

Instruction manual

Industrial PC



Industrial PC

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1 Identification

Target group

This document is not intended for end customers! Necessary safety instructions for the end customer must be passed on by the machine builder or system provider and adopted in the respective national language.

Intended use

This product has not been designed, developed and manufactured for use that creates fatal risks and hazards without exceptionally assured safety measures. These include death, injury, or serious physical harm or otherwise caused loss. These represent nuclear response monitoring, nuclear control systems, air traffic control, mass transportation control, medical life support systems, and weapons systems control.

Technical changes

Christ-Electronic Systems GmbH reserves the right to change the information, designs and technical data contained in this documentation without prior notice.

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Trademarks

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History

The following editions of the manual have already been published:

Version	Comment
09/2021	First edition

Table 1: History


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Design of safety instructions

⚠ DANGER	
	<p>Indicates an imminent danger Failure to follow the instructions may result in death or serious injury</p>

⚠ WARNING	
	<p>Indicates a dangerous situation Failure to observe this warning may result in serious injury or major damage to property</p>

⚠ CAUTION	
	<p>Indicates a possible dangerous situation Failure to observe the advice can result in injuries or property damage</p>

NOTICE	
	<p>Indicates user tips and useful information Important information to avoid malfunctions</p>

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2 Product description

Industrial PCs, as the heart of the machines in control cabinets, ensure smooth operation. The requirements placed on them are very different. For this reason, we offer our customers numerous product variants.

For a particularly long lifetime, there are no moving parts in the Industrial PCs. The Box PCs with passive cooling are therefore also particularly suitable for harsh industrial environments.

Another advantage is the industrial-grade components that are available over a long period of time. The optional integrated UPS prevents data loss during power fluctuations. If the power fails, the devices are shut down properly.

The Industrial PCs can be loaded with either Windows or Linux before delivery and are then immediately ready for use.

Thanks to the compact housing design, Christ Industrial Computers can also be optimally used in confined spaces. Despite their small size, they deliver high performance when required.

Whether for IIoT applications or computing-intensive automation applications, the portfolio of industrial PCs meets a wide range of requirements. The processor performance classes Intel® Celeron® or Intel® Core™ i3, i5, or i7 are suitable for a wide range of applications.

Memory expansion is also possible without any problems.

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2.1 System Overview

Argon

CPU	Intel® Celeron™ N3350 1.1 GHz
Graphic	Intel® HD Graphics 500 200 Hz
Memory	1 x DDR3 Slot, max. 8 GB
BIOS	AMI Optio 5 BIOS
Interfaces	2 x USB 3.0 Port (Type A) 2 x 1 GBit Ethernet (RJ45) 1 x RS-232 / RS-422 / RS-485 (Bios setting) (RJ50) 1 x Display Port 1.0

Table 2: System overview Argon

Titanium

CPU	Intel® Celeron™ 3965U 2.2 GHz	Intel® Core™ i3-7100U 2.4 GHz	Intel® Core™ i5-7300U 2.6 GHz	Intel® Core™ i7-7600U 2.8 GHz
Graphic	Intel® HD Graphics 610	Intel® HD Graphics 620		
Memory	2 x DDR4 slot, in summary max. 32 GB			
BIOS	AMI Optio 5 BIOS			
Interfaces	4 x USB: 2 x USB 2.0 Port (Type A); 2 x USB 3.0 Port (Type A) 2 x 1 GBit Ethernet (RJ45) 1 x RS-232 / RS-422 / RS-485 (Bios setting) (Sub-D) 1 x Display Port 1.1			

Table 3: System overview Titanium

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2.2 Housing Variant Industrial PC

