EKF

Product Information

SUB-RIO • CompactPCI® Serial • Quad Port Isolated RS-485 I/F

Rear I/O Transition Module • Mezzanine Expansion Module

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 SUB-RIO is basically a rear I/O transition module for CompactPCI® Serial systems. The board is equipped with four isolated rear panel RS-485 ports. High speed RS-485 balanced line transceivers with internal 5kV isolation barrier provide for optimum noise and EMC immunity.

In addition, the SUB-RIO can be configured as a mezzanine expansion module, suitable e.g. for the CompactPCI® Serial cards SU1-TWIST (isolated RS-485), SU2-BALLAD (isolated RS-232), SUA-RIO (isolated RS-232), and the SUB-RIO itself. When used as mezzanine board in addition to a carrier card, the SUB-RIO doubles the number of ports available from four to eight, and allows also mixed configurations RS-232 and RS-485.

When used as a rear I/O transition module, the SUB-RIO is equipped with the CompactPCI® Serial backplane connector rJ4, sourced from either the SU1-TWIST, SU2-BALLAD or SU3-ENSEMBLE octal UART cards via P4 RIO.

When used as a mezzanine expansion module, the backplane connector rJ4 is not populated. Instead, TTL-level UART ports are passed via on-board stacking connectors M51 to M84, for either top or bottom mount assemblies, with a common 8HP rear (or front) panel.

The isolated RS-485 ports are wired to Micro-D rear (front) panel connectors, individually configurable for full-duplex operation (4+1 wire cable) or half-duplex (2+1 wire cable), either point-to-point or multipoint applications. As an alternate, the SUB-RIO can be equipped with classic D-SUB 9-pin connectors, attached by means of flat cable assemblies (on-board headers PU5 to PU8).

Feature Summary

CompactPCI® Serial

▸ PICMG® CompactPCI® Serial (CPCI-S.0) standard

▸ Rear I/O transition module

▸ CompactPCI® Serial backplane connector rJ4

▸ Dimensions 100x80mm^2 (3U), 4HP rear panel width

▸ Suitable for CompactPCI® Serial octal UART peripheral cards SU1-TWIST, SU2-BALLAD and SU3-ENSEMBLE (matching SU1, SU2 or SU3 backplane connector P4)

▸ Expands front card to 8 ports in total (4 x front panel connectors, 4 x rear panel)

▸ Any 4 + 4 port mix of isolated RS-232 and RS-485

Mezzanine Option

▸ Mezzanine Expansion Module (rJ4 not populated)

▸ Expands carrier card to 8 front (or rear) ports, 8HP total panel width

▸ Suitable for CompactPCI® Serial octal UART peripheral carrier cards SU1-TWIST and SU2-BALLAD (8HP front panel assembly)

▸ Suitable for rear I/O modules SUA-RIO and SUB-RIO (8HP rear panel assembly)

▸ Stacking connectors M51 - M84, pass through, top or bottom mount

▸ Any 4 + 4 port mix of isolated RS-232 and RS-485

RS-485 Transceivers

▸ 5kVrms isolation barrier RS-485/RS-422 transceivers (Analog Devices ADM2682)

▸ Configurable as half- or full-duplex

▸ $\pm$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/μs

▸ Thermal shutdown protection

Feature Summary

Panel I/O

▸ 4 x Rear or front panel Micro-D 9-pin high density male connectors

▸ RS-485 ports isolated against each other and board circuitry

▸ On-board DIP-switches for full/half-duplex setting, and line termination on/off

▸ Micro-D cable assemblies available, e.g. Micro-D to classic style D-Sub male or female

▸ Ordering option D-Sub 9-pin panel connectors (4 ports require 8HP panel width)

▸ Option 2 x D-SUB9 panel connectors on request (4HP, 2 x micro ribbon flat cable assembly)

▸ Option 3 x D-SUB9 panel connectors on request (4HP, handle replaced by knurled screw)

▸ Option 4 x D-SUB9 panel connectors on request (8HP, 4 x micro ribbon flat cable assembly)

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°C (industrial temperature range)

▸ Storage temperature -40°C to +85°C, max. gradient 5°C/min

▸ Humidity 5% ... 95% RH non condensing

▸ Altitude -300m ... +3000m

▸ Shock 15g 0.33ms, 6g 6ms

▸ Vibration 1g 5-2000Hz

▸ MTBF 94.3 years

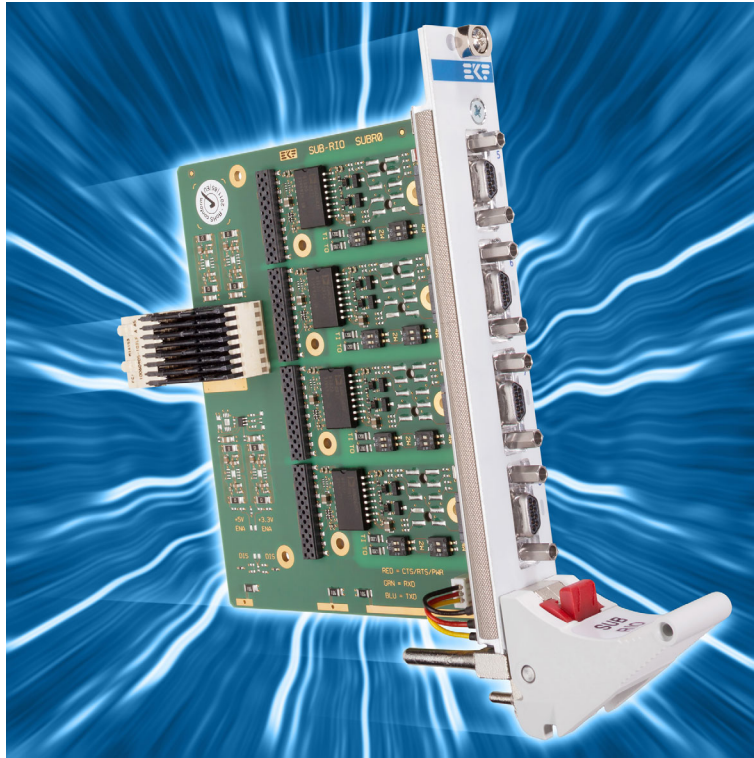▸ EC Regulations EN55022, EN55035, EN60950-1 (UL60950-1/IEC60950-1)

items are subject to changes w/o further notice

Please note: If an EKF product was labelled with this special sign according to ISO 7010 M002, please contact support@ekf.com for availability of additional documentation which may be important for proper usage.

SUB-RIO w. SU2-BALLAD (Isolated RS-232 Front Ports)

Block Diagram

Simplified Block Diagram
SUB-RIO • RS-485

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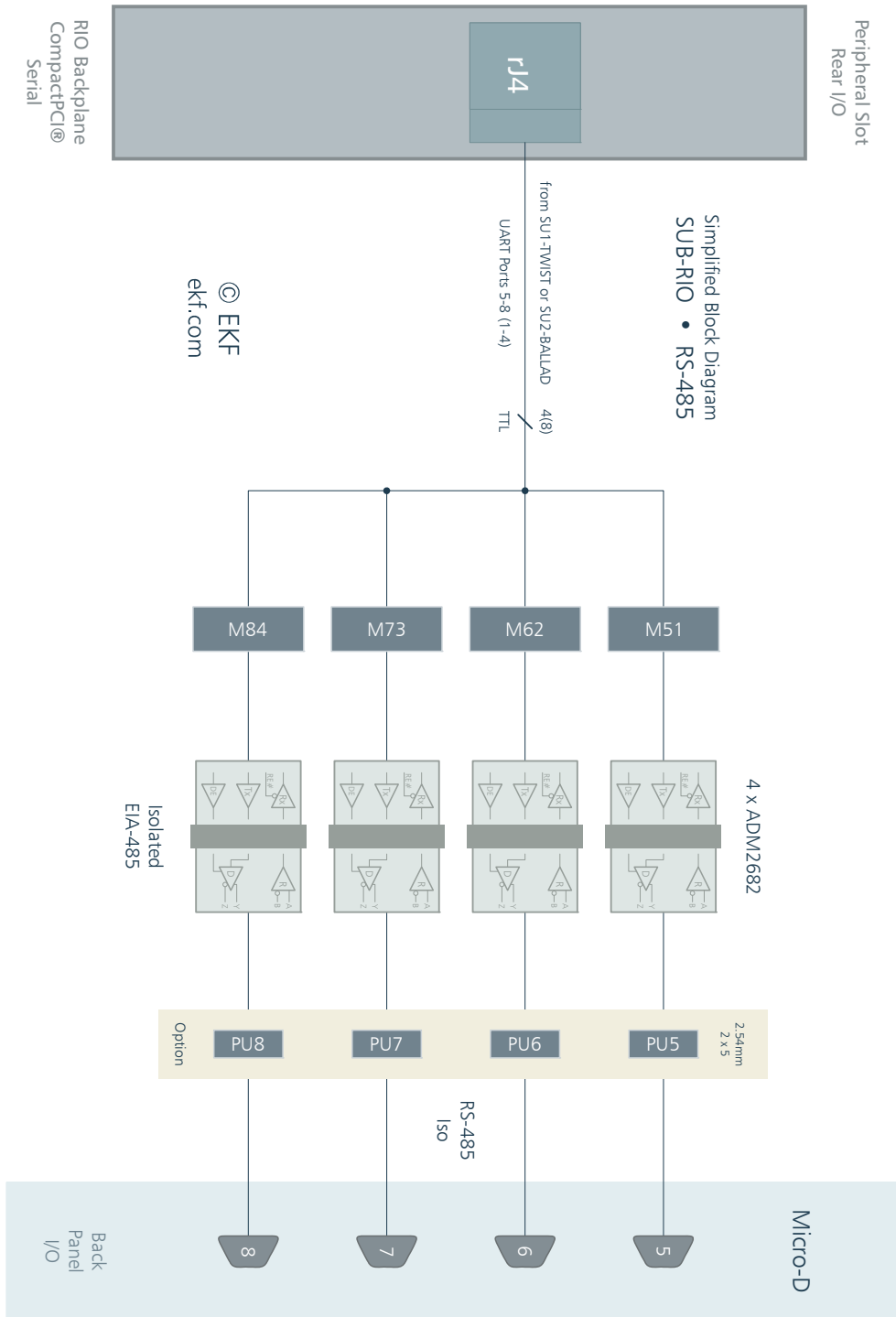
www.ekf.com/s/sub/img/sub_blk.pdf

