Sam440ep-flex
User Guide

version 0.2 – 22 May 2009

Please check you local regulations for disposal of electronic devices

Welcome

Thanks for buying an ACube Systems motherboard!
Your Sam440ep-flex board is ready to go. Just connect a PCI graphics card, a hard drive, monitor, mouse and a keyboard, and switch it on! It can be housed into a flex-atx, micro-atx and full ATX computer case.
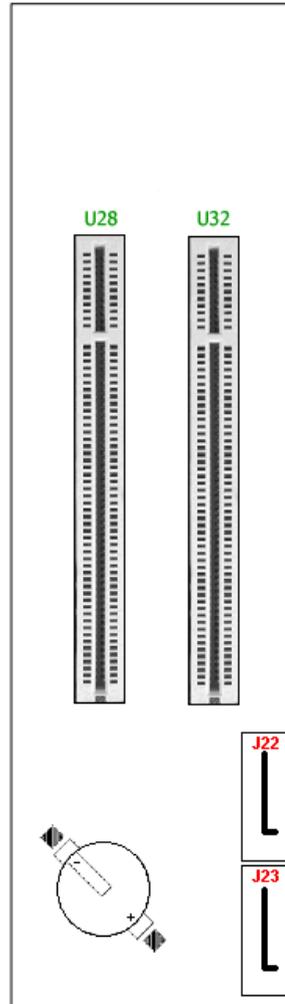
Enjoy our products!

1. Package

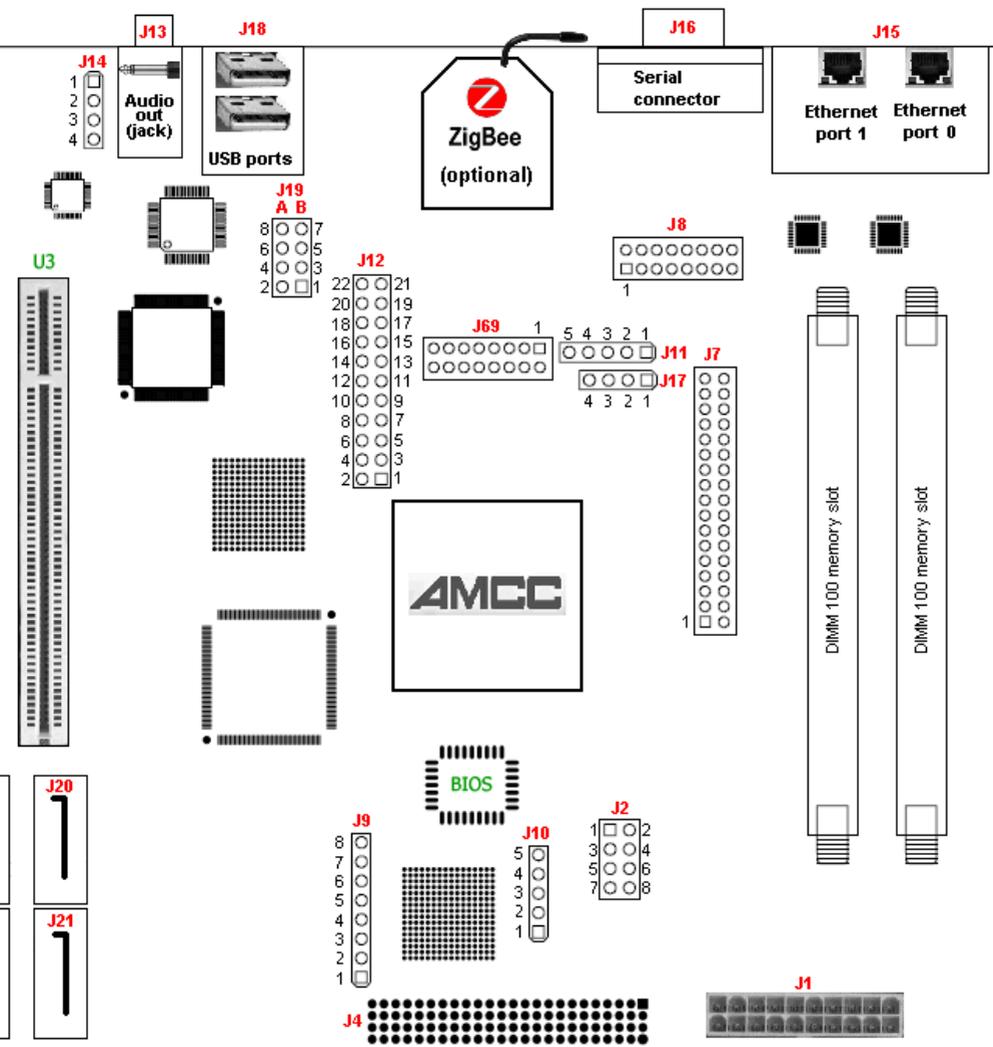Check your motherboard packaging for the following items:

Motherboard	Sam440ep-flex
Cables	2 x Sata cables
Documentation	User Guide

2. Features

• PowerPC AMCC 440ep	Power
• DDR Ram	
• Serial ATA 1.5 Gb/s	SERIAL ATA
• USB 2.0	HI-SPEED CERTIFIED USB
• Lattice XP FPGA	Lattice Semiconductor Corporation
• Rohs compliance	Pb lead-free ✓ RoHS 2002/95/EC
• ZigBee module (optional)	

U28   U32

J22

J23

Note that

J13 J18 J16 J15

J14
1
2
3
4
Audio out (jack)

USB ports

ZigBee (optional)

Serial connector

Ethernet port 1   Ethernet port 0

U3

J19
A B
8 7
6 5
4 3
2 1

J12
22 21
20 19
18 17
16 15
14 13
12 11
10 9
8 7
6 5
4 3
2 1

J69   1

J8
1

5 4 3 2 1
J11
J17
4 3 2 1

J7
1

DIMM 100 memory slot   DIMM 100 memory slot

AMCC

BIOS

J20

J21

J9
8
7
6
5
4
3
2
1

J10
5
4
3
2
1

J2
1 2
3 4
5 6
7 8

J1

J4

any component not shown in this picture is for internal use only.

3. Sam440ep-flex hardware specifications
- Flex-atx form factor (216 x 170 mm)
- 533/667 Mhz PowerPC AMCC 440ep CPU
- 2 DIMM module slots. Max 1 GB.
- Serial ATA Silicon Image 3114 controller - 4 ports (PCI 66 Mhz)
- Pericom 8150B PCI to PCI bridge
- Audio 5.1 onboard, CS 4281 and Realtek ALC655 codec (PCI 33 Mhz)
- USB 2.0 OHCI/EHCI NEC PCI controller (2 external ports, 2 internal ports)
- 3 PCI expansion slots, 32 bits, (1 x 66 Mhz, 2 x 33 Mhz), 3.3V
- Dual 10/100 Ethernet controller
- LatticeXP FPGA with 80 I/O pins expansion connector
- RTC clock
- Serial port
- I2C and SPI/I2C buses
- Optional ZigBee module

4. Rear panel connectors

Ethernet
J15 – Lan ports 0 and 1
Note that the connector which is closer to the end of the board is considered as unit 0. The other port is unit 1.

Serial
J16 – Serial port
Note that the serial line is made of 4 wires: Tx, Rx, RTS, CTS.

USB
J18 – USB 2.0 ports 1 and 2
These 2 ports support EHCI/OHCI protocols.

Audio
J13 – Audio out
The audio connector has a jack stereo format.

5. Internal connectors
Case panel connector: J2

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

USB

Internal USB ports: J19 (EHCI/OHCI) and J17 (OHCI only)

J19a (port 3)	1 – VCC		J17 (port 5)	1 – VCC
	3 – D-			2 – D-
	5 – D+			3 – D+
	7 – GND			4 – GND

J19b (port 4) 2 – VCC
4 – D-
6 – D+
8 – GND

Audio

Audio in: J14 (DVD/CD)

Audio expansion port: J12

1 – 3.3 V	2 – 5 V
3 – SPDIFI	4 – SPDIFO
5 – MIC1	6 – LINE_IN_L
7 – JD0	8 – JD2
9 – MIC2	10 – LINE_IN_R
11 – SURR_L	12 – PCIM_OUT
13 – SURR_R	14 – PCIM_IN
15 – AUX_L	16 – CEN_OUT
17 – AUX_R	18 – LFE_OUT
19 – FMIC	20 – VREFOUT
21 – GND	22 – GND

SATA ports: J20 (Hard Disk), J23 (DVD/CD), J21, J22

PCI slots
U3 – PCI slots running at 66 Mhz
U28 – PCI slots running at 33 Mhz
U32 – PCI slots running at 33 Mhz

For better performance we suggest to use the U3 slot for plugging a graphics card.

