



User's Manual

QEC-PPC-M-150T-S

DMP Vortex86 EX2 Processor

Compact Panel PC with 15" Touchscreen

(Revision 1.0A)

REVISION

DATE	VERSION	DESCRIPTION
2026/4/20	Version 1.0A	New Release

ICOP TECHNOLOGY INC.

COPYRIGHT

The information in this manual is subject to change without notice for continuous improvement in the product. All rights are reserved. The manufacturer assumes no responsibility for any inaccuracies that may be contained in this document, and makes no commitment to update or to keep current the information contained in this manual.

No part of this manual may be reproduced, copied, translated or transmitted, in whole or in part, in any form or by any means without the prior written permission of the ICOP Technology Inc.

©Copyright 2026 ICOP Technology Inc.
Manual # QEC-PPC-M-150T-S Ver.1.0A Apr, 2026

TRADEMARKS ACKNOWLEDGMENT

ICOP® is the registered trademark of ICOP Corporation. Other brand names or product names appearing in this document are the properties and registered trademarks of their respective owners. All names mentioned herewith are served for identification purpose only.

For more detailed information or if you are interested in other ICOP products, please visit our official websites at:

- Global: www.icop.com.tw
- USA: www.icoptech.com
- Japan: www.icop.co.jp
- Europe: www.icoptech.eu
- China: www.icop.com.cn

For technical support or demo images of operating systems download, please visit our websites at:

- ICOP Technical Resource:
https://www.icop.com.tw/resource_entrance

This Manual is for the QEC-PPC-M-150T-S.

SAFETY INFORMATION

- Read these Safety instructions carefully.
- Please carry the unit with both hands, handle carefully.
- Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
- Do not expose your Panel PC to rain or moisture in order to prevent shock and fire hazard.
- Power Input voltage rated +19 to 50VDC (Typ. +24VDC)
- Operating temperature between 0~+60°C / -20~+70°C (Option)
- Keep QEC-PPC-M-150T-S away from humidity.
- When using external storage as the main operating system storage, ensure the device's power is off before connecting and removing it
- Never touch un-insulated terminals or wire unless your power adaptor is disconnected.
- Locate your Panel PC as close as possible to the socket outline for easy access and to avoid force caused by entangling of your arms with surrounding cables from the Panel PC.
- If your QEC device will not be used for a period of time, make sure it is disconnected from the power source to avoid transient overvoltage damage.

WARNING!



DO NOT ATTEMPT TO OPEN OR TO DISASSEMBLE THE CHASSIS (ENCASING) OF THIS PRODUCT. PLEASE CONTACT YOUR DEALER FOR SERVICING FROM QUALIFIED TECHNICIAN.

Content

Content	iii
Ch. 1 General Information	1
1.1 Product Description	2
1.2 Product Specifications	3
1.3 Inspection standard for TFT-LCD Panel.....	5
1.4 Product Dimensions.....	9
1.5 Ordering Information.....	10
Ch. 2 Hardware System	11
2.1 General Technical Data.....	12
2.2 General Summary.....	13
2.2.1 HD Audio Line-out.....	14
2.2.2 USB.....	14
2.2.3 Giga LAN.....	15
2.2.4 USB Type-C	16
2.2.5 10/100Mbps LAN	17
2.2.6 Power Connector	17
2.2.7 Power Status LED.....	18
2.3 Wiring to the Connector	19
2.3.1 Connecting the wire to the connector	19
2.3.2 Removing the wire from the connector	19
Ch. 3 Hardware Installation	20
3.1 Mounting Instructions.....	21
3.1.1 Panel Mount.....	21
3.1.2 VESA Mount.....	24
Ch. 4 Development Note	25
4.1 Development Note	26
Warranty.....	27

Ch. 1

General Information

[1.1 Product Description](#)

[1.2 Product Specifications](#)

[1.3 Inspection standard for TFT-LCD Panel](#)

[1.4 Product Dimensions](#)

[1.5 Ordering Information](#)

1.1 Product Description

ICOP's QEC-PPC-M-150T-M is designed for real-time, reliable, and synchronized industrial HMI control. Each model integrates a high-resolution touch-enabled TFT LCD (15"), providing a rugged case and powerful control core within a compact system.

Efficient Development with 86Duino IDE

The development environment utilizes 86Duino IDE, an industrial Arduino-like platform that supports custom API, graphical programming tools, and high-level C/C++ programming, enabling rapid development while reducing hiring challenges and time to market.

Robust Storage, Reliable I/O, and Versatile Connectivity with Embedded form factor

Each model features a built-in 2GB SLC eMMC (or 16GB pSLC eMMC option), ensuring stable OS operation and offering ample storage for executables, HMI graphics, and application data. Files can be deployed via the 86Duino IDE. The IDE also integrates the LVGL graphics library, allowing developers to create modern and interactive touchscreen HMIs directly on this device.

The rugged panel design (dimensions vary by model) supports flexible integration and customization for industrial use. Standard operating temperature is 0°C to +60°C, with an extended option from -20°C to +70°C.

QEC-PPC-M-150T-S unit features one Giga LAN port, one 10/100Mbps LAN port, three USB2.0 ports, a USB programming port (for upload/debug), and HD Audio Line-out, which all can accessibly control via off-the-shelf Library.

