EPIC-9456

Intel® Core™ 2 Duo/

Core™ Duo/ Celeron® M Processor

DDR2 SODIMM (400/533/667MHz)

Up to 24-bit Dual-channel LVDS TFT LCD

8 USB 2.0 / 5 COMs / 1 IDE/

2 SATAII/ 1 LPT/ Digital I/O

EPIC-9456 Manual Rev.A 3rd Ed.

August 2010

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Packing List

Before you begin installing your card, please make sure that the following materials have been shipped:

- 1　9657666600　Jumper Cap
- 1　9681945600　Cable Kit for EPIC-9456
- 1　Cooler
- 1　EPIC-9456 CPU Card
- 1　Quick Installation Guide
- 1　CD-ROM for manual (in PDF format) and drivers

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

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Chapter

1

General Information

1.1 Introduction

AAEON announces the first EPIC Express Board-EPIC-9456, designed to fit in diverse applications that demand for fitting in different space limitations and high performance.

EPIC-9456 accommodates socket 478-based Intel® Core™ 2 Duo/ Core™ Duo/ Celeron® M (65nm) processor that is up to 2.16GHz and the Front Side Bus is 533/667MHz. This model features 200-pin DDR2 SODIMM and system memory is up to 2GB. Moreover, EPIC-9456 adopts Intel® 945GME + ICH7M as its chipset.

In addition, EPIC-9456 deploys Intel® 82573L 10/100/1000Base-TX chip and features two RJ-45 ports onboard to display the transcendent performance of network connections. This new EPIC Express Board configures an Intel® 945GME integrated graphics display chipset to support CRT/LCD, CRT/DVI, CRT/TV, simultaneous/ dual view displays.

In addition to the PCI-104 expansion, EPIC-9456 also features one EIDE, two SATA, one Type II CompactFlash for the storage and eight USB 2.0 ports, five COM ports, 8-bit Digital I/O for flexible I/O expansion. EPIC-9456 is an excellent choice for your vital applications.

1.2 Features

- Intel$^®$ Core^{TM} 2 Duo/ Core^{TM} Duo/ Celeron$^®$ M (65nm) Processor
- Intel$^®$ 945GME + ICH7M
- SODIMM DDR2 400/533/667 Max.2GB
- Gigabit Ethernet x 2
- Up to 24-bit Dual-channel LVDS, CRT, TV-out, DVI
- AC97 2.3 3D Surround 5.1CH Audio
- Type II CompactFlash x 1, EIDE x 1, SATA x 2
- Parallel x 1, COM x 5, USB2.0 x 8, 8-bit Digital I/O
- PCI-104 Expansion Interface
- +12V Only Operation

1.3 Specifications

System

- CPU — Supports Intel® Core™ 2 Duo/ Core™ Duo/ Celeron® M (Yonah) processors up to 2.16GHz, FSB: 533/667MHz
- System Memory — 200-pin DDR2 SODIMM x 1, max. 2GB (DDR2 400/533/667MHz)
- Chipset — Intel® 945GME + ICH7M
- I/O Chipset — IT8712F-KX + Fintek F81216DG
- Ethernet — Intel® 82573L, 10/100/1000Base-TX, RJ-45 x 2
- BIOS — Award Plug & Play BIOS – 1 MB ROM
- Wake On LAN — Yes
- Watchdog Timer — Generates a time-out system reset
- H/W status monitoring — Supports power supply voltage, fan speed and temperature monitoring
- Expansion Interface — PCI-104
- Battery — Lithium battery
- Power Requirement — +12V, AT/ATX
- Power Consumption (Typical) — Intel® Core™ 2 Duo T7400 2.16 GHz, DDR2 667 2GB,

Chapter 1 General Information 1- 4

EPIC Board	EPIC-9456

3.02A @ +12V

- Operating Temperature 32°F~140°F (0°C~60°C)
- Storage Temperature -40°F~176°F (-40°C~80°C)
- Operating Humidity 0%~90% relative humidity, non-condensing
- Board Size 4.53"(L) x 6.5" (W) (115mm x 165mm)
- Gross Weight 1.2 lb (0.5kg)

Display: Support: CRT/LCD, CRT/DVI, CRT/TV, simultaneous/ dual view displays

- Chipset Intel® 945GME integrated graphics + CH7307 + CH7308
- Memory Shared system memory up to 224MB w/ DVMT3.0
- Resolutions Up to 2048 x 1536 for CRT; Up to 1600x1200 @ 24-bit for LCD; 1600x1200 for DVI
- LCD Interface Up to 24-bit dual-channel LVDS TFT LCD
- TV-Out Supports NTSC/PAL, S-terminal and Composite Video
- DVI DVI-I x 1

I/O

- Storage   EIDE x 1 (UDMA100 for two
                             devices), SATA x 2, Type II
                             CompactFlash x 1
- Serial Port   RS-232 x 3, TTL only/ GPS x 1,
                             RS-232/422/485 x 1
- Parallel Port   SPP/ EPP/ ECP mode
- USB   USB 2.0 x 8
- PS/2 Port   Keyboard X 1, Mouse x 1
- Digital I/O   Supports 8-bit (Programmable)
- Audio   MIC-in, Line-in, Line-out, CD-in,
                             S/P DIF in/out, 5.1CH, Low
                             frequency effect out

Chapter

2

Quick Installation Guide

Notice:
The Quick Installation Guide is derived from Chapter 2 of user manual. For other chapters and further installation instructions, please refer to the user manual CD-ROM that came with the product.

