Appendix

A Specifications

PC Interface

Resources are assigned automatically (Plug&Play)

ME-9000 PCI/cPCI (Rev. 2.2)	PCI Local Bus Specification Rev. 2.2 (32 bit, 33 MHz, Universal-PCI: 5V/3.3V)
ME-9000 PCI-Express	PCI Express x1 Specification Rev. 2.0 (32 bit, 33 MHz, 3.3V)
ME-9100/9300 PCI/cPCI	PCI Local Bus Specification Rev. 2.1 (32 bit, 33 MHz, 5V)
ME-90 PC/104-Plus	PC/104-Plus Specification Rev. 2.3 (32 bit, 33 MHz, Universal-PCI: 5V/3.3V)

Note: On „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 byte ME-9100/9300: each 128 byte
Transfer rates	75/110/134/150/300/600/1.200/1.800/ 2.400/4.800/7.200/9.600/14.400/19.200/ 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. +5,4V (+5V < U < +13,2V)
	logical „1“: typ. -5,4V (-13,2V < U < -5V)
Voltage level for input signals (RxD):	
	logical „0“: +3V < U < +25V
	logical „1“: -25V < U < -3V
ESD protection	up to 15 kV (IEC 1000)
Electrical isolation	for „i“-versions up to 500V
	for „p“-versions up to 500V

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

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	U_{OL}:	max. 0,55V @ 6mA
(Vcc = 5V±10%)	U_{OH}:	min. 2,4V @ -2mA

Input level	U_{IL}:	-0,5 < 0,8V
(Vcc = 5V±10%)	U_{IH}:	2,0V < 6,0V
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 @ +5 V
Max. load of VCC on the customer design area (CDA) resp. ST2 of the ME-9000:	max. 300 mA @ VCC (+5V resp. +3.3V)
Max. load of VCC via ST3 of the ME-90 PC/104-Plus:	max. 300 mA @ VCC (+5V)
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	78pin D-Sub female connector with dual, quad or octopus cable to 9pin D-Sub male connectors 20pin IDC connector (ST2) for MIO pins incl. flat ribbon cable to 25pin D-Sub female connector
Connection ME-9100	78pin D-Sub female connector with dual, quad or octopus cable to 9pin D-Sub male connectors
Connection ME-9300	2 x 68pin VHDC female connectors
Connection ME-90 PC/104-Plus	Bus connectors for PCI and ISA bus (ISA bus looped through only), 2 x 40pol. IDC connectors (with 90° angle) incl. 2 flat ribbon cables with each 4 x 9pin D-Sub male connector, 20pin IDC connector (ST3) for MIO pins incl. flat ribbon cable to 25pin 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% (not condensing)

CE Certification

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

B 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.

