VORTEX

Vehicle Mount Computer User's Manual

v1.0k

Contents

Safety Precautions

1. Read these safety instructions carefully.
2. Keep this user's manual for later reference.
3. Disconnect this equipment from any power source before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a stable surface during installation. Dropping it or letting it fall may cause damage.
7. Do not leave this equipment in either an unconditioned environment or in an above 55ºC storage temperature as this may damage the equipment.
8. The openings on the enclosure are for air convection to protect the equipment from overheating. DO NOT COVER THE OPENINGS.
9. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
10. Place the power cord in a way so that people will not step on it. Do not place anything on top of the power cord. Use a power cord that has been approved for use with the product and that it matches the voltage and current marked on the product's electrical

range label. The voltage and current rating of the cord must be greater than the voltage and current rating marked on the product.

11. All cautions and warnings on the equipment should be noted.
12. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
13. Never pour any liquid into an opening. This may cause fire or electrical shock.
14. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
15. If one of the following situations arise, get the equipment checked by service personnel:
    a. The power cord or plug is damaged.
    b. Liquid has penetrated into the equipment.
    c. The equipment has been exposed to moisture.
    d. The equipment does not work well, or you cannot get it to work according to the user's manual.
    e. The equipment has been dropped and damaged.
    f. The equipment has obvious signs of breakage.
16. Do not place heavy objects on the equipment.
17. The unit uses a three-wire ground cable which is equipped with a third pin to ground the unit and prevent electric shock. Do not defeat the purpose of this pin. If your outlet does not support this kind of plug, contact your electrician to replace your obsolete outlet.
18. **CAUTION:** DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY RE- PLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE REC- OMMENDED BY THE MANUFACTURER. DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
19. **CAUTION:** Hot surface Do not touch 

Regulatory and Certification

FCC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

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 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.
- Equipment fans require professional installation. Please refer to the fan installation instructions for details.
- This equipment requires professional installation. Please read the installation instructions carefully when installing.

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

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provide with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

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.

The device is restricted to indoor use only when operating in the 5150 to 5350 MHz frequency range. CE

The device is intended for indoor use only when operating in the 5150 to 5350 MHz frequency range 5945 to 6425 MHz which is applicable in countries that support WIFI 6E.

CE

VORTEX Conforms to the Following Specifications

LVD 2014/35/EU

EN 62368-1: 2014 +A11: 2017

EMCD 2014/30/EU

EN 55032

EN 55035

RED 2014/53/EU

ETSI EN 300 328

ETSI EN 300 440

ETSI EN 301 893

ETSI EN 303 413

ETSI EN 301 489-1

ETSI EN 301 489-17

ETSI EN 301 489-19

EN 62311

EU Declaration of Conformity：

Hereby, RuggON Corporation declares that the radio equipment type VX-311 is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address: https://www.ruggon.com/en/index.php

RF Power Table

Calculation for maximum EIRP

Evaluation Mode	Maximum H-Field Strength (dBuA/m @10m)	Maximum Field Strength (dBuV/m @10m)	E.I.R.P (mW)	E-Field (V/m)	E- limit (V/m)	Test Result (PASS/FAIL)
RFID (13.56 MHz)	-19.933	31.567	0.0001	0.0075	28	PASS

Evaluation Mode	Maximum Conducted Output Power (dBm)	Antenna Gain (dBi)	Maximum E.I.R.P (dBm)	Maximum E.I.R.P (mW)	E-Field Strength (V/m)	Limit (V/m)	Test Result (PASS/FAIL)
Bluetooth BR / EDR	14.11	1.66	15.770	37.757	5.321	61.00	PASS
Bluetooth LE	14.59	1.66	16.250	42.170	5.624	61.00	PASS
WLAN 2.4 GHz	16.83	1.66	18.490	70.632	7.278	61.00	PASS
WLAN 5 GHz U-NII 1	17.77	2.57	20.340	108.143	9.006	61.00	PASS
WLAN 5 GHz U-NII 2A	17.69	2.78	20.470	111.429	9.142	61.00	PASS
WLAN 5 GHz U-NII 2C	8.58	3.96	12.540	17.947	3.669	61.00	PASS
WLAN 5 GHz U-NII 3	8.60	3.96	12.560	18.030	3.677	61.00	PASS
WLAN 6 GHz U-NII 5	17.77	3.89	21.660	146.555	10.484	61.00	PASS

