
# Spectronix Eye-BERT 40G Software Programming Instructions



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## Spectronix Eye-BERT 40G Software Programming


## Product Information

### Specifications

- **Remote control and** monitoring via USB or optional Ethernet connection
- **USB driver installation** is required for Windows operating systems
- **The default IP address for Ethernet communication:** 192.168.1.160
- **Communication protocol:** TCP/IP on port 2101

## Product Usage Instructions

### USB Interface

1. Copy the file cdc_NTXPV764.inf from the supplied CD to the hard drive.
2. Plug the Eye-BERT 40G into a free USB port and install the driver.
3. Locate the assigned COM port number in Device Manager for communication.

### Optional Ethernet Interface

The Eye-BERT 40G communicates using TCP/IP on port number 2101 with a default IP address of 192.168.1.160.

1. Use the Digi Device Discovery utility to retrieve and change the IP address.
2. Disable the Windows Firewall and start the program to configure network settings.

### Commands

The Eye-BERT 40G communicates using ASCII data with the following command.

| Command | Response |
| --- | --- |
| ? (Get Unit Information) | Start of response Command Echo Unit name Firmware Rev |

**Notes:**

- All communication is initiated by the host.
- Commands are not case-sensitive.
- A space or equal sign should be inserted between the command and any parameters.
- All commands should be terminated with a.
- Any response should be ignored.

## FAQ

**Q: How do I change the IP address of the Eye-BERT 40G?**

**A:** Use the Digi Device Discovery utility to retrieve and change the IP address. Refer to the installation program for detailed steps.

**Q: What is the default IP address for Ethernet communication?**

**A:** The default IP address is 192.168.1.160.

## Overview

- The Eye-BERT 40G allows remote control and monitoring via either a USB or optional Ethernet connection.
- Once a connection is made to the Eye-BERT using one of these interfaces, all commands and controls are the same regardless of which interface is used.

**USB Interface:**

- In order for Windows to recognize the Eye-BERT 40G USB port the USB driver must first be installed, after which the Eye-BERT 40G appears as an additional COM port on the computer. Currently, Windows XP, Vista, 7, and 8 are supported.
- Windows 7 requires the extra step listed below; Windows 8 requires additional steps which can be found in the following application note: **http://www.spectronixinc.com/Downloads/Installing%20Under%20Windows%208.pdf**

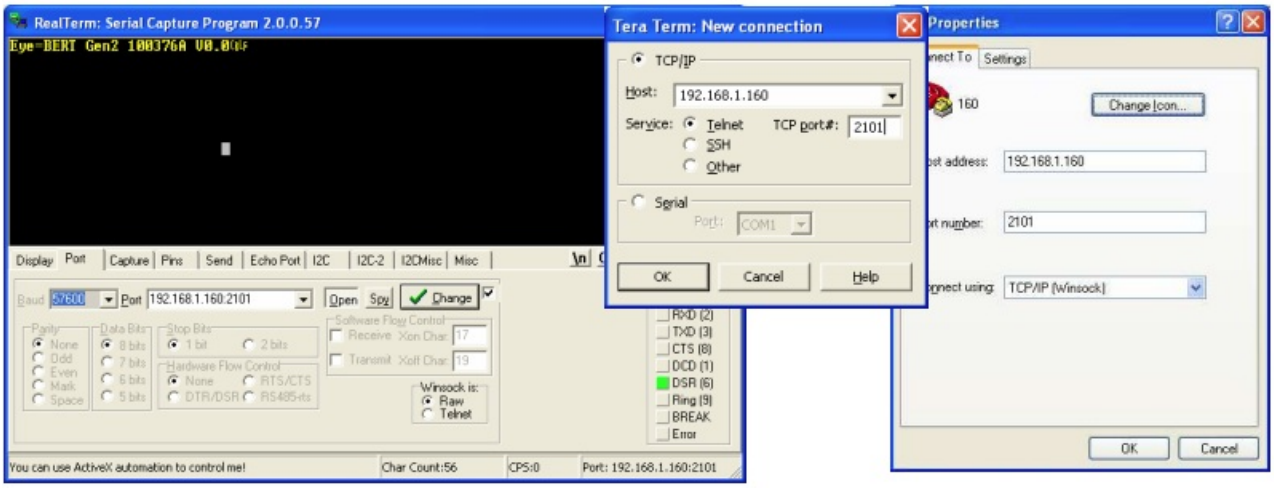
1. Copy the file “cdc_NTXPV764.inf” from the supplied CD to the hard drive.
2. Plug the Eye-BERT 40G into a free USB port. When the hardware installation wizard asks for the driver location, browse to the “cdc_NTXPVista.inf” file on the hard drive.
3. After the driver has been installed right click “my 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 40G.

