

# **RXi2-BP**

## **HARDWARE REFERENCE MANUAL**



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## Warnings and Caution Notes as Used in this Publication

### **WARNING**

Warning notices are used in this publication to emphasize that hazardous voltages, currents, temperatures, or other conditions that could cause personal injury, exist in this equipment, or may be associated with its use.

In situations where inattention could cause either personal injury or damage to equipment, a Warning notice is used.

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### **CAUTION**

Caution notices are used where equipment might be damaged if care is not taken.

---

### **NOTICE**

Notes and information that are not safety-related.

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**Note:** Notes merely call attention to information that is especially significant to understanding and operating the equipment.

These instructions do not purport to cover all details or variations in the equipment, nor to provide for every possible contingency to be met during installation, operation, and maintenance. The information is supplied for informational purposes only, and Emerson makes no warranty as to the accuracy of the information included herein. Changes, modifications, and/or improvements to equipment and specifications are made periodically and these changes may or may not be reflected herein. It is understood that Emerson may make changes, modifications, or improvements to the equipment referenced herein or to the document itself at any time. This document is intended for use by trained personnel familiar with the Emerson products referenced herein.

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# Section 1: Introduction

The RXi2-BP IPC industrial computing platform delivers compact, rugged, mid to high-performance computing and high-performance graphics capabilities to run HMI, historian, and analytics applications for real-time control and visualization of operations.

A Computer-On-Module (COM) is a module containing all the components necessary for a bootable host computer, packaged as a super component. A COM requires a carrier board to connect I/O and power up. COMs are used to build modular solutions and to offer Original Equipment Manufacturer (OEMs) fast time-to-market with reduced development costs. Like integrated circuits, they provide OEMs with significant freedom in meeting form-fit-function requirements. For these reasons, the COM methodology has gained much popularity with OEMs in the embedded industry.

The RXi2-BP IPC is composed of the following components:

- mC10L19 COM Express module based on AMD Ryzen V1000 or R1000 series
- CEC10 COM Express type 10 carrier board
- Industrial grade enclosure with heat sink for the module and carrier components

This chapter describes the features, capabilities, and compatibilities of the RXi2-BP IPC and its components.

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**Figure 1: RXi2-BP IPC**



## 1.1 Document History

Rev	Date	Description
C	September 2021	<ul style="list-style-type: none"> <li>Addition of 1-Slot variant</li> <li>Updates to support remote management</li> <li>Updates to support Movicon.NExT software bundles</li> </ul>
B	November 2020	<ul style="list-style-type: none"> <li>Updates to the product label</li> <li>Updates to Regulations and Certifications</li> </ul>
A	Oct 2020	Initial revision

## 1.2 Capability and Compatibility

The mC10L19 COM Express module is a fully x86 compatible single board computer module, containing many functions in a very small form factor. It is based on the PICMG COM Express Module Base Specification V3.0 Type 10. (Refer to the documentation located at [www.picmg.org](http://www.picmg.org).) The mC10L19 uses the AMD family 17h models 10h-1fh (V1000 and R1000) Ryzen Core Processor.

The CEC10 COM Express carrier board is also compliant with the PICMG COM Express Module Base Specification R3.0 Type 10 (refer to the documentation located at <http://www.picmg.org>).

The RXi2-BP power supply module provides a voltage input of nominal 24 V DC ( $\pm 25\%$ ) and supports under and overvoltage supervisory, and protection against reverse polarity.

## 1.3 Software Requirements

- Microsoft® Windows® 10 Professional 64-Bit IoT 2019 LTSC
- Linux® Kernel 5.4

## 1.4 Features

RXi2-BP IPC module features are as follows:

- AMD Ryzen V1000
  - 4c/8t V1000, TDP 12 - 25W, L2 2MB, L3 4MB, 8 GPU CU, Industrial-temp, 4 to 16GB DDR4-2400 ECC RAM (single rank)
- AMD Ryzen R1000
  - 2c/4t R1000, TDP 8 - 10W, L2 1MB, L3 2MB, 3 GPU CU, 4 to 16GB DDR4-2400 ECC RAM (single rank)
- 1x Display Port V1.4
- 2x USB 2.0
- 2x USB3.2 Gen1
- 4x Gig Ethernet ports (1 Realtek RTL8111 controller and 3 Intel i210IT controllers, supporting TimeSYNC IEEE1588 and 802.1AS)
- Mini PCIe slot (half size) as option
  - Unified Infrastructure Management (UIM) interface
- M.2 PCIe M-Key and SATA Gen3 capability
- fTPM V2.0
- Two serial interfaces (1x RS-232, 1x galvanic isolated RS-485/RS-422)
- Operating at 24 V dc ( $\pm 25\%$ ), including over- and under-voltage protection
- Reverse polarity protection

## Section 2: Unpacking and Inspection

This chapter describes unpacking, initial inspection, and required preparation considerations before using the RXi2-BP IPC. Perform the procedures in this chapter to verify proper operation after shipping and before system integration.

### CAUTION

If the RXi2-BP IPC operates in the high ambient temperature up to 70°C (149 ° F), the surface of the enclosure, especially the heat sink, can reach a temperature of 85°C (185 ° F) and above. Be careful and do not touch the RXi2-BP IPC with bare fingers.

Si le RXi2-BP IPC est opérée à une température ambiante élevée jusqu'à 70 ° C (149 ° F), la surface du boîtier, en particulier le dissipateur thermique, peut atteindre une température de 85 ° C (185 ° F) et plus. Soyez prudent et ne touchez pas le RXi2-BP IPC avec les doigts nus.

## 2.1 Package Contents

Verify that the delivered package contains the contents listed in the following table.

**Table 2-1 Delivery Volume**

Item	QTY	Description
RXi2-BP	1	RXi2-BP Industrial PC
Serial Connector Plug	2	Serial Connector Plug
24 V Power-In Connector Plug	1	Power Connector Plug
Quick Start Guide	1	Quick Start Guide (GFK-3196)

## 2.2 Available Options and Accessories

The following tables list the available accessories for the RXi2-BP IPC. For the complete list of orderable product SKUs please refer to the RXi2-BP Datasheet

**Table 2-2 Available Accessories**

Item	Description
R2B00ACCMP01	1pcs Panel Mounting Kit R2B for zero-slot variant
R2B00ACCMP02	1pcs Panel Mounting Kit R2B for one-slot variant
R2B00ACCRM01	1pcs DIN Rail Mounting Kit R2B

**Note:** For the most current information on options and accessories, contact the nearest Emerson sales or service office, or an authorized Emerson sales representative. Options are subject to change without notice.



## 2.3 ESD and EMI

Electrostatic Discharge (ESD) is the discharge of static electricity. Electromagnetic Interference (EMI) is a disturbance generated by an external source that affects an electrical circuit by electromagnetic induction, electrostatic coupling, or conduction. ESD and EMI issues may come up when installing and connecting the system to the other components. There are many ways to avoid problems with these issues.

Any operational system with cables for I/O signals, connectivity, or peripheral devices provides an entry point for ESD and EMI. If Emerson has not manufactured the complete system, including the enclosure and cables, then it is the responsibility of the system integrator and end-user to protect their system against potential problems. Filtering, optical isolation, ESD gaskets, and other measures might be required at the physical point of entry (enclosure).

Products manufactured by Emerson should normally be suitable for use in properly designed and produced customer equipment (cabinets, racks) without any major redesign. However, the systems might be subject to ESD and EMI problems once installed and interconnected with other systems. The end-user, system integrator, or installer must test for possible problems and in some cases, show compliance to local regulations as required in his country or by the intended application.

### CAUTION

Static-sensitive Devices: Handle only at static-safe workstations.

### CAUTION

This is an FCC Class A product intended for use in an industrial environment. In a home or residential environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

### CAUTION

Drain static electricity before you install or remove any parts. Installing or removing modules without observing this precaution could result in damage to this and/or other modules or components in your system.

Wear a properly functioning anti-static strap and make sure you are fully grounded. Any surface upon which you place the unprotected module or unit should be static-safe, which is usually facilitated by the use of anti-static mats. From the time it is removed from the anti-static bag until it is in the board carrier and functioning properly, extreme care should be taken to avoid zapping the component with ESD. Be aware that you could zap the component without knowing it; a small discharge, imperceptible to the eye and touch, can often be enough to damage electronic components. Extra caution should be taken in cold and dry weather when electrostatics easily builds up.

Only after ensuring that both you and the surrounding area are protected from ESD, carefully remove the component from the shipping carton by grasping the module on its edges. Place the component, in its anti-static bag, flat down on a suitable surface. You may then remove the component from the anti-static bag by tearing the ESD warning labels.

## 2.4 Unpack and Inspect

### CAUTION

Before installing or removing any board or module, ensure that the system power and external supplies have been turned off.

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### CAUTION

DO NOT apply power to the board if it has visible damage. Doing so may cause further, possibly irreparable damage, as well as introduce a fire or shock hazard.

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### NOTICE

Retain all packing material in case of future need.

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Before unpacking the board or module, or fitting the device into your system, read the manual carefully. Also, adhere to the following guidelines:

- Observe all precautions for electrostatic sensitive modules.
- If the product contains batteries, do not place it on conductive surfaces, anti-static plastic, or a sponge, which can cause shocks and lead to battery or board trace damage.
- Do not exceed the specified operational temperatures. Batteries and storage devices might also have temperature restrictions.
- Keep all original packaging material for future storage or warranty shipments of the board.

After unpacking the component, inspect it for visible damage that may have occurred during shipping or unpacking. Although the product is carefully packaged to protect it against the rigors of shipping, it is still possible that shipping damages may occur. A careful inspection of the shipping carton should reveal some information about how the package was handled by the shipping service.

If evidence of damage or rough handling is found (usually in the form of bent component leads or loose socketed components), notify the shipping service as soon as possible and contact Emerson for additional instructions. Depending on the severity of the damage, it may be necessary to return the product to the factory for repair.

## 2.5 Handling

### WARNING

If the RXi2-BP IPC operates in high ambient temperature up to 70°C (149 ° F), the surface of the enclosure, especially the heat sink, can reach a temperature of 85°C (185 ° F) and above. Be careful and do not touch the RXi2-BP IPC with bare fingers.

Si le RXi2-BP IPC est opérée à une température ambiante élevée jusqu'à 70 ° C (149 ° F), la surface du boîtier, en particulier le dissipateur thermique, peut atteindre une température de 85 ° C (185 ° F) et plus. Soyez prudent et ne touchez pas le RXi2-BP IPC avec les doigts nus.

### WARNING

Install the RXi2-BP IPC only in areas with restricted access.

Equipment for use in locations where children are not likely to be present.

