

**Half-size PCIe CPU Card Supports Socket 989B 32nm  
Intel® mobile Core™ i7/i5/i3 CPU with Intel® HM65, DDR3,  
VGA/LVDS, Dual PCIe GbE, SATA 6Gb/s, HD Audio and RoHS**

# **PIC0e-HM650**

## **Quick Installation Guide**

### **Version 1.01**

May. 18, 2012

#### **Package List**

PIC0e-HM650 package includes the following items:

- 1 x PIC0e-HM650 Single Board Computer
- 1 x Dual RS-232 Cable
- 2 x SATA Cable
- 1 x USB cable
- 1 x Mini Jumper Pack
- 1 x Utility CD(within manual)
- 1 x One Key Recovery CD
- 1 x QIG (Quick Installation Guide)



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## Specifications

- CPU  
Socket 989B supports Intel® mobile Core™ i7/i5/i3/Celeron® processor
- System Chipset: Intel® HM65
- BIOS: UEFI BIOS
- System Memory:  
Two 204-pin 1333/1066 MHz dual-channel DDR3 SO-DIMMs supported. (system max. 16GB)
- Display Output:  
VGA integrated in Intel® HM65  
18/24-bit dual-channel LVDS support
- Ethernet:  
Dual Realtek RTL8111E PCIe GbE controllers, LAN1 with ASF2.0 supported  
Super I/O: Fintek F81866
- I/O Interface:  
1 x RS-422/485  
2 x RS-232  
1 x LPT  
1 x 6-pin wafer for KB & MS  
8 x USB 2.0 (2 on rear, 6 by pin header)  
2 x SATA 6Gb/s  
2 x SATA 3Gb/s
- Digital I/O: 8-bit Digital I/O (4-bit input, 4-bit output)
- Infrared Interface: 1 x 5-pin infrared connector
- Audio: Supports by IEI AC-KIT-888HD Audio Kit
- Front Audio: 2 x 5-pin pin header
- TPM: 2 x 10-pin pin header
- SMBus: 1 x 4-pin wafer
- I2C: 1 x 4-pin wafer
- Infrared Interface: 1 x 5-pin pin header
- Expansion: PCI signal and 4 x PCIEx1 signal via golden finger
- Watchdog Timer: software Programmable support 1~255 sec.  
System reset

- FAN connector:
  - 1 x 4-pin smart fan connector
  - 1 x 3-pin system fan connector
- Power Supply: 5V@3.99A, 12V@0.43A, Vcore\_12V@3.80A, 5VSB@0.06A ( 2.70GHz Intel® Core i7-2620M with two 2GB 1333MHz DDR3 memory)
- Operation Humidity: 5% ~ 95%, non-condensing
- Dimensions: 185mm X 122mm
- Weight: 1.0Kg

## Ordering Information

**PICOe-HM650-R10:** Half-size PCIe CPU card supports 32nm Socket 989B Intel® mobile Core™ i7/i5/i3 CPU with Intel® HM65, DDR3, VGA/LVDS, dual PCIe GbE, SATA 6Gb/s, HD Audio and RoHS

**32200-074800-RS:** RS-422/485 cable, 200mm

**19800-000075-RS:** KB/MS cable with Bracket

**SAIDE-KIT01-R10:** SATA to IDE/CF Converter board

**32102-000100-200-RS:** SATA Power Cable

**32200-015100-RS:** LPT cable

**AC-KIT-888HD-R10:** 7.1 channel HD Audio kit with Realtek ALC888 support dual audio streams

**TPM-IN01-R11:** 20-Pin Infineon TPM module, software management tool, firmware V3.17

**CF-989A-RS-R12:** CPU cooler for mobile socket 989 and 55W CPU

**CF-989B-RS:** CPU cooler for mobile socket 989 and 50W CPU

# Jumpers setting and Connectors

## Table of Jumpers

LABEL	FUNCTION
J_CMOS1	CMOS state setting
J_VLVDS1	LCD Voltage Selector
J_PID1	LVDS Panel Resolution Selection
J_ATXCTL1	ATX & AT Power Selector
ME_RTC1	TPM SETTINGS
J_FLASH1	FLASH DEB\SCRIPTOR SECURITY OVERRIDE / ME DEBUG MODE

