GM8042 Desktop Tunable Laser Source

User Manual

July, 2011

UC INSTRUMENTS CORP.

Notices

Subject Matter

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For warranty service or repair, this product must be returned to a service facility designated by UC Instruments Corp. Buyer shall prepay shipping charges to UC Instruments Corp. and UC Instruments Corp. shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to UC Instruments Corp. from another country.

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The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

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The remedies provided herein are Buyer's sole and exclusive remedies.

UC Instruments Corp. shall not be liable for any direct, indirect, special, incidental, or consequential damages whether based on contract, tort, or any other legal theory.

Assistance

Product maintenance agreements and other customer assistance agreements are available for UC Instruments Corp. products. For any assistance contact the UC Instruments Corp. Maintenance Service Center.

Storage and Shipment

The instrument can be stored or shipped at temperatures between -30℃ and +80℃. The instrument should be protected from temperature extremes that may cause condensation within it.

Safety Considerations

WARNING: The instrument is not designed for outdoor use. To prevent potential fire or shock hazard, do not expose the instrument to rain or other excessive moisture.

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. UC Instruments Corp. assumes no liability for the customer's failure to comply with these requirements.

Before operation, you should review the instrument and manual for safety markings and instructions. You must follow these to ensure safe operation and to maintain the instrument in safe condition.

WARNING: To avoid hazardous electrical shock, do not perform electrical tests when there are signs of shipping damage to any portion of the outer enclosure (covers, panels, and so on).

Line Power Connection

WARNING: To avoid the possibility of injury or death, you must observe the following precautions before switching on the instrument.

- Do not remove protective covers. Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made only by qualified service personnel.
- Instruments that appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.
- Defective, damaged, or malfunctioning laser sources must be returned to UC Instruments Corp. Maintenance Service Center.
- Do not operate the instrument in the presence of flammable gases or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.

Contents

GM8042 Tunable Laser Source Mainframe

The GM8042 is a high power Desktop Tunable Laser Source Module. The output can be tuned to any wavelength within specified wavelength range. The GM8042 is also capable of fast sweeping for any specified wavelength/frequency range.

The GM8042 desktop tunable lasers offer superior performance for the test of DWDM components, AWG & PLC components, optical amplifiers, DWDM system and other general purpose of fiber optical test and measurement applications. It is a wavelength high accuracy, high power output, small dimension, fast startup, affordable tunable laser source system. UC INSTRUMENTS provides C band, L band, or C+L band tunable laser sources options for GM8042.

This section will introduce the features of GM8042 Tunable Laser Source. Here you will find a brief description of the instrument, how to use the user interface and how to perform a simple sample session.

Figure 1 GM8042 Mainframe

Specification

The GM8042 Tunable Laser Source Module is produced to the ISO9001 international quality system standard. UC Instruments Corp. continually increases customer satisfaction through improved quality control.

Specifications describe the instruments warranted performance. Supplementary performance characteristics describe the instruments non-warranted typical performance.

Model #	***GM8042C***	***GM8042L***	***GM8042CL***
Wavelength range	*1525.00 to 1568.00 nm*	*1568.00 to 1610.00 nm*	*1525.00 to 1610.00 nm*
Output Power	*>= 20 mW*	*>= 10 mW*	*>= 5.0 mW*
Power Adjust Range	*25 dB*	*25 dB*	*25 dB*
Wavelength resolution	*1.0 pm*		
Absolute wavelength accuracy	*+/- 10 pm, tpy. < 5 pm*		
Relative wavelength accuracy	*+/- 5 pm, Typ. +/- 2 pm*		
Wavelength repeatability	*+/- 2 pm, typ. +/- 1 pm*		
Wavelength stability (typ., 24 hrs at constant temperature	*<= +/- 2 pm*		
Tuning speed	*<= 0.02 s per step*		
Power stability	*< +/- 0.1 dB, 24 hours.*		
Power repeatability	*+/- 0.05 dB*		
Power linearity	*+/- 0.3 dB*		
Power flatness versus wavelength	*0.3 dB typ., 0.5 dB max.*		
Side-mode Suppression ritio	*>= 40 dB*		
Relative intensity noise(RIN. Typ.)	*< -135 dB*		
Power supply	*AC 100 - 240 V ± 10%, 48 - 66 Hz, 100 VA max.*		
Environmental *Storage temperature* *Operating temperature* *Humidity*	 *−40°C to +80°C* *0°C to +45°C* *<95% R.H. from 0°C to +45°C*		
Dimensions	*200 mm W, 105 mm H, 250 mm D*		
Weight	*9.0 lbs*		

Tunable Laser Summarize

What is a Tunable Laser Source?