Pour l'équipement destiné à être utilisé dans des endroits où les enfants ne sont probablement pas présents.

## Section 3: Mounting

RXi2-BP IPC cooling is designed for the wall-mounted orientation of the box. There are two possible mounting options:

- Din Rail Mounting
- Mounting Panel

### 3.1 DIN Rail Mounting

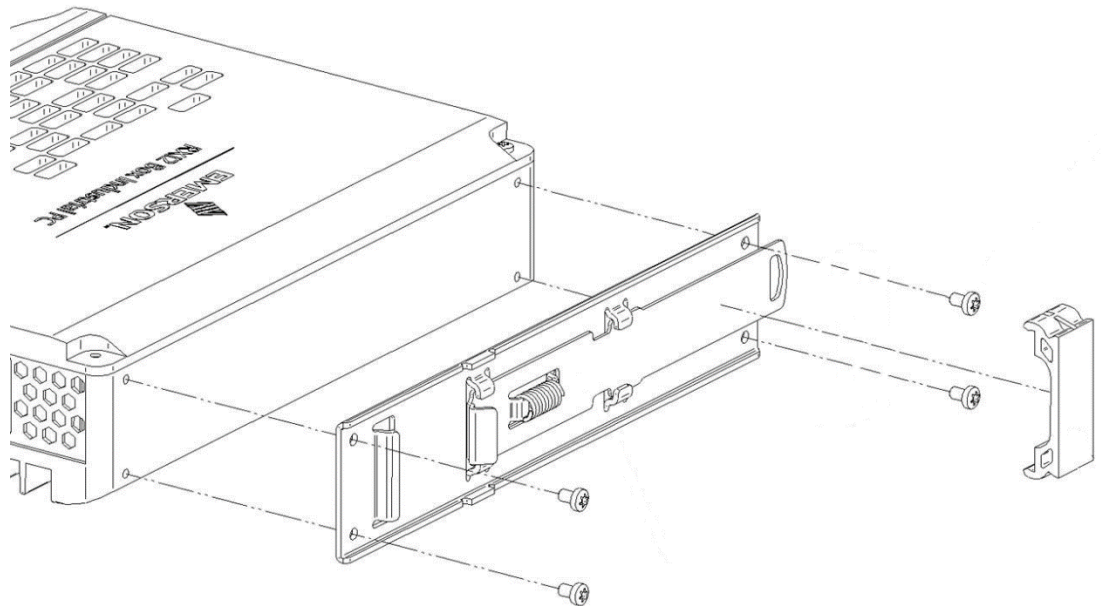
To mount the IPC to a DIN rail, the user will need to connect DIN Rail Clamp #R2B00ACCRM01 to the rear of the IPC:

1. Place the DIN Rail on the rear face of the RXI2-BP IPC.
2. Using a T9 Torx driver, secure the DIN rail with the provided M3x5-A2 screws, tightening to 0.6 Nm. (Do not overtighten.)

**Note:** For rugged applications, use a thread-locker to ensure that screws do not loosen.

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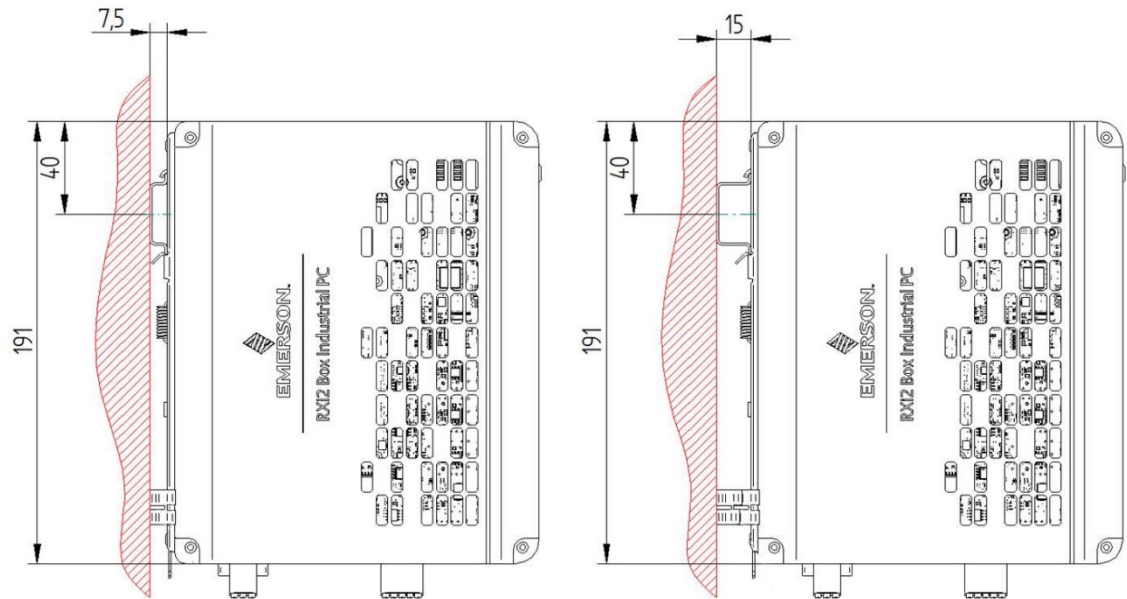
**Figure 2: Attaching a DIN Rail to an RXI2-BP IPC**



There are two DIN rail mounting options available, depending on the size of the DIN rail connector.

- If the DIN connector is 7.5 mm in height: use a single DIN rail support to offset the bottom of the IPC.
- If the DIN connector is 15 mm in height: use two DIN rail supports in a stack to increase the height to offset the bottom of the IPC.

**Figure 3: RXi2-BP IPC DIN Rail Mounting Options**

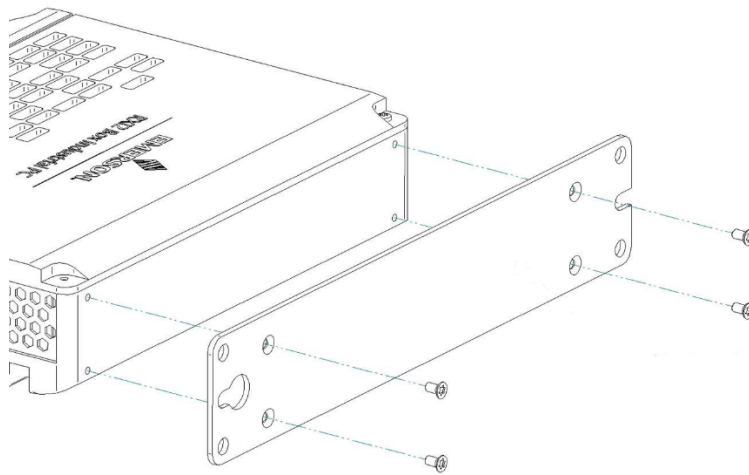


## 3.2 Panel Mounting

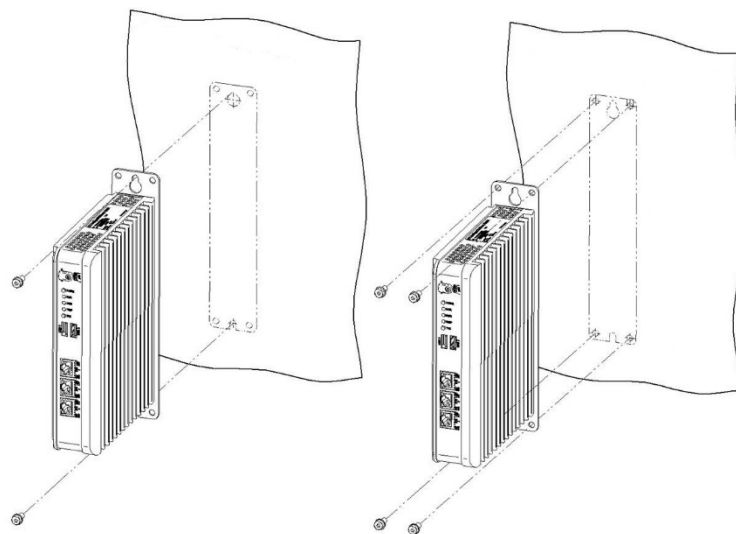
To mount the IPC in a panel mount configuration, the user will need to connect Mounting Panel #R2B00ACMP01 to the rear of the IPC:

1. Place the mounting plate on the rear of the IPC.
2. Using a T9 Torx driver, secure the mounting plate with the two provided M3x6 screws, tightening to 0.6 Nm. (Do not overtighten.)
3. For regular mounting, secure the mounting plate and IPC through the top and bottom center holes. For more rugged applications, secure the mounting plate with the four provided M3x6 screws in all four corners of the mounting panel.

**Figure 4: Attaching Mounting Plate RXi2-BP IPC**



**Figure 5: RXi2-BP IPC DIN Rail pre-mounting**

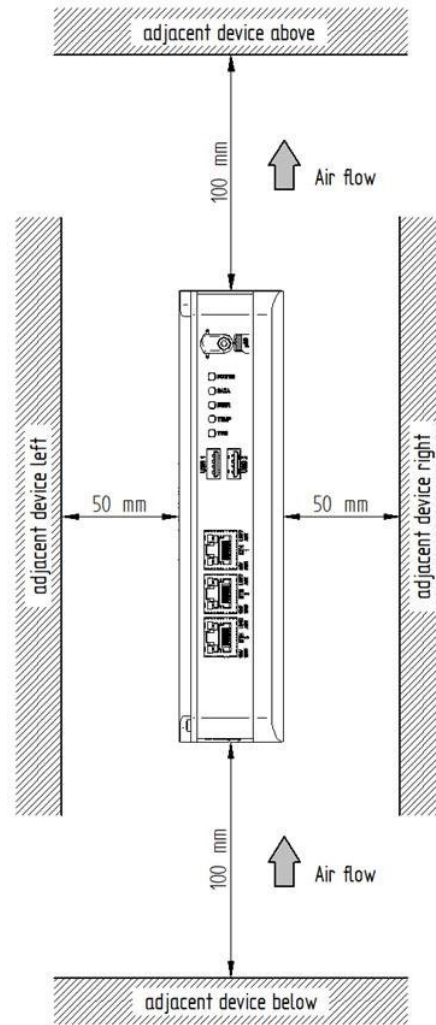


## 3.3 Clearances requirements to all mounting options

Figure 6 shows the optimal clearances requested by RXi2-BP to operate within full thermal specifications and is applicable for the DIN rail and panel mount option.

Any deviation in requested clearance will result in reduced thermal performance and must be evaluated by the customer based on the final setup.

**Figure 6: Minimum Clearances**



## Section 4: Installation and Startup

This chapter describes the installation and initial startup operations.

