EMX-G41

Mini-ITX Intel® G41 LGA775 socket for Intel® Core™2 Quad

User's Manual

1st Ed – 27 december 2010

FCC Statement

THIS DEVICE COMPLIES WITH PART 15 FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE.

(2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS "A" DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FCC RULES.

THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND, IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS.

OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE HARMFUL INTERFERENCE IN WHICH CASE THE USER WILL BE REQUIRED TO CORRECT THE INTERFERENCE AT HIS OWN EXPENSE.

Copyright Notice

Trademark Acknowledgement

Brand and product names are trademarks or registered trademarks of their respective owners.

Disclaimer

Avalue Technology Inc. reserves the right to make changes, without notice, to any product, including circuits and/or software described or contained in this manual in order to improve design and/or performance. Avalue Technology assumes no responsibility or liability for the use of the described product(s), conveys no license or title under any patent, copyright, or masks work rights to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified. Applications that are described in this manual are for illustration purposes only. Avalue Technology Inc. makes no representation or warranty that such application will be suitable for the specified use without further testing or modification.

Life Support Policy

Avalue Technology's PRODUCTS ARE NOT FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE PRIOR WRITTEN APPROVAL OF Avalue Technology Inc.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into body, or (b) support or sustain life and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

A Message to the Customer

Avalue Customer Services

Each and every Avalue's product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Avalue device is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Avalue has come to be known.

Your satisfaction is our primary concern. Here is a guide to Avalue's customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

Technical Support

We want you to get the maximum performance from your products. So if you run into technical difficulties, we are here to help. For the most frequently asked questions, you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone. So please consult the user's manual first.

To receive the latest version of the user's manual; please visit our Web site at:
http://www.avalue.com.tw/

If you still cannot find the answer, gather all the information or questions that apply to your problem, and with the product close at hand, call your dealer. Our dealers are well trained and ready to give you the support you need to get the most from your Avalue's products. In

fact, most problems reported are minor and are able to be easily solved over the phone. In addition, free technical support is available from Avalue's engineers every business day. We are always ready to give advice on application requirements or specific information on the installation and operation of any of our products. Please do not hesitate to call or e-mail us.

Headquarters and Branch

Avalue Technology Inc.

7F, 228, Lian-cheng Road, Chung Ho City, Taipei, Taiwan

Tel:+886-2-8226-2345

Fax: +886-2-8226-2777

Information:sales@avalue.com.tw

Service: service@avalue.com.tw

Avalue USA

Avalue Technology Inc.

200 Tornillo Way, Suite 210, Tinton Falls, NJ 07712

Tel: +1-732-578-0200

Fax: +1-732-578-0250

Information: sales@avalue-usa.com

Service: support@avalue-usa.com

BCM Advanced Research

BCM Advanced Research

an Avalue Company

7 Marconi, Irvine, CA92618

Tel: +1-949-470-1888

Fax: +1-949-470-0971

Information: BCMSales@bcmcom.com

Web: www.bcmcom.com

Avalue Europe

Avalue Europe A/S

Moelledalen 22C, 3140

Aalsgaarde, Denmark

Tel: +45-7025-0310

Fax:+45-4975-5026

Information: sales.europe@avalue.com.tw

Service: service.europe@avalue.com.tw

Avalue China

Avalue Technology Inc.

Room 805, Building 9,No.99 Tianzhou Rd.,

Caohejing Development Area,

Xuhui District, Shanghai

Tel: +86-21-5169-3609

Fax:+86-21-5445-3266

Information: sales.china@avalue.com.cn

Service: service@avalue.com.tw

Avalue Japan

Avalue Technology Inc.

2F keduka-Bldg, 2-27-3 Taito,

Taito-Ku, Tokyo 110-0016 Japan

Tel: +81-3-5807-2321

Fax: +81-3-5807-2322

Information: sales.japan@avalue.com.tw
Service: service@avalue.com.tw

Product Warranty

Avalue warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Avalue, or which have been subject to misuse, abuse, accident or improper installation. Avalue assumes no liability under the terms of this warranty as a consequence of such events. Because of Avalue's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If any of Avalue's products is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time, and freight. Please consult your dealer for more details. If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU type and speed, Avalue's products model name, hardware & BIOS revision number, other hardware and software used, etc.) Note anything abnormal and list any on-screen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information available.
3. If your product is diagnosed as defective, obtain an RMA (return material authorization) number from your dealer. This allows us to process your good return more quickly.
4. Carefully pack the defective product, a complete Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Contents

1. Getting Started

1.1 Safety Precautions

Warning!

Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.

Caution!

Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

1.2 Packing List

Before you begin installing your single board, please make sure that the following materials have been shipped:

Before you begin installing your single board, please make sure that the following parts have been shipped.

- 1 x EMX-G41 Intel® G41 Mini-ITX Module
- 1 x Quick Installation Guide
- DVD ROM containing Drivers and Utilities
- 2 x Sata cable kit(sata/power)
- 1 x Com 9p cable w/o bracket ph:2.00mm
- 1 x No logo printing driver CD (CD-R)
- 1 x AMI bios label
- 1 x I/O shield for IG41-IE1
- 1 x Printer cable d-sub 25P F/2*13P-2.0 17CM

If any of the above items is damaged or missing, contact your retailer.

1.3 Document Amendment History

Revision	Date	Comment
1st	December 2010	Initial Release

1.4 Manual Objectives

This manual describes in detail the Avalue Technology EMX-G41 Motherboard Board.

We have tried to include as much information as possible but we have not duplicated information that is provided in the standard IBM Technical References, unless it proved to be necessary to aid in the understanding of this board.

We strongly recommend that you study this manual carefully before attempting to interface with EMX-G41 series or change the standard configurations. Whilst all the necessary information is available in this manual we would recommend that unless you are confident, you contact your supplier for guidance.

Please be aware that it is possible to create configurations within the CMOS RAM that make booting impossible. If this should happen, clear the CMOS settings, (see the description of the Jumper Settings for details).

If you have any suggestions or find any errors concerning this manual and want to inform us of these, please contact our Customer Service department with the relevant details.

