

User Manual

SOM-7565 A2

ADVANTECH

Enabling an Intelligent Planet

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This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

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If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Declaration of Conformity

CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class B

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FM

This equipment has passed the FM certification. According to the National Fire Protection Association, work sites are classified into different classes, divisions and groups, based on hazard considerations. This equipment is compliant with the specifications of Class I, Division 2, Groups A, B, C and D indoor hazards.

Technical Support and Assistance

1. Visit the Advantech website at <http://support.advantech.com> where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
 - Product name and serial number
 - Description of your peripheral attachments
 - Description of your software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wording of any error messages

Warnings, Cautions and Notes

Warning! Warnings indicate conditions, which if not observed, can cause personal injury!



Caution! Cautions are included to help you avoid damaging hardware or losing data. e.g.



There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Note! Notes provide optional additional information.



Document Feedback

To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such - in writing to: support@advan-tech.com

Packing List

Before setting up the system, check that the items listed below are included and in good condition. If any item does not accord with the table, please contact your dealer immediately.

- SOM-7565 A2 CPU Module
- 1 x Heat spreader (1960055344N001)

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source is correct before connecting the equipment 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 equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated into the equipment.
 - The equipment has been exposed to moisture.
 - The equipment does not work well, or you cannot get it to work according to the user's manual.
 - The equipment has been dropped and damaged.
 - The equipment has obvious signs of breakage.
15. **DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20° C (-4° F) OR ABOVE 60° C (140° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.**
16. **CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.**

The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
- Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

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Chapter 1

General Information

This chapter gives background information on the SOM-7565 A2 CPU Computer on Module

Sections include:

- Introduction
- Specification
- Functional Block Diagram
- SOM-7565 A2 Type 10 Pin Assignment

1.1 Introduction

SOM-7565 A2 is a COM-Express Mini module with pin-out Type 10 that fully complies with the PICMG (PCI Industrial Computer Manufacturers Group) COM.0 R2.1 specification. The new CPU module uses an Intel Atom processor N2800/N2600 which contains Intel GFX Core GMA3600 supports full MPEG2, AVC/H.264, and VC-1 HW decode/acceleration, with NM10 chipset which supports advance expansion interface like PCI Express and I/O interface like Serial ATA (SATA), USB2.0. In a COM-Mini form factor of 84mm x 55mm, SOM-7565 A2 provides a balance of high performance and easy to integrate solution for customers' applications by utilizing a plug-in CPU module on an application-specific customer solution board. With advanced interfaces like PCI Express, SATA, USB 2.0, and HDMI/DVI/DP interfaces, it provides not only high speed/performance but also small pin-count that user easy to integrate in to system. SOM-7565 A2 offers design partners more choices for their own applications needing higher computing speeds while maintaining a compact form factor.

1.2 Specifications

1.2.1 Board Information

- **Pin Definition:** PICMG COM.0 R2.1 Type 10 pin-out definition
- **Form Factor:** PICMG COM.0 R2.1 Mini Module 84 x 55 mm

1.2.2 System Information

- **CPU:** Onboard Intel® Atom N2600 1.6GHz/N2800 1.86GHz processor, 1MB L2 Cache
- **Chipset:** Intel® NM10 Express Chipset
- **Memory:** On board DDR3 800MHz 2GB memory for N2600
Up to 4GB on board DDR3 1066MHz memory for N2800
- **BIOS:** AMI UEFI 16Mbit SPI BIOS
- **Power management:** Supports power saving modes including Normal / Standby / Suspend modes. ACPI 2.0 compliant

1.2.3 Display

- **Graphic Core:** Intel Atom integrated GMA3600 400MHz, supports DX9, OGL3.0, and MPEG2, AVC/H.264, VC-1 HW decode/acceleration
- **LVDS:** Supports 1-CH 18-bit, resolution up to 1366 x 768
- **HDMI/DVI/DP:** Supports 1 port HDMI (default), DVI, or DP multiplexed (BIOS modification needed).
Resolution: HDMI/DVI up to 1920 x 1200
DP up to 1600 x 1200
- **Dual Display:** Supports LVDS + HDMI/DVI/DP

1.2.4 Expansion Interface

- **PCI Express x1:** 3 ports or 4 ports (BOM option), PCI Express 1.0a compliant
- **Audio Interface:** Intel HD Audio interface
- **LPC Bus**
- **SMBus**
- **I2C Bus:** Up to 400KHz
- **SPI:** Supports SPI BIOS only

1.2.5 I/O

- **Onboard Flash:** Support onboard flash 8GB MLC, 4GB MLC, or 4GB SLC
- **Ethernet:** Intel 82574L Gigabit LAN controller supports 10/100/1000 Mbps Speed
- **SATA:** Supports 1 port, SATAII 300 Gb/s compliant (2 port optional while remove onboard flash)
- **USB Interface:** Supports 8 ports USB 2.0
- **Serial Port:** Supports 2 ports 2-wire serial port
- **Express Card:** 2 ports
- **Panel Control:** Supports panel backlight on/off control, brightness control
- **Thermal Protection:** Supports thermal shutdown or CPU throttling
- **Watchdog Timer:** 65536 level timer interval, from 0~65535 sec, multi-level, multi-option watchdog timer
- **Smart Fan:** 1 port
- **GPIO:** 8 GPIO
- **Hardware Monitor:** Vin, 5VSB, CMOS

1.2.6 iManager 2.0

Refer to section 4.3.