Technologies	Frequency range (MHz)	Max. Transmit Power
Bluetooth BR/EDR	**2412 ~ 2472**	**14.11(dBm)**
Bluetooth LE	**2412 ~ 2472**	**14.59(dBm)**
WLAN 2.4 GHz	**2412 ~ 2472**	**16.83(dBm)**
WLAN 5 GHz	**5150 ~ 5250**	**17.77(dBm)**
WLAN 5 GHz	**5250 ~ 5350**	**17.69(dBm)**
WLAN 5 GHz	**5470 ~ 5725**	**8.58(dBm)**
WLAN 5 GHz	**5725 ~ 5850**	**8.60(dBm)**
WLAN 6 GHz	**6425 ~ 6525**	**17.77(dBm)**

Lithium Battery Safety Statement

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

Disposal of a BATTERY into fire or a hot oven, or mechanically crushing or cutting of a BATTERY, that can result in an EXPLOSION;
Leaving a BATTERY in an extremely high temperature surrounding environment that can result in an EXPLOSION or the leakage of flammable liquid or gas;
A BATTERY subjected to extremely low air pressure that may result in an EXPLOSION or the leakage of flammable liquid or gas.

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. Product Introduction

VORTEX is a 7” in-vehicle terminal with 500nits brightness display and is flexible to support a wide range of wireless connection capability. The device is well-suited for warehouse management, harbor management, asset management applications. VORTEX’s optimized power system is designed for cold cranking, load dump, transient voltage and electronic statistic discharge (ESD) protection. The device is engineered with IP66 protection rating, a wide temperature design, wide input range, and rich expanding interfaces that support in-vehicle connectivity.

Hardware Specifications

Item	Description
Processor	Intel Raptor Lake i5-1335UE 1.3GHz
Memory	DDR5 SO-DIMM

Storage	1 x M.2 2242 keyB/M 1 x Micro SD card slot
Display	● Display Size: 7" WXGA ● Resolution: 1024 x 600 ● Contrast: 1:700 (typ) ● Brightness: Min. 500nits ● Viewing angle: 150/145 (H/V) (CR>10)
Touch Panel	● Projected Capacitive Touch Screen
Wireless Connectivity	● Wi-Fi 802.11 a/b/g/n/ac/ax/be ■ Support external or internal antenna. ■ The default setting is internal antenna. ■ RP-SMA jack connectors for external antenna connection. ■ External antenna connector is RP-SMA plug. ● Bluetooth V5.4 ■ Support external or internal antenna. ■ The default setting is internal antenna. ■ RP-SMA jack connectors for external antenna connection.
	■ External antenna connector is RP-SMA plug. ● Optional GNSS (GPS / QZSS or GLONASS) ■ Support external antenna only ■ SMA jack connectors for external antenna connection. ■ External antenna connector is SMA plug. ●SMA jack connectors for external antenna connection. ■ External antenna connector is SMA plug.
Item	**Description**
Power Input	i5-1335UE : 9~60VDC,10A
Power Comsumption	60W: 25°C, run Burn-In test and without USB Type C, RS232 loading 80W: 25°C, run Burn-In test and with USB Type C, RS232 loading 90W: 55°C, non fan run Burn-In test and with system full loading 90W: 60°C, run Burn-In test and with system full loading

Battery	LI-ION battery pack for graceful shutdown
Housing (Mechanical)	Die-casting aluminum for rear cover, fanless design
Certification	CE, FCC, CB

Environment

● Operating temperature: ■ -
30°C (-22°F) to 60°C (140°F)
■ In accordance with MIL-STD-810H Method 501.7 High Temperature Procedure II - Operation ■ In accordance with MIL-STD-810H Method 502.7 Low Temperature Procedure II - Operation ● Storage temperature: ■ -40°C (-40°F) to 70 °C (158°F)
■ In accordance with MIL-STD-810H Method 501.7 High Temperature Procedure I - Storage ■ In accordance with MIL-STD-810H Method 502.7 Low Temperature Procedure I - Storage ● Relative humidity: 5% to 95% @ 30°C (86°F) to 60°C (140°F) non-condensing in accordance with MIL-STD-810H Method 507.6 Humidity Procedure II Aggravated Cycles ●
Vibration Test:
■ Operating: MIL-STD-810H Method 514.8 Category 4, Fig 514.8C-2 Common carrier (US highway truck vibration exposure); Fig 514.8C-4 Composite two-wheeled trailer; Fig 514.8C-6 Composite wheeled vehicle.
■ Operating: IEC 60721-3-5 Class 5M3
■ Non-Operating: MIL-STD-810H Method 514.8 Category 24 Figure 514.8E-1 General minimum integrity ● Shock Test: ■ Operation: MIL-STD-810H Method 516.8 Procedure 1 Functional Shock ■ Non-Operation: MIL-STD-810H Method 516.8 Procedure V Crash Hazard Shock

