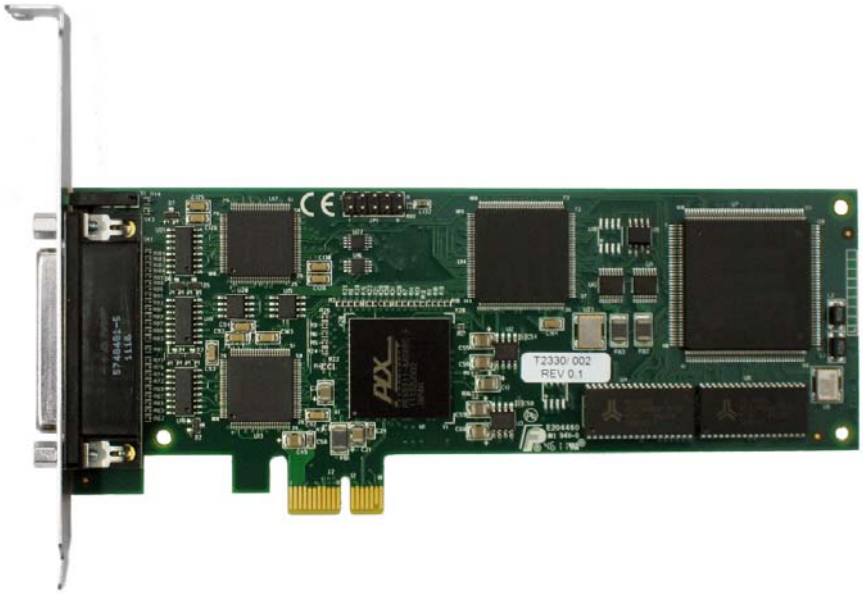
FarSync® T2Ee

Intelligent PCIe low profile synchronous 2 port adapter

FarSite COMMUNICATIONS

Key Features

- **2 port low profile PCIe bus mastering WAN adapter**
- **Interfaces for RS232, X.21, RS530, RS422, RS449, RS485 and V.35**
- **Sync (Bitstream and HDLC)**
- **NRZ, FM0, FM1, Manchester Encoding, Conditioned Diphase**
- **Wide speed range - up to 10 Mbits/s**
- **Wide range of internally generated clocks**
- **Interoperates with TCP/IP**
- **Comprehensive Developers Toolkit for Windows and Linux APIs**
- **FarSite customisable communications controller**



Overview

The FarSync T2Ee adapter and software is designed to provide high performance hardware communications solutions for business, government and military requirements who require a low profile PCIe synchronous communications adapter with externally sourced line clocks or able to generate a wide range of clock speeds internally. 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 FarSync SDK provides a Developers Toolkit for the product.

The T2Ee is a PCIe communications adapter with two independently configurable sync serial ports. Sync operation supports transparent bitstream and bitsync (HDLC) of up to 10 Mbits/s per line with a total adapter bandwidth of 40 Mbits/s. The highly flexible universal network connector supports RS232, X.21, RS530 (RS422 signalling), RS449 (RS422 signalling), RS485 and V.35 network interfaces.

Line signalling modes: NRZ, Manchester Encoding, FM0, FM1 and Conditioned Diphase (Differential Manchester) up to 10Mbits/s are handled as well as soft selectable line termination resistance.

The transparent bitstream option available with the APIs is suitable for VoIP (as a subsystem), video and voice such as T-DMB (Digital Multimedia Broadcasting), DAB (Digital Audio Broadcasting) ETI (Ensemble Transport Interface - ETSI EN 300 799).

Supplied with standard and low profile PCIe I/O brackets, the photo above shows the FarSync T2Ee fitted with the standard PCIe I/O bracket and the one below with the low profile I/O bracket.