1.2.7 Mechanical and Environmental Specification

- **Dimensions:** 84 x 55 mm (3.3" x 2.17")
- **Power Type and Supply Voltage:**
ATX: +12V and +5VSB (standby power)
AT: +12V
- **Power Requirement:**
Test Condition: Win7 32-bit standard, under 12V and 5VSB input power supply.
- **Temperature Specification:**
Operating: 0 ~ 60°C (32 ~ 140°F)
Storage: -40 ~ 85°C (-40 ~ 185°F)
- **Humidity Specification:**
Operating: 40°C@95% relative humidity, non-condensing
Storage: 60°C@95%relative humidity, non-condensing
- **EMC Compliance:**
CE/FCC Class B

1.3 Functional Block Diagram

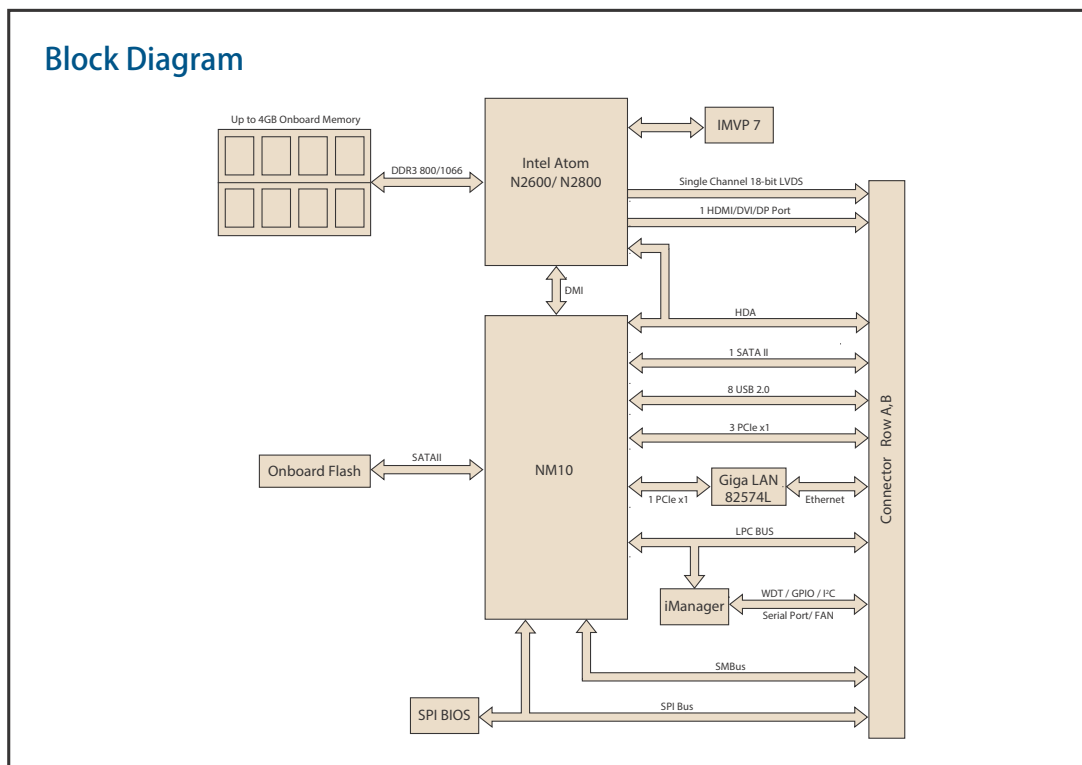


Figure 1.1 Functional Block Diagram

1.4 SOM-7565 A2 Type 10 Pin Assignment

This section gives SOM-7565 A2 pin assignment on COM Express connector which compliant with COMR.0 R2.1 Type 10 pin-out definitions. More details about how to use these pins and get design reference, please contact to Advantech for design guide, checklist, reference schematic, and other hardware/software supports.

Row A		Row B	
A1	GND (FIXED)	B1	GND (FIXED)
A2	GBE0_MDI3-	B2	GBE0_ACT#
A3	GBE0_MDI3+	B3	LPC_FRAME#
A4	GBE0_LINK100#	B4	LPC_AD0
A5	GBE0_LINK1000#	B5	LPC_AD1
A6	GBE0_MDI2-	B6	LPC_AD2
A7	GBE0_MDI2+	B7	LPC_AD3
A8	GBE0_LINK#	B8	LPC_DRQ0#
A9	GBE0_MDI1-	B9	LPC_DRQ1#
A10	GBE0_MDI1+	B10	LPC_CLK
A11	GND (FIXED)	B11	GND (FIXED)
A12	GBE0_MDI0-	B12	PWRBTN#
A13	GBE0_MDI0+	B13	SMB_CK
A14	GBE0_CTREF	B14	SMB_DAT
A15	SUS_S3#	B15	SMB_ALERT#
A16	SATA0_TX+	B16	SATA1_TX+ (Optional)

