Technical Information

C32-FIO
Front Panel I/O Expansion Board

3rd Floor Mezzanine Module
Usage Together with CCO-CONCERT

Document No. 5388 • Ed. 2 • 2009-09

Contents

About this Manual

This manual is a short form description of the technical aspects of the C32-FIO, required for installation and system integration. It is intended for the advanced user only. The latest version of this document may be obtained from www.ekf.com/c/ccpu/c32/c32_tie.pdf.

Edition History

EKF Document	Ed.	Contents/*Changes*	Author	Date
Text # 5388 cco_tie.wpd	1	Technical Information C32-FIO English, Preliminary Edition	jj	26 January 2009
	2	Added photos	jj	10 September 2009

Related Documents

For a description of the CCO-CONCERT side card, which acts as carrier board with respect to the C32-FIO, please refer to the correspondent technical information, available by download from www.ekf.com/c/ccpu/cco/cco_tie.pdf (change path accordingly for other possible carrier boards).

Nomenclature

Signal names used herein with an attached '#' designate active low lines.

Trade Marks

Some terms used herein are property of their respective owners, e.g.

- Intel, Pentium, Celeron, Core 2 Duo, Merom, Penryn, iAMT: ® Intel
- Santa Rosa Platform, Crestline Chipset GM965: Intel
- Montevina Platform, Cantiga Chipset GS45: Intel
- ***CompactPCI®*** : ® PICMG
- Windows XP, Windows Vista: ® Microsoft
- EKF, ekf system: ® EKF

EKF does not claim this list to be complete.

Legal Disclaimer - Liability Exclusion

This manual has been edited as carefully as possible. We apologize for any potential mistake. Information provided herein is designated exclusively to the proficient user (system integrator, engineer). EKF can accept no responsibility for any damage caused by the use of this manual.

