MYC-JA5D4X CPU Module

- *600MHz Atmel SAMA5D42/44 ARM Cortex-A5 Processors*
- *512MB DDR2 SDRAM*
- *512MB Nand Flash, 4MB Data Flash, 64KB EEPROM*
- *On-board Ethernet PHY*
- *DDR2 SO-DIMM 200-pin Expansion Connector*
- *Ready-to-Run Linux 3.18 Controller Board*

Figure 1-1 MYC-JA5D4X CPU Module (Top-view)

Measuring only 67.6mm by 45mm, the tiny MYC-JA5D4X series CPU Modules are highly-integrated Linux-ready SOM (System on Modules) cards ideal for your next embedded design. It is based on Atmel's SAMA5D4 series ARM Cortex-A5 MPUs which can operate at 600MHz (945DMIPS). Compared to the previous Cortex-A5 SoC from Atmel, the SAMA5D3, the SAMA5D4 brings a L2 cache, NEON, a slightly different clock tree, a hardware video decoder, and Trustzone support. Additionally, the MYC-JA5D4X module has 512MB DDR2 SDRAM, 512MB Nand Flash, 4MB Data Flash, 64KB EEPROM and Ethernet PHY on board and is equipped with one SO-DIMM 200-pin connector to bring out all the I/O signals from the CPU Module. It is ideal for any high-performance, low-power and cost-sensitive industrial application such as control panels/HMI, fitness equipment, smart grid infrastructure, communications gateways, imaging terminals and more.
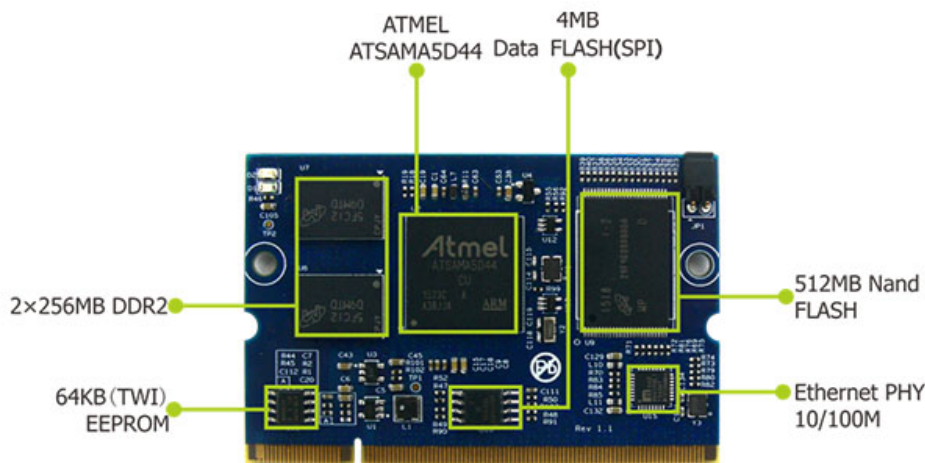

Figure 1-2 MYC-JA5D4X CPU Module

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The MYC-JA5D4X series CPU Modules allow two selections of Atmel SAMA5D42 and SAMA5D44 processors. The only difference between the two processors is that the SAMA5D44 supports Hardware video decoder while the SAMA5D42 cannot. MYIR provides comprehensive documents and ready-to-run software packages for running Linux 3.18 operating systems on the MYC-JA5D4X series modules.

