EKF

SYSTEM

Product Information

SU3-ENSEMBLE • CompactPCI® Serial
Isolated RS-485 & RS-232 I/F
Eight Port UART Modular Design

Short Description

The SU3-ENSEMBLE is a peripheral slot card for CompactPCI® Serial systems, based on a PCI Express® octal UART. The board can be individually populated with up to eight isolated transceivers, either RS-485 or RS-232, in any order. The transceiver modules are optionally available with RJ45, Micro-D or D-Sub front panel connectors.

A 4HP front panel is sufficient for up to four transceiver modules with RJ45 and/or Micro-D connectors. For up to eight modules the SU3-ENSEMBLE is available with an 8HP F/P. Transceiver modules with a D-Sub connector may require up to 12HP front panel width, dependent on the total number of ports, and are typically attached via flat cables.

SU3-ENSEMBLE • 8-Port 8HP Assembly RJ45

Feature Summary

Feature Summary

CompactPCI® Serial

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

▸ Single size Eurocard 3U 4HP 100x160mm^2

▸ Suitable for CompactPCI® Serial peripheral slot (PCI Express® enabled)

▸ CompactPCI® Serial backplane connector P1 for PCI Express®, single lane link

▸ Option CompactPCI® Serial backplane connector P6 for even more mechanical ruggedness

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 out-of-band control

▸ Driver enable signal for PartyLine operation

▸ Data frame 5, 6, 7, 8 and 9 bits

▸ Clock prescaling 4 to 46

▸ 14.4756MHz UART clock

▸ 50.0000 MHz clock option for highest RS-485 data rates available (SU5-ENSEMBLE)

▸ Windows® WHQL device driver support

▸ QNX driver support

Feature Summary

RS-485 Transceiver Modules

▸ Choice of three front panel connector types

▸ SUF-RS485 - Micro-D (20mm width module)

▸ SUH-RS485 - RJ45 (20mm width module)

▸ SUJ-RS485 - D-Sub 9-pos. (31mm width module)

▸ 5kV rms 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

▸ Suitable e.g. for industrial fieldbus applications

RS-232 Transceiver Modules

▸ Choice of three front panel connector types

▸ SUE-RS232 - Micro-D (20mm width module)

▸ SUG-RS232 - RJ45 (20mm width module)

▸ SUI-RS232 - D-Sub 9-pos. (31mm width module)

▸ 2.5kV Isolation barrier RS-232 transceivers (Analog Devices *iso*Power)

▸ Transceivers meet EIA/TIA-232-E specifications

▸ High data rate > 460kbps (each board tested @921.6kbps)

▸ $\pm$8 kV/$\pm$15 kV ESD protection on transceiver input/output pins

▸ High common-mode transient immunity >25 kV/μs

▸ Suitable for high noise data communications and diagnostic ports

Feature Summary

Front Panel I/O

▸ Up to 4 transceiver modules RJ45 and/or Micro-D within 4HP front panel width

▸ Up to 8 transceiver modules RJ45 and/or Micro-D within 8HP front panel width

▸ Up to 6 transceiver modules D-Sub within 8HP front panel width (flat cable attachment, front handle replaced by screw lock)

▸ Any mix of transceiver modules together with custom specific front panel design, up to 12HP width

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 53.1 years (SU3 board w/o transceiver modules)

▸ EC Regulations EN55022, EN55024, 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.

SU3-ENSEMBLE w. 6 x D-Sub Transceiver Modules (8HP Front Panel)

