NEXCOM International Co., Ltd.

IoT Automation Solutions Business Group

EtherCAT Motion Controller

NET 200-ECM

User Manual

NEXCOM International Co., Ltd.
Published April 2017

www.nexcom.com

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PREFACE

Copyright

Disclaimer

The information in this document is subject to change without prior notice and does not represent commitment from NEXCOM International Co., Ltd. However, users may update their knowledge of any product in use by constantly checking its manual posted on our website: http://www.nexcom.com. NEXCOM shall not be liable for direct, indirect, special, incidental, or consequential damages arising out of the use of any product, nor for any infringements upon the rights of third parties, which may result from such use. Any implied warranties of merchantability or fitness for any particular purpose is also disclaimed.

Acknowledgements

NET 200-ECM is a trademark of NEXCOM International Co., Ltd. All other product names mentioned herein are registered trademarks of their respective owners.

Regulatory Compliance Statements

This section provides the FCC compliance statement for Class A devices and describes how to keep the system CE compliant.

Declaration of Conformity

FCC

This equipment has been tested and verified to comply with the limits for a Class A digital device, pursuant to Part 15 of 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 instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area (domestic environment) is likely to cause harmful interference, in which case the user will be required to correct the interference (take adequate measures) at their own expense.

CE

The product(s) described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

RoHS Compliance

NEXCOM RoHS Environmental Policy and Status Update

NEXCOM is a global citizen for building the digital infrastructure. We are committed to providing green products and services, which are compliant with European Union RoHS (Restriction on Use of Hazardous Substance in Electronic Equipment) directive 2011/65/EU, to be your trusted green partner and to protect our environment.

RoHS restricts the use of Lead (Pb) < 0.1% or 1,000ppm, Mercury (Hg) < 0.1% or 1,000ppm, Cadmium (Cd) < 0.01% or 100ppm, Hexavalent Chromium (Cr6+) < 0.1% or 1,000ppm, Polybrominated biphenyls (PBB) < 0.1% or 1,000ppm, and Polybrominated diphenyl Ethers (PBDE) < 0.1% or 1,000ppm.

In order to meet the RoHS compliant directives, NEXCOM has established an engineering and manufacturing task force to implement the introduction of green products. The task force will ensure that we follow the standard NEXCOM development procedure and that all the new RoHS components and new manufacturing processes maintain the highest industry quality levels for which NEXCOM are renowned.

The model selection criteria will be based on market demand. Vendors and suppliers will ensure that all designed components will be RoHS compliant.

How to recognize NEXCOM RoHS Products?

For existing products where there are non-RoHS and RoHS versions, the suffix "(LF)" will be added to the compliant product name.

All new product models launched after January 2013 will be RoHS compliant. They will use the usual NEXCOM naming convention.

Warranty and RMA

NEXCOM Warranty Period

NEXCOM manufactures products that are new or equivalent to new in accordance with industry standard. NEXCOM warrants that products will be free from defect in material and workmanship for 2 years, beginning on the date of invoice by NEXCOM. HCP series products (Blade Server) which are manufactured by NEXCOM are covered by a three year warranty period.

NEXCOM Return Merchandise Authorization (RMA)

- Customers shall enclose the "NEXCOM RMA Service Form" with the returned packages.
- Customers must collect all the information about the problems encountered and note anything abnormal or, print out any on-screen messages, and describe the problems on the "NEXCOM RMA Service Form" for the RMA number apply process.
- Customers can send back the faulty products with or without accessories (manuals, cable, etc.) and any components from the card, such as CPU and RAM. If the components were suspected as part of the problems, please note clearly which components are included. Otherwise, NEXCOM is not responsible for the devices/parts.
- Customers are responsible for the safe packaging of defective products, making sure it is durable enough to be resistant against further damage and deterioration during transportation. In case of damages occurred during transportation, the repair is treated as "Out of Warranty."
- Any products returned by NEXCOM to other locations besides the customers' site will bear an extra charge and will be billed to the customer.

Repair Service Charges for Out-of-Warranty Products

NEXCOM will charge for out-of-warranty products in two categories, one is basic diagnostic fee and another is component (product) fee.

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System Level

- Component fee: NEXCOM will only charge for main components such as SMD chip, BGA chip, etc. Passive components will be repaired for free, ex: resistor, capacitor.
- Items will be replaced with NEXCOM products if the original one cannot be repaired. Ex: motherboard, power supply, etc.
- Replace with 3rd party products if needed.
- If RMA goods can not be repaired, NEXCOM will return it to the customer without any charge.

Board Level

- Component fee: NEXCOM will only charge for main components, such as SMD chip, BGA chip, etc. Passive components will be repaired for free, ex: resistors, capacitors.
- If RMA goods can not be repaired, NEXCOM will return it to the customer without any charge.

Warnings

Read and adhere to all warnings, cautions, and notices in this guide and the documentation supplied with the chassis, power supply, and accessory modules. If the instructions for the chassis and power supply are inconsistent with these instructions or the instructions for accessory modules, contact the supplier to find out how you can ensure that your computer meets safety and regulatory requirements.

Cautions

Electrostatic discharge (ESD) can damage system components. Do the described procedures only at an ESD workstation. If no such station is available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the computer chassis.

Safety Information

Before installing and using the device, note the following precautions:

- Read all instructions carefully.
- Do not place the unit on an unstable surface, cart, or stand.
- Follow all warnings and cautions in this manual.
- When replacing parts, ensure that your service technician uses parts specified by the manufacturer.
- Avoid using the system near water, in direct sunlight, or near a heating device.
- The load of the system unit does not solely rely for support from the rackmounts located on the sides. Firm support from the bottom is highly necessary in order to provide balance stability.
- The computer is provided with a battery-powered real-time clock circuit. There is a 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.

Installation Recommendations

Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.

Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:

- A Philips screwdriver
- A flat-tipped screwdriver
- A grounding strap
- An anti-static pad

Using your fingers can disconnect most of the connections. It is recommended that you do not use needle-nose pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.

Safety Precautions

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 stable surface during installation. Dropping it or letting it fall may cause damage.

7. The openings on the enclosure are for air convection to 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. Place the power cord in a way so that people will not step on it. Do not place anything on top of the power cord. Use a power cord that has been approved for use with the product and that it matches the voltage and current marked on the product's electrical range label. The voltage and current rating of the cord must be greater than the voltage and current rating marked on the product.

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:
    a. The power cord or plug is damaged.
    b. Liquid has penetrated into the equipment.
    c. The equipment has been exposed to moisture.
    d. The equipment does not work well, or you cannot get it to work according to the user's manual.
    e. The equipment has been dropped and damaged.
    f. The equipment has obvious signs of breakage.

15. Do not place heavy objects on the equipment.

16. The unit uses a three-wire ground cable which is equipped with a third pin to ground the unit and prevent electric shock. Do not defeat the purpose of this pin. If your outlet does not support this kind of plug, contact your electrician to replace your obsolete outlet.

17. 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.

Technical Support and Assistance

1. For the most updated information of NEXCOM products, visit NEXCOM's website at www.nexcom.com.

2. For technical issues that require contacting our technical support team or sales representative, please have the following information ready before calling:
   - Product name and serial number
   - Detailed information of the peripheral devices
   - Detailed information of the installed software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wordings of the error messages

Warning!

1. Handling the unit: carry the unit with both hands and handle it with care.

2. Maintenance: to keep the unit clean, use only approved cleaning products or clean with a dry cloth.

3. CompactFlash: Turn off the unit's power before inserting or removing a CompactFlash storage card.

Conventions Used in this Manual

Warning:
Information about certain situations, which if not observed, can cause personal injury. This will prevent injury to yourself when performing a task.

Caution:
Information to avoid damaging components or losing data.

Note:
Provides additional information to complete a task easily.

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Package Contents

Before continuing, verify that the package that you received is complete.
Your package should have all the items listed in the following table.

Item	Part Number	Description	Specification	Qty
1	4NCPF00310X00	Terminal Blocks 3P Phoenix Contact:1803581	3.81mm Female DIP Green	1
2	4NCPM00302X00	(T)Terminal Blocks 3P Phoenix Contact:1777992	5.08mm Male DIP Green	1
3	50311F0295X00	Flat Head Screw Long Fei:F2x4 NYLOK NIGP	F2x4 NIGP NYLOK	2
4	50311F0326X00	Flat Head Screw Long Fei:F3x5 NYLOK NI+Heat Treatment	F3x5 NYLOK NI+Heat Treatment	4
5	50311F0330X00	Round Head Screw Long Fei:P2x3 ISO+NYLON	P2x3 NI NYLOK	4
6	50311P0001X00	Price for Plastic Screw	HS6-75P 75mm	2
7	50322P0002X00	Plastic Nut Gin Lian:M6HW	10mmx6mm	2
8	5060900226X00	Mini PCIe Bracket CHYUAN-JYH	29x30x2.1mm SPCC t=1.0mm NI	1
9	6012200052X00	PE Zipper Bag #8	170x240mm, w/China RoHS Symbol	1
10	6012200053X00	PE Zipper Bag #3	100x70mm, w/China RoHS Symbol	2
11	60177A0464X00	(E)NIFE 200 Quick Reference Guide VER:A SIZE:A4	KRAMER	1
12	602DCD1049X00	(E)NIFE 200 DVD Driver VER:1.0	JCL	1
13	7800000078X00	DVI-I to VGA Adapter for NISE 104 ST:ADDH27B	DVI-I (24+5) Pin Male to VGA 15-pin Female	1

Ordering Information

The following information below provides ordering information for NET 200-ECM.

NET 200 (P/N: A0J10020003X0)
Front-access EtherCAT controller

Image Selection
NET 200-ECM WES7 32-bit & RTX 2012 (P/N: 88J10020000X0)
NET 200-ECM WES7 32-bit & RTX 2016 (P/N: 88J10020001X0)
NET 200-ECM WES7 64-bit & RTX 2014 (P/N: 88J10020002X0)
NET 200-ECM WES7 64-bit & RTX64 3.0 (P/N: 88J10020003X0)

24V, 60W AC/DC power adapter w/ o power cord (P/N: 7400060024X00)

Chapter 1: Product Introduction

Overview

Powered by Intel® Celeron® processor J1900 (formerly codenamed "Bay Trail-D"), NET 200-ECM presents intelligent PC-based EtherCAT controller for machine automation. It integrates NEXCOM's EtherCAT Master, NexECM, to perform real-time communication with cycle time up to 250 µs. NET 200-ECM also provides API for CiA 402 profile and built-in EtherCAT configuration tool to speed up development time for automation users.

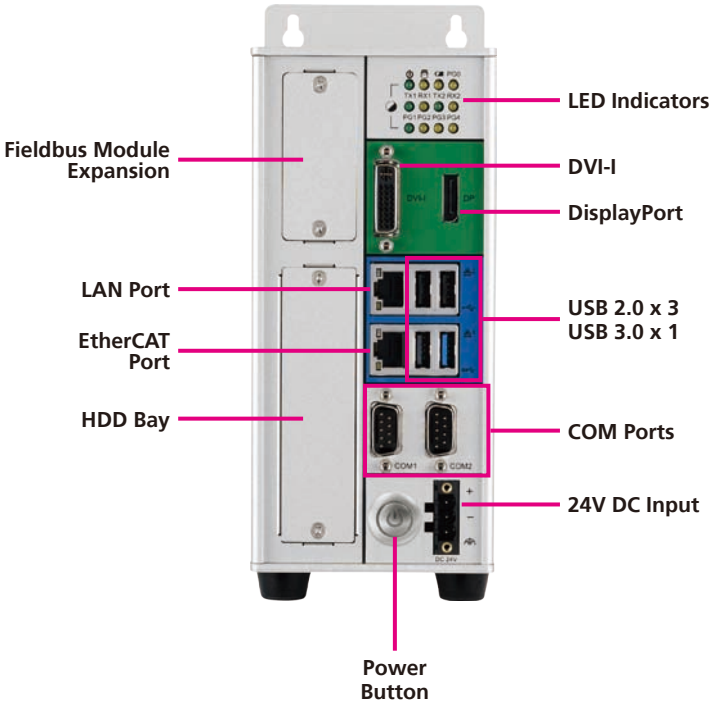
Besides EtherCAT communication, NET 200-ECM has high integration ability with two optional mini-PCIe modules and two COM ports, which makes it a flexible controller to connect with optional GbE LAN, Wi-Fi, 3.5G/4G LTE module or other fieldbus devices. With the provided features, NET 200-ECM is an ideal controller for your EtherCAT control system.

Key Features

- EtherCAT technology with NexECM, Class A EtherCAT Master
- EtherCAT communication cycle up to 250 µs
- Support high-level API for CiA 402 profile
- Onboard Intel® Celeron® processor J1900 Quad Core 2.0GHz
- Dual independent display from DP and DVI-I
- 3x USB 2.0 & 1x USB 3.0
- 2x RS232/422/485
- 2x mini-PCIe socket for optional Wi-Fi/3.5G/4G LTE/Fieldbus modules
- Support -5~55 °C operating temperature

Product Appearance

Front View



LED Indicators

Indicates the power, hard drive, battery, COM1/2 and GPO activity of the system.

DVI-I

Used to connect a digital LCD panel.

DisplayPort

Used to connect the system with display devices.

LAN Ports

LAN 1: EtherCAT LAN port
LAN 2: GbE LAN port to connect the system to a local area network.

USB Ports

USB 2.0 and USB 3.0 ports to connect the system with USB devices.

HDD Bay

A hard drive bay used to install 2.5" HDDs.

COM1 and COM2

Two DB9 ports used to connect RS232/422/485 compatible devices.

Power Button

Press to power-on or power-off the system.

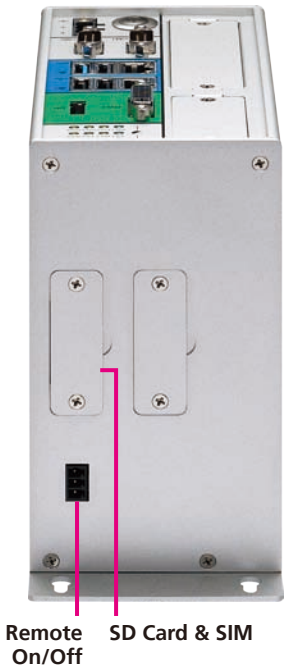
24V DC Input

Used to plug a DC power cord.

Fieldbus Module Expansion

Expansion slot for add-on fieldbus mini-PCIe modules.

Top View



Remote On/Off Switch

Used to connect a remote to power on/off the system.

SD Card Slot

Used to insert a SD card.

SIM Slot

Used to insert a SIM card.

Hardware Specifications

EtherCAT Master

- Slave module no.: up to 64
- Cycle time: up to 250μs
- Synchronization error: ±50ns
- Support CiA 402 standard protocol

CPU Support

- Onboard Intel® Celeron® processor J1900 Quad Core 2.0GHz

Main Memory

- 4GB RAM (2 x DDR3L)

Display Option

- Dual independent display
  - DVI-I and DP

I/O Interface - Front

- ATX power on/off switch
- LEDs for HDD LED, battery LEDs, power LED, COM port TX/RX, 5x Programmable GPO LEDs
- 1x External SD card
- 1x SIM card holder
- 1x EtherCAT port, 1 x Intel® I210IT GbE LAN port
- 1x DP display output
- 1x DVI-I display output
- 1x USB 3.0 (900mA per each)
- 3x USB 2.0 (500mA per each)
- 2x RS232/422/485 support auto flow control
  - Jumper-free setting on RS232/422/485
  - Support 2.5KV isolation protection on COM1
- 1x 3-pin DC input, typical 24V DC input with ±20% range

Storage Device

- 1x 2.5" SSD/HDD (SATA 2.0) -- front accessible
- 1x SD card (data storage only)
- 1x mSATA

Expansion Slot

- 2x Mini-PCIe socket for optional Wi-Fi/3.5G/4G LTE/Fieldbus modules

Power Requirements

- Typical 24V DC input with ±20% range
- 1x optional 24V, 60W power adapter

Dimensions

- 85mm (W) x 157mm (D) x 214mm (H)

Construction

- Aluminum and metal chassis with fanless design

Environment

- Operating temperature:
  Ambient with air flow: -5°C to 55°C
  (according to IEC60068-2-1, IEC60068-2-2, IEC60068-2-14)
- Storage temperature: -20°C to 80°C
- Relative humidity: 10% to 95% (non-condensing)
- Shock protection:
  - SSD: 20G, half sine, 11ms, IEC60068-2-27
  - CFast: 50G, half sine, 11ms, IEC60068-2-27
- Vibration protection w/ CFast & SSD condition:
  - Random: 2Grms @ 5~500Hz, IEC60068-2-64
  - Sinusoidal: 2Grms @ 5~500Hz, IEC60068-2-6

Certifications

- CE
- FCC Class A

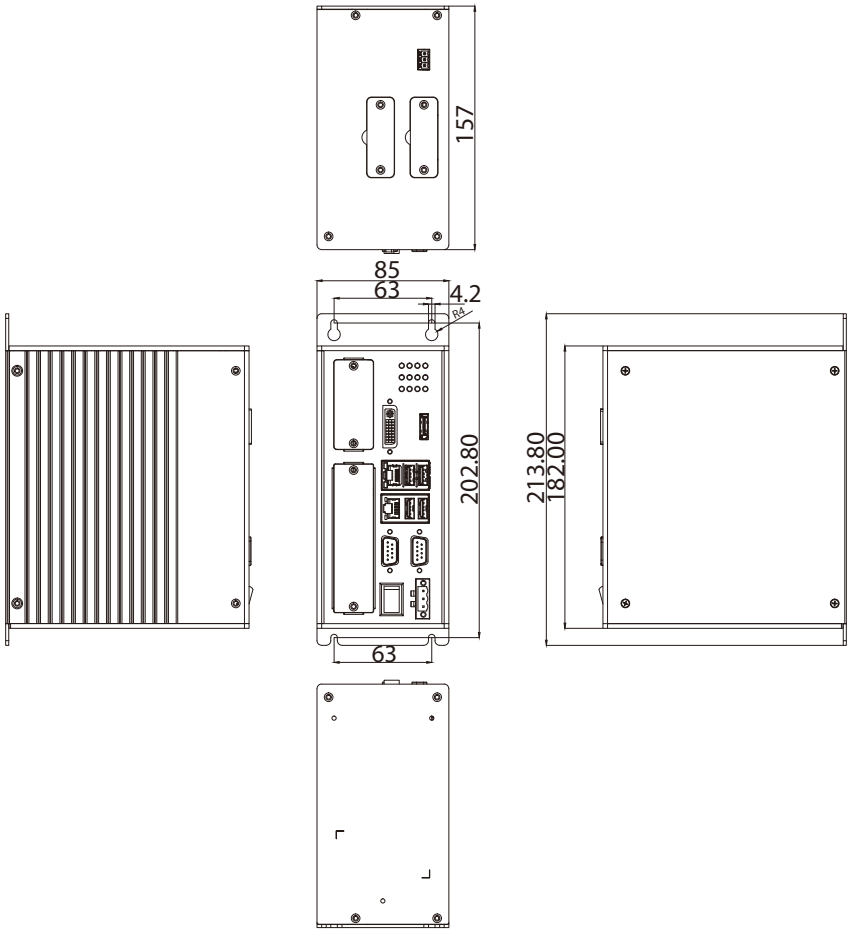
Pre-Installed Software Package

- Operating system: Windows Embedded Standard 7
- Real-time extension:
  - RTX2012/RTX2016 for 32-bit OS
  - RTX2014/RTX64 3.0 for 64-bit OS
- EtherCAT Master: NexECM
- EtherCAT configurator

EtherCAT Support Table

Feature Name	Short Description	NexECMRtx
Basic Features		
Service Commands	Support of all commands	✓
IRQ Field in Datagram	Use IRQ information from Slave in datagram header	✓
Slaves with Device Emulation	Support Slaves with and without application controller	✓
EtherCAT State Machine	Support of ESM special behavior	✓
Error Handling	Checking of network or slave errors, e.g. working counter	✓
Process Data Exchange		
Cyclic PDO	Cyclic process data exchange	✓
Network Configuration		
Reading ENI	Network configuration taken from ENI file	✓
Compare Network Configuration	Compare configured and existing network configuration during boot-up	✓
Explicit Device Identification	Identification used for hot connect and prevention against cable swapping	✓
Station Alias Addressing	Support configured station alias in slave, i.e. enable 2nd Address and use it	✓
Access to EEPROM	Support routines to access EEPROM via ESC register	✓
Mailbox Support		
Support Mailbox	Main functionality for mailbox transfer	✓
Mailbox Polling	Polling mailbox state in slaves	✓
CAN Application Layer Over EtherCAT (CoE)		
SDO Up/Download	Normal and expedited transfer	✓
Complete Access	Transfer the entire object (with all sub-indices) at once	✓
Distributed Clocks		
DC	Support of distributed clock	✓

Mechanical Dimensions

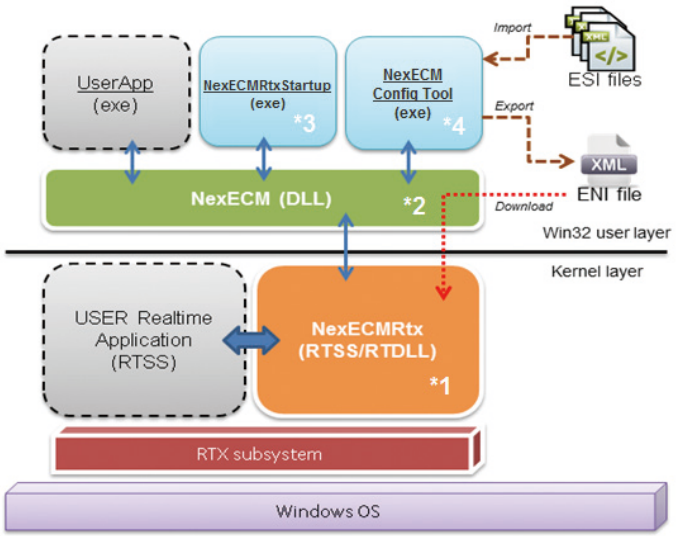


Chapter 2: Software Operation

NET 200-ECM is an EtherCAT master controller based on IntervalZero's real-time extension RTX. NET 200-ECM integrates NEXCOM's EtherCAT master software, NexECMRtx, to implement real-time operation and high performance communication.