Theory of Operation

The SUB-RIO is a quad isolating transceiver module, translating TTL-level UART (COM port) signals to twisted pair transmission lines according to RS-485. When used as rear I/O transition module as defined by the CompactPCI® Serial specification, all UART channels are passed across the backplane connector rJ4, mating the SU1-TWIST, SU2-BALLAD or SU3-ENSEMBLE P4 rear I/O connector pin assignment.
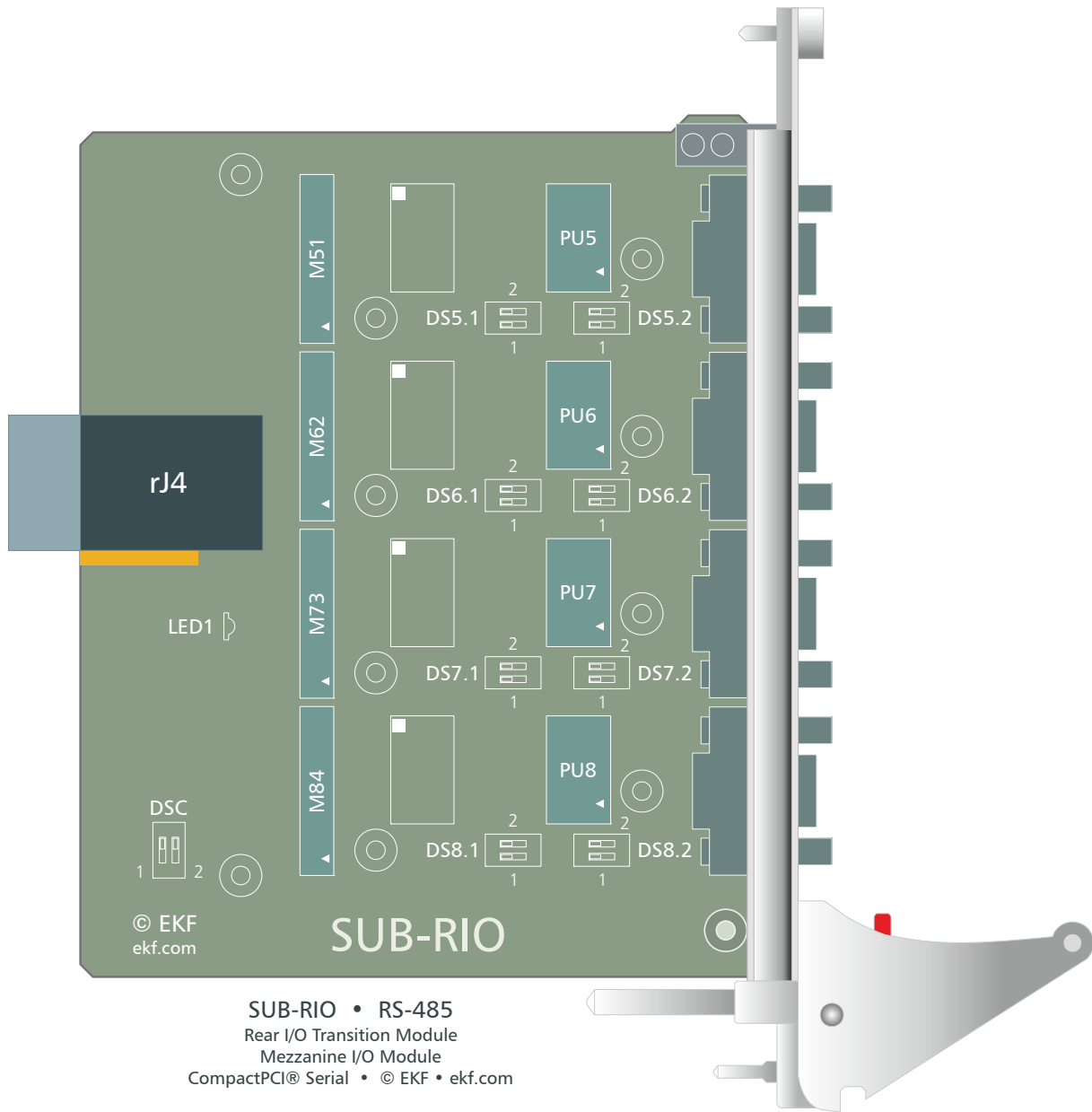
As an alternate, the SUB-RIO can be configured as mezzanine expansion board, for use on the SU1-TWIST or SU2-BALLAD carrier cards, and also on the SUA-RIO or SUB-RIO transition modules. For this application rJ4 will be not equipped on the SUB-RIO, and the TTL UART signals are handed over from the carrier via pass through stacking connectors M51 to M84. The mezzanine assembly expands the SU1-TWIST or SU2-BALLAD from four to eight front or rear panel ports, together with a common 8HP front or back panel.

On the SUB-RIO, four UART channels are wired to Micro-D back (front) panel connectors across isolating 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.
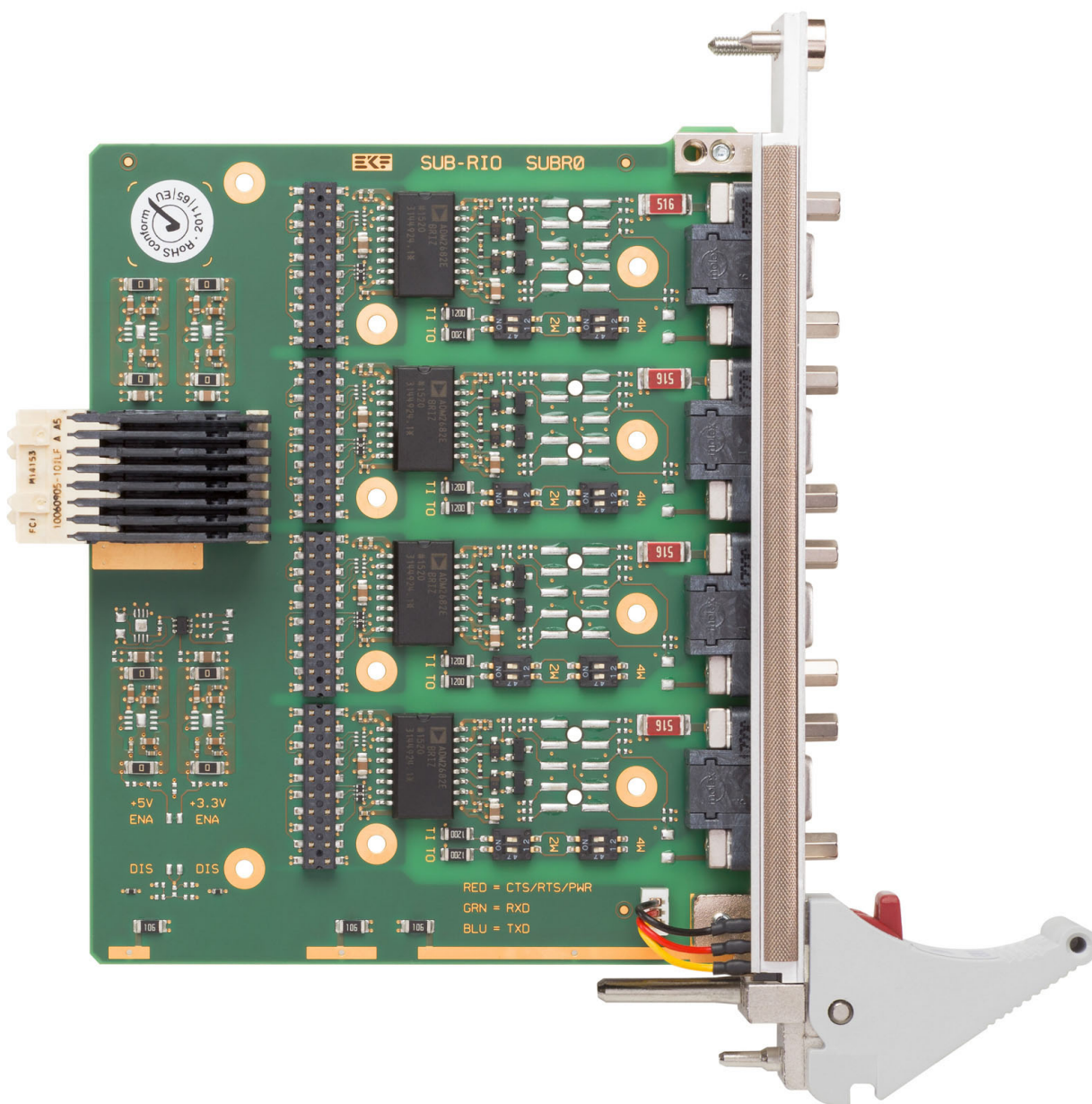
Four ADM2682E transceivers are provided to meet the RS-485 physical layer specifications. The RS-485 signals of any particular Micro-D high density male front panel connector are isolated from the board circuitry, and also from each other rear (front) panel port. Two-wire or four-wire operation can be selected by on-board DIP-switches

