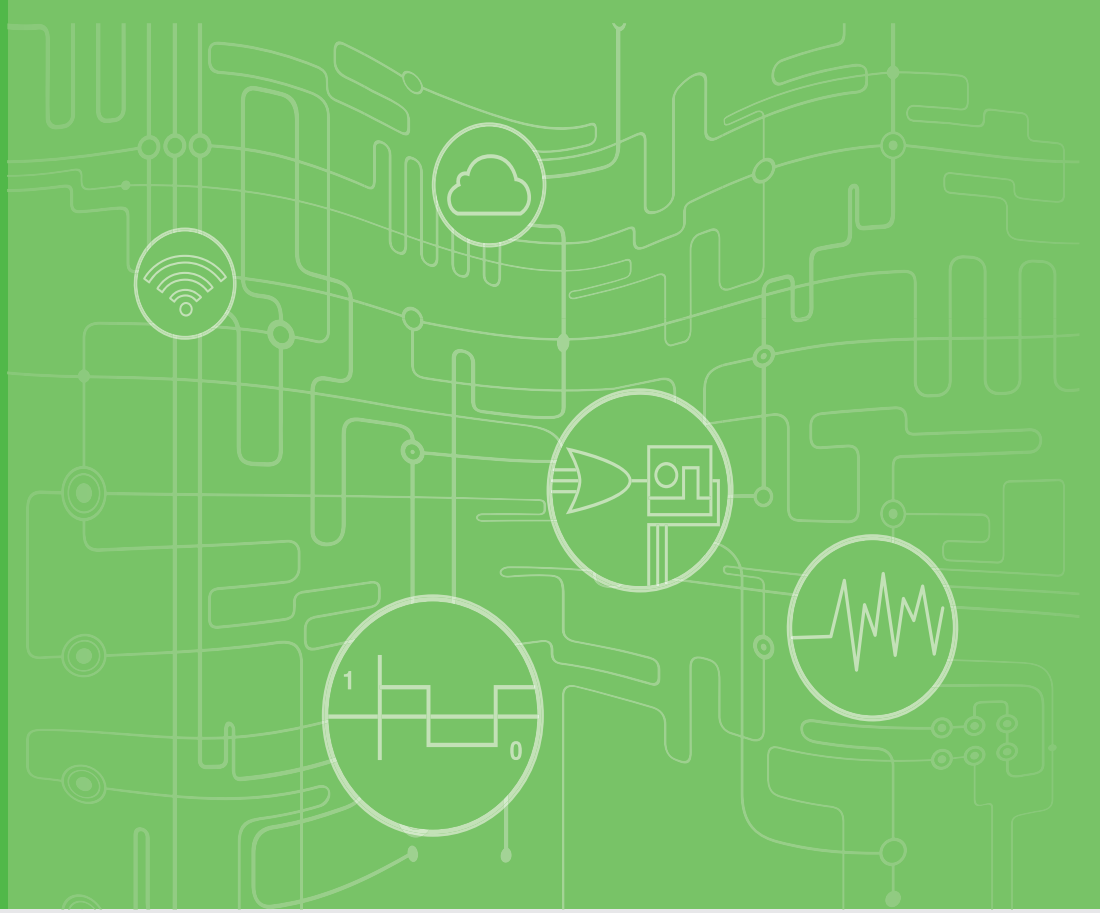

User Manual

WISE-5580

High Performance DIN-Rail PC Controller w/ 2xGbE, 1 x mPCIe, 4 x USB, VGA, HDMI

ADVANTECH

Enabling an Intelligent Planet

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Acknowledgements

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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 www.advantech.com/support 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

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
- Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

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 -10° C (14° 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.
18. 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.

Contents

Chapter 1

Introduction

1.1 Introduction

The WISE-5580 is an embedded Application Ready Platform (ARP) that can shorten your development time and offers a wide array of networking interfaces to fulfill the extensive needs of different projects. WISE-5580 includes Intel's Core i7/i5/Celeron technology and provides rich interface including 2 x serial port, 2 x GbE LAN, 4 x USB ports. WISE-5580 supports dual display VGA and HDMI for various high resolution requirements.

The WISE-5580 can operate in wide temperature ranges from -10 to 60 °C. The WISE-5580 leverage Intel Skylake series Core i CPU structure and support dual bank DDR4 which can support up to maximum 32GB RAM capability.In the WISE-5580 CPU Unit, it provides expansion including 1 x Mini-PCIe and 1 internal USB port.

With multiple OS and driver support, such as Windows 7/10, WES7, users can integrate applications easily in an ARP that provides versatile functions for diverse requirements.

1.2 Safety Precautions

The following sections tell how to make each connection. In most cases, you will simply need to connect to a standard cable.

Warning! *Always disconnect the power cord from your chassis whenever you are working on it. Do not connect while the power is on. A sudden rush of power can damage sensitive electronic components. Only experienced electronics personnel should open the chassis.*

Warning! *Toujours à la terre pour éliminer toute charge d'électricité statique avant toucher WISE-5580. Appareils électroniques modernes sont très sensibles à charges d'électricité statique. Utilisez un bracelet antistatique à tout moment. Placez tous composants électroniques sur une surface antistatique ou dans un statique-sac blindé.*

Caution! *Always ground yourself to remove any static electric charge before touching WISE-5580. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag.*

Caution! *Toujours débrancher le cordon d'alimentation de votre boîtier lorsque vous êtes travailler. Ne branchez pas lorsque l'appareil est allumé. Un afflux soudain de puissance peut endommager les composants électroniques sensibles. Seulement connu personnel de l'électronique devraient ouvrir le châssis.*

1.3 Accessories

Please refer below for the accessory list:

- Power Connector (Advantech P/N: 1652008020-01)

If anything is missing or damaged, contact your distributor or sales representative immediately.

1.4 Product Specifications

1.4.1 WISE-5580 System Specifications

- General
  - Certification: CE, FCC, UL
  - Dimensions (W x H x D): 139 x 100 x 80 mm
  - Form Factor: Passive Cooling and Front Accessible
  - Enclosure: Aluminum housing
  - Mounting: DIN-rail
  - Weight (Net): 1.3 kg
  - Power Requirement: 24 VDC ± 20%
  - Power Consumption: 15 W (Typical), 42 W (Max)
  - OS Support: Microsoft. Windows 7 32/64 bit, Windows 10 32/64 bit
- System Hardware
  - BIOS AMI EFI 128Mbit Flash BIOS
  - Watchdog Timer: Programmable 256 levels timer interval, from 1 to 255 sec
  - Processor :
    Intel. Core. i7-6600U 2.6GHz Skylake Dual Core, 4MB L2
    Intel. Core. i5-6300U 2.4GHz Skylake Dual Core, 3MB L2
    Intel. Celeron 3955U 2.0GHz Skylake Dual Core, 2MB L2
  - System Chip: Integrated PCH-LP
  - Memory: Windows 10 32/64 bitBuild in 4G for Celeron and 8G for Core i5/i7
  - Graphics Engine: Windows 10 32/64 bitIntel. Gen 9 LP GT2
  - Ethernet: Intel. i210-IT GbE, 802.1Qav, IEEE1588/802.1AS, 802.3az
  - LED Indicators: LEDs for Power, Storage, Program and Abnormal status
  - Storage:1 x M.2, 2280 M-Key
  - Expansion:
    1x Full-size mPCIe Slot, for wireless module or NVRAM module
    WISE-5400 function modules expansion from left side (max. 4)
    WISE-5000 EtherCAT Slice IO from right side
- I/O Interfaces
  - Serial Ports: 2 x RS-232/422/485, DB9, 50 ~ 115.2kbps
  - LAN Ports: 2 x RJ45, 10/100/1000 Mbps IEEE 802.3u 1000BASE-T Fast Ethernet
  - USB Ports:
    4 x USB ports (4 x USB 3.0 compliant)
    1 x internal USB
  - Display:
    1 x VGA, support up to 1920 x 1200 @ 60Hz 24bpp
    1 x HDMI, support up to 4096 x 2160 @ 24Hz 24bpp
  - Power Connector: Dual power input with alarm output
  - Grounding Protection: Chassis grounding

- Environment
  - Operating Temperature: -10 ~ 60°C (-4 ~ 140°F) @ 5 ~ 85% RH with 0.7m/s airflow
  - Storage Temperature: -40 ~ 85°C (-40 ~ 185°F)
  - Relative Humidity: 10 ~ 95% RH @ 40°C, non-condensing
  - Shock Protection: Operating, IEC 60068-2-27, 10G, half sine, 11 ms
  - Vibration Protection: Operating, IEC 60068-2-64, 1 Grms, random, 5 ~ 500 Hz, 1hr/axis (M.2)

Chapter 2

WISE-5000 System Overview

WISE-5000 product family consist of CPU and each function modules, which can be constructed to fulfill different application requirement.

The WISE-5000 product family includes:

1. WISE-5580 series: Basic CPU module
2. WISE-54XX series: Left hand side extension modules, PCIe backbone.
3. WISE-50XX series: Right hand side, slice IO modules, EtherCAT backbone.

