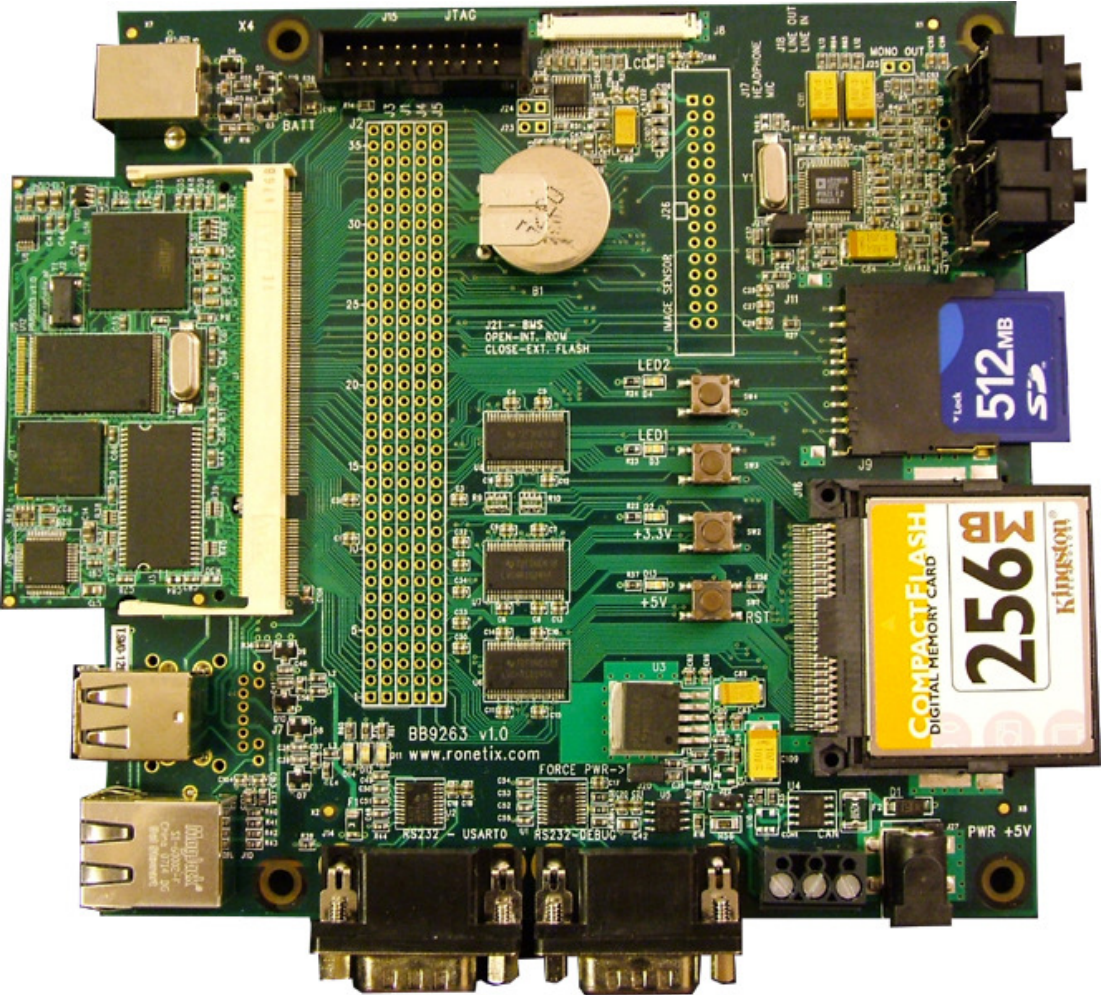


EB9263 Evaluation Board PM9263 CPU Module

User Manual

Version 1.2



RONETIX
embedded development tools

November, 2010

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1 Overview

1.1 Scope

The EB9263 Development Kit enables real time code development and evaluation. It supports AT91SAM9263.