OZONE SAFE

RECYCLABLE

2.1 Safety Precautions

Warning!   *Always completely disconnect the power cord from your board whenever you are working on it. Do not make connections while the power is on, because a sudden rush of power can damage sensitive electronic components.*

Caution!   *Always ground yourself to remove any static charge before touching the board. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis*

2.2 Location of Connectors and Jumpers

Component Side

Solder Side

CN10

DIMM1
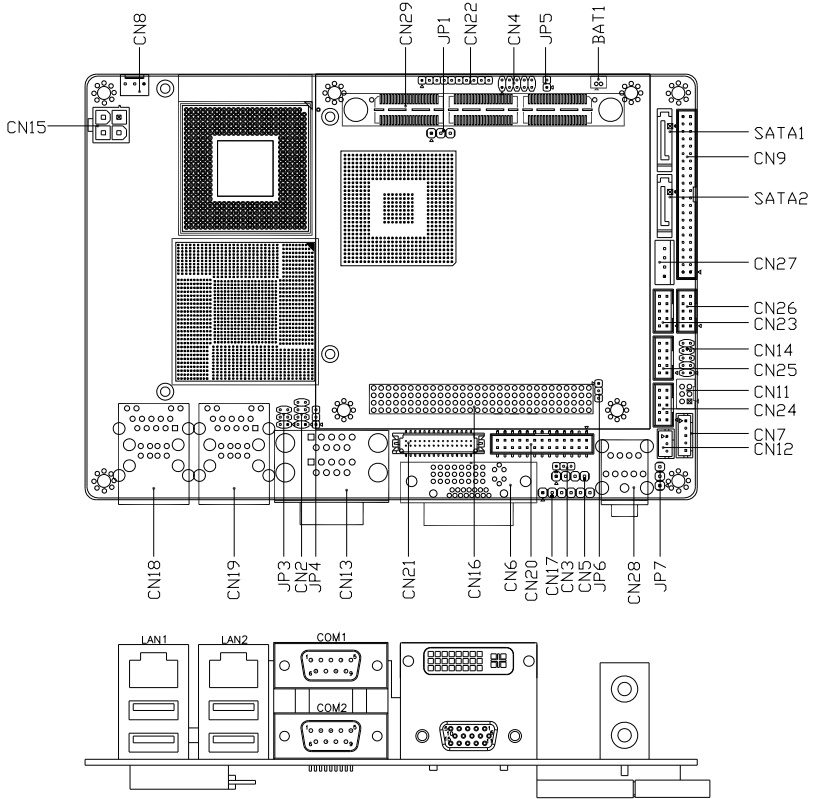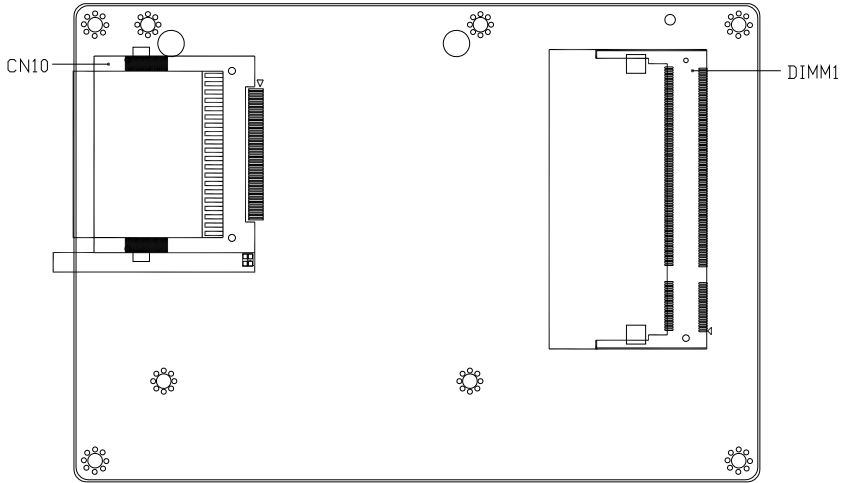
2.3 Mechanical Drawing

Component Side

Cooling System Height

Solder Side

121.92

12.70

93.74

96.26

53.58

29.47

0.00

0.00
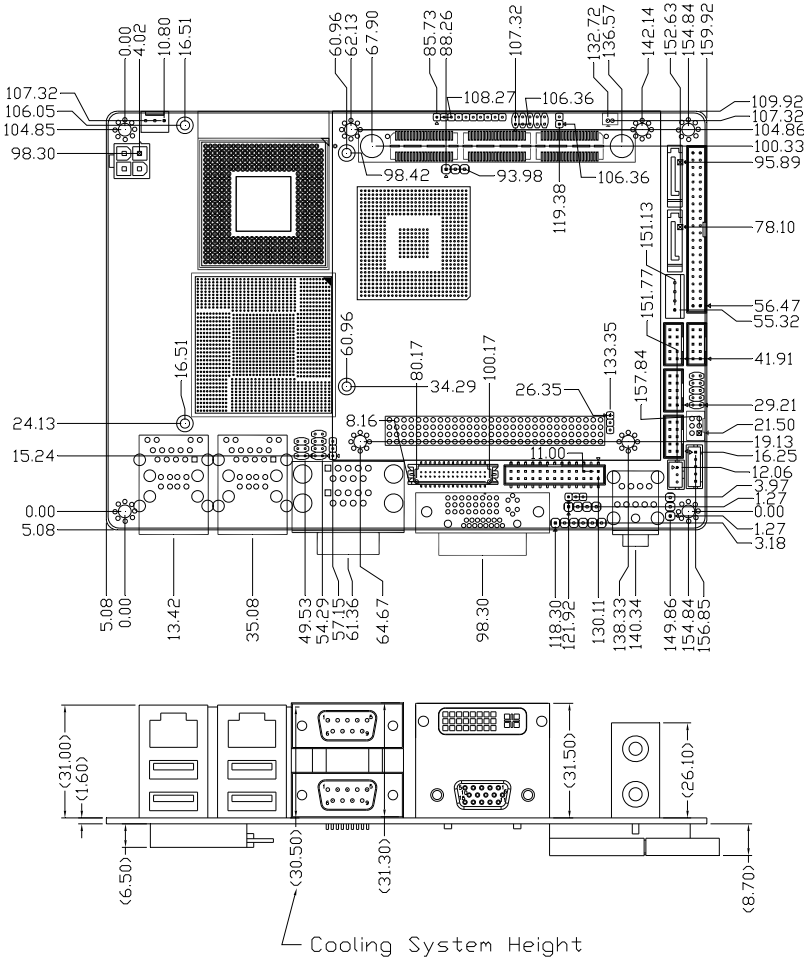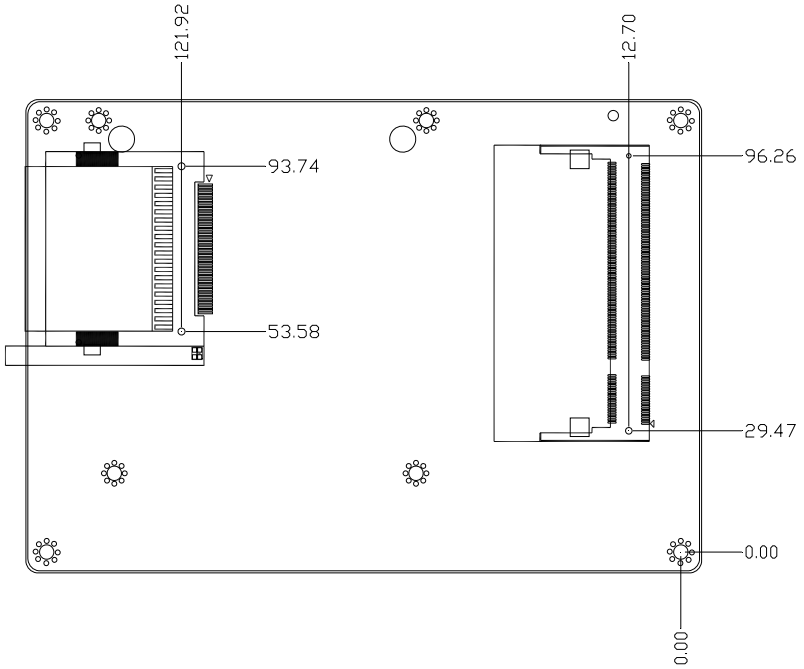
2.4 List of Jumpers