Block Diagram

4HP Front Panel I/O

RJ45 Micro-D D-Sub

8HP F/P for 8 x SUE/F/G/H Modules
12HP F/P for 8 x SUI/J Modules

Shown: 4HP 4 x SUH/SUG Modules

Up to 8 Modules in any Order
Isolated EIA-232 or EIA-485
RJ45, Micro-D, or D-Sub

SUE-SUF • Micro-D
SUG-SUH • RJ45
SUI-SUJ • D-Sub*
* flat cable attached

M48   M37   M26   M15

UART Ports 4 & 8
4=4HP 8=8HP
4&8=flat cable

UART Ports 3 & 7
3=4HP 7=8HP
3&7=flat cable

UART Ports 2 & 6
2=4HP 6=8HP
2&6=flat cable

UART Ports 1 & 5
1=4HP 5=8HP
1&5=flat cable

F/P IO

1-4 4HP F/P
5-8 8HP F/P
1-8 Flat Cable

TTL   8

P17C9X7958

PCIe®
Octal
UART

EPROM

14.7456MHz (SU3)
50.0000MHz (SU5)
UART Clock

Emulation
8/4/2 Ports
7958/4/2

Simplified Block Diagram
SU3-ENSEMBLE
SU5-ENSEMBLE
RS-232 & RS-485 Isolated
Modular Design

© EKF
ekf.com

PCI Express®

P1

Peripheral
Slot

Backplane
CompactPCI
Serial

P4

P6

www.ekf.com/s/su3/img/su3_blk.pdf

Theory of Operation

The SU3-ENSEMBLE is equipped with the Pericom PI7C9X7958 PCI Express® octal UART, which is suitable for asynchronous baud rates up to 15Mbps. All TTL level UART channels are wired to four 2.0mm pitch 2x10 position sockets, each capable to carry one or two transceiver modules by means of a suitable board-to-board stacker or micro ribbon flat cable assembly.

Up to four transceiver modules 1-4 can be populated on a SU3-ENSEMBLE which is provided with a 4HP front panel. These modules must be mounted with their component side down (towards the carrier card PCB).

For up to eight transceiver modules, the SU3-ENSEMBLE must be equipped with an 8HP front panel. The additional transceiver modules 5-8 must be mounted congruent on top of the modules 1-4, however with their component side up (modules back-to-back). This method is suitable for 20mm width transceiver module, provided with an RJ45 or Micro-D front panel connector.

Transceiver modules with D-Sub front panel connector however exhibit a width of 31mm, due to the D-Sub connector dimensions. Hence, a flat cable assembly will be in use for attachment of D-Sub modules.
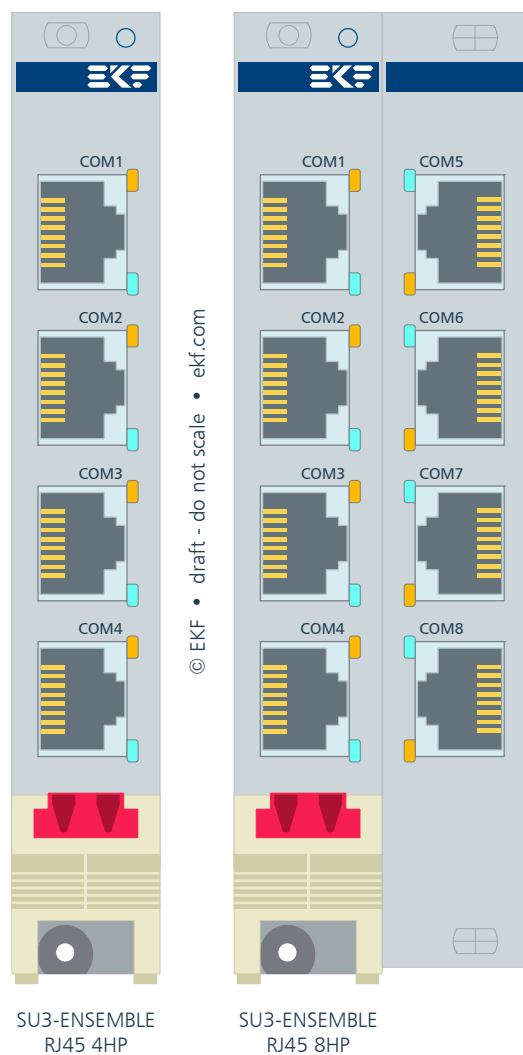
Component Orientation

