Key Features

- **Complete set of BERT (Bit Error Rate Test) line test patterns**

- **BER testing from your laptop with a durable USB adapter**

- **Tests NRZ, FM0, FM1, Manchester Encoding, NRZI & Conditioned Di-phase line signalling**

- **LabVIEW 32 / 64 bit and Windows APIs for test management**

- **Tests synchronous and asynchronous lines in loopback and point-to-point configurations**

- **Connects to RS232, V.35, RS530, RS422, X.21, RS485 and RS449 network interfaces**

- **User controlled error injection facility**

- **Speed range from 15 baud up to 2 Mbits/s or up to 16 Mbits/s (High Speed model)**

Overview

The FarSync BERT provides a comprehensive, simple to use, all in one, line testing utility for testing asynchronous and synchronous lines from your Laptop 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; real time error counters and full line test statistics are provided as well as support for user controlled error injection. The BER test patterns and test support are implemented in hardware and thus operate independent of host activity/loading.

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 from 15 baud up to 2 Mbits/s or to over 16 Mbits/s using the High Speed (HS) model.

The FarSync Flex adapter is simply plugged into any of your Laptop's USB ports; 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.

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.

Line Monitor software, which includes support for use with Wireshark, is also included in the product. Line Monitor cables are ordered separately.

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 either the graphical user interface, batch command files or via the API**

USB Adapter for BERT line testing and Line Monitoring

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 Tester 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)

Asynchronous Lines

On asynchronous lines 5, 6, 7 and 8 bit operation can be tested. The following patterns are recommended to be used:

- 63: 2^6-1
- 511: 2^9-1
- 2047: 2^{11}-1
- FOX

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
- Framing Errors - number of incorrectly framed asynchronous characters received
- Parity Errors - number of asynchronous characters received with incorrect parity
- Errored Secs (ES) / Unavailable Secs (US) - seconds during which one or more errors has been detected
- Severely Errored Secs (SES) - number of seconds during which the bit error rate is >= 0.1%
- Available Secs (AS) / Error Free Secs (EFS) - seconds during which no errors have been detected
- Loss of Sync (LOS) - number of times synchronisation has been lost

LabVIEW API

The LabVIEW API allows the BERT functions to be invoked, and results to be read, by LabVIEW programs (VIs). A sample VI program is provided to illustrate the use of the API. All the features available from the GUI are supported by the LabVIEW API. Both 64bit and 32 bit versions of LabVIEW are supported.

The adjacent diagram shows an synchronous V.24 (RS232) configuration.

LabVIEW 2010-2013 versions are supported.

FSBERTIFLib.IFsBert
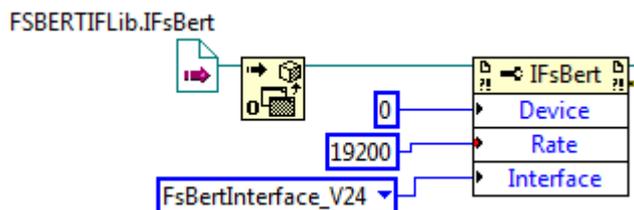
Windows API

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.

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 estimator.

Supported Network Interfaces

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

- V.35 DTE (M34M connector)- use cable UCV1
- X.21 (V.11) DTE (DB15M connector) - use cable UCX1
- RS232 (V.24) DTE (DB25M connector)   - use cable KCR1-V2
- RS530 (RS422) DTE (DB25M connector) - use cable KCR1-V2
- RS485 (4 wire) - use cable KCR1-V2

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

- X.21 (V.11) DCE (DB15F connector) - cable name UCX1-DCE
- RS232 (V.24) DCE (DB25F connector) - cable name KCR1-DCE
- RS530 (RS422) DCE (DB25F connector) - cable name KCR1-DCE
- RS449 (V.36) DTE (DB37M connector) - cable name KC449

See the Order Information section on the last page of this datasheet.

