

User's Manual

RS-232C GP-IB controller

Z S – 6 1 4 3 A F

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ZS-6143AF Start Guide

It is able to check the without problems of connection, setting and operation. Please follow the flow below.

① **Setting of internal switches**

Refer to page22 to set the internal DIP switch and rotary switch.

MODE(SW2) : Set communication protocol with host such as PC,PLC.

Be careful not to mistake the delimiter setting.

The delimiter used for RS-232C communication is set at this time.

Delimiters used for GP-IB communication are set by commands from the host.

ADR(SW3) : Set the GP-IB address of ZS-6143AF.

Set the address different from the address of the other device connected by GP-IB. Please not to use address 31.

Devices with the same GP-IB address do not have to exist.

In general, "0" is often used by the controller. Measuring instruments are set to other than "0". If there is no other device using "0", we recommend setting ZS-6143AF to "0".

Baud rate(SW4) : Set communication baud rate with host such as PC, PLC.

Try first at general speed, 2400bps, 9600bps,19200bps.

② **Preparation on the host**

Make the host equipment such as PC, PLC ready for RS-232C communication. Please prepare software that can use sample software or send and receive the data.

③ **Preparation of cables and power supply**

1. Connect ZS-6143AF and host such as PC, PLC with RS-232C cross cable.
2. Connect ZS-6143AF and GP-IB connected device with GP-IB cable.
3. Connect the power supply of the AC adapter or DC+5V to the ZS-6143AF, and turn on the power of ZS-6143AF.
4. Bothe the host equipment and GP-IB connected equipment should be turned on.

④ Confirm communication

Transmit the “DLM0x” command of the delimiter setting to ZS-6143AF and confirm that “END” is returned. “DLM0x” should be a parameter that matches the delimiter of the GP-IB connected device.

Transmit a character string with delimiter (CR or CR.LF) specified as MODE(SW2) added after “DLM0x” and please receive until the delimiter specified as “END” is added and sent.

If it does not work, please check the following.

- Confirm that the delimiter specified by the DIP switch of ZS-6143AF is added at the end of the ”DLM0x” command to be transmitted.
- Confirm that there is not a problem with the connection of the RS-232C cable differences such as cross or straight.
- Make sure that do not forget to turn on the power. Confirm that there is not a problem with the power supply when using DC+5V.
- Confirm that there is not a problem with communication parameter setting, baud rate of SW2 and SW4.
- Confirm whether communication parameter setting and baud rate are equal to host such as PC, PLC.
- Transmit “OUT 01” of the data transmission command to ZS-6143AF and confirm that “END” is returned when the GP-IB address of the GP-IB connected device is “1”.
- Confirm that the delimiter setting of the GP-IB connected device matches the delimiter setting of the “DLM” command.
- Confirm that the GP-IB address setting of the “OUT” command matches the GP-IB address setting of the GP-IB connected device.
- Confirm that there is no mistake in the command to the GP-IB connected device.
- If an error is returned, see page 18.

Transmit “INP 01” command to ZS-6143AF and confirm that the data is returned from GP-IB connected device when the GP-IB address of the GP-IB connected device is “1”.

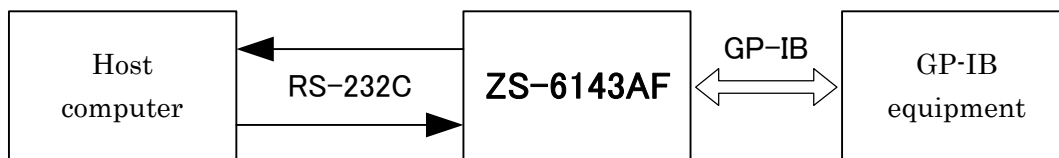
If it does not work, please check the following.

- Confirm that the delimiter setting of the GP-IB connected device matches the delimiter setting of the “DLM” command.
- Confirm that the GP-IB address setting of the “INP” command matches the GP-IB address setting of the GP-IB connected device.
- Confirm that ZS-6143AF will reply with GP-IB connected device specified as talker.
- ZS-6143AF will reply to the GP-IB connected device specified as talker.
- If an error is returned, see page 18.

1. Outline

ZS-6143AF is an interface conversion adapter that mediates communication between GP-IB and RS-232C.

ZS-6143AF operates as a GP-IB controller by a command from a host computer having the RS-232C interface.



2. Feature

- It is a small and light weight.
- Bidirectional 16Kbyte buffer memory is attached.
- The processing speed is improved compared with conventional ZS-6143F.

3. Specifications

3-1 GP-IB

- Compliant with IEEE s
SHI, AHI, T5, L3, SR1, RL1, PP0, DC1, DT1, C1, C2, C3, C4, C27
- Connector
57LE-20240-77C0-D35G-CA

3-2 RS-232C

- Communication method: Full duplex communication method
- Synchronization method: Start-stop synchronization method
- Communication speed: 1200, 2400, 4800, 7200, 9600, 14400, 19200, 28800, 38400, 57600, 115200, 230400, 460800, 921600 (bps)
- Parity: No parity, odd parity, even parity
- Stop bit length: 1, 2
- Character bit length: 7, 8
- Logistic level:

| Voltage | Data signal | Control signal |
|-------------|-------------|----------------|
| +3V to +12V | 0 (Space) | ON |
| -3V~ to 12V | 1 (Mark) | OFF |

