MC-1100 Series
Hardware User's Manual

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www.moxa.com/product

MOXA®

MC-1100 Series
Hardware User's Manual

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Introduction

Moxa's MC-1100 Series DIN-rail mountable, fanless, x86 embedded computers are based on the Intel® Atom™ E3800 Series processor, feature the most reliable I/O design to maximize connectivity, and support wireless modules (Wi-Fi/3G/LTE), making them suitable for a diverse range of communication applications.

With a wide operating temperature range (-40 to 70°C) and compliance with safety, EMI, and EMS standards, the MC-1100 Series of computers are ideal for intelligent computing and communication solutions operating in critical environments, including marine communication, oil & gas field site monitoring, and transportation.

The MC-1100 Series supports "Moxa Hardware Monitoring" for device I/O status monitoring and alerts, system temperature monitoring and alerts, and system power management. The ability to closely monitor a system status makes it easier to recover from errors and provides the most reliable platform for your applications.

The following topics are covered in this chapter:

❑ **Package Checklist**
❑ **Product Features**
❑ **MC-1100 Hardware Specifications**
❑ **Hardware Block Diagram**

Package Checklist

- MC-1100 embedded computer
- Terminal block to power jack converter
- DIN-rail 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-1100 embedded computers support the following features:

- Intel Atom Quad-core E3845 processor
- -40 to 70°C system operating temperature
- One mini-PCIe socket for wireless modules: Wi-Fi, 3G, LTE, GPS, and Bluetooth
- Variety of interfaces: Up to 2 serial ports, 4 Ethernet LAN ports, 4 DIs, 4 DOs, SD slot, 2 USB ports, VGA port, display port, wireless
- Certified for mission-critical environments: IEC-60945, DNV, UL C1D2, ATEX/ IECEx
- Windows 7 Embedded and Debian 8 platform support
- Moxa Proactive Monitoring utility for system hardware health monitoring
- Moxa Smart Recovery utility to recover system from boot failure (W7E only)

MC-1100 Hardware Specifications

The latest specifications for Moxa's products can be found at https://www.moxa.com.

Hardware Block Diagram

```
                    ┌──────────┐
                    │   BIOS   │
                    └──────────┘
                         │
  ┌──────────┐      ┌────────────┐      ┌──────────┐    ┌──────────┐
  │   VGA    │◄────►│            │◄────►│   LAN    │◄──►│ Gigabit  │
  └──────────┘      │            │      │ Control  │    │  LAN 1   │
  ┌──────────┐      │            │      └──────────┘    └──────────┘
  │ Display  │◄────►│            │◄────►│   LAN    │◄──►│ Gigabit  │
  │   Port   │      │ Atom E3800 │      │ Control  │    │  LAN 2   │
  └──────────┘      │ Series CPU │      └──────────┘    └──────────┘
                    │            │                                   ┌──────────────┐
  ┌──────────┐      │            │      ┌──────┐ ◄───────────────────►│ Mini PCIe x 1│
  │ CFast x 1│◄────►│            │      │ B2B  │                     └──────────────┘
  └──────────┘      │            │◄────►│ COM  │    ┌──────────┐    ┌──────────┐
  ┌──────────┐      │            │      │      │◄──►│   LAN    │◄──►│ Gigabit  │
  │ SD 3.0 x1│◄────►│            │      │      │    │ Control  │    │  LAN 3   │
  └──────────┘      │      ┌─────┤      │      │    └──────────┘    └──────────┘
  ┌──────────┐      │      │ RTC │      │      │◄──►│   LAN    │◄──►│ Gigabit  │
  │USB 2.0 x2│◄────►│      └─────┤      └──────┘    │ Control  │    │  LAN 4   │
  └──────────┘      └────────────┘                  └──────────┘    └──────────┘
                         │                 │     │
                    ┌──────────┐      ┌──────────┐  ┌──────────┐
                    │  DDR3L   │      │  Serial  │  │  DI x4   │
                    │ SO-DIMM  │      │ Port x2  │  │  DO x4   │
                    └──────────┘      └──────────┘  └──────────┘
```

2
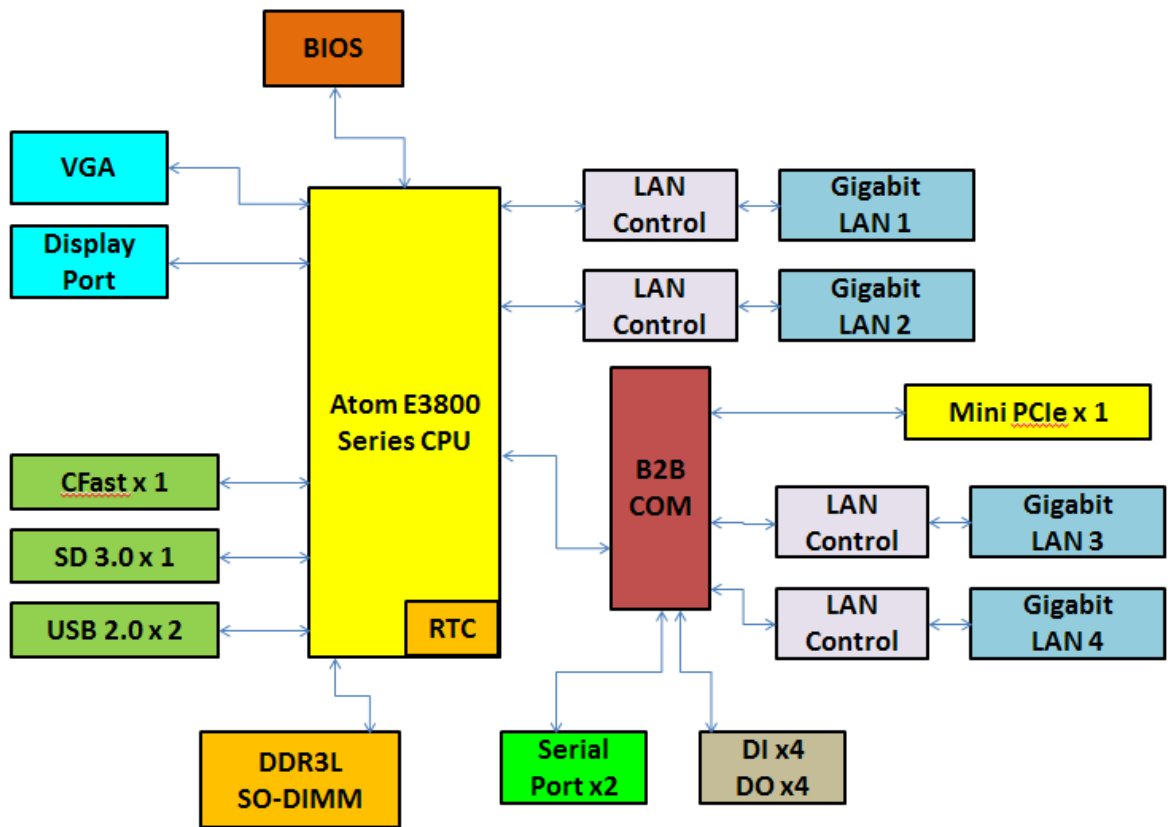
Hardware Introduction

The MC-1100 Series embedded computers are compact, well-designed, and rugged enough for industrial applications. LED indicators help you monitor performance and identify trouble spots, multiple serial ports allow you to connect different devices for wireless operation, and the reliable and stable hardware platform lets you devote your attention to developing your applications.
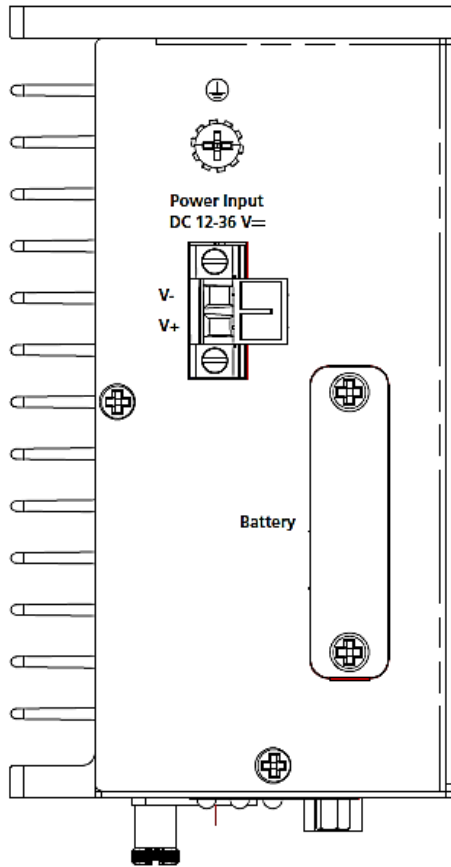
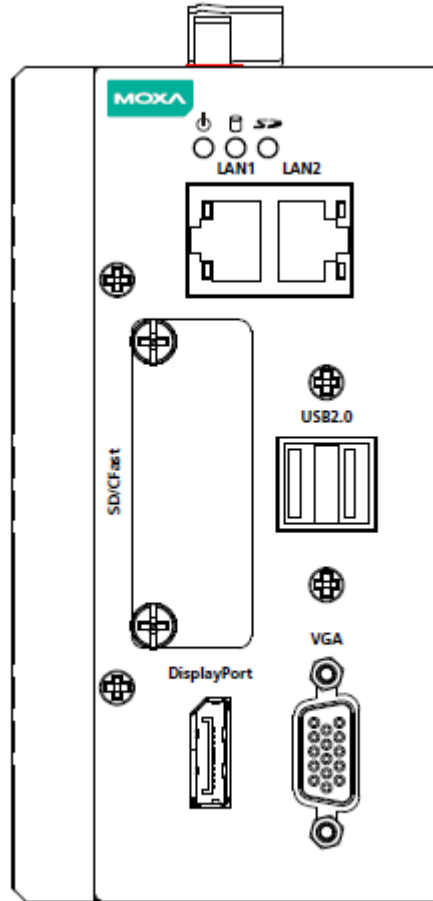The following topics are covered in this chapter:

Appearance

MC-1111

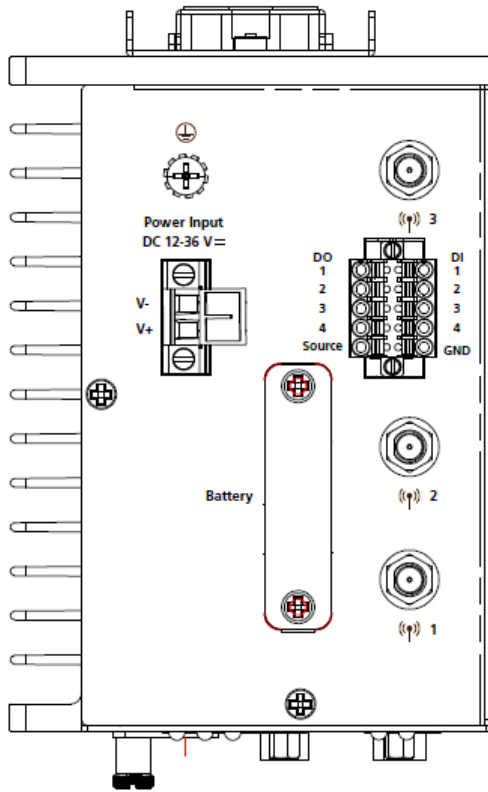**Top View**   **Front View**
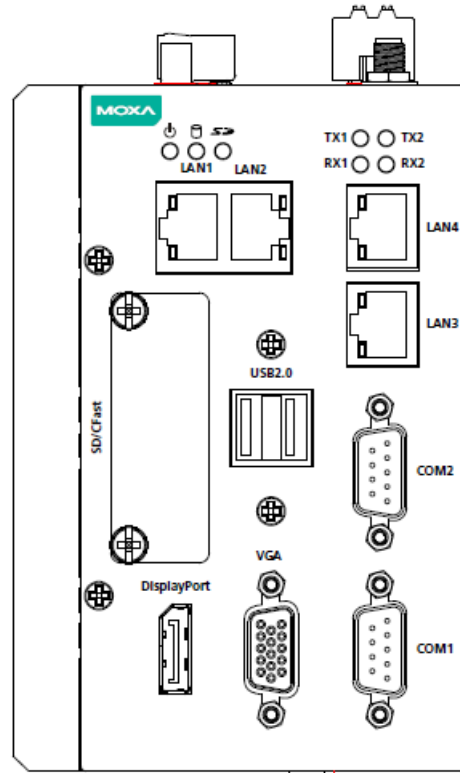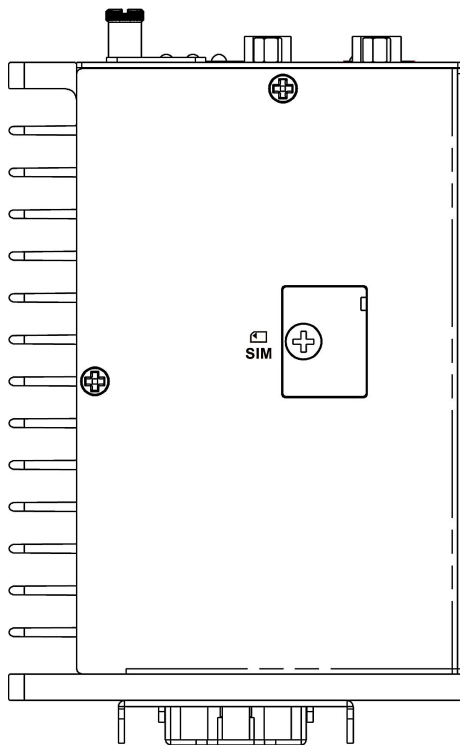
MC-1121

Top View
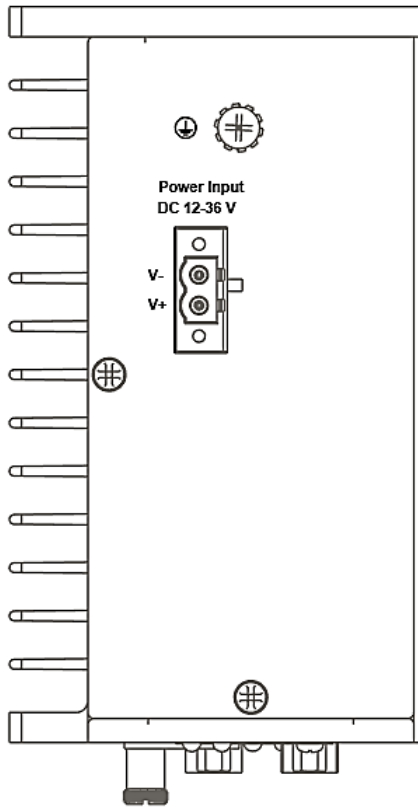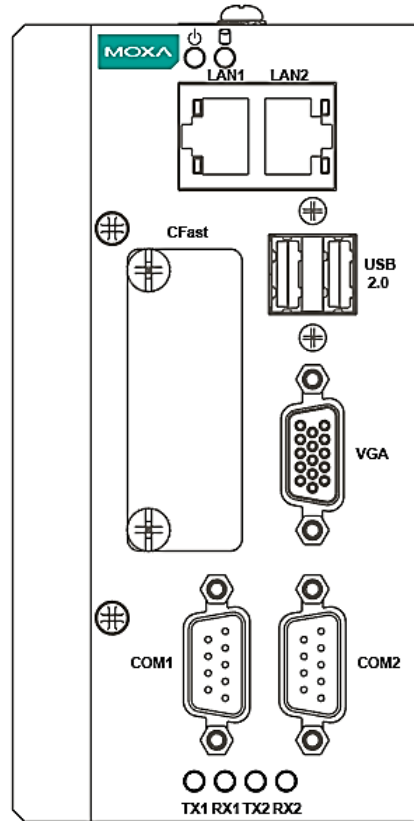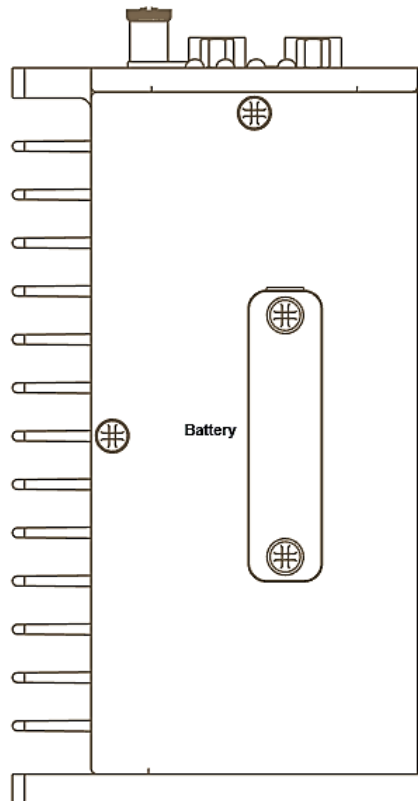   **Front View**
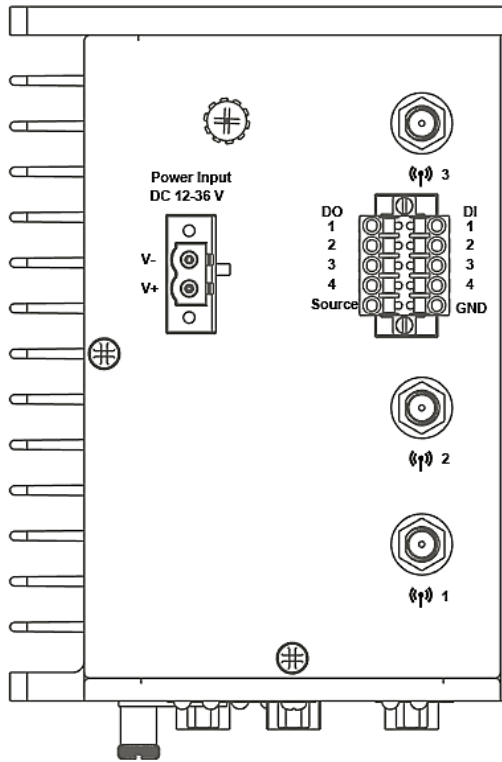
Rear View

MC-1112

Top View

Front View

Rear View

MC-1122

Top View   **Front View**
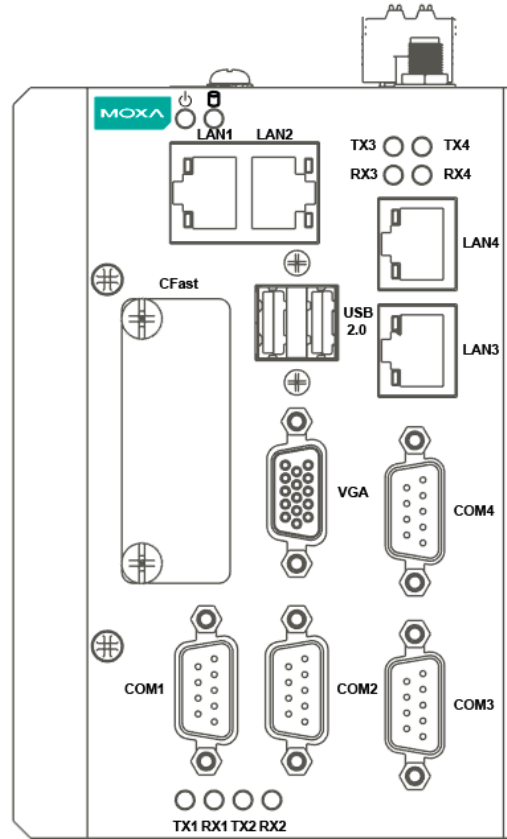
Rear View
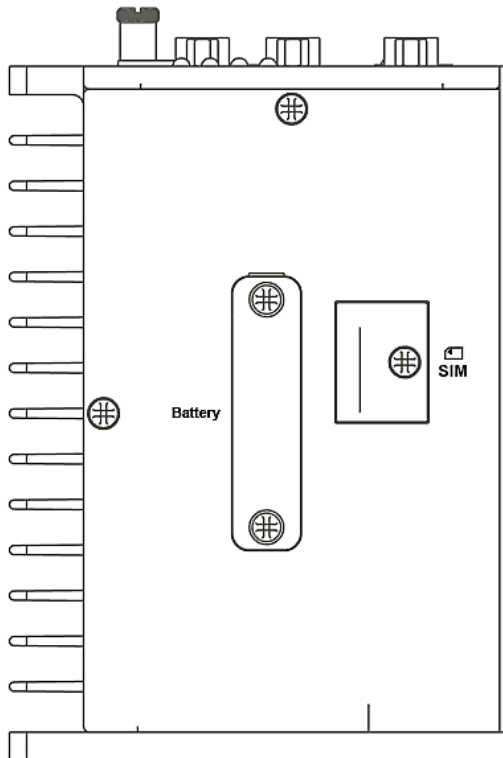
Dimensions in mm (inch)

