



NEXCOM International Co., Ltd.

IoT Automation Solutions Business Group

PC-based Factory Automation System

NIFE 103

User Manual

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PREFACE

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Disclaimer

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Acknowledgements

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Regulatory Compliance Statements

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

Declaration of Conformity

FCC

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

CE

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

RoHS Compliance



NEXCOM RoHS Environmental Policy and Status Update

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

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

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

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

How to recognize NEXCOM RoHS Products?

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

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

Warranty and RMA

NEXCOM Warranty Period

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

NEXCOM Return Merchandise Authorization (RMA)

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

Repair Service Charges for Out-of-Warranty Products

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

Repair Service Charges for Out-of-Warranty Products

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System Level

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

Board Level

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

Warnings

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

Cautions

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

Safety Information

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

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

Installation Recommendations

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

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

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

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

Safety Precautions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a stable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection to protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Place the power cord in a way so that people will not step on it. Do not place anything on top of the power cord. Use a power cord that has been approved for use with the product and that it matches the voltage and current marked on the product's electrical range label. The voltage and current rating of the cord must be greater than the voltage and current rating marked on the product.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
 - a. The power cord or plug is damaged.
 - b. Liquid has penetrated into the equipment.
 - c. The equipment has been exposed to moisture.
 - d. The equipment does not work well, or you cannot get it to work according to the user's manual.
 - e. The equipment has been dropped and damaged.
 - f. The equipment has obvious signs of breakage.
15. Do not place heavy objects on the equipment.
16. The unit uses a three-wire ground cable which is equipped with a third pin to ground the unit and prevent electric shock. Do not defeat the purpose of this pin. If your outlet does not support this kind of plug, contact your electrician to replace your obsolete outlet.
17. **CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.**

Technical Support and Assistance

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

Warning!

1. Handling the unit: carry the unit with both hands and handle it with care.
2. Maintenance: to keep the unit clean, use only approved cleaning products or clean with a dry cloth.

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.



Safety Warning: This equipment is intended for installation in a Restricted Access Location only.

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Package Contents

Before continuing, verify that the NIFE 103 package that you received is complete. Your package should have all the items listed in the following table.

Item	Part Number	Description	Qty
1	19J70010300X0	NIFE 103 ASSY	1
2	6012200052X00	PE Zipper Bag #8	1
3	5060900262X00	NISE 90 AL DIN Rail Clip VER:A SHYUNG SHUHN	1
4	6012200053X00	PE Zipper Bag #3	2
5	50311F0095X00	Flat Head Screw LONG FEI: F6#32Tx5 Nylok NIGP	4
6	50311F0330X00	Round Head Screw LONG FEI: P2x3 ISO+Nylon	3
7	4NCPF00316X00	Terminal Blocks 3P Phoenix Contact: 1834916	1
8	4NCPF01012X00	Terminal Blocks 10P Phoenix Contact: 1821177	1
9	50311F0574X00	P Head Screw w/Washer LONG FEI	1
10	60177A0572X00	NIFE 103 Quick Reference Guide VER:A SIZE:A4	1
11	602DCD1395X00	NIFE 103 DVD Driver VER:1.0	1

Ordering Information

The following information below provides ordering information for NIFE 103.

NIFE 103 System (P/N: 10J70010300X0)

Intel Atom® processor E3826 dual core fanless system

- **24V, 60W AC/DC power adapter w/o power cord (P/N: 7400060033X00)**

CHAPTER 1: PRODUCT INTRODUCTION

Overview



Key Features

- Onboard Intel Atom® processor E3826 Dual Core 1.46GHz
- 1 x Micro HDMI DisplayPort (type D)
- 2 x Intel® I210AT GbE LAN ports; support WoL, teaming and PXE
- 1 x USB 3.0 and 1 x USB 2.0
- 1 x Full size mini-PCIe socket for optional mSATA/4G/3.5G/LTE modules
- 1 x Half size mini-PCIe socket for optional Wi-Fi module
- 1 x RS232/485 with auto flow control
- Support -5~50 °C operating temperature
- Support +24VDC input $\pm 20\%$

Hardware Specifications

CPU Support

- Onboard Intel Atom® processor E3826 dual core 1.46GHz

Main Memory

- Onboard type 2GB DDR3L RAM
 - Un-buffered and non-ECC

Display Option

- 1x Micro HDMI DisplayPort (Type D)

I/O Interface - Front

- LEDs for power LED, battery low LED, WWAN LED, WLAN LED, 1 x programmable GPO LED
- 1 x RS232/485 support auto flow control
 - RS232 (Tx/Rx/CTS/RTS only)
 - RS485 support auto flow control
 - Support 2.5KV isolation protection
- 2 x Intel® I210AT GbE LAN ports, support WoL, teaming and PXE
- 1 x USB 3.0 (900mA per each)
- 1 x USB 2.0 (500mA per each)

I/O Interface - Top

- 1 x Micro HDMI DisplayPort (type D)
- 1 x System reset button

I/O Interface - Bottom

- 1 x 4-in/4-out 5V GPIO via 10-pin terminal block

Storage Device

- Onboard 16GB eMMC
- Optional mSATA module

Expansion Options

- 1 x Full size mini-PCIe socket for optional mSATA/4G/3.5G/LTE modules (USB signal only)
- 1 x Half size mini-PCIe socket for optional Wi-Fi module (PCIe and USB signal)

Power Requirements

- Power input: typical +24VDC ±20%
- 1x Optional 24V, 60W power adapter

Dimensions

- 56.5mm (W) x 100mm (D) x 120mm (H)

Construction

- Aluminum and metal chassis with front access design

Environment

- Operating temperature:
 - Ambient with air flow: -5°C to 55°C (according to IEC60068-2-1, IEC60068-2-2, IEC60068-2-14)
- Storage temperature: -20°C to 75°C
- Relative humidity: 10% to 93% (non-condensing)
- Shock protection:
 - mSATA/eMMC: 50G, half sine, 11ms, IEC60068-27

- Vibration protection w/ mSATA or eMMC condition:
 - Random: 2Grms @ 5~500 Hz, IEC60068-2-64
 - Sinusoidal: 2Grms @ 5~500 Hz, IEC60068-2-6

