



## Product Information

### CU2-QUARTET • *CompactPCI*<sup>®</sup> Intelligent 4-Port Serial Interface

Document No. 1919 • Edition 09/2003

*Still the most common industrial data transfer method: the asynchronous serial interface according to RS-232 and RS-485.*

A total of 4 serial ports (16550 type UART) provides the intelligent *CompactPCI*<sup>®</sup> hostadapter **CU2-QUARTET**, each capable of bitrates up to 230.4kBaud and individually configurable according to either RS-232E or RS-485.

Achieved by the available drivers software, the UARTs can be used by the host CPU like they were legacy COM ports. Thanks to the boards local intelligence, preprocessing and buffering of the serial data streams is also at the users choice, thus reducing considerably the hosts interrupt load.

Especially when operated with higher baudrates, the host CPU performance can be improved noticeable when using block transfers compared to the single character read/write method.

Equipped with the powerful embedded processor i960RP(D), the board profits from the built-in PCI bridge as interface to the *CompactPCI*<sup>®</sup> system bus. 4MB DRAM and 4MB Flash EEPROM offer generous local data buffering and program space.

Hence the CU2-QUARTET is ideally suited for all hard real-time applications with demand for serial interfaces, e.g. data acquisition, data concentration, machine control or fieldbus gateway.



All ports are directly available from the CU2-QUARTET front panel. Due to the height of 3U, the board is provided with four 10-position high density metric I/O connectors (system *har-link*<sup>®</sup>); one of the ports is additionally equipped with a D-SUB-9 connector maintaining compatibility to the desktop PC COM port. Assembled cable harnesses for the *har-link*<sup>®</sup> connector type are available in several configurations.

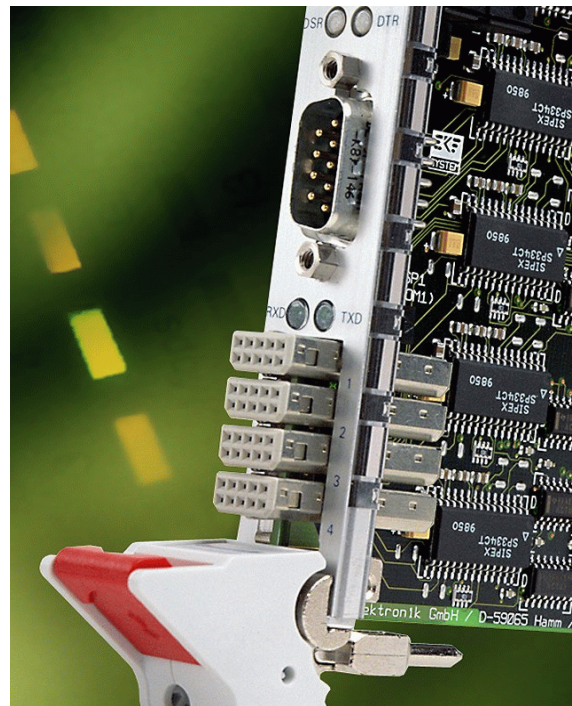
Each port allows individual transceiver configuration according to either RS-232E or RS-485/422 by a single jumper. In addition, all 4 UART channels are wired as TTL-level signals to the rear connector J2 (option). By employing external transition modules with built-in transceivers, any other popular industrial standard can be realized, including isolated interfaces.

