USER GUIDE

AP1430

Doc. Rev. 1.1

POSSIBILITIES START HERE kontron

AP1430 - USER GUIDE

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Revision History

Revision	Brief Description of Changes	Date of Issue
1.0	Initial Issue	2017-Mar-17
1.1	No RDIMM support – removed from this guide Changed 280 for 300W PSU IPMI mention removed / indicated that IPMI port is UNUSED Remove section about Installing 3.5'' HDD Changed Factory Default (F/D) by User Configurable Section 3.3 – Many changes to this subsection, including add/remove CPU heatsink details Add information about Power Budget vs PCIe card	2017-Aug-02

Customer Service

Visit our website at www.kontron.com.

Customer Comments

If you have any difficulties using this guide, discover an error, or just want to provide some feedback, please send a message to Kontron. Detail any errors you find. We will correct the errors or problems as soon as possible and post the revised user guide on our website. Thank you.

Symbols

The following symbols may be used in this manual

⚠DANGER	DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.
⚠WARNING	WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠CAUTION	CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.
NOTICE	NOTICE indicates a property damage message.
	**Electric Shock!** This symbol and title warn of hazards due to electrical shocks (> 60 V) when touching products or parts of them. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your material. Please refer also to the "High-Voltage Safety Instructions" portion below in this section.
	**ESD Sensitive Device!** This symbol and title inform that the electronic boards and their components are sensitive to static electricity. Care must therefore be taken during all handling operations and inspections of this product in order to ensure product integrity at all times.
	**HOT Surface!** Do NOT touch! Allow to cool before servicing.
	This symbol indicates general information about the product and the user manual. This symbol also indicates detail information about the specific product configuration.
	This symbol precedes helpful hints and tips for daily use.

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Electrostatic Discharge

⚠CAUTION The AP1430 is sensitive to electrostatic discharge (ESD). Users must take the appropriate precautions when handling ESD-sensitive devices.

Limited Warranty

Kontron grants the original purchaser of Kontron's products a TWO YEAR LIMITED HARDWARE WARRANTY as described in the following. However, no other warranties that may be granted or implied by anyone on behalf of Kontron are valid unless the consumer has the express written consent of Kontron.

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If the customer's eligibility for warranty has not been voided, in the event of any claim, he may return the product at the earliest possible convenience to the original place of purchase, together with a copy of the original document of purchase, a full description of the application the product is used on and a description of the defect. Pack the product in such a way as to ensure safe transportation (see our safety instructions).

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1/ Guide Overview

1.1. About this Guide

The AP1430 network platform offers high reliability and performance through the LGA1151 socket Intel® Xeon® E3 and 6th generation Intel® Core™ processors (codename: Skylake) with Intel® C236 chipset. The new platform features increased processor performance and faster I/O based on PCIe Gen 3, and brings greater memory bandwidth and capacity with DDR4 technology. This powerful network device offers outstanding I/O density scaling up to 13 one gigabit Ethernet ports, or three 10GbE ports in a modular architecture. The Network Interface Card (NIP) enables numerous port configurations with or without network bypass, offload and acceleration.

1.2. Intended Audience

This guide is intended for use by engineers who are evaluating and developing their own applications on the AP1430.

1.3. Guide Overview

This guide describes how to configure the AP1430 to meet various operating requirements and is organized as follows:

- Section 1/ provides an overview of this guide and information about contacting customer support.
- Section 2/ provides an overview of the components in the AP1430, a description of the features, and jumper settings.
- Section 3/ specifies hardware installation procedures.
- Section 4/ provides BIOS settings.

1.4. Technical or Customer Support

- You can reach Kontron customer support in the following ways: visit the Kontron website at kontron.com or email your questions to Support-COM@kontron.com.

2/ Introduction

2.1. Processor and Chipset Overview

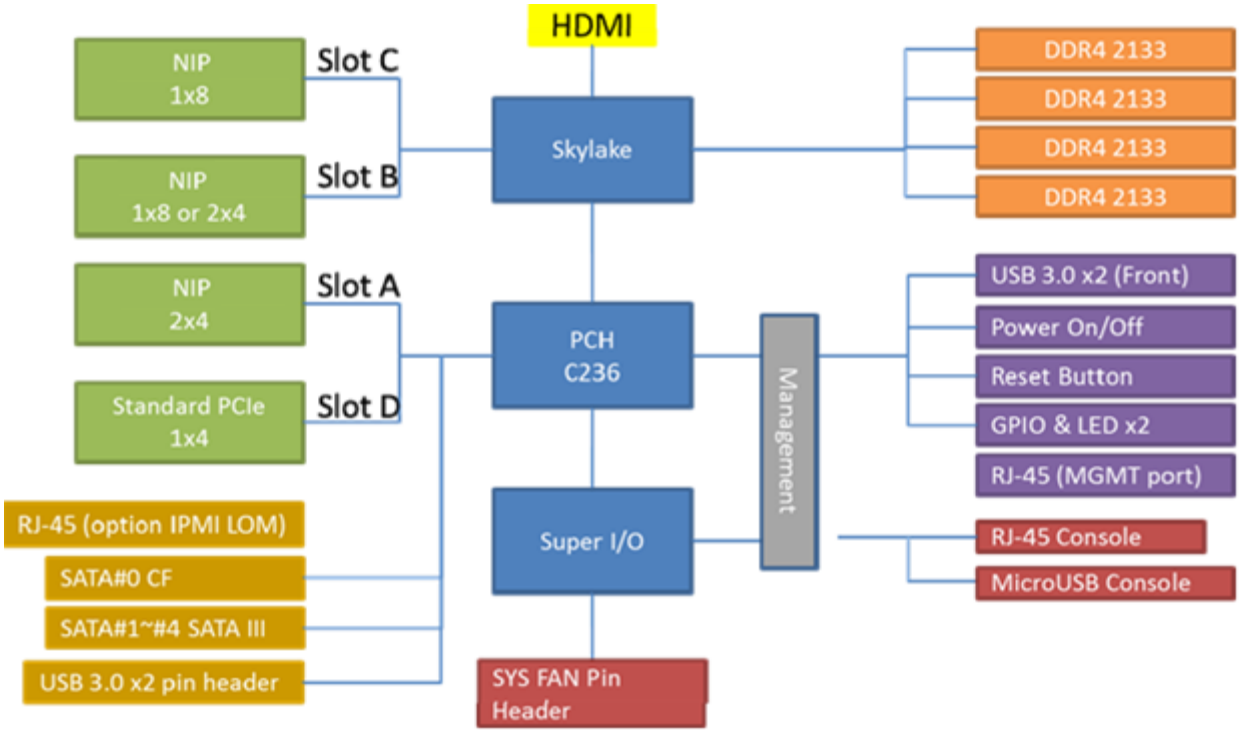
Built upon the functionalities and capabilities of the Intel® Skylake-S® Pentium® and Core™ series processors of the C236 chipset, the AP1430 provides the performance and features required for single processor workstation platforms.

2.2. Motherboard Features

Table 1: Motherboard features

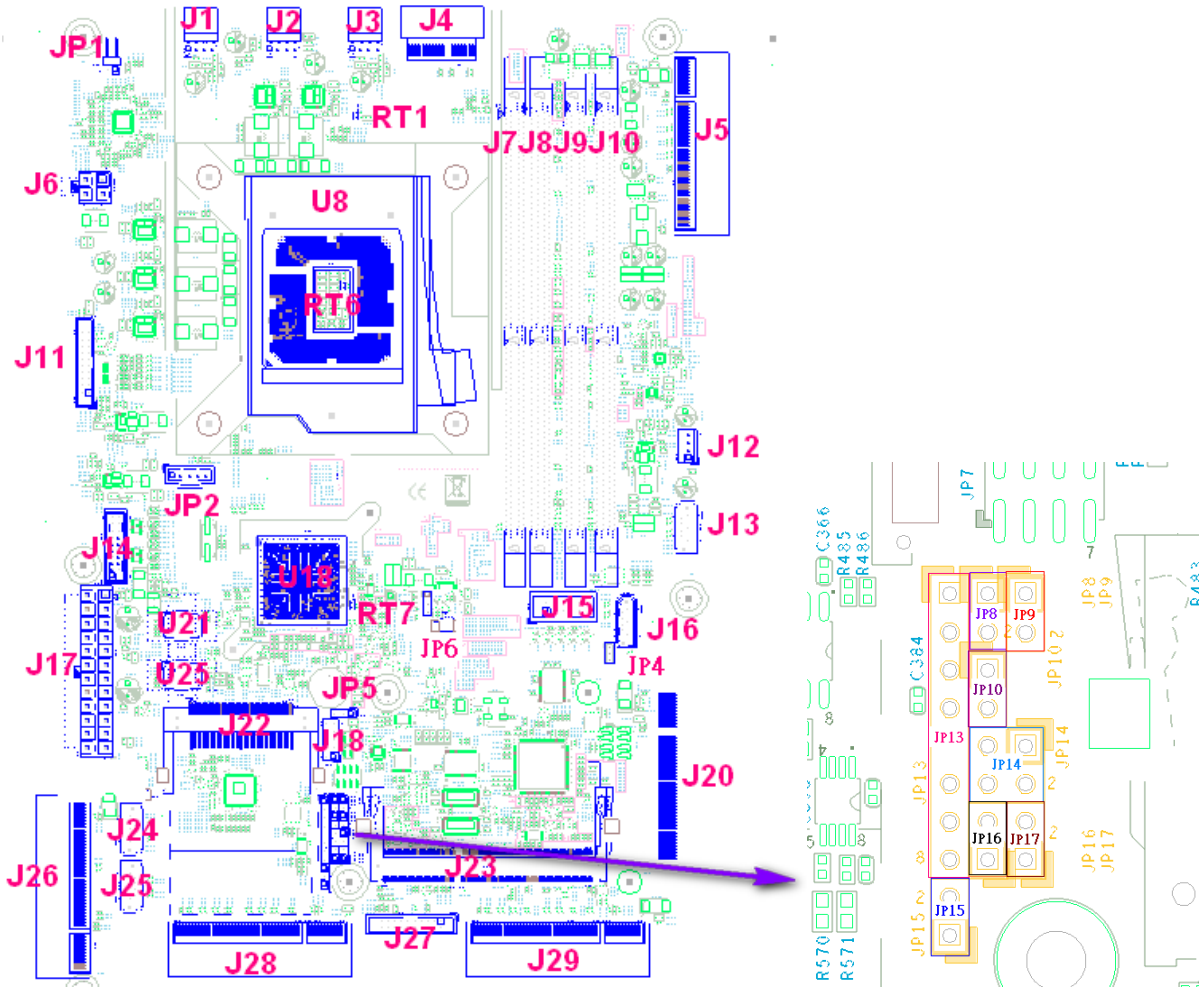
CPU/PCH	Intel® Skylake-S family processors of the Intel® C236 PCH
Memory	Up to 4 x DDR4 2133 non-ECC/ECC UDIMM
Storage	1 x CF, up to 2 x 2.5 HDD
Expansion	3 x NIP slots and 1 x standard low profile add-on card
Display	HDMI
LCD panel	EZIO-360
Bypass	Depends on LAN module
I/O interface	2 x USB3.0, 1 x RJ45 Console, 1 x Micro USB Console, 1 x RJ45 Mgmnt, 1 x RJ45 IPMI (**NOT USED**)
Power	2 x 300W AC PSU (redundant)
Dimension	438 mm (W) x 482.6 mm (D) x 44 mm (H)
LED	1 x HDD LED and 1 x Power LED
Button	1 x User Configurable (F/D) and 1 x Power on/off

Figure 1: AP1430 block diagram



2.3. Jumper Setting

Figure 2: Main board component map



Thermal Sensor List

- RT1: FAN-in Temperature Sensor
- RT6: CPU Temperature Sensor
- RT7: System Temperature

CPU Socket

- U8: CPU Socket

Table 2: DIMM socket

Connector	Function
J7	CH A DIMM0
J8	CH A DIMM1
J9	CH B DIMM0
J10	CH B DIMM1

Table 3: Jumper list

Jumper	Function
JP1	Power button (internal)
JP2	PMBus for power supply
JP4	SATA DOM 1-2: SATA DOM (default) Open: SATA
JP5	GPIO power 1-2: 5V 2-3: 3.3V (default)
JP6	CLR CMOS 1-2: Normal (default) 2-3: Clear CMOS
JP8	WDT function 1-2: Enable WDT (default) Open: Disable WDT
JP9	Reset header
JP10	Auto power on header
JP13	CPLD programming header
JP14	Auto power on PIC 1-2: Normal (default) 3-4: Normal (default)
JP15	CASE OPEN
JP16	FORCE_RECOVERY_ROM_N
JP17	AUTO_PWR_BTN_EN_N

Table 4: Connector list

Connector	Function
J1/J2/J3	FAN connector
J4	FAN connector (not used)
J5	Standard PCIe x4 (Slot_D)
J6	Power supply 12VDC
J7/J8/J9/J10	DDR4 connector
J11	HDMI header
J12	SATA power
J13/J24/J25	SATA connector
J14	USB 3.0 header
J15	VGA for IPMI
J16	SATA DOM
J17	ATX 24 pin
J18	GPIO header
J20	Connect CB-2070 riser (Slot_C)
J21	Battery socket
J22	CF connector
J23	LOM2400 connector
J26	Slot for management board
J27	TPM header
J28	PCIe extension port for NIP card (Slot_A)
J29	PCIe extension port for NIP card (Slot_B)

NOTE: Customer can add a Low-Profile PCIe x4 card in rear slot (J5/Slot D). As per PCIe standard, maximum power consumption of such card must be 25W.

