



# Sirrix.PCI4S0

## 4-Port S<sub>0</sub> PCI-Card



### Technical Data



**Sirrix AG**  
security technologies



# Sirrix.PCI4S0

## 4-Port S0 PCI-Card

### Overview

The Sirrix.PCI4S0 is a PCI-based ISDN interface card. It provides 4 BRI (Basic Rate Interface) ports that can be connected directly to both, the public ISDN network as well as to ISDN end-user devices like telephones and fax machines. Sirrix.PCI4S0 is full ISDN compatible and thus, it can be employed for voice applications as well as for data communications.

### Hardware Structure

The BRI ports are provided by four Infineon PSB 21150 (IPAC-X) interface circuits. There is a 32 KByte SRAM on-card that can be used for buffering the B-Channel data between hardware and the software application. The communication with the software is realized by an FPGA using the PCI bus.

The optionally available crypto mechanisms are realized in hardware and included within the FPGA. They allow a zero-delay encryption and decryption of the B-Channels.

### BRI Interface Lines

All 4 BRI lines of Sirrix.PCI4S0 can be configured independently to work in the NT mode (Network Termination) or TE mode (Terminal Equipment). In both modes they can be operated as PtMP (Point-to-MultiPoint) or as PtP (Point-to-Point). Moreover - and in all configurations the Sirrix.PCI4S0

support MSNs (Multiple Subscriber Number) and DDI (Direct Dialing In).

### Integrated PCM Bus

Using the Sirrix.PCM bus, one can link up several Sirrix.PCI4S0 cards, building a fully hardware-based ISDN switching network. This provides a zero-delay perfect-quality voice and data transmission.

### Power Supply

Sirrix.PCI4S0 can be connected with an internal 40V power supply (Sirrix.PS40V-A). The power is transformed from the computer's internal 12V power supply. Every line can be selected to be supplied by jumper configuration. Moreover, every line can be terminated (100 Ohm resistor for BRI line termination) also by using jumpers.

### Optical Display

The activation of the BRI lines are indicated on 4 LEDs. An additional LED indicates the status of the FPGA while another LED is freely programmable.

### ISDN Facilities Support

Almost all ISDN facilities are supported by Sirrix.PCI4S0. This encloses, e.g., CLIP (Calling Line Identification), CF (Call Forwarding), CW (Call Waiting), Call Hold and Transfer, Advice of Charge (AOC) and AOC During Call

(AOCD), 3PTY (Three Party Conference) etc. These facilities are supported by our comprehensive ISDN stack implementation. They can be used in PBX applications to provide the corresponding facilities.

### Possible Applications

Sirrix.PCI4S0 can be used, e.g., with the open-source PBX software Asterisk, for which we provide a channel driver.

With Sirrix.PCI4S0, everyone can build flexible, COTS-based PBX systems that allow much more facilities than common PBX.

Moreover, Sirrix.PCI4S0 can be used to build ISDN crypto-gateways or Voice-over-IP gateways or least-cost routers.

### Requirements

Sirrix.PCI4S0 card can be operated in an arbitrary PCI-based system with 32 Bit PCI 2.1 and with Linux kernel 2.6.



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## Features

### Hardware

- PCI V2.1 Card  
175 mm x 102 mm  
incl. PCI connector + bracket
- Four S0 ports (BRI)  
1 x RJ45 port each
- Programmable gate array  
(FPGA Altera Acex)
- LED (D9) for display of FPGA status
- Freely programmable LED (D11)
- 32 KByte SRAM as B-channel buffer for software switching with a depth of 64, 128, 256 or 512 Byte.
- Sirrix.PCM bus for B-channel switching in hardware across multiple cards (bandwidth 12,288 MBit = 192 B-channels)
- Conference room for three parties (3PTY) in A-law /  $\mu$ -Law codec with a data delay of only one frame (125  $\mu$ sec)
- Retrievable serial number
- Transparent encryption with low delay of B-channels with an arbitrary block cipher in the operation modes OFB, CFB, CTR or with another arbitrary stream cipher (cf. Sirrix.Crypt datasheet).

