

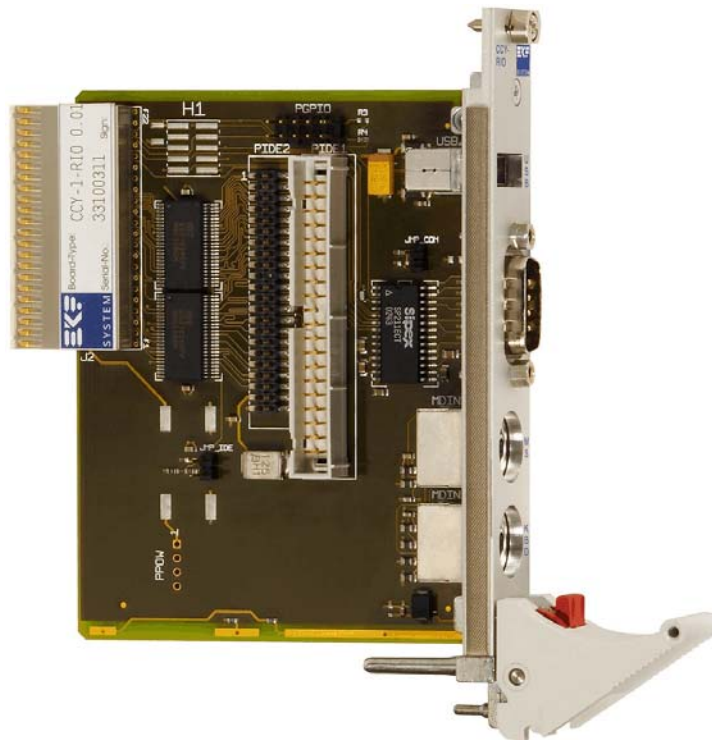


## Technical Information

### CCY-RIO • Rear I/O Transition Module

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## About this Manual

This manual is a short form description of the technical aspects of the CCY-RIO, 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 # 3109 ccyr0_tie.wpd	1	Technical Information CCY-RIO English Preliminary edition, to be completed later on	jj	7. Jul 03
	2	Changed illustrations: back panel, PS/2, USB	jj	14 October 2003
	3	Added assembly drawing	jj	29 October 2003
	4	Added images	jj	16 December 2003
	5	Added image of a single slot rear I/O backplane Added link to CC3-CAJUN documentation	jj	24 March 2006

## Related Documents

For a description of the CC2-TANGO CPU card, which may act as a controller board with respect to the CCY-RIO transition module, please refer to the correspondent CPU user guide, available by download at [http://www.ekf.com/c/ccpu/cc2/cc2\\_e.html](http://www.ekf.com/c/ccpu/cc2/cc2_e.html).



CC2-TANGO



CC3-CAJUN

For a description of the CC3-CAJUN CPU card, which may also act as a controller board with respect to the CCY-RIO transition module, please refer to the correspondent CPU user guide, available by download at [http://www.ekf.com/c/ccpu/cc3/cc3\\_e.html](http://www.ekf.com/c/ccpu/cc3/cc3_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.

Pentium, Celeron: ® Intel, **CompactPCI**: ® PICMG, Windows 2000, Windows XP: ® Microsoft

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.

