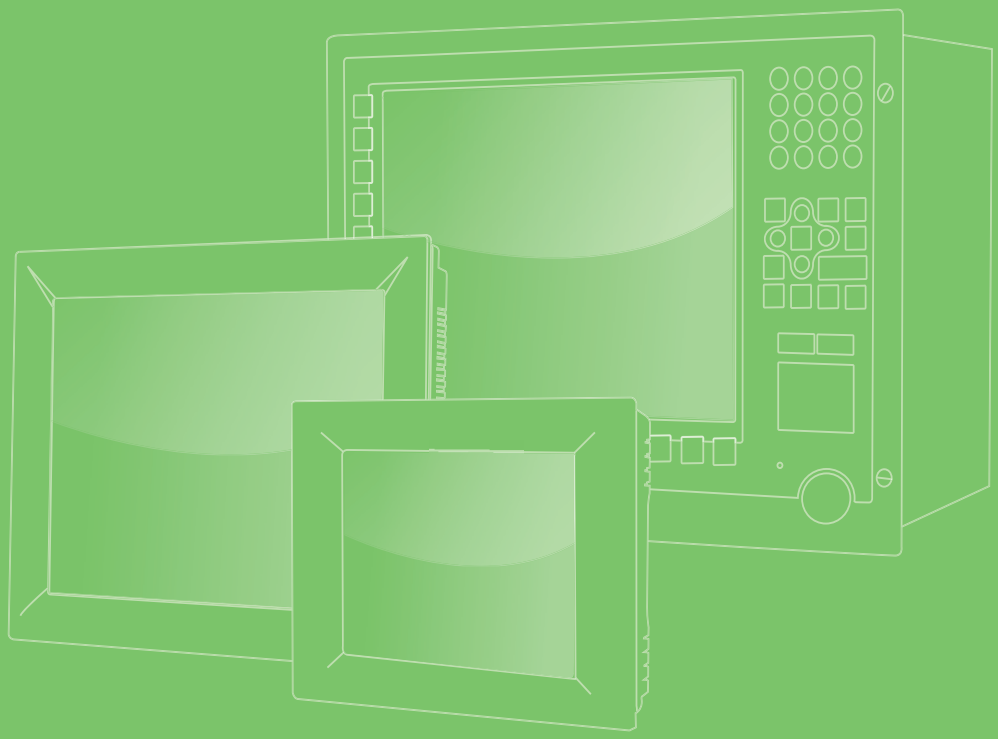

User Manual

TPC-1581WP and TPC-1881WP

Multi-Touch Panel Computer with Intel 4th Generation Core i Processor

ADVANTECH

Enabling an Intelligent Planet

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This Manual Covers the Following Models:

- TPC-1581WP
- TPC-1881WP

Part No. 2003058100 Edition 1

Printed in Taiwan March 2015

Product Warranty (2 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

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.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

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 merchandize 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 when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from Advantech. Please contact your local supplier for ordering information.

FCC Class A

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

Technical Support and Assistance

1. Visit the Advantech web site 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
3. This product is intended to be supplied by a listed power supply complying with UL60950-1.

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.
17. ATTENTION: Danger d'explosion si la batterie est mal REMPLACE. REMPLACER UNIQUEMENT PAR LE MEME TYPE OU EQUIVALENT RECOMMANDÉ PAR LE FABRICANT, jeter les piles usagées SELON LES INSTRUCTIONS DU FABRICANT.

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.

Caution! *Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.*

Attention! *Danger d'explosion si la pile est remplacée de façon incorrecte. Remplacez seulement avec le même type ou équivalent recommandé par le fabricant. Dispose des piles usagées selon les instructions du fabricant.*

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Chapter 1

General Information

1.1 Introduction

With Multi-Touch technology, the TPC-xx81WP features an Intel 4th Generation Core i3-4010U/ i7-4650U 1.7GHz processor with 4GB/8GB DDR3L SDRAM to provide a high computing performance. To enhance reliability and durability, they come with a 7H hardness anti-scratch surface on a high resolution display with Multi-Touch in 16:9 format. Through the Mini-PCIe slot, Advantech iDoor technology can provide more I/O connectors, Isolated Digital IO, the Fieldbus Protocol, 3G/GPS/GPRS/WiFi Communication and Battery-backup MRAM. A 2nd monitor and speaker can be attached via the integrated HDMI and Audio port.

The following are the key features:

- Industrial TFT LCD with 50K Lifetime LED Backlight
- Intel 4th Generation Core i3-4010U with 4GB DDR3L SDRAM
- 16:9 Wide Screen with PCT Multi-Touch
- IP66 Approved Front Protection & Panel Mounting
- Built-in Intelligent Home key and i Key for Intuitive UI
- Front LED Indicator to Show Operating Status
- Diverse system IO and Isolated Digital IO by iDoor Technology
- Supports Fieldbus Protocol by iDoor Technology
- 3G/GPS/GPRS/WiFi Communication by iDoor Technology
- Supports Battery-backup MRAM by iDoor Technology
- Chassis Grounding Protection
- HDMI and Audio Multimedia Support
- Anti-scratch surface: 7H hardness

1.2 Packing List

- 10/12 x Panel Mount Clamps
- 10/12 x Panel Mount Screws
- 1 x 3 Pin Power Connector
- 1 x Power Indication Sticker
- 1 x Wire for Chassis Ground
- 1 x TPC Driver DVD
- 1 x Registration and Warranty Card
- 1 x Simplified Chinese Manual
- 1 x China ROHS list

1.3 Specifications

1.3.1 General

- BIOS: AMI UEFI
- Certification: BSMI, CCC, CE, FCC Class A, UL
- Cooling System: Fanless design
- Dimensions (W x H x D):
  - TPC-1581WP: 419.7 x 269 x 56.7 mm (16.52" x 10.59" x 2.23")
  - TPC-1881WP: 488.1 x 309.1 x 56.7 mm (19.2" x 12.2" x 2.23")
- Enclosure:
  Front bezel: Die-cast Aluminum alloy
  Back housing: PC/ABS Resin
- Mounting: Panel Mount
- OS Support: Microsoft® WES7 32bit/64bit Windows 7 32bit/64bit Windows Embedded 8.1 Industry Pro 64bit Ubuntu 14.04.2 LTS
- Power Consumption:
  - TPC-1581WP:18W Typical, 60W Max. (Without Add-on card)
  - TPC-1881WP:28W Typical, 60W Max. (Without Add-on card)
- Power Input: $24V_{DC}$ +/- 20%
- Watchdog Timer: 1 ~ 255 sec (system)
- Weight (Net):
  - TPC-1581WP: 6 kg (13.22 lbs)
  - TPC-1881WP: 7 kg (15.44 lbs)

1.3.2 System Hardware

- CPU: Intel 4th Generation Core i3-4010U 1.7GHz
- Chipset: Lynx Point-LP
- Memory: 4GB DDR3L 1600MHz SO-DIMM SDRAM
- LAN: 10/100/1000 Base-T x 2
- Expansion Slots: Full-size Mini PCI-E
- Storage:
  CFast slot x 1
  2.5" SATA SSD slot x 1
- I/O:
  RS-232/422/485 x 1, RS-232 x 1
  USB 3.0 x 2, HDMI 1.4 x 1
  Audio Line out x 1, USB 2.0 x 1 (optional)
  Audio MIC x 1 (optional)

1.4 LCD Specifications

	TPC-1581WP	TPC-1881WP
Display Type	WXGA TFT LED LCD	WXGA TFT LED LCD
Size (diagonal)	15.6"	18.5"
Maximum Resolution	1366 x 768	1366 x 768
Maximum Colors	16.7 M	16.7 M
Viewing Angle	170°/160°	170°/160°
Luminance (cd / m2)	300	300
Contrast Ratio	500:1	500:1
Backlight	LED	LED
Backlight Life:	50,000hrs	50,000hrs

Note! *There might be several bright or dark pixels on the LCD. This phenomenon is normal in today's LCD manufacturing.*

1.5 Touchscreen Specifications

- **Touch Type:** Projected Capacitive
- **Base Glass Construction:** Tempered glass
- **Light Transmission:** ≥88%(Measured by BYK-Gardner at 550nm, and the test method accorded to ASTM D1003)
- **Controller:** USB Interface

1.6 Power

- **Input Voltage:**
  - Typical - $24V_{DC}$
  - Swing Range - $24V_{DC}$ +/- 20%
- **Power Consumption:**
  - TPC-1581WP: 18W Typical, 60W Max. (Without Add-on card)
  - TPC-1881WP: 28W Typical, 60W Max. (Without Add-on card)

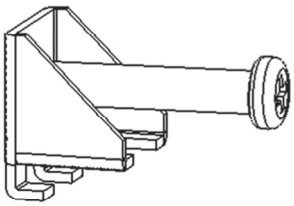
1.7 I/O Ports Arrangement

The arrangement of the I/O ports is shown in Figure 1.1

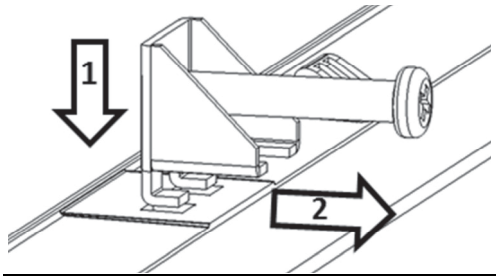
Figure 1.1 TPC-1581WP- I/O Port Arrangement

1.8 Panel Mounting

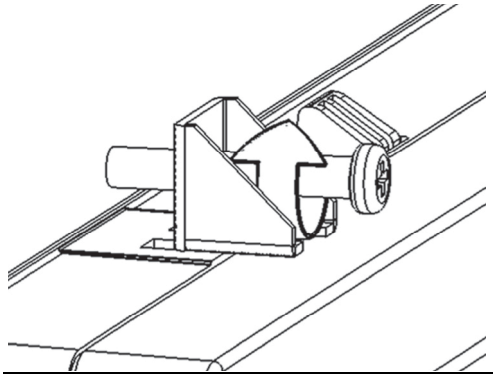
1. There is an adhesive waterproof gasket on the Mg front bezel. Make sure the waterproof gasket is in position before installing TPC into the panel opening.
2. Install the TPC into the panel opening.
3. Find the clamps and long screws in the accessory pack. Hook the clamps to the holes around the four sides of the bezel. Insert the screws into every clamp and fasten them. These screws will push the mounting panel and fix the unit.
4. The suggested mounting panel thickness is less than 6 mm (0.236”).



