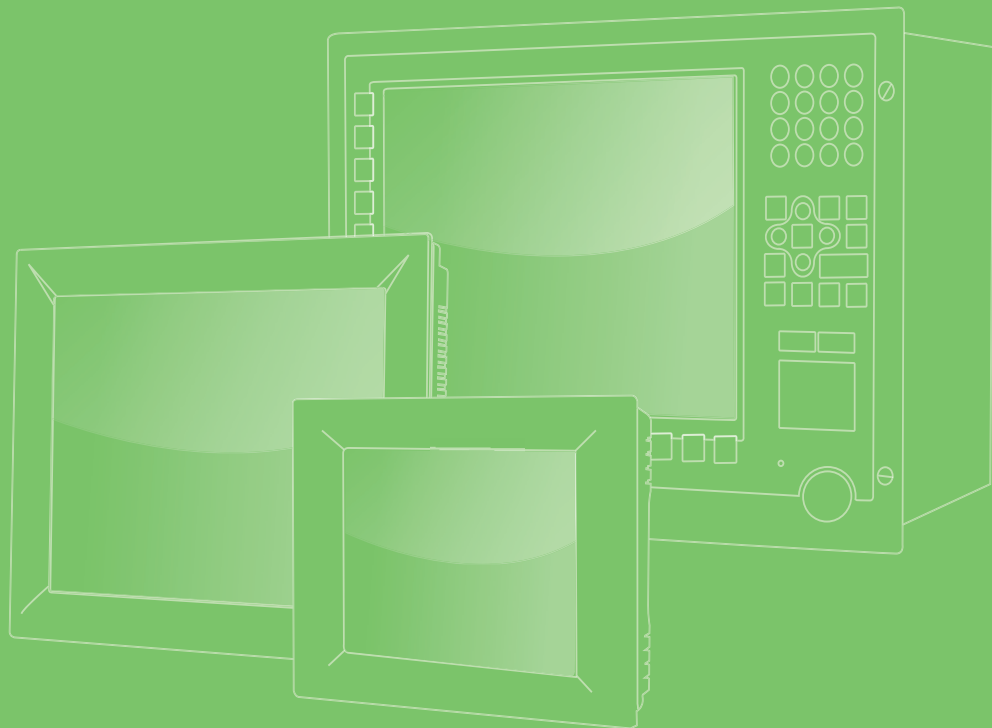


User Manual



TPC-XX40

**Multi-Touch Panel Computer
with AMD Dual-core Processor**

ADVANTECH

eAutomation

Copyright

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This Manual Covers the Following Models:

- TPC-1840
- TPC-2140

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 merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Declaration of Conformity

CE

This product has passed the CE test for environmental specifications 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; rated from 18-32 V_{DC}, minimum 2.5 A to 1.5 A.

Safety Instructions

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

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

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

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.*



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Chapter 1

General Information

1.1 Introduction

With brand-new ID design, TPC-1840/2140 series provide high resolution 18.5"/21.5" display and PCT multi-touch in 16:9 wide format. By embedding AMD T56E 1.65GHz processor with external APU, TPC-1840/2140 can support advanced graphical performance in more complex applications. Built-in function and home key button for greater user usability and operating safety. TPC-1840/2140 series also support mini-PCIe slot for communication function expansion. The opening side cover is designed for easy maintenance of Cfast/HDD/Mini-PCIe components.

The following are the key features:

- 18.5" WXGA / 21.5" Full HD TFT LED LCD display
- AMD dual-core T56E 1.65GHz with external APU, advanced graphical performance
- 16:9 wide screen with PCT multi-touch
- Built-in function and home key button used for intuitive UI
- Anti-scratch surface: 7H hardness
- Easy Maintenance of Cfast/HDD/Mini-PCIe components by opening side cover
- Support Mini-PCIe expansion slot
- Support HDMI for second display application
- HD Audio supports for alarm application
- Front LED indicator to show operating status
- NEMA4/IP65 compliant true flat screen
- Compact design with Die-cast Magnesium alloy front bezel

1.2 Packing List

- 12 x Panel Mount Clamps
- 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 System Kernel

- **CPU:** AMD G-series T56E 1.65GHz
- **BIOS:** AMI 32Mbit BIOS
- **System Chipset:** A50M FCH
- **VGA:** Integrated in A50M FCH
- **Memory:** 4GB SO-DIMM DDR3 SDRAM
- **LAN:** 10/100/1000Base-T x 2
- **Watchdog Timer:** 1 ~ 255 sec (system)
- **Expansion Slots:** Full-size Mini PCI-E x 1
- **Storage:** CFast slot x 1, 2.5" SATA HDD x 1(optional)
- **OS Support:** Microsoft® Win8/WES7P/XP/WES2009/WinCE 6.0/ Linux

1.3.2 I/O Ports

- **4 Serial Ports:** RS-232 x 3, RS-422/485 x 1
- **2 USB Ports:** compliant with USB 2.0 (Host)
- **Video and Audio Ports:** HDMI (Clone mode) x 1, Mic in & Line out x 1

1.3.3 Safety and Environment

Safety

- FCC Class A
- CE certificated
- The front bezel is certified with IP65

Environment

- **Operating Temperature:**
 - 0 ~ 50°C (32 ~ 122°F)
- **Storage Temperature:**
 - -20 ~ 60°C (-4 ~ 140°F)
- **Humidity:** 40°C @ 10~95% relative humidity (non-condensing, test times: 48hrs)
- **Vibration:** 1 grms (5 ~ 500 Hz) with HDD, 2 grms (5 ~ 500 Hz) with CFast only

1.4 LCD Specifications

	TPC-1840WP	TPC-2140WP
Display Type	WXGA LED LCD	Full HD LED LCD
Size (diagonal)	18.5"	21.5"
Maximum Resolution	1366 x 768	1920 x 1080
Maximum Colors	16.7 M	16.7 M
Viewing Angle	170°/160°	178°/178°
Luminance (cd / m2)	300	300
Contrast Ratio	1000:1	5000:1
Backlight	LED	LED

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:** $\geq 88\%$ (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 - 18-32V_{DC} (the fuse will become an open circuit if the input level exceeds 33V_{DC})
- **Power Consumption:** 35W (Typical)

1.7 I/O Ports Arrangement

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



Figure 1.1 TPC-1840WP/2140WP- 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.
1. Install the TPC into the panel opening.
2. Find the eight clamps and eight 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.
3. The suggested mounting panel thickness is less than 6 mm (0.236").



Figure 1.2 Panel Mounting

1.9 Dimensions and Cutout

TPC-1840WP

- **Weight:** 8kg
- **Dimensions (W x H x D):**
 - 488.1 x 309.1 x 56.7 (19.2" x 12.2" x 2.2")
- **Cutout:**
 - 479.3 x 300.3 mm (19.2" x 12")

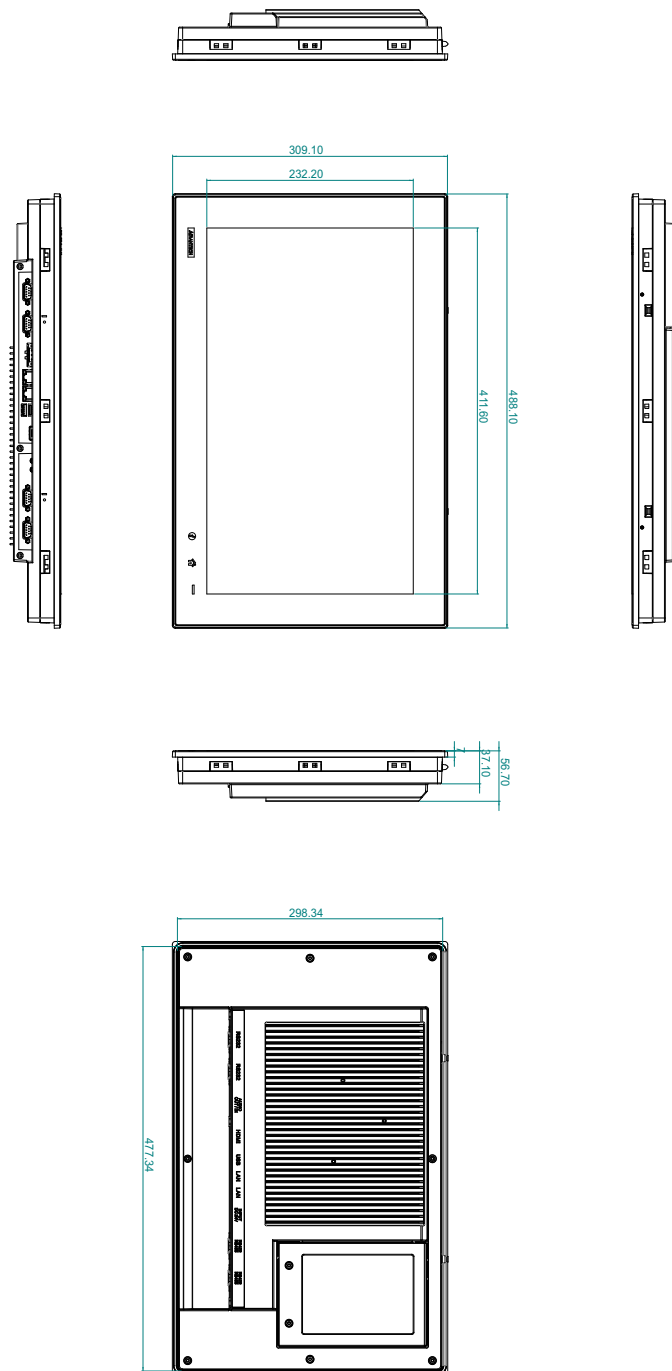


Figure 1.3 TPC-1840WP Dimensions

TPC-2140WP

- **Weight:** 8.5kg
- **Dimensions (W x H x D):**
 - 580.7 x 355.3 x 56.7 (22.8" x 14" x 2.2")
- **Cutout:**
 - 551.1 x 345.7" (22.1" x 13.8")

