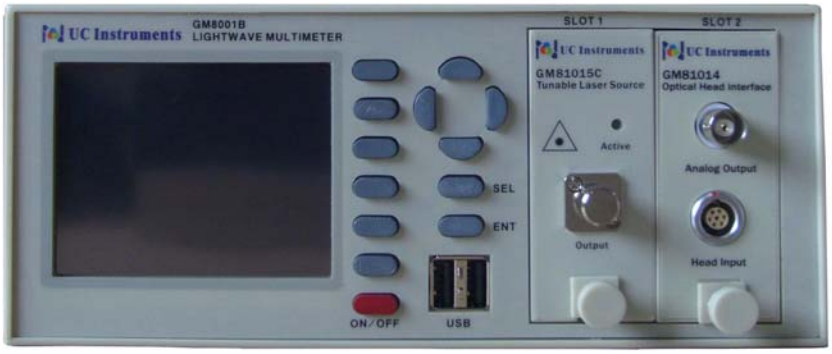
GM8001B Lightwave Multimeter

Programming Guide

Sept., 2010

(draft)



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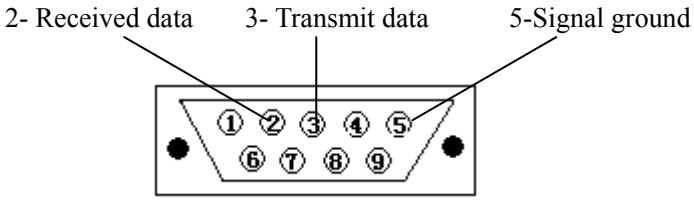
Communication Ports

RS232 Serial Port



The DB9 connector and pin assignments for GM8001B

Ethernet Port

IP address: the default is 192.168.0.200, revisable as required.
Subnet Mask: the default is 255.255.255.0, revisable as required.
Gateway: the default is 192.168.0.1, revisable as required.
Port number: 6000.

Communication setting:

1 Start bit, 8 Data bit, 1 Stop bit, No parity checking. Baud rate: 115200 bps.

Syntax

Commands format

The following symbols describe the syntax of commands in the following chapters.

The command is case-insensitive and can be written in upper case or in lower case or in both upper and lower case.

Example The command
SOURCE1 : STATE OFF
can also be written in lower case as
source1 : state off
or it can be written as
SOURCE1 : State off

Put a colon (**:**) before a component to indicate a move to the next level of the combination.
Example SOURCE1 : FREQUENCY : OFFSET ?

A command message is ended by a carriage return and a line feed character (\CR\LF).

The response format specifies what the instrument returns in response to a query. All responses are terminated with '\CR\LF >'.

For the query command, if normal, the instrument returns response value with 'CR\LF>', if an error occurs, then returns 'CR\LF'.

For the written command, if normal, the instrument returns 'CR\LF >', if an error occurs, then returns 'CR\LF'.

<…> The characters between angled brackets show the kind of data that you require, or that you get in a response. You don't type the angled brackets in the actual message.

[…] The characters between square brackets show optional information that you can include with the message.

/ The oblique line shows an either-or choice of data, for example, a/b means either a or b, but not both simultaneously.

All characters not between angled brackets are terminal symbols and must be sent exactly as shown. Items between angled brackets are not- terminal symbols, descriptions of these items follow the syntax description.
Spaces are ignored, they can be inserted to improve readability.

Units

The following table lists the base units in use.

Units	Default	Extended
Meter	nm	nm
Decibel	dB	dB
Second	s	ms, s
Decibel/1mW	dBm	dBm
Hertz	Hz	Hz
Watts	mW	pW, nW, uW, mW

Data type

Boolean	this can be data (ON or OFF), or a number. In a response you get 0, for OFF, or 1, for ON.
Value	is numeric data in one of the forms described below.
String	is ascii data.
Unit	is one of DB, DBM, W (Watts), or S (seconds), or NM. It is the unit in a value.

