OPERATION MANUAL

MBP-100CK
Chroma Keyer Processor

S

2nd Edition – Rev.2

FOR-A COMPANY LIMITED

Edition Revision History

Edit.	Rev.	Date	Description	Section/Page
1	-	2009/06/09		
2	-	2009/08/17	Block diagram added 1080p/PsF formats added Output description changed	P1 P9, 11 P2, 8
2	1	2010/03/05	A description of the BIOS reset procedure added Specifications for temperature and humid changed	Appendix P11
2	2	2015/07/27	Connector changed (from VGA to DVI-I) "How to Reset BIOS" changed	Unpacking Sec. 1-3, 2-2, 3, 4 Appendix

Precautions

Important Safety Warnings

[Power]

⚠ Caution	Operate unit **only** at the specified supply voltage.
🔌	Disconnect the power cord via the power plug only. **Do not** pull on the cable portion.
🚫 Stop	**Do not** place or drop heavy or sharp-edged objects on the power cord. A damaged cord can cause fire or electrical shock hazards. Regularly check the power cord for excessive wear or damage to avoid possible fire / electrical hazards.
❗ Caution	**Ensure** the power cord is firmly plugged into the AC outlet.

[Grounding]

❗ Caution	**Ensure** the unit is properly grounded at all times to prevent electrical shock.
⚠ Hazard	**Do not** ground the unit to gas lines, units, or fixtures of an explosive or dangerous nature.

[Operation]

⚠ Hazard	**Do not** operate the unit under hazardous or potentially explosive atmospheric conditions. Doing so could result in fire, explosion, or other hazardous results.
⚠ Hazard	**Do not** allow liquids, metal pieces, or other foreign materials to enter the unit. Doing so could result in fire, other hazards, or a unit malfunction.
🔌	If a foreign material does enter the unit, turn the power off and **immediately** disconnect the power cord. Remove the material and contact an authorized service representative if damage has occurred.

[Transportation]

❗ Caution	**Handle** with care to avoid impact shock during transit, which may cause malfunction. When you need to transport the unit, use the original or suitable alternative packing material.

[Circuitry Access]

	Do not remove covers, panels, casing, or access the circuitry with power applied to the unit. Turn the power off and disconnect the power cord prior to removal. Internal servicing / adjustment of unit should only be performed by qualified personnel.
Stop	**Do not** touch any parts / circuitry with a high heat factor. Capacitors can retain enough electric charge to cause mild to serious shock, even after the power has been disconnected. Capacitors associated with the power supply are especially hazardous.
Hazard	Unit **should not** be operated or stored with cover, panels, and / or casing removed. Operating the unit with circuitry exposed could result in electric shock / fire hazards or a unit malfunction.

[Potential Hazards]

Caution	If abnormal odors or noises are noticed coming from the unit, immediately turn the power off and disconnect the power cord to avoid potentially hazardous conditions. If problems similar to the above occur, contact an authorized service representative **before** attempting to operate the unit again.

[Rack Mount Brackets, Ground Terminal, and Rubber Feet]

Caution	To rack-mount or ground the unit, or to install rubber feet, **do not** use screws or materials other than those supplied. Doing so may cause damage to the internal circuits or components of the unit. If you remove the rubber feet that are attached to the unit, **do not** reinsert the screws that secure the rubber feet.

[Consumables]

Caution	Consumable items that are used in the unit must be periodically replaced. For further details on which parts are consumables and when they should be replaced, refer to the specifications at the end of the Operation Manual. Since the service life of the consumables varies greatly depending on the environment in which they are used, such items should be replaced at an early date. For details on replacing consumable items, contact your dealer.

Upon Receipt

Unpacking

MBP-100CK units and their accessories are fully inspected and adjusted prior to shipment. Operation can be performed immediately upon completing all required connections and operational settings.

Check your received items against the packing lists below.

ITEM	QTY	REMARKS
MBP-100CK	1	
AC Cord	1 set	One AC cord, and one set of AC cord retainer
Rack Mount Brackets	1 set	EIA standard type
Rubber feet	1 set	
DVI-VGA Conversion connector	1	
Operation Manual	2	This manual and GUI user's manual

IMPORTANT
Wait **at least 10 seconds** before turning back on the MBP-100CK after powering off.

Check

Check to ensure no damage has occurred during shipment. If damage has occurred, or items are missing, inform your supplier immediately.

Rack Mounting

The MBP-100CK can be mounted to EIA standard rack units. When rack mounting a unit, remove the rubber feet and use the accessory rack mount brackets (rack ears).

Table of Contents

1. Prior to Starting

1-1. Welcome

Congratulations! By purchasing MBP-100CK Chroma Keyer Processor you have entered the world of FOR-A and its many innovative products. Thank you for your patronage and we hope you will turn to FOR-A products again and again to satisfy your video and audio needs.
FOR-A provides a wide range of products, from basic support units to complex system controllers, which have been increasingly joined by products for computer video based systems. Whatever your needs, talk to your FOR-A representative. We will do our best to be of continuing service to you.

1-2. Features

The MBP-100CK is a Chroma Keyer that supports multi format video input/output. It features FOR-A's unique new algorithm for chroma key processing, and has been designed to provide the highest quality of chroma key with the simplest operation.

◆ **Block Diagram**
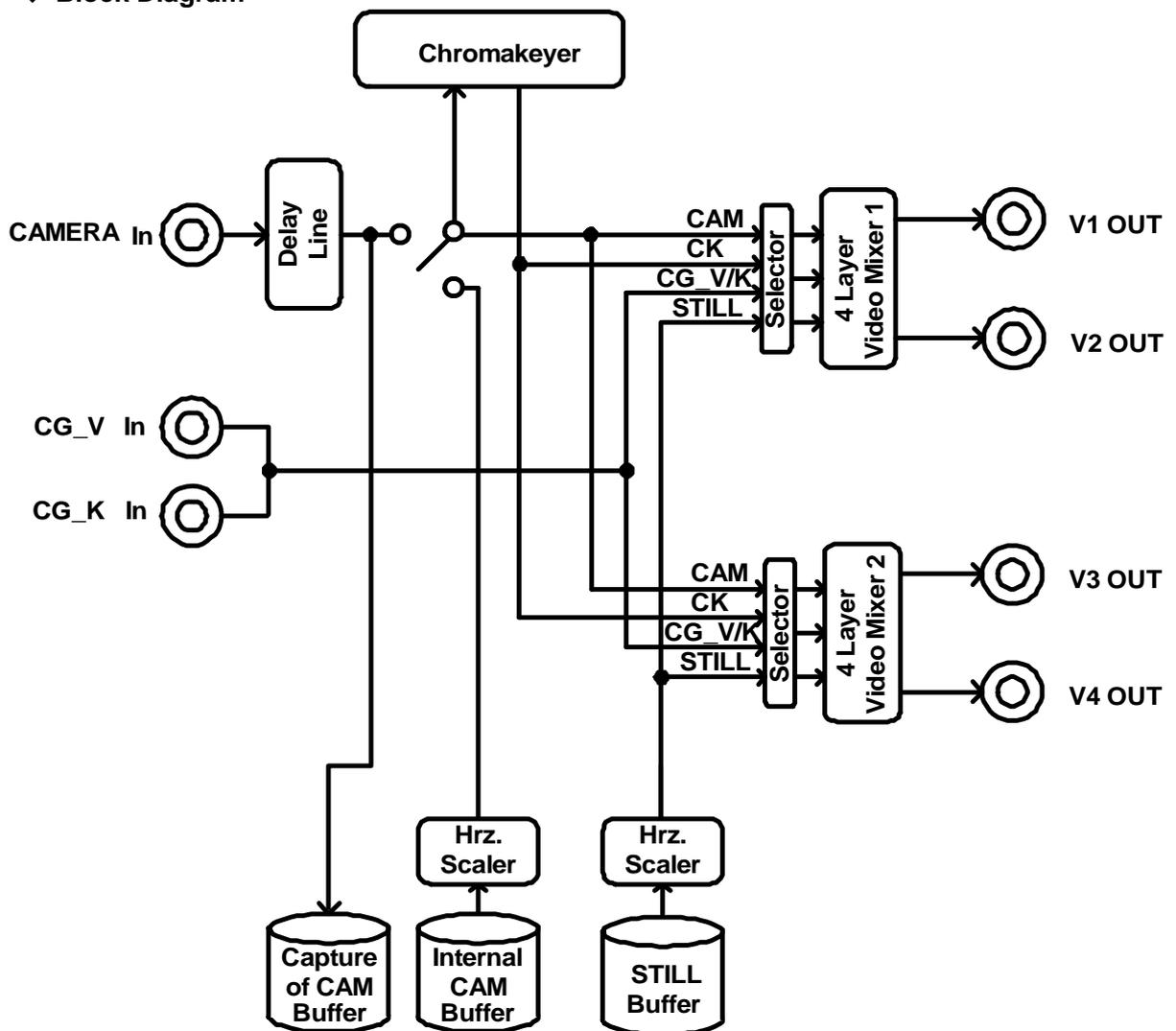
- ➢ 4:4:4:4 internal processing
- ➢ HD/SD-SDI 3-input/8-output
- ➢ High quality chroma keyer with unique algorithm
- ➢ Edge color replace function
- ➢ Flicker noise reduction filter
- ➢ DSK (mixing) function
- ➢ Still store function
- ➢ MBP-12RU: Remote Control unit (option)
- ➢ Chroma keying applicable to still images captured from camera
- ➢ Color correction after chroma keying
- ➢ Camera image capture

1-3. Peripherals Needed for the System

The following peripherals are required depending on your system configuration.