A17	SATA0_TX-	B17	SATA1_TX- (Optional)
A18	SUS_S4#	B18	SUS_STAT#
A19	SATA0_RX+	B19	SATA1_RX+ (Optional)
A20	SATA0_RX-	B20	SATA1_RX- (Optional)
A21	GND (FIXED)	B21	GND (FIXED)
A22	RSVD	B22	RSVD
A23	RSVD	B23	RSVD
A24	SUS_S5#	B24	PWR_OK
A25	RSVD	B25	RSVD
A26	RSVD	B26	RSVD
A27	BATLOW#	B27	WDT
A28	SATA_ACT#	B28	N/A
A29	HDA_SYNC	B29	HDA_SDIN1
A30	HDA_RST#	B30	HDA_SDIN0
A31	GND (FIXED)	B31	GND (FIXED)
A32	HDA_BITCLK	B32	SPKR
A33	HDA_SDOUT	B33	I2C_CK
A34	BIOS_DIS0#	B34	I2C_DAT
A35	THRMTRIP#	B35	THRM#
A36	USB6-	B36	USB7-
A37	USB6+	B37	USB7+
A38	USB_6_7_OC#	B38	USB_4_5_OC#
A39	USB4-	B39	USB5-
A40	USB4+	B40	USB5+
A41	GND (FIXED)	B41	GND (FIXED)
A42	USB2-	B42	USB3-
A43	USB2+	B43	USB3+
A44	USB_2_3_OC#	B44	USB_0_1_OC#
A45	USB0-	B45	USB1-
A46	USB0+	B46	USB1+
A47	VCC_RTC	B47	EXCD1_PERST#
A48	EXCD0_PERST#	B48	EXCD1_CPPE#
A49	EXCD0_CPPE#	B49	SYS_RESET#
A50	LPC_SERIRQ	B50	CB_RESET#
A51	GND (FIXED)	B51	GND (FIXED)
A52	RSVD	B52	RSVD
A53	RSVD	B53	RSVD
A54	GPI0	B54	GPO1
A55	RSVD	B55	RSVD
A56	RSVD	B56	RSVD
A57	GND	B57	GPO2
A58	PCIE_TX3+	B58	PCIE_RX3+
A59	PCIE_TX3-	B59	PCIE_RX3-
A60	GND (FIXED)	B60	GND (FIXED)
A61	PCIE_TX2+	B61	PCIE_RX2+
A62	PCIE_TX2-	B62	PCIE_RX2-
A63	GPI1	B63	GPO3
A64	PCIE_TX1+	B64	PCIE_RX1+

A65	PCIE_TX1-	B65	PCIE_RX1-
A66	GND	B66	WAKE0#
A67	GPI2	B67	WAKE1#
A68	PCIE_TX0+	B68	PCIE_RX0+
A69	PCIE_TX0-	B69	PCIE_RX0-
A70	GND (FIXED)	B70	GND (FIXED)
A71	LVDS_A0+	B71	DDIO_PAIR0+
A72	LVDS_A0-	B72	DDIO_PAIR0-
A73	LVDS_A1+	B73	DDIO_PAIR1+
A74	LVDS_A1-	B74	DDIO_PAIR1-
A75	LVDS_A2+	B75	DDIO_PAIR2+
A76	LVDS_A2-	B76	DDIO_PAIR2-
A77	LVDS_VDD_EN	B77	N/A
A78	LVDS_A3+	B78	N/A
A79	LVDS_A3-	B79	LVDS_BKLT_EN
A80	GND (FIXED)	B80	GND (FIXED)
A81	LVDS_A_CK+	B81	DDIO_PAIR3+
A82	LVDS_A_CK-	B82	DDIO_PAIR3-
A83	LVDS_I2C_CK	B83	LVDS_BKLT_CTRL
A84	LVDS_I2C_DAT	B84	VCC_5V_SBY
A85	GPI3	B85	VCC_5V_SBY
A86	RSVD	B86	VCC_5V_SBY
A87	RSVD	B87	VCC_5V_SBY
A88	PCIE0_CK_REF+	B88	BIOS_DIS1#
A89	PCIE0_CK_REF-	B89	DD0_HPD
A90	GND (FIXED)	B90	GND (FIXED)
A91	SPI_POWER	B91	N/A
A92	SPI_MISO	B92	N/A
A93	GPO0	B93	N/A
A94	SPI_CLK	B94	N/A
A95	SPI_MOSI	B95	DDIO_DDC_AUX_SEL
A96	N/A	B96	RSVD
A97	TYPE10#	B97	SPI_CS#
A98	RS1_TX	B98	DDIO_CTRLCLK_AUX+
A99	RS1_RX	B99	DDIO_CTRLDATA_AUX-
A100	GND (FIXED)	B100	GND (FIXED)
A101	RS2_TX	B101	FAN_PWMOUT
A102	RS2_RX	B102	FAN_TACHIN
A103	LID#	B103	SLEEP#
A104	VCC_12V	B104	VCC_12V
A105	VCC_12V	B105	VCC_12V
A106	VCC_12V	B106	VCC_12V
A107	VCC_12V	B107	VCC_12V
A108	VCC_12V	B108	VCC_12V
A109	VCC_12V	B109	VCC_12V
A110	GND (FIXED)	B110	GND (FIXED)

Chapter 2

Mechanical Information

This chapter gives mechanical information on the SOM-7565 A2 CPU Computer on Module

Sections include:

- Board Information
- Mechanical Drawing

2.1 Board Information

The figures below indicate the main chips on SOM-7565 A2 Computer-on-Module. Please aware of these positions when designing the customer's own carrier board to avoid mechanical and thermal problems.

