VM-521
User's Manual

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About this Manual

The VM-521 User's Manual provides instruction for qualified personnel to follow when setting up a new VM-521 device.

This document is intended for use by qualified personnel to compliment the training and expertise, not to replace it.

Related Information

Current information and manuals are available for download at the following website:

http://www.ruggon.com

Conventions

Bolded or underlined text is used to emphasize the designated information.

A Note is used to provide additional information for the device or settings.

A Caution is used to warn against potential hazards or to caution against unsafe practices.

A Warning is used to identify immediate hazards for property damage, injury or death.

Basic Safety Guidelines

Intended Use

The VM-521 ultra-rugged vehicle mounted computer is equipped with multi-functional terminals for stationary and mobile applications in industrial environments such as logistics, warehousing, fleet management, manufacturing and the automotive industry.

The operator is solely responsible for any damage resulting from unauthorized modifications to the device.

Unintended Application Use

The device is not designed for use in life-support systems or critical safety/security systems where system malfunction can lead to the direct or indirect endangerment of human life. The operator is fully responsible for using the device in these situations.

Maintenance and Operation Overview

The VM-521 is designed and manufactured according to strict controls and following the stated safety regulations. The following list identifies incorrect operating uses of the VM-521. Incorrect use of the VM-521 can lead to hardware damage, safety issues and possible risk to personnel health:

- The VM-521 is improperly or incorrectly installed;
- The VM-521 is under operation by untrained personnel;
- The VM-521 is not maintained as recommended;
- The VM-521 is not used as intended.

Safety

To prevent injury and damage, read the following safety guidelines prior to operating the device. The manufacturer assumes no liability for any and all damages arising from misuse or noncompliance with these guidelines.

Electrical Hazards

Installing Easy-access Separators

The VM-521 is not equipped with separators (switches) that are accessible from the outside. To quickly disconnect the device from the power supply in emergencies:

- Install an easy-access separator such as a switch or circuit breaker close to the device;
- Ensure that the separator separates all power cables.

Only connect to SELV Circuits

The VM-521 should only be connected to Safety Extra Low Voltage (SELV) circuits.

- Do not connect/disconnect any cables during thunderstorms;
- Do not connect/disconnect the VM-521 cables during thunderstorms.

Cleaning/Servicing: Disconnect the VM-521 from Power

„ Disconnect the VM-521 from power before cleaning or servicing it.

Repeated Power Pack Fuse Blowing

Contact an authorized service personnel for repairs to the power pack. In the event of a blown fuse after replacing the fuse, contact an authorized service personnel to avoid electrical shock.

Laying Cables

„ Cables must be laid in accordance with local and state regulations.

„ Ensure that the power cable is laid properly and properly secured.

Use only Supplied Power Cables

RuggON power cables meet industrial requirements for low-temperature flexibility, UV resistance, and oil resistance. Use only supplied power cables from RuggON.

If other power cables are used, the following may apply:

„ The operator is solely responsible for the resulting damage;

„ All RuggON warranties are void.

Charging the Vehicle Battery

When charging the vehicle battery,

„ The VM-521 must be disconnected from the vehicle battery;

„ Or ensure that the maximum permitted input voltage of the device is not exceeded.

Environmental Hazards

Do not use the VM-521 in locations near/with flammable gases or vapor.

The use of electrical equipment in explosive environments can be dangerous.

„ Turn off the device when near a gas station, fuel depot, chemical plant or a place where blasting operations take place.

Safety Guidelines for Mounting

Risk of Injury

The device may fall during transportation or installation and cause injury. It is recommended to have at least two people when installing/uninstalling the device.

When the mounting bracket breaks

„ When installing the VM-521, be aware of the sudden breaks of the bracket which may cause injury.

„ It is recommended to have proper safety measures in place such as security cables when installing.

Positioning the VM-521 on a Vehicle

Inside the vehicle, if a keyboard and scanner need to be installed, make sure there's enough space and the vision of the driver is not blocked at all causes.

Installing Loudspeakers to the VM-521

Any audio equipment must be installed by a trained professional prior to the installation of the device.

Environmental

Ambient Temperature

The VM-521 operates on the basis of a passive cooling concept which internal waste heat is released via the housing surface and requires fresh airflow in the environment.

- „ Operating the M-521 with no fresh cooling air may cause overheating and damage to the device.

- „ The operating environment should not be enclosed to prevent the cool air being heated by the heat waste from the device.

Connecting and Disconnecting External Devices

To prevent the considerable damage, the VM-521 and the external device should be disconnected from power when connecting/disconnecting excluding USB devices.

Only Use Authorized Accessories

Only use the supplied cables, power packs and other accessories that have been tested and approved by RuggON. Contact your local distributor for further information.

Radio Transmissions

Permitted Transmission Power

Follow the national regulations for the maximum permitted transmission power.

The operator is solely responsible for this type of operation.

Installation Distance

To follow the limits set by the FCC for exposure to radio waves, install the VM-521 with the minimum distance (20cm) between individuals and the PC antenna .

Radio Frequency Limited Locations

Considering the radio frequency limitation in hospitals and aircraft, the VM-521 can only be installed with permission.

Industrial computers may affect the function of implanted medical devices such as pacemakers and may cause malfunction. Always keep a distance of at least 20cm between a pacemaker and an industrial computer to minimize the risk of interference.

Cleaning and Servicing

- „ Disconnect the VM-521 from power before cleaning or servicing.

- „ Never clean the VM-521 with compressed air, a pressure washer or a vacuum cleaner.

- „ If necessary, clean the housing of the VM-521 with a damp cloth.

- „ Clean the touch-screen with a nonabrasive cloth.

Regulatory and Certification

FCC

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- ,, Reorient or relocate the receiving antenna.
- ,, Increase the separation between the equipment and the receiver.
- ,, Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- ,, Consult the dealer or an experienced radio/TV technician for help.

Shielded interconnect cables and shielded AC power cable must be employed with this equipment to insure compliance with the pertinent RF emission limits governing this device. Changes or modifications not expressly approved by the system's manufacturer could void the user's authority to operate the equipment.

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

RF Exposure Warning

The equipment complies with FCC RF exposure limits set forth for an uncontrolled environment. The equipment must not be co-located or operating in conjunction with any other antenna or transmitter.

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

End users must follow the specific operating instructions for satisfying RF exposure compliance. To maintain compliance with FCC RF exposure compliance requirements, please follow operation instruction as documented in this manual.

CE Marking

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. Please contact your local representative for ordering information.

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

European Notice

CE Declaration of Conformity

For the following equipment: tablet with built-in 802.11a/b/g/n WLAN module

Is herewith confirmed to comply with the requirements set out in the Council Directive on the

Approximation of the Laws of the Member States relating to Electromagnetic Compatibility (2004/105/ EC), Low-voltage Directive (2006/95/EC), the procedures given in European Council Directive 1999/5/EC.

The equipment was passed. The test was performed according to the following European standards:

- „ EN 300 328 V.1.4.1 (2003-04)
- „ EN 301 489-1 V.1.3.1 (2001-09) / EN 301 489-17 V.1.1.1 (2000-09)
- „ EN 301 893 V.1.2.2 (2003-06)
- „ EN 50371: 2002
- „ EN 60950: 2000

Regulatory Statement (R&TTE/WLAN IEEE 802.11b & 802.11g)

European standards dictate maximum radiated transmit power of 100mW EIRP and frequency range 2.400-2.4835GHz; In France, the equipment must be restricted to the 2.4465-2.4835GHz frequency range and must be restricted to indoor use.

Lithium Battery Safety Statement

Lithium battery inside. Danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by battery manufacturer.

THIS PRODUCT CONTAINS LITHIUM-ION BATTERY PACKS. IT MUST BE DISPOSED OF PROPERLY. CONTACT LOCAL ENVIRONMENTAL AGENCIES FOR INFORMATION ON RECYCLING AND DISPOSAL PLANS IN YOUR AREA.

Chapter 1. Introduction

The VM-521 is a rugged, vehicle-mounted Personal Computer (PC). The VM-521 fully supports wireless data communications from a properly configured off road, on road or maritime vehicle. The device is equipped with 802.11, Bluetooth, GPS or GLONASS for wireless data communications.

The VM-521 is a rugged 10.4" tablet computer capable of 1024 x 768 resolution. The anti-reflection tempered 5-wire resistive touch panel is capable of sunlit and hyper dimming for day and night mode readability. The illuminated keyboard is designed to compliment a user friendly experience during night mode operations.

The VM-521 supports the following operating systems:

- Windows Embedded 8.1 Industry x64
- Windows 7 Professional with Service Pack 1 x64
- Windows Embedded 8 Standard x64
- Windows Embedded Standard 7 x64
- Linux Kernel

About This Guide

The VM-521 User Manual provides instruction for qualified personnel to use as a guide for setup of the device. This document is not intended to replace the training and expertise of the end-user.

