# **MC-3201 Series Hardware User Manual**

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www.moxa.com/products



### MC-3201 Series Hardware User Manual

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The MC-3201 computers are built around a 11th Gen Intel® Celeron® or Intel® Core<sup>™</sup> i3, i5, or i7 processor and come with 2 DisplayPort interfaces, 2 USB 3.1 ports, 4 GbE ports, and 2 3-in-1 RS-232/422/485 serial ports. The MC-3201 is equipped with a 2.5" HDD/SSD slot and a built-in TPM 2.0 module.

Additional value and convenience are provided through a modular design with two independent slots for flexible system integration and expansion. Users have the option to add a variety of different communications modules, including Wi-Fi, 5G, LTE, GPS, and M.2 SATA SSD expansion modules.

With compliance with the IEC-60945 and E10 standards, the MC-3201 is sure to deliver stable and reliable system operation for marine and IIoT applications. These certifications are issued to products to indicate their suitability for marine applications.

# **Package Checklist**

- MC-3201 Series embedded computer
- Terminal block to power jack converter
- Power-jack-to-terminal-block cable
- Wall-mounting kit
- Quick installation guide (printed)
- Warranty card

NOTE

Please notify your sales representative if any of the above items are missing or damaged.

# **Product Features**

MC-3201 computers come with the following:

- 11th Gen Intel® Core<sup>™</sup> processor (Tiger Lake U)
- built-in DDR4 memory slots; total capacity up to 32 GB
- M.2 B key socket for 5G, GPS, and M.2 SATA SSD expansion modules
- M.2 E key socket for Wi-Fi and BT expansion modules
- Mini-PCIe socket for LTE and mSATA expansion modules
- Variety of interfaces: 2 serial ports, 4 Giga LAN ports, 2 USB 3.1 (type A) ports, 4 USB 2.0 (type A) ports
- Built-in TPM 2.0 module
- IEC-60945 and E10 compliance

# **Hardware Specifications**

NOTE

The latest specifications for Moxa's products can be found at <a href="https://moxa.com">https://moxa.com</a>.

# **Hardware Block Diagram**



The MC-3201 computers are compact, well designed, and rugged enough for industrial applications. LED indicators help you monitor the performance and identify trouble spots. Multiple serial ports allow you to connect different devices. The wireless and LTG modules provide wireless operations, and the reliable and stable hardware platform lets you devote your attention to developing your applications.

# Appearance



#### MC-3201-TGL1-S-S Front Panel

#### MC-3201-TGL1-S-S Rear Panel



#### MC-3201-TGL7-M-S Front Panel



Removable Storage Tray Cover

#### MC-3201-TGL7-M-S Rear Panel



# Dimensions

Unit: mm (inch)



# **LED Indicators**

LED Name	Status	Function	
Power	Green	Power is on and computer is functioning normally	
С С	Off	Power is off	
Storage 1 (mSATA)	Yellow	Blinking: Data transmission	
0	Off	No data transmission.	
	Green	Steady On: 100 Mbps Ethernet link	
LAN 1/2/2/4		Blinking: Data is being transmitted	
LAN 1/2/3/4 (on the connectors)	Yellow	Steady On: 1000 Mbps Ethernet link	
(on the connectors)		Blinking: Data is being transmitted	
	Off	10 Mbps Ethernet link or LAN is not connected	
Tx 1/2	Green	Blinking: Data is being transmitted	
(serial ports)	Off	No connection	
Rx 1/2	Yellow	Blinking: Data is being transmitted	
(serial ports)	Off	No connection	

In this chapter, we describe how to connect the MC-3201 computer to the network and to various devices.

# Installing the MC-3201

#### Wall Mounting

The MC-3201 can be installed on a wall by using the wall-mounting kit.

To install the MC-3201 on a wall, do the following:

Step 1: Use four screws for each bracket and attach the brackets to the back of the MC-3201. The screws are included in the wall-mounting kit. If you want to buy the screws separately, use the following specifications:



Screw-M/FMS M4x6mm Ni/90D Nylok





#### Note:

Mounting the MC-3201 to a wall requires four screws. Use the MC-3201 computer, with the wall-mounting brackets attached, as a guide to mark the correct locations of the screws on the wall.

The heads of the screws should be at least 6.0 mm in diameter, the shafts should be 3.5 mm in diameter with a minimum depth of 10 mm as shown in the figure on the right. Do not drive the screws in all the way; leave a space of about 2 mm to allow room for sliding the wall-mounting bracket between the wall and the screw.



# **Wiring Requirements**

In this section, we describe how to connect serial devices to the MC-3201 computer.

Be sure to read and follow these common safety precautions before proceeding with the installation of any electronic device:

• Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the crossing point.



### NOTE

Do not run signal and communication wiring together with power wiring in the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.

- Use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring that shares similar electrical characteristics can be bundled together.
- Keep input wiring and output wiring separated.
- For future reference, you should label the wiring used for all your devices.



### ATTENTION

#### Safety First!

Be sure to disconnect the power cord before installing and/or wiring your MC-3201.

#### Wiring Caution!

Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size. If the current goes above the maximum ratings, the wiring could overheat, causing severe damage to your equipment.

#### Temperature Caution!

Be careful when handling the unit. When the unit is plugged in, the internal components generate heat, and consequently the outer casing may feel hot to the touch.

### **Connecting the Power**



Connect the power connector/terminal block to the power supply that can provide 9 to 36 VDC (MC-3201-TGL1 model) or 24 VDC (MC-3201-TGL7 model). Before connecting the device to DC power inputs, make sure the DC power source voltage is stable. If the power is supplied properly, the Power LED will light up. The OS is ready when the Power LED glows solid green.

The input terminal block wiring should be installed by a skilled person. Wire size: 12-28 AWG  $\,$ 

- Torque value: 0.51 N-m
- Only one conductor per clamping point

If you are using a Class I adapter, the power cord should be connected to an outlet with an earthing connection.