Table 5: JP2 – PMBus connector

Pin	Signal Name
1	CLOCK
2	DATA
3	Alert
4	GND
5	3.3V

Table 6: JP4 – SATA DOM power select

Pin	Signal Name
1	+5S

2	SATA_DOM_POWER
3	GND

Table 7: JP5 – GPIO power select

Pin	Signal Name
1	+V5S
2	SIO_GPIO_VCC
3	+V3P3S

Table 8: JP6 – Clear CMOS

Pin	Signal Name
1	NC
2	RTCRST#
3	GND

Table 9: J1/J2/J3 – Smart fan

Pin	Signal Name
1	GND
2	+V12S
3	SYS_FAN_IN
4	SYS_FAN_OUT

Table 10: J13/J24/J25 – SATA connector

Pin	Signal Name
1	GND
2	TX+
3	TX-
4.	GND
5	RX-
6	RX+
7	GND

P1	GND
P2	GND

Table 11: J14 – USB3.0

Pin	Signal Name	Pin	Signal Name
20	KEY	1	+5V
19	+5V	2	SSRX2_N
18	SSRX1_N	3	SSRX2_P
17	SSRX1_P	4	GND
16	GND	5	SSTX2_N
15	SSTX1_N	6	SSTX2_P
14	SSTX1_P	7	GND
13	GND	8	D1_N
12	D2_N	9	D1_P
11	D2_P	10	GND

Table 12: J15 – VGA

Pin	Signal Name	Pin	Signal Name
1	RED	2	DDC_CLOCK
3	GREEN	4	GND
5	BLUE	6	DDC_DATA
7	V-SYNC	8	GND
9	H-SYNC	10	NC

Table 13: J16 – SATA DOM connector

Pin	Signal Name
1	GND
2	TX+
3	TX-
4	GND
5	RX-

6	RX+
7	GND
P1	SATA_DOM_POWER
P2	GND

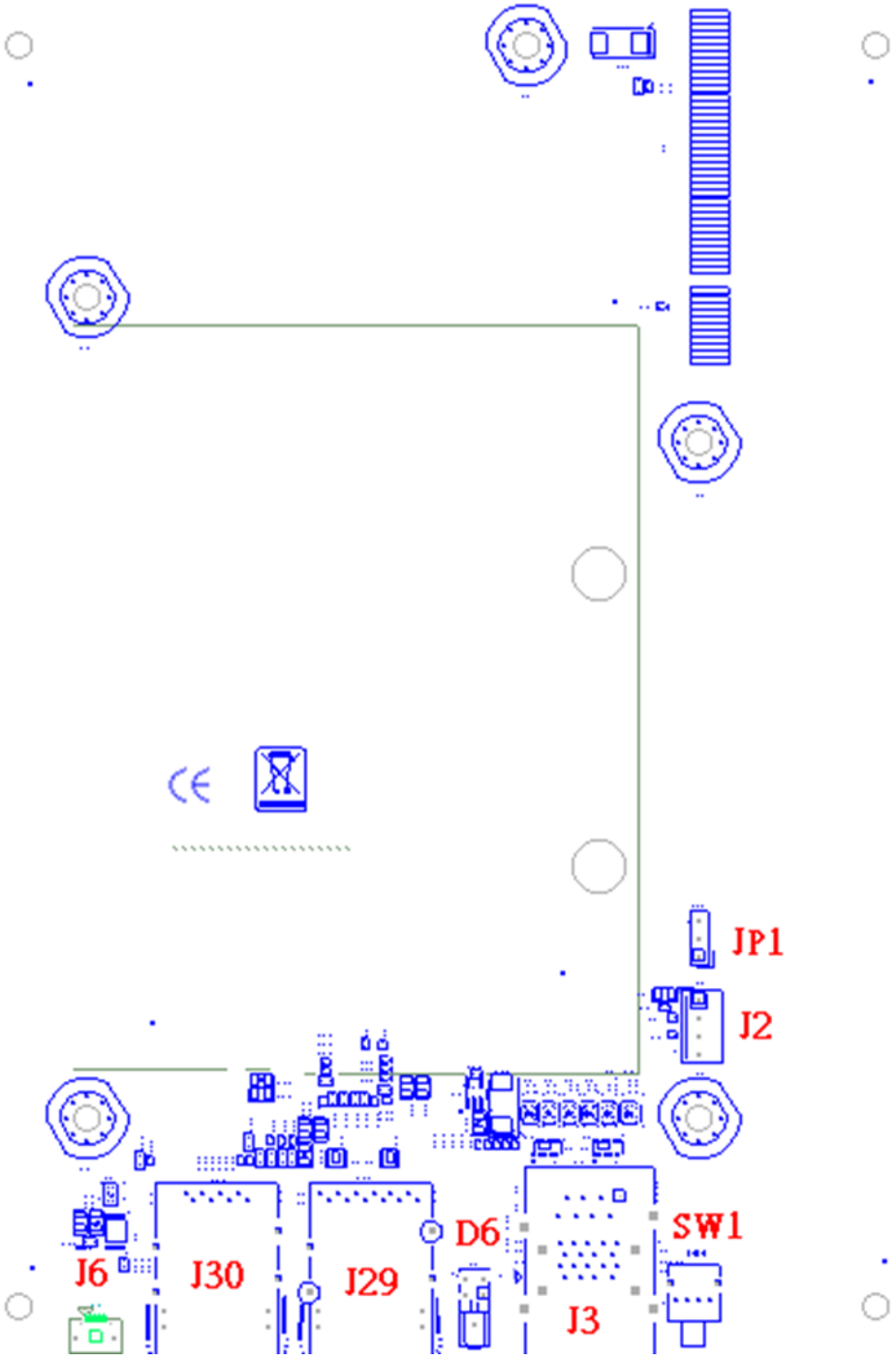
Table 14: J18 – GPIO

Pin	Signal Name	Pin	Signal Name
1	SIO_GP67	2	SIO_GP60
3	SIO_GP66	4	SIO_GP61
5	SIO_GP65	6	SIO_GP62
7	SIO_GP64	8	SIO_GP63
9	GND	10	SIO_GPIO_VCC

Table 15: J27 – TPM

Pin	Signal Name	Pin	Signal Name
1	TPM_CLK	2	GND
3	LFRAME#	4	NC
5	TPM_RESET#	6	5V
7	LAD3	8	LAD2
9	VCC3	10	LAD1
11	LAD0	12	GND
13	SMB_CLK	14	SMB_DATA
15	3VSB	16	SERIRQ
17	GND	18	GND
19	3VSB	20	LDRQ#1

Figure 3: Management board component map



The following tables contain descriptions of the components shown on Figure 3.

Table 16: JP1 – Power/Reset for SW1-lower

Position	Function
1-2	Power button
2-3	Reset button (default)

Table 17: Connector list

Connector	Function
J30	IPMI LAN
J29	I211 LAN
D6	LED (up: Power; down: SATA access)
J3	Dual USB3.0 and Console port
SW1-lower	Power/Reset button
SW1-upper	User Configurable button
J2	EZIO header for EZIO 360

NOTE:

- User Configurable button

  1. The User Configurable button can be used to perform a software-triggered User Definable task. Customer's application must take in charge this implementation. **NOTE**: A specific driver is needed to enable this functionality. Verify driver availability on Kontron's website in the AP1430 page, or contact Technical Support (Support-COM@kontron.com) if it is not on the website.

  This button is recessed behind the faceplate. It is suggested to use a pen tip to press the button.

Table 18: J2 – LCD display

Pin	Signal Name
1	5V
2	IN
3	OUT
4	GND

3/ Hardware Installation Procedures

3.1. Chassis

The system is integrated in a customized 1U chassis. On the front panel, you will find two management ports (standard + IPMI (unused)), one RJ45 port (default baud rate is 115200), two USB ports, and three NIP module slots. One of the three NIP modules may be filled with either a quad-port 1GbE module or a dual-port 10GbE module.

Figure 4: Front view of chassis

Figure 5: Rear view of chassis

3.2. Opening the Chassis

1. Loosen and remove the 4 screws of the chassis—one on each side and two at the rear—to remove the top lid.

Figure 6: Location of the screws

Disconnect power supply before servicing.

3.3. Installing a Processor

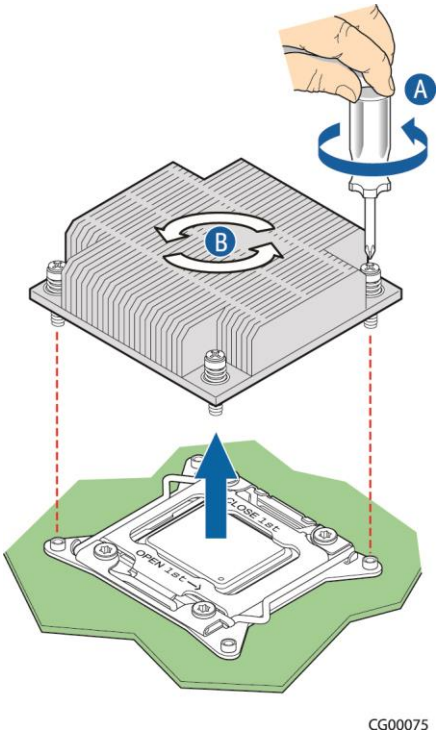
To install a CPU, follow the steps below.

1. If a CPU and its heatsink are already installed, you need to remove them first, see steps 2 and 3 below.Otherwise, you can jump to step 4.
2. To remove heatsink:

    a. Loosen the four captive screws on the corners of the heat sink with a Phillips screwdriver. (see Figure 7, "A")
    b. Twist the heat sink slightly to break the seal (thermal paste) between the heat sink and the processor socket. ("B")
    c. Lift the heat sink from the socket. If it does not pull up easily, twist the heat sink again.

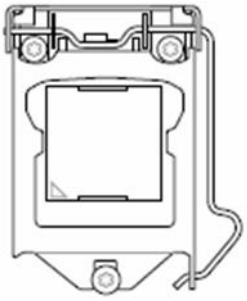
NOTE: Do not force the heat sink. Doing so could damage the processor or the socket contacts.

Figure 7 Removing Heatsink



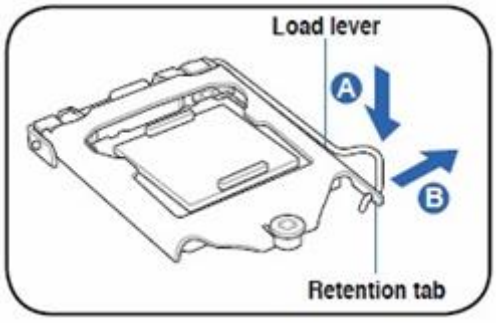
3. Remove CPU
    a. Open CPU lever and load plate, see Figure 9, 10 and 11 below.
    b. Gently remove the processor from the socket.

Figure 8: CPU socket 1150



4. Install CPU
    a. If not opened yet, open CPU socket by following instructions found under Figures 9, 10 and 11.
    b. Orient the processor with the socket so that the processor cutouts match the socket notches. (Figure 12)
    c. Gently place the processor in the socket.
    d. Close and secure retention tab by executing instructions found under Figures 13 and 14.
    e. Finally, install CPU heatsink, see Figure 15 (figure and instructions).

