SIEMENS

SIMATIC

Industrial PC
SIMATIC IPC327E

Operating Instructions

06/2019
A5E40965257-AD

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

⚠ WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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A5E40965257-AD
℗ 07/2019 Subject to change

Preface

These operating instructions contain all the information you need for commissioning and operation of the SIMATIC IPC327E.

It is intended both for programming and testing personnel who commission the device and connect it with other units (automation systems, programming devices), as well as for service and maintenance personnel who install add-ons or carry out fault/error analyses.

Basic knowledge requirements

A solid background in personal computers and Microsoft operating systems is required to understand this manual. General knowledge in the field automation control engineering is recommended.

Scope of validity of this document

These operating instructions are valid for all versions of the SIMATIC IPC327E.

Scope of this documentation

The documentation for the SIMATIC IPC327E consists of:

- Product information, e.g. "Important notes on your device"
- Quick Install Guide SIMATIC IPC327E
- SIMATIC IPC327E operating instructions in English and Chinese

The PDF version of the documentation is supplied with the device on the "Documentation and Drivers" CD/DVD.

Conventions

The terms "PC" and "device" are sometimes used to refer to the SIMATIC IPC327E in this documentation.

In these operating instructions, the abbreviation "Windows 7" denotes the term "Windows 7 Ultimate".

History

The following editions of these operating instructions have been published:

Edition	Comment
08/2017	First edition
11/2017	Operating system information has been replaced by references to separate operating system documents.
07/2018	Amendment to certification part.
06/2019	Update the Advanced menu for BIOS description.

Table of contents

Overview

1

1.1 Product description

SIMATIC IPC327E provides industrial functionality.

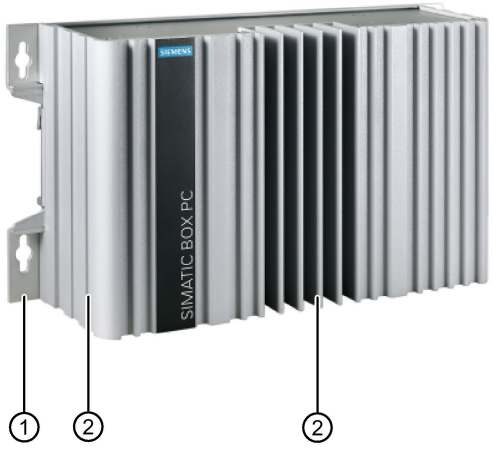
- Compact design
- Fanless
- Various interfaces
- IP40 protection

1.2 Structure of the devices

1.2.1 Views of the basic device

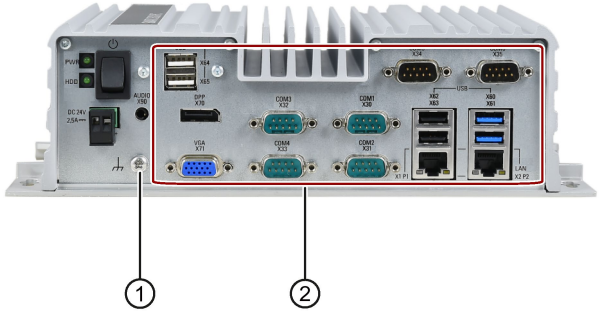
Front view and side view

The front view as below is the standard mounting position.



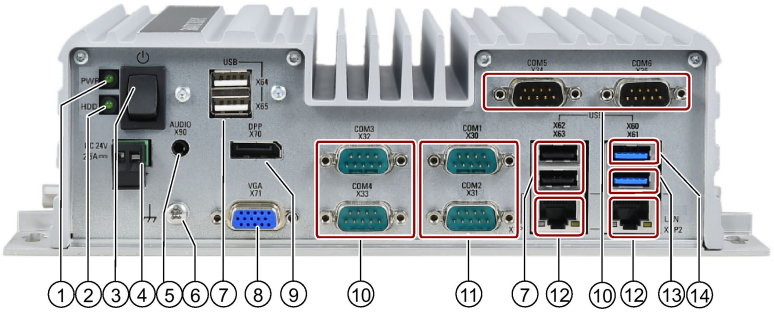
① Mounting holes for wall mounting
② Cooling fins

Bottom view



① Function earth
② Ports

1.2.2 Interfaces of the basic device



① Power status display
② HDD status display
③ On/off switch
④ Connection for a 24 VDC power supply
⑤ Connection for analog audio source and speaker.
⑥ Function earth
⑦ USB 2.0, high current
⑧ VGA interface
⑨ DisplayPort connection
⑩ Serial interface, 9-pin
- RS-232

⑪ Serial interface, 9-pin
- RS-232
- RS-422
- RS-485

⑫ RJ45 Ethernet connection for 10/100/1000 Mbps
⑬ USB 3.0 port 2, high current
⑭ USB 3.0 port 1, high current

1.2.3 Status displays

Display	Meaning	LED	Description
PWR	PC operating status display	Off	Hibernate, switched off or unplugged
		Green	PC is in operation.
		Green flashing	standby
HDD	Display for hard disk access	Off	No accessing
		Green flashing	Accessing data

Safety instructions 2

2.1 Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that may be implemented, please visit (https://www.siemens.com/industrialsecurity).

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customers' exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed visit (https://www.siemens.com/industrialsecurity).

2.2 General safety instructions

⚠ WARNING
Life-threatening voltages are present with an open control cabinet
When you install the device in a control cabinet, some areas or components in the open control cabinet may be carrying life-threatening voltages.
If you touch these areas or components, you may be killed by electric shock.
Switch off the power supply to the cabinet before opening it.

System expansions

NOTICE

Damage through system expansions

Device and system expansions may be faulty and can affect the entire machine or plant.

The installation of expansions can damage the device, machine or plant. Device and system expansions may violate safety rules and regulations regarding radio interference suppression. If you install or exchange system expansions and damage your device, the warranty becomes void.

Note the following for system expansions:

- Only install system expansion devices designed for this device. Contact your technical support team or where you purchased your PC to find out which system expansion devices may safely be installed.
- Observe the information on electromagnetic compatibility (Page 47).

⚠ WARNING

Risk of fire through expansion cards

Expansion cards generate additional heat. The device may overheat and cause a fire.

Please note the following:

- Observe the safety and installation instructions for the expansion cards.
- If in doubt, install the device in an enclosure that is compliant with sections 4.6 and 4.7.3 of the IEC/UL/EN/DIN-EN 60950-1 standard.

NOTICE

"Open Type" UL61010-2-201

Note that the device is classified as "Open Type" for use in the area of Industrial Control Equipment (UL61010-2-201). A UL61010-2-201 conform enclosure is therefore a mandatory requirement for approval or operation according to UL61010-2-201.

Battery

WARNING

Risk of explosion and release of harmful substances

Improper handling of lithium batteries can result in an explosion of the batteries.

Explosion of the batteries and the released pollutants can cause severe physical injury. Worn batteries jeopardize the function of the device.

Note the following when handling lithium batteries:

- Replace used batteries in good time; see the section "Replacing the backup battery (Page 39)" in the operating instructions.
- Replace the lithium battery only with an identical battery or types recommended by the manufacturer (type: CR2032).
- For any requirements on product maintenance, contact Siemens Technical support (Page 79).
- Do not throw lithium batteries into fire, do not solder on the cell body, do not recharge, do not open, do not short-circuit, do not reverse polarity, do not heat above 100°C and protect from direct sunlight, moisture and condensation.

Strong high-frequency radiation

NOTICE

Observe immunity to RF radiation

The device has an increased immunity to RF radiation according to the specifications on electromagnetic compatibility in the technical specifications.

Radiation exposure in excess of the specified immunity limits can impair device functions, result in malfunctions and therefore injuries or damages.

Read the information on immunity to RF radiation in the technical specifications.

ESD Guideline

Electrostatic sensitive devices can be labeled with an appropriate symbol.

NOTICE

Electrostatic sensitive devices (ESD)

When you touch electrostatic sensitive components, you can destroy them through voltages that are far below the human perception threshold.

If you work with components that can be destroyed by electrostatic discharge, observe the ESD Guideline (Page 48).

2.3 Notes on use

NOTICE
Possible functional restrictions in case of non-validated plant operation The device is tested and certified on the basis of the technical standards. In rare cases, functional restrictions can occur during plant operation. Validate the correct functioning of the plant to avoid functional restrictions.

Note

Use in an industrial environment without additional protective measures

This device was designed for use in a normal industrial environment according to IEC 60721-3-3.

Installing and connecting the device 3

3.1 Preparing for installation

3.1.1 Checking the delivery package

Procedure

1. When accepting a delivery, please check the packaging for visible transport damage.
2. If any transport damage is present at the time of delivery, lodge a complaint at the shipping company in charge. Have the shipper confirm the transport damage immediately.
3. Unpack the device at its installation location.
4. Keep the original packaging in case you have to transport the unit again.

   Note

   Damage to the device during transport and storage

   If a device is transported or stored without packaging, shocks, vibrations, pressure and moisture may impact the unprotected unit. A damaged packaging indicates that ambient conditions have already had a massive impact on the device.

   The device may be damaged.

   Do not dispose of the original packaging. Pack the device during transportation and storage.

5. Check the contents of the packaging and any accessories you may have ordered for completeness and damage.

6. If the contents of the packaging are incomplete, damaged or do not match your order, inform the responsible delivery service immediately.

⚠ WARNING

Electric shock and fire hazard due to damaged device

A damaged device can be under hazardous voltage and trigger a fire in the machine or plant. A damaged device has unpredictable properties and states.

Death or serious injury could occur.

Make sure that the damaged device is not inadvertently installed and put into operation. Label the damaged device and keep it locked away. Send off the device for immediate repair.

NOTICE

Damage from condensation

If the device is subjected to low temperatures or extreme fluctuations in temperature during transportation, for example in cold weather, moisture could build up on or inside the device.

Moisture causes a short circuit in electrical circuits and damages the device.

In order to prevent damage to the device, proceed as follows:

- Store the device in a dry place.
- Bring the device to room temperature before starting it up.
- Do not expose the device to direct heat radiation from a heating device.
- If condensation develops, wait approximately 12 hours or until the device is completely dry before switching it on.

7. Please keep the enclosed documentation in a safe place. It belongs to the device. You need the documentation when you commission the device for the first time.
8. Write down the identification data of the device.

3.1.2 Identification data of the device

The device can be clearly identified with the help of this identification data in case of repairs or theft.

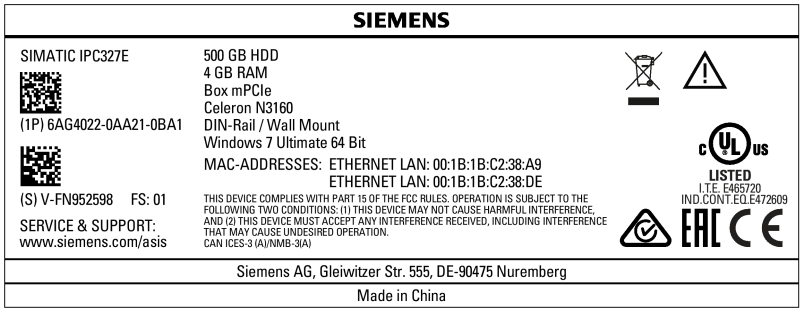
Enter the identification data in the following table:

Order number	6AG...
Serial number	S V
Production version	FS
Windows "Product Key"	
Ethernet address 1 (MAC)	
Ethernet address 2 (MAC)	

Obtain the data from the product label and COA label. The product label is located on the back panel of the device. The COA label is only available in pre-installed Windows operating systems and is affixed to the rear of the device.

Procedure

1. Get the information of order number, serial number, production version (FS), and Ethernet addresses from the product label. Below is an example of a product label.



Note

Replacement device without storage media

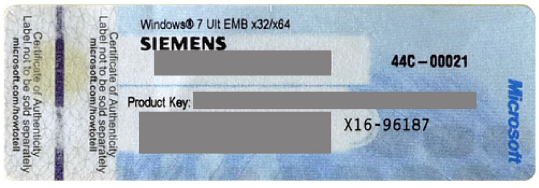
When you order a replacement device, remove all the storage media from your device, for example HDD. Insert the storage media into the replacement device.

2. Take down the Windows "Product Key" from the COA label.

Example of a COA label

Microsoft Windows "Product Key" on the "Certificate Of Authenticity" (COA):
The COA label is only attached to the rear of the device containing a preinstalled and activated Windows operating system.

- COA label of a device with Windows operating system



3.1.3 Permitted mounting positions

The following mounting positions are permitted:

- Horizontal mounting position

  The horizontal mounting position is the preferred position.

- Vertical mounting position

- Desk mounting position

Take into account the permitted temperature range for operation that depends on the mounting position in accordance with the "Technical specifications (Page 51)" section.

Ensure that the following clearances measurements to another component or to a wall of a housing are complied with:

- Below the device: ≥ 100 mm
- Above the device: ≥ 50 mm

3.2 Mounting the device

3.2.1 Mounting instructions

Note

If the equipment is used in manner not specified by the manufacture, the protection provided by the equipment may be impaired.

Note the following:

- The device is approved for operation indoor only.
- For installation in a control cabinet, observe the applicable country-specific regulations.
- When the device is used in the area of Industrial Control Equipment in accordance with UL61010-2-201, note that the device is classified as "Open Type". A UL61010-2-201 conform enclosure is therefore a requirement for approval or operation according to UL61010-2-201.
- All the external circuit of the device should be SELV circuit.

Possible mounting types of the device:

Mounting on a standard rail

Wall mounting

The mounting types are described in the following sections using the basic device as an example.

Position of the interfaces

For standard rail, the interface side of device can point either up or down. In the case of wall mounting, the interface side of the device can point up, down, to the left or to the right.

Fasten securely

NOTICE
Insufficient load carrying capacity If the mounting surface for wall and vertical mounting does not have sufficient load carrying capability, the device may fall down and be damaged. Ensure that the mounting surface on the wall can bear four times the total weight of the device, including fixing elements.

NOTICE
Incorrect fixing elements If you use anchors and screws other than those specified below for wall and vertical mounting, safe mounting is not guaranteed. The device can fall and may be damaged. Use only the anchors and screws specified in the following table.