● RS-232C Signal

| Signal | Connector PIN NO | Function |
|--------|---------------------|--|
| TXD | 3 | Transmission data from ZS-6143AF |
| RXD | 2 | Received data of ZS-6143AF |
| CTS | 8 | It is an input signal to receive permission of data transmission. It is possible to be controlled transmission data by this signal. |
| RTS | 7 | It is an output signal indicating whether or not data I/O is possible to the partner side. |
| GND | 5 | It becomes the voltage(0V) of all signals. |

- Connector: DE-9P-NR or equivalent

3-3 General specification

- (1) Power supply: DC+5V 500mA or less
- (2) Operating temperature: 0 to 40°C
- (3) Size(mm): 82 (W) ×30 (H) ×126 (D)
- (4) Weight: 500g or less
- (5) Accessory: DC input cable (optional AC adapter)

4. Operation

4-1 Operation sequence

ZS-6143AF operates as GP-IB controller by connecting the RS-232C interface side to the host computer or PLC.

ZS-6143AF enables remote operation by executing IFC (interface clear) on GP-IB side after turning on power and setting REN to “LOW”. After that, it waits for a command from the host computer or PLC.

The command consists of 3 to 4 letters of code and the character string following it using ASCII code, and there are control command, data output command, data request command etc.

ZS-6143AF returns a message to the host computer corresponding to the command when the command is sent from host computer or PLC. Therefore, each time a host computer sends a command, it must check this message before sending the next command.

The response message after executing the command uses the ASCII code and there are three types of message as follow.

- ① In case of a control command or data output command having no data to return to the host computer, END[delimiter] used.
- ② In case of a data request command etc. Which returns data to the host computer as below.

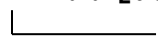
XXX•••XX [delimiter]



For the data format, refer to the description of each command.

- ③ If there is an error in the format or parameters of the command or error occurs, command is used as below.

*-ERR [delimiter]



There are F, G, O, P, R, T depending on the error type.
Please see page 18 for the error message table.

When the SRQ occurs irrespective of the command, the following ASCII code is sent from ZS-6143AF to the host computer. However, this code is transmitted only in SRQE mode. Please refer to section 4-2.

SRQ [delimiter]

4-2 SRQ

There are 2 types mode in the ZS-6143AF as below.

SRQE mode is that SRQ generation of GP-IB is reported to the host computer.

SRQD mode is that SRQ generation is disabled.

① SRQE mode

This command enables the interrupt processing function. SRQ message is sent to the host computer when SRQ generated. However, in case of the SRQ occurs during command execution, SRQ message is sent after returning a response message to the host computer.

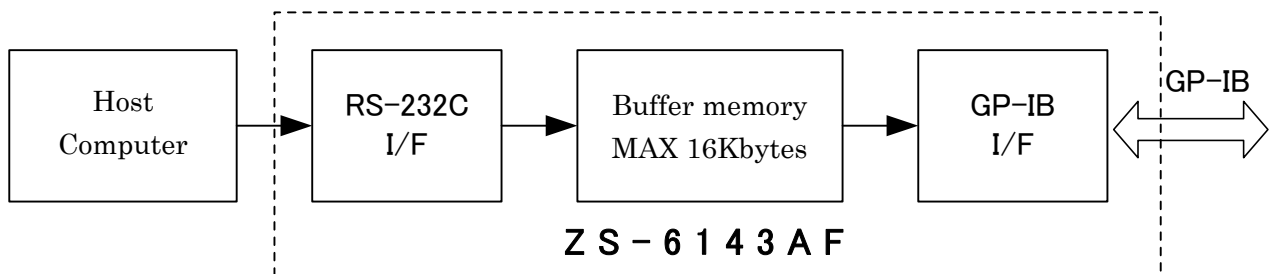
When the computer has the port interrupt function of RS-232C, SRQ interrupt processing can be performed.

② SRQD mode

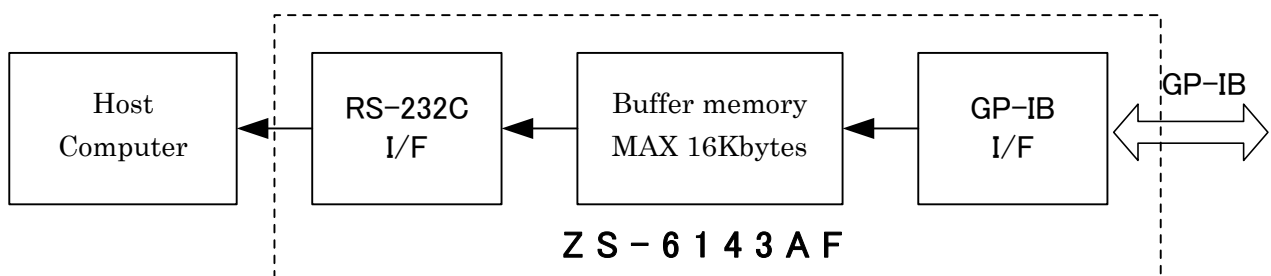
This command is disable the interrupt processing function. Even if SRQ occurs, nothing is sent to the host computer. This mode is set when the power is ON.

4-3 Internal buffer memory

ZS6143AF stores commands, data and delimiters from the host computer in the internal buffer memory before executing the command. The size of buffer memory is 16Kbytes including the delimiter. O-ERR will be generated if size of memory is more than 16Kbytes.



When receiving data from GP-IB device, the data is also stored in the internal buffer. It is able to be received up to 16Kbytes. More than 16Kbytes of data is not stored in the buffer memory.



4-4 Initial setting

The initial setting after turning on the power supply is as follows.