1.2 Product Specifications

CPU BOARD SPECIFICATIONS

CPU	DM&P Vortex86EX2- 533MHz
Cache	L1:16KB I-Cache, 16KB D-Cache L2: 128KB Cache
Memory	1GB DDRII onboard
LAN	1Gbps Ethernet RJ45 x1 10/100Mbps Ethernet RJ45 x1
Audio	HD Audio Realtek ALC888S
Internal Storage	32MB SPI Flash & 2GB SLC eMMC / 16GB eMMC (Option)
I/O	USB Ports (Ver2.0) x3 USB Type-C x1 (Software programming for 86Duino IDE only) Audio Line Ou (Audio Phone Jack) t x1

MECHANICAL & ENVIRONMENT

Power Requirement	+12 to 50VDC (Typ. +24VDC)
Power Consumption	13 W
Operating Temperature	0~+60°C (+32~+140°F) / -20~+70°C (-4~+158°F; Option)
Storage Temperature	-30~+80°C (-22~ +176°F)
Operating Humidity	0% ~ 90% Relative Humidity, Non-Condensing
Dimensions	354.84 x 280.84 x 55.00mm (13.97"x11.06"x2.17")
Weight	4.00 Kg
Protection	IP65 Front Panel
Certification	CE / UKCA / FCC / VCCI / Vibration / Shock

LCD SPECIFICATIONS

Display Type	15" XGA TFT LCD
Backlight Unit	LED
Display Resolution	1024(W) x 7680(H)
Brightness (cd/m ²)	400 nits
Contrast Ratio	800 : 1
Display Color	16.2M
Active Area (mm)	304.13 (H) x 228.10 (V)
Viewing Angle	Vertical 170°, Horizontal 170°
Backlight Lifetime	30,000 hrs

TOUCHSCREEN

Type1	Analog Resistive
Resolution	Continuous
Transmittance	80%
Controller	PS/2 interface
Durability	1 million

1.3 Inspection standard for TFT-LCD Panel

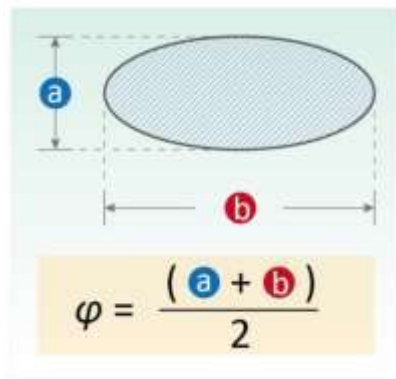
DEFECT TYPE			LIMIT					Note	
VISUAL DEFECT	INTERNAL	SPOT	$\varphi < 0.15\text{mm}$			Ignore		Note1	
			$0.15\text{mm} \leq \varphi \leq 0.5\text{mm}$			$N \leq 4$			
			$0.5\text{mm} < \varphi$			$N=0$			
		FIBER	$0.03\text{mm} < W \leq 0.1\text{mm}, L \leq 5\text{mm}$			$N \leq 3$		Note1	
			$1.0\text{mm} < W, 1.5\text{mm} < L$			$N=0$			
		POLARIZER BUBBLE	$\varphi < 0.15\text{mm}$			Ignore		Note1	
			$0.15\text{mm} \leq \varphi \leq 0.5\text{mm}$			$N \leq 2$			
			$0.5\text{mm} < \varphi$			$N=0$			
		Mura	It' OK if mura is slight visible through 6%ND filter						
ELECTRICAL DEFECT	BRIGHT DOT		A Grade			B Grade			
			C Area	O Area	Total	C Area	O Area	Total	Note3
			$N \leq 0$	$N \leq 2$	$N \leq 2$	$N \leq 2$	$N \leq 3$	$N \leq 5$	Note2
	DARK DOT		$N \leq 2$	$N \leq 3$	$N \leq 3$	$N \leq 3$	$N \leq 5$	$N \leq 8$	
	TOTAL DOT		$N \leq 4$			$N \leq 5$	$N \leq 6$	$N \leq 8$	Note2
	TWO ADJACENT DOT		$N \leq 0$	$N \leq 1$ pair	$N \leq 1$ pair	$N \leq 1$ pair	$N \leq 1$ pair	$N \leq 1$ pair	Note4
	THREE OR MORE ADJACENT DOT		NOT ALLOWED						
	LINE DEFECT		NOT ALLOWED						

(1) One pixel consists of 3 sub-pixels, including R, G, and B dot. (Sub-pixel = Dot)

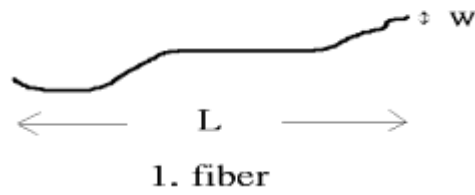
(2) Little bright Dot acceptable under 6% ND-Filter.

(3) If require G0 grand (Total dot $N \leq 0$), please contact region sales.

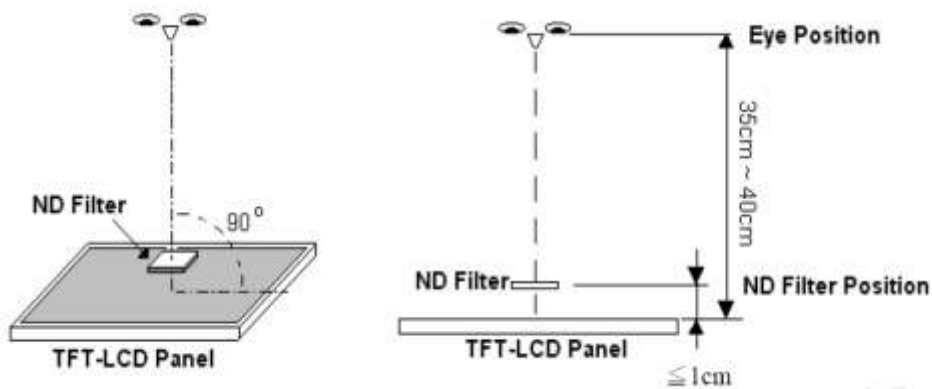
[**Note 1**] W: Width[mm]; L: Length[mm]; N: Number; ϕ : Average Diameter.



