Eye-BERT Micro (+10G)
Application Note
Remote PRBS Detection

Overview:

Normally the Eye-BERT Micro and Eye-BERT Micro 10G pattern detectors are used to measure a signal originating from their own pattern generator in BERT mode. A device can be made, however, to measure the bit error rate of a pattern generated by a different Eye-BERT by following the procedure below:

Eye-BERT Micro:

1. Configure the receiving BERT with the same rate and pattern as the transmitter

2. Switch the receiving BERT to repeat mode

This will cause the receiving BERT to monitor the BER and retransmit the signal. Mismatched data rates are not supported.

Eye-BERT Micro 10G:

1. Configure the receiving BERT with the same pattern as the transmitter

The data rates do not need to match, the pattern generator will transmit at the specified rate and the pattern detector will lock onto the incoming signal. BER monitoring in repeat mode is not supported.

Recommended 125Mb to 4.25Gb Long Reach Link Testing:

One Eye-BERT (or micro) can monitor the pattern sent by a second Eye-BERT from a remote distance as shown in the figure below. The Eye-BERT and Eye-BERT Micro can be used interchangeably, the difference being that the "Micro" must be used with a computer.
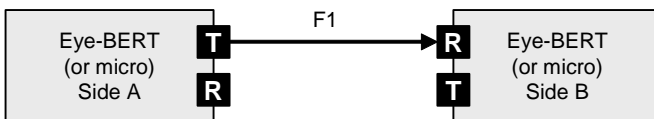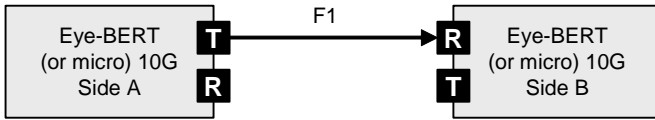

Single Fiber Testing:
- Both sides are set up for the same rate and pattern
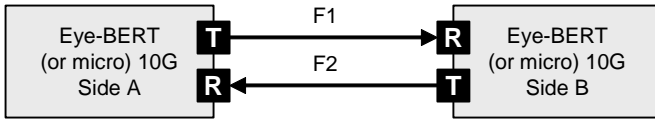- Side B monitors the errors in F1

Recommended 9.95Gb to 11.3Gb Long Reach Link Testing:

There are three recommended ways to test long reaches of fiber with the Eye-BERT (or micro) 10G, as shown in the figure below. The Eye-BERT 10G and Eye-BERT Micro 10G can be used interchangeably, the difference being that the "Micro" must be used with a computer. Each BERT receiver can monitor the other's transmitted pattern and report any errors on that link; if a receiver is not connected it will report a loss of signal but will not effect the transmit side (first two diagrams).

Eye-BERT (or micro) 10G Side A — T → F1 → R **Eye-BERT (or micro) 10G Side B**
R ← T

<u>Single Fiber Testing:</u>
- Both sides are set up for the same pattern
- Side B monitors the errors in F1

Eye-BERT (or micro) 10G Side A — T → F1 → R **Eye-BERT (or micro) 10G Side B**
R ← F2 ← T

<u>Dual Fiber Testing:</u>
- Both sides are set up for the same pattern
- Side B monitors the errors in F1
- Side A monitors the errors in F2

Eye-BERT (or micro) 10G Side A — T → F1 → R **Eye-BERT (or micro) 10G Side B**
R ← F2 ← T
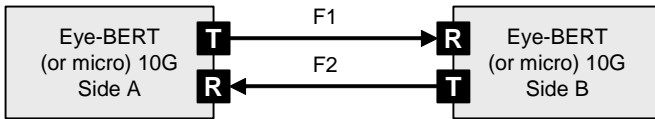
<u>Dual Composite Fiber Testing:</u>
- Side B is set up for loop-back / repeat mode
- Side B repeats / retransmits any errors in F1
- Side A reports any errors in F1 or F2

The third figure shows how error rate testing can be performed on two separate fibers and all errors summed and reported at one end. In this case side A is used as both the pattern generator and the error detector while side B is simply a repeater. Any errors in F1 will be regenerated on F2 and reported back to side A. Since side B retimes and regenerates the pattern, the effects of jitter and link budget on F1 will not affect the signal quality on F2. The errors reported at side A will be the sum of the errors on both fibers. Note that the Eye-BERT Micro 10G powers up in loop-back mode so no computer is required at side B, instead a simple USB power adapter can be plugged into the USB port to enable the unit.