MC-1111
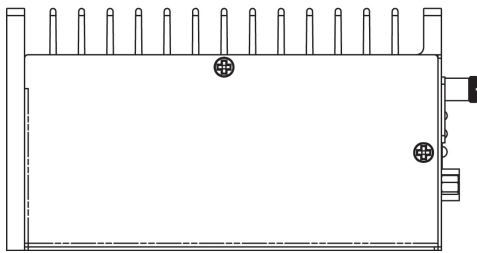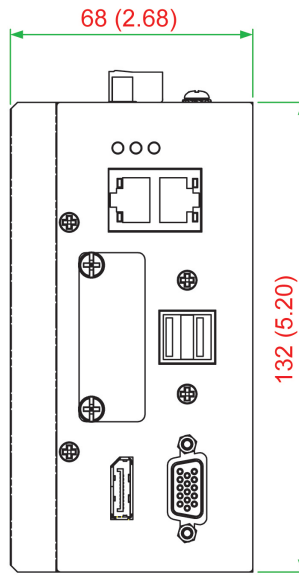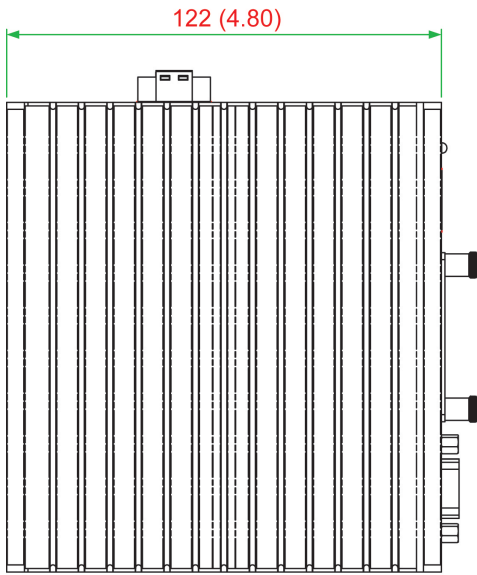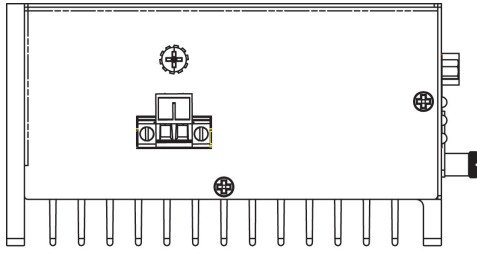
MC-1121
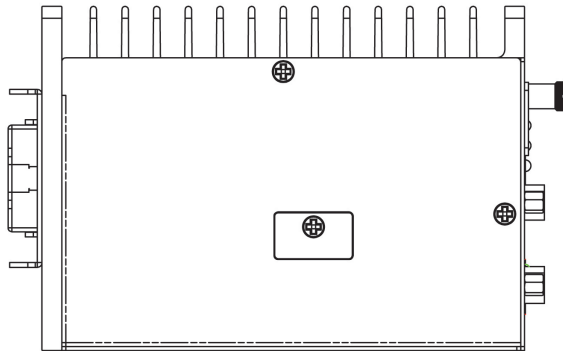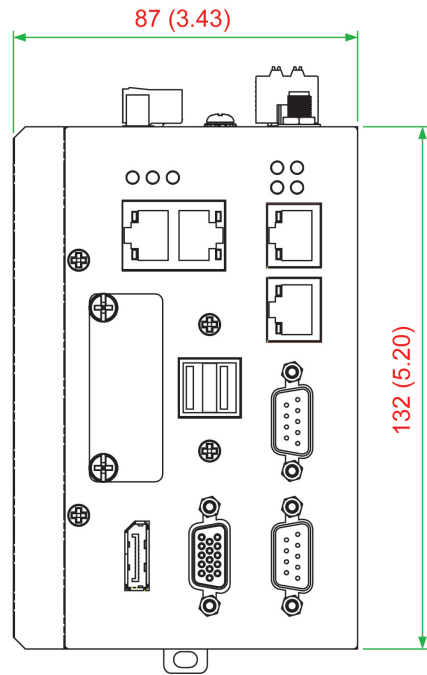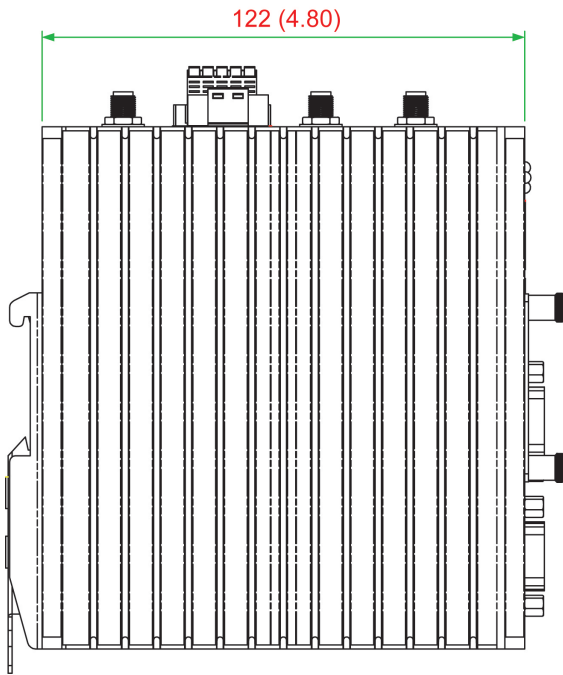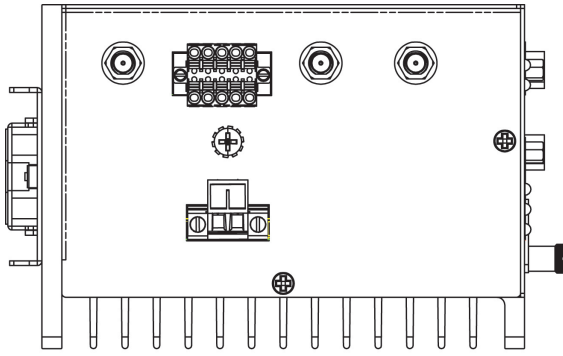
MC-1112
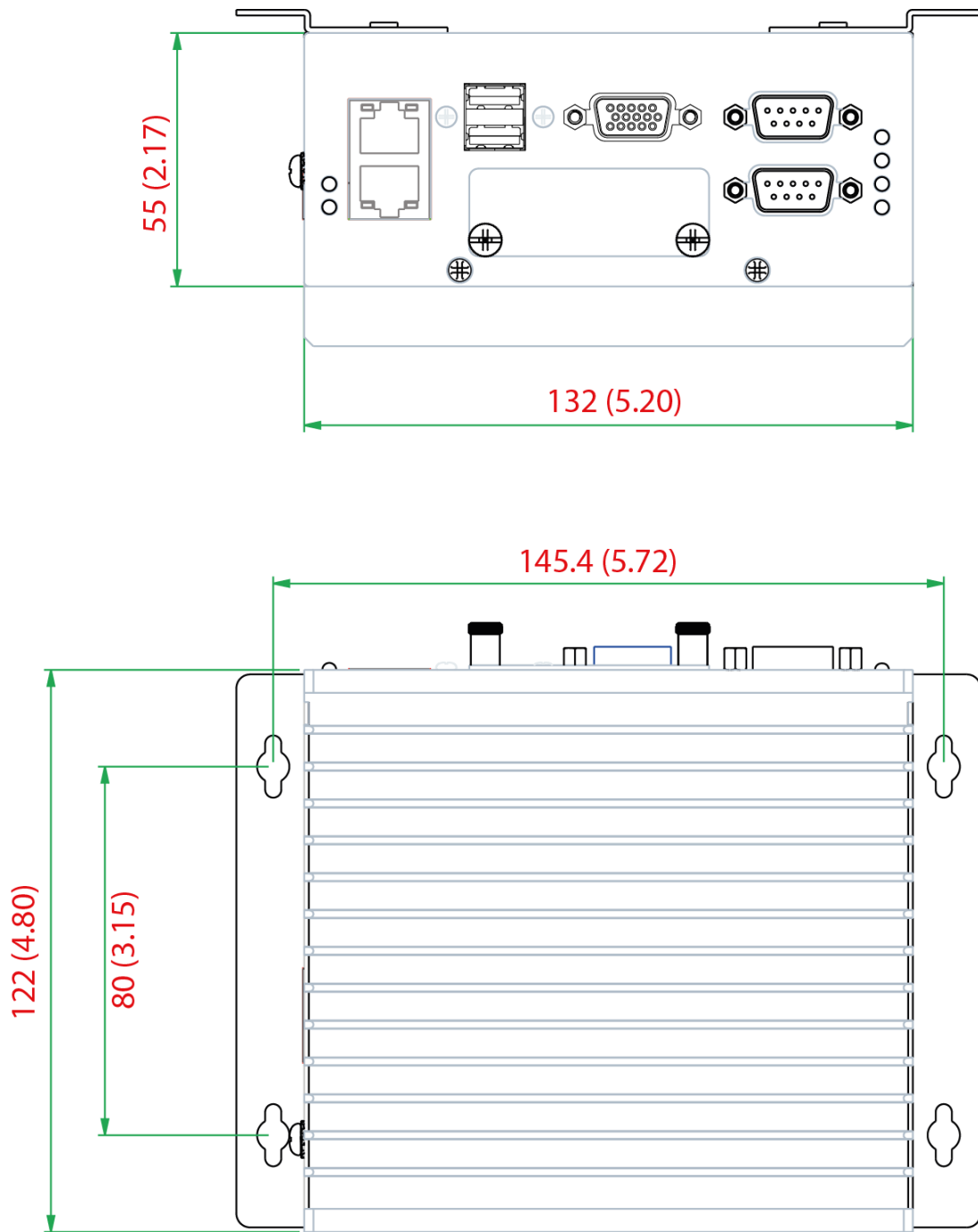
MC-1122
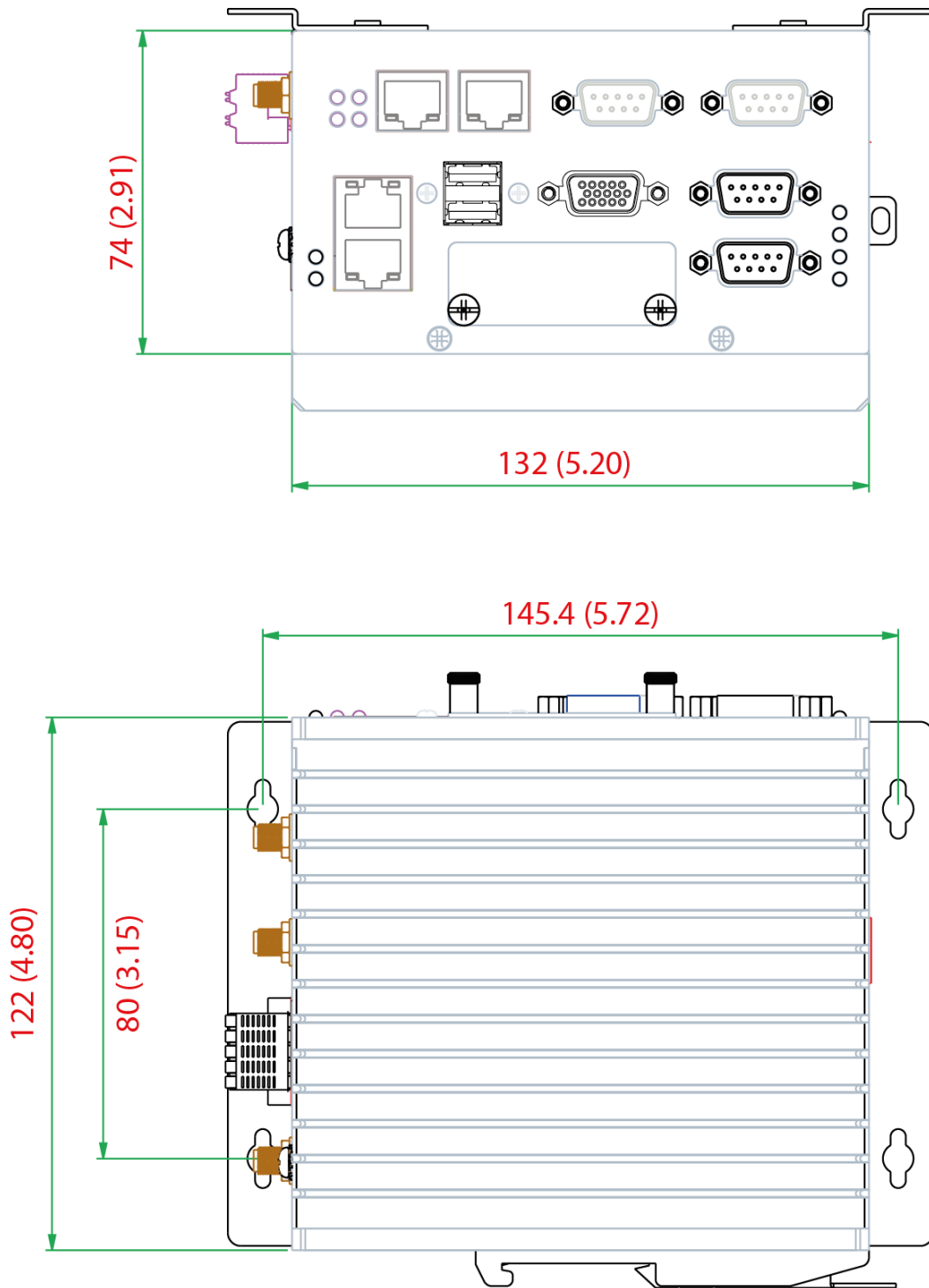
LED Indicators

LED Name		Status	Function
Power		Green	Power is on and computer is function normally.
		Off	Power is off.
Storage 1 (CFast)		Yellow	Blinking: Data is being transmitted.
		Off	No data transmission.
Storage 2 (SD) (MC-1111 and MC-1121 Series only)		Yellow	Blinking: Data is being transmitted.
		Off	No data transmission.
LAN 1/2/3/4 (LAN 3/4 is available only on the MC-1121 and MC-1122 Series)		Green	100 Mbps Ethernet link. Blinking: Data is being transmitted.
		Yellow	1000 Mbps Ethernet link. Blinking: Data is being transmitted.
		Off	10 Mbps Ethernet link or LAN is not connected.
Tx 1/2/3/4		Green	Blinking: Data is being transmitted.
		Off	Not connected.
Rx 1/2/3/4		Yellow	Blinking: Data is being transmitted.
		Off	Not connected.

3

Hardware Connection Description

In this chapter, we show how to connect the embedded computers to the network and to various devices.

The following topics are covered in this chapter:

Installing a Wireless Module

The MC-1121 and MC-1122 models are provided with one mini-PCIe socket. To install a wireless module (Wi-Fi, 3G, LTE, GPS, or Bluetooth), do the following:

STEP1: Loosen the six screws on the right panel and two screws on the bottom panel of your computer.

Right Panel   **Bottom Panel**
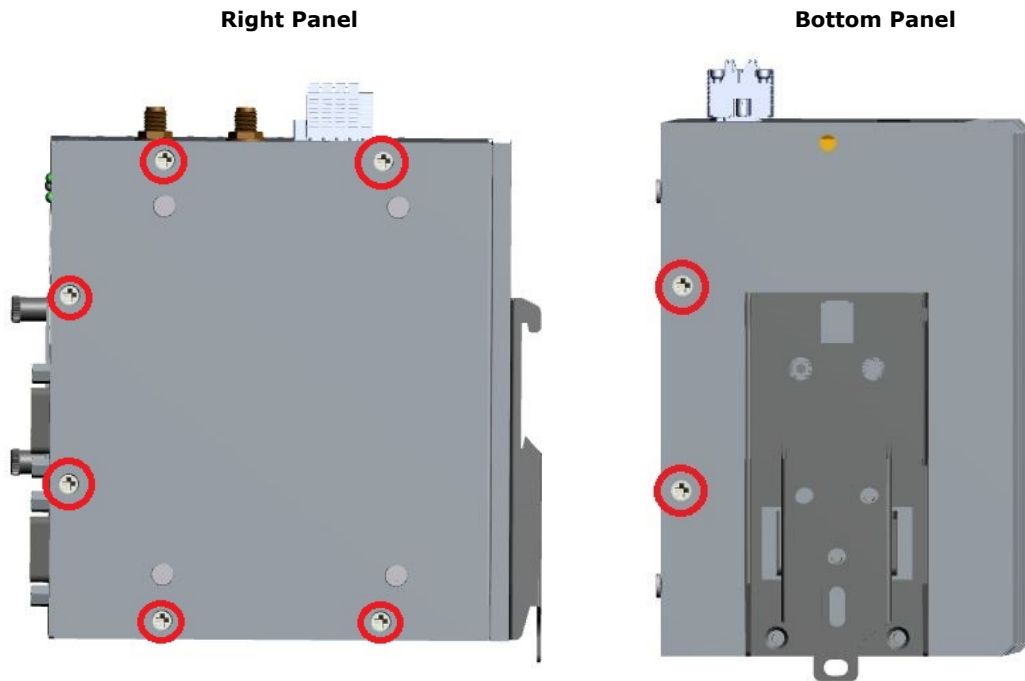
STEP2: Remove the right cover to expose the mini-PCIe socket.

STEP 3: Insert the wireless module card into the socket at an angle.

STEP 4: Push down the wireless module card and fasten two screws on to the card to secure it in place.
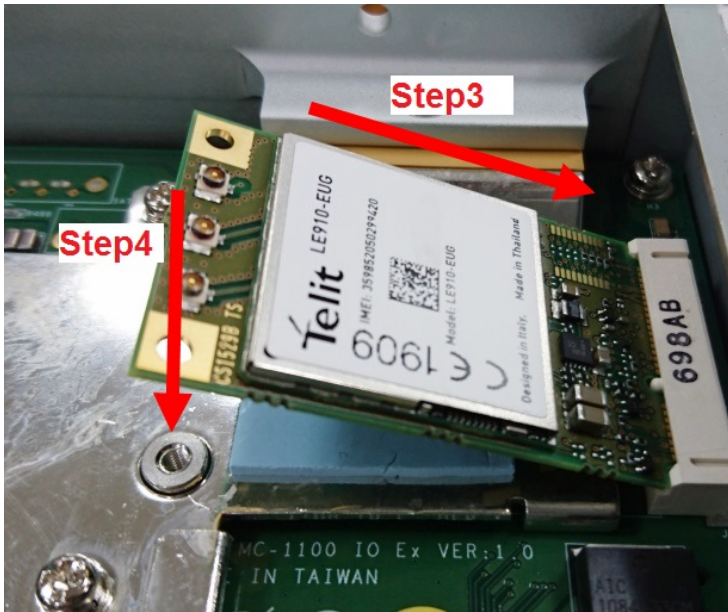
STEP 5: Connect the SMA cable to the connector on the wireless module card installed.

Package name: Cellular-LTE-EU(LE910)

The available connectors are:
- Main RF antenna (ANT)
- RX Diversity Antenna (DIV)
- GNSS Antenna (GPS)
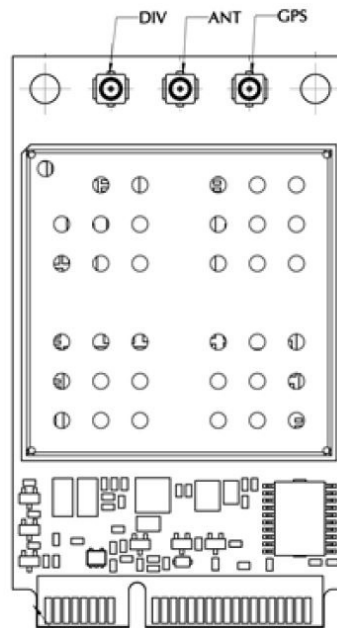
Package name:
Cellular-LTE(L201) for North America/
Cellular-LTE(L210) for EMEA and APAC
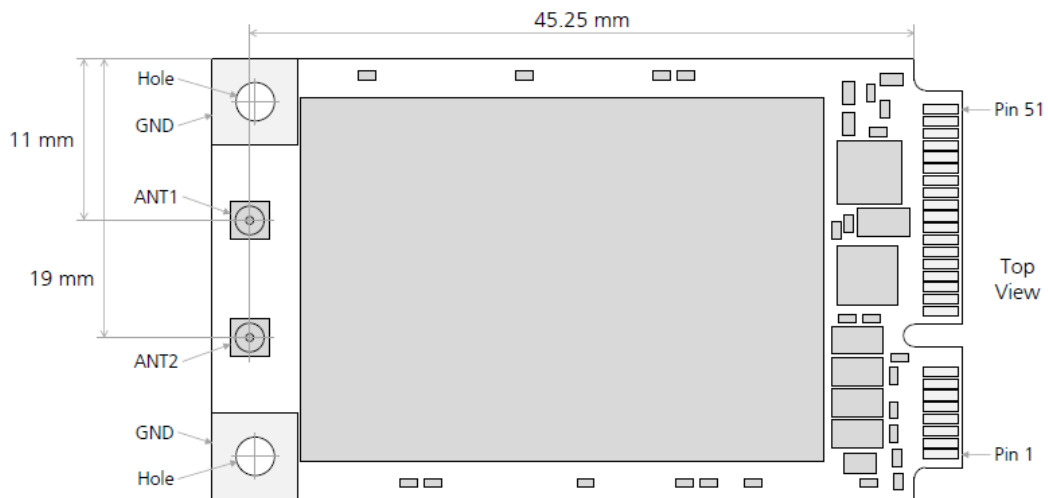
The available connectors are:

- ANT1: Main RF Antenna
- ANT2: RX Diversity Antenna

	Cellular-LTE(L201)	Cellular-LTE(L210)
Area	North America	EMEA and APAC
LTE Bands	2, 4, 5, 13, 17	1, 3, 5, 7, 8, 20
UMTS Bands	850, 1900	850, 900, 1900, 2100
Data Rates	Cat 4 (150 Mbit/s DL, 50 Mbit/s UL)	Cat 4 (150 Mbit/s DL, 50 Mbit/s UL)
MIMO	2x2	2x2

STEP 6: Replace the right cover.