#### ATTENTION

The equipment (MC-3201-TGL7-M-S) is intended to be supplied by the external power source (UL listed/ IEC 60950-1/ IEC 62368-1), whose output complies with ES1/SELV, output rating 24 VDC, 2.7 A min, and a minimum ambient temperature of 55°C.

#### ATTENTION

The equipment (MC-3201-TGL1-S-S) is intended to be supplied by the external power source (UL listed/ IEC 60950-1/ IEC 62368-1), whose output complies with ES1/SELV, output rating is 9 to 36 VDC, 9.5 A min and a minimum ambient temperature of 55°C.

### **Grounding the Unit**

Grounding and wire routing help limit the effects of noise due to electromagnetic interference (EMI). Run the ground connection from the functional earthing screw (M4) to the grounding surface prior to connecting the power.

Functional Earthing Screw



#### NOTE

A 4 mm<sup>2</sup> conductor must be used when the connection to the external grounding screw is utilized. The heat sink is grounded to the chassis by an internal screw.

# **Connecting to a Network**

To connect the MC-3201 computer to a network, connect a network cable to the computer's Ethernet port and connect the other end of the cable to your Ethernet network. When the cable is properly connected, the LEDs on the computer's Ethernet port turn on to indicate a valid connection.

Four 10/100/1000 Mbps Ethernet ports with RJ45 connectors are located on the rear panel of the computer.

### NOTE

The pin assignments for the MC-3201 computer's Ethernet port are shown in the following figure. If you want to use your own Ethernet cable, ensure that you match the pin assignments of the connector on the Ethernet cable.



# **Connecting to a Serial Device**

Use a serial cable to connect your serial device to the computer's serial port. The serial ports P1 to P2 have male DB9 connectors and can be configured for RS-232, RS-422, or RS-485 communication. For information on serial port configuration, refer to the MC-3201 software manual.

The pin assignments of the serial ports are shown in the following table:

#### DB9 Male Port

 $\bigcirc$ 

12345

6789

#### RS-232/422/485 Pinouts

	Pin	RS-232	RS-422	RS-485 (4-wire)	RS-485 (2-wire)
	1	DCD	TxDA(-)	TxDA(-)	-
$\cap$	2	RxD	TxDB(+)	TxDB(+)	-
$\sim$	3	TxD	RxDB(+)	RxDB(+)	DataB(+)
	4	DTR	RxDA(-)	RxDA(-)	DataA(-)
	5	GND	GND	GND	GND
	6	DSR	-	-	-
	7	RTS	-	-	-
	8	CTS	-	-	-

# **Connecting to a USB Device**

The MC-3201 is provided with two USB 3.0 ports with type-A connectors on the front panel, and four USB 2.0 ports on the rear panel. These ports can be used to connect to an external flash disk or hard drive. You can also use these USB ports to connect to a keyboard or a mouse.

# **Connecting to a Display Port**

The MC-3201 Series offers two display ports located on the rear panel, allowing users to connect to a video device. Make sure you use a certified cable for a reliable video connection.

# **Connecting to an Audio Input and Output**

The MC-3201 Series comes with a microphone input and a line output located on the rear panel, allowing users to connect an audio input and an audio output.

# **Connecting to a Digital Input and Digital Output**

The MC-3201-TGL7 Series comes with four digital inputs and four digital outputs connectors located on the rear panel. These connectors are using terminal blocks; refer to the figure on the right for detailed pin definitions.



### NOTE

Terminal block (J1)—R/C (XCFR2, XCFR8), socket soldered on to the PWB, DINKLE ENTERPRISE CO., LTD, type 5EHDRM, rated 300 V, 15 A, 105°C. Mating with plug type 5ESDVM rated 300 V, 15 A, 105°C. The plug-half connection is secured by screws; suitable for 12 to 28 AWG wire size, secured on plug by screws with a torque value of 0.51 N-m (4.5 lb-in).

# **Connecting to a NMEA Port**

The MC-3201-TGL7 Series also comes with four NMEA ports located on the rear panel. These ports are using terminal blocks; refer to the figure on the right for detailed pin definitions.



# **Inserting the USIM Card**

The MC-3201-TGL1-S-S has four USIM slots for 5G/LTE wireless Internet connections. Each slot supports dual USIM cards. To install a USIM card, gently remove the outer cover on the front panel, and then insert the USIM card into the slot.



# **Installing Storage Disk**

The MC-3201 offers one disk tray to allow users to install one storage disk such as a hard disk drive or solid-state drive.



### NOTE

The installation of the storage disk shall be operated by a skilled person.

To install a storage disk, do the following:

Step 1: Unfasten two screws and remove the storage cover on the front panel of the MC-3201.



**Step 2:** Slide the latch on the disk tray to the left and pull out the tray from the slot.



**Step 3:** Place the storage disk onto the tray.



**Step 4:** Fasten the four screws on the back of the storage tray.



**Step 5:** Insert the storage tray into the storage slot of the MC-3201. Make sure you insert the tray into the plastic rails on both sides of the slot.



**Step 6:** The latch on the tray to the right to secure the tray in the slot.



**Step 7:** Put back the cover on the storage slot and fasten the two screws to secure the cover in place.



### **Restricted Access Location**

This equipment is intended to be used in Restrict Access Location, like control room. The access can only be gained by SERVICE PERSONS or by USERS who have been instructed.



#### Caution

DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

# **RTC Battery Replacement**

The MC-3201's real-time clock is powered by a lithium battery. We strongly recommend that you do not replace the lithium battery without help from a qualified Moxa support engineer. If you need to change the battery, contact the Moxa RMA service team.



### ATTENTION

There is a risk of explosion if the battery is replaced by an incorrect type of battery.

### NOTE

The MC-3201 computer can be customized to support an easy RTC battery replacement function. Please contact your Moxa sales representative for details.

In this chapter, we describe the BIOS settings for the MC-3201 computer. The BIOS is a set of input/output control routines for peripherals to initialize the basic settings. The BIOS helps boot the system before the operating system is loaded. The BIOS setup allows the user to modify the system configuration for basic input/output peripherals. All the configurations are stored in the CMOS RAM, which has backup battery in case the computer is not connected to a power source. Consequently, the data stored in the CMOS RAM is retained when the system is rebooted, or the power is disconnected.

