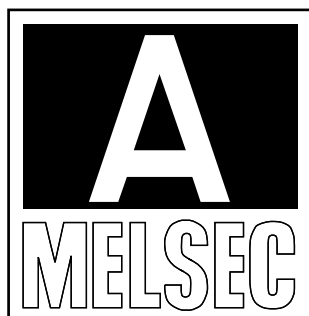
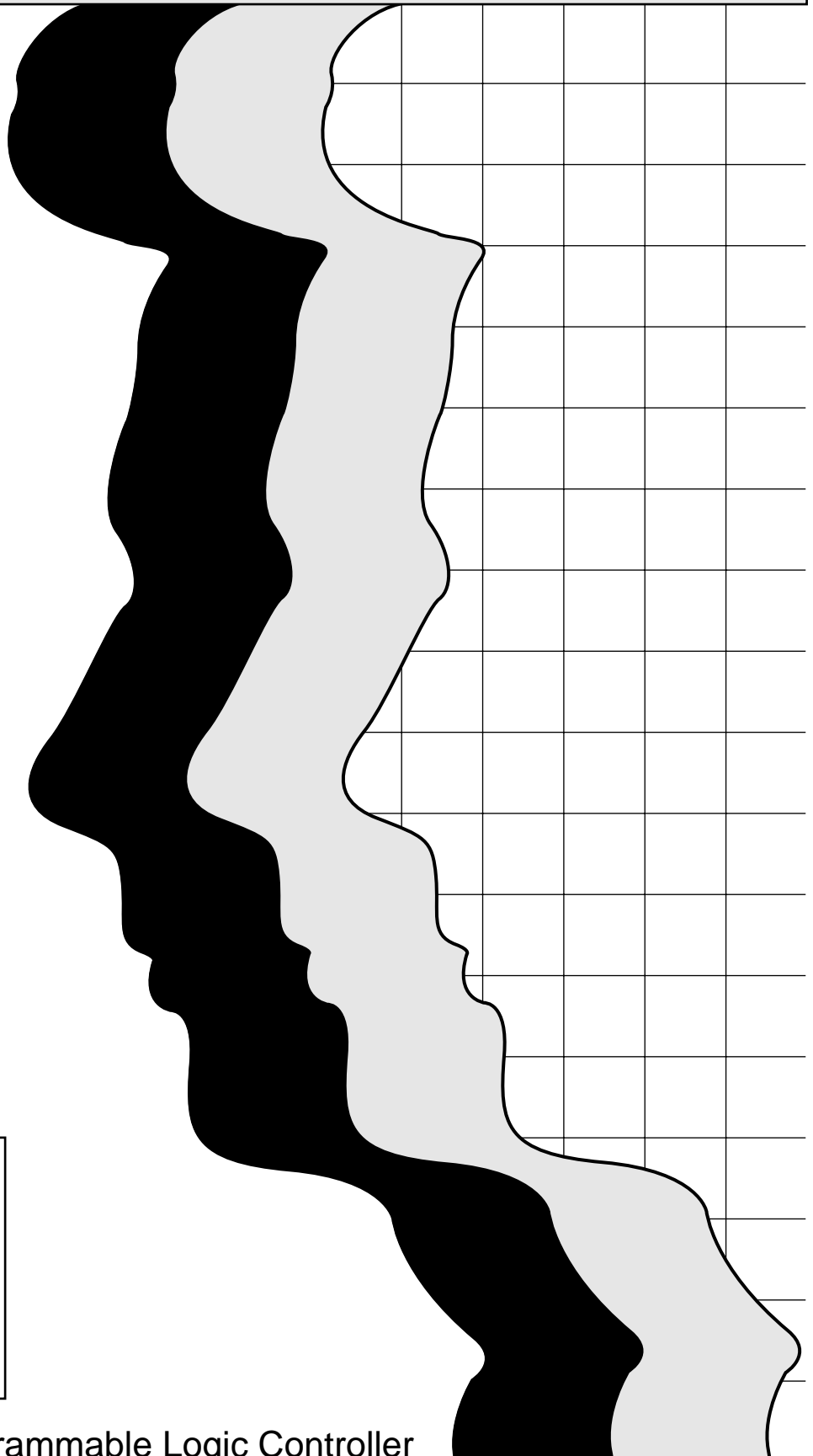


MITSUBISHI

A7BDE-J71LP21/BR11 MELSECNET/10 INTERFACE BOARD

User's Manual



Mitsubishi Programmable Logic Controller

INTRODUCTION

Thank you for selecting the A7BDE-J71LP21/BR11 MELSECNET/10 Interface Board. Please read this manual carefully so that the equipment may be used to its optimum. A copy of this manual should be forwarded to the end user.

User's are asked to read the "Software Grant Agreement" before operating the A7BDE-J71LP21/BR11 option card.

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IBM[®], PC/AT[®] are registered trademarks of International Business Machines Corporation.

IMPORTANT

- (1) Design the configuration of a system to provide an external protective or safety interlocking circuit for the PCs.
- (2) The components on the printed circuit boards will be damaged by static electricity, so avoid handling them directly. If it is necessary to handle them take the following precautions.
 - (a) Ground your body and the work bench.
 - (b) Do not touch the conductive areas of the printed circuit board and its electrical parts with non-grounded tools, etc.

Under no circumstances will Mitsubishi Electric be liable or responsible for any consequential damage that may arise as a result of the installation or use of this equipment.

All examples and diagrams shown in this manual are intended only as an aid to understanding the text, not to guarantee operation. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples.

Owing to the very great variety in possible applications of this equipment, you must satisfy yourself as to its suitability for your specific application.

REVISIONS

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

Print Date	*Manual Number	Revision
Jan., 1995	IB(NA)0800025-A	First edition

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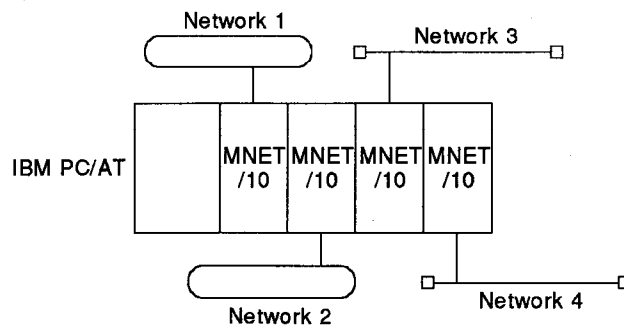
1. GENERAL DESCRIPTION

This manual describes the performance, functions, handling, and procedures for using the A7BDE-J71LP21/BR11 optical loop/coaxial bus data link interface board (hereafter called the "interface board"). The interface board is installed in the option slot of an IBM PC/AT[®] in order to configure the resulting combination as a control station or normal station in a MELSEC-NET/10 data link system.

1.1 Features

(1) Configuration of large-scale, flexible systems possible

- (a) Up to four A7BDE-J71LP21/BR11 interface boards can be installed in one PC.



(2) N:N communication with transient transmission function possible

A PC functioning as a normal station can access a programmable controller functioning as a normal station for data communication, device reading/writing, etc.

(3) Link devices supported independently in each network

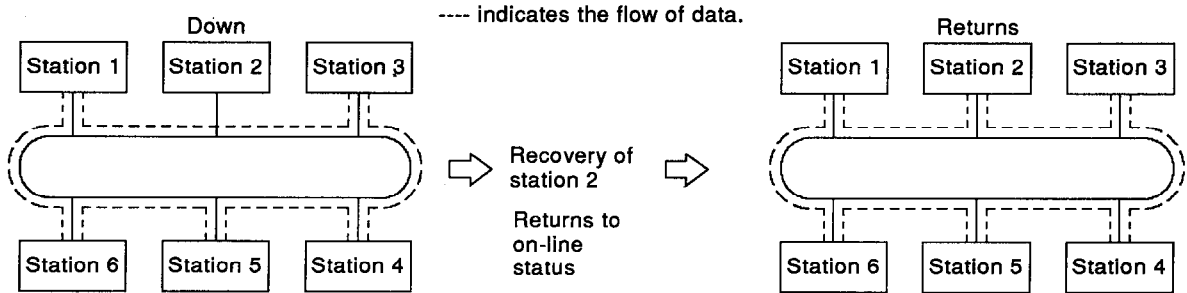
The following devices can be supported independently in each network: link relays (B), link registers (W), link inputs (X), link outputs (Y), link special relays (SB), and link special registers (SW).

The maximum number of points per station is the equivalent of 2000 bytes.

(4) Enriched RAS functions

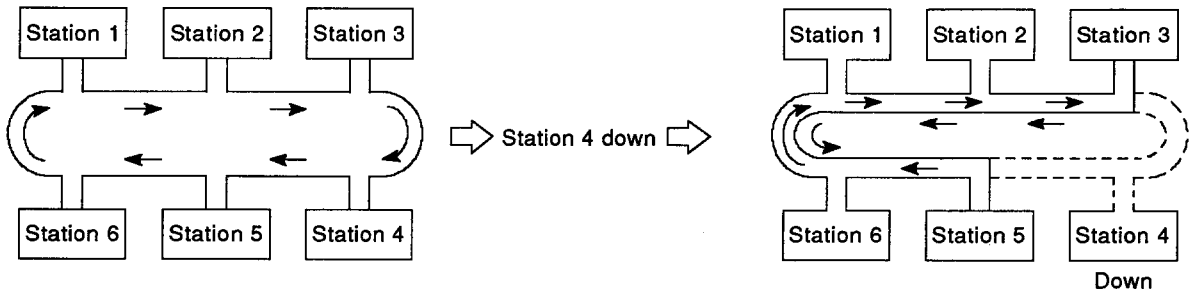
(a) Automatic on-line return function

When an off-line station is recovered from a fault, it automatically returns to the on-line status and restarts communications.



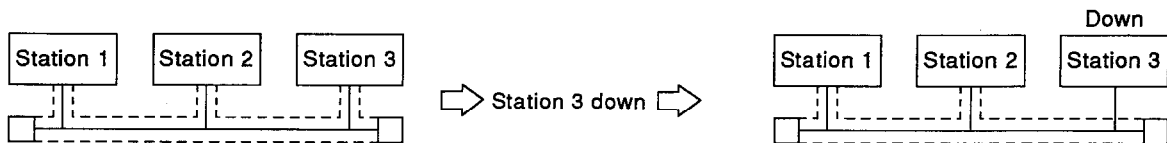
(b) Loopback function (optical loop system)

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.



(c) Station separation function (coaxial bus system)

When a station is down due to power failure, the station is separated from the system and the data link is executed with the available stations.



POINTS

(1) The A7BDE-J71AP21/R21 Interface Board and Software Driver are compatible with the following systems:

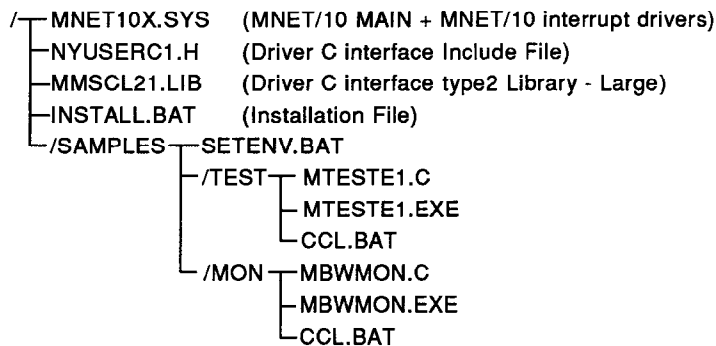
Computer : IBM PC/AT® . (or compatible)
 Operating System : MS-DOS® Ver. 3.1
 PC-DOS® Ver. 3.2
 Interface Port : 16-Bit. PC/AT® Standard.
 8 MHz Bus Clock.
 Support for 4 wait states.

(2) In this manual: PC = Personal Computer.

(3) Check to see that the following items are contained with the interface board when removing it from the shipping package.

COMPONENT		No.
A7BDE-J71AP21 OR A7BDE-J71AR21 I/F Board.		1
Software driver.		
MS-C® Function Library.	SW0IM-MNET10P	1
MS-C® Assembler Library.		

(4) Disk contents: The same files are included in the 3.5 and 5 Inch disks.



*1. Source Code of MMSCL21.LIB.

1. GENERAL DESCRIPTION

1.2 Items Packaged with the Interface Board

On unpacking the interface board, check that the following items have been supplied with it.

(1) Items in the product package

Item	Quantity
	A7BED-J71[]
A7BDE-J71LP21 or A7BDE-J71BR11 MELSECNET/10 interface board	1
SW01M-MNET10P software package for A7BDE-J71LP21/BR11	1
F connector for connection to coaxial cable (A7BDE-J71BR11 only)	1

(2) Items to be purchased separately

When using an A7BDE-J71BR11 to configure a coaxial bus system, terminal resistors must be connected at both ends of the system.