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

The table below shows the function of each of the board's jumpers:

Jumpers

Label	Function
JP1	Clear CMOS
JP3	COM2 Ring/+5V/+12V Selection
JP4	LVDS Operating Voltage Selection
JP5	AT Simulates ATX
JP6	PCI-104 Signaling Voltage Selection
JP7	LCD Inverter Power Selection

2.5 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:

Connectors

Label	Function
CN2	TV-out Connector
CN3	Audio Connector (Line-in)
CN4	Digital I/O Connector
CN5	Audio Connector (CD-in)
CN6	VGA + DVI-I Display Connectors
CN7	LCD Inverter Power Connector
CN8	CPU Fan Connector
CN9	Primary EIDE Connector
CN10	CompactFlash Slot
CN11	Keyboard/Mouse Connector
CN12	SPDIF Connector
CN13	COM1 RS-232 & COM2 RS-232/422/485 Serial Port Connector
CN14	Front Panel Connector
CN15	AT Power Connector
CN16	PCI-104 Connector
CN17	Audio Connector (Surround)

EPIC Board	EPIC-9456
CN18	Ethernet and USB Connectors
CN19	Ethernet and USB Connectors
CN20	LPT port Connector
CN21	LVDS Connector
CN22	COM5 RS-232 Serial Port/ GPS Connector
CN23	COM4 RS-232 Serial Port Connector
CN24	USB5& USB6 Connectors
CN25	USB7& USB8 Connectors
CN26	COM3 RS-232 Serial Port Connector
CN27	Power Output Connector
CN28	Audio Connector (Line-out, Microphone)
CN29	EPIC-Express Connector (Optional)

2.6 Setting Jumpers

You configure your card to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch. 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.

Open   **Closed**   **Closed 2-3**
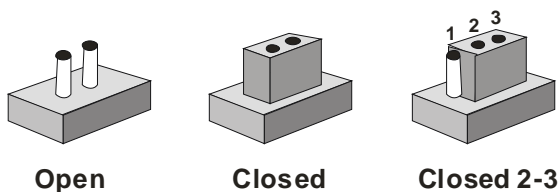
A pair of needle-nose pliers may be helpful when working with jumpers.

If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any change.

Generally, you simply need a standard cable to make most connections.

2.7 Clear CMOS (JP1)

JP1	Function
1-2	Protected (Default)
2-3	Clear

2.8 COM2 Ring/+5V/+12V Selection (JP3)

JP3	Function
1-2	+12V
3-4	+5V
5-6	Ring (Default)

Note: The Pin 9 feature of COM2 (inferior of CN13) is selected by jumper.

2.9 LVDS Operating Voltage Selection (JP4)

JP4	Function
1-2	+5V
2-3	+3.3V (Default)

2.10 AT Simulates ATX (JP5)

JP5	Function
1-2	AT (Default)
Open	ATX

2.11 PCI-104 Signaling Voltage Selection (JP6)

JP6	Function
1-2	+5V
2-3	+3.3V (Default)

2.12 LCD Inverter Power Selection (JP7)

JP7	Function
1-2	+5V (Default)
2-3	+12V

2.13 TV-out Connector (CN2)

Pin	Signal	Pin	Signal
1	Y	2	CVBS
3	GND	4	GND
5	C	6	N.C
7	GND	8	N.C

2.14 Audio Connector (Line-in) (CN3)

Pin	Signal	Pin	Signal
1	LINE_IN_RIGHT	2	GND
3	LINE_IN_LEFT		

2.15 Digital I/O Connector (CN4)

Pin	Signal	Pin	Signal
1	DIO1-1	2	DIO1-2
3	DIO1-3	4	DIO1-4
5	DIO1-5	6	DIO1-6
7	DIO1-7	8	DIO1-8
9	+5V	10	GND

