

USER MANUAL

AMOS-800

Ultra Compact and Fanless System
with ARM based VAB-800 board

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- 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.
- Discard used batteries according to local regulations.



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- All cautions and warnings on the equipment should be noted.
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 - 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 60°C (140°F). The equipment may be damaged.
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- 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 and Ordering Information

AMOS-800

- 1 x AMOS-800
- 1 x AC-to-DC adapter, DC 5V/2A, 10W
- 1 x DC Jack to Terminal
- 1 x COM connector cable
- 1 x WLAN module screw pack (2 x hex stand and 2 x M3.5 x 4mm)
- 4 x Rubber foot

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1. Product Overview

The VIA AMOS-800 industrial system is an ultra-compact solution designed to take full advantage of the super power-efficient, ARM based VIA VAB-800 Pico-ITX board, making it easy to create a broad spectrum of easy to assemble, fanless system designs for a wide variety of embedded applications.

A completely fanless system measuring 150mm (W) x 46mm (H) x 108mm (D), the AMOS-800 features a ruggedized design able to withstand a wide operating temperature range of -40°C up to 80°C while offering extremely low power consumption of a mere 3.14W TDP under typical operation.

On-board storage includes 4GB of eMMC Flash and can be expanded through one MicroSD Card. Comprehensive I/O functions on front and rear panels make the AMOS-800 a flexible solution for a wide range of embedded applications. Front I/O includes one COM1, one DIO and one CAN/COM2 port, as well as Line-in/out and Mic-in, while rear I/O includes, one VGA and one HDMI® port, one 10/100 LAN port, and three USB 2.0 ports. An optional VNT9271 WiFi USB module is available which can be supported through one on-board USB pin-header.

1.1. Key Features

1.1.1. ARM based System

Using a single core superscalar ARM Cortex A8 processor at 800 MHz speed, the VIA Embedded ARM based system AMOS-800 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. Fanless, Ruggedized, Ultra compact and Space saving

The AMOS-800 has an ultra compact, ruggedized chassis which is 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. Stylish and fully sealed design

The chassis of the AMOS-800 is composed of four main parts. The stylish ridged aluminum top cover does double duty and acts as the heatsink of the AMOS-800.

1.1.4. Optimize integration with multiple I/O access

Front and rear I/O access enables the AMOS-800 to easily support various applications as well as for easy integration and quick setup.

1.1.5. Storage Expansion

The MicroSD slot enables the AMOS-800 to have a flexible storage of MicroSD card memory.

1.1.6. Wide Range of Operating Temperature

The AMOS-800 carries a qualified thermal performance design which allows a wide range of operating temperature from -40°C up to 80°C, suitable for critical applications.

1.1.7. Shock Resistant

AMOS-800 is shock resistant to 50G for maximum reliability.

1.1.8. Networking Option

The AMOS-800 is equipped with RJ-45 port that supports high speed 100Mbit Ethernet. It also has wireless networking option that give the system a freedom of WiFi access through EMIO-1533 WLAN USB module.

1.1.9. Multiple Mounting Option

The AMOS-800 supports multiple methods for mounting the chassis securely. The rugged industrial PC can be mounted to a table, wall, or even to VESA mountable surfaces with the VESA mounting kit.

1.1.10. Embedded OS ready

The AMOS-800 is 100% compatible with Android 2.3 and Embedded Linux 2.6 operating systems.

1.2. Product Specifications

1.2.1. Computing System

- **Processor**
 - 800MHz Freescale Cortex-A8 single core i.MX537

1.2.2. System Memory

- **Technology & Max. Capacity**
 - 1GB DDR3-800 SDRAM using 128M x16 memory devices

1.2.3. Flash

- **Capacity**
 - 4GB onboard eMMC Flash memory

1.2.4. Graphic

- **Controller**
 - Supports two integrated graphics processing units: an OpenGL® ES 2.0 3D graphics accelerator and an OpenVG™ 1.1 2D graphics accelerator
- **CRT Interface**
 - 1x Onboard VGA port
- **HDMI® Interface**
 - Silicon image SiI9024A HDMI® transmitter
 - 1 x Onboard HDMI® port

