

Panasonic[®]

PROGRAMMABLE CONTROLLER

FP3/FP5

C.C.U. (Computer Communication Unit)

Technical Manual

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*MEWTOCOL : Communication protocol employed for bidirectional communication of C.C.U..

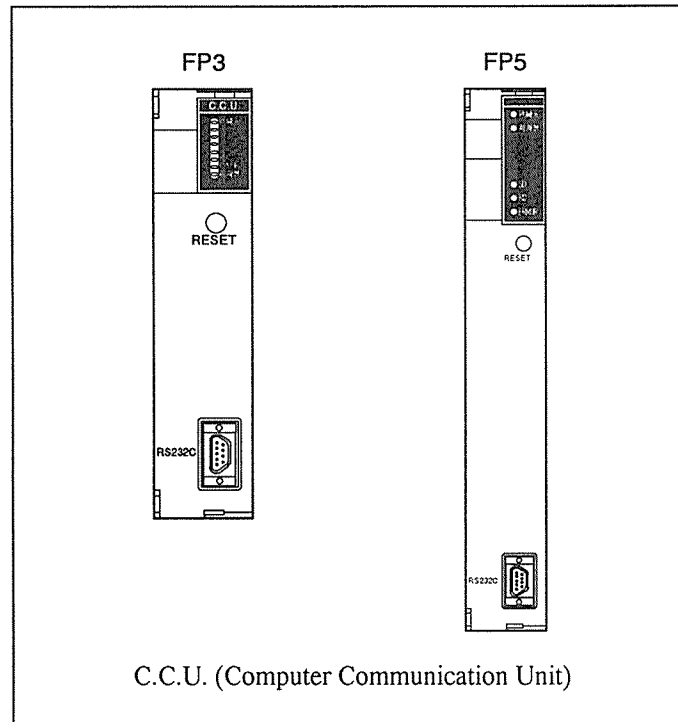
CHAPTER 1

SYSTEM CONFIGURATIONS AND SPECIFICATIONS

- 1-1. Features
- 1-2. System Configuration
- 1-3. Part Names and Functions
- 1-4. Specifications
 - 1. General Specifications
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 - 2. Installation Method

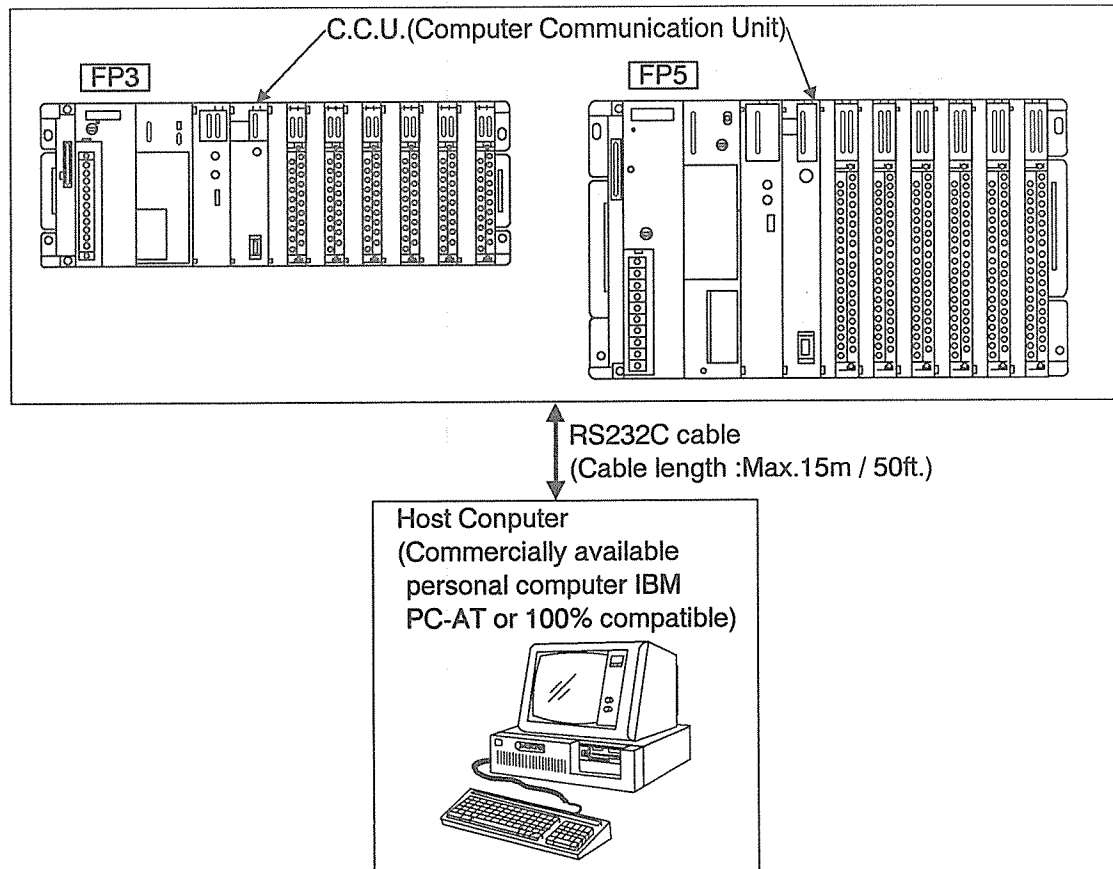
“PC” is the abbreviation for Programmable Controller.

1-1. Features



- The Computer Communication Unit offers advanced functions to perform communications between a Programmable Controller (PC) and a host computer (minicomputer or personal computer).
- Bidirectional communications are possible.
Supports the computer link function where the host computer controls the transmission and the data transfer function where the Programmable Controller (PC) controls the transmission.
- Installation of this unit enables the operating states of the various relays and data of the Programmable Controller (PC) to be monitored and enables data to be written by the host computer.
- Communicates on a one-to-one basis with the host computer through the RS232C interface.
- Uses a multi-conductor shielded cable and communicates up to a maximum of 15 m / 50 ft.
- Communicates with a computer which cannot be interfaced with a MEWNET link board as long as it has a RS232C interface.

1-2. System Configuration



Two communication functions are available.

- Computer link function : Communication is performed while the host computer controls transmission.
MEWTOCOL-COM* (see Chapter 8, Appendix) is used for the communication protocol.
- Data transfer function : Communication is performed with high level instructions SEND and RECV while the Programmable Controller (PC) controls transmission.
MEWTOCOL-DAT* (see Chapter 8, Appendix) is used for the communication protocol.

The simultaneous support of the two functions broadens the applications.

For example, with only the computer link function, polling* from the host computer must be used to monitor the change in data within the Programmable Controller (PC).

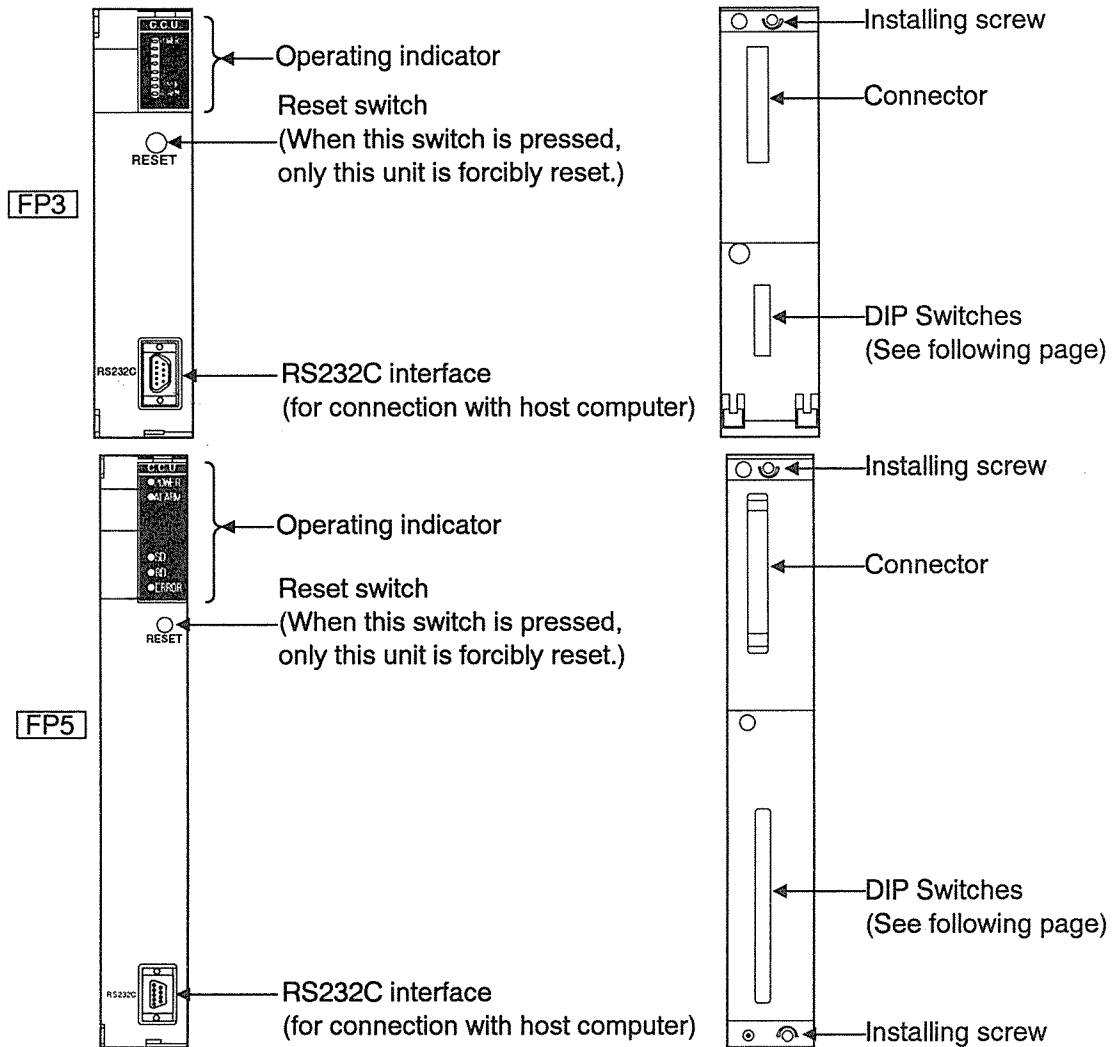
However, if the data transfer function is used, the data value can be sent from the Programmable Controller (PC) to the host computer when the data changes.

Note:

*MEWTOCOL: Communication protocol employed for bidirectional communication of C.C.U..

*Polling: Method which periodically inquires about the presence or absence of information to be sent from the computer monitor program to the terminal equipment.

1-3. Part Names and Functions



Operating indicator

LED Indicator	Function
FP3 POWER (green)	● :ON (Unit operating) ○ :OFF (Power OFF)
ALARM (red)	● :ON (Unit error) (Watching dog timer error generated) ○ :OFF (Turns OFF in the absence of errors)
SD:Send data monitor (green)	⊗ :Flashing (Sending) ○ :OFF (No send data)
RD:Receive data monitor (green)	⊗ :Flashing (Receiving) ○ :OFF (No receive data)
FP5 ERROR: Communication error (red)	● :ON (Communication error generated) ○ :OFF (Turns OFF when normal frame is received)

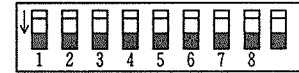
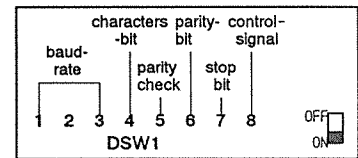
Communication errors

The communication error LED turns ON when a parity, framing or BCC error is generated. When a normal frame is received or transmitted (written to shared memory), the communication error LED turns OFF.

Refer to page 61, Section 8-1, "BCC (Block Check Code) CREATION".

DIP Switches (Unit rear side)

*OFF is represented as " 0 " and ON is represented as " 1 ".



Switch No.	Function		Switch position							
			1	2	3	4	5	6	7	8
1 to 3	Modem control		0 0 0							
	Baud rate	19,200 bps	1 0 0							
		9,600 bps	0 1 0							
		4,800 bps	1 1 0							
		2,400 bps	0 0 1							
		1,200 bps	1 0 1							
		600 bps	0 1 1							
300 bps	1 1 1									
4	Character bit	7-bit	0							
		8-bit	1							
5	Parity Check	Invalid	0							
		Valid	1							
6	Parity bit	Odd parity	0							
		Even parity	1							
7	Stop bit	1-bit	0							
		2-bit	1							
8	Control signal	Invalid CS,CD	0							
		Valid CS,CD	1							

When the parity check is set to invalid, the parity bit setting is ignored.

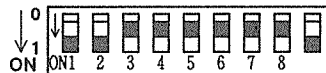
• CS and CD disable or enable is set for the control signal.

*CS: Clear to Send CD: Receive Carrier Detect

Example:

The switches are set as shown below.

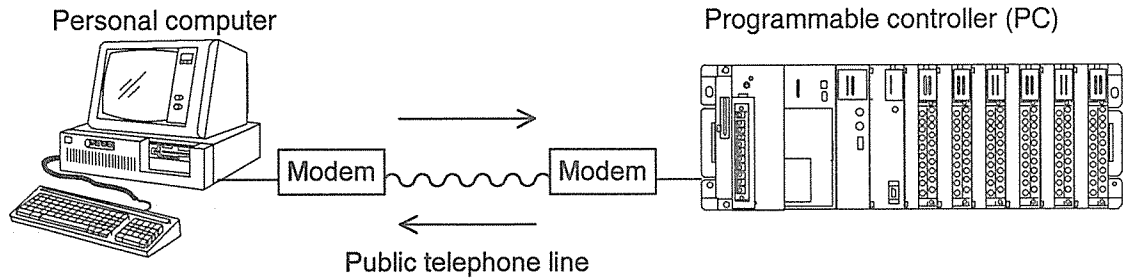
Baud rate : 4800 bps
 Character bit : 7-bit
 Parity Check : Invalid
 Parity bit : Odd parity
 Stop bit : 1-bit
 Control Signal : Invalid CS, CD



Modem Control

Supported by Ver. 1.1 or later.

Long distance communications are enabled between a personal computer and the computer communication unit (C.C.U.) through modem when DIP switch 1, 2 and 3 are all set to OFF.



Applicable modems:

Any 2400 bps modem compatible with the Hayes AT command set.

Modem control function:

Performs initialization of the modem when the C.C.U. is powered up or reset. After initialization, the modem itself performs the automatic answer and circuit disconnect operations.

Limitations During Modem Operation

Note:

Some functions are limited in the following manner when modem is used.

1. Data transfer function cannot be used.
 Since telephone numbers cannot be registered in data transfers, this function cannot be used during modem operation.

2. Baud rate is fixed at 2400 bps.

3. Bit length is fixed at 10 bits.
 Responses from the modem are always performed at a character bit of 10 bits (start bit + data bit + parity bit + stop bit).
 Since the start bit is fixed at 1 bit, select one of the following 3 combinations.

Start bit	Data bit	Parity bit	Stop bit	
1 +	8 +	0 +	1	= 10 bits
1 +	7 +	1 +	1	= 10 bits
1 +	7 +	0 +	2	= 10 bits

4. Modem must be in echo back mode.
 Since the C.C.U. checks for the echo back from the modem when a command is sent, be sure to set the modem to the echo back mode.

1-4. Specifications

1. General Specifications

Item	Specifications
Ambient temperature	0 °C to 55 °C (32 °F to 131 °F)
Storage temperature	- 20 °C to +70 °C (- 4 °F to +158 °F)
Ambient humidity	30 % to 85 % RH(non-condensing)
Storage humidity	30 % to 85 % RH(non-condensing)
Vibration resistance	10 Hz to 55Hz, 1 cycle/min : double amplitude 0.75mm(0.03in), 10 min. on 3 axes
Shock resistance	Min. 98 m/s ² , 4 times on 3 axes
Noise resistance	1000 V, 50 ns 1 μs pulse widths (based on in-house measurements)
Operating condition	Free of corrosive gases and excessive dust
Consumption current	Max. 100 mA (5 V DC)
Weight	FP3 type : Approx. 250 g (0.552 lbs) FP5 type : Approx. 360 g (0.795 lbs)

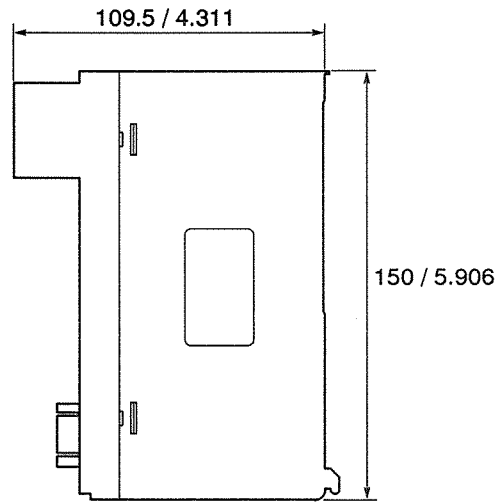
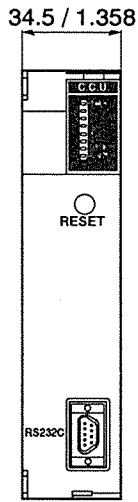
2. Performance Specifications

Item	Specifications	
Interface	RS232C one port	
Baud rate	300/600/1200/2400/4800/9600/19200 bps selected with DIP switch	
Communication system	Half duplex	
Synchronization system	Start-stop	
Transmission code	ASCII	
Transmission data format	Stop bit : 1-bit / 2-bit	
	Parity :Invalid / Valid (Even / Odd)	
	Character bit : 7-bit / 8-bit	
Data sending order	Sent from bit 0 in character units	
Computer link	Transmission unit	From header (%) to terminator (CR)
	Maximum message length	118 characters/frame maximum (from % to CR)
Data transfer	Transmission unit	From header (?) to terminator (CR)
	Maximum message length	240 characters / frame maximum (from ? to CR)

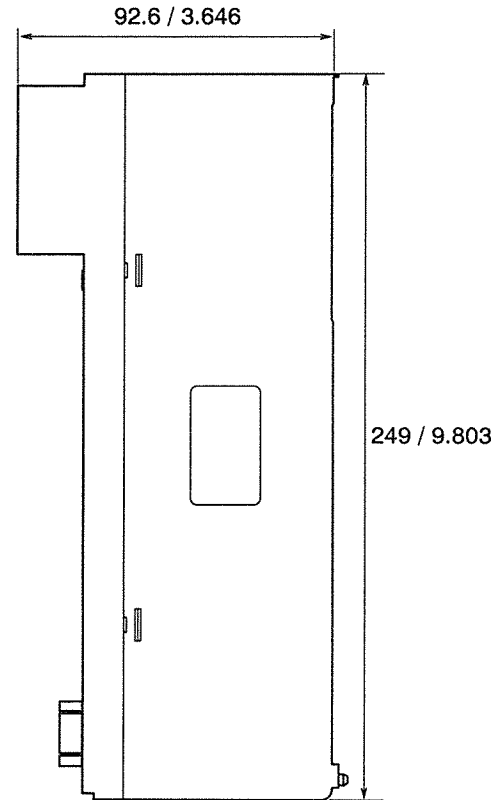
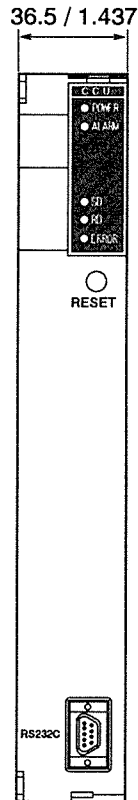
1-5. Dimensions

FP3 Type

(Unit : mm/in)



FP5 Type



1-6. Installation

1. Notes on Use

Install and remove the C.C.U. with all power OFF.
Use the C.C.U. with it firmly installed to the basic base plate.
Be sure not let pieces of wire fall into the unit when wiring.
Do not touch the connectors on rear of the unit.
Doing so will cause device damage from poor connections or static electricity.
Do not drop or strike the C.C.U.'s case as it is made of plastic.

The C.C.U. should be used within the specified ratings.

- Operate the system at ambient temperatures of 0 °C to 50 °C (32 °F to 131 °F).
- Operate the system at ambient humidity of 35 % to 85 % RH.

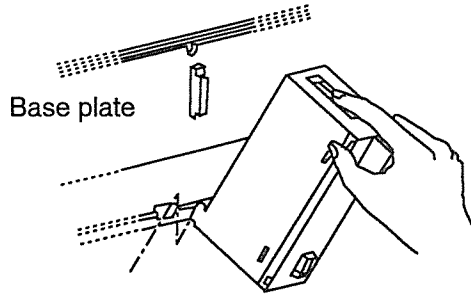
It should be used in a place where it will not be exposed to :

- Sudden temperature change causing dew condensation.
- Inflammable or corrosive gas.
- Excessive airborne dust or iron particles.
- Benzene, paint thinner, alcohol or other organic solvents or strong alkaline solutions of ammonia or caustic soda.
- Excessive vibration or shock.
- Influence from power transmission lines, high voltage equipment, power cables, power equipment, radio transmitters, or any other equipment that would generate high switching surges.
- Water splashes.
- Direct sunlight

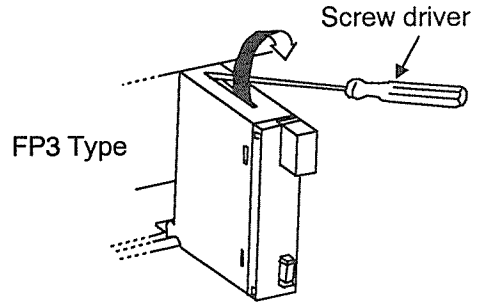
2. Installation Method

Before installing the unit, remove the connector cover on the base plate.

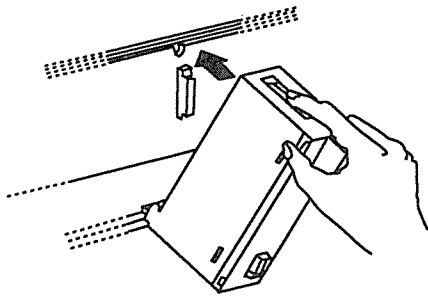
1. Fit the unit tabs (two) into the unit holes on the base plate.



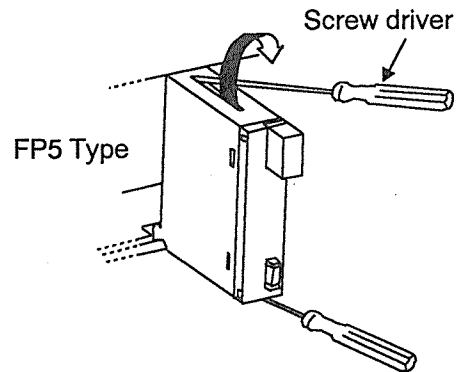
3. After properly installing the unit to the base plate, secure the installing screw at the top.



2. Push the unit in the direction of the arrow and install on to the base plate.



- After properly installing the unit to the base plate, secure the installing screw at the top and bottom.

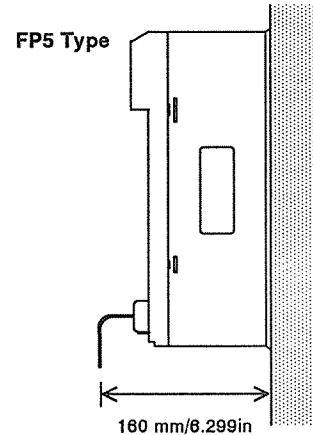
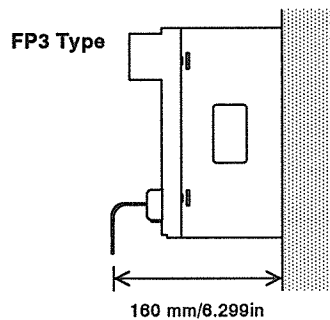


Notes :

- Be sure to remove or install the C.C.U. with the AC power of the power supply unit switched OFF.
- Be careful not to use unreasonable force when attaching the connector on the C.C.U. to the connector on the base plate.

Installing height :

- For your reference, refer to the figure below and note the depth of the control panel when the C.C.U. is to be used.



CHAPTER 2

CONNECTION METHOD

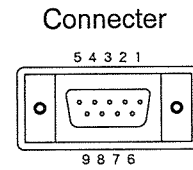
“PC” is the abbreviation for Programmable Controller.

2-1. Connection Method

RS232C Interface

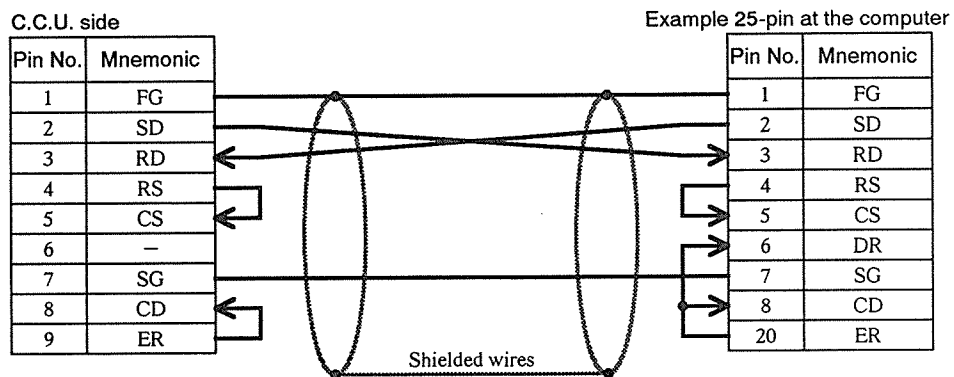
Connection signals

Pin No.	Signal	Mnemonic	Direction	
			DTE	DCE
1	Frame Ground	FG	————	
2	Send Data	SD	————→	
3	Receive Data	RD	←————	
4	Request to Send	RS	————→	
5	Clear to Send	CS	←————	
6	————	————	————	
7	Signal Ground	SG	————	
8	Receive Carrier Detect	CD	←————	
9	Equipment Ready	ER	————→	

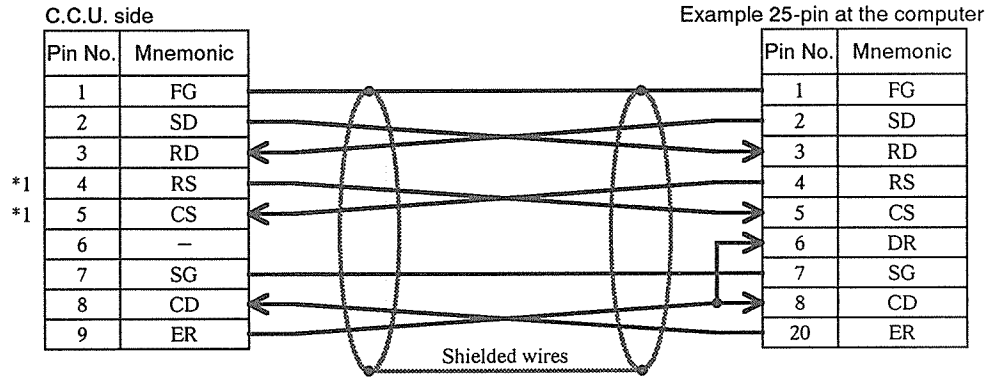


- DTE in the table above refers to the C.C.U. (Computer Communication Unit).
 - Each unit includes a connector and a connector cover.
- Two types of typical connection diagrams are shown below (with and without flow control).
 DIP switch No.8 for CHI(control signal selection) enable the input of CS and CD at the C.C.U..
 These switches permit the control to be enabled or disabled.

