Eye-BERT 40G
Users Manual

Overview:

The Eye-BERT 40G is a low cost, easy to use, stand-alone bit error rate tester offering high performance testing from 39.813Gpbs to 44.583Gbps in a compact package. The Eye-BERT accepts any MSA compatible QSFP transceiver for optical bit error rate testing.

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

❒ Observe ESD precautions when handling

❒ Proper ventilation may be required depending on the environment and transceiver

Connections

The QSFP slot is located on the front of the unit and power, USB, and Ethernet (if supplied), are located on the rear of the unit.

Starting the Eye-BERT

With the unit plugged into the supplied power adapter, press the power button above the display to turn the unit on. Note, holding the button too long will cause the unit to enter a special configuration mode and the screen will remain black. If this happens simply unplug the power cord and restart the unit. After a short initialization period the splash screen displays the status and firmware revision. Touch the display anywhere to continue. When the measurement screen is displayed, configure the parameters as desired (described below). Since each pattern detector must operate synchronously with its own pattern generator it is recommended to use only like channels with each other (for example, CH1 transmitter with CH1 receiver).

Measurement Screen

The Eye-BERT user interface consists of the main measurement screen and two configuration screens. The measurement screen is divided into two sections: the channel list area at the bottom of the screen which shows individual power and BER measurements for each channel and the detailed information area at the top which show the QSFP status and detailed BER measurement data. The upper measurement area can be configured to display detailed information for the any of the four channels or for the composite measurements. Pressing the upper measurement area cycles through the five measurement types as indicated by the icon (C,1,2,3,4). Additionally there are two buttons near the bottom of the screen which are used to enter the configuration screens and reset all BERT counters. The table below describes the measurement screen fields.

| Upper Area	Description
Channel Icon	The icon in the upper right corner of the display shows which channel is currently being displayed in this area. Channels may be numbered 1, 2, 3, 4, or "C" for composite. Pressing this area will cycle through the five choices.
BER	Displays the current bit error rate. For channels 1-4 the BER for the individual channel is displayed. For composite, the combined BER is calculated as the total error count of all channels divided by the total bit count of all channels. ❑ Green: No errors detected since the last reset ❑ Red: At least one error has been detected
Errors	Displays the error count. For channels 1-4 the error count for the individual channel is displayed. For composite, the total error count of all channels is displayed. ❑ Green: No errors detected within the last 100mS ❑ Red: At least one error has been detected within the last 100mS
Count	Displays the total number of bits received bits during a lock condition. For channels 1-4 the count for the individual channel is displayed. For composite, the total count of all channels is displayed.
Time	The total test time since the last reset (hours:minutes:seconds) For channels 1-4 the test time is the total time the channel was locked. For composite, the test time of the channel with the highest time is displayed.
QSFP	Displays the nominal transmit wavelength as reported by the QSFP. This is displayed only when there is a QSFP inserted.
Bit Rate	Current data rate setting for the individual channel (channels 1-4) or the composite sum of all bit rates.
Pattern	Current pattern setting

Upper Area	Description
Lock / LOL	Displays the individual channel pattern detector lock status for channels 1-4. For composite, if any channel is locked, "Lock" is displayed. ❑ "Lock" Green: pattern detector is lockeded ❑ "LOL" Red: pattern detector is not locked
Temperature	Displays the temperature reported by the QSFP. This is displayed only when there is a QSFP inserted.

Lower Area	Description
"dBm" (2nd column)	Displays the received optical power level as reported by the QSFP for each channel. The color indicates whether the QSFP has reported a loss of signal or not. This field is displayed only when a transceiver is inserted. ❑ Green: Indicates the receiver has a signal ❑ Red: Indicates the QSFP has reported a loss of signal
Rx (3rd column)	Displays "Lock" if the pattern detector has locked to the correct test pattern or "LOL" if it has lost lock. ❑ Green/Lock: Indicates the receiver has locked ❑ Red/LOL: The receiver has lost lock
BER (4th column)	Displays the bit error rate of the individual channel, only displayed if the pattern checker is locked to the correct pattern. ❑ Green: No errors detected since the last "Reset" ❑ Yellow: No current errors but errors have been detected since the last "Reset" ❑ Red: Errors detected in the last 100mS

Buttons	Description
Conf Button	Pressing this button displays the configuration screens as described in the following section
Reset Button	Pressing this button resets all BERT counters

Configuration Screens

Pressing the "Conf" button from the main screen displays one of the configuration screens shown below. To display a different configuration screen press the "Next" button.
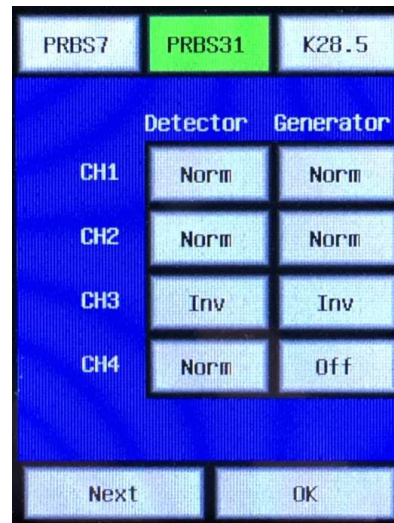
Field	Description
Rate Selection	Use the buttons on this screen to select the desired bit rate. This is the composite bit rate for all four channels.
Adjacent Channel	Selecting "Async" offsets channels 2 and 4 by +100Kbps resulting in these channels running asynchronously by approximately 10ppm.
Pattern Select	Select one of three test patterns.
Detector	For each of the four channels, the pattern detector input can be set to normal or inverted.
Generator	For each of the four channels, the pattern generator output can be set to normal, inverted, or output disabled.
Next	Displays the next configuration screen
OK	Used to return to the main measurement screen

USB and optional Ethernet ports

Remote computer control and automated testing of QSFP modules is possible via either USB or optional Ethernet ports. For more information on using these interfaces consult the "Eye-BERT 40G Software Programming Guide".

LETTER OF VOLOTILITY

The Eye-BERT 40G contains both volatile and non volatile memory. The Eye-BERT firmware application, settings, and network configuration 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.