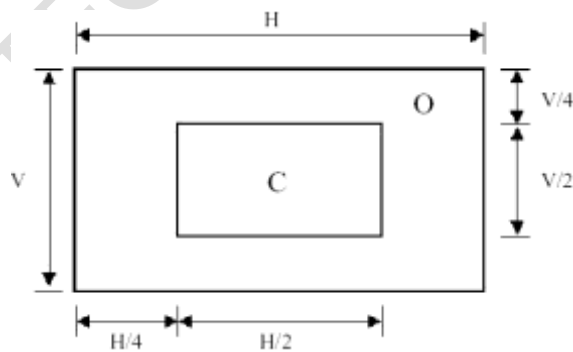
(a) White / Black Spot (b) Polarizer Bubble



[**Note 2**] Bright dot is defined through 6% transmission ND Filter as following.

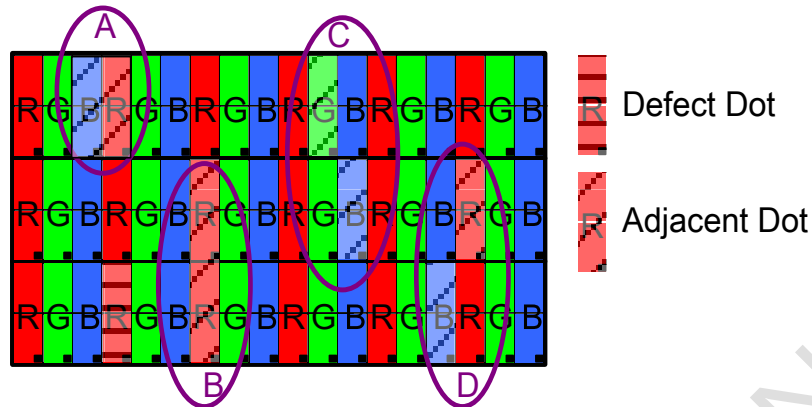


[**Note 3**] Display area



C Area: Center of display area **O Area:** Outer of display area

[Note 4] Judge the defect dot and the adjacent dot as following. Allow below (as A, B, C and D status) adjacent defect dots, including bright and dark adjacent dot. And they will be counted 2 defect dots in total quantity.



The defects that are not defined above and considered to be problem shall be reviewed and discussed by both parties.

Defects on the Black Matrix, out of Display area, are not considered as a defect or counted.

[Note 5]

According to the technical information from LCD manufacturer, the image retention may happen on LCD display if the static image is kept for a period of time without any change. ICOP will suggest customers not to have static image on LCD for over 4 hours without any image movement and also enable screensaver to avoid image sticking issue if LCD displays need to be kept on for a long time.

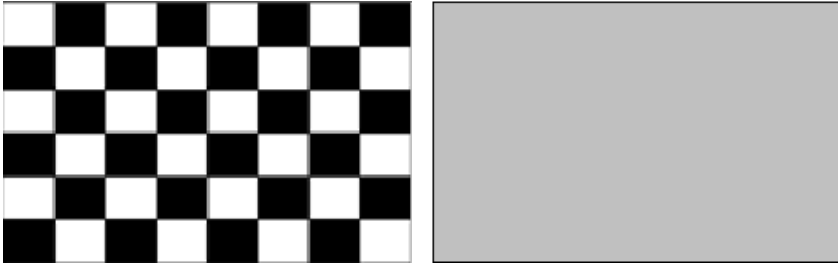
Some Image retention issue will disappear when LCD display is turned off for a period of time, but some image retention may be not reversible when LCD encounters screen burn.

The following is LCD manufacturer's test result for customers' reference.