## CCY-RIO Features

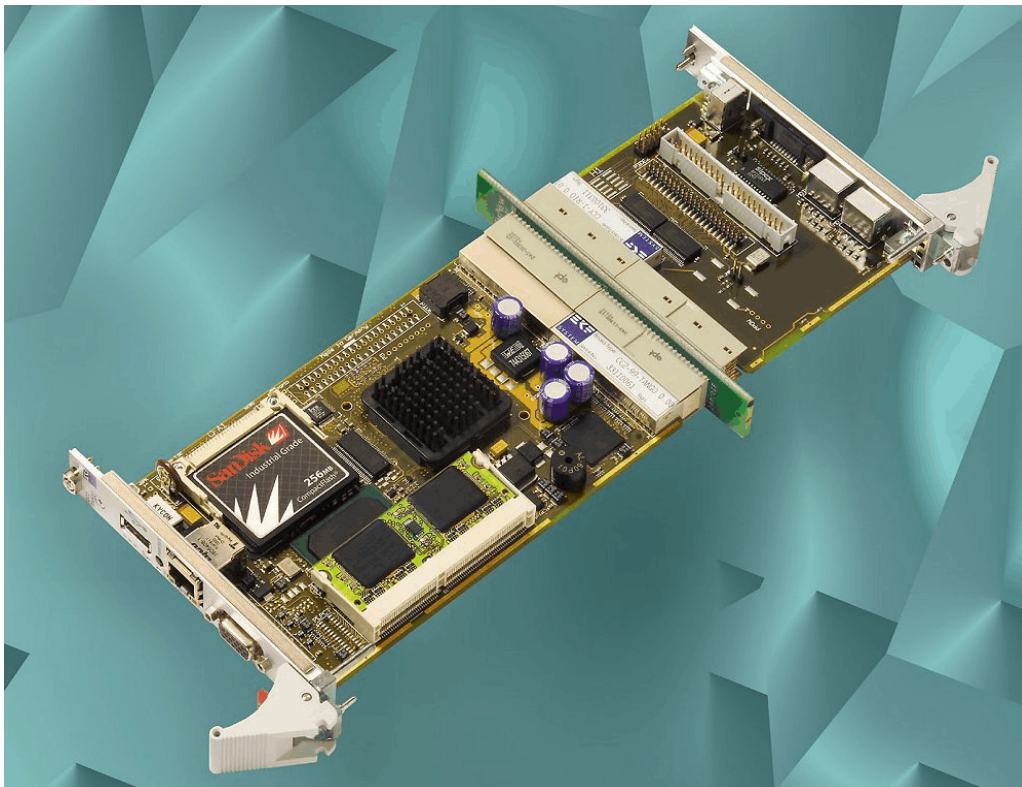
Feature Summary	
Form Factor	80x100mm <sup>2</sup> , back panel width 4HP (20.3mm), height 3U
On-Board Connectors	IDE/ATA 40-pin header 2.54mm, IDE/ATA 44-pin header 2.00mm, serial port header 2x5-position 2.00mm (TTL level), GPIO port header 2x5 position 2.54mm, +5V power connector
Back Panel Connectors	Keyboard/Mouse PS/2, Mouse PS/2, COM (RS-232E) 9-pos. D-Sub male, USB
CPCI Connector	J2metric connector 2.00mm 5x22



