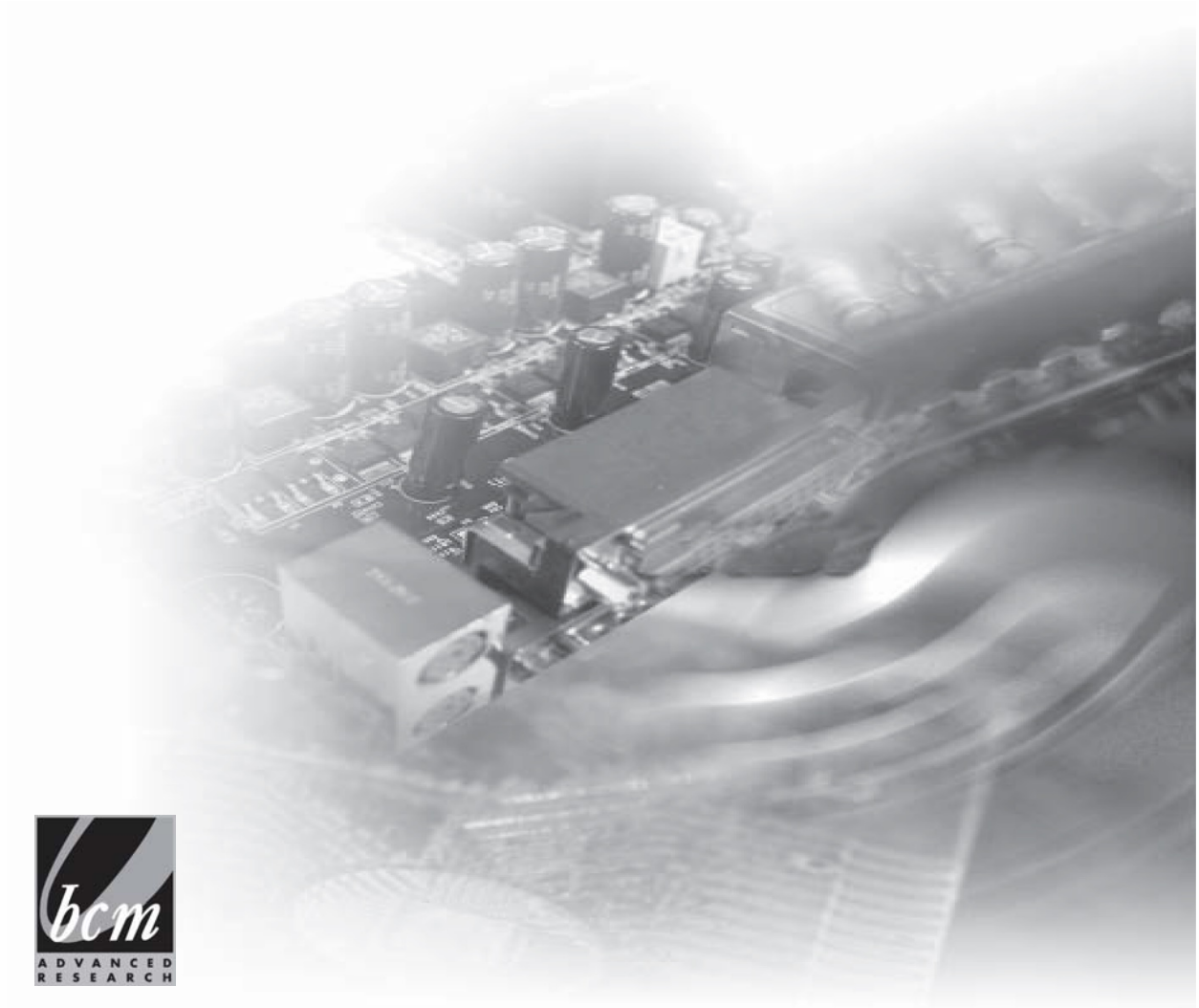
MX110H

User's Manual | Ver 1.0

Intel® H110 Mini ITX Motherboard supports 14nm Intel® Core™ i7/i5/i3

6th generation Desktop Processors (Skylake Platform)



Safety Information

Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.
- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.
- Make sure that your power supply is set to the correct voltage in your area. If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your retailer.

Operation safety

- Before installing the motherboard and adding devices on it, carefully read all the manuals that came with the package.
- Before using the product, make sure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.
- Place the product on a stable surface.
- If you encounter technical problems with the product, contact a qualified service technician or your retailer.

The symbol of the crossed out wheeled bin indicates that the product

(electrical and electronic equipment) should not be placed in municipal waste. Check local regulations for disposal of electronic products.

Safety Declaration

This device complies with the requirements in Part 15 of the FCC rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

About this guide

This user guide contains the information you need when installing and configuring the motherboard.

How this guide is organized

This manual contains the following parts:

- **Section 1, 2: Product Introduction and Installation**
  This chapter describes the features of the motherboard and the new technology it supports. This chapter also lists the hardware setup procedures that you have to perform when installing system components. It includes description of the jumpers and connectors on the motherboard.

- **Section 3: BIOS setup**
  This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.

Where to find more information

Refer to the following sources for additional information and for product and software updates.

1. Motherboard User's Manual and Device Drivers

Motherboard User's Manual and Device Drivers can be downloaded at BCM Advanced Research website: http://www.bcmcom.com/bcm_support_drivers.htm

2. Technical Support

If a problem arises with your system and no solution can be obtained from the user's manual, please contact your place of purchase or local distributor. Alternatively, please try the following help resources for further guidance. Visit the BCM Advanced Research website:

Revision History

Revision	Revision	Date
V1.0	First release version	2016/07

Contents

Chapter 1: Introduction

Thank you for purchasing ***MX110H*** motherboard, a reliable motherboard produced under our consistently stringent quality control. It delivers excellent performance with robust design conforming to our commitment to quality and endurance.

Because the motherboard specifications and the BIOS software might be updated, the content of this manual will be subject to change without notice. In case any modifications of this manual occur, the updated version will be available on our website without further notice.
If you require technical support related to this motherboard, please visit our website for specific information about the model you are using.

1.1 Package Contents

MX110H Motherboard (Mini-ITX Form Factor: 6.7-in x 6.7-in)
MX110H 1 x I/O Panel Shield

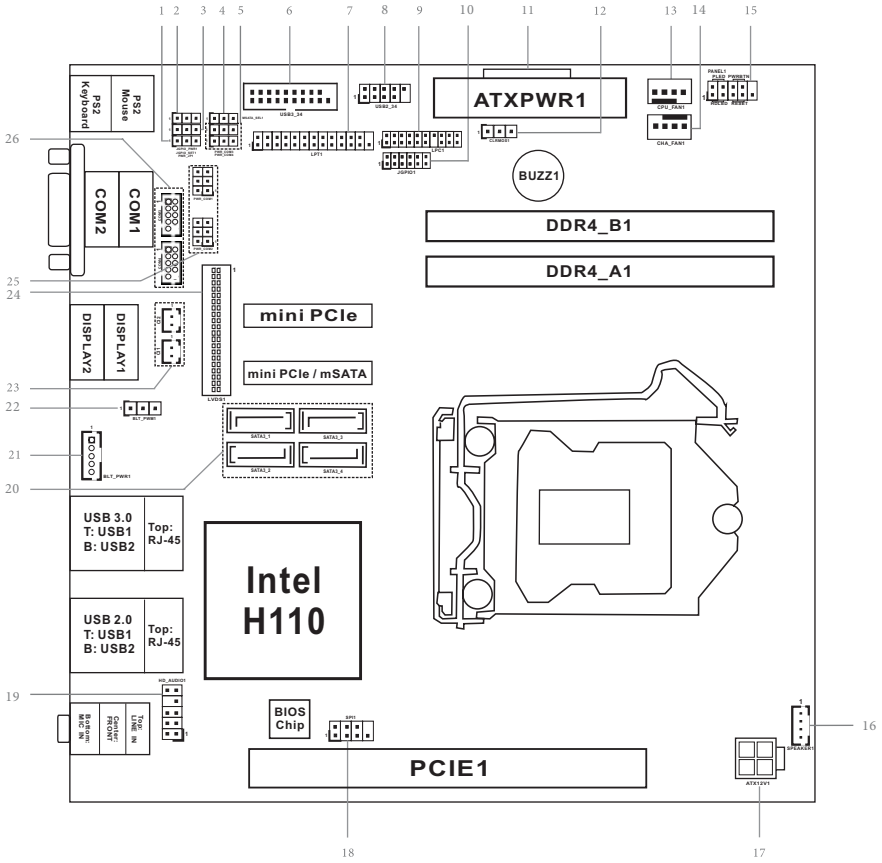
1.2 Specifications

Model Name	MX110H
MB Dimension	Mini-ITX 6.7 x 6.7 inches
	8 Layer Board
	BCM Standard Blue
CAP	All Solid CAP
Fanless	No
	ATX PWR IN
System	
CPU	Intel® Skylake Processor
	Supports LGA 1151 Core i7, Core i5, Core i3, Celeron CPU Up to 65W Max
Chipsets (PCH)	Intel® H110
	6 x PCIex1 Channel Available
System Memory	2 x SoDIMM Up to 32GB Dual Channel DDR4 2133Mhz Vertical Type Memory Sockets
Display	Intel® Integrated HD Graphic (CPU Dependent)
	2 x DisplayPort
	18/24 bits Dual Channel LVDS Through Chrontel® CH7511B (BOM option to support eDP)
Ethernet	2 GigaLan support
	Intel® i219-V PHY LAN Controller
	Intel® i211-AT PCIe LAN Controller
Audio	Realtek®ALC887
	ALC122, 3W Per Channel Amplier
Super I/O	Nuvoton® NCT6106D
	1 x RS232/422/485 port (with 5V/12V/RI set by jumper)
	1x RS-232 (with 5V/12V/RI set by Jumper)
	2x RS-232 (with 5V/12V set by Jumper)
Expansion Interface	1 x PCIe x 16 Slot (From CPU)
	1 x Full/Half Size Mini-PCIe with mSATA Support (SATA III) (+USB)
	1 x Half Size Mini-PCIe (+USB)
	Note: Two sockets can be placed in stack
Watch Dog Timer (WDT)	1 ~ 255 sec timer
RTC	Date and Time
BIOS	AMI® UEFI BIOS
	16MB (128Mb) Flash ROM
Others	TPM 2.0 (Optional) IC on-board design