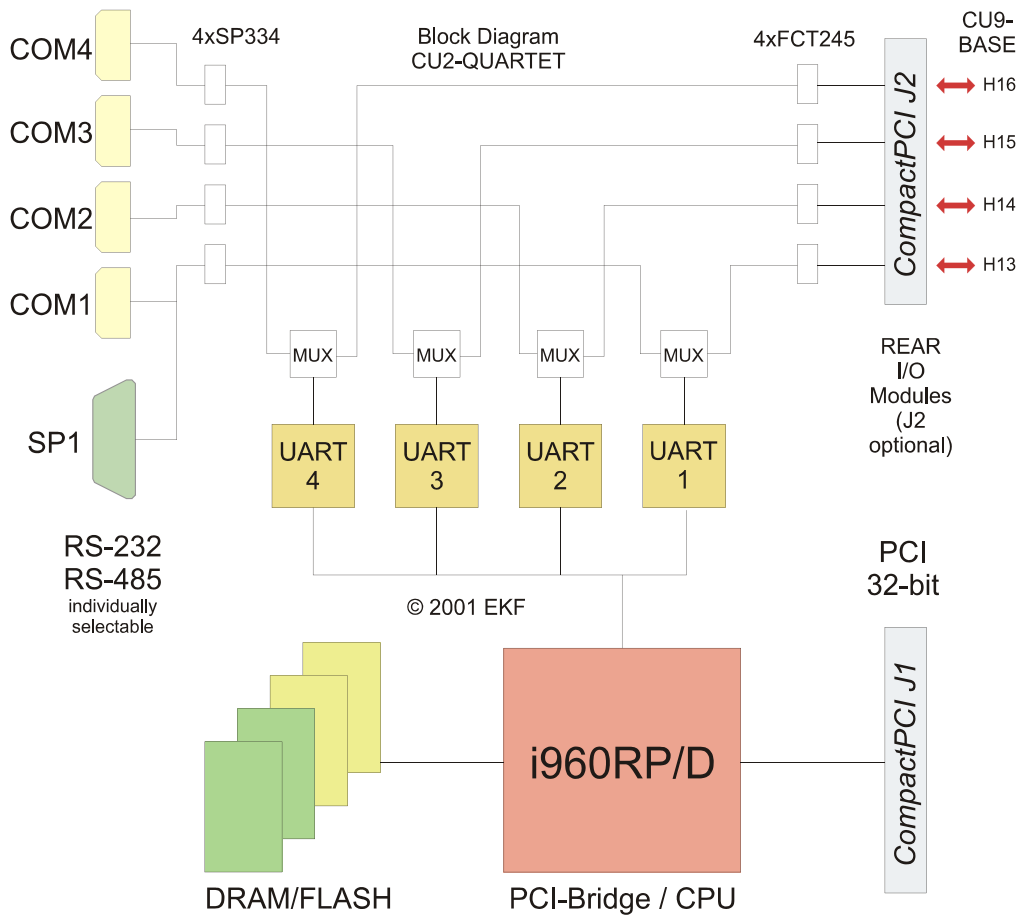
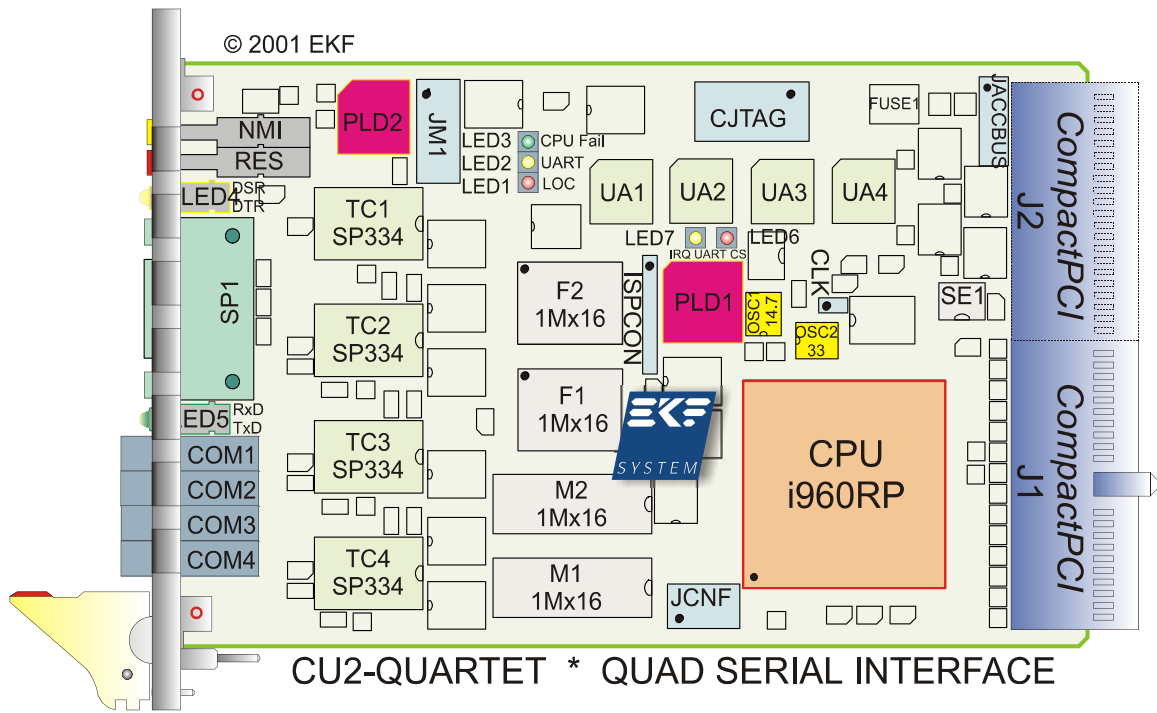
The EKF drivers treat the CU2-QUARTET module as 16C550 compatible COM ports. The drivers allow arbitrary names e.g. COM3..COM6 to be associated with the ports of a QUARTET.

