



Product Information

CS5-HORN • *CompactPCI*[®] Dual Ultra160 SCSI Hostadapter

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The **CS5-HORN** from EKF is a *CompactPCI*[®] based Ultra160 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 CS5-HORN provides up to 320MBps aggregate SCSI throughput. Optimum performance therefore is achieved when the HORN is operated in a 64-bit CPCI backplane, but 32-bit legacy systems also profit from the power of this SCSI controller.

By double transition clocking, Ultra160 speeds up the data transfer rate of Ultra2 from 80MBps to 160MBps per channel. Other Ultra160 features are Domain Validation and Cyclic Redundancy Check. Compatibility is maintained to all previous SCSI standards, e.g. Fast, Ultra and Ultra2 SCSI. The CS5-HORN is provided with two external VHDCI receptacles and one internal HDSUB connector; so external and internal devices can be connected simultaneously.

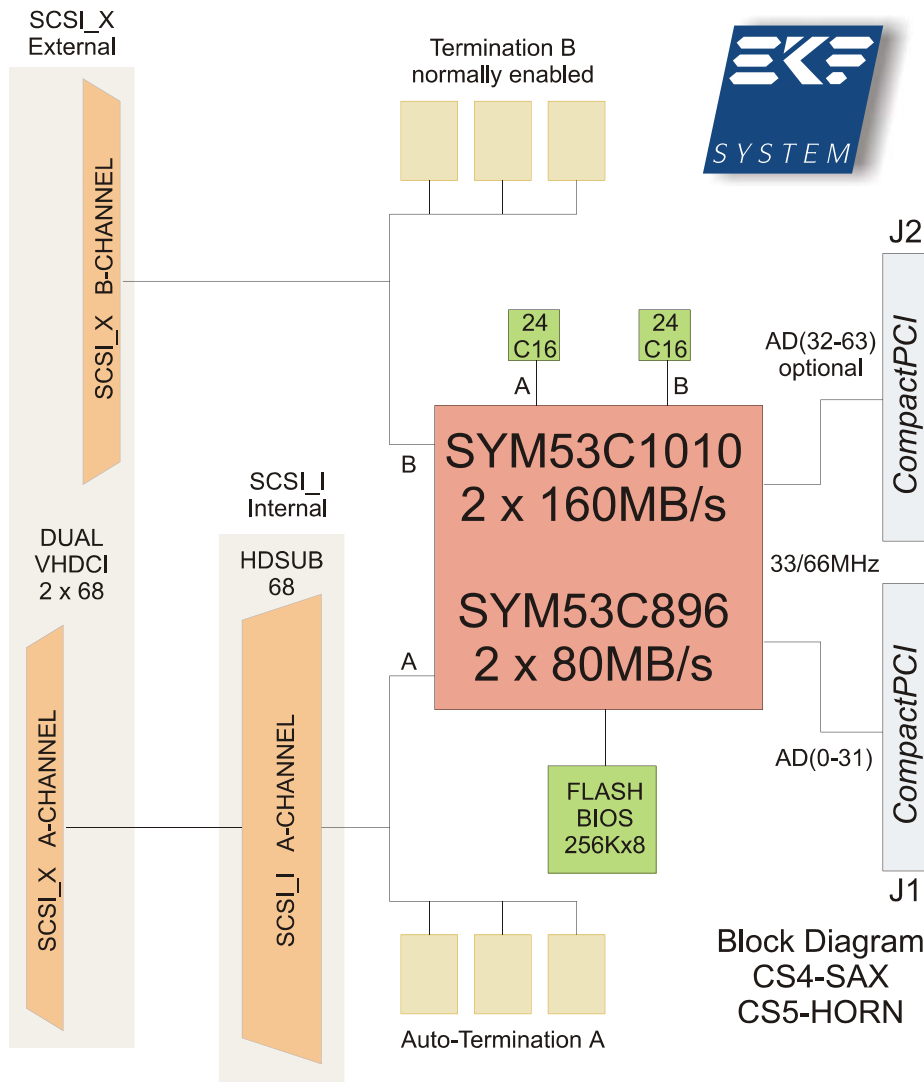
Comprehensive software support as well as PCI plug&play technology care for effortless installation of the CS5-HORN under nearly all popular operating systems.



The CS5-HORN allows for connecting of up to 2 x 15 peripherals with 16-bit (Wide) interface. For flexible cabling, the HORN 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 CS5-HORN 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 CS5-HORN to be either end of the SCSI bus, the local SCSI terminators are activated.