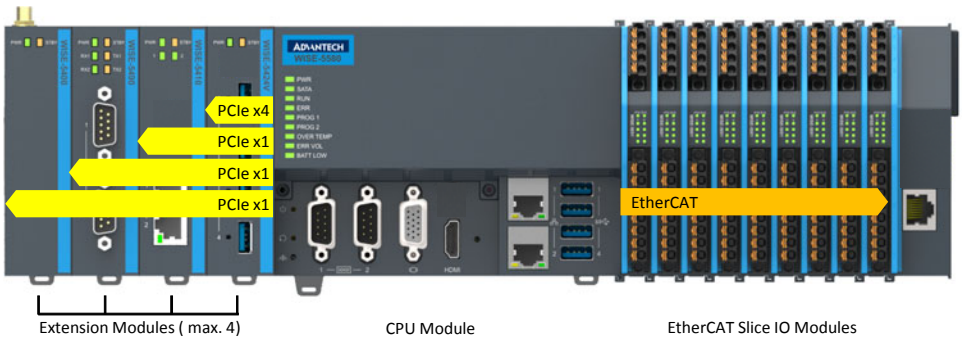


Figure 2.1 Product overview of WISE-5000 product family

Basic CPU module

The WISE-5580 Basic CPU module is a fully functional Embedded IPC without fan and internal cable, and includes:

- Two independent GbE interfaces
- Four USB 3.0 interfaces
- VGA and HDMI dual display
- Two serial COM port (RS-232/RS-485/RS-422)

The WISE-5580 Basic CPU module equips with 4 PCIe lanes for left hand side function extension, first attached module can use the PCIe x4 resource and the other 3 use PCIe x1 resource. The supported functions include USB 3.0, PoE, GbE, RS-232/422/485, Flash Disk and Wireless Interface.

The Right hand side is the EtherCAT slice IO extension, which can be centralized and distributed through EtherCAT network topology. The supported IO function included Digital Input/Output, Voltage/Current Analogue Input and Output, Thermal couple, RTD, Counter/Encoder.

Operation system is installed on the reliable industrial grade M.2 SSD. And the OS is suitable to be Microsoft Windows Embedded 7 32/64 bit and Microsoft Windows 10 Enterprise LTSB (Long Term Support Branch). These two OS could be pre-installed in factory before shipment.

The 2MB MRAM (NVRAM, Non-Volatile) is an option to the WISE-5580 Basic CPU module. It can be installed in the internal PCIe-mini card slot. In the event of a power failure, the data in the MRAM will be kept and available again after CPU restart.

Power System

WISE-5000 Series support 24VDC power input. Please use external adapter if the power source in the control cabinet is not 24VDC.

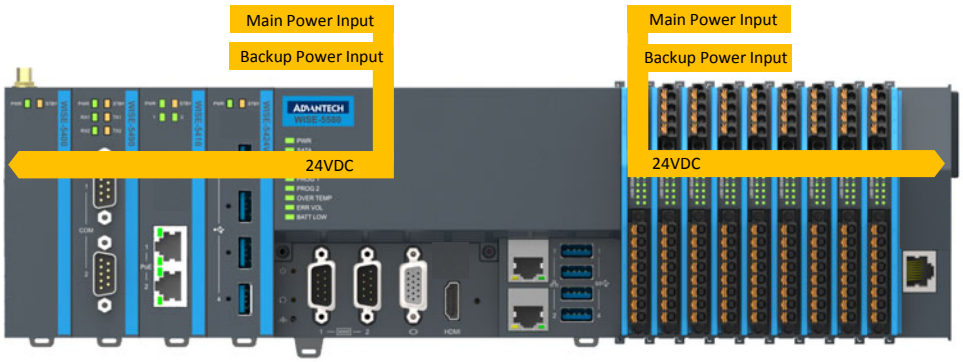


Figure 2.2 Power System of WISE-5000

There are 2 independent power systems for WISE-5000; one is from CPU module and supply left hand side extension modules. The other is for right hand side slice IO only. Both power system is 24 VDC with +/- 20% variation tolerance, also both support dual power input for main and backup power input. Once main power fail, the backup power can supply power to system to work and a hardware alarm will be triggered to report the situation.

Software Architecture

WISE-5000 integrates with 3S CODESYS become a powerful IEC-61131-3 Controller. With the EtherCAT support in CODESYS, WISE-5000 is possible to implement very fast control processes in microsecond range. It is also possible to execute Motion Control tasks with potentially up to 256 axis. Depending on the required cycle time, different number of servo axis can be controlled. Even special functions such as flying saw, electronic gearbox and cam plate can be realized easily through the drag and drop function block diagram.

Without IEC-61131-3 Softlogic, WISE-5000 is also a powerful embedded IPC for big data collection /analytics, or even vision inspection integration. With full function support of SDK/API in C/C++ and C# .NET environment, user can implement the algorithm easily and communicate the data with other node or cloud service with efficiency.

2.1 Configuration of CPU Module, WISE-5580

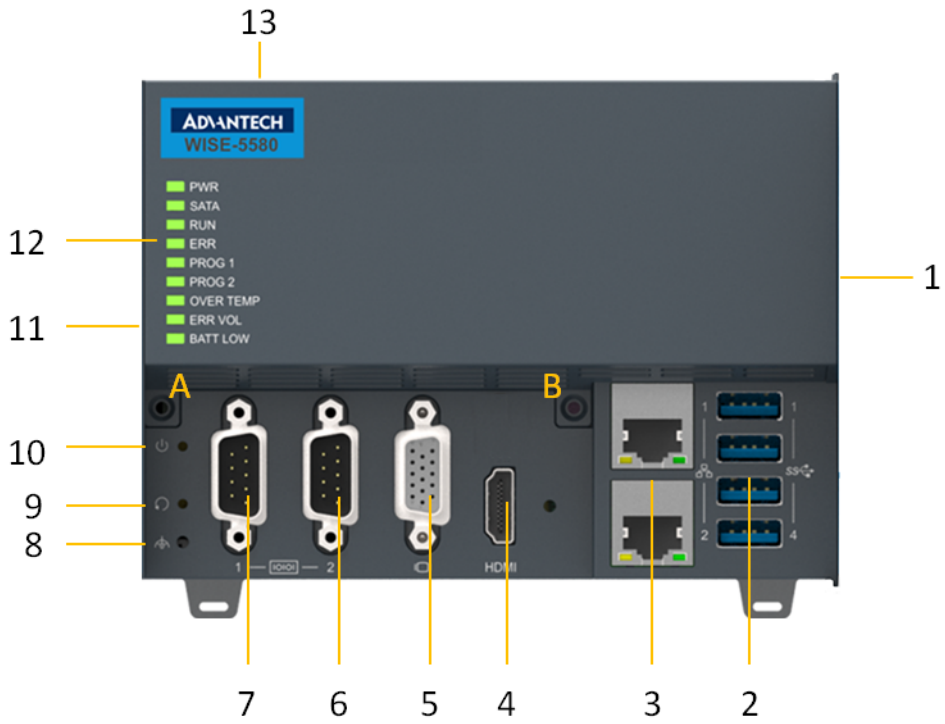


Figure 2.3 Front View of WISE-5580

Table 2.1: Legend of configuration of WISE-5580 CPU module

No.	Component	Description
1	EtherCAT Slice Connection	Connection for EtherCAT Slice IO extension modules.
2	USB Interface	Interfaces for peripherals such as mouse, keyboard or USB memory.
3	RJ45 Ethernet Interface	For connecting to local networks, internet or EtherCAT.
4	HDMI Interface	Digital interface for a monitor or panel with audio output
5	VGA Interface	Analogue interface for a monitor or panel
6 & 7	DB9 Interface	Interface for serial communication (RS-232/ 422/485 selectable in BIOS)
8	Shielding Ground Connection	Screw to fix the shielding ground connection
9	Reset Button	Hidden button for PC hardware reset function
10	Power Button	Hidden button for PC power function
11	Multi-function Connection	Connection for PCIe extension modules
12	Diagnostic LEDs	Diagnostic LEDs for CPU module
13	Power Input Wiring Terminal	7-pin terminal for dual 24VDC power input wiring and alarm output
A & B	Screws	Screws to open the front cover for internal configuration