Insert the screws into each clamp and fasten them



Hook the clamps into the holes



Fasten screws
Torque: 2 kgf-cm
These screws will push the mounting panel and secure the unit

Figure 1.2 Panel Mounting

1.9 Dimensions and Cutout

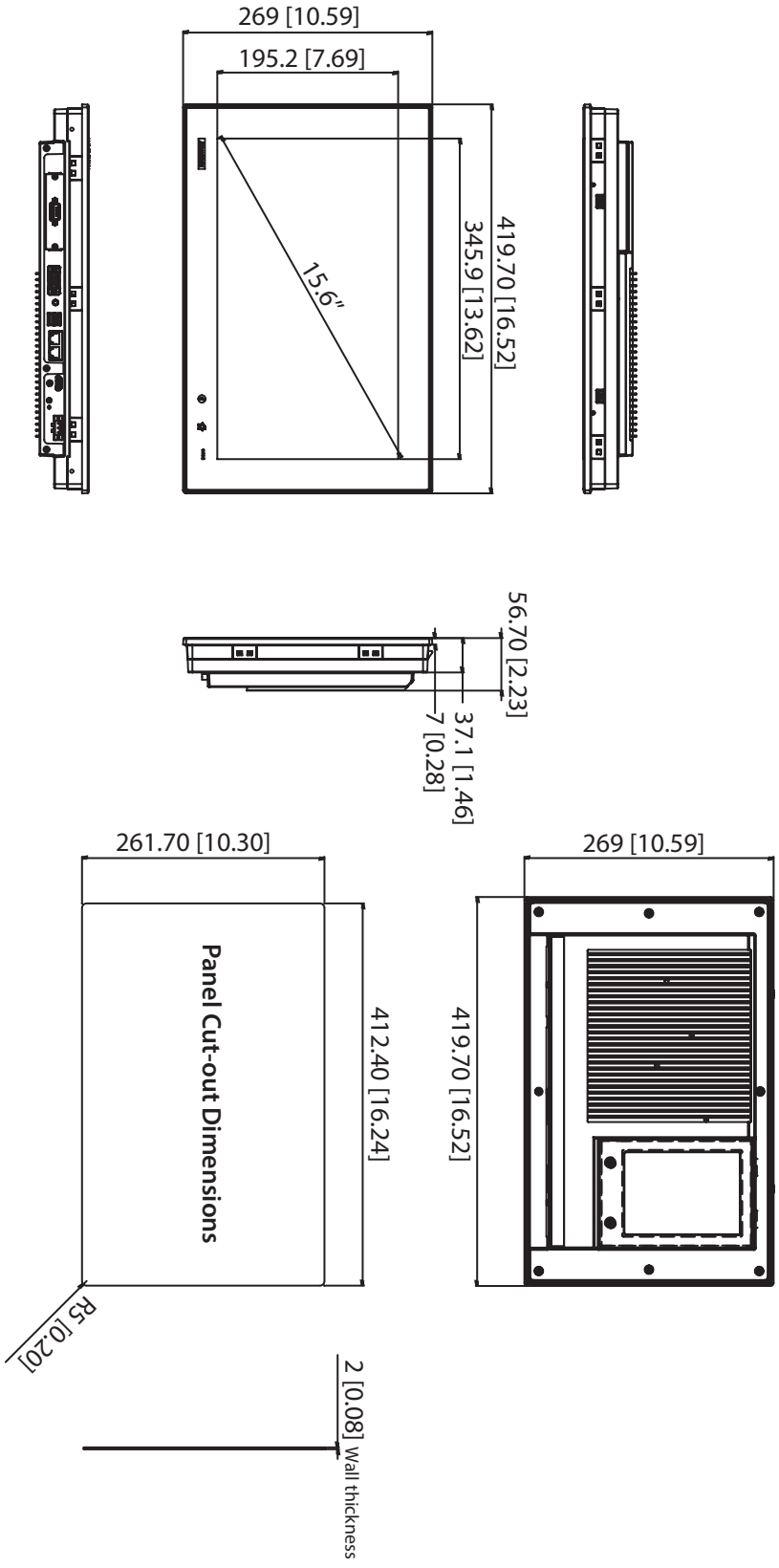


Figure 1.3 TPC-1581WP Dimensions

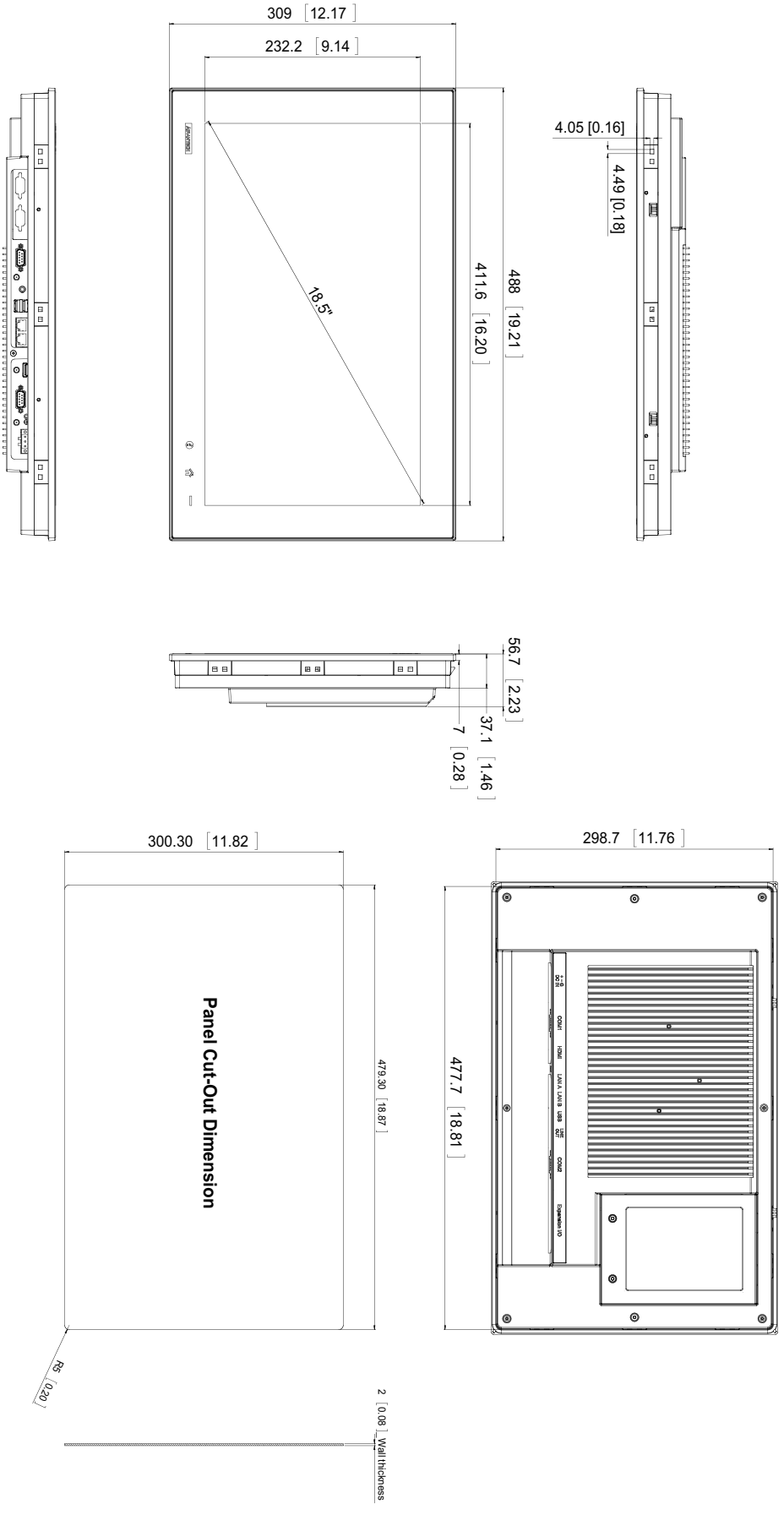


Figure 1.4 TPC-1881WP Dimensions

Chapter 2

System Setup

2.1 System Setup

You can easily get TPC started by following the below steps.

1. Unpack the TPC package. Check the packing list at the beginning of this manual to make sure all items have been included.