Figure 9: Releasing the load lever

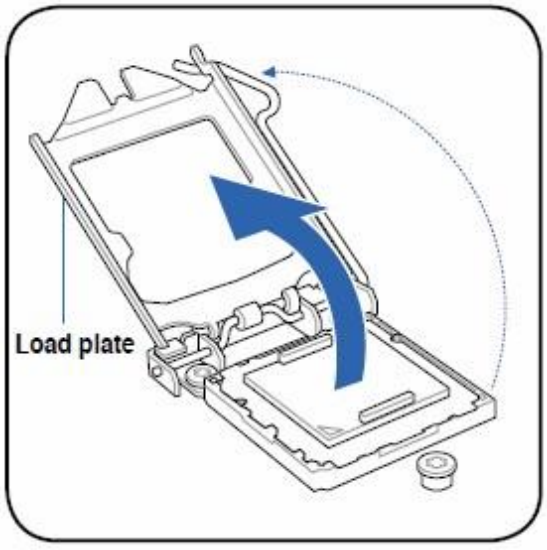


Press the load lever with your thumb (A), then move it to the right (B) until it is released from the retention tab.

NOTICE

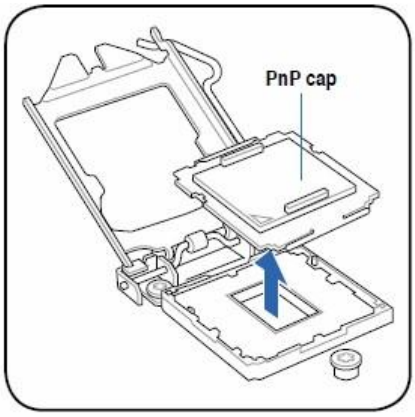
To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

Figure 10: Load plate



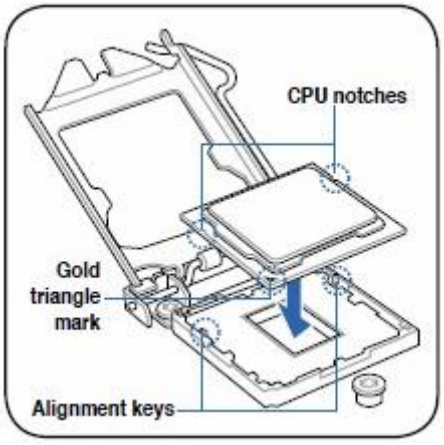
Lift the load lever in the direction of the arrow until the load plate is completely lifted.

Figure 11: PnP cap



Remove the PnP cap from the CPU socket.

Figure 12: CPU alignment

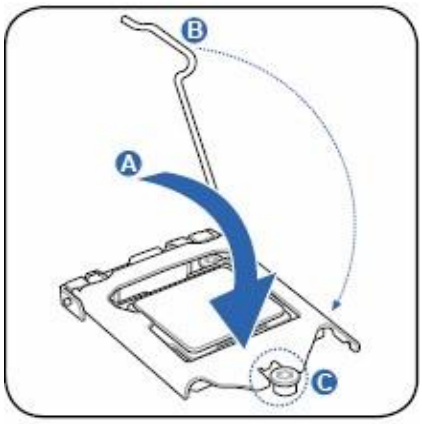


Position the CPU over the socket, ensuring that the gold triangle is on the bottom-left corner of the socket, and then slide the socket alignment keys into the CPU notches.

NOTICE

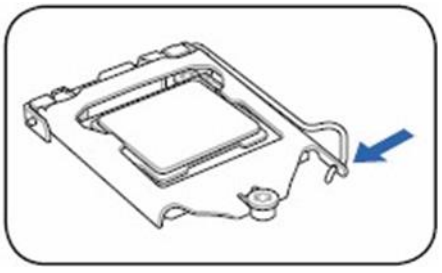
The CPU fits in only one position. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!

Figure 13: Closing the load plate



Close the load plate (A), and then push down the load lever (B), ensuring that the front edge of the load plate slides under the retention knob (C).

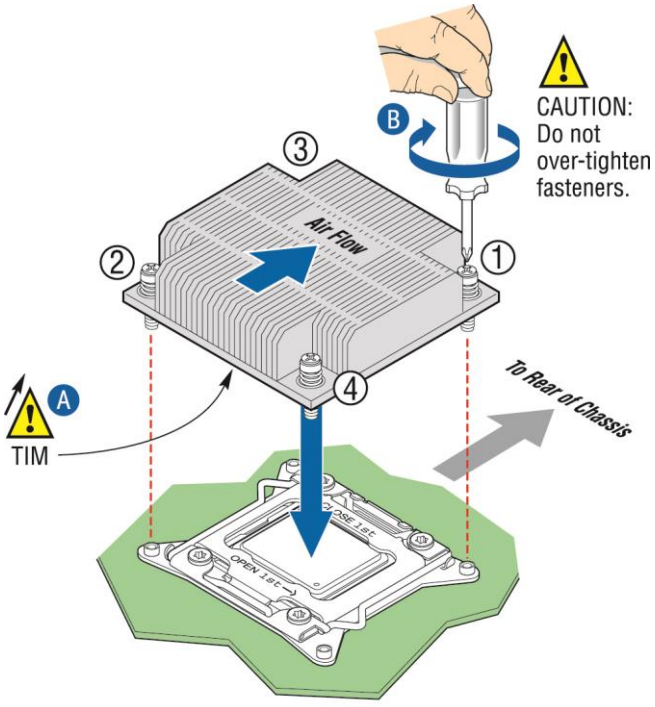
Figure 14: Load lever in retention tab



Insert the load lever under the retention tab.

5. Install heatsink

Figure 15 Installing CPU heatsink



1. Remove the protective film, if present, on the Thermal Interface Material (TIM) located on the bottom of the heat sink. (See "A" on Figure 15)
2. Set the heat sink over the processor, lining up the four captive screws with the four socket posts surrounding the processor. Align the heat sink fins to the front and back of the chassis for correct airflow (front to back).
3. Loosely screw in the captive screws on the heat sink corners by tightening one, then the one diagonally opposite, and so on. ("B")
4. Gradually and equally tighten each captive screw in diagonal order until each one is firmly tightened. See Figure 15 for the order.

3.4. Removing and Installing a DIMM

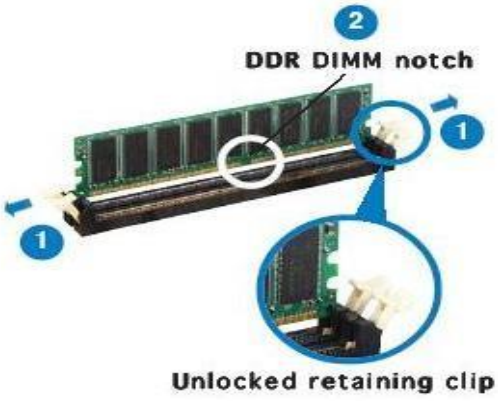
3.4.1. Installing a RAM module

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 motherboard and the components.

1. Unlock a DIMM socket by pressing the retaining clips outward.

2. Align a DIMM on the socket so the notch on the DIMM matches the mating part of the socket.

Figure 16: DIMM alignment

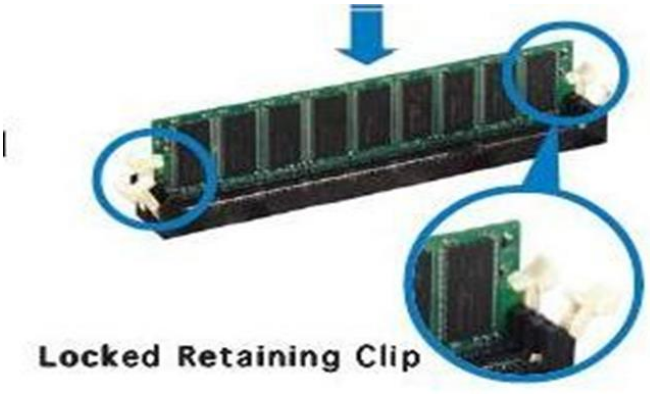


NOTICE

A DDR DIMM is keyed with a notch so that it fits in only one direction.
DO NOT force a DIMM into a socket to avoid damaging the DIMM.

3. Firmly insert the DIMM into the socket until the retaining clips snap back in place and the DIMM is properly seated.

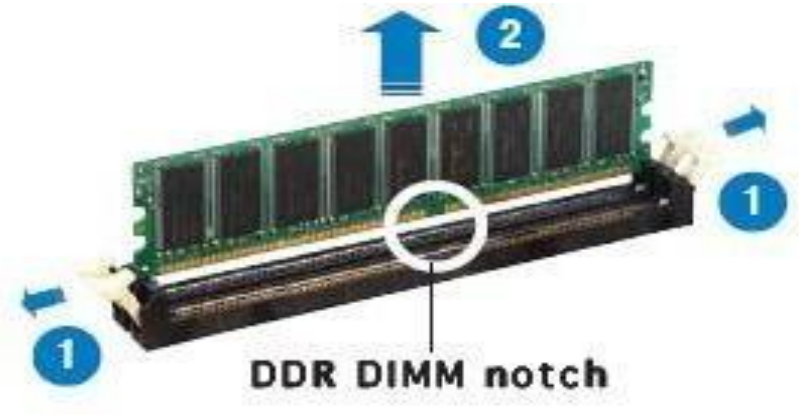
Figure 17: Inserted DIMM



3.4.2. Removing a DIMM

1. Simultaneously press the retaining clips outward to unlock the DIMM.

Figure 18: Unlocked DIMM



3.5. Removing and Installing a Compact Flash Card

1. Insert the Compact Flash Card into the CF interface.

Figure 19: Compact flash card

Figure 20: Compact flash card insertion

2. Push the Compact Flash Card firmly into the socket.

Figure 21: Installed Compact Flash Card

3.6. Removing and Installing a Battery

The battery connector can be removed and changed.

Figure 22: Battery connector

3.7. Removing and Installing an Add-on Card

The add-on module is installed in one of the three front slots of the chassis.

Please make sure to unplug the power cord before removing or installing a Kontron NIP module.

Table 19: Add-on card removal and installation

Step 1. Remove the tray from the bay by loosening the thumb screws.	Step 2. Insert the module into the bay.
	
Step 3. Secure the module in place using the screws.	
	

3.8. Removing and Installing a PCIe Card – Rear Slot

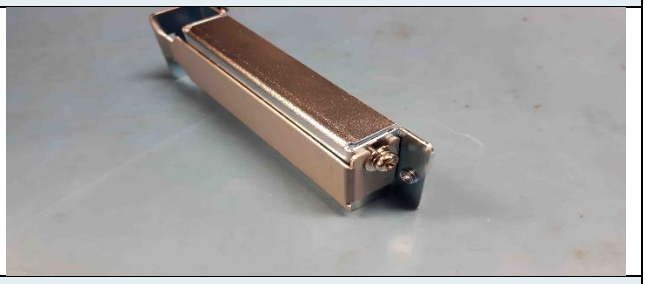
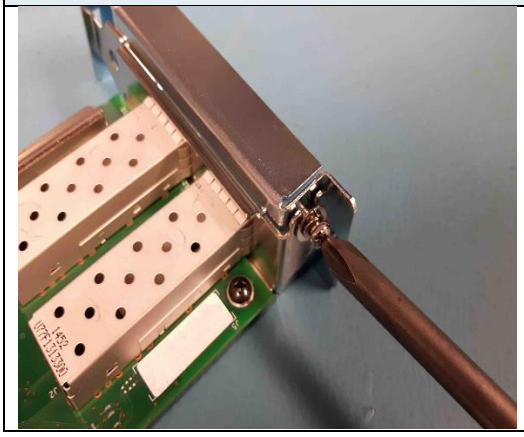
It is possible to add a PCIe card in the rear slot.

The rear PCIe slot has the following characteristics:

- Electrical interface is PCIe x4 Gen3.
- Slot accepts half-height (low-profile) faceplate.
- Mechanical connector is x8.

To mount the card, follow the instructions in Table 20.

Table 20: PCIe card installation and removal

Step 1. Unscrew the two chassis screws to remove the faceplate holder.	Step 2. Remove the faceplate screw.
	
Step 3. Install the PCIe card in the faceplate holder and secure it using the faceplate screw.	Step 4. Secure the PCIe card and holder assembly to the chassis using the two chassis screws removed in Step 1.
	

NOTE:

Customer can add a Low-Profile PCIe x4 card in rear slot.

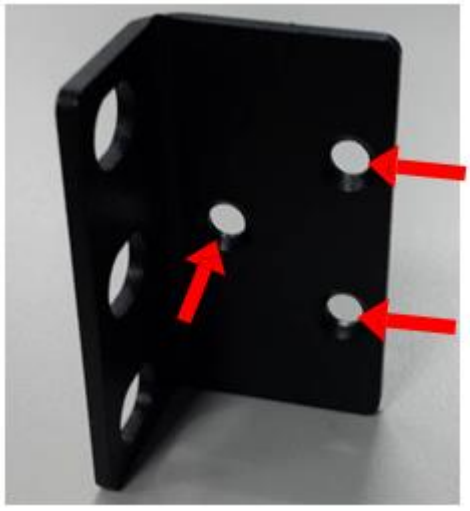
As per PCIe standard, maximum power consumption of such card must be 25W.

