

Overview:

The Eye-Scope is a highly integrated, low cost instrument capable of measuring and displaying the signal quality (Q-factor) and eye-diagram of NRZ signals up to 12.5Gbps. The unit provides many features not found in higher priced units including both electrical and optical inputs and outputs, an internal CDR, and a color display allowing true stand-alone operation. Operation is simple: the unit automatically locks onto and displays the data rate and “Q-factor” of any valid input signal and pressing the touch screen will scan and display the eye-diagram. Electrical and SFP+ outputs are provided allowing in-line signal monitoring.

Warnings and Precautions:

- Do not exceed manufacturers recommended electrical or optical input power on any port
- Use only compatible fiber optical connectors and modules
- Use only the supplied 5VDC power supply as applicable
- Observe ESD precautions when handling
- Proper ventilation or heat sinking may be required depending on the environment and transceiver

Connections

All signal connections are located on the front of the unit; power and USB connections are located on the rear.

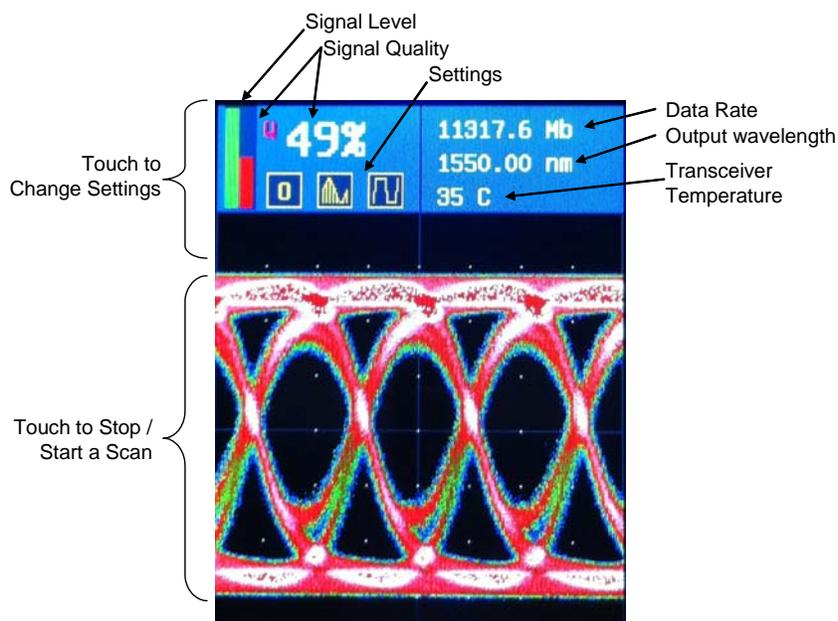


Field	Description
Optical Input	An FC/UPC connector is provided as the interface to the high speed optical receiver. This interface may be single mode or multimode fiber depending on the model type.
Electrical Input	A pair of 100Ω differential SMA connectors serve as the electrical input port. This interface can accept differential signals ranging from 100 to 1200mVpp.
Electrical Outputs	A pair of 100Ω differential SMA connectors serve as the electrical output port. The nominal differential amplitude is 900mVpp. This interface is always active and producing a copy of either the electrical or optical interface unless disabled.

Field	Description
SFP Slot	An MSA compliant SFP or SFP+ transceiver can be inserted into this slot to produce an optical output signal; the SFP receiver is not used. This interface is always active and producing a copy of either the electrical or optical interface unless disabled.
Power input	Connect to the supplied 5VDC adapter.
USB	Can be used with the supplied software to download and store eye scans.

