

MB/941

Baseboard

Hardware Reference



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1 INTRODUCTION

This document describes the basic hardware components of the MB/941.

1.1 Safety Guidelines

Please read the following safety guidelines carefully! In case of property or personal damage by not paying attention to this document and/or by incorrect handling, we do not assume liability. In such cases any warranty claim expires.



ATTENTION!
Observe precautions for handling – electrostatic sensitive device!

- Do NOT turn on the power supply while connecting any cables, especially the power cables. This could cause damaged board components! First connect the cables and THEN turn the power supply on.
- Discharge yourself before you work with the device, e.g. by touching a heater of metal, to avoid damages.
- Stay grounded while working with the device to avoid damage through electrostatic discharge.

1.2 Conventions

Convention	Usage
bold	Important terms
monospace	Pathnames, internet addresses and program code

Table 1: Conventions used in this document

1.3 Features and Technical Data

Memory	
Storage media	1x internal microSD card holder
Interfaces	
Power	1x via screw terminal
RS485	1x via screw terminal
RS232	1x via front panel connector
Ethernet	1x 10/100 Mbps (LAN 1, RJ45)
DIL-40 socket	1x for DIL/NetPC DNP/9535
Mini-PCIe	1x for WAN module
Special Functions	
SIM card	1x Mini-SIM card holder
System I/O	1x 10-pin connector
Displays / Control Elements	
LEDs	1x Power (green, via lightpipe) 1x User LED (yellow, via lightpipe) 1x LAN LED (green, on RJ45 interface) 1x Mini-PCIe debug LED (green, on-board)
Electrical Characteristics	
Power supply	12 .. 27 VDC from external power supply
Power consumption	< 1 W
Mechanical Characteristics	
Protection class	none
Mass	< 200 g
Dimensions	87.7 mm x 99.3 mm x 22.5 mm
Operating temperature	0 .. 70 °C
Standards and Certifications	
EMC	CE
EMC interference immunity	EN 61000 6-2
EMC interference emission	EN 61000 6-4
Environmental standards	RoHS, WEEE