3.9. Installing the Ear Mount Kit

The AP1430 series comes with 2 ear mount kits. To install them:

1. Take out the L-shaped ear mount kits. One ear mount fits on each side of the chassis.
2. Place the side with three holes (triangle) against the chassis and the side with three holes (vertically aligned) facing outward.
3. Tighten the screws on each side.

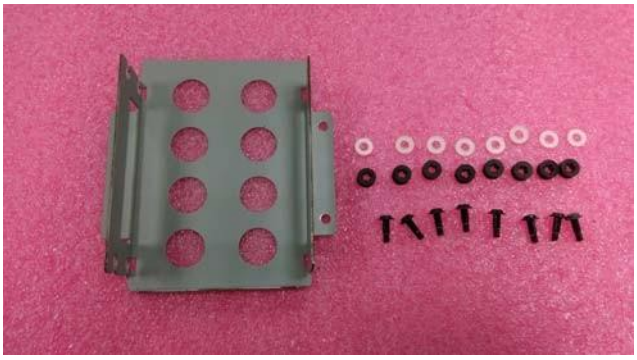
Figure 23: Bracket hole location



3.10. Removing and Installing a 2.5" HDD

The device has an internal drive bay for two 2.5" SATA hard disk drives. If the HDD is not pre-installed, you can install it yourself. Follow the steps below to install the HDD.

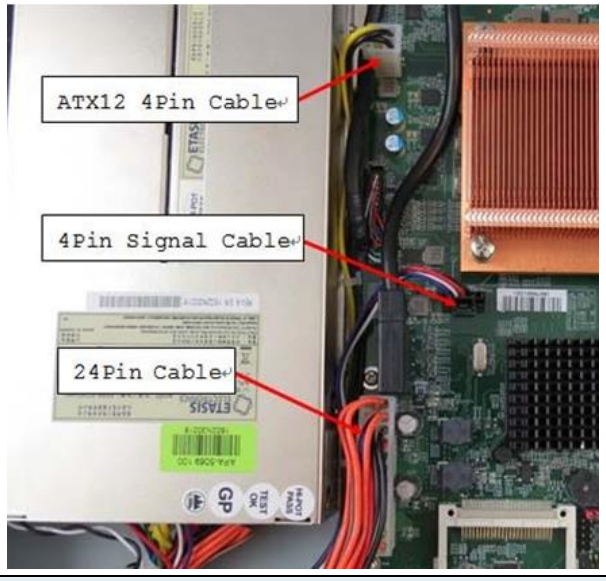
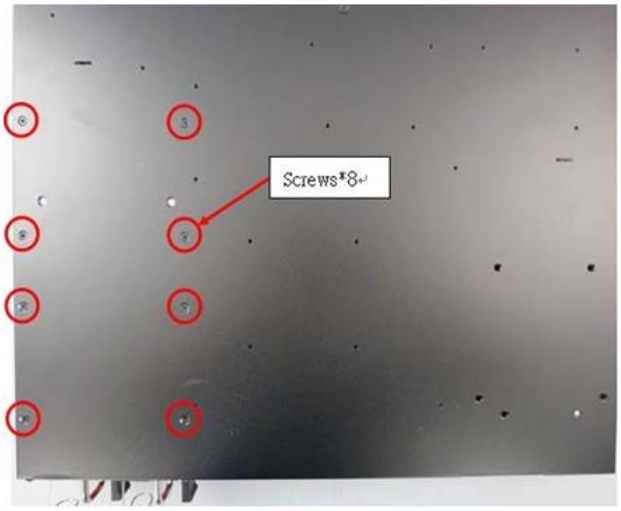
Table 21: 2.5" HDD removal and installation

Step 1. Drive bay can support two 2.5" SATA HDD/SSD.	Step 2. Install the cushions and plastic pads onto the bracket.
	
Step 3. Install the HDD, secure the ground cable and tighten the screws .	Step 4. Connect the SATA power from the power supply, and connect the SATA cable to the motherboard.
	

3.11. Removing the Power Supply

To remove the power supply, follow the instructions below.

Table 22: Power supply removal

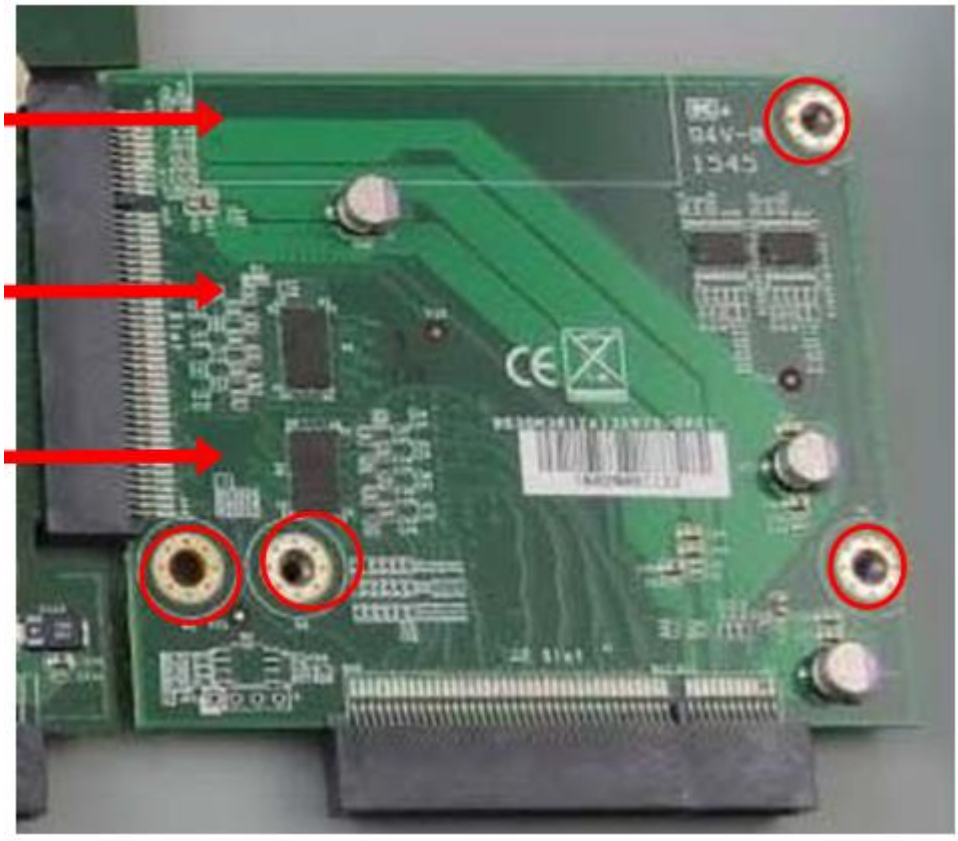
Step 1. Remove the three cables from the main board.	Step 2. Remove the eight screws from the bottom side of the chassis.
	
Step 3. Remove the four screws from the rear.	
	

3.12. Removing the Main Board

To remove the main board, follow the instructions below.

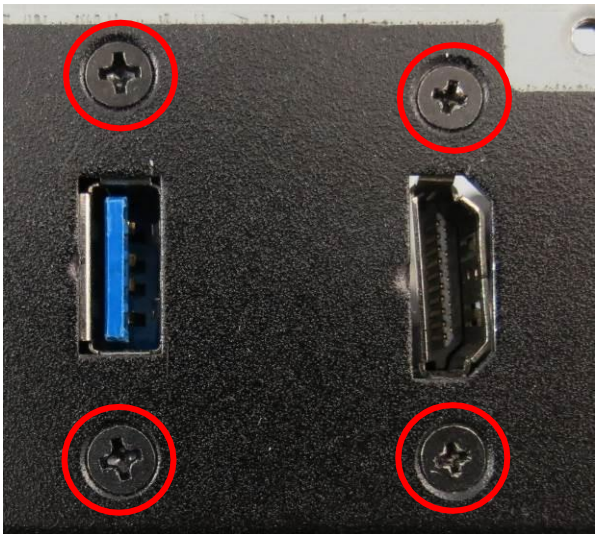
1. Remove the converter board.

Table 23: Converter board removal

Step 1. Remove the screws from the converter board, and remove the board.


2. Remove the HDMI and USB cables.

Table 24: HDMI and USB cable removal

Step 1. Remove the cables from the main board.	Step 2. Remove the screws from the rear.
	

3. Remove the EZIO cable.

Table 25: EZIO cable removal

Step 1. Remove the EZIO cable from the management board.


4. Remove the main board.

Table 26: Main board removal

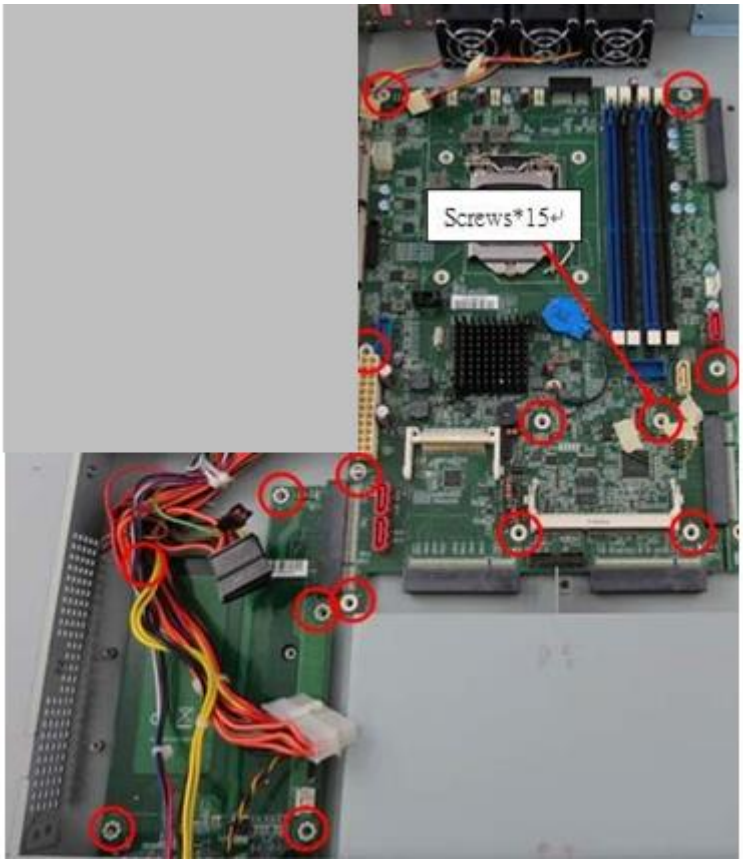
Step 1. Remove all the screws from the main board and the management board. It is easier to remove the main board at the same time as the management board.


Figure 24: Completed removal

4/ BIOS Settings

4.1. Introduction

The main BIOS functions include performing the POST (Power-On Self-Test) during system startup, initializing system hardware devices and loading an OS (Operating System).

To access the BIOS setup screen, press the <Tab> or <Delete> key during POST, after the system power is turned on.

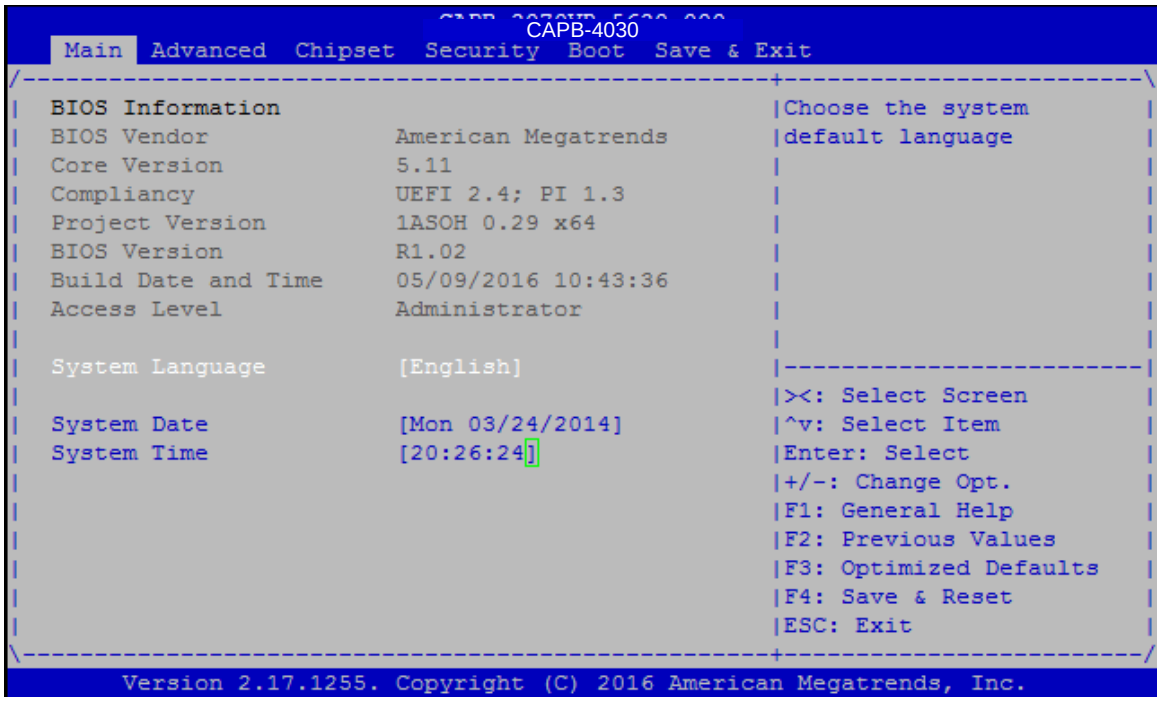
To change the setting value of BIOS setup items, use the keys below.

