



Product Information

CUD-TWIST • *CompactPCI*[®] • Quad Isolated RS-485 I/F

Document No. 8174 • 28 July 2016



Short Description

Proven and reliable, RS-485 (EIA/TIA-485) stays a popular fieldbus communication interface, due to simple installation via low cost twisted pair copper cables, up to 1200m length.

The CUD-TWIST is a peripheral slot card for CompactPCI® systems, equipped with four isolated front panel RS-485 ports. High speed RS-485 balanced line transceivers with internal 5kV isolation barrier provide for optimum noise and EMC immunity.

The CUD-TWIST is equipped with an octal PCI Express® to UART bridge. The 950-style UARTs are compatible with many asynchronous serial applications and protocols. Four isolated EIA/TIA-485 transceivers are wired to RJ45 front panel jacks, individually configurable for full-duplex operation (4+1 wire cable) or half-duplex (2+1 wire cable), either point-to-point or multipoint applications. Another four UART channels are wired to the CompactPCI® backplane connector J2 for rear I/O usage.



Feature Summary

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CompactPCI®

- ▶ PICMG® CompactPCI® Classic (CPCI 2.0) standard
- ▶ Single size Eurocard 3U 4HP 100x160mm²
- ▶ Suitable for CompactPCI® peripheral slot
- ▶ CompactPCI® backplane connector J1 for PCI® 32-bit 33/66MHz support
- ▶ Option CompactPCI® backplane connector J2 for rear I/O (4 x UART TTL level signals)
- ▶ On-board PCI® to PCI Express® bridge
- ▶ Option +5V only power supply

UART

- ▶ Pericom® PCI Express® octal UART PI7C9X7958
- ▶ High performance 950-class UARTs
- ▶ 16C550 software compatible
- ▶ 128-Byte FIFO for each transmitter/receiver
- ▶ Baud rate up to 15Mbps
- ▶ XON/XOFF in-band flow control
- ▶ CTS/RTS or DSR/DTR out-of-band control & driver enable signal for PartyLine operation
- ▶ Data frame 5, 6, 7, 8 and 9 bits
- ▶ Clock prescaling 4 to 46
- ▶ Windows® & Linux device driver support

Feature Summary

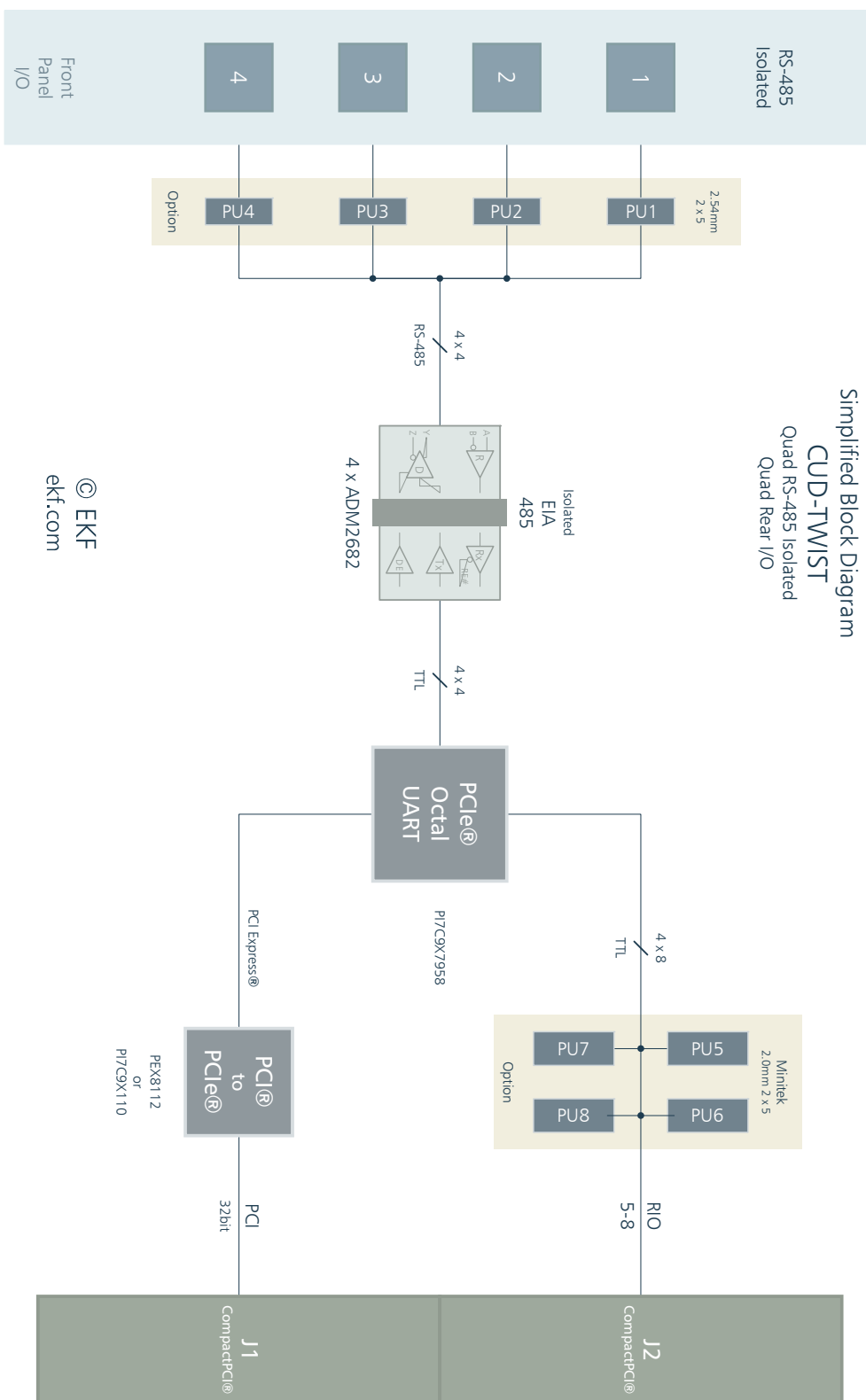
RS-485 Transceivers

- ▶ 5kV rms isolation barrier RS-485/RS-422 transceivers (Analog Devices)
- ▶ Configurable as half- or full-duplex
- ▶ ± 15 kV ESD protection on RS-485 input/output pins
- ▶ Transceiver data rate 16Mbps max.
- ▶ Connect up to 256 nodes on one PartyLine bus (driver enable control via dedicated UART mode select outputs)
- ▶ Open- and short-circuit, fail-safe receiver inputs
- ▶ High common-mode transient immunity >25 kV/ μ s
- ▶ Thermal shutdown protection
- ▶ 4 x Front panel RJ45 connectors 8-lead, three different pin assignments available by order:
 - ▶ - RJ45 CUD-TWIST native pin order, optimized for full-duplex via Ethernet cross-over patch cables
 - ▶ - RJ45 CU4-SOPRANO legacy pin arrangement for seamless changeover of applications
 - ▶ - RJ45 Half-duplex operation optimized via straight Ethernet patch cable
- ▶ RS-485 front ports isolated against each other and board circuitry
- ▶ On-board DIP-switches for full/half-duplex setting, and line termination on/off
- ▶ Ordering option D-Sub 9-pin front panel connectors (4 ports require 8HP F/P)

