



Sam460ex User Guide

version 1.1 – 31 Dec 2010

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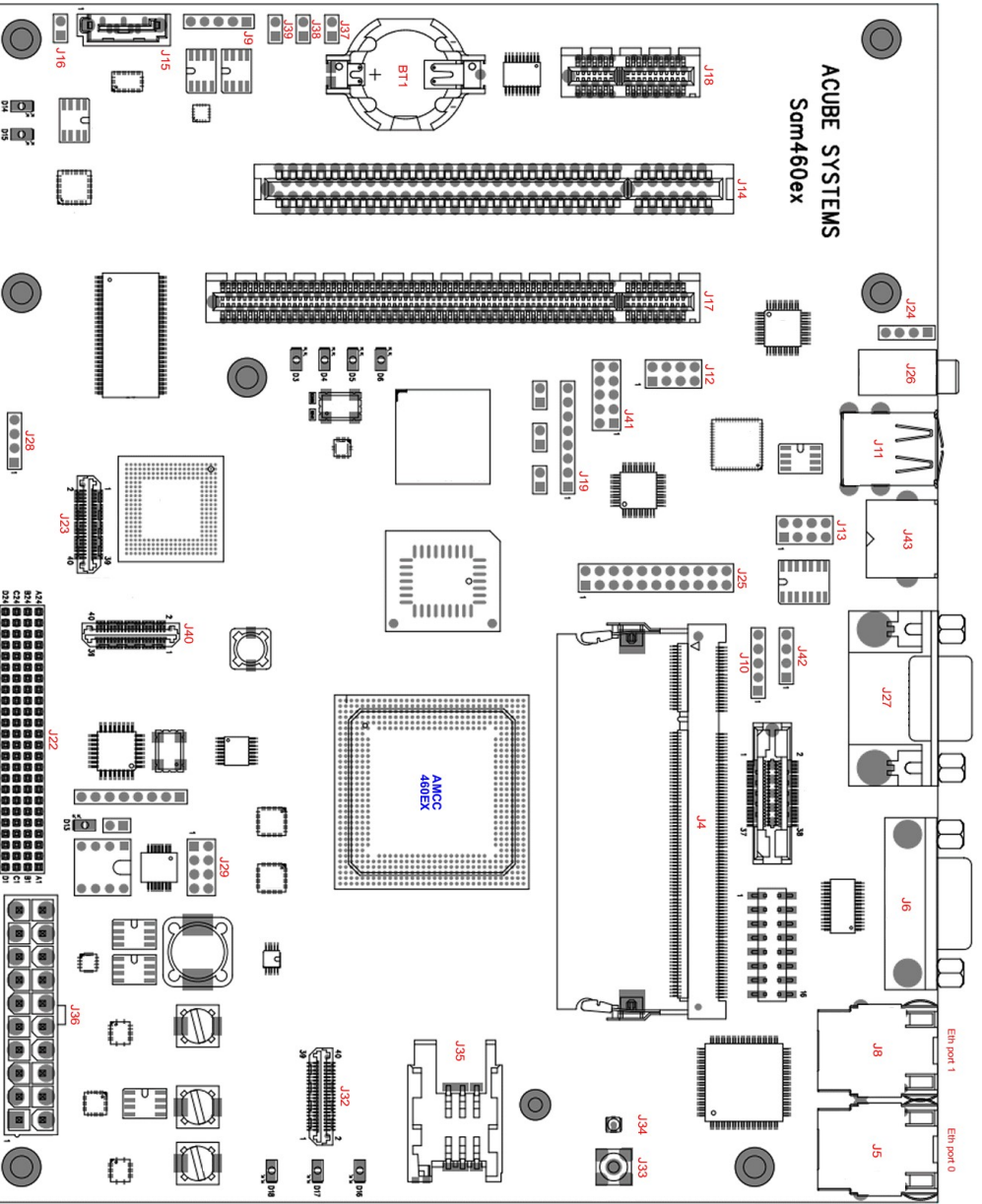