Material	Bore diameter	Fixing element
Concrete	Select according to the specification of the mounting elements used	• Anchor, ∅ 6 mm, 40 mm long • Screw, ∅ 4-5 mm, 40 mm long
Plasterboard, min. 13 mm thick		Toggle plug, ∅ 12 mm, 50 mm long
Metal, min. 2 mm thick		• Screw M4 × 15 • M4 nut

3.2.2 Mounting on a standard rail

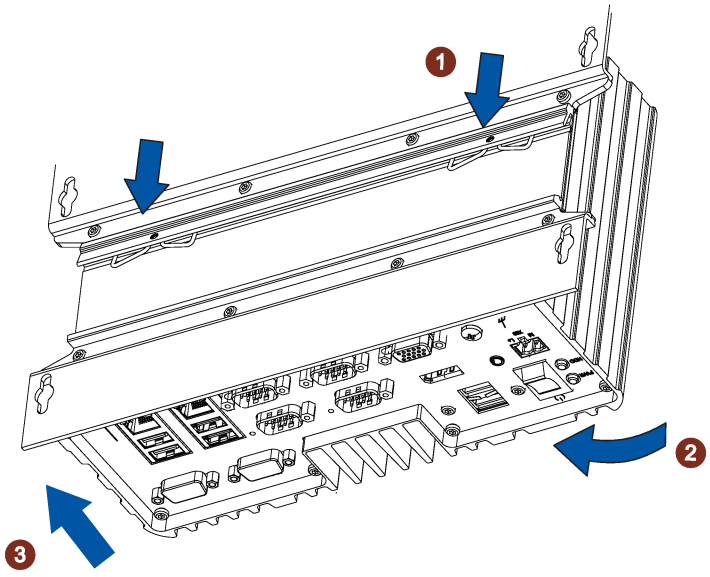
Mounting on a standard rail is suitable for horizontal mounting of the device.

Requirement

- A SIEMENS 35 mm standard rail TH35-15 conforming to EN 60715:2001

  The standard rail is mounted.

Procedure for mounting



1. Place the device with the standard rail bracket onto the mounting rail from above.

   If the device is tilted when you place it down, the standard rail bracket does not grip.

2. Press the device down and toward the standard rail until the standard rail bracket engages.
3. Check whether the device is seated firmly on the standard rail.

Procedure for dismantling

1. Press the device down until the lower rail guide frees the device.
2. Swing the device out of the rails.
3. Remove the device from the rail.

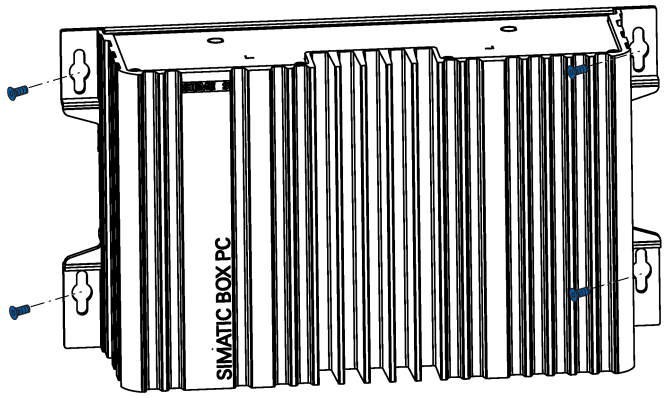
3.2.3 Wall mounting

Wall mounting is suitable for both horizontal and vertical mounting of the device.

Requirement

- A screwdriver
- Four anchors and four screws

Procedure for mounting



1. Place the device onto the mounting surface.
2. Mark the fixing holes.
3. Drill the fixing holes.
4. Insert the anchors in the drilled holes.
5. Screw on the device.

3.3 Connecting the device

3.3.1 Notes on connecting

⚠ WARNING

Risk of fire and electric shock

The on/off switch does not isolate the device from the power supply. Risk of electric shock if the device is opened incorrectly or defective. There is also a risk of fire if the device or connecting lines are damaged. Death or serious bodily injury can result.

You should therefore protect the device as follows:

- Always pull out the power plug when you are not using the device or if the device is defective. The power plug must be freely accessible.
- Use a central power isolating switch for cabinet installation.

WARNING

Risk of lightning strikes

A lightning flash may enter the mains cables and data transmission cables and jump to a person.

Death, serious injury and burns can be caused by lightning.

Take the following precautions:

- Disconnect the device from the power supply in good time when a thunderstorm is approaching.
- Do not touch mains cables and data transmission cables during a thunderstorm.
- Keep a sufficient distance from electric cables, distributors, systems, etc.

3.3.2 Connecting the function earth

A connected function earth discharges dangerous electrical charges from the metal enclosure. The current flowing through the function earth when such a fault occurs triggers an upstream protective device that disconnects the machine from the power supply.

The function earth also improves the discharge of interference generated by external power cables, signal cables or cables for I/O modules to ground.

The connection for the function earth is labeled with the following symbol:

Note

The function earth cannot connect hazard live parts.

WARNING

Electric shock and risk of fire

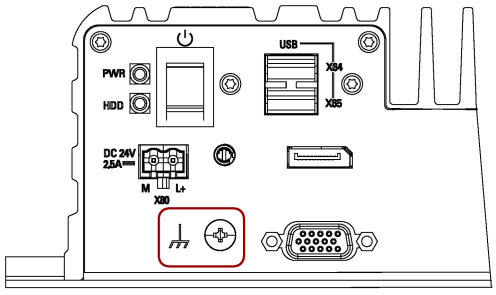
High voltage may be present in a defective device, which can cause fire or an electric shock if touched. Death and serious bodily injury can result.

- Connect the device to the function earth before you put it into operation.
- The function earth terminal on the device must be connected to the function earth of the control cabinet or system in which the device is installed.
- Never operate the device without function earth.
- If a device is defective, remove it from operation without delay and label it accordingly.

Requirement

- PH2 screwdriver
- Cable lug for M4
- Function earth with minimum cross-section of 2.5 mm² copper cable

Procedure

	**1** Clamp the cable lug on the function earth.
	2 Firmly attach the cable lug to the function earth connection on the device using the M4 thread (see part labeled).

3.3.3 Connecting the power supply

Note

The device should only be connected to a 24 VDC power supply which satisfies the requirements of safe extra low voltage (SELV) according to IEC/EN/DIN EN/UL 60950-1.

The power supply must meet the requirement NEC Class 2 or LPS according to the IEC/EN/DIN EN/UL 60950-1.

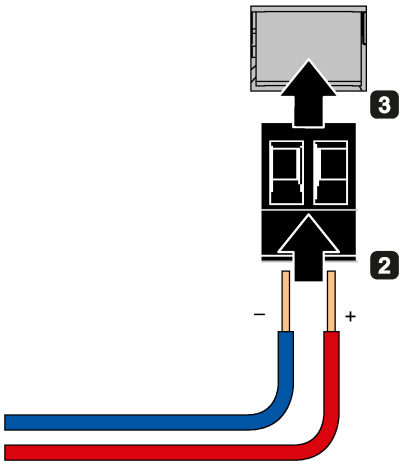
Note

The 24 VDC power supply must be adapted to the input data of the device (see the technical specifications in the operating instructions).

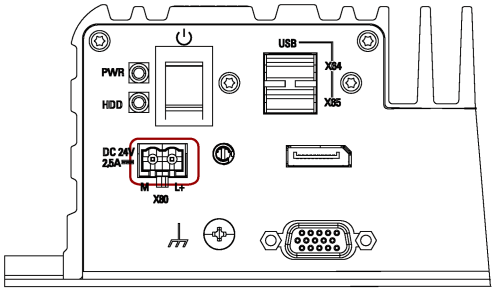
Requirement

- The function earth is connected.
- You are using the supplied terminal.
- A two-core cable with a cable cross-section of 0.75 mm² to 2.5 mm² for the 24 VDC connection.
- A slotted screwdriver with a 3mm blade.

Procedure



1. Switch off the 24 VDC power supply.
2. Connect the cores of the power supply.
3. Insert the terminal at the indicated position.



3.3.4 Connect device to networks

The following options are available for integrating the device in existing or planned system environments and networks.

Ethernet

You can use the integrated Ethernet interfaces (10/100/1000 Mbps) for communication and data exchange with automation devices, e.g. SIMATIC S7.

You need a suitable software to use this functionality: STEP 7, WinCC, SIMATIC NET.

Industrial Ethernet

You can establish a network between the device and other computers via Industrial Ethernet. The on-board LAN interfaces are twisted-pair TP interfaces that support data transmission rates of 10/100/1000 Mbps.

Note

You need a category 6 Ethernet cable for operation at 1000 Mbps.

PROFINET

PROFINET RT can be operated via:

- Standard Ethernet interfaces
- Implemented PROFINET Driver and valid runtime license (for further information, refer to PROFINET Driver (http://w3.siemens.com/mcms/distributed-io/en/profinet/profinet-driver/pages/))

SIMATIC NET

Use this software package to create, operate and configure an innovative network for Field & Control level. Information on this can be found on the SIMATIC NET Manual Collection CD. The software package and the documentation are not included in the product package.

Additional information

You can find additional information on the Internet at:

Technical support (https://support.industry.siemens.com/cs/?lc=en-WW)

Commissioning the device and device functions 4

4.1 General information on commissioning

Note

Windows Embedded Standard 7

Read the EWF and FBWF information

Two configurable write filters (Enhanced Write Filter and File Based Write Filter) are provided with Windows Embedded Standard. Read the EWF/FBWF information if you activate and use them, otherwise you may experience data loss.

Requirement

- The device is connected to the power supply.
- The function earth is connected.
- The connection cables are plugged in correctly.
- The following hardware is available for initial commissioning:
  - One USB keyboard
  - One USB mouse
  - A monitor/display

4.2 Initial commissioning

For the configuration with operating system pre-installed, the operating system is set up automatically on the device after the initial switch on. The commissioning procedure in this chapter is only applicable to the IPCs with operating system.

For the configurations without operating system pre-installed, contact the operating system provider to install the operating system firstly.

NOTICE
Faulty installation If you change the default values in the BIOS setup or if you turn off the device during the installation, you disrupt the installation and the operating system is not installed correctly. The operating safety of the device and the plant is at risk. Do not switch off the device during the entire installation process. Do not change the default values in the BIOS setup.

Note

If you install Windows 7 not by our restore or recovery DVD, you need to do the following two steps:

- Get the xHCI (USB) driver from the Documentation and Drivers DVD.
- Refer to “Walkthrough: Create a Windows RE Image (https://technet.microsoft.com/en-us/library/dd744525(v=ws.10).aspx)” to mount USB driver into the Windows Recovery Environment(RE).

If you install Windows 8 or Windows 10, you don't need to do the above two steps.

Procedure

1. Press the on/off switch.

   The green POWER LED lights up. The module carries out a self-test.

2. Follow the instructions on the screen.

   ```
   Press <ESC> or <DELETE> to enter setup.
   ```

3. Make the region and language settings.

   If you want your system language to be international, select English. For information on changing the region and language settings at a later point in time, refer to the section Installing the software (Page 41).

   Note

   Once the operating system has been set up, the device may restart.

Result

The interface of the operating system is displayed every time you turn on the device and after the startup routine.

4.3 Switching off the device

Shutting down the operating system

For Windows operating systems:

- Select "Start" > "Shut down"

  or

- Briefly press the on/off switch (unless otherwise configured in the power options). Information on the position of the button is available in the section "Interfaces of the basic device (Page 10)".

For non-Windows operating systems:

- Briefly press the on/off switch.

The operating system is shut down. The "POWER" LED goes out. The device is switched off but not fully disconnected from the mains voltage.

Fully disconnecting the device from mains voltage

⚠ WARNING

Risk of fire and electric shock

The on/off switch do not fully disconnect the device from the mains. If the device is switched off with the on/off switch, there remains a risk of electric shock and fire hazard, for example, if the device or connection cables are damaged or if the device is used improperly.

Always fully disconnect the device from the mains voltage as described below before performing work on the device or when the device will not be used over an extended period of time.

If the device was not mounted in a control cabinet:

- Shut down the operating system and pull the power plug on the rear of the device.

If the device was mounted in a control cabinet:

- Shut down the operating system and switch the AC circuit breaker to "Off".

The device is switched off and fully disconnected from the mains voltage. No trickle current is flowing.

Hardware reset

You can perform a hardware reset to switch off the device when the operating system no longer responds to input from the keyboard or mouse. The operating system is not safely shut down in this case.

NOTICE
Risk of data loss The device is restarted in the case of a hardware reset. Data in the main memory can be deleted. Data on the drive may be lost. The device may be damaged. Perform a hardware reset only in the case of an emergency.

For all operating systems:

- Press the on/off switch for more than four seconds.

4.4 Windows Security Center

Warning from the Windows Security Center

A warning from the Windows Security Center is displayed the first time you switch on your device. The Security Center checks the status of the device in regard to the three important security aspects listed below. If a problem is detected (an outdated antivirus program, for example), the Security Center issues a warning and makes recommendations on how you can better protect the device.

- **Firewall**: The Windows Firewall adds protection to the device by blocking network or Internet access to the device by unauthorized users. Windows checks if the device is protected by a software firewall.
  The firewall is enabled by default in the delivery state.
- **Antivirus software**: Antivirus programs add protection to the device by searching for and eliminating viruses and other security threats. Windows checks if a full-range, up-to-date antivirus program is running on the device.
  No antivirus software is installed in the delivery state.
- **Automatic updates**: Using the Automatic Update feature allows Windows to regularly search for the latest critical updates for the device and to install them automatically. This feature is disabled in the delivery state.
- **Real-time protection (Windows 7 only):** Windows Defender displays warnings if spyware or possibly unwanted software is installed or executed on the computer. You will also receive a warning if programs attempt to modify important Windows settings.

Configure the Security Center according to your requirements.

Expanding and assigning parameters to the device 5

5.1 Open the device

Requirement

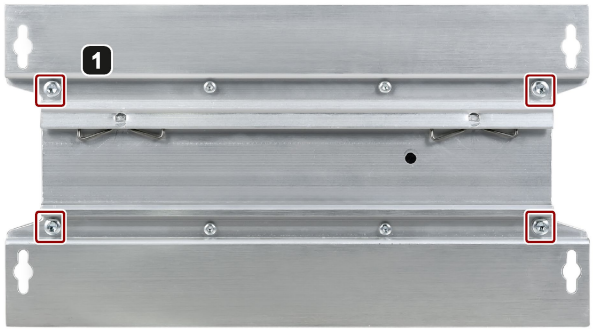
- The device is disconnected from the power supply.
- All connecting cables on the device have been removed.
- The device has been removed from the cabinet.
- A T10 screwdriver and a T20 screwdriver.

Procedure - opening the device

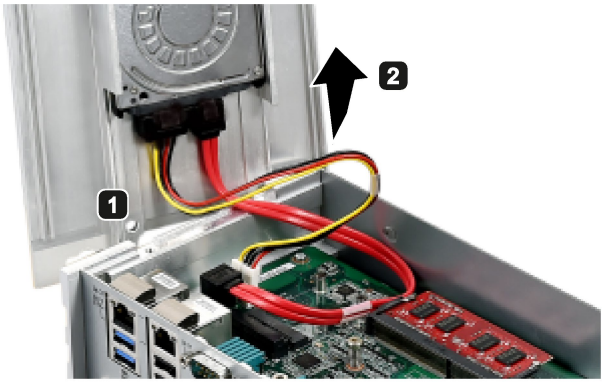
Note

On the basic device the drive is located on the underside of the rear panel.

