

# **SPC-2000** Ultra-Compact, Rugged, Extended Temp, Fanless Embedded System with Quad Core Intel® Atom™ E3845 Processor

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## Record of Revision

Version	Date	Page	Description	Remark
1.00	10/22/2014	All	Preliminary Release	
1.10	07/24/2015	All	Update Release	

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#### FCC

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

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## **Order Information**

Part Number	Description
606 2045	Ultra-compact Embedded System, 2 PoE+ GbE LAN, 1 DVI-I, 4 RS-232/422/485, 8 Isolated
SPC-2845	DIO, 4 USB3.0, Onboard Quad Core Intel® Atom™ E3845 Processor
600 3445	Ultra-compact Embedded System, 2 GbE LAN, 1 DVI-I, 4 RS-232/422/485, 4 USB 3.0,
SPC-2145	Onboard Quad Core Intel® Atom™ E3845 Processor

## **Optional Accessories**

Part Number	Description
DDR3L8G	Certified DDR3L-1333 8G RAM
DDR3L4G	Certified DDR3L-1333 4G RAM
M340L-W28M1	Vecow DDR3L 4GB 1333/1066MHz RAM, Micron® Chip, Wide Temperature -40°C ~ +85°C
PWA-60WP2	60W, 24V/2.5A 100V AC to 240V AC Power Adapter for 2 Pin 3.5mm Terminal Block
WiFi Module	Mini PCIe WiFi Module with Antenna
3G Module	Mini PCIe 3G Module with Antenna
4G Module	Mini PCIe 4G Module with Antenna
DIN-Rail	DIN-Rail Kit

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# **CHAPTER1** GENERAL INTRODUCTION

#### 1.1 Overview

With 3.5" form factor, SPC-2000 series is based on Quad Core Intel® Atom™ E3845 (formerly codenamed Bay Trail) processor family (1.91GHz) and DDR3L single channel 8GB ram, one DVI-I, four RS-232/422/485, isolated DIO, two PoE+ GbE LAN, one 2.5" SATA 3Gbps SSD/HDD tray, four USB 3.0 ports, and 2 miniPCIe. SPC-2000 series is in fanless mini form factor and capable of operating under wide temperatures from -25°C to +70°C for harsh environments. Design with four COM to satisfy various applications' control and connection requirements, SPC-2000 series still keep fanless and wide operation temperature plus with EN50155 standard and cable-less arrangement for industrial harsh environment. SPC-2000 series is ideal for information display in space-consuming and harsh environment, automation networking communication, IOT (Internet of Things), In-Vehicle Infotainment (IVI) systems, and M2M (Machine to Machine) applications.



## **1.2** Product Specification

## 1.2.1 Specifications of Vecow SPC-2845

System	
Processor	Quad Core Intel® Atom™ E3845 1.91GHz Processor (Bay Trail)
Chipset	Intel® Valleyview SoC
Memory	1 DDR3L 1333 SO-DIMM, up to 8GB
Video	1 DVI-I for VGA/DVI/HDMI Video Output
Audio	1 Speaker-out
Software Support	Windows 8, Windows 7, WES7, Linux
I/O Interface	
Serial	4 RS-232/422/485
LAN	2 Gigabit LAN by Intel <sup>®</sup> I210
PoE	2 Gigabit IEEE 802.3at (25.5W/48V) PoE <sup>+</sup> Port
USB	4 USB 3.0
DIO	8 Isolated DIO: 4 DI, 4 DO
LED	Power/HDD/WTD/PoE
Mini PCIe	1 Mini PCIe Socket (PCIe/ USB/ SIM Card Socket)
	1 Mini PCIe Socket (PCIe/ USB) optional with mSATA (Jumper Select)
Power Supply	
Power Input	Terminal Block; DC-in 6V to 36V, 2-pin Remote Power On/Off Switch
Power Output	Onboard 12V
Adaptor	AC to DC, 60W (Optional)
Storage	
SATA HDD	1 SATA II (3000S) 1 Front-access Removable HDD/SSD Tray (Optional)
mSATA	1 Mini PCle Socket (PCle + USB), optional with mSATA
Other	
Watchdog Timer	Reset: 1 to 255 sec./min. Per Step
Mechanical	
Dimension (W x L x H)	106mm x 150.4mm x 65.9mm (4.2" x 5.9" x 2.6")
Weight	1.4 kg (3.1 lb)
Mounting	DIN-Rail Mounting Kit (Optional) / Wallmount by mounting bracket
Docign	Ultra-compact; 3.5" Form Factor
Design	Top cover Heat Sink; Fanless Design
Environment	
Operating Temperature	-25°C to 70°C (-13°F to 158°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	10% to 95% Humidity, Non-condensing
	IEC 60068-2-27
Shock	CFast: 50G @ Wallmount, Half sine, 11ms
	HDD: 20G @ Wallmount, Halt sine, 11ms
Vibration	IEC 60068-2-64 (Kandom 1 Oct./min. 1nr/axis.)
EMC	CE. FCC. EN50155. EN50121-3-2

