

BOXER-6403

Boxer PC

Intel® Celeron®/Atom™ Processor

1 USB3.0, 3 USB2.0, 2 COM, 2 LAN,

1 HDMI, 1 LVDS, 2 Mini-Card

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Packing List

Before setting up your PC, please make sure that the following materials are enclosed:

- 1 BOXER-6403 Boxer PC
- 1 Burn-Proof Bracket
- 3 RJ-45 to D-sub cable
- 1 DVD-ROM for manual (in PDF format) and drivers
- 1 Power Adapter

If any of these items should be missing or damaged, please contact your distributor or sales representative immediately.

Safety & Warranty

Please read the following safety instructions carefully. It is advised that you keep this manual for future references

1. Disconnect this device from any AC supply before cleaning.
2. While cleaning, use a damp cloth instead of liquid or spray detergents.
3. For any pluggable equipment, the power outlet must be installed near the device and easily accessible.
4. Keep this device away from humidity.
5. Place this device on a solid surface during installation. Dropping it or letting it fall could cause damage.
6. The openings on the device's enclosure are for dissipating heat. **DO NOT COVER THE OPENINGS.**
7. Watch out for high temperatures that may occur during system operation.
8. Make sure the voltage of the power source is correct before connecting the device to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the device should be noted.
11. If the device is not to be used for a long time, disconnect it from the power supply to avoid damage by transient over-voltage.
12. Never pour any liquid into the openings. This could cause fire or electric shock.

13. As most electronic components are sensitive to static electrical charge, be sure to ground yourself to prevent static charge when installing the internal components. Use a grounding wrist strap and contain all electronic components in any static-shielded devices.
14. **If any of the following situations arises, please contact our service personnel:**
 - i. **Damaged power cord or plug**
 - ii. **Liquid intrusion to the device**
 - iii. **Exposure to moisture**
 - iv. **Device is not working as expected or in a manner as described in this manual**
 - v. **The device is dropped or damaged**
 - vi. **Any obvious signs of damage displayed on the device**
15. **DO NOT LEAVE THIS DEVICE IN AN UNCONTROLLED ENVIRONMENT WHERE THE STORAGE TEMPERATURE IS BELOW -10° C (14°F) OR ABOVE 60° C (140° F) TO PREVENT DAMAGE.**

FCC

Warning!



This device complies with Part 15 FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received including

interference that may cause undesired operation.

Caution:

There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions and your local government's recycling or disposal directives.

China RoHS Requirements
产品中有毒有害物质或元素名称及含量
AAEON Boxer/ Industrial System

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板 及其电子组件	×	○	○	○	○	○
外部信号 连接器及线材	×	○	○	○	○	○
外壳	×	○	○	○	○	○
中央处理器 与内存	×	○	○	○	○	○
硬盘	×	○	○	○	○	○
电源	×	○	○	○	○	○
<p>O: 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T 11363-2006 标准规定的限量要求以下。</p> <p>X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T 11363-2006 标准规定的限量要求。</p> <p>备注: 一、此产品所标示之环保使用期限，系指在一般正常使用状况下。 二、上述部件物质中央处理器、内存、硬盘、电源为选购品。</p>						

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Chapter

1

**General
Information**

1.1 Introduction

AAEON introduces the slimmest product in the BOXER series, the BOXER-6403, which utilizes the Intel® Celeron®/Atom™ processor: this boxer PC expands its graphics performance greatly with the newest generation of Celeron®/Atom™ processors.

So far, there is no other boxer PC can be so small and slim like the BOXER-6403, not even PICO-ITX system. With this tiny form factor, customers can fit it almost anywhere, and it provides quite a lot of I/O ports for basic applications. BOXER-6403 adopts a reliable fanless design for most rugged environment. It also provides wireless communication features for users wishing to build up a network connection at any locations.

The BOXER-6403 is a standalone high performance PC designed for extended operation and with high reliability. It can replace traditional methods and become the mainstream boxer PC for diversified markets.

1.2 Features

- Intel® Celeron®/ Atom™ Processor
- Ultra Compact design: 158mm x 95mm x 20mm
- Standardized I/O ports: USB & RJ-45, DIO
- HDMI connector for HDMI output
- Lockable power connector
- RJ-45 for COM port
- Aluminum CNC enclosure
- Fanless Design

1.3 Specifications

● CPU		Intel® Celeron®/Atom™ Processor
● Chipset		-
● System Memory		DDR3L 1333 SODIMM x 1, Max. 8 GB
● Display	VGA	-
Interface	DVI	-
	HDMI	HDMI x 1
	Others	18/24-bit single channel Onboard LVDS x 1 (internal)
● Storage	HDD/SSD	-
Device	CF-SATA	-
	Others	mSATA (half-size) Space
● Network	LAN	Intel® Gigabit Ethernet
	Wireless	Optional
● Front I/O	USB Port	USB 2.0 x 2, USB 3.0 x 1
	LAN	-
	Serial Port	-
	DIO	DIO x 6 (DI x 4, DO x 2, w/o isolation)
	Audio	-
	KB/MS	-
	Others	Power Button x 1
● Rear I/O	USB Port	-
	LAN	RJ-45 x 2
	Serial Port	RJ-45 x 2 for RS-232/422/485 (BIO)

		Selection)
	DIO	-
	Audio	-
	KB/MS	-
	Others	Lockable DC Jack x 1, HDMI x 1
● Expansion	PCIe	-
	PCI	-
	MiniCard	Half Mini-Card x 1 (mSATA only), Full Mini-Card x 1 w/ SIM slot (Mini-Card w/ SIM)
	Mini PCI	-
	Others	Onboard USB Pin header x 1
● Indicator	Front	-
	Rear	-
● Power Requirement		12V DC in with lockable connector ATX mode (optional for AT by jumper/BIOS setting)
● Power Consumption		-
● System Cooling		Passive cooling
● Mounting		VESA/ Din-rail (Wall/ Din-rail kit)
● Operating Temperature		-4°F ~ 104°F (-20°C ~ 40°C) without airflow (mSATA) -4°F ~ 122°F (-20°C ~ 50°C) with airflow (mSATA)
● Storage Temperature		-22°F ~ 176°F (-30°C ~ 80°C)

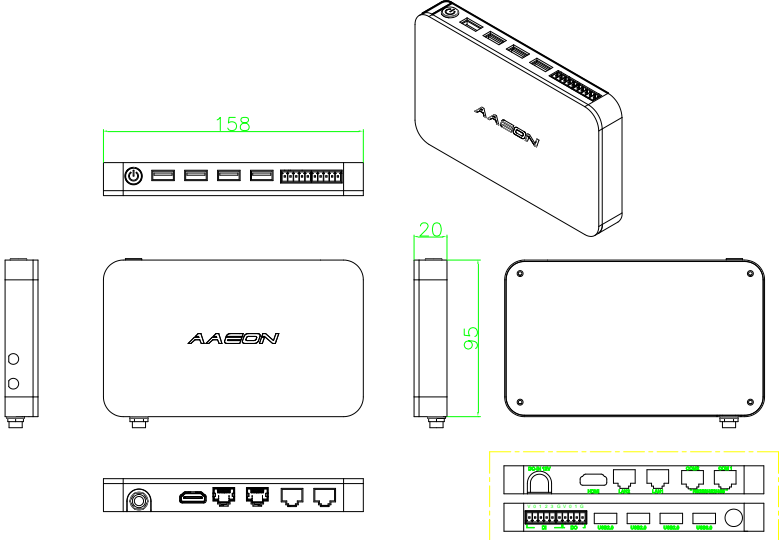
		5 ~ 95% @ 40°C, non-condensing
● Anti-Vibration		3 g rms/ 5~500 Hz/ operation (mSATA)
● Anti-Shock		20 G peak acceleration (11 msec. duration, mSATA)
● MTBF		-
● Certification	EMC	CE/FCC Class A
	Safety	-
● Dimension (W x H x D)		6.22" x 3.74" x 0.79" (158mm x 95mm x 20mm)
● Gross Weight		-
● OS Support		Windows® Embedded Standard 8 32/64-bit, Windows® Embedded Standard 7 32/64-bit, Windows® 8.1 32/64-bit Windows® 7 32/64-bit Linux by Fedora kernel 2.6.3 up

Chapter

2

Hardware Installation

2.1 Dimension and I/O of BOXER-6403



2.2 List of Jumpers

The board has a number of jumpers that allow you to configure your system to suit your application.