MYIR offers a development board MYD-JA5D4X for evaluation and prototyping based on Atmel SAMA5D4 solutions. The board is using the MYC-JA5D4X as core controller to be mounted on the specific designed base board, delivering a rich set of peripherals and user interfaces including serial ports, USB Host/Device, Ethernet ports, RS485, TF card slot, Audio in/out, HDMI, LCD, Camera interface, etc.
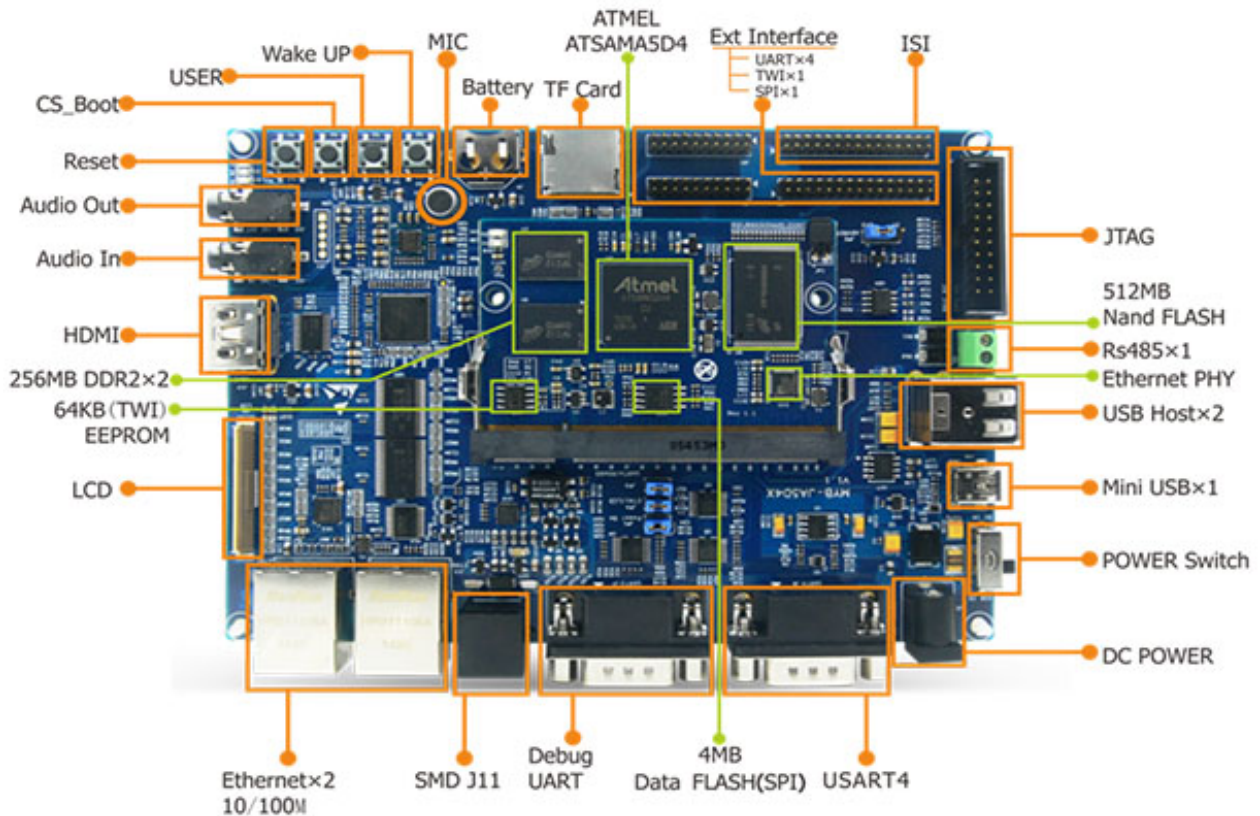

Figure 1-3 MYD-JA5D4X Development Board

MYIR also provides custom design services, we can help with your base board design based on the MYC-JA5D4X CPU module rapidly; we can also modify on existing hardware, whether reducing, adding or removing functions according to your requirements.

Hardware Specifications

The Atmel | SMART SAMA5D4 MPU is ideal for any high-performance, secure, and cost-sensitive industrial application. High-speed computing needs are supported by ARM Neon and a 128kB L2 cache that increases the overall system performance. The SAMA5D4 is an ideal fit for low-cost user interface applications that require video playback. The high-grade security features allow you to protect any system against counterfeiting and software theft, while also enabling you to securely store and transfer data.