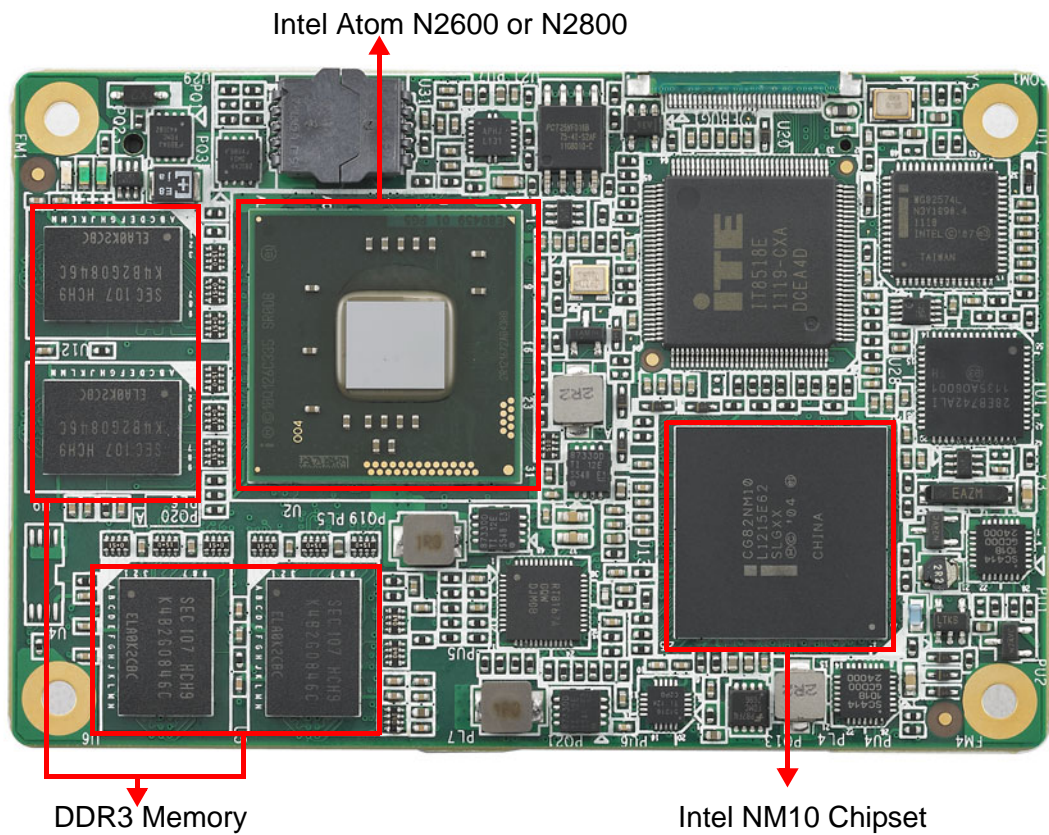


Figure 2.1 Board chips identify - Front

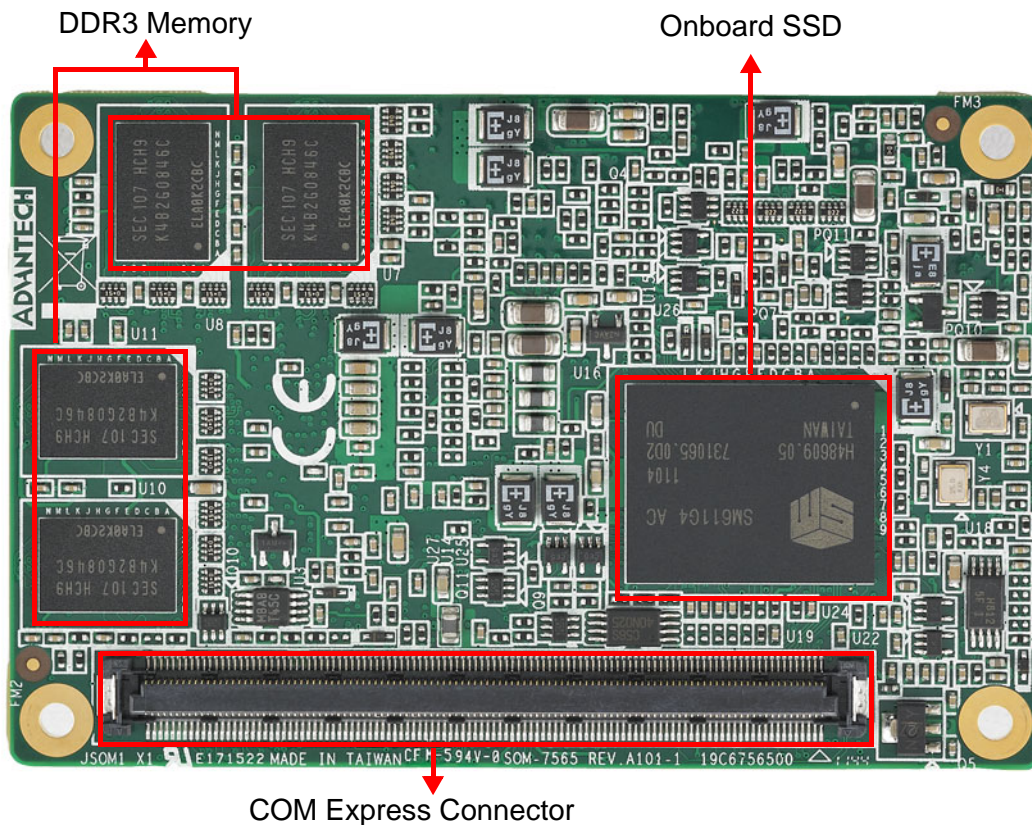


Figure 2.2 Board chips identify - Back

2.2 Mechanical Drawing

For more detail about 2D/3D models, please find on Advantech COM support service website <http://com.advantech.com>.