You can also purchase external 3G, 4G, and Wi-Fi antennas from Moxa. Please contact a Moxa sales representative for information.

After installing the wireless modules and external wireless antennas, the computer should appear as shown here.

Installing the MC-1100

DIN-rail Mounting

The MC-1100 comes with a DIN-rail mounting kit for installing the computer on a DIN rail.

Installation:

STEP 1:
Use 4 screws to attach the DIN-rail mounting bracket to the MC-1100's rear panel and tighten the screws to secure the bracket.
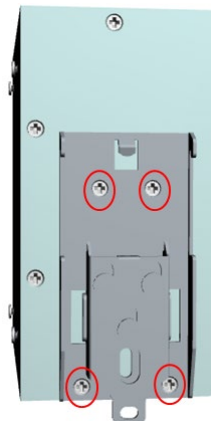
STEP 2:
Insert the upper lip of the DIN rail into the DIN-rail mounting kit.

STEP 3:
Press the MC-1100 towards the DIN rail until it snaps into place.
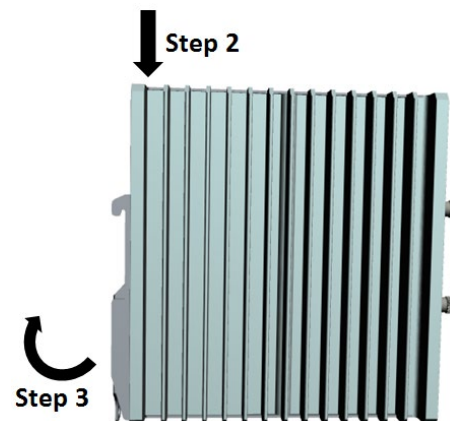
Removal:

STEP 1:
To unmount the MC-1100, pull down the latch provided at the base of the mounting kit with a screwdriver.

STEPS 2:
Slightly pull the MC-1100 forward and lift up to detach it from the DIN rail.
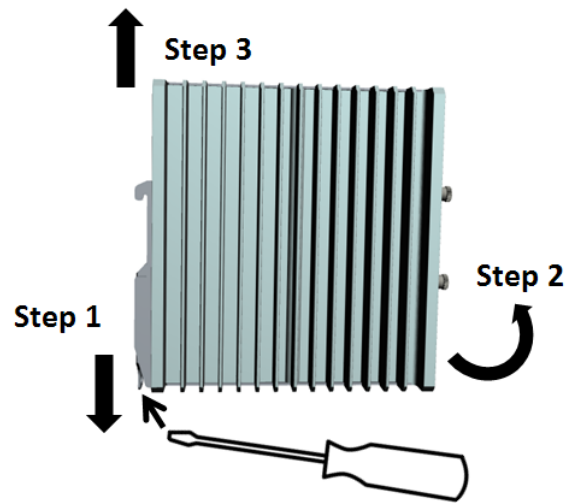
Wall or Cabinet Mounting (DNV)
Use the optional wall-mounting kit to install the MC-1100 on to a wall.

NOTE	The wall mounting kit can be purchased separately.

STEP 1:
Attach the wall-mounting brackets to the rear side of the MC-1100 by using two screws per bracket.
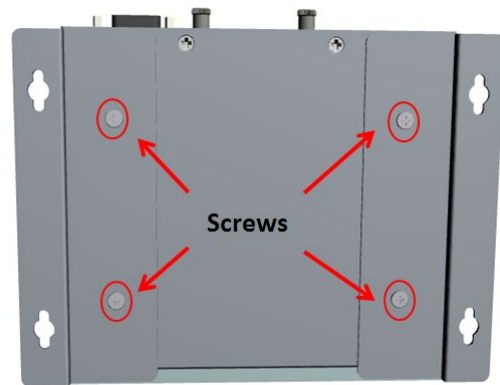
STEP 2:
Use four screws per side on the wall-mounting bracket to attach the MC-1100 to a wall or cabinet.
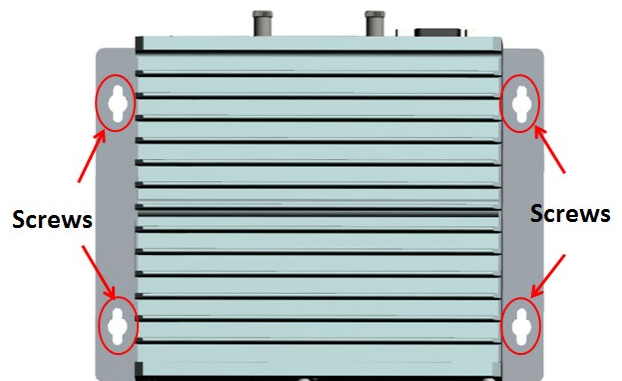
Wiring Requirements

In this section, we describe how to connect serial devices to the MC-1100 embedded 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 or 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 of your devices.

ATTENTION

Safety First!

Be sure to disconnect the power cord before installing and/or wiring your MC-1100.

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 serious 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
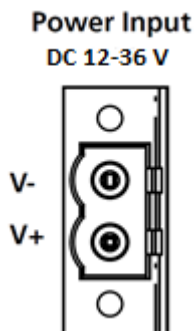
To power on the MC-1100, connect the "terminal block to power jack converter" to the MC-1100's DC terminal block (located on the left side panel), and then connect the power adapter. The system is automatically turned on when the power is plugged in. If it doesn't turn on automatically, press the Power Button to turn on the computer. Note that the Shielded Ground wire should be connected to the top pin of the terminal block. It takes about 30 seconds for the system to boot up. Once the system is ready, the Power LED will light up.

Grounding the Unit

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

MC-1111   **MC-1121**

MC-1112   **MC-1122**

Grounding
Connector
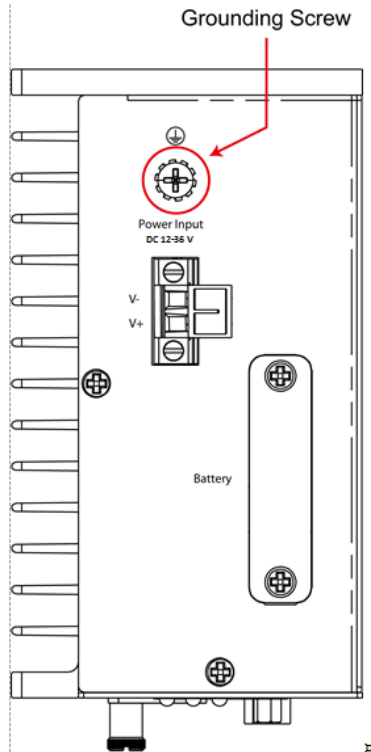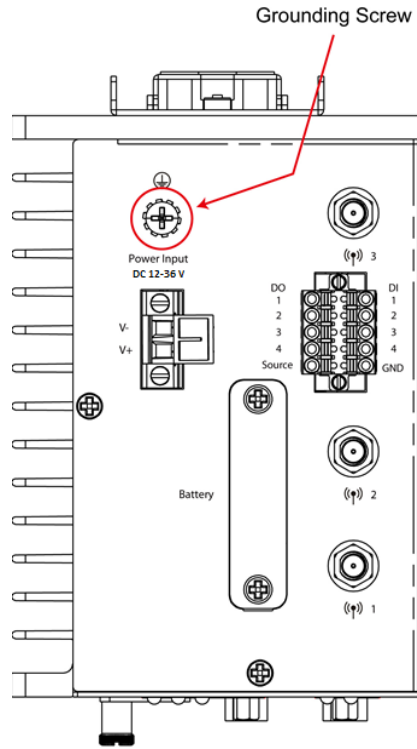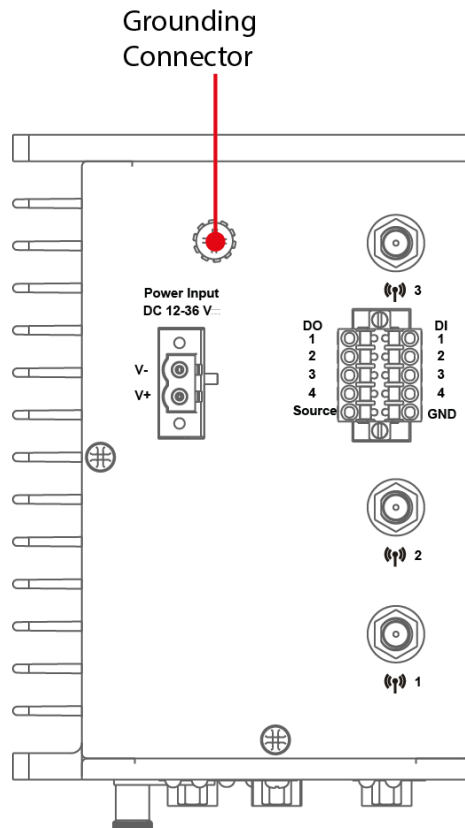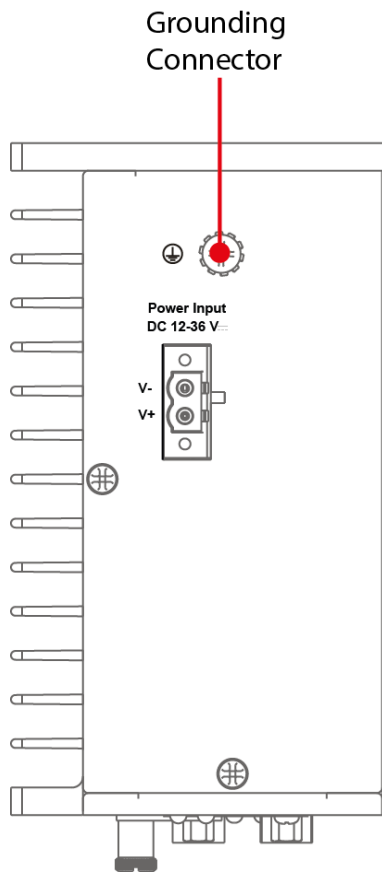
Connecting to a Network

To connect the MC-1100 computer to a network, connect a network cable to the embedded 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 embedded computer's Ethernet port turns on to indicate a valid connection.

Two 10/100/1000 Mbps Ethernet ports using RJ45 connectors are located on the front panel of the embedded computer. Refer to the following figures for the location and pin assignments of the Ethernet ports.

NOTE   The pin assignments for the MC-1100 computer's Ethernet port are shown in the following figure. If you create your own Ethernet cable, make sure that you match the pin assignments on the connector of the Ethernet cable.

MC-1111
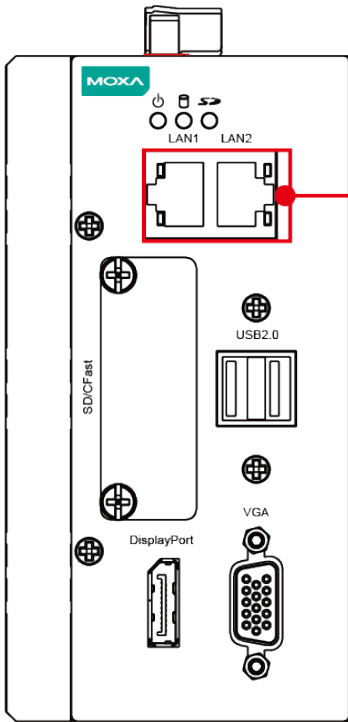
LAN Ports x 2 (RJ45)

MC-1121
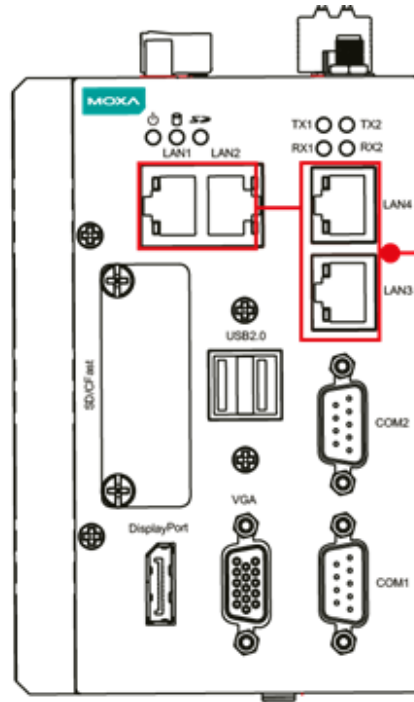
LAN Ports x 4 (RJ45)

MC-1112
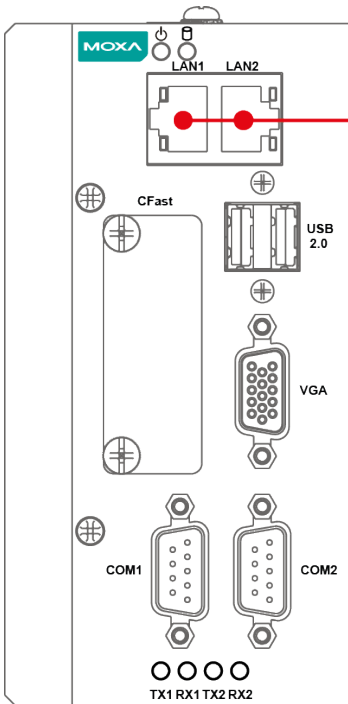
LAN Ports x 2 (RJ45)

MC-1122
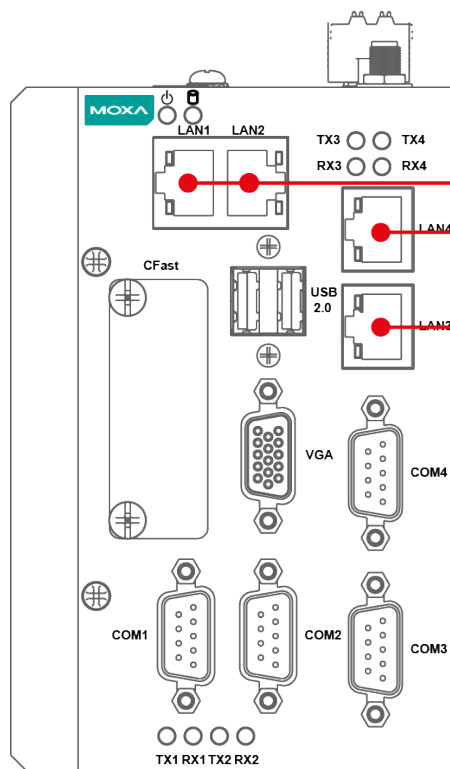
LAN Ports x 4 (RJ45)
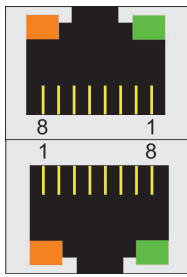
Pin	10/100 Mbps	1000 Mbps
1	ETx+	TRD(0)+
2	ETx-	TRD(0)-
3	ERx+	TRD(1)+
4	–	TRD(2)+
5	–	TRD(2)-
6	ERx-	TRD(1)-
7	–	TRD(3)+
8	–	TRD(3)-

Connecting to a Serial Device

Use a serial cable to connect your serial device to the embedded computer's serial port. 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-1100 software manual. The location and pin assignments of the serial ports are shown in the following table:

MC-1121

MC-1112   **MC-1122**

Serial Ports x 2

Serial Ports x 4

DB9 Male Port

1 2 3 4 5

6 7 8 9
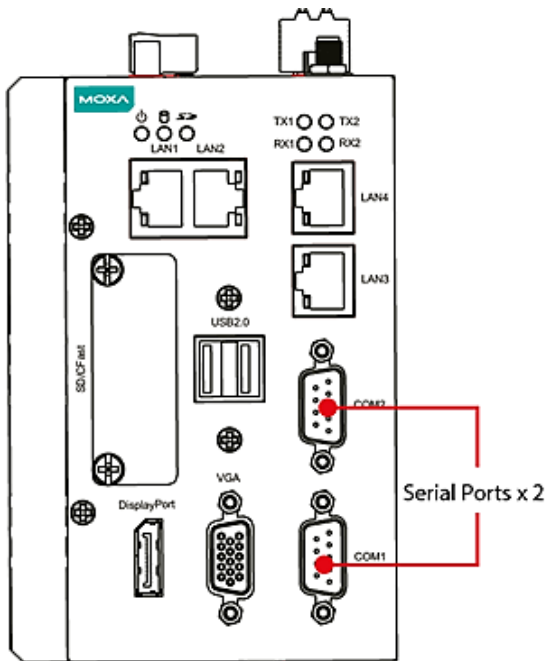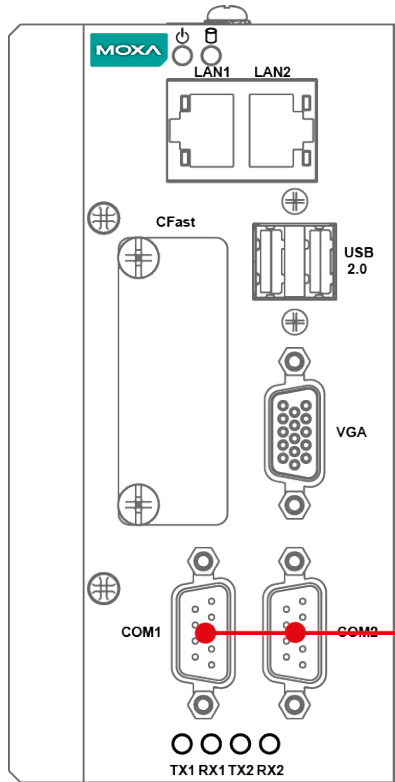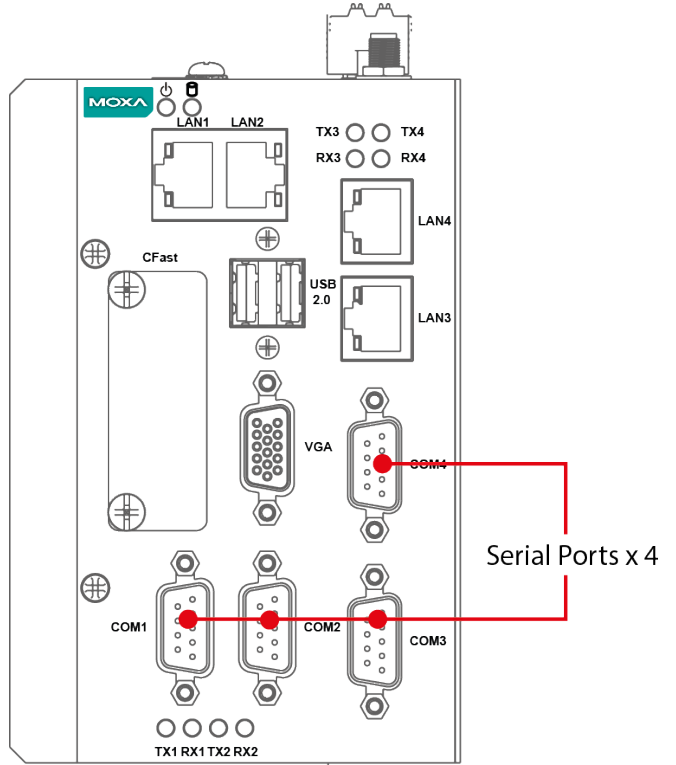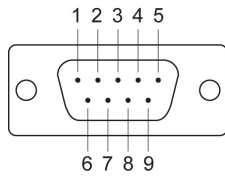
RS-232/422/485 Pinouts

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

Installing an SDHC/SDXC Card (MC-1111 and MC-1121 only)

The MC-1100 has an SD slot for storage expansion. The SD slot allows users to plug in a Secure Digital (SD) memory card, which is compliant with the SD 3.0 standard. To install an SD card, do the following:

1. Disconnect the MC-1100 from its power source.
2. Loosen the two screws on the SD/CFast card slot cover to remove the cover.
   The SD slot is located on the right side of the front panel.
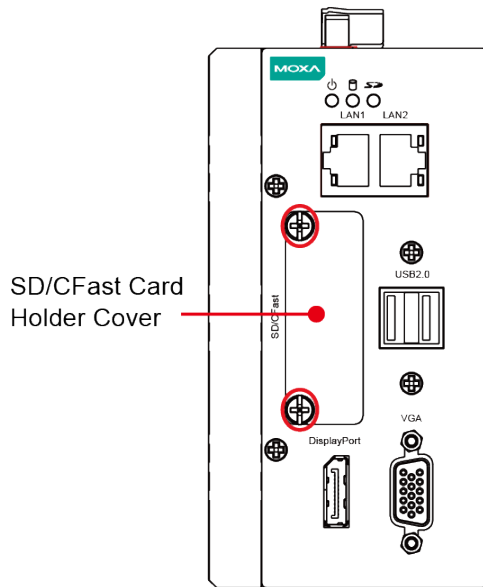
MC-1111   **MC-1121**
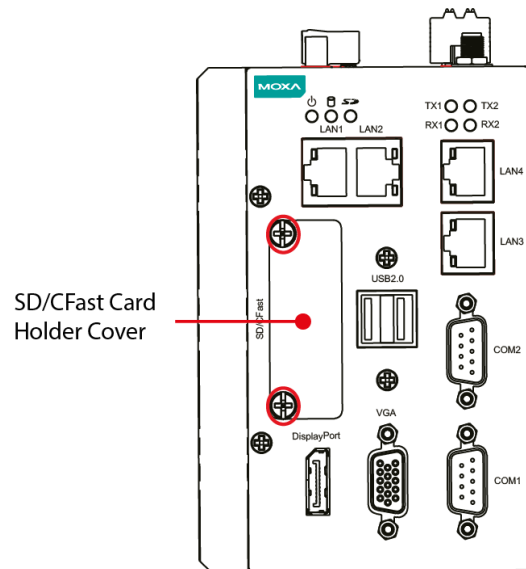
3. Insert the SD card into the slot and gently push it in with a finger until it locks in place.
   To remove the card, gently push it in to release the card and eject it out of the slot.