Specifying the slot

The GM8001B instrument has two slots in which the module can be inserted. Each module is identified by a slot number.

For commands that require you to specify a slot, the slot number is represented by [n] in a command.

The slot number represents the module's position in the mainframe. These numbers are displays on the front panel on the top of each module slot.

For example, disable the output of laser source module in slot 2. The command is

SOURCE[n] : STATE OFF, you should send:

- SOURCE2 : STATE OFF

Commands Lists

Common Commands

Command	Function
*IDN?	Identification query

***IDN?**

Syntax *IDN?

Response UC Instruments, GM8001B Lightwave Multimeter,
SN:GG033616004,HW Revision 1.00, **Firmware Revision 1.00

UC Instruments: Manufacturer
GM8001B Lightwave Multimeter: Instrument model
*****SN:GG013601004: Serial number of this instrument
*****HW Revision 1.00: Hardware revision
**Firmware Revision 3.00: Software revision

Description The *IDN? query gets the instrument identification over the interface.

Tunable Laser Source Module Commands

Command	Function
SOURCE [n]	n =1 / 2, specify either slot 1 or slot 2.
:STATE ?	
:STATE	<BOOLEAN>
:STATUS?	
:DISPLAY	
:UNIT ?	
:UNIT	<UNIT>
:FREQUENCY ?	
:FREQUENCY	<VALUE>
:FREQUENCY ? MAX /MIN	
:FREQUENCY MAX /MIN	
:FREQUENCY	
:OFFSET ?	
:OFFSET	<VALUE>

SOURCE[n] : STATE ?

Syntax SOURCE[n] : STATE ?
Response < Boolean >

Description This command returns the current setting for the state of the laser source. ON means the source is enabled. OFF means the source is disabled.

Example SOURCE1 : STATE ?
ON
>

SOURCE[n] :STATE

Syntax SOURCE[n] : STATE <BOOLEAN>
Description This command sets the state of the source output signal. You specify the state as a Boolean. OFF, or 0, disables the source. ON, or 1, enables the source.

Example SOURCE1 : STATE 0
>

SOURCE[n] : STATUS ?

Syntax SOURCE[n] : STATE ?
Response <VALUE>
Description This command returns the working state of the laser source module. 1 means the module is normal.

Example SOURCE1 : STATUS ?
1
>

SOURCE[n] :DISPLAY : UNIT ?

Syntax SOURCE[n] : DISPLAY : UNIT ?
Response <GHz/nm, dBm/dB/mW>

Description This command returns the units of wavelength/frequency and power values. The response message is separated by a comma.

Example SOURCE2 : DISPLAY : UNIT ?
nm, dBm
>

SOURCE[n] : DISPLAY : UNIT

Syntax SOURCE1 : DISPLAY : UNIT <Hz/M>

Description This command determines that either frequency or wavelength is displayed for the laser source module. Hz means the frequency value is displayed. M means the wavelength value is displayed.

Example SOURCE1 : DISPLAY : UNIT Hz
>

SOURCE[n] : FREQUENCY ?

Syntax SOURCE[n] : FREQUENCY ?
Response < VALUE >

Description This command returns the setting for the frequency of modulation of the output of the source module. The returned value is in Hertz. No unit is returned in the response message.

Example SOURCE1 : FREQUENCY ?
191200
>

SOURCE[n] : FREQUENCY

Syntax SOURCE[n] : FREQUENCY < VALUE >

Description This command sets the frequency of the amplitude modulation of the source output signal. The unit is default to Hertz, so you do not specify the unit in this command message.

Example SOURCE1 : FREQUENCY 191200
>

SOURCE[n] : FREQUENCY ? MAX /MIN

Syntax SOURCE[n] : FREQUENCY ? MAX / MIN
Response <VALUE>

Description This command returns the range setting of frequency for source module. *MAX* represents the maximum of frequency. *MIN* represents the minimum of frequency. The returned value is in Hertz. No unit is returned in the response message.