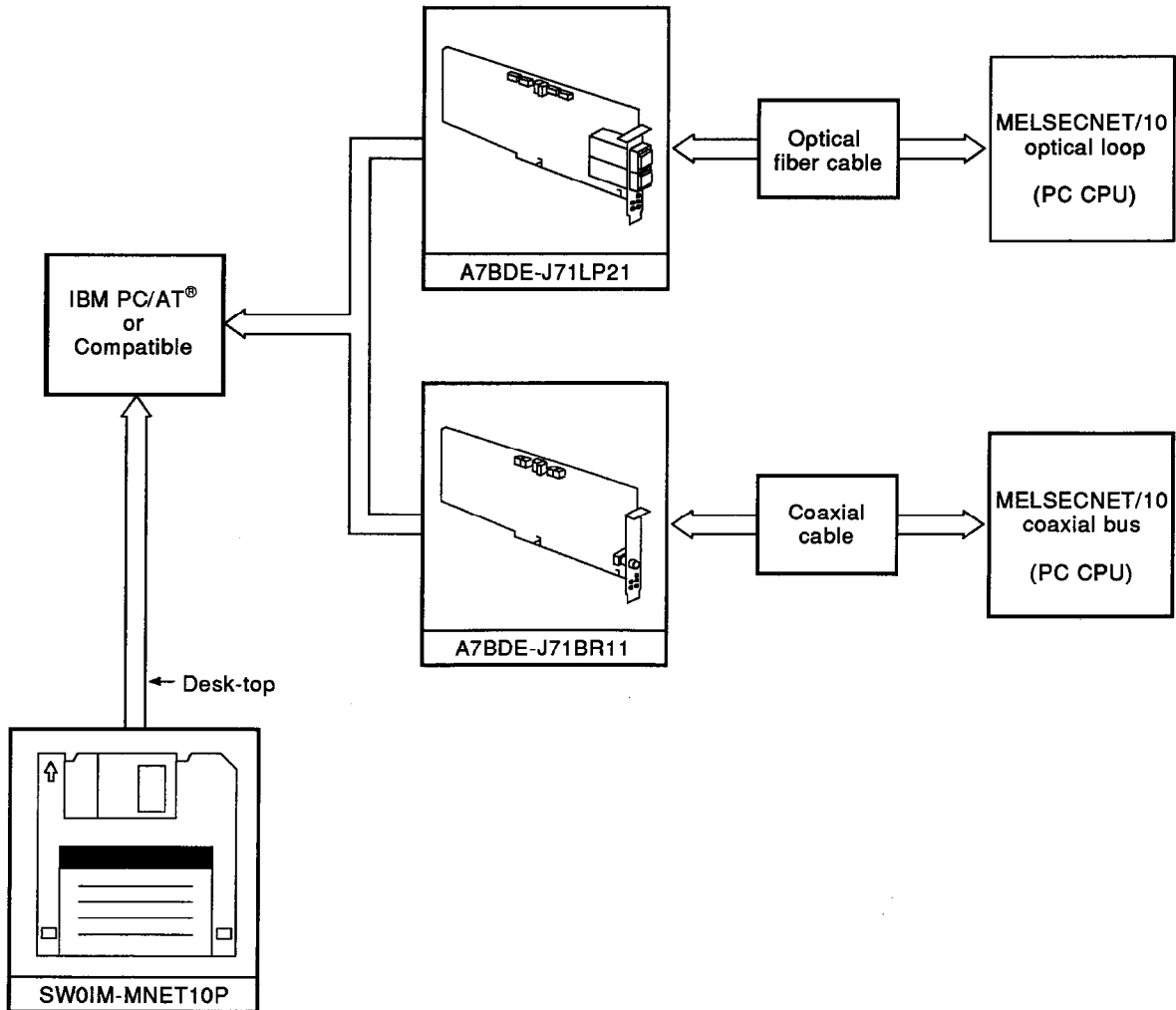
The model name of the terminal resistor to be purchased is indicated below:

Terminal resistor: A6RCON-R75

2. SYSTEM CONFIGURATION

2.1 Hardware Configuration

The following diagram gives the system configuration with the interface board installed in the PC.



REMARKS

1. Up to four interface boards can be installed in one PC.
2. If four interface boards are installed, four MELSECNET/10 networks can be configured.
3. All the cables within a single MELSECNET/10 network must be of one type only: either optical fiber or coaxial.

2.2 Overall Configuration

The MELSECNET/10 two-tier and multi-tier configurations that can be built using PCs with interface boards installed are described below.

For details on the possible combinations for MELSECNET/10 configurations, refer to the MELSECNET/10 Network System Reference Manual.

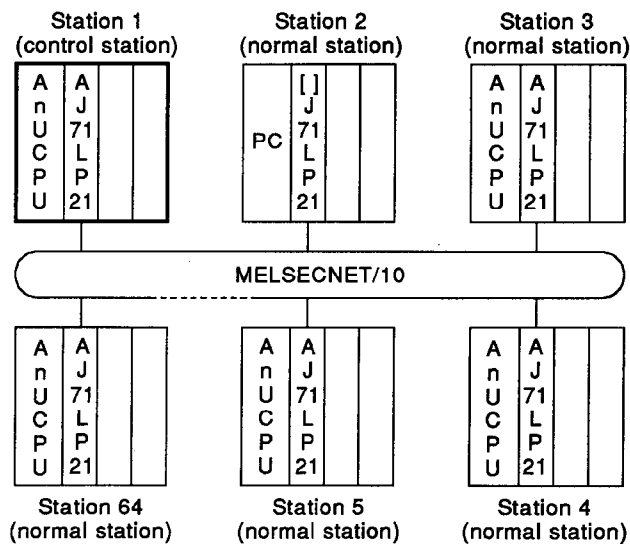
2.2.1 Configuration of a two-tier system

A two-tier system consists of a control station and normal stations connected by optical fiber 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. Any station can be set as the control station.

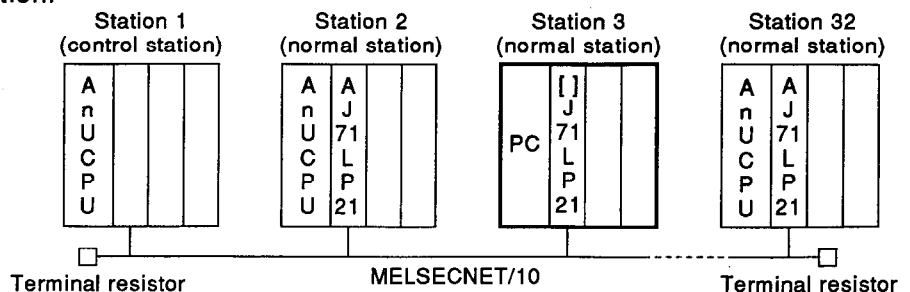
In the system configuration shown below, station 1 is set as the control station.



(2) Coaxial bus system

A coaxial bus system can be built with one control station and up to 31 normal stations. Any station can be set as the 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 in accordance with the common parameter settings of the control station.

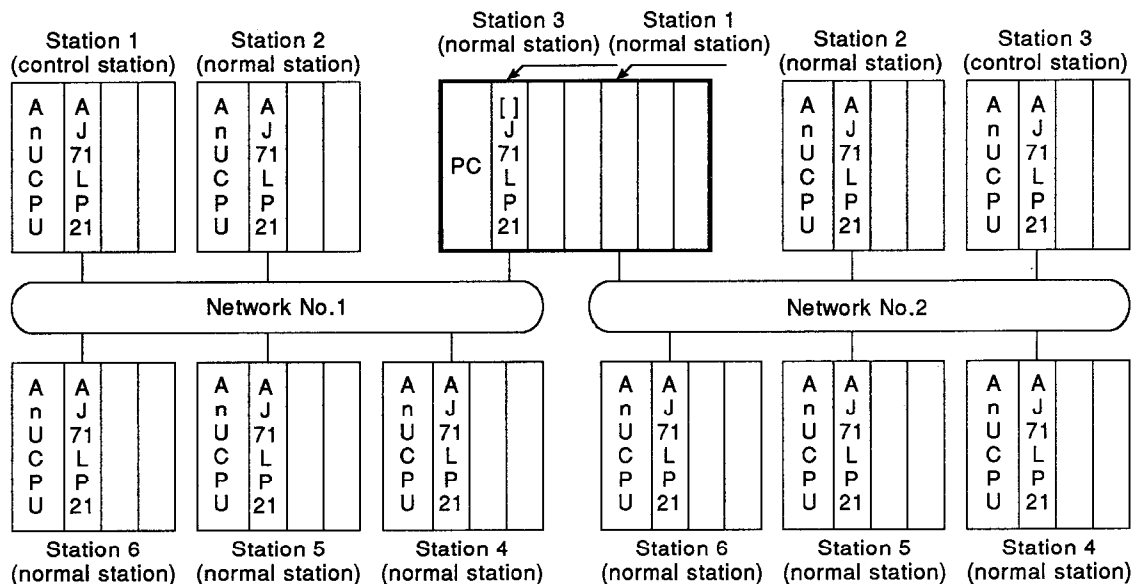
An A7BDE-J71LP21/BR11 cannot be installed at a control station.

2.2.2 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 connect two or more network interface boards to one PC.

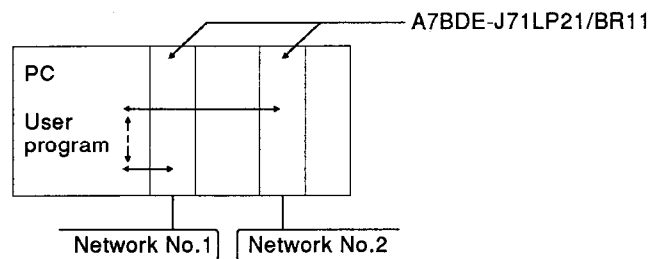
Up to four network interface boards can be installed in one PC.

In the system configuration shown below, station 3 of network No.1 and station 1 of network No.2 are installed in the same PC, thus connecting the two networks.



Note that although a PC can be used as a station that connects multiple networks, the PC will not support the inter-data-link transfer and routing functions.

If an inter-data-link transfer function is required, exchange data between the networks by using a user program, as shown below.

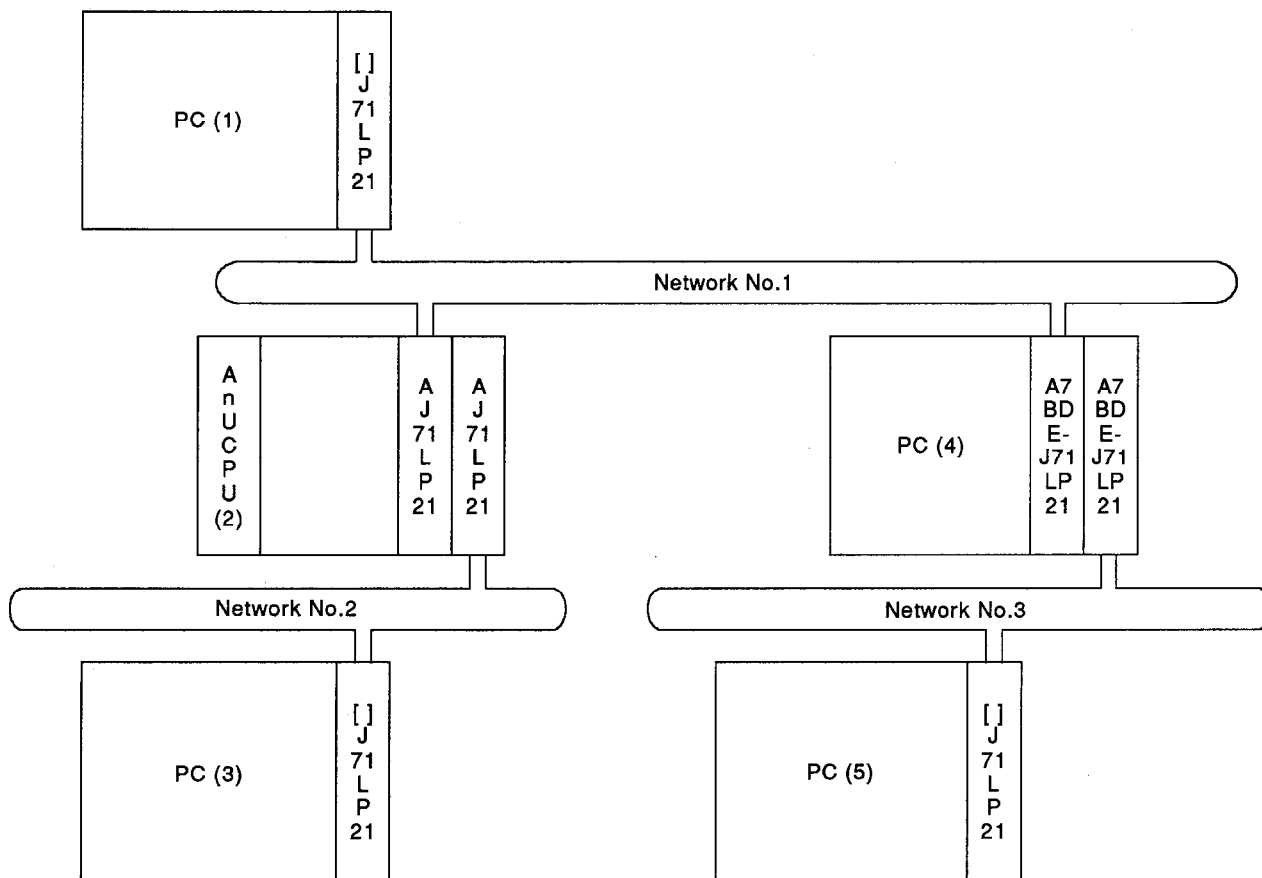


For details on the inter-data-link transfer and routing functions, refer to the MELSECNET/10 Network System Reference Manual.

2. SYSTEM CONFIGURATION

MELSEC-A

The possibilities for communicating with other stations within a MELSEC-NET/10 network system by using a user program or GPP function software package are shown below.

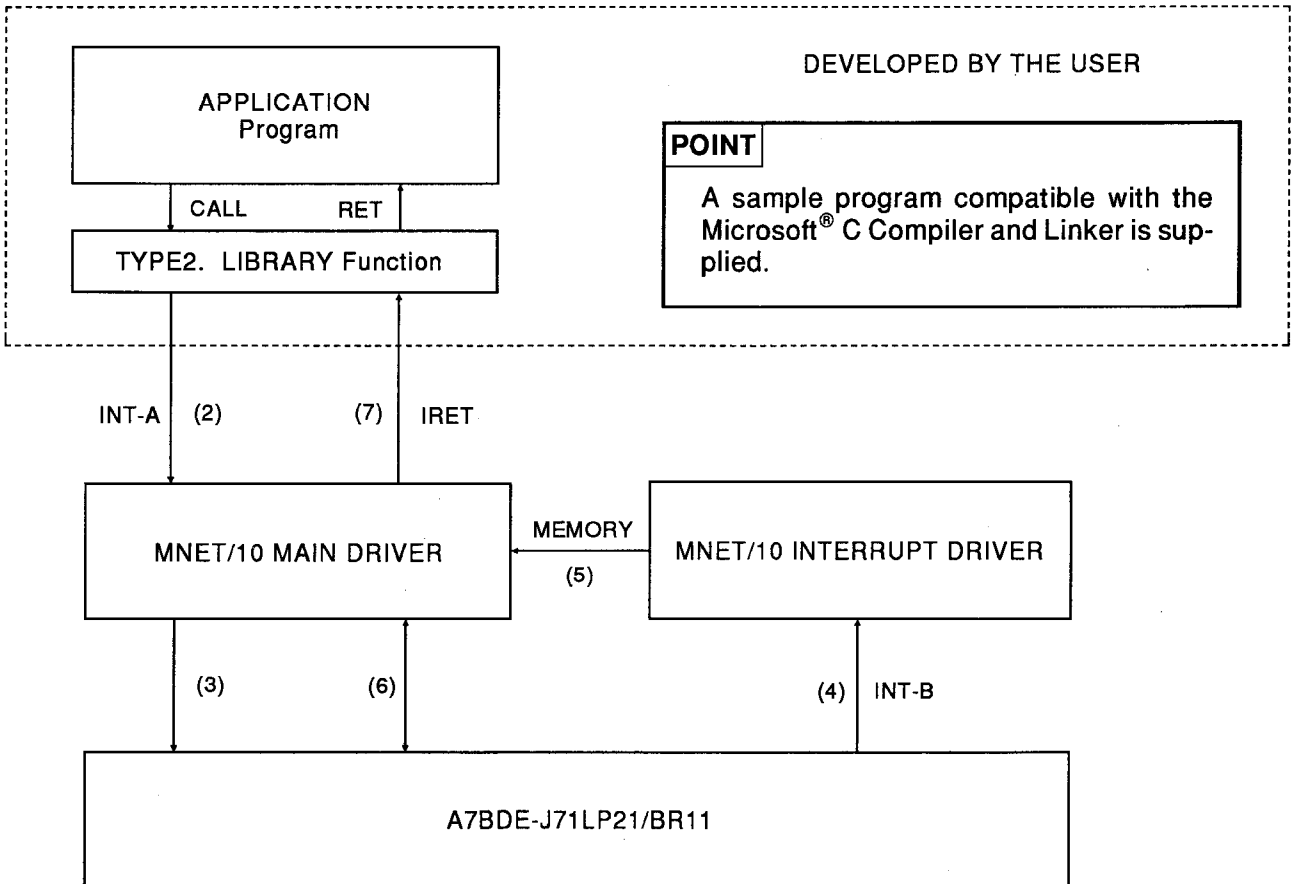


Station Requesting Communication \ Destination	Destination				
	PC (1)	AnUCPU (2)	PC (3)	PC (4)	PC (5)
PC (1)	————	Possible	Possible	Possible	Not possible
PC (3)	Possible	Possible	————	Possible	Not possible
PC (4)	Possible	Possible	Possible	————	Possible
PC (5)	Not possible	Not possible	Not possible	Possible	————

Since, unlike an AnUCPU, a PC does not support the routing function, PCs cannot be used as the gateway stations (relay stations) between networks. For example, in order to enable communication between PC 1 and PC 5 in this example system, PC 4, functioning as the gateway station, would have to be replaced by an AnUCPU.