⚠️ **ATTENTION**

Be sure to properly orient the CFast card when installing it; otherwise, you may not be able to insert the card all the way into the slot.

---

4. After the SD card is installed correctly, fasten the screws on the SD/CFast card cover.

Connecting to a USB Device

The MC-1100 has 2 USB 2.0 ports with Type A connectors (rated 5V and 700 mA total for 2 ports; max. 500 mA/port) located on the front panel. The ports support keyboard and mouse and can also be used to connect a flash disk for storing large amounts of data.

The following figures show the locations of the USB ports.
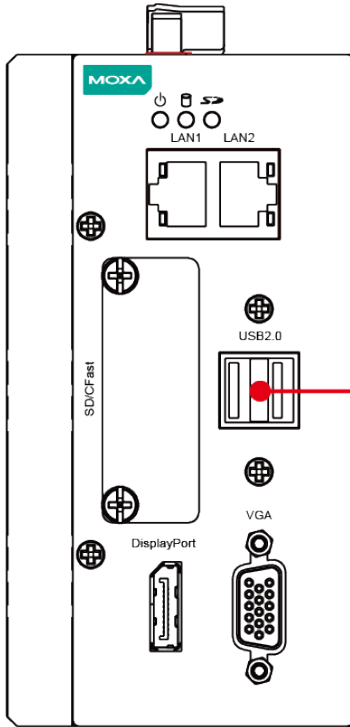
MC-1111   **MC-1121**

USB Hosts x 2 (type-A)
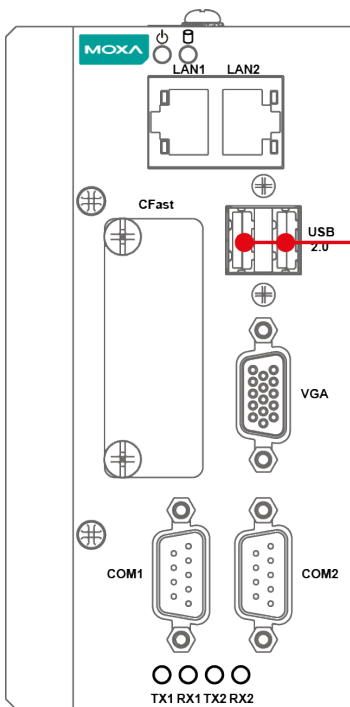
MC-1112   **MC-1122**
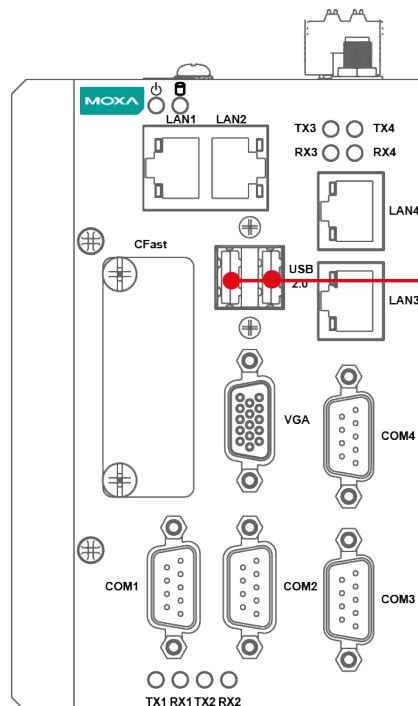
USB 2.0 Hosts x 2

DI/DO

The MC-1121 comes with a 4-channel digital input and a 4-channel digital output that connect through a terminal block connector. The pin assignments and wiring methods are shown in the diagrams below:

MC-1121   **MC-1122**
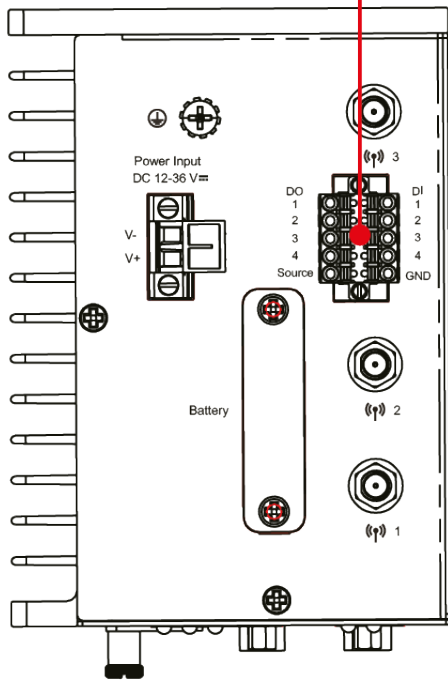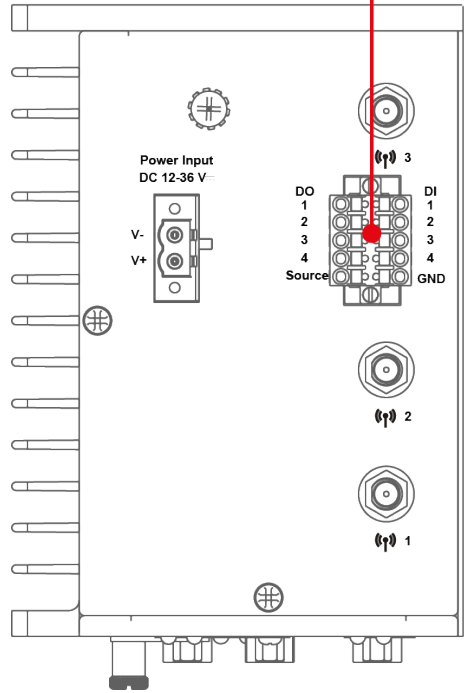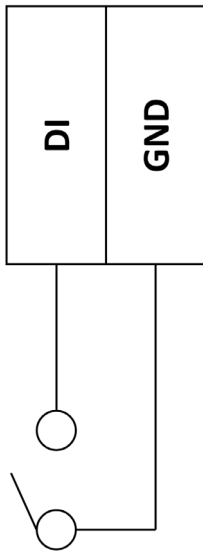
DI   **DO**
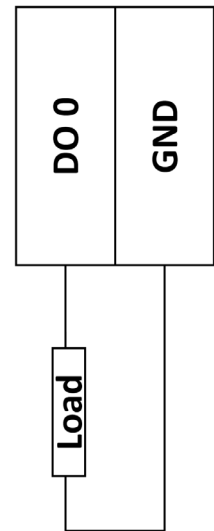
RTC Battery Replacement

The MC-1100'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-1100 embedded computer can be customized to support an easy RTC battery replacement function. Please contact your Moxa sales representative for details.

4

BIOS Setup

In this chapter, we describe the BIOS settings for the MC-1100 embedded computer. The BIOS is a set of input/output control routines for peripherals, which can be used to initialize the basic peripheral settings. The BIOS firmware 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 of the configurations are stored in the CMOS RAM, which has a backup battery power 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.

The following topics are covered in this chapter:

❒ **Entering the BIOS Setup**

❒ **Main Information**

❒ **Advanced Settings**

  ➢ Boot Configuration

  ➢ PCI Express Configuration

  ➢ USB Configuration

  ➢ SD Configuration (MC-1111 and MC-1121 Only)

  ➢ Miscellaneous Configuration

  ➢ SATA Configuration

  ➢ Console Redirection

  ➢ Hardware Monitor

  ➢ Smart Recovery Info

❒ **Security Settings**

  ➢ Set Supervisor Password

❒ **Power Settings**

  ➢ Wake on LAN

  ➢ Auto Wake on S5

  ➢ Power State 2 for VCC & VNN

❒ **Boot Settings**

  ➢ Boot Type

  ➢ PXE Boot to LAN

  ➢ PXE Boot capability

  ➢ Add Boot Options

  ➢ USB Boot

  ➢ Boot Delay Time

  ➢ Automatic Failover

  ➢ Boot Order Priority

  ➢ Legacy

❒ **EFI**

❒ **Exit Settings**

  ➢ Exit Saving Changes

  ➢ Save Change Without Exiting

  ➢ Exit Discarding Changes

  ➢ Load Optimal Defaults

  ➢ Load Custom Defaults

  ➢ Save Custom Defaults

  ➢ Discard Changes

❒ **Upgrading the BIOS**

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 appears with the following options:

- **Continue:** Continue to boot up
- **Boot Manager:** Select the device to boot up
- **Boot From File:** Select the UEFI boot up file
- **Setup Utility**

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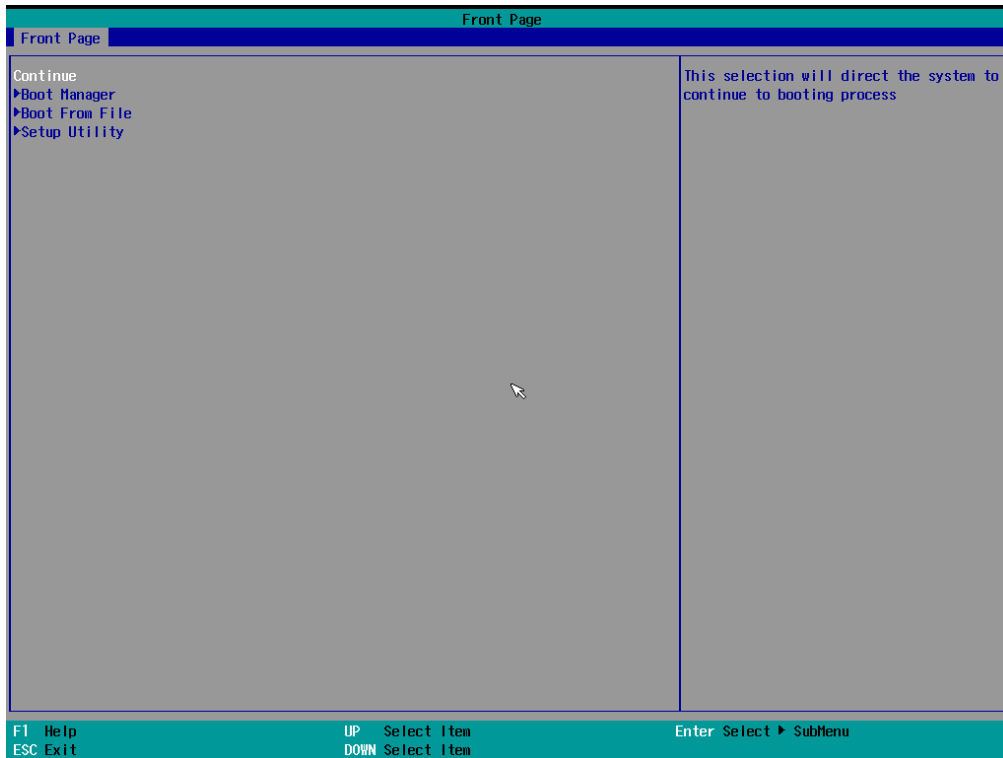
When you click **Setup Utility**, a basic description of each function key is listed at the bottom of the screen. Refer to these descriptions to learn how to use them.

F1: Help

F5/F6: Change Values

F9: Setup Defaults

F10: Save and Exit

↑↓: Select Item

← →: Select Menu

ESC: Exit

ENTER: Select or go to Submenu.

Main Information

The main page shows basic system information, such as the model name, BIOS version, and CPU type.

NOTE   The "Processor Type" varies depending on the product model.

```
                            InsydeH20 Setup Utility                          Rev. 5.0
 Main  Advanced  Security  Power  Boot  Exit

 BIOS Version                    V1.00S10                    This is the help for the hour, minute,
 Project Name                    V2201                       second field. Valid range is from 0 to
                                                             23, 0 to 59, 0 to 59. INCREASE/REDUCE : +
 Processor Type                  Intel(R) Atom(TM) CPU  E3845  @ 1.91GHz   /-.
 System Bus Speed                83 MHz
 System Memory Speed             1333 MHz
 Cache RAM                       2048 KB
 Total Memory                    4096 MB
 Channel A - SODIMM 0            4096 MB
 Channel B - SODIMM 0            [Not Installed]

 Platform firmware Information
 VLV SOC                         11 (D0 Stepping)
 MRC Version                     1.43
 PUNIT FW                        0x25
 PMC FW Patch                    0x5_11
 TXE FW Version                  1.1.0.1113
 IGD VBIOS Version               3798
 Microcode Revision              903
 CPU Flavor                      VLV IVI (0)
 Board ID                        BALEY BAY (20)
 Fab ID                          FAB3 (03)

 System Time                     [01:26:16]
 System Date                     [01/06/2014]




 F1  Help          ↑↓ Select Item      F5/F6 Change Values       F9  Setup Defaults
 Esc Exit          ↔  Select Menu      Enter Select ▶ SubMenu    F10 Save and Exit
```

Advanced Settings

The **Advanced** screen appears when you select "Advanced" from the main menu.

```
                            InsydeH20 Setup Utility                          Rev. 5.0
 Main  Advanced  Security  Power  Boot  Exit

                                                             Configures Boot Settings.
 ▶Boot Configuration
 ▶PCI Express Configuration
 ▶USB Configuration
 ▶SD Configuration
 ▶Miscellaneous Configuration
 ▶SATA Configuration
 ▶Console Redirection
 ▶Hardware Monitor
 ▶SMART RECOVERY Info













 F1  Help          ↑↓ Select Item      F5/F6 Change Values       F9  Setup Defaults
 Esc Exit          ↔  Select Menu      Enter Select ▶ SubMenu    F10 Save and Exit
```

4-3

Boot Configuration

This screen allows you to configure the initial status of the Numlock key when the computer boots up.

Options: On (default), Off

```
                                    InsydeH20 Setup Utility                              Rev. 3.7
      Advanced
  Boot Configuration                                             Selects Power-on state for Numlock

  Numlock                          <On>




  F1  Help              ↑↓ Select Item        F5/F6 Change Values        F9  Setup Defaults
  Esc Exit              ↔ Select Menu         Enter Select ▶ SubMenu     F10 Save and Exit
```
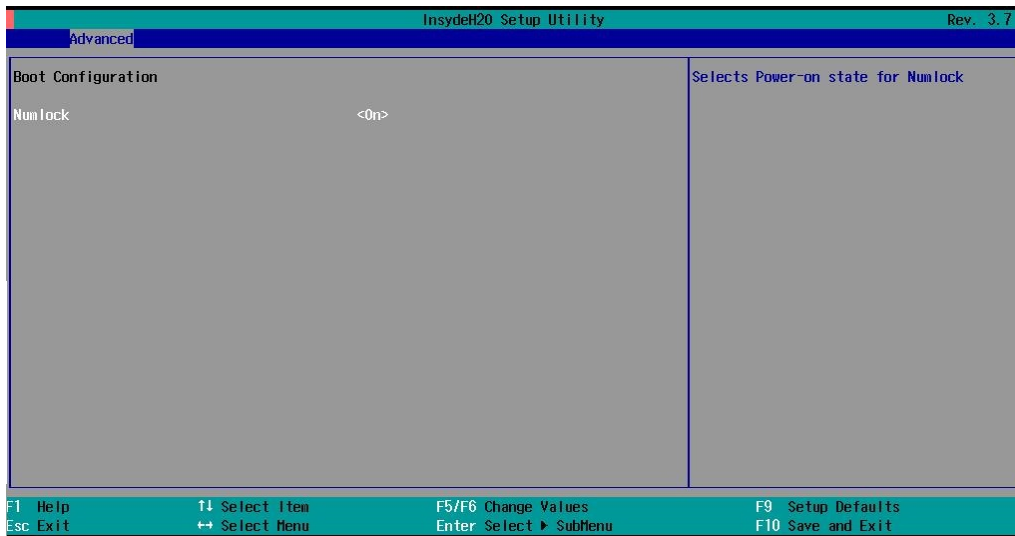
PCI Express Configuration

PCIE PORT 1 Speed

Configure PCIe Port1 Speed

Options: Auto, Gen1 and Gen2

PCIE PORT 2 Speed

Configure PCIe Port2 Speed

Options: Auto, Gen1 and Gen2

PCIE PORT 3 Speed

Configure PCIe Port3 Speed

Options: Auto, Gen1 and Gen2

PCIE PORT 4Speed

Configure PCIe Port4 Speed

Options: Auto, Gen1 and Gen2

USB Configuration

```
                              InsydeH20 Setup Utility                              Rev. 5.0
        Advanced
 USB Configuration                                            Disable USB port

 USB Port #0                        <Enabled>
 USB Port #1                        <Enabled>
 USB Port #2                        <Enabled>


















 F1  Help          UP    Select Item    LEFT  Select Item   F5 Change Values   Enter Select ►    F10 Save and Exit
 ESC Exit          DOWN  Select Item    RIGHT Select Item   F6 Change Values   F9    Setup Defaults
```
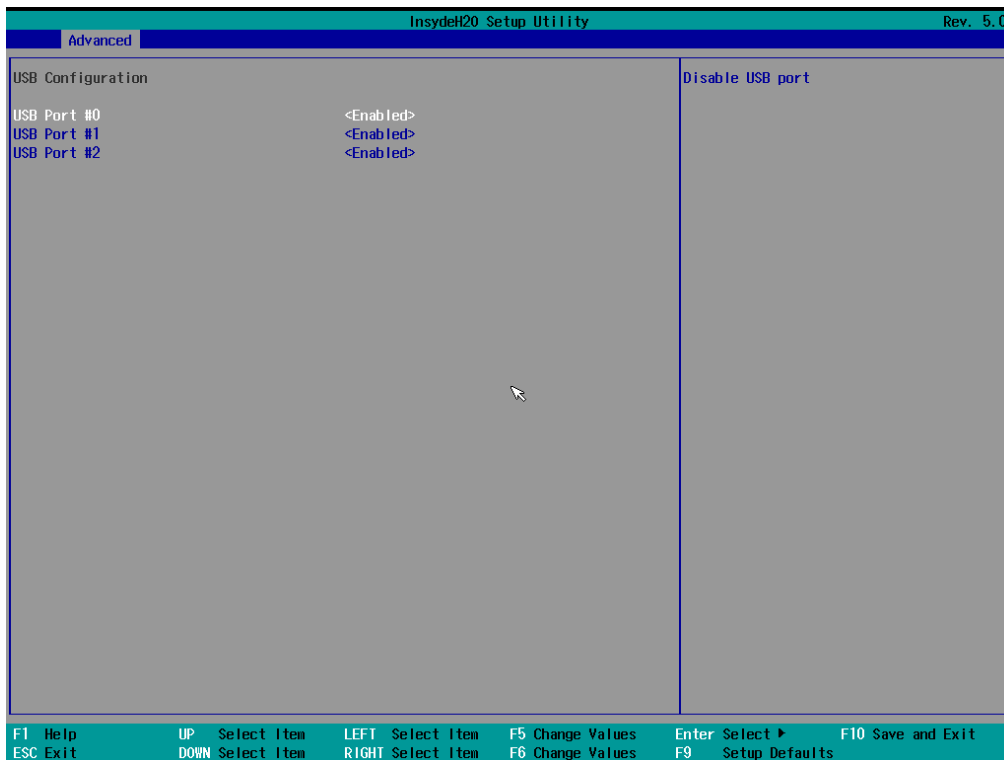
USB Port #0

Enable or Disable USB port 0; if disabled, the system won't detect when a USB device is plugged in.