Table 27: Bios keys

<←><→>	Move the selection to select screen
< ↑ >< ↓ >	Move the selection to select item
<Enter>	Enter a menu or confirm selection
<+><->	Increase/decrease the numeric value or change item setting
<F1>	Display general help screen
<F2>	Restore previous BIOS item setting value
<F3>	Restore optimized default value
<F4>	Execute Save and Reset
<ESC>	Execute Exit

4.2. Main Screen

Figure 25: BIOS Main screen



BIOS Information

Display basic BIOS ROM information.

System Language

Choose the system default language.

System Date

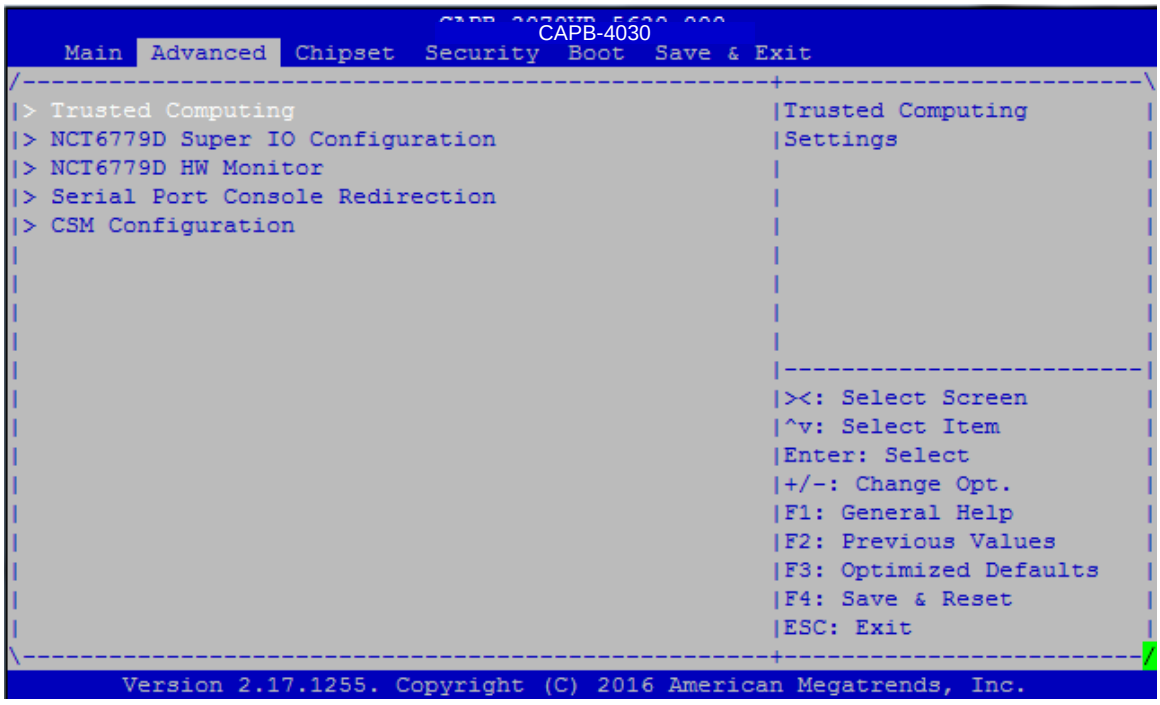
Display system date and change the system date.

System Time

Display system time and change the system time.

4.3. Advanced Screen

Figure 26: BIOS Advanced screen



Trusted Computing

Display Trusted Computing Settings.

NCT6779D Super IO Configuration

Configure the system Super IO chip parameters.

NCT6779D HW Monitor

Display Hardware Monitor Status.

Serial Port Console Redirection

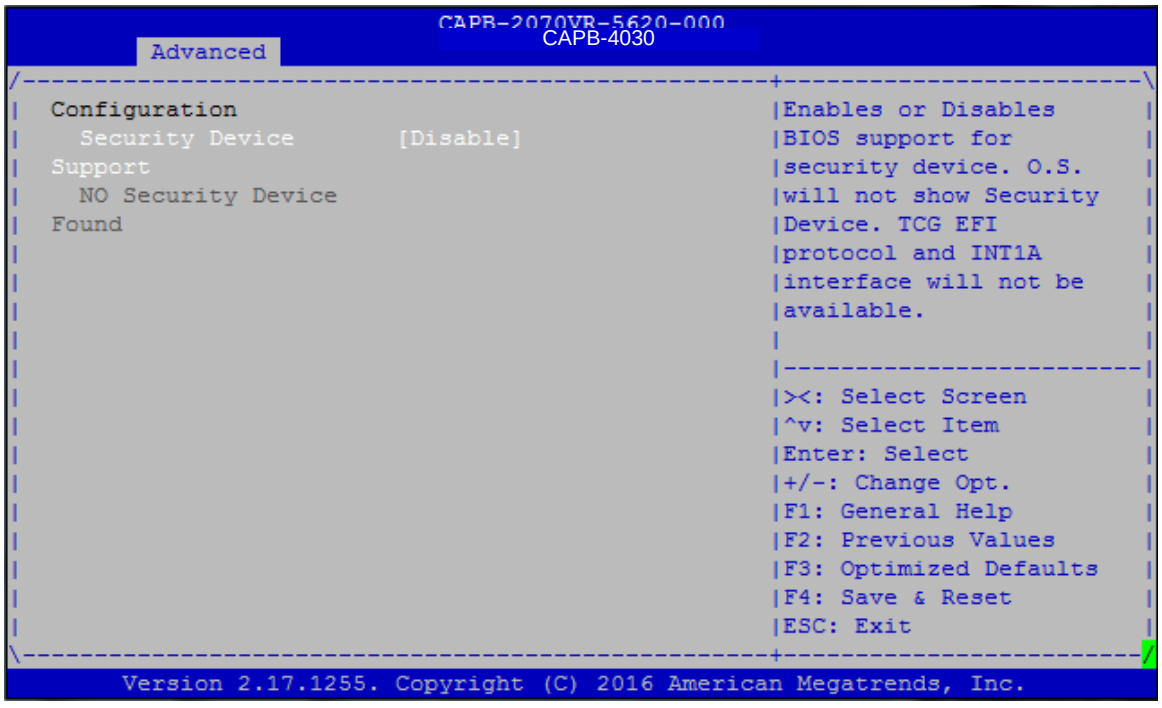
Configure the Serial Port Console Redirection parameters.

CSM Configuration

Configure the Option ROM execution settings.

4.3.1. Trusted Computing

Figure 27: Security Device Support screen

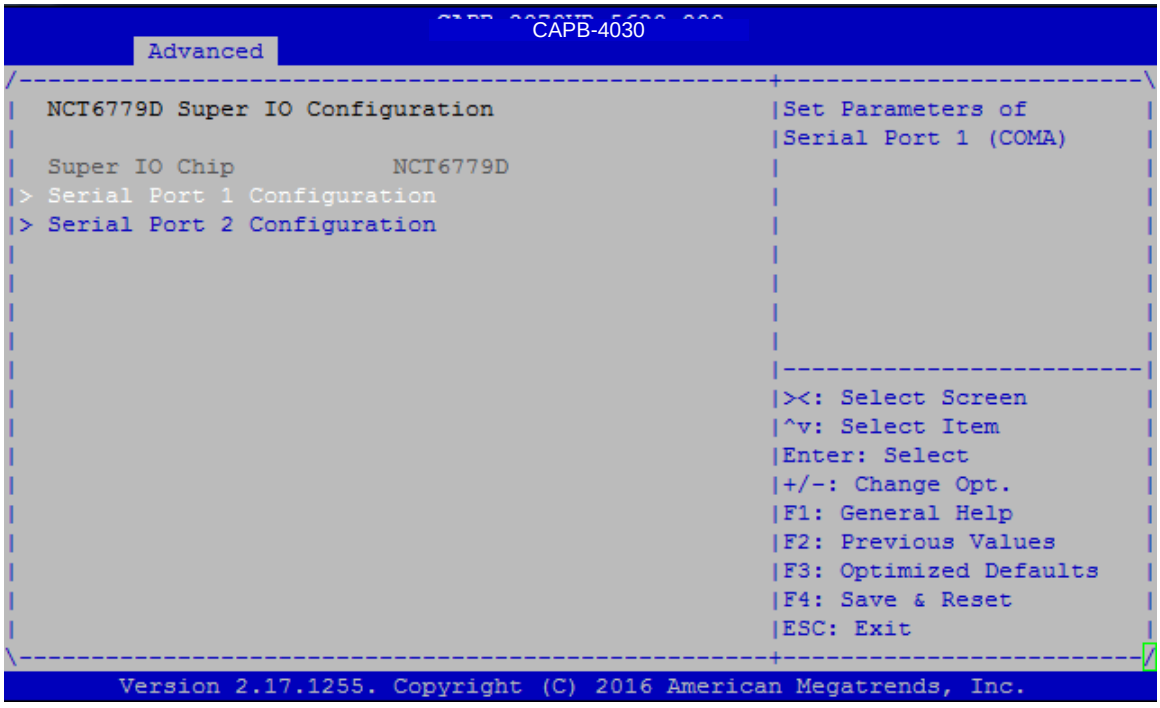


Security Device Support

Enable or disable BIOS support for security device. The OS will not show the security service. TCG EFI protocol and INT1A interface will not be available.

4.3.2. NCT6779D Super IO Configuration

Figure 28: Serial Port Configuration screen

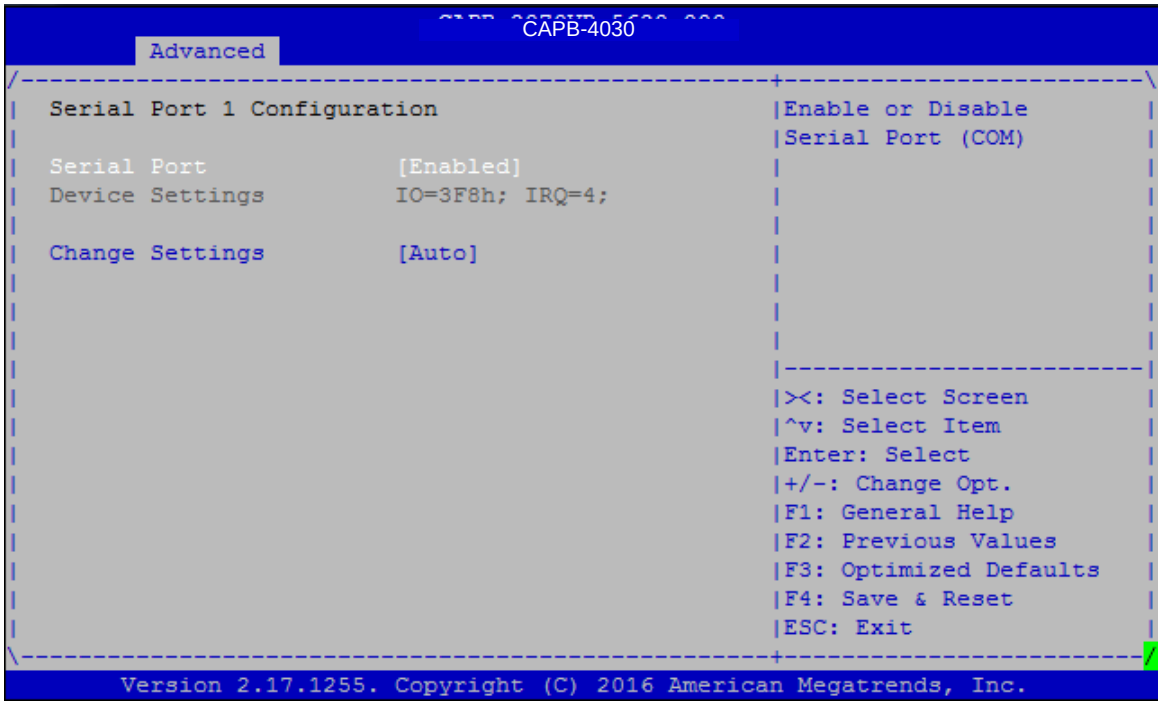


Serial Port 1/2 Configuration

Set parameters of serial ports 1 and 2 (COMA/COMB).