Developers might prefer to collect serial data for block transfers or local preprocessing directly on the QUARTET board. Program and data can be stored in a generous amount of local memory (4MB DRAM and 4MB Flash EEPROM). As a development tool, EKF provides the resident monitor/debugger MON960, which allows stand-alone operation and download of programs via CPCI bus or serial interface. Furthermore EKF can offer turn key ready application programming support.

The CU2-QUARTET hardware supports the I<sub>2</sub>O interface. This is a layered, standardized driver concept, modelled after the OSI reference, suitable especially for intelligent I/O sub-processors.

*Use of the CU2-QUARTET intelligent operation mode frees the host-CPU from critical low level tasks, an essential criterion for real-time applications. Because the QUARTET can be supplemented by a variety of external transition (transceiver) modules for popular serial interface standards, it is a smart and flexible solution to many different industrial applications, offering a fast time to market at moderate cost.*

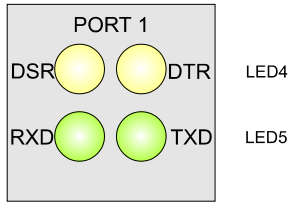




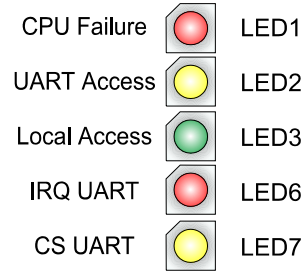
Technical Specifications		
Board	Dimensions	3U Eurocard (100x160mm <sup>2</sup> ), front panel width 20.3mm (4HP), mechanics constructed with respect to EMC requirements, ejector lever
CPU	Microprocessor	Intel i960RP/RD, 3.3V, 33/66MHz, clocked by system bus (local oscillator provided when operated as stand-alone)
	Memory	4MBytes FPM/EDO DRAM, 32-bit, 4MBytes FLASH ROM (SMT) 28F160S5 (Intel, Sharp), 32-bit
	Utilities	Watchdog and 5V/3.3V voltage-supervisor MAX705, serial EEPROM 4KByte I <sup>2</sup> C, optional: ACCESS.bus interface
	Firmware	Mon960 Monitor/Debugger available
Serial Interfaces	Interface Type	Asynchronous, serial protocol: 1 startbit; 7 or 8 databits; 1 or 2 stopbits; optional even/odd parity; standard bitrates up to 230.4 kbps
	Serial Interface Controller	16C550 asynchronous communication element, Texas Instruments TL16C550C or equivalent
	Physical Interface RS-232 and RS-485	RS-232E/V.28 including modem support, alternatively RS-485 full-duplex (RxD/TxD and DSR/DTR) individually selectable for each port, dual-mode transceiver SP334 (up to 230.4kbps @ RS-232, 10Mbps @ RS-485), 2kV ESD
	Connectors SP1, COM1..4	1 x D-SUB-9 connector (SP1), 4 x <i>har-link</i> <sup>®</sup> 10-position I/O connector (COM1..4), protruding through front panel cutouts
	Connector J2 (Option)	Additionally all UART ports available as buffered TTL signals across <i>CompactPCI</i> J2 connector for external transition-modules (option only, J2 <b>must</b> be omitted for 64-bit CPCI bus slots)
	Drivers	Serial drivers (COM port emulation) available by download for Windows NT4.0 and Windows 2000, others forthcoming
<i>CompactPCI</i> <sup>®</sup> Bus	Connector J1	32-Bit DMA Bus Master (133MB/s) 5V Interface
Power Supply	Connector J1	+5V ±5% 0.5A max. (current consumption by optional external transition- and rear-I/O modules not included) +3.3V ±0.3V 0.7A (i960RP) 0.9A (i960RD) max.
Temperature Humidity	Commercial Grade Version	operating temperature 0-70°C humidity 5-90% non condensing