System	
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USB	4 USB 3.0
LED	Power/HDD/WTD/PoE
	1 Mini PCIe Socket (PCIe/ USB/ SIM Card Socket)
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Power Output	Onboard 12V
Adaptor	AC to DC, 60W (Optional)
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	HDD: 20G @ Wallmount, Half sine, 11ms
	IFC 60068-2-64 (Bandom 1 Oct./min. 1br/axis.)
Vibration	HDD: 1 Grms @ 5Hz to 500Hz
EMC	CE, FCC, EN50155, EN50121-3-2

#### 1.2.2 Specifications of Vecow SPC-2145



## 1.3 Supported CPU List

Processor No.	Core Count	CPU Freq (GHz)	Gfx Freq (MHz) CPU Freq (GHz) Nominal/Turbo	
E3845	4C	1.91GHz	542/792	10W
E3827	2C	1.75GHz	542/792	8W
E3826	2C	1.46GHz	533/667	7W
E3825	2C	1.33 GHz	533 (No Turbo)	6W
E3815	1C	1.46 GHz	400 (No Turbo)	5W

## **1.4** Mechanical Dimension

Figure1.1 SPC-2145









Figure1.2 SPC-2845







# CHAPTER2 GETTING TO KNOW YOUR SPC-2000

## 2.1 Packing List

Item	Description		
1	SPC-2000 Ultra-compact Embedded System (According to the configuration you order, the SPC-2000 series may contain SSD/HDD and DDR3L SO-DIMM. Please verify these items if necessary.)		
	Accessory box, which contains		
	Vecow Drivers & Utilities DVD	1	
2	Wall-mounting bracket	2	
2	<ul> <li>M4 screws for wall-mounting bracket</li> </ul>	4	
	<ul> <li>M3 screws for SSD Bracket and Wall-mount Bracket</li> </ul>	12	
	2-pin pluggable terminal block	2	

## 2.2 Front Panel I/O Functions

On SPC-2000 series, all I/O connectors are located on front panel and rear panel. Most general computer connectors (i.e. LAN, USB, DVI-I, DIO and etc.) are placed on the front panel.







## 2.3 Power Button



The power button is a non-latched switch. In case of system halts, you can press and hold the power button for 4 seconds to compulsorily shut down the system. Please note that a 4 seconds interval is kept by the system between two on/off operations (i.e. once turning off the system, you shall wait for 4 seconds to initiate another power-on operation).



It is a hardware reset switch. Use this switch to reset the system without turning off the power. Momentarily pressing the switch will activate a reset.

## 2.5 PWR, WDT, HDD LED Indicator





Green-Power LED: If the LED is solid green, it indicates that the system is powered on. Green-WDT LED: Watch Dog LED.

Yellow -HDD LED: A hard disk LED. If the LED is on, it indicates that the system's storage is functional. If it is off, it indicates that the system's storage is not functional. If it is flashing, it indicates data access activities.

## 2.6 DVI-I Connector



The DVI-I connector on the front panel supports both DVI and VGA operation mode. This connector can either output DVI signals or VGA signal. The DVI output mode supports up to 1920x1200 resolution and VGA output mode supports up to 2560x1600 resolution.



## 2.7 Isolated DIO Connector

The SPC-2000 offers an 8-bit DIO (4-DI/ 4-DO) connector. Each bit of DI and DO equipped with a photo-coupler for isolated protection. Because the DIO is isolated by photocopiers, it requires power supply from external to activate this feature.

Pin Number	Description	Mapping to SIO GPIO Function
1	OUTPUT0	SIO_GPO70
2	INPUT 0	SIO_GPO74
3	OUTPUT1	SIO_GPO71
4	INPUT 1	SIO_GPO75
5	OUTPUT2	SIO_GPO72
6	INPUT 2	SIO_GPO76
7	OUTPUT3	SIO_GPO73
8	INPUT 4	SIO_GPO77
9	GND_ISO	



**GPI Mode Internal Block Diagram** 



#### **Absolute Maximum Ratings**

		Values		Unit
		MIN	ΜΑΧ	
VIH	High-Level Input Voltage	5	40	V
VIL	Low-Level Input Voltage	0	0.5	v

#### **GPO Mode Internal Block Diagram**



#### **Absolute Maximum Ratings**

		Values		Unit
		MIN	ΜΑΧ	
VDSS	Drain-source voltage		40	V
ID	Output current		30	mA



## 2.8 Dual PoE LAN Connector

The 10/100/1000 Mbps Ethernet LAN ports 1 and 2 use 8-pin RJ-45 connector. LNA 1 and LAN 2 are equipped with Intel I210 LAN chip. Using suitable RJ-45 cable, you can connect SPC-2000 system to a computer, or to any other piece of equipment that has an Ethernet connection, for example, a hub or a switch. Moreover, both of them have Wake-on-LAN and Preboot Execution Environment capabilities. The following diagram shows the pinouts for LAN 1 and LAN 2 port.