Label	Function
JP1	AT/ATX Mode Selection
JP2	LVDS BKLK Control Selection
JP3	LVDS Power Selection
JP4	LVDS BKLK Control Selection
JP5	Clear CMOS Jumper
JP6	Dry and Wet Contact Digital Input Power Selection
JP7	Dry and Wet Contact Digital Output Power Selection

2.3 List of Connectors

The board has a number of connectors that allow you to configure your system to suit your application. The table below shows the function of each board's connectors:

Label	Function
CN1	HDMI Display
CN2	USB 3.0 Connector
CN4	COM2 RS-232/422/485
CN11	LPC Expansion I/F
CN16	COM3 RS-232 I/F
CN17	COM1 RS-232/422/485
CN22	BIOS SPI Flash Header
CN23	Dry and Wet Contact Digital Input
CN24	Dry and Wet Contact Digital Output

CN26	RJ-45 Ethernet Port
CN27	RJ-45 Ethernet Port
USB1	USB 2.0 Port 1 Connector
USB2	USB 2.0 Port 2 Connector
USB3	USB 2.0 Port 3 Connector
BAT1	Battery Connector
DIMM1	DDR3L SODIMM Slot
PCIE1	mSATA Half Size MiniCard Slot
PCIE2	PCI-E Full Size MiniCard Slot

2.4 AT/ATX Mode Selection (JP1)



JP1	Function
1-2	ATX Mode (Default)
2-3	AT Mode

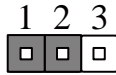
2.5 LVDS BKLT Control Selection (JP2)



JP2	Function
1-2	VR Mode

2-3 PWM Mode (Default)

2.6 LVDS Power Selection (JP3)



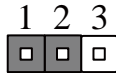
5V



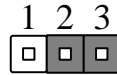
3.3V (Default)

JP3	Function
1-2	5V
2-3	3.3V (Default)

2.7 LVDS BKL T Power Selection (JP4)



12V



5V (Default)

JP4	Function
1-2	12V
2-3	5V (Default)

2.8 Clear CMOS Jumper (JP5)



Normal (Default)



Clear CMOS

JP5	Function
1-2	Normal (Default)

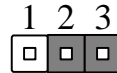
2-3

Clear CMOS

2.9 Dry and Wet Contact Digital Input Power Selection (JP6)



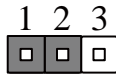
Wet Contact Digital Input



Dry Contact Digital Input (Default)

JP6	Function
1-2	Wet Contact Digital Input
2-3	Dry Contact Digital Input (Default)

2.10 Dry and Wet Contact Digital Output Power Selection (JP7)



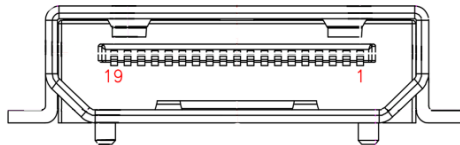
Wet Contact Digital Output



Dry Contact Digital Output (Default)

JP7	Function
1-2	Wet Contact Digital Output
2-3	Dry Contact Digital Output (Default)

2.11 HDMI Display (CN1)



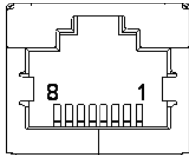
Pin	Pin Name	Signal Type	Signal Level
1	HDMI_TX2+		DIFF
2	GND	GND	
3	HDMI_TX2-		DIFF
4	HDMI_TX1+		DIFF
5	GND		GND
6	HDMI_TX1-		DIFF
7	HDMI_TX0+		DIFF
8	GND		GND
9	HDMI_TX0-		DIFF
10	HDMI_CLK+		DIFF
11	GND		GND
12	HDMI_CLK-		DIFF
13	NC		NC
14	NC		NC
15	HDMI_DDC_CLK	I/O	+5V
16	HDMI_DDC_DATA	I/O	+5V
17	GND		GND
18	HDMI_PWR	PWR	+5V
19	HDMI_HPD		IN

2.12 USB 3.0 Connector (CN2)

Pin	Pin Name	Signal Type	Signal Level
1	+5V	PWR	+5V

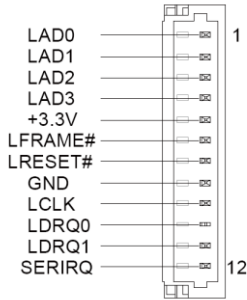
2	USB_D-	DIFF
3	USB_D+	DIFF
4	GND	GND
5	USB3.0 RX-	DIFF
6	USB3.0 RX+	DIFF
7	GND	GND
8	USB3.0 TX-	DIFF
9	USB3.0 TX+	DIFF

2.13 COM2 RS-232/422/485 Connector (CN4)



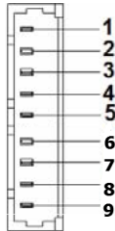
Pin	RS-232	RS-422	RS-485
1	DSR		
2	RTS		
3	GND		
4	TX	RX+	
5	RX	TX+	DATA+
6	DCD	TX-	DATA-
7	CTS		
8	DTR	RX	

2.14 LPC Expansion I/F (CN11)



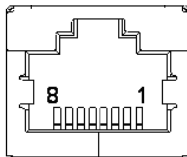
Pin	Pin Name	Signal Type	Signal Level
1	LAD0	I/O	+3.3V
2	LAD1	I/O	+3.3V
3	LAD2	I/O	+3.3V
4	LAD3	I/O	+3.3V
5	+3.3V	PWR	+3.3V
6	LFRAME#	IN	
7	LRESET#	OUT	+3.3V
8	GND	GND	
9	LCLK	OUT	
10	LDRQ0	IN	
11	LDRQ1	IN	
12	SERIRQ	I/O	+3.3V

2.15 COM3 RS-232 I/F (CN16)



Pin	RS-232
1	DCD
2	DSR
3	RX
4	RTS
5	TX
6	CTS
7	DTR
8	RI
9	GND

2.16 COM1 RS-232/422/485 Connector (CN17)

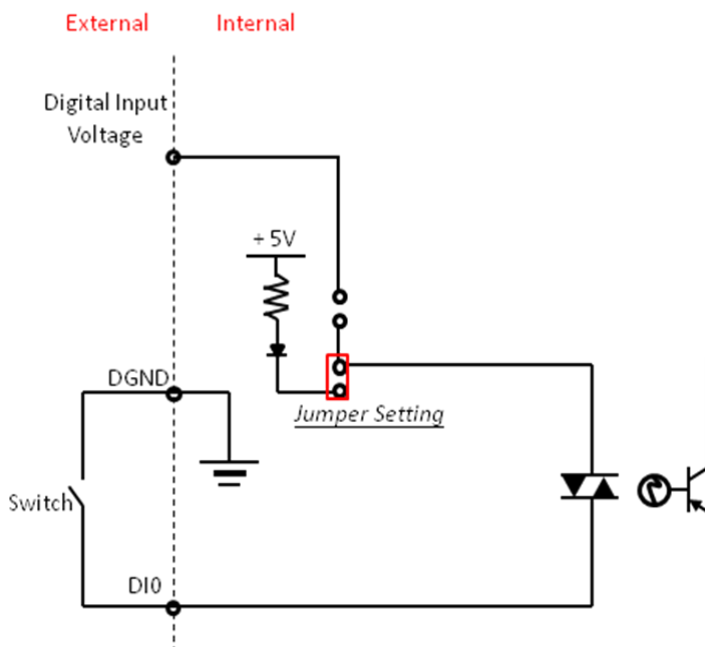


Pin	RS-232	RS-422	RS-485
1	DSR		

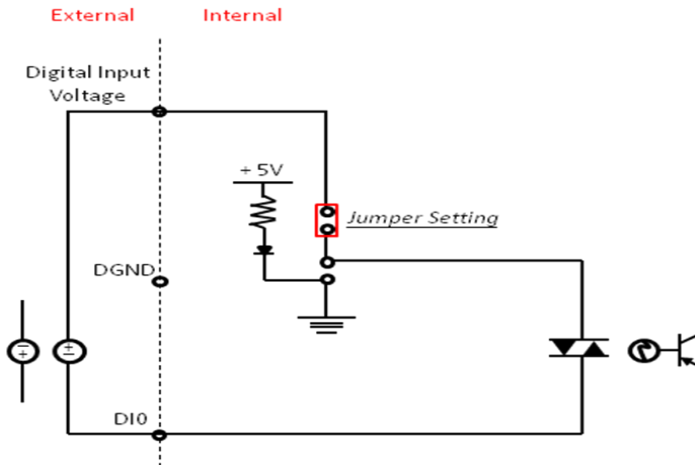
2	RTS		
3	GND		
4	TX	RX+	
5	RX	TX+	DATA+
6	DCD	TX-	DATA-
7	CTS		
8	DTR	RX	

2.17 Dry and Wet Contact Digital Input (CN23)

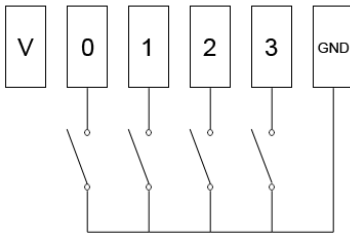
Digital Input Dry Contact Diagram



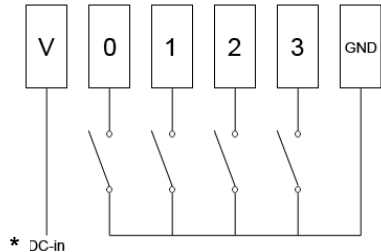
Digital Input Wet Contact Diagram



Dry Contact Wiring



Wet Contact Wiring



*Digital input voltage range:

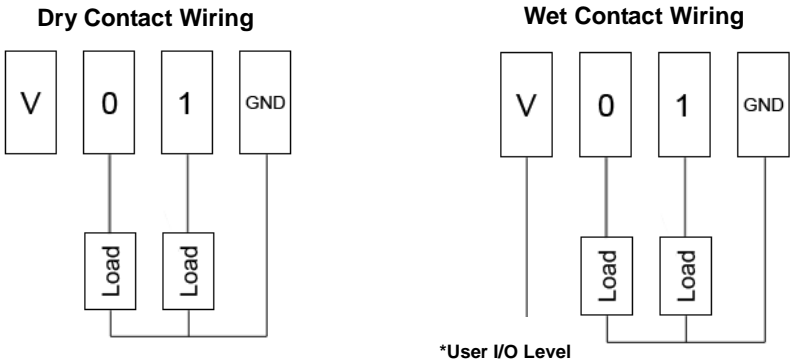
Max: 10 ~ 25V

Min: 5V

Pin	Pin Name	Signal Type	Signal Level
1	Digital input 3	Input	DRY (5V) WET (3~30V)

