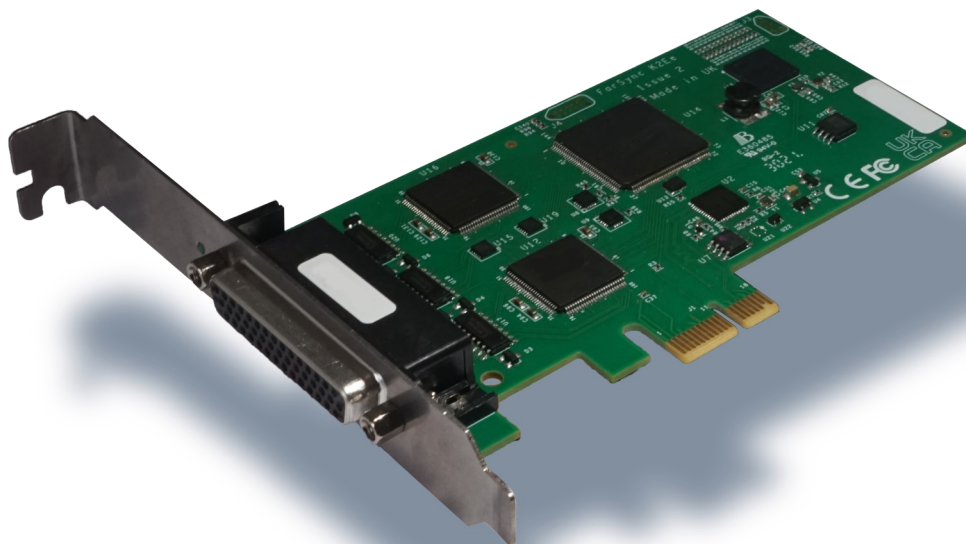




## FarSync® BERT Tester - PCIe

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



### Key Features

- Complete set of BERT (Bit Error Rate Test) line test patterns
- Operates in loopback and point-to-point including interoperation with other BER Testers
- BER testing of 1 or 2 lines from your PC using a dual port PCIe adapter
- Connects to RS232, V.35, RS530, RS422, X.21, RS485 and RS449 network interfaces
- Tests NRZ, FM0, FM1, Manchester Encoding & Conditioned Di-phase line signalling
- User controlled error injection facility and customer supplied test patterns
- LabVIEW 32 / 64 bit and Windows APIs for test management
- Line speeds to over up to 2 Mbits/s or 20 Mbits/s depending on the version.
- Round trip delay testing - test the latency of your network
- 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 over 2 Mbits/s with the standard speed version or up to 20 Mbits/s with the high speed version.

The FarSync K2Ee adapter is fitted in one of 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.

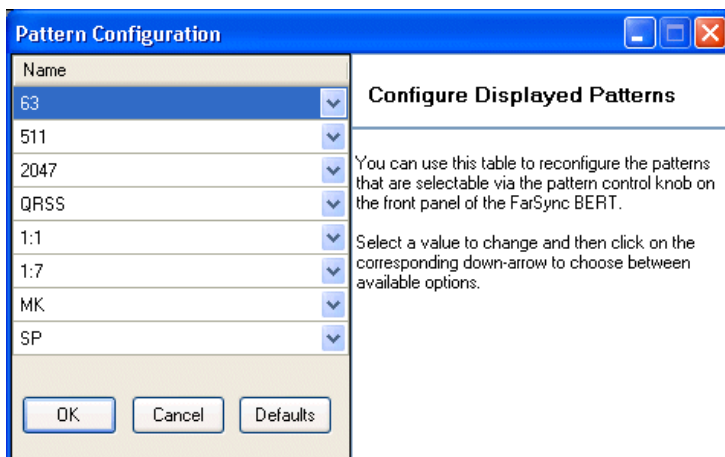
### Synchronous Lines

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.

- RS232 (V.24) DTE – using cable FCR2
- RS530 (RS422) DTE – using cable FCR2
- RS485 (4 wire) – using cable FCR2

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

- V.35 DTE – using cable 2 TCV1 (requires the FCR2 cable supplied with the product)
- X.21 (V.11) DTE – using 2 TCX1 (requires the FCR2 cable supplied with the product)
- RS499 (V.36) DTE – using 2 TC449 (requires the FCR2 cable supplied with the product)
- X.21 (V.11) DCE – using cable Null-MX
- RS232 (V.24) DCE – using cable Null-MR4 (requires the FCR2 cable supplied with the product and a TCX1)
- RS530 (RS422) DCE – using cable Null-MR4 (requires the FCR2 cable supplied with the product)