Pin Number	10 / 100 Mbps	1000 Mbps
1	E_TX+	MDI0_P
2	E_TX-	MDI0_N
3	E_RX+	MDI1_P
4	4 MDI2_P	
5		MDI2_N
6	E_RX-	MDI1_N
7	7 MDI3_P	
8		MDI3_N

The Ethernet ports use standard RJ-45 jack connectors with LED indicators on the front side to show Active/Link status and Speed status.

The LED indicators on the right bottom corners glow a solid green color when the cable is properly connected to a 100 Mbps Ethernet network. The LED indicator on the left bottom corner will flash on and off when Ethernet packets are being transmitted or received.





	10 Mbps	100 Mbps	1000 Mbps
Right bottom LED	Off	Solid Green	Solid Orange
Left bottom LED	Flash Yellow	Flash Yellow	Flash Yellow
Right bottom LED	Off	Solid Green	Solid Orange

SPC-2000 has a PSE controller designed for use in IEEE 802.3 Type 1 and Type 2 (highpower) compliant Power over Ethernet systems. If insert PD device, then PoE LED indicator is on



## 2.9 USB 3.0



The SPC-2000 comes with 4 USB 3.0 hosts on the front panel. These USB 3.0 ports allow data transfers up to 5 Gbps. The controller supports Super-Speed (SS), High-Speed (HS), Full-Speed (FS) and Low-Speed(LS) traffic on the bus.

## 2.10 DC-in 6V to 36V Terminal Block



The SPC-2000 offers 6 to 36 VDC power input with the terminal block.

![](_page_22_Picture_0.jpeg)

![](_page_22_Figure_1.jpeg)

It is a 2-pin power-on or power-off switch through Phoenix Contact terminal block. You could turn on or off the system power by using this contact. This terminal block support dual function of soft power-on / power-off (instant off or delay 4 second), and suspend mode.

#### MUULIUNR A DC-IN 6V-36V ((<del>•))</del>+ V- V+ COM2 COM4 0 0 o 000 D (N 0 0 0 0 0 COM1 COM3 ο 000 . . . . Switch O) 0 0 0 0 **0** 0 0 0 0 0

All serial COM can be configured for RS-232, RS-422, or RS-485 with auto flow control communication. Serial Port 2 default setting is RS-232, if you want to use RS-422 or RS-485, you can find the setting in BIOS.

<b>BIOS Setting</b>	Function		
	RS-232		
	RS-422 (5-wire)		
COM1~COM4	RS-422 (9-wire)		
	RS-485		
	RS-485 w/z auto-flow control		

## 2.12 COM Serial Port

![](_page_24_Picture_0.jpeg)

Sorial Dort		RS-232	RS-422	RS-422	RS-485
Senarport	Pin Number		(5-wire)	(9-wire)	(3-wire)
	1	DCD	TXD-	TXD-	DATA-
	2	RXD	TXD+	TXD+	DATA+
	3	TXD	RXD+	RXD+	
	4	DTR	RXD-	RXD-	
1~4	5	GND	GND	GND	GND
	6	DSR		RTS-	
	7	RTS		RTS+	
	8	СТЅ		CTS+	
	9	RI		CTS-	

The pin assignments are shown in the following table:

## 2.13 Audio Out Connector

![](_page_24_Figure_4.jpeg)

The SPC-2000 offers stereo audio connector of Line-Out. The audio chip controller is by ALC892 which is compliant with the Intel Azalia standard. To utilize the audio function in Windows, you need to install corresponding drivers for Realtek ALC892 codec.

## 2.14 Main Board Expansion Connectors

The figure below is the top view of the SPC-2000 main board which is the main board used in the SPC-2000 Series system. It shows the location of the connectors.

![](_page_25_Figure_3.jpeg)

![](_page_26_Picture_0.jpeg)

![](_page_26_Figure_1.jpeg)

The figure below is the bottom view of the SPC-2000 main board.

![](_page_27_Figure_1.jpeg)

## 2.15 CN5 SATA II Connector

The SPC-2000 features high performance Serial ATA II interfaces that eases cabling to hard drives or SSD with thin and short cables while application need larger storage capacity.