1.2.5. Ethernet

- **Controller**
 - SMSC LAN8720A 10/100 PHY transceiver with HP Auto-MDIX support
- **Interface**
 - 1 x RJ45 connector

1.2.6. HD Audio

- **Controller**
 - Freescale SGTL5000 low power stereo codec with headphone AMP
- **Interface**
 - Supports Line-In, Line-out, Mic-in connectors

1.2.7. Serial

- **USB**
 - SMSC USB 2.0 high speed 4-port hub controller
 - 4 x USB ports, USB 2.0 compliant
 - 3 x USB connectors
 - 1 x USB 2.0 pin header onboard supporting optional VIA 802.11n WiFi module VNT 9271
- **COM**
 - 1 x D-Sub 9-pin female connector

1.2.8. CANBus

- **Controller**
 - TI SN65HVD1050 EMC optimized CAN transceiver
- **Interface**
 - 1 x D-Sub 9-pin female connector

1.2.9. GPIO

- **General Purpose I/O**
 - 1 x D-Sub 9-pin female connector (GPI x4 + GPO x4)

1.2.10. Storage Interface

- **Interface**
 - 4GB onboard eMMC Flash memory
 - 1 x Onboard Micro SD connector

1.2.11. System Indicator

- **Power Status LED**
 - 1 x Red color
- **HDD Activity LED**
 - 1 x Green color LED

1.2.12. Watch Dog Timer

- **Output**
 - Integrated watch dog timer supporting two comparison points.
First comparison point can interrupt ARM core, and the second comparison point is capable of generating external interrupts on WDOG line

1.2.13. Onboard I/O Coastline Connectors

- **Front Panel I/O**
 - 1 x COM port
 - 1 x CANBus connector
 - 1 x GPIO connector
 - 3 x 3.5Ø phone Jack connectors as Line-out, Mic-In, Line-in
 - 1 x HDD & Power LED
 - 1 x Power on/off switch
 - 1 x DC power input connector by 2-pole phoenix connector
- **Rear Panel I/O**
 - 1 X HDMI® port
 - 1 x VGA port connector (1 x DB-15)
 - 1 x 10/100Mbps Ethernet connector (1 x RJ-45)
 - 3 x USB 2.0 connectors
 - 1 x eMMC/Micro SD boot switch
- **Bottom Opening Cover**
 - Bottom removable door plate to access the Micro SD flash drive

1.2.14. Power Supply

- **Input Voltage**
 - DC 5V
- **Power Input Connector**
 - 1 x DC power input with DC Jack
- **Power Consumption**
 - Typical: 3.14W

1.2.15. Mechanical

- **Construction**
 - Aluminum top cover
 - Metal chassis housing
 - Removable left & right of wall mountable bracket
- **VESA**
 - Optional VESA mounting bracket (75 mm x 75 mm and 100 mm x 100 mm)
- **Dimension**
 - 150 mm (W) x 45 mm (H) x 108 mm (D)

1.2.16. WiFi

- VIA 802.11 n Wireless module VNT 9271 (optional)

1.2.17. Environmental Specification

- **Operating Temperature**
 - -40°C up to 80 °C with VGA display output
 - -20°C ~80°C with HDMI® display output
- **Storage Temperature**
 - -40°C ~80 °C@ 90%, non-condensing
- **Relative Humidity**
 - 10 ~ 90% @ 45°C, non-condensing
- **Vibration Loading During Operation**
 - 5Grms, IEC 60068-2-64, random, 5 ~ 500Hz, 1 Oct./min, 1hr/axis (with onboard eMMC)
- **Shock During Operation**
 - 50G, IEC 60068-2-27, half size, 11ms duration (with onboard eMMC)
- **EMC Approved**
 - CE, FCC, Class A

1.2.18. Software Compatibility

- **Operating System**
 - Android 2.3
 - Embedded Linux 2.6



Note:

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.

