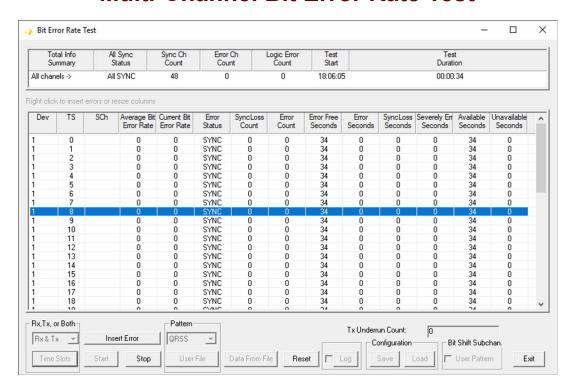# Multi-Channel Bit Error Rate Test

Overview

Multi-Channel Bit Error Rate Testing (MCBERT) measures correctness of data transmitted and received on T1/E1 lines/timeslots with stored data in a reference file. The application can work in real-time with data simultaneously being transmitted and received on T1/E1 lines/timeslots, or off-line with data stored in a file. The on-line T1/E1 testing can be done on full or fractional T1/E1.

The following independent streams can be compared to a pattern file.

- A Hyperchannel per T1/E1 (Nx64k timeslots, where N = 1...24 T1, 1...31 E1) line/trunk
- Multiple 64k (or 56k) channels
- Multiple subchannels Nx8K (8k, 16k...56k). For example, for T1 it could be up to 24x8 separate 8K subchannels (eight sub-channels per timeslot)

For more details, refer to Multi-Channel Bit Error Rate Test webpage.

Functional Features

The visual interface of this application consists of the following controls:

- **Rx, Tx, or Both**: Provides options to select Rx only mode to receive the data, Tx only mode to transmit the selected BER pattern (or a pattern file), or Tx Rx mode to send and receive the data
- **Time Slots**: Allows user to select independent stream timeslots, or hyper channels, or subchannels to be tested
- **Insert Error**: Allows user to insert errors while transmitting the selected BER pattern or a file
- **Pattern File**: User can choose any type of file to be used as the reference file. The chosen file is used for either online or offline testing
- **Data from File**: For Offline analysis, user can select any type of captured file to be compared against the reference file
- **Log**: Records the comparison of Expected and Received data to a file
- **Bit Shift Synchronization**: Allows to achieve proper synchronization with smaller file sizes on sub channels
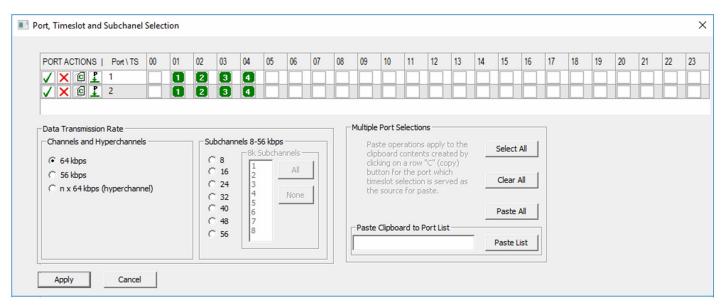
Real-time and Offline Analysis

In real-time analysis, a pattern file is selected for comparing the data. The entire pattern file is read into a circular memory buffer. In online analysis this buffer is subsequently used to compare with the input stream from T1/E1 line(s) or input file. Multiple input streams are always compared to the same patterns.

Mode of received data (64kbps, n x 64kbps or n x 8kbps) is selected depending upon timeslot specification. With the start of the MCBERT, the application provides all the statistics.

In case of Offline analysis, selection of data file will be compared with the selected reference file to provide the statistics.

Card / Timeslot / Subchannel Selection

Selecting Streams on T1/E1 Lines

The following selections can be made:

- Channels 1-24 for T1 and 1-32 for E1 per card (multiple streams per card). Hyper channel selection possible.
- Sub channels Up to 8x24/32- 8K sub channels (one or more bits per timeslot can represent a separate stream, for example, 56k is using 7 bits per timeslot. Multiple streams per timeslot and multiple timeslots per card can be used.

Note: When multiple timeslots are selected, selection of different data rate transmission is possible. When 64k radio button is selected, it means N separate streams of single timeslot each.

