



USER MANUAL

ARTiGO A600

Fanless Ultra-compact System



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Notice 1

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2

Shielded interface cables and A.C. power cord, if any, must be used in order to comply with the emission limits.

Notice 3

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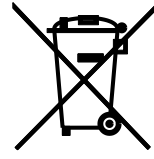


Tested To Comply
With FCC Standards
FOR HOME OR OFFICE US



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- ☐ Only use the appropriate battery specified for this product.
- ☐ Do not re-use, recharge, or reheat an old battery.
- ☐ Do not attempt to force open the battery.
- ☐ Do not discard used batteries with regular trash.
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- ☐ Keep this User's Manual for future reference.
- ☐ All cautions and warnings on the equipment should be noted.
- ☐ Keep this equipment away from humidity.
- ☐ Lay this equipment on a reliable flat surface before setting it up.
- ☐ Make sure the voltage of the power source and adjust properly 110/220V before connecting the equipment to the power inlet.
- ☐ Place the power cord in such a way that people cannot step on it.
- ☐ Always unplug the power cord before inserting any add-on card or module.
- ☐ If any of the following situations arises, get the equipment checked by authorized service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated into the equipment.
 - The equipment has been exposed to moisture.
 - The equipment has not worked well or you cannot get it work according to User's Manual.
 - The equipment has dropped and damaged.
 - The equipment has obvious sign of breakage.
- ☐ Do not leave this equipment in an environment unconditioned or in a storage temperature above 75°C (167°F). The equipment may be damaged.
- ☐ Never pour any liquid into the opening. Liquid can cause damage or electrical shock.
- ☐ Do not place anything over the power cord.
- ☐ Do not cover the ventilation holes. The openings on the enclosure protect the equipment from overheating.

Box Contents

ATG-A600-1S08A1

- ☐ 1 x ARTiGO A600 system
- ☐ 1 x AC to DC adapter
- ☐ 1 x DIO cable connector
- ☐ 1 x COM splitter cable connector
- ☐ 4 x 3-pole female terminal block

Ordering Information

Part Number	Description
ATG-A600-1S08A1	Fanless embedded system with 800MHz VIA Cortex-A9 SoC, 1GB DDR3 RAM, 4GB eMMC, Mini HDMI, 2 x Mini USB 2.0, 4 x 3-pole phoenix RS-485, COM, DIO, 10/100Mbps Ethernet, Micro SD card slot, miniPCle, and 12~24V DC-in

Optional Accessories

Wireless Accessories

Part Number	Description
EMIO-1533-00A2	VNT9271 IEEE 802.11/b/g/n USB Wi-Fi module with assembly kit

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1. Product Overview

The ARTiGO A600 is an ultra-compact and completely fanless system with rich connectivity options for enterprise Internet of Things (IoT) and Machine-to-Machine (M2M) applications. Its system is based on VIA VAB-600 Pico ITX board powered by 800MHz VIA Cortex-A9 SoC with built-in 3D/2D graphics engine and video multi-standard decoder. Also, the ARTiGO A600 is completely compatible with Linux Kernel 3.0.8 operating system.

The ARTiGO A600 is optimized for both power and performance with a wide operating temperature range from 0°C to 60°C, while offering very low power consumption of typical 5W. It also supports multiple I/O connectors in the rear panel such as mini USB 2.0 ports, mini HDMI® port, Micro SD card slot, Fast Ethernet LAN port, COM connector and DIO connector for diversified embedded applications. In addition, the ARTiGO A600 offers four COM connectors for RS-485 mode interface in the front panel, and onboard connectors such as SPI connector, SIM card socket, miniPCIe slot for 3G and WLAN connector for USB module (VNT9271).

1.1. Key Features

1.1.1. ARM Based System

Using a single-core Cortex A9 800MHz processor, the VIA ARTiGO A600 provides a full range of feature-rich, extremely power-efficient, and cost-effective solutions that are suitable for the fast-emerging, ultra-portable embedded computing applications.

1.1.2. Ultra-compact and Space Saving

The ARTiGO A600 has an ultra-compact and slim chassis, designed to save space that makes it suitable to install in space critical environment and to ensure maximum reliability. Its chassis design has a robust aluminum alloy top cover and steel bottom chassis.

1.1.3. Optimize Integration with Multiple I/O Access

Front and rear panel I/O, and bottom access enable the ARTiGO A600 to easily support various applications as well as for easy integration and quick setup.

1.1.4. Storage Expansion

ARTiGO A600 has an onboard 4GB eMMC flash storage and a Micro SD card slot for expandable storage.

1.1.5. Mounting Solution

The ARTiGO A600 supports multiple methods for mounting; it can be mounted to VESA mountable surfaces or even to wall with the VESA mounting kit (optional).

1.1.6. Wide Range of Operating Temperatures

The ARTiGO A600 carries a qualified thermal performance design which allows a wide range of operating temperatures from 0°C ~ 60°C, suitable for critical applications.

1.1.7. Networking Support

The ARTiGO A600 is equipped with RJ-45 port that supports high speed Fast Ethernet. It also has a wireless networking option that gives the system a freedom of 3G through miniPCIe slot, and WiFi connectivity through onboard WLAN (WiFi) connector.

1.1.8. Embedded OS ready

The ARTiGO A600 is 100% compatible with Linux Kernel 3.0.8 operating system.

1.2. Product Specifications

Processor

- 800MHz VIA Cortex-A9 SoC

System Memory

- 1GB DDR3 SDRAM onboard

Storage

- 4GB eMMC Flash memory

Boot Loader

- 512KB SPI Flash ROM

Graphics

- Mali-400 SP GPU
- Two integrated, independent 3D/2D graphics processing units
- Graphics engine supporting OpenGL[®] ES 2.0 hardware acceleration
- Supports MPEG-2, VC-1 and H.264 video decoding up to 1080p

LAN

- VIA VT6113 10/100 base-TX PHY chip

Audio

- VIA VT1603A I2S Audio Codec

HDMI[®]

- Integrated HDMI 1.4 transmitter

Front Panel I/O

- 4 x 3-pole Phoenix RS-485 ports
- 1 x Power On/Off button

Rear Panel I/O

- 2 x Mini USB 2.0 ports
- 1 x Mini HDMI port
- 1 x 8-pin DIO connector supports 8-bit GPIO (4 GPI + 4 GPO)
- 1 x 7-pin COM connector (Tx/Rx and Debug)
- 1 x Fast Ethernet port (10/100Mbps)
- 1 x Micro SD card slot
- 2 x Antenna holes (for 3G and WiFi/WLAN)
- 1 x DC-in jack

Onboard I/O

- 1 x MiniPCle slot (USB only)
- 1 x SIM card socket
- 1 x WiFi connector
- 1 x WiFi LED indicator
- 1 x SPI connector

Power Supply

- 12~24V DC-in

Operating System

- Linux Kernel 3.0.8

Operating Temperature

- 0°C ~ 60°C (with industrial storage)

Operating Humidity

- 0% ~ 90% @ 45°C (non-condensing)

Dimensions

- 125mm (W) x 125mm (D) x 30mm (H) (4.92" x 4.92" x 1.18")

Weight

- 0.48Kg (1.058lbs)

Mounting

- VESA mount (100mm x 100mm) (optional)

Mechanical Construction

- Aluminum top cover
- Metal chassis housing

Compliance

- CE/FCC

**Notes:**

1. As the operating temperature provided in the specifications is a result of the test performed in VIA's chamber, a number of variables can influence this result. Please note that the working temperature may vary depending on the actual situation and environment. It is highly suggested to execute a solid testing and take all the variables into consideration when building the system. Please ensure that the system runs well under the operating temperature in terms of application.
2. Please note that the lifespan of the onboard eMMC memory chip may vary depending on the amount of access. More frequent and larger data access on eMMC memory makes its lifespan shorter. Therefore, it is highly recommended to use a replaceable external storage (e.g., Micro SD card) for large data access.