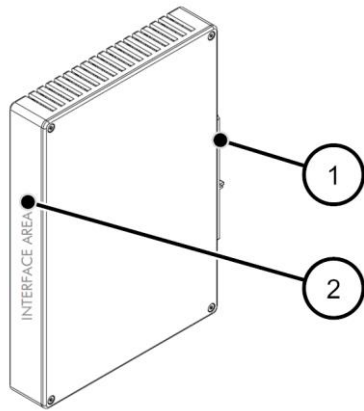


Illustration 1: Industrial PC

1	DIN Rail, 35 mm x 7.5 mm, DIN Rail 35 mm x 15 mm
2	Interface Area

Table 4: Industrial PC Front

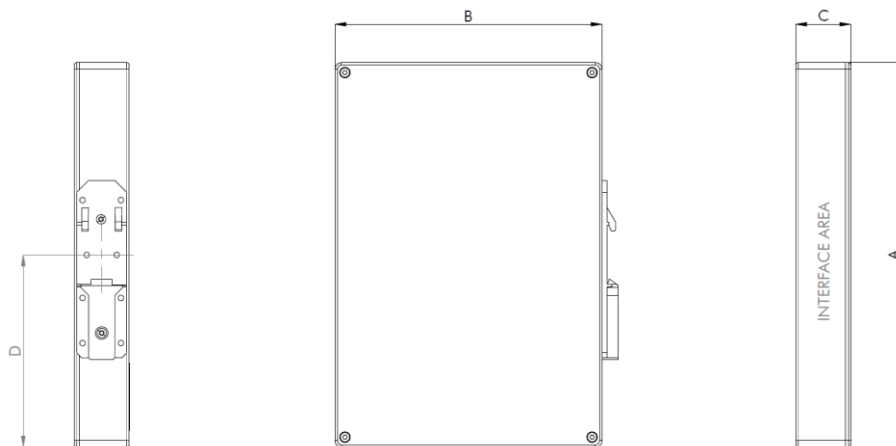


Illustration 2: Dimensions Industrial PC

Architecture	A	B	C	D
Argon	180	130	33	90
Titanium	230	160	33	115

Table 5: Dimensions Industrial PC

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2.3 Add-On

UPS (Uninterruptible Power Supply)

Energy Storage	400 Ws
Charge Duration	90 % in 45 seconds 100 % in 80 seconds
Configuration	Shutdown Time Dimming Time Dimming Intensity

The instruction for the UPS can be found in the FAQ section of the Christ website: [FAQ - Questions and Answers](#)


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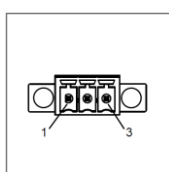
3 Description Hardware

3.1 External Interfaces

Power Supply

⚠ CAUTION	
	<p>External cable for Power Supply, Signal or Periphery Malfunction occur</p> <p>➤ Prepare a proper earth connection on the power pack</p>

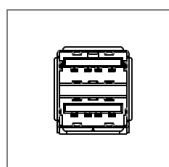
Supply Connector screwable



Mating Connector	Phoenix Connector MC 1,5 / 3-STF-3.5 (screwable)		
PIN	Function	Description	
1	GND	Ground	
2	FE	Functional Earth	
3	+24 VDC	Supply	

Table 6: Pinout Supply Connector screwable

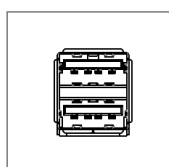
USB Host 2.0 (Type A)



PIN	Function	Description
1	VBUS	USB VCC
2	D-	USB Data-
3	D+	USB Data+
4	GND	USB Ground

Table 7: Pinout USB 2.0

USB Host 3.0 (Type A)



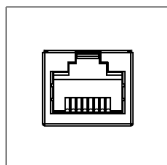
PIN	Function	Description
1	VBUS	USB VCC
2	D-	USB Data-
3	D+	USB Data+
4	GND	USB Ground
5	StdA_SSRX-	SuperSpeed transmitter differential pair
6	StdA_SSRX+	SuperSpeed transmitter differential pair
7	GND_DRAIN	Ground for signal return
8	StdA_SSTX-	SuperSpeed receiver differential pair
9	StdA_SSTX+	SuperSpeed receiver differential pair

Table 8: Pinout USB 3.0

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Ethernet



PIN	Function	Description
1	D1 +	Transmit Data +
2	D1 -	Transmit Data -
3	D2 +	Receive Data +
4	D3 +	Bidirectional +
5	D3 -	Bidirectional -
6	D2 -	Receive Data -
7	D4 +	Bidirectional +
8	D4 -	Bidirectional -

Table 9: Pinout Ethernet

WLAN



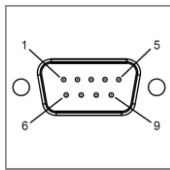
Mating Connector	SMA / RP-SMA
Description	
Transmission Standard	802.11 ac/a/b/g/n (2.4 GHz, 5 GHz)

Table 10: Pinout WLAN

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COM Connector (Titanium)



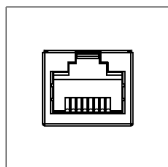
PIN	RS-232		RS-422		RS-485	
	Function	Description	Function	Description	Function	Description
1	DCD	Data Carrier Detect	TX-	Transmitter Differential Pair -	DATA-	Data Differential Pair A
2	RX	Receive Data	TX+	Transmitter Differential Pair +	DATA+	Data Differential Pair B
3	TX	Transmit Data	RX+	Receiver Differential Pair +	n.c.	not connected
4	DTR	Data Transmit Ready	RX-	Receiver Differential Pair -	n.c.	not connected
5	GND	Ground	GND	Ground	GND	Ground
6	DSR	Data Set Ready	n.c.	not connected	n.c.	not connected
7	RTS	Ready To Send	n.c.	not connected	n.c.	not connected
8	CTS	Clear To Send	n.c.	not connected	n.c.	not connected
9	RI	Ring Indicator	n.c.	not connected	n.c.	not connected

Table 11: Pinout COM Connector Titanium

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COM Connector (Celeron N3350 Argon)