The pin definitions and registers mapping are illustrated below:

Address: **801H**

BIOS Setting	Connector Definition	Address	IT8712F/ KX GPIO Setting
DIO1-1	CN4 Pin1	Bit0	U8 Pin27 (GPIO20)
DIO1-2	CN4 Pin2	Bit1	U8 Pin26 (GPIO21)
DIO1-3	CN4 Pin3	Bit2	U8 Pin25 (GPIO22)
DIO1-4	CN4 Pin4	Bit3	U8 Pin24 (GPIO23)
DIO1-5	CN4 Pin5	Bit4	U8 Pin23 (GPIO24)
DIO1-6	CN4 Pin6	Bit5	U8 Pin22 (GPIO25)
DIO1-7	CN4 Pin7	Bit6	U8 Pin21 (GPIO26)
DIO1-8	CN4 Pin8	Bit7	U8 Pin20 (GPIO27)

2.16 Audio Connector (CD-in) (CN5)

Pin	Name	Pin	Name
1	CD_IN_L	2	CD_GND
3	CD_GND	4	CD_IN_R

2.17 LCD Inverter Power Connector (CN7)

Pin	Signal	Pin	Signal
1	LCD Inverter power	2	Backlight Control
3	GND	4	GND
5	Backlight Enable	6	N.C.

2.18 CPU FAN Connector (CN8)

Pin	Signal
1	GND

2	+12V
3	Fan Tachometer

2.19 Primary EIDE Connector (CN9)

Pin	Signal	Pin	Signal
1	IDE RESET	2	GND
3	DATA7	4	DATA8
5	DATA6	6	DATA9
7	DATA5	8	DATA10
9	DATA4	10	DATA11
11	DATA3	12	DATA12
13	DATA2	14	DATA13
15	DATA1	16	DATA14
17	DATA0	18	DATA15
19	GND	20	N.C
21	REQ	22	GND
23	IO WRITE	24	GND
25	IO READ	26	GND
27	IO READY	28	GND
29	DACK	30	GND
31	IRQ14	32	N.C
33	ADDR1	34	UDMA DETECT
35	ADDR0	36	ADDR2
37	CS#1	38	CS#3
39	LED	40	GND
41	+5V	42	+5V
43	GND	44	N.C

2.20 Keyboard/ Mouse Connector (CN11)

Pin	Signal	Pin	Signal
1	KB_DATA	2	KB_CLK
3	GND	4	+5V
5	MS_DATA	6	MS_CLK

2.21 S/PDIF Connector (CN12)

Pin	Signal	Pin	Signal
1	SPDIF-OUT	2	GND
3	SPDIF-IN		

2.22 COM2 RS-232/422/485 Serial Port Connector (Inferior of CN13)
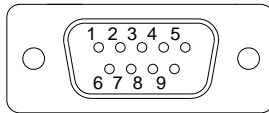
Pin	Signal	Pin	Signal
1	DCD (422TXD-/485DATA-)	2	RXD (422RXD+)
3	TXD (422TXD+/485DATA+)	4	DTR (422RXD-)
5	GND	6	DSR
7	RTS	8	CTS
9	RI/ +5V/ +12V	10	N.C.

2.23 Front Panel Connector (CN14)

Pin	Signal	Pin	Signal
1	Power On Button (-)	2	Power On Button (+)
3	IDE LED (-)	4	IDE LED (+)

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EPIC Board		EPIC-9456	
5	External Buzzer (-)	6	External Buzzer (+)
7	Power LED (-)	8	Power LED (+)
9	Reset Switch (-)	10	Reset Switch (+)

2.24 AT Power Connector (CN15)

Pin	Signal	Pin	Signal
1	GND	2	GND
3	+12V_DUAL	4	+12V_DUAL

2.25 Audio Connector (Surround) (CN17)

Pin	Signal	Pin	Signal
1	SURROUND-R	2	SURROUND-L
3	GND	4	GND
5	LFEOUT	6	CENOUT

2.26 LPT Port Connector (CN20)

Pin	Signal	Pin	Signal
1	#STROBE	2	#AFD
3	DATA0	4	#ERROR
5	DATA1	6	#INIT
7	DATA2	8	#SLIN
9	DATA3	10	GND
11	DATA4	12	GND
13	DATA5	14	GND
15	DATA6	16	GND
17	DATA7	18	GND
19	#ACK	20	GND
21	BUSY	22	GND

23	PE	24	GND
25	SELECT	26	N.C

2.27 LVDS Connector (CN21)

Pin	Signal	Pin	Signal
1	ENBKL	2	N.C
3	PPVCC	4	GND
5	CH1_LVDS_TXCLK-	6	CH1_LVDS_TXCLK+
7	PPVCC	8	GND
9	CH1_LVDS_TX0-	10	CH1_LVDS_TX0+
11	CH1_LVDS_TX1-	12	CH1_LVDS_TX1+
13	CH1_LVDS_TX2-	14	CH1_LVDS_TX2+
15	CH1_LVDS_TX3-	16	CH1_LVDS_TX3+
17	Serial port data	18	Serial port clock
19	CH2_LVDS_TX0-	20	CH2_LVDS_TX0+
21	CH2_LVDS_TX1-	22	CH2_LVDS_TX1+
23	CH2_LVDS_TX2-	24	CH2_LVDS_TX2+
25	CH2_LVDS_TX3-	26	CH2_LVDS_TX3+
27	PPVCC	28	GND
29	CH2_LVDS_TXCLK-	30	CH2_LVDS_TXCLK+

2.28 COM5 RS-232 Serial Port/ GPS Connector (CN22)

Pin	Signal	Pin	Signal
1	TP	2	TP
3	GPSGND	4	GPS_LED
5	RXD	6	TXD
7	GPSVCC	8	VCC
9	GPS_RST#	10	GPSGND

2.29 COM4 RS-232 Serial Port Connector (CN23)

Pin	Signal	Pin	Signal
1	DCD	2	RXD
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI	10	N.C