Pin Number	Definition	Pin Number	Definition
1	GND	12	GND
2	ТХР	13	GND
3	TXN	14	5V
4	GND	15	5V
5	RXN	16	5V
6	RXP 17		GND
7	GND	18	GND
8	NC	19	GND
9	NC	20	12V
10	NC	21	12V
11	GND	22	12V

## Vecow

#### 0 0 0 0 00 000 000 $\bigcirc$ <u> I</u>P (( ಿಂ 0 70 0 0 0 0 0 0 0 0 00000 000 000 000 000 000 000 0 (( $\bigcirc$ CN7 $\bigcirc$ h 00000 0 0 0 0 0 0 0 0 0 0 0 <u>CN8</u> -000000--00000000000-[0000] 20 0 0 0 0000 0 E F 0 。山 00000 0000 0.0

## 2.16 Mini PCIe Connector (CN8) with SIM Card Slot (CN7)

CN8 Mini PCIe Connector Pin Out

Pin #	Signal Name	Pin #	Signal Name
51	NC	52	+3.3Vaux
49	NC	50	GND
47	NC	48	+1.5V
45	NC	46	NC
43	GND	44	NC
41	+3.3Vaux	42	NC
39	+3.3Vaux	40	GND
37	GND	38	USB_D+
35	GND	36	USB_D-
33	PETp0	34	GND
31	PETn0	32	SMB_DATA
29	GND	30	SMB_CLK
27	GND	28	+1.5V
25	PERp0	26	GND
23	PERn0	24	+3.3Vaux
21	GND	22	PERST#
19	NC	20	NC
17	NC	18	GND
	Mechani	cal Key	
15	GND	16	UIM_VPP

13	REFCLK+	14	UIM_RST
11	REFCLK-	12	UIM_CLK
9	GND	10	UIM_DATA
7	CLKREQ#	8	UIM_PWR
5	NC	6	1.5V
3	NC	4	GND
1	WAKE#	2	3.3Vaux

## Vecow

## 2.17 Main Board Jumper Settings

The figure below is the top view of the SPC-2000 main board which is the main board used in the SPC-2000 Series system. It shows the location of the jumpers.

![](_page_30_Figure_3.jpeg)

You may configure your card to match the needs of your application by setting jumpers. A jumper is a metal bridge used to close an electric circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To "close" a jumper, you connect the pins with the clip. To "open" a jumper, you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2, or 2 and 3.

![](_page_30_Picture_5.jpeg)

![](_page_31_Figure_1.jpeg)

## 2.18 JP2(A) CMOS Clear Jumper Setting

![](_page_32_Picture_0.jpeg)

## 2.19 JP1 PCIe Mode Jumper Setting

![](_page_32_Figure_2.jpeg)

Setting	Description	
1-2	Auto Detection (Default)	
2-4	Mini PCIe	
1-3	mSATA	

![](_page_33_Figure_1.jpeg)

## 2.20 CN15 Internal USB Connector

This internal USB connector type is JST-BM04B-SRSS-TB Internal USB connector pinouts as below

Pin No.	Description
1	+3.3V
2	USB_N
3	USB_P
4	GND

## Vecow

# CHAPTER3 SYSTEM SETUP

## 3.1 How to Open Your SPC-2000 Chassis

1. Remove 4 pcs M3 PH screw from Heatsink top

![](_page_34_Picture_4.jpeg)

2. Remove 8 pcs #4-40 spacer from front panel

![](_page_34_Picture_6.jpeg)

![](_page_35_Picture_1.jpeg)

3. Remove 2 pcs M3 FH screw from front panel

4. Take off front panel away from SPC-2000

![](_page_35_Picture_4.jpeg)

![](_page_36_Picture_0.jpeg)

5. Remove 4 pcs #4-40 spacer from Rear panel

![](_page_36_Picture_2.jpeg)

6. Pull Heatsink and Bottom case until you can see the fully GPIO socket Caution: don't pull out heatsink and bottom case completely before removing GPIO cable from socket

![](_page_36_Picture_4.jpeg)

![](_page_37_Picture_1.jpeg)

7. Remove GPIO cable from PCB socket

8. Separate Heatsink and Bottom case

![](_page_37_Picture_4.jpeg)

![](_page_38_Picture_0.jpeg)

## 3.2 Installing DDR3L SODIMM Modules

1. Remove 4 pcs M3 PH screw from HDD bracket

![](_page_38_Picture_3.jpeg)

2. Install RAM module into RAM socket

![](_page_38_Picture_5.jpeg)

![](_page_39_Picture_1.jpeg)

3. Make sure RAM socket and RAM module both side locked

![](_page_40_Picture_0.jpeg)

## 3.3 Installing SSD/HDD

1. Take SSD module and SSD Bracket

![](_page_40_Picture_3.jpeg)