2	Digital input 2	Input	DRY (5V) WET (3~30V)
3	Digital input 1	Input	DRY (5V) WET (3~30V)
4	Digital input 0	Input	DRY (5V) WET (3~30V)
5	WET contact POWER	PWR	3~30V

2.18 Dry and Wet Contact Digital Output (CN24)



***Digital output voltage range:**

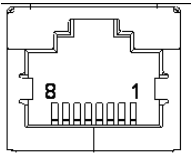
Max: 30V

Min: 5V

Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	Digital output 5	Input	Open collector to 30 VDC

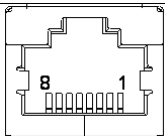
3	Digital output 4	Input	Open collector to 30 VDC
4	Digital output POWER	Input	3 ~ 30 V
5	GND	GND	

2.19 RJ-45 Ethernet Port (CN26)



Pin	Pin Name	Signal Type	Signal Level
1	MDI0+	DIFF	
2	MDI0-	DIFF	
3	MDI1+	DIFF	
4	MDI2+	DIFF	
5	MDI2-	DIFF	
6	MDI1-	DIFF	
7	MDI3+	DIFF	
8	MDI3-	DIFF	

2.20 RJ-45 Ethernet Port (CN27)



Pin	Pin Name	Signal Type	Signal Level
1	MDI0+	DIFF	
2	MDI0-	DIFF	
3	MDI1+	DIFF	
4	MDI2+	DIFF	
5	MDI2-	DIFF	
6	MDI1-	DIFF	
7	MDI3+	DIFF	
8	MDI3-	DIFF	

2.21 USB 2.0 Port 1 Connector (USB1)

Pin	Pin Name	Signal Type	Signal Level
1	+5V	PWR	+5V
2	USB_D-	DIFF	
3	USB_D+	DIFF	
4	GND	GND	

2.22 USB 2.0 Port 2 Connector (USB2)

Pin	Pin Name	Signal Type	Signal Level
1	+5V	PWR	+5V
2	USB_D-	DIFF	
3	USB_D+	DIFF	
4	GND	GND	

2.23 USB2.0 Port 3 Connector (USB3)

Pin	Pin Name	Signal Type	Signal Level
1	+5V	PWR	+5V
2	USB_D-	DIFF	
3	USB_D+	DIFF	
4	GND	GND	

2.24 DDR3L SODIMM Slot (DIMM1)

Standard Specification

2.25 Half Size MiniCard Slot (PCIE1)

Pin	Pin Name	Signal Type	Signal Level
1		NC	
2	+3.3V	PWR	+3.3V
3		NC	
4	GND	GND	
5		NC	
6	+1.5V	PWR	+1.5V
7		NC	
8		NC	
9	GND	GND	
10		NC	
11		NC	
12		NC	
13		NC	

14		NC	
15	GND	GND	
16		NC	
17		NC	
18	GND	GND	
19		NC	
20		NC	
21	GND	GND	
22		NC	
23	mSATA RX+	DIFF	
24	+3.3V	PWR	+3.3V
25	mSATA RX-	DIFF	
26	GND	GND	
27	GND	GND	
28	+1.5V	PWR	+1.5V
29	GND	GND	
30	SMB_CLK	I/O	+3.3V
31	mSATA_TX	DIFF	
32	SMB_DATA	I/O	+3.3V
33	mSATA_TX+	DIFF	
34	GND	GND	
35	GND	GND	
36		NC	
37	GND	GND	

38		NC	
39	+3.3V	PWR	+3.3V
40	GND	GND	
41	+3.3V	PWR	+3.3V
42		NC	
43		NC	
44		NC	
45		NC	
46		NC	
47		NC	
48	+1.5V	PWR	+1.5V
49		NC	
50	GND	GND	
51		NC	
52	+3.3V	PWR	+3.3V

2.26 PCI-E Full Size MiniCard Slot (PCIE2)

Pin	Pin Name	Signal Type	Signal Level
1		NC	
2	+3.3V	PWR	+3.3V
3		NC	
4	GND	GND	
5		NC	
6	+1.5V	PWR	+1.5V

Embedded Box PC		BOXER-6403	
7		NC	
8		NC	
9	GND	GND	
10		NC	
11		NC	
12		NC	
13		NC	
14		NC	
15	GND	GND	
16		NC	
17		NC	
18	GND	GND	
19		NC	
20		NC	
21	GND	GND	
22		NC	
23	PCIE RX-	DIFF	
24	+3.3V	PWR	+3.3V
25	PCIE RX+	DIFF	
26	GND	GND	
27	GND	GND	
28	+1.5V	PWR	+1.5V
29	GND	GND	
30	SMB_CLK	I/O	+3.3V

31	PCIE TX	DIFF	
32	SMB_DATA	I/O	
33	PCIE TX+	DIFF	
34	GND	GND	
35	GND	GND	
36		NC	
37	GND	GND	
38		NC	
39	+3.3V	PWR	+3.3V
40	GND	GND	
41	+3.3V	PWR	+3.3V
42		NC	
43		NC	
44		NC	
45		NC	
46		NC	
47		NC	
48	+1.5V	PWR	+1.5V
49		NC	
50	GND	GND	
51		NC	
52	+3.3V	PWR	+3.3V

Chapter

3

AMI BIOS Setup

3.1 System Test and Initialization

These routines test and initialize board hardware. If the routines encounter an error during the tests, you will either hear a few short beeps or see an error message on the screen. There are two kinds of errors: fatal and non-fatal. The system can usually continue the boot up sequence with non-fatal errors.

System configuration verification

These routines check the current system configuration stored in the CMOS memory and BIOS NVRAM. If system configuration is not found or system configuration data error is detected, system will load optimized default and re-boot with this default system configuration automatically.

There are four situations in which you will need to setup system configuration:

1. You are starting your system for the first time
2. You have changed the hardware attached to your system
3. The system configuration is reset by Clear-CMOS jumper
4. The CMOS memory has lost power and the configuration information has been erased.

The BOXER-6403 CMOS memory has an integral lithium battery backup for data retention. However, you will need to replace the complete unit when it depletes.

3.2 AMI BIOS Setup

AMI BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This type of information is stored in battery-backed CMOS RAM and BIOS NVRAM so that it retains the Setup information when the power is turned off.

Entering Setup

Power on the computer and press immediately. This will allow you to enter Setup.

Main

Set the date, use tab to switch between date elements.

Advanced

Enable/disable boot option for legacy network devices.

Chipset

Host bridge parameters.

Boot

Enables/disables quiet boot option.

Security

Set setup administrator password.

Save & Exit

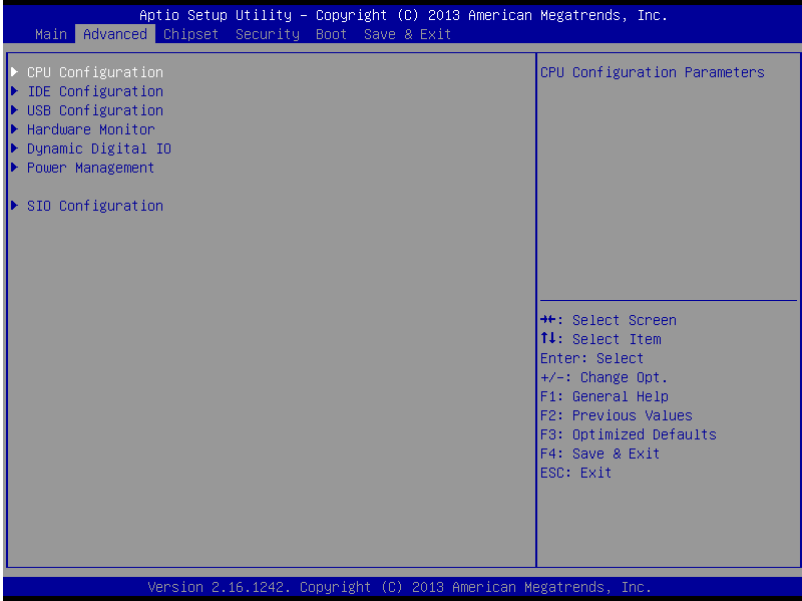
Exit system setup after saving the changes.

Setup Menu

Setup submenu: Main

Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.	
Main Advanced Chipset Security Boot Save & Exit	
BIOS Information BOXER-6403 R1.0 (B403AM10) (01/19/2015) x64	Set the Date. Use Tab to switch between Date elements.
BIOS Vendor Compliance	American Megatrends UEFI 2.3; PI 1.2
System Date System Time	[Mon 01/19/2015] [18:05:27]
Access Level	Administrator
	++: Select Screen ↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.	

Setup submenu: Advanced



CPU Configuration

Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.