① 3-wire connection with control signal invalid

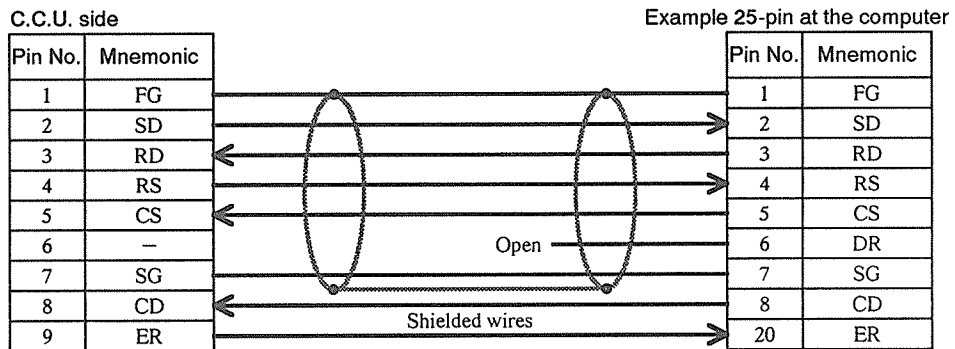


② RS and ER signal based control with control signal valid



*1 : Set the DIP switch No.8 (control signal selection) to ON.

When using the Modem





CHAPTER 3

DESCRIPTION OF OPERATIONS

- 3-1. Computer Link Function
- 3-2. Data Transfer Function
- 3-3. Procedure of Processing
- 3-4. Processing Conditions at Host Computer

“PC” is the abbreviation for Programmable Controller.

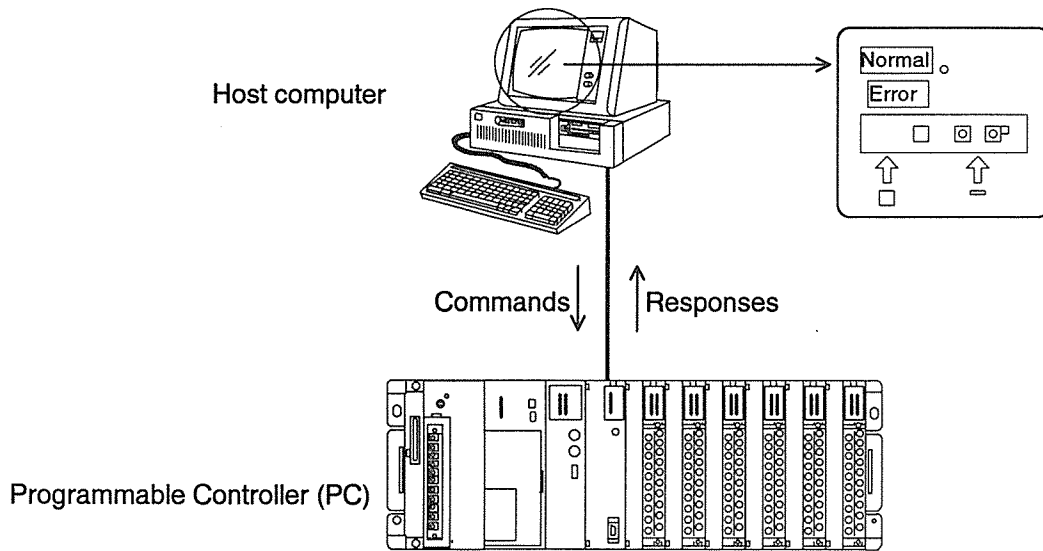
3-1. Computer Link Function

The Computer Communication Unit (C.C.U.) includes a RS232C compatible interface which connects a host computer to a Programmable Controller (PC).

It permits interaction between the computer and Programmable Controller (PC) using the computer link and data transfer functions.

Application : The computer link function is used to control and monitor the Programmable Controller (PC) with the computer.

Operation : The computer sends instructions to the C.C.U. and receives responses. This procedure permits interaction with the Programmable Controller (PC) through the C.C.U. and permits various types of information to be sent or received.



Software is required only at the computer to operate the C.C.U..

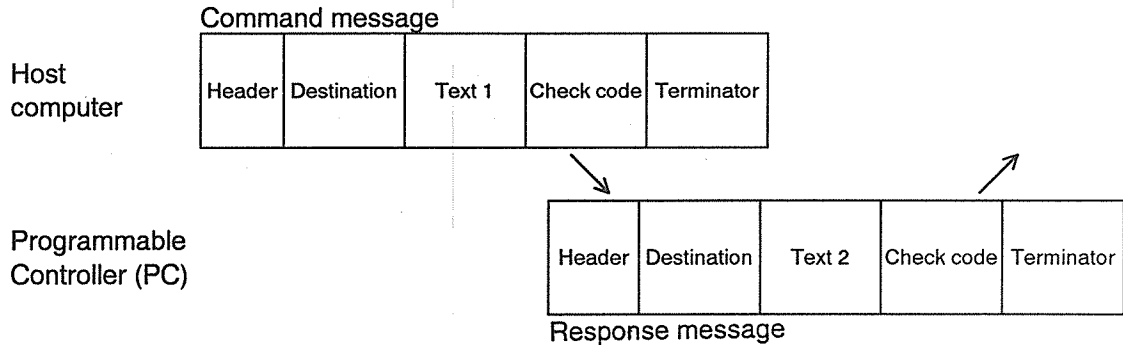
A program is not required in the operation of the C.C.U..

For the computer software, write the commands for the functions necessary to configure the system in a language such as BASIC or C.

1) Basic Processing for a Single Frame

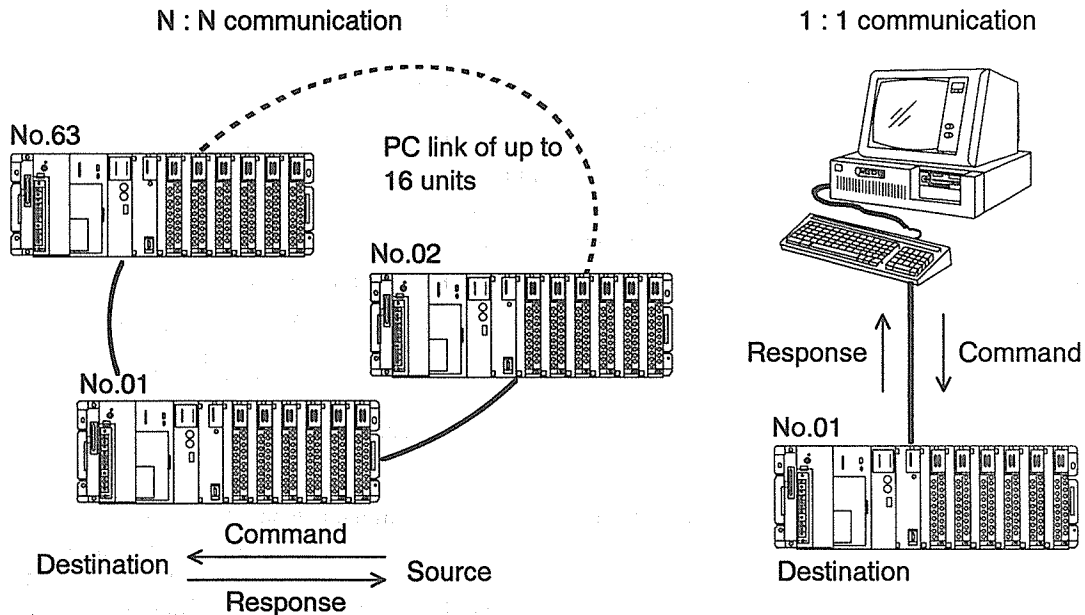
The processing for a single frame is given below.

- Uses an interactive dedicated protocol.
- Sends ASCII codes.
- Initially, the personal computer controls the transmission.
- Transmission control changes each time a command message is sent.



Description:

- The header (%) and terminator (CR) are specified in MEWTOCOL-COM.*
 - Text 1 contains various commands of which there are 24 types.
 - Since the communication is 1:1 if the destination is the C.C.U., specify the destination from the range of 1 to 63.
- A response returns with respect to the destination number sent by the command.



Notes :

- An error response returns, at the same time, the C.C.U. ERROR LED turns ON.
- The type of error can be determined from its code.
- For information on error codes, refer to page 24, Section 3-1, 3) Error Response Processing and page 63, Section 8-1, ERROR CODES.
- The ERROR LED turns OFF when a normal frame is received next.

For other details, refer to page 58, Section 8-1, 1. Computer Link (MEWTOCOL-COM).

*MEWTOCOL : Communication protocol employed for bidirectional communication of C.C.U..

Details of a command and its response are illustrated in the examples.

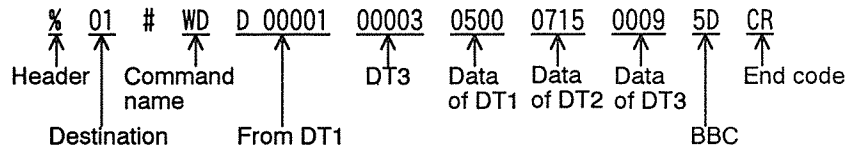
Writing to the Data Area (WD command)

A numeric value is written to the data area of Programmable Controller (PC) by the host computer.

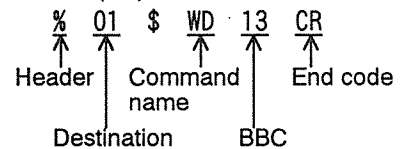
Program Example : Word numeric values are written to DT1 to DT3 of the Programmable Controller (PC).

The numeric values to be written are DT1 : 0005H, DT2 : 1507H, and DT3 : 0900H.

The command from the host computer is shown below.



The response from the Programmable Controller (PC) is shown below.



Note : The " \$" indicates a normal response.

Reading from the Data Area (RD command)

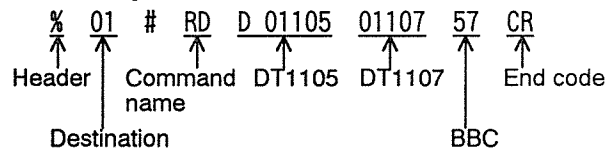
The contents of the Programmable Controller's (PC's) data area are read by the host computer.

Program Example : The data contents in DT1105 to DT1107 of the Programmable Controller (PC) are read.

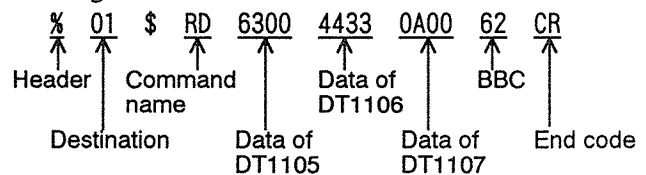
Assume that DT1105 to DT1107 contain the following numeric values.

- DT1105 = 0063H
- DT1106 = 3344H
- DT1107 = 000AH

The command from the host computer is shown below.



The response from the Programmable Controller is shown below.



Note : The " \$" indicates a normal response.

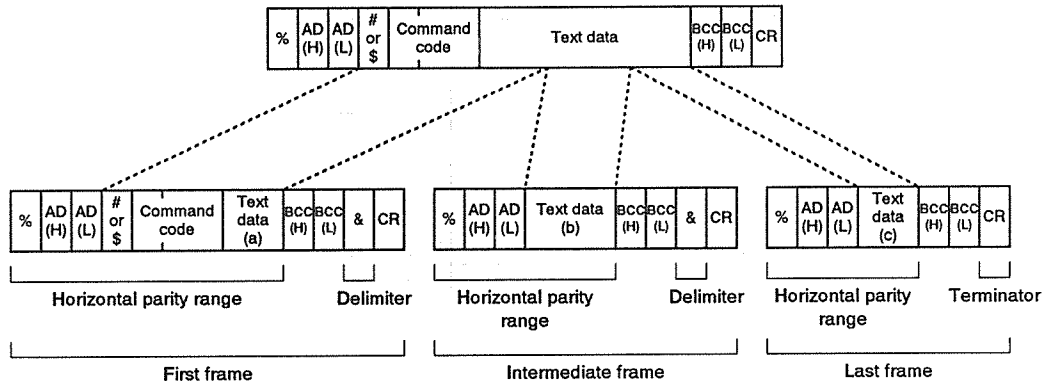
2) Basic Processing for Multiple Frames

The basic format for multiple frames is shown in the figure below.

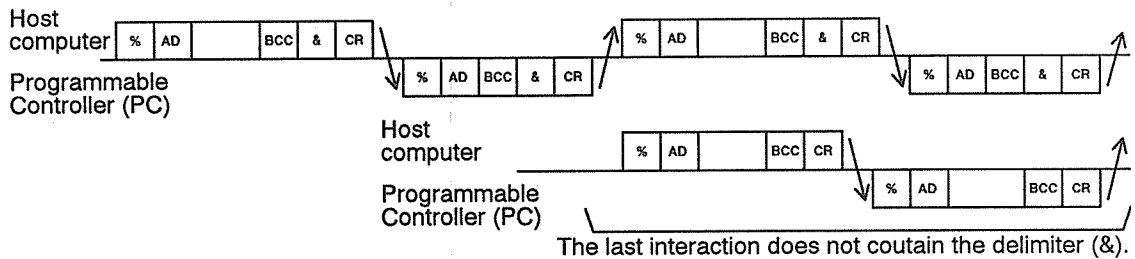
Multiple frames contain multiple frame commands which consist of multiple commands and multiple frame responses which consist of multiple responses.

They are used for commands and responses which exceed 118 bytes per frame.

Division of the Command Message or Response Message into Plural Frames



Multiple Frame Commands and Single Frame Response



Difference with the Single Frame :

When using multiple frames, a delimiter (&) which separates the frames is inserted between the check code (BCC) and terminator (CR).

Check code (BCC)	Delimiter (&)	Terminator (CR)
------------------	-----------------	-----------------

Delimiters are not inserted in the last command and response.

Aborting the Multiple Frame Processing Midway :

Generate the Abort command.

A response does not return. (refer to example)

Abort is used when arbitrarily terminating the processing or when executing the resend process if the Programmable Controller (PC) issues a normal response due to communication trouble and a BCC error occurs at the host computer.

Trouble Processing in Multiple Frames

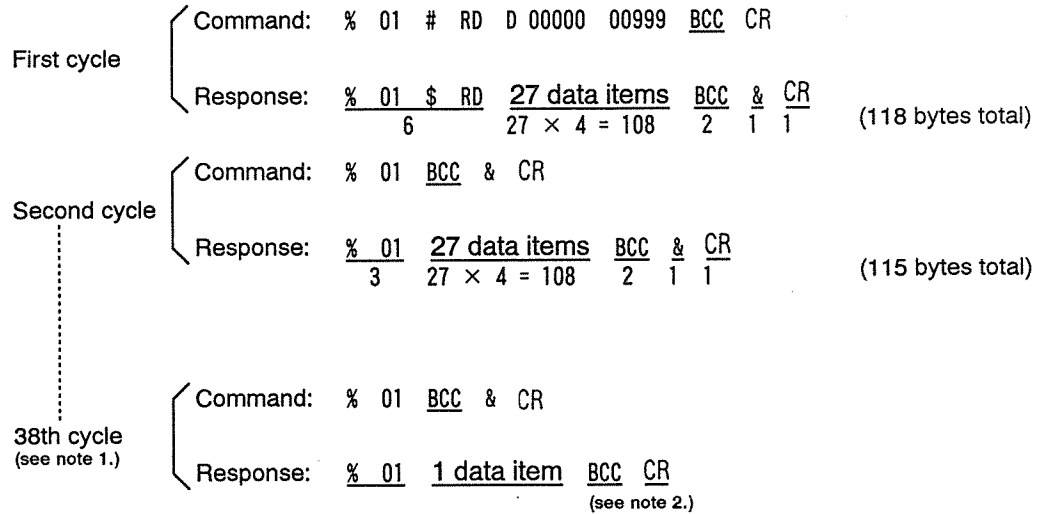
With multiple frames, the Programmable Controller (PC) begins processing for multiple frames at the first command.

If the Programmable Controller (PC) receives an error command in the multiple frames, the command becomes invalid and the initial state is restored. Therefore, if trouble occurs, start from the first command for the resend process.

Details of commands and responses are illustrated in the examples below.

① **Single frame command and multiple frame responses**

Program example The contents of the Programmable Controller's(PC's) data area (1000 data items from DT0 to DT999) are read by the host computer.
The commands and responses are shown below.

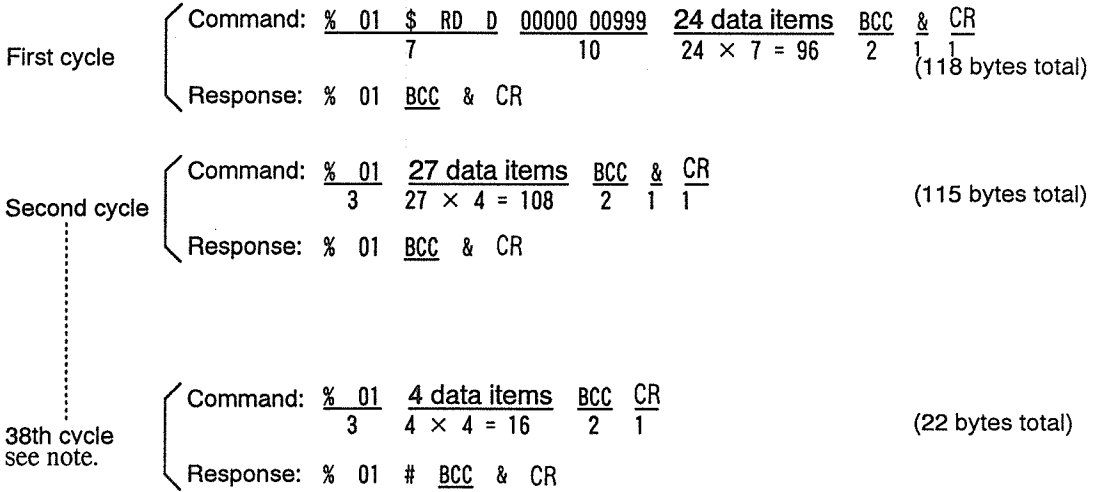


Notes :

1. The maximum number of characters per one frame is 118 bytes.
Up to a maximum of 27 data items in the data area can be read in one interaction.
The read operation for 1000 data items completes in a total of 38 cycles:
27 data items × 37 cycles (=999 data items) + 1 data item (last cycle).
2. The delimiter (&) is not included in the final transmission.

② Multiple frame commands and single frame response

Program example Data items (1000 items from DT0 to DT999) are written to the Programmable Controller's (PC's) data area by the host computer. The commands and responses are shown below.



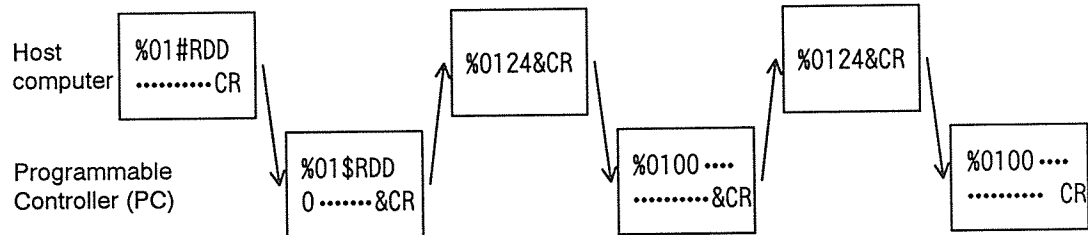
Note : The maximum number of characters per one frame is 118 bytes which limits the number of data characters that can be written during one interaction. Since the multiple frame commands are completed on the 38th cycle in this example, the response for the command reception is returned on the 38th response. The write operation is completed on the 38th cycle for 1000 data items = 24 data items (first cycle) + 27 data items x 36 cycles (=972 data items) + 4 data items (final cycle).

Note of Multiple Frames

1) Delimiter (&)

When using a delimiter (&) after the completed communication, the protocol error occur.

Program example : The contents of the Programmable Controller's(PC's) data area (data items from DT10 to DT100) are read by the host computer.
Commands and responses are shown below.



First cycle
 Command: %01#RDD000100010055
 Response: %01\$RD0-16&
 Omitted Data

Second cycle
 Command: %0124&CR
 Response: %010000.....000024&CR
 Omitted Data

Final cycle
 Command: %0124&CR
 Response: %010-24CR ← The data reading has been completed.
 Omitted Data

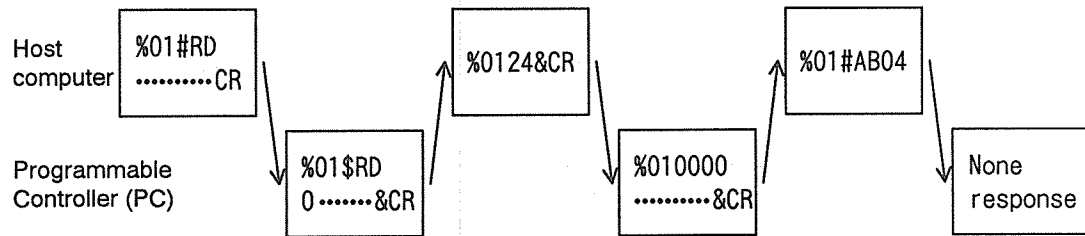
Note : When using a delimiter (&) after the completed reading, the protocol error occur.

Command: %0124&CR
 Response: %01!4302CR
 Protocol error

2) Abort command processing at multiple frame responses

*Abort command(AB) is transmission stop command.

Program example : The contents of the programmable Controller's (PC's) data area (data items from DT10 to DT100) are read by the host computer.
Commands and responses are shown below.



First cycle
 Command: %01#RDD000100010055CR
 Response: %01\$RD0-16&CR
 Omitted data

Second cycle
 Command: %0124&CR
 Response: %010000.....000024&CR
 Omitted data

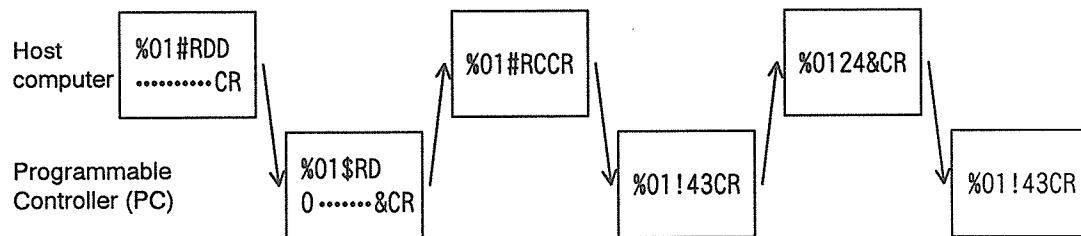
Final cycle
 Command: %01#AB04CR ← The command was canceled by Abort command processing.
 Response: None

Repeat Multiple commands %01#RDD000100010055CR ← Normal operation

Repeat Command: %01#RCSX00001DCR
 Response: %01\$RC021CR ← Normal operation

3)Using an another command during the data reading

Program example : The contents of the Programmable Controller's (PC's) data area (data items from DT10 to DT100) are read by the host computer.
Commands and responses are shown below.



First cycle
 Command: %01#RDD000100010055CR
 Response: %01\$RD0-16&CR
 Omitted data

Second cycle
 Command: %01#RCSX00001DCR ← Command of another multiple frames
 Response: %01!4302CR ← Protocol error

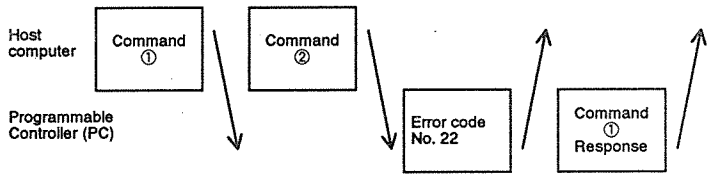
Final cycle
 Command: %0124&CR ← Normal command in multiple frames
 Response: %01!4302CR

3) Error Response Processing

① Error Codes

Error codes can be divided into two types.

One type consists of error codes(No. 21,22,27) which the C.C.U. occurs and the other type consists of error codes which the CPU occurs.

Code	Description
21	<p>Data error: A data error was occurred during communications. (parity error, framing error, CPU receive buffer overflow)</p>
22	<p>Over run error: The Programmable Controller's buffer is full. The CPU does not accept any input. Example : A command was sent before a response returned. In this case, an error response returns and the normal response for the previous command returns afterward.</p>  <pre> graph TD subgraph HostComputer [Host computer] C1[Command 1] C2[Command 2] EC[Error code No. 22] CR[Command 1 Response] end subgraph PC [Programmable Controller (PC)] R1[Response 1] end C1 --> PC PC --> R1 C2 --> PC PC --> EC EC --> HostComputer CR --> HostComputer </pre>
27	<p>Frame overflow: A frame exceeds 118 bytes.</p>

Since these errors are occurred the moment the C.C.U. receives the command, the command is invalid and is not sent to the CPU.

The main error codes which the CPU occurs are given below.