- Carefully open the device.
- You can not lay down the rear panel because of the drive's connecting cable.
- The rear panel can only be completely removed after disconnecting the connection plug.
- Read the information in section "Replacing the drive of a basic device (Page 40)".



1. Remove the marked screws.
   There are 4 screws on the basic device.
2. Carefully remove the device's rear panel.



3. Set the rear panel with the drive vertically against the device's side panel and prop it up.
   Notice: Connection plug and board can be damaged.
   - Ensure that the rear panel does not fall.
   - Remove the connection plug from the drive.

Procedure - closing the device

To close the device, carry out the steps for opening the device in the reverse order.

5.2 Installing the Mini card

This device supports the below expansion cards:

- a half-size mini card: you can install a half-size mini PCIe card into this slot.
- a full-size mini card: you can install a mSATA card or a mini card with USB2.0 interface in this slot

Note

Power consumption

If the power consumption of the Mini cards are too high, the device will be damaged.

Ensure that the power consumption amounts to a maximum of 2 W.

Ambient temperature

The temperature inside the IPC can be up to 25 °C above the maximum permissible ambient temperature of the device.

Make sure that the maximum permissible ambient temperature of the Mini cards are specified accordingly.

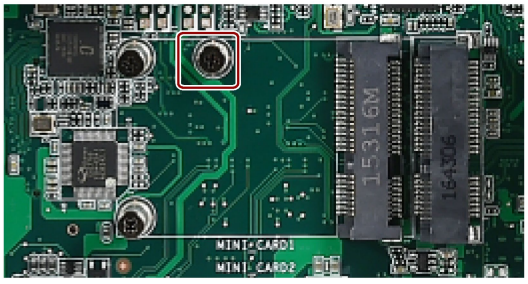
Note

If you want to use both of the two slots, insert the half-size mini card first.

Requirement

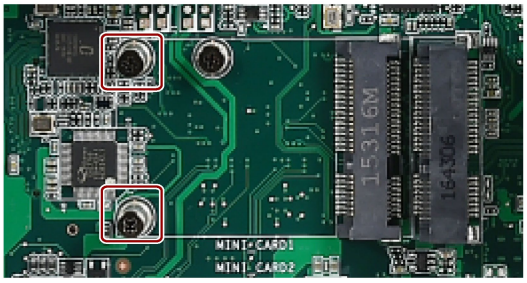
- The device is opened.

Install a half-size mini card



1. Remove the screw head of the half-size min card holder.
2. Insert a half-size mini PCIe card into the slot.
3. Secure the card with the screw that you removed from the card holder into the same hole.

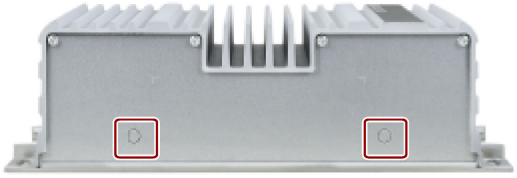
Install a full-size mini card



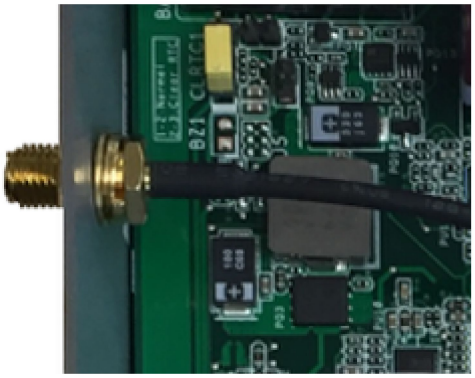
1. Remove the screw head of the full-size min card holder.
2. Insert a full-size mSATA card or a mini card with USB2.0 interface into the slot.
3. Secure the card with the screw that you removed from the card holder into the same hole.

Set the antenna

Follow the below instructions to set the antenna if your cards have an external antenna.



1. Remove the flaps of the two holes with a screw driver.
2. Secure the antenna in the device through the hole.



Maintaining and repairing the device

6

6.1 Maintenance

To maintain high system availability, we recommend the preventative replacement of those PC components that are subject to wear in accordance with the intervals for replacement indicated in the table below.

Component	Replacement interval:
HDD/SSD drive	3 years
CMOS backup battery	5 years

6.2 Repair information

Carrying out repairs

Only qualified personnel are permitted to repair the device.

⚠ WARNING

Unauthorized opening and improper repairs on the device may result in substantial damage to equipment or endanger the user.

- Always disconnect the power plug before you open the device.
- Only install system expansion devices designed for this device. If you install other expansion devices, you may damage the device or violate the safety requirements and regulations on RF suppression. Contact your technical support team or where you purchased your PC to find out which system expansion devices may be installed.

If you install or exchange system expansions and damage your device, the warranty becomes void.

⚠ CAUTION

Electrostatic sensitive devices (ESD)

The device contains electronic components which are destroyed by electrostatic charges. This can result in malfunctions and damage to the machine or plant.

Make sure you take precautionary measures even when you open the device, for example, when opening device doors, device covers or the housing cover. For more information, refer to the chapter "ESD Guideline (Page 48)"

Limitation of liability

All technical specifications and approvals of the device only apply if you use expansion components that have a valid CE approval (CE mark). The installation instructions for expansion components in the associated documentation must be observed.

UL approval of the device only applies when the UL-approved components are used according to their "Conditions of Acceptability".

We are not liable for functional limitations caused by the use of third-party devices or components.

Tools

Tools to open the device, see section "Open the device (Page 33)". You can make repairs on the device with the following tools:

- T20 screwdriver for function earth connection and enclosure
- T10 screwdriver for all of the remaining screws

6.3 Recycling and disposal

The devices described in these operating instructions can be recycled thanks to their low level of pollutants. Contact a certified disposal service company for environmentally sound recycling and disposal of your old devices.

6.4 Installing and removing hardware

6.4.1 Replacing the backup battery

Prior to replacement

⚠WARNING

Risk of explosion and release of harmful substances

Improper handling of lithium batteries can result in an explosion of the batteries.

Explosion of the batteries and the released pollutants can cause severe physical injury. Worn batteries jeopardize the function of the device.

Note the following when handling lithium batteries:

- Replace the battery every 5 years.
- Replace the lithium battery only with the type recommended by the manufacturer (type: CR2032).
- For any requirements on product maintenance, contact Siemens Technical support (Page 79).
- Do not throw lithium batteries into fire, do not solder on the cell body, do not recharge, do not open, do not short-circuit, do not reverse polarity, do not heat above 100°C and protect from direct sunlight, moisture and condensation.

NOTICE

Disposal of batteries

Batteries do not belong in domestic garbage. The user is legally obliged to return used batteries.

Used batteries pollute the environment as special waste. You as a user are liable to prosecution if you do not properly dispose of batteries.

Please observe the following when disposing of batteries:

- Dispose of used batteries as hazardous waste in accordance with local regulations.
- You can return used batteries to public collection points and wherever batteries of the type in question are sold.
- Label the battery container "Used batteries".

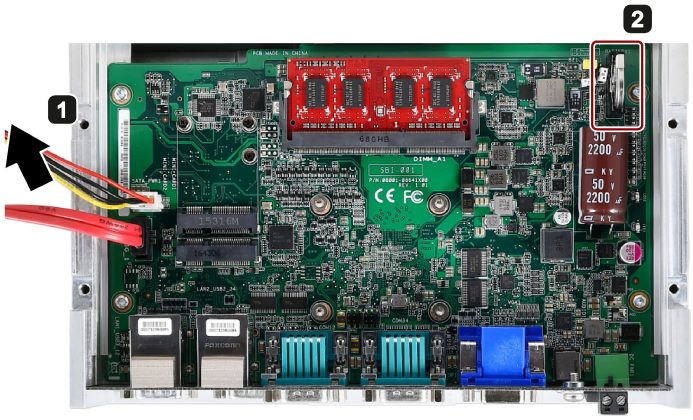
Requirement

- The device is disconnected from the power supply.
- The device is opened.

Procedure - removing

NOTICE
Time may be deleted The time will be deleted if it takes you longer than 30 seconds to replace the battery. The device is no longer synchronous. Time-controlled programs will no longer run or will run at the wrong time. This may damage the plant. Reset the time for the device.

Basic device



1. Lift up the cover slightly and open it carefully.
   Lay the cover aside next to the device.
2. Move the marked clip to one side, and then take out the battery.

Procedure - installation

To install the replacement battery, follow the steps for removing the battery in the reverse order.

6.4.2 Replacing the drive of a basic device

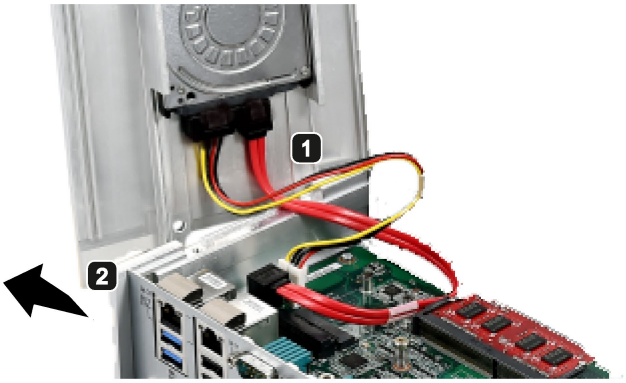
The procedure only applies to the basic device: Carry out the procedure if you want to replace the hard disk drive in the case of a fault.

Read the information in section "Repair information (Page 37)".

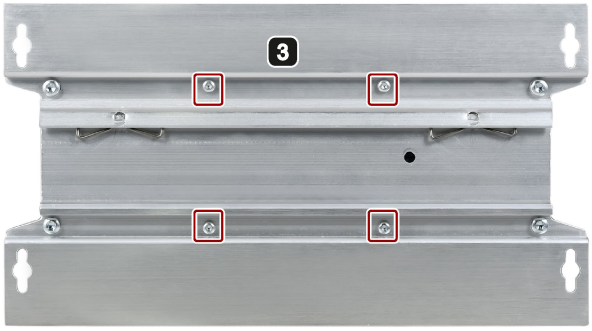
Requirement

- The device is open.
- A hard disk drive
- A T10 screwdriver

Procedure - removing



1. Pull out the connection plug.
2. Lay down the device's rear panel including the drive.



3. Remove the indicated screws.
4. Take out the HDD.

Procedure - installation

Proceed in reverse order.

6.5 Installing the software

Information on installation of the operating system is available on the Internet and on the supplied DVD:

Microsoft® Windows® 7 (https://support.industry.siemens.com/cs/ww/en/view/109752041)

Microsoft® Windows® 10 (https://support.industry.siemens.com/cs/ww/en/view/109768887)

Note

Before installing Windows 10, set the boot mode and video as **UEFI** in BIOS. On how to set the boot mode and Video, refer to Boot Setup (Page 71).

Note

To restore or recovery your Windows 10 system, you can use the Windows 10 restore DVD for IPC 327E/377E.

6.5.1 Installing the drivers

Requirements

- Windows 7/Windows Embedded Standard 7, or Windows 10 Operating System is installed in your IPC.
- You need to connect a mouse, a monitor and a keyboard to your PC.
- You also need an external DVD drive to your PC.

Drivers list

The drivers need to be installed on Windows 7 and Windows 10 are different:

Operating system	Drivers needed
Windows 7/Windows Embedded Standard 7	• Chipset • Graphic • LAN • Audio • Trusted Execution Engine • xHCI (USB)
Windows 10	• Chipset • Graphic • LAN • Audio • Trusted Execution Engine

To open the driver list

1. Put the *Documentation and Drivers* DVD into the external DVD drive.
2. Double-click **My Computer** → **Documentation and Drivers** to open the DVD.
3. Double-click **index.htm**.
4. Click **Drivers** to open the available OS list.
5. Click the OS you use.

The available driver list opened.

Alternative way to access the drivers

You can also find the drivers in the below path of the *Documentation and Drivers* DVD.

```
E:\Drivers
```

Note

Install the Windows system patch before installing the Intel chipset driver.

Step 1: install Intel chipset driver

1. Click **Setup Chipset Driver**.
2. Click  to install the chipset driver.
3. Click **Next** to continue.
4. Click **Accept** to accept the license agreement.
5. Click **Install** to allow the computer to start the installation.

   The installation starts.
6. Click **Yes** to confirm the user account control question.
7. Click **Finish** .

   The chipset installation is completed.

Step 2: install the Intel graphic driver

1. Click **Setup Graphic Driver.**
2. Click  to install the chipset driver.
3. Click **Yes** to confirm the user account control question.
4. Click **Next** to continue.
5. Click **Yes** to accept license agreement.
6. Click **Next** to confirm the *Readme File Information* and move on.

   The installation starts.
7. Click **Next** to continue the installation.
8. Select the radio button next to **"Yes, I want to restart this computer now."** and click **Finish** to restart the computer for the changes to take effect.

Step 3: install LAN driver

1. Click **Setup LAN Driver**.
2. Click  to install the chipset driver.
3. Click **Yes** to confirm the user account control question.
4. Click **Next** to continue.
5. Select the radio button before "**I accept the terms in the license agreement**", and click **Next** to accept license agreement.
6. Set the setup option as you like and click **Next**.
7. Click **Install** to start the driver installation.
8. Click **Finish**.

   The installation is completed.

Step 4: install Realtek Audio driver

1. Click **Setup Audio Driver**.
2. Click  to install the Audio driver.
3. Click **Yes** to confirm the user account control question.
4. Click **Yes** to continue.
5. Click **Install** to continue the installation.
6. Select the radio button next to "**Yes, I want to restart my computer now**." and click **OK** to restart the computer for the changes to take effect.

Step 5: install Intel Trusted Execution Engine driver

1. Click **Setup Trusted Execution Engine Driver**.
2. Click  to install the Intel Trusted Execution Engine driver.
3. Click **Yes** to confirm the user account control question.
4. Click **Next** to continue.
5. Select the radio button before "**I accept the terms in the License Agreement**", and click **Next** to accept license agreement.
6. Click **Next** to start the driver installation.
7. Click **Finish**.

   The installation is completed.

Optional step: install xHCI driver

1. Click **Setup xHCI (USB) Driver**.
2. Click  to install the chipset driver.
3. Click **Yes** to confirm the user account control question.
4. Click **Next** to continue.
5. Click **Yes** to accept license agreement.
6. Click **Next** to confirm the *Readme File Information* and move on.

   The installation starts.
7. Click **Next** to continue.
8. Select the radio button next to "**Yes, I want to restart my computer now**." and click **Finish** to restart the computer for the changes to take effect.

Technical specifications

7

7.1 Certificates and approvals

Note

Applicability

The following shows the approvals that may be available. For the device itself, it is certificated as shown on the product label and package label.

ISO 9001 certificate

The Siemens quality management system for all production processes (development, production and sales) meets the requirements of GB/T 19001-2008/ISO 9001:2008, ISO 14001:2004 + Cor. 1:2009 and BS OHSAS 18001:2007.