SU3-ENSEMBLE • CompactPCI® Serial • © EKF • ekf.com

SU3-ENSEMBLE • © EKF • ekf.com

SUH-RS485 • SUG-RS232
Isolated Interface • RJ45
M48

SUH-RS485 • SUG-RS232
Isolated Interface • RJ45
M37

SUH-RS485 • SUG-RS232
Isolated Interface • RJ45
M26

SUH-RS485 • SUG-RS232
Isolated Interface • RJ45
M15

P1

P6

Front Panel

SU3-ENSEMBLE
RJ45 4HP

SU3-ENSEMBLE
RJ45 8HP
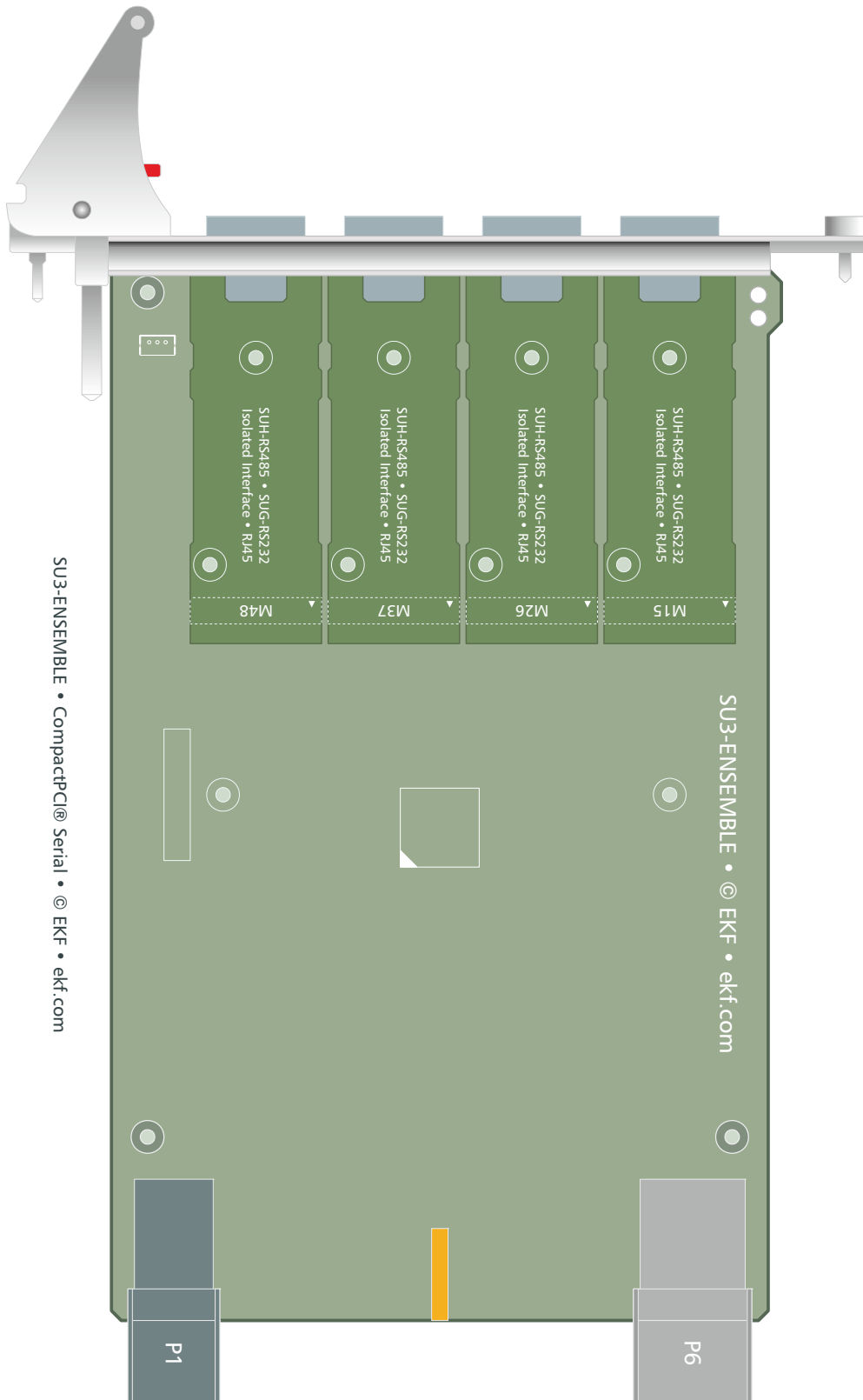
F/P shown for 4x/8x modules w. RJ45 connector