A tunable laser is a laser source for which the wavelength can be continuously tuned into a specific wavelength in a specified range.

Wavelength Range

Each tunable laser source module has a specified wavelength range. This range is available for same part number Tunable Laser Source modules.

Each specific tunable laser source module has a permitted wavelength range. This range is bigger than the specification wavelength range. The permitted wavelength range varies for each tunable laser module. You can set the wavelength to any value within the permitted wavelength range.

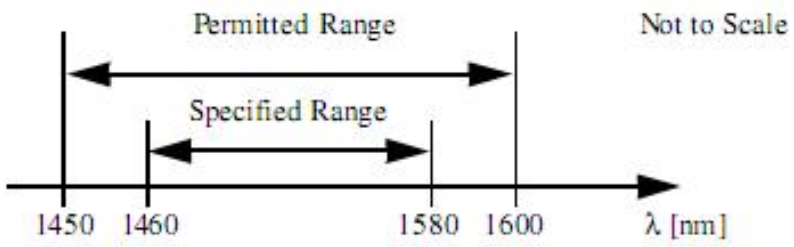


Fig. 2 Specification and Permitted Wavelength Rang

Description of the User Interface

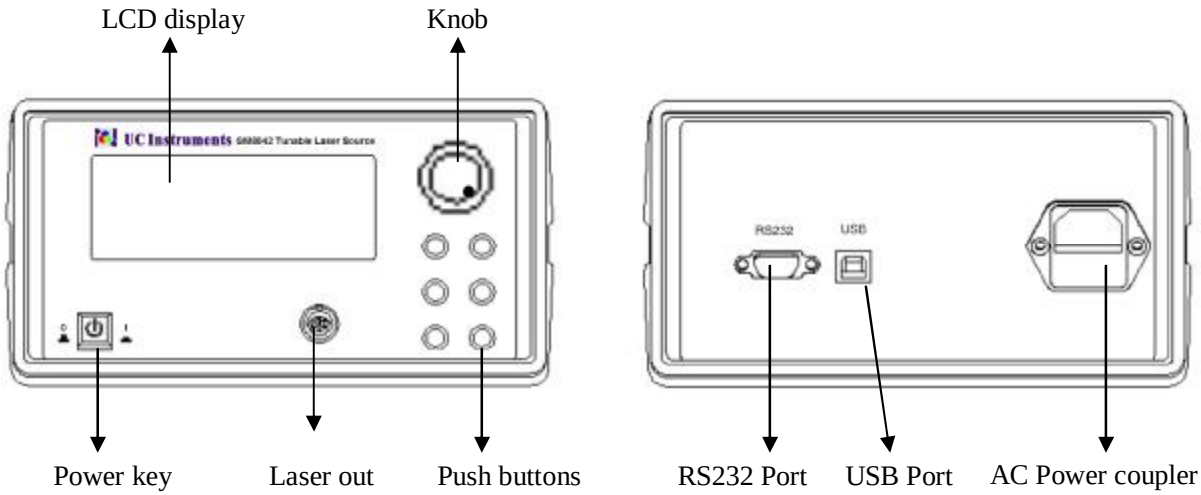


Figure 3 User interface of the GM8042

User Interface Features

Push Buttons and Knob

All the control to GM8042 is via the push buttons and knob.

Laser Out Connector

FC/PC adapter connector for laser output.

LCD display

The LCD shows the wavelength, frequency and power values for laser source, and state of laser output signal. If the module is performing a sweeping operation under remote control, the LCD will show a prompt.

How to Use the Module?

