



Technical Information

CCJ-RHYTHM

CompactPCI[®] Express System Slot Controller
Mezzanine I/O Companion Board

Document No. 4687 • Edition 9

2009-11



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About this Manual

This manual is a short form description of the technical aspects of the CCJ-RHYTHM, required for installation and system integration. It is intended for the very advanced user only.

Edition History

EKF Document	Ed.	Contents/ <i>Changes</i>	Author	Date
Text # 4687 ccj_tie.wpd	1	Technical Information CCJ-RHYTHM English, Preliminary Edition	jj	12 April 2007
	2	Added assembly drawing & image Schroff hybrid backplane	jj	3 May 2007
	3	Added mechanical drawing (position of inter- board connectors)	jj	16 July 2007
	4	Added P-UFD connector assignment	jj	6 September 2007
	5	Added illustration assembly drawing (top)	jj	3 December 2007
	6	Updated COM-A/B connector assignment	hg	19 May 2008
	7	Added photos CCG/CCJ & backplane	jj	19 June 2008
	8	'Power Distribution' described more in detail	jj	17 December 2008
	9	Added photos of CR4 CPCI Express system	jj	20 November 2009

Related Documents

For a description of the CCG-RUMBA CPU card, which acts as PCIe host and carrier board with respect to the CCJ-RHYTHM, please refer to the correspondent CPU user guide, available by download from www.ekf.com/c/ccpu/ccg/ccg_e.html.

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, Pentium M, Core 2 Duo, Merom, Penryn, iAMT: ® Intel
- ▶ Santa Rosa Platform, Crestline Chipset GM965, Matanzas CRB: Intel
- ▶ **CompactPCI® Express**: ® PICMG
- ▶ Windows 2000, 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.

Standards

Specifications/Standards	
CompactPCI Express (CPCIe)	PICMG EXP.0 R1.0 (www.picmg.org)
PCI Local Bus	PCI 2.2/2.3/3.0 Standards (PCI SIG www.pcisig.com)
USB	Universal Serial Bus Revision 2.0 specification (www.usb.org/developers)
PCI Express	PCIe Base Spec. 1.1 and other (PCI SIG www.pcisig.com)
1394 FireWire	IEEE 1394a-2000 (standards.ieee.org)
CompactFlash	CF+ and CompactFlash Specification Revision 3.0 (www.compactflash.org)
DVI	Digital Visual Interface Rev. 1.0 (Digital Display Working Group www.ddwg.org)
TPM	Trusted Platform Module 1.2 (https://www.trustedcomputinggroup.org)

CCJ-RHYTHM Features

Feature Summary	
Form Factor	Single size Eurocard (160x100mm ²), needs 4HP (20.3mm) additional mounting space, typically delivered as a ready to use assembly unit including the CCG-RUMBA providing a common 8HP front panel shared with the CPU board, mounting position right (on top of CPU board)
CPCIe Function	CompactPCI Express System Slot module, 4-Link configuration pin assignments
PCIe Switch	6-Port 24-lanes PCI Express packet switch <ul style="list-style-type: none"> ▶ 1 Port (1 link x 4 lanes) to CCG-RUMBA PCIe host (ICH8M-E) ▶ 4 Ports (4 links x 4 lanes) to CompactPCI Express backplane XJ2/XJ3 connectors ▶ 1 Lane for on-board usage (IEEE 1394a)
LPC Super-I/O ³ (SIO2)	SCH3114, parallel port, 4 serial ports, PS/2 keyboard & mouse port, LPC interface
Firmware Hub ³ (FWH2)	82802 generic device, 8Mbit Flash, LPC interface, can be switched as secondary or primary (boot code) FWH
1394a FireWire ³	XIO2200A, PCIe to 1394a bridge, dual cable port 400Mbps (100/200/400)
Serial Transceivers ³	Up to 2 x ADM211 or equivalent, EIA/TIA-232E (RS-232E) 230kbps max.
DVI ³	SDVO to DVI (Digital Visual Interface) Panellink/TMDS transmitter, dual screen operation (together with the carrier boards primary DVI video output), DVI is a stuffing option (front panel connector replaces 1 x COM and 1 x USB)
TPM ³	Option Trusted Platform Module cryptographic chip according to TPM 1.2
Front Panel Connectors	<ul style="list-style-type: none"> ▶ 2 x FireWire 1394a receptacles ▶ 2 x RS-232E male D-Sub COM port connectors (1 x if DVI is provided) ▶ 1 x USB connector ▶ 1 x DVI receptacle (option, replaces 1 x COM connector)
Host I/F Connectors (to CCG-RUMBA CPU Carrier Board) ¹	<ul style="list-style-type: none"> ▶ PCI Express interface (PCIe x 4) ▶ Multifunction expansion interface (LPC, USB, SMB) ▶ IDE/PATA interface ▶ SDVO (Serial Digital Video Out) port C graphics interface
On-Board I/O Connectors ¹	<ul style="list-style-type: none"> ▶ IDE/ATA 40-pin header 2.54mm ▶ IDE/ATA 40-pin header 2.00mm (on-board hard disk 2.5-inch) ▶ Socket for C10-CFA CompactFlash mezzanine module or 1.8-inch hard disk module ▶ 2 x serial port TTL 2.00mm header (suitable for EKF CU-series PHY-modules) ▶ PS/2 legacy keyboard / mouse header 2.54mm ▶ Line printer (parallel port) header 2.54mm ▶ USB 10-pin headers 2.00mm either top or bottom for a low profile Solid-State Drive (SSD) module ▶ Reset
CompactPCI Express System Slot Rear Connectors ¹	<ul style="list-style-type: none"> ▶ XP1 UPM Universal Power Module connector (+12V, +5V, +3.3V) ▶ XJ2, XJ3 ADF (Advanced Differential Fabric) connectors (4x4 PCIe links/lanes) ▶ XJ4 eHM (enhanced Hard Metric) connector (GPIO)
On-Board Functions	Speaker, LEDs, SMBus EEPROM, temperature sensors

Mass Storage Options ²	<ul style="list-style-type: none"> ▶ Hard disk drive 2.5-inch optional on-board ▶ Mezzanine module with 1.8-inch hard disk drive ▶ CompactFlash mezzanine module optional on-board ▶ External PATA drive
Thermal Conditions ⁴	<ul style="list-style-type: none"> ▶ Operating temperature: 0°C ... +70°C ▶ Storage temperature: -40°C ... +85°C, max. gradient 5°C/min ▶ Humidity 5% ... 95% RH non condensing
Environmental Conditions ⁴	<ul style="list-style-type: none"> ▶ Altitude -300m ... +3000m ▶ Shock 15g 0.33ms, 6g 6ms ▶ Vibration 1g 5-2000Hz
EC Regulations	<ul style="list-style-type: none"> ▶ EN55022, EN55024, EN60950-1 (UL60950-1/IEC60950-1) ▶ 2002/95/EC (RoHS)
MTBF	tbd

¹ Not all of these connectors may be present or functional on your actual CCJ-RHYTHM board. Assembly of these connectors is highly custom specific. Discuss your needs with EKF before ordering.

² Options may be exclusive, i.e. not necessarily concurrently present. Ask EKF for special solutions if required.

³ Silicon/function may not be present on your actual CCJ-RHYTHM board. Assembly of components is highly custom specific. Discuss your needs with EKF before ordering.

⁴ Hard disk option may require decrease

Short Description

Available as a mezzanine add-on companion board to the CCG-RUMBA card, the CCJ-RHYTHM enables the CCG-RUMBA to act as a system slot CPU simultaneously for both a CompactPCI backplane, and in addition a CompactPCI Express backplane. In order to simplify system integration, suitable all-in-one (heterogeneous) backplanes are available from independent vendors, which allow insertion of classic CPCI I/O boards (left from CCG-RUMBA) as well as high speed CPCIe cards (right to CCJ-RHYTHM). The user profits from such a hybrid solution by combining low cost CPCI modules, available from numerous vendors, with the advanced features of CPCIe boards in a single system, thus providing maximum flexibility.

The CCJ-RHYTHM will be attached on top of the CPU board, and shares its front panel typically with the host carrier (8HP front panel width in total). Interconnection between the CCJ-RHYTHM I/O module and the CPU carrier board is achieved by several expansion connectors, which comprise the PCIe (PCI Express), LPC (Low Pin Count), PATA/IDE and SDVO interfaces.

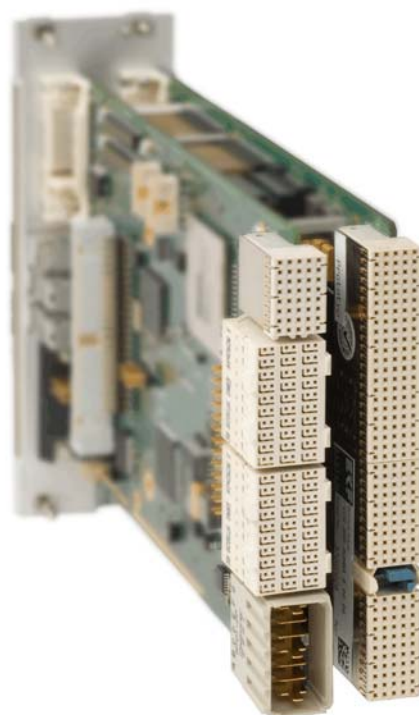
The heart of the CCJ-RHYTHM is a 6-port 24-lane PCIe packet switch. One port is used as a link to the PCIe host (which is the ICH8M-E on a CCG-RUMBA). Four ports establish the CompactPCI Express system slot interface (4-link configuration pin assignments). The remaining port is used locally by a IEEE1394 bridge.

In addition to its CPCIe system slot function, the CCJ-RHYTHM is provided with high-speed communication channels such as FireWire and USB, and common legacy I/O ports as well (COM, LPT). Optionally, a DVI connector allows for dual screen video operating mode.

As an option, the CCJ-RHYTHM is available with a rugged on-board 2.5-inch PATA hard disk (or even Flash) drive. Alternatively, either a CompactFlash card adapter, or an 1.8-inch hard disk can be accommodated, as a mezzanine module, and in addition an USB Solid-State Disk (SSD) module. Another option available is the Trusted Platform Module according to TPM 1.2 for safety critical applications.



CCG-RUMBA & CCJ-RHYTHM



Hybrid Backplane Connector Suite

The CCJ-RHYTHM communicates by means of 4 bottom mount expansion connectors with the host CPU: P-PCIE (PCI Express), P-EXP (multi-function I/F such as LPC, USB, SMB), P-IDE (PATA/IDE), and P-SDVO (Serial Digital Video).

The PCI Express interface is a single link comprised of 4 PCIe lanes, which are derived from the ICH component on the CPU carrier board. Because the CompactPCI Express specification demands 4 links (4 lanes each) on the system slot, a packet switch on the CCJ-RHYTHM is provided, as expander.

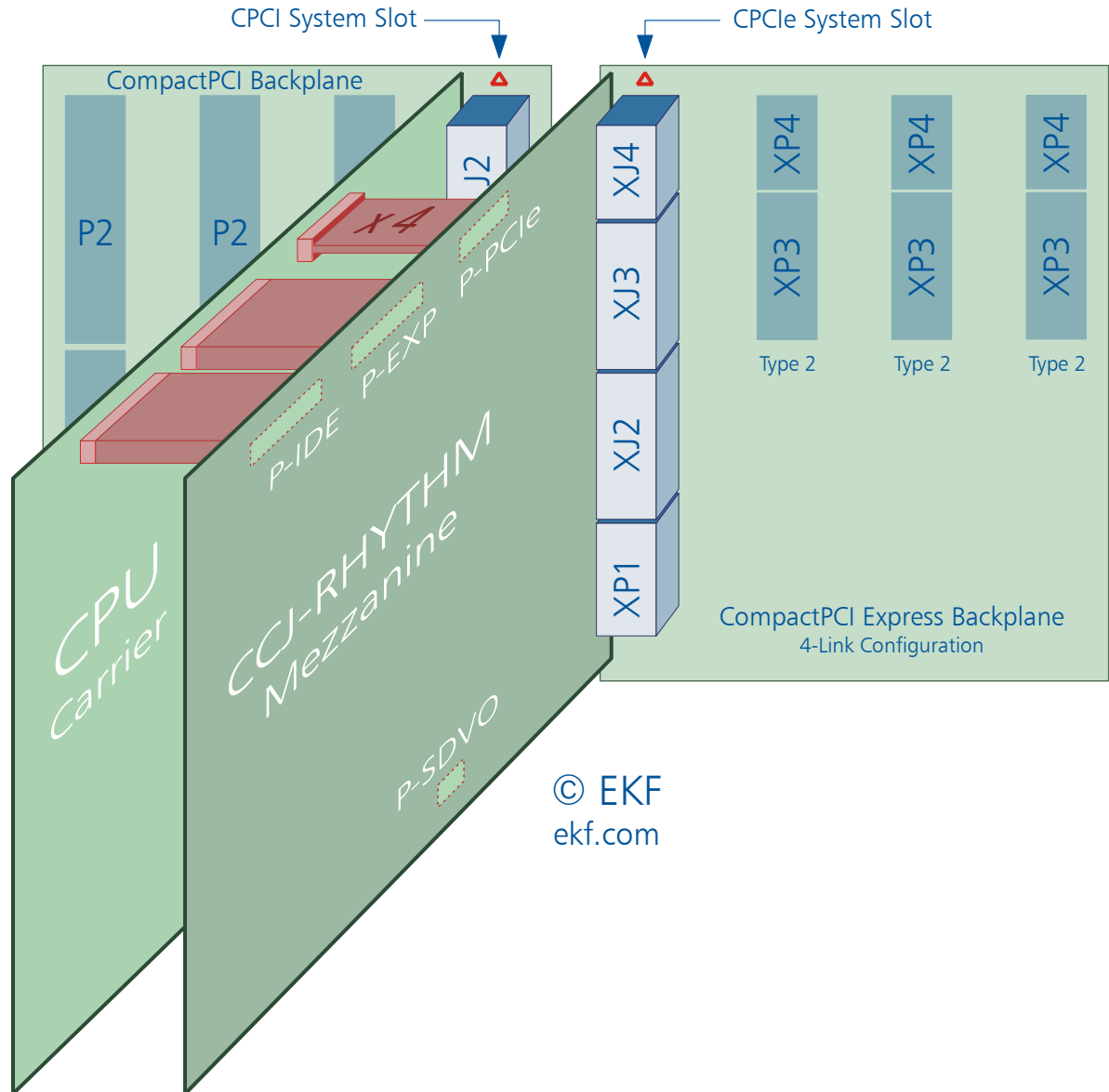
P-EXP combines several southbridge data channels: The LPC (Low Pin Count) is a multiplexed ISA bus, enabling the super-I/O (SIO) controller chip to emulate the legacy I/O interfaces; among these are the classic parallel (printer) and serial (COM) ports. Two USB lines are provided, one assigned to a front panel USB connector, the other to a pin header suitable for on-board attachment of a low profile USB Flash Disk (Solid-State Drive, SSD) module. The SMB (System Management Bus) is an enhanced I²C interface, enabling the BIOS and OS to gain access to special control functions of the PCIe switch and PCIe clock buffer.