B1 ME-9000/9100 RS-232

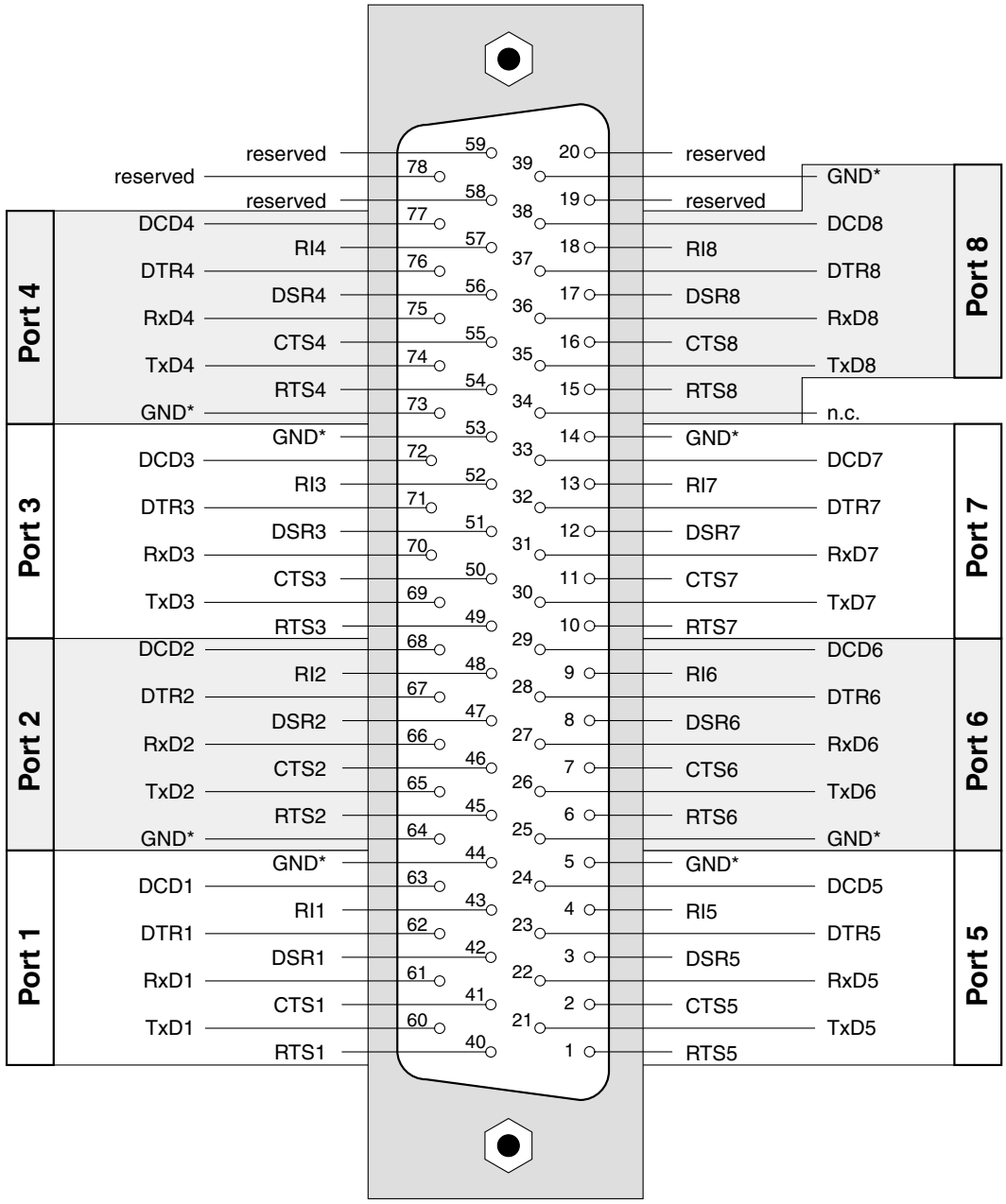

Diagram 58: Pinout of the 78pin D-Sub female connector for RS-232 ports

*see note on page 112!

