FarSync® TE1

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

FarSite
C O M M U N I C A T I O N S

Key Features

- ✓ **E1 unstructured and fractional (G.703, G.704)**
- ✓ **DAB STI and ETI compatible transparent bitstream and HDLC operation**
- ✓ **Universal PCI Bus mastering DMA Intelligent adapter**
- ✓ **APIs for Windows and Linux and interoperation with TCP/IP**
- ✓ **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**
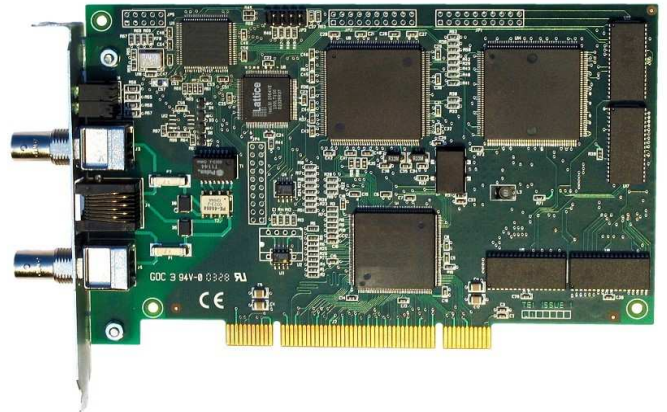
Overview

The intelligent FarSync TE1 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) using the BNC connectors.

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.

Features under Windows: The **Windows based API** common to the entire range of FarSync cards/devices is referred to as the FarSync Windows API (FsWinAPI). This is an extension of the MS COMM API and enables, for example, applications developed to support COM ports, to be easily ported to use FarSync support in E1. This standardization enables the API to also be readily accessible from higher level environments such as .NET, C#, VB.

The FsWinAPI provides applications with direct access to the card's communications port/s for bit sync (HDLC) framing and also transparent bitstream operation for video and voice type applications.

The FarSync TE1 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.

The card installs seamlessly under Windows 10, 8, 7; Windows Server 2019, 2016 and 2012 on both 32 and 64 bit, single and multi-core systems. The FarSync drivers are signed by Microsoft for easy installation.

LabVIEW applications can access this adapter.

Features under Linux: The API is based on the Char I/O interface and supports bit sync (HDLC) framed and transparent bitstream data. The TE1 card can also use the TCP/IP stack to allow access to IP based networks such as the Internet.

The TE1 card installs seamlessly as a plug and play device under the popular Linux 32 and 64 bit distributions. The cards supports Linux kernel versions 2.6 and onwards to 4 in 32 and 64 bit formats, including the leading distributions supplied by Red Hat, SuSE, CentOS, Debian, Ubuntu, Fedora, Slackware and more. Multi-processor systems are supported.

FarSite is committed to supporting the FarSync TE1 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. The driver supports both big-endian and little-endian memory storage formats.

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.

Free support from FarSite's Engineering department is provided to customers purchasing the FarSync SDK who have technical questions using the API.

Typical Applications

The FarSync TE1 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**

FarSync TE1 Product Details

The FarSync TE1 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 1 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 PCI interface to the PC/Server.

Network Interfaces

The TE1 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.

PCI Bus Specification

The FarSync TE1 adapter is suitable for systems with a PCI or PCI-X bus, covering single and multiprocessor systems. The adapter is PCI revision 2.2 compliant with support for both 3.3 and 5 volt signaling, the power for the adapter is taken from the 3.3 volt supply rail. The FarSync TE1 adapter may be fitted in either 32-bit PCI bus slots or 64-bit PCI-X bus slots as this Universal PCI adapter will work perfectly well in both.

Key Features supported on Linux

The FarSync TE1 installs seamlessly under Linux kernel series 2.6 and onwards on both single and multicore 32 and 64 bit systems. All the popular distributions are supported including Red Hat, SuSE, Slackware, Ubuntu, CentOS, Debian 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 Char I/O API provides a programming language independent, high-level interface to the FarSync base driver it supports access to bit synchronous (HDLC) framed, transparent bitstream. The cards can also use the TCP/IP stack to allow access to IP based networks such as the Internet. It also allows selection of the full range of clock modes.

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 TE1 installs easily under Windows 10, 8, 7; Windows Server 2019, 2016 and 2012 on single or multi-core 32 and 64 bit systems. A FsWinAPI 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.

Applications running in LabVIEW can access the card.

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 TE1 FsWinAPI 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 TE1.

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 FarSync_SDK_Datasheet for full details.

Product Packaging

A download product id is supplied with the product to allow download of the software firmware, drivers, utilities and the development toolkit. Cables are ordered separately.