◆ **VGA monitor**
For viewing images and controlling the GUI application, a VGA monitor and a connection cable are required.
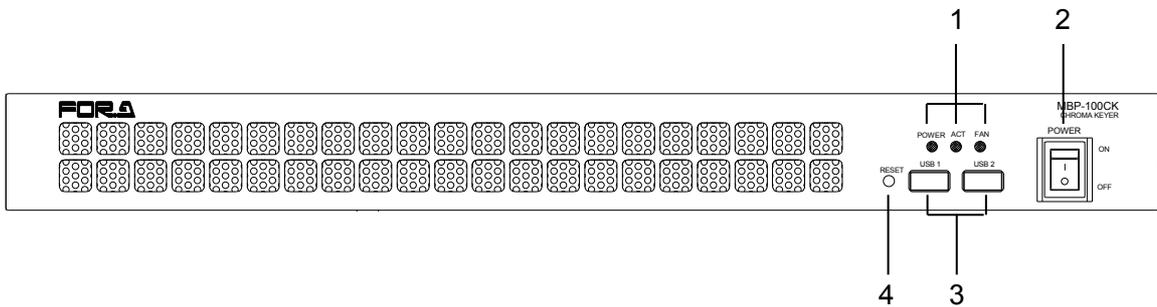VGA monitor―(VGA cable and DVI-VGA Conversion connector)―DVI-I connector on MBP-100CK

◆ **Mouse**
If you are using a VGA monitor, a mouse is required. Plug the mouse into one of the USB ports (USB1-4) on the front or rear of MBP-100CK

◆ **Keyboard**
A keyboard is useful for entering text data. Plug the keyboard into one of the USB ports (USB1-4) on the front or rear of MBP-100CK. (On-screen keypad is also available with mouse.)
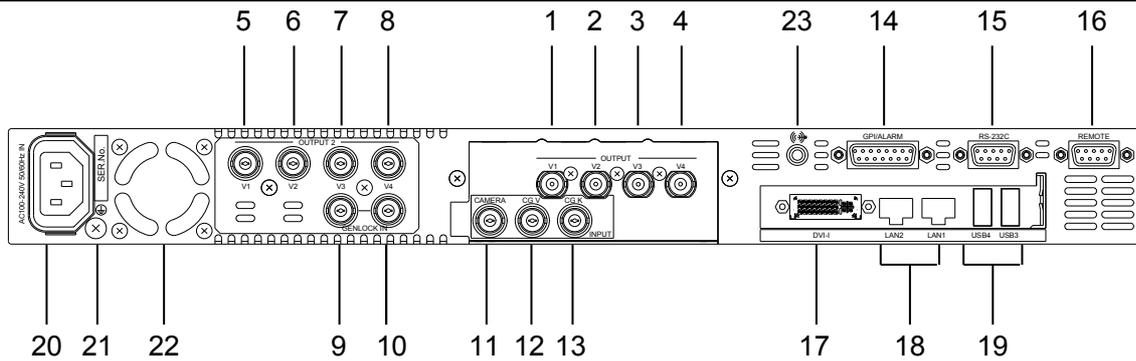
2. Panel Descriptions

2-1. Front Panel

No.	Name	Description		
1	Status Indicators	POWER	Lit green	Power is supplied to the unit.
			Unlit	Power is not supplied to the unit.
		ACT	-	Not used.
		FAN ALARM	Lit green	All cooling fans work properly.
			Lit red	One or more fans fail. Power off the unit and replace the failed fan, if necessary.
2	Power switch Power indicator	Switch used to turn unit power ON / OFF. Power indication will be lit green when power switch is set to ON and power applied to the unit. It takes about 5 seconds until the indicator lights up after powering on.		
3	USB1 USB2	Used for USB device connection (USB2.0)		
4	RESET	**Press the RESET** switch to start MBP-100CK **if the power indicator does not light up green 5 seconds after powering on.** This switch is not needed to use in the normal cases.		

| IMPORTANT |
|-----------|
| The FAN indicator lights up red when a fan failure occurs. In this case, power off the unit and consult your FOR-A reseller. |

2-2. Rear Panel

No.	Name		Description	Refer to
1	OUTPUT	V1	Outputs Video/Key. The output signals are set in Mixer1 and Selector. V1 and V2 can output different signals. (V1 outputs the bypassed signal from INPUT CAMERA when the unit is powered off.)	3
2		V2		
3		V3	Outputs Video/Key. The output signals are set in Mixer2 and Selector. V3 and V4 can output different signals.	
4		V4		
5	OUTPUT2	V1	Outputs the same signal as OUTPUT V1. (Does not output the bypassed signal.)	3
6		V2	Outputs the same signal as OUTPUT V2	
7		V3	Outputs the same signal as OUTPUT V3	
8		V4	Outputs the same signal as OUTPUT V4	
9	GENLOCK IN		Input external reference signal (Black Burst signal or Tri-level sync signal) to either one of these connectors.	3-1
10			The other connector is a loopthrough of GENLOCK IN. The loopthrough connector must be 75 ohm terminated if it isn't connected to other system equipment.	
11	INPUT	CAMERA	Used to connect camera input.	3
12		CG V	Used to connect external CG Video.	
13		CG K	Used to connect external CG Key.	
14	GPI / ALARM		Used for GPI control connection and power and fan alarm outputs. (15-pin D-sub, female)	2-4-1
15	RS-232C		Used for serial control connection. (9-pin D-sub, male)	2-3-2
16	REMOTE		Used for serial control connection (RS-422). (9-pin D-sub, female)	2-3-1
17	DVI-I		For output video on a monitor.	3
18	LAN1		Used for 100BASE-TX (1000BASE-T is future support.) Ethernet connection between MBP-100CK and MBP-12RU (optional remote unit). (RJ-45)	3
	LAN2		Not used.	
19	USB3 USB4		Used for USB device connection (USB3.0)	3
20	AC IN		Used for connection to AC power source via supplied accessory cord. (AC 100V-240V 50/60Hz)	
21	Ground Terminal		Used to ground unit to protect operators against static electricity and / or electrical shock.	
22	Cooling Fan		Used to air cool unit to prevent overheating. Do not block fan intake with other equipment or objects.	
23	Audio Out		Stereo headphone jack (Unable to monitor source audio.)	

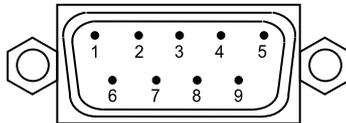# 2-3. Serial Interfaces

2-3-1. REMOTE

◆ **Connector Appearance**
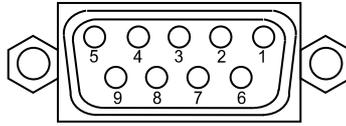
9-pin D-sub (female) (inch screw type)

◆ **Pin Assignment**

Pin No.	Signal	I/O	Description
1	FG	−	Frame ground
2	TX-	Out	Transmit data-
3	RX+	In	Receive data+
4	SG	−	Signal Ground
5	NC	−	No connection
6	SG	−	Signal Ground
7	TX+	Out	Transmit data+
8	RX-	In	Receive data-
9	FG	−	Frame ground

2-3-2. RS-232C

◆ **Connector Appearance**

9 pin D-sub (male)(inch screw type)

◆ **Pin Assignment**

Pin No.	Signal	I/O	Description
1	DCD	In	Carrier detection
2	RXD	In	Receive data
3	TXD	Out	Transmit data
4	DTR	Out	Data terminal ready
5	GND		Signal ground
6	DSR	In	Data set ready
7	RTS	Out	Request to send
8	CTS	In	Clear to send
9	RI	In	Ring Indicator

2-4. Parallel Interface

2-4-1. GPI / ALARM
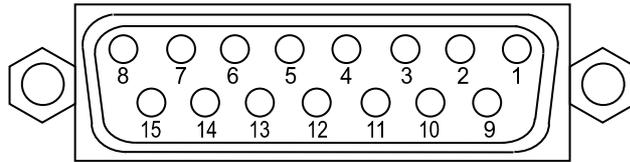
15-pin D-sub, female (inch screw type)

◆ **Pin Assignment**

Pin No.	Signal	I/O	Description
1	GND	—	Ground
2	POW ALARM	Out	Power alarm (*1)
3	FAN ALARM	Out	Fan alarm (*1)
4	NC	—	No connection
5	GPI IN3	In	GPI input (*2)
6	GPI IN2	In	GPI input (*2)
7	GPI IN1	In	GPI input (*2)
8	+5VOUT	Out	+5V output
9	COMMON	—	Power alarm and fan alarm common (*1)
10	NC	—	No connection
11	NC	—	No connection
12	GPI IN4	In	GPI input (*2)
13	GPI OUT2	Out	GPI output (*3)
14	GPI OUT1	Out	GPI output (*3)
15	GND	—	Ground

*   The maximum rating current for +5V output is 200mA.