2.3 Software Configuration

The following diagram shows the software configuration, the various components, and their relationship to each other.



POINT
A sample program compatible with the Microsoft® C Compiler and Linker is supplied.

Diagram Key

- Application** User created application program requiring access to MELSEC-NET/10.
- Library** User created function library, providing specific access subroutines.
- MNET/10 Main Driver** Accesses/requests A7BDE-J71LP21/BR11 memory areas.
- MNET/10 Interrupt Driver** Receives interrupt (IRQ) reply from the A7BDE-J71LP21/BR11.
- A7BDE-J71LP21/BR11** MELSECNET/10 I/F option board.

2.4 Precautions on System Configuration

A MELSECNET/10 system with up to four loops can be configured by installing MNET10 interface boards in a PC.

- (1) A PC can only be used as a normal station in a MELSECNET/10 loop. It cannot be used as a control station.
- (2) It is not possible to mix optical fiber cables and coaxial cables in the same loop: be careful to select interface boards whose specifications match the type of data link system.
- (3) If using a system configured using the interface board for use with coaxial cables (A7BDE-J71BR11) in a location badly affected by noise, ground the FG terminal of the PC.
- (4) Restrictions on cable length between stations when using coaxial cables

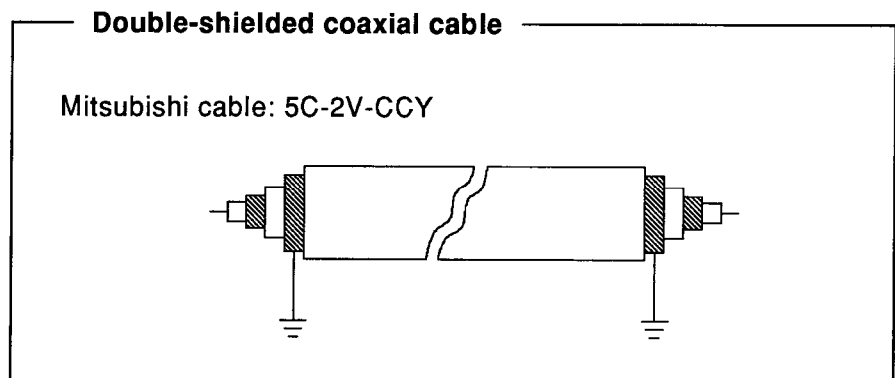
The lengths of coaxial cables used to connect network modules are restricted in accordance with the total number of stations, as shown in the table below.

Using cable lengths outside the ranges indicated in this table may cause communication errors.

Note that the overall distance is fixed at 500 m (1640 ft) regardless of the total number of stations.

Total Number of Stations	Cable Length Between Stations
1 to 9 stations	1 to 500 m
10 to 32 stations	1 to 5 m 13 to 17 m 25 to 500 m

- (5) Precautions when installing coaxial cables
 - (a) Maintain a clearance of at least 100 mm between coaxial cables and other power or control cables.
 - (b) In locations particularly susceptible to noise, use of double-shielded coaxial cables is recommended.



3. SPECIFICATIONS

The general specifications, and transmission and performance specifications of the I/F board are indicated below.

3.1 General Specifications

(1) The general specifications for the I/F board are given in Table 3.1.

Table 3.1 General Specifications

Item	Specification				
Operating ambient temperature	0 to 55 °C				
Storage ambient temperature	-20 to 75 °C				
Operating ambient humidity	10 to 90 % RH, no dew condensation is allowed				
Storage ambient humidity	10 to 90 % RH, no dew condensation is allowed				
Vibration resistance	*2 Conforms to JIS C 0911	Frequency	Acceleration	Amplitude	Sweep Count 10 times (1 octave/minute)*1
		10 to 55 Hz	_____	0.075 mm	
		55 to 150 Hz	9.8 m/s ² (1 g)	_____	
Shock resistance	Conforms to JIS C 0912 (98 m/s ² (10 g) x 3 times in 3 directions) *2				
Noise durability	1 μs noise width and 25 to 60 Hz noise frequency (measured with a noise simulator with a noise voltage of 1500 V.P.P.)				
Operating ambience	Free of corrosive gases. Dust should be minimal.				
Cooling method	Self-cooling				

REMARKS

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

*2: JIS: Japanese Industrial Standard

(2) The general specifications of the I/F board after its installation in the PC conform to those of the PC.

3. SPECIFICATIONS

3.2 Performance Specifications

Table 3.2 explains the performance specifications of the I/F board.

Refer to the MELSECNET/10 Network System Reference Manual for the specifications for optical fiber/coaxial cables.

Table 3.2 Function List

Item		A7BDE-J71LP21	A7BDE-J71BR11
Max. number of link points in 1 system	X/Y	8192 points (for each interface board)	
	B	8192 points (for each interface board)	
	W	8192 points (for each interface board)	
Maximum number of link points per station	$\frac{Y \text{ (points)} + B \text{ (points)}}{8} + 2 \times W \text{ (points)} \leq 2000 \text{ bytes}$		
Allowable momentary power interruption time	10 msec		
Communication speed	20 MBPS (multiplex transmission)/10 MBPS		10 MBPS
Communication method	Token ring method		Token bus method
Synchronous method	Frame synchronous method		
Coding method	NRZI (Non Return to Zero Inverted)		Manchester coding
Transmission path method	Duplex loop method		Single bus
Transmission format	Conforms to HDLC (frame method)		
Maximum number of networks	255		
Maximum number of groups	9		
Number of stations connected to a network	64 stations (control: 1, normal: 63)		32 stations (control: 1, normal: 31)
Maximum number of interface boards per PC	Four		
Overall distance of a network	30 Km (1.86 mil.) (Station-to-station: 500 m (0.31 mil.) when SI cable is used Station-to-station: 1 km (0.62 mil.) when QSI cable is used)		500 m (0.31 mil.) (Station-to-station: 500 m (0.31 mil.)
Error control system	Retry due to CRC (generating polynomial $X^{16} + X^{12} + X^5 + 1$) and time over		
RAS function	Various diagnosis and error detection functions		
Transient transmission	• N:N communication: batch read/write		
Connector	2-core optical connector plug (CA9003) For SI cables : CA9003 For QSI cables : CA7003		BNC-P-3-Ni, BNC-P-5 (DDK) equivalent
Connection cable (optical fiber/coaxial)	SI-200/250, QSI-185/230		3C-2V, 5C-2V equivalent
Current consumption (5 VDC) (A)	0.65		0.8
Dimensions mm (inch)	143 (5.62) H x 362 (14.25) W x 30 (1.18) D		143 (5.62) H x 362 (14.25) W x 30 (1.18) D
Weight kg (lb)	0.32 (0.71)		0.3 (0.66)

*1: When the H type is used the maximum station-to-station distance is 300 m (0.19 mil.).

3.3 Function List

The interface board provides the following functions.

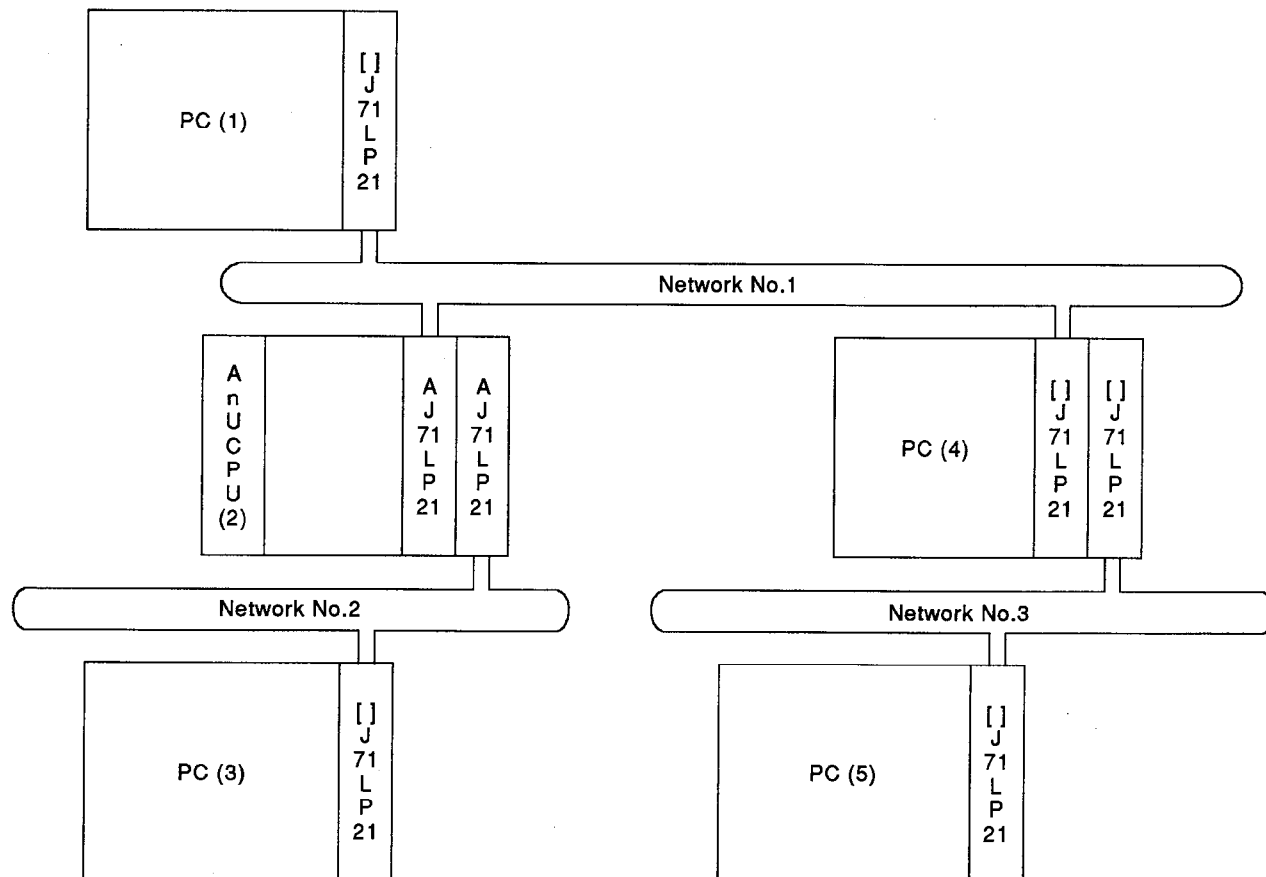
Table 3.2 Function List

Function	Description
Data communication	(1) The cyclic transmission function allows communication of input (X), output (Y), link relay (B), and link register (W) devices via the MELSECNET/10 network. <ul style="list-style-type: none"> • Each interface board independently supports 8000 points for each device type. • The number of link points supported by each station is the equivalent of 2000 bytes. (2) The transient transmission function allows N:N communication. <ul style="list-style-type: none"> • Communication is possible even when cyclic transmission is not performed. • It is possible to specify the maximum number of transient transmissions per link scan.
Loopback function	Using the duplex loop form, removes any faulty station from the system on cable read or slave station disconnection and continues normal operation with operative stations only.
Multiplex transmission function	Allows transmission at twice the normal speed by using independent transmission routes in a duplex loop configured with optical fiber cables.
Control station shift function	When the control station is disconnected, e.g. due to a fault, the normal station with the lowest station number becomes a sub-control station to enable data link communication to continue.
Automatic on-line return function	When an off-line station is recovered from a fault, it automatically returns to the on-line status and restarts data link.
Self-diagnostic function	(1) Error messages are displayed in accordance with error codes. (2) Error detection information is stored in special relays and special registers.

3. SPECIFICATIONS

3.4 Accessible Stations

The possibilities for communicating with other stations within the MELSEC-NET/10 network system by using a user program or GPP function software package are indicated below.



Station Requesting Communication \ Destination	PC (1)	AnUCPU (2)	PC (3)	PC (4)	PC (5)
PC (1)	————	Possible	Possible	Possible	Not possible
PC (3)	Possible	Possible	————	Possible	Not possible
PC (4)	Possible	Possible	Possible	————	Possible
PC (5)	Not possible	Not possible	Not possible	Possible	————

Since, unlike an AnUCPU, a PC does not support the routing function, PCs cannot be used as the gateway stations (relay stations) between networks.

