	Review the status of the relevant station and review the switch settings (check if there is a parameter error and check that the relevant station is set correctly at the control station).
F112	Loop status error	Check for cable faults, hardware faults, noise, miswiring, setting of the same station number twice, and setting of more than one control station.
F113	Transmission failure	Retry after waiting for a while. If the second attempt also results in failure, check for cable faults, hardware faults, noise, miswiring, failure to connect a terminal resistor (in the case of a bus), setting of the same station number twice, and setting of more than one control station. Review the parameters and switch settings. (Check if there is a parameter error and check that the relevant station is set correctly at the control station.)

Table 13.1 Error Code List (Continued)

Error Code	Meaning	Corrective Action
F114	Transmission failure	Retry after waiting for a while. If the second attempt also results in failure, check for cable faults, hardware faults, noise, miswiring, failure to connect a terminal resistor (in the case of a bus), setting of the same station number twice, and setting of more than one control station.
F115	Improper function code	Check for faulty cables, faulty hardware, incorrect wiring, duplication of station numbers, and duplication of control stations.
F116	Delayed online processing	
F117	Transmission failure	Check for cable faults, hardware faults, noise, failure to connect a terminal resistor (in the case of a bus), and miswiring.
F118	Initial status (baton regeneration)	Wait until SB0047 (baton passing status)/SB0049 (data link status) is OFF (normal).
F11A	Transmission failure (duplex loop transmission stopped)	Retry after waiting a while.
F11B	Disconnection	Review the parameter and switch settings (check if there is a parameter error and check that the relevant station is set correctly at the control station). Check for cable faults, hardware faults, noise, miswiring, setting of the same station number twice, and setting of more than one control station.
F11C	System error	The hardware of the network module is faulty. Contact your local Mitsubishi representative.
F11F	Initial status (no baton for the host station)	Review the parameter and switch settings (check if there is a parameter error and check that the relevant station is set correctly at the control station).
F120	Destination station specification error	Check for faulty cables, faulty hardware, incorrect wiring, absence of terminating resistor (in the case of the bus), and duplication of station numbers, control stations, and remote master stations.
F122	Transmission failure (in the case of a bus)	Check for disconnection or looseness of the coaxial cable, failure to connect a terminal resistor, and cable faults.
F220	System error	The hardware of the network module is faulty. Contact your local Mitsubishi representative.
F221		
F222	No vacancy in the receive buffer ("buffer full" error)	Retry after waiting a while. If the second attempt also results in an error, review the total number of transient transmissions in the system and the communication interval, and check for errors at the destination CPU such as absence of receive processing (END processing).
F701	Designated station No. error • (When sending data: Attempt made to send data to station "0". When receiving data: A message not intended for the host station has been received.) • An attempt was made to send data to the master station but it was down.	Correct the destination station number.
F702	Destination station No. error (ZNWR instruction) (The destination station number is outside the applicable range; i.e. it is "65" or higher.)	Correct the destination station number.
F703	Destination group No. error (ZNWR instruction) (The destination group number is outside the applicable range; i.e. 10 (8AH) or higher has been specified.)	Correct the destination group number.
F705	Destination CPU error (destination hardware error)	Check the destination CPU.

Table 13.1 Error Code List (Continued)

Error Code	Meaning	Corrective Action
F706	Received data error	The cable is faulty, or The hardware of the network module is faulty. If a communication error has occurred, review the cable. If not, the hardware of the network module is faulty. Contact your local Mitsubishi representative.
F707	Number of relay stations error (A destination outside the applicable relay range has been designated; there are 8 or more relay stations.)	Set appropriate destination stations. Review the system.
F708	Receiving group number error	Review the group number of the target station.
F709	Network No. error when receiving (the received network number is not correct)	Review the network number.
F70A	System error	The cable is faulty, or the hardware of the network module is faulty. If a communication error has occurred, review the cable. If not, the hardware of the network module is faulty. Contact your local Mitsubishi representative.
F70B	Response waiting time out	Retry after waiting a while.
F70C F70D	System error	The cable is faulty, or the hardware of the network module is faulty. If a communication error has occurred, review the cable. If not, the hardware of the network module is faulty. Contact your local Mitsubishi representative.
F781	System error	The hardware of the CPU or network module is faulty. Contact your local Mitsubishi representative.
F782	Connection target specification error	Check if C24 connection or CC-Link connection is specified for access to other stations. If the setting is correct, the hardware of the CPU or network module is faulty. Contact your local Mitsubishi representative.
F783	System error	The hardware of the network module is faulty. Contact your local Mitsubishi representative.
F800	Mode switching error	Correct the hardware switch settings.
F801	Network No. error	
F802	Group number error	
F803	Station No. error	
F804	DIP switch error	
F805 F808 F809 F80A F80B F811 F812	System error	The hardware of the network module is faulty. Contact your local Mitsubishi representative.
F820	Link parameter error	Change the network type of the normal station to that of the control station. Create and write new network parameters to the PLC. If the error recurs, the hardware of the CPU or network module is faulty. Contact your local Mitsubishi representative.