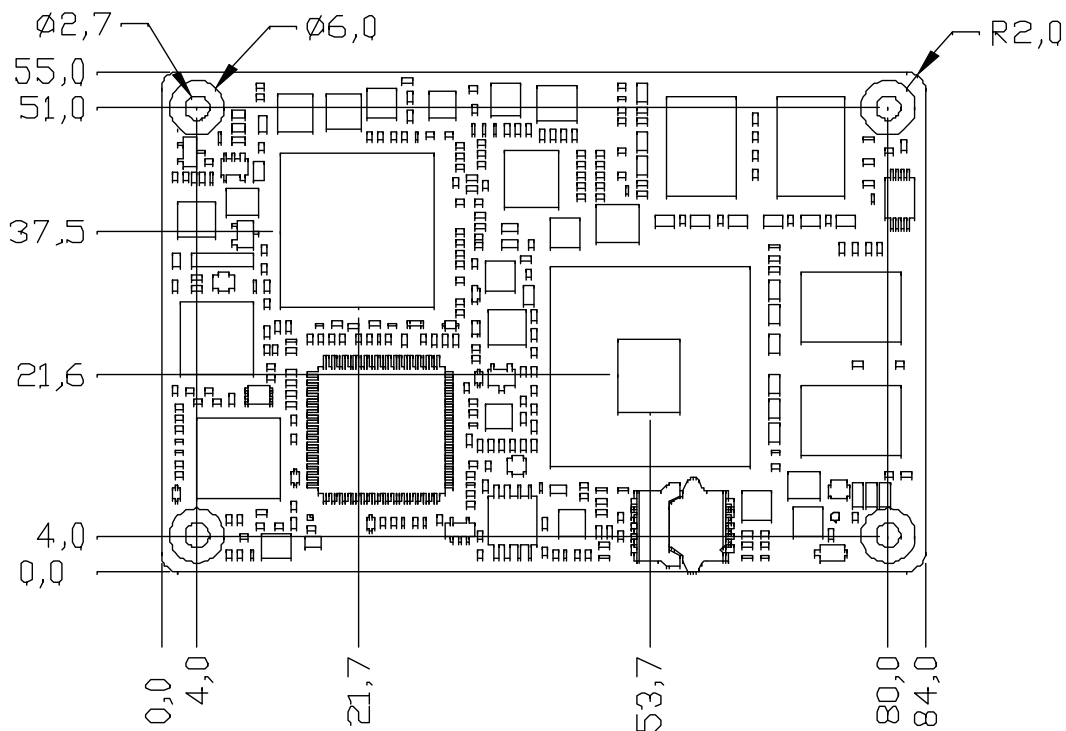


Figure 2.3 Board Mechanical Drawing - Front

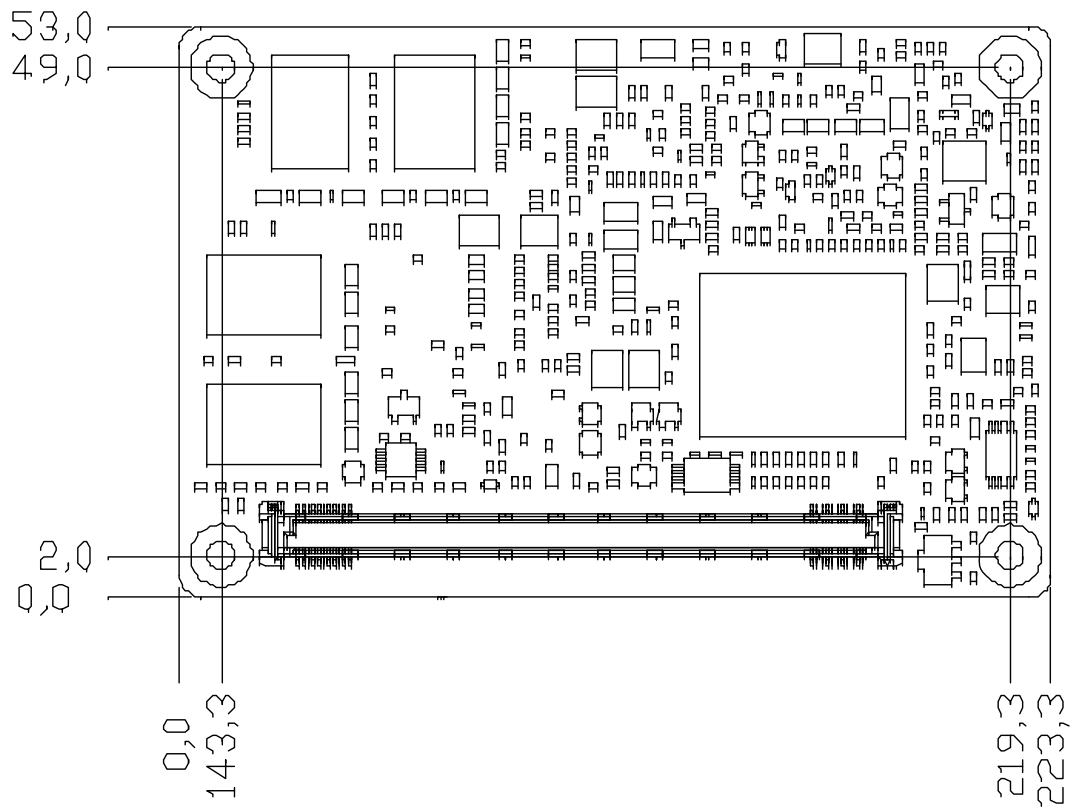


Figure 2.4 Board Mechanical Drawing - Back

Chapter 3

BIOS

Sections include:

- Entering Setup
- Hot/Operation key
- Exit BIOS Setup Utility

AMI BIOS has been integrated into many motherboards for over a decade. With the AMI BIOS Setup Utility, users can modify BIOS settings and control various system features. This chapter describes the basic navigation of the BIOS Setup Utility.



Figure 3.1 BIOS Setup Utility Main Screen

AMI BIOS ROM has a built-in BIOS Setup Utility that allows users to modify the basic system configuration. This information is stored in flash ROM so it retains the Setup information when the power is turned off.

3.1 Entering Setup

Turn on the computer and then press <F2> or to enter BIOS Setup Utility.

3.2 Hot / Operation key

When users first enter the BIOS Setup Utility, users will enter the Main setup screen. Users can always hot operation key to configure item setting.

3.2.1 Left / Right Key

Use these keys to switch sub-page or tab.

3.2.2 ESC key

Use this key to return previous page or exit this page.

3.2.3 Enter Key

Use this key to enter sub-page or change this item options.

3.2.4 + / - key

Use this key to switch item option.

3.2.5 F1 key

Use this key to display the help txt of this item.

3.2.6 F2 key

Use this key to load previous all of item setting.

3.2.7 F3 key

Use this key to load default setting all of items.

3.2.8 F4 key

Use this key to save and exit BIOS Setup Utility..

3.3 Exit BIOS Setup Utility

Switch the Exit tab of BIOS Setup Utility and select "Save changes and Exit". The system would be restart or boot up continue. There are several exit methods let user selected. Or use F4 key to exit BIOS Setup Utility.

Chapter 4

S/W Introduction & Installation

Sections include:

- S/W Introduction
- Driver Installation
- Advantech iManger

4.1 S/W Introduction