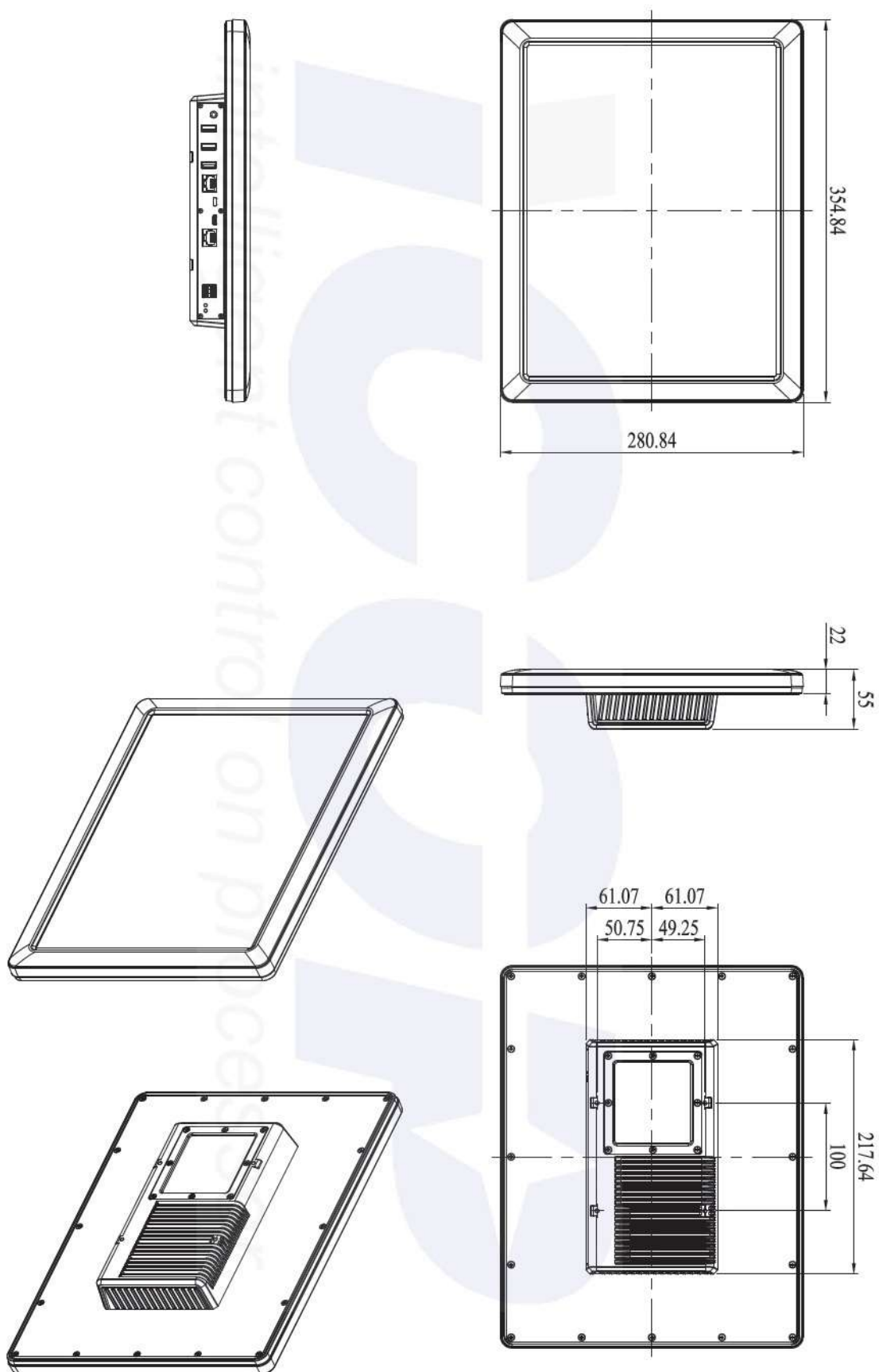
TEST ITEMS	CONDITIONS	NOTE
High Temperature Operation	70°C ;240hrs	
High Temperature Storage	80°C ; 240hrs	
High Temperature High Humidity Operation	60°C ; 90%RH ;240hrs	No condensation
Low Temperature Operation	-20°C ; 240hrs	Backlight unit always turn on
Low Temperature Storage	-30°C ; 240hrs	
Thermal Shock	-30°C (0.5hr) ~ 80°C (0.5hr) ; 200 Cycles	
Image Sticking	25°C ; 4hrs	Note 5-1
MTBF	20,000Hrs	

Note 5-1

1. Condition of Image Sticking test : $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$.
2. Operation with test pattern sustained for 4 hrs, then change to gray pattern immediately.
3. After 5 mins, the mura must be disappeared completely.



1.4 Product Dimensions



1.5 Ordering Information

PART NUMBER	DESCRIPTION
QEC-PPC-M-150T-S	15" Panel PC w/EX2/1GB DDRIII Memory/2GB SLC eMMC/3USB/GLAN/LAN/Line-out/RTP/DC12~50V
QEC-PPC-M-150T-S1 (Build To Order)	15" Panel PC w/EX2/1GB DDRIII Memory/ 16GB eMMC /3USB/GLAN/LAN/Line-out/RTP /DC12~50V

Ch. 2

Hardware System

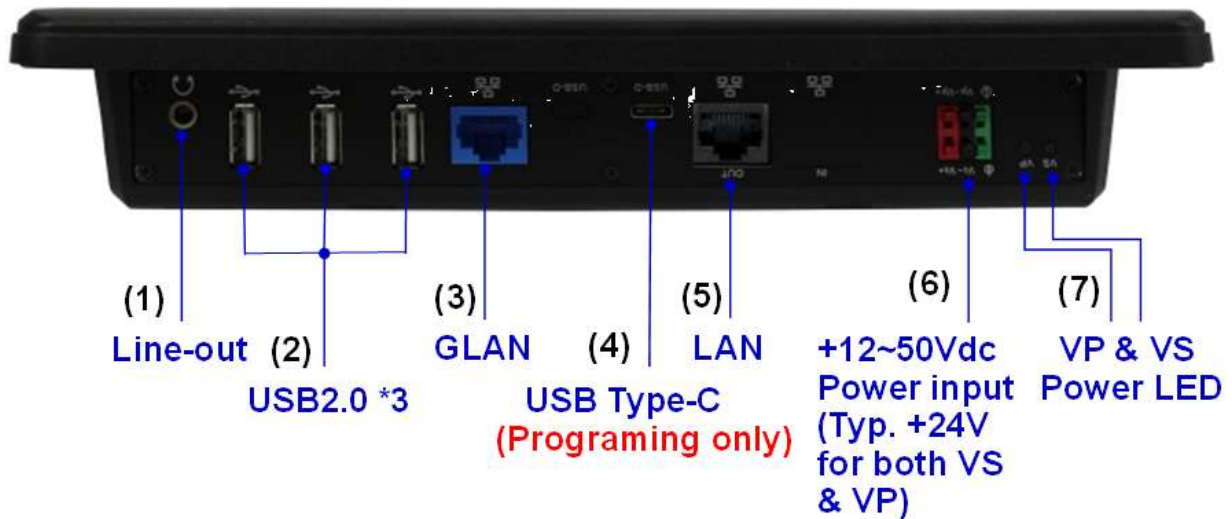
[2.1 General Technical Data](#)

[2.2 General Summary](#)

[2.3 Wiring to the Connector](#)

ICOP TECHNOLOGY INC.