## Table of Connectors

LABEL	FUNCTION
LAN1 & LAN2	RJ45 LAN Connector
USB_C1,USB_C2	USB Port Connectors
USB1,USB2,USB3	Internal USB Connectors
KB_MS1	PS/2 MOUSE & KEYBOARD Connector
VGA1	VGA 15-pin Female Connector
COM1,COM2	Internal Serial Port DB-9 Connectors
COM3	RS422/485 Serial Port
J_AUDIO1	Audio HDA Connector
S_ATA1 S_ATA2 S_ATA3 S_ATA4	Serial ATA Connectors
IR1	IrDA Infrared Interface Connector
JSPI1	Flash SPI ROM(BIOS)
JSPI2	Flash SPI ROM(EC)
INVERTER1	LVDS Panel Voltage Supply
LVDS1	LVDS Panel Connector
CPU_FAN1, SYS_FAN1	Fan Connector
DIO1	Digital I/O Connector
F_PANEL1	PWR & RST Buttons and Indicators
LPT1	Parallel Port Connector
ATXCTL1	ATX Power Supply to Mainboard Connector
CN5	SMBUS Connector
CN6	EC debug port
CN7	I2C Connector
TPM1	TPM Connector(80 port CONN)
CPU12V1	Power Supply DC12V Power in

## Jumpers setting

- **J\_CMOS1** : Clear CMOS Setup

J_CMOS1	DESCRIPTION
1-2 (default)*	Keep CMOS Setup (Normal Operation)
Short 2-3	Clear CMOS Setup

- **J\_VLVDS1** : Set The Panel Voltage

J_VLVDS1	DESCRIPTION
1-2 (default)*	Set The Voltage Level Of Panel To VCC3
Short 2-3	Set The Voltage Level Of Panel To VCC

- **J\_PID1** : LVDS Panel Resolution Selection

J_PID1	DESCRIPTION
OFF	640 X 480 (18bit)
1-2	800 X 480 (18bit)
3-4	800 X 600 (18bit)
1-2 & 3-4(Default)	1024 X 768 (18bit)
5-6	1024 X 768 (24bit)
1-2 & 5-6	1280 X 1024 (48bit)
3-4 & 5-6	1600 X 1200 (48bit)
1-2 & 3-4 & 5-6	1280 X 768 (18bit)
7-8	1280 X 800 (18bit)
1-2 & 7-8	1366 X 768 (24bit)
3-4 & 7-8	1440 X 900 (48bit)
1-2 & 3-4 & 7-8	1600 X 900 (48bit)
5-6 & 7-8	1680 X 1050 (48bit)
1-2 & 5-6 & 7-8	1920 X 1080 (48bit)
3-4 & 5-6 & 7-8	1920 X 1200 (48bit)
1-2 & 3-4 & 5-6 & 7-8	LVDS Disabled

- **J\_PCIE1**: Set The PCIE Mode

J_PCIE1	Description
OPEN	ONE SET x4
SHORT(Default)	FOUR SET x1

- **J\_ATXCTL1** : Set The Power mode

J_ATXCTL1	DESCRIPTION
1-2	ATX Power
Short 2-3 (default)*	AT Power

- **ME\_RTC1 : TPM SETTINGS**

ME_RTC1	DESCRIPTION
1-2 (default)*	Save ME RTC registers
Short 2-3	Clear ME RTC registers

- **J\_FLASH1 : Flash Descriptor Security Override**

J_FLASH1	DESCRIPTION
1-2	NO override
Short 2-3	Override

## Connectors

- **LAN1 、 LAN2: RJ45 LAN Connector**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	MDIA3-	5	MDIA1+
2	MDIA3+	6	MDIA2+-
3.	MDIA2-	7	MDIA0-
4.	MDIA1-	8	MDIA0+