Environment, Regulatory

- ▶ Designed & manufactured in Germany
- ▶ Certified quality management according to ISO 9001
- ▶ Long term availability
- ▶ Rugged solution (coating, sealing, underfilling on request)
- ▶ Custom specific modifications on request
- ▶ RoHS compliant
- ▶ Operation temperature -40°C to $+85^{\circ}\text{C}$ (industrial temperature range)
- ▶ Storage temperature -40°C to $+85^{\circ}\text{C}$, max. gradient $5^{\circ}\text{C}/\text{min}$
- ▶ Humidity 5% ... 95% RH non condensing
- ▶ Altitude -300m ... $+3000\text{m}$
- ▶ Shock 15g 0.33ms, 6g 6ms
- ▶ Vibration 1g 5-2000Hz
- ▶ MTBF 34.7 years ore better (depends on stuffing options)
- ▶ EC Regulations EN55022, EN55024, EN60950-1 (UL60950-1/IEC60950-1)

Block Diagram



Simplified Block Diagram
CUD-TWIST
 Quad RS-485 Isolated
 Quad Rear I/O

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 ekf.com

www.ekf.com/c/com/cud/img/cud_blk.pdf

Theory of Operation

The CUD-TWIST is equipped with the Pericom PI7C9X7958 PCI Express[®] octal UART, which is suitable for asynchronous baud rates up to 15Mbps. Four UART channels are wired to RJ45 front panel jacks across RS-485 transceivers. According to the RS-485 transmission line standard, only the UART receive and transmit data signals are in use, and in addition output pins which act as RS-485 driver and receiver enable control, as required for half-duplex multipoint configurations.

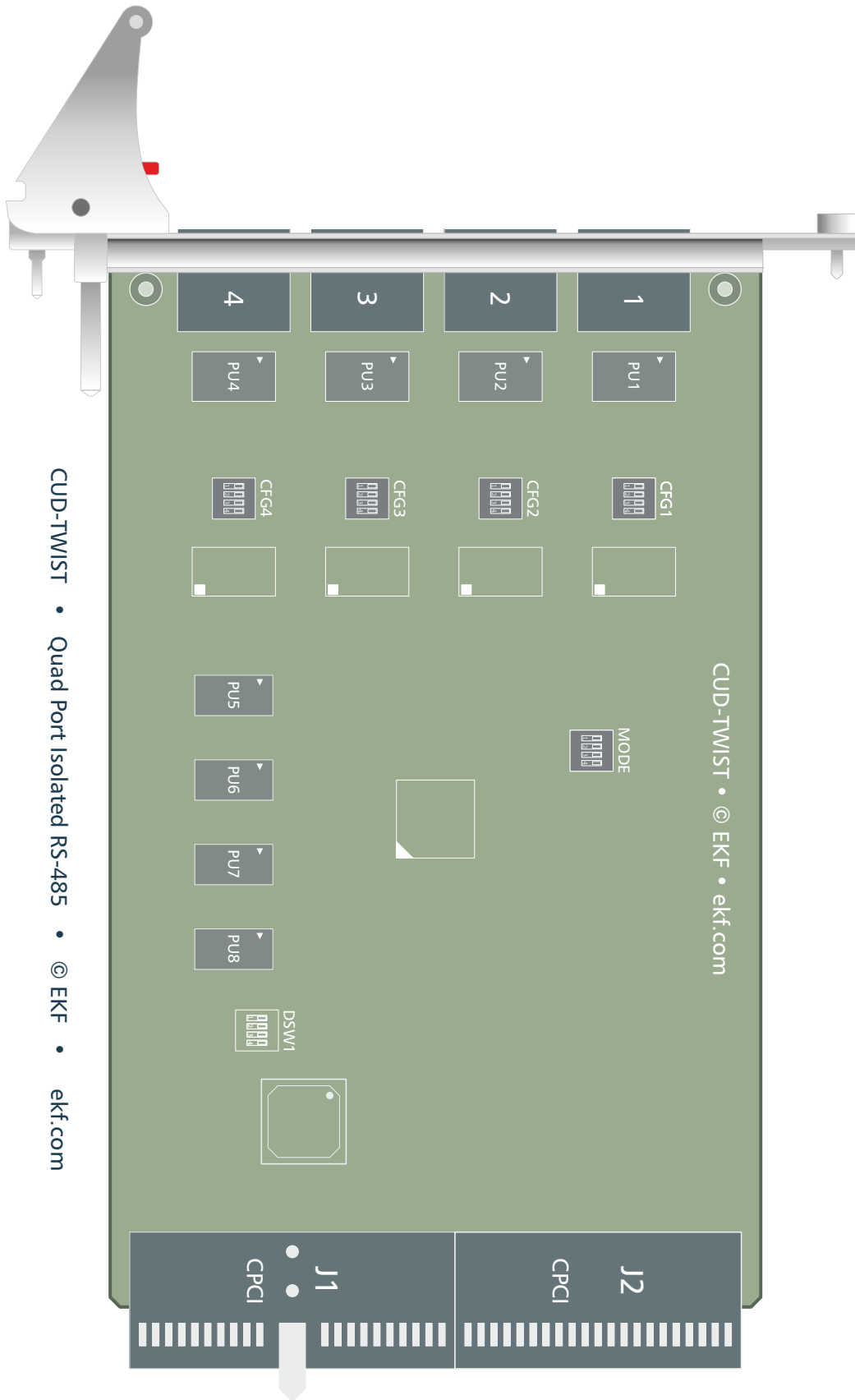
Four ADM2682E transceivers are provided to meet the RS-485 physical layer specifications. The RS-485 signals of any particular RJ45 front panel jack are isolated from the board circuitry, and also isolated from each other port. As manufacturing option, three different pin assignments are available for the RJ45 jacks, a CUD-TWIST native alignment which would allow low-cost Ethernet patch cable use for RS-485, and a legacy CU4-SOPRANO layout, and in addition a half-duplex optimized variant.

As an alternate to the RJ45 jacks, four 2.54mm pitch 2x5 position pin headers PU1-4 can be optionally populated on-board, for attachment of classic D-Sub 9-pin connectors by means of micro ribbon flat cables, to be combined with a non-standard 4HP or 8HP width front panel. Three different DB9 pin assignments are available as manufacturing option.

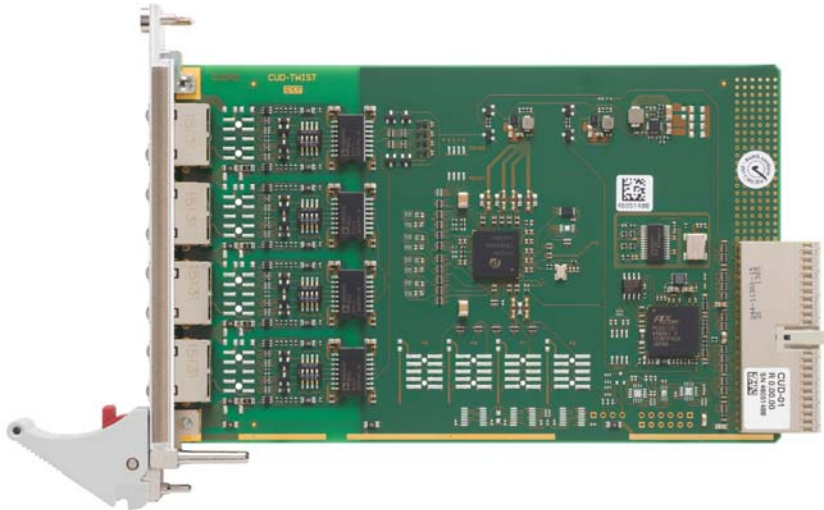
The CUD-TWIST can be configured also for rear I/O usage. Four UART ports are wired as TTL level signals to the optional backplane connector J2, for use with a suitable RIO PHY module, typically configured as either RS-232 or RS-485. Hence, with both front and rear I/O capabilities utilised, the CUD-TWIST is a true 8-port asynchronous serial interface solution.