Micro-D to Micro-D cable assemblies are available, as well as Micro-D to D-Sub, and pigtail Micro-D cables in addition. As an alternate to the Micro-D connectors, four 2.54mm pitch 2x5 position pin headers PU5-8 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 D-Sub 9-pin assignments are available as manufacturing option.
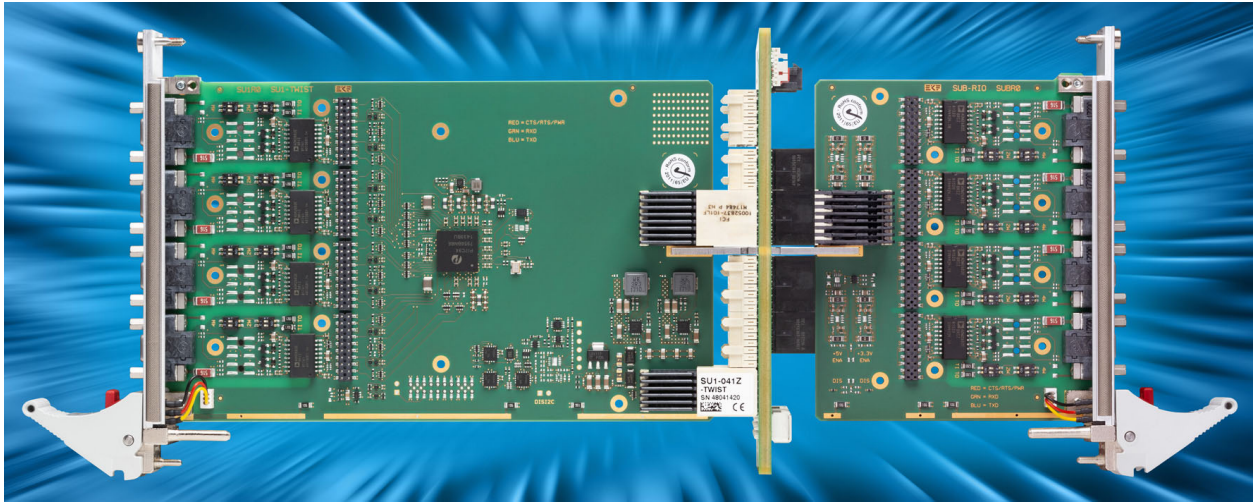
Component Orientation

SUB-RIO • RS-485
Rear I/O Transition Module
Mezzanine I/O Module
CompactPCI® Serial • © EKF • ekf.com
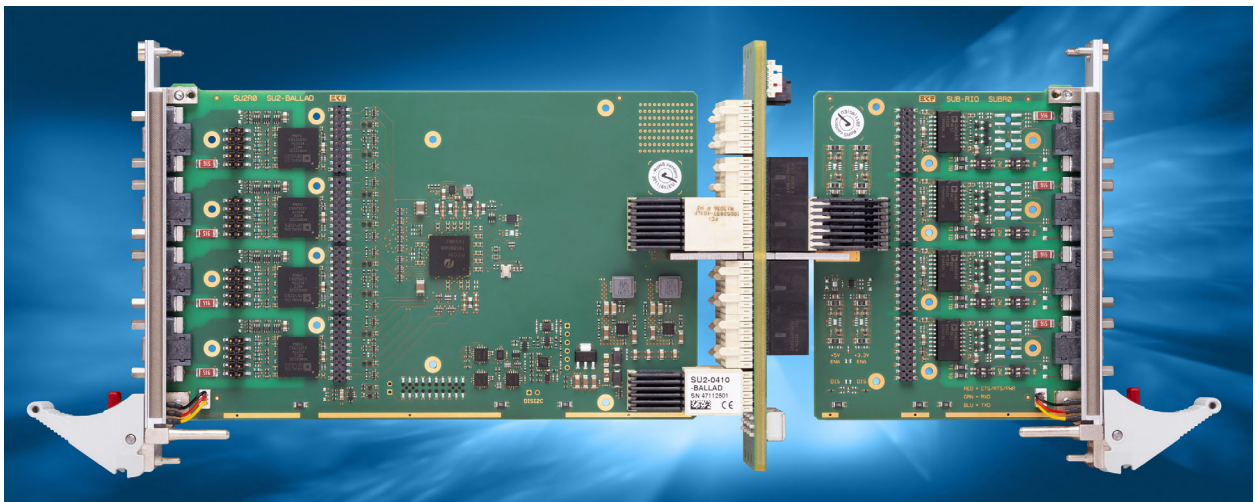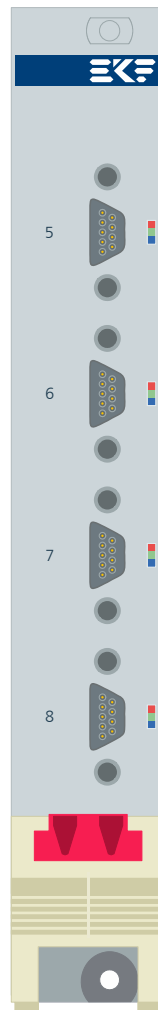
Eight Port Assemblies 4HP

SUB-RIO w. SU1-TWIST (Isolated RS-485 Front Ports)

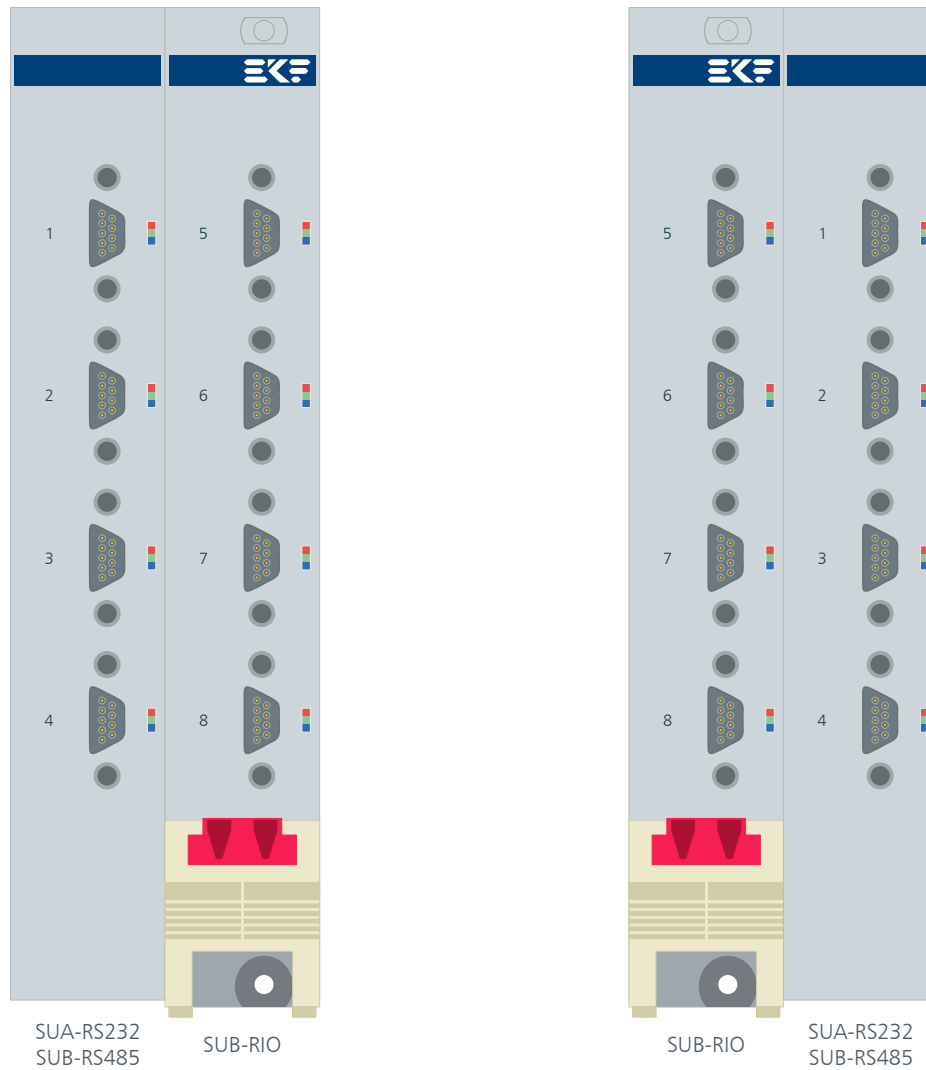SUB-RIO w. SU2-BALLAD (Isolated RS-232 Front Ports)

