SHARP

Version 1.0
Produced in Oct. 2005

Sharp Programmable Controller

Board PC J-board

Z-300 series

Model name

Serial Interface board : Z- 354J

User's Manual

Thank you for purchasing our J-board: Z-300 series programmable controller. This manual describes specifications and discusses the use of the serial interface board.
See the "J-board Z-300 series Z-311J/312J, Z-321J: User's Manual: Hardware Version" for installation methods and basic application of this board.

Note

- Should you have any questions or inquires, please feel free to contact one of our dealers, or our service department.
- Copying the whole or part of this manual is prohibited.
- The contents of this manual may be revised without notice.

Table of contents

Safety Precautions

Read this user's manual and attached documents carefully before installation, operation, maintenance and checking in order to use this board correctly. Understand all of this board's knowledge, safety information, and cautions before starting to use. In this user's manual, safety precautions are ranked into "Danger" and "Caution" as follows.

Danger : Wrong handling may possibly lead to death or heavy injury.

Caution : Wrong handling may possibly lead to medium or light injury or loss on properties.

Even in the case of Caution , a serious result may be experienced depending on the circumstances. Anyway, important points are mentioned. Be sure to observe them strictly.

The picture signs of prohibit and compel are explained below.

: It means a don't. For example, prohibition of disassembly is indicated as ( ).

: It means a must. For example, obligation of grounding is indicated as ( ).

1) Installation

Caution

- Use in the environments specified in the catalog and user's manual.
  Electric shock, fire or malfunction may be caused when used in the environments of high temperature, high humidity, dusty or corrosive atmosphere, vibration or impact.
- Install according to the instruction manual and user's manual.
  Wrong installation may cause a drop, trouble or malfunction.
- Never admit wire chips or foreign matters.
  Or fire, trouble or malfunction may be caused.

2) Wiring

Compel

- Be sure to ground.
  Unless grounded, electric shock or malfunction may be caused.

Caution

- Wiring should be done by a qualified electrician.
  Wrong wiring may lead to fire, trouble or electric shock.

3) Use

Danger

- Never touch the terminals while electric power is charged.
  Otherwise, you may have an electric shock.
- Assemble an emergency stop circuit and interlock circuit outside of the J-board and integrate the J-board's halt output. Otherwise a machine breakdown or accident may be caused by the trouble of the programmable controller.

Caution

- Manipulation for program change, forced output, RUN or STOP during operation should be done with particular care by confirming safety. Mis-operation may lead to a machine trouble or accident.
- Follow the power input order specified. Otherwise, the J-board malfunctions and damages machines or cause an accident.

4) Maintenance

Prohibit

- Don't disassemble or modify.
  Or fire, trouble or malfunction may be caused.

Caution

- Make sure to turn OFF the power before removing / installing the board, installing the connectors, or changing the switch settings.

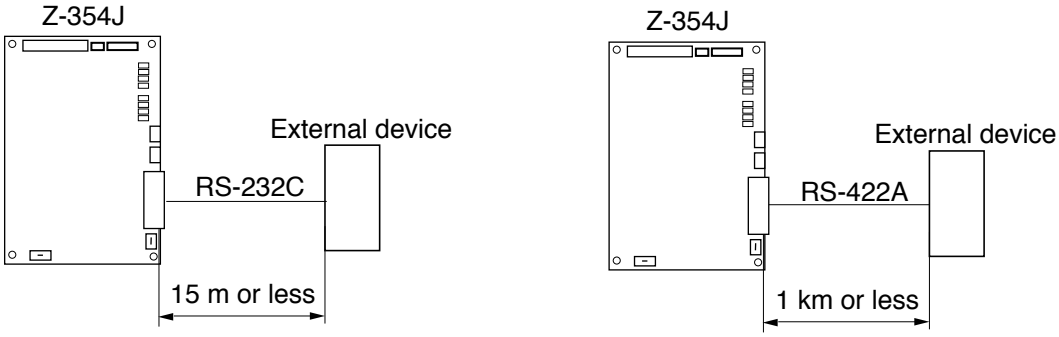
Chapter 1: Outline

The Z-354J serial interface board (hereafter referred to as "the board") is a special I/O board used to communicate with external devices. It has RS-232C/422A serial interfaces for communication with a personal computer and a bar code reader.

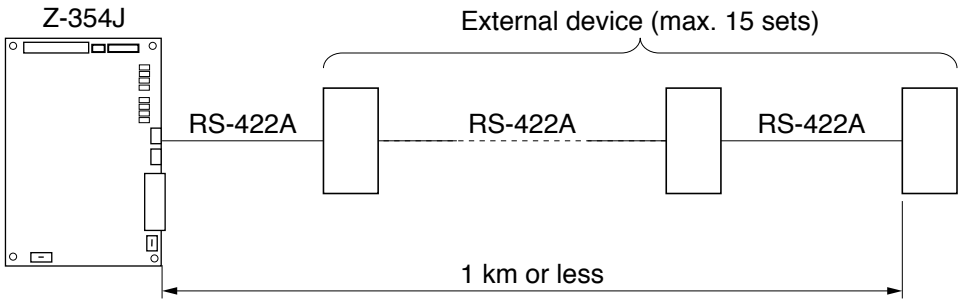
Compatible motherboards	Z-311J
	Z-312J
	Z-313J

Features and functions

1) Either RS-232C or RS-422A is selectable as communication mode.



2) When RS-422A is applied, max. 15 sets of external devices are connectable.



3) Applicable to various data formats for exchanging data with external device.

4) Max. 512 bytes of data sending/receiving is possible.

5) Outputs error information by error codes.

Chapter 2: Handling Precautions

(1) Precautions for installation

Never install the board in the following locations.

· Where proximate to any heat generating object.
· Where temperature rapidly changes and gives dew condensation.
· Where there is flammable gas.
· Where it directly receives vibration or shocks.
· Where exposed to dust, iron powder, or salty atmosphere.
(In conditions where the printed circuit boards may be directly affected by these causes, make sure to provide an appropriate external case to cover the J-board.)
· Where it is proximate to high voltage equipment, driving power tools, large open/close surge generating devices, and their wirings.

(2) Precautions at use

· In order to prevent personal injury or damage to equipment, construct an external emergency stop circuit and connect it to the halt output on the J-board.
· As J-board is board structure and it's electronic parts are exposed, be careful when handling.
1) Before you touch the board directly, be sure to eliminate static electricity in your body.
2) Do not touch directly with dirty hands such as stacked oil etc.
3) Do not put the board alone directly on conductive objects such as metallic boards.
(Once the J-board is installed on a motherboard, if it contacts a conductive object the battery on the motherboard may be short circuited and the back up memory may be damaged.)
4) Be careful not to apply excessive force to each switch, connector, terminal block of the J-board.
· Make sure to turn OFF the power before connecting the board, installing connector, changing a switch setting.

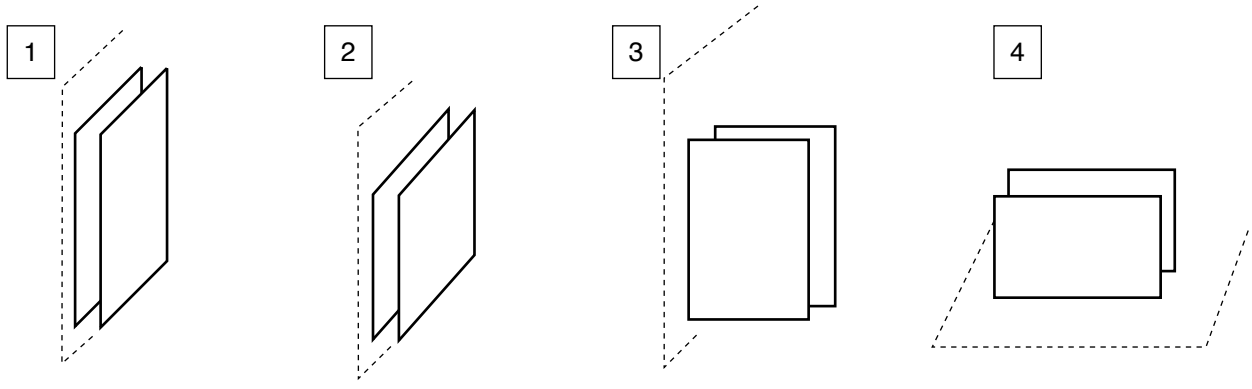
(3) Precautions for wiring

Do not run the communication lines parallel to or near to power lines or high voltage lines. Do not arrange wiring so that sources of electrical noise (driver lines, high voltage lines, or I/O lines) come close to the PC board on the J-board.

(4) Installation

Use bracket A or B (sold separately) to install the J-board in any of the following 4 positions.

[Recommending installation positions]

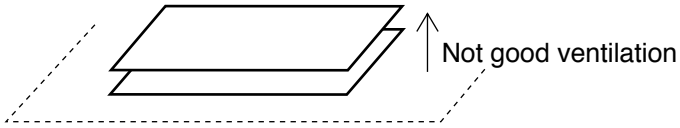


When fixing bracket A (Z-341J) is used

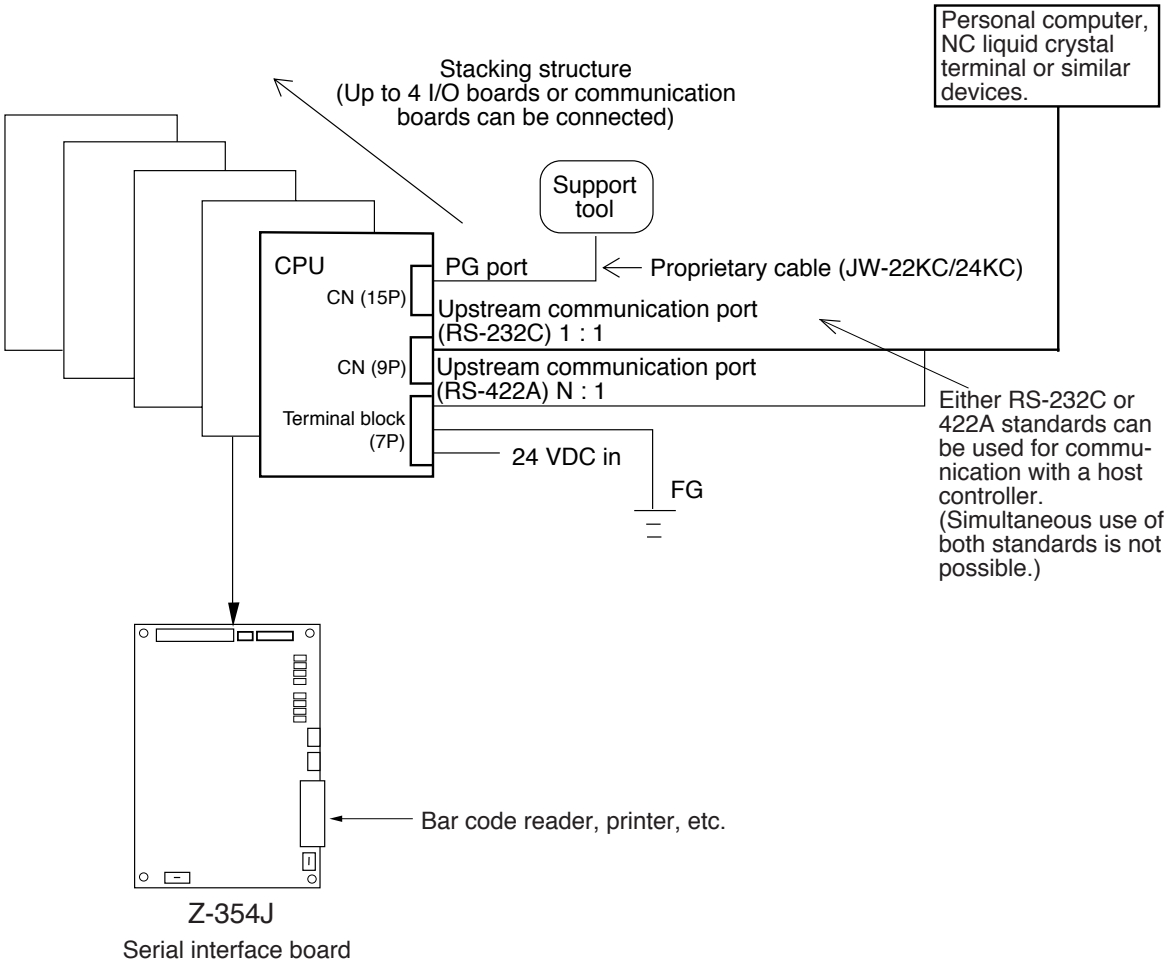
When fixing bracket B (Z-342J) is used

If you do not use bracket A or B to install the J-board, make sure it is very secure. Also, install the J-board with as much ventilation as possible.

