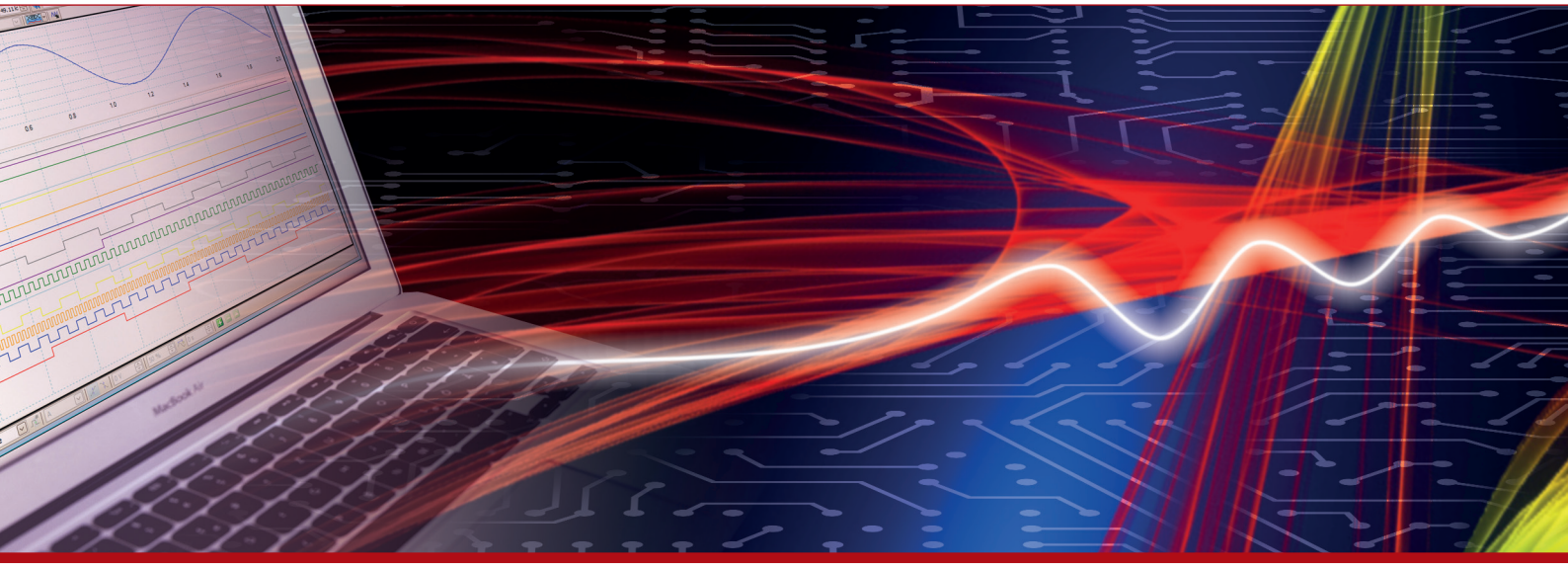
Product Datasheet - Technical Specifications



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ME-9000i isolated Serial Interface Board, RS232, RS422, RS485

- Serial interface boards.
- 4 or 8 ports.
- RS232 or RS422/RS485 ports or mixed versions RS232 + RS422/RS485.
- High-speed transmission rates up to 1 MBaud.
- All handshake lines wired to the connector.
- Galvanic isolation of all ports with common gound.
- ESD protection.
- 8 additional discrete TTL digital I/O lines, 1 counter 16 bit.
- Ideal solution for POS (point-of-sales) and retail applications.
- Plug&Play. For PCI-Express-, UniversalPCI- (3,3 V and 5 V) or CompactPCI/PXI-Bus (universal 3,3 V and 5 V).

Model	Isolation of all ports	Ports	Bus
ME-9000i/4 RS232 PCI	Standard (common GND)	4x RS232	StandardPCI
ME-9000i/4 RS485 PCI	Standard (common GND)	4x RS422/RS485	StandardPCI
ME-9000i/4 RS232 PCIe	Standard (common GND)	4x RS232	PCI-Express
ME-9000i/4 RS485 PCIe	Standard (common GND)	4x RS422/RS485	PCI-Express
ME-9000i/8 RS232 PCI	Standard (common GND)	8x RS232	StandardPCI
ME-9000i/8 RS485 PCI	Standard (common GND)	8x RS422/RS485	StandardPCI
ME-9000i/8 MIX PCI	Standard (common GND)	4x RS232 und 4x RS422/RS485	StandardPCI
ME-9000i/8 RS232 PCIe	Standard (common GND)	8x RS232	PCI-Express
ME-9000i/8 RS485 PCIe	Standard (common GND)	8x RS422/RS485	PCI-Express
ME-9000i/8 MIX PCIe	Standard (common GND)	4x RS232 und 4x RS422/RS485	PCI-Express
ME-9000i/8 RS232 cPCI	Standard (common GND)	8x RS232	3 HE CompactPCI
ME-9000i/8 RS485 cPCI	Standard (common GND)	8x RS422/RS485	3 HE CompactPCI

A Specification

PC Interface

Resources are assigned automatically (Plug&Play)	
ME-9000 PCI/cPCI (Rev. 2.2)	PCI local bus specification version 2.2 (32 bit, 33 MHz, Universal-PCI: 5 V/3,3 V)
ME-9000 PCI-Express	PCI-Express x1 specification version 2.0 (32 bit, 33 MHz, 3,3 V)
ME-9100/9300 PCI/cPCI	PCI local bus specification version 2.1 (32 bit, 33 MHz, 5 V)
ME-90 PC/104-Plus	PC/104-Plus specification version 2.3 (32 bit, 33 MHz, Universal-PCI: 5 V/3,3 V)

Note: One „**Mix**"-versions RS-232 and RS-422/485 ports can be combined on one board.