Table 2: Features and technical data of MB/941

1.4 Block Diagram

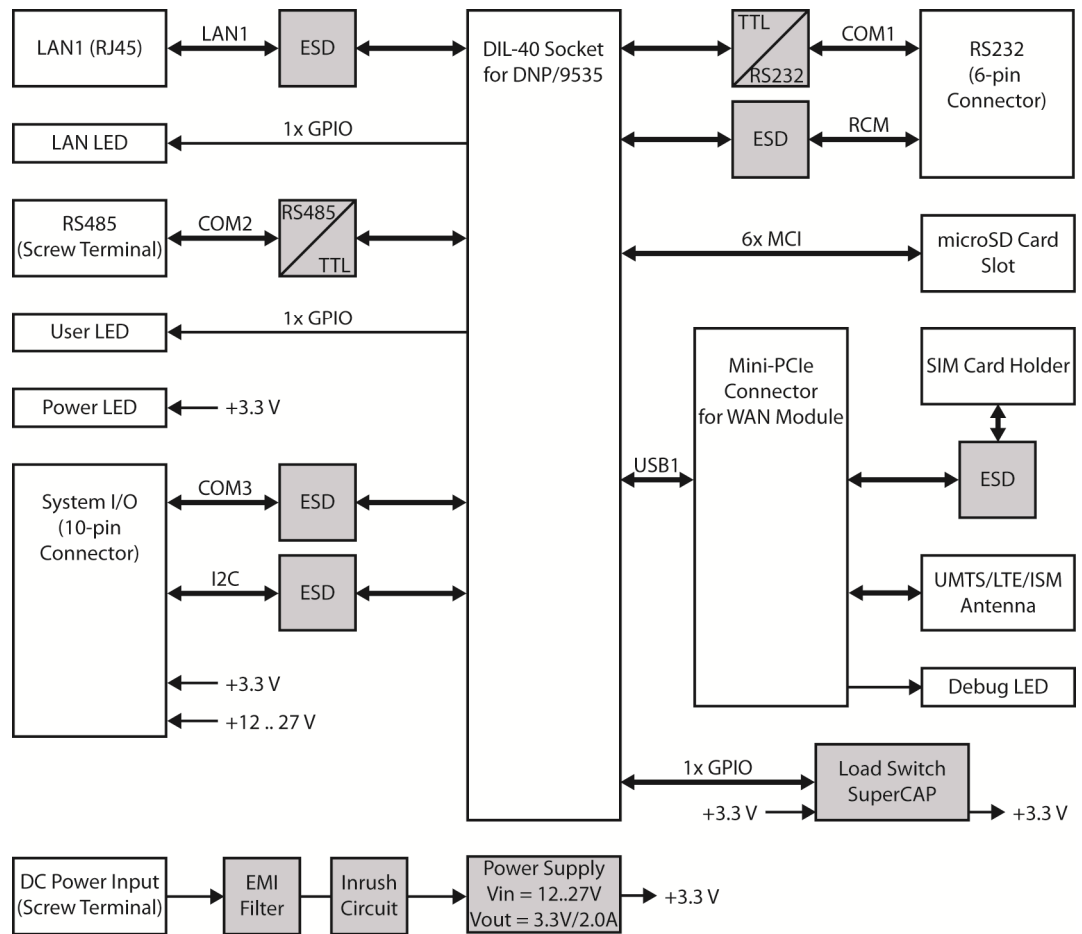
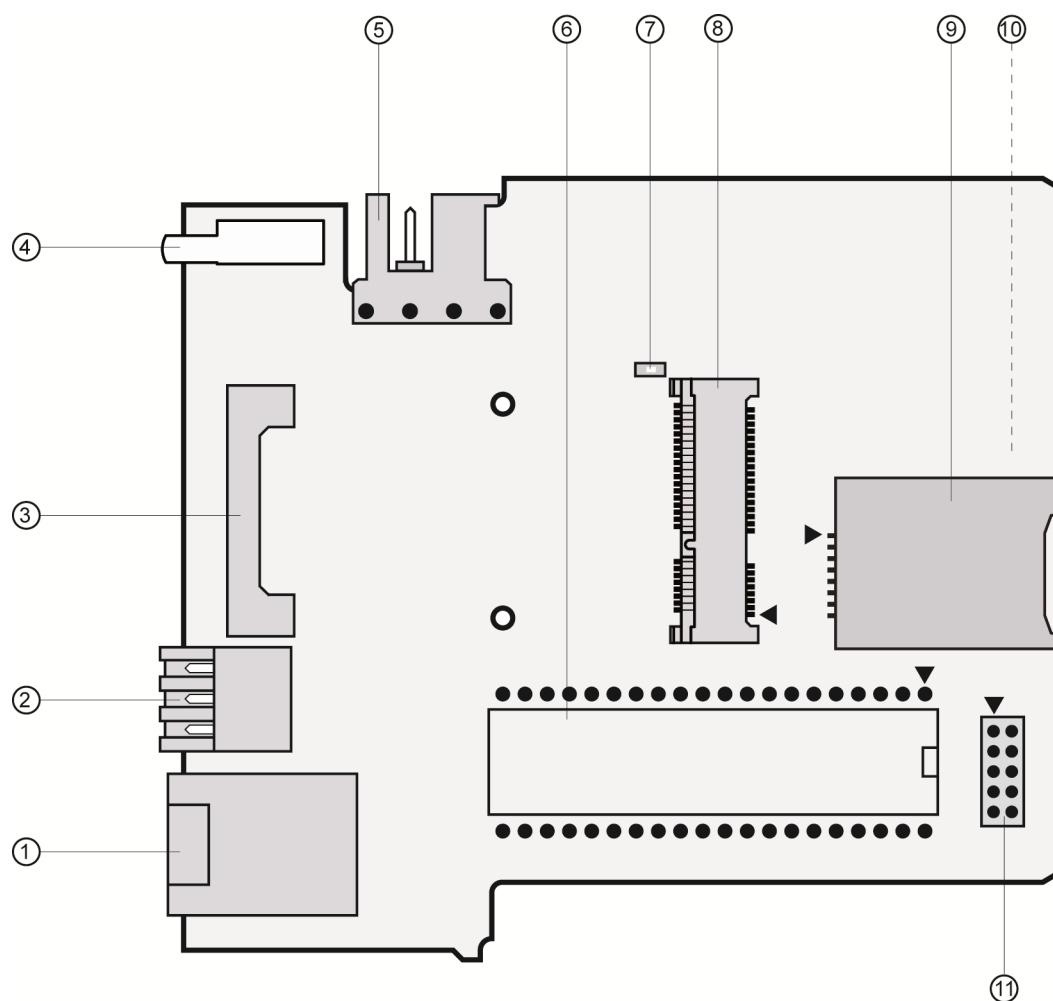