# **Entering the BIOS Setup**

To enter the BIOS setup utility, press the F2 key while the system is booting up. The main BIOS Setup screen will appear. You can configure the following settings on this screen.

- Continue: Continue to boot up
- Boot Manager: Select the device for boot up
- Device Management: Enter the device configuration menu
- Boot From File: Select the UEFI boot up file
- Administer Secure Boot: Enter the Secure Boot menu
- Setup Utility: Enter the BIOS configuration menu
- Intel® Management Engine BIOS Extension: Enter the AMT configuration menu (not supported in models with Intel® Celeron® and Core™ i3 processors)

#### Select F2 to enter the BIOS configuration.

Front Page				
Front Page				
Front Page Continue *Boot Hanager *Device Hanagement *Boot From File *Administer Secure Boot *Setup Utility *Intel(R) Management Engine BlOS Extension	This selection will direct the system to continue to booting process			
F1 Help Enter Select ► SubHe 1/4 Select Item	nu			

When you enter the **Setup Utility**, a basic description of each function key is listed at the bottom of the screen. Refer to these descriptions to learn how to use them.

F1	General Help	↑↓-	Select Item
F5/ F6	Change Values	$\longleftrightarrow$	Select Menu
F9	Setup Defaults	ESC	Exit
F10	Save and Exit	EN TER	Select or go to Submenu.

The BIOS configuration screen will be shown when you enter the **Setup Utility** option.

Main Advanced Security	Power Root Exit	InsydeH20 Setup Utility	Rev. 5.0
Main Advanced Security Project Name BIOS Version Processor Type System Hemory Speed Cache RAH Total Hemory SODIHH CPUID: CPUI Stepping: L1 Data Cache: L2 Cache: L3 Cache: L4 Cache: Number Of Processors: Microcode Rev: PCH Rev / SKU GOP Ver: Intel HE Version / SKU System Time System Date	HC-3201 V1.0.05 3.00GHz 2400 H1 2560 KE 16384 F 16384 F 16384 C 306C1 C 48 KB x 32 KB x 32 KB x 32 KB x 1280 KE 6 HB N/A 2 CoreC 0000007 20 (B0 17.0.10	112 an Intel(R) Core(TH) i3-1115G4E @ 7s 18 18 19 19 19 10 10 10 10 10 10 10 10 10 10	Rev. 5. This is the help for the hour, minute, second field. Valid range is from 0 to 23, 0 to 59, 0 to 59. INCREASE/REDUCE : +/
F1 Help Esc Exit	1/1 Select Item +/→ Select Item	F5/F6 Change Values Enter Select ≻ SubHenu	F9 Setup Defaults F10 Save and Exit

### NOTE

The **Processor Type** information may vary depending on the model that you have purchased.

# Main Page

The Main page displays basic hardware information, such as model name, BIOS version, and CPU type.

InsydeH20 Setup Utility Rev.				
Main Advanced Security Po	ver Boot Exit			
Project Name BIOS Version	MC-3201 V1.0.0512	This is the help for the hour, minute, second field. Valid range is from 0 to 23.0 to 50.0 to 50. UNCREASE (DEDUCE :		
Processor Type System Memory Speed Cache RAM Iotal Memory SODIHH1 CPUID: CPU Stepping: L1 Data Cache: L2 Cache: L3 Cache: L4 Cache: Number Of Processors: Microcode Rev: PCH Rev / SKU GOP Ver: Intel ME Version / SKU System Time System Date	11th Gen Intel(R) Core(TH) i3-111564E ( 3.00GHz 2400 HT/s 2560 KB 16384 HB 16384 HB 0x806C1 (figerLake ULT) 806C1 (B0 Stepping) 48 KB x 2 32 KB x 2 1280 KB x 2 1280 KB x 2 6 HB N/A 2 Core(s) / 4 Thread(s) 00000078 20 (B0 Stepping) / TGL PCH-LP U Premium 17.0.1064 15.0.10.1574 / CONSUMER 100:27:551 101/01/20211			
F1 Help Esc Exit	1/1 Select Item F5/F6 Change Values +/→ Select Item Enter Select > SubMe	F9 Setup Defaults enu F10 Save and Exit		

# **Advanced Settings**

Select the **Advanced** tab in the main menu to open the advanced features screen.

Main Advanced Se	curity Power	Boot Exit	InsydeH20 Setup Utility		Rev. 5.0
Hain Advanced Se >Boot Configuration >SATA Configuration >CPU Configuration >Chipset Configurati PCH-FW Configurati >COnsole Redirectio >S10 IT8786E	n ion on	Boot Exit		Configures Boot Settings.	Rev. 5.0
F1 Help Esc Exit		/l Select Item 4 Select Item	F5/F6 Change Values Enter Select ▶ SubHenu	F9 Setup Defaults F10 Save and Exit	

## **Boot Configuration**

The **Numlock** option allows configuration of the Numlock value.

Options: On (default), Off.

Advanced	Ins	ydeH20 Setup Utility	Rev. 5.
Boot Configuration		Se	elects Power-on state for Numlock
Numlock	<0n>		
1 Help sc Exit	1/↓ Select Item +/→ Select Item	F5/F6 Change Values Enter Select ▶ SubHenu	F9 Setup Defaults F10 Save and Exit

## **SATA Configuration**

These items allow you to select the SATA speed limit and enable or disable the RAID mode.

Advanced	InsydeH20 Se	tup Utility	Rev. 5.0
SATA Configuration		s	et total SATA port speed limited.
SATA Speed Limited Map SATA Root Port under VMD	<auto> <disabled></disabled></auto>		
▶Serial ATA Port 0 [Not Installe Hot Plug ▶Serial ATA Port 1 [H.2 (S42) 3H Hot Plug	<disabled></disabled>		
		5/F6 Change Values Enter Select ► SubMenu	F9 Setup Defaults F10 Save and Exit

### **SATA Speed Limited**

Options: Auto (default), Gen 1, Gen 2, Gen 3

### Map SATA Root Port under VMD

Options: Disabled (default), Enabled

### **Serial ATA Port**

This setting displays information on the installed drives.