UARTs (ME-9000/9100/9300, ME-90 PC/104-Plus)

Number of ports (RS-232 + RS-422/485)	ME-9000: 2, 4 or 8 (RS-232, RS-422/485) ME-9100: 4 or 8 (RS-232, RS-422/485) ME-9300: 16 (RS-232) ME-90 PC/104-Plus: 8 (RS-232, RS-422/485)
Type ME-9000 and ME-90 PC/104-Plus	Octo-UART integrated in the PCI controller of type EXAR XR17D158IV; register compatible to the 16550 with integrated transmit and receive FIFO for each port.
Type ME-9100	1 resp. 2 Quad-UARTs of type OX16C954 or compatibles (depends on number of ports); register compatible to the 16550 with integrated transmit and receive FIFO for each port.
Type ME-9300	4 Quad-UARTs of type OX16C954 or compatibles; register compatible to the 16550 with integrated transmit and receive FIFO for each port.
FIFO capacity	ME-9000/ME-90 PC/104-Plus: each 64 bytes ME-9100/9300: each 128 bytes

Transfer rates	75/110/134/150/300/600/1200/1800/2400/4800/7200/9600/14.400/19.200/38.400/57.600/115.200/128.000/230.400/460.800/921.600 Bd
Parity	none, odd, even, mark, space
Data bits	4; 5; 6; 7; 8
Stop bits	1; 1,5; 2
Flow control	Xon/Xoff, hardware, none

RS-232 Ports (ME-9000/9100/9300, ME-90 PC/104-Plus)

Signals	RxD, TxD, DCD, DTR, DSR, RTS, CTS, RI
Transfer distance	max. 15 m
Voltage level for output signals (TxD)	logical: „0“: typ. +5,4 V (+5 V < U < +13,2 V) logical: „1“: typ. -5,4 V (-13,2 V < U < -5 V)
Voltage level for input signals (RxD)	logical: „0“: +3 V < U < +25 V logical: „1“: -25 V < U < -3 V
ESD protection	up 15 kV (IEC 1000)
Electrical isolation	for „i“-versions up to 500 V for „p“-versions up to 500 V

RS-422/485 Ports (ME-9000/9100, ME-90 PC/104-Plus)

Operation modes	- RS-422 - RS-485 half-duplex (automatic flow-control) - RS-485 full-duplex
Transfer distance	max. 1200 m
Differential output voltage of the buffer:	2...4.8 V
Differential input voltage for high level:	min. 200 mV
Differential input voltage for low level:	max. 200 mV
Output offset voltage relating to GND	2...3 V
Electrical isolation	for „i“- und „p“-versions:

	- to PC ground: 500 V - between the ports (only „p“-models): 500 V

Multi-I/O Pins (ME-9000, ME-90 PC/104-Plus)

Number	8-bit bidirectional
Type	TTL ports
Interrupt	IRQ-DIO (must be enabled)
Output level (Vcc = 5 V±10 %)	U_{OL}: max. 0,55 V at 6 mA U_{OH}: min. 2,4 V at -2 mA
Input level (Vcc = 5 V±10 %)	U_{IL}: -0,5 < 0,8 V U_{IH}: 2,0 V < 6,0 V
Reference to GND	PC ground (GND_PC)

Counter (ME-9000, ME-90 PC/104-Plus)

Number	1 x 16 bit
Type	down-counter
Modes	„Single-Shot“ or „Retrigger“
Clock source	internal/external
Internal Oscillator	crystal oscillator (14,7456 MHz/100 ppm)
Ext. clock input	TMRCK
Interrupt	IRQ-CNT (must be enabled)
Reference to GND	PC-ground (GND_PC)

General Information

Power consumption	typ. 2,3 A at +5 V
Max. load of VCC on the customer design area (DA) resp. ST2 of the ME-9000:	max. 300 mA @ VCC (+5 V resp. +3,3 V)
Max. load of VCC via ST3 of the ME-90 PC/104-Plus:	max. 300 mA @ VCC (+5 V)
Physical size (without mounting bracket and connectors)	ME-9000 PCIe: 124 x 99 mm ME-9000 PCI: 124 x 99 mm ME-9100 PCI: 136 x 99 mm ME-9300 PCI: 129 x 99 mm ME-90 PC/104-Plus: 90 x 96 mm CompactPCI models: 3U CompactPCI