2.30 USB5 & USB6 Connector (CN24)

Pin	Signal	Pin	Signal
1	+5V	2	GND
3	USBD4-	4	GND
5	USBD4+	6	USBD5+
7	GND	8	USBD5-
9	GND	10	+5V

2.31 USB7 & USB8 Connector (CN25)

Pin	Signal	Pin	Signal
1	+5V	2	GND
3	USBD6-	4	GND
5	USBD6+	6	USBD7+
7	GND	8	USBD7-
9	GND	10	+5V

2.32 COM3 RS-232 Serial Port Connector (CN26)

Pin	Signal	Pin	Signal
1	DCD	2	RXD
3	TXD	4	DTR

EPIC Board		EPIC-9456	
5	GND	6	DSR
7	RTS	8	CTS
9	RI	10	N.C

2.33 Power Output Connector (CN27)

Pin	Signal	Pin	Signal
1	+12V	2	GND
3	GND	4	+5V

Note:

Current capacity of +5V is 2 amp.

Current capacity of +12V is 2 amp.

Below Table for China RoHS Requirements
产品中有毒有害物质或元素名称及含量
AAEON Main Board/ Daughter Board/ Backplane

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	×	○	○	○	○	○

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。

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。

备注：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。

Chapter

3

Award 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. Non-fatal error messages usually appear on the screen along with the following instructions:

　　　Press <F1> to RESUME

Write down the message and press the F1 key to continue the boot up sequence.

System configuration verification

These routines check the current system configuration against the values stored in the CMOS memory. If they do not match, the program outputs an error message. You will then need to run the BIOS setup program to set the configuration information in memory.

There are three situations in which you will need to change the CMOS settings:

1.   You are starting your system for the first time

2.   You have changed the hardware attached to your system

3.   The CMOS memory has lost power and the configuration information has been erased.

The EPIC-9456 CMOS memory has an integral lithium battery backup for data retention. However, you will need to replace the complete unit when it finally runs down.

3.2   Award BIOS Setup

Awards 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 so that it retains the Setup information when the power is turned off.

Entering Setup

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

Standard CMOS Features

Use this menu for basic system configuration. (Date, time, IDE, etc.)

Advanced BIOS Features

Use this menu to set the advanced features available on your system.

Advanced Chipset Features

Use this menu to change the values in the chipset registers and optimize your system performance.

Integrated Peripherals

Use this menu to specify your settings for integrated peripherals. (keyboard, mouse etc.)

Power Management Setup

Use this menu to specify your settings for power management. (HDD power down, power on by ring, KB wake up, etc.)

PnP/PCI Configurations

This entry appears if your system supports PnP/PCI.

PC Health Status

Use this menu to set PC Health Status.

Frequency/Voltage Control

Use this menu to specify your settings for auto detect DIMM/PCI clock and spread spectrum.

Load Optimized Defaults

Use this menu to load the BIOS default values that are factory settings for optimal performance system operations. While AWARD has designated the custom BIOS to maximize performance, the factory has the right to change these defaults to meet their needs.

Set Password

Use this menu to set Supervisor Password.

Save and Exit Setup

Save CMOS value changes to CMOS and exit setup.

Exit Without Saving

Abandon all CMOS value changes and exit setup.

You can refer to the "AAEON BIOS Item Description.pdf" file in the CD for the meaning of each setting in this chapter.

Chapter

4

Driver
Installation

The EPIC-9456 comes with a CD-ROM that contains all drivers and utilities that meet your needs.

Follow the sequence below to install the drivers:

Step 1 – Install Intel® INF Driver

Step 2 – Install Intel® VGA Driver

Step 3 – Install Intel® LAN Driver

Step 4 – Install Realtek Audio Driver

USB 2.0 Drivers are available for download using Windows Update for both Windows XP and Windows 2000. For additional information regarding USB 2.0 support in Windows XP and Windows 2000, please visit www.microsoft.com/hwdev/usb/.

Please read instructions below for further detailed installations.

4.1 Installation:

Insert the EPIC-9456 CD-ROM into the CD-ROM Drive. And install the drivers from Step 1 to Step 4 in order.

Step 1 – Install Intel INF Driver

1. Click on the *Step 1 - Intel INF Driver* folder and then double click on the *Setup.exe*

2. Follow the instructions that the window shows

3. The system will help you install the driver automatically

Step 2 – Install Intel VGA Driver

1. Click on the *Step 2 - Intel VGA Driver* folder and select the OS folder your system is

2. Double click on the *Setup.exe* in the OS folder

3. Follow the instructions that the window shows

4. The system will help you install the driver automatically

Step 3 – Install Intel LAN Driver

1. Click on the *Step 3 - Intel LAN Driver* folder and select the OS folder your system is

2. Double click on the *.exe* file in the OS folder

3. Follow the instructions that the window shows

4. The system will help you install the driver automatically

Step 4 – Install Intel Realtek Audio Driver

1. Click on the *Step 4 – Intel Realtek Audio Driver* folder and select the OS folder your system is

2. Double click on the *Setup.exe* file in the OS folder

3. Follow the instructions that the window shows

4. The system will help you install the driver automatically

Appendix

A

Programming the Watchdog Timer

A.1 Programming

EPIC-9456 utilizes ITE 8712 chipset as its watchdog timer controller.