Advanced

CPU Configuration		When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology
Intel(R) Celeron(R) CPU N2930 @ 1.83GHz		
CPU Signature	30678	
Microcode Patch	82d	
BayTrail SoC	C0 Stepping	
Max CPU Speed	1830 MHz	
Min CPU Speed	500 MHz	
Processor Cores	4	
Intel HT Technology	Not Supported	
Intel VT-x Technology	Supported	
L1 Data Cache	24 KB x 4	
L1 Code Cache	32 KB x 4	
L2 Cache	1024 KB x 2	
L3 Cache	Not Present	
Intel Virtualization Technology	[Enabled]	
EIST	[Enabled]	

++: Select Screen
 ↑↓: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Exit
 ESC: Exit

Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.

Options summary:

Intel Virtualization Technology	Disabled	
	Enabled	Optimal Default, Failsafe Default
EIST	Disabled	
	Enabled	Optimal Default, Failsafe Default

IDE Configuration (IDE)

Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.

Advanced

<p>IDE Configuration</p> <p>SATA Mode [AHCI Mode]</p> <p>SATA Port0 mSATA mini 3ME (16.0GB)</p> <p>SATA Port1 Not Present</p>	<p>Select IDE / AHCI</p> <hr/> <p> ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit </p>
---	--

Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.

Options summary:

SATA Mode	IDE Mode	Optimal Default, Failsafe Default
	AHCI Mode	

USB Configuration

Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.

Advanced

<p>USB Configuration</p> <p>USB Devices: 1 Drive, 1 Keyboard, 1 Mouse, 2 Hubs</p> <p>Legacy USB Support [Enabled]</p>	<p>Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.</p> <hr/> <p> ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit </p>
---	---

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Options summary:

Legacy USB Support	Enabled	Optimal Default, Failsafe Default
	Disabled	
	Auto	
Enables BIOS Support for Legacy USB Support. When enabled, USB can be functional in legacy environment like DOS. AUTO option disables legacy support if no USB devices are connected		

Hardware Monitor

Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.

Advanced

Pc Health Status	
CPU Temperature	: +44 %
SYS Temperature	: +35 %
VDCORE	: +0.824 V
+12V	: +12.232 V
+5V	: +4.800 V
VMEM	: +1.376 V
+3.3V	: +3.312 V
3VSB	: +3.312 V
5VSB	: +5.040 V
VBAT	: +3.216 V

++: Select Screen
 ↑↓: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Exit
 ESC: Exit

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Dynamic Digital IO

Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.

Advanced

Dynamic Digital IO Configuration		Set GPIO Output as Hi or Low
GPIO Direction	[Input]	
GPI1 Direction	[Input]	
GPI2 Direction	[Input]	
GPI3 Direction	[Input]	
GP00 Direction	[Output]	
Output Level	[Hi]	
GP01 Direction	[Output]	
Output Level	[Hi]	

++: Select Screen
 ↑↓: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Exit
 ESC: Exit

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Options summary:

GP00 Direction [Output]	Low	
	Hi	Optimal Default, Failsafe Default
GPO1 Direction [Output]	Low	
	Hi	Optimal Default, Failsafe Default

Power Management

Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.

Advanced

Power Management	Select power supply mode.
Power Mode [ATX Type]	
AC Power Loss [Last State]	
Wake Configuration	
RTC wake system from S5 [Disabled]	

++: Select Screen
 ↑↓: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Exit
 ESC: Exit

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Options summary:

Power Mode	ATX Type	Optimal Default, Failsafe Default
	AT Type	
Select power supply mode.		
AC Power Loss	Last State	Optimal Default, Failsafe Default
	Power On	
	Power Off	
Select power state when power is re-applied after a power failure.		
RTC wake system from S5	Disabled	Optimal Default, Failsafe Default
	Fixed Time	
	Dynamic Time	
Enable or disable System wake on alarm event. When enabled, System will wake on the hr::min::sec specified		

SIO Configuration

Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.

Advanced

AMI SIO Driver Version : A5.05.03

Super IO Chip Logical Device(s) Configuration

- ▶ [*Active*] Serial Port 1
- ▶ [*Active*] Serial Port 2
- ▶ [*Active*] Serial Port 3

WARNING: Logical Devices state showing at the left side of the controll, reflects current Logical Device state. Cahnges made during Setup Session will be shown after you restart the system.

View and Set Basic properties of the SIO Logical device. Like IO Base, IRQ Range, DMA Channel and Device Mode.

++: Select Screen
 ↑↓: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Exit
 ESC: Exit

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Serial Port 1 Configuration

Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.

Advanced

<p>Serial Port 1 Configuration</p> <p>Use This Device [Enabled]</p> <p>Logical Device Settings: Current : IO=3F8h; IRQ=4;</p> <p>Possible: [Use Automatic Settings] Mode : [RS232]</p> <p>WARNING: disabling SIO Logical Devices may have unwanted side effects. PROCEED WITH CAUTION.</p>	<p>Enable or Disable this Logical Devcie.</p> <hr/> <p> ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit </p>
--	---

Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.

Options summary:

Use This Device	Disabled	Optimal Default, Failsafe Default
	Enabled	
En/Disable Serial Port (COM)		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=3F8; IRQ=4;	
	IO=2F8; IRQ=3;	
Select an optimal setting for IO device		
Mode:	RS232	Optimal Default, Failsafe Default
	RS422	
	RS485	

Serial Port 2 Configuration

Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.

Advanced

<p>Serial Port 2 Configuration</p> <p>Use This Device [Enabled]</p> <p>Logical Device Settings: Current : IO=2F8h; IRQ=3;</p> <p>Possible: [Use Automatic Settings] Mode : [RS232]</p> <p>WARNING: disabling SIO Logical Devices may have unwanted side effects. PROCEED WITH CAUTION.</p>	<p>Enable or Disable this Logical Devcie.</p> <hr/> <p> ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit </p>
---	---

Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.

Options summary:

Use This Device	Disabled	Optimal Default, Failsafe Default
	Enabled	
En/Disable Serial Port (COM)		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=2F8; IRQ=3;	
	IO=3F8; IRQ=4;	
Select an optimal setting for IO device		
Mode:	RS232	Optimal Default, Failsafe Default
	RS422	
	RS485	

Serial Port 3 Configuration

Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.

Advanced

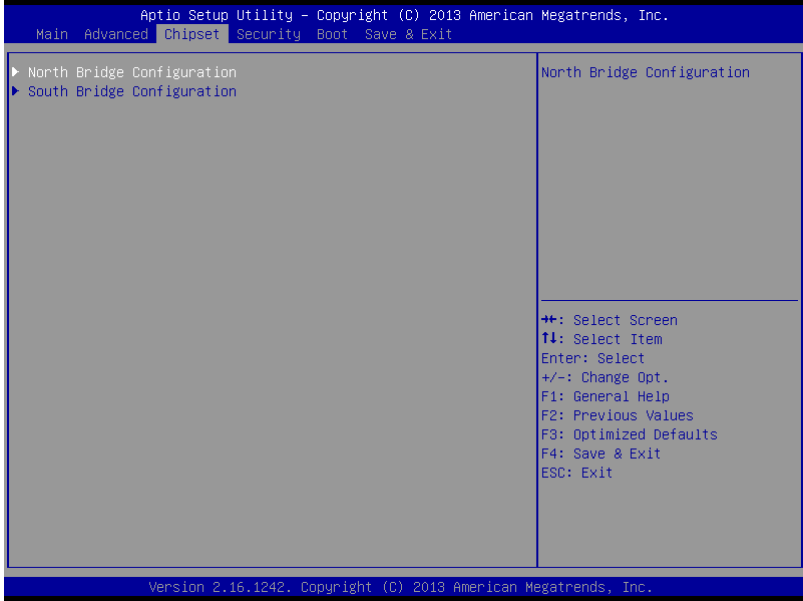
<p>Serial Port 3 Configuration</p> <p>Use This Device [Enabled]</p> <p>Logical Device Settings: Current : IO=3E8h; IRQ=11;</p> <p>Possible: [Use Automatic Settings]</p> <p>WARNING: disabling SIO Logical Devices may have unwanted side effects. PROCEED WITH CAUTION.</p>	<p>Enable or Disable this Logical Devcie.</p> <hr/> <p> ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit </p>
--	---

Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.

Options summary:

Use This Device	Disabled	Optimal Default, Failsafe Default
	Enabled	
En/Disable Serial Port (COM)		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=3E8; IRQ=11;	
	IO=2E8; IRQ=11;	
Select an optimal setting for IO device		

Setup submenu: Chipset



North Bridge

Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.

Chipset

North Bridge Configuration	Display Control Configuration
Memory Information	
Total Memory	8192 MB (LPDDR3)
Memory Slot0	8192 MB (LPDDR3)
▶ Display Control Configuration	
	++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

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Display Control Configuration

Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.

Chipset

Display Control Configuration		Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.
DVMT Pre-Allocated	[64M]	
DVMT Total Gfx Mem	[256MB]	++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

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Options summary:

DVMT Pre-Allocated	64M	Optimal Default, Failsafe Default
	96M	
	128M	
	160M	
	192M	
	224M	
	256M	
	288M	
	320M	
	352M	
	384M	
	416M	
	448M	
480M		
512M		
DVMT Total Gfx Mem	128MB	Optimal Default, Failsafe Default
	256MB	
	Max	

South Bridge

Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.