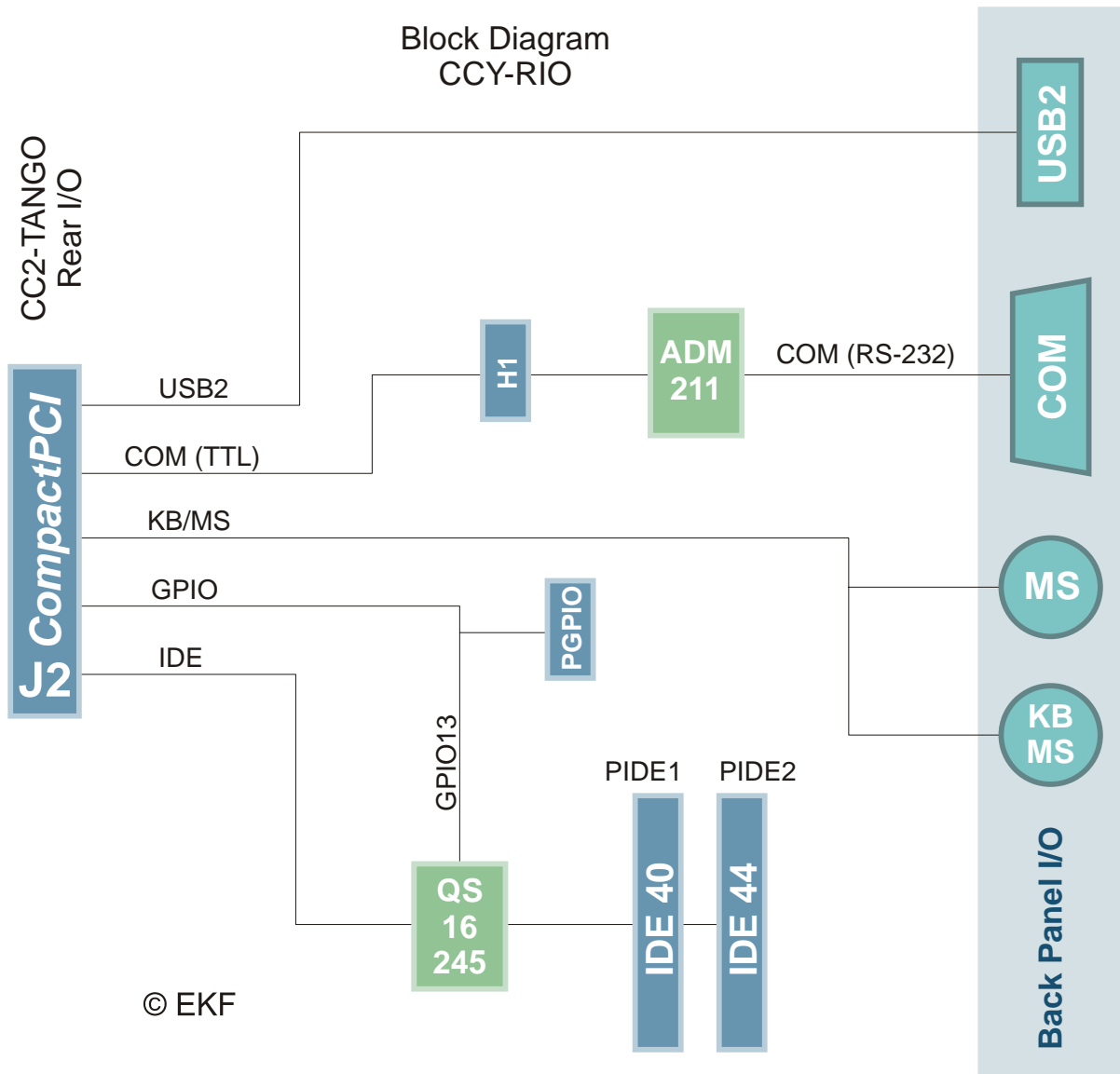
## Short Description

Available as a companion board to the CC2-TANGO or CC3-CAJUN CPU cards, the CCY-RIO is provided with several classic PC I/O ports. Being mainly a passive rear I/O transition module, groups of signals from the CC2 CPU board are passed across the CompactPCI J2/P2 connector to the CCY transition module. While the IDE signals are available locally on the CCY for internal attachment of ATA devices, other connectors like USB and PS/2 are mounted into the back panel for external use.

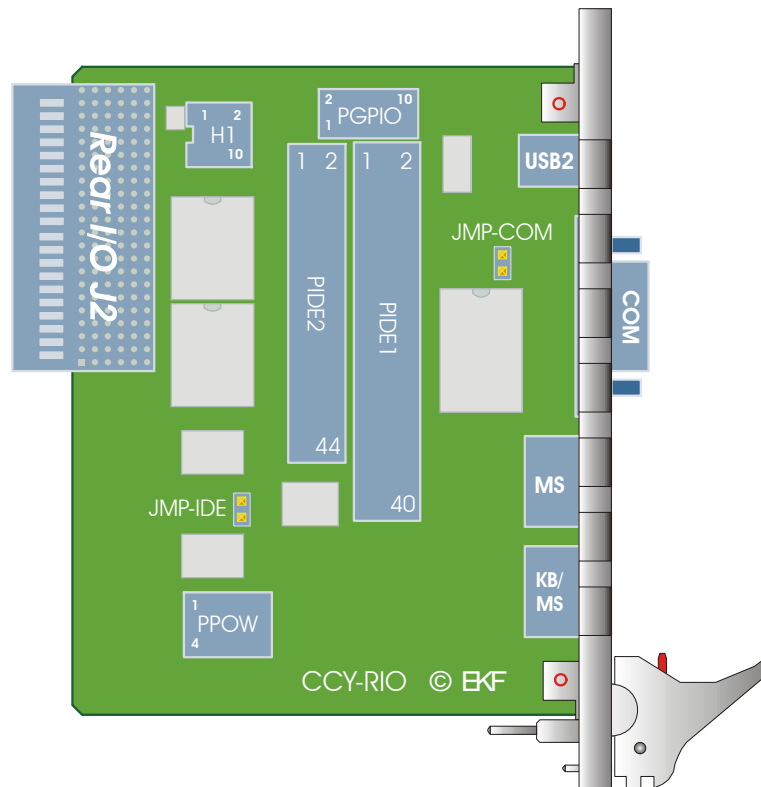
Utilization of the CCY-RIO transition module adds a level of I/O functionality, which is not available with a CC2/CC3 CPU board alone. Further on, swapping the CPU card is simplified by means of rear I/O, which is important for efficient system maintenance (MTTR).



Block Diagram



Top View Component Assembly



## On-Board Connectors

J2	CompactPCI receptacle, matches the CPCI backplane P2 connector
PIDE1	IDE 40-pin header, suitable for 3.5" hard disk drives and DVD drives
PIDE2	IDE 44-pin header, suitable for 2.5" hard disk drives
PGPIO	GPIO header, for custom specific use
H1	Serial interface header (TTL Level), suitable for attachment of the CU7-RS485 and CU8-RS232 PHY interface modules

With the exception of J2, all on-board connectors are provided as an option. Be sure to discuss your actual needs with EKF when ordering the CCY-RIO.