Certifications

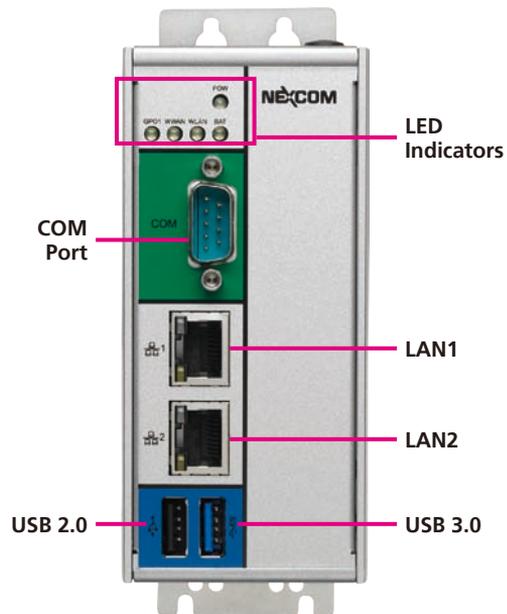
- CE Approval
 - EN61000-6-2
 - EN61000-6-4
- FCC Class A

Support OS

- Windows 8, 32-bit/64-bit
- Windows Embedded Standard 8, 32-bit/64-bit
- Windows 7, 32-bit/64-bit
- Windows Embedded Standard 7, 32-bit/64-bit
- Linux Kernel version 3.8.0

Knowing Your NIFE 103

Front View



LED Indicators

Indicates the power, battery, WLAN, WWAN and GPO activity of the system.

COM Port

DB9 port used to connect RS232/485 compatible devices.

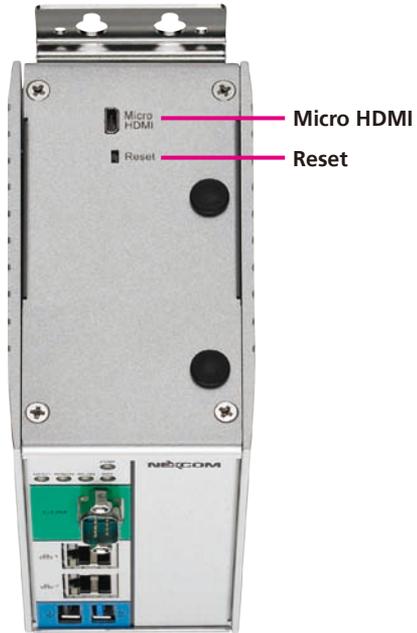
LAN1 and LAN2 Ports

Two LAN ports used to connect the system to a local area network.

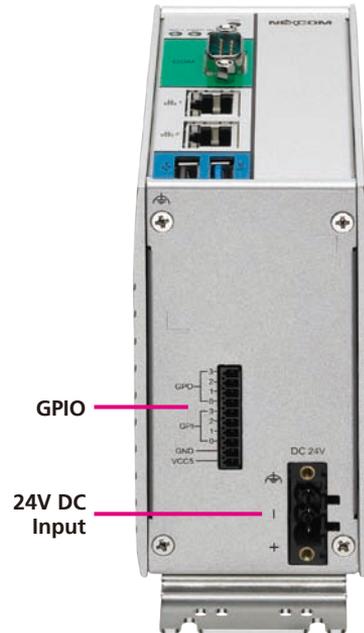
USB 2.0 and USB 3.0 Ports

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

Top View



Bottom View



Micro HDMI

Used to connect a high-definition display.

Reset

Press to restart the system.

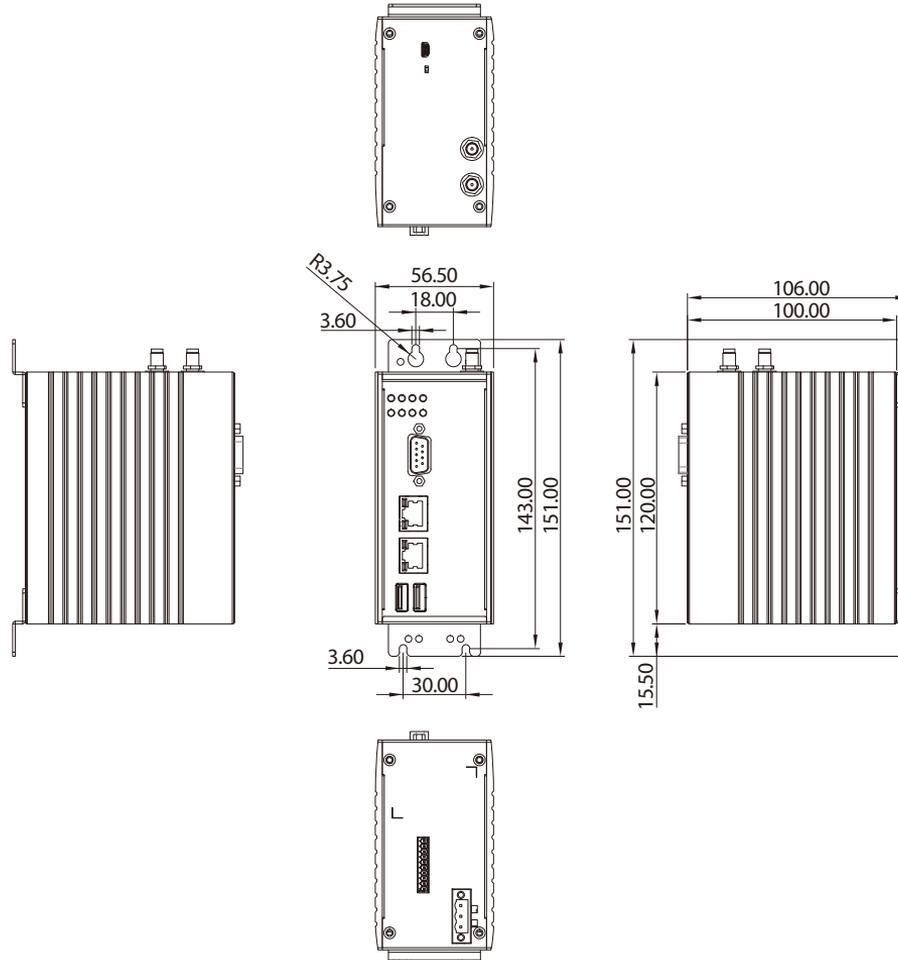
GPIO

The GPIO connector supports 4 digital input and 4 digital output.

24V DC Input

Used to plug a DC power cord.