1.3. Panel Layout

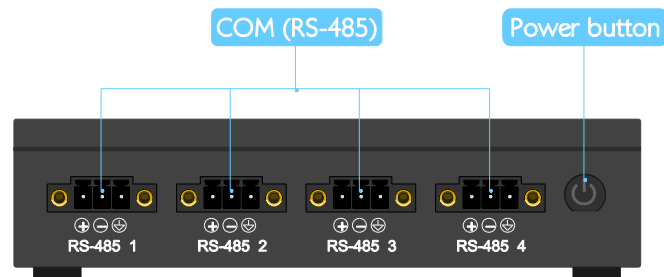


Figure 1: Front panel layout

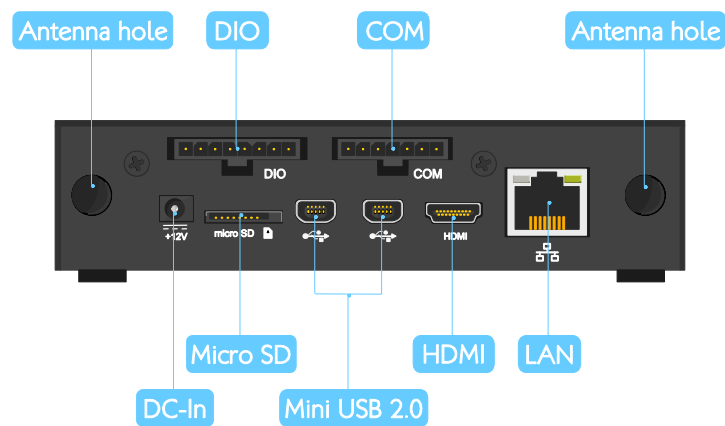


Figure 2: Rear panel layout

1.4. Dimensions

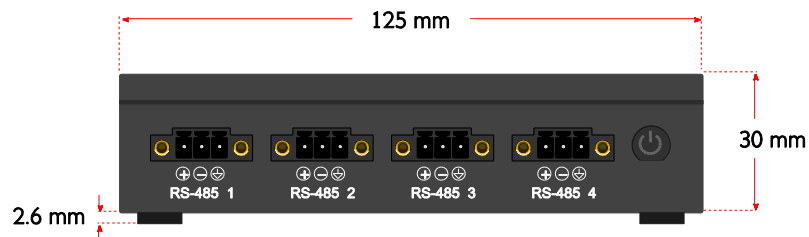


Figure 3: Front side view dimension



Figure 4: Right side view dimension

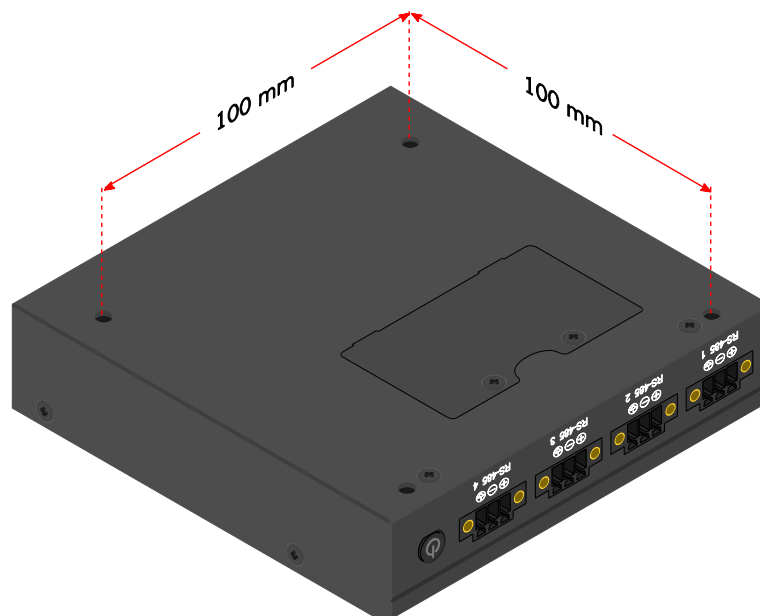


Figure 5: Bottom side view dimension

2. External I/O Pin Descriptions and Functionality

The ARTiGO A600 has a wide selection of interfaces. It includes a selection of frequently used ports/connectors as part of the external I/O.

2.1. Power button

The ARTiGO A600 comes with a Power button with built-in power LED indicator. The Power button can support three modes: **System Suspend/Resume** (press the button once), **Popup power control menu** (press the button for 4 seconds) and **System Off** (press the button for 8 seconds).



Figure 6: Power button diagram

2.2. COM (RS-485) connector

The ARTiGO A600 is equipped with four COM connectors located on the front panel. The COM connectors configured only as RS-485 mode.

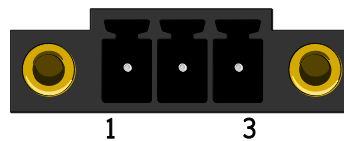


Figure 7: COM (RS-485) connector diagram

Pin	Signal
1	RS485_P1_TX+
2	RS485_P1_TX-
3	GND

Table 1: COM (RS-485) connector pinout

2.3. Digital I/O connector

The ARTiGO A600 is equipped with a DIO connector (8-pin) on the rear panel, to offer Digital I/O communication interface to support four GPI and four GPO signals using the DIO cable connector (see page 27 for DIO cable connector pinout). The pinout of the DIO connector is shown below.

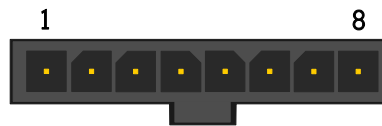


Figure 8: DIO connector diagram

Pin	Signal
1	GPIO20_CH
2	GPIO24_CH
3	GPIO21
4	GPIO25
5	GND
6	GPIO_26
7	GPIO_22
8	GPIO_27

Table 2: DIO connector pinout

2.4. COM connector

The ARTiGO A600 has a COM connector (7-pin) on the rear panel. The COM connector labeled as "COM" is used to attach the COM splitter cable connector that supports Tx/Rx. It can also be used for debugging purpose (see page 27 for COM splitter cable connector pinout). The pinout of the COM connector is shown below.



Figure 9: COM connector diagram

Pin	Signal
1	RX1
2	TX1
3	RX2
4	TX2
5	GND
6	GPIO_23
7	-

Table 3: COM connector pinout

2.5. DC-in jack

The ARTiGO A600 comes with a DC power input jack on the rear panel that carries $+12V_{DC} \sim +24V_{DC}$ external power input. The specifications and pinout of power jack are shown below.

