MMnet1002

Minimodule with ARM9 microprocessor and Ethernet

User's Manual

REV 0.5 (2008-10-10)

Many ideas one solution

Contents

1. INTRODUCTION 3

FEATURES 3

2 THE MODULE 4

BLOCK DIAGRAM 4
MODULE CONFIGURATION 5
MODULE CONFIGURATION 5
TERMINALS LAYOUT 6
AT91SAM9260/(AT91SAM9G20) MICROCONTROLLER 7
ETHERNET PHY 8
USB DEVICE INTERFACE 9
USB HOST INTERFACE 9
RS232 AND DBGU INTERFACES 10
ADDITIONAL RS232 INTERFACES. 11
I2C CONNECTORS 12
MICROSD CONNECTOR 13
DATAFLASH MEMORY 13
NAND FLASH MEMORY 14
SDRAM MEMORY 15
JTAG INTERFACE 16
LED DIODES 17
BATTERY BACKUP 17
POWER SUPPLY 18
PLACEMENT OF CONFIGURATION RESISTORS 19

3 SPECIFICATIONS 20

4 TECHNICAL ASSISTANCE 20

5 GUARANTEE 20

6 ASSEMBLY DRAWINGS 21

7 DIMENSIONS 22

8 SCHEMATICS 23

1. Introduction

MMnet1002 is a universal minimodule intended for use with “big” operating systems like Linux or Windows CE. It is equipped with fast ARM9 microprocessor running 200MHz or 400MHz clock, 64MB of RAM memory, 1GB of Flash memory, 100Mbit Ethernet, USB ports, onboard power supply and other peripherals. Microcontroller’s port are led to two pin headers. Thanks to use BGA packages and multilayer printed circuit board all of this could be placed on a small area. Module is a complete, independent microprocessor system, it just requires to connect power supply and Ethernet cable and you can login to Linux system. MMnet1002 can work standalone or can be connected with extension boards in form of a sandwich.

The **MMnet1002** minimodule can be also used in didactic laboratories of informatics colleges and universities, and can be also used to build circuits realizing thesis projects.

Features

MMnet1002 minimodule:

- Complete, ready to use microprocessor system
- Fast ARM926-EJ AT91SAM9260 (AT91SAM9G20) microprocessor with **210MHz (400MHz)** clock
- Up to **64MB** SDRAM memory and up to **4GB** NAND Flash
- **Ethernet** PHY 10/**100Mbit** interface with magnetics and RJ45 connector
- 2 x **USB** 2.0 Full Speed **Host** with double connector
- RS232 interface with connector
- USB 2.0 Full Speed Device with mini B connector
- **microSD** memory card socket
- Two I2C connectors
- Place for 64Mbit (**8MByte**) DataFlash memory
- RTC clock with battery backup
- RESET button
- Two LED diodes: „Power Supply” and „User”
- Module supply voltage 8 - 35VDC
- Possibility to connect expansion boards on top or bottom of module.
- 2 x 40 terminals with 0.1" (2.54mm) pitch, fitting every prototype board
- Small dimensions: 100mm x 70mm
- Module is delivered with Linux system, sample applications and development environment

2 The module

Block diagram

A block diagram of MMnet1002 minimodule is shown on the image below:

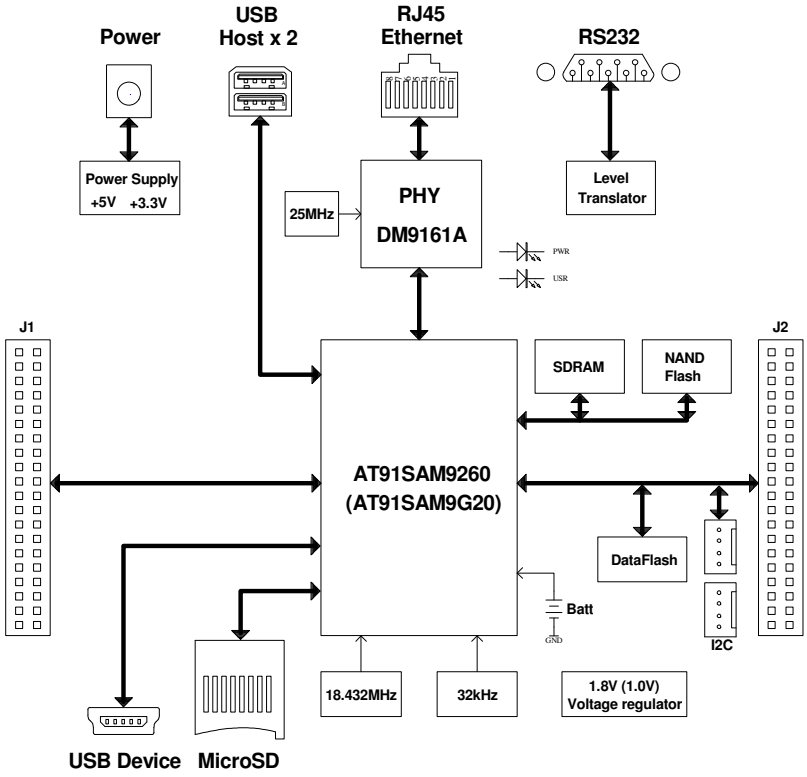
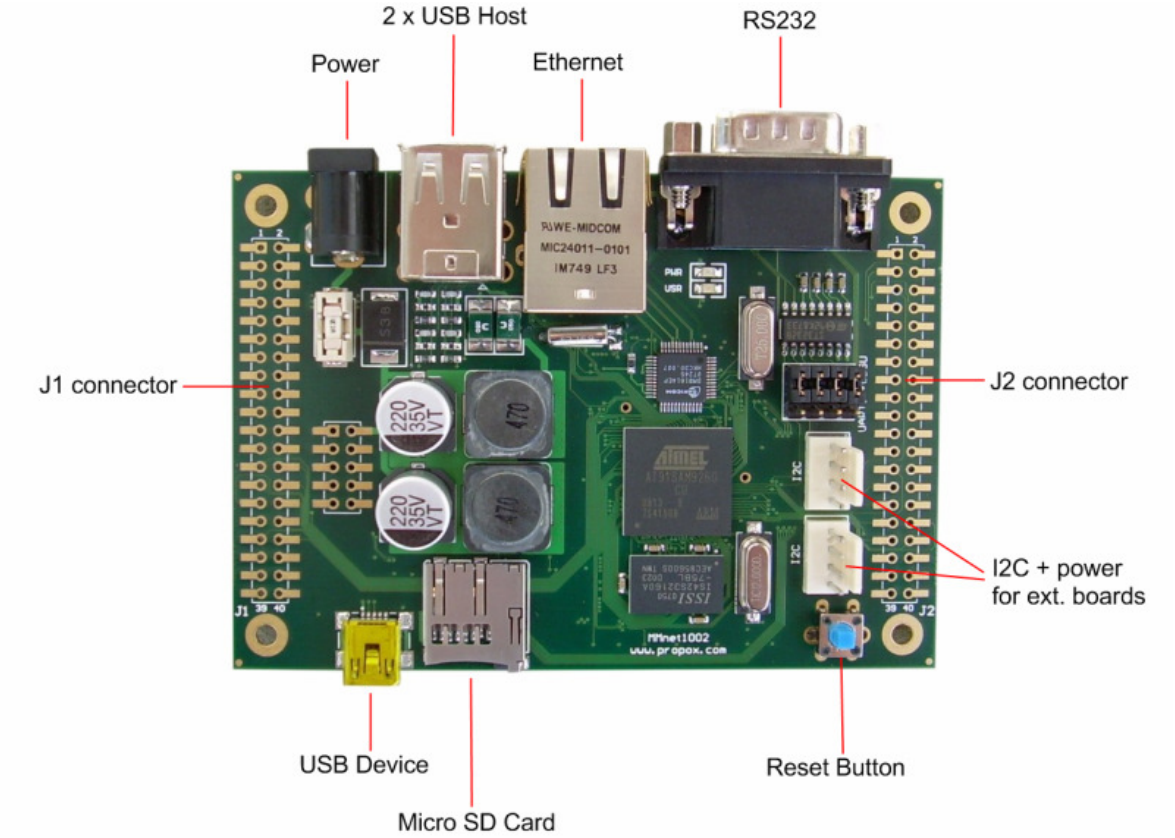


Figure 1 MMnet1002 block diagram.



Module configuration

Minimodule can be ordered in different configurations with use of selector:

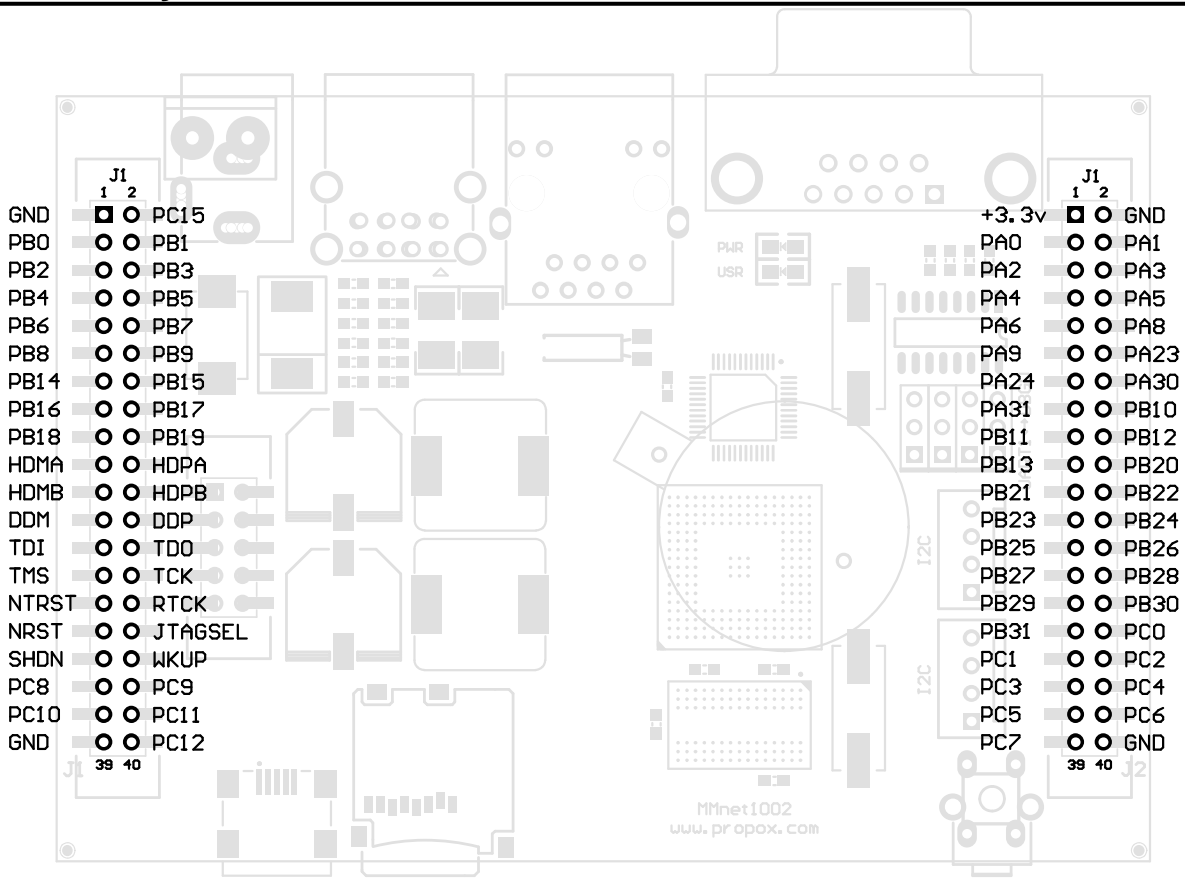
MMnet1002–Ax–Bx–Cx–Dx–Ex–Fx–Gx–Hx–Ix–Jx–Kx–Lx–Mx–Nx

In place of x should be used value from table:

Parameter	Description
A	1 – AT90SAM9260 2 - AT91SAM9G20
B	8 – 8MB 16 – 16MB 32 – 32MB 64 – 64MB
C	0 – without NAND Flash memory 1 – 1GB 2 – 2GB 4 – 4GB
D	0 – without DataFlash memory 2 – 2MB (AT45DB161) 4 – 4MB (AT45DB321) 8 – 8MB (AT45DB642)
E	0 – USB Host connector not mounted 1 – Single USB Host connector 2 – Double USB Host connector
F	0 – Power connector not mounted 1 – DC2.1 power connector 2 – Terminal Block power connector
G	0 – USB Device connector not mounted 1 – USB Device connector mounted 2 – USB Device connector and R15 resistor (USB Power detect) mounted
H	0 – microSD card connector not mounted 1 – microSD card connector mounted 2 - microSD card connector and R51 resistor (card detect) mounted
I	0 – RESET button not mounted 1 – mounted horizontal RESET 2 – mounted vertical RESET
J	0 – Battery socket not mounted (R53 mounted) 1 – Battery socket mounted (R53 not mounted)
K	0 – J1 and J2 not installed on the bottom of the PCB 1 – J1 and J2 installed on the bottom of the PCB, female type 2 – J1 and J2 installed on the bottom of the PCB, male standard 3 – J1 and J2 installed on the bottom of the PCB, male long
L	0 – J1 and J2 not installed on the top of the PCB 1 – J1 and J2 installed on the top of the PCB, female type 2 – J1 and J2 installed on the top of the PCB, male standard 3 – J1 and J2 installed on the top of the PCB, male long
M	0 – J12 not installed on the bottom of the PCB 1 – J12 installed on the bottom of the PCB, female type 2 – J12 installed on the bottom of the PCB, male standard 3 – J12 installed on the bottom of the PCB, male long
N	0 – J12 not installed on the top of the PCB 1 – J12 installed on the top of the PCB, female type 2 – J12 installed on the top of the PCB, male standard 3 – J12 installed on the top of the PCB, male long

For example.: MMnet1002–A1–B64–C1–D0–E2–F1–G1–H1–I1–J1–K0–L0–M0–N0

Terminals layout



Drawing 2 Terminals layout – top view.