2.1 General Technical Data



2.2 General Summary

No.	Description	Type Narrative	Pin #
1	HD Audio Line-out	External Audio Connector	-
2	USB	USB 2.0	-
3	Giga LAN	External RJ45 Connector	8-pin-
4	USB Type-C (Software Programming Port for 86Duino IDE only)	USB Type-C	-
5	10/100Mbps LAN	External RJ45 Connector	8-pin-
6	Power Connector	Terminal Block Interface	6-pin
7	Power Status LED	External Status LEDs	-

2.2.1 HD Audio Line-out

The QEC-PPC-M Series features an HD Audio (Line-Out) port for connecting external audio devices such as speakers or headphones.

The HD Audio port is located as shown in the diagram.



Compatible with standard 3.5mm audio jacks.

2.2.2 USB

There are three Standard USB 2.0 ports with hot-plug support as shown in the diagram.



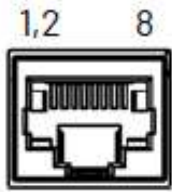
2.2.3 Giga LAN

The QEC-PPC-M-150T-S features one Giga LAN port and is dedicated to external Ethernet communications.

The Giga LAN port is blue.

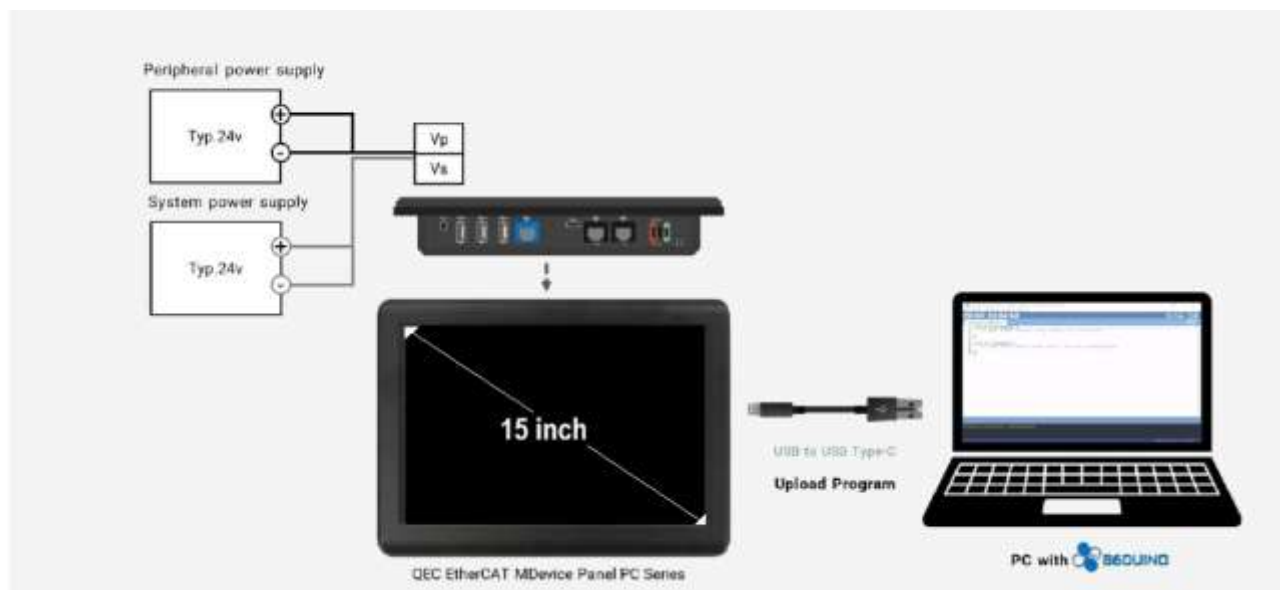


Pin Definitions:

	Pin #	Signal Name	Pin #	Signal Name
	L1	GTX+	L2	GTX-
	L3	GRX+	L4	GTXC+
	L5	GTXC-	L6	GRX-
	L7	GRXD+	L8	GRXD-

2.2.4 USB Type-C

The QEC-PPC-M-150T-S features a USB Type-C port primarily used for software programming uploads and debugging, but this port is reserved by 86Duino Coding IDE 501+ software utility only. When you use this software utility, you can connect the device to a computer using a USB to USB Type-C cable to upload code and configure the system.



The USB Type-C port is located as shown in the diagram.

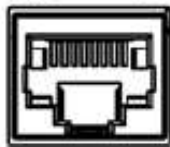


2.2.5 10/100Mbps LAN

The 10/100Mbps RJ45 Connectors is located as shown in the diagram.



Pin Definitions:

	Pin #	Signal Name	Pin #	Signal Name
	1	LAN1_TX+	2	LAN1_TX-
	3	LAN1_RX+	4	NC
	5	NC	6	LAN1_RX-
	7	NC	8	NC

2.2.6 Power Connector

Euroblock Connectors. 4-pins Power Input/Output & 2-pins FGND.



Vs for system power; Vp for peripheral power and backup power.

	Pin #	Signal Name	Pin #	Signal Name	Pin #	Signal Name
	1	Vs+	3	Vs- (GND)	5	FGND
	2	Vp+	4	Vp- (GND)	6	FGND

* Power Input voltage +12 to +50VDC Power Input (Typ. +24VDC) **Please supply both of Vs and Vp power input for whole system work.**

2.2.7 Power Status LED

Power status LEDs information.