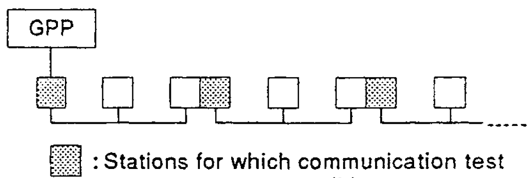
Table 13.1 Error Code List (Continued)

Error Code	Meaning	Corrective Action
F821	Station-specific parameter error	Review station-specific parameters. Set common parameters≧station-specific parameters for the sending range of the host station. If no station-specific parameters are set, the hardware of the CPU or network module is faulty. Contact your local Mitsubishi representative.
F822	System error	The hardware of the CPU or network module is faulty. Contact your local Mitsubishi representative.
F823	Parameter matching error (The transmission range for each station is smaller in the common parameters than in the station specific parameters.)	Correct the common parameters or the station specific parameters at each station.
F825	CPU parameter check error	Rewrite the network parameters for the control station to the PLC. If the error recurs, the hardware of the CPU or network module is faulty. Contact your local Mitsubishi representative.
F826	Time conveyor error (The parameters at the host station are older than the parameters received from the sub-control station.)	Review the parameters at the sub-control station and/or reset the host station.
F827	No automatic return	Execute processing with no automatic return function.
F828	Control station shift function not set	Execute processing on the understanding that there is no control station shift function.
F830 F831	System error	The hardware of the CPU or network module is faulty. Contact your local Mitsubishi representative.
F832	Start rejected (Start attempted under conditions that do not allow starting)	If all stations are stopped, start all stations. Do not perform an automatic start if there is a stop designation from another station.
F833	Key word error (Start executed from a station other than a stopped station.)	Execute the start from a stopped station. Execute a forced start.
F834 F835 F836	System error	The cable is faulty, or the hardware of the network module is faulty. If a communication error has occurred, review the cable. If not, the hardware of the network module is faulty. Contact your local Mitsubishi representative.
F837	Retry frequency "over"	Check the status of the control station. (Has it been reset, or has an error occurred, part way through?)
F838	Time out of corresponding timer	Check the status of the control station. (Has it been reset, or has an error occurred, part way through?)
F839	Communication impossible (SW0056 is "0")	Remedy the cause of the disconnection.
F83A	SW0000 request is outside the applicable range.	Correct the data of SW0000.
F901	System error	The hardware of the network module is faulty. Contact your local Mitsubishi representative.
F902	Routing count error	When the routing function is used to connect multiple network systems, transmission from the request source should be made within eight network systems (within seven relay stations).
F903 F904	System error	The hardware of the CPU or network module is faulty. Contact your local Mitsubishi representative.
F905	System error	The hardware of the network module is faulty. Contact your local Mitsubishi representative.
F906	Relay destination CPU error	Check the relay destination CPU. (Destination hardware error)
F981	System error	The hardware of the network module is faulty. Contact your local Mitsubishi representative.

Table 13.1 Error Code List (Continued)

Error Code	Meaning	Corrective Action
F982	Received transient transmission data cannot be processed.	Check for wrong target station and relay station numbers. (The CPU module or network module at the target station and relay station that requested the transient transmission function does not support the requested function.)
FA20	Master station routing parameter error	Correct the master station routing parameters.
FA21	Network No., station No., or module No. setting error	Correct the network No., station No. or module No.
FA22	Master station error	Set the routing parameters
FA25	ZNFR/ZNTO execution error (Buffer memory address designation, number of points designation error)	Correct the ZNFR/ZNTO instruction
FA26	Special function module handshake error	Make sure that the ZNFR/ZNTO instruction is executed with respect to a special function module.
FA30	I/O allocation error	Correct the I/O allocations
FA31	LB/LW allocation error	Correct the common parameters (LB/LW)
FA32	Illegal allocation error	Check the mounted modules.
FA33	Number of mounted intelligent special function modules error	Mount a maximum of two.
FA34	Special function module sum check error	Check the special function module. → Change it.
FA35	I/O module verify error	Check if the module is mounted securely.
FA36	Fuse blown error	Check the output module.
FC01 FC02 FC03	System error	The hardware of the network module is faulty. Contact your local Mitsubishi representative.
FD01	CRC error (offline test)	Retry. (However, if errors occur frequently, check for cable faults, hardware faults, noise, failure to connect a terminal resistor (in the case of a bus), and miswiring.)
FD02	Overrun error (offline test)	
FD03	AB.IF error (offline test)	
FD04	TIME error (offline test)	
FD05	Data error (offline test)	
FD06	Underrun error (offline test)	
FD07	Transmission failure	Retry. (However, if errors occur frequently, check for cable faults, hardware faults, noise, failure to connect a terminal resistor (in the case of a bus), and miswiring.)
FD08	Transmission failure (in the case of a bus)	Check for disconnection or looseness of the coaxial cable, failure to connect a terminal resistor, and cable faults.
FD09	Loop status changes during data link operation (offline loop test)	Retry. (Do not execute loop switching part way through.) However, if the problem occurs frequently, check the line and wiring.
FD0A	Communication unstable (offline loop test)	Retry. (However, if errors occur frequently, check for cable faults, hardware faults, noise, failure to connect a terminal resistor (in the case of a bus), and looseness.)
FD0B	Wiring error (offline loop test)	Check the wiring.
FD0C	System error	There is a problem with the hardware of the network module. Contact our branch office or agency responsible for your area.
FD11	"Test in progress" error	Execute the operation after the test instigated by another station is completed.
FD12	Disconnection error	Remedy the cause of the disconnection.