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

Configuring Sequence Description

After the hardware reset or power-on reset, the ITE 8712 enters the normal mode with all logical devices disabled except KBC. The initial state (enable bit) of this logical device (KBC) is determined by the state of pin 121 (DTR1#) at the falling edge of the system reset during power-on reset.
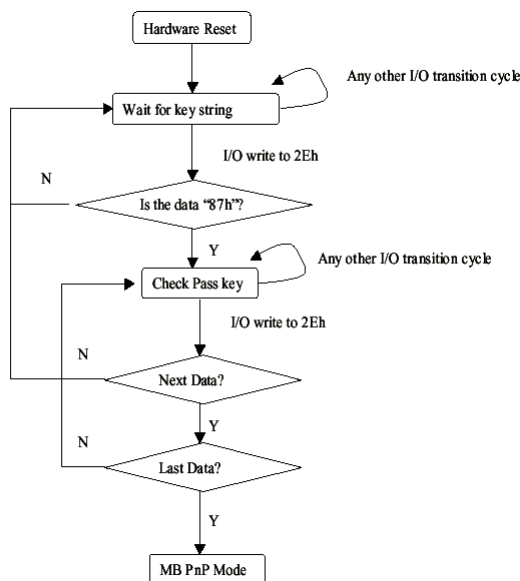
There are three steps to complete the configuration setup: (1) Enter the MB PnP Mode; (2) Modify the data of configuration

registers; (3) Exit the MB PnP Mode. Undesired result may occur if the MB PnP Mode is not exited normally.

(1) Enter the MB PnP Mode

To enter the MB PnP Mode, four special I/O write operations are to be performed during Wait for Key state. To ensure the initial state of the key-check logic, it is necessary to perform four write operations to the Special Address port (2EH). Two different enter keys are provided to select configuration ports (2Eh/2Fh) of the next step.

	Address Port	Data Port
87h, 01h, 55h, 55h:	2Eh	2Fh

(2) Modify the Data of the Registers

All configuration registers can be accessed after entering the MB PnP Mode. Before accessing a selected register, the content of Index 07h must be changed to the LDN to which the register belongs, except some Global registers.

(3) Exit the MB PnP Mode

Set bit 1 of the configure control register (Index=02h) to 1 to exit the MB PnP Mode.

WatchDog Timer Configuration Registers

LDN	Index	R/W	Reset	Configuration Register or Action
All	02H	W	N/A	Configure Control
07H	71H	R/W	00H	WatchDog Timer Control Register
07H	72H	R/W	00H	WatchDog Timer Configuration Register
07H	73H	R/W	00H	WatchDog Timer Time-out Value Register

Configure Control (Index=02h)

This register is write only. Its values are not sticky; that is to say, a hardware reset will automatically clear the bits, and does not require the software to clear them.

Bit	Description
7-2	Reserved
1	Returns to the Wait for Key state. This bit is used when the configuration sequence is completed
0	Resets all logical devices and restores configuration registers to their power-on states.

WatchDog Timer Control Register (Index=71h, Default=00h)

Bit	Description
7	WDT is reset upon a CIR interrupt
6	WDT is reset upon a KBC (mouse) interrupt
5	WDT is reset upon a KBC (keyboard) interrupt
4	WDT is reset upon a read or a write to the Game Port base address
3-2	Reserved
1	Force Time-out. This bit is self-clearing
0	WDT Status
	1: WDT value reaches 0.
	0: WDT value is not 0

WatchDog Timer Configuration Register (Index=72h, Default=00h)

Bit	Description
7	WDT Time-out value select
	1: Second
	0: Minute
6	WDT output through KRST (pulse) enable
5-4	Reserved
3-0	Select the interrupt level[Note] for WDT

WatchDog Timer Time-out Value Register (Index=73h, Default=00h)

Bit	Description
7-0	WDT Time-out value 7-0

A.2 IT8712 Watchdog Timer Initial Program

```
        .MODEL SMALL
        .CODE
Main:
        CALL Enter_Configuration_mode
        CALL Check_Chip
        mov cl, 7
        call Set_Logic_Device
        ;time setting
        mov cl, 10 ; 10 Sec
        dec al
Watch_Dog_Setting:
        ;Timer setting
        mov al, cl
        mov cl, 73h
        call Superio_Set_Reg
        ;Clear by keyboard or mouse interrupt
        mov al, 0f0h
        mov cl, 71h
        call Superio_Set_Reg
        ;unit is second.
        mov al, 0C0H
        mov cl, 72h
        call Superio_Set_Reg
```

```
; game port enable
mov cl, 9
call Set_Logic_Device


Initial_OK:
CALL Exit_Configuration_mode
MOV AH,4Ch
INT 21h


Enter_Configuration_Mode PROC NEAR
MOV SI,WORD PTR CS:[Offset Cfg_Port]


MOV DX,02Eh
MOV CX,04h
Init_1:
MOV AL,BYTE PTR CS:[SI]
OUT DX,AL
INC SI
LOOP Init_1
RET
Enter_Configuration_Mode ENDP


Exit_Configuration_Mode PROC NEAR
MOV AX,0202h
CALL Write_Configuration_Data
```

```
        RET
        Exit_Configuration_Mode ENDP


        Check_Chip PROC NEAR


        MOV AL,20h
        CALL Read_Configuration_Data
        CMP AL,87h
        JNE Not_Initial


        MOV AL,21h
        CALL Read_Configuration_Data
        CMP AL,12h
        JNE Not_Initial


Need_Initial:
        STC
        RET
Not_Initial:
        CLC
        RET
        Check_Chip ENDP
        Read_Configuration_Data PROC NEAR
        MOV DX,WORD PTR CS:[Cfg_Port+04h]
        OUT DX,AL
```

```
MOV DX,WORD PTR CS:[Cfg_Port+06h]
IN AL,DX
RET
Read_Configuration_Data ENDP


Write_Configuration_Data PROC NEAR
MOV DX,WORD PTR CS:[Cfg_Port+04h]
OUT DX,AL
XCHG AL,AH
MOV DX,WORD PTR CS:[Cfg_Port+06h]
OUT DX,AL
RET
Write_Configuration_Data ENDP


Superio_Set_Reg proc near
push ax
MOV DX,WORD PTR CS:[Cfg_Port+04h]
mov al,cl
out dx,al
pop ax
inc dx
out dx,al
ret
Superio_Set_Reg endp.Set_Logic_Device proc near
Set_Logic_Device   proc   near
```

```
        push ax
        push cx
        xchg al,cl
        mov cl,07h
        call Superio_Set_Reg
        pop cx
        pop ax
        ret
        Set_Logic_Device endp


        ;Select 02Eh->Index Port, 02Fh->Data Port
        Cfg_Port DB 087h,001h,055h,055h


        DW 02Eh,02Fh
```

END Main

Note: Interrupt level mapping

0Fh-Dh: not valid

0Ch: IRQ12

.