1.3. Product Dimensions

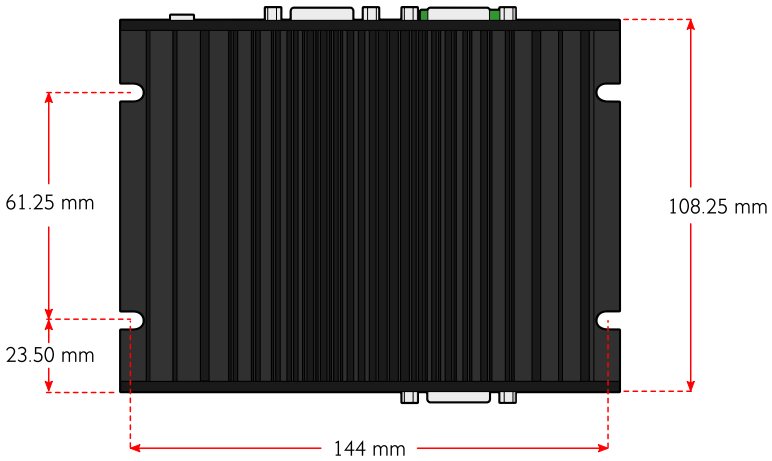


Figure 1: Dimensions of the AMOS-800 (top view)



Figure 2: Dimensions of the AMOS-800 (front view)

2. I/O Interface

The AMOS-800 has a wide selection of interfaces. It includes a selection of frequently used ports as part of the external I/O coastline.

2.1. External I/O Ports

The AMOS-800 has external I/O ports placed along both faces of the chassis.

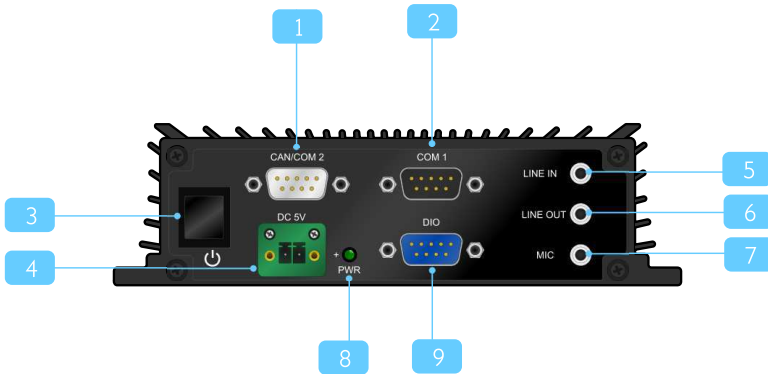


Figure 3: Front I/O panel

Item	Description	Item	Description
1	CAN/COM2 connector	6	Line-Out
2	COM1 connector	7	Mic-In
3	Power button (On/Off)	8	Power LED
4	DC power input connector	9	DIO connector
5	Line-In		

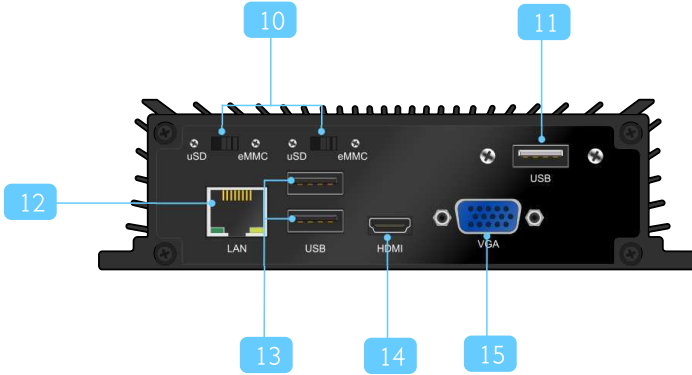


Figure 4: Rear I/O panel

Item	Description	Item	Description
10	eMMC/Micro SD boot switch	13	USB2.0 ports
11	USB 2.0 port	14	HDMI port
12	Gigabit Ethernet port 1 (LAN1)	15	VGA port

2.1.1. Power button

The AMOS-800 comes with a power button on the front panel that supports two functions: soft power on/off (instant off or delay 4 seconds), and suspend.