Figure 2.1 Unpack the Package

2. Open side cover and then Install a CFast card containing Windows CE, Embedded Windows XP or another operating system.

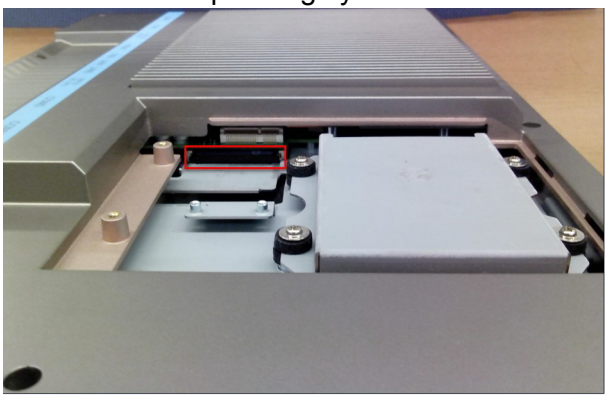


Figure 2.2 Install CFast Memory Card

Warning! *It is suggested to turn OFF system power as you plug in or pull out the memory card, even though the CompactFlash memory is hot swappable.*

3. Connect the power connector to the 24 V_{DC} power lines. The power lines can either be of some power adapter or in-house power source.

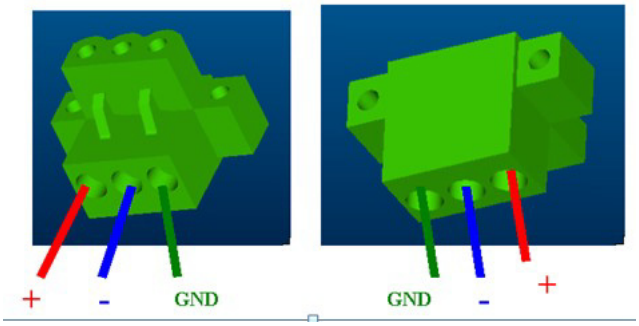


Figure 2.3 Pin Definition of Power Connector

Figure 2.4 Power Receptor

4. Plug the power lines into the system power receptor.
5. Power on the system.

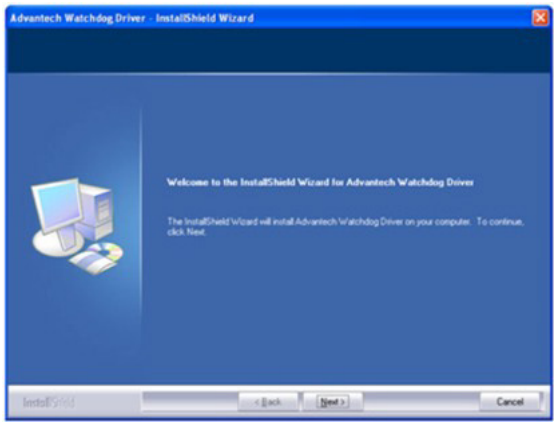
2.2 Installing the Drivers

2.2.1 Installation of Touch Screen driver

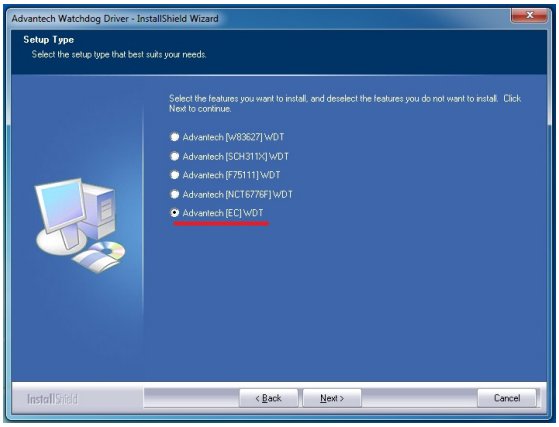
Windows 7 and Windows 8 has the built-in multi-touch driver to support.

2.2.2 Installation of Watchdog driver

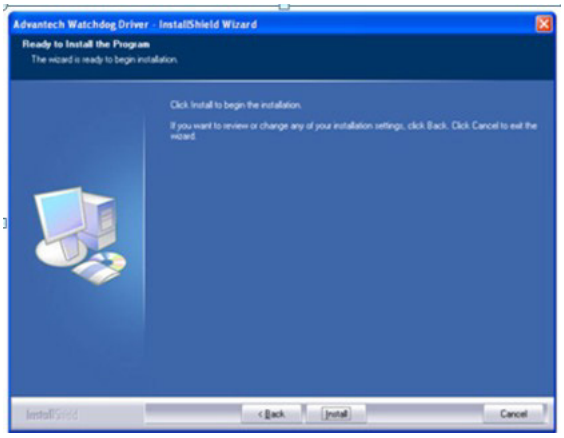
1. Enter into Watchdog folder, double click AdvWDT icon, and then click "Next" under InstallShield Wizard window.



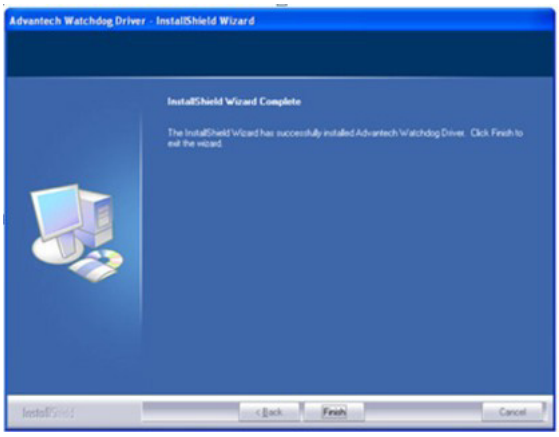
2. Select "Advantech [EC] WDT" and click "Next"



3. Click "Install"

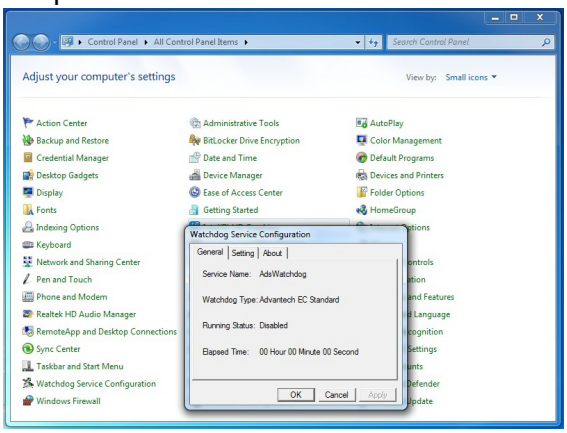


4. Click "Finish" to finish the installation



5. Select “Yes, I want to restart my computer now” and click “OK”

6. After installing Watchdog driver, a "Watchdog Service Configuration" icon will show in the control panel.

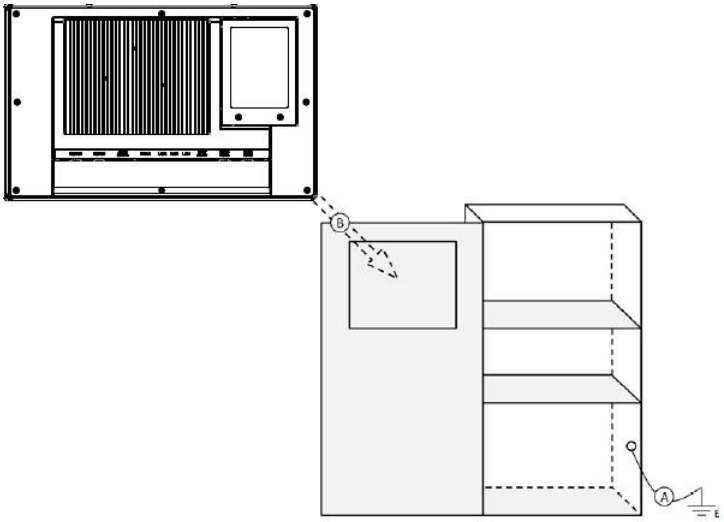


7. Double click the "Watchdog Service Configuration" icon, and you can configure the Watchdog timer function.

2.3 Cabinet Installation Guide

Follow the following steps to setup TPC-1581WP/1881WP series, and please pay attention that Ground pin of TPC-1581WP/1881WP series should be connected to earth ground. Under this circumstance, TPC-1581WP/1881WP series could have the best performance such as EMI immunity, ESD immunity, Surge immunity and also system isolation. If TPC-1581WP/1881WP series is embedded in the cabinet, TPC-1581WP/1881WP's ground, cabinet's ground and earth ground should all be connected together.

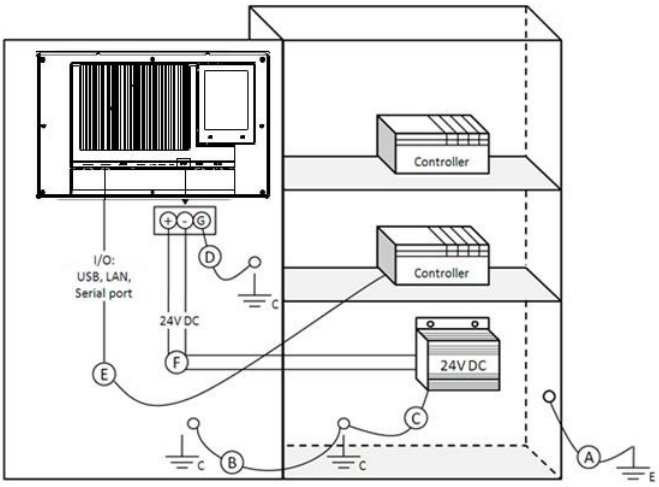
1. Embed TPC-1581WP/1881WP series into the cabinet.