- **Note,** that on some operating systems such as Windows 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.

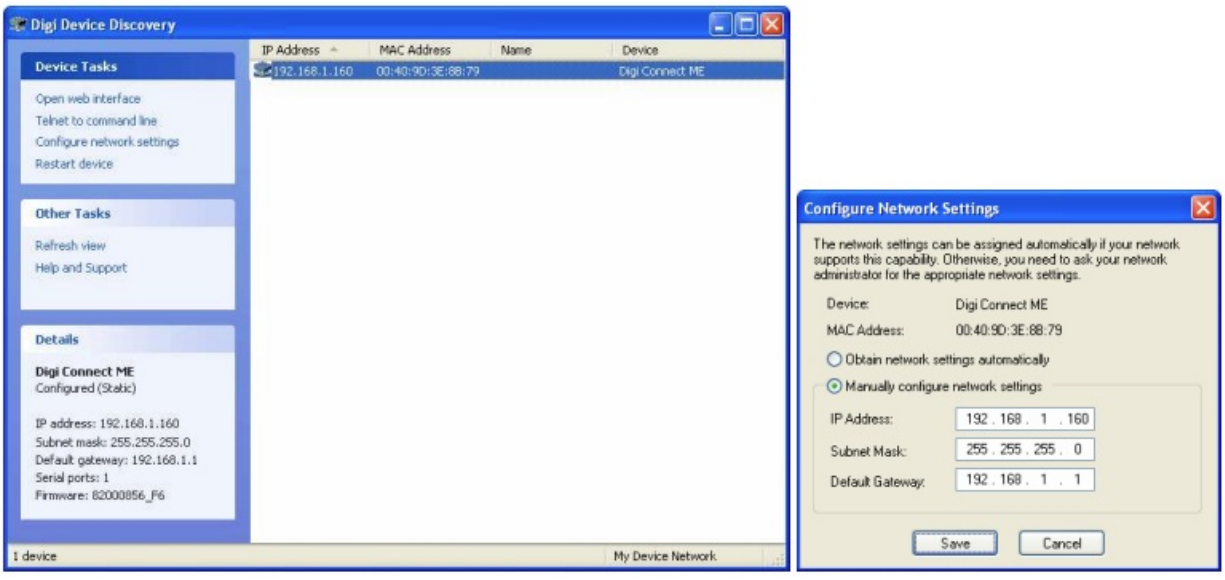
**Optional Ethernet Interface:**

- The Eye-BERT 40G communicates using TCP/IP on port number 2101 and is shipped with a default IP address of 192.168.1.160. Connection to this port is illustrated below using HyperTerminal, TeraTerm, and RealTerm.




## Changing the IP Address

- The Digi Device Discovery utility allows the user to retrieve and change the Eye-BERT IP address. The installation program “40002265_G.exe” can be found on the Spectronix or Digi websites.
- After installing the utility, disable Windows Firewall and any other virus or firewall programs and start the program. The program will report the IP and MAC addresses of all compatible devices on the network.
- Right-click on the device and select “Configure
- Network Settings” to change the network settings.




## Commands

- The Eye-BERT 40G uses ASCII data to communicate with a host computer; the tables below list the individual commands, parameters, and responses from the Eye-BERT 40G.