Internal I/O	
Display	1 x LVDS/eDP shared Header
	1 x Backlight Locking Type Header
Storage	3 x SATA III Connectors (Red)
	1 x SATA III Connectors (Shared with mSATA) (Black)
USB	1 x USB 2.0 2.54mm Headers (2 Ports Total)
	1 x USB 3.0 Header with Shroud (2 Ports Total)
Audio	1 x Front Audio Header (2.54mm Pitch)
	1 x Amplifer Locking Type Header (2.00mm Pitch)
Serial Port	2 x RS-232 2.0mm Locking Type Headers (with Voltage Selection)
	Note: 5V/12V/RI, set by Jumper
Parallel Port	1 x LPT Header with Shroud (2.0mm Pitch)
Digital I/O	1 x 8 bits GPIO Header
Battery	Cable Type CMOS Battery
FAN	1 x 4 Pin CPU Fan Header
	1 x 4 Pin Chassis Fan Header
Power In	1 x Standard 24 pin ATX Connector
	1 x 4 pin ATX 12 Connector
Front Panel	1 x Front Panel Header (2.54mm Pitch)
LPC Header	1 x LPC Header (2.0mm Pitch)
CI (Chassis Intrusion)	2 x Chassis Intrusion Locking Type Headers
Others	1 x SPI Header (2.0mm Pitch)
	1 x AT/ATX Mode Jumper
Rear I/O	
Keyboard/ Mouse (PS/2)	2 x PS/2
Serial Port	2 x DB-9 Connector
	1 port with RS-232/422/485 support
	1 port just only support RS-232
	Both with 5V/12V/RI suport at Pin9
	Note: 5V/12V/RI, set by Jumper; RS232/422/485 set by BIOS
LAN	2 x RJ45 (stack with USB)
USB2.0	2 x USB 2.0 (stack with RJ45)
USB 3.0	2 x USB 3.0 (stack with RJ45)
Display	2 x DP Connectors
Audio	1 x 3 Jacks Audio Connector (30mm Height)

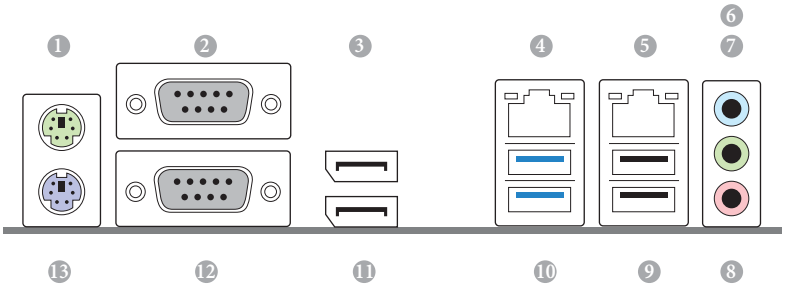
Others	
Regulatory Compliance	Design to Comply with FCC/CE/UL
	RoHS Compliant
Operation Environment	Temperature: 0 C to 60 C Note:In environment of
	45C or above, it requires active system fan cooling
Storage Environment	Temperature: -20 C to 60 C
	Humidity: 5% to 90% non-condensing
Accessories	1 x I/O Shield

1.3 Motherboard Layout



1 : ATX/AT Mode Select
2 : Digital Input/Output Power Select
3 : GPIO Default Setting
4 : mSATA Select
5 : COM Port PWR Setting Jumpers
    PWR_COM3 (For COM Port3)
    PWR_COM4 (For COM Port4)
6 : USB3.0 Header
7 : Printer Port Header
8 : USB2.0 Header
9 : LPC Header
10 : Digital Input/Output Pin Header
11 : 24-pin ATX Power Input Connector
12 : Clear CMOS Header
13 : 4-Pin CPU FAN Connector (+12V)
14 : 4-Pin Chassis FAN Connector (+12V)
15 : System Panel Header
16 : 3W Audio AMP Output Wafer
17 : 4-pin ATX Power Input Connector
18 : SPI Connector
19 : Front Panel Audio Header
20 : SATA3 Connectors (SATA3_1, SATA3_2, SATA3_3, SATA3_4)
21 : Inverter Power Control Wafer (BLT_PWR1)
22 : Backlight Control Level (BLT_PWM1)
23 : Chassis Intrusion Headers
24 : LVDS Panel Connector
25 : COM Port PWR Setting Jumpers
    PWR_COM1 (For COM Port1)
    PWR_COM2 (For COM Port2)
26 : COM3, 4 Headers (RS232)

1.4 I/O Panel



1	PS/2 Mouse Port	8	Microphone (Pink)
2	COM Port (COM1)*	9	USB 2.0 Ports (USB_12)
3	DisplayPort (DP1)	10	USB 3.0 Ports (USB3_12)
4	LAN RJ-45 Port (LAN1)**	11	DisplayPort (DP2)
5	LAN RJ-45 Port (LAN2)**	12	COM Port (COM2)
6	Line In (Light Blue)	13	PS/2 Keyboard Port
7	Front Speaker (Lime)		

* This motherboard supports RS232/422/485 on COM1 port. Please refer to below table for the pin de nition. In addition, COM1 port (RS232/422/485) can be adjusted in BIOS setup utility > Advanced Screen > Super IO Configuration. You may refer to page 38 for details.

COM1 Port Pin Definition

PIN	RS232	RS422	RS485
1	DCD	TX-	RTX-
2	RXD	RX+	N/A
3	TXD	TX+	RTX+
4	DTR	RX-	N/A
5	GND	GND	GND
6	DSR	N/A	N/A
7	RTS	N/A	N/A
8	CTS	N/A	N/A
9	RI# / +5V / +12V	N/A	N/A

** There are two LED next to the LAN port. Please refer to the table below for the LAN port LED indications.

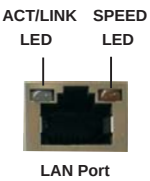
LAN Port LED Indications

Activity/Link LED

Status	Description
Off	No Link
Blinking	Data Activity
On	Link

SPEED LED

Status	Description
Off	10Mbps connection
Green	100Mbps connection
Orange	1Gbps connection



Chapter 2: Installation

This is a Mini-ITX form factor (6.7" x 6.7", 17.0 x 17.0 cm) motherboard. Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.

Make sure to unplug the power cord before installing or removing the motherboard. Failure to do so may cause physical injuries to you and damages to motherboard components.

2.1 Screw Holes

Place screws into the holes to secure the motherboard to the chassis.

Do not over-tighten the screws! Doing so may damage the motherboard.

2.2 Pre-installation Precautions

Take note of the following precautions before you install motherboard components or change any motherboard settings.

1. Unplug the power cord from the wall socket before touching any component.
2. To avoid damaging the motherboard components due to static electricity, NEVER place your motherboard directly on the carpet or the like. Also remember to use a grounded wrist strap or touch a safety grounded object before you handle components.
3. Hold components by the edges and do not touch the ICs.
4. Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that comes with the component.

Before you install or remove any component, ensure that the power is switched off or the power cord is detached from the power supply.
Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.

2.3 Processor

The board supports 6th generation Intel Core processors. Other processors may be supported in the future. This board supports processors with a maximum wattage of 65 W Thermal Design Power (TDP).

NOTE

This board has specific requirements for providing power to the processor. Additional power required will depend on configurations chosen by the integrator.

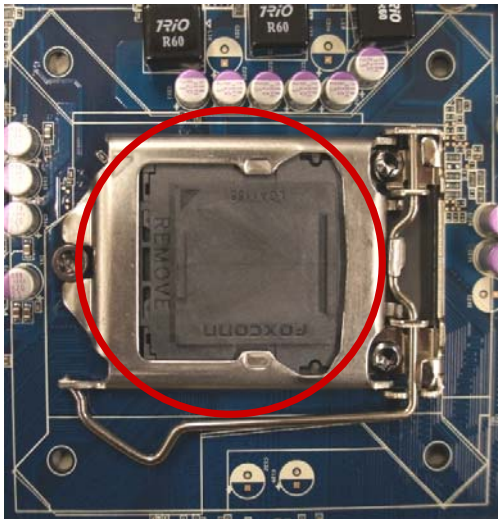
The motherboard comes with a surface mount LGA1151 socket designed for the Intel® Core™ i7/ i5/ i3 processor in the 1151-land package.

- Your boxed Intel® Core™ i7/ i5/ i3 LGA1151 processor package should come with installation instructions for the CPU, fan and heatsink assembly. If the instructions in this section do not match the CPU documentation, follow the latter.
- Upon purchase of the motherboard, make sure that the PnP cap is on the socket and the socket pins are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket pins/motherboard components. BCM will shoulder the cost of repair only if the damage is shipment/transit-related.
- Keep the cap after installing the motherboard. BCM will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA1151 socket.
- The product warranty does not cover damage to the socket pins resulting from incorrect CPU installation/removal, or misplacement/loss/incorrect removal of the PnP cap.
- Install the CPU fan and heatsink assembly before you install motherboard to the chassis.

If you purchased a separate CPU heatsink and fan assembly, make sure that you have properly applied Thermal Interface Material to the CPU heatsink or CPU before you install the heatsink and fan assembly.