(*1) See "Alarm Out Circuit" below.
(*2) See "GPI IN Circuit" in the next page.
(*3) See "GPI OUT Circuit" in the next page.

◆ **Alarm Out Circuit**
The alarms are relay contact outputs as shown below.

If power and cooling fan work normally: The alarm and common pins are open.
If an alarm occurs or power is turned off: The alarm and common pins are closed.

Pin 9 is used as a common pin for both power alarm and fan alarm.
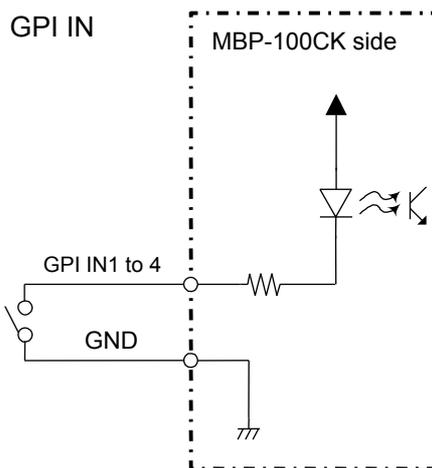The alarm relays rated at 30VDC, 0.5A

Alarm Output

MBP-100CK side

Max:30V

Relay contact POW

Closed when an alarm
occurs or power is
turned off.

Relay contact FAN ALARM

COMMON
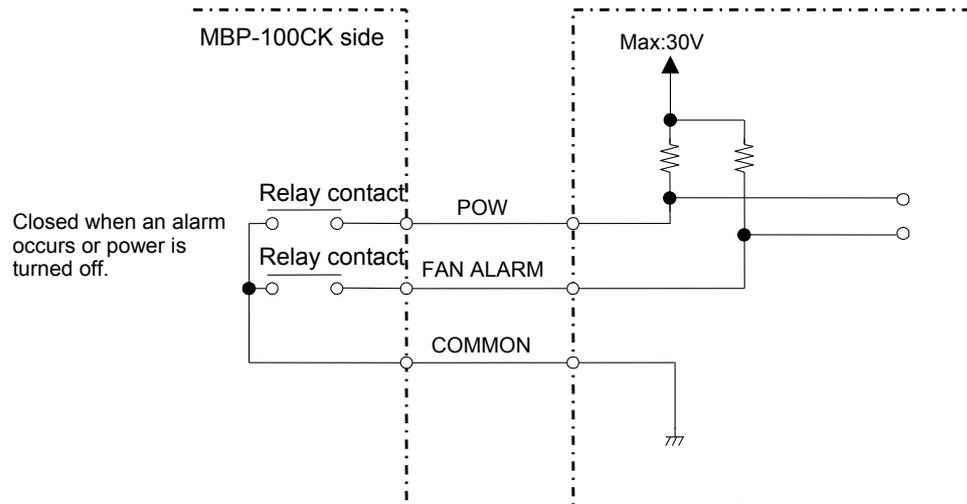
◆ **GPI IN Circuit**

GPI In and GND pins are shorted: Function ON
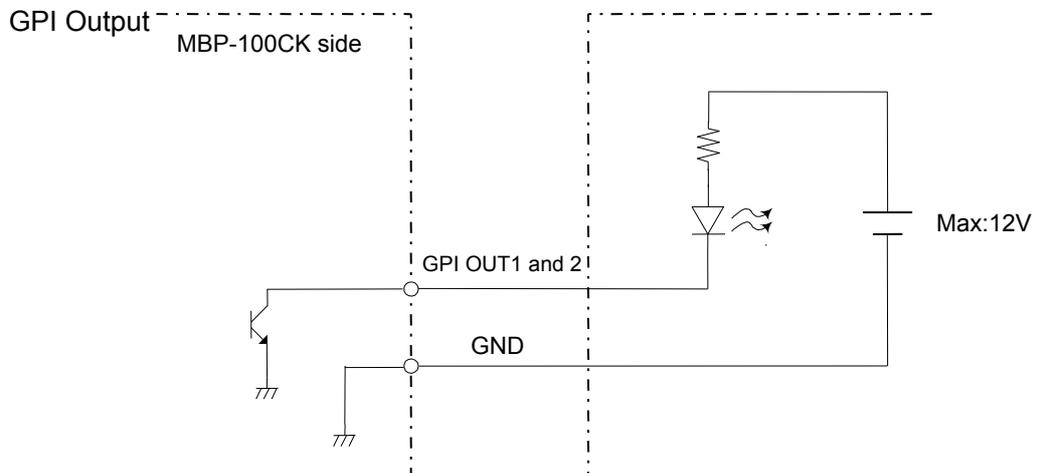GPI In and GND pins are open: Function OFF
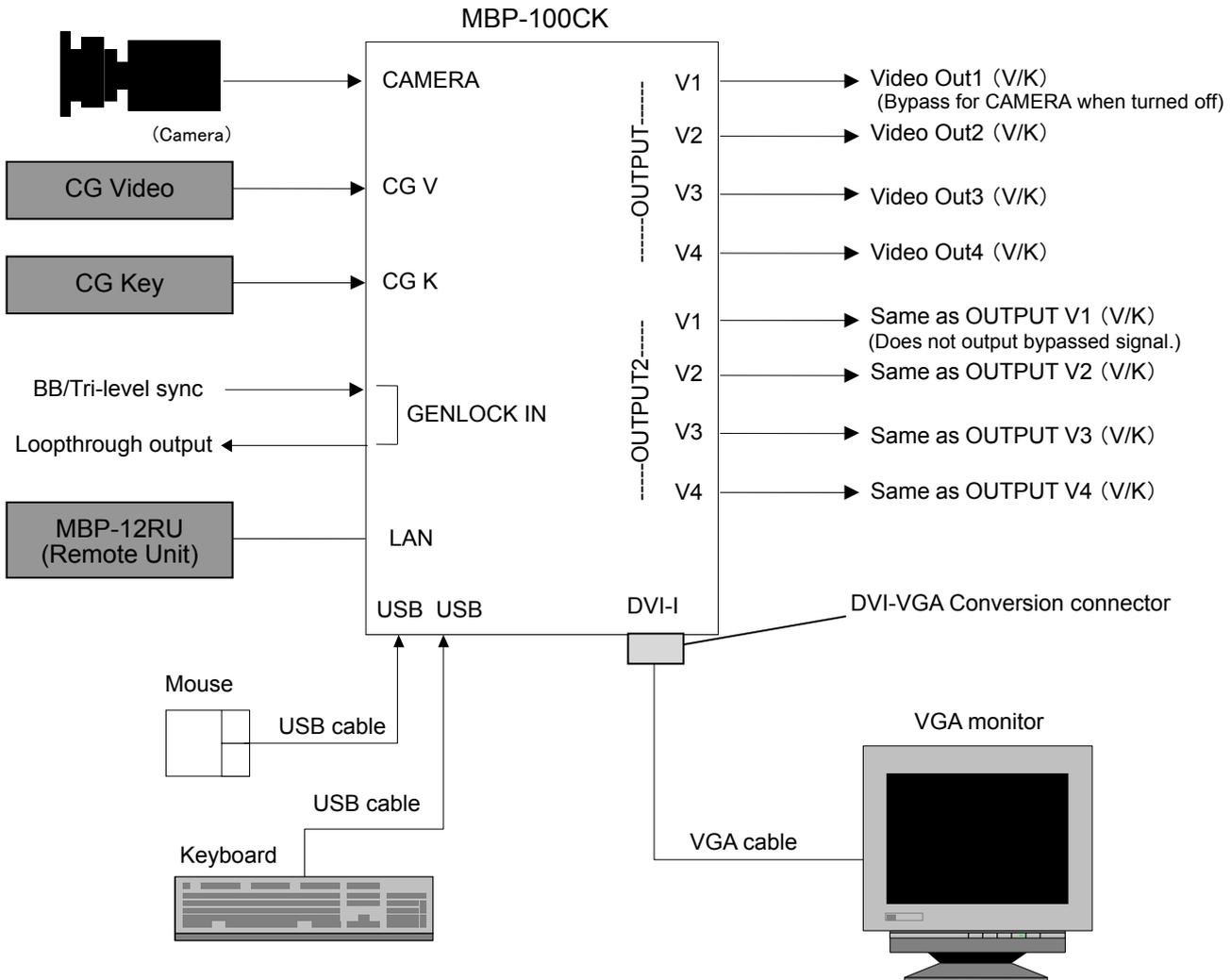

GPI IN

MBP-100CK side

GPI IN1 to 4

GND

◆ **GPI OUT Circuit**

GPI OUT is open collector output.
Use lower than12VDC if supplying an external power source. The maximum load current for
each pin is 20mA.

GPI Output

MBP-100CK side

GPI OUT1 and 2

GND

Max:12V

3. Connection

The figure below shows a system connection example of the MBP-100CK.