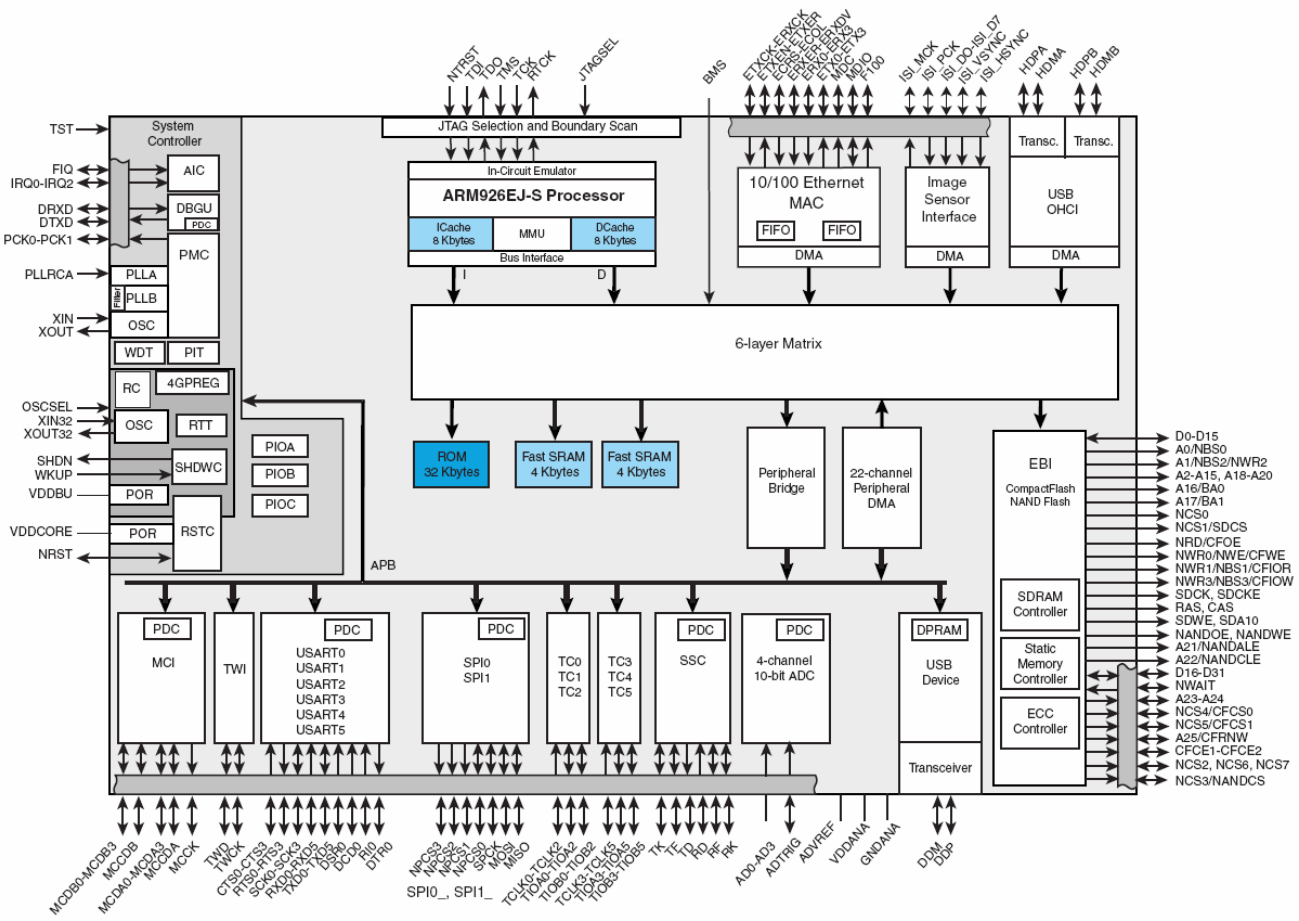
Name	J1		Name	Name	J2		Name
GND	1	2	PC15/NWAIT [IRQ1]	+3.3V	1	2	GND
PB0/SPI1_MISO [TIOA3]	3	4	PB1/SPI1_MOSI [TIOB3]	PA0/SPI0_MISO [MCDB0]	3	4	PA1/SPI0_MOSI [MCCDB]
PB2/SPI1_SPCK [TIOA4]	5	6	PB3/SPI1_NPCS0 [TIOA5]	PA2/SPI0_SPCK	5	6	PA3/SPI0_NPCS0 [MCDB3]
PB4/TXD0	7	8	PB5/RXD0	PA4/RTS2 [MCDB2]	7	8	PA5/CTS2 [MCDB1]
PB6/TXD1 [TCLK1]	9	10	PB7/RXD1 [TCLK2]	PA6/MCDA0	9	10	PA8/MCCK
PB8/TXD2	11	12	PB9/RXD2	PA9/MCDA1	11	12	PA23/TWD [ETX2]
PB14/DRXD	13	14	PB15/DTXD	PA24/TWCK [ETX3]	13	14	PA30/SCK2 [RXD4]
PB16/TK0 [TCLK3]	15	16	PB17/TF0 [TCLk4]	PA31/SCK0 [TXD4]	15	16	PB10/TXD3 [ISI_D8]
PB18/TD0 [TIOB4]	17	18	PB19/RD0 [TIOB5]	PB11/RXD3 [ISI_D9]	17	18	PB12/TXD5 [ISI_D10]
HDMA	19	20	HDPA	PB13/RXD5 [ISI_D11]	19	20	PB20/RK0 [ISI_D0]
HDMB	21	22	HAPB	PB21/RF0 [ISI_D1]	21	22	PB22/DSR0 [ISI_D2]
DDM	23	24	DDP	PB23/DCD0 [ISI_D3]	23	24	PB24/DTR0 [ISI_D4]
TDI	25	26	TDO	PB25/RI0 [ISI_D5]	25	26	PB26/RTS0 [ISI_D6]
TMS	27	28	TCK	PB27/CTS0 [ISI_D7]	27	28	PB28/RTS1 [ISI_PCK]
NTRST	29	30	RTCK	PB29/CTS1 [ISI_VSYNC]	29	30	PB30/PCK0 [ISI_HSYNC]
NRST	31	32	JTAGSEL	PB31/PCK1 [ISI_MCK]	31	32	PC0/ AD0 [SCK3]
SHDN	33	34	WKUP	PC1/ AD1 [PCK0]	33	34	PC2/ AD2 [PCK1]
PC8/NCS4/CFCS0 [RTS3]	35	36	PC9/NCS5/CFCS1 [TIOB0]	PC3/ AD3 [SPI1_NPCS3]	35	36	PC4/A23 [SPI1_NPCS2]
PC10/A25/CFRNW [CTS3]	37	38	PC11/NCS2 [SPI0_NPCS1]	PC5/A24 [SPI1_NPCS1]	37	38	PC6/TIOB2 [CFCE1]
GND	39	40	PC12/IRQ0 [NCS7]	PC7/TIOB1 [CFCE2]	39	40	GND

Detailed description of ports can be found in microcontroller datasheets www.atmel.com.

AT91SAM9260/(AT91SAM9G20) microcontroller

- 32-bit ARM926EJ core running up to 210MHz (400MHz)
- DSP Instruction Extensions and JAVA acceleration
- Memory Management Unit (MMU) allows to run Linux or Windows CE®
- 8kB (32kB) Data Cache and 8kB (32kB) Instruction Cache
- Two 4kB (16kB) Internal SRAM, Single-cycle Access at Maximum Matrix Speed
- External Bus Interface (EBI) supports SDRAM, Static Memory, ECC-enabled NAND Flash and Compact Flash
- USB 2.0 Full Speed (12 Mbits per second) Device Port
- USB 2.0 Full Speed (12 Mbits per second) Host and Double Port
- Ethernet MAC 10/100 Base T
- Image Sensor Interface
- Reset Controller
- Advanced Interrupt Controller
- RTC with battery backup
- Periodic Interval Timer, Watchdog Timer, Real-time Timer
- 10-bit A/D converter
- DMA controller
- MultiMedia Card/SDCard/SDIO controller
- Synchronous Serial Controller (supports I2S)
- 6 USARTs + 1 DBGU port
- 2 SPI interfaces
- TWI interface
- TWI interface
- JTAG interface

More info on AT91 microcontrollers can be fund at manufacturer site: http://www.atmel.com/



The minimodule is equipped with DM9161A Ethernet PHY and RJ45 connector with integrated magnetics.

DM9161A features:

- Fully compatible with IEEE 802.3/IEEE 802.3u 10Base-T/100Base-TX, ANSI X3T12 TP-PMD 1995
- Supports MDI/MDI-X auto crossover (Auto-MDI)
- Supports Auto-Negotiation IEEE 802.3u
- Full-duplex or half-duplex mode
- Low power consumption
- Low power modes

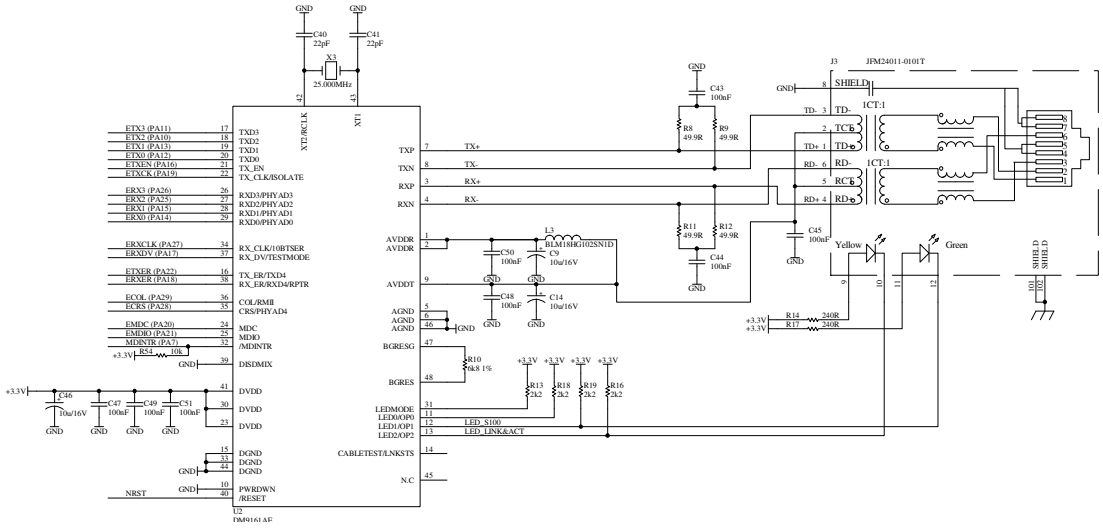
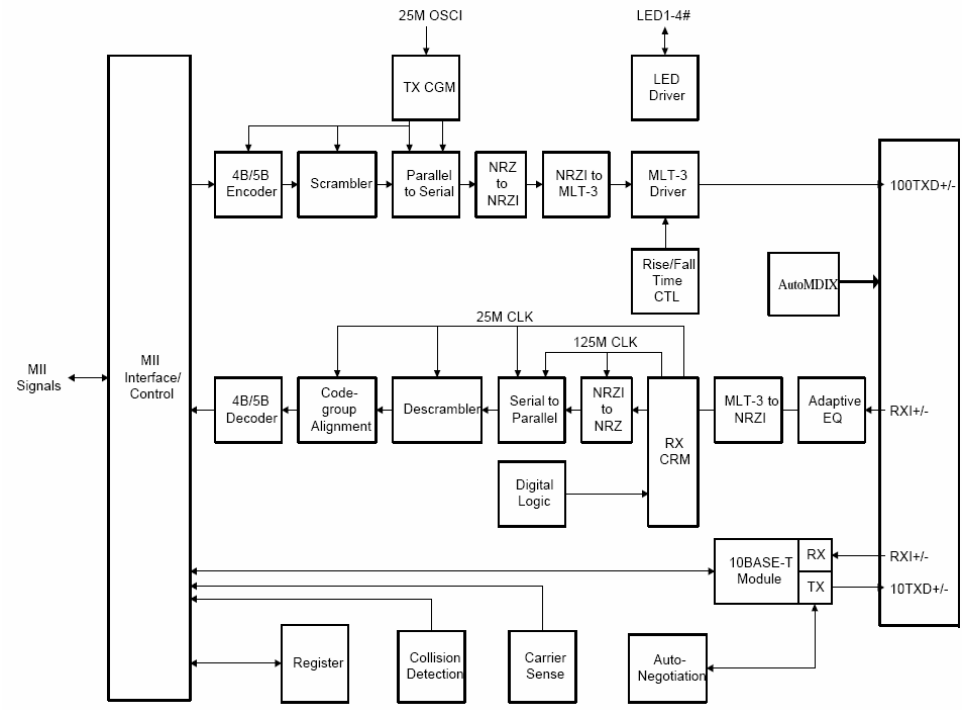


Figure 3 Implementation of Ethernet interface in MMnet1000.



DM9161A documentation can be fund on manufacturer site: http://www.davicom.com.tw

USB Device Interface

AT91SAM9260/AT91SAM9G20 microcontrollers have full-speed USB2.0 device interface. MMnet1002 module comes with USB mini B connector and required components. Additionally, by soldering R15 resistor (it is not mounted by default), it is possible to detect if module is connected to USB bus (with PC5 pin).