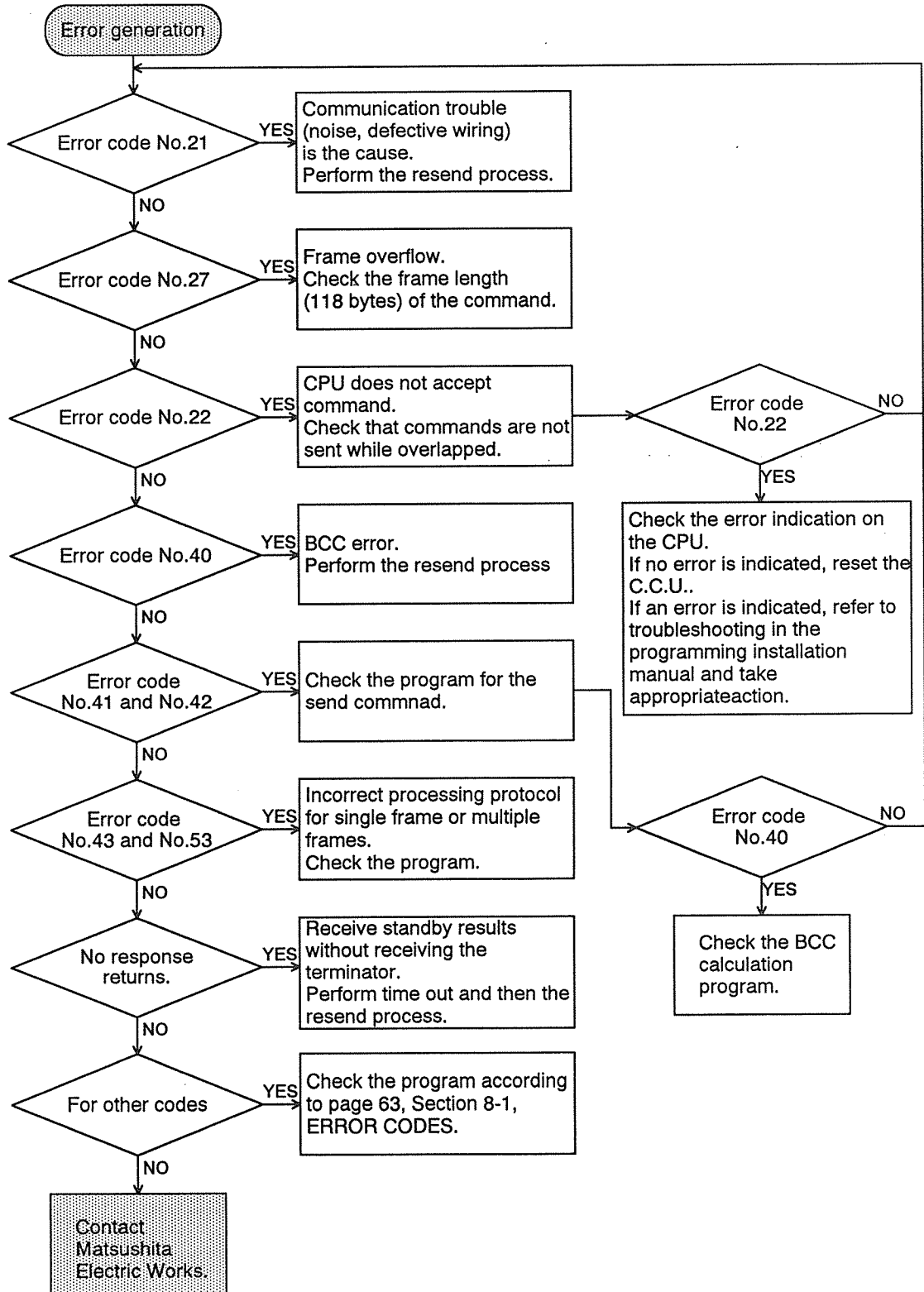
Code	Description
40	BCC error: Transmission error occurred in the command data.
41	Format error: Command message that does not match the transmission format was sent. Example : Insufficient or excessive number of command data items. There are no " # " or " destination. "
42	NOT support error : An unsupported command was sent. A command was sent to an unsupported destination.
43	Protocol error: Another command was sent during the transmission request message stand by state. Example: Multiple frame processing command was received during a single frame.
53	Busy error: Processing for another command when a command was received. Example: Incorrect communication destination no. during multiple frame processing.

Refer to page 63, Section 8-1,ERROR CODES, for further information.

② Communication Trouble shooting

This section describes trouble shooting when an error response is generated in the state where normal communication is performed.

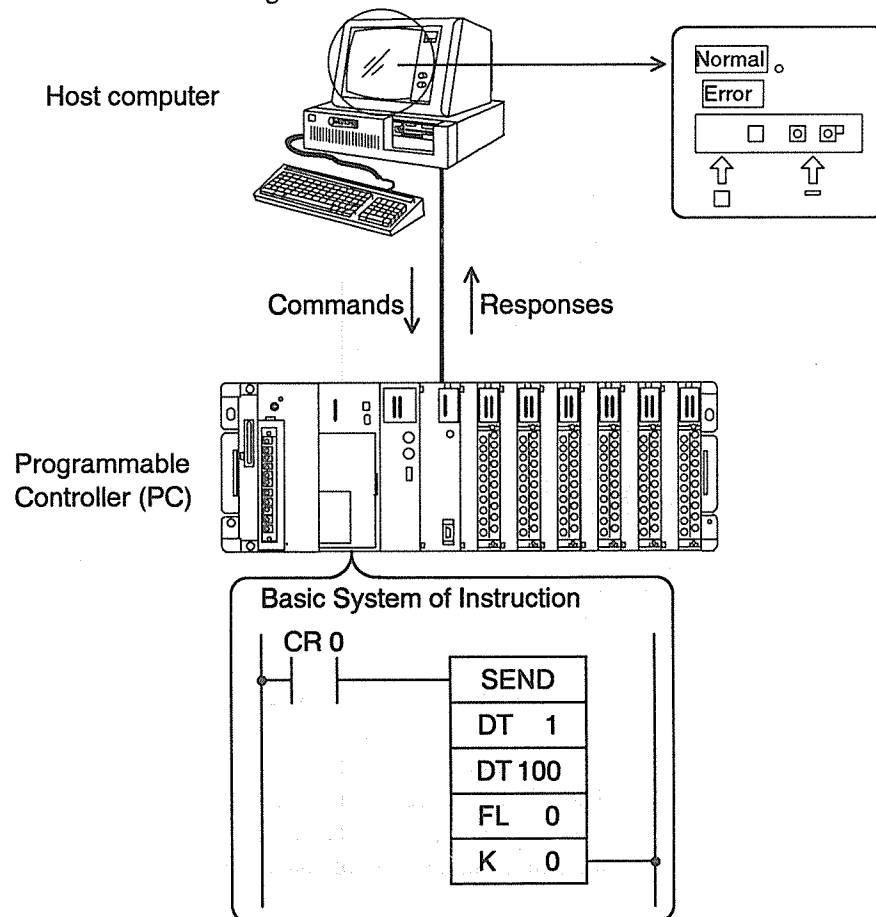
If normal communication is not possible, refer to page 54, Section 7-1, Trouble Shooting Flowchart.



3-2. Data Transfer Function

Application : The data transfer function is used to perform communication (error communications or data reports) from the Programmable Controller (PC) to computer.

Operation : The Programmable Controller (PC) controls transmission. Using program, it can read or write data contacts with the computer through the C.C.U.. In this case, the C.C.U. sends a command to the computer and receives a response. The using instructions are used the SEND and RECV commands.



Notes : A sequence program and computer software are required. Although the SEND command and RECV command result in the abnormal termination (time-out) if the computer does not return a response, the Programmable Controller (PC) does not stop because of this.

Reference: MEWNET link communications and C.C.U. based communications

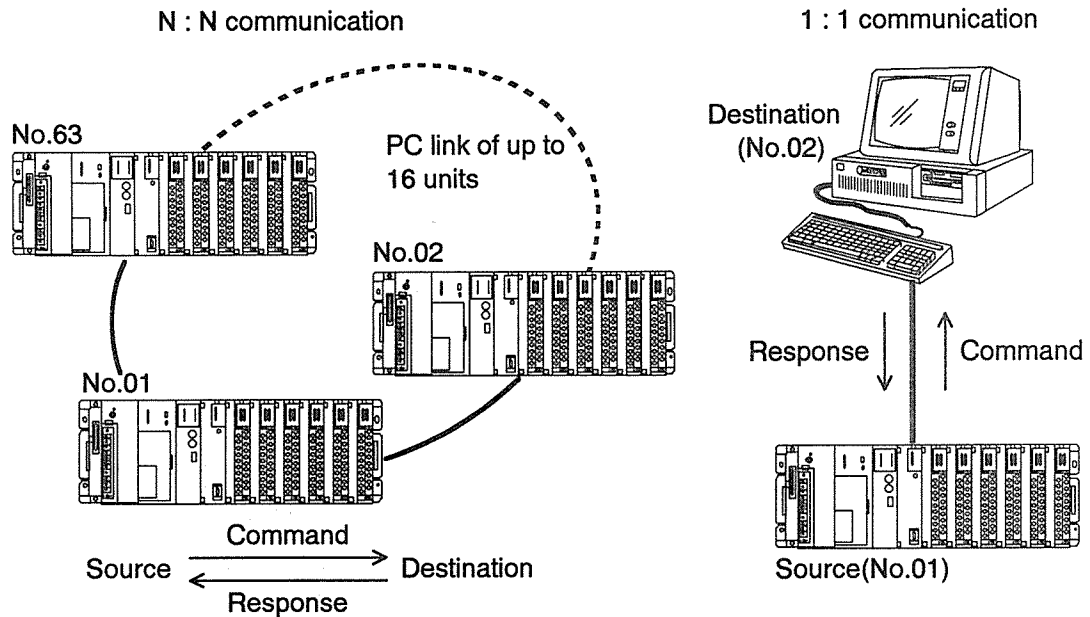
1. N:N communication and 1:1 communication

Communication is performed between the C.C.U. and host computer based on the protocol (MEWTOCOL) of our MEWNET bidirectional multi-communication network.

Since the communication is 1:1 between the C.C.U. and computer, the source and destination are fixed. However, it is necessary to specify them in the same manner as in N:N communications according to MEWTOCOL.

* The example below assumes that unit 01 is the source and unit 02 is the destination.

In the data transfer between the C.C.U. and computer, the source is the C.C.U. (unit 01) and the destination is the computer (unit 02).



2. Data access to the computer and contact and data area specification

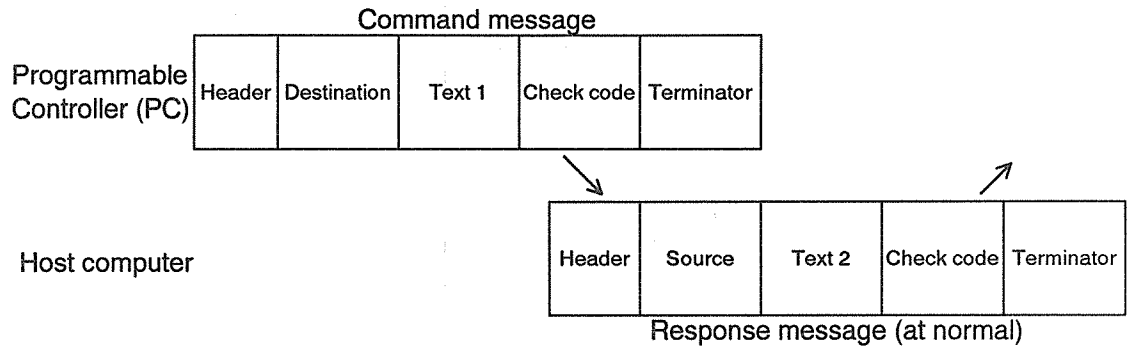
The data transfer function is originally for use between MEWNET link units. Its commands are used to handle the contact and data area.

There is no concept of the contact and the data area in the computer.

However, since the protocol (MEWTOCOL-DAT) is the same, they are transmitted in the form of contact and data area in the command.

1) Basic Processing

- Uses an interactive dedicated protocol.
- Sends ASCII codes.
- Initially, the Programmable Controller (PC) controls the transmission.
- Transmission control changes each time a command message is sent.



Description :

- The header (?) and terminator (CR) are specified in MEWTOCOL-DAT (C.C.U. specifications).
- For text 1, there are 4 types of commands.
- Since the communication is 1:1 if the destination is the C.C.U., specify the destination from the range of 1 to 63.
- For other details, refer to page 95, Section 8-1, 2. Data Transfer (MEWTOCOL-DAT)

Notes :

- When an error command is received at the host computer, return an error response corresponding to the code in page 63, Section 8-1, ERROR CODES.
This error code can be viewed with special data DT9039 at the Programmable Controller (PC).
- If a data error occurs for the response received at the Programmable Controller (PC), it is assumed that the Programmable Controller (PC) has not responded and a time-out error results.

3-2.Data Transfer Function

Details of a command and its response are illustrated in the examples.

When using the SEND instruction, write the data area by Programmable Controller (PC)

Data is written to the host computer by the Programmable Controller (PC).

* The SEND instruction has been originally provided for use between MEWNET link units.

Thus, even for this 1:1 communication between the C.C.U. and host computer, it is necessary to specify the source and destination by their unit numbers.

Note that the unit numbers specified in the program example below are temporary numbers due to the reason above.

(Therefore, there is no problem if the C.C.U. is set as 03 and the host computer as 04. For details, refer to the Link Unit Technical Manual.

For the link numbers, refer to page 43, Section 4-2, Location of C.C.U. on Basic Base Plate.)

The control data refers to the data area which contains condition settings for the SEND instruction.

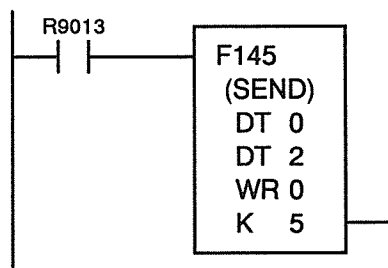
For details, refer to page 34, the description on the data transfer instruction.

Program Example : Two words (DT2, DT3) from DT2 of the Programmable Controller (PC) are written to WR5 of unit No.02 in link 1.

However, the C.C.U. is located in link 1 and its unit number in the link is 01.

Unit number 02 is set by the host computer.

Programmable Controller (PC):



- DT0 : 0002H Control data
- DT1 : 0102H Control data
- DT2 : 5523H Transfer data
- DT3 : 6689H Transfer data

Description :

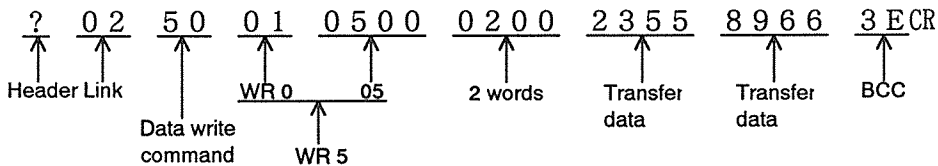
DT0 : 0002H
 ↑ ↙
 Word data 2 words

DT1 : 0102H
 ↑ ↙
 Send link Destination link unit No.

WR0 and K5 specify WR5.

Host Computer:

The following command arrives from the Programmable Controller (PC).



Note :

When this command arrives and the host computer does not return a response, the Programmable Controller (PC) times out after 2.5 s and the R9031 turns ON for an abnormal termination.

Normally, a response such as the one given below is returned.

Example of a normal response :

? 0 2 D 0 F F 4 9 CR

When using the RECV instruction, read the data area by Programmable Controller (PC)

Data in the host computer is read by the Programmable Controller (PC).

* The RECV instruction has been originally provided for use between MEWNET link units.

Thus, even for this 1 : 1 communication between the C.C.U. and host computer, it is necessary to specify the source and destination by their unit numbers.

Note that the unit numbers specified in the program example below are temporary numbers due to the reason above.

(Therefore, there is no problem if the C.C.U. is set as 03 and host computer as 04. for details, refer to the Link Unit Technical Manual.

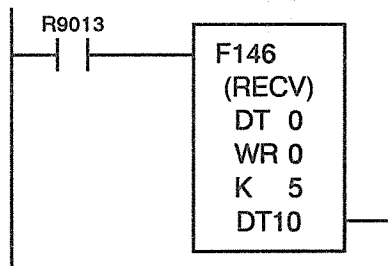
For the link numbers, refer to page 43, Section 4-2, Location of C.C.U. on Basic Base Plate.)

The control data refers to the data area which contains condition settings for the RECV instruction.

For details, refer to page 36, the description on the data transfer instruction.

Program Example : Two words (WR5, WR6) are read from WR5 of unit No.02 in link 1 and written to DT10 and DT11 of the Programmable Controller (PC).
 However, the C.C.U. is located in link 1 and its unit number in the link is 01.
 Unit number 02 is set for the host computer.

Programmable Controller (PC):



DT0 : 0002H Control data
 DT1 : 0102H Control data

Description :

DT0 : 0002H
 ↑
 Word data 2 words

DT1 : 0102H
 ↑ ↙
 Send link Destination link unit No.

WR0 and K5 specify WR5.

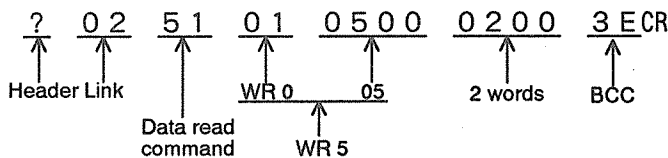
After the response below is executed:

DT10 : 3412H

DT11 : 7856H.

Host Computer:

The following command arrives from the Programmable Controller (PC),



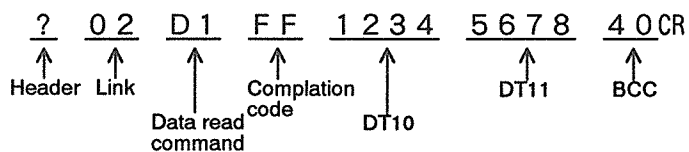
Note :

When this command arrives and the host computer does not return a response, the Programmable Controller (PC) times out after 2.5 s and the R9031 turns ON for an abnormal termination.

Normally, a response such as the one given below is returned.

Example of a

normal response :



When using the SEND instruction, write the contact by Programmable Controller (PC)

Contact is written to the host computer by the Programmable Controller (PC).

* The SEND instruction has been originally provided for use between MEWNET link units.

Thus, even for this 1 : 1 communication between the C.C.U. and host computer, it is necessary to specify the source and destination by their unit numbers.

Note that the unit numbers specified in the program example below are temporary numbers due to the reason above.

(Therefore, there is no problem if the C.C.U. is set as 03 and host computer as 04. for details, refer to the Link Unit Technical Manual.

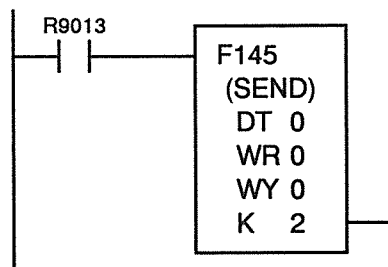
For the link numbers, refer to page 43, Section 4-2, Location of C.C.U. on Basic Base Plate.)

The control data refers to the data area which contains condition settings for the SEND instruction.

For details, refer to page 34, the description on the data transfer instruction.

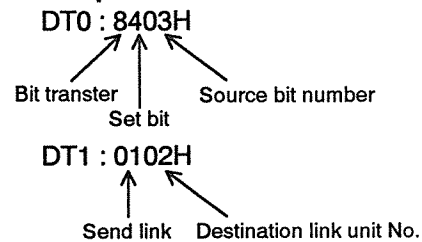
Program Example : R3 of Programmable Controller (PC) is written to Y24 of unit No.02 in link 1. However, the C.C.U. is located in link 1 and its unit number in the link is 01. Unit number 02 is set for the host computer.

Programmable Controller (PC):



DT0 : 8403H Control data
DT1 : 0102H Control data

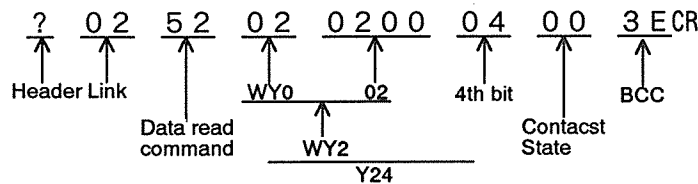
Description :



WY0 and K2 specify Y20 and DT0 specifies Y24.

Host Computer:

The following command arrives from the Programmable Controller (PC).



Note :

When this command arrives and the host computer does not return a response, the Programmable Controller (PC) times out after 2.0 s and the R9031 turns ON for an abnormal termination.

Normally, a response such as the one given below is returned.

Example of a normal response :

? 02 D2 FF 4 BCR

When using the RECV instruction, read the contact by Programmable Controller (PC)

Contact in the host computer is read by the Programmable Controller (PC).

* The RECV instruction has been originally provided for use between MEWNET link units.

Thus, even for this 1 : 1 communication between the C.C.U. and host computer, it is necessary to specify the source and destination by their unit numbers.

Note that the unit numbers specified in the program example below are temporary numbers due to the reason above.

(Therefore, there is no problem if the C.C.U. is set as 03 and host computer as 04. for details, refer to the Link Unit Technical Manual.

For the link numbers, refer to page 43, Section 4-2, Location of C.C.U. on Basic Base Plate.)

The control data refers to the data area which contains condition settings for the RECV instruction.

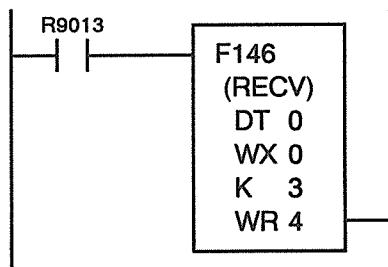
For details, refer to page 36, the description on the data transfer instruction.

Program Example : The contents of X35 of unit No.02 in link 1 is read and written to R46 of the Programmable Controller (PC).

However, the C.C.U. is located in link 1 and its unit number in the link is 01.

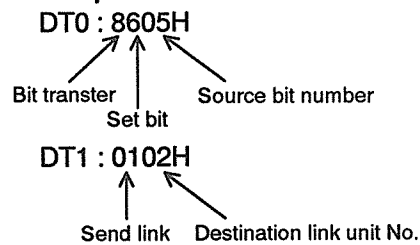
Unit number 02 is set for the host computer.

Programmable Controller (PC):



DT0 : 8605H Control data
DT1 : 0102H Control data

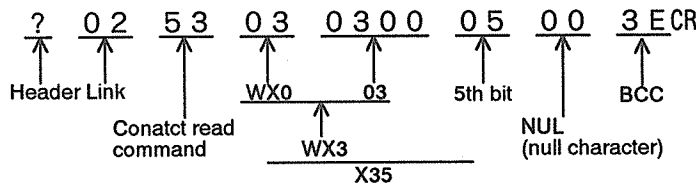
Description :



WX0 and K3 specify X30 and DT0 specifies X35.
WR4 and DT0 specify R46.

Host Computer:

The following command arrives from the Programmable Controller (PC).

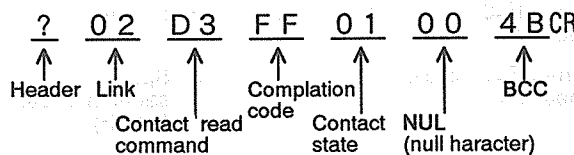


Note :

When this command arrives and the host computer does not return a response, the Programmable Controller (PC) times out after 2.0 s and the R9031 turns ON for an abnormal termination.

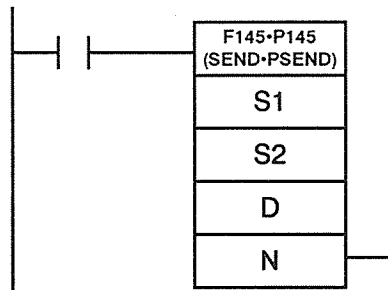
Normally, a response such as the one given below is returned.

Example of a normal response :



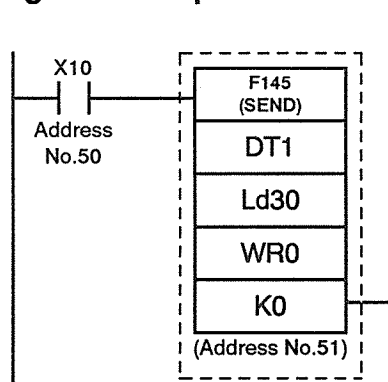
F145 Data transfer(MEUNET)
P145 (SEND)

Basic instruction format



S1 : Strat number of the area storing the control data (specified with two words).
 S2 : Send start area number.
 D : Set area of the destination Programmable Controller (PC). (specify number 0)
 N :Set strat area number of the destination Programmable Controller (PC).

Program example



Address	Key operation	Mnemonic
50	M STRT (0,1S) XIN BRK 1 NOP 0 WRT	ST X 10
51	P FUN FUN BRK 1 INT 4 IRET 5 ENT	F 145 (SEND)
	S DATA NOP 0 ENT	DT 0
	SFT Ld H 3 NOP 0 ENT	LD 30
	T WORD (0,01S) CR NOP 0 ENT	WR 0
	F L K NOP 0 WRT	K 0

Operation specification area(marked with ○)														Index modifier (○:usable) (X:not usable)	Number of steps	
Processing unit	Word unit															
Instruction	Set value	WX	WY	WR	WL	SV	EV	DT	LD	FL	IX	IY	K-Constant			
SEND	S1	○	○	○	○	○	○	○	○	○	-	-	-	-	○	9
	S2	○	○	○	○	○	○	○	○	○	-	-	-	-	○	
	D	-	○	○	○	○	○	○	○	○	-	-	-	-	×	
	N	-	-	-	-	-	-	-	-	-	-	-	-	○	○	

Description

Data at the specified area can be sent to area of another Programmable Controller (PC) connected on the MEUNET link.

The control data specified by S1 is defined as follows.

S1	F	n2	n1
S1 + 1	LK	UN	
	High-order	Low-order	

S1 : When F=0, word data transfer is specified n2 : Specify 0 n1 : Specify the number of send words(1 to 16)
 When F=1, bit transfer is specified n2 : Specify the set bit number (0 to F) n1 : Specify the send source bit number (0 to F)

S1+1: LK :send link specification(1 to 3) UN: Link unit number specification (1 to 63)

Note : Specify all data above in binary.