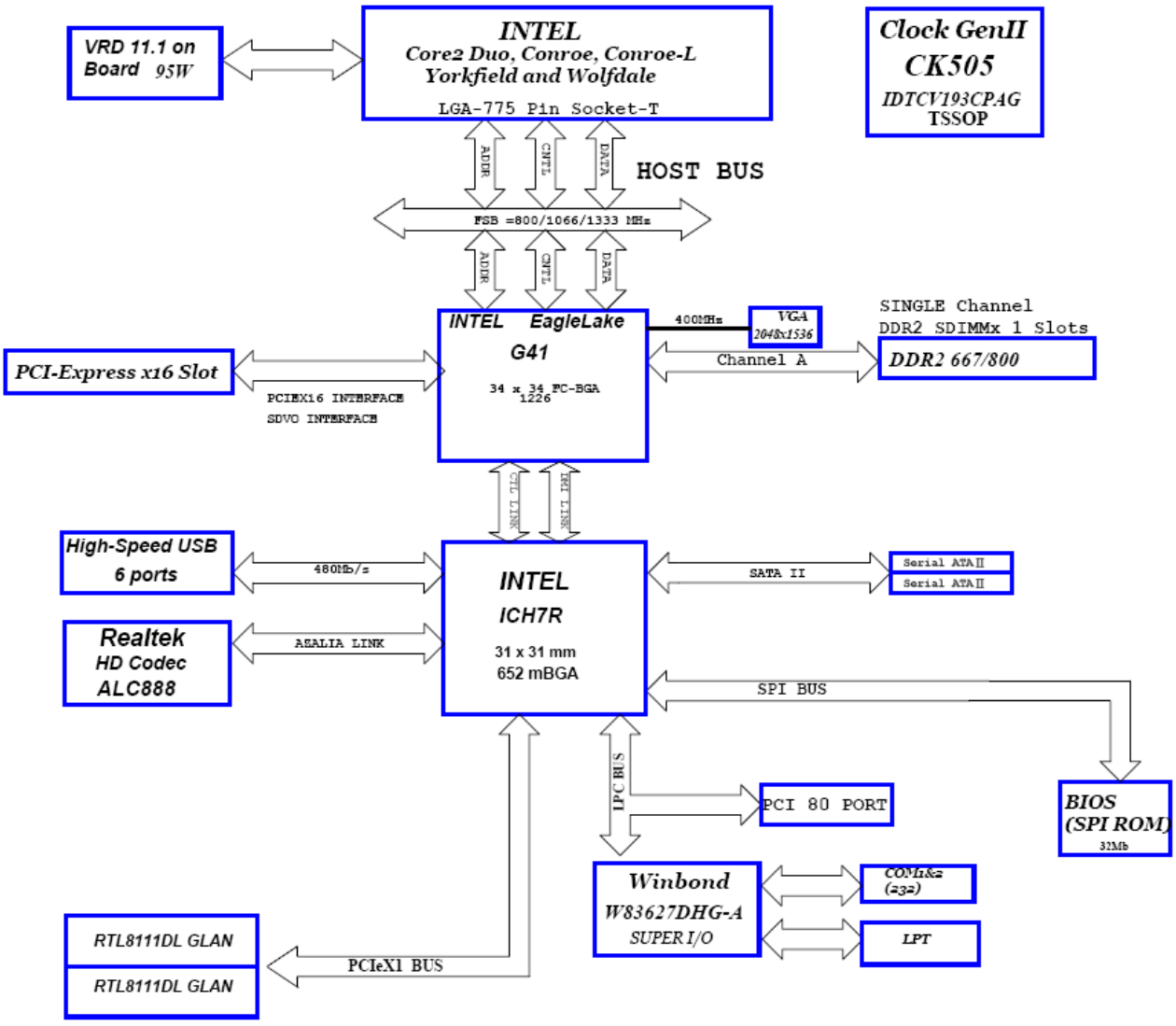
1.5 System Specifications

System	Mini-ITX
CPU	Socket 775 supports Core 2 Quad, Core 2 Duo 45nm CPU Supports CPU FSB 800/1066/1333 MHz
Chipset	Intel® G41 / ICH7R
SIO	Winbond W83627DHG-P
Memory	1 x 240 pin DDR DIMM socket supports DDRII memories 667/800 MHz up to 2GB
Graphic	
Chipset	Intel® Graphics Media Accelerator 4500 integrated
Display Memory	Intel® DVMT 4.0 Support up to 352MB Memory
VGA	2048 x 1536 @ 32bpp (75Hz)
LVDS	N/A
Dual Display	VGA + ADD2
Audio	
Audio Codec	Realtek® ALC888, 5.1 + 2 with Multiple Streaming HD Audio
Audio Interface	Mic in, Line in, Line out
Audio Amplifer	TPA3005D2 Stereo 5Watt per channel
Ethernet	
LAN 1	Realtek RTL8111DL PCI-E GbLAN Controller
LAN 2	Realtek RTL8111DL PCI-E GbLAN Controller
Wake up function	WOL
BIOS	
Core	AMI BIOS
Flash ROM	32MB Flash ROM
Watchdog Timer	Reset: 1 sec.~255 min. and 1 sec. or 1 min./step
H/W Status Monitor	Monitoring temperatures, voltages, and cooling fan status. Auto throttling control when CPU overheats
SmartFan Control	Yes, CPU FAN (by SIO)
Power	
Type	ATX (20+4pin)
Power Management	
ACPI	S1/S3/S4
Internal I/O interface	
USB 1.1/2.0	1 x pin-header support 2 devices (2x5, pitch 2.54mm)
LVDS	N/A
LCD Inverter	N/A

IDE	N/A
CF	N/A
MiniPCI	N/A
PCI-E x16	1 slot
COM (RS-232/422/485)	N/A
Front Audio	1 x pin-header, 2x5, pitch 2.54mm
FAN	1 x 4pin CPU FAN Connector
DIO	8-bit
Rear I/O interface	
PS/2	1 x Mini Din(KB/Mouse)
COM (RS-232)	2 port with 5V/12V power
LPT	1 box-header (2x13, pitch 2.54mm)
VGA	1 x VGA port (DB-15)
USB 2.0	4 x USB 2.0
LAN	2 x RJ45 port
Audio	Audio I/O (3 Jack)
Mechanical	
Form Factor	Mini-ITX
Size (L x W)	170x170mm
Environmental	
Power Requirement	T.B.D.
Operating Temperature	0~60°C
Operating Humidity	0%~90% Relative humidity (Non-condensing)
Certifications	
CE/FCC	Class A
Supported OS	
Windows	Windows XP / Windows 7
Linux	T.B.D.