.

03h: IRQ3

02h: not valid

01h: IRQ1

00h: no interrupt selected

Appendix

B

I/O Information

B.1 I/O Address Map

```
Input/output (IO)
    [00000000 - 0000000F]  Direct memory access controller
    [00000000 - 00000CF7]  PCI bus
    [00000010 - 0000001F]  Motherboard resources
    [00000020 - 00000021]  Programmable interrupt controller
    [00000022 - 0000003F]  Motherboard resources
    [00000040 - 00000043]  System timer
    [00000044 - 0000005F]  Motherboard resources
    [00000060 - 00000060]  Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
    [00000061 - 00000061]  System speaker
    [00000062 - 00000063]  Motherboard resources
    [00000064 - 00000064]  Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
    [00000065 - 0000006F]  Motherboard resources
    [00000070 - 00000073]  System CMOS/real time clock
    [00000074 - 0000007F]  Motherboard resources
    [00000080 - 00000090]  Direct memory access controller
    [00000091 - 00000093]  Motherboard resources
    [00000094 - 0000009F]  Direct memory access controller
    [000000A0 - 000000A1]  Programmable interrupt controller
    [000000A2 - 000000BF]  Motherboard resources
    [000000C0 - 000000DF]  Direct memory access controller
    [000000E0 - 000000EF]  Motherboard resources
    [000000F0 - 000000FF]  Numeric data processor
    [000001F0 - 000001F7]  Primary IDE Channel
    [00000274 - 00000277]  ISAPNP Read Data Port
    [00000279 - 00000279]  ISAPNP Read Data Port
    [00000280 - 00000287]  Communications Port (COM3)
    [00000288 - 0000028F]  Communications Port (COM4)
    [00000290 - 0000029F]  Motherboard resources
    [000002A0 - 000002A7]  Communications Port (COM5)
    [000002F8 - 000002FF]  Communications Port (COM2)
    [00000378 - 0000037F]  Printer Port (LPT1)
    [000003B0 - 000003BB]  Mobile Intel(R) 945 Express Chipset Family
    [000003C0 - 000003DF]  Mobile Intel(R) 945 Express Chipset Family
    [000003F0 - 000003F5]  Standard floppy disk controller
    [000003F6 - 000003F6]  Primary IDE Channel
    [000003F7 - 000003F7]  Standard floppy disk controller
    [000003F8 - 000003FF]  Communications Port (COM1)
    [00000400 - 000004BF]  Motherboard resources
    [000004D0 - 000004D1]  Motherboard resources
    [00000500 - 0000051F]  Intel(R) 82801G (ICH7 Family) SMBus Controller - 27DA
    [00000880 - 0000088F]  Motherboard resources
    [00000A79 - 00000A79]  ISAPNP Read Data Port
    [00000D00 - 0000FFFF]  PCI bus
    [0000B000 - 0000BFFF]  Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D2
    [0000BF00 - 0000BF1F]  Intel(R) PRO/1000 PL Network Connection
    [0000C000 - 0000CFFF]  Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D0
    [0000CF00 - 0000CF1F]  Intel(R) PRO/1000 PL Network Connection #2
    [0000F000 - 0000F0FF]  Realtek AC'97 Audio
    [0000F300 - 0000F30F]  Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
    [0000F400 - 0000F403]  Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
    [0000F500 - 0000F507]  Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
    [0000F600 - 0000F603]  Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
    [0000F700 - 0000F707]  Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
    [0000F800 - 0000F80F]  Intel(R) 82801G (ICH7 Family) Ultra ATA Storage Controllers - 27DF
    [0000FA00 - 0000FA3F]  Realtek AC'97 Audio
    [0000FB00 - 0000FB1F]  Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27CB
    [0000FC00 - 0000FC1F]  Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27CA
    [0000FD00 - 0000FD1F]  Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27C9
    [0000FE00 - 0000FE1F]  Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27C8
    [0000FF00 - 0000FF07]  Mobile Intel(R) 945 Express Chipset Family
```

B.2 1st MB Memory Address Map

```
Memory
   [00000000 - 0009FFFF]  System board
   [000A0000 - 000BFFFF]  Mobile Intel(R) 945 Express Chipset Family
   [000A0000 - 000BFFFF]  PCI bus
   [000C0000 - 000DFFFF]  PCI bus
   [000E0000 - 000EFFFF]  System board
   [000F0000 - 000FFFFF]  System board
   [00100000 - 1F6DFFFF]  System board
   [1F6E0000 - 1F6FFFFF]  System board
   [1F700000 - FEBFFFFF]  PCI bus
   [D0000000 - DFFFFFFF]  Mobile Intel(R) 945 Express Chipset Family
   [E0000000 - EFFFFFFF]  Motherboard resources
   [FD800000 - FD8FFFFF]  Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D2
   [FD900000 - FD9FFFFF]  Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D2
   [FD9E0000 - FD9FFFFF]  Intel(R) PRO/1000 PL Network Connection
   [FDA00000 - FDAFFFFF]  Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D0
   [FDD00000 - FDDFFFFF]  Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D0
   [FDDE0000 - FDDFFFFF]  Intel(R) PRO/1000 PL Network Connection #2
   [FDF00000 - FDF7FFFF]  Mobile Intel(R) 945 Express Chipset Family
   [FDF80000 - FDFBFFFF]  Mobile Intel(R) 945 Express Chipset Family
   [FDFFC000 - FDFFC3FF]  Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
   [FDFFD000 - FDFFD0FF]  Realtek AC'97 Audio
   [FDFFE000 - FDFFE1FF]  Realtek AC'97 Audio
   [FDFFF000 - FDFFF3FF]  Intel(R) 82801G (ICH7 Family) USB2 Enhanced Host Controller - 27CC
   [FEB80000 - FEBFFFFF]  Mobile Intel(R) 945 Express Chipset Family
   [FEC00000 - FEC00FFF]  System board
   [FED13000 - FED1DFFF]  System board
   [FED20000 - FED8FFFF]  System board
   [FEE00000 - FEE00FFF]  System board
   [FFB00000 - FFB7FFFF]  System board
   [FFB80000 - FFBFFFFF]  Intel(R) 82802 Firmware Hub Device
   [FFF00000 - FFFFFFFF]  System board
```