Certificate registration no. 01 100 1430201, 01 104 1430201 and 01 113 1430201.

Software license agreements

If the device is supplied with preinstalled software, you must observe the corresponding license agreements.

CE marking

CE

2014/30/EU Directive of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility; Official Journal of the EU L96, 29/03/2014, p. 79–106

EMC EN 61000-6-4:2007 + A1:2011, EN 61000-6-2:2005

FCC and Canada

USA	
Federal Communications Commission Radio Frequency Interference Statement	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 user will be required to correct the interference at his own expense.
Shielded cables	Shielded cables must be used with this equipment to maintain compliance with FCC regulations.
Modifications	Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.
Conditions of operations	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.

CANADA	
Canadian notice	This Class A digital apparatus complies with Canadian ICES-003.
Avis Canadian	Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Responsible party for Supplier's Declaration of Conformity

Siemens Industry, Inc.

Digital Factory - Factory Automation

5300 Triangle Parkway, Suite 100

Norcross, GA 30092

USA

Mail to: (amps.automation@siemens.com)

UL approval

The following approvals are available for the device:

- Underwriters Laboratories (UL) in accordance with Standard UL 60950-1 Second Edition, File E465720 (I.T.E)
- Underwriters Laboratories (UL) in accordance with Standard UL61010-1 and UL61010-2-201 (IND.CONT.EQ), File E472609
- Canadian National Standard CAN/CSA-C22.2 No. 60950-1-07
- Canadian National Standard CAN/CSA No.61010-1-12 and CAN/CSA C22.2 No.61010-2-201

Identification for Eurasian Customs Union

- EAC (Eurasian Conformity)
- Customs union of Russia, Belarus and Kazakhstan
- Declaration of conformity according to Technical Regulations of the Customs Union (TR CU)

Korea Certificate

This product meets the requirements of Korean certification.

This product satisfies the requirement of the Korean Certification (KC Mark).

이 기기는 업무용(A급) 전자파 적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며 가정 외의 지역에서 사용하는 것을 목적으로 합니다.

BSMI

This product meets the requirements of CNS15663(102/07), CNS13438(095/06/01) generic standard.

WEEE label (European Union)

Disposal instructions, observe the local regulations and the section "Recycling and disposal (Page 38) ".

7.2 Directives and declarations

7.2.1 Electromagnetic compatibility, Industrial and Residential Areas

Electromagnetic compatibility

This product meets the requirements of EC Directive 2014/30/EU "Electromagnetic Compatibility".

The device is designed for the following areas of application corresponding to the CE marking:

Scope of application	Requirements for	
	Interference emission	Immunity to interference
Industrial area	EN 61000-6-4:2007 +A1:2011	EN 61000-6-2:2005

7.2.2 ESD guideline

What does ESD mean?

An electronic module is equipped with highly integrated components. Due to their design, electronic components are highly sensitive to overvoltage and thus to the discharge of static electricity. Such electronic components or modules are labeled as electrostatic sensitive devices.

The following abbreviations are commonly used for electrostatic sensitive devices:

- ESD – Electrostatic sensitive device
- ESD – Electrostatic Sensitive Device as a common international designation

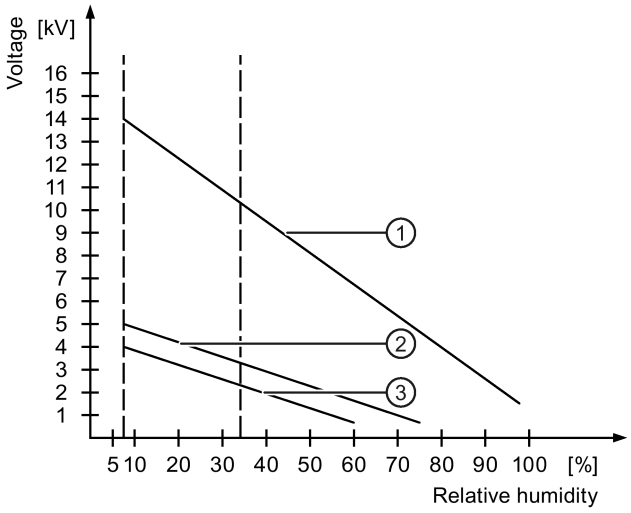
Electrostatic sensitive devices can be labeled with an appropriate symbol.

NOTICE
Damage to ESD from touch Electrostatic sensitive devices, ESD, can be destroyed by voltages which are far below the human perception limit. If you touch a component or electrical connections of a module without discharging any electrostatic energy, these voltages may arise. The damage to a module by an overvoltage can often not be immediately detected and only becomes evident after an extended period of operation. The consequences are incalculable and range from unforeseeable malfunctions to a total failure of the machine or system. Avoid touching components directly. Make sure that persons, the workstation and the packaging are properly grounded.

Charge

Every person without a conductive connection to the electrical potential of his/her surroundings can be electrostatically charged.

The material with which this person comes into contact is of particular significance. The figure shows the maximum electrostatic voltages with which a person is charged, depending on humidity and material. These values conform to the specifications of IEC 61000-4-2.



① Synthetic materials
② Wool
③ Antistatic materials such as wood or concrete

NOTICE
Grounding measures There is no equipotential bonding without grounding. An electrostatic charge is not discharged and may damage the ESD. Protect yourself against discharge of static electricity. When working with electrostatic sensitive devices, make sure that the person and the workplace are properly grounded.

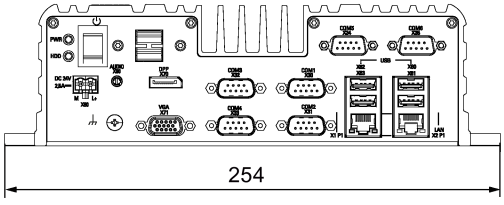
Protective measures against discharge of static electricity

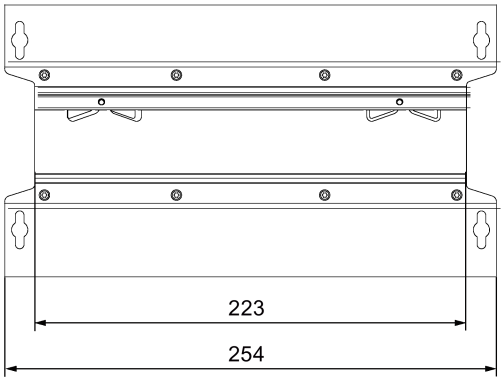
- Disconnect the power supply before you install or remove modules which are sensitive to ESD.
- Pay attention to good grounding:
  - When handling electrostatical sensitive devices, make sure that persons, the workstation and devices, tools and packaging used are properly grounded. This way you avoid static discharge.
- Avoid direct contact:
  - As a general rule, do not touch electrostatic sensitive devices, except in the case of unavoidable maintenance work.
  - Hold the modules at their edge so that you do not touch the connector pins or conductor paths. This way, the discharge energy does not reach and damage the sensitive components.
  - Discharge your body electrostatically before you take a measurement at a module. Do so by touching grounded metallic parts. Always use grounded measuring instruments.

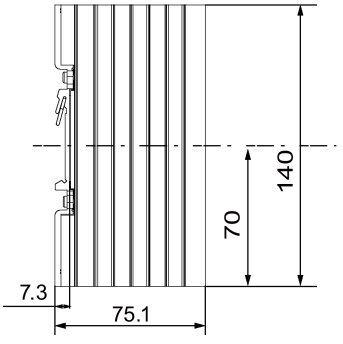
7.3 Dimension drawings

7.3.1 Dimension drawing basic device

Mounting on a standard rail

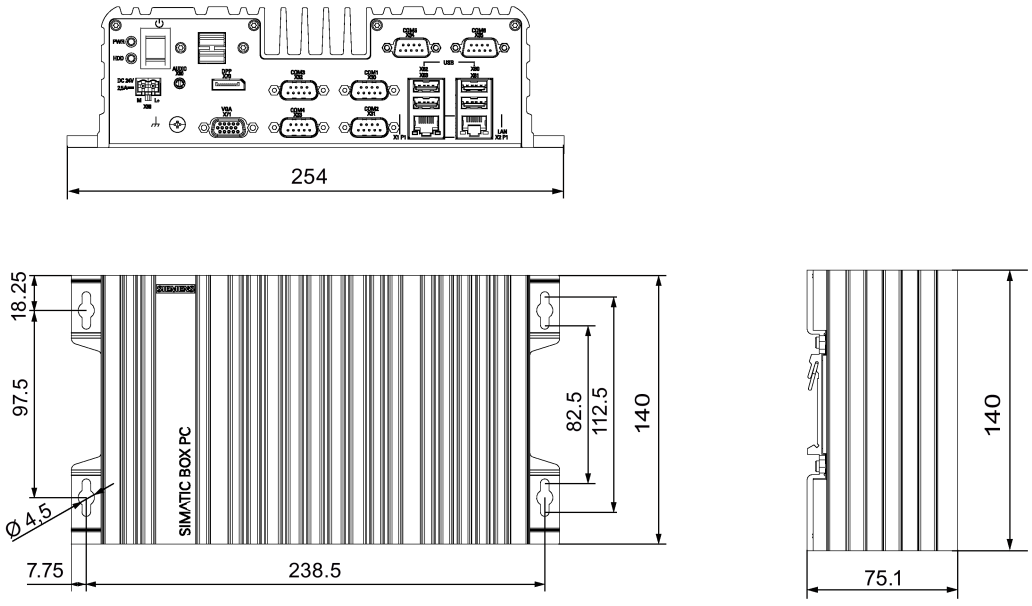






all dimensions in mm

Wall mounting



all dimensions in mm

7.4 Technical data

7.4.1 General technical specifications

General technical specifications

Weight with hard disk drive, without mounting brackets	Basic: Approx. 2.0 kg
Power supply [1]	24 VDC (20.4 to 28.8 V)
Power consumption (DC)	Continuous current • 24 V, 1.2 A maximum current • 2.5 A at 20.4 V
Noise emission	< 40 dB(A) according to DIN 45635-1
Degree of protection	IP40 in accordance with IEC 60529
Protection class	Protection class III in accordance with IEC 61140
Quality assurance	In accordance with ISO 9001

[1] The device should only be connected to a 24 VDC power supply which meets the requirements of safe extra low voltage (SELV) according to IEC/EN/DIN EN/UL 60950-1. The power supply must meet the requirement NEC Class 2 or LPS according to the IEC/EN/DINEN/UL 60950-1.

Electromagnetic compatibility

Radiation Emission (Enclosure port) in accordance with IEC 61000-6-3 + A1/ EN61000-6-4+A1	30 to 230MHz/ 30dB(µV/m) Quasi-peak 230 to 1000MHz/ 37dB(µV/m) Quasi-peak 1Ghz to 3Ghz/ 70dB(µV/m) peak 50dB(µV/m) average 3Ghz to 6Ghz/ 74dB(µV/m) peak 54dB(µV/m) average
Immunity with regard to conducted interference on the supply lines	± 2 kV in accordance with IEC 61000-4-4; Burst ± 1 kV in accordance with IEC 61000-4-5; Surge, line to line
Noise immunity on signal lines	± 1 kV to IEC 61000-4-4; Burst; Length < 30 m ± 2 kV in accordance with IEC 61000-4-4; Burst; length ≥ 30 m ± 2 kV in accordance with IEC 61000-4-5; Surge; length ≥ 30 m
Immunity to discharges of static electricity	± 6 kV contact discharge in accordance with IEC 61000-4-2 ± 8 kV air discharge in accordance with IEC 61000-4-2
Immunity to RF interference	10 V/m, 80 MHz to 1000 MHz, 80 % AM according to IEC 61000-4-3 3 V/m, 1.4 GHz to 6 GHz, 80 % AM according to IEC 61000-4-3
Conducted Emission (Low voltage DC mains port), in accordance with IEC 61000-6-3 + A1	0.15 to 0.5 MHz / 79 dB (µV) Q, 66 dB (µV) M 0.5 to 30 MHz / 73 dB (µV) Q, 60 dB (µV) M
Conducted Emission(Telecommunications/Network Port), in accordance with IEC 61000-6-3 + A1	0.15 to 0.5 MHz: 84 dB(µV) to 74 dB(µV) Q 74 dB(µV) to 64 dB(µV) M
	0.5 MHz to 30 MHz: 74 dB(µV) Q / 64 dB(µV) M
Immunity to magnetic fields	30 A/m, 50/60 Hz according to IEC 61000-4-8

Main circuit board

Processor	• Intel Celeron N3160: Quad Core, 1.6 GHz, burst frequency 2.24 GHz, 2 MB 2nd level cache, 6 W TDP
RAM	DDR3L memory up to 8 GB, 1× SODIMM modules / non-ECC
Expansion slots	1 Mini PCIe half-size slot 1 mSATA slot with USB2.0 bus signal

Drive, memory medium

Hard disk drive, optional	≥ 500 GB, 2.5" HDD
Solid State Drive, optional	256GB, 2.5" SSD
Floppy and CD-ROM drive	External, can be connected via USB port [1]
USB stick	External, can be connected via USB port

[1] Only to device USB port, not via USB hub

Graphics

Graphics controller	Integrated Graphic Controller
Resolution, graphics memory	• at least support 2 channels: 1 x VGA(DB-15) + 1 x DP(DDI) • 32bit, support from 640*480 pixels to 1920*1200 pixels

Ports

COM	• RS 232 , max. 115 Kbps, D-sub connector, 9-pin • RS 232 /RS 422 /RS 485 [1] (optional), max. 115 Kbps, D-sub connector, 9-pin
USB	• USB 2.0, high speed/high current, • USB 3.0, high current You can find additional information in the section Power demand of the components (Page 54)".
LAN interface X1 P1, RJ45	Intel Ethernet Controller I211-AT 10, 100, 1000 Mbps
LAN interface X2 P1, RJ45	Intel Ethernet Controller I211-AT 10, 100, 1000 Mbps
Keyboard, mouse	Connection via USB port

[1] In BIOS Setup, you can configure support for RS 232/ RS 422/ RS 485 for COM1 and COM2 ports.

7.4.2 Environmental conditions

Climatic ambient conditions

For permitted mounting positions, see section Preparing for installation (Page 16).