NET 200-ECM Pre-Installed Software Package

- Operating system: Windows Embedded Standard
- Real-time extension: RTX
- EtherCAT master: NexECMRtx
- EtherCAT configurator



System Structure

(*1) NexECMRtx.rtss - EtherCAT Master Runtime stack
(*2) NexECM.dll - EtherCAT Master Win32 API libraries
(*3) NexECMRtxStartup.exe - EtherCAT Master Startup utility
(*4) NexECM Config Tool.exe - EtherCAT Master Configuration utility

The next section describes how to get started with the NET series platform, and the detailed steps of software operation.

NexECM Introduction

NexECMRtx is an EtherCAT Master Communication Protocol solution. It is based on IntervalZero's RTX (RTX is a real-time extension on Microsoft Windows) to offer real-time communication between EtherCAT master and EtherCAT slave devices. NexECMRtx offers high level C/C++ APIs for rapid application development.

NexECMRtx also provides a configuration utility - NexECM EtherCAT configuration tool, a graphic user interface tool for customers to edit parameters for EtherCAT communication between master and slave devices. Its functions are as follows:

Step 1. Scan EtherCAT slave devices
Step 2. Import ESI file, and export ENI file
Step 3. Configure EtherCAT slave devices
Step 4. Monitor EtherCAT communication quality
Step 5. Test functions for EtherCAT slave devices

According to the EtherCAT standard document: ETG.1500, NexECMRtx currently supports Master functions, which are shown in the table below:

✓: Ready, △: By Project Request

Feature Name	Short Description	NexECMRtx
Basic Features		
Service Commands	Support of all commands	✓
IRQ Field in Datagram	Use IRQ information from Slave in datagram header	✓
Slaves with Device Emulation	Support Slaves with and without application controller	✓
EtherCAT State Machine	Support of ESM special behavior	✓
Error Handling	Checking of network or slave errors, e.g. working counter	✓
Process Data Exchange		
Cyclic PDO	Cyclic process data exchange	✓
Network Configuration		
Reading ENI	Network configuration taken from ENI file	✓
Compare Network Configuration	Compare configured and existing network configuration during boot-up	✓
Explicit Device Identification	Identification used for hot connect and prevention against cable swapping	✓
Station Alias Addressing	Support configured station alias in slave, i.e. enable 2nd Address and use it	✓
Access to EEPROM	Support routines to access EEPROM via ESC register	✓
Mailbox Support		
Support Mailbox	Main functionality for mailbox transfer	✓
Mailbox Polling	Polling mailbox state in slaves	✓
CAN Application Layer Over EtherCAT (CoE)		
SDO Up/Download	Normal and expedited transfer	✓
Complete Access	Transfer the entire object (with all sub-indices) at once	✓
SDO Info Service	Services to read object dictionary	✓
Emergency Message	Receive emergency messages	✓

Ethernet over EtherCAT (EoE)		
EoE	Ethernet over EtherCAT	△
File over EtherCAT (FoE)		
FoE	File over EtherCAT	△
Servo over EtherCAT (SoE)		
SoE	Servo over EtherCAT	△
Distributed Clocks		
DC	Support of Distributed Clock	✓

Documents for more detailed information about NexECM can be found from ***Start*** > ***All Programs*** > ***NEXCOM*** > ***NexECMRtx*** > ***Doc***.

RTX Activation

Every NET series platform comes with a sticker on the bottom of the platform that contains a set of RTX activation key. You need to activate RTX with the runtime license to start EtherCAT master and related operations. The steps required to activate your product will depend on whether or not the machine is connected to the Internet.

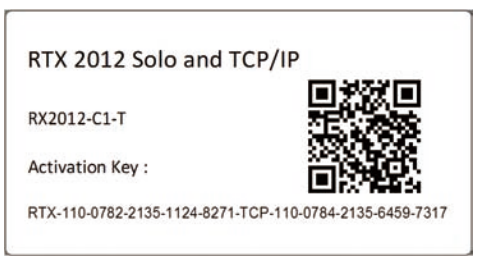


Figure 1. RTX Activation Key Sticker

Activate RTX with Internet Connection

Step 1. Open the ***Activation and Configuration*** dialog. This dialog appears once RTX has been installed. You can also launch it from ***Start*** > ***All Programs*** > ***IntervalZero*** > ***RTX 2012*** > ***RTX Activation***.

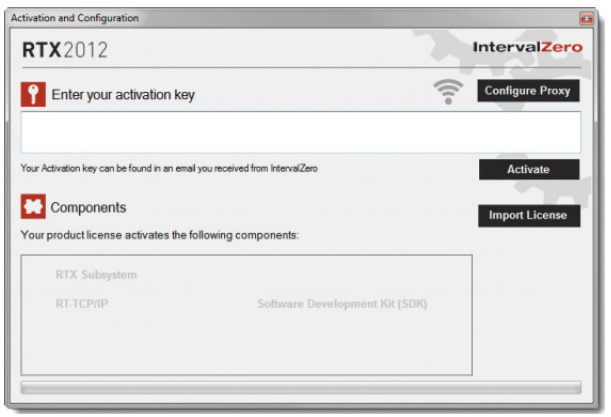


Figure 2. Activation Dialog

Step 2. Make sure your machine is connected to the Internet with access to the License Server. If no network connection is found, make sure all network cables are plugged in and click the Network icon to refresh. If a network connection still isn't found, you may need to configure a Proxy Server.

Step 3. Enter the activation key and then click ***Activate***. The product components activated by your key are indicated by a check mark in the *Components* box.

You need to enter the full Activation Key at once! Take *Figure. 1* as example, the Activation key you should key in is:
RTX-110-0782-2135-1124-8271-TCP-110-0784-2135-6459-7317

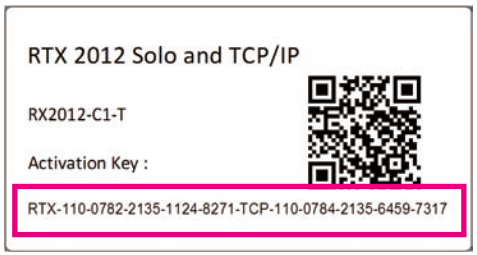


Figure 3. Key Section in the Sticker

Activate RTX without Internet Connection

If the computer on which you installed RTX is not connected to the Internet, the activation process requires a few additional steps.

Step 1. Open the ***Activation and Configuration*** dialog. You can launch it from ***Start*** > ***All Programs*** > ***IntervalZero*** > ***RTX 2012*** > ***RTX Activation***.

Step 2. Check your Internet connection. Continue with these steps only if there is no connection to the Internet. If you are connected, follow the steps in the previous section.

Step 3. Enter your activation key and then click ***Activate***.

Step 4. In the dialog that appears, click ***Yes*** to create a fingerprint file.

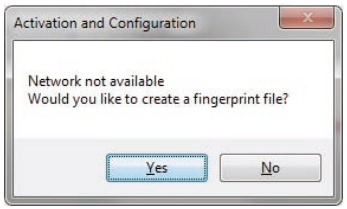


Figure 4. Fingerprint Dialog

Step 5. In the ***Save As*** dialog, name the file fingerprint.rfp. By default, the file will be saved to the desktop.

Step 6. Navigate to the desktop, and then copy and paste the file fingerprint.rfp to an external device.

Step 7. Connect the device to a machine with Internet connectivity.

Step 8. Launch a web browser, and navigate to http://Activation.IntervalZero.com.

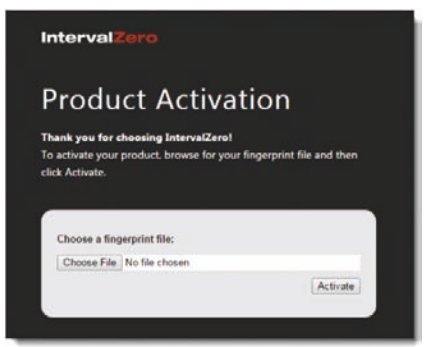


Figure 5. Product Activation Website

Step 9. Browse for and open the file fingerprint.rfp.

Step 10. Click ***Activate*** to generate a license (.lic) file.

Step 11. In the ***File Download*** dialog, click ***Save***.

Step 12. Copy the file License.lic to the external device, and transfer it to the machine on which RTX is installed.

Step 13. In the ***Product Activation*** dialog, click ***Import License File***.

Step 14. Browse for and open the file License.lic.

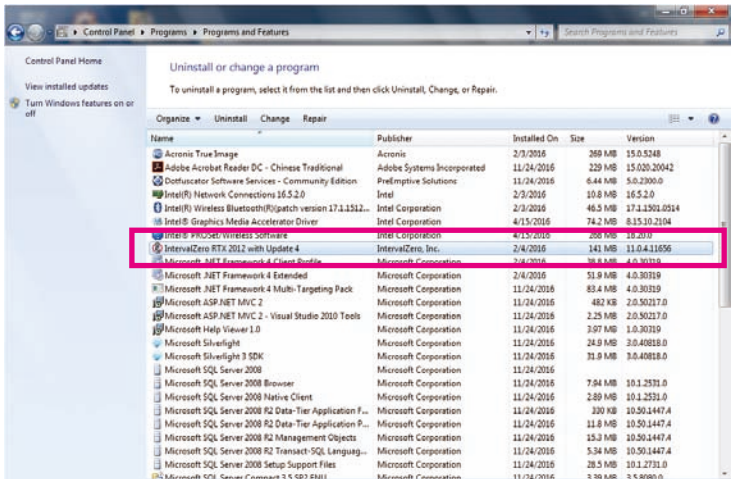
Microsoft Visual Studio Installation

For all of the NET series platforms, RTX are pre-installed. If you want to build RTX programs in Visual Studio, please refer to the following installation steps.

Step 1. Install Visual Studio. The supported versions list is in the table below.

Operating System	RTX Version	Visual Studio Version
WES7, 32-bit	RTX 2012	Visual Studio 2010 Visual Studio 2012
	RTX 2016	Visual Studio 2013 Visual Studio 2015
WES7, 64-bit	RTX64 2014	Visual Studio 2013 and up
	RTX64 3.0	Visual Studio 2013 and up

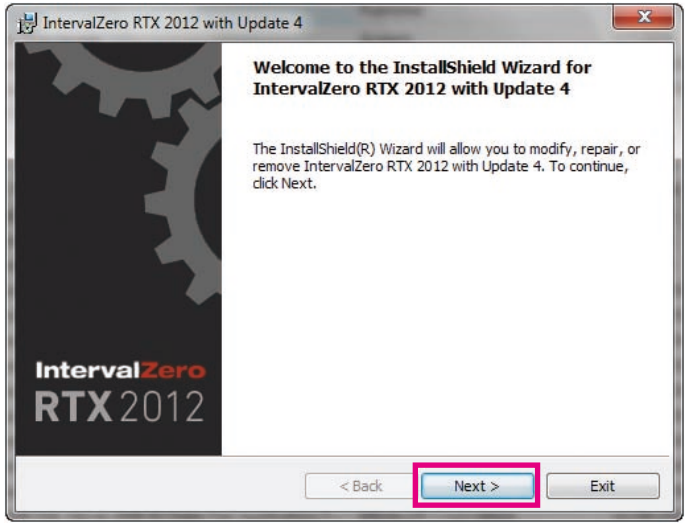
Step 2. After installation, please check the RTX Version on the NET platform. (***Windows*** > ***Start Menu*** > ***Control Panel*** > ***Programs*** > ***Programs and Features***). As shown in the example, the version is IntervalZero RTX 2012 with Update 4.



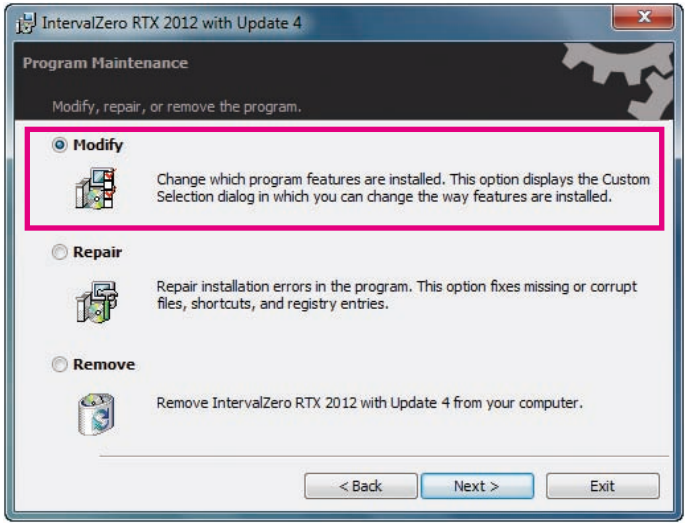
Step 3. Download the related RTX runtime installation file, from the IntervalZero download site.

- RTX 2102 (http://www.intervalzero.com/rtx-2012-downloads/)
- RTX 2016 (http://www.intervalzero.com/rtx-2016-downloads/)
- RTX64 2014 (https://www.intervalzero.com/rtx-downloads/rtx64-downloads/rtx64-2014-downloads)
- RTX64 3.0 (https://www.intervalzero.com/rtx-downloads/rtx64-downloads/rtx64-3-0-downloads)

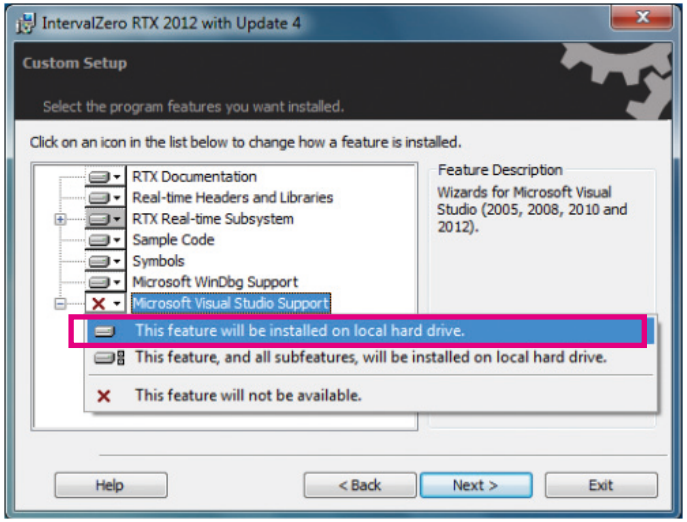
Step 4. Double-click the RTX install package, and click ***Next >***.



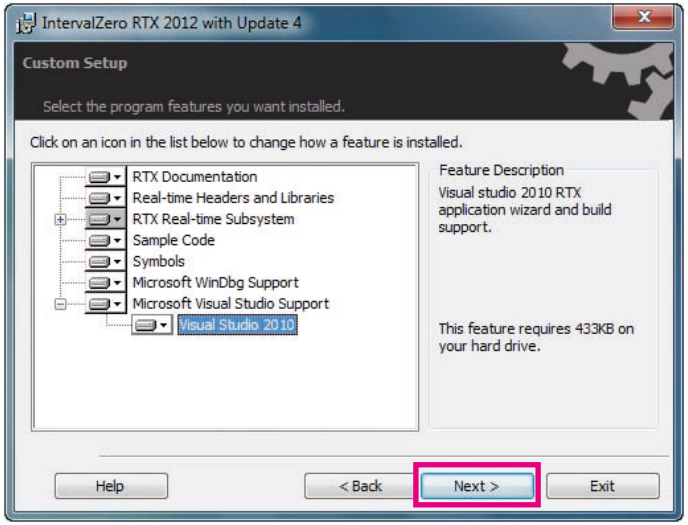
Step 5. Select ***Modify***.



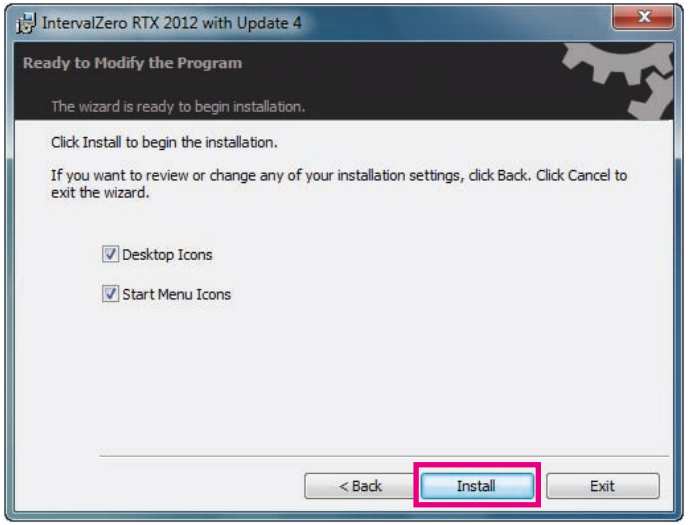
Step 6. Add the installed Visual Studio software in the list.

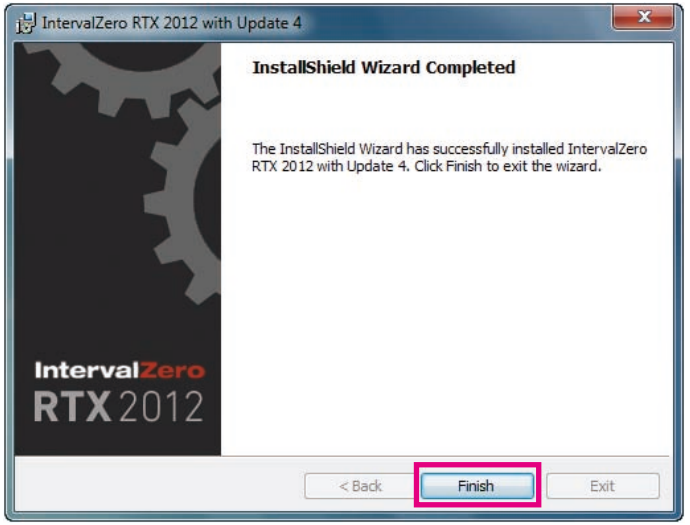


Step 7. Click **Next >**.