Examples :

Sending 2 words of data to unit 02 in link 1 using word transfer
 Control data (S1) : 0002H
 Control data (S1+1): 0102H

Sending R3 from unit 01 to Y24 in unit 02 using bit transfer
 Control data (S1) : 8403H
 Control data (S1+1): 0102H

Word Transfer : S1 and S1+1(control data) specify that n1 words of data from the area specified by S2 are to be sent to the personal computer or Programmable Controller (PC)* which is installed with the link unit specified by UN on the link specified by LK, and placed into the Nth area specified by destination D.

Bit Transfer : S1 and S1+1(control data) specify that the nth bit in the area specified by S2 are to be sent to the personal computer or Programmable Controller (PC) which is mounted with the link unit specified by UN on the link specified by LK, and placed into the n2th in the Nth area specified by destination D.

- * 1. The link loop is specified by specifying the link unit with LK.
 The destination (remote unit) is specified by specifying the link unit or link board within that loop with UN.
 - * 2. D specifies the type of area such as WX, WY, DT or Ld.
 The Nth area refers to the area number.
 For example, if N=3 when D=WX0, it is WX3.
- Only one instruction can be executed at a time.
 Even when executing a send request, the actual processing is executed at END instruction.
 The special relay and special data register below are used to determine executable (non-executable) and completion states.

R9030 MEWNET send/receive executable flag ;0: Non-executable
 (under execution)
 1: Executable

R9031 MEWNET send/receive completion flag ;0: Normal completion
 1: Abnormal completion

DT9039 MEWNET send/receive error code: Stores the error code of the abnormal completion (valid only when R9031 is on)

Flag Operation

The error flags (R9007,R9008) turns on when any of the following conditions occur.

- Control data exceeds the specification range.
- There is no link unit.
- S2+n-1 or D+n-1 exceeds the range of S2, D.

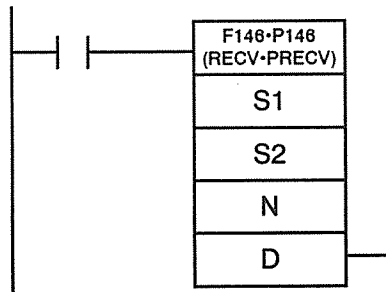
Note : Refer to page 63, Section 8-1, ERROR CODES on link system error in the table of error codes for the DT9039.

Errors such as 71H, 72H and 73H are communication time-out errors.
 The time can be set from 10 ms to 81.9 s with system register No. 32.
 The default value is set to 2 s.

- 71H : Link transmission answer wait time-out error
- 72H : Transmission buffer empty wait time-out error
- 73H : Response wait time-out error

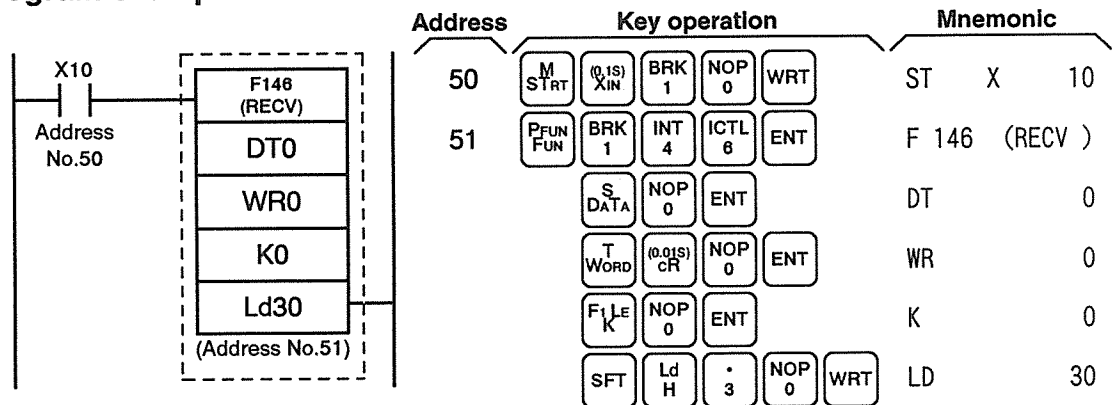
F146 Data receive (MEWNET)
P146 (RECV)

Basic instruction format



S1 : Start number of the area storing the control data (specified with two words).
 S2 : Receive start area (specify number0).
 N : Receive start area number.
 D : Set start area number.

Program example

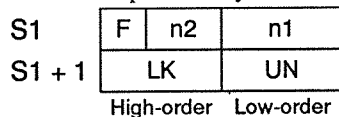


Operand specification area(marked with ○)														Index modifier (○:usable) (X:not usable)	Number of steps	
Processing unit	Word unit															
Instruction	Set value	WX	WY	WR	WL	SV	EV	DT	LD	FL	IX	IY	K-Constant			
RECV	S1	○	○	○	○	○	○	○	○	○	-	-	-	-	○	9
	S2	○	○	○	○	○	○	○	○	○	-	-	-	-	X	
	N	-	-	-	-	-	-	-	-	-	-	-	○	○	○	
	D	-	○	○	○	○	○	○	○	○	-	-	-	-	○	

Description

The computer data that is placed into the specified area for another Programmable Controller (PC) which is connected in the MEWNET link can be received into the specified area in the local unit.

The control data specified by S1 is defined as follows.



S1 : When F=0, word data transfer is specified n2 : Specify 0 n1 : Specify the number of receive words(1 to 16)
 When F=1, bit transfer is specified n2 : Specify the set bit number (0 to F) n1 : Specify the send source bit number (0 to F)

S1+1: LK :send link specification(1 to 3) UN: Link unit number specification (1 to 63)

Note : Specify all data above in binary.

Examples :

Reading 2 words of data from unit 02 in link 1 using word transfer
 Control data (S1) : 0002H
 Control data (S1+1): 0102H

Reading X35 from unit 02 in link 1 and writing it to R46 in unit 01 using bit transfer
 Control data (S1) : 8605H
 Control data (S1+1): 0102H

Word Transfer : S1 and S1+1(control data) specify that n1 words of data from the Nth word in the area specified by S2 are to be received from the personal computer or Programmable Controller (PC) which is installed with the link unit specified by UN on the link specified by LK, and placed into the area specified by D.

Bit Transfer : S1 and S1+1(control data) specify that the n1th bit of the Nth word in the area specified by S2 is to be received from the personal computer or Programmable Controller (PC) which is installed with the link unit specified by UN on the link specified by LK, and placed into the n2th bit in the area specified by D.

- * 1. The link loop is specified by specifying the link unit with LK.
 The destination (remote unit) is specified by specifying the link unit or link board within that loop with UN.
- * 2. S2, D specifies the type of area such as WX, WY, DT or Ld.
 The Nth area refers to the area number.
 For example, if N=3 when S2=WX0, it is WX3.

- Only one instruction can be executed at a time.
 Even when executing a receive request, the actual processing is executed at the END instruction.
 The special relay and special data register below are used to determine executable (non-executable) and completion states.

R9030 MEWNET send/receive executable flag ;0 :Non-executable
 (under execution)
 1 :Executable

R9031 MEWNET send/receive completion flag ;0 :Normal completion
 1 :Abnormal completion

DT9039 MEWNET send/receive error code : Stores the error code of
 the abnormal completion
 (valid only when
 R9031 is on)

Flag Operation

The error flags (R9007,R9008) turns on when any of the following conditions occur.

- Control data exceeds the specified range.
- There is no link unit.
- S2+n-1 or D+n-1 exceeds the range of S2, D.

Notes :

When a special relay or special data register is to be received, specify WR900 or DT9000, respectively, to S2.
 Refer to page 63, Section 8-1, ERROR CODES on error in the table of error codes for the DT9039.
 Errors such as 71H, 72H and 73H are communication time-out errors.
 The time can be set from 10 ms to 81.9 s with system register No.32.
 The default value is set to 2 s.

- 71H : Optical link transmission answer wait time-out error
- 72H : Transmission buffer empty wait time-out error
- 73H : Response wait time-out error

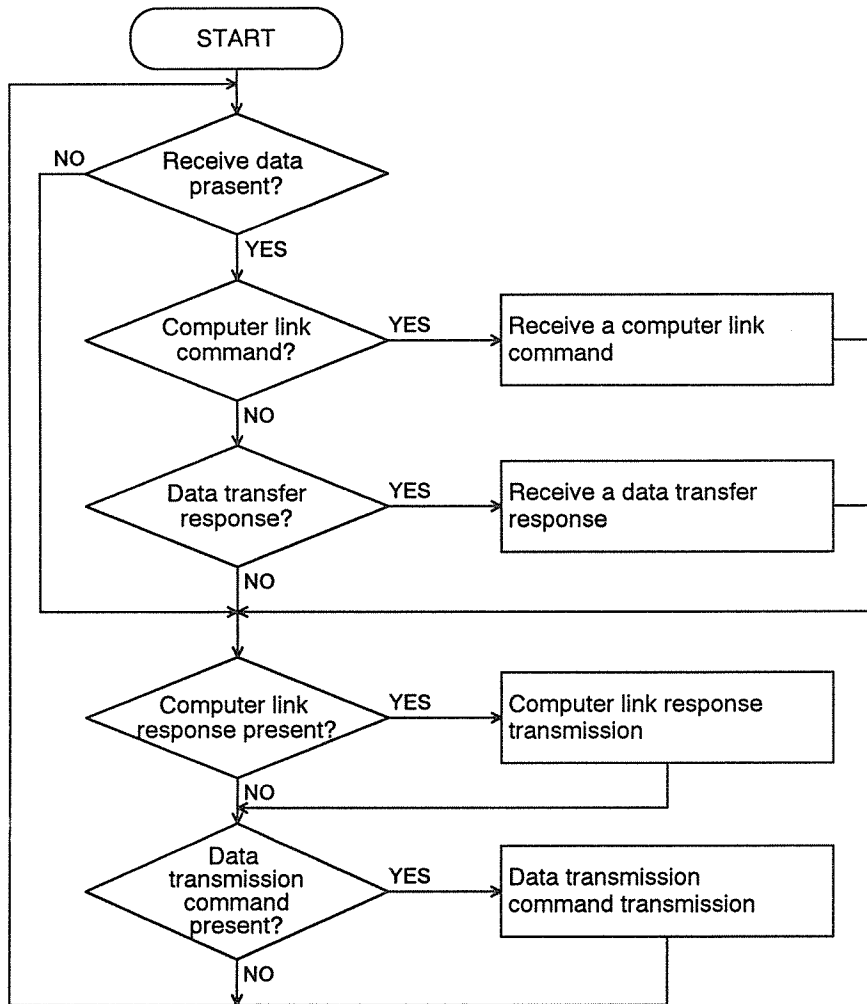
3-3. Procedure of Processing

Basic :

Since the communication is processed in half-duplex mode, generate a frame for another function after the command and response frame completes.

Another frame is not processed while the C.C.U. is sending or receiving a frame.

C.C.U. Frame Receive Process

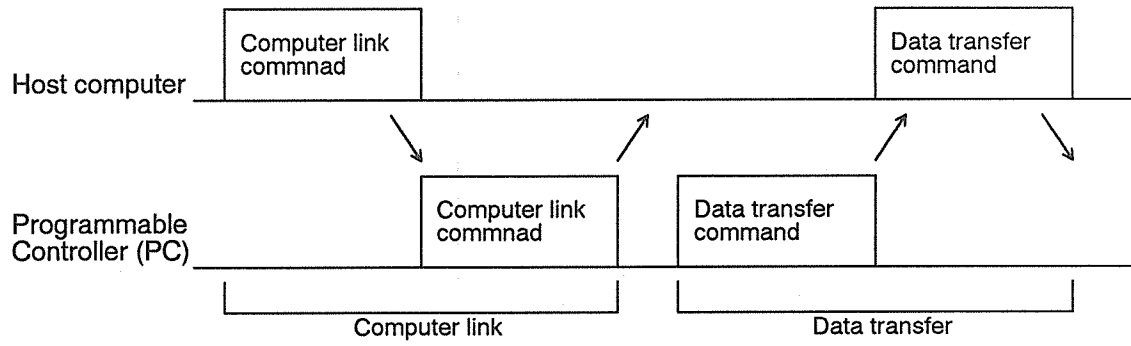


The order of precedence is 1 through 4 as shown in the figure above.

- | | |
|---------------------------|------------|
| | Precedence |
| 1. Computer link command | High |
| 2. Data transfer response | ↓ |
| 3. Computer link respons | ↓ |
| 4. Data transfer command | Low |

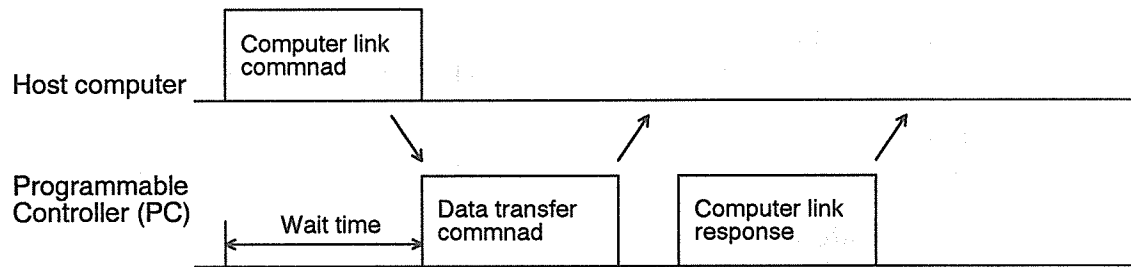
• If frames arrive at the C.C.U. simultaneously, processing begins from the one with the highest precedence.

1) Normal

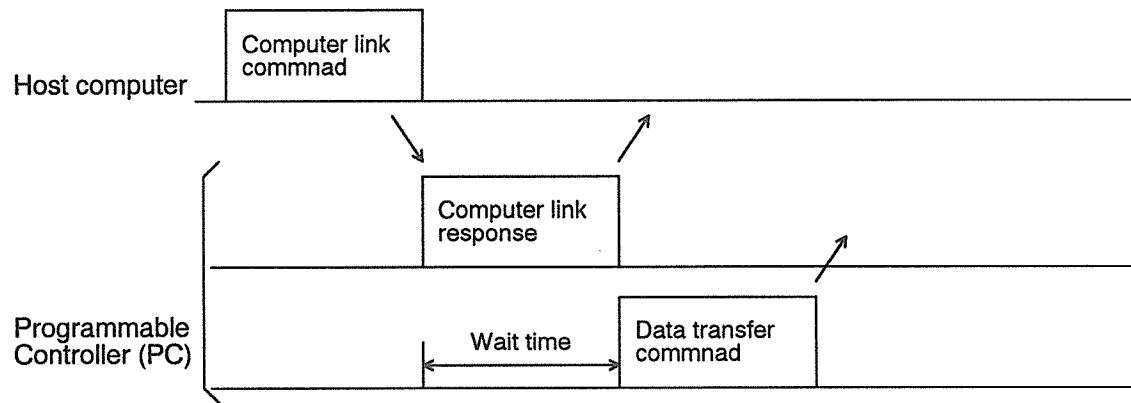


2) Simultaneous

Simultaneous Computer Link Command and Data Transfer Command



Simultaneous Data Transfer Command and Computer Link Response



3-4. Processing Conditions at Host Computer

The various conditions must agree for the host computer to communicate with the C.C.U..
Refer to the user's manual for the host computer and perform the correct settings.

1) Setting the Communication Parameters

Transmission speed and data format (character bit, parity check, stop bit etc.) settings :
Set the same transmission speed and data format for both the C.C.U. and host computer.
Refer to page 5, Section 1-3, DIP Switches on how to set the C.C.U.'s transmission speed and data format.
Use the computer software or hardware setting to set the host computer.

2) Command and Response

Refer to page 18, examples of command and response and page 59, Section 8-1, 1. Computer Link (MEWTOCOL-COM) and page 95, Section 8-1, 2. Data Transfer (MEWTOCOL-DAT) in the Appendix.

3) Communication Control

Create the software for error control, error processing and time-out processing to match the system.

4) Wiring of the C.C.U. and Host Computer

Refer to page 12, Section 2-1, Connection Method and wire with the connector (D-sub 9-pin) supplied.

5) ASCII Codes

Refer to page 104, Section 8-2, ASCII Codes.

CHAPTER 4

NOTES ON OPERATION

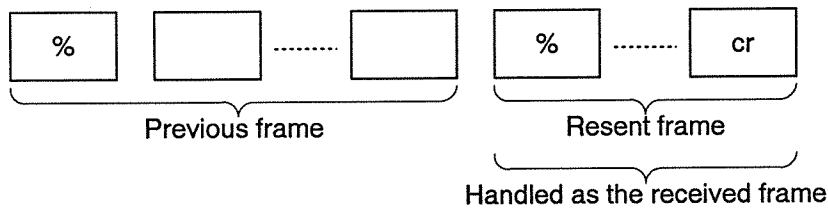
4-1. Notes on Operation

4-2. Location of C.C.U. on Basic Base Plate

“PC” is the abbreviation for Programmable Controller.

4-1. Notes on Operation

- The cable used to connect the host computer and C.C.U. is not available from us.
Refer to page 12, Section 2-1, Connection Method and prepare a cable using the connector (D-sub 9-pin) supplied.
- All commands sent from the host computer until the end of initialization of the CPU or C.C.U. when the power is turned ON are canceled and responses do not return.
- If an error occurs within a frame during reception, the frame is completely cleared, an error response returns and at the same time the error LED turns ON.
However, when the next normal frame arrives, the error LED turns OFF and the frame is processed as the received frame.
- If the terminator was not received due to communication trouble.
The C.C.U. remains in the standby state until the termination code arrives.
To prevent the standby state from continuing, execute the time-out process at the host computer and then resend the command.
The C.C.U.'s buffer is shown below when the retransmission is received from the host computer.



- The C.C.U. ignores everything but the commands and responses of the computer link and data transfer.
In other words, only the " %" and " ? " are accepted as frame headers while other characters are ignored.

4-2. Location of C.C.U. on Basic Base Plate

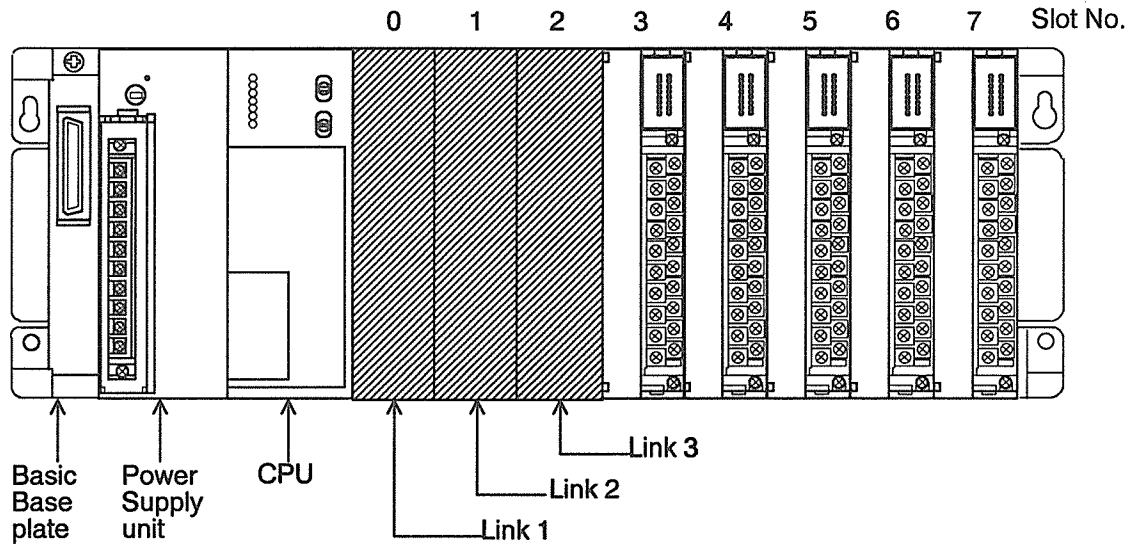
The C.C.U. cannot be installed to an expansion base plate.

The C.C.U. is handled in the same manner as the link unit.

Up to 3 units, including the link unit, can be installed for one CPU.

They are designated LINK1, LINK2 and LINK3 from the unit closest to the CPU.

For example two C.C.U. and one link unit can be installed.



I/O Numbers :

I/O numbers for 16 points are allocated automatically for each installed C.C.U..

For example, in the figure above, slot No.0 occupies 0 to F, slot No.1 occupies 10 to 1F and slot No.2 occupies 20 to 2F.

When programming, be sure the I/O numbers to be allocated to the I/O unit do not conflict with those occupied by the C.C.U..

Programming can be accomplished without regard as to the I/O numbers occupied by the C.C.U. when 0SE is allocated to the slot containing the C.C.U. using the NPST-GR (programming support software)'s I/O MAP function.

(The initial value is 16SE.)

For details, refer to the section on the I/O MAP in the NPST-GR Manual.



CHAPTER 5

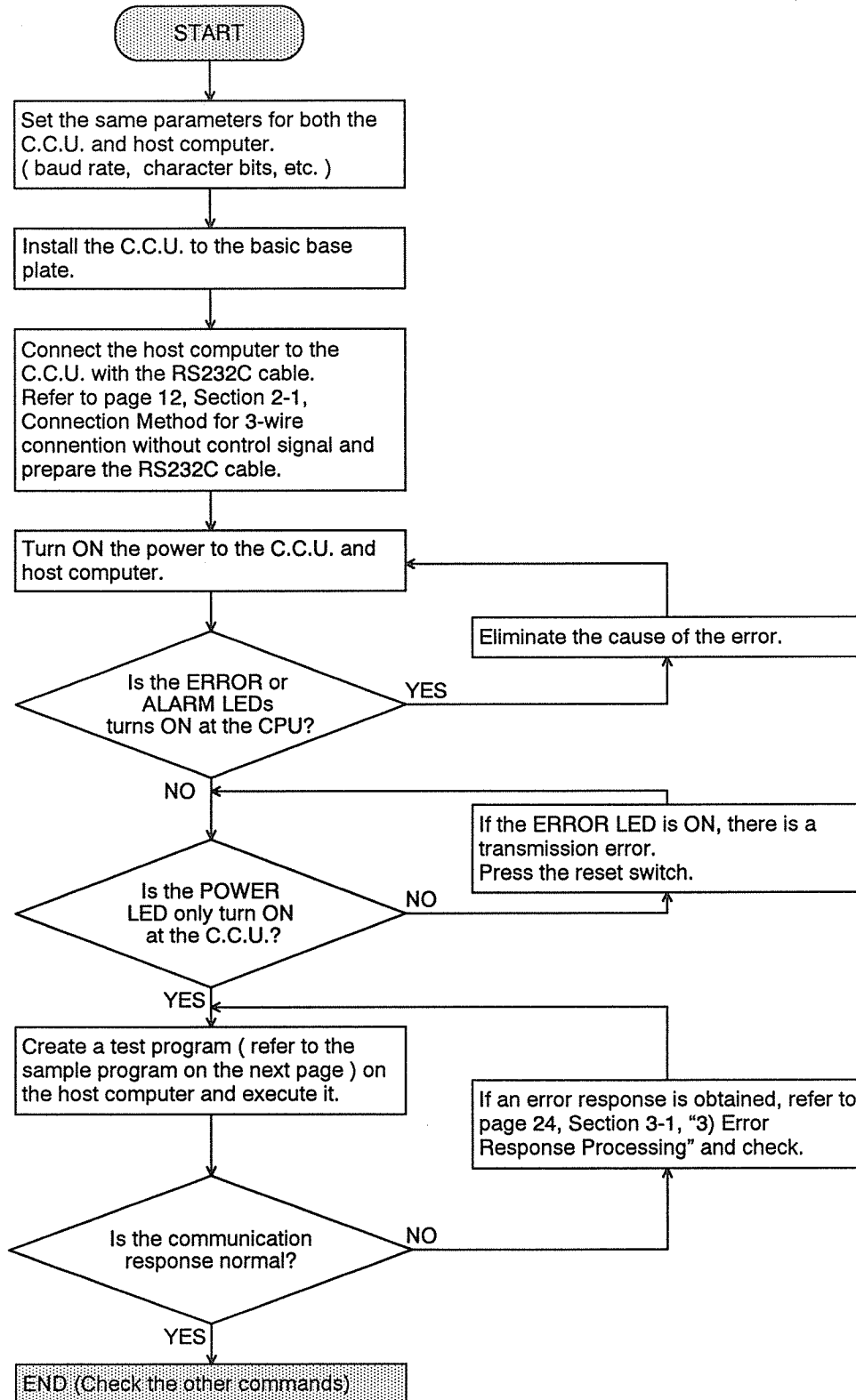
TEST OF COMMUNICATION FUNCTION

- 5-1. Execution Procedure
- 5-2. Sample Program

“PC” is the abbreviation for Programmable Controller.

5-1. Execution Procedure

The execution procedure is given below for the test program which checks whether the communication is normal.



5-2. Sample Program

The program for reading the data in the area DT0 to DT9 of the computer via. data area command.
If you run the program, the response result from a Programmable Controller (PC) and the number of transmission will be displayed on the screen (around at a center of the screen).

```

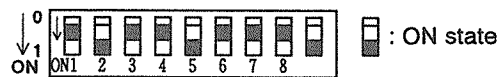
10 CLS
20 OPEN "COM1:9600, 0, 7, 1" AS #1 ←—————(1)
30 D$="%01#RDD0000000009" ←—————(2)
40 B=0:FOR I=1 TO LEN(D$):B=B XOR ASC(MID$(D$, I, 1)):NEXT I ←—————(3)
50 B$=RIGHT$("0"+HEX$(B), 2)
60 D$=D$+B$+CHR$(&HD)
70 PRINT #1, D$; ←—————(4)
80 INPUT #1, R$ ←—————(5)
90 LOCATE 10, 10
100 PRINT R$;" ";J
110 J=J+1
120 GOTO 70

```

Program explanation

- (1) Setting transmission mode (9600 bps, data bits: 7-bit , parity odd, stop bits: 1 bit).
- (2) Setting command.
- (3) Calculating BCC.
- (4) Sending command.
- (5) Receiving command.