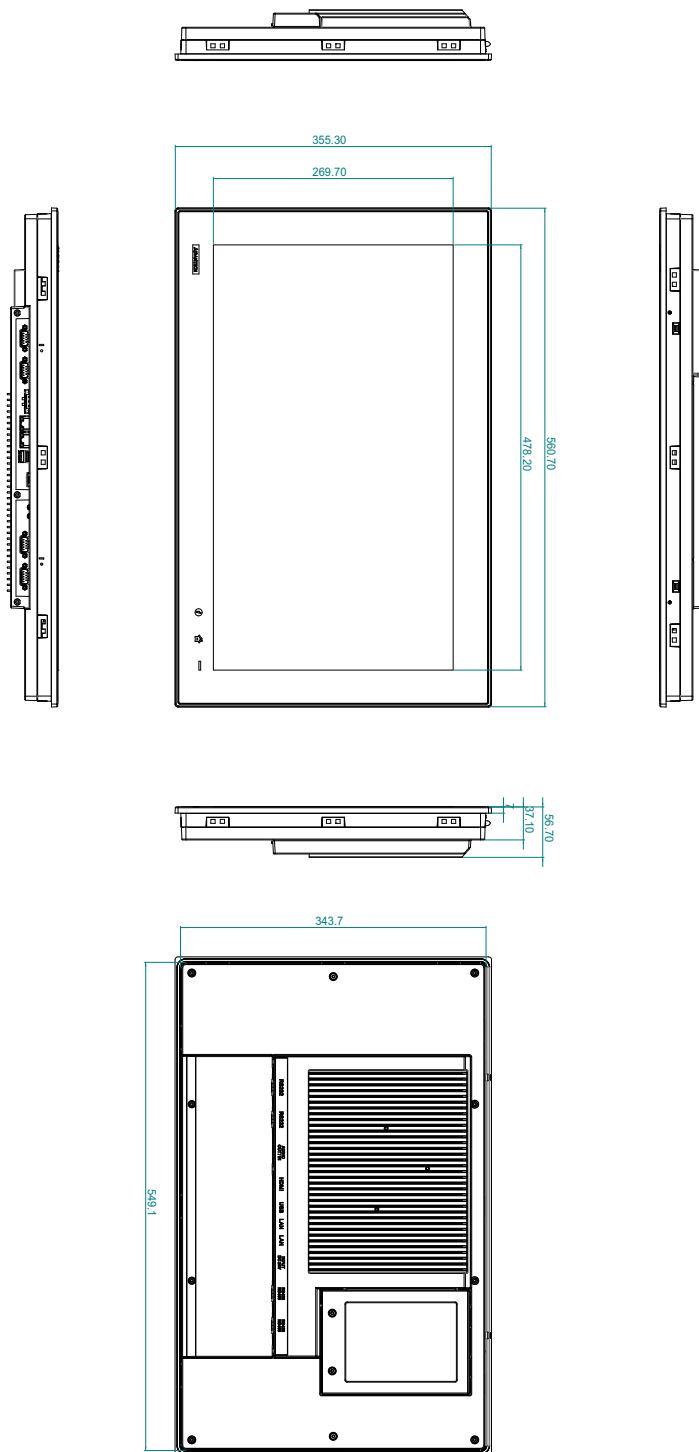


Figure 1.4 TPC-2140WP Dimensions

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.

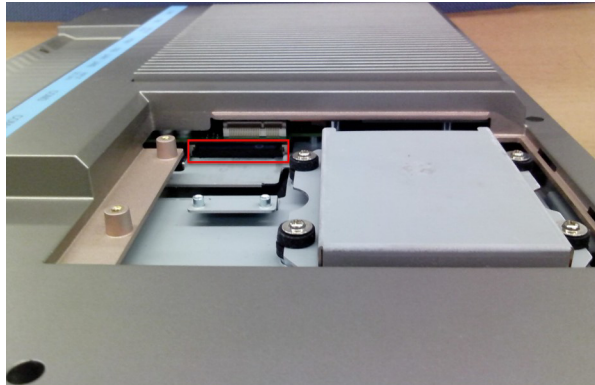


Figure 2.2 Install CompactFlash Memory Card

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.

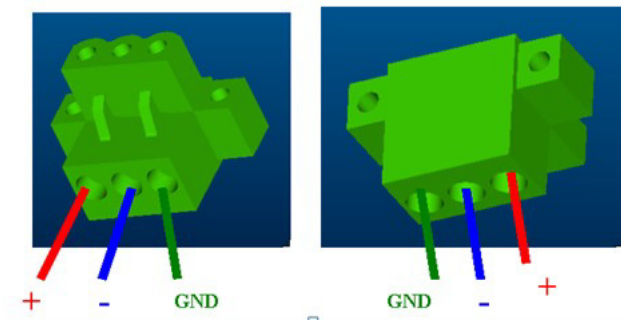


Figure 2.3 Pin Definition of Power Connector



Figure 2.4 Power Receptor

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

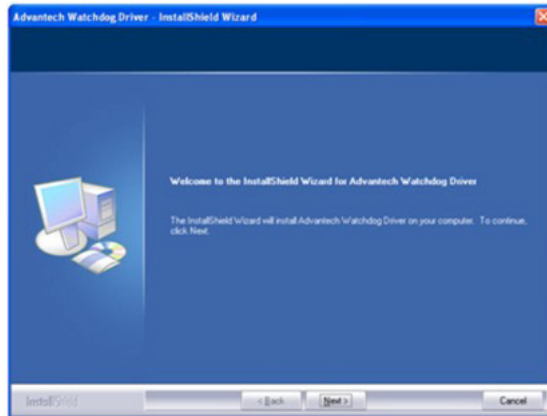
2.2 Installing the Drivers

2.2.1 Installation of Touch Screen driver

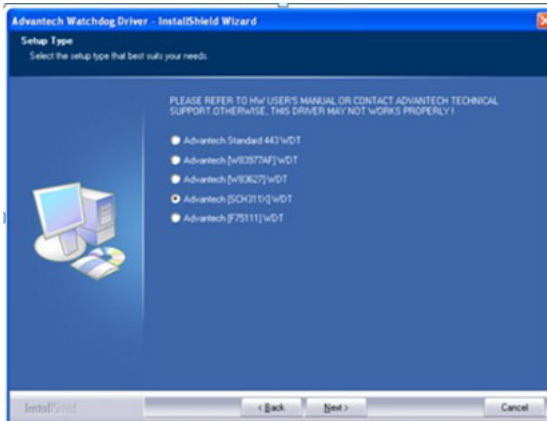
TPC-1840 will use built-in PCT touch driver of OS. If operating under Windows XP SP3, Windows 7 and Windows 8.

2.2.2 Installation of Watchdog driver

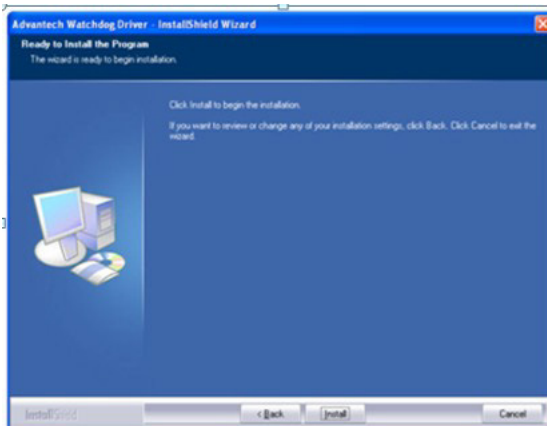
1. Enter into Watchdog folder, double click AdvWDT icon, and then click "Next" under InstallShield Wizard window.



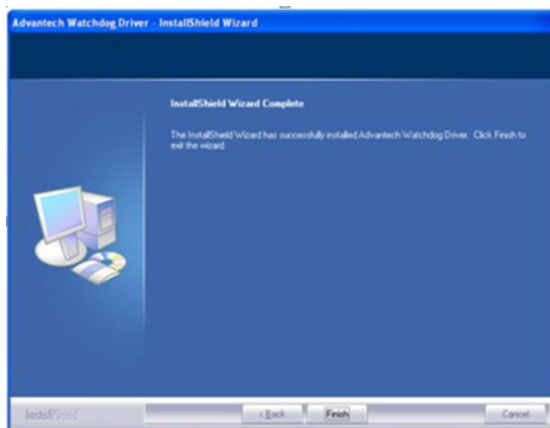
2. Select "Advantech [SCH311X] WDT" and click "Next"



3. Click "Install"



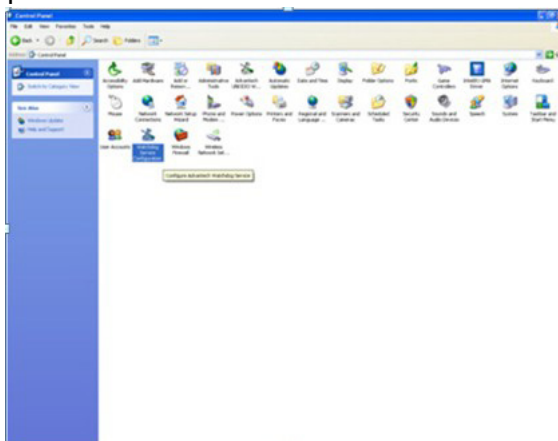
- Click "Finish" to finish the installation



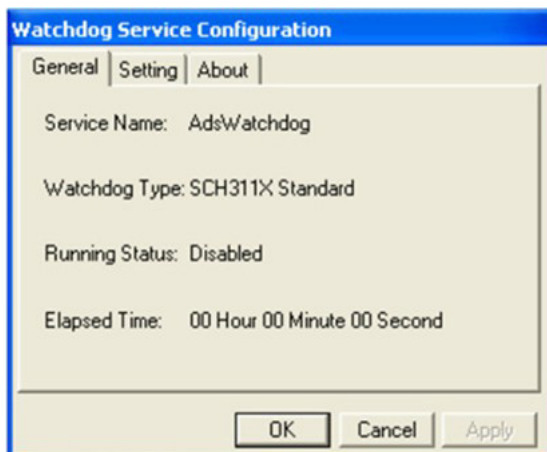
- Select "Yes, I want to restart my computer now" and click "OK"



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



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

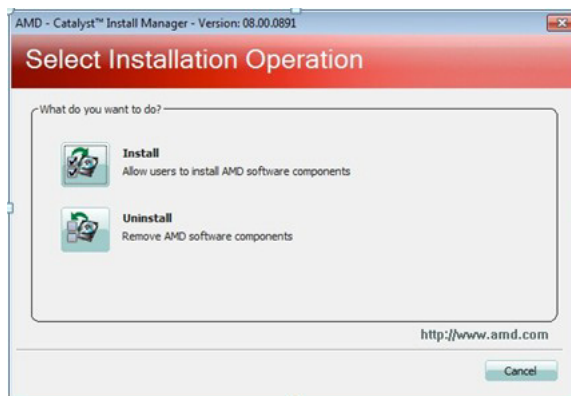


2.2.3 Installation of graphic driver

1. Enter into TS folder, enter into "graphic driver for Windows 7" Driver folder and double click setup icon, and then click "Next" under setup wizard window.



