



## Product Information

### CS4-SAX • **CompactPCI**<sup>®</sup> Dual Ultra2 SCSI Hostadapter

Document No. 2171 \* Edition 04/2001

The **CS4-SAX** from EKF is a **CompactPCI**<sup>®</sup> based Dual Ultra2 SCSI hostadapter, suitable for attachment of LVD/SE 16-bit peripherals as Raid-systems, high performance hard disks and streamer tape drives. Provided with two independent ports, both channels can be dedicated to LVD devices, or alternatively one channel can be used to support mixed performance SE devices.

The **CS4-SAX** provides up to 160MBps aggregate SCSI throughput. Optimum performance therefore is achieved when the **SAX** is operated in a 64-bit CPCI backplane, but 32-bit legacy systems also profit from the power of this SCSI controller.

LVD (low voltage differential) signalling technology allows an overall cable length of the SCSI bus up to 12m. LVD and SE (single ended) devices are sensed automatically by the **SAX**, and the SCSI interface is self-configured to match the peripherals SCSI operating mode. Compatibility is maintained to all previous SCSI standards, e.g. Fast and Ultra SCSI. The board is provided with two external VHDCI receptacles and one internal HDSUB connector; so external and internal devices can be connected simultaneously.

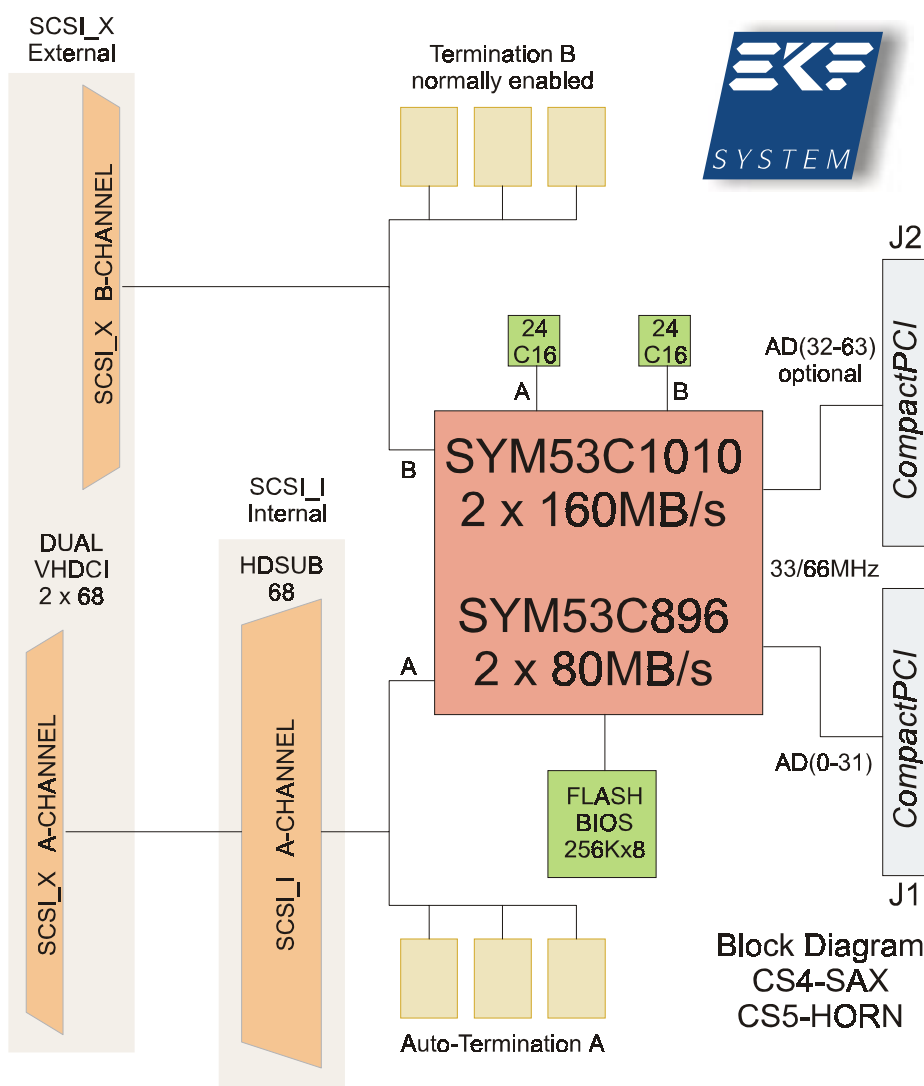
Comprehensive software support as well as PCI plug&play technology care for effortless installation of the **CS4-SAX** under nearly all popular operating systems.