Figure 5: Power button diagram

2.1.2. DC-In Power Input Connector

The AMOS-800 comes with a 2-pole Phoenix connector on the front panel that carries $5V_{DC}$ external power input.

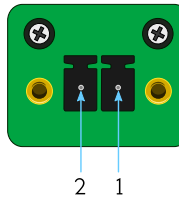


Figure 6: Power input connector pinout diagram

Pin	Signal
1	5VDC
2	GND

Table 1: Power input connector pinout

2.1.3. LED Indicator

There is one LED on the front panel of the AMOS-800 that indicates the status of the system:

- PWR LED is green and indicates the status of the system's power status.

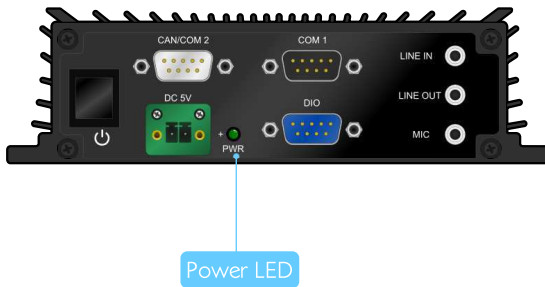


Figure 7: System LED indicator

2.1.4. Audio Jacks

There are three audio jack receptacles integrated into a single stack on the I/O coastline. Each receptacle can fit a 3.5 mm Tip Ring Sleeve (TRS) connector enabling connection to Line-In, Line-Out and MIC-In. The Line-In jack is for connecting an external audio device such as CD player, tape player and etc. The Line-Out jack is for connecting to external speakers or headphones. The MIC-In jack is for connecting to a microphone.

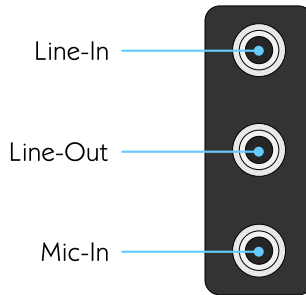


Figure 8: Audio jack receptacle stack

Wiring	Line-In	Line-Out	MIC-In
Tip	Left channel in	Left channel	Left channel
Ring	Right channel in	Right channel	Right channel
Sleeve	Ground	Ground	Ground

Table 2: Audio jack receptacle pinout

2.1.5. COM1 Connector

The integrated 9-pin COM connector uses a male DE-9 connector. The COM1 connector supports the RS-232 standard. The pinout of the COM port is shown below.

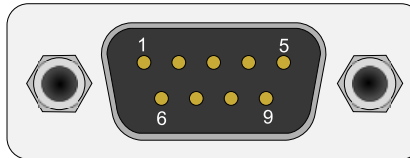


Figure 9: COM1 connector pinout diagram

Pin	Signal
1	DCD1
2	SIN1(Tx)
3	SOUT1(Rx)
4	DTR1
5	GND
6	DSR1
7	RTS1
8	CTS1
9	RI1

Table 3: COM1 connector pinout

2.1.6. CAN/COM2 Connector

The integrated 9-pin CAN/COM2 connector uses a male DE-9 connector. The pinout of the CAN/COM2 port is shown below.

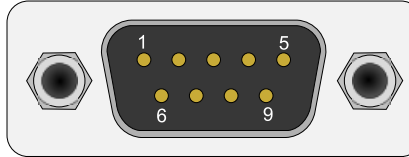


Figure 10: CAN/COM2 connector pinout diagram

Pin	Signal
1	N/A
2	CANL1
3	N/A
4	N/A
5	GND
6	GND
7	CANH1
8	RX
9	TX

Table 4: CAN/COM2 connector pinout

2.1.7. DIO

The AMOS-800 provides one D-sub 9-pin female connector, which offers Digital IO communication interface port.

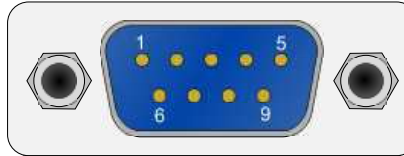


Figure 11: DIO port pinout diagram

Pin	Signal
1	GPIO32
2	GPI4
3	GPO12
4	GPI5
5	GPIO9
6	GPI9
7	GPIO12
8	GPI8
9	+5V

Table 5: DIO port pinout

2.1.8. eMMC/Micro SD boot switch

The AMOS-800 comes with two boot switches which allows user to select boot device from eMMC and Micro SD.