### CAUTION

Before installing or removing any component, make sure that the system power and external supplies have been turned off.

---

### CAUTION

Static-sensitive Devices: Handle only at static-safe workstations.

---

### CAUTION

Drain static electricity before you install or remove any parts. Installing or removing modules without observing this precaution could result in damage to this and/or other components in your system.

---

## 4.1 General Installation Guidelines

Adhere to the following guidelines during installation:

- Observe all safety procedures to avoid damaging the system, and to protect operators and users.
- Before installing or removing any board, verify that the system power and external supplies have been turned off.
- Make sure the RXi2-BP IPC is properly mounted.
- Connect all I/O cables.
- Do not restore power until all components are fitted correctly into the system and all connections have been made properly.

## 4.2 Required Materials

The following items are required to start the RXi2-BP IPC in a standard configuration:

- Power supply
- Keyboard and mouse
- Video monitor



## 4.2.1 Power Supply

### CAUTION

Verify that the power supply is turned off while installing boards or modules into the RXi2-BP IPC.

Adhere to the following guidelines:

- Verify that the power supply can meet the total power requirements of the RXi2-BP IPC. (Refer to the section Specifications.)
- Verify that the power supply is not turned ON while opening the enclosure to install add-on boards and modules into the RXi2-BP IPC (such as the PCIe boards or internal SATA drives).

## 4.2.2 Keyboard

A compatible USB keyboard for the initial system operation of the RXi2-BP IPC is required. Depending on your application, this may be a standard keyboard or one that uses membrane switches for harsh environments.

## 4.2.3 Video Monitor

Any video monitor with a native Display Port (or a suitable adaptor for the Display Port) can be used for the initial setup.

# 4.3 Minimum System Requirements

The RXi2-BP IPC has been thoroughly tested and is nearly ready for usage in the target system. To verify operation for the first time, Emerson recommends that you only configure a minimal system. It is not necessary to have disk drives, a flash disk, or other accessories connected, to perform the Power-On Self-Test (POST).

# 4.4 Initial Startup

A few seconds after powering up, the RXi2-BP IPC system UEFI Firmware banner will display on the screen. If you do not see any error messages up to this point, the RXi2-BP IPC is running properly and ready to be configured for your application.

**Note:** *If the RXi2-BP IPC does not perform as described above, some damage may have occurred during shipment, or the board is not installed or configured properly. Contact Emerson for technical support. (Refer to the section Contact Information.)*

## 4.5 UEFI Firmware Setup

### 4.5.1 Entering UEFI Firmware Setup

To enter setup during the initial startup sequence: press the **Delete** or **F2** key during the startup sequence.

Adhere to the applicable on-screen messages when prompted.

To save changes, go to Save & Exit page and choose **Save Changes and Exit** option

### 4.5.2 Selective Alternative Boot Source

To select an alternative boot device (for example, boot from USB stick), without changing settings in UEFI Firmware, please press and hold the **F7** key during the power-up sequence

### 4.5.3 Setting up Boot Priority

To configure a particular boot priority, within UEFI Firmware Setup, navigate to the Boot page and configure **Boot Option #1** and **Boot Option #2**, as required. Go to Save & Exit page and choose **Save Changes and Exit** option.

### 4.5.4 Restoring UEFI Settings

When within UEFI Firmware Setup, navigate to the Save & Exit page, choose **Restore Defaults**, choose **Save Changes, and Exit**.

### 4.5.5 Configuring Hibernation and Sleep States

When within UEFI Firmware Setup, navigate to the Advanced page, choose ACPI Settings, make required changes. Go to Save & Exit page and choose **Save Changes and Exit** option.

### 4.5.6 UEFI Passwords

To configure Administrator and User passwords, within UEFI Firmware Setup, navigate to Advanced page, choose **Security**, make required changes. Go to Save & Exit page and choose **Save Changes and Exit** option

### 4.5.7 Secure Boot Configuration

To configure Secure Boot, change/reset Keys, within UEFI Firmware Setup, navigate to the Advanced page, choose the **Secure Boot** option, make required changes. Go to Save & Exit page and choose **Save Changes and Exit** option

Note: For in-depth technical information about the CPU and its peripherals, please refer to the mC10L19 Hardware Reference Manual (GFK-3096).

## 4.6 Remote Management Setup

The RXi2-BP IPC uses DASH to implement remote management capabilities over the Realtek LAN controller. The sections below describe how to enable and configure DASH remote management.

Please follow the recommendations for secure system operation in the Secure Deployment Guide for this system. Implementing security measures is the responsibility of the customer. Failing to implement security precautions may compromise the security of both, the system and the operational environment.

### 4.6.1 Prerequisites

The following prerequisites are necessary for setting up DASH remote management:

- Setup LAN: Separate LAN environment for system setup tasks with no connection to factory-, office network or any other network.
- Administrator PC with the following provisions:
  - Network port connected to setup LAN
  - The current version of Windows OS
  - Network configuration to enable connection to the target system with DASH Factory Default Network Configuration
  - Realtek Management Console installed
- Target system:
  - Network port connected to setup LAN
  - The keyboard and monitor attached

### 4.6.2 Enabling and Configuring DASH in UEFI Setup on Target System

Please go through the following steps to enable and configure DASH remote management:

1. Start with the target system powered off.
2. Keep Physical Presence Button pressed.
3. Power on the system.
4. After a few seconds, Physical Presence LED starts blinking.
5. Keep Physical Presence Button pressed until Physical Presence LED stays on permanently.
6. Immediately press the DEL key and hold it down until the UEFI setup screen is displayed.
7. Change following settings in UEFI setup:
  - a. Advanced->DASH Configuration->DASH = **[Enabled]**
  - b. Advanced->DASH Configuration->MCTP Configuration->MCTP Support = **[Enabled]**
  - c. Advanced->DASH Configuration->ASF Configuration->ASF Support = **[Enabled]**
  - d. Advanced->Network Stack Configuration->Network Stack = **[Enabled]**
8. Save settings, exit UEFI setup and reboot system.
9. Enter UEFI setup using same procedure as described above.
10. Navigate to the DASH configuration page: *Advanced->Realtek PCIe GBE Family Controller (MAC:xx:xx:xx:xx:xx:xx)->RealManage Setup->RealManage Setup*

11. Go to Page **Setup and Configuration** and select page **Security Configuration**.
12. Use item **Modify username** to set a username for the initial administrator user.
13. For compatibility with Realtek Management Console, use **Administrator**.
14. Other user names are possible but may lead to compatibility problems.
15. Use item **Modify password** to set the individual password.
16. Press the Escape key to return to page **Realtek RealManage Setup**.  
**ATTENTION:** Before exiting Realtek RealManage Setup, the configuration changes must be saved!
17. Save configuration changes using item **Save RealManage Configuration**.
18. Save settings, exit UEFI setup, and power off the system.
19. Disconnect the system from the main power for at least 10 seconds.

### 4.6.3 Network configuration

The RXi2-BP IPC comes with the following default network configuration for DASH remote management:

- Static IP address: 192.168.0.40
- Subnet mask: 255.255.0.0
- Gateway IP address: 192.168.9.1

To change the network configuration via UEFI setup, please go through the steps below:

1. Enter UEFI setup using the same procedure as described above.
2. Navigate to the DASH configuration page:  
*Advanced->Realtek PCIe GBE Family Controller (MAC:xx:xx:xx:xx:xx:xx)->RealManage Setup->RealManage Setup*
3. Enter username (e.g. "Administrator") and password as configured before.
4. Go to page **TCP/IP Configuration**.
5. Configure IP Address (item **OOBip**), subnet mask, gateway, and DNS as applicable for setup LAN.
6. Press the Escape key to return to page **Realtek RealManage Setup**.  
**ATTENTION:** Before exiting Realtek RealManage Setup, the configuration changes must be saved!
7. Save configuration changes using item **Save RealManage Configuration**.
8. Save settings, exit UEFI setup, and reboot the system.

## 4.6.4 Connecting to Target System with Realtek Management Console

Please go through the following steps:

1. Power on the target system.
2. Wait until the Emerson company logo is displayed.
3. On Administrator PC:
  - a. Start Realtek Management Console.
  - b. Use Discovery tab to scan for target system with an IP range matching either the DASH Factory Default Network Configuration or manual configuration (see above).
  - c. Double click on discovered IP to connect to the target system.
  - d. Provide username and password as configured before and click the button **Login**.

After login, the target system can be managed with DASH remote management. Please configure the system as applicable for your target scenario.

## Section 5: Installation and Replacement Procedures

### 5.1 Remove and Attach Cover

1. Shut down the system and remove power from the RXi2-BP IPC.
2. Loosen the four screws on the RXi2-BP IPC's top cover and remove it (Figure 7).

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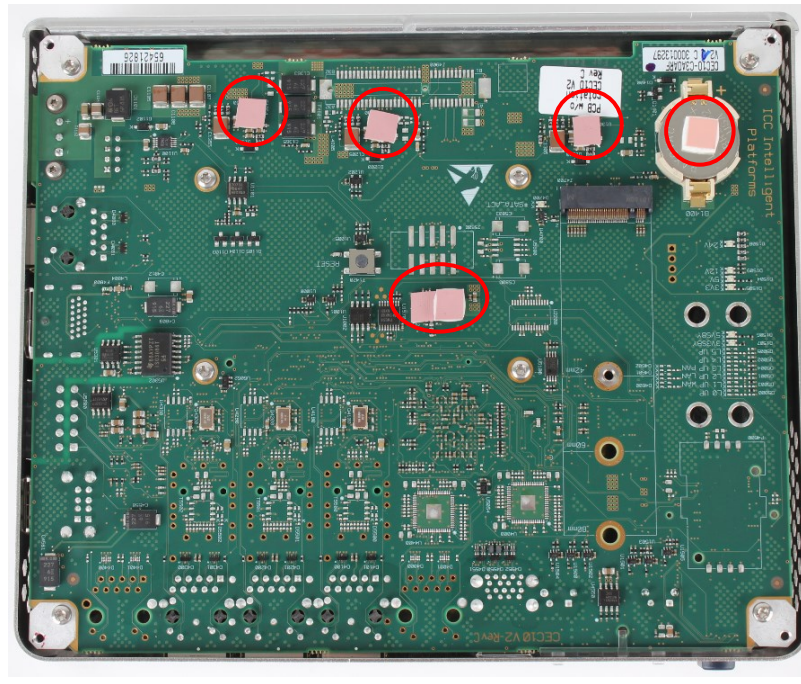
**Figure 7: IPC Cover**



- Please be aware that all six gap pads are in position (Figure 8). They are a part of thermal management, and important for the system's lifetime. The battery has a thicker gap pad.  
**Do not mix!**

**Note:** Gap pads are only placed in the 0-slot variant

**Figure 8: Position of Six Gap Pads**



- Once the desired maintenance or replacement task is completed, attach the cover again, double-check that the lid is correctly placed. Tighten the four screws with 0.6 Nm.