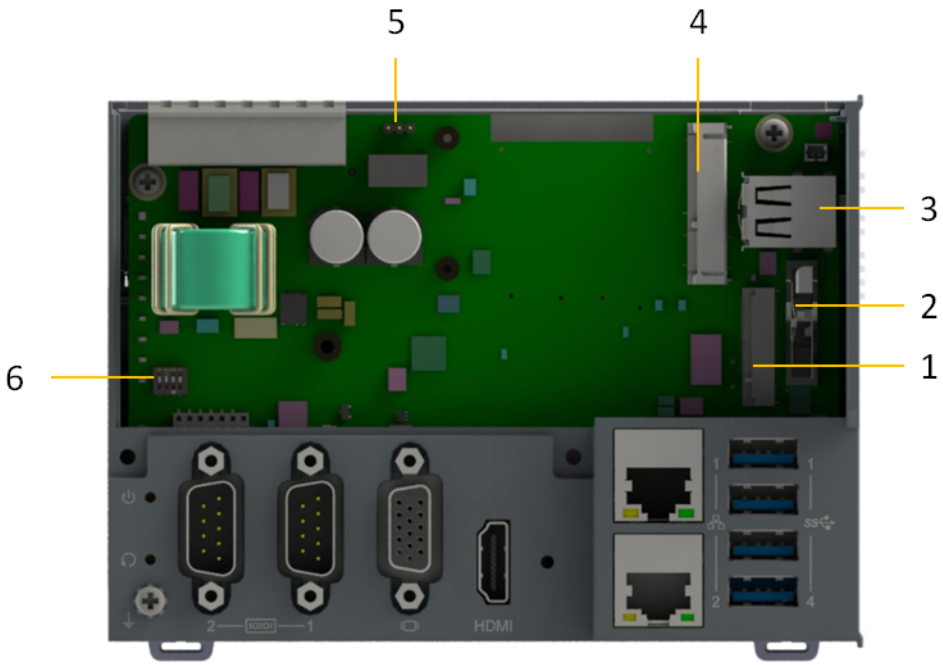


Figure 2.4 Internal configuration under the front cover of WISE-5580

Table 2.2: Legend of configuration inside WISE-5580 CPU module

No.	Component	Description
1	M.2 Connector (M Key)	To install M.2 SSD for operation system installation.
2	RTC Battery	Battery to keep RTC and BIOS settings
3	Internal USB Interface	Interfaces for peripherals such as USB memory or USB dongle key.
4	PCIe-mini card slot	Slot for PCIe-mini cards, such as NVRAM card or Embedded Wireless Module (EWM)
5	Jumpers	Jumpers for power alarm output (NO/NC) (Refer to p.20 ERR-LOGIC1)
6	DIP Switch	To select the communication mode of COM1/ COM2 For VGA, USB, AT power setting. (Refer to p.20 ERR-LOGIC1)

2.2 Module Overview

2.2.1 WISE-54XX PCIe Expansion Module

WISE-5580 provide PCIe extension interface from the left-hand side, and there are following modules available:

Table 2.3: Table 3: List of WISE-54XX series extension modules

No.	Model	Front View	Description
1	WISE-5400		**Wireless Expansion Module** -PCIe-mini Card Slot (full-size) inside for Advantech EWM module installation. -With nano-SIM card slot for telecom service.
2	WISE-5424V		**USB 3.0 Interface Module** -4x USB 3.0 with full bandwidth* *Full USB 3.0 bandwidth only work in the first slot which is with PCIex4 resource.
3	WISE-5490		**Serial Communication Module** -2x RS-232/422/485 with DB9 connector -2500VDC isolation
4	WISE-5410		**GigE Communication Module** -2x GigE with RJ45 -Speed 10/100/1000Mbps -With Intel i350-AM2 NIC
5	WISE-5410P		**PoE Communication Module** -2x GigE with RJ45 -Speed 10/100/1000Mbps -With Intel i350-AM2 NIC -PoE power 48VDC with max 20W per module

Note! *EtherCAT supports up to 65535 slave device in one network. However more devices would need longer cycle time to have all real-time data back to master.*

2.2.2 WISE-50XX EtherCAT I/O Modules

Right-hand side of WISE-5580 is the interface for the EtherCAT Slice IO modules, below is the table for the current supported IO modules:

Table 2.4: List of WISE-50XX series extension modules

No.	Model	Description
1	WISE-5001	**Power Input Module with 4-ch Digital Input** -24VDC power input for Slice IO* -Abnormal Voltage detection -4DI / Wet Contact *This should be the first module to start the right hand side slice IO after WISE-5580. It can also be added between WISE-50XX modules to provide extra power.
2	WISE-5015	**4-Ch RTD input module** -2 or 3 wire RTD sensor -Pt100, Pt1000, Balco500, Ni518 -100Hz sample rate per channel
3	WISE-5017V	**6-Ch Voltage Input Module** -Voltage Input -16-bit resolution -100Hz sample rate per channel
4	WISE-5017C	**6-Ch Current Input Module** -Current Input -16-bit resolution -100Hz sample rate per channel -Support wire burn-out detection
5	WISE-5018	**6-Ch Thermocouple Input Module** -Type J/K/T/E/R/S/B -16-bit resolution -100Hz sample rate per channel -Support wire burn-out detection
6	WISE-5024	**4-Ch Analogue Output Module** -Voltage and Current -16-bit resolution -Fail-safe value output
7	WISE-5051	**8-Ch Isolated Digital Input Module** -DI Voltage: 10~30VDC -Filter : 3ms
8	WISE-5052	**16-Ch Isolated Digital Input Module** -DI Voltage: 10~30VDC -Filter : 3ms
9	WISE-5056	**8-Ch Isolated Digital Output Module** -Sink Type -DO Voltage: 10~30VDC
10	WISE-5056SO	**8-Ch Isolated Digital Output Module** -Source Type -DO Voltage: 10~30VDC
11	WISE-5057	**16-Ch Isolated Digital Output Module** -Sink Type -DO Voltage: 10~30VDC

Table 2.4: List of WISE-50XX series extension modules		
12	WISE-5057SO	**16-Ch Isolated Digital Output Module** -Source Type -DO Voltage: 10~30VDC
13	WISE-5080	**2-Ch Counter/Encoder Input Module** -Counter Range : 32-bit -Mode : Frequency, Counter -Counter Mode : up/down, bi-direction, A/B Phase
14	WISE-5074	**EtherCAT Bus Coupler** -24VDC power input -2xRJ45 -Abnormal Voltage detection *This module is with power input, no need WISE-5001 on the right side
15	WISE-5079	**EtherCAT Bus Extender** -Extend EtherCAT by RJ45

With the PCIe and EtherCAT interface, WISE-5580 can optionally equip some function module to fulfill application requirements.

Below are examples:

- Vision + Motion Controller

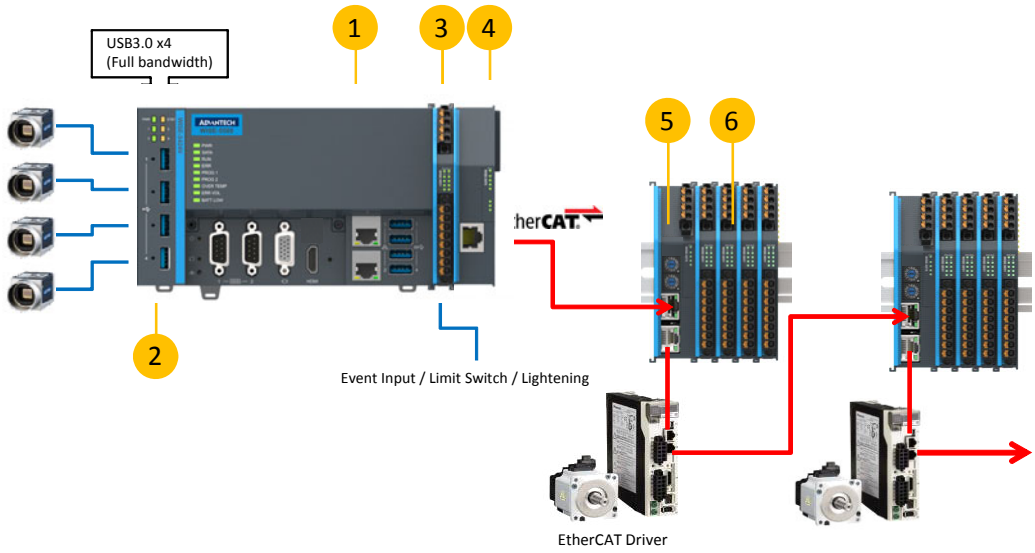


Figure 2.5 WISE-5000 System Configuration for Motion + Vision Application

Table 2.5: WISE-5000 System Configuration for Motion + Vision Application		
No.	**Part Number**	**Description**
1	WISE-5580	CPU Module to integrate Motion and Vision application
2	WISE-5424V	USB 3.0 x4 expansion for camera
2a	WISE-5410 (option)	GibE x2 expansion for camera
2b	WISE-5410P (option)	PoE x2 expansion for camera
3	WISE-5001	24VDC Power input module for WISE-5000 Slice IO, include 4DI
4	WISE-5079	Extend EtherCAT to next station

Table 2.5: WISE-5000 System Configuration for Motion + Vision Application		
5	WISE-5074	EtherCAT bus coupler
6	WISE-50XX	WISE-5000 Slice IO to fulfill the IO requirement of the station