triple color LEDs assigned to each connector/port
for detailed description please refer to the SUE-SUJ module documentation
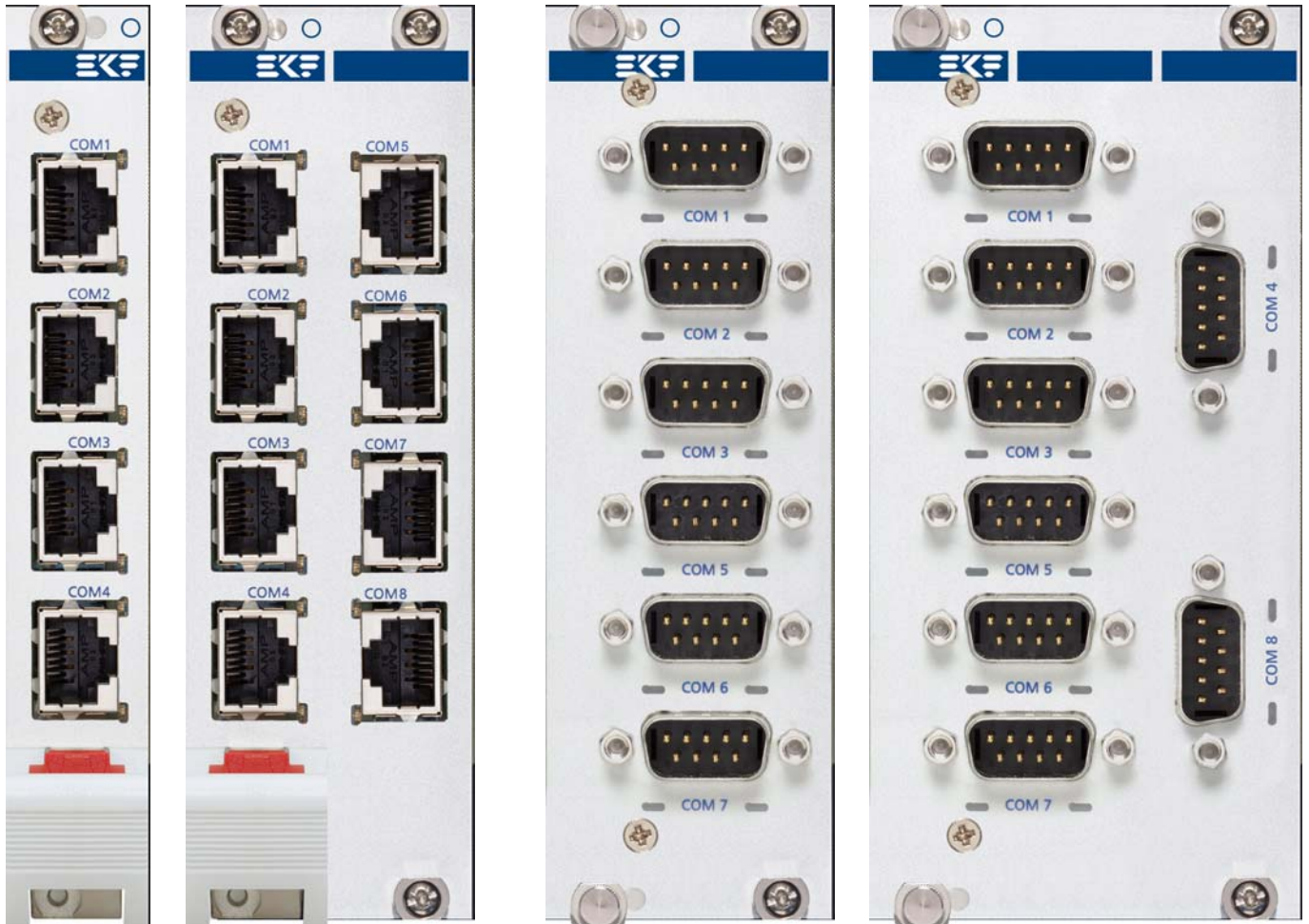
Typical front front panels 4/8/12HP