MBP-100CK

CAMERA	V1 → Video Out1 (V/K) (Bypass for CAMERA when turned off)
	V2 → Video Out2 (V/K)
CG V	V3 → Video Out3 (V/K)
	V4 → Video Out4 (V/K)
CG K	V1 → Same as OUTPUT V1 (V/K) (Does not output bypassed signal.)
	V2 → Same as OUTPUT V2 (V/K)
GENLOCK IN	V3 → Same as OUTPUT V3 (V/K)
	V4 → Same as OUTPUT V4 (V/K)

(Camera)

CG Video

CG Key

BB/Tri-level sync

Loopthrough output

GENLOCK IN

OUTPUT

OUTPUT2

MBP-12RU
(Remote Unit) — LAN

USB USB

DVI-I — DVI-VGA Conversion connector

Mouse

USB cable

USB cable

Keyboard

VGA monitor

VGA cable

NOTE

The MBP-100CK sends a set of four video signals (V1 to V4) to OUTPUT and OUTPUT2. OUTPUT2-V1 to V4 respectively displays the same image as OUTPUT-V1 to V4.

Use the USB ports for keyboard and mouse connections. If connecting a PS/2 mouse, use the USB -PS/2 converter.

3-1. System Phase Adjustment

The genlock phases for SDI signals can be adjusted using the MBP-12GUI control software as shown below.
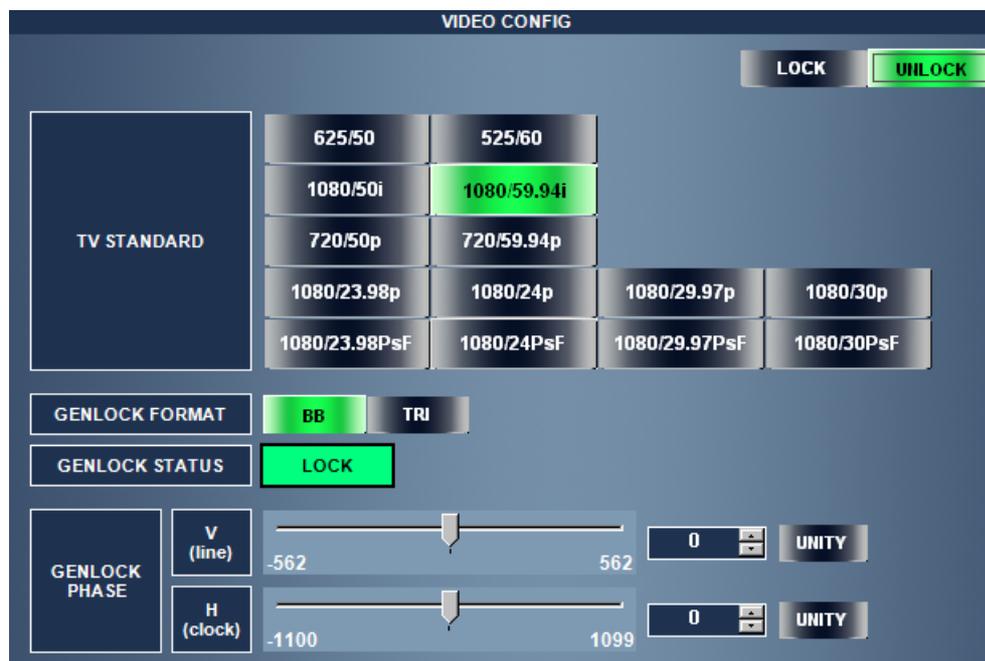
◆ **H Phase**
Move the bottom slide lever or enter a value to adjust the horizontal phase.

TV standard	Setting range	Step	Default
1080/59.94i	-1100 to +1099 (-14.83µs to +14.81µs)	1 (13.48ns)	0
1080/50i	-1320 to +1319 (-17.79µs to +17.78µs)	1 (13.47ns)	0
1080/23.98p 1080/23.98PsF	-1375 to +1374 (-18.53µs to +18.52µs)	1 (13.48ns)	0
1080/24p 1080/24PsF	-1375 to +1374 (-18.52µs to +18.50µs)	1 (13.47ns)	0
1080/29.97p 1080/29.97PsF	-1100 to +1099 (-14.83µs to +14.81µs)	1 (13.48ns)	0
1080/30p 1080/30PsF	-1100 to +1099 (-14.81µs to +14.80µs)	1 (13.47ns)	0
720/59.94p	-825 to +824 (-11.12µs to +11.11µs)	1 (13.48ns)	0
720/50p	-990 to +989 (-13.34µs to +13.32µs)	1 (13.47ns)	0
525/60	-858 to +857 (-31.78µs to +31.74µs)	1 (37.04ns)	0
625/50	-864 to +863 (-32.00µs to +31.96µs)	1 (37.04ns)	0

◆ V Phase

Move the upper slide lever or enter a value to adjust the vertical phase.

TV standard	Setting range	Step	Default
1080/59.94i	-562 line to +562 line (-16.67ms to +16.67ms)	1 line (29.66µs)	0
1080/50i	-562 line to +562 line (-20.00ms to +20.00ms)	1 line (35.56µs)	0
1080/23.98p 1080/23.98PsF	-562 line to +562 line (-20.83ms to +20.83ms)	1 line (37.07µs)	0
1080/24p 1080/24PsF	-562 line to +562 line (-20.81ms to +20.81ms)	1 line (37.04µs)	0
1080/29.97p 1080/29.97PsF	-562 line to +562 line (-16.67ms to +16.67ms)	1 line (29.66µs)	0
1080/30p 1080/30PsF	-562 line to +562 line (-16.65ms to +16.65ms)	1 line (29.63µs)	0
720/59.94p	-375 line to +374 line (-8.34ms to +8.32ms)	1 line (22.24µs)	0
720/50p	-375 line to +374 line (-10.00ms to +9.97ms)	1 line (26.67µs)	0
525/60	-262 line to +262 line (-16.68ms to +16.68ms)	1 line (63.56µs)	0
625/50	-312 line to +312 line (-20.00ms to +20.00ms)	1 line (64.00µs)	0

| **IMPORTANT** |
|---|
| The system phase adjustments described in the MBP-100CK Operation manual 3-1. "System Phase Adjustment" and in the MBP-12GUI Operation manual 3-2-(4). "GENLOCK PHASE" need to store the settings to the event memory after the adjustment to keep the adjustment effective at the next reboot. |
| Be sure to store the settings to the event number 1 "Boot Setting" after changing the genlock phase. Please refer to the MBP-12GUI Operation manual 3-10-1 "Saving Event" for the details on how to save the settings. When saving the settings, other settings than genlock phase such as output signal settings, mixer settings and audio settings must not be changed from the default values. |

4. Specifications and Dimensions

4-1. Unit Specifications

Video formats	HD-SDI	1080/59.94i, 1080/50i, 720/59.94p, 720/50p
	(Option)	1080/23.98p, 1080/24p, 1080/29.97p, 1080/30p, 1080/23.98PsF, 1080/24PsF, 1080/29.97PsF, 1080/30PsF
	SD-SDI	525/60, 625/50
Video Input	HD-SDI or SD-SDI	1.5Gbps 75Ω BNC x 3 270Mbps 75Ω BNC x 3
Genlock Input	BB: or Tri-level sync:	0.429V(p-p) (NTSC)/0.45V(p-p) (PAL) 0.6V(p-p) Loopthrough or 75 ohm, BNCx1
Video Output		
OUTPUT (V1-V4)	HD-SDI or SD-SDI	1.5Gbps 75Ω BNC x 4 270Mbps 75Ω BNC x 4 (V1 outputs the bypassed signal from INPUT CAMERA when the unit is powered off.)
OUTPUT2 (V1-V4) (Same signals as OUTPUT)	HD-SDI or SD-SDI	1.5Gbps 75Ω BNCx4 270Mbps 75Ω BNC x 4 (V1 does not output the bypassed signal.)
Input Lock	±1/2H (Up to 1H offset referring to genlock phase)	
I/O delay		
CAMERA	1 frame (When the phase of input is the same as genlock phase.)	
CGV CGK	1 line (When the phase of input is the same as genlock phase.)	
Signal Processing	4:4:4:4 component	
Chroma keyer	High quality chroma keyer with FOR-A's unique algorithm	
DSK	Mixing: Normal-mix or Additive-mix selectable, 4 layers	
Camera Delay	0H – 7 frames	
	* Adjustable in 2-pixel steps (HD: approx. 27ns, SD: approx.74ns) for H phase.	
Interface		
REMOTE	9-pin D-sub (female) x 1	
RS232C	9-pin D-sub (male) x 1	
USB	2.0 , Series-A type connector x 2 (2 on the front panel)	
	3.0 , Series-A type connector x 2 (2 on the rear panel)	
LAN1	100BASE-TX (1000BASE-T is future support) RJ-45 x 1	
LAN2	Not used.	
DVI-I	DVI-I x 1 (1280 x 1024)	
GPI/ALARM	15-pin D-sub (female) x 1 ALARM: power and fan alarms (relay output) GPI: 4-input/2-output (relay input, open collector output)	
Audio Out	3.5 mm Stereo headphone mini jack x 1	
Temperature	0°C - 40°C	
Humidity	20% - 80% (no condensation)	
Power	100VAC-240VAC±10%, 50/60Hz	
Consumption	110VA(115W) at 100VAC 132VA(118W) at 200VAC	
Dimensions	430 (W) x 44 (H) x 500 (D) mm, EIA 1RU	
Weight	9 kg	
Consumables (if used 24 hours a day at room temperature)	Cooling fans: Power unit: Battery:	Replace every 3 years Replace every 5 years Replace every 5 years (*)

*Yearly battery replacement is recommended when unit is stored without powering on for long periods.