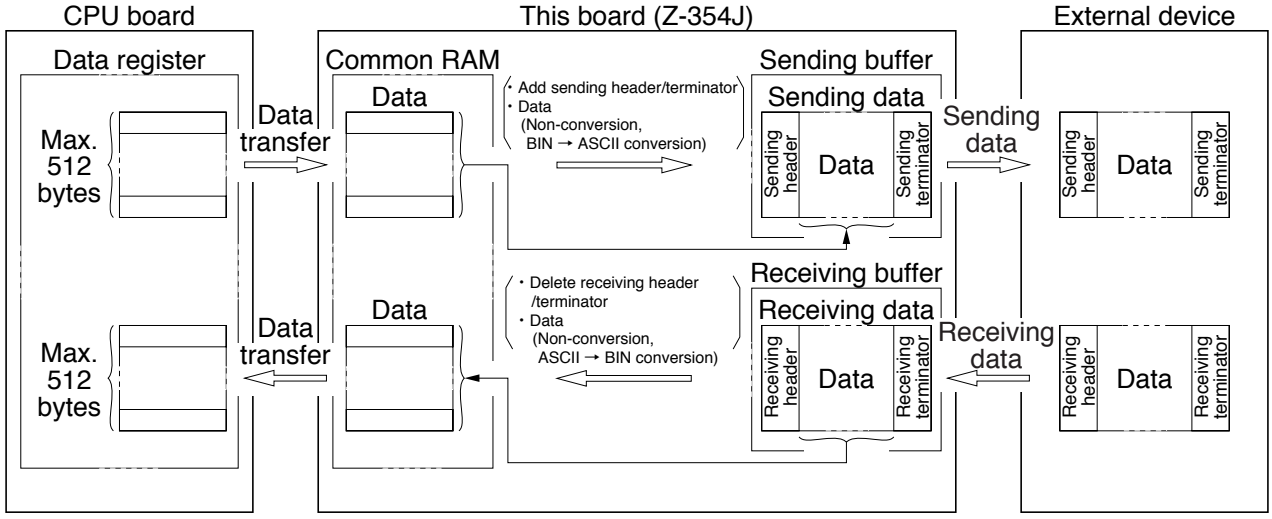
If the J-board is installed horizontally, as shown in the figure below, it will not be well ventilated. Make sure the installation allows enough space above the board so that the surrounding temperature does not rise above 55˚C.



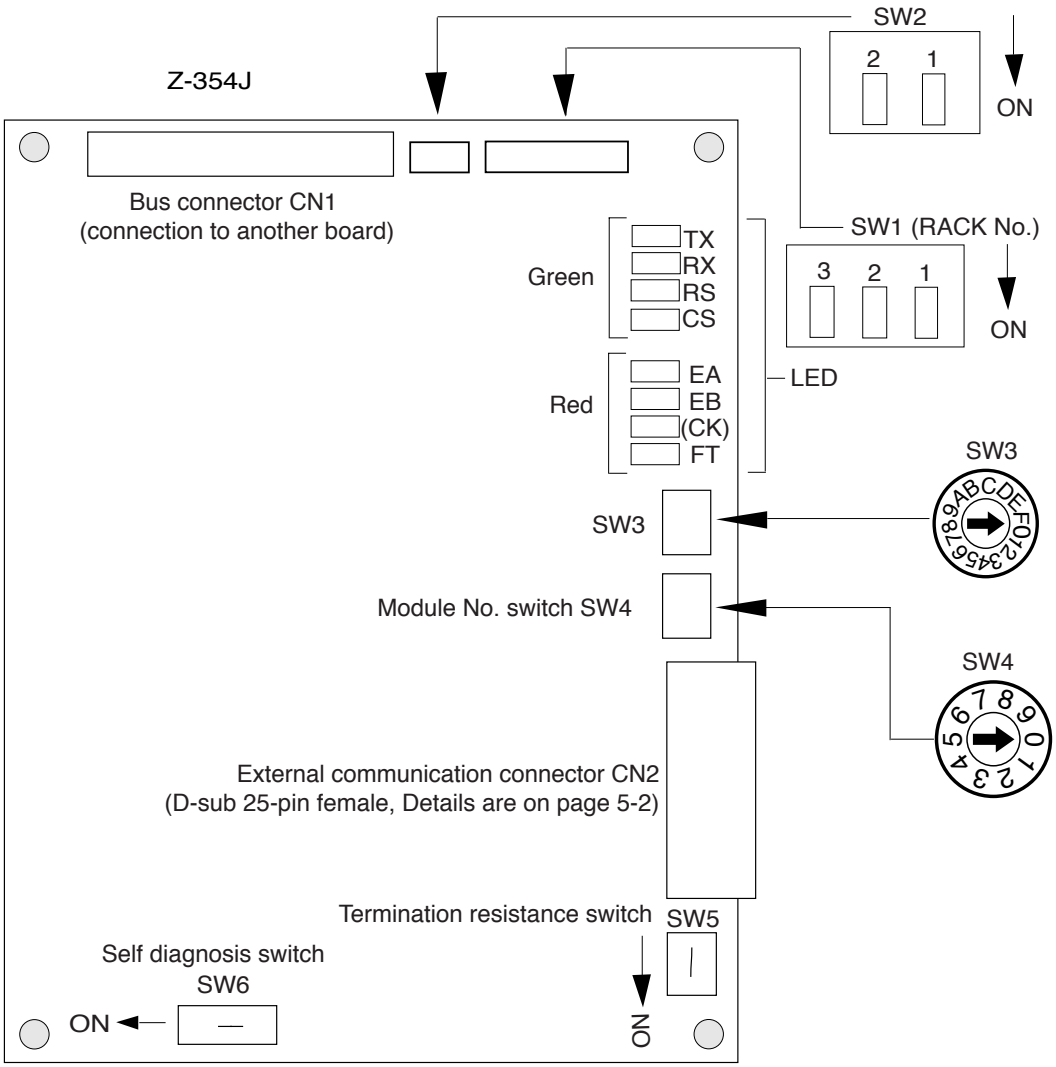
Chapter 3: System Configuration



Data flow chart



Chapter 4: Name and Function of Each Part



- Setting switches

Switch name		Switch type	Setting when delivered	Setting details
SW1	1	Dip switch (3 poles)	OFF	Specify a rack no. Factory setting: Rack address 0
	2		OFF	
	3		OFF	
SW2	1	Dip switch (2 poles)	ON	Use it with the factory setting (ON).
	2		ON	
SW3		Rotary switch (0 to F)	0	Use it with the factory setting (0).
SW4 (Module No. switch)		Rotary switch (0 to 9)	0	Specify a parameter area and a control relay area.
SW5 (Termination resistance switch)		Slide switch (1 pole)	ON	Only need to set this switch when connecting by selecting the RS-422A protocol. ("ON" enables a termination resistance, and "OFF" removes the termination resistance) For details, see the next page.
SW6 (Self diagnosis switch)		Slide switch (1 pole)	OFF	The setting for this switch must not be changed. Keep the factory settings. (ON enables the self diagnosis)

- LED display

LED	Indication color	Display details
TX	Green	Is ON while sending date (J-board -> external device).
RX	Green	Is ON while receiving date (J-board <- external device).
RS	Green	Is ON when the J-board is requesting an external device to send data (the J-board is ready to receive).
CS	Green	Is ON when the J-board can send data to an external device (waiting for an external device that is ready to receive).
EA	Red	Goes ON when any of the parameters or control relay settings are out of range.
EB	Red	Goes ON when a communication error occurs, such as parity error, or time out.
(CK)	Red	On during self diagnosis (goes OFF in normal use).
FT	Red	Goes ON when a hardware error occurs on the J-board.

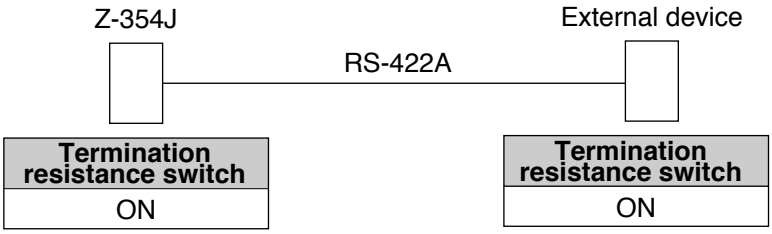
- Setting of SW5 (termination resistance switch)

When communication mode is RS-422 (2-wire system, 4-wire system), set termination resistance. At RS-232C, this setting is not required.

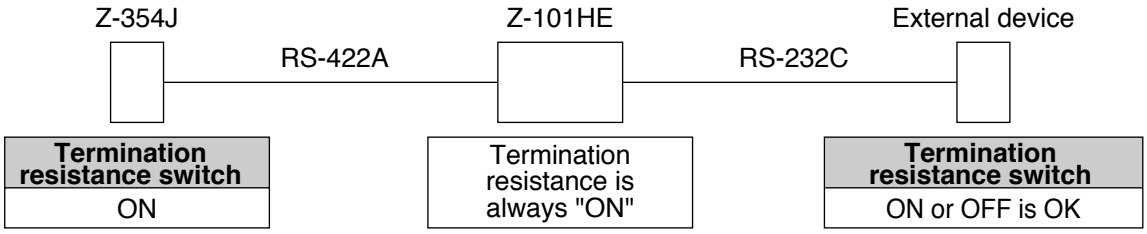
Setting	Condition of the board
ON	Insert termination resistance
OFF	Do not insert termination resistance

("1" by "1" connection)

• Turn "ON" the switch on both of the module and external device.

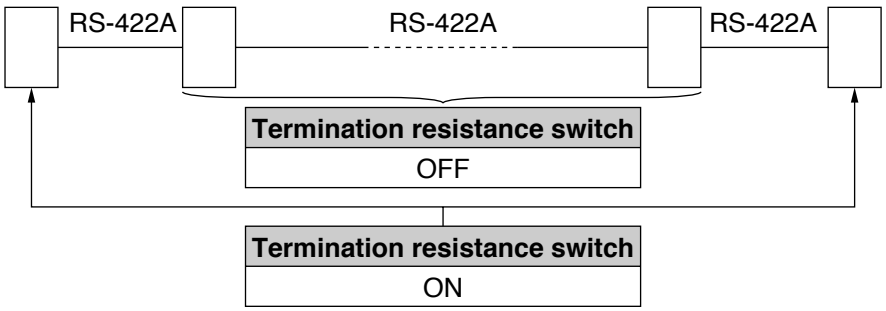


• When Z-101HE (RS-232C/RS-422A converter) is using, termination resistance of Z-101HE is always "ON."



("1" by "N" connection)

• Turn "ON" both of end stations, turn "OFF" intermediate stations.



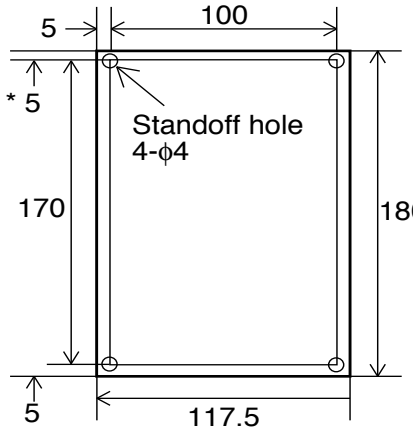
This° board need not necessarily be end station.

Chapter 5: Installation/Wiring Method

5-1. Installation method

Shown below are the PC board dimensions and assembled dimensions of the Z-354J.

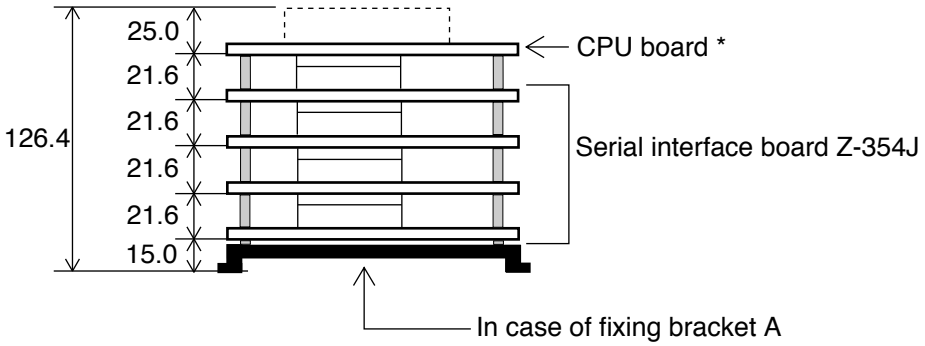
- PC board dimensions



Brackets are not included in the dimensions on the left.

