
ADVANTEST®
ADVANTEST CORPORATION

*INSTRUCTION
MANUAL*

Q8142A/8143A
LD LIGHT SOURCES

MANUAL NUMBER OEA00 9102

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1.1 This Instruction Manual

1. General Information

1.1 This Instruction Manual

This instruction manual is common to both the Q8142A and Q8143A LD Light Sources. The difference between the two models is as follows.

Peak wavelengths of emission: Q8142A: 1310 \pm 10 nm
Q8143A: 1550 \pm 20 nm

1.2 Product Outline

The Q8142A/Q8143A LD light sources are stabilized for single/multi-mode fibers with 1.3 and 1.55 μ m bands. A Fabry-Perot type laser diode (hereafter referred to as LD) is used as the emission element, and the light output and emission wavelength are stabilized by the APC (Automatic Power Control) and the ATC(Automatic Temperature Control) circuits.

There are three modes for light output with CW, CHOP and EXT MODULATION, where CW is the continuous light output without modulation, CHOP is the chopped light output of a square waveform with 270Hz modulation, and EXT MODULATION makes modulation of the intensity of light output possible by superpositing the signal supplied from an external input connector. A synchronized signal is also output in the CHOP mode to provide high sensitivity measurement when used with a lock-in amplifier.

A spherically polished (PC polished) FC-type connector is used for the light output terminal. By making use of the spherically polished fiber for the external connection as well, the effect of the reflected light is reduced, making stabilized measurement possible.

DANGER!

This instrument emits an invisible laser beam. Because the beam causes damage to the eyes, never look directly into it or use optical instruments such as a magnifying glass or microscope to observe the surface of the output connector terminal or that of the connected fiber while the light output is on.

1.3 Prior to Initial Operation

1.3.1 Inspection for damage to the outside and attachments

When you have received the product, inspect for damage caused during transportation. If it has been damaged or does not work to specification, please contact the dealer or support office. The addresses and phone numbers of the support offices are given at the end of this manual.

Table 1-1 Standard Attachments for models Q8142A/8143A

Parts name	Standard	Parts code	Quantity	Remarks
Power cable	—	A01402	1	
Slow blow fuse	EAWK 0.5A	DFT-AAR5A	2	
Instruction manual	—	EQ8142A/8143A	1	English version

1.3.2 Environmental specifications and cautions

(1) Environmental specifications

This instrument should be operated under a temperature and humidity environment of 0 °C to +40 °C and less than 85%.

In order to insure that this instrument works to specification, operate in an environment with low temperature variation.

(2) Vibration and shock

If strong vibration or shock is applied to this instrument, the performance might be degraded. Be careful not to apply more vibration or shock than occurs during normal transportation.

(3) Warming up duration

Immediately upon power up, all functions of this instrument will work. A warming up period of more than 30 minutes, however, is required to obtain the specified stability.

(4) Storage

If this instrument is not be used for a long period, wrap it in a vinyl sheet, put in a corrugated cardboard box, store in a place with low humidity and do not expose to direct sunlight.

The temperature range for storage is from -20 °C to +70 °C.

1.3.3 Line power, grounding and fuse

(1) Line power

The voltage of the line power is indicated in the line voltage receptacle on the rear panel. Before operation, make sure that the line voltage in your area matches the indicated value. Only pull out or push in the power cable after confirming that the instrument power switch is turned off.

(2) Power cable and grounding

Always ground the instrument when operating it on commercial power.

This instrument is equipped with a 3-pin power plug, the cylindrical center pin of which is to be grounded. When connecting the plug to the AC outlet using the attached A09034 adapter, the ground wire [Fig. 1-1 (a)] or the GND terminal on the rear panel should be connected to the ground.

The attached A09034 adapter meets the Electrical Appliance Regulations of Japan.

Since pin widths A and B of the two poles of the A09034 adapter differ as shown in [Fig. 1-1 (b)], only connect to the AC outlet after confirming the direction of the poles of the plug and AC outlet.

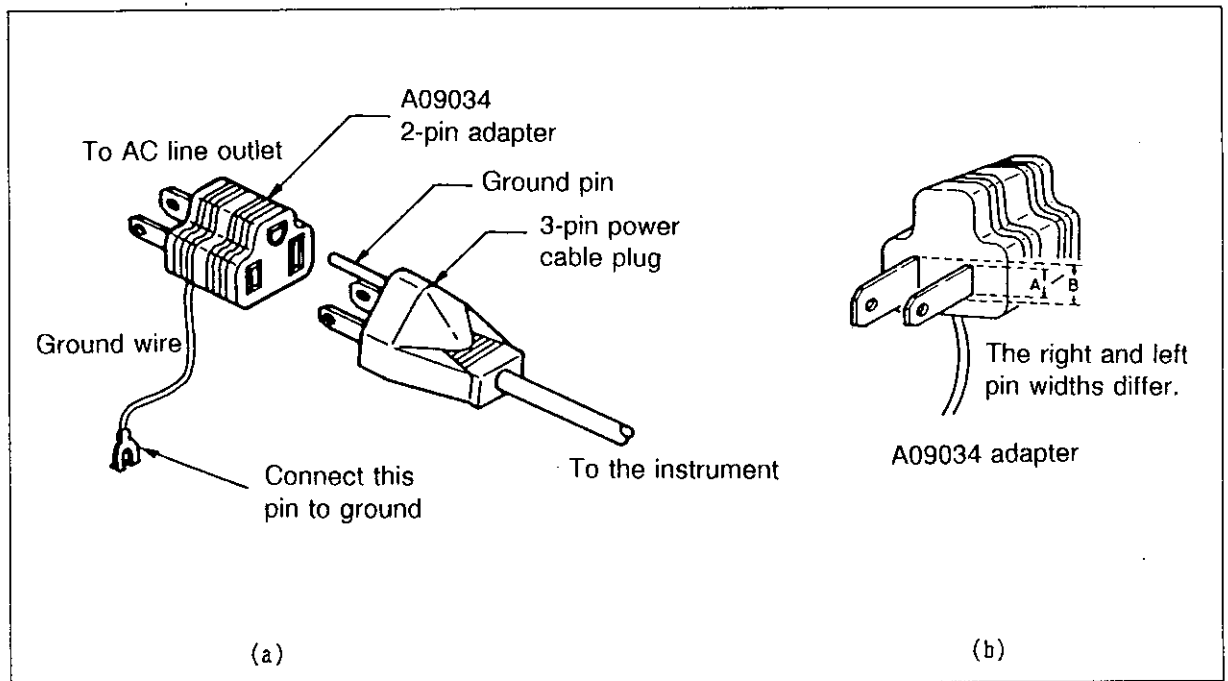


Fig. 1-1 Power Cable Plug and Adapter

(3) Confirmation and replacement of fuse

CAUTION

When replacing the fuse, always remove the power plug from the AC outlet first.

The power supply fuse is installed in the fuse holder of the back panel. When the fuse must be confirmed or changed, pull forward the cap of fuse holder after the power supply cable is disconnected from the power supply connector, then the fuse can be taken off.