2.3.1 Installing the CPU

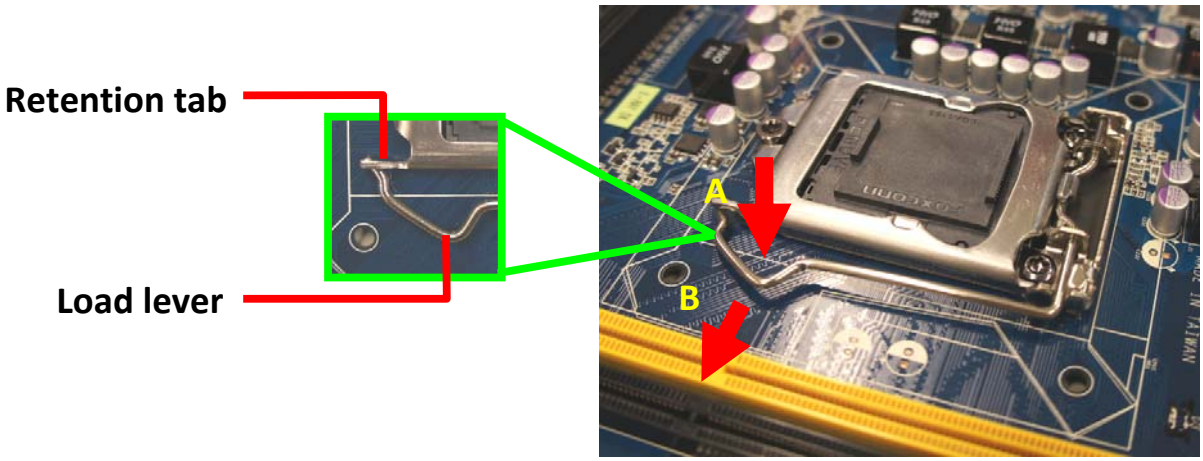
1. Locate the CPU socket on the motherboard.



Before installing the CPU, make sure that the socket box is facing towards you and the load lever is on your left.

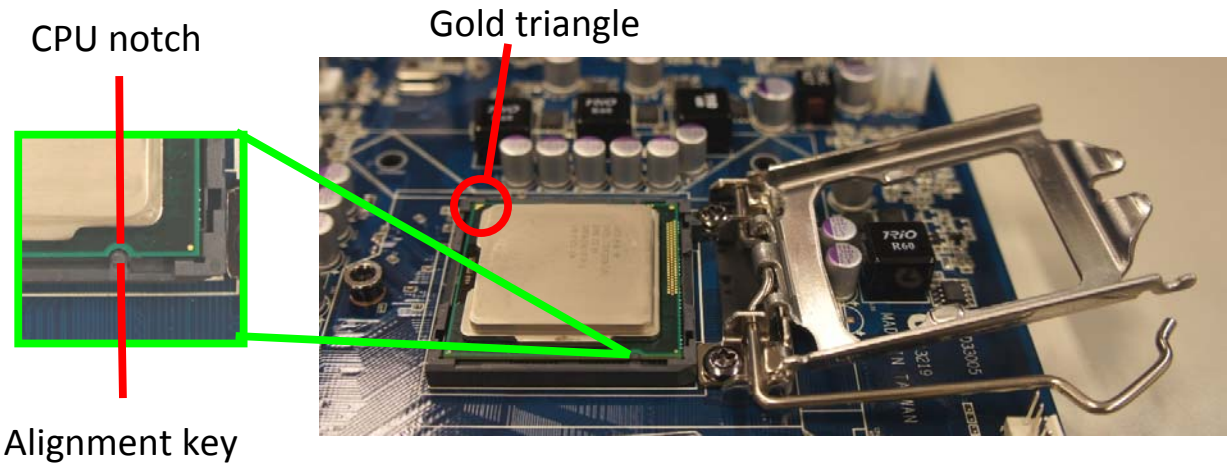
2. Remove the PnP cap.

3. Press the load lever with your thumb (A), then move it to the left (B) until it is released from the retention tab.



To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

4. Position the CPU over the socket, making sure that the gold triangle is on the top-left corner of the socket then fit the socket alignment key into the CPU notch.



5. Pull back the load lever, then push the load lever (A) until it snaps into the retention tab.

The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!

2.3.2 Installing the CPU Heatsink and Fan

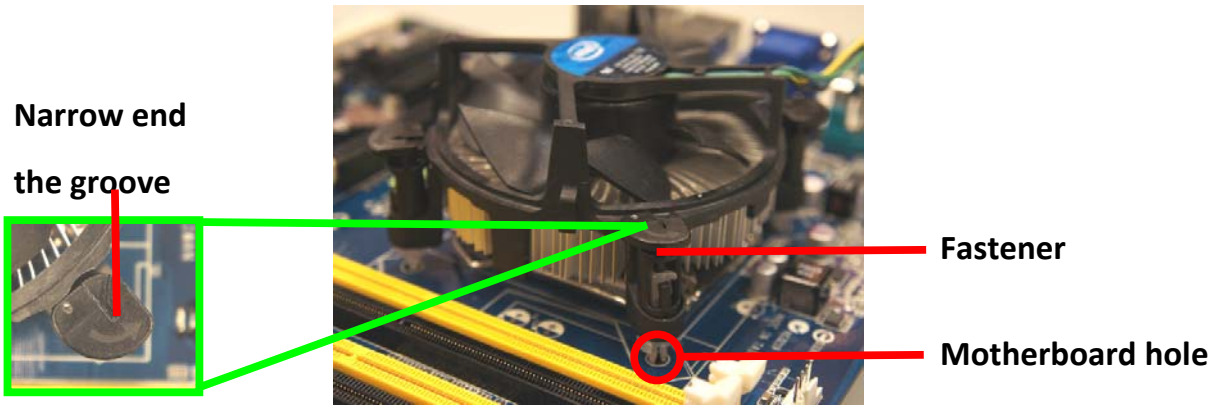
Intel® Core™ i7/ i5/ i3 LGA1151 processor requires a specially designed heatsink and fan assembly to ensure optimum thermal condition and performance.

- Install the motherboard to the chassis before you install the CPU fan and heatsink assembly.
- When you buy a boxed Intel® Core™ i7/ i5/ i3 LGA1151 processor, the package includes the CPU fan and heatsink assembly. If you buy a CPU separately, make sure that you use only Intel® certified multi-directional heatsink and fan.
- Your Intel® Core™ i7/ i5/ i3 LGA1151 processor heatsink and fan assembly comes in a push-pin design and requires no tool to install.

If you purchased a separate CPU heatsink and fan assembly, make sure that you have properly applied Thermal Interface Material to the CPU heatsink or CPU before you install the heatsink and fan assembly.

To install the CPU heatsink and fan:

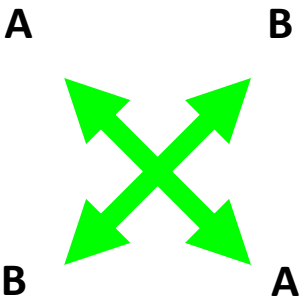
1. Place the heatsink on top of the installed CPU, making sure that the four fasteners match the holes on the motherboard.

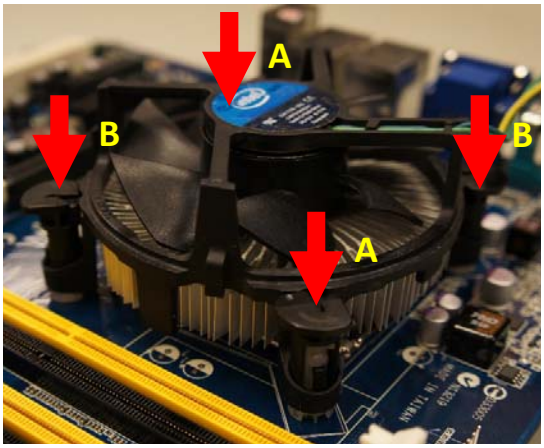


Orient the heatsink and fan assembly such that the CPU fan cable is closest to the CPU fan connector.

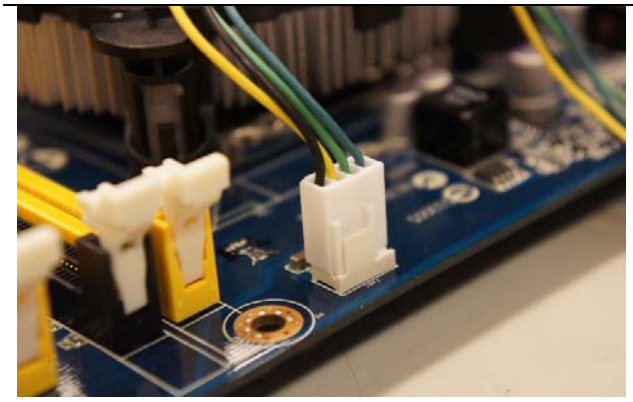
- Make sure each fastener is oriented as shown, with the narrow groove directed outward.

2. Push down two fasteners at a time in a diagonal sequence to secure the heatsink and fan assembly in place.





3. Connect the CPU fan cable to the connector on the motherboard labeled CPU_FAN.



Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components.

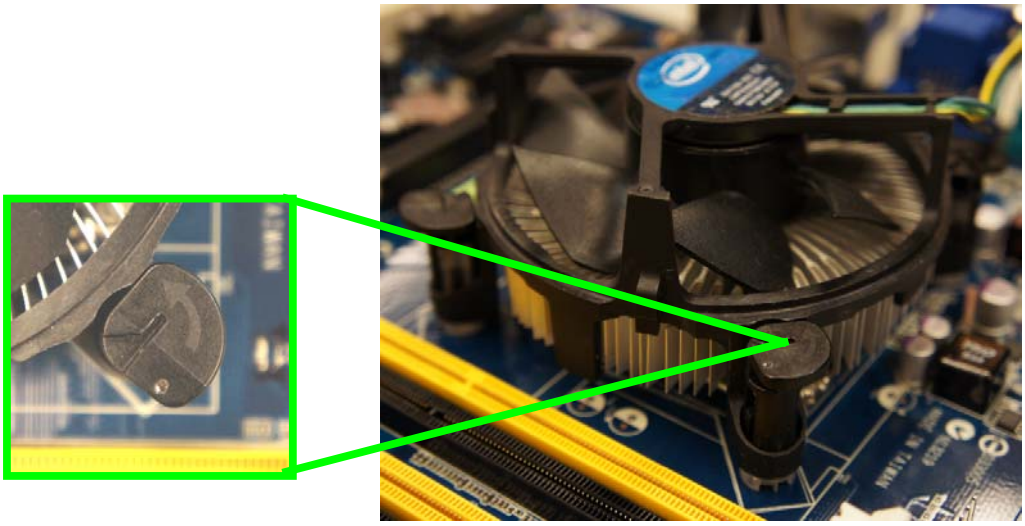
These are not jumpers! DO NOT place jumper caps on the fan connectors.