The Parallel ATA/IDE interface is still essential for embedded applications, due to the availability of ATA CompactFlash cards and 1.8-inch hard disks with an PATA/IDE compatible I/F only. Optionally, the CCJ-RHYTHM can be equipped with either a CompactFlash mezzanine module, or a robust 2.5-inch hard disk drive, particularly suited for use in a rugged environment. A mezzanine module is also available which carries an 1.8-inch drive, as an alternative.

The SDVO interface connects to the multiplexed PEG/SDVO graphics I/F of the GMCH (northbridge) on the CPU carrier board. The SDVO-C port is used to establish a secondary PanelLink (DVI) channel on the CCJ-RHYTHM, in addition to the primary DVI connector on the CCG-RUMBA. Basically, dual screen operation mode is also possible with the CCG-RUMBA alone. Due to the VGA signals on its DVI-I connector, a digital and in addition a VGA monitor can be attached simultaneously (splitter cable required). However, if two DVI (digital) monitors are mandatory, the CCJ-RHYTHM can be optionally ordered with a secondary PanelLink transmitter and DVI front panel connector.

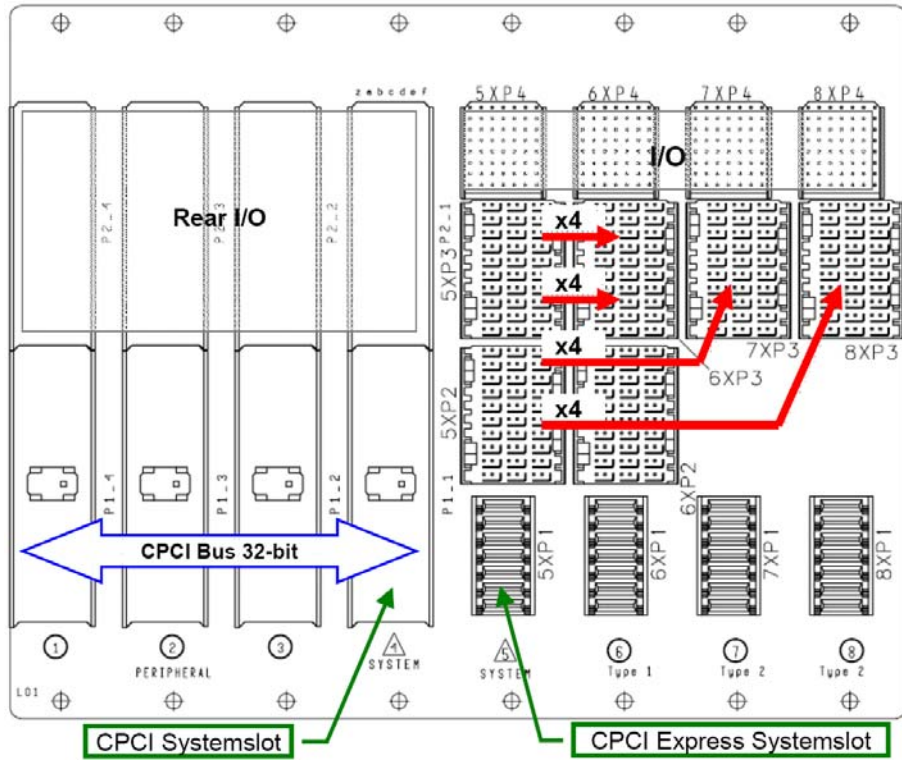
The CCJ-RHYTHM fits on the top side of the CCG-RUMBA CPU board, which is on the right side when looking at the front panel of the boards while inserted into a CPCI/CPCIe rack. A suitable hybrid (all-in-one) backplane provides its CPCI slots beginning with the CPU carrier board (CPCI system slot) from mid to left, and the CPCIe slots starting from the CCJ-RHYTHM (CPCIe system slot) to the right.

The Trusted Platform Module is an optionally available cryptographic chip, which provides a comprehensive hardware and software solution for safer computing. Conforming to the TPM1.2 standard of the TCG, the TPM is comprised of a 16-bit security controller and additional hardware e.g. to generate 2048 bit RSA keys and true random numbers, thus meeting the highest industry rating for digital security.

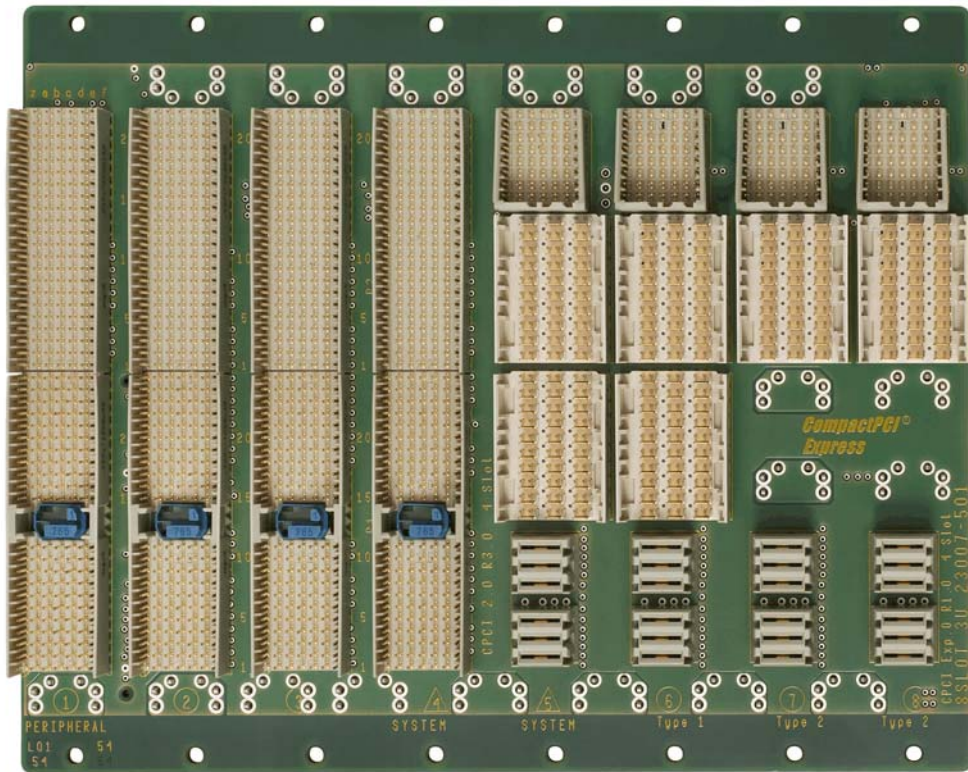


For system integration, either two individual passive backplanes, CompactPCI and in addition CompactPCI Express can be used, or a single passive hybrid backplane, providing both slots for CPCI and CPCIe. A suitable hybrid backplane can be ordered e.g. from Schroff (23007-501). The maximum number of CPCI slots (passive backplane, w/o PCI bridge) is 8 - 7 peripheral slots + 1 system slot. The maximum number of CPCIe slots (passive backplane, no PCIe packet switch) is 5 - 1 system slot + 4 Type 2 peripheral slots.

Do not confuse the term 'hybrid backplane', which is somewhat arbitrary and means a backplane with separated (independent) areas for CPCI and CPCIe, with the 'Hybrid Peripheral Slot' as defined by the CompactPCI Express specification in chapter 3.3.4.