*specifications are subject to change without further notice*

CU2-QUARTET  
LED Beschriftung Frontplatte



CU2-QUARTET  
On-Board SMT LEDs



Jumper

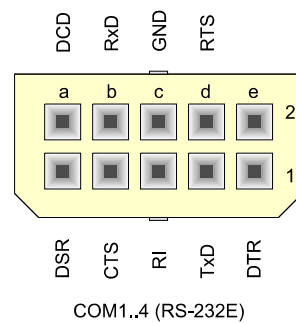
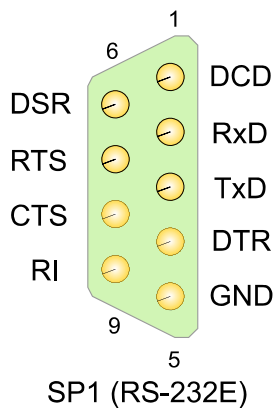
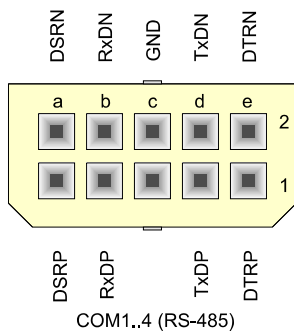
JCLK	CPU clock local/CPCI
JCNF	CPU behaviour after reset, effects of CPCI reset on CU2-QUARTET
JSER	Serial transceiver mode selection RS-232 or RS-485. If RS-485 has been chosen, drivers can be activated by RTS low, RTS high, or fix on

Internal Connectors (Option)

CJTAG	JTAG test port
ISPCON	ispGAL programming port
JACCBUS	I <sup>2</sup> C-Bus expansion slot