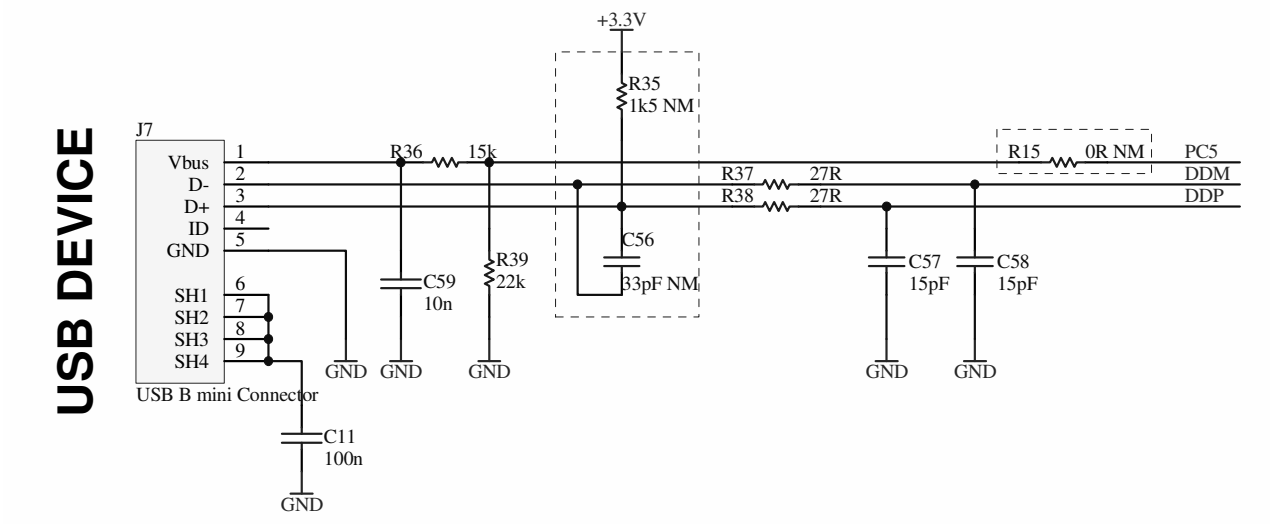


Figure 4 Implementation of USB Device Interface.

USB Host Interface

AT91SAM9260/AT91SAM9G20 microcontrollers have USB Host interface with two ports compliant with USB 2.0 specification (Full Speed and Low Speed). Ports are connected to double USB A connector on the module. Onboard 5V power supply delivers up to 500mA to each port. Ports are overcurrent protected with resetable fuses.

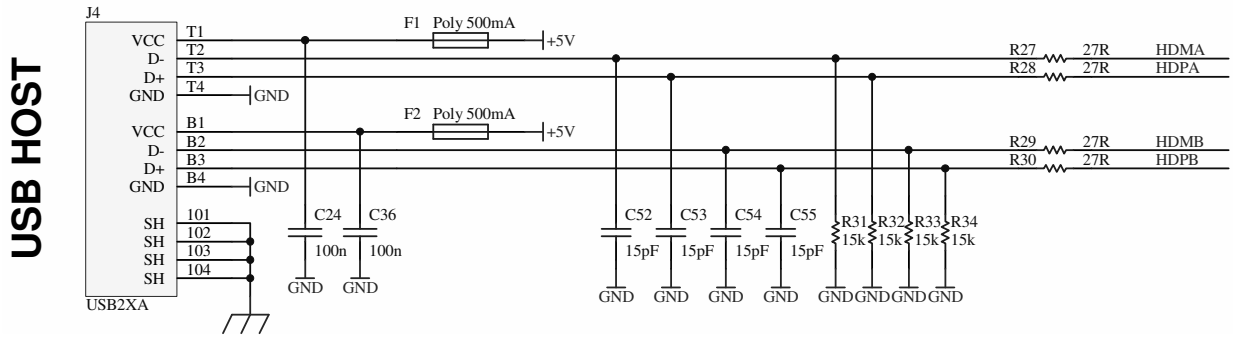


Figure 5 Implementation of USB Host Interface.

MMnet1002 module has RS232 DB9M connector (DTE) with transceiver, witch can be connected to microcontroller's DBGU or UART1 interfaces. Choice is made with JP2 – JP5 jumpers placed near connector. Jumpers in higher position choose DBGU, in higher – UART1. In case of UART1 also two modem signals can be connected: RTS and CTS, in case of UART1 only TXD and RXD are available.

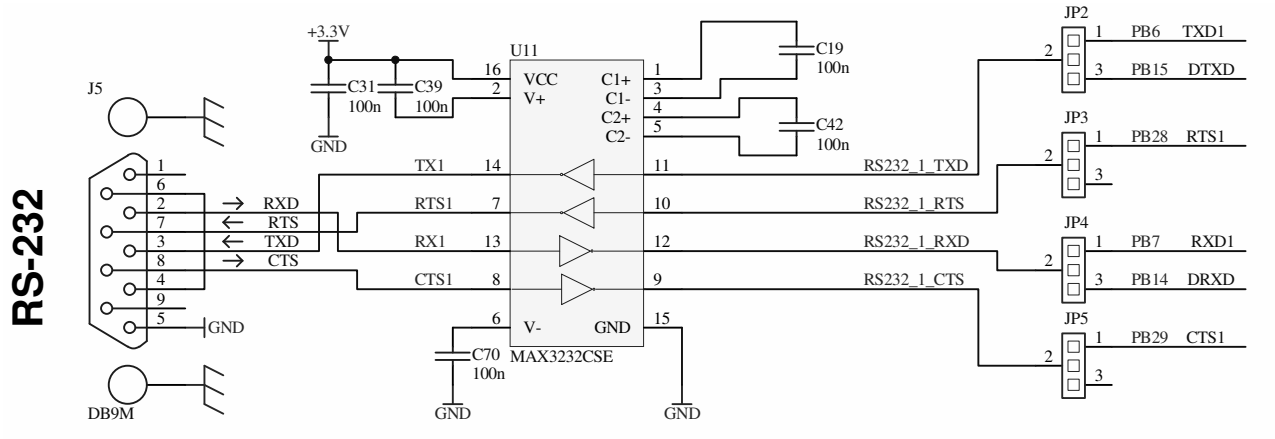


Figure 6 Implementation of RS232 Interface.

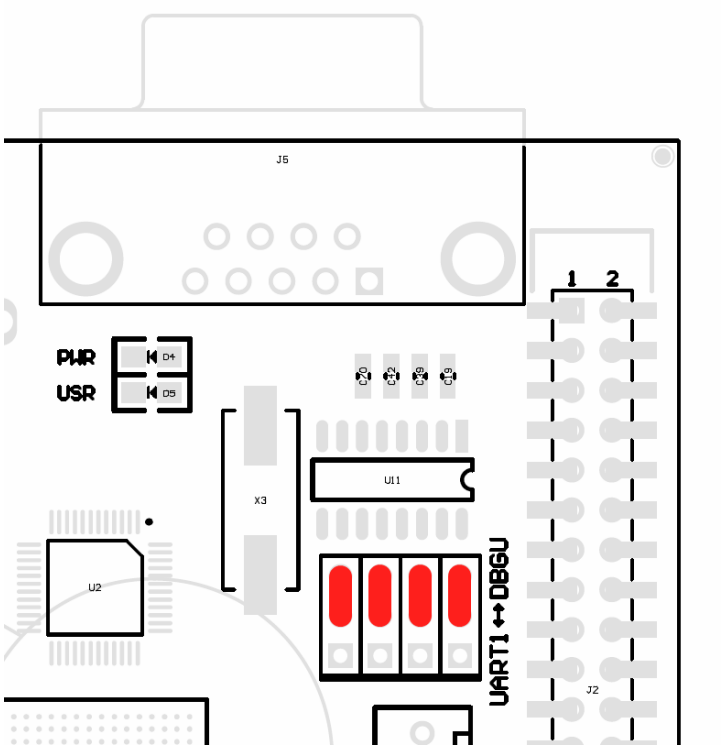


Figure 7 Jumpers in DBGU position.

Additional RS232 interfaces.

AT91SAM9260/AT91SAM9G20 microcontrollers has seven USART ports which can be used to connect the minimodule with a PC computer other equipment equipped with a RS-232 port. UART0 have full modem lines, UART 1, 2, and3 have two modem signals: RTS and CTS, and ports UART4, 5 and DBGU only TXD and RXD lines. Drawings below show example of use UART0.

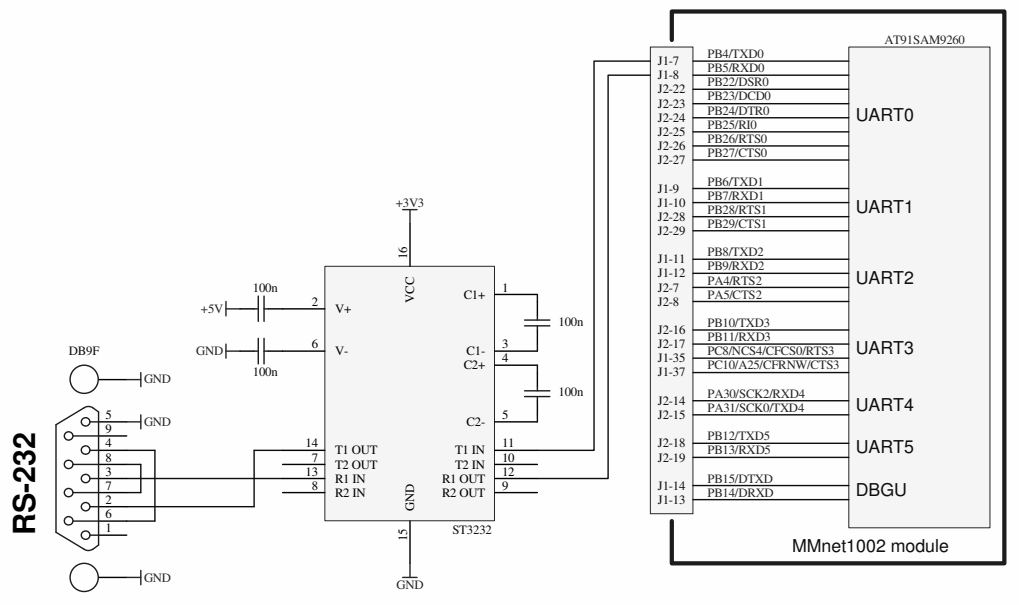


Figure 8 Example of UART0 use as DCE.

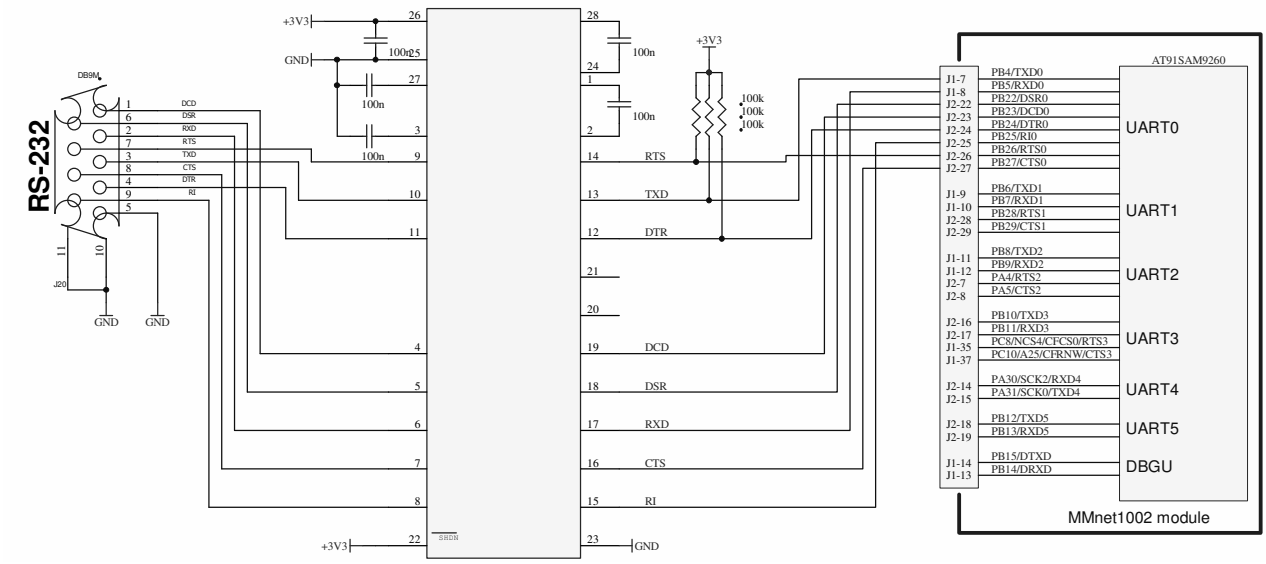


Figure 9 Example of UART0 use as DTE.

I2C Connectors

AT91SAM9260/AT91SAM9G20 microcontrollers have I2C (TWI) interface, which can be used for connecting external peripherals such as I/O ports, ADCs/DACs, EEPROM memories and other. Module is equipped with two connectors with I2C signals and power.

WARNING: Take care when using I2C connectors. Improper handling leading to short-circuit between power supply line and one of interface lines may cause irreversible damage to module and connected board.

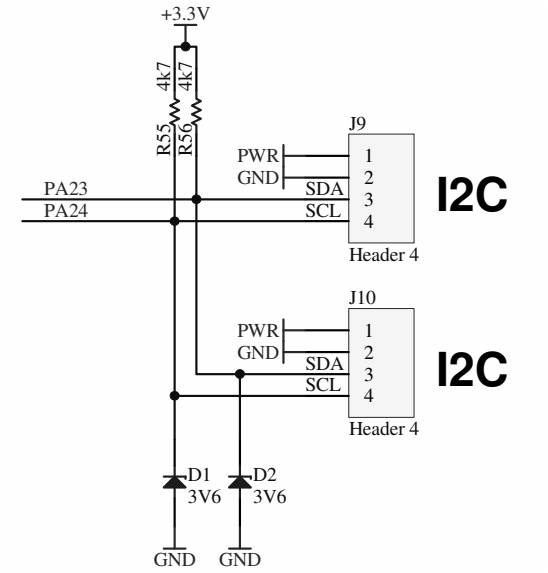


Figure 10 I2C connectors.