C.C.U. DIP switches setting





CHAPTER 6

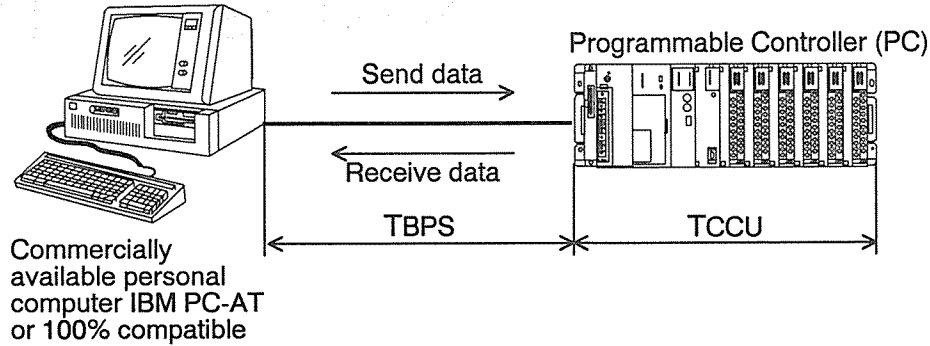
TRANSMISSION TIME

“PC” is the abbreviation for Programmable Controller.

6-1. Transmission Time

The transmission time represents the time required for a computer to communicate with Programmable Controller (PC) through the C.C.U..

This does not include the processing time at the computer.



$$\text{TRANSMISSION TIME (T)} = \text{TBPS} + \text{TCCU}$$

TBPS : Time for data to be transmitted over the RS232C

TCCU : Time for processing at the C.C.U. and CPU (Computer Link Transmission Time)

1) Time for data to be transmitted over the RS232C(TBPS)

$$\text{TBPS} = \left(\frac{\text{TN}}{\text{BPS}} + \text{TA} + \frac{\text{RN}}{\text{BPS}} \right) \times 1000(\text{ms})$$

TN : Number of transmit command bits (number of bytes \times m*)

TA : Transmission delay time occurring at transmission

[average idle time between character frames \times (number of bytes - 1)]

RN : Number of received response bits (number of bytes \times m*)

BPS : Baud rate

* m = Start bit (: 1) + Data bit (7 or 8) + Parity bit (: 0 or 1) + Stop bit (: 1 or 2)

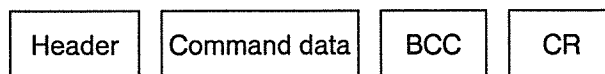
Example :

Transmit command : 40 bytes, Receive response : 8 bytes, Baud rate : 9600 bps, Start bit : 1-bit,

Character bits : 7-bit, Parity bit : 1-bit, Stop bit : 1-bit, No transmit application delay time.

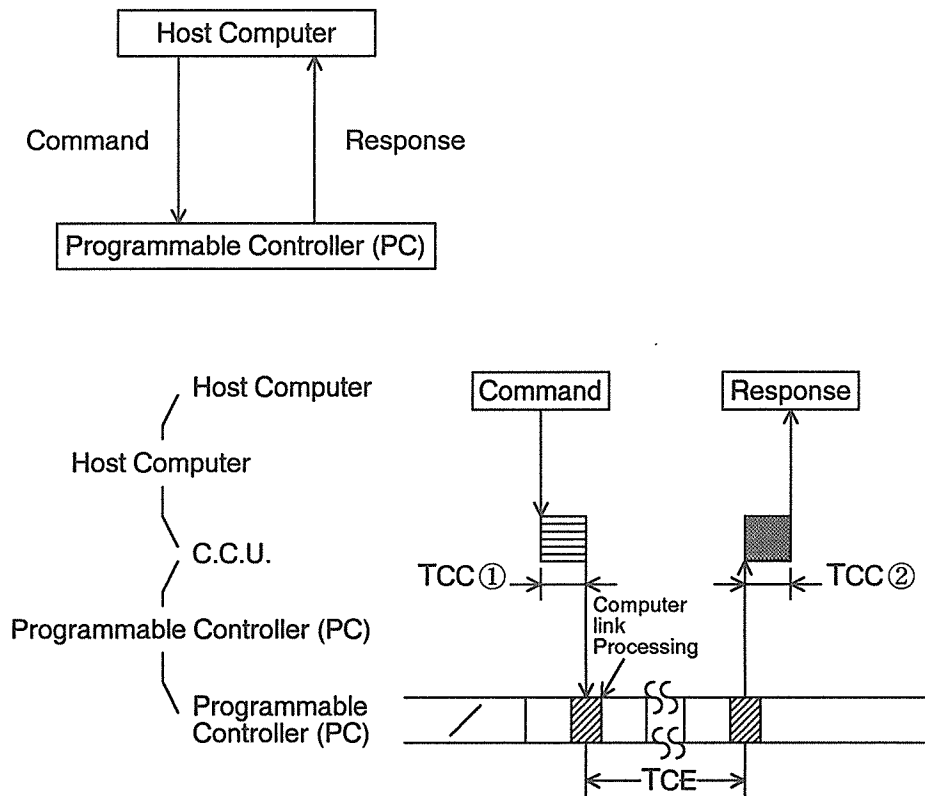
$$\text{TBPS} = \left(\frac{40 \times 10}{9600} + \frac{8 \times 10}{9600} \right) \times 1000(\text{ms}) = 50\text{ms}$$

Refer to the "Chapter 8, MEWTOCOL-COM" for the number of bytes in the transmit / receive commands.



2) Computer Link Transmission Response Time (TCCU)

The computer link transmission response time is the time from when a command is sent from the host computer, until the response from the destination Programmable Controller (PC) is stored into the computer.



$TCCU$ (Computer link transmission response time) = $TCC \text{ ①} + TCE + TCC \text{ ②}$

$TCC \text{ ①}$: The check time at C.C.U. receive or the write time to the Programmable Controller's (PC's) RAM.

(1 ms or less)

$TCC \text{ ②}$: Processing at C.C.U. transmit. (1 ms or less)

TCE : Computer link processing time for the Programmable Controller (PC).

(1 to 2 scan time)

Note:

TCE is the scan time for the Programmable Controller (PC) unit and becomes longer as the program becomes larger.



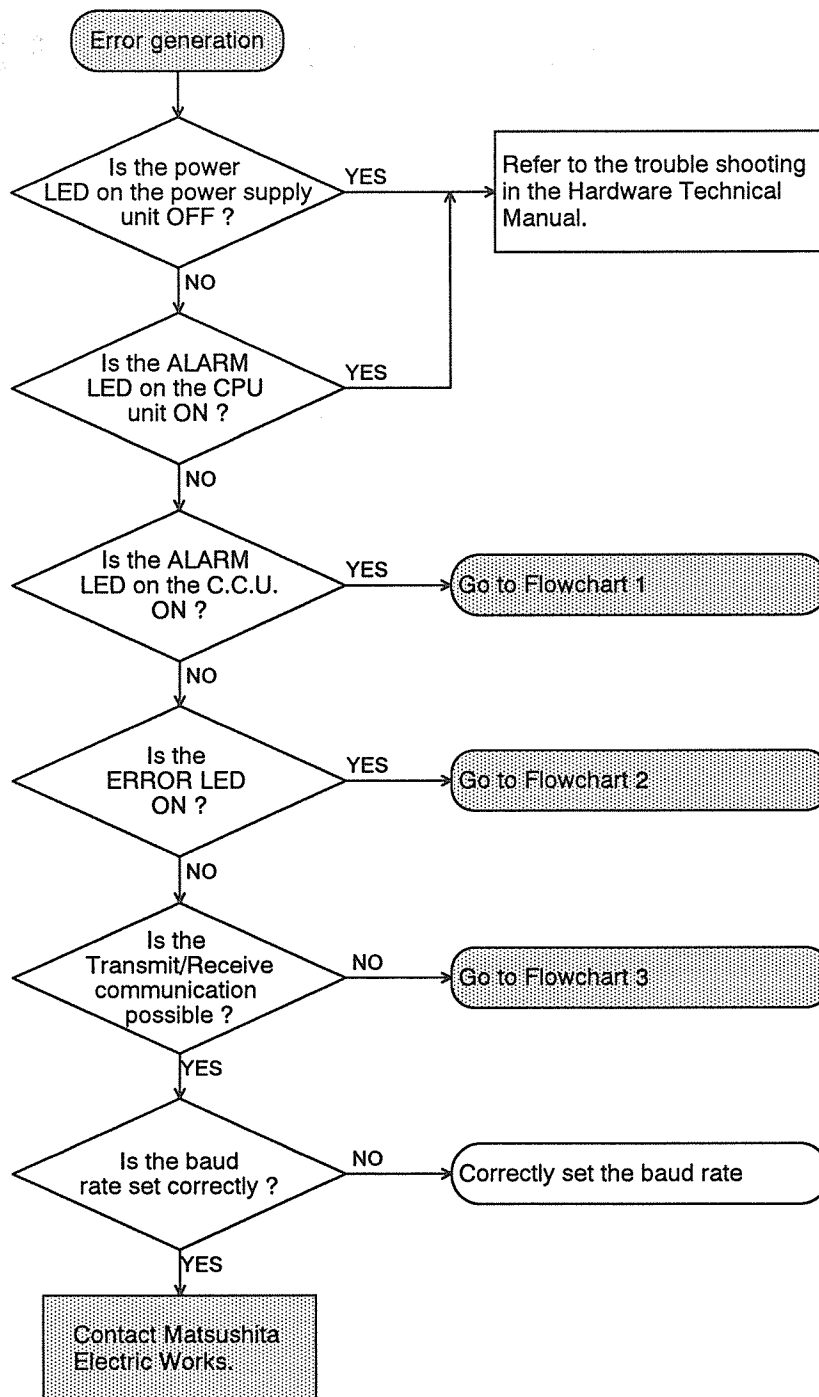
CHAPTER 7

TROUBLE SHOOTING

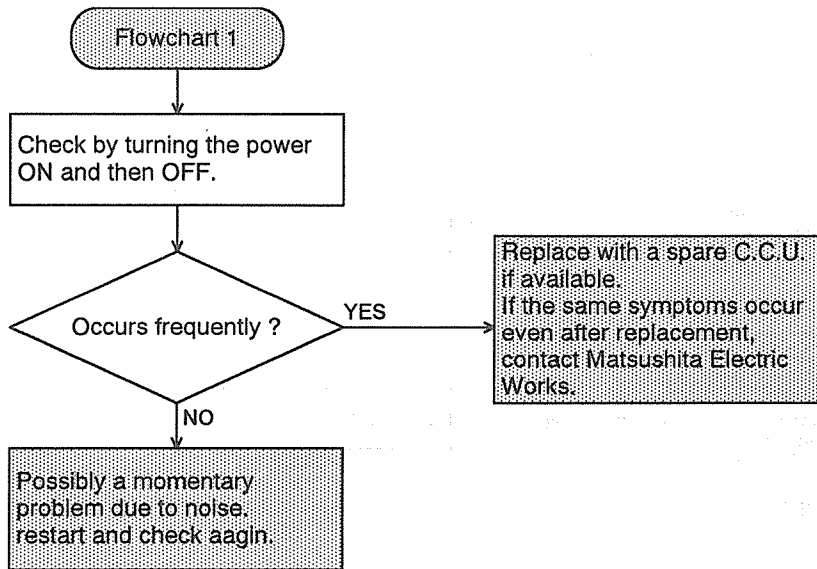
“PC” is the abbreviation for Programmable Controller.

7-1. Trouble Shooting Flowchart

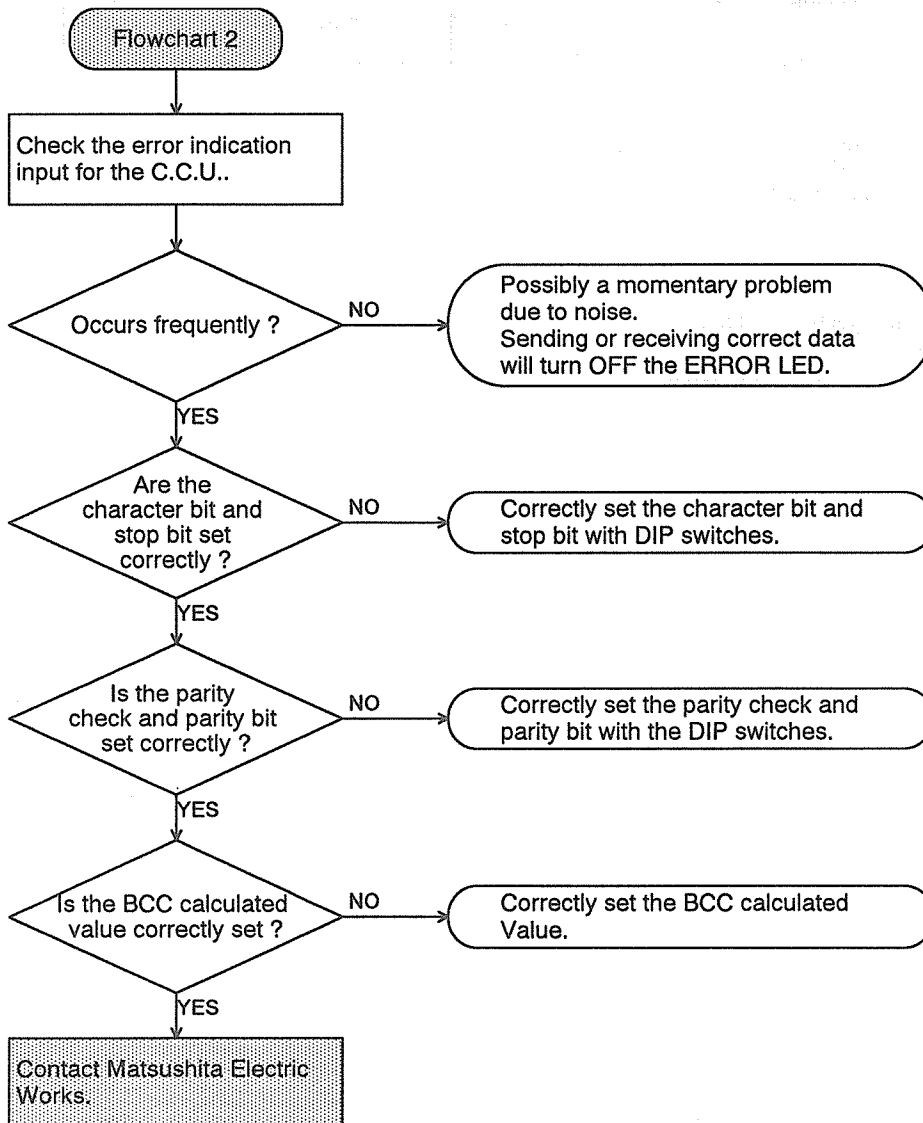
Mian Flowchart



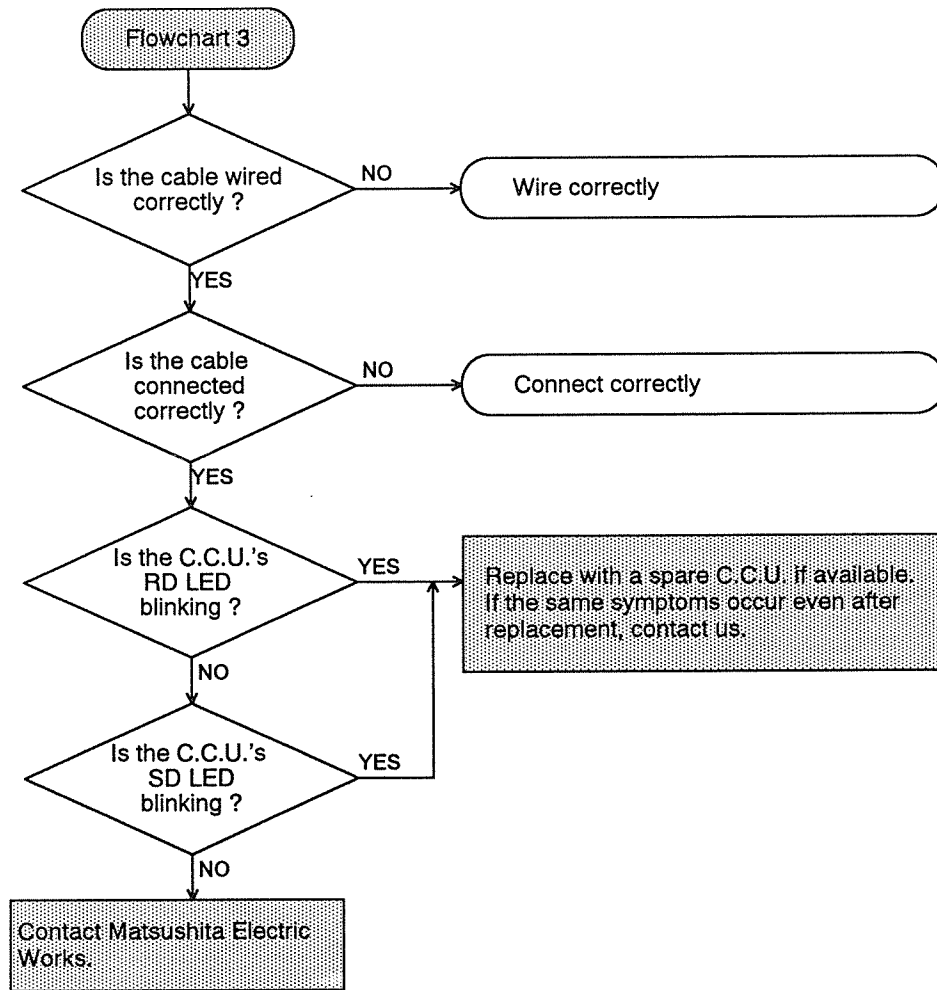
1. Follow this flowchart when the ALRAM LED is ON.



2. Follow this flowchart when the ERROR LED is ON.



3. Follow this flowchart when the Transmit/Receive communication is impossible.



CHAPTER 8

APPENDIX

8-1. MEWTOCOL

1. Computer Link(MEWTOCOL-COM)

FEATURES

DESCRIPTION

BCC(Block Check Code) CRETION

ERROR CONTROL

ERROR CODES

COMMANDS

COMMAND DESCRIPTION

- | | |
|--|--|
| 1. Read Contact Area | 13. Write Aet Value Area |
| 2. Write Contact Area | 14. Read Course Value Area |
| 3. Supplementary Description of
Read/Write Contact Area | 15. Write Course Value Area |
| 4. Read Contact Area | 16. Monitor Contact Registration and Reset |
| 5. Write Contact Area | 17. Monitor Data Registration and Reset |
| 6. Read Contact Area | 18. Monitor Execution |
| 7. Write Contact Area | 19. Read System Register |
| 8. Preset Word Unit in Contact Area | 20. Write System Register |
| 9. Read Data Area | 21. Read Programmable Controller Status |
| 10. Write Data Area | 22. Read Program Block |
| 11. Preset of Data Area | 23. Write Program Block |
| 12. Read Set Value Area | 24. Abort |

2. Data Transfer(MEWTOCOL-DAT)

FEATURES

DESCRIPTION

DESCRIPTION OF THE FORMAT

ERROR CODES

COMMANDS

CONTACT AND DATA CODES

COMMAND DESCRIPTION

- | | |
|--------------------|------------------------------|
| 1. Write Data Area | 3. Write Contact InFormation |
| 2. Read Data Area | 4. Read Contact Information |

8-2. ASCII Codes

“PC” is the abbreviation for Programmable Controller.

8-1. MEWTOCOL

*MEWTOCOL : Communication protocol employed for bidirectional communication of C.C.U..

1. Computer Link(MEWTOCOL-COM)

MEWTOCOL-COM is the protocol used between MEWNET link units and its format is for 1:N communications.

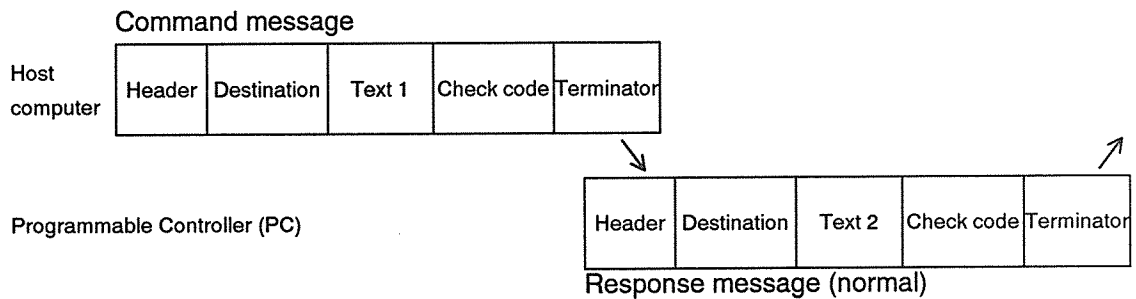
Thus, it is necessary to specify the destination according to this format also for the 1:1 communication between the C.C.U. and host computer.

Note that a temporary number is used in this case.

Normally set the destination to "01".

FEATURES

1. Dedicate procedure and interactive operation.
2. ASCII code transmissions.
3. The initial right to send is at the personal computer.
4. The right to send shifts each time the command message is sent.



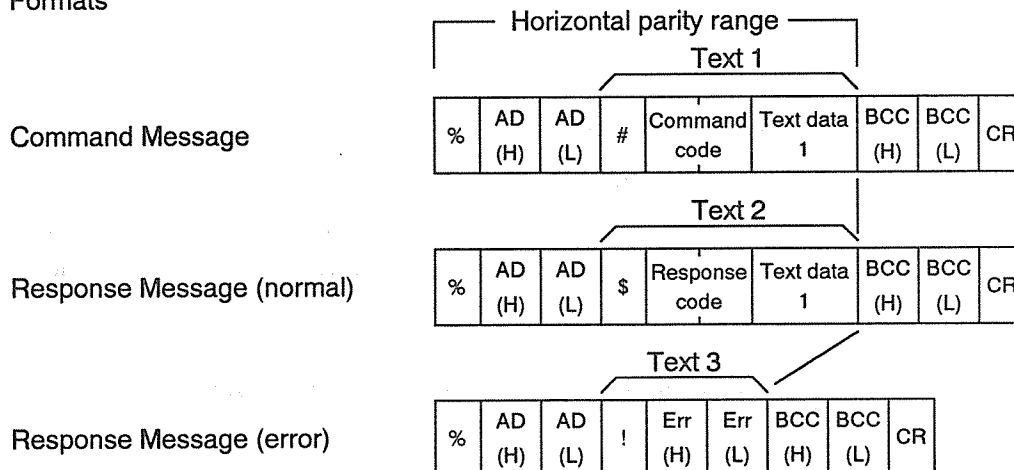
DESCRIPTION

1) Messages

Command message : A message from the personal computer to the Programmable Controller (PC) is called a command message.

Response message : A response (message from the Programmable Controller (PC) to the personal computer) to a command is called a response message.

Formats

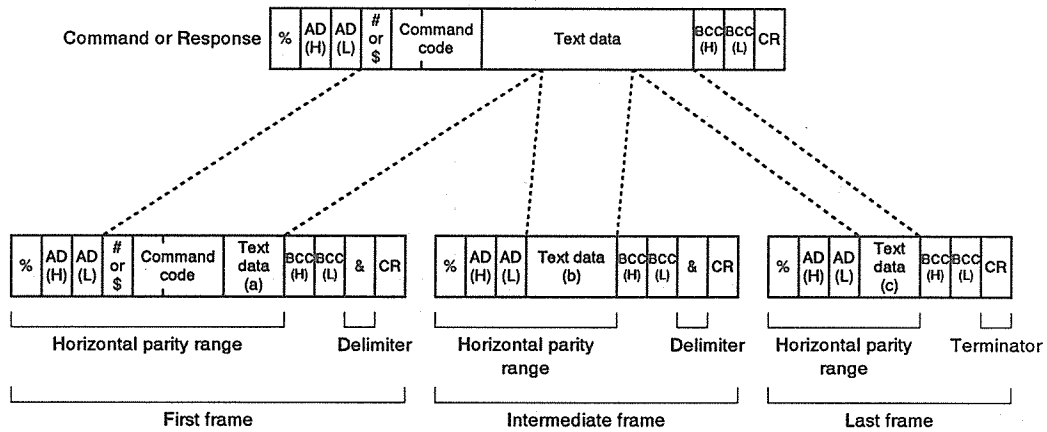


The max. No. of characters (% to CR) that are allowed in a command message or response message is 118.

If the number of characters in a command message is 119 or more, divide the message into plural frames as shown below and then send.

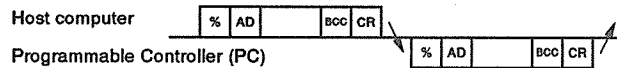
Further, if the number of characters in a response message is 119 or more, the response returns from the Programmable Controller (PC) in plural frames as shown below.

Division of the Command Message or Response Message into Plural Frames

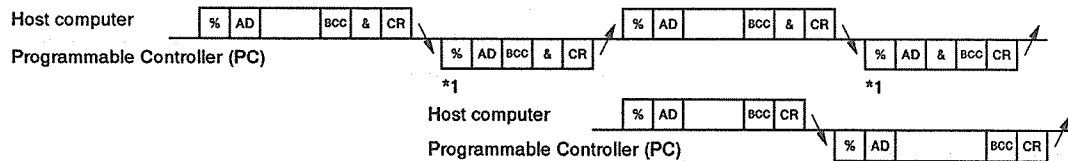


Example of Communication Timing Charts

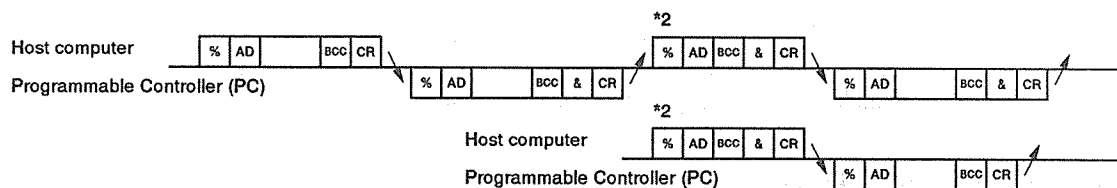
Single Frame Command and Single Frame Response



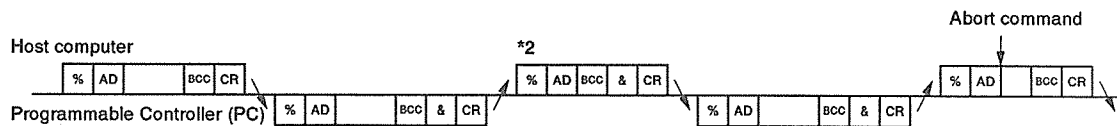
Plural Frame Command and Single Frame Response



Single Frame Command and Plural Frame Response



Plural Frame Response Aborted Midway



Notes :

After one frame is sent when sending a message divided into plural frames, the next frame is not sent until the request to send message (*1 in the example communication timing charts) from the remote unit is received.

