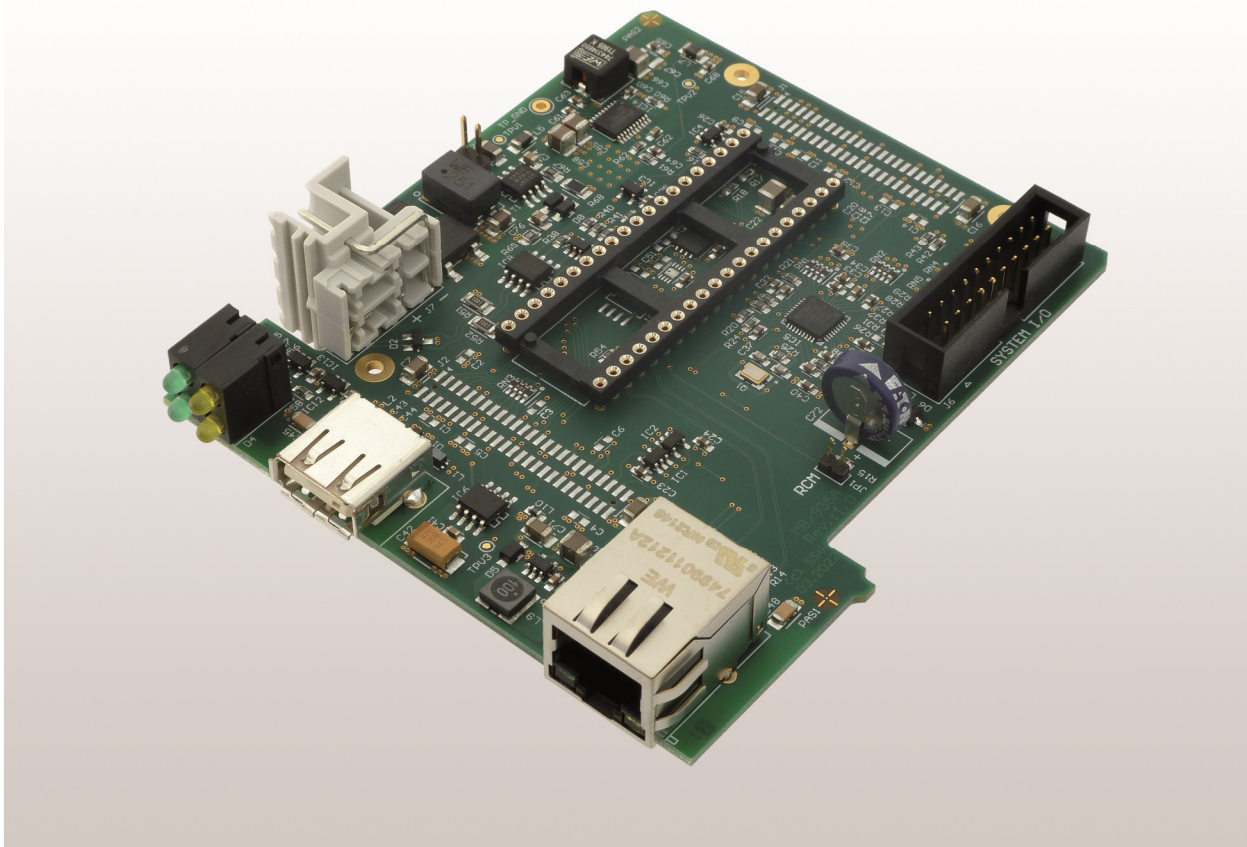


MB/935A

Baseboard

Hardware Reference



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1 INTRODUCTION

This document describes the basic hardware components of the baseboard MB/935A.