- Assembly dimensions (when 4 sets of the Z-354J are stacked)

[Unit: mm]



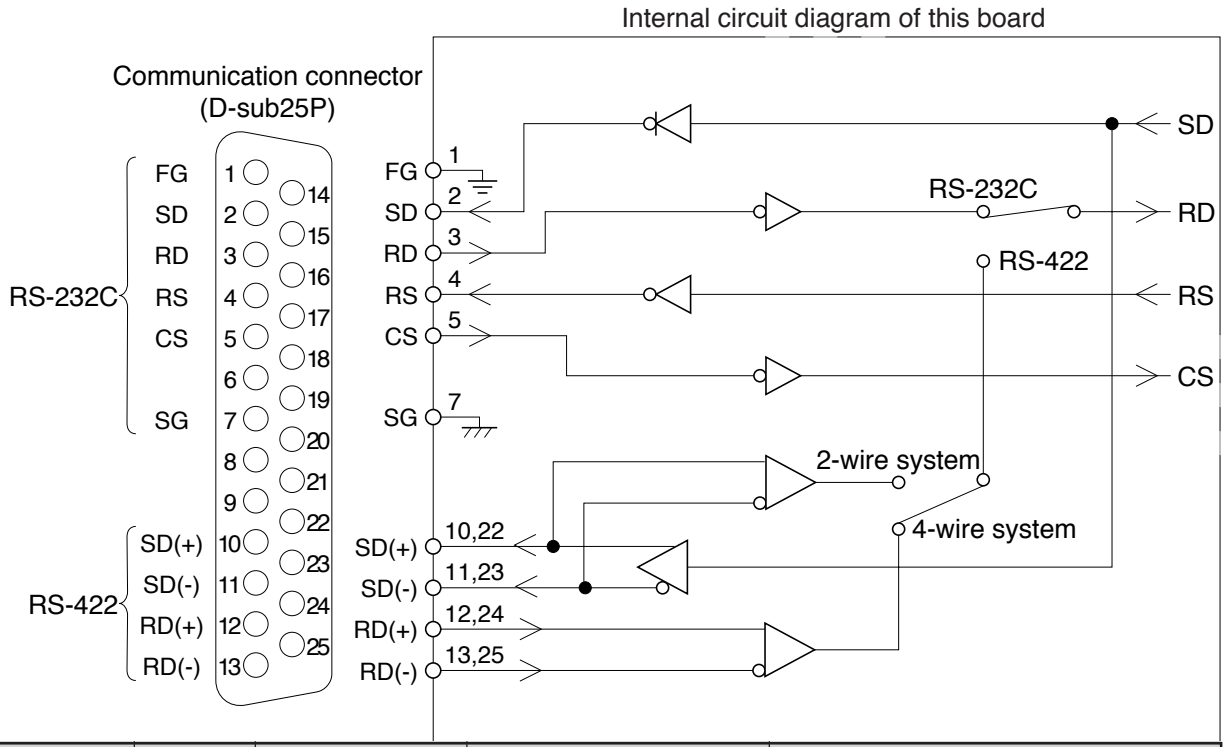
* CPU board should be installed on the top.

For the details about assembling and installing the board, see the "J-board Z-311J/312J, User's Manual, Hardware Version."

5-2. Wiring method

This board can be connected to either an RS-232C or RS-422A (2-wire system, 4-wire system) device through external communication connector CN2.

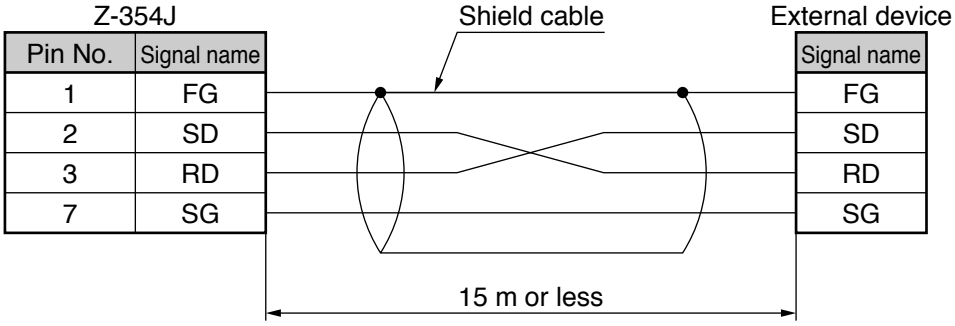
[1] Pin assignment of CN2 external communication connector



Std.	Pin No.	Signal name	Function	Signal direction
RS-232C	1	FG	Frame ground	—
	2	SD	Sending data	Z-354J -> External device
	3	RD	Receiving data	Z-354J <- External device
	4	RS	Request to send	Z-354J -> External device
	5	CS	Ready to send	Z-354J <- External device
	6	—	Not used	—
	7	SG	Signal ground	—
—	8, 9	—	Not used	—
RS-422A	10,22	SD (+)	Sending signal	Z-354J -> External device
	11,23	SD (–)		
	12,24	RD (+)	Receiving signal	Z-354J <- External device
	13,25	RD (–)		
—	14 to 21	—	Not used	—

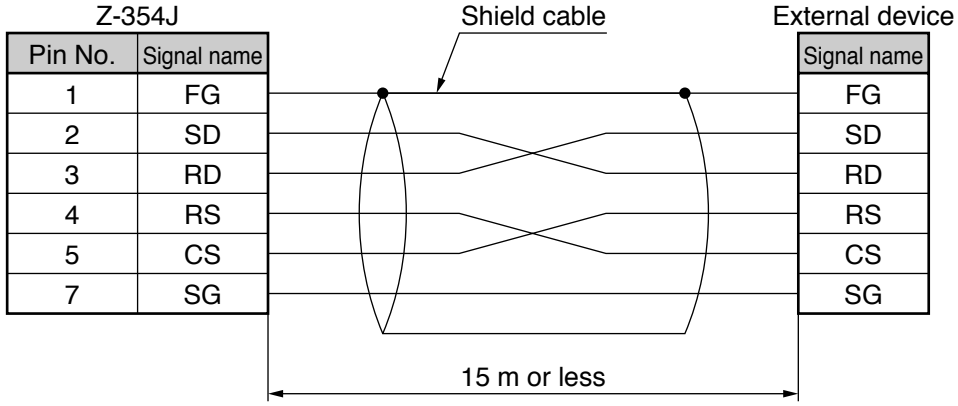
[2] Connection example

(1) RS-232C (In case of control signal: absent, XON/XOFF manual, or XON/XOFF automatic)



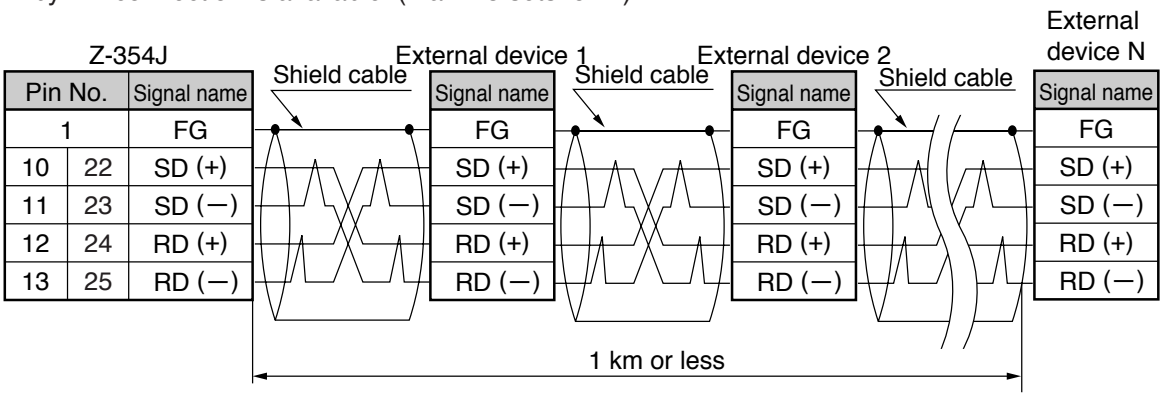
RS and CS of external device might be shorted in accordance with specification (available operation when both RS and CS are "ON") of its external device.
Some external device cannot communicate unless DCD (carrier detection) is "ON."
In this case, latch DCD terminal signal at the external device side or loop back "ON" voltage signal.

(2) RS-232C (In case of control signal: RS/CS manual, or RS/CS automatic)



(3) RS-422A (4-wire system)

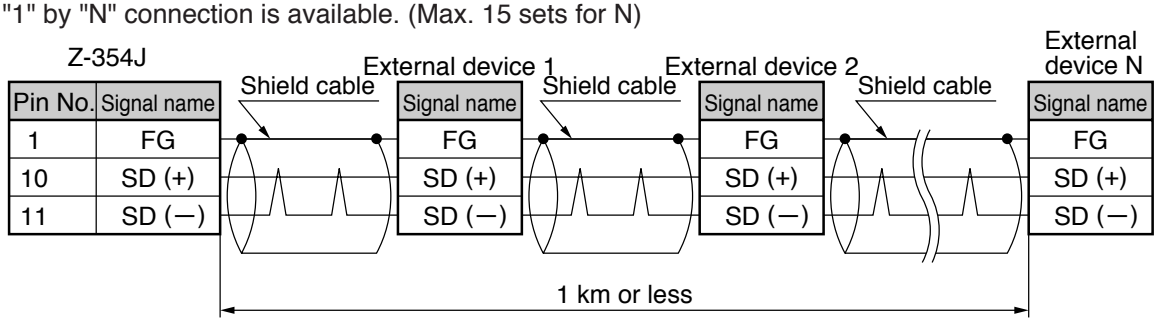
"1" by "N" connection is available. (Max. 15 sets for N)



This board needs not necessarily to be end station.

(4) RS-422A (2-wire system)

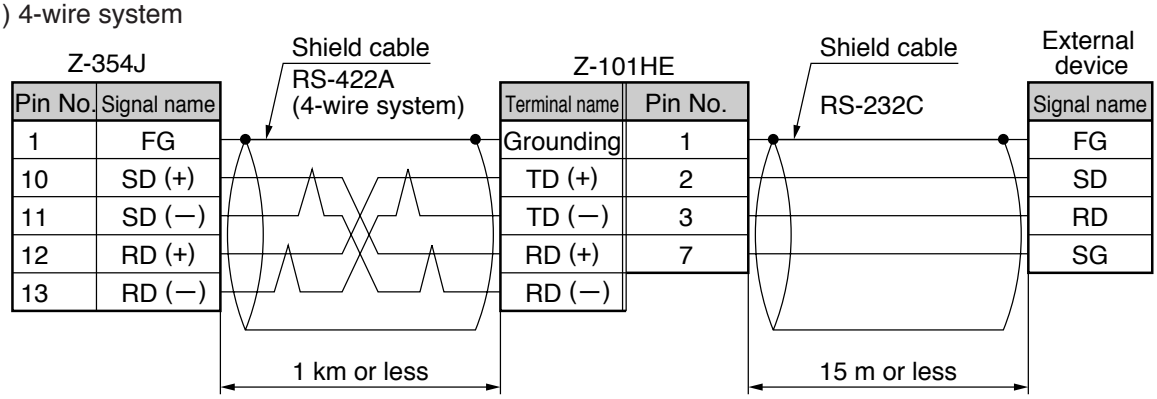
"1" by "N" connection is available. (Max. 15 sets for N)



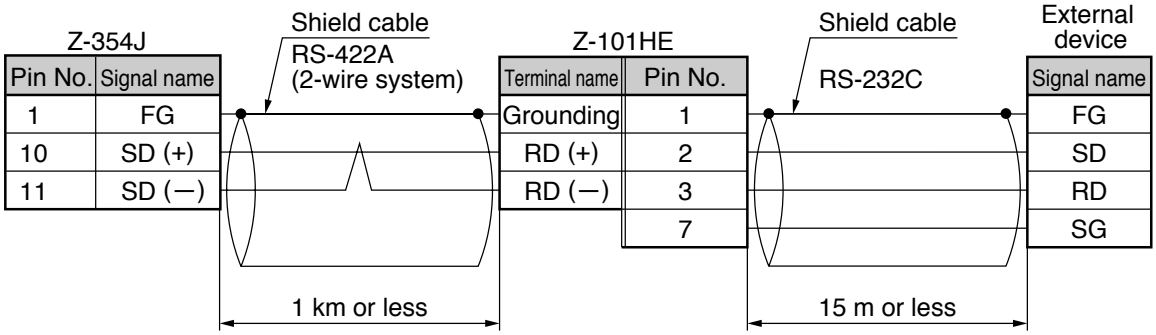
This board is not necessary be an end station.