Typical Applications

The FarSync T2Ee suits a wide range of different applications these include:

- Low profile solution for synchronous ports
- High speed multi-port HDLC framing support for non standard or specialist protocols
- Multi purpose multi port communication adapter supplying a wide range of adapter generated clock speeds
- Line connection adapter for LabVIEW application
- Manchester Encoding and Conditioned Diphase for long, reliable, high speed self clocking lines
- Interfacing DAB ETI (Ensemble Transport Interface - ETSI EN 300 799) transparent bit streams to Servers
- Interfacing high speed MPEG Video bit streams T-DMB ETI to Servers

Features under Windows

The FarSync T2Ee supports a **Windows based API,** common to the entire range of FarSync adapters/devices, it 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 synchronous modes. This standardization enables the API to also be readily accessible from higher level environments such as .NET, C#, VB etc.

The FsWinAPI provides applications with direct access to the adapter's communications port/s for bit sync (HDLC) framing, LAPB, V.120, ETI (NI, V.11) and also transparent bitstream operation for video and voice type applications.

The FarSync T2Ee 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.

LabVIEW applications can access this adapter.

The product is supplied with a comprehensive configuration utility. The lines can be reconfigured and restarted without reloading the software. There is context sensitive help and an on-line manual should it be required. An advanced tab permits users to further specify the configuration of the line if necessary.

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

Features under Linux

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 and transparent bitstream data.

The adapter 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.

The link level protocol used can be PPP, Cisco HDLC, LAPB or Frame Relay with optional authentication by CHAP, MSCHAP or PAP (RFC 1334) thus providing a standard point-to-point network interface. Bitstream and ETI (NI, V.11) is supported with the FarSync SDK.

The adapter installs seamlessly as a plug and play device. The driver supports Linux kernel versions 2.6 and onwards including the leading distributions supplied by Red Hat, SuSE, CentOS, Debian, Ubuntu, Fedora, Slackware and more. Multi-processor systems are supported. The driver is dynamically loadable so a kernel rebuild is not required for the driver to be installed. Big Endian and Little Endian drivers are supplied.

FarSite is committed to supporting the adapters 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.

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.

FarSync SDK

The FarSync SDK provides a Developers Toolkit with full documentation, useful utilities, such as a line monitor, and many sample applications using the APIs 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 APIs. See https://www.farsite.com/datasheets/FarSync_SDK_Datasheet.pdf

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Product Details

The FarSync T2Ee is supplied with software drivers for Windows and Linux. This includes a 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.

The drivers supplied with Windows and Linux allow large numbers of ports to be supported by the installation of multiple FarSync T2Ee adapters in a Server. Typically 12 or more adapters (24+ ports) can be supported; the adapter limit is only dependent on the resources available in the host server and the total bandwidth of the PCIe bus.

Adapter Hardware

The adapter comprises an AMD processor with no wait state SRAM. The whole memory space may be mapped via the PCIe interface to the PC/Server. The AMD processor contains an embedded HDLC / transparent controller with SDMA access (128 buffers per port) and a full range of timers. In addition the adapter features a FarSite extended communications controller (customisable).

The T2Ee supports two synchronous ports which can run to speeds of up to 10 Mbits/s full duplex internally clocked and 10 Mbits/s externally clocked. Total bandwidth supported by the adapter is 40 Mbits/s.

Network Interfaces

The multi function line drivers available on all the ports support RS232 (V.24), X.21 (V.11), V.35, RS422, RS530 (EIA530), RS449 and RS485 network interfaces, all soft configurable and protected from static charges by ESD protection devices.

Internally Sourced Clocks

Internally generated clocks to drive a serial communications port can be derived from either an on-board 8.192MHz clock (25ppm) and can be set to hundreds of different frequencies between 100 baud and 10 Mbits/s, some of pre-programmed list is in the table below. Many other frequencies can be synthesized to order, contact us to discuss your requirements.