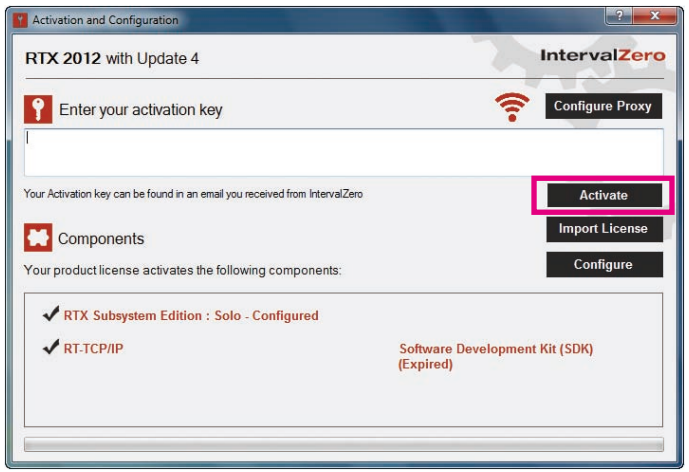


Step 8. Click ***Install***, and then click ***Finish***.

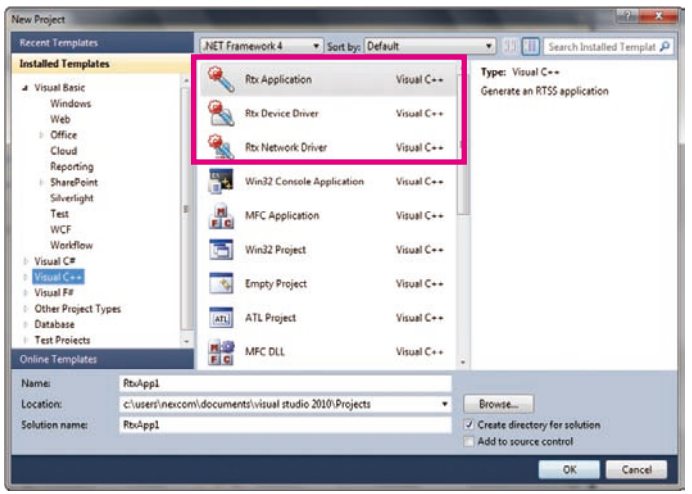




Step 9. Activate RTX license, you can refer to the previous section for the activation steps.



Step 10. After completing the steps, you can start to build your RTX program.



EtherCAT Utilities

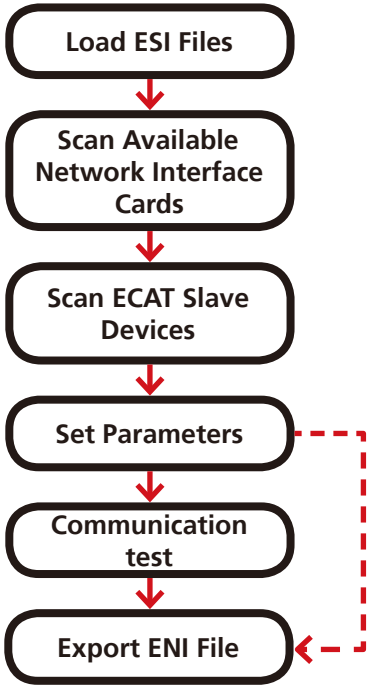
EtherCAT Configuration Tool

You can achieve the following with the NexECM Configuration Tool master utility:

1. Scan EtherCAT slave device
2. Import ESI file, and export ENI file
3. Edit CoE slave devices PDO mapping
4. ProcessData access
5. CoE slave devices SDO communication test
6. Monitor EtherCAT communication quality
7. Test slave devices' operation

Operation Flow

The basic operation flow of NexECM Configuration Tool is as follows:



ESI: An XML file to describe the EtherCAT Slave Devices Information.
ENI: An XML file to describe the EtherCAT Network Information.

- **Load ESI Files:**
  When NexECM Configuration Tool starts, it will automatically import all the files in the folder whose location is "Program Files/NEXCOM/NexECMRtx/tools/x32/ESI_File" or "Program Files/NEXCOM/NexECMRtx/tools/x32/ESI_File."

- **Scan Available Network Interface Cards:**
  NexECM Configuration Tool detects RTX environment and automatically finds all available network interface cards. RTX network interface card drivers are pre-installed on every NET series platform, and LAN1 of the platform is set as EtherCAT port.

- **Scan ECAT Slave Devices:**
  NexECM Configuration Tool scans the ECAT slave devices on the selected network port. If a device has no matched ESI file (VendorID, DevicID not matched), it will be defined as "Unknown". Move the mouse cursor to "Unknown" device will pop up the hardware information (VendorID, DeviceID and RevisionNumber).

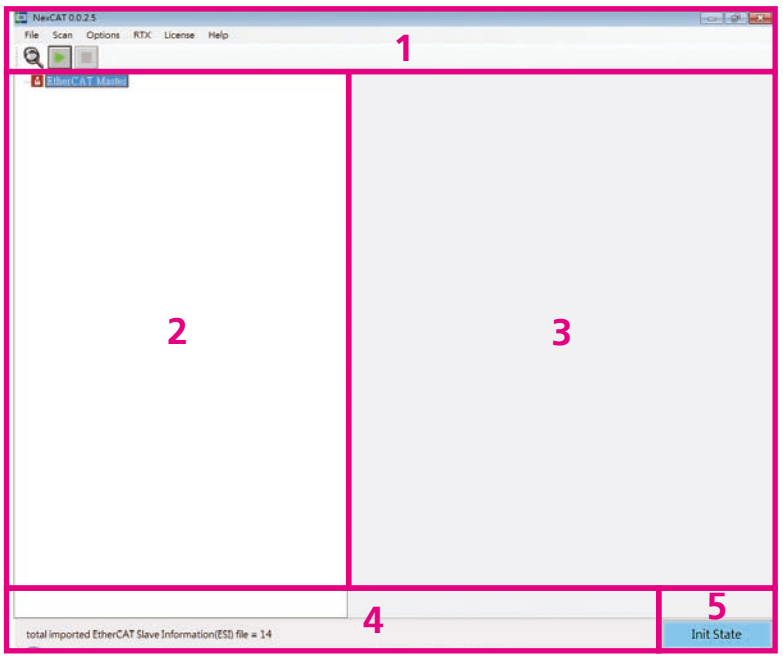
- **Set Parameters:**
  NexECM Configuration Tool generates the plan of PDO and ProcessData memory according to ESI files, then export to ENI file automatically. Users can also use the NexECM Configuration Tool built-in PDO mapping editor to customize their own plan, and then export the final setting to ENI file.

- **Communication Test:**
  User can start all the EC-Slave devices directly; the status will be changed from initial state (INIT) to operation state (OP). If there is a slave device which cannot be transferred to the operation state successfully, you can find the status and messages from the main page's area 4 and area 5 (in the following figure).

- **Export ENI file:**
  If the tests on each devices show normal, the user can use the function "Export ENI", to export the ENI file to the storage device. Actually, when you use the "Start Network" feature, the system automatically exports the current settings and network topology to ENI file.
  (The default path is C:\ENI_NexCAT_Export.xml)

NexECM Configuration ToolMain Page

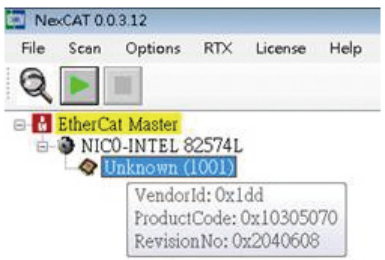
The NexECM Configuration Tool Main Page is divided into 5 areas, we will explain it in the following:



- **Area 1:**
  Shows the software name and version, e.g. NexECM Configuration Tool0025.

Icon	Description
	Scan NIC: Find the available network interface and display it on the form
	Start Network: Start communication and export ENI file to the default path (C:\)
	Stop Network: Stop all communication of EtherCAT slave devices

- **Area 2:**
  Shows the entire network topology and all online EtherCAT slave devices. If the EtherCAT slave device fails to be scanned and shows "Unknown", please update the ESI file of the slave device by contacting the slave device supplier and import it again.



"Unknown" device: Popup info when cursor is moved onto the item.

- **Area 3:**
  Shows the menu of parameters. You can set the slave device parameters and master parameters here.

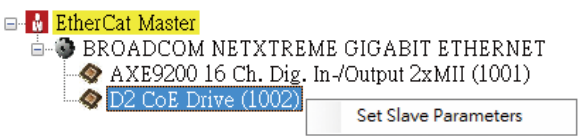
- **Area 4:**
  Shows message and error code.

- **Area 5:**
  Shows the state of EtherCAT slave devices. Currently we have 4 states:

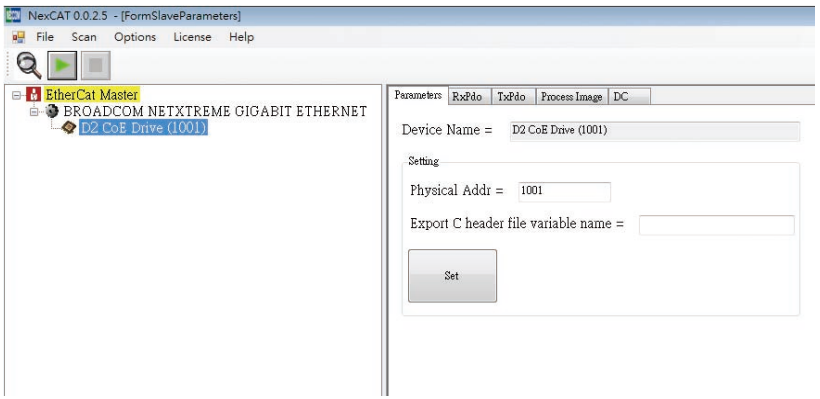
1. **Initial:** There is no communication and all slave devices are in initial state.
2. **Error:** There is communication but slave devices cannot be switched to OP state. Common errors are: ENI file does not match with the actual network topology; ESI version does not match with the slave device version and so on.
3. **Retry:** When the parameter "Link Error Mode" of ECAT master is set to "Auto re-connect" (refer to the NexECMRtx User Manual "Chapter 3.1.6") and slave device is in "OP" state but experiencing a link problem, the master will show "Retry" status and attempt to re-connect the disconnected slaves until they are working. Master will also try to re-connect those lost link modules, while other modules can operate as usual. This status is displayed continuously until all slaves are back to "OP" state.
4. **Running:** Network is connected and all slave devices are in "OP" state.

Set Slave Parameters

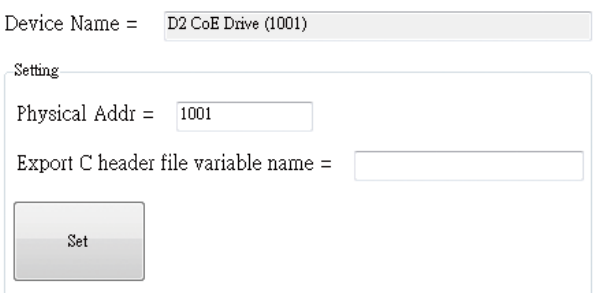
Select the slave device and right click to bring up a pop-up menu, choose "Set Slave Parameters".



Slave device setting page must be used before starting the Network, because all the parameters changed are valid only before the start of the Network. If user changed the settings after starting the Network, a network re-start is needed.



1. Parameters Tab



Device Name: Shows the name of current selected slave device.
Physical Addr: Defines the node address (configured address) for a slave device.
Export C header file variable name: Exports the process image for each slave, it must be used with function "Export C file" of Master Parameters setting (refer to the NexECMRtx User Manual "Chapter 3.1.6").

```
#define _Physical Addrdsss (+variable name)_ObjectName
[ProcessData offset]
```

Example:

Export C header file variable name= "_AXIS"

Export C header will be:

```
#define _1001_AXIS_Statusword              16777216
#define _1001_AXIS_PositionActualValue     16777218
#define _1001_AXIS_VelocityActualValue     16777222
#define _1001_AXIS_Controlword             16777216
#define _1001_AXIS_TargetPosition          16777218
```

2. RxPdo & TxPdo Tab

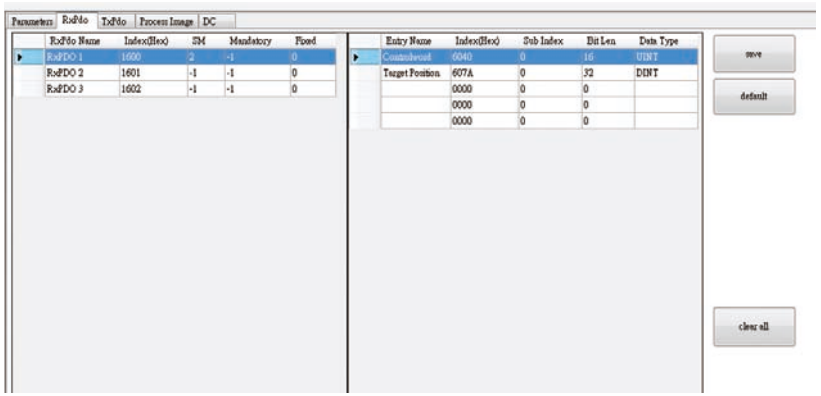


Table Description:

- **RxPdo(TxPdo) Name:** Default name is based from ESI file, user can change and export it to ENI.
- **Index:** Parameters from CoE. Changes are not recommended.
- **SM:** Number of Sync Manager, user can change the value.
- **Mandatory:** Defines the necessary parameters.
- **Fixed:** Defines which parameter the user can change.
- **Entry Name:** From CoE, user can change and export it to ENI.
- **Indicator:** Parameter from CoE. Changes are not recommended.
- **Sub Indicator:** Parameter from CoE. Changes are not recommended.
- **BitLen:** Parameter from CoE. Changes are not recommended.
- **DataType:** Parameter from CoE. Changes are not recommended.
- **Save Button:** Save changes after editing.
- **Default Button:** Revert to default ESI setting.
- **Clear All Button:** Clear PDO setting.

3. Process Image Tab

User can edit settings in the "RxPdo" or "TxPdo" tab. After editing, you can check the corresponding memory address in this tab. The edited settings will be valid after you click on the ***save*** button.

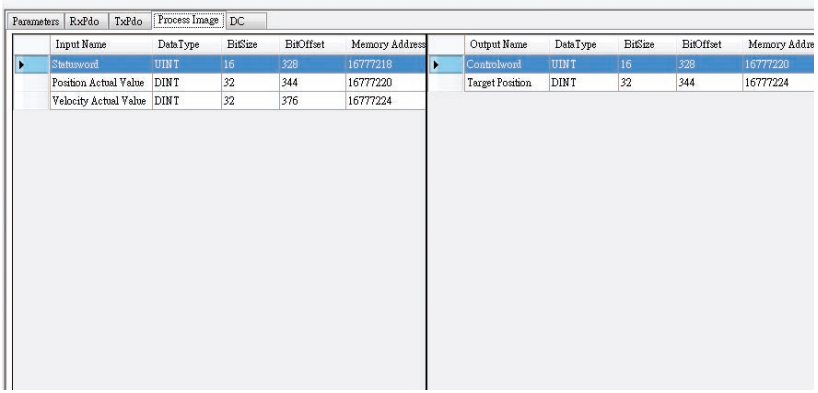
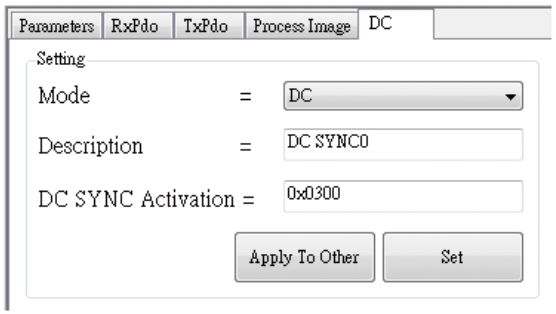


Table description:

- **Input(Output) Name:** Uses the name in the "RxPdo" or "TxPdo" tab.
- **BitSize:** Variables Memory Size.
- **BitOffset:** Variable Offset (based on setting in "RxPdo" or "TxPdo").
- **Memory Address:** Variables Memory Address.

4. DC Tab

This tab is used to set DC mode. Default DC settings of each slave are from its ESI file.

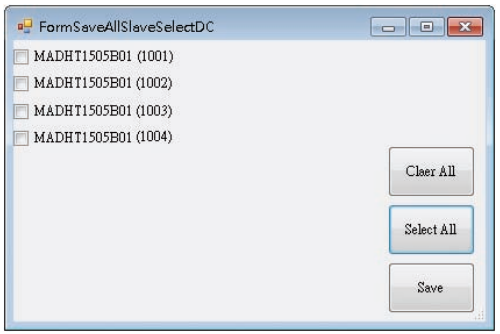


- **Mode (Description):**
  Select the DC mode. If the slave supports DC mode, the default is enable "DC" sync mode. As long as (a) slave(s) device's DC mode can be selected in the network, EtherCAT Master will have a DC output information (function) of ENI File. To turn off the DC function from the network, the user must set all slaves as "free run" mode.

- **DC SYNC Activation: (ESC Register 0x0980~0x0981)**
  0x0000 – Disable SYNC0 & SYNC1 (Free Run)
  0x0300 – Activate SYNC0 (DC Sync)
  0x0700 – Activate SYNC0 & SYNC1

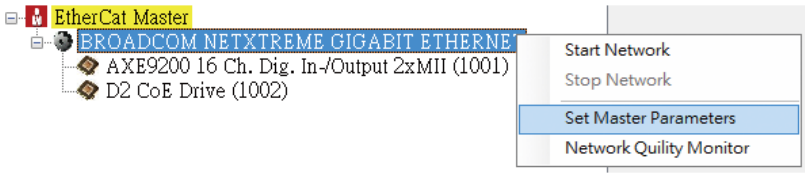
  This is an advanced setting. This column will be displayed according to the ESI file selected in the DC mode. It is used to control DC SYNC signal output. Generally leave it at default.

- **Apply To Other:**
  Apply current slave device's settings to other slaves. Clicking the button will pop up the following dialog.



Set Master Parameters

Select the device and right click to bring up the pop-up menu, choose "Set Master Parameters".

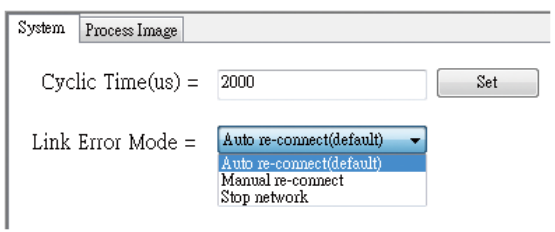


There are 2 tabs:

1. System
2. ProcessImage

Described as below:

System Tab



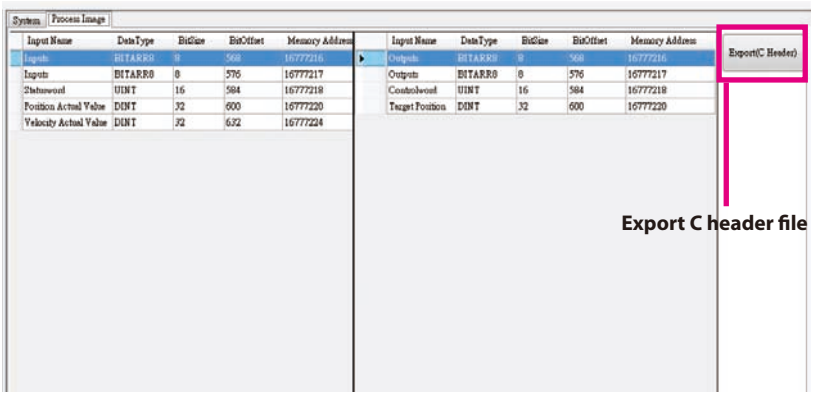
The Cyclic Time: Used to set the system performance. The values are communication time or refresh frequency between EC-Master and EC-Slave devices. The minimum value can't be larger than system limit value. This also can be set by calling API. Unit is micro second (us).