Option: Enabled (default), Disabled

USB Port #1

Enable or Disable USB port 1; if disabled, the system won't detect when a USB device is plugged in.

Option: Enabled (default), Disabled

USB Port #2

Enable or Disable USB port 2; if disabled, the system won't detect when a USB device is plugged in.

Option: Enabled (default), Disabled

USB Port #3

Enable or Disable USB port 3; if disabled, the system won't detect when a USB device is plugged in.

Option: Enabled (default), Disabled

SD Configuration (MC-1111 and MC-1121 Only)

```
                                    InsydeH20 Setup Utility                                    Rev. 5.0
    Advanced
 SD Configuration                                               Disable/Enable SDR25 Capability in SD
                                                                Card controller
 SDR25 Capability Support for SDCard      <Enabled>
 DDR50 Capability Support for SDCard      <Disabled>




 F1  Help               ↑↓ Select Item        F5/F6 Change Values          F9  Setup Defaults
 Esc Exit               ↔ Select Menu          Enter Select ▶ SubMenu       F10 Save and Exit
```
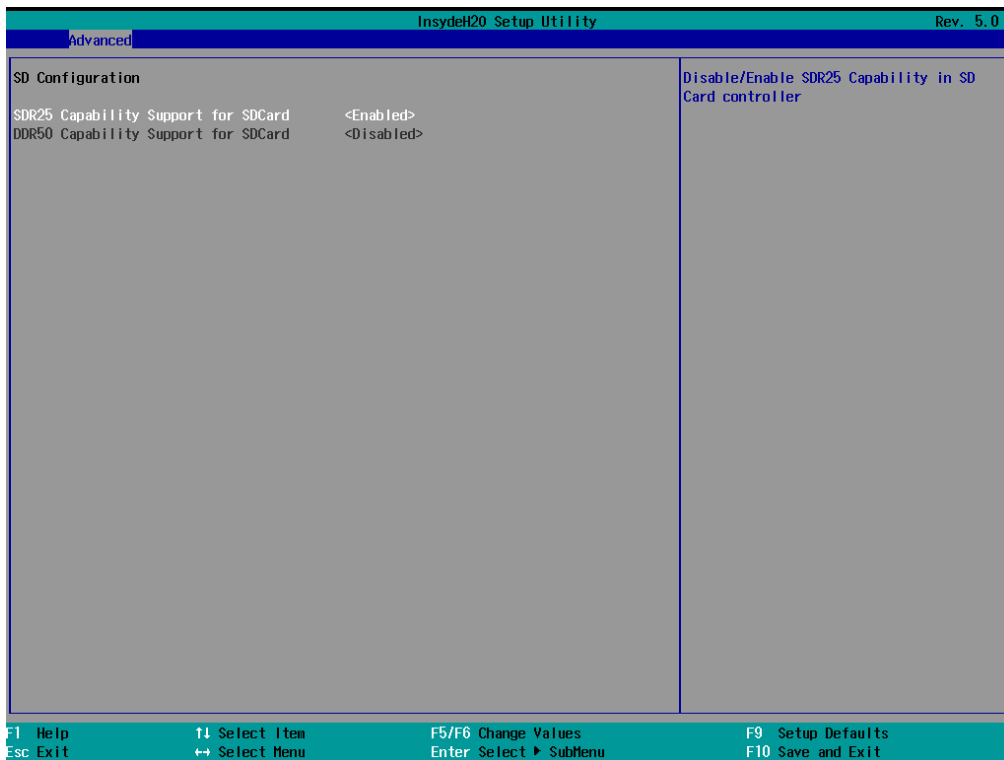
SDR25 Capability Support for SD Card

Set Input/output timing for SDR25 mode.

Option: Enabled (default), Disabled

DDR50 Capability Support for SD Card

Set Input/output timing for DDR50 mode.

Option: Enabled (default), Disabled

Miscellaneous Configuration

```
                          InsydeH20 Setup Utility                        Rev. 5.0
  Advanced
Miscellaneous Configuration                               Specify what state to go to when power is
                                                          re-applied after a power failure (G3
Power ON after Power Failure          <Enable>            state).


















F1  Help          UP   Select Item    LEFT  Select Item   F5 Change Values    F10 Save and Exit
ESC Exit          DOWN Select Item    RIGHT Select Item   F6 Change Values    F9    Setup Defaults
```
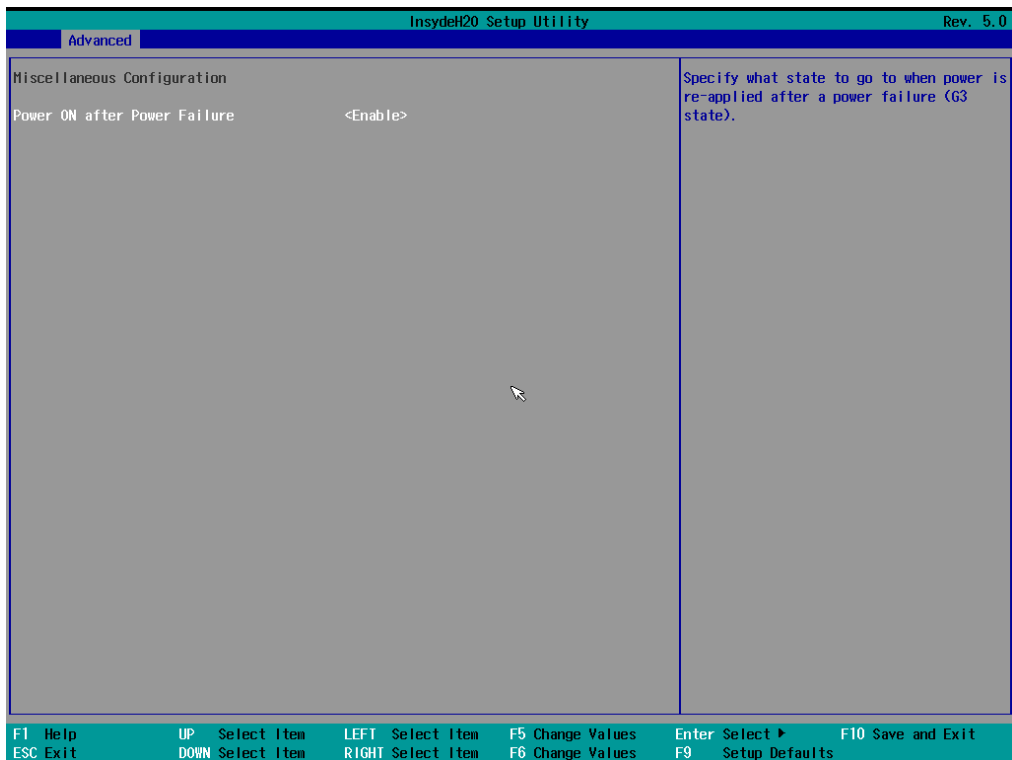
Power ON after Power Failure

This setting allows you to configure whether or not the computer automatically reboot after a system crash. When set to ON, the computer will automatically reboot after a system crash; when set to OFF, it won't automatically reboot after a system crash. Options: ON (default), OFF, Last State.

NOTE	This setting is only available in the MC-1121 and MC-1122 models.

DO-0 Level

This item allows you set the DO 0 as high or low.

Options: High (default), Low

DO-1 Level

This item allows you set the DO 1 as high or low.

Options: High (default), Low

DO-2 Level

This item allows you set the DO 2 as high or low

Options: High (default), Low

DO-3 Level

This item allows you set the DO 3 as high or low.

Options: High (default), Low

SATA Configuration

```
                              InsydeH20 Setup Utility                           Rev. 5.0
    Advanced

Chipset SATA Mode              <AHCI>                          Select SATA mode, AHCI or IDE.
SATA Speed                     <Gen2>

Serial ATA Port 0     [CFast 3SE        ]
Serial ATA Port 1     [Not Installed]



                                            k










F1  Help          UP   Select Item    LEFT  Select Item   F5 Change Values   Enter Select ▶    F10 Save and Exit
ESC Exit          DOWN Select Item     RIGHT Select Item   F6 Change Values   F9    Setup Defaults
```
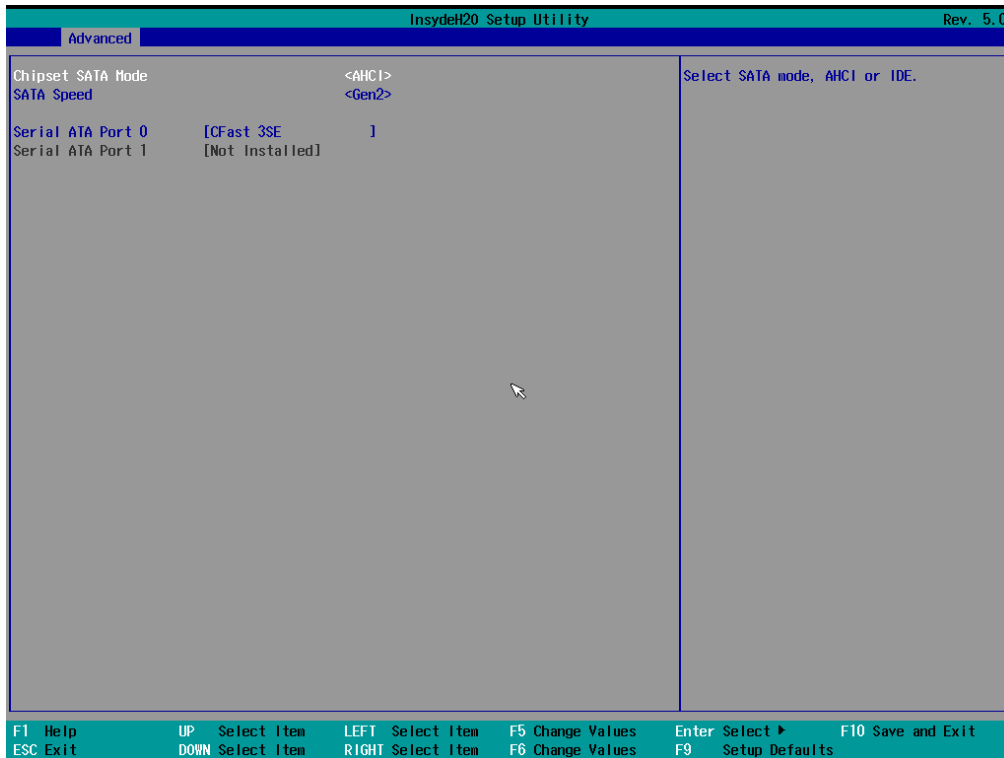
Chipset SATA Mode

Select SATA mode

Options: AHCI (default), IDE

SATA Speed

Select SATA Speed

Options: Gen1 (default), Gen2

4-8

Console Redirection

```
                              InsydeH20 Setup Utility                        Rev. 5.0
      Advanced
 Console Redirection Setup                                    Enable Console Redirection Function

 Console Serial Redirect            <Disabled>

 ACPI SPCR Table                    <Disabled>




















 F1  Help            ↑↓ Select Item        F5/F6 Change Values        F9  Setup Defaults
 Esc Exit            ↔  Select Menu         Enter Select ▶ SubMenu     F10 Save and Exit
```
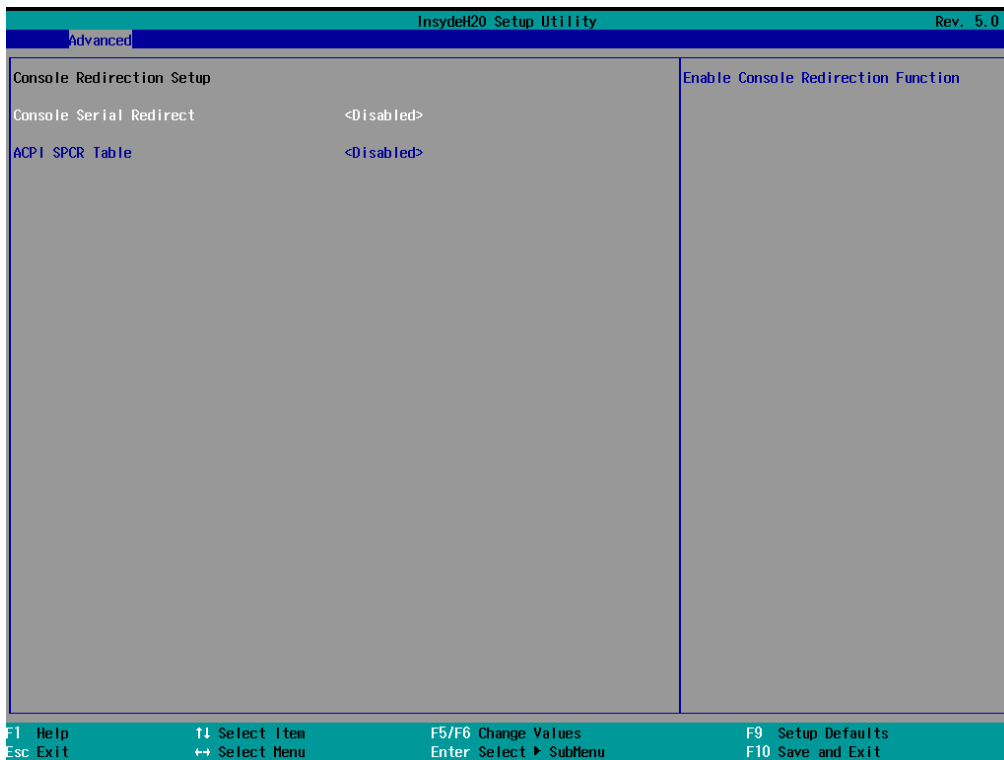
Console Serial Redirect

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

Options: Disabled (default), Enabled

ACPI SPCR Table

This table is used to indicate whether a serial port or a non-legacy UART (Universal Asynchronous Receiver/Transmitter) interface is available for use with Microsoft Windows Emergency Management Services (EMS).

Options: Disabled (default), Enabled

Hardware Monitor

This screen allows you to view voltage levels, system temperature, and CPU temperature.

```
                              InsydeH20 Setup Utility                         Rev. 5.0
      Advanced

Hardware Monitor

Voltage
  VCORE                        0.928 V
  GFX                          0.992 V
  3.3V                         3.392 V
  5V                           4.960 V

Temperature
  CPU (°C/°F)                  39°C/102°F
  System (°C/°F)               46°C/114°F




F1  Help            ↑↓ Select Item      F5/F6 Change Values          F9  Setup Defaults
Esc Exit            ↔ Select Menu       Enter Select ▶ SubMenu       F10 Save and Exit
```

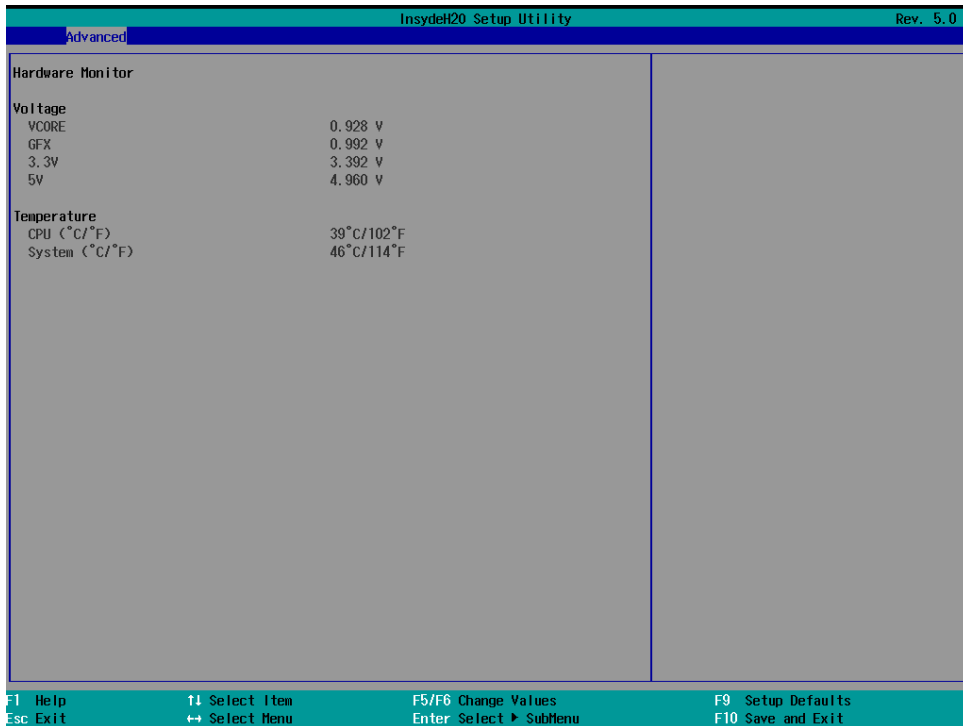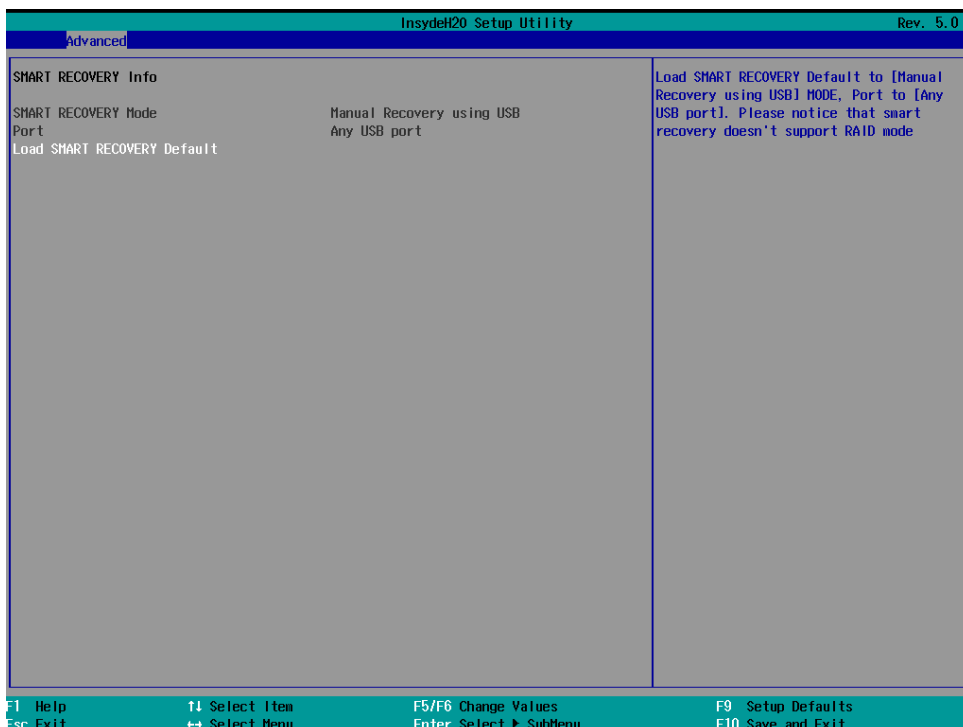Note that the voltage values vary depending on the model. The temperature readings shown on the screen are within ±5% of the actual readings. However, the temperature readings are only valid when the ambient temperature is above 0°C.

Smart Recovery Info

This screen allows you to view information on the Smart Recovery function.

```
                              InsydeH20 Setup Utility                         Rev. 5.0
      Advanced

SMART RECOVERY Info                                            Load SMART RECOVERY Default to [Manual
                                                               Recovery using USB] MODE, Port to [Any
SMART RECOVERY Mode          Manual Recovery using USB         USB port]. Please notice that smart
Port                         Any USB port                      recovery doesn't support RAID mode
Load SMART RECOVERY Default




F1  Help            ↑↓ Select Item      F5/F6 Change Values          F9  Setup Defaults
Esc Exit            ↔ Select Menu       Enter Select ▶ SubMenu       F10 Save and Exit
```
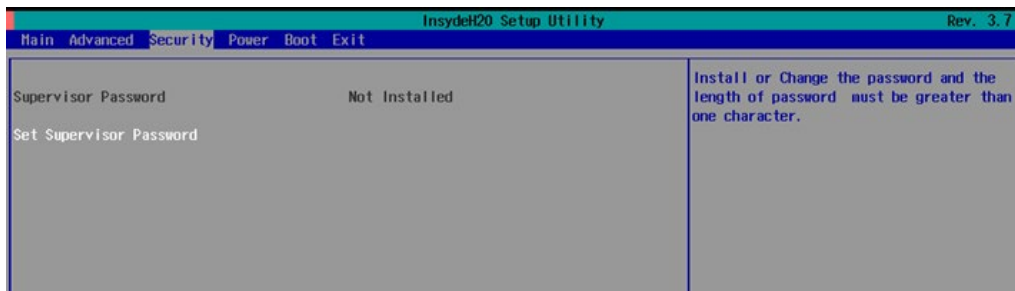
Load Smart Recovery Default

This setting allows you to load the default values for the Smart Recovery function. Refer to the Smart Recovery Website for details.