### **SATA Port Hot Plug**

This setting allows you to enable/disable hot-plugging capabilities (the ability to remove the drive while the computer is running) that are configured by software for installed storage drives.

Options: Disabled (default), Enabled

#### RAID

You must set the **Map SATA Root Port under VDM** to **Enabled** to enable **r**edundant **a**rray of **i**nexpensive **d**isks technology. The device has two SATA interfaces, which only support RAID level 0 and RAID level 1.

When using the continuous update policy, changes made to the data on the master drive while the system is not docked are automatically copied to the recovery drive when the system is re-docked. When using the on-request update policy, the master drive data can be restored to a previous state by copying the data on the recovery drive back to the master drive.



Source: http://en.wikipedia.org/wiki/Standard RAID levels for details.

### Intel Rapid Storage Technology

This section allows users to configure Intel® Rapid Storage Technology.

InsydeH2O Setup Utility			
Advanced			
SATA Configuration		Map/UnMap SATA Root Port to VMD for RAID mode	
SATA Speed Limited Map SATA Root Port under VMD	< <mark>Auto&gt;</mark> <enabled></enabled>		
▶Serial ATA Port 0 [Not Insta Hot Plug ▶Serial ATA Port 1 [H.2 (\$42) Hot Plug	<disabled></disabled>		
	Select Item F5/F6 Change Value Select Item Enter Select Model		

After enabling **Map SATA Root Port under VMD**, saving changes, and rebooting the system, you can select the **Device Manager** to configure the Intel Rapid Storage Technology settings.

	Device Manager
Devices List ▶Intel(R) Rapid Storage Technology	This formset allows the user to manage RAID volumes on the Intel(R) RAID Controller
Press ESC to exit.	
F1 Help Esc Exit	t/4 – Select Iten Enter Select ⊨ SubMenu

		Intel(R) Rapid St	orage Technology	
Intel(R) Rapid Storage Techno	ology			
Create RAID Volume				Enter a unique volume name that has no special characters and is 16 characters
Name:		Volume1		or less.
RAID Level:		<raido (stripe)=""></raido>		
Select Disks:	_			
SATA 0.0, MOXA FTH Plus-60 SSI	U	<>		
A060C21C200019, 55.8GB SATA 0.1, M.2 (S42) 3ME4		< >		
CA12107260500029, 29.8GB				
01210120000023, 23.005				
Strip Size:		<64KB>		
Capacity (MB):		[0]		
▶Create Volume				
Colored at least two distants				
Select at least two disks				
F1 Help	↑/↓ Select	ten P	5/F6 Change Values	F9 Setup Defaults
Esc Exit	+/+ Select I		nter Select ▶ SubMenu	F10 Save

# **CPU** Configuration

Advanced	Insyd	eH2O Setup Utility		Rev.	5.0
CPU Configuration	<411>		Number of cores to enable in eac processor package.	h	
Hyper-Thread ing	<enabled></enabled>				
F1 Help Esc Exit	1/↓ Select Item +/→ Select Item	F5/F6 Change Values Enter Select ► SubMenu	F9 Setup Defaults F10 Save and Exit		

### **Active Processor Cores**

This item indicates the number of cores to enable in each processor package.

#### **Hyper-Threading**

This feature makes the processor resources work more efficiently, enabling multiple threads to run on each core. It also increases processor throughput, improving overall performance on threaded software.

Options: Disabled, Enabled (default)

### **Video Configuration**



#### **DVMT Pre-Allocated**

This item allows you to configure pre-allocated memory capacity for the IGD. Pre-allocated graphics memory is invisible to the operating system.

Options: 32M (default), 96M, 128M, 160M

**DVMT:** The amount of video memory your computer has is dependent on the amount of pre-allocated memory set for your system plus the Dynamic Video Memory Technology (DVMT). DVMT dynamically allocates system memory for use as video memory creating the most efficient use of available resources for maximum 2D/3D graphics performance.

#### **DVMT Total Gfx Mem.**

This item allows you to configure the maximum amount of memory DVMT will use when allocating additional memory for the internal graphics device.

Options: 256 MB (default), 128 MB, Max.

# **Chipset Configuration**

This item allows you to configure the chipset settings.

Advanced	Ins	ydeH20 Setup Utility	Rev.
Chipset Configuration			s item allows you to enable/disable computer from automatically
ower ON after Power Failure	<0N>	powe	ering up after a system crash. ions: ON (default), OFF, Last Stat
	1/↓ Select Item -/→ Select Item	F5/F6 Change Values Enter Select ► SubMenu	F9 Setup Defaults F10 Save and Exit

#### **Power ON after Power Failure**

This item allows you to enable/disable the computer from automatically powering up after system power is re-enabled.

Options: ON (default), OFF, Last State

### **PCH-FW** Configuration

This item allows you to configure the PCH-FW settings.

# **Console Redirection**

When the Console Redirection Function is enabled, the console information will be output to both the display monitor and through the serial port.

Options: Disabled (default), Enabled

	InsydeH20	Setup Utility	Rev. 5.0
Advanced			
Console Redirection Setup			Enable Console Redirection Function, Support Serial Port A
Console Serial Redirect	<disabled></disabled>		(RS-232/VT100/115200/N81).
F1 Help Esc Exit	↑/↓ Select Item +/+ Select Item	F5/F6 Change Values Enter Select ▶ SubMenu	F9 Setup Defaults F10 Save and Exit

## **SIO ITE8786E**

This section allows users to configure SIO settings.