I/O Ports

Main System

On the left side under the cover, you can find the

Item	Description
Expandable Storage	MicroSD x 1
USB	USB 3.1 type C x 1 (DisplayPort Alt Mode supported)
RESET	System reset button
Speaker	Dual speakers (2W)

IO-A

Item	Description

Serial	RS-232 full pin with power x 1 (COM1)* * Operate up to 115K bps * The transmission speed is in counter-relationship to the transmission distance
USB	USB 2.0 x 2
Ethernet	Gigabit Ethernet x 1

IO-B

Item	Description
Serial	RS-232 full pin with power x 1 (COM1)* RS-232(TX,RX)/422/485 x 1 (COM2)*, * The transmission speed is in counter-relationship to the transmission distance
USB	USB 2.0 x 2
Ethernet	Gigabit Ethernet x 1
CAN	Optional CAN bus 2.0B x 1 or CAN FD x 2 or SAE J1939 x 1
Digital I/O	DI x 2, DO x 2
Video	Optional CVBS input x 2

IO-C

Item	Description
Serial	1st RS-232(TX,RX)/485 x 1 (COM?)* 2nd RS-232(TX,RX)/485 x 1 (COM?)* * Operate up to 115K bps * The transmission speed is in counter-relationship to the transmission distance
USB	USB 2.0 x 2
Ethernet	Gigabit Ethernet x 2
CAN	Optional CAN bus 2.0B x 1 or CAN FD x 2 or SAE J1939 x 1
Digital I/O	DI x 3, DO x 1

Dimension and Weight

Dimension: 220 x 152 x 50 (mm) / 8.66 x 5.98 x 1.97 (in.) (W x H x D) Weight: 1.67 kg/ 3.68 lbs.

IO-A

IO-B vs IO-A

Package List

Before you begin the installation or configuration process, make sure to inspect all the components and accessories. Contact your representative if there are any missing or damaged items.
Please verify the delivery of the contents upon receipt.

- VORTEX vehicle mount computer (Model: VX-311) ● Quick start guide ● Touch screen protection film ● Accessory Box enclosed with one M12 cable with fork terminals (Length: 2 Meter)

NOTE:

- The packaging material provides optimal protection to your device. After unpacking, DO store the original packaging material in the event that you need to return for shipment.
- The protection film on the screen in the package is intended for you to increase the durability of the touch screen and protect it from scratching, etching, and damage. Designed with a low-tack adhesive, you can easily apply and remove the protection film while it is also engineered to be touch-sensitive and won't affect touch or swipe functions. It is recommended that you paste it onto the touch screen for protection.

Chapter 2. Hardware Mounting

Make sure that only trained personnel perform the installation.

The VORTEX supports a standard 35mm X 75mm VESA hole pattern (M5 thread, deepness 9mm) with four mounting holes on the back side of the device.
The recommended screw-in depth is 9mm and M5*Pitch 0.8mm bolt.

Notes: *To prevent any damage or injury, make sure the mounting bracket is securely attached.*

Chapter 4. Start up

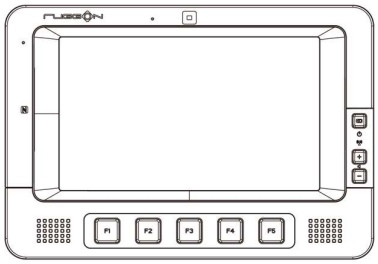
Powering the System

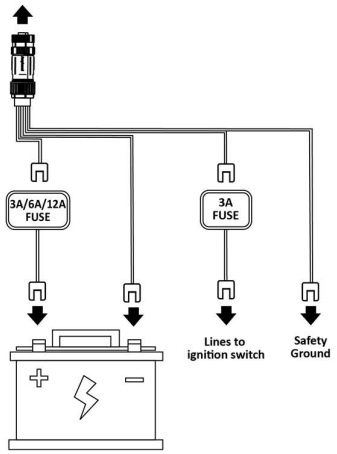
Installation Instructions

Fuses* are required in connecting the power cable and battery in series and add 3A fuse in ACC/ignition line to avoid the risks of wire damage and vehicle burning.