- Data Concentrator

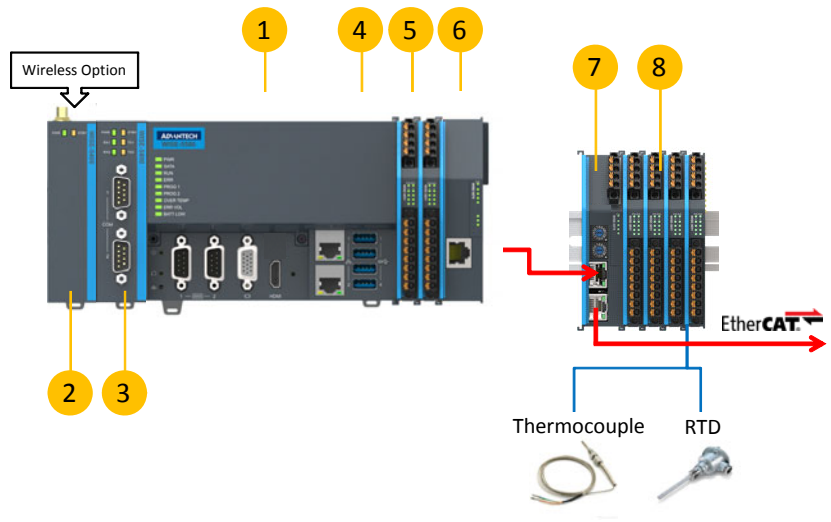


Figure 2.6 WISE-5000 System Configuration for Big Data Edge Concentrator

No.	Part Number	Description
1	WISE-5580	CPU Module to handle Big Data applications
2	WISE-5400	Wireless expansion option for Wi-Fi/ 3G/ LTE
3	WISE-5490	2x Isolation COM port expansion, RS-232/ 422/485
4	WISE-5001	24VDC Power input module for WISE-5000 Slice IO, include 4DI
5	WISE-50XX	WISE-5000 Slice IO to fulfill the IO requirement of the station
6	WISE-5079	Extend EtherCAT to next station
7	WISE-5074	EtherCAT bus coupler
8	WISE-50XX	WISE-5000 Slice IO to fulfill the IO requirement of the station

2.3 CPU Types

Control IPC Barebone

WISE-5580 provides product offering as Control IPC Barebone for user to do the system configuration according to the application. User can install the supported OS and get the driver support from Advantech website. However, we suggest user to order embedded OS from Advantech which is optimized OS image with best performance.

CODESYS Ready PAC

WISE-5580 can well integrate IEC-61131-3 softlogic software CODESYS, and become a PAC (Programmable Automation Controller) with optimized performance.

CODESYS provide 3 level of software runtime engine for different application scenarios, and also provides HMI function for data visualization.

Table 2.6: WISE-5580 Control IPC Product Offering

Category	Control IPC Barebone		
P/N	WISE-5580-C3000A	WISE-5580-54000A	WISE-5580-74000A
CPU	Celeron 3955U 2.0GHz	Core™ i5-6300U 2.4GHz	Core™ i7-6600U 2.6GHz
RAM	4G DDR4	8G DDR4	8G DDR4

Table 2.7: WISE-5580 CODESYS Ready PAC Product Offering

Category	CODESYS Ready PAC		
P/N	ESRP-SCS-W5580-CR0	ESRP-SCS-W5580-5M1	ESRP-SCS-W5580-7C1
CPU	Celeron 3955U 2.0GHz	Core™ i5-6300U 2.4GHz	Core™ i7-6600U 2.6GHz
RAM	4G DDR4	8G DDR4	8G DDR4
Storage (M.2)	64GB	64GB	64GB
OS	WES7P 32-bit	WES7P 64-bit	WES7P 64-bit
NVRAM	2MB	2MB	2MB
SW	CODESYS V3 Pure Control	CODESYS V3 P2P Motion w/ HMI	CODESYS V3 Advanced Motion w/ HMI (CNC/Robotics)

2.4 CPU architecture

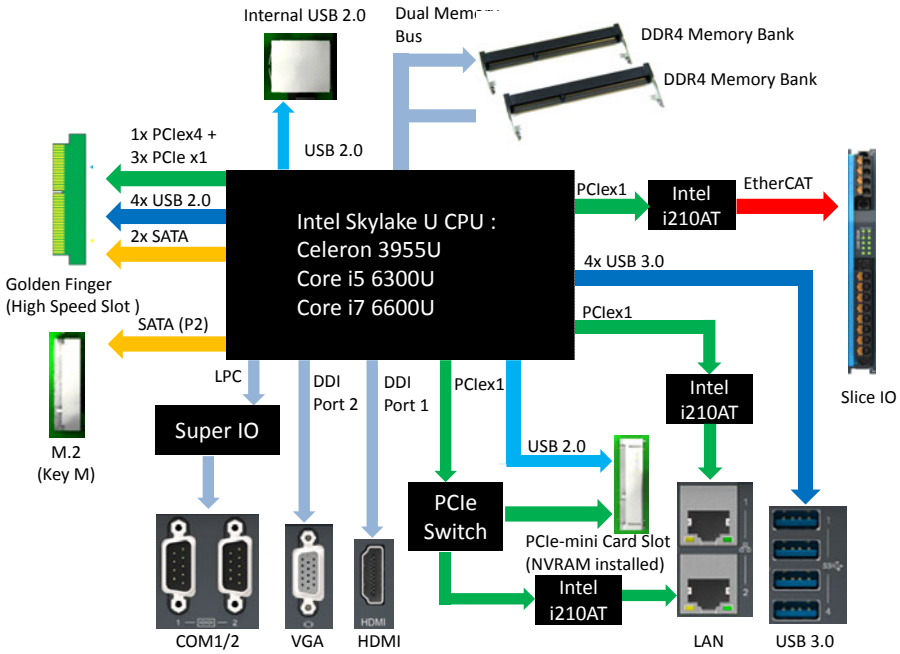


Figure 2.7 System Architecture of WISE-5580

Note! *LAN2 and PCIe-mini Card share resource*

Chapter 3

Initial Setup

3.1 Selecting the appropriate power supply unit

The WISE-5580 need external 24VDC power input from the screw terminal on the top. And this power input will supply power to the main CPU module (WISE-5580) and left-hand-side PCIe expansion modules (WISE-54XX) .The pin definition is as below:

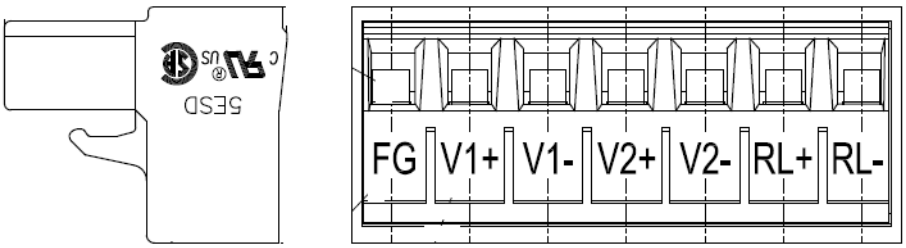


Table 3.1: Pin Definition of Power Input Terminal

No	Name	Function
1	FG	Field Ground Connection
2	V1+	Power Input 1
3	V1-	
4	V2+	Power Input 2
5	V2-	
6	RL+	Power Abnormal Relay Output (Normal Close/Open changeable) * Refer to p.20 ERR-LOGIC1
7	RL-	

To keep the system work properly, user has to calculate the system power consumption to select the proper power supply unit. The selected power supply should provide more power than the max power consumption of the system.

For example:

Item	Model	Function	Max Power Consumption
1	WISE-5580	Main CPU Module	42W
2	WISE-5424V	4x USB	15W
3	WISE-5490	2x Serial Port	2W
		Sub-total	59W

Suggest adding tolerance on the total power consumption and also considering the power de-rating effect in your application environment.

Below is the suggestion list of verified power supply unit:

Item	Part Number	Description
1	PSD-A60W24	DIN Rail AC to DC 100-240V 60W 24V
2	PSD-A120W24	DIN Rail AC to DC 100-240V 120W 24V
3	96PSD-A240W24-MN	DIN Rail AC to DC 100-240V 240W 24V

The default power mode is AT mode, the system will boot as long as one valid power input from 1 or 2. Please check below LED to make sure the system is well powered.

Model	LED	Status	Definition
WISE-5580	PWR	Green	System Power OK
		Orange	System Standby
WISE-54XX	PWR	Green	System Power OK
	STBY	Orange	System Standby

NOTE: Please do not assemble or disassemble the system while the PWR /STBY LED is on. Please make sure power is completely removed and every LED is off before changing hardware configuration.

To enhance the system availability, WISE-5580 provides dual power input function to support main power input and backup power input. Either power input encounter trouble will trigger below alarms:

1. The LED "ERR VOL" turns "On"
2. The RL+ /RL- on the Power Input Terminal changes(Refer to p.20 ERR-LOGIC1)
3. The system tag change and can be access remotely

3.2 System Configuration and Installation

Please refer to section 1.1, table 2 to do the necessary configuration or maintenance. Please follow below step to open the front cover to do access the internal system components:

Step1: Remove the 7 pins Power Input Wiring Terminal on the top of the device

Step2: Remove the USB/HDMI fix kit from the front cover (Option)

Step3: Remove 2 screws on the lower side of the front cover

Step4: Move the cover upward slightly and move forward.

User can do the following access:

- Install the M.2 SSD storage
  This is the storage for the operating system, and suggests using industrial grade SSD to ensure the system reliability. Please refer to datasheet to check the parts which has been verified to work well with the system.
  After insert the SSD, please fix the SSD in the slot by the provided screw.
- Install the PCIe-mini card module
  User can install PCIe-mini card module in the PCIe-mini card slot. For example:
  - NVRAM module: PCM-2300MR-AE
    It provides the non-volatile memory for the system. This function is usually necessary for running a softlogic system.
  - Advantech EWM wireless module
    Include Wi-Fi, 3G, LTE, GPS function available for optional expansion, there is one hole reserve for antenna SMA connector on the top cover.
  - Other 3rd party PCIe-mini card module
    This PCIe-mini card is with PCIex1 signal and USB2.0 signal, please check the signal compatibility and driver availability first.