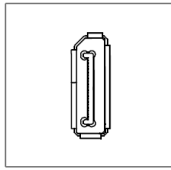
PIN	RS-232		RS-422		RS-485	
	Function	Description	Function	Description	Function	Description
1	DSR	Data Set Ready	n.c.	not connected	n.c.	not connected
2	GND	Ground	GND	Ground	GND	Ground
3	GND	Ground	GND	Ground	GND	Ground
4	TXD	Transmit Data	RX+	Receiver Differential Pair +	n.c.	not connected
5	RXD	Receive Data	TX+	Transmitter Differential Pair +	DATA+	Data Differential Pair B
6	DCD	Data Carrier Detect	TX-	Transmitter Differential Pair -	DATA-	Data Differential Pair A
7	DTR	Data Terminal Ready	RX-	Receiver Differential Pair -	n.c.	not connected
8	CTS	Clear To Send	n.c.	not connected	n.c.	not connected
9	RTS	Request To Send	n.c.	not connected	n.c.	not connected
10	RI	Ring Indicator	n.c.	not connected	n.c.	not connected

Table 12: Pinout COM Connector Celeron N3350 Argon

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Display Port



PIN	Function	Description
1	DP data 0+	DP data 0+
2	GND	Ground
3	DP data0-	DP data0-
4	DP data1 +	DP data1 +
5	GND	Ground
6	DP data1-	DP data1-
7	DP data2+	DP data2+
8	GND	Ground
9	DP data2-	DP data2-
10	DP data3+	DP data3+
11	GND	Ground
12	DP data3-	DP data3-
13	CONFIG1 CAD	Cable adapter recognized
14	CONFIG2	Ground (Pull-Down)
15	AUX_CH+	Additional device +
16	GND	Ground
17	AUX_CH-	Additional device -
18	HPD	Hot Plug recognized
19	GND	Ground
20	DP_PWR 3,3V	Power Supply DP

Table 13: Pinout Display Port



With the DP1.0 it is not possible to display an image on DVI / HDMI devices. An active adapter with properties of DP++ is required for this.¹



Display Port 1.1 is also known as "Dual-Mode Display Port" and "Display Port++". This allows compatibility with DVI and HDMI.

¹ The Argon board uses DP1.0

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4 Environmental Conditions

⚠ WARNING	
	<p>Insufficient air supply to the device</p> <p>Overheating</p> <ul style="list-style-type: none"> ➤ Never cover the device completely or operate it in a small, unventilated housing

4.1 Temperature test

The values for operating temperature and humidity were determined under worst-case conditions. The maximum workload of the system was achieved by the BurnInTest from PassMark Software Pty Ltd.

The test ran under 100 % utilisation of:

- CPU
- RAM
- 2D and 3D Graphic (x86 only)
- Brightness of the display

4.2 IP Protection Class

The protection class only can be guaranteed under the following conditions:



- The device is installed correctly
- All components and covers of the interfaces are assembled
- Compliance with all environmental conditions

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5 Assembly and Commissioning

This chapter describes all the steps for assembly. The following warnings are safety instructions that must be applied throughout the assembly chapter and in every other life cycle of the device.

⚠ DANGER	
	<p>Danger from electric shock, explosion or electric arc Serious injury or death</p> <ul style="list-style-type: none"> ➤ Pull out the mains plug and do not open the covers
⚠ WARNING	
	<p>Dropping a device Injuries and bruises to the legs and / or feet</p> <ul style="list-style-type: none"> ➤ Wear safety shoes

Note for the installation site

This device is not designed for outdoor use.

Make sure that the ambient temperature and humidity are within the ranges which are specified under [Environmental Conditions](#).

Do not install the device directly in the sunlight.

Make sure that the device is installed so that is accessible for the operator.

Installation instructions

Check the package contents for any visible damage and for completeness.

In case of damage, do not install the device and contact the [Christ Service](#).

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5.1 Connection of the power supply

Use conductors with a cross-section of 0.75 mm² to 1.5 mm². Use the MC 1,5/ 3-STF-3,5 BKBDWH:GND Q PCB connector from Phoenix.

Strip the insulation from the individual wires of the conductor (1). Insert these into the connection contacts (3) of the PCB connector and tighten the screw contacts (2) with a screwdriver and a maximum torque of 0.3 Nm.

The rear view (4) of the connector is shown for clarification.

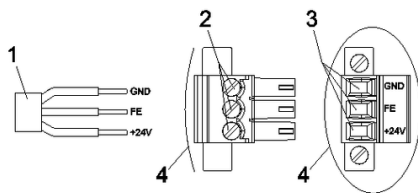



Illustration 3: Connection of the power supply

5.2 Earth Connection

NOTICE	
	<p>Earthing not connected</p> <p>Not guaranteed functionality of the device</p> <ul style="list-style-type: none"> ➤ All earth connections must be connected to an earth point

5.3 Mounting Industrial PC

Step 1:

Hook the Industrial PC onto the fastening rail at an angle from above. Press the Industrial PC down until it hooks into place.