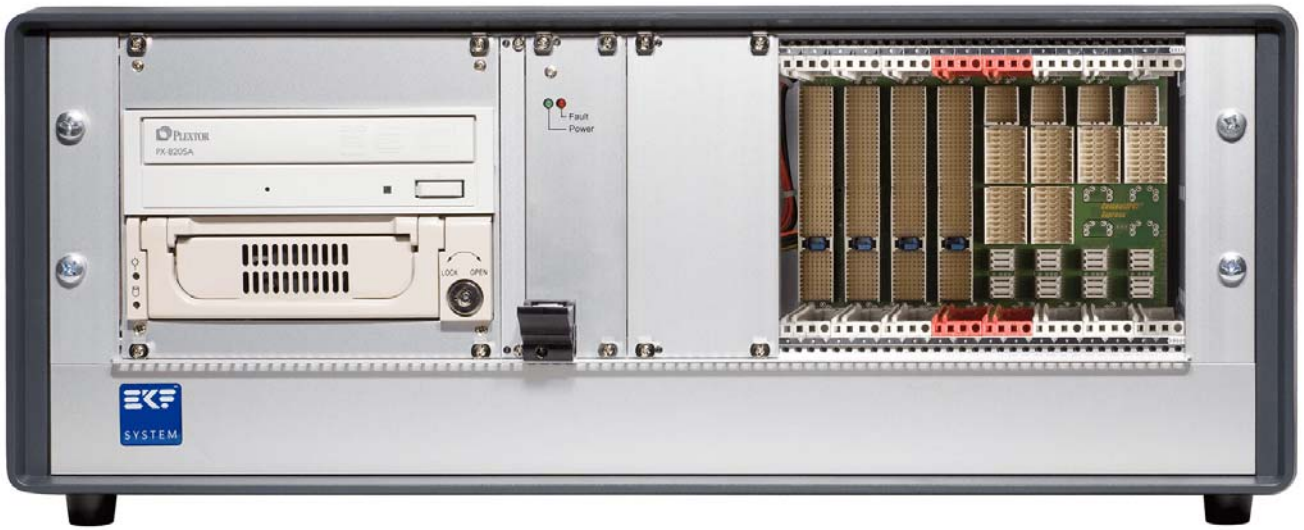


Schroff Hybrid-Backplane 23007-501

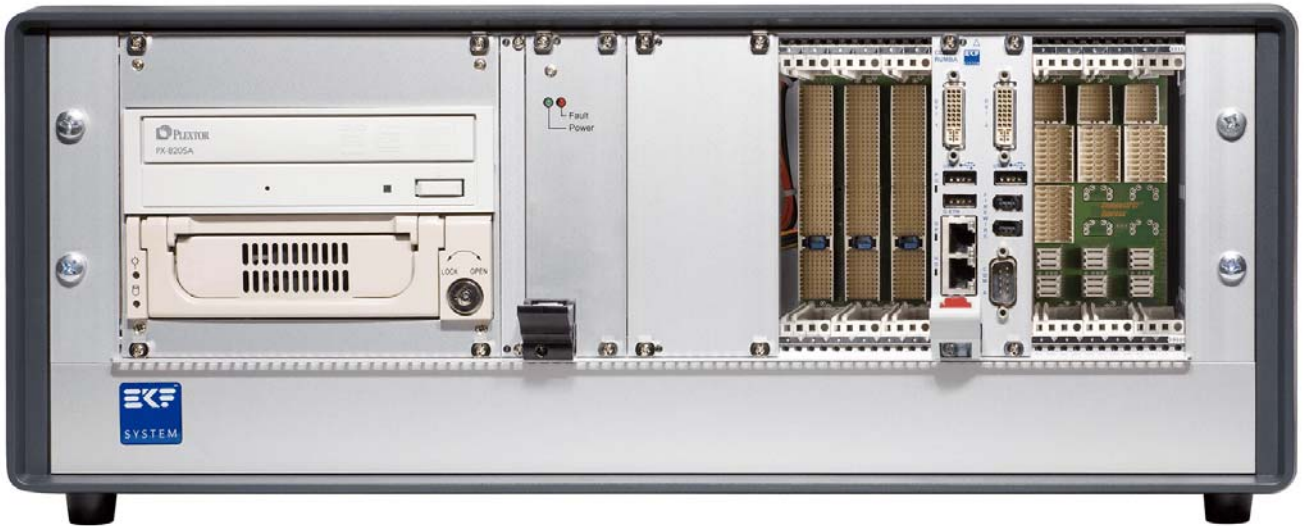


Left: Compact PCI Zone

Right: CPCI Express Zone

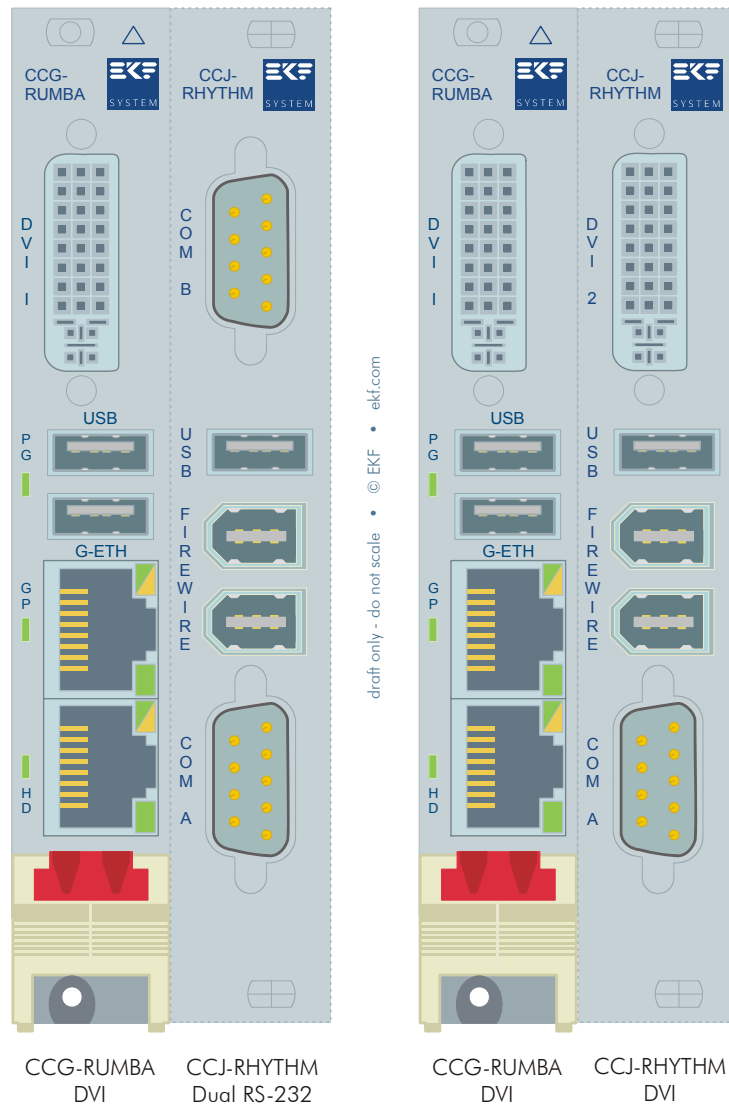


CR4-46-RACK CompactPCI Express System



CPU Board and CCJ-RHYTHM Side Card in a CR4-46-RACK CPCI Express System

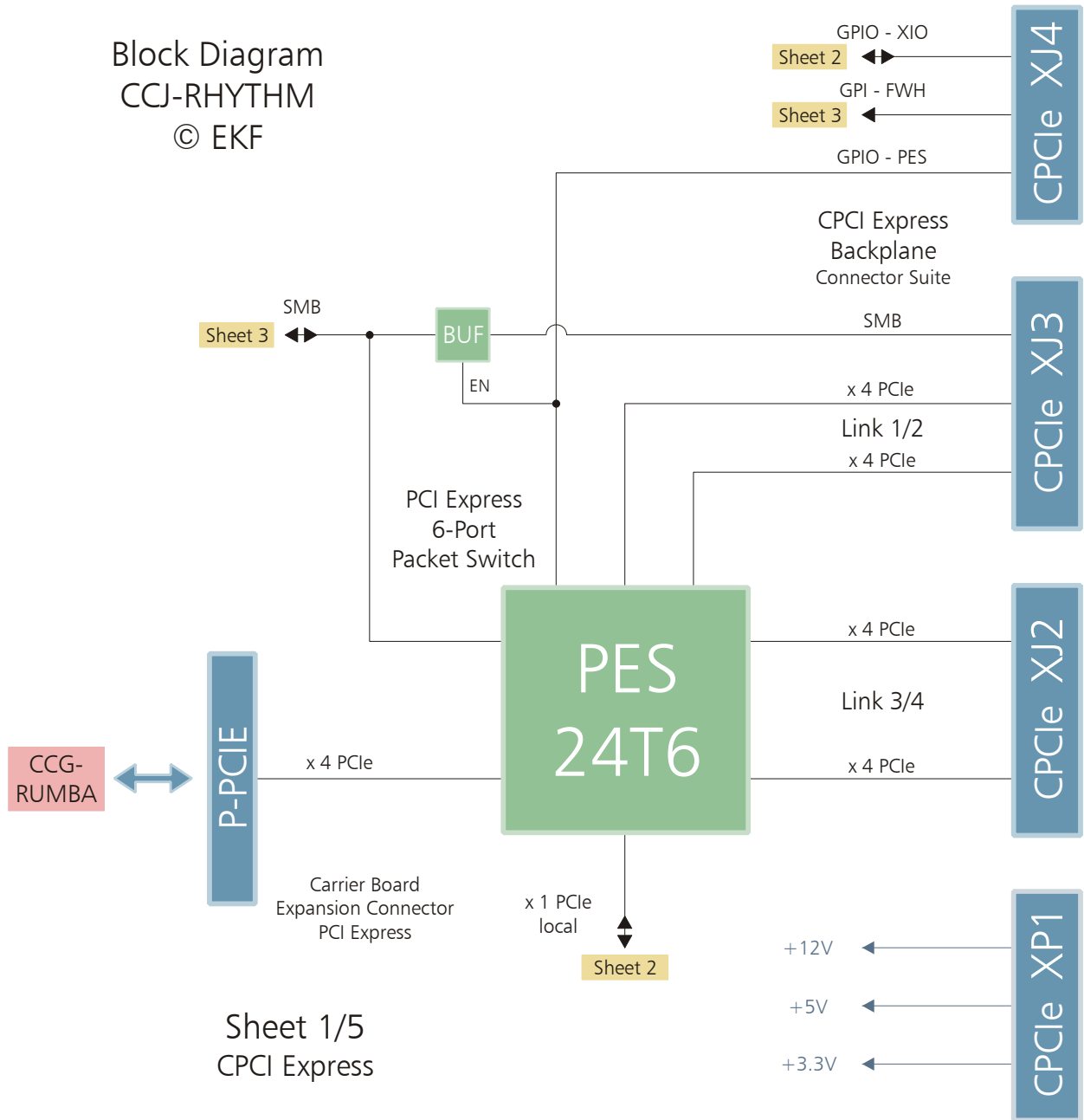
Front Panel Variations

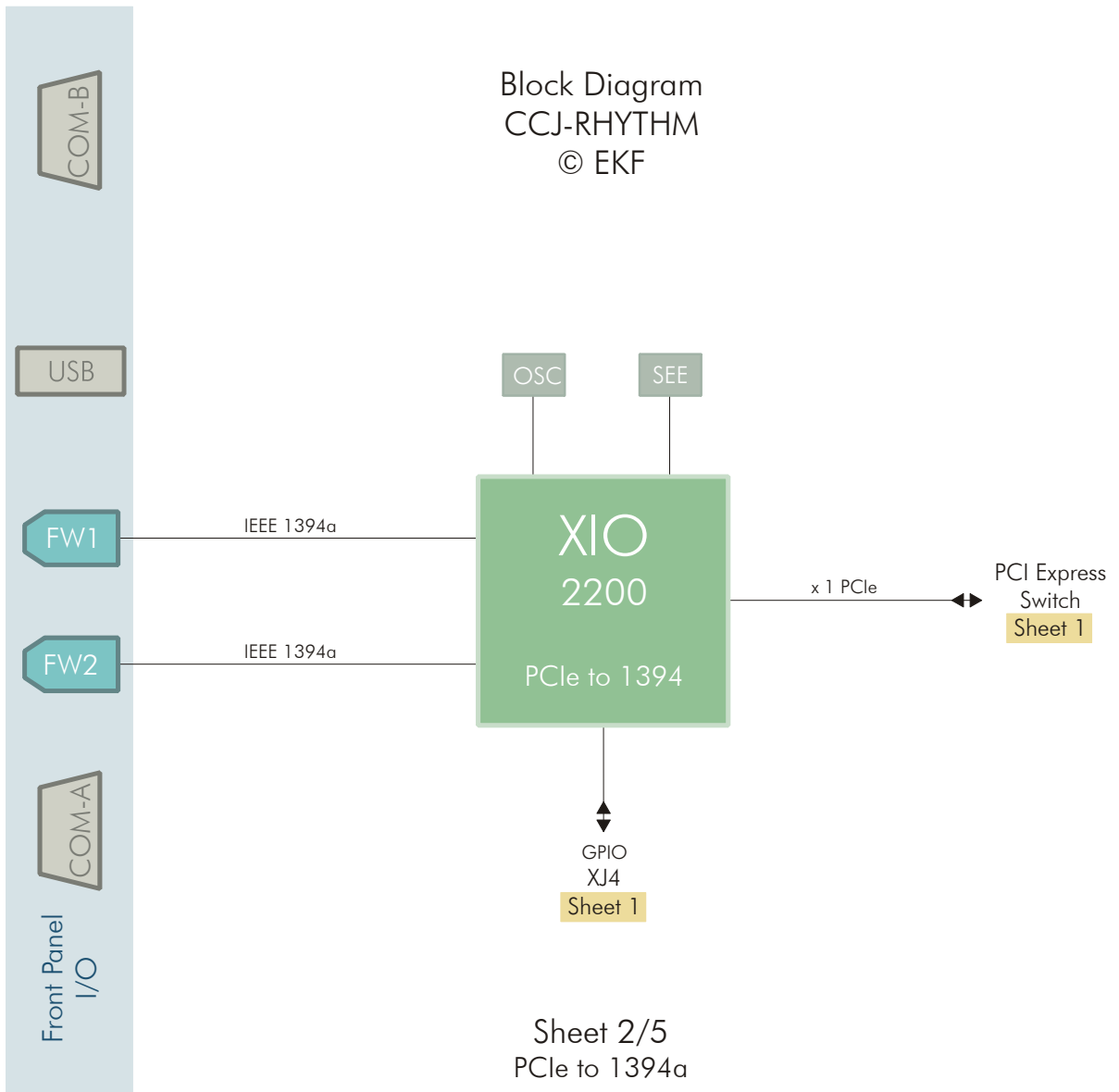


Typically the CCG-RUMBA carrier board CPU and the CCJ-RHYTHM share a common 3U/8HP front panel. The CCJ-RHYTHM is available in two flavours, either with dual COM port connectors, and dual USB receptacles, or with a DVI output, which replaces one USB and one COM port connector. Not shown in the illustration above are variations of the CCG-RUMBA (e.g. with VGA connector rather than DVI).

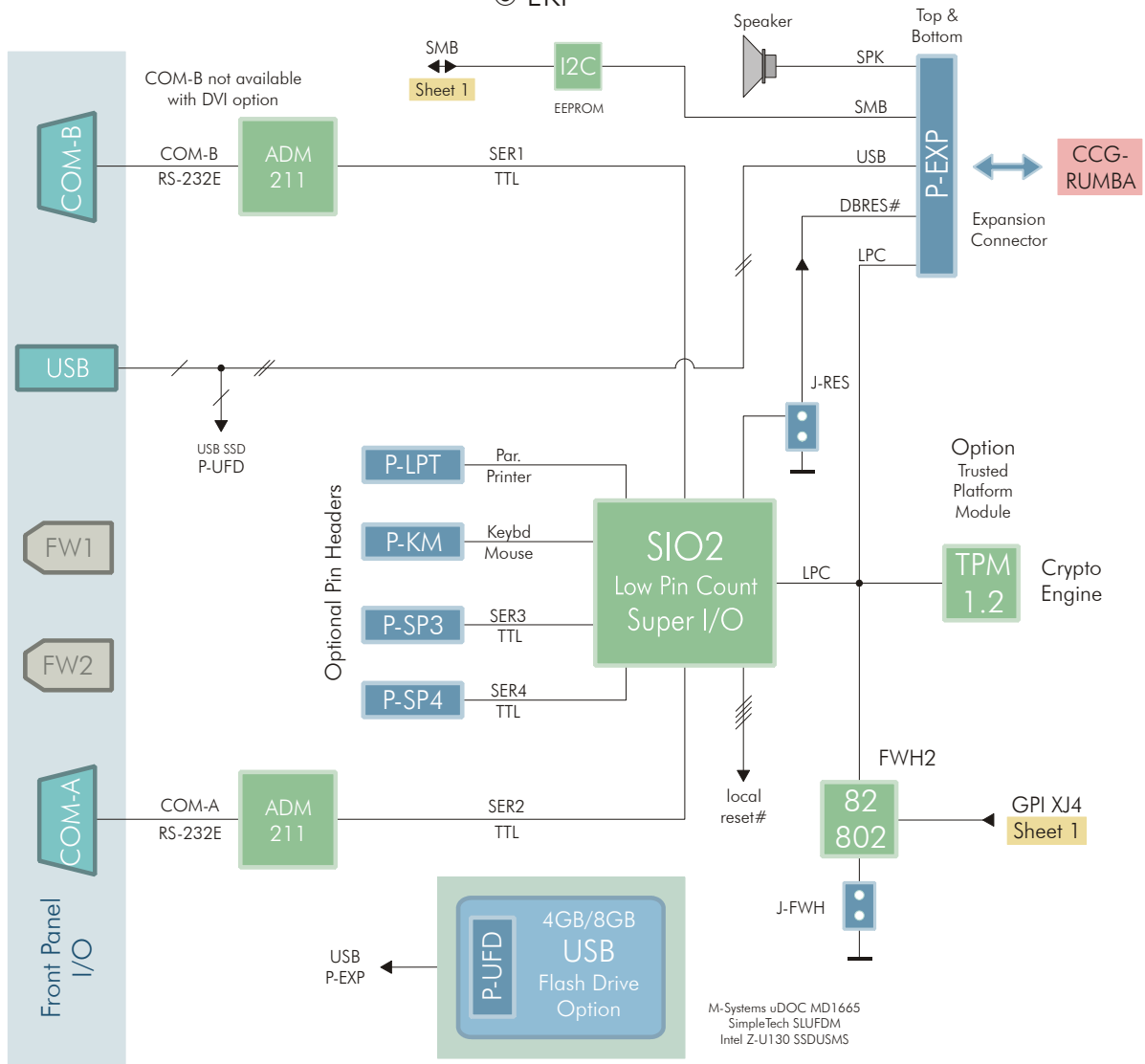
EKF offers in addition custom specific design, for board electronics and also for front panel layout.