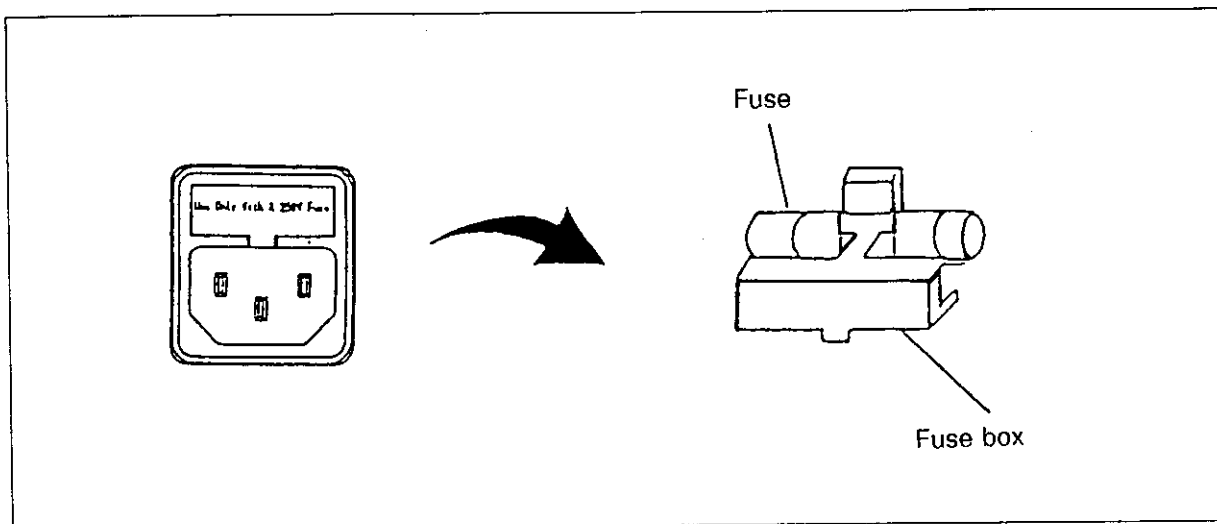


Fig. 1-2 Fuse holder

1.3.4 Self-diagnosis function

Immediately upon power up, all LEDs on the panel will come on for about 1 second for checking purposes. During this time, an internal RAM check is also executed. If all LEDs remain on, the instrument is in an abnormal state. In this case, please contact the dealer or support office. The addresses and phone numbers of the support offices are given at the end of this manual.

1.3.5 Cautions on operation

- (1) Danger of output power

DANGER!

This instrument emits an invisible laser beam. Because the beam causes damage to the eyes, never look directly into it or use optical instruments such as a magnifying glass or microscope to observe the surface of the output connector terminal or that of the connected fiber while the light output is on.

- (2) Cleaning the connector

Whenever the terminal of the connected optical fiber becomes dirty, inaccurate measurement and even damage to the terminal of the internal connector of this instrument may result. Use a non-damaged connector. And before connecting, clean the terminal of the connector with cloth impregnated with alcohol.

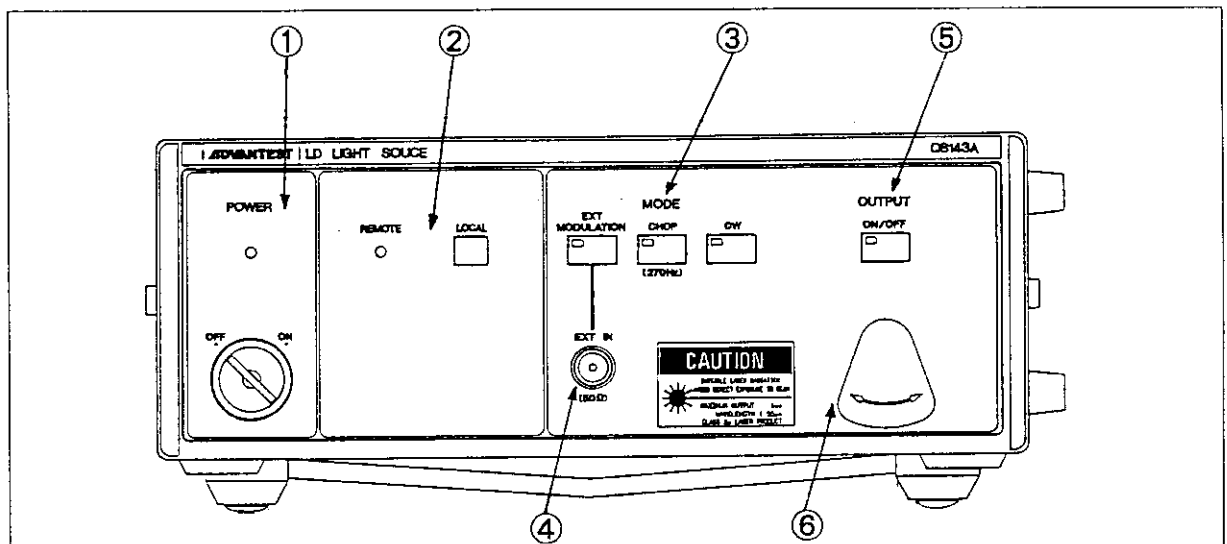
- (3) Input level for external modulation

The maximum input level for external modulation is 0dBm (at 50 Ω). If excess power is applied to the input connector, the LD may be damaged. Also, be particularly careful of the central pole of the external modulation input connector since discharge between the pole and ground due to static electricity may result in damage to the LD.

2. Panel Descriptions

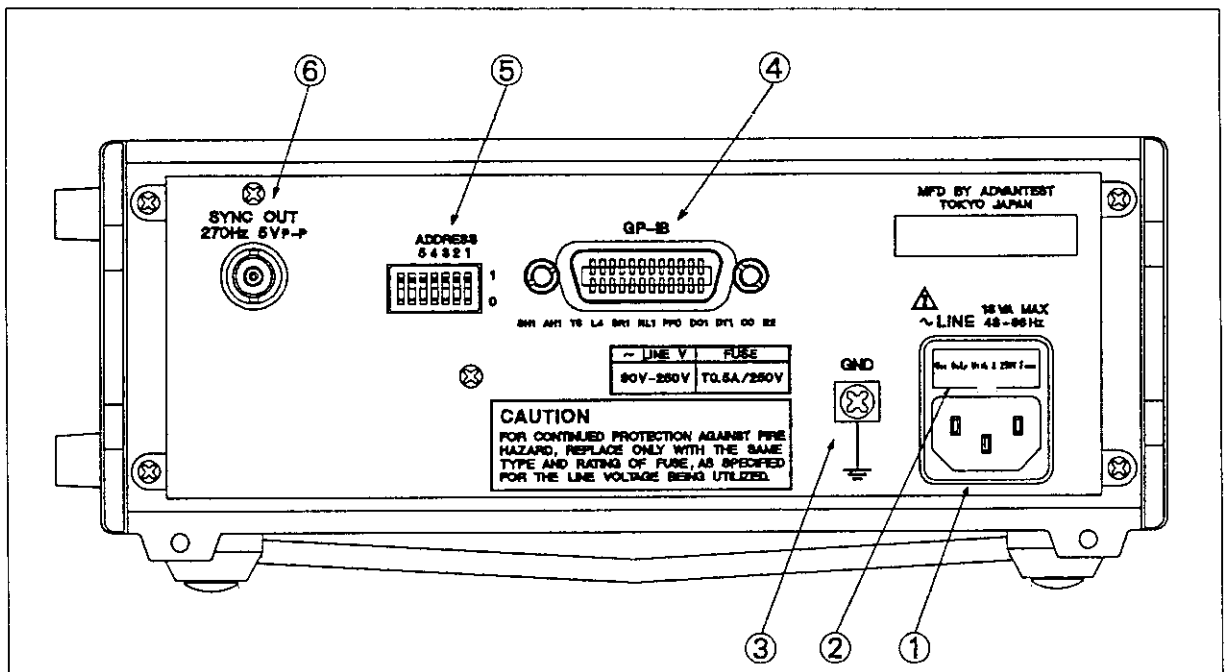
2.1 Front Panel

- ① POWER switch and POWER indicator
The instruments can be turned on by depressing and releasing POWER switch and POWER indicator on the front panel. Depressing and releasing a second time turns the power off with the switch remaining out.
- ② LOCAL/REMOTE mode switch and REMOTE indicator
This switch changes the instrument between LOCAL (manual operation) and REMOTE (GP-IB control) mode and vice versa.
The default mode is LOCAL on initial power up. Depressing the switch once, changes the mode to REMOTE and the REMOTE indicator comes on. Pushing it again, returns the mode to LOCAL.
If the GP-IB command for mode change is accepted in LOCAL mode, the instrument switches to REMOTE.
- ③ Output Mode selectors and indicators
CW : selects a non-modulated continuous light (default mode on initial power up) as the output mode.
CHOP : selects a square waveform, 270Hz modulated light as the output mode.
EXT MODULATION : selects an externally modulated light as the output mode.
- ④ Input connector for the external modulation signal
This is the input terminal for the modulation signal when the EXTERNAL MODULATION mode is selected.
- ⑤ Output control switch and indicator
This switch turns the light output ON or OFF. The indicator comes on when the light output becomes ON. The default mode is OFF on initial power up.
- ⑥ Output connector and shutter
This is for external optical fiber connection. The shutter prevents accidents.



