Key Features

- **Documented APIs for Linux and Windows**
- **Developer support from FarSite Engineering**
- **Encoder/decoder for bitstream data formatting**
- **Many Linux and Windows sample applications**
- **Line Monitor to assist rapid application development**

Overview

The SDK includes support for writing applications for the FarSync range of products on both Linux and Windows. Containing documentation, working sample applications, user libraries and test utility applications. There is everything a user needs to rapidly develop and test a wide variety of applications using synchronous (HDLC framed) protocols, asynchronous data or transparent bitstream data requirements including Audio, MPEG Video T-DMB, DAB STI and DAB ETI with the bitstream encoder and decoders provided.

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.

Note: This toolkit is not appropriate for the FarSync X25 range of products, they are supplied with their own specialist X.25 toolkit.

Windows SDCI API

The SDCI API allows applications to exactly control the type of data sent and received in both bit synchronous data and transparent bitstream formats on FarSync adapters up to 10Mbits/s per port. The SDCI API, manual provided in Adobe PDF format contains a comprehensive set of function call definitions and helpful advice on the best way to utilise the interface.

SDCI is a standard interface defined by Microsoft that allows Independent Hardware Vendors to provide compatible drivers that conform to the standard Host Integration Server 2000 model. The interface provides a small set of commands to configure the link, read and write control signals, transmit and receive data, abort the transmitter or receiver etc. FarSite has enhanced the interface with a number of IOCTL's to configure and control the additional functions of the FarSync adapters including transparent continuous bitstream support.

An Application communicates with the FarSync adapter through the SDCI driver by means of Input/Output Control commands, or IOCTL's. IOCTL commands are sent from user-mode applications via the *DeviceIoControl* function. This is done by sending a parameter block recognised by the driver causing the corresponding device to perform the corresponding operation. All I/O requests are passed to the driver using the standard Input/Output Request Packet, or IRP structures.

Synchronous and E1 operation

The SDCI API has been extended to allow applications to exactly control the type of data sent and received in both bit synchronous (HDLC framed) data and transparent bitstream formats. Through the SDCI API an application can be rapidly developed for such requirements as supporting specialist synchronous protocols or transparent data requirements including Audio, MPEG Video T-DMB, DAB STI and DAB ETI.

Adapters with extended clocking features such as the FarSync T4E and FarSync T4E+ are supported by the API.