4-2. External Dimensions

(All dimensions in mm.)
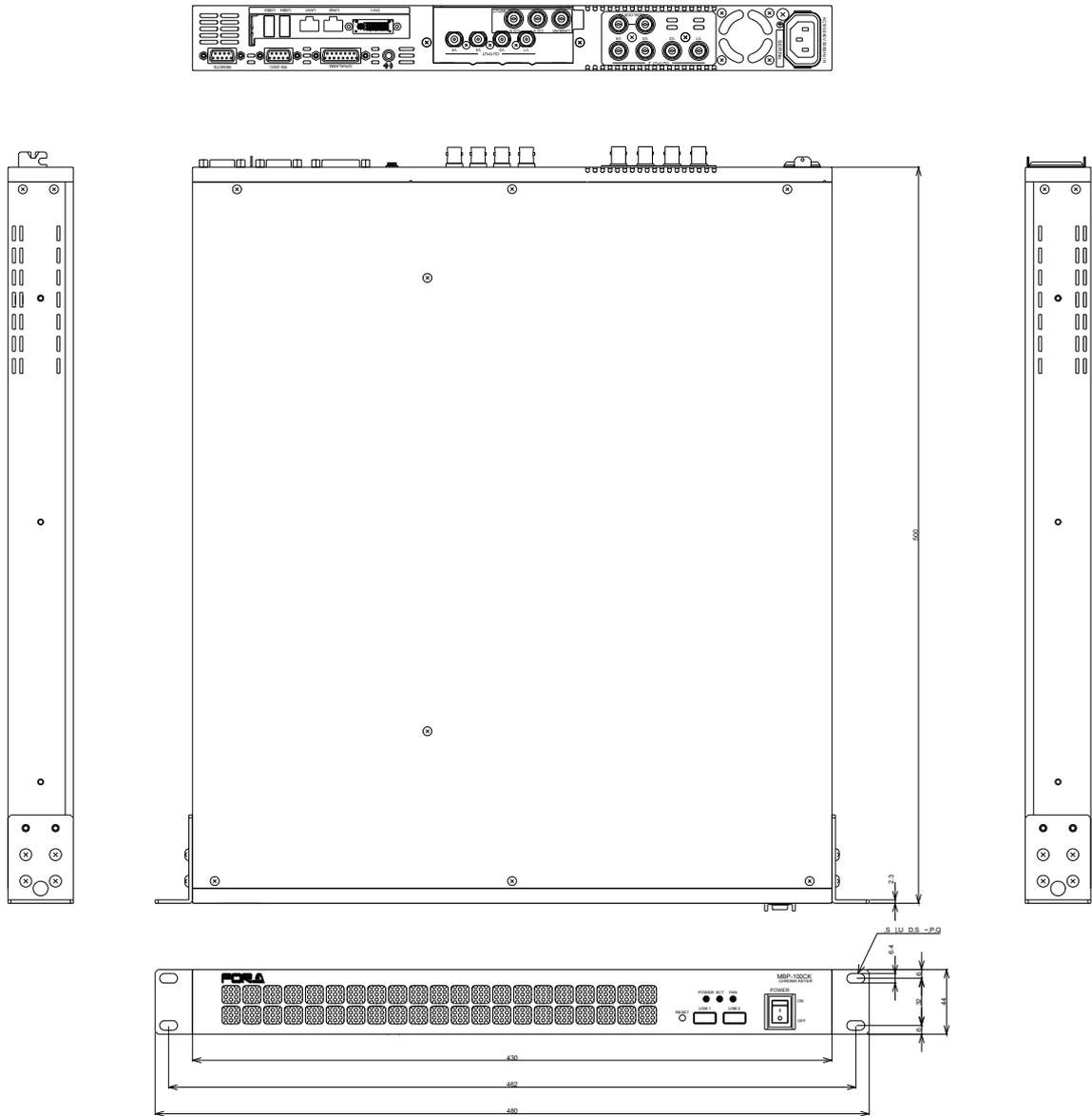
Appendix. How to Reset BIOS

In case the operating system cannot be started due to the lack of battery power which backs up the BIOS settings, please consult your FOR-A reseller. Be sure to ask the FOR-A reseller to replace the battery, because some mechanical ability is required for the battery replacement.
If you urge to recover the unit, it is possible for the moment by following the procedure below to reset the BIOS.

1. Opening BIOS Setup Menu

1. Connect a PC monitor to the DVI-I port and a keyboard and mouse to the USB ports on the rear of the device and turn on the power

2. The screen appears as below. Press the **F2** key.

3. The Phoenix SecureCore Technology Setup screen appears.
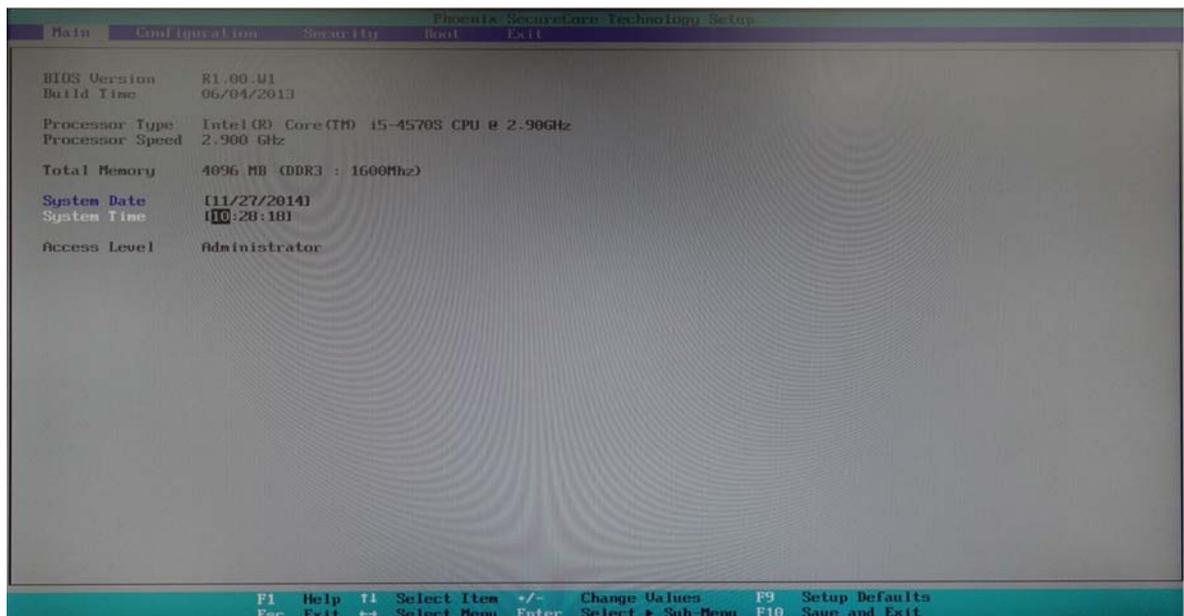
After loading default configuration settings, set the values as shown below.
The detailed procedure is given in the following section.

Item	Menu bar	Menu Item	Submenu 1	Submenu 2	Value
(1)	Main	System Date	-	-	Current date
		System Time	-	-	Current time
(2)	Configuration	PCI/PCIE Configuration	Processor PCI Express Configuration	PEG0	GEN2
				PEG1	GEN2
				PEG2	GEN2
		Power Control Configuration	Restore AC power loss	-	Power On
		CPU Configuration	EIST	-	Disable
		Chipset Configuration	Memory Configuration	Max TOLUD	Dynamic
		SATA Configuration	Hot Plug	-	Disable (for all items)
		Super IO Configuration	COM2 Configuration	-	RS-422
			Parallel Port Address	-	378/ IRQ7
			Parallel Port Mode	-	Standard
(3)	Boot	Boot Priority Order		1	ATA HDD0
				2	ATA HDD1

2. Setting Procedure

◆ **Default configuration**

(a) On the menu bar, select **Exit** using the right and left arrow keys.