Step A: Connect the cabinet to earth ground.

Step B: Embed null TPC-1581WP series into the cabinet without any I/O cable and power.

2. System wiring



Step A: Connect the cabinet to earth ground.

Step B: Ensure that all cabinet has been grounded together.

Step C: Connect the ground of the power supply to the cabinet.

Step D: Connect the ground pin of TPC-1581WP/1881WP series to the cabinet.

Step E: Connect the I/O to the controller if needed.

Step F: Connect the V+ and V- of power supply to TPC-1581WP/1881WP series.

While completing step A to F step by step, you can supply power to TPC-1581WP/1881WP series now.

Chapter 3

Features in Windows Embedded

3.1 Features in Windows Embedded

TPC product supports the embedded Windows platform. This section outlines the important features (EWF, FBWF, UWF and HORM), that are provided in WES7.

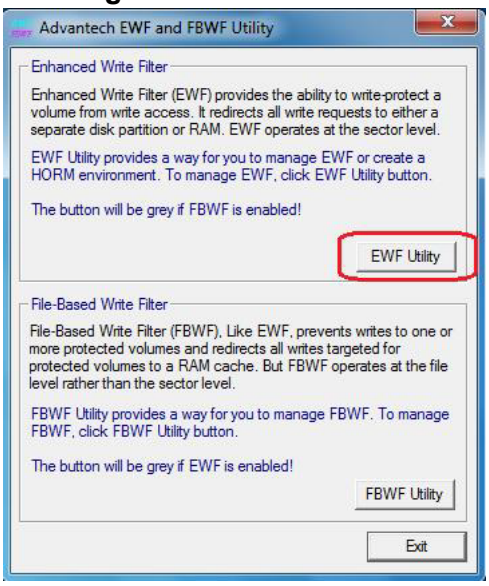
3.2 Enhanced Write Filter (EWF)

Enhanced Write Filter (EWF) and File-Based Write Filter (FBWF) redirect all writes targeted at protected volumes to a RAM or disk cache, called an overlay. The overlay stores changes made to the operating system, but is removed when the device is restarted, restoring the device to its original state. Note that there is no disk-based overlay support for Windows Embedded Standard 7.

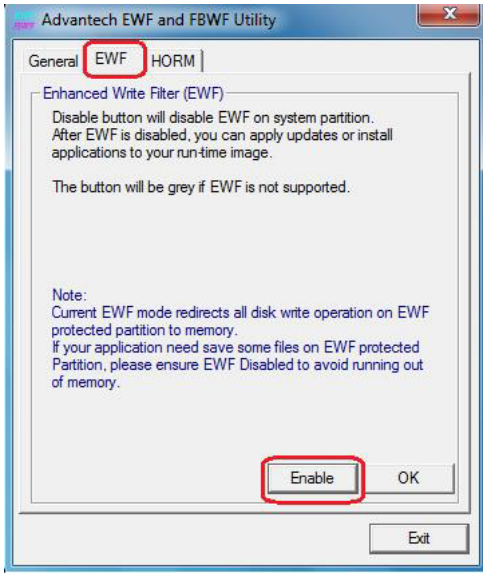
EWF works at the sector level on protected disks and allows you to commit changes so that they persist when the device is restarted. EWF is useful for thin clients that do not need to store cached information or receive frequent updates. Changes made to a system protected by EWF are stored in one or more layers that represent snapshots in time. Applying changes to an image applies all changes made to the operating system during a specific period of time.

Advantech provide utility to operate EWF. Refer below steps if you want to enable.

1. Click **Start Menu**->**All Programs**->**Advantech**->**AdvWF** and click **EWF Utility**



2. Click **EWF tab**, and click "**Enable**" button



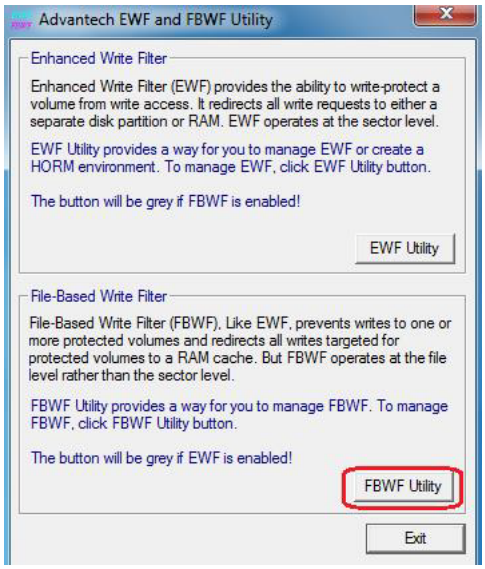
3. After the system is rebooted automatically, EWF enable

3.3 File-Based Write Filter (FBWF)

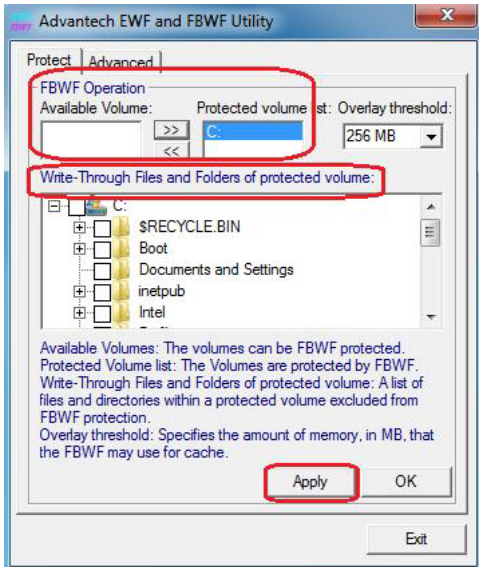
File-Based Write Filter (FBWF) works at the file level instead of the sector level on protected disks. By default, FBWF protects the whole disk, but selective write through exceptions can be granted to specific files and folders. Writes to folders with write-through exceptions will be persisted when the device restarts.

Advantech provide utility to operate FBWF. Refer below steps if you want to enable

1. Click **Start Menu**->**All Programs**->**Advantech**->**AdvWF** and **click FBWF Utility**



2. Move volume you want to protect from “Available Volume” to “Protected Volume” and choose “Write-Through Files and Folders”



3. Click “**Apply**”, and the system is rebooted automatically. Then FBWF enable.

3.4 HORM

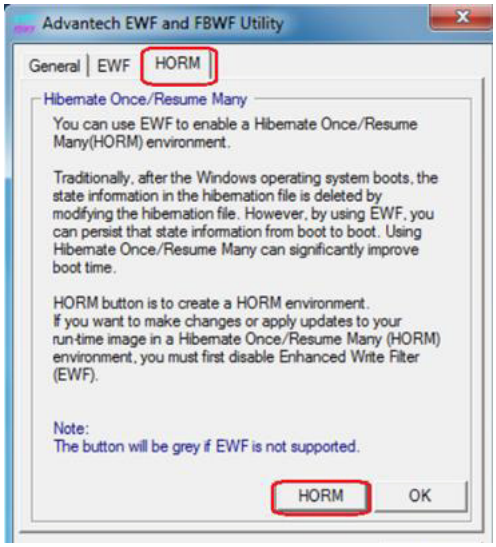
HORM stands for Hibernate Once Resume Many. In HORM environment, a single hibernation file is used to boot the system repeatedly. To set a HORM environment, please follow the steps below.

1. Make sure EWF is disabled. You can run OSUnLock to disable EWF.
2. Enable hibernation support: Open the command prompt and type “powercfg -h on”
3. Run “power options” in control panel, and then select “Enable Hibernation” in hibernation pane.

Enable EWF:

1. Run OSLock, and then system reboot automatically.
2. Open those software that customers want to directly use after system resume from hibernation.
3. Hibernate via Advantech HORM utility:

1. Click **Start Menu->All Programs->Advantech->AdvWF**
2. Select “Enable Hibernation” in “Power Options”.
3. Open AdvWF and enable EWF
4. After the system is rebooted automatically, open AdvWF and click EWF Utility.
5. Click HORM tab, and click “HORM” button.