## Back Panel Connectors

KB	PS/2 style (Mini-DIN) connector. In addition to its native signals the connector KB (keyboard) incorporates mouse clock and data signals on the remaining free pins in order to allow attachment of both, KB and MS (mouse) devices across an external splitter cable (available as accessory).
MS	PS/2 style (Mini-DIN) connector, for attachment of a pointing device (mouse).
COM	9-pin male D-Sub connector, RS-232E serial interface
USB2	USB connector, USB 1.1 interface

## 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. source and from any telecommunication performing any of the procedures disconnect power, or telecommunication perform any procedures can result in Some parts of the system can continue to operate even though the power switch is in its off state.



Disconnect the system from its power links, networks or modems before described in this chapter. Failure to links before you open the system or personal injury or equipment damage.

#### Caution

Electrostatic discharge (ESD) can damage components. Perform the procedures described in this chapter only at an ESD workstation. If provide some ESD protection by wearing to a metal part of the system chassis or in its original ESD protected packaging. such a station is not available, you can an antistatic wrist strap and attaching it board front panel. Store the board only 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 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 (e.g. 10Base-2 BNC T-connector)

## 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)
Isolating Elements	ARP Datacom, 63115 Dietzenbach	Ordering No. 182 068 (Cheapernet T-connector)
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

### Caution

Some of the connectors may provide operating voltage (e.g. 5V) to devices inside the system chassis, such as internal drives. 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.

### General Considerations

Utilization of the CCY-RIO rear I/O transition module is bound to several preconditions, which must be completely satisfied.

- ▶ The CC2 and CC3 CPU cards by default are suitable for a 64-bit CompactPCI backplane. However, the J2/P2 pin assignments of a 64-bit CPCI backplane differ substantially from a CompactPCI rear I/O backplane. Hence [usage of the rear I/O features is available only as stuffing options on the CC2 CPU board, which have to be ordered explicitly](#). Pull-up resistor networks on the CPCI address/data lines AD33-AD63 and associated control signals must be removed, and pass-through resistor networks for the required rear I/O signals have to be filled on the CC2. Neither can these modifications be made afterwards on a CC2 64-bit J2 CPU board by the user, nor by EKF, due to the technical effort needed and costs incurred.
- ▶ [The system in use must be equipped with a P2 CompactPCI rear I/O backplane](#). If the system is provided with a P2 CompactPCI 64-bit backplane instead, several of the CC2 rear I/O signals will collide with the 64-bit address/data lines on the backplane, with unpredictable results regarding the rear I/O signal integrity.

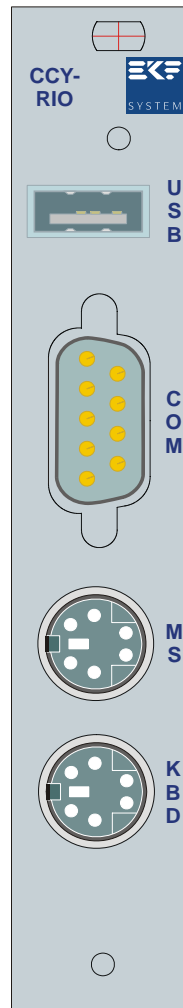


Single Slot Rear-I/O Backplane  
EKF Part No. 932.4.01.000

Please note, that EKF is not only a manufacturer of boards, but also has many years of experience as a system integrator. Please contact [sales@ekf.de](mailto:sales@ekf.de) for a quote on the complete system, tailored to your individual needs.

## Back Panel Connectors

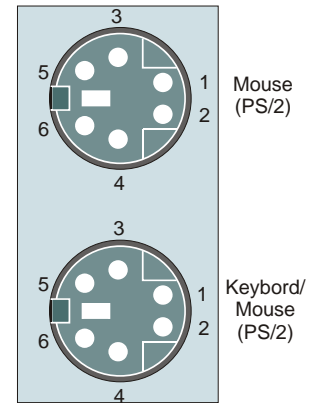
The CCY-RIO is provided with a 3U/4HP rear panel, which contains the PS/2 style keyboard and mouse jacks, a serial COM port D-SUB connector, and an USB receptacle. Characteristic features and the pin assignments of each connector are described on the following pages.



## Keyboard, Mouse

Keyboard	
1	DAT K
2	<i>DAT M</i>
3	GND
4	5V
5	CLK K
6	<i>CLK M</i>

Mouse	
1	DAT M
2	
3	GND
4	5V
5	CLK M
6	



The CCY-RIO rear I/O transition module is provided with both connectors MS (mouse) and KBD (keyboard). As an option, keyboard and mouse signals can be derived both from the connector KBD by means of a suitable splitter cable. The splitter is available as notebook computer accessory either from EKF or computer stores. Please note, that the mouse and keyboard function have been intentionally swapped against each other, in order to allow keyboard only attachment without splitter cable. When using the splitter cable, the mouse has to be connected to the keyboard splitter end, and the keyboard must be attached to the splitter end labelled with the mouse symbol.