RAM slots
Both memory slots are the same. In case only one memory module is used, it can be installed in either one.

Misc
ATX Power connector: J1

Cpu JTAG: J8
LatticeXP FPGA JTAG: J9
LatticeXP FPGA expansion connector: J4 (80 I/O pins available)

I2C bus port: J10
            1 – SCLK
            2 – 3.3V
            3 – SDATA
            4 – GND
            5 – NC

SPI/I2C bus port: J11
            1 – I2C SCLK / SPI SCL
            2 – 3.3V
            3 – I2C SDATA / SPI SDA
            4 – GND
            5 – SPI SDO

GPIO: J7

6. Firmware

Note: the 1.3.1 Uboot version shipped with the board is under constant development. Currently there are a few limitations, which may be resolved in future updates.

To use an USB keyboard under UBoot, it needs to be attached to the upper external USB port (J18) or internal header J19A.

Uboot currently handles only 2 SATA ports from which you can boot. It means that you must connect devices you want to boot from on J20 and J23 only.
Obviously, other devices will be recognised when the operating system is loaded.

7. Instructions

There is a blue led near the J21 Sata connector. When this led is lit, the board is under power. When the board is switched on, this led should go off and the power led on the computer case should light on.

If you encounter a problem using your board, please contact your dealer. He is very qualified to fix any issues.
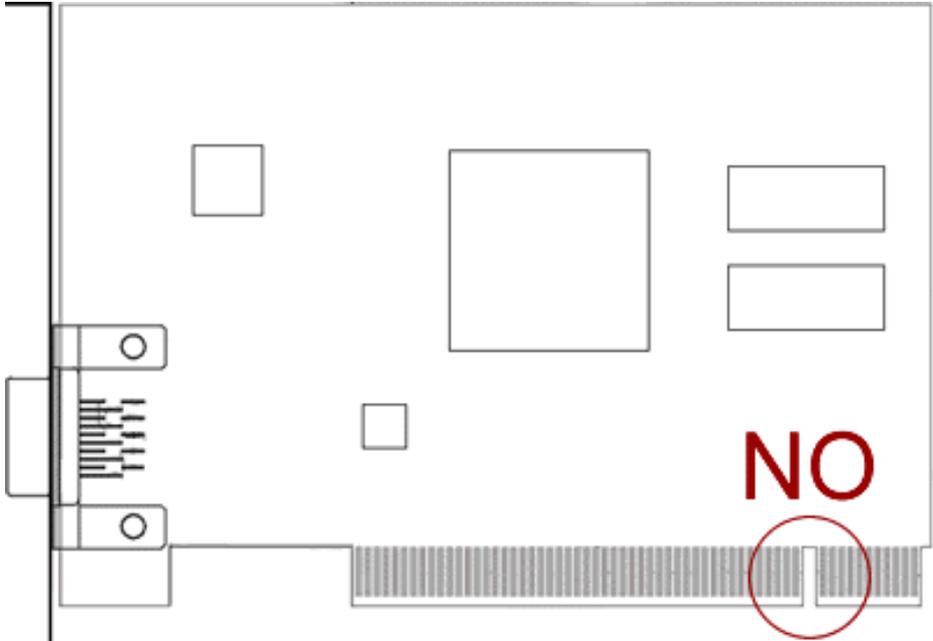
8. Safety Information