Initialization the Display Screen

When the GM8042 is powered up, the screen will show initial information, such as, the serial number, hardware revision, firmware revision of the GM8042, and information about detecting laser source.

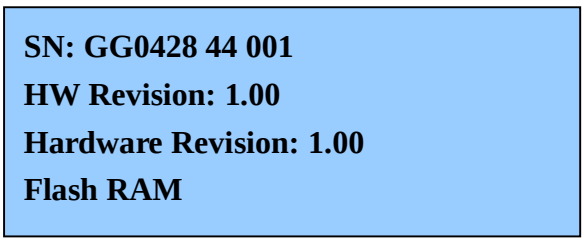


Figure 4 the initial information for GM8042

The Display Screen

Figure 4 shows the screen profile of the GM8042. This screen will show up immediately after start-up. The screen shows the wavelength, frequency and power values of the laser output signal.

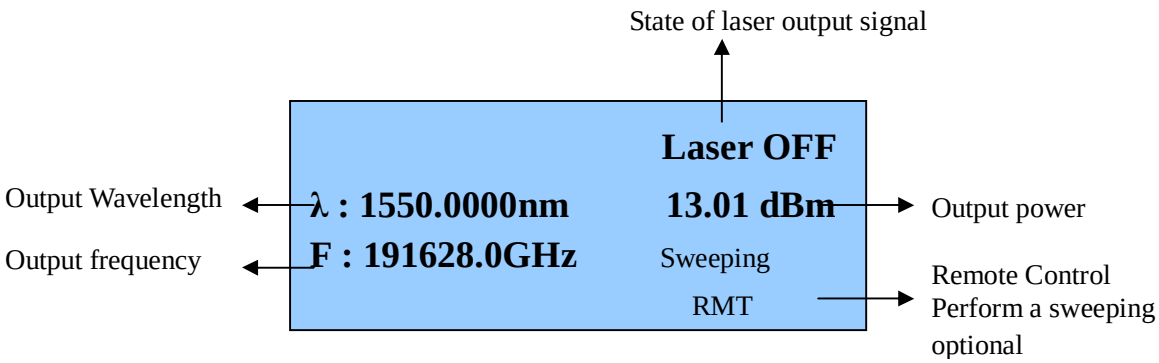


Figure 5 GM8042 Display Screen

How to Change the Value of a Parameter?

What follows is a description of the way of change the value of parameters.

1 Select the desired parameter.
2 The digit which was modified last of setting value is highlighted.
3 Pressing [◀] or [▶] pushbutton to move to the digit which is desired to edit.
4 Rotate the knob to modify the numeric of digit. Clockwise rotation increases the numeric, and anticlockwise rotation decreases the Numeric.
Notice: The numeric is specified a range. When you rotates the knob, if the numeric reaches it's specified range, the LCD displays max or min value prompt.

How to Set the Wavelength?

For example, set the wavelength from 1550nm to 1545.00nm:

1 Press the [λ/F] button to select the wavelength parameter.
2 Press the [UNIT] button to move to the < λ > parameter.
3 Pressing [◀] or [▶] pushbutton to move to the third digit, 5, as shown in Figure 6.

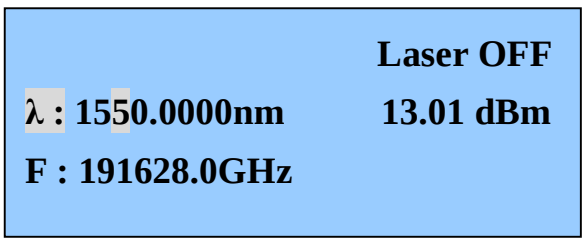


Figure 6 Modify the <λ> parameter

4 Rotates the knob anticlockwise to decrease the current numerics to 4.
5 Pressing the [▶] pushbutton to move to the fourth digit, 0.
6 Rotates the knob clockwise to increase the current numerics to 5.

How to Set the Frequency?