Note! *Go to Advantech’s product support page for the detailed driver user manual.*

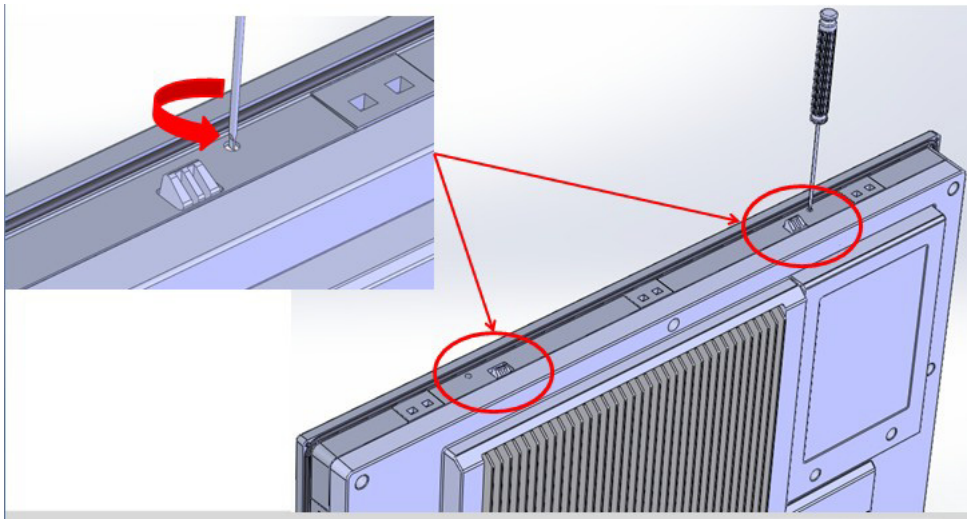
Appendix A

Easy Installation

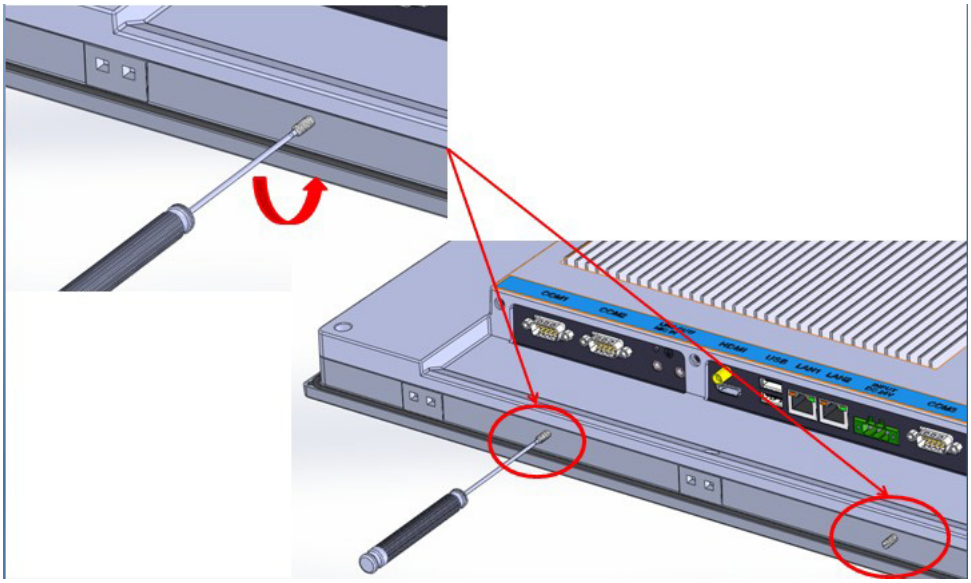
A.1 Easy Installation

With easy installation, a person can complete panel mount process by himself, just follow following steps:

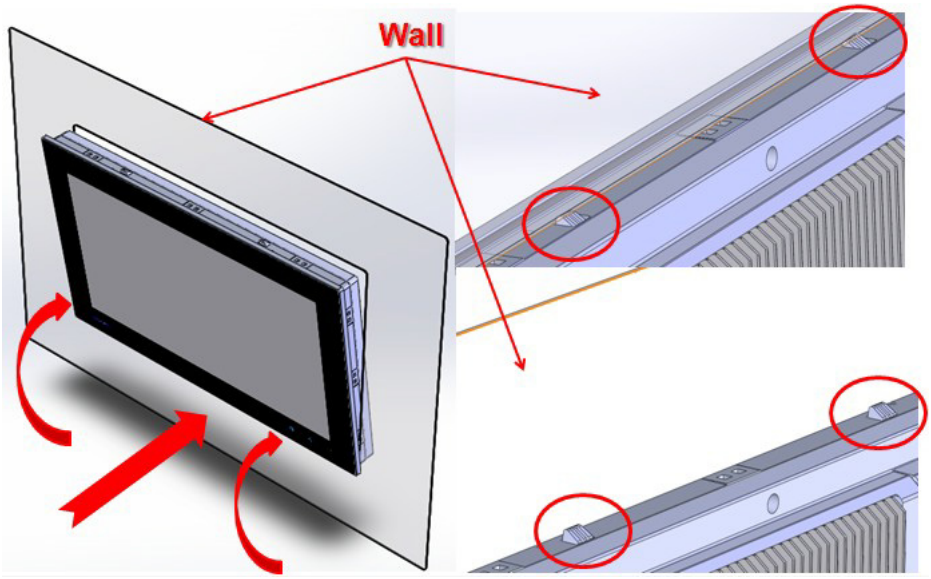
Step 1: Release the 2 screws in the top of TPC and the snap hook will arise.



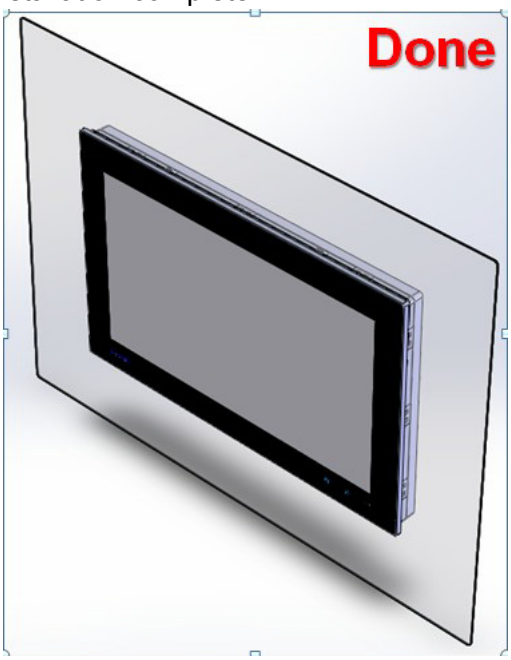
Step 2: And then release the 2 screws in the bottom of TPC



Step 3: Set TPC cross the cut-out hole and push it into the wall, the snap hook will hold the machine on the wall.



Step 4: Panel-mount installation complete



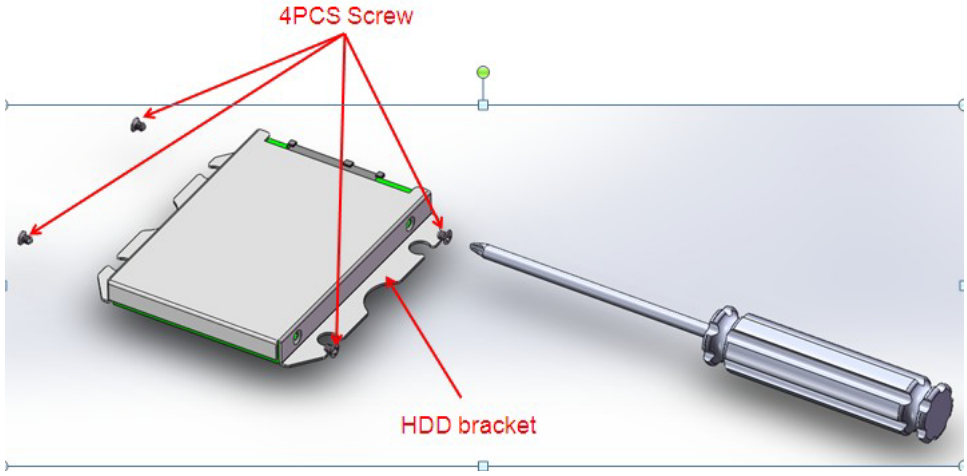
Note! While using easy installation, the suggested mounting panel thickness is less than 2 mm (0.079"). When without easy installation, the suggested mounting panel thickness is less than 6 mm (0.236").

Appendix B

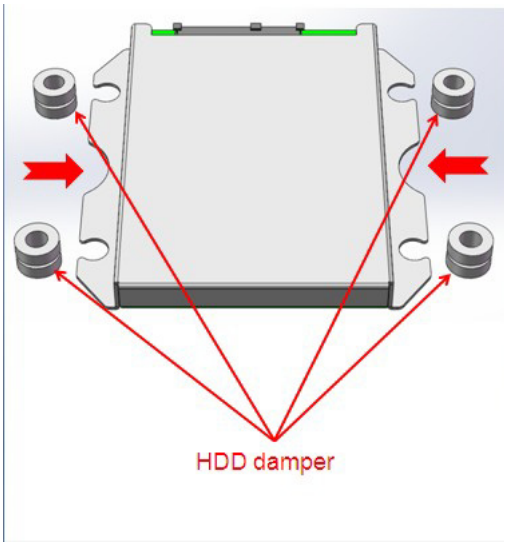
HDD assembly instructions and mSATA expansion

B.1 HDD Assembly Instructions

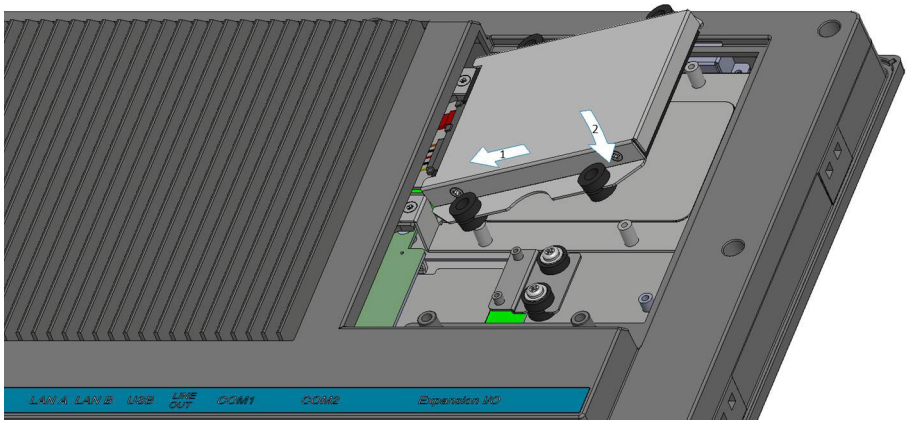
Step 1: Fix 2.5" HDD/SSD on the bracket, shown as follows:



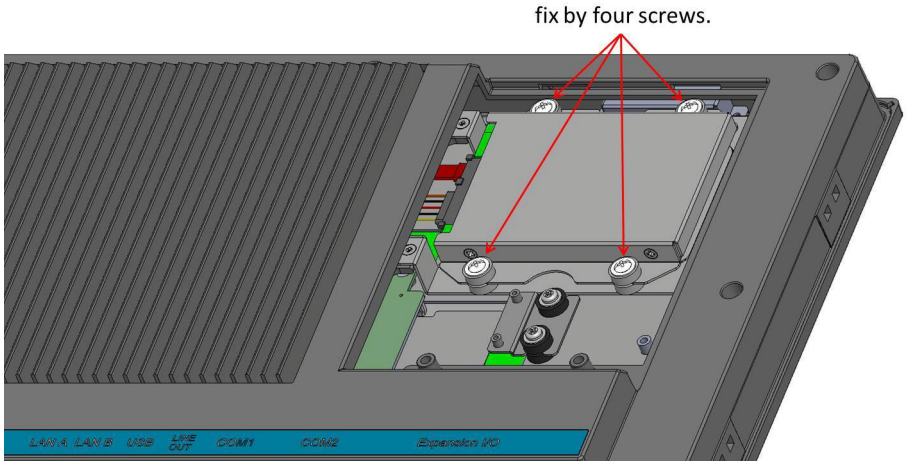
Step 2: Install the dampers in the bracket.



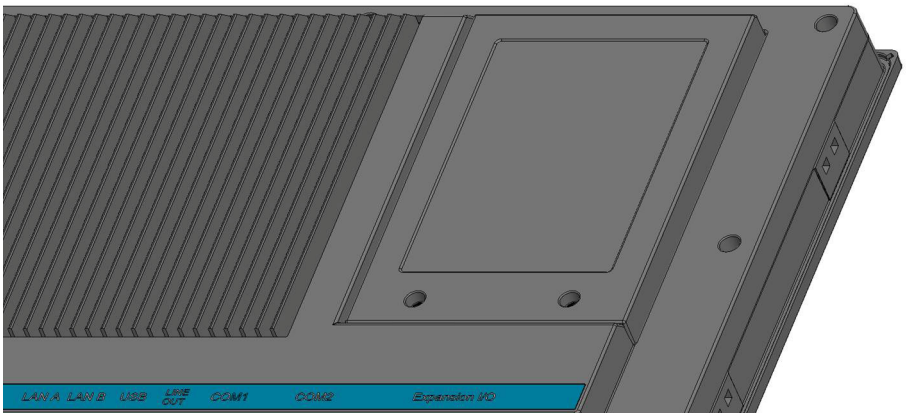
Step 3: Install HDD module into system and then cover back the side cover to finish.



fix by four screws.

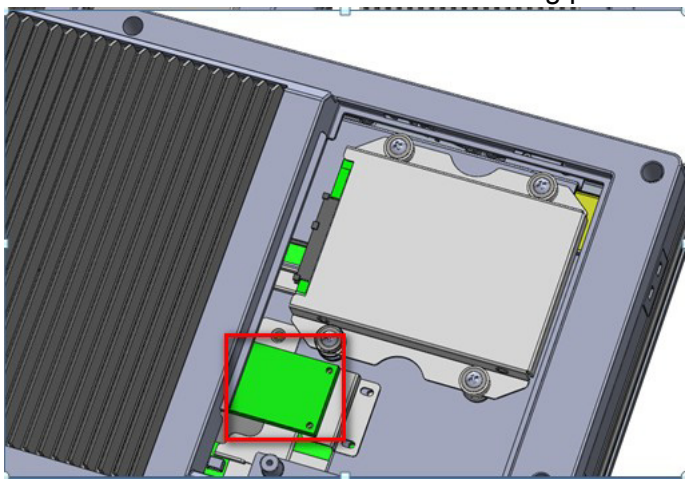


Cover back the side cover to finish.



B.2 mSATA expansion

Step1: Insert mSATA module to mini-PCIE slot as following picture shows:



Step2: Power up the system then you can find your mSATA storage after entering OS.

Appendix C

UI Operating Process

C.1 UI Operating Process

This section is to introduce how to operate HMI utility(GL_Utility), you can download the utility from Advantech's product support portal of the TPC at http://support.advantech.com. See the process below:

1. As you can find 2 function buttons in the lower right corner of front panel, represents “intelligent” key while represents “home” key. At the same time you can find status indicator show in following table:

Table C.1: Status indicator table

Indicator	Status
Green	Power on
Orange	Stand by
No light	Off

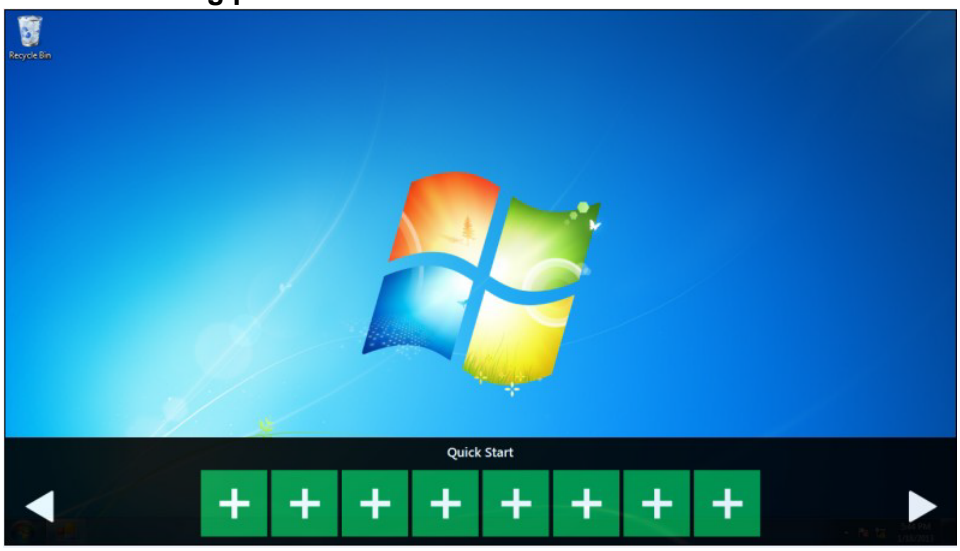
2. One press Home Key->

Home – Back to desktop (default setting)

Home - Execute Home-key App (Set up in setting page)