13.1 Error Code List (Continued)

Error Code	Meaning	Corrective Action
FD13	Number of stations abnormal error (• Online diagnosis in accordance with parameter designations was executed when parameters were not set. • Online diagnosis was executed while the total number of link stations, or number of stations, set in the common parameters was a value smaller than the host station number.)	• Execute online diagnosis after setting the total number of link stations in the common parameters. • Designate a station number that is the same as or higher than the host station station number. Or execute online diagnosis from a station number than is equal to or lower than the designated number of stations.
FD14	System error	The hardware of the network module is faulty. Contact your local Mitsubishi representative.
FD15		
FD16	Online diagnostic retry excess	Check for cable fault, improper cable connection, noise and wiring mistake.
FD17	System error	The hardware of the network module is faulty. Contact your local Mitsubishi representative.
FD18		
FD19		
FD1A	Same station number allocated twice (station order confirmation test)	Check the stations to which the station number is allocated and correct the problem.
FD1B	"Test stopped" error	A station executing a test has been stopped during test execution, for example by resetting. There is a faulty station on the line.
FD1C	Test stopped by loop switching	Retry. (Do not execute loop switching part way through.) However, if the problem occurs frequently, check the line and wiring.
FD1D	System error	The hardware of the network module is faulty. Contact your local Mitsubishi representative.
FD1E	Test impossible with bus type used	Perform a test that is possible with the bus type being used.
FD31	Duplicated online diagnosis request (Online diagnosis requests made simultaneously)	Wait until one online diagnosis operation has finished before requesting another one.
FD32	System error	The hardware of the network module is faulty. Contact your local Mitsubishi representative.
FD33		
FD35	Time out while waiting for response	Retry after waiting a while. Check the status of the relevant station and the line.
FD36	Time out while waiting for correspondence	
FD38	Text duplication error	
FD39	Test request destination is the host station (communication test)	Change the test request destination.
FD3A	Test request destination is an inapplicable station (communication test)	The station for which the test request was designated is not an acceptable one.  : Stations for which communication test requests are not possible
FE20	Data error (A station whose CPU is stopped and which cannot process the data has been designated.)	Correct the routing parameters or change the stopped station to an AnUCPU.
FE21	LRDP/LWDP device range error	Check the device range at the communicating CPU. The ZNRD/ZNWR instruction was executed for the AnN/AnA/AnS (H) CPU. Correct the program.
FE22	AnUCPU request error	Error such as data length error

13.1 Error Code List (Continued)

Error Code	Meaning	Corrective Action
FF01	System error	The hardware of the network module is faulty. Contact your local Mitsubishi representative.
FF03		
FF04		
FF05		
FF06		
FF10		
FF11		
FF12		
FF13		
FF20		
FF21		
FF22		
FF30		
FF31		
FF32		
FF33		
FF34		
FF40		
FF80		

13.2 Troubleshooting

This section describes simple troubleshooting procedures.
If a problem occurs during data link operation, check the link status using the following steps in the order they are presented here.

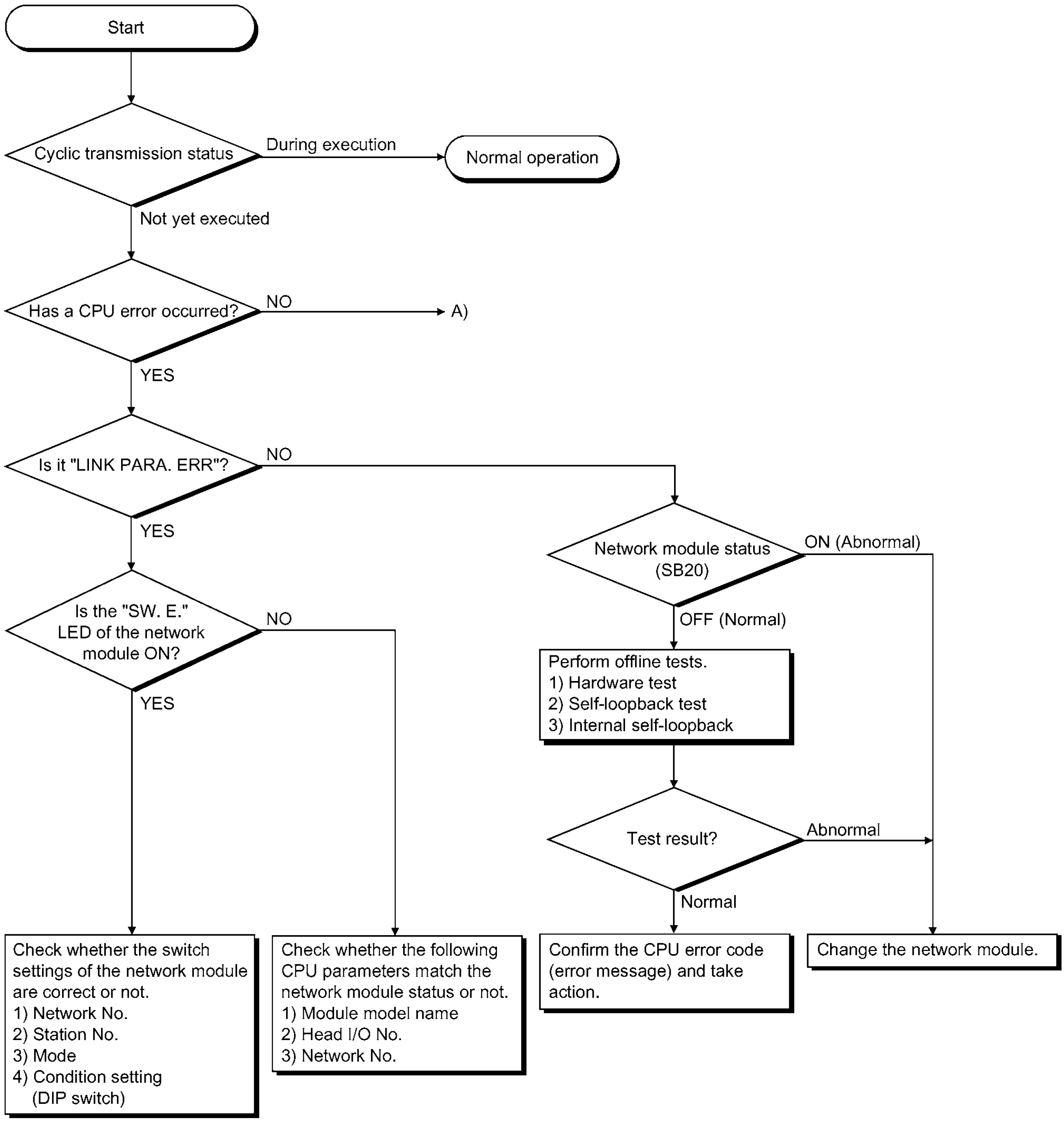
(1) Check the status of the line and the status of other stations by performing network monitoring at a peripheral device (see section 6.1).