The downloadable software includes:

- Drivers for Linux and Windows. 32 and 64 bit drivers are supplied
- Numerous example applications with source code
- Documentation for all the APIs in Adobe PDF format
- Source code for Linux drivers and API Libraries
- Various useful utility programs

New versions of the software are made available from the support section on farsite.com as they are released.

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.
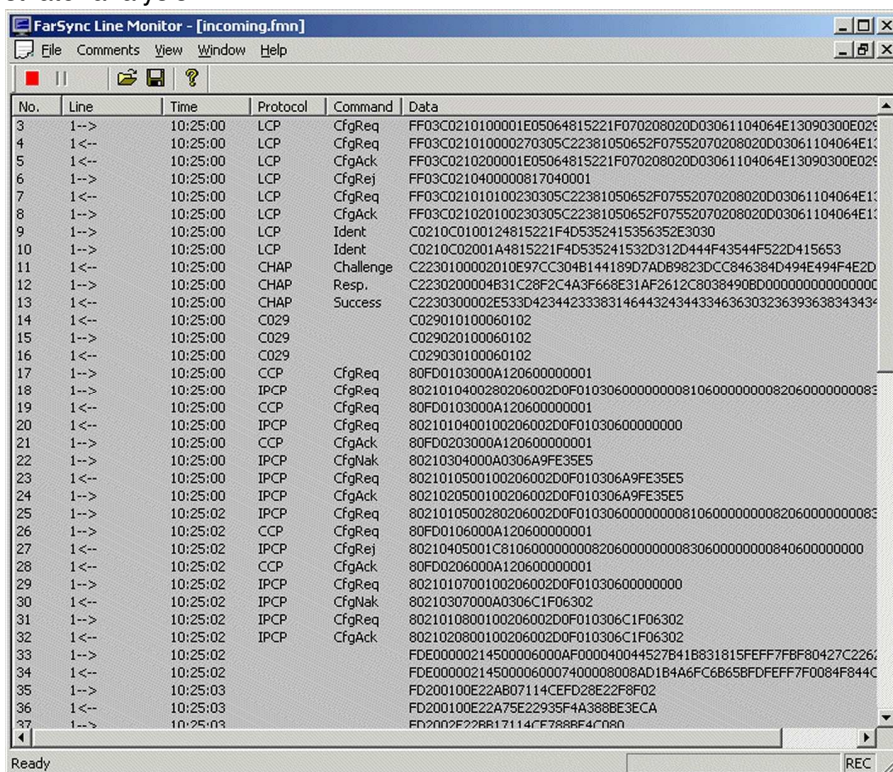
Software Technical Specifications	
Linux	
Distribution support	Distributions by Red Hat, SuSE, Slackware, CentOS, Ubuntu, Debian, Fedora and more. Drivers for kernel series 2.6 and onwards. on both single and multi-core 32 and 64 bit systems
Kernel support	All sub versions of kernel releases from 2.6.12
Protocols supported	TCP/IP, PPP, Cisco HDLC, Frame Relay, CHAP, MSCHAP, PAP (RFCs 1661, 1332, 1334), Raw Bitstream
API and interfaces	Char I/O API
Windows	
O/S types	Windows 10, 8, 7; Windows Server 2019, 2016 and 2012 32 and 64 bit (single and multi-core systems) LabVIEW running in a Windows O/S
Protocols supported	TCP/IP, PPP, CHAP, PAP (RFCs 1661, 1332, 1334), Raw bitstream
API and interfaces	FsWinAPI, NDIS (LAN) where the line appears as a LAN interface
Utilities	Line Monitor to record, display and store line traffic included

Technical Specifications — Hardware Features

Adapter type	AMD processor with SRAM and FALC56 E1 comms controller, Universal PCI (PCI-X compatible, PCI v2.2 compliant), bus mastering, DMA enabled, Supports 3.3 & 5 volt PCI signalling, Suitable for 32 and 64 bit PCI bus slots
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)
ESD Protection	Sidactor and telelink fuse, designed for zero maintenance. The FarSync TE1 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	According 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	273,220 Hours - Bellcore Method 1 Case 3, 40 deg.C ambient, 15 deg.C case rise above ambient
RoHS2	Compliant
Warranty	5 years

Order Information

Name	Description	Product Code
FarSync TE1	Intelligent 1 port E1 adapter, Universal PCI with BNC and RJ48C (RJ45) connectors, with an API for customer applications and support for TCP/IP operation. Includes a 2 metre cable with RJ48C Connectors. Drivers for Linux and Windows. To develop applications that will use the API the FarSync SDK should be ordered	FS4150
FarSync SDK	Linux and Windows Developers Toolkit for the FarSync TE1 and other FarSync cards, this is required if you want to write software to use the adapter's API	FS9610

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Pg 5

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