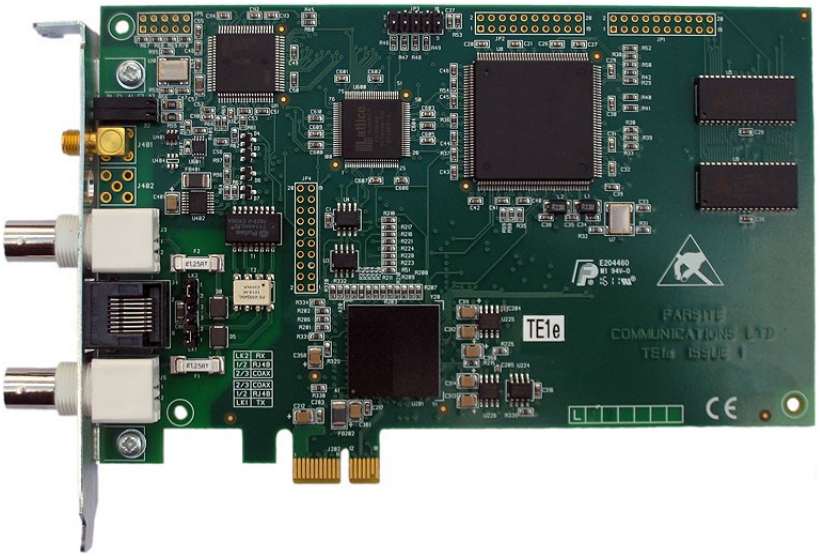
FarSync® TE1e

A PCI Express adapter for E1 (G.703 / G.704) connections with BNC and RJ48C connectors for Linux and Windows.

FarSite COMMUNICATIONS

Key Features

- **E1 unstructured and fractional (G.703, G.704**
- **DAB STI and ETI compatible transparent bitstream and HDLC operation**
- **PCI Express Bus mastering DMA Intelligent adapter**
- **APIs for Windows and Linux and interoperation with TCP/IP**
- **Selectable external clock synchronisation through a SMA connector**
- **Supplied with choice of RJ48C or BNC connectors**
- **Comprehensive Developers Toolkit available**
- **General purpose bitstream decoding library including support for DAB ETI and DAB STI**



Overview

The intelligent FarSync TE1e adapter brings comprehensive E1 support to Linux and Windows to allow your application full access to the E1 features available on the board. Full bandwidth on unstructured E1 G.703 lines, E1 fractional (G.703/G.704), HDLC framed and transparent operation are all supported with easy software configuration. The product includes a low level driver that allows access to the communications features available in the hardware. The adapter can optionally use the host's standard TCP/IP protocol stack to allow access to IP based networks such as the Internet.

The G.703 transparent bitstream option available with the API is suitable for video and voice such as T-DMB (Digital Multimedia Broadcasting), DAB (Digital Audio Broadcasting) ETI (Ensemble Transport Interface - ETSI EN 300 799) and STI (Service Transport Interface - ETSI EN 300 797).

The FarSync SDK provides the Developers Toolkit for the product and includes a general purpose bitstream encoding and decoding library including support for DAB-ETI (NI, G.703) and DAB-STI (PI, G.703) that reduces application development timescales.

Both the RJ48C (RJ45) and twin coax (BNC) connectors are available on the adapter so if you are not sure what connector type is going to be required, use the FarSync TE1e.

An external clock input of up to 10mhz through a SMA connector is supported to allow synchronisation of the output data clock, to, for example, a GPS source.

The product is supplied with a 5 year warranty.

Features under Windows: The product includes support for the Microsoft standard Windows SDCI API, providing applications with direct access to the adapter's communications port/s for bit sync (HDLC) framing and also transparent bitstream operation for video and voice type applications.

The adapter installs seamlessly under Windows 10, 8.1, 7; Windows Server 2012 and 2008 on both 32 and 64 bit, single and multi-core systems. The FarSync drivers are signed by Microsoft for easy installation.

The low level API is based on an extended SDCI interface and supports bit sync (HDLC) framed and transparent bit stream data.