Temperature, tested in accordance with IEC 60068-2-1, IEC 60068-2-2 and IEC 60068-2-14	
Operation, USB load max. 10 W, mini card load max. 2 W:	0 °C to +40 °C applies to device for all permitted mounting positions 0 °C to +50 °C applies to device for all permitted mounting positions for SSD configuration
Temperature during storage/transport	-20°C to +60 °C
Gradient	• Operation: Max. 10 °C/h • Storage: 20 °C/h, no condensation
Relative humidity, tested in accordance with IEC 60068-2-78, IEC 60068-2-30	
Operation	5% to 85% at 30 °C, no condensation
Storage/transport	5% to 95% at 25/55 °C, no condensation
Atmospheric pressure	
Operation	1080 to 795 hPa, corresponds to an elevation of -1000 to 2000 m
Storage/transport	1080 to 660 hPa, corresponds to an elevation of -1000 to 3500 m

Mechanical ambient conditions

Vibration resistance, tested in accordance with DIN IEC 60068-2-6	
Operation	With hard disk : • 10 to 58 Hz: 0.0375 mm • 58 to 200 Hz: 4.9 m/s² With SSD : • 10 to 58 Hz: 0.075 mm • 58 to 200 Hz: 9.8 m/s²
Storage/transport	• 5 to 8.4 Hz: 3.5 mm • 8.4 to 500 Hz: 9.8 m/s²
Shock resistance, tested in accordance with IEC 60068-2-27	
Operation	• With hard disk: 9.81 m/s², 20 ms • With SSD: 150 m/s², 11 ms
Storage/transport	• 250 m/s², 6 ms

7.4.3 Power demand of the components

Maximum power consumption of the auxiliary components

Auxiliary components		Maximum permitted power consumption			Max. total power
		+5 V	+3.3 V	+1.5 V	
USB device 3.0	High current	900 mA	--	--	10 W (for all USB devices)
USB Device 2.0	High current	500 mA	--	--	
Mini PCIe module	Per slot	--	1.5 A [1]	0.5 A [2]	2 W in total
mSATA module	Per slot	--	1.5 A [1]	0.5 A [2]	

[1] May amount to maximum 3.0 A for up to 100 ms at start-stop torque of device

[2] May amount to maximum 1.2 A for up to 100 ms at start-stop torque of device

Note

Device can overheat!

The power supply cannot make unlimited power available. The auxiliary components consume energy and produce heat.

The device may overheat. The auxiliary components will be damaged.

7.4.4 DC power supply

Technical specifications

Input voltage	24 VDC (20.4 to 28.8 VDC)
Power consumption	Max. 30 W
Buffering upon power failure	Hold-up time > 10 ms
Protection class	Safety class III

Note

Inrush current

The device needs an inrush current of at least 4 A for 25 ms.

The peak value of the inrush current depends on the input voltage and the impedance of the 24 V source; peak currents in excess of 4 A are possible. This will not have a negative impact on device functionality.

Typical power consumption

	Power consumption (at 24 V rated voltage)
Basic device with Intel Celeron N3160	13 W
USB expansion	See section Power demand of the components (Page 54)
Expansion PCIe	

7.5 Hardware descriptions

7.5.1 Technical features of the motherboard

Component / port	**Description**	**Parameters**
Chipset	integrated in CPU	
CPU	Intel Celeron N3160	
Memory	DDR3L SODIMM	2 GB, 4 GB and 8 GB
Graphics	Integrated graphics	up to 512 MB graphics memory taken dynamically from RAM

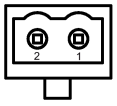
7.5.2 External interfaces

7.5.2.1 Overview of interfaces

Interface	Position	Description
COM	External	9-pin D-sub: • 4 x RS 232 • 2 x RS 232/ RS 422/ RS 485
USB [1]	External	4 × USB 2.0 2 × USB 3.0
Ethernet	External	2 x RJ45 10/100/1000 Mbps
DisplayPort	External	• 1 x DP • 1 x VGA

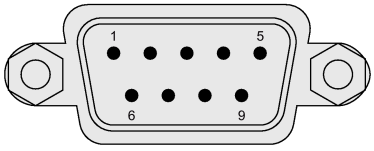
[1] Only four of these USB ports may be operated simultaneously in high current mode, max. 10 W.

7.5.2.2 DC in connector



Pin	Short description
1	24V
2	GND

7.5.2.3 Serial interface



RS232
RS422
RS485

Pin assignment RS232

Pin	Short description	Meaning
1	DCD	Data carrier detect (I)
2	RxD	Received data (I)
3	TxD	Transmitted data (O)
4	DTR	Data terminal ready (O)
5	M	Ground
6	DSR	Data set ready (I)
7	RTS	Request to send (O)
8	CTS	Clear to send (I)
9	RI	Incoming call (I)

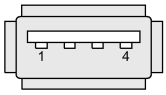
Pin assignment RS422

Pin	Short description	Meaning
1	TX-	Transmit data - (O) for full-duplex mode
2	TX+	Transmit data + (O) for full-duplex mode
3	RX+	Receive data + (I) for full-duplex mode
4	RX-	Receive data - (I) for full-duplex mode
5	M	Signal ground
6	nc	
7	nc	
8	nc	
9	nc	

Pin assignment RS485

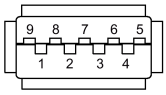
Pin	Short description	Meaning
1	Data-	Transmit / receive data - (I/O) for half-duplex mode
2	Data+	Transmit / receive data+ (I/O) for half-duplex mode
3	nc	
4	nc	
5	M	Signal ground
6	nc	
7	nc	
8	nc	
9	nc	

7.5.2.4 USB 2.0 port



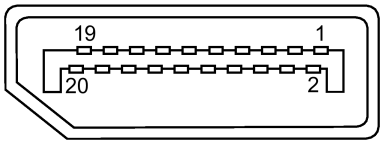
Pin	Short description	Meaning
1	USB_P5V_fused (O)	+5 V, fused
2	USB_D0M (I/O)	Data–
3	USB_D0P (I/O)	Data+
4	USB_GND	GND

7.5.2.5 USB 3.0 port



Pin	Short name	Meaning	Input / output
1	VBUS	+ 5 V (fused)	Output
2	D-	Data channel USB2	Input / output
3	D+	Data channel USB2	Input / output
4	GND	Ground	–
5	RX-	Data channel USB3	Input
6	RX+	Data channel USB3	Input
7	GND	Ground	–
8	TX-	Data channel USB3	Output
9	TX+	Data channel USB3	Output

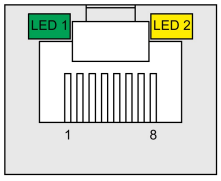
7.5.2.6 DisplayPort



Pin	Short name	Meaning	Input / output
1	ML_Lane0+	DP data 0+	Output
2	GND	Ground	-
3	ML_Lane0-	DP data 0-	Output
4	ML_Lane1+	DP data 1+	Output
5	GND	Ground	-
6	ML_Lane1-	DP data 1-	Output
7	ML_Lane2+	DP data 2+	Output

Pin	Short name	Meaning	Input / output
8	GND	Ground	-
9	ML_Lane2-	DP data 2-	Output
10	ML_Lane3+	DP data 3+	Output
11	GND	Ground	-
12	ML_Lane3-	DP data 3-	Output
13	CONFIG1 CAD	Cable Adapter Detect	Input
14	CONFIG2	Ground (PullDown)	-
15	AUX_CH+	Auxiliary channel+	Bidirectional
16	GND	Ground	-
17	AUX_CH-	Auxiliary channel-	Bidirectional
18	HPD	Hot Plug Detect	Input
19	GND	Ground	-
20	DP_PWR	+3.3V (fused)	Output

7.5.2.7 Ethernet port



Pin	Short description	Meaning
1	BI_DA+	Bidirectional data A+, input/output
2	BI_DA–	Bidirectional data A–, input/output
3	BI_DB+	Bidirectional data B+, input/output
4	BI_DC+	Bidirectional data C+, input/output
5	BI_DC–	Bidirectional data C–, input/output
6	BI_DB–	Bidirectional data B–, input/output
7	BI_DD+	Bidirectional data D+, input/output
8	BI_DD–	Bidirectional data D–, input/output

LED	Short description	Meaning
1	LED 1	Off: Port is Not Active Lit orange: Port is Active, but No Data Activity Blinking: Port is Active and there is Data Activity
2	LED 2	Off: 10Mbps Lit red: 100Mbps Lit green: 1Gbps

7.5.3 Internal interfaces

7.5.3.1 Overview of internal interfaces

Interface	Position	Connector	Description
Mini PCIe x1	Internal		PCIe x1 interface
mSATA x 1	internal		mSATA x 1 interface with USB2.0 signal

7.5.3.2 Mini PCIe and mSATA interface

Assignment of the PCIe x1 interface					
Top side			Bottom side		
Pin no.	Name	Description	Pin no.	Name	Description
1	WAKE#	Signal for link reactivation	2	3.3 V	3.3 V power
3	Reserved**		4	GND	Ground
5	Reserved**		6	1.5 V	1.5 V power
7	CLKREQ#	Clock request	8	UIM PMR	
9	GND	Ground	10	UIM DATA	
11	REFCLK-	Reference clock (differential pair)	12	UIM CLK	
13	REFCLK+	Reference clock (differential pair)	14	UIM RESET	
15	GND	Ground	16	UIM VPP	
17	Reserved***(UIM_C4)		18	GND	Ground
19	Reserved***(UIM_C8)		20	W DISABLE#	
21	GND	Ground	22	PERST#	Fundamental reset
23	PERn0	Receiver differential pair, Lane 0	24	+3.3 Vaux	3.3 V power
25	PERp0	Receiver differential pair, Lane 0	26	GND	Ground
27	GND	Ground	28	+1.5 V	1.5 V power
29	GND	Ground	30	SMB_CLK	
31	PETn0	Transmitter differential pair, Lane 0	32	SMB_DATA	
33	PETp0	Transmitter differential pair, Lane 0	34	GND	Ground
35	GND	Ground	36	USB_D-	
37	Reserved*		38	USB_D+	
39	Reserved*		40	GND	Ground
41	Reserved*		42	LED_WWAN#	

Assignment of the PCIe x1 interface					
43	Reserved*		44	LED_WLAN#	
45	Reserved*		46	LED_WPAN#	
47	Reserved*		48	+1.5 V	1.5 V power
49	Reserved*		50	GND	Ground
51	Reserved*		52	3.3 V	3.3 V power

7.5.4 Currently allocated system resources

All system resources (hardware addresses, memory utilization, interrupt assignment, DMA channels) are assigned dynamically by the Windows operating system, depending on the hardware equipment, drivers and connected external devices. You can view the current allocation of system resources or possible conflicts in the Control Panel.

Procedure

To view the system resources, proceed as follows:

1. In the Windows Start menu, select "Start -> Run".
2. Enter "msinfo32" in the command prompt and confirm your entry with "OK".

7.6 BIOS description

7.6.1 BIOS getting started

BIOS setup utility: Aptio TSE

The motherboard's BIOS is developed on AMI based code. AMI provides Aptio™ Text Setup Environment (TSE), a test-based basic input and output system as BIOS setup utility. The purpose of Aptio™ TSE is to empower the user with complete system control at boot.

Getting BIOS setup

To enter BIOS Setup at startup:

1. Power on the motherboard.
2. Press **DELETE** or **ESC** key on your keyboard during the Power - On - Self - Test (POST) when the SIEMENS logo is shown on screen.

   The Aptio™ TSE main BIOS setup menu is displayed.

   You can access the other setup screens from the main BIOS setup menu, such as 'Advanced' or 'Chipset' menus.

NOTICE
• If **DELETE** or **ESC** is not pressed, POST continues its routines. • If the timing is missed for entering BIOS setup during POST, a system reset is required by one of following methods: – Press **CTRL** + **ALT** + **DELETE** simultaneously. – Press the power button to turn off system then turn it on.

BIOS setup menu

The Aptio™ TSE BIOS setup menu is the first screen that you can navigate. Each BIOS setup menu option is described in this manual.

Navigation

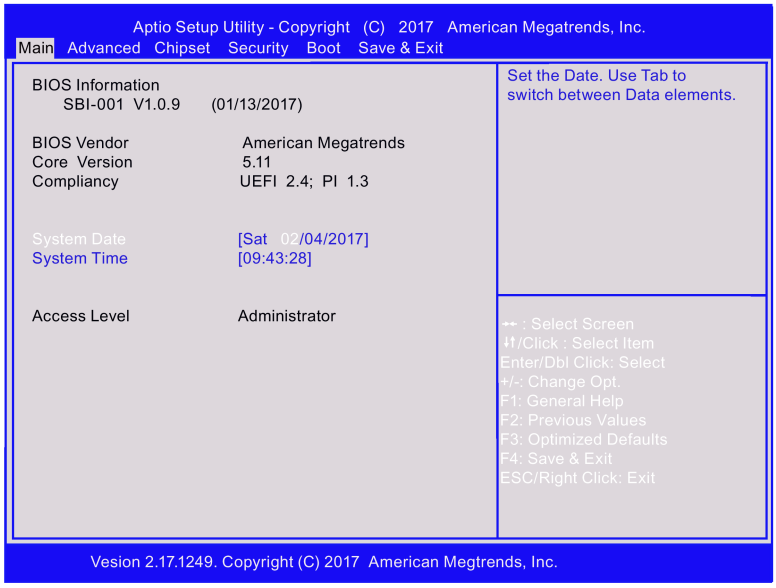
The Aptio™ TSE keyboard-based navigation can be accomplished using a combination of the keys, for example, function keys, **ENTER**, **ESC**, **ARROW** keys. Function description for navigation keys is listed below.

Press	To
→ ← : Select Screen	Menu Bar and select a BIOS setup page, for example, the Main page.
↑ ↓/Click : Select Item	Select a BIOS setup item or sub page.
Enter/Dbl Click : Select	Select an option to edit its value or access a sub menu.
+ / - : Change Opt.	Change the field value of a particular setup item, for example, date, time.
F1 : General Help	To display the general help window.
F2: Previous Values	To enable user to load previous values in BIOS setup Menu.
F3: Optimized Defaults	To enable user to load optimized default values in BIOS Setup Menu.
F4: Save & Exit	To enable user to save the current configuration and exit BIOS Setup Menu.
ESC/Right Click: Exit	The <ESC> Key or Right Click allows user to discard any change have made and exit BIOS Setup Menu. Press <ESC> Key or Right Click to exit BIOS Setup Menu without saving change. The following screen will appear: You can press <Enter> Key to discard changes and exit. Or use arrow keys to select “No” then press <Enter> Key to abort this function and return to previous screen.

7.6.2 Main setup

The main setup menu

The main setup menu is shown as below.



Note

Take the BIOS version installed on your IPC as standard.

BIOS information

Item	Description
BIOS information	Show the BIOS release information.
BIOS Vendor	Show the vendor information.
Core Version	Show the BIOS core version information.
Compliancy	Show the UEFI specification version.

System date

1. Use arrow key to select the data.
2. Navigate to the month, day and year and type in the value as you need. Press **Enter** to jump to next filed.
3. Press **F4** key and save the change.

System time

1. Use arrow key to select the data.
2. Navigate to the hour, minute and second and type in the value as you need. Press **Enter** to jump to next filed.
3. Press **F4** key and save the change.

Note

Enter the time in the 24-hour format. For example, you should enter 06:30:00 for 6:30 AM.