The 5V pins of both connectors (pin 4) are protected against short-circuit situations on the CC2 CPU board by a Polyswitch resettable fuse.

In order to get the PS/2 ports working, the CC2 on-board SIO must be active. Enter the CC2 BIOS setup for checking the status.

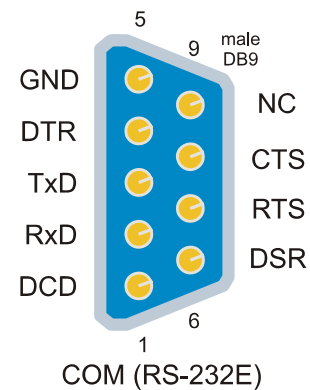
### Serial COM Port

The CC2 CPU board passes over its SIO (Super-I/O) serial interface to the CCY transition module as TTL level signals. The optional dual-row pin header H1 may be used for attachment of the rear I/O PHY module CU7-RS485, if an optically isolated EIA/TIA-485 interface is required.

H1 (Option) Metric Header 2x5 2.0mm TTL Level Serial Interface			
+5V	1	2	DSR#
NC RI#	3	4	RxD
TxD	5	6	DTR#
RTS#	7	8	CTS#
DCD#	9	10	GND

For RS-232E across the rear panel D-SUB connector however, H1 is not stuffed, and the CCY transition module is equipped with a RS-232 transceiver (ADM211E) instead.

DB1 (COM) D-SUB 9-Position Male Connector RS-232E Serial Interface			
		1	DCD
DSR	6		
		2	RxD
RTS	7		
		3	TxD
CTS	8		
		4	DTR
NC RI +5V	9		
		5	GND



The modem signal RI (ring indicator) is not supported on the CCY transition module. As an option, the CCY could be stuffed with a ferrite bead which delivers +5V power to pin 9 of the D-SUB connector.

Check the CC2 BIOS setup for activating the SIO and the serial interface.

## USB

The rear I/O USB port on the CCY transition module is independent from the CC2 CPU front panel USB interface, thus doubling the overall USB bandwidth available. The connector can source up to 500mA into external devices and is protected by an electronic switch located on the CC2 CPU board. The interface complies to the USB1.1 specification.

1	+5V (Electronic Switch 0.5A)
2	USB Data NEG
3	USB Data POS
4	GND



- 1 +5V
- 2 D-
- 3 D+
- 4 GND

## On-Board Connectors

The CCY-RIO transition module may be equipped with several on-board connectors for system internal usage. Be sure to specify your individual needs when ordering the CCY board. The on-board connectors optionally available are

- ▶ IDE connector 2 x 20 positions
- ▶ IDE connector 2 x 22 positions
- ▶ GPIO (General Purpose I/O) connector 2 x 5 positions
- ▶ Serial interface (TTL level) 2 x 5 positions
- ▶ External +5V power connector 1 x 4 positions, 2.50mm

The IDE and GPIO connectors are described hereafter. The on-board serial interface connector has been described in connection with the RS-232 D-SUB rear panel connector.

## IDE/ATA Connector PIDE1

The optional on-board connector PIDE1 is a dual row 2 x 20 pin header (2.54mm pitch), suitable for attachment of up to two 3.5-inch hard disks and/or CD-ROM or DVD drives, configured as master and slave devices attached to a common flat ribbon cable (use special 80-pin cabling assembly for Ultra ATA/66 and Ultra ATA/100 operation).

Usage of PIDE1 on the CCY transition module is an alternative to the primary IDE interface connector PIDE on the CC2 CPU board. Routing of IDE signals is extremely critical. No branches or open endings are allowed on the IDE bus. Therefore, either one of the rear I/O connectors PIDE1/PIDE2 may be in use, or the CPU board connector PIDE, but never two or three connectors simultaneously. Consequently, a CC2 CPU board intended for rear I/O IDE attachment will not be equipped with its IDE connector. If the CCY rear I/O transition module is stuffed with either connector PIDE1 or PIDE2, the CCY is also provided with analog switches, which allow to cut off the IDE bus close to the CompactPCI connector J2, in order to reduce signal reflections if neither PIDE1 nor PIDE2 are in use. By default, the switches are set to 'on' (pass through). The GPIO13 line of the CC2 CPU on-board SIO is used to enable/disable the IDE switches on the CCY transition module. Check the CC2 BIOS setup for the appropriate settings.