4.3.2.1. Serial Port 1/2 Configuration

Figure 29: Serial Port 1 Configuration screen



Serial Port

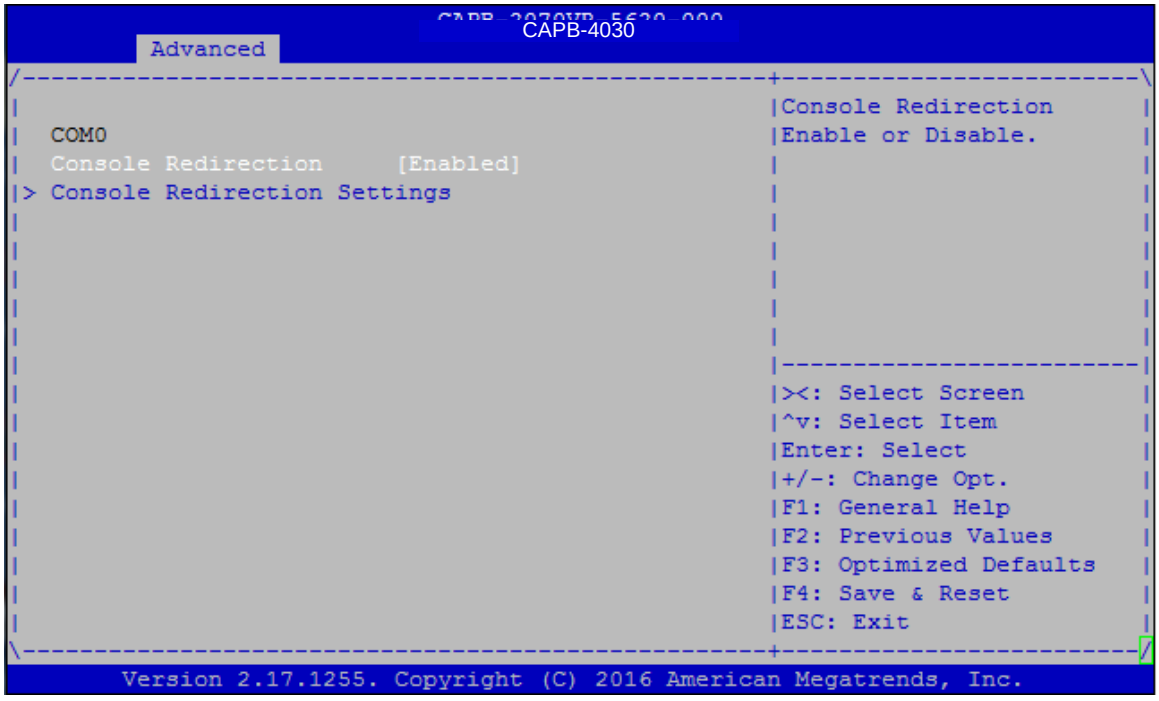
Enable or disable serial port (COM).

Change Settings

Select an optimal setting for Super IO Device.

4.3.3. Serial Port Console Redirection

Figure 30: Console Redirection screen

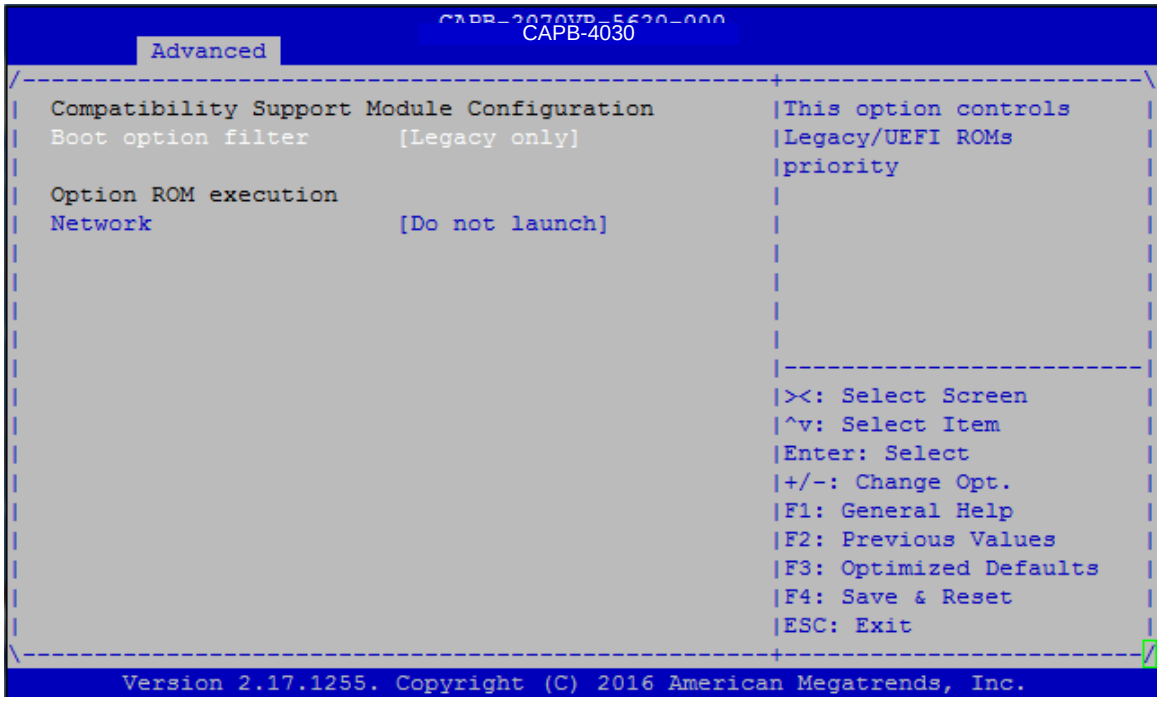


Console Redirection

Enable or disable Console Redirection.

4.3.4. CSM Configuration

Figure 31: CSM Configuration screen



Boot option filter

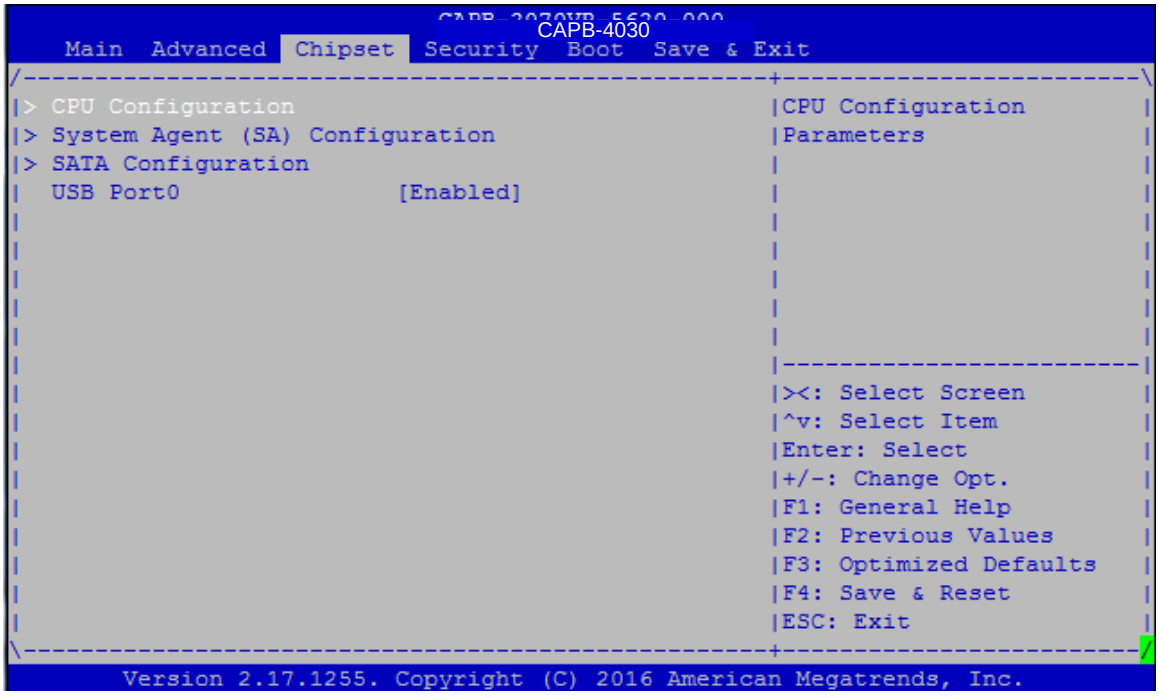
Control Legacy/UEFI ROM priority.

Network

Control the execution of UEFI and Legacy PXE OpROM.

4.4. Chipset Screen

Figure 32: Chipset screen



CPU Configuration

Display CPU Configuration Parameters.

System Agent (SA) Configuration

Display System Agent (SA) Parameters.

SATA Configuration

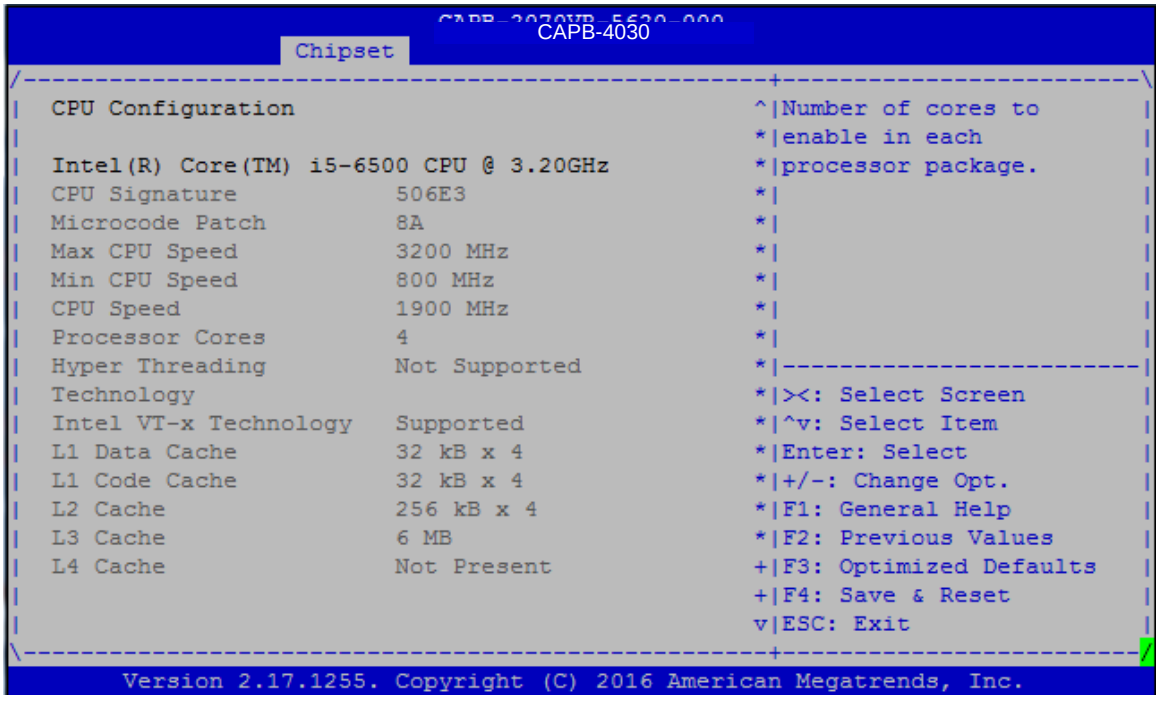
Display SATA Device Options Settings.

USB Port0

Enable or disable USB Port0 Power.