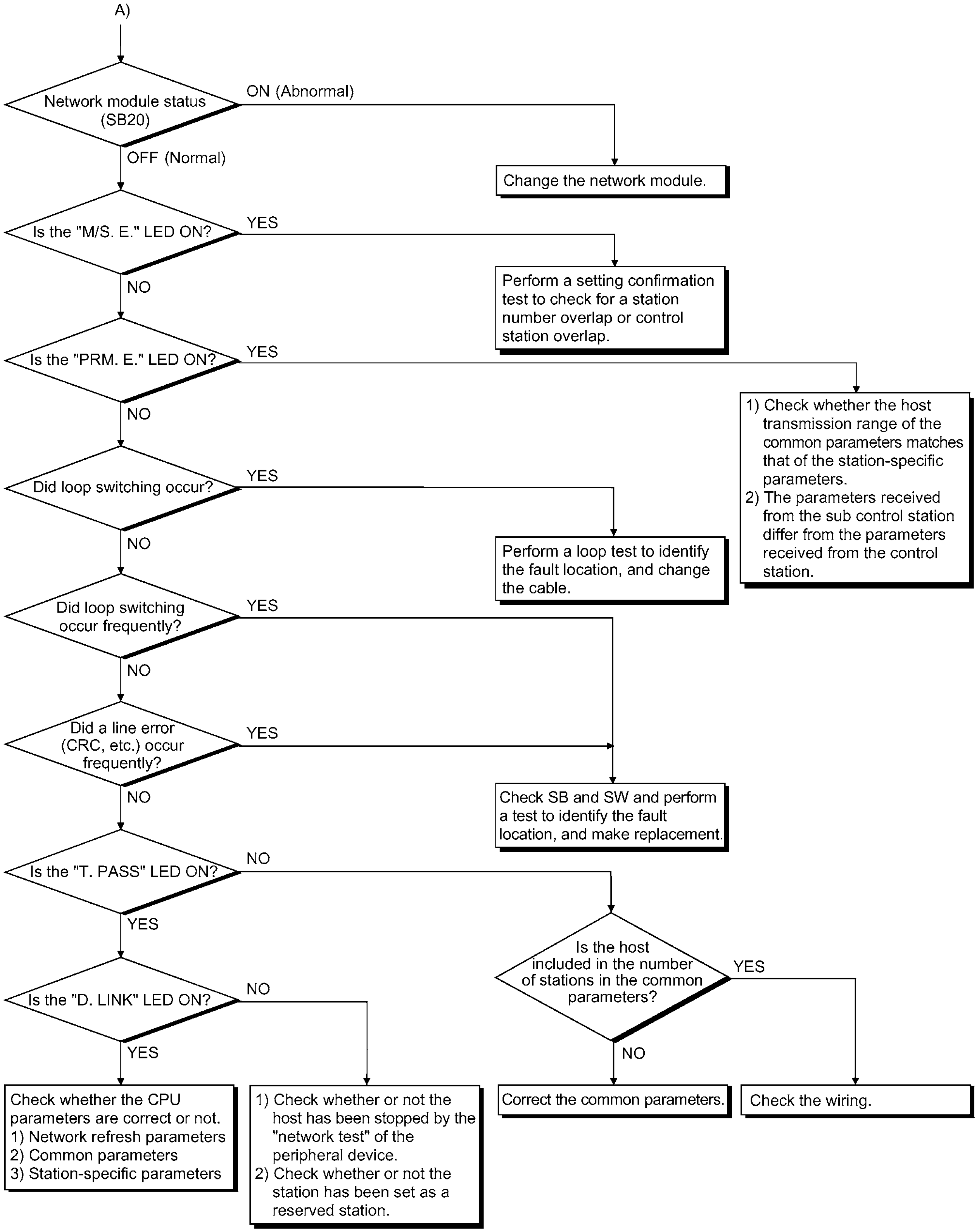
(2) Check the lit/unlit status of the LEDs on the network module at the station at which the communication error has occurred (see sections 3.1 and 3.2).

REMARK

In order to ensure fast and complete recovery from problems that occur during data link operation, it is important to check the hardware settings of the network module and the connection of the data link cables on starting up the system.
It is important to carry out the following procedures relating to the network module properly: setting the hardware settings, connection of the data link cables, and performance of offline diagnosis (hardware test, internal self-loopback test, station to station test, reverse loop/forward loop test, etc.). The relevant procedures are described in chapter 3 "SETTINGS AND CONNECTIONS OF THE NETWORK MODULE".

A simple troubleshooting flowchart is shown below.