Windows SDCI API continued

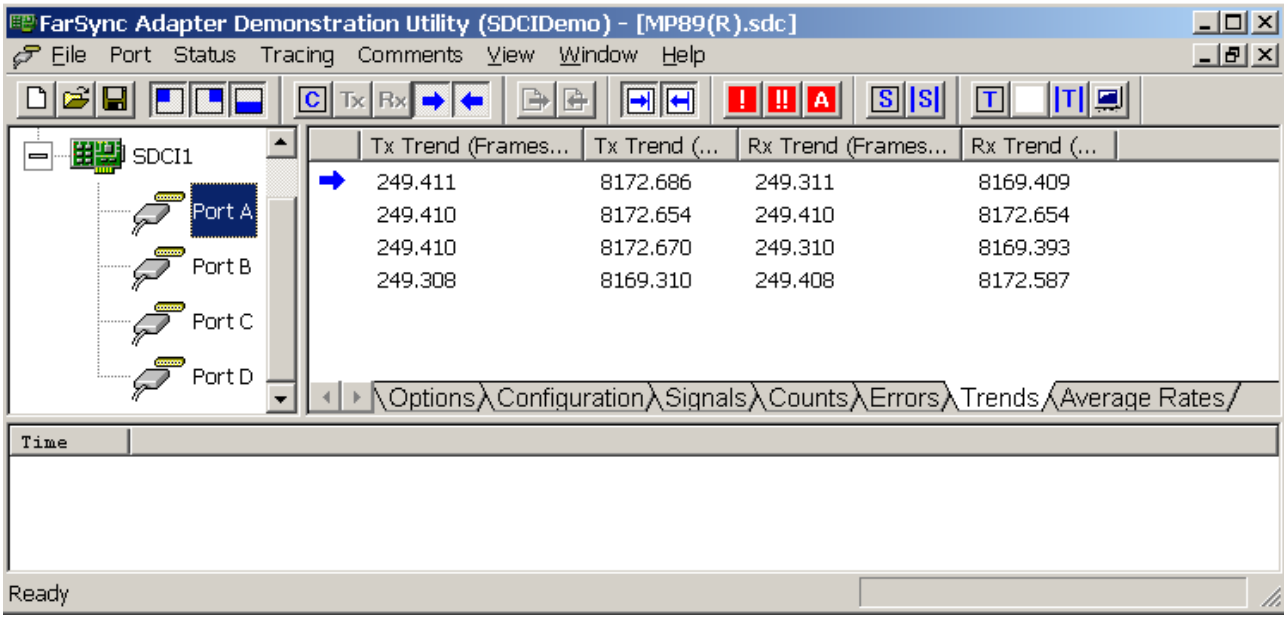
Asynchronous Operation

To operate a port with asynchronous data under Windows, the FarSync driver supports a subset of the standard Win32 COMM API as detailed in Microsoft's MSDN Documentation. This enables applications that currently interface to standard serial ports on Windows to be easily ported to use FarSync ports in asynchronous mode. As an alternative to using the Win32 COMM interface, SDCI clients also have the option of using much of the same code to support FarSync ports in either asynchronous or synchronous modes e.g. the same data transfer IOCTLs. Dynamic switching between Async and Sync operation is supported.

Asynchronous operation is available for the FarSync T4U+Async, T4E, T4E+, T4Ue+Async and Flex.

Sample Applications

A number of easy to follow sample applications are provided demonstrating the wide variety of features available with the adapters. This includes a kernel mode sample for those customers who require the ultimate performance. GUI based demonstration and test utilities such as the SDCI demo utility (illustrated in a screen shot below) utilize the wide range of features supported by the adapters.



Linux Raw Sockets API

The Linux Raw Sockets API allows applications to send and receive HDLC format (bitsync) frames and also transparent bitstreams.

Sample applications supplied with the Developers Toolkit demonstrate both modes of operation. The source for the applications and drivers are included, with the API user manuals provided in Adobe PDF format. A monitor program is included in the Linux support that allows data sent and received by the application to be recorded in hex format.

Synchronous and E1 Operation

The API allows applications to exactly control the type of data sent and received in both bit synchronous data and transparent bitstream formats on FarSync adapters up to 10Mbits/s per port. All the ports are individually selectable for speed, clocking direction and mode of operation. For the maximum speeds supported by a particular adapter please check the FarSync products particular technical specification.

Frame sizes up to 32 Kbytes are supported in HDLC mode to allow support for a wide variety of specialist synchronous protocols.

The transparent bit stream mode is suitable for transparent data requirements such as Audio, MPEG Video T-DMB, DAB STI and DAB ETI. See also the General Bitstream encoding and decoding library details, it will help shortcut the development time needed for these types of applications

The API allow the full range of internal clock speeds to be selected and also selection of extended clocking options supported by FarSync adapters such as the FarSync T4E and FarSync T4E+.

LAPB Mode on Linux

An API to the LAPB protocol is available though the RAW sockets interface, all the ports on the adapter can be addressed by this method.

Asynchronous Operation on Linux

Asynchronous operation is available via a TTY interface for the FarSync T4U+Async, T4E, T4E+, T4Ue+Async and Flex.

Linux Sample Applications

A number of easy to follow sample applications are provided with source code demonstrating the wide variety of features available with the adapters.

General details on HDLC mode

HDLC mode is the normal data mode in which FarSync adapters operate. An HDLC frame uses flags to determine the beginning and end of a frame. These flags provide frame synchronisation. One flag may be used as both an end flag for one frame and the start flag for the next frame. Although FarSync adapters do not transmit such shared flags, they can receive and correctly handle them.