- ① Delimiter of sending GP-IB: CR.LF&EOI
- ② Time-out function of GP-IB: None
- ③ Setting of SRQ mode: SRQD mode

4-5 Command

This section explains the commands for controlling the GP-IB device from PC, PLC and etc. with RS-232C interface.

4-5-1. Host computer can use these commands as below.

| NO. | Command | Function |
|-----|---------|---|
| 1 | REM | GP-IB device becomes a remote status. |
| 2 | IFC | The interface of GP-IB device is initialized. |
| 3 | DCL | GP-IB device becomes a clear. |
| 4 | SDC | The specified GP-IB device becomes a clear. |
| 5 | GTL | The specified GP-IB device becomes local control. |
| 6 | LLO | It is disable local control of GP-IB device. |
| 7 | GET | It sends a GET command to the specified GP-IB device. |
| 8 | CMD | Message command is output to GP-IB. |
| 9 | TAD | It specifies a talker address of GP-IB. |
| 10 | LAD | It specifies a listener address of GP-IB. |
| 11 | DAT | ASCII data will be output to the equipment that has already been designated as a listener. |
| 12 | DATB | Binary data will be output to the equipment that has already been designated as a listener. |
| 13 | OUT | It sends ASCII data to the specified listener. |
| 14 | OUTB | It sends binary data to the specified listener. |
| 15 | INP | It receives ASCII data from the specified talker. |
| 16 | INPB | It receives binary data from the specified talker. |
| 17 | IND | It receives ASCII data from the device that has already been specified as a talker. |
| 18 | INDB | It receives binary data from the device that has already been specified as a talker. |
| 19 | RDS | It receives the status data from the specified GP-IB device. |
| 20 | DLM | It specifies the delimiter of data to be sent to the GP-IB device. |
| 21 | TOE | It sets timeout of GP-IB handshake. (100ms to 25.5sec or no timeout) |
| 22 | SRQE | It is sent SRQ signal to the host computer when SRQ occurs. |
| 23 | SRQD | It ignores SRQ generation. |

4-5-2. How to send a command

Commands from the host computer are sent in order of [command][delimiter]. Commands can be sent continuously separated by colon “ : ”. This is called multi-command. Multi-command function can be switched ON/OFF by DIP switch.

[Multi-command: command:command.....command:command:delimiter]

The command sent by the multi-command is executed sequentially, and the response message is returned to the host computer after the execution of all commands is completed.

This response message belongs to the command executed most recently. Therefore, when using any of the five commands (INP, INPB, IND, INDB, RDS) that return data in the response message, be sure to make it the last command sequence.

If an error occurs during multi-command execution, the command execution is terminated at that point, and an error response message is returned to the host computer.

Be sure to use the delimiter code specified by the MODE switch for the delimiter. When sending a message from the ZS-6143AF to the host computer, send it with the delimiter code which is set by the MODE switch.

4-5-3. Command format

A command format is as follows.

Command code△ $\left[\begin{array}{c} \text{address} \\ \text{parameter} \end{array} \right]$; (data)
(space) (semicolon)

Separate multiple address or parameters with a comma (,). The address is a decimal two-digit code, the parameter and data have two decimal digits and two hexadecimal digits.

Depending on the command, it is unnecessary to use a character after including semicolon (;) or space

4-6 Description of commands

(1) REM (Remote)

Function: It sets the REN line to LOW level.

After turning on the power, ZS-6143AF executes IFC and sets the REN line to LOW.

Format: REM

(2) IFC (Interface Clear)

Function: It outputs a negative pulse of 100 μ s to the IFC line.

ZS-6143AF executes IFC after turning on the power.

Format: IFC

(3) DCL (Device Clear)

Function: It sends DCL message to all devices on the GP-IB system and clear the device status.

Format: DCL

(4) SDC (Selected Device Clear)

Function: It sends SDC message to the specified device with A₀ to A_n on the GP-IB system and clear the device status.

Format: SDC A₀, A₁, ..., A_n

A₀ to A_n: device address (00 to 30), decimal two digits

Example) SDC 00, 01, 30

Clear the devices with device address 0,1, and 30

(5) GTL (Go To Local)

Function: It sends a GTL message to all devices on the GP-IB system or devices specified by A₀ to A_n, and puts the device in local mode.

Format: 1. GTL

The REN line is set to HIGH level and all devices are local.

2. GTL A₀, A₁, ..., A_n

It sends GTL message to the device specified A₀ to A_n.

A₀ to A_n: Device address (00 to 30) decimal two digits

Example) GTL 00, 01, 30

It sets the device address 0, 1, 30 to local mode.

(6) LLO (Local Lock Out)

Function: It sends LLO message to all the devices on the GP-IB system and disable the device in local mode.

Format: LLO

(7) GET (Group Execute Trigger)

Function: It sends GET message to the device specified by A0 to An on the GP-IB system and trigger the device.

Format: GET A₀, A₁, ..., A_n

A₀ to A_n: device address (00 to 30), decimal to digits

Example) GET 00, 01, 30

Trigger device address 0, 1, and 30.

(8) CMD (Command)

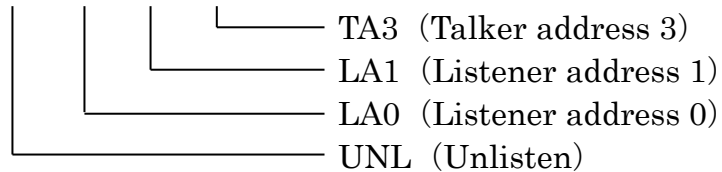
Function: It controls the bus by outputting the ATN line of C0 to Cn message command code to LOW level on the GP-IB system. The command code is represented by two hexadecimal digits.

