



NEXCOM International Co., Ltd.

IoT Automation Solutions Business Group

EtherCAT Motion Controller

NET 3140P2E-ECM

User Manual

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PREFACE

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Acknowledgements

NET 3140P2E-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 B 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 B 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 2002/95/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 in 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 2006 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.

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 needlenose 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. Do not leave this equipment in either an unconditioned environment or in a above 40°C storage temperature as this may damage the equipment.
8. The openings on the enclosure are for air convection to protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
9. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
10. 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.
11. All cautions and warnings on the equipment should be noted.
12. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
13. Never pour any liquid into an opening. This may cause fire or electrical shock.
14. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
15. 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.
16. Do not place heavy objects on the equipment.
17. 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.
18. **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.**
19. The computer is provided with CD drives that comply with the appropriate safety standards including IEC 60825.

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 NET 3140P2E-ECM package that you received is complete. Your package should have all the items listed in the following table.

Item	Description	Qty
1	DC CORD WIRE L:1050mm	1
2	PE ZIPPER BAG #3	1
3	PE ZIPPER BAG #8	1
4	DB44 TO 4X DB9 COM PORT	1
5	DOW CORNING 340 Silcone Heat Sink Compound(3g)	1
6	POWER CON 2P PHOENIX CONTACT	1
7	FLAT HEAD SCREW LONG FOR HDD USE	4
8	NISE3140 QUICK REFERENCE GUIDE	1
9	NISE3140 CD DRIVER	1
10	DVI-I TO VGA ADAPTER	1
11	MYLAR	1

ORDERING INFORMATION

The following provides ordering information for NET 3140P2E-ECM.

- **NET 3140P2E-ECM (P/N: 10J10314000X0)**
EtherCAT controller with PCI and PCIe expansion slots
- **19V, 120W AC/DC power adapter w/o power cord
(P/N: 7410120002X00)**

CHAPTER 1: PRODUCT INTRODUCTION

Overview

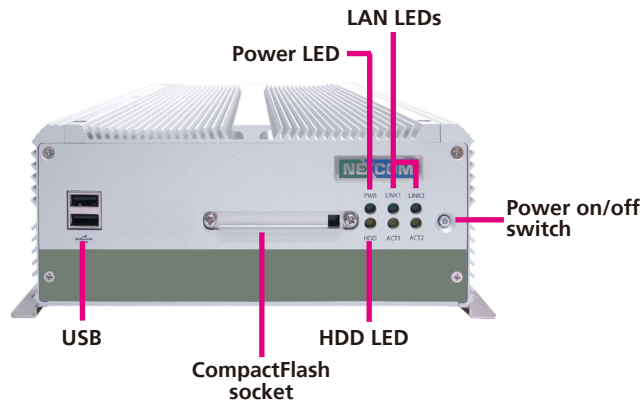
Utilizing the Intel® GM45 chipsets, NET 3140P2E-ECM is highly scalable supporting a wide variety of Intel® Core™ 2 Duo and Celeron® processors. With pre-installed NexECM EtherCAT Master software, NET 3140P2E-ECM delivers exceptional performance with notable stability. NET 3140P2E-ECM supports dual independent displays through 2 x VGA, DVI or LVDS outputs. Housed in a robust aluminum chassis, its fanless design offers noise-free, ultra reliable operation in demanding industrial environments. NET 3140P2E-ECM offers comprehensive and easy-to-use application configurator for system development and debugging to speed up development period.

Key Features

- Support Intel® Core™ 2 Duo/Celeron® processor
- EtherCAT technology with NexECM, Class A EtherCAT Master
- EtherCAT communication cycle up to 250 μ s
- Support CoE protocol
- Support high-level API for CiA 402 profile
- Built-in full function EtherCAT application configurator
- Dual VGA or VGA/DVI independent display
- 3 x RS232 and 1 x RS232/422/485 with auto direction control
- One external locked CF socket
- Onboard DC to DC power design to support +16 to 30V_{DC} power input

Product Appearance

Front Panel



Power On/Off Switch

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

Power LED

Indicates the power status of the system.

HDD LED

Indicates the status of the hard drive.

LAN LEDs

Indicate the status of the LAN ports.

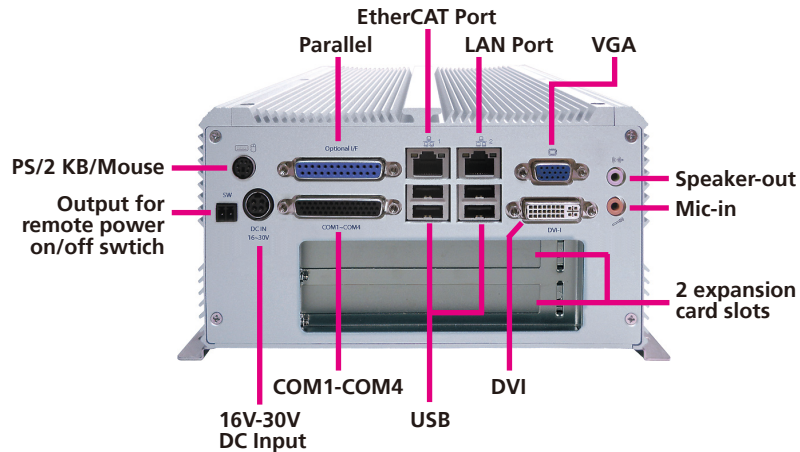
CompactFlash Socket

Used to insert a CompactFlash card.

USB

Used to connect USB 2.0/1.1 devices.

Rear Panel



Output for Remote Power On/Off Switch

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

PS/2 Keyboard/Mouse

Used to connect a PS/2 keyboard and PS/2 mouse via a cable.

16V-30V DC Input

Used to plug a DC power cord.

Parallel

Used to connect a parallel device.

COM1 to COM4

The DB44 port supports 3 RS232 and 1 RS232/422/485 compatible serial devices.

LAN

LAN 1: EtherCAT LAN port.

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

USB

Used to connect USB 2.0/1.1 devices.

VGA

Used to connect an analog VGA monitor.

DVI

Used to connect a digital LCD panel.

Speaker-out

Used to connect a headphone or a speaker.

Mic-in

Used to connect an external microphone.

Expansion Slots

One PCI and PCIe expansion slot.

Hardware Specifications

EtherCAT Master

- Slave module no.: up to 64
- Cycle time: up to 250 μ s
- Synchronization error: \pm 50ns
- Support CiA 402 standard protocol

CPU Support

- Support Intel® Core™ 2 Duo P8400

Main Memory

- 2x 2GB DDR3 SDRAM

Chipset

- Intel® GM45 graphics and memory controller hub
- Featuring the mobile Intel® graphics media accelerator 4500MHD
- Intel® 82801IBM (ICH9M) I/O controller hub

I/O Interface - Front

- ATX power on/off switch
- HDD access/power status LEDs
- 1x Front access CF card socket
- 2x USB 2.0 ports

I/O Interface - Rear

- 2-pin remote power on/off switch
- +16 to 30V_{DC} input
- 1x PS/2 for keyboard/mouse
- 1x DB25 parallel port (optional GPIO or LVDS interface)
- 1x DB44 serial port for 4x RS232
(COM2: RS232/422/485 with auto flow control)

- 2x GbE LAN ports (support WoL & LAN teaming)
- 4x USB 2.0 ports
- 1x DB15 VGA port
- 1x DVI-I port (DVI-D + VGA)
- 1x Line-out and 1x Mic-in

Device

- 1x 2.5" SATA HDD drive bay
- 1x External locked CF card socket
- Optional power adapter

Expansion

- Add-on card length support:
 - Max. 169mm x1 and 240mm x1 (with 2.5" HDD installed)
 - Max. 240mm x2 (without 2.5" HDD installed)

Power Requirements

- ATX power mode
- Onboard DC to DC power support from +16 to 30V_{DC}

Dimensions

- 195mm (W) x 268mm (D) x 101mm (H) (7.7" x 10.5" x 3.98")

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 93% (non-condensing)
- Shock protection:
 - HDD: 20G, half sine, 11ms, IEC60068-2-27

- CF: 50G, half sine, 11ms, IEC60068-2-27
- Vibration protection w/ HDD condition
 - Random: 0.5Grms @ 5~500Hz according to IEC60068-2-64
 - Sinusoidal: 0.5Grms @ 5~500Hz according to IEC60068-2-6

Certifications

- CE approval
- FCC Class B

Pre-Installed Software Package

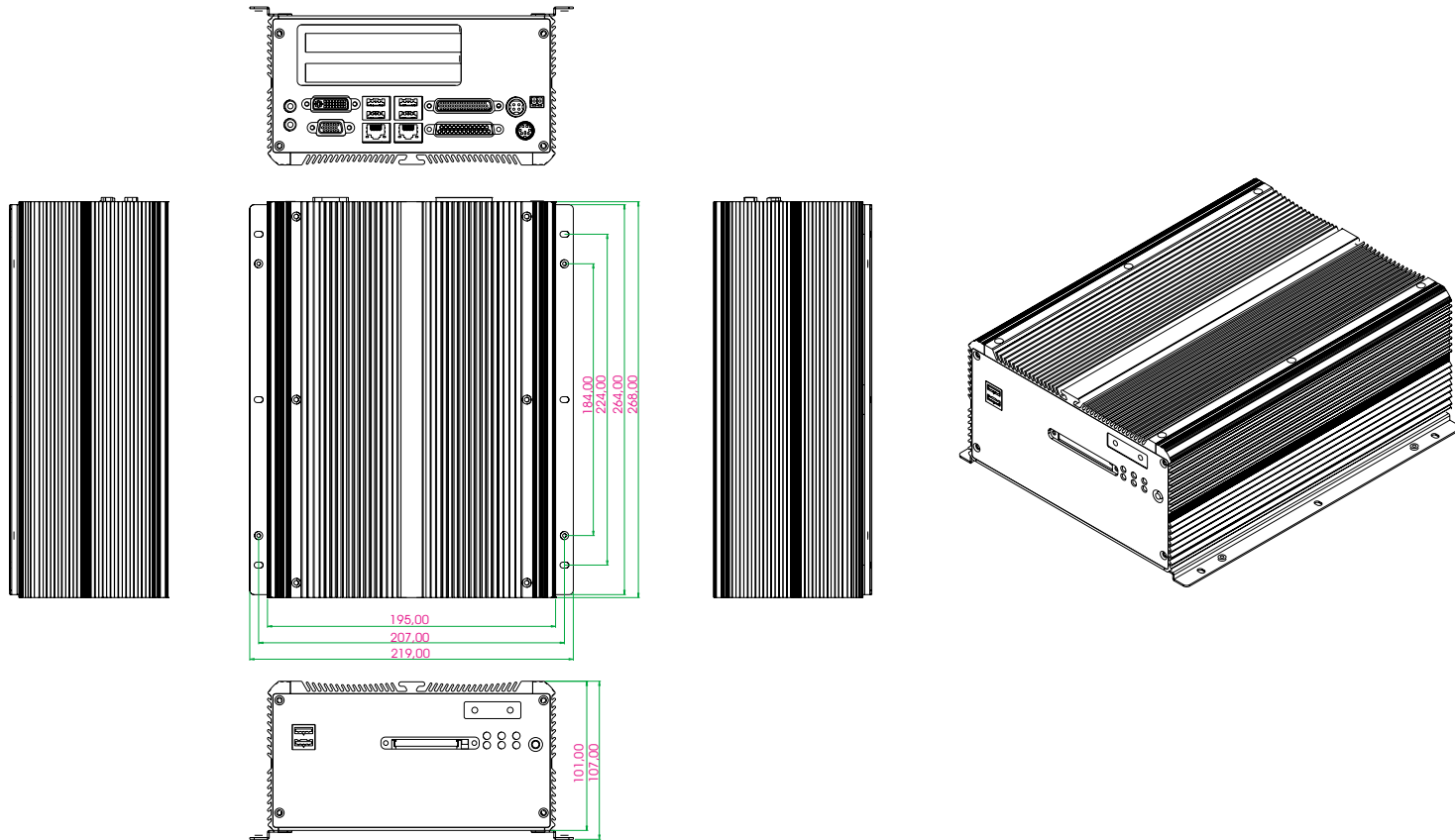
- Operating system: Windows Embedded Standard 7
- Real-time extension:
 - RTX2012/RTX2016 for 32-bit OS
 - RTX2014 for 64-bit OS
- EtherCAT Master: NexECM
- EtherCAT configurator

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

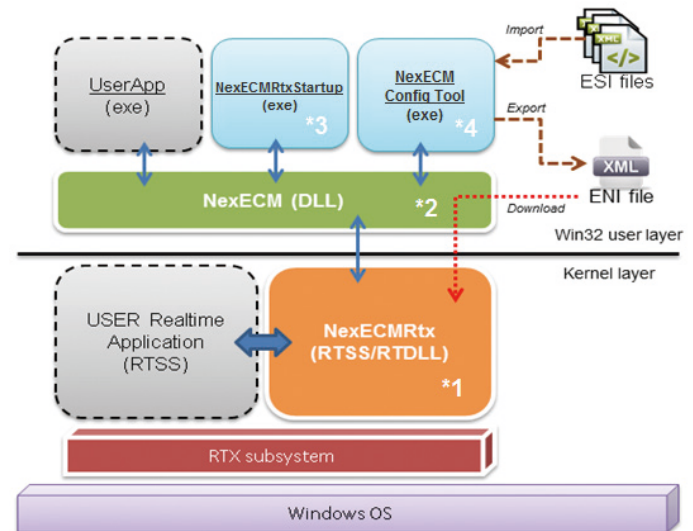


CHAPTER 2: SOFTWARE OPERATION

NET 3140P2E-ECM is an EtherCAT master controller based on IntervalZero's real-time extension RTX. NET 3140P2E-ECM integrates NEXCOM's EtherCAT master software, NexECMRtx, to implement real-time operation and high performance communication.

NET 3140P2E-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.

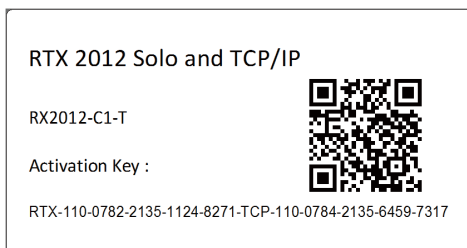


Figure 1. RTX Activation Key Sticker

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.**

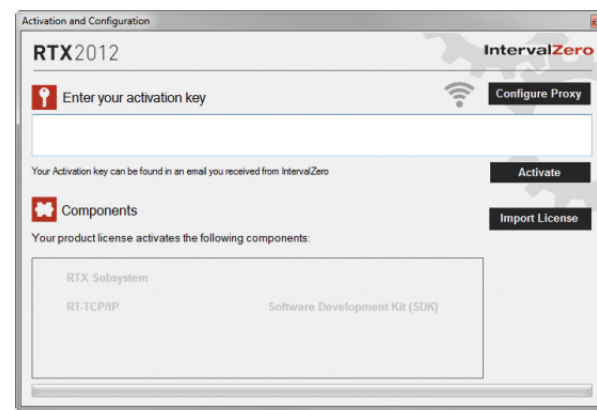


Figure 2. Activation Dialog

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

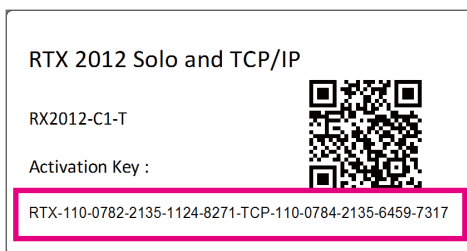


Figure 3. Key Section in the Sticker

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.

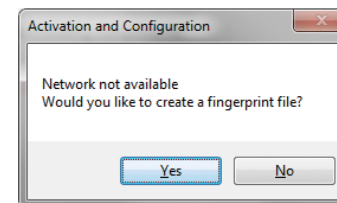


Figure 4. Fingerprint Dialog

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>.

