Eye-BERT 10G and Micro 10G Software Programming Guide

USB Driver:

In order for Windows to recognize the Eye-BERT 10G / Eye-BERT Micro 10G the USB driver must first be installed, after which the Eye-BERT 10G appears as an additional COM port on the computer. Currently Windows XP, Vista, and 7 are supported.

1. Copy the file "cdc_NTXPV764.inf" from the supplied CD to the hard drive.

2. Plug the Eye-BERT 10G into a free USB port. When the hardware installation wizard asks for the driver location, browse to the "cdc_NTXPVista.inf" file on the hard drive.

3. After the driver has been installed right click "my computer" and select "properties". In the properties window select the "hardware" tab. Click on "device manager" and expand the "Ports (COM & LPT)" item. Locate the "Spectronix, Inc." entry and note the assigned COM number, (ie "COM4"). This is the COM port that the software will use to communicate with the Eye-BERT Micro.

Note, on some operating systems such as Window 7, manual USB driver installation may be necessary. If the hardware installation wizard fails, go to "My Computer" > "Properties" > "Hardware" > "Device Manager", and find the "Spectronix" or "SERIAL DEMO" entry under "Other Devices" and select "Update Driver". At this point you will be able to browse to the location of the driver.

USB Commands:

The Eye-BERT 10G uses a combination of ASCII and binary data to communicate with a host computer; the tables below list the individual commands, parameters, and responses from the Eye-BERT 10G.

Notes:

1. All communication is initiated by the host.

2. Commands are not case sensitive.

3. A space or equal sign should be inserted between the command and any parameters.

4. All commands should be terminated with a <CR> <LF>.

5. Responses from the Eye-BERT 10G are not terminated unless noted.

6. Text inside quotations ("") are ASCII and those not in quotations are binary.

Get Unit Information	
Command:	Parameters:
"?"	**(none)**
Response:	Parameters:
Unit name	**"Eye-BERT 10G:"** *or* **"Eye-BERT Micro 10G:"**
Transceiver Vendor	*(string, up to 18 characters)*
Transceiver Serial Number	*(string, up to 18 characters)*
String Termination	**0x00**
Notes:	Useful for identifying the unit type when multiple units are used with the same computer

Set the wavelength	
Command:	Parameters:
"SetWL"	**"####.##"** *(Wavelength in nm)*
Response:	Parameters:
(none)	
Notes:	*Example: "setwl=1550.12"*

Set the data rate	
Command:	Parameters:
"SetRate"	**"##########"** *(Bit Rate in bps/10)*
Response:	Parameters:
(none)	
Notes:	*Example: "setrate=995328000" for 9.95328Gbps)*

Set the pattern (generator and detector)	
Command:	Parameters:
"SetPat"	**"7"** *(PRBS 2^7-1)*
	"3" *(PRBS 2^{31}-1)*
	"D" *(DCD duty cycle distortion jitter pattern)*
	"C################" *(custom, "##########" = 16 ASCII coded hex characters representing a 64 bit repeating pattern)*
	"L" *(Loop-back: data on the input is retransmitted on the output)*

Response:	Parameters:
(none)	
Notes:	*Example: "setpat=AAAAAAAAAAAAAAA" a half rate on/off pattern using the custom pattern option*

Turn Transceiver Laser on / off	
Command:	Parameters:
"TX"	**"0"** *(laser off)* **"1"** *(laser on)*
Response:	Parameters:
(none)	
Notes:	*Example: "tx=1" turns the laser on*

Reset error counters, BER, and test timers	
Command:	Parameters:
"Reset"	*(none)*
Response:	Parameters:
(none)	
Notes:	

Get Transceiver Register Information and Values	
Command:	Parameters:
"XFP"	
Response:	Parameters:
XFP information	*(ASCII text formatted information about the XFP including: Vendor, Model, Serial Number, Power Levels, and data from ID and Diagnostic registers)*
Notes:	

Get Transceiver Register Information and run Automated Performance Testing	
Command:	Parameters:
"Test"	
Response:	Parameters:
XFP information and Test Results	*(ASCII text formatted information about the XFP including: Vendor, Model, Serial Number, Power Levels, and data the ID and Diagnostic registers)*

Notes:	Test results are evaluated on the information read from the XFP registers. The test takes about 18 seconds to complete.