The CS4-SAX allows for connecting of up to 2 x 15 peripherals with 16-bit (Wide) interface. For flexible cabling, the SAX is provided with SCSI connectors for both internal and external use. All of the SCSI connectors can be used together at the same time. The dual VHDCI receptacle SCSI\_X is mounted to the front panel of the CS4-SAX for attachment of external devices to the SCSI channels A and/or B. The HDSUB connector SCSI\_I is provided for internal use (channel A only). Peripherals, attached to any of the SCSI connectors, are sensed by a logic circuitry. If the logic detects the CS4-SAX to be either end of the SCSI bus, the local SCSI terminators are activated.

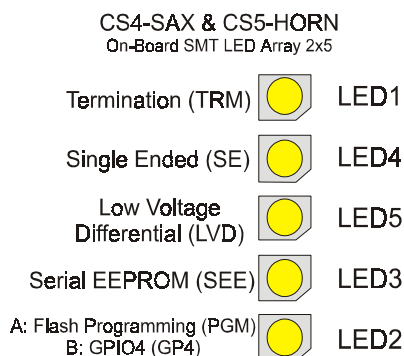
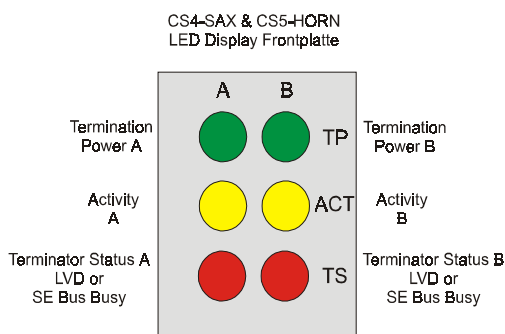
8-bit (Narrow) SCSI peripherals need an adapter (connector or cable) in order to reduce from 68 to 50 leads.

The jumperless board is built around the LSI Logic (Symbios) SYM53C896 SCSI processor. Being also compatible to the SYM22910 hostadapter board, the CS4-SAX can be used with all LSI Logic software (e.g. the Device Management System SDMS). Therefore, existing SYM22910 drivers for operating systems as Windows or Linux are valid also for the CS4-SAX.



The CS4-SAX provides a Flash Extended BIOS, thus enabling operating system boot from any SCSI drive. The Flash-EEPROM can be field upgraded at any time by means of a utility program. The CS4-SAX is additionally equipped with two serial EEPROMs, saving configuration parameters of each of the two SCSI channels (e.g. for SCAM support).

In order to ease system integration, several LED's show interesting board status information:



The CS4-SAX sources the voltages for the on-board and external SCSI terminators (TERMPOWER), fused by Polyswitches (reversible fuse).

SCSI Bus data and control signal integrity will be improved by the SCSI controller chip using the Symbios Tolerant™ filtering technology, thus minimizing the influence of a critical SCSI cabling (poor cables, mixed cable types, noisy environment).

The CS4-SAX is provided with a 64-bit CPCI interface, giving a nominal bandwidth of 266MBps in a suitable system (P1/P2 backplane). This is more than enough to handle the theoretical aggregate maximum 160MBps SCSI data stream.

Actually, the SCSI busses operate with considerable lower data transfer rates. Usual configurations dedicate one of the SCSI channels to mixed performance SE devices, while the other channel is reserved for the LVD devices only (this is done so because a SE peripheral on a SCSI bus forces all LVD devices into the legacy single ended mode). The SE organized SCSI bus however operates with a maximum of 40MBps (20MBps if 8-bit narrow devices). Furthermore, most peripherals by far do not reach the maximum data transfer rates when accessed outside their local caches due to latency periods. Therefore, the CS4-SAX is an outstanding choice also for 32-bit CPCI systems with a nominal bandwidth of 133MBps.

