

FarSync T4E and FarSync T4E+ - 4 port Universal PCI multi clock source synchronous WAN communications cards



The FarSync T4E and FarSync T4E+ Universal PCI cards are intelligent 4 port transparent bitstream / HDLC cards with multiple clock sourcing options with multipliers and dividers suitable for providing WAN communications for VoIP and also requirements where clock synchronisation across ports is required.

Overview

The FarSync T4E and T4E+ cards and software is designed to provide high performance hardware communications solutions for business, government and military requirements who need a Universal PCI synchronous communications card with externally sourced line clocks or highly adaptable control of line clocks. The product includes a low level driver that allows access to the communications features available in the hardware. The card 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 T4E and T4E+ are Universal PCI communications cards (PCI and PCI-X compatible) with four independently configurable sync/async serial ports with and external synchronisation capability (eg sourced from GPS). Sync operation supports transparent bitstream and bitsync (HDLC) of up to 10 Mbits/s per line with a total card bandwidth of 60 Mbits/s. The highly flexible universal network connector supports RS232C, X.21, RS530 (RS422 signalling), RS449 (RS422 signalling) and V.35 network interfaces.

The FarSync T4E+ is a superset of the T4E features and also supports Manchester encoding up to 10Mbits/s as well as NRZ line signalling and soft selectable line termination.

One of the unique features of the T4E is the huge variety of clock source options, clocks can be:

- Internally generated using a local clock generator
- External from the WAN communications line
- External via a special CTBus (H.100) clock bus connector
- Sourced on one port then routed to the others
- Sourced from a T4E then routed down the CTBus to other T4Es (and other cards supporting the CTBus) to allow clock synchronisation to be maintained.
- Multiplied or divided per port to obtain the required rate
- Independently configurable for each line

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).

Features under Windows:

The products include support for the Microsoft standard Windows SDCI API, providing applications with direct access to the card's communications port/s for bit synchronous (HDLC) framing, asynchronous and transparent bitstream operation for video and voice type applications.

The card installs seamlessly under Windows 7, Windows XP, Windows Server 2003, Vista and Windows Server 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 synchronous (HDLC) framed, transparent bit stream data. The special clocking features are all accessible through the SDCI interface. Async support is also provided by the Win32 COMM interface as well as the SDCI IOCTLs.

The FarSync T4E can also be installed to appear as a NDIS (LAN) interface so it can simply use the TCP/IP stack to allow access to IP based networks such as the Internet.

Features under Linux:

The low level API is based on the raw socket interface and supports bit synchronous (HDLC) framed and transparent bitstream data. The T4E card 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 T4E card installs seamlessly as a plug and play device under the popular Linux 32 and 64 bit distributions. The cards supports Linux kernel version 2.4 and 2.6 in 32 and 64 bit formats, including the leading distributions supplied by Redhat, SuSE, Mandriva, Debian, Ubuntu, Fedora, Slackware and more. Multi-processor systems are supported.

FarSite is committed to supporting the FarSync T4E 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.

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.

Typical Applications

The FarSync T4E is particularly suitable for VoIP applications where clock synchronisation or widely variable clock speeds are required. Examples of such applications include:

- Reproduction of legacy Audio streams across the TCP/IP networks (VoIP) using Satellite (GPS) clock source synchronisation
- 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
- High speed multi-port HDLC framing support for non standard or specialist protocols
- Network clock synchronisation
- Multi purpose multi port communication card supplying a wide range of card generated clock speeds

FarSync T4E Product Details

The FarSync T4E 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.

The drivers supplied with Windows and Linux allow large numbers of ports to be supported by the installation of multiple FarSync T4E cards in a Server. Typically 12 or more cards (48+ ports) can be supported; the card limit is only dependent on the resources available in the host Server and the total bandwidth of the PCI bus.

Card Hardware

The card comprises a AMD processor with no wait state SRAM. The whole memory space may be mapped via the PCI / PCI-X interface to the PC/Server. The AMD processor contains a quad embedded HDLC / transparent controller with SDMA access (128 buffers per port) and a full range of timers.

The T4E supports four 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 card is 64 Mbits/s. A quad port UART (async controller) is included. Async or Sync operation is dynamically selectable on each port.

Network Interfaces

The multi function line drivers available on all the ports support RS232C (V.24), X.21 (V.11), V.35, RS530 (EIA530, RS422) and RS449 (RS422 signalling) network interfaces, all soft configurable and protected from static charges by ESD protection devices.