PIDE1			
reset#	1	2	GND
d07	3	4	d08
d06	5	6	d09
d05	7	8	d10
d04	9	10	d11
d03	11	12	d12
d02	13	14	d13
d01	15	16	d14
d00	17	18	d15
GND	19	20	KEY
dmarq	21	22	GND
iow#	23	24	GND
ior#	25	26	GND
iordy	27	28	GND
dmack#	29	30	GND
intrq	31	32	
a1	33	34	66MHz
a0	35	36	a2
cs1#	37	38	cs3#
act#	39	40	GND

## IDE/ATA Connector PIDE2

The optional CCY transition module on-board connector PIDE2 is a dual row 2 x 22 pin header (2.00mm pitch), suitable for attachment of up to two 2.5-inch hard disk drives, configured as master and slave devices attached to a common flat ribbon cable. Both connectors PIDE1 and PIDE2 are assigned to the primary IDE interface of the CC2 CPU board. Because no branches or open endings are allowed on the IDE bus, only a single connector, either one of the rear I/O connectors PIDE1 and PIDE2, or the CPU board connector PIDE may be in use. PIDE1/PIDE2 can be deactivated by means of analog switches provided on the CCY transition module as described in the chapter "IDE/ATA Connector PIDE1" of this manual.

The metric connector PIDE2 matches the typical 2.5-inch hard disk drive connector. Suitable 1.00mm pitch flat ribbon cable assemblies are available from EKF. The CompactPCI specification does not assign +5V to the connector J2, but the CC2 CPU board is provided with a 0.75A Polyswitch for passing +5V power to the CCY transition module across a single J2 pin. Therefore, if drive power is sourced directly by the CCY across PIDE2, the maximum power consumption of the attached IDE device should be less than ~3W.

PIDE2			
reset#	1	2	GND
d07	3	4	d08
d06	5	6	d09
d05	7	8	d10
d04	9	10	d11
d03	11	12	d12
d02	13	14	d13
d01	15	16	d14
d00	17	18	d15
GND	19	20	KEY
dmarq	21	22	GND
iow#	23	24	GND
ior#	25	26	GND
iordy	27	28	GND
dmack#	29	30	GND
intrq	31	32	
a1	33	34	
a0	35	36	a2
cs1#	37	38	cs3#
act#	39	40	GND
drvpwr	41	42	drvpwr
GND	43	44	

## GPIO Connector PGPIO

The CC2 CPU board is provided with an on-board SIO, which makes available several general purpose input/output signals. Five of the +5V level GPIOs are passed through to the CCY rear I/O transition module, connector GPIO (optional), dual row 2 x 5, 2.54mm pin header.

- ▶ GPIO13 - used as an active low input to the CC2 CPU while detecting the presence of the CCY rear I/O module, and used as an active low output to the CCY for enabling/disabling the IDE analog switches (if stuffed), or user definable TTL input/output (8mA sink). A 4.7k pull-down resistor is provided on the CCY GPIO13 typically.
- ▶ GPIO20 - used as PXI J2 Trig0 in a PXI environment, or user definable TTL input/output (8mA sink, 50k P/U)
- ▶ GPIO21 - used as PXI J2 Trig1 in a PXI environment, or user definable TTL input/output (8mA sink, 50k P/U)
- ▶ GPIO26 - used as PXI J2 Trig6 in a PXI environment, or user definable TTL input/output (24mA sink, 50k P/U)
- ▶ GPIO27 - used as PXI J2 Trig7 in a PXI environment, or user definable TTL input/output (24mA sink, 50k P/U)

PGPIO (Option) Pin Header 2x5 2.54mm TTL Level GPIO Signals			
SIO GPIO20 (PXI Trig0)	1	2	SIO GPIO27 (PXI Trig7)
SIO GPIO21 (PXI Trig1)	3	4	SIO GPIO26 (PXI Trig6)
NC	5	6	NC
NC	7	8	NC
SIO GPIO13	9	10	GND

### Power Connector PPOW

The CCY rear I/O transition module can be supplied with +5V across the J2 connector from the CC2 CPU board. +5V would be required for the CCY on-board RS-232E transceiver, and for IDE devices possibly attached to the 44-lead connector PIDE2, which passes directly power to the drive(s). With a maximum of 0.75A current from J2, only a single, low power consuming drive could be installed.

With the optional connector PPOW, the systems power supply can be directly connected to the CCY transition module, up to a maximum of 3A @5V. The connector is an AMP EI series 4-position header, being very popular since it is used also on 3.5-inch floppy disk drives.