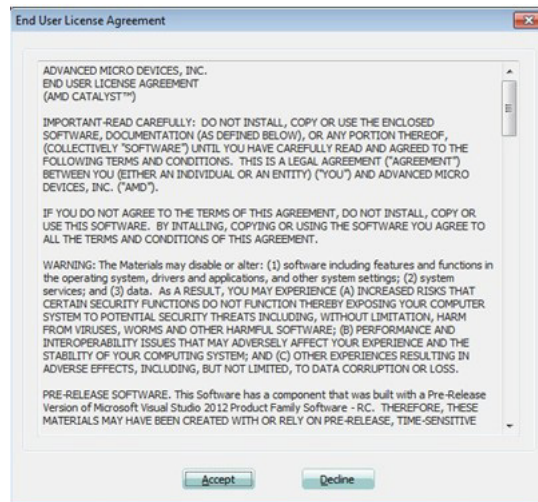
2. Click "Install"



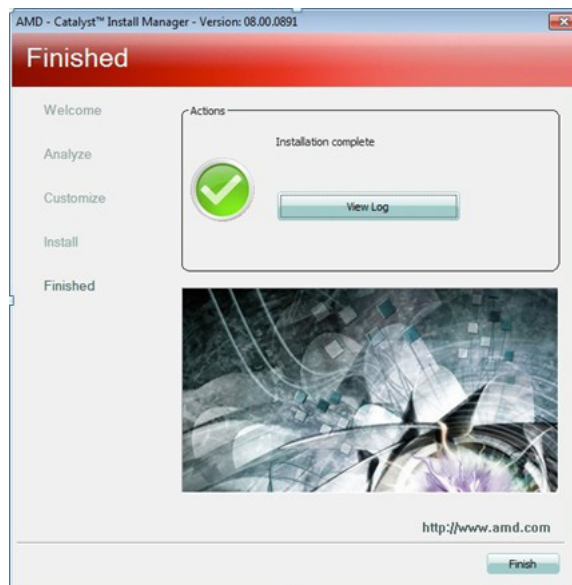
3. Select "Express" and click "Next"



4. Click “Accept”

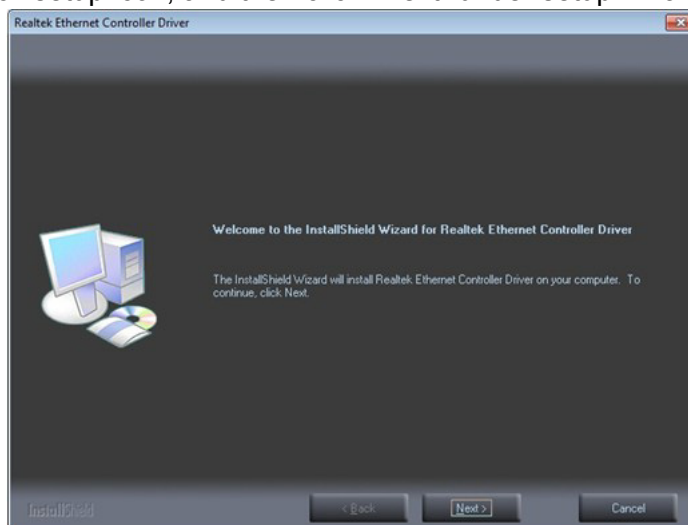


5. Click “Finish” to finish the installation

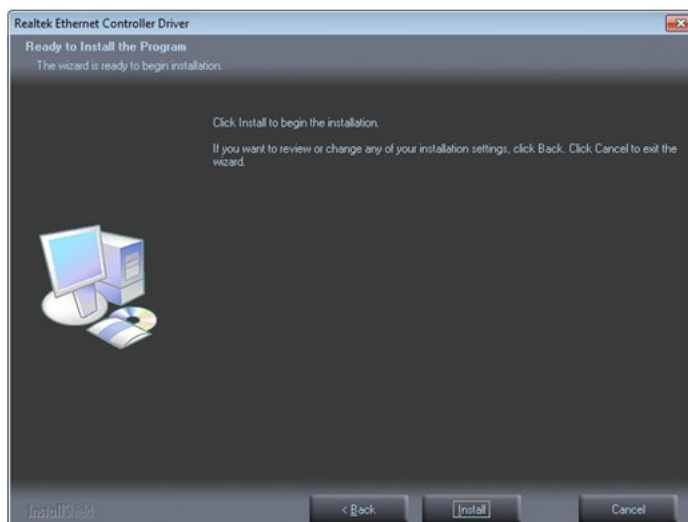


2.2.4 Installation of LAN driver

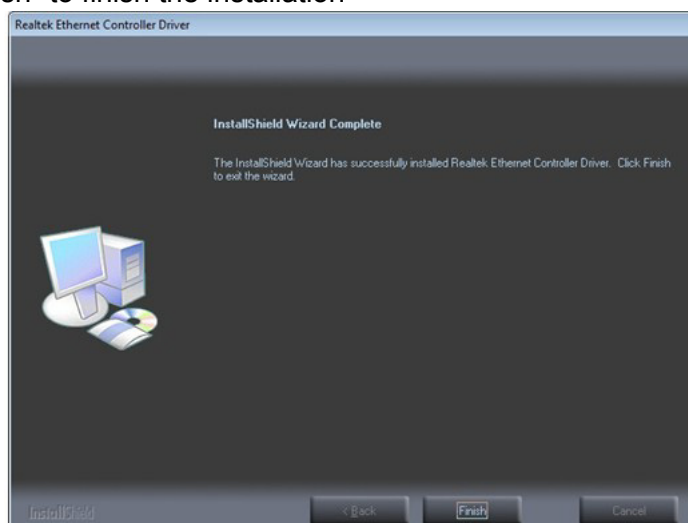
1. Enter into TS folder, enter into "Ethernet driver for Windows 7" Driver folder and double click setup icon, and then click "Next" under setup wizard window.



2. Click "Install"



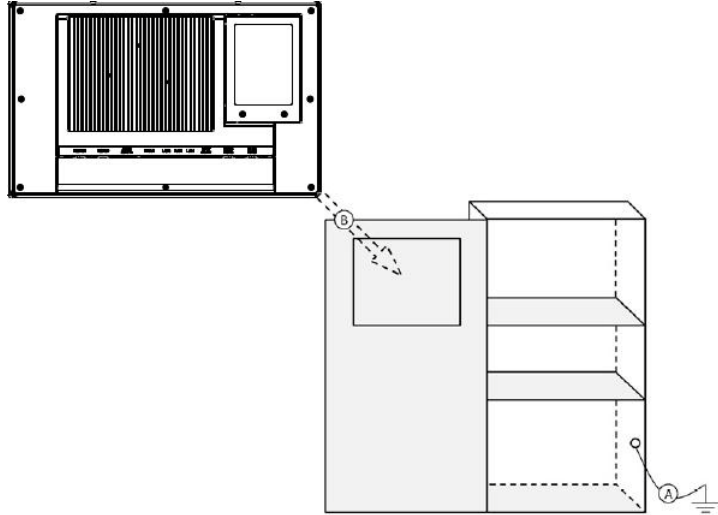
3. Click "Finish" to finish the installation



2.3 Cabinet Installation Guide

Follow the following steps to setup TPC-1840/2140 series, and please pay attention that Ground pin of TPC-1840/2140 series should be connected to earth ground. Under this circumstance, TPC-1840/2140 series could have the best performance such as EMI immunity, ESD immunity, Surge immunity and also system isolation. If TPC-1840/2140 series is embedded in the cabinet, TPC-1840/2140's ground, cabinet's ground and earth ground should all be connected together.

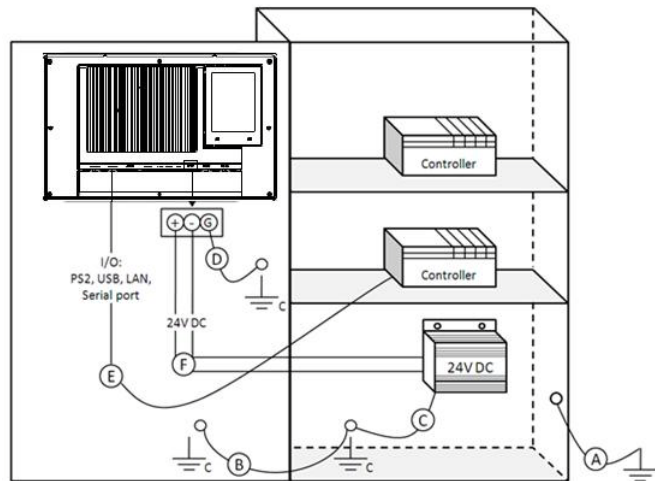
1. Embed TPC-1840/2140 series into the cabinet.



Step A: Connect the cabinet to earth ground.

Step B: Embed null TPC-1840 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-1840/2140 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-1840/2140 series.