2.3.3 Uninstalling the CPU Heatsink and Fan

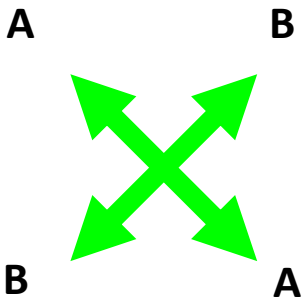
To uninstall the CPU heatsink and fan:

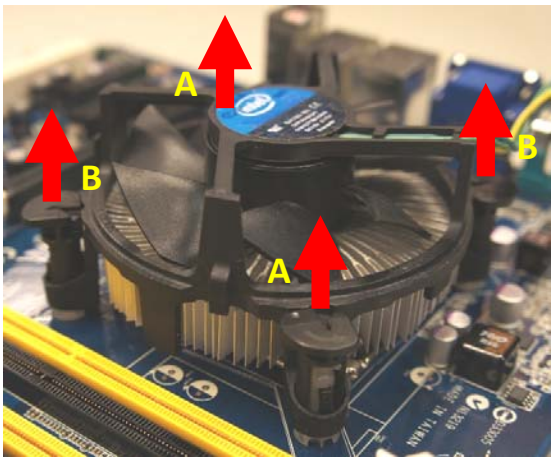
1. Disconnect the CPU fan cable from the connector on the motherboard.

2. Rotate each fastener counterclockwise

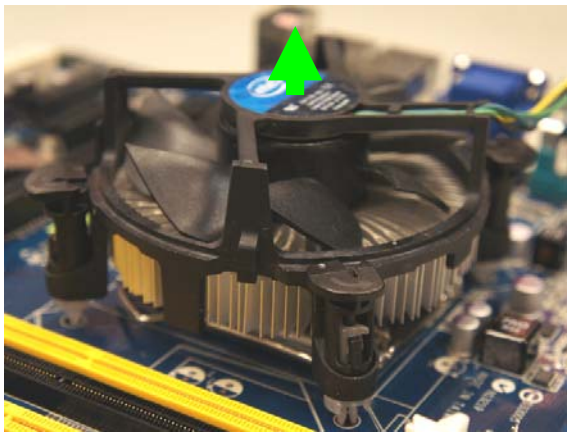


3. Pull up two fasteners at a time in a diagonal sequence to disengage the heatsink and fan assembly from the motherboard.





4. Carefully remove the heatsink and fan assembly from the motherboard.



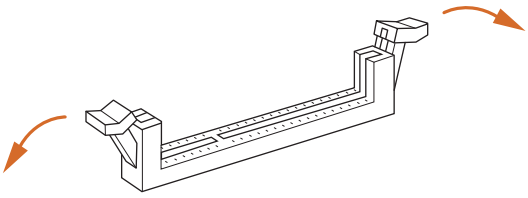
5. Rotate each fastener clockwise to ensure correct orientation when reinstalling.

2.4 Installation of Memory Modules (SO-DIMM)

MX110H motherboard provides two DDR4 (Double Data Rate 4) SO-DIMM slots, which support Dual Channel DDR4.

1. It is not allowed to install a DDR, DDR2 or DDR3 memory module into a DDR4 slot; otherwise, this motherboard and SO-DIMM may be damaged.
2. Please make sure to disconnect the power supply before adding or removing SO-DIMMs or the system components.
3. The SO-DIMM only fits in one correct orientation. It will cause permanent damage to the motherboard and the SO-DIMM if you force the SO-DIMM into the slot at incorrect orientation.

1



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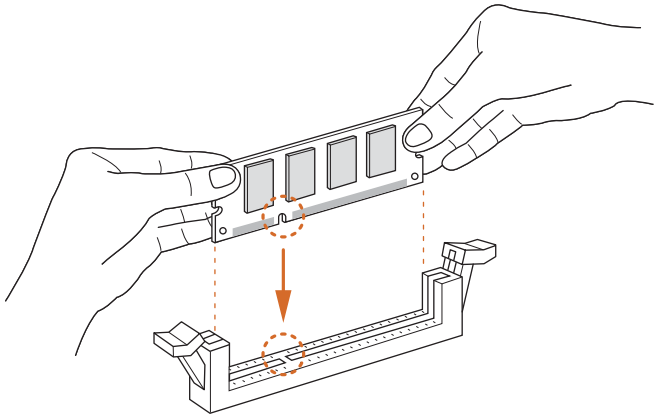

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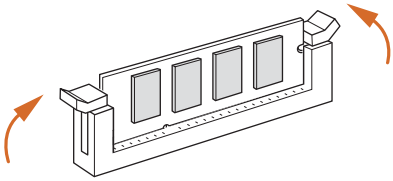


2.5 Expansion Slots (mini-PCIe, mini-PCIe / mini-SATA and PCI Express Slots)

There is 1 mini-PCIe slot, 1 mini-PCIe / mini-SATA slot and 1 PCI Express slot on this motherboard.

mini-PCIe slot:

MINI_PCIE1 (mini-PCIe slot; half size) is used for PCI Express mini cards.

mini-PCIe / mini-SATA slot:

MINI_SATA1 (mini-PCIe / mini-SATA slot; full size) is used for mSATA cards.

PCIE slot: PCIE1 (PCIE x16 slot) is used for PCI Express x16 lane width cards.

Installing an expansion card

Step 1. Before installing the expansion card, please make sure that the power supply is switched off or the power cord is unplugged. Please read the documentation of the expansion card and make necessary hardware settings for the card before you start the installation.

Step 2. Remove the system unit cover (if your motherboard is already installed in a chassis).

Step 3. Remove the bracket facing the slot that you intend to use. Keep the screws for later use.

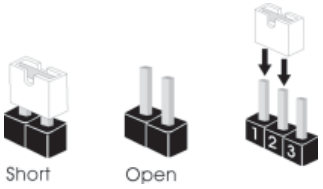
Step 4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.

Step 5. Fasten the card to the chassis with screws.

Step 6. Replace the system cover.

2.6 Jumpers Setup

The illustration shows how jumpers are setup. When the jumper cap is placed on pins, the jumper is “Short”. If no jumper cap is placed on pins, the jumper is “Open”. The illustration shows a 3-pin jumper whose pin1 and pin2 are “Short” when jumper cap is placed on these 2 pins.



Clear CMOS Jumper
(CLRCMOS1)
(see p.9, No. 12)

Note: CLRCMOS1 allows you to clear the data in CMOS. To clear and reset the system parameters to default setup, please turn off the computer and unplug the power cord from the power supply. After waiting for 15 seconds, use a jumper cap to short pin2 and pin3 on CLRCMOS1 for 5 seconds. However, please do not clear the CMOS right after you update the BIOS. If you need to clear the CMOS when you just finish updating the BIOS, you must boot up the system first, and then shut it down before you do the clear-CMOS action. Please be noted that the password, date, time, user default profile will be cleared only if the CMOS battery is removed.

Digital Input / Output Power Select
(3-pin JGPIO_PWR1)
(see p.9 No. 2)

1-2: +12V
2-3: +5V (Default)

ATX/AT Mode Select
(3-pin PWR_JP1)
(see p.9 No. 1)

1-2: AT Mode
2-3: ATX Mode (Default)

Backlight Control Level (CON_LBKLT_CTL)
(3-pin BLT_PWM1)
(see p.9, No. 22)

1-2: +3V
2-3: +5V (Default)

GPIO Default Setting
(3-pin JGPIO_SET1)
(see p.9 No. 3)

1-2: Pull-High (Default)
2-3: Pull-Low

COM Port Pin9 PWR Setting Jumpers
(6-pin PWR_COM1, for COM Port1)
(6-pin PWR_COM2, for COM Port2)
(see p.9, No. 5)

1-2: +12V
3-4: RI# (Default)
5-6: +5V

(3-pin PWR_COM3, for COM Port3)
(3-pin PWR_COM4, for COM Port4)
(see p.9, No. 5)

1-2: +5V (Default)
2-3: +12V

mSATA Select
(3-pin MSATA_SEL1)
(see p.9 No. 4)

1-2: Mini-PCIE + SATA3_4 (Default)
2-3: mSATA (no SATA3_4)

2.7 Onboard Headers and Connectors

Onboard headers and connectors are NOT jumpers. Do NOT place jumper caps over these headers and connectors. Placing jumper caps over the headers and connectors will cause permanent damage of the motherboard!

SATA3 Connectors

(SATA3_1: see p.9, No. 20)

(SATA3_2: see p.9, No. 20)

(SATA3_3: see p.9, No. 20)

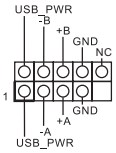
(SATA3_4: see p.9, No. 20)

These four Serial ATA3 (SATA3) connectors support SATA data cables for internal storage devices. The current SATA3 interface allows up to 6.0 Gb/s data transfer rate.

USB 2.0 Connector

(9-pin USB2_34)

(see p.9 No. 8)

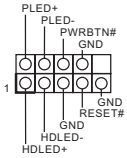


There is one USB 2.0 connector on this motherboard. This USB 2.0 connector can support two USB ports.

System Panel Header

(9-pin PANEL1)

(see p.9 No. 15)



This header accommodates several system front panel functions.

Connect the power switch, reset switch and system status indicator on the chassis to this header according to the pin assignments below. Note the positive and negative pins before connecting the cables.

PWRBTN (Power Switch):
Connect to the power switch on the chassis front panel. You may configure the way to turn off your system using the power switch.
RESET (Reset Switch):
Connect to the reset switch on the chassis front panel. Press the reset switch to restart the computer if the computer freezes and fails to perform a normal restart.
PLED (System Power LED):
Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED keeps blinking when the system is in S1 sleep state. The LED is off when the system is in S3/S4 sleep state or powered off (S5).

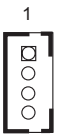
HDLED (Hard Drive Activity LED):
Connect to the hard drive activity LED on the chassis front panel. The LED is on when the hard drive is reading or writing data.