**Note:** Gap pads are only placed in the 0-slot variant

## 5.2 Replace the Real-Time Clock (RTC) battery

### **⚠ CAUTION**

There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type. Dispose of used batteries according to Emerson-provided instructions and applicable local regulations.

The battery can only be exchanged by a skilled person.

### **⚠ CAUTION**

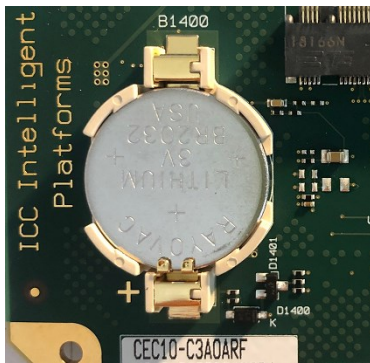
Static-sensitive Devices: Handle only at static-safe workstations.

## NOTICE

The information described in this section applies to service technicians only.

1. Follow instructions on how to remove the cover, see Section 5.1, *Remove and Attach Cover*.
2. Locate the RTC battery (Figure 9).

**Figure 9: RTC Battery**



**Note:** The gap pad is already removed.

3. Remove the RTC battery carefully from the retaining clip.
4. Install a new RTC battery in the retaining clip with the positive (+) side up and reapply the gap pad. (The gap pad establishes a thermal connection from the battery to the lid. Otherwise, thermal derating might be required).

## ⚠ CAUTION

The battery may explode if mistreated. Do not recharge, disassemble, heat above 100° C (212 °F), or incinerate!

## ⚠ CAUTION

Use of a different battery type other than the same type as removed or equivalent type may present a risk of fire or explosion!

5. To attach cover, follow instructions in Section 5.1, *Remove and Attach Cover*.



## 5.3 Inserting and removal of $\mu$ SD Card

1. Unscrew the  $\mu$ SD card lid with Tx 8 screwdriver until  $\mu$ SD opening is accessible.
2. Inserting the  $\mu$ SD card into the opening (Figure 10).

**Figure 10: Inserted  $\mu$ SD card before plugging in**



3. Plug in the  $\mu$ SD card until you hear a click. The populated connector is a push-push connector (Figure 11).

**Figure 11: Plugged in  $\mu$ SD card**



4. Re-attach the lid and tighten the screw to 0.45 Nm (Figure 12).

**Figure 12: Close  $\mu$ SD card lid**



5. To remove the  $\mu$ SD card, remove the lid first and push it carefully in the same direction as step 3, the  $\mu$ SD card will pop out slightly and can then be removed.

## 5.4 Change M.2 Mass Storage Device

### NOTICE

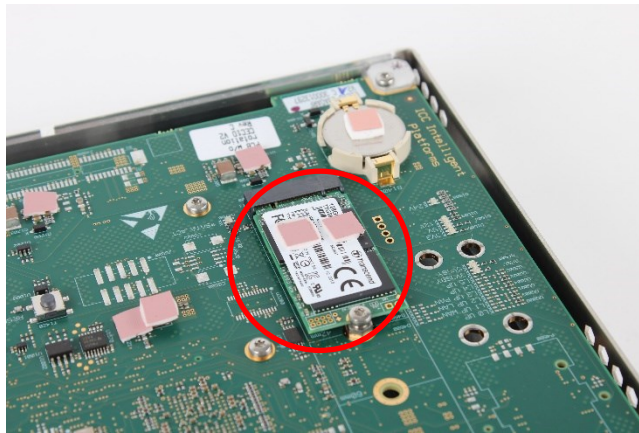
The information described in this section applies to service technicians only.  
Refer to [M.2 \(SATA\)](#) for technical details.

### ⚠ CAUTION

Verify that the power supply is turned off while installing boards or modules into the RXi2-BP IPC.

1. To remove the cover, follow instructions in Section 5.1 *Remove and Attach Cover*.
2. Locate M.2 mass storage and unscrew the Tx 8 screw (Figure 13).

**Figure 13: Populated M.2 Mass Storage**



**Note:** Red marked gap pads on the M.2 storage are only placed in the 0-slot variant and must be re-used.

3. Remove the M.2 mass storage device (Figure 14).
4. With the 0-slot variant, you have to remove the thermal gap pads from the M.2 mass storage device and store them for reuse on a replacement device

---

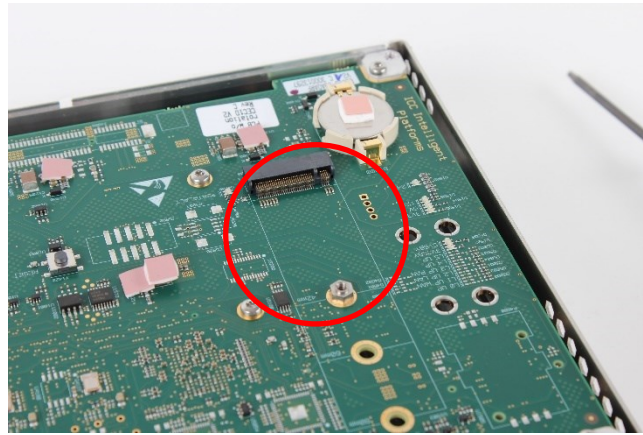
**Figure 14: Screw Removal**



- 
4. An empty slot is now ready for new M.2 mass storage devices (Figure 15).

---

**Figure 15: Empty Slot**



- 
5. To insert a new M.2 storage device, connect the M.2 storage device in the slot and tighten the mounting screw to 0.45 Nm
  6. Reuse the gap pads from the previous M.2 module. Install them in the same location as shown in Figure 13. (The gap pad establishes a thermal connection from M.2 to the lid, otherwise, thermal derating may be possible. This concept is only implemented at the 0-slot variant).
  7. Follow instructions in section 5.1, *Remove and Attach Cover*.

## 5.5 Mounting PCIe AddIn Card (1 slot only)

### NOTICE

The information described in this section applies to service technicians only.  
Refer to [PCIe](#) for technical details.

### ⚠ CAUTION

Verify that the power supply is turned off while installing PCIe AddIn cards into the RXi2-BP IPC.

1. Remove cover as described in Section 5.1 Remove and Attach Cover.

**Figure 16: Removed cover from 1 slot R2B system**

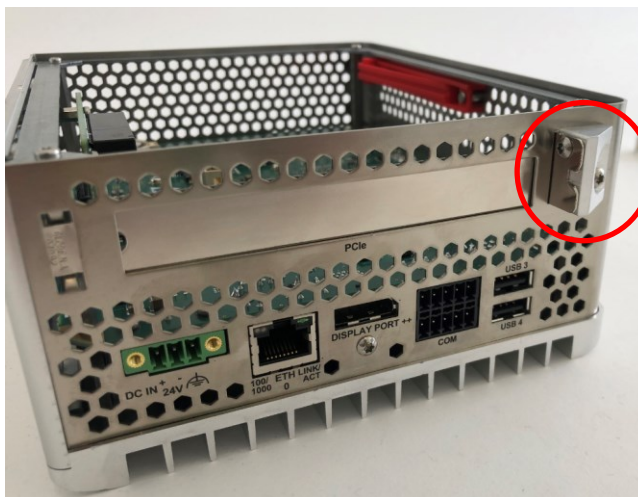


**Note:** Cardholder color can vary. In this manual, a red version is shown.

2. Remove bracket by removing both screws Tx10.

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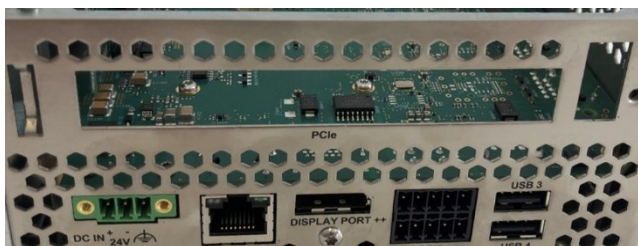
**Figure 17: Removal of the bracket**



3. Remove slot cover by pushing right.

---

**Figure 18: Removed slot cover**

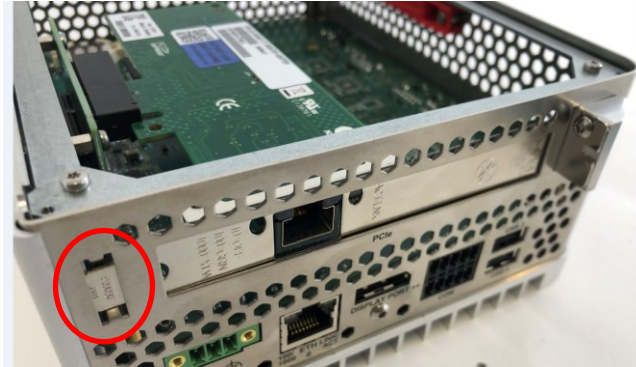




4. Insert PCIe AddIn card.  
Verify that the PCIe AddIn card slot cover is correctly mounted and thread into the sidewall lash.  
Tighten screws at bracket both with 0.6Nm.

---

**Figure 19: Populated PCIe AddIn card with bracket reattached.**



- 
5. Adjusting cardholder to PCIe add-in card.