Clock Generation, Detection and Selection

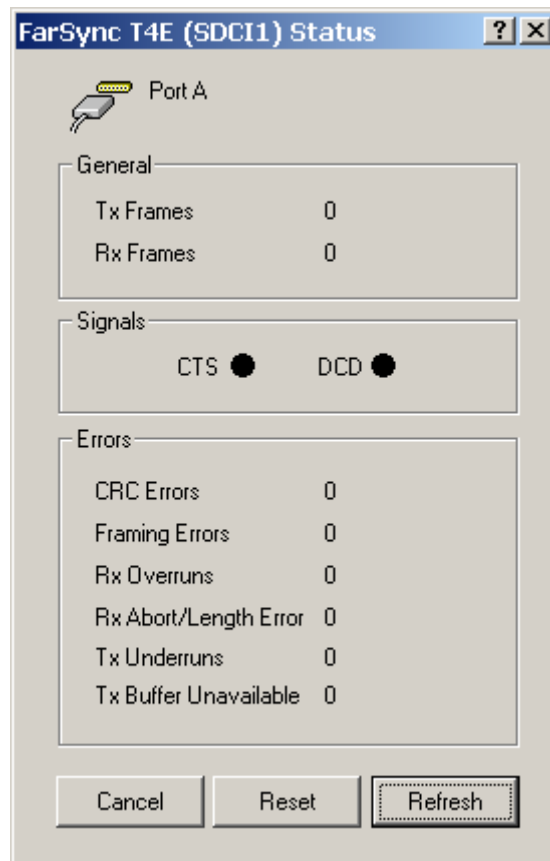
Five on-board frequency synthesisers are configurable for generating clocks for the CTBus (H.100) and/or to the 4 serial ports.

Internally sourced clocks

Internally generated clocks to drive a serial communications port can be derived from either an on-board 8.192MHz clock (32ppm) or an CTBus bus clock and can be set to 160 different frequencies between 300 baud and 8.192 Mbits/s, the complete list is in the table below:

Table of internally generated clock rates supported by the T4E								
300	600	1200	2400	4800	7200	8000	9600	12000
14400	16000	16800	19200	21600	24000	26400	28800	31200
32000	33600	36000	43200	48000	56000	64000	80000	96000
112000	128000	160000	320000	384000	448000	512000	576000	640000
1024000	704000	768000	832000	1088000	1152000	1216000	1280000	1344000
1408000	1472000	1536000	1792000	1856000	1920000	1984000	2000000	2048000
2112000	2176000	2240000	2496000	2560000	2688000	2752000	2816000	2880000
2944000	3000000	3008000	3264000	3328000	3456000	3520000	3584000	3648000
3712000	3776000	3840000	4032000	4096000	4224000	4288000	4352000	4416000
4480000	4544000	4608000	4864000	4928000	4992000	5000000	5056000	5120000
5184000	5248000	5312000	5568000	5632000	5696000	5760000	5824000	5888000
5952000	6000000	6016000	6272000	6336000	6400000	6464000	6528000	6592000
6656000	6720000	6784000	7000000	7040000	7104000	7168000	7232000	7296000
7360000	7424000	7488000	7744000	7808000	7872000	7936000	8000000	8064000
8128000	8192000	9000000						

Externally sourced clocks



FarSync T4E Line Status Utility

External clocks received from a serial port and used to drive serial communications port can be any frequency up to 10,000,000Hz.

A CTBus (H.100 bus) clock may be generated from a received serial port clock for the following sub-set of frequencies: 38400, 57600, 64k, 128k, 256k, 512k, 1024k, 2048k, 4096k and 8192k.

Terminal Timing

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

Clock Routing

Clocks sourced from one port can be routed to drive the other ports.

Clock Speed Detection

A 16-bit timer enables differentiation between the clock frequencies, enabling auto-configuration of clock synthesisers when cables are connected.

H.100 Bus - Special clocking options

The T4E supports a subset of the CTBus (H.100) interface to enable synchronisation of serial ports(s) to the H.100 bus (both master and slave modes), with CT_C8_A, CT_C8_B, CT_FRAME_A and CT_FRAME_B signals and jumper-selectable signal terminations. Serial port data is not frame aligned. This is of particular use in VoIP applications where a data on a line must be exactly reproduced at another location without slip.

In CT_Bus Slave mode, the CTBus clock (auto-selected with A being primary) can be used as a clock source to derive serial port clock(s).

In CT_Master mode, the CTBus clock (either A or B) can be derived from either a received serial port clock or an internal oscillator

PC / Server PCI and PCI-X Compatibility

The FarSync T4E card is suitable for systems with a PCI or PCI-X bus, covering single processor systems, multi-processor systems and processors featuring HyperThreading technology. The card is PCI revision 2.2 compliant with support for both 3.3 and 5 volt signalling, the power for the card is taken from the 3.3 volt supply rail. The FarSync T4E card may be fitted in either 32-bit PCI bus slots or 64-bit PCI-X bus slots as this Universal PCI card will work perfectly well in both.

T4E+ extra features

Manchester encoding is supporting up to 10 MBits/s where the clock for the data is taken from the incoming data line. This means separate clock lines are not required. Manchester encoding is a soft configurable alternative to NRZ.