After insert the PCIe-mini card module, please fix it by the provided screw.

And also install the related driver in the operating system to enable the functionality.

- Change the Battery
  The Battery is to keep BIOS setting and CMOS. Please change the battery while the "BATT LOW" LED is on. The specification is as below

Type	Lithium Carbon-Monoflouride
Size	BR2032
Operation Temperature	-40 °C to +85 °C
Advantech Part Number	1750199011

- Install USB device in the internal USB2.0 port
  WISE-5580 reserves one port inside the chassis for important USB device. This design can keep user's important property inside the chassis and it would be not as easy to remove as it is outside the chassis. The USB device could be:
  - USB dongle key for software
  - Extra USB storage for data
- Jumper/DIP switch settings for special functions
  Below is the SW5 function

DIP	Function	Status
1	Power for USB1&2 in standby mode	ON : USB supply 5V
		OFF : None (default)
2	Power for USB3&4 in standby mode	ON : USB supply 5V
		OFF : None (default)
3	VGA force output	ON : No output load
		OFF : Simulate output load (default)
4	Power AT mode	ON : Hardware AT mode
		OFF : Simulated AT mode (default)

Jumper ERR_LOGIC1

This jumper is to set the relay for power alarm output

Position of Jumper	Status
PIN 1-2 short	Normal Open
PIN 2-3 short	Normal Close

3.3 Mounting

3.3.1 Attaching the WISE-54XX left-hand-side module (option)

Left-hand-side PCIe module should be assembly before mount on the DIN-rail.

Please follow below steps and diagram to install.

Step1: Use the guide pin to direct the module in the right position.

Step2: Push the golden finger into the slot

Step3: Screw in the screws to make sure the combination is tight,

Step4: Follow the same step to stack 2nd and next WISE-54XX module

3.3.2 Permissible installation positions

Note: The CPU module may overheat if the installation position is incorrect or minimum distances are not adhered.

WISE-5580 is with passive cooling system, and need correct mounting position to ensure optimum heat dissipation.

Note the below requirements for the control cabinet:

1. Please make sure the temperature of control cabinet is within the operation temperature of WISE-5580, which is -10~60 °C
2. Please adhere to the minimum clearance of 50 mm above and below the CPU module, in order to ensure proper ventilation
3. Additional equipment or select suitable control cabinet enclosure to ensure the heat can be dissipated from the control cabinet

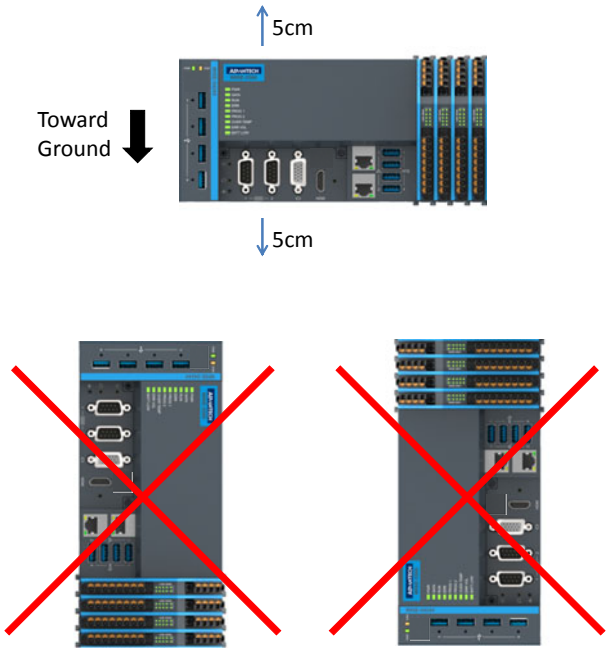


Figure 3.1 Mounting position for WISE-5580

3.3.3 Attaching on the DIN-rail

Please follow below steps to secure WISE-5580 on the DIN-rail:

Step1: Unlock the latches at the bottom of WISE-5580 and WISE-54XX

Step2: Place the WISE-5580 on the DIN-rail, hang the device on the top side of the DIN-rail. And push the lower side of the device onto the DIN-rail.

Step3: Lock the latches

3.3.4 Install the WISE-50XX right-hand-side modules

Note: The WISE-50XX on the right-hand-side has independent power system. WISE-5001, smart power input terminal should be the first module to supply the power to the right side WISE-50XX modules.

Please follow below steps to slice in the module one by one:

Step1: Unlock the latched at the bottom of WISE-50XX

Step2: Remove the protection cover on the right-side of WISE-5580, and slice in the module on the side of the WISE-5580

Step3: Touch the orange part on the lower side to release the latch to lock the module on the DIN-rail

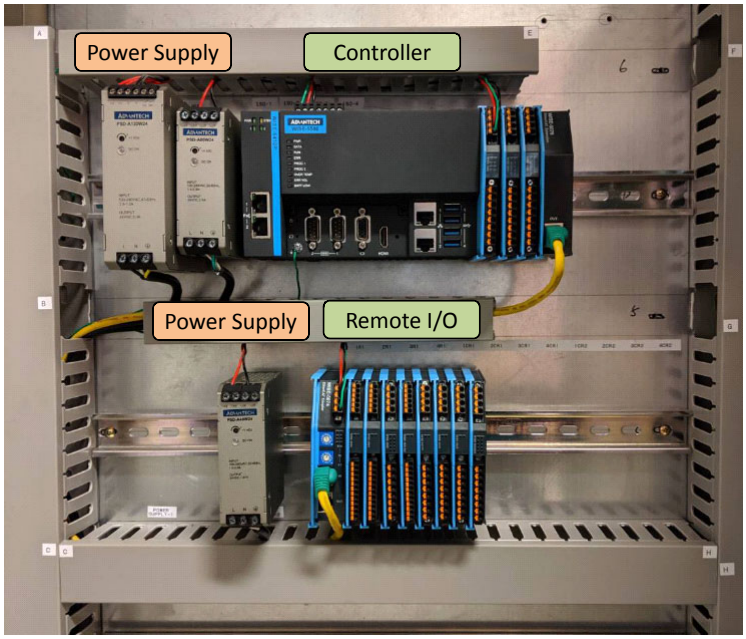


Figure 3.2 WISE-5000 installed in control box

3.4 BIOS Setup

3.4.1 How to enter the BIOS?

First, plug-in the 24VDC input power to boot the WISE-5580 or reboot it if it is running.

Second, press "Delete" key while the WISE-5580 is performing the power-on self-test (POST).

If you can hear the "beep" sound from your WISE-5580 controller, you are successfully accessing the BIOS.

3.4.2 BIOS configuration

When you enter the BIOS, the "**Main**" tab list overall information to the WISE-5580 controller; you may see **BIOS information** and **Processor Information** on this page.

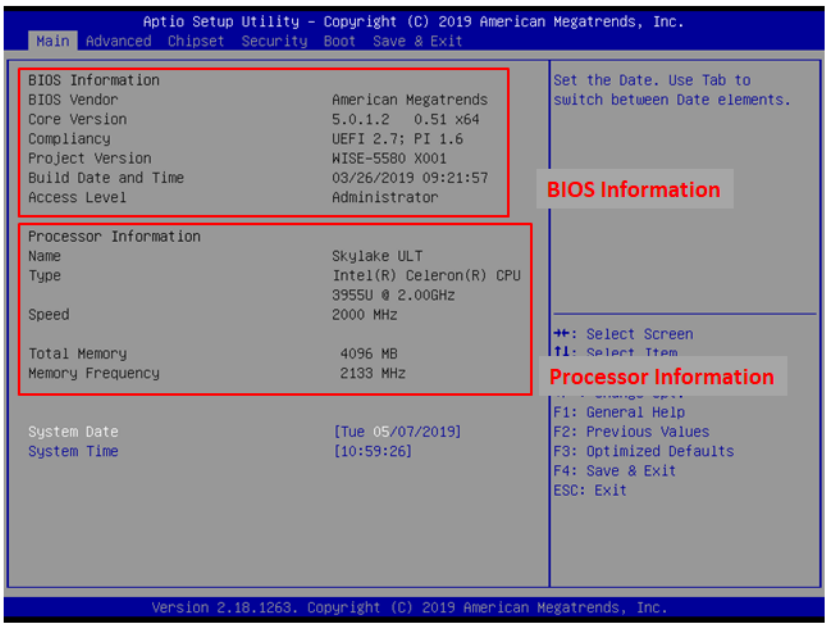


Figure 3.3 BIOS and processor information

3.4.3 Hardware Monitor

The "**Hardware Monitor**" option under "**Advanced**" tab shows all hardware monitor sensors real-time value.