Example SOURCE1 : FREQUENCY? MAX
196585
>

SOURCE1 : FREQUENCY? MIN
191000
>

SOURCE[n] : FREQUENCY MAX /MIN

Syntax SOURCE[n] : FREQUENCY MAX / MIN

Description This command sets the current frequency to maximum or minimum for the source module. The maximum and minimum of frequency depend on the source module you use. *MAX* represents the maximum. *MIN* represents the minimum.

Example SOURCE1 : FREQUENCY MAX
>

SOURCE[n] : FREQUENCY : OFFSET ?

Syntax SOURCE[n] : FREQUENCY : OFFSET ?
Response < VALUE >

Description This command returns the offset of frequency for the source module. The returned value is in Hertz. No unit is returned in the response message.

Example SOURCE1 : FREQUENCY : OFFSET ?
19.0
>

SOURCE[n] : FREQUENCY : OFFSET

Syntax SOURCE[n] : FREQUENCY : OFFSET < VALUE >

Description This command sets the offset of frequency for the source module. The unit is default to Hertz, so you do not specify the unit in this command message.

Example SOURCE1 : FREQUENCY : OFFSET 20
>

Tunable Laser Source Module Sweep Commands

Command	Function
SOURCE [N]	n =1 / 2, specify either slot 1 or slot 2.
:SWEEP	
:FREQ:START ?	
:FREQ:START	<VALUE>
:FREQ:STOP ?	
:FREQ:STOP	<VALUE>
:FREQ:STEP ?	
:FREQ:STEP	<VALUE>
:WAVE:START ?	
:WAVE:START	<VALUE>
:WAVE:STOP ?	
:WAVE:STOP	<VALUE>
:WAVE:STEP?	
:WAVE:STEP	<VALUE>
:UNIT ?	
:UNIT	<HZ/M>
:SWEEP:REF	
:SWEEP:DUT	
:SWEEP:ABORT	

SOURCE[n] : SWEEP :FREQ:START ?

Syntax SOURCE[n] : SWEEP : FREQ : START ?
Response < VALUE >

Description This command returns the setting value of the frequency at which the sweep begins for the source module. The returned value is in Hertz. No unit is returned in the response message.

Example SOURCE1 : SWEEP : FREQ : START ?
191200
>

SOURCE[n] : SWEEP : FREQ : START

Syntax SOURCE[n] : SWEEP : FREQ : START < VALUE >

Description This command sets the frequency at which the sweep begins for the source module. The default unit is Hertz. Don't attach the unit in the command message.

Example SOURCE1 : SWEEP : FREQ : START 191000
>

SOURCE[n] : SWEEP :FREQ:STOP ?

Syntax SOURCE[n] : SWEEP : FREQ : STOP ?
Response < VALUE >

Description This command returns the setting value of frequency at which the sweep ends for the source module. The returned value is in Hertz. No unit is returned in the response message.

Example SOURCE1 : SWEEP : FREQ : STOP?
196000
>

SOURCE[n] : SWEEP :FREQ: STOP

Syntax SOURCE[n] : SWEEP : FREQ : STOP < VALUE >

Description This command sets the frequency at which the sweep ends for the source module. The default unit is Hertz. Don't attach the unit in the command message.

Example SOURCE1 : SWEEP : FREQ : STOP 196000
>

SOURCE[n] : SWEEP :FREQ : STEP ?

Syntax SOURCE[n] : SWEEP : FREQ : STEP ?
Response < VALUE >

Description This command returns the size of the change in the frequency for each step of a stepped sweep for the source module. The returned value is in Hertz. No unit is returned in the response message.