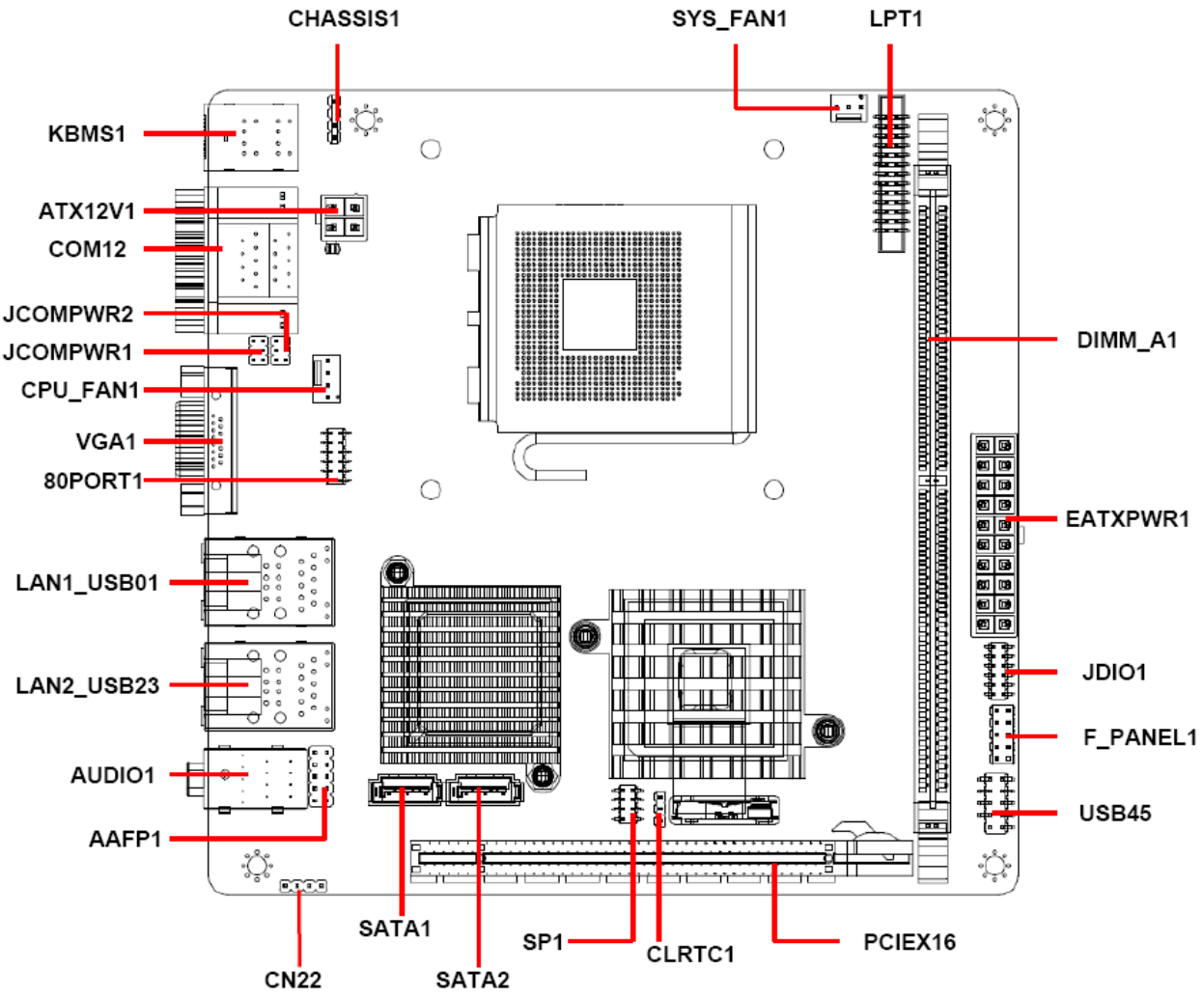
1.6 Architecture Overview – Block Diagram

The following block diagram shows the architecture and main components of EMX-G41.



2. Hardware Configuration

2.1 Product Overview



2.2 Installation Procedure

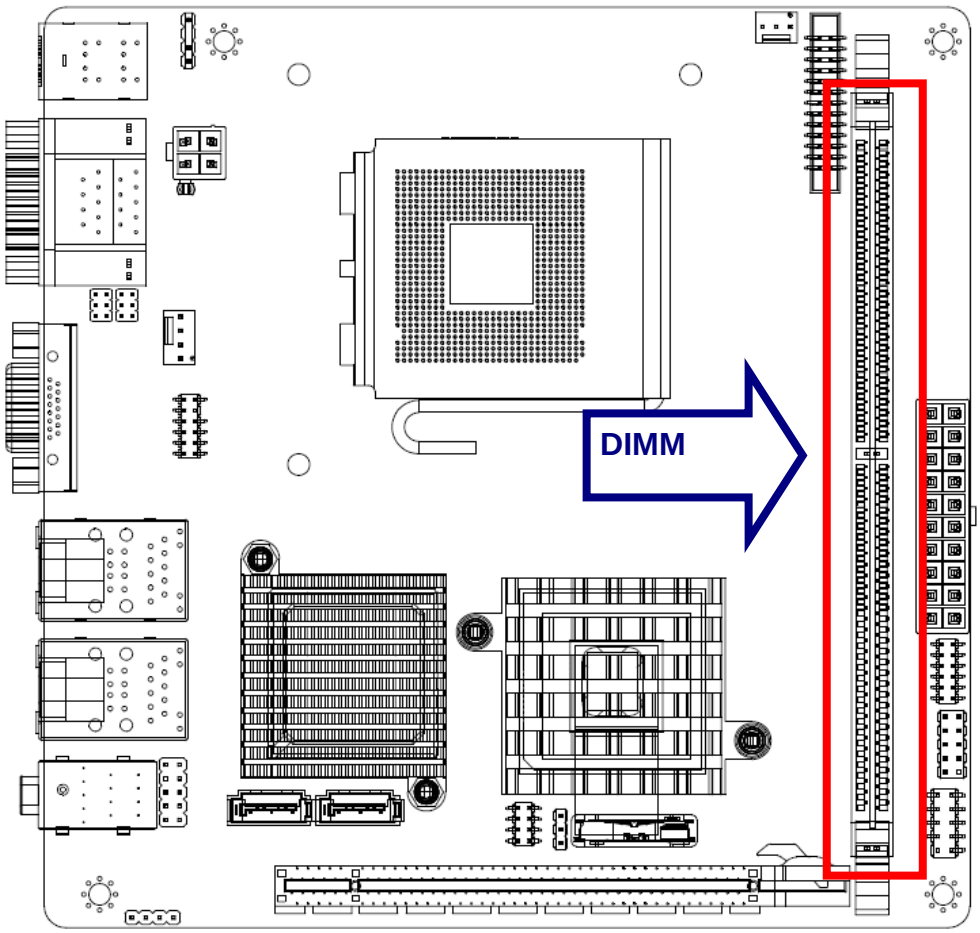
This chapter explains you the instructions of how to setup your system.

1. Turn off the power supply.
2. Insert the DIMM module (be careful with the orientation).
3. Insert all external cables for hard disk, floppy, keyboard, mouse, USB etc. except for flat panel. A CRT monitor must be connected in order to change CMOS settings to support flat panel.
4. Connect power supply to the board via the ATXPWR.
5. Turn on the power.
6. Enter the BIOS setup by pressing the delete key during boot up. Use the "LOAD BIOS DEFAULTS" feature. The ***Integrated Peripheral Setup*** and the ***Standard CMOS Setup*** Window must be entered and configured correctly to match the particular system configuration.
7. If TFT panel display is to be utilized, make sure the panel voltage is correctly set before connecting the display cable and turning on the power.

Note: Make sure the heat sink and the CPU top surface are in total contact to avoid CPU overheating problem that would cause the system to hang or unstable

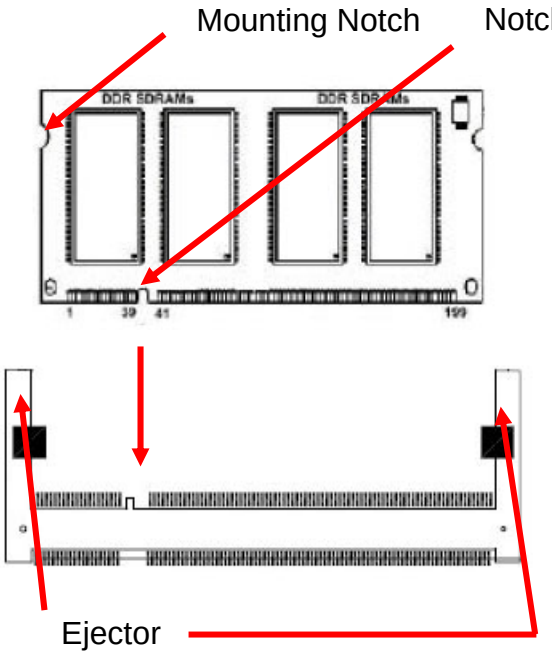
2.2.1 Main Memory

EMX-G41 provides 1 x 240 pin DDR DIMM socket that supports DDRII memories 667/800 MHz up to 2GB



Make sure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to both the board and the components.