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

Interfaces	
Power	1x via screw terminal [J7]
RS485	1x via screw terminal [J7]
USB host	1x Type A (USB2.2) [J4]
Ethernet	1x 10/100 Mbps (RJ45) [J5]
System I/O power	1x 2-pin connector [J8]
DIL-40 socket	1x for 40-pin DIL/NetPC devices [J3]
Special Functions	
Hardware security	1x Secure element (option)
System I/O	1x 20-pin connector (I2C, COM1, COM3, USB2.1, USB2.3, GPIO) [J6]
Displays / Control Elements	
LEDs	1x Power (green) 3x User LED (1x green, 2x yellow – connected to 3x GPIO) 1x LAN LED (green on RJ45 interface)
Jumper	1x Remote Console Mode [JP1]
Electrical Characteristics	
Power supply	12 .. 24 VDC \pm 10% from external power supply
Power consumption	< 1 W (without DIL/NetPC and add-ons)
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/935A

1.4 Block Diagram

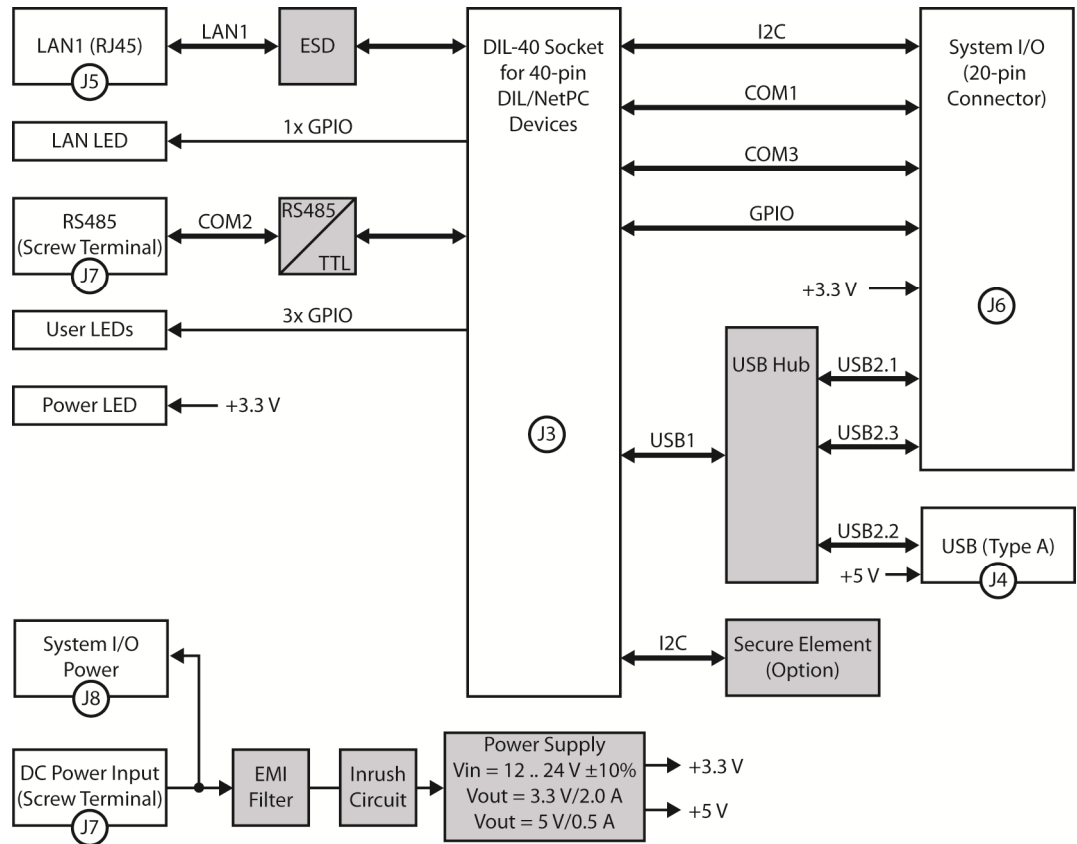
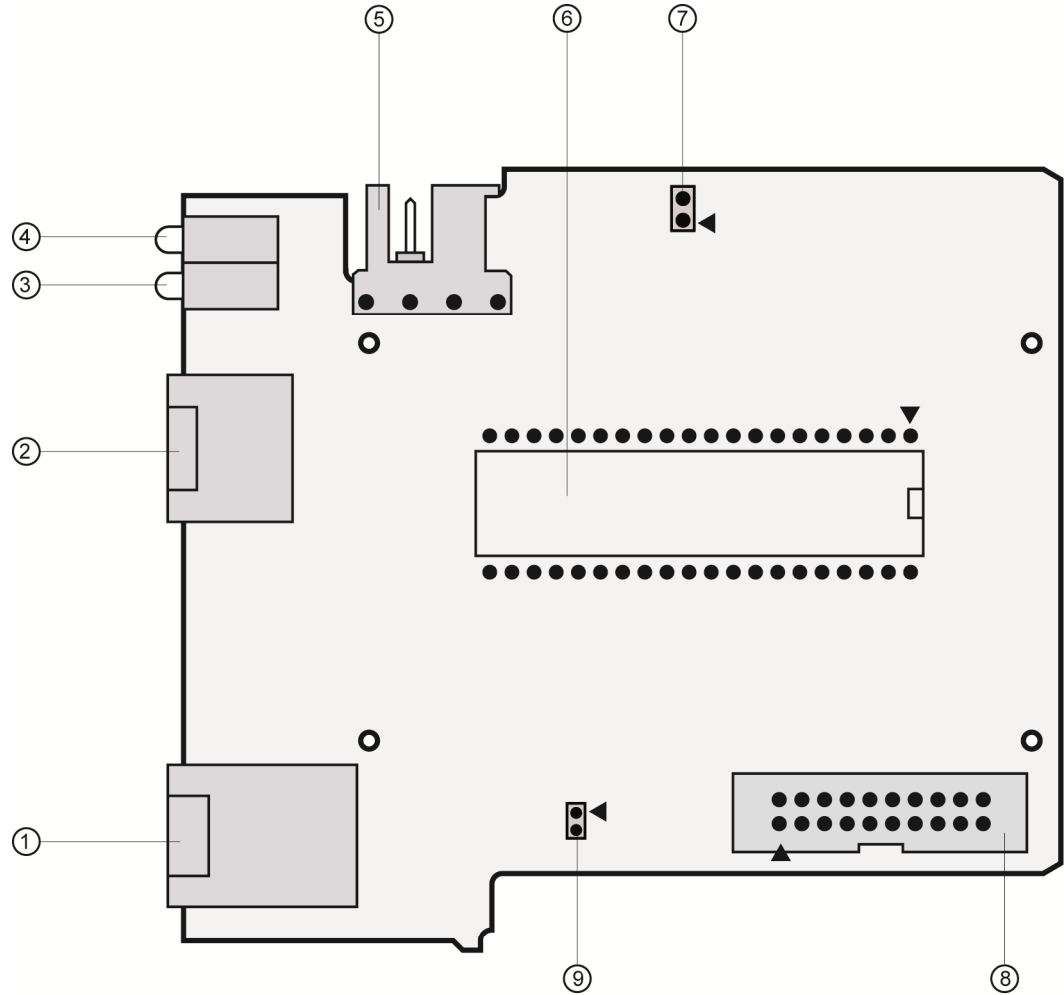


Figure 1: Block diagram of MB/935A

2 BOARD LAYOUT

2.1 Board Layout

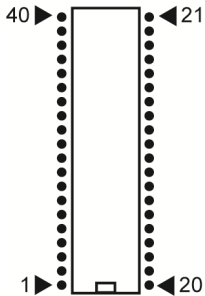


- ① J5: 10/100 Mbps Ethernet LAN1
- ② J4: USB Host port
- ③ D4: LEDs S1 + S2
- ④ D3: LEDs power + S3
- ⑤ J7: Terminal block
- ⑥ J3: DIL-40 socket
- ⑦ J8: System I/O power
- ⑧ J6: System I/O connector
- ⑨ JP1: RCM jumper