See 4-11. Message code table page16.

Format: CMD C₀, C₁, ..., C_n

C₀~C_n: Command code (00~FF) two hexadecimal digits (n < 32)

Example) CMD 3F, 20, 21, 43



(9) TAD (Talker Address)

Function: It will use the equipment specified by A on the GP-IB system as a talker. It is able to designate only one device.

Format: TAD A

A: device address (00 to 30) decimal two digits

Example) TAD 01

It takes the device with device address 1 as a talker.

(10) LAD (Listener Address)

Function: It will use the devices specified in A0 to An on the GP-IB system as listeners.

Format: LAD A₀, A₁, ..., A_n

A₀~A_n : device address (00 to 30) decimal two digits

Example) LAD 00, 01, 30

It takes the devices with device address 0, 1, 30 as listeners.

(11) DAT (Data)

Function: The ATN line of the ASCII data after the space on the GP-IB system is set to HIGH level and output. This command does not send a delimiter.

In case of “multi-command = set”, colon can not use as data. When using colon, please set to “multi-command = none”.

Separate data (comma) is unnecessary.

Format: DAT X₀X₁...X_n

X₀ to X_n: ASCII data (n < 16384 bytes, including command and delimiter)

Example) DAT ABCD1234

Set data mode on GP-IB and output ABCD1234.

(12) DATB (Data Binary)

Function: The ATN line of the binary data after the space on the GP-IB system is set to HIGH level and putout.

Data expressed in hexadecimal two digits is converted to binary data and output. This command does not send a delimiter.

The maximum data is 5,000.

Format: DATB XY₀, XY₁, ...XY_n

XY₀~XY_n: Represent 1 byte of binary data in two hexadecimal digits (n < 5,000).

Example) DATB 05, F0, 0A, A0

| MSB | LSB | | | | | | | |
|-----|-----|---|---|---|---|---|---|-------------------------|
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 st byte 05 |
| 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2 nd byte F0 |
| 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 3 rd byte 0A |
| 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 th byte A0 |

(13) OUT (Output)

Function: Send the ASCII data after the semicolon (;) and the delimiter specified by the DLM command to the designated device on the GP-IB system. It is able to specify only one device.

In case of “multi-command = set”, colon can not use as data. When using colon, please set to “multi-command = none”.

Separate data (comma) is unnecessary.

Format: OUT A ; X₀X₁...X_n

A : device address to specify as a listener(00 to 30), decimal two digits.

X₀ to X_n: ASCII data (n < 16384 bytes including data and delimiter)

Example) OUT 01 ; 1234WXYZ

Send the data 1234WXYZ and the delimiter specified by the DLM command to the device at the device address 1.

(14) OUTB (Output Binary)

Function: Binary data after the semicolon (;) and regardless of the DLM command, EOI is sent as a delimiter to the specified device on the GP-IB system. It is able to specify only one device.

It converts the data expressed in hexadecimal two digits to binary data and send it.

The maximum data is 5,000.

Format: OUTB A ; XY₀, XY₁, ..., XY_n

A: device address to specify as a listener (00 to 30), decimal two digits.

XY₀~XY_n: represent 1 byte of binary data in two hexadecimal digits.

(n < 5,000)

Example) OUTB 01 ; 50, F0, 0A, A0

It outputs to the device of device address 1 as below and sends the EOI as a delimiter.

| MSB | | | | | | | | LSB | |
|-----|---|---|---|---|---|---|---|-----------------------------------|--|
| 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 st byte 50 | |
| 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2 nd byte F0 | |
| 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 3 rd byte 0A | |
| 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 th byte A0 (EOI set) | |

(15) INP (Input)

Function: It receives ASCII data from the specified talker device on the GP-IB system and sends it the host computer after it finishes. Reception from the GP-IB ends with a delimiter.

The data that can be received is 16Kbytes or less, and data larger than that is handshaked but it is not stored in the internal buffer.

It is possible to specify only one device.

When using with multi-command, please do it last.

Format: INP A

A: device address to specify as a talker (00 to 30), decimal two digits.

Format of data sent to the host computer.

$X_0X_1X_2\cdots X_n$ delimiter

X_0 to X_n : ASCII data read from the device at device address A.

Example) INP 01

Read ASCII data from the device with device address 1.

(16) INPB (Input binary)

Function: It receives binary data from the talker device specified by A on the GP-IB system, converts the binary data into the hexadecimal two digits format and sends it to the host computer after it finishes.

Reception from the GP-IB ends with a delimiter, please specified EOI. The data that can be received is 16Kbytes or less, and data larger than that is handshaked but it is not stored in the internal buffer. It is possible to specify only one device.

When using with multi-command, please do it last.

Format: INPB A

A: device address (00 to 30), decimal two digits.

Format of data sent to the host computer.

$XY_0XY_1XY_2\cdots XY_n$ delimiter

XY_0 to XY_n : Binary data read from the device with device with address A is sent.

Example) INPB 01

Read binary data from the device with device address 1.

(17) IND (Input Data)

Function: It receives ASCII data from the specified talker device on the GP-IB system and sends it the host computer after it finishes. Reception from the GP-IB ends with a delimiter. The data that can be received is 16Kbytes or less, and data larger than that is handshaked but it is not stored in the internal buffer.