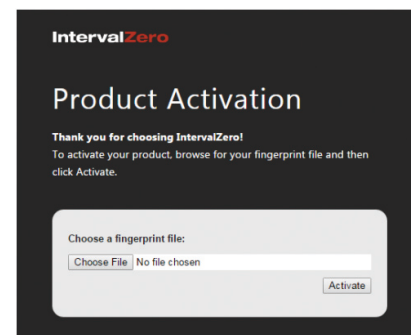


Figure 5. Product Activation Website

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.

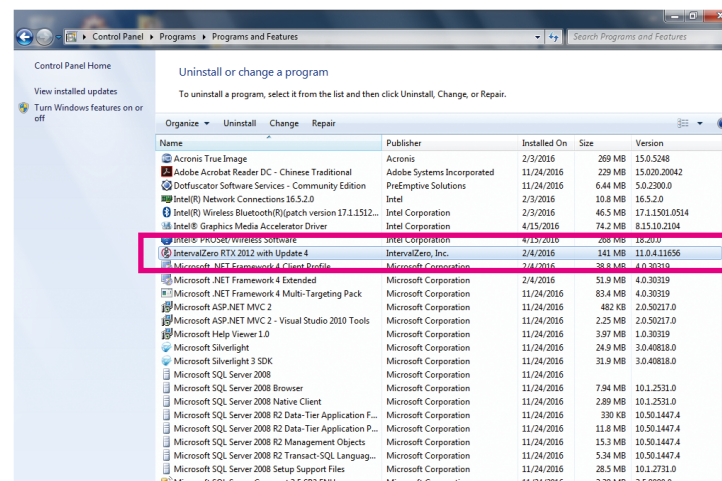
Microsoft Visual Studio Installation

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

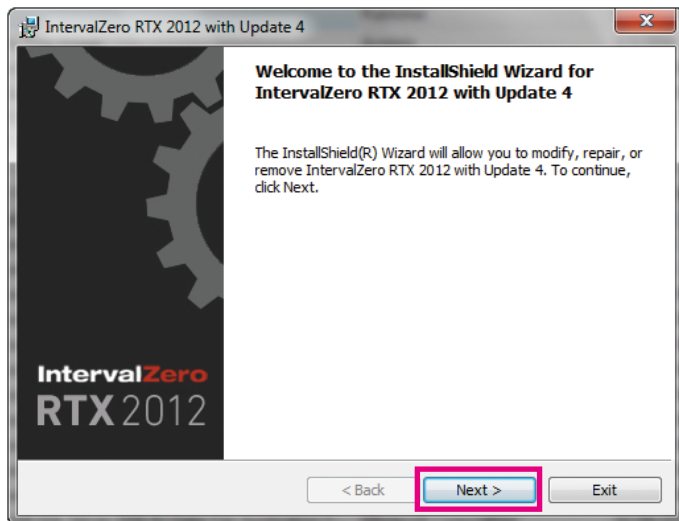
Step 2. After installation, please check the RTX Version on the NET platform. (**Windows > Start Menu > Control Panel > Programs > Programs and Features**). As shown in the example, the version is IntervalZero RTX 2012 with Update 4.



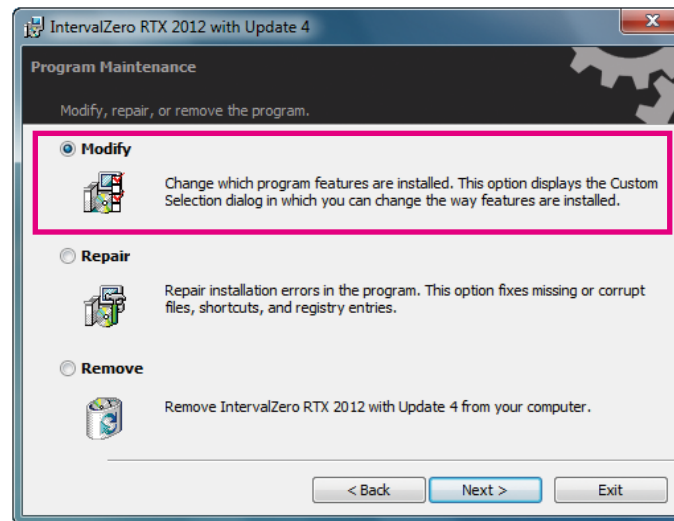
Step 3. Download the related RTX runtime installation file, from the IntervalZero download site.

- 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/>)

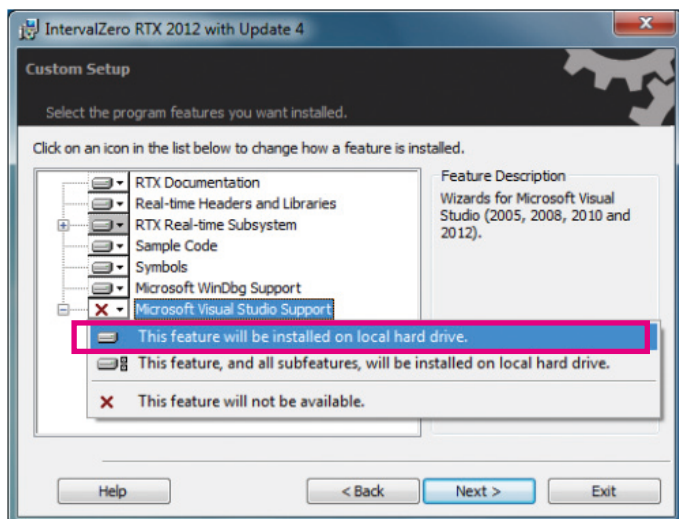
Step 4. Double-click the RTX install package, and click **Next >**.



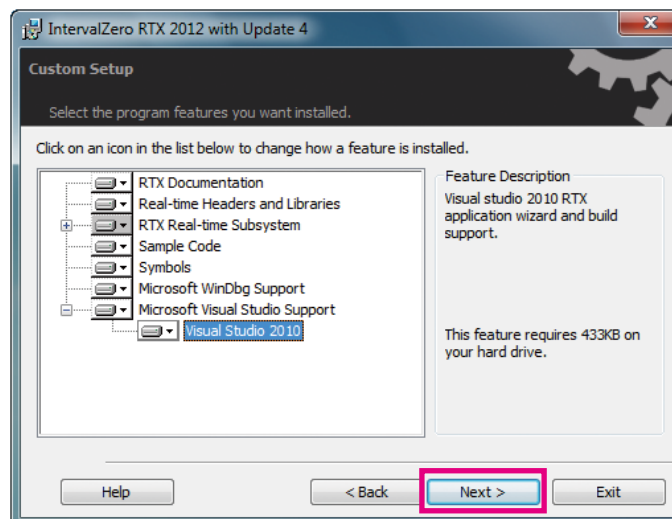
Step 5. Select **Modify**.



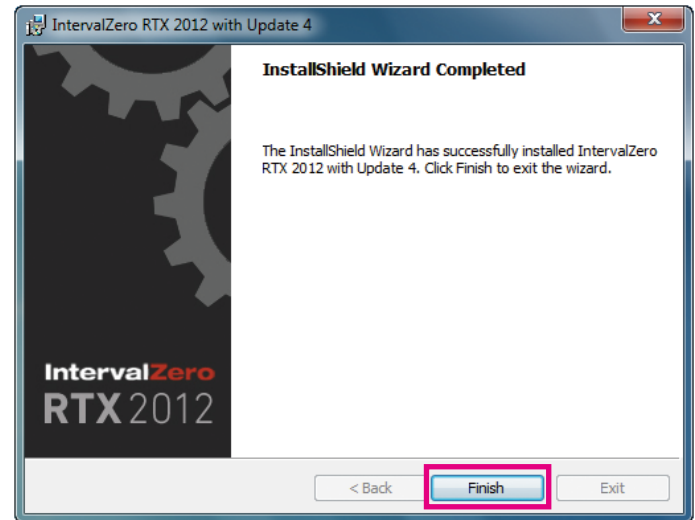
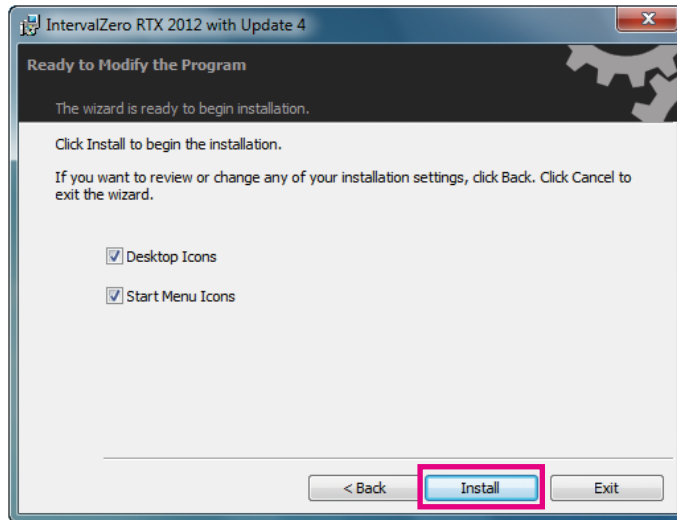
Step 6. Add the installed Visual Studio software in the list.



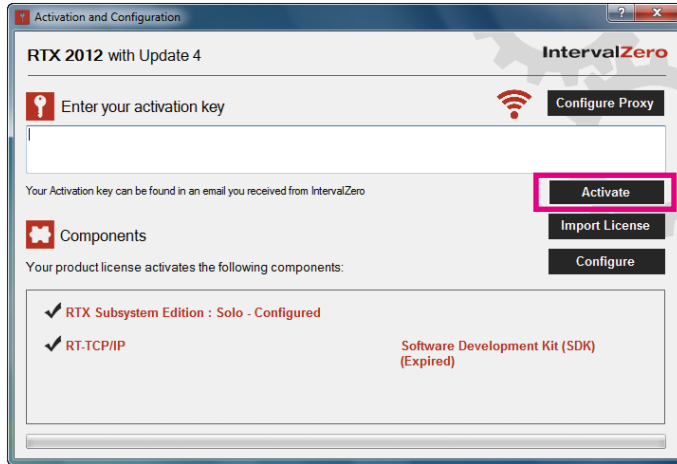
Step 7. Click **Next >**.



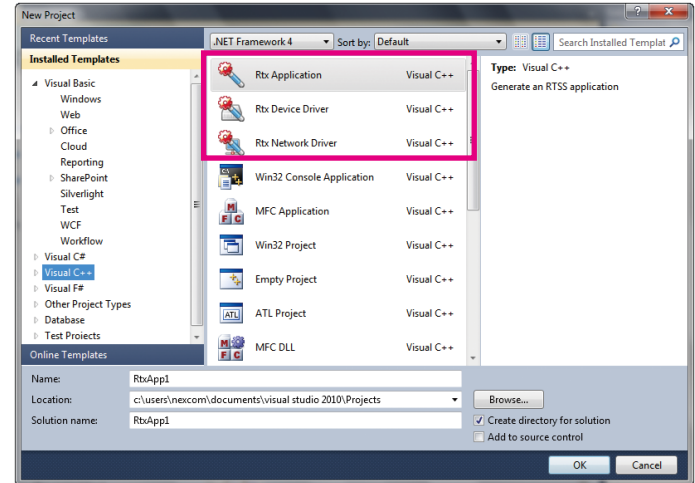
Step 8. Click **Install**, and then click **Finish**.



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

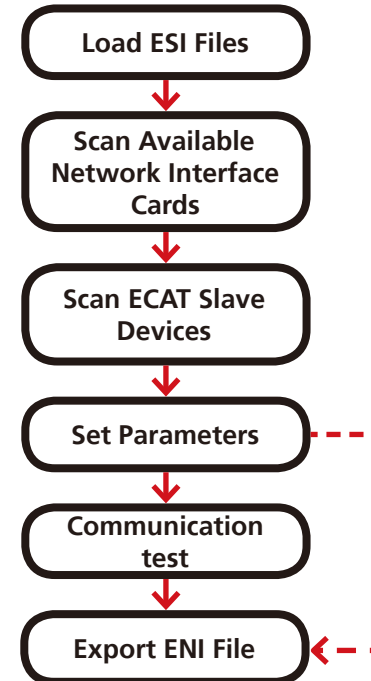
EtherCAT Configuration Tool

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, DeviceID 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:**

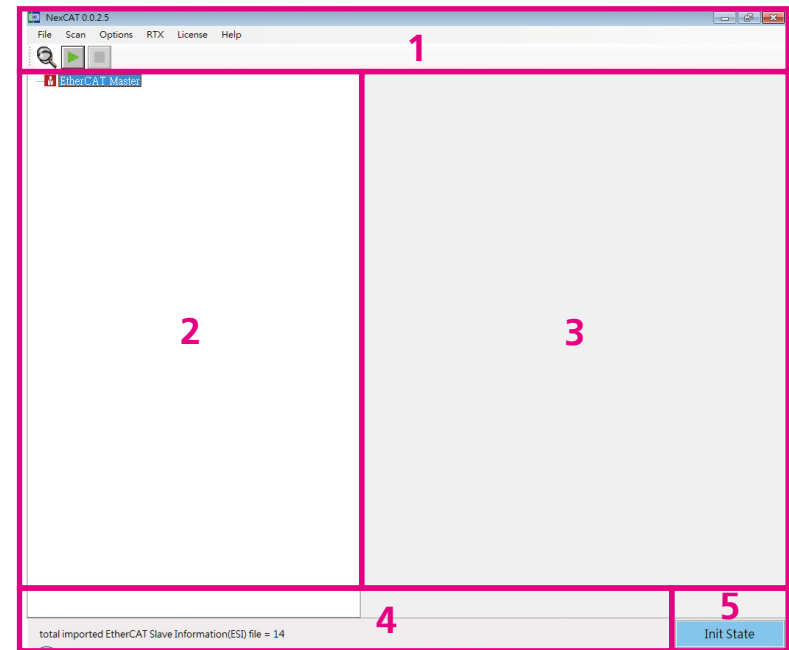
User can start all the EC-Slave devices directly; the status will be changed from initial state (INIT) to operation state (OP). If there is a slave device which cannot be transferred to the operation state successfully, you can find the status and messages from the main page's area 4 and area 5 (in the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

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



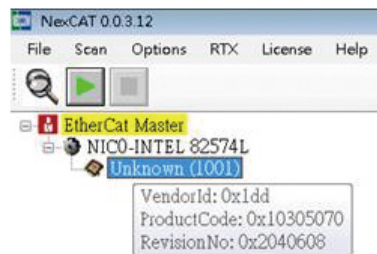
- **Area 1:**

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.