1.2 Package contents

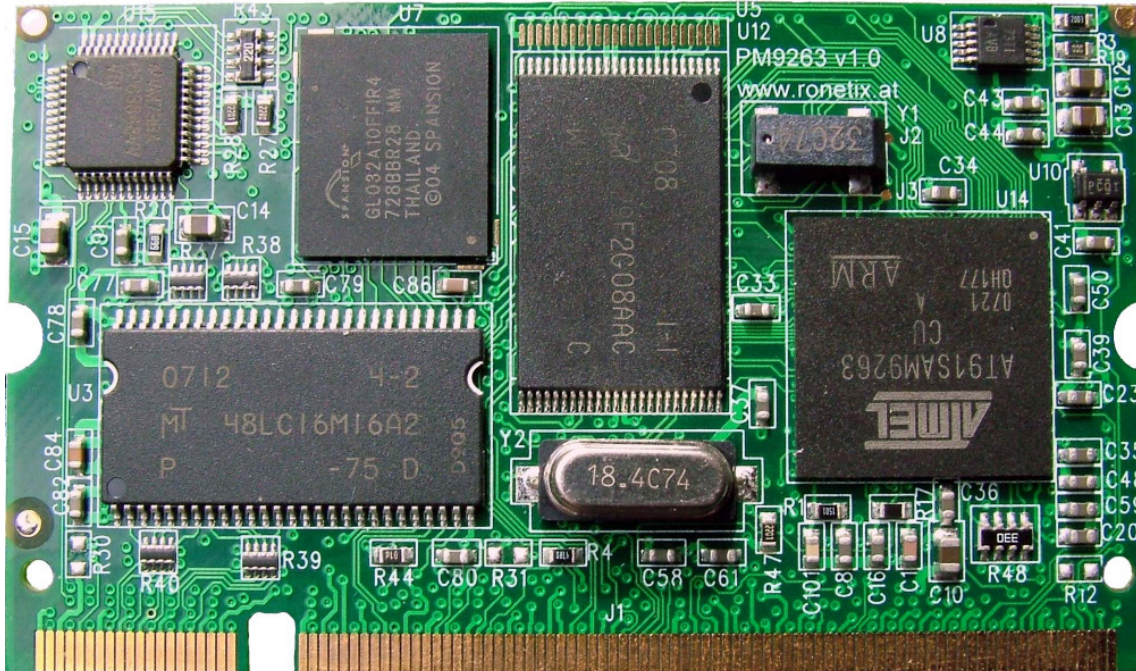
The Development Kit consists of:

- CPU Module PM9263
- Base Board BB9263
- Power Supply 5V/1A
- PEEDI – JTAG Emulator and Flash Programmer (optional)
- DVD including software, datasheets and documentation

A copy of the DVD can be found here: <http://download.ronetix.info>

2 The CPU Module PM9263

2.1 The PM9263



The PM9263 from Ronetix consists of an AT91SAM9263 together with several peripherals:

- ▶ ATMEL AT91SAM9263 Microcontroller in BGA324 package with:
 - ARM926EJ-S™ ARM® Processor

- DSP Instruction Extensions
- ARM Jazelle® Technology for Java® Acceleration
- 16 Kbytes Data Cache, 16 Kbytes Instruction Cache, Write Buffer
- 220 MIPS at 200 MHz
- Bus Matrix – Five Masters and Five Slaves
- Embedded ICE (In-Circuit Emulation) with JTAG interface
- 80 Kbytes Internal RAM
- Dual External Bus Interface
- DMA Controller
- 3 USARTs
- 2 Synchronous Serial Controllers (SSC)
- Two Master/Slave SPI Interfaces
- One 3-Channel 16-bit Timer/Counter
- Programmable Watchdog Timer
- USB 2.0 Full Speed (12 Mb/s) – Host Port
- USB 2.0 Full Speed (12 Mb/s) – Device Port
- LCD Controller
- 2D Graphics Accelerator
- Image sensor interface
- AC97 Controller
- Real-time Clock with On-chip 32 kHz Oscillator
- 160 Programmable I/O Lines
- Advanced Power Management Controller
- ▶ 4 Mbyte 16-bit NOR Flash
- ▶ 64 Mbyte 32-bit SDRAM
- ▶ 4 MB PSRAM connected on the EB11
- ▶ 2 Gbit NAND Flash
- ▶ 32 Mbits SPI Serial DataFlash AT45DB321D
- ▶ Serial Number Chip DS2401
- ▶ SODIMM 200-pin connector
- ▶ Dimension 67,6 mm x 40.0 mm