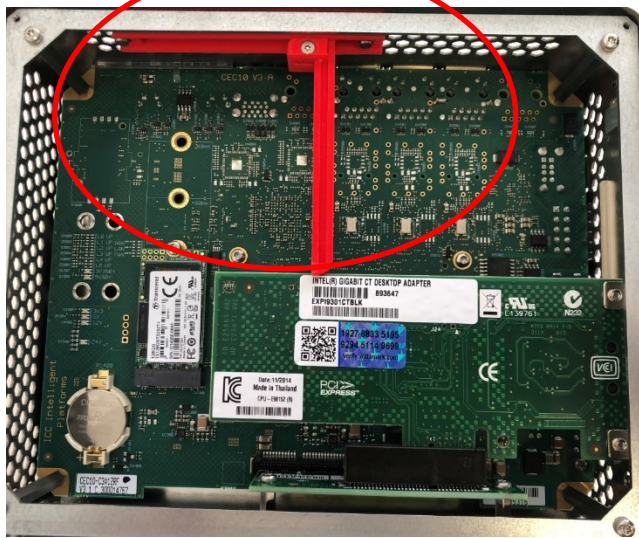
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**Figure 20: Populated PCIe AddIn card with Cardholder in Default Position.**



6. Move lever of cardholder until it connects and supports PCIe AddIn card.

**Figure 21: Populated PCIe AddIn card with the cardholder in final position.**

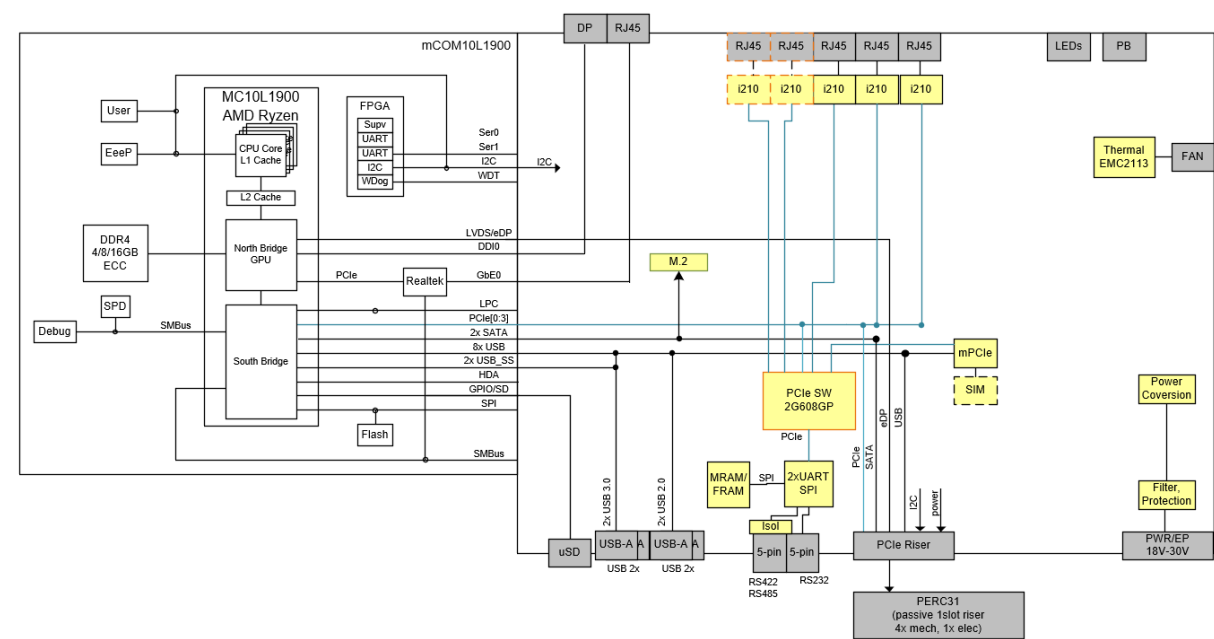


7. To fix the lever in this position, move the slider to the cardholder base and tighten the Tx6 screw with a torque of 0.25Nm.
8. Attach cover again as described in Section 5.1 Remove and Attach Cover.

# Section 6: Hardware Interfaces

This chapter describes the hardware interfaces used in the RXi2-BP.  
The following diagram provides an overview of the way the hardware interface is used.

Figure 22: Overview of the Interface Usage



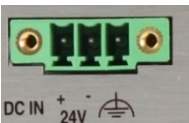
**Note:** PERC31 is only available in 1slot systems.

## 6.1 External Interfaces

### 6.1.1 Power-In

The corresponding plug must be a Phoenix Contact “1748367” or equivalent.  
RXi2-BP can be powered with a DC power supply with 24V (+-25%) and at least delivering 2.0 A for a 0slot system and 2.4A for a 1slot system.

Figure 23: 24V DC-IN



Signal Name	Pin (left to right)
Power + (24V DC)	1
Power - (24V DC)	2
FGND	3



## 6.1.2 LEDs

The RXi2-BP provides a set of different status-LEDs on the front panel to indicate various functions.

**Figure 24: LEDs**



LED Name	Color	LED status indication
Power (also a button)	Green	All power rails available and valid (S0)
	Yellow	Standby power valid (S3/S4/S5)
	Red	Error condition, contact Emerson support for help.
SATA	Green	SATA access in progress (M.2)
USER	Green	LED which can be controlled from OS, ask ICC for support if desired.
TEMP	Green	Temperatures below $T_{hot}$ and $T_{crit}$
	Yellow	Temperatures above $T_{hot}$ and below $T_{crit}$ If supported by OS, a graceful shutdown is initiated
	Red	Temperatures above $T_{hot}$ and $T_{crit}$ An immediate shutdown has occurred to protect the system
TPM (also a button)	Red	If physical presence is activated, this LED shows the current status of the physical presence state.

## 6.1.3 Buttons

The RXi2-BP provides two buttons - one Power button and one TPM button.

### Power Button

Pressing (short push) the power button triggers the operating system to shut down (Power State S5). If the operating system does not immediately shut down, press and hold the Power button for more than 5 sec to force the RXi2-BP IPC to shut down immediately without operating system support.

State S5 (Soft-off mode) will switch off the CPU core power and reset the RXi2-BP IPC. The state S5 is indicated with a yellow power LED. At this stage, it is possible to reactivate the RXi2-BP IPC by pressing (short push) the Power button. This action will switch on the CPU core voltage, and the board will restart.

## TPM Button

If active, the TPM button is needed to enter UEFI Firmware Setup and to boot sources (via F7).  
If disabled, the button has no functionality.

If TPM button functionality is active, press and hold the TPM button right after power-up.  
TPM LED starts to blink, keep the button pressed until TPM LED is steady on.  
Now you can enter UEFI Setup by pressing the “Del” or Boot options by pressing the “F7” Button.  
The TPM LED remains on until the next reboot or power cycle to indicate that a physical presence operation was detected in the current boot.

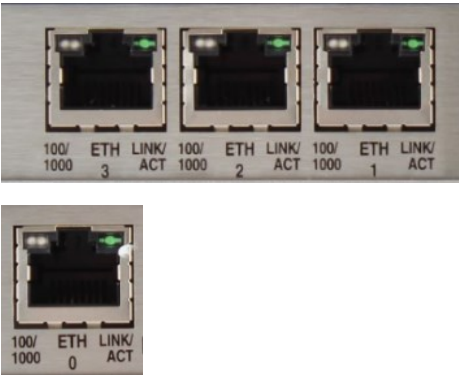
### 6.1.4 Ethernet Ports

The RXi2-BP provides four Ethernet ports: three RJ45 ports at the front, and one at the bottom.  
All Ethernet ports support 10/100/1000 Base-T. For a proper 100/1000 Mbit connection, a CAT5 cable is recommended.

The three RJ45 ports located at the front (ETH1-3) are connected to Intel I210 devices located on the carrier.

The one RJ45 port located at the bottom (ETH0) is connected to the on-module Realtek RTL8111EP Ethernet Controller.

**Figure 25: Ethernet Ports**

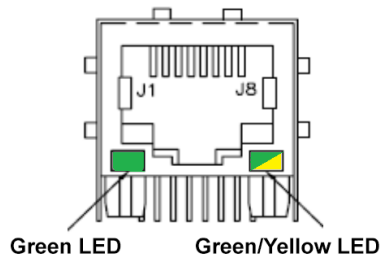


10/100 BaseT Name	1000 BaseT Name	Pin
TxD+	LP_DA+	1
TxD-	LP_DA-	2
RxD+	LP_DB+	3
NC	LP_DC+	4
NC	LP_DC-	5
RxD-	LP_DB-	6
NC	LP_DD+	7
NC	LP_DD-	8

## Ethernet Ports LEDs

Same configuration for all Ethernet ports:

Figure 26: Ethernet Ports LEDs



Pin	LED color	LED status indication
12	Green	ACT/LINK Blink with activity, Steady on with no activity at 10/100/1000
13/14	Green Yellow Off	LINK1000 (steady on) LINK100 (steady on) LINK10

### 6.1.5 USB2 / USB3.2Gen1

The RXi2-BP provides two USB2 (USB 3 & 4) and two USB3.2 Gen1 (USB 1 & 2) ports. All four are USB type-A connectors.

Each port (USB2 and USB3.2 Gen1) is protected with an electrical fuse rated up to 1 A. For normal operation, please do not exceed 900mA for USB3.2 Gen1 and 500mA for USB2.

#### USB2

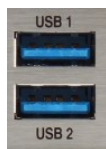
Figure 27: USB2 Port and Pinout



Signal Name	Pin
VCC (5V_SBY)	1
USB-	2
USB+	3
GND	4

## USB3.2 Gen1

**Figure 28: USB3.2 Gen1 Port and Pinout**



Signal Name	Pin
VCC (5V_SBY)	1
USB-	2
USB+	3
GND	4
SSRX-	5
SSRX+	6
GND	7
SSTX-	8
SSTX+	9

### 6.1.6

## DisplayPort

RXi2-BP provides one Display port (DP1) interface that provides signals for connecting either a suitable DP-monitor or an adaptor to several other display standards.

**Figure 29: DisplayPort Pinout**



Signal Name Pin	Pin
TxD0+/-	1/3
TxD1+/-	4/6
TxD2+/-	7/9
TxD3+/-	10/12
AUXSEL	13
NC	14
CLK/AUX+	15
DAT/AUX-	17
HTPLG	18
DP_VCC	20
GND	2, 5, 8, 11, 16, 19

## 6.1.7 Serial Ports

The RXi2-BP provides two serial interfaces, one configured to RS232 (P0) and one configurable to RS422 or RS485 [2W/4W] (P1). The connector is a Phoenix contact “1953745” or equivalent and mates with Phoenix contact “1952296.” Two mating plugs are shipped with the system.

**Figure 30: Serial Ports**



Signal Name Pin RS232	Pin
TX	1
RTS	2
GND	3
CTS	4
RX	5
Signal Name Pin RS4xx	Pin
RX+	6
RX-	7
GND	8
TX-	9
TX+	10

For RS-422 and RS-485-4-wire modes, connect the corresponding RX+/- signals with the TX+/- signals and vice versa on the remote device.

For RS-485 2-wire mode connect RX+ and TX+ with the + line of the cable and the RX- and the TX- together with the – line of the cable.

The difference between the various RS-4xx modes is the TX/RX signal control. In the RS-422 mode, TX and RX are always active. In RS-485 4-wire mode, TX is only active when there is something to transmit, RX is always active. In RS-485 2-wire mode, TX and RX are active when transmitting and inactive when not transmitting. The various modes can be selected via the Operating System device driver.

The RXi2-BP system does not provide any termination resistors. If required, the termination can be attached to the plug directly.

## 6.1.8 $\mu$ SD Slot

The RXi2-BP provides a  $\mu$ SD card slot with a mechanical lock.