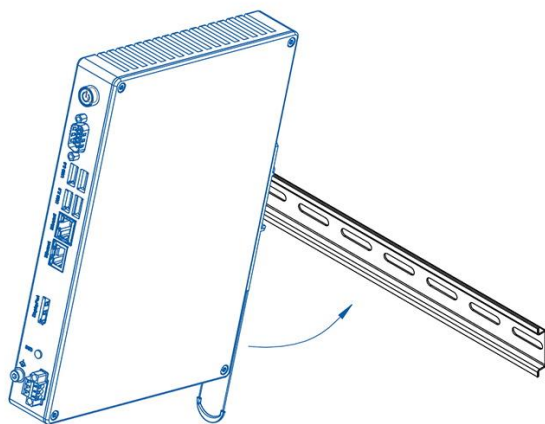


Illustration 4: Mounting Industrial PC Step 1

Step 2:

The industrial PC hangs on the fastening rail.

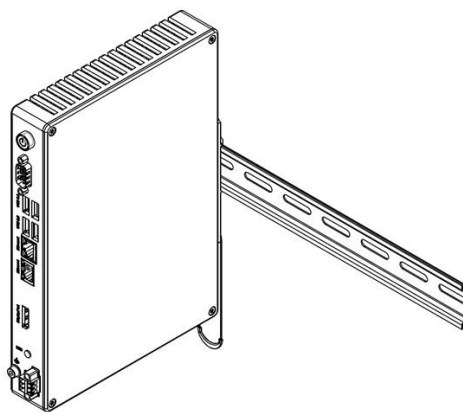


Illustration 5: Mounting Industrial PC Step 2

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5.4 Dismounting Industrial PC

Step 1:

Pull down on the pull cord to release the Industrial PC.

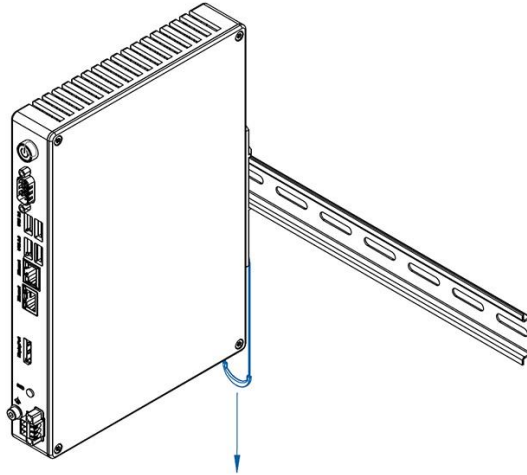


Illustration 6: Dismounting Industrial PC Step 1

Step 2:

Tilt the Industrial PC forward with the pull cord pulled at the bottom and unhook it at the top.

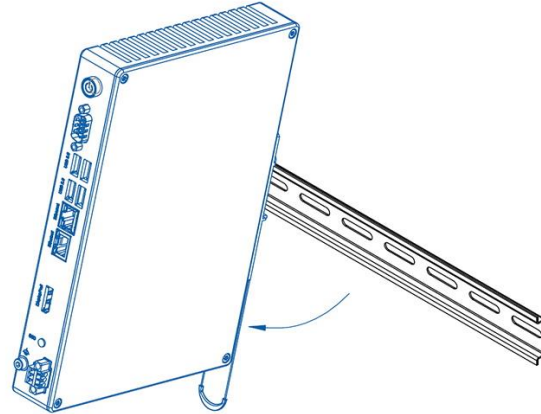


Illustration 7: Dismounting Industrial PC Step 2

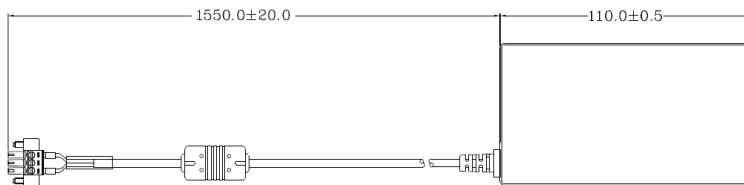
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6 Accessories and Spare Parts

The accessories listed here have been checked by Christ and are compatible with the products.
The following accessories are available:

Power supply



Input Voltage	90 - 264 VAC
Input Current	max. 1 A
Input Frequency	47 - 63 Hz
Consumption with unloaded output	max. 0.075 W
Output Voltage	24 VDC
Output Current	max. 2.5 A
Temperature Range Operation	0 - 70°C
Humidity Operation	20 - 80% RH non condensing

Table 14: Power supply

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7 Software

The x86 architecture has a BIOS (Basic Input Output System) for the basic settings of the system. This is not present in the ARM architectures. Here, updates are performed with **CURT (Christ Update and Recovery Tool)**.