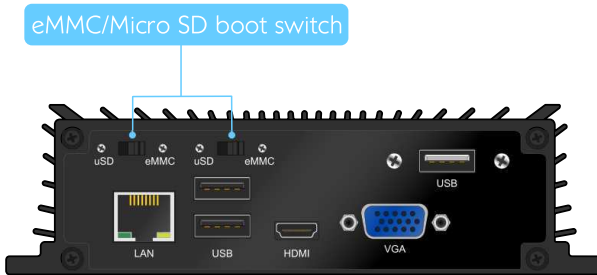


Figure 12: eMMC/Micro SD boot switch



Note:

Both boot switches have to be set at the same position for the boot device to be selected.

2.1.9. 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 RJ45). The Fast Ethernet ports are controlled by VIA Fast Ethernet controller. The pinout of the Fast Ethernet port is shown below.

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

Table 6: Fast Ethernet port pinout

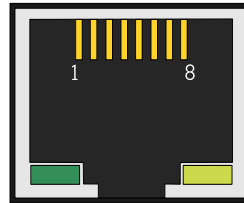


Figure 13: Fast Ethernet port pinout diagram

The RJ-45 port has two individual LED indicators located on the front side to show its Active/Link status and Speed status.

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

Table 7: Fast Ethernet LED color definition

2.1.10. USB 2.0 Port

The AMOS-800 provides three USB 2.0 ports, each USB port gives complete Plug and Play and hot swap capability for external devices. The USB interface complies with USB UHCI, Rev. 2.0. The pinout of the typical USB 2.0 port is shown below.

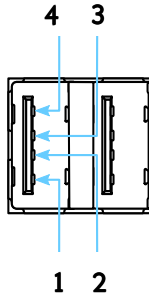


Figure 14: USB 2.0 port pinout diagram

USB1		USB2	
Pin	Signal	Pin	Signal
1	VCC	1	VCC
2	USB data -	2	USB data -
3	USB data +	3	USB data +
4	GND	4	GND

Table 8: USB 2.0 port pinout

2.1.11. Mini HDMI® Port

The integrated 19-pin HDMI® port uses an HDMI® Type C connector as defined in the HDMI® specification. The HDMI® port is for connecting to HDMI® displays. The pinout of the Mini HDMI® port is shown below.

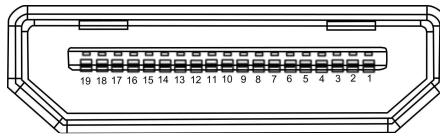


Figure 15: Mini HDMI® port pinout diagram

Pin	Signal	Pin	Signal
1	TMDS Data2 Shield	2	TMDS Data2+
3	TMDS Data2-	4	TMDS Data1 Shield
5	TMDS Data1+	6	TMDS Data1-
7	TMDS Data0 Shield	8	TMDS Data0+
9	TMDS Data0-	10	TMDS Clock Shield
11	TMDS Clock+	12	TMDS Clock-
13	DDC/CEC Ground	14	CEC
15	SCL	16	SDA
17	Reserved (N.C. on device)	18	+5V Power
19	Hot Plug Detect		

Table 9: HDMI® port pinout

2.1.12. VGA Connector

The 15-pin VGA connector uses a female DE-15 connector. The VGA connector is for connecting to analog displays. The pinout of the VGA connector is shown below.

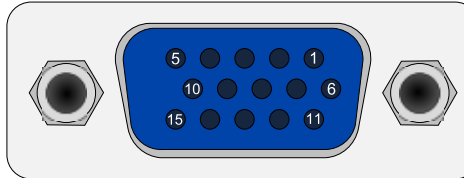


Figure 16: VGA connector pinout diagram

Pin	Signal	Pin	Signal
1	VGA-R	9	+5VCRT
2	VGA-G	10	Ground
3	VGA-B	11	NC
4	NC	12	VGA-SPD
5	Ground	13	VGA_HS
6	Ground	14	VGA_VS
7	Ground	15	VGA-SPCLK
8	Ground		

Table 10: VGA connector pinout

3. 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.