Access level

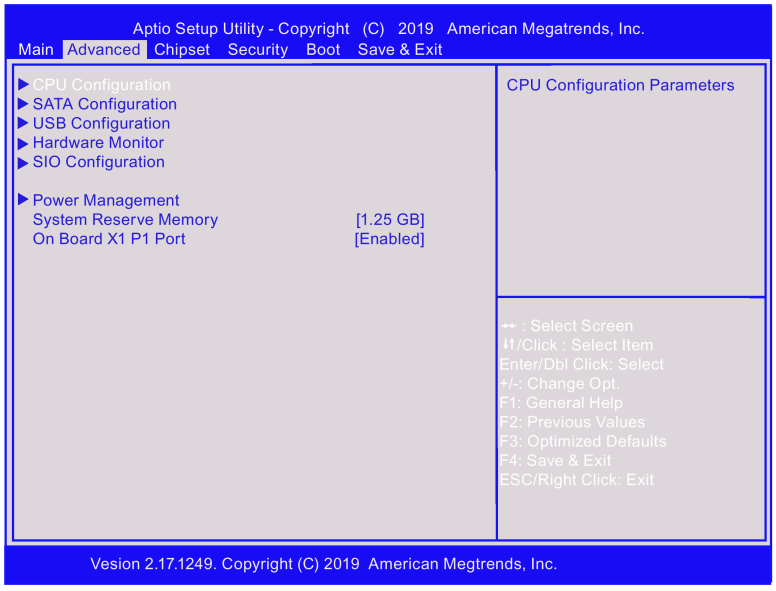
Access level shows what access right you have to setup BIOS. For setting the access level, go to the chapter Security Menu.

Access right	Description
Administrator	Have full access right to change BIOS settings.
User	Have guest level access right and can only change limited items.

7.6.3 Advanced setup

Advanced setup

The **Advanced** setup menu allows you to change the settings for the CPU and other system devices.



CPU Configuration

In CPU configuration page, you can view and configure CPU parameters.

Intel virtualization technology/EIST/Turbo Mode

You can enable or disable the intel virtualization technology with the following steps:

1. Select **Intel virtualization technology/EIST/Turbo Mode** with the arrow keys and press **Enter** key.
2. Select **Enabled** or **Disabled** as you need and press **Enter** key in the pop-up window.
3. Press **F4** key and save the change.

USB Configuration

In USB configuration page, you can view and configure USB parameters.

USB device

The USB device shows the USB device detected by BIOS during POST. If there is no device attached to the motherboard, only 2 Hubs is shown.

Legacy USB support

You can enable or disable the USB support with the following steps:

1. Select **Legacy USB support** with the arrow keys and press **Enter** key.
2. Select **Enabled, Disabled** or **Auto** as you need and press **Enter** key in the pop-up window.
3. Press **F4** key and save the change.

See the configuration options for **Legacy USB support** below:

Configuration options	Description
Auto	This option disables Legacy USB Support if there is no USB device is connected.
Enabled	This option enables Legacy USB Support.
Disabled	This option keeps USB device available only for EFI application.

USB3.0 Port 1,USB3.0 Port 2 and USB2.0 Ports

You can enable or disable the USB Ports Per-port disable control with the following steps:

1. Select **USB 3.0 Port 1** or **USB 3.0 Port 2** or **USB2.0 Ports** with the arrow keys and press **Enter** key.
2. Select **Enabled/Disabled** as you need and press **Enter** key in the pop-up window.
3. Press **F4** key and save the change.

Note

If you select **Disable** on **USB 2.0 Ports**, all the USB2.0 ports cannot be used.

Hardware Monitor

In Hardware Monitor page, you can view and monitor the hardware status. See the hardware monitor parameters below:

Configuration options	Description
system temperature	Show the temperature inside chassis.
CPU temperature	Show the CPU temperature.
VCORE	Show VCORE power voltage.
+3.3V	Show +3.3V power voltage.
+5V	Show +5V power voltage.
+12V	Show +12V power voltage.
VCC3V	Show VCC3V power voltage.
VSB3	Show VSB3 power voltage.
VBAT	Show VBAT power voltage.

SIO Configuration

In Super IO configuration page, you can view and configure super IO chip parameters.

Serial port 1 configuration

Follow the steps below to enable or disable the serial port 1.

1. Select the port which you want to set with the arrow keys and press **Enter** key.
2. Select **Enabled** or **Disabled** as you need and press **Enter** key in the pop-up window.
3. The enabled port can select corresponding Change Setting and Device Mode and press **Enter** key.
4. Press **F4** key and save the change.

The table below is the detailed port setting.

Port type	Change Settings	Device Mode
Serial port 1	Auto IO=3F8h; IRQ=3; IO=2F8h; IRQ=3;	RS-232 RS-422 RS-485
Serial port 2	Auto IO=2F8h; IRQ=4; IO=3F8h; IRQ=4;	RS-232 RS-422 RS-485
Serial port 3	Auto IO=3E8h; IRQ=5; IO=2E8h; IRQ=5;	-
Serial port 4	Auto IO=2E8h; IRQ=7; IO=3E8h; IRQ=7;	-

Port type	Change Settings	Device Mode
Serial port 5	Auto IO=2D0h; IRQ=10; IO=2C0h; IRQ=10;	-
Serial port 6	Auto IO=2C0h; IRQ=11; IO=2D0h; IRQ=11;	-

See the options for device mode below:

Configuration options	Description
RS-232	To enable RS-232 mode for serial port 1/2.
RS-422	To enable RS-422 mode for serial port 1/2.
RS-485	To enable RS-485 mode for serial port 1/2.

See the baud rate for RS-422 and RS-485 below: 50, 75, 110,134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, 19200, 38400, 57600, 115200.

Power Management

You can view and configure power management in this page.

Restore AC Power Loss

You can restore the AC power loss with the following steps:

1. Select **Last State, Always On and Always Off** with the arrow keys and press **Enter** key.
2. Press **F4** key and save the change.

See the configuration options for **Restore AC Power Loss** below:

Configuration options	Description
Always On	The system goes into on state after the AC power restores.
Always Off	The system goes into off state after the AC power restores.
Last State	The system goes into on state if system state was on before AC power loss; the system goes into off state if system state was sleep, hibernate or off before AC power loss.

Resume from Network

You can enable or disable the function of resuming from network with the following steps:

1. Select **Resume from Network** with the arrow keys and press **Enter** key.
2. Select **Disabled** or **Enabled** as you need and press **Enter** key in the pop-up window.
3. Press **F4** key and save the change.

System Reserve Memory

If you plug external mini PCIe device, you can adjust system reserve memory for mini PCIe device with the following steps:

1. Select **2 GB, 1.75 GB, 1.5 GB, 1.25 GB** or **1 GB** with the arrow keys and press **Enter** key.
2. Press **F4** key and save the change.

On Board X1 P1 Port

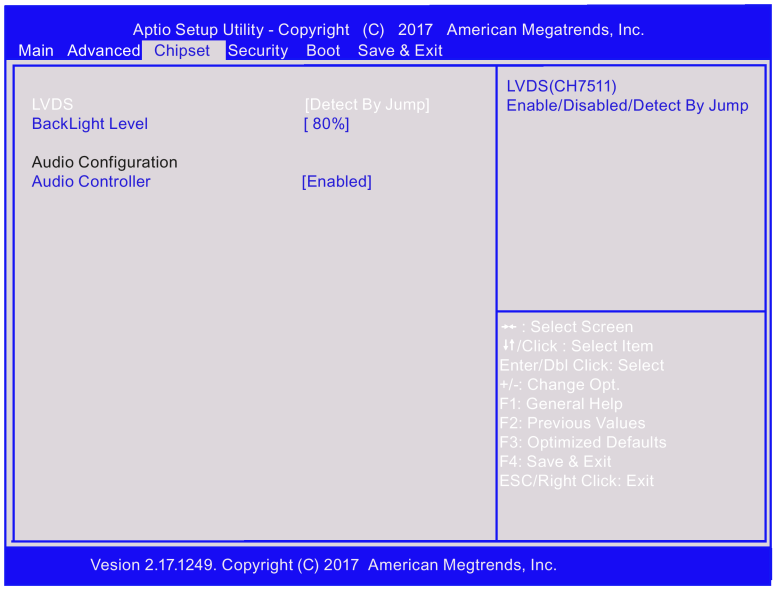
You can enable or disable On Board X1 P1 Port with the following steps:

1. Select **Disabled** or **Enabled** as you need and press **Enter** key in the pop-up window.
2. Press **F4** key and save the change.

7.6.4 Chipset setup

Chipset page

Select **Chipset** from the BIOS setup page to enter the Chipset BIOS setup page. The Chipset page is shown as below.



LVDS

Follow the instructions below to enable or disable LVDS

1. Select **LVDS** with the arrow keys and press **Enter** key.
2. Select **Disabled** or **Detect By Jump** by default and press **Enter** key in the active window pop-up.
3. Press **F4** key and save the change.

Audio configuration

In Audio configuration page, you can view and configure Audio Controller.

1. Select **Audio Controller** with the arrow keys and press **Enter** key.
2. Select **Enabled** or **Disabled** as you want and press **Enter** key.
3. Press **F4** key and save the change.

7.6.5 Security setup

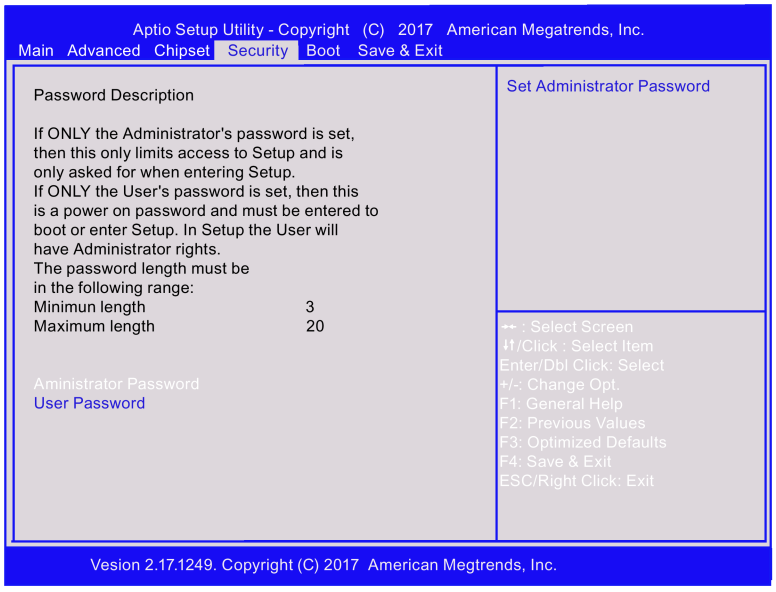
Security setup

NOTICE
Risk of unauthorized modification for BIOS setting Everyone can access BIOS and change its setting if you don't set a password for BIOS. Modify the BIOS setting arbitrarily may interfere with device function. Set passwords for administrator and user. In this way to avoid unauthorized access and modification to BIOS.

Security setup provides both Administrator and User password. If you want use both of these two passwords, the Administrator password must be set firstly. The Administrator and User passwords activate two different levels of password security.

After the passwords are set, you must enter a password every time when you enter BIOS.

Select **Security** menu item in BIOS Setup screen to enter Security setup screen. Security menu is shown below:



Administrator password

In the security setup page, you can set an administrator password level password for BIOS.

1. Select **Administrator Password** with the arrow keys and press **Enter** key.
2. Enter a password of at least three characters in length. The password can be up to 20 characters long and case-sensitive.
3. Re-enter the password when you are asked to confirm the password in the screen popped up.

User password

In the security setup page, you can set a user level password for BIOS.

1. Select **User Password** with the arrow keys and press **Enter** key.
2. Enter a password of at least three characters in length. The password can be up to 20 characters long and case-sensitive.
3. Re-enter the password when you are asked to confirm the password in the screen popped up.

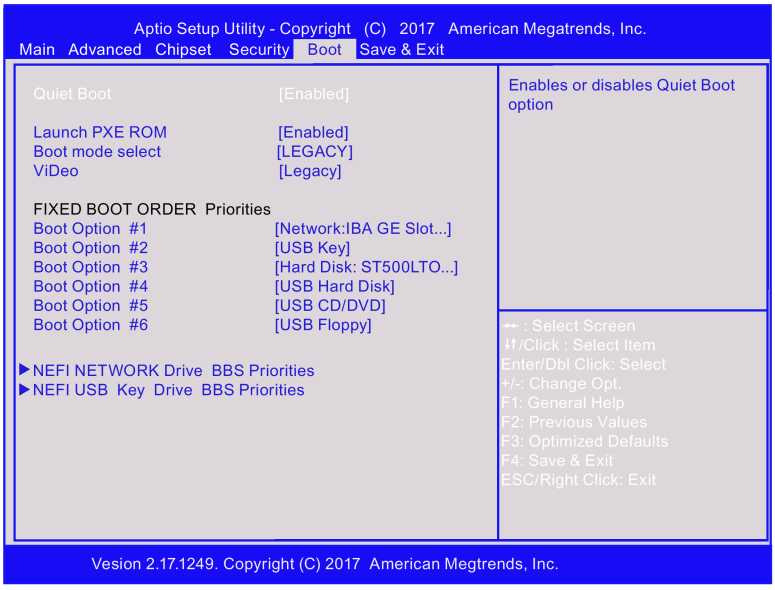
Note

Record the new password when the password is changed. If you forget the password, you must erase the system configuration information in NVRAM.

7.6.6 Boot Setup

Boot Setup

Select **Boot** from the BIOS setup page to enter the boot setup page. The boot page is shown as below.



Boot configuration

In the Boot configuration page, you can modify the boot up screen between POST message and SIEMENS logo.

Quiet Boot

Follow the steps below to select your boot-up screen.

1. Select **Quiet Boot** with the arrow keys and press **Enter** key.
2. Select the **Disabled** or **Enabled** as you want and press **Enter** key.
3. Press **F4** key and save the change.

See the quiet boot options below:

Option	Description
Disabled	Set the motherboard to display the POST message.
Enabled	Set the motherboard to display the SIEMENS logo. This is the default setting for Quiet boot.

Note

If quiet boot function is set as **Enabled** in BIOS, you can press TAB key to switch to POST message when the IPC is booting.

Launch PXE ROM

Follow the steps below to set the **PXE ROM**.

1. Select **Launch PXE ROM** with the arrow keys and press **Enter** key.
2. Select the **Disabled** or **Enabled** as you want and press **Enter** key.
3. Press **F4** key and save the change.

Boot mode select

Follow the steps below to select your boot-up screen.

1. Select **Boot mode select** with the arrow keys and press **Enter** key.
2. Select the **LEGACY** or **UEFI** as you want and press **Enter** key.

   Note

   Before installing Windows 10, set the boot mode as **UEFI** in BIOS.

3. Press **F4** key and save the change.

Video

Follow the steps below to select your boot-up screen.