As an alternate to J2 RIO, optional 2.0mm pitch shrouded headers PU5-8 can be provided for attachment of CU-series PHY modules.

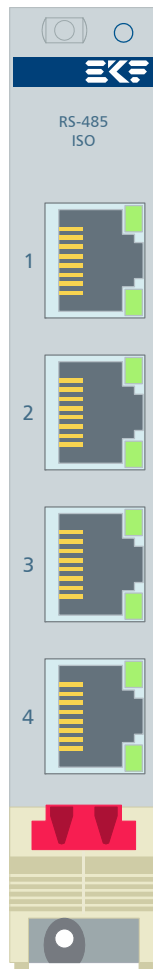
Component Orientation



CUD-TWIST • Quad Port Isolated RS-485 • © EKF • ekf.com



Front Panel



© EKF • draft - do not scale • ekf.com

CUD-TWIST
RS-485 ISO

www.ekf.com/c/com/cud/img/cud_fpl.pdf

activity on each connector

upper LED = RxD

lower LED = TxD

RJ45 Connectors - CUD-TWIST Native Pin Assignment (Alternate 1)

The front panel RS-485 ports are routed to RJ45 jacks. There are three varying pin assignments available by order. The CUD-TWIST native arrangement allows utilisation of low-cost Ethernet twisted pair cables (4 twisted pairs type). For a full-duplex (point-to-point) connection, RS-485 then uses the 3/6 wire pair for A/B (input), and the 1/2 pair as Y/Z (output).

Two CUD-TWIST boards with native RJ45 pin assignment can be connected directly via an Ethernet patch cable. A straight Ethernet patch cable type is suitable for half-duplex (RS-485 2+1 wire) applications. For full-duplex (RS-485 4+1 wire) systems however, a cross-over Ethernet patch cable would be needed. Gigabit Ethernet cables (4 twisted pairs) should be used in order to force a common signal ground (RJ45 reference GND pin 4 not supported over legacy 2 twisted pair cables).

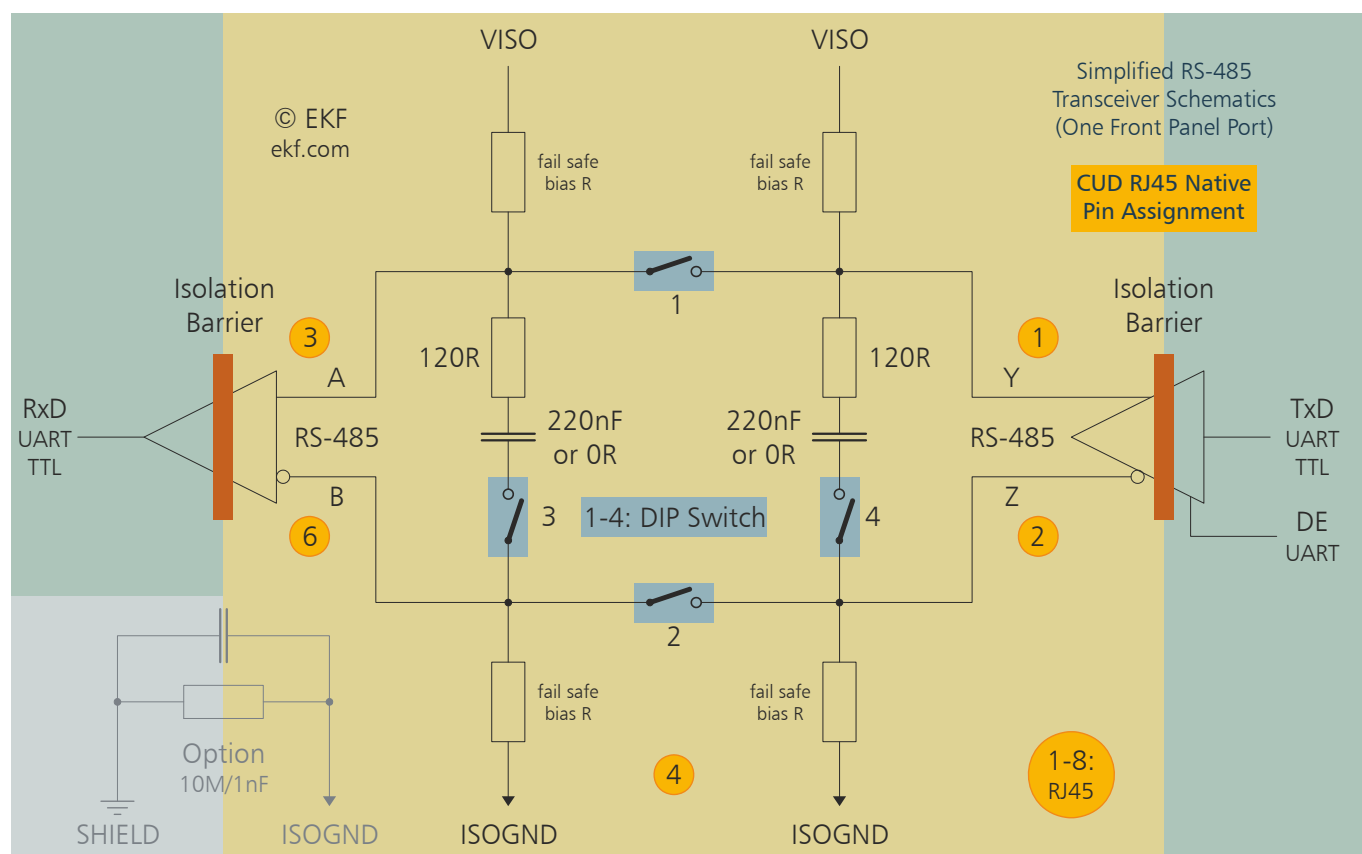
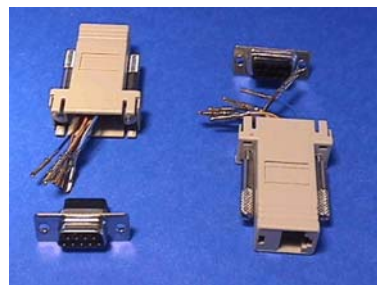
In an RS-485 2+1 wire application (half-duplex, aka PartyLine), the A/B signal would be present simultaneously on two twisted pairs, since A/B input signals are internally connected to Y/Z output signals (setup of the CUD-TWIST internal configuration as described with DIP switch settings). Hence, the half-duplex optimized pin assignment (Alternate 3) described later on should be considered for larger cable length PartyLine applications.