2.2 Electrostatic Warning

The PM9263 Module is shipped in protective anti-static packaging. The board must not be subjected to high electrostatic potentials. A grounding strap or similar protective device should be worn when handling the board. Avoid touching the component pins or any other metallic element.

2.3 Layout

The board layout diagram (Figure 2-1 and Figure 2-2) shows an approximate floorplan of the board. It was designed to provide the smallest board dimensions. The board has 6 signal layers and 2 power planes. The mechanical drawing of the CPU module is available on the DVD or here:

http://download.ronetix.info/boards/doc/PM9263/PM9263_v1.2

Figure 2-1 – Top View

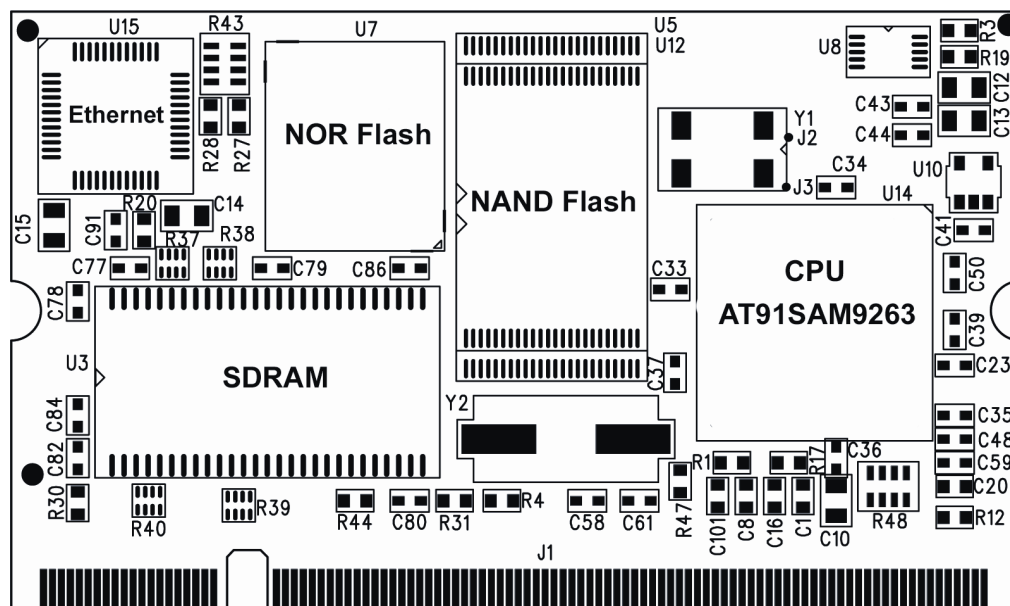
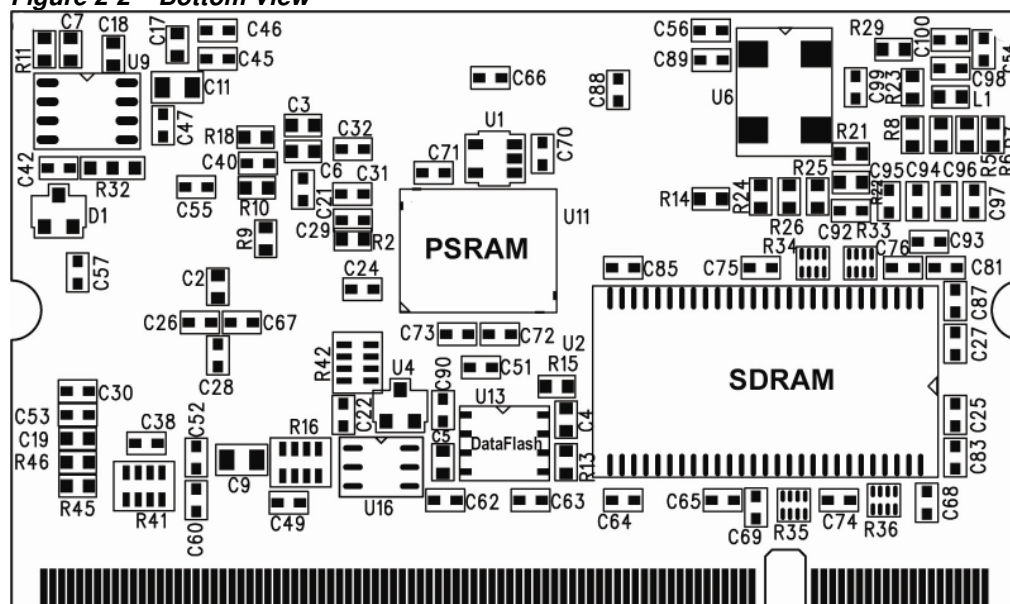