Block Diagram CCJ-RHYTHM



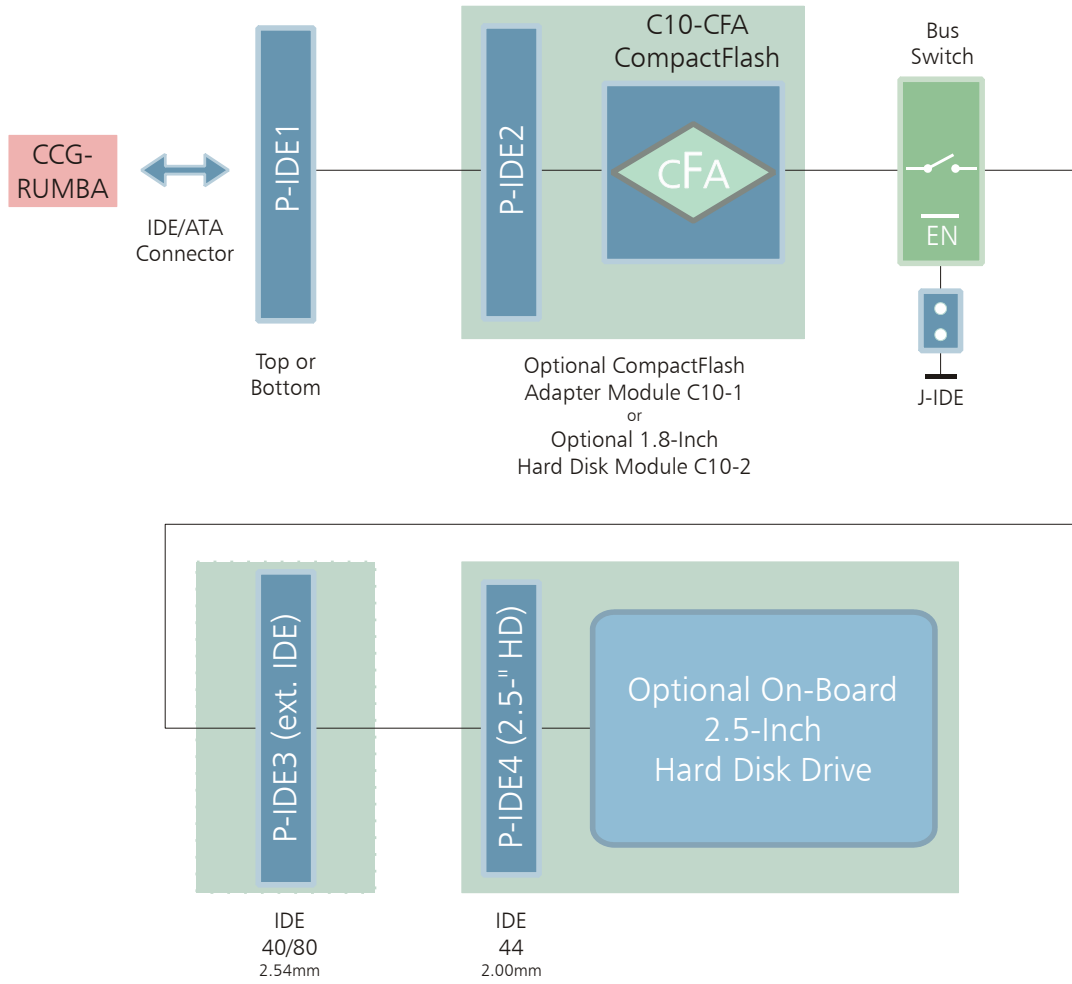


Block Diagram
CCJ-RHYTHM
© EKF

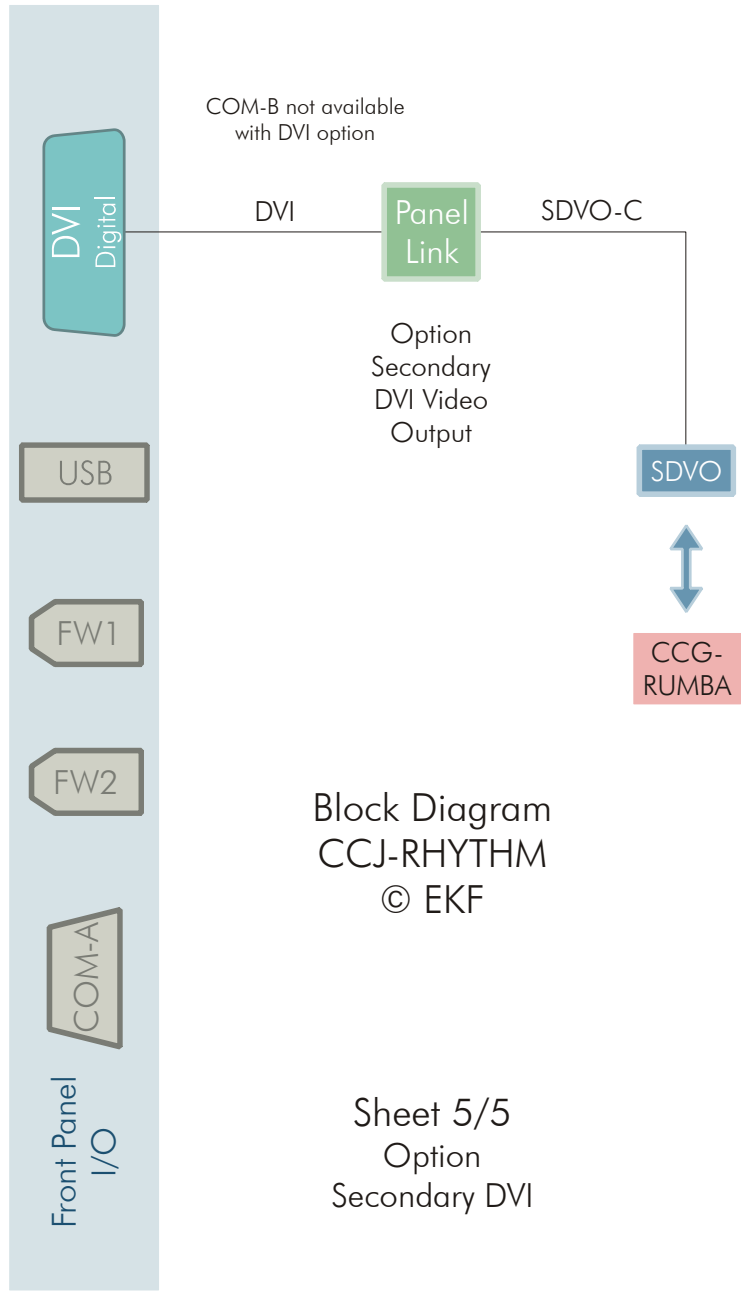


Sheet 3/5
Super I/O

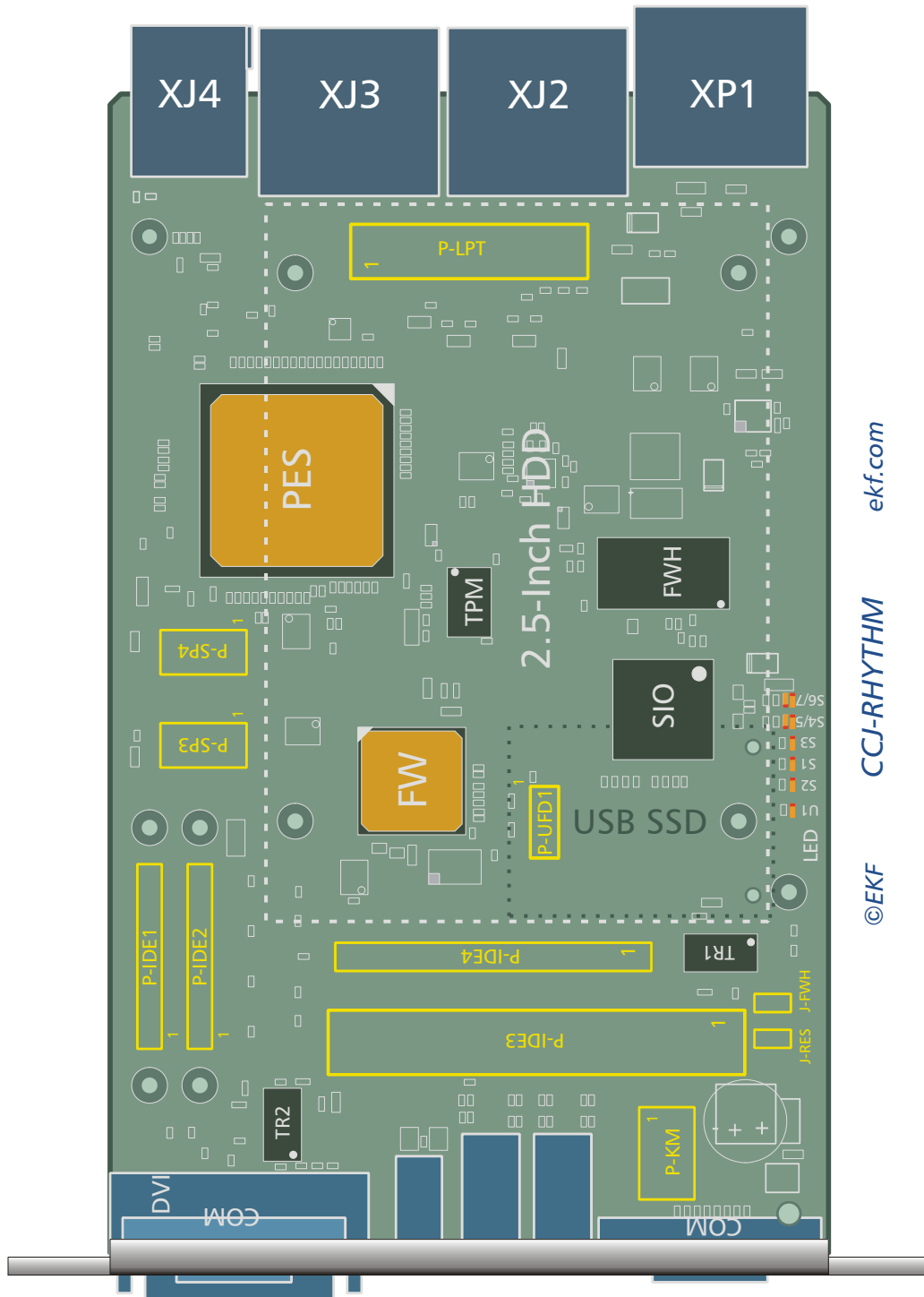
Block Diagram
 CCJ-RHYTHM
 © EKF



Sheet 4/5
 IDE Storage Options



Top View Component Assembly CCJ-RHYTHM



Front Panel Connectors

COM-A ^{1 2}	RS-232E serial communications port (CCJ-RHYTHM on-board SIO2 serial port 1), D-Sub 9-position male connector
COM-B	RS-232E serial communications port (CCJ-RHYTHM on-board SIO2 serial port 2), alternate D-Sub 9-position male connector
FW1	1394a FireWire receptacle, PHY port 1
FW2	1394a FireWire receptacle, PHY port 2
USB	USB type A root hub connector (CCG-RUMBA ICH8M-E USB port)
DVI ²	Option Digital Video Port (DVI-D)

¹ Due to a primary SIO which may be present on the CPU board itself, the BIOS may assign COM port numbers different from COM1/COM2 to these interface lines on the CCJ-RHYTHM, e.g. COM2/COM3.

² If present, the DVI receptacle replaces the COM-B connector, due to insufficient space on the front panel

On-Board Connectors

P-IDE2	Dual row socket, for attachment of a CompactFlash socket or 1.8-inch hard disk on a mezzanine module (C10)
P-IDE3	Pin header 40-lead 2.54mm, for attachment of an external IDE/PATA device by flat cable assembly
P-IDE4	Pin header 44-lead 2.00mm, for attachment of an on-board 2.5-inch hard disk
P-KM	Pin header 10-lead 2.54mm, provides PS/2 style keyboard and mouse signals
P-LPT	Pin header 26-lead 2.54mm, provides parallel port I/O
P-SP3 P-SP4 ¹	Pin headers 10-lead 2.00mm, provide TTL level serial COM port signals
P-UFD1 P-UFD2	Pin headers 10-lead 2.00mm, suitable for low profile USB SSD (Flash Disk), alternates P-UFD1 (top mount) or P-UFD2 (bottom mount)

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 CCJ-RHYTHM, e.g. COM4/COM5.

Jumpers

J-FWH ¹	Determines if the optional on-board firmware hub is acting as boot BIOS (jumper set) or as secondary BIOS (jumper removed = default).
J-IDE ¹	Enables IDE bus switches when set. Please note: In order to make use of either connector P-IDE3 (external IDE device), or P-IDE4 (2.5-inch on-board hard disk), the jumper J-IDE must be set. However, if neither P-IDE3 nor P-IDE4 is in use, J-IDE must be removed in order to avoid reflections on the IDE bus caused by tapped signal traces. If the board is equipped with resistor arrays rather than bus switches, J-IDE is removed.
J-RES ¹	Jumper 2.54mm, allows to force a CPU debug reset on the CCG-RUMBA carrier board

¹ Not all of these jumpers may be present or functional on your actual CCJ-RHYTHM board. Assembly of these jumpers is highly custom specific. Discuss your needs with EKF before ordering.