CUD-TWIST Alternate 1 Native Pin Assignment Serial Ports 1 - 4 • Shielded RJ45 Jacks EKF Part # 270.00.08.6		
	1	Y (Non-Inverting RS-485 Output)
	2	Z (Inverting RS-485 Output)
	3	A (Non-Inverting RS-485 Input)
	4	Isolated Ground
	5	NC
	6	B (Inverting RS-485 Input)
	7	NC
	8	NC

The pin assignment described above is available by order - please refer to www.ekf.com/liste/liste20.html

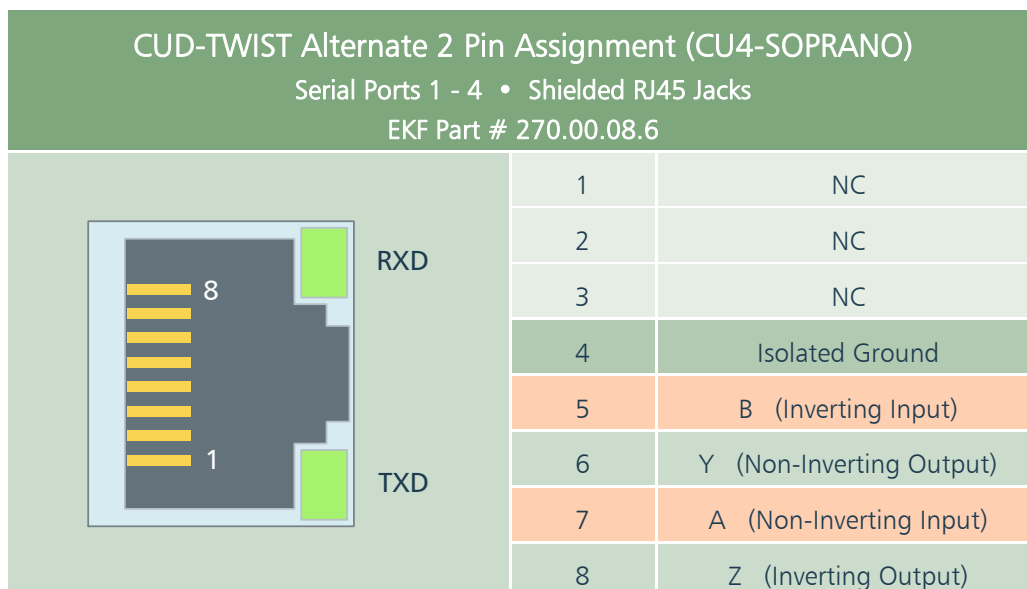
Please note, that Ethernet twisted pair cables provide 100 Ohm impedance, whereas RS-485 specifies 120 Ohm for optimum performance. The maximum RS-485 cable length defined therefore may be reduced with Ethernet cables due to a certain amount of signal reflection at either cable ending.

Frequently D-Sub 9-position connectors are required for RS-485 fieldbus cabling. A short Ethernet patch cable can be used as connection to a suitable adapter RJ45 <--> D-Sub (available from several distributors, but can be also ordered directly from EKF). Please note, that the adapters are preassembled kits only, which should be configured (strapped) by the customers themselves to fit their particular requirements.



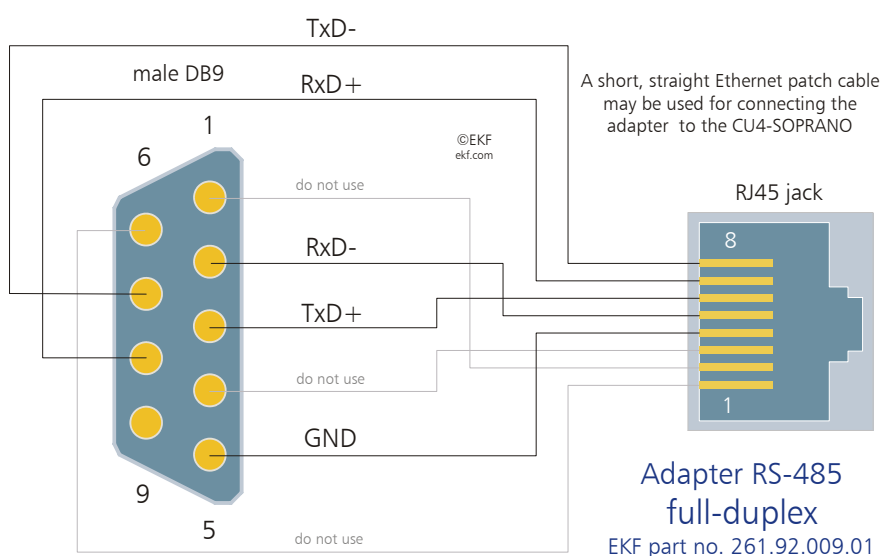
RJ45 Connectors - CU4-SOPRANO Legacy Pin Assignment (Alternate 2)

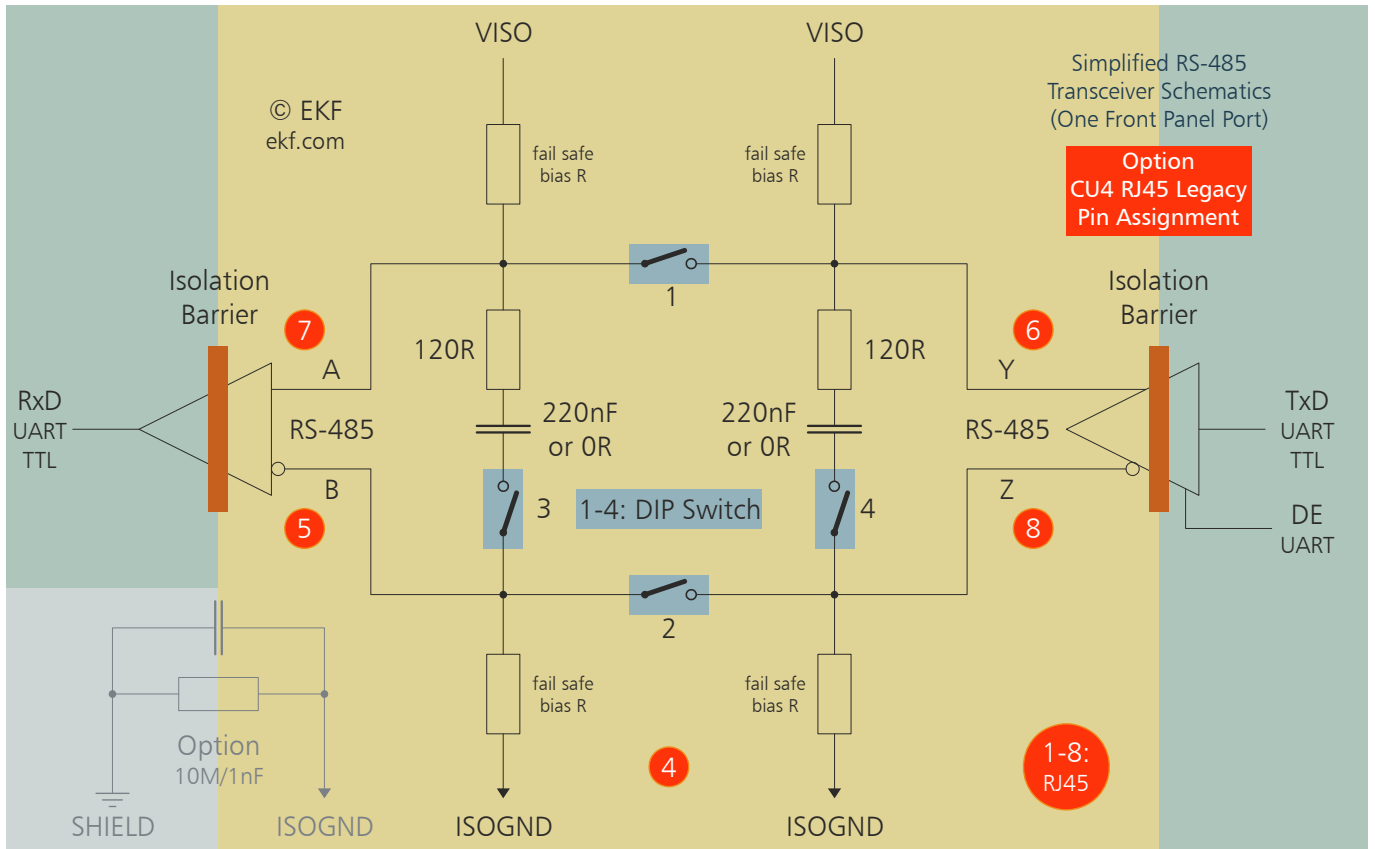
For seamless changeover from CU4-SOPRANO based applications, the CUD-TWIST can be ordered with a legacy pin assignment, which emulates the CU4 pinout when operated as RS-485 interface.