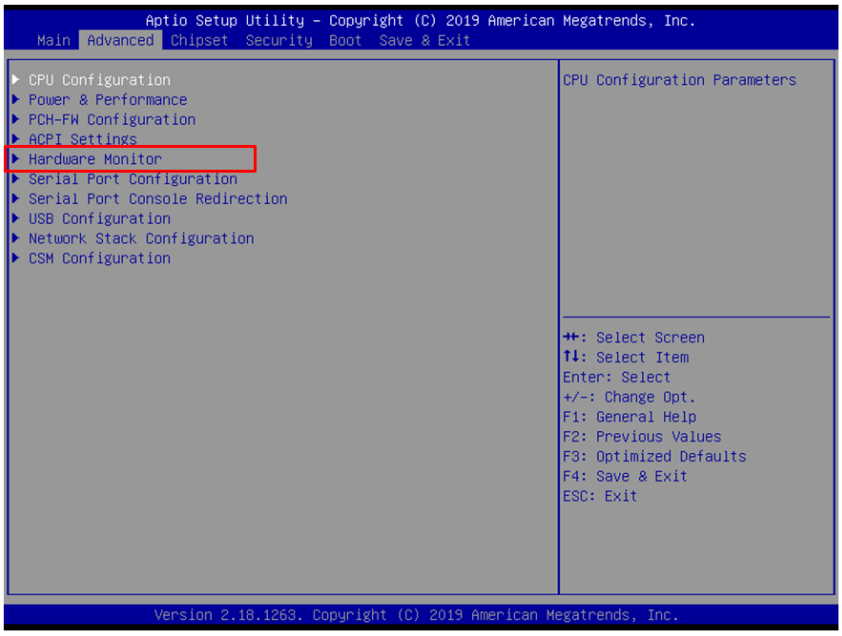


Figure 3.4 Configuration list under Advanced tab in BIOS

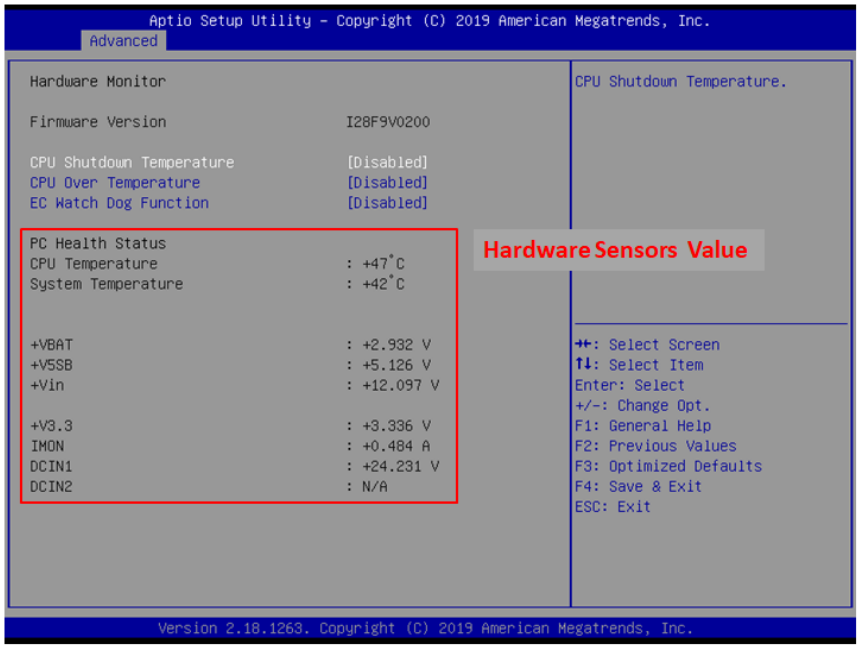


Figure 3.5 The Hardware Sensors Value showed in BIOS

3.4.3.1 CPU Over Temperature and CPU Shutdown Temperature

There are many factors that may lead to CPU temperature overheat, such as improper system installation, ambient temperature too high or poor ventilation.

You may set the "CPU Over Temperature" value in BIOS configuration, the LED indicator (OVER TEMP) on the front panel will be turned on when the CPU temperature abnormal.

In order to protect your system from overheat damage; you may also set the "CPU Shutdown Temperature" value. When the CPU overheats, the system will shut down automatically.

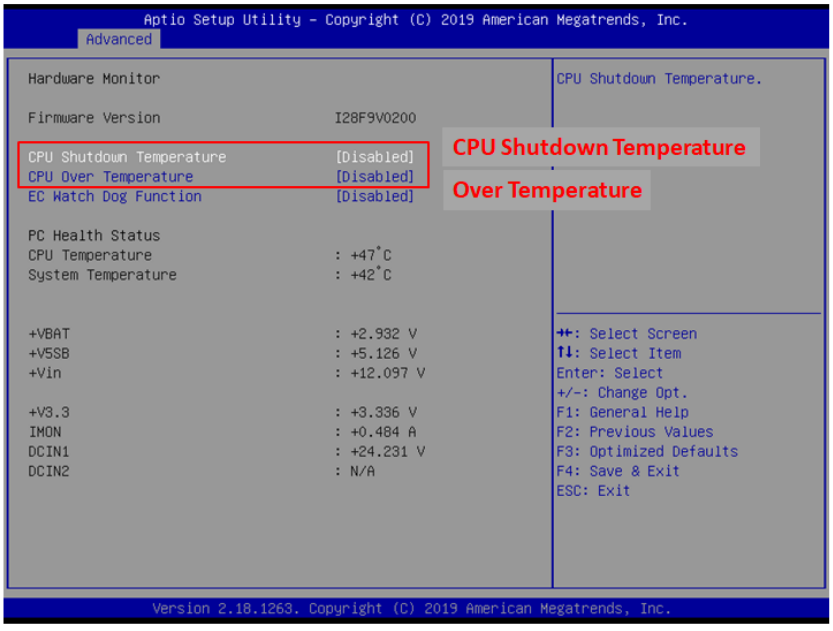


Figure 3.6 The CPU shutdown temperature and over temperature configuration in BIOS

3.4.3.2 EC Watch Dog Function

EC Watch Dog Timer can be easily configured under Hardware Monitor page. Like the figure below, users can choose a certain time interval to reboot the system if the computer fails to reset the watchdog.

Furthermore, WISE-5580 also supports numerous Watch Dog Timer API to allow users to build their own applications. For more details, please refer to Chapter 3.6 Advantech Watchdog KMDF Driver.

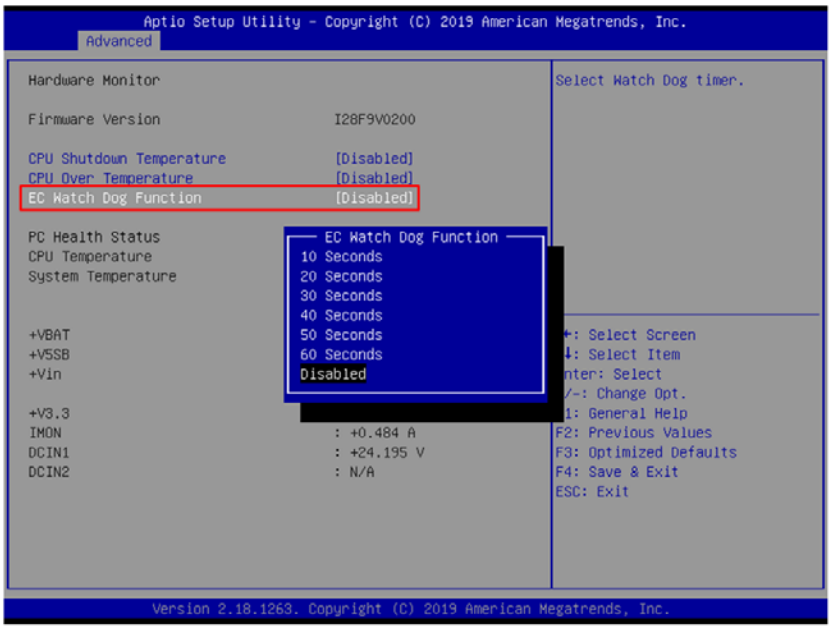


Figure 3.7 EC watch dog timer configuration in BIOS

3.4.4 Serial port configuration

In order to configure the two DB9 serial ports at the front panel into the same protocol you're connecting, you may enter the "**Advanced**" tab and select "**Serial Port Configuration**" to enable the serial port and select the protocol type.