Example SOURCE1 : SWEEP : FREQ : STEP?
1000
>

SOURCE[n] : SWEEP :FREQ: STEP

Syntax SOURCE[n] : SWEEP : FREQ : STEP < VALUE >

Description This command sets the size of the change in the frequency for each step of a stepped sweep for the source module. The default unit is Hertz. Don't attach the unit in the command message.

Example SOURCE1 : SWEEP : FREQ : STEP 1000
>

SOURCE[n] : SWEEP :WAVE : START ?

Syntax SOURCE[n] : SWEEP : WAVE : START ?
Response < VALUE >

Description This command returns the setting value of the wavelength at which the sweep begins for the source module. The returned value is in nanometer. No unit is returned in the response message.

Example SOURCE1 : SWEEP : WAVE : START ?
1525.000
>

SOURCE[n] : SWEEP : WAVE:START

Syntax SOURCE[n] : SWEEP : WAVE : START < VALUE >

Description This command sets the wavelength at which the sweep begins for the source module. The default unit is nanometer. Don't attach the unit in the command message.

Example SOURCE1 : SWEEP : WAVE : START 1525
>

SOURCE[n] : SWEEP : WAVE:STOP ?

Syntax SOURCE[n] : SWEEP : WAVE : STOP ?
Response < VALUE >

Description This command returns the setting value of wavelength at which the sweep ends for the source module. The returned value is in nanometer. No unit is returned in the response message.

Example SOURCE1 : SWEEP : WAVE : STOP?
1568
>

SOURCE[n] : SWEEP : WAVE: STOP

Syntax SOURCE[n] : SWEEP : WAVE : STOP < VALUE >

Description This command sets the wavelength at which the sweep ends for the source module. The default unit is nanometer. Don't attach the unit in the command message.

Example SOURCE1 : SWEEP : WAVE : STOP 1568
>

SOURCE[n] : SWEEP : WAVE:STEP ?

Syntax SOURCE[n] : SWEEP : WAVE : STEP ?
Response < VALUE >

Description This command returns the size of the change in the wavelength for each step of a stepped sweep for the source module. The returned value is in nanometer. No unit is returned in the response message.

Example SOURCE1 : SWEEP : WAVE : STEP?
0.010
>

SOURCE[n] : SWEEP : WAVE: STEP

Syntax SOURCE[n] : SWEEP : WAVE : STEP < VALUE >

Description This command sets the size of the change in the wavelength for each step of a stepped sweep for the source module. The default unit is nanometer. Don't attach the unit in the command message.

Example SOURCE1 : SWEEP : WAVE : STEP 0.02
>

SOURCE[n] : SWEEP : UNIT ?

Syntax SOURCE[n] : SWEEP : UNIT ?
Response < UNIT >

Description This command returns the setting of sweep mode for source module. The returned value is either Hz or M. *Hz* means frequency sweep. *M* means wavelength sweep.

Example SOURCE1 : SWEEP : UNIT ?
Hz
>

SOURCE[n] : SWEEP : UNIT

Syntax SOURCE[n] : SWEEP : UNIT < Hz / M >

Description This command sets the sweep mode for source module. The setting value is either Hz or M. *Hz* means frequency sweep. *M* means wavelength sweep.

Example SOURCE1 : SWEEP : UNIT M
>

SOURCE[n] : SWEEP : REF

Syntax SOURCE[n] : SWEEP : REF

Description This command starts REF sweep for the source module.

Example SOURCE1 : SWEEP : REF
>

SOURCE[n] : SWEEP : DUT

Syntax SOURCE[n] : SWEEP : DUT

Description This command starts DUT sweep for the source module.

Example SOURCE1 : SWEEP : DUT
>

SOURCE[n] : SWEEP : ABORT

Syntax SOURCE[n] : SWEEP : ABORT

Description This command aborts the sweep performing for source module.

Example SOURCE1 : SWEEP : ABORT
>

Slot Commands

Command	Function
SLOT[n] : EMPTY? : IDN?	n =1 / 2, specify either slot 1 or slot 2.

