

# Technical Specifications

Model	Units	520 Dual 13/15		520 Dual 85/13		520 Single			
Wavelength	nm	1310 Laser	1550 Laser	850 VCSEL	1310 Laser	650 Laser	850 VCSEL	1310 Laser	1550 Laser
Wavelength Range	nm	+/- 20	+/-20	+/-20	+/-20	+/-20	+/-20	+/-30	+/-30
Spectral Width (FWHM)	nm	2	2	2	2	3	2	2	2
Stability 1 hr. max. deviation	dB	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Power Output (Set Point min.) 9/125 SMF 50/125 .21 NA GI MMF 62.5/125 0.23 NA GI MMF 100/140 0.29 NA GI MMF 200/240 0.22 NA SI MMF*	dBm	-10 -10 -10 -10 -10	-10 -10 -10 -10 -10	N/A -7* -7 -7 -7	-7 -7 -7 -7 -7	0 0 0 0 0	N/A -7** -7 -7 -7	-7 -7 -7 -7 -7	-10 -10 -10 -10 -10
Modulation Frequencies	Hz	270, 1000, 2000		270, 1000, 200 + External Modulation Capable up to 1 MHz					
Functions		MOD (CW DC or modulated output mode), SOURCE (selectable frequency)							
Auto Shutoff/ Shutoff Disable		Unit powers down 15 min. after last key has been depressed. User-selectable disable function							
Power	V	Requires one 9 Volt alkaline battery (>20 hrs. battery life*) or Cercis 120 V AC Adaptor							

Specifications subject to change without notice.

\*Typical

**BOLD TYPE** are standard Laser/VCSEL sources.

\*\*All sources are standard with **BOLD** typed fiber interface. Use of same size or larger fibers (*italic*) will yield the same output power since the unit contains a fiber-pigtailed source.

## Battery / AC Adaptor

The battery is easily replaced via the back sliding compartment door. The light source should be "OFF", and the battery properly connected and seated within the compartment. Connect the lead from the A604 or A605 interchangeable AC adaptor to the side of the unit, then plug the adaptor into an outlet—120V and 90-240V (47-63 Hz), respectively.

## External Modulation

The external modulation port is intended to provide a simple, digital optical signal from an input electrical signal. Connection is made through an electrical SMA connector at the top of the light source. An input signal of 0—5 Volt (max.) is converted into a pulse waveform at the input signal frequency. A frequency up to 1 MHz can be applied.

## Warning

**Operation of this Laser/VCSEL Light Source must conform to the specifications and instructions provided herein. Please read and understand the entire contents of this manual before operation.**

## Connector Interface Cleaning

It is important that the connector interface be kept clean and free of contamination. Prior to insertion of any connector into the light source optical port(s), proper cleaning of the connector should be done to industry-standard procedures. Various cleaning methods include commercial adhesive cleaners (CLE-TOP, etc.), or swabbing the connector end with alcohol and dusting/drying with canned air.



## Adaptors

**Cercis** offers an option of interchangeable click-on/click-off precision machined stainless steel connector adaptors. Standard SC, FC, ST & 2.5 mm ferrule universal adaptors are available.

## Calibration and Maintenance

Each **Cercis** light source is calibrated to NIST traceable standards. The unit should be returned to **Cercis** on an annual basis for recalibration.

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Thank you for purchasing a **Cercis Model 520 Laser Light Source**. This product is designed to provide many years of productive service.

<b>Cercis, Inc.</b>	
<b>On/Off</b>	AUTO SHUTOFF(default) Depress key & hold ~1 sec. For NO SHUTOFF
<b>Source</b>	Turn source on/off; depress for +/- 1 dB
<b>MOD</b>	Dual Source: Depress 1X for 1st; 2X for 2nd; hold for +/- 1 dB 1X—270 Hz 2X—1000 Hz 3X—2000 Hz (Single Only) 4X—External modulation
<b>Serial No:</b>	
<b>Part No:</b>	
<b>NIST Traceable</b>	<b>Cal:</b>
<b>Due:</b>	

The label shown at left is on the back of each **Cercis Laser Light Source**. Included are brief operating instructions, annunciator meanings, unique serial number, **Cercis** part number, the calibration date and recalibration due date.