When using with multi-command, please do it last.

This command is used to receive repeated data from a talker that has already been set up.

Format: IND

Format of data sent to the host computer.

X₀X₁X₂.....X_n delimiter

X₀ to X_n: inputted ASCII data

(18) INDB (Input data binary)

Function: Receives binary data from the device specified by the talker on the GP-IB system, converts the binary data into hexadecimal two digits format and sends it to the host computer after finishes.

Reception ends with a delimiter, please specify EOI. The data that can be received is less than 16Kbytes and data larger than that is handshaked but it is not stored in the internal buffer.

When using with multi-command, please do it last.

Format: INDB

Format of data sent to the host computer.

XY₀XY₁XY₂.....XY_n delimiter

XY₀ to XY_n : It converts the read binary data to hexadecimal two digits format and sends it.

(19) RDS (Read status byte)

Function: It executes the serial poll to all devices specified by A0 to An on the GP-IB system and return the device address and status byte to the host computer.

The format of the data to be returned to the host computer is the hexadecimal code with the device address two digits and the status byte two digits as one set in the order specified by the RDS command.

Format: DS A₀, A₁, ..., A_n

A₀ to A_n: device address(00 to 30), decimal two digits.

Format of data sent to the host computer.

A₀S₀A₁S₁...A_nS_n delimiter

A₀ to A_n: device address (00 to 1E), hexadecimal two digits.

S₀ to S_n: status byte (00 to FF), hexadecimal two digits

When this data is 40(HEX) or more, SRQ occurs.

Example) RDS 00, 01, 30

Check the status bytes of device address 0, 1 and 30. In case of the returned data is the following data [], the device with device address 0 is generating SRQ. [004001001E00 delimiter]

(20) DLM (Delimiter)

Function: It specifies the delimiter when outputting from ZS-6143AF onto the GP-IB system. After power ON, CR.LF&EOI is specified.

Format: DLM P

P: parameter (00 to 04)

| | |
|----|-----------|
| P | delimiter |
| 00 | CR.LF&EOI |
| 01 | LF&EOI |
| 02 | LF |
| 03 | CR.LF |
| 04 | EOI |

Example) DLM 01

Delimiter is specified as LF&EOI.

(21) TOE (Time Out Error)

Function: When the GP-IB handshake stops, set the timeout to exit from that state by parameter.

Timeout is a value multiplied by 100ms to the number converted into decimal number that is represented by hexadecimal two digits. If the handshake stops longer than the timeout setting, send G-ERR message to the host computer.

After power ON, P=00 is set.

Format: TOE P

P: parameter (00 to FF), hexadecimal two digits.

| P | Delimiter |
|----|--------------------------|
| 00 | Without timeout function |
| 01 | 100ms |
| 02 | 200ms |
| ⋮ | ⋮ |
| FF | 25.5sec |

(22) SRQE (Service Request Enable)

Function: ZS-6143AF becomes SRQE status.

When SRQ occurs on the GP-IB system, it sends SRQ to the host computer.

If SRQ occurs during execution of another command, it sends and SRQ message after sending the message or data.

Format: SRQE

Data sent to the host computer.

SRQ delimiter

(23) SRQD (Service Request Disable)

Function: ZS-6143AF becomes SRQD status.

It ignores generated SRQ on the GP-IB system.

After power on, this mode is set.

Format: SRQD

4-7 Table of commands

| NO | command | format | remarks |
|----|---------|--|---|
| 1 | REM | REM | REN=L |
| 2 | IFC | IFC | |
| 3 | DCL | DCL | |
| 4 | SDC | SDC A ₁ ,A ₂ ,···,A _n | |
| 5 | GTL | GTL A ₁ ,A ₂ ,···,A _n | In case of without device address, REN=H |
| 6 | LLO | LLO | |
| 7 | GET | GET A ₁ ,A ₂ ,···,A _n | |
| 8 | CMD | CMD C ₁ ,C ₂ ,···,C _n | |
| 9 | TAD | TAD A | Specified talker address |
| 10 | LAD | LAD A ₁ ,A ₂ ,···,A _n | Specify listener address |
| 11 | DAT | DAT X ₁ X ₂ ···X _n | Device address not accompanied |
| 12 | DATB | DATB XY ₁ ,XY ₂ ,···,XY _n | Device address not accompanied Execute after specifying with LAD |
| 13 | OUT | OUT A;X ₁ ,X ₂ ,···X _n | Device address shall be one Execute after specifying with LAD |
| 14 | OUTB | OUTB A;XY ₁ ,XY ₂ ,···,XY _n | Device address shall be one |
| 15 | INP | INP A | Device address shall be one Execute after specifying with TAD |
| 16 | INPB | INPB A | Device address shall be one Execute after specifying with TAD |
| 17 | IND | IND | Device address not accompanied |
| 18 | INDB | INDB | Device address not accompanied |
| 19 | RDS | RDS A ₁ ,A ₂ ,···,A _n | Status response is hexadecimal code |
| 20 | DLM | DLM P | P=00 to 04 |
| 21 | TOE | TOE P | P=00 to FF (hexadecimal code) |
| 22 | SRQE | SRQE | |
| 23 | SRQD | SRQD | |

Note) A_n=00 to 30 (device address)

Note) When using the command of #15 to #19 with multi command, please send it at the end of the command.

4-8 Operation sequence with RS-232C

After tuning on the power, RTS signal can be received all the time.

RTS signal turns off when 1 byte of data is received.

RTS signal turns on when the reception processing is completed.