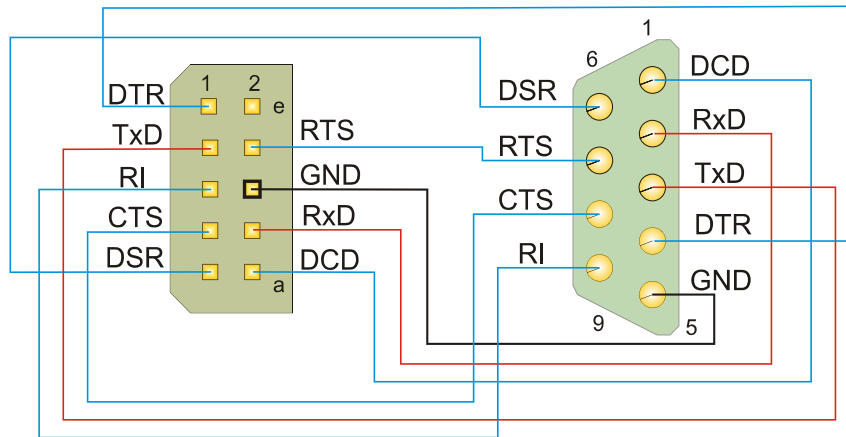
Front Panel Connectors

SP1	Serial Port 1, D-SUB 9 connector, PC compatible pin-out when in RS-232 mode
COM1-COM4	Serial Port 1-4 (COM1 in parallel to SP1), metric I/O connectors. Note: do not confuse connector assignment COM1..4 with arbitrary serial port naming by software drivers



### Emulation Cable RS-232

CU2-QUARTET serial ports COM1...COM4  
to PC compatible D-SUB connector



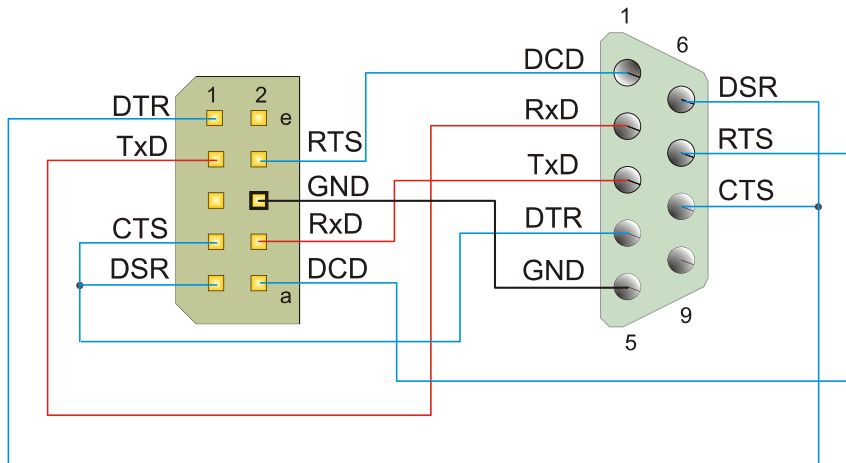
har-link I/O metric male connector  
HARTING part no. 27 11 161 8001  
EKF part no. 250.0205.20.01

shielded male D-SUB connector

use shielded data cable only  
complete cable assembly available on request

### Link Cable RS-232

for interconnection between CU2-QUARTET  
serial ports COM1..COM4 and PC COM port

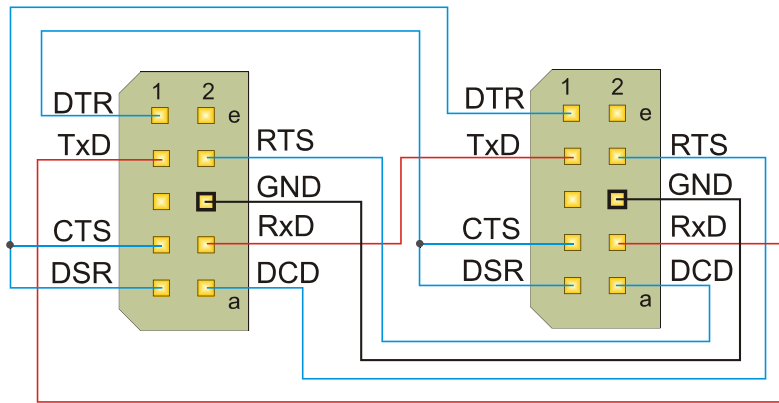


har-link I/O metric male connector  
HARTING part no. 27 11 161 8001  
EKF part no. 250.0205.20.01

shielded female D-SUB 9 connector

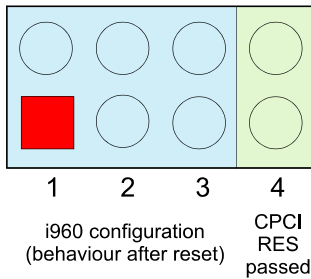
use shielded data cable only  
complete cable assembly available on request