#### Limited Warranty

Cercis makes every effort to assure that its products meet high quality and durability standards, and warrants to the original purchaser that the product be free from defects in materials and workmanship: 1 year limited warranty (unless otherwise specified). Warranty does not apply to defects due directly or indirectly to misuse, abuse, negligence or accidents, repairs or alternations made outside our facilities or to a lack of maintenance. Cercis limits all implied warranties to the period specified above from the date the product was purchased. Except as stated herein, any implied warranties of merchantability and fitness are excluded. Cercis shall in no event be liable for death, injuries to persons or property or for incidental, contingent, special or consequential damage arising from the use of its products. To take advantage of this warranty, the product must be approved for return for examination, postage prepaid, to Cercis. Proof of purchase date and an explanation of the complaint must accompany the merchandise. If our inspection discloses a defect, Cercis will either repair or replace the product with a product of equal or higher performance. If it is determined that the defect resulted from causes not within the scope of Cercis warranty, then the purchaser must bear the cost of repair and return shipping.

## Operator's Manual



# Model 520 Laser/VCSEL Light Source

## Easy as 1, 2, 3 ... or

### Operating Instructions

1) Depress **ON/OFF** key to turn the light source on and off. The default is **AUTO SHUTOFF** which automatically turns off the light source if a key is not depressed within 15 minutes. Depress any button within the 15 min. interval to restart the timer.

Override to **NO AUTO SHUTOFF** by holding the **ON/OFF** key down ~ 1 second; disabling the power saver feature and the light source will not shutoff until (unless) the battery discharges or an operator pushes **ON/OFF**.

2) Press and release the **SOURCE** key to activate the source.

**Single Source:** Calibrated output power.

Depress and hold **SOURCE** key to cycle the power up 1 dB or down 1 dB from the calibrated output power level (std see Table).

(continued next page)

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## On/Off, Source & MOD

**Dual Source:** Depress **SOURCE** 1X to illuminate the 1st source (850 nm); depress 2X for the 2nd source (1310 nm). Depress and hold **SOURCE** key to cycle either source up 1 dB or down 1 dB from the calibrated output power level (std. see Table next page). All calibrated wavelength options are NIST traceable.

3) Press **MOD** key 1X for 270 Hz modulation (the green indicator LED slowly blinks); 2X for 1000 Hz modulation (the indicator LED blinks faster); 3X for 2000 Hz modulation (the indicator LED blinks rapidly). For single sources, depress 4X for external modulation (up to 1 MHz—the indicator LED will remain illuminated). Depressing MOD again will turn off modulation. Modulation can also be turned off by depressing **SOURCE** key or **ON/OFF** (which will turn the light source off) key.

For optimum results, select the light source best suited to your power meter range.



Reference this manual for proper operation and maintenance of your **Cercis Model 520 Laser Light Source**.



After a command is received, the 520\_R will prompt for any required parameters by sending a “?” character. The program must wait for the prompt before sending each parameter. If an error is encountered at any time, the 520\_R will send the appropriate error code (see Table A) and terminate the command. After a command is successfully completed, the 520\_R will return “OK”; a new command may then be issued.

All commands and parameters must be received by the 520\_R within a user programmable timeout period. This timeout period defaults to approximately 3 seconds at power on, but may be changed by issuing the TMO command. If a command or parameter is not received within the timeout period, a “TIMEOUT ERROR” code is returned & the command is terminated.