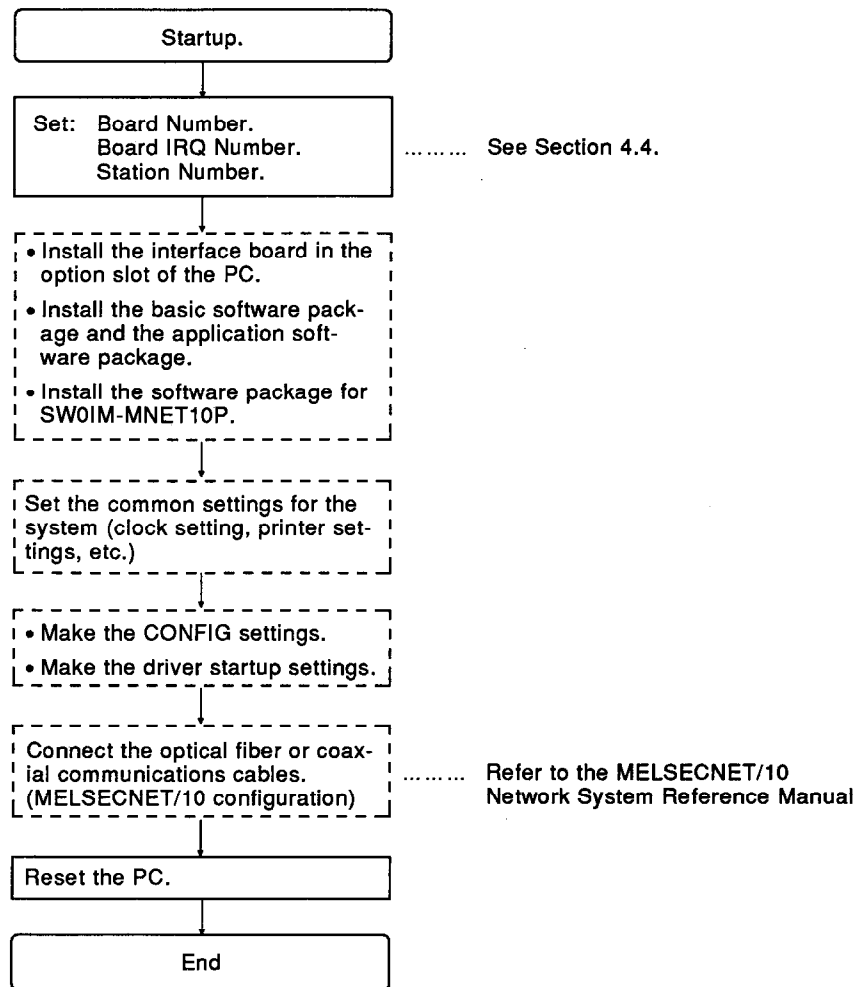
For example, in order to enable communication between PC 1 and PC 5 in this example system, PC 4 functioning as the gateway station would have to be replaced by an AnUCPU.

4. PRE-OPERATION SETTINGS AND PROCEDURES

This section describes the procedure to follow before the interface board can be operated, the names of its parts, and how to set them. For details on operation board settings, see Section 4.4.

4.1 Pre-Operation Settings and Procedures

The flowchart below outlines the procedure to be followed before using the interface board.



4.2 Precautions for Handling

Follow the precautions for handling the optional module below:

- (1) The optional module is put in an anti-static electric bag. Use the bag when keeping or carrying the optional module.
- (2) The printed circuit board of the optional module packages electronic components susceptible to static electricity. Do not touch the conductive and electrical components on the board.
- (3) When mounting the optional module, hold only by the end face of the section, where it is to be mounted, and of the printed circuit. Insert the connector into the socket securely.
- (4) Do not drop or impose on the optional module strong shock.
- (5) Do not remove the fixtures and the printed circuit board from the optional module. It may cause malfunctioning.
- (6) When mounting the optional module, use care not to allow foreign substances, such as wire scraps, to drop into it.
- (7) Tighten the optional module clamping screws (M4 screws) to a tightening torque of between 117.7 N and 186.3 N (12 kg-cm and 19 kg-cm).

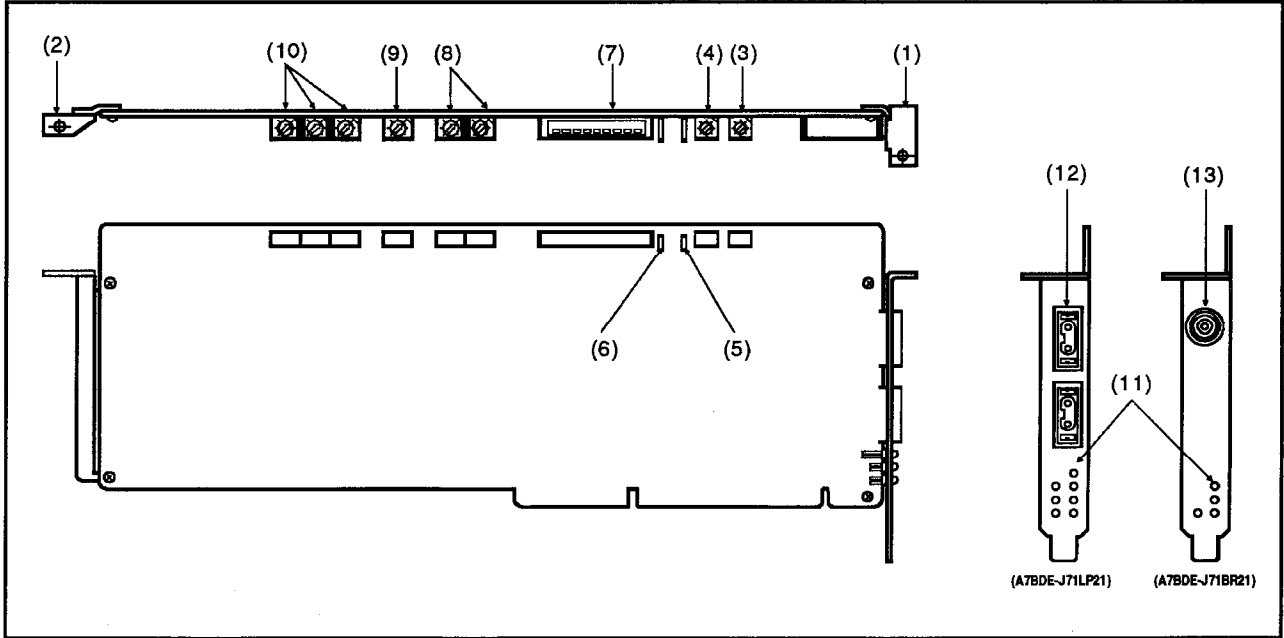
4. PRE-OPERATION SETTINGS AND PROCEDURES

MELSEC-A

4.3 Names of Parts

4.3.1 A7BDE-J71LP21/BR11

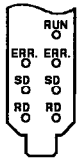
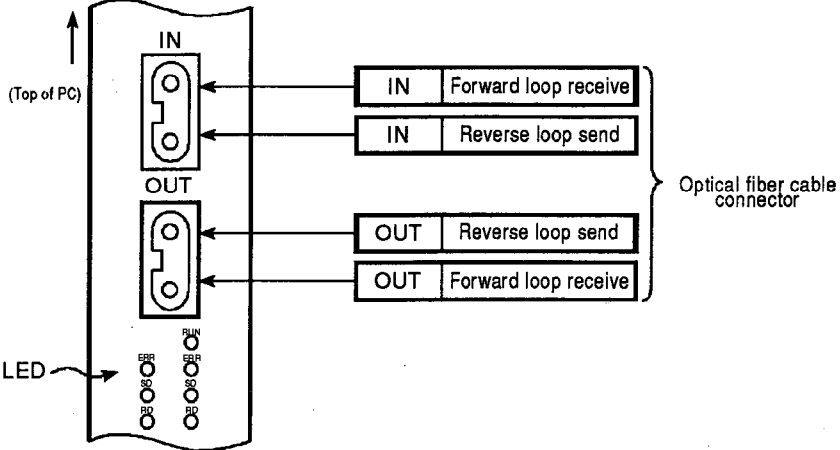
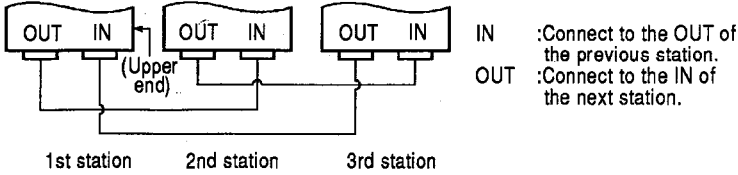
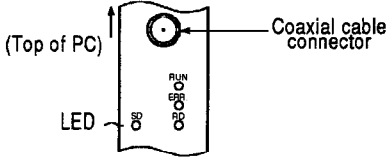
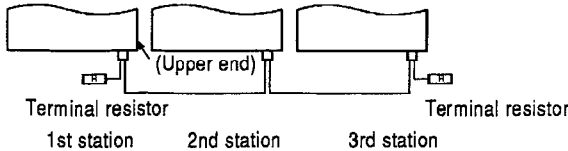
The names and functions of the parts of the interface board are as follows:



Number	Name	Contents																																		
(1) (2)	Mounting fixture	Fixture used to secure the interface board to the PC.																																		
(3)	Board number setting dial	This rotary switch sets the board number allocated to the system board. (For details, see Section 4.4.1.)																																		
(4)	Board interrupt setting dial	This rotary switch sets the number used by the OS to identify the option board. (For details, see Section 4.4.2.)																																		
(5)	Jumper (1)	Factory set to the "100H" position. (For details, see Section 4.4.7.)																																		
(6)	Jumper (2)	Factory set to the "4K" position. Do not change this setting.																																		
(7)	Condition setting switches	<table border="1"> <thead> <tr> <th>SW</th> <th>Description</th> <th>OFF</th> <th>ON</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Network type</td> <td>PC-to-PC network</td> <td>Cannot be set</td> </tr> <tr> <td>2</td> <td>Station type</td> <td>Normal station</td> <td>Control station</td> </tr> <tr> <td>3</td> <td>Parameters</td> <td>Common parameters</td> <td>Default parameters</td> </tr> <tr> <td>4</td> <td rowspan="2">Number of stations (valid when SW3 is ON)</td> <td>OFF 8 stations</td> <td>ON 16 stations</td> </tr> <tr> <td>5</td> <td>OFF 32 stations</td> <td>ON 64 stations</td> </tr> <tr> <td>6</td> <td rowspan="2">Total number of B/W points (valid when SW3 is ON)</td> <td>OFF 2 k</td> <td>ON 4 k</td> </tr> <tr> <td>7</td> <td>OFF 6 k</td> <td>ON 8 k</td> </tr> <tr> <td>8</td> <td>Not used</td> <td colspan="2">—</td> </tr> </tbody> </table> <p>All switches are factory set to the OFF position. (For details, see Section 4.4.6.)</p>	SW	Description	OFF	ON	1	Network type	PC-to-PC network	Cannot be set	2	Station type	Normal station	Control station	3	Parameters	Common parameters	Default parameters	4	Number of stations (valid when SW3 is ON)	OFF 8 stations	ON 16 stations	5	OFF 32 stations	ON 64 stations	6	Total number of B/W points (valid when SW3 is ON)	OFF 2 k	ON 4 k	7	OFF 6 k	ON 8 k	8	Not used	—	
SW	Description	OFF	ON																																	
1	Network type	PC-to-PC network	Cannot be set																																	
2	Station type	Normal station	Control station																																	
3	Parameters	Common parameters	Default parameters																																	
4	Number of stations (valid when SW3 is ON)	OFF 8 stations	ON 16 stations																																	
5		OFF 32 stations	ON 64 stations																																	
6	Total number of B/W points (valid when SW3 is ON)	OFF 2 k	ON 4 k																																	
7		OFF 6 k	ON 8 k																																	
8	Not used	—																																		
(8)	Station number setting switch	Two rotary switches used to specify the station number (range: 00 to 64) (For details, see Section 4.4.5.)																																		

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Number	Name	Contents										
(9)	Group number setting switch	Used to set the group number (factory setting: 0). 1 to 9 : Group number 0 : No group setting (For details, see Section 4.4.4.)										
(10)	Network number setting switches	Used to set the network number (factory setting: 1). 1 to 255 : Network number Other than 1 to 255 : Setting error (For details, see Section 4.4.3.)										
(11)	LEDs for display of operation status 	These LEDs display operation status and information concerning abnormal conditions. <table border="1" data-bbox="539 551 1409 734"> <thead> <tr> <th>LED Name</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>RUN</td> <td>Lights during normal I/F board operation. Extinguishes if abnormal condition occurs.</td> </tr> <tr> <td>ERR</td> <td>Flashes on occurrence of data receive error, lights when cable broken.</td> </tr> <tr> <td>SD</td> <td>Lights during data send.</td> </tr> <tr> <td>RD</td> <td>Lights during data receive.</td> </tr> </tbody> </table>	LED Name	Description	RUN	Lights during normal I/F board operation. Extinguishes if abnormal condition occurs.	ERR	Flashes on occurrence of data receive error, lights when cable broken.	SD	Lights during data send.	RD	Lights during data receive.
LED Name	Description											
RUN	Lights during normal I/F board operation. Extinguishes if abnormal condition occurs.											
ERR	Flashes on occurrence of data receive error, lights when cable broken.											
SD	Lights during data send.											
RD	Lights during data receive.											
(12)	Connector for optical fiber cable	<p>(1) The cable terminals are configured in the following manner.</p>  <p>(2) The cables are connected in the following manner.</p>  <p>IN : Connect to the OUT of the previous station. OUT : Connect to the IN of the next station.</p>										
(13)	Connector for coaxial cable	<p>The cable terminals are configured in the following manner.</p>  <p>(2) The cables are connected in the following manner.</p>  <p>Terminal resistor</p>										

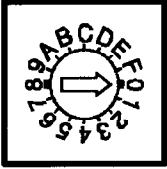
4.4 Board Settings

The following sections describe how to set the interface board's hardware setting switches. Ensure the PC is OFF before making any setting.

4.4.1 Board number setting

Option board numbers are assigned to each option board installed in the PC so that the boards can be identified for access by the OS.

- (1) The table below shows the correspondence between the number set with the board number setting dial and the board number displayed on the board selection screen for option board setting (see Section 5.2).

	Dial Number	Board Number	Dial Number	Board Number
	0	0	8	8
	1	1	9	9
	2	2	A	A
	3	3	B	B
	4	4	C	C
	5	5	D	D
	6	6	E	E
	7	7	F	F

- (2) The dial number is set to zero when shipped.
- (3) If more than one interface board is installed in the same PC, channel numbers (51 to 54) are allocated to them from channel 51 up, starting with the board with the lowest board number.
For details, see Section 5.2(1) Channel No.
- (4) For each option board, there is an occupied memory area for use by the system. Since the size of the occupied memory area differs according to the option board, the occupied memory areas for different boards may overlap even if the option board number settings are not duplicated. When setting the board numbers, take the size of the occupied memory area for each board into account.