### Link Cable RS-232 for interconnection between CU2-QUARTET serial ports COM1...COM4



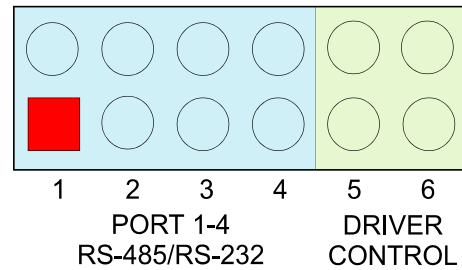
har-link I/O metric male connectors  
HARTING part no. 27 11 161 8001  
EKF part no. 250.0205.20.01  
use shielded data cable only  
complete cable assembly available on request

#### JCNF



**JCNF example configuration:**  
(1) local CPU idle after CPCI reset  
(2) local CPU accepts CPCI config cycles  
(3) no internal CPU selftest after CPCI reset  
(4) CPCI reset passed through to local reset

#### JSER

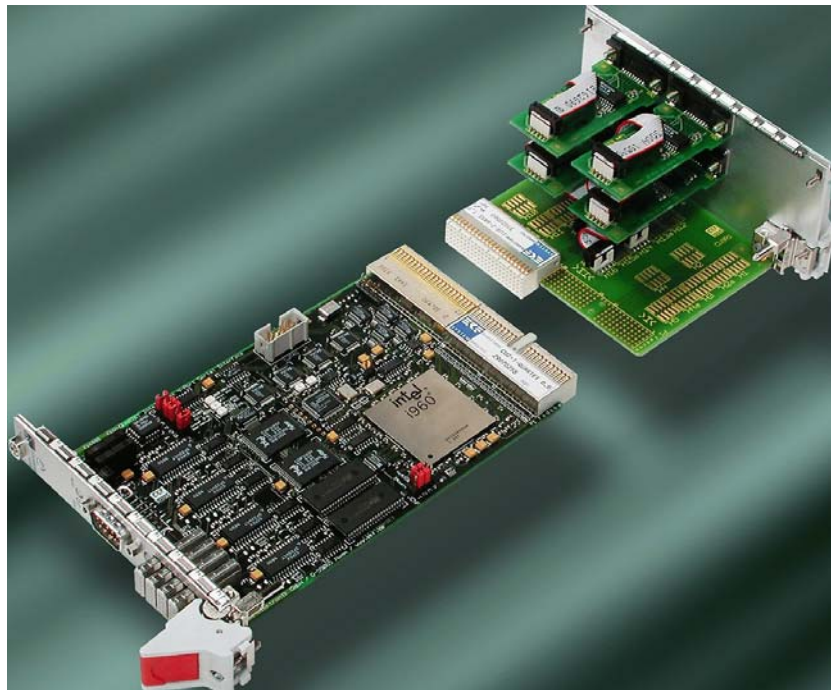


**JSER example configuration:**  
(1) PORT1 configured as RS-485  
(2) PORT2 configured as RS-232  
(3) PORT3 configured as RS-485  
(4) PORT4 configured as RS-232  
(5/6) RS-485 drivers enabled with RTS=low

Optional Connector J2  
(Rear-I/O)

