



## VTAP100 OEM Module Installation Guide

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**If you need help** to set up or use VTAP100 OEM module, beyond what is contained in this Installation Guide, then please contact our support team.

Email: [support@dotorigin.com](mailto:support@dotorigin.com)

Download the latest documentation and firmware from <https://vtap100.com/resources/>

Telephone UK and Europe: +44 (0) 1428 685861

Telephone North America and Latin America: +1 888-262-9642 or +1 565-262-9642

**If you have any feedback** on setting up or using VTAP100 OEM module or this documentation, then please contact our support team. The product is constantly being reviewed and improved and we value feedback about your experience.

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## Safety instructions



### WARNING: INTENDED USE

The VTAP100 equipment is intended for use by suitably qualified integrators, who will integrate the VTAP100 OEM module (PCB) into their own hardware, without any changes or modifications to the VTAP100 OEM module device. (An optional wallbox case can be supplied.) Components mounted on the VTAP100 PCB are not user-serviceable. Product safety has been tested to comply with IEC 62368-1.



### WARNING: ESD PRECAUTIONS

We recommend careful handling and storage of Electrostatic Sensitive Devices (ESDs) during installation. The VTAP100 OEM module (PCB) should always be protected by static shielding bags for shipping or storage.



### WARNING: POWER SUPPLY

Use **only** a MicroUSB to USB cable, **or** the optional captive USB cable, if any, to connect the VTAP100 OEM module PCB to a PC. (**Never** connect both at the same time).

Using other cables will invalidate EMC emissions and immunity certifications.

The VTAP100 is rated at 5V DC (typ. 110mA, max 150mA) for power over USB.



### **WARNING: USER DESIGNED ENCLOSURES**

It is the responsibility of the integrator to ensure that their enclosure design for the VTAP100 retains compliance with EMC emissions and immunity standards.

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 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.

Integrators are responsible for evaluating their own end product (including the VTAP100 OEM module PCB) and obtaining separate approvals for the markets in which it will be sold or used.

# 1 Using this guide

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This guide is for first-time users of the VTAP100 OEM module.

It contains the information you need about your VTAP100 hardware.

Consult the VTAP100 Basic Configuration Guide for more about configuration and maintenance features, including how to update the firmware on your VTAP100 unit, when a new release is available.

If you need help beyond what is contained in this guide please contact [support@dotorigin.com](mailto:support@dotorigin.com).

## 2 How the VTAP100 works

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With the VTAP100 OEM module connected to a PC, simply tap your smartphone against the VTAP100. Your mobile NFC pass will be read and data sent to the connected PC.

Of course, the data can only be read if your phone contains a mobile NFC pass, which has been issued in connection with the Merchant ID(s)/Collector ID(s) and key(s) that are known to the VTAP100. The unit comes with default values, so that you can test **Default operation on factory settings** before you begin customising any settings.

When the VTAP100 OEM module is connected to a computer it appears as a generic mass storage device (like a memory stick). To configure your VTAP100, you simply edit or create text files. These will be read automatically, and control the operation of the VTAP100. Consult the VTAP100 Basic Configuration Guide for more detail.

By default the VTAP100 is fully upgradable in the field. However, the VTAP100 can be locked in software or hardware, before deploying the unit, so that operation is no longer easily changed.

## 2.1 Default operation on factory settings

Before anyone changes the configuration from its default, you can confirm that the unit is working.

These steps demonstrate that the hardware can detect and interact with an OriginPass mobile NFC pass, which is ready to work with the default configuration of your VTAP100.

1. Obtain an OriginPass from Dot Origin by visiting <https://originpass.com/VTAP/> and add it to your Google Pay or Apple Wallet.
2. Connect the VTAP100 to your PC, using a USB cable.
3. Open a text editor, such as Windows Notepad.
4. When you tap the OriginPass on the VTAP100:
  - Pass contents will be displayed in the open text editor.
  - The diagnostic LEDs on the VTAP100 PCB will flash together.
  - Your smartphone may signal with a buzz or beep.

**Note:** Some Android phones will only interact if their screen is on, although it does not need to be unlocked. You may need to enable NFC in the settings for the smartphone.

**Note:** If the pass detected does not match the key and ID on the VTAP, or is moved away too quickly to be read, the pass contents displayed will be an 8 digit random hex string, such as '08E22AC1', different on each presentation. OriginPass contents will be a consistent string of the type '3~ffymeK9f\_mziYtA6~53999301628695~Valued'. The separator '~' or '|' will depend on your keyboard language settings.