The size of the occupied memory area for each board is shown overpage.

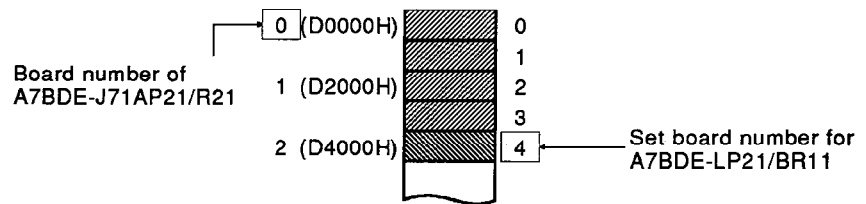
4. PRE-OPERATION SETTINGS AND PROCEDURES

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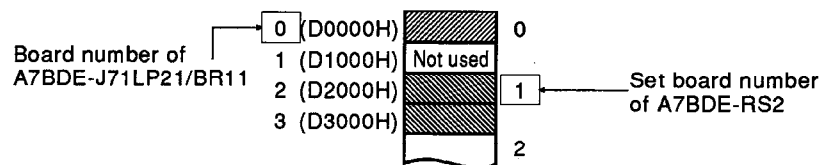
	A7BDE-J71AP21/R21 A7BDE-A3A A7BDE-A3N	A7BDE-J71LP21/BR11	All Option Boards other than Those to the Left
Dial number range	0 to 9	0 to F	0 to 9
Setting range	0 to 7	0 to F	0 to 7
Points used for board No.	2	1	1
Memory area occupied when board number setting is "0".			

(5) Board number setting examples are indicated below.

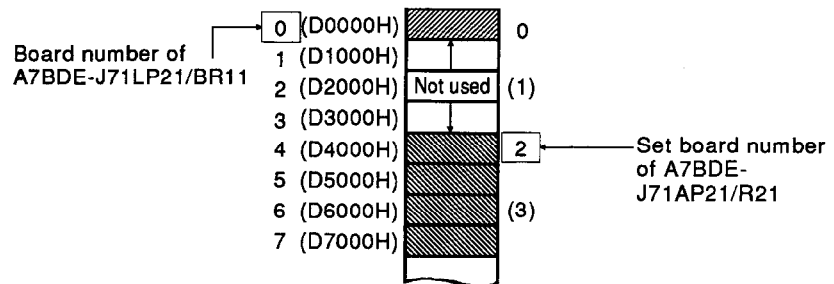
(a) An A7BDE-J71LP21/BR11 is set after an A7BDE-J71AP21/R21 whose board number is "0":



(b) An A7BDE-RS2 is set after an A7BDE-J71AP21/BR11 whose board number is "0":



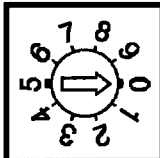
(c) An A7BDE-J71AP21/R21 is set after an A7BDE-J71AP21/BR11 whose board number is "0":



4.4.2 Board IRQ number setting

The option board IRQ number is used by the OS to identify which option board is accessing it.

(1) The table below shows the allowable board IRQ number settings.

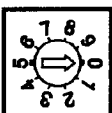
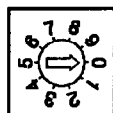
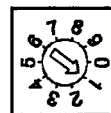
	Dial Number	Setting Possible/ Not Possible	Dial Number	Setting Possible/ Not Possible
	0	Not possible (IRQ 3)	5	Possible (IRQ B)
	1	Not possible	6	Possible (IRQ C)
	2	Possible (IRQ 5)	7	Possible (IRQ F)
	3	Not possible	8	DO NOT SET
	4	Possible (IRQ A)	9	DO NOT SET

(2) When setting the dial numbers, ensure that the A7BDE-J71LP21/BR11 IRQ numbers do not conflict with the settings of other option boards.

(3) The dial number is set to zero when shipped.

4.4.3 Network number setting

(1) The following table provides information concerning the setting of network numbers.

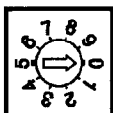
	Setting Method
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>X100</p>  </div> <div style="text-align: center;"> <p>X10</p>  </div> <div style="text-align: center;"> <p>X1</p>  </div> </div>	<p>(1)X100 switch : Used to set the hundreds digit of the network number.</p> <p>(2)X10 switch : Used to set the tens digit of the network number.</p> <p>(3)X1 switch : Used to set the units digit of the network number.</p>

(2) The dials are set to "001" when shipped.

(3) For the precautions on network number setting when connecting to a MELSECNET/10 network, refer to the MELSECNET/10 Network System Reference Manual.

4.4.4 Group number setting

(1) The following table provides information concerning the setting of a group number for the board.

	Description
	<p>(1) If no group setting is required, set "0".</p> <p>(2) To specify a group for transient transmission, set a group number in the range 1 to 9.</p>

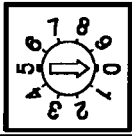
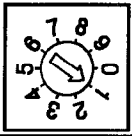
(2) The dial is set to "0" when shipped.

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4.4.5 Station number setting

- (1) The following table provides information concerning the setting of station numbers.


		Description
X10	X1	(1)X10 switch : Used to set the tens digit of the station number. (2)X1 switch : Used to set the units digit of the station number. (3)For a PC-to-PC network, the station number can be set in the range 1 to 64.
		

- (2) The station number dial is set to (01) when shipped.
- (3) For the precautions on station number setting when connecting to a MELSECNET/10 network, refer to the MELSECNET/10 Network System Reference Manual.

4.4.6 Operating condition setting

- (1) The following table provides information concerning the setting of board operating condition setting switches.

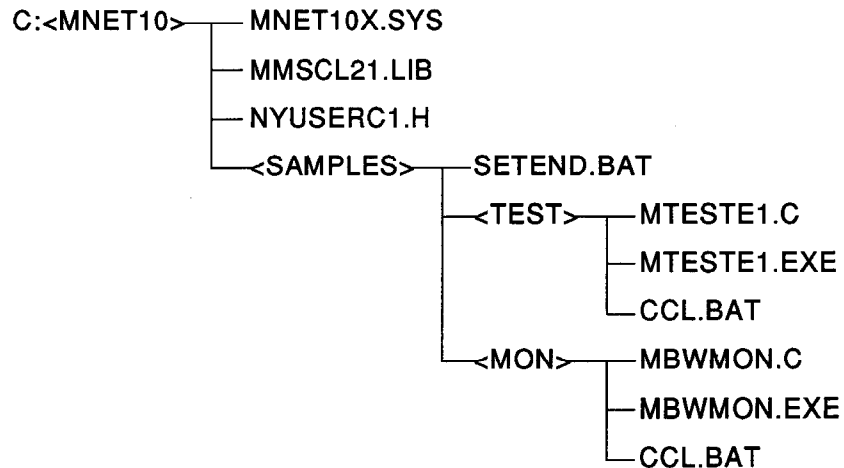
		Description			
SW	Description	OFF		ON	
1	Network type	PC-to-PC network		Cannot be set	
2	Station type	Normal station		Control station	
3	Parameters	Common parameters		Default parameters	
4	Number of stations (valid when SW3 is ON)	OFF	8 stations	ON	16 stations
5		OFF	OFF	ON	32 stations
6	Total number of B/W points (valid when SW3 is ON)	OFF	2 k	ON	4 k
7		OFF	OFF	ON	6 k
8	Not used	—			



- (2) All switches are factory set to the OFF position.
- (3) For the precautions on operating condition setting when connecting to a MELSECNET/10 network, refer to the MELSECNET/10 Network System Reference Manual.

4.5 Installing SW0IM-MNET10P, and File Directory After Installation

- (1) Install the SW0IM-MNET10P system disk by using the INSTALL command.
- (2) The file directory after installation is shown below.



4.6 Driver Entry Method

This section describes the procedure for installing the Driver software into the PC.

After loading the Driver file onto the hard-disk, add the following to the CONFIG.SYS file on the operating system data disk using an editor.

DEVICE=[Drive:] [Path] driver name INT-A__BD_INT-B__00H

- (1) INT-A__ Interrupt number for use when the application requests the driver to perform processing.
Set between 60 and FFH.
- (2) BD_ Option Board Number dial setting.
Set between 0 and F.
- (3) INT-B Option Board Interrupt number (IRQ) setting.
Set 2 or between 4 and 7.
- (4) _00H I/O Port Number Offset.
Set to 100H or 300H.

Example.

DEVICE=C:\MNET10X.SYS INT-A78 BD0 INT-B5 100H

- i.e. (a) Driver MNET10X.SYS is loaded in root directory of drive C:
 (b) The option board has been assigned interrupt vector 78H.
 (c) The option board number is set to 0.
 (d) The option board interrupt number is set to 5. (IRQ 11.)
 (e) The I/O Port Number offset is set to 100H.

POINT

The following message is displayed at normal installation. MELSEC-NET/10 DRIVER MNET10X.SYS Ver. 00A.
 For further driver messages at startup, please see the APPENDIX 2.

5. PROGRAMMING

This section describes the programming procedure of the A7BDE-J71LP21/BR11. Topics covered are the assembler interface format, and an example MS-C function library.

5.1 Library

The driver interface library contains the functions required for the user's application program to access MELSECNET/10 via the A7BDE-J71LP21/BR11. This library is fundamentally created by the user and subsequently linked to the application program. As a sample, a function library compatible with the MS-C compiler and Linker is supplied.

Main Processings of Library.

No.	Processing Timing	Library Processing	System Call
1	First call	Checks that the driver is being started up. Reads the INT number entered into CONFIG. SYS file. Performs the same processing as second and subsequent calls.	Opens the driver. Reads from the driver using I/O control.
2	Second and subsequent calls	Pushes arguments onto stack. Generates interruption in accordance with INT number. Restores stack.	

Function	Processing/Name of Function	Description	Communication Type 2
MNET10 board device access	Batch read mdreceive	Batch reads the statuses of the devices (B, W, X, Y, special B, special W) of the host station MNET10 board.	○
	Batch write mdsend	Batch writes data to the devices (B, W, X, Y, special B, special W) of the host station MNET10 board.	○
	Random read mdrandr	Reads (monitors) randomly specified devices (B, W, X, Y, special B, special W) of the host station MNET10 board.	○
	Random write vdrandw	Writes to (tests) randomly specified devices (B, W, X, Y, special B) of the host station MNET10 board.	○
User data communication	User data send mdsend	Sends user data to the MNET10 board at another station in the MNET10 network.	○
	User data receive mdreceive	Receives user data sent from the MNET10 board at another station in the MNET10 network.	○
PC CPU device memory access	Batch read mdreceive	Reads the data of devices (X, Y, M, B, D, W, R, etc.) used in the sequence program of the PC CPU at another station.	○
	Batch write mdsend	Writes data to devices (X, Y, M, B, D, W, R, etc.) used in the sequence program of the PC CPU at another station.	○
	Set mddevset	Turns ON bit devices (X, Y, M, B, etc.) used in the sequence program of the PC CPU at another station.	○
	Reset mddevrst	Turns OFF bit devices (X, Y, M, B, etc.) used in the sequence program of the PC CPU at another station.	○
	Random read mdrandr	Reads (monitors) the statuses of randomly specified devices (X, Y, M, B, D, W, R, etc.) used in the sequence program of the PC CPU at another station.	○
	Random write mdrandw	Writes data to (tests) randomly specified devices (X, Y, M, B, D, W, R, etc.) used in the sequence program of the PC CPU at another station.	○
PC CPU control	Remote run/stop/pause mdcontrol	Controls the operation status (RUN/STOP/PAUSE) of the PC CPU at another station.	○
Board control	Board reset mdcontrol	Resets the A7BDE-J71LP21/BR11 board.	○
	CPU type read mdtyperead	Reads the model of the PC CPU.	○

5.2 Type 2 Library Function

Common data

The following data is common to all the functions described in this section.

(1) Channel No.

- 51 : MNET10 (first board)
- 52 : MNET10 (second board)
- 53 : MNET10 (third board)
- 54 : MNET10 (fourth board)

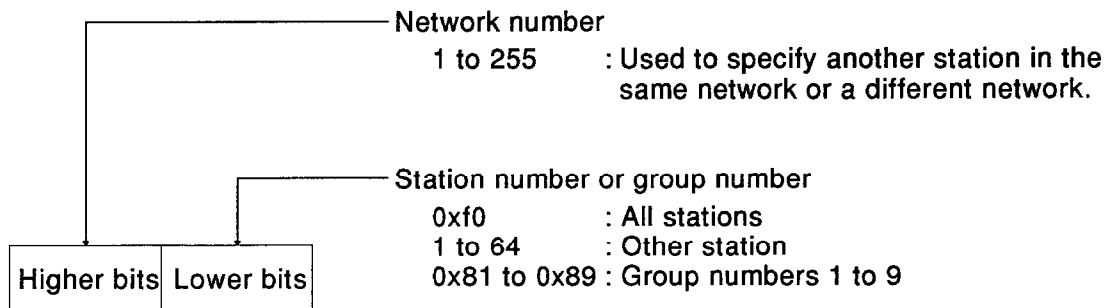
Channel numbers are assigned from 51 up starting with the board with the lowest board number.

(2) Station number

- MNET10

0xff: Host station

Numbers for other stations are configured as shown below.



* "All stations" (0xf0) and group numbers 1 to 9 (0x81 to 0x89) can only be specified with the user data send (mdsend) function.

(3) Device type

The device type for a communication function can be specified either by specifying a code number or a device name.

Device Type		Device	Device Type		Device
Code Specification	Device Name Specification		Code Specification	Device Name Specification	
1	DevX	X	19	DevA	A
2	DevY	Y	20	DevZ	Z
3	DevL	L	21	DevV	V
4	DevM	M	22	DevR	R
5	DevSM	Special M	23	DevB	B
5	DevSM	SB (Link special B for MNET10)	24	DevW	W
		F	50	DevSPB	Buffer memory (A3A, A3N board, buffer memory of L6AF module)
6	DevF	T (contact)			
7	DevTT	T (coil)			
8	DevTC	C (contact)	100	DevUSER	User data
9	DevCT	C (coil)			
10	DevCC	T (present value)	16002	DevTS2	T (set value, sub-2)
11	DevTN	C (present value)	16003	DevTS3	T (set value, sub-3)
12	DevCN	D	18002	DevCS2	C (set value, sub-2)
13	DevD	Special D	18003	DevCS3	C (set value, sub-3)
14	DevSD	SW (Link special register for MNET10)	22001	DevER1	Expansion file register block No.1
14	DevSD			to	to
15	DevTM	T (set value main)	to	to	to
16	DevTS	T (set value, sub-1)			
17	DevCM	C (set value main)	22256	DevER256	Expansion file register block No.256
18	DevCS	C (set value, sub-1)			

*1 If 22000 is specified as the device type, the same processing as if 22(R) were specified will be executed.