2.2 Rear Panel

- ① Power cable receptacle
This is for connecting the AC line power cable. Connect the plug of the attached power cable (A01402).
- ② Fuse holder
This is designed for AC line power. When replacing the fuse, always remove the power cable plug from the AC outlet first.
- ③ Ground terminal
This terminal grounds the instrument chassis.
- ④ GP-IB connector
This is used for GP-IB cable connection.
- ⑤ GP-IB address switch
This is for setting the primary GP-IB address.
- ⑥ Output connector for the synchronized signal (270Hz OUT)
The signal synchronized to the light output is output to this terminal in CHOP mode.



3. Operating Instruction

3.1 Power-up Procedure

- ① After confirming that the power key is turned OFF, connect the power cable plug to the AC outlet.
- ② Depress the power switch to ON. At this time, all LEDs on the front panel will come on for about 1 second and a self-check is made. The LEDs will then go off and the instrument is ready for operation.
- ③ The default modes on initial power up are as follows:
Operation mode : LOCAL
Modulation mode : CW
Output control : OFF
- ④ If you want to use the EXTERNAL MODULATION mode, connect the cable to the input connector for EXTERNAL MODULATION.

CAUTION

Care is needed when connecting the BNC cable since the LD may be damaged by discharge current from the cable's charged central conductor.

3.2 Fiber Connection

- ① Before connecting the fiber, be sure to clean the fiber connection with ethanol or the like.
- ② Connect the fiber by turning the shutter clockwise or counterclockwise.

3.3 Switching the Modulation Modes

- ① Select the mode by depressing the desired mode switch.

3.4 Output Control

- ① Switch output ON or OFF by using the OUTPUT ON/OFF switch on the front panel.

MEMO



A large, empty rectangular area with rounded corners, enclosed by a dashed border, intended for writing the memo content.

4. GP-IB Interface

4.1 Introduction

This instrument can be connected to a GP-IB bus conforming to IEEE 488-1978 standard.

4.2 GP-IB Interface Overview

The GP-IB interface provides a bus line for measuring instruments through simple cable connection (bus line) to a controller or other peripheral device.

In the GP-IB system, the "primary address" should first be determined for each instrument connected to the bus line. These instruments can play one or more roles of controller, talker (device for "talking") and listener (device for "listening").

While the system is in operation, only one "talker" can send data on the bus, while several "listeners" can accept it. The controller specifies the address of the "talker" and the "listener(s)", sends data from the "talker" to the "listener(s)" or sends the measuring setup conditions from the controller itself ("talker") to the "listener(s)".

For data transfer between devices, eight data lines are used in bit-parallel, byte-serial format, with asynchronous transfer in both directions.

Thanks to this asynchronous system, both high-speed and low-speed instruments can co-exist and the connection between them is possible.

The data (messages) sent or received between instruments handles the measured data, the measuring conditions (programs) and various commands in ASCII code.

In addition to the eight data lines, the GP-IB bus has three handshake lines for controlling the transfer sequence of the asynchronous data bytes between instruments, and five management lines for controlling the flow of information on the bus.

- For the handshake lines, the following signals are used:
 - DAV (Data Valid) indicates that data is valid for any listener.
 - NRFD (Not Ready For Data) indicates that the accepting instrument is not ready for data reception.
 - NDAC (Not Data Accepted) Indicates that the device has not accepted data.

- For the management lines, the following signals are used:
 - ATN (Attention) interprets whether the data line signals are addresses, commands or other information.
 - IFC (Interface Clear) clears the interface bus and returns all active devices to idle state.
 - EOI (End or Identify) used to mark the end of a multi-byte data transfer sequence.
 - SRQ (Service Request) requests service from the controller for some instruments.
 - REN (Remote Enable) places devices capable of being remotely programmed, in remote mode .

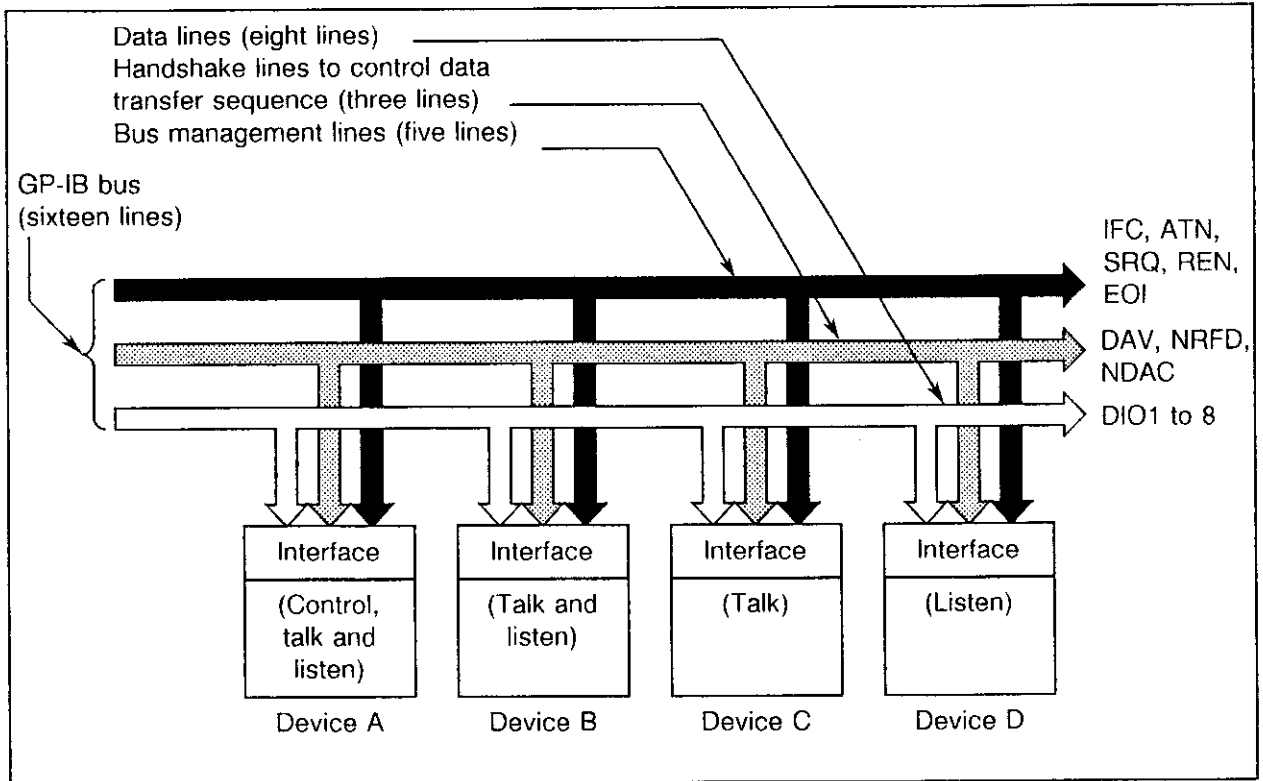


Fig. 4-1 Outline of the GP-IB Interface

4.3 The GP-IB Standard and Specifications of this Instrument

Standard	:	IEEE488-1978
Code	:	ASCII
Logical level	:	Logical "0" (High) is more than +2.4V Logical "1" (Low) is less than +0.4V
Driver specifications	:	Open-corrector type (except EOI and DAV) "Low" level output voltage is less than +0.4V, 48mA "High" level output voltage is more than +2.4V, -5.2mA
Receiver specifications	:	Low state is less than +0.6V and High state is more than +2.0V.
Address specifications	:	31 addresses can be specified by using the ADDRESS switches for Talker/Listener address.
Cable length	:	The total length of the bus cables is limited as follows: The total length of the bus cable must be shorter than (number of devices to be connected to the bus line) × 2m and not longer than 20m.
Signal line termination	:	The sixteen bus lines are terminated as shown below.