(b) Select **Load Setup Defaults** using the up and down arrow keys, and press **Enter**.
A confirmation message appears asking if you want to load the default configuration settings. Press **Enter**. The default configuration settings will load.
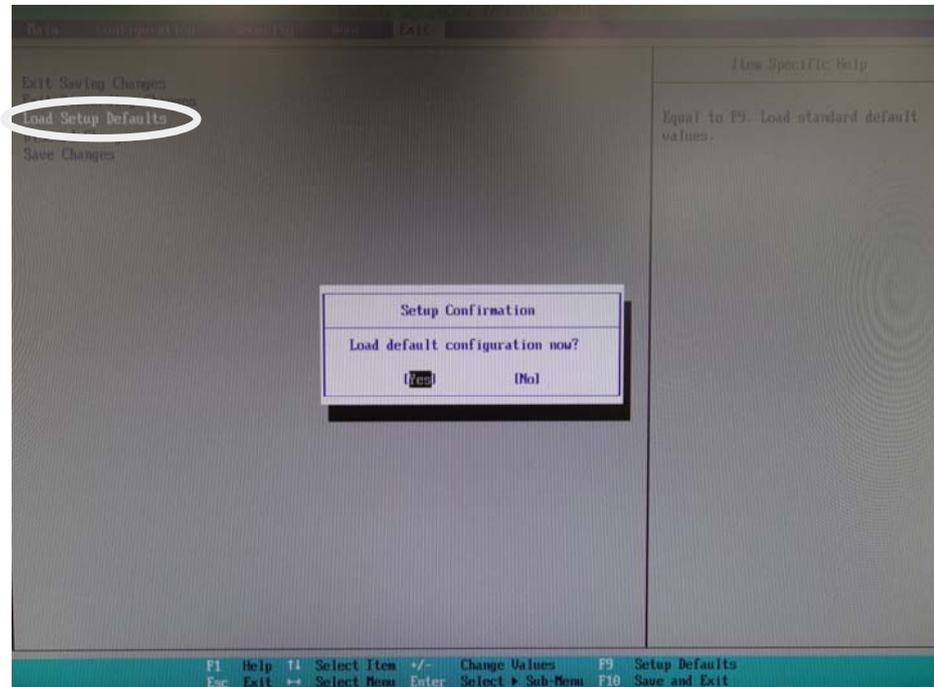
(1) Date and time settings
(a) On the menu bar, select **Main** using the right and left arrow keys.
(b) Select **System Date** using the up and down arrow keys, and enter the current date using the numeric keys. Press **Enter** to confirm an entry and move the cursor to month/day/year. In the same way, set the current time under **System Time**.
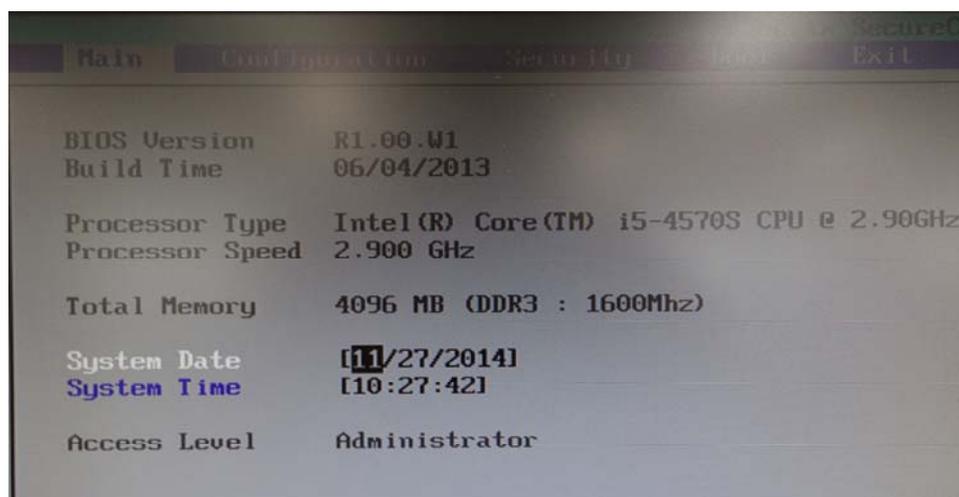
(2) Configuration menu
On the menu bar, select **Configuration** using the right and left arrow keys. The
Configuration menu screen appears.
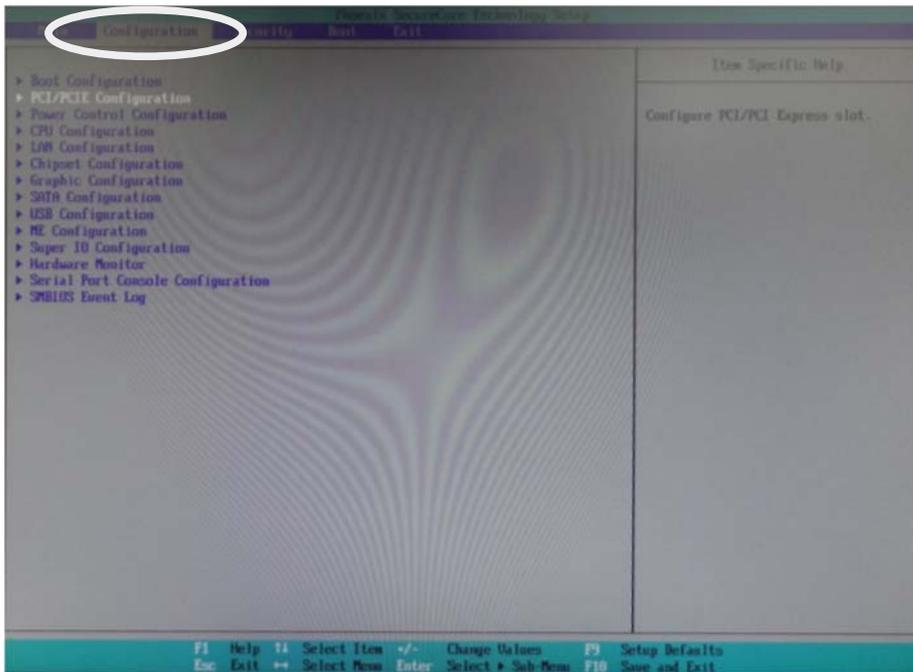
◆ **PCI/PCIE Configuration**
(a) Select the **PCI/PCIE Configuration** submenu, and press **Enter** to display the menu.
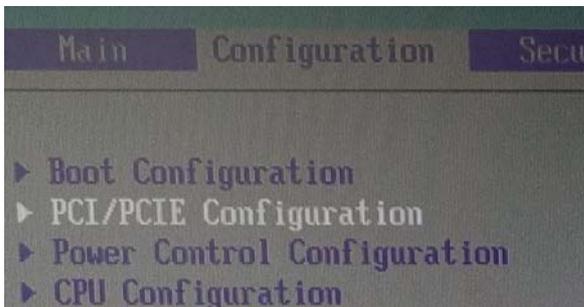
(b) Select **Processor PCI Express Configuratio**n using the up and down arrow keys, and
press **Enter**. The Options window appears. Select **PEG0** and press **Enter**. Select **GEN2**
and press **Enter**.

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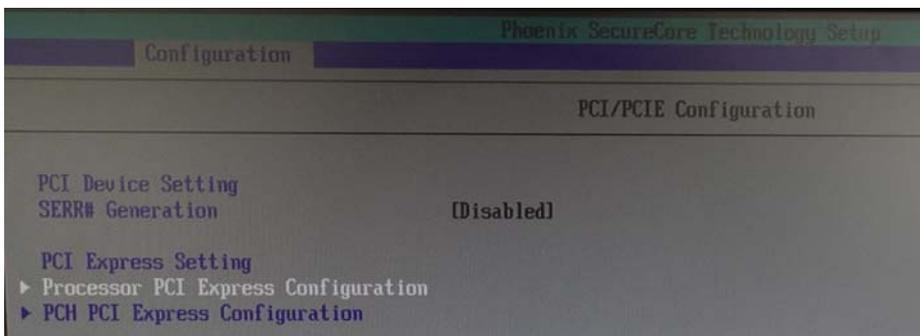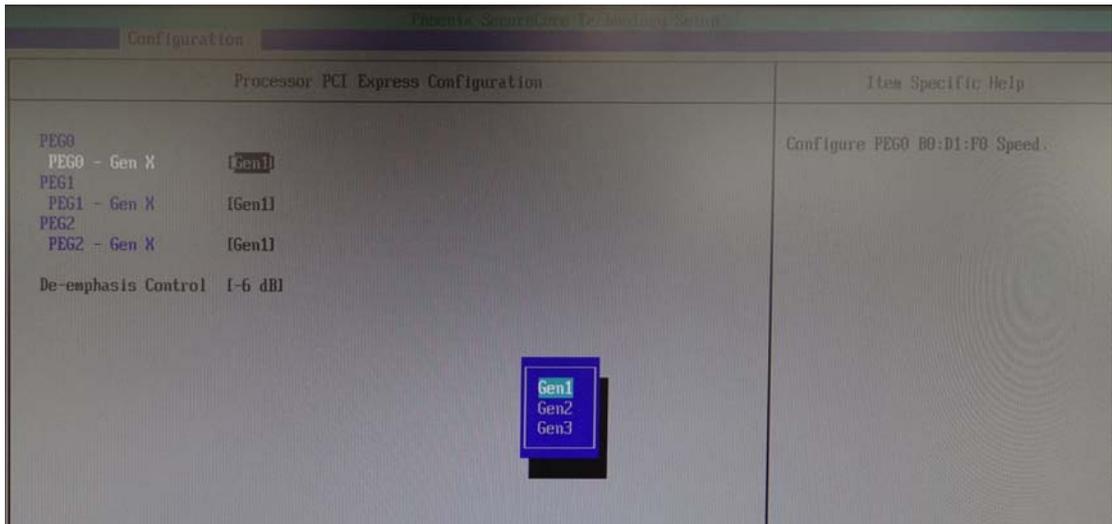
(c) In the same way, set **PEG1** and **PEG2** to **GEN2**.