Rear Panel 4HP

SUB-RIO

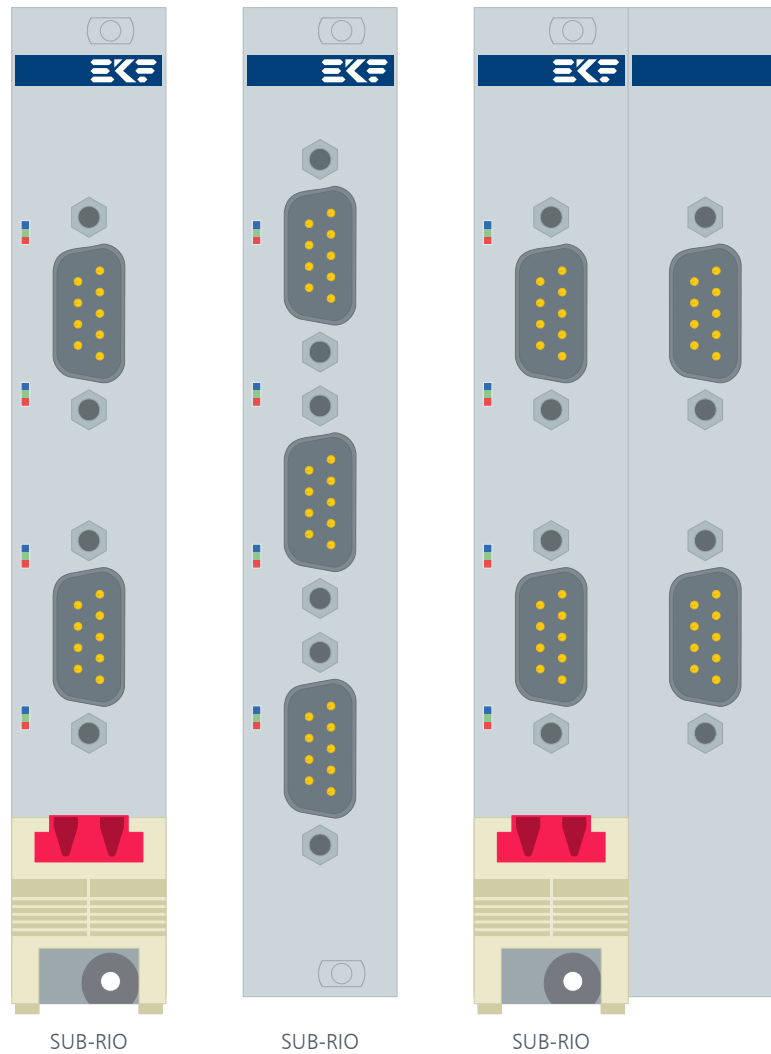www.ekf.com/s/sub/img/sub_rpl.pdf

activity on each connector
red LED = Isolated Power Good
green LED = RxD
blue LED = TxD

Rear Panel 8HP

The SUB-RIO can be used as a carrier for another SUB-RS485 or SUA-RS232 mezzanine card, either top or bottom mount, as 8HP assembly.
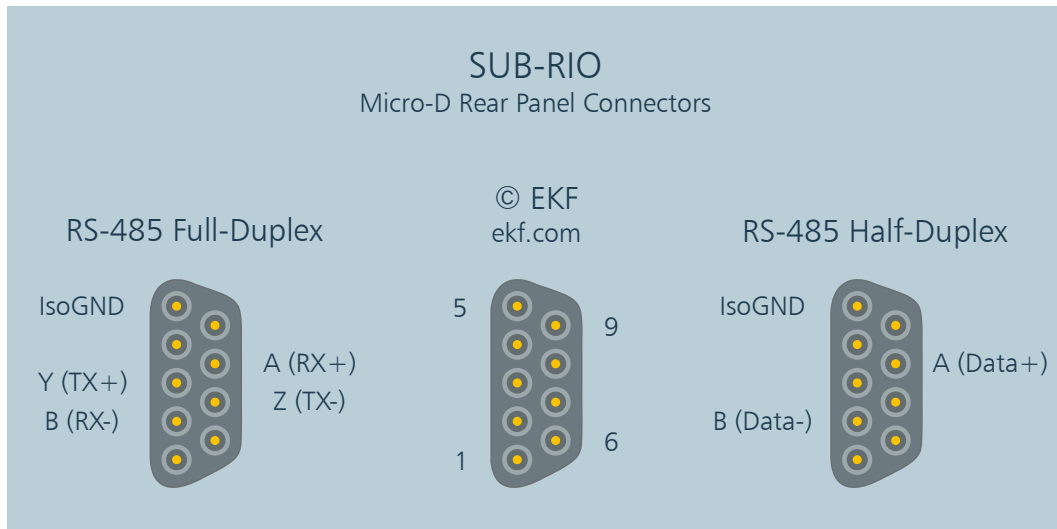
Option D-SUB Back Panel

SUB-RIO   SUB-RIO   SUB-RIO

When equipped with optional D-SUB 9-pin connectors, knurled screws will replace the handle (three connector panel). The quad connector assembly requires 8HP in total.

Rear Panel Connectors

Due to space restrictions, the SUB-RIO is provided with four Micro-D male connectors, which are considerably smaller than standard D-Sub connectors and therefore allow a 4HP panel for the board. The Micro-D connector pin assignment is illustrated below (view on rear panel).

SUB-RIO
Micro-D Rear Panel Connectors

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RS-485 Full-Duplex

IsoGND

Y (TX+)
B (RX-)

A (RX+)
Z (TX-)

5
9

1
6

RS-485 Half-Duplex

IsoGND

B (Data-)

A (Data+)

IsoGND is the reference ground for the RS-485 signals (see also chapter 'Is RS-485 a Two-Wire Connection?'). IsoGND is isolated from the board and system logic GND, and from Shield (panel/chassis).

A minimum cabling solution requires 2+1 wires (PartyLine Half-Duplex mode), or 4+1 (Full-Duplex).

Micro-D Cables

Some ready to use adapter cable assemblies are available from stock, e.g. Micro-D to D-Sub (female or male), wired straight pin to pin. In addition, custom specific cable assemblies are available on request.