Figure 2-2 – Bottom View



2.4 Circuit Description

The schematic of the CPU module can be found on the DVD or here:
http://download.ronetix.info/boards/doc/PM9263/PM9263_v1.2

2.4.1 AT91SAM9263

The footprint is for a 324-pin BGA package.

2.4.2 Revisions

There are two revisions of PM9263: v1.0 and v1.1.

The differences between both versions are:

- PM9263 v1.0 fits into 1.8V and 2.5V SODIMM200 connectors, whereas PM9263 v1.1 fits only in 2.5V connectors.
- V1.1 – PB20 and PB21 can be used for version coding
- V1.1 supports NAND Flash devices with up to four dies - PB23, PB24, PB25 are used for NAND_CS1, NAND_CS2 and NAND_CS3
- V1.1 – PB27 is used to enable or disable the 50MHz quartz oscillator
- V1.1 - Removed 16-bit NAND Flash footprint
- V1.1 supports up to 512Mbit NOR Flash devices
- V1.1 doesn't use pin 200 of SODIMM200 connector

2.4.3 200-pin SODIMM Connector

The 200-pin SODIMM connector makes the most CPU pins, Vcc 3.3V and Ground available to the user. The recommended SODIMM200 2.5V connector is:

FCI 59354-052FSLF

2.4.4 Memories

The PM9263 has on board:

- 4 Mbyte, 16-bit Parallel Flash (boot capable)
- 64 Mbyte, 32-bit SDRAM
- 4 Mbyte PSRAM connected to EBI1
- 2 Gbit, 8-bit NAND Flash (boot capable)
- 32 Mbit, serial SPI DataFlash (boot capable)

The AT91SAM9263 CPU can boot in 2 different ways:

- If BMS = 0 - direct from the parallel Flash
- If BMS = 1 – then the internal 32 KB ROM boot loader of AT91SAM9263 allows the CPU to boot from the DataFlash or the NAND Flash

The JTAG Emulator and Flash Programmer PEEDI from Ronetix support the flash programming of all these memories: FLASH, DataFlash and NAND Flash.

For more information visit <http://www.ronetix.at/peedi.html>

2.4.5 Serial Number Chip DS2401

The DS2401 1-Wire® Silicon Serial Number has a unique 48-bit serial number, an 8-bit CRC, and an 8-bit Family Code. It is connected to PB31 of the AT91SAM9263 and allows the module to have a unique serial number. It can be used also for the MAC address of the Ethernet controller.

2.4.6 Crystal Quartzes

The board has two crystals and one oscillator: a 32.768 kHz connected to the RTC low-power oscillator of the AT91SAM9263, an 18.4320 MHz connected to the main oscillator and a 50 MHz oscillator for the Ethernet Controller. The 50MHz oscillator can be enabled or disabled with a GPIO: PB27

The AT91SAM9263 Master Clock can be derived from the 32.768 kHz crystal quartz or the 18.4320 MHz crystal quartz depending on the programming of the APMC registers.