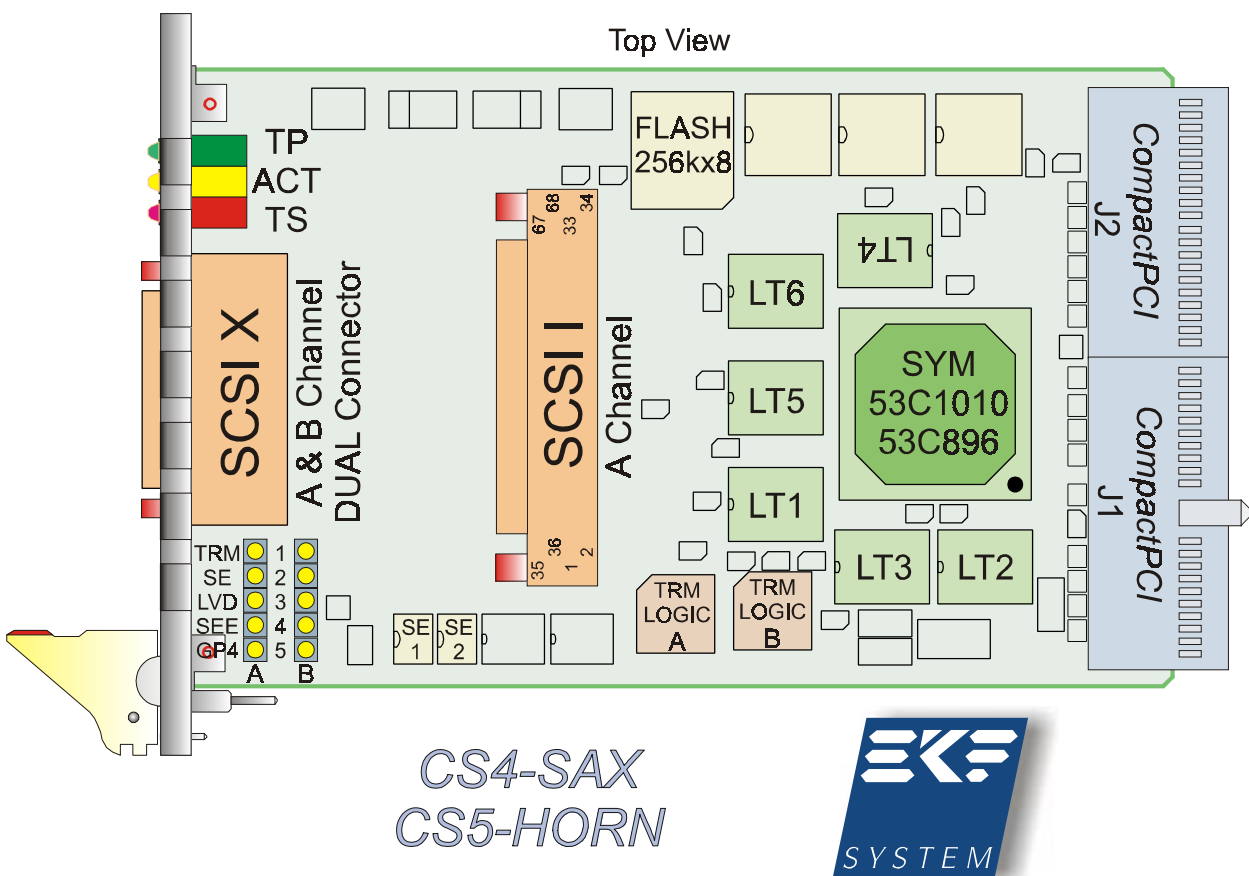
A toolset already mentioned, but worth to be more intensively discussed is the Symbios SCSI Device Management Software SDMS, running on the CS4-SAX without any modification. SDMS is a package of utilities and drivers, including ASPI, RAID, or removeable media support for popular disk operating systems. As a resident part of the SDMS, basic routines are contained within the on-board Flash Extended BIOS. Like any other BIOS routine, this resident software does not depend on an individual OS, but allows standalone operation and diagnostics instead, e.g. low level harddisk formatting or SCSI bus configuration. In order to obtain actual information or download the latest firmware release, the LSI Logic Internet site <http://www.lsillogic.com> should be visited.

The CS4-SAX is a 3U (single size) Eurocard. For 6U **CompactPCI**® systems there is a mechanical kit available, expanding the front panel to 6U (CR9-ADAPT).