EKF Part Numbers Micro-D Cable Assemblies RS-232	
259.901.0009.18	Micro-D to Micro-D cable assembly, 9 circuits, 1.8m, female to female cable connectors
259.921.0009.18	Micro-D to D-SUB cable assembly, 9 circuits, 1.8m, Micro-D female connector to male D-SUB
259.931.0009.18	Micro-D to D-SUB cable assembly, 9 circuits, 1.8m, Micro-D female connector to female D-SUB
259.951.0009.18	Micro-D single ended cable assembly, 9 circuits, 1.8m, Micro-D female connector to pigtail
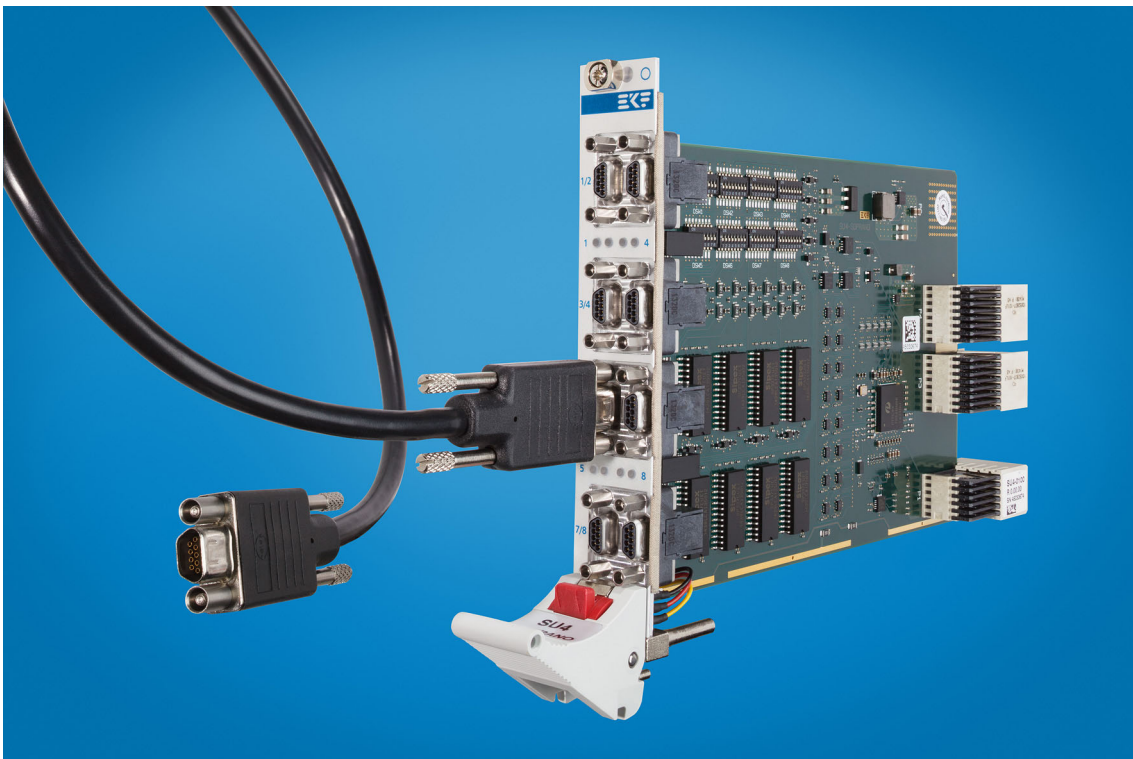
Micro-D to Micro-D Cable Assembly (Picture Similar)
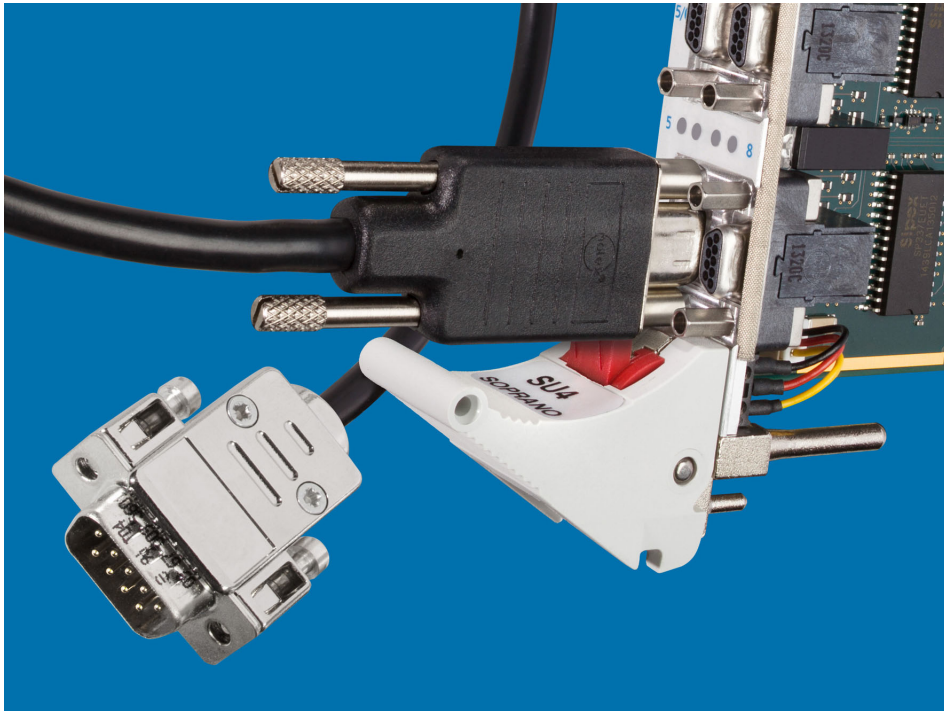
Micro-D to D-SUB Cable Assembly (Picture Similar)
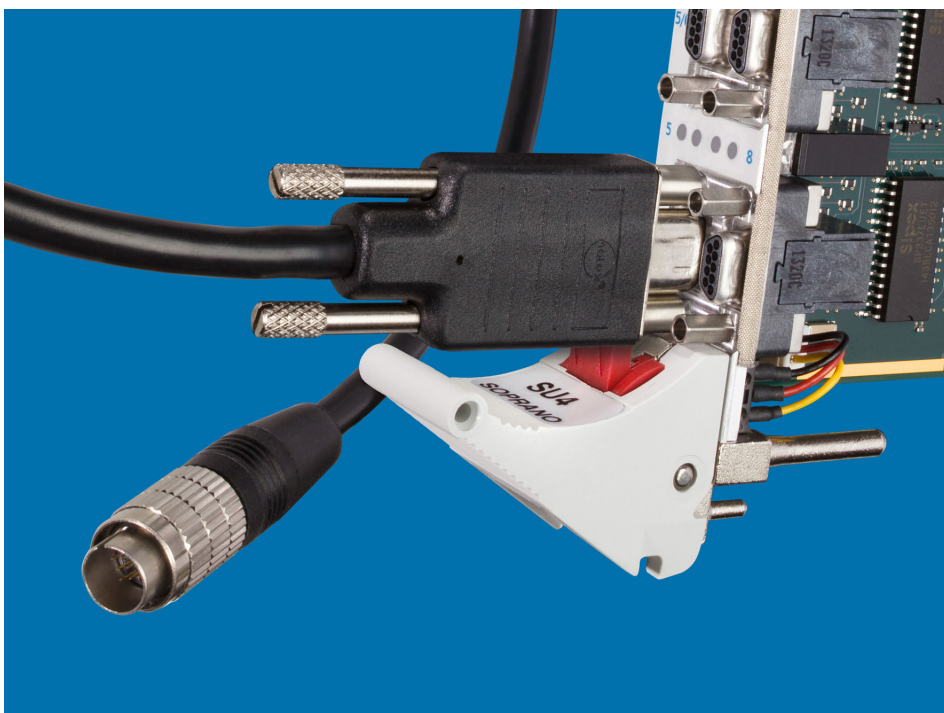
Micro-D to Custom Specific Connector Cable Assembly (Picture Similar)

Transceiver Schematics

Illustrated below is the default transceiver circuitry. The light blue zone is the isolated area (front panel connectors). Please refer to the DIP-Switch configurations (chapter 'RS-485 Half-Duplex vs. Full-Duplex') for operation mode and line termination settings.
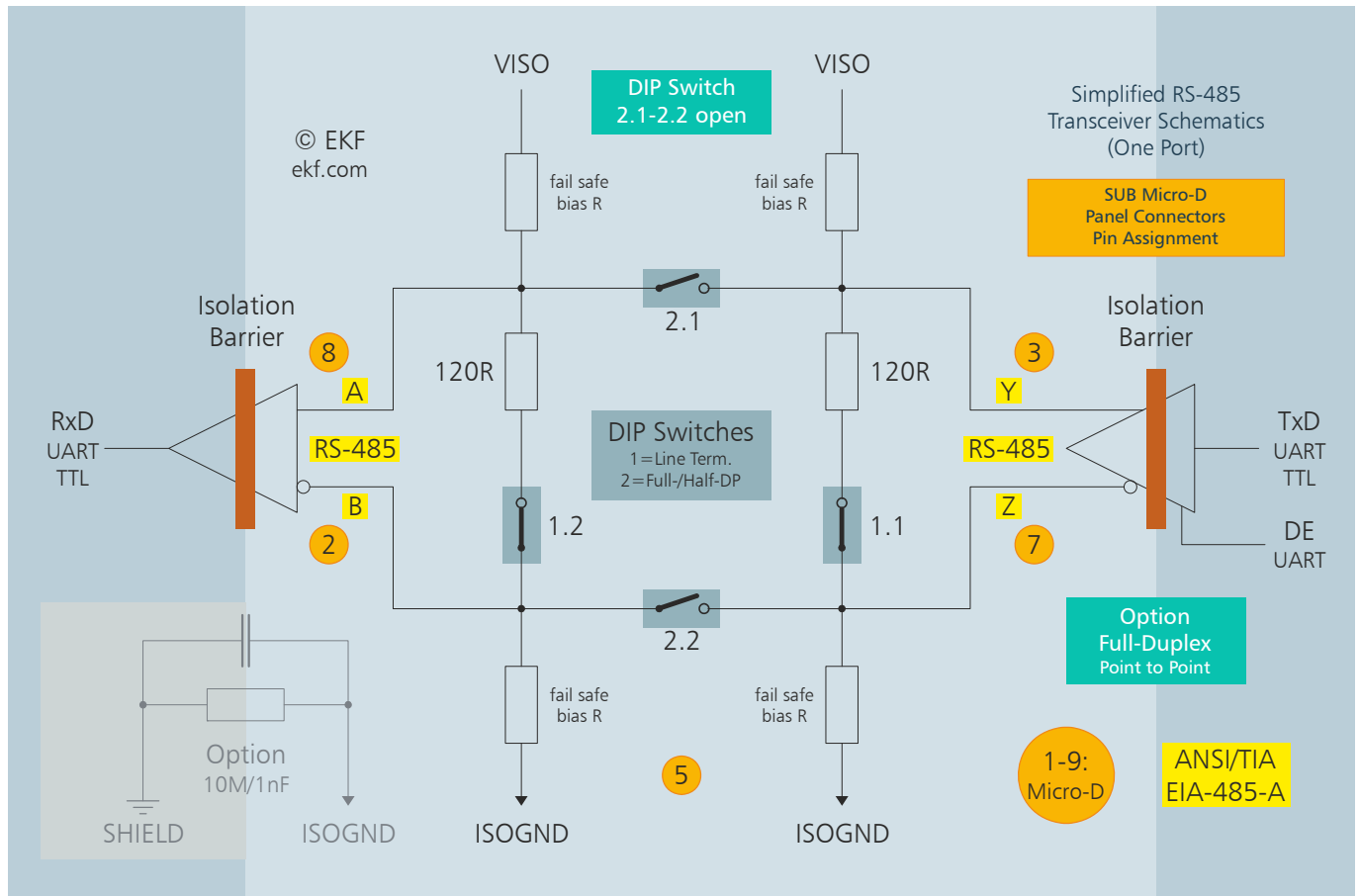
Illustrated above is a point-to-point 4-wire configuration (in addition to reference ground wire). Switches 2.1 and 2.2 are open. Setting of line termination switches 3 and 4 depends on data transfer bit rate and cable length. Normally set both switches on (off if external termination is applied).