100, 300, 600, 1200, 2400, 4800, 7200, 8000, 9600, 12000, 14400, 16000, 16800, 19200, 21600, 24000, 26400, 28800, 31200, 32000, 33000, 33333, 33600, 36000, 38400, 40000, 40800, 43200, 48000, 56000, 64000, 80000, 96000, 112000, 128000, 160000, 192000, 224000, 256000, 320000, 384000, 448000, 512000, 576000, 640000, 704000, 768000, 832000, 896000, 960000, 1000000, 1024000, 1088000, 1152000, 1216000, 1280000, 1344000, 1408000, 1472000, 1536000, 1600000, 1664000, 1728000, 1792000, 1856000, 1920000, 1984000, 2000000, 2048000, 2112000, 2176000, 2240000, 2304000, 2368000, 2432000, 2496000, 2560000, 2624000, 2688000, 2752000, 2816000, 2880000, 2944000, 3000000, 3008000, 3072000, 3136000, 3200000, 3264000, 3328000, 3392000, 3456000, 3520000, 3584000, 3648000, 3712000, 3776000, 3840000, 3904000, 3968000, 4000000, 4032000, 4096000, 4160000, 4224000, 4288000, 4352000, 4416000, 4480000, 4544000, 4608000, 4672000, 4736000, 4800000, 4864000, 4928000, 4992000, 5000000, 5056000, 5120000, 5184000, 5248000, 5312000, 5376000, 5440000, 5504000, 5568000, 5632000, 5696000, 5760000, 5824000, 5888000, 5952000, 6000000, 6016000, 6080000, 6144000, 6208000, 6272000, 6336000, 6400000, 6464000, 6528000, 6553600, 6592000, 6656000, 6720000, 6784000, 6848000, 6912000, 6976000, 7000000, 7040000, 7104000, 7168000, 7232000, 7296000, 7360000, 7424000, 7488000, 7552000, 7616000, 7680000, 7744000, 7808000, 7872000, 7936000, 8000000, 8064000, 8128000, 8192000, 9000000, 10000000.

Line Signalling Modes

NRZ plus the self clocking (clock for the data is decoded from the incoming data line) line signalling modes Manchester Encoding, Conditioned Diphase (also known as Differential Manchester), FM0 and FM1 at speeds of up to 10 MBits/s. This means separate clock lines are not required, these line signalling modes are a soft configurable alternative to NRZ and a reliable way of handling long high speed cable runs.

Line termination is supported on all the balanced pair signals for X.21 (V.11), V.35, RS422, RS530 (EIA530), RS449 and RS485 operation. The line termination resistors may be soft selected to be selected on a port by port basis. The addition of line termination resistors helps improve signal quality on long high speed lines.

Terminal Timing

Terminal Timing is supported to enable system-wide clock synchronisation.

PCI Express Bus Specification

The FarSync T2Ee 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 and above. The FarSync T2Ee is a bus mastering, 1x (single lane) adapter.

Cables

This two port adapter uses a single HD44F connector with the cable splitting out to two connectors. Two port cables are available for RS232, RS530, V.35, X.21 and RS449 operation. The interface also support RS485 operation, no special cables are provided for this. Details of the standard cables and DTE to DCE conversion cables available are listed in the Order Information on the last page.

Technical Specifications - Hardware Features	
Adapter type and PCIe specification	AMD Processor with embedded communications controller, FarSite extended communications controller (customisable). PCIe bus compliant with PCI Express Base Specification Revision 1.0a, x1 (single lane) bus mastering adapter. HD44F connector for the 2 synchronous ports.
Network connection types supported (with cables)	2 synchronous ports, soft switchable line termination, **RS232** (V.24, X.21bis) - DTE DB25M type connector, **X.21** (V.11) - DTE DB15M type connector, **V.35** - DTE M34M type connector, **RS530** (EIA530, RS422) - DTE DB25M type connector, **RS449** (RS422) - DTE DB37M type connector, **RS485** 2 and 4 wire. DCE type cables are also available.
Link speed range Sync	X21, RS530, RS449, V.35, RS422, RS485: up to 10 Mbits/s internally or externally clocked, RS232: up to 128 Kbits/s.
Line Signalling Modes	NRZ, Manchester Encoding, Conditioned Diphase (Differential Manchester), FM0 and FM1.
ESD line protection	Littelfuse high speed ESD and over-voltage protection.
Multiple adapters	12 or more; only dependant of the number of PCIe slots available on the server .
Maximum total bandwidth	40 Mbits/s
LEDs	2 LEDs, one per port showing line connection status.
Line clocking - internal	Internal clock range: over 160 different frequencies between 100 baud & 10 Mbits/s. See the complete list on page 3. No special cables are required to use internal clocks. Internal clocking is supported on RS530, RS232, X.21, V.35 and RS449 connections.
Line clocking - external	External clocks received from a serial port and used to a drive serial communication sport can be any frequency up to 10MHz.
Terminal timing	Terminal Timing is supported to enable system-wide clock synchronisation.
Approvals	EN55022 class B, CE, FCC class B.
MTBF	228,500 hours calculated using Bellcore Method 1 Case 3, 40 deg.C ambient, 15 deg.C case temperature rise above ambient.
Power requirements	< 1.2 A @ +3.3v, < 4 watts.
Physical characteristics	Short card (height 64mm, length 167mm), standard and low profile PCIe I/O brackets supplied.
Cables	Cables are ordered separately, details on the Order Information on the last page.
Warranty	5 Years