A)
Network module status (SB20)
ON (Abnormal)
Change the network module.
OFF (Normal)
Is the "M/S. E." LED ON?
YES
Perform a setting confirmation test to check for a station number overlap or control station overlap.
NO
Is the "PRM. E." LED ON?
YES
1) Check whether the host transmission range of the common parameters matches that of the station-specific parameters.
2) The parameters received from the sub control station differ from the parameters received from the control station.
NO
Did loop switching occur?
YES
Perform a loop test to identify the fault location, and change the cable.
NO
Did loop switching occur frequently?
YES
NO
Did a line error (CRC, etc.) occur frequently?
YES
Check SB and SW and perform a test to identify the fault location, and make replacement.
NO
Is the "T. PASS" LED ON?
NO
Is the host included in the number of stations in the common parameters?
YES
Check the wiring.
NO
Correct the common parameters.
YES
Is the "D. LINK" LED ON?
NO
1) Check whether or not the host has been stopped by the "network test" of the peripheral device.
2) Check whether or not the station has been set as a reserved station.
YES
Check whether the CPU parameters are correct or not.
1) Network refresh parameters
2) Common parameters
3) Station-specific parameters

POINT

Refer to the following if the "T. PASS" LED turns ON and OFF or is instable.
<Cause>
It is assumed that the line status is instable.
<Corrective action>
1) Check that the connector is not nearly disconnected and the cable is not nearly broken.
2) Check that the cable used is as determined in the specifications.
3) Check that the overall distance and interstation distance are as determined in the specifications.

13.2.1 Points to check first

Point to Check	Check Method
Monitor the communication status at each of the stations from a peripheral device using the network monitoring function.	Check the status of the CPU module at the station at which the communication error occurred, the status of the network module, and the loop status of each module, to determine the site of the error.
Is the "POWER" LED of the power supply module of the station at which the error occurred lit?	If the "POWER" LED is not lit, check the supply voltage to the power supply module, and check for insufficient power supply capacity, overvoltage, and failure of the power supply module.
Is the "RUN" LED of the CPU module lit?	If the "RUN" LED is not lit or is flashing, read the error code at a peripheral device and take the corrective action appropriate for the error. (For information on the meanings of error codes and the corrective action to take, refer to the users' manual for the CPU module.)
Is the lit/unlit status of the LEDs on the network module normal?	Check the lit/unlit status of the "RUN", "SW.E", "M/S.E", "PRM.E", etc., LEDs and take appropriate action if an error is indicated. (See section 13.3.) If the "T. PASS" LED turns ON and OFF or is instable, check the following since the line status is assumed to be instable. 1) Check that the connector is not nearly disconnected and the cable is not nearly broken. 2) Check that the cable used is as determined in the specifications. 3) Check that the overall distance and interstation distance are as determined in the specifications.

13.2.2 Troubleshooting when data link is disabled throughout the system

Point to Check	Check Method
Monitor the communication status at each device using the network monitoring function.	Check the status of the line by performing a network diagnosis loop test from a peripheral device (this applies only in the case of a fiber-optic loop system). Check the CPU module and network module at the station at which the error occurred. Check the network module and data link cable by performing a self-loopback test and station to station test in offline testing to determine the location of the line error. Check if all the stations in the data link are stopped.
Have the network link parameters been set at the control station?	Check by reading the network parameters from the CPU module of the control station.
Is there a mistake in the switch settings of the network module at the control station?	Check the network No. setting switch, station No. setting switch, mode setting switch, condition setting switches, etc.
Is the link watch dog time setting appropriate?	Set the link watch dog time to 2000 ms and check if data link is possible.
Is the control station down?	Check the lit/unlit status of the LEDs on the network module of the control station.
Has control shifted to the sub-control station?	Check if the communication error setting of the common parameters for the control station specifies that control of the data link will be taken over by the sub-control station if the control station goes down.

13.2.3 Troubleshooting when the data link is disabled at a specific station

Point to Check	Check Method
Monitor the communication status at each station.	Check stations at which a communication error has occurred, and the loop status, by performing line monitoring using the network monitoring function at a peripheral device. In the case of a fiber-optic loop system, check the line status and the communication status at each station using the loop test of the network diagnosis function at a peripheral device.
Is the network module at the station at which the communication error has occurred normal?	Check if an error or failure has occurred at the CPU module or network module of the station at which the communication error occurred.
Is the network module the cause of the loop error? Or is the data link cable the cause?	Check if the network module is normal by executing a self-loopback test in offline testing. Check if the data link cable is normal by executing a station to station test in offline testing.
Are there any mistakes in the network parameters of the control station?	Check that, in the common parameter settings, the setting for the total number of stations in the link is the highest station number or a higher number, and that stations which cannot communicate are set as reserve stations.
Are the network parameters at the station at which the error has occurred normal?	Read the network parameters from the CPU module at the station at which the communication error occurred and check if the "set number of modules" settings and network refresh parameters are set correctly.
Are there any mistakes in the network module switch settings?	Check the network No. setting switch, the station number setting switch, the mode setting switch, and the condition setting switches.
Has any data link cable been disconnected?	Perform the line monitoring or loop test in Network diagnostics of peripheral device to check the wiring status.

13.2.4 Troubleshooting when the communicated data is abnormal

(1) Abnormal cyclic transmission data

Point to Check	Check Method
Is the sequence program error-free?	Set the CPU modules at the sending station and receiving station to the STOP status, switch the link devices of the sending station ON and OFF using test operation at a peripheral device, and check if the data is transmitted to the receiving station. If data is transmitted normally, correct the sequence program. If data is not transmitted normally, review the network parameters of the control station and self station.
Are there any mistakes in the network parameters of the control station?	Review the range of link devices allocated to the sending station.
Are there any mistakes in the network parameter settings of the sending station?	Check the settings of the network refresh parameters and the station specific parameters, and check which ranges of LB/LW/LY devices used by the sequence program the ranges of LB/LW/LY devices received from the sending station are stored in.
Are there any mistakes in the network parameter settings of the receiving station?	Check the settings of the network refresh parameters and station specific parameters and chek wihch range of devices used by the sequence program the network module LB/LW/LY devices received from the sending station are stored in.