1. Select **Video** with the arrow keys and press **Enter** key.
2. Select the **UEFI** or **Legacy** as you want and press **Enter** key.

   Note

   Before installing Windows 10, set the Video as **UEFI** in BIOS.

3. Press **F4** key and save the change.

Set boot priority

In set boot priority page, you can set the boot devices priority for all your boot devices.

Follow the steps below to set the boot devices priority.

1. Select boot priority you wish to change with the arrow keys and press **Enter** key.

   The option screen opens.
2. Select the device category and press **Enter** key .
3. Press **F4** key and save the change.

See the default priority for booting device below:

Boot priority	Device category
1st boot	HDD/SSD
2nd boot	USB-Key
3rd boot	USB-FDD
4th boot	USB-CD/DVD
5th boot	USB-HDD
6th boot	Network (PXE enable)

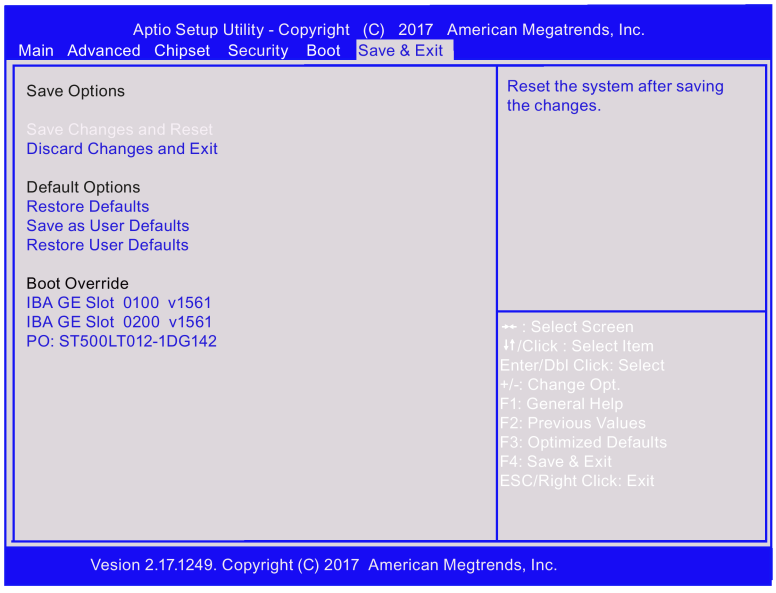
Once bootable devices are attached, the following items show up.

Bootable device	Description
Hard Disk Drive BBS Priorities	All the boot options that are configured as Hard Disk Drive are displayed in this page. You can change the priority as similar as changing the main boot option priorities. The 1st boot option has the highest boot priority and appears at the boot option priorities and boot order.
Floppy Drive BBS Priorities	You can set the system boot order for floppy drives in this field. The 1st boot option has the highest boot priority and appears at the boot option priorities and boot order.
CD/DVD ROM Drive BBS Priorities	You can set the system boot order for CD/DVD ROM drives in this field. The 1st boot option has the highest boot priority and appears at the boot option priorities and boot order.
USB Hard Disk Drive BBS Priorities	All the Boot options that are configured as USB Hard Disk Drive are displayed in this field. You can change the priority as similar to the main boot option priorities. The 1st boot option has the highest boot priority and appears at the boot option priorities and boot order.
USB Floppy Drive BBS Priorities	You can set the system boot order for USB floppy drives in this field. The 1st boot option has the highest boot priority and appears at the boot option priorities and boot order.
USB CD/DVD ROM Drive BBS Priorities	All the Boot options that are configured as USB CD/DVD ROM Drive are displayed in this field. You can change the priority as similar to the main boot option priorities. The 1st boot option has the highest boot priority and appears at the boot option priorities and boot order.

7.6.7 Save and Exit

Save and exit

Select **Save & Exit** from the BIOS setup page to enter the save and exit page. The save and exit page is shown as below.



Save Options

Save changes and reset

When you completed the system configuration changes, save the changes with the following instructions.

1. Select **Save Changes and Reset** with the arrow keys and press **Enter** key.
2. Select **Yes** and press **Enter** key to save changes and reset. Or Select **No** to quit the save.

After the system is rebooted, the new system configurations take effect.

Discard changes and reset

You can reboot the system without saving the changes with the following instructions.

1. Select **Discard Changes and Reset** with the arrow keys and press **Enter** key.
2. Select **Yes** and press **Enter** key to discard changes and reset. Or Select **No** to quit.

Defaults Options

Restore defaults

You can restore the system with the following instructions.

1. Select **Restore Defaults** with the arrow keys and press **Enter** key.
2. Select **Yes** and press **Enter** key to the load optimized defaults. Or Select **No** to quit.

Save as user defaults

You can save your settings as user default settings with the following instructions.

1. Select **Save as User Defaults** with the arrow keys and press **Enter** key.
2. Select **Yes** and press **Enter** key to save the settings as user defaults. Or Select **No** to quit.

Restore user defaults

You can restore the user default settings with the following instructions.

1. Select **Restore User Defaults** with the arrow keys and press **Enter** key.
2. Select **Yes** and press **Enter** key to load optimized defaults. Or Select **No** to quit.

Boot override

All the available boot options are listed below the **Boot Override**. You can select any of the options to boot from a particular device.

Appendix Motherboard

A

A.1 Jumpers

WARNING

Electrostatic sensitive devices (ESD)

The motherboard contains electronic components which can be destroyed by electrostatic charges. This can result in malfunctions and damage to the machine or plant.

Always completely disconnect the power cord from your motherboard when you are working on it. Do not make connections while the power is on, because a sudden rush of power can damage the sensitive electronic components.

Always ground yourself to remove any static charge before touching the board. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis.

⚠WARNING

Improper operations on the motherboard may result in substantial damage to the motherboard or endanger the operator.

- Do not remove or ruin the motherboard serial number labels.
  These labels and the serial numbers are required for warranty validation.
- Wear electrostatic discharge (ESD) wrist strap or gloves when handling or touching the motherboard.
- When handling the motherboard, avoid to touch any metal leads or connectors.
- Always unplug the AC power cord from the power outlet before you installing or removing the motherboard.
- Place the motherboard on an anti-static pad or in a electrostatic shielding container during the operation.
- Turn off the power supply before you removing the power supply cable from the motherboard.
- Before turning on the power supply, check if the input voltage setting follows the local voltage standard.
- Before operating the motherboard, make sure that the cables and the power connectors of all the attached hardware components are connected.

  Turning on the power before you connected them, the motherboard and the system components may get damaged and injure operator.
- Make sure you securely attached the hardware components to the motherboard connectors/ slots/ sockets.
- The screws are not allowed to connect with motherboard circuit or components. The motherboard can be get damaged by this action.
- Do not leave the screws or the metal components on the motherboard or inside of the chassis.

Setting Jumpers

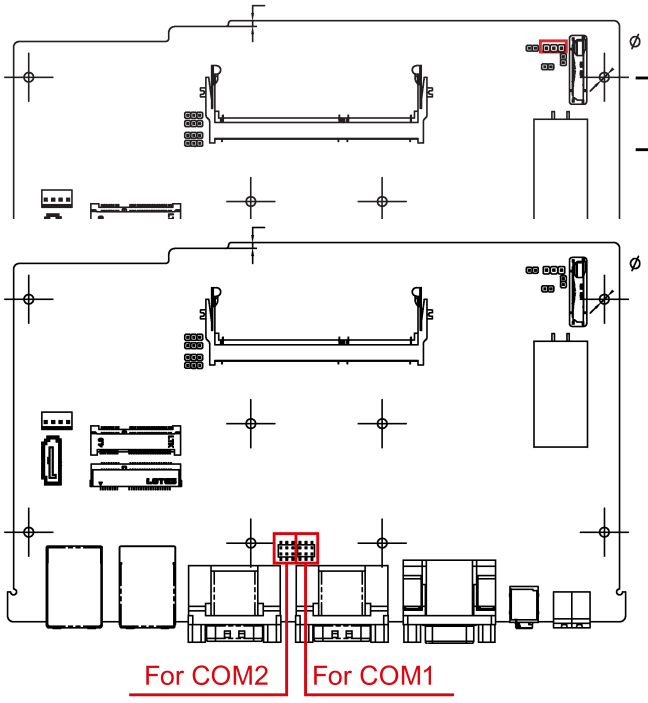
The board has a number of jumpers that allow you to configure. A jumper is a kind of electric switch. By setting jumpers, you can configure your card to match the needs of your application.

A jumper consists of two metal pins and a small metal clip (often protected by a plastic cover).

To connect the pins, lid the pin with the clip. To disconnect a jumper, remove the clip. Some jumpers have three pins, labeled 1, 2 and 3. In this case you can connect either pins 1 and 2 or 2 and 3.

A pair of needle nose pliers may be helpful when working with jumpers. If you have any questions about the best hardware configuration for you application, contact your local distributor or sales representative before you make any change.

Clear COMS

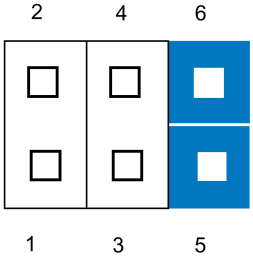


CLRTC1

Jumper position	Function
1-2	protected (default)

Jumper for COM port voltage setting

Jumper position	Function
1-2	+12V
3-4	+5V
5-6	RI (Default)



Technical support

B

B.1 Service and support

You can find additional information and support for the products described on the Internet at the following addresses:

- Technical support

  (https://support.industry.siemens.com/cs/start?lc=en-WW)
- Support request form
  (https://support.industry.siemens.com/My/ww/en/requests#createRequest)
- After Sales Information System SIMATIC IPC/PG

  (http://www.siemens.com/asis)
- SIMATIC Documentation Collection

  (http://www.siemens.com/simatic-tech-doku-portal)
- Your local representative

  (http://w3.siemens.com/aspa_app/)
- Training center

  (http://sitrain.automation.siemens.com/sitrainworld/?AppLang=en)
- Industry Mall

  (https://mall.industry.siemens.com)

When contacting your local representative or Technical Support, please have the following information at hand:

- MLFB of the device
- BIOS version for industrial PC or image version of the device
- Other installed hardware
- Other installed software

Tools & downloads

Please check regularly if updates and hotfixes are available for download to your device. The download area is available on the Internet at the following link:

After Sales Information System SIMATIC IPC/PG (http://www.siemens.com/asis)

B.2 Troubleshooting

This chapter provides you with tips on how to locate and/or troubleshoot problems which occur.

Problem	Possible cause	Possible remedy
The device is not operational	No power supply	• Check the power supply, the power cord and the power plug. • Check if the On/Off switch is in the correct position.
	Device is being operated outside the specified ambient conditions	• Check the ambient conditions. • After transport in cold weather, wait approximately 12 hours before switching on the device.
The monitor remains dark	The monitor is switched off	Switch on the monitor.
	The monitor is in "power save" mode	Press any key on the keyboard.
	The brightness button has been set to dark	Increase brightness using the brightness button. For detailed information, refer to the monitor operating instructions.
	The power cord or the monitor cable is not connected.	• Check whether the power cord has been properly connected to the monitor and to the system unit or to the grounded shockproof outlet. • Check whether the monitor cable has been properly connected to the system unit and to the monitor.
		If the monitor screen still remains dark after you have performed these checks and measures, contact your technical support team.
The mouse pointer does not appear on the screen	The mouse driver is not loaded	Check whether the mouse driver is properly installed and available when you start the user program. Detailed information about the mouse driver is available in the corresponding documentation.
	Mouse not connected	• Check whether the mouse cord is properly connected to the system unit. • If you use an adapter or extension for the mouse cable, also check these connectors.
		If the mouse pointer still does not appear on the screen after you have performed these checks and actions, contact your technical support team.
Wrong time and/or date on the PC		1. Open the BIOS Setup. 2. Set the time or date.
Although the BIOS setting is OK, the time and data are still wrong	The backup battery is dead.	Replace the backup battery.

Problem	Possible cause	Possible remedy
USB device not responding	The USB ports are not correctly supported.	• Turn on USB Legacy Support for mouse and keyboard. • For other devices, you need the USB device drivers for the required operating system.
DVD/CD drive door, if present, does not open	The device is switched off or the open/close button is disabled by a software application.	Emergency removal of the data medium: 1. Switch off the device. 2. Insert a pointed object, for example, an opened paper clip, into the emergency extraction opening of the drive. Apply pressure carefully until the door opens. 3. Pull the door out further with your hand.
"chkdsk" is not functioning	EWF (Enhanced Write Filter) has been activated. The "chkdsk" command is not supported if the EWF has been activated.	Deactivate the EWF or use an alternative method to "chkdsk".

B.3 Notes on the use of third-party modules

Problem	Possible cause	Possible remedy
The device crashes during startup	• Redundant I/O addresses • Redundant hardware interrupts and/or DMA channels • Fluctuation of signal frequencies or levels • Different pin assignment	Check your computer configuration: • If the computer configuration corresponds to the delivery state, contact your technical support team. • If the configuration has changed, restore the factory state. To do this, remove the third-party modules and restart the device. If the error no longer occurs, the third-party module being used was the cause of the fault. Replace the thrid-party module with a Siemens module or contact the module supplier.
		If the device still crashes, contact your technical support team.
	• Insufficient output of an external power supply, e.g. UPS	• Use a higher capacity power supply
The device does not start up or switches off immediately	• A counter voltage is fed into the device by connected or installed third-party components	Clarify the following with the supplier of the component: • The component can be operated without an external power supply. • The component can be reconfigured so that it only uses the external power supply or that of the device.

Markings and symbols

C

C.1 Overview

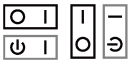
The following tables show all the symbols which may be found on your SIMATIC industrial PC, SIMATIC industrial monitor or SIMATIC Field PG in addition to the symbols which are explained in the operating instructions.

The symbols on your device may vary in some details from the symbols shown in the following tables.

C.2 Safety

Symbol	Meaning		Symbol	Meaning
	Warning, observe the supplied documentation.			Lock is closed
	Attention, radio equipment			Lock is open
	Disconnect the power plug before opening			Opening for Kensington lock
	Attention ESD (Electrostatic sensitive device)			Warning of hot surface

C.3 Operator controls

Symbol	Meaning		Symbol	Meaning
	On/off switch, without electrical isolation			Eject CD/DVD
	On/off switch, without electrical isolation			

C.4 Certificates, approvals and markings

The following table shows symbols relating to certificates, approvals and markings which may be on the device. You can find more information in the operating instructions for your device:

Symbol	Meaning		Symbol	Meaning
	Approved for Australia and New Zealand			Marking for the Eurasian Customs Union
	Approved for China			Test mark of Factory Mutual Research
	CE markings for European countries			Marking of Federal Communications Commission for the USA
	EFUP (Environment Friendly Use Period) marking for China			Approved for Korea
	Test mark of the Underwriters Laboratories			Disposal information, observe the local regulations.