Link Error Mode: Behavior when there is a link error. After the network has been started, slave devices will be in"Operation" state. There are three modes when EC-Master detects the link error:

User also can set the mode by calling API, please refer to the NexECMRtx User Manual "Chapter 6.2".

- **Auto re-connect(default):** When a slave device loses communication, the main page "Area 5" will show "Slave Retry" message, while the system continues to re-connect automatically until the connection succeeds. Other slave devices continue to work at the same time.
- **Manual re-connect:** When a slave device loses communication, other slave devices will continue to work normally. The main page "Area 5" will show "Error message" and continue the next time when a network connection is successful.
- **Stop network:** When a slave device loses communication, EC-Master will stop the network. The main page "Area 5" will show "Error message".

Process Image Tab



- **Network process image map**
  The format is the same with the process image of a slave described in the NexECMRtx User Manual "Chapter 3.1.5", but here you can see the memory allocation for the entire network topology, or use "Export C Header File" function to output variables of each slave device. You also can write your own program when the memory is accessed directly through the API.

- **Export C heard file for process image map**
  Click"Export C Header File" button.
  PDO memory mapping offset can be output as a C header (*.h), It is easy to maintain your code using the define symbol when PDO mapping has changed. Output symbol format please refer to the NexECMRtx User Manual "Chapter 3.1.5".

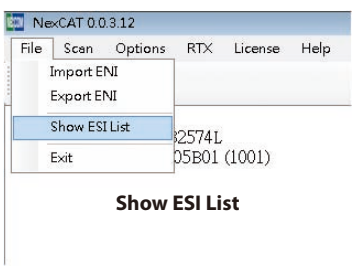
ESI List (ESI File Management)

When using NexECM Configuration Tool to scan the devices, you can get how many slave devices and obtain hardware information (e.g. Device ID etc). Through comparing the information, NexECM Configuration Tool will get which ESI belongs to. (About ESI file please refer to the NexECMRtx User Manual "Chapter 3.1.3"). If users get a new ECAT slave device, they must import the ESI of the device.

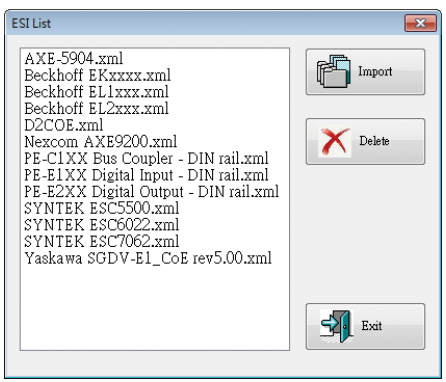
2 methods to manage the ESI files:

1. Add/Remove the ESI file to the specified folder directly. When you add a new ESI file, you need to restart the NexECM Configuration Tool.

2. Use "ESI list" page to import/delete ESI files. The action of import & delete is applied immediately. No need to restart the NexECM Configuration Tool.



Show ESI List

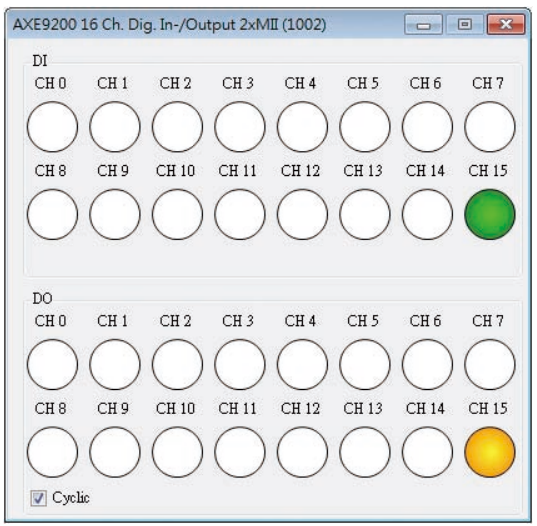


ESI List Page

DIO User Interface

In Area 2, double-click the selected DIO slave device which you want to test, the DIO operation menu will appear. NexECM Configuration Tool will determine the device for DI, DO or DIO devices and automatically calculate the number of IO.

When the mouse cursor is at the DO button, the user can manually press DO button to operate DO, or user can use the "Cyclic function" and let the DO slave device to run automatically to start Marquee features starting from small (0) to large, and repeated run. After you check the box for Cyclic, it operates automatically. After the check is canceled, the program stops at the last channel being executed in operation.

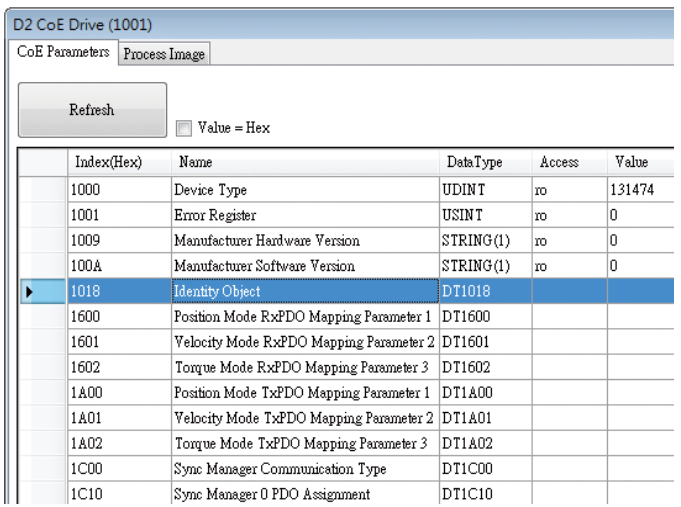


CoE-SDO Operation Page

In Area 2, double-click the selected CoE slave device which you want to test, the CoE operation menu will appear. NexECM Configuration Tool will automatically determine whether the slave device supports CIA 402.

Press the Refresh button and this will update parameter values automatically, the user can choose to represent decimal or hexadecimal display format. If a parameter is float, then the parameter from binary system will display in float.

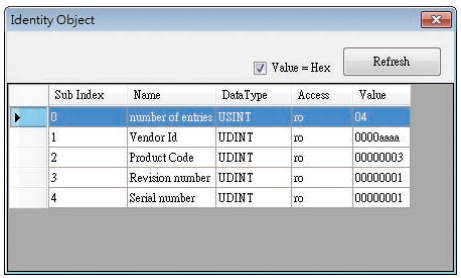
If the user wants to change parameters value, you can use the mouse and click the left button twice quickly to edit the parameters value. After editing is complete, press the Enter key or leave the table then it can be successfully written. If the write fails or does not meet the standard written format data form, the parameter values automatically go back to the state before editing.



Index(Hex)	Name	DataType	Access	Value
1000	Device Type	UDINT	ro	131474
1001	Error Register	USINT	ro	0
1009	Manufacturer Hardware Version	STRING(1)	ro	0
100A	Manufacturer Software Version	STRING(1)	ro	0
1018	Identity Object	DT1018		
1600	Position Mode RxPDO Mapping Parameter 1	DT1600		
1601	Velocity Mode RxPDO Mapping Parameter 2	DT1601		
1602	Torque Mode RxPDO Mapping Parameter 3	DT1602		
1A00	Position Mode TxPDO Mapping Parameter 1	DT1A00		
1A01	Velocity Mode TxPDO Mapping Parameter 2	DT1A01		
1A02	Torque Mode TxPDO Mapping Parameter 3	DT1A02		
1C00	Sync Manager Communication Type	DT1C00		
1C10	Sync Manager 0 PDO Assignment	DT1C10		

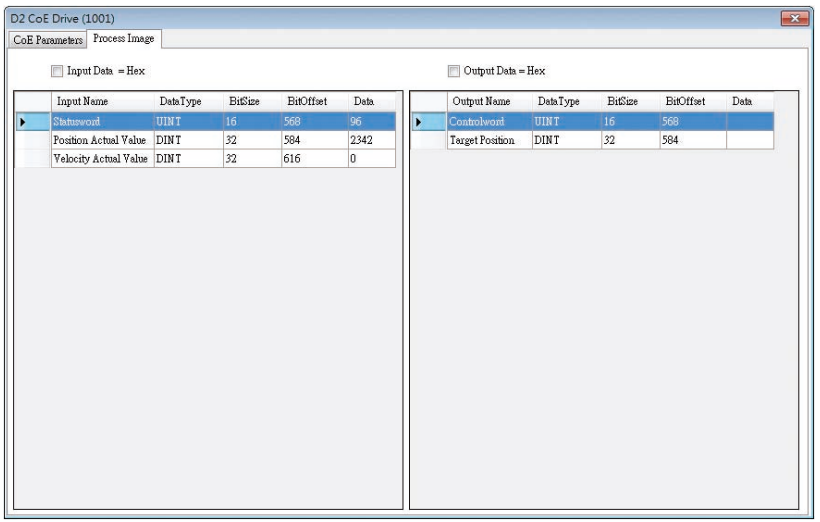
CoE Parameters

If the parameter of data type is "dataType", it indicates that the parameters contain sub parameters (Sub index). The user may want to access the parameters by double-clicking the mouse, and determine if the program has sub parameters (Sub Indicator). There will be a child window shown below. It is the same to read and write as mentioned in previous chapter.



Sub Parameters

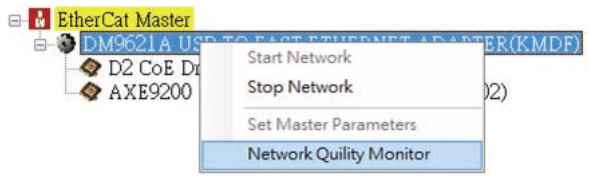
Process Image Parameters Operation Page



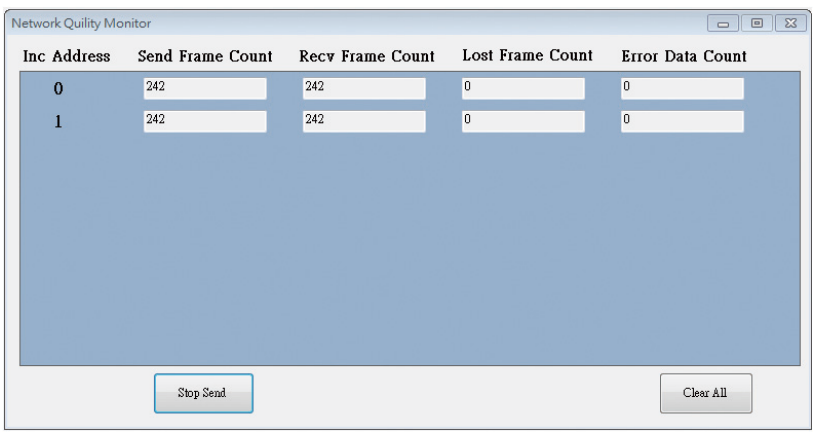
Users can access PDO (process data object) data after starting the network. When the checkbox "input data (output data) = hex" is checked, the data in the table is display as hexadecimal format.

Network Quality Monitor

Users can open network communication quality test page after starting the network. Perform a Master to each slave device communication packet test. To show this page, you can right click the mouse on the node of network card (NIC) in NexECM Configuration Tool Area 2 and select "Network Quality Monitor" and the Network quality test page will appear.



Right Click on the NIC node



Network Quality Monitor Page

- **Inc Address:** The Slave ID will follow the order of the scanned, zero based.
- **Send Frame Count:** The numbers of test frames are sent to slave device, check if the slave devices are in "OP" state. The frequency of the send frames is 10 ms.
- **Recv Frame Count:** The number of response frames. Normally, Both Send Frame Count and Recv Frame Count should be consistent.
- **Lost Frame Count:** Lost frames.
- **Error Frame Count:** The return frames data content does not belong to the slave device and state != OP.

Their relationship are as the following:

Send Frame count = Recv Frame count + Lost Frame count
Recv Frame count = Normal Frame (state == OP) + Error Data Frame count.

NexECMRtxStartup

"NexECMRtxStartup.exe" provides the convenience while you're using EtherCAT Master. Based on "NexECMRtxConfig.ini", we offer 3 major functions:

1. Load EtherCAT Master - NexECMRtx.rtss
2. Download ENI file (EtherCAT Network Information)
3. Load user's RTX appliation (ex: UserRTXApp.rtss)

You can modify NexECMRtxStartup.ini content by "Notepad" or text editing software to meet your current files placed circumstances. Usually you need to modify "Application path" and "Network information file (ENI) path". You can find the ".ini" files "C:\Program Files\NEXCOM\NexECMRtx\tools". Please refer to the following illustration.

NexECMRtxConfig.ini Content

	Description
PATH_ENI	
PATH:	Network Information File (ENI) Path OPTION: Check the network interface card information by using ENI file. 0: Use ENI file. 1: Do not use ENI file, use Parameter setting.
PATH_NEXECMRTX_DRIVER	
PATH:	NexECMRtx.rtss File Path
PATH_USER_APP (Option)	
PATH:	Fill your RTX application (*.rtss) path and file name.

Acronis System Image Recovery

Every NET system platform is equipped with **Acronis Startup Recovery Manager** and users need to activate it in Windows first to enable its recovery function. **Acronis Startup Recovery Manager** is a modification of the bootable agent, residing on the system disk in Windows and configured to start at boot time on pressing F11. It eliminates the need for a separate media or network connection to start the bootable rescue utility.

Activate Acronis Startup Recovery Manager

Please refer to the following steps to activate **Acronis Startup Recovery Manager**.

Step 1. Open **Acronis** on your desktop, choose **Tools and utilities** page then click **Acronis Startup Recovery Manager**.

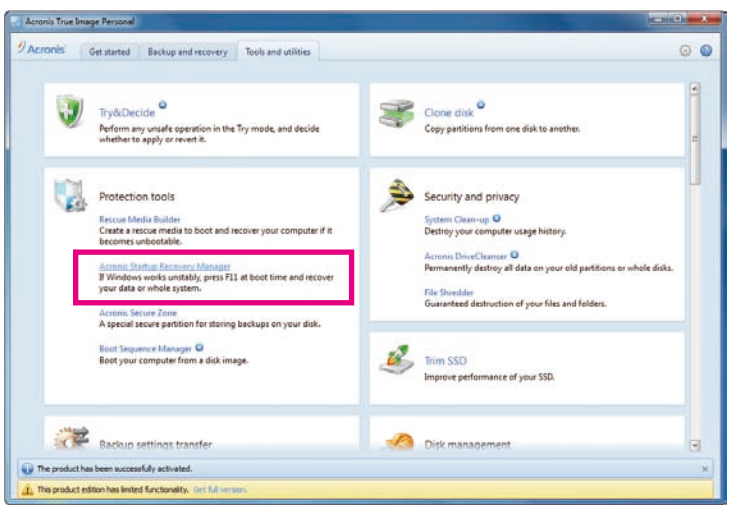


Figure 1. Acronis Startup Page

Step 2. Click **Activate**, then you will see the successful information. (Figure 3)

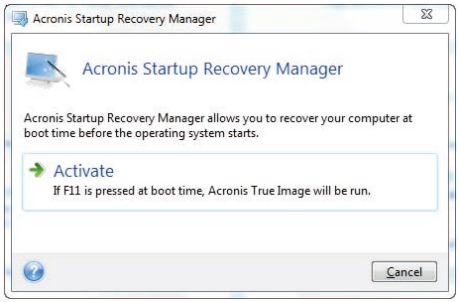


Figure 2: Acronis Startup Recovery Manager

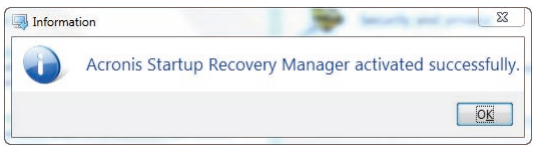


Figure 3: The Information for Startup Recovery Manager

Step 3. Reboot your NET Series platform, and if the following prompt appears on your screen, it means the configuration for **Acronis Startup Recovery Manager** was successful.

Starting Acronis Loader…
Press F11 to run Acronis Startup Recovery Manager…

Backup Your NET Series System

When the installations and license activations of the necessary software in Windows are done, users can backup system image for the complete system. Once the system is backed up, users can always recover the operating system despite of any OS problem. This allows users to have a clean and complete backup image for your NET Series System.

The following steps show you how to back up system image with **Acronis Tools**.

Step 1. Double-click **Acronis** shortcut at desktop, and choose **Backup and recovery page**, then click **Back up data**.

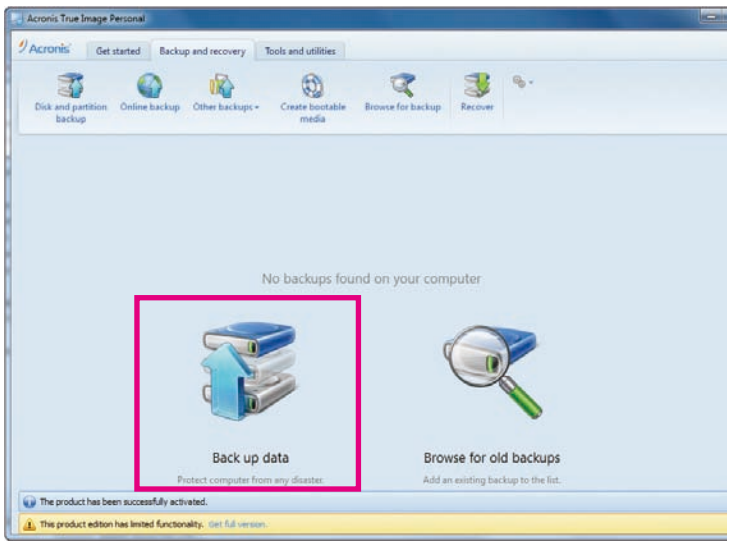


Figure 4. Backup and Recovery Page

Step 2. Back up the source to the **Acronis Secure Zone**, and name the backup file, then click **Back up now**.

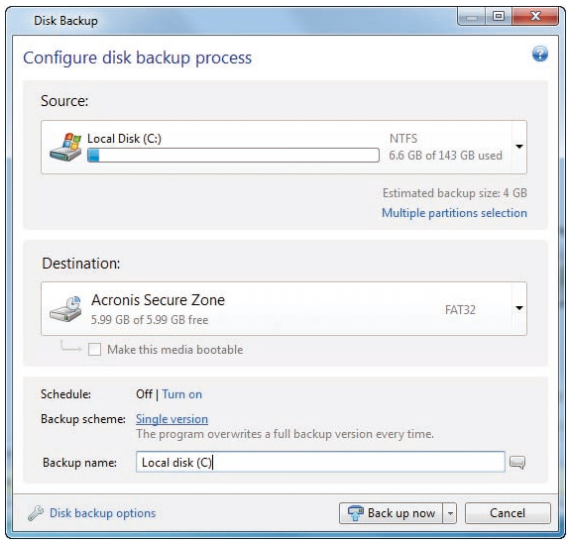


Figure 5. Disk Backup Page

Step 3. Wait for a few minutes, the backup file for your system will be created in the **Acronis Secure Zone**.