Below is an example of a typical command and return sequence which illustrates sending the GSI (get source information) command/parameter and receiving a response. In the example, (CR) is the RETURN character (ASCII 13 decimal, OD hexadecimal), the text after and including the “;” is a comment only for explanation and should not be part of the program.

```
Send: GSI(CR) ; GSI get source info command
Receive: ? ; request source # parameter
Send: 1(CR) ; send source #1 parameter
Receive: LASER,1310nm:100uW(CR) ; source info
Receive: OK(CR) ; command completed
```

The returned information is dependent on the source installed in the instrument in position #1 and may be different than example.

The following is a GSI command where the parameter send is for an invalid source number (3). The 520\_R replies with an error code and terminates the command.

```
Send: GSI(CR) ; GSI get source info command
Receive: ? ; request source # parameter
Send: 5(CR) ; send source #5 parameter
Receive: 107(CR) ; error #107 invalid source
```

### 1.2 Software Control Scheme

The Model 520\_R LASER source is designed to be custom configured with user specified LASERS or VCSELs. In order to allow the software to accommodate custom configurations, the instrument is controlled by the remote control software via source ID handles. ID handles are simply numeric values corresponding to the physical light source.



### 1.3 Error Codes—Table A

The following table lists all the standard Error codes and explanations. There may be additional error codes available if the instrument has been customized for added features; see any available appendices.

Code	Error	Description
E100	Null Error	Internal use
E101	Error None	Internal use
E102	Unrecognized Command	Command issued is not recognized
E103	Command Syntax	Command syntax error
E104	Parameter Syntax	Parameter syntax error
E105	Parameter Range	Parameter value is out of range
E106	Buffer Overflow	Secondary receive buffer overflow
E107	Source Unavailable	Source not installed or greater than 2
E109	Invalid Mode	Power meter mode is not valid
E110	Timeout Error	Serial timeout expired

### 1.4 Command Set—Table B

Table B gives a listing of all the Model 520\_R commands in alphabetical order.

Mnemonic	Command
GHV	Get Hardware Version
GMN	Get Model
GMO	Get Current Mode
GNS	Get Number of Sources
GRD	Get Current Reading
GSI	Get Source Information
GSV	Get Software Version
MOD	Modulation Enable— 1 = No Modulation 2 = 270 Hz 3 = 1000 Hz 4 = 2000 Hz
SDE	Source Disable
SEN	Source Enable
TMO	Serial Timeout



COMMAND NAME: Enable Modulation  
 COMMAND MNEMONIC: **MOD**  
 NUMBER OF PARAMETERS: None  
 DESCRIPTION: Sets the modulation  
 1 = No Modulation 2 = 270 Hz 3 = 1000 Hz 4 = 2000 Hz  
 EXAMPLE:  
 Send: MOD(CR)  
 Receive: ?  
 Receive: 2(CR)  
 Receive: OK(CR)

COMMAND NAME: Source ENable  
 COMMAND MNEMONIC: **SEN**  
 NUMBER OF PARAMETERS: One  
 PARAMETER TYPE: Integer  
 PARAMETER RANGE: 1 to number of sources  
 DESCRIPTION: Enable light source number  
 EXAMPLE:  
 Send: SEN(CR)  
 Receive: ?  
 Send: 1(CR)  
 Receive: OK(CR)

COMMAND NAME: Source Disable  
 COMMAND MNEMONIC: **SDE**  
 NUMBER OF PARAMETERS: One  
 PARAMETER TYPE: Integer  
 PARAMETER RANGE: 1 to number of sources  
 DESCRIPTION: Disable light source number  
 EXAMPLE:  
 Send: SDE(CR)  
 Receive: ?  
 Send: 1(CR)  
 Receive: OK(CR)



## 1.5 Command Set Descriptions

Following is a list of all commands including command name, command mnemonic, number of parameters, parameter name, parameter type, parameter range, command description and command example