Data is transmitted when the CTS signal is ON.

4-9 Error message

| Error code | Contents |
|----------------------------|--|
| F-ERR (Format Error) | Command format is incorrect. The number of specified address exceeds 31. The total number of received commands and transmitted data is more than 16 Kbytes or the number of data exceeds 5000 with some commands. Data transmission command was not set at the end when multi command was used. |
| G-ERR (Timeout Error) | When handshake timeout was set in GP-IB, the handshake did not end within the set time. There was no listener when ZS-6143AF performed the talker operation. |
| O-ERR (Overflow Error) | It was sent more than 16 Kbytes including delimiter from the host computer. |
| P-ERR (Parameter Error) | The address and parameters of each command are out of range. Binary data is a value other than 0 to F. |
| R-ERR (RS-232C Error) | A transfer error (parity, framing, overrun error) occurred in RS-232C. |
| T-ERR (Timeout Error) | The interval between the character sent from the host computer and the next character being sent exceeds 1 second. |

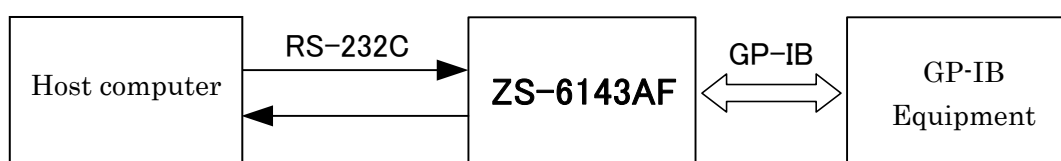
Note) When G-ERR occurs, ZS-6143AF sends UNT(5FH) and UNL(3FH) to stop communication. In this case, please reset the talker and listener.

When R-ERR occurs, TX and RX LEDs are blinked at the same time and the unit becomes the power-supply wait status. All commands will not be accepted after that. In this case, please turn on the power again and restart ZS-6143AF.

Note) In case of an error other than R-ERR, processing of the command is aborted when an error occurs.

4-10 How to use

- (1) Set the GP-IB device address with bits 1 to 5 of the ADR switch(SW3). This is the GP-IB device address of ZS-6143AF.
- (2) Set the protocol of RS-232C with bits 1 to 7 of the MODE switch(SW2) and the baud rate switch(SW4).
- (3) Refer to [5. Connection of the RS-232C cable](#) for the connection of RS-232C cable.
- (4) Please turn on the power to GP-IB equipment, ZS-6143AF, host computer in that order. It becomes usable state.
- (5) The configuration of the equipment should be as below.



4-11 GP-IB Message code table

The command information is outputted from the controller when the ATN signal is “L”, and codes are assigned as shown below.

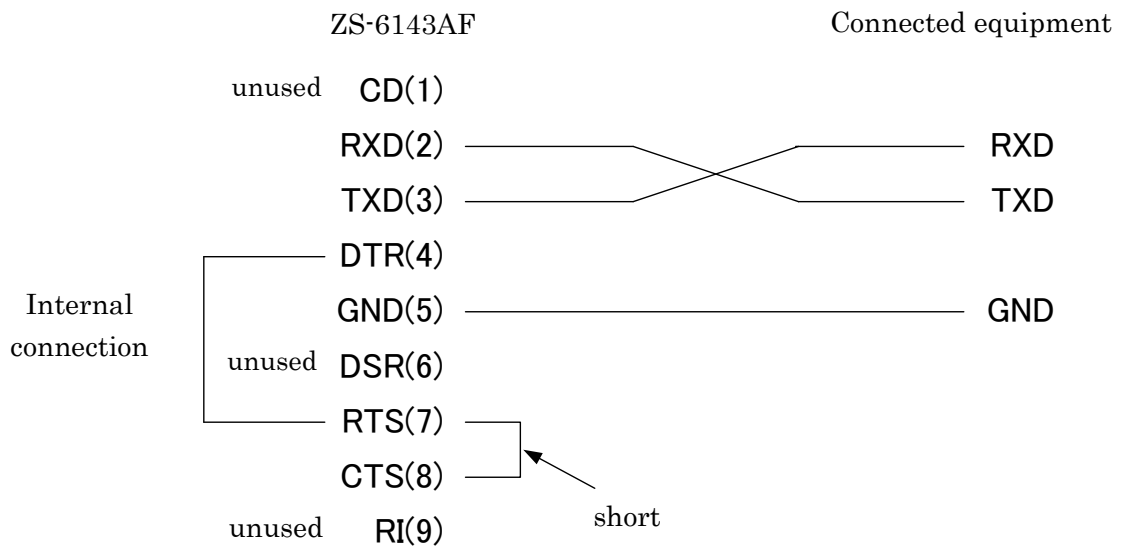
| Bits | b7 | | | | 0 | ① | 0 | MSG | | 0 | MSG | | 1 | MSG | | 1 | MSG | | 1 | MSG | | |
|------|----|----|----|----|--------|-----|-----------|-----|-----|----|-----|---|-----|-----|-----|---|-----|---|-----|-----|-----|---|
| | b5 | | b6 | | 0 | MSG | 0 | MSG | | 1 | MSG | | 0 | MSG | | 1 | MSG | | 1 | MSG | | |
| | b1 | b2 | b3 | b4 | column | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | | | | | | | | |
| | | | | | row | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | NUL | | DLE | | SP | | | | | | | | | | | | |
| 0 | 0 | 0 | 1 | 1 | 1 | SCH | GTL | DC1 | LLO | ! | | | | | | | | | | | | |
| 0 | 0 | 1 | 0 | 2 | 2 | STX | | DC2 | | " | | | | | | | | | | | | |
| 0 | 0 | 1 | 1 | 3 | 3 | ETX | | DC3 | | # | | | | | | | | | | | | |
| 0 | 1 | 0 | 0 | 4 | 4 | EOT | SDC | DC4 | DCL | \$ | | | | | | | | | | | | |
| 0 | 1 | 0 | 1 | 5 | 5 | ENQ | ②③ PPC | NAK | PPU | % | | | | | | | | | | | | |
| 0 | 1 | 1 | 0 | 6 | 6 | ACK | | SYN | | & | | | | | | | | | | | | |
| 0 | 1 | 1 | 1 | 7 | 7 | BEL | | ETB | SPE | ' | | | | | | | | | | | | |
| 1 | 0 | 0 | 0 | 8 | 8 | BS | GET | CAN | SPD | (| | | | | | | | | | | | |
| 1 | 0 | 0 | 1 | 9 | 9 | HT | ④ TCT | EM | |) | | | | | | | | | | | | |
| 1 | 0 | 1 | 0 | 10 | 10 | LF | | SUB | | * | | | | | | | | | | | | |
| 1 | 0 | 1 | 1 | 11 | 11 | VT | | ESC | | + | | | | | | | | | | | | |
| 1 | 1 | 0 | 0 | 12 | 12 | FF | | FS | | . | | | | | | | | | | | | |
| 1 | 1 | 0 | 1 | 13 | 13 | CR | | GS | | - | | | | | | | | | | | | |
| 1 | 1 | 1 | 0 | 14 | 14 | SO | | RS | | . | | | | | | | | | | | | |
| 1 | 1 | 1 | 1 | 15 | 15 | SI | | US | | / | | | | | | | | | | | | |
| | | | | | | | | | | | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| | | | | | | | | | | | ACG | | UCG | | LAG | | TAG | | PCG | | SCG | |