Advanced	Insydel	120 Setup Utility	Rev. 5.0
PUART Port 1 Configuration PUART Port 2 Configuration PHardware Honitor			UART Configuration
Fl Help Esc Exit	t/4 Select Item +/→ Select Item	F5/F6 Change Values Enter Select ► SubHenu	F9 Setup Defaults F10 Save and Exit
Advanced	Insydel	420 Setup Utility	Rev. 5.0
UART Port 1 Configuration UART Port 1 Base 1/O Address Interrupt UART Hode	<enab led=""> &lt;3F8b&gt; &lt;1R04&gt; <r\$232></r\$232></enab>		Configure UART Port using options : [Disabled] Disable device [Enabled] Enable device and use below settings

### **Serial Port A**

This function allows users to configure the resources for the serial port A.

Disable: Disables the serial port A connection

Enable: Enables the Serial Port A connection (default)

### **Serial Port B**

This function allows users to configure the resources for the serial port B.

Disable: Disables the serial port B connection

Enable: Enables the Serial Port B connection (default)

### **Hardware Monitor**

This item allows you to view stats such as CPU and system temperature, voltage levels, and other chipset information.

Advanced	Insy	deH2O Setup Utility	Rev. 5.
Hardware Monitor			
Voltage 3.3V 5V	3.204 V 4.817 V		
Temperature THP IN1 THP IN2	64.0 °C/ 14 66.0 °C/ 15	7.2 °F 0.8 °F	
F1 Help Esc Exit	†/↓ Select Item +/→ Select Item	F5/F6 Change Values Enter Select ▶ SubMenu	F9 Setup Defaults F10 Save and Exit

# **Security Settings**

This section allows users to configure security-related settings with a supervisor password and user password.

Main Advanced Security Po		eH20 Setup Utility	Rev. 5.
Current TPM Device TPM State Clear TPM	<tph (dtph<br="" 2.0="">All Hierarchie [ ]</tph>		lear TPM. Removes all TPM context ssociated with a specific Owner.
Supervisor Password	Not Installed		
Set Supervisor Password			
F1 Help Esc Exit	1/↓ Select Item +/→ Select Item	F5/F6 Change Values Enter Select ► SubMenu	F9 Setup Defaults F10 Save and Exit

### **Current TPM Device**

This item shows if the system has TMP device and its type.

### **TPM State**

This item allows you view the status of current TPM settings.

### **Clear TPM**

This item allows users to remove all TPM context associated with a specific owner.

## Set Supervisor Password

This item allows you to set the supervisor password. Select the **Set Supervisor Password** option and enter the password and confirm the password again.

To delete the password, select the **Set Supervisor Password** option and enter the old password; leave the new password fields blank, and then press enter.

	Ins	ydeH20 Setup Utility	Rev. 5.
Main Advanced Security Powe	er Boot Exit		
Current TPM Device TPM State Clear TPM	<tpm (d<br="" 2.0="">All Hierarc [ ]</tpm>		d length must be 8 or more ers
Supervisor Password	Not Install	ed	
Set Supervisor Password			
	Set	Supervisor Password	
	Enter New Pa Enter New Pa	ssword: ssword Again:	
F1 Help Esc Exit	1/1 Select Item +/+ Select Item		F9 Setup Defaults F10 Save and Exit

After setting the supervisor password, users can choose when the input password screen should be displayed.

	Ir	nsydeH20 Setup Utility	Rev. 5.0
Main Advanced Security Po	wer Boot Exit		
Current TPH Device TPH State Clear TPH Supervisor Password	<tph (<br="" 2.0="">All Hierar [ ] Installed</tph>	(DTPH)> chies Enabled, Owned	Enable:System will ask input password on post time. Disable:System will ask input password when go to Setup Utility. Config-Only:System will ask input password when user press F2 into Frontpage
Set Supervisor Password Power on Password	<d i="" led2<="" sab="" td=""><td>Power on Password Enabled Disabled Config-Only</td><td></td></d>	Power on Password Enabled Disabled Config-Only	
F1 Help Esc Exit	1/↓ Select Item €/→ Select Item	F5/F6 Change Values Enter Select ▶ SubMenu	F9 Setup Defaults F10 Save and Exit

Enable: System will ask for the password on post time

Disable: System will ask for the password to go to the setup utility

Config-Only: System will only ask for the password when you select the config (F2) option

# **Power Settings**

The section allows users to configure power settings.

		eH20 Setup Utility	Rev. 5.
Main Advanced Security	Power Boot Exit		
Wake on LAN Auto Wake on S5	<enabled> <d i="" sabled=""></d></enabled>		Determines the action taken when the system power is off and a PCI Power Management Enable wake up event occurs.
M.2 B Key Power mPCIE Power	<0ff> <0ff>		
F1 Help Esc Exit	1/↓ Select Item +/+ Select Item	F5/F6 Change Values Enter Select ► SubMenu	F9 Setup Defaults F10 Save and Exit

### Wake on LAN

This feature is used to wake the system by a LAN device from a remote host.

Options: Enabled (default), Disabled

### Auto Wake on S5

This item allows you to configure the computer to wake from S5 status. S5 stands for Soft Off, where the PSU remains engaged but power to all other parts of the system is cut. Auto-wake on S5 schedules a soft-reboot at certain periodic times that may be specified in the BIOS.

Options: Disabled (default); By Every Day (user specifies a regular daily time when the computer will power up); By Day of Month (user specifies a regular day each month when the computer will power up)

## **M.2 B Key Power**

This item allows you to control the default power of the M.2 B Key slot.

Options: Off (default), on

# **Boot Settings**

The section allows users to configure boot settings.

Main Advanced Securi	ty Power Boot Exit	deH2O Setup Utility	Rev.
Network Stack USB Boot Timeout	<d i="" led="" sab=""> <enab led=""> [0]</enab></d>		twork Stack Support: Windows 8 BitLocker Unlock UEFI IPv4/IPv6 PXE Legacy PXE OPROM
►EF I			
F1 Help	t/↓ Select Item	F5/F6 Change Values	F9 Setup Defaults
Esc Exit	+/→ Select Item	Enter Select 🕨 SubMenu	F10 Save and Exit

#### NOTE

If you do not add any storage, you will not see the EFI option.

### **Network Stack**

It deploys an Internet Protocol (IP) stack. The IP stack provides an application library to open/close connections to remote devices and send/receive data between the remote devices.