B2 ME-9000/9100 RS-422/485

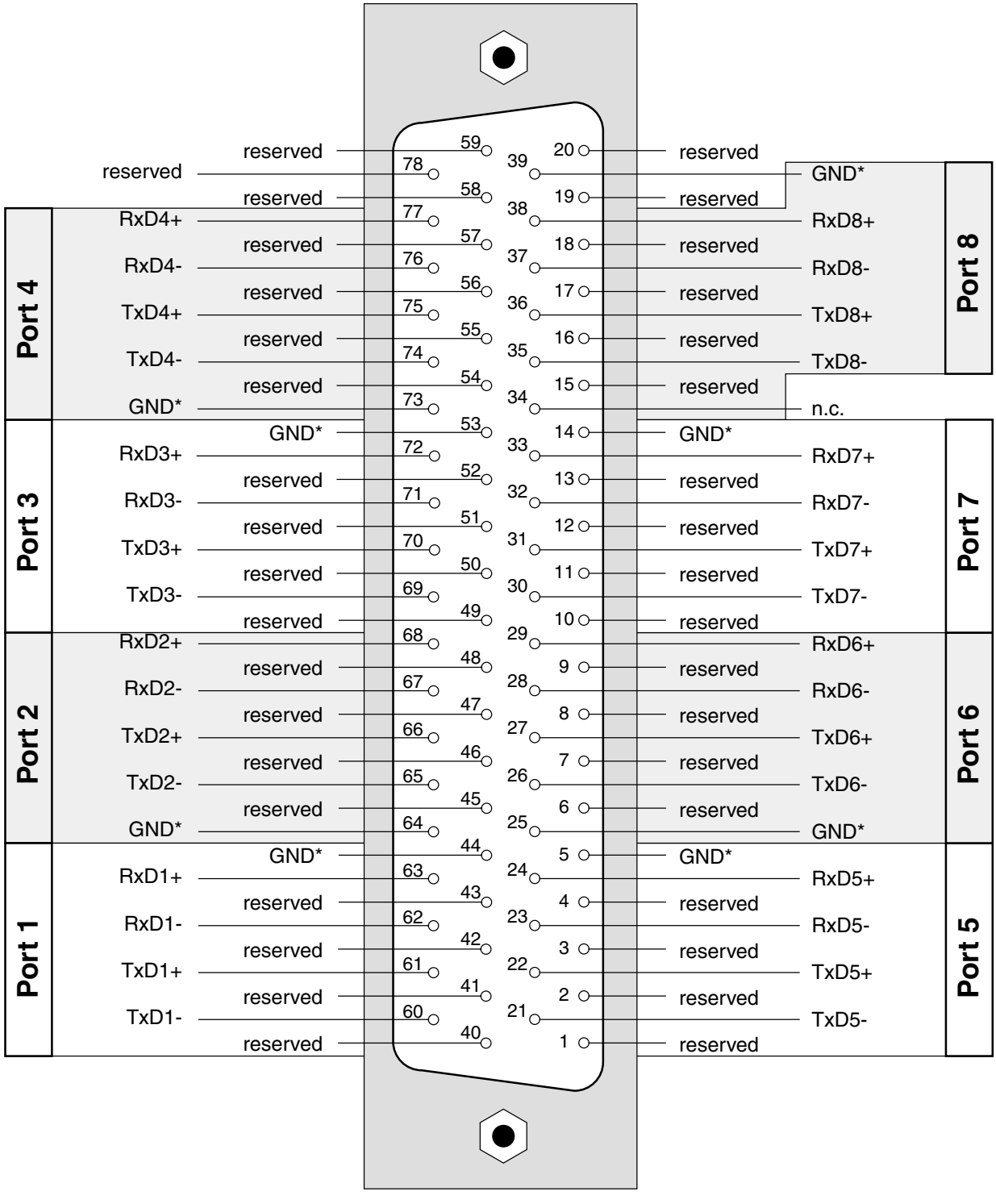

Diagram 59: Pinout of the 78pin D-Sub female connector for RS-422/485 ports

*see note on page 112!