7.1 BIOS Basic Settings

AMI BIOS ROM has built-in settings program that allows users to make basic settings. This information is stored in a battery supported CMOS RAM, so it remains stored even when there is no power supply.

Accessing the BIOS works by pressing the "Del" key several times while the device is booting.

The following tabs in the BIOS enable various settings.

Main	Set date
Advanced	Make advanced BIOS settings like: COM, ACPI, etc.
Chipset	Enter host bridge parameters
Security	Set administrator password
Boot	Set Boot Option
Save & Exit	Save the settings made and initiate a restart. (Also possible with the F4 key on the keyboard)

Table 15: BIOS

Pressing F3 and confirming the query "Load Optimized Defaults?" with "Yes" restores the delivery state.

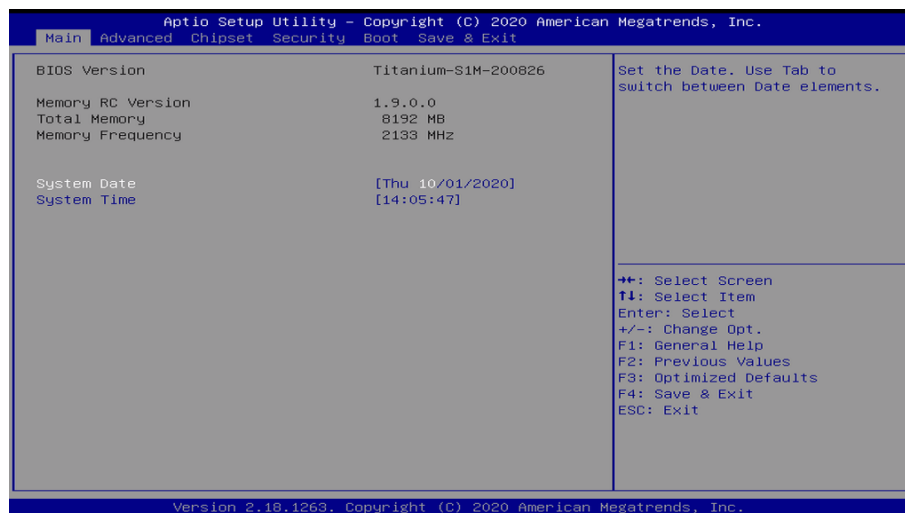


Illustration 8: BIOS

7.1.1 COM Port configuration

COM Port configuration

Argon

In order for RS-232, RS-422 and RS-485 to be recognized on the COM port, the following settings must be made in the BIOS:

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1. Select "Advanced" tab
2. Select "F81804 Super IO Configuration"
3. Select "Serial Port1 Configuration"
4. Make setting in "Device Mode" (RS-422 / RS-485 / RS-232)
5. Save with keystroke "F4" (confirmation with "Yes")

COM Port configuration

Titanium

In order for RS-232, RS-422 and RS-485 to be recognized on the COM port, the following settings must be made in the BIOS:

1. Select "Advanced" tab
2. Select "F81804 Super IO Configuration"
3. Select "Serial Port1 Configuration"
4. Under "F81846 SERIAL PORT1 MODE SELECT" select the mode (RS232, RS422, RS485)
5. If RS422 or RS485 mode has been selected, settings can be made for "RS422/RS485 Termination" or "RTS Auto Flow Control"
6. Save with keystroke "F4" (confirmation with "Yes")

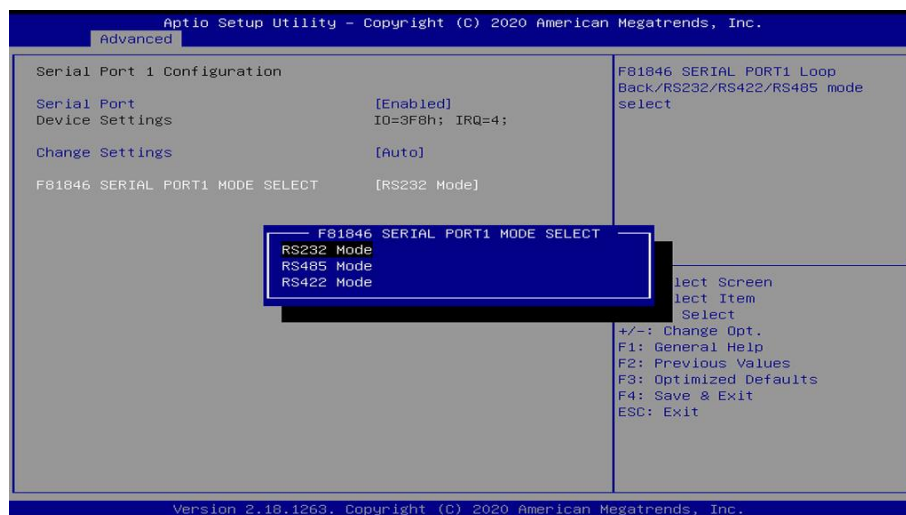


Illustration 9: BIOS COM Port Titanium

7.1.2 Set Boot Priority

Set Boot Priority

Argon / Titanium

If you want to boot from a USB device, the following settings must be made in the BIOS:

1. Select "Boot" tab
2. Select "Boot mode select" "UEFI"
3. Open the "Boot Option #1" by pressing the "Enter" key
4. Select USB device with "Enter"
5. Save with keystroke "F4" (confirmation with "Yes")

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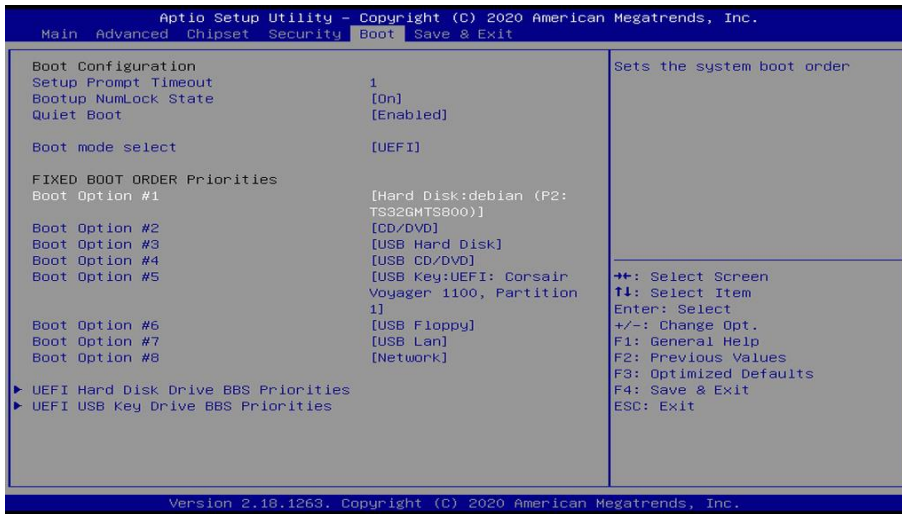


Illustration 10: BIOS Boot Priority

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7.2 BIOS Update

7.2.1 Preparation

Copy the AMI BIOS update files to a USB stick

You can obtain the required files from Christ Electronic Systems. These are the same for Argon and Titanium.

- efi
- flash.nsh
- fparts.txt
- Fpt.efi
- Titanium-200826a-S1M.bin (This .bin is only an example, the file can also be named differently)

7.2.2 Perform Update

Insert the bootable USB stick with the required files into the device.

Set the USB stick to Hard Disk Boot Priority in the BIOS. You can read about the procedure under [Boot Priority](#).

The EFI Update Script is automatically detected on the USB stick and starts the update process.

Further procedure Argon

- Confirm the question: "Enter 'q' to quit, any other key to continue:" with Enter.

```

If you don't want to update, press 'q', else press any key to update!
=====
Enter 'q' to quit, any other key to continue: _
    
```

Illustration 11: Argon BIOS Update

- Confirm the question "Do you want to continue? Y/<N> or q to quit:" with "y"
- The update is executed
- The message "FPT Operation Successful" indicates successful completion

```

FPT Operation Successful.
Done! Please turn off the system
    
```

Illustration 12: Argon BIOS Update successful

- Disconnect the power supply
- Restore the power supply and enter the BIOS again (do not reboot)
- Press the F3 key to confirm the question "Load Optimized Defaults" with "Yes"
- Press the F4 key to save and exit

Further procedure Titanium

Confirm the question: "Enter 'q' to quit, any other key to continue:" with Enter.

```

If you don't want to update, press 'q', else press any key to update!
=====
Enter 'q' to quit, any other key to continue: _
    
```

Illustration 13: Titanium BIOS Update

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- The update is executed
- The message "FPT Operation Successful" indicates successful completion

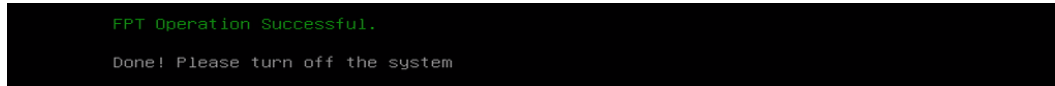


Illustration 14: Titanium BIOS Update successful

- Disconnect the power supply
- Restore the power supply and enter the BIOS again (do not reboot)
- Press the F3 key to confirm the question "Load Optimized Defaults" with "Yes"
- Press the F4 key to save and exit

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7.3 OBS Client

7.3.1 Activating the OCB Client

The OBS client is disabled by default.