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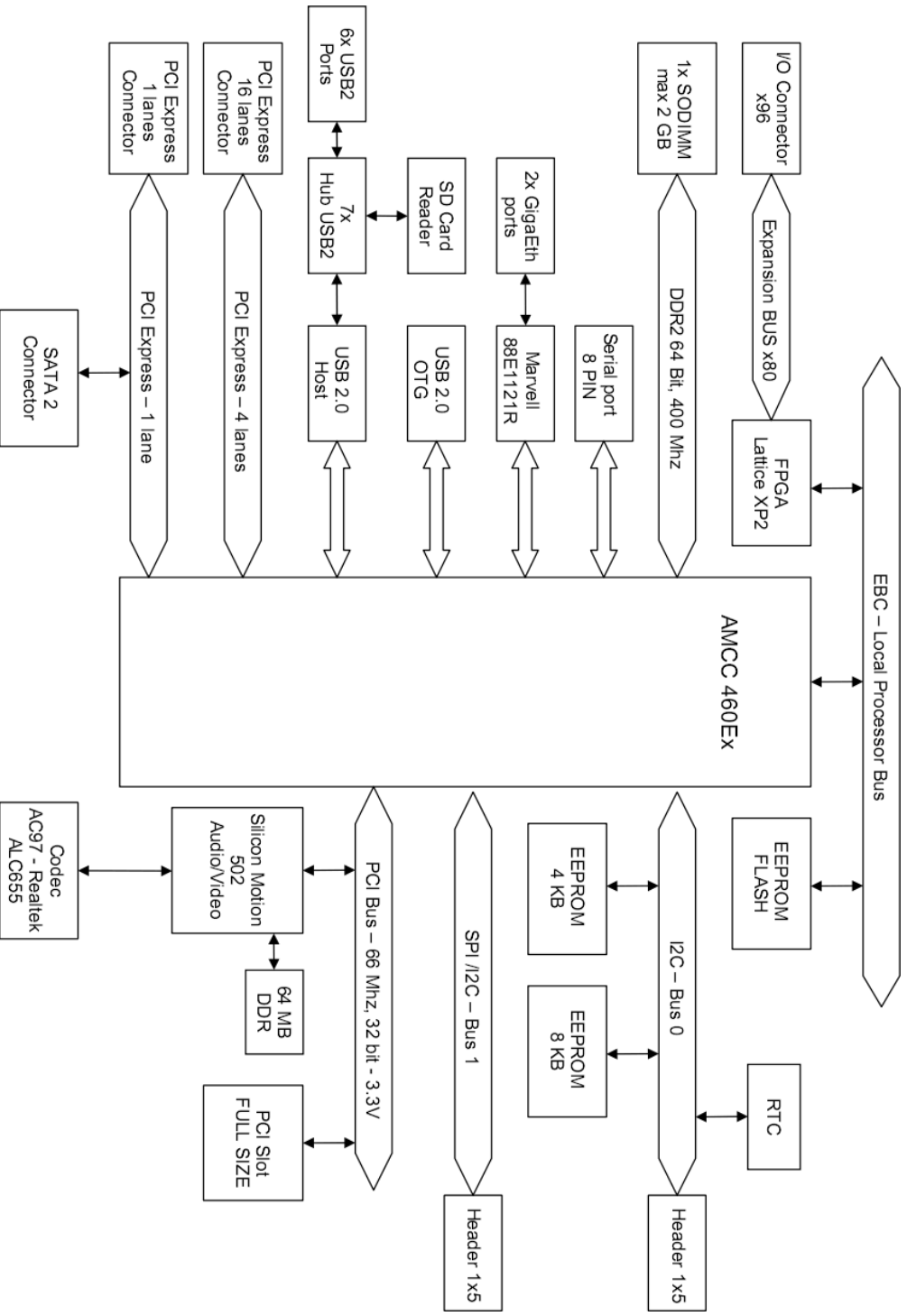
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ACUBE SYSTEMS Sam460ex