- **USB\_C1 & USB\_C2 : USB Connector**

USB_C06, USB_C07	
PIN NO.	DESCRIPTION
1	VCC
2	DATA-
3	DATA+
4	GROUND

- **USB1 、 USB2 、 USB3: Internal USB Connectors**

USB			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	GND
3	DATA-	4	DATA+
5	DATA+	6	DATA-
7	GND	8	VCC

- **KB\_MS1: 6-pin Wafer Keyboard Connector**

PIN NO.	DESCRIPTION
1	VCC5_KBMS
2	MSDATA
3	MSCLK
4	KBDATA
5	KBCLK
6	KBGND

- **VGA1 : 15-pin Female Connector**

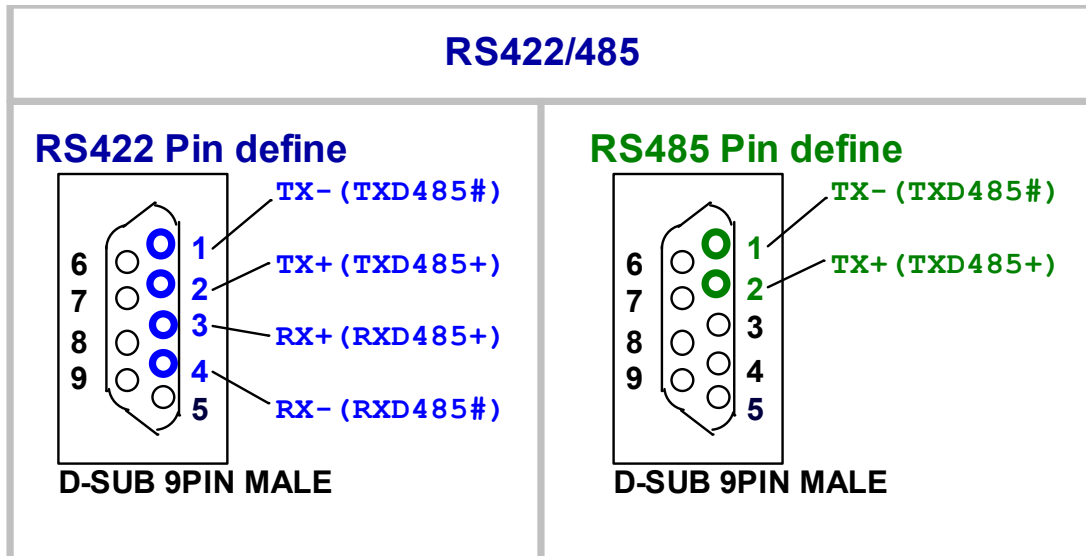
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RED	2	GREEN
3	BLUE	4	NC
5	GND	6	VCC
7	GND	8	GND
9	VCC	10	GND
11	NC	12	DDCDA
13	HSYNC	14	VSYNC
15	DDCCLK		

- **COM1 、COM2 : External Serial Port Connector**

PIN NO.	DESCRIPTION
1	-NDCD2
2	-NDSR2
3	NSIN2
4	-NRTS2
5	NSOUT2
6	-NCTS2
7	-NDTR2
8	-XRI2
9	GND
10	GND

- COM3 : RS422/485 Serial Port External Serial Port Connector

PIN NO.	DESCRIPTION
1	RXD485#
2	RXD485+
3	RXD485-
4	RXD485#



- J\_AUDIO1 : Audio Source Connector

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	HDA_SYNC	2	HDA_BITCLK
3	HDA_SDOUT	4	SB_SPKR
5	HDA_SDIN0	6	HDA_RST#
7	VCC	8	GND
9	+12V	10	GND

- S\_ATA1 、 S\_ATA2 、 S\_ATA3 、 S\_ATA4: Serial ATA Connector

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	5	RX-
2	TX+	6	RX+
3	TX-	7	GND
4	GND	8	N/C



• IR1: IrDA connector

PIN NO.	DESCRIPTION
1	VCC
2	NC
3	IR-RX
4	GND
5	IR-TX

• JSPI1:FlashSPI ROM

JSPI1			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	3.3V	2	GND
3	CS0	4	CLK
5	SO0	6	SI
7	N/C	8	N/C