To enable the OBS client, perform the following steps:

1. Launch Task Manager
2. Open "Startup" tab
3. Select "Hardware Monitor Utility for IBASE" and activate it by clicking on "Enable"

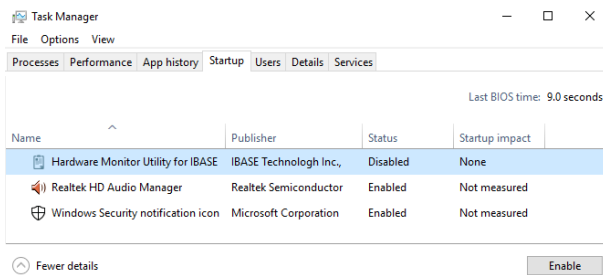


Illustration 15: Task Manager - enable OBS Client

4. Perform a restart of the device

7.3.2 Functions of the OBS Client

To start the OBS client, expand the taskbar and click on the key icon.



Illustration 16: Start OBS Client

These functions are provided by the OBS Client:

System Information

The System Information provides information about the processor and the operating system.

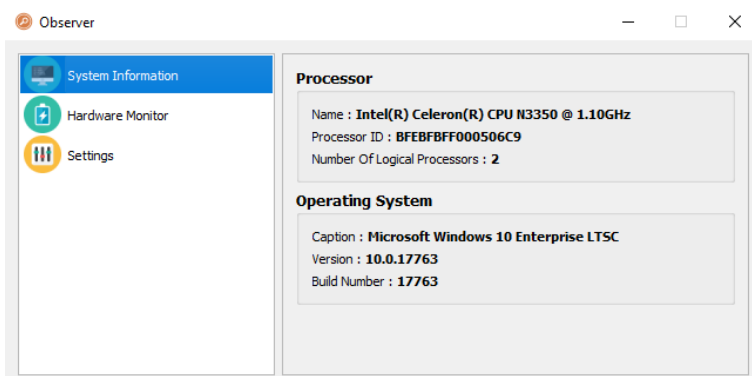


Illustration 17: OBS Client System Information

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Hardware Monitor

The Hardware Monitor category indicates the approximate temperatures of the processor and peripherals.

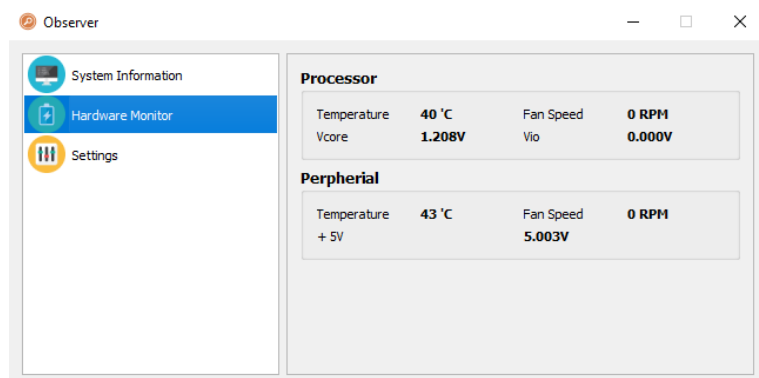


Illustration 18: OBS Client Hardware Monitor

Settings

Various settings can be made in the Settings area.

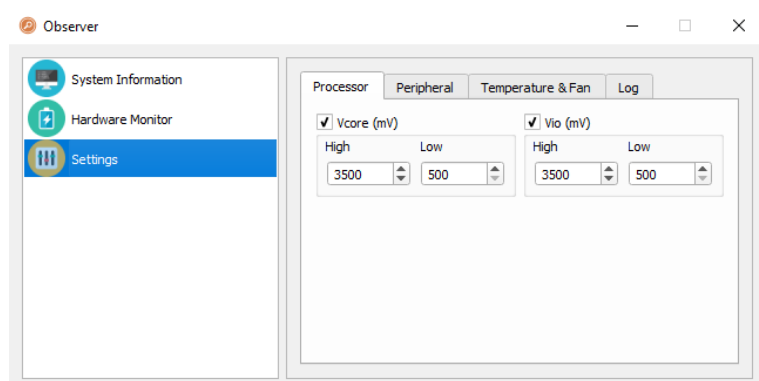


Illustration 19: OBS Client Settings

7.4 Redo Backup and Recovery

The instructions for Christ Redo Backup and Recovery can be found in the FAQ section of the Christ website: [FAQ - Questions and answers](#)

7.5 Enhanced Write Filter EWF

Instructions on how to set EWF and UWF filters can be found in the FAQ section of the Christ website: [FAQ - Questions and Answers](#)


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8 Maintenance

The following chapter describes maintenance measures that can be performed by a qualified end user.

8.1 Cleaning

⚠ DANGER	
	<p>Triggering unintended functions</p> <p>Loss of control of the plant / machine / device</p> <ul style="list-style-type: none"> ➤ The unit may only be cleaned when it is switched off or unplugged.

To clean the device, use a soft cloth moistened with detergent solution.

The cleaning agent must not be applied directly to the device. Under no circumstances may aggressive solvents, chemicals or scouring agents be used.