Any combination and count up to eight of SUE - SUJ modules can be realized on customers request
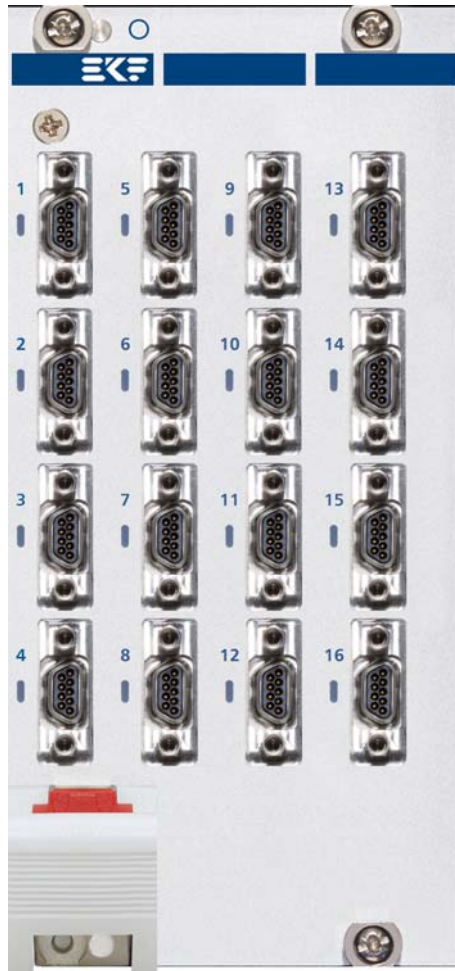
12HP Front Panel w. 16 x Micro-D (Assembly w. 2 x SU3-ENSEMBLE)

Module Overview

Transceiver Modules Available			
Front Connector	Isolated I/F	Module Width	Ordering No.
D-Sub 9-pos.	EIA-232	31mm	SUI-xxxx-RS232
D-Sub 9-pos.	EIA-485	31mm	SUJ-xxxx-RS485
Micro-D 9-pos.	EIA-232	20mm	SUE-xxxx-RS232
Micro-D 9-pos.	EIA-485	20mm	SUF-xxxx-RS485
RJ45 8-pos.	EIA-232	20mm	SUG-xxxx-RS232
RJ45 8-pos.	EIA-485	20mm	SUH-xxxx-RS485

Modules with 20mm front width will be attached directly to the SU3-ENSEMBLE, which allows up to 4 front panel connectors vertically assigned for a 4HP fron panel (8 connectors with 8HP front panel width). D-Sub modules (31mm width) typically require a flat cable attachment, and can be mounted to the front panel either horizontally or vertically grouped.