Technical Specifications

Table 1. Technical Specifications

Item	Description
Processor	Intel® Bay Trail-I E3845 1.91GHz (Quad Core)
Memory	4GB SO-DIMM DDR3L SDRAM, up to 8GB
Storage	SSD x 1, SD slot x 1
Display	10.4-inch XGA (1024 x 768); 700,000 hours backlight life 1,000 nits sunlight readable (MIL STD 85762A) to 0.1 nits hyper dimming for night mode operation - Anti-reflection tempered 5-wire resistive touch panel - PCT (Gorilla) by request only
Wireless Connectivity	802.11 ac/a/b/g/n 2x2 - Bluetooth 2.0/2.1+EDR, 3.0+HS, 4.0 IE - GPS / QZSS or GLONASS - Wi-Fi and GPS, built-in and external antennas are interchangeability

Item	Description
DC Power Pack 24/48V$_{dc}$ 35W Nominal	24/48V$_{dc}$ nominal Voltage range: 18V$_{dc}$ - 60V$_{dc}$ Galvanically isolated Maximum output: 35W Withstands bursts up to 2 kV DC/DC Delay Timer/Filter
Battery	2,900mAh, 7.5V
Housing (Mechanical)	Die-cast aluminum alloy, fanless design
I/O Interfaces	„ Dual Gigabit LAN for teaming / redundant function support „ RS-232 x 1 + 5V support; 3KVrms isolation protection for RS-422/485 x 1 (RS-485 supports auto flow control and NMEA 0183 physical layer) „ 2 x USB (2.0 and 1.x compliant) „ 2.5KVrms isolation protection CANBUS (Controller Area Network) x 2, NMEA 2000 physical layer support „ 3KVrms isolation protection for 4 DI + 4 DO „ Stereo microphone x 1 or line-in, stereo HD audio x 1 „ Waterproof speakers
Dimensions	„ 275 mm (W) x 252 mm (H) x 68 mm (D) „ 10.83 in. (W) x 9.92 in. (H) x 2.68 in. (D)
Weight	„ 3.8 kg (include SSD) „ 8.38 lbs (include SSD)
Operating System	„ Windows Embedded 8.1 Industry x64 „ Windows 7 Professional with Service Pack 1 x64 „ Windows Embedded 8 Standard x64 „ Windows Embedded Standard 7 x64 „ Linux Kernel

Item	Description
Ambient Conditions	Operating temperature: , ‚ -30°C (-22°F) to 55°C (122°F) In accordance with MIL-STD-810G Method 501.5 High Temperature Procedure II – Operation In accordance with MIL-STD-810G Method 502.5 Low Temperature Procedure II – Operation Storage temperature: , ‚ -30°C (-22°F) to 70 °C (158°F) In accordance with MIL-STD-810G Method 501.5 High Temperature Procedure I – Storage In accordance with MIL-STD-810G Method 502.5 Low Temperature Procedure I – Storage Relative humidity: , ‚ 5% to 95% @ 30°C (86°F) to 60°C (140°F) non-condensating in accordance with MIL-STD-810G Method 507.5 Humidity Procedure II Aggravated Cycles Vibration Test: , ‚ Operating: MIL-STD-810G Method 514.6 Category 4, Fig 514.6C-1 Common carrier (US highway truck vibration exposure); Fig 514.6C-2 Composite two-wheeled trailer; Fig 514.6C-3 Composite wheeled vehicle , ‚ Non-Operating: MIL-STD-810G Method 514.6 Category 24, Fig 514.6E-1 (General minimum integrity exposure) Shock Test: , ‚ Operation: MIL-STD-810G Method 516.6 Procedure 1 Functional Shock (40g, 11ms) , ‚ Non-Operation: MIL-STD-810G Method 516.6 Procedure V Crash Hazard Shock (75g, 8~13ms)
Video Capturing	Optional video input up to 4 ports with comprehensive SDK included
Certification	CE, FCC, CB

Unpacking the Device

Before you begin the installation or configuration process make sure to inspect all components and accessories. Contact your representative if there are any missing or damaged items. See *"Contacting RuggON"* on page 63.
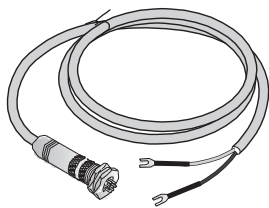
Scope of Delivery

The VM-521 is delivered with the following items. The VM-521 is not shipped with accessories. All accessories are sold separately. For help, contact your local RuggON sales representative. See *"Contacting RuggON"* on page 63.
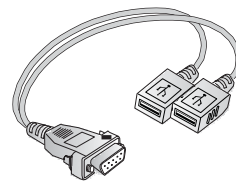
Please verify the delivery of the contents upon receipt.
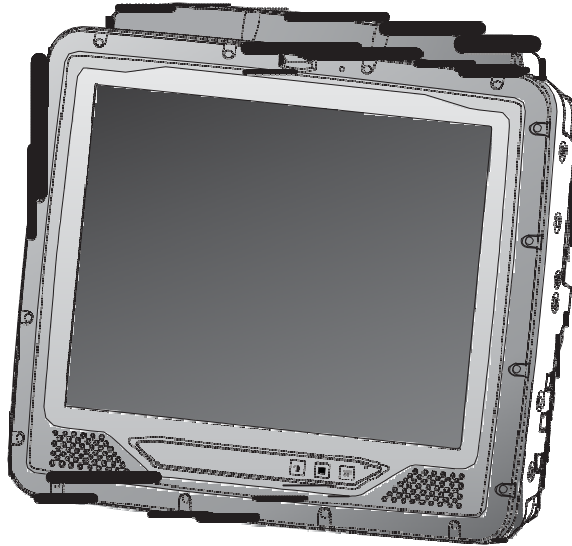
VM-521 (64GB SSD included)

18V and 24V fused bare wire input cable with safety-locking nut

DB9 serial to dual USB cable

Packaging

The packaging material has been selected to optimally protect your device. After unpacking, store the original packaging material in the event that you need to return shipment.

Identifying the Device

Device Overview

Figure 1. Front View
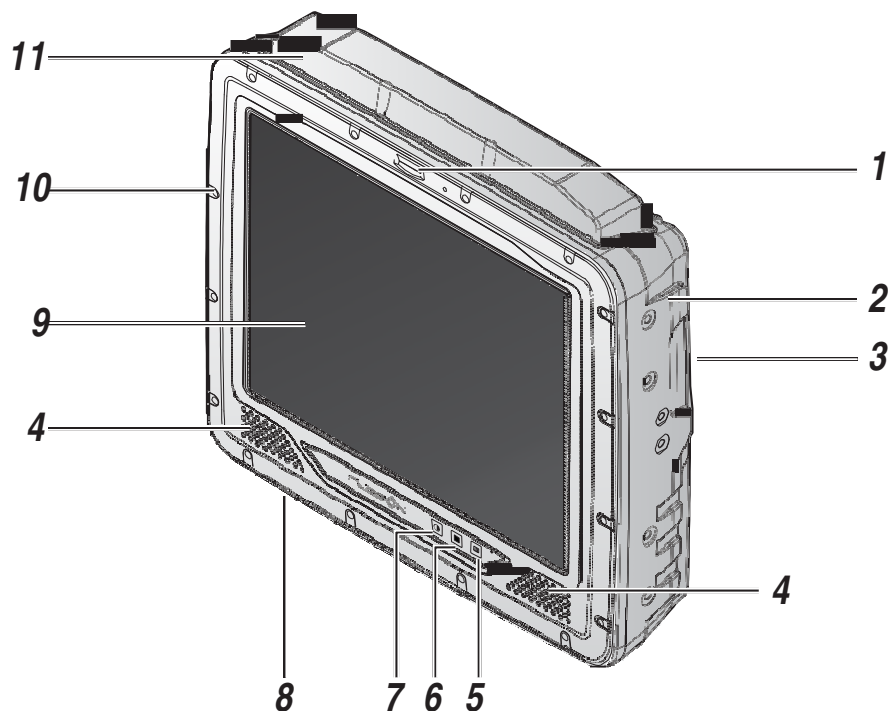
Table 2. Front View

No	Item	Description
1	LED indicator	See *"LED Status"* on page 55.
2	Side view	See *"Side View"* on page 14 for further information.
3	Rear view	Back of device. See *"Rear View"* on page 15 for further information.
4	Speakers	2 x 2W waterproof, front mounted speakers.
5	Defrost key	Optional key to provide function for panel defrost.
6	FN key	Key provides function for Home or SW initiation (programmable).
7	Dimming key	Key provides switching function between normal and night operation modes.
8	Bottom view	Bottom of device. See *"Bottom View"* on page 13 for further information.
9	Touch screen	Anti-reflection tempered 5-wire resistive touch panel.
10	Stainless screws	x16 stainless steel screws to secure chassis.
11	Antenna housing	Built-in antenna for GPS/QZSS or GLONASS and Wi-Fi + Bluetooth.

Front View

Figure 2. Front View
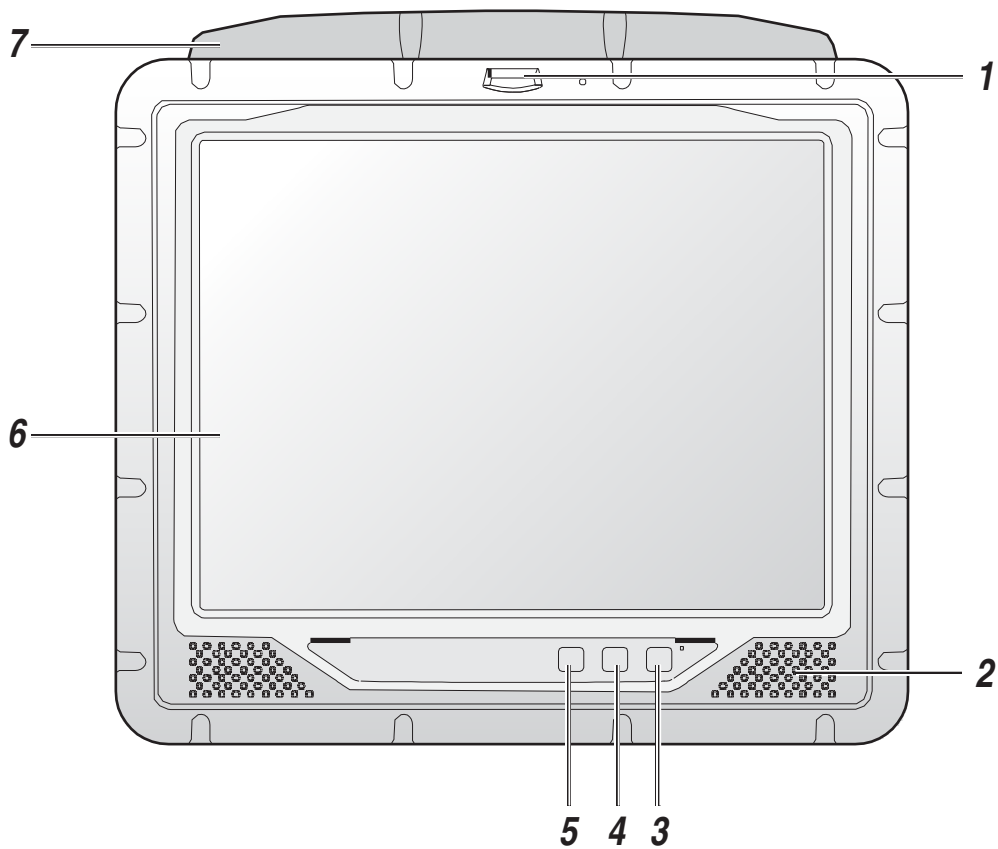
Table 3. Front View

No	Item	Description
1	LED indicator	See *"LED Status"* on page 55.
2	Speakers	2 x 2W waterproof, front mounted speakers.
3	Defrost/defog key	Key provides function for panel defrost and defog (optional function).
4	FN key	Key provides function for Home or SW initiation (programmable).
5	Dimming key	Key provides switching function between normal and night operation modes.
6	Touch screen	Anti-reflection tempered 5-wire resistive touch panel.
7	Antenna housing	Built-in antenna for GPS/QZSS or GLONASS and Wi-Fi + Bluetooth.