2. Match SSD bracket hole and SSD screw hole.

![](_page_40_Picture_5.jpeg)

![](_page_41_Picture_1.jpeg)

3. Locked 4 pcs M3 screw in SSD screw hole.

4. Insert SSD SATA connector into PCB SATA socket.

![](_page_41_Picture_4.jpeg)

![](_page_42_Picture_0.jpeg)

5. Locked 4 pcs M3 PH screw into spacer.

![](_page_42_Picture_2.jpeg)

## 3.4 Installing Mini PCIe Module

1. Insert miniPCIe module into miniPCIe socket

![](_page_42_Picture_5.jpeg)

![](_page_43_Picture_1.jpeg)

2. Locked 2 pcs M2.5 PH screw into PCB spacer

![](_page_44_Picture_0.jpeg)

## 3.5 Mount Your SPC-2000

#### 1. Locked 4 pcs M3 screw both side

![](_page_44_Picture_3.jpeg)

2. Locked 4 pcs M3 PH screw

![](_page_44_Picture_5.jpeg)

# CHAPTER4 BIOS AND DRIVER

## 4.1 BIOS Settings

The board uses UEFI BIOS that is use Serial Peripheral Interface (SPI) Flash. The SPI Flash contains the BIOS Setup program, POST, the PCI auto-configuration utility, LAN, EEPROM information, and Serial port support. The BIOS setup program is accessed by pressing the <Del> key after the Power-On Self-Test (POST) memory test begins and before the operating system boot begins. The menu bar is shown below.

Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.					
Main	Advanced	Chipset	Security	Boot	Save & Exit
		_			

Figure 1-1: BIOS Menu Bar

## 4.2 Main Menu

Main Advand	ed Chipset Security	Boot	Save & Exit
		5000	
<b>BIOS Information</b>			Item Specific Hel
<b>BIOS Version</b>	Vecow SPC-2000	0 020-005	
Release time	10/01/2014 16:4	40:00	
System Language	[English]		
System Date	[Thu 02/21/201	3]	
	[10.00.00]		

#### Figure 1-2: BIOS Main screen

**System Time / Date :** Press "TAB" key to switch sub-items of value .Then press " +" key or "-" key number key for modify value.

In this page , you could make sure you CPU type and DRAM type that you are install into this system.

![](_page_46_Picture_0.jpeg)

## 4.3 Advanced Function

#### 4.3.1 ACPI Setting

Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.							
Main	Advanced	Chipset	Security	Boot	Save & E	xit	
ACPI Setti	ings					Item Specific Help	
Enable Hi	bernation		[En	abled]			
ACPI Sleep State		[S3]					

Figure 1-3: ACPI Setting setup screen

**Enable ACPI Auto Configuration:** This system support ACPI function as auto process. You should Enable / Disable that depend as your O.S.

**Enable Hibernation:** It is able to use Hibernate function if O.S support. But some Operation system maybe not effective with this function.

ACPI Sleep state: Select sleep state while SUSPEND button pressed.

#### 4.3.2 Serial Port 1 Configuration

Advanced->IT8786 Super IO Configuration->Serial Port 1 Configuration

Main	Advanced	Chipset	Security	Boot	Save a	& Exit
Serial Por	t 1 Configurat	ion				Item Specific Help
Serial Por Device Se	ttings		(En IO	abled] =3F8h; IRC	Q=4;	
Change Se	ettings		[Aı	uto]		
Interface	Mode		[R	S-232 Moo	de]	

#### Figure 1-7: Serial Port 1Setup screen

#### Serial Port :

Enable or Disable Serial port.

#### **Device Setting:**

Current IO addresses and interrupts resource of Serial Port.

#### Change Settings :

Select another device setting.

Here have 6 options :

Auto

IO=3F8h; IRQ=4;

IO=3F8h; IRQ=3,4,5,6,7,8,9,10,11,12;

- IO=2F8h; IRQ=3,4,5,6,7,8,9,10,11,12;
- IO=3E8h; IRQ=3,4,5,6,7,8,9,10,11,12;
- IO=2E8h; IRQ=3,4,5,6,7,8,9,10,11,12;

#### Interface Mode:

Select UART transfer and receive protocol

Here have 3 options :

RS-232 Mode

RS-422 Mode

RS-485 Mode

#### 9-bit Multi-Drops Mode:

![](_page_48_Picture_0.jpeg)

#### 4.3.3 Serial Port 2 Configuration

Advanced->IT8786 Super IO Configuration->Serial Port 2 Configuration

Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.								
Main	Advanced	Chipset	Security	Boot	Save &	Exit		
Serial Port	t 2 Configurat	ion				Item Specific Help		
Serial Port	ttings		(En: IO	abled) =3F8h; IR(	Q=4;			
Change Se Interface	ettings Mode		[Au [R	ıto] S-232 Mo	de]			
9-bit Mult	i-Drops Mode	25	[Di	isable]				

Figure 1-7: Serial Port 1Setup screen

#### Serial Port :

Enable or Disable Serial port.