**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. Any <CR> <LF> response should be ignored

| Get Unit Information | |
|---|---|
| Command: | Parameters: |
| **"?"** | **(none)** |
| Response: | Parameters: |
| Start of response | **{** |
| Command Echo | **?:** |
| Unit name | **Eye-BERT 40G 100400A** |
| Firmware Rev | **V1.0** |

| | |
|---|---|
| Termination | **}** |
| Notes: | |

| Set the data rate | |
|---|---|
| Command: | Parameters: |
| **"SetRate"** | **"########"** *(Bit Rate in Kbps)* |
| Response: | Parameters: |
| **(none)** | |
| **Notes:** | *Sets to the closest standard bit rate Example: "setrate=39813120" for 39.813120 Gbps.* |

| Set the pattern (generator and detector) | |
|---|---|
| Command: | Parameters: |
| **"SetPat"** | **"7"** *(PRBS $2^7$-1)*<br>**"3"** *(PRBS $2^{31}$-1)*<br>**"x"** *(K28.5 pattern)* |
| Response: | Parameters: |
| **(none)** | |
| Notes: | *Example: "setpat=7"* |

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

| Read the status and settings | |
|---|---|
| Command: | Parameters: |
| **“Stat”** | *(none)* |
| Response: | Parameters: |
| Start of response | **{** |
| Command Echo | **STAT:** |
| SFP Tx wavelength (nm) | **1310.00** |

| | |
|---|---|
| SFP temperature (°C) | **42** |
| Bit rate (bps) | **39813120000** |
| Pattern | **3**<br>*(per “setpat” command)* |
| Termination | **}** |
| Notes: | All parameters are separated by “,”<br>*Example:*<br>**{STAT: 1310.00, 42, 39813120000, 3}** |

| Read the measurements | |
|---|---|
| Command: | Parameters: |
| **“meas”** | *(none)* |
| Response: | Parameters: |
| Start of response | **{** |
| Command Echo | **MEAS:** |
| Channel Number | **1**<br>*“1 through 4”* |
| Tx polarity or off | **X**<br>*“+ or – or X = off”* |
| Rx polarity | **+**<br>*“+ or -”* |
| Rx power (dBm) | **–21.2** |
| Signal Status | **Sig**<br>*“Sig” or “LOS”* |
| Lock Status | **Lock**<br>*“Lock” or “LOL”* |
| Error count | **2.354e04** |
| Bit count | **1.522e10** |
| BER | **1.547e-06** |
| Test Time (seconds) | **864** |
| Termination | **}** |

| | |
|---|---|
| Notes: | All parameters are separated by ",". Channel number through test time repeats for each channel. Channels are separated by CR/LF.<br>*Example:*<br>**{MEAS:**<br>**1, Off, +, -21.2, Lock, 2.354e04, 1.522e10, 1.547e-06, 864**<br>**2, +, +, -15.1, Lock, 2.354e04, 1.522e10, 1.547e-06, 864**<br>**3, +, +, -15.1, Lock, 2.354e04, 1.522e10, 1.547e-06, 864**<br>**4, -, -, -15.1, Lock, 2.354e04, 1.522e10, 1.547e-06, 864}** |

| Tests the transceiver and returns a test report | |
|---|---|
| Command: | Parameters: |
| **"Test"** | |
| Response: | Parameters: |
| **Test Report** | *(ASCII text formatted information about the QSFP including Vendor, Model, Serial Number, Power Levels, and data from all registers)* |
| Start of response | **{** |
| Command Echo | **Test:** |