Bottom View

Figure 3. Bottom View
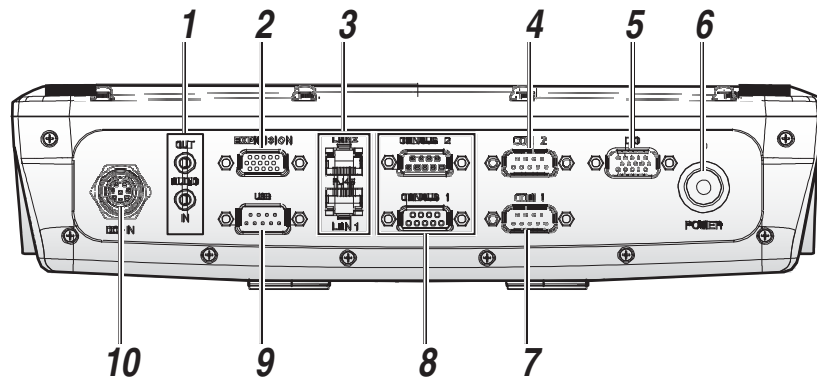
Table 4. Bottom View

No	Item	Description
1	AUDIO In/Out	Connect audio cabling to the device.
2	Expansion	Connect cabling to a camera.
3	LAN x 2	Connect the VM-521 to an Ethernet (RJ-45) cable.
4	COM2	Connect RS-422/RS-485 devices such as a printer or scanner to the VM-521.
5	DIO	Connect to a DIO device or accessory (4 x in, 4 x out).
6	Power switch	Turns the VM-521 on or off.
7	COM1	Connect RS-232 devices such as a printer or scanner to the VM-521.
8	CANBUS x 2	Connect CANBUS cables to allow devices to communicate within a vehicle without the use of a host computer.
9	USB	Connect the VM-521 DB9 serial to dual USB cable to USB devices.
10	DC In	Connect the VM-521 to a power supply (9-36 / 18-60 VDC) source.

Side View

Figure 4. Side View

Left View   **Right View**

1

2
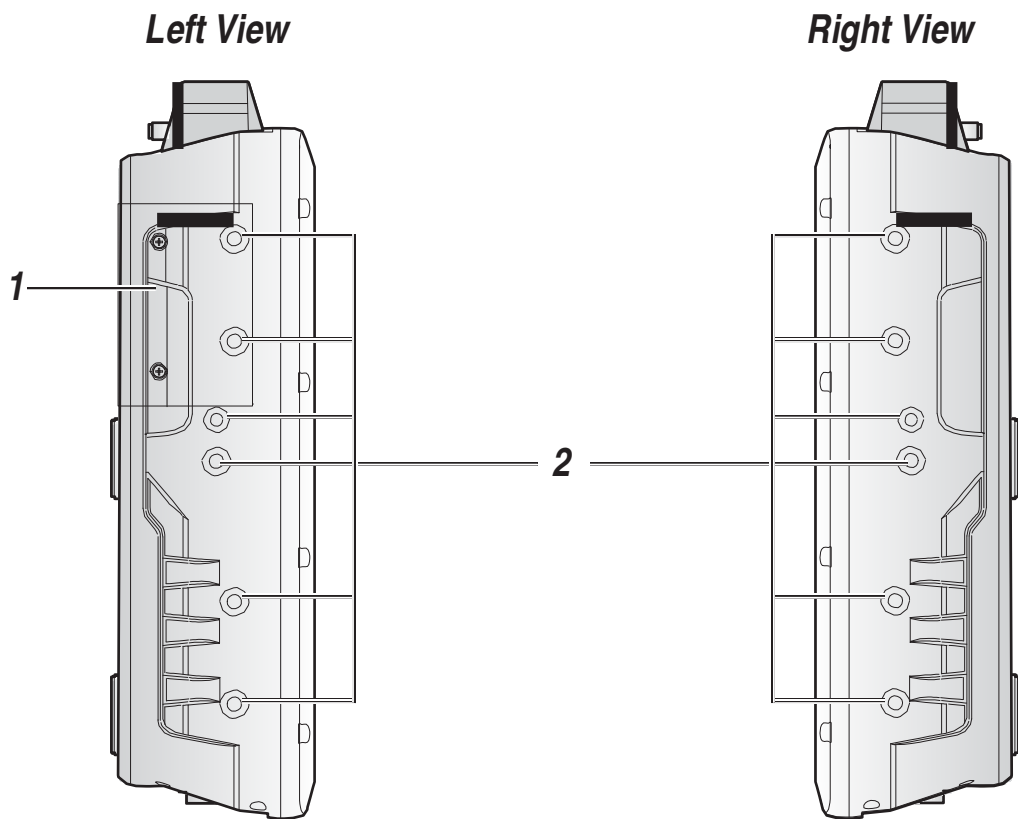
Table 5. Side View

No	Item	Description
1	Communication cover	Open to access SD card
2	Mounting holes	Securing holes for additional mounting options.

Rear View

Figure 5. Rear View
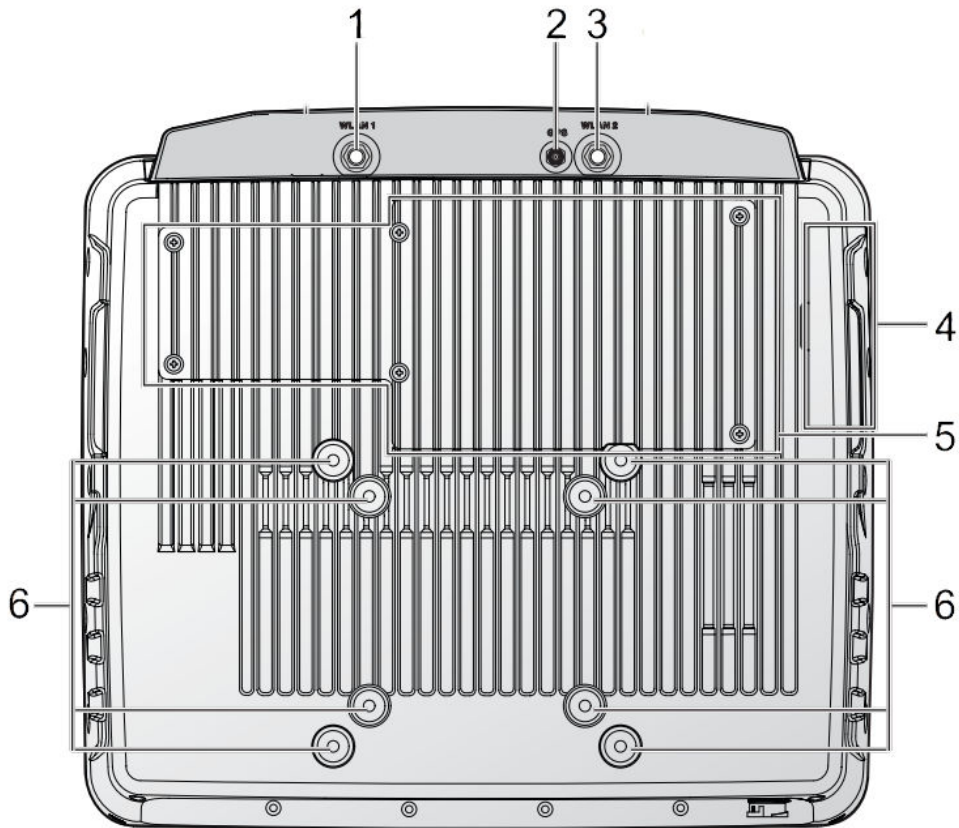
Table 6. Rear View

No	Item	Descri
1	WLAN1	Connect WLAN1 antenna.
2	GPS	Connect GPS antenna.
3	WLAN2	Connect WLAN2 antenna.
4	Communication cover	Open to access SD card.
7	Service cover	Remove to service SSD, DIMM, video card
8	VESA mounting holes	Standard VESA mounts: ,, 3.94" (100 mm) ,, 2.95" (75 mm) **Note:** M4 screws required for VESA mount.

Dimensions

The following section provides information regarding the dimensions of the device. The dimensions are in centimeters and inches, respectively.