Chipset

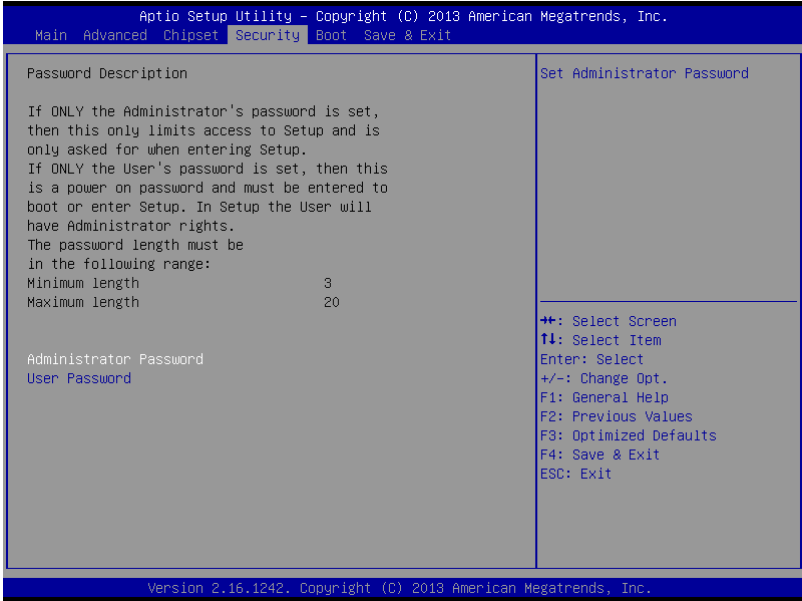
<p>South Bridge Configuration</p> <p>Audio Controller [Enabled]</p>	<p>Control Detection of the Azalia device. Disabled = Azalia will be unconditionally disabled. Enabled = Azalia will be unconditionally Enabled. Auto = Azalia will be enabled if present disabled otherwise.</p> <hr/> <p> ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit </p>
---	---

Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.

Options summary:

Audio Controller	Disabled	Optimal Default, Failsafe Default
	Enabled	

Security



Change User/Supervisor Password

You can install a Supervisor password, and if you install a supervisor password, you can then install a user password. A user password does not provide access to many of the features in the Setup utility.

If you highlight these items and press Enter, a dialog box appears which lets you enter a password. You can enter no more than six letters or numbers. Press Enter after you have typed in the password. A second dialog box asks you to retype the password for confirmation. Press Enter after you have retyped it correctly. The password is required at boot time, or when the user enters the Setup utility.

Removing the Password

Highlight this item and type in the current password. At the next dialog box press Enter to disable password protection.

Setup submenu: Boot

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Main Advanced Chipset Security **Boot** Save & Exit

<p>Boot Configuration</p> <p>Quiet Boot [Enabled]</p> <p>Option ROM Messages [Force BIOS]</p> <p>Launch PXE OpROM [Disabled]</p> <p>Boot Option Priorities</p> <p>Boot Option #1 [UEFI: Lexar USB Fla...]</p> <p>Boot Option #2 [P0: mSATA mini 3ME ...]</p> <p>Boot Option #3 [UEFI: Built-in EFI ...]</p> <p>Hard Drive BBS Priorities</p>	<p>Enables or disables Quiet Boot option</p> <hr/> <p> ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit </p>
--	--

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Options summary:

Quiet Boot	Disabled	Default
	Enabled	
En/Disable showing boot logo.		
Option ROM Messages	Force BIOS	Default
	Keep Current	
Set display mode for Option ROM		
Launch PXE OpROM	Disabled	Default
	Enabled	
En/Disable Legacy Boot Option		

BBS Priorities

Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.		
Boot		
Boot Option #1	[Lexar USB Flash Dri...]	Sets the system boot order
Boot Option #2	[P0: mSATA mini 3ME ...]	
		++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.		

Setup submenu: Exit



Chapter

4

Driver Installation

The BOXER-6403 comes with a driver disk that contains all drivers and utilities that can help you setup your product.

Insert the disk and the installation guide will start automatically. If it doesn't, please follow the sequence below to install the drivers.

Follow the sequence below to install the drivers:

Step 1 – Install Chipset Driver

Step 2 – Install Graphics Driver

Step 3 – Install Network Driver

Step 4 – Install xHCI Driver

Step 5 – Install Intel Sideband Fabric Device Driver

Please refer to the instructions below for further details.

4.1 Installation

Insert the BOXER-6403 driver disk into the disk drive. And install the drivers from Step 1 to Step 5 in order.

Step 1 – Install Chipset Driver

1. Open the **Step 1 - Chipset** folder and open the **SetupChipset.exe** file
2. Follow the instructions
3. Drivers will be installed automatically

Step 2 – Install Graphics Driver

1. Open the **Step 2 - Graphics** folder and select your OS
2. Open the **Setup.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 3 – Install Network Driver

1. Open the **Step 3 - Network** folder and select your OS
2. Open the **.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 4 – Install xHCI Driver

1. Open the **Step 4 - xHCI** folder and open the **Setup.exe** file

2. Follow the instructions
3. Drivers will be installed automatically

Step 5 – Install Intel Sideband Fabric Device Driver

1. Open the **Step 5 - Intel Sideband Fabric Device** and open the **Setup.exe** file
2. Follow the instructions
3. Drivers will be installed automatically

Appendix

A

Programming the Watchdog Timer

A.1 Watchdog Timer Initial Program

Table 1 : SuperIO relative register table		
	Default Value	Note
Index	0x2E ^(Note1)	SIO MB PnP Mode Index Register 0x2E or 0x4E
Data	0x2F ^(Note2)	SIO MB PnP Mode Data Register 0x2F or 0x4F

Table 2 : Watchdog relative register table					
	LDN	Register	BitNum	Value	Note
Timer Counter	0x07 ^(Note3)	0xF6 ^(Note4)		(Note24)	Time of watchdog timer (0~255) This register is byte access
Counting Unit	0x07 ^(Note5)	0xF5 ^(Note6)	3 ^(Note7)	0 ^(Note8)	Select time unit. 0: second 1: minute
Watchdog Enable	0x07 ^(Note9)	0xF5 ^(Note10)	5 ^(Note11)	1 ^(Note12)	0: Disable 1: Enable
Timeout Status	0x07 ^(Note13)	0xF5 ^(Note14)	6 ^(Note15)	1	1: Clear timeout status
Output Mode	0x07 ^(Note16)	0xF5 ^(Note17)	4 ^(Note18)	1 ^(Note19)	Select WDTRST# output mode 0: level 1: pulse
WDTRST output	0x07 ^(Note20)	0xFA ^(Note21)	0 ^(Note22)	1 ^(Note23)	Enable/Disable time out output via WDTRST# 0: Disable 1: Enable

```

*****
// SuperIO relative definition (Please reference to Table 1)
#define byte SIOIndex //This parameter is represented from Note1
#define byte SIOData //This parameter is represented from Note2
#define void IOWriteByte(byte IOPort, byte Value);
#define byte IOReadByte(byte IOPort);
// Watch Dog relative definition (Please reference to Table 2)
#define byte TimerLDN //This parameter is represented from Note3
#define byte TimerReg //This parameter is represented from Note4
#define byte TimerVal // This parameter is represented from Note24
#define byte UnitLDN //This parameter is represented from Note5
#define byte UnitReg //This parameter is represented from Note6
#define byte UnitBit //This parameter is represented from Note7
#define byte UnitVal //This parameter is represented from Note8
#define byte EnableLDN //This parameter is represented from Note9
#define byte EnableReg //This parameter is represented from Note10
#define byte EnableBit //This parameter is represented from Note11
#define byte EnableVal //This parameter is represented from Note12
#define byte StatusLDN // This parameter is represented from Note13
#define byte StatusReg // This parameter is represented from Note14
#define byte StatusBit // This parameter is represented from Note15
#define byte ModeLDN // This parameter is represented from Note16
#define byte ModeReg // This parameter is represented from Note17
#define byte ModeBit // This parameter is represented from Note18
#define byte ModeVal // This parameter is represented from Note19
#define byte WDRstLDN // This parameter is represented from Note20
#define byte WDRstReg // This parameter is represented from Note21
#define byte WDRstBit // This parameter is represented from Note22
#define byte WDRstVal // This parameter is represented from Note23
*****

```

```
*****  
VOID Main() {  
    // Procedure : AaeonWDTConfig  
    // (byte)Timer : Time of WDT timer.(0x00~0xFF)  
    // (boolean)Unit : Select time unit(0: second, 1: minute).  
    AaeonWDTConfig();  
  
    // Procedure : AaeonWDTEnable  
    // This procedure will enable the WDT counting.  
    AaeonWDTEnable();  
}  
*****
```

```

*****
// Procedure : AaeonWDTEnable
VOID AaeonWDTEnable (){
    WDTEnableDisable(EnableLDN, EnableReg, EnableBit, 1);
}

// Procedure : AaeonWDTConfig
VOID AaeonWDTConfig (){
    // Disable WDT counting
    WDTEnableDisable(EnableLDN, EnableReg, EnableBit, 0);
    // Clear Watchdog Timeout Status
    WDTClearTimeoutStatus();
    // WDT relative parameter setting
    WDTParameterSetting();
}

VOID WDTEnableDisable(byte LDN, byte Register, byte BitNum, byte Value){
    SIOBitSet(LDN, Register, BitNum, Value);
}

VOID WDTParameterSetting(){
    // Watchdog Timer counter setting
    SIOByteSet(TimerLDN, TimerReg, TimerVal);
    // WDT counting unit setting
    SIOBitSet(UnitLDN, UnitReg, UnitBit, UnitVal);
    // WDT output mode setting, level / pulse
    SIOBitSet(ModeLDN, ModeReg, ModeBit, ModeVal);
    // Watchdog timeout output via WDTRST#
    SIOBitSet(WDTRstLDN, WDTRstReg, WDTRstBit, WDTRstVal);
}

VOID WDTClearTimeoutStatus(){
    SIOBitSet(StatusLDN, StatusReg, StatusBit, 1);
}
*****