- Note) ① MSG is interface message
- Note) ② b1=DI01, b7=DI07, DI08 is unused
- Note) ③ Accompanied by a secondary command
- Note) ④ Unrecognized command (UNC)
- GTL···Go to Local
 - SDC···Selected Device Clear
 - PPC···Parallel Poll Configure
 - GET···Group Execute Triger
 - TCT···Take Control
 - LLO···Local Lockout
 - DCL···Device Clear
 - PPU···Parallel Poll Unconfigure
 - SPE···Serial Poll Enable
 - SPD···Serial Poll Disable

5. Connection of the RS-232C cable

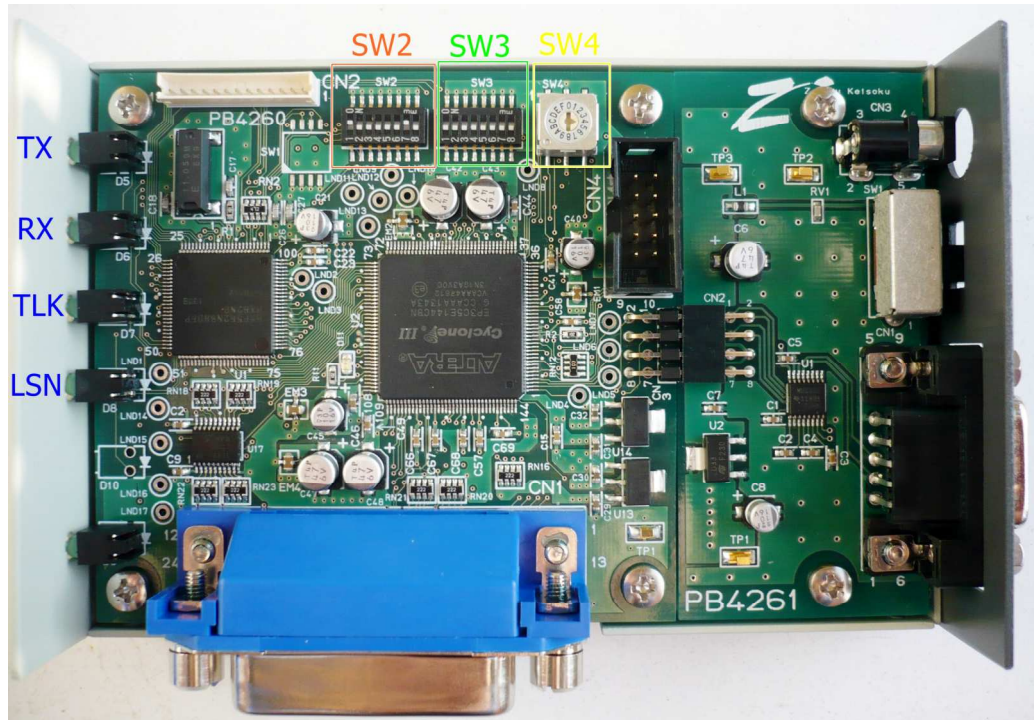
Please use Dsub-9pin, as a KR-ECLK, KR-LK or equivalent for the cable of ZS-6143AF.

When communicating with only TXD, RXD, please wire as below. However, if you set the baud rate higher than 57,600bps, communication error may occur.



6. Function

GP-IB address, RS-232C communication protocol, and other operating modes are set with the switch on the board. Take the screws at the 4 corners, remove the top cover and make the settings. The LED indicates the communication status of GP-IB and RS-232C.