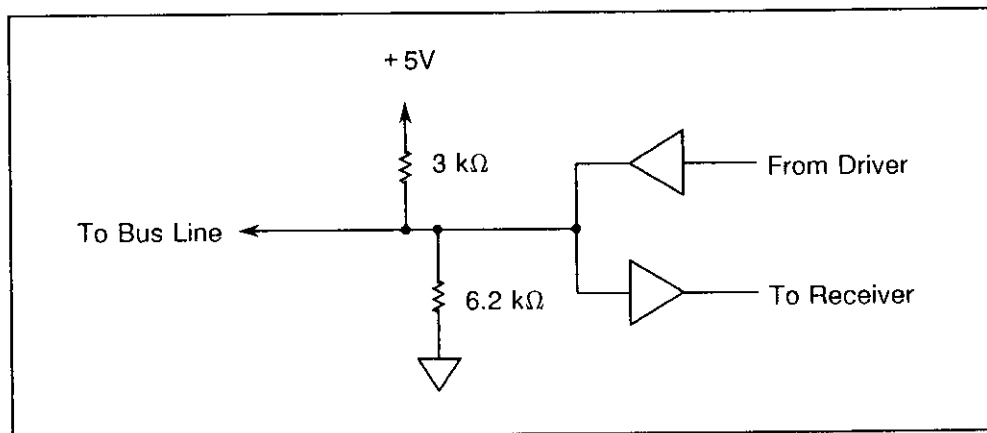


Fig. 4-2 Termination of the Signal Lines

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4.3 The GP-IB Standard and Specifications of this Instrument

Connector : 57FE-20240-20SD35 24-contact
GP-IB connector (compatible with products of Daiichi Dennshi Kogyo Inc. in Japan)

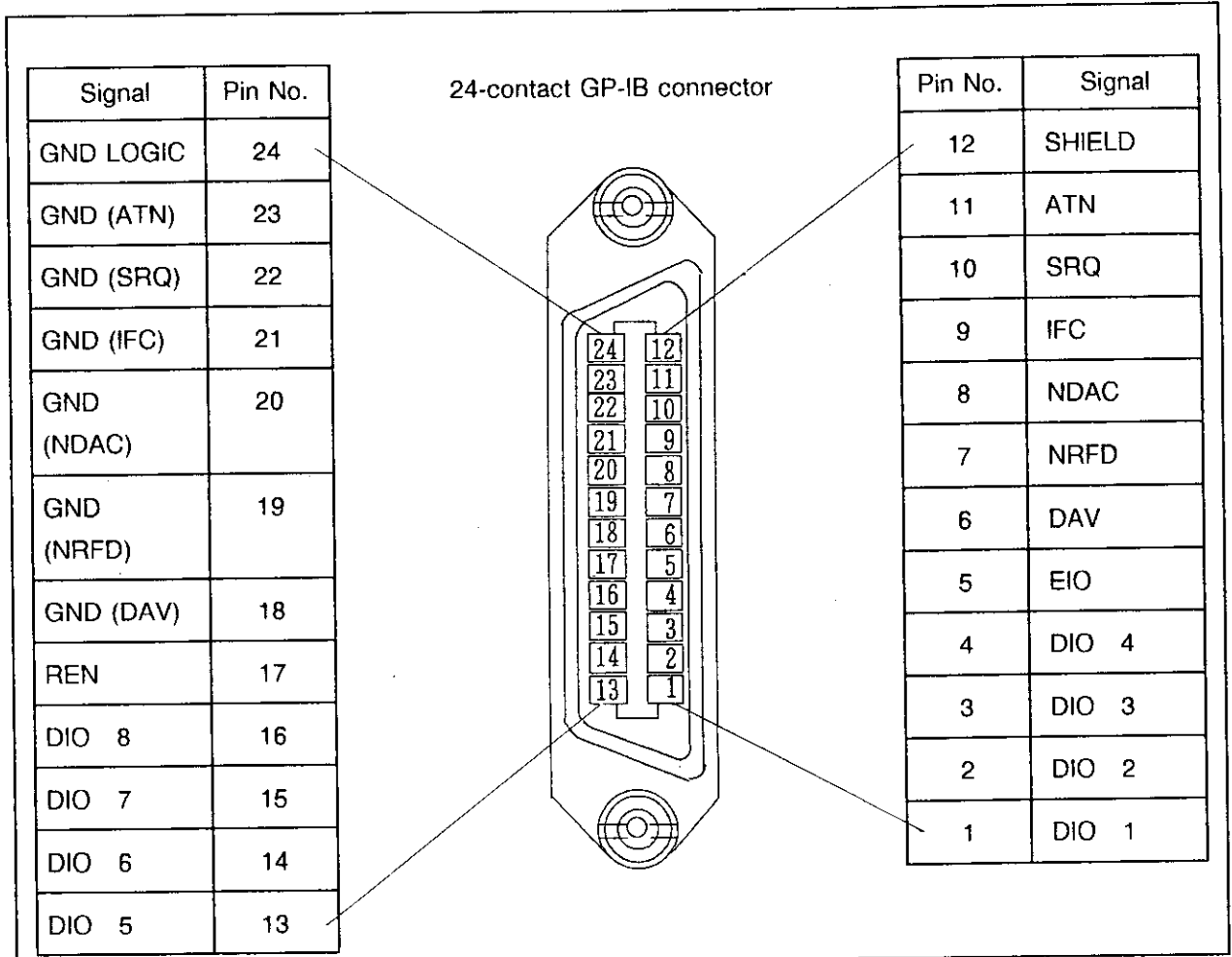


Fig. 4-3 Pin Assignment of the GP-IB Connector

Interface Function Codes [See Table 4-1]

Table 4-1 Interface Function Codes

Code	Interface function and description
SH1	Source Handshake capability
AH1	Acceptor Handshake capability
T5	Basic Talker Serial polling possible Talker release possible according to Listener specification No talk-only mode
L4	Basic Listener Listener release possible according to Talker specification No listen-only mode
SR1	Service request possible
RL1	Remote/Local possible
PR0	Parallel polling impossible
DC1	Device clear possible
DT1	Device trigger possible
C0	Controller impossible
E2	Tri-state output

4.4 GP-IB Control Procedure

4.4.1 Bus connection to component instruments

Since the GP-IB system is composed of multiple instruments, preparation of the total system is necessary with special attention being paid to the following:

- (1) Referring to the instruction manuals of this instrument, the controller and peripheral devices, confirm the state (preparation) and action of these instruments before bus connection.
- (2) Make sure that the cable length does not exceed than permitted for bus connection between instruments and the controller.

The total length of the bus cable must be shorter than [number of devices connected to the bus] × 2m and not longer than 20m.

It should be noted that the following optional standard cables are available.

Table 4-2 Standard Bus Cables (optional)

Length	Code
0.5 m	408JE-1P5
1 m	408JE-101
2 m	408JE-102
4 m	408JE-104

- (3) When connecting the bus cables, you are recommended not to stack no more than three connectors on any one instrument. Securely tighten the connector screws.
The bus cable connector is a piggy-back type with male and female connectors on either side designed to permit a number of parallel connections to be made on one instrument.
- (4) After confirming that the line power requirements, grounding and setup conditions, as necessary, of each device are satisfactory, turn the power of all instruments on.
All instruments connected to the bus line should be turned on. If any device is not powered up, the performance of the total system is not be guaranteed.
- (5) Before connecting or removing any of the bus cable connectors, be sure to remove the power cable plug from the AC outlet.