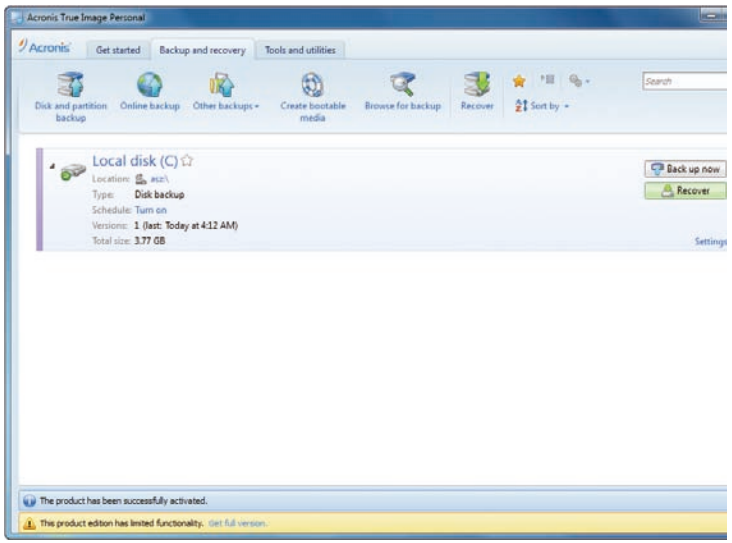


Figure 6. Back Up Complete

Figure 7. Acronis Secure Zone

Note: You can adjust the size for **Acronis Secure Zone** by referring to the following steps.

Step 1. Choose **Tools and utilities** page then click **Acronis Secure Zone**.

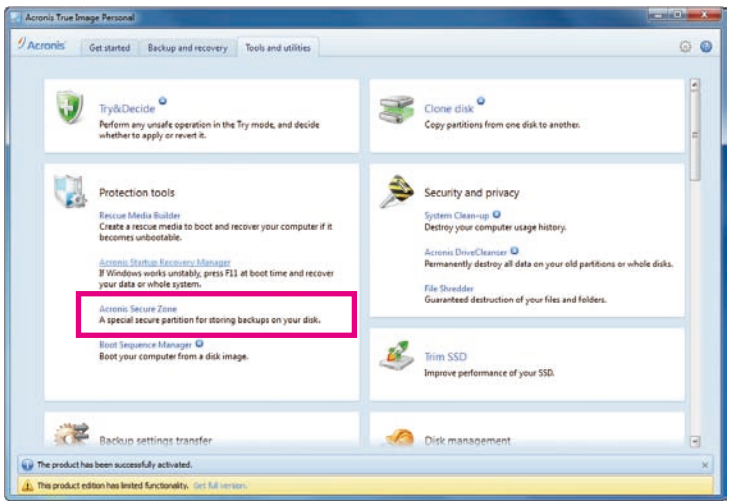


Figure 8. Adjust the Size for Acronis Secure Zone (1)

Step 2. Choose a selection which you need, then you will see the adjustment selections after you click **Next >**.

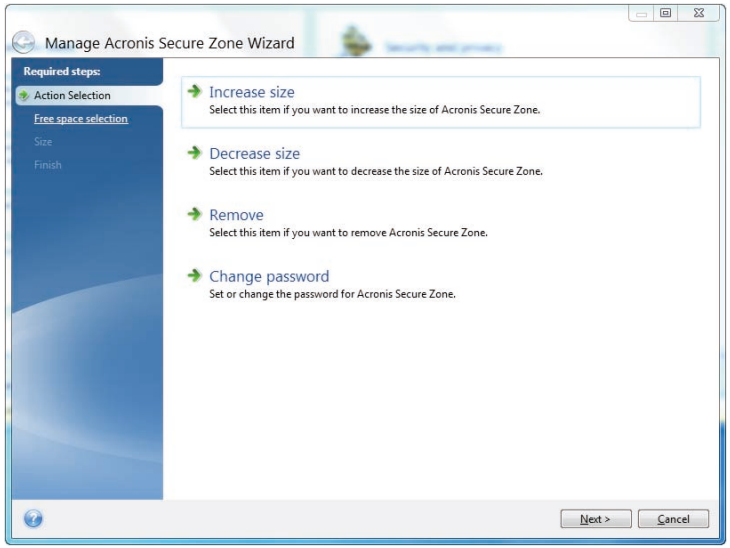


Figure 9. Adjust the Size for Acronis Secure Zone (2)

Step 3. Choose Disk 1: (C:), then you can adjust the size for **Acronis Secure Zone** (Figure 10), then click **Next >** to finish.

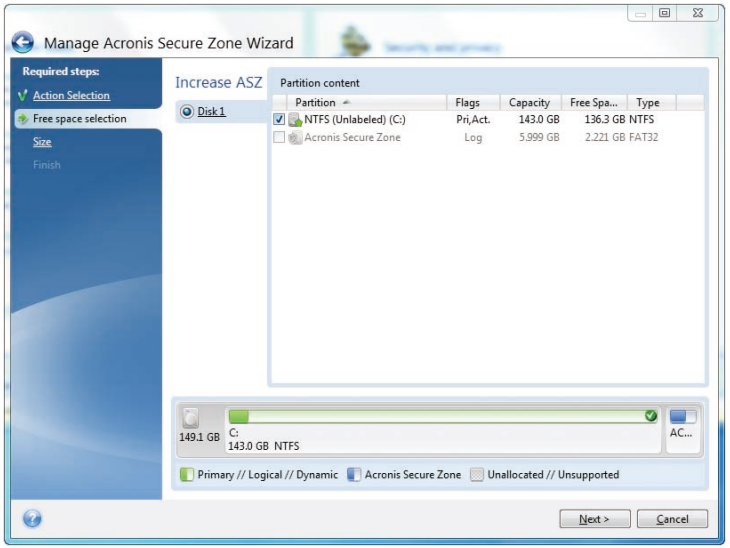


Figure 10. Adjust the Size for Acronis Secure Zone (3)

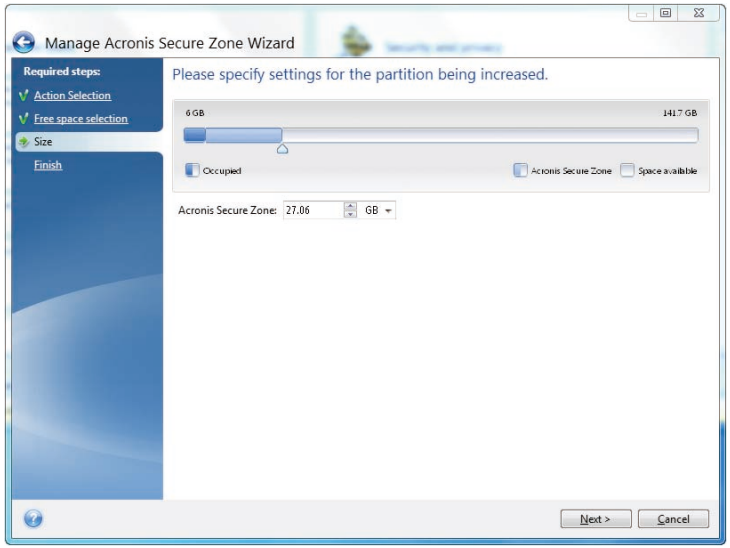


Figure 11. Adjust the Size for Acronis Secure Zone – Increase Size (4)

Recover Your NET Series System

This chapter shows you how to recover your system with **Acronis Startup Recovery Manager**. The prompt "**Press F11 for Acronis Startup Recovery Manager…**" will appear anytime you boot your system and you can simply hit the **F11** key on the keyboard to start the recovery process. The recovery function works even when the operating system fails.

The following steps will show you how to recover the system by using **Acronis Startup Recovery Manager**.

Step 1. Reboot the NET platform, when the following statement appears on your screen, hit **F11** immediately.

> **Starting Acronis Loader…**
> **Press F11 to run Acronis Startup Recovery Manager…**

Step 2. Enter the Linux kernel command line: **quiet** in the Boot menu, then click **OK**.

Step 3. After entering the **Acronis True Image Personal**, click **Acronis True Image**.

Step 4. Wait for initialization to finish and enter into the Home page, click **Recover**, then you will enter the **Recovery Wizard System**.

Step 5. In the **Recovery Wizard System**, you need to select the NET Series backup (which platform is used, e.g., NET3600…) in the Archive selection, then click the **Next >** button.

Step 6. In the **Recovery method** page, choose **Recover whole disk and partitions**, then click the **Next >** button.

Step 7. In the **What to recover** page, select NTFS(C:) in Disk 1, then click the **Next >** button.

Step 8. In the **Specify settings of Partition C** page, the first part is **Partition location**, click **New location**, then choose NTFS(C:) and click **Accept**. The second part is **Partition Type**, click **Change default**, select Primary, then click **Accept**.

Step 9. After completing Steps 1 to 8, you will see the **Summary** information in the **finish** page if those steps are set successfully. Click **Proceed** to start recovery.

Chapter 3: Jumpers and Connectors

This chapter describes how to set the jumpers and connectors on the NET 200-ECM motherboard.

Before You Begin

- Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.
- Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:
  - A Philips screwdriver
  - A flat-tipped screwdriver
  - A set of jewelers screwdrivers
  - A grounding strap
  - An anti-static pad
- Using your fingers can disconnect most of the connections. It is recommended that you do not use needle-nosed pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.
- Before working on internal components, make sure that the power is off. Ground yourself before touching any internal components, by touching a metal object. Static electricity can damage many of the electronic components. Humid environments tend to have less static electricity than dry environments. A grounding strap is warranted whenever danger of static electricity exists.

Precautions

Computer components and electronic circuit boards can be damaged by discharges of static electricity. Working on computers that are still connected to a power supply can be extremely dangerous.

Follow the guidelines below to avoid damage to your computer or yourself:

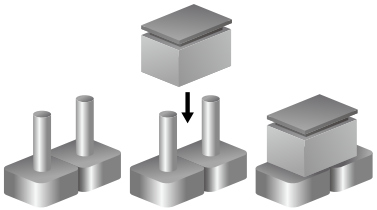
- Always disconnect the unit from the power outlet whenever you are working inside the case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal body of any other grounded appliance.
- Hold electronic circuit boards by the edges only. Do not touch the components on the board unless it is necessary to do so. Don't flex or stress the circuit board.
- Leave all components inside the static-proof packaging that they shipped with until they are ready for installation.
- Use correct screws and do not over tighten screws.

Jumper Settings

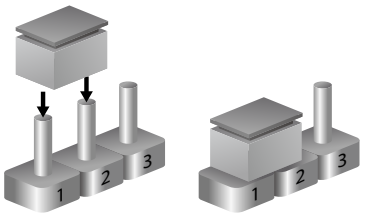
A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is short. If you remove the jumper cap, or place the jumper cap on just one pin, the jumper is open.

Refer to the illustrations below for examples of what the 2-pin and 3-pin jumpers look like when they are short (on) and open (off).

Two-Pin Jumpers: Open (Left) and Short (Right)

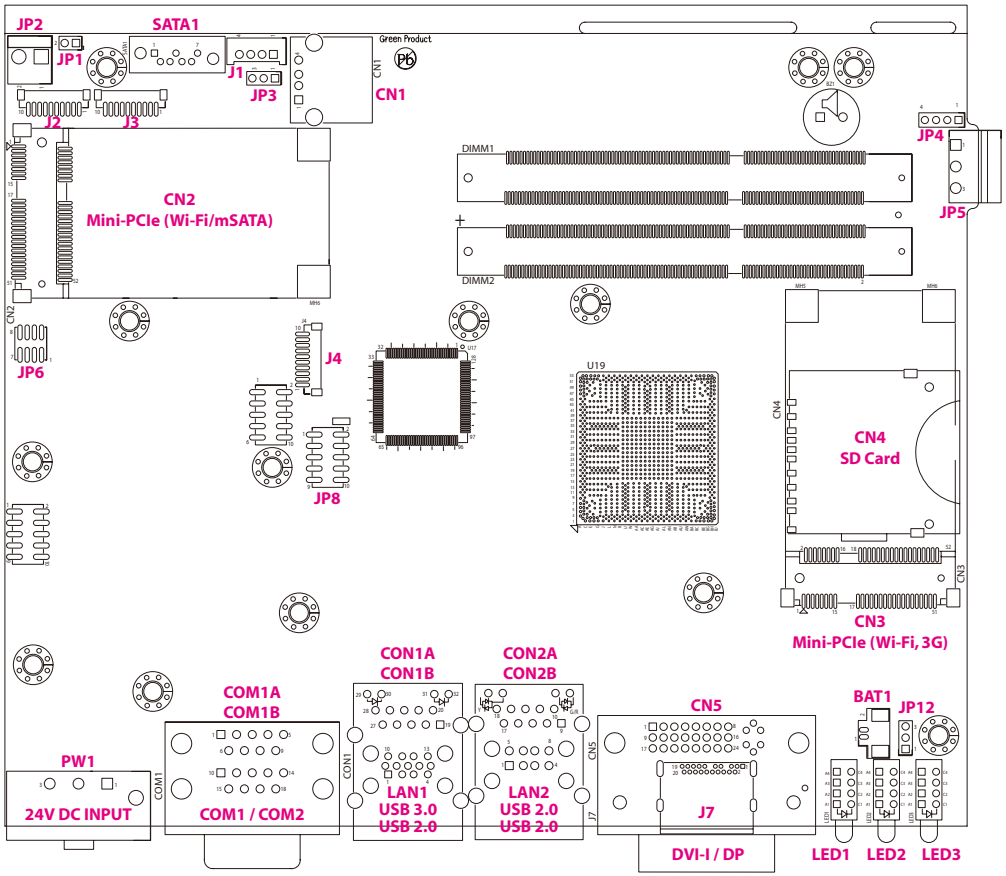


Three-Pin Jumpers: Pins 1 and 2 are Short



Locations of the Jumpers and Connectors for NIFB 200

The figure below is the top view of the NIFB 200 main board which is the main board used in NET 200-ECM. It shows the locations of the jumpers and connectors.



Jumpers

AT/ATX Mode Select

Connector type: 1x3 3-pin header, 2.0mm pitch
Connector location: JP3

Pin	Definition
1	3VSB
2	AT/ATX_SEL
3	ATXBT_R

RTC Connector

Connector type: 1x3 3-pin header, 2.0mm pitch
Connector location: JP12

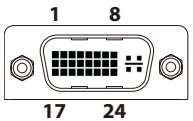
Pin	Definition
1	NC
2	RTC_TEST#
3	GND

Connector Pin Definitions

External I/O Interfaces - Front Panel

DVI-I Connector

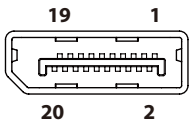
Connector type: 24-pin D-Sub, 2.0mm-M-180 (DVI)
Connector location: CN5



Pin	Definition	Pin	Definition
1	DVI1_DATA2_N_C	2	DVI1_DATA2_P_C
3	GND	4	NC
5	NC	6	DVI1_CTRL_CLK_C
7	DVI1_CTRL_DAT_C	8	VSYNC_VGA
9	DVI1_DATA1_N_C	10	DVI1_DATA1_P_C
11	GND	12	NC
13	NC	14	DVI1_PWR
15	GND	16	DVI1_HPD
17	DVI1_DATA0_N_C	18	DVI1_DATA0_P_C
19	GND	20	DDC_CLK_VGA_C
21	DDC_DATA_VGA_C	22	NC
23	DVI1_CLK_P_C	24	DVI1_CLK_N_C
C1	RED_VGA	C2	GREEN_VGA
C3	BLUE_VGA	C4	HSYNC_VGA
C5A	VGADET	C5B	GND

DisplayPort Connector

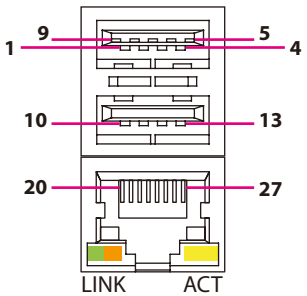
Connector type: DisplayPort
Connector location: J7



Pin	Definition	Pin	Definition
1	DP_DATA0_P_C	2	GND
3	DP_DATA0_N_C	4	DP_DATA1_P_C
5	GND	6	DP_DATA1_N_C
7	DP_DATA2_P_C	8	GND
9	DP_DATA2_N_C	10	DP_DATA3_P_C
11	GND	12	DP_DATA3_N_C
13	DPC_CONFIG1	14	DPC_CONFIG2
15	DPC_AUXP_C	16	GND
17	DPC_AUXN_C	18	DP_HPD_R
19	N21809347	20	HDMI_PWR

LAN1 and USB 3.0/USB 2.0 Ports

Connector type: RJ45 port with LEDs
USB 3.0 and USB 2.0 port, Type A
Connector location: CON1A (USB) and CON1B (LAN)



Act	Status
Flashing Yellow	Data activity
Off	No activity

Link	Status
Steady Green	1G network link
Steady Orange	100Mbps network link
Off	10Mbps or no link

USB

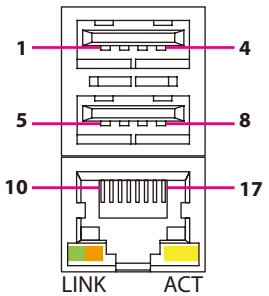
Pin	Definition	Pin	Definition
1	P5V_OC01_C	2	USB_0N_C
3	USB_0P_C	4	GND
5	USB3_RX0_N_C	6	USB3_RX0_P_C
7	GND	8	USB3_TX0_N_C
9	USB3_TX0_P_C	10	P5V_OC01_C
11	HUBUSB_DN4_C	12	HUBUSB_DP4_C
13	GND		

LAN

Pin	Definition	Pin	Definition
19	V1P5_LAN2	20	LAN2_MDI0P
21	LAN2_MDI0N	22	LAN2_MDI1P
23	LAN2_MDI1N	24	LAN2_MDI2P
25	LAN2_MDI2N	26	LAN2_MDI3P
27	LAN2_MDI3N	28	GND
29	LAN2_ACT_CON	30	LAN2_LED_ACT#
31	LAN2_100#_CON	32	LAN2_LINK1G#

LAN2 and USB 2.0 Ports

Connector type: RJ45 port with LEDs
USB 2.0 ports, Type A
Connector location: CON2A (USB) and CON2B (LAN)



Act	Status
Flashing Yellow	Data activity
Off	No activity

Link	Status
Steady Green	1G network link
Steady Orange	100Mbps network link
Off	10Mbps or no link

USB

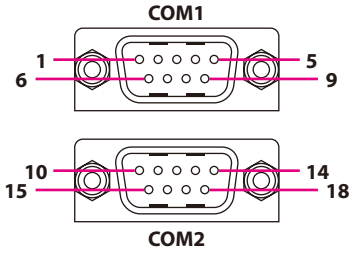
Pin	Definition	Pin	Definition
1	USB_OC12	2	DN1_C
3	DP1_C	4	GND
5	USB_OC12	6	DN2_C
7	DP2_C	8	GND

LAN

Pin	Definition	Pin	Definition
9	V1P5_LAN	10	LAN1_MDI0P
11	LAN1_MDI0N	12	LAN1_MDI1P
13	LAN1_MDI1N	14	LAN1_MDI2P
15	LAN1_MDI2N	16	LAN1_MDI3P
17	LAN1_MDI3N	18	GND
19	LAN1_LINK1G#	20	LAN1_100#_CON
21	LAN1_LED_ACT#	22	LAN1_ACT_CON

COM1 and COM2 Port

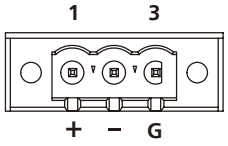
Connector type: DB-9 port, 9-pin D-Sub
Connector location: COM1A (COM1) and COM1B (COM2)



Pin	Definition	Pin	Definition
1	SP1_DCD	2	SP1_RXD
3	SP1_TXD	4	SP1_DTR
5	ISO_GND	6	SP1_DSR
7	SP1_RTS	8	SP1_CTS
9	SP1_RI	10	SP2_DCD
11	SP2_RXD	12	SP2_TXD
13	SP2_DTR	14	GND
15	SP2_DSR	16	SP2_RTS
17	SP2_CTS	18	SP2_RI

24V DC Power Input

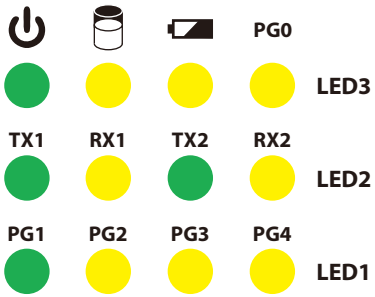
Connector type: Phoenix Contact 1x3 3-pin terminal block
Connector location: PW1