While completing step A to F step by step, you can supply power to TPC-1840/2140 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 and HORM), that are provided in Windows XP embedded.

3.2 EWF

EWF stands for Enhanced Write Filter. It provides an upper filter in the storage device driver stack that redirects disk write operations to volatile (RAM) or non-volatile (disk) storage. EWF protects a volume from write access. The benefits are as the following.

Write-protect one or more partitions on your system.

Enable read-only media, such as CD-ROM or flash, to boot and run.

Prolong the lifespan of write-sensitive storage, such as CompactFlash.

TPC-1840/2140 XPE provides EWF RAM-REG mode on system partition. All write to system partition will be redirected to RAM once this mode is enabled. This mode is manually enabled by customers after they finish all their changes on system such as installing their applications or adjusting system setting.

Advantech provides a pair of utilities to operate EWF, OSLock and OSUnlock. Refer the training slide in the folder, file name is "Advantech XPe Add-one.pdf".

3.3 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.

Make sure EWF is disabled. You can run OSUnlock to disable EWF.

Enable hibernation support:

Run "power options" in control panel, and then select "Enable Hibernation" in hibernation pane.

Enable EWF:

Run OSLock, and then system reboot automatically.

Open those software that customers want to directly use after system resume from hibernation.

Hibernate via Advantech HORM utility:

Click **Start Menu->All Programs->Advantech->AdvWF**

HORM environment remains all along unless the following events occur:

Run EWF commit command (ewfmgr c: -commit) and then reboot system.

Select "Discard hibernation file" by clicking F8 when system is starting up.

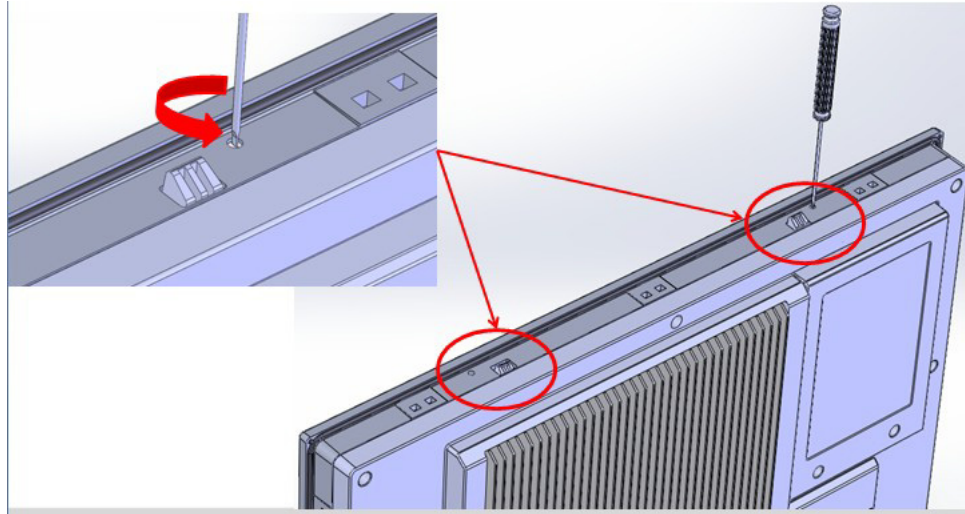
Appendix **A**

Easy Installation

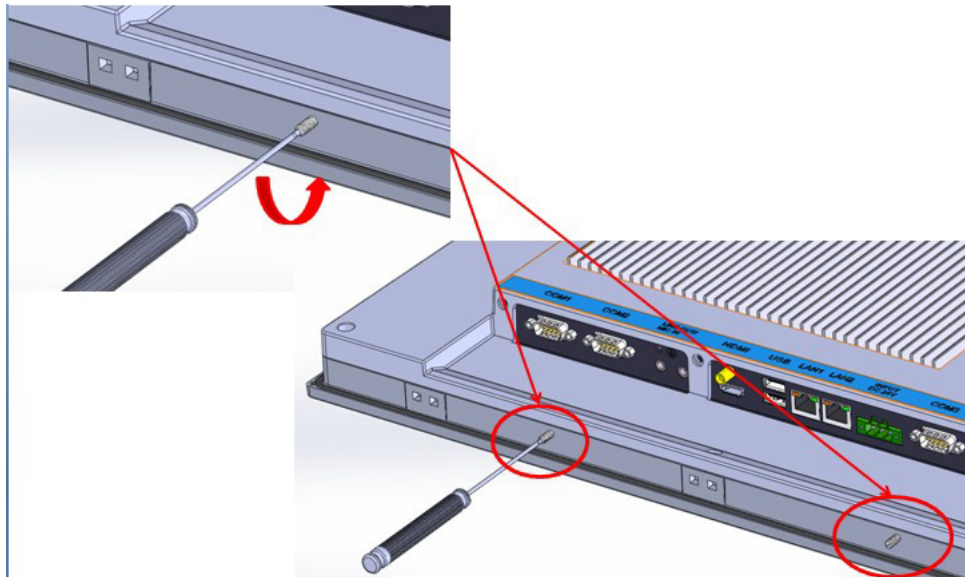
A.1 Easy Installation

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

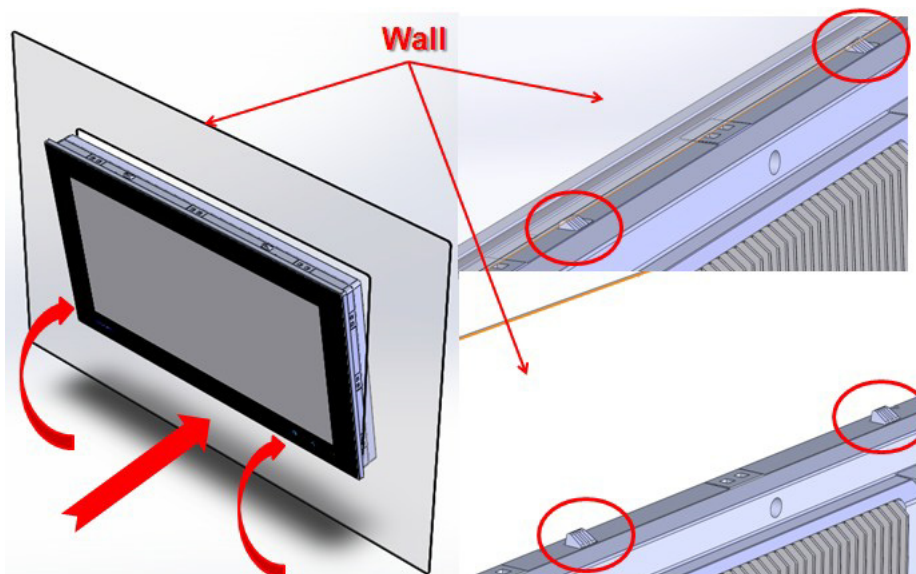
Step 1: Release the 2 screws in the top of TPC and the snap hook will arise.



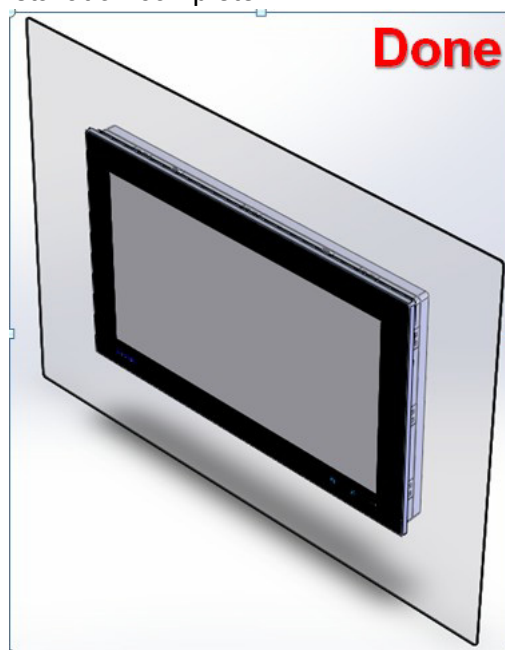
Step 2: And then release the 2 screws in the bottom of TPC



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").

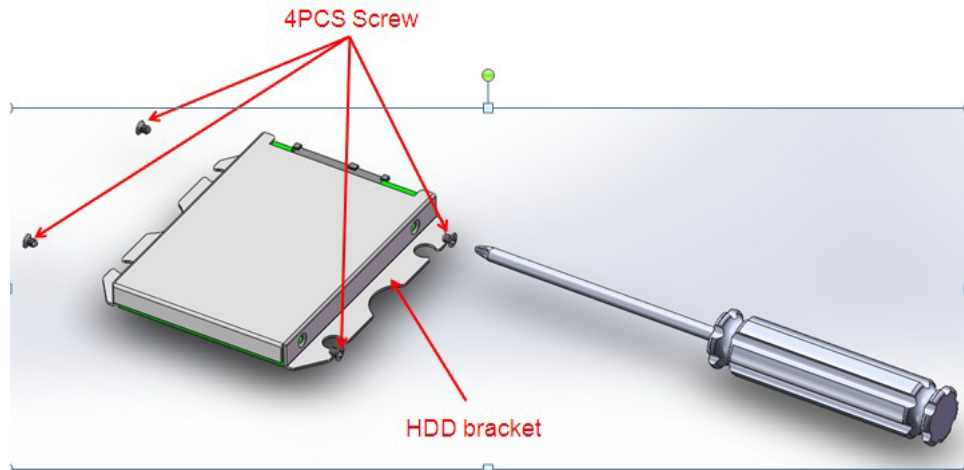


Appendix **B**

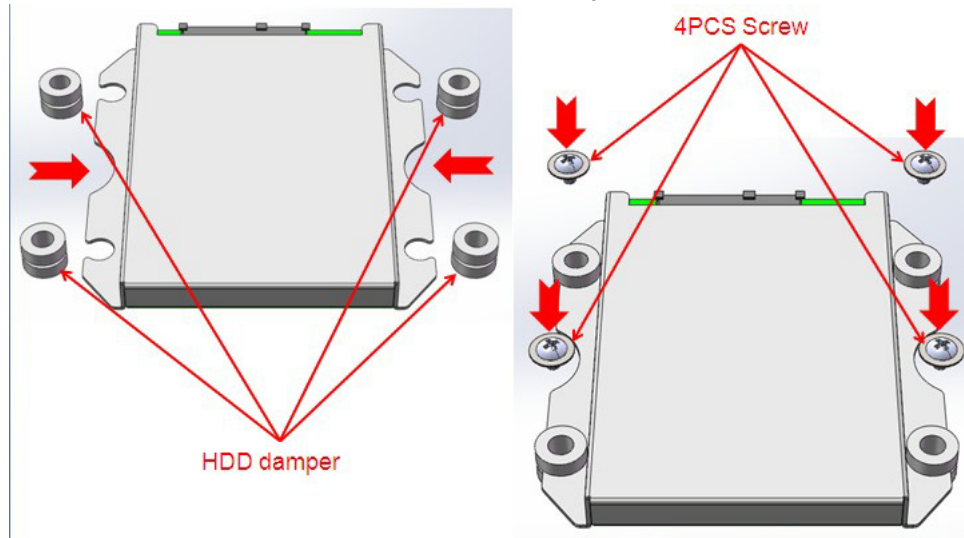
HDD assembly
instructions and
mSATA expansion