Inter-Board Connectors

P-EXP	Dual row socket, available from bottom of the CCJ-RHYTHM PCB, matching with the corresponding socket on the CPU carrier board, connected through a board stacker, comprising of: <ul style="list-style-type: none"> • LPC Low Pin Count interface • AC97 Audio Codec / HD Audio (Azalia) • 2 x USB • SMB, Speaker, Reset
P-IDE1	Dual row socket, available from bottom of the CCJ-RHYTHM PCB, matching with the corresponding socket on the CPU carrier board, connected through a board stacker, comprising of: <ul style="list-style-type: none"> • Host CPU (ICH8M-E) IDE/ATA Interface
P-PCIE	High speed socket edge card connector, available from bottom of the CCJ-RHYTHM PCB, matching with the corresponding socket on the CPU carrier board, connected through a high speed strip line PCB (C22), comprising of: <ul style="list-style-type: none"> • Host CPU (ICH8M-E) PCI Express (PCIe) x 4 interface
P-SDVO	High speed socket edge card connector, available from bottom of the CCJ-RHYTHM PCB, matching with the corresponding socket on the CPU carrier board, connected through a high speed strip line PCB (C21), comprising of: <ul style="list-style-type: none"> • Host CPU (GMCH 965) SDVO-C digital video

Backplane Connectors

XP1	CompactPCI Express System Slot Power Connector UPM-7 (male)
XJ2	CompactPCI Express signal connector PCIe Links 3/4 ADF (female)
XJ3	CompactPCI Express signal connector PCIe Links 1/2 ADF (female)
XJ4	CompactPCI Express signal connector GPIO eHM (female)

Please note: Neither of the connectors mentioned above may be present or functional on your actual CCJ-RHYTHM board. Assembly of most connectors is highly custom specific. Discuss your needs with EKF before ordering.

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 any telecommunication links, networks or procedures described in this chapter. Failure links before you open the system or perform or equipment damage. Some parts of the the power switch is in its off state.



the system from its power source and from modems before performing any of the to disconnect power, or telecommunication any procedures can result in personal injury system can continue to operate even though

Caution

Electrostatic discharge (ESD) can damage components. Perform the procedures described in this chapter only at an ESD workstation. If such a some ESD protection by wearing an metal part of the system chassis or board original ESD protected packaging. Retain the antistatic box) in case of returning the board



to EKF for repair. station is not available, you can provide antistatic wrist strap and attaching it to a front panel. Store the board only in its original packaging (antistatic bag and

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 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 neighbored 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 both front panel screws (top/bottom), unlock the ejector lever
- Remove any onboard cabling assembly
- Activate the ejector lever
- Remove the card carefully (be sure not to damage components mounted on the bottom side of the board by scratching neighbored 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

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

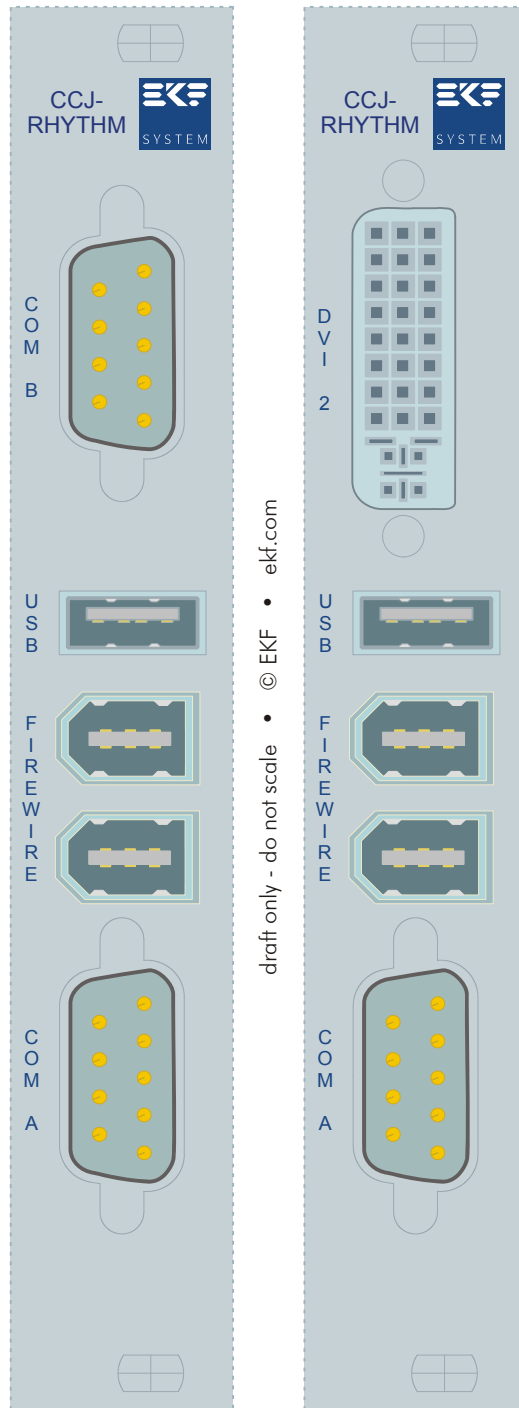
Some of the connectors may provide operating voltage (e.g. +12V, +5V and +3.3V) to devices inside the system chassis, such as internal peripherals. Not all of these connectors are overcurrent protected. Do not use these connectors for powering devices external to the computer chassis. A fault in the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

Please Note

The CCJ-RHYTHM 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 CCJ 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', 'inter-board connectors', 'on-board connectors', and 'rear I/O connectors').

Front Panel Connectors

The suitable CPU carrier board for use together with the CCJ-RHYTHM mezzanine module is the CCG-RUMBA. The CCJ-RHYTHM companion board mounts on top (at the right side) of the CCG-RUMBA. By default, the CCJ-RHYTHM shares an 8HP (~40.6mm) front panel with the CPU carrier board. Further more, custom specific front panel options are available on request. Shown below are two basic variants of the CCJ-RHYTHM (illustration w/o CCG-RUMBA front panel).



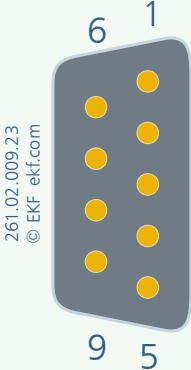
CCJ-RHYTHM
Dual RS-232

CCJ-RHYTHM
Dual DVI

COM-A/COM-B Serial Port Connectors

The on-board secondary Super-I/O (SIO) on the CCJ-RHYTHM provides four asynchronous serial interfaces, two of them available from the front panel (EIA/TIA 232), and another two as on-board pin headers only (TTL).

Due to another (primary) SIO typically available on the CCG-RUMBA 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 CCG-RUMBA 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 and COM-B.

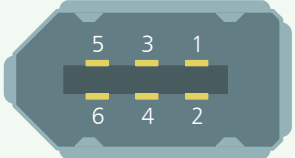
COM-A/B RS-232 Male D-Sub 9 261.02.009.23				
			1	DCD1(2)
	DSR1(2)	6		
			2	RXD1(2)
	RTS1(2)	7		
			3	TXD1(2)
	CTS1(2)	8		
			4	DTR1(2)
	RI1(2)	9		
			5	GND

The on-board ESD protected RS-232E transceivers on the CCJ-RHYTHM allow a bitrate of up to 230kbps.

If a DVI receptacle is provided on the CCJ-RHYTHM, the COM-B connector will be removed.

1394 FireWire Connectors

The CCJ-RHYTHM is equipped with an integrated PCIe to PCI bridge and 1394a OHCI compliant LLC/PHY (XIO2200A). Both cable port connectors are suitable for data transfer rates of 100Mbps, 200Mbps and 400Mbps according to IEEE1394a-2000.

2 x 1394a FireWire Receptacles 270.30.06.1		
 <p>1394a FireWire Receptacle © EKF • ekf.com Part No. 270.30.06.1</p>	1	+12V/0.5A Bus Power ¹⁾
	2	GND
	3	TP B-
	4	TP B+
	5	TP A-
	6	TP A+

¹⁾ protected by PolySwitch fuses 0.5A

Please note: The cable port bus power (+12V) on a particular FireWire receptacle is present if sourced across either

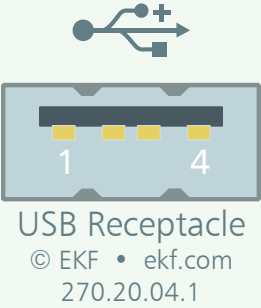
- ▶ the CPCI Express rear power connector XP1
- ▶ the inter-board connector P-EXP pin 40 (carrier board may switch off pin 12V according to its current sleep state)
- ▶ the neighbored FireWire receptacle, if a self-powered 1394 device is attached to it

Both cable ports are fused by individual 0.5A PolySwitches (self resettable fuse). Due to a reasonable voltage drop across Schottky diodes in the 12V power lines, the actual bus power voltage may be as low as ~11.5V.

Typical operating systems provide software drivers for TIs FireWire components. If required, e.g. for GPIO programming, the XIO2200A data manual can be obtained from the www.ti.com website.

USB Connector

The host CPU board CCG-RUMBA is equipped with an ICH8M-E (Input/Output Controller Hub), which incorporates a number of USB 1.1/2.0 compliant ports. Two of the USB interfaces are routed to the CCJ-RHYTHM mezzanine companion board across the expansion port connector P-EXP. One USB port is available from the CCJ-RHYTHM front panel, while the other is assigned to an optional USB Solid-State Drive.

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

1) Electronic Power Switch

Note:

Numbering (1, 2) of USB ports within this document (CCJ-RHYTHM) does not correspond with the USB port numbering used in the CCG-RUMBA documentation or Intel ICH8M-E data sheet.

DVI-2 Receptacle

As an option, the CCJ-RHYTHM is available with a SDVO to PanelLink transceiver for digital video. The secondary DVI receptacle on the CCJ-RHYTHM can be used in addition to the primary DVI connector on the CCG-RUMBA for dual digital screen operation mode.

Other than with the CCG-RUMBA, the DVI connector on the CCJ-RHYTHM does not provide analog signals (VGA) in addition. Please understand that the CCJ-RHYTHM complies with DVI-D, though the actual front panel receptacle may contain (not connected) additional leads conforming to DVI-I. This allows usage of DVI-D and DVI-I cable harnesses (provided that the attached monitor is also equipped with a DVI-I connector).

If the DVI option was chosen, connectors COM-B will be removed.

DVI Connector 261.70.029.01						
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">261.70.029.01 • © EKF • ekf.com</p> <p style="text-align: center;">DVI</p>	17	TX0-	9	TX1-	1	TX2-
	18	TX0+	10	TX1+	2	TX2+
	19	GND	11	GND	3	GND
	20		12		4	
	21		13		5	
	22	GND	14	DDC_POW ¹⁾	6	DDC_SCL
	23	TXC+	15	GND	7	DDC_SDA
	24	TXC-	16	DVI_HP	8	VSYNC
			c3	BLUE	c1	RED
			c6	GND	c5	GND
		c4	HSYNC	c2	GREEN	

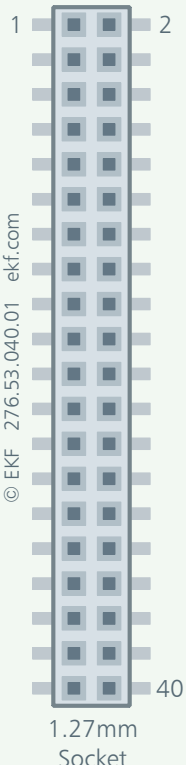
¹⁾ +5V protected by a PolySwitch Fuse 1.5A

On-Board Connectors

The CCJ-RHYTHM can be equipped with several on-board connectors. Some of these connectors are available as an option only or exclusive to each other, and therefore may not be present on your actual board.

P-IDE2

The optional connector P-IDE2 is mounted on top of the CCJ-RHYTHM and identical to P-IDE1. It may be used as a replicator for a mezzanine module with a CompactFlash socket (EKF C10-1-CFA, part of the CCG-RUMBA) or an 1.8-inch hard disk mezzanine module (C10-2-CFA).

P-IDE2 CompactFlash Interface 1.27mm Socket 2 x 20 (276.53.040.01)				
 <p>top view pin numbering order</p>	IDE_RESET#	1	2	GND
	IDE0_DD07	3	4	IDE0_DD08
	IDE0_DD06	5	6	IDE0_DD09
	IDE0_DD05	7	8	IDE0_DD10
	IDE0_DD04	9	10	IDE0_DD11
	IDE0_DD03	11	12	IDE0_DD12
	IDE0_DD02	13	14	IDE0_DD13
	IDE0_DD01	15	16	IDE0_DD14
	IDE0_DD00	17	18	IDE0_DD15
	GND	19	20	+3.3V_CR *
	IDE0_DMARQ	21	22	+3.3V_CR *
	IDE0_DIOW#	23	24	GND
	IDE0_DIOR#	25	26	GND
	IDE0_IORDY	27	28	+5V_CR *
	IDE0_DMACK#	29	30	+5V_CR *
	IDE0_INTRQ	31	32	GND
	IDE0_DA1	33	34	IDE0_CBLID#
	IDE0_DA0	35	36	IDE0_DA2
	IDE0_CS0#	37	38	IDE0_CS1#
	IDE0_ACT#	39	40	GND

* switched power supply lines from CCG-RUMBA carrier board according to Sx state

If the CompactFlash adapter module is the only IDE device on the CCJ-RHYTHM, the IDE signal lines to all other IDE connectors P-IDE3, P-IDE4 should be interrupted (remove jumper J-IDE, which in turn disables an electronic bus switch). This helps to avoid reflections on the IDE bus, which could otherwise degrade the signal quality.

P-IDE3

P-IDE3 is provided optionally for attachment of classic IDE devices (e.g. 3.5-inch hard disk drive, DVD-ROM).

Usage of the IDE connector P-IDE3 requires the IDE bus switches enabled (jumper J-IDE set). No stubs are allowed on an IDE cable assembly, i.e. concurrent operation of devices attached to P-IDE3 and other IDE dedicated connectors cannot be guaranteed.

P-IDE3 IDE Device Header 2.54mm 2 x 20 (260.02.040.09)				
	IDE_RESET#	1	2	GND
	IDE1_DD07	3	4	IDE1_DD08
	IDE1_DD06	5	6	IDE1_DD09
	IDE1_DD05	7	8	IDE1_DD10
	IDE1_DD04	9	10	IDE1_DD11
	IDE1_DD03	11	12	IDE1_DD12
	IDE1_DD02	13	14	IDE1_DD13
	IDE1_DD01	15	16	IDE1_DD14
	IDE1_DD00	17	18	IDE1_DD15
	GND	19	20	KEY
	IDE1_DMARQ	21	22	GND
	IDE1_DIOW#	23	24	GND
	IDE1_DIOR#	25	26	GND
	IDE1_IORDY	27	28	GND
	IDE1_DMACK#	29	30	GND
	IDE1_INTRQ	31	32	NC
	IDE1_DA1	33	34	IDE1_CBLID#
	IDE1_DA0	35	36	IDE1_DA2
	IDE1_CS0#	37	38	IDE1_CS1#
	IDE0_ACT#	39	40	GND

The presence of an IDE bus switch and in turn J-IDE is optional. In most cases a fixed resistor array replaces the bus switch, which makes J-IDE superfluous.