(5) Using Z-101HE (RS-232C/RS-422A converter)

1) 4-wire system



2) 2-wire system automatic



- RS and CS of external device might be shorted in accordance with specification (available operation when both RS and CS are "ON") of its external device.
  Some external device cannot communicate unless DCD (carrier detection) is "ON."
  In this case, latch DCD terminal signal at the external device side or loop back "ON" voltage signal.
- When Z-101HE automatic mode is applied, set transfer rate 2400 bits/s or up.

Notes

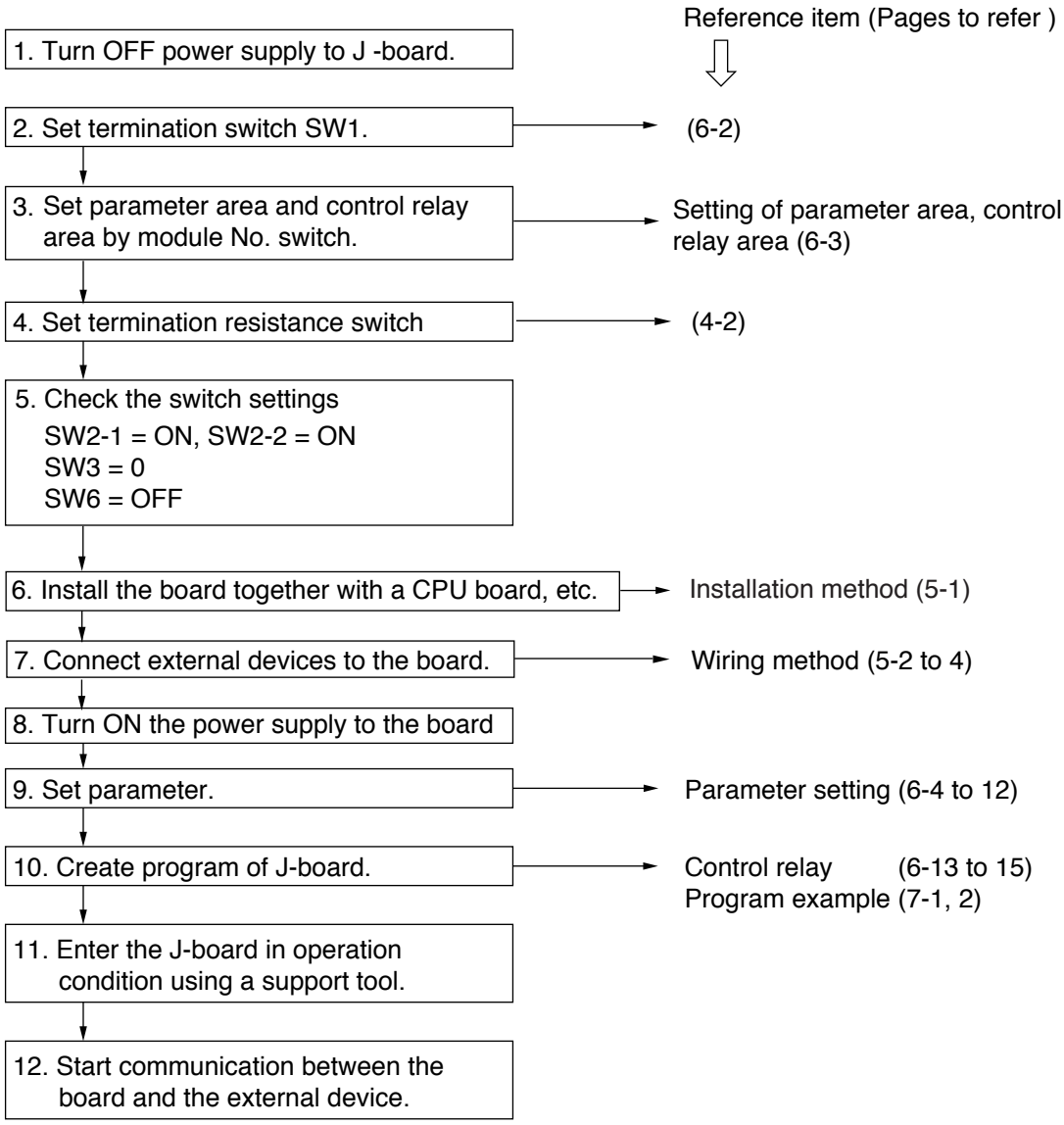
* Be sure to use the following shielded twisted pair cables.

Manufacturer	RS-232C, RS-422A (4-wire system)	RS-422A (2-wire system)
HITACHI CABLE LTD	CO -SPEV -SB0.5	S -IREV -SW2*0.5

* Wire the communication cable as far apart as possible from power lines or high voltage lines, so as not to run close or parallel to them.

Chapter 6: How to Use

Standard operation flow is shown below. Refer to this for use.



[1] Allocation of I/O relays

This board contains 8 bytes, as shown below.

I/O relays are allocated on this board as dummies. They do not function. However, please note that their assignment may affect I/O relay addresses on another I/O board.

Allocation example when the rack No. is 0.

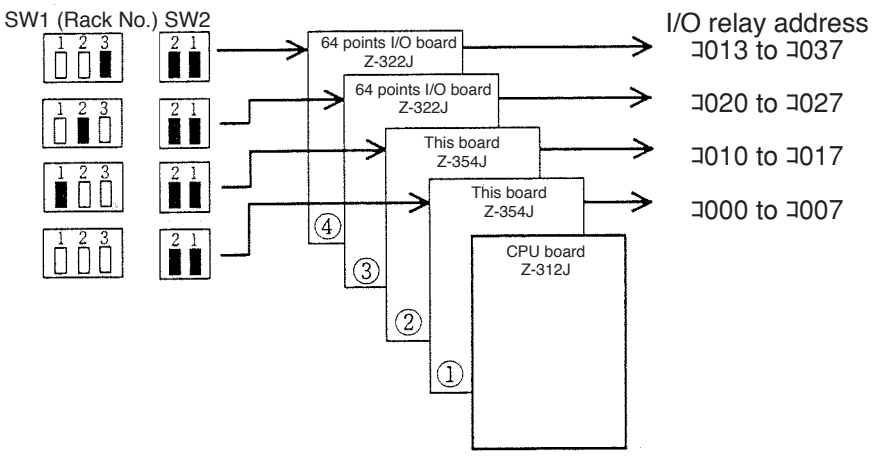
Allocation	I/O relay address	Actual address
Dummy (vacant)	ㅋ.000	R = 0, S = 0
	ㅋ.001	
Dummy (vacant)	ㅋ.002	R = 0, S = 1
	ㅋ.003	
Dummy (vacant)	ㅋ.004	R = 0, S = 2
	ㅋ.005	
Dummy (vacant)	ㅋ.006	R = 0. S = 3
	ㅋ.007	

- Turn SW2-1 and SW2-2 ON

■ An example of the assignment of I/O relays when an I/O board is installed on a motherboard.

■ = ON

□ = OFF

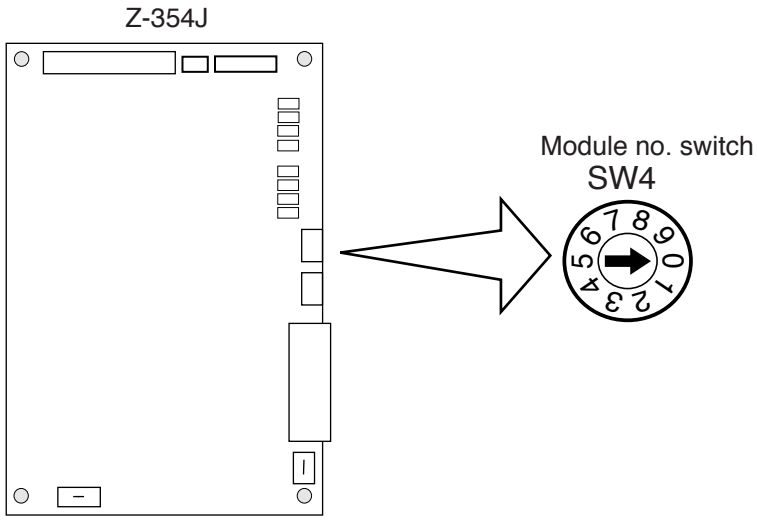


Remarks

* When SW1 (rack no.) is set the to same number for multiple J-boards, they may have the same I/O allocations which can cause a malfunction.
* When SW1 (rack no.) is turned ON on multiple stations, an "I/O verification error: Error code 60" will occur.

[2] Settings of parameter area, control relay area

Set parameter area to designate communication mode, transfer rate etc., and control relay area required for data sending/receiving programs using a module No. switch.
Be sure not to set same number with other special I/O module.



Module No. switch setting value	* Parameter area		Control relay area (byte address)
	Parameter address	Register address of file 1	
0	T- 0 (000 to 177)	000000 to 000177	□0200 to □0217
1	T- 1 (000 to 177)	000200 to 000377	□0220 to □0237
2	T- 2 (000 to 177)	000400 to 000577	□0240 to □0257
3	T- 3 (000 to 177)	000600 to 000777	□0260 to □0277
4	T- 4 (000 to 177)	001000 to 001177	□0300 to □0317
5	T- 5 (000 to 177)	001200 to 001377	□0320 to □0337
6	T- 6 (000 to 177)	001400 to 001577	□0340 to □0357
7	T- 7 (000 to 177)	001600 to 001777	□0360 to □0377
8	Prohibited to set		
9			

* Depending on a peripheral device used for entering parameters, addresses to enter vary. (=> Next page)

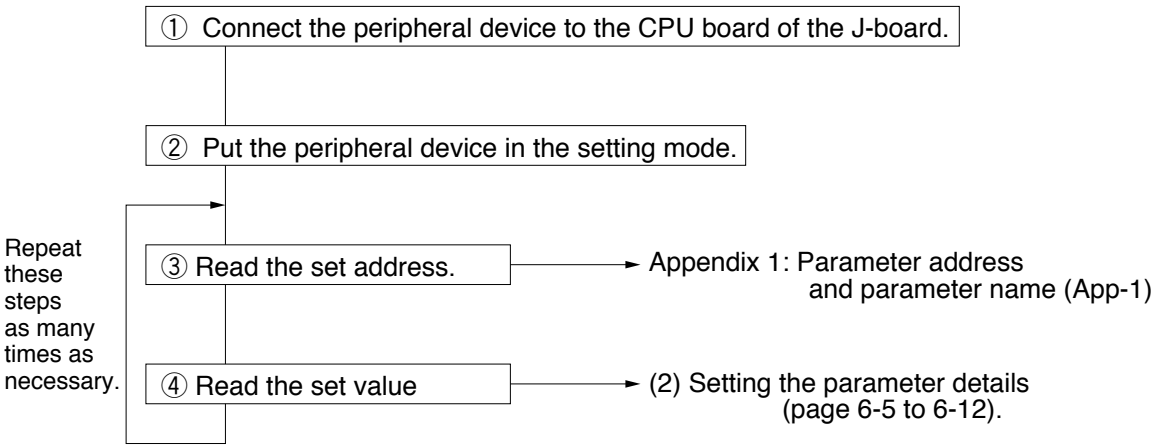
Remarks

* Only set the module no. switch when the power to the J-board is OFF. Use a slotted screwdriver.

[3] Parameter setting

Specify the parameters using a peripheral device.
For details about the operation methods, see the manual for the peripheral device.

(1) Setting procedures



Peripheral device	Address to set
JW-2PG	Parameters
JW-10PG	File 1 register
JW-11PG	Parameters
JW-12PG	
JW-13PG	
ZW-101PG1	File 1 register
Z-100LP2F	
JW-40PG	Specify the JW21/22 parameters for editing programs (Special I/O module)
JW-50PG	
JW-92SP	
JW-52SP	

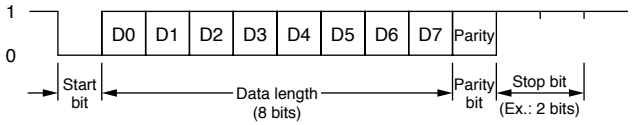
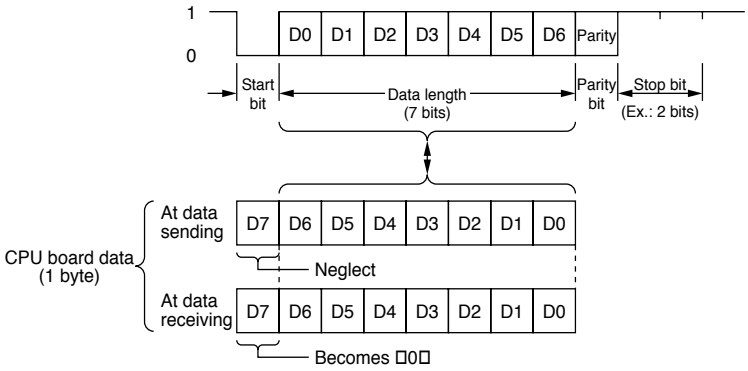
Remarks

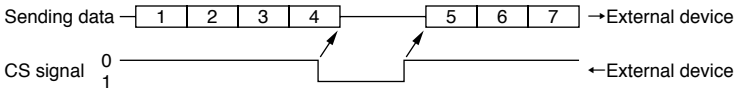
* When the power is turned ON or the J-board status changes from "stop" to "operating," the J-board's motherboard transfers the parameters to the J-board, and specifies the communication conditions.