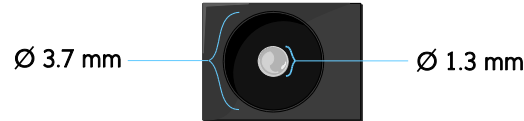


Figure 10: DC-in jack diagram

Physical Specifications	
Outer Diameter	3.7 mm
Inner Diameter	1.3 mm
Barrel Depth	8.25 mm
Electrical Specifications	
Input Voltage	+12V ~ +24V

Table 4: DC-in jack specifications

Pin	Signal
1	+12V ~ +24V
2	GND

Table 5: DC-in jack pinout

2.6. Micro SD card slot

The Micro SD card slot is located on the rear panel. It offers expandable storage up to 32 GB capacity.



Figure 11: Micro SD card slot diagram

Pin	Signal
1	SD0DATA2
2	SD0DATA3
3	SD0CMD
4	VDD (3.3V)
5	SD0CLK
6	GND
7	SD0DATA0
8	SD0DATA1
9	SD0_CD

Table 6: Micro SD card slot pinout

2.7. Mini USB 2.0 port

The ARTiGO A600 has two Mini USB 2.0 ports located on the rear panel. The Mini USB 2.0 interface port gives complete Plug and Play and hot swap capability for external devices and it complies with USB UHCI, rev. 2.0. The Mini USB port uses the USB Type AB receptacle connector. The pinout of the typical Mini USB port is shown below.

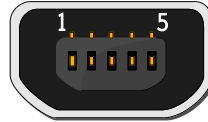


Figure 12: Mini USB 2.0 port diagram

Mini USB 2.0 Port 1		Mini USB 2.0 Port 2	
Pin	Signal	Pin	Signal
1	VCC (+5V)	1	VCC (+5V)
2	USBH1-	2	USBH2-
3	USBH1+	3	USBH2+
4	ID (GND)	4	ID (GND)
5	GND	5	GND

Table 7: Mini USB 2.0 port pinouts

2.8. Mini HDMI® port

The ARTiGO A600 has a mini HDMI® port (19-pin HDMI® Type C connector) located on the rear panel. The mini HDMI® port is used to connect high definition video and digital audio using a single cable. It allows connecting the digital video devices which utilize a high definition video signal. The pinout of the HDMI® port is shown below.



Figure 13: Mini HDMI® port diagram

Pin	Signal
1	GND
2	LCD1DO2+
3	LCD1DO2-
4	GND
5	LCD1DO1+
6	LCD1DO1-
7	GND
8	LCD1DO0+
9	LCD1DO0-
10	GND
11	LCD1CLK+
12	LCD1CLK-
13	GND
14	HDMI_CECIN
15	DDCSCL
16	DDCSDA
17	-
18	VCC_5V
19	HPD

Table 8: Mini HDMI® port pinout

2.9. LAN port (Fast Ethernet)

The integrated 8-pin Fast Ethernet port is using an 8 Position 8 Contact (8P8C) receptacle connector (commonly referred to as RJ-45). The Fast Ethernet port is controlled by VIA VT6113 10/100 Base-TX PHY chip controller. The pinout of the Fast Ethernet port is shown below.

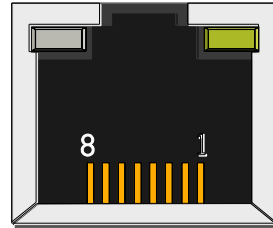


Figure 14: LAN port diagram

Pin	Signal
1	TD+
2	TD-
3	RD+
4	REGOUT
5	REGOUT
6	RD-
7	GND
8	GND

Table 9: LAN port pinout

The LAN port has two individual LED indicators located on the front side to show its Active/Link status and Speed status.

	Link LED (Left LED on RJ-45 connector)	Active LED (Right LED on RJ-45 connector)
Link Off	Off	Off
Speed_10Mbit	The LED is always On in dark color	Flash in Yellow or Orange color
Speed_100Mbit	The LED is always On in Red color	Flash in Yellow or Orange color

Table 10: RJ-45 LAN port color LED definition

3. Onboard I/O

This chapter provides information about the onboard connectors, slot and socket on ARTiGO A600 system's mainboard.

3.1. MiniPCle slot

The ARTiGO A600 is equipped with miniPCle slot for 3G module. The miniPCle slot is compatible with mini PCle 2.0 module that has full-length in size. The pinout of miniPCle slot is shown below.

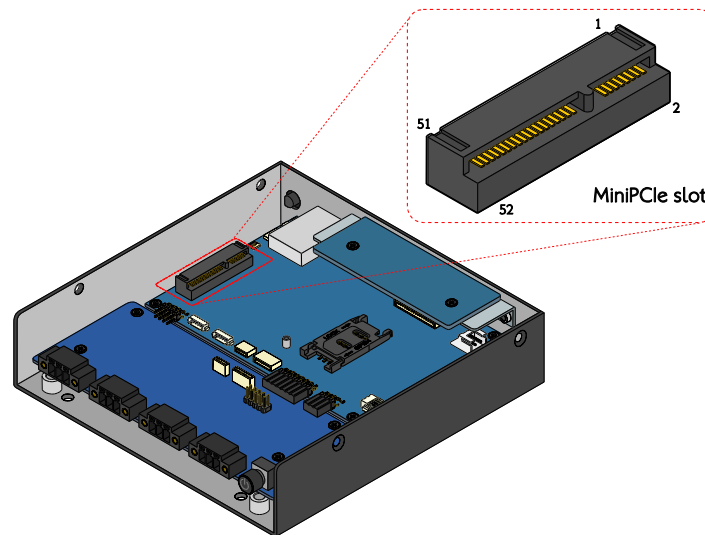


Figure 15: MiniPCle slot diagram

Pin	Signal	Pin	Signal
1	-	2	VSUS33
3	-	4	GND
5	-	6	+1.5V
7	-	8	USIM_VCC
9	GND	10	USIM_DATA
11	-	12	USIM_CLK
13	-	14	USIM_RST
15	GND	16	USIM_VPP
17	-	18	GND
19	-	20	-
21	GND	22	-PEX1_RST
23	-	24	VSUS33
25	-	26	GND
27	GND	28	+1.5V
29	GND	30	I2C0SCL
31	-	32	I2C0SDA
33	-	34	GND
35	GND	36	USBHD_0-
37	GND	38	USBHD_0+
39	VSUS33	40	GND
41	VSUS33	42	LED_WWAN1-
43	GND	44	LED_WLAN1-
45	-	46	LED_WPAN1-
47	-	48	+1.5V
49	-	50	GND
51	-	52	VSUS33

Table 11: MiniPCle slot pinout

3.2. SIM Card socket

The ARTiGO A600 is equipped with SIM card socket that can support 3G SIM card. Using the SIM card socket on ARTiGO A600 requires a 3G module installed in the MiniPCle x1 slot to enable the 3G function, otherwise the SIM card socket is disabled. The SIM card socket is designed only for 3G module without built-in SIM card socket on it. The SIM card socket is labeled as "SIM1". The pinout of the slot is shown below.