3.1. Installing the Micro SD Card

Step 1

Locate the Micro SD card access cover on the bottom side of the AMOS-800 and remove the screw.

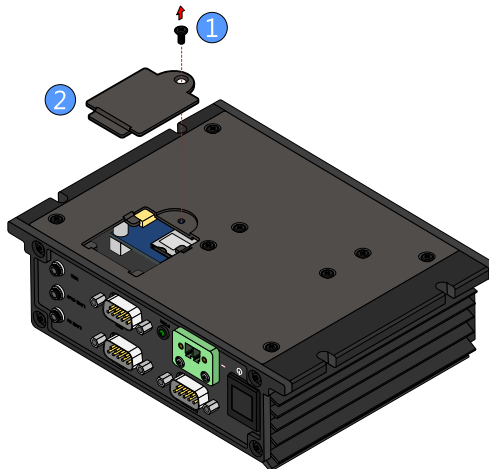


Figure 17: Removing Micro SD card access cover

Step 2

Gently lift up and remove the access cover.

Step 3

Gently slide the Micro SD card into the card slot reader with the label side faces up then press the card until it locks into place.

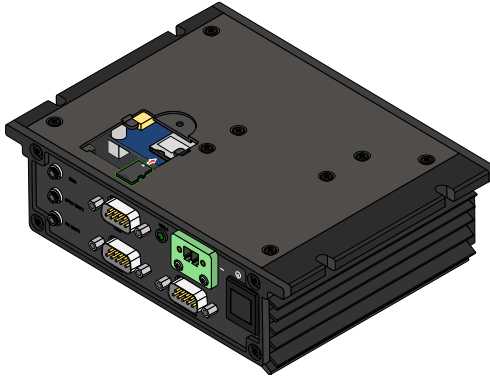


Figure 18: Inserting Micro SD card

Step 4

Reinstall the Micro SD card access cover then secure it with the screw.



Note:

To remove the Micro SD card, press the card to disengage from the slot reader then gently pull out the card.

3.2. Removing the Chassis Top Cover

Step 1

Remove four corner screws from the bottom of the AMOS-800.



Figure 19: Removing chassis bottom screws

Step 2

Unscrew the four chassis screws from both I/O face plates and the screws of VGA connector on the rear plate.



Figure 20: Removing front and rear plate screws

Step 3

Then carefully pull the rear face plate and gently slide the top cover backward and lift off the top cover.

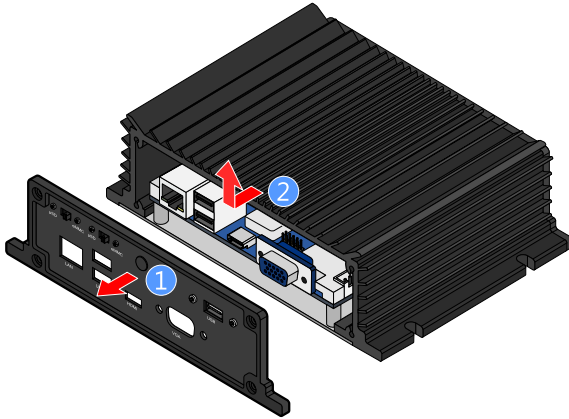


Figure 21: Removing top cover chassis

3.3. Installing the WLAN (WiFi) kit

Step 1

Mount the WLAN USB module (EMIO-1533) on the heatsink and secure it with two screws as indicated in the figure below.