CR9-ADAPT



*It is needless to discuss the advantages of SCSI, as superior data throughput at minimal CPU load. With the CS4-SAX, any **CompactPCI**® system can profit from dual Ultra2 SCSI performance. The CS4-SAX is an affordable, highly reliable industrial grade product,, and - last not least - fast and smoothly to be installed.*



## Technical Specifications

<b>Board</b>	<b>Dimensions</b>	3U Eurocard (100x160mm <sup>2</sup> ), front panel width 20.2mm (4HP), mechanics constructed with respect to EMC requirements, ejector lever
<b>SCSI Bus</b>	<b>Bus Type</b>	2 x ANSI SCSI Parallel Interface-2 (SPI-2) 16-bit (8-bit by adapter) LVD (low voltage differential signal) max. 2 x 15 devices SE (single ended) max. 2 x 15 devices (16-bit), 2 x 7 devices (8-bit)
	<b>Performance (each Channel)</b>	Ultra2 80MBps Wide Ultra 40MBps (16-bit), Narrow Ultra 20MBps (8-bit) Wide Fast 20MBps (16-bit), Narrow Fast 10MBps (8-bit)
	<b>Connector SCSI_X</b>	external connectors (front panel): dual VHDCI (0.8mm pitch) 68-lead receptacle, shielded, screw lock mechanism, each connector rotated 180° against the other (matching plugs with suitable asymmetric hood profile required if both connectors are engaged) SCSI channel A and B
	<b>Connector SCSI_I</b>	internal connector: 68-lead high density socket HDSUB (1.27mm pitch), screw lock mechanism 2-56 UNC, SCSI channel A only
	<b>Maximum SCSI Cable Length</b>	low voltage differential (LVD) mode: Ultra2 SCSI 12m single ended (SE) mode: Fast SCSI 3m, Ultra SCSI 3m (4 devices), 1.5m (8 devices)
	<b>Termination</b>	active termination, automatically enabled when board is sensed to be either end of the SCSI bus, LVD/SE self configured termination power fused by self resetting Polyswitches 1.25A trip
	<b>Controller Chip</b>	SCSI multi-function controller SYM53C896 I <sub>2</sub> O Ready maximum aggregated throughput 160MBps PCI busmaster 64/32-bit (block transfer maximum 266MBps) on-chip LVD/SE transceiver 2kV ESD protected SCAM (SCSI Configured AutoMatically) level 1 functionality target disconnect/reconnect (interrupt) Symbios TolerANT™ SCSI signal filtering
<b>CompactPCI® Bus</b>	<b>Connector J2</b> <b>Connector J1</b>	64-bit, 33MHz (266MBps) 32-bit, 33MHz (133MBps) PCI burst mode 3.3V or 5V interface
<b>Power Requirements</b>	<b>Connector J1</b>	+5V ±5% 3.0A max. (including external termination power) +3.3V ±0.3V 600mA max. +12V ±5% 50mA max. (when programming the Flash)
<b>Temperature Humidity</b>	<b>Commercial Version</b>	operating temperature 0-70 °C (industrial temperature range available on request) humidity 5-90% non condensing
<b>Software</b>	<b>Drivers/BIOS Download</b>	Symbios/LSI Logic SDMS software for Windows and many other popular operating systems

*specifications are subject to change without further notice*

## Pin Orientation Dual VHDCI SCSI Receptacles (External, A &amp; B-Channel)

A-Channel			
1	SD12+	SD12#	35
2	SD13+	SD13#	36
3	SD14+	SD14#	37
4	SD15+	SD15#	38
5	SDP1+	SDP1#	39
6	SD0+	SD0#	40
7	SD1+	SD1#	41
8	SD2+	SD2#	42
9	SD3+	SD3#	43
10	SD4+	SD45#	44
11	SD5+	SD5#	45
12	SD6+	SD6#	46
13	SD7+	SD7#	47
14	SDP0+	SDP0#	48
15	GND	GND	49
16	DIFFSENS	CPRSNT_I# <sup>1</sup>	50
17	TRMPWR	TRMPWR	51
18	TRMPWR	TRMPWR	52
19	N/C	N/C	53
20	GND	GND	54
21	SATN+	SATN#	55
22	GND	GND	56
23	SBSY+	SBSY#	57
24	SACK+	SACK#	58
25	SRST+	SRST#	59
26	SMSG+	SMSG#	60
27	SSEL+	SSEL#	61
28	SC/D+	SC/D#	62
29	SREQ+	SREQ#	63
30	SI/O+	SI/O#	64
31	SD8+	SD8#	65
32	SD9+	SD9#	66
33	SD10+	SD10#	67
34	SD11+	SD11#	68