B.1 HDD Assembly Instructions

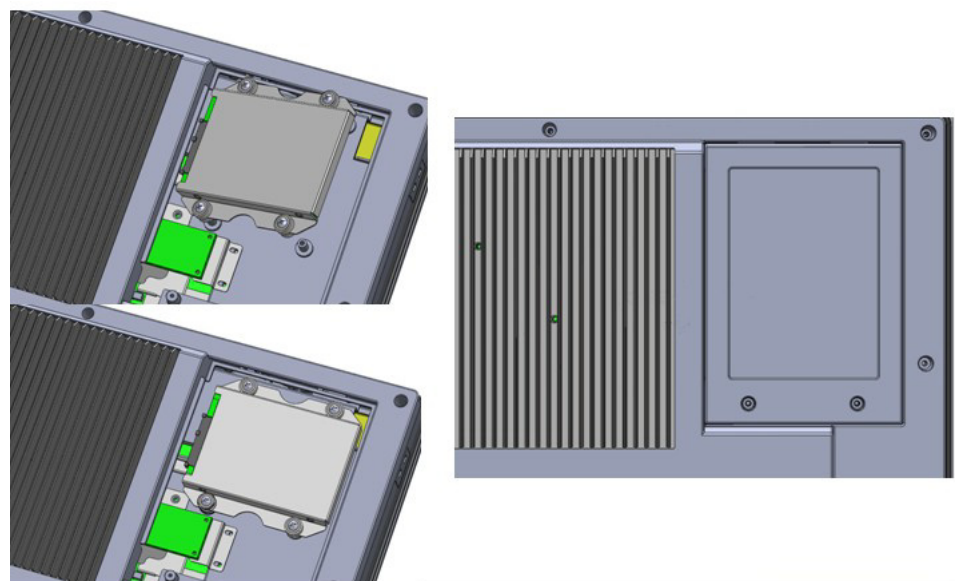
Step 1: Fix 2.5" HDD/SSD on the bracket, shown as follows:



Step 2: Install the dampers in the bracket and fix by four screws.

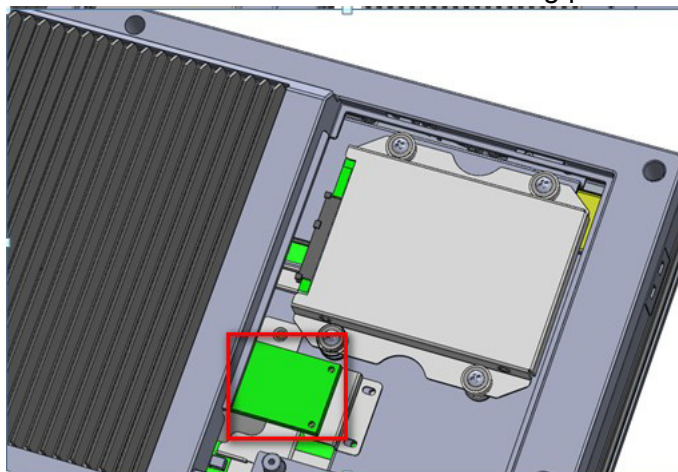


Step 3: Install HDD module into system and then cover back the side cover to finish.



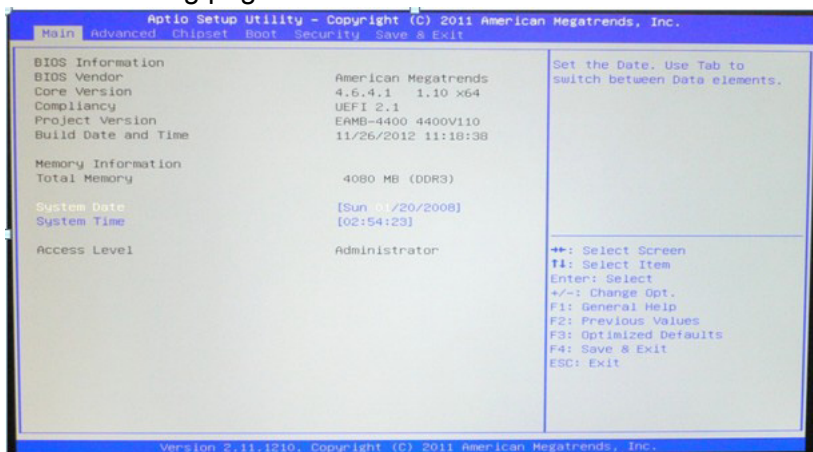
B.2 mSATA expansion

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

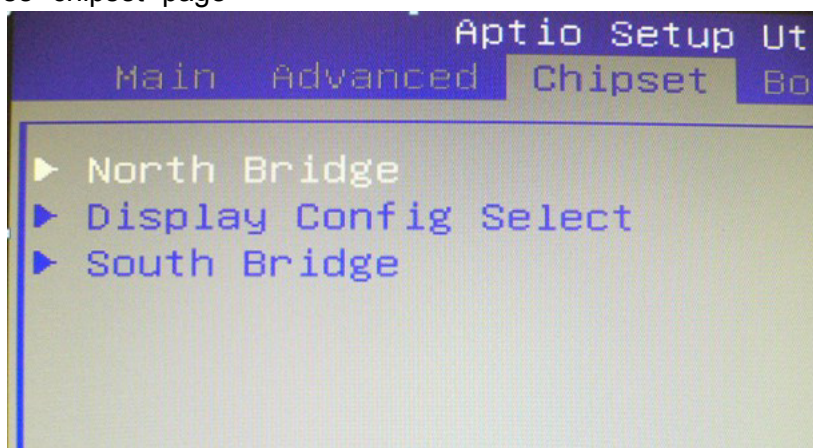


Step2: Change BIOS settings as following operations

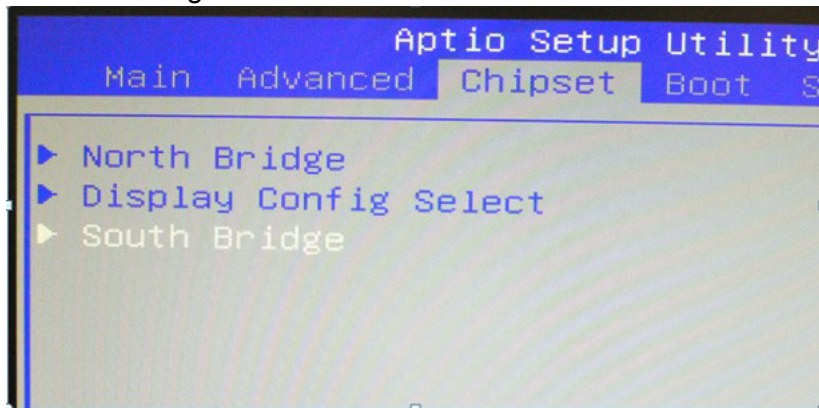
1. Access BIOS setting page



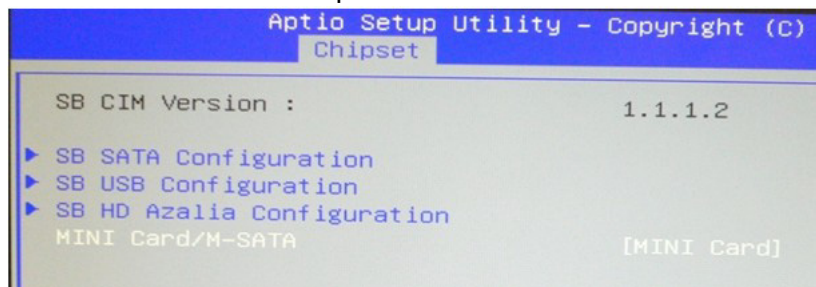
2. Choose "chipset" page



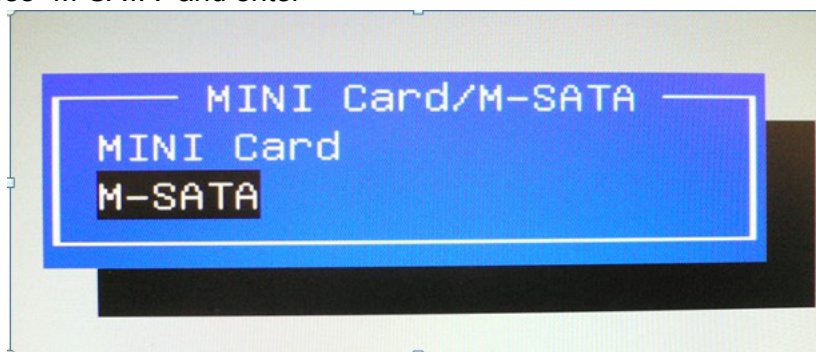
3. Choose "South Bridge" and then enter



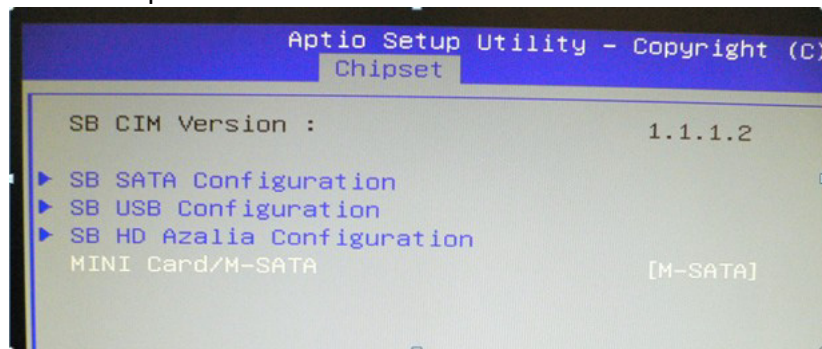
4. Choose "MINI Card/M-SATA" option and enter