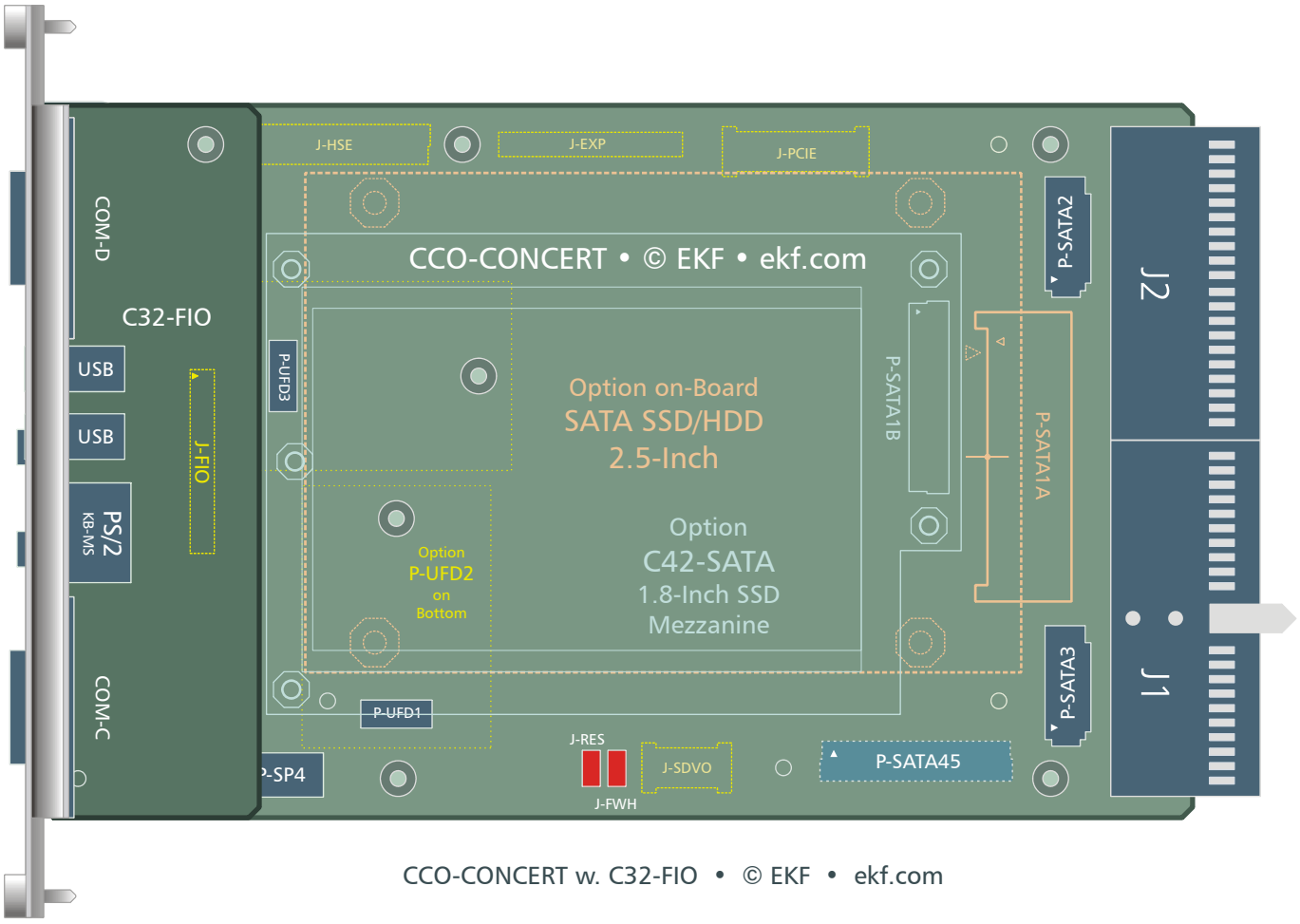
C32-FIO Features

Short Description

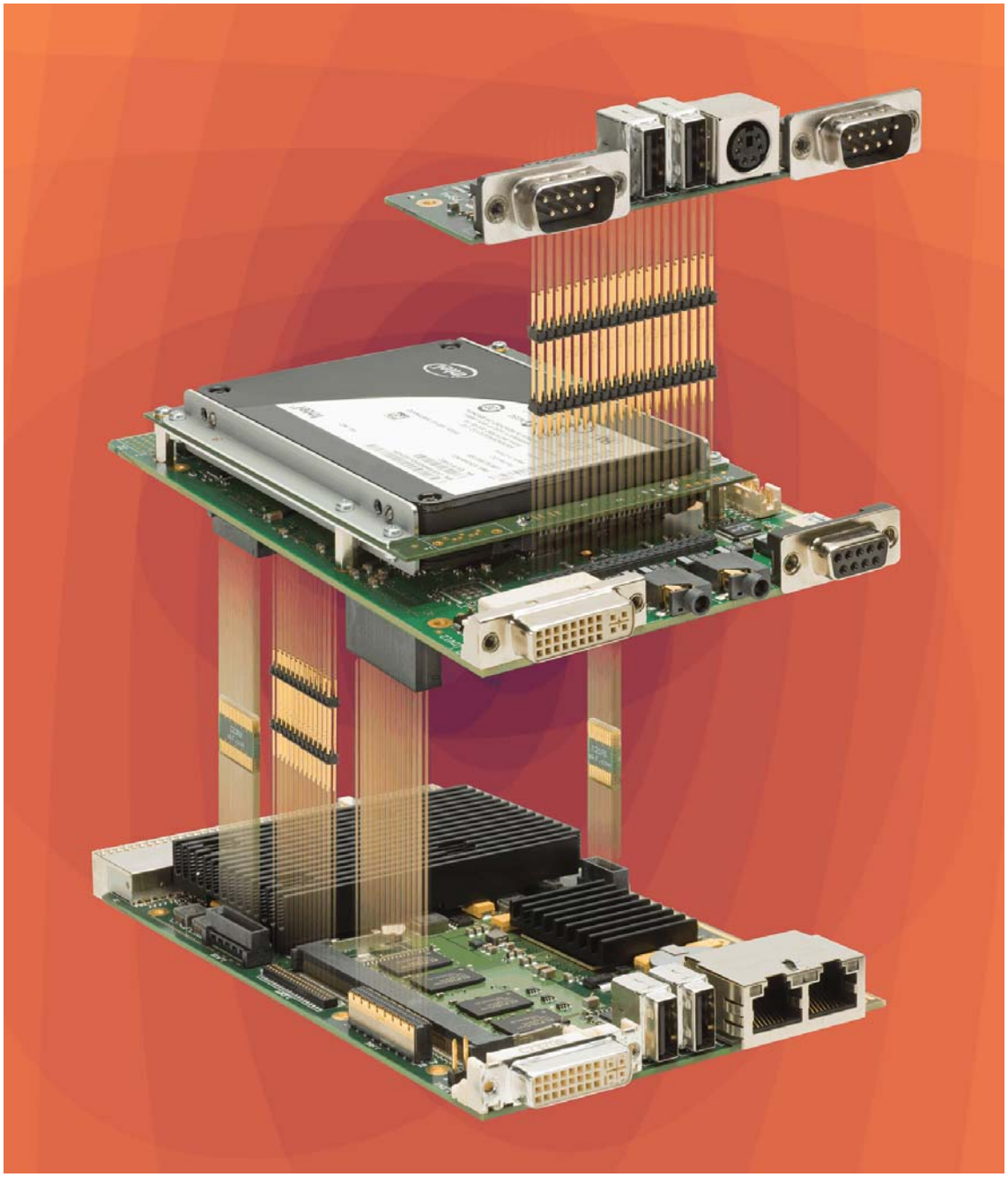
*The **C32-FIO** is a third floor mezzanine module with miscellaneous legacy front panel I/O, residing on the CCO-CONCERT expansion side board, which in turn is mounted on a suitable EKF CompactPCI CPU card.*

The C32-FIO provides two TIA/EIA RS-232 COM port connectors, two USB receptacles, and a Mini-DIN connector, shared for classic PS/2 style keyboard and mouse peripheral devices.

With exception of two RS-232 transceivers, the C32-FIO is basically a passive board. I/O signals are passed through the mezzanine connector J-FIO to the front panel connectors, using only some EMC filtering and ESD protection components. Typically, the C32-FIO and associated boards come as a 12HP front panel assembly (this results from 4HP for the CPU (basement), 4HP for the side card (2nd floor), and another 4HP for the C32-FIO (3rd floor).