Pin	Definition
1	VIN_1
2	VIN_VSS
3	H3_GND

LED Indicators

Connector location: LED1, LED2 and LED3

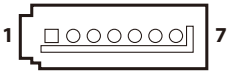


	Pin	Definition	Pin	Definition
LED1	A1	GPIO3_LED	C1	GPO_PR3
	A2	GPIO2_LED	C2	GPO_PR2
	A3	GPIO1_LED	C3	GPO_PR1
	A4	GPIO0_LED	C4	GPO_PR0
LED2	A1	COM2_RXLEDN	C1	COM2_RXLEDP
	A2	COM2_TXLEDN	C2	COM2_TXLEDP
	A3	COM1_RXLEDN	C3	COM1_RXLEDP
	A4	COM1_TXLEDN	C4	COM1_TXLEDP
LED3	A1	GPIO4_LED	C1	GPO_PR4
	A2	BAT_LED_N	C2	GND
	A3	HDD_LED_PWR	C3	HDD_LED_N
	A4	POWER_LED_PWR	C4	PWR_LED_N

Internal Connectors

SATA Connector

Connector type: Standard Serial ATA 7P (1.27mm, SATA-M-180)
Connector location: SATA1



Pin	Definition	Pin	Definition
1	GND	2	S_TXP1
3	S_TXN1	4	GND
5	S_RXN1	6	S_RXP1
7	GND		

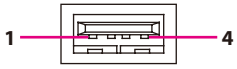
SATA Power Connector

Connector type: 1x4 4-pin header, 2.0mm pitch
Connector location: J1

Pin	Definition
1	VCC12
2	GND
3	GND
4	VCC5

Internal USB Dongle Connector

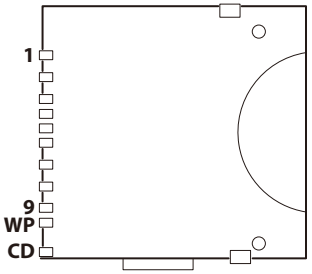
Connector type: USB port
Connector location: CN1



Pin	Definition
1	USB_OC3
2	DN3_C
3	DP3_C
4	GND

SD Card Slot

Connector location: CN4



Pin	Definition	Pin	Definition
1	SD_D3	2	SD_CMD
3	GND	4	VSD
5	SD_CLK	6	GND
7	SD_D0	8	SD_D1
9	SD_D2	WP	SD_WP
CD	SD_DET		

Debug Card Connector

Connector type: 1x10 10-pin header, 1.0mm pitch
Connector location: J4

Pin	Definition	Pin	Definition
1	GND	2	PLTRST_3P3#
3	LPC_CLK0_DEBUG	4	LPC_FRAME#
5	LPC_AD3	6	LPC_AD2
7	LPC_AD1	8	LPC_AD0
9	VCC3	10	VCC3

Line-out Pin Header

Connector type: 1x4 4-pin header, 2.0mm pitch
Connector location: JP4

Pin	Definition
1	FRONT_LCI
2	AGND
3	EXLINEOUT_JD
4	FRONT_RCI

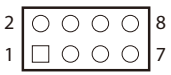
Power Connector

Connector type: 1x2 2-pin header, 3.96mm pitch
Connector location: JP2

Pin	Definition
1	VCC12
2	GND

PS2 KB/MS Pin Header

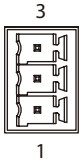
Connector type: 2x4 8-pin header, 1.27mm pitch
Connector location: JP6



Pin	Definition	Pin	Definition
1	5VSB	2	5VSB
3	KDAT_R	4	MDAT_R
5	KCLK_R	6	MCLK_R
7	GND	8	GND

Remote Push Button Connector

Connector type: 1x3 3-pin terminal block, 3.81mm pitch
Connector location: JP5



Pin	Definition
1	PBT_TR
2	GND
3	3VSB

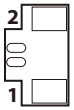
System Reset Connector

Connector type: 1x2 2-pin header, 2.0mm pitch
Connector location: JP1

Pin	Definition
1	PM_RESET#_J
2	GND

Battery Connector

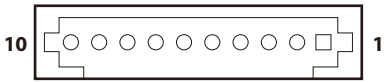
Connector type: 1x2 2-pin header, 2.0mm pitch
Connector location: BAT1



Pin	Definition
1	GND
2	VBAT

Internal COM3 Connector

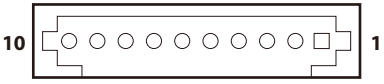
Connector type: 1x10 10-pin header JST, 1.0mm pitch
Connector location: J2



Pin	Definition	Pin	Definition
1	SP3_DCD	2	SP3_RXD
3	SP3_TXD	4	SP3_DTR
5	GND	6	SP3_DSR
7	SP3_RTS	8	SP3_CTS
9	SP3_RI	10	VCC5

Internal COM4 Connector

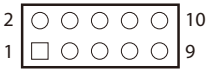
Connector type: 1x10 10-pin header JST, 1.0mm pitch
Connector location: J3



Pin	Definition	Pin	Definition
1	SP4_DCD	2	SP4_RXD
3	SP4_TXD	4	SP4_DTR
5	GND	6	SP4_DSR
7	SP4_RTS	8	SP4_CTS
9	SP4_RI	10	VCC12

Internal GPIO Pin Header

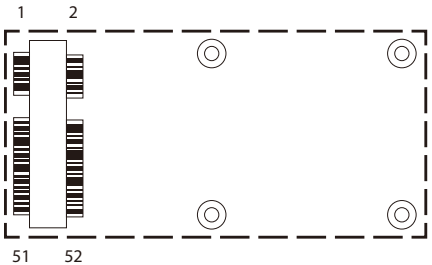
Connector type: 2x5 10-pin header, 2.0mm pitch
Connector location: JP8



Pin	Definition	Pin	Definition
1	VCC5	2	GND
3	ICH_GPO0_OUT	4	ICH_GPI0_IN
5	ICH_GPO1_OUT	6	ICH_GPI1_IN
7	ICH_GPO2_OUT	8	ICH_GPI2_IN
9	ICH_GPO3_OUT	10	ICH_GPI3_IN

Mini-PCIe Connector

Connector location: CN3

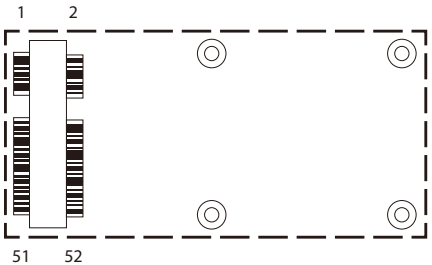


Pin	Definition	Pin	Definition
1	PCIE_WAKE#	2	3VSB_MINI2
3	NC	4	GND
5	NC	6	1V5
7	PCIE_CLKREQ2#	8	UIM_PWR
9	GND	10	UIM_DATA
11	PCIE_CLKN2	12	UIM_CLK
13	PCIE_CLKP2	14	UIM_RESET
15	GND	16	UIM_VCCP
17	NC	18	GND
19	NC	20	MINICARD2DIS#
21	GND	22	PLTRST_3P3#_CON
23	PCIE_RN2	24	3VSB_MINI2
25	PCIE_RP2	26	GND

Pin	Definition	Pin	Definition
27	GND	28	1V5
29	GND	30	SMB_CLK_CON
31	PCIE_TXN2	32	SMB_DATA_CON
33	PCIE_TXP2	34	GND
35	GND	36	MINI2USBN
37	GND	38	MINI2USBP
39	3VSB_MINI2	40	GND
41	3VSB_MINI2	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	1V5
49	NC	50	GND
51	NC	52	3VSB

Mini-PCIe Connector

Connector location: CN2



Pin	Definition	Pin	Definition
1	PCIE_WAKE#	2	3VSB_MINI1
3	NC	4	GND
5	NC	6	1V5
7	PCIE_CLKREQ3#	8	NC
9	GND	10	NC
11	HUB_CLKN3_R	12	NC
13	HUB_CLKP3_R	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	MINICARD1DIS#
21	GND	22	PLTRST_3P3#_CON
23	PCIE_mSATA_RXP_R	24	3VSB_MINI1
25	PCIE_mSATA_RXN_R	26	GND

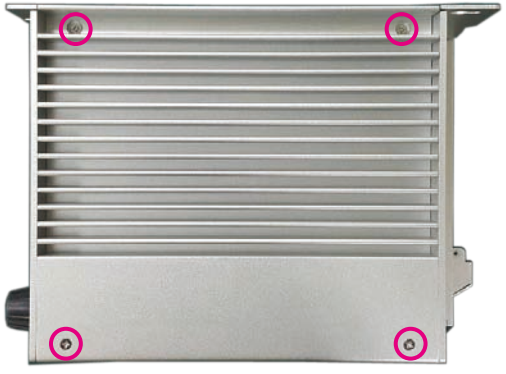
Pin	Definition	Pin	Definition
27	GND	28	1V5_1
29	GND	30	SMB_CLK_CON
31	PCIE_mSATA_TXN_R	32	SMB_DATA_CON
33	PCIE_mSATA_TXP_R	34	GND
35	GND	36	DN2
37	GND	38	DP2
39	3VSB_MINI1	40	GND
41	3VSB_MINI1	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	1V5_1
49	NC	50	GND
51	NC	52	3VSB_MINI1

Chapter 4: Hardware Installation

Installing a SO-DIMM Memory Module

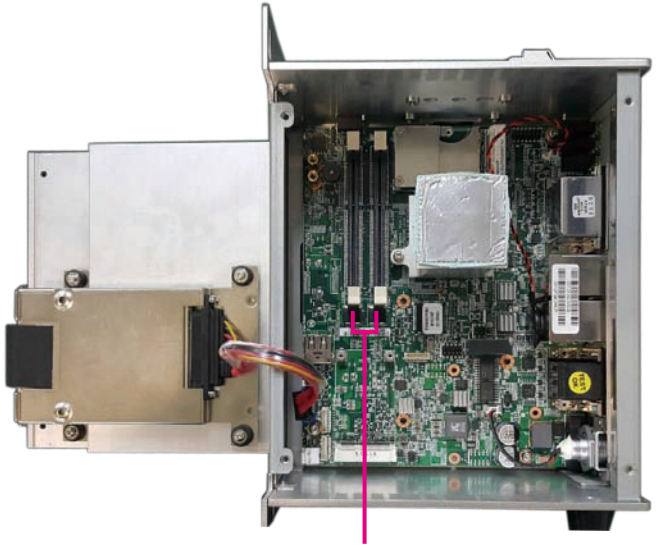
1. Place the NET 200-ECM system on a flat surface to prepare for installation.

2. Locate the four screws on the side of the chassis.



3. Remove the four screws and gently lift up the side cover.

4. Locate the memory module sockets.

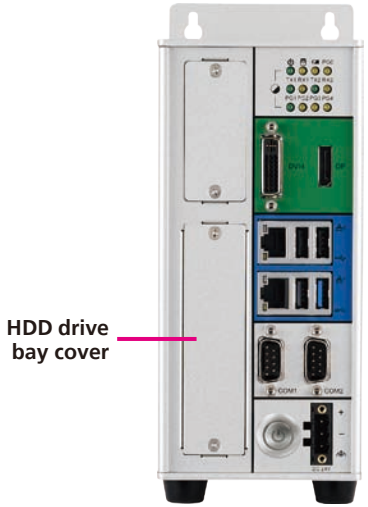


5. Insert the memory module into the socket.

6. Ensure the memory module is secured properly into the socket.

Installing a 2.5" SATA HDD

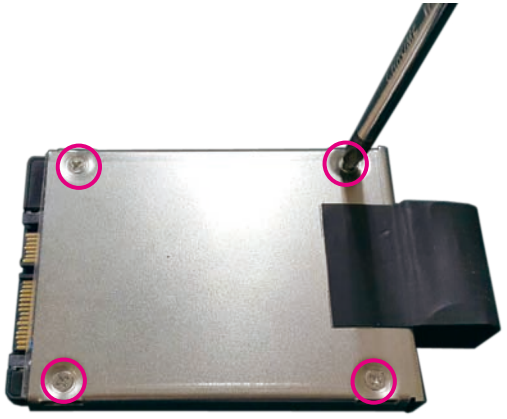
1. Locate the HDD drive bay cover on the front panel.



2. Remove the screws on the HDD drive bay cover.

3. Pull out the HDD bracket by pulling the tape.

4. Install the 2.5" HDD into the bracket and secure it with screws.

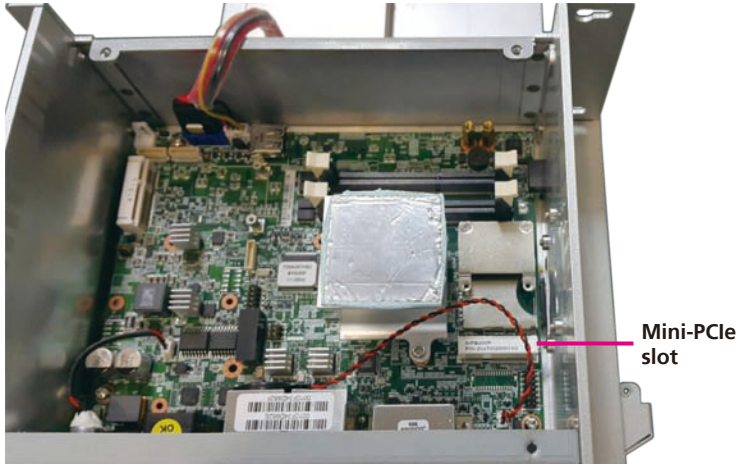


5. Place the HDD bracket back to its original location.

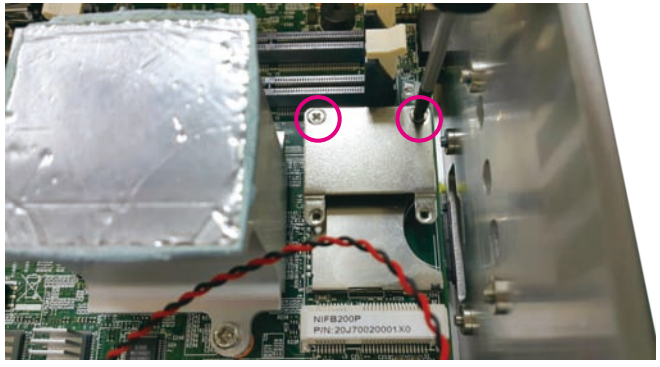
6. Secure the HDD drive bay cover with screws.

Installing a Mini-PCIe Module (Half-Size)

1. Locate the mini-PCIe slot on the board.



2. Remove the mini-PCIe bracket from the board.



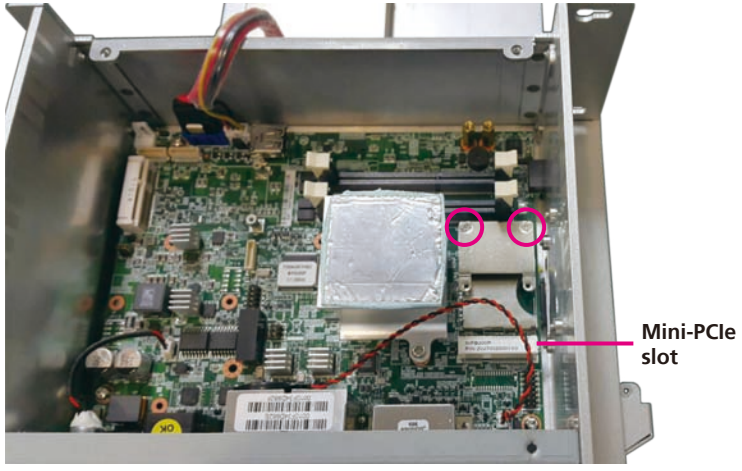
3. Screw the mini-PCIe bracket to the mini-PCIe module.

4. Insert the mini-PCIe module into the mini-PCIe slot at a 45 degree angle until the gold-plated connector on the edge of the module completely disappears into the slot.

5. Push the module down and secure it with screws.

Installing a Mini-PCIe Module (Full-Size)

1. Locate the mini-PCIe slot on the board and remove the mini-PCIe bracket.



2-1. Insert the mini-PCIe module into the mini-PCIe slot at a 45 degree angle until the gold-plated connector on the edge of the module completely disappears into the slot.

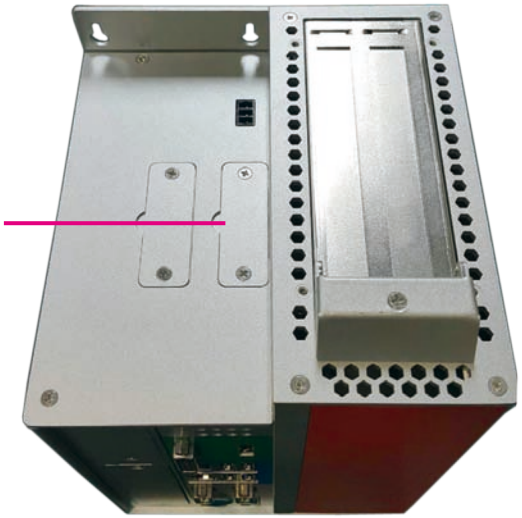
2-2. Secure the module with screws.

Installing a SD Card or SIM Card

SD Card Installation Instructions

Note: The following instructions use NIFE 200P2 as an example, but can be applied to NET 200-ECM.

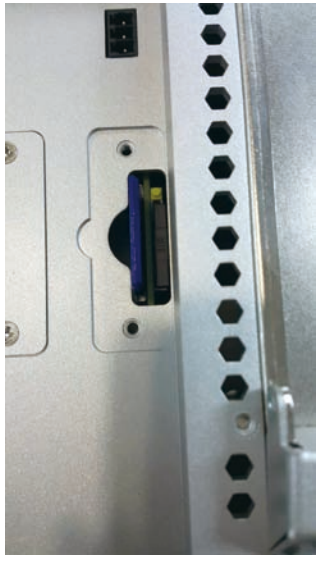
1. Locate the SIM/SD card cover on the top of NET 200-ECM and loosen the screws on the cover.



2. Remove the cover.

3. Insert the SD card into the SD card socket.

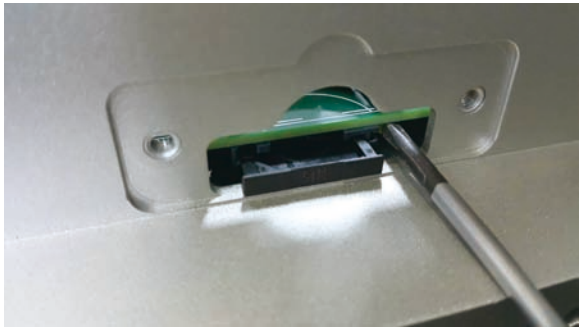
4. Ensure the SD card is correctly secured in position.



5. Press down the SD card until it is fixed into the socket.

SIM Card Installation Instructions

6. Locate the SIM Card socket on the top of NET 200-ECM and press the yellow button gently to retrieve the SIM card holder.



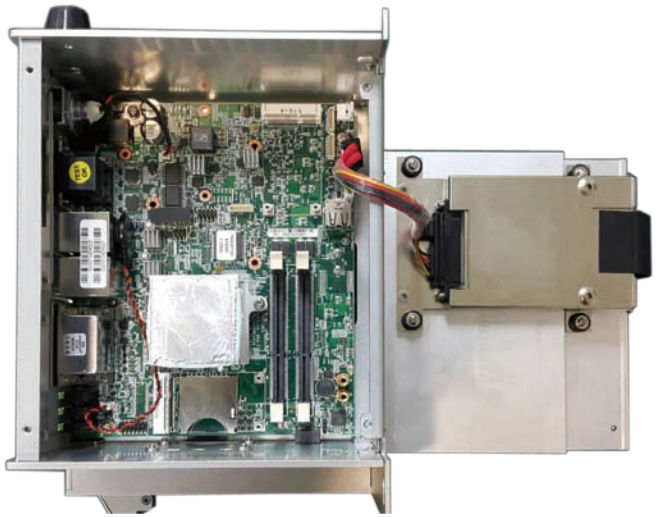
7. Place the SIM card into the holder.