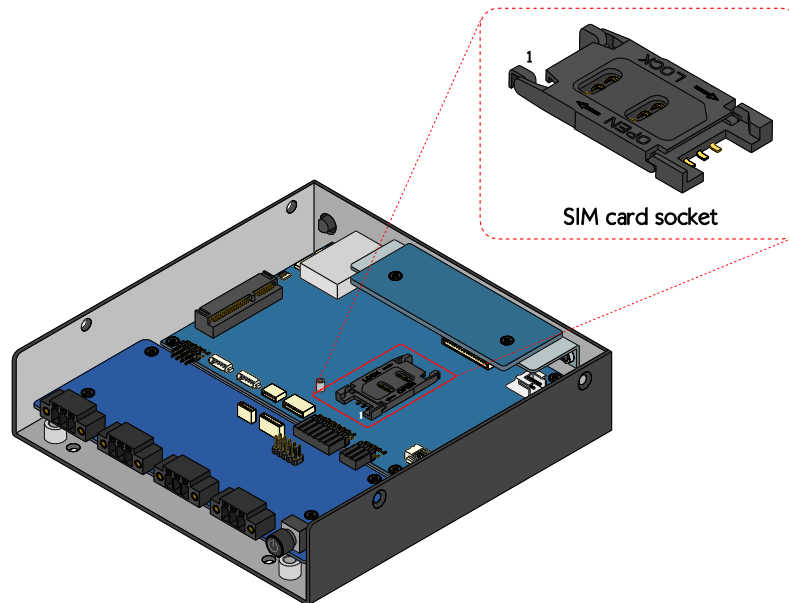


Figure 16: SIM card socket diagram

Pin	Signal
1	USIM_VCC
2	USIM_RST
3	USIM_CLK
4	-
5	GND
6	USIM_VPPSIM
7	USIM_DATA

Table 12: SIM card socket pinout

3.3. WLAN (Wi-Fi) connector

The ARTiGO A600 supports an onboard WLAN connector labeled as “WLAN”. The connector is compatible with the WLAN USB module. The pinout of WLAN connector is as shown below.

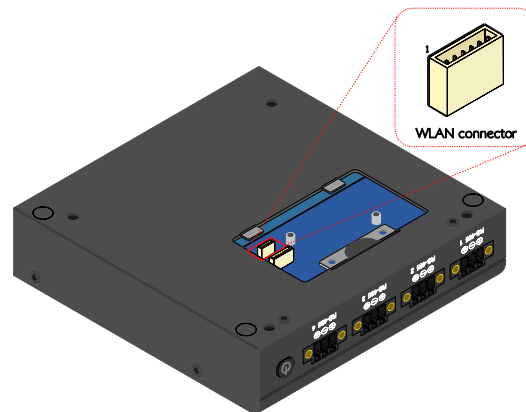


Figure 17: WLAN connector diagram

Pin	Signal
1	5VIN_WLAN
2	USBDN_WLAN_DM1
3	USBDN_WLAN_DP1
4	GND
5	-
6	WLAN_ONOFF

Table 13: WLAN connector pinout

3.4. SPI connector

The ARTiGO A600 is equipped with one 8-pin SPI connector. The SPI (Serial Peripheral Interface) connector is used to connect to the SPI programming fixture for updating the SPI flash ROM. The connector is labeled as “SPI”. The pinout of the connector is shown below.

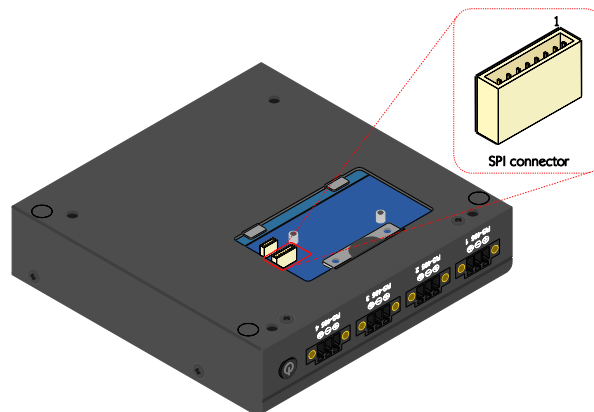


Figure 18: SPI connector diagram

Pin	Signal
1	VPROG_SPI
2	GND
3	SFCS0-
4	SFCLK
5	SFDI
6	SFDO
7	SFCS1-
8	NC

Table 14: SPI connector pinout

4. Hardware Installation

This chapter provides information about hardware installation procedures. It is recommended to use a grounded wrist strap before handling computer components. Electrostatic discharge (ESD) can damage some components.

4.1. Removing the chassis top cover

Step 1

Remove six screws of the top cover.

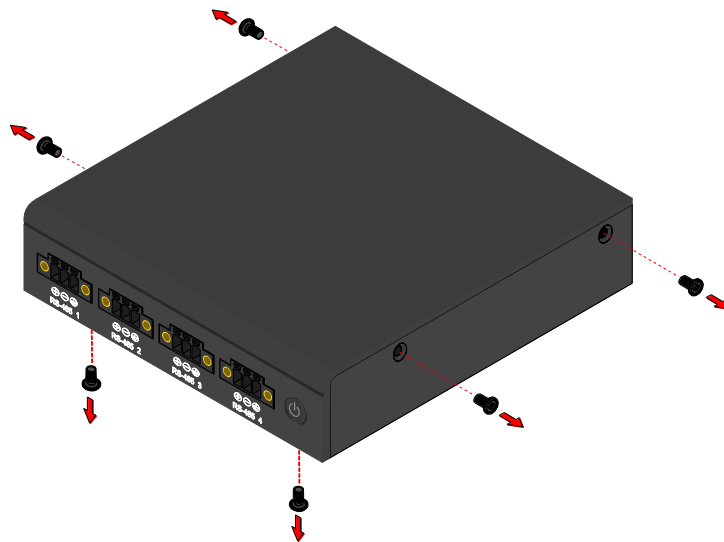


Figure 19: Unscrewing the top cover

Step 2

Slide the top cover horizontally to disengage it from the chassis then pull up to remove the top cover.

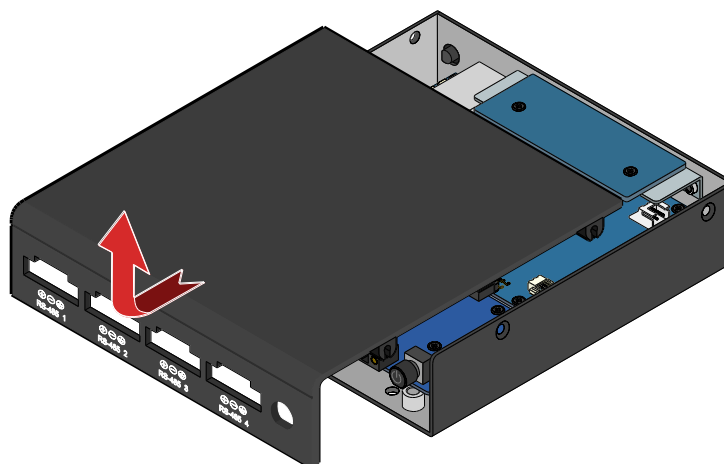


Figure 20: Removing top cover

4.2. Installing the 3G MiniPCle module and antenna

Step 1

Align the notch on the MiniPCle module with the notch on the MiniPCle slot then insert the module at a 30° angle.