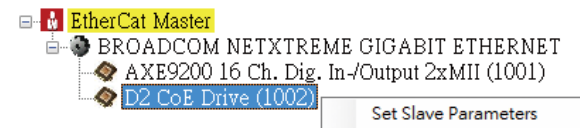
- **Area 5:**

Shows the state of EtherCAT slave devices. Currently we have 4 states:

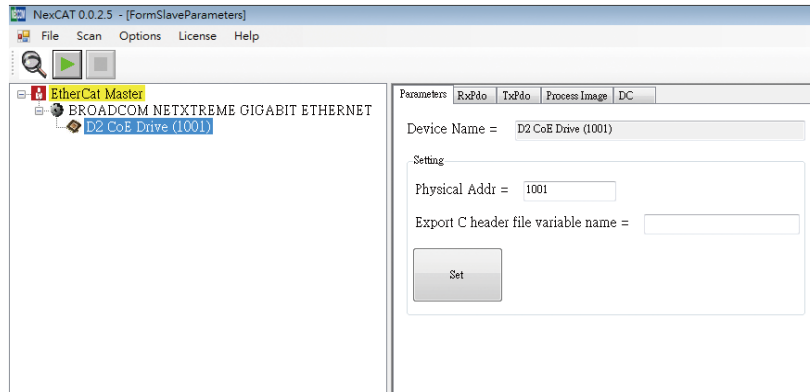
1. **Initial:** There is no communication and all slave devices are in initial state.
2. **Error:** There is communication but slave devices cannot be switched to OP state. Common errors are: ENI file does not match with the actual network topology; ESI version does not match with the slave device version 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 =

Setting

Physical Addr =

Export C header file variable name =

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 Addrsss (+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

RxPdo Name	Index(Hex)	SM	Mandatory	Fixed
RxPdo 1	1600	2	-1	0
RxPdo 2	1601	-1	-1	0
RxPdo 3	1602	-1	-1	0

Entry Name	Index(Hex)	Sub Index	Bit Len	Data Type
Controlword	6040	0	16	UINT
Target Position	607A	0	32	DINT
	0000	0	0	
	0000	0	0	
	0000	0	0	

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.
- **Data Type:** 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.

Input Name	Data Type	BitSize	BitOffset	Memory Address	Output Name	Data Type	BitSize	BitOffset	Memory Address
Statusword	UINT	16	328	16777218	Controlword	UINT	16	328	16777220
Position Actual Value	DINT	32	344	16777220	Target Position	DINT	32	344	16777224
Velocity Actual Value	DINT	32	376	16777224					

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.

The screenshot shows a configuration window with tabs for Parameters, RxPdo, TxPdo, Process Image, and DC. The DC tab is active. Under the 'Setting' section, there are three fields: 'Mode' set to 'DC', 'Description' set to 'DC SYNC0', and 'DC SYNC Activation' set to '0x0300'. At the bottom of the setting area are two buttons: 'Apply To Other' and 'Set'.

- **Apply To Other:**

Apply current slave device's settings to other slaves. Clicking the button will pop up the following dialog.

The screenshot shows a dialog box titled 'FormSaveAllSlaveSelectDC'. It contains a list of four slave devices, each with a checkbox: 'MADHT1505B01 (1001)', 'MADHT1505B01 (1002)', 'MADHT1505B01 (1003)', and 'MADHT1505B01 (1004)'. On the right side of the dialog, there are three buttons: 'Clear All', 'Select All', and 'Save'.

- **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.

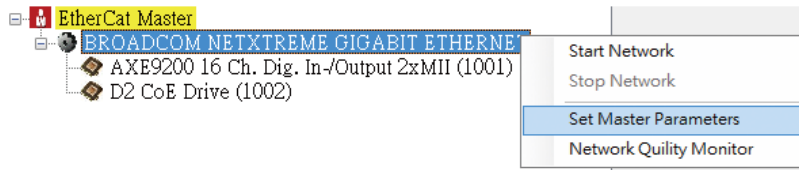
- **DC SYNC Activation: (ESC Register 0x0980~0x0981)**

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.

Set Master Parameters

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

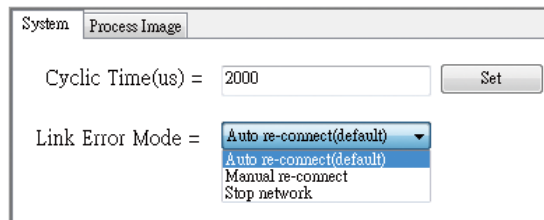


There are 2 tabs:

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

Input Name	Data Type	BitSize	BitOffset	Memory Address	Input Name	Data Type	BitSize	BitOffset	Memory Address
Inputs	BITARR8	8	568	16777216	Outputs	BITARR8	8	568	16777216
Inputs	BITARR8	8	576	16777217	Outputs	BITARR8	8	576	16777217
Statusword	UINT	16	584	16777218	Controlword	UINT	16	584	16777218
Position Actual Value	DINT	32	600	16777220	Target Position	DINT	32	600	16777220
Velocity Actual Value	DINT	32	632	16777224					

Export C header file

- **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 header file for process image map**

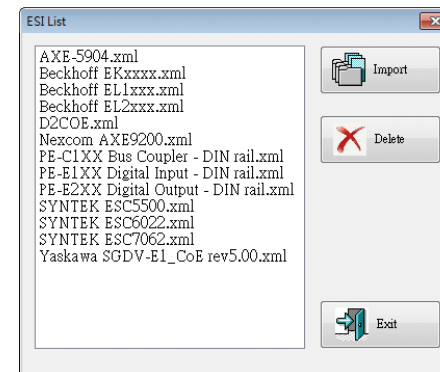
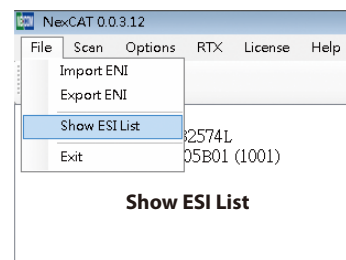
Click "Export C Header File" button. PDO memory mapping offset can be output as a C header (*.h), It is easy to maintain your code using the define symbol when PDO mapping has changed. Output symbol format please refer to the NexECMRtx User Manual "Chapter 3.1.5".

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.

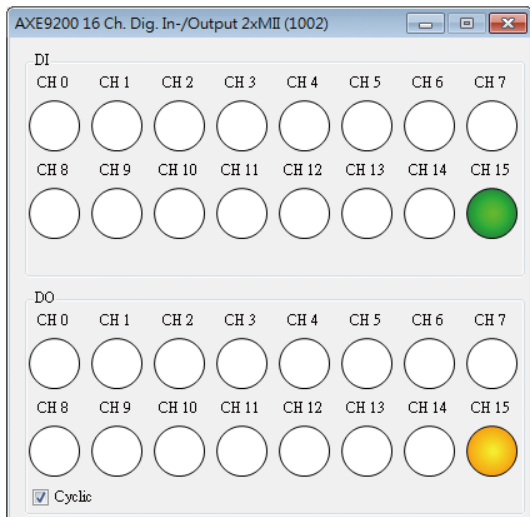


ESI List Page

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.

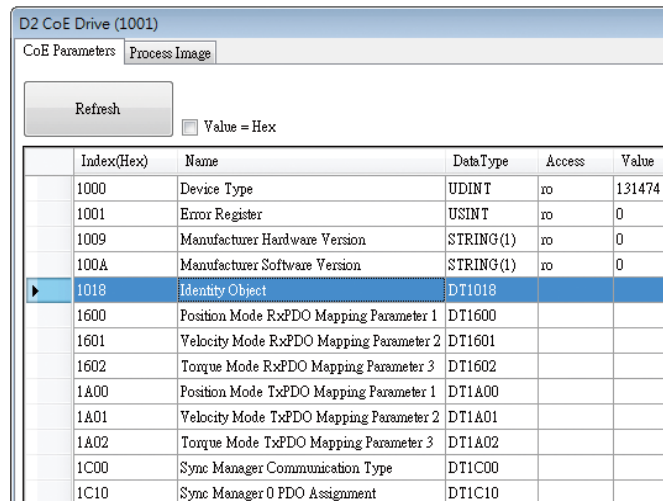


CoE-SDO Operation Page

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.



CoE Parameters

If the parameter of data type is "data type", 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.

The screenshot shows a dialog box titled "Identity Object" with a "Value = Hex" checkbox and a "Refresh" button. Below is a table of sub-parameters:

Sub Index	Name	Data Type	Access	Value
0	number of entries	USINT	ro	04
1	Vendor Id	UDINT	ro	0000aaaa
2	Product Code	UDINT	ro	00000003
3	Revision number	UDINT	ro	00000001
4	Serial number	UDINT	ro	00000001

Sub Parameters

Process Image Parameters Operation Page

The screenshot shows the "D2 CoE Drive (1001) Process Image" window. It has two tabs: "CoE Parameters" and "Process Image". The "Process Image" tab is active, showing two tables. The left table is for "Input Data = Hex" and the right table is for "Output Data = Hex". Both tables have columns for Name, Data Type, Bit Size, Bit Offset, and Data.

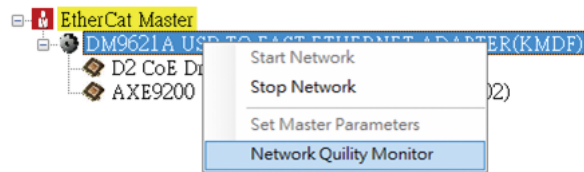
Input Name	Data Type	Bit Size	Bit Offset	Data
▶ Statusword	UDINT	16	568	96
Position Actual Value	DINT	32	584	2342
Velocity Actual Value	DINT	32	616	0

Output Name	Data Type	Bit Size	Bit Offset	Data
▶ Controlword	UDINT	16	568	
Target Position	DINT	32	584	

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 application (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 - 記事本
檔案(F) 編輯(E) 格式(O) 檢視(V) 說明(H)