The mission of Advantech Embedded Software Services is to “Enhance quality of life with Advantech platforms and Microsoft Windows embedded technology.” We enable Windows Embedded software products on Advantech platforms to more effectively support the embedded computing community. Customers are freed from the hassle of dealing with multiple vendors (Hardware suppliers, System integrators, Embedded OS distributor) for projects. Our goal is to make Windows Embedded Software solutions easily and widely available to the embedded computing community.

4.2 Driver Installation

The Intel Chipset Software Installation (CSI) utility installs the Windows INF files that outline to the operating system how the chipset components will be configured.

4.2.1 Windows XP / Windows 7 Driver Setup

To install the drivers please connect to internet and browse the website <http://support.advantech.com.tw> and download the drivers that you want to install and follow Driver Setup instructions to complete the installation.

4.2.2 Other OS

To install the drivers for Other Windows OS or Linux, please connect to internet and browse the website <http://support.advantech.com.tw> to download the setup file.

4.3 Advantech iManager

Advantech's platforms come equipped with iManager, a micro controller that provides embedded features for system integrators. Embedded features have been moved from the OS/BIOS level to the board level, to increase reliability and simplify integration. iManager runs whether the operating system is running or not; it can count the boot times and running hours of the device, monitor device health, and provide an advanced watchdog to handle errors just as they happen. iManager also comes with a secure & encrypted EEPROM for storing important security key or other customer define information. All the embedded functions are configured through API and provide corresponding utilities to demonstrate. These APIs comply with PICMG EAPI (Embedded Application Programmable Interface) specification and unify in the same structures. It makes these embedded features easier to integrate, speed up developing schedule, and provide the customer's software continuity while upgrade hardware. More detail of how to use the APIs and utilities, please refer to Advantech iManager 2.0 Software API User Manual.