Figure 2: Board layout MB/935A

3 PINOUTS

3.1 J3: DIL-40 Socket



Pin	Name	Group	Function
1	PA0	PIO	Reset Output Signal
2	PA1	PIO	Reset Hub
3	PA2	PIO	Reset ext-IO
4	---	---	Reserved. Do not use.
5	PA4	PIO	DIO3 on System I/O [J6]
6	PA5	PIO	DIO2 on System I/O [J6]
7	PA6	PIO	DIO1 on System I/O [J6]
8	PA7	PIO	DIO0 on System I/O [J6]
9	TXD3	SIO	Serial I/O, UART COM3 TXD (used as COM2 [J7])
10	RXD3	SIO	Serial I/O, UART COM3 RXD (used as COM2 [J7])
11	RTS3	SIO	Serial I/O, UART COM3 RTS (used as COM2 [J7])
12	CTS3	SIO	Serial I/O, UART COM3 CTS (used as COM2 [J7])
13	I2CSCL	SIO	I2C Interface Serial Clock Line
14	I2CSDA	SIO	I2C Interface Serial Data Line
15	---	---	Reserved. Do not use.
16	---	---	Reserved. Do not use.
17	---	---	Reserved. Do not use.
18	HDM	USB	USB Host Port Data - [J4]
19	HDP	USB	USB Host Port Data + [J4]
20	GND	PWR	Ground
21	RCM	---	RCM (Remote Console Mode) Input
22	LTXP	LAN	10/100 Mbps LAN, TX+ [J5]
23	LTXM	LAN	10/100 Mbps LAN, TX- [J5]
24	LRXP	LAN	10/100 Mbps LAN, RX+ [J5]
25	LRXM	LAN	10/100 Mbps LAN, RX- [J5]
26	TXD2	SIO	Serial I/O, UART COM2 TXD (used as COM1 on System I/O [J6])
27	RXD2	SIO	Serial I/O, UART COM2 RXD (used as COM1 on System I/O [J6])
28	---	---	Reserved. Do not use.
29	---	---	Reserved. Do not use.
30	---	---	Reserved. Do not use.
31	---	---	Reserved. Do not use.
32	RTS1	SIO	Serial I/O, UART COM1 RTS (used as COM3 on System I/O [J6])
33	CTS1	SIO	Serial I/O, UART COM1 CTS (used as COM3 on System I/O [J6])
34	TXD1	SIO	Serial I/O, UART COM1 TXD (used as COM3 on System I/O [J6])
35	RXD1	SIO	Serial I/O, UART COM1 RXD (used as COM3 on System I/O [J6])
36	PC0	PIO	10/100 Mbps Ethernet LAN Interface LAN1 LED Output
37	PC1	PIO	LED S3
38	PC2	PIO	LED S2
39	PC3	PIO	LED S1
40	VCC3	PWR	3.3 Volt Power Output

Table 3: Pinout DIL-40 socket

3.2 J4: USB Port

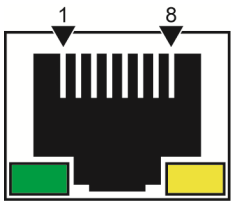


Pin	Name	Type*	Level	Function
1	VCC5	P	4.5..5.5 V	5 VDC Power Output
2	DATA-	I/O	Diff90	USB Host Port Data -
3	DATA+	I/O	Diff90	USB Host Port Data +
4	GND	P	0 V	Ground