[PATH_ENI]
PATH = D:\NEXCOM\EtherCAT\ENI_EXAMPLE.xml
OPTION = 1

[PATH_NEXECMRTX_DRIVER]
PATH = C:\ProgramFiles\NexCom\NexECMRtx.rtss

[PATH_USER_APP]
PATH = D:\ProgramFiles\NexCom\UserApp.exe
  
```

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**.

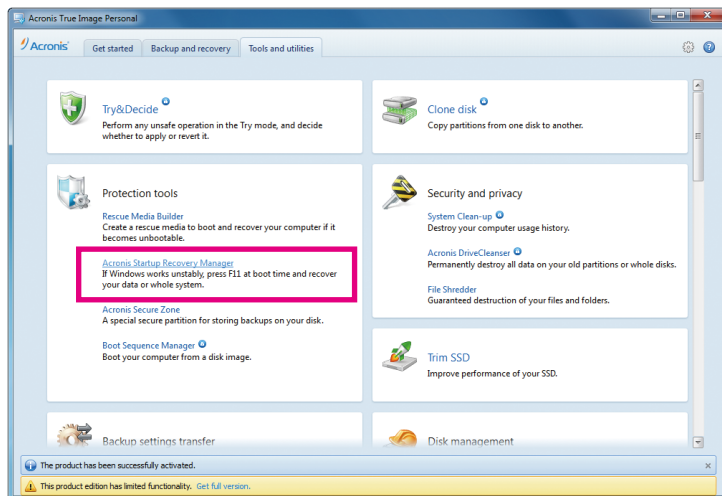


Figure 1. Acronis Startup Page

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

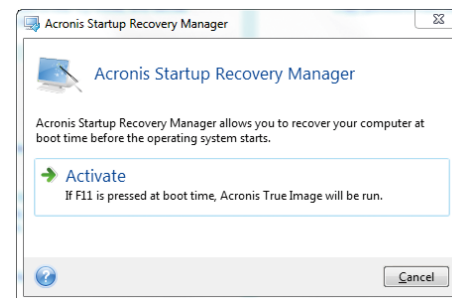


Figure 2: Acronis Startup Recovery Manager

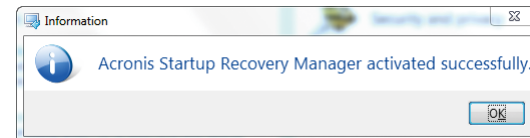


Figure 3: The Information for Startup Recovery Manager

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**.

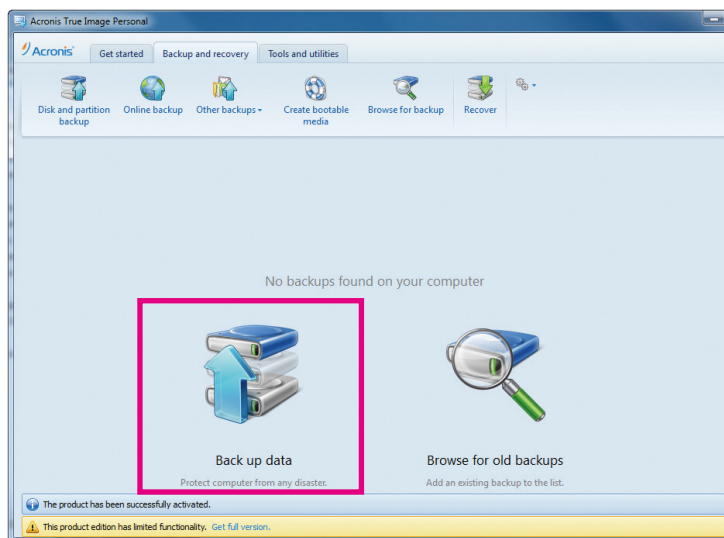


Figure 4. Backup and Recovery Page

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

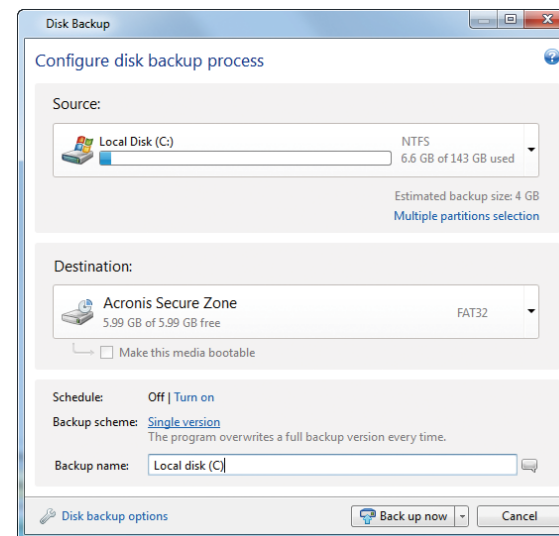


Figure 5. Disk Backup Page

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

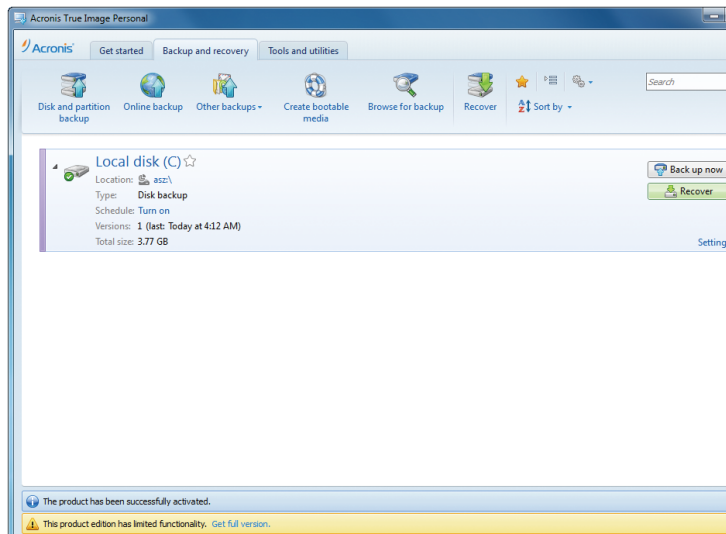


Figure 6. Back Up Complete

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**.

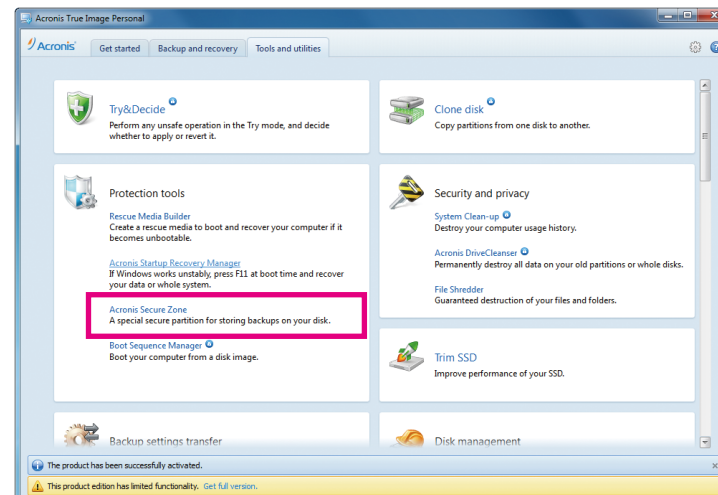


Figure 8. Adjust the Size for Acronis Secure Zone (1)

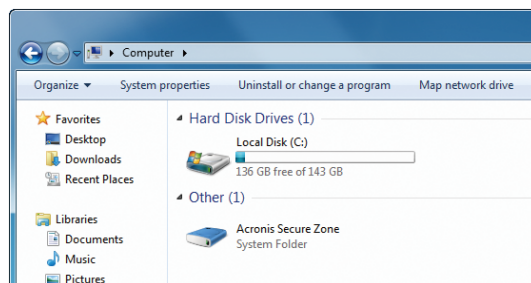


Figure 7. Acronis Secure Zone

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

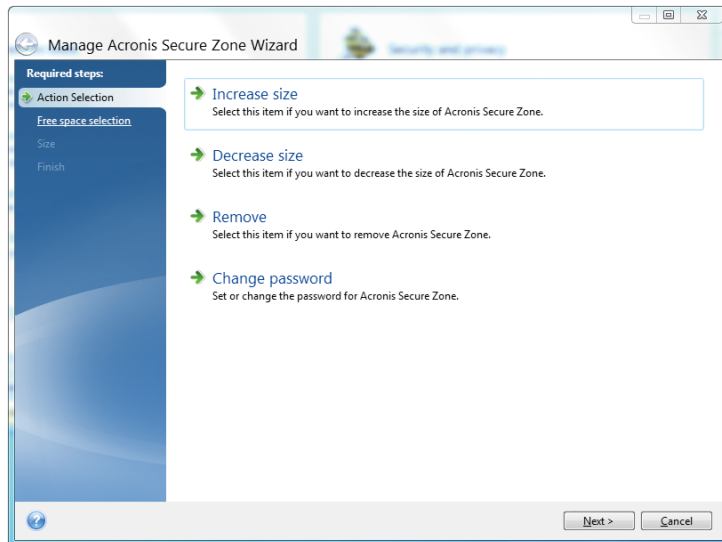


Figure 9. Adjust the Size for Acronis Secure Zone (2)

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

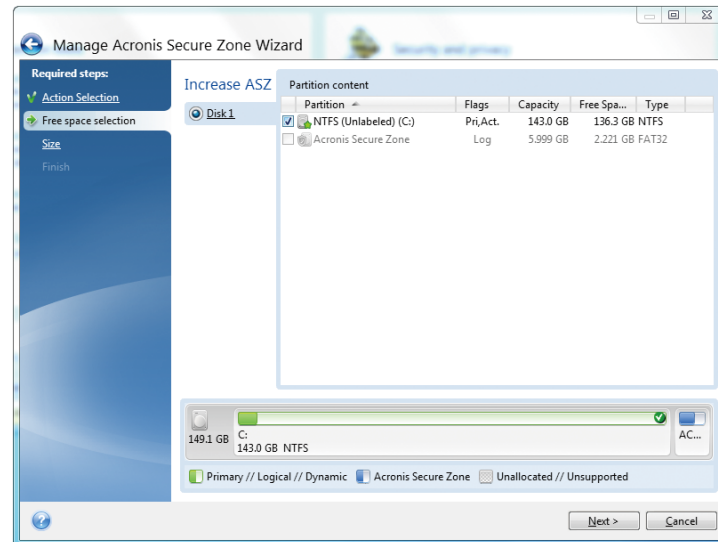


Figure 10. Adjust the Size for Acronis Secure Zone (3)

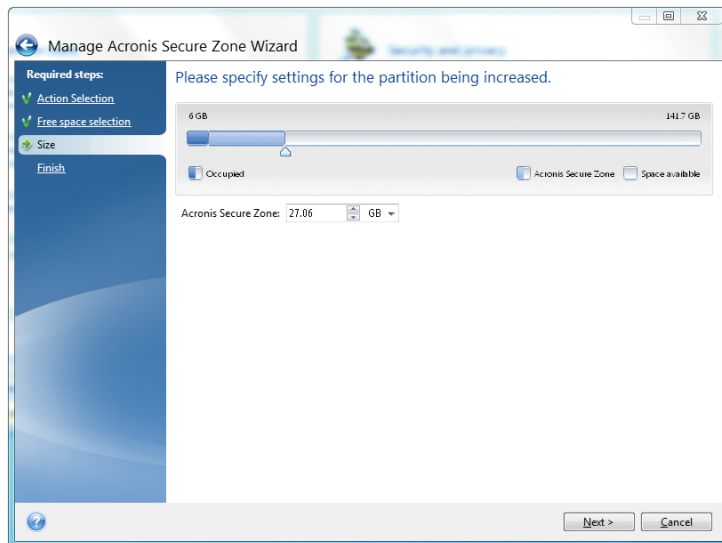


Figure 11. Adjust the Size for Acronis Secure Zone – Increase Size (4)

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 on the motherboard. Note that the following procedures are generic for NET 3140P2E-ECM.

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 elec-

tronic components. Humid environment 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 the 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:

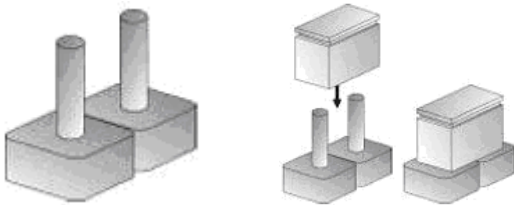
- Always disconnect the unit from the power outlet whenever you are working inside the case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal 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

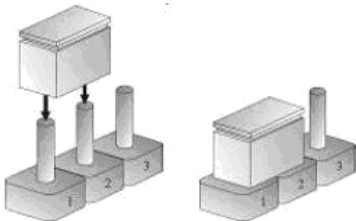
A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is **short**. If you remove the jumper cap, or place the jumper cap on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



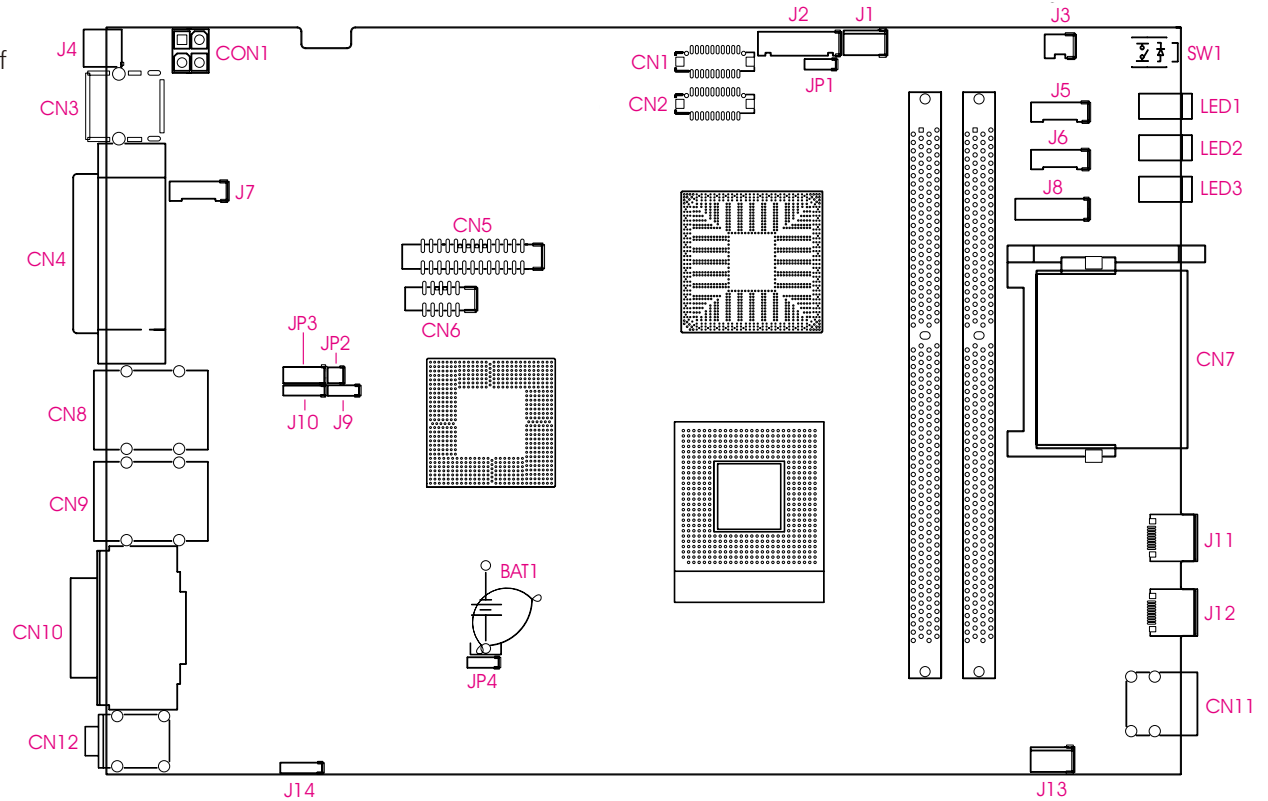
Three-Pin Jumpers: Pins 1 and 2 Are Short



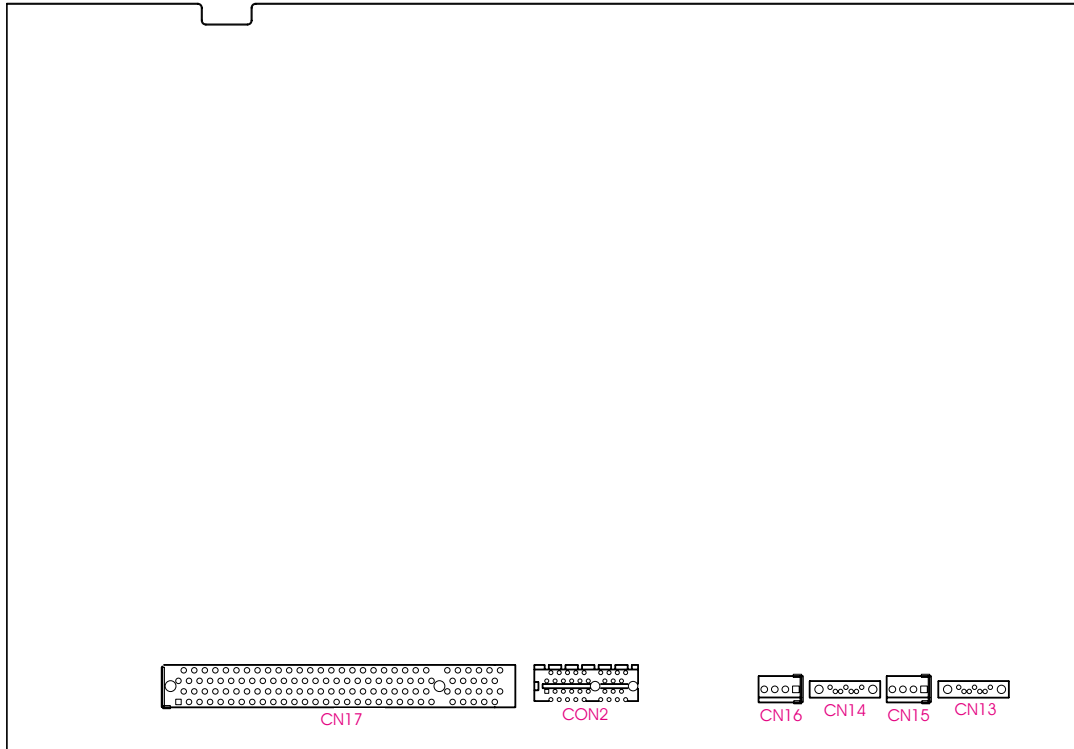
Locations of the Jumpers and Connectors

NISB3140

The figure on the right is the top view of the NISB3140 main board which is the main board used in NET 3140P2E-ECM. It shows the locations of the jumpers and connectors.



The figure below is the bottom view of the NISB3140 main board.



Connector Pin Definitions

External I/O Interface

Status Indicators

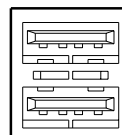
PWR	LNK1	LNK2
HDD	ACT1	ACT2

Status	LED Color
PWR	Green
HDD	Yellow
LNK1, LNK2	Green lighted: LAN ports linked
ACT1, ACT2	Yellow blinking: Data activity

USB Ports

Connector size: Dual USB port

Connector location: CN11



Pin	Definition	Pin	Definition
1	VCC5	7	USB5+
2	USB4-	8	GND
3	USB4+	22	GND
4	GND	23	GND
5	VCC5	26	GND
6	USB5-	27	GND

Remote Power On/Off Switch

Connector size: 2-pin switch

Connector location: J4

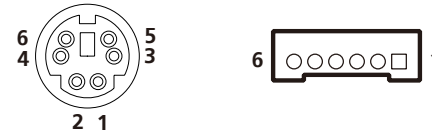


Pin	Definition
1	GND
2	PWRBT

PS/2 Keyboard/Mouse Port

Connector size: PS/2, Mini-DIN-6, JST-2.0mm-M-180

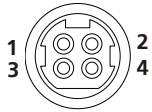
Connector location: J7



Pin	Definition	Pin	Definition
1	VCC5	2	KDAT
3	KCLK	4	MDAT
5	MCLK	6	GND

16V-30V DC Input

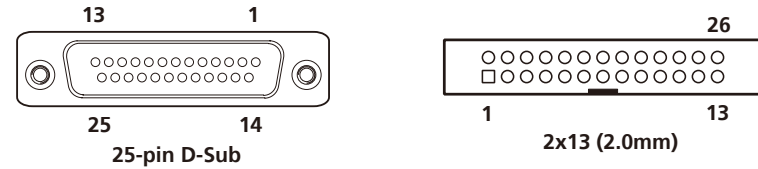
Connector size: 4-pin power jack, 15x16x17.4mm, POWER-F-90
Connector location: CN3



Pin	Definition	Pin	Definition
1	VIN	2	VIN
3	GND	4	GND

Parallel Connector

Connector size: 25-pin D-Sub, 2x13 (2.0mm), BOX-2.0mm-M-180
Connector location: CN5

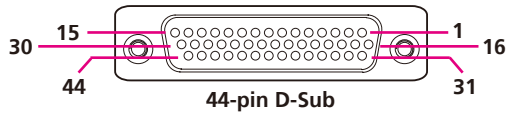


Pin	Definition	Pin	Definition
1	LPT_STB#	2	LPT_PRD0
3	LPT_PRD1	4	LPT_PRD2
5	LPT_PRD3	6	LPT_PRD4
7	LPT_PRD5	8	LPT_PRD6
9	LPT_PRD7	10	LPT_ACK#R
11	LPT_BUSY	12	LPT_PE
13	LPT_SLCT	14	LPT_AFD#
15	LPT_ERR#	16	LPT_INIT#
17	LPT_SLIN#	18	GND
19	GND	20	GND
21	GND	22	GND
23	GND	24	GND
25	GND	26	NC

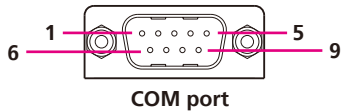
Serial Interface (COM 1 - COM 4)

Connector size: 44-pin D-Sub, 2x22 (12.55mm x 53.04mm)

Connector location: CN4



The 44-pin D-Sub connector is used to connect 4 external serial devices. Use the COM ports on the provided “DB44 to 4x DB9 COM port cable” (included in the package) to connect the devices.



Pin	Definition	Pin	Definition
1	COM1_DCD	2	COM1_RXD
3	COM1_TXD	4	COM1_DTR
5	GND	6	COM1_DSR
7	COM1_RTS	8	COM1_CTS
9	COM1_RI	10	GND
11	COM2_DCD	12	COM2_RXD
13	COM2_TXD	14	COM2_DTR
15	GND	16	COM2_DSR
17	COM2_RTS	18	COM2_CTS
19	COM2_RI	20	GND
21	COM3_DCD	22	COM3_RXD
23	COM3_TXD	24	COM3_DTR
25	GND	26	COM3_DSR
27	COM3_RTS	28	COM3_CTS
29	COM3_RI	30	GND
31	COM4_DCD	32	COM4_RXD
33	COM4_TXD	34	COM4_DTR
35	GND	36	COM4_DSR
37	COM4_RTS	38	COM4_CTS
39	COM4_RI	40	GND
41	NC	42	NC
43	NC	44	NC

COM1 (RS232) labelled "A" on DB9 Cable Connector					
DB44 Pin #	DB9 Pin #	Def.	DB44 Pin #	DB9 Pin #	Def.
1	1	DCD1	2	2	RXD1
3	3	TXD1	4	4	DTR1
5	5	GND	6	6	DSR1
7	7	RTS1	8	8	CTS1
9	9	RI1	10		GND

COM2 (RS232) labelled "B" on DB9 Cable Connector					
DB44 Pin #	DB9 Pin #	Def.	DB44 Pin #	DB9 Pin #	Def.
11	1	DCD2	12	2	RXD2
13	3	TXD2	14	4	DTR2
15	5	GND	16	6	DSR2
17	7	RTS2	18	8	CTS2
19	9	RI2	20		GND

COM3 (RS232) labelled "C" on DB9 Cable Connector					
DB44 Pin #	DB9 Pin #	Def.	DB44 Pin #	DB9 Pin #	Def.
21	1	DCD3	22	2	RXD3
23	3	TXD3	24	4	DTR3
25	5	GND	26	6	DSR3
27	7	RTS3	28	8	CTS3
29	9	RI3	30		GND

COM4 (RS232) labelled "D" on DB9 Cable Connector					
DB44 Pin #	DB9 Pin #	Def.	DB44 Pin #	DB9 Pin #	Def.
31	1	DCD4	32	2	RXD4
33	3	TXD4	34	4	DTR4
35	5	GND	36	6	DSR4
37	7	RTS4	38	8	CTS4
39	9	RI4	40		GND
41		NC	42		NC
43		NC	44		NC

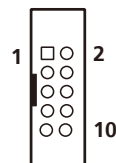
Note: Pin 39 is defined as an external power source, which can be selected for 5V or 12V using JP10.

COM2 (RS422) labelled "B" on DB9 Cable Connector					
DB44 Pin #	DB9 Pin #	Def.	DB44 Pin #	DB9 Pin #	Def.
11	1	TXD-	12	2	TXD+
13	3	RXD+	14	4	RXD-
15	5	GND	16	6	RTS-
17	7	RTS#	18	8	CTS+
19	9	CTS-	20		GND

COM2 (RS485) labelled "B" on DB9 Cable Connector					
DB44 Pin #	DB9 Pin #	Def.	DB44 Pin #	DB9 Pin #	Def.
11	1	TXD-	12	2	TXD+
		RXD-			RXD+
13	3	Reserved	14	4	Reserved
15	5	Reserved	16	6	Reserved
17	7	Reserved	18	8	Reserved
19	9	Reserved	20		Reserved

Connector size: 2x5 (2.0mm -M-180)

Connector location: CN6

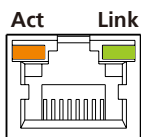


Pin	Definition	Pin	Definition
1	COM5_DCD	2	COM5_RXD
3	COM5_TXD	4	COM5_DTR
5	GND	6	COM5_DSR
7	COM5_RTS	8	COM5_CTS
9	COM5_RI	10	GND

LAN Ports

Connector size: RJ45 port with LEDs

Connector location: CN8B (LAN1)



Act	Status
Orange Blinking	Data Activity
Off	No Activity

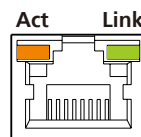
Link	Status
Green Always Lighted	Linked
Off	No Link

Pin	Definition	Pin	Definition
09	LAN1_M0P	10	LAN1_M0N
11	LAN1_M1P	12	LAN1_M2P
13	LAN1_M2N	14	LAN1_M1N
15	LAN1_M3P	16	LAN1_M3N
17	LAN1_LED1P	18	LAN1_LED_ACT#
19	LAN1_LED2P	20	LAN1_LINK#
21	GND	24	GND
25	GND	28	GND

LAN2 Ports

Connector size: RJ45 port with LEDs

Connector location: CN9B (LAN2)



Act	Status
Orange Blinking	Data Activity
Off	No Activity

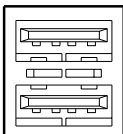
Link	Status
Green Always Lighted	Linked
Off	No Link

Pin	Definition	Pin	Definition
09	LAN2_M0P	10	LAN2_M0N
11	LAN2_M1P	12	LAN2_M2P
13	LAN2_M2N	14	LAN2_M1N
15	LAN2_M3P	16	LAN2_M3N
17	LAN2_LED1P	18	LAN2_LED_ACT#
19	LAN2_LED2P	20	LAN2_LINK#
21	GND	24	GND
25	GND	28	GND

USB Ports

Connector size: Dual USB port

Connector location: CN8A