Read the measurement results	
Command:	Parameters:
"R"	*(none)*
Response:	Parameters:
Bit Rate (four bytes)	*Rate (bps/10) =* **byte1** * *2^24 +* **byte2** * *2^16 +* **byte3** * *2^8 +* **byte4** *A Bit Rate value of 0 indicates that there is a frequency error most likely caused by an out of range value.*
PRBS (one byte)	*(per "SetPat" command above)*
Receive Optical power in dBm (two bytes)	*Power (dBm) = (32768 – (* **byte1** * *256 +* **byte2** *)) / 100*
Transmit Optical power in dBm (two bytes)	*Power (dBm) = (32768 – (* **byte1** * *256 +* **byte2** *)) / 100*
Transmit Wavelength (three bytes)	*Wavelength (nm) = (* **byte1** *$*2^{16}$ +* **byte2** *$*2^{8}$ +* **byte3** *)) / 100*
SFP Temperature in °C (two bytes)	*Temp (°C) = (32768 – (* **byte1** * *256 +* **byte2** *)) / 100*
Optical Receiver status (one byte)	**0** *(not used)* **1** *(no signal)* **2** *(signal and sync)* **3** *(signal but no lock)*
Total bit count (four bytes)	*Count = (* **byte1** *$*2^{16}$ +* **byte2** *$*2^{8}$ +* **byte3** *) $*2^{(\textbf{byte4} - 24)}$*
Error count (four bytes)	*Errors = (* **byte1** *$*2^{16}$ +* **byte2** *$*2^{8}$ +* **byte3** *) $*2^{(\textbf{byte4} - 24)}$*
Termination (one byte)	**0x00** *(termination character)*
Notes:	BER = Errors / Count

Read XFP Register (V 0.2 and above)	
Command:	Parameters:
"RdXFP"	**"#"** *"#": register number in hex* *Example:* **"RdXFP 0x44"** *Reads the first byte of the serial number from the information register at address 0x44*
Response:	Parameters:

`Register type,`
`register`
`number, value`
	Example: **"44 = 35"**
	
	(information register (0xA0), register number (0x44), value (5 ASCII)

Notes:	*All values passed in and returned are in hex, preceding "0x" is optional. Input parameters should be separated by a space. Note, not all XFP vendors support reading and writing all locations. See SFF-8472 for more information.*

Write XFP Register, then respond with read back value (V 0.2 and above)	
Command:	Parameters:
"WrXFP"	**"#" "v"** *"#": register number in hex, "v": value to be written in hex.* *Example:* **"WrXFP 0x80 0x55"** *Writes 0x55 to the first byte of the user writable EEPROM area at register at address 0x80.*
Response:	Parameters:

`Register type,`
`register`
`number, value`
	Example: **"80 = 55"**
	
	(diagnostic register (0xA2), register number (0x80), value read back (0x55)

Notes:	*All values passed in and returned are in hex, preceding "0x" is optional. Input parameters should be separated by a space. Note, not all SFP vendors support reading and writing all locations. See SFF-8472 for more information.*

Factory / Test Commands:

Print Terminal Formatted Menu / Status	
Command:	Parameters:
"!"	**(none)**
Response:	Parameters:
Notes:	

Toggles Command Echo	
Command:	Parameters:
"echo"	**(none)**
Response:	Parameters:
Notes:	

Clears the Terminal Screen	
Command:	Parameters:
"Clear"	**(none)**
Response:	Parameters:
Notes:	

Displays the Si5338 clock generator Registers	
Command:	Parameters:
"RdCG"	**(none)**
Response:	Parameters:
Notes:	

Displays the CDR Registers	
Command:	Parameters:
"RdCDR"	**(none)**
Response:	Parameters:
Notes:	

Performs Self Test using a loopback cable	
Command:	Parameters:
"Bist"	**(none)**

Response:	Parameters:
Notes:	

Map the bit rates where the CDR can lock	
Command:	Parameters:
"Map"	**"#"** *(bit rate resolution in %)*
Response:	Parameters:
(none)	
Notes:	*Example: "map=10" tests the CDR locking from 100Mbps to 4.29Gb increasing each point by 10%.*