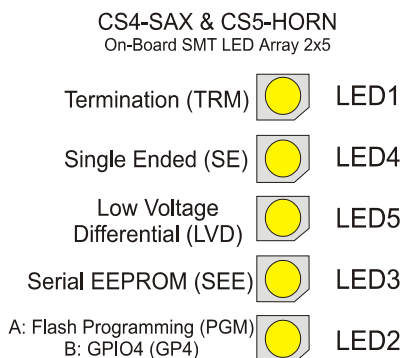
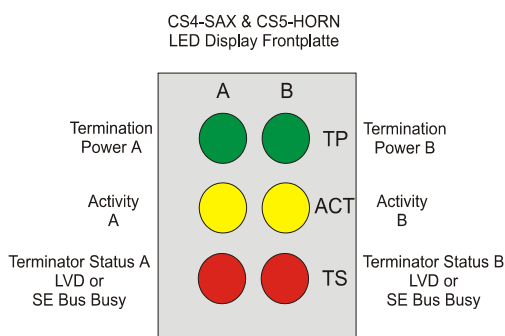
8-bit (Narrow) SCSI peripherals need an adapter (connector or cable) in order to reduce from 68 to 50 leads.

The jumperless board is built around the LSI Logic (Symbios) SYM53C1010 SCSI processor. Being also compatible to the SYM22915 hostadapter board, the CS5-HORN can be used with all LSI Logic software (e.g. the Device Management System SDMS). Therefore, existing SYM22915 drivers for operating systems as Windows or Linux are valid also for the CS5-HORN.



The CS5-HORN 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 CS5-HORN 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 CS5-HORN 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 CS5-HORN is provided with a 64-bit CPCI interface, giving a nominal bandwidth of 532MBps @66MHz in a suitable system (P1/P2 backplane). This is by far enough to handle the theoretical aggregate maximum 320MBps SCSI data stream. However, a 64-bit @33MHz CPCI System (266MBps) seems to be slightly imbalanced.

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 CS5-HORN is an outstanding choice also for 32-bit CPCI systems with a nominal bandwidth of 133MBps.*

SureLINK™ domain validation technology detects the configuration of the SCSI busses and automatically tests and adjusts the SCSI transfer rate to optimize interoperability. The CS5-HORN exceeds Ultra160 by providing not only Basic (Level 1) and Enhanced (Level 2) domain validation, but adds Margined (Level 3) domain validation. This enhancement margins LVD drive strength and clock signal timing characteristics to identify marginal Ultra3 systems.

CRC improves the reliability of SCSI data transmission through enhanced detection of communication errors. The CRC has approximately 2⁻³² rate of undetected error patterns. CRC is the best way to ensure data protection during hot plugging.

To provide complete end-to-end protection of the SCSI I/O, AIP (Asynchronous Information Protection) protects all non-data-phases (command, status, message), augmenting the CRC feature of Ultra160.

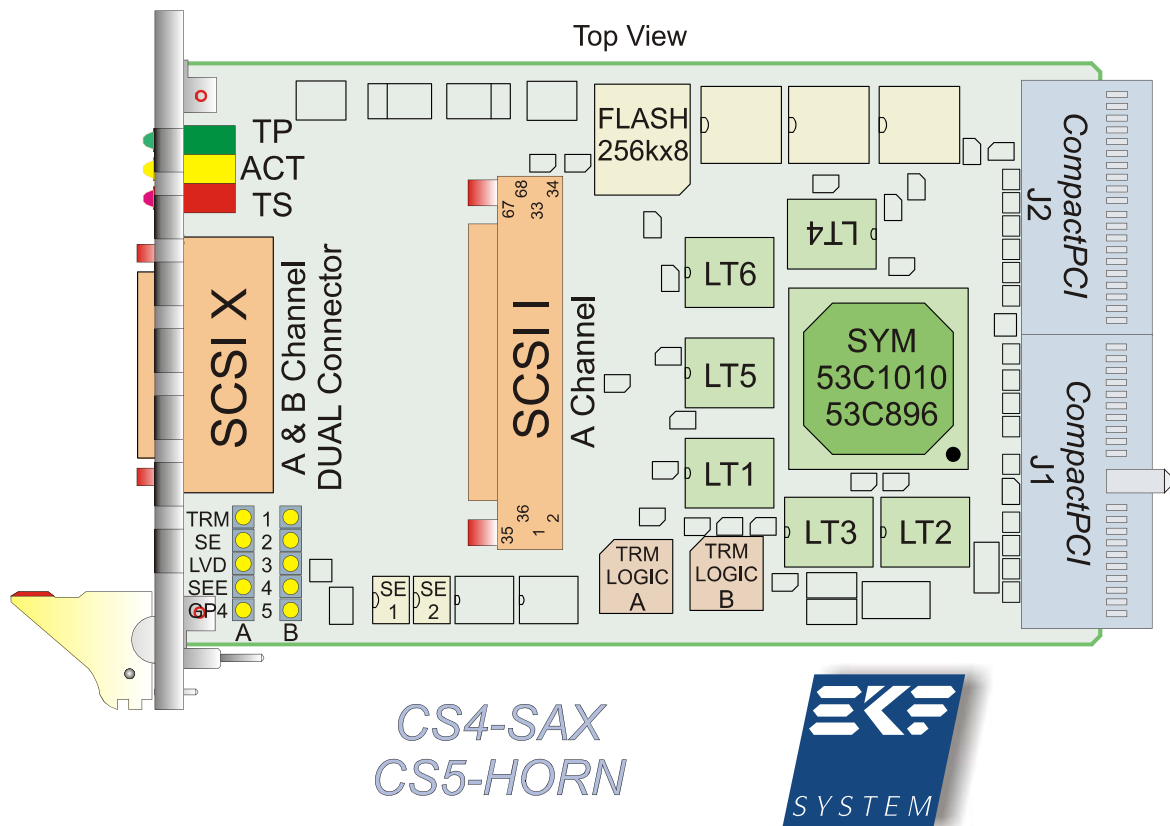
A toolset already mentioned, but worth to be more intensively discussed is the Symbios SCSI Device Management Software SDMS, running on the CS5-HORN without any modification. SDMS is a package of utilities and drivers, including ASPI, RAID, or removeable media support for popular disk operating systems. 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.