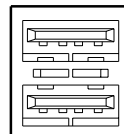


Pin	Definition	Pin	Definition
1	VCC5	5	VCC5
2	USB0-	6	USB1-
3	USB0+	7	USB1+
4	GND	8	GND
22	GND	23	GND
26	GND	27	GND

USB Ports

Connector size: Dual USB port

Connector location: CN9A

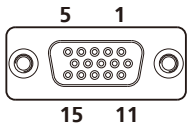


Pin	Definition	Pin	Definition
1	VCC5	5	VCC5
2	USB2-	6	USB3-
3	USB2+	7	USB3+
4	GND	8	GND
22	GND	23	GND
26	GND	27	GND

VGA Port

Connector size: DB-15 port, 15-pin D-Sub

Connector location: CN10B

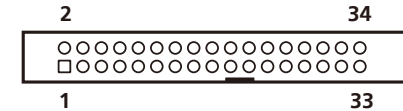
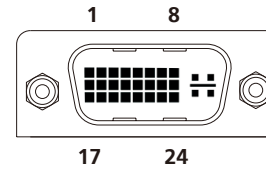


Pin	Description	Pin	Description	Pin	Description
1	RED_VGA	2	GREEN_VGA	3	BLUE_VGA
4	DVI_GND	5	DVI_GND	6	DVI_GND
7	DVI_GND	8	DVI_GND	9	VGA_+5V
10	DVI_GND	11	DVI_GND	12	DATA_V
13	HS_VGA	14	VS_VGA	15	CLK_V
MH3	DVI_GND	MH4	DVI_GND		

DVI-I Port

Connector size: 30-pin D-Sub, 2.0mm-M-180

Connector location: CN10A

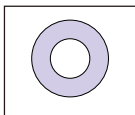


Pin	Function	Pin	Function
01	HDMI_DATA2_N	2	HDMI_DATA2_P
03	GND	4	NC
05	DDC_DATA	6	HDMI_DDC_CLK
07	HDMI	8	DDC_VSYNC_VGA
09	HDMI_DATA1_N	10	HDMI_DATA1_P
11	GND	12	NC
13	NC	14	VCC5
15	GND	16	HDMIC_HPD
17	HDMI_DATA0_N	18	HDMI_DATA0_P
19	GND	20	DDC_DATA_VGA
21	DDC_CLK_VGA	22	NC
23	HDMI_CLK_P	24	HDMI_CLK_N
C1	RED_VGA	C2	GREEN_VGA
C3	BLUE_VGA	C4	HSYNC_VGA
C5A	GND	C5B	GND

Speaker-out Jack

Connector size: 5-pin jack, 25.9x12.6x17.0mm

Connector location: CN12B

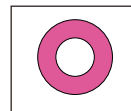


Pin	Definition
22	LINE_OUT_L
23	GND
24	LINE_JD
25	LINE_OUT_R

Mic-in Jack

Connector size: 5-pin jack, 25.9x12.6x17.0mm

Connector location: CN12A



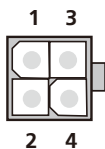
Pin	Definition
1	GND
2	MIC_OUT-L
3	GND
4	MIC_JD
5	MIC_OUT-R

Internal Connectors

ATX Power Output Connector

Connector size: 2x2

Connector location: CON1



Pin	Definition
1	GND
2	GND
3	VIN
4	VIN

CMOS Clear

Connector size: 1x3 (2.54mm-M-180)

Connector location: JP4



Pin	Definition
1	RTC
2	RTCRST#
3	CLR_CMOS

Reset Connector

Connector size: 1x2 (JST 2.5mm-M-90)

Connector location: J3



Pin	Definition
1	SYS_RESET#
2	GND

SMBus Pin Header

Connector size: 1x3 (2.54mm-M-180)

Connector location: J9



Pin	Definition
1	SMB_CLK
2	SMB_DATA
3	GND

LVDS Power Select

Connector size: 1x3 (2.54mm-M-180)

Connector location: JP1

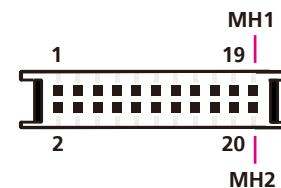


Pin	Definition
1	VCC5
2	PANEL_VDD
3	VCC3

LVDS Channel A Connector

Connector size: LCD-1.25mm-M-180

Connector location: CN2

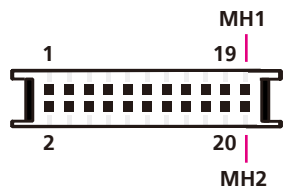


Pin	Definition	Pin	Definition
1	L_DDC_CLK	2	L_DDC_DATA
3	PANEL_VDD	4	LA_DATAP0
5	LA_DATAP3	6	LA_DATAN0
7	LA_DATAN3	8	PANEL_VDD
9	GND	10	LA_DATAP1
11	LA_CLKP	12	LA_DATAN1
13	LA_CLKN	14	GND
15	GND	16	+12V
17	LA_DATAP2	18	+12V
19	LA_DATAN2	20	GND

LVDS Channel B Connector

Connector size: LCD-1.25mm-M-180

Connector location: CN1

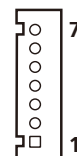


Pin	Definition	Pin	Definition
1	L_DDC_CLK	2	L_DDC_DATA
3	PANEL_VDD	4	LB_DATAP0
5	LB_DATAP3	6	LB_DATAN0
7	LB_DATAN3	8	PANEL_VDD
9	GND	10	LB_DATAP1
11	LB_CLKP	12	LB_DATAN1
13	LB_CLKN	14	GND
15	GND_LVDS	16	+12V
17	LB_DATAP2	18	+12V
19	LB_DATAN2	20	GND

LVDS Backlight Connector

Connector size: 1x7 (JST-2.5mm-M-180)

Connector location: J2



Pin	Definition
1	VCC5
2	+12V
3	+12V
4	BKLTCTL
5	GND
6	GND
7	BKLTEN

CD-in Connector

Connector size: 1x4 (2.54mm-M-180)

Connector location: J14



Pin	Definition
1	CD_L
2	GND
3	GND
4	CD_R

SATA1 Port

Connector size: Standard Serial ATAII 7P (1.27mm, SATA-M-180)

Connector location: CN13



Pin	Definition
1	GND
2	SATA_TXP0
3	SATA_TXN0
4	GND
5	SATA_RXN0
6	SATA_RXP0
7	GND

SATA2 Port

Connector size: Standard Serial ATAII 7P (1.27mm, SATA-M-180)

Connector location: CN14

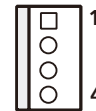


Pin	Definition
1	GND
2	SATA_TXP1
3	SATA_TXN1
4	GND
5	SATA_RXN1
6	SATA_RXP1
7	GND

SATA1 Power Connector

Connector size: 4-pin Wafer, 2.54mm-M-180

Connector location: CN16

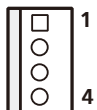


Pin	Definition
1	+12V
2	GND
3	GND
4	VCC5

SATA2 Power Connector

Connector size: 4-pin Wafer, 2.54mm-M-180

Connector location: CN15

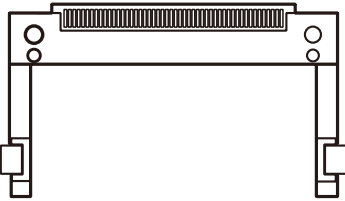


Pin	Definition
1	+12V
2	GND
3	GND
4	VCC5

CompactFlash

Connector type: 2x25 (2.5mm)

Connector location: CN7



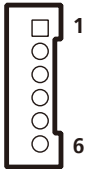
Pin	Description	Pin	Description
1	GND	2	PDD3
3	PDD4	4	PDD5
5	PDD6	6	PDD7
7	-PCS0	8	GND
9	GND	10	GND
11	GND	12	GND
13	VCC5	14	GND
15	GND	16	GND
17	GND	18	PDA2
19	PDA1	20	PDA0
21	PDD0	22	PDD1
23	PDD2	24	NC
25	CF_CD#2	26	CF_CD#1
27	PDD11	28	PDD12

Pin	Description	Pin	Description
29	PDD13	30	PDD14
31	PDD15	32	-PCS1
33	NC	34	-PDIOR
35	-PDIOW	36	VCC5
37	IRQ14	38	VCC5
39	CF_CSEL#	40	NC
41	CF_RST#	42	PHDRDY
43	PDDREQ	44	PDDACK
45	IDE_ACT#	46	PPDIAG#
47	PDD8	48	PDD9
49	PDD10	50	GND

USB4 Connector

Connector size: 6-pin boxed header, JST-2.0mm-M-180

Connector location: J5

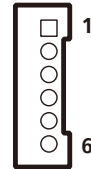


Pin	Definition
1	VCC5
2	USB6-
3	USB6+
4	USB7-
5	USB7+
6	GND

USB5 Connector

Connector size: 6-pin boxed header, JST-2.0mm-M-180

Connector location: J6

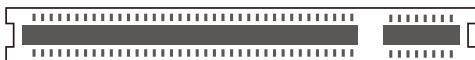


Pin	Definition
1	VCC5
2	USB8-
3	USB8+
4	USB9-
5	USB9+
6	GND

PCI Connector

Connector size: DF13-40DS-1.25DSA

Connector location: CN17



Pin	Definition	Pin	Definition
A	GND	B	PDD3
A	PDD5	B	PDD6
A1	PCI_SLOT_TRST#	B1	-12V
A2	+12V	B2	PCI_SLOT_TCK
A3	PCI_SLOT_TMS	B3	GND
A4	PCI_SLOT_TDI	B4	NC
A5	VCC5	B5	VCC5
A6	PCI_SLOT_IRQ#0	B6	VCC5
A7	PCI_SLOT_IRQ#2	B7	PCI_SLOT_IRQ#1
A8	VCC5	B8	PCI_SLOT_IRQ#3
A9	PCI_SLOT_RSV1	B9	PCI_SLOT_PRSNT1#
A10	VCC5	B10	PCI_SLOT_RSV5
A11	PCI_SLOT_RSV2	B11	PCI_SLOT_PRSNT2#
A12	GND	B12	GND
A13	GND	B13	GND
A14	3VSB	B14	PCI_CLK1
A15	PCI_SLOT_RST#	B15	GND
A16	VCC5	B16	PCI_CLK0
A17	PCI_GNT#0	B17	GND

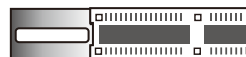
Pin	Definition	Pin	Definition
A18	GND	B18	PCI_SLOT_REQ#0
A19	PCI_SLOT_PME#	B19	VCC5
A20	PCI_AD30	B20	PCI_AD31
A21	VCC3	B21	PCI_AD29
A22	PCI_AD28	B22	GND
A23	PCI_AD26	B23	PCI_AD27
A24	GND	B24	PCI_AD25
A25	PCI_AD24	B25	VCC3
A26	PCI_SLOT_IDSEL	B26	PCI_CBE#3
A27	VCC3	B27	PCI_AD23
A28	PCI_AD22	B28	GND
A29	PCI_AD20	B29	PCI_AD21
A30	GND	B30	PCI_AD19
A31	PCI_AD18	B31	VCC3
A32	PCI_AD16	B32	PCI_AD17
A33	VCC3	B33	PCI_CBE#2
A34	PCI_FRAME#	B34	GND
A35	GND	B35	PCI_IRDY#
A36	PCI_TRDY#	B36	VCC3
A37	GND	B37	PCI_DEVSEL#
A38	PCI_STOP#	B38	GND
A39	VCC3	B39	PCI_LOCK#
A40	SMBCLK_PCI	B40	PCI_PERR#
A41	SMBDATA_PCI	B41	VCC3
A42	GND	B42	PCI_SERR#

Pin	Definition	Pin	Definition
A43	PCI_PAR	B43	VCC3
A44	PCI_AD15	B44	PCI_CBE#1
A45	VCC3	B45	PCI_AD14
A46	PCI_AD13	B46	GND
A47	PCI_AD11	B47	PCI_AD12
A48	GND	B48	PCI_AD10
A49	PCI_AD9	B49	GND
A52	PCI_CBE#0	B52	PCI_AD8
A53	VCC3	B53	PCI_AD7
A54	PCI_AD6	B54	VCC3
A55	PCI_AD4	B55	PCI_AD5
A56	GND	B56	PCI_AD3
A57	PCI_AD2	B57	GND
A58	PCI_AD0	B58	PCI_AD1
A59	VCC5	B59	VCC5
A60	PU1_REQ64#	B60	PU1_ACK64#
A61	VCC5	B61	VCC5
A62	VCC5	B62	VCC5

PCIe x1 Slot

Connector size: PCIe x1

Connector location: CON2



Pin	Definition	Pin	Definition
A1	PRSNT1#	B1	+12V
A2	+12V	B2	+12V
A3	+12V	B3	+12V
A4	GND	B4	GND
A5	NC	B5	SMB_CLK
A6	NC	B6	SMB_DATA
A7	NC	B7	GND
A8	NC	B8	VCC3
A9	VCC3	B9	NC
A10	VCC3	B10	3VSB
A11	PERST#	B11	WAKE#
A12	GND	B12	NC
A13	PCIE_CLK_P	B13	GND
A14	PCIE_CLK_N	B14	TXP3
A15	GND	B15	TXN3
A16	RXP3	B16	GND
A17	RXN3	B17	NC
A18	GND	B18	GND

COM4 RI Pin Header

Connector size: 1x5 (2.0mm -M-180)

Connector location: J10

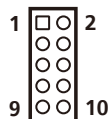


Pin	Definition
1	VCC5
2	COM4_RI_T
3	+12V
4	COM4_RI_T
5	COM4_RI

GPIO Connector

Connector size: 10-pin header, 2x5 (2.0mm -M-180)

Connector location: JP3



Pin	Definition	Pin	Definition
1	VCC5	2	GND
3	GPO1	4	GPI1
5	GPO2	6	GPI2
7	GPO3	8	GPI3
9	GPO4	10	GPI4

GPIO LED Connector

Connector size: 2x2 (2.0mm -M-180)

Connector location: JP2

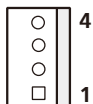


Pin	Definition
1	GPO_LED0
2	GND
3	GPO_LED1
4	GND

Smart Fan1 Connector

Connector size: 4-pin Wafer, 2.54mm-M-180

Connector location: J13