1 Press the [*λ/F*] button to select the wavelength parameter.

2 Press the [UNIT] button to move to the < *F* > parameter.

3 Pressing [◀] or [▶] pushbutton to move to the desired digit, as shown in Figure 7.

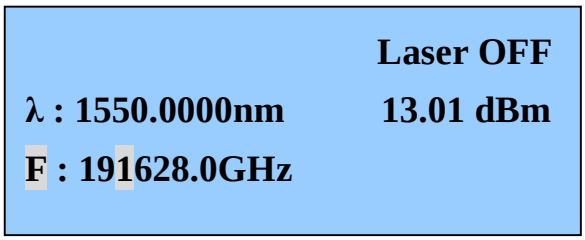


Figure 7 Modify the <*F*> parameter

4 Rotates the knob anticlockwise to decrease the current selected numeric and rotates the knob clockwise to increase the current selected numeric.

How to Set Output Power?

1 Press the [*POWER*] button to select the power parameter.

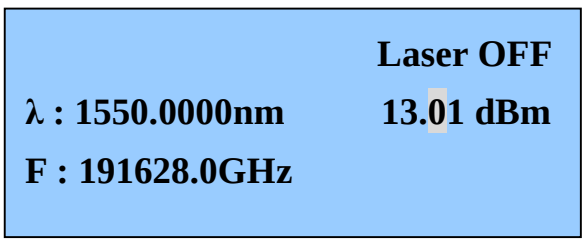


Figure 8 Modify the power parameter

2 Pressing [◀] or [▶] pushbutton to move to the desired digit, as shown in Figure 8.

3 Rotates the knob anticlockwise to decrease the current selected numeric and rotates the knob clockwise to increase the current selected numeric.

How to Set the Wavelength Offset?

1 Press the [*λ/F*] and [UNIT] buttons simultaneously to enter offset setting interface.
2 Press the [*λ/F*] to move to the < λ > parameter.

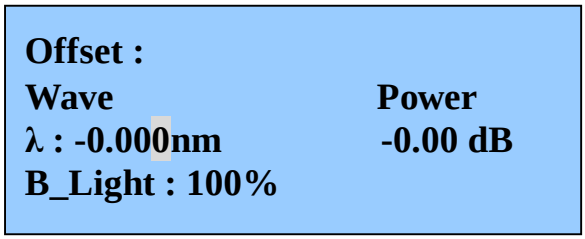


Figure 9 Set the wavelength offset

3 Pressing [◀] or [▶] pushbutton to move to the desired digit, as shown in Figure 9.

4 Rotates the knob anticlockwise to decrease the current selected numeric and rotates the knob clockwise to increase the current selected numeric.

5 The setting range of wavelength offset is from -50pm to +50pm.

6 Press the [UNIT] button to save it and exit.

How to Set the Power Offset?

1 Press the [*λ/F*] and [UNIT] buttons simultaneously to enter offset setting interface.
2 Press the [*POWER*] to move to the power parameter.

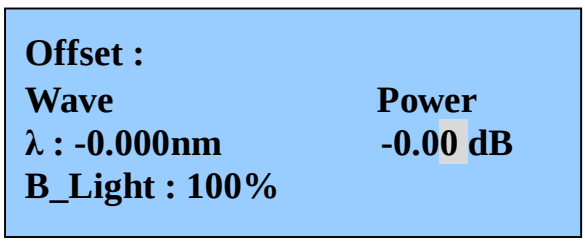


Figure 10 Set the power offset

3 Pressing [◀] or [▶] pushbutton to move to the desired digit, as shown in Figure 10.

4 Rotates the knob anticlockwise to decrease the current selected numeric and rotates the knob clockwise to increase the current selected numeric.

5 The setting range of power offset is from -1dB to +1dB.

6 Press the [UNIT] button to save it and exit.

How to Set the Backlight?

1 Press the [*λ/F*] and [UNIT] buttons simultaneously to enter offset setting interface.

2 Press the [*Active*] to move to the backlight parameter, as shown in Figure 11.

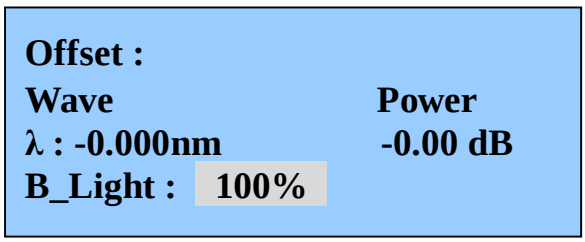


Figure 11 Set the Backlight

3 Rotates the knob anticlockwise to decrease the percent of backlight and rotates the knob clockwise to increase the percent of backlight.