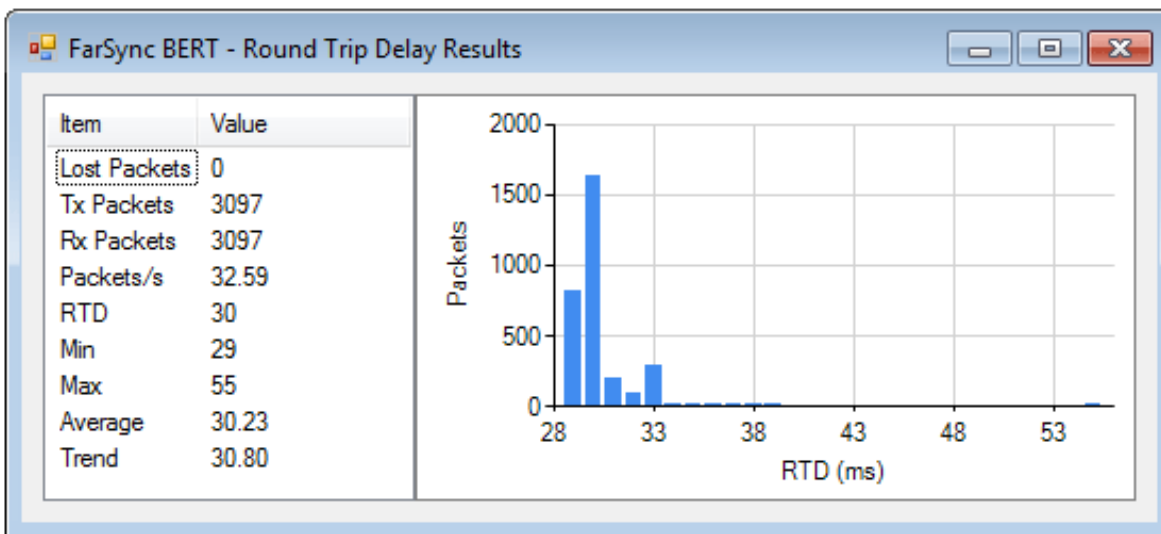
See the Order Information section on the last page.

## 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.

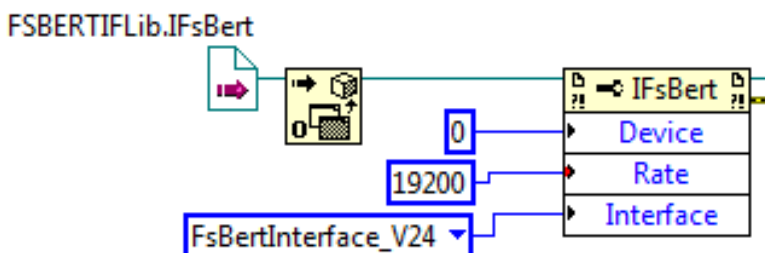


The results are shown as a readout and as a graphical spread of times measured.

## 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	<b>BER (Bit Error Rate) line quality tester for testing synchronous lines from a PCIe card</b> , tests X.21, RS232, V.35, RS422, RS485 (4 wire), RS530, RS449 network interfaces, <b>Synchronous - maximum test speed 2 Mbits/s on each port<sup>1</sup>.</b>	FS4204
FarSync BERT Tester HS - PCIe	<b>BER (Bit Error Rate) High Speed line quality tester for testing synchronous lines from a PCIe card</b> , tests X.21, RS232, V.35, RS422, RS485 (4 wire), RS530, RS449 network interfaces. <b>Synchronous - maximum test speed 20 Mbits/s on a single port and 16Mbits/s on 2 ports<sup>1</sup>.</b>	FS4206
<sup>1</sup> Both Include: FarSync K2Ee - dual port low profile PCIe adapter (standard and low profile PCI brackets supplied) BERT application software for Windows 11, 10, 8.1 . Requires a PC, not supplied. <b>Test Cables Included:</b> 1x FCR2 - dual port DTE RS232, RS530, (DB25M) connection cable 1x Loopback connector for self test.		
BERT Calibration Certificate	<b>FarSite issued calibration certificate</b> for FarSync BERT USB and PCIe variants. Testing and verification of FarSync BERT is conducted through specific crystal timing tests against a high accuracy GPS clock. One certificate required per device.	FS4950
Additional cables available		
TCX1	<b>X.21 (V.11) DTE transition cable</b> , DB15M connector, 1 port EIA-530 to X.21, 0.5 metres	FS6052
TCV1	<b>V.35 DTE single port adapter cable</b> , M34M connector, 0.5 metres, requires the FCR2 cable supplied with the product.	FS6053
TC449	<b>RS449 DTE transition cable</b> , DB37M connector, 1 port EIA-530 to RS449, 1.5 metres	FS6054
Null-MX	<b>X.21 double shielded crossover cable</b> , DB15F connector to DB15F connector, 0.5 metres. Converts DTE presentation to DCE.	FS6090
Null-MR4	<b>Combined RS530 (RS422, EIA530) and RS232 (V.24) double shielded crossover cable</b> , DB25F connector to DB25F connector, 0.5 metres. Converts DTE presentation to DCE	FS6097

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FarSite Communications may make improvements and/or changes in the products and/or programs described in this publication at any time.

FarSync ® BERT Tester - PCIe Datasheet Version 2.0.2

+44 (0)1256 330 461

[info@farsite.com](mailto:info@farsite.com)

[www.farsite.com](http://www.farsite.com)

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