The front panel design may differ by chassis. A front panel module mainly consists of power switch, reset switch, power LED, hard drive activity LED, speaker and etc. When connecting your chassis front panel module to this header, make sure the wire assignments and the pin assign-ments are matched correctly.

3W Audio AMP Output Wafer

(4-pin SPEAKER1)

(see p.9 No. 16)

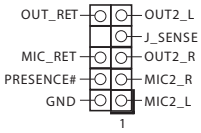


PIN	Signal Name
1	OUTLN
2	OUTLP
3	OUTRP
4	OUTRN

Front Panel Audio Header

(9-pin HD_AUDIO1)

(see p.9 No. 19)



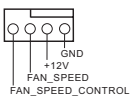
This is an interface for front panel audio cable that allows convenient connection and control of audio devices.

1. High Definition Audio supports Jack Sensing, but the panel wire on the chassis must support HDA to function correctly. Please follow the instruction in our manual and chassis manual to install your system.
2. If you use AC'97 audio panel, please install it to the front panel audio header as below:
   A. Connect Mic_IN (MIC) to MIC2_L.
   B. Connect Audio_R (RIN) to OUT2_R and Audio_L (LIN) to OUT2_L.
   C. Connect Ground (GND) to Ground (GND).
   D. MIC_RET and OUT_RET are for HD audio panel only. You don't need to connect them for AC'97 audio panel.
   E. To activate the front mic.
      Go to the "FrontMic" Tab in the Realtek Control panel. Adjust "Recording Volume".

Chassis Fan Connector

(4-pin CHA_FAN1)

(see p.9 No. 14)

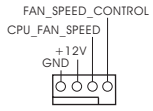


Please connect the fan cable to the fan connector and match the black wire to the ground pin.

CPU Fan Connector

(4-pin CPU_FAN1)

(see p.9 No. 13)



Please connect the CPU fan cable to the connector and match the black wire to the ground pin.

Though this motherboard provides 4-Pin CPU fan (Quiet Fan) support, the 3-Pin CPU fan still can work successfully even without the fan speed control function. If you plan to connect the 3-Pin CPU fan to the CPU fan connector on this motherboard, please connect it to Pin 1-3.

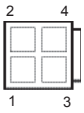
Pin 1-3 Connected

3-Pin Fan Installation

ATX Power Input Connector (Input 12V)

(4-pin ATX12V1)

(see p.9 No. 17)

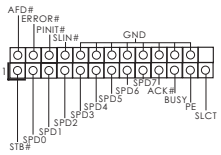


Please connect a DC 12V power supply to this connector.
1-2: GND
3-4: DC Input

Printer Port Header

(25-pin LPT1)

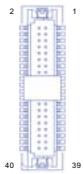
(see p.9 No. 7)



LVDS Connector

(40-pin LVDS1)

(see p.9 No. 24)



PIN	Signal Name	PIN	Signal Name
2	VDD_+5V	1	VDD_+3.3V
4	VDD_+5V	3	VDD_+3.3V
6	DDC_DATA	5	DDC_CLK
8	GND	7	GND
10	LVDS_A0+	9	LVDS_A1+
12	LVDS_A0-	11	LVDS_A1-
14	GND	13	GND
16	LVDS_A2+	15	LVDS_A3+
18	LVDS_A2-	17	LVDS_A3-
20	GND	19	GND
22	LVDS_B0+	21	LVDS_B1+
24	LVDS_B0-	23	LVDS_B1-
26	GND	25	GND
28	LVDS_B2+	27	LVDS_B3+
30	LVDS_B2-	29	LVDS_B3-
32	GND	31	GND
34	LVDS_A_CLK+	33	LVDS_B_CLK+
36	LVDS_A_CLK-	35	LVDS_B_CLK-
38	GND	37	GND
40	VDD_+12V	39	VDD_+12V

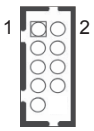
Chassis Intrusion Headers

(2-pin CI1, CI2: see p.9, No. 23)

This motherboard supports CASE OPEN detection feature that detects if the chassis cover has been removed. This feature requires a chassis with chassis intrusion detection design.

COM3, 4 Headers (RS232)

(9-pin COM3/COM4: see p.9, No. 26)

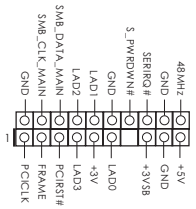


PIN	Signal Name	PIN	Signal Name
1	DDCD#	2	RRXD
3	TTXD	4	DDTR#
5	GND	6	DDSR#
7	RRTS#	8	CCTS#
9	+5V / +12V	10	NC

LPC Header

(19-pin LPC1)

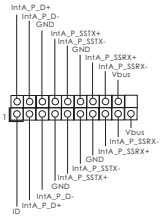
(see p.9, No. 9)



USB 3.0 Connector

(9-pin USB3_34)

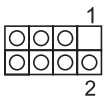
(see p.9 No. 6)



There is one USB 3.0 connector on this motherboard. This USB 3.0 connector can support two USB ports.

SPI Connector

(7-pin SPI1: see p.9, No. 18)

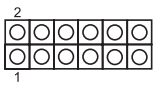


For Update EEPROM BIOS purpose only

PIN	Signal Name	PIN	Signal Name	PIN	Signal Name	PIN	Signal Name
7	GND	5	CLK	3	SPI_MOSI	1	NC
8	+3.3V	6	SPI_CS#	4	SPI_MISO	2	SPI_HOLD1#

Digital Input/Output Pin Header

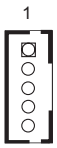
(12-pin JGPIO1: see p.9, No. 10)



PIN	Signal Name	PIN	Signal Name	PIN	Signal Name	PIN	Signal Name	PIN	Signal Name	PIN	Signal Name
2	SIO_GP20	4	SIO_GP21	6	SIO_GP22	8	SIO_GP23	10	SMB_DATA	12	GND
1	SIO_GP24	3	SIO_GP25	5	SIO_GP26	7	SIO_GP27	9	SMB_CLK	11	JGPIO_PWR

Inverter Power Control Wafer

(5-pin BLT_PWR1: see p.9, No. 21)



PIN	Signal Name
1	+12_BL
2	GND
3	CON_LBKLT_EN
4	CON_LBKLT_CTL
5	+5V_BL

ATX Power Input Connector

(24-pin ATXPWR1)

(see p.9 No. 11)

Please connect a power supply to this connector.

Chapter 3: BIOS SETUP UTILITY

3.1 Introduction

This section explains how to use the BIOS SETUP UTILITY to configure your system. The Bios chip on the motherboard stores the BIOS SETUP UTILITY. You may run the BIOSSETUP UTILITY when you start up the computer. Please press <F2> or <Del> during the Power-On-Self-Test (POST) to enter the BIOS SETUP UTILITY, otherwise, POST will continue with its test routines.
If you wish to enter the BIOS SETUP UTILITY after POST, restart the system by pressing <Ctl> + <Alt> + <Delete>, or by pressing the reset button on the system chassis. You may also restart by turning the system off and then back on.

Because the BIOS software is often being updated, the following BIOS setup screens and descriptions are for reference purpose only, and they may not exactly match what you see on your screen.

3.1.1 BIOS Menu Bar

The top of the screen has a menu bar with the following selections:

Main	To set up the system time/date information
Advanced	To set up the advanced BIOS features
H/W Monitor	To display current hardware status
Security	To set up the security features
Boot	To set up the default system device to locate and load the Operating System
Exit	To exit the current screen or the BIOS SETUP UTILITY

Use < ← > key or < → > key to choose among the selections on the menu bar, and then press <Enter> to get into the sub screen. You can also use the mouse to click your required item.

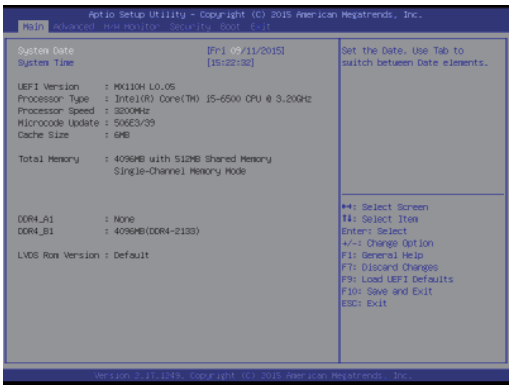
3.1.2 Navigation Keys

Please check the following table for the function description of each navigation key.

Navigation Key(s)	Function Description
← / →	Moves cursor left or right to select Screens
↑ / ↓	Moves cursor up or down to select items
+ / -	To change option for the selected items
<Enter>	To bring up the selected screen
<F1>	To display the General Help Screen
<F7>	Discard changes
<F9>	To load optimal default values for all the settings
<F10>	To save changes and exit the UEFI SETUP UTILITY
<F12>	Print screen
<ESC>	To jump to the Exit Screen or exit the current screen

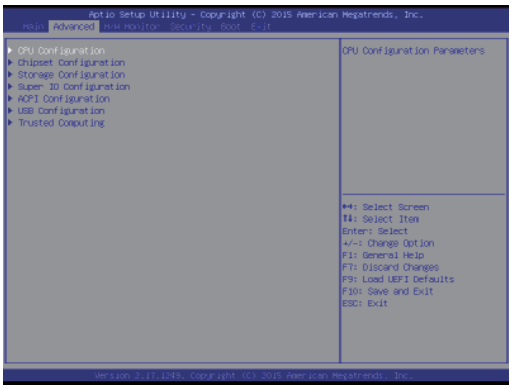
3.2 Main Screen

When you enter the BIOS SETUP UTILITY, the Main screen will appear and display the system overview.



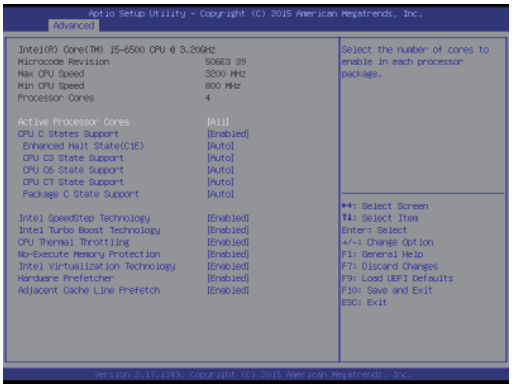
3.3 Advanced Screen

In this section, you may set the configurations for the following items: CPU Configuration, Chipset Configuration, Storage Configuration, Super IO Configuration, ACPI Configuration, and USB Configuration.