Benefits

- ARM® Cortex®-A5 running at 600Mhz (945DMIPS).
- ARM Neon for high-precision computing and acceleration of complex algorithms including multimedia.
- 128KB of L2 cache for system performance.
- 720p hardware video decoder supporting H264/263, VP8, JPEG.
- Graphic LCD TFT controller with overlays for image composition.
- CMOS image sensor interface.
- Three High Speed USB ports (configurable as three hosts or two hosts and one device port).
- Dual EMAC 10/100 with IEEE1588 support.
- Advanced security features to prevent counterfeiting, secure external communication, and authenticate the system:
  - On-the-fly encryption/decryption of code from external DDR.
  - Encryption engines supporting AES/3DES, RSA, ECC - TRNG, SHA.
  - Tamper detection pins.
  - Memory content protection (secure key storage).
- BGA289 and BGA361 in 0.8mm pitch.

Device	Package	Video Decoder	DDR Databus Width
ATSAMA5D44	TFBGA361 (16 x 16, 0.8mm)	Yes	16-bit/32- bit
ATSAMA5D43	LFBGA289 (14 x 14, 0.8mm)	Yes	16-bit
ATSAMA5D42	TFBGA361 (16 x 16, 0.8mm)	No	16-bit/32-bit
ATSAMA5D41	LFBGA289 (14 x 14, 0.8mm)	No	16-bit

Table 1-1 SAMA5D4 Series Devices

The MYC-JA5D4X CPU Module is built around the SAMA5D4 processor with some core components including DDR2, Nand Flash, Data Flash, EEPROM, and Ethernet PHY integrated to be served as the controller board of embedded products. The CPU Module is characterized as below:

Mechanical Parameters

- Dimensions: 67.6mm x 45mm
- PCB Layers: 8-layer design
- Power supply: +3.3V/2A
- Working temperature: 0~70 Celsius (commercial grade) or -40~85 Celsius (industrial grade)

Processor

- Atmel SAMA5D42 or SAMA5D44 ARM Cortex-A5 Processor

Memory

- 512MB DDR2 SDRAM
- 512MB Nand Flash

- 4MB Data Flash
- 64KB EEPROM

Peripherals and Signals Routed to Pins Processor

- On-board Ethernet PHY
- One power indicator (Red LED)
- One user LED (Blue)
- DDR2 SO-DIMM 200-pin connector brings out below peripheral signals:
  - 2 x Ethernet
  - 3 x USB2.0 Host
  - 8 x Serial ports
  - 4 x TWI
  - 3 x SPI
  - 5 x 12-bit ADC
  - 1 x SMD
  - 4 x 4-bit SDIO
  - 1 x LCD
  - 1 x ISI
  - 7 x GPIOs

Signals Routed to SO-DIMM 200-pin Connector

MYIR has designed a base board for the MYC-JA5D4X CPU Modules. The CPU Module is equipped with one SO-DIMM 200-pin connector which provides an interface to bring out all the I/O signals to or from the CPU Module and extended through the base board. Please refer to the file from below link to know signals routed to the pins.

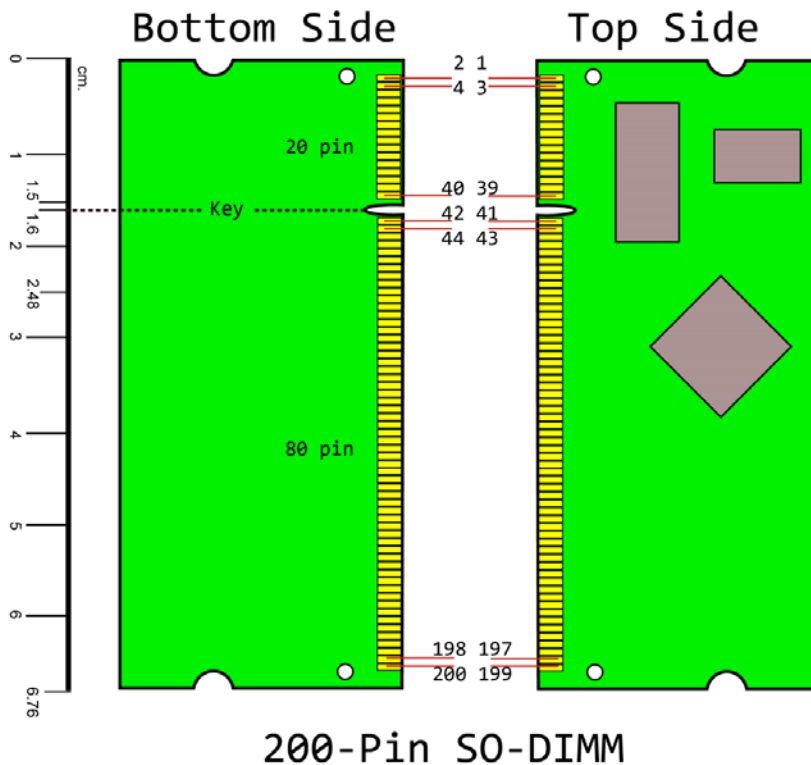http://www.myirtech.com/download/SAMA5D4/MYC-JA5D4X_Pinouts.pdf