Options: Disabled (default), Enabled

### **PXE Boot capability**

This item will be shown only when you have enabled the Network Stack.

PXE Booting is booting a system over a network. This item allows users to start PXE over IPv4 or IPv6 Options: Disabled (default), UEFI: IPv4, UEFI: IPv6, UEFI: IPv4/IPv6

### **USB Boot**

Set booting to USB boot devices capability. Options: Enabled (Default), Disabled
# Timeout

This item allows users to set the number of second that the firmware will wait before booting the original default boot selection.

# EFI



This item allows users to select the boot order. Use F5 (move down) or F6 (move up) to change the value.

# **Exit Settings**

The section allows users to exit the BIOS environment.

Main Advanced Security		InsydeH20 Setup Utility	Rev. 5.0
Exit Saving Changes Save Change Without Exit Exit Discarding Changes Load Optimal Defaults Load Custom Defaults Save Custom Defaults Discard Changes			Σxit system setup and save your changes.
F1 Help Esc Exit	1/↓ Select Item +/→ Select Item	F5/F6 Change Values Enter Select ► SubHenu	F9 Setup Defaults F10 Save and Exit

### **Exit Saving Changes**

This item allows you to exit the BIOS environment and save the values you have just configured. Options: Yes (default), No

### Save Change Without Exit

This item allows you to save changes without exiting the BIOS environment. Options: Yes (default), No

# **Exit Discarding Changes**

This item allows you to exit without saving any changes that might have been made to the BIOS. Options: Yes (default), No

# **Load Optimal Defaults**

This item allows you to revert to the factory default BIOS values. Options: Yes (default), No

# Load Custom Defaults

This item allows you to load custom default values for the BIOS settings.

Options: Yes (default), No

### **Save Custom Defaults**

This item allows you to save the current BIOS values as a "custom default" that may be reverted to at any time by the load custom defaults selection.

Options: Yes (default), No

### **Discard Changes**

This item allows you to discard all settings you have just configured.

Options: Yes (default), No

# **Enabling AMT**



#### NOTE

The AMT function is not supported in the models with Celeron and i3 CPU.

To enter the BIOS setup utility, press the "F2" key while the system is booting up. The main **BIOS Setup** screen will appear. Five options will be available:

1. Select Intel® Management Engine BIOS Extension to enter the AMT configuration.



2. Press **<Enter>** to start the login procedure.

Intel(R) Management Engine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434 Copyright(C) 2003-16 Intel Corporation. All Rights Reserved				
	MAIN MENU			
MEBx Login > Intel(R) ME General Settings > Intel(R) AMT Configuration MEBx Exit				
	Intel(R) ME Password			
Intel(R) ME Password				
[†↓]=Move Highlight	[Enter]=\$elect Entry	[Esc]=Exit		

3. Type the default password: admin

Intel(R) Management Engine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434 Copyright(C) 2003-16 Intel Corporation. All Rights Reserved				
MAIN MENU				
MEBx Login > Intel(R) ME General Settings > Intel(R) AMT Configuration MEBx Exit	Intel(R) ME Password			
Intel(R) ME Password				
[†↓]=Move Highlight	[Enter]=\$elect Entry	[Esc]=Exit		

4. Type the new password. It must include both upper-case and lower-case characters, numbers, and special symbols. E.g., **Admin'12**.

Intel(R) Management Engine Blos Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434 Copyright(C) 2003-16 Intel Corporation. All Rights Reserved				
MAIN MENU				
HEBx Login > Intel(R) ME General Settings > Intel(R) AMT Configuration HEBx Exit				
	Intel(R) ME New Password			
Intel(R) ME Password				
[1↓]=Move Highlight	[Enter]=Select Entry	[Esc]=Exit		

- 5. Select **Intel® AMT Configuration** to enable remote access without a local user present for consent, select **User Consent**, and then select **User Opt-in** and change the value to **None**.
- 6. Set static IP or DHCP by request.

Intel(R) Management Engine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434 Copyright(C) 2003-16 Intel Corporation. All Rights Reserved				
WIRED LAN IPV4 CONFIGURATION				
DHCP Mode IPV4 Address Subnet Mask Address Default Gateway Address Preferred DNS Address Alternate DNS Address	<d i="" led="" sab=""> 172. 16. 1. 2 255. 255. 255. 0 0. 0. 0. 0 0. 0. 0. 0 0. 0. 0. 0 0. 0. 0. 0</d>			
Subnet mask (e.g. 255.255.0)				
[†↓]=Move Highlight	[Enter]=\$elect Entry	[Esc]=Exit		

7. Set Activate Network Access to enable remote access capability.

Intel(R) Management Engine Blos Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434 Copyright(C) 2003-16 Intel Corporation. All Rights Reserved				
INTEL(R) AMT CONFIGURATION				
Manageability Feature Selection <enabled> &gt; SOL/Storage Redirection/KVM &gt; User Consent</enabled>				
Password Policy <anytime> &gt; Network Setup Activate Network Access</anytime>				
Unconfigure Network Access <pre></pre> <pre></pre> Remote Setup And Configuration Power Control	>			
[1]=Move Highlight [Enter]=Select Entry [E	Esc]=Exit			

# **Using AMT**

You can use any AMT tool available to run the remote management function using a web browser.

 Type the IP address of your computer as configured in the AMT configuration settings with port 16992. The AMT logon screen will appear.

CIntel® Active Management Technology - Windows Internet Explorer				
C + Ittp://172.16.1.2:16992/logon.htm	<b>× * *</b>			
Intel® Active Management Technology	(intel)			
Log On Log on to Intel® Active Management Technology on this computer.				

2. Click Log On and type the username (admin) and password.

tem Status	System Status		
Iware Information System	Power	On	
Processor	IP address	172.16.1.2	
Memory Disk	IPv6 address	Disabled	
Battery	System ID	12345678-1234-5678-90ab-cddeefaabbcc	
it Log ote Control	Date	8/21/2014	
er Policies	Time	7:59 pm	
ork Settings Network Settings em Name Settings Accounts	Refresh		

# 

### NOTE

The AMT port is LAN1.