Setting wrong values in this section may cause the system to malfunction.

3.3.1 CPU Configuration



Active Processor Cores

Use this item to select the number of cores to enable in each processor package. The default value is [All].

CPU C States Support

Enable CPU C States Support for power saving. It is recommended to keep C3, C6 and C7 all enabled for better power saving.

Enhanced Halt State (C1E)

Enable Enhanced Halt State (C1E) for lower power consumption.

CPU C3 State Support

Use this to enable or disable CPU C3 (ACPI C2) report to OS.

CPU C6 State Support

Use this to enable or disable CPU C6 (ACPI C3) report to OS.

CPU C7 State Support

Use this to enable or disable CPU C7 (ACPI C7) report to OS.

Package C State Support

Selected option will program into C State package limit register. The default value is [Auto].

Intel SpeedStep Technology

Intel SpeedStep technology is Intel's new power saving technology. Processors can switch between multiple frequencies and voltage points to enable power saving. The default value is [Enabled]. Configuration options: [Enabled] and [Disabled]. If you install Windows® 8 / 8.1 and want to enable this function, please set this item to [Enabled]. This item will be hidden if the current CPU does not support Intel SpeedStep technology.

Please note that enabling this function may reduce CPU voltage and lead to system stability or compatibility issues with some power supplies. Please set this item to [Disabled] if above issues occur.

Intel Turbo Boost Technology

Intel Turbo Boost Technology enables the processor to run above its base operating frequency when the operating system requests the highest performance state.

CPU Thermal Throttling

You may select [Enabled] to enable CPU internal thermal control mechanism to keep the CPU from overheating.

No-Execute Memory Protection

No-Execution (NX) Memory Protection Technology is an enhancement to the IA-32 Intel Architecture. An IA-32 processor with “No Execute (NX) Memory Protection” can prevent data pages from being used by malicious software to execute codes. This option will be hidden if the current CPU does not support No-Excute Memory Protection.

Intel Virtualization Technology

When this option is set to [Enabled], a VMM (Virtual Machine Architecture) can utilize the additional hardware capabilities provided by Vanderpool Technology. This option will be hidden if the installed CPU does not support Intel Virtualization Technology.

Hardware Prefetcher

Use this item to turn on/off the MLC streamer prefetcher.

Adjacent Cache Line Prefetch

Use this item to turn on/off prefetching of adjacent cache lines.

3.3.2 Chipset Configuration

Primary Graphics Adapter

This allows you to select [Onboard] or [PCI Express] as the boot graphic adapter priority. The default value is [PCI Express].

Top of Lower Usable Dram

The default value is [Dynamic].

VT-d

Use this to enable or disable Intel® VT-d technology (Intel® Virtualization Technology for Directed I/O). The default value of this feature is [Disabled].

PCIE1 Link Speed

Select the link speed for PCIE1.

Share Memory

Configure the size of memory that is allocated to the integrated graphics processor when the system boots up.

IGPU Multi-Moniter

This allows you to enable or disable IGPU Multi-Moniter. The default value is [Enabled].

Onboard LAN 1

This allows you to enable or disable the Onboard LAN 1 feature.

Onboard LAN 2

This allows you to enable or disable the Onboard LAN 2 feature.

Onboard HD Audio

Select [Auto], [Enabled] or [Disabled] for the onboard HD Audio feature.

Front Panel

Select [Auto] or [Disabled] for the onboard HD Audio Front Panel.

Deep Sleep

Mobile platforms support Deep S5 in DC only and desktop platforms support Deep S5 in AC only. The default value is [Disabled].

Active LVDS

Use this to enable or disable the LVDS. The default value is [Disabled].

Primary IGFX Boot Display

Select a primary VGA.

3.3.3 Storage Configuration

SATA Controller(s)

Use this item to enable or disable the SATA Controller feature.

SATA Mode Selection

Use this to select SATA mode. Configuration options:[AHCI Mode] and [Disabled]. The default value is [AHCI Mode].

AHCI (Advanced Host Controller Interface) supports NCQ and other new features that will improve SATA disk perfor-mance.

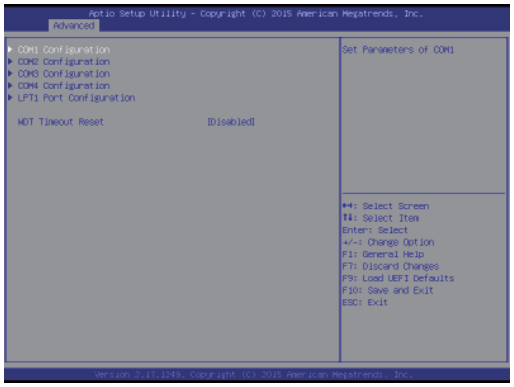
SATA Aggressive Link Power Management

Use this item to configure SATA Aggressive Link Power Management.

Hard Disk S.M.A.R.T.

Use this item to enable or disable the S.M.A.R.T. (Self-Monitoring, Analy-sis, and Reporting Technology) feature. Configuration options: [Disabled] and [Enabled].

3.3.4 Super IO Configuration



COM1 Configuration

Use this to set parameters of COM1. Select COM1 port type: [RS232], [RS422] or [RS485].

COM2 Configuration

Use this to set parameters of COM2.

COM3 Configuration

Use this to set parameters of COM3.

COM4 Configuration

Use this to set parameters of COM4.

LPT1 Port Configuration

Use this set parameters of the onboard parallel port.

WDT Timeout Reset

This allows users to enable/disable the Watch Dog Timer timeout to reset system. The default value is [Disabled].

3.3.5 ACPI Configuration

Suspend to RAM

Use this item to select whether to auto-detect or disable the Suspend-to-RAM feature. Select [Auto] will enable this feature if the OS supports it.

ACPI HPET Table

Use this item to enable or disable ACPI HPET Table. The default value is [Enabled]. Please set this option to [Enabled] if you plan to use this motherboard to submit Windows® certi cation.

PS/2 Keyboard Power On

Use this item to enable or disable PS/2 keyboard to turn on the system from the power-soft-off mode.

PCIE Devices Power On

Use this item to enable or disable PCIE devices to turn on the system from the power-soft-off mode.

Ring-In Power On

Allow the system to be waked up by onboard COM port modem Ring-In signals.

RTC Alarm Power On

Use this item to enable or disable RTC (Real Time Clock) to power on the system.

USB Keyboard/Remote Power On

Use this item to enable or disable USB Keyboard/Remote to power on the system.

USB Mouse Power On

Use this item to enable or disable USB Mouse to power on the system.

3.3.6 USB Configuration

Legacy USB Support

Use this option to select legacy support for USB devices. There are four configuration options: [Enabled], [Auto] and [UEFI Setup Only]. The default value is [Auto]. Please refer to below descriptions for the details of these four options:

[Enabled] - Enables support for legacy USB.

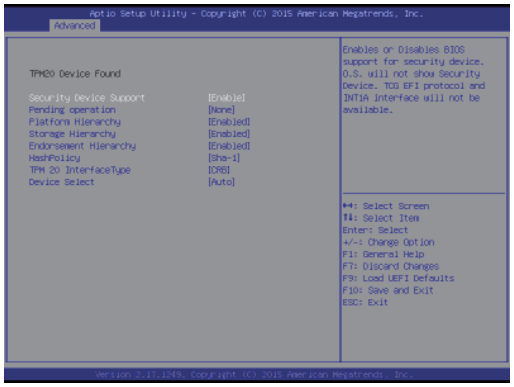
[Auto] - Enables legacy support if USB devices are connected.

[UEFI Setup Only] - USB devices are allowed to use only under UEFI setup and Windows / Linux OS.

PS/2 Simulator

The default value is [Disabled].

3.3.7 Trusted Computing (Optional)

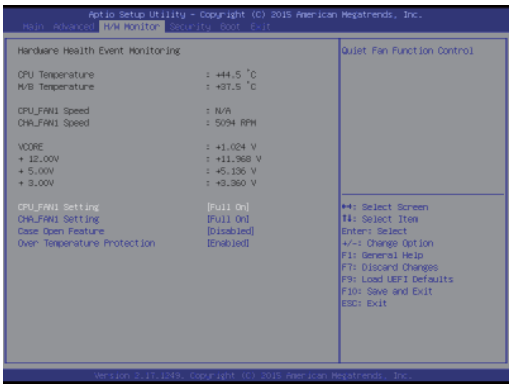


Security Device Support

Enable or disable BIOS support for security device.

3.4 Hardware Health Event Monitoring Screen

In this section, it allows you to monitor the status of the hardware on your system, including the parameters of the CPU temperature, motherboard temperature, CPU fan speed, chassis fan speed, and the critical voltage.



CPU_FAN1 Setting

This allows you to set CPU_FAN1's speed. Configuration options: [Full On] and [Automatic Mode]. The default value is [Full On].

CHA_FAN1 Setting

This allows you to set CHA_FAN1's speed. Configuration options: [Full On] and [Automatic Mode]. The default value is [Full On].

Case Open Feature

This allows you to enable or disable case open detection feature. The default is value [Disabled].

Clear Status

This option appears only when the case open has been detected. Use this option to keep or clear the record of previous chassis intrusion status.

Over Temperature Protection

Use this item to enable or disable Over Temperature Protection. The default value is [Enabled].

3.5 Security Screen

In this section, you may set, change or clear the supervisor/user password for the system.

Supervisor Password

Set or change the password for the administrator account. Only the ad-ministrator has authority to change the settings in the BIOS Setup Utility. Leave it blank and press enter to remove the password.

User Password

Set or change the password for the user account. Users are unable to change the settings in the BIOS Setup Utility. Leave it blank and press en-ter to remove the password.

Secure Boot

Enable to support Windows 8 64-bit Secure Boot.

3.6 Boot Screen

In this section, it will display the available devices on your system for you to confi gure the boot settings and the boot priority.