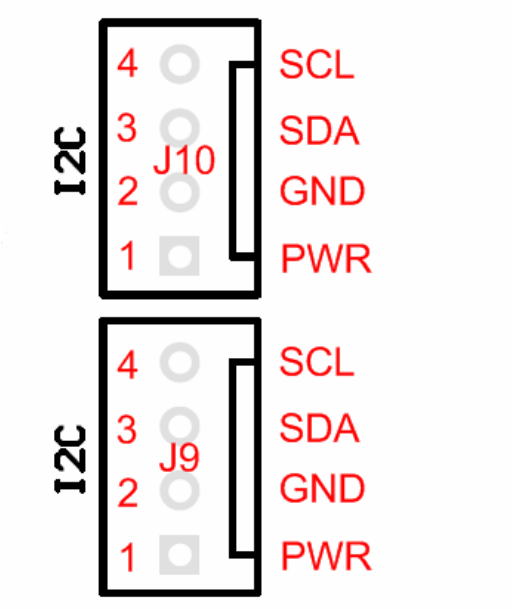


Figure 4 Signals in I2C connectors.

MicroSD connector

AT91SAM9260/AT91SAM9G20 microcontrollers have (Multimedia Card Interface) compatible with MMC V3.11 specification, SDIO V1.1 specification and SD Memory Card V1.0 specification. MMnet1002 module contains microSD connector which allows to use memory cards and other devices with SDIO interface such as Wi-Fi cards.

There is possibility to detect insertion and remove of card with use of PC8 pin. To allow this, R51 resistor should be soldered (it is not mounted by default). When card is present pin is in low logic state.

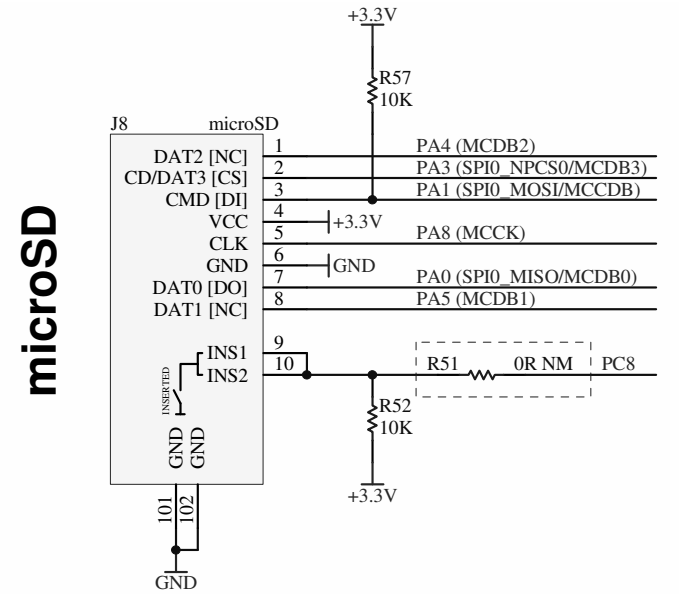


Figure 11 MicroSD connector.

DataFlash memory

The minimodule can be equipped with serial DataFlash with 16Mb, 32 Mb or 64Mb capacity.

AT91SAM9260/AT91SAM9G20 microcontrollers can boot from DataFlash memory, so entire operating system including file system can be placed in this memory.

Memory is connected to microcontroller's SPI interface and is activated by low logic level on #CS pin. If there is such need (for example when restoring broken bootloader), DataFlash can be deactivated by unsoldering R47 resistor. Content of memory can be protected from accidental deletion by soldering R46 resistor (it is not mounted by default). Such possibility can be useful in system which do not need software upgrade.

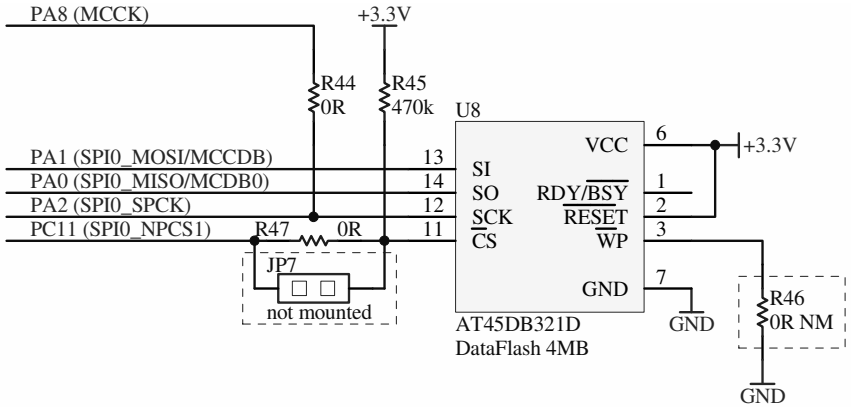


Figure 12 DataFlash memory.

A detailed description of DataFlash memories can be found on Atmel's web page: www.atmel.com.

NAND Flash memory

The minimodule can be equipped with NANDFlash memory with capacities from 128MB to 4GB, as standard, 1GB memory is available.

AT91SAM9260/AT91SAM9G20 microcontrollers can boot from NANDFlash memory, so entire operating system including file system can be placed in this memory.

Memory is connected directly to system bus, so high read/write speed can be achieved (dependent on used memory).

Content of memory can be protected from accidental deletion by soldering R49 resistor (it is not mounted by default).

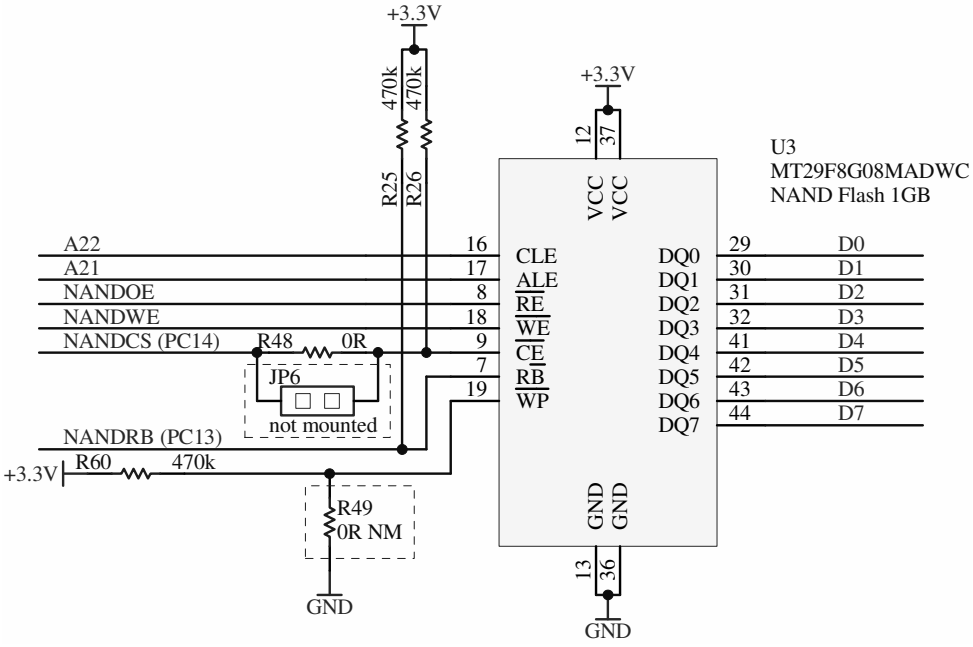


Figure 13 NAND Flash memory.

A detailed description of NANDFlash memories can be found on Micron web page: www.micron.com.

SDRAM memory

Module by default is equipped with 64MB SDRAM memory. For reduce cost when ordering higher quantities, lower capacity memory can be mounted (8, 16 or 32MB). Memory is connected to system bus with 100MHz (AT91SAM9260) or 133MHz (AT91SAM9G20) clocking.

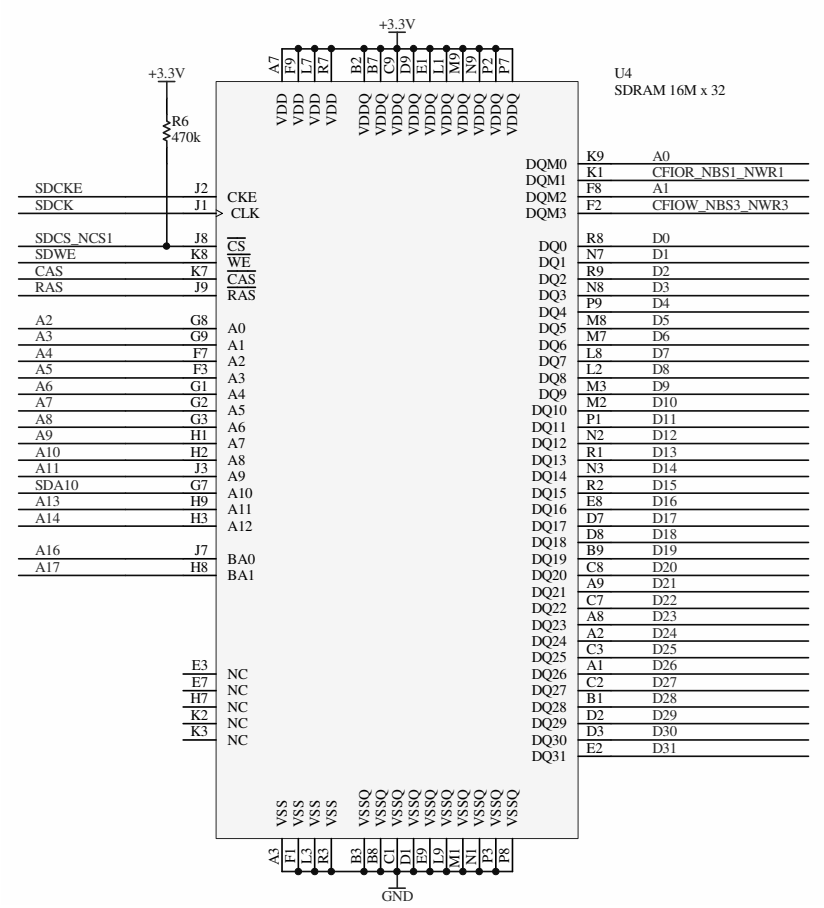


Figure 14 SDRAM memory.

Programming/debugging of module can be done through JTAG interface.

JTAG is a four-lead interface permitting the takeover of control over the processor's core. The possibilities offered by this interface are, among others: step operation, full-speed operation, hardware and software breakpoints, inspection and modification of contents of registers and data memories. The method of connecting the JTAG connector to the minimodule is shown in the drawing:

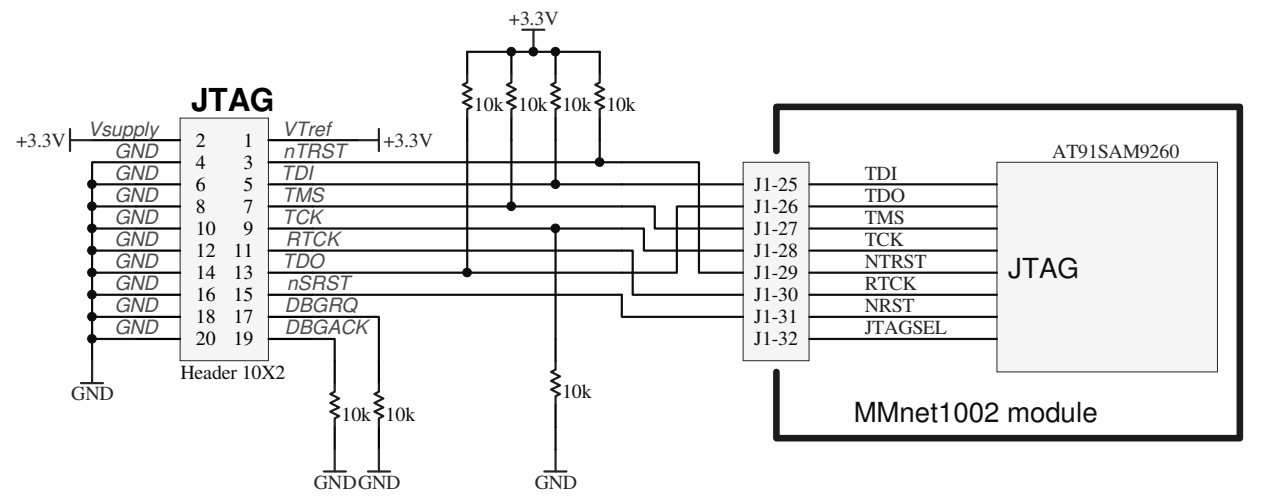


Figure 15 Connection of JTAG interface to MMnet100.

JTAG interface can also work In boundary scan mode, to enable his mode high logic level (1.8V) should be connected to JTAGSEL pin. In JTAG mode JTAGSEL pin can be left unconnected.

WARNING: voltage higher than 1.8V an JTAGSEL pin can damage microprocessor!

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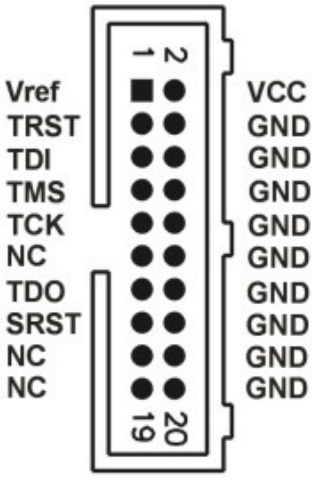


Figure 16 JTAG connector.