Introduction

Your Sam460ex board is ready to go.

Just connect a hard drive, monitor, mouse and keyboard, and switch it on!

It can be housed into a flex-ATX, micro-ATX or full ATX computer case.

The use of a good quality ATX power supply is strongly advised for a correct operation of the board.

Sam460ex Hardware Specifications

- flex-ATX form factor (21.6 x 17 cm)
- 8 layers PCB
- AMCC 460ex SoC – upto 1.150 Ghz
- max 2 GB DDR2 Ram – 200-pin SODIMM
- Silicon Motion SM502 embedded MoC (audio/video) max 64MB Gfx RAM
- Audio 5.1 Realtek ALC655 codec
- PCI-express 4x lanes slot (16x mechanical connector)
- PCI-express 1x lane slot (* check notes)
- PCI slot, 32 bits, 33/66 Mhz, 3.3V
- 1x SATA2 port (* check notes)
- 6x USB2 EHCI/OHCI ports + 1 USB1.1 port
- 1x 10/100/1000 Ethernet port (another 10/100/1000 Ethernet port is optional)
- Lattice XP2 FPGA with 80 I/O pins expansion connector (connector is optional)
- UMTS/GSM module (optional requires add-on card)
- 512 MB NAND Flash (optional)
- integrated SD card reader
- RTC clock
- Serial port, 8-wires
- I2C and SPI/I2C buses
- passive cooling
- U-Boot 2010.06

Connectors

Case panel connector (near the ATX Power connector) - J29

- 1-2 HD led
- 3-4 Power led
- 5-6 Power Switch
- 7-8 Reset Switch

Note: on computer cases with a single switch off/reset button, connect the button to pins 5-6 on J29. To reset the board, press shortly the button. To switch it off, keep pressed the button for 2-3 seconds.

ATX Power connector - J36

RAM (DDR2 - 200-pin SODIMM) max 2 GB – J4 (we suggest the use of a 667/800 Mhz module)

USB

J11 - External USB ports (EHCI/OHCI)

J12, J13 - Internal USB ports (EHCI/OHCI)

J28 - Internal USB Port (OHCI)

J12a (port 3)	1 – VCC 3 – D- 5 – D+ 7 – GND	J12b (port 4)	2 – VCC 4 – D- 6 – D+ 8 – GND	J13a (port 5)	1 – VCC 3 – D- 5 – D+ 7 – GND	J13b (port 6)	2 – VCC 4 – D- 6 – D+ 8 – GND	J28 (port 7)	1 – VCC 2 – D- 3 – D+ 4 – GND
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Video

J23 - LVDS

J27 - VGA

J40 - Zoom Video port

J42 - add-on card

J43 - SVideo in-out (requires add-on card)

Audio

J24 - Audio in (DVD/CD)

J25 - Audio expansion port

J26 - Audio out (stereo jack)

J41 - Audio front panel AC97

1 - Mic	2 - GND
3 - VREF OUT	4 - NC
5 - Right	6 - Line in L
7 - NC	8 - NC
9 - Left	10 - Line in R

Ethernet

J5, J8 - Dual 10/100/1000 Ethernet ports

SATA2

J15 - SATA2 port

J16 - SATA2 or PCI-e 1x selector

Miscellaneous

J6 - Serial port (8-wires)

J9 - I2C bus port

J10 - SPI/I2C bus port

1 – SCLK	1 – I2C SCLK / SPI SCL
2 – 3.3V	2 – 3.3V
3 – SDATA	3 – I2C SDATA / SPI SDA
4 – GND	4 – GND
5 – NC	5 – SPI SDO

J19 - Lattice XP2 FPGA JTAG

J22 - Lattice XP2 FPGA expansion connector (80 I/O pins available)

J31 - SD card: (solder side)

J32 - UMTS module

J33, J34 - Antenna (UMTS)

J35 - SIM socket (UMTS)

J37 - service (factory setting: open)

J38 - service (factory setting: closed)

J39 - service (factory setting: closed)

Boot

The current U-Boot version supports booting from the following devices:

- SATA hard disk connected on the onboard SATA2 controller port J15 (* check notes)
- PATA hard disk and/or DVD connected to a Silicon Image 0680 controller on PCI slot (*)
- SATA hard disk and/or DVD connected to a Silicon Image 3512 controller on PCI slot (*)
- SATA hard disk and/or DVD connected to a Silicon Image 3114 controller on PCI slot (*)
- USB mass storage
- internal SD card reader J31
- Network

(*) check page 7 on how to recognize a suitable PCI card for your Sam460ex

Video output

The current U-Boot version supports video output from:

- onboard SM502 VGA port
- Radeon card on PCI slot
- Radeon card on PCI-Express slot

To change the preferred video output, select it from the “Video Option” U-Boot menu.