**Figure 31:  $\mu$ SD Slot**



Signal Name	Pin
DATA2	1
DATA3	2
CMD	3
VDD	4
CLK	5
VSS	6
DATA0	7
DATA1	8
CD	9

## 6.2 Internal Interfaces

### 6.2.1 M.2 (SATA)

A mass storage M.2 type M-connector (per Spec 3.0 V1.2; June 2019) is located under the system lid and can only accommodate devices with the SATA interface (up to SATA G3 with 6Gbit/s); no NVMe modules are supported.

Form factors 2042, 2060, and 2080 are supported and 2042 is the default.

If you require to change from form factor 2042 to any other please contact Emerson support for guidance.

The pinout is specified in the M.2 standard and is not listed in this document.

### 6.2.2 PCIe

The PCIe AddIn card must be compliant to PCI SIG specification (PCIe CEM R3.0 May 2011 and PCIe Base R3.1a December 2015) and up to Full Height, Half Length is supported.

The maximum allowed power consumption is 10W in total (from 12V and 3V3 combined).

The internal riser card has an x4 connector populated but has only a PCIe connection of Gen3 x1.

The pinout is specified in the PCIe CEM standard and is not listed in this document.

## 6.3 Internal Devices

### 6.3.1 MRAM

The RXi2-BP is capable of Non-Volatile Random Access Memory (MRAM) with 1 Mbit.

Emerson may be able to enable MRAM in a customized application. Contact Emerson for assistance.

### 6.3.2 Temperature Sensor

UEFI Firmware sets up two thermal zones on the RXi2-BP carrier board that can be observed with an EMC2113 device. This device contains internal temperature sensors. Three external temperature sensors are also connected.

All external sensors are grouped as one thermal group and placed so that the hottest point can be observed, no matter the mounting style.

The EMC2113 device measures the temperature of several higher-rated devices (GBE; Multi I/O; PCIe Switch) with the help of a common heatsink.

Please also refer to Section 6.1.2 *LEDs* for additional information.

# Section 7: Hardware and Firmware Programmable Devices

## 7.1 SMBUS Devices

Device	Address [7b format]	Function
PI6CDBL402B	6Eh	Clock Buffer 4x
TCA9554	20h	SMB Port Expander
EMC2303	2Eh	Temperatur Controller
PI7C9X2G608GP	68h	PCle Switch

## 7.2 I2C Devices

Device	Address [7b format]	Function
24C64	57h	Carrier EEPROM
TCA9554	20h	I2C Port Expander

## 7.3 Ethernet

The Ethernet controllers provide an iNVM, which contains the MAC address, as well as their configuration. This content is not accessible to the user.

## 7.4 PCIe Switch

The PCIe switch has a dedicated EEPROM connected for configuration and is not accessible to the user.

## 7.5 Multi I/O

The Multi I/O controller (in this system, configured to 2x serial and 1x SPI bridge) has a dedicated EEPROM connected for configuration and is not accessible to the user.



## 7.6 PCIe Ports

Source	Port	Destination
COMe PCIe	0	Diodes PI7C9X2G608GP (PCIe Switch Upstream port)
COMe PCIe	1	Intel I210 #1 (GBE)
COMe PCIe	2	Intel I210 #2 (GBE)
COMe PCIe	3	RiserSlot
PI7C9X2G608GP PCIe	1	Intel I210 #3 (GBE)
PI7C9X2G608GP PCIe	4	Intel I210 #4 (GBE) (not populated in 4 GBE version)
PI7C9X2G608GP PCIe	5	AX99100 (Multi I/O)
PI7C9X2G608GP PCIe	6	Intel I210 #5 (GBE) (not populated in 4 GBE version)
PI7C9X2G608GP PCIe	7	mPCIe slot

Note: Ports 2 & 3 are not useable in used PI7C9X2G608GP configuration.

## 7.7 PCI Routing

Function	Connected to	Vendor ID/System ID	Device	Bus:Dev:Func
<b>mC10L19</b>				
Host Bridge		AMD / 1022	15D0	0:0.0
IOMMU		AMD / 1022	15D1	0:0.2
Host bridge		AMD / 1022	1452	0:1.0
PCI Bridge	1:0.0	AMD / 1022	15D3	0:1.1
PCI Bridge	2:0.0	AMD / 1022	15D3	0:1.2
PCI Bridge	3:0.0	AMD / 1022	15D3	0:1.4
PCI Bridge	A:0.0	AMD / 1022	15D3	0:1.5
Host bridge		AMD / 1022	1452	0:8.0
PCI Bridge	B:0.0	AMD / 1022	15DB	0:8.1
PCI Bridge	C:0.0	AMD / 1022	15DC	0:8.2
SMBus		AMD / 1022	790B	0:14.0
ISA Bridge		AMD / 1022	790E	0:14.3
Host bridge		AMD / 1022	15E8	0:18.0
Host bridge		AMD / 1022	15E9	0:18.1
Host bridge		AMD / 1022	5EA	0:18.2
Host bridge		AMD / 1022	15EB	0:18.3
Host bridge		AMD / 1022	15EC	0:18.4
Host bridge		AMD / 1022	15ED	0:18.5
Host bridge		AMD / 1022	15EE	0:18.6
Host bridge		AMD / 1022	15EF	0:18.7
GBE (on-module)		Realtek / 10EC	8168	1:0.0
GBE (on-module) serial		Realtek / 10EC	816A	1:0.1
GBE (on-module) serial Note: Not user useable		Realtek / 10EC	816B	1:0.2
GBE (on-module) IPMI Note: Not user useable		Realtek / 10EC	816C	1:0.3
GBE (on-module) USB		Realtek / 10EC	816D	1:0.4
VGA compatible Controller		AMD / 1022	15DD	B:0.0
Audio Device		AMD / 1022	15DE	B:0.1

Function	Connected to	Vendor ID/System ID	Device	Bus:Dev:Func
<b>mC10L19</b>				
Encryption controller		AMD / 1022	15DF	B:0.2
USB controller		AMD / 1022	15E0	B:0.3
USB controller		AMD / 1022	15E1	B:0.4
Multimedia controller		AMD / 1022	15E2	B:0.5
Audio device		AMD / 1022	15E3	B:0.6
Non-VGA unclassified device		AMD / 1022	15E6	B:0.7
SATA Controller		AMD / 1022	7901	C:0.0
<b>CEC10</b>				
GBE		Intel / 8086	157B	2:0.0
PCI Bridge upstream		Diodes / 12D8	2608	3:0.0
PCI Bridge downstream		Diodes / 12D8	2608	4:1:0
PCI Bridge downstream	6:0.0	Diodes / 12D8	2608	4:2:0
PCI Bridge downstream	7:0.0	Diodes / 12D8	2608	4:3:0
PCI Bridge downstream		Diodes / 12D8	2608	4:4:0
PCI Bridge downstream		Diodes / 12D8	2608	4:5:0
Serial Controller		ASIX / 125B	9100	6:0.0
Serial Controller		ASIX / 125B	9100	6:0.1
Memory Interface		ASIX / 125B	9100	6:0.3
GBE		Intel / 8086	157B	7:0.0
GBE		Intel / 8086	157B	A:0.0

Note: This routing is only an example of one particular system and bus numbers >0 are likely to change.

## Section 8: Thermal Performance

Thermal design with modern x86 processor architecture is a complex topic with many variables that contribute to the final performance:

- CPU Maximum frequency (user configurable)
- CPU Boost mode (Turbo mode) (user configurable)
- Software application and the worst-case workload it creates for the CPU
- Peripherals being used (display, USB devices, number of active Ethernet ports)
- Power and size of PCIe plug-in card
- IPC mounting, orientation, clearances
- Ambient air temperature and how static the air is (airflow)

### 8.1 x86 Processor Thermal Design Features

#### 8.1.1 Dynamic CPU Frequency and Boost Modes

Modern x86 architectures made a significant improvement in increasing computing performance while reducing power and heat dissipation at the same time. In a typical application, CPU activity varies and highly depends on memory, storage, and other I/O devices. When the CPU needs data for the computation, it attempts to process it as quickly as possible and then, while waiting for the next set of data, goes to a low frequency, low power mode. Following this strategy, modern CPUs can transition to a very high CPU frequency (high power), but only for a limited time, and will then need to slow down and wait for more data. Such bursts of CPU activity come at a relatively high rate (milliseconds/microseconds). This strategy allows an increase in observable performance, while simultaneously averaging out to a lower heat dissipation. RXi2-BP and the AMD Ryzen processor that it uses support these techniques, and they are enabled in UEFI settings by default. It is highly recommended to keep these settings enabled so that the performance and thermal advantages of the architecture can be utilized.

#### 8.1.2 CPU Throttling

One other important aspect of modern x86 architecture is the CPU's ability to protect itself from thermal events. This is called CPU throttling and results in the CPU reducing its operating frequency when it reaches its maximum temperature. This throttling effect occurs automatically, and at the first glance might not be obvious to the user. Application performance, however, will be significantly reduced in this case and might lead to a variation in performance test results. To avoid performance loss due to CPU throttling, it is recommended to ensure that the CPU temperature is significantly lower than its maximum value in the worst-case ambient air environment. RXi2-BP is designed specifically to optimize heat transfer from the CPU die to the external heatsink, and in most cases will not be a factor in limiting Industrial PC performance.

### 8.1.3 Temperature Monitoring and Protection

The RXi2-BP can monitor critical temperatures on-module and on-carrier and is configured to protect itself from an overtemperature condition.

IPC peripheral circuitry provides two static thermal zones (TZE1 and TZE2) and the CPU circuitry provides also two thermal zones (TZCP and TZD1).

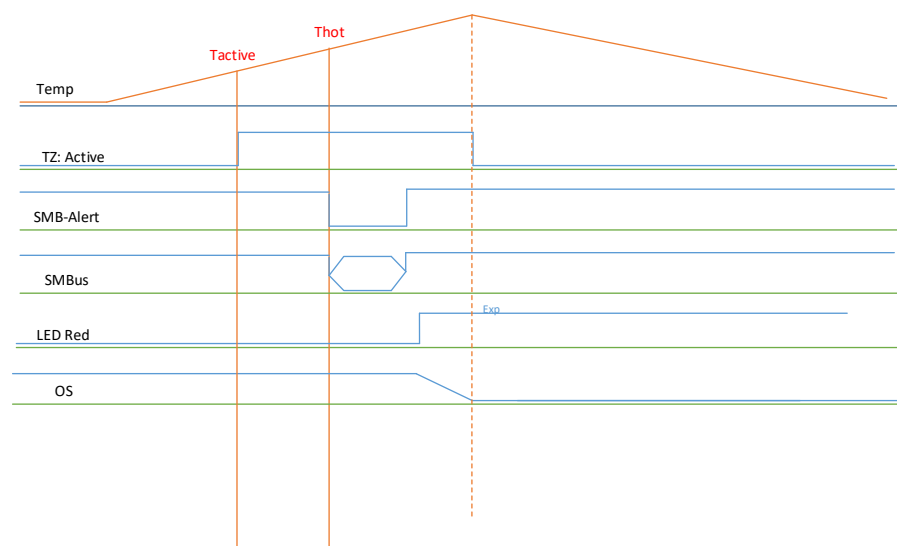
The current thermal state can be always checked with the THRM LED? state.