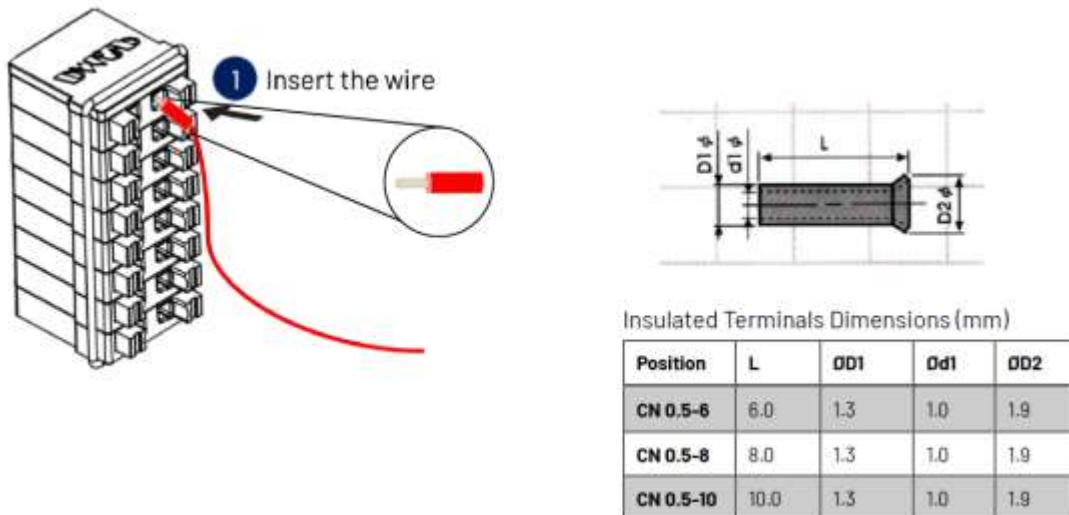
Vs for system power; Vp for peripheral power and backup power.

Power input is 24V (typical). The LED status provide high/low voltage warning.

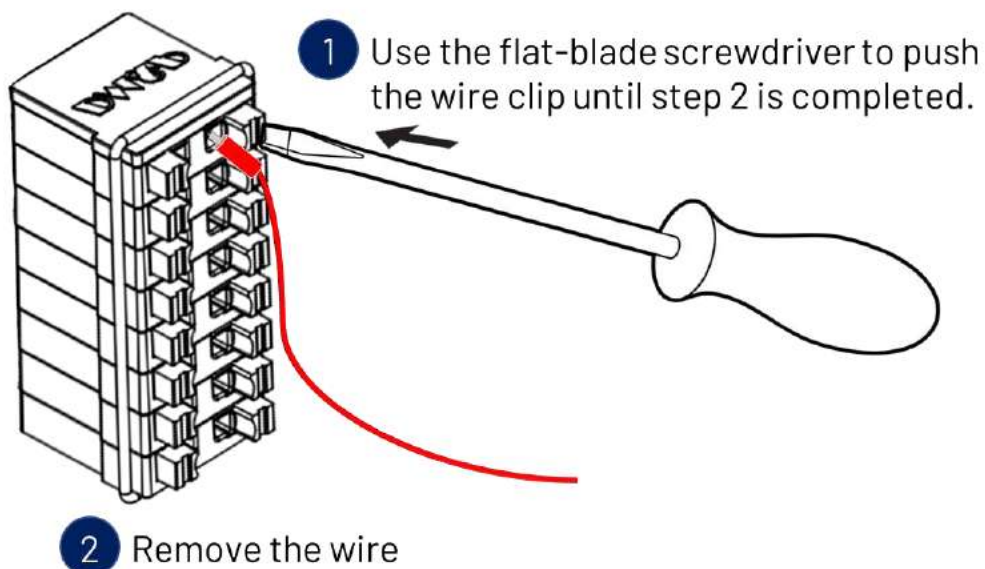
***Note: Please supply both of Vs and Vp power input for whole system work.**