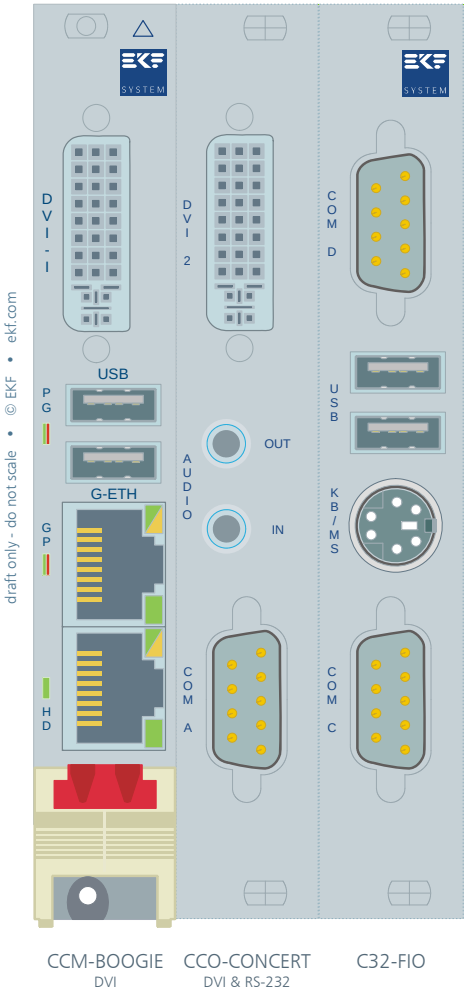


CCO-CONCERT w. C32-FIO • © EKF • ekf.com



C32-FIO on Top of the Stack

Front Panel Options



Typically, the CPU carrier board, the CCO-CONCERT side card and the C32-FIO module share a common 3U/12HP front panel. Not shown in the illustration above are variations of the CCO-CONCERT and CPU carrier (e.g. with VGA connector rather than DVI).

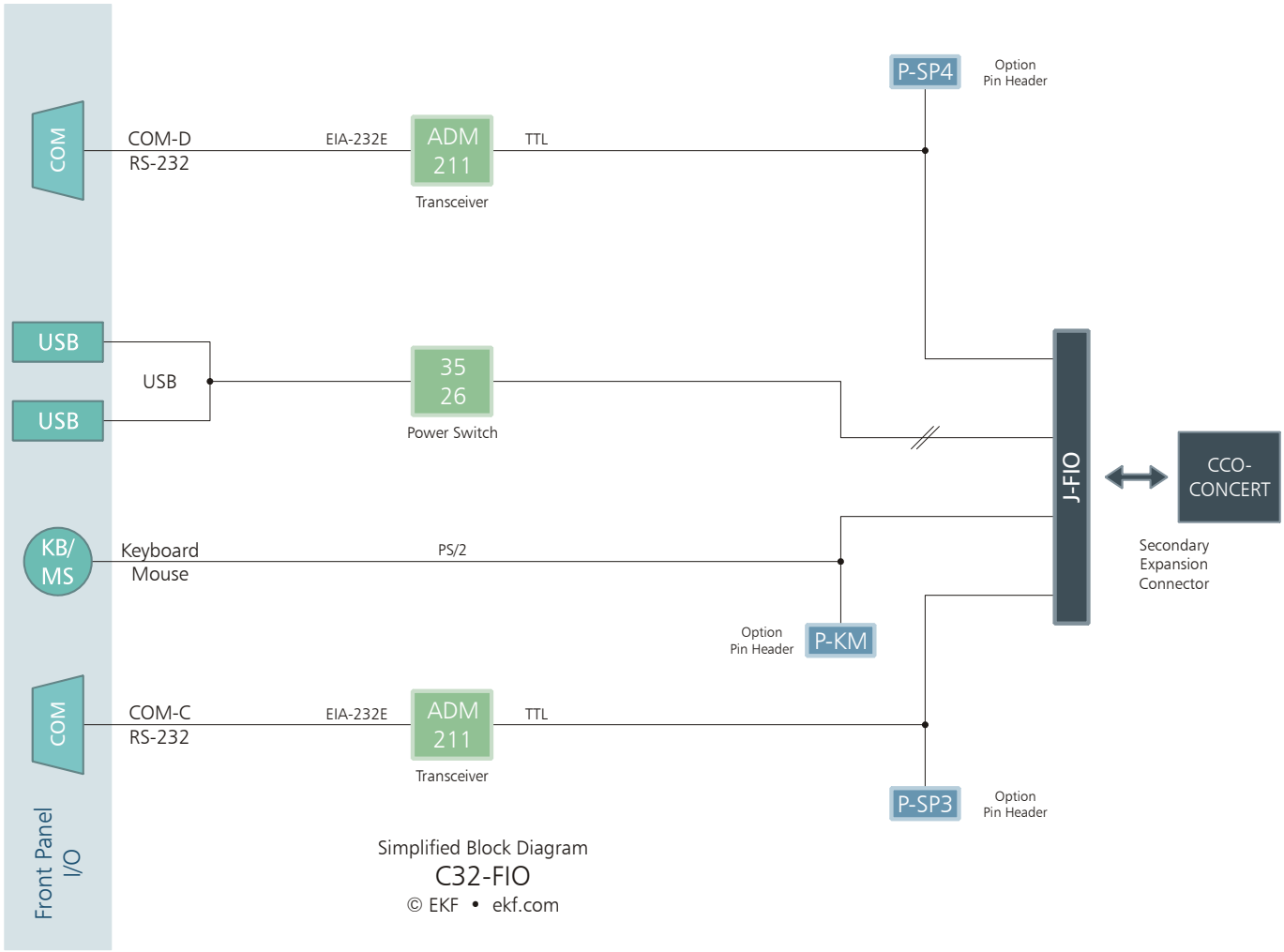
There may be reasons for further widening of the front panel (e.g. 16HP width); this would provide additional space e.g. for RS-485 serial port connectors (CUx-series PHY modules attached to C32-FIO). Please discuss your needs for an individual solution with EKF.