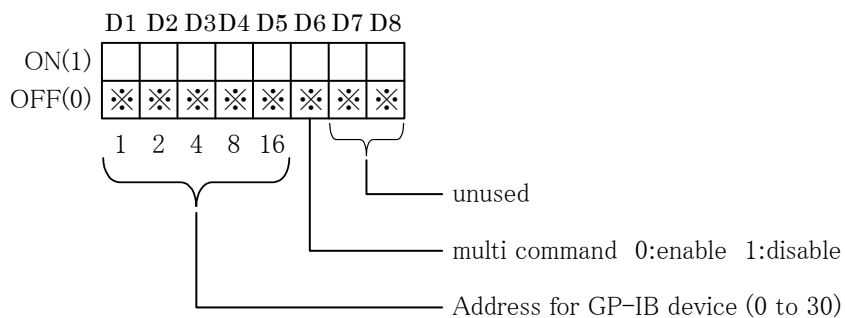


There is a product with SW1 (4 bit dip switch) mounted on the left side of SW2, but please use this switch in its initial setting.

6-1 ADR switch (SW3)

It specifies the GP-IB address and controls.

※ is initial setting.

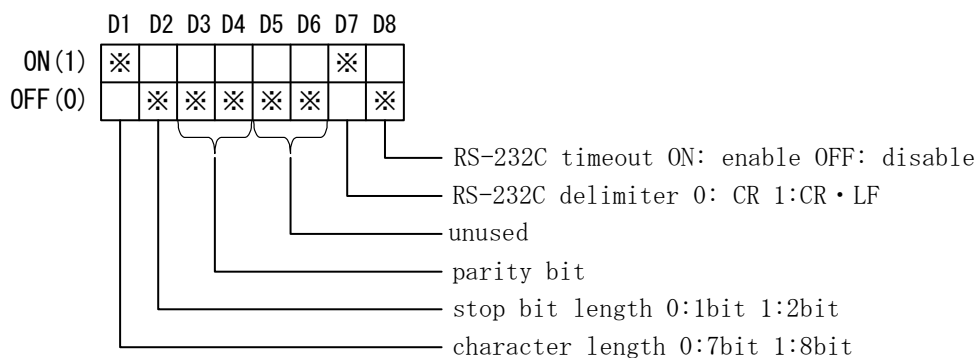


Note) Do not set “31” as GP-IB address.

Note) Do not set it to same address as the device connected to GP-IB.

6-2 MODE switch (SW2)

It sets the communication protocol of RS-232C.



| Parity bit | | |
|------------|----|----------|
| D3 | D4 | contents |
| 0 | 0 | none |
| 1 | 0 | odd |
| 1 | 1 | even |

6-3 Baud rate switch (SW4) Initial setting: 9600bps

| Switch # | Baud rate (bps) |
|----------|-----------------|
| 0 | 1,200 |
| 1 | 2,400 |
| 2 | 4,800 |
| 3 | 7,200 |
| 4 | 9,600 |
| 5 | 14,400 |
| 6 | 19,200 |
| 7 | 28,800 |

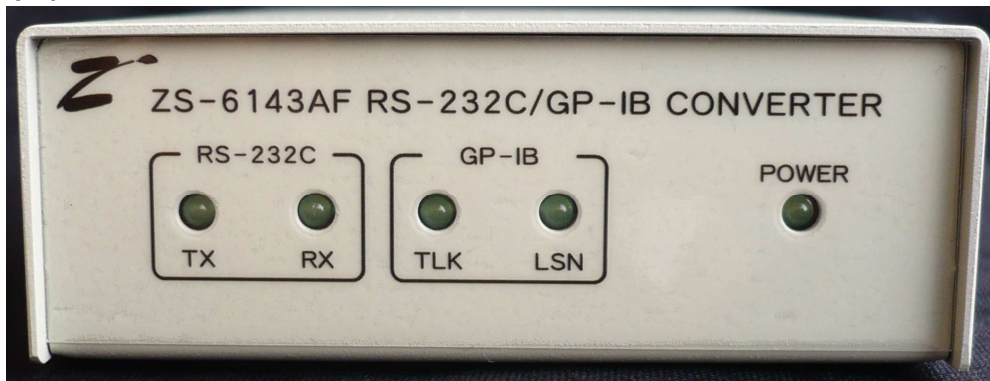
| Switch # | Baud rate (bps) |
|----------|-----------------|
| 8 | 38,400 |
| 9 | 57,600 |
| A | 115,200 |
| B | 230,400 |
| C | 460,800 |
| D | 921,600 |
| E | Unused |
| F | Unused |

6-4 LED

| Name | Status |
|-------|-----------------------------|
| POWER | Enable |
| TX | Data transfer to RS-232C |
| RX | Receiving data from RS-232C |
| TLK | Data transfer to GP-IB |
| LSN | Receiving data from GP-IB |

7. Appearance

Front



Back



8. Warranty

If it fails during normal use, we will repair it free of charge as described in this warranty as below.

- 1) During the warranty period which is one year from the date of purchase, we will repair it free of charge in case of malfunction in accordance with instruction manual.
- 2) It will be charged for extra in the following case, even during warranty period.
 - Incorrect usage or failure or damage caused by carelessness.
 - Failure or damage caused by improper repair or remodeling.
 - Failure or damage caused by external factors such as fire, earthquake, other natural disasters, abnormal voltage and so on.
 - Replacement of consumable parts.
 - Change of power supply and voltage.
- 3) This warranty provision is effective only in Japan.