◆　**Power Control Configuration**

(a) Press the **Esc** key to return to the **Configuration** menu screen. Select the **Power Control Configuration** submenu and press **Enter**.
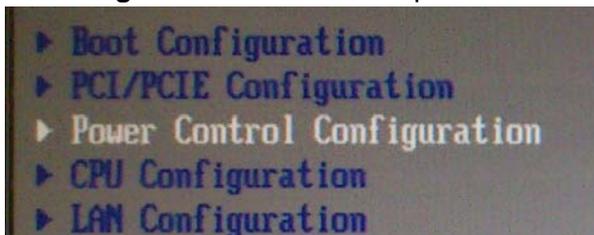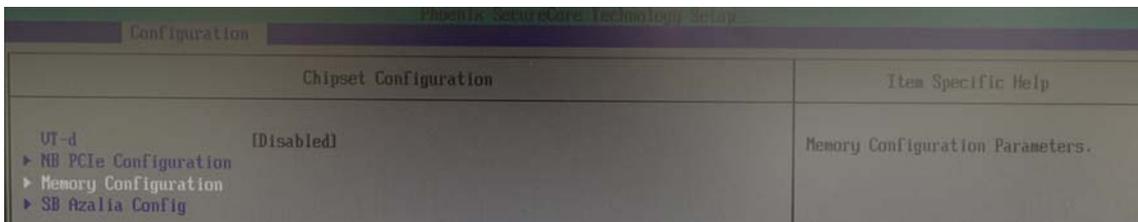

(b) Select **Restore AC power loss**, and press **Enter**. Select **Power On**, and press **Enter**.
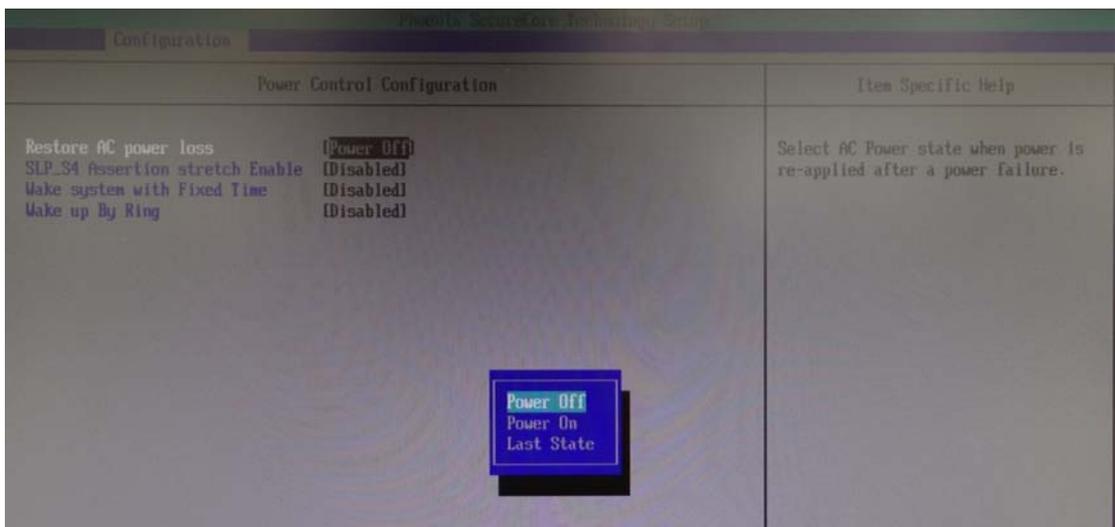
◆ CPU Configuration

(a) Press the **Esc** key to return to the **Configuration** menu screen. Display the **CPU Configuration** menu.
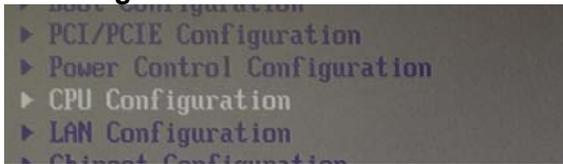
(b) Select **EIST** using the up and down arrow keys, and press **Enter**.
(c) Select **Disabled** using the up and down arrow keys, and press **Enter**.
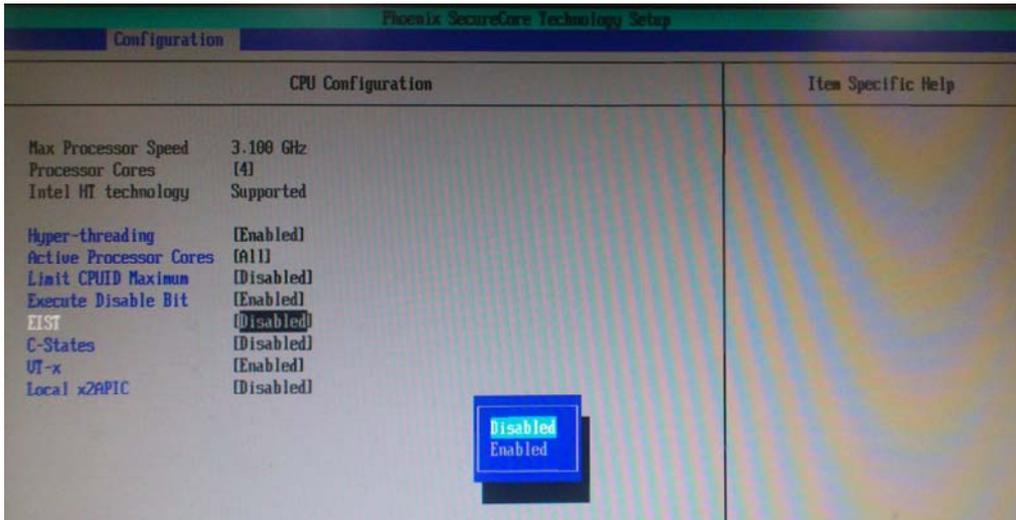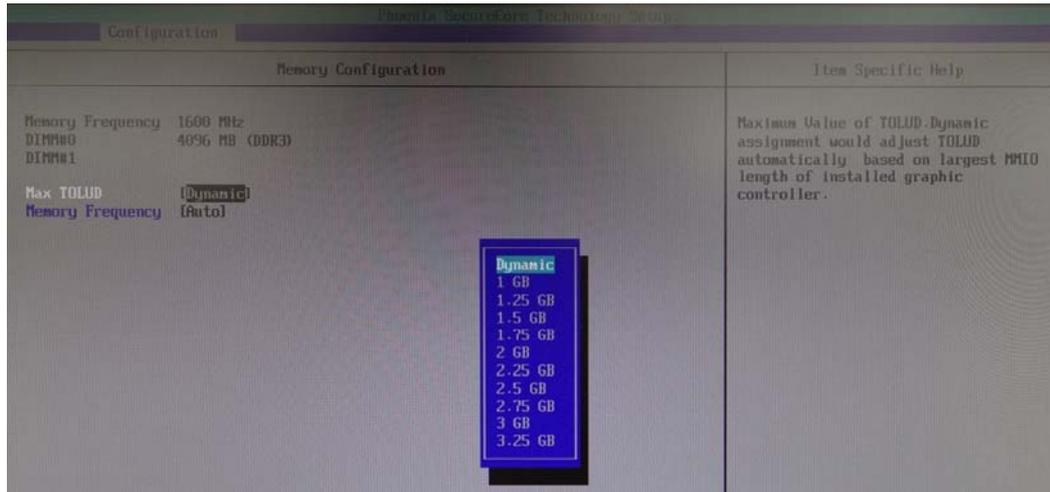

◆ Chipset Configuration

(a) Press the **Esc** key to return to the **Configuration** menu screen. Display the **Chipset Configuration** menu.
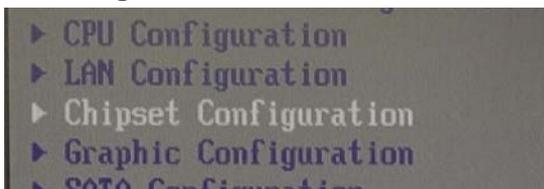
(b) Select **Memory Configuration** using the up and down arrow keys, and press **Enter**.
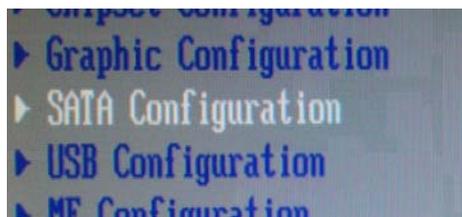
(c) Select **Max TOLUD** using the up and down arrow keys, and press **Enter**.
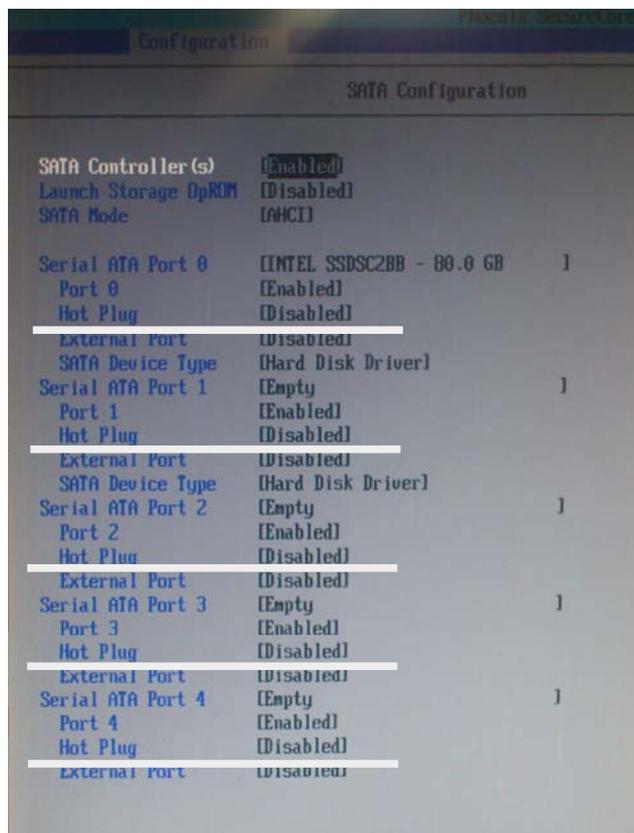(d) Select **Dynamic** and press **Enter**.