The dimensions of the C32-FIO allow a C20-SATA dual drive storage module to be coexistent on a CCO-CONCERT, which requires 12HP assembly height in total as well.

CCM-CCO-C32 12HP Front Panel

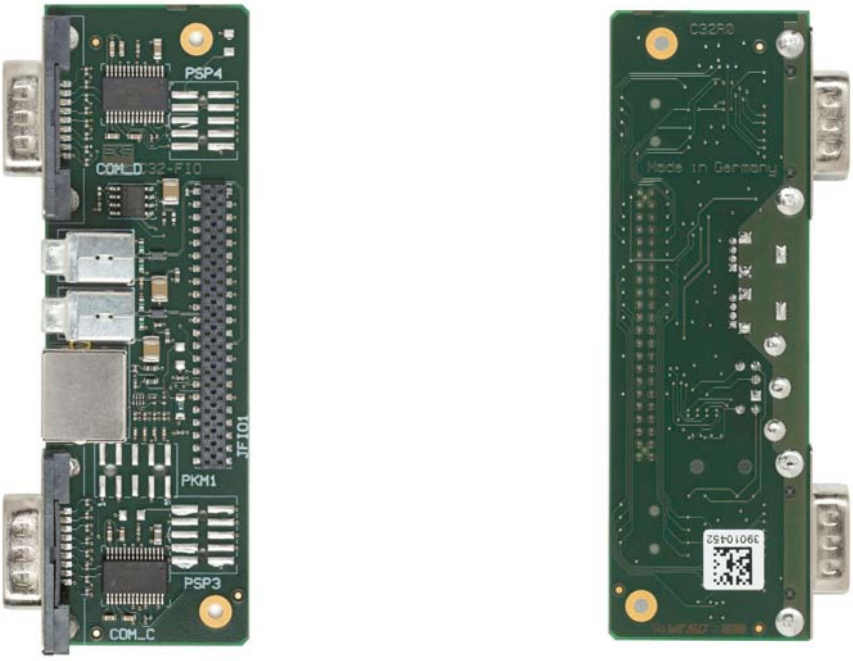
CCG-CCO-C32 12HP Front Panel

Block Diagram



Simplified Block Diagram
C32-FIO
© EKF • ekf.com

Top/Bottom View Component Assembly



CCG-RUMBA with CCO-CONCERT and C32-FIO

CCM-BOOGIE with CCO-CONCERT, C20-SATA and C32-FIO

Front Panel Connectors

COM-C [1] COM-D [1]	Male D-SUB 9-position, TIA/EIA RS-232E, ADM211 transceiver, up to 230kbps, all handshake signals available
KB/MS	PS/2 style keyboard & mouse Mini-DIN 6 connector (splitter cable required for concurrent KB/MS operation, available from EKF)
USB	2 x USB Type A receptacle

[1] Due to a primary SIO which may be present on the CPU board itself, the BIOS may assign COM port numbers different from COM3/COM4 to these interface lines on the C32-FIO, e.g. COM4/COM5.

On-Board Connectors

P-KM	Option dual row pin header 10-lead 2.00mm, for optional attachment of an cable assembly to an additional PS/2 Mini-DIN connector
P-SP3 [1] P-SP4 [1]	Option dual row pin headers 10-lead 2.00mm, provide TTL level serial COM port signals for attachment of CU-series modules when ADM211 transceiver(s) removed

Inter-Board Connector

J-FIO	Dual row socket 2.00mm, on top of the C32-FIO PCB, matching with the corresponding socket on the CCO-CONCERT side board, connected through a board stacker, comprised of: ▸ Serial (UART) ports 3-4 ▸ 2 x USB ▸ PS/2 keyboard/mouse ▸ Analog and digital audio (not in use on C32-FIO)

Installing and Replacing Components

Before You Begin

Warnings

The procedures in this chapter assume familiarity with the general terminology associated with industrial electronics and with safety practices and regulatory compliance required for using and modifying electronic equipment. Disconnect the system from its power source and from any telecommunication links, networks or modems before performing any of the procedures described in this chapter. Failure to disconnect power, or telecommunication links before you open the system or perform any procedures can result in personal injury or equipment damage. Some parts of the system can continue to operate even though the power switch is in its off state.