2.3 Wiring to the Connector

2.3.1 Connecting the wire to the connector



2.3.2 Removing the wire from the connector



Ch. 3

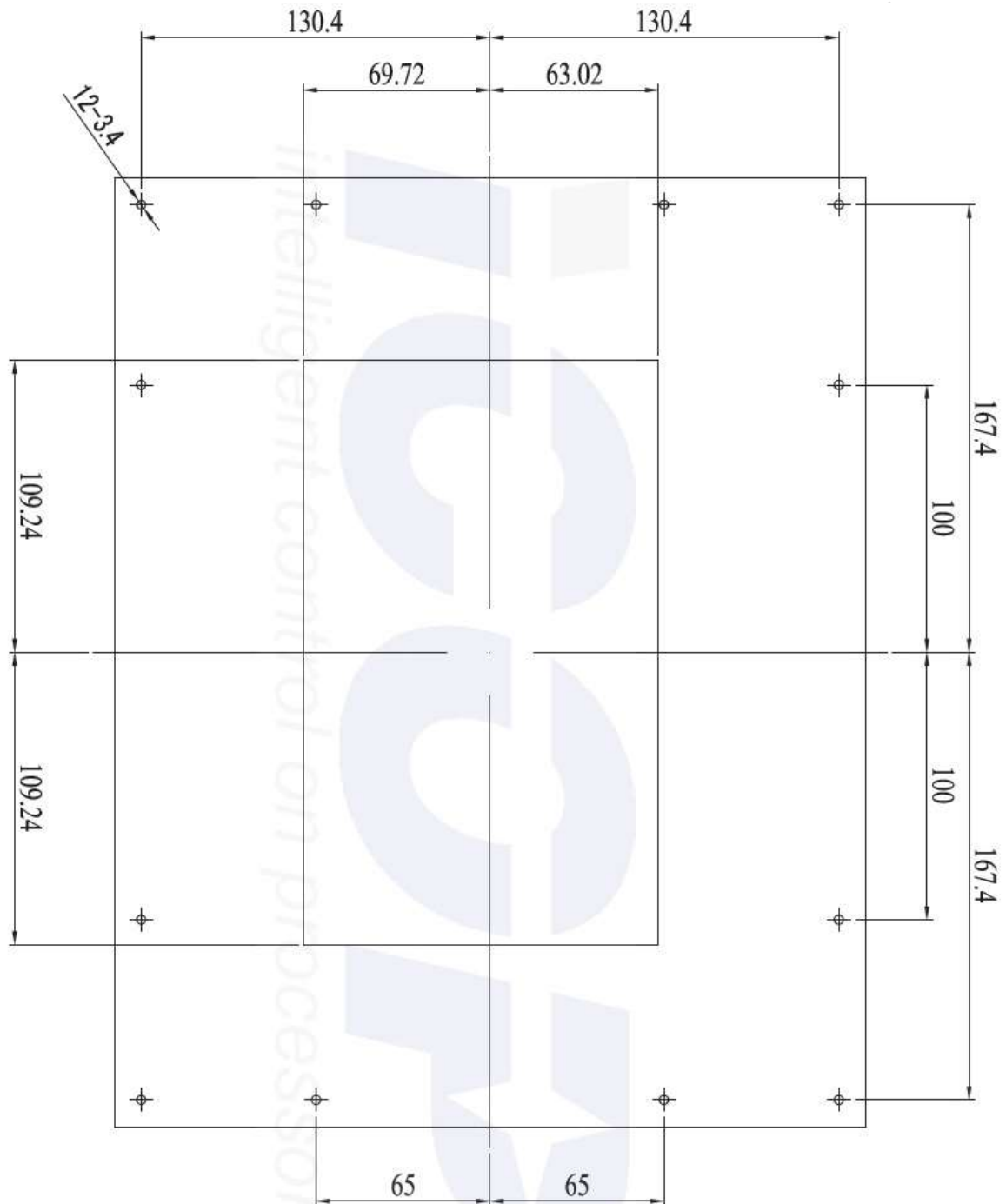
Hardware Installation

[3.1 Mounting Instructions](#)