- Locate the DIMM socket on the board.
- Hold two edges of the DIMM module carefully. Keep away of touching its connectors.
- Align the notch key on the module with the rib on the slot.
- Firmly press the modules into the socket automatically snaps into the mounting notch. Do not force the DIMM module in with extra force as the DIMM module only fit in one direction.



204-pin DDR2 DIMM

- To remove the DIMM modules, push the two ejector tabs on the slot outward simultaneously, and then pull out the DIMM module.

Note:

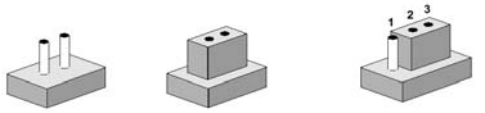
(1) Please do not change any DDR2 SDRAM parameter in BIOS setup to increase your system's performance without acquiring technical information in advance.

(2) Static electricity can damage the electronic components of the computer or optional boards. Before starting these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object.

2.3 Jumper and Connector List

You can configure your board to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch.

It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To “close” a jumper you connect the pins with the clip. To “open” a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2, and 3. In this case, you would connect either two pins.



Open Closed Closed 2-3

The jumper settings are schematically depicted in this manual as follows:

Open Closed Closed 2-3

A pair of needle-nose pliers may be helpful when working with jumpers.

Connectors on the board are linked to external devices such as hard disk drives, a keyboard, or floppy drives. In addition, the board has a number of jumpers that allow you to configure your system to suit your application.

If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

The following tables list the function of each of the board's jumpers and connectors.

Jumpers

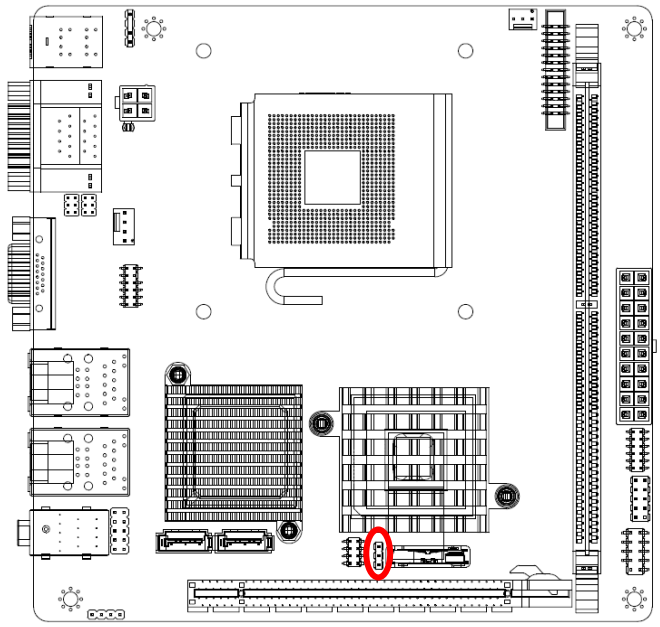
Label	Function	Note
CLRTC1	Clear CMOS	3 x 1 header, pitch 2.54mm
CHASSIS1	Chassis Intrusion Connector	4 x 1 header, pitch 2.54mm
JCOMPWR1	Power Selector Ring /+5V/+12V	3 x 2 header, pitch 2.0mm
JCOMPWR2	Power Selector Ring /+5V/+12V	3 x 2 header, pitch 2.0mm

Connectors

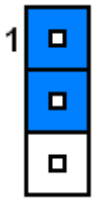
Label	Function	Note
AAFP1	Front Panel audio Connector	5 x 2 header, pitch 2.54mm
EATXPWR1	ATX Power supply connector	10 x 2 wafer, pitch 4.2mm
ATX12V1	VRM Power supply connector	2 x 2 wafer, pitch 4.2mm
AUDIO1	Rear audio jack	
CN22	Amplifier connector	4 x 1 wafer, pitch 2.54mm
COM12	Serial port connector	D-sub 9-pin, male
CPU_FAN1	CPU fan connector	4 x 1 wafer, pitch 2.54mm
DIMM_A1	240pin DDR2 SODIMM Socket	
F_PANEL1	Front panel connector	5 x 2 header, pitch 2.54mm
JDIO1	General purpose I/O connector	6 x 2 header, pitch 2.0mm
KBMS1	Keyboard & Mouse connector	6 x 2 header
LAN2_USB23	RJ45 & USB connector	
LAN1_USB01	RJ45 & USB connector	
LPT1	Parallel Port Connector	13 x 2 header, pitch 2.0mm
PCIEX16	164 pin PCIEXPRESS socket	
SATA1	Serial ATA connector 1	
SATA2	Serial ATA connector 2	
SP1	SPI Connector	4 x 2 header, pitch 2.0mm
SYS_FAN1	System fan connector	3 x 1 wafer, pitch 2.54mm
USB45	USB connector	5 x 2 header, pitch 2.54mm
VGA1	VGA connector 1 & 2	D-sub 15-pin, female
80PORT1	Low Pin Count Interface	10 x 2 header, pitch 2.0mm

2.4 Setting Jumpers & Connectors

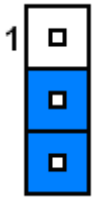
2.4.1 Clear CMOS (CLRTC1)