Caution

Electrostatic discharge (ESD) can damage components. Perform the procedures described in this chapter only at an ESD workstation. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis or board front panel. Store the board only in its original ESD protected packaging. Retain the original packaging (antistatic bag and antistatic box) in case of returning the board to EKF for repair.

Installing the Board

Warning

This procedure should be done only by qualified technical personnel. Disconnect the system from its power source before doing the procedures described here. Failure to disconnect power, or telecommunication links before you open the system or perform any procedures can result in personal injury or equipment damage.

Typically you will perform the following steps:

- Switch off the system, remove the AC power cord
- Attach your antistatic wrist strap to a metallic part of the system 
- Remove the board assembly packaging, be sure to touch the board only at the front panel
- Identify the related CompactPCI slot (peripheral slot for I/O boards, system slot for CPU boards, with the system slot typically most right or most left to the backplane)
- Insert card carefully (be sure not to damage components mounted on the bottom side of the board by scratching neighboured front panels)
- A card with onboard connectors requires attachment of associated cabling now
- Lock the ejector lever, fix screws at the front panel (top/bottom)
- Retain original packaging in case of return

Removing the Board

Warning

This procedure should be done only by qualified technical personnel. Disconnect the system from its power source before doing the procedures described here. Failure to disconnect power, or telecommunication links before you open the system or perform any procedures can result in personal injury or equipment damage.

Typically you will perform the following steps:

- Switch off the system, remove the AC power cord
- Attach your antistatic wrist strap to a metallic part of the system
- Identify the board, be sure to touch the board only at the front panel
- Unfasten any front panel screws (top/bottom), unlock the ejector lever
- Remove any onboard cabling assembly
- Activate the ejector lever
- Remove the card assembly carefully (be sure not to damage components mounted on the bottom side of the board by scratching neighboured front panels)
- Store board in the original packaging, do not touch any components, hold the board at the front panel only

Warning

Do not expose the card to fire. Battery cells and other components could explode and cause personal injury.

EMC Recommendations

CE

In order to comply with the CE regulations for EMC, it is mandatory to observe the following rules:

- The chassis or rack including other boards in use must comply entirely with CE
- Close all board slots not in use with a blind front panel
- Front panels must be fastened by built-in screws
- Cover any unused front panel mounted connector with a shielding cap
- External communications cable assemblies must be shielded (shield connected only at one end of the cable)
- Use ferrite beads for cabling wherever appropriate
- Some connectors may require additional isolating parts

Reccomended Accessories

Blind CPCI Front Panels	EKF Elektronik	Widths currently available (1HP=5.08mm): with handle 4HP/8HP without handle 2HP/4HP/8HP/10HP/12HP
Ferrit Bead Filters	ARP Datacom, 63115 Dietzenbach	Ordering No. 102 820 (cable diameter 6.5mm) 102 821 (cable diameter 10.0mm) 102 822 (cable diameter 13.0mm)
Metal Shielding Caps	Conec-Polytronic, 59557 Lippstadt	Ordering No. CDFA 09 165 X 13129 X (DB9) CDSFA 15 165 X 12979 X (DB15) CDSFA 25 165 X 12989 X (DB25)