4.4.2 Preparation for operation

- (1) Connect the object to be measured to this instrument.
- (2) Set the GP-IB address using the switches on the rear panel (0 to 30).
The primary address of this instrument is factory set to "8".
- (3) Some controllers may have specifications written in ASCII code in stead of being numbered from 0 to 30. In this case, refer to Table 4-3 for the primary address.

Table 4-3 Table of ASCII Address Codes

ASCII code character		Decimal code
LISTEN	TALK	
SP	@	00
!	A	01
"	B	02
#	C	03
\$	D	04
%	E	05
&	F	06
'	G	07
(H	08
)	I	09
*	J	10
+	K	11
,	L	12
-	M	13
.	N	14
/	O	15
0	P	16
1	Q	17
2	R	18
3	S	19
4	T	20
5	U	21
6	V	22
7	W	23
8	X	24
9	Y	25
:	Z	26
;	[27
<	\	28
=]	29
>	-	30

4.4.3 General operating precautions

- (1) Caution when changing the setup primary address
If the primary address is changed while the power is ON, you should turn the instrument off then on again.
- (2) When this instrument is turned on or commands are received, it assumes the following states:

Table 4-4 Change in State by Command

	Talker (no LED indicator)	Listener (no LED)	Remote (no LED)	SRQ (no LED)	Status byte
POWER ON	Clear	Clear	Local	Clear	Clear
IFC	Clear	Clear	—	—	—
'DCL' and 'SDC' commands	Clear	—	—	Clear	Clear
"*CLR" and "*RST" codes	Clear	Set	Remote	Clear	Clear the b0-bit
'GET' command	Clear	—	—	—	Clear the b0-bit
"*TRG" code	Clear	Set	Remote	—	—
Serial Polling	—	Clear	—	Clear	—

- (3) If an 'ATN' request interrupts message transfer between devices, the preceding state is cleared since the 'ATN' code has priority.

4.5 GP-IB Bus Commands

This instrument responds to bus commands as shown in Table 4-5.

Table 4-5 Response to Bus Commands

Classification	Command	Action
Un-address Commands	UTL	Releases the instrument from Listener specification.
	UNT	Releases the instrument from Talker specification.
Universal commands	DCL	Sets the instrument to the default setup state in CW mode with OUTPUT OFF.
	LLO	Does not accept LOCAL mode switching.
	SPE	When the address of this instrument is specified, sends the status byte to the bus.
	SPD	Truncates the serial polling mode.
Address specified commands	GET	Sets OUTPUT ON.
	GTL	Moves to LOCAL mode but does not change the setup states.
	SDC	Same as DCL command.

4.6 GP-IB Management Lines

The response of this instrument to the state of the management lines is shown in Table 4-6.

Table 4-6 Response to the State of the Management Lines

Line	Action
ATN	"L" indicates that the byte on the bus is Interface Information, while "H" denotes data.
REN	The instrument enters GP-IB mode when this line is "L" and this instrument is specified to the Listener.
IFC	The interface is cleared when this line is "L" and the active Talkers and Listeners are also cleared.
SRQ	When an illegal command is accepted, this line changes to "L".
EOI	If the EOI is marked, this instrument interpret the end of one block.

4.7 Programming Codes for the GP-IB Functions

The programming codes to set the GP-IB functions are shown in Table 4-7.

Table 4-7 Programming codes for the GP-IB functions

Function	Programm- ing code	Default setup condition	Function
Block Delimiter			Block delimiter specified for data output.
CR + LF (EOI)	"DL0"	○	Sends the EOI code when the "CRLF" code is transmitted.
LF (EOI)	"DL1"		Transmits the "LF" code.
	"DL2"		Send the EOI code when the last data byte has been transmitted.
LF (EOI)	"DL3"		Sends the EOI code when the "LF" code is transmitted.
Service request	"SRQON"		Generates the SRQ signal.
	"SRQOF"	○	Does not generate the SRQ signal.
Clear Status	"*CLS"		Clears the status byte and cancels the SRQ signal when it has been generated.
Trigger	"*TRG"		Sets OUTPUT to "ON". Same as the "GET" command.
Initialize GPIB	"*CLR"		Initialization command for the GP-IB functions. Same as the "DCL" and "SDC" commands.
Initialize Parameter	"*RST"		Initialization command. Switches the instrument to initial setup state. Enables "CLR" command processing.

Note: "*CLS", "*TRG", "*CLR" and "*RST" are IEEE488.2 standard commands.

4.8 Setting the Measurement Functions

The programming codes for setting the measurement functions are shown in Table 4-8.

Table 4-8 Programming Codes for Setting the Measurement Functions

Function	Programm- ing code	Default setup condition	Function
Output ON/OFF	"LDON"		OUTPUT is "ON".
	"LDOF"	○	OUTPUT is "OFF".
Mode	"CW"	○	OUTPUT mode specified as CW light.
	"F270"		OUTPUT mode specified as 270 Hz CHOPped light.
EXT-Modulation	"EXTON"		EXTERNAL MODULATION is "ON" (OUTPUT mode is CW light).
	"EXTOF"	○	EXTERNAL MODULATION is "OFF".

4.9 Requesting Reading of Setup Conditions

The programming codes for requesting reading of setup conditions are shown in Table 4-9.

Table 4-9 Programming Codes for Requesting Reading of Setup Conditions

Programming code	Result and Output format	Content
"LD?"	"LDON"	OUTPUT is "ON".
	"LDOF"	OUTPUT is "ON".
"MOD?"	"CW"	OUTPUT mode is CW light.
	"F270"	OUTPUT mode is 270Hz CHOPped light.
"EXM?"	"EXTON"	EXTERNAL MODULATION is "ON".
	"EXTOF"	EXTERNAL MODULATION is "OFF"
"STS?"	Refer to ①	Transmits the OUTPUT state, OUTPUT mode and the the EXTERNAL MODULATION state simultaneously.

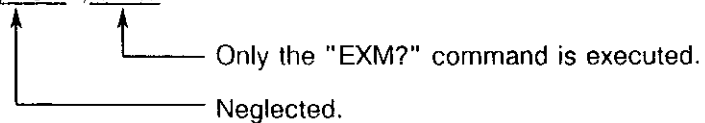
① Typical result of "STS?" command.

Example: "LDON,CW,EXTON"

② Reading commands should be sent separately.

When more than two programming commands are sent, only the last command is effective.

Example: "LD?,MOD?,EXM?"



In this case, use the "STS?" command.

4.10 Requesting Reading of GP-IB Setup Conditions

The programming codes for requesting reading of GP-IB setup conditions are shown in Table 4-9.

Table 4-10 Programming Codes for Requesting Reading of GP-IB Setup Conditions

Programming code	Result and Output format	Content
"DL?"	"DL0"	The delimiter is CR + LF (EOI).
	"DL1"	The delimiter is LF.
	"DL2"	The delimiter is (EOI).
	"DL3"	The delimiter is LF (EOI).
"SRQ?"	"SRQON"	Generates the SRQ signal.
	"SRQOF"	Does not generate the SRQ signal.

4.11 Interpretation of the Special Codes

Codes other than those defined by the control codes are interpreted as shown in Table 4-11.

Table 4-11 Interpretation of the Control Codes

Code	Name	Interpretation
SP	Space	Neglected.
,	Comma	Used as a data separator.
;	Semicolon	Used as a message separator.

4.12 Service Request

4.12.1 Outline

The Service Request is a function that interrupts the controller and informs the user of the operating state of the instrument when the specified operating state is entered.