```

```

VOID SIOEnterMBPnPMode() {
    IOWriteByte(SIOIndex, 0x87);
    IOWriteByte(SIOIndex, 0x87);
}

VOID SIOExitMBPnPMode() {
    IOWriteByte(SIOIndex, 0xAA);
}

VOID SIOSelectLDN(byte LDN) {
    IOWriteByte(SIOIndex, 0x07); // SIO LDN Register Offset = 0x07
    IOWriteByte(SIOData, LDN);
}

VOID SIOBitSet(byte LDN, byte Register, byte BitNum, byte Value) {
    Byte TmpValue;

    SIOEnterMBPnPMode();
    SIOSelectLDN(byte LDN);
    IOWriteByte(SIOIndex, Register);
    TmpValue = IOReadByte(SIOData);
    TmpValue &= ~(1 << BitNum);
    TmpValue |= (Value << BitNum);
    IOWriteByte(SIOData, TmpValue);
    SIOExitMBPnPMode();
}

VOID SIOByteSet(byte LDN, byte Register, byte Value) {
    SIOEnterMBPnPMode();
    SIOSelectLDN(LDN);
    IOWriteByte(SIOIndex, Register);
    IOWriteByte(SIOData, Value);
    SIOExitMBPnPMode();
}

```

Appendix

B

I/O Information

B.1 I/O Address Map

Input/output (IO)	
[0000000000000000 - 000000000000006F]	PCI bus
[0000000000000020 - 0000000000000021]	Programmable interrupt controller
[0000000000000024 - 0000000000000025]	Programmable interrupt controller
[0000000000000028 - 0000000000000029]	Programmable interrupt controller
[000000000000002C - 000000000000002D]	Programmable interrupt controller
[000000000000002E - 000000000000002F]	Motherboard resources
[0000000000000030 - 0000000000000031]	Programmable interrupt controller
[0000000000000034 - 0000000000000035]	Programmable interrupt controller
[0000000000000038 - 0000000000000039]	Programmable interrupt controller
[000000000000003C - 000000000000003D]	Programmable interrupt controller
[0000000000000040 - 0000000000000043]	System timer
[000000000000004E - 000000000000004F]	Motherboard resources
[0000000000000050 - 0000000000000053]	System timer
[0000000000000061 - 0000000000000061]	Motherboard resources
[0000000000000063 - 0000000000000063]	Motherboard resources
[0000000000000065 - 0000000000000065]	Motherboard resources
[0000000000000067 - 0000000000000067]	Motherboard resources
[0000000000000070 - 0000000000000070]	Motherboard resources
[0000000000000070 - 0000000000000077]	System CMOS/real time clock
[0000000000000078 - 000000000000007F]	PCI bus
[0000000000000080 - 000000000000008F]	Motherboard resources
[0000000000000092 - 0000000000000092]	Motherboard resources
[00000000000000A0 - 00000000000000A1]	Programmable interrupt controller
[00000000000000A4 - 00000000000000A5]	Programmable interrupt controller
[00000000000000A8 - 00000000000000A9]	Programmable interrupt controller
[00000000000000AC - 00000000000000AD]	Programmable interrupt controller
[00000000000000B0 - 00000000000000B1]	Programmable interrupt controller
[00000000000000B2 - 00000000000000B3]	Motherboard resources
[00000000000000B4 - 00000000000000B5]	Programmable interrupt controller
[00000000000000B8 - 00000000000000B9]	Programmable interrupt controller
[00000000000000BC - 00000000000000BD]	Programmable interrupt controller
[00000000000002F8 - 00000000000002FF]	Communications Port (COM2)
[00000000000003B0 - 00000000000003BB]	Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/J1900
[00000000000003C0 - 00000000000003DF]	Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/J1900



































[0000000000000078 - 000000000000CF7]	PCI bus
[0000000000000080 - 000000000000008F]	Motherboard resources
[0000000000000092 - 0000000000000092]	Motherboard resources
[00000000000000A0 - 00000000000000A1]	Programmable interrupt controller
[00000000000000A4 - 00000000000000A5]	Programmable interrupt controller
[00000000000000A8 - 00000000000000A9]	Programmable interrupt controller
[00000000000000AC - 00000000000000AD]	Programmable interrupt controller
[00000000000000B0 - 00000000000000B1]	Programmable interrupt controller
[00000000000000B2 - 00000000000000B3]	Motherboard resources
[00000000000000B4 - 00000000000000B5]	Programmable interrupt controller
[00000000000000B8 - 00000000000000B9]	Programmable interrupt controller
[00000000000000BC - 00000000000000BD]	Programmable interrupt controller
[00000000000002F8 - 00000000000002FF]	Communications Port (COM2)
[00000000000003B0 - 00000000000003BB]	Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/J1900
[00000000000003C0 - 00000000000003DF]	Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/J1900
[00000000000003E8 - 00000000000003EF]	Communications Port (COM3)
[00000000000003F8 - 00000000000003FF]	Communications Port (COM1)
[0000000000000400 - 000000000000047F]	Motherboard resources
[00000000000004D0 - 00000000000004D1]	Programmable interrupt controller
[0000000000000500 - 00000000000005FE]	Motherboard resources
[0000000000000600 - 000000000000061F]	Motherboard resources
[0000000000000680 - 000000000000069F]	Motherboard resources
[0000000000000A00 - 0000000000000A0F]	Motherboard resources
[0000000000000A10 - 0000000000000A1F]	Motherboard resources
[0000000000000A20 - 0000000000000A2F]	Motherboard resources
[0000000000000D00 - 000000000000FFFF]	PCI bus
[000000000000C000 - 000000000000CFFF]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 2 - 0F4A
[000000000000D000 - 000000000000DFFF]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 1 - 0F48
[000000000000E000 - 000000000000E01F]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Platform Control Unit - SMBus Port - 0F12
[000000000000E020 - 000000000000E03F]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23
[000000000000E040 - 000000000000E043]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23
[000000000000E050 - 000000000000E057]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23
[000000000000E060 - 000000000000E063]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23
[000000000000E070 - 000000000000E077]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23
[000000000000E080 - 000000000000E087]	Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/J1900




































B.2 Memory Address Map




































The screenshot displays the Memory address map for a device named 'boxer-PC'. The list includes various hardware components and their corresponding memory addresses and device names.




































Address Range	Device Name
[0000000000A0000 - 0000000000BFFFFF]	Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/J1900
[0000000000A0000 - 0000000000BFFFFF]	PCI bus
[0000000000C0000 - 0000000000DFFFFF]	PCI bus
[0000000000E0000 - 0000000000FFFFFF]	PCI bus
[00000000C0000000 - 00000000CFFFFFFF]	Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/J1900
[00000000C0000000 - 00000000D0616FFE]	PCI bus
[00000000D0000000 - 00000000D03FFFFFFF]	Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/J1900
[00000000D0400000 - 00000000D041FFFFF]	Intel(R) I211 Gigabit Network Connection
[00000000D0400000 - 00000000D04FFFFFFF]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 2 - 0F4A
[00000000D0420000 - 00000000D0423FFF]	Intel(R) I211 Gigabit Network Connection
[00000000D0500000 - 00000000D051FFFFF]	Intel(R) I211 Gigabit Network Connection #2
[00000000D0500000 - 00000000D05FFFFFFF]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 1 - 0F48
[00000000D0520000 - 00000000D0523FFF]	Intel(R) I211 Gigabit Network Connection #2
[00000000D0600000 - 00000000D060FFFFF]	Intel(R) USB 3.0 eXtensible Host Controller
[00000000D0610000 - 00000000D0613FFF]	High Definition Audio Controller
[00000000D0614000 - 00000000D061401F]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Platform Control Unit - SMBus Port - 0F12
[00000000D0616000 - 00000000D0616FFF]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23
[00000000E0000000 - 00000000EFFFFFFF]	Motherboard resources
[00000000E00000D0 - 00000000E00000DB]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor MBI Device - 33BD
[00000000FED00000 - 00000000FED003FF]	High precision event timer
[00000000FED01000 - 00000000FED01FFF]	Motherboard resources
[00000000FED03000 - 00000000FED03FFF]	Motherboard resources
[00000000FED04000 - 00000000FED04FFF]	Motherboard resources
[00000000FED08000 - 00000000FED08FFF]	Motherboard resources
[00000000FED1C000 - 00000000FED1CFFF]	Motherboard resources
[00000000FEE00000 - 00000000FEEFFFFFFF]	Motherboard resources
[00000000FEF00000 - 00000000FEFFFFFFF]	Motherboard resources
[00000000FF000000 - 00000000FFFFFFFF]	Intel(R) 82802 Firmware Hub Device