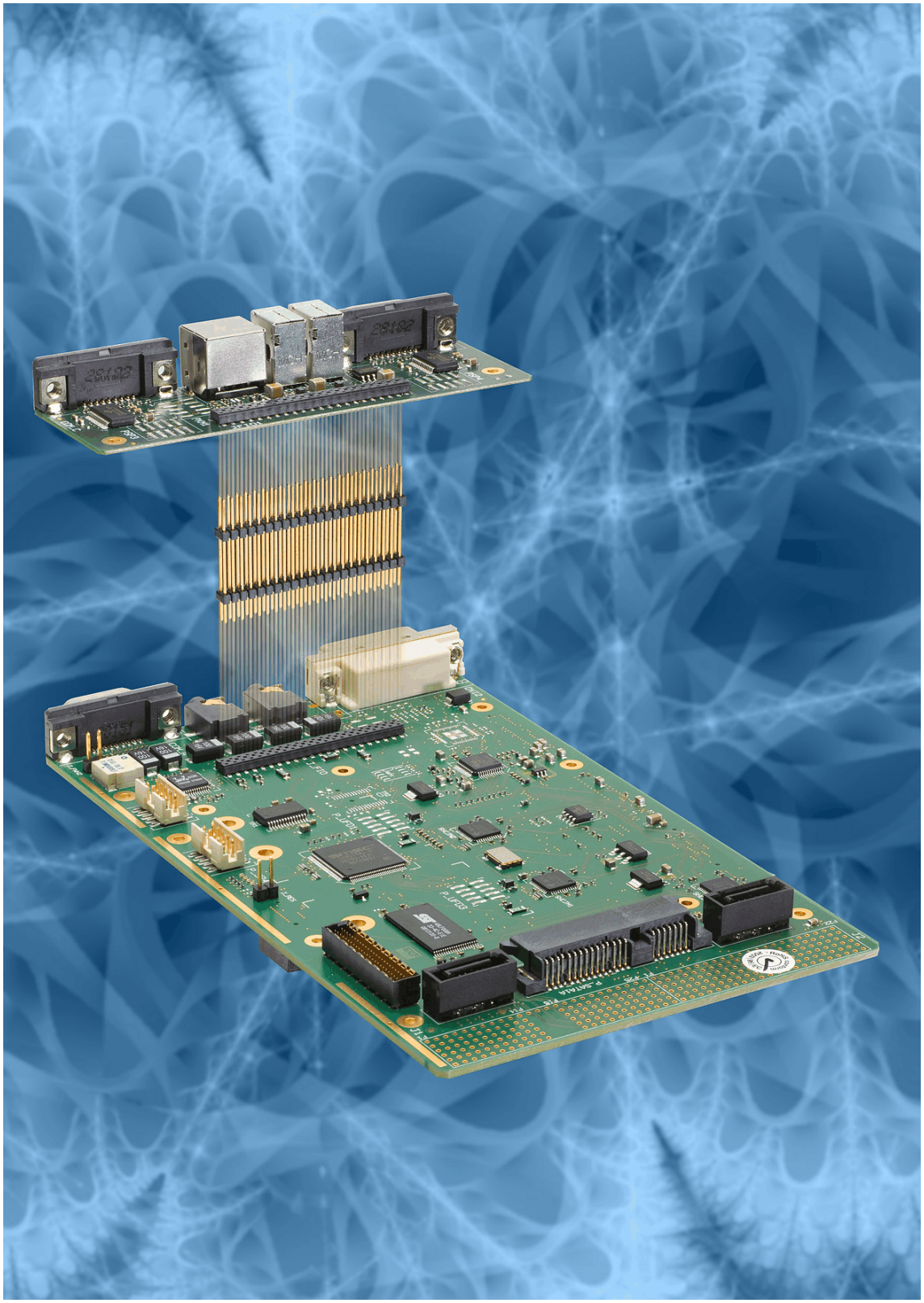
Technical Reference - Connectors

Caution

Some of the connectors may provide operating voltage (e.g. +12V, +5V and +3.3V) to devices inside the system chassis, such as internal peripherals. Not all of these connectors are overcurrent protected. Do not use these connectors for powering devices external to the computer chassis. A fault in the load presented by the external devices could cause damage to the board, the interconnecting cable and the external devices themselves.

Please Note

The C32-FIO mezzanine module may be equipped with several on-board connectors for system internal usage. Not all of these connectors may be present on a particular board. Be sure to specify your individual needs when ordering the C32-FIO board. Characteristic features and the pin assignments of each connector are described on the following pages (connector designation in alphabetical order within the groups 'front panel connectors', 'on-board connectors', and 'inter-board connectors').

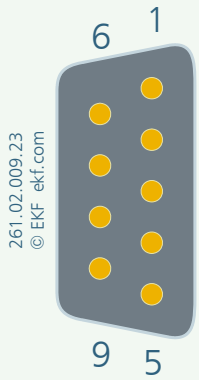


Front Panel Connectors

COM-C/COM-D Serial Port Connectors

The secondary Super-I/O (SIO) on the CCO-CONCERT provides four asynchronous serial interfaces, two of them available from the CCO-CONCERT front panel (EIA/TIA 232). The other two (TTL-level) can be used across J-FIO on the C32-FIO mezzanine board, which also provides two RS-232 transceivers.

Due to another (primary) SIO typically available on the CPU host board, the serial interfaces are not necessarily dedicated to the COM-1/COM-4 ports of a typical PC. Verify or modify the accompanying CPU BIOS settings for mapping of physical asynchronous serial I/O ports to the logical COM port order. Being ignorant of the actual port mapping, the serial port front panel connectors are marked neutrally as COM-A COM-B on the CCO-CONCERT, and COM-C COM-D on the C32-FIO.



COM-C/D RS-232 Male D-Sub 9 261.02.009.23			
		1	DCD3(4)
DSR3(4)	6		
		2	RXD3(4)
RTS3(4)	7		
		3	TXD3(4)
CTS3(4)	8		
		4	DTR3(4)
RI3(4)	9		
		5	GND

The on-board ESD protected RS-232E transceivers on the C32-FIO will allow a bit rate of up to 230kbps.

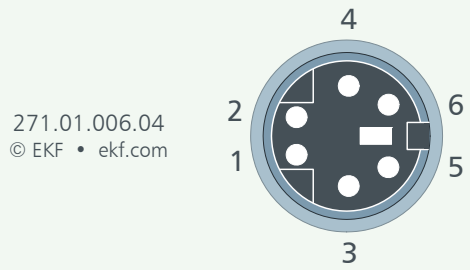
As an option, the serial ports are also available across the on-board headers P-SP3 and P-SP4 for attachment of EKF CU-series PHY modules. In order to avoid signal interference, the on-board ADM211E serial transceivers must be disabled or not stuffed, for alternate signal usage by a CU-series module.


DVI 1
DVI 2
COM D
USB
USB
OUT
AUDIO
IN
KB/MS
ETH
GP
HD
COM A
COM C


DVI 2
COM D
USB
USB
OUT
AUDIO
IN
KB/MS
ETH
GP
COM A
COM C
Intel

KB/MS

The PS/2 Mini-DIN connector incorporates both inputs, keyboard and mouse. This method allows solely attachment of a PS/2 keyboard, or usage of a keyboard and a mouse by means of an additional splitter cable (available as accessory to notebook computers or from EKF).