C.5 Interfaces

Symbol	Meaning		Symbol	Meaning
⎓	Connection to the power supply			PS/2 mouse interface
	Protective conductor terminal			PS/2 keyboard-interface
	Connection for functional earthing (equipotential bonding line)			Multimedia Card Reader
DPP	DisplayPort interface			Smart Card Reader
	DVI-D interface			Line In
LAN	LAN interface, not approved for connecting WAN or telephone			Line Out
	Serial port			Microphone input
	USB port			Universal Audio Jack
	USB 2.0 high-speed port			Headphone output
SS	USB 3.0 super-speed port			

List of abbreviations

D

AC	Alternating current	Alternating current
ACPI	Advanced Configuration and Power Interface	
AHCI	Advanced Host Controller Interface	Standardized controller interface for SATA devices. This is supported in Microsoft Windows XP as of SP1 and IAA driver.
APIC	Advanced Programmable Interrupt Controller	
AT	Advanced Technology	
ATA	Advanced Technology Attachment	
AWG	American Wire Gauge	A standardized wire gauge system. Used in North America and Canada.
BIOS	Basic Input Output System	
CAN	Controller Area Network	
CD-ROM	Compact Disc – Read Only Memory	
CE	Communauté Européenne	
CF	CompactFlash	
CMOS	Complementary Metal Oxide Semiconductors	
COA	Certificate of authentication	
COM	Communications Port	Term for the serial interface
CPU	Central Processing Unit	CPU
CSA	Canadian Standards Association	Canadian organization for tests and certifications according to national or binational standards
CTS	Clear To Send	Clear to send
DC	Direct Current	DC current
DCD	Data Carrier Detect	Data carrier signal detection
DMA	Direct Memory Access	
DOS	Disk Operating System	
DP	DisplayPort	
DQS	Deutsche Gesellschaft zur Zertifizierung von Qualitätsmanagement mBH	
DSR	Data Set Ready	Ready for operation
DTR	Data Terminal Ready	Data terminal is ready

DVD	Digital Versatile Disk	
ESD	Components sensitive to electrostatic charge	
EN	European standard	
EEPROM	Electrically Erasable Programmable Read-Only Memory	
ESD	Electrostatic Sensitive Device	Electrostatic Sensitive Devices
	Electrostatic discharge	Electrostatic discharge
EWF	Enhanced Write Filter	
FBWF	File Based Write Filter	
GND	Ground	Chassis ground
HD	Hard disk	Hard disk
HDD	Hard Disk Drive	HDD
HMI	Human Machine Interface	User interface
HORM	Hibernate Once - Resume Many	
HT	Hyper Threading	
I/O	Input/Output	Data input/output for computers
IDE	Integrated Device Electronics	
IEC	International Electronical Commission	
IGD	Integrated Graphics Device	
IP	International Protection	Degree of protection
	in English-speaking countries: Ingress Protection	
IRQ	Interrupt Request	
ISA	Industry Standard Architecture	Bus for expansion modules
LAN	Local Area Network	Computer network that is limited to a local area.
LEDs	Light Emitting Diode	Light emitting diode
LPS	Limited Power Source	
MAC	Media access control	Media access control
MLFB	Machine-readable product designation	
MRAM	Magnetoresistive random-access memory	Backup memory
MS	Microsoft	
MTBF	Mean Time Between Failures	
MUI	Multilanguage User Interface	Language localization in Windows
NEMA	National Electrical Manufacturers Association	
NTFS	New Technology File System	
NVRAM	Non Volatile Random Access Memory	Non-volatile data memory. Data memory is retained without external power supply.
ODD	Optical Disk Drive	

PC	Personal computer	
PCI	Peripheral Component Interconnect	High-speed expansion bus
PCIe	Peripheral Component Interconnect express	High-speed serial, differential full-duplex PtP interface with high data rate.
PG	Programming device	
POST	Power On Self Test	
PXE	Preboot Execution Environment	Software for running new PCs without hard disk data via the network
RAID	Redundant Array of Independent Disks	Redundant hard disk array
RAL	Restricted Access Location	
RAM	Random Access Memory	
RI	Ring Input	Incoming call
ROM	Read-Only Memory	
RS 485	Reconciliation Sublayer 485	Bidirectional bus system
RTC	Real Time Clock	Real-time clock
RTS	Request to send	Request to send
RxD	Receive Data	Data transfer signal
SATA	Serial Advanced Technology Attachment	
SCU	Setup Configuration Utility	
SELV	Safety Extra Low Voltage	Safety extra low voltage
SMART	Self Monitoring Analysis and Reporting Technology	Hard disk error diagnostics program
SRAM	Static Random Access Memory	Static RAM
SSD	Solid State Drive	
TFT	Thin-Film-Transistor	
TxD	Transmit Data	Data transfer signal
UEFI	Unified Extensible Firmware Interface	
UL	Underwriters Laboratories Inc.	US organization for testing and certification according to national or binational standards.
USB	Universal Serial Bus	
VDE	Verband der Elektrotechnik, Elektronik und Informationstechnik e.V (Association for Electrical, Electronic and Information Technologies)	
VT	Virtualization Technology	Intel technology which provides a virtual, closed environment.

VT-d	Virtualization Technology for Directed I/O	Enables the direct assignment of a device (e.g. network adapter) to a virtual device.
WD	Watchdog	Program monitoring with error detection and alarming.

Glossary

AHCI mode

AHCI is a standardized method to address the SATA controller. AHCI describes a structure in the RAM, which contains a general area for control and status, as well as a command list.

APIC mode

Advanced peripheral interrupt controller. 24 interrupt lines are available.

Automation system

A programmable controller (PLC) of the SIMATIC S7 system consist of a central controller, one or several CPUs, and various I/O modules.

Backup

Duplicate of a program, data medium or database, used either for archiving purposes or for the protection of vital and non-replaceable data against loss when the working copy is corrupted. Certain applications automatically generate backup copies of data files, and manage both the current and the previous versions on the hard disk.

Baud

Physical unit for the step speed in signal transmission. Defines the number of transferred signal states per second. With only two states, one baud is equivalent to a transmission rate of 1 bps.

Cache

High-speed access buffer for interim storage (buffering) of requested data.

CE marking

Communauté **E**uropéene: The CE symbol confirms the conformity of the product with all applicable EC directives such as the EMC Directive.

CFast

The faster SATA protocol is used with the CFast standard for memory cards based on CompactFlash. The connectors on these cards are not compatible with a classic CompactFlash card.

Chipset

Located on the motherboard, connects the processor with the PCI or PCIe bus and the external interfaces.

Cold restart

A start sequence, starting when the computer is switched on. The system usually performs some basic hardware checks within the cold start sequence, and then loads the operating system from the hard disk to work memory -> boot

COM interface

The COM interface is a serial V.24 interface. The interface is suitable for asynchronous data transfer.

CompactFlash card

CompactFlash is a digital storage medium in card format and without moving parts. The CF card contains the non-volatile memory and the controller. The interface of the CF card corresponds with the IDE interface. CF cards can be operated without additional electronics on PCMCIA or IDE hard disk controllers using a plug and socket adapter. There are two design forms: CF-I (42.6 x 36.4 x 3.3 mm) and CF-II (42.8 x 36.4 x 5 mm).

Configuration files

These are files containing data which define the configuration after restart. Examples of such files are CONFIG.SYS, AUTOEXEC.BAT and the registry files .

Configuration software

The configuration software updates the device configuration when new modules are installed . This is done either by copying the configuration files supplied with the module or by manual configuration using the configuration utility.

Controller

Integrated hardware and software controllers that control the functions of certain internal or peripheral devices (for example, the keyboard controller).

Device configuration

The configuration of a PC or programming device contains information on hardware and device options, such as memory configuration, drive types, monitor, network address, etc. The data are stored in a configuration file and enable the operating system to load the correct device drivers and configure the correct device parameters. . If changes are made to the hardware configuration, the user can change entries in the configuration file using the SETUP program. .

Drivers

Program parts of the operating system. They adapt user program data to the specific formats required by I/O devices such as hard disk, printers, and monitors.

EMC directive

Directive concerning **E**lectro**m**agnetic **C**ompatibility. Compliance is confirmed by the CE symbol and the EC certificate of conformity.

Energy management

The energy management functions of a modern PC allow individual control over the current consumption of vital computer components (e.g. of the monitor, hard disk and CPU), by restricting their activity based on the current system or component load. Energy management is of particular importance for mobile PCs.

Energy options

The energy options can be used to reduce energy consumption of the computer, while keeping it ready for immediate use. This can be configured in Windows by selecting Settings > Control Panel > Energy options.

Enhanced Write Filter

Configurable write filter that allows you to, for example, boot Windows Embedded Standard from write-protected media (e.g., CD-ROM), set write protection for individual partitions, and adapt the file system performance to user requirements (when using memory cards, for example).

ESD Guideline

Guideline for using electrostatic sensitive components.

Ethernet

Local network (bus structure) for text and data communication with a transfer rate of 10/100/1000 Mbps.

Execute Disable Capability

Hardware implementation that prevents mutual memory accesses by programs and applications. It is only effective when all relevant system components, such as processors, operating systems and applications are supported.

Extensible Firmware Interface

Refers to the central interface between the firmware, the individual components of a computer and the operating system. EFI is located logically below the operating system and represents the successor to PC BIOS, focusing on 64-bit systems.

File Based Write Filter

Configurable write filter to protect individual files from write access.

Formatting

Basic partitioning of memory space on a magnetic data medium into tracks and segments. Formatting deletes all data on a data medium. All data media must be formatted prior to their first use.

HORM

Hibernate once, resume many is a method for fast booting from a single Hibernate file that only needs to be created once. HORM ensures restoration of a uniform, saved system state when booting. This minimizes write access, for example to a memory card, when you start up and shut down Windows Embedded Standard 7.

Hub

A term in network technology. In a network, a device joining communication lines at a central location, providing a common connection to all devices on the network.

Hyper Threading

HT technology (multi-threading) enables the parallel computing of processes. HT is only effective when all relevant system components, such as processors, operating systems and applications are supported.

IGD

Integrated Graphics Device. Graphics interface integrated in the chipset.

Image

This refers to the image, for example, of hard disk partitions saved to a file in order to restore them when necessary.

Intel Active Management Technology

This technology permits diagnostics, management and remote control of PCs. It is only effective when all relevant system components, such as processors, operating systems and applications are supported.

Intel VT

The Intel Virtualization Technology (IVT) is the implementation of a secure closed environment for applications. Special (visualization) software an a VT-capable processor is required for its use.

Interface

- Physical interconnection (cable) of hardware elements such as PLCs, PCs, programming devices, printers or monitors.
- Interface for interactive software applications.

LAN

Local **A**rea **N**etwork: LAN is a local network that consists of a group of computers and other devices that are distributed across a relatively restricted range and are linked with communication cables. The devices connected to a LAN are called nodes. The purpose of networks is the mutual use of files, printers or other resources.

Legacy Boot Device

Conventional drives can be used as USB devices.

License key

The license key represents the electronic license stamp of a license. Siemens AG issues a license key for each software that is protected by a license.

License key USB flash drive

The license key USB flash drive contains the authorizations or license keys required to enable protected SIMATIC software.

Low-voltage directive

EC Product Safety Directive relating to the safety of products which are operated on low voltage (50 V AC to 1000 V AC, 70 V DC to 1500 V DC) and not specified in other directives. Compliance is confirmed by the CE symbol and the EC certificate of conformity.

Module

Modules are plug-in units for PLCs, programming devices or PCs. They are available as local modules, expansion modules, interfaces or mass storage (Mass storage module).

Motherboard

The motherboard is the core of the computer. Here, data are processed and stored, and interfaces and device I/Os are controlled and managed.

Operating system

Generic term which describes all functions for controlling and monitoring user program execution, distribution of system resources to the user programs and the operating mode in cooperation with the hardware (for example, Windows 7 Ultimate).

Pixel

The pixel represents the smallest element that can be reproduced on-screen or on a printer.

Plug&Play

Generally, a reference to the ability of a computer to automatically configure the system for communication with peripheral devices (for example monitors, modems or printers). The user can plug in a peripheral and "play" it at once without manually configuring the system. A Plug&Play PC requires both a BIOS that supports Plug&Play and a Plug&Play expansion card.

POST

Self-test performed by the BIOS after the computer is switched on. Performs a RAM test and a graphics controller test, for example. The system outputs audible signals (beep codes) if the BIOS detects any errors; the relevant message indicating cause of error is output on the screen.

Programmable controller

The programmable controllers of the SIMATIC S7 system consist of a central controller, one or more CPUs, and various other modules (e.g. I/O modules).

PXE server

A **P**reboot E**x**ecution **E**nvironment server is part of a network environment and can provide software to connected computers even before they boot. This can involve operating system installations or servicing tools, for example.

RAL

Restricted **A**ccess **L**ocation: Installation of the device in a production facility with restricted access, for example, a locked control cabinet.

Recovery DVD

Contains the tools for configuring hard disks and the Windows operating system.

Reset

Hardware reset: Reset/restart of the PC using a button/switch.

Restart

Warm restart of a computer without switching the power off (Ctrl + Alt + Del)

Restore DVD

The Restore DVD is used to restore the system partition or the entire hard disk to delivery state if the system has crashed. The DVD contains all the necessary image files and is bootable.

ROM

Read-Only Memory ROM is a read-only memory in which every memory location can be addressed individually. The programs or data are permanently stored and are not lost in the event of a power failure.

S.M.A.R.T

Self-Monitoring, Analysis and Reporting Technology (SMART or S.M.A.R.T.) is an industry standard integrated in storage media. It makes for permanent monitoring of important parameters and early detection of imminent problems.

SATA

Serial ATA Interface for hard disk drives and optical drives with serial data transmission rates of up to 300 Mbps.

SETUP (BIOS Setup)

A program in which information about the device configuration (that is the configuration of the hardware on the PC/PG) is defined. The device configuration of the PC/PG is preset with defaults. Changes must therefore be entered in the SETUP if a memory expansion, new modules or a new drive are added to the hardware configuration.

SSD (Solid State Drive)

A Solid State Drive is a drive that can be installed like any other drive; it does not contain a rotating disk or other moving parts because only semiconductor memory chips of similar capacity will be used. This design makes SSDs more rugged, provides shorter access times, low energy consumption and rapid data transfer.

STEP 7

Programming software for the creation of user programs for SIMATIC S7 controllers.

Troubleshooting

Error cause, cause analysis, remedy

Trusted Execution Technology

Hardware implementation that allows secured execution of programs and applications. It is only effective when all relevant system components, such as processors, operating systems and applications are supported.

Wake on LAN

Wake on Local area network. This function allows the PC to be started via the LAN interface.

Warm restart

The restart of a computer after a program was aborted. The operating system is loaded and restarted again. The CTRL+ ALT+ DEL hotkey can be used to initiate a warm restart.

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