B3 ME-9300 RS-232

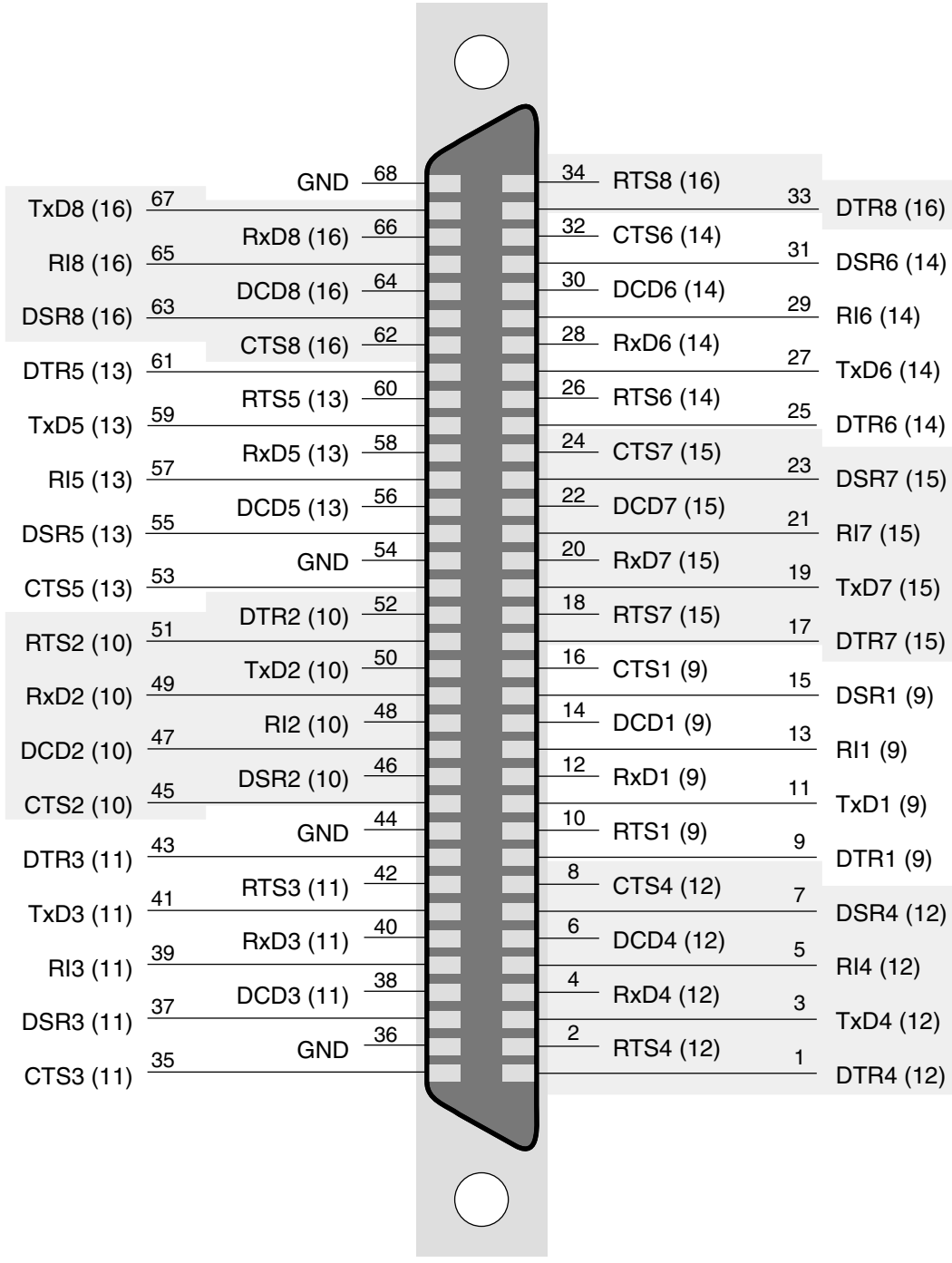

Diagram 60: 68pin VHDC female connector of the ME-9300

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

B4 ME-90 PC/104-Plus

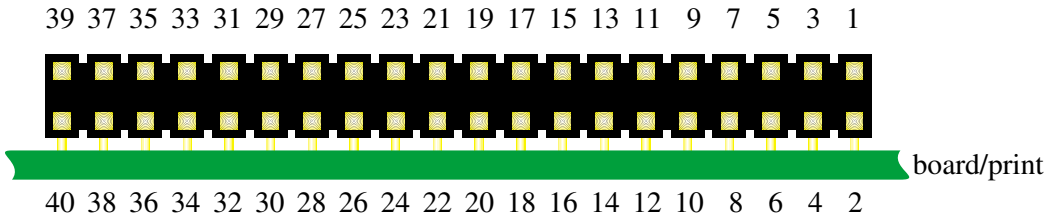

Diagram 61: 40pin IDC connector of the ME-90 PC/104-Plus

Both of the 40pin 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	Masse	GND	Masse
10	1 or 5	+5V	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	Masse	GND	Masse

Table 9: Pinout of the 40pin IDC connector

Pin	COM	RS-232	Direction	RS-422/485	Direction
20	2 or 6	+5V	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	Masse	GND	Masse
30	3 or 7	+5V	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	Masse	GND	Masse
40	4 or 8	+5V	VCC	n.c.	–

Table 9: Pinout of the 40pin IDC connector

B5 Auxiliary Connector ST2 (ME-9000)