SLOT[n] : EMPTY ?

Syntax SLOT[n] : EMPTY ?

Response < Empty or Not empty >

Description This command queries whether the module slot is empty. *Empty* means the module slot is empty. *Not empty* means there is a module in the slot.

Example SLOT1 : EMPTY ?
Not Empty
>

SLOT[n] : IDN?

Syntax SLOT[n] : IDN ?
Response < String >

Description This command queries the identification of a module in a slot, such as model, serial number, and firmware version of the module.

Example SLOT1 : IDN ?
GM81015C, serial number: CY13231845, VER: Software Revision 1.20E
>

Read Commands

Command	Function
READ[n] : POW ?	n =1 / 2, specify either slot 1 or slot 2.

READ[n] : POW ?

Syntax READ[n] : POW ?
Response < VALUE>

Description This command gets a power reading from the module. The value read back is a floating point number, the units of the number read back depend on whether the absolute or relative measurement mode is being used, and which units have been selected. The possible units are watts, dBm, or dB.

Example READ1 : POW ?
-72.711dBm
>
Description: read the power value of optical power module in slot 1.

Optical Power Meter Module Commands

Command	Function
SENS[n]	n =1 / 2, specify either slot 1 or slot 2.
: POW	
: WAVE ?	
: WAVE	<VALUE>
: REF?	
: REF	< VALUE >
: REF:DISP	
: UNIT?	
: UNIT	< XXXXX >
: ATIME?	
: ATIME	<XXXXX>
: CORR:COLL	
:ZERO?	
:ZERO:ALL	
: FUNC:PAR	
:MINM?	
:MINM	<0/1/2/3>

SENS[n] : POW : WAVE ?

Syntax SENS[n] : POW : WAVE ?
Response < VALUE >

Description This command returns the wavelength setting for the power module. The returned value is in nanometer. No unit is returned in the response message.

Example SENS1 : POW : WAVE ?
1550.0
>

SENS[n] : POW : WAVE

Syntax SENS[n] : POW : WAVE < VALUE >

Description This command sets the wavelength for the power module. The unit is default to nanometer, so you do not specify the unit in this command message.

Example SENS1 : POW : WAVE 1528
>

SENS[n] : POW : REF ?

Syntax SENS[n] : REF ?
Response < VALUE>

Description This command returns the reference value that is set for the power module. The returned value is in dB. No unit is returned in the response message.

Example SENS1: REF ?
-90.000
>

SENS[n] : POW : REF

Syntax SENS[n] : REF < VALUE>

Description This command sets the reference value for the power module. The unit for reference value is default to dB, so you do not specify the unit in this command message.

Example SENS1: REF -23
>

SENS[n] : POW : REF:DISP

Syntax SENS[n] : REF : DISP

Description This command sets the reference value for the power module from the input power signal when the unit of power used is dB.

Example SENS1 : REF : DISP
>

SENS[n] : POW : UNIT ?

Syntax SENS[n] : POW : UNIT ?
Response < mW / dBm / dB >, String

Description This command returns the unit of power reading.

Example SENS1: POW : UNIT ?
dBm
>

SENS[n] : POW : UNIT

Syntax SENS[n] : POW : UNIT < mW / dBm / dB >

Description This command sets the unit of power in use. This can be watts, dBm or dB.

Example SENS1: POW : UNIT mW
>

SENS[n] : POW : ATIME?

Syntax SENS[n] : POW : ATIME ?
Response < 1ms, 2ms, 5ms, 10ms, 20ms, 50ms, 100ms, 200ms, 500ms, 1000ms, 2000ms, 5000ms, 10000ms >

Description This command returns the setting for the averaging time for the power module. The unit, milliseconds, is returned in the response message.