Figure 6. Front View Dimensions
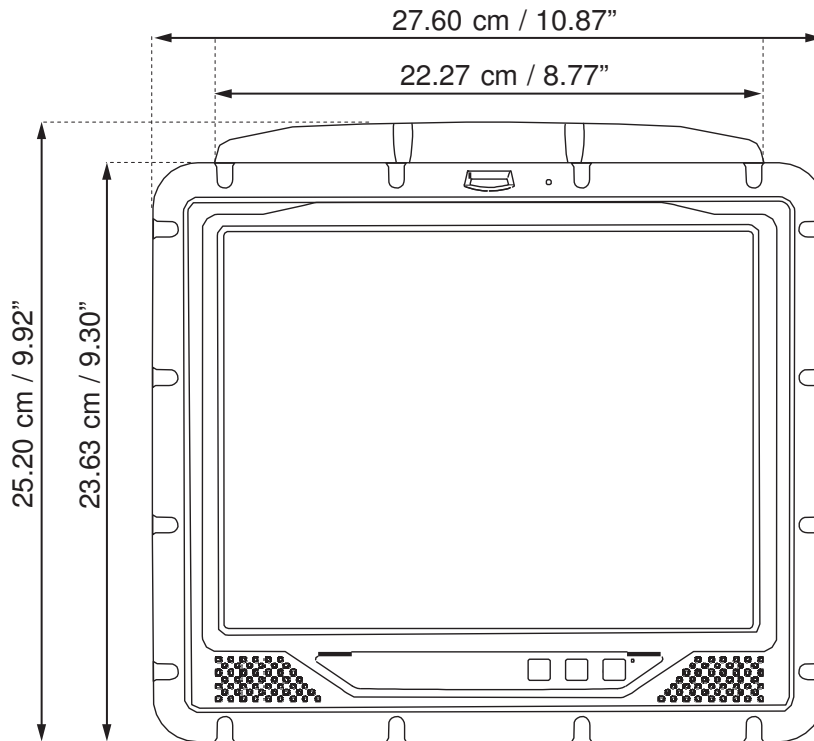
Figure 7. Side View Dimensions
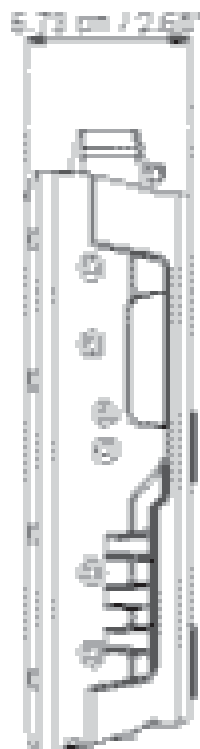
Figure 8. Rear View Dimensions
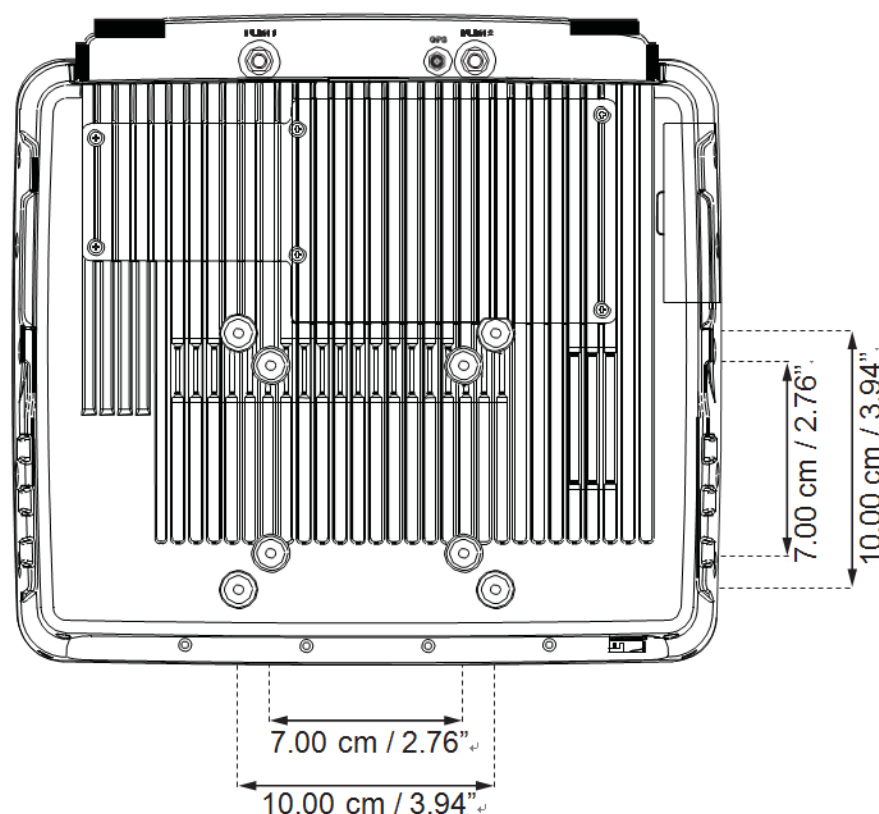
Touch Screen

> ⚠️ *Always use the point of the stylus for tapping or making strokes on the touch screen.*
> *Never use an actual pen, pencil, or sharp/abrasive object on the touch screen.*

The stylus is used as a pen. Touch the screen with the tip of the stylus then lift it up off the screen.

After each use, replace the stylus in the stylus holder for proper care and to preserve the life of the stylus.

A stylus is also used as a mouse pointer with use of the left-clicking function. The stylus can be used to:

- Open applications
- Choose commands in menu
- Select options in dialogue box or drop-down menu
- Drag the scroll bar
- Drag across the text to select content
- Place the cursor in a text box before typing

A right click is generated by tapping the mouse icon in the system tray. After tapping, the mouse icon highlights the right button of the icon in red. The next touch screen tap is treated as a right click. The mouse icon returns to the left button highlighted in red so subsequent taps are treated as left clicks.

A stylus replacement kit is available.

Chapter 2. Getting Started

This section provides an outline of the steps necessary to setup a VM-521.

For additional technical assistance, contact your RuggON representative. See *"Contacting RuggON"* on page 63.

> It is recommended to install or remove accessories on a clean, well-lit work surface. To protect yourself and the device from electrostatic discharge, wear anti-static wrist straps or place the device on an anti-static mat.

Using USB Cabling

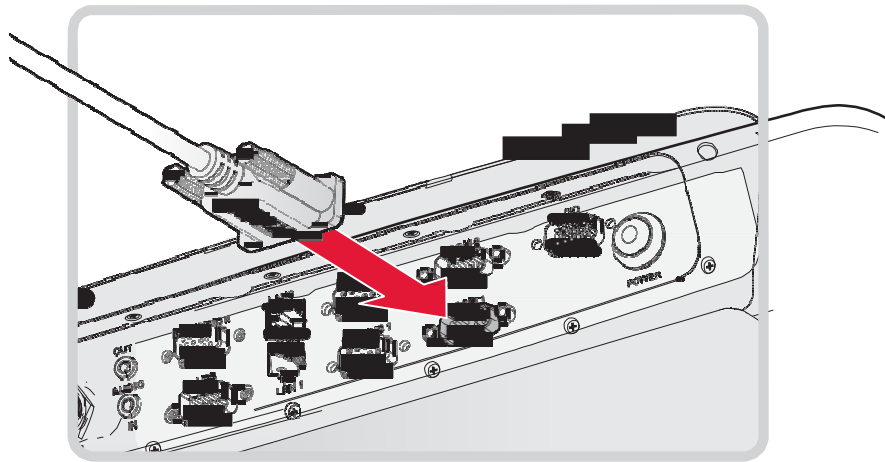> To prevent damage to the device, connect all cabling and accessories before powering up the device.

Connecting a USB Cable

Connect the DB9 to dual USB type cable to the VM-521. Plug the desired devices, such as a USB mouse or storage device.

USB devices may be installed, removed or swapped without power down the VM-521.

1. Connect the DB9 to dual USB type cable to the designated port.
2. Secure the thumbscrews clockwise direction.
3. Secure the cable using wire ties or other applicable materials.
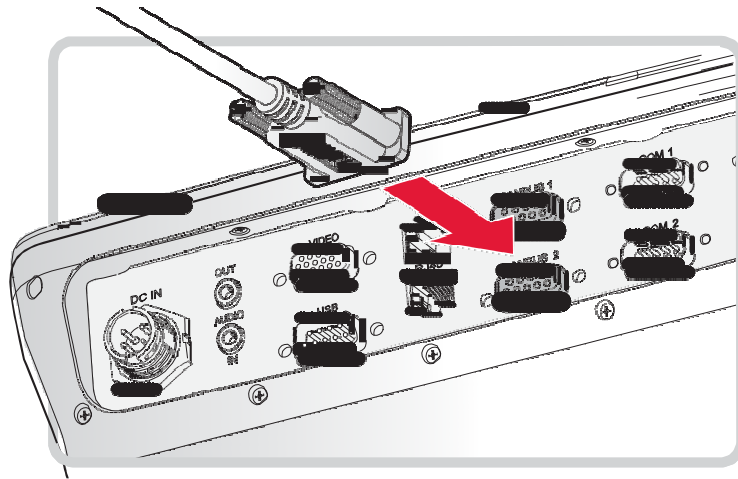
Figure 9. Connect USB Cabling
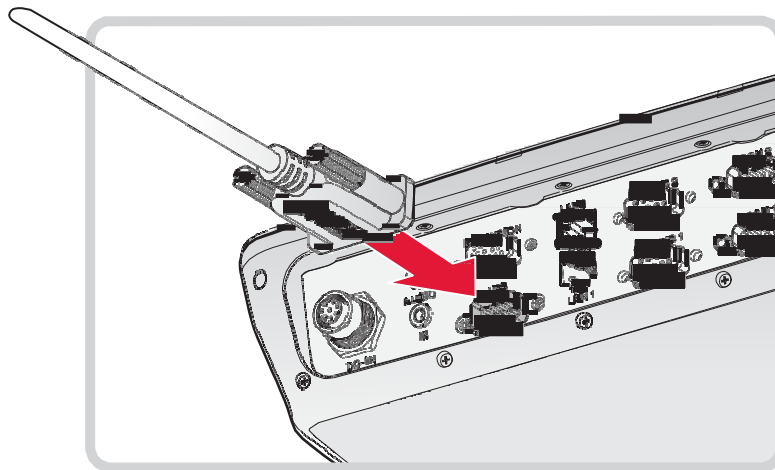
Using Ethernet Cabling

> To prevent damage to the device, connect all cabling and accessories before powering up the device.