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

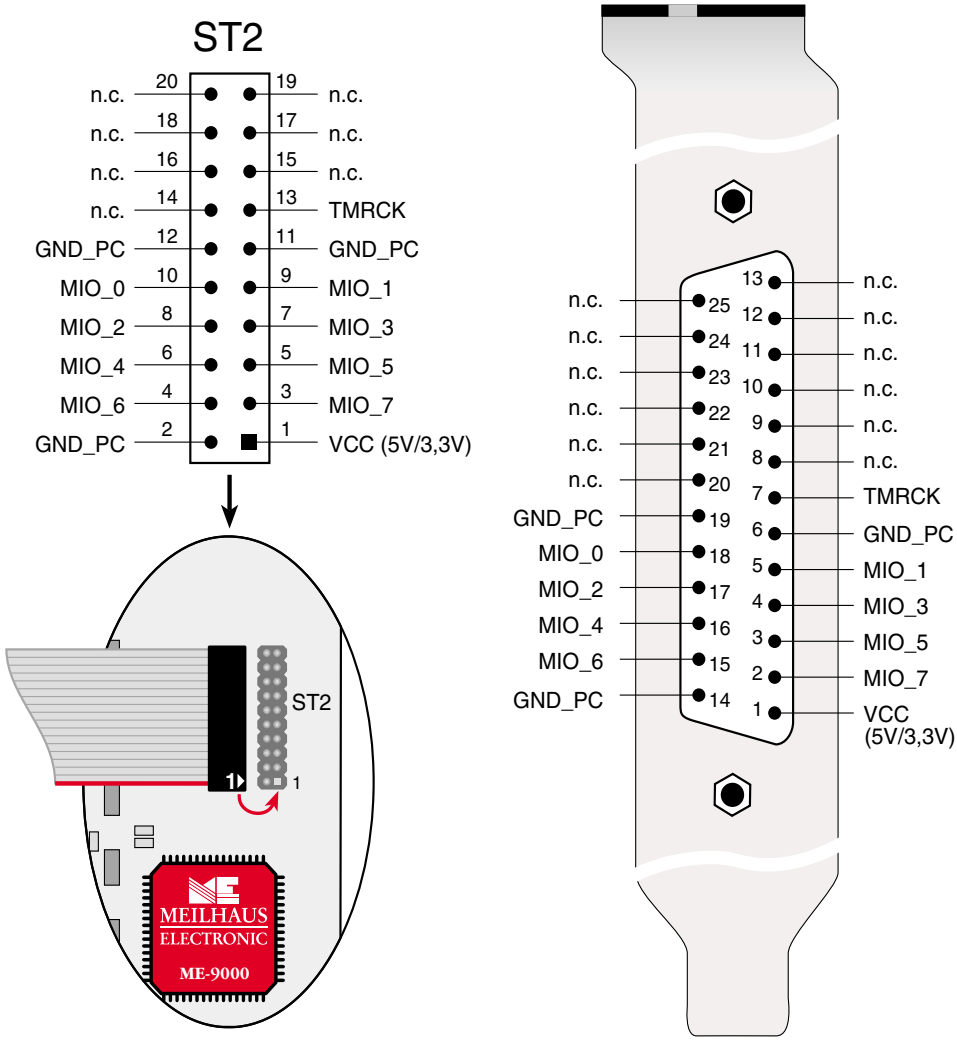

Diagram 62: Pinout of ST2 on ME-9000(i)

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

B6 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 20pin IDC connector to 25pin D-Sub female connector (comes with the board).