Mechanical Dimensions



CHAPTER 2: JUMPERS AND CONNECTORS

This chapter describes how to set the jumpers and connectors on the NIFE 103 motherboard.

Before You Begin

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

dry environments. A grounding strap is warranted whenever danger of static electricity exists.

Precautions

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

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

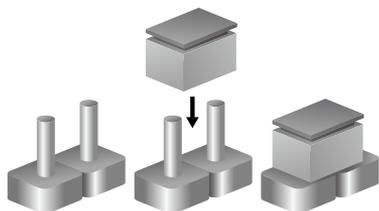
- Always disconnect the unit from the power outlet whenever you are working inside the case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal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

Jumper Settings

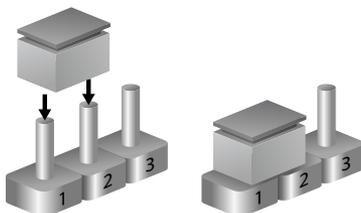
A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is short. If you remove the jumper cap, or place the jumper cap on just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

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

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



Three-Pin Jumpers: Pins 1 and 2 are Short

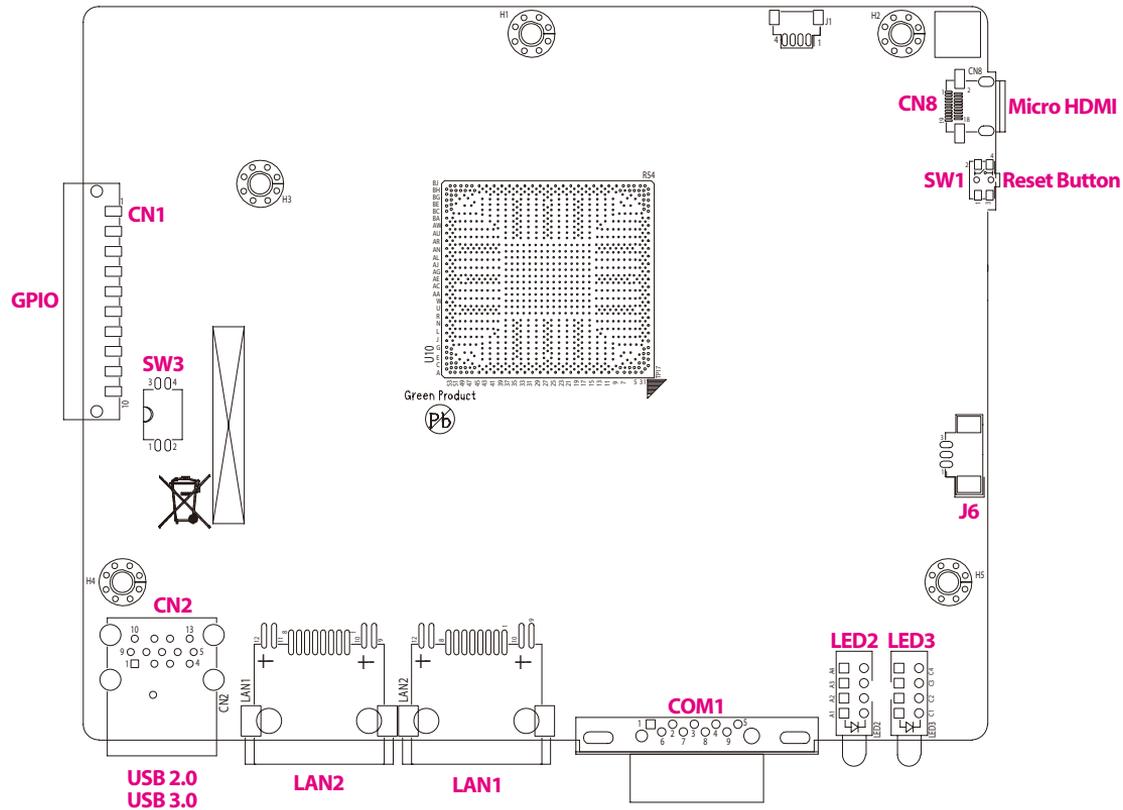


NIFE 103 System Components

The NIFE 103 system is made up of a NTIB 100 motherboard and a power board. This chapter lists the location and pinout assignment of the jumpers and connectors on each component.

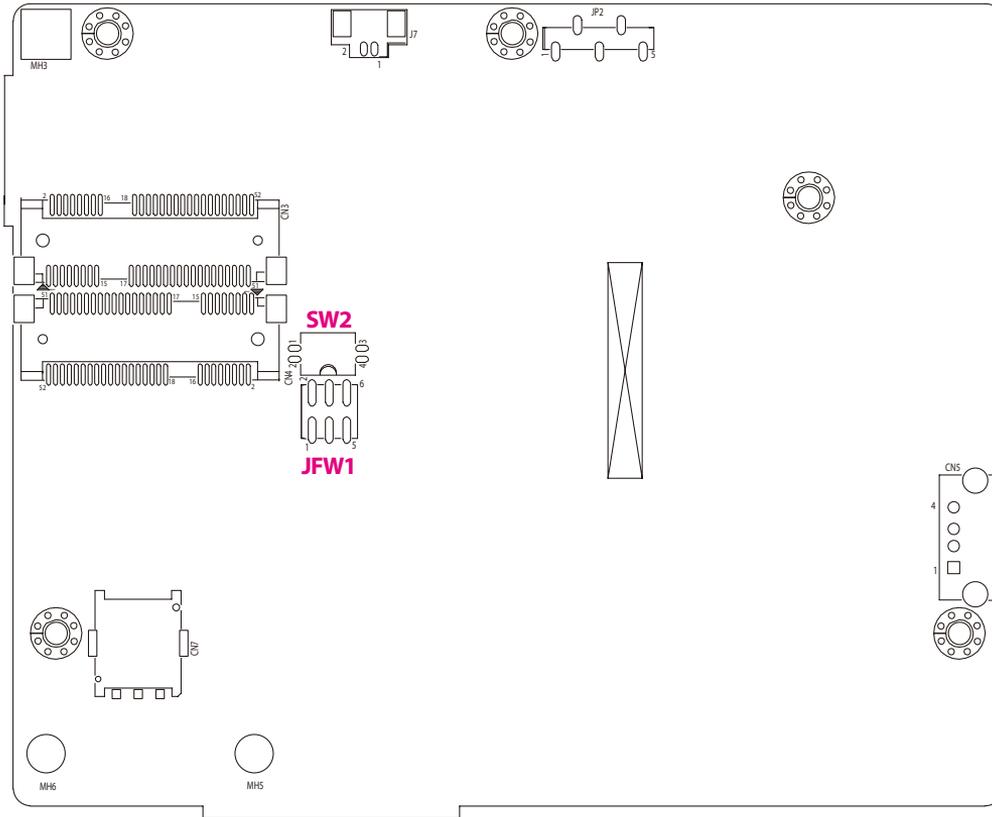
Locations of the DIP Switches and Connectors for NTIB 100