An HDLC frame typically consists of an opening flag, followed by an address field, a control field, an information field, a cyclic redundancy check (CRC) field, and, finally, a closing flag. As far as the FarSync driver is concerned the address, control and information fields are just data. Frames maintain data transparency by a process called zero-insertion and deletion. When transmitting data, the transmitter inserts a zero after five consecutive ones. When receiving data, between opening and closing flags, the receiver deletes any zero received after five consecutive ones. Zero insertion and deletion is sometimes called bit stuffing and unstuffing and also ZBID.

Generals details on Transparent bitstream mode

The FarSync adapter can run in transparent bitstream mode, in this mode there is no data flow control. Generally for data transmission the application should continuously supply data at a sufficient rate for the line speed so that there are no breaks in transmission. For data reception the application should provide empty buffers at a sufficient rate for the line speed to ensure that no received data is lost.

In this mode the communications controller transmits data exactly as it is loaded in the transmit FIFO, when the transmitter has no more data to send it transmits mark idle, no abort sequence is sent. Receive data may not be byte aligned, as the receiver knows nothing of the data format or any synchronising sequences. If received data needs to be byte aligned then this can be achieved in software on the Host PC.

Transparent Mode is useful for transmitting and receiving raw data streams such as MPEG video and audio such as T-DMB (Digital Multimedia Broadcasting) and DAB (Digital Audio Broadcasting) ETI (Ensemble Transport Interface - ETSI EN 300 799) and STI (Service Transport Interface - ETSI EN 300 797).

FarSync adapters normally send and receive the LSB of a byte first, this is however configurable to MSB if required. When receiving transparent data, no buffer status is transferred to the buffer descriptors by the SmartDMA. The received data is simply a continuous stream filling buffers, and the SmartDMA controller keeps cycling through buffers without ever storing an EOP. The receiver will begin receiving as soon as the port is started. It will continue receiving as long as there are buffers available in the receive buffer ring. Each receive block is as big as the buffer allocated for it. If the receive data is marking, then the receive buffers just keep being filled with 0xFF's until there are no buffers available or the port is stopped.

General Purpose Bitstream Encoding and Decoding Library

A library is provided that allows low level encoding and decoding of the transparent bitstream for speedy application development of your Windows or Linux application. The library can be configured to identify and extract most fixed-length byte-oriented user frames; where frames can be defined in terms of single or alternate synchronizing patterns, frame length and number of sync patterns to acquire sync. It can for example provide low level frame handling for E1, DAB-ETI or DAB-STI.

Windows and Linux sample send and receive programs demonstrating common modes of operation are supplied with sample data files.

DAB modes supported:

ETI

ETI(NI, G.703) - on the FarSync TE1 and FarSync TE1R

ETI(NI, V.11) - on the FarSync T1U, FarSync T2U, FarSync T2Ue, FarSync T4U, FarSync T4Ue, FarSync T4E, FarSync T4E+ and FarSync Flex.

STI

STI(PI, G.703) - on the FarSync TE1 and FarSync TE1R

STI(PI, V.11) - on the FarSync T1U, FarSync T2U, FarSync T2Ue, FarSync T4U, FarSync T4Ue, FarSync T4E, FarSync T4E+ and FarSync Flex.

For Windows the library is available in 32 bit form for 32 bit based applications.