• JSPI2:FlashSPI ROM

JSPI1			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	3.3V	2	GND
3	CS0	4	CLK
5	SO0	6	SI
7	N/C	8	N/C

• INVERTER1: Panel Power Supply

PIN NO.	DESCRIPTION
1	BRIGHTNESS
2	GND
3	12V
4	GND
5	ENABKL

• **LVDS1: LVDS Connector**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND
3	A_Y0	4	A_Y0#
5	A_Y1	6	A_Y1#
7	A_Y2	8	A_Y2#
9	A_CK	10	A_CK#
11	A_Y3	12	A_Y3#
13	GND	14	GND
15	B_Y0	16	B_Y0#
17	B_Y1	18	B_Y1#
19	B_Y2	20	B_Y2#
21	B_CK	22	B_CK#
23	B_Y3	24	B_Y3#
25	GND	26	GND
27	VCC/VCC3	28	VCC/VCC3
29	VCC/VCC3	30	VCC/VCC3

• **CPU\_FAN1 : CPU Fan Connector**

PIN NO.	DESCRIPTION
1	Ground
2	+12V
3	Rotation Signal
4	Control

• **SYS\_FAN1 : System Fan Connector**

PIN NO.	DESCRIPTION
1	Rotation Signal
2	+12V
3	GND

• **DIO1 : Digital Input / Output Connector**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	VCC
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

• **F\_PANEL1 : External Switches and Indicators panel**

Function	PIN	DESCRIPTION	Function	DESCRIPTION	PIN
	1	NC		LED_PWR	6
PWR_BTN	2	GND	PWR_LED	LED_PWR	7
	3	PWR_BTN-		GND	8
HDD_LED	4	IDE_LED_PWR	RESET	EXTRST-	9
	5	SATA_LED#		GND	10

• **LPT1 : Parallel Port Connector**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	STROBE#	14	AUTO FORM FEED #
2	DATA0	15	ERROR#
3	DATA1	16	INITIALIZE#
4	DATA2	17	PRINTER SELECT LN#
5	DATA3	18	GND
6	DATA4	19	GND
7	DATA5	20	GND
8	DATA6	21	GND
9	DATA7	22	GND
10	ACKNOWLEDGE#	23	GND
11	BUSY	24	GND
12	PAPER EMPTY	25	GND
13	PRINTER SELECT	26	NC

• **ATXCTL1 : ATX/AT Connector**

PIN NO.	DESCRIPTION
1	GND
2	PS_ON#
3	5VSB

• **CN5: SMBUS Connector**

PIN NO.	DESCRIPTION
1	GND
2	SMB_DATA
3	SMB_CLK
4	+V5S

- CN6: EC Debug port

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	EC_EPP_STB#	11	EC_EPP_BUSY
2	EC_EPP_PD0	12	EC_EPP_KSI5
3	EC_EPP_PD1	13	EC_EPP_KSI4
4	EC_EPP_PD2	14	EC_EPP_AFD#
5	EC_EPP_PD3	15	NC
6	EC_EPP_PD4	16	EC_EPP_INIT#
7	EC_EPP_PD5	17	EC_EPP_SLIN#
8	EC_EPP_PD6	18	GND
9	EC_EPP_PD7	19	GND
10	NC	20	GND