Top View

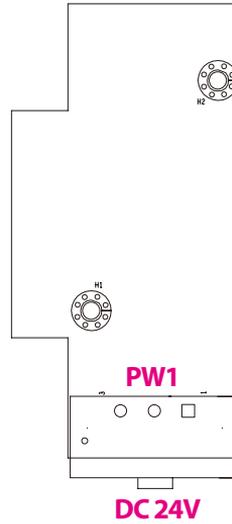


The figure below is the bottom view of the NTIB 100 motherboard.

Bottom View



Connector Locations for the Power Board



DIP Switches

AT/ATX Switch

Connector type: 2-pin On/Off DIP switch

Connector location: SW3



Pin	Function
1	AT_ATX_SELECT
2	NC
3	*GND
4	*GND

Clear CMOS Select

Connector type: 2-pin On/Off DIP switch

Connector location: SW2



Pin	Function
1	RTC_TEST#
2	SRTC_RST#
3	GND
4	GND

Connector Pin Definitions

External I/O Interfaces

Power LED Indicator

Connector location: LED3

POW



Pin	Definition
A1	VCC3
C1	GND

GPO1/WWAN/WLAN/BAT LED Indicators

Connector location: LED2

GPO1



WWAN



WLAN



BAT

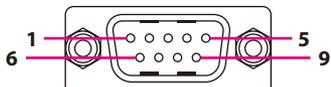


Pin	Definition	Pin	Definition
A1	3VSB	C1	BATTERY_LED
A2	VCC3	C2	WLAN_LED
A3	VCC3	C3	WWLAN_LED
A4	VCC3	C4	GPO_LED2

COM1 Connector

Connector type: DB-9 port, 9-pin D-Sub

Connector location: COM1

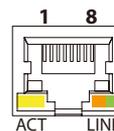


Pin	Definition	Pin	Definition
1	RS485_D-_R	2	COM1_RXD
3	COM1_TXD	4	NC
5	GND	6	RS485_D+_R
7	COM1_RTS#	8	COM1_CTS#
9	NC		

LAN1 Port

Connector type: RJ45 port with LEDs

Connector location: LAN1



Act	Status
Flashing Yellow	Data activity
Off	No activity

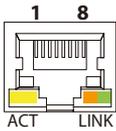
Link	Status
Steady Green	1G network link
Steady Orange	100Mbps network link
Off	10Mbps or no link

Pin	Definition	Pin	Definition
1	LAN2TXDP0	2	LAN2TXDN0
3	LAN2TXDP1	4	LAN2TXDP2
5	LAN2TXDN2	6	LAN2TXDN1
7	LAN2TXDP3	8	LAN2TXDN3
9	LAN2_LED_ACT#	10	LAN2_ACTPW
11	LAN2_LED_LINK1G#	12	LAN2_LINK

LAN2 Port

Connector type: RJ45 port with LEDs

Connector location: LAN2



Act	Status
Flashing Yellow	Data activity
Off	No activity

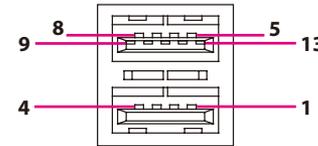
Link	Status
Steady Green	1G network link
Steady Orange	100Mbps network link
Off	10Mbps or no link

Pin	Definition	Pin	Definition
1	LANTXDP0	2	LANTXDN0
3	LANTXDP1	4	LANTXDP2
5	LANTXDN2	6	LANTXDN1
7	LANTXDP3	8	LANTXDN3
9	LAN_LED_ACT#	10	LAN1_ACTPW
11	LAN_LED_LINK1G#	12	LAN1_LINK

USB 3.0 and USB 2.0 Port

Connector type: USB 3.0 and USB 2.0 port

Connector location: CN2

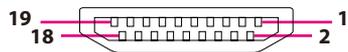


Pin	Definition	Pin	Definition
1	5VSB	2	SOC_USB0N
3	SOC_USB0P	4	GND
5	USB3_RX0_N_C	6	USB3_RX0_P_C
7	GND	8	USB3_TX0_N_C
9	USB3_TX0_P_C	10	5VSB
11	SOC_USB2N	12	SOC_USB2P
13	GND		

Micro HDMI

Connector type: Micro HDMI port

Connector location: CN8



Pin	Definition	Pin	Definition
1	HDMI_HPD_R	2	GND
3	HDMI_DATA2_P_C	4	GND
5	HDMI_DATA2_N_C	6	HDMI_DATA1_P_C
7	GND	8	HDMI_DATA1_N_C
9	HDMI_DATA0_P_C	10	GND
11	HDMI_DATA0_N_C	12	HDMI_CLK_P_C
13	GND	14	HDMI_CLK_N_C
15	NC	16	GND
17	HDMI_CTRL_CLK	18	HDMI_CTRL_DAT
19	HDMI_PWR		
MH1	CHASSIS_DP_GND	MH2	CHASSIS_DP_GND
MH3	CHASSIS_DP_GND	MH4	CHASSIS_DP_GND

Reset Button

Connector location: SW1

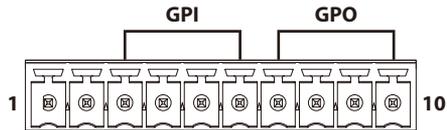


Pin	Definition	Pin	Definition
1	PM_RESET#_J	2	PM_RESET#_J
3	GND	4	GND

GPIO Connector

Connector type: 1x10 10-pin switch

Connector location: CN1

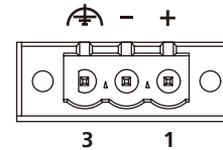


Pin	Definition	Pin	Definition
1	VCC5	2	GND
3	ICH_GPIO0_IN	4	ICH_GPI1_IN
5	ICH_GPIO2_IN	6	ICH_GPI3_IN
7	ICH_GPO0_OUT	8	ICH_GPO1_OUT
9	ICH_GPO2_OUT	10	ICH_GPO3_OUT