Boot From Onboard LAN

Use this item to enable or disable the Boot From Onboard LAN feature.

Setup Prompt Timeout

This shows the number of seconds to wait for setup activation key.

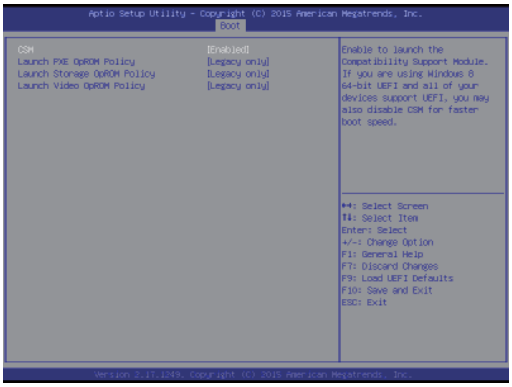
Bootup Num-Lock

If this item is set to [On], it will automatically activate the Numeric Lock function after boot-up.

Boot Beep

Select whether the Boot Beep should be turned on or off when the system boots up. Please note that a buzzer is needed.

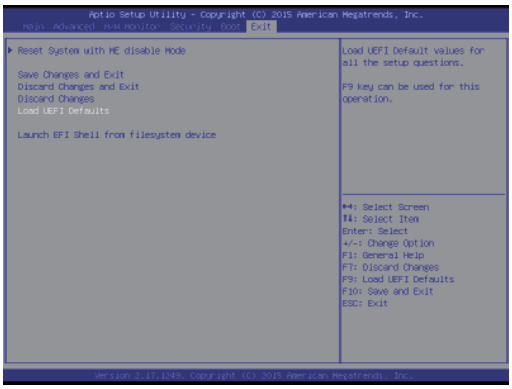
CSM (Compatibility Support Module)



CSM

Enable to launch the Compatibility Support Module. Please do not disable unless you're running a WHCK test. If you are using Windows® 8 64-bit and all of your devices support UEFI, you may also disable CSM for faster boot speed.

3.7 Exit Screen



Reset System with ME disable Mode

ME will run into the temporary disable mode. Ignore it if ME Ignition FW.

Save Changes and Exit

When you select this option, it will pop-out the following message, “Save configuration changes and exit setup?” Select [OK] to save the changes and exit the BIOS SETUP UTILITY.

Discard Changes and Exit

When you select this option, it will pop-out the following message, “Discard changes and exit setup?” Select [OK] to exit the BIOS SETUP UTILITY without saving any changes.

Discard Changes

When you select this option, it will pop-out the following message, “Discard changes?” Select [OK] to discard all changes.

Load UEFI BIOS Defaults

Load BIOS default values for all the setup questions. F9 key can be used for this operation.

Launch EFI Shell from filesystem device

Attempts to Launch EFI Shell application (Shell64.efi) from one of the available lesystem devices.

Appendix: GPIO Programming

7.1 Configuration Sequence

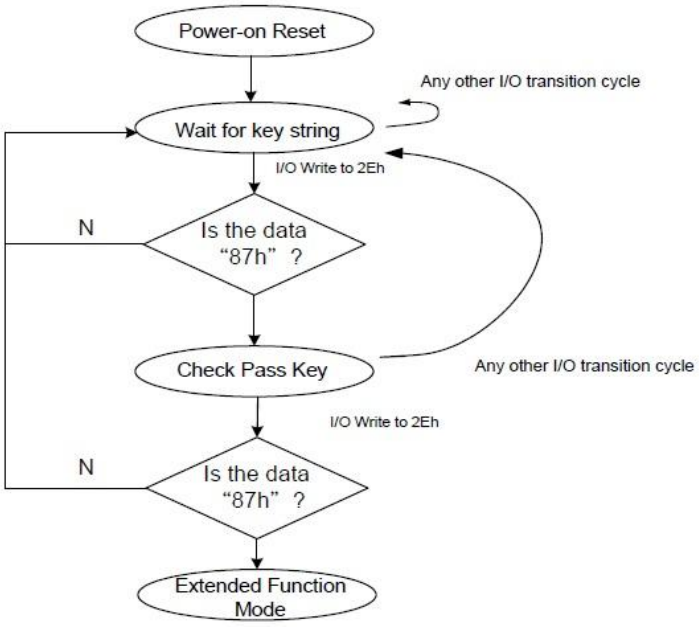


Figure 7-2 Configuration Register

To program the NCT6102D / NCT6104D / NCT6106D configuration registers, the following configuration procedures must be followed in sequence:

(1). Enter the Extended Function Mode.

(2). Configure the configuration registers.

(3). Exit the Extended Function Mode.

7.1.1 Enter the Extended Function Mode

To place the chip into the Extended Function Mode, two successive writes of 0x87 must be applied to Extended Function Enable Registers (EFERs, i.e. 2Eh or 4Eh).

7.1.2 Configure the Configuration Registers

The chip selects the Logical Device and activates the desired Logical Devices through Extended Function Index Register (EFIR) and Extended Function Data Register (EFDR). The EFIR is located at the same address as the EFER, and the EFDR is located at address (EFIR+1).

First, write the Logical Device Number (i.e. 0x07) to the EFIR and then write the number of the desired Logical Device to the EFDR. If accessing the Chip (Global) Control Registers, this step is not required.

Secondly, write the address of the desired configuration register within the Logical Device to the EFIR and then write (or read) the desired configuration register through the EFDR.

7.1.3 Exit the Extended Function Mode

To exit the Extended Function Mode, writing 0xAA to the EFER is required. Once the chip exits the Extended Function Mode, it is in the normal running mode and is ready to enter the configuration mode.

23.8 Logical Device 7 (GPIO)

CR 30h.

Location: Address 30h
Attribute: Read/Write
Power Well: VSB
Reset by: RSMRST#, LRESET# (Bit2)
Default : DFh
Size: 8 bits

BIT	READ / WRITE	DESCRIPTION	
7	R / W	0: GPIO7 is inactive.	1: GPIO7 is active.
6	R / W	0: GPIO6 is inactive.	1: GPIO6 is active.
5	R / W	0: GPIO5 is inactive.	1: GPIO5 is active.
4	R / W	0: GPIO4 is inactive.	1: GPIO4 is active.
3	R / W	0: GPIO3 is inactive.	1: GPIO3 is active.
2	R / W	0: GPIO2 is inactive.	1: GPIO2 is active.
1	R / W	0: GPIO1 is inactive.	1: GPIO1 is active.
0	R / W	0: GPIO0 is inactive.	1: GPIO0 is active.

CR E8h. GPIO2 I/O Register

Location: Address E8h
Attribute: Read/Write
Power Well: VCC
Reset by: GP2X_MRST

Default : FFh
Size: 8 bits

BIT	READ / WRITE	DESCRIPTION
7-0	R / W	GPIO2 I/O register 0: The respective GPIO2 PIN is programmed as an output port 1: The respective GPIO2 PIN is programmed as an input port.

CR E9h. GPIO2 Data Register

Location: Address E9h
Attribute: Read/Write
Power Well: VCC
Reset by: GP2X_MRST
Default : 00h
Size: 8 bits

BIT	READ / WRITE	DESCRIPTION
7-0	R / W	GPIO2 Data register For output ports, the respective bits can be read/written and produced to pins.
	Read Only	For input ports, the respective bits can be read only from pins. Write accesses will be ignored.

GPIO Setting(GP20～GP27)：

1.GP20：

```
//Enter the Extended Function Mode
IO_WRITE_BYTE(0x2E, 0x87);
IO_WRITE_BYTE(0x2E, 0x87);
// Configure the configuration registers
//Switch to local device 7
IO_WRITE_BYTE(0x2E, 0x07);
IO_WRITE_BYTE(0x2F, 0x07);
//Activate GPIO group 2
IO_WRITE_BYTE(0x2E, 0x30);
UCHAR Temp = IO_READ_BYTE(0x2F)|0x04;
IO_WRITE_BYTE(0x2E, 0x30);
IO_WRITE_BYTE(0x2F, Temp);
//Programmed GPIO20 as an output port
IO_WRITE_BYTE(0x2E, 0xE8);
UCHAR Temp = IO_READ_BYTE(0x2F)&0xFE;
IO_WRITE_BYTE(0x2E, 0xE8);
IO_WRITE_BYTE(0x2F, Temp);
//Set GPIO20 to low state
IO_WRITE_BYTE(0x2E, 0xE9);
UCHAR Temp = IO_READ_BYTE(0x2F)&0xFE;
IO_WRITE_BYTE(0x2E, 0xE9);
IO_WRITE_BYTE(0x2F, Temp);
//Set GPIO20 to high state
IO_WRITE_BYTE(0x2E, 0xE9);
UCHAR Temp = IO_READ_BYTE(0x2F)|0x01;
IO_WRITE_BYTE(0x2E, 0xE9);
IO_WRITE_BYTE(0x2F, Temp);
// Exit the Extended Function Mode
IO_WRITE_BYTE(0x2E, 0xAA);
```

2.GP21：

```
//Enter the Extended Function Mode
IO_WRITE_BYTE(0x2E, 0x87);
IO_WRITE_BYTE(0x2E, 0x87);
// Configure the configuration registers
//Switch to local device 7
IO_WRITE_BYTE(0x2E, 0x07);
IO_WRITE_BYTE(0x2F, 0x07);
//Activate GPIO group 2
IO_WRITE_BYTE(0x2E, 0x30);
UCHAR Temp = IO_READ_BYTE(0x2F)|0x04;
IO_WRITE_BYTE(0x2E, 0x30);
IO_WRITE_BYTE(0x2F, Temp);
//Programmed GPIO21 as an output port
IO_WRITE_BYTE(0x2E, 0xE8);
UCHAR Temp = IO_READ_BYTE(0x2F)&0xFD;
IO_WRITE_BYTE(0x2E, 0xE8);
IO_WRITE_BYTE(0x2F, Temp);
//Set GPIO21 to low state
IO_WRITE_BYTE(0x2E, 0xE9);
UCHAR Temp = IO_READ_BYTE(0x2F)&0xFD;
IO_WRITE_BYTE(0x2E, 0xE9);
IO_WRITE_BYTE(0x2F, Temp);
//Set GPIO21 to high state
IO_WRITE_BYTE(0x2E, 0xE9);
UCHAR Temp = IO_READ_BYTE(0x2F)|0x02;
IO_WRITE_BYTE(0x2E, 0xE9);
IO_WRITE_BYTE(0x2F, Temp);
// Exit the Extended Function Mode
IO_WRITE_BYTE(0x2E, 0xAA);
```