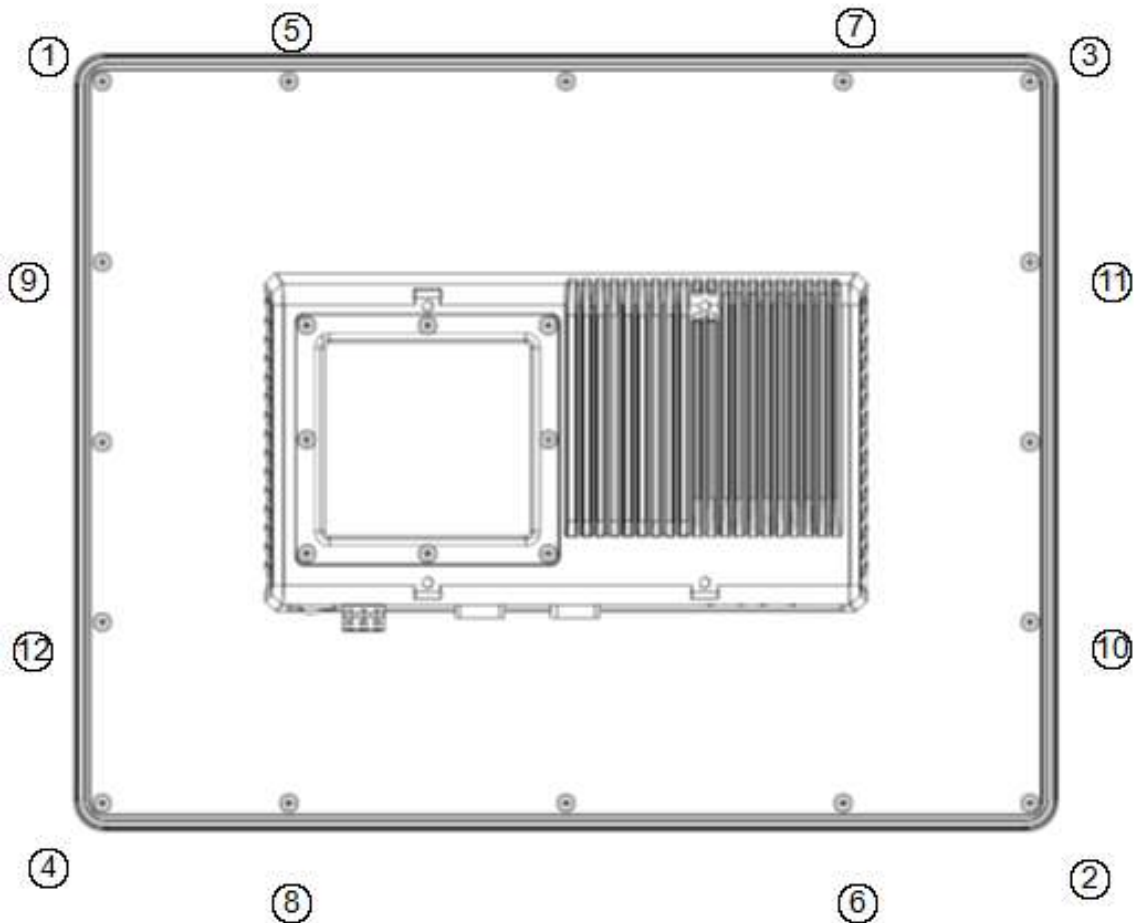
3.1 Mounting Instructions

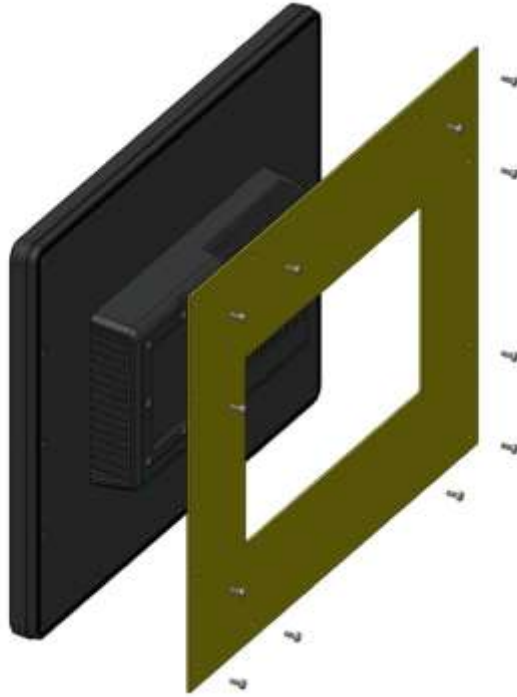
This procedure applies to QEC-PPC-M-150T-S model with a 15-inch touch display.
Mounting type.

3.1.1 Panel Mount



1. Cut a mounting hole in the panel. (Note 1)
2. Check and remove the twelve M3 screws in a diagonal pattern as image below if necessary.
3. Place PPC-150T face-down on a clean, flat surface.
4. Slide the panel cutout around the back of PPC-150T, until the panel rests directly on the gasket. Make sure the screw holes align with the screw holes on PPC-150T.
5. The screw size is M3*L (L=wall thickness + 6.0mm) (Note 2)
6. Insert all twelve M3 screws into the screw holes. (Note 2)
7. Finger-tighten the M3 screws. Finish tightening the M3 screws in a diagonal pattern using an M3 screw driver (see the image as below); maximum torque 0.44Nm (4.5 kgf-cm).





Note 1:

It is strongly recommended that a professional machine shop cut the mounting hole in the panel.

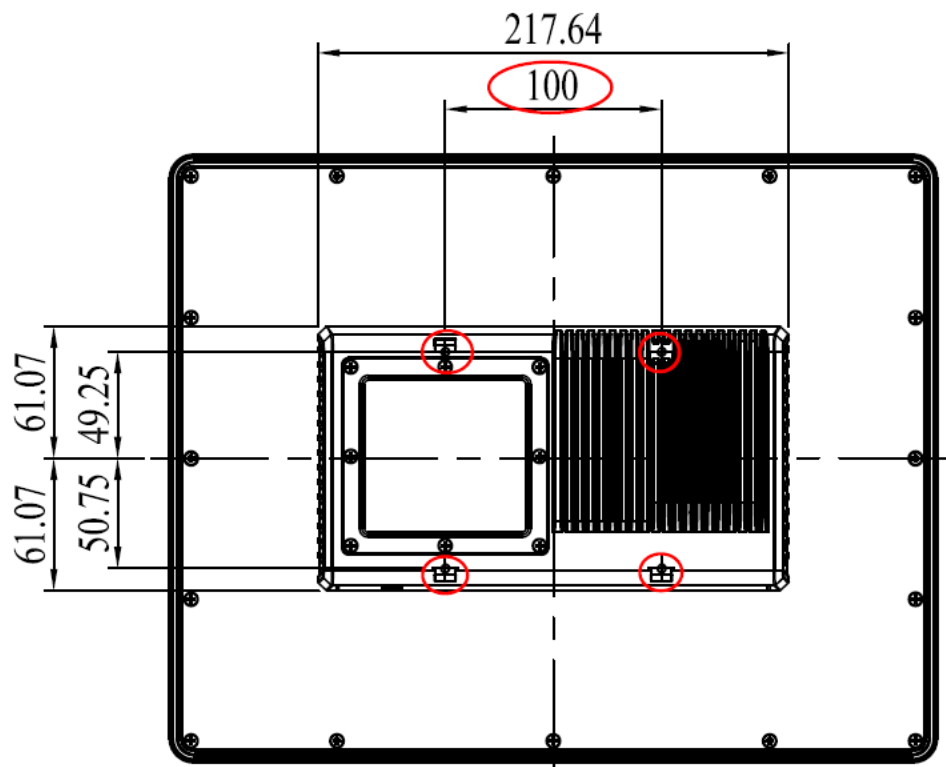


Note 2:

The length for all twelve M3 screws will be according to the thickness of mounting panel. For example: The length of standard M3 screws for PPC-150T is 6mm. If the thickness of your mounting panel is 3mm and washer thickness is 1mm, you have to use 10mm M3 screw.

3.1.2 VESA Mount

QEC-PPC-M-150T-S supports standard VESA Mount, 100mm x 100mm. The screw size supports M4 screws.



Ch. 4

Development Note

[4.1 Development Note](#)

4.1 Development Note

< TECHNICAL RESOURCE >

Please visit the technical resource website to get more information at https://www.icop.com.tw/resource_entrance.

< LINUX INSTALLATION NOTE>

Please visit Linux technical website to get more information for VEX2 at <https://www.vortex86.com/news/2>.

Warranty

This product is warranted to be in good working order for a period of one year from the date of purchase. Should this product fail to be in good working order at any time during this period, we will, at our option, replace or repair it at no additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster. Vendor assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, originality to use this product. Vendor will not be liable for any claim made by any other related party. Return authorization must be obtained from the vendor before returned merchandise will be accepted. Authorization can be obtained by calling or faxing the vendor and requesting a Return Merchandise Authorization (RMA) number. Returned goods should always be accompanied by a clear problem description.

All Trademarks appearing in this manuscript are registered trademark of their respective owners. All Specifications are subject to change without notice.
©ICOP Technology Inc. 2026