4 Press the [UNIT] button to save it and exit.

How to Set the Power Units?

1 Press the [*POWER*] button to select the power parameter.

2 pressing the [UNIT] button allows you to select either *dBm* or *mW as* the units in which power is displayed.

How to Enable the Laser Output?

Press the [Active] button on the front panel of the GM8042 to enable the laser output. If the Active LED is lit, the source is emitting radiation, and the LCD displays ‘Laser ON’ on the right of the top.

How to Disable the Laser Output?

Press the [Active] button on the front panel of the GM8042 to disable the laser output. If the Active LED goes out, the source stops emitting radiation, and the LCD displays 'Laser OFF' on the right of the top.

How to Set the Tunable Laser Units

1 Press the [λ/F] button to select the wavelength parameter.
2 pressing the [UNIT] button allows you to select either λ or F, the units in which wavelength is displayed.

How to Perform a Sweep Testing?

What is a Wavelength Sweep Testing?

A wavelength sweep testing is performed when the instrument changes the optical wavelength of the optical output across a user-defined wavelength range. You can use a wavelength sweep to measure the wavelength-dependent loss of an optical component.

How to Perform a Wavelength/Frequency Sweep Operation?

The GM8042 Tunable Laser Source is equipped with the PC software. You can perform the wavelength or frequency sweep via this software.

See the "software control" section for detailed information on sweep operation.

How to Abort a Wavelength/Frequency Sweep Operation?

When the GM8042 is performing a wavelength or frequency sweep operation by the PC software, pressing the [◀] button on the front panel aborts the sweep operation.

How to Unlock the Remote Control Status?

When the GM8042 is under remote RS232 or USB control, all the manual buttons are locked except [◀] and the LCD displays “RMT” on the right of the bottom.

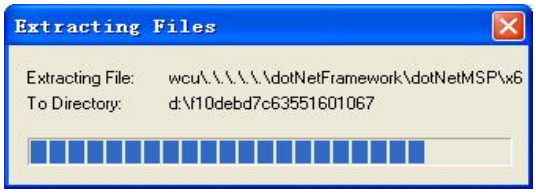
Pressing the [◀] button can exit from the remote control.

Software Control

Software Installation

1 Install the .NET Framework software.
Install the .NET 3.5 by double clicking DotNET_Framework35.exe file. Please note this step can be skipped for Windows 7 and windows vista.

- Double click the DotNET_Framework35.exe file to unpack it.



- After unpacking, install the .NET 3.5 according to the system prompts.

- Finish the installation for the Microsoft.NET 3.5。

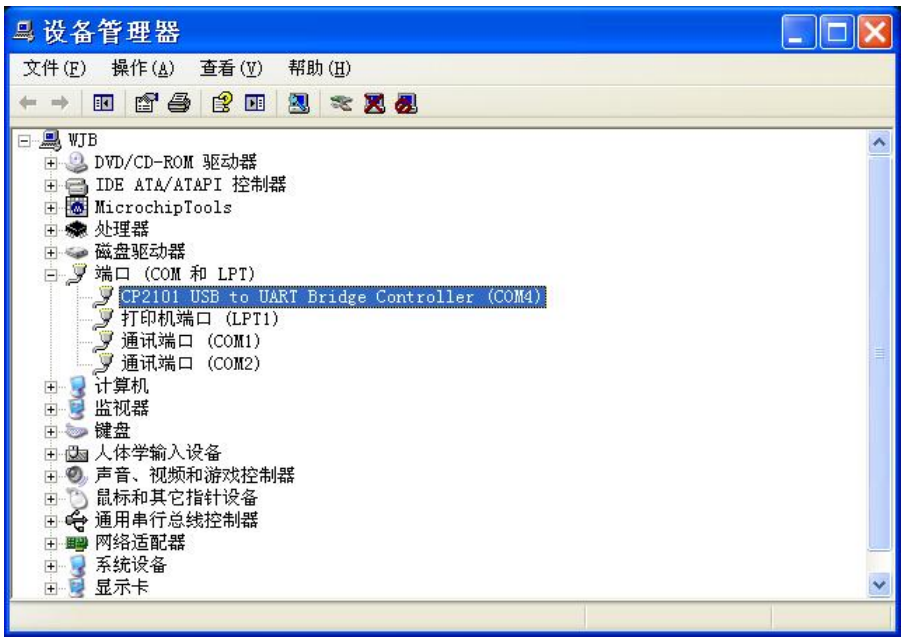
2 Install the USB driver.
If you want to use USB port for communication with PC, before operating the GM8042, the USB driver software must be installed first.