(2) Abnormal transient transmission

Point to Check	Check Method
Does an error occur when cyclic transmission is executed?	Check the error code generated on execution of transient transmission and take the action indicated in the error code table in section 13.1.
Are there any mistakes in the routing parameter settings?	Check the settings using the communication test in online diagnosis from a peripheral device.

13.3 LEDs on the Network Module

This section describes the LEDs that light on occurrence of an error during data link operation.

Display	Error Detection Status	Possible Causes
RUN	Not lit	A hardware error has occurred in the network module. An error has occurred in the CPU module.
SW.E.	Lit	The network No. setting switch has been set to a value outside the range 1 to 255. The station No. setting switch has been set to a value outside the range 1 to 64. In the condition setting switch settings, the network type has been set as "remote I/O net" (i.e. DIP switch SW-1 is set to the ON position). The mode setting switch has been set to an unusable position. In the default parameter settings, the number of stations has been set at "8" and the total number of points has been set at "8k".
M/S.E.	Lit	It has been detected that the same station number has been set twice, or more than one control station has been set, in one network.
PRM.E.	Lit	A matching error has occurred because the range of devices set in the station specific parameters is larger than the range of LB/LW devices allocated to the host station in the common parameters. The parameters received from the sub-control station differ from the parameters stored at the host station (which were received by the host station from the control station).
D.LINK	Not lit	Cyclic transmission has been stopped by stopping data link operation from a peripheral device or by executing an online test etc. T.PASS is not lit.
T.PASS	Not lit	The station cannot participate in baton passing and transient transmission is therefore impossible. Communication has been stopped by a control station shift or by a line error.
CRC	Lit	A code check is performed on the received data to determine if there is an error or not. An error occurs in the event of a cable fault, noise, etc.
OVER	Lit	Received data has overwritten the previous set of data before it could be processed. A hardware error has occurred in the receiving circuitry of the network module.
AB.IF	Lit	"1" bits have been received continuously in a frame of received data and the stipulated data length has been exceeded, or the data length of the received data is shorter than stipulated. Short watchdog time setting, cable fault, noise, etc. caused the error.
TIME	Lit	Baton passing has not reached the host station within the set watchdog time. Short watchdog time setting, cable fault, noise, etc. caused the error.
DATA	Lit	Error code data has been received. A cable fault, noise, etc. caused the error.
UNDER	Lit	Internal processing of send data is not being performed at regular intervals. A hardware error has occurred in the sending circuitry of the network module.
LOOP	Lit	If the F.LOOP LED is lit, it means there is a line error in the forward loop line; an error occurs if the power supply to stations that are adjacent to the host station and send data to it is switched off, if a hardware error occurs in the forward loop sending circuitry, if the forward loop data link cable is not connected or broken, or if there is a hardware error in the forward loop receiving circuitry of the host station. If the R.LOOP LED is lit, it means there is a line error in the reverse loop line; an error occurs if the power supply to stations that are adjacent to the host station and send data to it is switched off, if a hardware error occurs in the reverse loop sending circuitry, if the reverse loop data link cable is not connected or broken, or if there is a hardware error in the reverse loop receiving circuitry of the host station.

APPENDICES

APPENDIX 1 NETWORK PARAMETER SETTING SHEETS

When the MELSECNET/10 parameters are set at a peripheral device, filling in these forms provides a convenient record of the settings.
The configuration of these forms differs somewhat from that of the setting screens actually displayed by the peripheral device.

1.1 "Number of Modules" Settings

SET NUMBER OF MODULES

NUMBER OF NETWORK MODULES (1-4) [ ]

EFFECTIVE MODULE NUMBER [ ]

	MODULE NO.1	MODULE NO.2	MODULE NO.3	MODULE NO.4
HEAD I/O NO.	[ ]	[ ]	[ ]	[ ]
NETWORK MODULE TYPE	[ ]	[ ]	[ ]	[ ]
	1 : MELSECNET/10 (DEFAULT PARAMETER) 2 : MELSECNET/10 (CONTROL STATION) 3 : MELSECNET/10 (NORMAL STATION)		4 : MELSECNET/10 (REMOTE I/O) 5 : MELSECNET II (MASTER STATION) 6 : MELSECNET II (LOCAL STATION)	
NETWORK NO.	[ ]	[ ]	[ ]	[ ]

1.2 Network Refresh Parameters

(1) MELSECNET/10

NETWORK REFRESH PARAMETER OF MELSECNET/10

[SETTING 1] NETWORK MODULE NUMBER [ ]

LB ↔ B TRANSFER	HEAD LB NO. [ ] ↔ HEAD B [ ] TRANSFER SIZE [ ] H POINTS
LW ↔ W TRABSFER	HEAD LW NO. [ ] ↔ HEAD W [ ] TRANSFER SIZE [ ] H POINTS
LX ↔ X TRANSFER	HEAD LX NO. [ ] ↔ HEAD X [ ] TRANSFER SIZE [ ] H POINTS
LY ↔ Y TRANSFER	HEAD LY NO. [ ] ↔ HEAD Y [ ] TRANSFER SIZE [ ] H POINTS
SB TRANSFER DEVICE	HEAD SB NO. [ ] ↔ DESTINATION [ ] TRANSFER SIZE [ ] H POINTS
SW TRANSFER DEVICE	HEAD SW NO. [ ] ↔ DESTINATION [ ] TRANSFER SIZE [ ] H POINTS
LB ↔ EXTENSION TRANSFER	HEAD LB NO. [ ] ↔ BLOCK [ ] HEAD NO. [ ] TRANSFER SIZE [ ] H POINTS
LW ↔ EXTENISON TRANSFER	HEAD LW NO. [ ] ↔ BLOCK [ ] HEAD NO. [ ] TRANSFER SIZE [ ] H POINTS
ERROR AREA	[ ] 0: HOLD 1 : OVERWRITE