Pin	Definition
1	GND
2	+12V
3	CPUFANIN
4	CPUFANOUT

Smart Fan2 Connector

Connector size: 4-pin Wafer, 2.54mm-M-180

Connector location: J1



Pin	Definition
1	GND
2	+12V
3	SYSFANIN
4	SYSFANOUT

Power Push Button

Connector location: SW1

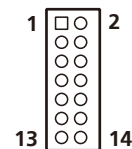


Pin	Definition
1	GND
2	PWRBT
3	PWRBT
4	GND
A1	PWRLED
C1	PWRLED
MH1	NC
MH2	NC

External LED Pin Header

Connector size: 2x7 (2.54mm -M-180)

Connector location: J8



Pin	Description	Pin	Description
1	LED_PWRN	2	LED_PWRP
3	HD_LEDN	4	LED_HDDP
5	LAN1_LINK#	6	LAN1_LINKP
7	LAN1_LED_ACT#	8	LAN1_ACTP
9	LAN2_LINK#	10	LAN2_LINKP
11	LAN2_LED_ACT#	12	LAN2_ACTP
13	NC	14	NC

CHAPTER 4: HARDWARE INSTALLATION

Removing the Chassis Cover

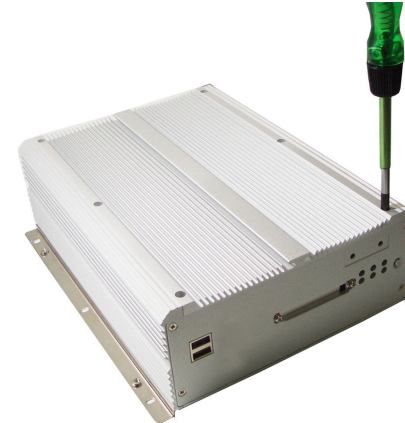


Prior to removing the chassis cover, make sure the unit's power is off and disconnected from the power sources to prevent electric shock or system damage.

1. The screws on the cover are used to secure the cover to the chassis.



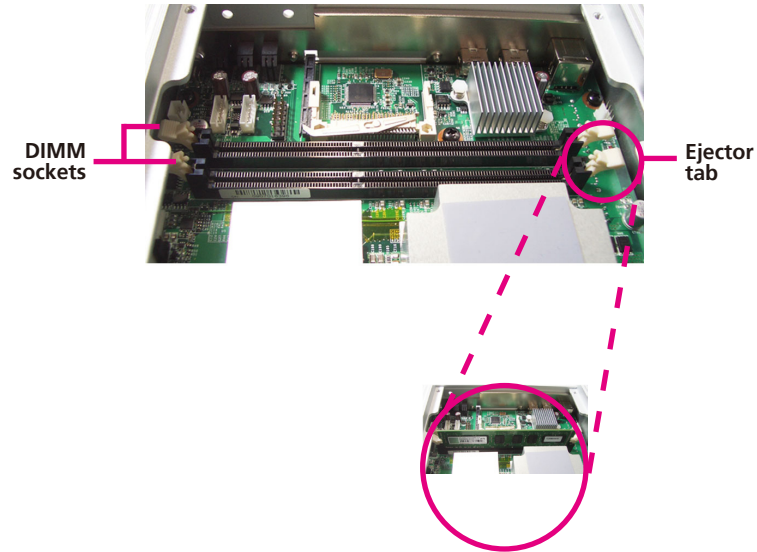
2. Remove these screws and put them in a safe place for later use.



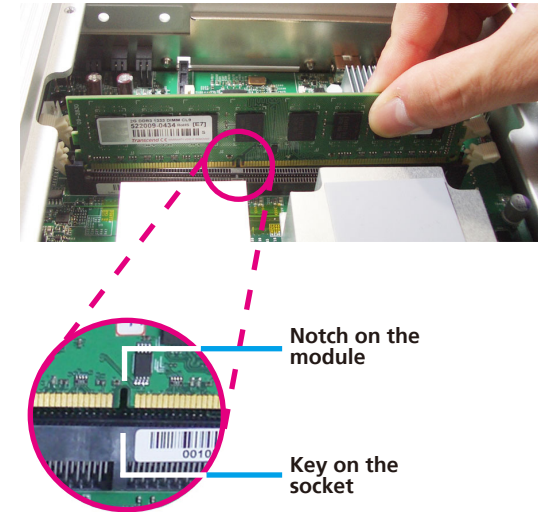
3. Lift up the cover then remove it from the chassis.

Installing a DIMM

1. Push the ejector tabs which are at the ends of the socket outward. This indicates that the socket is unlocked.



2. Note how the module is keyed to the socket. Grasping the module by its edges, align the module with the socket so that the "notch" on the module is aligned with the "key" on the socket. The key ensures the module can be plugged into the socket in only one direction.

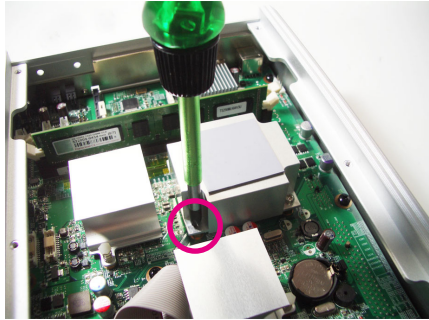


3. Seat the module vertically, pressing it down firmly until it is completely seated in the socket. The ejector tabs at the ends of the socket will automatically snap into the locked position to hold the module in place.

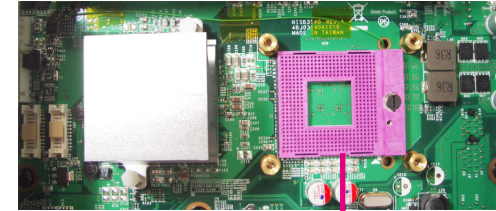


Installing the CPU

1. Loosen the mounting screws that secure the heat sink to the chassis.



2. The CPU socket is readily accessible after you have removed the heat sink.

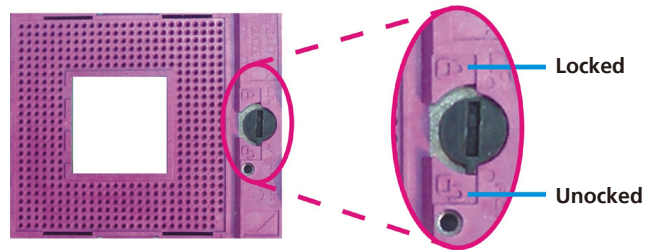


CPU socket

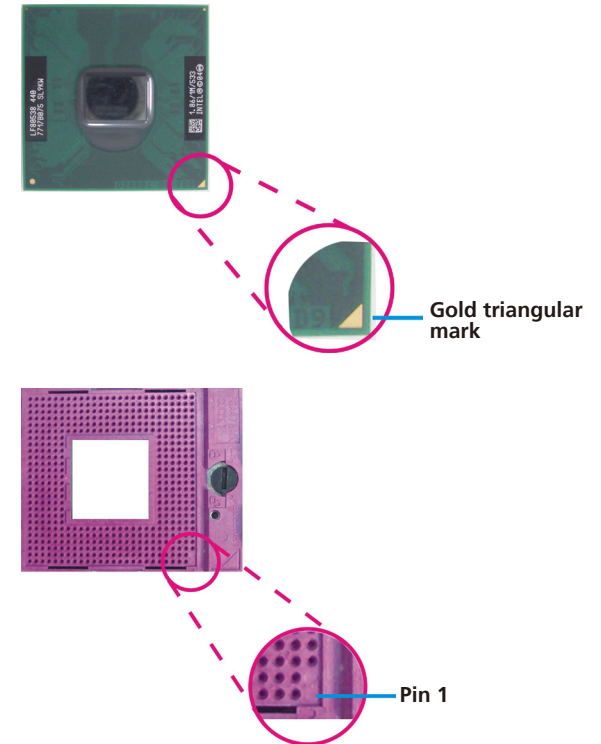


- Make sure all power cables are unplugged before you install the CPU.
- The CPU socket must not come in contact with anything other than the CPU. Avoid unnecessary exposure.

3. Use a screwdriver to turn the screw to its unlocked position.

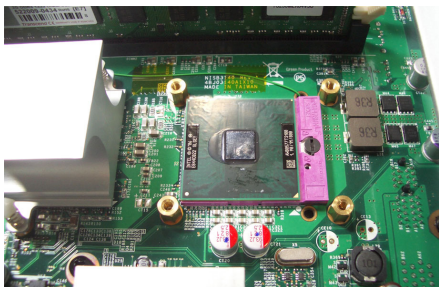


4. Position the CPU above the socket. The gold triangular mark on the CPU must align with pin 1 of the CPU socket.



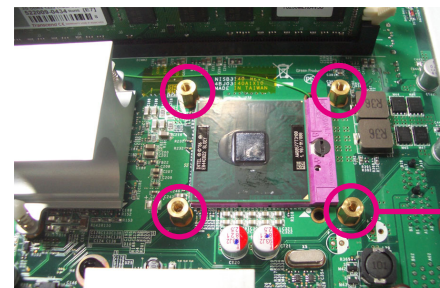
Handle the CPU by its edges and avoid touching the pins.

5. Insert the CPU into the socket until it is seated in place. The CPU will fit in only one orientation and can easily be inserted without exerting any force. Use a screwdriver to turn the screw to its locked position.

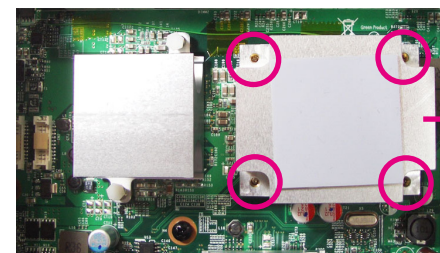


Do not force the CPU into the socket. Forcing the CPU into the socket may bend the pins and damage the CPU.

6. Before you install the heat sink, apply thermal paste onto the top of the CPU. Do not spread the paste all over the surface. When you later place the heat sink on top of the CPU, the compound will disperse evenly.
7. Align the mounting holes of the heat sink with the mounting nuts on the board then secure the heat sink with the screws you removed earlier.



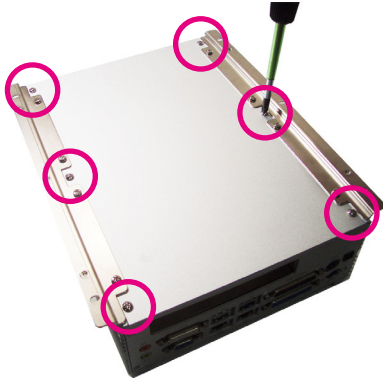
Mounting nut



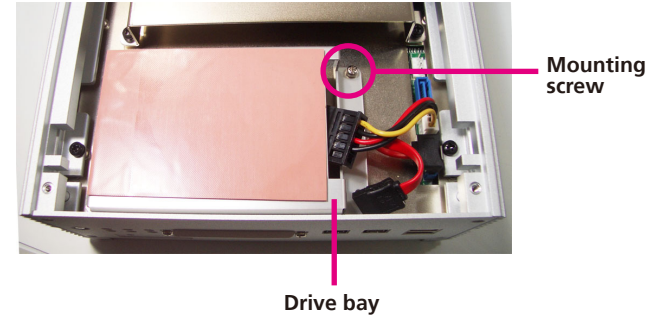
Heat sink

Installing a SATA Hard Drive

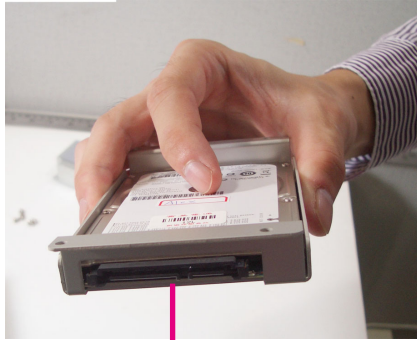
1. With the bottom side of the chassis facing up, remove the screws of the bottom cover.



2. Remove the 4 mounting screws that secure the drive bay to the chassis then remove the drive bay. The drive bay is used to hold a SATA hard drive.

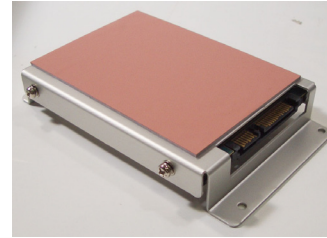


3. Place the SATA hard drive on the drive bay. Make sure the connector side of the SATA drive is facing the opening of the drive bay.

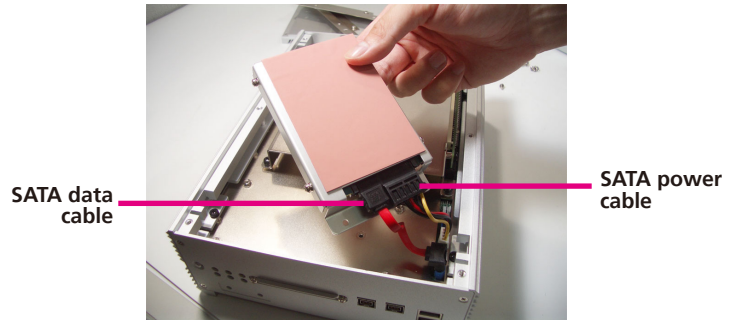


Connector side of the SATA drive

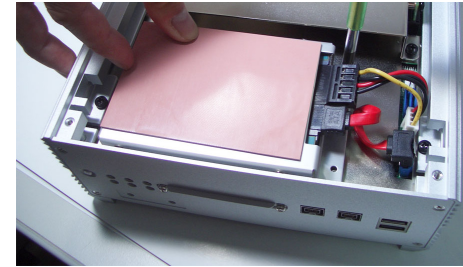
4. Align the mounting holes that are on the sides of the SATA drive with the mounting holes on the drive bay then use the provided mounting screws to secure the drive in place.



5. Connect the SATA data cable and SATA power cable to the connectors on the SATA drive.



6. Secure the drive into the chassis.



APPENDIX A: BIOS SETUP

This chapter describes how to use the BIOS setup program for NET 3140P2E-ECM. The BIOS screens 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 such items 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 intimately 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.

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 allows you to enter Setup. Another way to enter Setup is to power on the computer and wait for the following message during the POST:

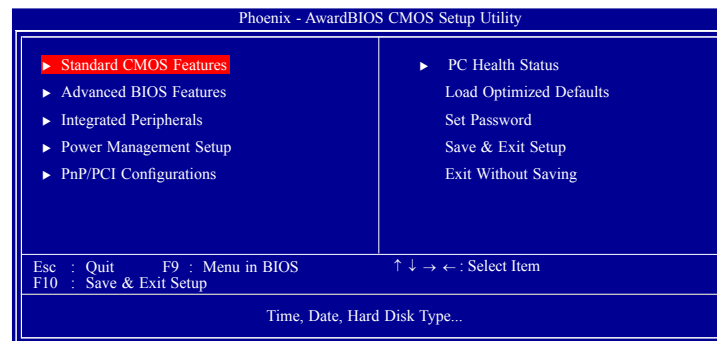
TO ENTER SETUP BEFORE BOOT

PRESS <CTRL-ALT-ESC>

Press the key to enter Setup:

BIOS Main Menu

Once you enter Award BIOS CMOS Setup Utility, the Main Menu will appear on screen. The main menu allows you to select from eight setup functions and two exit choices. Use the arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.



The following table lists the available options on the main menu.

Menu	Description
Standard CMOS Features	Use this menu for basic system configuration.
Advanced BIOS Features	Use this menu to set the advanced features available on the system.
Integrated Peripherals	Use this menu to specify your settings for integrated peripherals.
Power Management Setup	Use this menu to specify your settings for power management.
PnP/PCI Configurations	Appears if your system supports Plug and Play and PCI Configuration.
PC Health Status	Displays CPU, System Temperature, Fan Speed, and System Voltages Value.
Load Optimized Defaults	Use this menu to load the BIOS default values, that is, factory settings for optimum system performance. While Award has designed the custom BIOS to maximize performance, the factory has the option to change these defaults to meet their needs.
Set Password	Enables you to change, set, or disable the supervisor or user password.
Save & Exit Setup	Saves CMOS value changes to CMOS and exits setup
Exit Without Saving	Ignores all CMOS value changes and exits setup.

Getting Help

The BIOS Setup program provides descriptions of the options available on the menu.

- If you are on the main menu, a description of the highlighted option can be found at the bottom of the screen.
- If you are on the Status Page or Option Page setup menu, a description of the highlighted option can be found on the right side of the screen under the heading Item Help.

Using the Control Keys

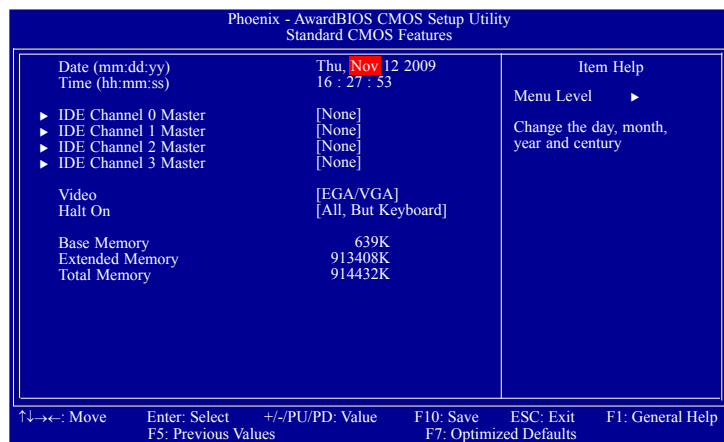
The table below lists the keys that help you navigate the setup program.

Use This Key	To Do This
Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item to the left
Right arrow	Move to the item to the right
Esc key	Main Menu: Quit without saving changes to CMOS Status Option Page Setup Menus: Exit current page and return to Main Menu.
Enter Key	Select or Accept an Item
PgUp/plus key	Increase the numeric value or make changes
PgDn/minus key	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu

Use This Key	To Do This
F2/Shift + F2 key	Change color from total 16 colors. F2 to select color forward, (Shift) F2 to select color backward
F5 key	Restore the previous CMOS value from CMOS (only for Option Page Setup Menu)
F6 key	Load the default CMOS value from BIOS default table (only for Option Page Setup Menu)
F7 key	Load the Setup default value (only for Option Page Setup Menu)
F9 Key	Menu in BIOS
F10 key	Save all the CMOS changes (only for Main Menu)