#### **Device Setting:**

Current IO addresses and interrupts resource of Serial Port.

#### **Change Settings :**

Select another device setting.

Here have 6 options :

Auto

IO=3F8h; IRQ=4;

IO=3F8h; IRQ=3,4,5,6,7,8,9,10,11,12;

IO=2F8h; IRQ=3,4,5,6,7,8,9,10,11,12;

IO=3E8h; IRQ=3,4,5,6,7,8,9,10,11,12;

IO=2E8h; IRQ=3,4,5,6,7,8,9,10,11,12;

#### Interface Mode:

Select UART transfer and receive protocol

Here have 3 options :

RS-232 Mode

RS-422 Mode

RS-485 Mode

#### 9-bit Multi-Drops Mode:

#### 4.3.4 Serial Port 3 Configuration

Advanced->IT8786 Super IO Configuration->Serial Port 3 Configuration

Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.								
Main	Advanced	Chipset	Security	Boot	Save &	Exit		
Serial Port	: 3 Configurat	ion				Item Specific Help		
Serial Port Device Set	ttings		(En: IO	abled] =3F8h; IRC	Q=4;			
Change Se Interface I	ttings Vode		[Au [R	uto] S-232 Mod	de]			
9-bit Mult	i-Drops Mode	es	[Di	isable]				

#### Figure 1-7: Serial Port 1Setup screen

#### Serial Port :

Enable or Disable Serial port.

#### **Device Setting:**

Current IO addresses and interrupts resource of Serial Port.

#### Change Settings :

Select another device setting.

Here have 6 options :

Auto

IO=3F8h; IRQ=4;

IO=3F8h; IRQ=3,4,5,6,7,8,9,10,11,12;

- IO=2F8h; IRQ=3,4,5,6,7,8,9,10,11,12;
- IO=3E8h; IRQ=3,4,5,6,7,8,9,10,11,12;
- IO=2E8h; IRQ=3,4,5,6,7,8,9,10,11,12;

#### Interface Mode:

Select UART transfer and receive protocol

Here have 3 options :

RS-232 Mode

RS-422 Mode

RS-485 Mode

#### 9-bit Multi-Drops Mode:

![](_page_50_Picture_0.jpeg)

#### 4.3.5 Serial Port 4 Configuration

Advanced->IT8786 Super IO Configuration->Serial Port 4 Configuration

Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.							
Main	Advanced	Chipset	Security	Boot	Save &	Exit	
Serial Por	t 4 Configurat	ion				Item Specific Help	
Serial Por Device Se	ttings		(Ena IO	abled] =3F8h; IRC	Q=4;		
Change Se Interface	ettings Mode		[Aı [R	ıto] S-232 Moc	de]		
9-bit Mult	ti-Drops Mode	25	[Di	sable]			

Figure 1-7: Serial Port 1Setup screen

#### Serial Port :

Enable or Disable Serial port.

#### **Device Setting:**

Current IO addresses and interrupts resource of Serial Port.

#### **Change Settings :**

Select another device setting.

Here have 6 options :

Auto

IO=3F8h; IRQ=4;

IO=3F8h; IRQ=3,4,5,6,7,8,9,10,11,12;

IO=2F8h; IRQ=3,4,5,6,7,8,9,10,11,12;

IO=3E8h; IRQ=3,4,5,6,7,8,9,10,11,12;

IO=2E8h; IRQ=3,4,5,6,7,8,9,10,11,12;

#### Interface Mode:

Select UART transfer and receive protocol

Here have 3 options :

RS-232 Mode

RS-422 Mode

RS-485 Mode

#### 9-bit Multi-Drops Mode:

#### 4.3.6 PPM Configuration

Advanced->PPM Configuration

	Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.								
Main	Advanced	Chipset	Security	Boot	Save &	Exit			
PPM Conf	iguration					Item Specific Help			
EIST CPU C Stat	te Report		[Disab [Enable	led] ed]					
Enhance	e C State		[Enable	ed]					
Max CPU	C-State		[C7]						

Figure 1-4: Trusted Computing setup screen

**EIST :** Enables or Disables Intel Speed function , once you enabled it , you could use the Intel Turbo Boost software to monitor you CPU performance. Please refer to CPU check list.