The FarSync TE1e can also be installed to appear as a NDIS (LAN) interface so it can simply use the TCP/IP stack over PPP to allow access to IP based networks such as the Internet.

Applications running in LabVIEW can access the card.

Features under Linux: The low level API is based on the raw socket interface and supports bit sync (HDLC) framed and transparent bitstream data. The TE1e adapter can also use the TCP/IP stack to allow access to IP based networks such as the Internet.

The TE1e adapter installs seamlessly as a plug and play device under the popular Linux 32 and 64 bit distributions. The cards supports Linux kernel version 2.6 and onwards in 32 and 64 bit formats, including the leading distributions supplied by Red Hat, SuSE, CentOS, Debian, Ubuntu, Fedora, Slackware, CentOS and more. Multi-processor systems are supported.

FarSite is committed to supporting the FarSync TE1e on new versions of Linux and Linux kernels as they are released. The source code for the driver is supplied with the product allowing rebuilding by the end user for use with almost any of the current or future Linux variants.

Developers Toolkit: The FarSync SDK provides a Developers Toolkit with full documentation, a DAB compatible bitstream encoding and decoding library, useful utilities, such as a line monitor, and many sample applications for Linux and Windows.

Typical Applications

The FarSync TE1e adapter is suitable for a very wide variety of applications, including for example:

- **HDLC framing support for non standard or specialist protocols**
- **Interfacing DAB ETI (Ensemble Transport Interface - ETSI EN 300 799) or STI (Service Transport Interface - ETSI EN 300 797) transparent bit streams to Servers**
- **Integration with embedded Linux and Windows based products**
- **E1 Internet access**
- **E1 Frame Relay Access**
- **Remote office access over leased lines**
- **Server based network hub (Routers and Firewalls)**
- **Satellite Multicasting**
- **Video Teleconferencing**

FarSync TE1e - Product Details

The FarSync TE1e is supplied with software drivers for Windows and Linux. This includes a low level driver that allows access to the communications features available in the hardware and an optionally installable driver that connects with the standard TCP/IP protocol stack to allow access to IP based networks such as the Internet.

Adapter Hardware

The single port adapter runs an AMD processor with SRAM. The adapter has an embedded HDLC / transparent controller with SDMA access (128 buffers) and a wide range of timers. The whole memory space may be mapped via the PCIe interface to the PC/Server.

Network Interfaces

The TE1e supports E1 unstructured (G.703) and Transparent operation at 2.048 Mbits/s, E1 fractional (G.703/G.704) at speeds from 64 Kbits/s to 1.984 Mbits/s,

E1 Modes: HDLC-framed or transparent data over G.703 unframed/unstructured or G.703/G.704 framed/structured Doubleframe and CRC4 multiframe modes.

External Clock: A SMA connector on the adapter allows connection of an external clock source of 10Mhz, 5Mhz, 2.048Mhz or 1Mhz. The external clock can be selected to drive the data output clock.

PCI Express Bus Specification

The FarSync TE1e adapter is suitable for systems with a PCIe bus, covering single and multi-processor systems. The adapter is compliant with PCI Express Base specification revision 1.0a. The FarSync TE1e is a bus mastering, 1x (single lane) adapter.

Key Features supported on Linux

The FarSync TE1e installs seamlessly under Linux kernel series 2.6 and onwards on both single and multi-core 32 and 64 bit systems. All the popular distributions are supported including Red Hat, SuSE, Slackware, Ubuntu, Debian, CentOS and Fedora.

Installation is simple, the driver is dynamically loadable so a kernel rebuild is not required for the driver to be installed. The driver acts as a dynamically loadable module. The link level protocol can be PPP, Cisco HDLC or Frame Relay with optional authentication by CHAP, MSCHAP or PAP (RFC 1334) providing a standard point-to-point network interface. The driver is supplied with source code.

The Raw Sockets API allows applications developed using the FarSync SDK to access the full feature set of the hardware, these include bit sync (HDLC framed) data, and transparent bitstream data.