BIOS Setup Utility

Standard CMOS Features



Date

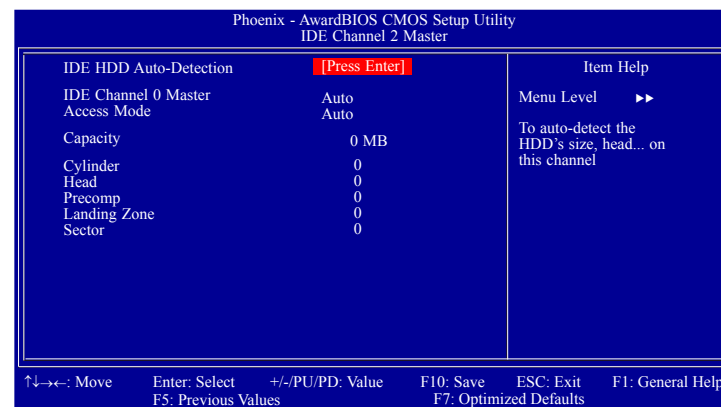
The date format is <day>, <month>, <date>, <year>. Day displays a day, from Sunday to Saturday. Month displays the month, from January to December. Date displays the date, from 1 to 31. Year displays the year, from 1999 to 2099.

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.

IDE Channel 0 Master and IDE Channel 3 Master

To configure the IDE drives, move the cursor to a field then press <Enter>. The following screen will appear.



IDE HDD Auto-Detection

Detects the parameters of the drive. The parameters will automatically be shown on the screen.

IDE Channel 0 Master / IDE Channel 0 Slave

If you select "Auto", the BIOS will auto-detect the HDD & CD-ROM drive at the POST stage and show the IDE for the HDD & CD-ROM drive. If a hard disk has not been installed, select "None".

Access Mode

For hard drives larger than 528MB, you would typically select the LBA type. Certain operating systems require that you select CHS or Large. Please check your operating system's manual or Help desk on which one to select.

Capacity

Displays the approximate capacity of the disk drive. Usually the size is slightly greater than the size of a formatted disk given by a disk checking program.

Cylinder

This field displays the number of cylinders.

Head

This field displays the number of read/write heads.

Precomp

This field displays the number of cylinders at which to change the write timing.

Landing Zone

This field displays the number of cylinders specified as the landing zone for the read/write heads.

Sector

This field displays the number sectors per track.

Video

This field selects the type of video adapter used for the primary system monitor. Although secondary monitors are supported, you do not have to select the type. The default setting is EGA/VGA.

EGA/VGA

Enhanced Graphics Adapter/Video Graphics Array. For EGA, VGA, SVGA and PGA monitor adapters.

CGA 40

Color Graphics Adapter. Power up in 40-column mode.

CGA 80

Color Graphics Adapter. Power up in 80-column mode.

Mono

Monochrome adapter. Includes high resolution monochrome adapters.

Halt On

This field determines whether the system will stop if an error is detected during power up. The default setting is All Errors.

No Errors

The system boot will not stop for any errors detected.

All Errors

The system boot will stop whenever the BIOS detects a non-fatal error.

All, But Keyboard

The system boot will not stop for a keyboard error; it will stop for all other errors.

Base Memory

Displays the amount of base (or conventional) memory installed in the system. The value of the base memory is typically 512K for systems with 512K memory installed on the motherboard or 640K for systems with 640K or more memory installed on the motherboard.

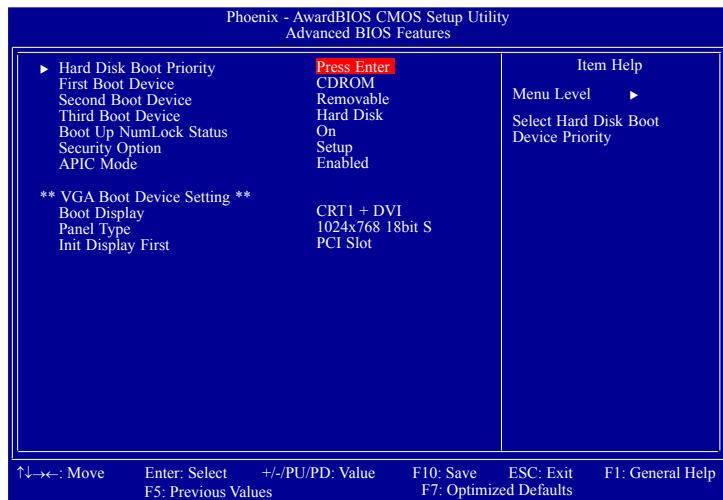
Extended Memory

Displays the amount of extended memory detected during boot-up.

Total Memory

Displays the total memory available in the system.

Advanced BIOS Features



Hard Disk Boot Priority

This field is used to select the boot sequence of the hard drives. Move the cursor to this field then press <Enter>. Use the Up or Down arrow keys to select a device then press <+> to move it up or <-> to move it down the list.

First Boot Device, Second Boot Device and Third Boot Device

Select the drive to boot first, second and third in the “First Boot Device” “Second Boot Device” and “Third Boot Device” fields respectively. The BIOS will boot the operating system according to the sequence of the drive selected.

The options are:

Hard Disk
CDROM
USB-FDD
USB-ZIP
USB-CDROM
LAN
Disabled

Boot Up NumLock Status

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.

Security Option

This field determines when the system will prompt for the password - everytime the system boots or only when you enter the BIOS setup. Set the password in the Set Supervisor/User Password submenu.

System

The system will not boot and access to Setup will be denied unless the correct password is entered at the prompt.

Setup

The system will boot, but access to Setup will be denied unless the correct password is entered at the prompt.

APIC Mode

This field is used to enable or disable the APIC mode.

Boot Display

This field is used to select the type of display to use when the system boots.

CRT1

LFP

CRT1 + LFP

CRT2

CRT1 + CRT2

DVI

CRT1+DVI

Panel Type

This field is used to select the type of panel that you are using. The options are:

640x480 18bit S

800x600 18bit S

1024x768 18bit S

1280x1024 18bit D

1400x1050 18bit D

1280x800 24bit D



Init Display First

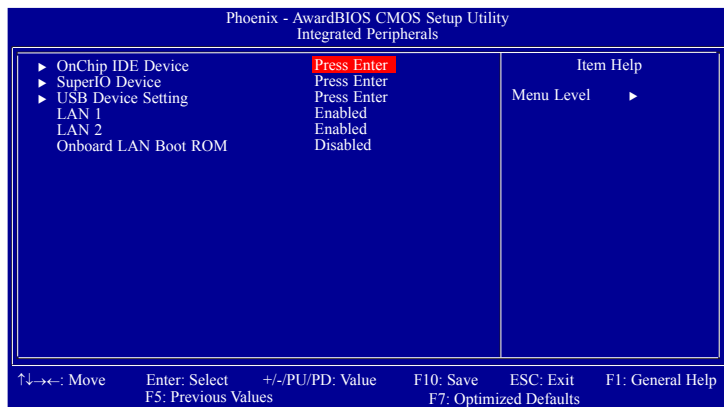
Onboard

When the system boots, it will first initialize the onboard VGA.

PCI Slot

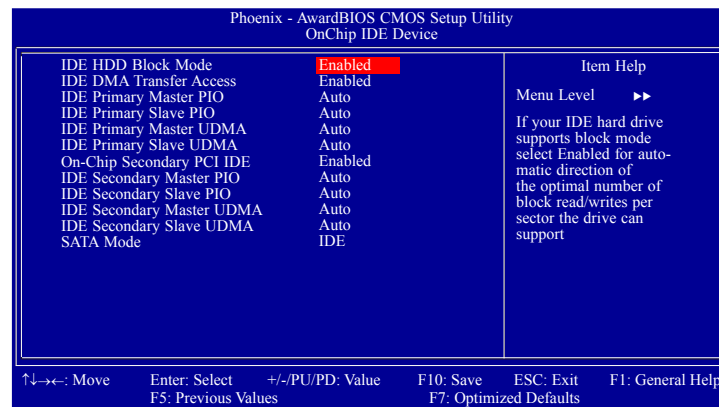
When the system boots, it will first initialize PCI.

Integrated Peripherals



OnChip IDE Device

Move the cursor to this field and press <Enter>. The following screen will appear.



IDE HDD Block Mode

Enabled

The IDE HDD uses the block mode. The system BIOS will check the hard disk drive for the maximum block size the system can transfer. The block size will depend on the type of hard disk drive.

Disabled

The IDE HDD uses the standard mode.

IDE DMA Transfer Access

This field, when Enabled, will enhance the IDE DMA transfer of an IDE hard disk drive.

IDE Primary Master/Slave PIO and IDE Secondary Master/Slave PIO

PIO means Programmed Input/Output. Rather than have the BIOS issue a series of commands to effect a transfer to or from the disk drive, PIO allows the BIOS to tell the controller what it wants and then let the controller and the CPU perform the complete task by themselves. Your system supports five modes, 0 (default) to 4, which primarily differ in timing. When Auto is selected, the BIOS will select the best available mode after checking your drive.

Auto

The BIOS will automatically set the system according to your hard disk drive's timing.

Mode 0-4

You can select a mode that matches your hard disk drive's timing. Caution: Do not use the wrong setting or you will have drive errors.

IDE Primary Master/Slave UDMA and IDE Secondary Master/Slave UDMA

These fields allow you to set the Ultra DMA in use. When Auto is selected, the BIOS will select the best available option after checking your hard drive or CD-ROM.

Auto

The BIOS will automatically detect the settings for you.

Disabled

The BIOS will not detect these categories.

SATA Mode

IDE

This option configures the Serial ATA drives as Parallel ATA storage devices.

AHCI

This option allows the Serial ATA devices to use AHCI (Advanced Host Controller Interface).

SuperIO Device

This field is used to configure the I/O devices installed in the system.

USB Device Setting

This field is used to configure the USB devices installed in the system.

LAN 1 and LAN 2

These fields are used to enable or disable the onboard LAN.

Onboard LAN Boot ROM

Enable this field if you wish to use the boot ROM (instead of a disk drive) to boot-up the system and access the local area network directly.

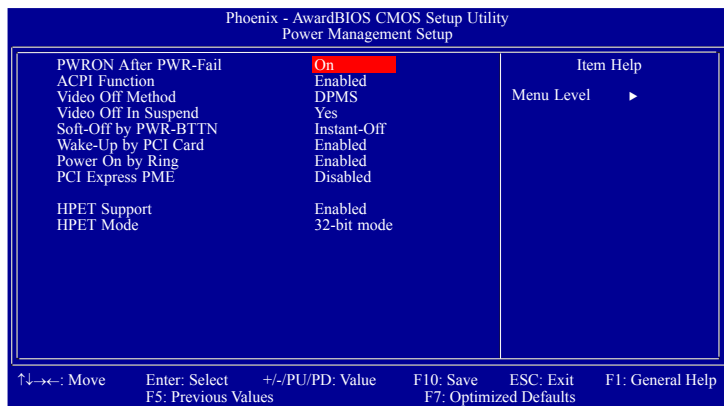
If you wish to change the boot ROM's settings, type the <Shift> and <F10> keys simultaneously when prompted during boot-up. Take note: you will be able to access the boot ROM's program (by typing <Shift> + <F10>) only when this field is enabled.

Power Management Setup

Power Management Setup lets you control the system power. The system has various power-saving modes — including powering down the hard disk, turning off the video, suspending to RAM, and software power down — that allows the system to automatically resume by certain events.