3.GP22：

```
//Enter the Extended Function Mode
IO_WRITE_BYTE(0x2E, 0x87);
IO_WRITE_BYTE(0x2E, 0x87);
// Configure the configuration registers
//Switch to local device 7
IO_WRITE_BYTE(0x2E, 0x07);
IO_WRITE_BYTE(0x2F, 0x07);
//Activate GPIO group 2
IO_WRITE_BYTE(0x2E, 0x30);
UCHAR Temp = IO_READ_BYTE(0x2F)|0x04;
IO_WRITE_BYTE(0x2E, 0x30);
IO_WRITE_BYTE(0x2F, Temp);
//Programmed GPIO22 as an output port
IO_WRITE_BYTE(0x2E, 0xE8);
UCHAR Temp = IO_READ_BYTE(0x2F)&0xFB;
IO_WRITE_BYTE(0x2E, 0xE8);
IO_WRITE_BYTE(0x2F, Temp);
//Set GPIO22 to low state
IO_WRITE_BYTE(0x2E, 0xE9);
UCHAR Temp = IO_READ_BYTE(0x2F)&0xFB;
IO_WRITE_BYTE(0x2E, 0xE9);
IO_WRITE_BYTE(0x2F, Temp);
//Set GPIO22 to high state
IO_WRITE_BYTE(0x2E, 0xE9);
UCHAR Temp = IO_READ_BYTE(0x2F)|0x04;
IO_WRITE_BYTE(0x2E, 0xE9);
IO_WRITE_BYTE(0x2F, Temp);
// Exit the Extended Function Mode
IO_WRITE_BYTE(0x2E, 0xAA);
```

4.GP23：

```
//Enter the Extended Function Mode
IO_WRITE_BYTE(0x2E, 0x87);
IO_WRITE_BYTE(0x2E, 0x87);
// Configure the configuration registers
//Switch to local device 7
IO_WRITE_BYTE(0x2E, 0x07);
IO_WRITE_BYTE(0x2F, 0x07);
//Activate GPIO group 2
IO_WRITE_BYTE(0x2E, 0x30);
UCHAR Temp = IO_READ_BYTE(0x2F)|0x04;
IO_WRITE_BYTE(0x2E, 0x30);
IO_WRITE_BYTE(0x2F, Temp);
//Programmed GPIO23 as an output port
IO_WRITE_BYTE(0x2E, 0xE8);
UCHAR Temp = IO_READ_BYTE(0x2F)&0xF7;
IO_WRITE_BYTE(0x2E, 0xE8);
IO_WRITE_BYTE(0x2F, Temp);
//Set GPIO23 to low state
IO_WRITE_BYTE(0x2E, 0xE9);
UCHAR Temp = IO_READ_BYTE(0x2F)&0xF7;
IO_WRITE_BYTE(0x2E, 0xE9);
IO_WRITE_BYTE(0x2F, Temp);
//Set GPIO23 to high state
IO_WRITE_BYTE(0x2E, 0xE9);
UCHAR Temp = IO_READ_BYTE(0x2F)|0x08;
IO_WRITE_BYTE(0x2E, 0xE9);
IO_WRITE_BYTE(0x2F, Temp);
// Exit the Extended Function Mode
IO_WRITE_BYTE(0x2E, 0xAA);
```

5.GP24：

```
//Enter the Extended Function Mode
IO_WRITE_BYTE(0x2E, 0x87);
IO_WRITE_BYTE(0x2E, 0x87);
// Configure the configuration registers
//Switch to local device 7
IO_WRITE_BYTE(0x2E, 0x07);
IO_WRITE_BYTE(0x2F, 0x07);
//Activate GPIO group 2
IO_WRITE_BYTE(0x2E, 0x30);
UCHAR Temp = IO_READ_BYTE(0x2F)|0x04;
IO_WRITE_BYTE(0x2E, 0x30);
IO_WRITE_BYTE(0x2F, Temp);
//Programmed GPIO24 as an output port
IO_WRITE_BYTE(0x2E, 0xE8);
UCHAR Temp = IO_READ_BYTE(0x2F)&0xEF;
IO_WRITE_BYTE(0x2E, 0xE8);
IO_WRITE_BYTE(0x2F, Temp);
//Set GPIO24 to low state
IO_WRITE_BYTE(0x2E, 0xE9);
UCHAR Temp = IO_READ_BYTE(0x2F)&0xEF;
IO_WRITE_BYTE(0x2E, 0xE9);
IO_WRITE_BYTE(0x2F, Temp);
//Set GPIO24 to high state
IO_WRITE_BYTE(0x2E, 0xE9);
UCHAR Temp = IO_READ_BYTE(0x2F)|0x10;
IO_WRITE_BYTE(0x2E, 0xE9);
IO_WRITE_BYTE(0x2F, Temp);
// Exit the Extended Function Mode
IO_WRITE_BYTE(0x2E, 0xAA);
```

6.GP25：

```
//Enter the Extended Function Mode
IO_WRITE_BYTE(0x2E, 0x87);
IO_WRITE_BYTE(0x2E, 0x87);
// Configure the configuration registers
//Switch to local device 7
IO_WRITE_BYTE(0x2E, 0x07);
IO_WRITE_BYTE(0x2F, 0x07);
//Activate GPIO group 2
IO_WRITE_BYTE(0x2E, 0x30);
UCHAR Temp = IO_READ_BYTE(0x2F)|0x04;
IO_WRITE_BYTE(0x2E, 0x30);
IO_WRITE_BYTE(0x2F, Temp);
//Programmed GPIO25 as an output port
IO_WRITE_BYTE(0x2E, 0xE8);
UCHAR Temp = IO_READ_BYTE(0x2F)&0xDF;
IO_WRITE_BYTE(0x2E, 0xE8);
IO_WRITE_BYTE(0x2F, Temp);
//Set GPIO25 to low state
IO_WRITE_BYTE(0x2E, 0xE9);
UCHAR Temp = IO_READ_BYTE(0x2F)&0xDF;
IO_WRITE_BYTE(0x2E, 0xE9);
IO_WRITE_BYTE(0x2F, Temp);
//Set GPIO25 to high state
IO_WRITE_BYTE(0x2E, 0xE9);
UCHAR Temp = IO_READ_BYTE(0x2F)|0x20;
IO_WRITE_BYTE(0x2E, 0xE9);
IO_WRITE_BYTE(0x2F, Temp);
// Exit the Extended Function Mode
IO_WRITE_BYTE(0x2E, 0xAA);
```

7.GP26：

```
//Enter the Extended Function Mode
IO_WRITE_BYTE(0x2E, 0x87);
IO_WRITE_BYTE(0x2E, 0x87);
// Configure the configuration registers
//Switch to local device 7
IO_WRITE_BYTE(0x2E, 0x07);
IO_WRITE_BYTE(0x2F, 0x07);
//Activate GPIO group 2
IO_WRITE_BYTE(0x2E, 0x30);
UCHAR Temp = IO_READ_BYTE(0x2F)|0x04;
IO_WRITE_BYTE(0x2E, 0x30);
IO_WRITE_BYTE(0x2F, Temp);
//Programmed GPIO26 as an output port
IO_WRITE_BYTE(0x2E, 0xE8);
UCHAR Temp = IO_READ_BYTE(0x2F)&0xBF;
IO_WRITE_BYTE(0x2E, 0xE8);
IO_WRITE_BYTE(0x2F, Temp);
//Set GPIO26 to low state
IO_WRITE_BYTE(0x2E, 0xE9);
UCHAR Temp = IO_READ_BYTE(0x2F)&0xBF;
IO_WRITE_BYTE(0x2E, 0xE9);
IO_WRITE_BYTE(0x2F, Temp);
//Set GPIO26 to high state
IO_WRITE_BYTE(0x2E, 0xE9);
UCHAR Temp = IO_READ_BYTE(0x2F)|0x40;
IO_WRITE_BYTE(0x2E, 0xE9);
IO_WRITE_BYTE(0x2F, Temp);
// Exit the Extended Function Mode
IO_WRITE_BYTE(0x2E, 0xAA);
```

8.GP27：

```
//Enter the Extended Function Mode
IO_WRITE_BYTE(0x2E, 0x87);
IO_WRITE_BYTE(0x2E, 0x87);
// Configure the configuration registers
//Switch to local device 7
IO_WRITE_BYTE(0x2E, 0x07);
IO_WRITE_BYTE(0x2F, 0x07);
//Activate GPIO group 2
IO_WRITE_BYTE(0x2E, 0x30);
UCHAR Temp = IO_READ_BYTE(0x2F)|0x04;
IO_WRITE_BYTE(0x2E, 0x30);
IO_WRITE_BYTE(0x2F, Temp);
//Programmed GPIO27 as an output port
IO_WRITE_BYTE(0x2E, 0xE8);
UCHAR Temp = IO_READ_BYTE(0x2F)&0x7F;
IO_WRITE_BYTE(0x2E, 0xE8);
IO_WRITE_BYTE(0x2F, Temp);
//Set GPIO27 to low state
IO_WRITE_BYTE(0x2E, 0xE9);
UCHAR Temp = IO_READ_BYTE(0x2F)&0x7F;
IO_WRITE_BYTE(0x2E, 0xE9);
IO_WRITE_BYTE(0x2F, Temp);
//Set GPIO27 to high state
IO_WRITE_BYTE(0x2E, 0xE9);
UCHAR Temp = IO_READ_BYTE(0x2F)|0x80;
IO_WRITE_BYTE(0x2E, 0xE9);
IO_WRITE_BYTE(0x2F, Temp);
// Exit the Extended Function Mode
IO_WRITE_BYTE(0x2E, 0xAA);
```