FarSite COMMUNICATIONS
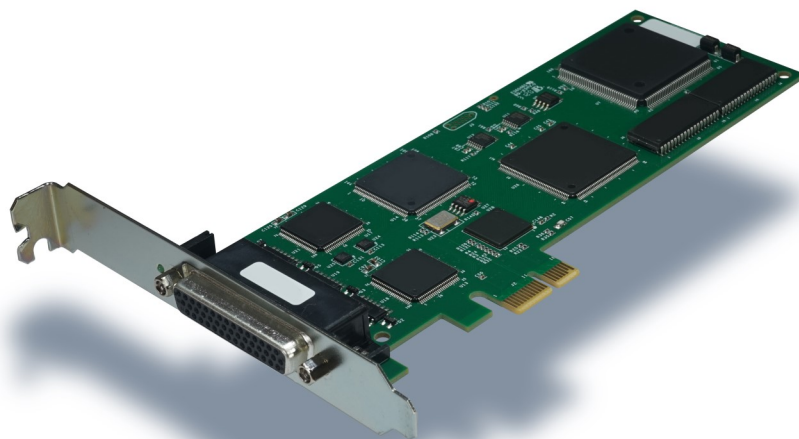
FarSync® BERT Tester - PCIe

A Bit Error Rate 2 port line quality tester
for a Windows PC with a PCIe slot

FarSync® BERT Tester - PCIe

Bit Error Rate 2 port line tester for your Windows PC

Key Features

- **Complete set of BERT (Bit Error Rate Test) line test patterns**
- **BER testing of 1 or 2 lines from your PC using a dual port PCIe adapter**
- **Tests NRZ, FM0, FM1, Manchester Encoding & Conditioned Di-phase line signalling**
- **LabVIEW 32 / 64 bit and Windows APIs for test management**
- **Round trip delay testing - test the latency of your network**

- **Operates in loopback and point-to-point including interoperation with other BER Testers**
- **Connects to RS232, V.35, RS530, RS422, X.21, RS485 and RS449 network interfaces**
- **User controlled error injection facility and customer supplied test patterns**
- **Line speed range up to 10 Mbits/s**
- **Tests can be test count or time controlled**
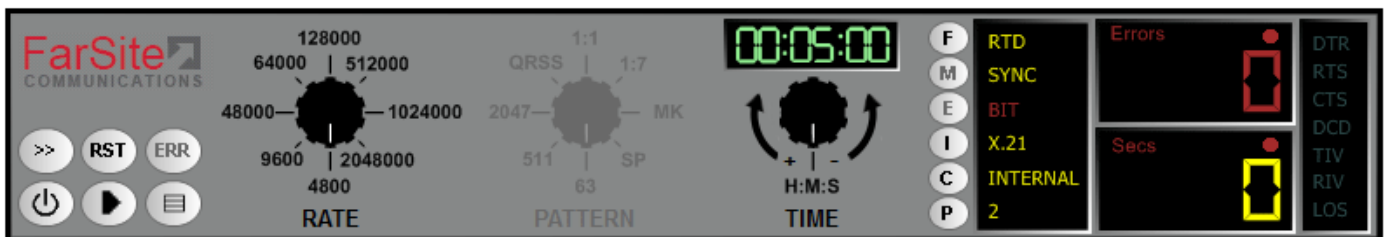
Overview

The FarSync BERT provides a comprehensive, simple to use, all in one, line testing utility for testing synchronous lines from your PC. There are no extra expensive modules to buy to test different line types. All the popular standard BERT test patterns can be selected; the test period can be controlled by test count or by elapsed time; real time error counters and full line test statistics are provided as well as support for user controlled error injection. The round trip delay testing calibrates your network performance, particularly useful for wireless networks.

Lines with network interfaces RS232 (V.24), V.35, RS530 (EIA530), RS422, X.21 (V.11), RS449 and RS485 (4 wire) can be tested with line speeds ranging up to 10 Mbits/s.

The FarSync T2Ee adapter is fitted in one your PC's PCIe slots; select one of the cables provided to connect to the line to be tested; the BERT application can then be started and the line quality results are displayed in real time. Multiple FarSync BERTs can be run from a PC.

There is API access for LabVIEW or Windows applications, this allows programmatic control of when tests are run, the tests to be run, and the results obtained.

Test Modes

- **The FarSync BERT Tester can act as either the physical DTE or DCE**
- **The tests can be run in point-to-point modes or loopback**
- **The tests can be invoked manually via the graphical user interface, via batch command files or via the API**
- **Tests can be based on the pre-set number of test iterations required or run over a pre-set time**

User Interface

The FarSync BERT Tester has a full graphical user interface (screen shot at the top of the page) that enables the user to select and configure the test to be run. The final test results are displayed via the user interface. The status of each test is reported in real-time via the GUI whilst each test is being run. A drop down window provides additional detailed test results.