The pin assignment described above is available by order - please refer to www.ekf.com/liste/liste20.html

With respect to the CU4-SOPRANO legacy pin assignment some customers may continue using an adapter RJ45 to D-Sub 9 position, pre-configured by EKF, which results in the wiring diagram shown below.



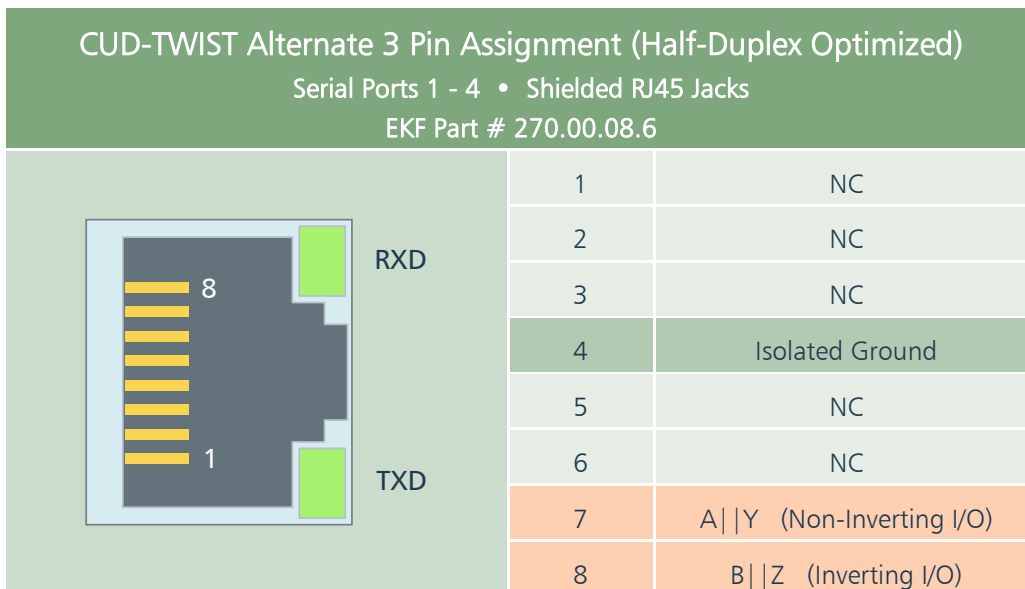


RJ45 Legacy Pin Assignment (Alternate 2)

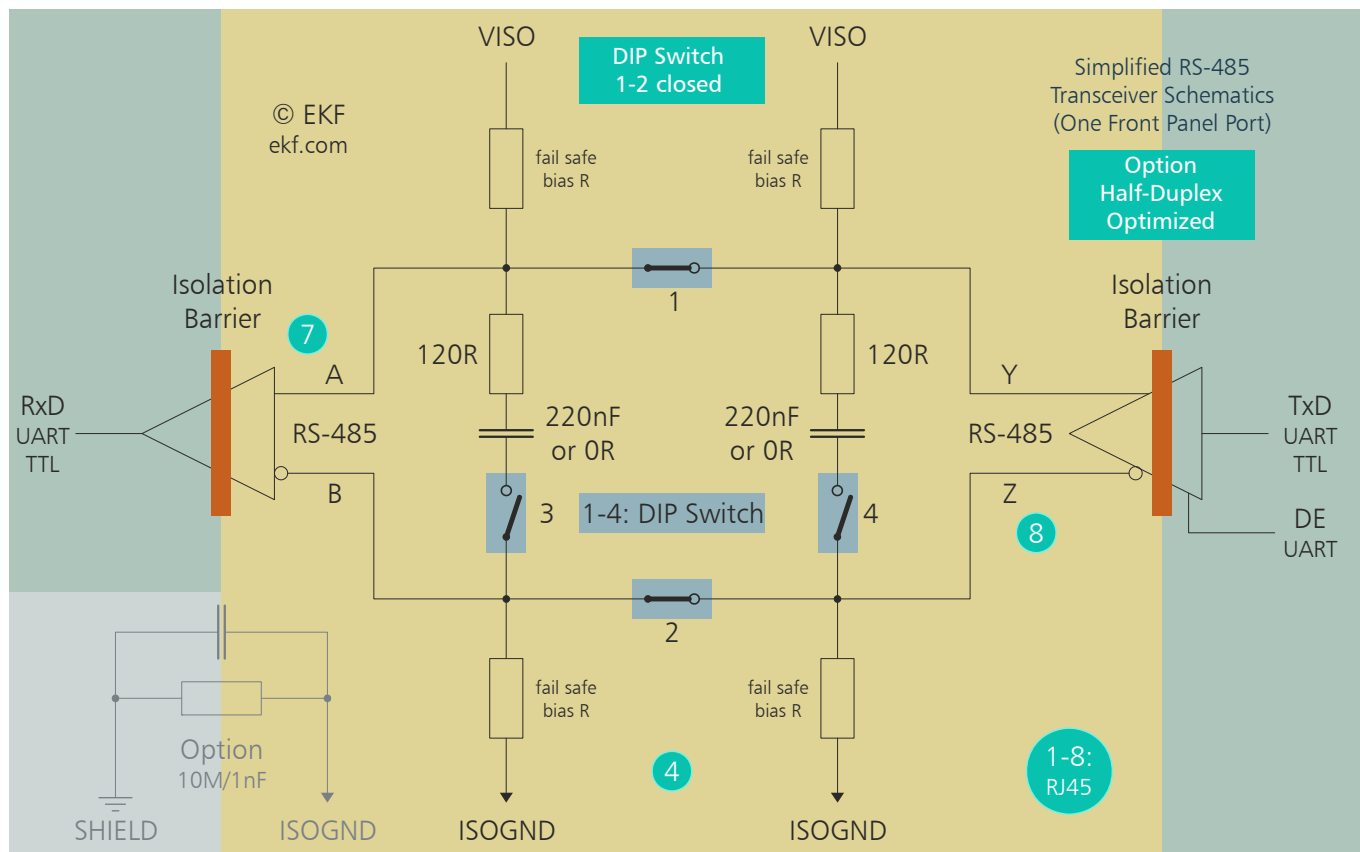


RJ45 Connectors - Half-Duplex Optimized Pin Assignment (Alternate 3)

For PartyLine (half-duplex) configured systems, the RS-485 A/B inputs are internally connected to the corresponding outputs Y/Z, by means of DIP switches on-board. Opposite to the pin configuration described with Alternate 1, the half-duplex optimized pin assignment uses only one twisted pair for A/B = Y/Z, as shown below. A straight 4-pair type cable can be used to connect directly two CUD-TWIST ports configured this way.