Control**GPIO**

General Purpose Input/Output is a flexible parallel interface that allows a variety of custom connections. It allows users to monitor the level of signal input or set the output status to switch on/off a device. Our API also provides Programmable GPIO, which allows developers to dynamically set the GPIO input or output status.

**SMBus**

SMBus is the System Management Bus defined by Intel® Corporation in 1995. It is used in personal computers and servers for low-speed system management communications. The SMBus API allows a developer to interface an embedded system environment and transfer serial messages using the SMBus protocols, allowing multiple simultaneous device control.

**I2C**

I2C is a bi-directional two wire bus that was developed by Philips for use in their televisions in the 1980s. The I2C API allows a developer to interface with an embedded system environment and transfer serial messages using the I2C protocols, allowing multiple simultaneous device control.

Display**Brightness Control**

The Brightness Control API allows a developer to interface with an embedded device to easily control brightness.

**Backlight**

The Backlight API allows a developer to control the backlight (screen) on/off in an embedded device.

Monitor**Watchdog**

A watchdog timer (WDT) is a device that performs a specific operation after a certain period of time if something goes wrong and the system does not recover on its own. A watchdog timer can be programmed to perform a warm boot (restarting the system) after a certain number of seconds.

**Hardware Monitor**

The Hardware Monitor (HWM) API is a system health supervision API that inspects certain condition indexes, such as fan speed, temperature and voltage.

**Hardware Control**

The Hardware Control API allows developers to set the PWM (Pulse Width Modulation) value to adjust fan speed or other devices; it can also be used to adjust the LCD brightness.

Power Saving**CPU Speed**

Make use of Intel SpeedStep technology to reduce power power consumption. The system will automatically adjust the CPU Speed depending on system loading.

**System Throttling**

Refers to a series of methods for reducing power consumption in computers by lowering the clock frequency. These APIs allow the user to lower the clock from 87.5% to 12.5%.

Appendix **A**

Watchdog Timer

This appendix gives you the information about the watchdog timer programming on the SOM-7565 A2 CPU System on Module

Sections include:

- Watchdog Timer Programming

A.1 Programming the Watchdog Timer

Trigger Event	Note
IRQ	IRQ5, 7, 14 (default disable) IRQ can be set in BIOS
NMI	N/A
SCI	Power button event
Power Off	Support
H/W Restart	Support
External WDT	N/A

For details, please refer to iManager & Software API User Manual:

Appendix **B**

Programming GPIO

This Appendix gives the illustration of the General Purpose Input and Output pin setting.

Sections include:

- System I/O ports

B.1 GPIO Register

GPIO Byte Mapping	H/W Pin Name
BIT0	GPO0
BIT1	GPO1
BIT2	GPO2
BIT3	GPO3
BIT4	GPI0
BIT5	GPI1
BIT6	GPI2
BIT7	GPI3

For details, please refer to iManager & Software API User Manual

Appendix **C**

System Assignments

This appendix gives you the information about the system resource allocation on the SOM-7565 A2 CPU System on Module.

Sections include:

- System I/O ports
- DMA Channel Assignments
- Interrupt Assignments
- 1st MB Memory Map

C.1 System I/O Ports

Table C.1: System I/O ports

Addr.range(Hex)	Device
0000 - 000F	Direct memory access controller
0000 - 0CF7	PCI bus
0010 - 001F	Motherboard resources
0020 - 0021	Programmable interrupt controller
0022 - 003F	Motherboard resources
0040 - 0043	System timer
0044 - 005F	Motherboard resources
0060 - 0060	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
0061 - 0061	System speaker
0062 - 0062	Microsoft ACPI-Compliant Embedded Controller
0063 - 0063	Motherboard resources
0064 - 0064	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
0065 - 0065	Motherboard resources
0066 - 0066	Microsoft ACPI-Compliant Embedded Controller
0067 - 006F	Motherboard resources
0070 - 0071	System CMOS/real time clock
0072 - 007F	Motherboard resources
0080 - 0080	Motherboard resources
0081 - 0083	Direct memory access controller
0084 - 0086	Motherboard resources
0087 - 0087	Direct memory access controller
0088 - 0088	Motherboard resources
0089 - 008B	Direct memory access controller
008C - 008E	Motherboard resources
008F - 008F	Direct memory access controller
0090 - 009F	Motherboard resources
00A0 - 00A1	Programmable interrupt controller
00A2 - 00BF	Motherboard resources
00C0 - 00DF	Direct memory access controller
00E0 - 00EF	Motherboard resources
00F0 - 00FF	Numeric data processor
01F0 - 01F7	Primary IDE Channel
0274 - 0277	ISAPNP Read Data Port
0279 - 0279	ISAPNP Read Data Port
0378 - 037F	Parallel port (LPT1) N455 CPU only
03B0 - 03BB	Intel(R) Graphic Media Accelerator 3150
03C0 - 03DF	Intel(R) Graphic Media Accelerator 3150
03F6 - 03F6	Primary IDE Channel
03F8 - 03FF	Communications Port (COM1)
0400 - 041F	Intel(R) ICH8 Family SMBus Controller ©C 283E
04D0 - 04D1	Motherboard resources
0500 - 053F	Motherboard resources
0800 - 087F	Motherboard resources