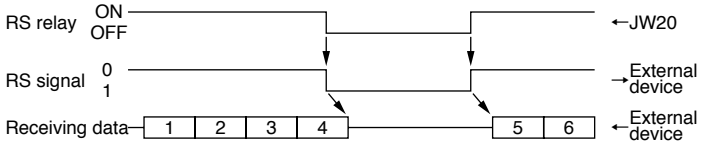
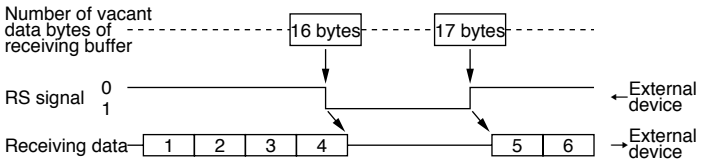
(2) Setting the parameter details

The address shown below is parameter address. In case of register address of fiel 1, refer to appendix. 1.

Address T-0 to 7	Parameter name	Setting value (Hexadecimal)	Details	
000	Parameter transfer	22 (Initial value: 00)	**Execution of parameter transfer** - Transfer parameters from CPU board's memory to the board - Other than 22_{HEX} is treated as prameter transfer error.	
001	BCC calculation	00 (Initial value)	**Completion of BCC calculation**	
		01	**Execution of BCC calculation** - At changing parameter, set to 01_{HEX}. - When the CPU board's changes from "program mode" to "date transfer mode" or it turns from OFF to ON, it calculates BCC codes of parameter setting contents and stores in parameter address 177. - When the calculation is completed, set to 00_{HEX}.	
002	Communi-cation mode	00 (Initial value)	**RS-232C** - Transfer mode is fixed to full-duplex.	
		01	**RS-422A (4-wire system)** - Either full-duplex or half duplex is selectable as transfer mode.	
		02	**RS-422A (2-wire system)** - Transfer mode is fixed to half-duplex.	
003	Transfer mode	00 (Initial value)	**Full-duplex** - Both sending and receiving data at the same time is possible. - In case of RS-422A (2-wire system), it is fixed to half-duplex so that this setting is invalid.	
		01	**Half-duplex** - Execute sending and receiving alternately. - In case of RS-232C, it is fixed to full-duplex so that this setting is invalid.	
004	Transfer speed	00 (Initial value)	19200 bits/s	- Select to match the external device's specifications
		01	9600 bits/s	
		02	4800 bits/s	
		03	2400 bits/s	
		04	1200 bits/s	
		05	600 bits/s	

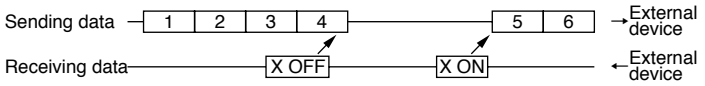
<table>
<tr><th>Address
T-0 to 7</th><th>Parameter name</th><th>Setting value
(Hexadecimal)</th><th colspan="2">Details</th></tr>
<tr><td rowspan="2">005</td><td rowspan="2">Data length</td><td>00
(Initial value)</td><td colspan="2">8 bits
• Data to be subject to JIS code, binary data, special character.
 
</td></tr>
<tr><td>01</td><td colspan="2">7 bits
• Data to be subject to ASCII code only.
• At communication with an external device the data length of which is fixed to 7 bits.
 
</td></tr>
<tr><td rowspan="2">006</td><td rowspan="2">Stop bit</td><td>00
(Initial value)</td><td>2 bits</td><td rowspan="2">• Select to match the external device’s specifications</td></tr>
<tr><td>01</td><td>1 bit</td></tr>
<tr><td rowspan="3">007</td><td rowspan="3">Parity</td><td>00
(Initial value)</td><td colspan="2">Even
• Set and check that length of total amount of bits of data D_0 to D_7 (D_0 to D_6 at 7 bits data length) and "ON" bit of parity bit becomes even.</td></tr>
<tr><td>01</td><td colspan="2">Odd
• Set and check that length of total amount of bits of data D_0 to D_7 (D_0 to D_6 at 7 bits data length) and "ON" bit of parity bit becomes odd.</td></tr>
<tr><td>02</td><td colspan="2">Absent
• Don’t set and check above parity bit.</td></tr>
</table>

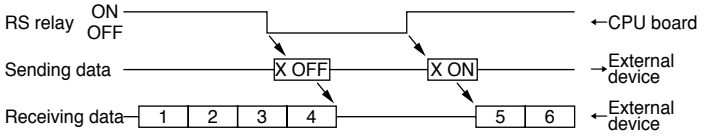
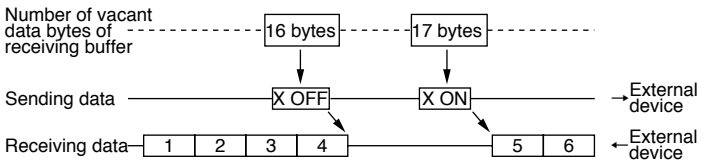
<table>
<tr><th>Address
T-0 to 7</th><th>Parameter
name</th><th>Setting value
(Hexadecimal)</th><th>Details</th></tr>
<tr><td rowspan="3">010</td><td rowspan="3">Control
signal</td><td>00
(Initial value)</td><td>Absent
• No check concerning communication.
• RS relay is normally ON.</td></tr>
<tr><td>01</td><td>RS/CS manual
• Communication mode: Valid at RS-232C.
• Control sending data by CS signal from external device.
1. When CS signal is 0, ready for data sending
2. When CS signal is 1, stop data sending.
 

• Control receiving data by RS relay.
1. When RS relay is OFF, RS signal becomes "1" and requests to stop data sending to an external device.
2. When RS relay is "ON," RS signal becomes "0" and requests to send data to an external device.
3. Receiving data time over error due to switch "OFF" RS relay does not occur.
 
</td></tr>
<tr><td>02</td><td>RS/CS automatic
• Communication mode: Valid at RS-232C
• Control sending data by CS signal from external device. Contents is the same as RS/CS manual operation.
• Control receiving data by number of vacant data bytes of receiving buffer.
1. When number of vacant data bytes becomes less than 16 bytes, RS signal turns to "1" and requests to stop sending data to an external device.
2. When number of vacant data bytes becomes more than 17 bytes, RS signal turns to "0" and requests to send data to an external device.
 
</td></tr>
</table>

Remarks

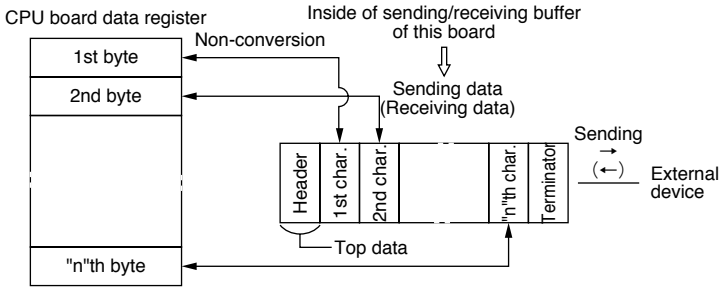
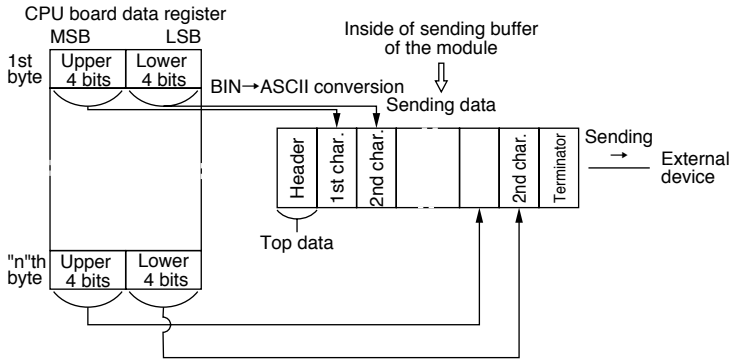
* Match setting of control signal at external device side to this board's settings.

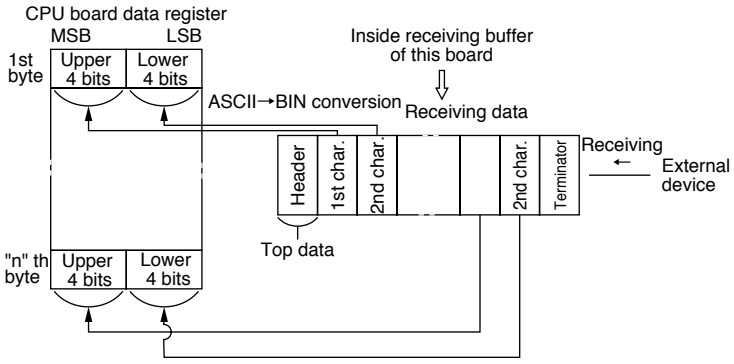
<table>
<tr><th>Address
T-0 to 7</th><th>Parameter name</th><th>Setting value (Hexadecimal)</th><th>Details</th></tr>
<tr><td rowspan="2">010</td><td rowspan="2">Control signal</td><td>03</td><td>XON/XOFF manual
• Transfer mode: Valid at full-duplex.
• Control sending data by XON, XOFF codes from an external device.
1. Possible data sending by receiving XON [11_{HEX}].
2. Data stops sending by receiving XOFF [13_{HEX}].
 

• Control receiving data by RS relay.
1. This board automatically sends XOFF [13_{HEX}] by turning RS relay from "ON" to "OFF," and requests to stop sending data to an external device.
2. This board automatically sends XON [11_{HEX}] by turning RS relay from "OFF" to "ON," and requests to send data to an external device.
3. Receiving data time over error by turning OFF RS relay does not occurs.
 
</td></tr>
<tr><td>04</td><td>XON/XOFF automatic
• Transfer mode: Valid at full-duplex.
• Control sending data by XON, XOFF codes from external device.
Contents is as same as XON/XOFF manual operation.
• Control receiving data by number of vacant data bytes of receiving buffer.
1. When number of vacant data bytes is less than 16 bytes, this board automatically sends XOFF [13_{HEX}] and requests to stop sending data to an external device.
2. When number of vacant data bytes is more than 17 bytes, this board automatically sends XON [11_{HEX}] and requests to send data to an external device.
 
</td></tr>
</table>

Remarks

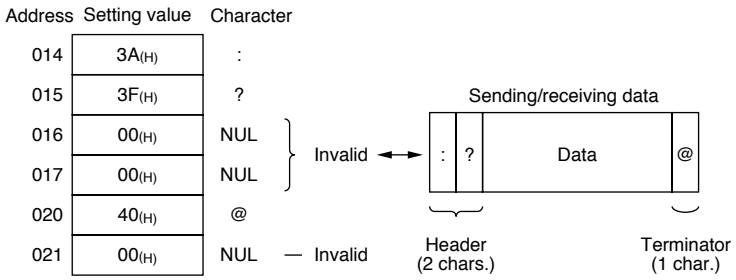
* Match setting of control signal at external device side to this board's settings.

Address T-0 to 7	Parameter name	Setting value (Hexadecimal)	Details
011	Transfer code conversion	00 (Initial value)	**Sending: Non-conversion** **Receiving: Non-conversion** • Send CPU board's data without conversion. • Send data from an external device without conversion. • JIS codes, binary data are usable (data length: 8 bits).  * Max. value of n (2 points) is 512. * Values in ( ) means conditions at receiving.
		01	**Sending: BIN –> ASCII conversion** **Receiving: Non-conversion** • Send data after convert BIN data of CPU board to ASCII form. (Sending header/terminators are sent without conversion.) • Receive data from an external device without conversion. (At sending)  * Max. value of n (2 points) is 512. (At receiving) Same as receiving of setting value 00_{HEX}.