Illustrated below is a multi-point (aka PartyLine) 2-wire configuration (in addition to reference ground wire). Switches 2.1 and 2.2 are closed (A=Y, B=Z). Setting of line termination switches 1.1 and 1.2 depends mainly on the position of a particular RS-485 node on the common data bus. Normally set both switches off. If a port is positioned on either cable ending however, set termination switches 1.2 on, 1.2 off (both off if external termination is applied).
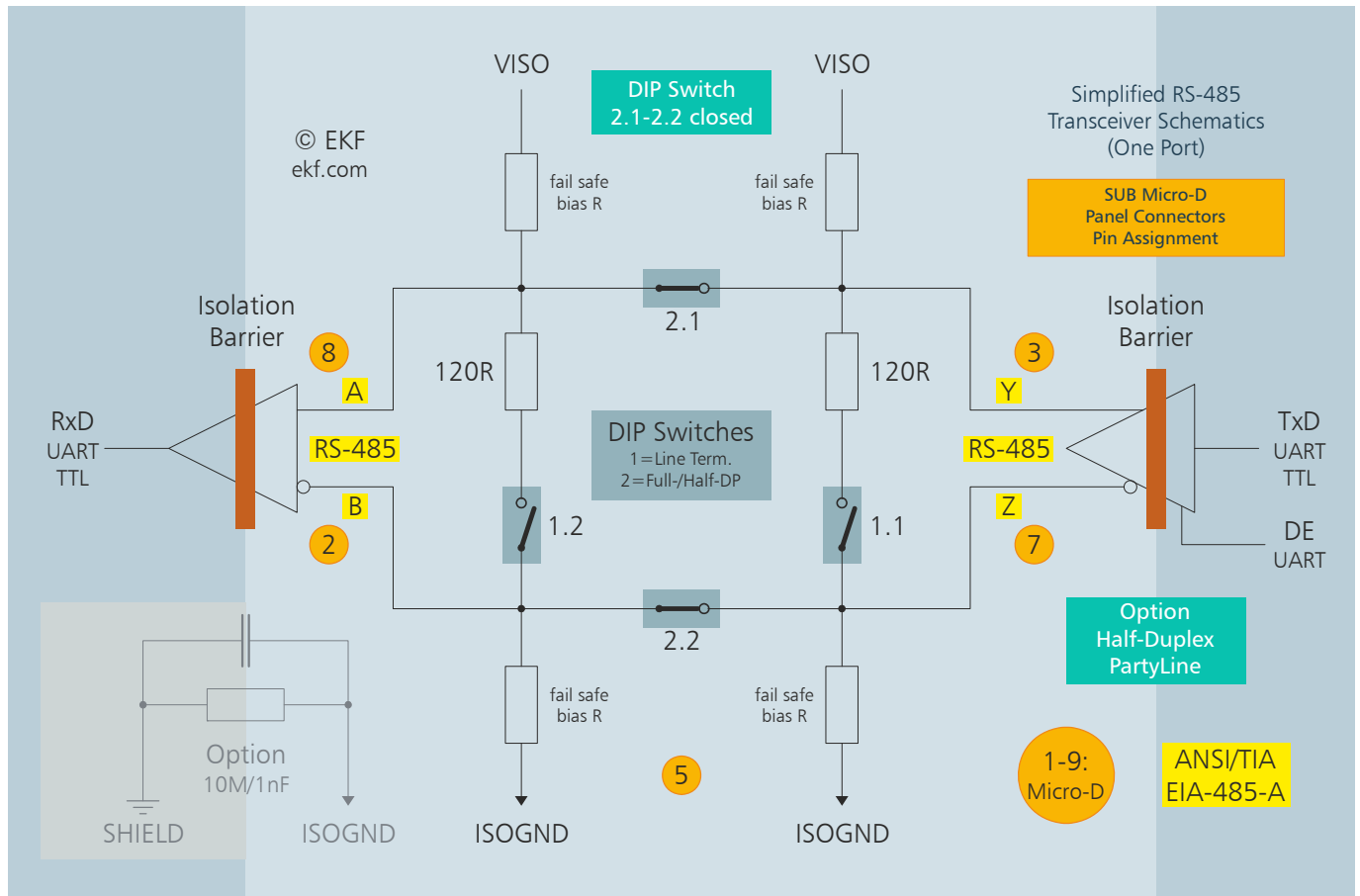
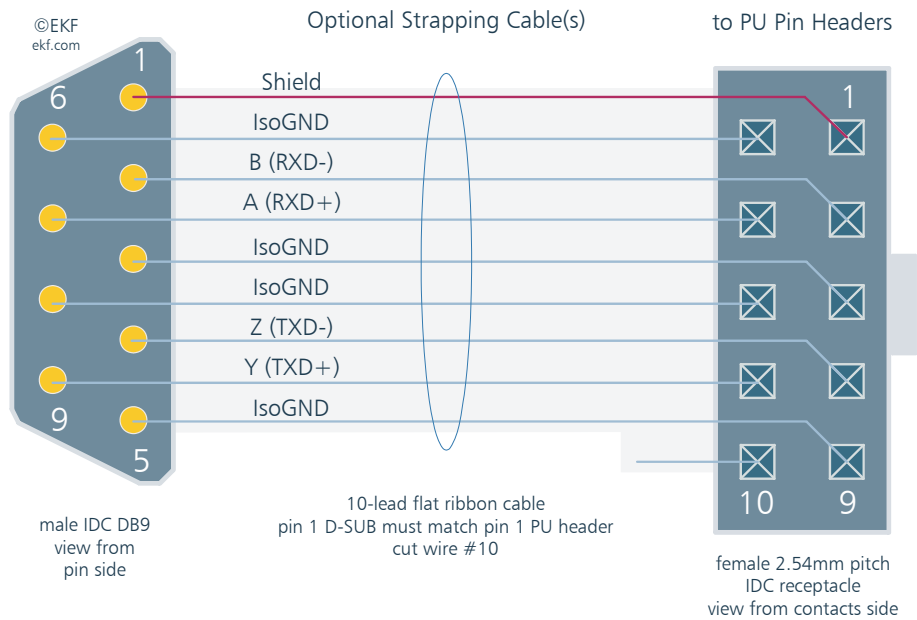On a PartyLine bus, no more than a single node is allowed to send data at a particular time; all other nodes must disable their drivers in order to avoid data collision at the same time. A suitable software protocol must be established which controls the driver enable (DE) pin of the transceiver. The SUB-RIO was designed for the Pericom/Diodes UART, which requires proprietary driver software for DE control.

Option Pin Headers for D-Sub Connectors

The SUB-RIO can be equipped with pin headers for attachment of classic male 9-pin D-Sub front panel connectors, as an alternate to the Micro-D connectors. 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 D-SUB 9-pin wiring diagram as used on the closely related DU1-MUSTANG XMC module.