PPOW (Option) Pin Header 1x4 2.50mm +5V Power	
+5V	1
GND	2
GND	3
NC	4

## CompactPCI J2

#J2	A	B	C	D	E
22	GA4	GA3	GA2	GA1	GA0
21	CLK6	GND	RSV KB_DAT	RSV KB/MS_POW	RSV MS_DAT
20	CLK5	GND	RSV KB_CLK	GND	RSV MS_CLK
19	GND	GND	RSV COM1_TXD	RSV COM1_RXD	RSV COM1_RTS#
18	BRSVP2A18	BRSVP2B18	BRSVP2C18	GND	BRSVP2E18 PXI_TRIG6
17	BRSVP2A17	GND	PRST#	REQ6#	GNT6#
16	BRSVP2A16 PXI_TRIG1	BRSVP2B16 PXI_TRIG0	DEG#	GND	BRSVP2E16 PXI_TRIG7
15	BRSVP2A15 MOD_DET#	GND	FAL#	REQ5#	GNT5#
14	AD35 IDE_RST#	AD34 IDE_D7	AD33 IDE_D8	GND	AD32 IDE_D6
13	AD38 IDE_D9	GND	V(I/O)	AD37 IDE_D5	AD36 IDE_D10
12	AD42 IDE_D4	AD41 IDE_D11	AD40 IDE_D3	GND	AD39 IDE_D12
11	AD45 IDE_D2	GND	V(I/O)	AD44 IDE_D13	AD43 IDE_D1
10	AD49 IDE_D14	AD48 IDE_D0	AD47 IDE_D15	GND	AD46 IDE_DRQ
9	AD52 IDE_IOW#	GND	V(I/O)	AD51 IDE_IOR#	AD50 IDE_IORDY
8	AD56 IDE_DACK#	AD55 IDE_INT	AD54 IDE_A1	GND	AD53 IDE_66MHz
7	AD59 IDE_A0	GND	V(I/O)	AD58 IDE_A2	AD57 IDE_CS1#
6	AD63 IDE_CS3#	AD62 IDE_ACT#	AD61 COM1_CTS#	GND	AD60 COM1_DSR#
5	C/BE5# COM1_DTR#	GND (64EN#)	V(I/O)	C/BE4# USB2_POW	PAR64 USB2_D+
4	V(I/O)	BRSVP2B4 +5V/0.75A	C/BE7# COM1_DCD#	GND	C/BE6# USB2_D-
3	CLK4	GND	GNT3#	REQ4#	GNT4#
2	CLK2	CLK3	SYSEN#	GNT2#	REQ3#
1	CLK1	GND	REQ1#	GNT1#	REQ2#

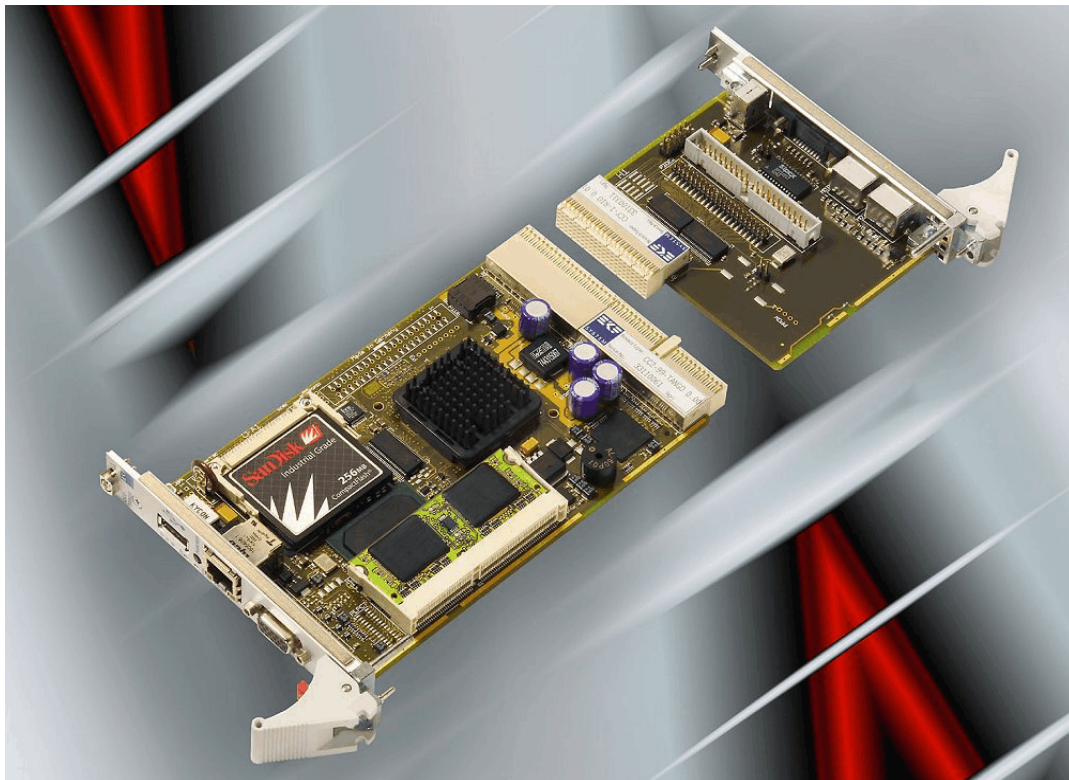
Pin 4B is used to supply the CCY-RIO rear I/O transition module with +5V power. The accompanying Polyswitch resettable fuse is located on the CC2 CPU board. The +5V power line is needed for the RS-232 transceiver ADM211, and optionally for an attached IDE device (observe limited power consumption requirements). The USB power line (pin 5B) is separately available, just as the keyboard/mouse power (pin 21D). While the USB power line is short-circuit protected by an electronic switch on the CC2 CPU board, the KBD/MS power is protected by a Polyswitch resettable fuse.