SUF-RS485 • SUE-RS232 • Micro-D Connector

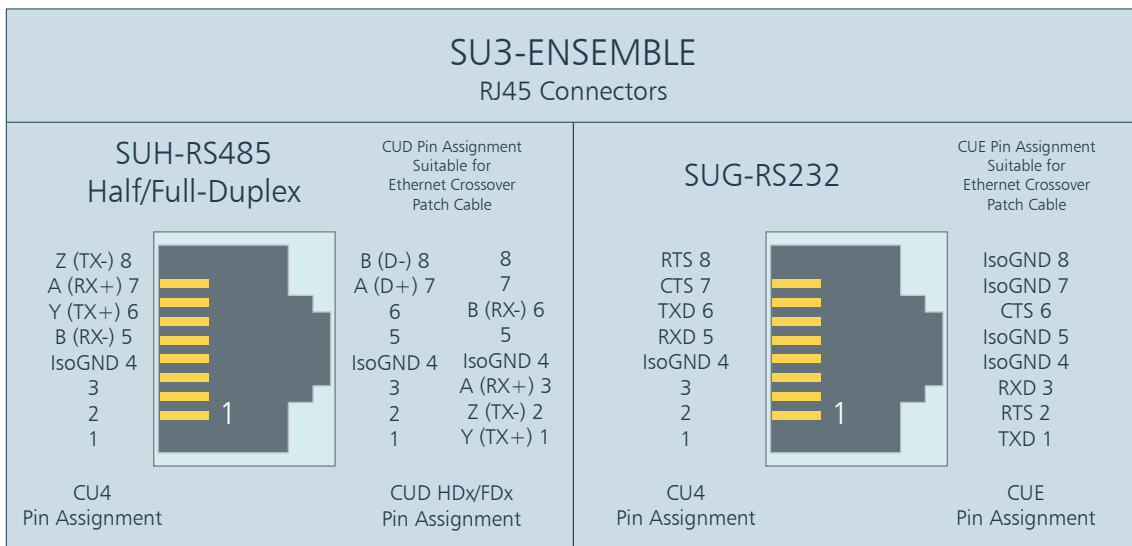SUH-RS485 • SUG-RS232 • RJ45 Connector

SUJ-RS485 • SUI-RS232 • D-Sub Connector

Front Panel Connectors

The SU3-ENSEMBLE can be populated with up to 8 transceiver modules with RJ45 and/or Micro-D I/O connectors, for a front panel width of 4HP or 8HP. These modules can be mixed at customers discretion, however not all front panel versions may be available from stock.
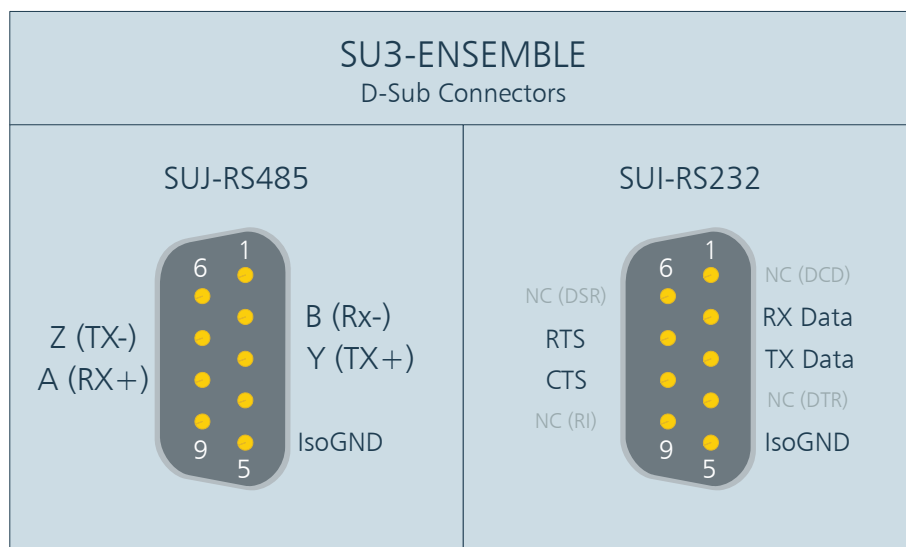