To suppress most of the boot messages, select “Silent” in the “Console” U-Boot menu.

Notes

1 - the SATA2 port and the PCI-e 1x slot are mutually exclusive, only one of them can be used at a time:

- to use the SATA2 port, close **J16** with a jumper, and select the corresponding entry in the "PCI-E 1x / SATA-2" U-Boot menu.
- to use the PCI-e 1x slot, remove the **J16** jumper, and select the corresponding entry in the "PCI-E 1x / SATA-2" U-Boot menu.

A reboot is required.

2 - the Sam460ex board is built to work standalone in a fanless environment but particular care must be taken when housing the board in a closed metallic cabinet with other electronic devices (such as hard drives, CD/DVD, DC-DC converter etc..)

In these cases, ensure to have free circulation of fresh air inside the cabinet, via holes or a small fan.

3 - when using a PCI-Express graphic card, we suggest to use a Radeon HD2400 or newer models. Older models like X600, X800 are not fully compatible with the Sam460ex and may not work. Some X1550 cards are reported to work OK.

4 – after switching OFF the board, it's **strongly advised** to wait at least **15 seconds** before switching it ON again, otherwise the onboard devices may not work correctly. The current firmware doesn't allow to switch on the board again after 3 seconds.

5 – the onboard graphic card has a max resolution of 1280x1024 pixels (4:3) or 1440x900 pixels (16:9).

Support DDC, 2D hardware acceleration, hardware sprite (3 colors) and PIP.

There is no support for 3D or compositing.

Some Operating Systems may limit color resolution to 8 and 16 bits.

Frequently Asked Questions

How to use more than one SATA drive?

The Sam460ex is made both for embedded and consumer markets. It can be adapted to different needs. As an example, a customer who wants a board for home use will probably choose to add a SATA controller on a PCI card. This will allow up to four SATA drives. ACube may provide such expansion boards.

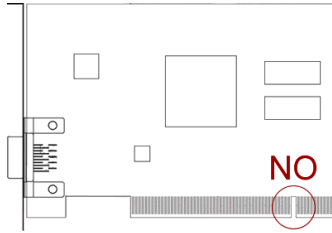
How can the Operating System be loaded?

It is possible to load the operating system from a PATA/SATA harddisk, a CDROM connected on PATA/SATA, an USB key, a SD card or from the network.

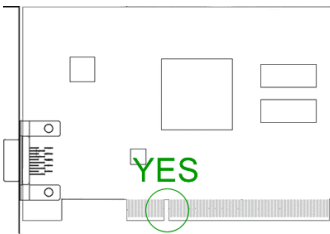
How to enable DMA for SATA devices?

Check the documentation which comes with the Operating System on how to enable DMA for SATA devices. By default, all devices are set to PIO mode (slow)

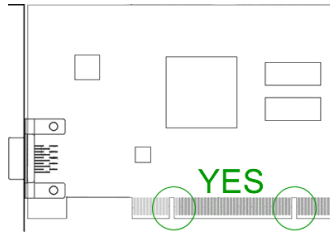
Warning: the PCI slot is compatible with 3.3V PCI card **only**. Inserting a 5.0V PCI card will damage the Sam460ex board !!
Do not try to reverse a 5.0V PCI board to fit it into the 3.3V PCI slot, it will damage your board !!



5V compatible PCI card – DON'T use it



3,3V compatible PCI card – OK



3,3V and 5V compatible PCI card – OK



Products for free minds



Please check your local regulations for disposal of electronic devices