Address T-0 to 7	Parameter name	Setting value (Hexadecimal)	Contents
011	Transfer code conversion	02	**Sending: Non-conversion** **Receiving: ASCII –> BIN conversion** • Send CPU board's data without conversion. • After converting data from an external device from ASCII to BIN, take as CPU board's data. • Only 0 to 9, A to F are usable as ASCII characters for receiving data (except receiving header, terminator). (At sending) Same as sending of setting value 00_{HEX}. (See previous page) (At receiving)  * Max. value of "n" (2 places) is 512. * Be sure to set number of receiving characters to even by an external device.
		03	**Sending: BIN –> ASCII conversion** **Receiving: ASCII -> BIN conversion** • Send data after converting CPU board's data from BIN to ASCII. (Send header/terminators without conversion.) • After converting data from an external device from ASCII to BIN, take as CPU board's data. • Only 0 to 9, A to F are usable as ASCII characters for receiving data (except receiving header, terminator). (At sending) Same as sending of setting value 01_{HEX}. (See previous page) (At receiving) Same as receiving setting value 02_{HEX}.

Address T-0 to 7	Parameter name	Setting value (Hexadecimal)	Details	
012	Sending time over interval	00 (Initial value)	0 ms	• While sending data, when data stops at a middle of 1 data frame (see page 6-16), the timer starts. • When this board does not send next data until the sending time over interval, a sending time out error occurs. When this board sends next data, it resets the timer and continues sending. • Allowance of setting time is 0 to +100 ms. (Example) At 00_{HEX} setting: 0 ms to 100 ms At 01_{HEX} setting: 100 ms to 200 ms
		01	100 ms	
		02	200 ms	
		03	300 ms	
		04	400 ms	
		05	500 ms	
		06	600 ms	
		07	700 ms	
		08	800 ms	
		09	900 ms	
		0A	1000 ms	
		0B	1100 ms	
		0C	1200 ms	
		0D	1300 ms	
		0E	1400 ms	
		0F	1500 ms	
		10	1600 ms	
		11	1700 ms	
		12	1800 ms	
		13	1900 ms	
		14	2000 ms	
		Other than above	Setting prohibited	
013	Receiving time over interval	00 (Initial value)	0 ms	• While the board is receiving data, if the receiving data stops sending at a middle of 1 data frame (see page 6-17), the timer starts counting. • If the board does not receive the next data within the receive time out interval, the receive time out error occurs. If the board receives the next data within the specified time interval, the board resets the timer and continues receiving data. • Allowance of the specified time is the same as the sending time out time. • When the RS/CS manual or XON/XOFF manual is selected as control signal, and if the RS relay is OFF, the receiving time over error does not occur.
		01	100 ms	
		02	200 ms	
		03	300 ms	
		04	400 ms	
		05	500 ms	
		06	600 ms	
		07	700 ms	
		08	800 ms	
		09	900 ms	
		0A	1000 ms	
		0B	1100 ms	
		0C	1200 ms	
		0D	1300 ms	
		0E	1400 ms	
		0F	1500 ms	
		10	1600 ms	
		11	1700 ms	
		12	1800 ms	
		13	1900 ms	
		14	2000 ms	
		Other than above	Setting prohibited	

<table>
<tr><th>Address
T-0 to 7</th><th>Parameter name</th><th>Setting value (Hexadecimal)</th><th>Details</th></tr>
<tr><td>014
015
016
017</td><td>EXP1 header</td><td rowspan="2">(Initial value: 00)</td><td rowspan="2">• When EXP1 header, EXP1 terminator are set at sending header/terminator or receiving header/terminator of a control relay (see page 6-14), any set code in this parameter is valid as control character.
• When NUL code [00_{HEX}] is set, thereafter set code becomes invalid so that header can use 1 to 4 characters and terminator can use 1 to 2 characters.
• When NUL code is set at each top address 014, 020, it becomes header: absent, terminator: absent, conditions.

(Setting example)
 
</td></tr>
<tr><td>020
021</td><td>EXP1 terminator</td></tr>
<tr><td>022
023
024
025</td><td>EXP2 header</td><td rowspan="2">(Initial value: 00)</td><td rowspan="2">• When EXP2 header, EXP2 terminator are set at sending header/terminator or receiving header/terminator of a control relay (see page 6-14), any set code in this parameter is valid as control character.
• Setting contents is as same as EXP1 header, EXP1 terminator.</td></tr>
<tr><td>026
027</td><td>EXP2 terminator</td></tr>
<tr><td>030
to
176</td><td>Not used</td><td>(Initial value: 00)</td><td>————————————</td></tr>
<tr><td>177</td><td>BCC code</td><td>——</td><td>• Setting is not required. (Setting by support tool is invalid).
• Store check code of parameter. (This board checks parameter setting values from CPU board using this code.)</td></tr>
</table>

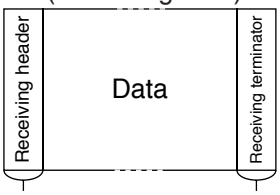
[4] Control relay

Control relays are used for a program to send and receive data.
As for programming, refer to the basic program on "Chapter 7: Program Example."

(1) Control relay contents

Addresses shown below are true when the module No. switch setting is "0." For settings of other numbers, refer to appendix 2 .

Address		Name of control relay	Contents
□0200	D_1	T_{RDY} (Ready sending operation)	- Turns "ON" when data sending to an external device is available. - When T_{RDY} relay turns from OFF" to "ON," this board clears error codes of control relay and recovers from error condition.
	D_3	R_{REQ} (Request to transfer receiving data)	- Turns "ON" when the CPU board requests to send receiving data to this board. - While R_{REQ} relay turns from "OFF" to "ON," when this board has received data, it turns "ON" R_{ACK} relay. (It also clears error codes.)
	D_5	RS (Request to send)	- Control RS (control signal of RS-232C) from the CPU board, this signal turns "ON" when requesting to send data to an external device. (RS signal voltage is +10 V.) - Valid when parameter setting of control signal (Page 6-7 and 6-8) is "RS/CS manual" and "XON/XOFF manual."
□0201	D_1	T_{REQ} (Request to transfer sending data)	- Turns "ON" when there is no data in sending buffer of this board.
	D_3	R_{RDY} (Ready to transfer receiving data)	- Turns "ON" when this board has receiving data, and ready to transfer to the CPU board.
	D_4	R_{ACK} (Ready to transfer receiving data)	- Turns "ON" when this board has receiving data while R_{REQ} turns from "OFF" to "ON." - This board transfers receiving data to the CPU board by F-85 instruction while R_{ACK} turns from "OFF" to "ON," and turns "OFF" after completion of transfer.
	D_5	CS (Ready sending)	- Monitors CS (control signal of RS-232C) at the CPU board, and turns "ON" when an external device is ready to receive data. (CS signal voltage is +3 to +15 V.)
	D_7	U_{RDY} (Available operation of this board)	- This board turns "ON" this signal when it ready to operate, and keeps "ON" condition with both of the below conditions. 1. Completion of transfer parameter from the CPU board to this board. 2. Mode switch is set to "0."
0202		Error code (See page 8-1 and 8-2.)	- This board converts errors which occurred inside to error codes, and outputs to this address. - Error code becomes 00_{HEX} (normal operation) at following conditions. 1. When T_{RDY} relay turns from "OFF" to "ON." 2. J-board starts operation from stopped condition. - When more than one errors occurs, this board outputs a priority error code.

<table>
<tr><th colspan="2">Address</th><th>Name of control relay</th><th>Setting value or output value</th><th colspan="2">Details</th></tr>
<tr><td rowspan="11">Ⅎ0203</td><td rowspan="10">D0 to D3</td><td rowspan="10">Receiving header/ terminator</td><td></td><td>Receiving header</td><td>Receiving terminator</td><td rowspan="10">Specify these addresses in order to determine whether the data received are intended for this board or not.
(Receiving data)
 
</td></tr>
<tr><td>0HEX</td><td>Absent</td><td>Absent</td></tr>
<tr><td>1HEX *1</td><td>EXP1 header</td><td>EXP1 terminator</td></tr>
<tr><td>2HEX *1</td><td>EXP2 header</td><td>EXP2 terminator</td></tr>
<tr><td>3HEX</td><td>Absent</td><td>CR</td></tr>
<tr><td>4HEX</td><td>Absent</td><td>LF</td></tr>
<tr><td>5HEX</td><td>Absent</td><td>CR • LF</td></tr>
<tr><td>6HEX</td><td>STX</td><td>ETX</td></tr>
<tr><td>7HEX *2</td><td>STX</td><td>ETX + BCC (1 byte)</td></tr>
<tr><td>Other than above</td><td colspan="2">Setting prohibited</td></tr>
<tr><td rowspan="11">D4 to D7</td><td rowspan="11">Sending header/ terminator</td><td></td><td>Receiving header</td><td>Receiving terminator</td><td rowspan="11">Specify these addresses in order to determine whether the data sent are intended for this board or not.
(Sending data)
 
</td></tr>
<tr><td>0HEX</td><td>Absent</td><td>Absent</td></tr>
<tr><td>1HEX *1</td><td>EXP1 header</td><td>EXP1 terminator</td></tr>
<tr><td>2HEX *1</td><td>EXP2 header</td><td>EXP2 terminator</td></tr>
<tr><td>3HEX</td><td>Absent</td><td>CR</td></tr>
<tr><td>4HEX</td><td>Absent</td><td>LF</td></tr>
<tr><td>5HEX</td><td>Absent</td><td>CR • LF</td></tr>
<tr><td>6HEX</td><td>STX</td><td>ETX</td></tr>
<tr><td>7HEX *2</td><td>STX</td><td>ETX + BCC (1 byte)</td></tr>
<tr><td>Other than above</td><td colspan="2">Setting prohibited</td></tr>
<tr><td>Ⅎ0204 (Lower)
Ⅎ0205 (Upper)</td><td>No. of sending bytes</td><td>0000HEX
0001HEX
to
0200HEX
Other than above</td><td>Variable data length
1 byte
to
512 bytes
Setting prohibited</td><td colspan="2">• Set number of byte of sending data to external device.
• When number of byte is set to "variable data length," the module is unable to send while sending terminator is "absent," and automatically calculates number of sending bytes while sending terminator is "present."
• As for relationship with other settings, see page 6-16.</td></tr>
<tr><td>Ⅎ0206 (Lower)
Ⅎ0207 (Upper)</td><td>No. of transfer bytes</td><td>0000HEX
to
0200HEX</td><td>0 byte
to
512 bytes</td><td colspan="2">• Setting is not required.
[After calculating number of receiving data bytes from an external device (except receiving header/terminator), this board outputs the result to this address.]
• As for relationship with other settings, see page 6-17.</td></tr>
<tr><td>Ⅎ0210 (Lower)
]0211 (Upper)</td><td>No. of receiving bytes</td><td>0000HEX
to
0200HEX
Other than above</td><td>0 byte
to
512 bytes
Setting prohibited</td><td colspan="2">• Set number of bytes of receiving data from an external device.
• This setting is valid only when both receiving header/terminator are "absent."
• As for relationship with other settings, see page 6-17.</td></tr>
</table>

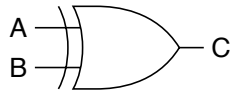
*1 (4 places) – Become parameter set code (see page 6-12.)

*2 (2 places) – How to make a BCC code

BCC check is made based on the calculation of the range from STX onward up to ETX. The calculations are all performed in bit patterns of ASCII 7-bit codes.

1) Operate XOR of the first character and the second character of the communication data.

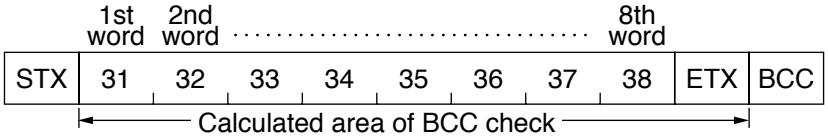
Truth table of eXclusive OR

Symbol	A	B	C
	0	0	0
	1	0	1
	0	1	1
	1	1	0

2) Operate XOR of the result of that operation and the third character.

3) Determine the result of operation sequentially and, lastly, operate XOR of ETX to take it as BCC code.

(Example)



ASCII	Binary value		XOR value
31	110001		
32	110010	⊕	110001=Result (1)
33	110011	⊕	000011=
34	110100	⊕	110000=
35	110101	⊕	000100=
36	110110	⊕	110001=
37	110111	⊕	000111=
38	111000	⊕	110000=
ETX(03)	000011	⊕	001000=
			001011 ····· BCC code

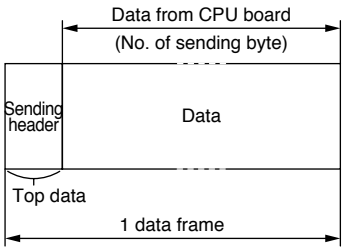
Remarks

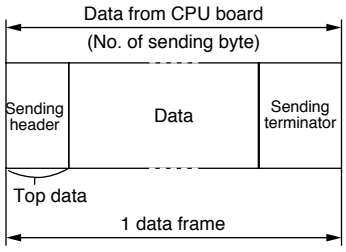
* The number of transfer bytes and receiving bytes are values after converting transfer code at data receiving. Therefore, when this board receives after conversion from ASCII to BIN (page 6-10), number of data bytes at an external device is 1024 bytes at max.