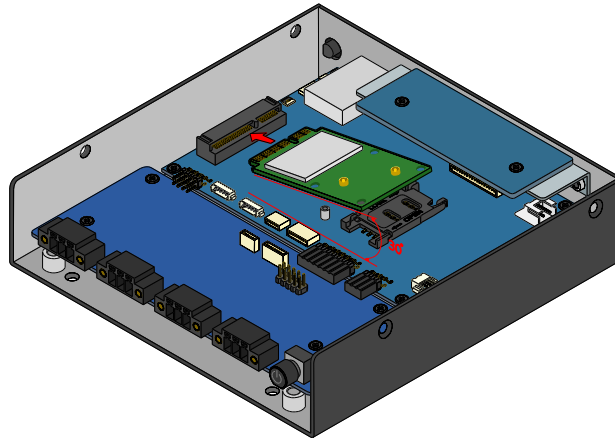


Figure 21: Inserting MiniPCle module

Step 2

Once the module has been fully inserted, push down the module until the screw hole align with the standoff hole. Secure the module with screw and then remove the 3G antenna hole cover.

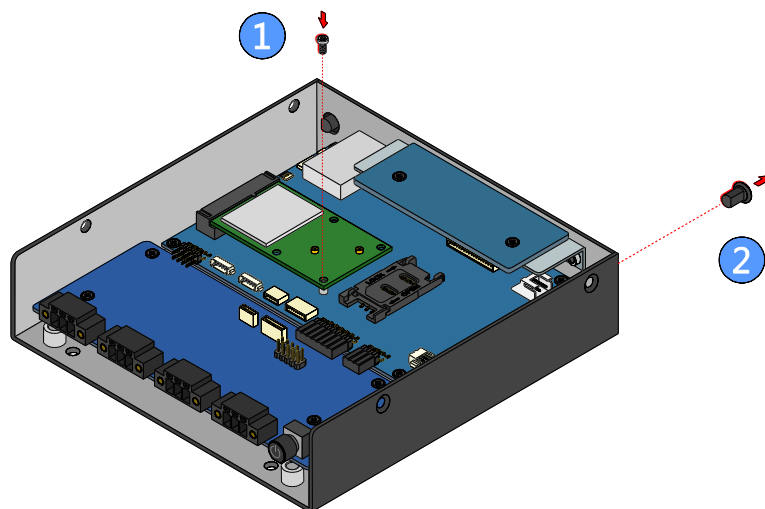


Figure 22: Securing MiniPCle module and removing 3G antenna hole cover

Step 3

Insert the 3G antenna connector into the antenna hole from the inside of the chassis. Insert the washer, fasten it with the nut and install the external antenna. Then connect the mini coaxial cable of the 3G antenna connector to the mini RF connector on 3G miniPCle module.

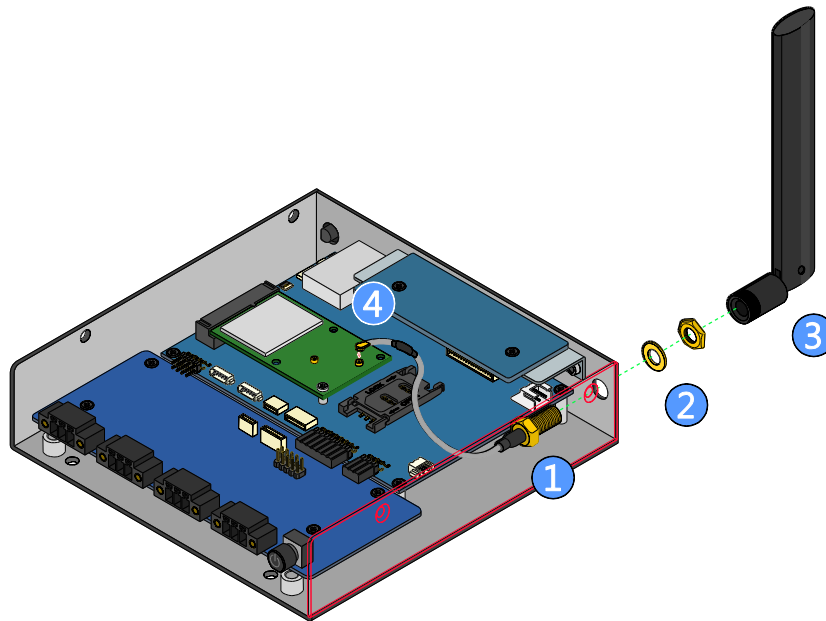


Figure 23: Installing 3G antenna

4.3. Installing SIM card

Step 1

Push back firmly the SIM card socket to unlock the opening.

Step 2

Pull up the socket and place the SIM card inside the socket. Ensure the angled corner of the SIM card is placed in the correct way before closing the socket.

Step 3

Gently close the socket by pulling down the SIM socket.

Step 4

Carefully lock the SIM socket by sliding back the socket.

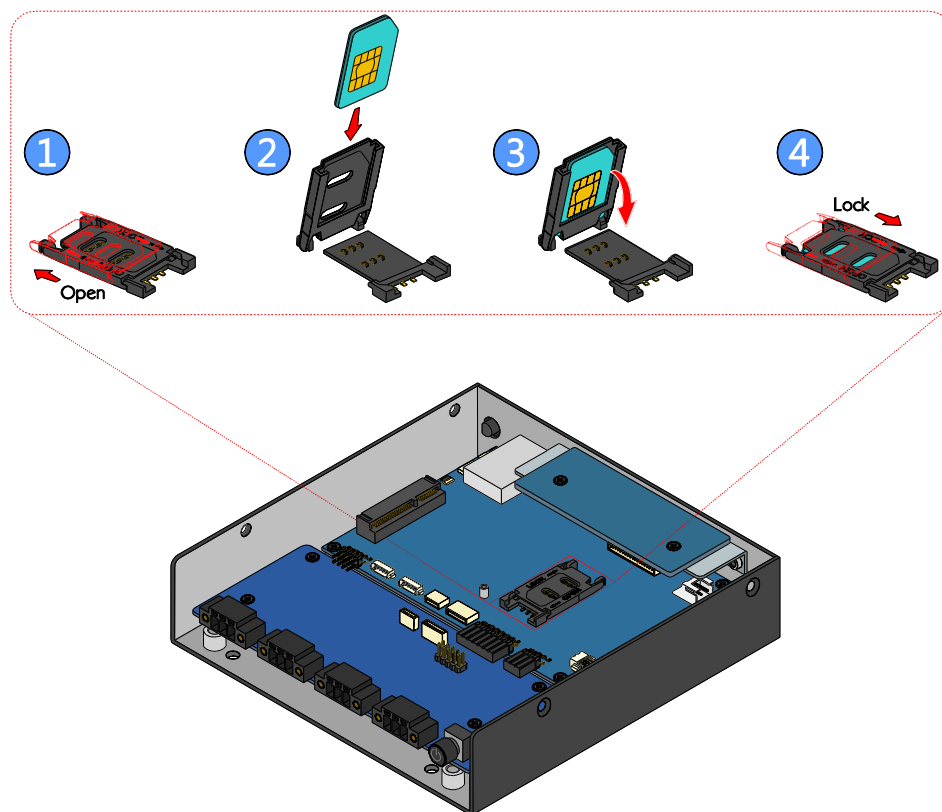


Figure 24: Installing the SIM card

4.4. Installing the WLAN USB module

Step 1

Locate the bottom access cover of the chassis. Remove the screws then gently lift up the bottom access cover.