P-IDE4

P-IDE4 is optionally provided for a 2.5-inch on-board hard disk drive. Usage of P-IDE4 requires the IDE bus switches enabled (jumper J-IDE set). No stubs are allowed on an IDE cable assembly, i.e. concurrent operation of devices attached to P-IDE4 and other IDE dedicated connectors cannot be guaranteed.

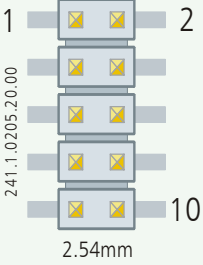
P-IDE4 On-Board 2.5-Inch Hard Disk Drive 2.00mm Pin Header 2x22 (251.1.0222.20.01)				
	IDE_RESET#	1	2	GND
	IDE1_DD07	3	4	IDE1_DD08
	IDE1_DD06	5	6	IDE1_DD09
	IDE1_DD05	7	8	IDE1_DD10
	IDE1_DD04	9	10	IDE1_DD11
	IDE1_DD03	11	12	IDE1_DD12
	IDE1_DD02	13	14	IDE1_DD13
	IDE1_DD01	15	16	IDE1_DD14
	IDE1_DD00	17	18	IDE1_DD15
	GND	19	20	KEY
	IDE1_DMARQ	21	22	GND
	IDE1_DIOW#	23	24	GND
	IDE1_DIOR#	25	26	GND
	IDE1_IORDY	27	28	GND
	IDE1_DMACK#	29	30	GND
	IDE1_INTRQ	31	32	NC
	IDE1_DA1	33	34	IDE1_CBLID#
	IDE1_DA0	35	36	IDE1_DA2
	IDE1_CS0#	37	38	IDE1_CS1#
	IDE0_ACT#	39	40	GND
+5V_HD *	41	42	+5V_HD *	
GND	43	44	NC	

- *
 - ▶ short circuit protection by PolySwitch resettable fuse 1.5A
 - ▶ switched power supply lines from CCG-RUMBA carrier board according to Sx state
 - ▶ +5V_HD can be alternatively sourced from CompactPCI Express backplane as stuffing option

The presence of an IDE bus switch and in turn J-IDE is optional. In most cases a fixed resistor array replaces the bus switch, which makes J-IDE superfluous.

P-KM

In most cases keyboard and mouse will be attached to the USB. As an option, the legacy PS/2 style signals are available from the pin header P-KM. A cable harness or small adapter board is required for cross-over to the PS/2 Mini-Din female connector(s).

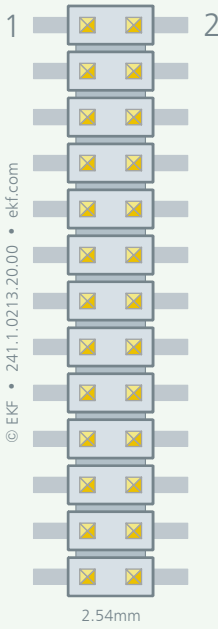
P-KM Keyboard - Mouse PS/2 Signals SMT 2.54mm Pin Header 2 x 5 (241.1.0205.20.00)				
	+5V Mouse ¹	1	2	Clock Mouse
	GND Mouse	3	4	Data Mouse
	NC	5	6	NC
	+5V Keyboard ¹	7	8	Clock Keyboard
	GND Keyboard	9	10	Data Keyboard

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

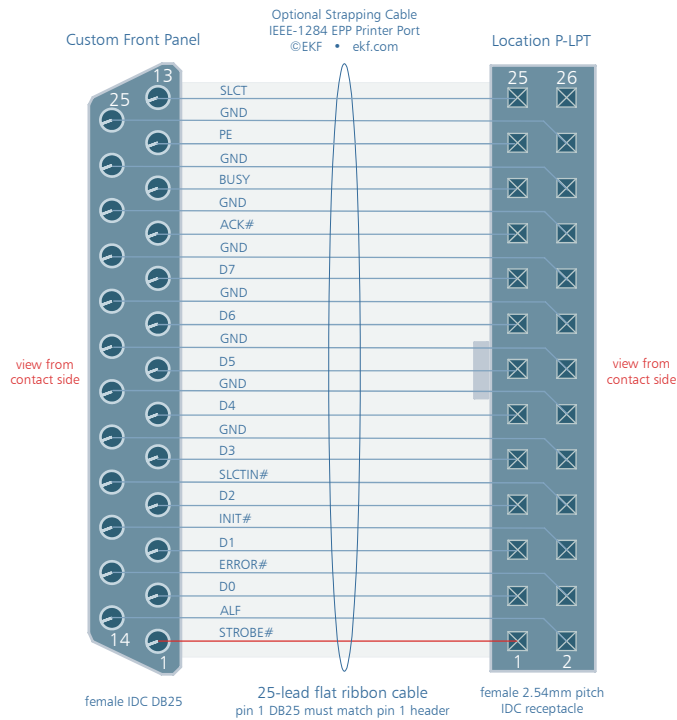
P-LPT

As an option, a parallel port 26-pin header is provided on-board. A flat cable assembly can be used for cross-over to the popular female D-Sub 25-position connector.

P-LPT Parallel Port (Line Printer) SMT 2.54mm Pin Header 2 x 13 (241.1.0213.20.00)

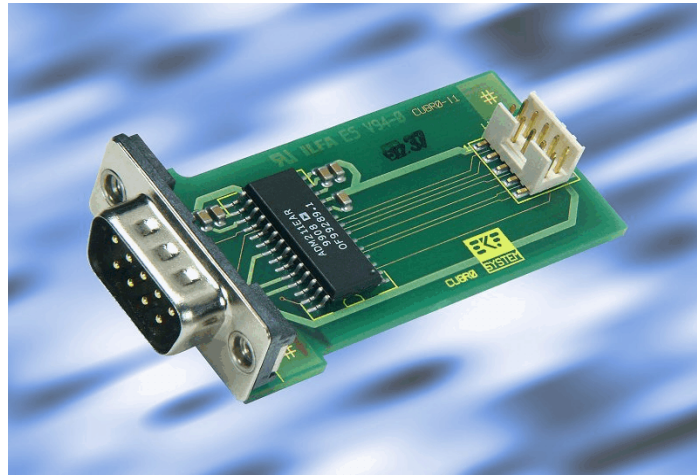


STROBE#	1	2	ALF#
D0	3	4	ERROR#
D1	5	6	INIT#
D2	7	8	SLCTIN#
D3	9	10	GND
D4	11	12	GND
D5	13	14	GND
D6	15	16	GND
D7	17	18	GND
ACK#	19	20	GND
BUSY	21	22	GND
PE	23	24	GND
SLCT	25	26	



P-SP3 P-SP4

The on-board SIO (Super I/O controller) provides up to four serial interfaces (UART, DOS COM ports). While the serial ports SP1 und SP2 have dedicated RS-232 transceivers on-board and are available as COM-A and COM-B from the front panel, another set of two UARTs has been wired to the optional pin headers P-SP3 and P-SP4 (TTL-level). 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.



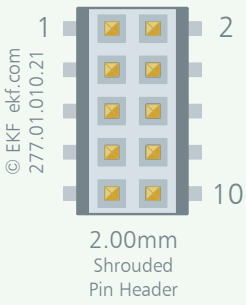
CU-Series PHY Module

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

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

P-SP3 TTL-Level Serial I/O or GPIO 2.00mm Pin Header 2 x 5 (277.01.010.21)					
	+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	

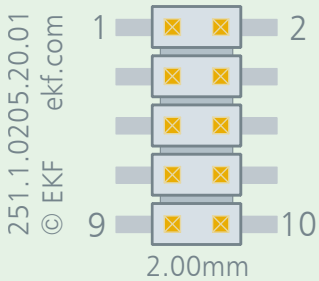
¹ short circuit protection by a PolySwitch resettable fuse, voltage derived from +5V_CR carrier board switched power well

P-SP4 TTL-Level Serial I/O or GPIO 2.00mm Pin Header 2 x 5 (277.01.010.21)				
 <p>© EKF ekf.com 277.01.010.21</p> <p>2.00mm Shrouded Pin Header</p>	+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

P-UFD1 P-UFD2

As an option, the CCJ-RHYTHM can be equipped with a connector for an industrial style USB Flash disk mezzanine module. The connector is a 2.0mm pitch pin header, suitable for a low profile SSD (Solid-State Drive) 37mm x 26mm. As of current, such modules are available e.g. from M-Systems, STEC, Intel, SanDisk and other manufacturers, up to 8GByte.

P-UFD				
2.00mm Pin Header 2x5 (251.1.0205.20.01)				
USB Solid-State Drive (Low Profile) 562.20.0004.00 (4GB)				
M-Systems uDOC MD1675				
SimpleTech SLUFDM				
Intel Z-U130 SSDUSMS				
SanDisk SDUS5EB				
	+5V_CR	1	2	NC
	USB+	3	4	NC
	USB-	5	6	NC
	GND	7	8	NC
	Mech. Key	9	10	LED# ¹

¹ Activity LED signal available with Intel Z-U130 only

As a stuffing option, the connector P-UFD is populated either on top (P-UFD1) or on bottom (P-UFD2) of the CCJ-RHYTHM. The top mounting alternate (P-UFD1) is not recommended if in addition an on-board 2.5-inch hard disk is present, since the hard disk extends over the space required for the top mount USB SSD module. Please specify your needs when ordering.



Jumpers

For jumper J-IDE please refer to description of on-board connectors J-IDE3 and J-IDE4. For jumper J-FWH please refer to description of Firmware Hub 2.

J-RES Reset

Provided as an option, the pin header J-RES can be used for resetting the CPU host board (processor reset) if wired to additional circuitry (e.g. watchdog or manual pushbutton). Tie reset# to GND with an open collector output. While debugging the system, a 2.54mm jumper may be used to force a manual reset.



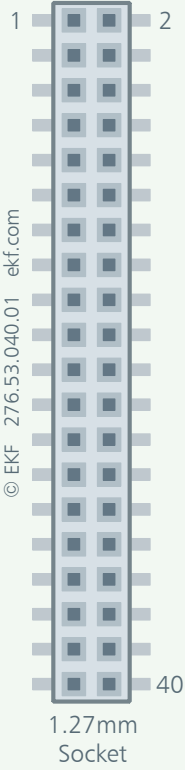
Inter-Board Connectors

The CCJ-RHYTHM is equipped with up to four inter-board connectors. These are the P-EXP (LPC and mixed signals), the P-IDE1 (PATA), P-PCIe (4-Link PCI Express), and the P-SDVO, which is available as an option only (if the board is provided with the video output, i.e. PanelLink transmitter and DVI connector). All inter-board connectors are situated at the bottom of the CCJ-RHYTHM and establish the data path and power link to the carrier board CPU. As the CCJ-RHYTHM comes typically mounted as a unit together with the CCG-RUMBA, there is normally no need for the user to get access to any of the inter-board connectors. They are described here as a reference only and for better understanding of the CCJ-RHYTHM.

P-EXP

The inter-board connector P-EXP is mounted on bottom of the CCJ-RHYTHM PCB, with its face aligned towards the corresponding connector on the CCG-RUMBA. This allows to attach the CCJ-RHYTHM mezzanine companion card on top of the CPU carrier board. A suitable board stacker is used in addition to bridge the gap between the two boards. P-EXP is used to pass the Low Pin Count I/F to the CCJ-RHYTHM, besides USB channels and other sideband signals.

P-EXP Expansion Board Interface (LPC/HD-Audio/USB) 1.27mm Socket 2 x 20 (276.53.040.01)

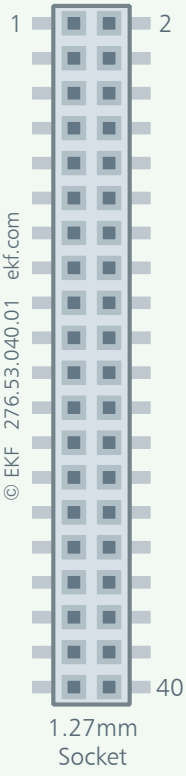
 <p>pin orientation shows CPU carrier board top view</p>	GND	1	2	+3.3V_CR *
	CLK_33MHZ	3	4	PLTRST#
	LPC_AD0	5	6	LPC_AD1
	LPC_AD2	7	8	LPC_AD3
	LPC_FRAME#	9	10	LPC_DRQ#
	GND	11	12	+3.3V_CR *
	SERIRQ	13	14	PME#
	SMI#	15	16	CLK_14MHZ
	FWH_ID0	17	18	FWH_INIT#
	KBD_RST#	19	20	A20GATE
	GND	21	22	+5V_CR *
	USB_P2N ¹	23	24	USB_P1N ²
	USB_P2P ¹	25	26	USB_P1P ²
	USB_OC# ³	27	28	DBRESET#
	SMB_CLK	29	30	SMB_DAT
	GND	31	32	+5V_CR *
	HDA_SDOOUT	33	34	HDA_SDINO
	HDA_RST#	35	36	HDA_SYNC
	HDA_BITCLK	37	38	HDA_SDIN1
	SPEAKER	39	40	+12V_CR *

- ¹ connects to USB Port 6 on CCG-RUMBA
² connects to USB Port 5 on CCG-RUMBA
³ connects to USB_OC56# on CCG-RUMBA

* switched power supply lines from CCG-RUMBA carrier board according to Sx state

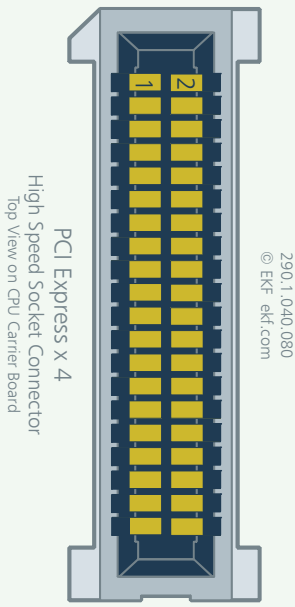
P-IDE1

The inter-board connector P-IDE1 is mounted on bottom of the CCJ-RHYTHM PCB, with its face aligned towards the corresponding connector on the CCG-RUMBA. This allows to attach the CCJ-RHYTHM mezzanine companion card on top of the CPU carrier board. A suitable board stacker is used in addition to bridge the gap between the two boards. P-IDE1 is dedicated to the PATA/IDE channel of the ICH8M-E (Input/Output Controller Hub) on the host CPU board.