8. Insert the SIM card holder back to its original position.

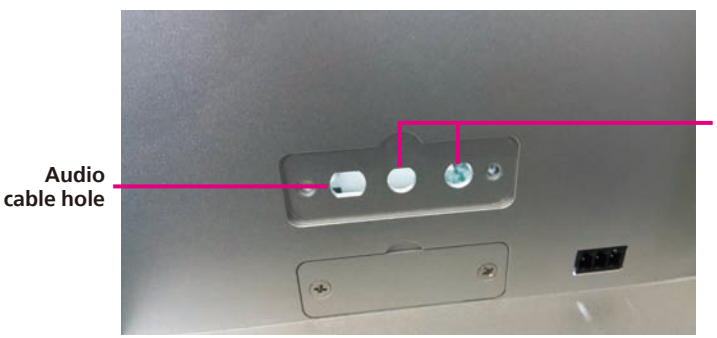
Installing an Antenna or Audio Cable

Antenna Installation Instructions

1. Remove the side cover of the chassis first.



2. Remove the antenna hole cover located on the top of NET 200-ECM. (2x Antenna Holes, 1x Audio Cable Hole)



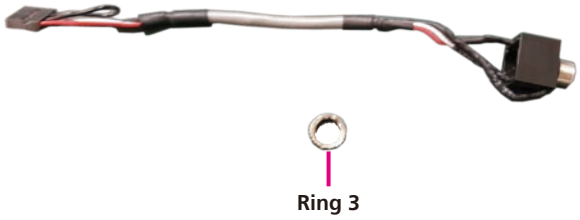
3. Seperate the 2 rings (ring 1 and ring 2) from the antenna jack.

4. Insert the antenna jack through the antenna hole, and then install ring 1 and ring 2 onto the antenna jack.

5. Attach the antenna cable end onto the 3G or Wi-Fi mini-PCIe module.

Audio Cable Installation Instructions

6. Seperate ring 3 from the audio cable.



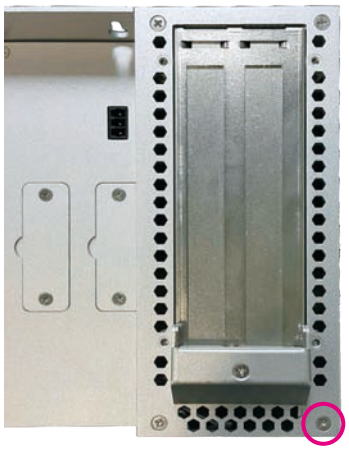
7. Insert the audio cable through the audio cable hole, and then install ring 3 onto the audio jack.

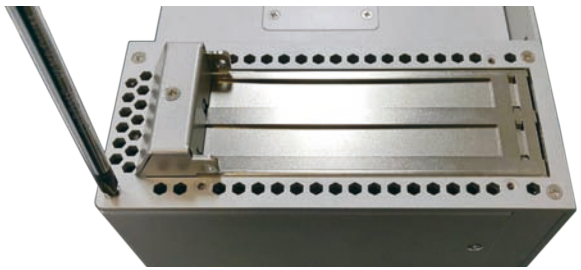
8. Attach the audio cable end to the JP4 connector, which is the audio pin header for NET 200-ECM.

Removing the Side Cover

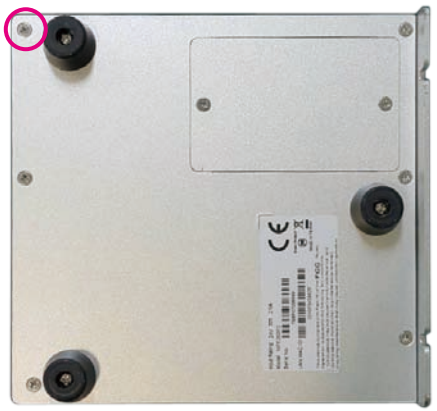
Note: The following instructions use NIFE 200P2 as an example, but can be applied to NET 200-ECM.

1. Remove the screw circled below, located on the top of the system.

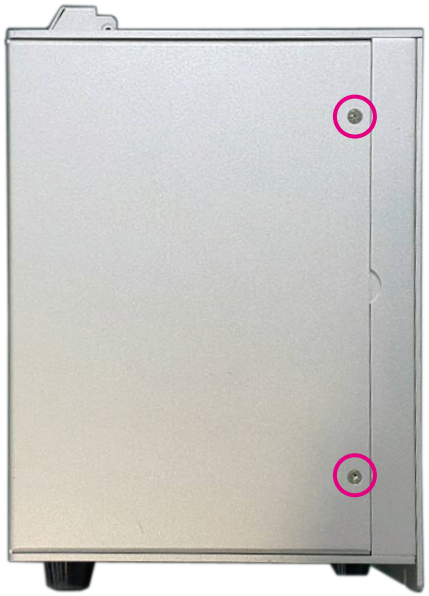




2. Remove the screw circled below, located on the bottom of system.



3. Locate the two screws on the side cover. (Four screws for NET 200-ECM)



4. Remove the screws and gently lift up the side cover.

Appendix A: BIOS Setup

This chapter describes how to use the BIOS setup program for NET 200-ECM. The BIOS screens provided in this chapter are for reference only and may change if the BIOS is updated in the future.

To check for the latest updates and revisions, visit the NEXCOM website at www.nexcom.com.tw.

About BIOS Setup

The BIOS (Basic Input and Output System) Setup program is a menu driven utility that enables you to make changes to the system configuration and tailor your system to suit your individual work needs. It is a ROM-based configuration utility that displays the system's configuration status and provides you with a tool to set system parameters.

These parameters are stored in non-volatile battery-backed-up CMOS RAM that saves this information even when the power is turned off. When the system is turned back on, the system is configured with the values found in CMOS.

With easy-to-use pull down menus, you can configure items such as:

- Hard drives, diskette drives, and peripherals
- Video display type and display options
- Password protection from unauthorized use
- Power management features

The settings made in the setup program affect how the computer performs. It is important, therefore, first to try to understand all the setup options, and second, to make settings appropriate for the way you use the computer.

When to Configure the BIOS

- This program should be executed under the following conditions:
- When changing the system configuration
- When a configuration error is detected by the system and you are prompted to make changes to the setup program
- When resetting the system clock
- When redefining the communication ports to prevent any conflicts
- When making changes to the Power Management configuration
- When changing the password or making other changes to the security setup

Normally, CMOS setup is needed when the system hardware is not consistent with the information contained in the CMOS RAM, whenever the CMOS RAM has lost power, or the system features need to be changed.

Default Configuration

Most of the configuration settings are either predefined according to the Load Optimal Defaults settings which are stored in the BIOS or are automatically detected and configured without requiring any actions. There are a few settings that you may need to change depending on your system configuration.

Entering Setup

When the system is powered on, the BIOS will enter the Power-On Self Test (POST) routines. These routines perform various diagnostic checks; if an error is encountered, the error will be reported in one of two different ways:

- If the error occurs before the display device is initialized, a series of beeps will be transmitted.
- If the error occurs after the display device is initialized, the screen will display the error message.

Powering on the computer and immediately pressing <Del> allows you to enter Setup.

Press the 

key to enter Setup:

Legends

Key	Function
	Moves the highlight left or right to select a menu.
	Moves the highlight up or down between sub-menus or fields.
	Exits the BIOS Setup Utility.
	Scrolls forward through the values or options of the highlighted field.
	Scrolls backward through the values or options of the highlighted field.
	Selects a field.
	Displays General Help.
	Load previous values.
	Load optimized default values.
	Saves and exits the Setup program.
	Press <Enter> to enter the highlighted sub-menu

Scroll Bar

When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

Submenu

When "▶" appears on the left of a particular field, it indicates that a submenu which contains additional options are available for that field. To display the submenu, move the highlight to that field and press 

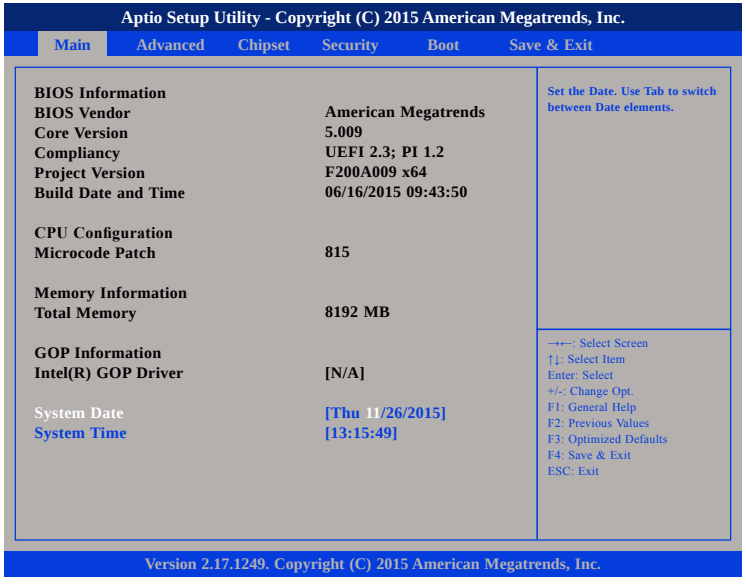
.

BIOS Setup Utility

Once you enter the AMI BIOS Setup Utility, the Main Menu will appear on the screen. The main menu allows you to select from several setup functions and one exit. Use arrow keys to select among the items and press Enter to accept or enter the submenu.

Main

The Main menu is the first screen that you will see when you enter the BIOS Setup Utility.



System Date

The date format is <day>, <month>, <date>, <year>. Day displays a day, from Monday to Sunday. Month displays the month, from January to December. Date displays the date, from 1 to 31. Year displays the year, from 1999 to 2099.

System Time

The time format is <hour>, <minute>, <second>. The time is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Hour displays hours from 00 to 23. Minute displays minutes from 00 to 59. Second displays seconds from 00 to 59.

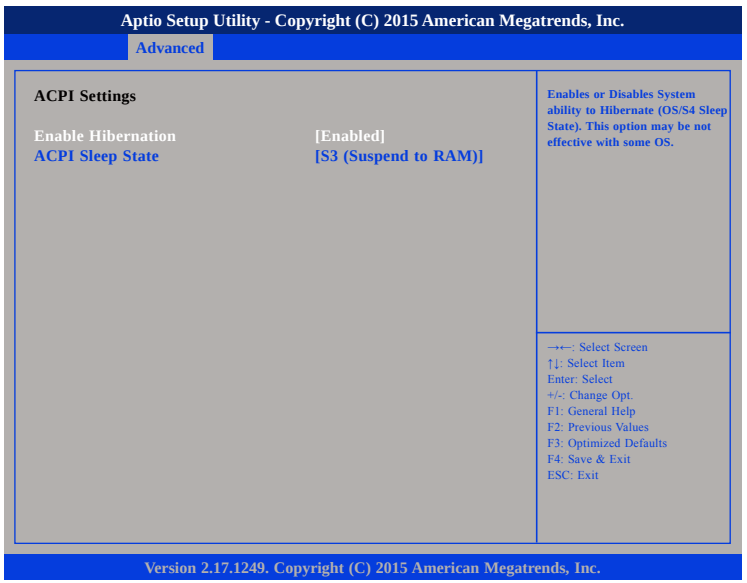
Advanced

The Advanced menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.

Setting incorrect field values may cause the system to malfunction.

ACPI Settings

This section is used to configure ACPI Settings.



Enable Hibernation

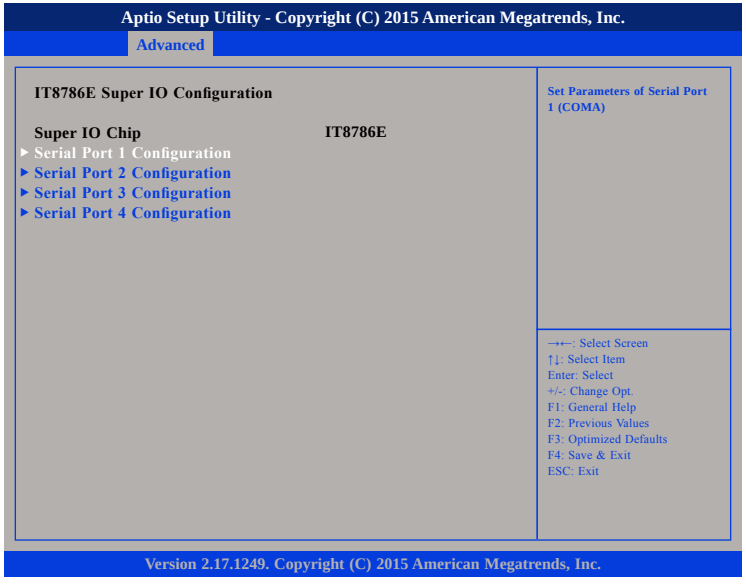
Enables or disables system ability to hibernate (OS/S4 Sleep State). This option may not be effective with some OS.

ACPI Sleep State

Select the highest ACPI sleep state the system will enter when the suspend button is pressed. The options are Suspend Disabled and S3 (Suspend to RAM).

IT8786E Super IO Configuration

This section is used to configure the serial ports.



Super IO Chip

Displays the Super I/O chip used on the board.

Serial Port 1 Configuration

This section is used to configure serial port 1.

Serial Port

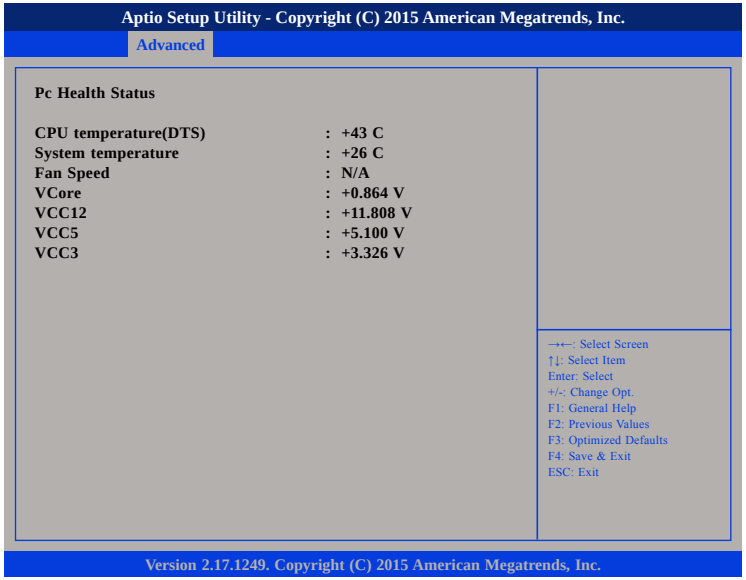
Enables or disables the serial port.

Onboard Serial Port Mode

Select this to change the serial port mode to RS232, RS422, RS485 or RS485 Auto.

Hardware Monitor

This section is used to monitor hardware status such as temperature, fan speed and voltages.



CPU Temperature
Detects and displays the current CPU temperature.

System Temperature
Detects and displays the current system temperature.

Fan Speed
Detects and displays the fan speed.

VCore
Detects and displays the Vcore CPU voltage.

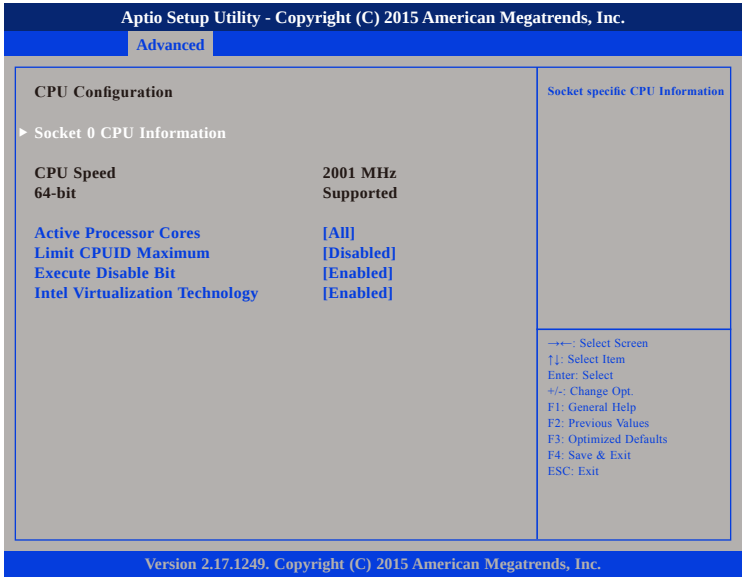
VCC12
Detects and displays 12V voltage.

VCC5
Detects and displays 5V voltage.

VCC3
Detects and displays 3.3V voltage.

CPU Configuration

This section is used to configure the CPU.



Active Processor Cores

Select the number of cores to enable in each processor package.

Limit CPUID Maximum

The CPUID instruction of some newer CPUs will return a value greater than 3. The default is Disabled because this problem does not exist in the Windows series operating systems. If you are using an operating system other than Windows, this problem may occur. To avoid this problem, enable this field to limit the return value to 3 or lesser than 3.

Execute Disable Bit

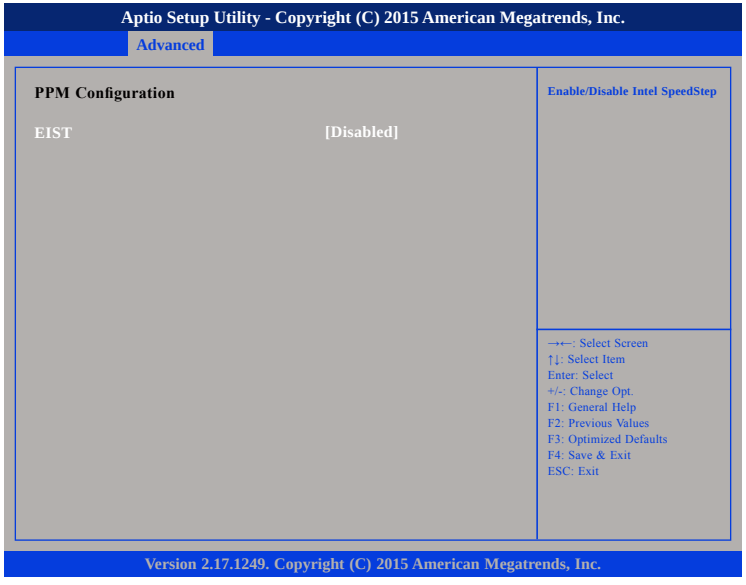
When this field is set to Disabled, it will force the XD feature flag to always return to 0. XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, RedHat Enterprise 3 Update 3).

Intel® Virtualization Technology

Enables or disables Intel® Virtualization technology.

PPM Configuration

This section is used to configure the Processor Power Management (PPM) configuration.

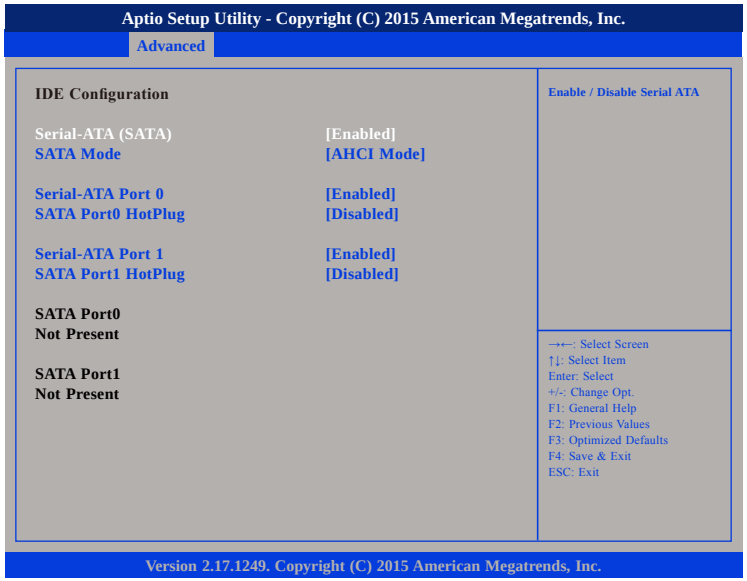


EIST

Enables or disables Intel® SpeedStep.