COMMAND NAME:  
Get Hardware Version  
COMMAND MNEMONIC:  
**GHV**  
NUMBER OF PARAMETERS:  
None  
DESCRIPTION:  
Returns the instrument hardware revision number  
EXAMPLE:  
*Send:* GHV(CR)  
*Receive:* Hardware V2.00(CR)  
*Receive:* OK(CR)

COMMAND NAME:  
Get Model Number  
COMMAND MNEMONIC:  
**GMN**  
NUMBER OF PARAMETERS:  
None  
DESCRIPTION:  
Returns the model number and any custom modifiers to the base model number  
EXAMPLE:  
*Send:* GMN(CR)  
*Receive:* Model 520\_R(CR)  
*Receive:* OK(CR)

COMMAND NAME:  
Get Source Information  
COMMAND MNEMONIC:  
**GSI**  
NUMBER OF PARAMETERS:  
One  
PARAMETER TYPE  
Integer  
PARAMETER RANGE  
1 to number of sources  
DESCRIPTION:  
Returns information on the source requested  
EXAMPLE:  
*Send:* GSI(CR)  
*Receive:* ?  
*Send:* 1(CR)  
*Receive:* LASER:1310nm:100uW(CR)  
*Receive:* OK(CR)

COMMAND NAME:  
Get Number of Sources  
COMMAND MNEMONIC:  
**GNS**  
NUMBER OF PARAMETERS:  
None  
DESCRIPTION:  
Returns the number of light sources (1 or 2, single or dual)  
EXAMPLE:  
*Send:* GNS(CR)  
*Receive:* 2(CR)  
*Receive:* OK(CR)

COMMAND NAME:  
Get Software Version  
COMMAND MNEMONIC:  
**GSV**  
NUMBER OF PARAMETERS:  
None  
DESCRIPTION:  
Returns the instrument firmware revision number  
EXAMPLE:  
*Send:* GSV(CR)  
*Receive:* Firmware V2.00(CR)  
*Receive:* OK(CR)

COMMAND NAME:  
set the TiMeOut value  
COMMAND MNEMONIC:  
**TMO**  
NUMBER OF PARAMETERS:  
1  
PARAMETER TYPE  
Integer  
PARAMETER RANGE  
0 to 255  
DESCRIPTION:  
Sets a new time out value for serial communications. The value is a relative number with 255 corresponding to approximately 3 second timeout  
EXAMPLE:  
*Send:* TMO(CR)  
*Receive:* ?  
*Send:* 200(CR)  
*Receive:* OK(CR)

## RS232 Bus Port—Programming for Remote Operation

### 1.0 Overview

The Model 520\_R programming interface enables the user to remotely control the instrument using a PC. The interface operates using standard RS-232 serial bus ASCII text communications. It is compatible with DOS, Windows, Mac or Linux operating systems.

Software to control the 520\_R can be easily programmed using various platforms such as Microsoft Visual Basic<sup>R</sup>, or Visual C++<sup>R</sup>, and National Instruments Labview<sup>R</sup>, or any programming language allowing ASCII text communications over the PC hardware RS-232 serial bus.

The programming interface includes a full set of commands to allow the user to control the instrument and obtain various system configuration information and measurement results.

### 1.1 Communications Protocol

The 520\_R hardware RS-232 serial port is a 3 wire implementation using the RxD, TxD and GND pins of the standard RS-232 interface. All communications flow control handshaking is performed in software by the programming interface. The serial communication parameters are fixed at the following values

BAUD RATE, 9600  
DATA BITS, 8  
STOP BITS, 1  
PARITY, none  
FLOW CONTROL, none

These COM port parameters should be setup using either the operating system or programming language commands.

All communications to and from the 520\_R are by ASCII text string commands, parameters and returned values. Commands, parameters and return values are terminated by a RETURN character, CR (ASCII 13 decimal, 0D hexadecimal). The 520\_R contains an internal hardware receive buffer which is 4 bytes long. All commands and parameters must be 4 bytes or less (including the terminating CR) or a buffer overflow may result.