### ISDN-Hardware

- S0 ports (BRI)  
Infineon PSB21150 ISAC-X V1.4
- Each S0 port is configurable in NT or TE mode independently.
- 100  $\Omega$  terminating resistors
- S0 power supply (POWER12, POWER34; 40 V power supply Sirrix.PS40V-A at POWER-40V); current-limiter to 0,1 A (4 W) per port onboard (ETSI EN 300 012-1)
- One LED for each S0 port for display of the Layer 1 activation state (LEDs D12 + D13)

### ISDN-Stack

- Comprehensive implementation of the DSSI ISDN stack
- Layer 1: Hardware with kernel module (ITU-T I.430 / ETSI EN 300 012-1)
- Layer 2 and 3: in user space (ITU-T Q.920, Q.921, Q.930, Q.931, Q.932, Q. 850 / ETSI EN 300 012, ETS 300 125, ETS 300 102, EN 300 196)
- NT and TE mode in PtP and PtMP configuration
- Arbitrary number of Layer 2 und 3 instances
- ISDN numbers with arbitrary length, with or without direct dialling in (MSN + DDI, ITU-T Q.951.1, Q.951.2, ETSI EN 300 064-1, EN 300 052-1)
- Display of calling party number (CLIP) (ITU-T Q.951.3, ETSI EN 300 092-1)
- CallerID name can be transmitted by Display Information Element
- Suppression of display of calling party number (CLIR), from telephone menu (ITU-T Q.951.4, ETSI EN 300 093-1)
- Connected Party Number (COLP) (ITU-T Q.951.5, ETSI EN 300 097-1)
- Call forward (CFU, CFNR, CFB, facility protocol), from telephone menu (ITU-T Q.952, ETSI EN 300 207-1)
- Hold and call selection (HOLD) (ITU-T Q.953.2, ETSI EN 300 196-1)
- Call transfer (ECT) (ITU-T Q.952.7, ETSI EN 300 369-1)
- CallWaiting (CW) (ITU-T Q.953.1, ETSI EN 300 058-1)
- Three party conference (3PTY) from telephone menu (ITU-T Q.954.2, ETSI EN 300 188-1)
- Advice of charge (AOCD) in units or currency (ITU-T Q.956.2, ETSI EN 300 188-1)

### Additional Features

- Notify Information Element  
e. g. during HOLD or 3PTY
- Redirection Party Number Information Element
- Echo Cancellation  
(with software switching, e. g. for VoIP)

### Applications

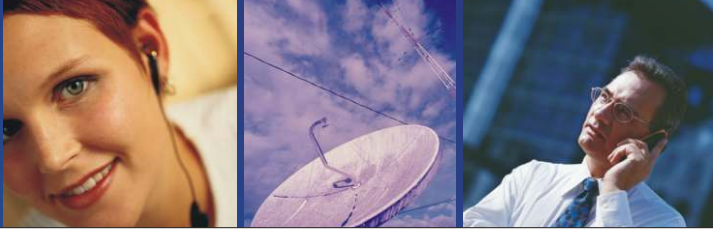
- Software based PBX systems  
(e. g. Asterisk)
- ISDN crypto gateways
- VoIP gateway to the public telephone network or VoIP Gateway for internal extensions; channel banks
- Least Cost Router for VoIP or CbC

### Scalability

- Sirrix.PCM-Bus supports up to 12 PCI-cards with 96 B-channels in each system
- By interlinking multiple systems, a virtually arbitrary amount of extensions can be served.
- The connection to the public net can be achieved by an arbitrary number of S0- or S2M-ports.

### System Requirements

- Arbitrary computer system
- Free 32 Bit PCI 2.1 slot
- Linux with kernel 2.6



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## Hardware Overview