| | |
|---|---|
| QSFP Registers: | QSFP INFORMATION:<br>QSFP Vendor: 3M COMPANY<br>Part Number: 6B2A-0412A-0<br>SN: M41407100195<br>Date Code 07-05-14<br>Media: OM3, 50um, 100 m<br>Wavelength: 850.00 nm<br>Speed: 10300.00 Gbps<br>Temperature: 49.0 C<br><br>---CH1---- ---CH2---- ---CH3---- ---CH4---<br>_<br>Off Rx (dBm) -30.0 -30.0 -30.0 -30.0<br>Off LOS Ind 1 1 1 1<br>On Rx (dBm) -0.5 -1.0 -12.0 ! -6.9<br>On LOS Ind 0 0 0 0<br>39.813Gb (BER) 0.000E00 0.000E00 0.000E00 0.000E00<br>40.000Gb (BER) 0.000E00 0.000E00 1.862E-10* 0.000E00<br>40.319Gb (BER) 0.000E00 0.000E00 3.725E-10* 0.000E00<br>41.250Gb (BER) 0.000E00 0.000E00 9.313E-10! 0.000E00<br>41.774Gb (BER) 0.000E00 0.000E00 1.676E-09* 0.000E00<br>41.785Gb (BER) 0.000E00 0.000E00 2.048E-09* 0.000E00<br>43.018Gb (BER) 0.000E00 0.000E00 8.009E-09* 0.000E00<br>44.570Gb (BER) 0.000E00 0.000E00 2.235E-08* 0.000E00<br>44.583Gb (BER) 0.000E00 0.000E00 2.682E-08* 0.000E00<br>Note: Warning "*" indicates the QSFP is not specified at this speed<br>Tested at PRBS31 for 1 second (BER~ 1E-10)<br>Tests may not be valid for all devices<br><br>*** QSFP FAILED WITH 2 ERRORS "!" ***<br>*** with 7 warnings "*" ***<br>*** Tested by Eye-BERT 40G www.spectronixinc.com *** |
| Termination | **}** |

| | |
|---|---|
| Notes: | Testing consists of the following:<br><br>1. Receiver power level <= -10dBm with the transmitter off<br><br>2. QSFP must report LOS with the transmitter off<br><br>3. Receiver power level > -10dBm with the transmitter on<br><br>4. QSFP must not report LOS with the transmitter on<br><br>5. If the BER is > 0, an error is reported if the test rate is within 100Mbps of the advertised rate, otherwise a warning is reported.<br><br>In the example above, channel 3 reported low receive power when the transmitter was enabled resulting in an error. The BER test failed at 41.25Gbps since the device is rated for 41.2Gbps (10.3*4) and warnings were flagged for each other rate that reported errors.<br><br>Note these tests may not be appropriate for all transceivers. |

| Prints Transceiver Register Information and Values | |
|---|---|
| Command: | Parameters: |
| **“PrintQSFP”** | |
| Response: | Parameters: |

| | |
|---|---|
| **QSFP information** | *(ASCII text formatted information about the QSFP including Vendor, Model, Serial Number, Power Levels, and data from all registers)* |
| Start of response | **{** |
| Command Echo | **PRINTQSFP:** |

| | |
|---|---|
| QSFP Registers: | QSFP Vendor: 3M COMPANY<br>Part Number: 6B2A-0412A-0<br>SN: M41407100195<br>Date Code 07-05-14<br>Media: OM3, 50um, 100 m<br>Wavelength: 850.00 nm<br>Speed: 10300.00 Mbps<br><br>Temperature: 51 C<br>Rx Power: 0.0, 1.6, -0.9, 3.3 dBm<br><br>QSFP Lower Page:<br>  \| 00 01 02 03 04 05 06 07 08 09 0a 0b 0c 0d 0e 0f<br>--+-----------------------------------------------<br>00\| 0d 00 02 00 00 00 00 00 00 00 00 00 00 00 00 00<br>10\| 00 00 00 00 00 00 33 2b 00 00 80 f4 00 00 00 00<br>20\| 00 00 27 bf 39 51 1f 5d 54 0a 0b 0d 0b 0d 0b 0d<br>30\| 0b 0d 00 00 00 00 00 00 00 00 00 00 00 00 00 00<br>40\| 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00<br>50\| 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00<br>60\| 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00<br>70\| 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 04<br><br>QSFP Upper Page 00:<br>  \| 00 01 02 03 04 05 06 07 08 09 0a 0b 0c 0d 0e 0f<br>--+-----------------------------------------------<br>80\| 0d 00 0c 04 01 00 01 40 00 02 80 05 67 00 00 32<br>90\| 00 00 00 00 33 4d 20 43 4f 4d 50 41 4e 59 20 20<br>a0\| 20 20 20 20 07 08 00 21 36 42 32 41 2d 30 34 31<br>b0\| 32 41 2d 30 20 20 20 20 30 31 42 68 07 d0 00 05 |