Notes:
* 3A for 48VDC power input
* 6A for 24VDC power input
* 12A for 12VDC power input

Please refer to the diagram below for VORTEX installation.





Power on the System

VORTEX has two power modes for user preference, and you can activate them through BIOS.
If VORTEX is connected to vehicle battery, please enable its “ACC sense mode”. If you want to use power adapter as power supply instead, please disable “ACC Input Detection”.

To turn on the system, please follow the instructions below: **When VORTEX is connected to vehicle battery**

- In “ACC sense mode,” no matter “Power button” is enabled or disabled; the system is only controlled by ACC sense.
  - Scenario: When the system is off, switch the ignition from off to on to turn on the system’s on/delay function.

- In “ACC sense mode,” with the “Power button” enabled, the system will only be controllable via its ACC or turn on/off buttons.
  - Scenario: When the system is off without under voltage protection(UVP) and ignition is on, press the power button to turn on the system.

When VORTEX is connected to power adapter

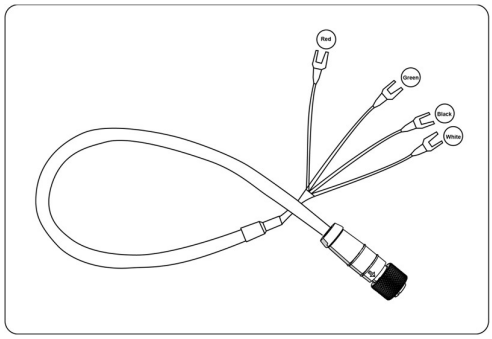
The power source isn't controlled by AAC/Ignition signals; please disable "ACC sense" mode in Hot Button Utility ● In "Disable ACC sense mode," with "Power button" enabled, the system will only be controllable via its turn on/off buttons.

- Scenario: When the system is off and without under voltage protection (UVP), press the power button to turn on the system.

In "Disable ACC sense mode," with the "Power button" disabled, the system will auto turn on with power source without UVP.

Connector Power

VORTEX allows a wide range of DC power input from 9~60V via a M12 S-CODE 4-PIN power cord. You can start up VORTEX via either car power cable or external power adapter. Refer to the M12 S-CODE 4-PIN power cord and its wire definition in the following.



1. Use only power cables verified and supplied by RuggON to meet the specific requirements for voltage, current, low-temperature flexibility, UV resistance, oil resistance, etc.
2. Do not bend or kink the power supply cables and make sure they are securely protected against crushing and abrading.
3. Make sure power cables are correctly connected to the safety ground
4. Directly connect the power cable of VORTEX to vehicle battery through appropriate fuse instead of sharing any power supply lines of other equipment to avoid interference.
5. To compensate the voltage drop of the power supply cable, make sure that it is left with adequate cross-section area for sufficient ampacity. .

The wire definition

Wire Color	Signal
RED	V+
BLACK	V-
GREEN	PE (Safety Ground)
WHITE	ACC/ Ignition

Power on through vehicle power cable

1. The bare wire lead cable allows you to directly wire 12V, 24V or 48V car power supply. Please follow the wire definition to connect it to your power source.
   Please refer to the installation diagram on page 23 to install the 3A, 6A or 14A fuse between the power cable and power source.

2. Plug the power cord into the power connector and adjust it to the right positioning. (Refer to power connector diagram on page 25)

3. VORTEX is automatically turned on with ACC switched ON.

Power on through external power adapter

To power on VORTEX, please connect red (V+) wire to white (ACC/ Ignition) wire. ACC ignition mode is not supported in such condition.

Make sure that all the power supplies are disconnected when you plug the power cord into the power connector.

Please press the power button to turn off the system. If you direct remove the power source, the system will consume internal battery instead and perform a graceful shutdown in one minute. It will reduce the battery life.

Internal Battery

If VORTEX is disconnected from external power, the internal battery can keep it running up to 1 minute.

When power is restored, VORTEX will continue its normal operation. When VORTEX is connected to external power, an internal charger will automatically charge the internal battery. If external power is off and the device has continued to run for 1 minute on its internal battery, please charge the internal battery for at least 7 minutes.

Limitation charge from internal battery

When vehicle power is unstable such as experiencing voltage drops, VORTEX's internal battery can only keep its system's core computing logic running above -10°C while with below functions temporarily affected until the vehicle power is restored*1.