SU3-ENSEMBLE
Micro-D Connectors

SUF-RS485
Half/Full-Duplex

5 9
IsoGND
Y (TX+)   A (RX+)
B (RX-)   Z (TX-)
1 6
SU1/SU4 Pin Assignment

SUE-RS232

5 9
IsoGND   NC (RI)
NC (DTR)   CTS
TXD   RTS
RXD   NC (DSR)
NC (DCD)
1 6
SU2/SU4 Pin Assignment
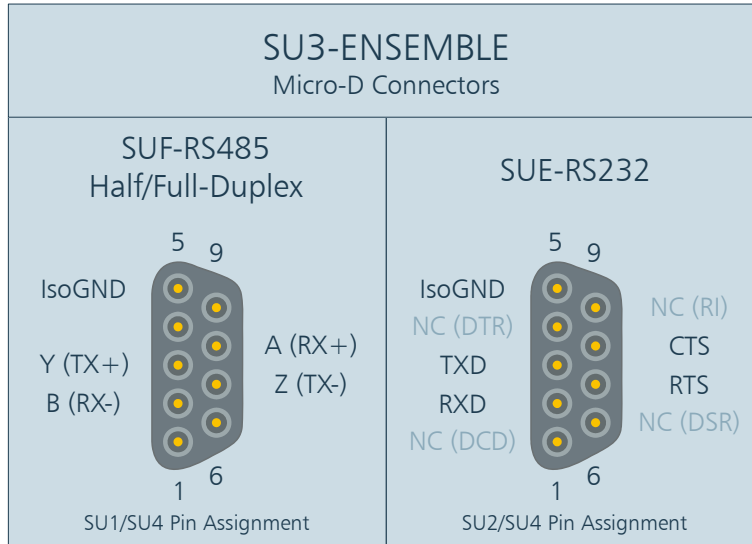
IsoGND is the reference ground for all signals of a particular I/O connector, isolated from the board and system logic GND, and from Shield (panel/chassis), and also from other transceiver modules.

SU3-ENSEMBLE
RJ45 Connectors

SUH-RS485
Half/Full-Duplex

Z (TX-) 8
A (RX+) 7
Y (TX+) 6
B (RX-) 5
IsoGND 4
3
2
1

CU4
Pin Assignment

CUD Pin Assignment
Suitable for
Ethernet Crossover
Patch Cable

B (D-) 8   8
A (D+) 7   7
6   B (RX-) 6
5   5
IsoGND 4   IsoGND 4
3   A (RX+) 3
2   Z (TX-) 2
1   Y (TX+) 1

CUD HDx/FDx
Pin Assignment

SUG-RS232

RTS 8
CTS 7
TXD 6
RXD 5
IsoGND 4
3
2
1

CU4
Pin Assignment

CUE Pin Assignment
Suitable for
Ethernet Crossover
Patch Cable

IsoGND 8
IsoGND 7
CTS 6
IsoGND 5
IsoGND 4
RXD 3
RTS 2
TXD 1

CUE
Pin Assignment

Standard versions of the SU3-ENSEMBLE use the CU4 pin assignment to provide an easy migration path for CU4/SU4 users. Alternate RJ45 pin assignments may be useful for new applications and are available on customer request.

The SU3-ENSEMBLE can be also used with transceiver modules equipped with the popular D-Sub I/O connector. This may require a front panel width of 8HP or 12HP.

SU3-ENSEMBLE
D-Sub Connectors

SUJ-RS485

6
1

Z (TX-)
A (RX+)

B (Rx-)
Y (TX+)

IsoGND

9
5

SUI-RS232

6
1

NC (DSR)

RTS

CTS

NC (RI)

NC (DCD)

RX Data

TX Data

NC (DTR)

IsoGND

9
5

Standard versions of the SU3-ENSEMBLE use the CU4 pin assignment to provide an easy migration path for CU4/SU4 users. SUJ was designed to allow any pinout (available on customer request only).

Sockets M15 - M48

The SU3-ENSEMBLE is equipped with four pass-through sockets, each wired to 2 UART channels, suitable for attachment of up to eight EKF SU*-series transceiver modules.

A mezzanine transceiver module connects to the the SU3-ENSEMBLE sockets M15-M48 via pin stackers. Two transceiver modules can be attached this way to any one socket. Transceiver modules 1-4 must be mounted with their component side down, facing towards the SU3-ENSEMBLE PCB. Optional transceiver modules 5-8 must be mounted on top of the modules 1-4, but with their component side up (transceiver modules back to back).