ALWAYS DISCONNECT ALL POWER CABLES BEFORE CONNECTING OR REMOVING CABLES FROM THE MOTHERBOARD.
Also make sure that your power supply is set to the correct voltage in your area.
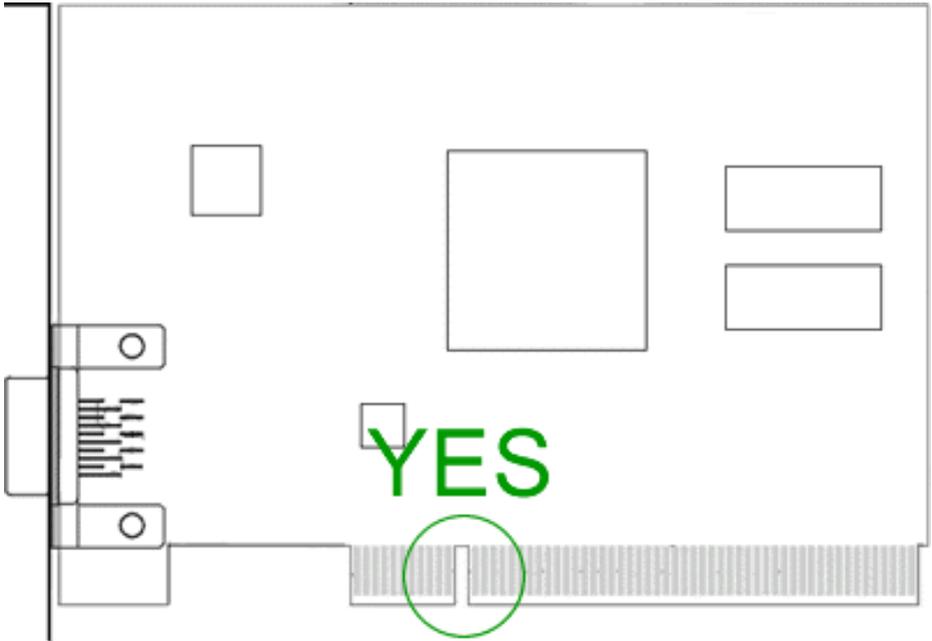
9. PCI SLOTS

Warning: the PCI slots are compatible with 3.3V PCI cards only. Inserting a 5.0V PCI card will damage the Sam440ep-flex board!!
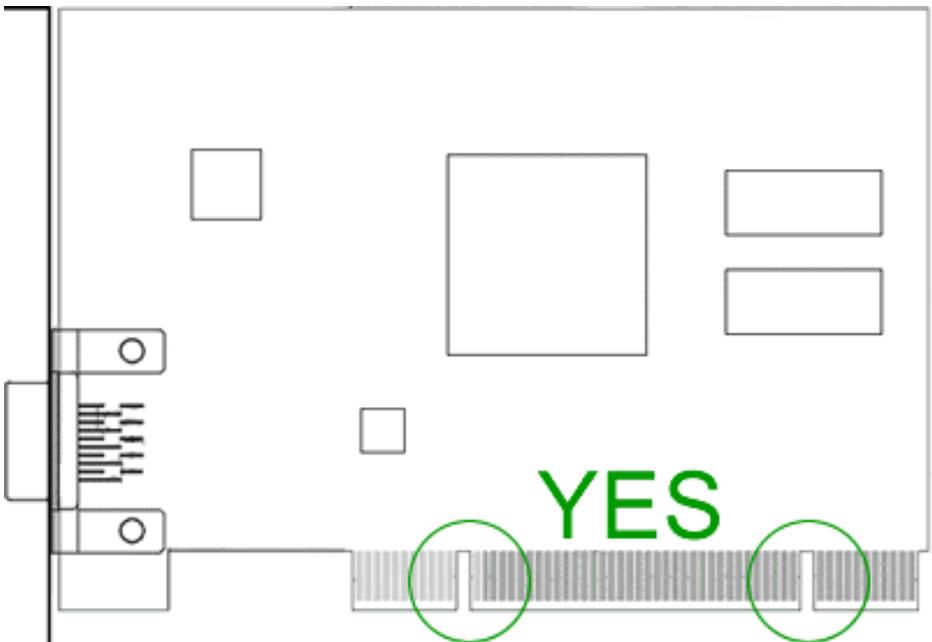Do not try to reverse a 5.0V PCI board to fit it into the 3.3V PCI slot, it will damage your board!!

5V compatible PCI card – DO NOT use it

YES

3,3V compatible PCI card – OK

YES

3,3V and 5V compatible PCI card – OK