1. Type-C interface disabled
2. Turn off the COM1 power output
3. Backlight is forcibly turned dark*2
4. Mute speaker
5. Defrost/ defog function disabled
6. CPU throttling *4

*1 If vehicle power is restored immediately after the device suffers from instant voltage drop, afore affected functions will get back to normal conditions.
*2 VORTEX offers two backlight modes. Under normal mode, the backlight turns dark; under night mode, the backlight remains the same brightness.

When the external power is in presence, an internal charger will automatically charge the internal battery. The ratio of the internal battery charged time against its discharged time is around 4 times. It means it takes 4 minutes to charge the battery after discharging the battery for 1 minute.

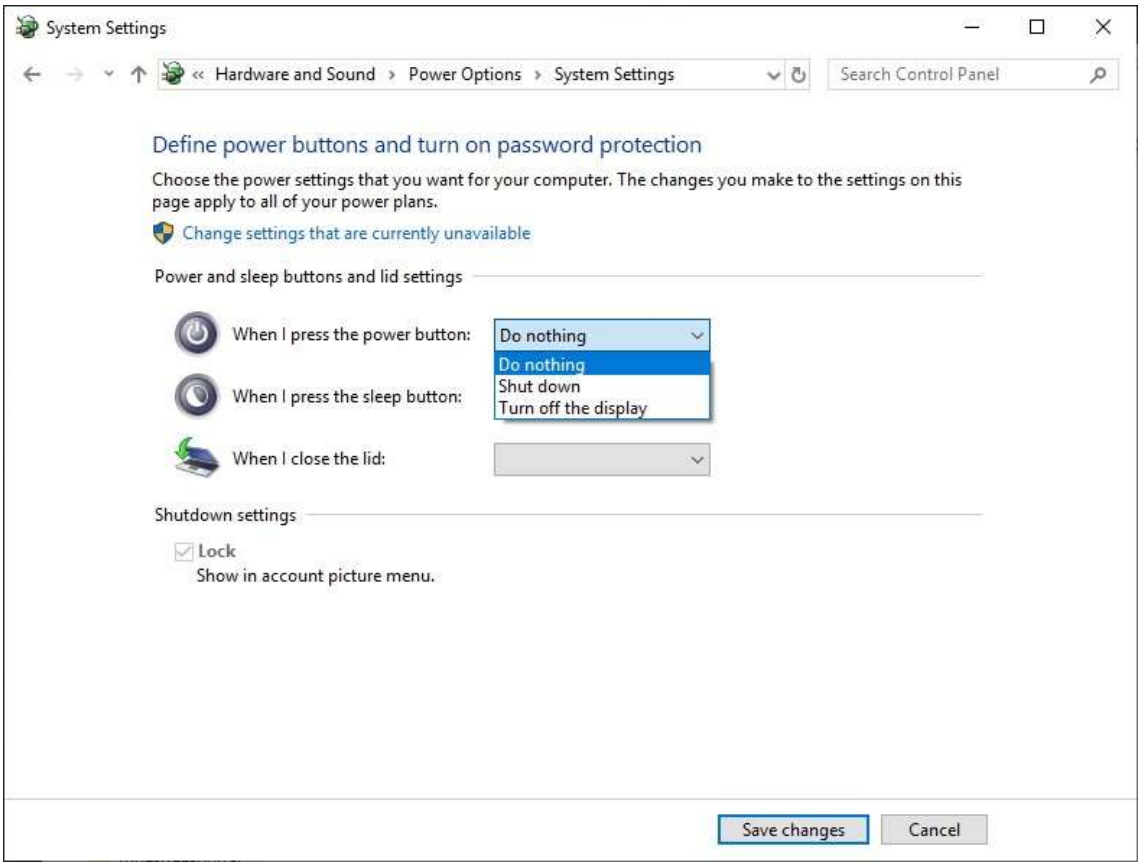
Powering Down the System

When VORTEX is connected to vehicle battery ● When system is on, switch the ignition from on to off to turn off or delay off the system.

- When system is on and with “Power button” enabled*1, switch the ignition from on to off or press the power button to turn off the system.

***1 Power Button Define**

Define the power and sleep buttons in Windows “System Settings”, lid settings (Do nothing/ Shut down/ Turn off the display) in the dropdown menu, select “Shut down” to powering down the system.



When VORTEX is connected to power adapter

When system is on and with “Power button” enabled, press the power button to turn off the system.

Unexpected Power Outage

When VORTEX is connected to vehicle battery

The system will follow your delay off setting, but will still perform a graceful shutdown up to one minute.