If an overtemperature situation is present and the system shuts off, the last LED state is visible also in S4/S5.

The following activities are implemented when conducted in an ACPI-aware Operating System. Any non-ACPI-aware operating system must rely on internal hardware protection and must be evaluated separately on a case-by-case basis.

Once the  $T_{HOT}$  threshold is exceeded, the system will try to shutdown gracefully into S4, depending on OS configuration.

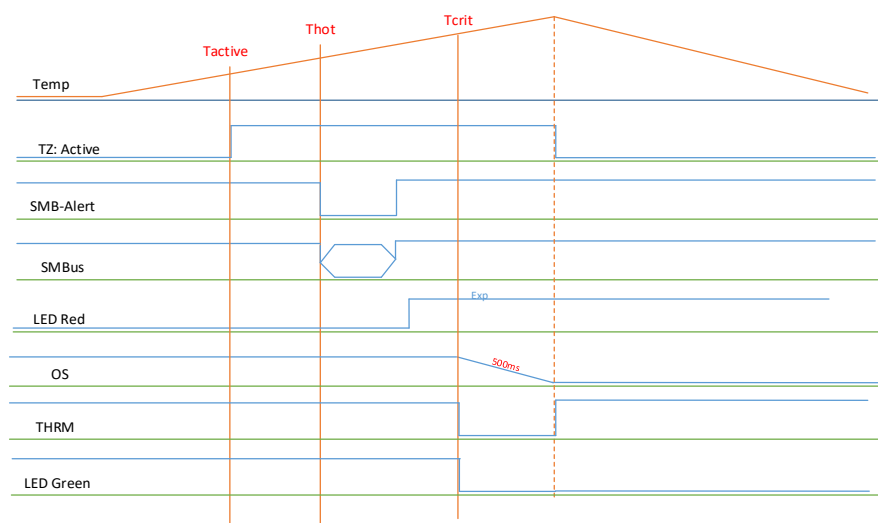
**Figure 32: Thermal Zones:  $T_{active}$  to  $T_{hot}$**



Note: Thermal Zone 'Active' is optional and not implemented in fanless RXi2-BP design.

Once the  $T_{CRIT}$  threshold is exceeded, the system will try to shut down within 500ms into S5.

**Figure 33: Thermal Zone  $T_{active}$  to  $T_{hot}$  to  $T_{crit}$**



Note: Thermal Zone 'Active' is optional and not implemented in the RXi2-BP fanless design.

If the system is rebooting while the overtemperature situation is still present, the system will be shut down again after handing over to the operating system. However, this depends on how the operating system is configured. In case of questions, please contact Emerson support.

This could cause unbootable SSDs and other data loss, and therefore it is highly recommended to resolve overtemperature situations before rebooting the system.

## 8.2 Thermal Design Strategy

Having many parameters that influence the thermal performance of an IPC makes it difficult to perform thermal design by simply analyzing thermal test data and specifications.

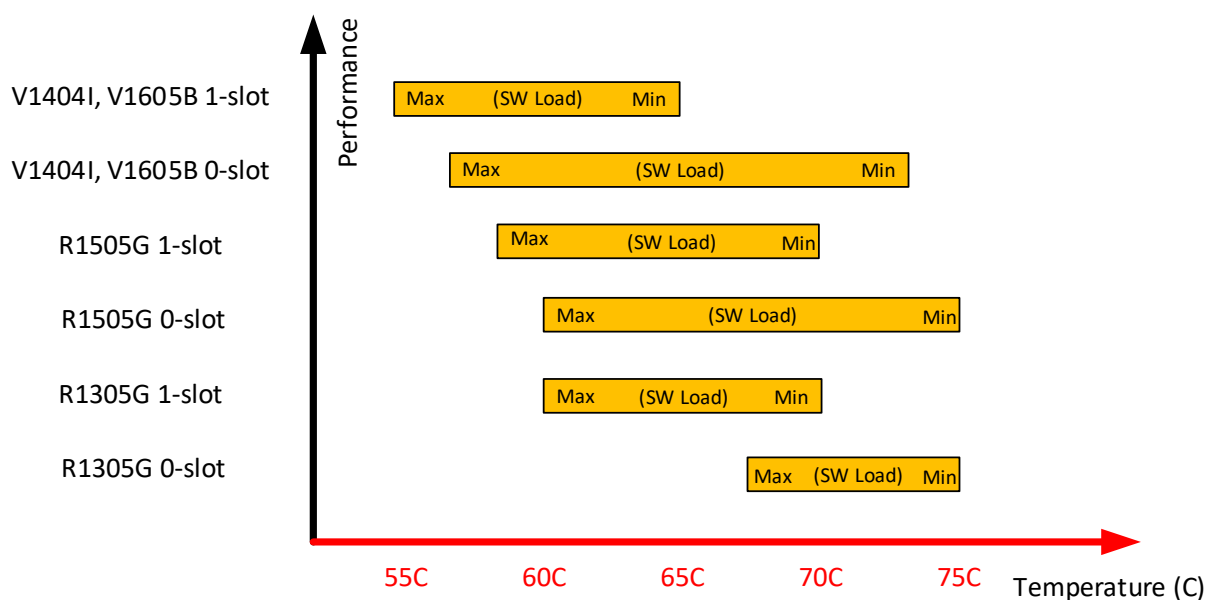
The recommended way to assess thermal performance is to test the real software application, or a good approximation of it, in an environment that would be the worst-case for the real use scenario. This typically means static air, no airflow at all.

Note that typical thermal test chambers have a significant internal airflow, which results in higher thermal performance levels than those observed in real installations.

### 8.2.1 Thermal Guidance

The following is thermal guidance for the different RXi2-BP processor SKUs. It is based on zero airflows. Note that even a slight movement of air will dramatically increase the operating temperature range.

The graph below shows the maximum ambient temperature range, based on CPU SKU and application workload. Note that the lower temperature limit is not affected by application software load and purely depends on the product SKU as stated in the specification section.

**Figure 34: Upper Ambient Air Temperature Limit Range**


## 8.2.2 Thermal Test Data

Given the large number of factors influencing thermal performance, it is not feasible to test every possible permutation. Instead, the strategy is to provide test data for several specific test cases that allow the user to make first estimates and then perform real testing.

For a more detailed Thermal Test Report and further thermal design guidance please contact Emerson technical support.

Note: all testing is performed in still ambient air (zero airflows) with the unit mounted on the DIN rail with clearances as described in installation instructions within this manual.

Note: all tests ensure that the CPU never throttles due to thermal limitations

**Table 3: Power and Thermal Overview with Different CPUs and Workloads for 0slot variant**

CPU (note-1)	PCIe Slots	RAM	Display	Active Eth	Operating System	Application Workload (note-2)	CPU Util.	Average IPC Power	Maximum Ambient Air temperature
R1305G (2C, 4T, 10W)	0	4GB	XGA (text mode)	1	Linux Ubuntu 20.04	PACEdge Light workload	5%	8.5W	75 °C
R1305G (2C, 4T, 10W)	0	16GB	SXGA (graphics mode)	4	Win 10	Win Idle	5%	12W	75 °C
R1305G (2C, 4T, 10W)	0	4GB	XGA (text mode)	1	Linux Ubuntu 20.04	PACEdge Medium workload	38%	12W	75 °C

R1305G (2C, 4T, 10W)	0	4GB	XGA (text mode)	1	Linux Ubuntu 20.04	PACEdge Max workload	55%	14W	72C
R1305G (2C, 4T, 10W)	0	16GB	SXGA (graphics mode)	4	Win 10	Win Max Work Load	100%	19.5W	68 °C
R1505G (2C, 4T, 10W)	0	16GB	XGA (text mode)	1	Linux Ubuntu 20.04	PACEdge Light workload	5%	13W	75 °C
R1505G (2C, 4T, 10W)	0	16GB	XGA (text mode)	1	Linux Ubuntu 20.04	PACEdge Max workload	60%	27W	60 °C
V1605B, V1404I (4C, 8T, 25W)	0	16GB	SXGA (graphics mode)	4	Linux	Win Idle	5%	11W	74 °C
V1605B, V1404I (4C, 8T, 25W)	0	16GB	SXGA (graphics mode)	4	Win 10	Win Max Work Load	100%	30.7W	56 °C
R1305G (2C, 4T, 10W)	1 8-port RS232 3W	16GB	SXGA (graphics mode)	4	Linux Ubuntu 20.04	PACEdge Medium workload	70%	17W	70 °C
V1605B, V1404I (4C, 8T, 25W)	1 8-port RS232 3W	16GB	SXGA (graphics mode)	4	Linux Ubuntu 20.04	PACEdge Medium workload	35%	31W	65 °C

note-1: CPU column indicates AMD CPU model, number of Cores, number of Threads, and CPU maximum power setting, settable via UEFI.

note-2: Workload definition:

- Win Max Work Load: achieved by running a burn-in test application with the following settings: burn-in test, 70% CPU, 50% GPU in 3D rendering mode, 50% RAM, 50% COM, 50% USB, 50% SSD, 50% Ethernet. It represents maximum realistic application work and results in 100% CPU utilization, as reported by OS.
- PACEdge Light workload: PACEdge software, small application with Dashboard, InfluxDB database, Grafana, 5 sensors/sec
- PACEdge Medium workload: PACEdge software, small application with Dashboard, InfluxDB database, Grafana, 150 sensors/sec
- PACEdge Max workload: PACEdge software, small application with Dashboard, InfluxDB database, Grafana, 550 sensors/sec, maximum that can read.

Note: Tests with a 1-slot PCIe card were executed using an 8-port serial RS232 card with 3W power dissipation. Using PCIe cards with higher power dissipation will reduce maximum operating temperature. A thermal test will have to be performed to assess the thermal impact.

## Section 9: Specifications

This chapter provides specifications and other useful information about RXi2-BP.

The RXi2-BP must be connected from PowerIn port ([Pin3, see Power-In for details](#)) to FGND to ensure proper EMC protection.

### 9.1 Power Consumption

#### **⚠ WARNING**

The R2B industrial PC power supply must meet the requirements for SELV (safety extra-low voltage)/LPS (limited power source) or ES1/PS2.

L'alimentation du PC industriel R2B doit répondre aux exigences SELV (sécurité très basse tension) / LPS (source d'alimentation limitée) ou ES1 / PS2.