2.4.7 Power

PM9263 v1.0 requires only 3.3V power supply. Pin 200 of the SODIMM200 connector is connected to +5V on the base board, but for custom designs this is not necessary – pin 200 can be connected to +3.3V.

PM9263 v1.1 doesn't use pin 200 – it is not used and not connected.

The power consumption of PM9263 with all peripherals without Ethernet is 200mA/3.3V.

The power consumption of PM9263 with all peripherals with Ethernet is 300mA/3.3V.

2.4.8 Ethernet Controller

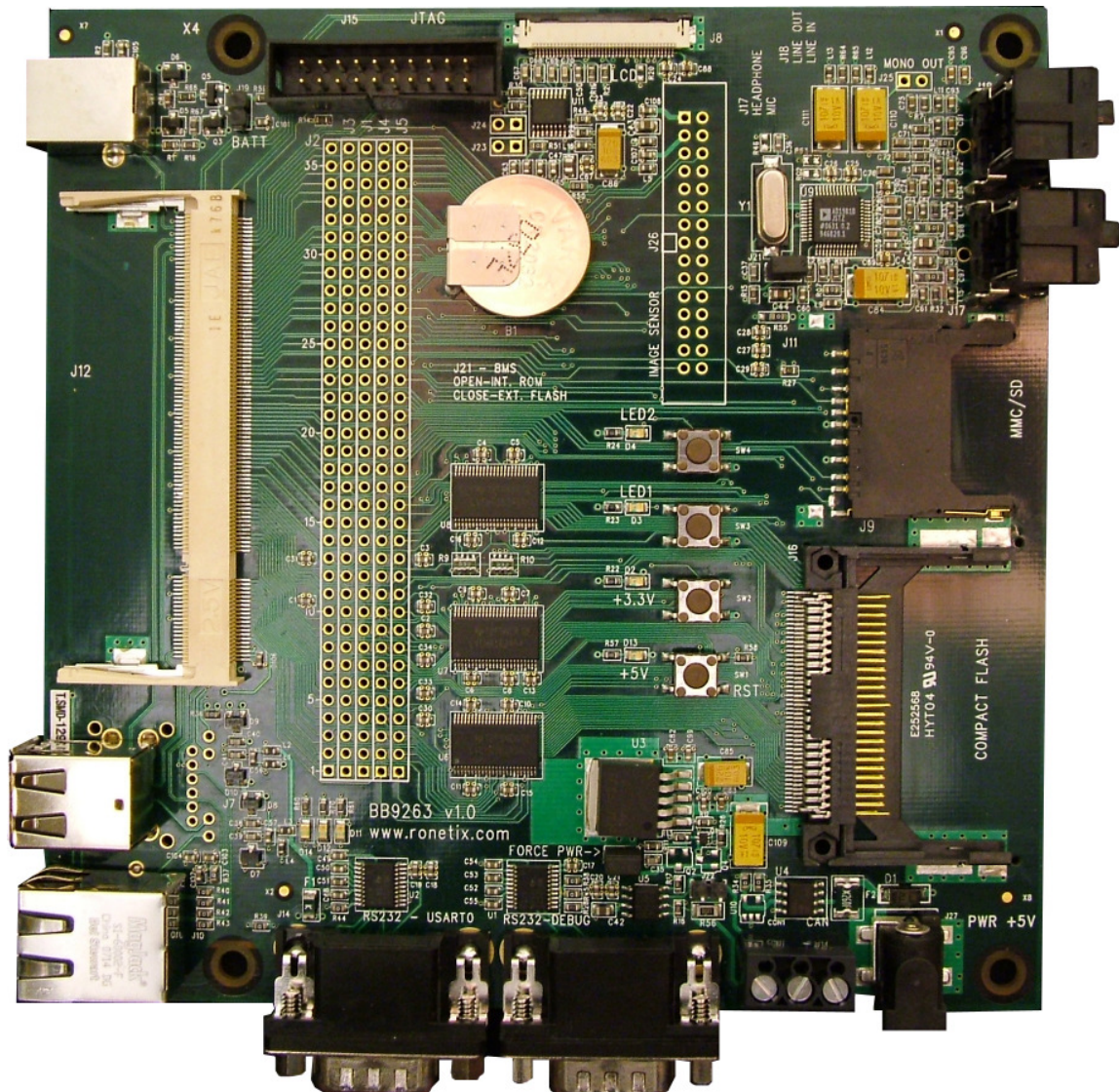
The PM9263 has on board a DP83848 10/100M PHY.