Pin description	
VCC	Supply voltage to the emulator
Vref	Target voltage sense
TRST	Tap RESET, RESET signal for JTAG chain
TDI	Test Data Input, data signal from debugger to target
TMS	Test Mode Select, mode select signal from emulator to target
TCK	Test Clock, clock signal from emulator to target
TDO	Test Data Output, data signal from target to debugger.
SRST	Target RESET signal
GND	Ground

JTAG programmer/debugger may be found on page:
- ARMCable I: http://www.propox.com/products/t_122.html

LED diodes

MMnet1002 module has two LED diodes. Red diode indicate presence of 3.3V Power supply, green diode, which is connected to pin PC15, is available to the user.

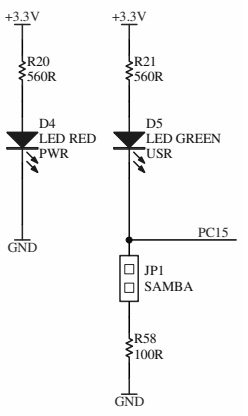


Figure 17 LED diodes.

Battery backup

AT91SAM9260 (AT91SAM9G20) contain RTC clock and 16 bytes of memory with battery backup possibility. CR2032 battery can be mounted don module if necessary, if not, R53 resistor should be mounted instead.

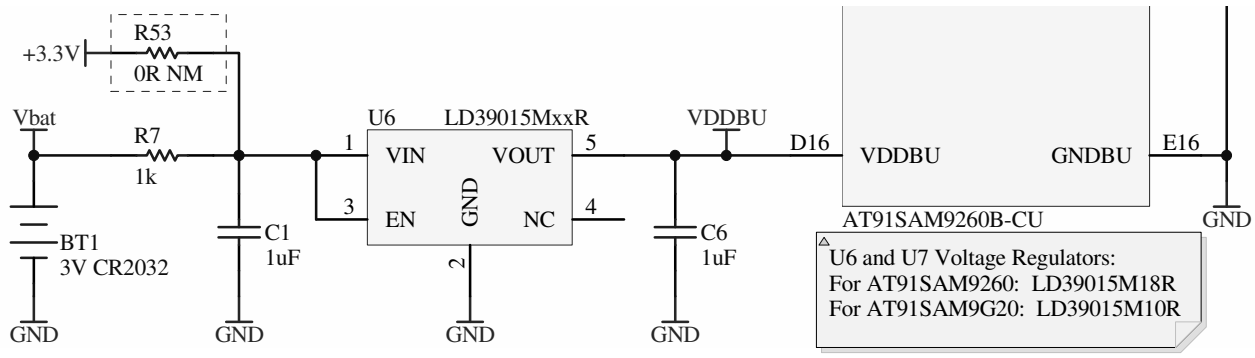


Figure 18 Battery backup power supply.

Power supply

MMnet1002 require external power supply in range 8 – 40V DC or 8 – 24V AC. Supply voltage can be led to standard connector 2.1mm/5mm or to „terminal block" type connector (chosen while ordering). Power can be also supplied through J12 connector (only DC in this case).

3.3V and 5V voltages are generated by onboard switching regulators that ensures high efficiency and low heat generation. Output current capability of 3.3V supply is 1A, where 0.5A should be reserved for module and remaining 0.5A can be used to supply devices connected to module (through J1, J2 and J12 connectors). 5V power supply can also deliver 1A and is intended to supply devices connected to USB bus. This voltage can also be used to supply devices connected to J1, J2 and J12 connectors provided that USB devices are not used or require less power than maximum

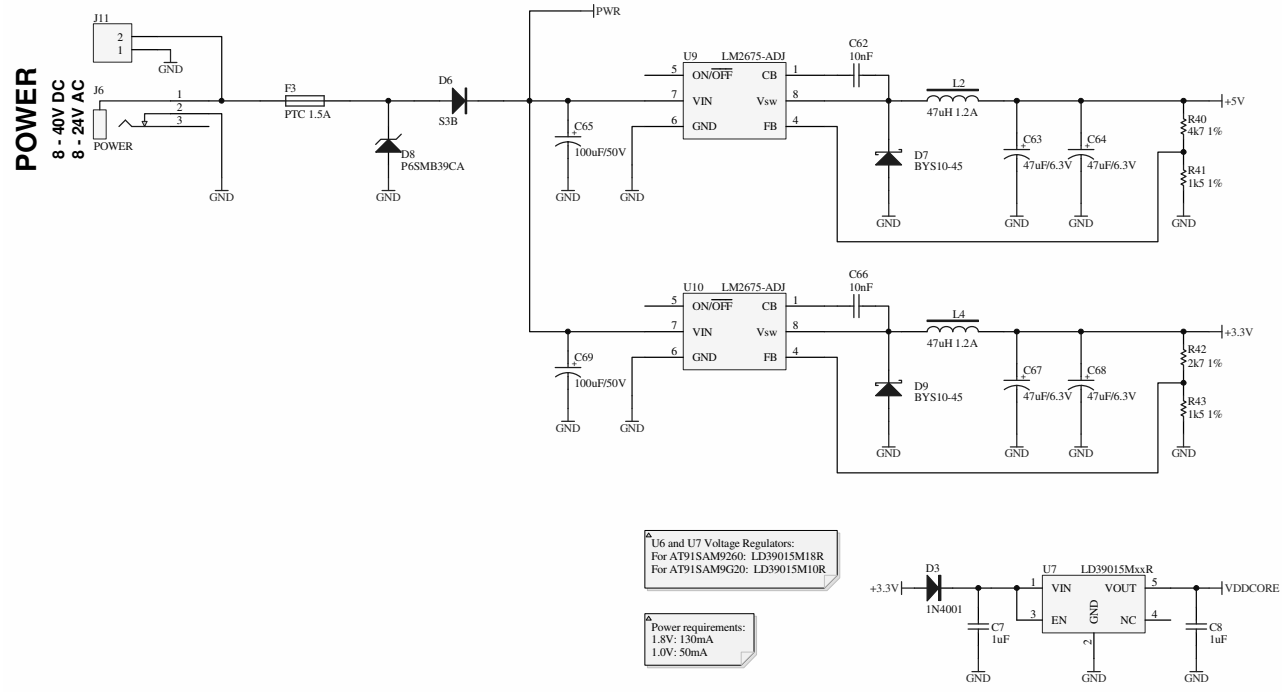


Figure 19 Power supply on MMnet1002

Placement of configuration resistors

Below are grouped functions of resistors and their placement is presented:

Resistor	Default	Function
R15	Not mounted	When this resistor is mounted it s possible to detect if module is connected to USB bus (using PC5 pin).
R51	Not mounted	When this resistor is mounted it s possible to detect if microSD card is inserted (using PC8 pin).
R46	Not mounted	When this resistor is mounted DataFlash memory is protected from writing data.
R47	Mounted	When this resistor is unsoldered DataFlash memory is disconnected from SPI bus.
R48	Mounted	When this resistor is unsoldered NAND Flash memory is disabled.
R49	Not mounted	When this resistor is mounted NAND Flash memory is protected from writing data.
R53	Not mounted	If battery is not mounted on the module, this resistor should be mounted.
R21	Mounted	When this resistor is unsoldered green LED diode is disconnected from PC15 pin.

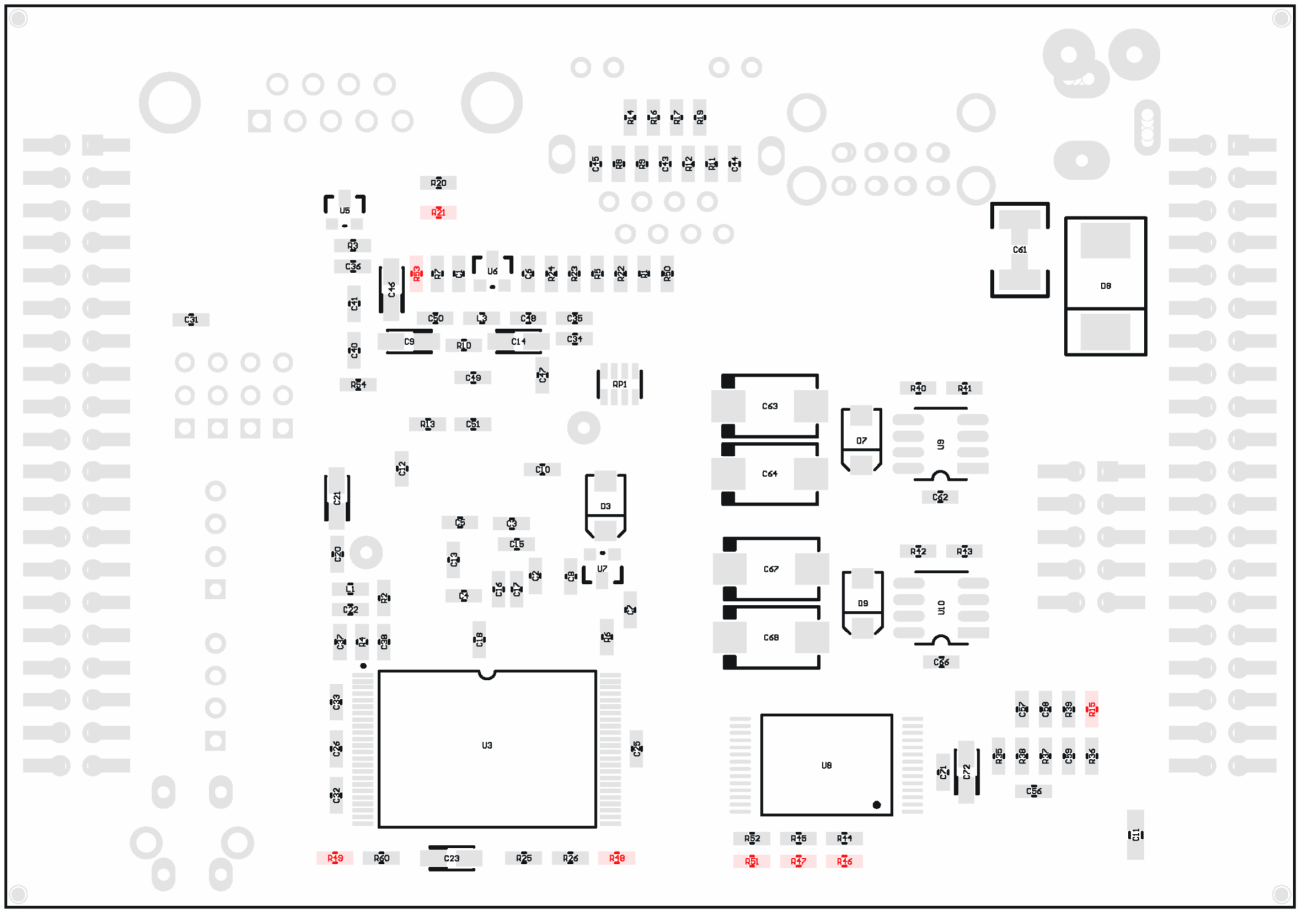


Figure 20 Placement of configuration resistors on bottom side of the board.

3 Specifications

Microcontroller	AT91SAM9260 / AT91SAM9G20
NAND Flash memory	1GB by default
SDRAM memory	64MB by default
DataFlash memory	Up to 8MB
No. of digital I/O	Up to 60
No. of analog inputs	Up to 6
Ethernet	10/100 Mb/s Auto-MDIX, onboard RJ45 connector
Power supply	8 – 35VDC
Maximum power consumption	1.5W module + 5W USB devices
Dimensions	100x70mm
Weight	Abort 70g
Operating temperature range	-20 – 85ºC
Humidity	5 – 95%
Connectors	RS232 (DB9M) RJ45 (Ethernet) 2 x USB Host USB Device B mini Power supply DC2.1 microSD Card Two 2x40 headers

4 Technical assistance

In order to obtain technical assistance please contact support@propox.com . In the request please include the following information:

- number of the module version (e.g. REV 1)
- setting of resistors
- a detailed description of the problem

5 Guarantee

The MMlpc213x minimodule is covered by a six-month guarantee. All faults and defects not caused by the user will be removed at the Producer's cost. Transportation costs are borne by the buyer.

The Producer takes no responsibility for any damage and defects caused in the course of using the MMlpc213x module.