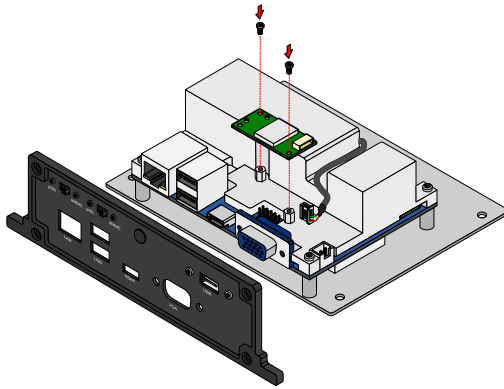


Figure 22: Installing WLAN module

Step 2

Attach the WLAN USB board-to-board cable to the WLAN USB module (EMIO-1533) connector. Then remove the antenna WLAN hole cover from the rear I/O plate.

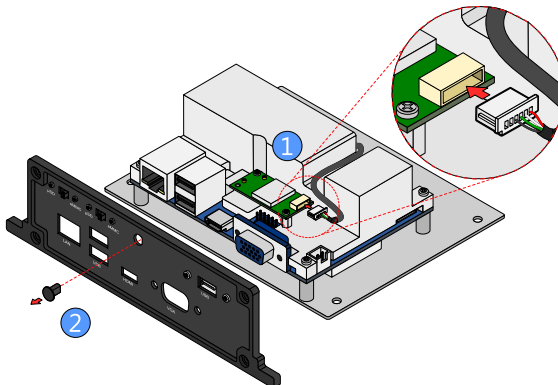


Figure 23: Connecting WLAN board-to-board cable and removing antenna hole cover

Step 3

Insert the WLAN port connector into the antenna hole from the inside of the rear I/O plate. Insert the washer, fasten it with the nut and install the external antenna. Gently connect the mini coaxial cable of the WLAN port connector to the mini RF connector on the WLAN USB (EMIO-1533) module.

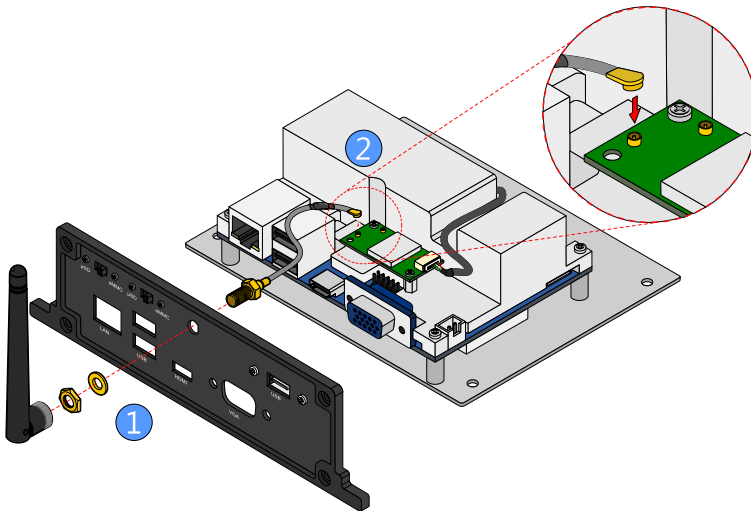


Figure 24: Installing WLAN antenna

Step 4

Reinstall the top cover chassis and secure the front and rear I/O plates.

3.4. Installing the Rubber Feet

Step 1

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

Step 2

Attach carefully each rubber foot. Firmly press it down to ensure the rubber foot is properly in place.



Figure 25: Installing rubber feet

3.5. Installing the VESA mounting kit (optional)

An optional VESA mounting kit is available for mounting the AMOS-800 behind the monitor or wall.