Test Patterns

A wide variety of pseudo random and fixed test patterns may be configured on the FarSync BERT used to test the line. ITU compliant test pattern recommendations are supported, these are compatible with other industry standard BER Testers.

Synchronous Lines

The following *pseudo random* patterns are ITU-T compliant, they are used to test synchronous lines:

- 63: 2^6-1- including a max of 5 sequential zeros and 6 sequential ones
- 511: 2^9-1- including a max of 8 sequential zeros and 9 sequential ones
- 2047: 2^{11}-1- including a max of 10 sequential zeros and 11 sequential ones
- 2^{15}-1 including a max of 14 sequential zeros and 15 sequential ones
- 2^{20}-1 including a max of 19 sequential zeros and 20 sequential ones
- 2^{23}-1 including a max of 22 sequential zeros and 23 sequential ones
- QRSS: 2^{20}-1 modified to transmit a maximum of 14 sequential zeros

The following *fixed* patterns can be used to test synchronous lines:

- 1:7 (1/8, 1-in-8) - 1 mark followed by 7 spaces
- 1/16 (1:15, 1-in-16) - 1 mark followed by 15 spaces
- 2/8 (2:6, 2-in-8) - 2 marks in 8 bits (0100 0010...)
- 3/24, 3-in-24 - 3 marks in 24 bits (0010 0010 0010 0000 0000 0000...)
- MK - all 1s
- SP - all 0s
- 1:1 - alternating 1s and 0s
- FOX (see ITU recommendation R.52 for definition)
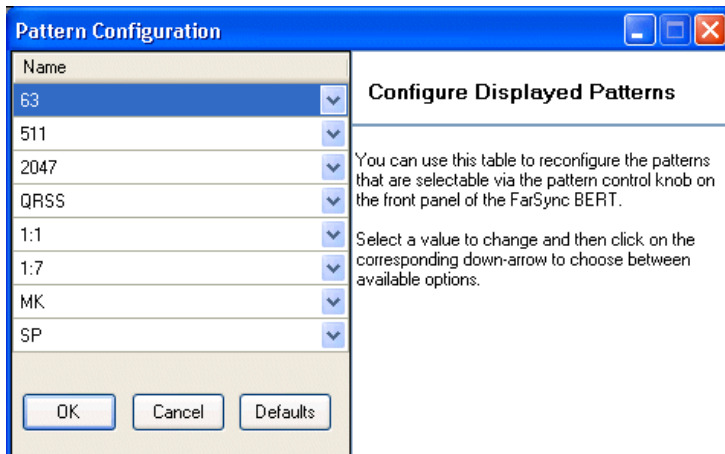
Line Error Reporting

The line test results displays industry-standard count values (e.g. ITU-T G.821) which help indicate the quality of the line under test. The result table shows error rates, expressed as a percentage or in scientific/engineering format.

- Bits - number of bits received
- Blocks - number of blocks received
- Block Errors - number of blocks received with errors
- Errored Secs (ES) / Unavailable Secs (US) - number of secs during which one or more errors has been detected
- Severely Errored Secs (SES) - number of secs during which > 30% of blocks are in error or for which the bit error density is $>10^{-2}$
- Available Secs (AS) / Error Free Secs (EFS) - number of secs during which no errors have been detected
- Loss of Sync (LOS) - number of times synchronisation has been lost

Supported Network Interfaces

The FarSync BERT Tester products is supplied with the following cables, these are the most common network connector types used on synchronous lines.

- X.21 (V.11) DTE (DB15M connector) - using cable FCR2 plus 2 TCX1
- RS232 (V.24) DTE (DB25M connector) - using cable FCR2
- RS530 (RS422) DTE (DB25M connector) - using cable FCR2
- RS485 (4 wire) - using cable FCR2
- RS449 (V.36) DTE (DB37M connector) - using cable FCR2 plus 2 TC449

Additional cables supporting the following other interfaces may also be purchased if required.

- V.35 DTE (M34M connector) - cable name TCV1, requires cable FCR2 supplied with the product
- X.21 (V.11) DCE (DB15F connector) - cable name Null-MX
- RS232 (V.24) and RS530 (RS422) DCE (DB25F connector) - cable name Null-MR4

See the Order Information section on the last page.