Connection ME-9000	78-pin D-Sub female connector with dual, quad or octopus cable to 9-pin D-Sub male connectors 20-pin IDC connector (ST2) for MIO pins incl. flat ribbon cable to 25-pin.
Connection ME-9100	78-pin D-Sub female connector with dual, quad or octopus cable to 9pin D-Sub male connectors (ST2) for MIO pins incl. flat ribbon cable to 25-pin D-Sub female connector.
Connection ME-9300	2 x 68-pin VHDCI female connectors
Connection ME-90 PC/104-Plus	Bus connectors for PCI and ISA bus (ISA bus looped through only), 2 x 40-pin IDC connectors (with 90° angle) incl. 2 flat ribbon cables with each 4 x 9-pin. D-Sub male connector, 20-pin. IDC connector (ST3) for MIO pins incl. flat ribbon cable to 25-pin D-Sub female connector.
Operating temperature	ME-9000: -40…+71 °C ME-9100/9300: 0…70 °C ME-90 PC/104-Plus: -40…+85 °C
Storage temperature	ME-9000/9100: -40…100 °C ME-9300: -40…100 °C ME-90 PC/104-Plus: -40…100 °C
Relative humidity	20…55 % (non-condensing)

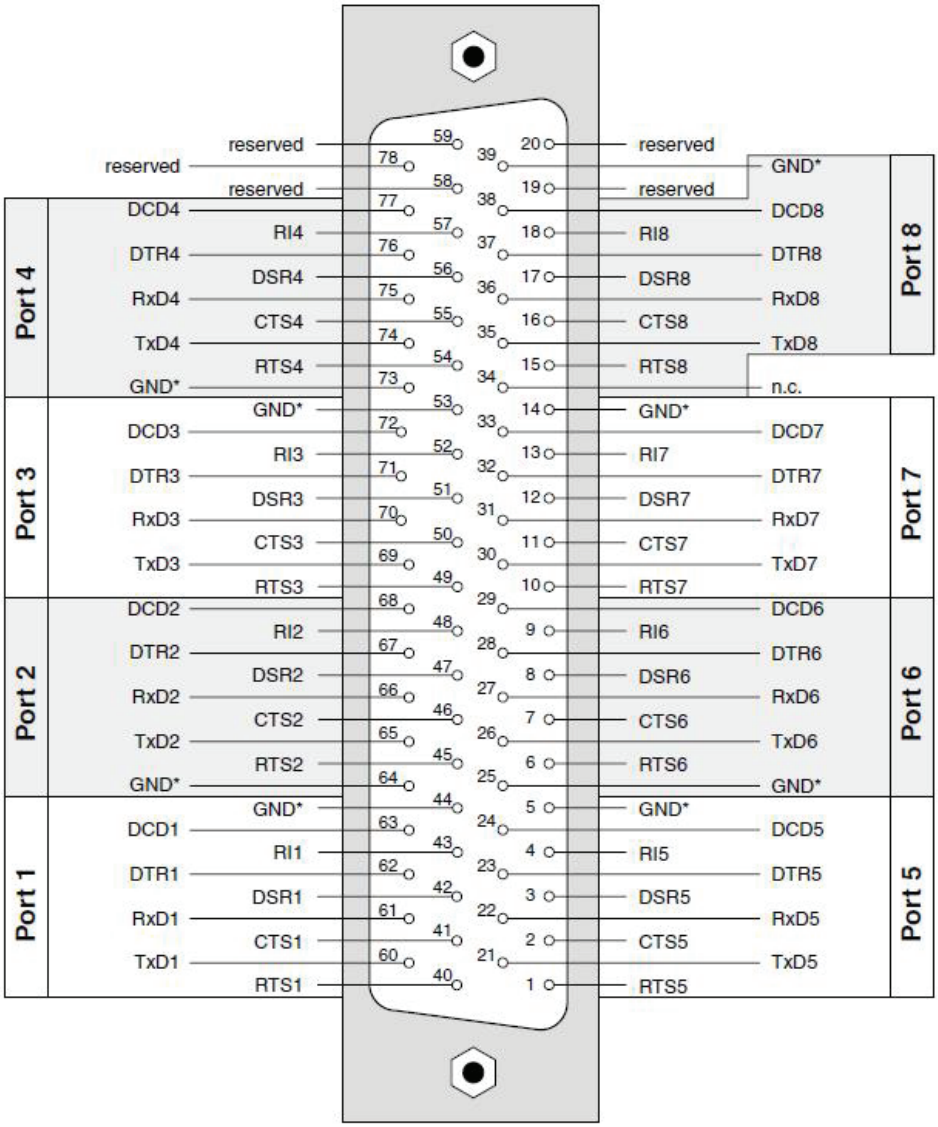
CE Certification

EMC-directive	89/336/EMC
Emission	EN 55022
Noise immunity	EN 50082-2

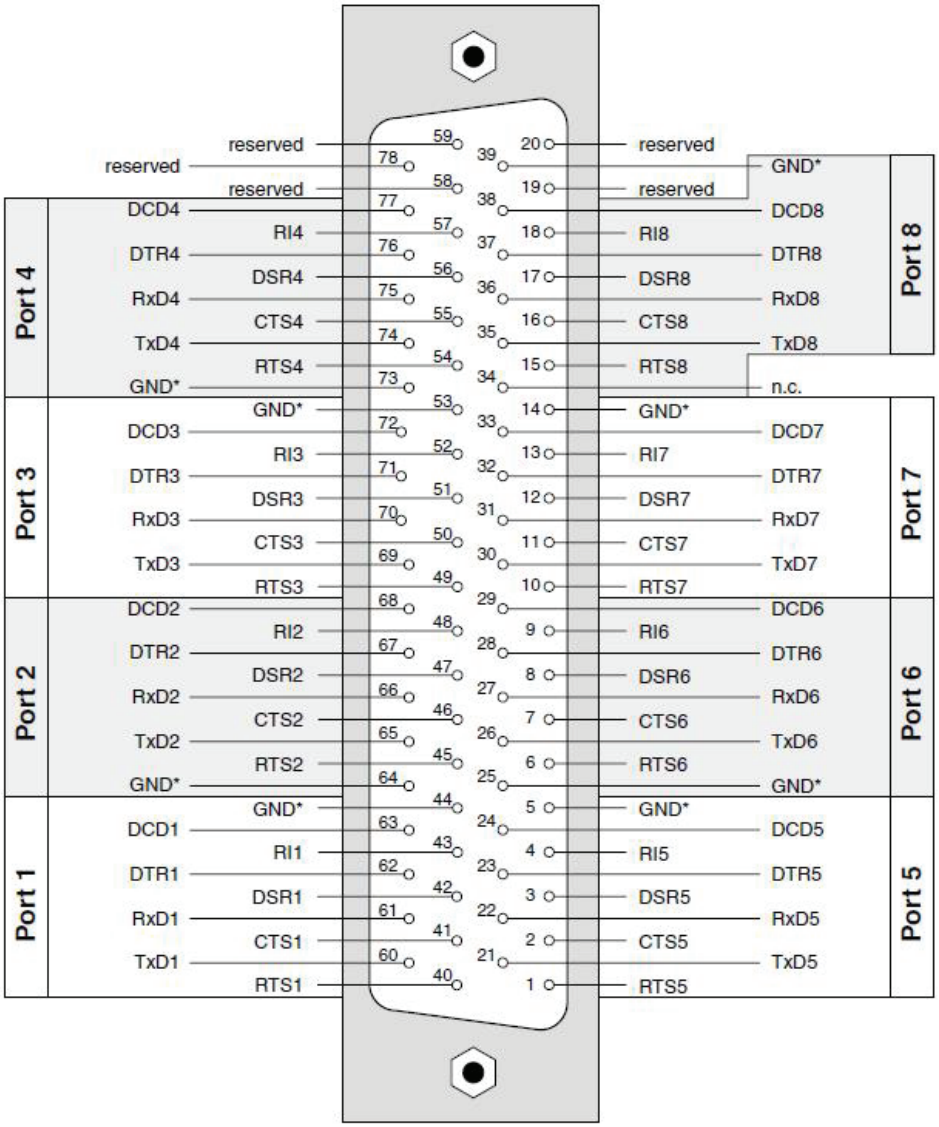
3 Pinout

Note the different pinout of the RS-232 and RS-422/485 ports. The „**MIX**- versions provide RS-232 as well as RS-422/485 ports. The RS-232 ports occupy always the lower significant ports followed by the RS-485 ports.