The operating state is identified by the status byte using the contents of the 8-bit register. When an instrument requests service (SRQ), the controller searches the GP-IB bus for the device requesting service. When the instrument is found, the controller sends the "SPE (Serial Poll Enable)" command in order to inform it that the controller is ready accept the status byte. The controller determines the operating state of the instrument through the contents of the status byte.

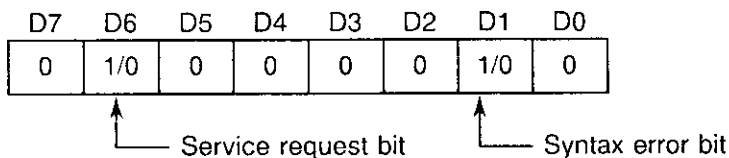
4.12.2 Request for service and Status Byte

When the "SRQON" mode is specified, the instrument sends a service request signal to the controller upon receiving an undefined command.

When this instrument requests service, the status byte is sent to the controller as a result of serial polling being executed by the controller.

When "SRQOF" mode, is specified, the instrument does not request service although the status byte is still sent to the controller.

4.12.3 Structure of the status byte



Service request bit : Set to "1" when a syntax error occurs. Set to "0" in other cases. After the bit has been set to "1" as a result of a syntax error, the instrument sends the status byte using the "SPE" command from the controller. The bit is then set to "0" after the "SPD (Serial Poll Disenable)" command is received from the controller.

Syntax error bit : Set to "1" when an undefined command is received. The instrument sends the status byte after receiving the "SPE" command from the controller. The bit is then set to "0" after the "SPD (Serial Poll Disenable)" command is received from the controller.

4.13 Examples of programming

Examples of programming using Hewlett-Packard HP300 series and NEC PC9801 series computers are shown below.

< For HP300 series computers >

```
1000 !Q8142A/43A GPIB SAMPLE PROGRAM
1010 !
1020 OIs = 701 ! GPIB ADDRESS
1030 !
1040 OUTPUT OIs; = "CW, LDOF" ! MODE = CW, OUTPUT = ON
1050 !
1060 OUTPUT OIs; = "LDOF" ! OUTPUT OFF
1070 !
1080 OUTPUT OIs; = "EXTON" ! MODE = EXTERNAL MODULATION
1090 OUTPUT OIs; = "LDON" ! OUTPUT = ON
1100 !
1110 OUTPUT OIs; = "F270, LDON" ! MODE = 270Hz CHOP, OUTPUT = ON
1120 OUTPUT OIs; = "STS?" ! OUTPUT STSTATUS
1130 ENTER OIs;A$ ! DATA INPUT
1140 PRINT A$
1150 !
1160 END
```

5. Maintenance

5.1 Inspection

Should problems occur while operating this instrument, please contact the dealer or support office after checking the following items.

The addresses and phone numbers of the support offices are given at the end of this manual.

Symptom	Cause	Procedure
Power indicator does not light.	The line fuse is blown. Visual inspection is not reliable. Make sure that the resistance of the fuse is less than 15Ω by digital volt-meter, etc.	Referring to subsection 1.3.3, replace with the fuse provided.
Light output is not on or weak.	Light output switch is not ON.	Turn on the light output switch.
	Disconnection of the fiber cable.	Replace the fiber cable.
	The terminal of the fiber connector is dirty.	Referring to the sections 5.2 and 5.3, clean the connector.
The output level varies largely.	The terminal of the fiber connector is dirty.	Referring to the sections 5.2 and 5.3, clean the connector.

5.2 Cleaning the Fiber Connector

To clean the fiber connector, softly wipe the top and sides of the ferrule with lens cleaning paper, oil-free gauze, etc. moistened with ethanol.

5.3 Cleaning the Inside of the Light Output Connector

Blow the dust off using an inactive gas spray for lens cleaning. To avoid accidents, always make sure that the instrument is turned off first.

MEMO



A large, empty rectangular box with rounded corners, intended for writing the memo's content. The box is defined by a solid line on the top and left sides, and a dashed line on the bottom and right sides.

6. Description of Operation

6.1 Outline

This instrument uses an InGaAsP laser photodiode as the emission element. It is also equipped with a monitor photodiode, a Peltier element and a thermistor. The general block diagram is shown in Fig. 6-1.

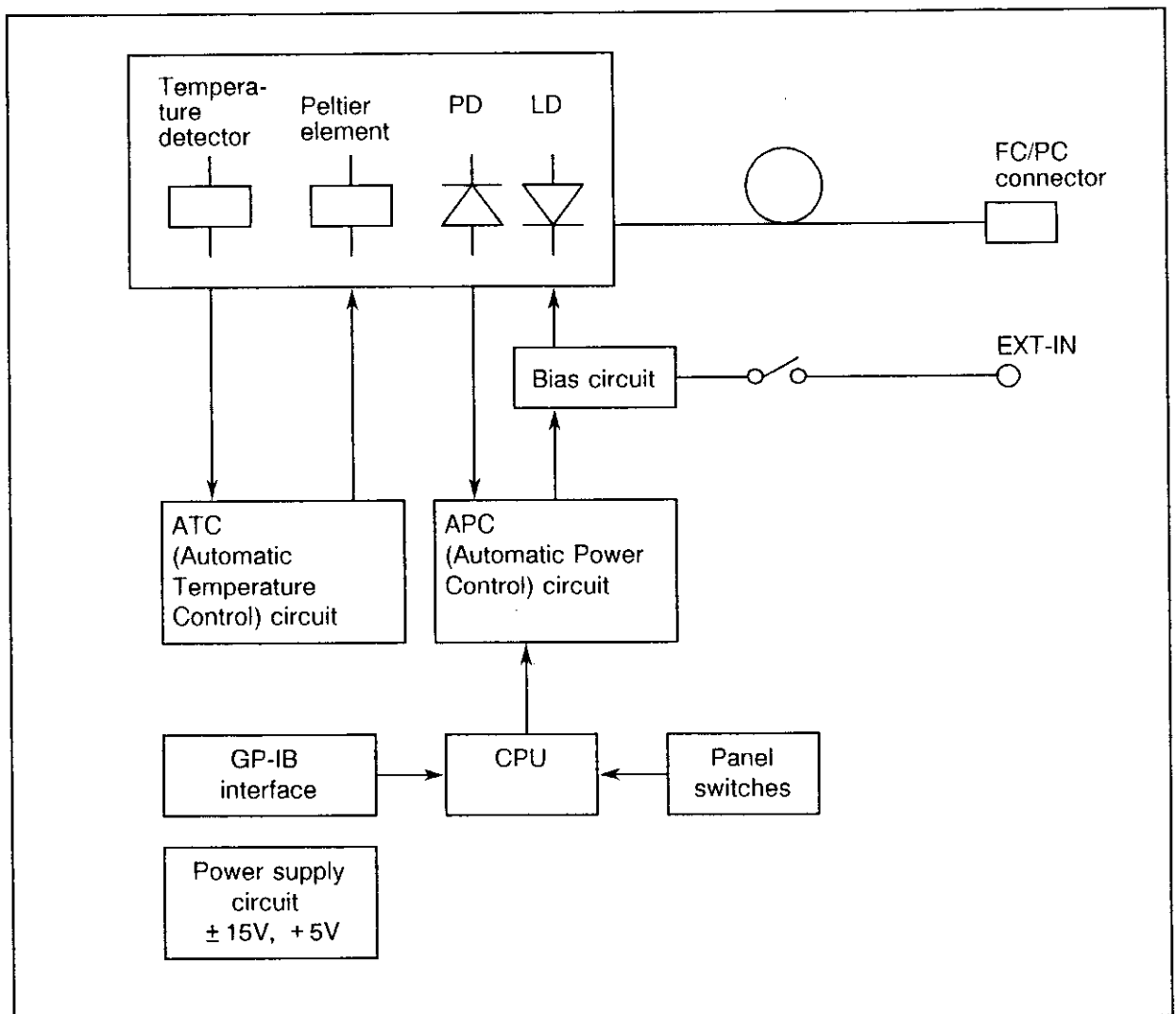


Fig. 6-1 General Block Diagram

MEMO



A large, empty rectangular area with rounded corners, enclosed by a dashed border, intended for writing the memo's content.