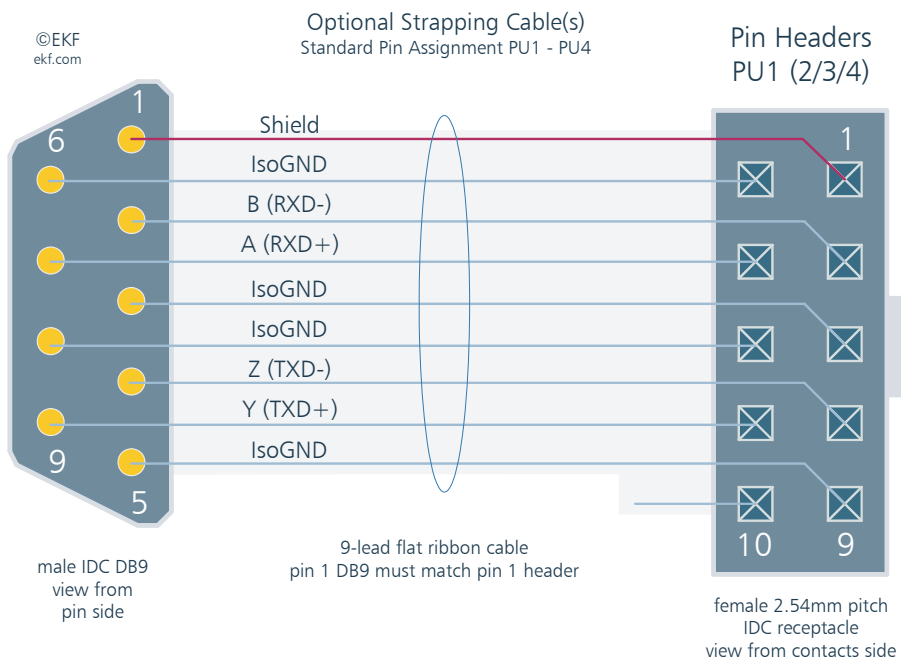
The pin assignment described above is available by order - please refer to www.ekf.com/liste/liste20.html



Pin Headers for Option Front Panel D-Sub Connectors

The CUD-TWIST can be equipped with pin headers for attachment of classic male 9-pin D-Sub front panel connectors, as an alternate to the proprietary RJ45 jacks. This ordering option however requires an 8HP front panel for the quad port RS-485 solution, and micro ribbon flat cable assemblies. There are three different pin configurations available (board manufacturing options). Shown below is the recommended pin assignment which results in a DB9 wiring diagram as used on the closely related DU1-MUSTANG XMC module.

PU1 - PU4 Option Dual-Row Header 2.54mm EKF Part No. 241.1.0205.20.00			
Shield	1	2	IsoGND
B	3	4	A
IsoGND	5	6	IsoGND
Z	7	8	Y
IsoGND	9	10	



Assuming IDC connectors at both endings of a micro ribbon flat cable, the resulting pin assignment on a 9-position male D-Sub connector is shown in the table below:

CUD-TWIST D-Sub Front Panel Option (DU1-MUSTANG)		
Serial Ports 1 - 4 • Option Male D-Sub 9		
1.27mm Pitch Flat Cable IDC Connectors		
<p> IsoGND A IsoGND Y </p> <p> 6 1 9 5 </p> <p> Shield B IsoGND Z IsoGND </p> <p>CUD TWIST • DU1-MUSTANG</p>	1	Shield (Frame Ground)
	2	B (Inverting Input)
	3	Isolated Ground
	4	Z (Inverting Output)
	5	Isolated Ground
	6	Isolated Ground
	7	A (Non-Inverting Input)
	8	Isolated Ground
	9	Y (Non-Inverting Output)



Another board manufacturing option is the signal assignment used on the CU4-SOPRANO P1 - P4 pin headers:

PU1 - PU4 (CU4-SOPRANO P1-P4 Pin Assignment)			
Option Dual-Row Header 2.54mm			
EKF Part No. 241.1.0205.20.00			
	1	2	
B (RXD-)	3	4	Z (TXD-)
Y (TXD+)	5	6	A (RXD+)
	7	8	
IsoGND	9	10	

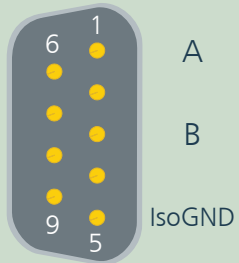
Assuming IDC connectors at both endings of a micro ribbon flat cable, the resulting pin assignment on a 9-position male D-Sub connector is shown in the table below:

CUD-TWIST D-Sub Front Panel Option (CU4-SOPRANO)		
Serial Ports 1 - 4 • Option Male D-Sub 9		
1.27mm Pitch Flat Cable IDC Connectors		
<p>CUD TWIST • CU4-SOPRANO</p>	1	
	2	B (Inverting Input)
	3	Y (Non-Inverting Output)
	4	
	5	Isolated Ground
	6	
	7	Z (Inverting Output)
	8	A (Non-Inverting Input)
	9	

A third board manufacturing option is the signal assignment used for a custom specific layout, referenced here as 'WL':

PU1 - PU4 (WL Pin Assignment) Option Dual-Row Header 2.54mm EKF Part No. 241.1.0205.20.00			
A (RXD+/TXD+)	1	2	
	3	4	
B (RXD-/TXD-)	5	6	
	7	8	
IsoGND	9	10	

Assuming IDC connectors at both endings of a micro ribbon flat cable, the resulting pin assignment on a 9-position male D-Sub connector is shown in the table below:

CUD-TWIST D-Sub Front Panel Option (WL) Serial Ports 1 - 4 • Option Male D-Sub 9 1.27mm Pitch Flat Cable IDC Connectors		
 <p>CUD TWIST • WL</p>	1	A (Non-Inverting I/O)
	4	
	3	B (Inverting I/O)
	4	
	5	Isolated Ground
	6	
	4	
	4	
	9	

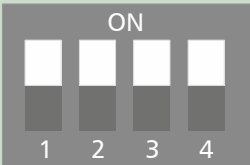
RS-485 Half-Duplex vs. Full-Duplex

For a full-duplex RS-485 point-to-point application, the receiver data lines A/B and the driver signals Y/Z require a twisted-pair wire each, plus reference ground, resulting in a total of $2 \times 2 + 1$ wires. By specification, RS-485 requires a common ground - this is referred to as signal C in the ANSI EIA-485 document. In many cases the additional ground wire can be omitted, if all RS-485 nodes are properly grounded. Sometimes the RS-485 cable shield is used as common ground.

For a half duplex RS-485 point-to-point or multipoint application, the receiver data lines A/B and the driver signals Y/Z must be tied together ($A=Y, B=Z$). This solution requires a single twisted-pair wire, resulting in a $2 + 1$ wire cable. The strapping between A/Y and B/Z will be often done externally, e.g. within the shell of a DB9 connector. As an alternate, the CUD-TWIST provides on-board DIP-switches, which allow to join A/Y and B/Z internally (1=ON 2=ON).