Settings and Indicators

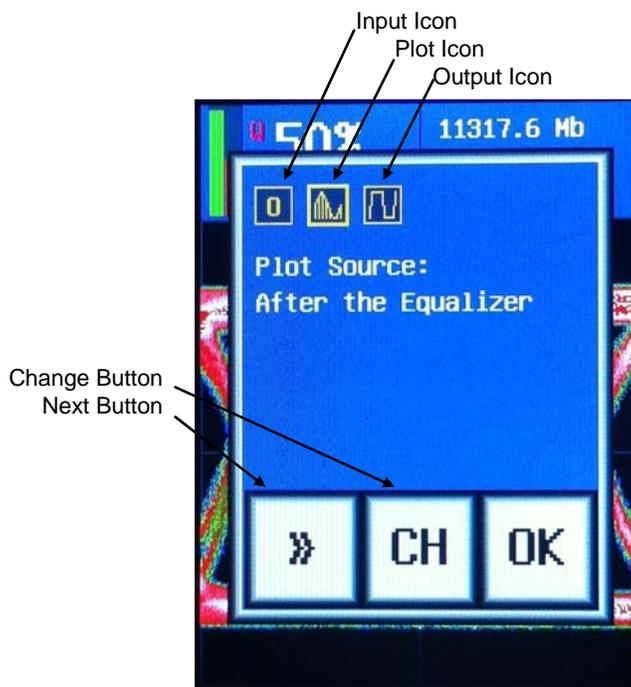
The Eye-Scope user interface consists of two screens, the measurement screen and the settings screen. The measurement screen has two sections, the status / settings area at the top and the eye capture area at the bottom. Pressing the eye capture area initiates an eye scan which takes approximately 60 seconds to complete. Scanning can be aborted by pressing the scan area a second time. Note, eye scans are not allowed below 622Mbps. The settings area contains information about the operation and settings of the unit as described in the table below.



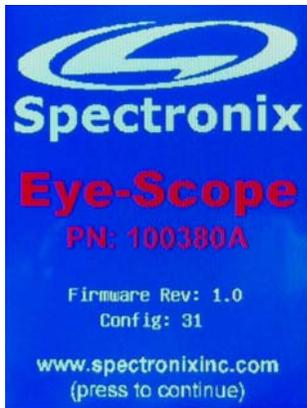
Field	Description
Signal Level	Gives an indication of the input signal amplitude. This bar has three colors that indicate the status of the input signal: <ul style="list-style-type: none"> <input type="checkbox"/> Green: Data rate identified and locked <input type="checkbox"/> Yellow: Sufficient amplitude but not locked <input type="checkbox"/> Red: Low amplitude
Signal Quality	The signal quality is displayed as both a numeric percentage and a bar graph. When this value disappears the input has lost lock.
Setting Icons	Indicates user settings, see description of settings below.
Data Rate	Measured input data rate. When there is sufficient signal but the input signal is not locked the rate will cycle through the different rates until it locks.

Field	Description
Output Wavelength	Transmit wavelength of the SFP / SFP+ transceiver (displayed only when a transceiver is present)
Temperature	Internal temperature of the SFP / SFP+ transceiver

Pressing the upper portion of the measurement screen displays the settings pop-up window. Three icons are used to display the settings of five parameters as described below. Selecting the Next button (>>) selects the next parameter and pressing the Change button (CH) changes the setting of the selected parameter. These settings are saved between power cycles.



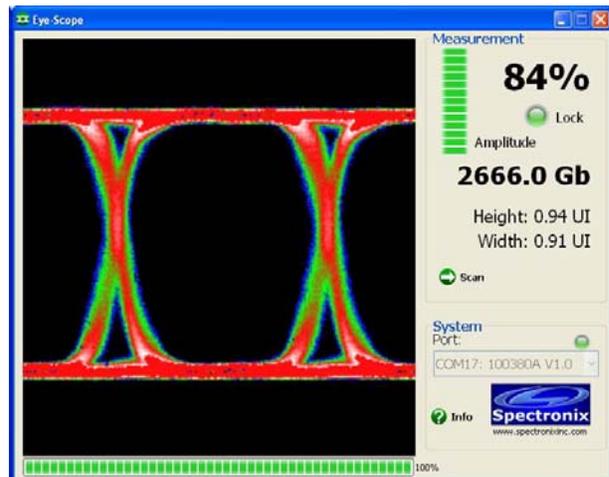
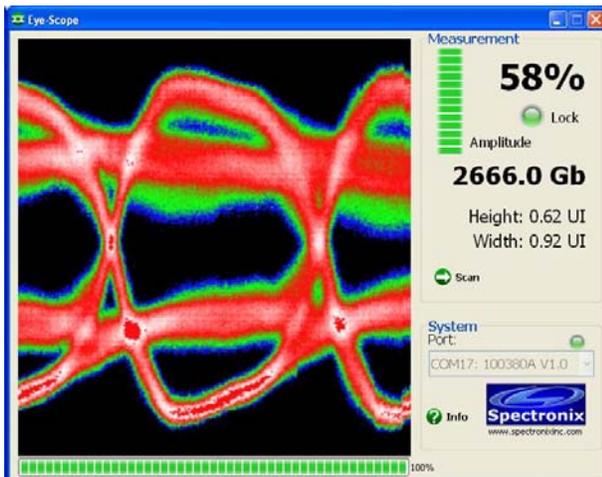
Field	Description
Input Select	Switches between the optical and electrical inputs, indicated as “O” or “E” on the input icon.
Plot Source	Determines whether to display the input signal before or after the input adaptive equalizer. The plot icon will be displayed with vertical lines (shown above) to indicate after the equalizer or without vertical lines to indicate before the equalizer. This setting has no effect on the output data.
Plot Polarity	Allows the user to invert the plot display. The plot icon will be inverted to indicate an inversion.
Output Polarity	Both the optical and electrical outputs will be inverted if this option is selected. The output icon will invert to indicate the inversion.
Enable Output	The outputs (optical and electrical) can be enabled or disabled by selecting this option. The output icon will display a horizontal line to indicate that the outputs are disabled.