◆   **SATA Configuration**

(a) Press the **Esc** key to return to the **Configuration** menu screen. Display the **SATA Configuration** menu.


(b) Set all **Hot Plug** settings to **Disabled**.

◆　**Super IO Configuration**

(a) Press the **Esc** key to return to the **Configuration** menu screen. Display the **Super IO Configuration** menu.

(b) Select **COM2 Configuration** using the up and down arrow keys, and press **Enter**.

(c) Select **RS-422** using the up and down arrow keys, and press **Enter**.
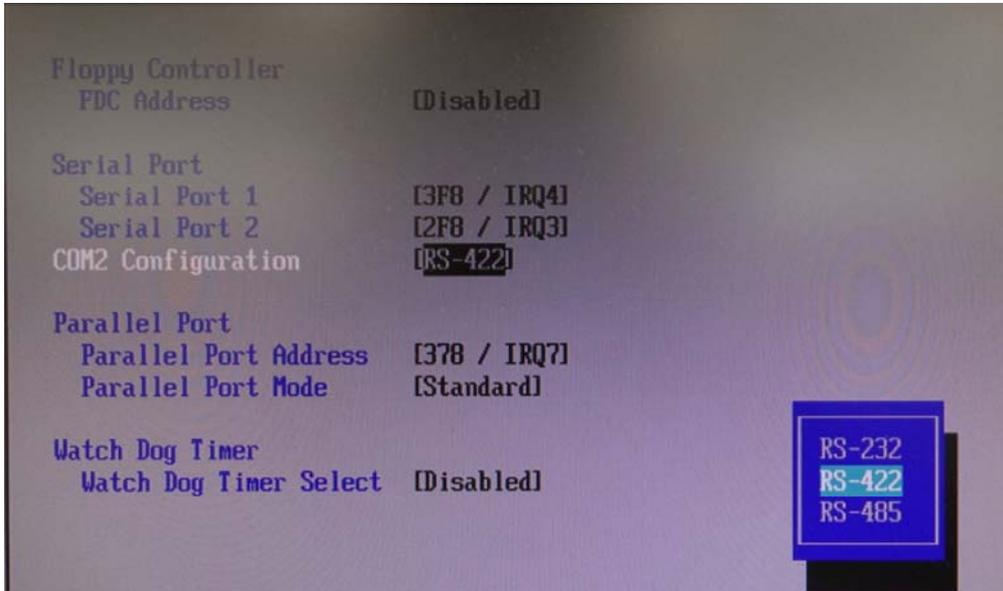
(d) Select **Parallel Port Address** using the up and down arrow keys, and press **Enter**.
(e) Select **378/ IRQ7** using the up and down arrow keys, and press **Enter**.
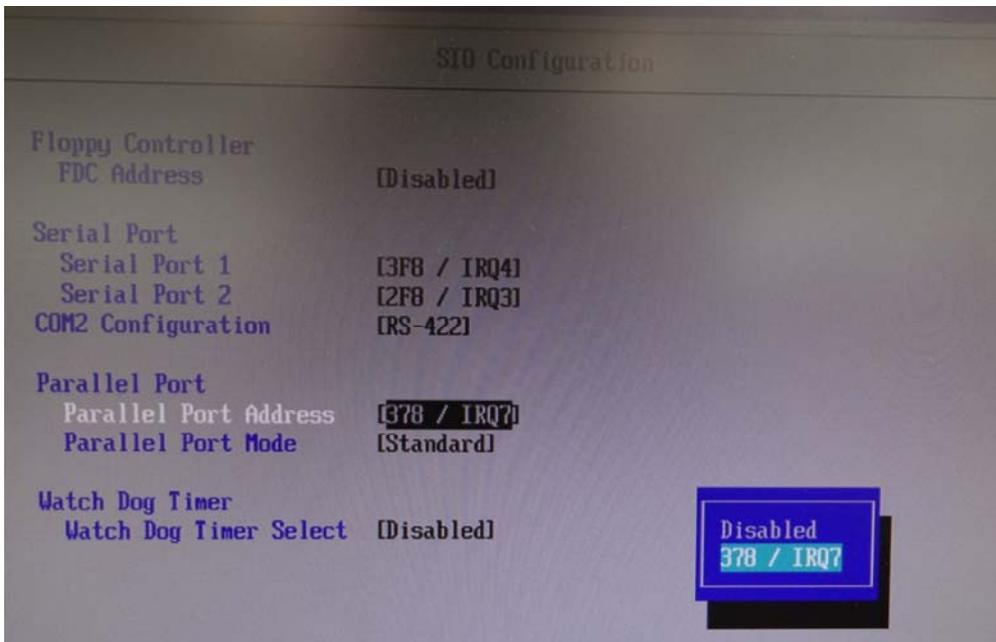
(f) Select **Parallel Port Mode** using the up and down arrow keys, and press **Enter**.
(g) Select **Standard** using the up and down arrow keys, and press **Enter**.
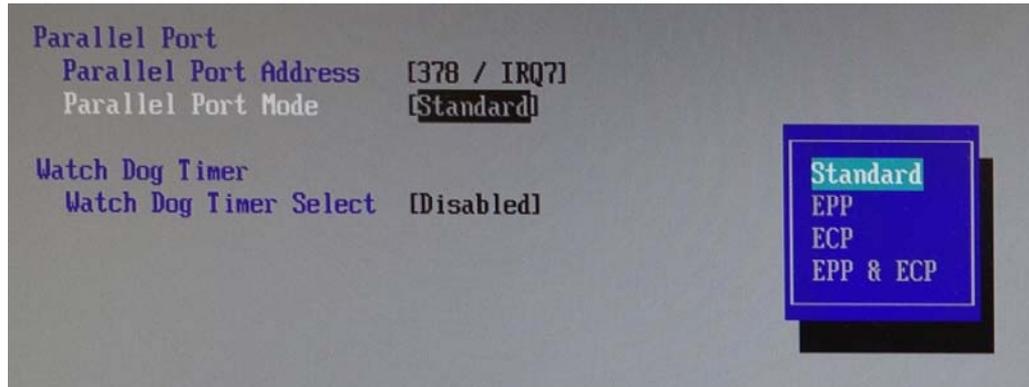
(3) Boot menu
    (a) Press the **Esc** key to return to the **Configuration** menu screen. On the menu bar, select **Boot** using the right and left arrow keys.
    (b) Under **Boot Priority Order,** set **1** to **ATA HDD0**. Use the **+** and **−** keys to change the setting.
    (c) Under **Boot Priority Order**, set **2** to **ATA HDD1**.
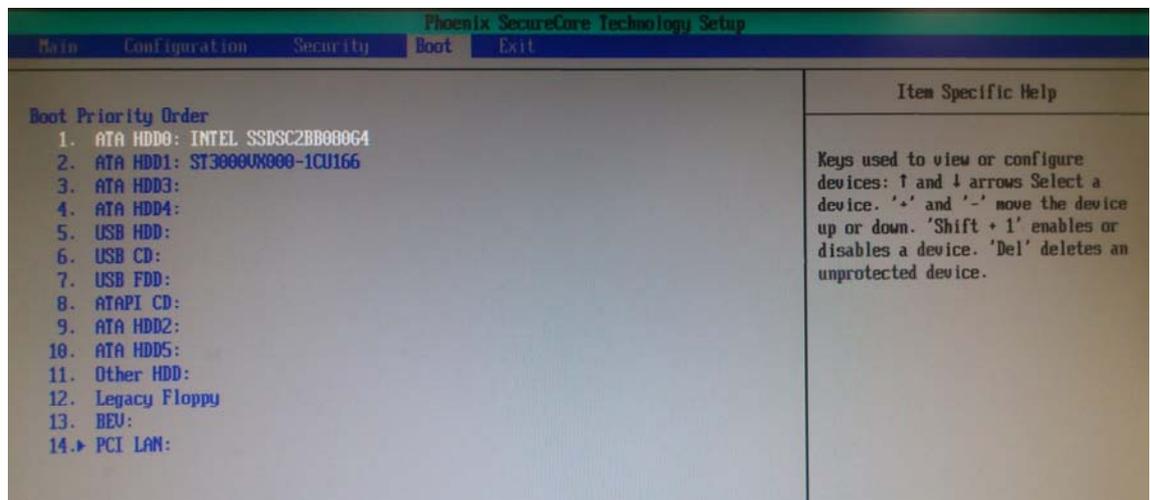
    (d) Once you have completed the settings, press the **F10** key. A confirmation message appears asking if you want to save the settings and exit the BIOS setup menus. Select **Yes** and press **Enter**. The system restarts from the BIOS boot screen.

The procedure is complete.

Warning

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

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