Table 4: Pinout USB port

* P = Power I = Input O = Output I/O = Input/Output

3.3 J5: 10/100 Mbps Ethernet Interface LAN1



Pin	Name	Type*	Level	Function
1	TX+	O	Diff100	10/100 Mbps LAN, TX+
2	TX-	O	Diff100	10/100 Mbps LAN, TX-
3	RX+	I	Diff100	10/100 Mbps LAN, RX+
4	---	---	---	Bob-Smith Termination
5	---	---	---	Bob-Smith Termination
6	RX-	I	Diff100	10/100 Mbps LAN, RX-
7	---	---	---	Bob-Smith Termination
8	---	---	---	Bob-Smith Termination

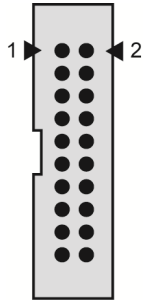
Table 5: Pinout Ethernet interface LAN1

* P = Power I = Input O = Output I/O = Input/Output

LED	Function
Green (left)	10/100BASE-T link/activity
Yellow (right)	Not Connected

Table 6: Ethernet LED functions

3.4 J6: System I/O Connector

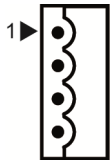


Pin	Name	Group	Type*	Level	Function
1	EXTRST	GPIO	O	3.3 V	External Reset Output
2	VCC	PWR	P	3.3 V	3 Volt Power Output
3	HDP1	USB	I/O	Diff99	USB Host1 Port Data +
4	HDM1	USB	I/O	Diff99	USB Host1 Port Data -
5	HDP2	USB	I/O	Diff99	USB Host2 Port Data +
6	HDM2	USB	I/O	Diff99	USB Host2 Port Data -
7	TXD3	SIO	O	3.3 V	Serial I/O, UART COM3 TXD
8	RXD3	SIO	I	3.3 V	Serial I/O, UART COM3 RXD
9	RTS3	SIO	O	3.3 V	Serial I/O, UART COM3 RTS
10	CTS3	SIO	I	3.3 V	Serial I/O, UART COM3 CTS
11	TXD1	SIO	O	3.3 V	Serial I/O, UART COM1 TXD
12	RXD1	SIO	I	3.3 V	Serial I/O, UART COM1 RXD
13	RTS1	SIO	O	3.3 V	Serial I/O, UART COM1 RTS
14	CTS1	SIO	I	3.3 V	Serial I/O, UART COM1 CTS
15	GND	PWR	P	0 V	Ground
16	GND	PWR	P	0 V	Ground
17	MFP0	GPIO	I/O	3.3 V	Multi Function Pin 0 (DIO0/I2C_SCL)
18	MFP1	GPIO	I/O	3.3 V	Multi Function Pin 1 (DIO1/I2C_SDA)
19	DIO2	GPIO	I/O	3.3 V	Digital IO 2
20	DIO3	GPIO	I/O	3.3 V	Digital IO 2

Table 7: Pinout system I/O connector

* P = Power I = Input O = Output I/O = Input/Output

3.5 J7: Screw Terminals



Pin	Type*	Level	Function
1	I/O	Diff	COM2 Serial Port RS485+
2	I/O	Diff	COM2 Serial Port RS485-
3	P	12..24 V	Vin 12..24 VDC ±10%
4	P	0 V	GNDin

Table 8: Pinout screw terminals

* P = Power I = Input O = Output I/O = Input/Output

Protection-Level RS485:

- ESD (IEC 61000-4-2): Level 4 (8KV contact / 15KV air)
- EFT (IEC 61000-4-4): Level 4 (2KV)
- Surge (IEC 61000-4-5): Level 2 (1KV)

3.6 J8: System I/O Power Connector

Pin	Type*	Level	Function
1	P	12..24 V	24 VDC Power Output
2	P	0 V	GND

Table 9: Pinout system I/O power connector

* P = Power

3.7 JP1: RCM Jumper

The MB/935A offers a jumper for the Remote Console Mode (RCM). This allows to control the DIL/NetPC via a terminal emulation program over the UART based serial COM port (serial-based CLI = Command Line Interface).