Using the Eye-Scope

With the unit plugged into the supplied power adapter, press the power button above the display to turn the unit on. The splash screen displays the firmware revision and the unit configuration number. Touch the display anywhere to continue. When the measurement screen is displayed, configure the parameters as desired (described above). When a signal is applied the unit will start scanning the programmed data rates; periodically the unit may momentarily false lock then continue scanning – this is normal for some signals. Once the unit locks to a data rate the amplitude bar will turn green and the signal quality will be displayed. Once locked an eye scan can be initiated by touching the lower portion of the screen. Note, eye scanning is only available at 622Mbps and above.

An adaptive input equalizer constantly optimizes the input signal quality prior to retiming and retransmission via the optical and electrical outputs. The eye diagram can be captured either before or after the equalizer. The two scans below illustrate the effectiveness of the adaptive equalizer. The first scan shows the signal at the input; ringing and reflections can be seen as a result of a grossly mismatched transmission line. The second plot shows this same signal after the adaptive equalizer.



When an eye is not being plotted the eye is continually being scanned in order to calculate the signal quality. The signal quality is calculated by multiplying the normalized clear eye opening height and the clear eye opening width, a running average increases the resolution and decreases the variability of this measurement. The signal quality can be monitored and displayed either before or after the equalizer, per the “plot source” setting.

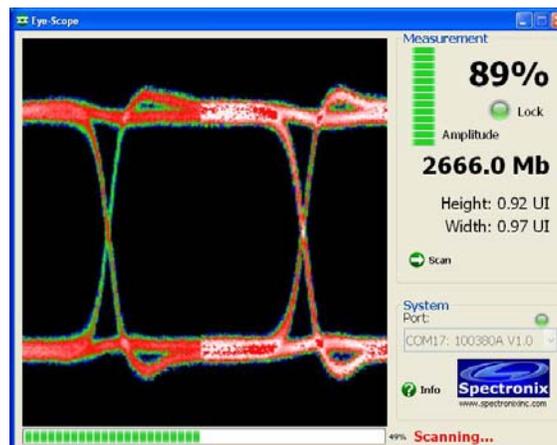
Installing the Optional Software and Starting the Application

The Eye-Scope software is an optional utility that allows the user to save scans to a computer in the form of bitmaps.

1. Insert the CD or download the application from www.spectronixinc.com, run the “Eye-Scope Install.exe” installation program. **Windows 7 Users: right click the file and select “Run as administrator”.**
2. Connect power to the Eye-Scope using the supplied 5VDC adapter (select models).
3. Plug the Eye-Scope into a free USB port. When the hardware installation wizard asks for the driver location, browse to “cdc_NTXPV764.inf” located in the installation directory. 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.
4. Start the application from the program start menu

Using the Optional Eye-Scope Application

At start-up the Eye-Scope Application searches for compatible Eye-Scope devices and lists them in the “Port” drop down box. The Eye-Scope must be powered on and connected to a USB port prior to launching the Eye-Scope Application. Once the user selects a device from the list, the connection LED will turn green and the fields will begin to update.



Upon pressing the “Scan” button, the user will be asked for a location to store the captured eye scan. Once entered, an eye capture is initiated on both the device screen and the on the computer.

APPENDIX LETTER OF VOLATILITY

The Eye-Scope contains both volatile and non volatile memory. The Eye-Scope firmware application and settings are stored in non volatile memory and program variables and settings are stored in volatile RAM which is cleared upon power down. The user has no means of directly altering the non volatile memory without opening up the unit and reprogramming the device using a special programming adapter. Therefore there is no clearing procedure.