The power-saving modes can be controlled by timeouts. If the system is inactive for a time, the timeouts begin counting. If inactivity continues and reaches the defined timeout period, the system enters a power saving mode. If any item in the list of Reload Global Timer Events is enabled, then any activity on that item will reset the timeout counters to zero.

If the system is suspended or has been powered down by software, it can be resumed by a wake up call that is generated by incoming traffic to a modem, a LAN card, a PCI card, or a fixed alarm on the system real-time clock.



PWRON After PWR-Fail

Off

When power returns after an AC power failure, the system's power is off. You must press the Power button to power-on the system.

On

When power returns after an AC power failure, the system will automatically power-on.

Former-Sts

When power returns after an AC power failure, the system will return to the state where you left off before power failure occurs. If the system's power is off when AC power failure occurs, it will remain off when power returns. If the system's power is on when AC power failure occurs, the system will power-on when power returns.

ACPI Function

By default, the ACPI function is enabled. This function should be enabled only in operating systems that support ACPI.

Video Off Method

This determines the manner in which the monitor is blanked.

V/H SYNC + Blank

This selection will cause the system to turn off the vertical and horizontal synchronization ports and write blanks to the video buffer.

Blank Screen

This option only writes blanks to the video buffer.

DPMS Support

Initializes display power management signaling. Use this option if your video board supports it.

Video Off In Suspend

This field is used to activate the video off feature when the system enters the Suspend mode. The options are Yes and No.

Soft-Off by PWR-BTTN

This field allows you to select the method of powering off your system.

Delay 4 Sec.

Regardless of whether the Power Management function is enabled or disabled, if the power button is pushed and released in less than 4 sec, the system enters the Suspend mode. The purpose of this function is to prevent the system from powering off in case you accidentally “hit” or pushed the power button. Push and release again in less than 4 sec to restore. Pushing the power button for more than 4 seconds will power off the system.

Instant-Off

Pressing and then releasing the power button at once will immediately power off your system.

Wake-Up by PCI Card

Enabled

This field should be set to Enabled only if your PCI card such as LAN card or modem card uses the PCI PME (Power Management Event) signal to remotely wake up the system. Access to the LAN card or PCI card will cause the system to wake up. Refer to the card's documentation for more information.

Disabled

The system will not wake up despite access to the PCI card.

Power On By Ring

Set this field to Enabled to use the modem ring-on function. This will allow your system to power-on to respond to calls coming from an external modem.

PCI Express PME

This field is used to configure the PCI Express PME.

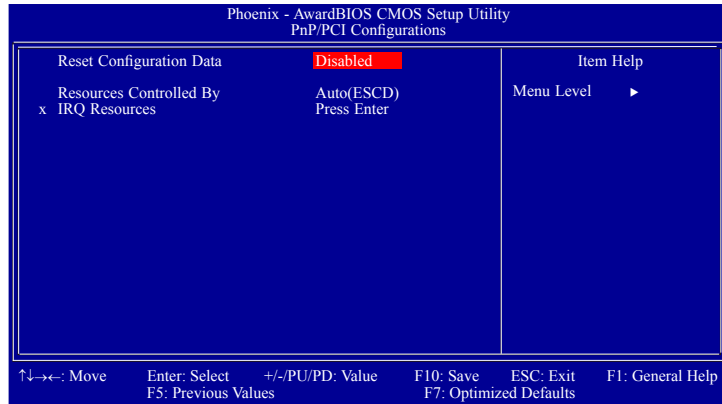
HPET Support

This field is used to enable or disable HPET.

HPET Mode

The options are 32-bit mode and 64-bit mode.

PnP/PCI Configurations



Reset Configuration Data

Enabled

The BIOS will automatically reset the Extended System Configuration Data (ESCD) once. It will then recreate a new set of configuration data.

Disabled

The BIOS will not reset the configuration data.

Resources Controlled By

The Award Plug and Play BIOS has the capability to automatically configure all of the boot and Plug and Play compatible devices.

Auto(ESCD)

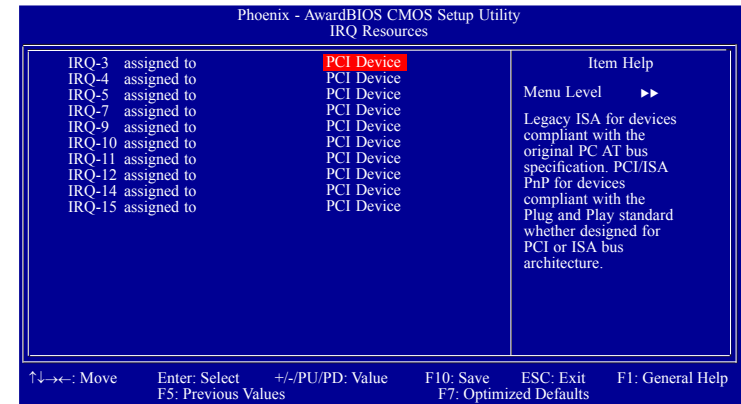
The system will automatically detect the settings for you.

Manual

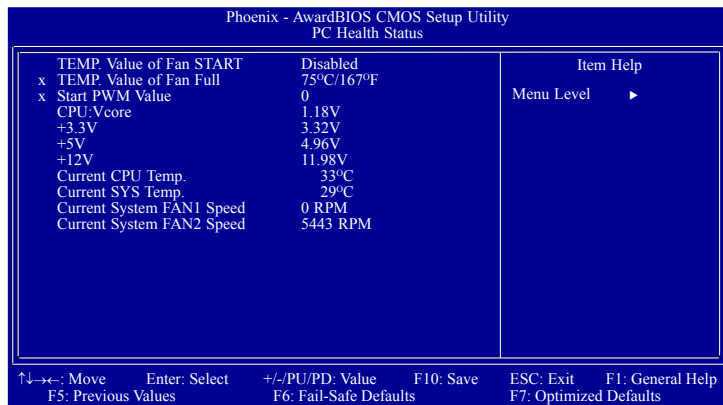
Choose the specific IRQ resources in the "IRQ Resources" field.

IRQ Resources

Set each system interrupt to either PCI Device or Reserved.



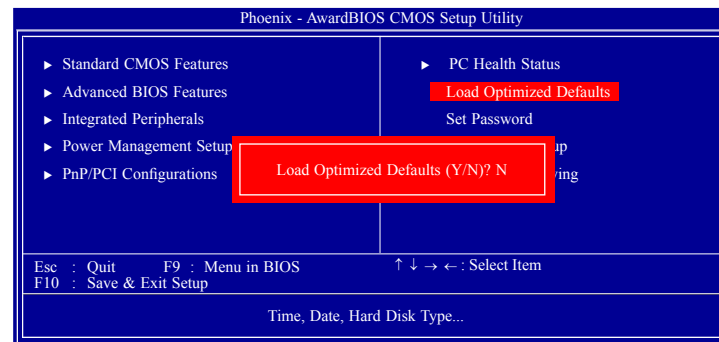
PC Health Status



CPU:Vcore to Current System FAN2 Speed

These fields will show the output voltage, temperature and fan speed of the monitored devices or components.

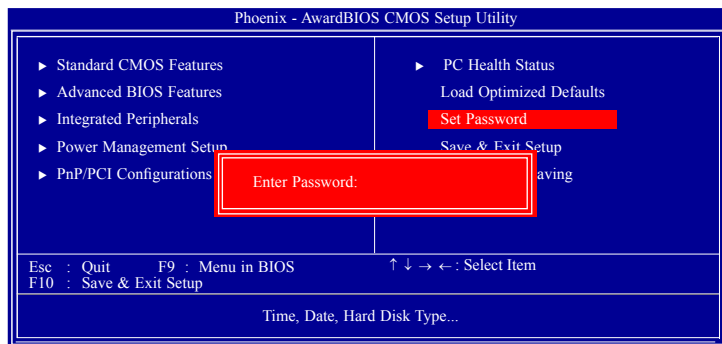
Load Optimized Defaults



This option opens a dialog box that lets you install optimized defaults for all appropriate items in the whole setup utility. Press the <Y> key and then <Enter> to install the defaults. Press the <N> key and then <Enter> if you do not want to install the defaults. The optimized defaults place demands on the system that may be greater than the performance level of the components, such as the CPU and the memory.

Fatal errors or instability may occur if you install the optimized defaults when your hardware does not support them. If you only want to install setup defaults for a specific option, select and display that option, and then press the <F7> key.

Set Password

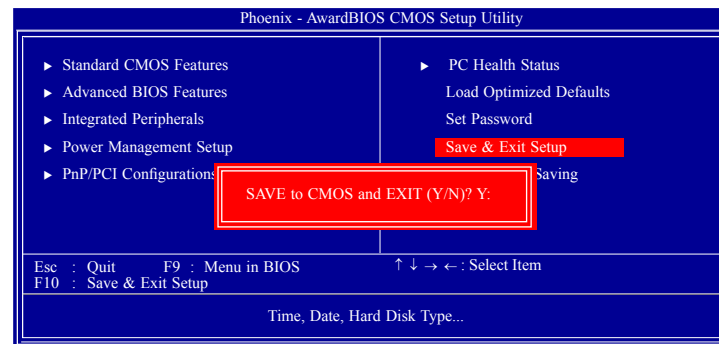


The User Password utility sets the password. The main board is shipped with the password disabled. If you want to change the password, you must first enter the current password, then at the prompt enter your new password. The password is case sensitive. You can use up to eight alphanumeric characters. Press <Enter> after entering the password. At the next prompt, confirm the new password by retyping it and pressing <Enter> again.

To disable the password function, highlight "Set Password" then press <Enter>, instead of typing in a new password. A message appears confirming that the password has been disabled. If you have set supervisor and user Password, only the supervisor password allows you to enter the BIOS setup program.

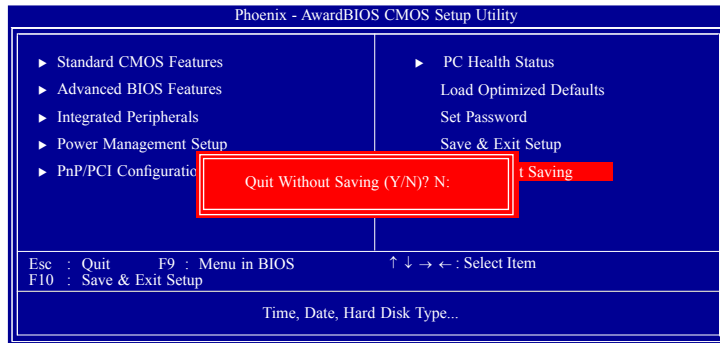
Note: If you forgot your password, the only way to solve this problem is to discharge the CMOS memory by turning power off and placing a shunt (jumper cap) on the RTC Clear jumper to short pin 2 and pin 3 for five seconds, then putting the shunt back to pin 1 and pin 2.

Save & Exit Setup



Selecting this option and pressing <Enter> will save the new setting information in the CMOS memory and continue with the bootup process.

Exit Without Saving



Selecting this option and pressing <Enter> will exit the Setup utility without recording any new values or changing old ones.

APPENDIX B: GPIO PROGRAMMING GUIDE

NISB3140 GPIO

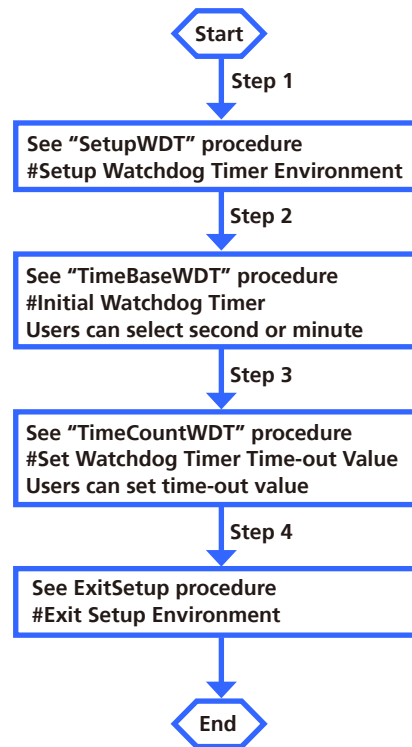
PIN	Description	PIN	Description
1	+5V	2	GND
3	GPO54	4	GPI50
5	GPO55	6	GPI51
7	GPO56	8	GPI52
9	GPO57	10	GPI53

IO base address : 800h

Bit0 : GPI50
 Bit1 : GP I51
 Bit2 : GP I52
 Bit3 : GP I53
 Bit4 : GPO54
 Bit5 : GPO55
 Bit6 : GPO56
 Bit7 : GPO57

1. Read/Write GPIO data by I/O port 804h

APPENDIX C: WATCHDOG TIMER SETTING



```

=====
SetupWDT      PROC
    mov     dx, 2eh
    mov     al, 087h
    out     dx, al
    nop
    nop
    mov     al, 01h
    out     dx, al
    nop
    nop
    mov     al, 55h
    out     dx, al
    nop
    nop
    out     dx, al          ;Write operations to special address port
(2E) for entering MB PnP Mode.

    mov     al, 07h
    out     2eh, al
    mov     al, 08h      ;Select logical device for Watch Dog.
    out     2fh, al
    ret
SetupWDT      ENDP

```

```

=====
TimeBaseWDT   PROC
    mov     al, 72h
    out     2eh, al
    mov     al, 40h      ;Set WDT reset upon KBRST#
    or      al, 00h      ;Here!! set 00h for second, set 80h for minute

```

```

    out     2fh, al
    ret
TimeBaseWDT   ENDP

```

```

=====
TimeCountWDT  PROC
    mov     al, 73h      ;WDT Time-out register.
    out     2eh, al
    mov     al, 03h      ;Here!! Set count 3.
    out     2fh, al
    ret
TimeCountWDT  ENDP

```

```

=====
ExitSetup PROC
    mov     dx, 2eh
    mov     al, 0AAh
    out     dx, al
ExitSetup ENDP
=====

```