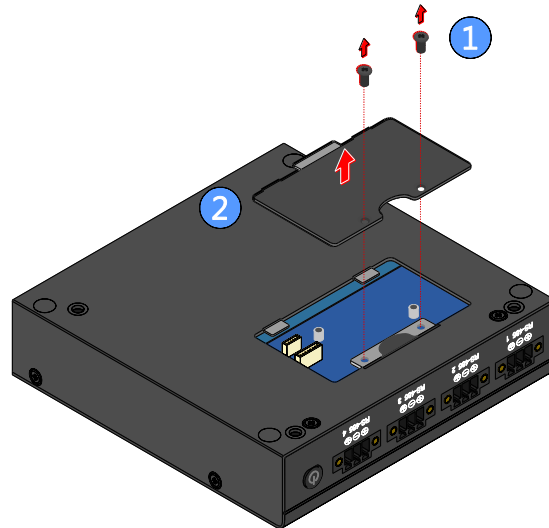


Figure 25: Removing the bottom access cover

Step 2

Install the WLAN USB module (VNT9271) on standoff holes and secure it with two screws.

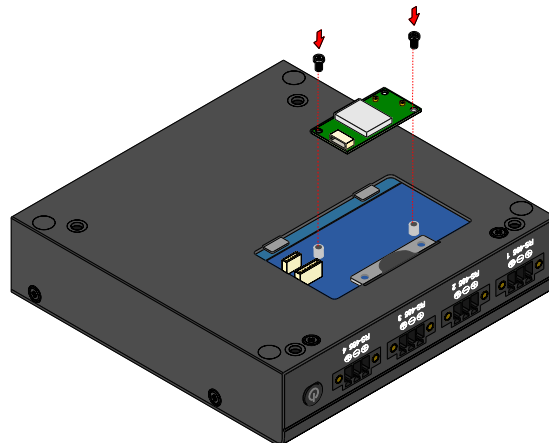


Figure 26: Installing the WLAN USB module

Step 3

Attach the WLAN USB board-to-board cable to the WLAN USB module (VNT9271) connector, and attach the other end of the cable to the onboard WLAN connector.

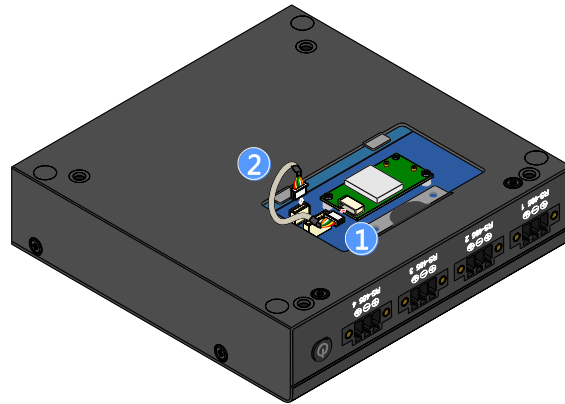


Figure 27: Connecting the WLAN USB board-to-board cable

Step 4

Remove the WLAN antenna hole cover on the rear panel.

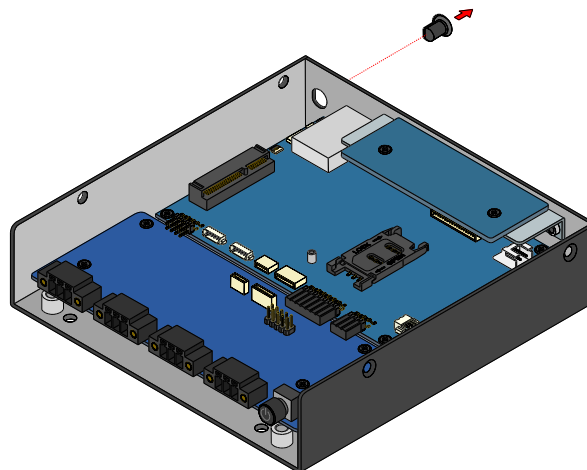


Figure 28: Removing WLAN antenna hole cover

Step 5

Insert the WLAN port connector into the antenna hole from the inside of the chassis. Insert the washer, fasten it with the nut and install the external antenna. Insert the mini coaxial cable through the available spacing and ensure the cable stretches down to the installed WLAN USB module.

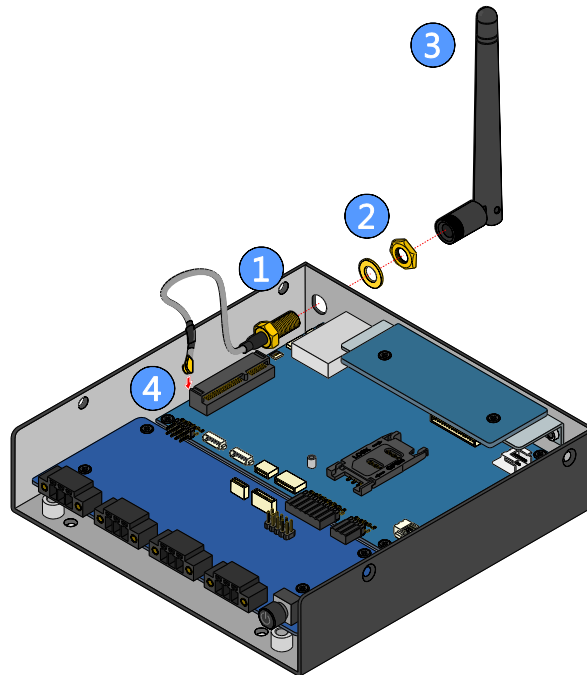


Figure 29: Installing the WLAN USB antenna

Step 6

Gently connect the mini coaxial cable of the WLAN port connector to the mini RF connector on the WLAN USB module (VNT9271).

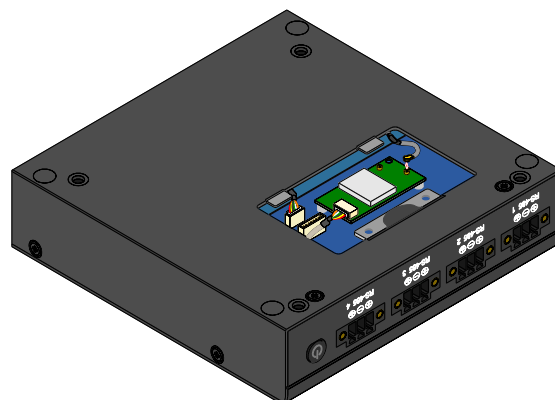


Figure 30: Connecting WLAN mini coaxial cable

Step 7

Reinstall the bottom access cover.

4.5. Reinstalling the top cover

Step 1

Mount the top cover. Then gently slide/push backward the top cover until it completely covers the top side of the chassis.

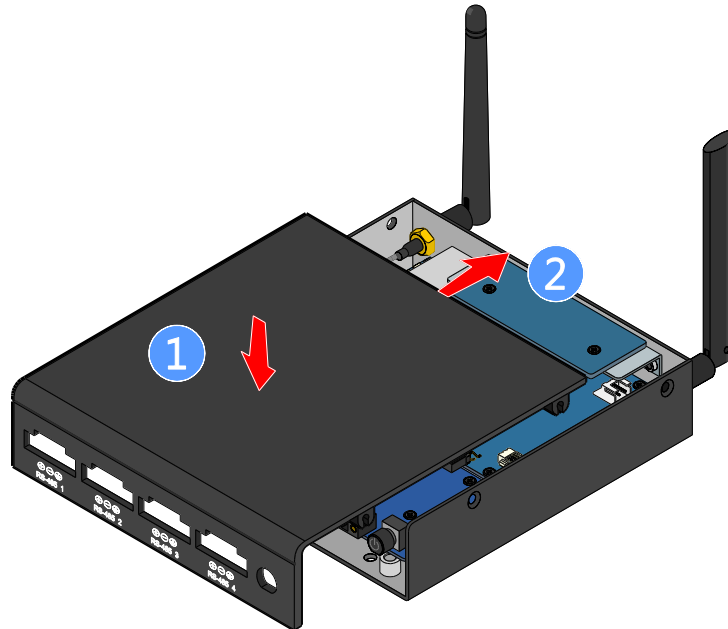


Figure 31: Installing the top cover

Step 2

Once the top cover has been put in place, secure the top cover with six screws.