B.3 IRQ Mapping Chart

```
Interrupt request (IRQ)
    (ISA) 0    System timer
    (ISA) 1    Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
    (ISA) 3    Communications Port (COM2)
    (ISA) 4    Communications Port (COM1)
    (ISA) 6    Standard floppy disk controller
    (ISA) 8    System CMOS/real time clock
    (ISA) 9    Microsoft ACPI-Compliant System
    (ISA) 10   Communications Port (COM3)
    (ISA) 10   Communications Port (COM5)
    (ISA) 11   Communications Port (COM4)
    (ISA) 12   PS/2 Compatible Mouse
    (ISA) 13   Numeric data processor
    (ISA) 14   Primary IDE Channel
    (PCI) 15   Intel(R) 82801G (ICH7 Family) SMBus Controller - 27DA
    (PCI) 16   Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D0
    (PCI) 16   Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27CB
    (PCI) 16   Intel(R) PRO/1000 PL Network Connection #2
    (PCI) 16   Mobile Intel(R) 945 Express Chipset Family
    (PCI) 17   Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D2
    (PCI) 17   Intel(R) PRO/1000 PL Network Connection
    (PCI) 17   Realtek AC'97 Audio
    (PCI) 18   Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27CA
    (PCI) 19   Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27C9
    (PCI) 19   Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
    (PCI) 23   Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27C8
    (PCI) 23   Intel(R) 82801G (ICH7 Family) USB2 Enhanced Host Controller - 27CC
```

B.4 DMA Channel Assignments

```
Direct memory access (DMA)
    2    Standard floppy disk controller
    4    Direct memory access controller
```

Appendix

C

Mating Connecotor

C.1 List of Mating Connectors and Cables

The table notes mating connectors and available cables.

Connector Label	Function	Mating Connector		Available Cable	Cable P/N
		Vendor	Model no		
CN2	TV_out Connector	CATCH	2.00mm Pitch 8 pins (CATCH H754-2x4 or compatible)	TV-Out Cable	1700080180
CN3	Audio Connector (Line-in)	CATCH	2.0mm pitch 3 pin (CATCH HS-3P-2.0 or compatible)	Line-in Cable	1703030102
CN4	Digital I/O Connector	CATCH	2.00mm Pitch 10 pins (CATCH H754-2x5 or compatible)	Digital I/O Cable	N/A
CN5	Audio Connector (CD-in)	JIH VEI	2.54mm pitch 4 pin (JIH VEI 21B12564-04S10 B-01G-6/3 or compatible)	CD-in Cable	N/A
CN7	LCD Inverter Connector	CATCH	2.0mm pitch 5 pin (CATCH HS-5P-2.0 or compatible)	LCD Inverter Cable	N/A
CN8	CPU Fan Connector	Ho-Base	(2543-WS-3 or compatible)	CPU Fan Cable	N/A
CN9	Primary EIDE Connector	CATCH	2.00mm Pitch 44 pins (CATCH H820-2 or compatible)	EIDE Cable	1701440500
CN11	PS2 Keyboard/Mouse	CATCH	(CATCH MD-6PS or compatible)	Keyboard / Mouse Cable	1700060152

	Connector				
CN12	SPDIF Connector	CATCH	2.00mm pitch 3 pins(CATCH 1192-700-03S or compatible)	SPDIF Cable	1709030150
CN14	Front Panel Connector	CATCH	2.00mm Pitch 10 pins (CATCH H754-2x5 or compatible)	Front Panel Cable	N/A
CN15	AT Power Connector	LIAN TAY	(LIAN TAY H756-04　or compatible)	Power Cable	1702040151
CN17	Audio Connector (Line-Out)	JIH VEI	2.54mm pitch 6pins(JIH VEI 21B12564-06S01 B-01G-6/3 or compatible)	Line-Out Cable	1700060153
CN20	LPT port Connector	CATCH	2.00mm Pitch 26 pins(CATCH.1147-000-26MSP or compatible)	LPT cable	1701260200
CN21	LVDS Connector	CATCH	1.25mm Pitch 30 pins (CATCH H716 or compatible)	LVDS Cable	N/A
CN22	COM5/GPS connector	CATCH	1.0mm pitch 10 pin (CATCH HS-10P-1.0 or compatible)	COM5/G PS Cable	N/A
CN23	COM4 Connector	CATCH	2.00mm Pitch 10 pins (CATCH H754-2x5 or compatible)	Serial Port Cable	1701100206
CN24	USB5 & USB6 Connector	CATCH	2.00mm Pitch 10 pins (CATCH H754-2x5 or compatible)	USB Cable	1709100208

CN25	USB7 & USB8 Connector	CATCH	2.00mm Pitch 10 pins (CATCH H754-2x5 or compatible)	USB Cable	1709100208
CN26	COM3 Connector	CATCH	2.00mm Pitch 10 pins (CATCH H754-2x5 or compatible)	Serial Port Cable	1701100206
CN27	Power Output Connector	Ho-Base	(2543-H-4 or compatible)	Power output cable	1702040109
BAT1	Battery Wafer	CATCH	1.25mm pitch 2 pins (MOLEX 51021-0200 or compatible)	Battery cable	175011901C