A configuration utility is provided to set the line speed, interface type and protocol, after which the ports may be configured with standard networking tools.

Key Features supported on Windows

The FarSync TE1e installs easily under Windows 10, 8.1, 7; Windows Server 2012 and 2008 on single or multi-core 32 and 64 bit systems. A low level SDCI driver is installed with the optional installation of an NDIS (LAN) driver. The NDIS driver supports TCP/IP running over PPP with optional authentication by CHAP or PAP (RFC 1334) providing a standard point-to-point network interface. The drivers are signed by Microsoft for easy installation.

The product is supplied with a comprehensive configuration utility and its own Line Monitor that allows the user to record, display and store line traffic with WAN protocol decoding for fast debugging.

The FarSync TE1e enhanced SDCI API allows applications developed using the FarSync SDK to exactly control the type of data sent and received in bit sync (HDLC framed) data and transparent bitstream formats.

FarSync SDK - The Developers Toolkit

The SDK includes support for writing applications on both Linux and Windows and contains documentation, working sample applications, development and test utility applications. There is everything a user needs to rapidly develop and test a wide variety of applications such as specialist synchronous (HDLC framed) protocols or transparent bitstream data requirements including Audio, MPEG Video T-DMB, DAB ETI and DAB STI with a bitstream encoder and decoder library.

The FarSync SDK is ordered separately from the FarSync TE1e.

Our Engineering department provides free email and telephone assistance to application developers using the API as part of the package provided when the FarSync SDK is purchased.

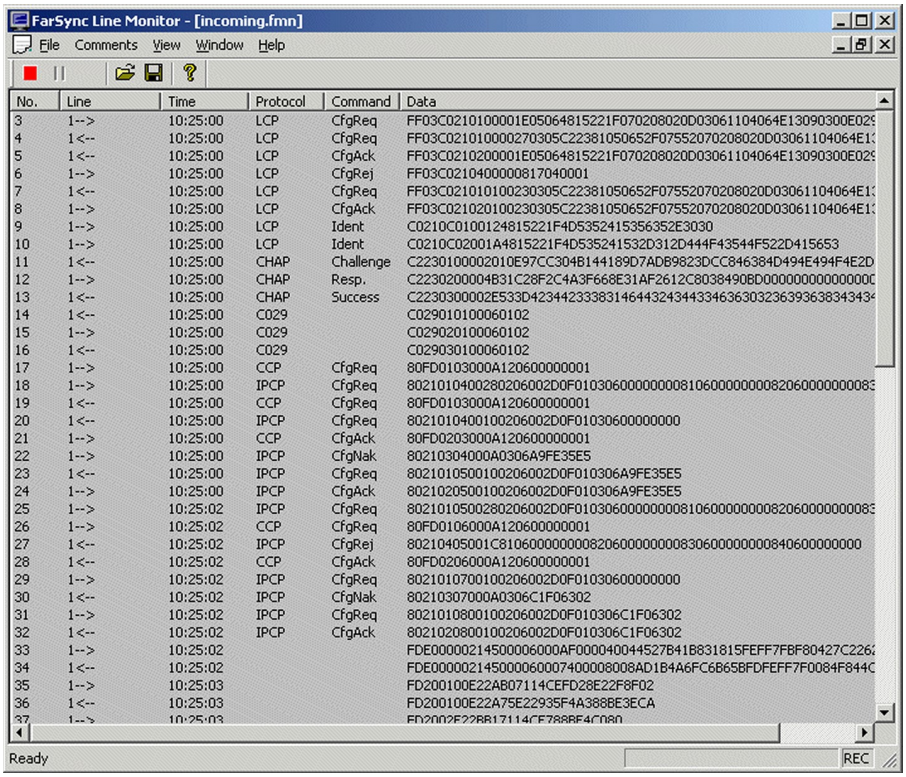
See the FarSync SDK Datasheet for full details.

Linux Line Monitoring

The Farmon utility allows all data sent and received on the line to be recorded.

Windows Line Monitor

The product is supplied with a high performance multi-channel line monitor that allows the user to record, display , store and replay line traffic with protocol decoding (sample screen below). Comments can even be inserted into the line trace to assist later analysis.