Normal*

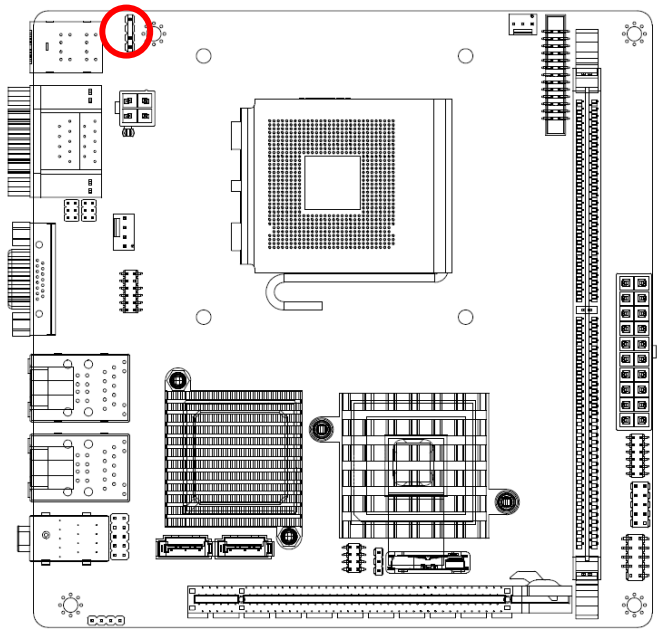


Clear CMOS

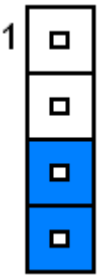


Default*

2.4.2 Chassis Intrusion Connector (CHASSIS1)



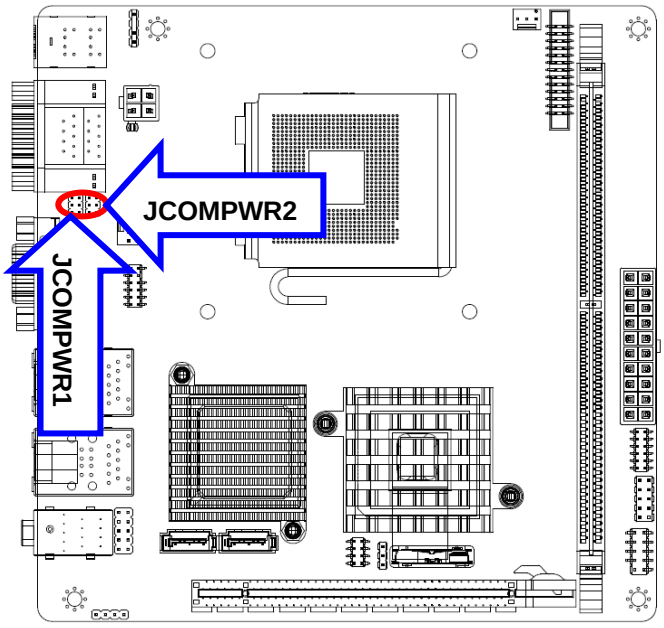
+5V*



Signal	PIN
+5V	1
GND	3
Chassis signal	4

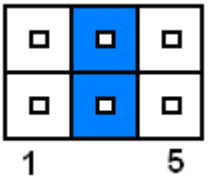
Default*

2.3.4 Power selector – Ring, +5V, +12V (JCOMPWR1/ JCOMPWR2)

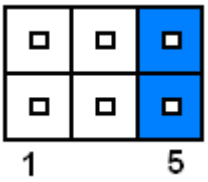


*Default

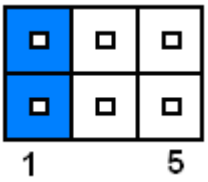
Ring*



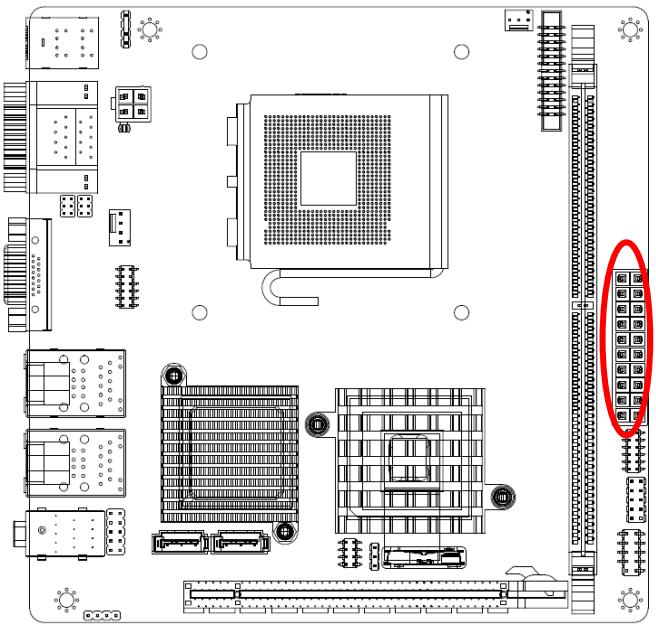
+5V

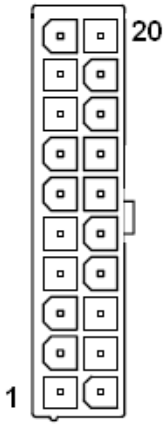


+12V



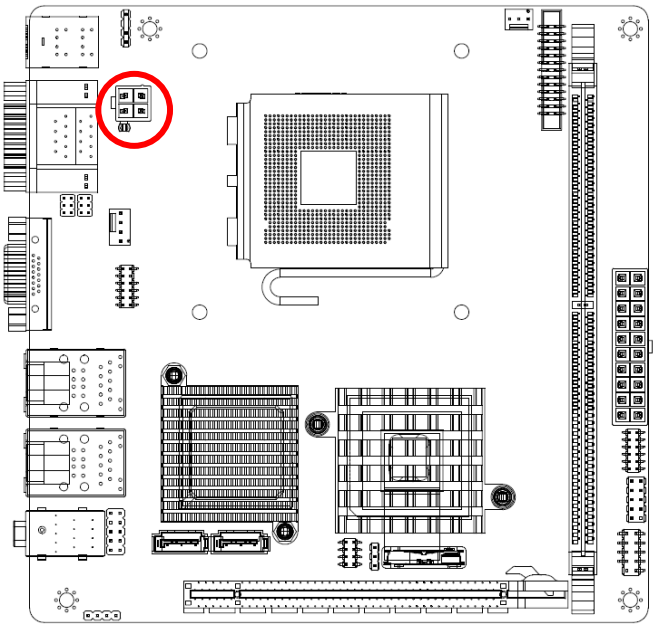
2.4.3 ATX power connector (EATXPWR1)

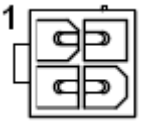




Signal	PIN	PIN	Signal
+12V	10	20	+5V
+5VSB	9	19	+5V
ATX_PWR	8	18	-5V
GND	7	17	GND
+5V	6	16	GND
GND	5	15	GND
+5V	4	14	PSON#
GND	3	13	GND
+3.3V	2	12	-12V
+3.3V	1	11	+3.3V

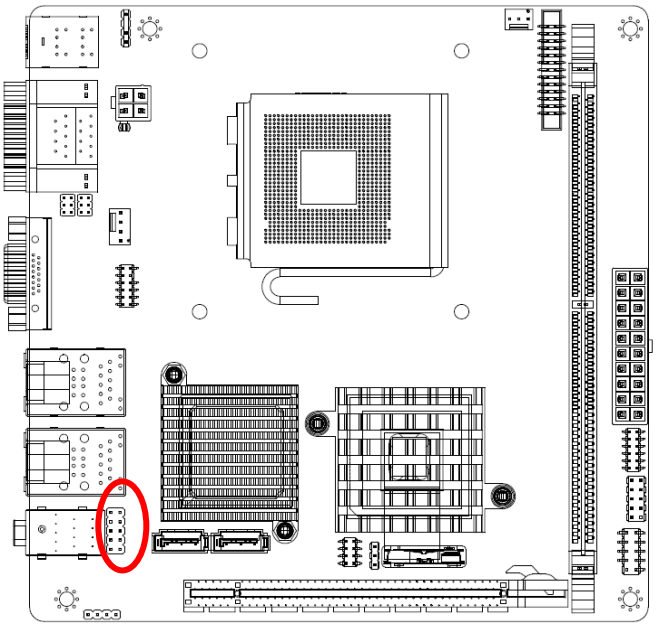
2.4.4 VRM Power supply connector (ATX12V1)