P-IDE1 IDE Expansion Interface 1.27mm Socket 2 x 20 (276.53.040.01)				
 <p>top view pin numbering order (identical to view on top of carrier board CCG-RUMBA)</p>	PLTRST# (P-IDE1)	1	2	GND
	IDE0_DD07	3	4	IDE0_DD08
	IDE0_DD06	5	6	IDE0_DD09
	IDE0_DD05	7	8	IDE0_DD10
	IDE0_DD04	9	10	IDE0_DD11
	IDE0_DD03	11	12	IDE0_DD12
	IDE0_DD02	13	14	IDE0_DD13
	IDE0_DD01	15	16	IDE0_DD14
	IDE0_DD00	17	18	IDE0_DD15
	GND	19	20	+3.3V_CR *
	IDE0_DMARQ	21	22	+3.3V_CR *
	IDE0_DIOW#	23	24	GND
	IDE0_DIOR#	25	26	GND
	IDE0_IORDY	27	28	+5V_CR *
	IDE0_DMACK#	29	30	+5V_CR *
	IDE0_INTRQ	31	32	GND
	IDE0_DA1	33	34	IDE0_CBLID#
	IDE0_DA0	35	36	IDE0_DA2
	IDE0_CS0#	37	38	IDE0_CS1#
	IDE0_ACT#	39	40	GND

P-PCIE

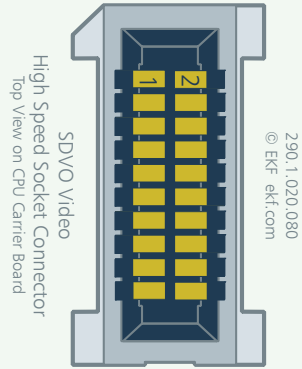
The high speed expansion socket P-PCIE is mounted on bottom of the CCJ-RHYTHM. This allows to attach the mezzanine companion card on top of the CPU carrier board. A mating strip line PCB (C22-PCIEX2) is used in addition to bridge the gap between the two boards, which results from the horizontal 0.8-inch (20.32mm) card slot pitch. P-PCIE is organized as PCIe x 4 link, or 2 x PCIe x 2 links, or 4 single PCIe lanes.

P-PCIE PCI Express x 4 High Speed Dual Row Socket 0.8mm Pitch 290.1.040.080				
 <p>pin orientation shows CPU carrier board top view (see-trough CCJ-RHYTHM PCB)</p> <p>¹ switched on/off power lines on CCG-RUMBA CPU carrier board according to S3 state</p>	GND	1	2	GND
	+5V_CR ¹	3	4	+3.3V_CR ¹
	+5V_CR ¹	5	6	+3.3V_CR ¹
	GND	7	8	GND
	PE_CLKP	9	10	PE_RST#
	PE_CLKN	11	12	PE_WAKE#
	GND	13	14	GND
	PE0_TP	15	16	PE0_RP
	PE0_TN	17	18	PE0_RN
	GND	19	20	GND
	GND	21	22	GND
	PE1_TP	23	24	PE1_RP
	PE1_TN	25	26	PE1_RN
	GND	27	28	GND
	PE2_TP	29	30	PE2_RP
	PE2_TN	31	32	PE2_RN
	GND	33	34	GND
	PE3_TP	35	36	PE3_RP
	PE3_TN	37	38	PE3_RN
	GND	39	40	+12V_CR ¹

P-SDVO

As an option, the high speed expansion socket P-SDVO is mounted on bottom of the CCJ-RHYTHM. This allows to attach the mezzanine companion card on top of the CPU carrier board. A mating strip line PCB (C21-PCIEX1) is used in addition to bridge the gap between the two boards, which results from the horizontal 0.8-inch (20.32mm) card slot pitch.

P-SDVO SDVO Video High Speed Dual Row Socket 0.8mm Pitch (290.1.020.080)



pin orientation shows CPU carrier board top view

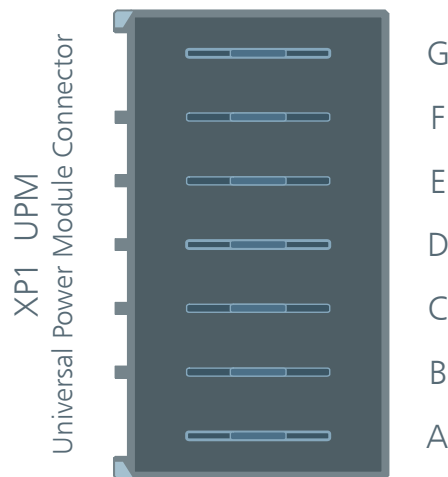
GND	1	2	GND
SDVO_RED+	3	4	SDVO_CLK+
SDVO_RED-	5	6	SDVO_CLK-
GND	7	8	GND
SDVO_GREEN+	9	10	SDVO_INT+
SDVO_GREEN-	11	12	SDVO_INT-
GND	13	14	GND
SDVO_BLUE+	15	16	SDVO_CTR_CLK
SDVO_BLUE-	17	18	SDVO_CTR_DATA
GND	19	20	GND

CompactPCI Express Backplane Connectors

The CCJ-RHYTHM is equipped with four connectors towards the CPCle backplane, one for power, two for PCI Express high speed signalling, and one for GPIO. These connectors form the CompactPCI Express System Slot (4-link configuration pin assignments).

XP1

UPM Universal Power Module Connector (264.06.007.10)	
XP1	Power Rail
G	GND
F	+12V
E	+12V
D	GND
C	+5V
B	+3.3V
A	GND

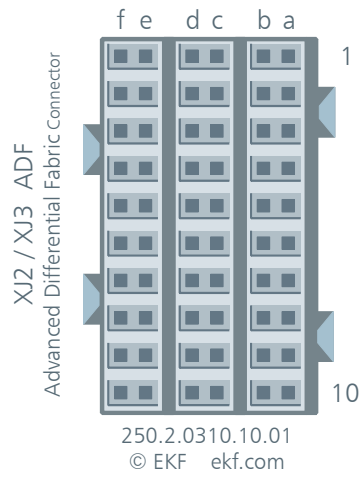


264.06.007.10
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XJ2

Advanced Differential Fabric Connector (250.2.0310.10.01)						
XJ2	A	B	C	D	E	F
1	3PETP1	3PETN1	3PERP1	3PERN1	3PETP2	3PETN2
2	3PETP3	3PETN3	3PERP3	3PERN3	3PERP2	3PERN2
3	4PETP0	4PETN0	4PERP0	4PERN0	4PETP1	4PETN1
4	4PETP2	4PETN2	4PERP2	4PERN2	4PERP1	4PERN1
5	4PETP3	4PETN3	4PERP3	4PERN3	RSV	RSV
6	RSV	RSV	RSV	RSV	RSV	RSV
7	RSV	RSV	RSV	RSV	RSV	RSV
8	RSV	RSV	RSV	RSV	RSV	RSV
9	RSV	RSV	RSV	RSV	RSV	RSV
10	RSV	RSV	RSV	RSV	RSV	RSV

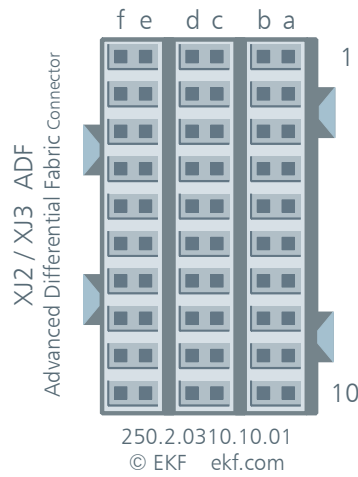
all shielding pins connected to ground



XJ3

Advanced Differential Fabric Connector (250.2.0310.10.01)						
XJ3	A	B	C	D	E	F
1	RSV PXI	RSV PXI	RSV PXI	RSV PXI	RSV PXI	RSV PXI
2	RSV	RSV	PWR_OK	PS_ON#	LINKCAP	PWRBTN#
3	SMB_DAT	SMB_CLK	4REFCLK+	4REFCLK-	2REFCLK+	2REFCLK-
4	RSV	RESET#	3REFCLK+	3REFCLK-	1REFCLK+	1REFCLK-
5	1PETP0	1PETN0	1PERP0	1PERN0	1PETP1	1PETN1
6	1PETP2	1PETN2	1PERP2	1PERN2	1PERP1	1PERN1
7	1PETP3	1PETN3	1PERP3	1PERN3	2PETP0	2PETN0
8	2PETP1	2PETN1	2PERP1	2PERN1	2PERP0	2PERN0
9	2PETP2	2PETN2	2PERP2	2PERN2	2PETP3	2PETN3
10	3PETP0	3PETN0	3PERP0	3PERN0	2PERP3	2PERN3

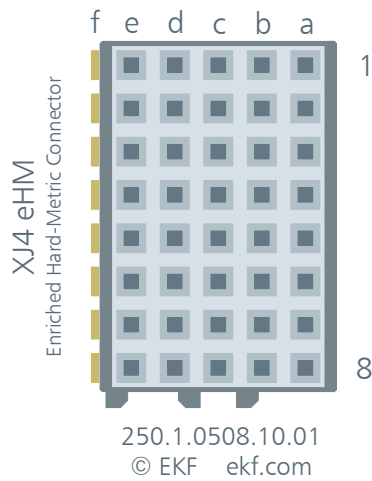
all shielding pins connected to ground



XJ4

Enriched Hard-Metric Connector (250.1.0508.10.01)					
XJ4	A	B	C	D	E
1	GA4	GA3	GA2	GA1	GA0
2	+5V_AUX	GND	SYSEN#	WAKE#	ALERT#
3	I/O	I/O	PES_GPIO0 I/O	PES_GPIO1 I/O	FWH_GPI1 ¹ I/O
4	I/O	I/O	PES_GPIO2 I/O	PES_GPIO3 I/O	FWH_GPI2 ¹ I/O
5	XIO_GPIO3 PXI_TRIG3	XIO_GPIO4 PXI_TRIG4	XIO_GPIO5 PXI_TRIG5	GND PXI_GND	XIO_GPIO6 PXI_TRIG6
6	XIO_GPIO2 PXI_TRIG2	GND PXI_GND	PES_GPIO4 I/O	PXI_STAR	PXI_CLK10
7	XIO_GPIO1 PXI_TRIG1	XIO_GPIO0 PXI_TRIG0	PES_GPIO5 I/O	GND PXI_GND	XIO_GPIO7 PXI_TRIG7
8	I/O	GND PXI_GND	PES_GPIO6 I/O	PES_GPIO7 I/O	PXI_LBR6

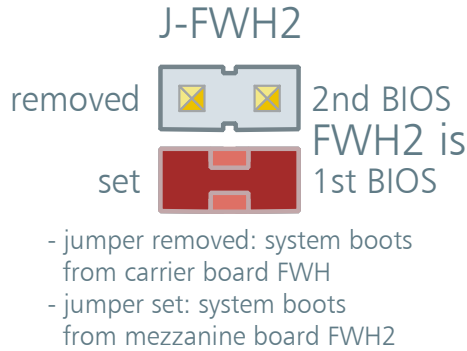
¹ These inputs are not +5V tolerant (3.3V only)



FWH = FirwareHub PES = PCI Express Switch XIO = XIO2200A FireWire

Firmware Hub 2

The CCJ-RHYTHM is optionally provided with a 82802 compatible 8Mbit Flash (Firmware Hub), which can be used either as alternative boot BIOS, as an expansion memory to the CPU board BIOS, or for BIOS retrieval/rescue. The Firmware Hub is connected to the LPC (Low Pin Count) interface. The device ID of a particular FWH determines whether it is detected as BIOS after power on (ID = 0). If stuffed, the jumper J-FWH sets the on-board FWH2 ID to zero (and simultaneously changes the CCG-RUMBA FWH ID to 1) - hence the system will use the BIOS on the CCJ-RHYTHM after power-on.



A programming tool for the Firmware Hub and latest BIOS releases can be obtained from the EKF website.

Trusted Platform Module

The CCJ-RHYTHM can be optionally equipped with a Trusted Platform Module cryptographic chip according to the TPM 1.2 specification. The board provides a footprint which is suitable for

- ▶ SLB9635 (Infineon www.infineon.com/tpm)
- ▶ AT97SC3203 (Atmel www.atmel.com)

and other brands. The TPM chip communicates with the CPU carrier board through the LPC interface. Recent operating systems such as Windows Vista and Linux provide TPM software support.

Typically, TPM chip manufacturers provide the necessary device driver software for integration into special operating systems, along with BIOS drivers. Full documentation for TCG primitives can be found in the TCG TPM Main Specification, Parts 1 – 3, on the TCG website located at <https://www.trustedcomputinggroup.org/>. TPM features specific to PC Client platforms are specified in the “TCG PC Client Specific TPM Interface Specification, Version 1.2”, also available on the TCG web site. Implementation guidance for 32-bit PC platforms is outlined in the “TCG PC Client Specific Implementation Specification for Conventional BIOS for TCG Version 1.2”, also available on the TCG web site.