24V DC Power Input

Connector type: 1x3 3-pin terminal block

Connector location: PW1



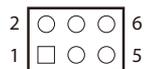
Pin	Definition
1	VIN_1
2	VIN_VSS
3	R_GND

Internal Connectors

BIOS Flash Pin Header

Connector type: 2x3 6-pin header, 2.0mm pitch

Connector location: JFW1

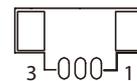


Pin	Definition	Pin	Definition
1	VSPI	2	GND
3	BIOS_SPI_CS#0	4	BIOS_SPI_CLK
5	BIOS_SPI_SO	6	BIOS_SPI_SI

Power Button Connector

Connector type: 1x3 3-pin header, 1.25mm pitch

Connector location: J6



Pin	Definition
1	GND
2	EC_PWRBT#
3	S3_OUT

CHAPTER 3: SYSTEM SETUP

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. Remove the screws on the side chassis.



2. Remove the screws on the bottom chassis.



3. Remove the screws on the rear chassis.

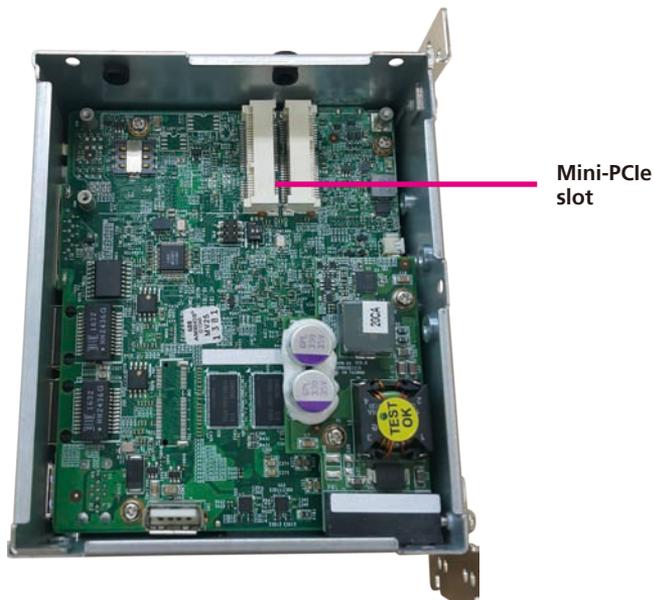


4. Gently lift up the cover.



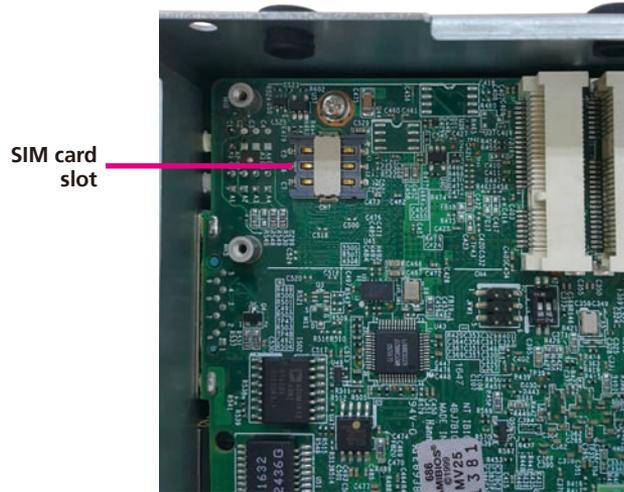
Installing a mSATA or 3G Module

1. Locate the mini-PCIe slot for 3G or mSATA modules. The SIM card is located in the middle of the mini-PCIe slot.
2. Insert the mSATA module into the mini-PCIe slot at 45 degree angle until the gold-plated connector on the edge of the module completely disappears into the slot.



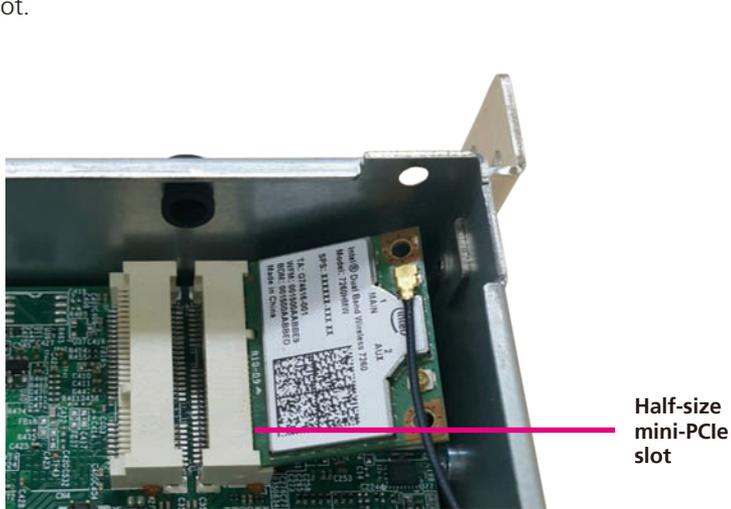
3. When installing a 3G module, make sure to install the SIM card first.

4. Push the module down and secure it with screws. Ensure both screws are fixed tightly to the slot.



Installing a Wi-Fi Module

1. Locate the half-size mini-PCIe slot on the board for the Wi-Fi module. Insert the Wi-Fi module into the slot at 45 degree angle until the gold-plated connector on the edge of the module completely disappears into the slot.
2. Push the module down and secure it with a screw. Ensure the screw is fixed tightly to the slot.

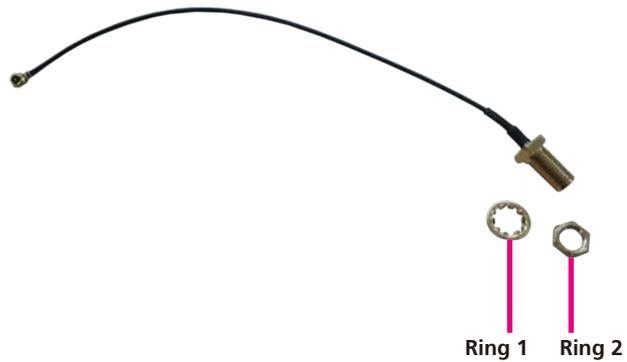


Installing an Antenna



Before installing an antenna, make sure that the 3G/GSM/Wi-Fi module is installed into the slot first.