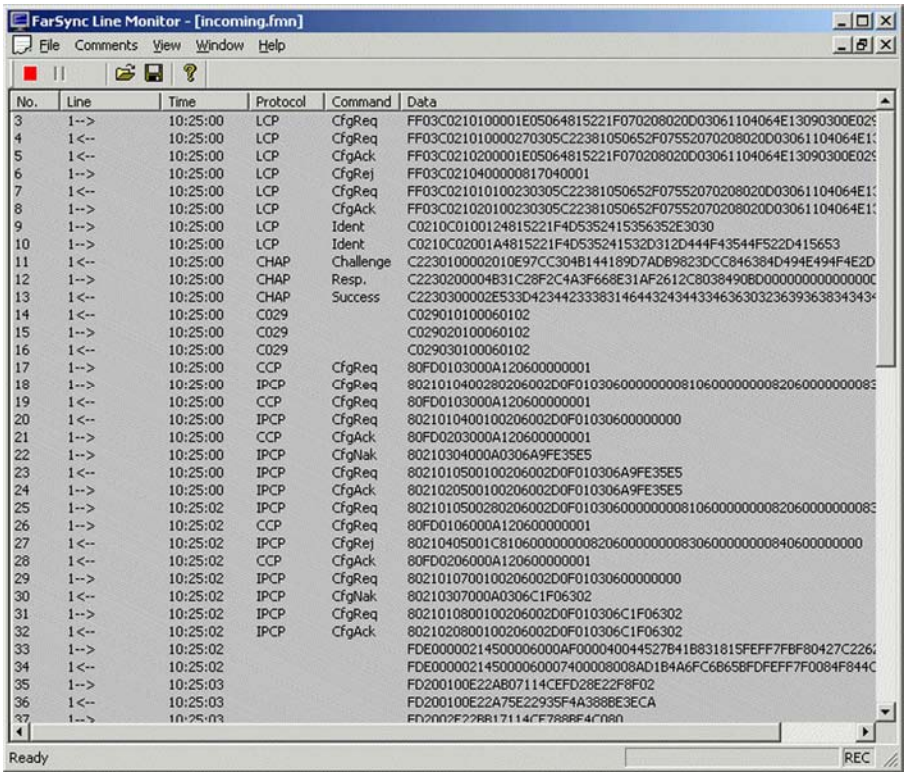
For Linux the library is available in 32 and 64 bit form.

Linux Line Monitoring

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

Windows Line Monitor

The 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.



The FarSync SDK supports APIs to all the products listed in this table			
Products supported by the SDK	**Product Code**	**Windows API**	**Linux API**
FarSync Flex	FS4100	Yes	Yes
FarSync T1U	FS4140	Yes	Yes
FarSync T2U	FS4240	Yes	Yes
FarSync T4U	FS4440	Yes	Yes
FarSync T4U +async	FS4441	Yes	Yes
FarSync T4E	FS4444	Yes	Yes
FarSync T4E+	FS4446	Yes	Yes
FarSync TE1	FS4150	Yes	Yes
FarSync TE1R	FS4151	Yes	Yes
FarSync T2Ue	FS4250	Yes	Yes
FarSync T4Ue	FS4450	Yes	Yes
FarSync T4Ue +async	FS4451	Yes	Yes
FarSync M1P v2	FS4133	Yes	No

FarSync SDK—Developers Toolkit, what's included	
Reference manuals	Windows SDCI API user manual, Linux Raw Sockets API user manual, Linux LAPB API, RS485 application guidelines (for the FarSync Flex) Bitstream encoder/decoder user manual
Sample programs	Sample applications supplied that use the SDCI API, Raw Sockets APIs and the bitstream encoder/ decoder. There are also adapter performance check and adapter function test applications
Source code	Sample C applications and Linux drivers source code supplied
Bitstream encoding and decoding	Library and sample programs supporting decoding of bitstream data, can be configured to support many different fixed length bitstreams such as ETI, STI and E1 framing.
Customer support	We provide free email and telephone assistance to the application developer using the API as part of the package provided when the FarSync SDK is purchased.

Order Information

Name	Description	Product Code
FarSync SDK	Linux and Windows Developers Toolkit for the FarSync adapters - this is required if you want to write software to use the FarSync adapter APIs. *Note: This toolkit is not appropriate for the FarSync X25 range of products or the FarLinX Gateways, they are supplied with their own toolkit.*	FS9610

Distributed by Network Technologies Dtld. GmbH, Bernhardstrasse 10, D-53902 Bad Muenstereifel, Germany

Tel: +49 2253 92420
Fax: +49 2253 924229
Email: info@ntdgmbh.de
Web: www.ntdgmbh.de