- First find the file CP210x_VCP_Win_XP_S2K3_Vista_7.exe on the CD provided with the instrument.
- Double click the destination file, according to the prompt select the target path to install the USB driver program.

System Setup

1 Power up the GM8042.

2 Connect the PC to the GM8042 with the supplied USB cable, the PC will prompt for installing the hardware automatically. After completing the installation, open the windows device manager, and look for added comport under ‘comport（COM and LPT）’. The PC assigns a comport number automatically.



3 You can also use a RS232 cable supplied by UC Instruments Corp. to Connect the PC to the GM8042.

Assume you use a USB port in this section.

4 Run the PC software, select the above comport (COM4 in this example), baud rate is set to 115200, press ‘open’ button to establish the communication between the PC and the GM8042.

Software Operation

When the module communicates with pc, the interface is shown below. The user may use this PC software to set the current output frequency/wavelength, perform sweep operation and turning laser on/off.

- **Open/Close Communication Comport**

  Click open or close button, the communication comport will be enabled or disabled.

- **Set current frequency**

  Select frequency value on frequency drop-down box, then click [set value] button, the frequency setting will be sent to module. If click the [Set to Max] or [Set to Min] button, the current frequency will be set to maximum or minimum laser frequency of the module.

- **Set current wavelength**

  Select wavelength value on wavelength drop-down box, then click [set value] button, the wavelength setting will be sent to module. If click [Set to Max] or [Set to Min] button, the current wavelength will be set to maximum or minimum laser wavelength of the module.

- **Control laser output state:** Set the laser state to "ON" to enable the laser output. Set it to "OFF" to turn laser output off.

- **Set sweeping Mode:** in Mode drop-down box, specify the either frequency or wavelength sweeping mode.

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- **Set frequency sweeping:** in Freq Scan frame, specify the beginning and end values, step value and wait interval between two steps in per drop-down box for frequency sweeping. When ready, click [Set Value] to confirm, then press [Sweep] button to start the sweeping operation.

- **Set wavelength sweeping:** in Wave Scan frame, specify the beginning and end values, step value and wait interval between two steps in per drop-down box for wavelength sweeping. When ready, click [Set Value] to confirm, then press [Sweep] button to start the sweeping operation.

- **Abort Sweeping:** You can press [Abort] button to abort the sweeping in progress.

Communication Interface

There are two communication interface ports on the rear panel of the GM8042. They are USB port and RS232 serial interface port.

RS232 Serial Interface Port

The GM8042 serial interface has fixed parameters.

The PC serial interface should be configured to match the instrument's fixed parameters.

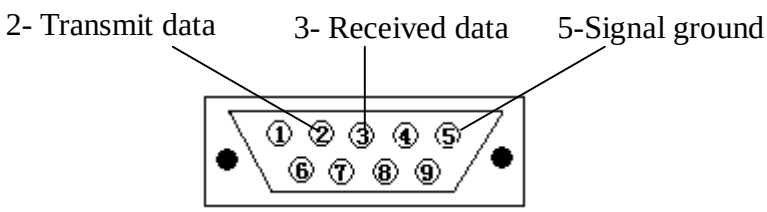
Fixed Parameters

These are:

Baud rate	115200
Data Bits	8
Parity	None
Stop Bits	1

RS232 Connector

The following figure shows the connector and pin assignments.