Connecting Ethernet Cabling

> A shielded cable is required to maintain emissions and device compliance.

Connect to a local area network (LAN) using an RJ45 (Ethernet) cable.

1. Locate the LAN 1 or 2 port on the bottom of the device.
2. Insert an RJ45 cable in the port.
3. Secure the cable using wire ties or other applicable materials.

Figure 10. Connect Ethernet Cabling
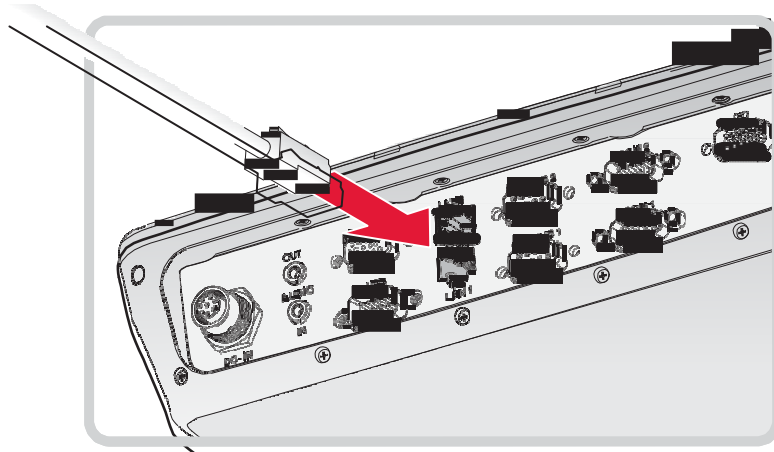
Using COM Cabling

To prevent damage to the device, connect all cabling and accessories before powering up the device.

Connecting RS-232 Cable

Connect a peripheral device, such as a printer or other device with a serial port.

1. Locate the COM 1 port on the bottom of the device.
2. Connect the RS-232 cable to the designated port.
3. Secure RS-232 cable to the device with the embedded thumbscrews.
4. Secure the cable using wire ties or other applicable materials.

Figure 11. Connect RS-232 Cabling

## *Connecting RS-422/RS-485 Cable*

Connect a peripheral device, such as a printer or other device with a serial port.

1. Locate the COM 2 port on the bottom of the device.
2. Connect the RS-422/RS-485 cable to the designated port.
3. Secure RS-422/RS-485 cable to the device with the embedded thumbscrews.
4. Secure the cable using wire ties or other applicable materials.

Figure 12. Connect RS-422/RS-485 Cabling
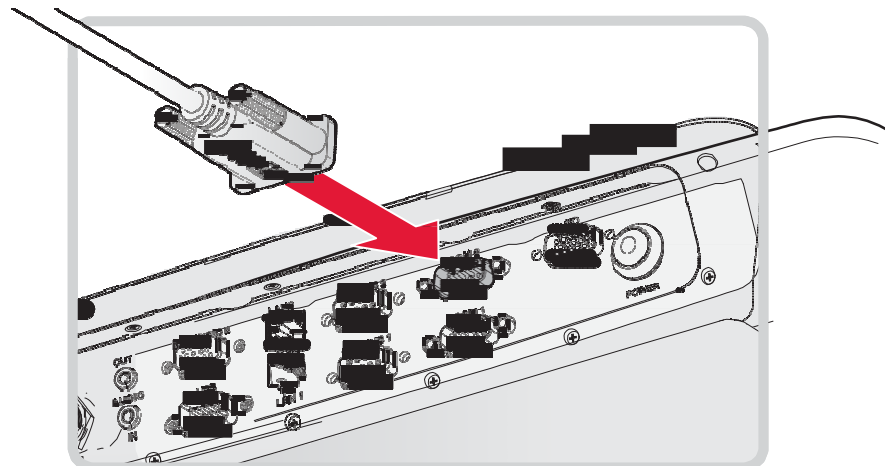
Using CANBUS Cabling

To prevent damage to the device, connect all cabling and accessories before powering up the device.

## Connecting a CANBUS Cable

CANBUS ports allow the devices to communicate with each other within a vehicle without a host computer.

1. Locate the CANBUS 1 or 2 port on the bottom of the device.

2. Connect the CANBUS cable to the designated port.

3. Secure the cable to the device with the embedded thumbscrews

4. Secure the cable using wire ties or other applicable materials.

Figure 13. Connect CANBUS Cabling

Using DIO Cabling

To prevent damage to the device, connect all cabling and accessories before powering up the device.

Connecting a DIO Cable

The DIO port supports 4 input and 4 output ports.

1. Locate the DIO port on the bottom of the device.
2. Connect the DIO cable to the port.
3. Secure DIO cable to the device with the embedded thumbscrews.
4. Secure the cable using wire ties or other applicable materials.

Figure 14. Connect DIO Cabling
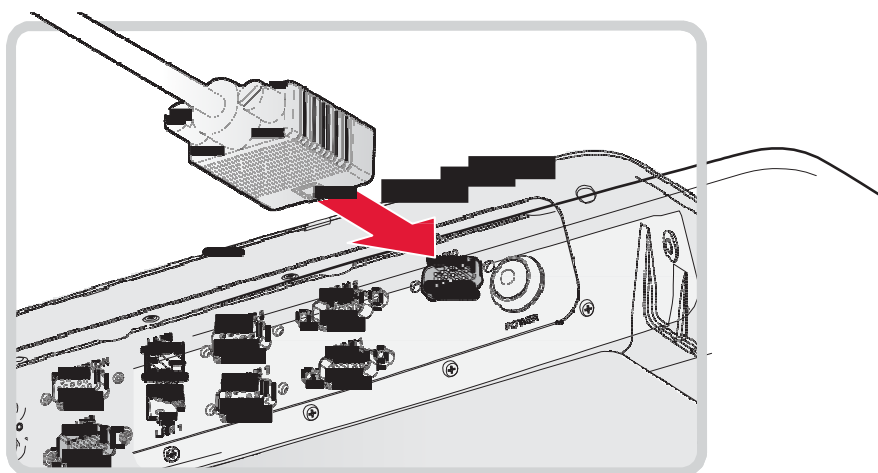
Using Audio Cabling

	To prevent damage to the device, connect all cabling and accessories before powering up the device.

Connecting an Audio Cable

The VM-521 is equipped with audio jacks to connect to headphones or microphone. The connectors are color coded and marked Audio Out and Audio In.

The audio ports require a 3.5mm audio cable to connect to the device.

1. Locate the audio in or out port on the bottom of the device.

2. Connect the audio cable to the designated port.

3. Secure the cable using wire ties or other applicable materials.

Figure 15. Connect Audio Cabling
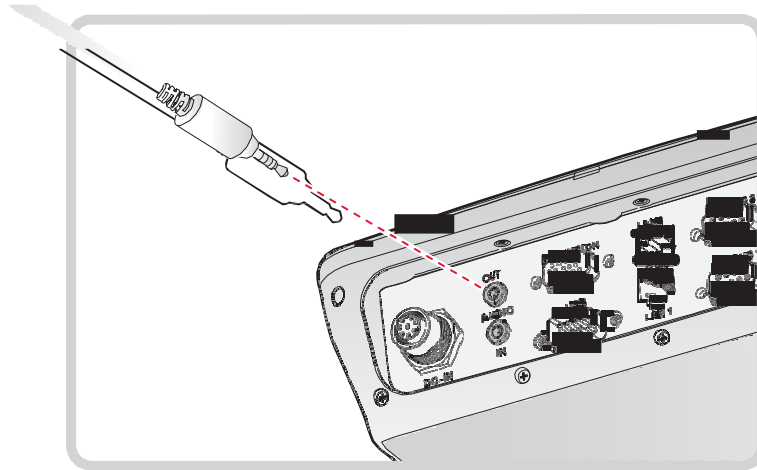
Connecting to Power Supply

The VM-521 is equipped with a galvanically seperated, integrated DC power supply. Power is connected on the underside of the device using a bare leads power cord. The power switch is also located on the underside of the device.

> ⚠️ *Only use original power supply cables as provided by RuggON.*
>
> *If other power cables are used:*
>
> *- The user is solely responsible for any resulting damage.*
>
> *- All warranties with RuggON are voided.*

Installing the Power Adapter

> To prevent damage or injury refer to the rating label on the device to determine the voltage/power information rating (High-voltage: VM-521-HR; Low-voltage: VM-521-LR) before connecting the power adapter and powering on the device.

The device is powered using the provided power adapter. Do not use any other adapter other than the one provided with your device.

If your adapter is damaged, contact your representative to order a replacement adapter designed for this device.

1. Locate the DC In port on the bottom of the device.
2. Locate the arrow indicator on the top of the power cable. Align the arrow indicator with the indentation on the DC In port.
3. Insert the power cord in the port.

Figure 16. Connecting the Power Cord

Arrow Indicator
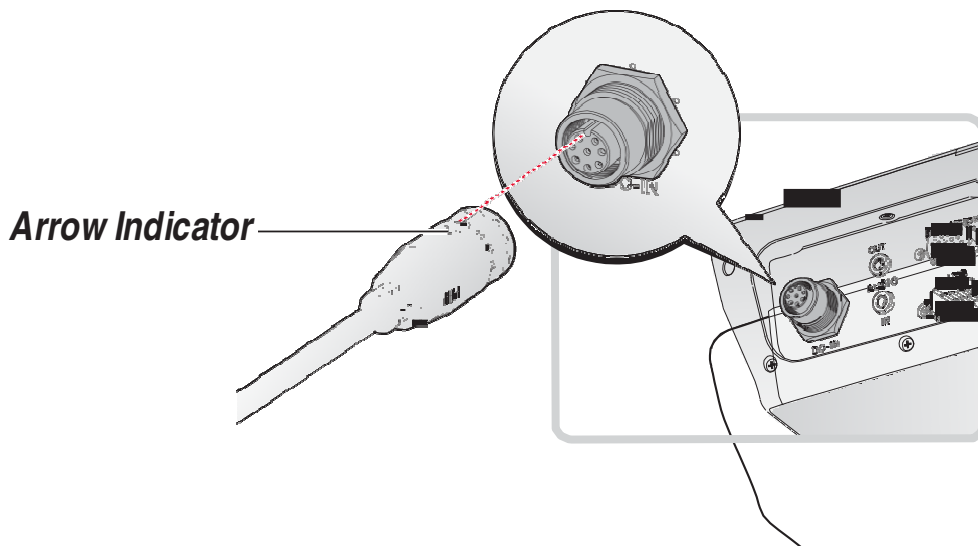
4. Twist the nut as shown in the following image to lock the power cord to the device.