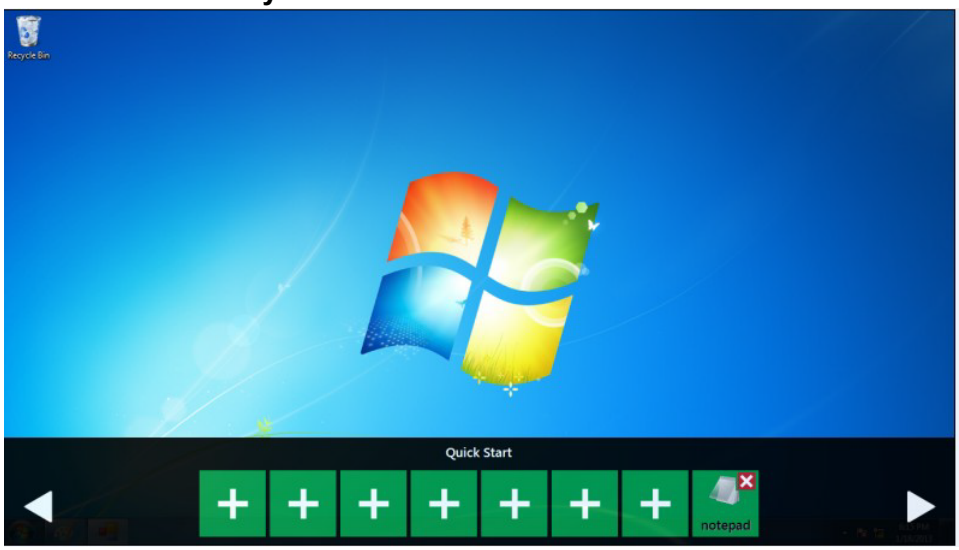
3. Long press Home Key->

Home - Long press to disable / enable touch function



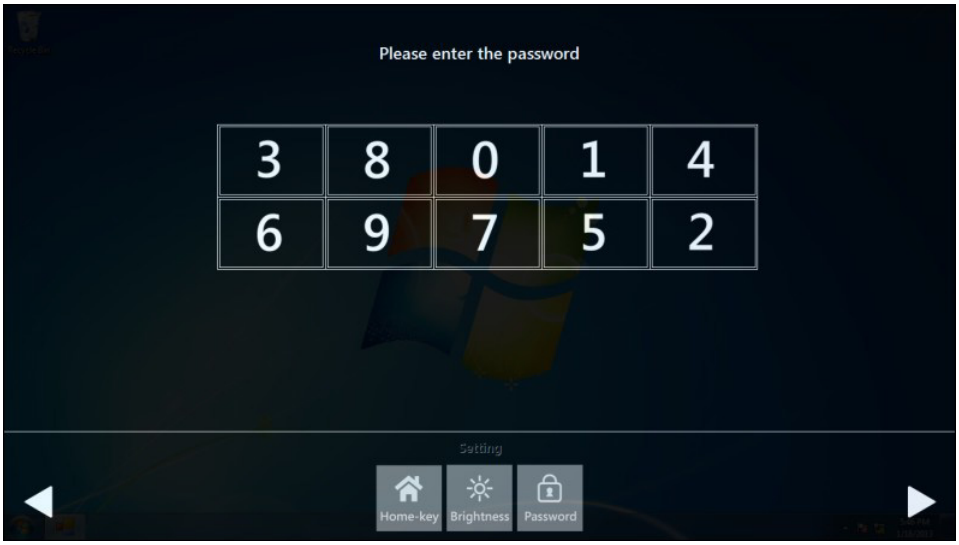
4. One press Intelligent Key->

GLToolbar Utility



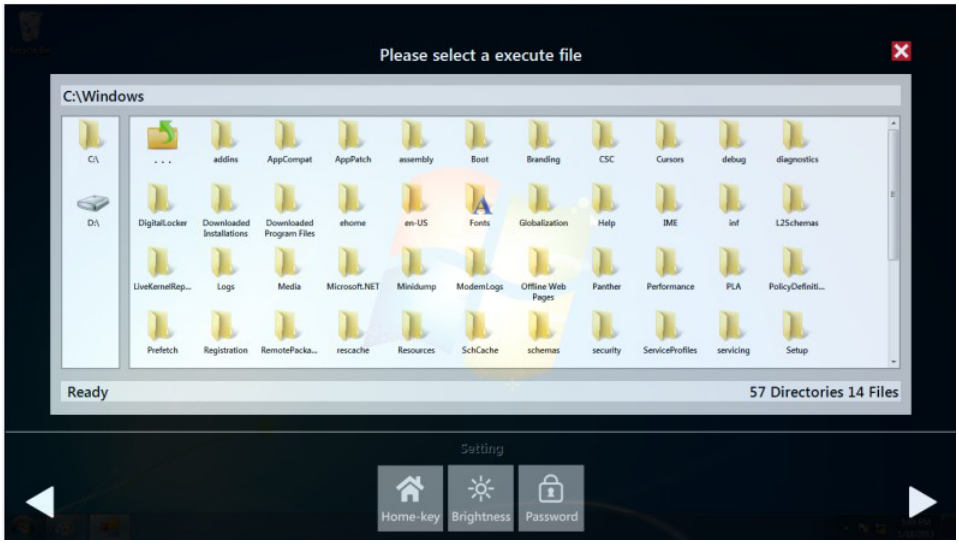
A. Quick start->

- Press “+” to add shortcut
- Long press the icon to perform “right click” until an “X” mark appears in upper right corner to “delete”

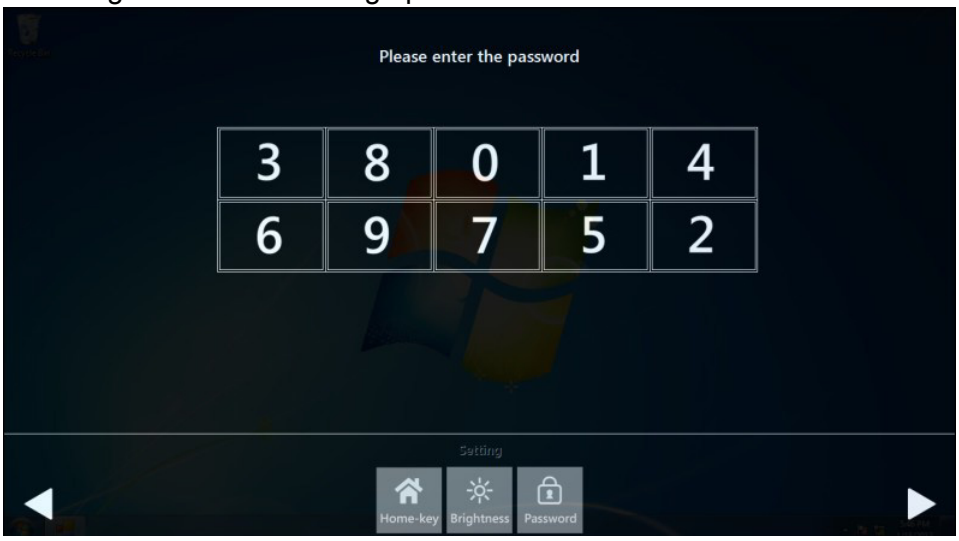


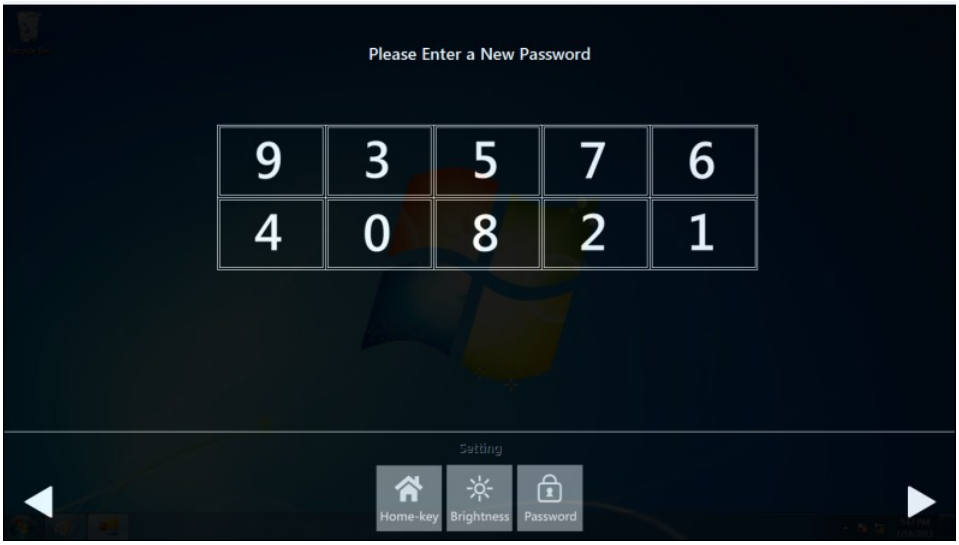
B. Setting ->

- Password confirmation for authority confirmation when first log in, default password is “1234” without input order to active.



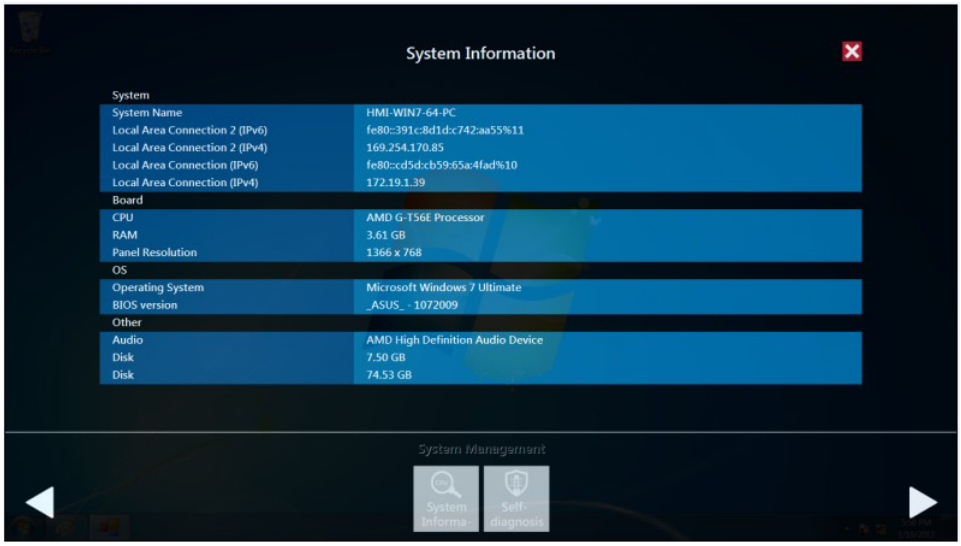
- Setting - Home-key: Select an execute file to set up as "Home-key" App, in default path is to show “desktop”
- Setting - Brightness: Brightness control from 1 to 8
- Setting - Password: Change password function





C. System management->

– System information:



– Self Diagnosis:

Note!* *TPC-1581WP/1881WP also provides open button code as following definition for customer's configuration to their Apps/SW applications. The codes are defined from general keyboard input.*

Table C.2: Button code definition

	One press	Long press
I key (icon)	Ctrl+Shift+Alt+I	Ctrl+Shift+Alt+U
H Key (icon)	Ctrl+Shift+Alt+H	Ctrl+Shift+Alt+L

Appendix D

Notice

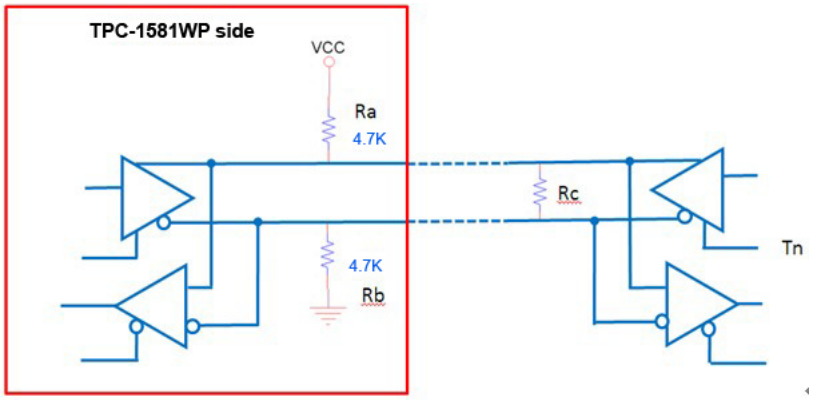
D.1 Notice

1. RS-422/485 terminal impedance calculation:

In order to improve transmission speed for big data and provide steady signal in long distance transmission of RS422/485, we'll add a terminal impedance that matches transmission line's impedance.