When VORTEX is connected to power adapter

The system will consume internal battery instead and perform a graceful shutdown in one minute.

LED Status

The LEDs on VORTEX are status indicators that show the operating status of your system. The status indicators can help pinpoint possible failed hardware components causing specific symptoms. Refer to the description below.

LED	Status	Description
Power	Blink Green	Power up
Power	Blink Yellow	Load BIOS
Power	Solid Green	System ready to use
Power	Blink Red	Vehicle battery abnormal

Adjust the Speaker Volume

VORTEX allows you to adjust volume through volume buttons; you can also adjust the volume levels using Windows.

- Press the button to increase the volume.
- Press the button to decrease the volume.

Auto-Brightness Adjustment

When you use VORTEX, you may well encounter different lighting conditions that make it difficult to see the information on screen. VORTEX's built-in the ambient light sensor on the front panel supports auto-dimming, which you can also disable to manually adjust the brightness; this setting can be done via Hot Button Utility.

Internal Microphone

VORTEX is equipped with an internal microphone, so you don't need an external one. In addition to the built-in speaker and microphones, you can plug external headsets in the audio jack.

Display on/off

To turn on/off the display, press the display button located on the right side of the device.

Programmable Buttons

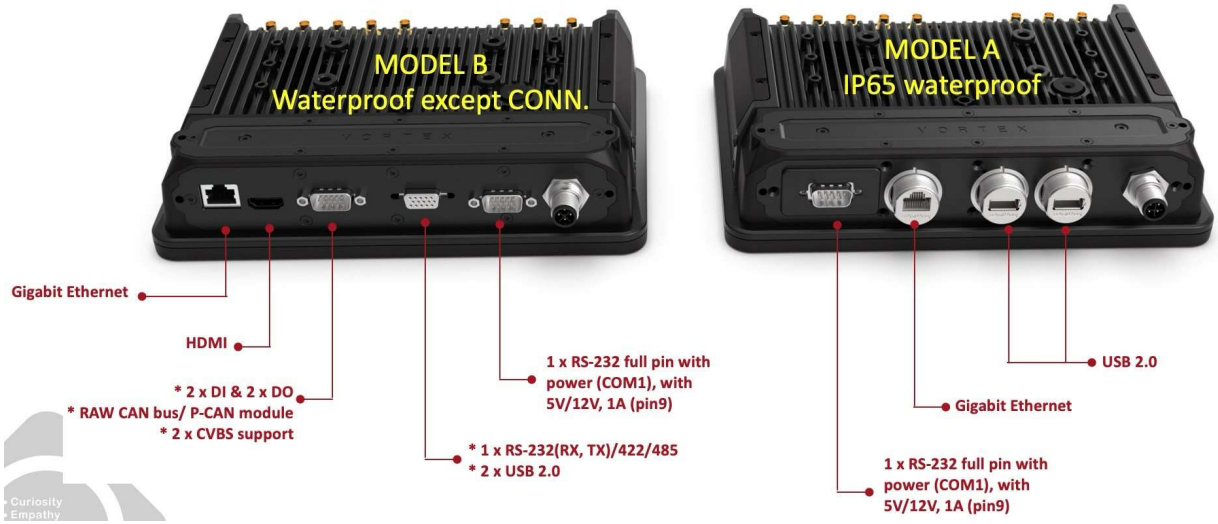
VORTEX provides five programmable buttons for default commands. You can configure the programmable buttons via BIOS or keymap utility to different commands or keyboard shortcuts to better fit your work style.

Power Management

All configuration settings, including power management and system setup, are done within the BIOS. Please refer to the BIOS settings for configuration details.

Chapter 5. Jumpers and Connectors

Bottom View



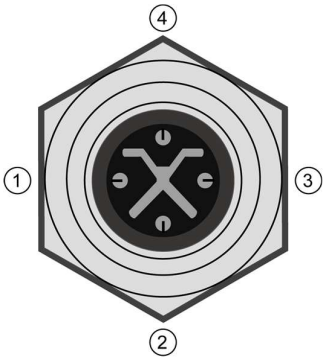
External Connectors Pin Assignments

Use this section as a reference for the pin assignments of the various ports available on the

VORTEX.