B.3 IRQ Mapping Chart

Interrupt request (IRQ)		
	(ISA) 0x00000000 (00)	System timer
	(ISA) 0x00000003 (03)	Communications Port (COM2)
	(ISA) 0x00000004 (04)	Communications Port (COM1)
	(ISA) 0x00000008 (08)	High precision event timer
	(ISA) 0x0000000B (11)	Communications Port (COM3)
	(ISA) 0x00000051 (81)	Microsoft ACPI-Compliant System
	(ISA) 0x00000052 (82)	Microsoft ACPI-Compliant System
	(ISA) 0x00000053 (83)	Microsoft ACPI-Compliant System
	(ISA) 0x00000054 (84)	Microsoft ACPI-Compliant System
	(ISA) 0x00000055 (85)	Microsoft ACPI-Compliant System
	(ISA) 0x00000056 (86)	Microsoft ACPI-Compliant System
	(ISA) 0x00000057 (87)	Microsoft ACPI-Compliant System
	(ISA) 0x00000058 (88)	Microsoft ACPI-Compliant System
	(ISA) 0x00000059 (89)	Microsoft ACPI-Compliant System
	(ISA) 0x0000005A (90)	Microsoft ACPI-Compliant System
	(ISA) 0x0000005B (91)	Microsoft ACPI-Compliant System
	(ISA) 0x0000005C (92)	Microsoft ACPI-Compliant System
	(ISA) 0x0000005D (93)	Microsoft ACPI-Compliant System
	(ISA) 0x0000005E (94)	Microsoft ACPI-Compliant System
	(ISA) 0x0000005F (95)	Microsoft ACPI-Compliant System
	(ISA) 0x00000060 (96)	Microsoft ACPI-Compliant System
	(ISA) 0x00000061 (97)	Microsoft ACPI-Compliant System
	(ISA) 0x00000062 (98)	Microsoft ACPI-Compliant System
	(ISA) 0x00000063 (99)	Microsoft ACPI-Compliant System
	(ISA) 0x00000064 (100)	Microsoft ACPI-Compliant System
	(ISA) 0x00000065 (101)	Microsoft ACPI-Compliant System
	(ISA) 0x00000066 (102)	Microsoft ACPI-Compliant System
	(ISA) 0x00000067 (103)	Microsoft ACPI-Compliant System
	(ISA) 0x00000068 (104)	Microsoft ACPI-Compliant System
	(ISA) 0x00000069 (105)	Microsoft ACPI-Compliant System
	(ISA) 0x0000006A (106)	Microsoft ACPI-Compliant System
	(ISA) 0x0000006B (107)	Microsoft ACPI-Compliant System
	(ISA) 0x0000006C (108)	Microsoft ACPI-Compliant System
	(ISA) 0x0000006D (109)	Microsoft ACPI-Compliant System

	(ISA) 0x0000006E (110)	Microsoft ACPI-Compliant System
	(ISA) 0x0000006F (111)	Microsoft ACPI-Compliant System
	(ISA) 0x00000070 (112)	Microsoft ACPI-Compliant System
	(ISA) 0x00000071 (113)	Microsoft ACPI-Compliant System
	(ISA) 0x00000072 (114)	Microsoft ACPI-Compliant System
	(ISA) 0x00000073 (115)	Microsoft ACPI-Compliant System
	(ISA) 0x00000074 (116)	Microsoft ACPI-Compliant System
	(ISA) 0x00000075 (117)	Microsoft ACPI-Compliant System
	(ISA) 0x00000076 (118)	Microsoft ACPI-Compliant System
	(ISA) 0x00000077 (119)	Microsoft ACPI-Compliant System
	(ISA) 0x00000078 (120)	Microsoft ACPI-Compliant System
	(ISA) 0x00000079 (121)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007A (122)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007B (123)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007C (124)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007D (125)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007E (126)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007F (127)	Microsoft ACPI-Compliant System
	(ISA) 0x00000080 (128)	Microsoft ACPI-Compliant System
	(ISA) 0x00000081 (129)	Microsoft ACPI-Compliant System
	(ISA) 0x00000082 (130)	Microsoft ACPI-Compliant System
	(ISA) 0x00000083 (131)	Microsoft ACPI-Compliant System
	(ISA) 0x00000084 (132)	Microsoft ACPI-Compliant System
	(ISA) 0x00000085 (133)	Microsoft ACPI-Compliant System
	(ISA) 0x00000086 (134)	Microsoft ACPI-Compliant System
	(ISA) 0x00000087 (135)	Microsoft ACPI-Compliant System
	(ISA) 0x00000088 (136)	Microsoft ACPI-Compliant System
	(ISA) 0x00000089 (137)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008A (138)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008B (139)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008C (140)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008D (141)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008E (142)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008F (143)	Microsoft ACPI-Compliant System
	(ISA) 0x00000090 (144)	Microsoft ACPI-Compliant System

	(ISA) 0x00000091 (145)	Microsoft ACPI-Compliant System
	(ISA) 0x00000092 (146)	Microsoft ACPI-Compliant System
	(ISA) 0x00000093 (147)	Microsoft ACPI-Compliant System
	(ISA) 0x00000094 (148)	Microsoft ACPI-Compliant System
	(ISA) 0x00000095 (149)	Microsoft ACPI-Compliant System
	(ISA) 0x00000096 (150)	Microsoft ACPI-Compliant System
	(ISA) 0x00000097 (151)	Microsoft ACPI-Compliant System
	(ISA) 0x00000098 (152)	Microsoft ACPI-Compliant System
	(ISA) 0x00000099 (153)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009A (154)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009B (155)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009C (156)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009D (157)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009E (158)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009F (159)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A0 (160)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A1 (161)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A2 (162)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A3 (163)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A4 (164)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A5 (165)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A6 (166)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A7 (167)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A8 (168)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A9 (169)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AA (170)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AB (171)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AC (172)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AD (173)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AE (174)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AF (175)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B0 (176)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B1 (177)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B2 (178)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B3 (179)	Microsoft ACPI-Compliant System

	(ISA) 0x000000B1 (177)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B2 (178)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B3 (179)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B4 (180)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B5 (181)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B6 (182)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B7 (183)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B8 (184)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B9 (185)	Microsoft ACPI-Compliant System
	(ISA) 0x000000BA (186)	Microsoft ACPI-Compliant System
	(ISA) 0x000000BB (187)	Microsoft ACPI-Compliant System
	(ISA) 0x000000BC (188)	Microsoft ACPI-Compliant System
	(ISA) 0x000000BD (189)	Microsoft ACPI-Compliant System
	(ISA) 0x000000BE (190)	Microsoft ACPI-Compliant System
	(PCI) 0x00000005 (05)	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Platform Control Unit - SMBus Port - 0F12
	(PCI) 0x00000010 (16)	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 1 - 0F48
	(PCI) 0x00000011 (17)	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 2 - 0F4A
	(PCI) 0x00000012 (18)	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 3 - 0F4C
	(PCI) 0x00000013 (19)	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23
	(PCI) 0x00000013 (19)	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 4 - 0F4E
	(PCI) 0x00000016 (22)	High Definition Audio Controller
	(PCI) 0xFFFFFFFF1 (-15)	Intel(R) I211 Gigabit Network Connection
	(PCI) 0xFFFFFFFF2 (-14)	Intel(R) I211 Gigabit Network Connection
	(PCI) 0xFFFFFFFF3 (-13)	Intel(R) I211 Gigabit Network Connection
	(PCI) 0xFFFFFFFF4 (-12)	Intel(R) I211 Gigabit Network Connection
	(PCI) 0xFFFFFFFF5 (-11)	Intel(R) I211 Gigabit Network Connection
	(PCI) 0xFFFFFFFF6 (-10)	Intel(R) I211 Gigabit Network Connection
	(PCI) 0xFFFFFFFF7 (-9)	Intel(R) I211 Gigabit Network Connection #2
	(PCI) 0xFFFFFFFF8 (-8)	Intel(R) I211 Gigabit Network Connection #2
	(PCI) 0xFFFFFFFF9 (-7)	Intel(R) I211 Gigabit Network Connection #2
	(PCI) 0xFFFFFFFFA (-6)	Intel(R) I211 Gigabit Network Connection #2
	(PCI) 0xFFFFFFFFB (-5)	Intel(R) I211 Gigabit Network Connection #2
	(PCI) 0xFFFFFFFFC (-4)	Intel(R) I211 Gigabit Network Connection #2
	(PCI) 0xFFFFFFFFD (-3)	Intel(R) USB 3.0 eXtensible Host Controller
	(PCI) 0xFFFFFFFFE (-2)	Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/11900

Appendix

C

Electrical Specifications for I/O Ports

C.1 Electrical Specifications for I/O Ports

I/O	Reference	Signal Name	Rate Output
Backlight Brightness Control Connector	CN19	+VCC_LVDS_BKLT	+5V/0.5 or +12V/0.5
Internal LVDS Connector	CN25	VCC	+3.3V/1A or +5V/1A
HDMI Connector	CN1	+5V	+5V/1A
USB3.0 Connector	USB3	+5V	+5V/1Aer channel)
mSATA Connector	PCIE1_A1	+3.3VSB +1.5V	+3.3V/1.1A +1.5V/0.375A
COM1 RS232/422/485 Connector	CN17	+5V/+12V	+5V/0.5A or +12V/0.5A
COM2 RS232/422/485 Connector	CN4	+5V/+12V	+5V/0.5A or +12V/0.5A
USB2.0 Connector	USB1	+5V	+5V/0.5A~1Aer channel)
USB2.0 Connector	USB2	+5V	+5V/0.5A~1Aer channel)
USB2.0 Connector	USB3	+5V	+5V/0.5A~1Aer channel)

C.2 DIO Programming

BOXER-6403 utilizes FINTEK 81866 chipset as its Digital I/O controller.