31 ME-9000/9100 RS-232

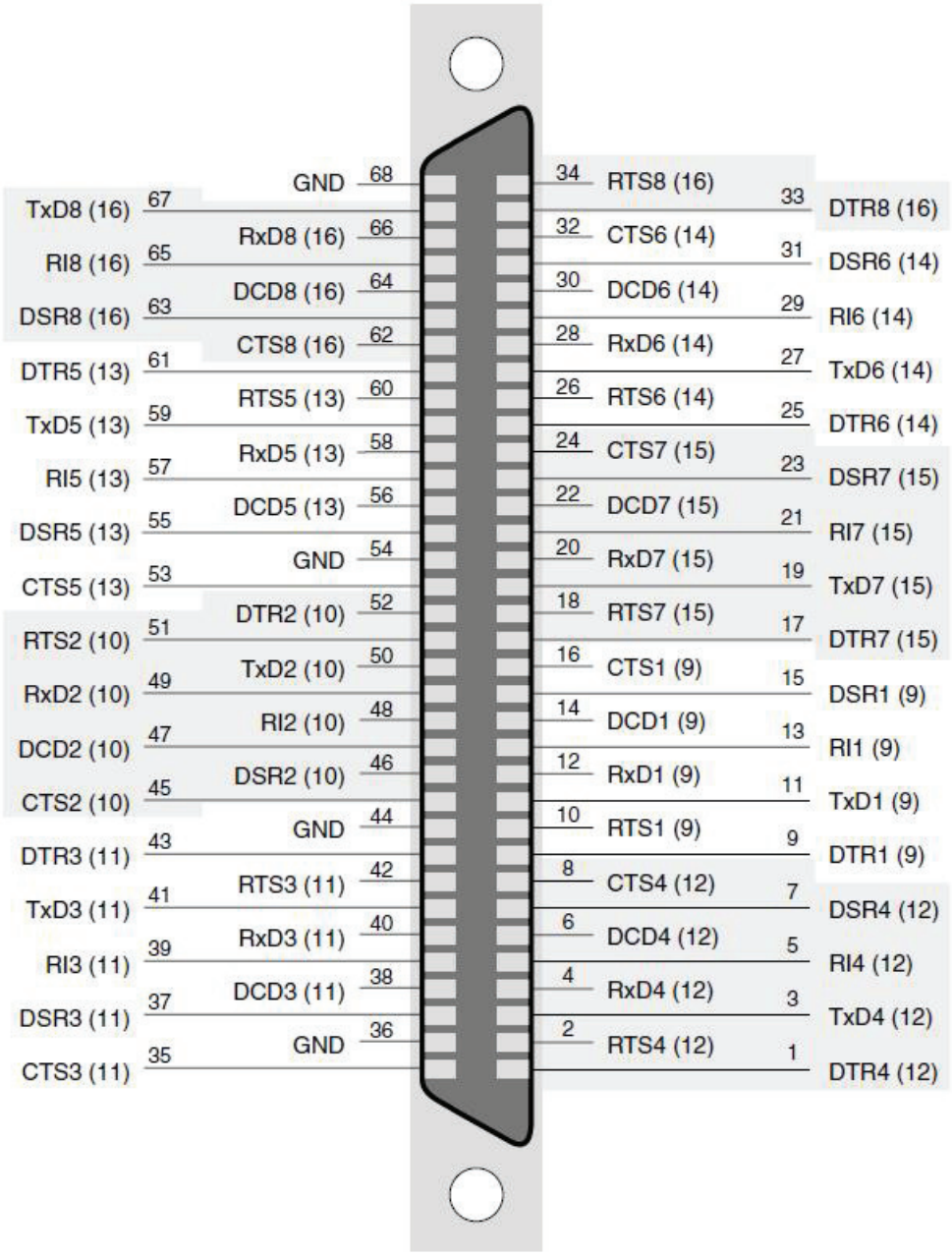


Picture 58: Pinout of the 78-pin D-Sub female connector for RS-232 ports



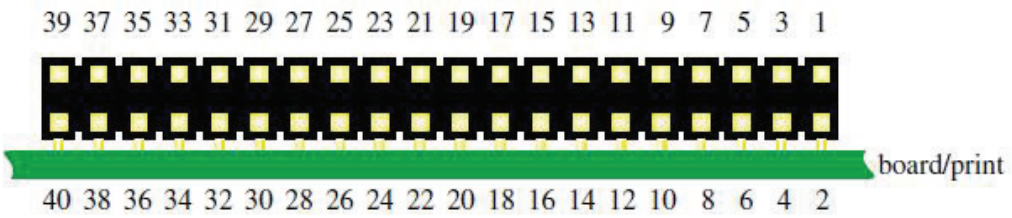
Picture 59: Pinout of the 78-pin D-Sub female connector for RS-422-485 ports

33 ME-9300 RS-232



Picture 60: 68-pin VHDC female connector of the ME-9300

Pinout is valid for both VHDC connectors (connector A: lower, connector B: upper). The numbers in brackets describe the port numbers of connector B.



Picture 61: 40-pin IDC connector of the ME-90 PC/104-Plus

Both of the 40-pin IDC connectors for COM1...4 and COM5...8 are allocated identically (see the following table).

Pin	COM	RS-232	Direction	RS-422/485	Direction
1	1 or 5	DCD	Input	RxD+	Input
2	1 or 5	DSR	Input	reserved	–
3	1 or 5	RxD	Input	RxD-	Input
4	1 or 5	RTS	Output	reserved	–
5	1 or 5	TxD	Output	TxD+	Output
6	1 or 5	CTS	Input	reserved	–
7	1 or 5	DTR	Output	TxD-	Output
8	1 or 5	RI	Input	reserved	–
9	1 or 5	GND	Mass	GND	Mass
10	1 or 5	+5 V	VCC	n.c.	–
11	2 or 6	DCD	Input	RxD+	Input
12	2 or 6	DSR	Input	reserved	–
13	2 or 6	RxD	Input	RxD-	Input
14	2 or 6	RTS	Output	reserved	–
15	2 or 6	TxD	Output	TxD+	Output
16	2 or 6	CTS	Input	reserved	–
17	2 or 6	DTR	Output	TxD-	Output
18	2 or 6	RI	Input	reserved	–
19	2 or 6	GND	Mass	GND	Mass