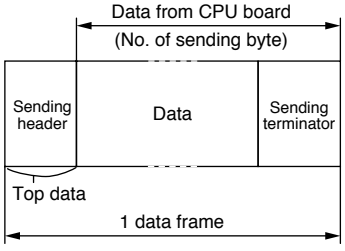
Number of transfer bytes, number of receiving bytes	Number of data bytes at the external device	
	Receiving: non-conversion	Receiving: ASCII -> BIN conversion
1	1	2
2	2	4
to	to	to
511	511	1022
512	512	1024

[5] Sending data

Relations between sending header/terminator, number of sending bytes (P6-14) and 1 data frame of sending data are as follows:

<table>
<tr><th>Data sending terminator
[Control relay setting value]</th><th>Number of sending byte
[Control relay setting value]</th><th>Sending data</th></tr>
<tr><td rowspan="2">Absent
0_{HEX}
Including setting EXP1 terminator or EXP2 terminator of parameter to "absent" at 1_{HEX}, 2_{HEX} settings.</td><td>Variable data length
[0000_{HEX}]</td><td>• Unable sending
(Number of sending bytes uncertain error)</td></tr>
<tr><td>1 to 512 bytes
[0001_{HEX} to 0200_{HEX}]</td><td> 

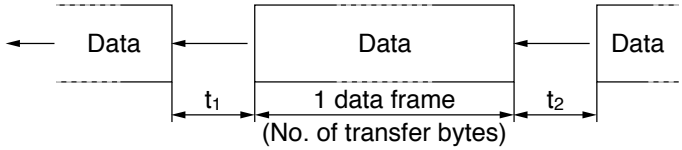
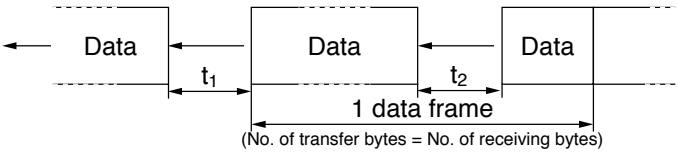
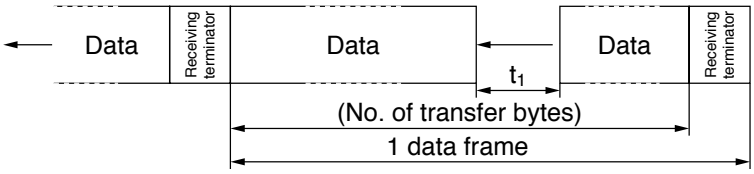
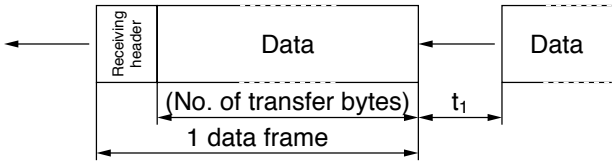
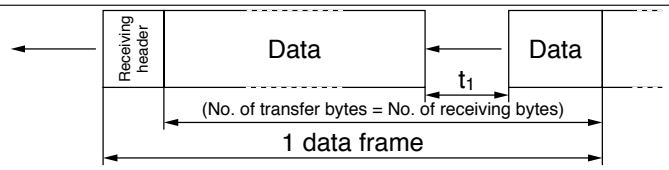
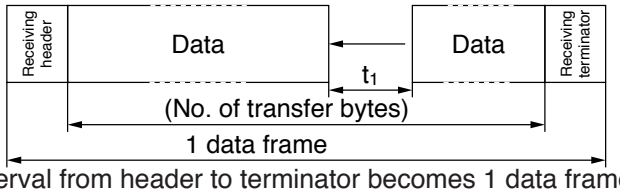
• Add sending header set by control relay automatically.</td></tr>
<tr><td rowspan="2">Present
[1_{HEX} to 7_{HEX}]</td><td>Variable data length
[0000_{HEX}]</td><td> 

• Calculate the number of sending bytes automatically.
• Setting sending header/terminator set in the CPU board data with control relay is required.</td></tr>
<tr><td>1 to 512 bytes
[0001_{HEX} to 0200_{HEX}]</td><td> 

• Add sending header/terminator set by control relay automatically.</td></tr>
</table>

[6] Receiving data

Relationship between receiving header/terminator, number of receiving bytes (page 6-14), receiving time out interval (page 6-11), number of transfer bytes (page 6-14) and 1 data frame of receiving data are as follows:
(t_1, t_2 are intervals between each receiving data, "T" as receiving time out interval.)

Receiving header/ terminator [Control relay setting value]	Number of receiving byte [Control relay setting value]	Receiving data
Receiving header: absent Receiving terminator: absent [0_{HEX} (Including above conditions at 1_{HEX}, 2_{HEX} parameter setting.)]	0 byte [0000_{HEX}]	 • When both t_1 and t_2 are longer than "T," an interval length between each start point of t_1 and t_2 becomes 1 data frame.
	1 to 512 bytes [0001_{HEX} to 0200_{HEX}]	 • When t_1 is longer than "T," an interval of number of receiving bytes becomes 1 data frame. • When t_2 passes "T" set time, the Module treats it as receiving time out error and rejects received data.
Receiving header: absent Receiving terminator: present [3_{HEX} to 5_{HEX} Including above conditions at 1_{HEX}, 2_{HEX} Parameter setting.]	Setting value: Invalid	 • An interval after receipt of terminator to receipt of next terminator becomes 1 data frame. *
Receiving header: present Receiving terminator: absent [Above case only with 1_{HEX}, 2_{HEX} parameter settings.]	0 byte [0000_{HEX}]	 • An interval from header to "T" time out of t_1 becomes 1 data frame.
	1 to 512 bytes [0001_{HEX} to 0200_{HEX}]	 • An interval from header to number of receiving bytes becomes 1 data frame. *
Receiving header: present Receiving terminator: present [1_{HEX}, 2_{HEX} 6_{HEX}, 7_{HEX}]	Setting value:	 • An interval from header to terminator becomes 1 data frame. *

* (3 places) When t_1 exceeds T, it becomes receiving time out error and rejects received data.

Remarks

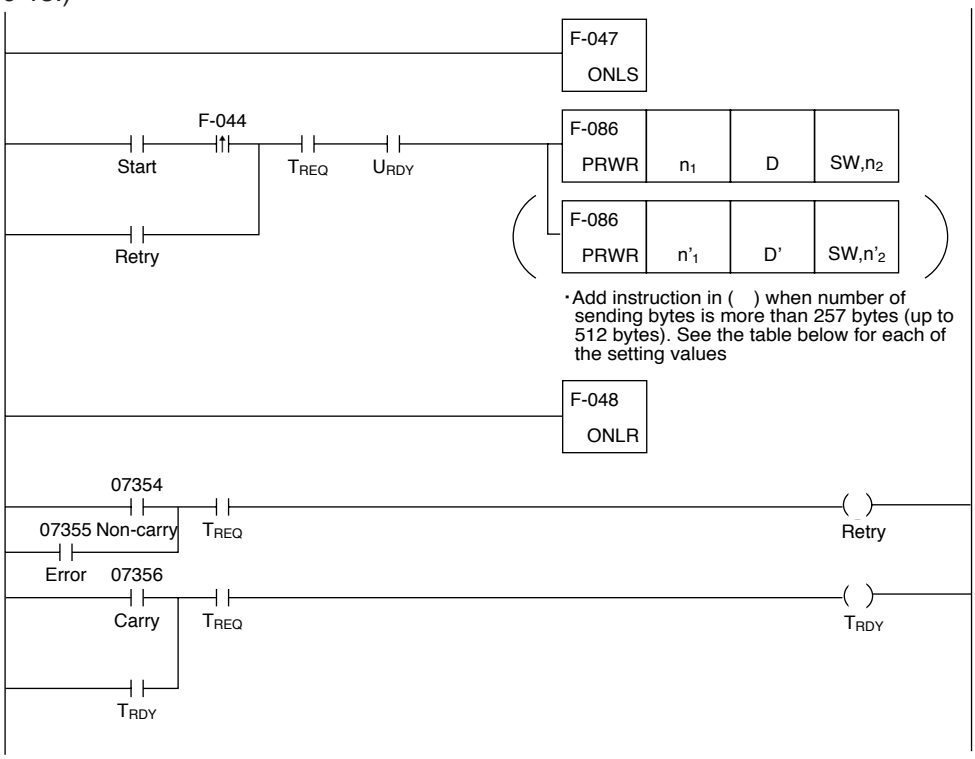
* When number of transfer bytes exceeds 512, it becomes overflow error and rejects received data.

Chapter 7. Program Example

This chapter describes basic program of data sending and data receiving, and its application examples. Use this basic program for programming.

(1) Data sending

When the start relay turns from "OFF" to "ON" while there is no sending data in the module sending buffer, the module transfers J-board's data to the module's sending buffer by F-86 instruction, and starts data send to an external device. The retry relay function is capable of re-transferring data which was not executed data transfer by F-86 instruction. (As for functions of each control relay, see page 6-13.)



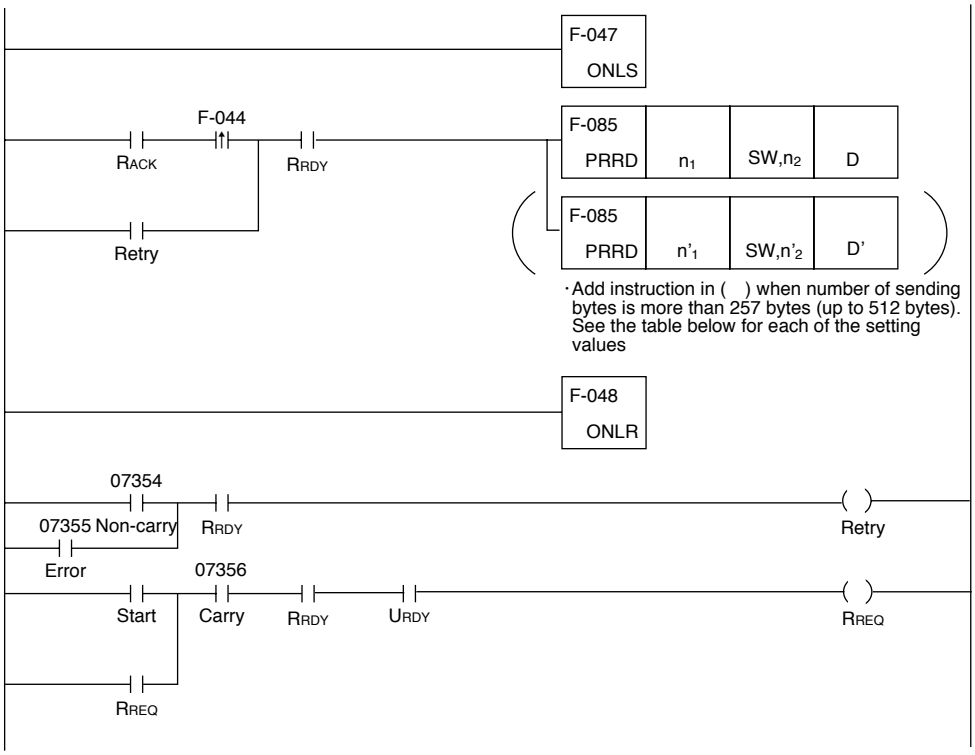
• Carry flag (07356) turns ON when only the data transfer is completed using F-86 instruction.

1) Set the relay number
   Start, retry --- Any number
   T_{RDY}, T_{REQ}, U_{RDY} --- The number set with the module no. switch on this board (see App-2).
2) Setting value of F-86 instruction

	Number of sending bytes	
	0 to 256	257 to 512
n_1 (transfer bytes)	Set 001OCT to 377OCT for 0 to 255, and 000OCT for 256 of number of sending bytes.	000OCT
D (top address)	Set the top address of sending data ⊐0000 to ⊐1577, b0000 to b1777, 09000 to 99777, E0000 to E1777	
SW (switch setting)	Specify the module number switch value of this board (0 to 7).	
n2 (transfer data)	0	0
n'1 (number of transfer bytes)		Set 001OCT to 377OCT for 257 to 511, and 000OCT for 512 of number of transfer bytes.
D' (top address)		Set the 257th byte address counting from address D.
n'2 (transfer area)		1

(2) Data receiving

When start relay turns from "OFF" to "ON" while there is data from an external device in the module sending buffer, the module transfers data in receiving buffer to data register of J-board instruction. The retry relay function is capable of re-transferring data which was not executed data transfer by F-85 instruction. (As for functions of each control relay, see page 6-13.)