When receiving plural frames, send the message (*2 in the example communication timing charts) to the remote unit to receive the next frame.

2) Control Codes

Name	Character	ASCII Code	Description
Header	%	25H	Indicates the start of a message.
Command	#	23H	Indicates a command message.
Response (normal)	\$	24H	Indicates a normal response message.
Response (error)	!	21H	Indicates a response message during an error.
Terminator	CR	0DH	Indicates the end of a message.
Delimiter	&	26H	Indicates a delimiter when dividing a message into plural frames.

3) Destination and Source, AD(H), (L)

Two-digit decimal number 01 to 63 (ASCII code)

In the command message, the number indicates the Programmable Controller (PC) unit No. which is to receive the command message.

“(H)” signifies the high-order digit and “(L)” the low-order digit.

Normally specify “01” when using the C.C.U..

In the response message, the number indicates the Programmable Controller (PC) unit No. send the response message.

(H) is the high-order digit and (L), it rep is the low-order digit.(see note).

When the number is FF (ASCII code), it represents a global transfer (broadcast to all units).

Note :

When global transfer is performed, a response message for the command message is not returned.

In this case, the global relay (CR97F) is turned ON after processing ends for command at the Programmable Controller (PC).

4) Block Check Code : BCC(H), (L)

Two-digit hexadecimal number 00 to FF (ASCII code)

This code is used for error detection in the send data.

A horizontal parity codes is used in the unit.

Refer to page 62, BCC(Block Check Code) CREATION.

If *** is entered instead of the BCC, transmission is possible without the BCC.

The BCC is included in the response for this case also.

5) Error Cord :(H), (L)

Two-digit hexadecimal number 00 to FF (ASCII code)

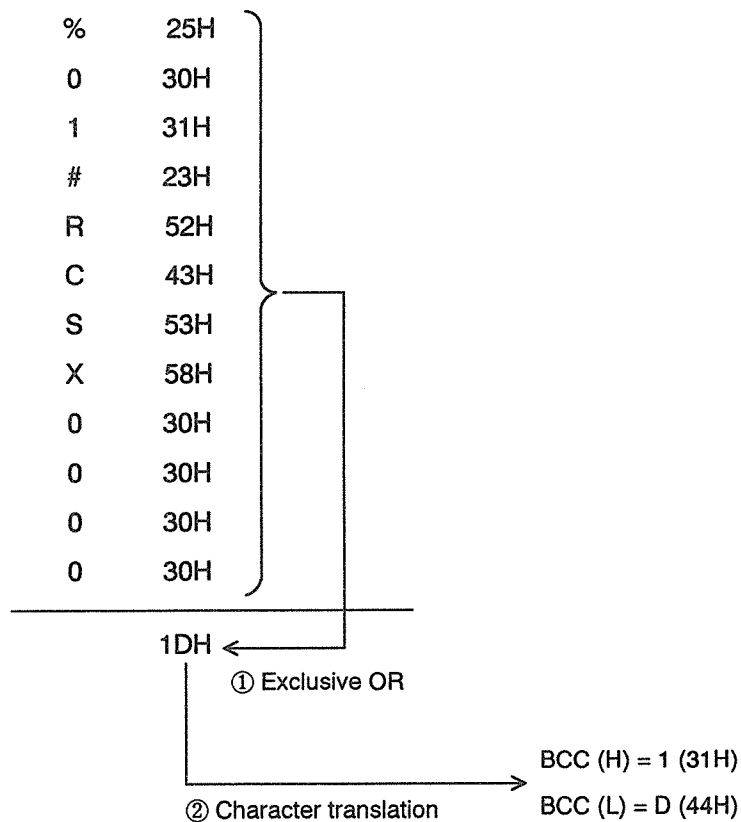
Indicates the type of error when an error occurs.

BCC (Block Check Code) CREATION

BCC is used for horizontal parity check, which is effective in improving transmission data reliability. It is created by Exclusive ORing the entire codes from the header through the last text character, then translating the resulting 8-bit data into ASCII characters, as shown in the following example :

Example :

%	<u>01</u>	#	<u>RC</u>	<u>S</u>	<u>X</u>	<u>0000</u>	<u>1D</u>	CR
	↑		↑	↑	↑	↑	↑	
	Peripheral tool code		Read Contact	Signal point handing	Contact X(input)	Contact No.0	2-character BCC	



ERROR CONTROL

Error recovery in the unit requires execution at the personal computer.
The following shows the error detection functions that are performed in the unit.

1. Format Check

Format check for the command message.

2. Command Code (Text Data Matching)

Checks whether the text data contents are valid for the command code.
Example : I/O number overflow, Valid command check etc

3. Command Code (Operating Level Matching)

Checks whether the Programmable Controller's (PC's) operating mode and command code match.
Example: Program rewrite during run.

4. BCC Check

Exclusive OR (XOR)-based check from % to the text.

When one of the errors above is detected in the Programmable Controller (PC), the command message becomes invalid and is not executed.
After CR is received, an error response message is returned.

ERROR CODES

Error type	Code	Description
Link System Error	20	Undefined
	*21	NACK error : Either the remote unit was incorrectly recognized or a data error occurred.
	*22	WACK error : The receive buffer of the remote unit is full.
	23	Duplicate port error : The remote unit was set with the same unit no. (01 to 16) as the local unit.
	24	Transmission format error : Attempt was made to send data that does not match the transmission format. Either a frame overflow or data error occurred.
	25	Hardware error : Transmission system hardware stops operating normally.
	26	Unit no. error : The unit no. of the remote unit was set to a number other than 01 to 63.
	*27	NOT support error : Frame overflow at the receiving side. An instance where an attempt was made to send different frame lengths between different models.
	28	No response error : Remote does not exist. (time out)
	29	Buffer closed error : Attempt was made to send or receive in the buffer closed state.
	30	Time out : Transmit disable state continues.
Basic Procedure Error	40	BCC error : Transmission error occurred in command data.
	41	Format error : Command message that does not match the transmission format was sent. Examples: Excessive or insufficient number of command data items. There are no "#" and "destination".
	42	NOT support error : An unsupported command was sent. A command was sent to an unsupported destination.
	43	Procedure error : Another command was sent during the transmission request message standby state.
Processing System Error	50	Link set error : A link no. that does not exist was set.
	51	Simultaneous operating error : The transmit buffer of the local unit was already full when a command was issued to the other unit.
	52	Transmit disable error : Cannot transmit to another unit.
	53	Busy error : Processing for another command when a command was received.

(* marked code) : Code supported by the C.C.U. among the error codes (20 to 30) generated in the link system. For details, refer to page 24, Section 3-1, 3) Error Response Processing.

Error type	Code	Description	
Programmable Controller Application Error	60	Parameter error:	A code without an area specification parameter or a code which cannot be used in the command was found. (X, Y, D, etc.) A code with an illegal function specification parameter (0, 1, 2, etc.) was found.
	61	Data error :	Contact no., area no., data code format (BCD, hex, etc.), overflow, underflow or range specification error.
	62	Registration error :	Excessive number of registrations or operation in unregistered state. (monitor registration, trace registration, etc.) When a registration overflow occurs, perform a registration reset.
	63	Programmable Controller (PC) mode error :	Operating mode of the Programmable Controller (PC) when a command was sent does not allow the command to be processed.
	65	Protect error :	Write operation was performed to the program area or system register in the memory protect state.
	66	Address error :	Address (program address, absolute address, etc.) data code format (BCD, hex, etc.), overflow, underflow or range specification error.
	67	Missing data error :	Read data does not exist. (Data not written with a comment registration was read.)

COMMANDS

Command Code	Description
RCS	Read single point of contact information
WCS	Write single point of contact information
RCP	Read plural points of contact information
WCP	Write plural points of contact information
RCC	Read word unit of contact information
WCC	Write word unit of contact information
SC	Preset word unit in contact area
RD	Read data area
WD	Write data area
SD	Preset of data area
RS	Read timer and counter set value area
WS	Write timer and counter set value area
RK	Read timer and counter elapsed value area
WK	Write timer and counter elapsed value area
MC	Registration and reset of monitor contact
MD	Registration and reset of monitor data
MG	Monitor execution
RR	Read system register
WR	Write system register
RT	Read Programmable Controller (PC) status
RP	Read program
WP	Write program
RM	Remote control (RUN/PROGRAM mode switching)
AB	Transmission abort command

CONTACT AND DATA CODES

1. Contact Codes

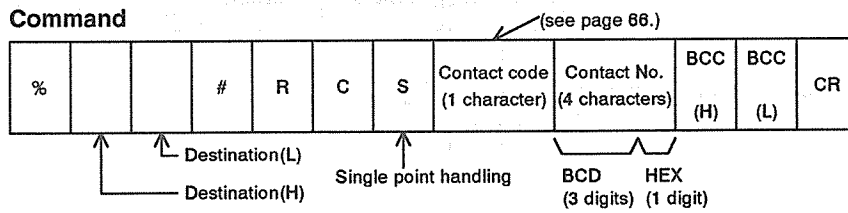
Contact Code	Description
X	External Input
Y	External Output
R	Internal Relay
T	Timer
C	Counter
L	Link Relay

2. Data Codes

Data Code	Description
D	Data Register
L	Link Register
F	File Register
S	Preset Value
K	Elapsed Value
IX	Index Register External Input
IY	Index Register External Output
WX	Word External Input
WY	Word External Output
WR	Word Internal Relay
WL	Word Link Relay

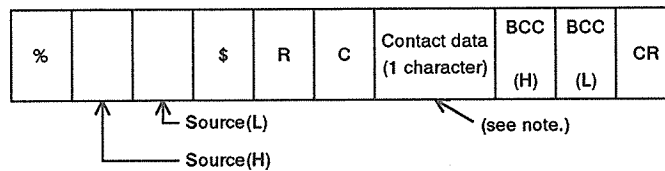
COMMAND DESCRIPTION

1. Contact Area Read (single point) (Command code: RCS)

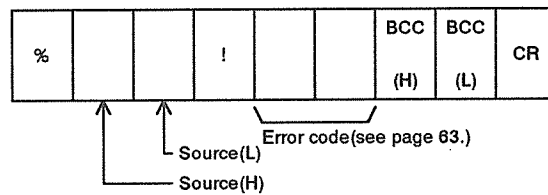


Response

Read OK



Read Error



Note :

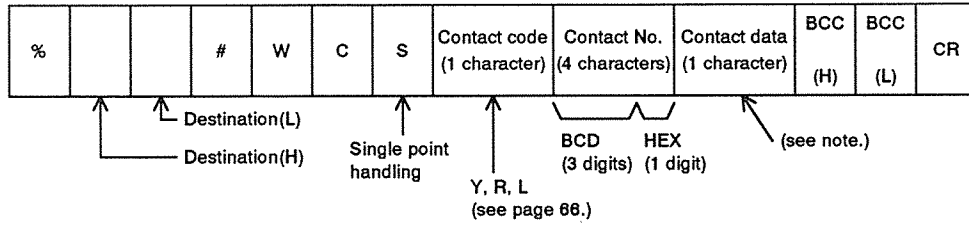
The "\$" indicates a normal response.

Contact Data

Contact State	Data
OFF	"0"
ON	"1"

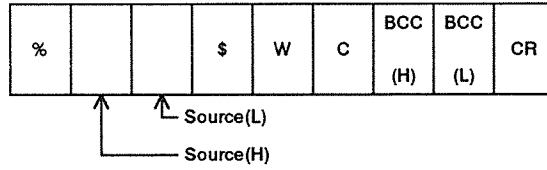
2. Contact Area Write (single point) (Command code: WCS)

Command

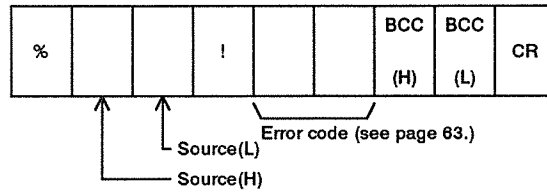


Response

Write OK



Write Error



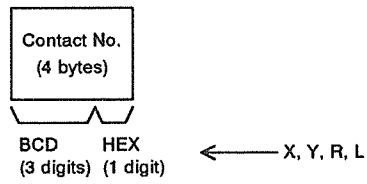
Note :

Contact Data

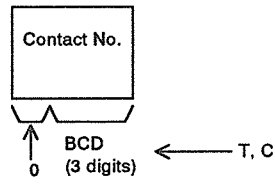
Contact State	Data
ON	"1"
OFF	"0"

3. Supplementary Description of Read/Write Contact Area (communication command)

(single point)



[Timer(T), Counter(C), Contact code]



Even if a no. which is used internally as T(C) is read as C(T) no. it does not result in an error and the contact information for the no. returns.

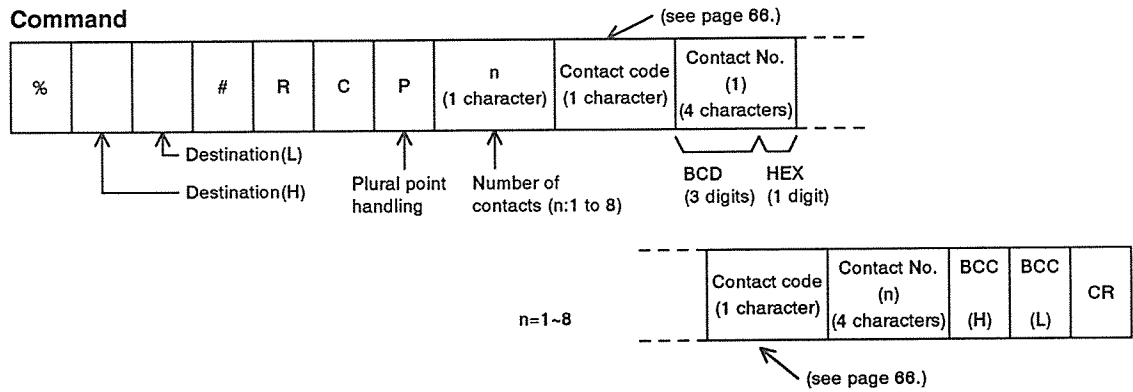
(word unit block) RCC, WCC

Timer and counter contacts are not handled in word units.

If a word no. is specified with the T or C contact code, the information shown below returns.

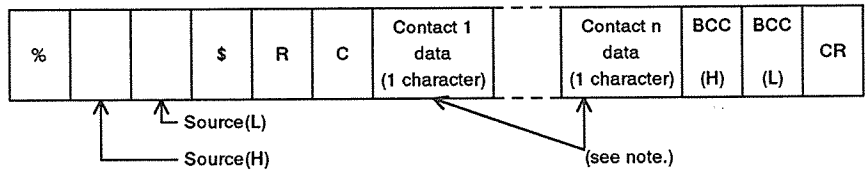
Contact Code	Crowd No.	Response Information
T (C)	0	T (C) : 0 to 15
	1	T (C) : 16 to 31
	2	T (C) : 32 to 47
	3	T (C) : 48 to 63
	⋮	⋮
	15	T (C) : 240 to 255

4. Read Contact Area (plural points) (Command code : RCP)

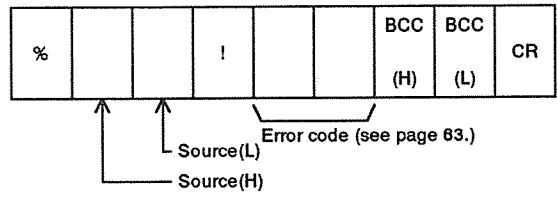


Response

Read OK



Read Error

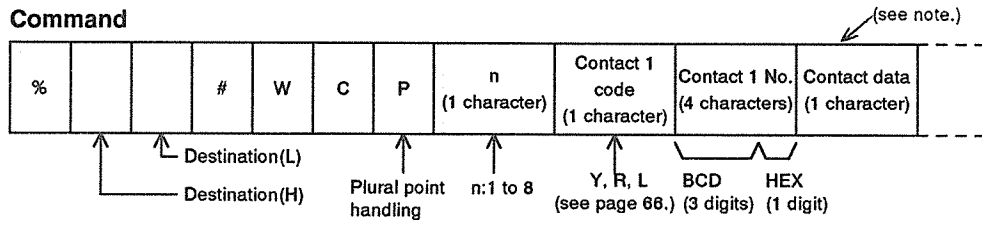


Note :

Contact Data

Contact State	Data
OFF	"0"
ON	"1"

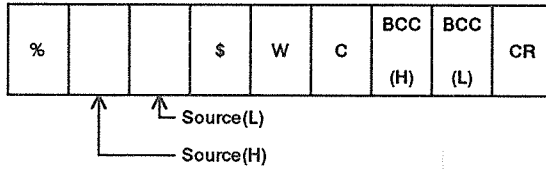
5. Write Contact Area (plural points) (Command code : WCP)



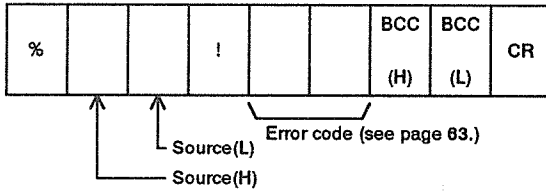
Contact n code (1 character)	Contact n No. (4 character)	Contact data (1 character)	BCC (H)	BCC (L)	CR
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Response

Write OK



Write Error



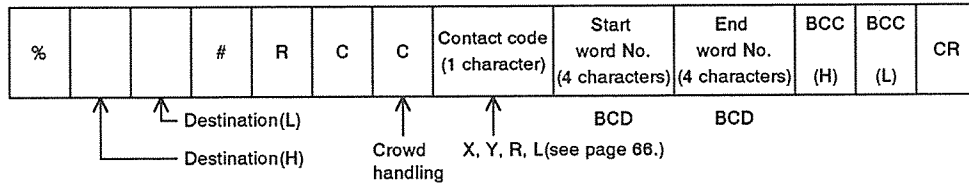
Note :

Contact Data

Contact State	Data
OFF	"0"
ON	"1"

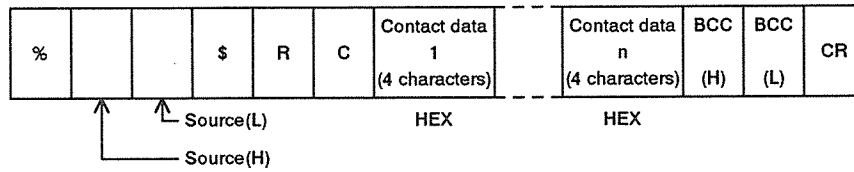
6. Contact Area Read (word unit block) (Command code : RCC)

Command

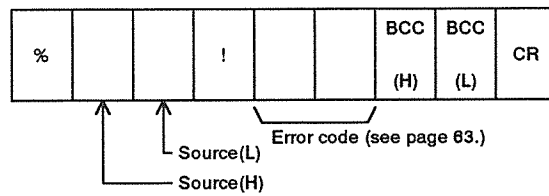


Response

Read OK

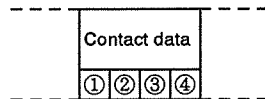
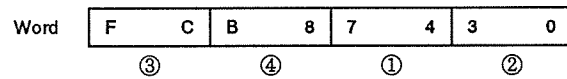


Read Error



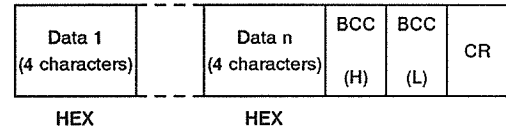
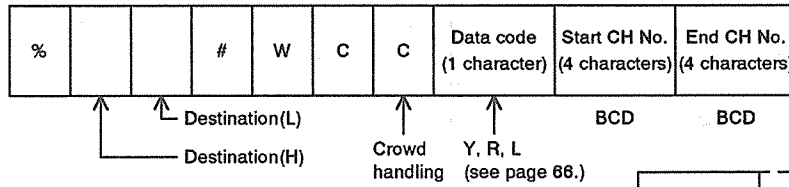
Contact codes are the same as for the read single point

Contact Data Sequence



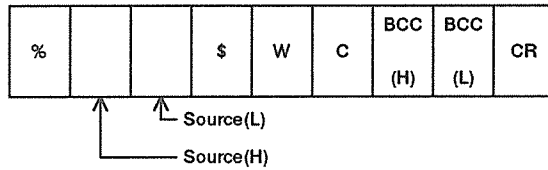
7. Write Contact Area (word unit block) (Command code : WCC)

Command

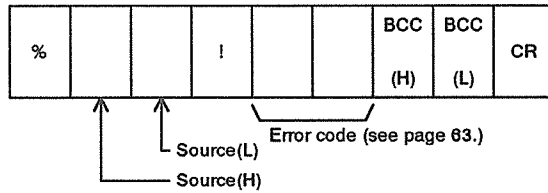


Response

Read OK

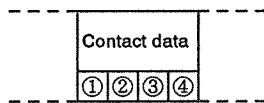
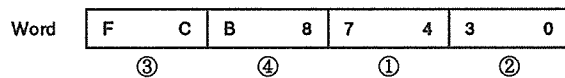


Read Error



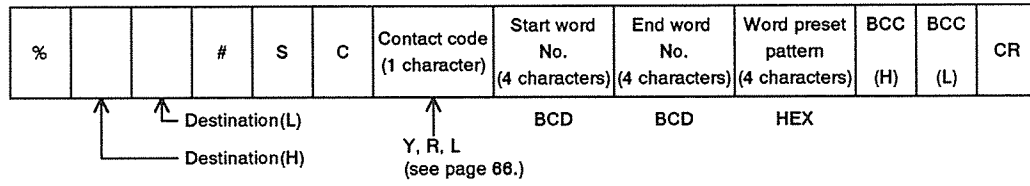
Contact codes are the same as for the read single point

Contact Data Sequence



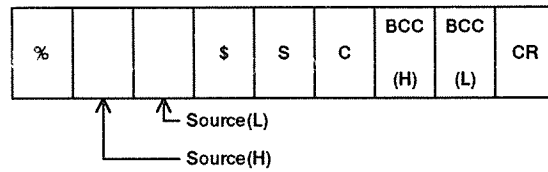
8. Preset Word Unit in Contact Area (Command code : SC)

Command

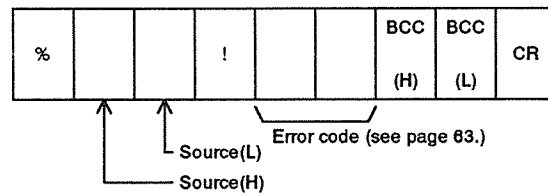


Response

Preset OK

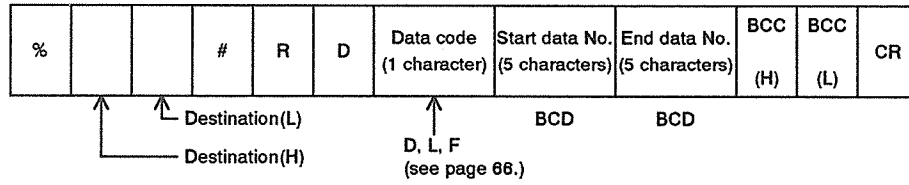


Preset Error



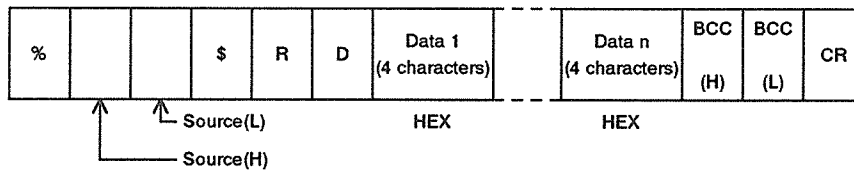
9. Read Data Area (Command code : RD)

Command

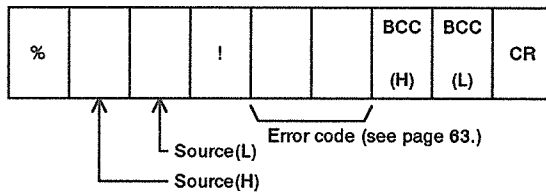


Response

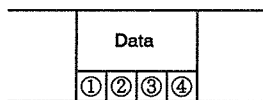
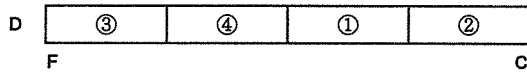
Read OK



Read Error



Data (4 characters)



Details of a command and its response are illustrated in the examples.

Reading from the Data Area (RD command)

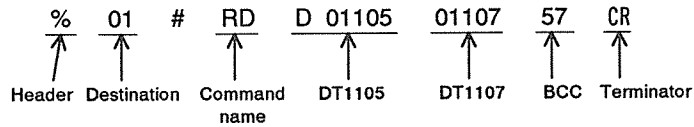
The contents of the Programmable Controller 's (PC's) data area are read by the host computer.

Program Example :

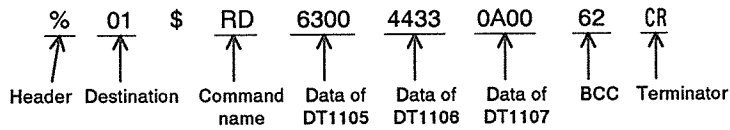
The data contents in DT1105 to DT1107 of the Programmable Controller (PC) are read.
Assume that DT1105 to DT1107 contain the following numeric values.

DT1105 = 0063H
DT1106 = 3344H
DT1107 = 000AH

The command from the host computer is shown below.