#### 4.3.7 CPU Configuration

Advanced->CPU Configuration->Socket 0 CPU Information

Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.									
Main	Advanced	Chipset	Security	Boot	Save & I	Exit			
CPU Confi	guration					Item Specific Help			
CPU Speed 64bit supp	d port		1910MHz Supported						
Inter Virtu	ualization Tec	hnology	[Disable]						

![](_page_51_Figure_9.jpeg)

![](_page_52_Picture_0.jpeg)

#### Intel Virtualization Technology:

This for for Virtualization Application or platform usage, when enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology,

4.3.8	IDE	Configur	ation
-------	-----	----------	-------

Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.								
Main	Advanced	Chipset	Security	Boot	Save &	Exit		
IDE Config	uration					Item Specific Help		
Serial-ATA	(SATA)							
SATA Mod	le		[AHCI	Mode]				
Serial-ATA	Port 0		[Enable	ed]				
Serial-ATA	Port 0		[Enable	bel				

Figure 1-6: SATA Configuration setup screen

#### Serial-ATA(SATA) :

Enables or Disables integrate SATA controller for Storage device use.

#### SATA Mode Selection:

Determines how the SATA transfer mode for operate. Here have three option for choice [IDE] / [AHCI] .

#### Serial Port 0~1 :

This system offers two SATA port for connection SATA device.

## 4.4 Chipset Function

Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.								
Main	Advanced	Chipset	Security	Boot	Save & Exit			

#### 4.4.1 Display Configuration

Chipset->North Bridge->Intel IGD Configuration->Primary Display

	Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.								
Main	Advanced	Chipset	Security	Boot	Save & I	Exit			
GOP Confi	iguration					Item Specific Help			
Primary D	isplay		[PCI]						

Figure 1-11: Network Setup screen

#### **Primary Display :**

Select which Display module you would like to you on current system.

[PCI] : System display function will be change to internal PCI or PCIe bus.

[IGD] : Use Internal Intel HD Graphics unit for unique display output.

#### 4.4.2 Power Loss Configuration

#### Chipset->South Bridge

Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.								
Main	Advanced	Chipset	Security	Boot	Save & I	Exit		
Restore A	C Power Loss		[	Last State ]		Item Specific Help		

![](_page_53_Figure_14.jpeg)

#### **Restore AC Power Loss :**

![](_page_54_Picture_0.jpeg)

[Power Off]: When plug-in the power source , system will keep on SB mode.[Power On]: When plug-in the power source , system will auto booting .[Last State]: When plug-in the power source , system will keep on last power status.

### 4.5 Boot Function

Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.								
Main	Advanced	Chipset	Security	Boot	Save & Exit			

#### 4.5.1 Change Boot Configuration

Phoenix SecureCore(tm) Setup Utility						
Main Ad	lvanced	Chipset	Security	Boot	Save &	Exit
Boot Configur	ation					Item Specific Help
Boot option # Boot option #	1 2	[SATA [SATA	A PS:Device A PS:Device	Name ] Name ]		

#### Figure 1-13 Boot Setup screen

#### **Boot option:**

When you press "Enter", you can select which device you would like to boot.

### 4.6 Save & Exit

Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.						
Main	Advanced	Chipset	Security	Boot	Save & Exit	

#### 4.6.1 Reload Default BIOS Value

Phoenix SecureCore(tm) Setup Utility						
Main	Advanced	Chipset	Security	Boot	Save &	Exit
Boot Cor	nfiguration					Item Specific Help
Save as l	Jser Defaults					
Restore	User Defaults					

#### Figure 1-13 Boot Setup screen

![](_page_56_Picture_0.jpeg)

#### **Restore Default:**

Use the function to restore all BIOS setting, but not include administrator password and system RTC value.

#### Save as Use Default:

Uses can use this function to match the target system.

#### **Restore as Use Default:**

Restore all BIOS setting to User Default.

# Appendix A: ISOLATED DIO GUIDE

## A. SIO Pin Definition

IO Pin	GPIO 77~74	GPIO 73~70	
Base Adr.	0xA06[7:4]	0xA06[3:0]	
Usage	Input	Output	

#### **B.** Function Description

The SPC-2000 offers a 8-bit DIO (4-DI / 4-DO) DB9 connector.

Each bit of DI and DO equipped with a photo-coupler for isolated protection.

All IO pins are fix by Hardware design that cannot change in/out direction in runtime process. The definition is shown below:

### C. Register Allocation

#define LOGIC_DEVICE_ADDRESS	0x07	
#define LOGIC_DEVICE_GPIO	0x07	
#define LOGIC_DEVICE_WDT	0x07	( Use same Group Table)
#define GPIO7_IO_Dir	0xCE	

## D. Set I/O Direction

Setdata ( GPIO7\_IO\_Dir,0x0F );

Low level [0] : The I/O pin set as input. High level [1] : The I/O pin set as output.