Figure 1: Block diagram of MB/941

2 BOARD LAYOUT

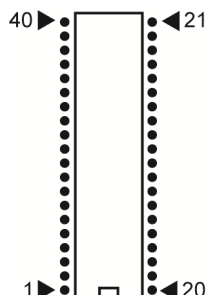


- | | |
|---------------------------------|------------------------------------|
| ① J7: 10/100 Mbps Ethernet LAN1 | ⑦ D1: MiniPCle debug LED |
| ② J5: COM1 connector (RS232) | ⑧ J2: MiniPCle connector |
| ③ J3: Latch for MiniPCle | ⑨ J4: SIM card holder (push-push) |
| ④ LP1: LED Lightpipe | ⑩ J9: microSD card slot (backside) |
| ⑤ J6: Terminal block | ⑪ J8: System I/O connector |
| ⑥ J1: DIL-40 socket | |

Figure 2: Board layout MB/941

3 PINOUTS

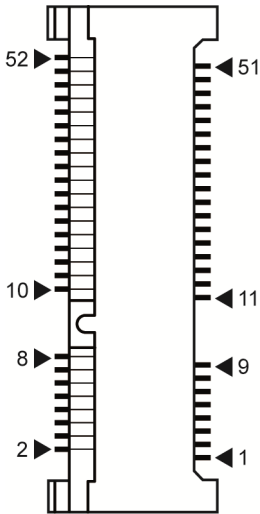
3.1 J1: DIL-40 Socket



Pin	Name	Group	Function
1	MCI1_CK	PIO	microSD Card Clock
2	MCI1_CDA	PIO	microSD Card Command
3	MCI1_DA0	PIO	microSD Card Data 0
4	MCI1_DA1	PIO	microSD Card Data 1
5	MCI1_DA2	PIO	microSD Card Data 2
6	MCI1_DA3	PIO	microSD Card Data 3
7	---	---	Reserved. Do not use.
8	---	---	Reserved. Do not use.
9	TXD2	PIO	COM2 Serial Port, TXD Pin (RS485)
10	RXD2	PIO	COM2 Serial Port, RXD Pin (RS485)
11	RTS2	PIO	COM2 Serial Port, RTS Pin (RS485)
12	CTS2	PIO	COM2 Serial Port, CTS Pin (RS485)
13	I2C_SCL	PIO	I2C Interface Serial Clock Line
14	I2C_SDA	PIO	I2C Interface Serial Data Line
15	---	---	Reserved. Do not use.
16	---	---	Reserved. Do not use.
17	---	---	Reserved. Do not use.
18	HDMA	USB	USB Host Port -
19	HDP+	USB	USB Host Port +
20	GND	---	Ground
21	RCM	---	RCM (Remote Console Mode) Input
22	TX+	LAN	10/100 Mbps LAN, TX+ Pin
23	TX-	LAN	10/100 Mbps LAN, TX- Pin
24	RX+	LAN	10/100 Mbps LAN, RX+ Pin
25	RX-	LAN	10/100 Mbps LAN, RX- Pin
26	TXD3	SIO	COM3 Serial Port, TXD Pin
27	RXD3	SIO	COM3 Serial Port, RXD Pin
28	RI1	SIO	COM1 Serial Port, RI Pin
29	DTR1	SIO	COM1 Serial Port, DTR Pin
30	DSR1	SIO	COM1 Serial Port, DSR Pin
31	DCD1	SIO	COM1 Serial Port, DCD Pin
32	RTS1	SIO	COM1 Serial Port, RTS Pin
33	CTS1	SIO	COM1 Serial Port, CTS Pin
34	TXD1	SIO	COM1 Serial Port, TXD Pin
35	RXD1	SIO	COM1 Serial Port, RXD Pin
36	PC0	PIO	LAN LED
37	PC1	PIO	User LED
38	PC2	PIO	PCIe Socket Power Enable
39	PC3	PIO	RS485 Termination Enable
40	VCC	---	3.3 Volt Power Input

Table 3: Pinout DIL-40 socket

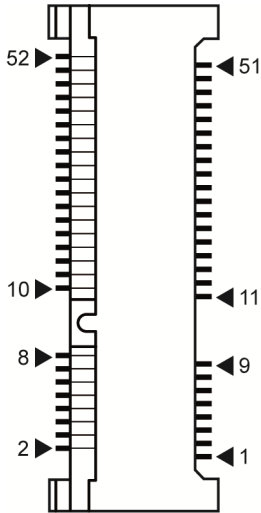
3.2 J2: Mini-PCle Connector (Part 1)