1. Prepare the antenna cable for the 3G/GSM/Wi-Fi module.



2. Locate the antenna hole on the front panel and insert the antenna jack through the antenna hole. Fix the antenna jack with ring 1 then ring 2.



3. Connect an external antenna to the antenna jack.



CHAPTER 4: BIOS SETUP

This chapter describes how to use the BIOS setup program for NIFE 103. The BIOS screens provided in this chapter are for reference only and may change if the BIOS is updated in the future.

To check for the latest updates and revisions, visit the NEXCOM Web site 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 affect how the computer performs. It is important, therefore, first to try to understand all the setup options, and second, to make settings appropriate for the way you use the computer.

When to Configure the BIOS

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

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

Default Configuration

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

Entering Setup

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

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

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

Press the  key to enter Setup:

Legends

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

Scroll Bar

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

Submenu

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

BIOS Setup Utility

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

Main

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

System Date

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

System Time

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

Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.					
Main	Advanced	Chipset	Security	Boot	Save & Exit
BIOS Information		American Megatrends		Set the Time. Use Tab to switch between Time elements.	
BIOS Vendor	5.009				
Core Version	UEFI 2.3; PI 1.2				
Compliancy	C100A007 x64				
Project Version	10/19/2016 13:55:35				
Build Date and Time					
CPU Configuration		901			
Microcode Patch					
Memory Information		2048 MB			
Total Memory					
GOP Information		[N/A]		←→: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
Intel(R) GOP Driver					
System Date	[Tue 08/29/2017]				
System Time	[15:53:09]				
Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.					

Advanced

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

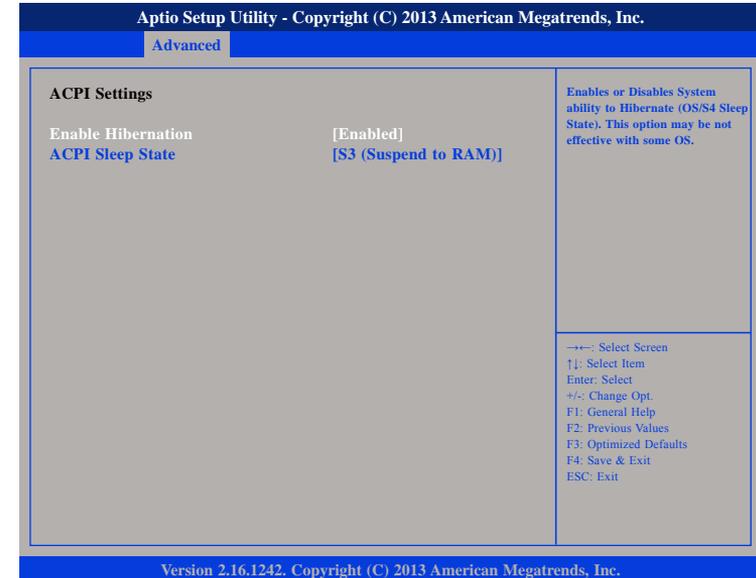


Setting incorrect field values may cause the system to malfunction.



ACPI Settings

This section is used to configure ACPI Settings.



Enable Hibernation

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

ACPI Sleep State

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

F81216SEC Super IO Configuration

This section is used to configure the serial port.



Super IO Chip

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

Serial Port 1 Configuration

This section is used to configure serial port 1.



Serial Port

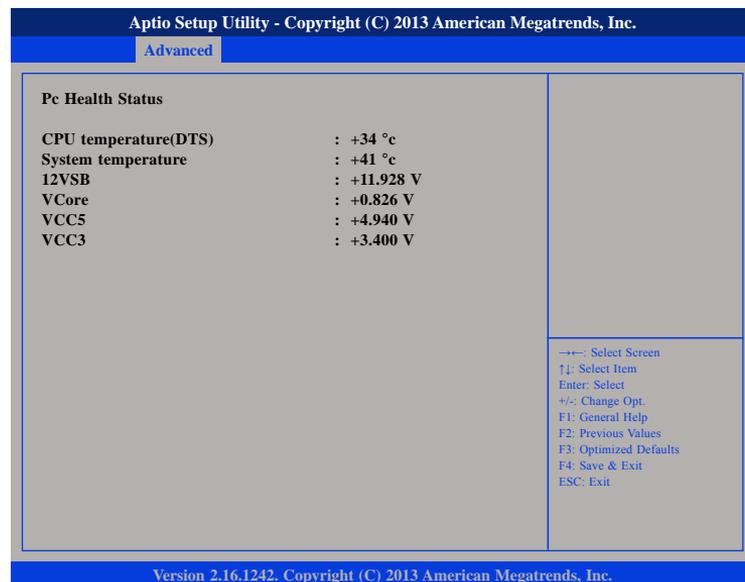
Enables or disables the serial port.

RS485 AUTO

Enables or disables RS485 Auto.

H/W Monitor

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



VCore

Detects and displays the Vcore CPU voltage.

VCC5

Detects and displays 5V voltage.

VCC3

Detects and displays 3.3V voltage.

CPU temperature(DTS)

Detects and displays the current CPU temperature.

System temperature

Detects and displays the current system temperature.

12VSB

Detects and displays 12V voltage.

Serial Port Console Redirection

This section is used to configure the serial port that will be used for console redirection.



Console Redirection

Enables or disables the console redirection.

Console Redirection (Serial Port for Out-of-Band Management)

Enables or disables the console redirection. When enabled, Console Redirection Settings will be available.

COM0 Console Redirection Settings



Terminal Type

ANSI Extended ASCII character set.

VT100 ASCII character set.

VT100+ Extends VT100 to support color, function keys, etc.

VT-UTF8 Uses UTF8 encoding to map Unicode characters onto 1 or more bytes.

Bits Per Second

Selects the serial port transmission speed. The speed must match the other side. Long or noisy lines may require a lower speed.

Data Bits

The options are 7 and 8.

Parity

A parity bit can be sent with the data bits to detect some transmission errors.

Even Parity bit is 0 if the number of 1's in the data bits is even.

Odd Parity bit is 0 if number of 1's in the data bits is odd.

Stop Bits

Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.

Flow Control

Flow control can prevent data loss from buffer overflow. When sending data and the receiving buffers are full, a "stop" signal can be sent to stop the data flow.