Options: Yes (default), No

Security Settings

This screen allows you to configure a supervisor password.

```
                           InsydeH20 Setup Utility                        Rev. 3.7
Main  Advanced  Security  Power  Boot  Exit

                                                      Install or Change the password and the
Supervisor Password             Not Installed         length of password  must be greater than
                                                      one character.
Set Supervisor Password
```

Set Supervisor Password

This setting allows you set the supervisor password.

Type the new password, and then retype the password again to confirm.

To delete the password, enter the existing password in the **Set Supervisor Password** field and leave the two new password fields the follow blank; then, press [Enter].
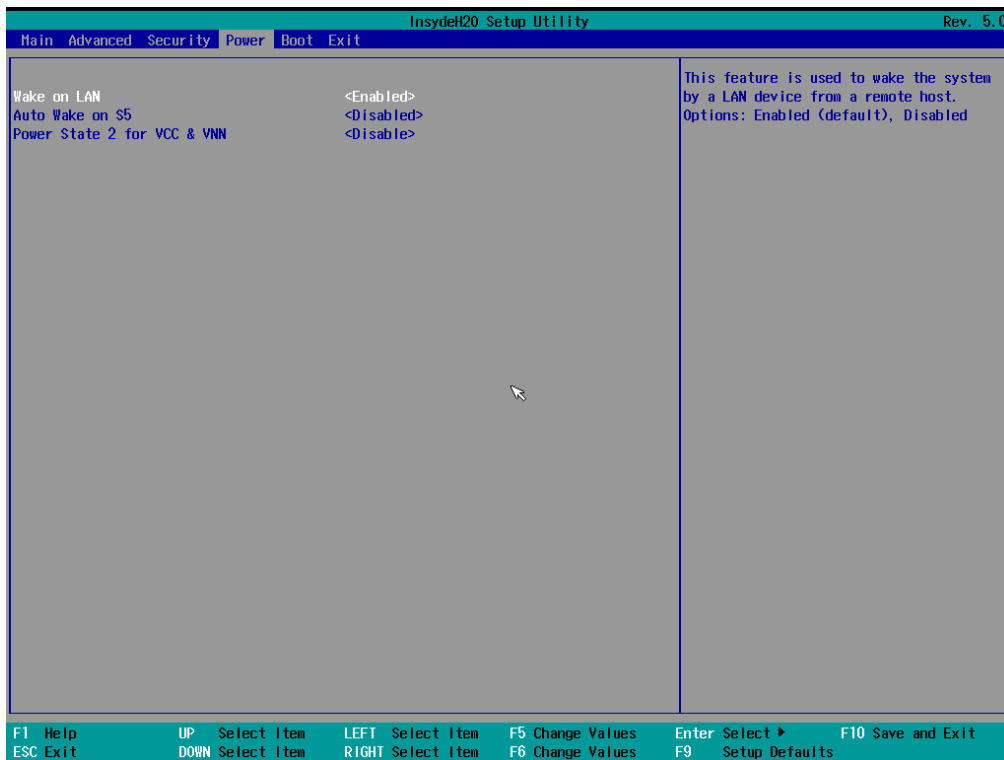
```
           Set Supervisor Password
  Please type in your new password   [          ]
  Please confirm your new password   [          ]
```

4-11

Power Settings

The screen allows you to configure power settings.

```
                              InsydeH20 Setup Utility                          Rev. 5.0
  Main  Advanced  Security  Power  Boot  Exit

  Wake on LAN                       <Enabled>              This feature is used to wake the system
  Auto Wake on S5                   <Disabled>             by a LAN device from a remote host.
  Power State 2 for VCC & VNN       <Disable>              Options: Enabled (default), Disabled




                                            ⬚




  F1  Help            UP   Select Item   LEFT  Select Item   F5 Change Values   Enter Select ▶     F10 Save and Exit
  ESC Exit            DOWN Select Item   RIGHT Select Item   F6 Change Values   F9   Setup Defaults
```

Wake on LAN

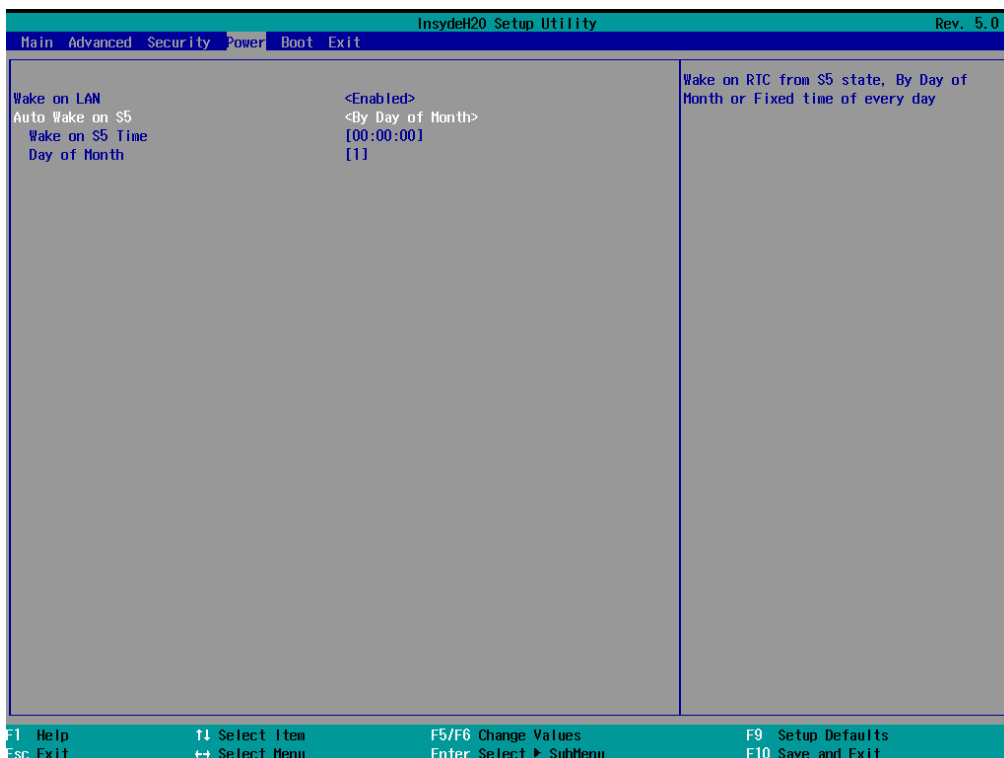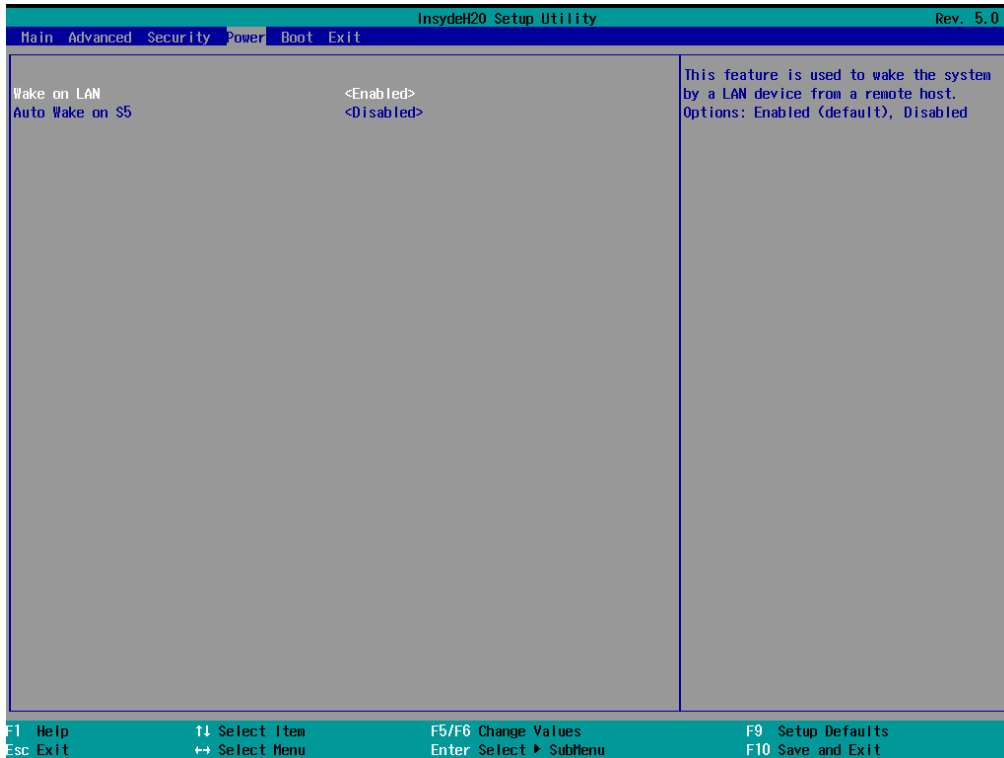This setting allows you to wake the system over the LAN from a remote host.

Options: Enabled (default), Disabled.

Auto Wake on S5

This setting allows you to configure the computer to wake from the S5 (Soft Off) state where the power supply remains engaged but is not supplying power to all other parts of the system.

You can set the auto-wake on S5 schedules for the system to perform a soft-reboot at specific times.

Options: Disabled (default); By Every Day (user specifies at what time each day the computer will power up); By Day of Month (user specifies which day of each month the computer will power up)

```
                              InsydeH20 Setup Utility                    Rev. 5.0
   Main  Advanced  Security  Power  Boot  Exit

   Wake on LAN                    <Enabled>              This feature is used to wake the system
   Auto Wake on S5                <Disabled>             by a LAN device from a remote host.
                                                         Options: Enabled (default), Disabled














   F1  Help          ↑↓ Select Item      F5/F6 Change Values       F9  Setup Defaults
   Esc Exit          ↔  Select Menu      Enter Select ▶ SubMenu    F10 Save and Exit
```

```
                              InsydeH20 Setup Utility                    Rev. 5.0
   Main  Advanced  Security  Power  Boot  Exit

   Wake on LAN                    <Enabled>              Wake on RTC from S5 state, By Day of
   Auto Wake on S5                <By Day of Month>      Month or Fixed time of every day
     Wake on S5 Time              [00:00:00]
     Day of Month                 [1]














   F1  Help          ↑↓ Select Item      F5/F6 Change Values       F9  Setup Defaults
   Esc Exit          ↔  Select Menu      Enter Select ▶ SubMenu    F10 Save and Exit
```

Power State 2 for VCC & VNN

This setting allows you to enable/disable CPU core voltage (VCC) and graphics core voltage (VNN) rails for low-power scenarios in SOC S0 state.

Options: Enabled (default), Disabled.

Boot Settings

The screen allows you to configure boot settings.

```
                              InsydeH20 Setup Utility                              Rev. 5.0
   Main  Advanced  Security  Power  Boot  Exit

                                                        Select boot type to Dual type, Legacy
   Boot Type                  <Dual Boot Type>          type or UEFI type
   PXE Boot to LAN            <Disabled>
   PXE Boot capability        <Disabled>
   Add Boot Options           <Last>
   USB Boot                   <Enabled>
   Boot Delay Time            [0]
   Automatic Failover         <Enabled>

   Boot Order Priority        <Legacy First>
  ▶Legacy
  ▶EFI

   F1  Help          ↑↓ Select Item      F5/F6 Change Values        F9  Setup Defaults
   Esc Exit          ↔  Select Menu      Enter Select ▶ SubMenu     F10 Save and Exit
```

Boot Type

The system will be based on the value used to build the boot environment for different types of operating systems.

Options: Dual Boot Type (default), Legacy Boot Type, UEFI Boot Type

PXE Boot to LAN

This setting allows you to enable or disable the PXE boot to LAN function.

Options: Disabled (default), Enabled

PXE Boot capability

This function is enabled while PXE Boot to LAN enabled.

Supports Network Stack UEFI PXE or Legacy.

Options: Disabled (default), UEFI: IPv4, Legacy

Add Boot Options

This setting allows you to add boot order options for new boot devices and removable devices, such as a USB drive.

Options: Last (default), First, Auto

USB Boot

This setting allows you to enable or disable the USB boot function.

Options: Enabled (default), Disabled

Boot Delay Time

This setting allows you to configure the delay time to enter a hot key during POST.

Options: 0 Second (default), User define

Automatic Failover

Options: Enabled (default), Disabled

Enable: If boot to default device fails, it will try to boot the next device.

Disable: If boot to default device fails, a warning message will pop up.

Boot Order Priority

This setting allows you to determine the booting priority of the EFI device. If this setting is EFI first, the EFI device will boot first; if Legacy first, the legacy device will boot first.

Options: Legacy first (default), EFI first

Legacy

Normal Boot Menu

This setting allows you to configure the boot menu.

Options: Normal (default), Advance

Boot Type Order

This setting allows you to configure the boot order. To change the boot order, press the "-" or "F5" key to an item move down the list, and the "+" or "F6" key to move up.

Options: Hard Disk Drive (default), CD/DVD-ROM Drive, USB, Others

```
                         InsydeH20 Setup Utility                              Rev. 5.0
              Boot
Legacy - Boot Device Priority                        Select Normal Boot Option Priority or
Normal Boot Menu              <Advance>              Advance Boot Option Priority

Legacy                        CFast 3SE
                              Sandisk USB Ultra
                              SD256








                                          ▯





F1  Help        UP   Select Item   LEFT  Select Item   F5 Change Values   Enter Select ▶   F10 Save and Exit
ESC Exit        DOWN Select Item   RIGHT Select Item   F6 Change Values   F9   Setup Defaults
```
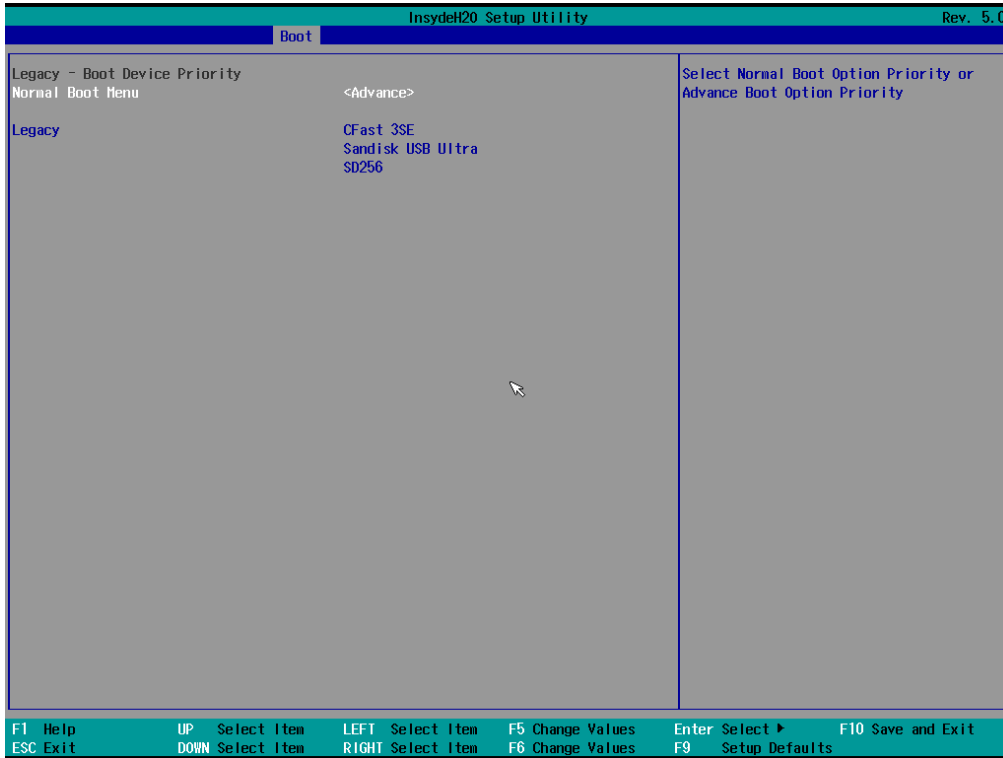
EFI

Adjust boot order settings for an EFI device.

Exit Settings

The screen shows the various options to exit from the BIOS setup utility.

```
                          InsydeH20 Setup Utility                        Rev. 3.7
  Main  Advanced  Security  Power  Boot  Exit

                                                    Exit system setup and save your changes.
 Exit Saving Changes
 Save Change Without Exit
 Exit Discarding Changes
 Load Optimal Defaults
 Load Custom Defaults
 Save Custom Defaults
 Discard Changes




















F1  Help              ↑↓ Select Item        F5/F6 Change Values      F9  Setup Defaults
Esc Exit              ↔ Select Menu          Enter Select ▶ SubMenu   F10 Save and Exit
```

Exit Saving Changes

This option allows you to exit the BIOS setup utility and save the values you have just configured.

Options: Yes (default), No

Save Change Without Exiting

This option allows you to save changes without exiting the BIOS setup utility.

Options: Yes (default), No

Exit Discarding Changes

This option allows you to exit without saving that changes that might have been made to the BIOS.

Options: Yes (default), No

Load Optimal Defaults

This option allows you to revert to the factory default BIOS values.

Options: Yes (default), No

Load Custom Defaults

This option allows you to load the custom default BIOS settings.

Options: Yes (default), No

Save Custom Defaults

This option allows you to save the current BIOS settings as a "custom default" that you can load at any time using the "Load Custom Defaults" option.

Options: Yes (default), No

Discard Changes

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

Options: Yes (default), No

Upgrading the BIOS

This section describes how to upgrade the BIOS.

> ⚠️ **WARNING**
>
> An improper BIOS upgrade process may permanently damage the computer. We strongly recommend that you contact Moxa technical support for assistance to obtain all the necessary tools and the most up-to-date advice before attempting to upgrade the BIOS on any Moxa device.

Step 1: Create a Bootable USB Disk

Before upgrading the BIOS, every user should first create a bootable USB drive as a system rescue device.

A useful software suite for creating USB RAM drives can be found by searching for Rufus, which can then be downloaded and used to create a bootable RAM drive.

Complete the following steps to create a bootable USB disk using Rufus:

1. Start Rufus* and then in the "Device" drop-down list select the USB device that you want to use as a bootable disk.
    *Rufus official website:
    https://rufus.akeo.ie/?locale=en_US

2. Select **MBR partition scheme for BIOS or UEFI computers** from the "Partition scheme and target system type" drop-down list so it can boot from a legacy BIOS or UEFI.

3. Select **FAT32 (Default)** from the "File system" drop-down list.

4. Select **4096 bytes (Default)** from the "Cluster size" drop-down list.

5. Enter a drive name in the "New volume label" input box.

6. Check the **Quick format**, **Create a bootable disk using FreeDOS**, and **Create extended label and icon files** options.

7. Click **Start** to format and create the bootable USB drive.
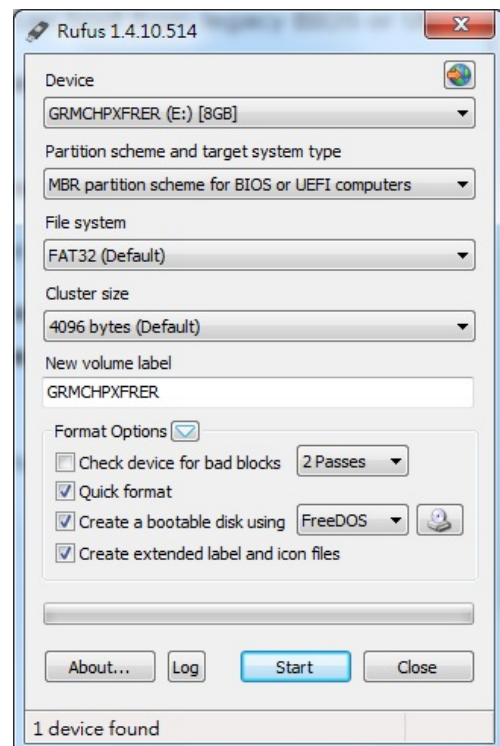
⚠️ **ATTENTION**

When you use a USB drive larger than 4 GB, you will need to convert the file system type to FAT32.

Step 2: Prepare the Upgrade File

You must use the BIOS upgrade installation file to upgrade the BIOS. Contact Moxa technical support for assistance.

1. Get the BIOS upgrade installation file.
   The file name should be in the format: **MC-1100_VxxxSxx.exe** (where "xx" refers to the version numbers).
2. Copy the file to the bootable USB drive.