*2 Designations such as DevX used to specify the device name are defined in the include file "nyuserc1.h".

(4) Device No.

Numbers within the device range of the CPU can be specified. When accessing a bit device, the number specified must be a multiple of 8.

(5) The size of the accessible area varies according to the conditions, as shown below.

(a) For batch reading/writing of devices

Device range: The entire area can be accessed.

(b) For random reading/writing of devices

Device range: The number of accessible points is restricted according to the conditions as shown below.

Board or ACPU	Random Read	Random Write
• AnUCPU via MNET10 • MNET10 board host station	288 points	196 points
• Other than above	40 points	24 points

When word devices are specified, or when input (X) devices of an A1(N), A2(N), or A3(N)CPU are specified, the maximum number of points is half the figure given in the table above.

1) mdopen

• Functin Name

mdopen
Open the communicatin line.

• Format

ret=mdopen(chan,mode,&path);
short ret; Return value
shot chan; Communication line channel number
short mode; M-NET mode
long path; Pointer of the opened path

• Explanation

o The function executes initialization according to the spacificed channel and opens it.

chan 51: MNET10 (first board)
52: MNET10 (second board)
53: MNET10 (third board)
54: MNET10 (fourth board)

o The argument "mode" is effective only when the communication line is opened for the MNET board and sets the MELSECNET mode as indicated below.

mode 0: MELSECNET mode (conventional mode)
1: MELSECNETII mode
2: MELSECNET composite mode
-1: No mode setting

If the opened communication line is not opened for the MNET board, the variable value is ignored.

o The function checks the range of the argument and returns the error code if the range is incorrect.

o If an error code is returned from the communication driver, the function returns the error code as it is.

• Return value

"0" when processing ends correctly.
Other than "0" when processing ends abnormally.
-8: Channel No. error The specified channel number is invalid.

• Related functions

mdclose()

• Example

See the explanation for mdsend()

POINTS

- If an error code is returned from the MNET driver, the function returns the error code as it is. (See APPENDIX 2)
- The return path used for this function can also be used for type 1 functions.
- When the option board is accessed from more than one task, set "0 to 2" as the mode setting for one of the tasks only. Set "-1" as the mode setting for the other task.
- When using the PC as a master station, it is essential to transfer the link parameters to the MNET board using the mdnetprm() command after executing mdopen().

2) `mdclose`

- Function name
`mdclose`
Closes the communication line.
- Format
`ret=mdclose(path);`
short `ret`; Return value
long `path`; Pointer of the opened path
- Explanation
 - o The function closes the communicating line meeting the correctly.
 - o The function deletes the data table that is created when the communication line was opened.
- Return value
"0" when processing ends correctly.
Other than "0" when processing ends abnormally.
-1: Path error The designated path is invalid.
- Related functions
`mdopen()`
- Example
See the explanation for `mdsend()`.

POINTS

- If an error code is returned from the MNET driver, the function returns the error code as it is. (See APPENDIX 2)
- If "0" is specified for the path, all channels are closed.

3) mdsend

- Function name
mdsend
Device write
- Format
ret=mdsend(path,stno,devtyp,devno,&size,data);
short ret; Return value
long path; Channel path
short stno; Station number (Refer to Section 5.2 Type 2 Library Function.)
short devtyp; Device type
short devno; Head device number
short size; Write data byte size
short data[]; Write data
- Explanation
 - o The function writes data to the designated device.
 - o The function checks the arguments and whether the "address obtained from the argument + size" is within the device memory range.
 - o If the designated write size is greater than the allowable write size, the allowable write size is returned to "size".
- Return value
"0" when processing ends correctly.
Other than "0" when processing ends abnormally.
 - 1: Path error The designated path is invalid.
 - 2: Device number error The designated number is outside the allowable range.
 - 3: Device type error The designated device type is invalid.
 - 4: CPU error An invalid station is designated.
 - 5: Size error The value "device number + size" is greater than the device range.
An access is made to a word device with an odd-number bytes.
The value "device number + size" is greater than the range of the block.
 - 12: Block error The block of the designated extended file register is invalid.
 - 13: Write protect error The block to be accessed in the extended file register overlaps the write protect area of a memory cassette.
 - 14: Memory cassette error A memory cassette is not installed or the wrong memory cassette is installed in the CPU which was accessed.
 - 16: Station No./group No. error The designated station number or group number is outside the allowable range.
 - 17: Group No. all station designation error Group number all station designation is invalid.

POINTS

- If an error code is returned from the MNET driver, the function returns the error code as it is. (See APPENDIX 2)
- To access the host station, designate the station number with "0xFF(255)". If an actual station number assigned to the host station is used, an error(-4) occurs.
- To access a bit device, specify a device number using a multiple of 8.
- Note that if data is written to a block where an expansion comment is allocated, the expansion comment is deleted.
- Note that if data is written to a block which overlaps the sub-2 or sub-3 setting area, the sub-2 or sub-3 program is deleted.

- Example

```

#include <nyusercl.h>
#include <memory.h>
#define MSIZE 1024
main()
{
    long path;
    short data [MSIZE/8];
    short size;
    short ret;
    int i,j;

    ret = mdopen(1,0,&path);
    if(ret != 0){
        printf("\n Communication open error [%04x]",ret);
        exit(1);
    }

    /**** Setting data to M0 to M1023 of host station ****/
    size = MSIZE/8;
    for(i=0;i<MSIZE/16;i++) {
        data[i] = (i%2)? 0xaaaa : 0x5555;
    }
    ret = mdsend(path,0xff,4,0,&size,data);
    if(ret != 0){
        printf("\n Send error[%04X]",ret);
        mdclose(path);
        exit(1);
    }
    ret = mdreceive(path,0xff,4,0,&size,data);
    if(ret != 0){
        printf("\n Send error[%04X]",ret);
        mdclose(path);
        exit(1);
    }
    for(i=0;i<MSIZE/16;i++){
        printf("\nM%4d", i*16);
        for(j=0;j<16;j++,data[i]>>=1){
            if(data[i] & 1){
                printf("●");
            }else{
                printf("○");
            }
        }
    }
    ret = mdclose(path);
    if(ret != 0){
        printf("\n Communication close error[%04X]",ret);
        exit(1);
    }
}

```

4) **mdrecieve**

- Function name
mdrecieve
Device read
- Format
ret=mdrecieve(path,stno,devtyp,devno,&size,data);
short ret; Return value
long path; Channel path
short stno; Station number (Refer to Section 5.2 Type 2 Library Function.)
short devtyp; Device type
short devno; Head device number
short size; Read data byte size
short data[]; Read data (single-precision integer matrix)
- Explanation
 - o The function reads the designated value.
 - o The function checks the arguments and whether the "address obtained from the argument + size" is within the device memory range.
 - o If the designated read size is greater than the allowable read size, the allowable read size is returned to "size".
- Return value
"0" when processing ends correctly.
Other than "0" when processing ends abnormally.

-1: Path error	The designated path is invalid.
-2: Device number error	The designated number is outside the allowable range.
-3: Device type error	The designated device type is invalid.
-4: CPU error	An invalid station is designated.
-5: Size error	The value "device number + size" is greater than the device range. An acces is made to a word device with an odd-number bytes. The value "device number + size" is greater than the range of the block.
-11: Insufficient buffer area	The read area size defined by the read data storage matrix variable is small.
-12: Block error	The specified block is invalid.
-14: Memory cassette error	A memory cassette is not installed or an improper memory cassette is installed in the CPU which was accessed.
-16: Station No./group No. error	The designated station number or group number is outside the allowable range.
-17: Group No. all station designation error	Group number all station designation is invalid.
- Related functions
mdopen(),mdclose()
- Example
See the explanation for "mdsend()".

POINTS

- If an error code is returned from the MNET driver, the function returns the error code as it is. (See APPENDIX 2)
- To access the host station, designate the station number with "0xFF(255)". If an actual station number assigned to the host station is used, an error(-4) occurs.
- To access a bit device, specify a device number using a multiple of 8.

5) mddevset

- Function name
mddevset
Device set
- Format
ret=mddevset(path,stno,devtyp,devno);
short ret; Return value
long path; Channel path
short stno; Station number (Refer to Section 5.2 Type 2 Library Function.)
short devtyp; Device type
short devno; Head device number
- Explanation
 - o The function sets (turns on) the designated device.
 - o The function checks the arguments.
- Return value
"0" when processing ends correctly.
Other than "0" when processing ends abnormally.
 - 1: Path error The designated path is invalid.
 - 2: Device number error The designated number is outside the allowable range.
 - 3: Device type error The designated device type is invalid.
 - 4: CPU error An invalid station is designated.
 - 16: Station No./group The designated station number or group number is outside the allowable range.
 - No. error
 - 17: Group No. all station Group number all station designation is invalid.
 - designation error
- Related functions
mdopen(),mdclose(),mddevrst()

POINTS

- If an error code is returned from the MNET driver, the function returns the error code as it is. (See APPENDIX 2)
- To access the host station, designate the station number with "0xFF(255)". If an actual station number assigned to the host station is used, an error(-4) occurs.

- Example

```

#include <nyusercl.h>
#include <memory.h>
#define MSIZE 16
main()
{
    long path;
    short data [MSIZE/8];
    short size;
    short ret;
    int i,j;

    ret = mdopen(2,0,&path);
    if(ret != 0){
        printf("\n Communication open error [%04x]",ret);
        exit(1);
    }

    /**** Turning ON of B0 to B15 of host station ****/
    for(i=0;i<16;i++) {
        if(i%2){
            ret = mddevset(path,0xff,23,i);
        }else{
            ret = mddevrst(path,0xff,23,i);
        }
        if(ret != 0){
            printf("\n Send error[%d]",ret);
            mdclose(path);
            exit(1);
        }
    }

    size = 2;
    ret = mdreceive(path,0xff,23,0,&size,data);
    if(ret != 0){
        printf("\n Receive error[%04X]",ret);
        mdclose(path);
        exit(1);
    }
    for(i=0;i<MSIZE/16;i++){
        printf("\nB%4d", i*16);
        for(j=0;j<16;j++,data[i]>>=1){
            if(data[i] & 1){
                printf("●");
            }else{
                printf("○");
            }
        }
    }
    ret = mdclose(path);
    if(ret != 0){
        printf("\n Communication close error[%04X]",ret);
        exit(1);
    }
}

```

6) mddevrst

- Function name
mddevrst
Device reset
- Format
ret=mddevrst(path,stno,devtyp,devno);
short ret; Return value
long path; Channel path
short stno; Station number (Refer to Section 5.2 Type 2 Library Function.)
short devtyp; Device type
short devno; Head device number
- Explanation
 - o The function resets (turns off) the designated device.
 - o The function checks the arguments.
- Return value
 - "0" when processing ends correctly.
 - Other than "0" when processing ends abnormally.
 - 1: Path error The designated path is invalid.
 - 2: Device number error The designated number is outside the allowable range.
 - 3: Device type error The designated device type is invalid.
 - 4: CPU error An invalid station is designated.
 - 16: Station No./group The designated station number or group number is outside the allowable range.
 - 17: Group No. all station Group number all station designation is invalid.
 - designation error
- Example
See the explanation for "mdsend()".

POINTS

- If an error code is returned from the MNET driver, the function returns the error code as it is. (See APPENDIX 2)
- To access the host station, designate the station number with "0xFF(255)". If an actual station number assigned to the host station is used, an error(-4) occurs.

7) mdrandw

- Function name
mdrandw
Device random write
- Format
ret=mdrandw(path,stno,dev,buf,bufsize);
short ret; Return value
long path; Channel path
short stno; Station number (Refer to Section 5.2 Type 2 Library Function.)
short dev[]; Designated random write device
short buf[]; Write data
short bufsize; Dummy

- Explanation

- o The function writes data to a device designated at random.

```

Designated random write device dev[ ]
dev[0] ..... Number of blocks
dev[1] ..... Device type
dev[2] ..... Start device number
dev[3] ..... Number of points
dev[4] ..... Device type
      to
      } Block 1
      } Block 2
    
```

- o How the devices are designated is shown below.

```

M100 TO M115 ..... Turns off all bits.
D10 to D13 ..... Stores 10 to D10, 200 to D11, 300 to D12, and 400 to D13.
    
```

Designated random write device

```

dev[0]=2; ..... Two ranges (M100 to M115, D10 to D13)
dev[1]=DevM;
dev[2]=100;  ] ... M100 and up
dev[3]=16; ..... 16 points (M100 to M115)
dev[4]=DevD;
dev[5]=10;  ] ... D10 and up
dev[6]=4; ..... 4 points (D10 to M115)
    
```

Write data

```

buf[0]=0; ..... Turns off all bits.
buf[1]=10; ..... Stores 10 to D10.
buf[2]=200; ..... Stores 200 to D11.
buf[3]=300; ..... Stores 300 to D12.
buf[4]=400; ..... Stores 400 to D13.
    
```


- Return value
 - "0" when processing ends correctly.
 - Other than "0" when processing ends abnormally.
 - 1: Path error The designated path is invalid.
 - 2: Device number error The designated number is outside the allowable range.
 - 3: Device type error The designated device type is invalid.
 - 4: CPU error An invalid station is designated.
 - 5: Size error The value "device number + size" is greater than the device range.
An acces is made to a word device with an odd-number bytes.
The value "device number + size" is greater than the range of the block.
The number of write points is outside the allowable range.
 - 6: Block number The block number of dev[0] cannot be processed.
 - 12: Block error The specified block is invalid.
 - 13: Write protect error The block to be accessed overlaps the memory protected area.
 - 16: Station No./group The designated station number or group number is
No. error outside the allowable range.
 - 17: Group No. all station Group number all station designation is invalid.
designation error

POINTS

- If an error code is returned from the MNET driver, the function returns the error code as it is. (See APPENDIX 2)
- To access the host station, designate the station number with "0xFF(255)". If an actual station number assigned to the host station is used, an error(-4) occurs.
- The following devices cannot be designated for random device write.
 - 1 T, C (set value)
 - 2 Buffer memory
 - 3 W of host station in MNETII or MNET10
- For the number of points for which random write is allowed, refer to item 5 on page 5-3.
- Note that if data is written to a block where an expansion comment is allocated (expansion file register), the expansion comment is deleted.
- Note that if data is written to a block which overlaps the sub-2 or sub-3 setting area (expansion file register), the sub-2 or sub-3 program is deleted.