Table C.1: System I/O ports

0A00 - 0A0F	Motherboard resources
0A79 - 0A79	ISAPNP Read Data Port
0D00 - FFFF	PCI bus
D080 - D087	Intel(R) Graphic Media Accelerator 3150
D400 - D41F	Intel 82567V-3 Gigabit Network Connection
D480 - D49F	Standard Universal PCI to USB Host Controller
D800 - D81F	Intel ICH8 Family USB Universal Host Controller - 2832
D880 - D89F	Intel ICH8 Family USB Universal Host Controller - 2831
DC00 - DC1F	Intel ICH8 Family USB Universal Host Controller - 2830
E080 - E08F	Intel ICH8M 3 port Serial ATA Storage Controller - 2828
E400 - E40F	Intel ICH8M 3 port Serial ATA Storage Controller - 2828
E480 - E483	Intel ICH8M 3 port Serial ATA Storage Controller - 2828
E800 - E807	Intel ICH8M 3 port Serial ATA Storage Controller - 2828
E880 - E883	Intel ICH8M 3 port Serial ATA Storage Controller - 2828
EC00 - EC07	Intel ICH8M 3 port Serial ATA Storage Controller - 2828
FFA0 - FFAF	Intel ICH8M Ultra ATA Storage Controller - 2850

C.2 DMA Channel Assignments

Table C.2: DMA channel assignments

Channel	Function
0	Available
1	Available
2	Available
3	Available
4	Direct memory access controller
5	Available
6	Available
7	Available

C.3 Interrupt Assignments

Table C.3: Interrupt assignments

Interrupt#	Interrupt source
NMI	Parity error detected
IRQ 0	System timer
IRQ 1	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
IRQ2	Available
IRQ3	Available
IRQ 4	Communications Port (COM1)
IRQ 5	Available
IRQ 6	Available
IRQ 7	Available
IRQ 8	System CMOS/real time clock

Table C.3: Interrupt assignments

IRQ 9	Microsoft ACPI-Compliant System
IRQ 10	Available
IRQ 11	Available
IRQ 12	PS/2 Compatible Mouse
IRQ 13	Numeric data processor
IRQ 14	Primary IDE Channel
IRQ 15	Available
IRQ 16	Intel(R) Graphic Media Accelerator 3150
IRQ 16	Standard Universal PCI to USB Host Controller
IRQ 18	Intel(R) ICH8 Family USB Universal Host Controller - 2832*
IRQ 18	Intel(R) ICH8M 3 port Serial ATA Host Controller - 2828
IRQ 19	Intel(R) ICH8 Family USB Universal Host Controller - 2831*
IRQ 21	Microsoft UAA Bus Driver for High Definition Audio
IRQ 23	Intel(R) 82567V-3 Gigabit Network Connection*
IRQ 23	Intel ICH8 Family USB Universal Host Controller - 2830*
IRQ 23	Intel ICH8 Family USB2 Universal Host Controller - 2836*

*USB and Ethernet IRQ is automatically set by the system.

C.4 1st MB Memory Map

Table C.4: 1st MB memory map

Addr. range (Hex)	Device
00000000 - 0009FFFF	System board
000A0000 - 000BFFFF	Intel(R) Graphic Media Accelerator 3150
000A0000 - 000BFFFF	PCI Bus
000C0000 - 000CFFFF	System board
000D0000 - 000DFFFF	PCI bus
000E0000 - 000FFFFF	System board
00100000 - 7F6FFFFF	System board
7F700000 - DFFFFFFF	PCI Bus
D0000000 - DFFFFFFF	Intel(R) Graphic Media Accelerator 3150
E0000000 - EFFFFFFF	Motherboard resource
F0000000 - FED8FFFF	PCI Bus
FE980000 - FE9FFFFF	Intel(R) Graphic Media Accelerator 3150
FEA00000 - FEAFFFFF	Intel(R) Graphic Media Accelerator 3150
FEB00000 - FEB7FFFF	Intel(R) Graphic Media Accelerator 3150
FEB80000 - FEBBFFFF	Intel 82567V-3 Gigabit Network Connection
FEB80000 - FEBBFFFF	Microsoft UAA Bus Driver for High Definition Audio
FEB80000 - FEBBFFFF	Intel 82567V-3 Gigabit Network Connection
FEB80000 - FEBBFFFF	Intel ICH8 Family USB2 Enhanced Host Controller - 2836
FEB80000 - FEBBFFFF	Intel ICH8 Family SMBus Controller @C 283E
FEC00000 - FEC0FFFF	Motherboard resources
FED00000 - FED003FF	HPET (High Precision Event Timer)
FED14000 - FED19FFF	System board
FED1C000 - FED1FFFF	Motherboard resources

Table C.4: 1st MB memory map

FED20000 - FED3FFFF	Motherboard resources
FED40000 - FED8FFFF	Motherboard resources
FED90000 - FED93FFF	System board
FED90000 - FFFFFFFF	System board
FEE00000 - FEE00FFF	Motherboard resources
FFB00000 - FFBFFFFFF	Intel 82802 Firmware Hub Device
FFC00000 - FFEFFFFFF	Motherboard resources
FFF00000 - FFFFFFFF	Intel 82802 Firmware Hub Device