B-Channel			
1	BD12+	BD12#	35
2	BD13+	BD13#	36
3	BD14+	BD14#	37
4	BD15+	BD15#	38
5	BDP1+	BDP1#	39
6	BD0+	BD0#	40
7	BD1+	BD1#	41
8	BD2+	BD2#	42
9	BD3+	BD3#	43
10	BD4+	BD45#	44
11	BD5+	BD5#	45
12	BD6+	BD6#	46
13	BD7+	BD7#	47
14	BDP0+	BDP0#	48
15	GND	GND	49
16	BDIFFSENS	BCPRSNT_X# <sup>1</sup>	50
17	BTRMPWR	BTRMPWR	51
18	BTRMPWR	BTRMPWR	52
19	N/C	N/C	53
20	GND	GND	54
21	BATN+	BATN#	55
22	GND	GND	56
23	BBSY+	BBSY#	57
24	BACK+	SACK#	58
25	BRST+	BRST#	59
26	SMSG+	BMSG#	60
27	BSEL+	BSEL#	61
28	BC/D+	BC/D#	62
29	BREQ+	BREQ#	63
30	BI/O+	BI/O#	64
31	BD8+	BD8#	65
32	BD9+	BD9#	66
33	BD10+	BD10#	67
34	BD11+	BD11#	68

<sup>1</sup> (B)CPRSNT\_X# is used to sense the connection of a SCSI device by sensing SCSI standard GND on this pin (input signal to the auto termination logic)

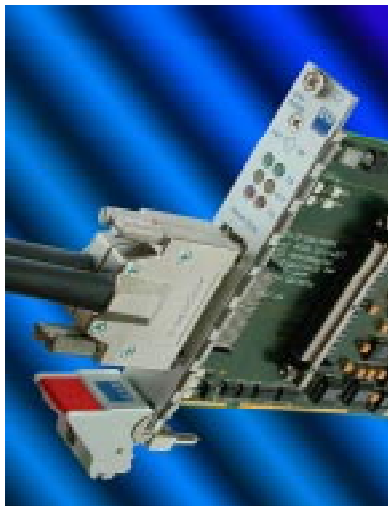
## Pin Orientation HD D-SUB 68 SCSI Receptacle (Internal, A-Channel)

1	SD12+	SD12#	35
2	SD13+	SD13#	36
3	SD14+	SD14#	37
4	SD15+	SD15#	38
5	SDP1+	SDP1#	39
6	SD0+	SD0#	40
7	SD1+	SD1#	41
8	SD2+	SD2#	42
9	SD3+	SD3#	43
10	SD4+	SD45#	44
11	SD5+	SD5#	45
12	SD6+	SD6#	46
13	SD7+	SD7#	47
14	SDP0+	SDP0#	48
15	GND	GND	49
16	DIFFSENS	CPRSNT_I# <sup>1</sup>	50
17	TRMPWR	TRMPWR	51
18	TRMPWR	TRMPWR	52
19	<i>N/C</i>	<i>N/C</i>	53
20	GND	GND	54
21	SATN+	SATN#	55
22	GND	GND	56
23	SBSY+	SBSY#	57
24	SACK+	SACK#	58
25	SRST+	SRST#	59
26	SMSG+	SMSG#	60
27	SSEL+	SSEL#	61
28	SC/D+	SC/D#	62
29	SREQ+	SREQ#	63
30	SI/O+	SI/O#	64
31	SD8+	SD8#	65
32	SD9+	SD9#	66
33	SD10+	SD10#	67
34	SD11+	SD11#	68

<sup>1</sup> CPRSNT\_I# is used to sense the connection of a SCSI device by sensing SCSI standard GND on this pin (input signal to the auto termination logic).

Ordering Information		
Short Alias	Ordering Number	Short Description
SAX	CS4-1-SAX	3U <i>CompactPCI</i> dual Ultra2 SCSI hostadapter, 32-bit CPCI I/F J1 (J2 left out)
SAX	CS4-2-SAX	3U <i>CompactPCI</i> dual Ultra2 SCSI hostadapter, 32/64-bit CPCI I/F J1/J2
	CR9-1-ADAPT	mechanical kit, converts front panel from 3U to 6U
	8993102	external SCSI cable assembly, VHDCI to HD-DSUB, 68-pos., length 1m, asymmetric VHDCI connector <sup>1</sup>

<sup>1</sup> Whenever both external SCSI channels are in use (front panel mounted dual VHDCI receptacle), the connector style of the external VHDCI cabling set is important. Connectors conforming to the VHDCI standard are provided with an asymmetric cable entrance with respect to the center of the pin rows. However, there are cable assemblies available with symmetric VHDCI connectors, resulting in the effect that the plug overlaps partially the neighbored VHDCI receptacle.



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