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Synchronization Algorithm and States

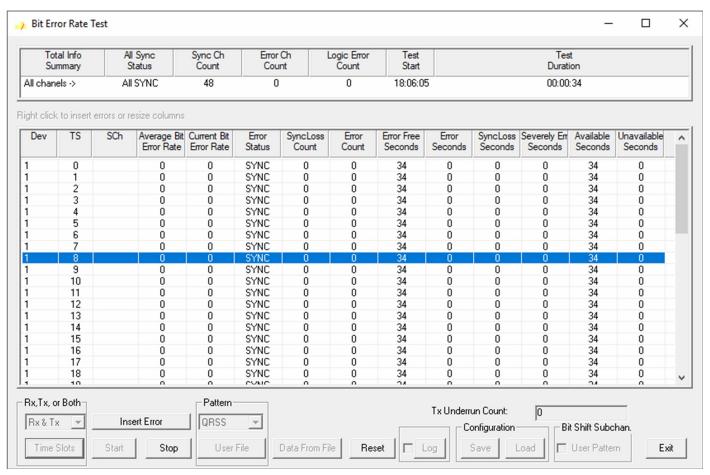MCBERT can be in one of the following three states:

NoSync

Initially MCBERT will be in NoSync state where it stays till the continuous bytes match is found between five consecutive input bytes and five consecutive pattern bytes.

PreSync

After continuous match is found MCBERT state changes in PreSync till sufficient number of bytes are matched, so that error rate becomes below 10^{-2}.

Sync

After sufficient number of consecutive input bytes match, MCBERT enters Sync state. Any errors in PreSync or Sync state exceeding the error rate more than 10^{-2} cause transition into NoSync state.

Bit Error Rate Test — □ ×

Total Info Summary	All Sync Status	Sync Ch Count	Error Ch Count	Logic Error Count	Test Start	Test Duration
All chanels ->	All SYNC	48	0	0	18:06:05	00:00:34

Right click to insert errors or resize columns

Dev	TS	SCh	Average Bit Error Rate	Current Bit Error Rate	Error Status	SyncLoss Count	Error Count	Error Free Seconds	Error Seconds	SyncLoss Seconds	Severely Err Seconds	Available Seconds	Unavailable Seconds
1	0		0	0	SYNC	0	0	34	0	0	0	34	0
1	1		0	0	SYNC	0	0	34	0	0	0	34	0
1	2		0	0	SYNC	0	0	34	0	0	0	34	0
1	3		0	0	SYNC	0	0	34	0	0	0	34	0
1	4		0	0	SYNC	0	0	34	0	0	0	34	0
1	5		0	0	SYNC	0	0	34	0	0	0	34	0
1	6		0	0	SYNC	0	0	34	0	0	0	34	0
1	7		0	0	SYNC	0	0	34	0	0	0	34	0
1	8		0	0	SYNC	0	0	34	0	0	0	34	0
1	9		0	0	SYNC	0	0	34	0	0	0	34	0
1	10		0	0	SYNC	0	0	34	0	0	0	34	0
1	11		0	0	SYNC	0	0	34	0	0	0	34	0
1	12		0	0	SYNC	0	0	34	0	0	0	34	0
1	13		0	0	SYNC	0	0	34	0	0	0	34	0
1	14		0	0	SYNC	0	0	34	0	0	0	34	0
1	15		0	0	SYNC	0	0	34	0	0	0	34	0
1	16		0	0	SYNC	0	0	34	0	0	0	34	0
1	17		0	0	SYNC	0	0	34	0	0	0	34	0
1	18		0	0	SYNC	0	0	34	0	0	0	34	0
1	19		0	0	SYNC	0	0	34	0	0	0	34	0

Rx,Tx, or Both: Rx & Tx | Insert Error | Pattern: QRSS | User File | Data From File | Reset | ☐ Log

Tx Underrun Count: 0

Configuration: Save | Load
Bit Shift Subchan.: ☐ User Pattern

Time Slots | Start | Stop | Exit

Multi-channel Bit Error Rate Test

Buyer's Guide

Item No	Product Description
XX018	Multi-Channel BERT Software

Item No	Related Software
XX670	w/ Multi-Channel BER Testing
XX610	w/ Transmit and Receive File Capability
XX020	Record/Playback File software
XX019	Transmit / Receive File Utility Software

Item No	Related Hardware
PTE001	tProbe™ T1 E1 Base Unit
FTE001, ETE001	Quad and Octal T1 E1 Analyzer Boards
XTE001	Dual Express (PCIe) T1 E1 Boards
TTE001	tScan16™ T1 E1 Boards

Note: PCs which include GL hardware/software require Intel or AMD processors for compliance.

For more details, refer to Multi-Channel Bit Error Rate Test webpage.

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