[SETTING 2]

LB ↔ B TRANSFER	HEAD LB NO. [ ] ↔ HEAD B [ ] TRANSFER SIZE [ ] H POINTS
LW ↔ W TRABSFER	HEAD LW NO. [ ] ↔ HEAD W [ ] TRANSFER SIZE [ ]H POINTS
LX ↔ X TRANSFER	HEAD LX NO. [ ] ↔ HEAD X [ ] TRANSFER SIZE [ ] H POINTS
LY ↔ Y TRANSFER	HEAD LY NO. [ ] ↔ HEAD Y [ ] TRANSFER SIZE [ ] H POINTS

(2) MELSECNET II

NETWORK REFRESH PARAMETER OF MELSECNET II

[SETTING 1] NETWORK MODULE NUMBER [ ]

LB ↔ B TRANSFER	HEAD LB NO. [ ] ↔ HEAD B [ ] TRANSFER SIZE [ ] H POINTS
LW ↔ W TRABSFER	HEAD LW NO. [ ] ↔ HEAD W [ ] TRANSFER SIZE [ ]H POINTS
LX/LY ↔ X/Y TRANSFER	HEAD LX/LY 0000 ↔ HEAD X/Y [ ] TRANSFER SIZE [ ] H POINTS

1.3 Common Parameters (MELSECNET/10), PLC to PLC Network

(1) LB/LW settings

SETTING THE LB/LW TRANSMISSION RANGES IN EACH STATION

NETWORK MODULE NUMBER

TOTAL NUMBER OF LINK STATIONS	W.D.T. X 10ms

RESERVE	STATION NUMBER	TRANSMISSION RANGE OF EACH STATION	
		LB	LW
	1	—	—
	2	—	—
	3	—	—
	4	—	—
	5	—	—
	6	—	—
	7	—	—
	8	—	—
	9	—	—
	0	—	—

If the station number is a two-digit one, write the extra digit in the box enclosed by a dotted line.
The highest station number is 64.
Circle the station numbers of reserve stations.

(2) LX/LY settings

SETTING THE LX/LY TRANSMISSION RANGES IN EACH STATION

NETWORK MODULE NUMBER

TOTAL NUMBER OF LINK STATIONS	W.D.T. X 10ms

SETTING I/O MASTER STATIONS

BLOCK [ ]

RESERVE	STATION NUMBER	TRANSMISSION RANGE OF EACH STATION (M → L)		RANSMISSION RANGE OF EACH STATION (M ← L)	
		LX	LY	LX	LY
	1	—	—	—	—
	2	—	—	—	—
	3	—	—	—	—
	4	—	—	—	—
	5	—	—	—	—
	6	—	—	—	—
	7	—	—	—	—
	8	—	—	—	—
	9	—	—	—	—
	0	—	—	—	—

If the station number is a two-digit one, write the extra digit in the box enclosed by a dotted line.
The highest station number is 64.
Circle the station numbers of reserve stations.

(3) Reserve station settings

RESERVE STATION SETTINGS

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64

Circle the station numbers of reserve stations.

(4) Extension settings

EXTENSION SETTINGS

			Default values
CONSTANT LINK SCAN	[ ]	MS(0-500)	....[0] ms
MAX. NUMBER OF TRANSIENT TRANSMISSION IN ONE SCAN	[ ]	TIMES(1-16)	....[2] times
MAX. NUMBER OF STATIONS RETURNED IN ONE SCAN	[ ]	STATIONS(1-16)	....[2] stations
MULTIPLEX TRANSMISSION	[ ]	0:NONE 1:SET	....[0]

(5) Communication error setting

COMMUNICATION ERROR SETTING

			Default values
DATA LINK BY SUB-CONTROL STATION WHEN CONTROL STATION IS DOWN	[ ]	0:YES 1:NO	..[0]

(6) Uniform allocation

UNIFORM ALLOCATION

NUMBER OF STATIONS FOR FOR UNIFORM ALLOCATION	[ ] STATIONS	NUMBER OF STATIONS UNIFORM ALLOCATION	[ ] STATIONS
NUMBER OF ALLOCATION POINTS	[ ] H POINTS	NUMBER OF ALLOCATION POINTS	[ ] H POINTS
UNIFORM ALLOCATION HEAD DEVICE LB	[ ]	UNIFORM ALLOCATION HEAD DEVICE LW	[ ]
NUMBER OF STATIONS FOR UNIFORM ALLOCATION	[ ] STATIONS	NUMBER OF STATIONS FOR UNIFORM ALLOCATION	[ ] STATIONS
NUMBER OF ALLOCATION POINTS	[ ] H POINTS	NUMBER OF ALLOCATION POINTS	[ ] H POINTS
UNIFORM ALLOCATION HEAD DEVICE LX	[ ]	UNIFORM ALLOCATION HEAD DEVICE LY	[ ]

(7) Allocation with number of points designation

ALLOCATION WITH NUMBER OF POINTS DESIGNATION

ALLOCATION HEAD DEVICE			
LB [ ]	LW [ ]	LX [ ]	LY [ ]

STATION NUMBER	LB POINTS	LW POINTS	LX POINTS	LY POINTS
1				
2				
3				
4				
5				
6				
7				
8				
9				
0				

If the station number is a two-digit one, write the extra digit in the box enclosed by a dotted line.