PU5 - PU8 • DU1-MUSTANG Pin Assignment 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	

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Optional Strapping Cable(s)

to PU Pin Headers

Shield

IsoGND

B (RXD-)

A (RXD+)

IsoGND

IsoGND

Z (TXD-)

Y (TXD+)

IsoGND

male IDC DB9
view from
pin side

10-lead flat ribbon cable
pin 1 D-SUB must match pin 1 PU header
cut wire #10

female 2.54mm pitch
IDC receptacle
view from contacts side

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:

SUB-RIO D-Sub Front Panel Option • DU1-MUSTANG
1.27mm Pitch Flat Cable IDC Connectors

SUB-RIO • CUD-TWIST • DU1-MUSTANG

Pin	Signal
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)

D-Sub Rear Panel Option (Picture Similar)

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

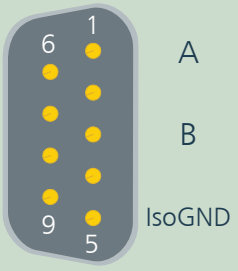| PU5 - PU8 • CU4-SOPRANO Legacy Pin Assignment			
Option Dual-Row Header 2.54mm			
EKF Part No. 241.1.0205.20.00			
	1	2	
B (RXD-)	3	4	Z (TXD-)
Y (TXD+)	5	6	A (RXD+)
	7	8	
IsoGND	9	10	

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:

SUB-RIO D-Sub Front Panel Option • CU4-SOPRANO Legacy		
1.27mm Pitch Flat Cable IDC Connectors		
	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	

SUB-RIO • CUD-TWIST • CU4-SOPRANO

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

PU5 - PU8 • 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:

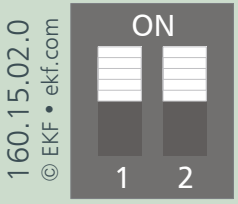| SUB-RIO D-Sub Front Panel Option (WL)		
1.27mm Pitch Flat Cable IDC Connectors		
	1	A (Non-Inverting I/O)
	4	
	3	B (Inverting I/O)
	4	
	5	Isolated Ground
	6	
	4	
	4	
CUD TWIST • WL	9	

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 2x2+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 cable connector. As an alternate, the SUB-RIO provides on-board DIP-switches, which allow to join A/Y and B/Z internally (1=ON 2=ON).
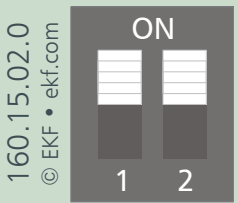
Termination DIP Switches x.1 (Each Port x) EKF Part No. 160.15.02.0		
	1=ON	Y/Z Termination 120R Active
	2=ON	AB Termination 120R Active (Full-Duplex Only)

Half-/Full-Duplex Configuration DIP Switches x.2 (Each Port x) EKF Part No. 160.15.02.0		
	1=OFF 2=OFF	Full-Duplex RS-485 (Point-to-Point)
	1=ON 2=ON	Half-Duplex RS-485 (PartyLine)

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 Micro-D or D-SUB cable connectors. As an alternate, the SUB-RIO 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 (DC termination), for maximum signal integrity with long cables and high data transfer rates. If no termination is required, set the port configuration switches to off. In addition, each RS-485 port is provided with fail-safe bias resistors, 549R to ISOGND at the inverting inputs/outputs (B/Z), and 549R to VISO at the non-inverting inputs/outputs (A/Y). Each line is overvoltage protected by TVS components (PSD12C combined with SM712).

Isolation Voltage

The ADM2682E on-board transceivers withstand 5kVrms, which is far more than can achieved for the SUB-RIO assembly. The maximum safe isolation voltage depends mainly on the voltage rating specified for the Micro-D or D-SUB connectors in use (signal pins to frame/chassis ground).

For personal safety, EKF recommends strongly to limit a superimposed external voltage to less then 60V, measured against power earth.

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 SUB-RIO 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 ore 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 Ethernet cable as RS-485 transmission line, two or more wires are available for common ground.

ANSI/TIA/EIA-485-A
Interconnect Application

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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/s/su1/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
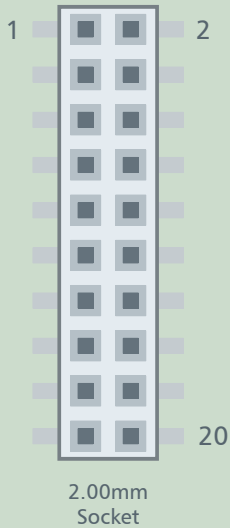
Standards - Specifications		
Term	Document	Origin
CompactPCI® Serial	CompactPCI® Serial Specification, PICMG® CPCI-S.0 R2.0	www.picmg.org
RS-485	ANSI/TIA/EIA-485-A Standard Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Multipoint Systems	www.tiaonline.org

Sockets M51 - M84

The SUB-RIO can be used as a pure quad port rear I/O transition module, but was in addition designed to act as a carrier card for other mezzanine transceiver modules, with up to four additional I/O ports. Further more, the SUB-RIO can be used as mezzanine expansion module itself. The SUB-RIO is provided with four pass-through sockets, suitable for attachment of (or operation as) a mezzanine module. A mezzanine expansion module connects to the the SUB-RIO carrier card via pin stackers, and can be mounted either on top or to the bottom. Both alternates result in an 8HP rear panel. If configured as a mezzanine card, the SUB-RIO can also be used with the SU1-TWIST (isolated RS-485) and SU2-BALLAD (isolated RS-232) carrier boards (8HP front panel assembly).

M51 - M84 • TTL-Level Serial I/O				
2.00mm Socket Strip 2 x 10 (251.1.0210.10.09)				
+5V	1	2	GND	
RTS# (5-8)	3	4	RXD (5-8)	
TXD (5-8)	5	6	+3.3V	
DE (5-8)	7	8	CTS# (5-8)	
RE# (5-8)	9	10	GND	
RE# (1-4)	11	12	GND	
DE (1-4)	13	14	CTS# (1-4)	
TXD# (1-4)	15	16	+3.3V	
RTS# (1-4)	17	18	RXD (1-4)	
+5V	19	20	GND	

Driver enable (DE) and receiver enable (RE#) are required for RS-485 ports configured for half-duplex (PartyLine) operation. The driver enable signal is generated by the front card Pericom/Diodes UART in conjunction with the Pericom/Diodes driver software.

Typically, the serial ports 5 - 8 provided by the octal UART of an SU1-TWIST or SU2-BALLAD front card are available for either rear I/O across P4, or locally across the SU1/SU2 on-board Mxx mezzanine connectors. For usage of ports 5 - 8 as a rear I/O solution, only P4 must be engaged. A special case is rear I/O for all eight ports of a SU1/SU2 UART card. This will require that all transceivers on the front board are not populated, and two SU* rear I/O transition modules are in use, one acting as carrier, and the other configured as mezzanine expansion module.

CompactPCI® Serial Backplane Connector rJ4 (Option)

For usage as a rear I/O transition module. the SUB-RIO is equipped with the backplane connector rJ4, which mates the SU1-TWIST and SU2-BALLAD P4 connector pin assignment, for up to eight UART ports (TTL level signals). Typically, the UART ports 1-4 are used on the front card, and 5-8 on the rear I/O module. If the SUB-RIO is used as a mezzanine module, rJ4 is not populated.

rJ4	A	B	C	D	E	F	G	H	I	J	K	L
rJ4 CompactPCI® Serial Rear Board Backplane Connector EKF Part #250.3.1208.10.00 • 96 pos. 12x8												
8	GND	+3.3V	+3.3V	GND	UART 1 RXD	UART 1 RTS#	GND	UART 1 RE#	UART 1 DE	GND	UART 1 TXD	UART 1 CTS#
7	+5V	I2C CLK	GND	UART 5 CTS#	UART 5 TXD	GND	UART 5 DE	UART 5 RE#	GND	UART 5 RTS#	UART 5 RXD	GND
6	GND	+3.3V	+3.3V	GND	UART 2 RXD	UART 2 RTS#	GND	UART 2 RE#	UART 2 DE	GND	UART 2 TXD	UART 2 CTS#
5	+5V	I2C DAT	GND	UART 6 CTS#	UART 6 TXD	GND	UART 6 DE	UART 6 RE#	GND	UART 6 RTS#	UART 6 RXD	GND
4	GND	+3.3V	+3.3V	GND	UART 3 RXD	UART 3 RTS#	GND	UART 3 RE#	UART 3 DE	GND	UART 3 TXD	UART 3 CTS#
3	+5V	I2C PWR	GND	UART 7 CTS#	UART 7 TXD	GND	UART 7 DE	UART 7 RE#	GND	UART 7 RTS#	UART 7 RXD	GND
2	GND	+3.3V	+3.3V	GND	UART 4 RXD	UART 4 RTS#	GND	UART 4 RE#	UART 4 DE	GND	UART 4 TXD	UART 4 CTS#
1	+5V	RIO ACT#	GND	UART 8 CTS#	UART 8 TXD	GND	UART 8 DE	UART 8 RE#	GND	UART 8 RTS#	UART 8 RXD	GND