The CS5-HORN is a 3U (single size) Eurocard. For 6U *CompactPCI*® systems there is a machanical 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 CS5-HORN, any CompactPCI® system can profit from dual Ultra160 SCSI reliability and performance. The CS5-HORN is an affordable industrial grade product,, and - last not least - fast and smoothly to be installed.



Technical Specifications

	Dimensions	3U Eurocard (100x160mm ²), front panel width 20.2mm (4HP), mechanics constructed with respect to EMC requirements, ejector lever
SCSI Bus	Bus Type	2 x ANSI SCSI Parallel Interface-3 (SPI-3) 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)
	Performance (each Channel)	Ultra160 160MBps Ultra2 80MBps Wide Ultra 40MBps (16-bit), Narrow Ultra 20MBps (8-bit) Wide Fast 20MBps (16-bit), Narrow Fast 10MBps (8-bit)
	Connector SCSI_X	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
	Connector SCSI_I	internal connector: 68-lead high density socket HDSUB (1.27mm pitch), screw lock mechanism 2-56 UNC, SCSI channel A only
	Maximum SCSI Cable Length	low voltage differential (LVD) mode: Ultra160/Ultra2 SCSI 12m single ended (SE) mode: Fast SCSI 3m, Ultra SCSI 3m (4 devices), 1.5m (8 devices)
	Termination	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
	Controller Chip	SCSI multi-function controller SYM53C1010 maximum aggregated throughput 320MBps PCI busmaster 64/32-bit (block transfer maximum 532MBps) on-chip LVD/SE transceiver 2kV ESD protected SCAM (SCSI Configured AutoMatically) level 1 functionality target disconnect/reconnect (interrupt) Symbios TolerANT™ SCSI signal filtering SureLINK™ domain validation AIP Asynchronous Information Protection
CPCI Bus	Connector J2	64-bit, 66MHz (532MBps)
	Connector J1	64-bit, 33MHz (266MBps) 32-bit, 33MHz (133MBps) PCI burst mode 3.3V or 5V interface
Power Requirements	Connector J1	+5V ±5% 3.0A max. (including termination power) +3.3V ±0.3V 600mA max. +12V ±5% 50mA max. (when programming the Flash)
Temperature Humidity	Commercial Version	operating temperature 0-70 °C (industrial grade temperature range available on request) humidity 5-90% non condensing
Software	Drivers / BIOS Download	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 & 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	CPRSN _T _I# ¹	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	BCPRSN _T _X# ¹	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

¹ (B)CPRSN_T_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# ¹	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

¹ 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		
Alias	Ordering No.	Short Description
HORN	CS5-1-HORN	3U <i>CompactPCI</i> dual Ultra160 SCSI hostadapter, 33MHz CPCI clock
HORN	CS5-2-HORN	3U <i>CompactPCI</i> dual Ultra160 SCSI hostadapter, 66MHz CPCI clock
	CR9-1-ADAPT	mechanical kit, converts front panel from 3U to 6U
	899.3.1.02	external SCSI cable assembly, VHDCI to HD-DSUB, 68-pos., length 1m, asymmetric VHDCI connector ¹
	899.3.2.02	external SCSI cable assembly, VHDCI to HD-DSUB, 68-pos., length 2m, asymmetric VHDCI connector ¹
	899.3.3.02	external SCSI cable assembly, VHDCI to HD-DSUB, 68-pos., length 3m, asymmetric VHDCI connector ¹
	899.4.010.01	external SCSI cable assembly, VHDCI to VHDCI, 68-pos., length 1m, asymmetric VHDCI connectors ¹
	899.4.020.01	same as 899.4.010.01, 2m
	899.4.030.01	same as 899.4.010.01, 3m

¹ 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. Furthermore, cables must comply with Ultra160 LVD/SE standards.



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