IO-A

Power Connector

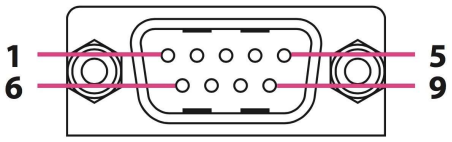


TYPE: M12 S-CODE 4-PIN male connector

Pin	Signal
1	V+
2	ACC
3	V-
4	PE (Safety Ground)

Note: Please refer to Power on through vehicle power cable on page 24 for connecting the external power cable to power source.

RS-232 Port (COM1)



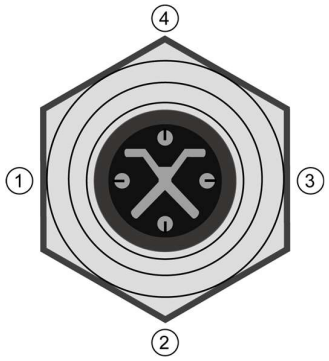
TYPE: DSUB 9-PIN male connector

Pin	Signal

1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	PWR (0/5/12V@600mA , default 0V)

IO-B

Power Connector

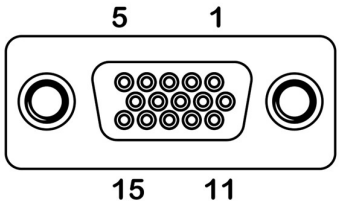


TYPE: M12 S-CODE 4-PIN male connector

Pin	Signal
1	V+
2	ACC
3	V-
4	PE (Safety Ground)

Note: Please refer to Power on through vehicle power cable on page 24 for connecting the external power cable to power source.

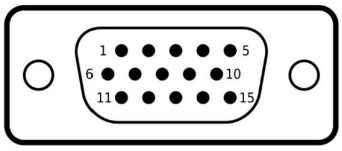
USB and RS-232/422/485 Port (COM2)



Pin	Signal
1	USB DP2
2	USB DN2
3	Reserved
4	RS-232_TXD/ RS-422_RP
5	GND
6	RS-422_TN/ RS-485_DN
7	RS-422 RN
8	Reserved
9	USB 5V_2
10	RS-232_RXD/ RS-422_TP/ RS-485_DP
11	GND
12	USB DP1
13	USB DN1
14	USB 5V_1
15	GND

We provide Y-cable with DB15 male connector which is the RS232/422/485 and USB converter. Please contact your local representative for ordering information

Digital I/O, CANbus and Video Port



Pin	Signal	Pin	Signal
1	CAN1_H	9	CAN2_L
2	CAN1_GND	10	DIO_GND
3	VIDEO_CH1	11	CAN2_GND
4	VIDEO_GND1	12	DO1
5	CAN2_H	13	DI1
6	CAN1_L	14	DI2
7	VIDEO_CH2	15	DO2
8	VIDEO_GND2		

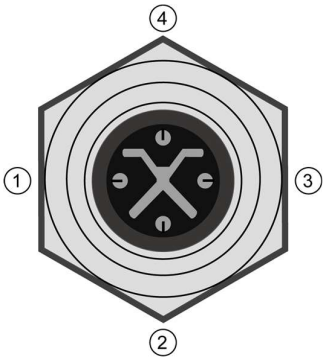
We provide the DB15 male connector to multiple pins without termination cable. Please contact your local representative for ordering information

*DI: 5V TTL Compatible Logic, withstand max 36V input, also accept external OC/OD driving circuit.

*DO: 5V TTL Compatible Logic, max sink 30mA while driving low, internal pull up 5V thru 330 ohm, also accept external 4.7K ohm resistor pull to 36Vmax.

IO-C

Power Connector

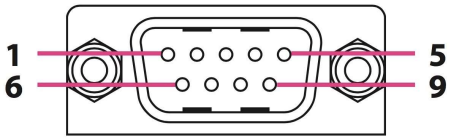


TYPE: M12 S-CODE 4-PIN male connector

Pin	Signal
1	V+
2	ACC
3	V-
4	PE (Safety Ground)

Note: Please refer to Power on through vehicle power cable on page 24 for connecting the external power cable to power source.