8) **mdrandr**

- Function name
 mdrandr
 Device random read
- Format
 ret=mdrandr(path,stno,dev,buf,bufsize);
 short ret; Return value
 long path; Channel path
 short stno; Station number (Refer to Section 5.2 Type 2 Library Function.)
 short dev[]; Designated random read device
 short buf[]; Read data (single-precision integer matrix)
 short bufsize; Number of bytes of the read data storage area

- Explanation
 - o The function reads data from a device designated at random.

Designated random read device dev[]

dev[0]	.....	Number of blocks		
dev[1]	.....	Device type		Block 1
dev[2]	.....	Start device number		
dev[3]	.....	Number of points		Block 2
dev[4]	.....	Device type		
	to			

- o How the devices are designated is shown below.

M100 TO M115 All bits are off.
 D10 to D13 10 is stored in D10, 200 in D11, 300 in D12, and 400 in D13.
 M0 to M13 All bits are on.
 Present value of T10 ... Present value of T10 is 1 sec (10).

* The explanation above assumes the present status of the objective devices.

Designated random read device

dev[0]=4; Four ranges (M100 to M115, D10 to D13, M0 to M16, T10 present value)

dev[1]=DevM;		... M100 and up
dev[2]=100;		
dev[3]=16;		16 points (M100 to M115)
dev[4]=DevD;		... D10 and up
dev[5]=10;		
dev[6]=4;		4 points (D10 to D13)
dev[7]=DevM;		... M0 and up
dev[8]=0;		
dev[9]=14;		14 points (M0 to M13)
dev[10]=DevTN;		.. T10 timer present value and up
dev[11]=10;		
dev[12]=1;		1 point (T10)

Read data

Read data is stored of matrix variables of buf[0] and up.
 buf[0]=0; All bits of M100 to M113 are off.
 buf[1]=10; Present value of D10
 buf[2]=200; Present value of D11
 buf[3]=300; Present value of D12
 buf[4]=400; Present value of D13
 buf[5]=0x3fff; All bits of M0 to M13 are on.
 buf[6]=10; Present value of T10 is 10 (1 sec).

Number of bytes of read data storage area

Designate the size of matrix variable `buf[]`, where the read data is stored, as the number of bytes. In this example, "14" is input.

`buf[0]` to `buf[6]` $7 \times 2 = 14$ bytes

- Return value

"0" when processing ends correctly.

Other than "0" when processing ends abnormally.

- 1: Path error The designated path is invalid.
- 2: Device number error The designated number is outside the allowable range.
- 3: Device type error The designated device type is invalid.
- 4: CPU error An invalid station is designated.
- 5: Size error The value "device number + size" is greater than the device range.
An access is made to a word device with an odd-number bytes.
The value "device number + size" is greater than the range of the block.
The number of write points is outside the allowable range.
- 6: Block number The block number of `dev[0]` cannot be processed.
- 12: Block error The specified block is invalid.
- 15: Write protect error The block to be accessed overlaps the memory protected area.
- 16: Station No./group The designated station number or group number is outside the
No. error allowable range.
- 17: Group No. all station Group number all station designation is invalid.
designation error

POINTS

- If an error code is returned from the MNET driver, the function returns the error code as it is. (See APPENDIX 2)
- To access the host station, designate the station number with "0xFF(255)". If an actual station number assigned to the host station is used, an error(-4) occurs.
- The following devices cannot be designated for random device write.
 - 1 T, C (set value)
 - 2 Buffer memory
 - 3 W of host station in MNET11 or MNET10
- For the number of random write allowed points, refer to item 5 on page 5-3.

9) mdcontrol

- Function name
mdcontrol
Remote RUN/STOP/PAUSE
- Format
ret=mdcontrol(path,stno,&buf);
short ret; Return value
long path; Channel path
short stno; Station number (Refer to Section 5.2 Type 2 Library Function.)
short buf; Designation code

- Explanation
 - o The function controls the PC CPU (remote RUN / STOP / PAUSE).
 - o The designation codes used for this control are indicated below.

Command	Designation Code
Remote RUN	0
Remote STOP	1
Remote PAUSE	2

- Return value
"0" when processing ends correctly.
Other than "0" when processing ends abnormally.
 - 1: Path error The designated path is invalid.
 - 4: CPU error An invalid station is designated.
 - 16: Station No./group No. error The designated station number or group number is outside the allowable range.
 - 17: Group No. all station designation error Group number all station designation is invalid.
 - 18: Remote command error A code other than the specified designation code is given.

POINT

- If an error code is returned from the MNET driver, the function returns the error code as it is. (See APPENDIX 2)

10) mdtyperead

- Function name
mdtyperead
PC CPU model read
- Format
ret=mdtyperead(path,stno,&buf);
short ret; Return value
long path; Channel path
short stno; Station number (Refer to Section 5.2 Type 2 Library Function.)
short buf[1]; Model name code
- Explanation
 - o The function reads the model name of the CPU installed in the designated PC.

PC CPU Model Name	Model Name Code
A0J2	A0H
A1N	A1H
A2N	A2H
A3N	A3H
A3H, A3M	A4H
AJ72	ABH
T3A (A mode)	A8H
T3A (T mode)	A9H
A2A	92H
A2AS1	93H
A3A	94H
A0J2H, A1S	98H
A2C	9AH
A2U	82H
A2U-S1	83H
A3U	84H
A4U	85H
A7BDE-J71P21/R21, A7BDE-J71AP21/R21	90H

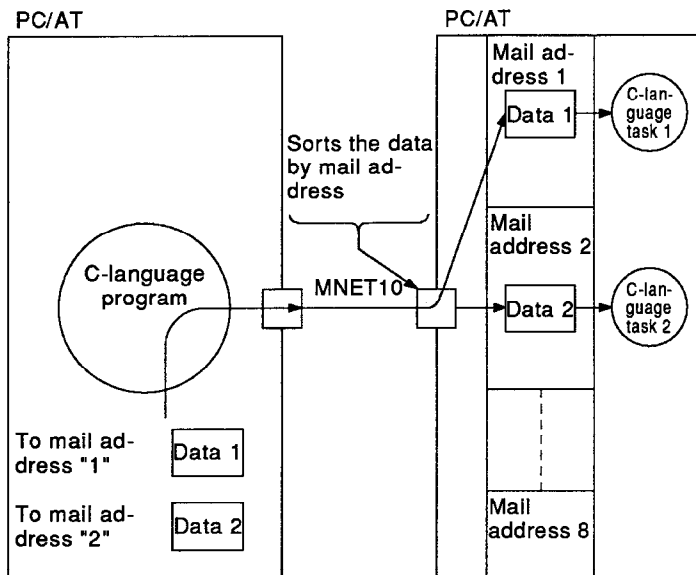
- Return value
"0" when processing ends correctly.
Other than "0" when processing ends abnormally.
 - 1: Path error The designated path is invalid.
 - 4: CPU error An invalid station is designated.
 - 16: Station No./group The designated station number or group number is outside the
No. error allowable range.
 - 17: Group No. all station Group number all station designation is invalid.
designation error

POINT

- If an error code is returned from the MNET driver, the function returns the error code as it is. (See APPENDIX 2)

11) msend

- Function name
msend
User data send
- Format
ret=msend(path,stno,devtype,devno,&size,data);
short ret; Return value
long path; Channel path
short stno; Station number (Refer to Section 5.2 Type 2 Library Function.)
short devtyp; Designation of device type "100" or "DevUSER"
short devno; Designation of mail address of communication station in the range "1" to "8"
short size; Designation of the size of data to be sent in the range 1 to 960 bytes.
char data[]; Send data (single-precision integer matrix)
- Explanation
 - o The function sends the user data to MNET/10 board in another station in the MELSEC-NET/10 network.
 - o The designated mail address data is sent.



- Return value
"0" when processing ends correctly.
Other than "0" when processing ends abnormally.
 - 1: Path error The designated path is invalid.
 - 3: Device type error The designated device type is invalid.
 - 4: CPU error An invalid station is designated.
 - 5: Size error The designated value of send data size is outside the allowable range.
 - 16: Station No./group No. error The designated station number or group number is outside the allowable range.
 - 19: Mail address error The designated mail address is outside the allowable range.

POINT

- If an error code is returned from the MNET driver, the function returns the error code as it is. (See Chapter 6)

12) mdreceive

- Function name
mdreceive
User data receive
- Format
ret=mdrecieve(path,stno,devtype,devno,&size,data);
short ret; Return value
long path; Cannel path
short stno; Designation of host station (0xff)
short devtyp; Designation of device type "100" or "DevUSER"
short devno; Designation of mail address in the range "1" to "8"
short size; Receive data size in the number of bytes
short data[]; Receive data (single-precision integer matrix)
- Explanation
 - o The function reads the user data sent from MNET/10 board in another station in the MELSECNET/10 network.
 - o The received data is stored in the MNET/10 board. Note that the board can store up to 16 messages; if messages exceeding this limit are received, they are discarded. If this happens, no error message is returned to the data send station. It is necessary to communicate by handshaking using the application program.
 - o The data received before the execution of mdopen is stored.
- Return value
"0" when processing ends correctly.
Other than "0" when processing ends abnormally.
 - 1: Path error The designated path is invalid.
 - 3: Device type error The designated device type is invalid.
 - 5: Size error The designated value of receive data size is outside the allowable range.
 - 16: Station No./group No. error The designated station number or group number is outside the allowable range.
 - 19: Mail address error The designated mail address is outside the allowable range.

POINT

- If an error code is returned from the MNET driver, the function returns the error code as it is. (See Chapter 6)

6. TROUBLESHOOTING

6.1 MNET10 Driver Startup Messages

No.	Status	Description	Start Up
0	Message	MELSEC DRIVER MMNET10[].SYS Ver. 00A	Succeeded
1	Message	ERROR 0001 IN MELSEC DRIVER MMNET10[].SYS INT-A PARAMETER ERROR	Failed
	Error definition	Argument (1) characters are not INT-A.	
2	Message	ERROR 0002 IN MELSEC DRIVER MMNET10[].SYS INT-A NUMBER ERROR	Failed
	Error definition	Argument (1) number is other than 0x60 to 0xFF.	
3	Message	ERROR 0003 IN MELSEC DRIVER MMNET10[].SYS BD PARAMETER ERROR	Failed
	Error definition	Argument (2) characters are not BD.	
4	Message	ERROR 0004 IN MELSEC DRIVER MMNET10[].SYS BD NUMBER ERROR	Failed
	Error definition	Argument (2) number is other than 0 to 7.	
5	Message	ERROR 0005 IN MELSEC DRIVER MMNET10[].SYS INT-B PARAMETER ERROR	Failed
	Error definition	Argument (3) characters are not INT-B.	
6	Message	ERROR 0006 IN MELSEC DRIVER MMNET10[].SYS INT-B NUMBER ERROR	Failed
	Error definition	Argument (3) number is other than 0 to 7. The number set by the I/O port setting jumper on board 0 differs from the number set by argument (3).	
7	Message	ERROR 0007 IN MELSEC DRIVER MMNET10[].SYS BOARD NOT FOUND	Failed
	Error definition	Board is not found at argument (2). Cause (1) Board does not exist. (2) Argument (2) number is the same as one used for other boards. (3) 2-port memory is the same as one used for other boards. (4) The number set by the I/O port setting jumper on board 0 differs from the number set by argument (4).	
8	Message	ERROR 0008 IN MELSEC DRIVER MMNET10[].SYS BOARD NOT RESPONSE	Failed
	Error definition	Communication with board at start up. Cause (1) Board not installed properly. (2) Argument (3) number is the same as one used for other boards.	
9	Message	ERROR 0009 IN MELSEC DRIVER MMNET10[].SYS STATION NO ERROR	Failed
	Error definition	Station number dial setting is greater than 64.	
10	Message	ERROR 0010 IN MELSEC DRIVER MMNET10[].SYS 100H/300H PARAMETER ERROR	Failed
	Error definition	The number set with the interrupt switch on the board differs from the number set by argument (4). The number set by argument (4) is other than 100H/300H.	

6. TROUBLESHOOTING

MELSEC-A

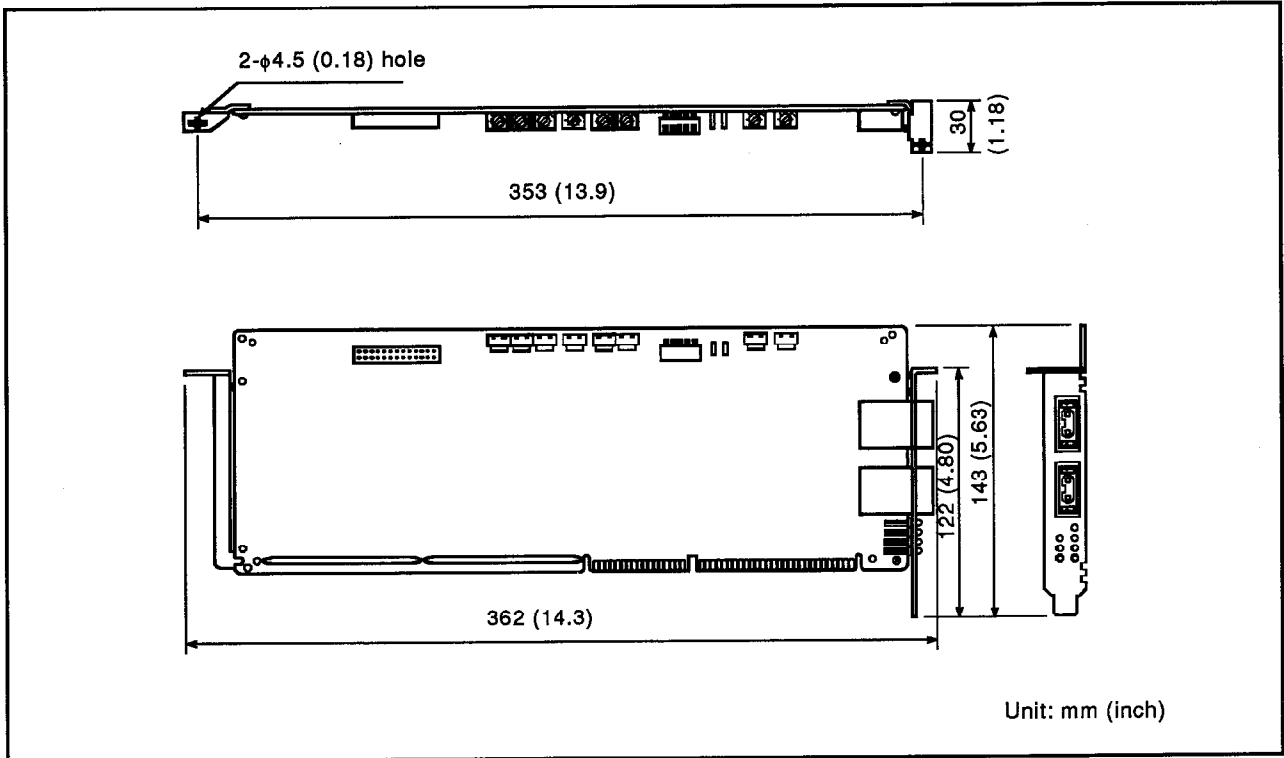
No.	Status	Description	Start Up
11	Message	ERROR 0011 IN MELSEC DRIVER MMNET10[].SYS SET UP PIN NOT 'AT' ERROR	Failed
	Error definition	The PC/AT setting jumper on the board is not at the AT side.	
12	Message	ERROR 0012 IN MELSEC DRIVER MMNET10[].SYS HARDWARE NOT 'LM7000/A7PHP' ERROR	Failed
	Error definition	The PC is other than LM7000/A7HP.	
13	Message	ERROR 0013 IN MELSEC DRIVER MMNET10[].SYS OS MISSMATCH ERROR	Failed
	Error definition	The OS on which the driver operates is not the correct one.	