RS232 Connector

RS232 Cable

The connectors pin assignments on the cable for RS232 Communication.

DB9 Connector		DB9 Connector	
Pin	**Notes**	**Pin**	**Notes**
2	*Received data*	**2**	*Transmit data*
3	*Transmit data*	**3**	*Received data*
5	*Signal ground*	**5**	*Signal ground*

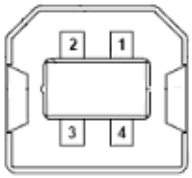
NOTE For serial communication use the null modem cable provided with your instrument.

USB Port

The USB Port is for connection to PC with PC software.

USB Connector

This is a standard four-core type B USB connector.



USB Cable

The USB connection cable must not be extended beyond 5m. For distance over 5m, it is possible to use a third party USB extender. Typically, they extend USB up to 50m.

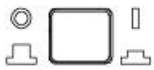
AC Line Power Supply Requirements

Line Power Requirements

The GM8042 Desktop Tunable Laser Source complies with over voltage category II and can operate from the single-phase AC power source that supplies between 100V and 240V at a frequency in the range 48 to 66 Hz. The maximum power consumption is 230mA under 115V voltage. The maximum power consumption is 120mA under 230V voltage.

Line Power Cable

In accordance with international safety standards, the instrument has a three-wire power cable. When connected to an appropriate AC power receptacle, this cable earths the instrument cabinet.



GM8042 Power Key

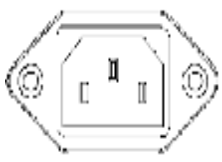
The power key on the front panel of the GM8012 may turn on or turn off the power.

WARNING: To avoid the possibility of injury or death, you must observe the following precautions before switching on the instrument.

- Insert the power cable plug only into a socket outlet provided with a protective earth contact. Do not negate this protective action by the using an extension cord without a protective conductor.
- Do not interrupt the protective earth connection intentionally.

The AC power requirements are summarized on the rear panel of the instrument.

AC INPUT:
100-240V~, 48-66Hz, 48~ 66Hz
230mA/115V, 120mA/230V,



AC Power Requirement Mark - GM8042

Claims and Repackaging

If physical damage is evident or if the instrument does not meet specification when received, notify the carrier and the UC Instruments Corp. Maintenance Service Center. The Maintenance Service Center will arrange for repair or replacement of the unit without waiting for settlement of the claim against the carrier.

Return Shipments to UC Instruments Corporation

If the instrument is to be shipped to a UC Instruments Corp. Maintenance Service Center, attach a tag showing owner, return address, model number and full serial number and the type of service required.

The original shipping carton and packing material may be reusable, but the UC Instruments Corp. Maintenance Service Center will provide information and recommendation on materials to be used if the original packing is no longer available or reusable.

General instructions for repackaging are as follows:

- Wrap instrument in heavy paper or plastic.
- Use strong shipping container.
- Use enough shock absorbing material around all sides of the instrument to provide a firm cushion and prevent movement inside container. Protect control panel with cardboard.
- Seal shipping container securely.
- Mark shipping container **FRAGILE** to encourage careful handling.
- In any correspondence, refer to instrument by model number and serial number.

UC Instruments Corp. Maintenance Service Center

Any adjustment, maintenance, or repair of GM8012 must be performed by qualified personnel. Contact your customer engineer through UC Instruments Corp. Maintenance Service Center.

Tel:0773-5850657, 5803731

http://www.ucigl.com

Standard Equipments

This appendix provides information about GM8042's Standard Equipments.

Accessories	
Model #	**Description**
RS232 Cable	Null modem cable
USB Connection Cable	Standard four-core type B USB cable.
AC Power Cable	three-wire power cable
CD	Includes GM8042 User manual and PC software

Maintenance

- Avoid sharp vibration when operation.
- Keep the head face of sensor clean.
- Cover the channel adaptor on the front panel with the dust cap.
- Don't forcibly push or drag the connector out of the adaptor of GM8042.
- Be careful for crash and fall-off.

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