Technical Specifications - Software Features

Linux

Distribution Support	Distributions by Red Hat, SuSE, CentOS, Ubuntu, Debian, Fedora, Slackware, and more. Drivers for kernel series 2.6 and onwards on both single and multi-core 32 and 64 bit systems.
Kernel Supported	All sub versions of kernel releases from 2.6.12 onward. The product may operate successfully with earlier versions of the kernel but no specific testing has been undertaken by FarSite. Big Endian and Little Endian drivers supplied.
Protocol Supported	TCP/IP, PPP, Cisco HDLC, LAPB, Frame Relay, CHAP, MSCHAP, PAP (RFCs 1661, 1332, 1334), Bitstream. ETI (NI, V.11) with FarSync SDK.
API and Interfaces	Char I/O API, hdlcX

Windows

O/S Types	Windows 10, 8, 7, Vista, Windows Server 2016, 2012 and 2008, LabVIEW running on a Windows O/S.
Protocol Supported	TCP/IP, PPP, LAPB, V.120, CHAP, PAP (RFCs 1661, 1332, 1334), ETI (NI, V.11), 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.

Order Information

Name	Description	Product Code
FarSync T2Ee	PCIe synchronous 2 port bus mastering adapter (X.21 / V.35 / RS232 / EIA530 / RS422 / RS449 / RS485), bitstream and HDLC run-time support for custom applications plus TCP/IP operation on Linux and Windows. NRZ, Manchester Encoding, Conditioned Diphase, FM1 or FM0 selectable, other encodings can be developed to order. FsWinAPI for Windows 10, 8, 7, Vista; Windows Server 2016, 2012, 2008, Char I/O and hdlcX APIs for Linux, To develop applications to use the API the FarSync SDK should also be ordered. Cables are ordered separately.	FS4256
Compatible Cables		
FCR1	**One port RS530 and RS232 DTE cable** DB25M connector, 1.5 metres. Also supports adaption to X.21, V.35 and RS449 interfaces with addition of conversion cables TCX1, TCV1 and TC449 respectively to allow mixed connectors.	FS6073
FCR2	**Dual port RS530 and RS232 DTE cable** DB25M connectors, 1.5 metres. Also supports adaption to X.21, V.35 and RS449 interfaces with addition of conversion cables TCX1, TCV1 and TC449 respectively to allow mixed connectors.	FS6077
FCX2	**Dual port X.21 (V.11) DTE cable**, DB15M connectors, 2.0 metres.	FS6078
FCV2	**Dual port V.35 DTE cable**, M34M connectors, 2.0 metres.	FS6079
FC449	**Dual port RS449 DTE cable**, DB37M connectors, 3.0 metres.	FS6080
Special Purpose Cables - Suitable for all FarSync T-Series adapters		
Null-MX	X.21 (V.11, RS422) double shielded crossover cable, DB15F connector to DB15F connector, 0.5 metres. Converts DTE presentation to DCE.	FS6090
Null-MR4	Combined RS530 (RS422, EIA 530) 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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