7. Specifications

7.1 Light Output Specifications

	Q8142A	Q8143A
Laser peak wavelength	1310 ± 10 nm	1550 ± 20 nm
Full width at half maximum of the emission spectrum	Less than ± 5 nm	Less than ± 10 nm
Output power level	0dBm ± 1dB (for CW light, at the output terminal of a 2m SM fiber)	
Light output stability	Less than 0.01dB under <ul style="list-style-type: none"> • 23 ± 1°C conditions for 1 minute at the output terminal of a 2m-long 10-125 μm SM fiber, FC/PC connector 	
	Less than 0.05dB under <ul style="list-style-type: none"> • 0 to 40 °C ± 2 °C conditions for 60 minutes at the output terminal of a 2m-long 10-125 μm SM fiber, FC/PC connector 	
	Less than 1 dB under <ul style="list-style-type: none"> • 0 to 40 °C conditions at the output terminal of a 2m-long 10-125 μm SM fiber, FC/PC connector 	
Type of light output connector	FC type connector (PC polished internally)	
Output mode	CW and CHOP (internal modulation)	
	EXT-MOD (external modulation)	

7.2 Internal Modulation Specifications

Modulation frequency	: 270Hz ± 0.1Hz
Modulation waveform	: Square waveform with 50% ± 5% duty cycle
Extinction ratio	: More than 30dB
Synchronous output	: TTL level with BNC connector (grounded to the same voltage as the chassis)

7.3 External Modulation Specifications

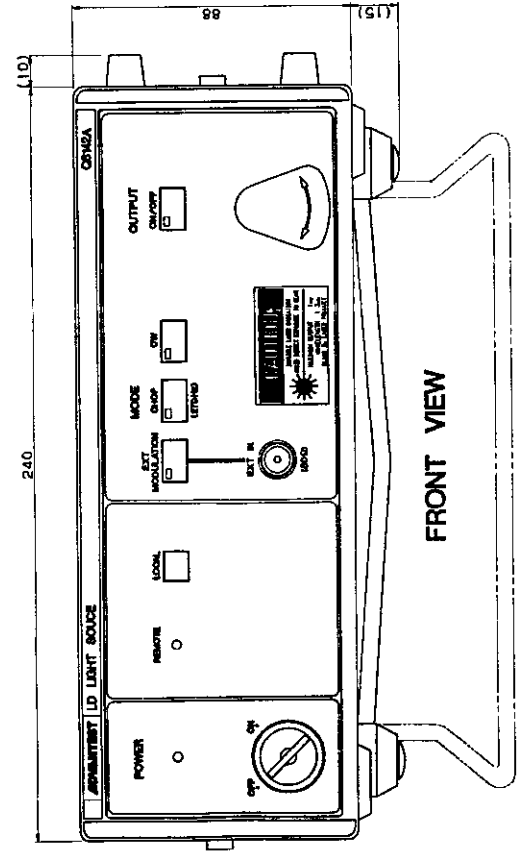
Modulation bandwidth	:	0.1 to 500MHz
Modulation bandwidth deviation	:	± 6dB (for 10MHz standard)
Input level allowance	:	Less than 0dBm
Input connector	:	BNC connector
Input impedance	:	50Ω unbalanced

7.4 Control via the GP-IB Interface

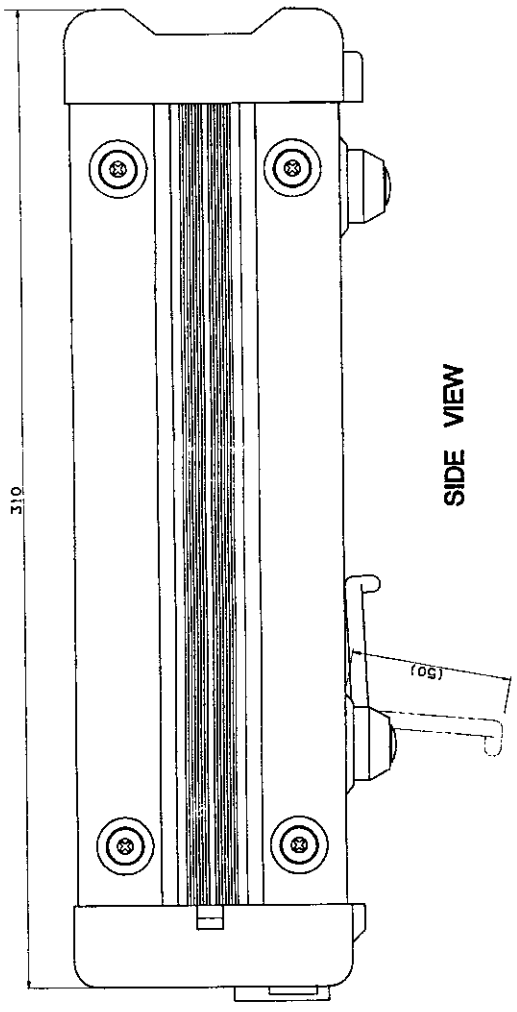
Standard	:	IEEE488-1978
Control signal	:	OUTPUT ON/OFF Output modes : CW, 270Hz-CHOP and EXT-MOD
Status output	:	OUTPUT ON/OFF Output modes : CW, 270Hz-CHOP and EXT-MOD

7.5 General Specifications

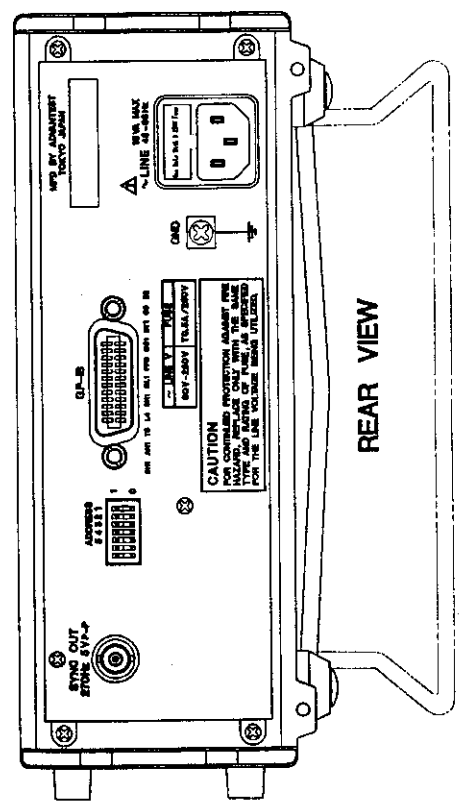
Operation environment	:	0 °C to +40 °C with less than 85% RH
Storage environment	:	-20 °C to +70 °C with less than 85% RH
Line voltage	:	AC 90-250V, 48-66Hz
Power consumption	:	Less than 18VA
Dimensions	:	Approx. 240(W) × 88(H) × 310(D)mm
Weight	:	Less than 3.3kg