**Note:** If local security settings prevent or limit the use of removable storage devices, or the connection of additional keyboards, an administrator may need to alter those permissions.



### 3 Mechanical installation

The VTAP100 unit for OEM integration comprises a PCB with an integral antenna.

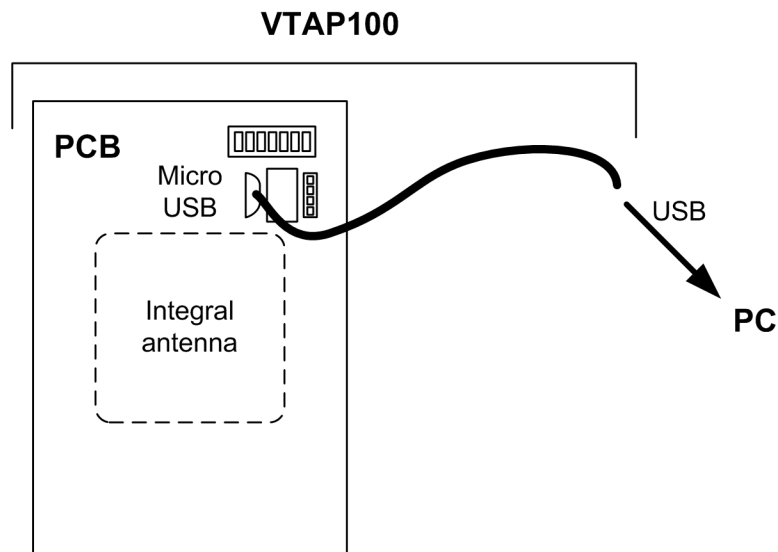


Figure 3-1 VTAP100 components - v4a Hardware



**WARNING:** Observe all Safety instructions when installing the VTAP100 PCB.

There is more detailed information in section 3.5 about how to fit the VTAP100 unit inside the Optional wallbox case, if used.

#### 3.1 Power

Connect the PCB to a PC using **only** a MicroUSB to USB cable.

The VTAP100 is rated at 5V DC (typ. 110mA, max 150mA) for power over USB.

#### 3.2 Environment

The VTAP100 must be stored and operated under the following conditions:

- Ambient temperature -25 to +70°C (-13 to 158°F)
- Humidity 0 to 95% RH non-condensing
- Pressure 86-106kPa

### 3.3 Mounting points

The PCB has 2.7mm diameter mounting holes for fixing the unit. Either use the 50mm spaced holes on the snap-off tabs, or remove those tabs and make use of the holes on the body of the board. If you need to remove the tabs, we recommend carefully following the perforations provided to avoid damage to the board, using a vice and pliers, or a PCB cutter. Use 2-4 small nuts and bolts to mount the board securely.

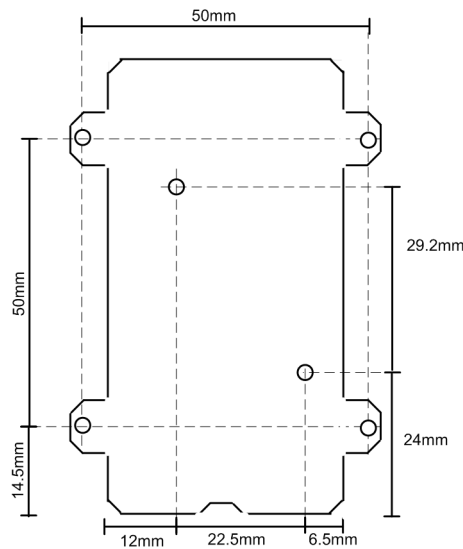


Figure 3-2 VTAP100 PCB mounting holes - v4 Hardware

The user's smartphone should be able to tap within 10mm of the antenna on the PCB. The antenna position should be clearly marked and easily accessed, so that users can position their smartphone appropriately. Be aware that antennas are positioned differently in different makes of smartphone. Apple iPhones often have antennas near the top and Android phones are more likely to have an antenna in the middle.

### 3.4 Optional RS232 connection

The PCB has a special connector J1 (an 8 pin, 2mm pitch header connector) which can be used to attach a captive cable with a matching crimp housing.

The standard connector fitted to the PCB is a Hirose DF11-8DP-2DSA male header plug with shroud. The matching crimp housing is the Hirose DF11-8DS-2C.