Configuration DIP Switches (Each Front Panel Port)

EKF Part No. 160.15.04.0

 <p>160.15.04.0 © EKF • ekf.com</p>	1=OFF 2=OFF	Full-Duplex RS-485 (Point-to-Point)
	1=ON 2=ON	Half-Duplex RS-485 (PartyLine)
	3=ON	A/B Termination Active
	4=ON	Y/Z Termination Active (Full-Duplex Only)

If Ethernet cables are in use for the RS-485 fieldbus, consider the RJ45 pin assignment alternate 1 for full duplex operation (cross-over patch cable), and the pin assignment alternate 3 for half duplex operation (either cable type straight or cross-over). The common reference ground via RJ45 pin 4 requires 4-pair cables (aka GbE). Do not forget to set the configuration DIP switches 1/2 accordingly (off=F/D, on=H/D).

Each RS-485 port is provided with fail-safe resistors (549R to ISO GND at the inverting inputs/outputs (A/Y), and 549R to VISO at the non-inverting inputs/outputs (B/Z).

RS-485 Line Termination

For signal integrity, both extreme ends of a RS-485 bus must be terminated, typically 120 Ohm between A/B and also Y/Z (full-duplex only), ideally matching the twisted pair cable impedance. A popular approach is to use external termination, having the resistors located within the shell of the DB9 cable connectors. As an alternate, the CUD-TWIST provides on-board DIP-switches, which can individually activate internal termination resistors on A/B and Y/Z.

By default, the internal termination is achieved by 120 Ohm & 0R placed in series (DC termination), for maximum signal integrity with long cables. As an ordering option, for short cables and low data transfer rates up to 38400bps also AC termination (220nF as replacement for 0R) may be considered, in order to reduce the power consumption of idle links (~100mW savings per port).

If no termination is required, set the port configuration switches 3&4 to off.

Isolation Voltage

The maximum isolation voltage with respect to the CUD-TWIST depends mainly on the voltage rating specified for the RJ45 jacks, or D-Sub connectors if in use (signal pins and isolated ground to frame ground). In most cases, the reason for a superimposed voltage would be a ground loop, electromagnetic interference and/or electrostatic charging due to a long RS-485 cable.

Whenever suitable, tie together externally (e.g. within the mating cable connector) isolated ground and shield, or couple loosely by 10MOhm/1nF 500VAC in parallel. On request, the CUD-TWIST can be manufactured with these components populated on-board, for each port individually.

Is RS-485 a Two-Wire Connection?

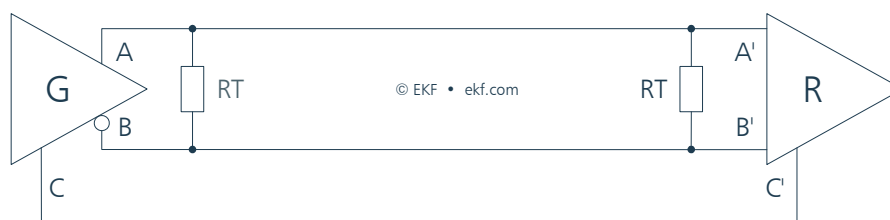
Is RS-485 a two-wire or a three-wire system? It is most definitely a three wire system (four plus one wire with respect to full-duplex operation). The TIA standard (ANSI/TIA/EIA-485-A, page 15, A.4.1) requires the presence of a common return path between all circuit grounds along the balanced line for proper operation.

The TIA standard defines a maximum common mode voltage range from -7V to +12V on the signal lines A and B, measured against C (common ground). A TIA/EIA-485 system however with only two wires A and B (C generator and C' receiver commons not connected) can result in an unpredictable common mode voltage superimposed on the interface lines A and B, caused either by electrostatic charging or electromagnetic interference.

A 2-wire system often may work though due to idle-line fail-safe resistors at the receiver inputs, which can be considered as a loosely coupled common ground. Nevertheless this operation mode cannot be recommended - what is working flawless in the laboratory may not work reliable under real conditions in an industrial environment.

Where do we get the third wire? Many times inner and/or outer cable shields are used as the third (fifth) wire. When using a twisted pair Gigabit Ethernet cable as RS-485 transmission line, up to 4 wires are available for common ground.

ANSI/TIA/EIA-485-A
Interconnect Application



G = Generator • R = Receiver • RT = Termination Resistor
 A/A' = Generator/Receiver Interface Point
 B/B' = Generator/Receiver Interface Point
 C/C' = Generator/Receiver Common

www.ekf.com/c/ccom/cud/img/rs485_common_ground.pdf

Useful External Documents

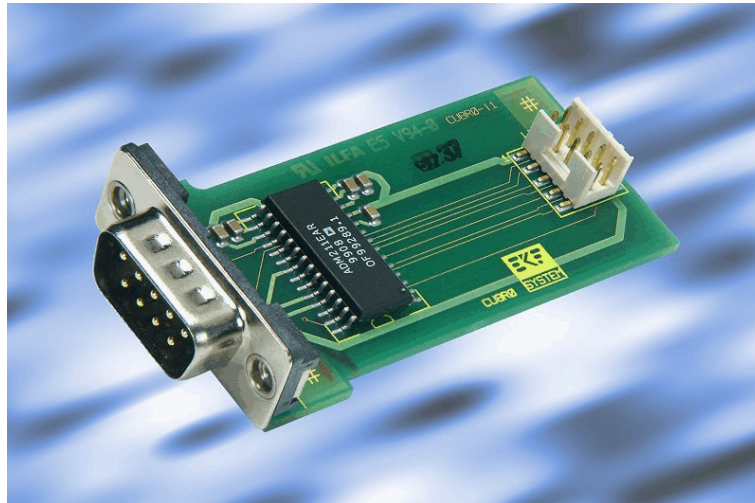
Wikipedia	RS-485 Three-wire connection https://en.wikipedia.org/wiki/RS-485#Three-wire_connection
Article/ Blog	RS485 Cables – Why you need 3 wires for 2 (two) wire RS485 • www.chipkin.com/articles/rs485-cables-why-you-need-3-wires-for-2-two-wire-rs485
Application Note	AN960 • RS-485/RS-422 Circuit Implementation Guide • www.analog.com/static/imported-files/application_notes/AN-960.pdf

Standards - Specifications

Term	Document	Origin
CompactPCI®	CompactPCI® Specification, PICMG® 2.0 R3.0	www.picmg.org
PCI Express®	PCI Express® Base Specification	www.pcisig.com
RS-485	ANSI/TIA/EIA-485-A Standard Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Multipoint Systems	www.tiaonline.org

Pin Headers PU5 - PU8

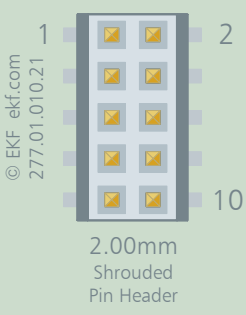
As an option, the CUD-TWIST can be equipped with four pin headers, wired to the UART channels 5 - 8, suitable for attachment of EKF CU-series PHY modules via a micro ribbon flat cable assembly. A PHY module is a transceiver from TTL level signals to a specific symmetric or asymmetric interface standard, e.g. EIA-485 or RS-232E, with or w/o galvanic isolation.



CU-Series PHY Module

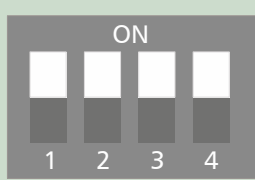


Please contact sales@ekf.de for availability of different CU-series modules (inquiries for custom specific PHY or transition modules welcome).