Step 3: Run the Upgrade Program on the MC-1100 Computer

1. Reboot the computer, and press F2 during the booting process to display the Boot Manager.

```
                              Front Page
 Front Page
Continue                               This selection will direct the system to
▶Boot Manager                          continue to booting process
▶Boot From File
▶Setup Utility










                                    ⬚




F1  Help                    UP    Select Item     Enter Select ▶ SubMenu
ESC Exit                    DOWN  Select Item
```
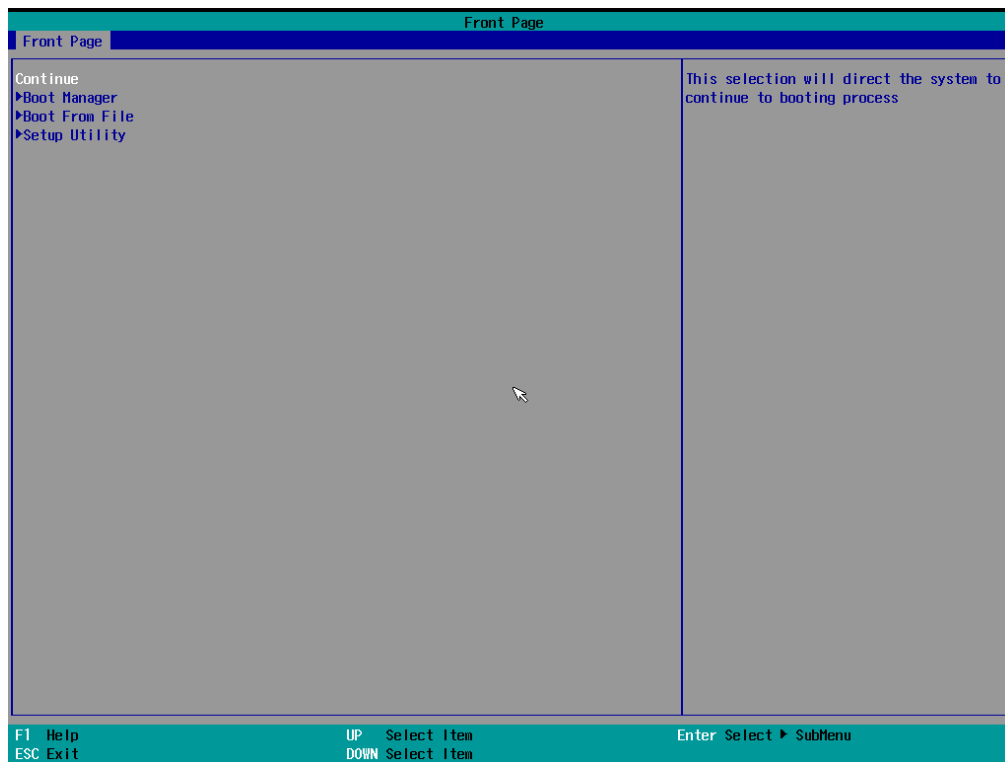
2. Select USB Disk as the first boot source and press [Enter] to continue.

```
                                    Boot Manager

Boot Option Menu

Legacy Hard Drive
CFast 3SE
Legacy USB
Sandisk USB Ultra
Legacy Floppy
SD256
EFI Boot Devices
Internal EFI Shell

↑ and ↓ to change option, ENTER to select an option, ESC to exit




                                            ▯




F1  Help                    UP   Select Item          Enter Select ▶ SubMenu
ESC Exit                    DOWN Select Item
```

3. When the computer finishes booting up, a command window appears. Go to the directory where the upgrade file is located. For example, if the upgrade file is stored in the MC-1100 folder, type `cd MC-1100`.

```
C:\cd MC-1100
```

4. Run the upgrade program by typing **MC-1100S10.exe**.
    Note that the filename for the upgrade program may vary depending on the version.

```
C:\ MC-1100>MC-1100S10.exe
```

5. The upgrade program will run automatically. Wait until the procedure is complete.

⚠ **ATTENTION**

Do NOT remove the power supply during a BIOS upgrade.

```
C:\> MC-1100>MC-1100S10.exe
Option: -bios -all -nv
```

Please do not remove the AC power!

```
      Insyde H20FFT (Flash Firmware Tool) Version (SEG) 100.00.07.20
         Copyright(c) 2012 – 2014, Insyde Software Corp. All Rights
                               Reserved.


               Initializing


               Current BIOS Model name: MC-1100
               New      BIOS Model name: MC-1100


               Current BIOS version: V1.00S10
               New      BIOS version: V1.00S10


               Updating Block at FFFFF000
```

```
0%          25%          50%          75%          100%
                                                            100%
```

6. When the upgrade is finished, the computer automatically reboots. You may check the BIOS version on the Main page of the BIOS setup utility.

```
BIOS Version                V1.00S10
Project Name                MC-1100
```

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.

<u>**Class A :**</u> 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.

European Community

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.

B

Configuring the Serial Interface

In this chapter, we describe how to configure the MC-1100 embedded computer's serial interface.

The following topics are covered in this appendix:

❒ **Overview**
❒ **Configuring the Serial Interface Mode**

Overview

The MC-1100's COM1 and COM2 serial ports support the following serial modes: **RS-232**, **2-wire RS-485**, and **4-wire RS-422/485**.

Configuring the Serial Interface Mode

Complete the following steps to configure the serial interface mode:

1. From the Start menu, Click **All Programs → Moxa → mxSetSerialInterface**.
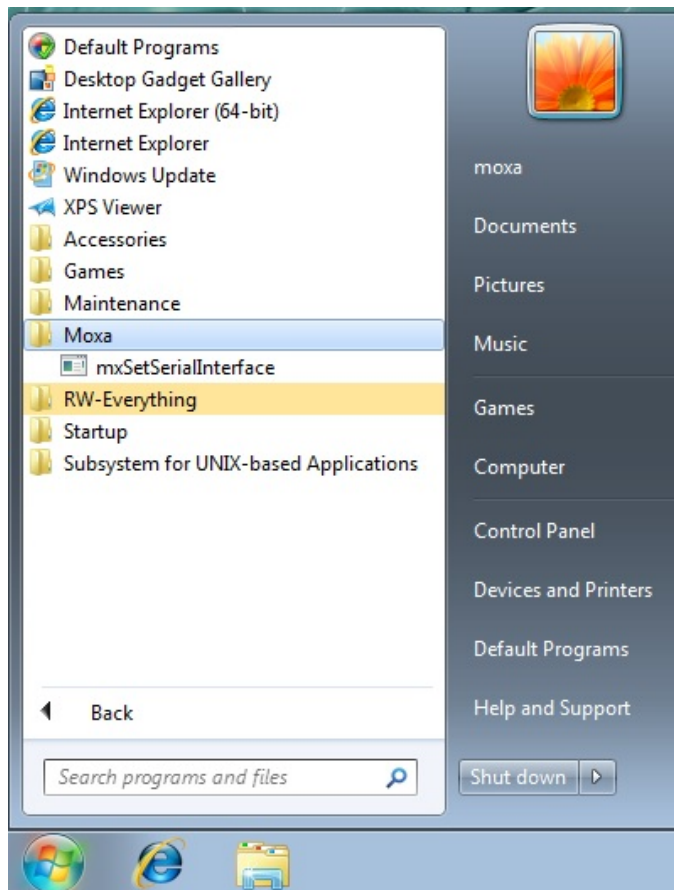
2. Select the port you would like to configure from the **Port** dropdown box.
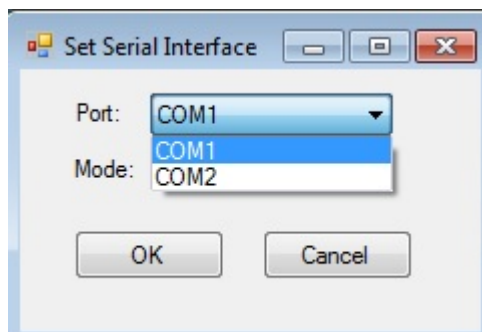
3. Select the serial interface mode for the port from the **Mode** dropdown box.
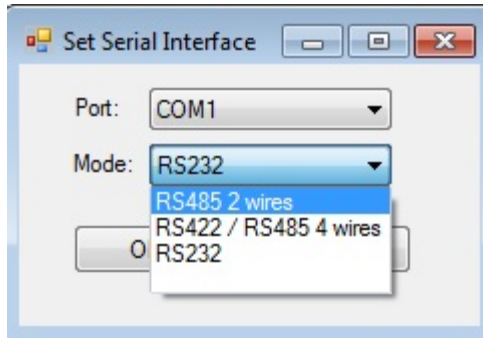
4. Click **OK**.
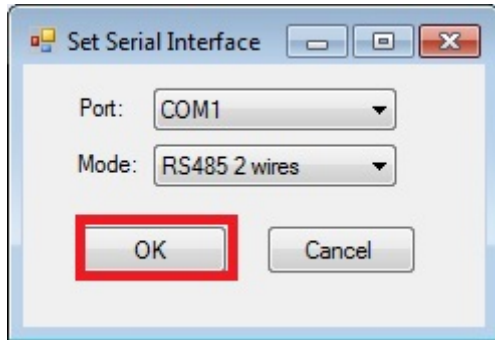
C

Examples
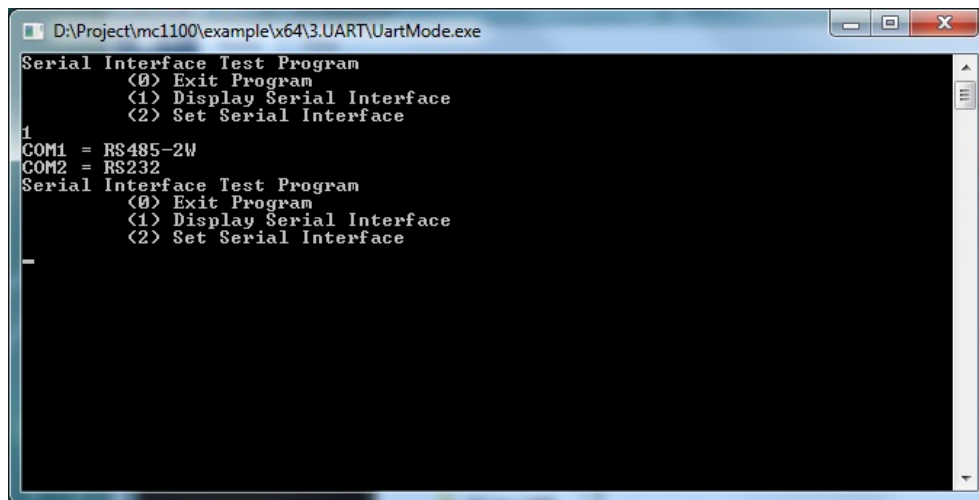
In this chapter, we provide examples to illustrate how to use the MC-1100 computer for a variety of applications.

The following topics are covered in this appendix:

❑ **Serial Interface**
❑ **Digital Input/Output**
❑ **Watchdog**
❑ **Power Control**

Serial Interface

1. Download the MC-1100 Utility Package from: https://www.moxa.com/product/MC-1100_Series.htm
2. Copy the following files from the utility package to a folder on your MC-1100.
   mxsp.dll: \examples\MC-1100-W7E-example\3.lib\mxsp\x64\
   sysinfo.dll: \examples\MC-1100-W7E-example\3.lib\mxsp\x64\
   sysinfo.sys: \examples\MC-1100-W7E-example\3.lib\mxsp\x64\
   sysinfoX64.sys: \examples\MC-1100-W7E-example\3.lib\mxsp\x64\
   mxGeneralIo.dll: \examples\MC-1100-W7E-example\3.lib\MxGeneralIo\x64\
   UartMode.exe: \examples\MC-1100-W7E-example\x64\Release\

3. Execute **UartMode.exe**.

4. Type **2** to set the serial interface, and then follow the onscreen instructions

5. Type **1** to display the current serial interface settings.
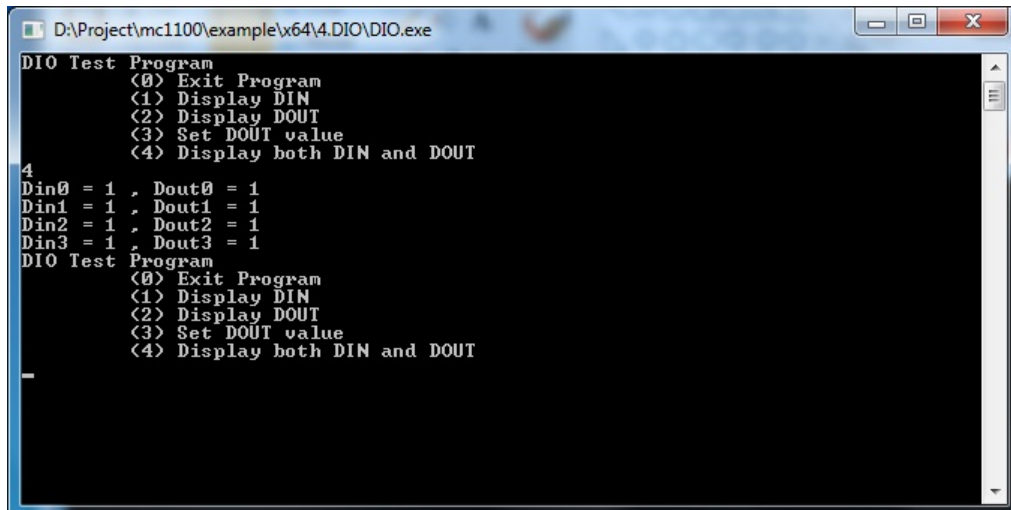
Digital Input/Output

1. Download the MC-1100 Utility Package from: https://www.moxa.com/product/MC-1100_Series.htm
2. Copy the following files from the MC-1100 Utility Package to a folder on your MC-1100.

    mxdgio.dll: \examples\MC-1100-W7E-example\3.lib\mxdgio\x64\

    mxGeneralIo.dll: \examples\MC-1100-W7E-example\3.lib\MxGeneralIo\x64\

    DIO.exe: \examples\MC-1100-W7E-example\x64\Release\

3. Execute **DIO.exe**.

4. Type **4** to display the current DI and DO values.
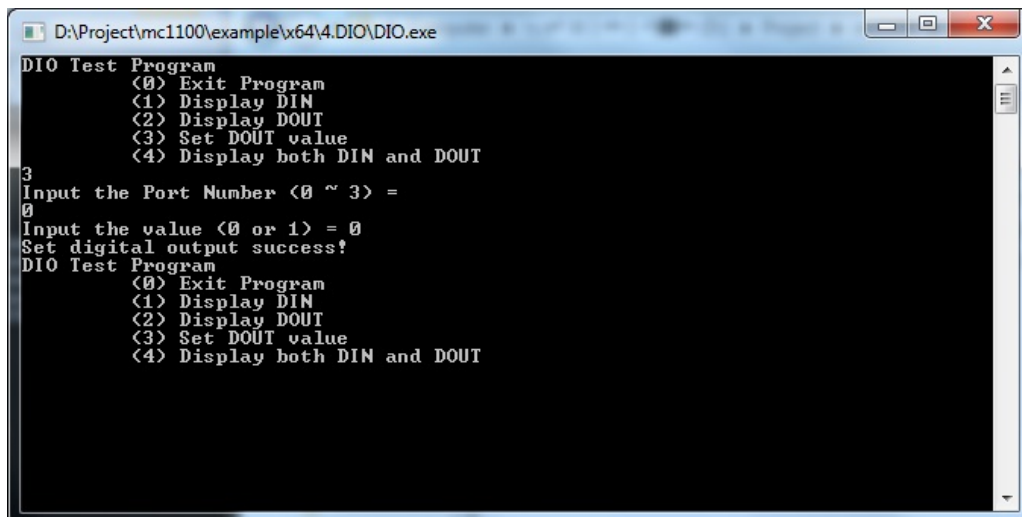
5. Type **3** to set the DOUT port number, and then follow the onscreen instructions.
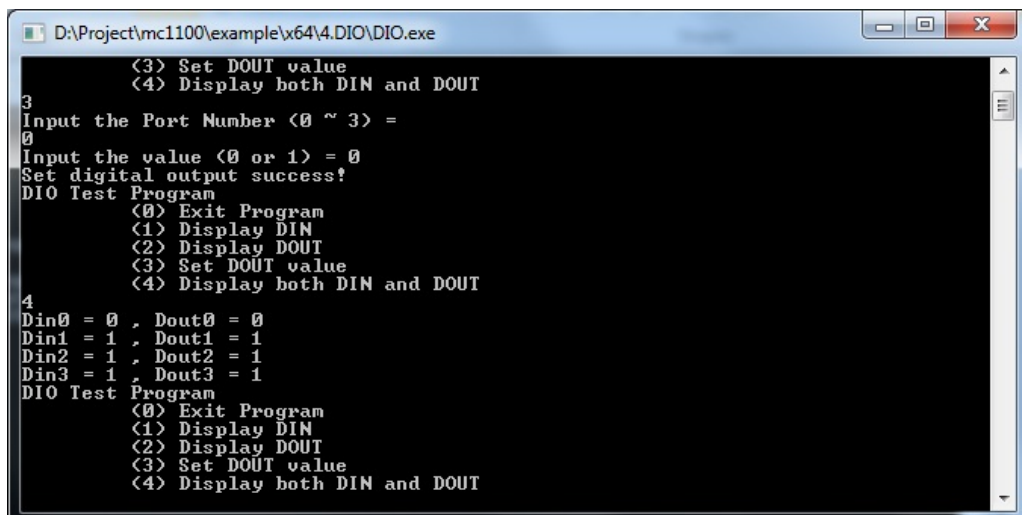
6. Type **4** to check if the port value was set correctly.
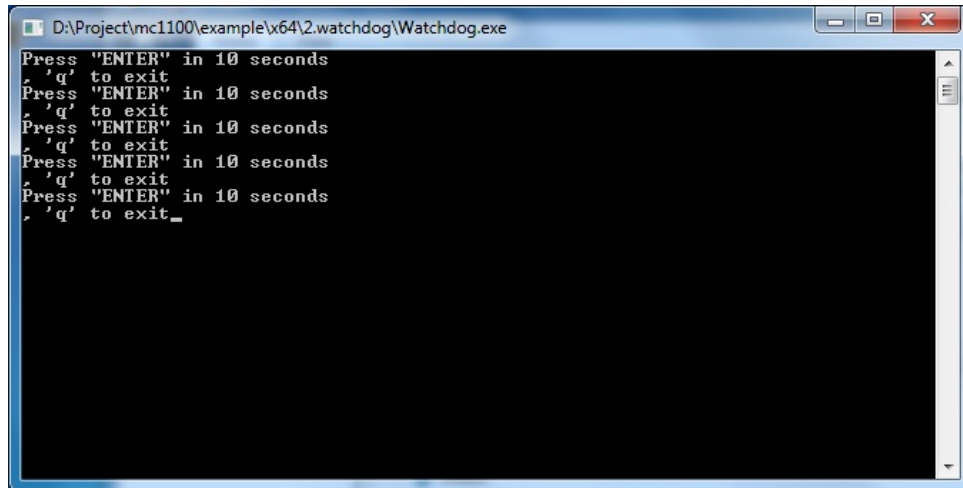
Watchdog

1. Download the MC-1100 Utility Package from: https://www.moxa.com/product/MC-1100_Series.htm
2. Copy the following files from the MC-1100 Utility Package to a folder on your MC-1100.
   mxdwg.dll: \examples\MC-1100-W7E-example\3.lib\mxdwg\x64\
   mxGeneralIo.dll: \examples\MC-1100-W7E-example\3.lib\MxGeneralIo\x64\
   Watchdog.exe: \examples\MC-1100-W7E-example\x64\Release\

3. To prevent the system from rebooting, press [Enter] at least once every 10 seconds; otherwise, the system will reboot automatically.
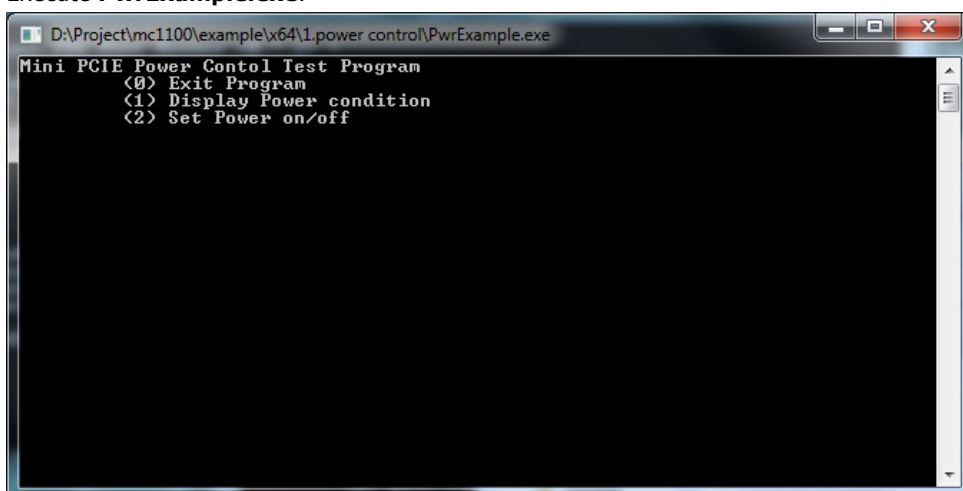
   Press **q** and **ENTER** to exit the program.