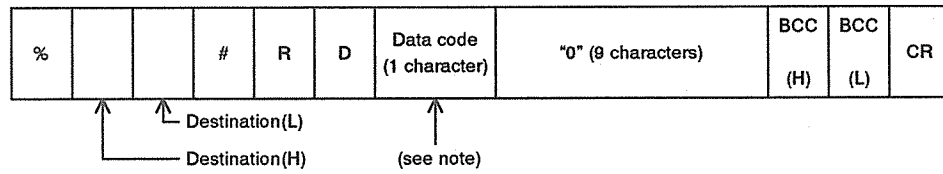
The response from the Programmable Controller (PC) is shown below.



Note : The "\$" indicates a normal response.

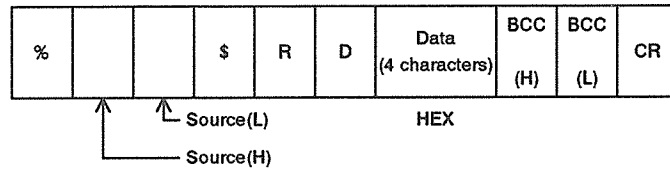
For Index Register

Command

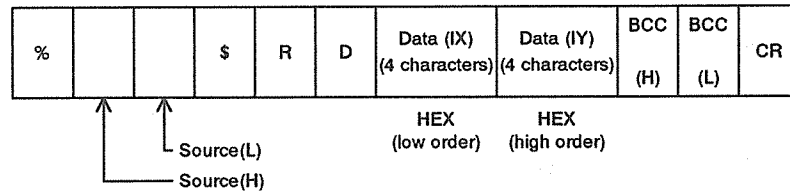


Response

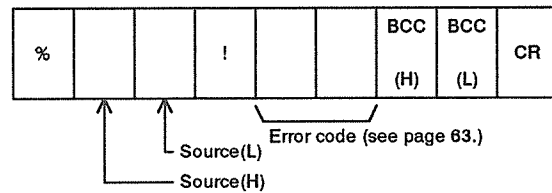
Read OK (for IX, IY)



Read OK (for ID)



Read Error



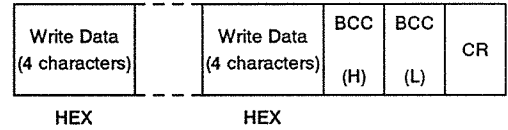
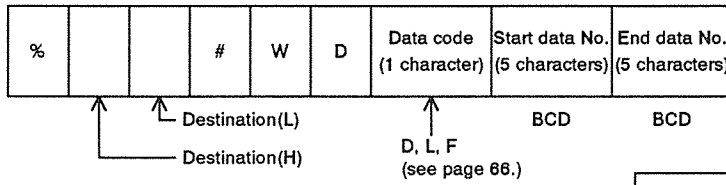
Note :

Data Codes

Data	Code
IX	"I" "X"
IY	"I" "Y"
IX, IY	"I" "D"

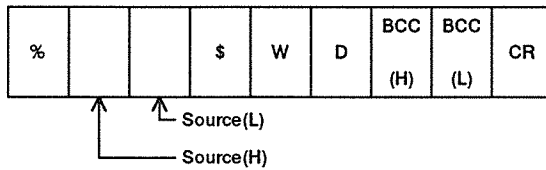
10. Write Data Area (Command code : WD)

Command

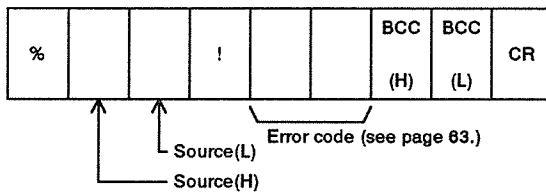


Response

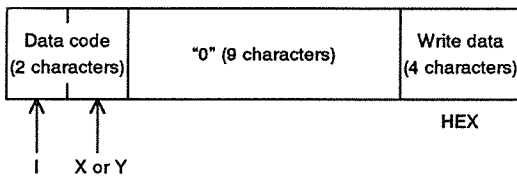
Write OK



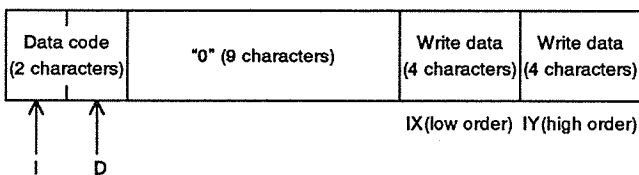
Write Error



Write to IX, IY (between WD and BCC)



Batch processing (write to IX, IY 32-bit) (between WD and BCC)



Details of a command and its response are illustrated in the examples.

Writing to the Data Area (WD command)

A numeric value is written to the Programmable Controller's (PC's) data area by the host computer.

Program Example :

Word numeric values are written to DT1 to DT3 of the Programmable Controller (PC).

The response from the Programmable Controller (PC) is shown below.

The contents of the Programmable Controller's (PC's) data area are read by the host computer.

%	01	#	WD	D	00001	00003	0500	0715	0009	5D	CR
↑	↑		↑		↑	↑	↑	↑	↑	↑	↑
Header	Destination		Command name		Form DT 1	DT3	Data of DT 1	Data of DT 2	Data of DT 3	BCC	Terminator

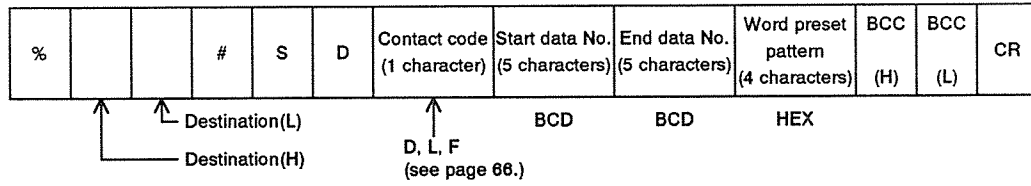
The response from the Programmable Controller (PC) is shown below.

%	01	\$	WD	13	CR
↑	↑		↑	↑	↑
Header	Destination		Command name	BCC	Terminator

Note : The "\$" indicates a normal response.

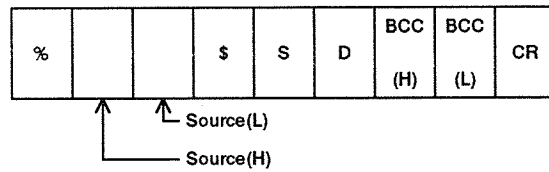
11. Preset of Data Area (Command code : SD)

Command

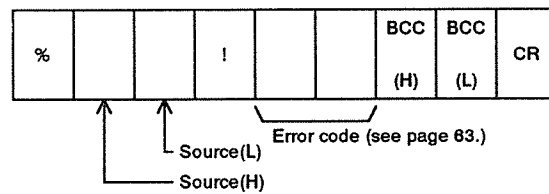


Response

Preset OK



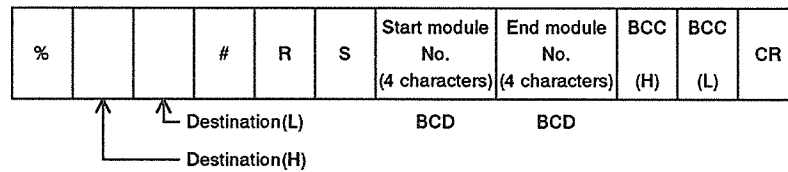
Preset Error



Same word (2-byte) data is written to the specified range of the data area or link data area.

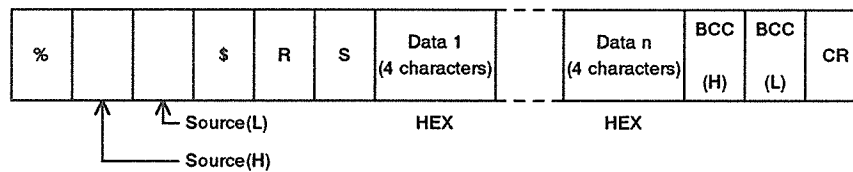
12. Read Set Value Area (Command code : RS)

Command

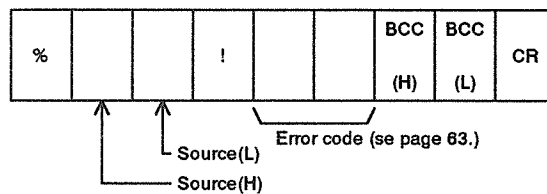


Response

Read OK



Read Error

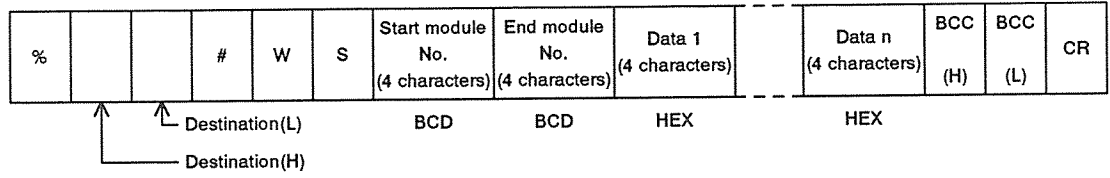


Data is handled in 16-bit.

The maximum number of specified modules is 24.

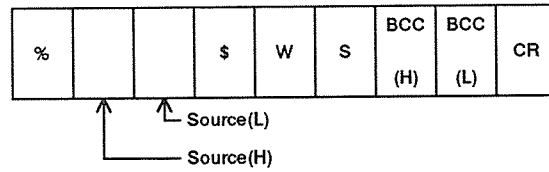
13. Write Set Value Area (Command code : WS)

Command

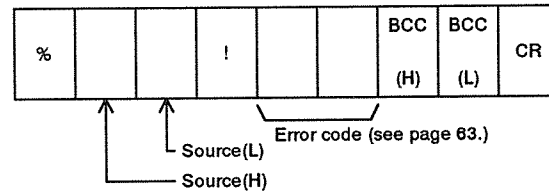


Response

Write OK

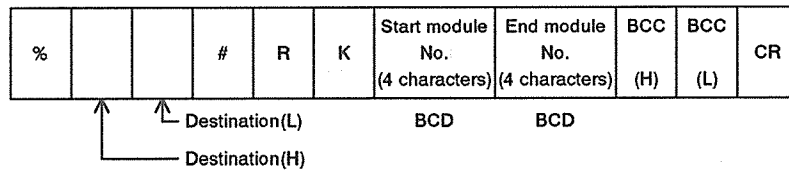


Write Error



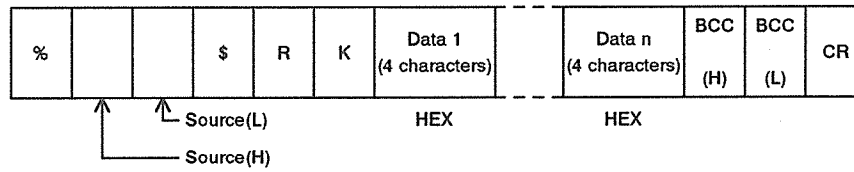
14. Read Count (Elapsed) Value Area (Command code : RK)

Command

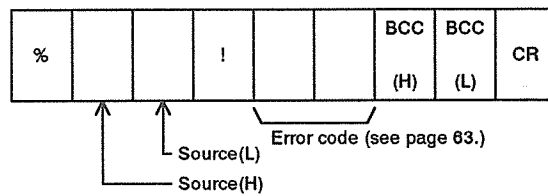


Response

Read OK



Read Error

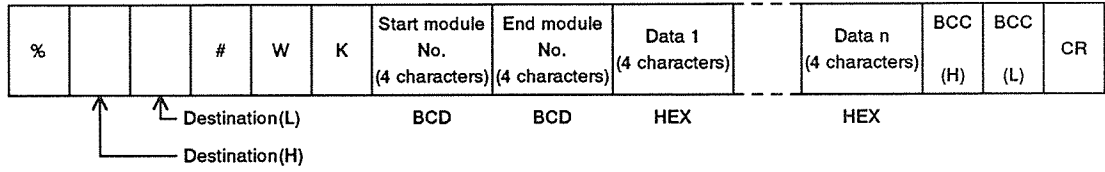


Data is handled in 16-bit.

The maximum number of specified modules is 24.

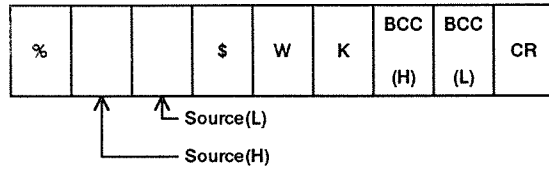
15. Write Count (Elapsed) Value Area (Command code : WK)

Command

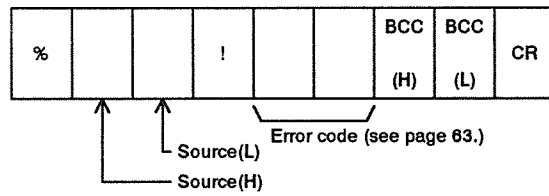


Response

Write OK



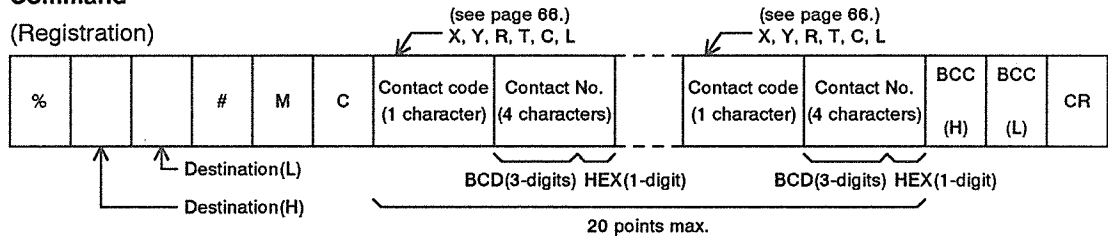
Write Error



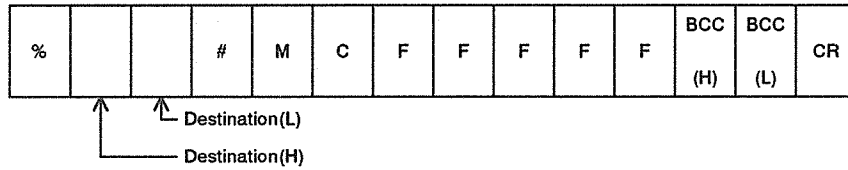
16. Monitor Contact Registration and Reset (Command code : MC)

Command

(Registration)

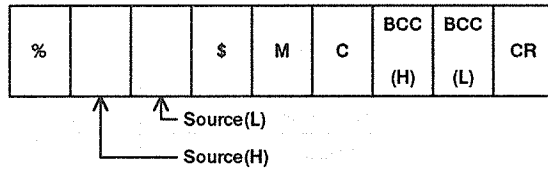


(Registration Reset)

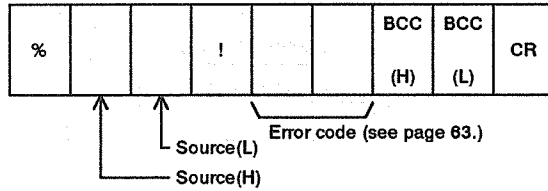


Response

Registration OK



Registration Error



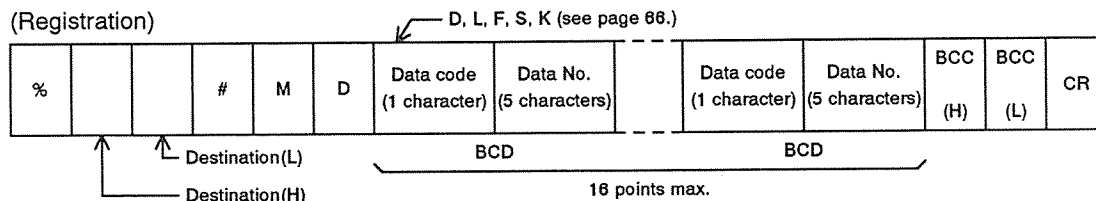
If the contact code is "*", it is a dummy registration.

The maximum number of registrations per unit is 80 points.
(Up to 20 points per command.)

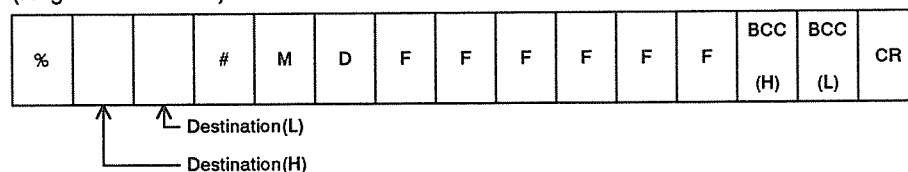
17. Monitor Data Registration and Reset (Command code : MD)

Command

(Registration)

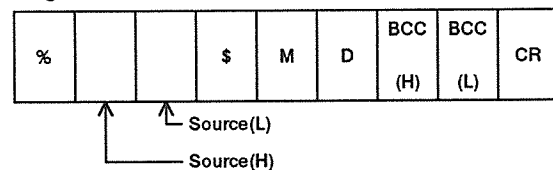


(Registration Reset)

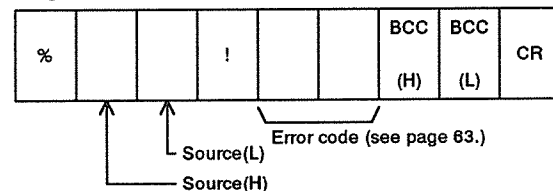


Response

Registration OK



Registration Error



Data Type	Data Code
Data register	D
Link register	L
File register	F
Set value	S
Elapsed value	K
Index register X	IX
Index register Y	IY
Word external input	WX
Word external output	WY
Word internal relay	WR
Word link relay	WL

} 2 characters (see notes.)

The maximum number of registrations per unit is 16.

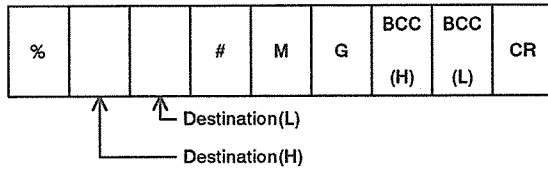
A dummy registration ("*") is not allowed for monitor data registration.

Notes :

- For data codes IX and IY where the first character is I, the first character in the data No. separates X and Y.
The remaining 4 characters in the data No. are 0.
- For data codes WX, WY, WR and WL where the first character is W, the first character in the data No. separates X, Y, R and L.
The remaining 4 characters in the data No. use the 3 low-order characters.
The 1 high-order character is 0.

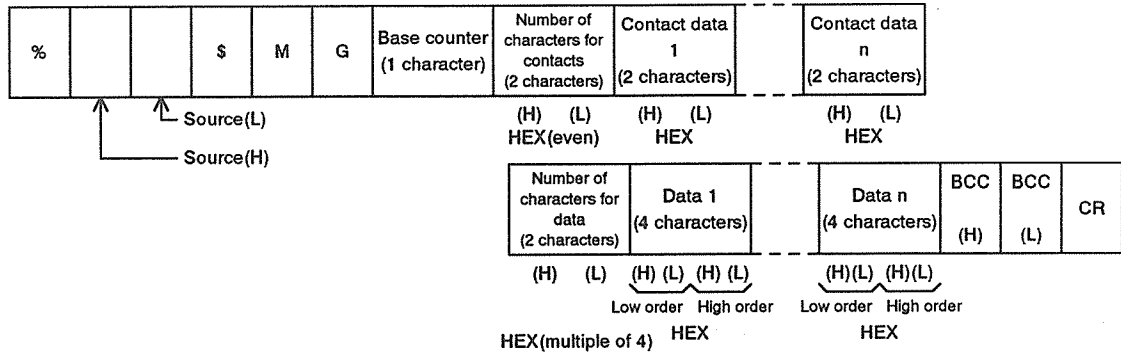
18. Monitor Execution (Command code : MG)

Command

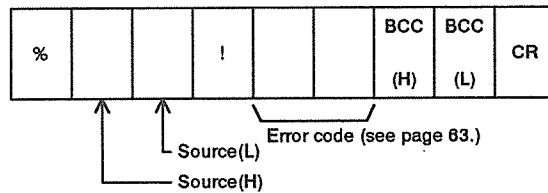


Response

Monitor OK



Monitor Error



In the contact data, 2 characters of data for 8 contacts are returned.

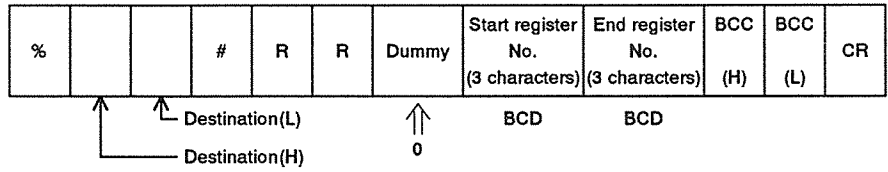
Data consists one data item with 4 characters.

Number of characters consists of binary data converted to ASCII.

The base counter returns "A" when the number of sequencer scans from the previous response to the current response is 10 or more.

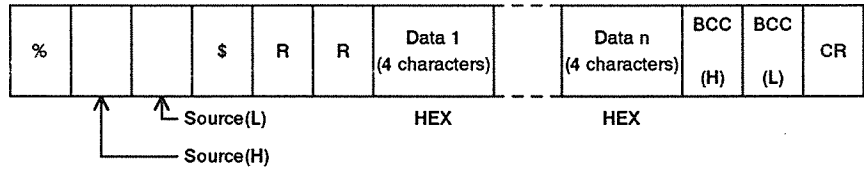
19. Read System Register (Command code : RR)

Command

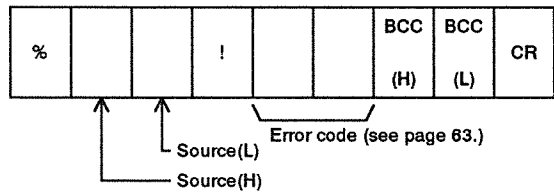


Response

Read OK

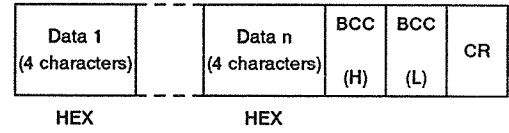
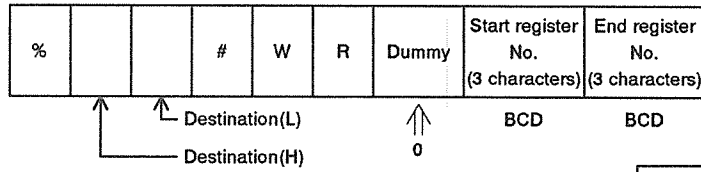


Read Error



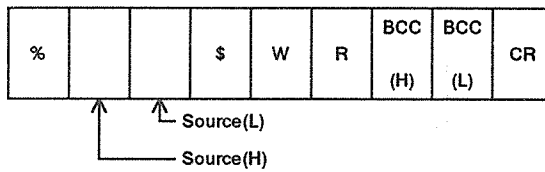
20. Write System Register (Command code : WR)

Command

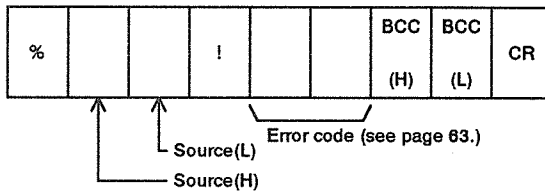


Response

Write OK

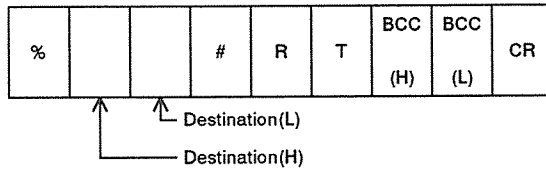


Write Error



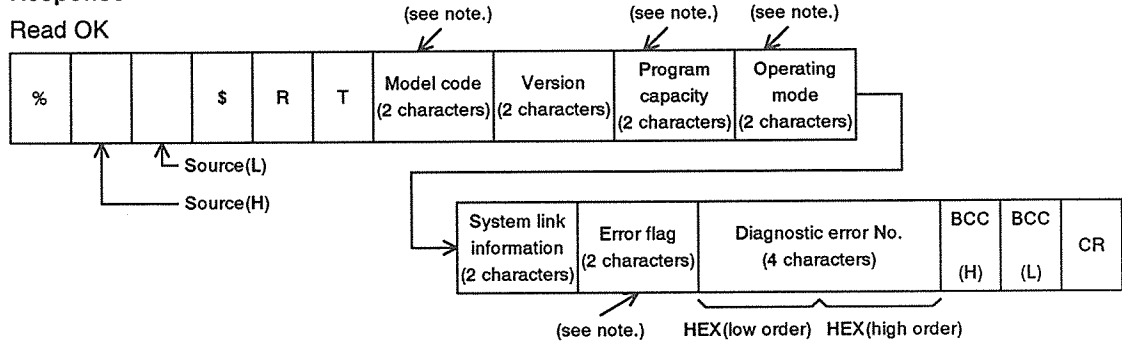
21. Read Programmable Controller (PC) Status (Command code : RT)

Command

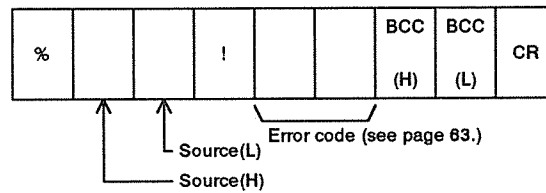


Response

Read OK



Read Error

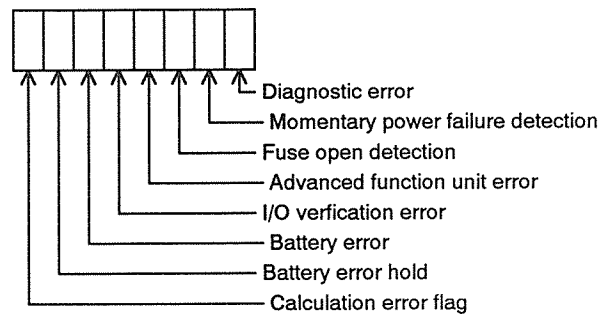


Note :

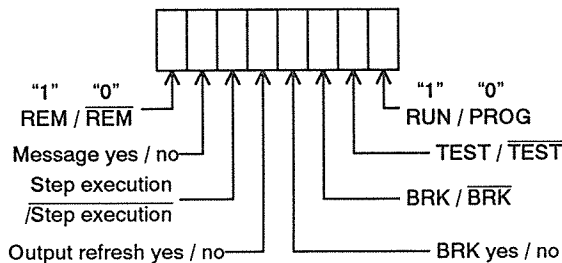
Model Code

Model	Code
FP3	03
FP5	02

Error Flag



Operating Mode



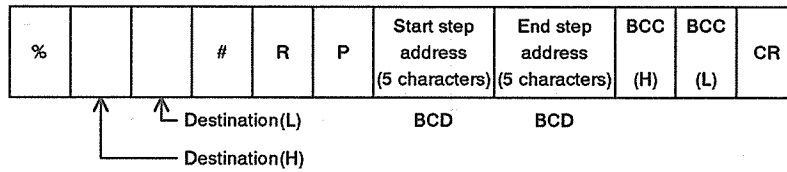
Program Capacity

Program Capacity	Code	Last Step Address
2K	02	1534
...	...	} 1024 × code No. - 512-2
16K	16		15870

(The program capacity is only an even number.)