2.4.9 Temperature range

PM9263 is available in two temperature ranges:

- Standard temperature range 0° +70°C
- Industrial temperature range -40° +85°C

3 Base Board BB9263



The BB9263 is equipped with:

- SODIMM 200 pin for reception of PM9263
- one USB device port
- two USB Host ports
- one RJ45 10/100M Ethernet
- JTAG debug interface, 20-pin
- one 3.5" ¼ VGA TFT LCD + Touch Screen – 40 pin
- Image interface, 30 pin
- two RS232
- four Audio connectors: Line In, Line Out, Headphone, Microphone
- one MMC/SD card connector
- one Compact Flash connector

- CAN connector
- expansion connectors
- one reset push-button
- one wakeup push-button
- two user input push-buttons
- three general purpose LEDs
- two power LEDs: one for 5V and one for 3.3V
- one Lithium Coin Battery
- DC power connector 2.1mm by 5.5mm. The central pin is positive polarity.

The board dimension is 145 mm by 145 mm

3.1 Jumpers

Jumper	Description
J19	Connect/Disconnect the 3.0V battery backup. default: open
J20	Forces power on. To use the software shutdown control, J20 must be opened and the battery backup J19 must be closed. default: close
J21	Boot mode select: open – the CPU boots from the internal ROM close – the CPU boots from the NOR Flash default: close
J22	Enable 120 ohms CAN bus resistance termination default: open

3.2 Electrostatic Warning

The BB9263 Module is shipped in protective anti-static packaging. The board must not be subjected to high electrostatic potentials. A grounding strap or similar protective device should be worn when handling the board. Avoid touching the component pins or any other metallic element.

3.3 Requirements

The BB9263 requires DC power supply 5V / 1A. The DC power connector is 2.1mm by 5.5mm; the central pin is positive polarity.

The board has reverse voltage protection.

For more information please see the board schematics on the DVD.

4 Getting started

The EB9263 is delivered with a DVD containing all necessary and step-by-step procedure for working with the GNU development tools.

Please refer to this DVD, or to the Ronetix web site, for the most up-to-date information:

<http://download.ronetix.info>

4.1 Getting started with Linux

To get started with U-BOOT and Linux, please read the U-BOOT and Linux Kernel readme from the DVD or from here:

<http://download.ronetix.info/boards>

4.2 Getting started with a standalone example under Windows

To get started with a standalone example under Windows, please read the “Software Installation Guide” from the DVD or from here:

<http://download.ronetix.info/boards>

5 Differences between PM9263 and Atmel AT91SAM9263-EK

	AT91SAM9263-EK	PM9263
Quartz Oscillator	16.367660MHz	18.432MHz
Signal NAND Ready/Busy	PA22	PB30
LCD CONTROL IN (PIN35)	PA30	PA22
EtherPHY	Davicom DM9161A	National DP83848
LEDs	PC29, PB8, PB7	PB7,PB8
Boot Memory	DataFlash, NAND	NOR, DataFlash, NAND
Touchscreen	SPI0_NPCS3-PB11 SPI0_SPCK-PA2 SPI0_MOSI-PA1 SPI0_MISO-PA0	SPI1_NPCS0-PB15 SPI1_SPCK-PB14 SPI1_MOSI-PB13 SPI1_MISO-PB12
MMC Card Detect	PE18	PA21
MMC Write Protect	PE19	PA16