Another key for correct signal transmission is that the Vfsb of receptor must be +/-0.2V. If Vfsb is under 0.2V, then it'll come out abnormal transmission result. The terminal impedance is the most important condition to maintain Vfsb above 0.2V.

The RS422/485 I/O of TPC-1581WP/TPC-1881WP has been added pull high & pull low resistor, as shown in following diagram:



When using RS422/485 port of TPC-1581WP/1881WP, please apply below formula to calculate terminal impedance to meet the standard. $V_{fsb} = 0.2V$

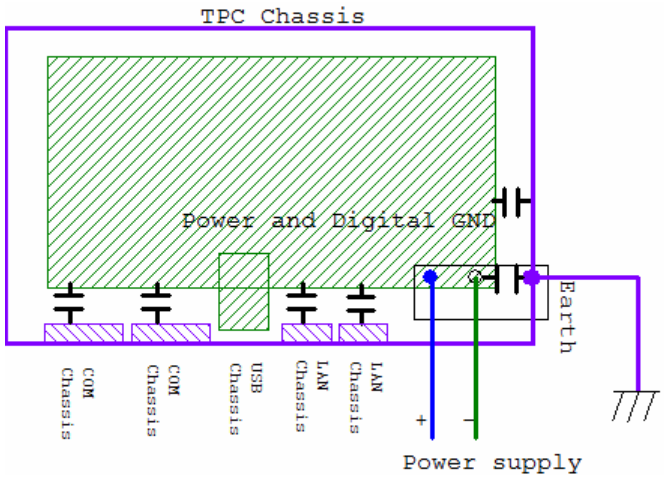
$V_{fsb} = 0.2V$, $Vcc = 5V$, $R_a = R_b = 10K\Omega$

$$V_{fsb} = Vcc(R_c / (R_a + R_c + R_b))$$

D.2 Power/Digital Ground and Earth Ground

The purpose is to block all the external interference on the chassis, and prevent any possibility of bad grounding design to cause electric shock of people. This is so called level 1 isolation which consumer PC do not implement this kind of design.

- TPC Chassis and Earth (Power pin3) are short,
- TPC Chassis and Power / Digital GND are OPEN



The TPC is and industrial grade product, designed to prevent external interference and the possibility of electric shock. To complete the isolation design, we need to consider the following:

- The Ethernet is isolated, a LAN connection will not impact the isolation design.
- For general USB devices, to solve EMI and ESD issues, they are designed as a chassis and digital short. But the TPC prevents damage to USB devices, ESD and EMI solutions are designed to use the Power GND as a vent path to ensure Power GND and Chassis GND will not have potential difference abnormalities.
- For COM ports, since there are different COM port designs, long distance connection cause voltage level difference between the two COM port chassis.So the shell ground of cable must be isolated to signal digital ground

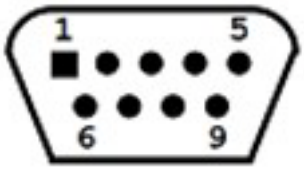
In real cases, many customers may break the level 1 isolation by 3rd party Device or cable design, in this situation, we need to consider making all the GND short (Power GND/Digital GND/Earth GND), and ensure customers have good Earth GND connection.

Appendix E

Comport Pin Definition

E.1 COM1: RS-232

Pin Definition



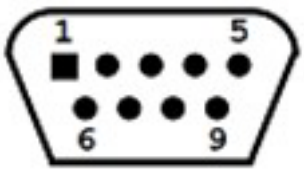
COM1

Pin	Signal
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

E.2 COM2: RS-232/422/ 485

The serial port COM2 on the TPC-1581WP/1881WP series are adjustable by BIOS. It can be set to RS-422 or RS-485 mode. This port is designed with auto data flow control capability.In other words, the TPC-1581WP/1881WP series can automatically detect the data flow direction at this port when the two wired RS-485 communication is activated.

Pin Definition

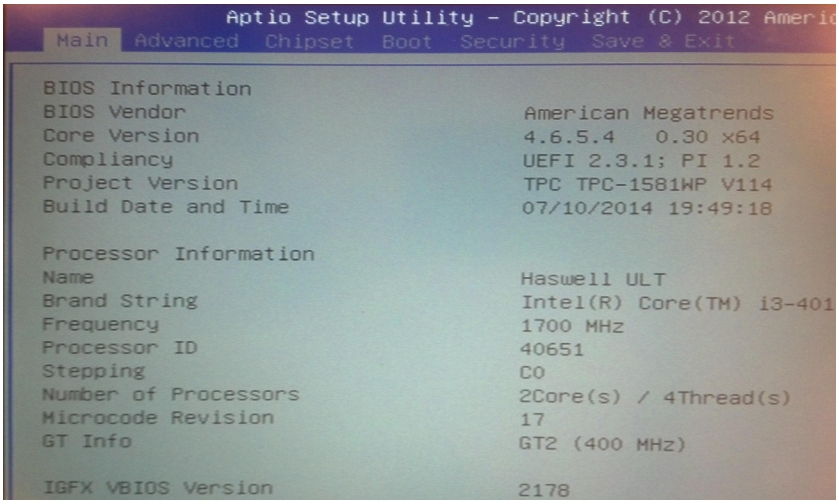


COM 2

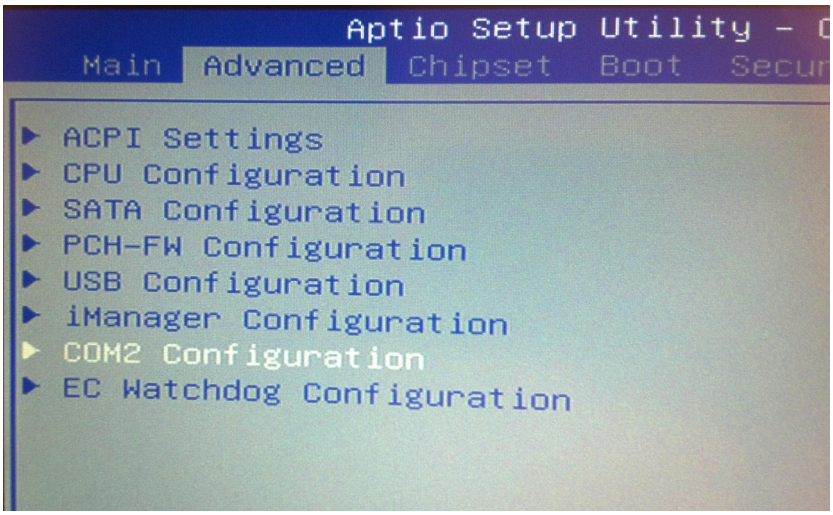
Pin	Signal	
	RS-422	RS-485
1	TX-	D-
2	TX+	D+
3	Rx+	–
4	Rx-	–
5	GND	GND
6	–	–
7	–	–
8	–	–
9	–	–

E.3 RS-422/ 485 mode setting by BIOS

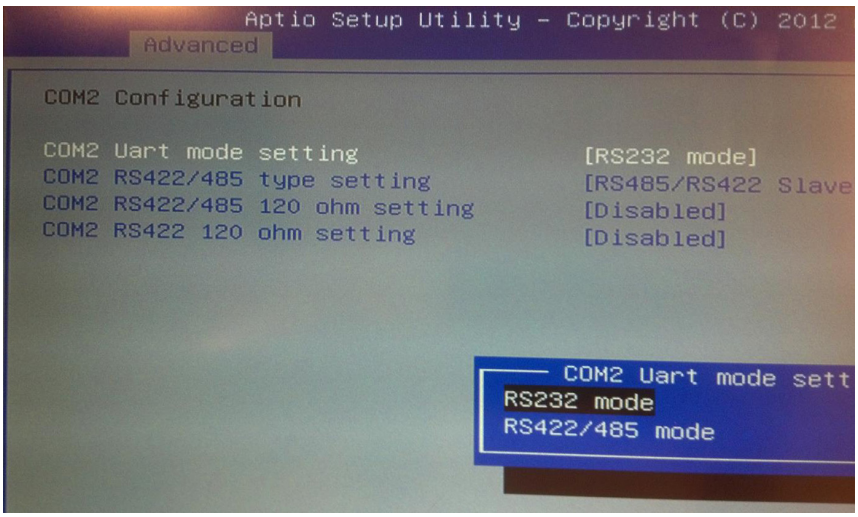
1. Enter into BIOS setup utility



2. Enter into Advanced tab and select Serial ports Configuration.



3. Select Serial Port 2 Configuration (COM2) for RS-422/ 485 mode setting.



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