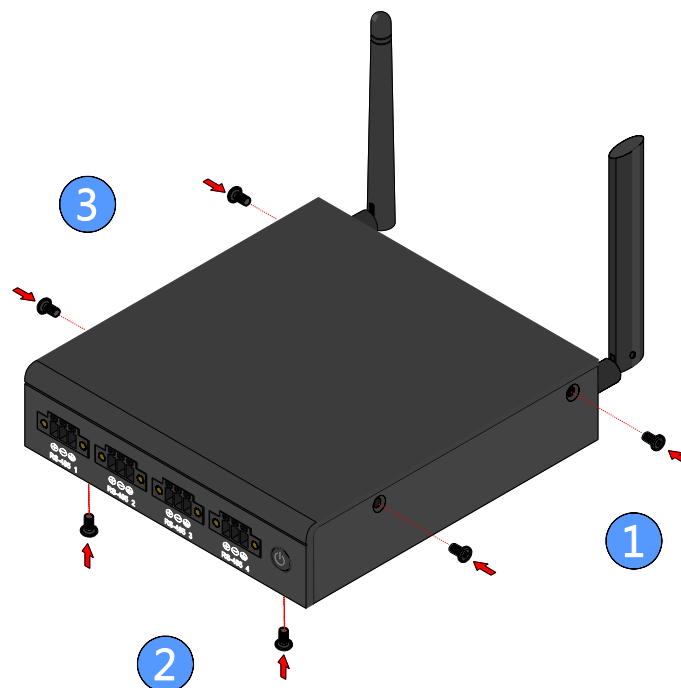


Figure 32: Securing the top cover

4.6. Installing the rubber feet (optional)

Step 1

Locate the designated areas for rubber feet on the bottom side of the chassis.

Step 2

Attach each rubber foot and firmly press it down to ensure the rubber foot is properly in place.

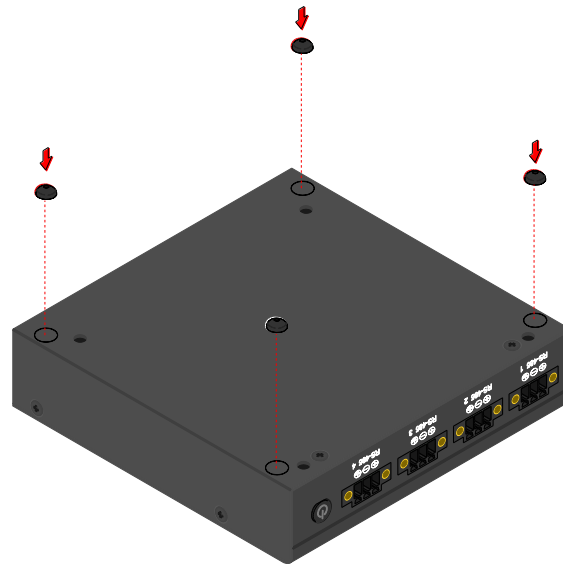


Figure 33: Installing the rubber feet

4.7. Installing the VESA mounting kit (optional)

An optional VESA mounting kit is available for mounting the ARTiGO A600 behind the monitor or wall.

Step 1

Attach the VESA bracket on the back of the ARTiGO A600 using four M4 x 6mm screws.

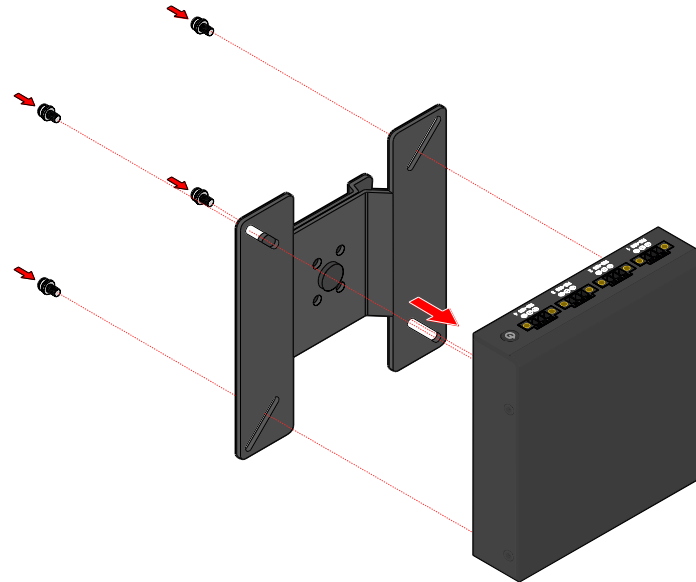


Figure 34: Installing the VESA bracket



Cautions:

1. Remove first the rubber feet before installing the VESA bracket.
2. Do not use other types of screws for VESA bracket; these might damage the internal board.

Step 2

Align the VESA mounting hole of the VESA plate to the VESA hole on the back of the monitor.

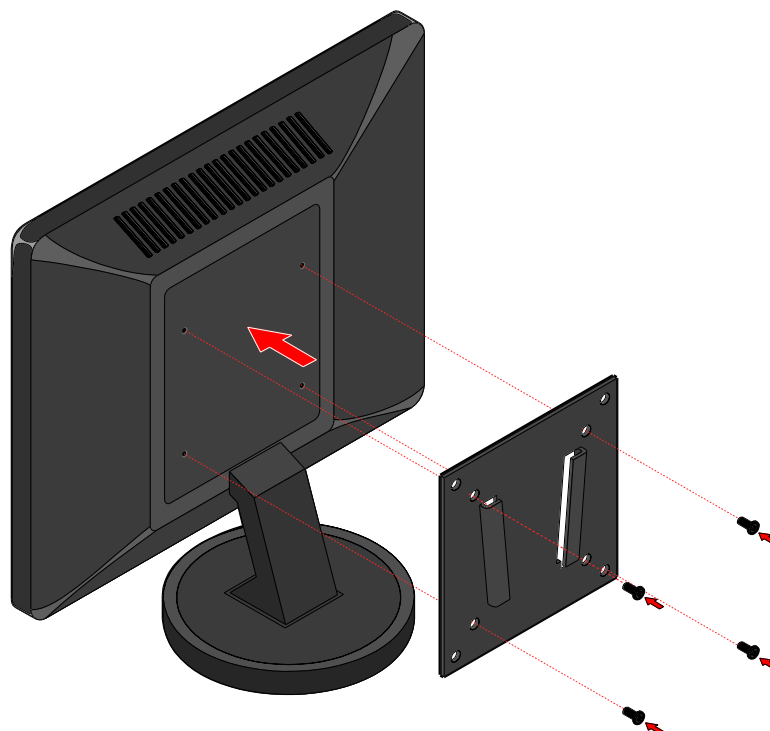


Figure 35: Installing the VESA plate

Step 3

Secure the VESA mounting plate with four screws.