- CN7: I2C Connector

PIN NO.	DESCRIPTION
1	GND
2	PCH_GP38_PU
3	PCH_GP39_PU
4	+V5S

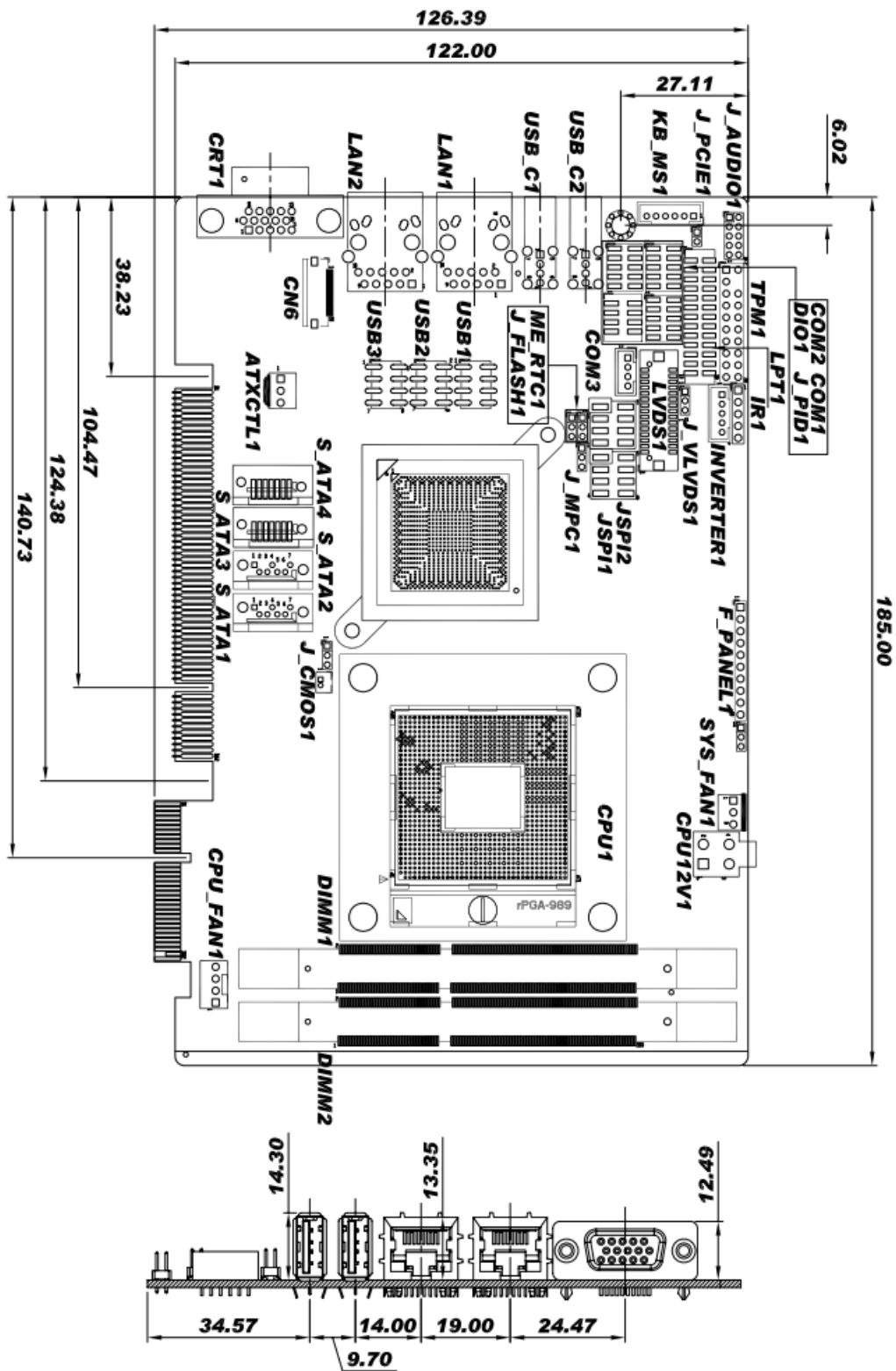
- TPM1:

TPM1 Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	CLK	2	GND
3	FRAME#	4	NC
5	RERST#	6	+5V
7	AD3	8	AD2
9	+3V	10	AD1
11	AD0	12	GND
13	SMB_CLK	14	SMB_DATA
15	SB3V	16	SERIRQ
17	GND	18	CLKRUN#
19	PM_SUS_STAT #	20	DRQ#

- CPU12V1: Power Supply DC12V Power IN

ATX 12V1			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND
3	+12V	4	+12V

# Board Layout: Jumper and Connector Locations



(Unit:mm)