6 Assembly drawings

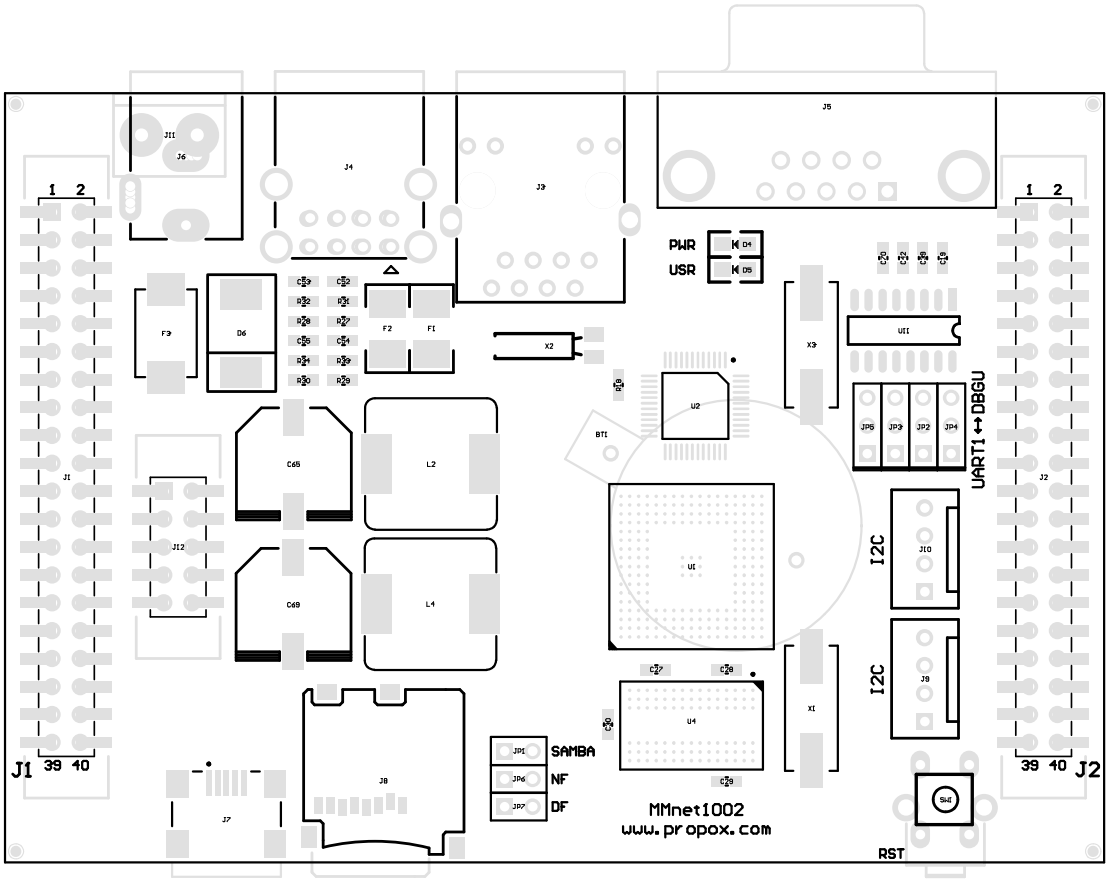


Figure 21 Assembly drawing – top layer.

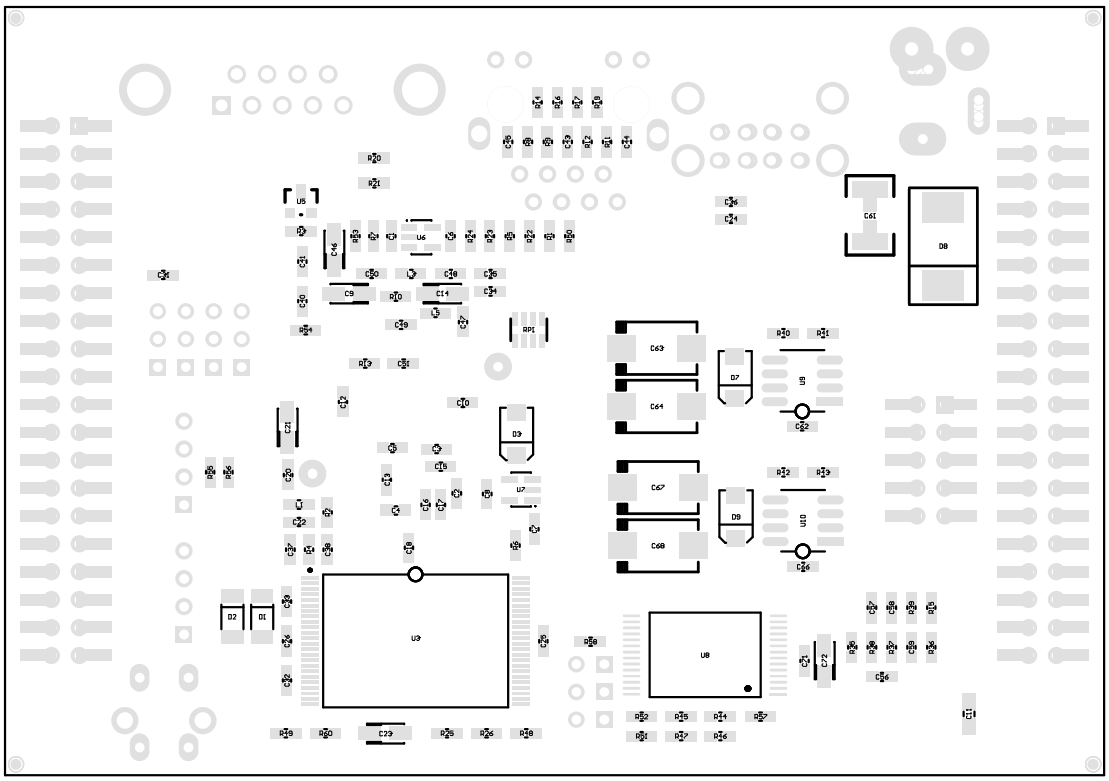


Figure 22 Assembly drawing – bottom layer.

7 Dimensions

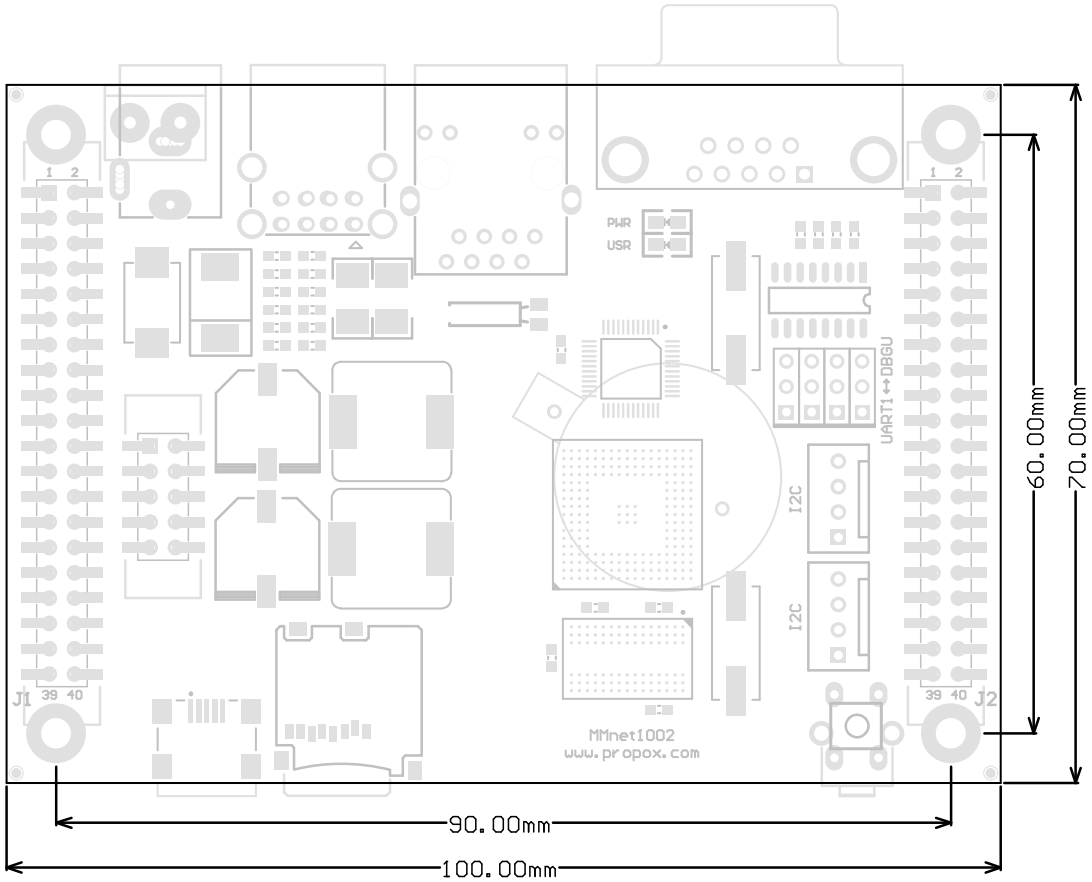


Figure 23 Dimensions – top view.

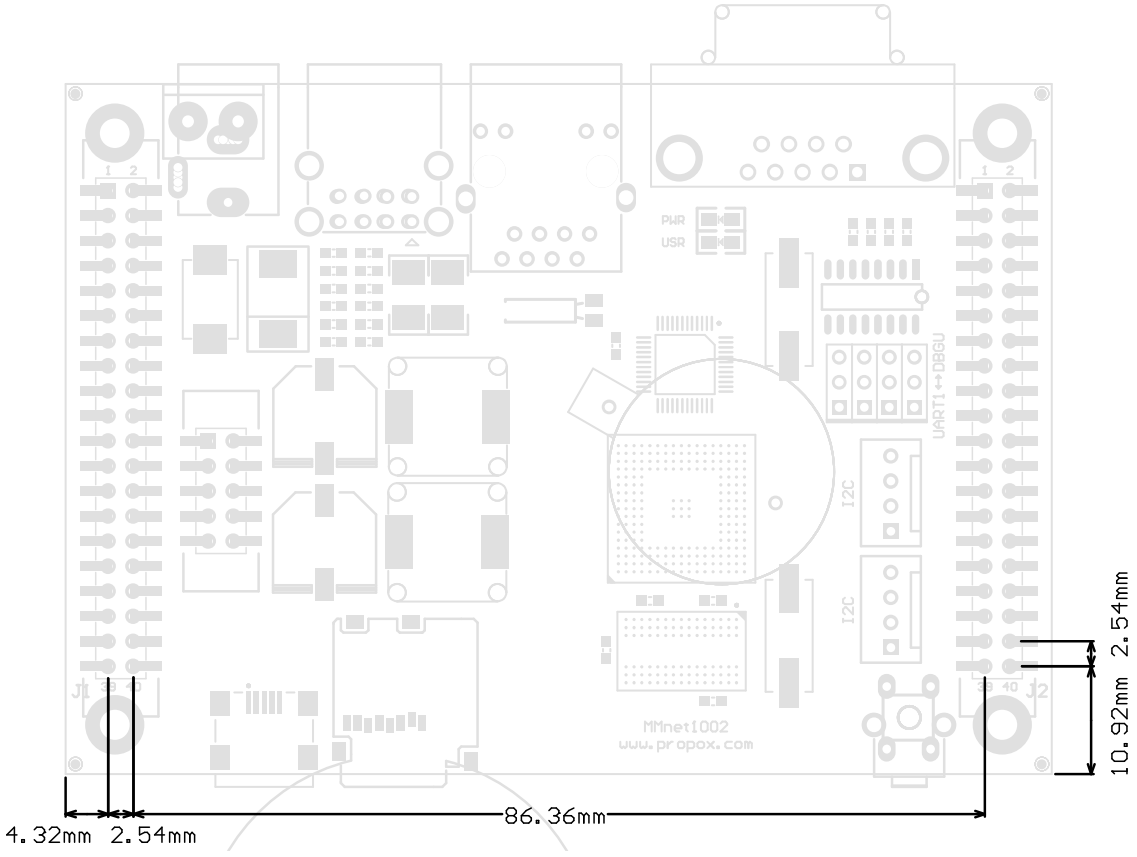


Figure 24 Dimensions – connectors.