Power Control

In this section, we illustrate how to use the test utility to control power through the mini-PCIE interface.
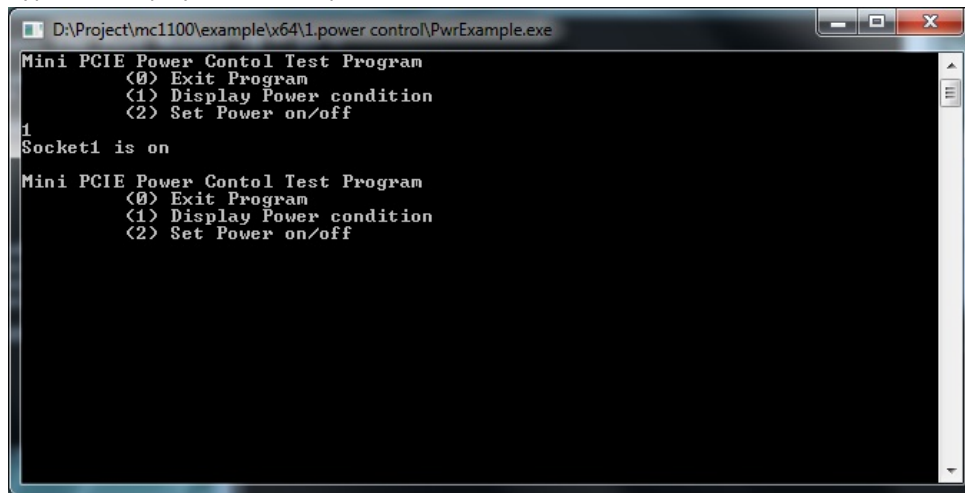
1. Download the MC-1100 Utility Package from: https://www.moxa.com/product/MC-1100_Series.htm
2. Copy the following files from the MC-1100 Utility Package to a folder on your MC-1100.
   mxgpio.dll: \examples\MC-1100-W7E-example\3.lib\mxgpio\x64\
   mxGeneralIo.dll: \examples\MC-1100-W7E-example\3.lib\MxGeneralIo\x64\
   PwrExample.exe: \examples\MC-1100-W7E-example\x64\Release\

3. Execute **PwrExample.exe**.
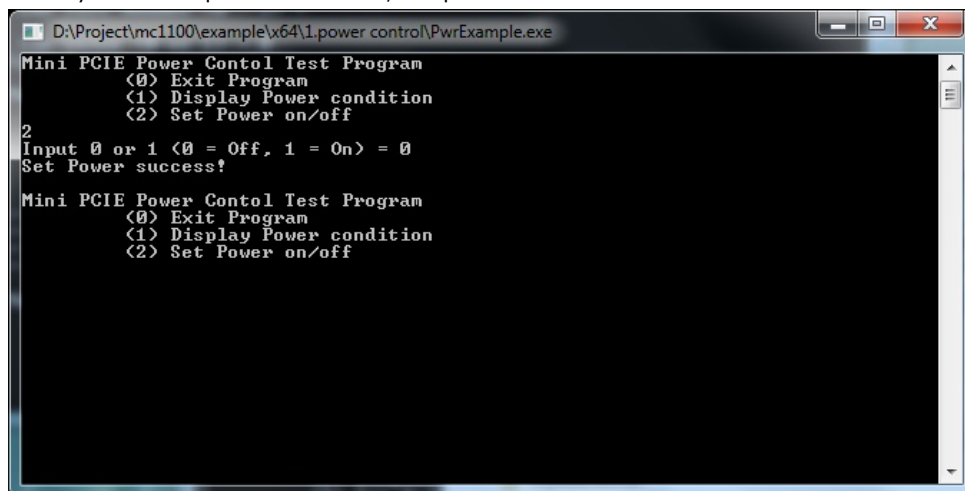
4. Type **1** to display the current power status.

5. Type **2** and follow the onscreen instructions to set the power value.

When you set the power value to 0, the power turns off.

When you set the power value to 1, the power turns on.

D

Telit LE910 Module for the SMS Function

In this chapter, we set up a test environment to send an SMS from the Telit LE910 module on the MC-1100 to a cell phone and verify that the message is delivered properly.

The following topics are covered in this appendix:

❏ **Setting Up the Test Environment**
   ➢ Prerequisites
   ➢ Setting Up the Test System
❏ **Using MxTerm to Test the SMS Function**
❏ **Using a Sample Program to Test the SMS Function**

Setting Up the Test Environment

Prerequisites

You will need the following to set up the test environment.

Type	Description
OS	Windows 10 IoT 2016
Software	• Moxa's PComm Lite utility (Mxterm.exe) • Sample code*
Hardware	• MC-1121 / MC-1122 • Telit LE910 module

*The sample code can be downloaded from MC-1100's product page.

Setting Up the Test System

Once you have set up the hardware, use the following steps to set up the test environment.

1. Check the properties of the Telit Module.
   a. Open the Device Manager: **Start**-> **Controls** -> **Device Manager**
   b. Double-click on **Telit LE Family USB Modem device** item under **Modems** -> **Telit LE Family USB Modem.**
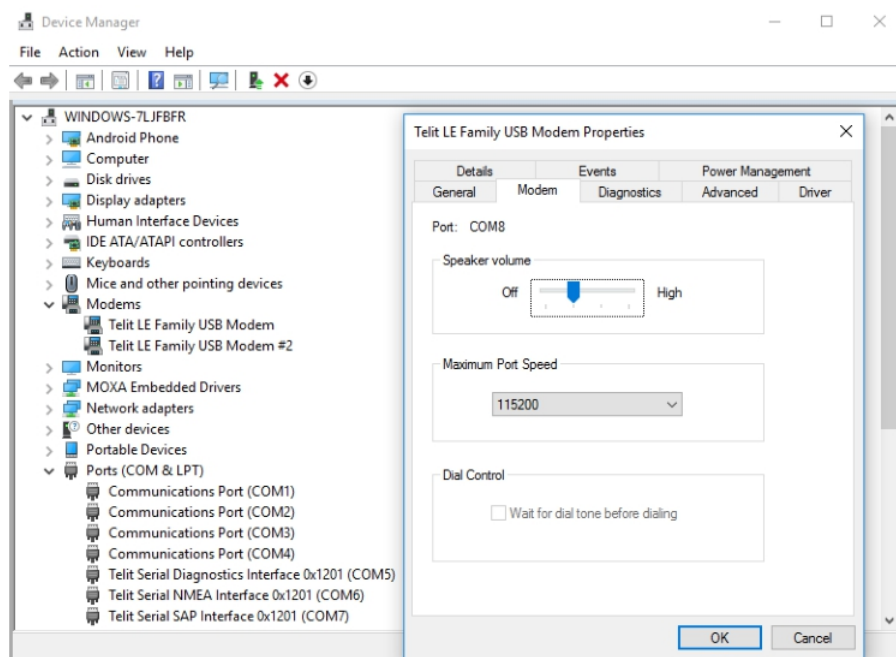
2. Download and install Moxa's PComm Lite utility from:
   https://www.moxa.com/product/download_pcommlite_info.htm
3. Open the PComm Terminal Emulator and setup the COM port parameters (E.g.: COM8, Speed: 115200)
4. Unlock the SIM card and check the SIM card status.

Action	Command and Result
Check PIN status	**AT+CPIN?** **+CPIN: READY** - ME is not awaiting any password **+CPIN: SIM PIN** - ME is awaiting the SIM PIN
Enter PIN code	**AT+CPIN=**<*pin*> For example, enter the default pin code, AT+CPIN=0000
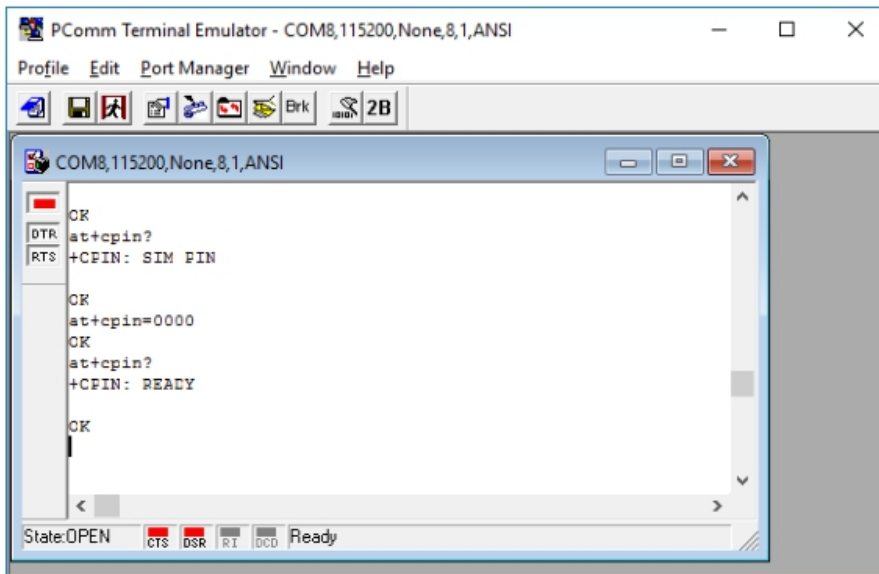
After you see the result **+CPIN: Ready,** go to next step.

5. Check the network registration status.

| Action	Command and Result
Check network registration	**AT+CREG=[**_<mode>_**]** _<mode>_: • **0**—disable network registration unsolicited result code (factory default) • **1**—enable network registration unsolicited result code • **2**—enable network registration unsolicited result code with network Cell identification data
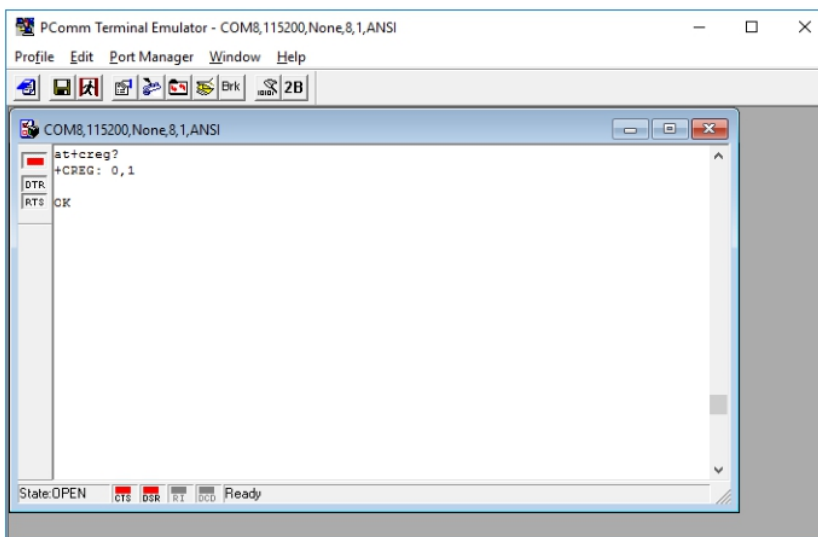
6. Set the Message Format to Text mode.

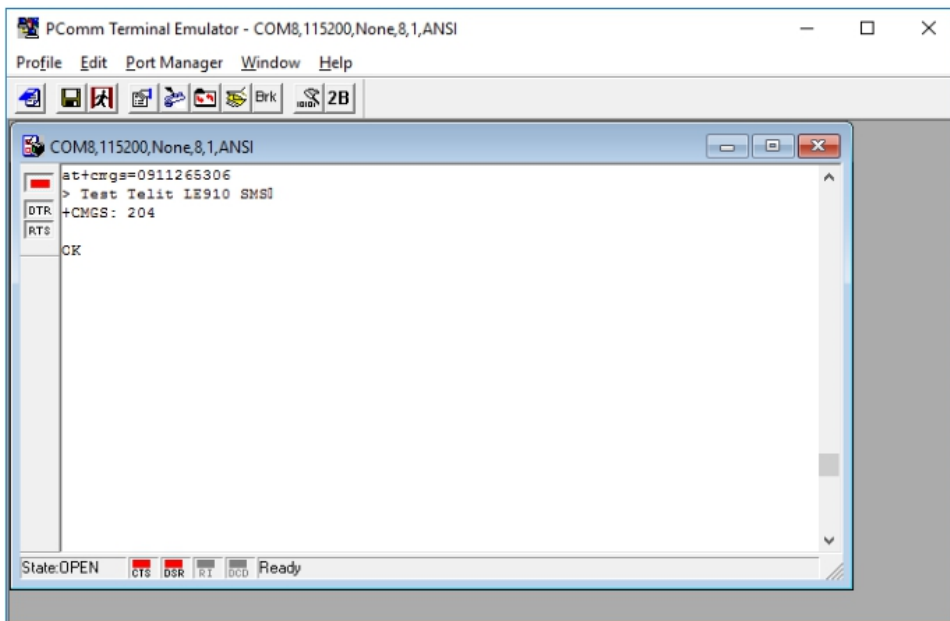| Action	Command and Result
Change Message Format	**AT+CMGF=[**_<mode>_**]** _<mode>_ • **0**—PDU mode, as defined in GSM 3.40 and GSM 3.41 (factory default) • **1**—Text mode
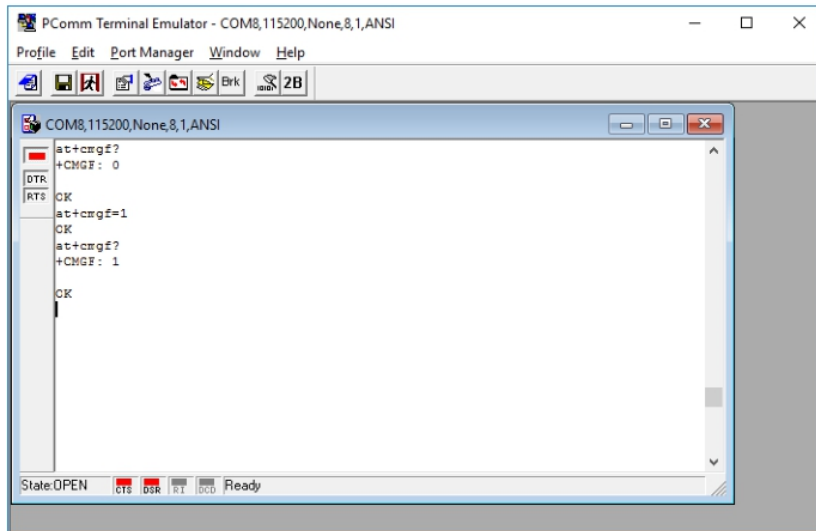
Using MxTerm to Test the SMS Function
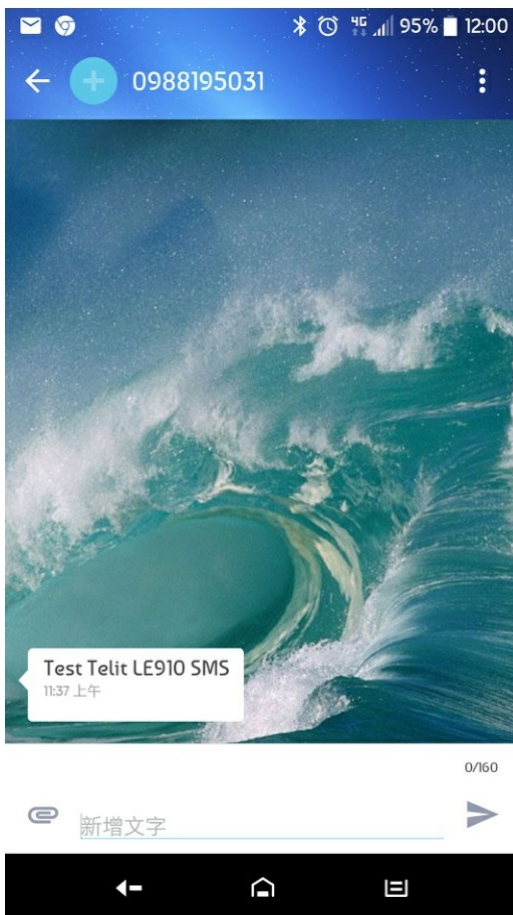
1. Run the MxTerm utility on your MC-1100 computer
2. Open a COM port (e.g., COM8).
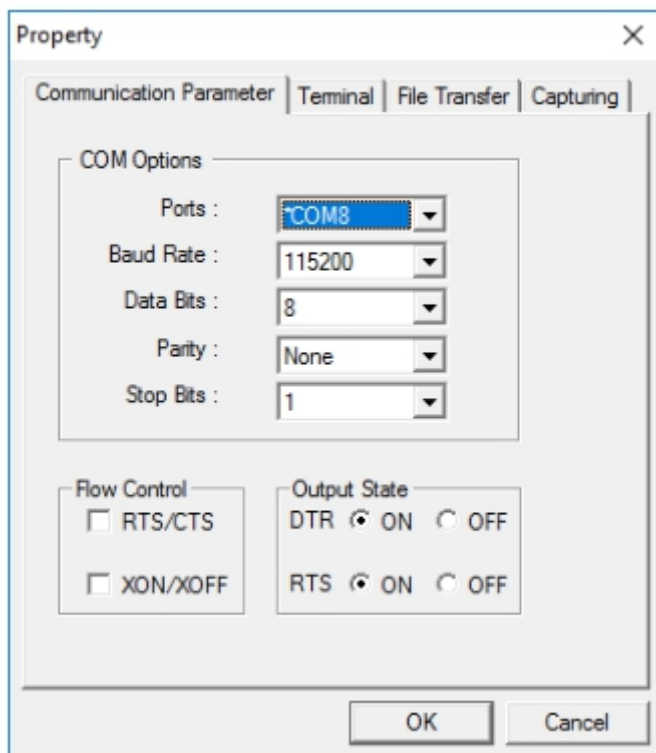
3. Enter `at+cmgs`=*<cell phone number>* and then enter the message you want to send.
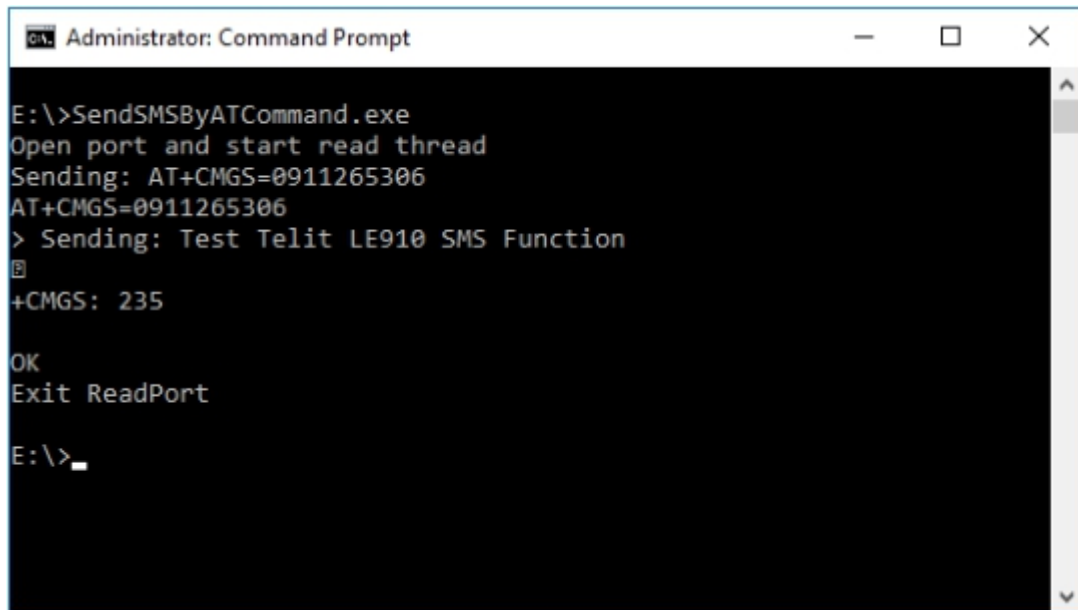
4. Confirm that the SMS message is delivered to the cell phone.

Using a Sample Program to Test the SMS Function

1. Run the sample program **SendSMSByATCommand.exe**.

```
Administrator: Command Prompt                          —    □    ×

E:\>SendSMSByATCommand.exe
Open port and start read thread
Sending: AT+CMGS=0911265306
AT+CMGS=0911265306
> Sending: Test Telit LE910 SMS Function

+CMGS: 235

OK
Exit ReadPort

E:\>_
```

2. Enter the cell phone number and the SMS that you want to send.
3. Confirm that the SMS message is delivered to the cell phone.