Step 4

Hook in the VESA bracket (with the ARTiGO A600 system) by sliding into the VESA plate. Then connect all the necessary cables on the rear panel of the system.

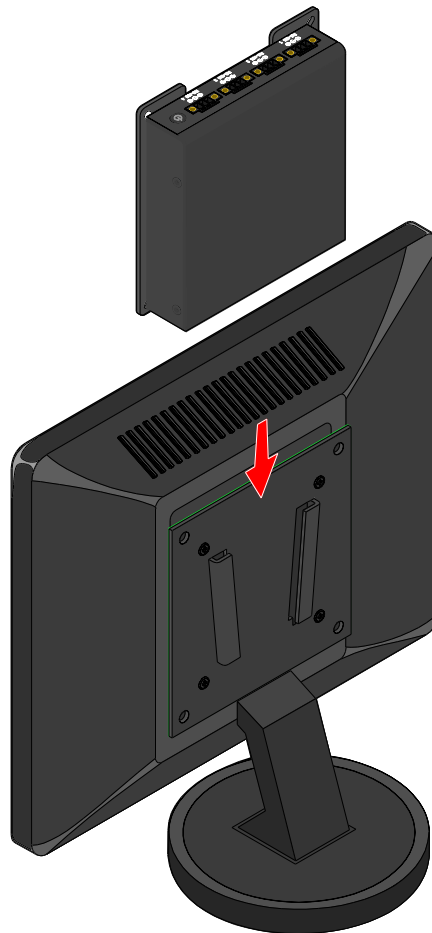


Figure 36: Installing ARTiGO A600 system to the VESA plate

4.8. Connecting the DIO and COM splitter cable connectors

Step 1

Locate the DIO and COM connectors on the rear panel I/O.

Step 2

Follow the proper orientation of the connectors. Gently connect the DIO and COM splitter cable connectors on the DIO and COM connectors respectively

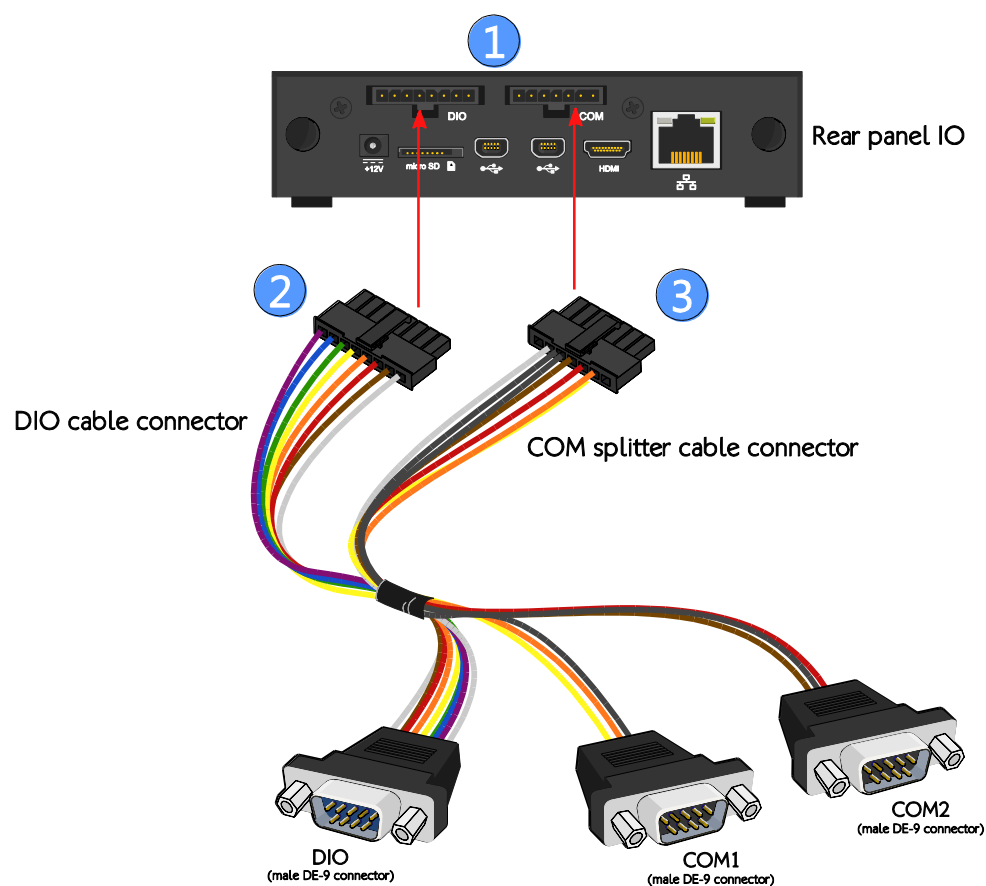


Figure 37: Connecting the DIO and COM cable connectors

5. Software and Technical Supports

5.1. Linux Support

The VIA ARTiGO A600 mainboard is highly compatible with Linux Kernel 3.0.8.

5.1.1. Driver Installation

Support and drivers are provided through various methods including:

- Drivers provided by VIA
- Using a driver built into a distribution package
- Visiting www.viatech.com for the latest updated drivers
- Installing a third party driver (such as the ALSA driver from the Advanced Linux Sound Architecture project for integrated audio)

5.2. Technical Supports and Assistance

- For utilities downloads, latest documentation and new information about the ARTiGO A600, go to <http://www.viatech.com/en/systems/>
- For technical support and additional assistance, always contact your local sales representative or board distributor, or go to <http://www.viatech.com/en/about/contact/> to fill up the form request.
- For OEM clients and system integrators developing a product for long term production, other code and resources may also be made available. Contact VIA to submit a request.

Appendix A. DIO and COM Splitter Cable Connector Pin Descriptions

A.1. DIO cable connector pinout

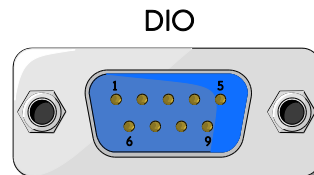


Figure 38: DIO connector (male DE-9 connector) diagram

DIO cable connector	
Pin	Signal
1	GPIO20_CH
2	GPIO24_CH
3	GPIO21
4	GPIO25
5	GND
6	GPIO_26
7	GPIO_22
8	GPIO_27
9	GPIO_23

Table 15: DIO cable connector (male DE-9 connector) pinout

A.2. COM splitter cable connector pinout

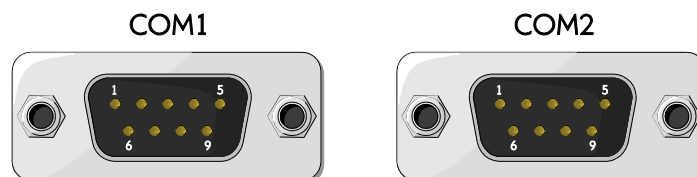


Figure 39: COM splitter cable connectors (male DE-9 connector) diagram

COM1 cable connector		COM2 cable connector	
Pin	Signal	Pin	Signal
1	-	1	-
2	RX1	2	RX2
3	TX1	3	TX2
4	-	4	-
5	GND	5	GND
6	-	6	-
7	-	7	-
8	-	8	-
9	-	9	-

Table 16: COM splitter cable connector (male DE-9 connector) pinout



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