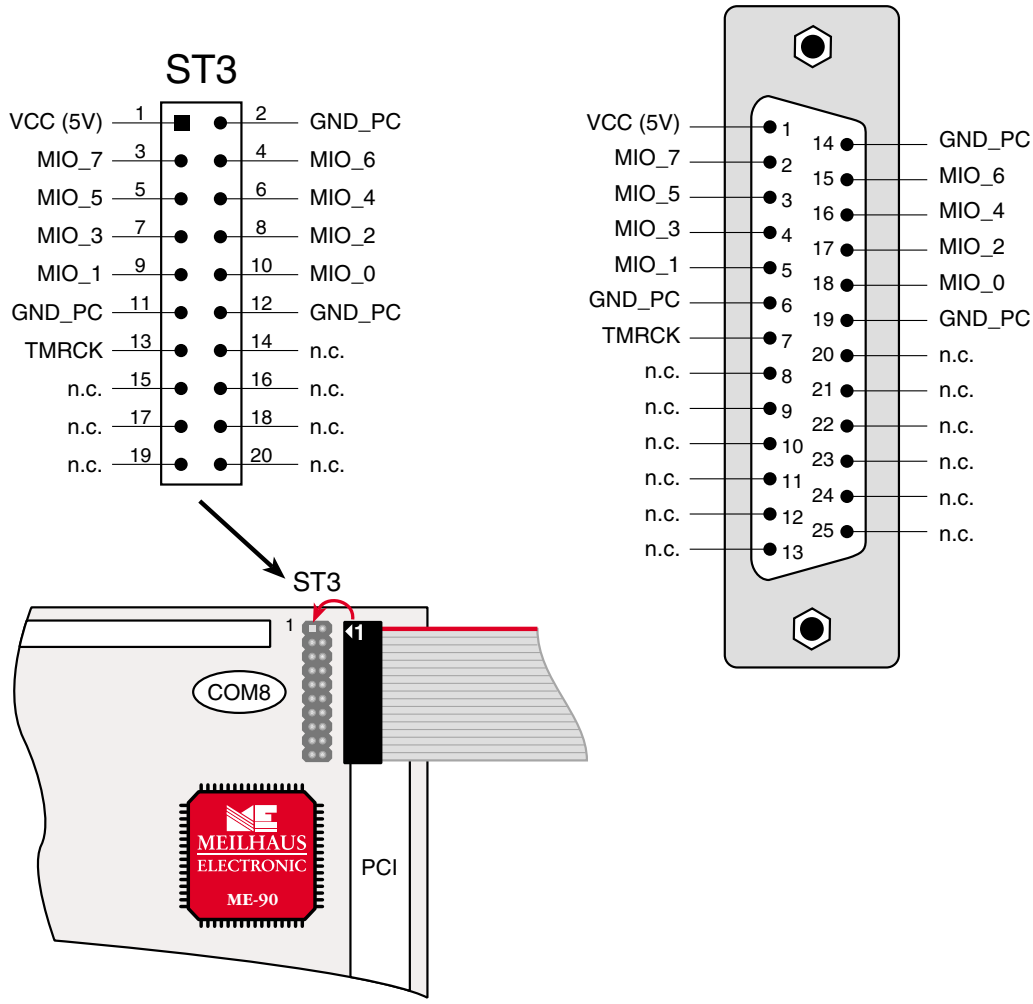

Diagram 63: Pinout of ST3 of the ME-90 PC/104-Plus

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

B7 9pin male connector ME-9000/9100/9300

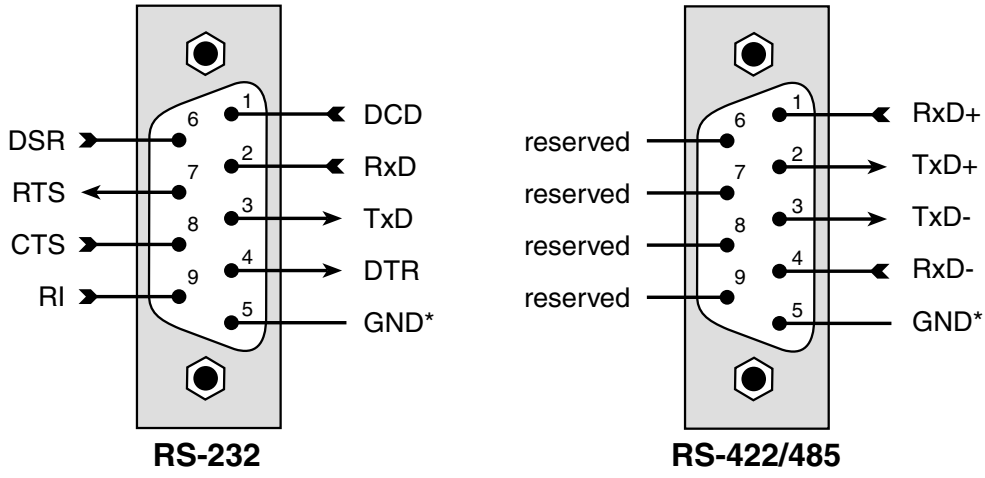

Diagram 64: 9pin D-Sub male connector ME-9x00

* **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 each another and to PC ground, so called „island-grounds" (GND_*x*).