8.2 Maintenance

It does not require any maintenance on the part of the user.

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9 Technical Data

9.1 Mechanical Specifications

Housing	Aluminium
Weight	max. 1.2 kg
Dimensions	See Table Dimensions
Mounting	DIN Rail, 35 mm x 7.5 mm, DIN Rail 35 mm x 15 mm
Cooling	Passive

Table 16: Mechanical Specifications

9.2 Electrical Specifications


Supply Voltage	10.8 VDC ... 28.8VDC
Power Consumption	see table Power Consumption
Continuous Rated Current	max. 2.5A
Inrush Current (load-independent)	max. 70A for 80 μ s (Used power supply: FSP060-DAAN3)
External Power Supply	SELV
Earthing	Functional Earthing (Cable cross-section has to be identical to the supply lines)
Battery Lifetime	4 years (constantly turned off)

Table 17: Electrical Specifications

9.2.1 Power Consumption

Architecture	Power Consumption
Argon	up to 25 W
Titanium	up to 45 W

Table 18: Power Consumption

NOTICE	
	<p>Specifications are maximum values Peripheral devices are considered (e.g. 1 x USB 2.0 equals 2,5 W)</p>

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9.3 Electromagnetic Compatibility

Emitted Interference	EN55032 Class A
Immunity of supply line DC	±2 kV according to IEC 61000-4-4; EFT ± 0,5 kV according to IEC 61000-4-5; Surge asymmetrical
Immunity of signal lines	±1 kV according to IEC 61000-4-4; EFT
ESD	± 4 kV Contact discharge according to EN61000-4-2 ± 8 kV Air discharge according to EN 61000-4-2
Immunity of conducted emission	3 V 150 kHz – 80 MHz, 80% AM nach IEC 61000-4-6
Immunity of high-frequency radiation	3 V/m 80 MHz – 1 GHz, 80% AM nach IEC 61000-4-3 3 V/m 1 GHz – 6 GHz, 80% AM nach IEC 61000-4-3

Table 19: Electromagnetic Compatibility

9.4 Environmental Conditions

Operating Temperature (Standard Conditions)	0 ~ 50 °C
Operating Temperature (Different Conditions)	0 ~ 60 °C (see device-specific datasheet)
Storage Temperature	-10 ~ 70 °C
Humidity	5 ~ 80 % (non condensing)
Protection Class (Standard Conditions)	IP20
Transportation and Storage	Suitable packing increases shock resistance
max. Installation Altitude	2000 m
Cooling	Natural Air Convection

Table 20: Environmental Conditions

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10 Standards and Approvals

10.1 CE Marking



The device has been tested in accordance with the applicable EU directives and the associated harmonized standards.

NOTICE	
	<p>Declaration of Conformity</p> <p>The declaration of Conformity can be downloaded from the Christ Electronic Systems Homepage.</p>

10.2 RoHS



The device complies with the requirement of the EU Directive RoHS 2011/65/EU.

10.3 Electromagnetic Compatibility

The device complies with the requirements of the EU Electromagnetic Compatibility Directive 2014/30/EU with the harmonized standards listed below:

EN 55032: 2015 Class A	Electromagnetic compatibility of multimedia equipment - Emission Requirements
EN 55035: 2017	Electromagnetic compatibility of multimedia equipment - Immunity requirements

10.4 Environmentally Appropriate Disposal

The device must not be disposed of with domestic waste.



The appliance complies with the requirement of the EU Directive WEEE 2012/19/EU, which is symbolised by the symbol with the crossed-out dustbin.

In order to enable environmentally friendly recycling, the various materials must be separated from one another.

Disposal must be carried out in accordance with the applicable legal regulations.

Component parts	Disposal
Enclosure	Metal Recycling
Electronic	Electronics Recycling
Paper / cardboard packaging	Paper / Cardboard boxes Recycling
Plastic packing materials	Plastics Recycling

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11 Technical Support

Despite the highest quality standards and detailed function tests of all our products, daily use of our devices can always lead to damage or failure of a wearing part. The failure of a machine in production costs a lot of money. That is why the Christ company processes complaints as quickly as possible.

You can send the device to us without prior notice. All you need to do is fill out the [cover letter for the repair](#) and enclose it with the touch panel or IPC so that the service department can start the repair quickly. When the device arrives, it goes through a defined process that clearly documents all processes and makes the respective status traceable. As soon as your panel or IPC is registered in our system, you will receive a confirmation of receipt so that you can also get a precise overview.

Technical Support can be contacted as follows:

Service, Repair and Technical Support

Phone: +49 8331 8371-500

Fax: +49 8331 8371-497

E-Mail: service@christ-es.de

Or directly via the Homepage.

[Christ Service](#)

11.1 Device Seal

A device seal is affixed to every Christ device in order to prove whether the device has been opened by a third party. In case of a defect, please do not open the device, but contact our service department. They will discuss the further procedure with you.

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