4.4.1. CPU Configuration

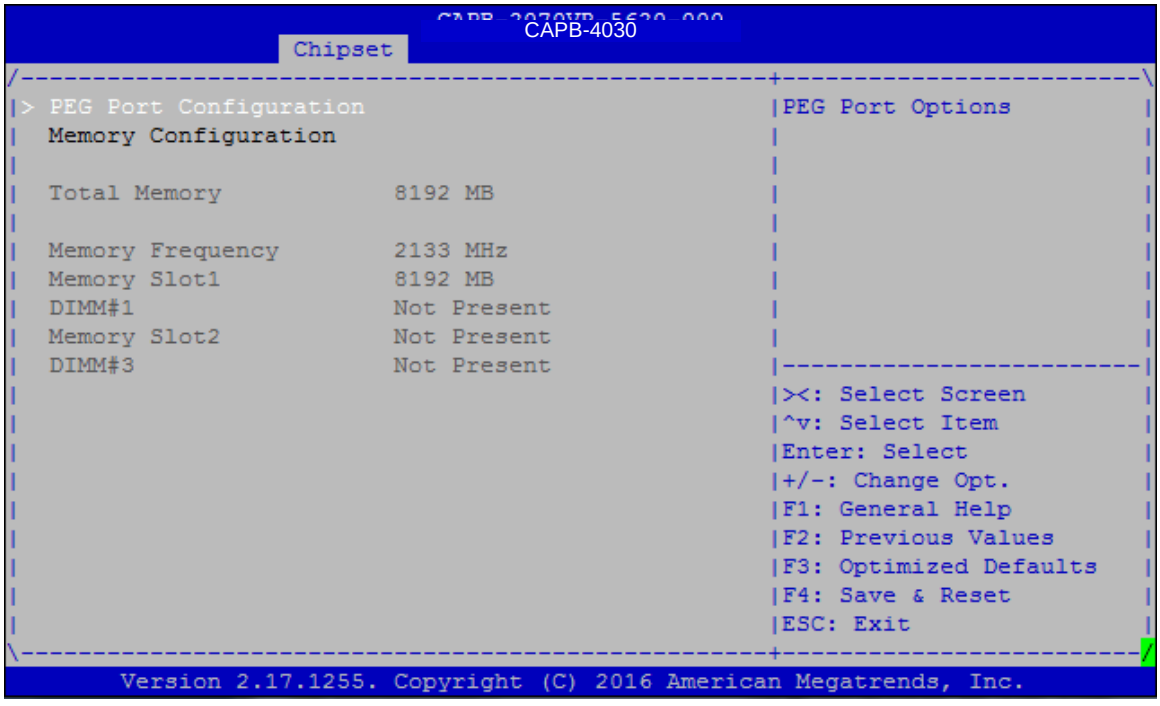
Figure 33: CPU Configuration screen



Display CPU information.

4.4.2. System Agent (SA) Configuration

Figure 34: System Agent Configuration screen



PEG Port Configuration

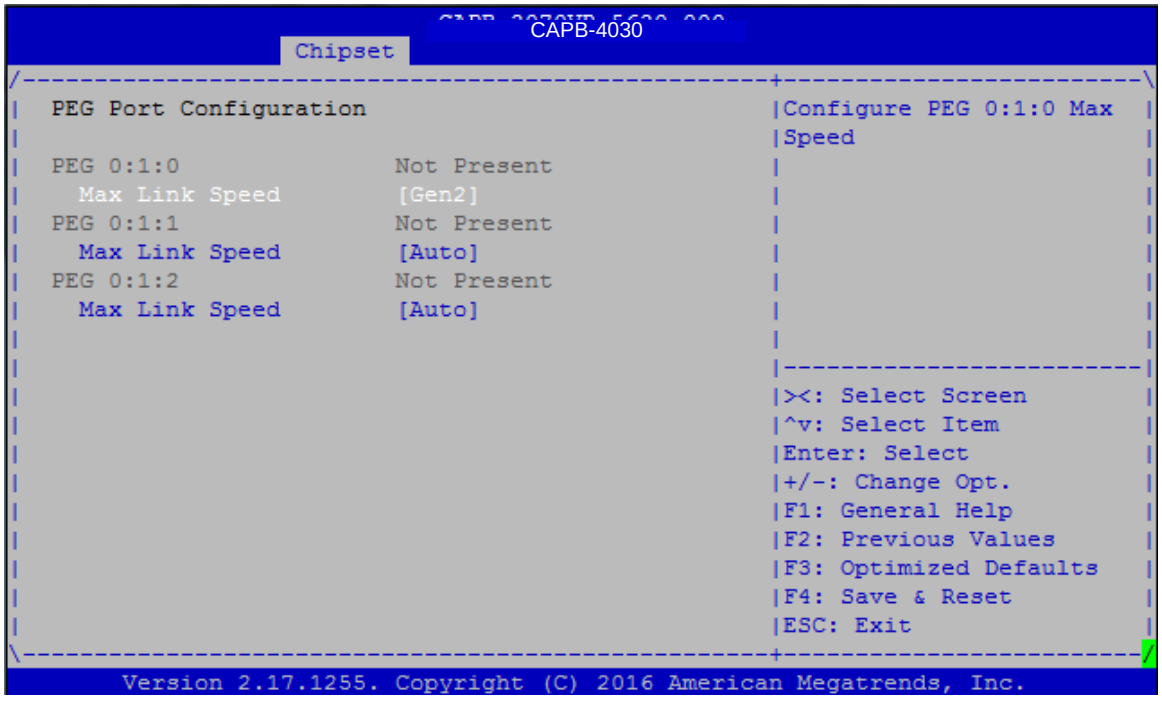
Display PEG Port Options.

Memory Configuration

Display memory size/frequency.

4.4.2.1. PEG Port Configuration

Figure 35: PEG Port Configuration screen

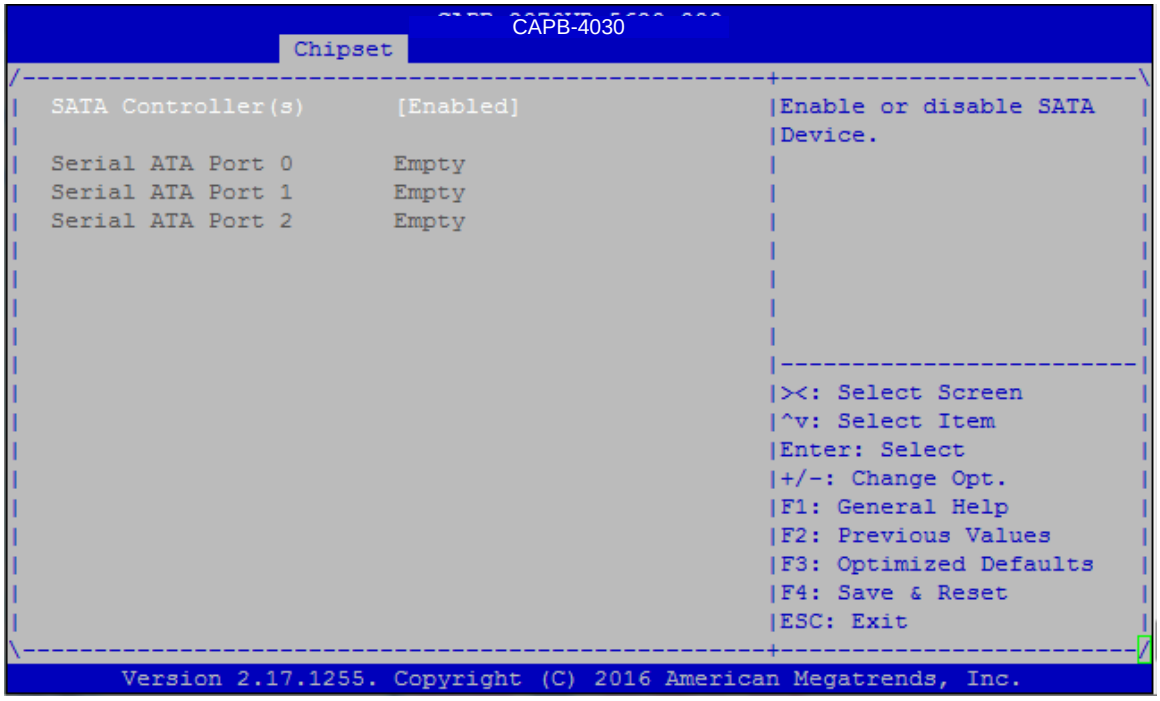


Max Link Speed

Configure max speed for PEG 0:1:0 / PEG 0:1:1 / PEG 0:1:2.

4.4.3. SATA Configuration

Figure 36: SATA Configuration screen

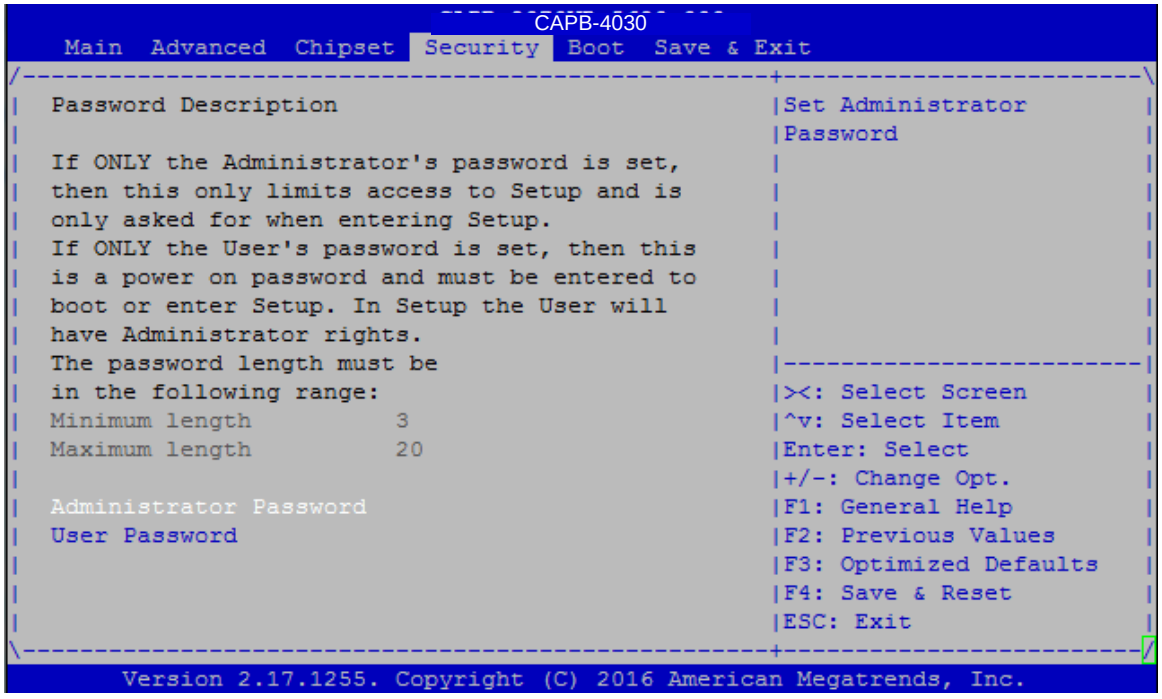


SATA Controller(s)

Enable or disable SATA device.

4.5. Security Screen

Figure 37: Security screen



Administrator Password

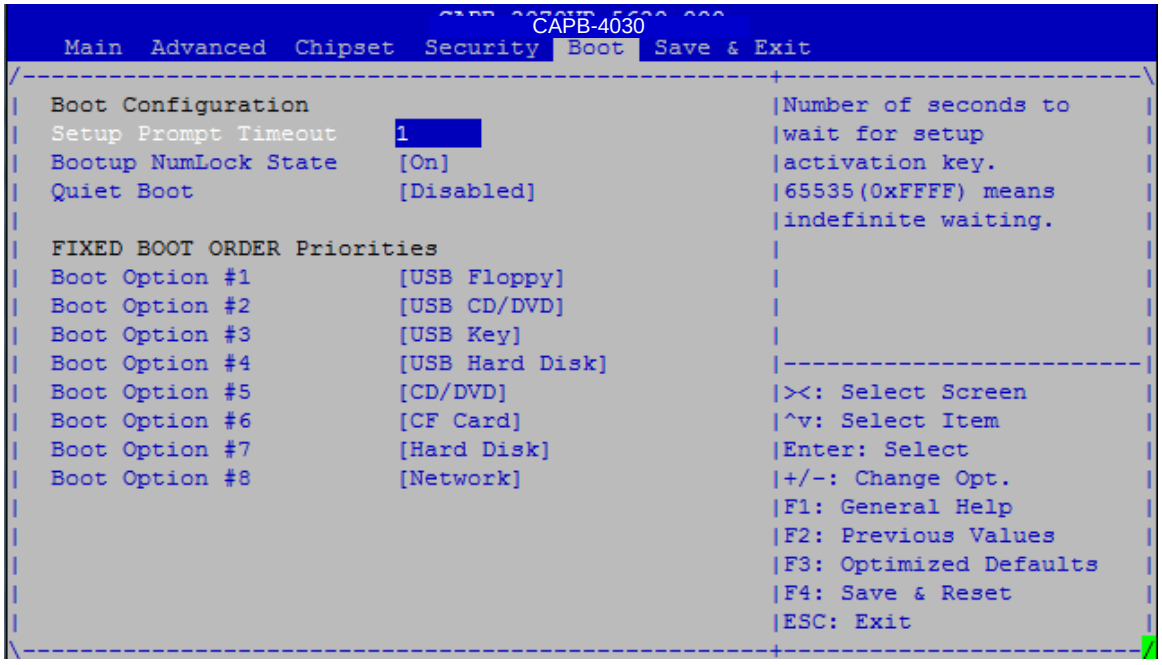
Set Administrator Password.