all signals TTL level compliant, +3.45V maximum input voltage
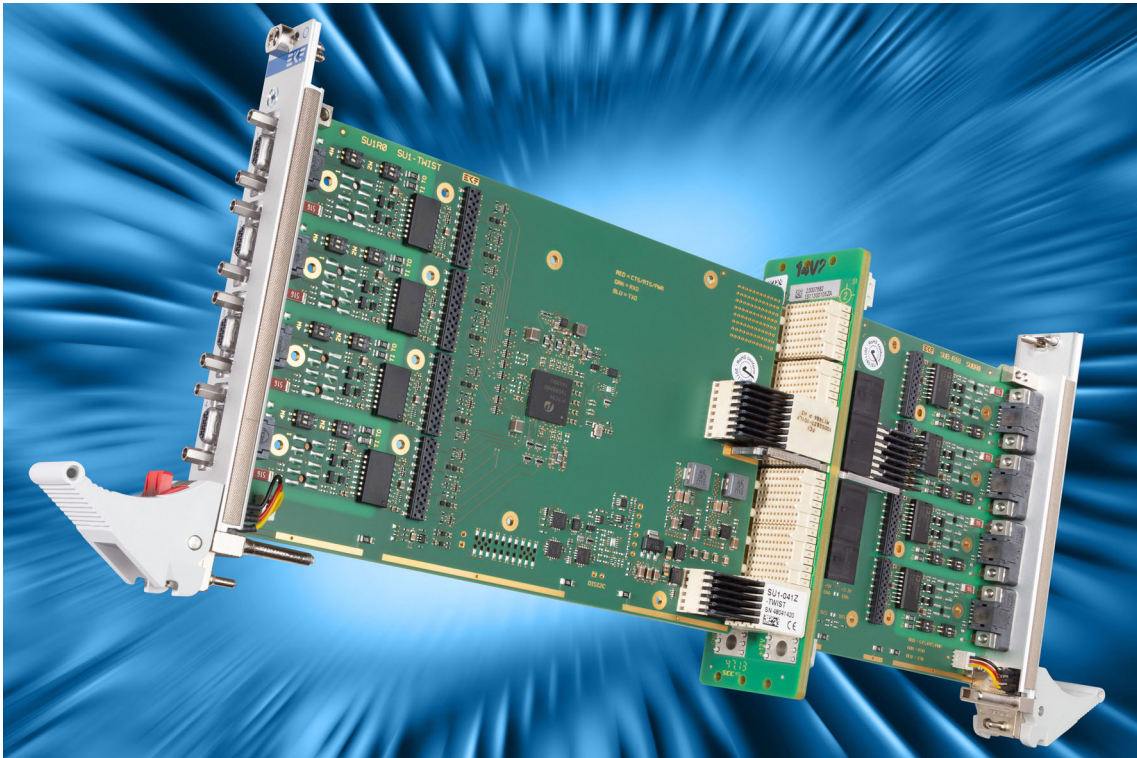
SU1-TWIST w. SUB-RIO (Isolated RS-485 Front Ports)

SUB-RIO w. SU1-TWIST (Eight Port 4HP Isolated RS-485 Solution)

Driver Software

UART drivers are available for download from the EKF website e.g. at https://www.ekf.com/s/su1/drv/.

Ordering Information

Ordering Information
For popular SUB-RIO SKUs please refer to https://www.ekf.com/liste/liste_21.html#SUB

Related Products

Related Links	
SU1-TWIST (Isolated RS-485)	https://www.ekf.com/s/su1/su1.html
SU2-BALLAD (Isolated RS-232)	https://www.ekf.com/s/su2/su2.html
SU3-ENSEMBLE (Isolated RS-***)	https://www.ekf.com/s/su3/su3.html
SU4-SOPRANO (RS-232/232 Selectable)	https://www.ekf.com/s/su4/su4.html
SUA-RIO (Rear I/O Isolated RS-232)	https://www.ekf.com/s/sua/sua.html
SUB-RIO (Rear I/O Isolated RS-485)	https://www.ekf.com/s/sub/sub.html
CompactPCI® Serial UART Solutions	https://www.ekf.com/s/serial.html#SU
CompactPCI® Classic UART Solutions	https://www.ekf.com/c/ccom/ccom.html
XMC Module UART Solutions	https://www.ekf.com/d/dcom.html

SUB-0330-RIO (D-Sub)
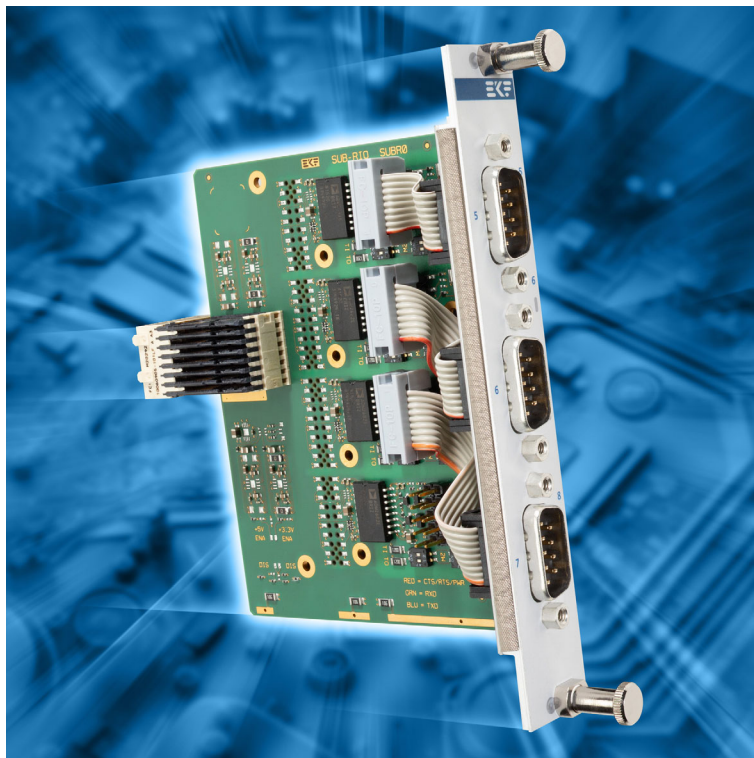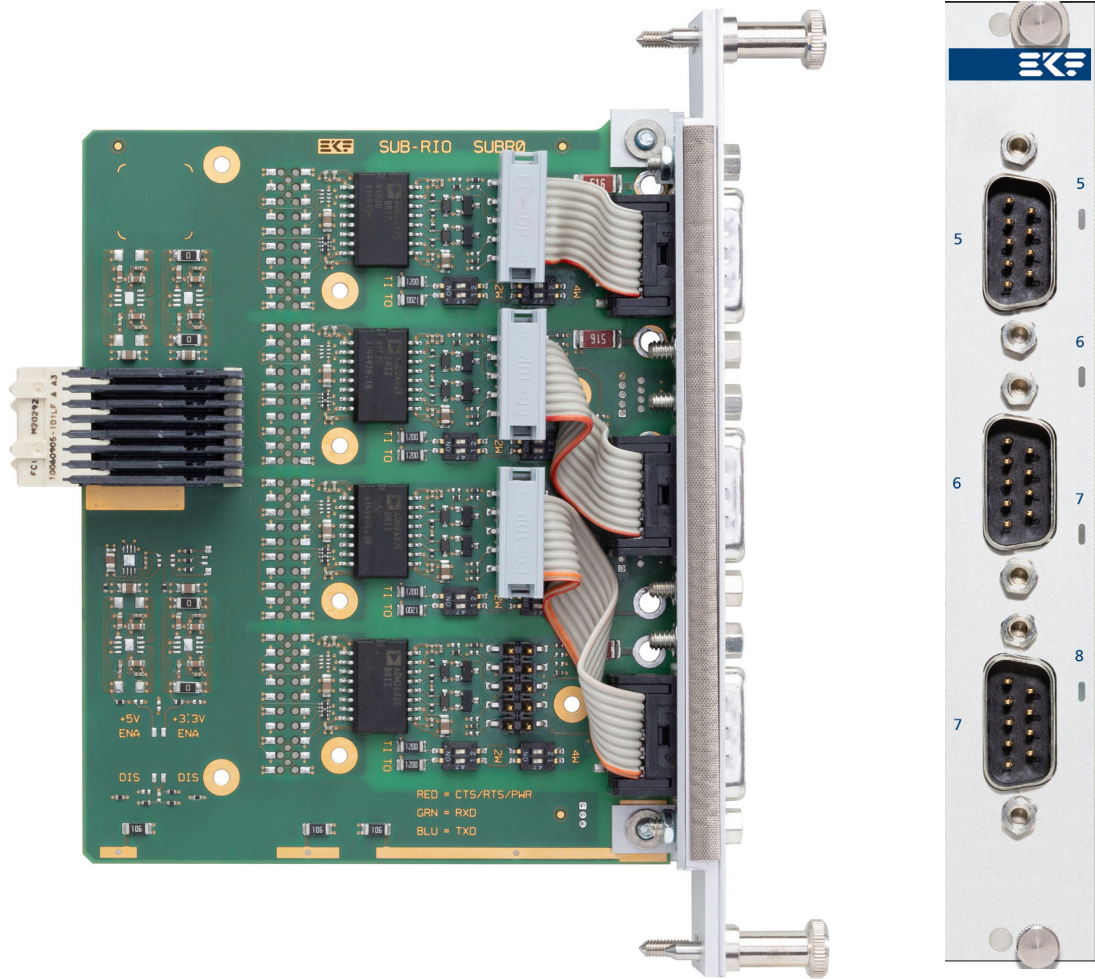
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