#### E. Output Data

The data format is four bit , please mask upper four bit to avoid some run-time error. **byte testdata;** 

outport ( DIO\_Port , 0x0F&testdata );

### F. Input Data

You need shift right four bit to get input value. inportb(DIO\_Port)>>4;

![](_page_58_Picture_0.jpeg)

# Appendix B: WDT FUNCTION

## A. Function Description

The WDT are using internal Super IO function. However, you must entry super I/O configuration mode to set it.
Super I/O special address port = 0x2E
Super I/O special data port = 0x2F
GPIO Logical device is 0x07

#### **B. Entry Functions**

1. Entry MB PnP mode.

//write twice 0x87 value. outportb(Super I/O special address port, 0x87); outportb(Super I/O special address port, 0x01); outportb(Super I/O special address port, 0x55); outportb(Super I/O special address port, 0x55);

- Located on Logical Device 7(LOGIC\_DEVICE\_WDT)
   //write 0x07 on Reg [0x07], this setup must follow Step A. that can be workable.
   outportb(Super I/O special address port, 0x07);
   outportb(Super I/O special data port, 0x07);
- **3.** Config the WDT register

outb(WDT\_Config,SPECIAL\_ADDRESS\_PORT); outb(WDT\_As\_Second|WDT\_Pin\_PWRGD,SPECIAL\_DATA\_PORT);

4. Start WDT Time out value

Here have 2 Byte for WDT timing count, MSB and LSB should be write the value separate.

WDT\_TimeOut\_MSB,SPECIAL WDT\_TimeOut\_LSB,SPECIAL

outb(WDT\_TimeOut\_LSB,SPECIAL\_ADDRESS\_PORT); outb(WDT\_TimeOutValue,SPECIAL\_DATA\_PORT);

# Appendix C: win7 installation guide

Vecow's ultra-compact box PC, SPC-2000 series, offers the best possible hardware specification in the market. It supports four USB 3.0 ports. Although USB 3.0 is compatible to USB 2.0, it requires USB 3.0 driver for activation. Windows 8 has built-in USB 3.0 driver, and the user can smoothly install OS. In Windows 7, however, USB 3.0 driver is not included and requires extra steps. This document provides options and steps for user to install Operation System and activate USB 3.0 ports in Windows 7 environments. This installation process focuses on Windows 7, WinServer2008 R2 of Windows System and Fedora 21, and Ubuntu 12.04 LTS Linux distribution.

### Win7 Pre-installed by Vecow

Vecow has Customer License Agreement with Microsoft and can help to purchase and pre-install OS for all Vecow products. Along with system burn-in test, USB 3.0 driver will be installed and checked before shipping. You are welcome to include storage device and Operation System when ordering products. Please contact Vecow sales team for more details.

### Win7 OS installation via DVD

1. Connect a USB hub to the following port and connect input devices

![](_page_59_Picture_7.jpeg)

2. Change the following BIOS settings

Advanced -> **CSM Configuration** -> Storage -> Legacy Only Advanced -> **USB Configuration** -> Legacy USB Support -> Enabled Advanced -> **USB Configuration** -> XHCI Hand-off -> Disabled Advanced -> **USB Configuration** -> EHCI Hand-off -> Enabled Chipset -> South Bridge -> USB Configuration -> XHCI Mode -> Disabled Chipset -> South Bridge -> **USB Configuration** -> USB 2.0(EHCI) Support -> Enabled Save & Exit -> Save Changes and Exit -> Yes

Connect all USB devices (DVD/Keyboard/Mouse) to the PCH USB port.
 Before OS/USB3 drivers are properly installed, only PCH USB port can be recognized by
 Legacy OS kernel. It is suggested to use a USB hub for the PCH USB port and connect all USB devices to the hub.

![](_page_60_Picture_0.jpeg)

4. Insert Win7 Install CD and booting up from CD-Device.

Generally, the OS DVD will install windows automatically on whole new system. If you have two bootable devices that connect to the system, please make sure which one is using on O.S install.

- 5. Verify the BIOS setting again.
- 6. Complete the O.S install process.
- 7. Driver Installation

In addition to USB3.0, you also need to install all the drivers to make the system functional.

- Chipset Driver
- LAN driver
- USB 3.0 driver
- Graphics (.NET 4.0 required)

All driver packages could be found at Vecow web site or Driver CD which attached on the shipment with the embedded system.

### Win7 System image file

- Include USB 3.0 driver in Win7 (ref. to above steps)
- Use Ghost to create Disk Image file
- Restore system from Disk Image file in different storage devices
- Install the storage device with disk image file to SPC-2000
- Repeat above steps and apply to different SPC-2000 units
- Suggested approach for installing Win7 in several SPC-2000

\*\* If more help is needed, please contact Vecow Technical Support