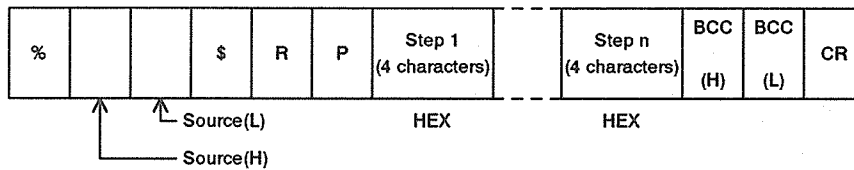
22. Read Program Block (Command code : RP)

Command

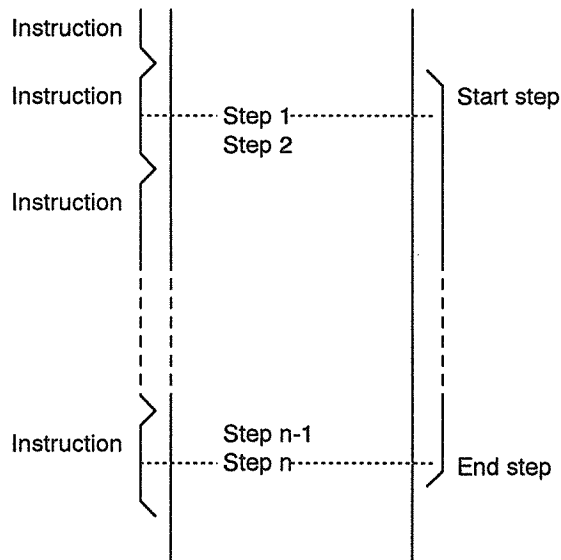
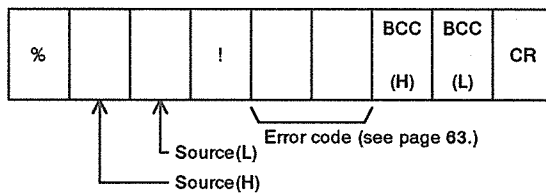


Response

Read OK



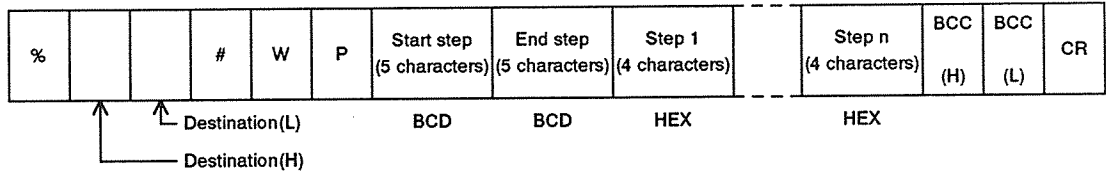
Read Error



A specified step may result in the middle of an instruction.

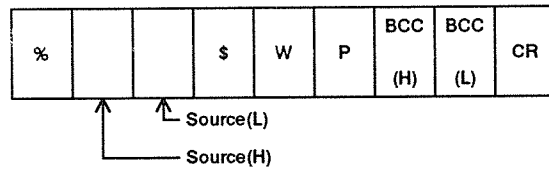
23. Write Program Block (Command code : WP)

Command

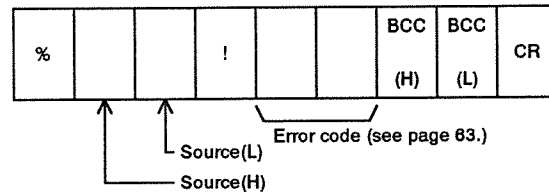


Response

Write OK

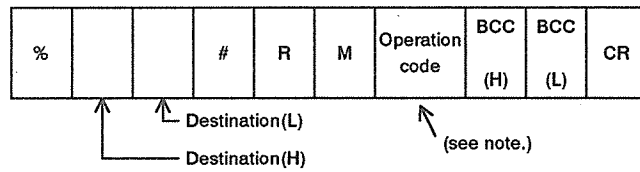


Write Error



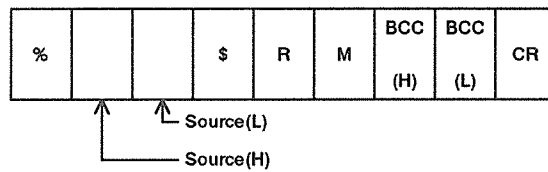
24. Remote Control (Command code : RM)

Command

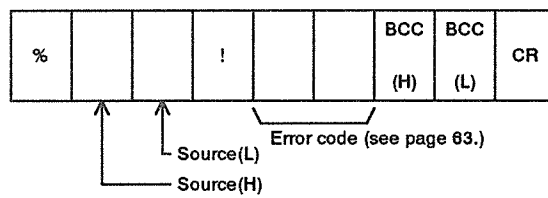


Response

Remote Control OK



Remote Control Error



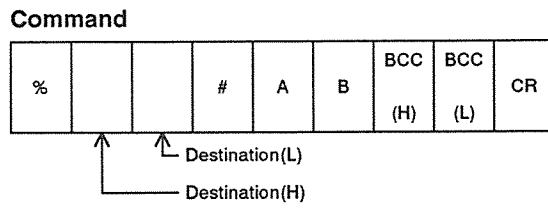
Note :

Operation Codes

Code	Operation
"R"	PROGRAM mode to RUN mode : activation
"P"	RUN mode to PROGRAM mode : stop

Valid only when the Programmable Controller (PC) is in the REMOTE mode.

25. Abort (Command code : AB)



Response : None

Issued by the command sending side when reception for a response of plural frames is to be aborted.

2. Data Transfer(MEWTOCOL-DAT)

MEWTOCOL-DAT is the protocol used between MEWNET link units and its format is for 1:N communications.

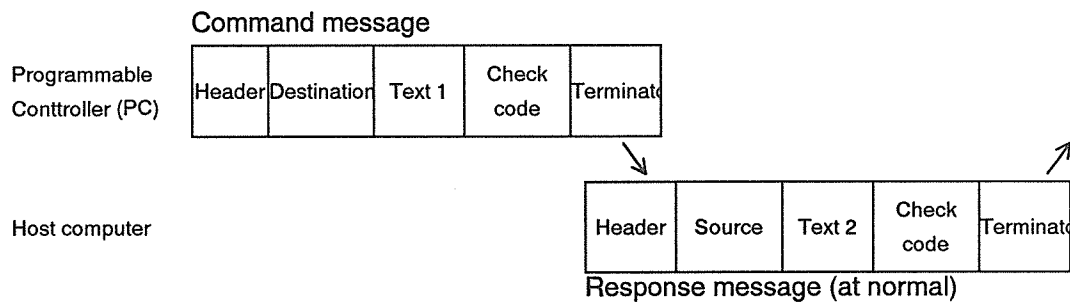
Thus, it is necessary to specify the destination or source according to this format also for the 1:1 communication between the C.C.U. and host computer.

Note that a temporary number is used in this case.

Normally set the destination (Host computer) to "02" and source (Programmable Controller (PC)) to "01".

FEATURES

1. Dedicate procedure and interactive operation.
2. ASCII code transmissions.
3. The initial right to send is at the Programmable Controller (PC).
4. The right to send shifts each time the command message is sent.



DESCRIPTION

Messages

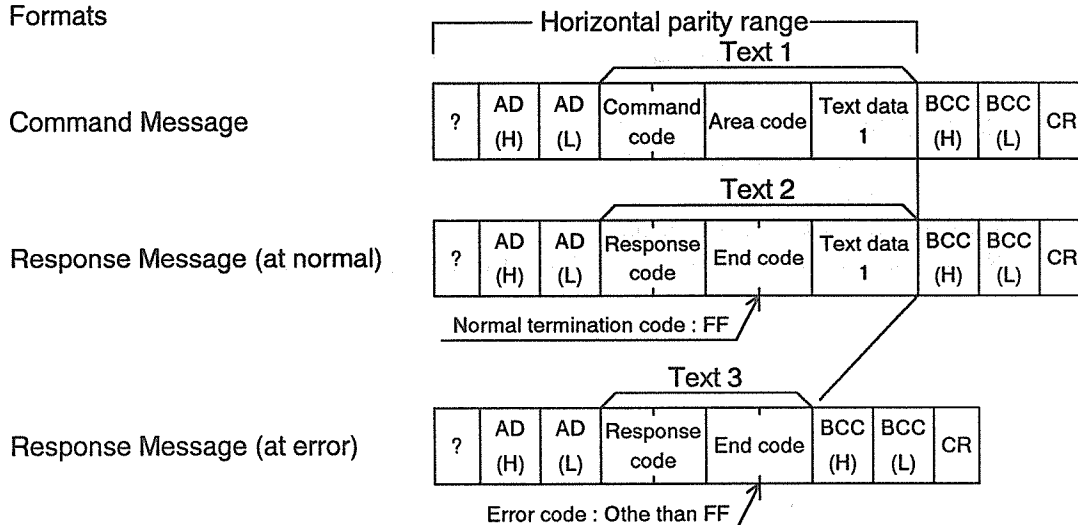
Command message : A message from the Programmable Controller (PC) to the personal computer is called a command message.

Response message : A response message from the personal computer to the Programmable Controller (PC) to a command is called a response message.

For an error, select the corresponding code from page 63, ERROR CODES and send as an error code.

A command message can be issued with the Programmable Controller (PC) send instruction (SEND) and receive instruction (RECV).

Formats



DESCRIPTION OF THE FORMAT

Control Codes

Name	Character	ASCII Code	Description
Header	?	3FH	Indicates the start of a message.
Terminator	CR	0DH	Indicates the end of a message.

Destination and Source, AD (H), (L)

2-digit decimal 01 to 63 (ASCII code)

The unit no. of the Programmable Controller (PC) which is to receive the command message is give in the command message.

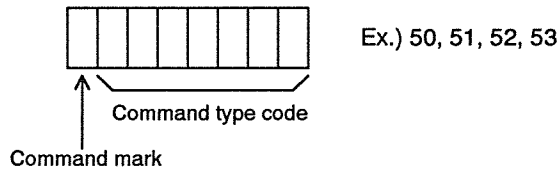
The unit no. of the Programmable Controller (PC) which sent the response message is give within the response message.

(H) is the high digit and (L) is the low digit.

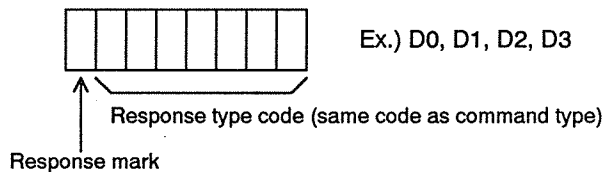
Note : Select any unit No. for 1 :1 communications at the C.C.U..

Command code : The format is shown below.

Refer to page 99, COMMANDS for the command type code.



Response code : The format is shown below.



End code : Normal completion with FFH.

Error with a code other than FFH.(Refer to page 97, ERROR CODES.)

Text data 1 : Depends on command type code.

Text data 2 : Depends on response type code.

Block Check Code BCC (H), (L)

Two digit hexadecimal 00 to FF (ASCII code)

This code is used for error detection in the transmission data.

Horizontal prity codes are used in this unit.

(Refer to the section on page 62, BCC (Block Check Code) CREATION.)

ERROR CODES

Error type	Code (HEX)	Description
Link System Error	20H	Undefined
	21H	NACK error : Either the remote unit was incorrectly recognized or a data error occurred.
	22H	WACK error : The receive buffer of the remote unit is full.
	23H	Duplicate port error : The remote unit was set with the same unit no. (01 to 16) as the local unit.
	24H	Transmission format error : Attempt was made to send data that does not match the transmission format. Either a frame overflow or data error occurred.
	25H	Hardware error : Transmission system hardware stops operating normally.
	26H	Unit no. error : The unit no. of the remote unit was set to a number other than 1 to 63.
	27H	NOT support error : Frame overflow at the receiving side. An instance where an attempt was made to send different frame lengths between different models.
	28H	No response error : Remote does not exist. (time out)
	29H	Buffer closed error : Attempt was made to send or receive in the buffer closed state.
	30H	Time out : Transmit disable state continues.
Basic Procedure Error	40H	BCC error : Transmission error occurred in command data.
	41H	Format error : Command message that does not match the transmission format was sent. Examples: Excessive or insufficient number of command data items. There are no " # " and " destination ".
	42H	NOT support error : An unsupported command was sent. A command was sent to an unsupported destination.
	43H	Procedure error : Another command was sent during the transmission request message standby state.
Processing System Error	50H	Link set error : A link No. that does not exist was set.
	51H	Simultaneous operating error : The transmit buffer of the local unit was already full when a command was issued to the other unit.
	52H	Transmit disable error : Cannot transmit to another unit.
	53H	Busy error : Processing for another command when a command was received.

Error type	Code (HEX)	Description	
Programmable Controller (PC) Application Error	60H	Parameter error:	A code without an area specification parameter or a code which cannot be used in the command was found. (X, Y, D, etc.) A code with an illegal function specification parameter (0, 1, 2, etc.) was found.
	61H	Data error :	Contact no., Area no., data code format (BCD, hex, etc.), overflow, underflow or range specification error.
	62H	Registration error :	Excessive number of registrations or operation in unregistered state. (monitor registration, trace registration, etc.)
	63H	Programmable Controller (PC) mode error :	Operating mode of the Programmable Controller (PC) when a command was sent does not allow the command to be processed.
	65H	Protect error :	Write operation was performed to the program area or system register in the memory protect state.
	66H	Address error :	Address (program address, absolute address, etc.) data code format (BCD, HEX, etc.), overflow, underflow or range specification error.
	67H	Missing data error :	Read data does not exist. (Data not written with a comment registration was read.)

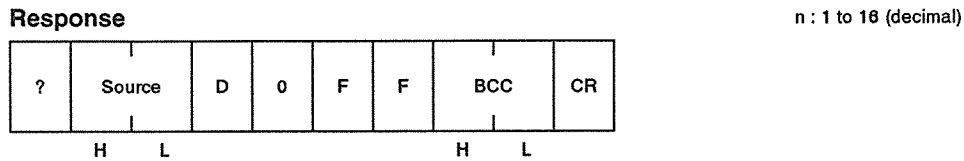
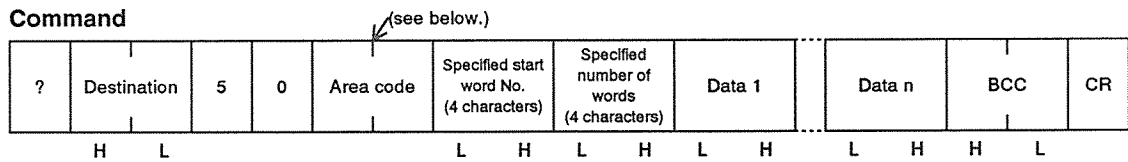
COMMANDS

Command Code	Description
50	Write data area
51	Read data area
52	Write contact information
53	Read contact information

COMMAND DESCRIPTION

1. Write Data Area (Command code : 50)

Writes the specified number of data words from the specified start word No. in the data area.



Area Codes

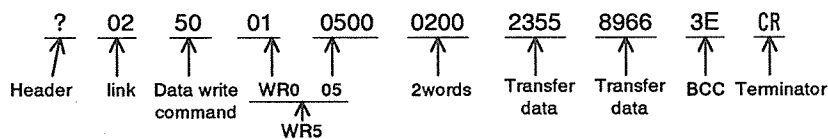
Code No.	Area	Name
00	WL	Link relay
01	WR	Internal relay
02	WY	Output
03	WX	Input
04	SV	Preset value
05	EV	Count (Elapsed) value
06	LD	Link data register
07	SWR	Special relay
08	SDT	Special data register
09	DT	Data register
0A	FL	File register

Example :

Two words (DT2, DT3) from DT2 of the Programmable Controller (PC) are written to WR5 in link 1.

(The description for the example is given on page 30.)

The following command arrives from the Programmable Controller (PC).



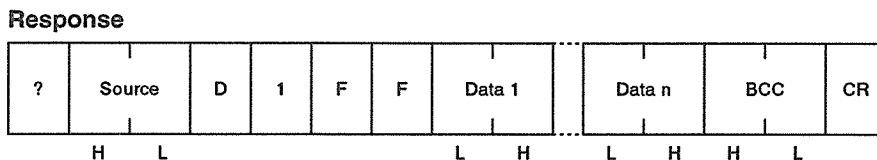
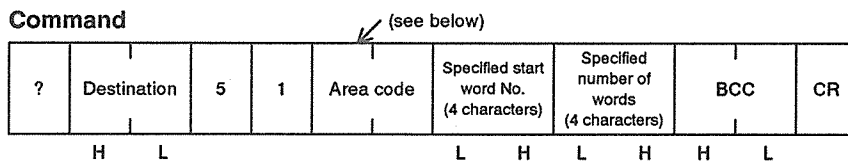
Note :

When this command arrives and the host computer does not return a response, the Programmable Controller (PC) times out after 2.5 s and the R9031 turns ON for an abnormal termination.

Example of normal response : ? 02 D0 FF 49 CR

2. Read Data Area (Command code : 51)

Reads the specified number of data words from the specified start word no. in the data area.



n : 1 to 16 (decimal)

Area Codes

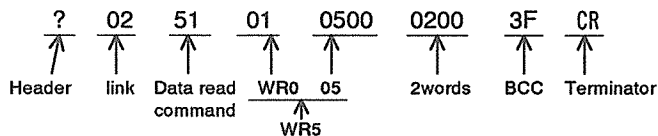
Code No.	Area	Name
00	WL	Link relay
01	WR	Internal relay
02	WY	Output
03	WX	Input
04	SV	Preset value
05	EV	Count (Elapsed) value
06	LD	Link data register
07	SWR	Special relay
08	SDT	Special data register
09	DT	Data register
0A	FL	File register

Example :

Two words (WR5, WR6) are read from WR5 of unit No.02 in link 1 and written to DT10 and DT11 of the Programmable Controller (PC).

(The description for the example is given on page 31.)

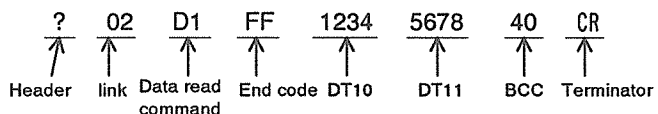
The following command arrives from the Programmable Controller (PC).



Note :

When this command arrives and the host computer does not return a response, the Programmable Controller (PC) times out after 2.5 s and the R9031 turns ON for an abnormal termination.

Example of normal response :



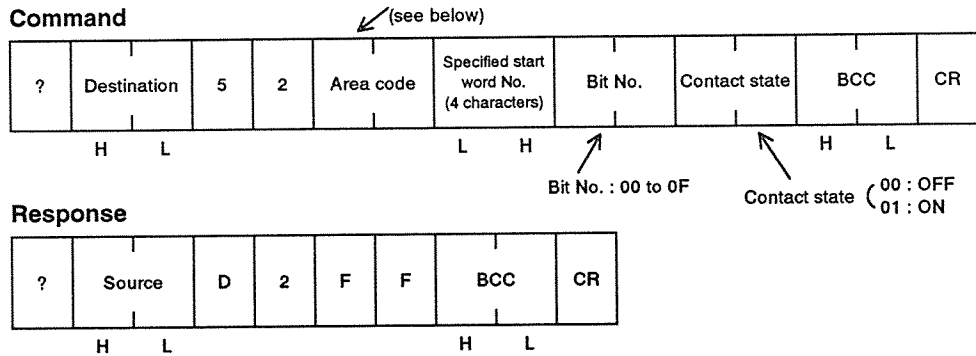
After the response below is executed

DT10 : 3412H

DT11 : 7856H

3. Write Contact Information (Command code : 52)

Writes for the specified contact in the contact area.



Area Codes

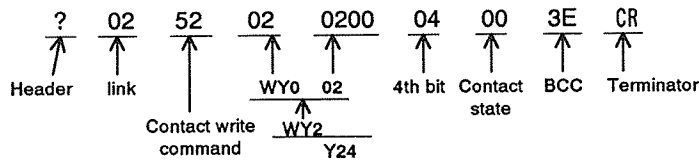
Code No.	Area	Name
00	WL	Link relay
01	WR	Internal relay
02	WY	Output
03	WX	Input
04	SV	Preset value
05	EV	Count (Elapsed) value
06	LD	Link data register
07	SWR	Special relay
08	SDT	Special data register
09	DT	Data register
0A	FL	File register

Example :

R3 of Programmable Controller (PC) is written to Y24 of unit No.02 in link 1.

(The description for the example is given on page 32.)

The following command arrives from the Programmable Controller (PC).



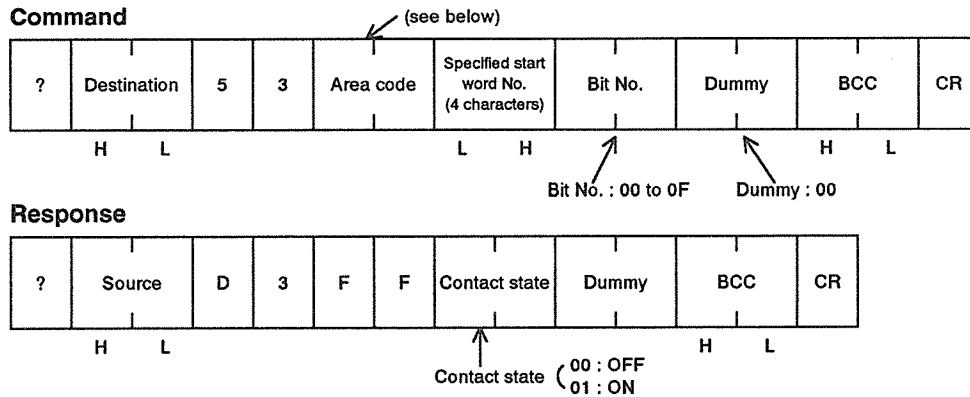
Note :

When this command arrives and the host computer does not return a response, the Programmable Controller (PC) times out after 2.5 s. and the R9031 turns ON for an abnormal termination.

Example of normal response : ? 02 D2 FF 4B CR

4. Read Contact Information (Command code : 53)

Reads the specified contact in the contact area.



Area Codes

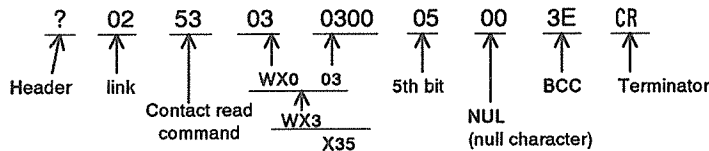
Code No.	Area	Name
00	WL	Link relay
01	WR	Internal relay
02	WY	Output
03	WX	Input
04	SV	Preset value
05	EV	Count (Elapsed) value
06	LD	Link data register
07	SWR	Special relay
08	SDT	Special data register
09	DT	Data register
OA	FL	File register

Example :

The contents of X35 of unit No.02 in link 1 is read and written to R46 of the Programmable Controller (PC).

(The description for the example is given on page 33.)

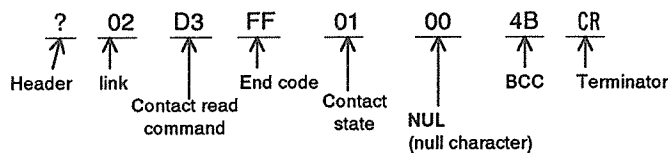
The following command arrives from the Programmable Controller (PC).



Note :

When this command arrives and the host computer does not return a response, the Programmable Controller (PC) times out after 2.5 s and the R9031 turns ON for an abnormal termination.

Example of normal response :



8-2. ASCII Codes

								b ₇	0	0	0	0	1	1	1	1
								b ₆	0	0	1	1	0	0	1	1
								b ₅	0	1	0	1	0	1	0	1
b ₇	b ₆	b ₅	b ₄	b ₃	b ₂	b ₁	R	C	0	1	2	3	4	5	6	7
0	0	0	0	0	0	0	0	NUL	DLE	SPACE	0	@	P		p	
0	0	0	1	1	1	1	1	SOH	DC1	!	1	A	Q	a	q	
0	0	1	0	2	2	2	2	STX	DC2	"	2	B	R	b	r	
0	0	1	1	3	3	3	3	ETX	DC3	#	3	C	S	c	s	
0	1	0	0	4	4	4	4	EOT	DC4	\$	4	D	T	d	t	
0	1	0	1	5	5	5	5	ENQ	NAK	%	5	E	U	e	u	
0	1	1	0	6	6	6	6	ACK	SYN	&	6	F	V	f	v	
0	1	1	1	7	7	7	7	BEL	ETB	'	7	G	W	g	w	
1	0	0	0	8	8	8	8	BS	CAN	(	8	H	X	h	x
1	0	0	1	9	9	9	9	HT	EM	)	9	I	Y	i	y
1	0	1	0	A	A	A	A	LF	SUB	*	:	J	Z	j	z	
1	0	1	1	B	B	B	B	VT	ESC	+	;	K	[k	{	
1	1	0	0	C	C	C	C	FF	FS	,	<	L	\	l		
1	1	0	1	D	D	D	D	CR	GS	-	=	M]	m	}	
1	1	1	0	E	E	E	E	SO	RS	.	>	N	^	n	~	
1	1	1	1	F	F	F	F	SI	US	/	?	O	_	o	DEL	



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