RS-232, RS-485 Port

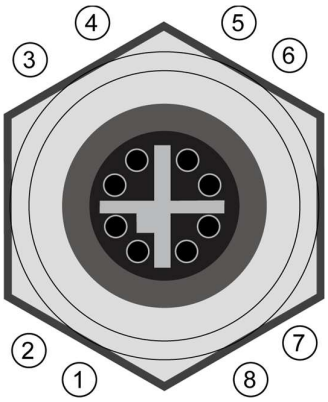


TYPE: DSUB 9-PIN male connector

Pin	Signal
1	RS-485_DN1
2	RS-232_RXD1/ RS-485_DP1
3	RS-232_TXD1

4	GND2
5	GND1
6	RS-485_DN2
7	RS-232_RXD2/ RS-485_DP2
8	RS-232_TXD2
9	

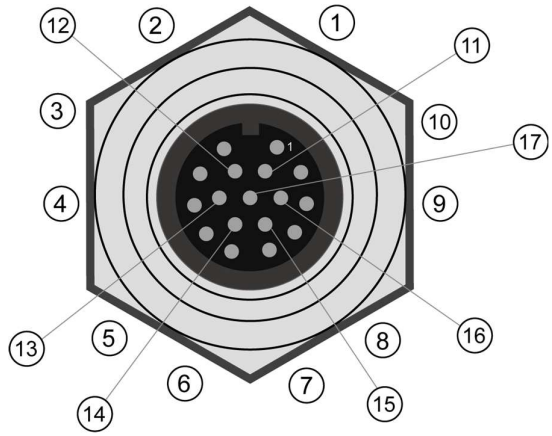
Ethernet Port



TYPE: M12 X-CODE 8-PIN female connector

Pin	Signal
1	DA+
2	DA-
3	DB+
4	DB-
5	DD+
6	DD-
7	DC-
8	DC+

Digital I/O, CAN bus Port and Dual USB



TYPE: M12 A-CODE 17-PIN male connector

Pin	Signal	Pin	Signal
1	CAN1_H	10	DIO_GND
2	CAN1_GND	11	USB1/ USB2/ CAN2 _GND
3	USB2_DP2	12	DI0
4	USB2_DN2	13	DOUT0
5	CAN2_H	14	DI1
6	CAN1_L	15	DI2
7	USB2_DP1	16	USB5V2
8	USB2_DN1	17	USB5V1
9	CAN2_L		

* Only CAN Bus 1 (CAN1) has signal isolation.
* M12 A CODE 17-PIN connector to DSUB connector adapter cable is also available. Please contact your local sales representative for ordering information.

Chapter 6. Key Mapping

Please refer to the following chart for programmable button key mapping.

Key Button	App Get Key (code 1)
F1	E0 55
F2	E0 56
F3	E0 57
F4	E0 6E
F5	E0 12

APPENDIX A Programmable Button Key Mapping for Linux

How to set up the hard button key mapping

1. Under Linux original environment, these key scan codes are not included in kernel mapping table, it need load these scan codes during system start up
2. Linux provides one command to load specified scan code to mapping table, commend syntax is as below:

SETKEYCODES(8) System Manager's Manual SETKEYCODES(8)

NAME

setkeycodes - load kernel scancode-to-keycode mapping table entries

SYNOPSIS

setkeycodes scancode keycode ...

DESCRIPTION

The setkeycodes command reads its arguments two at a time, each pair of arguments consisting of a scancode (given in hexadecimal) and a keycode (given in decimal). For each such pair, it tells the kernel keyboard driver to map the specified scancode to the specified keycode.

This command is useful only for people with slightly unusualkeyboards, that have a few keys which produce scancodes that the kernel does not recognize.

THEORY

The usual PC keyboard produces a series of scancodes for each key press and key release. (Scancodes are shown by **showkey** , see showkey(1)) The kernel parses this stream of scancodes, and converts it to a stream of keycodes (key press/release events). (Keycodes are shown by **showkey**.) Apart from a few scancodes with special meaning, and apart from the sequence produced by the Pause key, and apart from shiftstate related scancodes, and apart from the key up/down bit, the stream of scancodes

consists of unescaped scancodes xx (7 bits) and escaped scancodes e0 xx (8+7 its). To these scancodes or scancode pairs, a corresponding keycode can be assigned (in the range 1-127). For example, if you have a Macro key that produces e0 6f according to showkey(1), the command **setkeycodes e06f 112**
will assign the keycode 112 to it, and then loadkeys(1) can be used to define the function of this key.

Some older kernels might hardwire a low scancode range to the equivalent keycodes; setkeycodes will fail when you try to remap these.

For example, we can set F1, F2 scancode by following steps:

1. Look for current available keycodes to assign the hard buttons xmodmap -pke
   you can select 247, 248 keycodes which are available

2. Set hard button F1, F2 scancode by the command sudo setkeycodes e055 247 sudo setkeycodes e056 248

3. Now you can execute below command to get hard button keycode sudo showkey