1.4 Station Specific Parameters

(1) LB settings

LB SETTINGS OF STATION SPECIFIS PARAMETERS

NETWORK MODULE NO.

NO.	LB SET 1	LB SET 2	COMMON PARAMETER SETTING
1	—	—	—
2	—	—	—
3	—	—	—
4	—	—	—
5	—	—	—
6	—	—	—
7	—	—	—
8	—	—	—
9	—	—	—
0	—	—	—

If the station number is a two-digit one, write the extra digit in the box enclosed by a dotted line.
The highest station number is 64.
Use the same LB settings as set in the form in section 1.3 (1) of this appendix for the common parameter setting entries.

(2) LW settings

LW SETTINGS OF STATION SPECIFIS PARAMETERS

NETWORK MODULE NO.

NO.	LW SET 1	LW SET 2	COMMON PARAMETER SETTING
1	—	—	—
2	—	—	—
3	—	—	—
4	—	—	—
5	—	—	—
6	—	—	—
7	—	—	—
8	—	—	—
9	—	—	—
0	—	—	—

If the station number is a two-digit one, write the extra digit in the box enclosed by a dotted line.
The highest station number is 64.
Use the same LW settings as set in the form in section 1.3 (1) of these APPENDIX for the common parameter setting entries.

1.5 Transfer Parameters for Data Link

TRANSFER PARAMETERS FOR DATA LINK

NO.	TRANS-FER	1 NET [ ] ( )	TRANS-FER	2 NET [ ] ( )	TRANS-FER	3 NET [ ] ( )	TRANS-FER	4 NET [ ] ( )
1		L —		L —		L —		L —
2		L —		L —		L —		L —
3		L —		L —		L —		L —
4		L —		L —		L —		L —
5		L —		L —		L —		L —
6		L —		L —		L —		L —
7		L —		L —		L —		L —
8		L —		L —		L —		L —
9		L —		L —		L —		L —
10		L —		L —		L —		L —
11		L —		L —		L —		L —
12		L —		L —		L —		L —
13		L —		L —		L —		L —
14		L —		L —		L —		L —
15		L —		L —		L —		L —
16		L —		L —		L —		L —
17		L —		L —		L —		L —
18		L —		L —		L —		L —
19		L —		L —		L —		L —
20		L —		L —		L —		L —
21		L —		L —		L —		L —
22		L —		L —		L —		L —
23		L —		L —		L —		L —
24		L —		L —		L —		L —

Enter "source" for transfer sources and "dest." for transfer destinations.
In the square brackets, [ ], enter 10 for MELSECNET/10 or II for MELSECNET II.
In the parentheses, ( ), enter the head I/O number set in the "set number of modules" settings.

1.6 Routing parameters

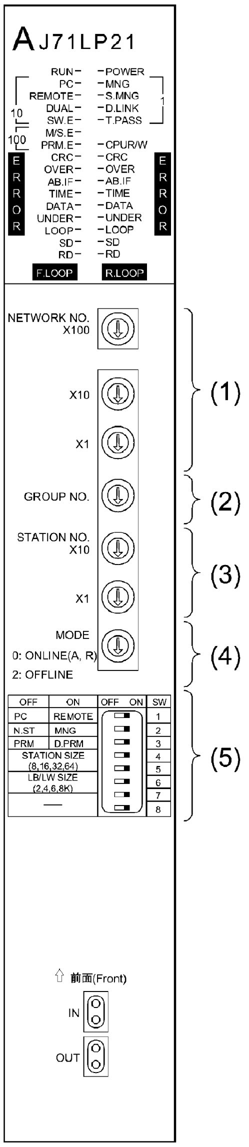
ROUTING PARAMETER

NO.	DESTINATION NETWORK NO.	RELAY DESTINATION NETWORK NO.	RELAY DESTINATION STATION NO.
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			

1.7 Network Module Settings

NETWORK MODULE SETTINGS

Front view



(1) Network No.setting switch setting range
X100 [ ] .... Setting range: 0 to 2
X10 [ ] .... Setting range: 0 to 9
X1 [ ] .... Setting range: 0 to 9

(2) Group No. setting switch
X1 [ ] .... Setting range: 0 to 9

(3) Station No. setting range
X10 [ ] .... Setting range: 0 to 6
X1 [ ] .... Setting range: 0 to 9

(4) Mode setting switch
[ ] .... Setting range: 0 to F

(5) Condition setting switch

SW	ON/OFF condition	OFF	ON
1	[ ]	PC-to-PC network	Remote I/O network
2	[ ]	Normal station	Control station
3	[ ]	Common parameter	Default parameters
4	[ ]	Number of stations	
5	[ ]		
6	[ ]	Each total number of B/W points	
7	[ ]		
8	[ ]	Not used	

MEMO

WARRANTY

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.
However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.
[Gratis Warranty Term]
The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place.
Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.
[Gratis Warranty Range]

(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.

(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
2. Failure caused by unapproved modifications, etc., to the product by the user.
3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

(1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued.
Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.

(2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation of damages caused by any cause found not to be the responsibility of Mitsubishi, loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products, special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products, replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

Type MELSECNET/10 Network System (PLC to PLC network)

Reference Manual

MODEL	MELSECNET/10-R-E
MODEL CODE	13JE33
IB(NA)-66440-H(1211)MEE	

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