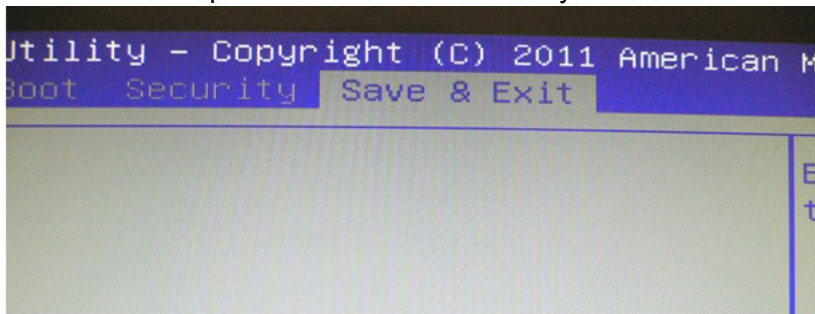
5. Choose "M-SATA" and enter



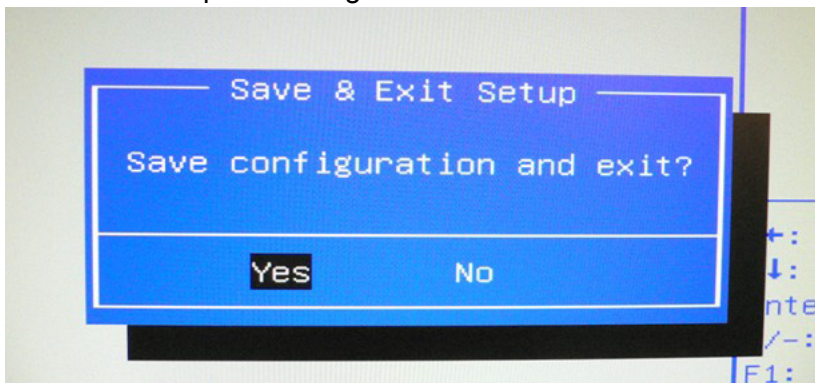
6. Press "ESC" to quit



7. Press "Save & Exit" option and enter Use "->" key



8. Choose "Yes" to complete setting



Appendix **C**

UI Operating Process

C.1 UI Operating Process

This section is to introduce how to operate HMI utility (GLToolBar), see the process below:

1. As you can find 2 function buttons in the lower right corner of front panel,



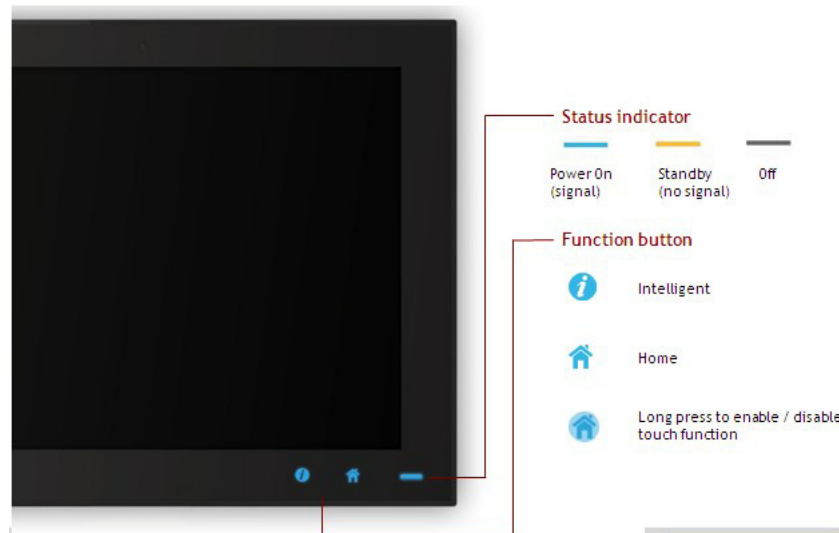
represents “intelligent” key while



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)



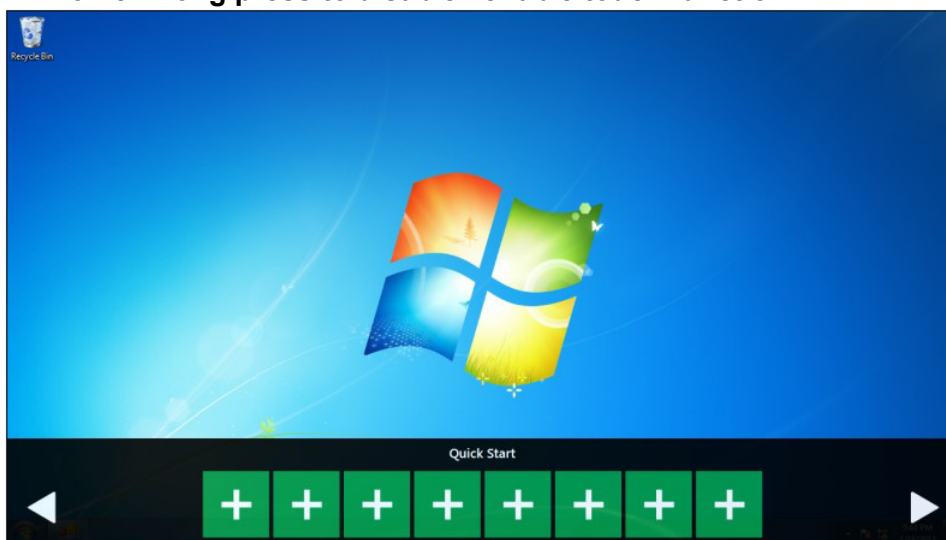
Home - Execute Home-key App (Set up in setting page)



3. Long press Home Key->



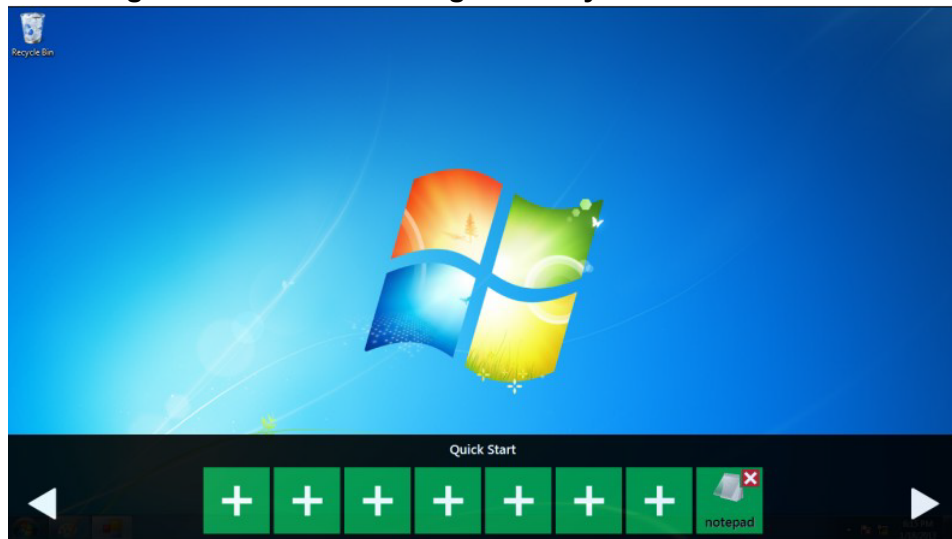
Home - Long press to disable / enable touch function