Step 1

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

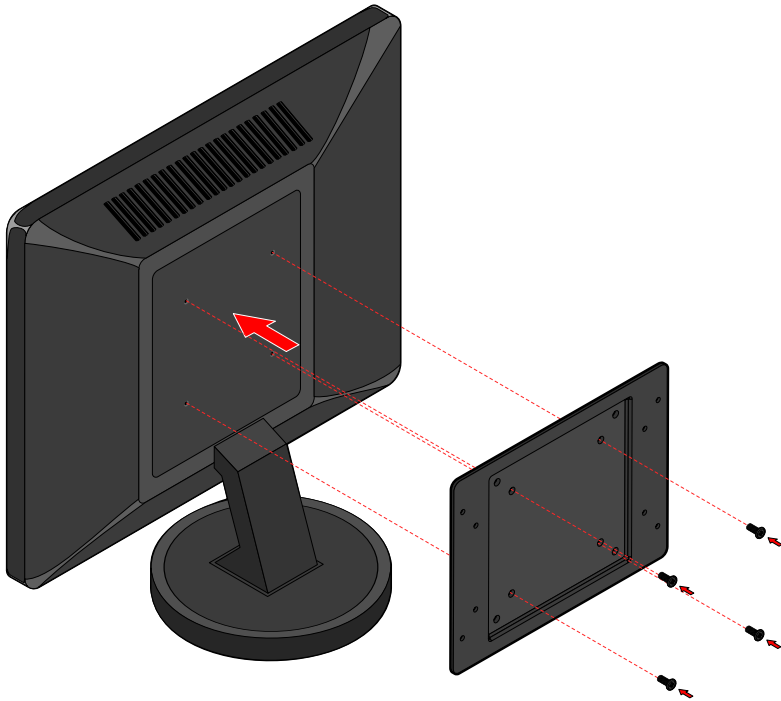


Figure 26: Installing VESA plate

Step 2

Secure the VESA mounting plate with four M4 x 7mm screws.

Step 3

Attach the VESA bracket at back of the AMOS-800 using four M5 x 10mm screws.

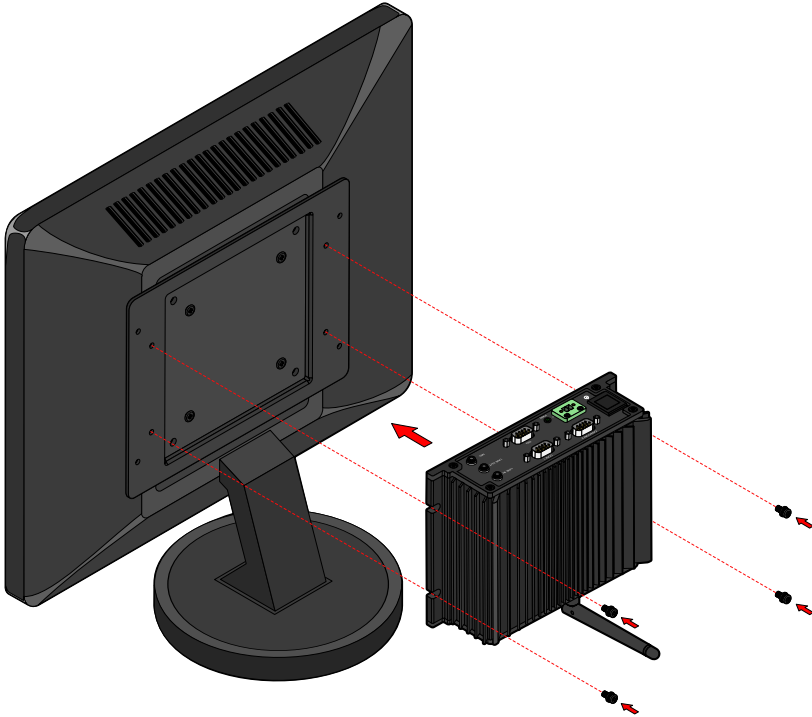


Figure 27: Installing AMOS-800 to the VESA plate



Reminder:

Remove first the rubber feet from the bottom of the AMOS-800 before installing it to the VESA bracket.

4. Driver Installation

4.1. Microsoft Driver Support

The AMOS-800 is compatible with Microsoft operating systems. The latest Windows drivers can be downloaded from the VIA Embedded website at www.viaembedded.com.

For embedded operating systems, the related drivers can be found in the VIA Embedded website at www.viaembedded.com.

4.2. Linux Driver Support

The AMOS-800 is compatible with many Linux distributions.

Support and drivers are provided through various methods including:

- Drivers provided by VIA
- Using a driver built into a distribution package
- Visiting www.viaembedded.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)
- Debian Linux 6 (Kernel 2.6.32-5-686)

For OEM clients and system integrators developing a product for long term production, other code and resources may also be made available. You can submit a request to your VIA Embedded support contact.

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