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

Key Features supported on Linux

The FarSync T4E installs seamlessly under Linux kernel series 2.4 and 2.6 on both single and multi-core 32 and 64 bit systems. All the popular distributions are supported including Red Hat, SuSE, Slackware, Ubuntu, Mandriva, 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 Raw Sockets API allows applications developed using the FarSync SDK to access the full feature set of the hardware, these include bit synchronous (HDLC framed) data, and transparent bitstream data in signal mode NRZ.

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 T4E installs easily under Windows 7, Windows Vista, Windows XP, Windows Server 2003 and Windows Server 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, typical screens are shown below. 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.



Configuration Utility Screens

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.

The FarSync T4E enhanced SDCI API allows applications developed using the FarSync SDK to exactly control the type of data sent and received in bit synchronous (HDLC framed) data and transparent bitstream formats in NRZ signal mode.

Cables

This four port card uses a single large high density 100 pin HIPPI type connector, all four lines are available though this connector. The quad port cable HCR4 attaches to the T4E card and splits out the four network interfaces into separate network connectors to provide support for EIA-530 (RS422) and RS232C. X.21, V.25 and RS449 are available through transition connectors.

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 and DAB ETI with bitstream encoder and decoder. The FarSync SDK is ordered separately from the FarSync T4E.

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.

FarSync T4E and T4E+ - Software Technical Specifications

Linux

Distribution Support	Distributions by Red Hat, SuSE, Slackware, Mandriva, Ubuntu, Debian, Fedora and more. Drivers for kernel series 2.4 and 2.6 on both single and multi-core 32 and 64 bit systems
Kernel Support	All sub versions of kernel releases from 2.4 and 2.6.
Protocol Supported	TCP/IP, PPP, Cisco HDLC, Frame Relay, CHAP, MSCHAP, PAP (RFCs 1661, 1332, 1334)
API and Interfaces	Raw Socket API

Windows

O/S Types	Windows 7, Windows XP, Windows Vista, Windows Server 2003, Windows Server 2008 32 and 64 bit (single and multi-core systems)
Protocol Supported	TCP/IP, PPP, CHAP, PAP (RFCs 1661, 1332, 1334)
API and Interfaces	Extended SDCI API, NDIS (LAN) where the line appears as a LAN interface
Utilities	Line Monitor to record, display and store line traffic included

Hardware Technical Specifications

card type and size	AMD processor with SRAM and quad port synchronous controller, Universal PCI (PCI-X compatible, PCI v2.2 compliant), bus mastering, DMA enabled, 100 pin HIPPI connector for the network connections, CTBus (H.100 bus) for external clocking connection, Suitable for 32 and 64 bit PCI bus slots
Physical characteristics	Short card (height 107mm, length 167mm)
Network connections supported	4 synchronous or asynchronous ports RS232C (V.24, X.21bis) - DTE 25 pin male D type, X.21 (V.11) - DTE 15 pin male D type, V.35 - DTE MRAC-34 male 'brick' type, RS530 (EIA530, RS422) - DTE 25 pin male D type, RS449 (RS422) - DTE 37 pin male D type
Link speed range Synchronous	X21, RS530, RS449: up to 10 Mbits/s internal clocked, 10 Mbits/s externally clocked, V.35: 2 Mbits/s or 10 Mbits/s with termination, RS232C: up to 128 Kbits/s
Link speed range Asynchronous	RS232C, X.21: 110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38.4K, 57.6K & 115.2 Kbits/s
Maximum total bandwidth	64 Mbits/s
Line signal modes	On the T4E: NRZ; On the T4E+ NRZ and Manchester encoding
Multiple cards	12 or more; only dependant of the number of PCI slots available on the server
Line indicators	4 LEDs one per port showing line connection status
ESD Protection	Yes, Littelfuse high speed ESD and over-voltage protection
MTBF	141,438 hours calculated using Belcore Method 1 Case 3, 40 deg.C ambient, 15 deg.C case temperature rise above ambient
Approvals	EN55022 class B, CE, FCC class B
Power requirements	< 1.75 A @ +3.3v, < 10mA @ +/- 12v (for ESD suppression) < 6 watt. Note: 5 volt supply not required
Line clocking - internal	Internal clock range: over 160 different frequencies between 300 baud and 10 Mbits/s. No special cables are required to use internal clocks. Internal clocking is supported on RS530, RS232C, 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. For a specific sub-set of frequencies (38400, 57600, 64k, 128k, 256k, 512k, 1024k, 2048k, 4096k, 8192k) an H.100 bus clock may be derived from a received serial port clock.
Line Termination	On the T4E+ only line termination resistors can be configured on or off
Terminal timing	Terminal Timing is supported to enable system-wide clock synchronisation.
Clock speed detection	A 16-bit timer enables differentiation between the clock frequencies listed above, enabling auto-configuration of clock synthesisers when cables are connected.
H.100 Bus - special clocking options	The T4E supports a subset of the H.100 interface to enable synchronisation of serial ports(s) to the H.100 bus in both master and slave modes.
RoHS Compliance	Yes
Cables	Cables are ordered separately
Warranty	5 years