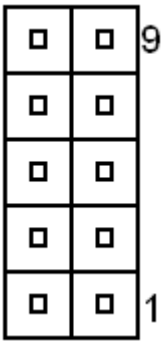




Signal	PIN	PIN	Signal
+12V	1	2	GND
+12V	3	4	GND

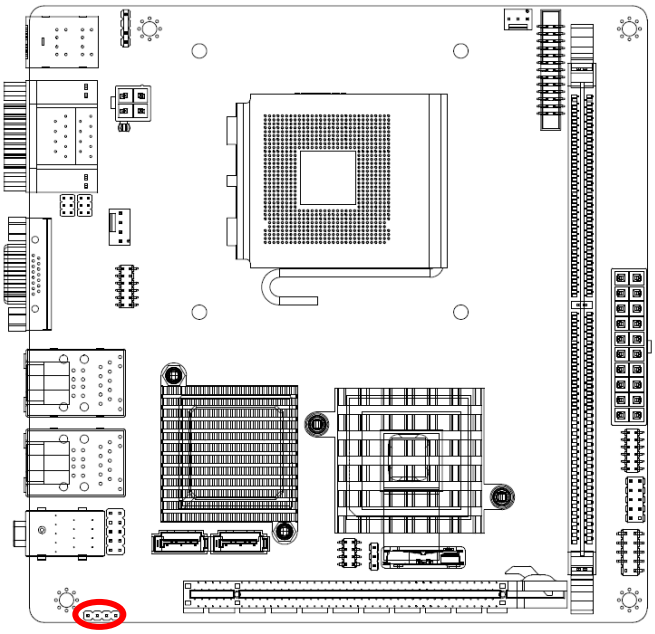
2.3.3 Front Panel Audio connector (AAFP1)

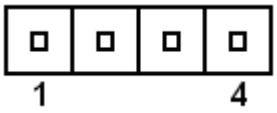




Signal	PIN	PIN	Signal
SENSE2_RTN	10	9	PORT2 L
	8	7	SENSE_SEND
SENSE1_RTN	6	5	PORT2 R
PRESENSE	4	3	PORT1 R
AGND	2	1	PORT1 L

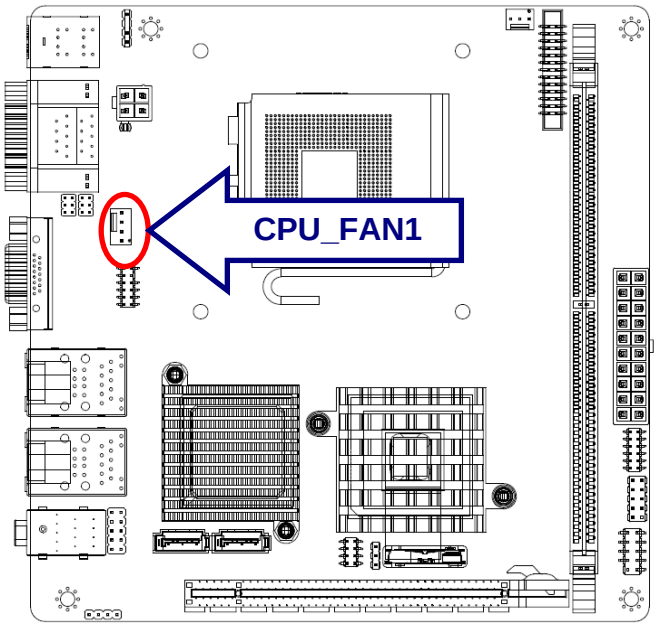
2.3.4 Amplifier connector (CN22)

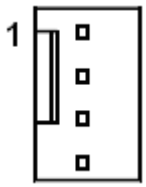




Signal	PIN
AMP_L-	1
AMP_L+	2
AMP_R-	3
AMP_R+	4

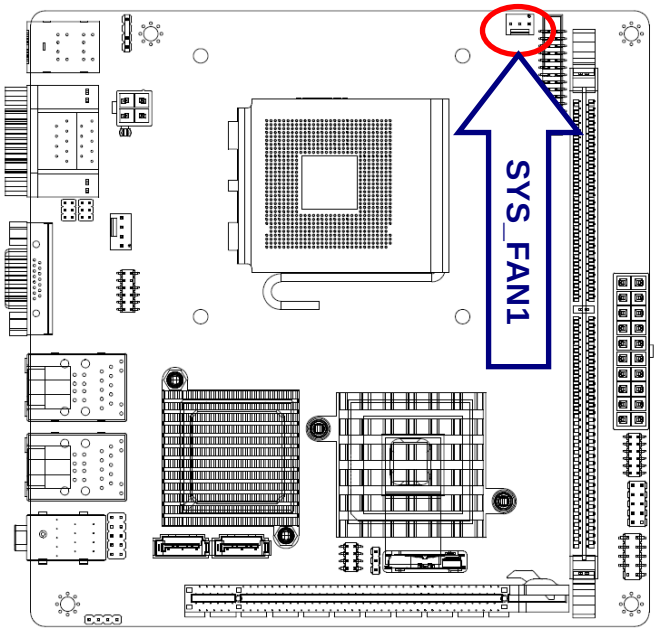
2.3.5 CPU Fan Connector (CPU_FAN1)

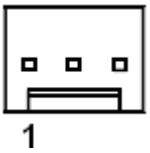




Signal	PIN
GND	1
+12V	2
FTAC2	3
FCTL2	4

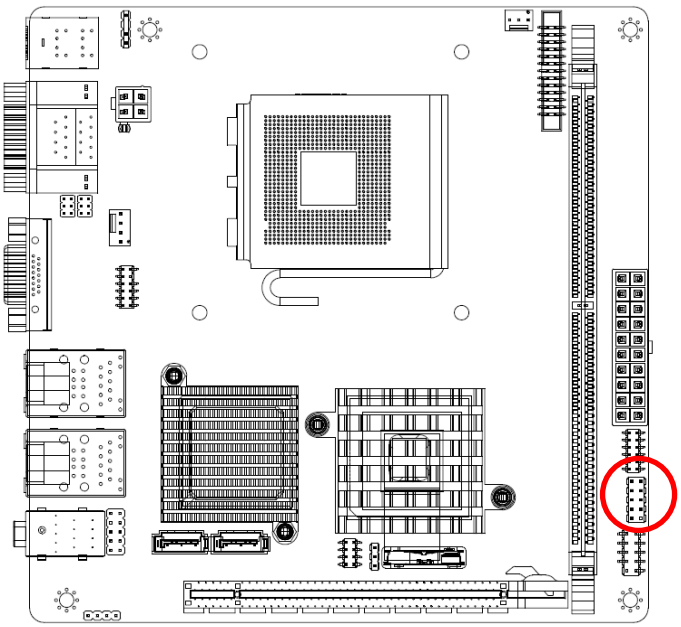
2.3.6 System Fan Connector (SYS_FAN1)

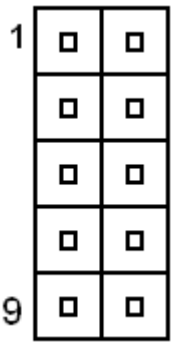




Signal	PIN
GND	1
+12V	2
FTAC1	3

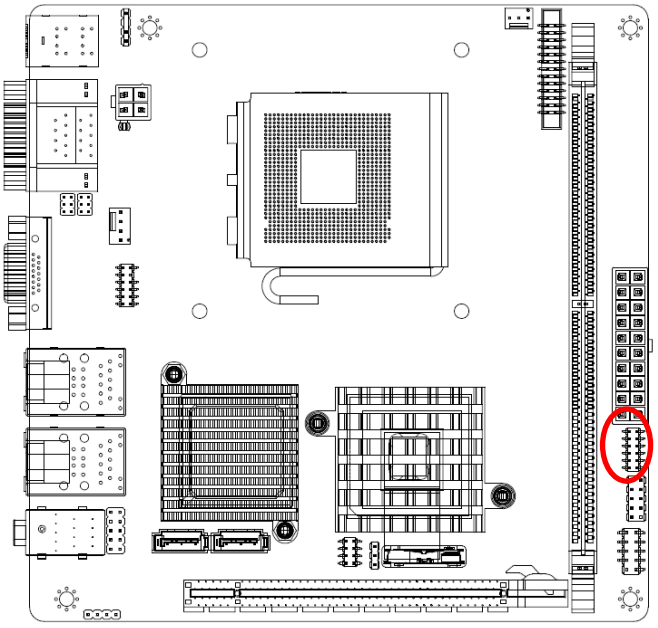
2.3.7 Front Panel Connector (F_PANEL1)