VT-UTF8 Combo Key Support

Enables or disables VT-UTF8 combo key support.

Recorder Mode

When this field is enabled, only text will be sent. This is to capture the terminal data.

Resolution 100x31

Enables or disables extended terminal resolution.

Legacy OS Redirection

Selects the number of rows and columns that support redirection.

Putty KeyPad

Selects the Putty keyboard emulation type.

Redirection After BIOS POST

Enables or disables redirection after BIOS POST.

CPU Configuration

This section is used to configure the CPU.



Active Processor Core

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

Limit CPUID Maximum

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

Execute Disable Bit

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

Intel® Virtualization

Enables or disables Intel® Virtualization technology.

Socket 0 CPU Information

This section displays the information of the CPU installed in Socket 0.

Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.

Advanced

Socket 0 CPU Configuration	
Intel(R) Atom(TM) CPU E3826 @ 1.46GHz	
CPU Signature	30679
Microcode Patch	901
Max CPU Speed	1460 MHz
Min CPU Speed	533 MHz
Processor Cores	2
Intel HT Technology	Not Supported
Intel VT-x Technology	Supported
L1 Data Cache	24 kB x 2
L1 Code Cache	32 kB x 2
L2 Cache	1024 kB x 1
L3 Cache	Not Present

→←: Select Screen
 ↑↓: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Exit
 ESC: Exit

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PPM Configuration

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



EIST

Enables or disables Intel® SpeedStep.

IDE Configuration

This section is used to configure the SATA drives.



Serial-ATA (SATA)

Enables or disables SATA device.

SATA Mode

Configures the SATA as AHCI mode.

Serial-ATA Port 0 and Serial-ATA Port 1

Enables or disables SATA port 0 and SATA port 1.

SATA Port1 Hotplug and SATA Port2 Hotplug

Enables or disables hotplug support on SATA port 1 and SATA port 2.

Miscellaneous Configuration

This section is used to configure other miscellaneous settings.



OS Selection

Selects the operating system as Windows 8.X, Android or Windows 7.

LPSS & SCC Configuration

This section is used to configure LPSS and SCC settings.



LPSS & SCC Devices Mode

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

SCC eMMC Support

Enables or disables SCC eMMC support.

SCC eMMC 4.5 DDR50 Support

Enables or disables SCC eMMC 4.5 DDR50 support.

SCC eMMC 4.5 HS200 Support

Enables or disables SCC eMMC 4.5 HS200 support.

CSM Configuration

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



CSM Support

Enables or disables CSM support.

Network

Controls the execution of UEFI and legacy PXE OpROM.

Onboard LAN PXE

Enables or disables onboard LAN PXE ROM.

Storage

Controls the execution of UEFI and legacy storage OpROM.

Video

Controls the execution of UEFI and legacy video OpROM.

Other PCI Devices

Determines OpROM execution policy for devices other than network, storage or video.

USB Configuration

This section is used to configure the USB.



Legacy USB Support

Enable Enables Legacy USB.

Auto Disables support for Legacy when no USB devices are connected.

Disable Keeps USB devices available only for EFI applications.

XHCI Legacy Support

Enables or disables XHCI controller legacy support.

XHCI Hand-off and EHCI Hand-off

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

USB Mass Storage Driver Support

Enables or disables USB mass storage driver support.

USB transfer time-out

The time-out value for control, bulk, and Interrupt transfers.

Device reset time-out

Selects the USB mass storage device's start unit command timeout.

Device power-up delay

Maximum time the value will take before it properly reports itself to the Host Controller. "Auto" uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

Chipset

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



South Bridge

This section is used to configure the south bridge features.



High Precision Timer

Enables or disables the high precision event timer.

Restore AC Power Loss

Power 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.
Power On	When power returns after an AC power failure, the system will automatically power-on.
Last State	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.

USB Configuration



USB 2.0(EHCI) Support

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

USB RMH Mode

Enables or disables PCH USB rate matching hubs mode.

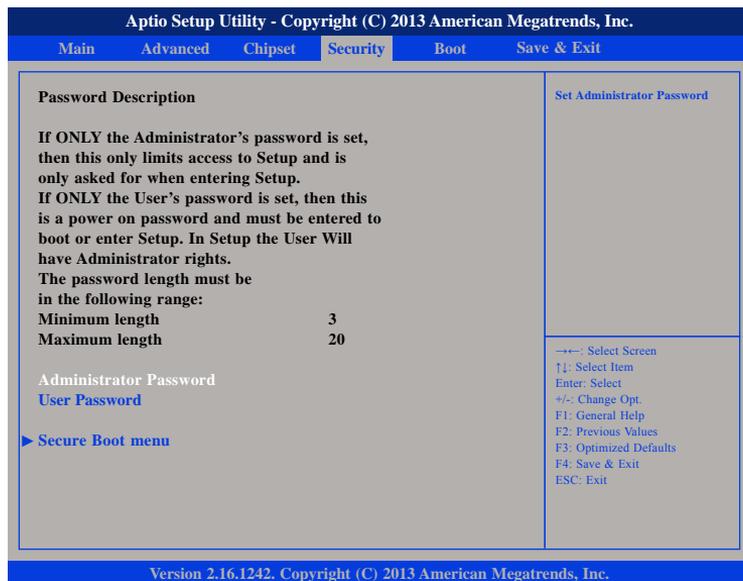
USB EHCI Debug

Enables or disables PCH EHCI debug capability.

USB Power State in S5

Configures the USB power state in S5.

Security



Administrator Password

Select this to reconfigure the administrator's password.

User Password

Select this to reconfigure the user's password.

Boot



Bootup NumLock State

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

Fast Boot

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

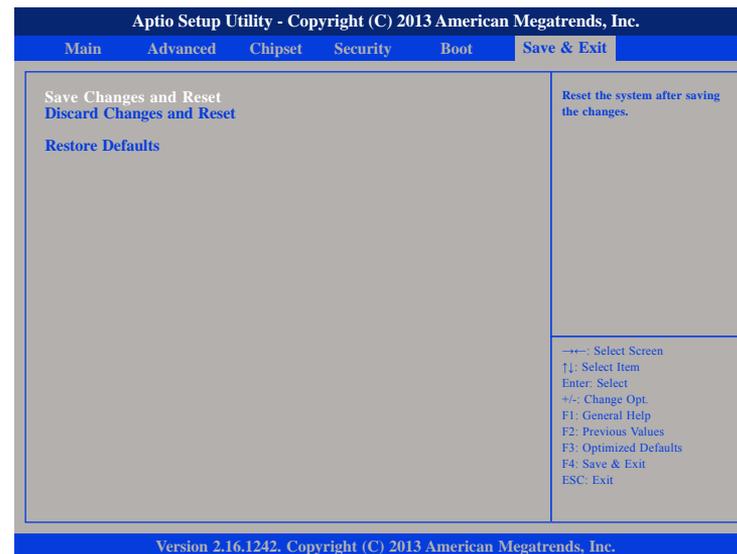
Boot mode select

Configures the boot mode option.