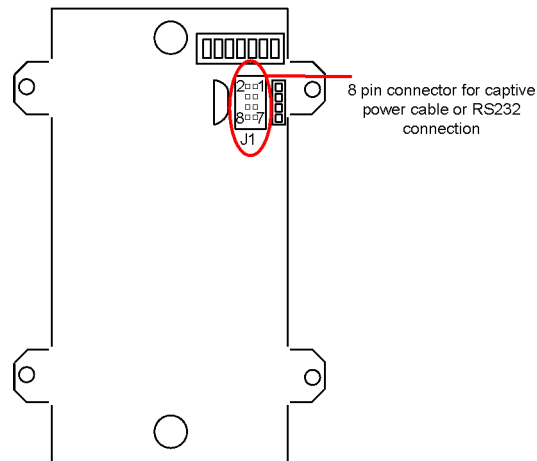
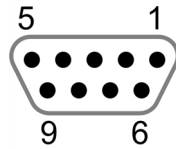


Figure 3-3 VTAP100 captive power cable or RS232 connection - VTAP100 v4a Hardware

The connector J1 includes both USB and RS232 signals, as follows:

Pin	Function
1	GND
2	USB D+
3	+5V supply
4	USB D-
5	RS232 RXD (input)
6	Reserved (sense input)
7	RS232 TXD (output)
8	Reserved (sense GND)



**Figure 3-4 Typical RS232 cable**

A typical RS232 cable has the following DB9 female connector pinout:

Pin	Function
2	TXD
3	RXD
5	GND
9	+5V supply

A PC or terminal RS232 connector is usually DTE (data terminating equipment), typically a male DB9 with TXD on pin 3 and RXD on pin 2. The appropriate connecting cable is then a DCE (data communications equipment) female DB9. TXD and RXD pins are swapped between the DCE and DTE devices, so that the transmit pin on one connects to the receive pin on the other.

The VTAP100 requires a 5V power supply, but not all RS232 devices have 5V on pin 9. Either:

- Disconnect the USB cable before making the serial connection, if power will be provided by J1 (pins 1 and 3) and the serial cable/host.
- Or retain a USB connection in addition to the serial connection, if power is not available from your RS232 device.

Some serial cables have a separate DC 5.5/2.1mm barrel connector to supply power. In these cables, typically, the centre pin is +5V and the outer barrel is GND.

### 3.5 Optional wallbox

The optional square wallbox for a VTAP100 is 86mm x 86mm and 25.5mm deep.



Figure 3-5 VTAP100 -SQ square wallbox

You can design and affix your own branded label to the unit.

The size of the label recess on a square (-SQ) wallbox is 72.33mm x 72.33mm with 4mm radius rounded corners as shown below.

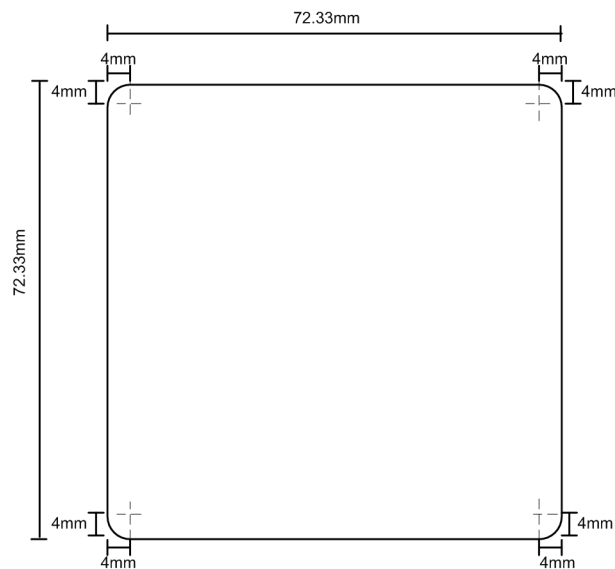


Figure 3-6 Dimensions of label recess in -SQ square wallbox

## 4 Module integration instructions

The VTAP100 OEM module has been tested and found to comply with the limits for a Class B digital device, pursuant to 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

These instructions must be followed to maintain the FCC approval for the VTAP100 OEM module, when it is integrated into a host system.

**CAUTION:** Changes or modifications made to the VTAP100 OEM module, that have not been expressly approved by Dot Origin Ltd could void the user's authority to operate the equipment.

### 4.1 Applicable FCC rules

The VTAP100 OEM module operates at 13.56MHz and is therefore subject to FCC rules for radio frequency devices. When a pass is presented to the reader, a person comes within 10mm of the device, so the rules relating to 'portable' transmitters apply.