Example SENS1 : POW : ATIME ?
100ms
>

SENS[n] : POW : ATIME

Syntax SENS[n] : POW : ATIME < 1ms, 2ms, 5ms, 10ms, 20ms, 50ms, 100ms, 200ms, 500ms, 1000ms, 2000ms, 5000ms, 10000ms >

Description This command sets the averaging time for the power module. The input power signal is read and averaged over this period. When you special the averaging time, the unit should be attached. The millisecond is the unit if you don't specify the unit.

Example SENS1 : POW : ATIME 20ms
>

SENS[n] : CORR:COLL:ZERO ?

Syntax SENS[n] : CORR : COLL : ZERO ?
Response < Boolean >

Description This command returns the status of the most recent zero command. 0 means that the zero succeeded without errors. 1 means that no remote zeroing operation has been performed.

Example SENS1 : CORR : COLL : ZERO ?
1
>

SENS[n] : CORR:COLL:ZERO:ALL

Syntax SENS[n] : CORR : COLL : ZERO : ALL

Description This command zeros the electrical offsets for the power module.

Example SENS1 : CORR : COLL : ZERO : ALL
>

MaxMin Mode

Command	Function
SENS[n]:	n =1 / 2, specify either slot 1 or slot 2.
: FUNC: PAR : MINM?	
: FUNC: PAR : MINM	< VALUE >

SENS[n] : FUNC : PAR : MINM ?

Syntax SENS[n] : FUNC : PAR : MINM ?
Response < 0/1/2/3 >

Description This command queries the setting of MinMax mode for power module. The result is returned as a numeric value. 0 means disabling the MinMax mode. 1 means Continuous mode, 2 means Window mode, 3 means Refresh mode.

SENS[n] : FUNC : PAR : MINM

Syntax SENS[n] : FUNC : PAR : MINM < 0 / 1 / 2 / 3 >

Description This command sets the MinMax mode for power module. 0 means disabling the MinMax mode. 1 means Continuous mode, 2 means Window mode, 3 means Refresh mode.

Example SENS1 : FUNC : PAR : MINM 2
>

Varial Optical Attenuator Module Commands

Command	Function
INPUT[n]	n =1 / 2, specify either slot 1 or slot 2.
:WAVE ?	
:WAVE	<VALUE>
:ATT ?	
:ATT	<VALUE>

INPUT[n] : WAVE ?

Syntax INPUT[n] : WAVE ?
Response < VALUE >

Description This command returns the wavelength setting for the attenuator module. The returned value is in nanometer. No unit is returned in the response message.

Example
```
INPUT1 : WAVE ?
1550.0
>
```

INPUT[n] : WAVE

Syntax INPUT[n] : WAVE <VALUE>

Description This command sets the wavelength for the attenuator module. The unit is default to nanometer, so you do not specify the unit in this command message.

Example
```
INPUT1 : WAVE 1550.0
>
```

INPUT[n] : ATT ?

Syntax INPUT[n] : ATT ?
Response < VALUE >

Description This command returns the setting for the attenuation of the attenuator module. The returned value is in dB. No unit is returned in the response message.

Example
```
INPUT1 : ATT ?
0.1
>
```

INPUT[n] : ATT

Syntax INPUT[n] : ATT < VALUE >

Description This command sets the attenuation of the attenuator module. The unit is default to dB, so you do not specify the unit in this command message.

Example INPUT1 : ATT 0.1
>

Data and File Process Commands

Command	Function
FILE : ID < STRING > ?	
FILE : LIST ?	
FILE : DEL	< STRING >

FILE : ID < STRING > ?

Syntax FILE : ID < STRING > ?

Description This command gets the details of a sweeping file specified by the file number. STRING represents the file number.

Example FILE : ID 405 ?

FILE : LIST ?

Syntax FILE : LIST ?

Description This command returns a list in which the file numbers of all sweeping files are.

FILE : DEL

Syntax FILE : DEL < STRING >

Description This command deletes a sweeping file specified by the file number. STRING represents the file number.

Example FILE : DEL 405

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