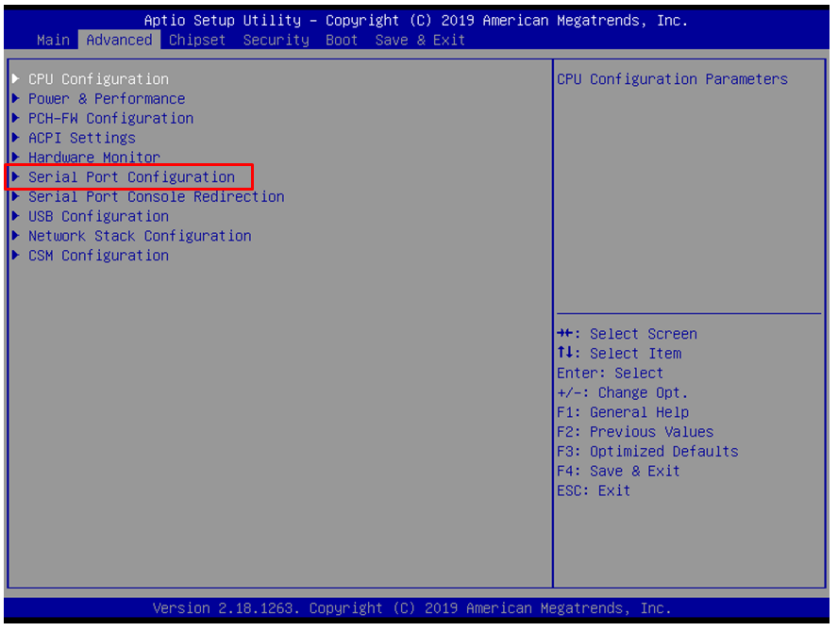


Figure 3.8 Serial port configuration in BIOS

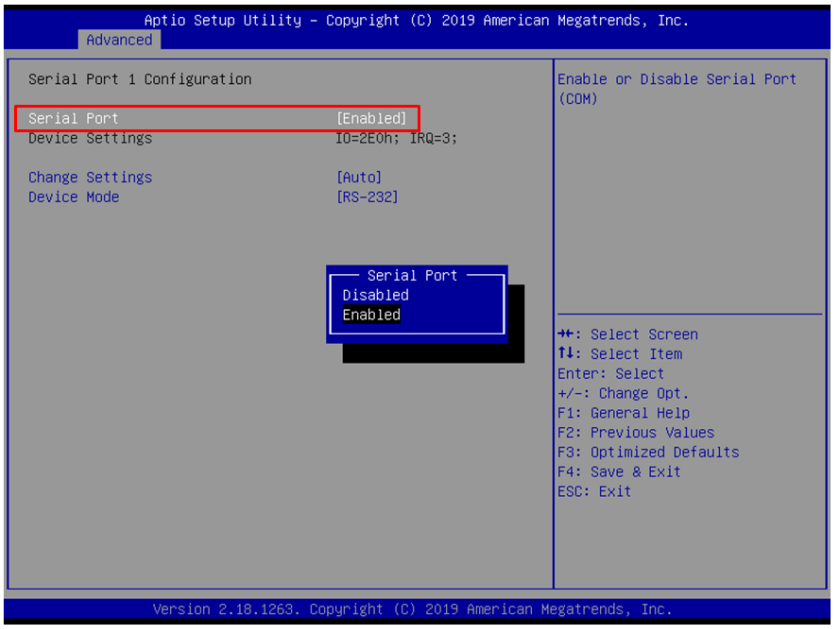


Figure 3.9 Enabling serial port in BIOS

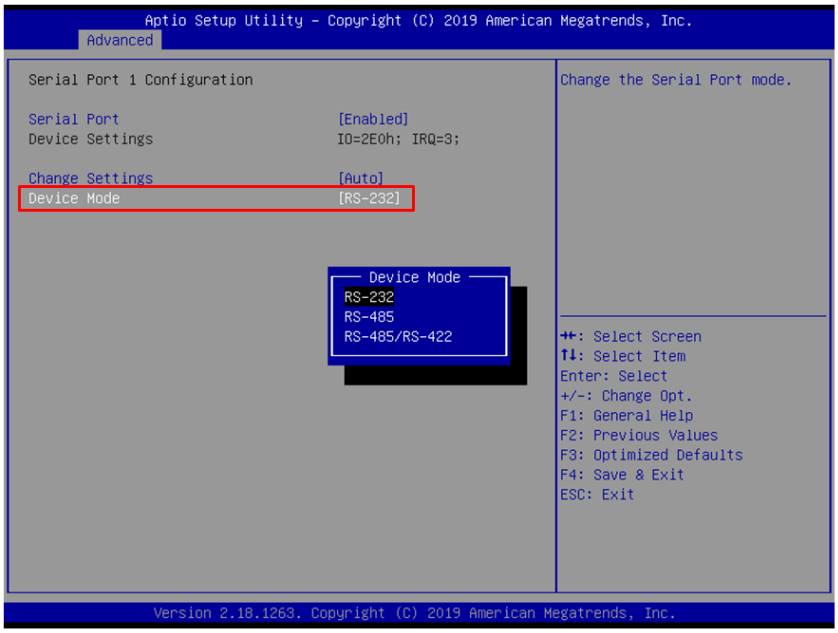


Figure 3.10 Configure serial port protocol type in BIOS

3.4.5 Save settings and Return to default

After configuring the BIOS, please press "**F4**" key to save the settings and exit the BIOS.

If you want to return the setting to default, please press "**F3**" key to return the optimized default setting.

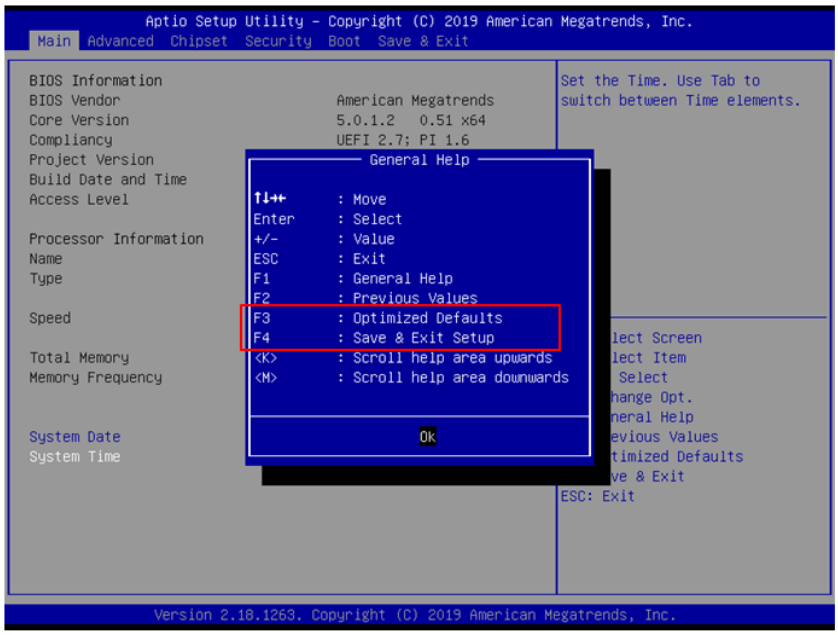


Figure 3.11 Hotkey to Optimized Defaults and Save & Exit Setup in BIOS

Chapter 4

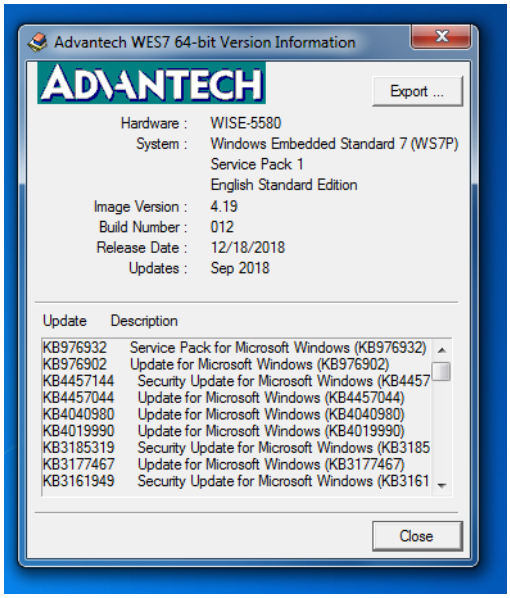
Software Tools

WISE-5580 controller also support with useful utilities and drivers to help you monitor your device easily or build up your own applications for advanced uses.

All the utilities and drivers are bundled in OS image which has already been pre-installed in your WISE-5580.

4.1 Verinfo

The Advantech Verinfo utility provides an easy way to list all system information of the WISE-5580 you're using, which includes: Hardware info, System info, Image Version, Build Number, Release Date, and Updated Packages for WES OS.

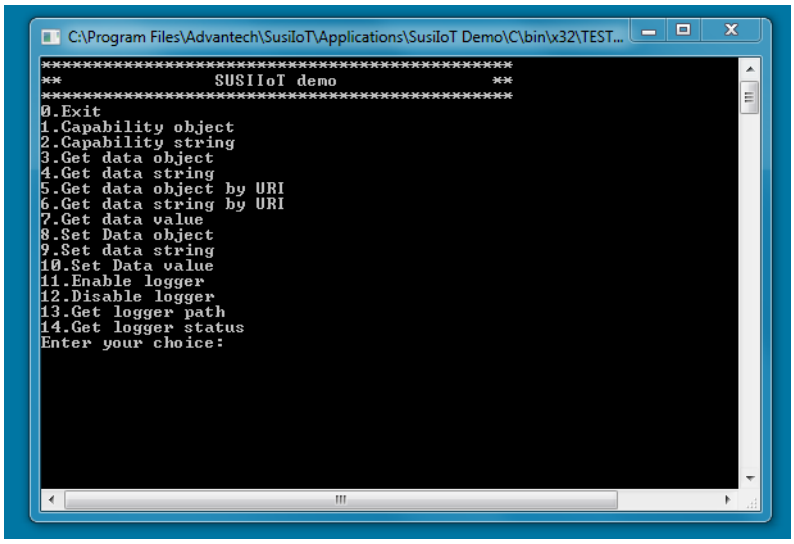


You can find the utility by the following path in WISE-5580:

C:\Program Files\Advantech\VerInfo\VerInfo.exe

4.2 Susi IOT

Advantech Susi IOT provides an interface to have an overview for all system information on your WISE-5580 platform.