Supported Line Test Speed Range

FarSync BERT Tester-USB: Synchronous 100 baud to 2 Mbits/s, **Asynchronous** 15 baud to 115.2 Kbps/s
FarSync BERT HS Tester-USB: Synchronous: 100 baud to 16 Mbits/s, **Asynchronous**: 15 baud to 115.2 Kbps/s

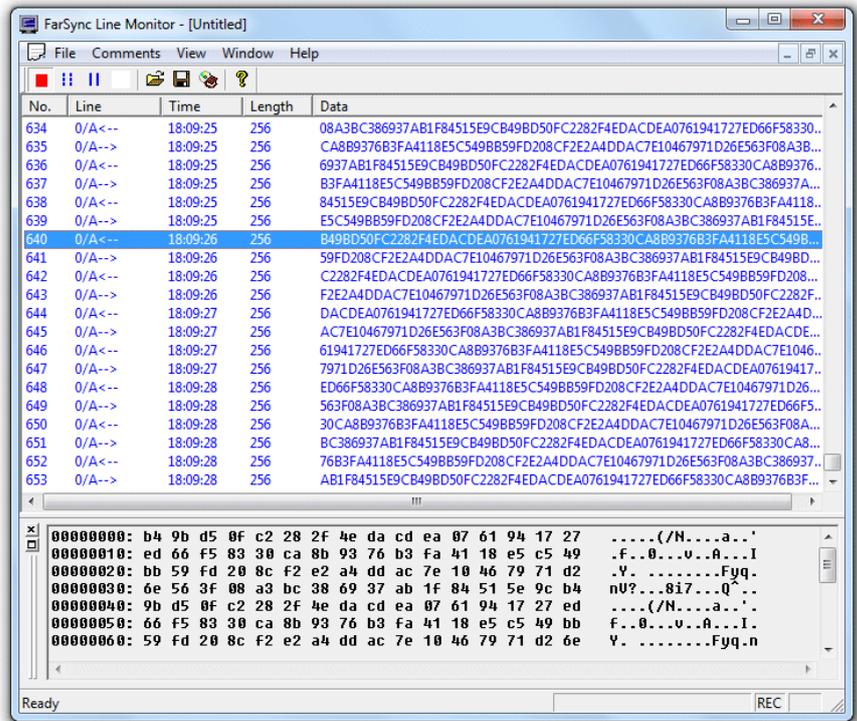## Supported Types of Line Data Encoding

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

Windows Line Monitor

The product is supplied with a high performance multi-channel line monitor that allows the user to record and display, store line traffic with protocol decoding.

The software also allows the popular Wireshark Line Monitor software to be used.

To monitor both data directions on the line, special line monitor cables are required. These cables are not included in the FarSync BERT Tester product but can be ordered separately. See details of the line monitor cables available as listed in the Order Information section below.

Order Information

Name	Description	Product Code
FarSync BERT Tester - USB	**USB BERT line quality tester for Synchronous (to 2 Mbits/s) & Asynchronous lines** with X.21, RS232, V.35, RS422, RS485(4 wire) or RS530 network interfaces *	FS4105
FarSync BERT HS Tester -USB	**High Speed USB BERT line quality tester for Synchronous (to 16Mbits/s) & Asynchronous lines** with X.21, RS232, V.35, RS422, RS485(4 wire) or RS530 network interfaces *	FS4106
	* Includes: FarSync Flex V2 - USB adapter with BERT Module Line Monitor and BERT application software for Windows 8, 7, Vista and XP. **TEST CABLES INCLUDED** KCR1–V2 - RS232, RS530, RS485 DTE connection (DB25M) cable UCX1 - X.21 connection DTE (DB5M) cable UCV1 - V.35 connection DTE (V.35M) cable Loopback connector for self test. Notes: Requires a Laptop or Notebook, not supplied. Line Monitor software requires a special cable to monitor data in both directions, to order see below. Connection to a USB 2.0 or 3.0 port is required for BERT operation.	
Additional cables available		
KC449	Single RS449 DTE cable, DB37M connector,1.5 metres	FS6019
KCR1-DCE	Single combined RS232 (V.24) and RS530 (RS422) DCE cable, DB25F connector, 2 metres	FS6070
UCX1-DCE	Single X.21 (V.11) DCE cable, DB15F connector, 2 metres	FS6075
KCR-MON	Line Monitor cable for RS232 (V.24) and RS530 (RS422) with DB25M to DB25F pass-through	FS6016
KCX-MON	Line Monitor cable for X.21 (V.11) with DB15M to DB15F pass-through	FS6017

Tel: +44 (0)1256 336740
Fax: +44 (0)1256 854931
Email: info@farsite.com
Web: www.farsite.com

FarSite COMMUNICATIONS