Pin	Name	Function
1	---	Reserved. Do not use.
2	PCI_VCC	3.3 Volt Power
3	---	Reserved. Do not use.
4	GND	Ground
5	---	Reserved. Do not use.
6	---	Reserved. Do not use.
7	---	Reserved. Do not use.
8	SIM_PWR	SIM Card Power
9	GND	Ground
10	SIM_DAT	SIM Card Data
11	---	Reserved. Do not use.
12	SIM_CLK	SIM Card Clock
13	---	Reserved. Do not use.
14	SIM_RST	SIM Card Reset
15	GND	Ground
16	SIM_VPP	Not connected.
17	---	Reserved. Do not use.
18	GND	Ground
19	---	Reserved. Do not use.
20	---	Reserved. Do not use.
21	GND	Ground
22	PCI_RST	Mini-PCle Card Reset Signal
23	---	Reserved. Do not use.
24	PCI_VCC	3.3 Volt Power
25	---	Reserved. Do not use.
26	GND	Ground

Table 4: Pinout Mini-PCle connector (part 1)

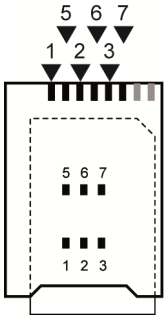
3.3 J2: Mini-PCIe Connector (Part 2)



Pin	Name	Function
27	GND	Ground
28	---	Reserved. Do not use.
29	GND	Ground
30	SMB_CLK	PCIe Serial Clock Line (for optional use)
31	---	Reserved. Do not use.
32	SMB_DAT	PCIe Serial Data Line (for optional use)
33	---	Reserved. Do not use.
34	GND	Ground
35	GND	Ground
36	HDMA	USB Host -
37	GND	Ground
38	HDPA	USB Host +
39	PCI_VCC	3.3 Volt Power
40	GND	Ground
41	PCI_VCC	3.3 Volt Power
42	LED_WWAN	WAN LED (for debug purpose only)
43	GND	Ground
44	---	Reserved. Do not use.
45	---	Reserved. Do not use.
46	---	Reserved. Do not use.
47	---	Reserved. Do not use.
48	---	Reserved. Do not use.
49	---	Reserved. Do not use.
50	GND	Ground
51	---	Reserved. Do not use.
52	PCI_VCC	3.3 Volt Power

Table 5: Pinout Mini-PCIe connector (part 2)

3.4 J4: SIM Card Holder



Pin	Name	Function
1	SIM_VCC	SIM Card Power
2	SIM_RST	SIM Card Reset
3	SIM_CLK	SIM Card Clock
5	SIM_GND	SIM Card Ground
6	SIM_VPP	Not connected.
7	SIM_DAT	SIM Card Data

Table 6: Pinout SIM card holder

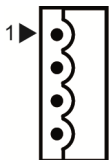
3.5 J5: Serial Port COM1 (RS232/RCM)



Pin	Name	Function
1	RXD1	COM1 Serial Port, RXD Pin (RS232)
2	RTS1	COM1 Serial Port, RTS Pin (RS232)
3	TXD1	COM1 Serial Port, TXD Pin (RS232)
4	CTS1	COM1 Serial Port, CTS Pin (RS232)
5	GND1	Ground
6	RCM1	COM1 Serial Port, RCM Pin (RS232)

Table 7: Pinout COM1 connector

3.6 J6: Screw Terminals

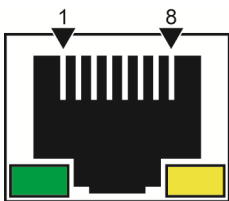


Pin	Function
1	COM2 Serial Port RS485+
2	COM2 Serial Port RS485-
3	Vin 24 VDC ±10%
4	GNDin

Table 8: Pinout screw terminals

3.7 J7: 10/100 Mbps Ethernet Interface LAN1

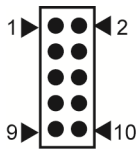
LAN1 offers one green LED which is on when there is a LAN link established and blinks when there is traffic. The yellow LED is not connected.



Pin	Name	Function
1	TX+	10/100 Mbps LAN, TX+
2	TX-	10/100 Mbps LAN, TX-
3	RX+	10/100 Mbps LAN, RX+
4	---	Not Used.
5	---	Not Used.
6	RX-	10/100 Mbps LAN, RX-
7	---	Not Used.
8	---	Not Used.