### NOTE

For details, refer to the Intel AMT Implementation and Reference Guide at: <u>https://software.intel.com/sites/manageability/AMT\_Implementation\_and\_Reference\_Guide/default.htm?t\_url=WordDocuments%2Faccessingintelamtviathewebuiinterface.htm</u>

# **Administering Secure Boot**

Press F2 to go to the Administer Secure Boot.

Administer Secure Boot	Administe	er Secure Boot	
System Status:			Restore all of the Secure Boot Settings to default factory settings and enable
Secure Boot Database Secure Boot Status User Customized Security	Un locked Disabled NO		Secure Boot.
Options:			
▶Select a UEFI file as trusted for executi Enforce Secure Boot Erase all Secure Boot Settings Restore Secure Boot to Factory Settings	on <d i="" led="" sab=""> <d i="" led="" sab=""> <enab led=""></enab></d></d>		
PPK Options ▶KEK Options ▶DB Options ▶DBT Options ▶DBR Options			
F1 Help 1/4 Select		F5/F6 Change Values	F9 Setup Defaults
Esc Exit +/+ Select	ltem	Enter Select ► SubMenu	F10 Save and Exit

Secure Boot helps a computer resist attacks and infection from malware. The feature defines an interface between the operating system and BIOS. It detects tampering with boot loaders, key operation system files, and unauthorized option ROMs by validating their digital signatures.

# **Enabling UEFI Secure Boot**

Set as "enabled" in "Restore Secure Boot to Factory Settings" under Administer Secure Boot menu. Press F10 as save and exist.



Moxa has put Microsoft key in BIOS in default; if users cannot boot up by "Non Windows OS", use the following example.

# **Enroll EFI Image**

	Administer Secure Boot	
Administer Secure Boot		
System Status:		Add sepecific EFI image hash to allowed database.
Secure Boot Database Secure Boot Status User Customized Security	Installed and Locked Disabled NO	
Options:		
<pre>&gt;Select a UEF1 file as trusted for execut Enforce Secure Boot Erase all Secure Boot to Factory Settings Net Options &gt;PK Options &gt;DB Options &gt;DB Options &gt;DBR Options &gt;DBR Options</pre>	ion <enabled> <disabled> <enabled> <enabled></enabled></enabled></disabled></enabled>	
F1 Help 1/4 Select Esc Exit +/+ Select		F9 Setup Defaults F10 Save and Exit

Administer Secure Bo	Ad	minister Secure Boot	
<.> <> bootx64.efi			
F1 Help Esc Exit	1/↓ Select Item +/→ Select Item	F5/F6 Change Values Enter Select ▶ SubMenu	F9 Setup Defaults F10 Save and Exit

Enter "Administer Secure Boot" once again and see "Select a UEFI file as trusted for execution", put loader into the database named and followed by the UEFI standard \EFI\BOOT\BOOT{machine type short-name}. E.g., efi\boot\BootX64.efi, Debian (EFI\debian\grubx64.efi), Suse (EFI\opensuse\grubx64.efi)

# **Enroll Customer Key**

Administer Secure Boot	Administer Secure Boot	
System Status:		Enroll/Delete Signature
Secure Boot Database Secure Boot Status User Customized Security	Installed and Locked Disabled NO	
Options:		
▶Select a UEFI file as trusted for execut	ion	
Enforce Secure Boot		
	<enabled></enabled>	
Erase all Secure Boot Settings	<disabled> <enabled></enabled></disabled>	
Restore Secure Boot to Factory Settings	<eu9d1605< th=""><th></th></eu9d1605<>	
▶PK Options ▶KEK Options ▶DB Options ▶DBX Options ▶DBT Options ▶DBR Options		
F1 Help t/↓ Select		F9 Setup Defaults
Esc Exit +/+ Select	: Item Enter Select ▶ SubMenu	F10 Save and Exit

Administer Secure Boot				
ÞEnroll Signature ÞDelete Signature			Enroll Signature	
	#indows Production PCA 2011 Corporation UEFI CA 2011 cate.			
F1 Help Esc Exit	1/1 Select Item €/4 Select Item	F5/F6 Change Values Enter Select > Subhenu	F9 Setup Defaults F10 Save and Exit	

Enter "DB OPTION" and enroll your key. Please make sure your key is CRT format and uses RSA 2048 or better.

# **Upgrading the BIOS**

This section describes how to upgrade the BIOS on your computer.



### NOTE

It is possible to permanently damage the computer when upgrading the BIOS. We strongly recommend that you contact Moxa's technical support staff for assistance to obtain all the necessary tools and the most current advice before attempting to upgrade the BIOS on any Moxa device.

#### Step 1: Create a Bootable USB Disk

Before upgrading the BIOS, you must create a bootable USB drive as a system boot device for use in the future.

- 1. Insert a USB disk in the computer's USB drive.
- 2. Search for "format" and select Create and format hard disk partitions.

Al	I Apps	Documents	Settings	Photos	Ν
Best	match				
<b>S</b>	Create a partition Control p		d disk	$\rightarrow$	
Com	nmand				
	format			>	
Sett	ings				
⊕	See the cu formats	rrent date and	time	>	
$\oplus$	Region set	tings		>	
$\oplus$	Set region	al format		>	
ç	Emphasize	formatted tex	d	>	
$\oplus$	Change th	e date and tim	e formats	>	
Q	format				

3. Right-click on the USB disk item and select Format.

Volume	Layout	Туре	File System	Status	Capacity	Free Spa	% Free	
(D:) (Disk 0 partition 2 Recovery Windows (C:)	Simple	Basic Basic Basic Basic Basic	NTFS NTFS NTFS	Healthy (P Healthy (E Healthy (	. 7.14 GB . 100 MB	7.07 GB 100 MB 190 MB 15.66 GB	99 % 100 % 38 % 54 %	
							Open Explore	
							Mark Partition as Ac	
							Change Drive Letter Format	and Paths
29.80 GB	<b>Recovery</b> 500 MB NTFS Healthy (OEM P	Partition)	100 MB Healthy (E	Fl System Pa	<b>Windows (C:)</b> 29.21 GB NTFS Healthy (Boot, Pa	ge Fil	Extend Volume Shrink Volume Add Mirror Delete Volume	
= Disk 1							Properties	
Removable	(D:) 7.14 GB NTFS						Help	
		y Partition)	///////////////////////////////////////	777777777	///////////////////////////////////////	1//////////////////////////////////////	7/////	