User Password

Set User Password.

4.6. Boot Screen

Figure 38: Boot screen



Setup Prompt Timeout

Number of seconds to wait for setup activation key. Use 65535(0xFFFF) for indefinite waiting.

Bootup NumLock State

Select the keyboard NumLock state.

Quiet Boot

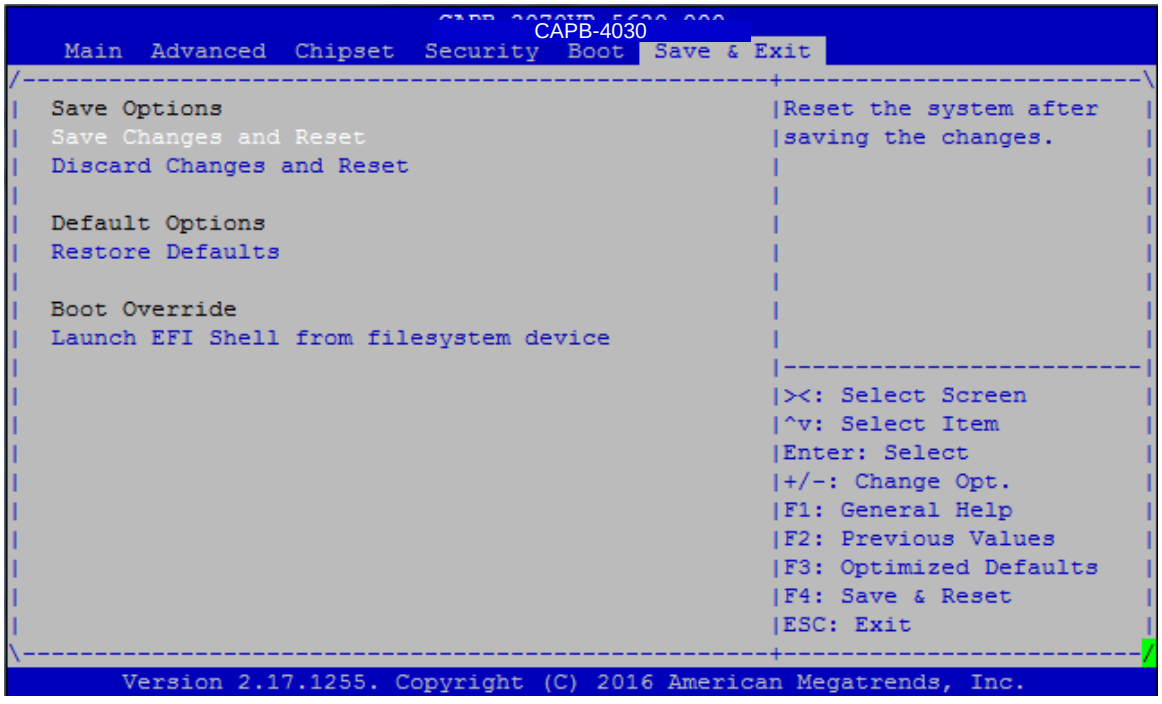
Enable or disable Quiet Boot option.

FIXED BOOT ORDER Priorities

Set the system boot order.

4.7. Save & Exit Screen

Figure 39: Save & Exit screen



Save Changes and Reset

Reset system after saving the changes.

Discard Changes and Reset

Reset system setup without saving any changes.

Restore Defaults

Restore/Load Default values for all the setup options.

Launch EFI Shell from filesystem device

Attempt to launch EFI Shell application (Shell.efi) from one of the available filesystem devices.

4.8. BIOS Status and Beep Codes

4.8.1. BIOS Status Codes

Table 28: PEI phase

Code	Description
0x10	PEI_CORE_STARTED
0x11	PEI_CAR_CPU_INIT
0x15	PEI_CAR_NB_INIT
0x19	PEI_CAR_SB_INIT
0x2B	PEI_MEMORY_SPD_READ
0x2C	PEI_MEMORY_PRESENCE_DETECT
0x2D	PEI_MEMORY_TIMING
0x2E	PEI_MEMORY_CONFIGURING
0x2F	PEI_MEMORY_INIT
0x31	PEI_MEMORY_INSTALLED
0x32	PEI_CPU_INIT
0x33	PEI_CPU_CACHE_INIT
0x34	PEI_CPU_AP_INIT
0x35	PEI_CPU_BSP_SELECT
0x36	PEI_CPU_SMM_INIT
0x37	PEI_MEM_NB_INIT
0x3B	PEI_MEM_SB_INIT
0x4F	PEI_DXE_IPL_STARTED
0x60	DXE_CORE_STARTED
0xF0	PEI_RECOVERY_AUTO
0xF1	PEI_RECOVERY_USER
0xF2	PEI_RECOVERY_STARTED
0xF3	PEI_RECOVERY_CAPSULE_FOUND
0xF4	PEI_RECOVERY_CAPSULE_LOADED
0xE0	PEI_S3_STARTED
0xE1	PEI_S3_BOOT_SCRIPT
0xE2	PEI_S3_VIDEO_REPOST
0xE3	PEI_S3_OS_WAKE
0x50	PEI_MEMORY_INVALID_TYPE
0x50	PEI_MEMORY_INVALID_SPEED

Code	Description
0x51	PEI_MEMORY_SPD_FAIL
0x52	PEI_MEMORY_INVALID_SIZE
0x52	PEI_MEMORY_MISMATCH
0x53	PEI_MEMORY_NOT_DETECTED
0x53	PEI_MEMORY_NONE_USEFUL
0x54	PEI_MEMORY_ERROR
0x55	PEI_MEMORY_NOT_INSTALLED
0x56	PEI_CPU_INVALID_TYPE
0x56	PEI_CPU_INVALID_SPEED
0x57	PEI_CPU_MISMATCH
0x58	PEI_CPU_SELF_TEST_FAILED
0x58	PEI_CPU_CACHE_ERROR
0x59	PEI_CPU_MICROCODE_UPDATE_FAILED
0x59	PEI_CPU_NO_MICROCODE
0x5A	PEI_CPU_INTERNAL_ERROR
0x5A	PEI_CPU_ERROR
0x5B	PEI_RESET_NOT_AVAILABLE0x5B
0xF8	PEI_RECOVERY_PPI_NOT_FOUND
0xF9	PEI_RECOVERY_NO_CAPSULE
0xFA	PEI_RECOVERY_INVALID_CAPSULE
0xE8	PEI_MEMORY_S3_RESUME_FAILED
0xE9	PEI_S3_RESUME_PPI_NOT_FOUND
0xEA	PEI_S3_BOOT_SCRIPT_ERROR
0xEB	PEI_S3_OS_WAKE_ERROR

Table 29: DXE phase

Code	Description
0x60	DXE_CORE_STARTED
0x61	DXE_NVRAM_INIT
0x62	DXE_SBRUN_INIT
0x63	DXE_CPU_INIT
0x68	DXE_NB_HB_INIT
0x69	DXE_NB_INIT

Code	Description
0x6A	DXE_NB_SMM_INIT
0x70	DXE_SB_INIT
0x71	DXE_SB_SMM_INIT
0x72	DXE_SB_DEVICES_INIT
0x78	DXE_ACPI_INIT
0x79	DXE_CSM_INIT
0x90	DXE_BDS_STARTED
0x91	DXE_BDS_CONNECT_DRIVERS
0x92	DXE_PCI_BUS_BEGIN
0x93	DXE_PCI_BUS_HPC_INIT
0x94	DXE_PCI_BUS_ENUM
0x95	DXE_PCI_BUS_REQUEST_RESOURCES
0x96	DXE_PCI_BUS_ASSIGN_RESOURCES
0x97	DXE_CON_OUT_CONNECT
0x98	DXE_CON_IN_CONNECT
0x99	DXE_SIO_INIT
0x9A	DXE_USB_BEGIN
0x9B	DXE_USB_RESET
0x9C	DXE_USB_DETECT
0x9D	DXE_USB_ENABLE
0xA0	DXE_IDE_BEGIN
0xA1	DXE_IDE_RESET
0xA2	DXE_IDE_DETECT
0xA3	DXE_IDE_ENABLE
0xA4	DXE_SCSI_BEGIN
0xA5	DXE_SCSI_RESET
0xA6	DXE_SCSI_DETECT
0xA7	DXE_SCSI_ENABLE
0xA8	DXE_SETUP_VERIFYING_PASSWORD
0xA9	DXE_SETUP_START
0xAB	DXE_SETUP_INPUT_WAIT
0xAD	DXE_READY_TO_BOOT
0xAE	DXE_LEGACY_BOOT

Code	Description
0xAF	DXE_EXIT_BOOT_SERVICES
0xB0	RT_SET_VIRTUAL_ADDRESS_MAP_BEGIN
0xB1	RT_SET_VIRTUAL_ADDRESS_MAP_END
0xB2	DXE_LEGACY_OPROM_INIT
0xB3	DXE_RESET_SYSTEM
0xB4	DXE_USB_HOTPLUG
0xB5	DXE_PCI_BUS_HOTPLUG
0xB6	DXE_NVRAM_CLEANUP
0xB7	DXE_CONFIGURATION_RESET
0xD0	DXE_CPU_ERROR
0xD1	DXE_NB_ERROR
0xD2	DXE_SB_ERROR
0xD3	DXE_ARCH_PROTOCOL_NOT_AVAILABLE
0xD4	DXE_PCI_BUS_OUT_OF_RESOURCES
0xD5	DXE_LEGACY_OPROM_NO_SPACE
0xD6	DXE_NO_CON_OUT
0xD7	DXE_NO_CON_IN
0xD8	DXE_INVALID_PASSWORD
0xD9	DXE_BOOT_OPTION_LOAD_ERROR
0xDA	DXE_BOOT_OPTION_FAILED
0xDB	DXE_FLASH_UPDATE_FAILED
0xDC	DXE_RESET_NOT_AVAILABLE

4.8.2. BIOS Beep Codes

Table 30: PEI phase

Beep Times	Description
2 times	PEI_RECOVERY_STARTED
1 time	PEI_MEMORY_NOT_INSTALLED
1 time	PEI_MEMORY_INSTALLED_TWICE
3 times	PEI_DXEIPL_NOT_FOUND
3 times	PEI_DXE_CORE_NOT_FOUND
7 times	PEI_RESET_NOT_AVAILABLE

Beep Times	Description
4 times	PEI_RECOVERY_FAILED
4 times	PEI_S3_RESUME_FAILED

Table 31: DXE phase

Beep Times	Description
4 times	DXE_ARCH_PROTOCOL_NOT_AVAILABLE
5 times	DXE_NO_CON_OUT
5 times	DXE_NO_CON_IN
1 time	DXE_INVALID_PASSWORD
6 times	DXE_FLASH_UPDATE_FAILED
7 times	DXE_RESET_NOT_AVAILABLE
8 times	DXE_PCI_BUS_OUT_OF_RESOURCES

About Kontron

Kontron, a global leader in embedded computing technology and trusted advisor in IoT, works closely with its customers, allowing them to focus on their core competencies by offering a complete and integrated portfolio of hardware, software and services designed to help them make the most of their applications.

With a significant percentage of employees in research and development, Kontron creates many of the standards that drive the world's embedded computing platforms; bringing to life numerous technologies and applications that touch millions of lives. The result is an accelerated time-to-market, reduced total-cost-of-ownership, product longevity and the best possible overall application with leading-edge, highest reliability embedded technology

Kontron is a listed company. Its shares are traded in the Prime Standard segment of the Frankfurt Stock Exchange and on other exchanges under the symbol "KBC". For more information, please visit: http://www.kontron.com/

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