The max. current consumption can vary, depending on the CPU model, load, input voltage, and temperature, all tests running the same load:

V1605B, running a Burn-in at 25 °C (77 °F) with 90% load at CPU, 2D, 3D, RAM, Video, ETH, Serial, Disk

- 18V DC -> 1.77 A
- 24V DC -> 1.33 A
- 30V DC -> 1.07 A

Figure 35: UL Label 0-Slot

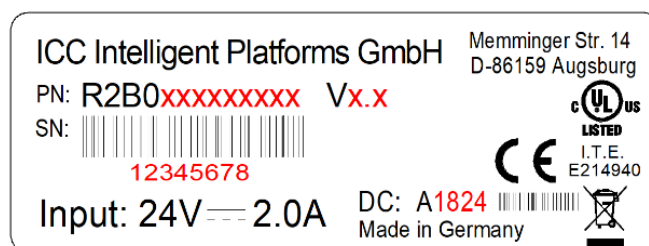
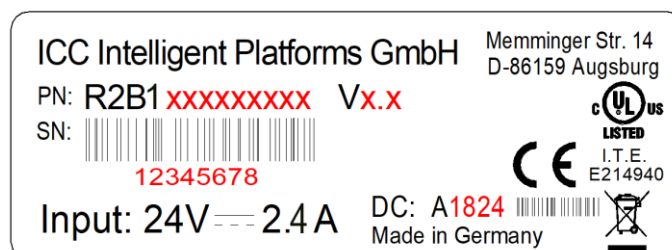


Figure 36: UL Label 1-Slot





## 9.2 Temperature

Ambient temperatures and humidity values for the RXi2-BP IPC are provided in the following table. For more details on the operating temperature and its dependency on application software, please refer to the Thermal Design section.

Temperature	
Storage	-40 to 85°C (-40 to 185 °F)
Operating 0slot (Standard SKUs)	0 up to 70°C (32 to 158 °F), at zero airflow
Operating 0slot (Extended SKUs)	-40 up to 70°C (-40 to 158 °F), at zero airflow
Operating 1slot (Standard SKUs)	0 up to 65°C (32 to 149 °F), at zero airflow
Operating 1slot (Extended SKUs)	-40 up to 65°C (-40 to 149 °F), at zero airflow
Operating 1slot R1305G CPU (Standard SKUs)	0 up to 70°C (32 to 158 °F), at zero airflow
Humidity	
Storage	5 to 95% rH, non-condensing, at 40°C (104 °F)
Operating	

## 9.3 Shock and Vibration

Shock and vibration values for the RXi2-BP IPC are provided in the following tables for both mounting variants.

DIN Rail	
Impact, operating	IEC 60068-2-27: 1987 (test Ea) - 15g of 11ms half-sine pulse - 3 shocks each axis (=18)
Sinusoidal Vibration, operating:	IEC 60068-2-6: 2008 (test Fc) 5 to 13.2 Hz @ .079 inch displacement 13.2 -33.9 Hz @ 0.7g acceleration 33.9-57 Hz @ .012 inch displacement 57-500Hz @ 2G 1 Oct/min, 10 Cycles a 3 axes

Mounting Panel	
Impact, operating	IEC 60068-2-27: 1987 (test Ea) - 15g of 18ms half-sine pulse - 3 shocks each axis (=18)
Sinusoidal Vibration, operating:	IEC 60068-2-6: 2008 (test Fc) 5 to 13.2 Hz @ .079 inch displacement 13.2 -33.9 Hz @ 0.7g acceleration 33.9-57 Hz @ .012 inch displacement 57-500Hz @ 2G 1 Oct/min, 10 Cycles a 3 axes

## 9.4 Altitude

Altitude, air pressure, and ambient temperature influence the thermal operation of the components described in this document. They have been developed and tested at ~500 m (1650 ft) above sea level at a typical ambient temperature of 20°C (68 °F). Because of only marginal variations within a limited range of altitudes, this product operates as specified within altitudes from sea level to 1,000 m (6,560 ft), depending on the level.

The maximum altitude for the RXi2-BP IPC is specified in the following table.

Maximum Altitude	
Operating	2 km (6600ft)
Storage	12 km (40000ft)

## 9.5 Regulations and Certifications

Item	Specification
EMC	EMC Directive 2014/30/EU EN 61000-6-4 Emission standard for industrial environments EN 61000-6-2 Immunity standard for industrial environments FCC Part 15 B 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. CAN ICES-3 (A)/NMB-3(A)
Product Safety	LVD Directive 2014/35/EU IEC 62368-1 UL 62368-1 (UL file number E214940)
Hazardous Locations	UL Listed US/CAN Hazardous Locations: Class 1 Division 2 Groups ABCD ATEX Zone 2
CE	Meets CE conformance.
REACH	Our product and their packaging materials contain none of the 144 substances (SVHC) included in the candidate list (20.6.2013) according to article 59 (1) of regulation Regulation (EC) No 1907/2006 (REACH) (refer to the website of the European Chemical Agency (ECHA) <a href="http://echa.europa.eu">http://echa.europa.eu</a> ) in a concentration above 0.1% by weight. We comply with the obligation of article Article 33(1) of the REACH-compliance.

## 9.6 Battery

The RXi2-BP IPC contains a CR2032 lithium coin battery. The maximum current used by the mC10L19 module is 6μA. Depending on the operating hours and temperature, the estimated battery life is 2 to 10 years. Battery current is not used when the RXi2-BP IPC is supplied with 24V.

## 9.7 Technical Specifications

Item	Specification
Processor	AMD Ryzen V1000 and R1000 series
Memory	Up to 16 GB ECC 2400 MHz
SATA	M.2 M-keyed interface up to 6 Gb/s
Ethernet	4x Ethernet (10/100/1000 Mbit)
Graphics	1x DisplayPort

USB	2x USB 2 2x USB 3.2 Gen 1
Serial	1x RS232 1x RS4xx (galv. Isolated)
Non-volatile memory	MRAM, 1Mb
UEFI	UEFI AMI Aptio© 5

## 9.8 Dimensions and weight

0-slot variant	
Dimensions	158 x 191 x 44.5 mm
Weigth	1.45kg
1-slot variant	
Dimensions	158 x 191 x 81.8 mm
Weigth	1.73kg

## Section 10: Troubleshooting

### 10.1 Movicon.NeXT License File Recovery in Windows 10

An industrial PC pre-installed with Windows 10 and a Movicon.NeXT software package, ships with the license files already activated and ready to use. In the rare case of a major software crash, the IPC will require a re-image of Windows's license files, which will have to be manually re-installed. Emerson Customer Care will assist with this re-installation. Please follow the procedure below to re-install your lost license.

1. If you require to reinstall Windows+Movicon image please contact Technical Support, reinstall the image and proceed with next step.
2. Record the MAC address of the system:
  - a. Open a Microsoft File Explorer, navigate to **C:\Program Files\Emerson\libipld\**
  - b. Click (left click) in the file path window, the path will become text and be highlighted. Type: **powershell**
  - c. Hit enter and a powershell window will open. In the powershell window execute command: **.\ipldutil.exe select**
  - d. You will be shown one or more MAC addresses, please copy the first MAC address in the list and email it along with the Serial Number to Emerson Customer Care. (The serial number can be found on the label located on the left side of the unit, indicated by SN: xxxxxxxx)
  - e. Contact information is provided at the end of this document.
3. Get new license files from Emerson Customer Care:
  - a. Email MAC address and hardware serial number to **Emerson Customer Care**, requesting new license files. Please note – do not contact Emerson tech support.
  - b. Customer care will respond with two files: **license.json** and **license.sig**
4. Install new license files into the system:
  - a. Open Microsoft File Explorer, navigate to **C:\Program Data\Emerson\libipld\**  
Note: you might need to enable "Show hidden files, folders, and drives" feature in File Explorer Options menu in order to see Program Data folder.
  - b. Paste the files received from Customer care into this location
5. Verify that the license and features that are enabled:
  - a. Start MoviconNeXT software and check license under **Options->License**.

**Note:** the above procedure is only applicable to Industrial PCs with pre-loaded, unmodified Movicon.NeXT package requiring license recovery. In case of one or more of the conditions below, please install Movicon.NeXT (if not already installed), start it, go to Options->License->License Manager, then open Snipping Tool in Windows and make License Manager window screen capture. Contact your local sales representative and email the screen capture.

- Movicon.NeXT installations by user
- Additional Movicon.NeXT features need to be added to a pre-loaded software package
- Modifications to pre-loaded software package have been previously applied

## **10.2 Unexpected Restarts When Booting**

AMD Ryzen processors have an increased range of power consumption, where for a very short period of time (milliseconds) they can consume significantly more power than the average power consumption. In the case that the unit is restarting when booting up the operating system, check the power supply, and make sure that it is rated well above maximum specified power consumption.

## **10.3 Booting Problems, Hardware Devices Not Present**

When seeing unexpected hardware problems, missing hardware devices and interfaces, or booting issues, please start with restoring UEFI settings to factory default. To do that please reboot the unit, enter UEFI settings by pressing and holding the [F2] key right after power-up, and restoring default UEFI settings via applicable menus.

# General Contact Information

Home link: <http://www.emerson.com/industrial-automation-controls>

Knowledge Base: <https://www.emerson.com/industrial-automation-controls/support>

## Technical Support

### Americas

Phone: 1-888-565-4155  
1-434-214-8532 (If toll-free option is unavailable)

Customer Care (Quotes/Orders/Returns): [customercare.mas@emerson.com](mailto:customercare.mas@emerson.com)  
Technical Support: [support.mas@emerson.com](mailto:support.mas@emerson.com)

### Europe

Phone: +800-4444-8001  
+420-225-379-328 (If toll free option is unavailable)  
+39-0362-228-5555 (from Italy - if toll-free 800 option is unavailable or dialing from mobile)

Customer Care (Quotes/Orders/Returns): [customercare.emea.mas@emerson.com](mailto:customercare.emea.mas@emerson.com)  
Technical Support: [support.mas.emea@emerson.com](mailto:support.mas.emea@emerson.com)

### Asia

Phone: +86-400-842-8599  
+65-6955-9413 (All other Countries)

Customer Care (Quotes/Orders/Returns): [customercare.cn.mas@emerson.com](mailto:customercare.cn.mas@emerson.com)  
Technical Support: [support.mas.apac@emerson.com](mailto:support.mas.apac@emerson.com)

Any escalation request should be sent to [mas.sfdcescalation@emerson.com](mailto:mas.sfdcescalation@emerson.com)

**Note:** If the product is purchased through an Authorized Channel Partner, please contact the seller directly for any support.

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