Software Technical Specifications	
Linux	
Distribution support	Distributions by Red Hat, SuSE, Slackware, Ubuntu, Debian, Fedora, CentOS and more. Drivers for kernel series 2.6 and onwards on both single and multi-core 32 and 64 bit systems
Kernel support	Sub versions of kernel releases from 2.6.12 onward. The products may operate successfully with earlier versions of the kernel but no specific testing has been undertaken by FarSite
Protocols supported	TCP/IP, PPP, Cisco HDLC, Frame Relay, CHAP, MSCHAP, PAP (RFCs 1661, 1332, 1334), Raw Bitstream
API and interfaces	Raw Sockets API
Windows	
O/S types	Windows 10, 8.1 and 7; Windows Server 2012 and 2008 LabVIEW running on a Windows O/S. 32 and 64 bit (single and multi-core systems)
Protocols supported	TCP/IP, PPP, CHAP, PAP (RFCs 1661, 1332, 1334), Raw bitstream
API and interfaces	Extended SDCI API, NDIS (LAN) where the line appears as a LAN interface
Utilities	Multi-channel line Monitoring Utility, with protocol decode

Technical Specifications — Hardware Features	
Adapter type	AMD processor with SRAM and FALC56 E1/T1 comms controller, PCIe (compliant with PCI Express Base Specification Revision 1.0a), 1x (single lane), bus mastering, DMA enabled.
Physical size	Short adapter (height 107mm, length 167mm)
Network connectors	E1: 120-ohm RJ48C (often referred to as RJ45) or Twin 75 ohm BNC
Link speed range	E1: unstructured (G.703) : 2.048 Mbits/s, fractional (G.704): 64 Kbits/s to 1.984 Mbits/s,
E1 frame structure and modes	E1 - HDLC-framed or transparent data over G.703 unframed/unstructured or G.703/G.704 framed/ structured doubleframe and CRC4 multiframe modes
G.706 features	CRC4 to non-CRC4 interworking according to ITU-T G.706 Annex B (E1) Error checking via CRC4 procedures according to ITU-T G.706 (E1) Error checking via CRC6 procedures according to ITU-T G.706 (E1)
External Clock	External clock source speeds of 10Mhz, 5Mhz, 2.048Mhz and 1Mhz through a SMA connector
ESD Protection	Sidactor and telelink fuse, designed for zero maintenance. The FarSync TE1e uses solid state fuses unlike many E1 interface cards, no parts need to be replaced after a survivable lightening strike
Back panel Indicators	LEDs for Port open, Loss of Signal (LOS), Receive Remote Alarm (RRA), Alarm Indication Signal (AIS)
Approvals	EN55022 class B, CE, FCC class B, TBR12 and TBR13
Loss of Signal indication	Complies to ITU-T G.775, ETS300233, user programmable between 50mV and 800mV
Jitter Specifications Compliance	ITU-T I.431, G.703, G.736, G.823
Intrinsic Jitter	< 0.02 UI (using internal clock)
Jitter Tolerance	10 UI @ 1KHz 0.5 UI @ 40KHz – 100KHz
Power requirements	< 1.4 Amp @ +3.3v, < 5 watts
Cables	2 metre RJ48 cable included
MTBF	270,000 hours - Bellcore Method 1 Case 3, 40 deg.C ambient, 15 deg.C case rise above ambient
Compliance	RoHS2, REACH
Warranty	5 years

Order Information

Name	Description	Product Code
FarSync TE1e	1 port E1 PCI express card with BNC and RJ48C (RJ45) connectors, includes APIs for customer applications Details: transparent, unstructured E1 G.703 lines, E1 fractional (G.703/ G.704). APIs for Linux, Windows 10, 8.1, 7, Server 2012 and 2008. (For older version contact FarSite) External clock in via SMA connector.	FS4155
FarSync SDK	Linux and Windows Developers Toolkit for the FarSync TE1e and other FarSync cards, this is required if you want to write software to use the adapter's API	FS9610

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