[]: X or V

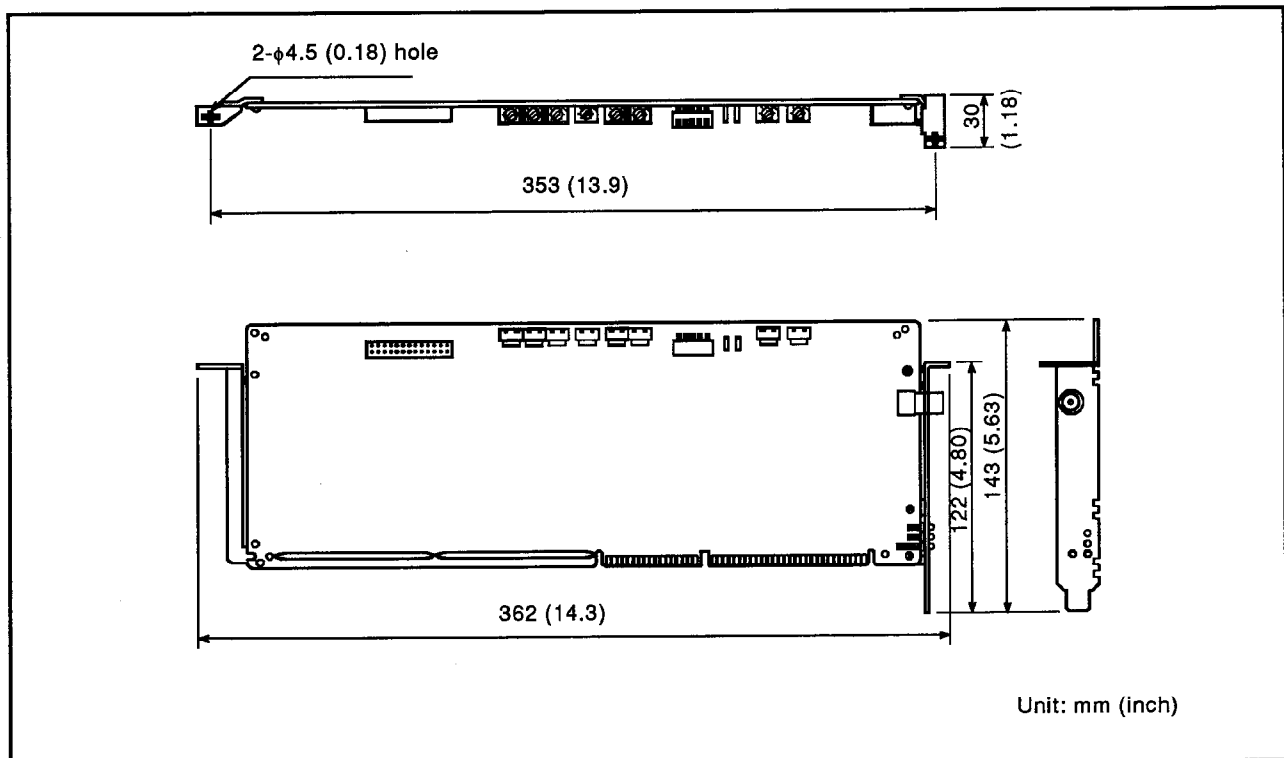
APPENDICES

APPENDIX 1 DIMENSIONS

(1) A7BDE-J71LP21 interface board (Optical fiber cable)



(2) A7BDE-J71BR11 interface board (Coaxial cable)



APPENDIX 2 DRIVER RETURN VALUES AND ERROR CODES

Return Value (HEX)	Description	Remedy
0	Normal termination	
1	Driver not started up.	Correct error at driver start-up.
2	Board response error A reply was not given within the time-out period.	Check board installation status.
4	A function request other than nl1sync is made during SEND/RECEIVE processing. An nl1sync function request is made other than in SEND/RECEIVE processing.	Secure synchronization by SYNC. Correct the program so that SYNC is not executed.
-1 (FFFF)	Status (-1 in decimal) SEND/RECEIVE processing in progress	Make completion synchronization by SYNC.
64 (40)	Command error Command set is other than NL1OPEN, NL1CLOSE, NL1RECEIVE and NL1SEND.	Correct command code. (Correct library.)
65 (41)	Channel error Channel number has not yet been entered.	Correct channel number.
66 (42)	Open error Specified channel is already open.	Set the number of OPEN times to 1, inside the application program.
67 (43)	Close error Specified channel is already closed.	Set the number of CLOSE times to 1, inside the application program.
68 (44)	Path error PATH number set is other than open path.	Set open PATH number.
69 (45)	Processing code error Processing code set is unsupported. Processing code requested of host station cannot be processed by the host MNET board. A station number that cannot be requested has been specified.	Correct processing code of ARG1.
70 (46)	Station number error A request has been made to the master station if the MNET board is the master station. A request has been made to a local station if the MNET board is a local station.	Correct station number of ARG1.
71 (47)	Receive data absent Free data receive (processing code 0x404) was requested despite the absence of general receive data.	Request processing code 0x404 when receive data exists.
72 (48)	Mode setting standby Mode has not been set.	Set mode.
73 (49)	Mode error A request was given to other station although mode setting is other than online.	Select online mode or cancel request.
74 (4A)	Waiting for "Board Reset" Present status is now "Wait for Board Reset Request", because "Board Response Error" has occurred.	Execute "Board Reset".

Return Value (HEX)	Description	Remedy
75 (4B)	General data free receive task error Free data receive (processing code: 0x404) is requested by the MNET driver for VM386 although the present task is not for general data free receive.	Make the request only after switching the task to the MNET data free receive task (processing code: 0x411).
76 (4C)	MNET initial communication in progress	Retry after waiting.
90 (5A)	Default parameter error	Re-set the default parameters.
91 (5B)	Specific parameter error	Re-set the specific parameters.
98 (62)	EMS error EMS access error has occurred in user data send/receive processing.	Check the EMS.
100 (64)	Send buffer full	Retry after waiting.
101 (65)	Routing parameter error Routine parameter is not set.	Correct the setting for the routing parameter.
128 (80)	Read range error The specified number of bytes to be read is outside the range.	Correct the number of bytes to be read.
129 (81)	Device name error Nonexistent device name has been specified for MNET board device access.	Correct device name.
130 (82)	Device number error Nonexistent device number has been specified for MNET board device access. Device number specified for bit device is not a multiple of eight.	Correct device number.
131 (83)	Device point number error The number of points specified for MNET board device access exceeded the device range. The number of points specified for bit device is not a multiple of eight.	Correct the number of device points.
132 (84)	Write range error The specified number of bytes to be written is outside the range.	Correct the number of bytes to be written.
133 (85)	Link parameter error Link parameters have been corrupted. The total number of slave stations in link parameters is 0. Fixed pattern in link parameters has been corrupted. Sum check in link parameters has been corrupted.	Correct corresponding link parameter.
134 (86)	Link parameter I/O assignment error Sum check in I/O assignment has been corrupted.	Correct I/O assignment.
135 (87)	Specification error for remote RUN/STOP/PAUSE A value outside of 0 to 2 for remote RUN/STOP/PAUSE, has been set.	Reset the value within 0 to 2.

Return Value (HEX)	Description	Remedy
136 (88)	Specification error for random write A value outside of 0 to 2 for random write has been set.	Reset the value within 0 to 2.
137 (89)	Processing cancel The next processing request is made although the previously made processing request has not been completed.	Make the processing request again after the previously requested processing has been completed.
138 (8A)	Switch number designation error Switch reading is designated while the read switch number is other than "0" or "1".	Correct the switch number setting.
139 (8B)	Operation mode error MNETII parameters were written while setting the MNET mode, or vice versa. In mode setting, an operating mode number other than 0 to 2 is set.	Write the MNET parameters in the MNET mode. Write the MNETII parameters in the MNETII mode.
140 (8C)	MNETII parameter error	Re-set the MNETII parameters.
150 (96)	Channel not set error In the no-protocol mode, no channel setting request is made.	Make a request after setting the channel.
151 (97)	Mode error In the no-protocol mode, no mode is set. In the no-protocol mode, the present mode does not allow processing. Mode setting for the no-protocol mode is not made after resetting the board.	Set the mode. Make a request after setting the correct mode. Set the mode after resetting the board.
152 (98)	Test count 0 error In the no-protocol mode, the test counter is already "0". In the no-protocol mode, the test has finished in an error status.	Set the test mode again and then set the test counter.
153 (99)	Channel request error In the no-protocol mode, a reset request is made for the RS232C channel.	Give the request in the RS422 channel.
154 (9A)	Other channel open error In the no-protocol mode, a reset request is made while the RS232C channel is open.	Make the request after closing the RS232C channel.
212 (D4)	Processing cancel A new request is made before the present processing has been completed.	Make the new request again.
213 (D5)	Checksum error During communication, a checksum error has occurred.	Check the cable.
215 (D7)	Receive length error The receive data exceeds the receive area range.	Check the receive data length.
	Request data buffer length over The data length of the request data is outside the request data area size.	Reduce the request data size.
216 (D8)	Protocol error Communication protocol is incorrect. Request code does not exist.	Check the cable.

Return Value (HEX)	Description	Remedy
217 (D9)	Address error Address is outside the access range.	Check requested data.
219 (DB)	Write error Cannot write.	Check requested data.
224 (E0)	PC No. error Requested station does not exist.	Correct station number.
225 (E1)	Processing mode error Processing code set cannot be processed by the requested ACPU.(Checked by the requested ACPU.)	Correct requested ACPU and processing code.
226 (E2)	Special module designation error Special module specified cannot be processed.	Correct Y No.
227 (E3)	Other data error Requested data, e.g. address, head step and the number of shifts, is in error.	Correct requested data.
228 (E4)	Link designation error Processing code set cannot be processed by the requested station. (Checked by the requested station link module.)	Correct requested station number and processing code.
232 (E8)	Remote error Entry code invalid for remote run/stop/pause request.	Search for requester of remote run/stop/pause to the requested ACPU.
233 (E9)	Link time-out Requested station has stopped link during processing.	Resume link.
234 (EA)	Special module busy Specified special module is performing other processing.	Check special module hardware.
236 (EC)	Requested station busy When general data is sent, receive buffer of requested station is full or is not ready to receive data.	Make a request when requested station is ready.
240 (F0)	Link error A request has been made to a station that stopped link.	Resume link.
241 (F1)	Special module bus error Specified special module is not ready for processing.	Check special module hardware.
242 (F2)	Special module time-out No response from specified special module.	Check special module hardware.
	No response is given from the MNETII / MINI-S3 / B-NET board.	Check the hardware of the MNETII / MINI-S3 / B-NET board.
256 (100)	RS4 time-out The processing has not been completed within the specified time.	Check the cable. Check the hardware of the connected CPU.
257 (101)	Receive error Overrun error, parity error, or framing error has occurred.	Check the cable. Check the hardware of the connected CPU.

Return Value (HEX)	Description	Remedy
258 (102)	CPU communication error DSR signal is turned off.	Check the cable. Check the hardware of the connected CPU.
259 (103)	Send request error Error in the contents of the send request (requested number of characters).	Correct the contents of request.
	ANS data buffer length over Data length of ANS data is longer than the ANS data area.	Change the request data to shorten the data length of the ANS data.
272 (110)	RS4 time-out When the send request is given, the time-out value is exceeded.	Find the cause of the time-out and take appropriate action.
273 (111)	Receive error Overrun error, parity error, or framing error has occurred.	Execute the error cause read request to find the cause of the error.
274 (112)	Send request argument error There is an error in the argument in the send request.	Specify the correct argument.
275 (113)	Receive request argument error There is an error in the argument in the receive request.	Specify the correct argument.
276 (114)	Receive buffer overflow Overflow with the receive buffer	Find the cause of the overflow and take appropriate action. (execute the DC control with the communicating station.)
277 (115)	Channel setting argument error There is an error in the argument for setting the channel.	Specify the correct argument.
278 (116)	MNETII / MINI-S3 / B-NET board not-installed error The MNETII / MINI-S3 / B-NET board is not installed.	Install the MNETII / MINI-S3 / B-NET board.
288 (120)	Relay station error There is no routing parameter in the relay station.	Write the routing parameter to the relay station.
289 (121)	Relay station error In relaying processing, there is no relaying network number in the routing parameter.	Correct the setting for the routing parameter in the relay station.
290 (122)	Message error A request message which cannot be processed by the CPU is received.	Check the link status. Check the cable and noise.
(F702) (F111)	Station error The corresponding station is abnormal, or there is an error in the setting of stations.	Check the station in question. Check the set station numbers for send/receive processing.
(F222)	Communicating station buffer full	Retry.

A7BDE-J71LP21/BR11 MELSECNET/10 INTERFACE BOARD

User's Manual

MODEL	A7BDE-J71LP21-U-E
MODEL CODE	13J794
IB(NA)0800025-A(9501)MEE	

 **mitsubishi electric corporation**

HEAD OFFICE : MITSUBISHI DENKI BLDG MARUNOUCHI TOKYO 100-8310 TELEX : J24532 CABLE MELCO TOKYO
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