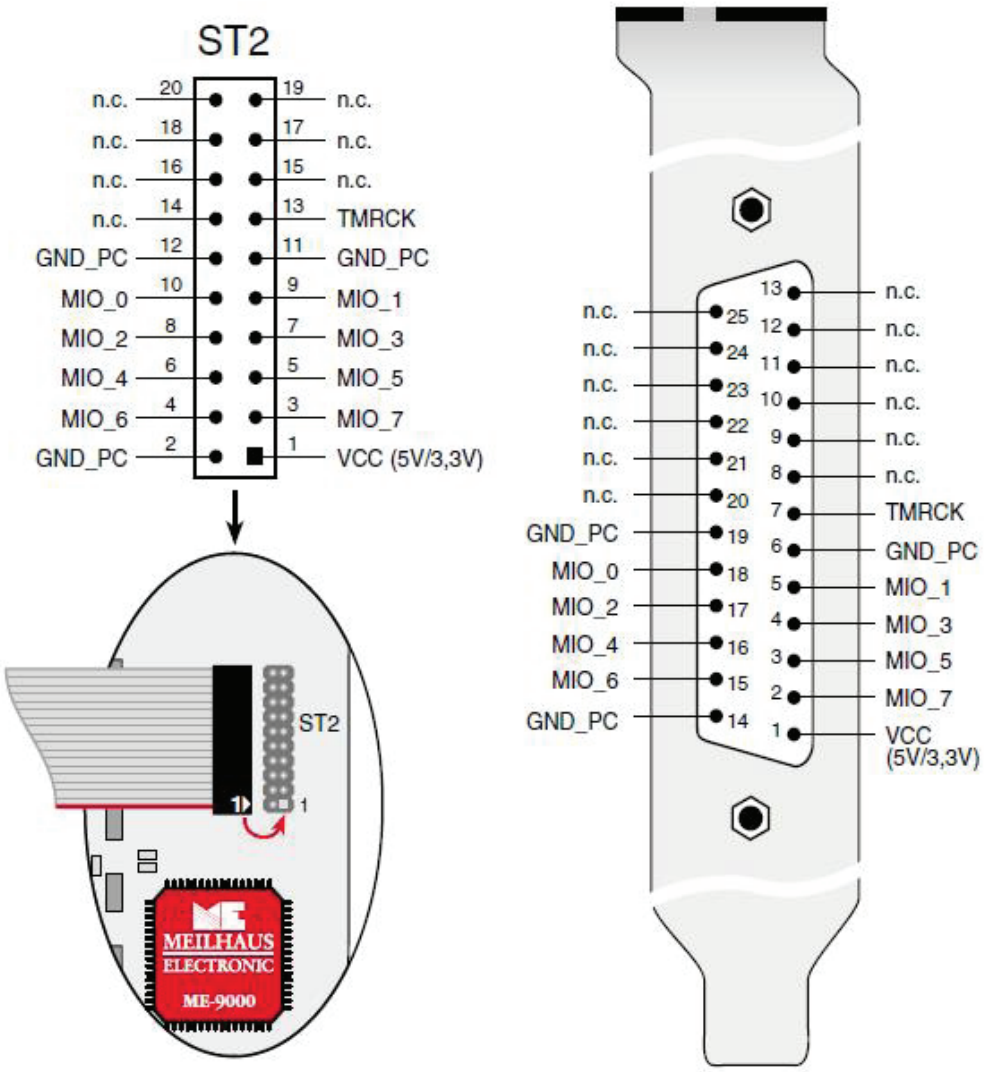
Table 9: Pinout of the 40-pin IDC connector

Pin	COM	RS-232	Direction	RS-422/485	Direction
20	2 or 6	+5 V	VCC	n.c.	–
21	3 or 7	DCD	Input	RxD+	Input
22	3 or 7	DSR	Input	reserved	–
23	3 or 7	RxD	Input	RxD-	Input
24	3 or 7	RTS	Output	reserved	–
25	3 or 7	TxD	Output	TxD+	Output
26	3 or 7	CTS	Input	reserved	–
27	3 or 7	DTR	Output	TxD-	Output
28	3 or 7	RI	Input	reserved	–
29	3 or 7	GND	Mass	GND	Mass
30	3 or 7	+5 V	VCC	n.c.	–
31	4 or 8	DCD	Input	RxD+	Input
32	4 or 8	DSR	Input	reserved	–
33	4 or 8	RxD	Input	RxD-	Input
34	4 or 8	RTS	Output	reserved	–
35	4 or 8	TxD	Output	TxD+	Output
36	4 or 8	CTS	Input	reserved	–
37	4 or 8	DTR	Output	TxD-	Output
38	4 or 8	RI	Input	reserved	–
39	4 or 8	GND	Mass	GND	Mass
40	4 or 8	+5 V	VCC	n.c.	–

Table 9: Pinout of the 40-pin IDC connector

35 Auxiliary Connector ST2 (ME-9000)

ME-AK-D25F/S: Adapter cable from 20-pin IDC connector to mounting bracket with 25-pin D-Sub female connector (comes with the board).