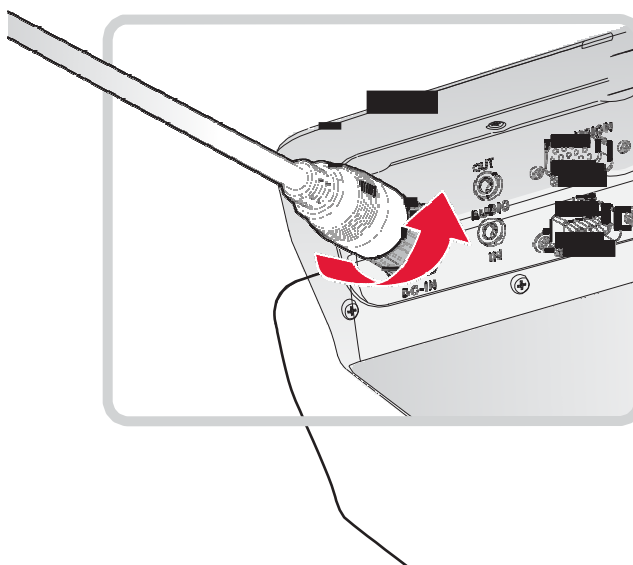*Figure 17. Locking the Power Cord*
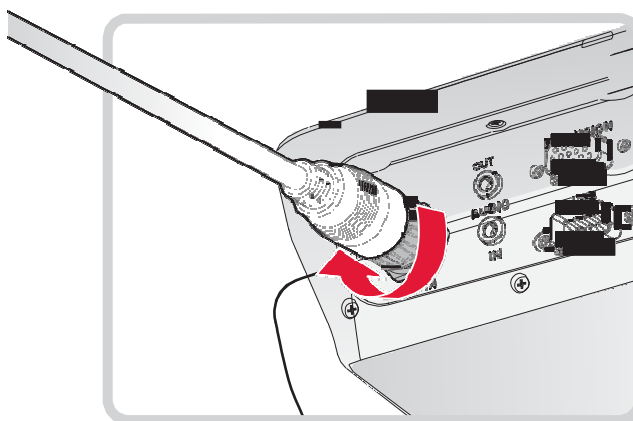
5. Connect the other end of the power cord to the power supply source.

6. Secure the cable using wire ties or other applicable materials.
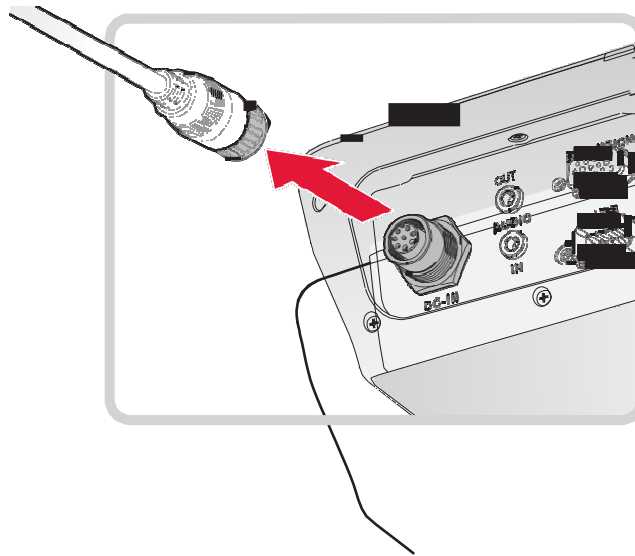
Removing the Power Adapter

1. Locate the DC In port and connected power cord on the bottom of the device.

2. Hold the exterior of the nut and turn it (counter clockwise) as shown to unlock the power cord.

Figure 18. Unlocking the Power Cord

3.   Remove the power cord from the device to disconnect it.

Figure 19. Removing the Power Cord

Chapter 3. Hardware Installation

This section provides information for the installation and removal of supported components. Only qualified personnel are authorized to service or install hardware.

⚠️ *Installing or removing components should only be performed on a clean, well-lit work surface. When necessary, protect the work surface, the device, and components from electrostatic discharge.*

Service Cover

The service bay found under the service cover contains the locations for the single DIMM, VGA, and SD slot. To service or replace any of the supported components it is necessary to access the service bay by removing the service cover first.

Removing the Service Cover

The service cover is located on the rear of the device. To access the service cover the device must be removed from its mounting apparatus.

1. Power down the device and disconnect from all the power source.

2. Unmount the device from the mounting apparatus.

3. Place the device display side down on a clean work surface.

4. Locate the service cover on the rear of the device.

5. Remove the screws securing the service cover.

Figure 20. Removing the Screws
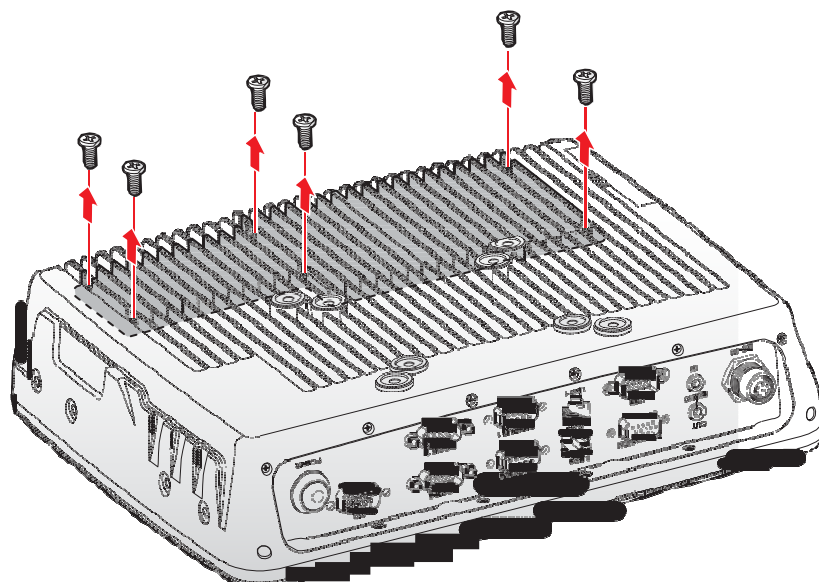
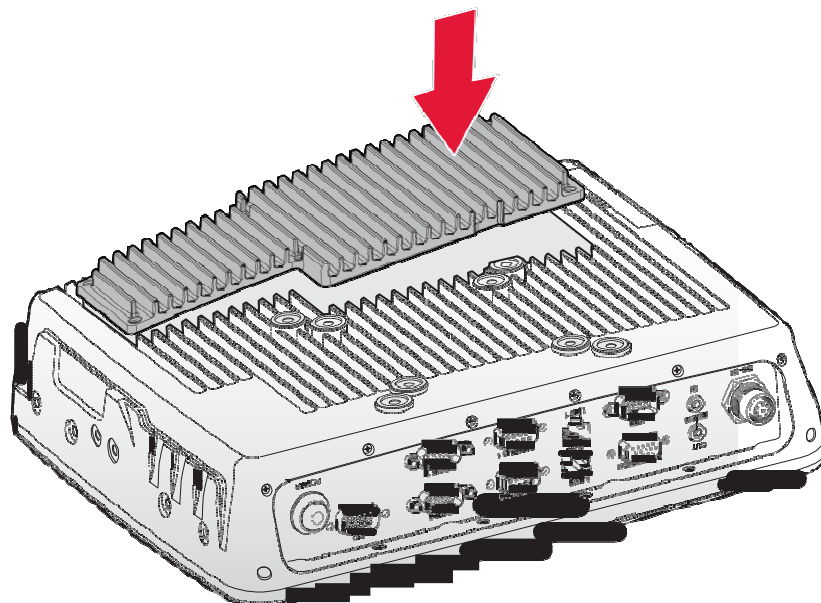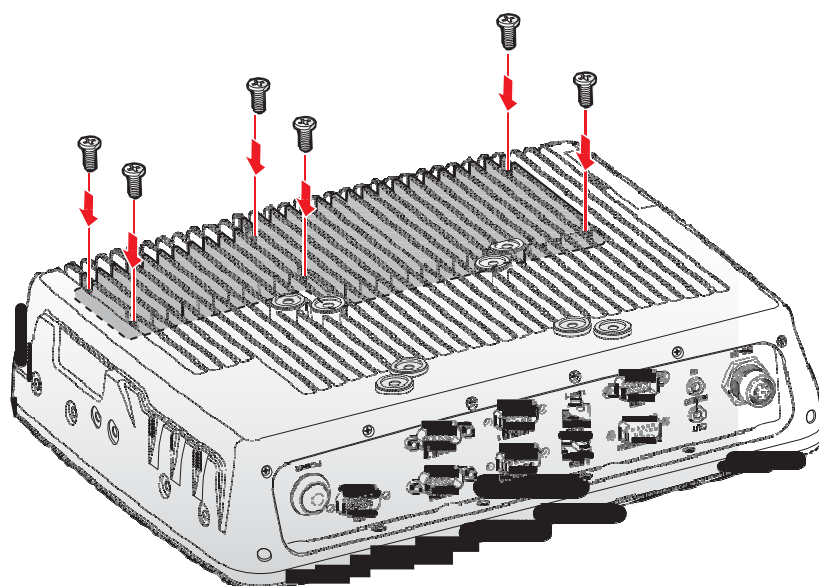6.   Grasp one end of the service cover and angle it up to remove.