### 4.2 Specific operational use conditions

The VTAP100 OEM module must be stored and operated under the following conditions:

- Ambient temperature -25 to +70°C (-13 to 158°F)
- Humidity 0 to 95% RH non-condensing
- Pressure 86-106kPa

### 4.3 RF exposure considerations

This module complies with FCC RF radiation exposure limits set for an uncontrolled environment. It is expected that VTAP100 OEM modules will be mounted in places that make it possible for people to come within 10mm of the unit and it is therefore defined by the FCC as a 'portable' device.

Screened cable should be used, wherever possible, to connect VTAP100 OEM modules to other devices, to avoid interference from other equipment.

The end-user manual for the host equipment, that contains a VTAP100 OEM module, must clearly indicate the operating conditions to be observed, so that the user remains in compliance with current FCC RF exposure guidelines.

## 4.4 Antennas

The VTAP100 OEM module has been tested with its integrated loop antenna, printed on the PCB. There are no alternative antennas approved for use. If an external antenna is attached, the new arrangement would require a new FCC approval.

## 4.5 Label and compliance information

The integrator must attach a label to the new equipment, hosting the VTAP100 OEM module, which states 'Contains FCC ID 2A282-VTAP100'.

## 4.6 Information on test modes

The following test modes are recommended to achieve states of maximum emission levels or susceptibility in the VTAP100 OEM module:

1. VTAP100 OEM module powered on. Communicating with PC over USB. Continuously reading tag.
2. VTAP100 OEM module powered on and tag present, but not communicating with external device.

## 4.7 Additional testing requirements

The VTAP100 OEM module is only FCC authorised for use in compliance with the specific FCC transmitter rules listed on the grant. The integrator is responsible for compliance to any other FCC rules that apply to the host, which are not covered by the modular transmitter grant of certification.

The final host product, with the VTAP100 OEM module installed, will still require Part 15 Subpart B compliance testing, to evaluate transmission effects when the VTAP100 OEM module and host equipment operate at the same time. Be aware that additional testing can be required on the final integrated system. We recommend integrators refer to further advice from the FCC OET Knowledge Base, such as [996369 D04 Module Integration Guide v02](#).

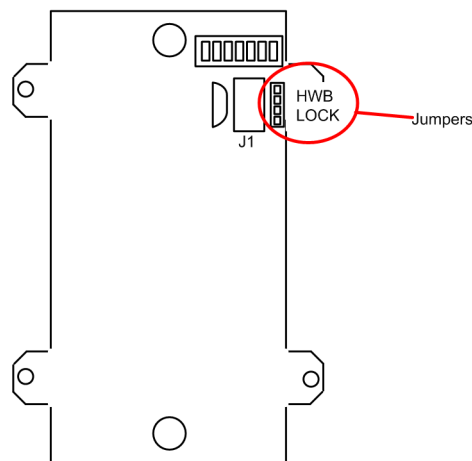
## 5 Hardware lock to disable USB mass storage device

You can lock the VTAP100 so that its firmware and configuration cannot be changed. You can either do this in software, or simply disable the mass storage device in hardware.

A software lock leaves some files visible. A hardware lock means that the VTAP100 will no longer be detected as a USB mass storage device. (It will still behave as an HID keyboard device and, if enabled, the virtual COM port will behave as a composite USB device consisting of HID keyboard and USB virtual COM port.)

You can use a hardware lock provided the jumper labelled LOCK (close to the MicroUSB connector) remains accessible on a VTAP100 OEM module.

Connect a jumper across LOCK on the PCB to lock the device, preventing firmware or configuration changes via the mass storage device. (It may still be possible to update the firmware or configuration via the command interfaces of the virtual COM port or serial ports, if they are enabled.)



**Figure 5-1 Jumper positions on VTAP100 PCB v4a hardware**

When you start the VTAP100, the presence of this jumper means the connected PC will not detect a USB mass storage device. The VTAP100 will only be detected by the PC as a keyboard (or keyboard and virtual COM port).

At any time you can remove the jumper across LOCK. When you restart the VTAP100, it will be detected as a USB mass storage device and you will be able to make firmware or configuration changes again.



## 6 Disposal

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For safety and sustainability, it is the responsibility of the integrator to ensure that when equipment containing a VTAP100 reaches the end of its life, it is recycled in accordance with WEEE Regulations within the EU.



VTAP100 (PCB and cables) should not be disposed of in general waste. If you wish to discard electrical and electronic equipment (EEE), please contact your supplier for further information.