Below are the procedures to complete its configuration and the AAEON initial watchdog timer program is also attached based on which you can develop customized program to fit your application.

There are three steps to complete the configuration setup: (1) Enter the MB PnP Mode; (2) Modify the data of configuration registers; (3) Exit the MB PnP Mode. Undesired result may occur if the MB PnP Mode is not exited normally.(These three steps are the same as programming WDT)

C.3 Digital I/O Register

Table 1 : SuperIO relative register table		
	Default Value	Note
Index	0x2E ^(Note1)	SIO MB PnP Mode Index Register 0x2E or 0x4E
Data	0x2F ^(Note2)	SIO MB PnP Mode Data Register 0x2F or 0x4F

Table 2 : Digital Input relative register table					
	LDN	Register	BitNum	Value	Note
DIO-1 Pin Status	0x06 ^(Note3)	0xA2 ^(Note4)	0 ^(Note5)		GPIO50
DIO-2 Pin Status	0x06 ^(Note6)	0xA2 ^(Note7)	1 ^(Note8)		GPIO51
DIO-3 Pin Status	0x06 ^(Note9)	0xA2 ^(Note10)	2 ^(Note11)		GPIO52
DIO-4 Pin Status	0x06 ^(Note12)	0xA2 ^(Note13)	3 ^(Note14)		GPIO53
DIO-5 Pin Status	0x06 ^(Note15)	0xA2 ^(Note16)	4 ^(Note17)		GPIO54
DIO-5 Pin Status	0x06 ^(Note18)	0xA2 ^(Note19)	5 ^(Note20)		GPIO55

Table 3 : Digital Output relative register table					
	LDN	Register	BitNum	Value	Note
DIO-1 Output Data	0x06 ^(Note21)	0xA1 ^(Note22)	0 ^(Note23)	^(Note24)	GPIO50
DIO-2 Output Data	0x06 ^(Note25)	0xA1 ^(Note26)	1 ^(Note27)	^(Note28)	GPIO51
DIO-3 Output Data	0x06 ^(Note29)	0xA1 ^(Note30)	2 ^(Note31)	^(Note32)	GPIO52
DIO-4 Output Data	0x06 ^(Note33)	0xA1 ^(Note34)	3 ^(Note35)	^(Note36)	GPIO53
DIO-5 Output Data	0x06 ^(Note37)	0xA1 ^(Note38)	4 ^(Note39)	^(Note40)	GPIO54
DIO-5 Output Data	0x06 ^(Note41)	0xA1 ^(Note42)	4 ^(Note43)	^(Note44)	GPIO55

C.4 Digital I/O Sample Program

```
*****
// SuperIO relative definition (Please reference to Table 1)
#define byte SIOIndex //This parameter is represented from Note1
#define byte SIOData //This parameter is represented from Note2
#define void IOWriteByte(byte IOPort, byte Value);
#define byte IOReadByte(byte IOPort);
// Digital Input Status relative definition (Please reference to Table 2)
#define byte DInput1LDN // This parameter is represented from Note3
#define byte DInput1Reg // This parameter is represented from Note4
#define byte DInput1Bit // This parameter is represented from Note5
#define byte DInput2LDN // This parameter is represented from Note6
#define byte DInput2Reg // This parameter is represented from Note7
#define byte DInput2Bit // This parameter is represented from Note8
#define byte DInput3LDN // This parameter is represented from Note9
#define byte DInput3Reg // This parameter is represented from Note10
#define byte DInput3Bit // This parameter is represented from Note11
#define byte DInput4LDN // This parameter is represented from Note12
#define byte DInput4Reg // This parameter is represented from Note13
#define byte DInput4Bit // This parameter is represented from Note14
#define byte DInput5LDN // This parameter is represented from Note15
#define byte DInput5Reg // This parameter is represented from Note16
#define byte DInput5Bit // This parameter is represented from Note17
#define byte DInput6LDN // This parameter is represented from Note18
#define byte DInput6Reg // This parameter is represented from Note19
#define byte DInput6Bit // This parameter is represented from Note20
*****
```

```

*****
// Digital Output control relative definition (Please reference to Table 3)
#define byte DOutput1LDN // This parameter is represented from Note21
#define byte DOutput1Reg // This parameter is represented from Note22
#define byte DOutput1Bit // This parameter is represented from Note23
#define byte DOutput1Val // This parameter is represented from Note24
#define byte DOutput2LDN // This parameter is represented from Note25
#define byte DOutput2Reg // This parameter is represented from Note26
#define byte DOutput2Bit // This parameter is represented from Note27
#define byte DOutput2Val // This parameter is represented from Note28
#define byte DOutput3LDN // This parameter is represented from Note29
#define byte DOutput3Reg // This parameter is represented from Note30
#define byte DOutput3Bit // This parameter is represented from Note31
#define byte DOutput3Val // This parameter is represented from Note32
#define byte DOutput4LDN // This parameter is represented from Note33
#define byte DOutput4Reg // This parameter is represented from Note34
#define byte DOutput4Bit // This parameter is represented from Note35
#define byte DOutput4Val // This parameter is represented from Note36
#define byte DOutput5LDN // This parameter is represented from Note37
#define byte DOutput5Reg // This parameter is represented from Note38
#define byte DOutput5Bit // This parameter is represented from Note39
#define byte DOutput5Val // This parameter is represented from Note40
#define byte DOutput6LDN // This parameter is represented from Note41
#define byte DOutput6Reg // This parameter is represented from Note42
#define byte DOutput6Bit // This parameter is represented from Note43
#define byte DOutput6Val // This parameter is represented from Note44
*****

```

```
*****
VOID Main() {
    Boolean PinStatus ;

    // Procedure : AaeonReadPinStatus
    // Input :
    //     Example, Read Digital I/O Pin 3 status
    // Output :
    //     InputStatus :
    //         0: Digital I/O Pin level is low
    //         1: Digital I/O Pin level is High
    PinStatus = AaeonReadPinStatus(DInput3LDN, DInput3Reg, DInput3Bit);

    // Procedure : AaeonSetOutputLevel
    // Input :
    //     Example, Set Digital I/O Pin 6 level
    AaeonSetOutputLevel(DOutput6LDN, DOutput6Reg, DOutput6Bit,
DOutput6Val);
}
*****
```

```
*****
Boolean AaeonReadPinStatus(byte LDN, byte Register, byte BitNum){
    Boolean PinStatus ;

    PinStatus = SIOBitRead(LDN, Register, BitNum);
    Return PinStatus ;
}
VOID AaeonSetOutputLevel(byte LDN, byte Register, byte BitNum,
byte Value){
    ConfigToOutputMode(LDN, Register, BitNum);
    SIOBitSet(LDN, Register, BitNum, Value);
}
*****
```

```

*****
VOID SIOEnterMBPnPMode(){
    IOWriteByte(SIOIndex, 0x87);
    IOWriteByte(SIOIndex, 0x87);
}

VOID SIOExitMBPnPMode(){
    IOWriteByte(SIOIndex, 0xAA);
}

VOID SIOSelectLDN(byte LDN){
    IOWriteByte(SIOIndex, 0x07); // SIO LDN Register Offset = 0x07
    IOWriteByte(SIOData, LDN);
}

VOID SIOBitSet(byte LDN, byte Register, byte BitNum, byte Value){
    Byte TmpValue;

    SIOEnterMBPnPMode();
    SIOSelectLDN(byte LDN);
    IOWriteByte(SIOIndex, Register);
    TmpValue = IOReadByte(SIOData);
    TmpValue &= ~(1 << BitNum);
    TmpValue |= (Value << BitNum);
    IOWriteByte(SIOData, TmpValue);
    SIOExitMBPnPMode();
}

VOID SIOByteSet(byte LDN, byte Register, byte Value){
    SIOEnterMBPnPMode();
    SIOSelectLDN(LDN);
    IOWriteByte(SIOIndex, Register);
    IOWriteByte(SIOData, Value);
    SIOExitMBPnPMode();
}
*****

```

```

Boolean SIOBitRead(byte LDN, byte Register, byte BitNum){
    Byte TmpValue;

    SIOEnterMBPnPMode();
    SIOSelectLDN(LDN);
    IOWriteByte(SIOIndex, Register);
    TmpValue = IOReadByte(SIOData);
    TmpValue &= (1 << BitNum);
    SIOExitMBPnPMode();
    If(TmpValue == 0)
        Return 0;
    Return 1;
}
VOID ConfigToOutputMode(byte LDN, byte Register, byte BitNum){
    Byte TmpValue, OutputEnableReg;

    OutputEnableReg = Register-1;
    SIOEnterMBPnPMode();
    SIOSelectLDN(LDN);
    IOWriteByte(SIOIndex, OutputEnableReg);
    TmpValue = IOReadByte(SIOData);
    TmpValue |= (1 << BitNum);
    IOWriteByte(SIOData, OutputEnableReg);
    SIOExitMBPnPMode();
}

```