PU5 - PU8 • TTL-Level Serial I/O				
2.00mm Pin Header 2 x 5 (277.01.010.21)				
	+5V 0.75A ¹	1	2	DSR#
	RI#	3	4	RXD#
	TXD#	5	6	DTR#
	RTS# or DE# *	7	8	CTS#
	DCD	9	10	GND

¹ short circuit protection by a PolySwitch resettable fuse

* Pin 7 should be configured as driver enable (DE#) for RS-485 half-duplex (PartyLine) operation. A DIP switch is provided to setup each connector PU5-8 individually. The driver enable signal is generated by the on-board Pericom UART in conjunction with the Pericom driver software.

MODESEL DIP Switch		
Affects PU5 - PU8 and J2 RIO		
EKF Part No. 160.15.04.0		
	1 (2/3/4) = OFF	UART Port 5 (6/7/8) RTS# may be required for external RS-232 transceivers
	1 (2/3/4) = ON	UART Port 5 (6/7/8) DE# driver enable signal controls RS-485 driver when operated as half-duplex (PartyLine)

In addition, the serial ports 5 - 8 provided by the UART are also available for rear I/O across J2 (stuffing option). In order to avoid signal interference and malfunction, attach a transceiver module or other circuitry to these ports only once, either to the pin headers PU5 - PU8, or through a rear I/O transition module via J2.

CompactPCI® Peripheral Slot Connector J1

The CUD-TWIST is equipped with a PCI to PCI Express® bridge. The card can be inserted in any peripheral slot of the CompactPCI® backplane for proper operation. As an option, the board can be populated with a +5V to +3.3V switched regulator, which would allow to use the CUD-TWIST in a +5V only system.

#J1	A	B	C	D	E
25	+5V	REQ64#	ENUM#	+3.3V	+5V
24	AD1	+5V	VI/O	AD0	ACK64#
23	+3.3V	AD4	AD3	+5V	AD2
22	AD7	GND	+3.3V	AD6	AD5
21	+3.3V	AD9	AD8	M66EN	C/BE0#
20	AD12	GND	VI/O	AD11	AD10
19	+3.3V	AD15	AD14	GND	AD13
18	SERR#	GND	+3.3V	PAR	C/BE1#
17	+3.3V	IPMB SCL	IPMB SDA	GND	PERR#
16	DEVSEL#	GND	VI/O	STOP#	LOCK#
15	+3.3V	FRAME#	IRDY#	BD_SEL#	TRDY#
14					
13			Not Keyed		
12					
11	AD18	AD17	AD16	GND	C/BE2#
10	AD21	GND	+3.3V	AD20	AD19
9	C/BE3#	IDSEL	AD23	GND	AD22
8	AD26	GND	VI/O	AD25	AD24
7	AD30	AD29	AD28	GND	AD27
6	REQ#	GND	+3.3V	CLK	AD31
5	BRSVP1A5	BRSVP1B5	RST#	GND	GNT#
4	IPMB PWR	HEALTHY#	VI/O	INTP	INTS
3	INTA#	INTB#	INTC#	+5V	INTD#
2	TCK	+5V	TMS	TDO ¹	TDI ¹
1	+5V	-12V	TRST#	+12V	+5V

pin positions printed grey: not connected

1 TDO - TDI internally connected

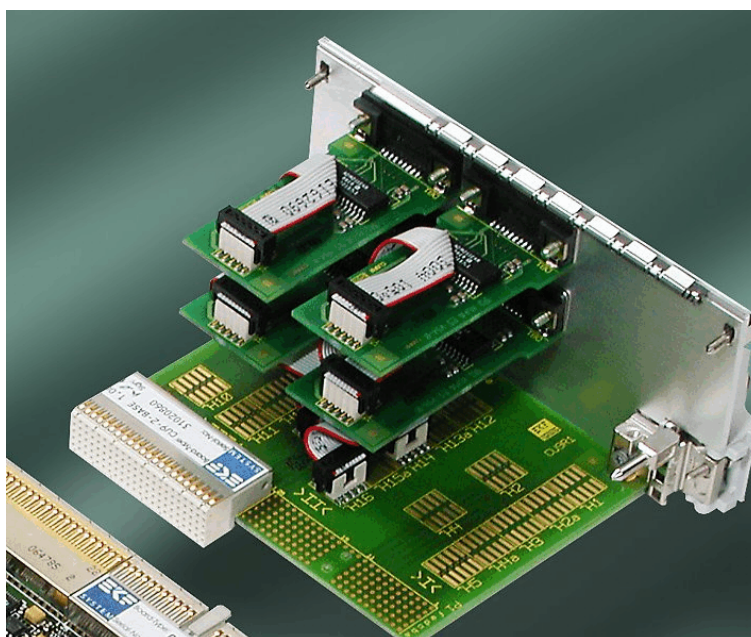
CompactPCI® Rear I/O Connector J2

The rear I/O connector J2 is stuffed as an option only. **In order to avoid damages, before installing the CUD-TWIST with the J2 populated, ensure that your system is not equipped with a P2 CompactPCI 64-bit expansion backplane.**

#J2	A	B	C	D	E
22					
21					
20					
19					
18					
17					
16					
15					
14					
13					
12					
11					
10					
9					
8	DSR5#	RXD5	DTR5#	CTS5#	GND
7	+5V	RI5#	TXD5	RTS5# or DE5#	DCD5#
6	DSR6#	RXD6	DTR6#	CTS6#	GND
5	+5V	RI6#	TXD6	RTS6# or DE6#	DCD6#
4	DSR7#	RXD7	DTR7#	CTS7#	GND
3	+5V	RI7#	TXD7	RTS7# or DE7#	DCD7#
2	DSR8#	RXD8	DTR8#	CTS8#	GND
1	+5V	RI8#	TXD8	RTS8# or DE8#	DCD8#

The signal assignment of the optional J2 connector matches the transition board CU9-2-BASE and CU9-4-BASE. Across the transition board, rear I/O PHY-modules of the CU7/CU8 series may be attached by means of a flat cable. **Warning: For systems with a P2 64-bit CompactPCI expansion backplane, the connector J2 on the CUD-TWIST must not be stuffed!**

For proper usage of the RTS*# or DE*# pins, please refer to MODSEL DIP switch settings described with the PU5 - PU8 connectors earlier in this document. In order to avoid signal interference and malfunction, attach a transceiver module or other circuitry to these ports only once, either to the pin headers PU5 - PU8, or through a rear I/O transition module via J2.



CU9-2-BASE with PHY Modules

The TTL signals from J2/P2 are routed across the rear I/O transition board CU9-2-BASE or CU9-4-BASE to its shrouded pin headers H13..H16. By means of a short flat ribbon cable, the PHY modules CU7-RS485 or CU8-RS232 are attached. Up to four PHY modules CU7 and CU8 can be mounted at the 3U/12HP back panel of the CU9-2-BASE. The CU9-4-BASE provides a 8HP rear panel, hence preferred by most customers. Custom specific rear panels are also available.



CU9-2-BASE



CU9-4-BASE

Driver Software

UART drivers are available for download from the EKF website at:
<http://www.ekf.com/c/ccom/cud/drv/>

Ordering Information

Ordering Information
For popular CUD-TWIST SKUs please refer to www.ekf.com/liste/liste_20.html#CUD

Related Links to CompactPCI® UART Cards	
CUD-TWIST Home	www.ekf.com/c/ccom/cud/cud.html
CompactPCI® Classic UART Solutions	www.ekf.com/c/ccom/ccom.html
CompactPCI® Serial UART Solutions	www.ekf.com/s/serial.html#SU
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