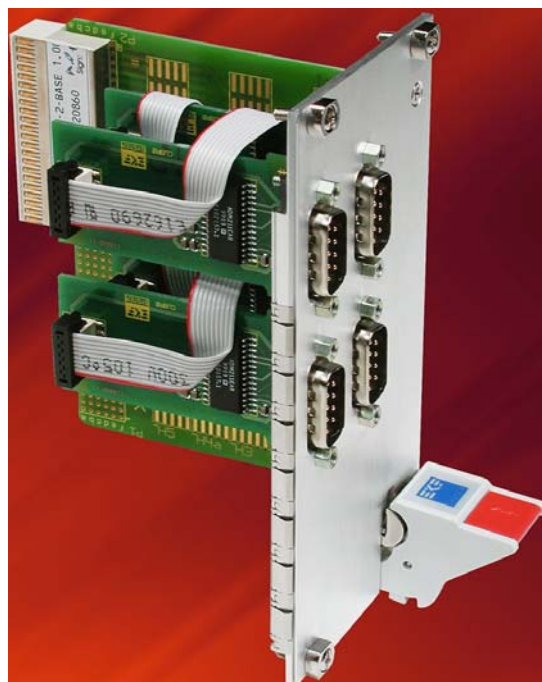
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22					
21					
20					
19					
18					
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14					
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12					
11					
10					
9					
8	DSR1#	RXD1	DTR1#	CTS1#	GND
7	+5V	RI1#	TXD1	RTS1#	DCD1#
6	DSR2#	RXD2	DTR2#	CTS2#	GND
5	+5V	RI2#	TXD2	RTS2#	DCD2#
4	DSR3#	RXD3	DTR3#	CTS3#	GND
3	+5V	RI3#	TXD3	RTS3#	DCD3#
2	DSR4#	RXD4	DTR4#	CTS4#	GND
1	+5V	RI4#	TXD4	RTS4#	DCD4#

The pin-out of the optional J2 connector matches the transition board CU9-2-BASE, allowing for attachment of rear-I/O PHY modules (CU7/CU8 series). The connector J2 must not be stuffed if the CU2-QUARTET is intended for use on a 64-bit CompactPCI backplane slot due to signal conflicts between a rear-I/O and a 64-bit backplane!



CU2 with Transition Module CU9-2-BASE  
and Rear-I/O PHY Interface Modules CU7/CU8

The rear-I/O signals, derived from the CU2-QUARTET, are passed via its (optional) CPCI connector J2, across the backplane, to the additionally available transition board CU9-2-BASE. There are four headers (H13..H16) provided for attachment of up to 4 rear-I/O PHY interface modules of the CU7/CU8 series across micro-ribbon flat cables. The PHY interface modules can be directly mounted to the 12HP back panel of the CU9-2-BASE transition board.



CU9-2-BASE with PHY Modules

Ordering Information		
Alias	Ordering No.	Short Description
QUARTET	CU2-1-QUARTET	3U, <i>CompactPCI</i> 4-port serial asynchronous interface subsystem with i960RP CPU/bridge, 4MB Flash, 4MB DRAM, MON960, individually selectable RS-232/RS-485, available from front panel, ports additionally routed across J2 as TTL level signals for use with rear-I/O interface modules (option only, J2 is regularly omitted in order not to interfere with 64-bit CompactPCI backplanes)
RS485	CU7-1-RS485	RS-485/RS-422 Rear I/O PHY interface module, 1 port, 2.5Mbps two wire transmission line (party line), electrically isolated
RS485	CU7-2-RS485	RS-485/RS-422 Rear I/O PHY interface module, 1 port, 2.5Mbps 4-wire transmission line (point-to-point), electrically isolated
RS232	CU8-1-RS232	RS-232E/V.28 rear-I/O interface module, including flat cable assembly
	CU9-2-BASE	Transition board, bridging function between CU2-QUARTET (J2) and rear-I/O PHY interface modules, 4 ports, 3U/12HP back panel
	250.0205.30.04	1m Cable harness Har-Link to D-Sub 9-position male connector, emulates PC COM port, D-Sub hood with nuts 4/40 UNC
	250.0205.30.05	2m Cable harness Har-Link to Har-Link connector, to be used as RS-232 link-cable (null-modem) between CU2-QUARTET boards
	250.0205.30.06	Similar to 250.0205.30.04, but D-Sub hood with screws
	250.0205.30.07	2m Cable harness, single Har-Link connector with open cable ending, to be finished by the customer
	280.7.201	Link-cable (null-modem), female D-Sub 9-position connectors, suitable in combination with 250.0205.30.04 for data exchange between CU2-QUARTET and PC COM port



250.0205.30.04



250.0205.30.06



280.7.201

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