PS/2 KB/MS Mini-Din 6-Position		
	1	DAT KB
	2	*DAT MS 2)*
	3	GND
	4	5V 1)
	5	CLK KB
	6	*CLK MS 2)*

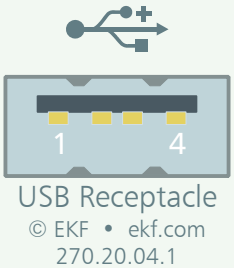
1) Fused by PolySwitch
2) Splitter cable required for attachment of both keyboard and mouse (EKF 280.7.400)

Please note: When using the splitter cable for simultaneous attachment of keyboard and mouse, the mouse connector must be plugged onto the receptacle marked as keyboard, and vice versa (this is true for the splitter cable part no. 280.7.400 by EKF).

As an option, the PS/2 ports are also available across the on-board header P-KM for custom specific usage. In order to avoid signal interference, do not attach devices to both, the front panel Mini-DIN connector and P-KM concurrently.

USB

The host CPU board is equipped with an ICHx (Input/Output Controller Hub), which incorporates a number of USB 1.1/2.0 compliant ports. Two of the USB interfaces are passed through the CCO-CONCERT side card and routed to the C32-FIO mezzanine companion board across the expansion port connector J-FIO, to the USB front panel receptacles. The USB power lines are individually protected from a short circuit situation by a dual electronic switch.

Dual USB Receptacles 270.20.04.1		
	1	+5V_USB 0.5A 1)
	2	DATA-
	3	DATA+
	4	GND

1) Electronic Power Switch

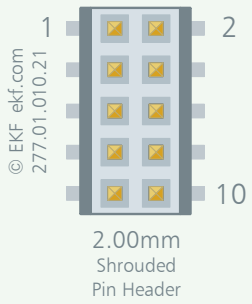
On-Board Connectors

As an option, the C32-FIO can be equipped with several on-board connectors. Assembly of these connectors is highly custom specific. Discuss your needs with EKF before ordering, so that the optimum board configuration for your application will be chosen.

P-KM

Both, PS/2 keyboard and mouse signals, are wired so to the Mini-DIN front panel jack, that either a keyboard may be solely connected, or keyboard and mouse concurrently, by means of an external splitter cable (available from EKF). As an option, the pin header P-KM can be used for attachment of an additional Mini-DIN connector, or for system internal usage.

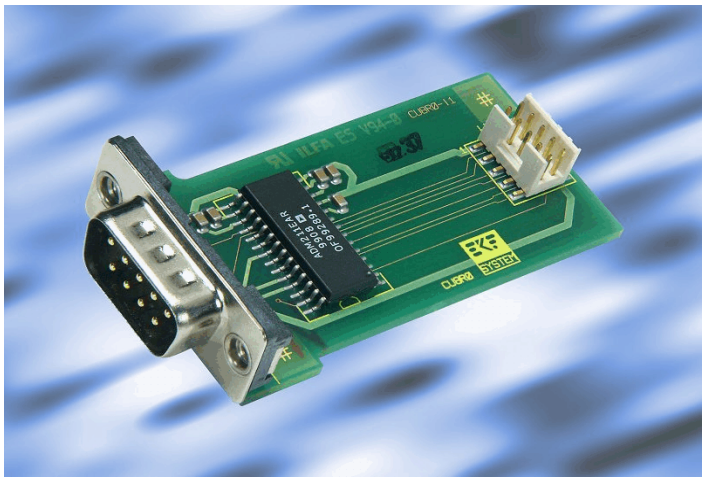
P-KM PS/2 Keyboard Mouse 2.00mm Pin Header 2 x 5 (277.01.010.21)



+5V [1]	1	2	MS CLK
GND	3	4	MS DAT
NC	5	6	NC
+5V [1]	7	8	KB CLK
GND	9	10	KB DAT

P-SP3 P-SP4

The carrier board SIO (Super I/O controller) provides up to four serial interfaces (UART, DOS COM ports). While the serial ports SP1 and SP2 are already assigned to the carrier board front panel RS-232 COM port connectors, another two UARTs are available in addition on the C32-FIO from the optional pin headers P-SP3 and P-SP4 (TTL-level on all signals). P-SP3 and P-SP4 are suitable for attachment of EKF CU-series PHY modules via a micro ribbon flat cable assembly. A PHY module is a transceiver from TTL level signals to a specific symmetric or asymmetric interface standard, e.g. EIA-485 or RS-232E, with or w/o galvanic isolation. Please contact sales@ekf.de for availability of different CU-series modules (inquiries for custom specific PHY or transition modules welcome). Also custom specific front panel design can be done.