FRONT VIEW



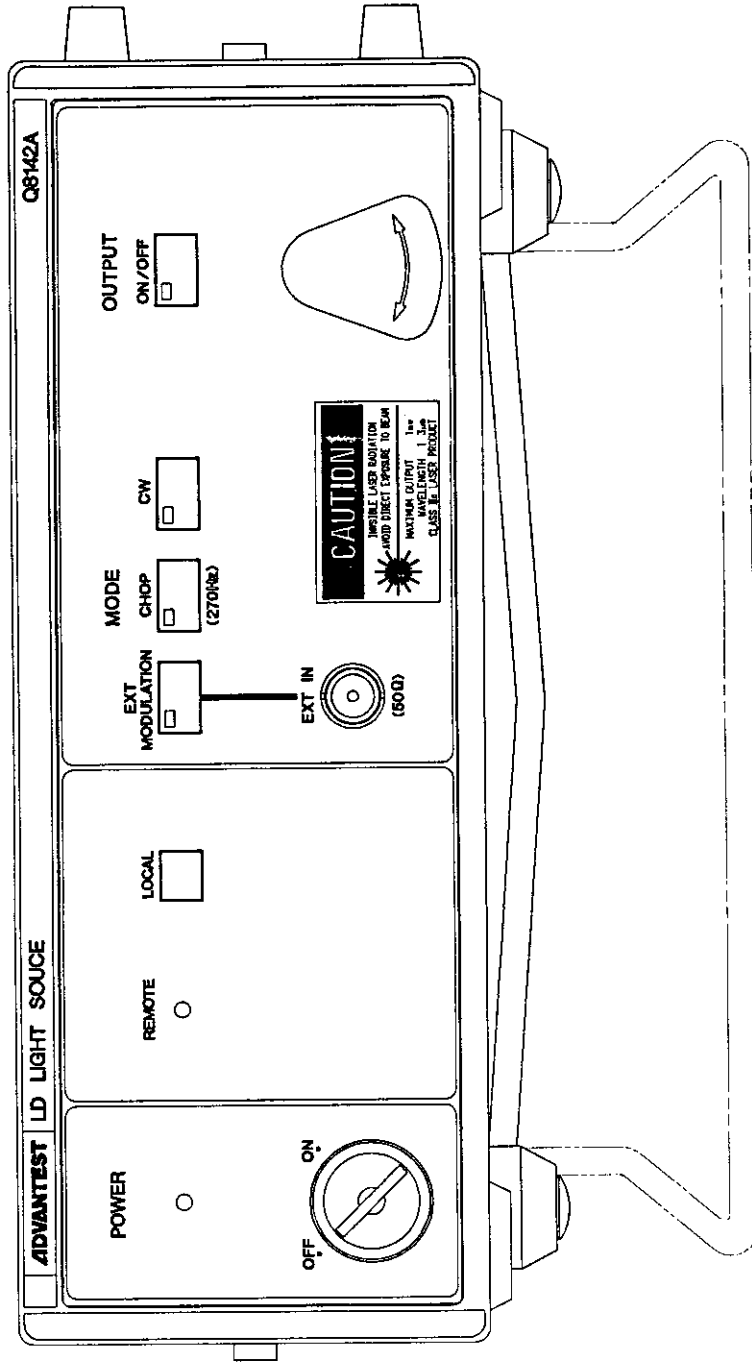
SIDE VIEW



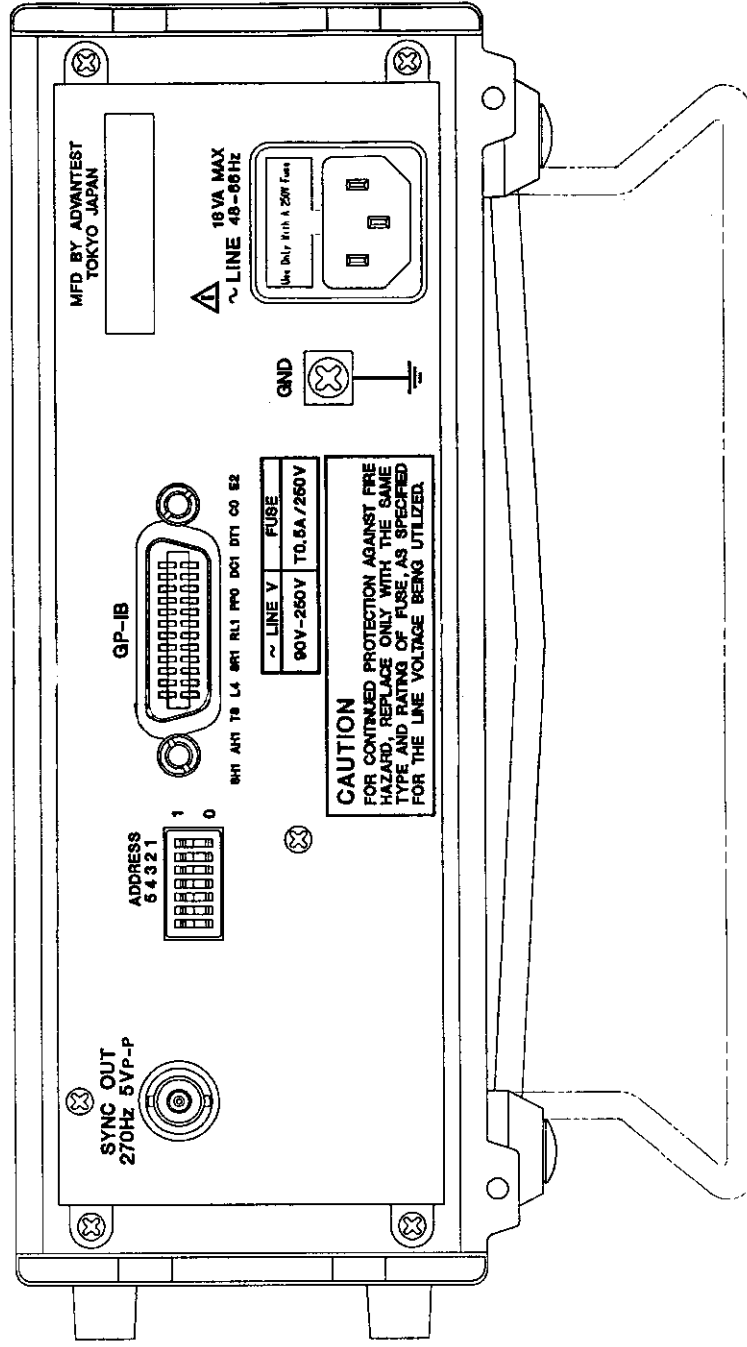
REAR VIEW

Unit: mm

**Q8142A
EXTERNAL VIEW**



Q8142A
FRONT VIEW



Q8142A
REAR VIEW

Q8142AEXT3-9006-A

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2. The warranty period for the Product (the "Warranty Period") will be a period of one year commencing on the delivery date of the Product.
3. If the Product is found to be defective during the Warranty Period, Advantest will, at its option and in its sole and absolute discretion, either (a) repair the defective Product or part or component thereof or (b) replace the defective Product or part or component thereof, in either case at Advantest's sole cost and expense.
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 - (d) use of the Product in connection with software, interfaces, products or parts other than software, interfaces, products or parts supplied or recommended by Advantest;
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 - (g) the occurrence of an event of force majeure, including, without limitation, fire, explosion, geological change, storm, flood, earthquake, tidal wave, lightning or act of war; or
 - (h) any negligent act or omission of the Purchaser or any third party other than Advantest.
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In order to maintain safe and trouble-free operation of the Product and to prevent the incurrence of unnecessary costs and expenses, Advantest recommends a regular preventive maintenance program under its maintenance agreement.

Advantest's maintenance agreement provides the Purchaser on-site and off-site maintenance, parts, maintenance machinery, regular inspections, and telephone support and will last a maximum of ten years from the date the delivery of the Product. For specific details of the services provided under the maintenance agreement, please contact the nearest Advantest office listed at the end of this Operation Manual or Advantest's sales representatives.

Some of the components and parts of this Product have a limited operating life (such as, electrical and mechanical parts, fan motors, unit power supply, etc.). Accordingly, these components and parts will have to be replaced on a periodic basis. If the operating life of a component or part has expired and such component or part has not been replaced, there is a possibility that the Product will not perform properly. Additionally, if the operating life of a component or part has expired and continued use of such component or part damages the Product, the Product may not be repairable. Please contact the nearest Advantest office listed at the end of this Operation Manual or Advantest's sales representatives to determine the operating life of a specific component or part, as the operating life may vary depending on various factors such as operating condition and usage environment.

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