Table 9: Pinout Ethernet interface LAN1

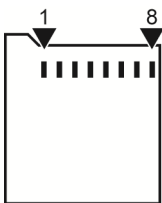
3.8 J8: System I/O Connector



Pin	Name	Function
1	VCC24	24 Volt Power Output
2	VCC24	24 Volt Power Output
3	GND	Ground
4	GND	Ground
5	TXD3	COM3 Serial Port, TXD Pin (RS232)
6	I2C_SCL	I2C Interface Serial Clock Line
7	RXD3	COM3 Serial Port, RXD Pin (RS232)
8	I2C_SDA	I2C Interface Serial Data Line
9	VCC3	3.3 Volt Power Output
10	VCC3	3.3 Volt Power Output

Table 10: Pinout system I/O connector

3.9 J9: microSD Card Slot



Pin	Name	Function
1	MCI1_DA2	SD Card Data 2
2	MCI1_DA3	SD Card Data 3
3	MCI1_CDA	SD Card Command
4	VCC3	3.3 VDC
5	MCI1_CK	SD Card Clock
6	GND	Ground
7	MCI1_DA0	SD Card Data 0
8	MCI1_DA1	SD Card Data 1

Table 11: Pinout microSD card slot

3.10 Front Panel LEDs

Name	Color	Function
Power	Green	Permanent on when power supply is established
S1	Yellow	User LED, free programmable

Table 12: Function of front panel LEDs

4 MECHANICAL DIMENSIONS

All length dimensions have a tolerance of 0.5 mm.

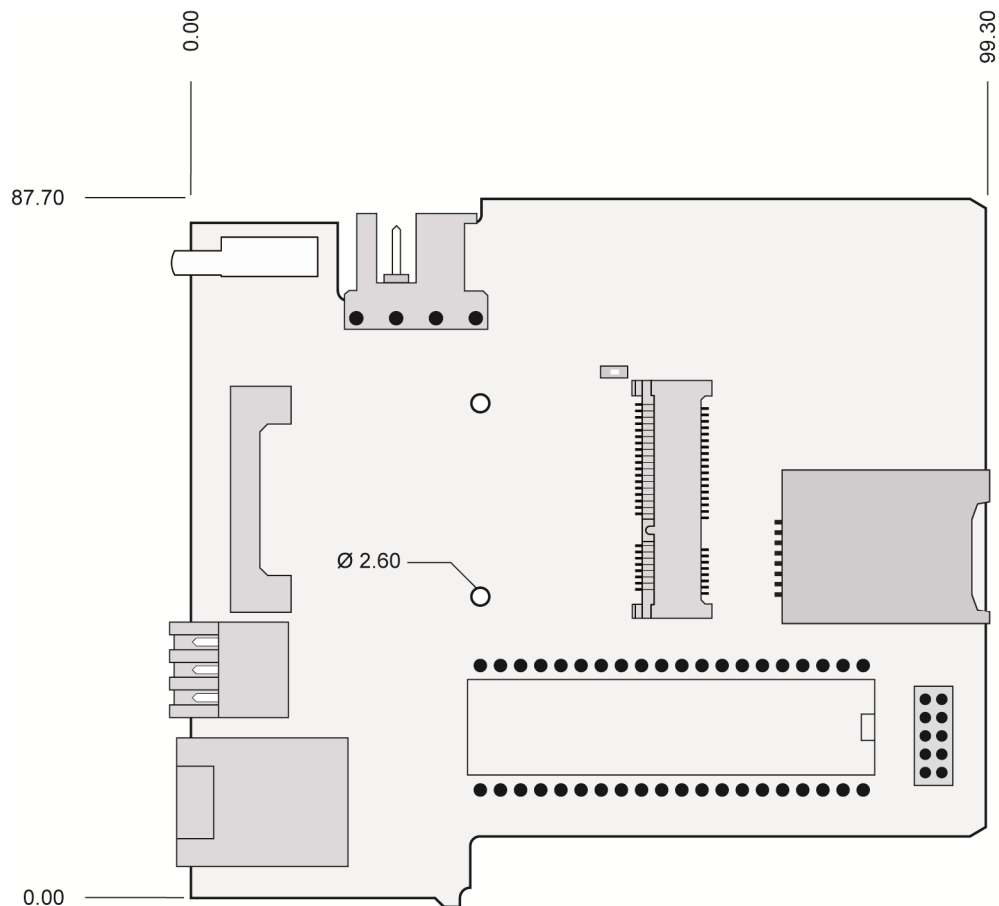


Figure 1: Mechanical dimensions of MB/941

5 HELPFUL LITERATURE

- DIL/NetPC DNP/9535 hardware reference

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DOCUMENT HISTORY

Revision	Date	Remarks	Name	Review
1.0	2017-05-05	First version	WBU	SSC
1.1	2017-08-24	Corrected the reversed names of COM2 and COM3	WBU	SSC

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