4. Select FAT32 and click OK to start formatting the disk.

Format D:	×
Volume label:	New Volume
File system:	NTFS ~
Allocation unit size:	NTFS FAT32
Perform a quick for	exFAT mat
Enable file and fold	er compression
	OK Cancel

#### Step 2: Prepare the Upgrade File

You must use the BIOS upgrade installation file to upgrade the BIOS. Contact Moxa's technical department for assistance. The BIOS upgrade file includes an **efi** folder and an **xxxx.efi** file. Copy the **efi** folder and **xxxx.efi** file to the bootable USB disk.

#### Step 3: Run the Upgrade Program on Your Computer

- 1. Reboot the computer with the boot disk and press F2 to go to the Boot Manager.
- If the BIOS cannot recognize the USB drive as the boot-up device, the USB drive might not have a partition table. Use the Windows command line tool **diskpart** to rebuild the partition table.

2. Select the USB Disk.



The screen will switch to the SHELL environment.

 Type fs0:, go to the directory where the upgrade file is located, and type xxxxx.efi (the file name is based on the upgrade file from Moxa).



4. Wait until the upgrade procedure is completed.



#### ATTENTION

Do NOT switch off the power supply during the BIOS upgrade, since doing so may cause the system to crash.

	Insyde I	H2OFFT (Flash Firmware Tool) Version (SEG) 200.00.00.13	
	2	t (C) 2020 Insyde Software Corp. All Rights Reserved.	
		Loading New BIOS Image File: Done	
		Current BlOS Model Name: MC-3201	
		New BIOS Model Name: MC-3201	
		Current BIOS Version: V1.0.0S12	
		New BIOS Version: V1.0.0S12	
Common	Region:00	StartAddr:0xFE000000 EndAddr:0xFE000FFF	
Common	Region:01	<pre>\$tartAddr:0xFF400000 EndAddr:0xFFFFFFFF</pre>	
		Updating Block at FE21D000h	
	0%	25% 50% 75% 100%	
		6%	

When the upgrade is finished, the computer will automatically reboot.

You can check BIOS version on the Main page to confirm the upgrade.

Main	Advanced	Secur i ty	Power	Boot	Exit
Projec	t Name				MC-3201
Project Name BIOS Version					V1.0.0\$12

If the system has more than one boot device, you will see more than one fsx (x represents the number).

EFI Shel	l version 2.50 [22281.4149]
Current	running mode 1.1.2
Device m	apping table
fs0	:HardDisk - Alias hd33e0a2 blk0
	PciRoot(0x0)/Pci(0x17,0x0)/Sata(0x4,0x0,0x0)/HD(2,GPT,0AC3B829-99B0-4FDE-844D-8A10C1D55C6C,0xFA000,0x32000)
fs1	:Removable HardDisk - Alias hd25r0b blk1
	Pc iRoot(0x0)/Pc i (0x14, 0x0)/USB(0x11, 0x0)/HD(1, MBR, 0x00DD3D80, 0x3F, 0xEB5FC1)
fs2	:Removable BlockDevice - Alias f25s0 blk2
	Pc iRoot(0x0)/Pc i (0x14, 0x0)/USB(0x12, 0x0)
b1k0	:HardDisk - Alias hd33e0a2 fs0
	PciRoot(0x0)/Pci(0x17, 0x0)/Sata(0x4, 0x0, 0x0)/HD(2, GPT, 0AC3B829-99B0-4FDE-844D-8A10C1D55C6C, 0xFA000, 0x32000)
blk1	:Removable HardDisk - Alias hd25r0b fs1
	PciRoot(0x0)/Pci(0x14, 0x0)/USB(0x11, 0x0)/HD(1, MBR, 0x00DD3D80, 0x3F, 0xEB5FC1)
b1k2	:Removable BlockDevice - Alias f25s0 fs2
	Pc iRoot(0x0)/Pc i (0x14, 0x0)/USB(0x12, 0x0)
b1k3	:HardDisk - Alias (null)
	PciRoot(0x0)/Pci(0x17,0x0)/Sata(0x4,0x0,0x0)/HD(1,GPT,5796BAEF-EC3F-447F-B4F1-21EB08DC5D57,0x800,0xF9800)
bik4	:HardDisk - Alias (null)
	Pc iRoot(0x0)/Pc i(0x17, 0x0)/Sata(0x4, 0x0, 0x0)/HD(3, GPT, 7C8FF3C6-53E8-4CF9-8141-65DF7EF04399, 0x12C000, 0x8000)
b1k5	:HardDisk - Alias (null)
	Pc iRoot(0x0)/Pc i(0x17, 0x0)/Sata(0x4, 0x0, 0x0)/HD(4, GPT, 1AABAECE-BE17-4C27-AF60-E6C69977AC02, 0x134000, 0x3A6E800)
blk6	:BlockDevice - Alias (null)
	Pc iRoot(0x0)/Pc i (0x17, 0x0)/Sata(0x4, 0x0, 0x0)
blk7	:Removable BlockDevice - Alias (null)
	PciRoot(0x0)/Pci(0x14,0x0)/USB(0x11,0x0)

5. Go to each fsx (x stands for the number) and type Is to view the content of the boot device. If you find an upgrade file, run it.



# A. Regulatory Approval Statement



This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**Class A:** FCC Warning! This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the users will be required to correct the interference at their own expense.



#### Warning:

This is a class A product. If used in a domestic environment, this product may cause undesirable radio interference, in which case the user may be required to take adequate measures to prevent the interference from affecting nearby devices.