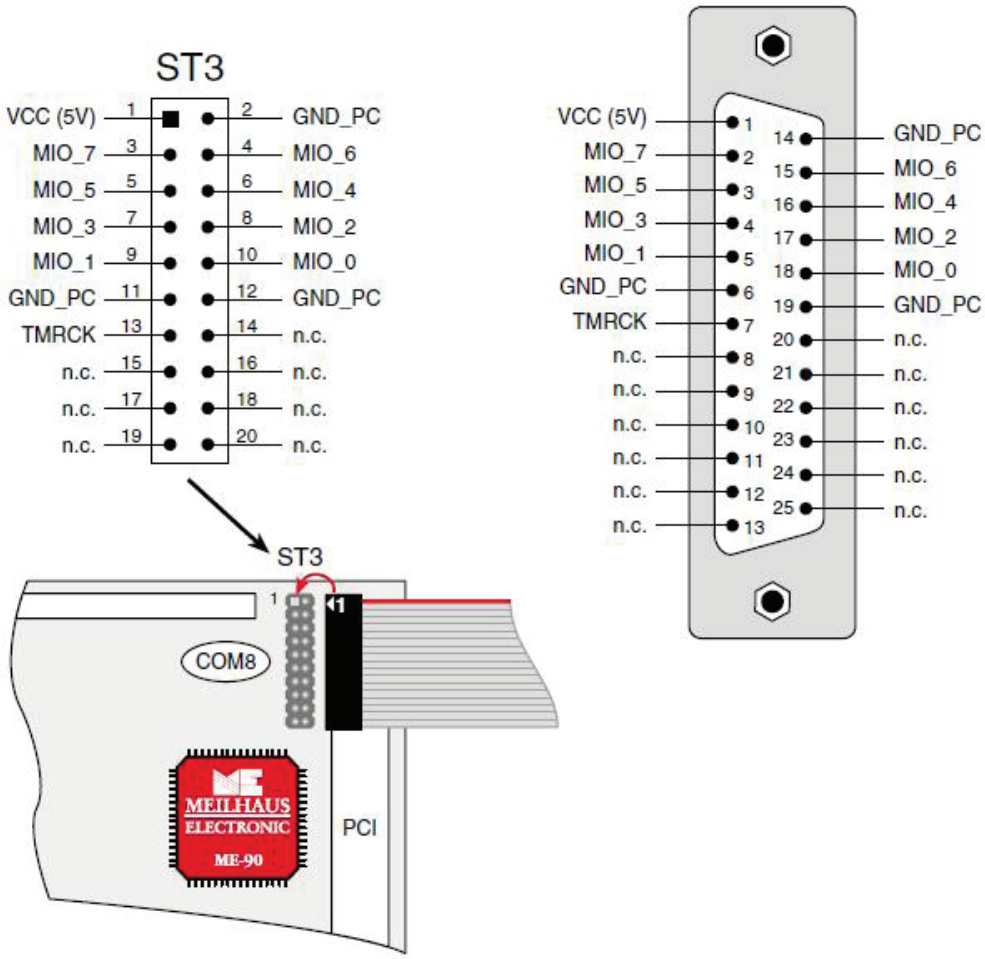


Picture 62: Pinout of ST2 on ME-9000 (i)

Note: Connect the mounting bracket pin 1 of the flat ribbon cable (red marked line) as shown above to the IDC connector ST2.

3.6 Auxiliary Connector ST3 (ME-90 PC/104-Plus)

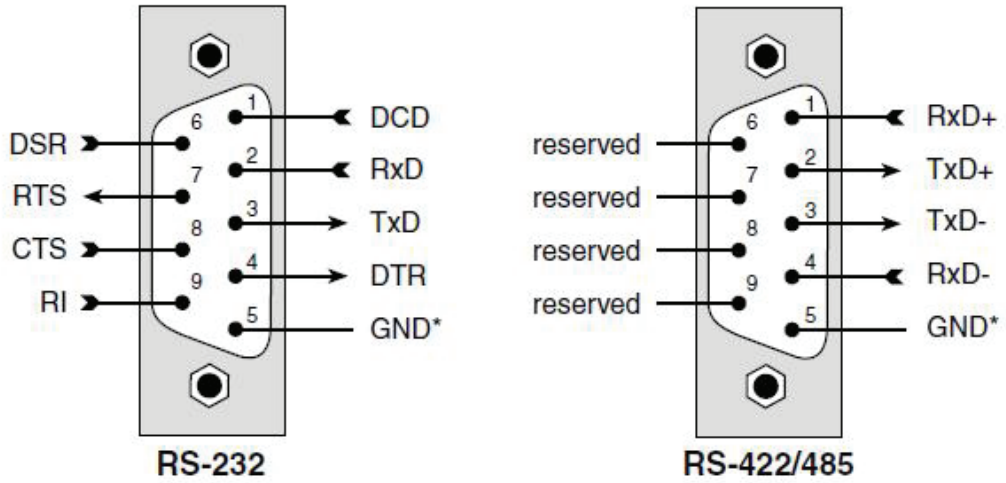
ME-AK-D25F: Adapter cable for multi-I/O port of the ME-90 PC/104-Plus from 20-pin IDC connector to 25-pin D-Sub female connector (comes with the board).



Picture 63: Pinout of ST3 of the ME-90 PC/104-Plus

Note: Connect pin 1 of the flat ribbon cable (red marked line) as shown above to pin 1 of the IDC connector ST3.