Figure 21. Removing the Service Cover
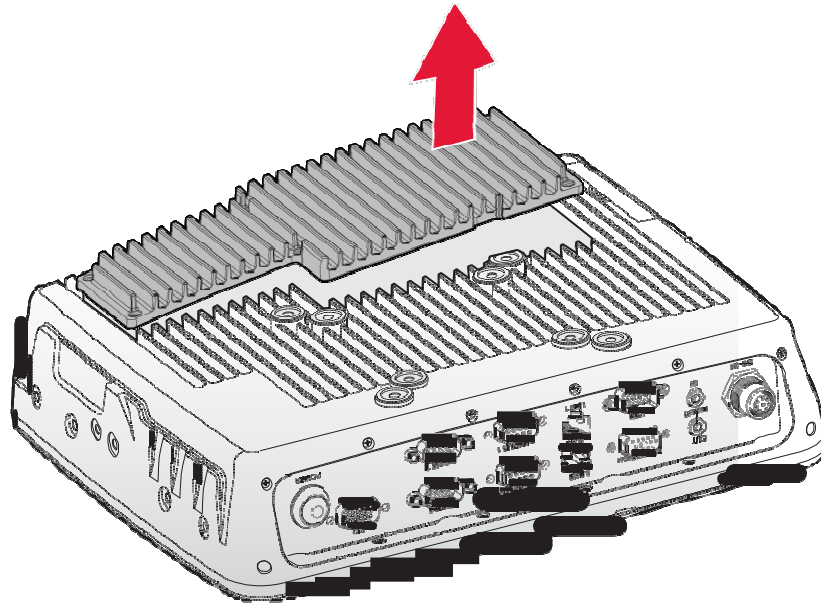
Replacing the Service Cover

1.   Power down the device and disconnect from all the power source.

2.   Unmount the device from the mounting apparatus.

3.   Place the device display side down on a clean work surface.

4.   Align the service cover over the rear of the device, see the following image.

5.   Insert the service cover in the service bay.

Figure 22. Inserting the Service Cover

6.   Secure the service cover in the VM-521 with the provided screws.

Figure 23. Securing the Screws

DIMM Module

Prevention of EMI interference in this device is not guaranteed if the original components are replaced.

A single DIMM module slot is available for memory expansion. The device supports up to 8GB of SO-DIMM DDR3L SDRAM.

Installing a DIMM Module

1.   Power down the device and disconnect from all the power source.

2.   Unmount the device from the mounting apparatus.

3.   Place the device display side down on a clean work surface.

4.   Remove the service cover. See *"Removing the Service Cover"* on page 27.

5.   Locate the DIMM slot on the VM-521.

*Figure 24. Rear View: Locating the DIMM Slot*

DIMM Slot
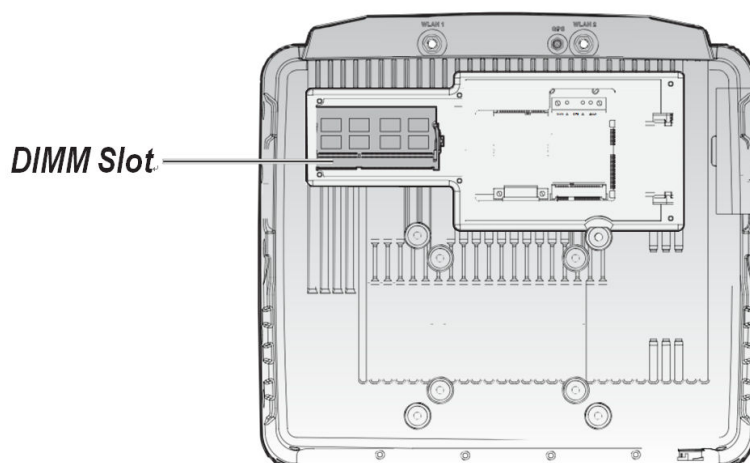
6. Remove the DIMM module from its packaging. Take care not to touch the connectors on the module.

> ✎ Handle the DIMM module by the edges. Do not touch the connectors to prevent damage to the modules.

7. Insert the DIMM module into the slot making sure the protrusion on the slot is aligned with the indentation on the module.

8. Press the DIMM module down until the clips lock in place. An audible click is heard when the installation is correct.
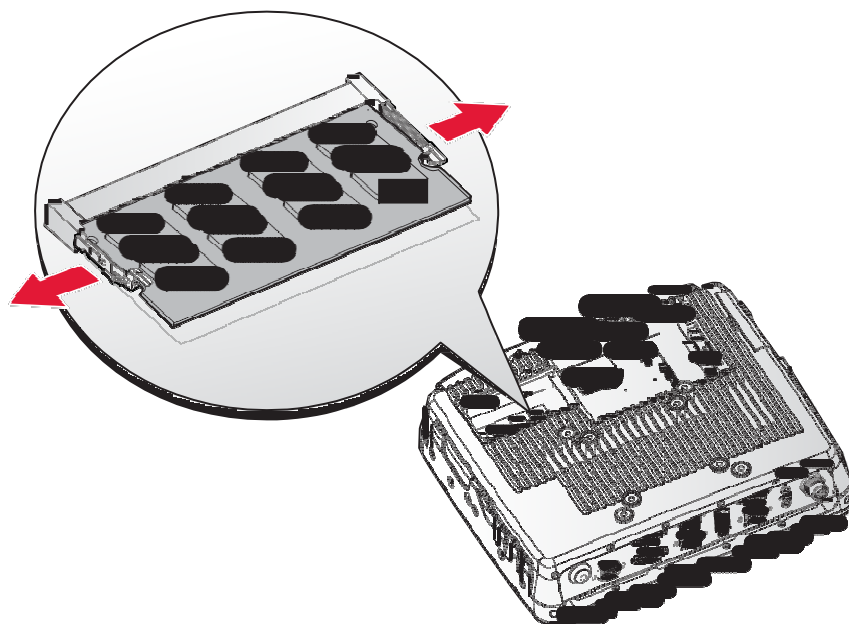
Figure 25. Installing the DIMM Module
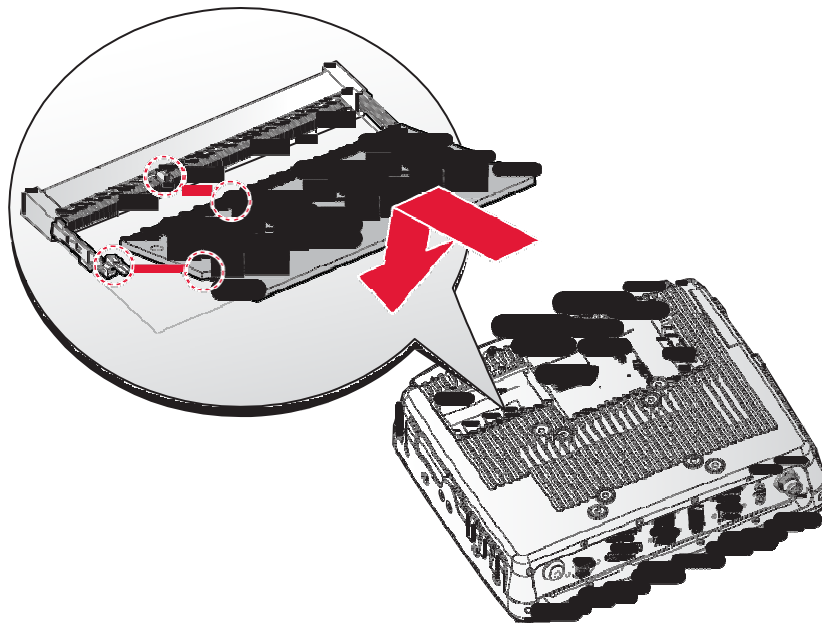
9. Replace the service cover. See *"Replacing the Service Cover"* on page 28.

Removing a DIMM Module

1. Power down the device and disconnect from all the power source.

2. Unmount the device from the mounting apparatus.

3. Place the device display side down on a clean work surface.

4. Remove the service cover. See *"Removing the Service Cover"* on page 27.

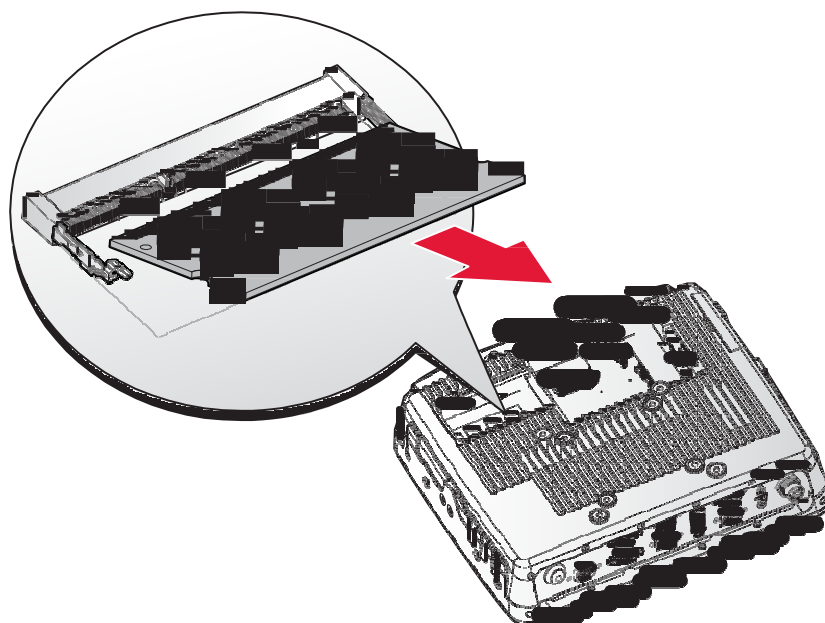5. Locate the installed DIMM module in the service bay.