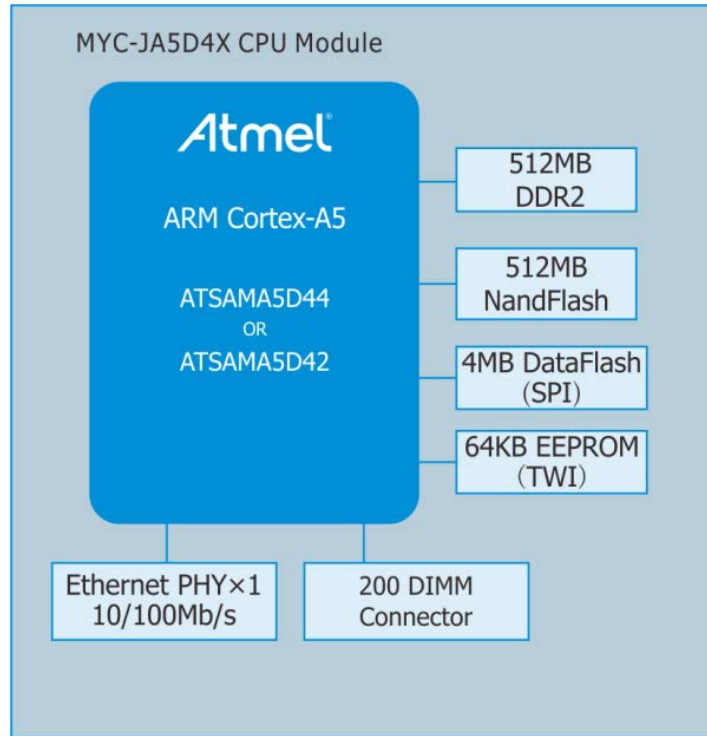*Figure 1-4 MYC-JA5D4X CPU Module Pin Map*