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

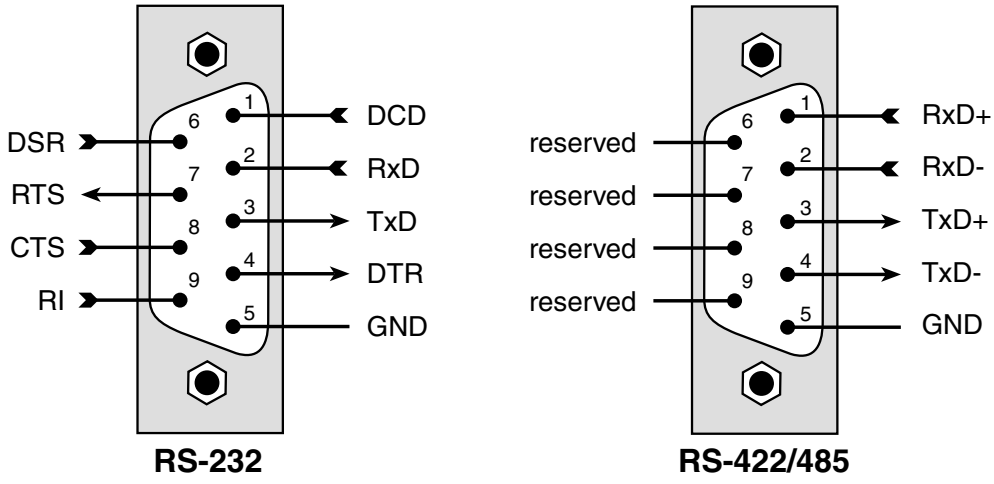

Diagram 65: 9pin D-Sub male connector of ME-90 PC/104-Plus

B9 8pin RJ-45 female connectors

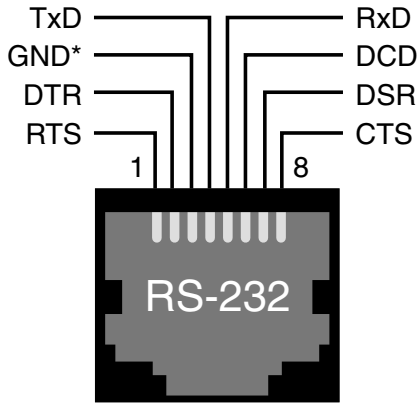

Diagram 66: 8pin RJ-45 female connector for RS-232 ports (Rocket-Port pinout)

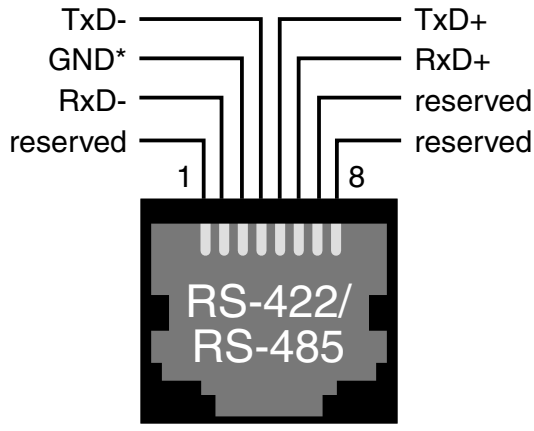

Diagram 67: 8pin RJ-45 female connector for RS-422/485 ports (not Rocket-Port compatible)

B10 Null modem cable

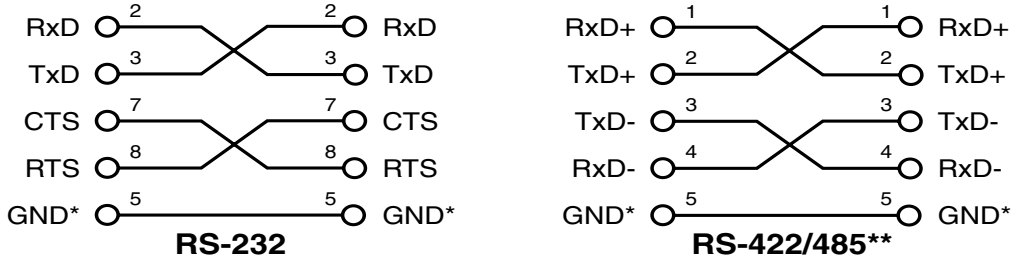

Diagram 68: Null modem cable RS-232 (left), RS-422/485 (right)

*see note on page 112! **not for ME-90 PC/104-Plus