As an alternate, transceiver modules can be attached by a flat cable assembly to the sockets M15-M48. This is recommended for D-Sub connector transceiver modules with a width of 31mm.

M15 - M48 • TTL-Level Serial I/O				
2.00mm Socket Strip 2 x 10 (251.1.0210.10.09)				
+5V	1	2	GND	
RTS# (1-4)	3	4	RXD (1-4)	
TXD (1-4)	5	6	+3.3V	
DE (1-4)	7	8	CTS# (1-4)	
RE# (1-4)	9	10	GND	
RE# (5-8)	11	12	GND	
DE (5-8)	13	14	CTS# (5-8)	
TXD# (5-8)	15	16	+3.3V	
RTS# (5-8)	17	18	RXD (5-8)	
+5V	19	20	GND	

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

CompactPCI® Serial Backplane Connector

The SU3-ENSEMBLE is equipped with a PCI Express® based UART (Gen1 single lane). The card can be inserted in any PCIe® enabled peripheral slot of the CompactPCI® Serial backplane for proper operation.

P1 CompactPCI® Serial Peripheral Slot Backplane Connector											
EKF Part #250.3.1206.20.02 • 72 pos. 12x6, 14mm Width											
P1	A	B	C	D	E	F	G	H	I	J	K	L
6	GND	PE TX02+	PE TX02-	GND	PE RX02+	PE RX02-	GND	PE TX03+	PE TX03-	GND	PE RX03+	PE RX03-
5	PE TX00+	PE TX00-	GND	PE RX00+	PE RX00-	GND	PE TX01+	PE TX01-	GND	PE RX01+	PE RX01-	GND
4	GND	USB2+	USB2-	GND	PE CLK+	PE CLK-	GND	SATA TX+	SATA TX-	GND	SATA RX+	SATA RX-
3	USB3 TX+	USB3 TX-	GA0	USB3 RX+	USB3 RX-	GA1	SATA SDI	SATA SDO	GA2	SATA SCL	SATA SL	GA3
2	GND	I2C SCL	I2C SDA	GND	RSV	RSV	GND	RST#	WAKE#	GND	PE EN#	SYS EN#
1	+12V	STBY	GND	+12V	+12V	GND	+12V	+12V	GND	+12V	+12V	GND

pin positions printed white/grey: not connected

Driver Software

UART drivers are available for download from the EKF website e.g. at https://www.ekf.com/s/su3/drv/.

Related Products

Related Links	
SUE-SUJ Isolated Transceiver Modules RS-232 & RS-485	www.ekf.com/s/sue-suj/sue-suj.html
SU1-TWIST Isolated RS-485	www.ekf.com/s/su1/su1.html
SU2-BALLAD Isolated RS-232	www.ekf.com/s/su2/su2.html
SU4-SOPRANO RS-232/232 Selectable	www.ekf.com/s/su4/su4.html
SUA-RIO Rear I/O Isolated RS-232	www.ekf.com/s/sua/sua.html
SUB-RIO Rear I/O Isolated RS-485	www.ekf.com/s/sub/sub.html
CompactPCI® Serial UART Solutions	www.ekf.com/s/serial.html#SU
CompactPCI® Classic UART Solutions	www.ekf.com/c/ccom/ccom.html
XMC Module UART Solutions	www.ekf.com/d/dcom.html

Ordering Information

Ordering Information
For popular SU3-ENSEMBLE SKUs please refer to www.ekf.com/liste/liste_21.html#SU3

SU3-045x-ENSEMBLE w. 4 x RJ45 Transceiver Modules (4HP Front Panel)

Ordering Number Key SU3-abcd-ENSEMBLE (Availability on Request)		
a	0	EKF standard product
bc	45	4HP front panel for 4 x RJ45
	63	8HP front panel for 6 x D-Sub
	83	12HP front panel for 8 x D-Sub
	85	8HP front panel for 8 x RJ45
d	0-4 (6/8)	assembly configuration (number of RS-485 ports, others RS-232)

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