37 9-pin male connector ME-9000/9100/9300



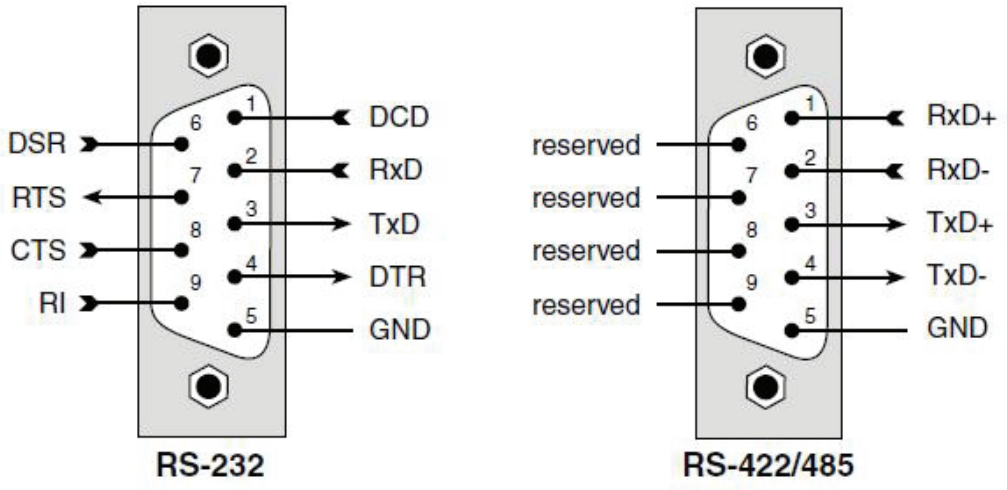
Picture 64: 9-pin D-Sub male connector ME-9x00

***Ground Reference ME-9000 Series**

Note the different ground reference at the GND pins of the connectors of the ME-9000 series:

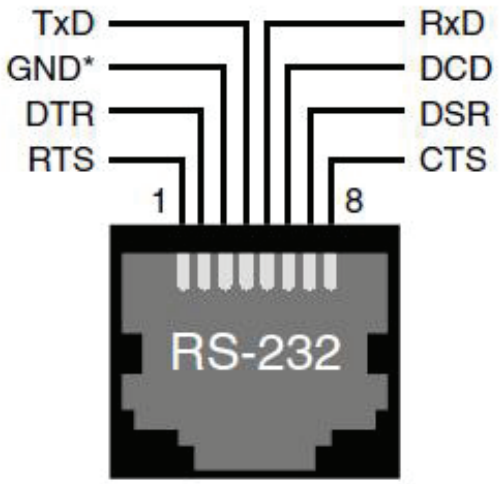
- TTL models (without opto-isolation): PC ground (GND_PC).
- „i"-models: from application view one common ground (GND_C) isolated to PC ground.
- „p"-models: ground of the single ports isolated from one another and to PC ground, so called „island-grounds" (GND_x).

B8 9-pin male connector ME-90 PC/104-Plus

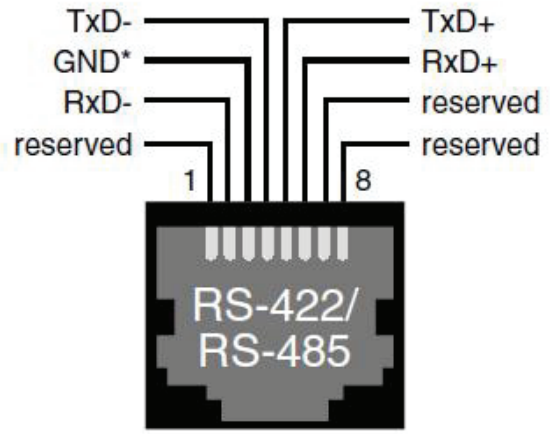


Picture 65: 9-pin D-Sub male connector of ME-90 PC/104-Plus

B9 8-pin RJ-45 female connectors

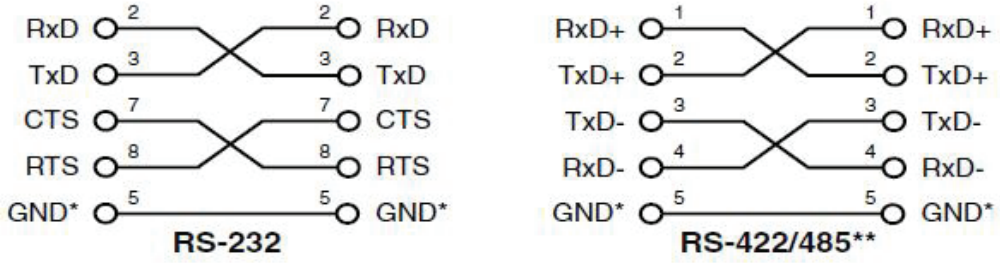


Picture 66: 8-pin RJ-45 female connector for RS_232 ports (Rocket-Port pinout)



Picture 67: 8-pin RJ-45 female connector for RS-422/485 ports (not Rocket-Port compatible)

310 Null modem cable



Picture 68: Null modem cable RS-232 (left), RS-422/485 (right)

* see note on page 111! **not for ME-90 PC/104-Plus