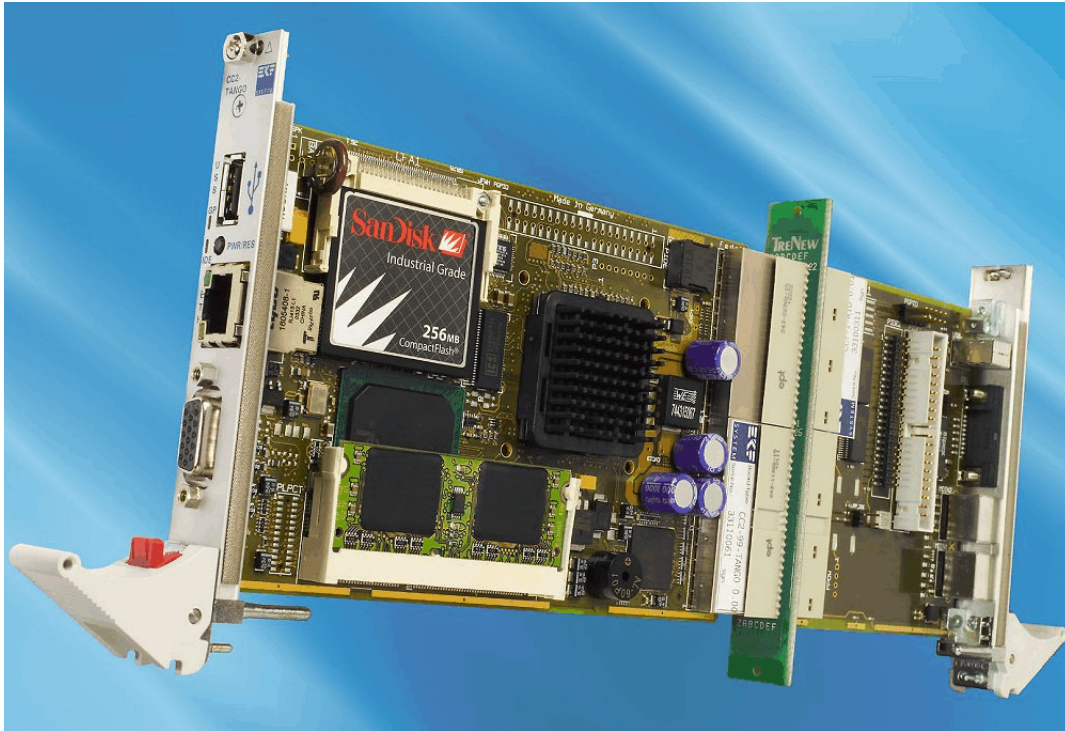
Pin 15A is used to detect the presence of the CCY module in a system. The signal mod\_det# is terminated with a 4.7k pull-down resistor on the CCY, and routed to the CC2 on-board SIO GPIO13. Without the CCY being present, the SIO recognizes a '1' from the GPIO13 input (internal 50k P/U), otherwise a '0' is detected. The signal mod\_det# is also used to control the analog switches which unblock the IDE 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](mailto:sales@ekf.de) for details.

EKF reserves the right to refuse distribution of confidential information material for any reason that EKF may consider substantial.





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