IDE Configuration

This section is used to configure the SATA drives.



Serial-ATA (SATA)
Enables or disables the SATA device.

Serial-ATA Port 0 and Serial-ATA Port 1
Enables or disables SATA port 0 and SATA port 1.

SATA Port0 Hotplug and SATA Port1 Hotplug
Enables or disables hotplug support on SATA port 0 and SATA port 1.

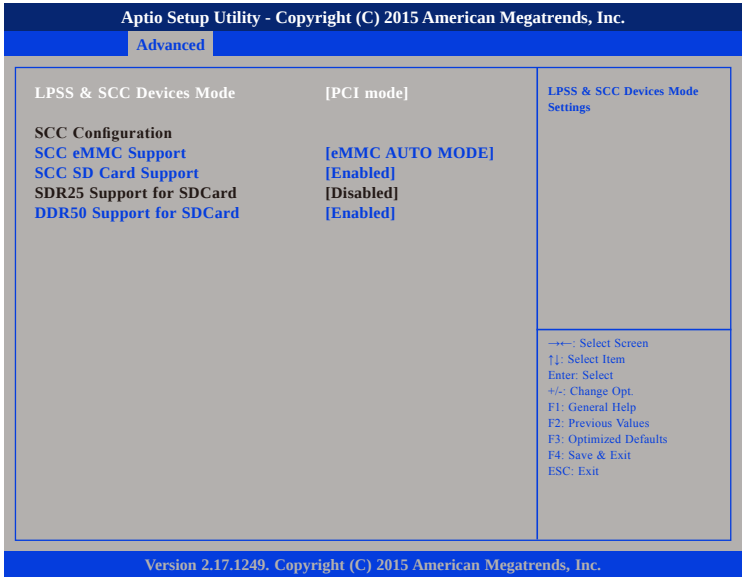
SATA Mode
Configures the SATA as IDE or AHCI mode.

IDE This option configures the Serial ATA drives as Parallel ATA physical storage device.

AHCI This option configures the Serial ATA drives to use AHCI (Advanced Host Controller Interface). AHCI allows the storage driver to enable the advanced Serial ATA features which will increase storage performance.

LPSS & SCC Configuration

This section is used to configure LPSS and SCC settings.



LPSS & SCC Devices Mode

Selects the LPSS and SCC device mode as ACPI mode or PCI mode.

SCC eMMC Support

Enables or disables SCC eMMC support.

SCC SD Card Support

Enables or disables SCC SD card support.

DDR50 Support for SDCard

Enables or disables DDR50 support for SD card.

CSM Configuration

This section is used to configure the compatibility support module features.

CSM Support

Enables or disables CSM support.

Network

Controls the execution of UEFI and legacy PXE OpROM.

Onboard LAN PXE

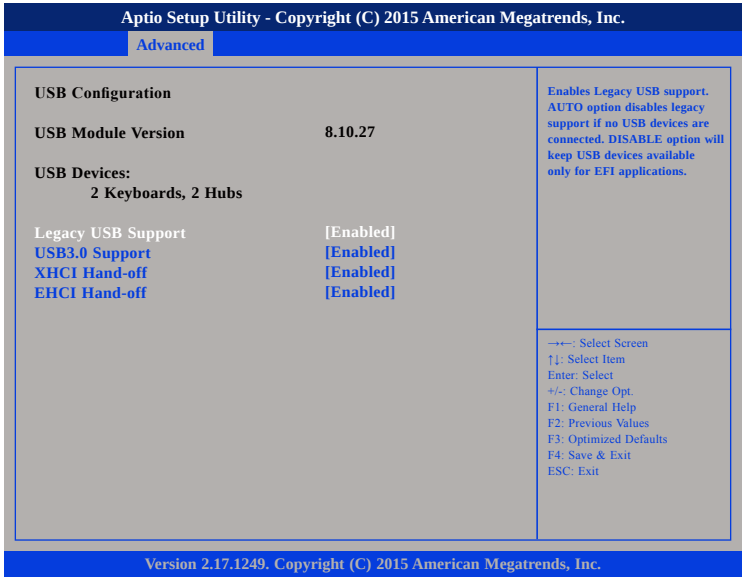
Enables or disables onboard LAN PXE ROM.

Storage

Controls the execution of UEFI and legacy storage OpROM.

USB Configuration

This section is used to configure the USB.



Legacy USB Support

Enable Enables Legacy USB.
Auto Disables support for Legacy when no USB devices are connected.
Disable Keeps USB devices available only for EFI applications.

USB3.0 Support

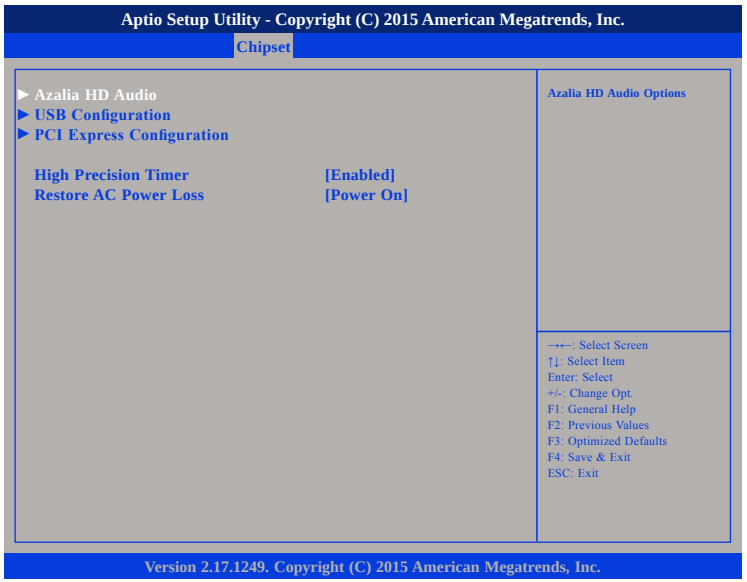
Enables or disables USB 3.0 controller support.

XHCI Hand-off and EHCI Hand-off

This is a workaround for OSs that does not support XHCI hand-off and EHCI Hand-off. The XHCI and EHCI ownership change should be claimed by the XHCI and EHCI driver respectively.

Chipset

This section gives you functions to configure the system based on the specific features of the chipset. The chipset manages bus speeds and access to system memory resources.



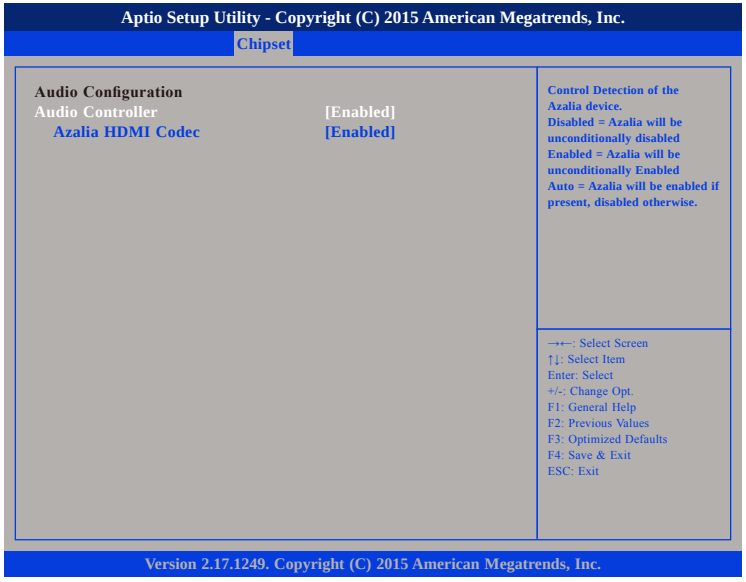
High Precision Timer

Enables or disables the high precision event timer.

Restore AC Power Loss

Select the AC power state when power is re-applied after a power failure.

Azalia HD Audio



Azalia

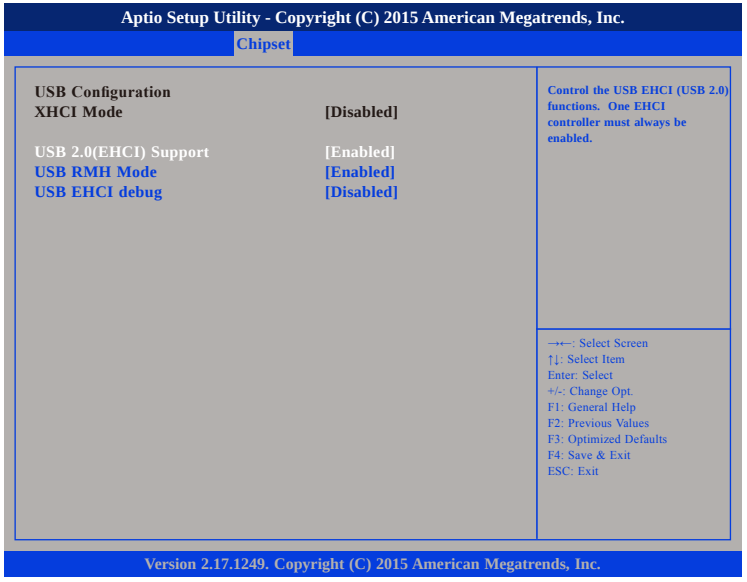
Control detection of the Azalia device.

Disabled	Azalia will be unconditionally disabled.
Enabled	Azalia will be unconditionally enabled.

Azalia HDMI Codec

Enables or disables internal HDMI codec for Azalia.

USB Configuration



USB 2.0(EHCI) Support

Enables or disables the Enhanced Host Controller Interface (USB 2.0), one EHCI controller must always be enabled.

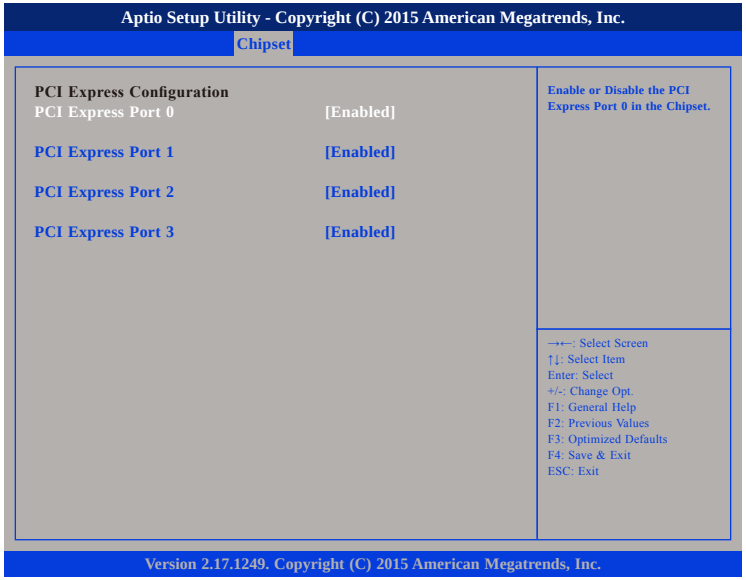
USB RMH Mode

Enables or disables PCH USB rate matching hubs mode.

USB EHCI Debug

Enables or disables PCH EHCI debug capability.

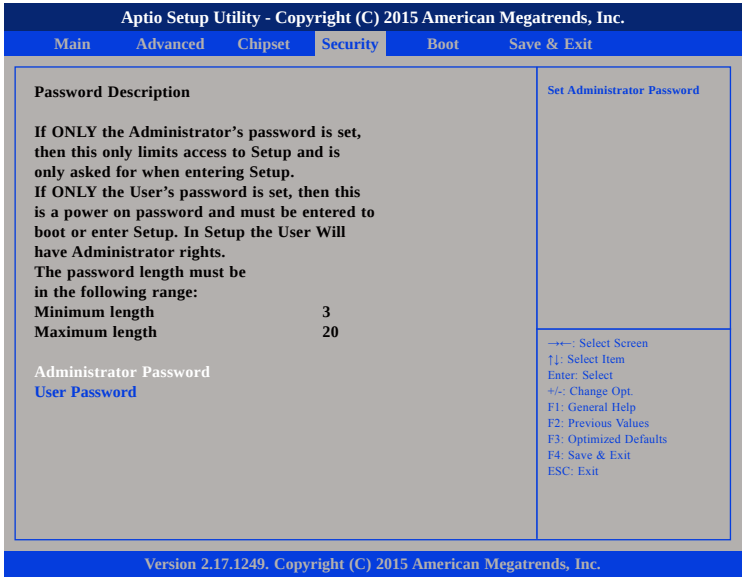
PCI Express Configuration



PCI Express Port 0 to PCI Express Port 3

Enables or disables the PCI Express ports 0 to 3 on the chipset.

Security



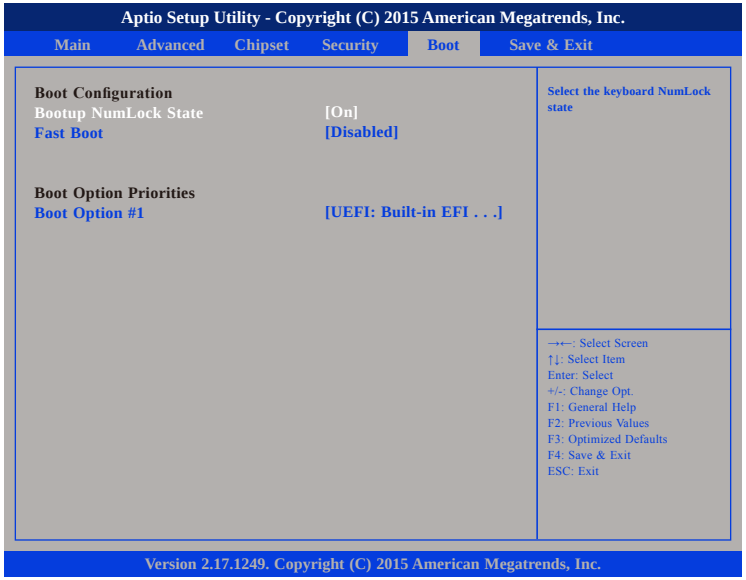
Administrator Password

Select this to reconfigure the administrator's password.

User Password

Select this to reconfigure the user's password.

Boot

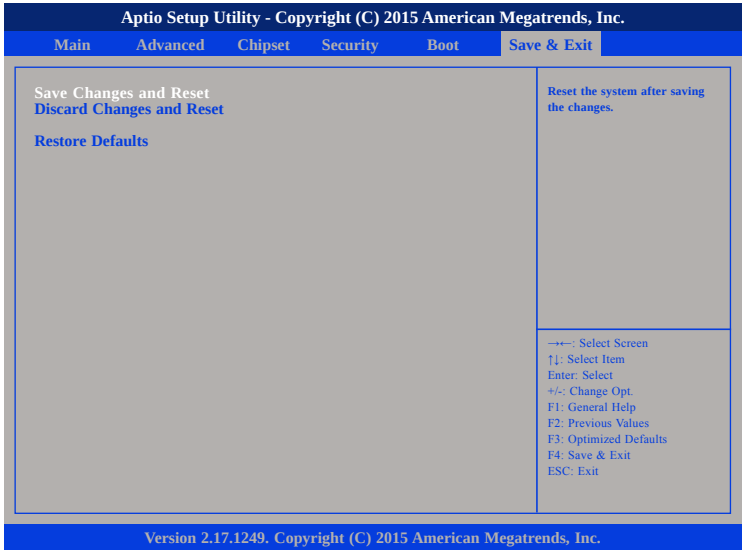


Bootup NumLock State
This allows you to determine the default state of the numeric keypad. By default, the system boots up with NumLock on wherein the function of the numeric keypad is the number keys. When set to Off, the function of the numeric keypad is the arrow keys.

Fast Boot
When enabled, the BIOS will shorten or skip some check items during POST. This will decrease the time needed to boot the system.

Boot Option Priorities
Adjust the boot sequence of the system. Boot Option #1 is the first boot device that the system will boot from, next will be #2 and so forth.

Save & Exit



Save Changes and Reset
To save the changes and reset, select this field then press <Enter>. A dialog box will appear. Confirm by selecting Yes.

Discard Changes and Reset
To exit the Setup utility without saving the changes, select this field then press <Enter>. You may be prompted to confirm again before exiting.

Restore Defaults
To restore the BIOS to default settings, select this field then press <Enter>. A dialog box will appear. Confirm by selecting Yes.

Appendix B: GPI/O Programming Guide

GPI/O (General Purpose Input/Output) pins are provided for custom system design. This appendix provides definitions and its default setting for the ten GPI/O pins in NET 200-ECM. The pin definition is shown in the following table:

Pin	GPI/O Mode	PowerOn Default	Address	Pin	GPI/O Mode	PowerOn Default	Address
1	VCC	-	-	2	GND	-	-
3	GPO0	Low	A03h (Bit6)	4	GPI0	High	A03h (Bit1)
5	GPO1	Low	A02h (Bit5)	6	GPI1	High	A05h (Bit5)
7	GPO2	Low	A07h (Bit0)	8	GPI2	High	A05h (Bit4)
9	GPO3	Low	A07h (Bit1)	10	GPI3	High	A00h (Bit1)

Control the GPO 0/1/2/3 level from I/O port A03h bit6/ A02h bit5 A07h bit0/ A07h bit1.
The bit is Set/Clear indicated output High/Low.

GPIO programming sample code

```
#define GPO0                    (0x01 << 6)
#define GPO1                    (0x01 << 5)
#define GPO2                    (0x01 << 0)
#define GPO3                    (0x01 << 1)

#define GPO0_HI                 outportb(0xA03, GPO0)
#define GPO0_LO                 outportb(0xA03, 0x00)
#define GPO1_HI                 outportb(0xA02, GPO1)
#define GPO1_LO                 outportb(0xA02, 0x00)
#define GPO2_HI                 outportb(0xA07, GPO2)
#define GPO2_LO                 outportb(0xA07, 0x00)
#define GPO3_HI                 outportb(0xA07, GPO3)
#define GPO3_LO                 outportb(0xA07, 0x00)

void main(void)
{
   GPO0_HI;
   GPO1_LO;
   GPO2_HI;
   GPO3_LO;
}
```

Appendix C: Watchdog Timer Setting

ITE8786 WatchDog Programming Guide

```
#define SUPERIO_PORT    0x2E
#define WDT_SET         0x72
#define WDT_VALUE       0x73

void main(void)
{
  #Enter SuperIO Configuration
        outportb(SUPERIO_PORT, 0x87);
        outportb(SUPERIO_PORT, 0x01);
        outportb(SUPERIO_PORT, 0x55);
        outportb(SUPERIO_PORT, 0x55);

  # Set LDN
        outportb(SUPERIO_PORT, 0x07);
        outportb(SUPERIO_PORT+1 ,0x07);

  # Set WDT setting
        outportb(SUPERIO_PORT, WDT_SET);
        outportb(SUPERIO_PORT+1, 0x90);         # Use the second
                                                # Use the minute, change value to 0x10
  # Set WDT sec/min
        outportb(SUPERIO_PORT, WDT_VALUE);
        outportb(SUPERIO_PORT+1, 0x05);         #Set 5 seconds
}
```

Appendix D: LED Programming Guide

LEDs are provided for custom system design. This appendix provides definitions and its default setting for the LEDs in NET 200-ECM. The LED definition is shown in the following table:

Pin	PowerOn Default	Address
GPO-PR0	High	A07h (Bit5)
GPO-PR1	High	A07h (Bit4)
GPO-PR2	High	A07h (Bit3)
GPO-PR3	High	A07h (Bit2)
GPO-PR4	High	A07h (Bit6)

Control the GPO (PR0/PR1/PR2/PR3/PR4) level from I/O port A07h bit (5/4/3/2/6). The bit is Set/Clear indicated output High/Low.