Atmels TPM includes a cryptographic accelerator capable of computing a 2048-bit RSA signature in 500 ms and a 1024-bit RSA signature in 100ms. Performance of the SHA-1 accelerator is 50us per 64-byte block. TCG key generation operations will be completed using a proprietary mechanism in less than 1 msec. The TPM is offered to OEM manufacturers as a turnkey solution, including the firmware integrated on the chip.

Infineons security controllers have achieved the industry's highest rating for digital security, the Common Criteria EAL 5 high Certificate issued by the German government agency responsible for security in information technology. Infineon provides OEMs with a complete TCG solution that includes all required hardware, software, and management utilities to develop a complete platform security solution.

Power Distribution

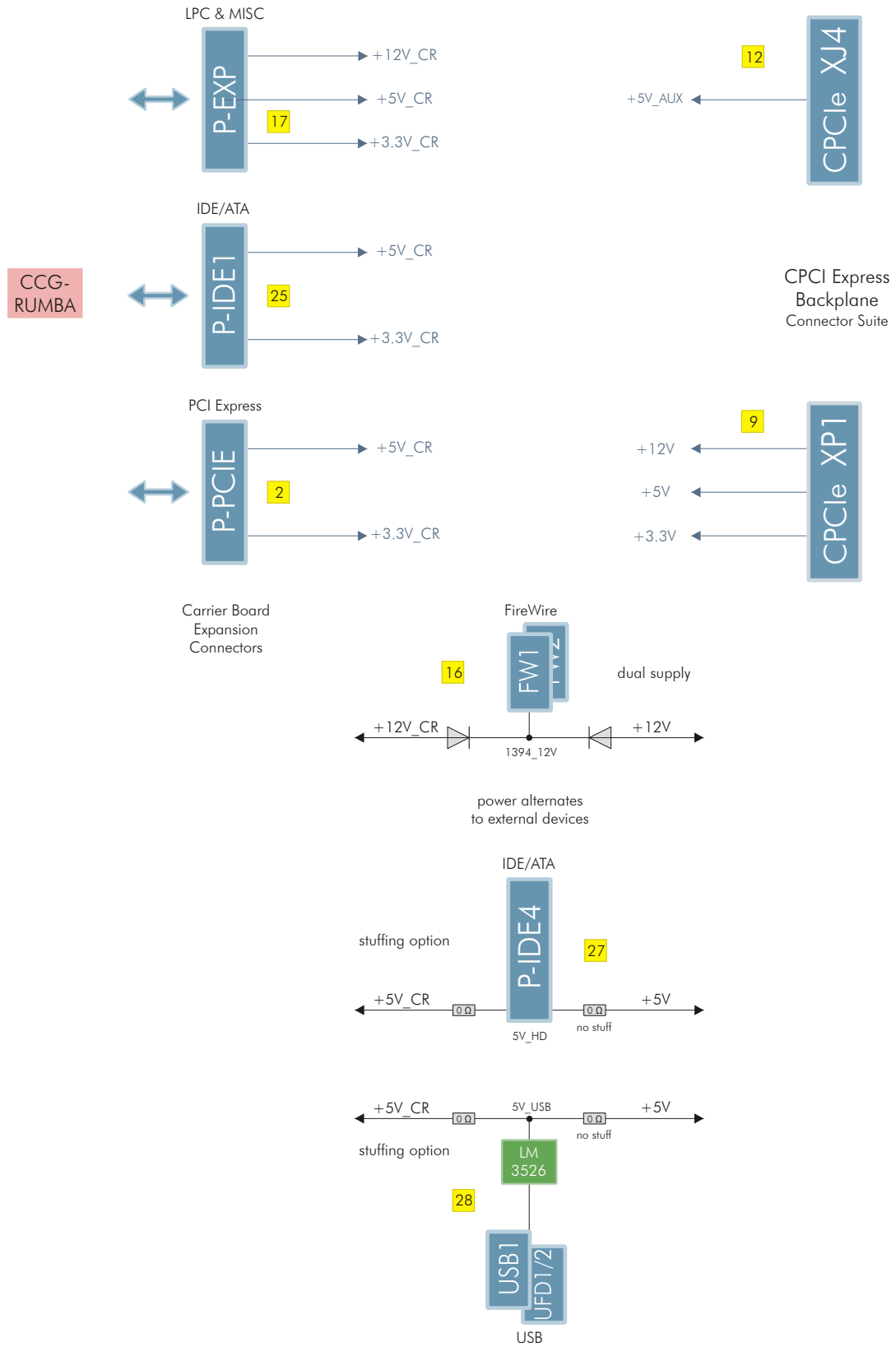
The CCJ-RHYTHM requires power from two sources: The CPU carrier board supplies +3.3V_CR, +5V_CR, and +12V_CR (connector P-EXP), which may be switched off according to the current system sleep state. In addition, the CompactPCI Express backplane also supplies the voltages +3.3V, +5V and +12V (connector XP1). Do not confuse both sets of voltage rails, which are not tied together on the CCJ-RHYTHM.

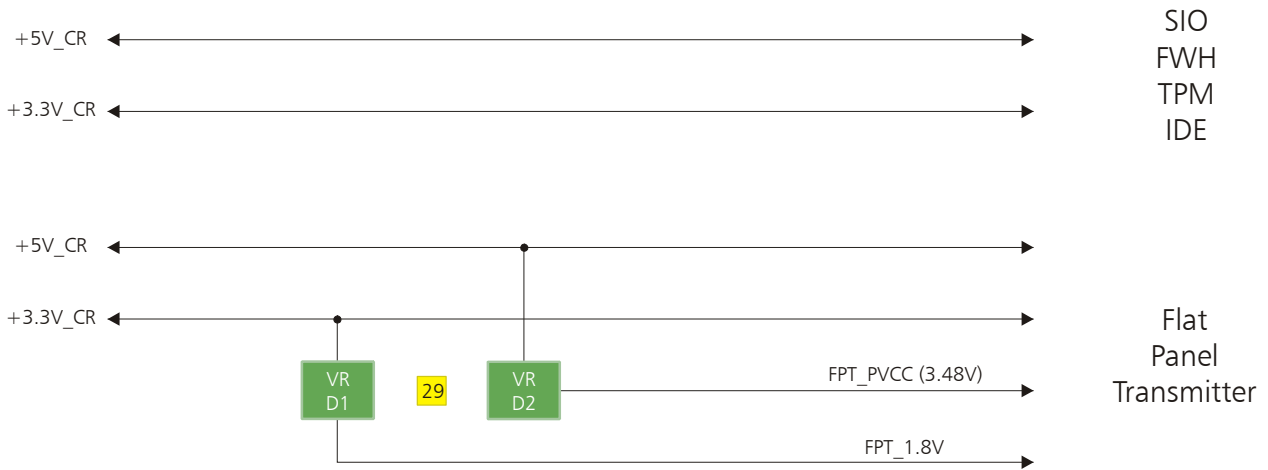
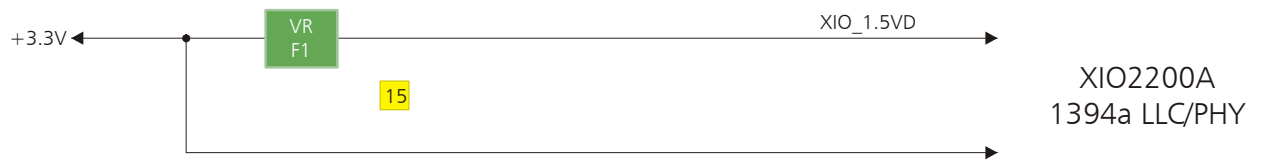
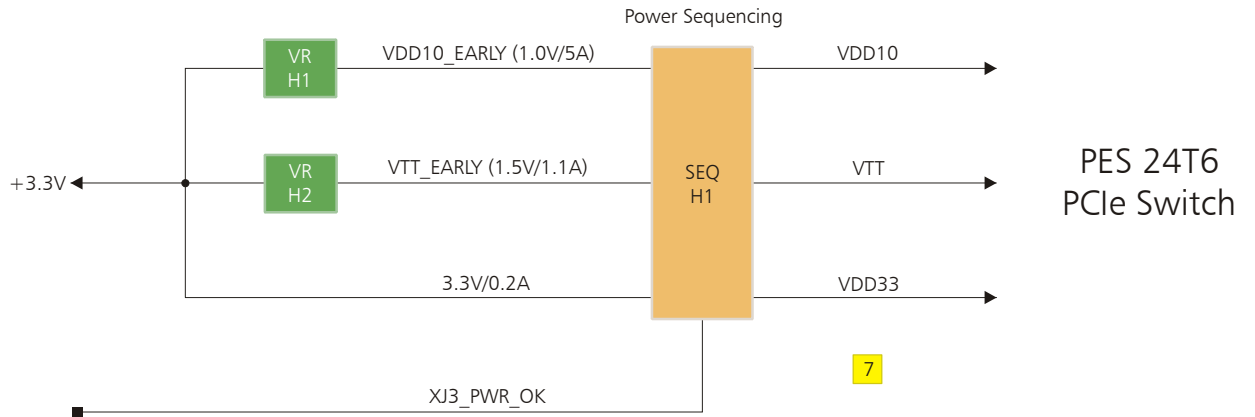
On the CCJ-RHYTHM all components, which are related to PCI Express functionality and the CPCIe system slot feature (prominently the PCIe packet switch), use the power rails from the XP1 UPM-7 power connector. Other components however such as the SIO are connected to the carrier board power rails, in order to potentially enable feature reduced board versions which do not use PCI Express functions, and consequently do not provide the CompactPCI Express connectors. For an on-board hard disk drive, the +5V power source can be selected by a zero-Ohm resistor (stuffing option), either tied to +5V_CR (carrier board) or +5V (XP1 CPCIe backplane connector).

As a PCIe coupled device, which is attached to the PCIe packet switch, also the XIO2200A FireWire controller demands its main power from the XP1 backplane power connector (+3.3V). The IEEE1394 +12V bus power is derived concurrently from both, the carrier board +12V_CR and the CPCIe +12V (back-driving protection by Schottky diodes), in order to optimize bus power sourcing to external IEEE1394 devices.

Power Distribution
CCJ-RHYTHM
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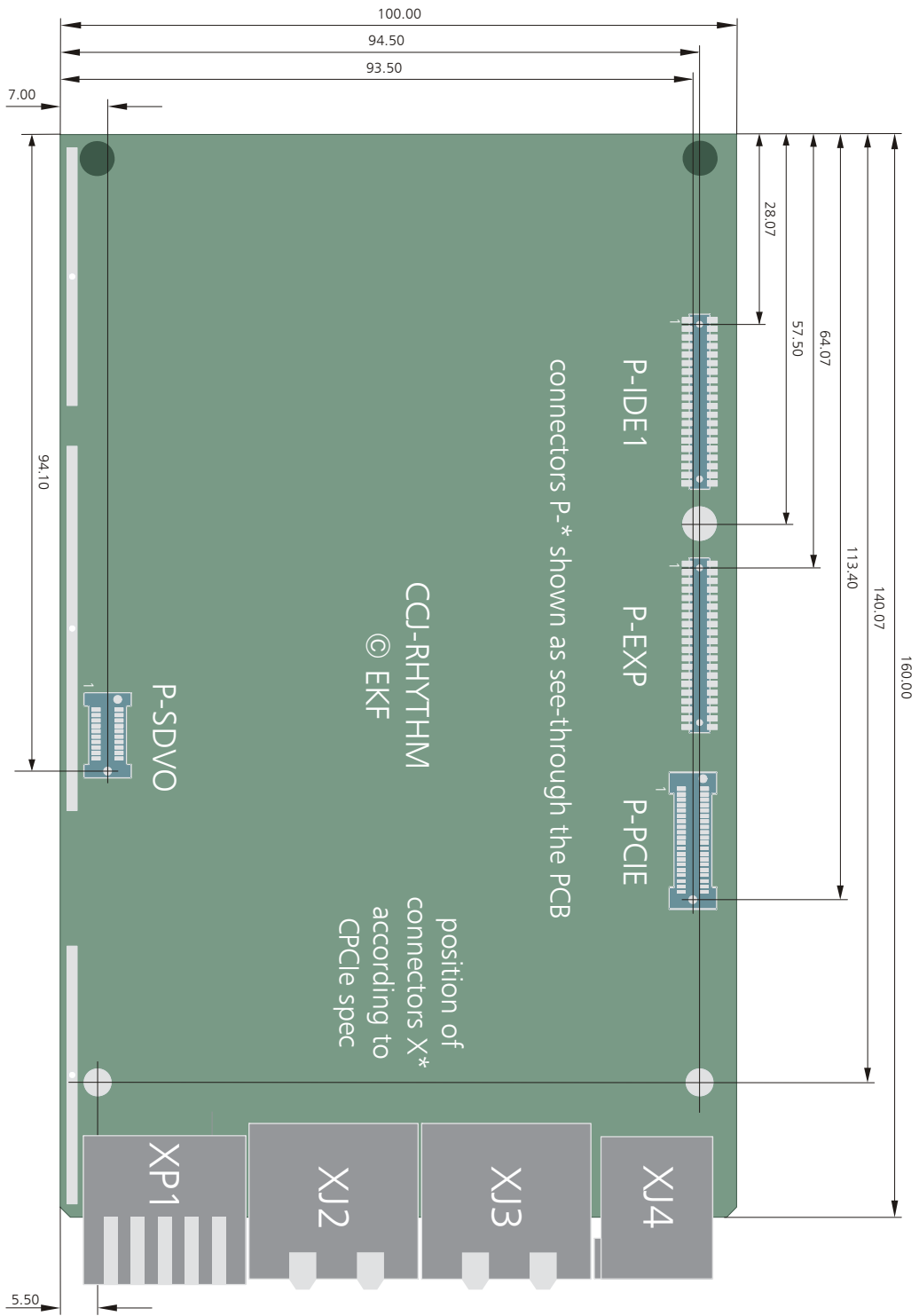




Power Distribution
CCJ-RHYTHM
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Position Drawing Inter-Board Connectors



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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