Function Block Diagram

Figure 1-5 MYC-JA5D4X Function Block Diagram

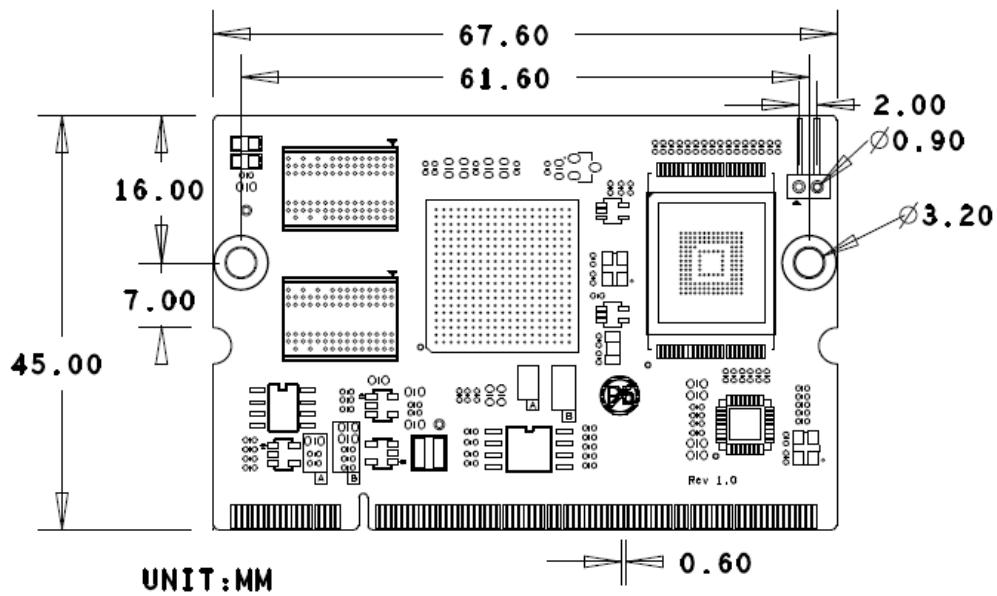**Dimension Chart of MYC-JA5D4X**

Figure 1-6 Dimensions of MYC-JA5D4X

Software Features

MYIR has provided Linux software packages for the MYC-JA5D4X CPU Modules. Please see the features below:

Category	Name	Description	Source code provided
Boot loader	Bootstrap	First boot program, init RAM and load u-boot	yes
	U-boot	Secondary boot program, is responsible for system initialization and boot kernel 1. Support network to download images 2. Support settings, save the environment variable 3. Support memory content display, contrast, modify 4. Support bootcmd, bootargs	yes
Kernel	Linux 3.18	Custom for MYD-JA5D4X hardware	yes
Drivers	USB Host	USB Host driver, support OHCI and EHCI	yes
	USB Device	USB Device driver	yes
	Ethernet	Ethernet driver	yes
	MMC/SD	MMC/SD driver	yes
	Nand Flash	Nand Flash driver	yes
	I2C(TWI)	I2C driver	yes
	SPI	SPI driver	yes
	WDI	Watch Dog driver	yes
	LCD Controller	LCD driver, for 4.3 inch, 7 inch	yes
	RTC	RTC clock driver	yes
	Touch Screen	Resistive/capacitive touch screen driver	yes
	PWM	PWM (Pulse Width Modulation) driver	yes
	UART	Serial driver	yes
	ADC	ADC driver	yes
	LED	LED driver, GPIO LED and PWM LED	yes
	GPIO	GPIO driver	yes
	HDMI	HDMI driver	yes
Filesystem	rootfs	Base on build root	Bin
	rootfs-qt	Qt file system	Bin
Applications	Key&LED	Key&LED test program	yes
	NET	TCP/IP Sokect C/S test program	yes
	RTC	RTC clock testing experiment	yes
	I2C(TWI)	i2c-dev application interface demo	yes
	EEPROM	EEPROM Application interface demo	yes
	RS485	RS485 test program	yes
	RS232	RS232 test program	yes
	Audio	Audio test program	yes
	Framebuffer	Display demo	yes

Table 1-1 MYC-JA5D4X Software Features

Order Information

Product Item	Part No.	Packing List
MYC-JA5D42 CPU Module	MYC-JA5D42-512N512D-C	➢ One MYC-JA5D4X CPU Module ➢ One Product DVD (including user manual, datasheet and software packages)
MYC-JA5D44 CPU Module	MYC-JA5D44-512N512D-C	
MYD-JA5D42 Development Board	MYD-JA5D42-512N512D-C	
MYD-JA5D44 Development Board	MYD-JA5D44-512N512D-C	**Add-on Options**
MY-LCD43TP 4.3-inch LCD Module	MY-TFT043RV2	➢ MYD-JA5D4X Development Board
MY-LCD70TP 7-inch LCD Module	MY-TFT070RV2	➢ MY-LCD43TP 4.3-inch LCD Module
MY-LCD70TP-C 7-inch LCD Module	MY-TFT070CV2	➢ MY-LCD70TP 7-inch LCD Module ➢ MY-LCD70TP-C 7-inch LCD Module
MY-SODIMM200 Socket	MY-SODIMM200	➢ MY-SODIMM200 Socket

Remark:
1. Discount is available for mass orders. Please contact MYIR for inquiries.
2. Our products are delivered of commercial grade (0~70 Celsius) by default. . If customer needs boards of industrial grade (-40~85 Celsius), or you may need boards with other RAM, Flash configurations, please inquire MYIR for availability and prices.

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