To disable RCM remove the jumper cap of the RCM jumper. This frees the UART based serial COM port for application usage.

Jumper	Function
Set	Enable Remote Console Mode
Not set(default)	Disable Remote Console Mode

Table 10: RCM jumper settings

3.8 Front Panel LEDs



Name	Color	Function
Power	Green	Permanent on when power supply is established
S1	Green	User LED, free programmable
S2	Yellow	User LED, free programmable
S3	Yellow	User LED, not used.

Table 11: Function of front panel LEDs

4 MECHANICAL DIMENSIONS

All length dimensions have a tolerance of 0.5 mm.

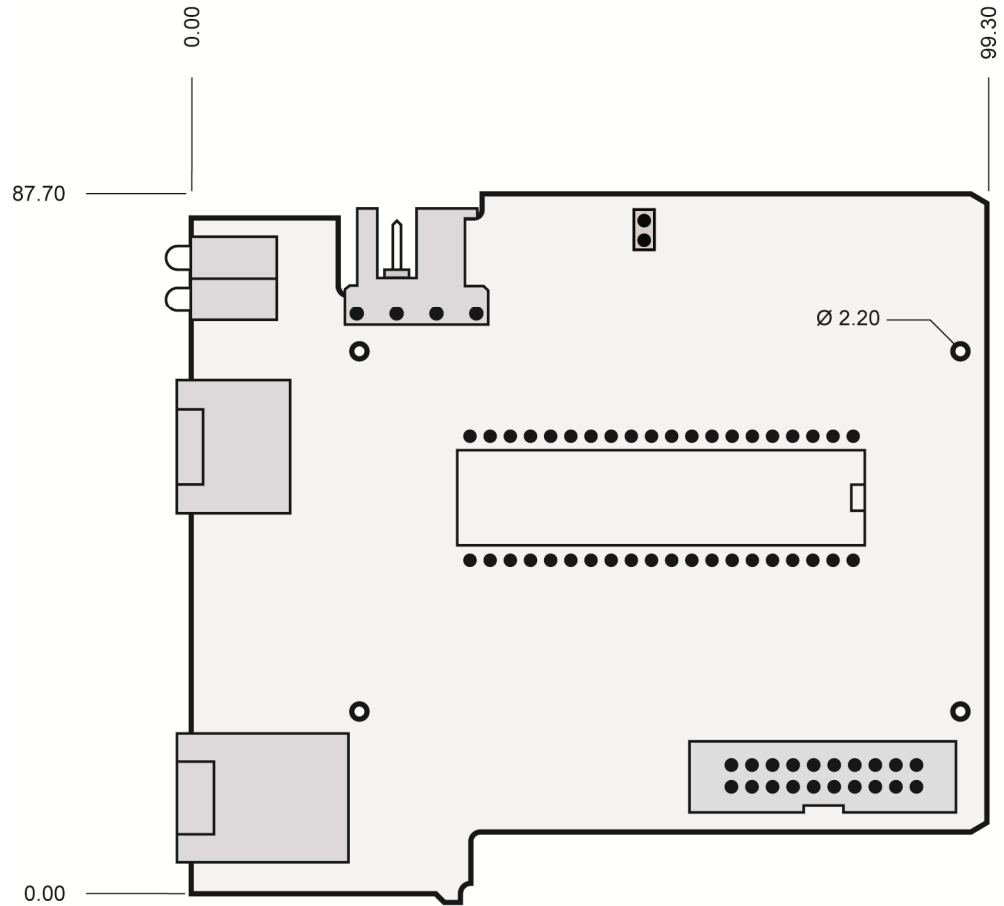


Figure 3: Mechanical dimensions of MB/935A

5 HELPFUL LITERATURE

- DIL/NetPC DNP/9535 hardware reference
- DIL/NetPC DNP/8331 hardware reference

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1.0	2022-12-09	First version	WBU	KDW

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