6.   Pull the locking levers to unlock the DIMM.

Figure 26. Releasing the Locking Levers

7.   Remove the DIMM from the connector.

Figure 27. Removing a DIMM Module

8.   Replace the service cover. See *"Replacing the Service Cover"* on page 28.
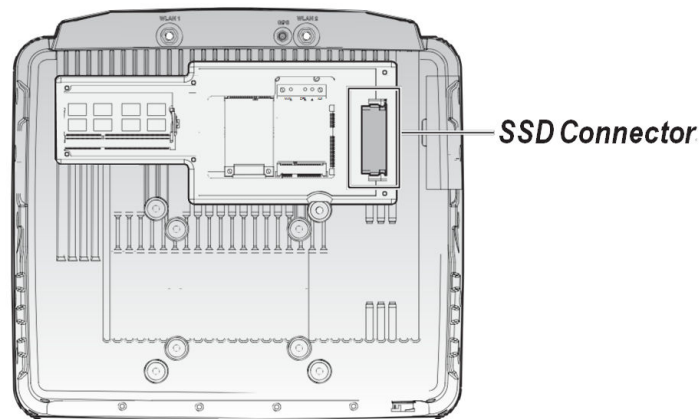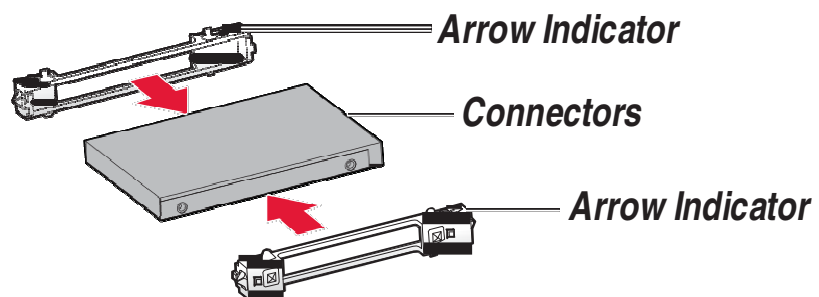
SSD Module

![pencil icon] Prevention of EMI interference in this device is not guaranteed if the original components are replaced.

Installing an SSD Module

1. Power down the device and disconnect from all power sources.
2. Unmount the device from the mounting apparatus.
3. Place the device display side down on a clean work surface.
4. Remove the service cover. See *"Removing the Service Cover"* on page 27.
5. Locate the SSD connector on the VM-521.

Figure 28. Rear View: Locating the SSD Connector

6. Remove the SSD module from its packaging.
7. Align the arrow indicators on the silicone guard strips to the front (connector side) of the SSD module.
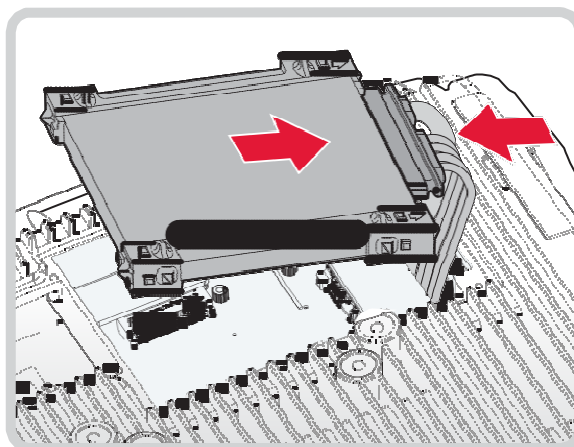8. Insert the guard strips over the sides of the SSD module.

Figure 29. Installing the SSD Silicone Guard Strips

9. Grasp the SATA cable from the SSD bay and pull it forward to release it from its enclosure.
10. Align the SATA cable with the connectors on the SSD module.

11. Connect the SSD to the SATA cable.

Figure 30. Connecting the SATA cable to an SSD Module

12. Hold the SSD module with one hand. With the other hand push in the SATA cabling underneath the chassis. It is necessary to tuck the cables in to allow for enough space to install the SSD module.

13. Angle the SSD connectors into the SSD bay to correctly seat the SSD module.

14. Lower the rear of the SSD in the bay and press it down gently to seat it correctly.

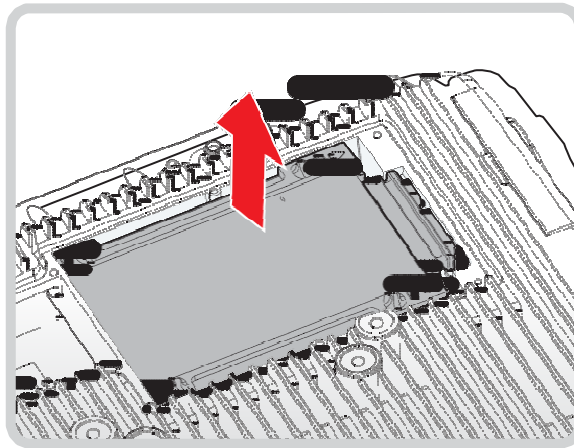*Figure 31. Installing an SSD Module*
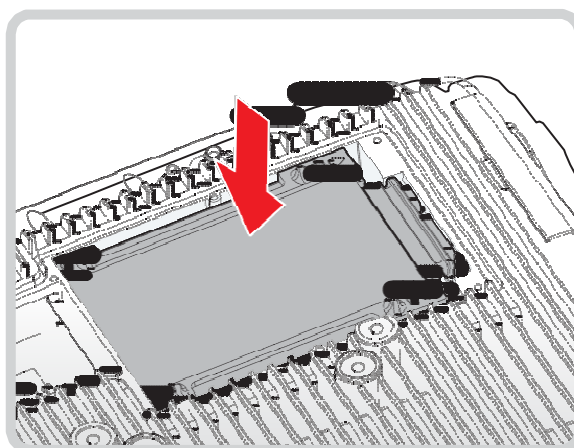
15. Replace the service cover. See *"Replacing the Service Cover"* on page 28.

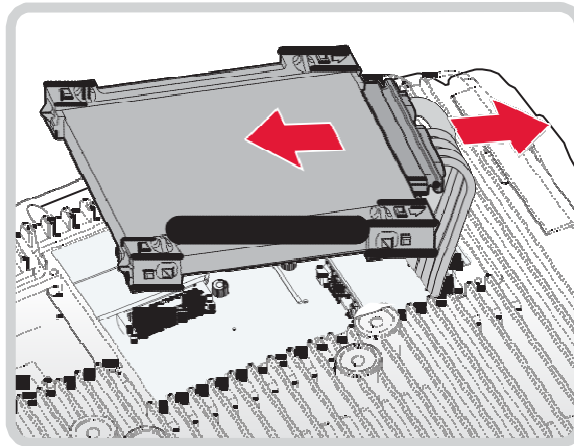## *Removing an SSD Module*

1. Power down the device and disconnect from all power sources.

2. Unmount the device from the mounting apparatus.

3. Place the device display side down on a clean work surface.

4. Open the service cover. See *"Removing the Service Cover"* on page 27.

5. It may be necessary to grasp the silicone guard strip and gently pull them up to remove the SSD module from the bay. For best results, pull up on the rear of the SSD module. The SSD module angles up.

6. Slide the SSD module out of the bay.

Figure 32. Removing an SSD Module

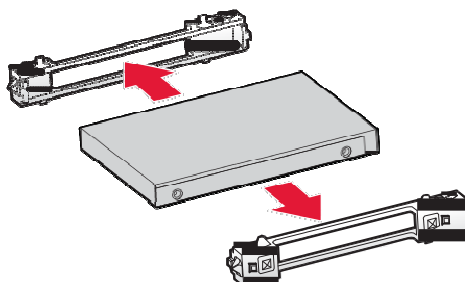7. Disconnect the SSD module from the SATA cable.

Figure 33. Disconnecting the SATA Cable

8. Remove the silicone guard strips from the SSD module. Do not throw them away the guard strips away.

   Keep the guard strips for later use on the replacement SSD module.

Figure 34. Removing the SSD Silicone Guard Strips

9. Replace the service cover. See *"Replacing the Service Cover"* on page 28.

PCIe Expansion Options

The device is equipped with two mini PCIe slots for additional expansion. The following information provides a guideline for the installation of a mini PCIe video card.

Installing a mini PCIe Card

1. Power down the device and disconnect from all power sources.
2. Unmount the device from the mounting apparatus.
3. Place the device display side down on a clean work surface.
4. Open the service cover. See *"Removing the Service Cover"* on page 27.
5. Remove the SSD module. See *"Removing an SSD Module"* on page 34.
6. Locate the mini PCIe slot, see the following image, designated for a video card.

Figure 35. Rear View: Locating the mini PCIe Slot for Video Expansion
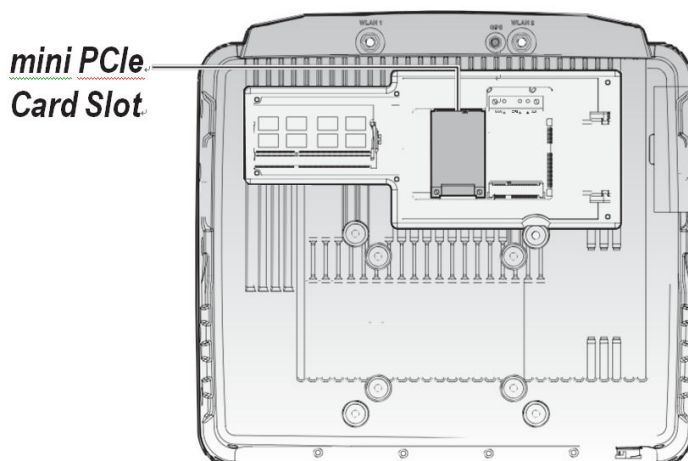
7. Remove the mini PCIe card from its packaging.