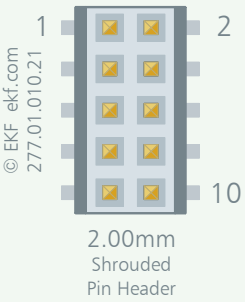


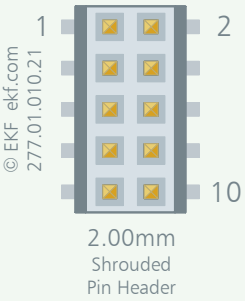
CU-Series PHY Module

Due to another (primary) SIO typically available on the CCM-BOOGIE host board, the serial interfaces are not necessarily assigned to COM-1/COM-4 by the operating system. Verify or modify the accompanying CCM-BOOGIE or other CPU carrier board BIOS settings for mapping of physical asynchronous serial I/O ports to the logical COM port order.

Alternatively the connectors P-SP3/P-SP4 can be used as 5V tolerant programmable I/O (GPIO). Details can be derived from the SCH3114 Super I/O controller data sheet (www.smsc.com).

P-SP3 and/or P-SP4 are provided as an option only, since these UART channels are typically assigned to the front panel D-SUB connectors COM-C and COM-D (via ADM211 RS-232 transceivers). In order to avoid signal interference, attaching a transceiver module or other circuitry to P-SP3/4 requires the particular on-board ADM211 transceiver(s) to be disabled or not populated.

P-SP3 TTL-Level Serial I/O or GPIO 2.00mm Pin Header 2 x 5 (277.01.010.21)				
 2.00mm Shrouded Pin Header	+5V_SP3 0.5A [1]	1	2	DSR3# / GP12
	RI3# / GP13	3	4	RXD3 / GP10
	TXD3 / GP11	5	6	DTR3# / GP15
	RTS3# / GP17	7	8	CTS3# / GP16
	DCD3# / GP12	9	10	GND

P-SP4 TTL-Level Serial I/O or GPIO 2.00mm Pin Header 2 x 5 (277.01.010.21)				
 2.00mm Shrouded Pin Header	+5V_SP4 0.5A [1]	1	2	DSR4# / GP66
	RI4# / GP31	3	4	RXD4 / GP64
	TXD4 / GP65	5	6	DTR4# / GP34
	RTS4# / GP67	7	8	CTS4# / GP62
	DCD4# / GP63	9	10	GND

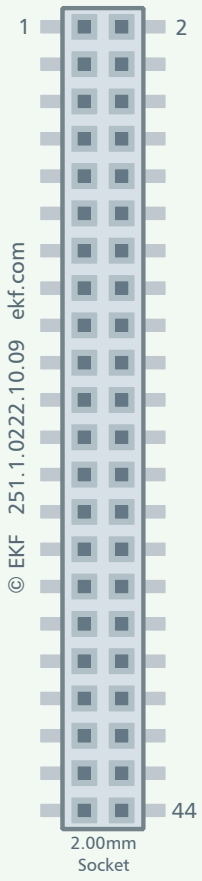
[1] short circuit protection by a PolySwitch resettable fuse, voltage derived from +5V_CR carrier board switched power well

Inter-Board Connector

The C32-FIO is connected with the carrier board via J-FIO, a 2x22 position pass-through socket, and a board stacker (spacer pin array) in addition.

As the C32-FIO comes typically mounted as a 12HP unit together with the CCM-BOOGIE and the CCO-CONCERT (or other carrier board), there is normally no need for the user to get access to the inter-board connector. It is described here as a reference only and for better understanding of the C32-FIO.

J-FIO



J-FIO Miscellaneous Signals Secondary Expansion Board Interface (Audio - COM - PS/2 - USB) Part #251.1.0222.10.09 2.00mm Socket 2 x 22			
GND	1	2	+3.3V_CR *
SP4_RI#	3	4	SP4_DSR#
SP4_TXD	5	6	SP4_RXD
SP4_RTS#	7	8	SP4_DTR#
SP4_DCD#	9	10	SP4_CTS#
GND	11	12	+3.3V_CR *
SP3_RI#	13	14	SP3_DSR#
SP3_TXD	15	16	SP3_RXD
SP3_RTS#	17	18	SP3_DTR#
SP3_DCD#	19	20	SP3_CTS#
GND	21	22	+5V_CR *
USB_P2N [1]	23	24	USB_P1N [2]
USB_P2P [1]	25	26	USB_P1P [2]
USB_OC# [3]	27	28	GND
PS/2 Clock Keyboard	29	30	PS/2 Clock Mouse
PS/2 Data Keyboard	31	32	PS/2 Data Mouse
GND	33	34	+5V_A **
S/PDIF _IN	35	36	*S/PDIF _OUT*
CD_L	37	38	*CD_ R*
LINE1_L	39	40	*MIC1_L*
AGND	41	42	*CD_GND*
LINE1_R	43	44	*MIC1_R*

[1] connects to USB Port 6 on CCM-BOOGIE or CCG-RUMBA
[2] connects to USB Port 5 on CCM-BOOGIE or CCG-RUMBA
[3] connects to USB_OC56#on CCM-BOOGIE or CCG-RUMBA

* switched power supply lines from CPU carrier board according to Sx state
** always on power supply line from CPU carrier board

Audio Signals not in use on C32-FIO

Schematics

Complete circuit diagrams for this product are available for customers on request. Signing of a non-disclosure agreement would be needed. Please contact sales@ekf.de for details.

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