• Carry flag (07356) turns ON when only the data transfer is completed using F-85 instruction.

1) Set the relay number

Start, retry --- Any number

RACK, RRDY, RREQ, URDY --- The number set with the module no. switch on this board (see App-2).

2) Setting value of F-85 instruction

	Number of sending bytes	
	0 to 256	**257 to 512**
n1 (transfer bytes)	Set 001OCT to 377OCT for 0 to 255, and 000OCT for 256 of number of receiving bytes.	000OCT
D (top address)	Set the top address which transfer the receiving data ↗0000 to ↗1577, b0000 to b1777, 09000 to 99777, E0000 to E1777	
SW (switch setting)	Specify the module No. switch value of this board (0 to 7).	
n2 (transfer data)	2	2
n'1 (number of transfer bytes)		Set 001OCT to 377OCT for 257 to 511, and 000OCT for 512 of number of transfer bytes.
D' (top address)		Set the 257th byte address counting from address D.
n'2 (transfer area)		3

Chapter 8. Error and Treatment

When this board is abnormal, EA, EB, or FT on the LED lights (see page 4-1), and stores error code in control relay area. (See page 6-13 and App-2.)

The stored address is fixed by module No. switch setting of the module.

Module no. switch specified	0	1	2	3	4	5	6	7
Error code storage address	⊐0202	⊐ 0222	⊐ 0242	⊐ 0262	⊐ 0302	⊐0322	⊐0342	⊐0362

Causes and treatments for errors

	Error code (Hexa-decimal)	Name	Cause	Treatment [( ) means page to refer.]	Priority	Lighting LED
	00	Normal operation	—————	—————	—	—
Parameter setting error	80	Parameter transfer error	Set other than 22_{HEX} in parameter transfer.	Check setting value of parameter transfer (6-5)	2	EA
	81	BCC calculation error	Setting value of BCC calculation is incorrect.	Check setting value of BCC value. (6-5)	13	
	82	Communication mode error	Setting value of communication mode is outside the range.	Check setting value of communication mode (6-5)	3	
	83	Transfer mode error	Setting value of transfer mode is outside the range.	Check setting value of transfer mode. (6-5)	4	
	84	Transfer rate error	Setting value of transfer rate is outside the range.	Check setting value of transfer rate. (6-5)	5	
	85	Data length error	Setting value of data length is outside the range.	Check setting value of data length. (6-6)	6	
	86	Stop bit error	Setting value of stop bit is outside the range.	Check setting value of stop bit. (6-6)	7	
	87	Parity error	Setting value of parity is outside the range.	Check setting value of parity. (6-6)	8	
	88	Control signal error	Setting value of control signal is outside the range.	Check setting value of control signal. (6-7 to 6-8)	9	
	89	Transfer code conversion error	Setting value of transfer code conversion is outside the range.	Check setting value of transfer code conversion. (6-9 to 6-10)	10	
	8A	Sending time over interval error	Setting value of sending time over interval is outside the range.	Check setting value of sending time over interval. (6-11)	11	
	8B	Receiving time over interval error	Setting value of receiving time over interval is outside the	Check setting value of receiving time over interval. (6-11)	12	

	Error code (Hexa-decimal)	Name	Cause	Treatment	Priority	Lighting LED
Control relay setting error	90	Sending, receiving header/terminator error	Setting value of sending, receiving header/terminator is outside the range.	Check control relay settings of sending, receiving header/terminator. (6-14)	14	EA
	91	Number of sending bytes error	• Setting value of the number of sending bytes is outside the range. • Set sending header/terminator to "absent," and number of sending byte setting is "variable data length."	Check number of sending byte setting control relay, sending header/terminator setting control relay. (6-14)	15	
	92	Number of sending bytes undefined error	While number of sending bytes being "variable data length," there is no sending terminator in sending data.	Check sending data, sending header/terminator setting control relay, number of sending byte setting control relay, sending header/terminator setting parameter. (6-12, 6-14)	17	
	93	Number of receiving bytes error	Setting value of number of receiving byte is outside the range.	Check number of receiving byte setting control relay. (6-14)	16	
Communication error	A0	Parity error	An error occurs by parity check during receiving data.	• Check communication setting with external device. • Check external device, communication cable.	19	EB
	A1	Framing error	Receiving data is abnormal.	• Check communication setting with external device. • Check external device, communication cable.	20	
	A2	Overrun error	Receiving data exceeds receiving buffer capacity.	Check number of sending data of external device.	21	
	A3	Overflow error	Number of receiving bytes exceeds 512 bytes which is a limit to transfer to CPU board.	Check number of sending data of external device.	22	
	A4	Data conversion error	Receive unable to convert code by ASCII –> BIN conversion of receiving data.	Check sending data of external device.	23	
	A5	BCC check error	When receiving header/terminator is set to STX-ETX + BCC, BCC code calculated by receiving data differs from received BCC codes.	Check sending data of external device.	24	
	A6	Sending time over error	Prohibition to receive of an external device continued longer than sending time out interval set in parameter.	Check external device, communication cable.	26	
	A7	Receiving time over error	Data stopped condition while data receiving continued longer than receiving time out interval set in parameter.	Check external device, communication cable.	25	
Hardware error	C0	Hardware error	Error occurs by ROM sum check, RAM read/write check inside the module.	Replace this board.	1	EA
Communication error	C1	Data collision error	When the transfer mode is half duplex, both the module and an external device send data, or communication cable is shorted.	• Check sending, receiving timing with external device. • Check communication cable.	18	EB
	——	Module error	Watchdog timer timed over.	Replace the module	—	FT
	——	SM3 error	SM3 is set to other than 0.	Set SM3 to 0.	—	EA EB

Chapter 9: Specifications

(1) Generaleral specifications

Items	Specifications
Ambient operation temperature	0 to +55°C/35 to 90% (without dew condensation)
Storage temperature /humidity	-20 to +70°C/35 to 90 %RH (without dew condensation)
Vibration	JIS C0911 or equivalent Duplex width: 0.15 mm (10 to 55 Hz), 1 G (55 to 150 Hz), 2 hours each in the X, Y, and Z directions
Shock	JIS C0912 or equivalent. 10 G 3 times in X, Y, and Z directions
Noise immunity	1000 Vp-p, 1μs (by noise simulator: Voltage charged between the 24 VDC line (pin 9) and the FG on the motherboard.)
Installation direction	Any of the 3 directions.
Grounding	Class 3 grounding
Accessories	4 screws (Semuth M3 x 6 mm), 4 standoffs (15 mm)

(2) Performance specifications

Item	Specifications
Number of I/O points	I/O relays: 64 points (dummies) Data relay: 128 points Parameter settings: 128 bytes
Internal current consumption	210 mA
Weight	Approx. 150 g

(3) Communication specifications

Items	Specifications	
	RS -232C	RS -422A
Number of serial I/F ports	1 (Use either RS-232C or RS-422A)	
Specifications	No protocol	
Number of connectable modules	1 set	Max. 15 sets
Data transfer standard	EIA RS-232C	EIA RS-422A (2-wire system, 4-wire system)
Transfer rate	600, 1200, 2400, 4800, 9600, 19200 bits/sec.	
Synchronous mode	Start-stop system	
Transfer mode	Full-duplex/half-duplex	
Circuit configuration	1 : 1	1 : N
Control signal	Absent, RS/CS manual, RS/CS automatic, XON/XOFF manual, XON/XOFF automatic	
Data length	7/8 bits	
Parity	Absent, odd, even	
Stop bit	1/2 bits	
Control character	Absent, EXP1, EXP2, CR, LF, CR - LF, STX, ETX, ETX+BCC	
Transfer code	Non-conversion, BIN <-> ASCII conversion	
Number of sending/receiving bytes	Individual setting for sending/receiving (1 to 512 bytes)	
Communication line	Cable total length :Max. 15 m (Shielded twisted pair cable)	Cable total length :Max. 1 km (Shielded twisted pair cable)

Appendix

Appendix 1. Parameter address and parameter name

The below table shows the relation between address of parameter area and name of parameter set by module No. switches.

Parameter area									Parameter name
Parameter address	Register address of file 1 (Setting value of module No. switch)								
T-0 to 7	0	1	2	3	4	5	6	7	
000	000000	000200	000400	000600	001000	001200	001400	001600	Parameter transfer
001	000001	000201	000401	000601	001001	001201	001401	001601	BCC calculation
002	000002	000202	000402	000602	001002	001202	001402	001602	Communication mode
003	000003	000203	000403	000603	001003	001203	001403	001603	Transfer mode
004	000004	000204	000404	000604	001004	001204	001404	001604	Transfer rate
005	000005	000205	000405	000605	001005	001205	001405	001605	Data length
006	000006	000206	000406	000606	001006	001206	001406	001606	Stop bit
007	000007	000207	000407	000607	001007	001207	001407	001607	Parity
010	000010	000210	000410	000610	001010	001210	001410	001610	Control signal
011	000011	000211	000411	000611	001011	001211	001411	001611	Transfer code conversion
012	000012	000212	000412	000612	001012	001212	01412	001612	Sending time over interval
013	000013	000213	000413	000613	001013	001213	001413	001613	Receiving time over interval
014	000014	000214	000414	000614	001014	001214	001414	001614	EXP1 header
015	000015	000215	000415	000615	001015	001215	001415	001615	
016	000016	000216	000416	000616	001016	001216	001416	001616	
017	000017	000217	000417	000617	001017	001217	001417	001617	
020	000020	000220	000420	000620	001020	001220	001420	001620	EXP1 terminator
021	000021	000221	000421	000621	001021	001221	001421	001621	
022	000022	000222	000422	000622	001022	001222	001422	001622	EXP2 header
023	000023	000223	000423	000623	001023	001223	001423	001623	
024	000024	000224	000424	000624	001024	001224	001424	001624	
025	000025	000225	000425	000625	001025	001225	001425	001625	
026	000026	000226	000426	000626	001026	001226	001426	001626	EXP2 terminator
027	000027	000227	000427	000627	001027	001227	001427	001627	
030 to 176	000030 to 000176	000230 to 000376	000430 to 000576	000630 to 000776	001030 to 001176	001230 to 001376	001430 to 001576	001630 to 001776	Not used
177	000177	000377	000577	000777	001177	001377	001577	001777	BCC code

Appendix 2. Address and name of control relay

The below table shows the relation between address of control relay area and name of control relay set by module No. switches.

Control relay address (Setting value of module No. switches)								Name of control relay (Bit address)								Signal direction
0	1	2	3	4	5	6	7	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0	
□0200	□0220	□0240	□0260	□0300	□0320	□0340	□0360	—	—	RS	—	R_{REQ}	—	T_{RDY}	—	CPU board -> Z-354J
□0201	□0221	□0241	□0261	□0301	□0321	□0341	□0361	U_{RDY}	—	CS	R_{ACK}	R_{RDY}	—	T_{REQ}	—	CPU board <- Z-354J
□0202	□0222	□0242	□0262	□0302	□0322	□0342	□0362	Error code								
□0203	□0223	□0243	□0263	□0303	□0323	□0343	□0363	Sending header/terminator				Receiving header/				
□0204	□0224	□0244	□0264	□0304	□0324	□0344	□0364	Number of sending bytes (Lower)								CPU board -> Z-354J
□0205	□0225	□0245	□0265	□0305	□0325	□0345	□0365	Number of receiving bytes (Upper)								
□0206	□0226	□0246	□0266	□0306	□0326	□0346	□0366	Number of transfer bytes (Lower)								CPU board <- Z-354J
□0207	□0227	□0247	□0267	□0307	□0327	□0347	□0367	Number of transfer bytes (Upper)								
□0210	□0230	□0250	□0270	□0310	□0330	□0350	□0370	Number of receiving bytes (Lower)								CPU board -> Z-354J
□0211	□0231	□0251	□0271	□0311	□0331	□0351	□0371	Number of receiving bytes (Upper)								
□0212 to □0217	□0232 to □0237	□0252 to □0257	□0272 to □0277	□0312 to □0317	□0332 to □0337	□0352 to □0357	□0372 to □0377	Not used								———

SHARP MANUFACTURING SYSTEMS CORPORATION

♦ Information about Sharp image sensor camera and programmable controller is available at our internet homepage

http://sharp-world.com/sms/

1.0v 10.2005
(0.1I.M.S)