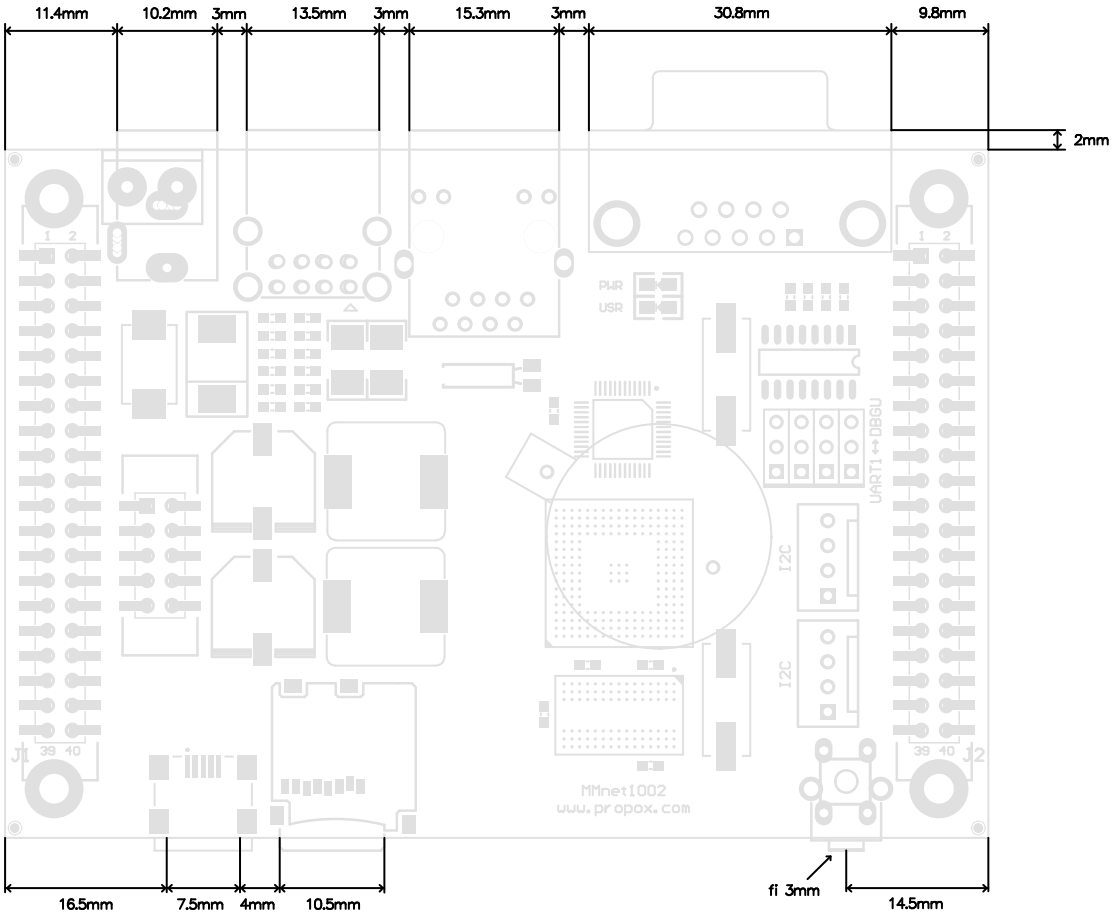
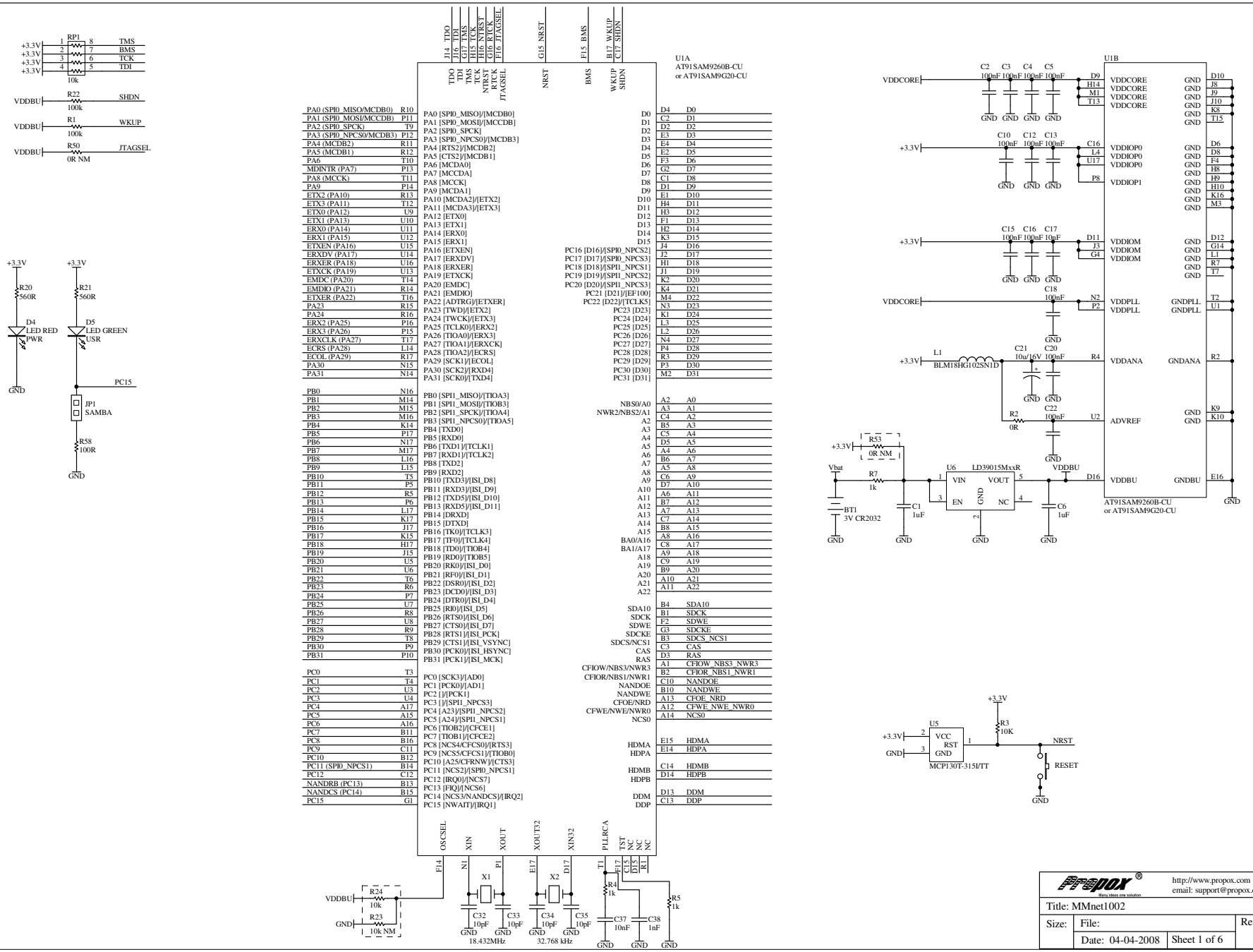


Figure 25 Dimensions – connectors.

Figure 26 Dimensions – side view.

8 Schematics


RP1
TMS
BMS
TCK
TDI
10k
R22
100k
SHDN
R1
100k
WKUP
R50
0R NM
JTAGSEL
D4
LED RED
PWR
R20
560R
D5
LED GREEN
USR
R21
560R
PC15
JP1
SAMBA
R58
100R
GND
U1A
AT91SAM9260B-CU
or AT91SAM9G20-CU
PA0 (SPI0_MISO/MCDB0) R10
PA1 (SPI0_MOSI/MCCDB) P11
PA2 (SPI0_SPCK) T9
PA3 (SPI0_NPCS0/MCDB3) P12
PA4 (MCDB2) R11
PA5 (MCDB1) R12
PA6 T10
MDINTR (PA7) P13
PA8 (MCCK) T11
PA9 P14
ETX2 (PA10) R13
ETX3 (PA11) T12
ETX0 (PA12) U9
ETX1 (PA13) U10
ERX0 (PA14) U11
ERX1 (PA15) U12
ETXEN (PA16) U15
ERXDV (PA17) U14
ERXER (PA18) U16
ETXCK (PA19) U13
EMDC (PA20) T14
EMDIO (PA21) R14
ETXER (PA22) T16
PA23 R15
PA24 R16
ERX2 (PA25) P16
ERX3 (PA26) P15
ERXCLK (PA27) T17
ECRS (PA28) L14
ECOL (PA29) R17
PA30 N15
PA31 N14
PB0 N16
PB1 M14
PB2 M15
PB3 M16
PB4 K14
PB5 P17
PB6 N17
PB7 M17
PB8 L16
PB9 L15
PB10 T5
PB11 P5
PB12 R5
PB13 P6
PB14 L17
PB15 K17
PB16 J17
PB17 K15
PB18 H17
PB19 J15
PB20 U5
PB21 U6
PB22 T6
PB23 R6
PB24 P7
PB25 U7
PB26 R8
PB27 U8
PB28 R9
PB29 T8
PB30 P9
PB31 P10
PC0 T3
PC1 T4
PC2 U3
PC3 U4
PC4 A17
PC5 A15
PC6 A16
PC7 B11
PC8 B16
PC9 C11
PC10 B12
PC11 (SPI0_NPCS1) B14
PC12 C12
NANDRB (PC13) B13
NANDCS (PC14) B15
PC15 G1
PA0 [SPI0_MISO]/[MCDB0]
PA1 [SPI0_MOSI]/[MCCDB]
PA2 [SPI0_SPCK]
PA3 [SPI0_NPCS0]/[MCDB3]
PA4 [RTS2]/[MCDB2]
PA5 [CTS2]/[MCDB1]
PA6 [MCDA0]
PA7 [MCCDA]
PA8 [MCCK]
PA9 [MCDA1]
PA10 [MCDA2]/[ETX2]
PA11 [MCDA3]/[ETX3]
PA12 [ETX0]
PA13 [ETX1]
PA14 [ERX0]
PA15 [ERX1]
PA16 [ETXEN]
PA17 [ERXDV]
PA18 [ERXER]
PA19 [ETXCK]
PA20 [EMDC]
PA21 [EMDIO]
PA22 [ADTRG]/[ETXER]
PA23 [TWD]/[ETX2]
PA24 [TWCK]/[ETX3]
PA25 [TCLK0]/[ERX2]
PA26 [TIOA0]/[ERX3]
PA27 [TIOA1]/[ERXCK]
PA28 [TIOA2]/[ECRS]
PA29 [SCK1]/[ECOL]
PA30 [SCK2]/[RXD4]
PA31 [SCK0]/[TXD4]
PB0 [SPI1_MISO]/[TIOA3]
PB1 [SPI1_MOSI]/[TIOB3]
PB2 [SPI1_SPCK]/[TIOA4]
PB3 [SPI1_NPCS0]/[TIOA5]
PB4 [TXD0]
PB5 [RXD0]
PB6 [TXD1]/[TCLK1]
PB7 [RXD1]/[TCLK2]
PB8 [TXD2]
PB9 [RXD2]
PB10 [TXD3]/[ISI_D8]
PB11 [RXD3]/[ISI_D9]
PB12 [TXD5]/[ISI_D10]
PB13 [RXD5]/[ISI_D11]
PB14 [DRXD]
PB15 [DTXD]
PB16 [TK0]/[TCLK3]
PB17 [TF0]/[TCLK4]
PB18 [TD0]/[TIOB4]
PB19 [RD0]/[TIOB5]
PB20 [RK0]/[ISI_D0]
PB21 [RF0]/[ISI_D1]
PB22 [DSR0]/[ISI_D2]
PB23 [DCD0]/[ISI_D3]
PB24 [DTR0]/[ISI_D4]
PB25 [RI0]/[ISI_D5]
PB26 [RTS0]/[ISI_D6]
PB27 [CTS0]/[ISI_D7]
PB28 [RTS1]/[ISI_PCK]
PB29 [CTS1]/[ISI_VSYNC]
PB30 [PCK0]/[ISI_HSYNC]
PB31 [PCK1]/[ISI_MCK]
PC0 [SCK3]/[AD0]
PC1 [PCK0]/[AD1]
PC2 [/][PCK1]
PC3 [/][SPI1_NPCS3]
PC4 [A23]/[SPI1_NPCS2]
PC5 [A24]/[SPI1_NPCS1]
PC6 [TIOB2]/[CFCE1]
PC7 [TIOB1]/[CFCE2]
PC8 [NCS4/CFCS0]/[RTS3]
PC9 [NCS5/CFCS1]/[TIOB0]
PC10 [A25/CFRNW]/[CTS3]
PC11 [NCS2]/[SPI0_NPCS1]
PC12 [IRQ0]/[NCS7]
PC13 [FIQ]/[NCS6]
PC14 [NCS3/NANDCS]/[IRQ2]
PC15 [NWAIT]/[IRQ1]
D0 C2 D1
D1 C3 D2
D2 D2 D3
D3 E3 D4
D4 E4 D5
D5 E2 D6
D6 F3 D7
D7 G2 D8
D8 C1 D9
D9 D1 D10
D10 E1 D11
D11 H4 D12
D12 H3 D13
D13 F1 D14
D14 H2 D15
D15 K3 D16
PC16 [D16]/[SPI0_NPCS2] J4 D17
PC17 [D17]/[SPI0_NPCS3] J2 D18
PC18 [D18]/[SPI1_NPCS1] H1 D19
PC19 [D19]/[SPI1_NPCS2] J1 D20
PC20 [D20]/[SPI1_NPCS3] K2 D21
PC21 [D21]/[EF100] K4 D22
PC22 [D22]/[TCLK5] M4 D23
PC23 [D23] N3 D24
PC24 [D24] K1 D25
PC25 [D25] L3 D26
PC26 [D26] L2 D27
PC27 [D27] N4 D28
PC28 [D28] P4 D29
PC29 [D29] R3 D30
PC30 [D30] P3 D31
PC31 [D31] M2
NBS0/A0 A2 A0
NWR2/NBS2/A1 A3 A1
A2 C4 A2
A3 B5 A3
A4 C5 A4
A5 D5 A5
A6 A4 A6
A7 B6 A7
A8 A5 A8
A9 C6 A9
A10 D7 A10
A11 A6 A11
A12 B7 A12
A13 A7 A13
A14 C7 A14
A15 B8 A15
BA0/A16 A8 A16
BA1/A17 C8 A17
A18 A9 A18
A19 C9 A19
A20 B9 A20
A21 A10 A21
A22 A11 A22
SDA10 B4 SDA10
SDCK B1 SDCK
SDWE F2 SDWE
SDCKE G3 SDCKE
SDCS/NCS1 B3 SDCS_NCS1
CAS C3 CAS
RAS D3 RAS
CFIOW/NBS3/NWR3 A1 CFIOW_NBS3_NWR3
CFIOR/NBS1/NWR1 B2 CFIOR_NBS1_NWR1
NANDOE C10 NANDOE
NANDWE B10 NANDWE
CFOE/NRD A13 CFOE_NRD
CFWE/NWE/NWR0 A12 CFWE_NWE_NWR0
NCS0 A14 NCS0
HDMA E15 HDMA
HDPA E14 HDPA
HDMB C14 HDMB
HDPB D14 HDPB
DDM D13 DDM
DDP C13 DDP
TDO J14
TDI G17
TMS H15
TCK H16
NTRST G16
RTCK F16
JTAGSEL G15
NRST F15
BMS B17
WKUP C17
SHDN
OSCSEL F14
XIN N1
XOUT P1
XOUT32 E17
XIN32 D17
PLLRCA T1
TST F17
NC C15
NC D15
NC R1
R24 10k
R23 10k NM
X1 18.432MHz
X2 32.768 kHz
C32 10pF
C33 10pF
C34 10pF
C35 10pF
R4 1k
R5 1k
C37 10nF
C38 1nF
U1B
VDDCORE
C2 100nF
C3 100nF
C4 100nF
C5 100nF
D9
H14
M1
T13
VDDIOP0
C10 100nF
C12 100nF
C13 100nF
C16
L4
U17
P8
VDDIOP1
VDDIOM
C15 100nF
C16 100nF
C17 10nF
D11
J3
G4
C18 100nF
N2
P2
VDDPLL
L1
BLM18HG102SN1D
C21 10u/16V
C20 100nF
R4
VDDANA
R2 0R
C22 100nF
U2
ADVREF
R53 0R NM
Vbat
R7 1k
BT1 3V CR2032
C1 1uF
U6 LD39015MxxR
VIN
VOUT
EN
GND
NC
C6 1uF
VDDBU
D16
GNDBU
E16
GNDANA
GNDPLL
AT91SAM9260B-CU
or AT91SAM9G20-CU
U5
VCC
RST
GND
MCP130T-315I/TT
R3 10K
NRST
RESET
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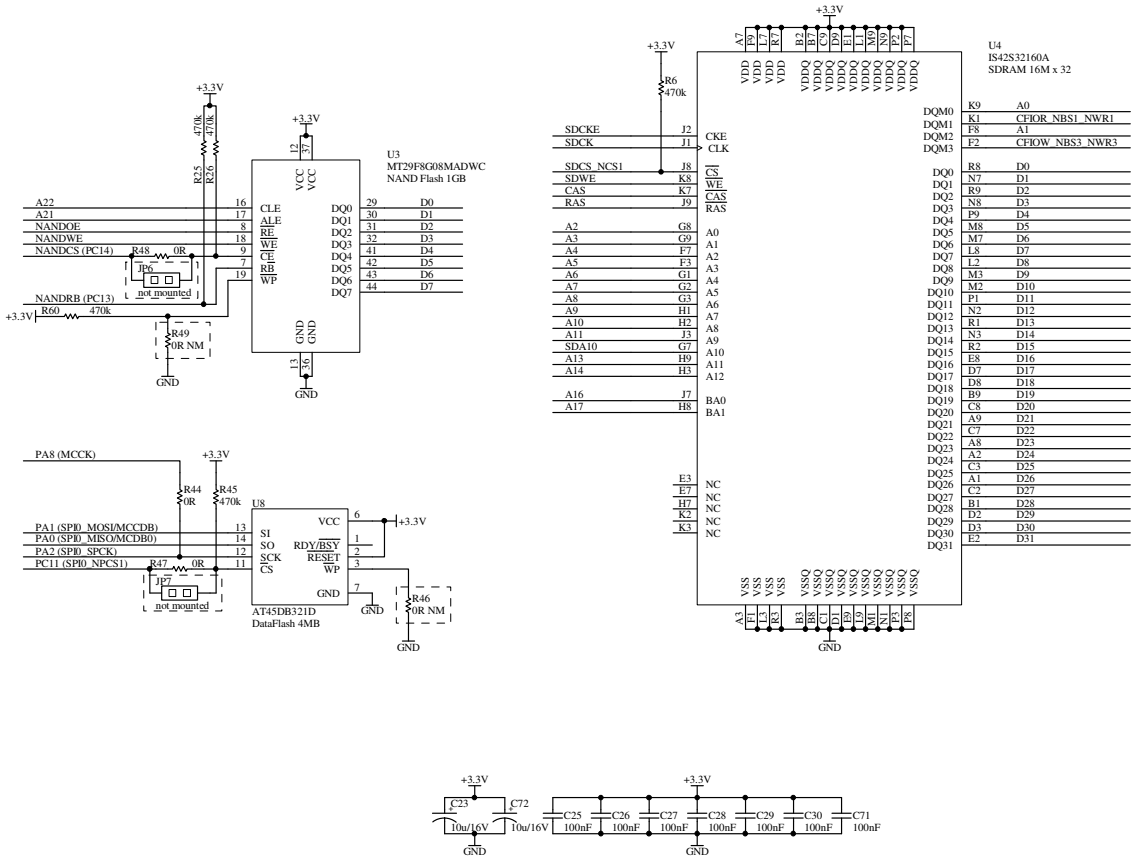