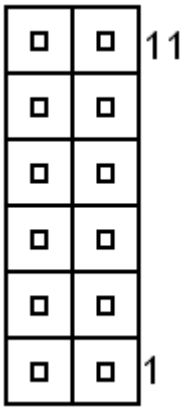




Signal	PIN	PIN	Signal
HDLED+	1	2	FP_LED+
HD_LED#	3	4	FP_LED-
GND	5	6	PWRBTN#IN
SYS_RESET#	7	8	GND
NC	9	10	

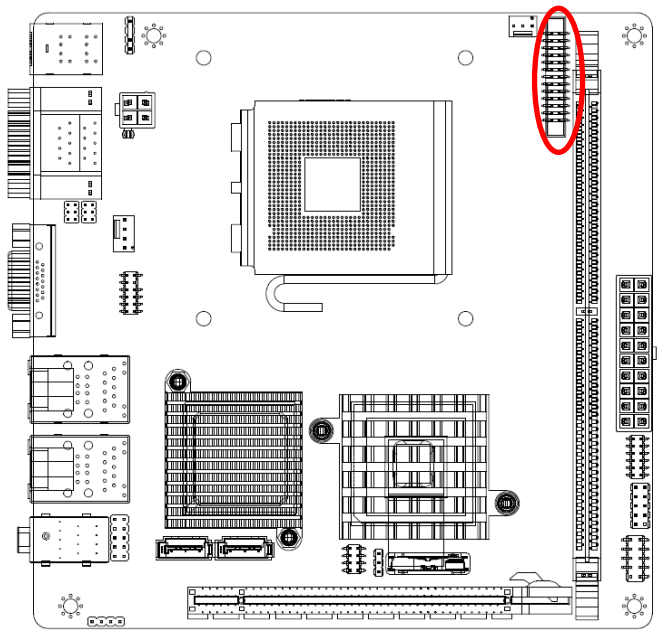
2.3.8 General purpose I/O connector (JDIO1)

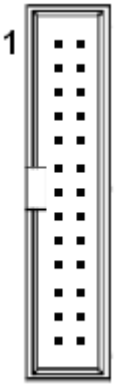




Signal	PIN	PIN	Signal
+5V	12	11	GND
DATA	10	9	CLK
GPI3	8	7	GPO3
GPI2	6	5	GPO2
GPI1	4	3	GPO1
GPI0	2	1	GPO0

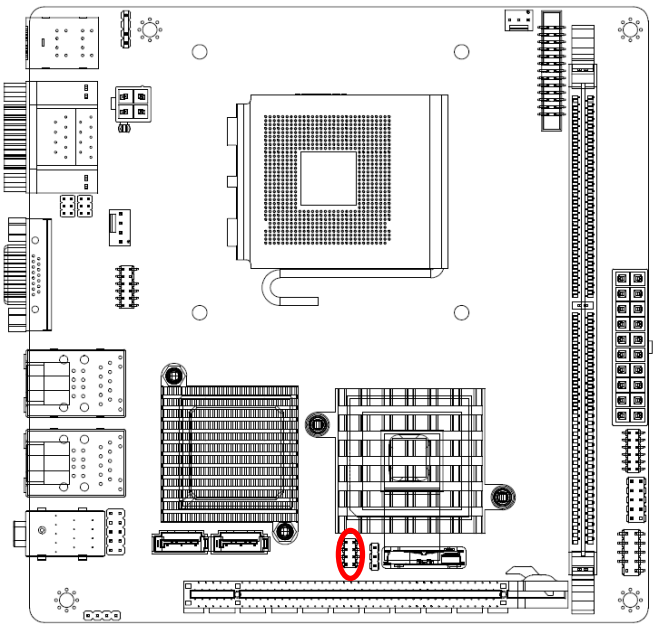
2.3.9 Parallel port connector (LPT1)

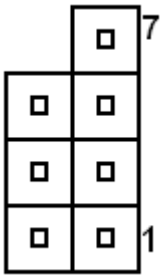




Signal	PIN	PIN	Signal
STB#	1	2	AFD#
PD0	3	4	ERR#
PD1	5	6	INIT#
PD2	7	8	SLIN#
PD3	9	10	GND
PD4	11	12	GND
PD5	13	14	GND
PD6	15	16	GND
PD7	17	18	GND
ACK#	19	20	GND
BUSY	21	22	GND
PE	23	24	GND
SLCT	25	26	GND

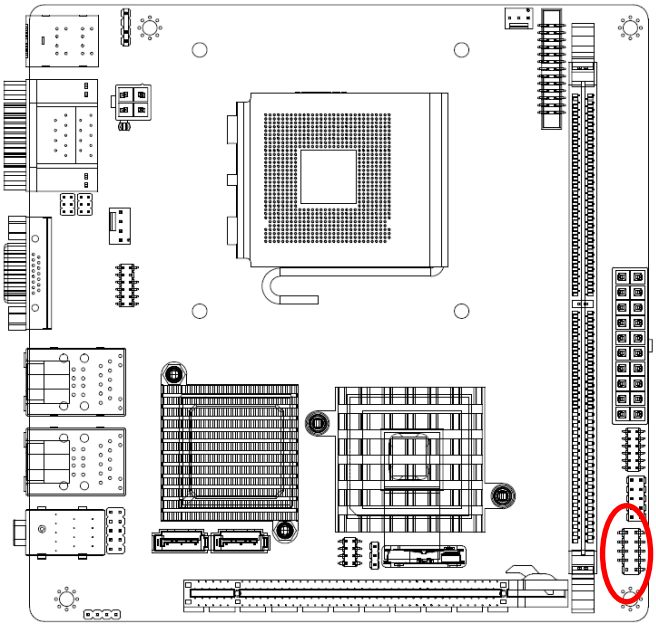
2.3.10 SPI connector (SP1)