Supported Types of Line Data Encoding

- NRZ
- FM0 / FM1
- Manchester Encoding
- Differential Manchester (Conditioned Di-phase)

Round Trip Delay

Network latency can be measured using the round trip delay feature which is particularly useful for testing wireless networks. The results are shown as a readout and as a graphical spread of times measured.
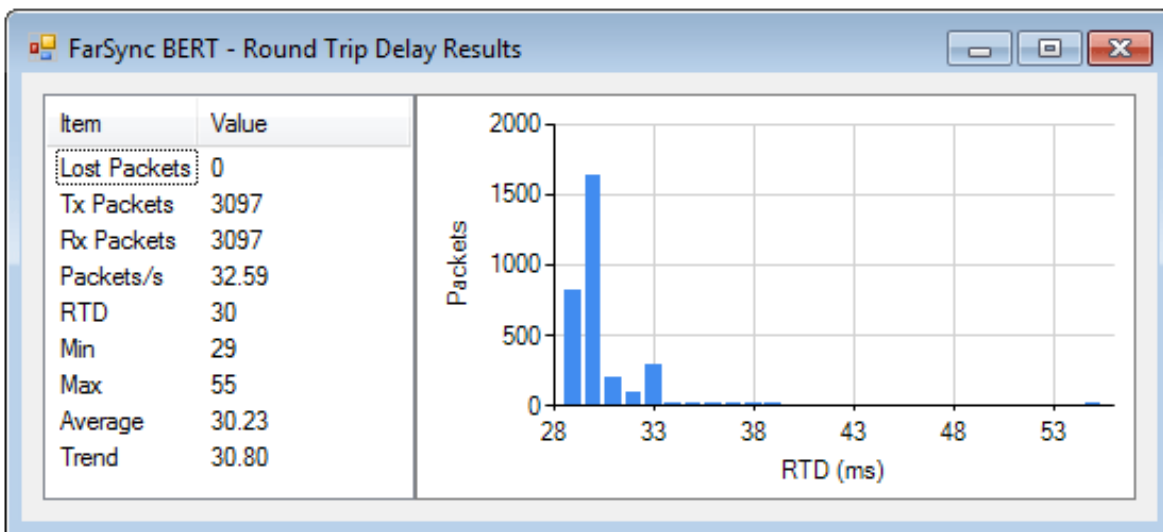
LabVIEW API

The LabVIEW allows the BERT functions to be invoked, and results to be read, by LabVIEW programs (VIs). Sample VIs are provided to illustrate the use of the API. All the features available from the GUI are supported by the LabVIEW API.

The diagram shows a synchronous V.24 (RS232) configuration.
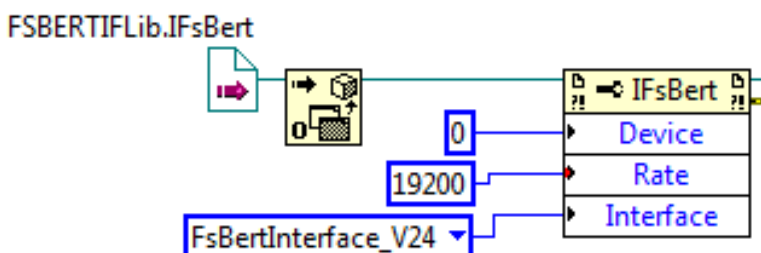
Windows API

The BERT's COM API allows its functions to be invoked, and results supplied back, programmatically from Windows applications. All the features available from the GUI are supported by the COM API. Sample applications are supplied in Python, C# and VBS.

The FarSync BERT can also be used in command line/script mode with the configuration being specified by command line parameters - the results are written to a log file.

Other Features

Single or multiple bit errors can be injected at the user's request.

Line data can be inverted to support lines where the balanced pair data lines may have been swapped over or the data supplied has been inverted. Inverted receive data can be automatically detected and converted as required.

Using the supplied loopback connector, the FarSync BERT Tester may be self tested prior to use.

Audible Alerts on errors and loss of sync.

Line clock speed display and a Line Monitor to display and record line traffic transmitted and received by the BER testing.

Bidirectional clocking and enhanced clocking modes and handling of custom clock rates.

Order Information

Name	Description	Product Code
FarSync BERT Tester - PCIe	**BER (Bit Error Rate) line quality tester for testing synchronous lines from a PCIe card,** tests X.21, RS232, V.35, RS422, RS485 (4 wire), RS530, RS449 network interfaces, it includes: FarSync T2Ee - dual port low profile PCIe adapter (standard and low profile PCI brackets supplied) BERT application software for Windows 10, 8 and 7. Requires a PC, not supplied. **TEST CABLES INCLUDED** 1 FCR2 - dual port DTE RS232, RS530, (DB25M) connection cable 2 TCX1 - X.21 DTE connection (DB15M) cable 2 TC449 - RS449 DTE connection (DB37M) cable Loopback connector for self test.	FS4205
Additional cables available		
TCV1	**V.35 DTE single port adapter cable**, M34M connector, 0.5 metres, requires the FCR2 cable supplied with product	FS6053
Null-MX	**X.21 double shielded crossover cable**, DB15F connector to DB15F connector, 0.5 metres. Converts DTE presentation to DCE.	FS6090
Null-MR4	**Combined RS530 (RS422, EIA530) and RS232 (V.24) double shielded crossover cable**, DB25F connector to DB25F connector, 0.5 metres. Converts DTE presentation to DCE	FS6097

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