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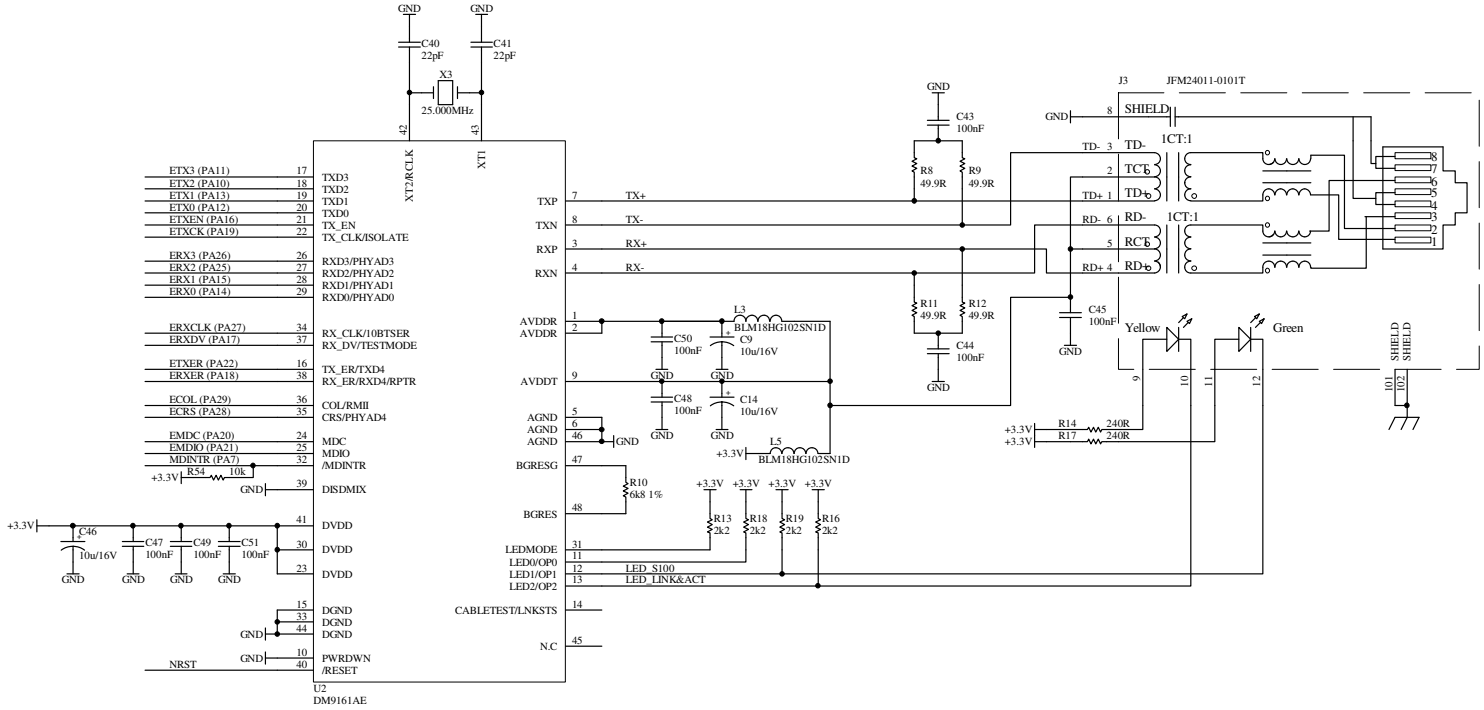

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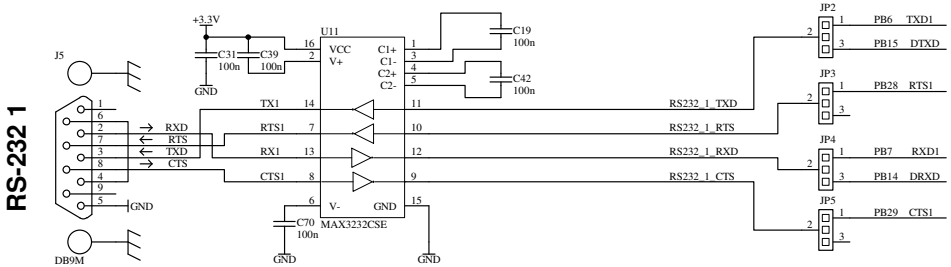

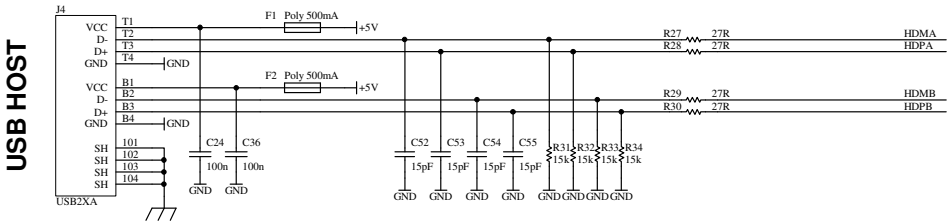

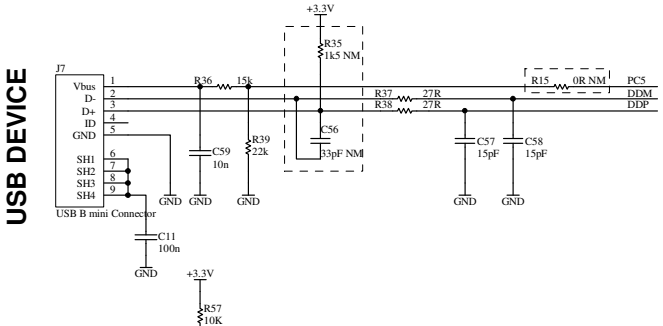

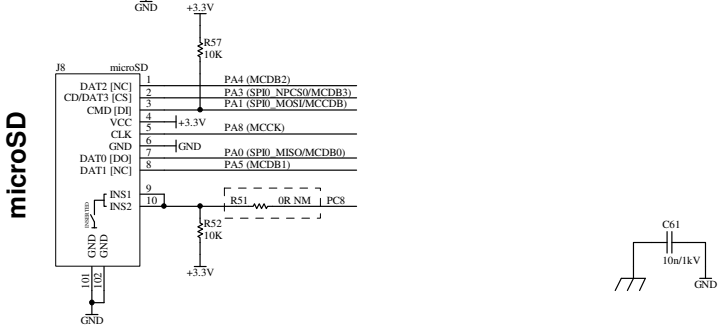

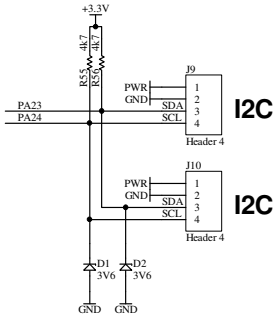

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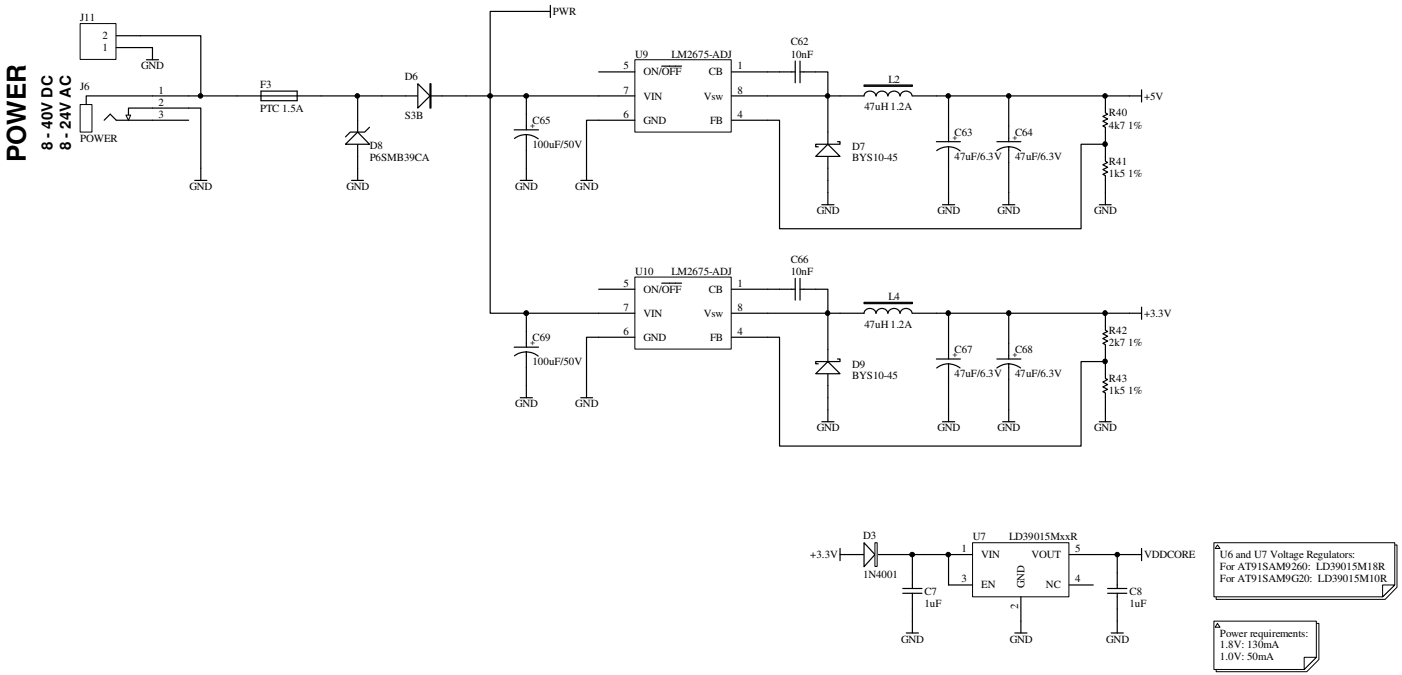

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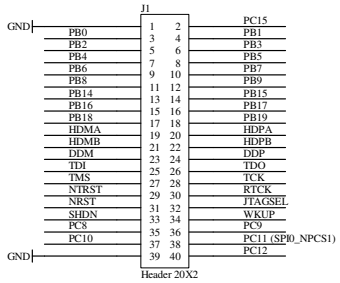

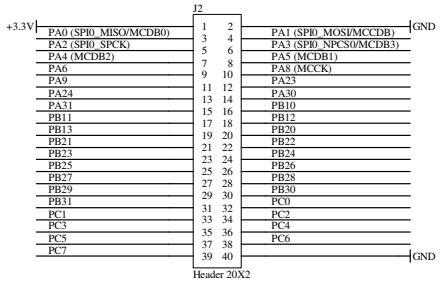

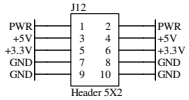

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