4. One press Intelligent Key->

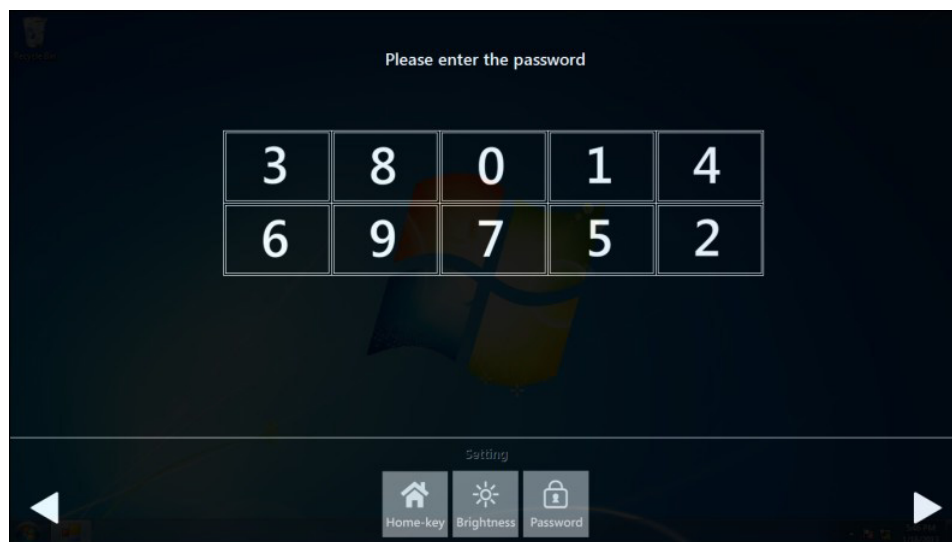


Intelligent - Advantech Intelligent Utility



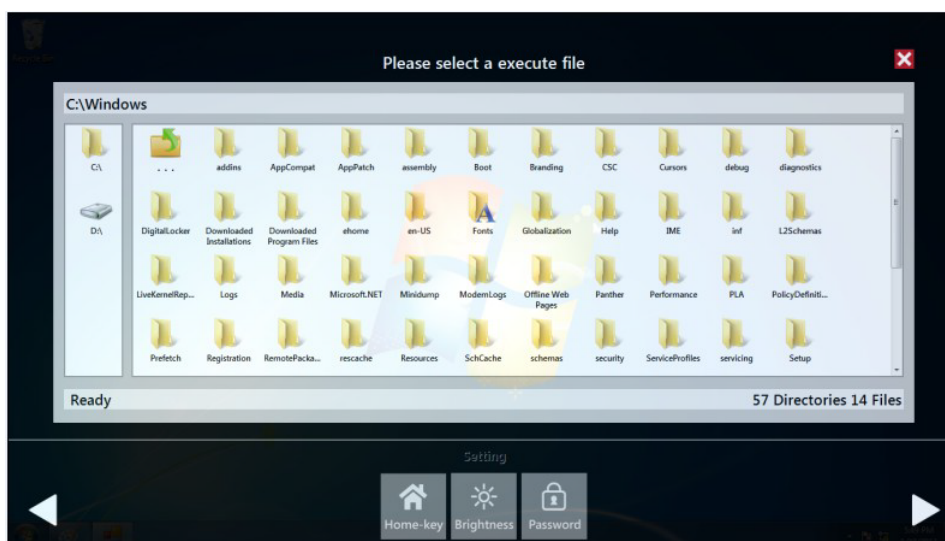
A. Quick start->

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

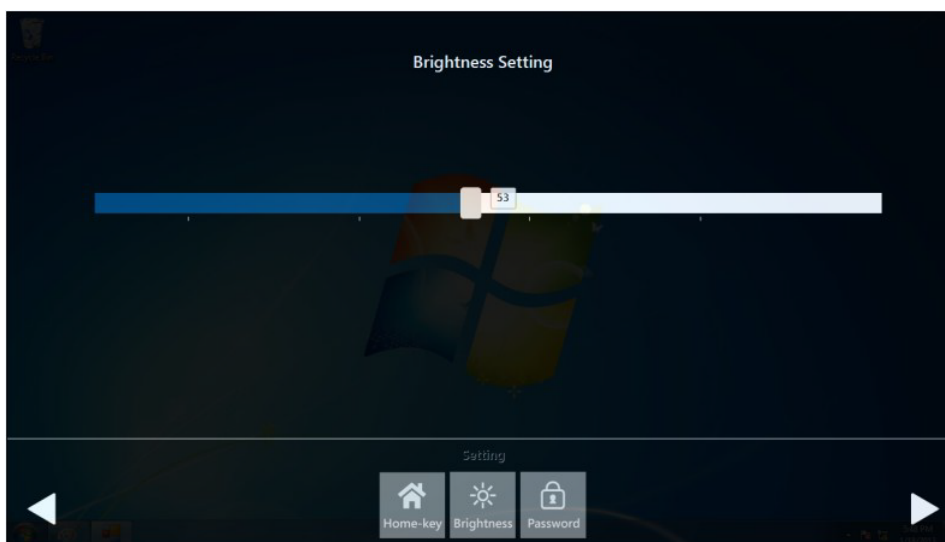


B. Setting ->

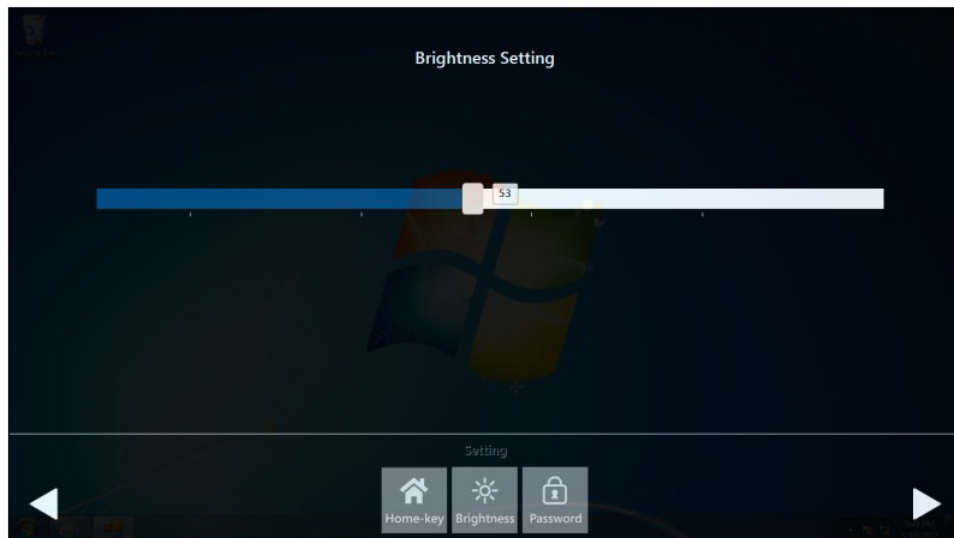
- Password confirmation for authority confirmation when first log in, default password is “1234” without input order to active.



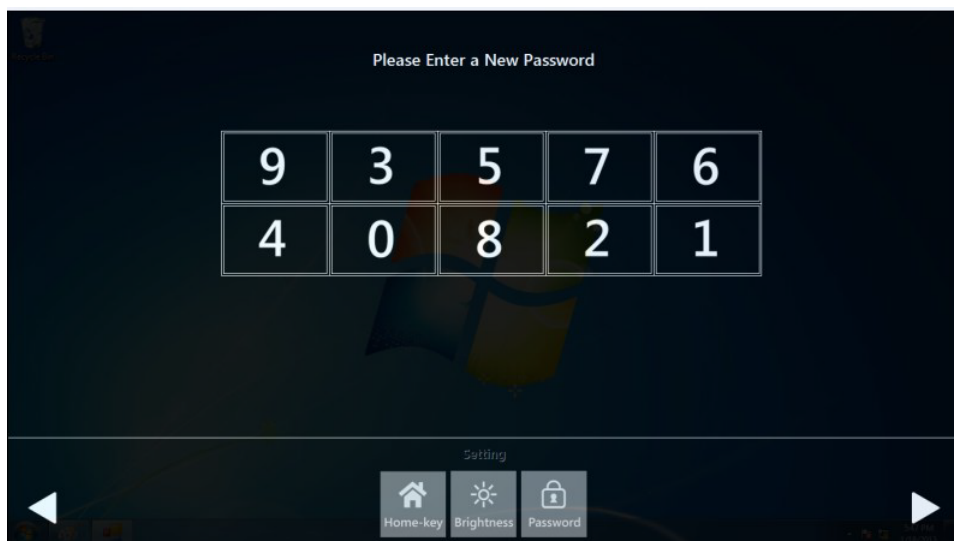
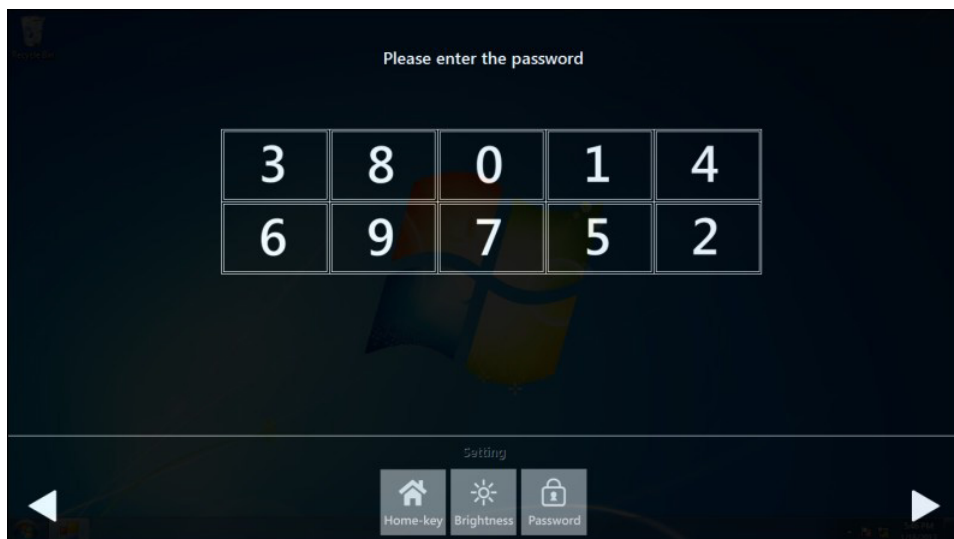
- Setting - Home-key: Select an execute file to set up as "Home-key" App, in default path is to show “desktop”



- Setting - Brightness: Brightness control from 10 to 100 percentages

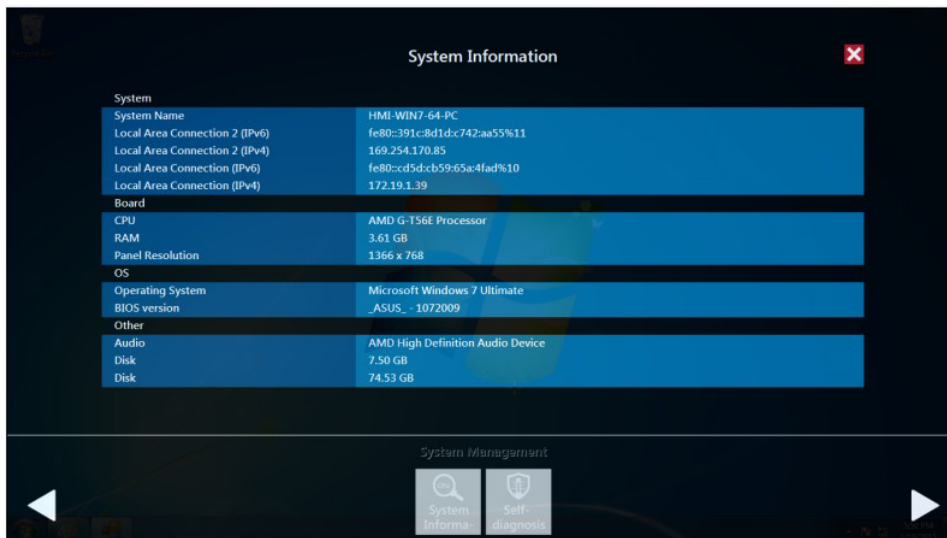


- Setting - Password: Change password function



C. System management->

– System information:





– Self Diagnosis:



Note!* *TPC-1840/2140 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

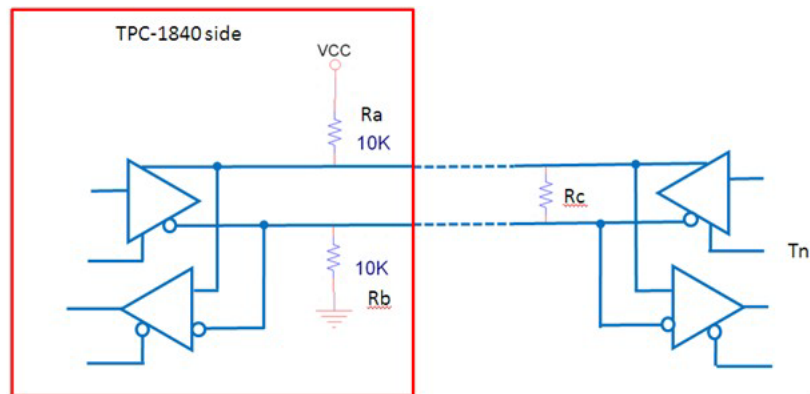
D.1 Notice

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 V_{fsb} of receptor must be $\pm 0.2V$. If V_{fsb} is under $0.2V$, then it'll come out abnormal transmission result. The terminal impedance is the most important condition to maintain V_{fsb} above $0.2V$.

The RS422/485 I/O of TPC-1840 has been added pull high & pull low resistor, as shown in following diagram:



When using RS422/485 port of TPC-1840/2140, please apply below formula to calculate terminal impedance to meet the standard. $V_{fsb} = 0.2V$

$$V_{fsb} = 0.2V \quad V_{cc} = 5V \quad R_a = R_b = 10K\Omega$$

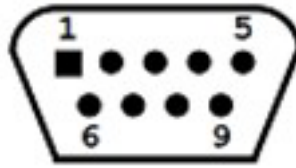
$$V_{fsb} = V_{cc}(R_c / (R_a + R_c + R_b))$$

Appendix **E**

Comport pin definition

E.1 COM1/ COM2/ COM3: RS-232

Pin Definition



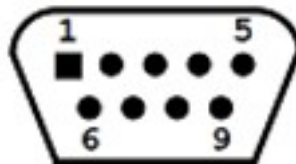
COM1/ COM2/ COM3

Pin	Signal
1	NDCD
2	NRX
3	NTX
4	NDTR
5	GND
6	NDSR
7	NRTS
8	NCTS
9	NRI

E.2 COM4(Optional): RS-422/ 485

The serial port COM4 on the TPC-1840 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-1840 series can automatically detect the data flow direction at this port when the two-wired RS-485 communication is activated.

Pin Definition

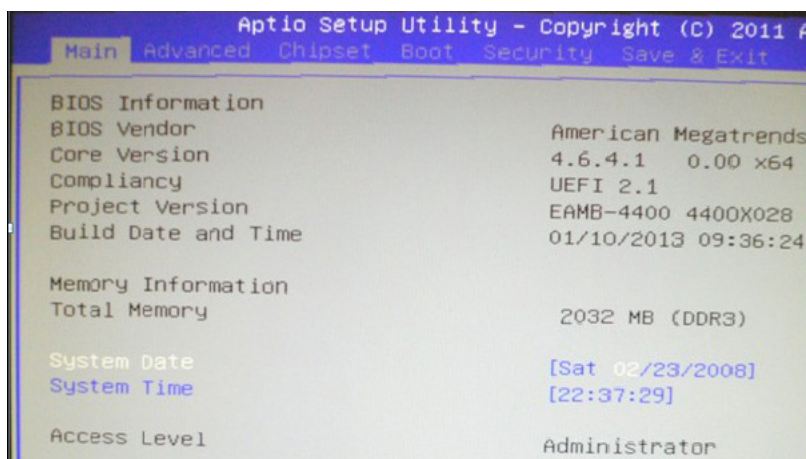


COM 4

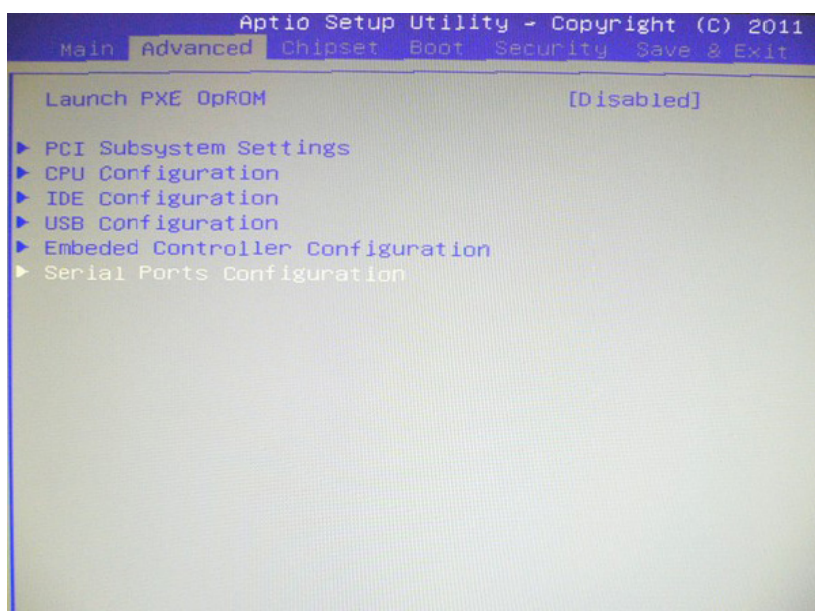
Pin	Signal	
	RS-422	RS-485
1	TX-	D-
2	TX+	D+
3	Rx+	-
4	Rx-	-
5	GND	GND
6	-	-
7	-	-
8	-	-
9	-	-

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

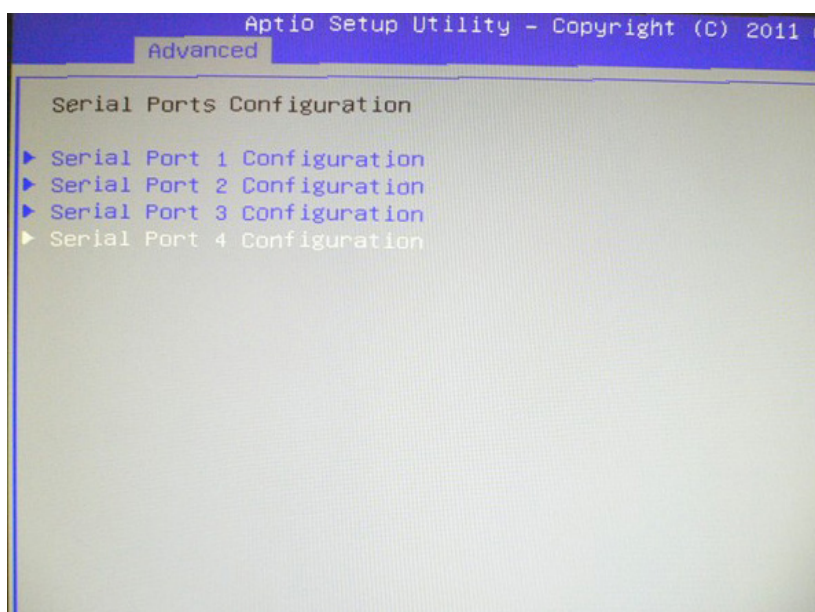
1. Enter into BIOS setup utility



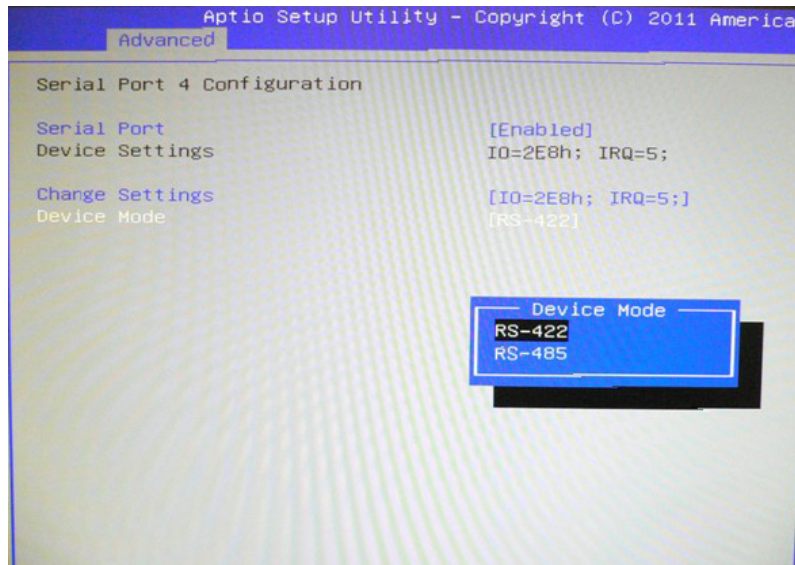
2. Enter into Advanced tab and select Serial ports Configuration.



3. Select Serial Port4 Configuration (COM4) for RS-422/ 485 mode setting.



- The default setting is RS-422 mode.



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