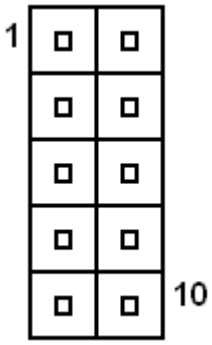




Signal	PIN	PIN	Signal
		7	SPI_HOLD#
SPI_MOSI	6	5	SPI_MISO
SPI_CLK	4	3	SPI_CS#
GND	2	1	+3.3V

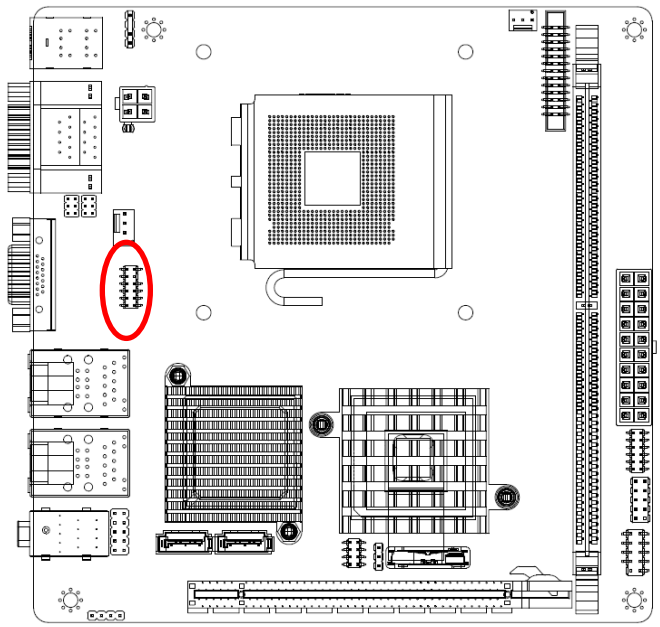
2.3.11 USB connector (USB45)

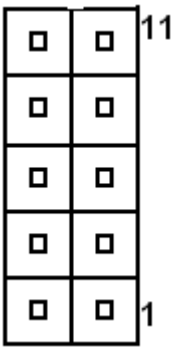




Signal	PIN	PIN	Signal
+5V_DUAL	1	2	+5V_DUAL
USBP4-_C	3	4	USBP5-_C
USBP4+_C	5	6	USBP5+_C
GND	7	8	GND
		10	NC

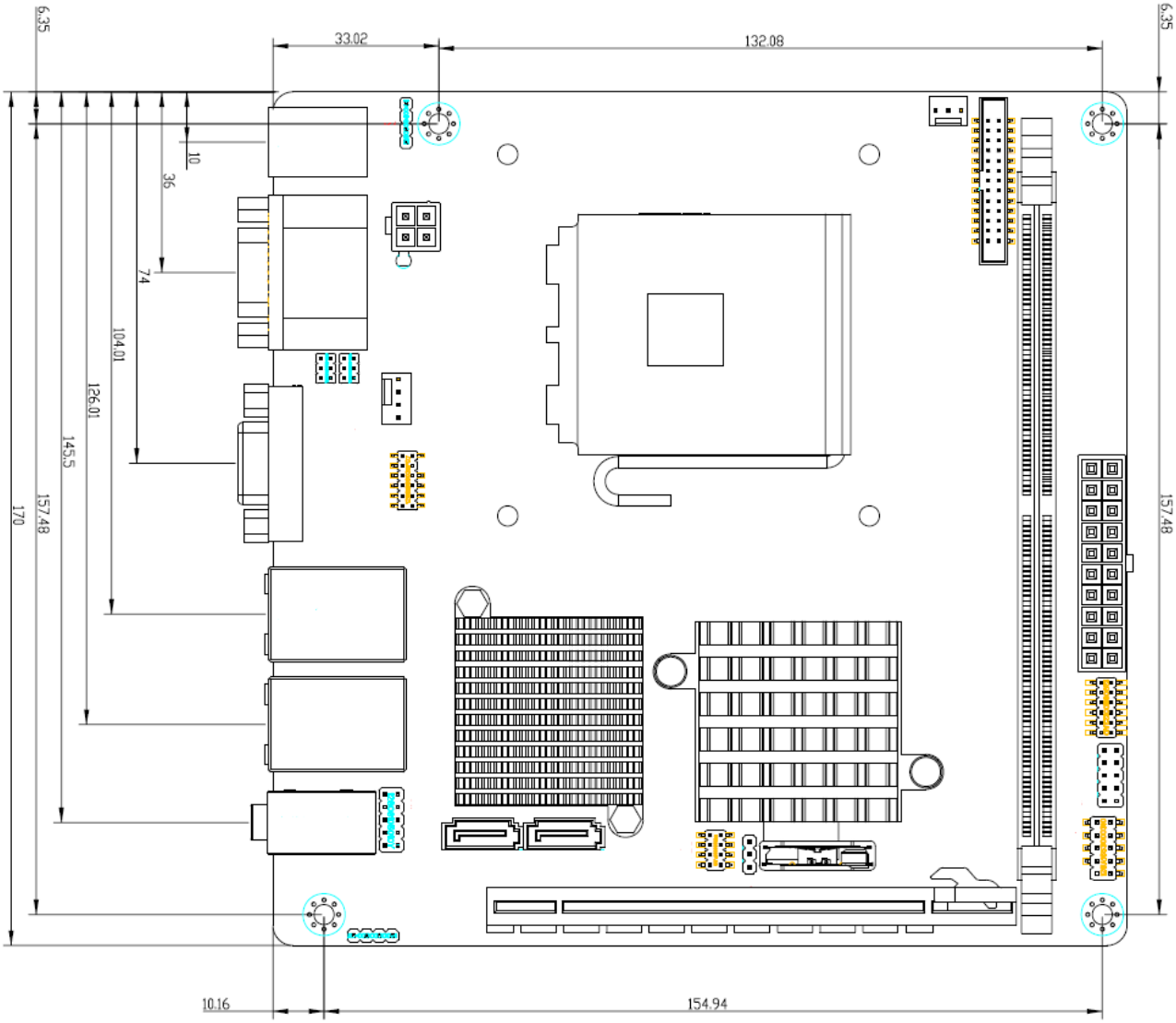
2.3.12 Low Pin Count Interface (80PORT1)

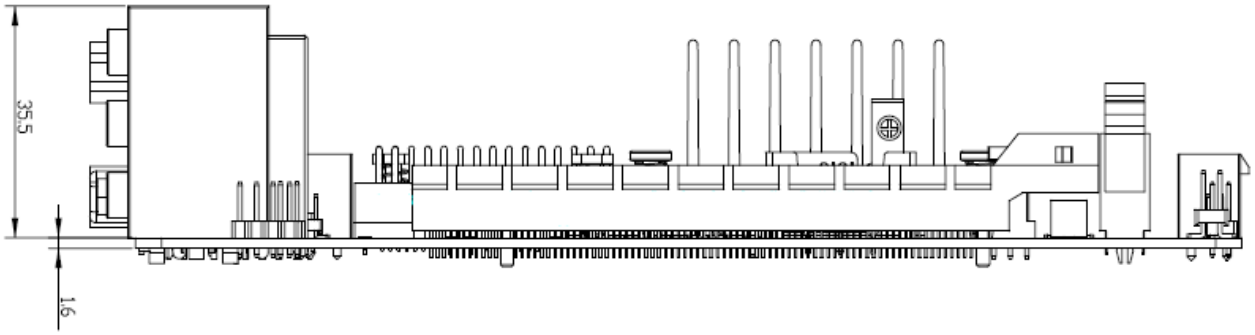




Signal	PIN	PIN	Signal
GND	12	11	PCICLKP80
GND	10		
LAD0	8	7	LFRAME#
LAD2	6	5	LAD1
PLTRST#	4	3	LAD3
+3.3V	2	1	NC

3. Mechanical Drawing


6.35
33.02
132.08
6.35
10
36
74
104.01
126.01
145.5
157.48
170
157.48
10.16
154.94


35.5
1.6