| | |
|---|---|
| | c0\| 00 00 00 18 4d 34 31 34 30 37 31 30 30 31 39 35<br>d0\| 20 20 20 20 31 34 30 37 30 35 20 20 08 00 00 8e<br>e0\| 35 00 00 00 0c 14 1c 1c 00 00 00 0c 14 1c 1c 00<br>f0\| 00 00 0c 14 1c 1c 00 00 00 0c 14 1c 1c 00 00 00<br><br>QSFP Upper Page 01:<br>\| 00 01 02 03 04 05 06 07 08 09 0a 0b 0c 0d 0e 0f<br>--+-----------------------------------------------<br>80\| 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00<br>90\| 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00<br>a0\| 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00<br>b0\| 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00<br>c0\| 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00<br>d0\| 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00<br>e0\| 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00<br>f0\| 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00<br><br>QSFP Upper Page 02:<br>\| 00 01 02 03 04 05 06 07 08 09 0a 0b 0c 0d 0e 0f<br>--+-----------------------------------------------<br>80\| ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff<br>90\| ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff<br>a0\| ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff<br>b0\| ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff<br>c0\| ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff<br>d0\| ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff<br>e0\| ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff 1e<br>f0\| ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff<br><br>QSFP Upper Page 03:<br>\| 00 01 02 03 04 05 06 07 08 09 0a 0b 0c 0d 0e 0f<br>--+-----------------------------------------------<br>80\| 5a 00 00 00 4b 00 08 00 00 00 00 00 00 00 00 00<br>90\| 8a ac 75 30 87 5a 7a 76 00 00 00 00 00 00 00 00<br>a0\| 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00<br>b0\| ff ff 00 00 ff ff 00 00 ff ff 00 00 ff ff 00 00<br>c0\| 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00<br>d0\| 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00<br>e0\| 00 00 00 00 00 00 00 00 00 00 00 00 00 00 22 22<br>f0\| ff 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 |
| Termination | **}** |

| Read QSFP Register | |
|---|---|
| Command: | Parameters: |
| **"RdQSFP"** | **"P" "A"** *"P": register page – 0 through 3, "A": register number in hex – 0 through FF*<br><br>*Example:* **"RdQSFP 0 0xC4"**<br><br>*Reads the first byte of the serial number from the information register at address 0xC4 in page 0.* |
| Response: | Parameters: |
| Start of response | **{** |
| Command Echo | **RDQSFP:** |
| **Register type, register number, value** | *Example:* **"P00:c4 = 4d"**<br><br>*(page 0, address 0xC4= 0x4d ("M" ASCII)* |
| Termination | **}** |
| 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 QSFP vendors support reading and writing all locations. See SFF-8438 for more information.* |

| Write SFP Register, then respond with read read-back value | |
|---|---|
| Command: | Parameters: |
| **“WrQSFP”** | **“P” “A” “D”** *“P”: register page – 0 through 3, “A”: register number in hex – 0 thr ough FF, “D”: value to be written in hex.*<br>*Example:* **”WrQSFP 0 0x56 0x0F”**<br>*Writes 0x0F to address 0x56 to turn all four transmitters off. Note, since address 0x56 is in the lower address space the page number is irrelevant.* |
| Response: | Parameters: |
| Start of response | **{** |
| Command Echo | **WRQSFP:** |
| **Register type, register number, value** | *Example:* **”P00:56 = 0F”**<br>*(diagnostic register (0xA2), register number (0x80), value read back (0x55)* |
| Termination | **}** |
| Notes: | *All values passed in and returned are in hex, preceding “0x” is optional. Input pa rameters should be separated by a space. Note, not all QSFP vendors support r eading and writing all locations. See SFF-8438 for more information.* |



## Documents / Resources

| | |
|---|---|
|  | Spectronix Eye-BERT 40G Software Programming [pdf] Instructions<br>V1, V1.1, Eye-BERT 40G Software Programming, Eye-BERT 40G, Eye-BERT, Eye-BERT Softw are Programming, Software Programming |

## References

- Overview - Spectronix
- User Manual