FIXED BOOT ORDER Priorities

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

Save & Exit



Save Changes and Reset

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

Discard Changes and Reset

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

Restore Defaults

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

APPENDIX A: POWER CONSUMPTION

Power Consumption Measurement Test

Purpose

The purpose of the power consumption test is to verify the power dissipation of system, and the loading of power supply.

Test Equipment/Software

1. DC power supply.
2. Operating System OS: Windows 8.1 64-bit.
3. Burn-in Test V8.1 Pro
4. Intel® Thermal Analysis Tool software version: 5.0.1019
5. Network test program.
6. Function port fixture:

Functional Port	Front / Rear Panel
USB 2.0 x1	5V, 0.5A (Cement Resistor)
USB 3.0 x1	5V, 1A (Cement Resistor)
Micro HDMI to HDMI 1.8M Cable & LCD Monitor	
COM 1	RS232 Loopback (115200 baud rate)
USB	Keyboard & Mouse

Device Under Test

DUT: NIFE 103 SYS#1

Test Parameters

1. Make sure mechanical structure and electrical functionality are normal before testing.
2. Install all I/O load devices and refer to the system input voltage specifications to set up the DC power supply voltage.
3. Measure system maximum power consumption in the following modes:
 - BIOS mode.
 - ACPI Sleep State Mode (S3).
 - 100% Full loading mode (Include USB load fixture).
4. Measure and record system maximum power consumption value.

Test Result

System Mode		24Vdc	
		I _{max} .	W _{max} .
CPU: Intel Atom® CPU E3826 @ 1.46 GHz Main System: NIFE 103 EMMC: NAND EMMC 16G Memory: MICRON: MTF16GAKAECN-2M 2G WT	BIOS Mode	0.25A	6.0W
	ACPI Sleep State Mode (S3)	0.071A	1.7W
	100% Full Loading Mode	0.725A	17.4W

APPENDIX B: WATCHDOG TIMER PROGRAMMING REFERENCE

WatchDog Programming Guide

```
#define NCT7904D_SLAVEADDRESS 0x5A  
#define SMBUS_BASE_ADDRESS 0xE000
```

```
;SmbusWriteByte, Please refer to Smbus Write Byte Protocol  
SmbusWriteByte(0xFF,0x00);
```

```
;enable Soft Watch Dog  
SmbusWriteByte(0xE1,0x01);
```

```
;Setup WDT time-out value, the unit is minute. this demo code is used to program the time-out value with 1 min.  
SmbusWriteByte(0xE3,0x01);
```

```
;enable Soft Watch Dog Timer  
SmbusWriteByte(0xE0,0x55);
```

APPENDIX C: GPIO PROGRAMMING GUIDE

GPIO (General Purpose Input/Output) pins are provided for custom system design. This appendix provides definitions and its default setting for the ten GPIO pins in NIFE 103. The pin definition is shown in the following table:

Pin	GPIO Mode	PowerOn Default	Address	Pin	GPIO Mode	PowerOn Default	Address
1	VCC	-	-	2	GND	-	-
3	GPI	Low	588h (Bit22)	7	GPO	Low	Memory-FED0E168h
4	GPI	Low	588h (Bit23)	8	GPO	Low	Memory-FED0E158h
5	GPI	Low	588h (Bit24)	9	GPO	Low	Memory-FED0E188h
6	GPI	Low	588h (Bit25)	10	GPO	Low	Memory-FED0E198h

CN1 – GPIO Connector

Pin	GPIO Mode	PowerOn Default	Address
C2	GPO	Low	SMBUS-EAh (Bit3)
C1	GPO	Low	SMBUS-EAh (Bit4)

LED3 – GPO LED

Control the GPO pin (7/8/9/10) level from Memory address FED0E168h/ FED0E158h/ FED0E188h/ FED0E198h.

Control the GPO (C2/C1) level from SMBUS EAh bit (3/4).

The bit is Set/Clear indicated output High/Low.

GPIO programming sample code

```
#define MEMORY_BASE_ADDRESS    0xFED0E000
#define NCT7904D_SLAVEADDRESS  0x5A
#define SMBUS_BASE_ADDRESS     0xE000

#define GPO7_HI      MmioWrite(MEMORY_BASE_ADDRESS+0x168, 0x00000001)
#define GPO7_LO      MmioWrite(MEMORY_BASE_ADDRESS+0x168, 0x00000000)
#define GPO8_HI      MmioWrite(MEMORY_BASE_ADDRESS+0x158, 0x00000001)
#define GPO8_LO      MmioWrite(MEMORY_BASE_ADDRESS+0x158, 0x00000000)
#define GPO9_HI      MmioWrite(MEMORY_BASE_ADDRESS+0x188, 0x00000001)
#define GPO9_LO      MmioWrite(MEMORY_BASE_ADDRESS+0x188, 0x00000000)
#define GPO10_HI     MmioWrite(MEMORY_BASE_ADDRESS+0x198, 0x00000001)
#define GPO10_LO     MmioWrite(MEMORY_BASE_ADDRESS+0x198, 0x00000000)

//SmbusWriteByte, Please refer to Smbus Write Byte Protocol
#define GPOC2_HI     SmbusWriteByte (0xEA, XXXX1XXXb)
#define GPOC2_LO     SmbusWriteByte (0xEA, XXXX0XXXb)
#define GPOC1_HI     SmbusWriteByte (0xEA, XXX1XXXXb)
#define GPOC1_LO     SmbusWriteByte (0xEA, XXX0XXXXb)

void main(void)
{
    GPO7_HI;
    GPO8_LO;
    GPO9_HI;
    GPO10_LO;

    GPOC2_HI;
    GPOC1_LO;
}
```