USB Driver:

In order for Windows to recognize the Eye-BERT MicroX the USB driver must first be installed, after which the Eye-BERT MicroX appears as an additional COM port on the computer. Currently Windows XP, Vista, and 7, 8, and 10 are supported.

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

2. Plug the Eye-BERT MicroX 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 MicroX.

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 MicroX 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 MicroX.

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 MicroX are not terminated unless noted.

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

7. For dual channel models, "b" can be appended to any command to communicate with secondary side

Get Unit Information	
Command:	Parameters:
"?"	**(none)**
Response:	Parameters:
Unit name	**"Eye-BERT MicroX: "**
Firmware Version	*(#.#)*
Transceiver Vendor	*(string, up to 18 characters)*
Transceiver Serial Number	*(string, up to 18 characters)*
Termination	**<cr> <lf>**
Notes:	Useful for identifying the unit type when multiple units are used with the same computer

Set the wavelength (V 2.0 and above)	
Command:	Parameters:
"SetWL"	**"####.##"** *(Wavelength in nm)*
Response:	Parameters:
(none)	
Notes:	*Example: "setwl 1550.12"*

Set the data rate	
Command:	Parameters:
"SetRate"	**"########"** *(Bit Rate in Kbps)*
Response:	Parameters:
(none)	
Notes:	*Example: "setrate 1250000" for 1.25Gbps*

Set the pattern (generator and detector)	
Command:	Parameters:
"SetPat"	**"0"** *(Low power standby)*
	"7" *(PRBS 2^7-1)*
	"9" *(PRBS 2^9-1)*

	"1" *(PRBS 2^{11}-1)*
	"5" *(PRBS 2^{15}-1)*
	"2" *(PRBS 2^{23}-1)*
	"3" *(PRBS 2^{31}-1)*
	"8" *(PRBS 2^{58}-1)*
	"6" *(PRBS 2^{63}-1)*
	"L" *(Loop-back: data on the input is retransmitted on the output)*
Response:	Parameters:
(none)	
Notes:	*Example: "setpat 31" generates a PRBS2^{31} pattern.*

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:	*Resets either side A or B*

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

Notes:	

Get Transceiver Register Information and run Automated Performance Testing	
Command:	Parameters:
"Test"	
Response:	Parameters:
SFP information and Test Results	*(ASCII text formatted information about the SFP including: Vendor, Model, Serial Number, Power Levels, and data from both the ID and Diagnostic registers)*
Notes:	*Test results are evaluated on the information read from the SFP registers. The test takes about 17 seconds to complete.*

Read the measurement results	
Command:	Parameters:
"R"	*(none)*
Response:	Parameters:
Bit Rate (four bytes)	*Rate (bps/10) =* **byte1** $* 2^{\wedge}24 +$ **byte2** $* 2^{\wedge}16 +$ **byte3** $* 2^{\wedge}8 +$ **byte4** *A Bit Rate value of 0 indicates that there is a frequency error most likely caused by an out of range value.*
PRBS Setting (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)*
	D[6] *(SFP is inserted)*
	D[7] *(new SFP inserted, cleared after "?" command)*
Total bit count (four bytes)	*Count = (*$\mathbf{byte1}$*$*2^{16}$+$\mathbf{byte2}$*$*2^{8}$+$\mathbf{byte3}$*) $*2^{(\mathbf{byte4}-24)}$*
Error count (four bytes)	*Errors = (*$\mathbf{byte1}$*$*2^{16}$+$\mathbf{byte2}$*$*2^{8}$+$\mathbf{byte3}$*) $*2^{(\mathbf{byte4}-24)}$*
Eye opening (two bytes)	*Horiz = (*$\mathbf{byte1}$*/32 (UI)*
	Vert = ($\mathbf{byte1}$**3.125 (mV)*
Detected Pattern (one byte)	*PRBS + 100*Inverted (107 = PRBS7, inverted).*
	See "SetPat" command.
Termination (one byte)	**0x00** *(termination character)*
Notes:	BER = Errors / Count

Read SFP Register (V 1.3 and above)	
Command:	Parameters:
"RdSFP"	**"t" "#"** *"t" : register type – either "I" for information or "D" for diagnostic, "#": register number in hex* *Example:* **"RdSFP I 0x44"** *Reads the first byte of the serial number from the information register at address 0x44*
Response:	Parameters:
Register type, register number, value	*Example:* **"a0:44 = 35"** *(information register (0xA0), register number (0x44), value (5 ASCII)*
Notes:	*The physical address of the information register is 0xA0 and the physical address of the diagnostic register is 0xA2. 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.*

Write SFP Register, then respond with read back value (V 1.3 and above)	
Command:	Parameters:
"WrSFP"	**"t" "#" "v"** *"t" : register type – either "I" for information "D" for diagnostic, or "T" for tuning, "#": register number in hex, "v": value to be written in hex.* *Example:* **"WrSFP D 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:* **"a2:80 = 55"** *(diagnostic register (0xA2), register number (0x80), value read back (0x55)*
Notes:	*The physical address of the information register is 0xA0 and the physical address of the diagnostic and tuning register is 0xA2. 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.*

Scan an eye diagram	
Command:	Example / Parameters:

"Scan"	[channel] [scale]
	(channel: 0:15, scale: 1=100, 2=200, 3=300, 4=400mVpp)
	"7 4" (scan CH6, 400mVpp)
Response:	Example / Parameters:
Waveform	Binary data points (intensity) scanning from left to right (64x64 grid)
Termination	<0xFF>
Notes:	Channels: 7= SMA input, 14= SFP input, 13= QSFP1, 12= QSFP2, 10= QSFP3, 8= QSFP4. All other channels are internal.