You can find the utility by the following path in WISE-5580:

C:\Program Files\Advantech\SusiIoT\Applications\SusiIoT Demo

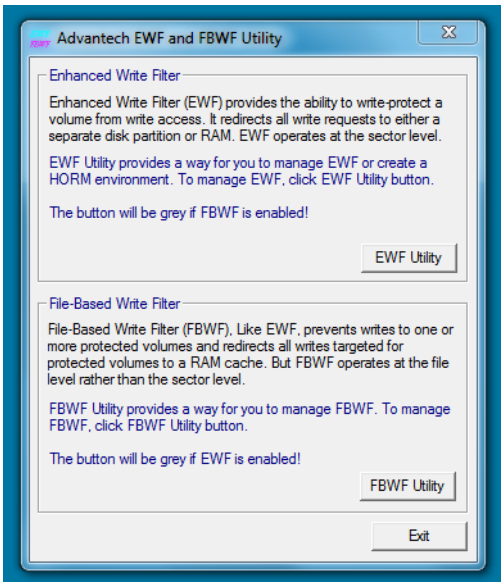
4.3 EAPI

Embedded API (EAPI) follows PICMG EAPI to specify functions for industrial application and provide a common programming interface. The target is to avoid software modifications when changing device modules. EAPI will cover all interfaces in the device to unify the software control:

You can find developer guide and sample codes by the following path in WISE-5580: **C:\Program Files\Advantech\PlatFormSDK**

4.4 AdvWF

Advantech AdvWF utility provides two key Windows XP Embedded's Embedded Enabling Features (EEFs), Enhanced Write Filter (EWF) and File-Based Write Filter (FBWF) features, please find details in Advantech EWF&FBWF User Guide.

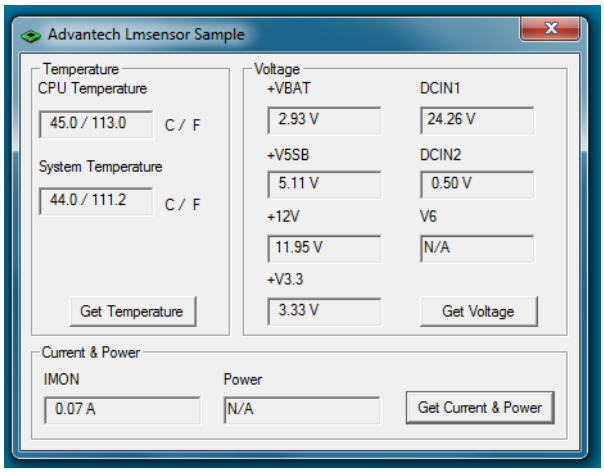


You can find user guide and utility by the following path in WISE-5580: **C:\Program Files\Advantech \Utility**

4.5 Advantech Lmsensor

The Advantech Lmsensor device driver provides functions to maximize the hardware's performance.

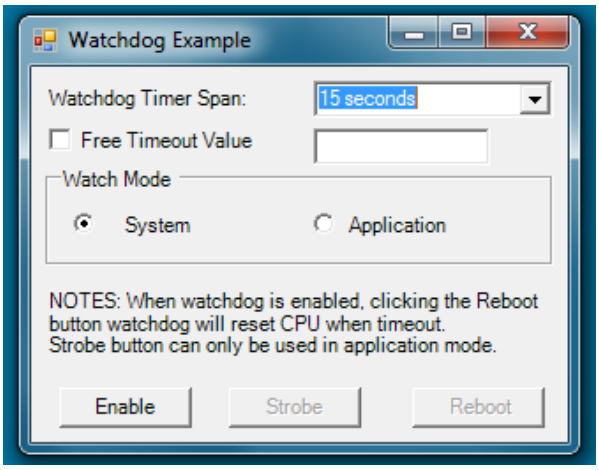
The driver allows you to easily perform versatile Lmsensor operations in programs developed with tools like Microsoft Visual C++, Embedded Visual C++, and other programming languages in different Windows system platforms. This driver also provides sample application. You can modify sample application to meet your needs.



You can find examples and user manual by the following path in WISE-5580: **C:\ Program Files (x86)\Advantech\Lmsensor**

4.6 Advantech Watchdog KMDF Driver

Advantech Watchdog KMDF Driver contains a set of functions and related structures that can be used in various application programs for interfacing with KMDF Drivers. The APIs support Microsoft Visual C++, Microsoft Visual Basic, and Microsoft C# development environments. You can directly write applications with windows API. Examples of VC, VC.NET, VB.NET, and C#.NET are supplied in the package, providing a reference for you to develop applications. When developing work is completed, you can use test tools to verify if functions of the application are correct.



You can find examples and user manual by the following path in WISE-5580: **C:\ Program Files (x86)\Advantech\Watchdog**

Appendix A

Pin Assignments

A.1 COM1/COM2 RS-232/422/485

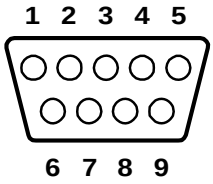


Table A.1: RS-232 Serial Port Pin Assignments

Pin	Pin Name
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

Table A.2: RS-422/485 Serial Port Pin Assignments

Pin	RS-422	RS-485
1	TX-	Data-
2	TX+	Data+
3	RX+	NC
4	RX-	NC
5	GND	GND
6	NC	NC
7	NC	NC
8	NC	NC
9	NC	NC

Please setup the serial port in the BIOS.

A.2 USB Connector

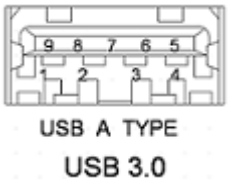


Table A.3: USB 3.0 Connector Pin Assignments

Pin	Signal Name	Description
1	VBUS	Power
2	D-	USB2.0 differential pair
3	D+	
4	GND	Ground for power return
5	StdA_SSRX-	SuperSpeed receiver differential pair
6	StdA_SSRX+	
7	GND_DRIAN	Ground for signal return
8	StdA_SSTX-	SuperSpeed transmitter differential pair
9	StdA_SSTX+	

A.3 HDMI Display Connector

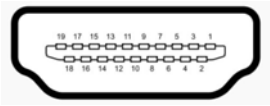


Table A.4: HDMI Display Connector

Pin	Signal	Pin	Signal
1	TMDS Data2+	2	TMDS Data2 Shield
3	TMDS Data2-	4	TMDS Data1+
5	TMDS Data1 Shield	6	TMDS Data1-
7	TMDS Data0+	8	TMDS Data0 Shield
9	TMDS Data0-	10	TMDS Clock+
11	TMDS Clock Shield	12	TMDS Clock-
13	CEC	14	Reserved
15	SCL	16	SDA
17	DDC/CEC/HEC Ground	18	+5 V Power (max 50 mA)
19	Hot Plug Detect		

A.4 EtherCAT Connector

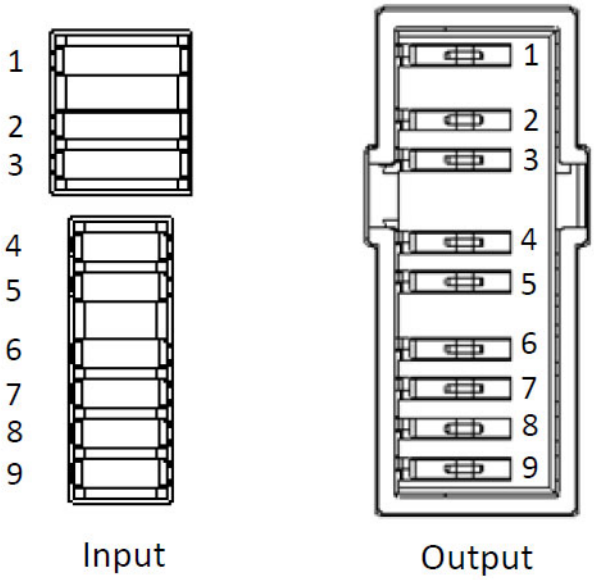


Table A.5: EtherCAT Connector

Pin	Signal Name (Input)	Signal Name (Input)
1	FG	FG
2	GND	GND
3	GND	GND
4	24V	24V
5	24V	24V
6	TX+	RX+
7	TX-	RX-
8	RX+	TX+
9	RX-	TX-

A.5 LED Indicators

Table A.6: PWR LED		
Description	**ACPI Status**	
LED Status	OFF	Shutdown
	Green	S0
	Flashing Green	S3
	Orange	S5

Table A.7: SATA LED		
Description	SATA Read and Write	
LED Status	OFF	Not working
	Orange	Read and Write

Table A.8: RUN LED		
Description	**User Defined**	
LED Status	OFF	User Defined
	Green	User Defined

Table A.9: ERR LED		
Description	**User Defined**	
LED Status	OFF	User Defined
	Red	User Defined

Table A.10: Over Temp LED		
Description	**User Defined**	
Setting	BIOS	
LED Status	OFF	Normal
	Red	Over temp
	Green	OS Recovery

Table A.11: ERR VOL		
Description	Detect AC1 and AC2 power high and low limit voltage	
Setting	BIOS	
LED Status	OFF	Safety
	Red	Abnormal*
	Green	OS Recovery

*Due to the resolution of the chipset, the real lower limitation will be around 19.3V (2LSB)

Table A.12: BATT LOW		
Description	Detect battery voltage	
Setting	BIOS	
LED Status	OFF	Normal
	Red	Battery Low

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