

VTAP₀₀

Installation Guide - VTAP100 Desktop USB Reader

VTAP100-USB

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DOT ORIGIN

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

Email: vtap-support@dotorigin.com

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

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

Telephone North America and Latin America: +1 (562) 262-9642

If you have any feedback on setting up or using your VTAP100 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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Dot Origin Ltd

Unit 7, Coopers Place Business Park, Combe Lane, Wormley

Godalming GU8 5SZ United Kingdom

+44 (0) 1428 685861

Contents

1 Using this guide	1
2 How the VTAP100 works	2
2.1 Test using factory settings	3
2.2 Start reading your own passes	3
2.3 Check status in BOOT.TXT	7
3 Choose a location for your VTAP100	9
4 Obtain a custom label for the case	11
5 Mount a VTAP100	12
6 Hardware lock to disable USB mass storage device	13
7 Find your hardware version	15
8 Disposal	16

Safety instructions



WARNING: INTENDED USE

The VTAP100-USB are boxed products for end-users. Although the enclosure may be opened when the device is not connected, components mounted on the VTAP PCB are not user-serviceable.



WARNING: ESD PRECAUTIONS

If the enclosure is opened to access the PCB, we recommend careful handling of Electrostatic Sensitive Devices (ESDs) .



WARNING: POWER SUPPLY

Use the USB cable provided to connect the VTAP100-USB to a PC. Use a standard micro-USB cable to connect the VTAP100-PAC-485 model to a PC or **alternatively** power the unit by connecting it to an access controller, using the RS-485 connector cable. If the VTAP100 is being powered through its RS-485 connector, you can still make an additional USB data connection to a PC, provided that the PC is already powered before the connection is made.

EMC emissions and immunity certifications are only valid when using the VTAP100-USB with the supplied cable.

 **WARNING:FCC COMPLIANCE**

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, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: 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.

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

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and a human body.

**WARNING:ISED COMPLIANCE**

This device contains licence-exempt transmitter(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference, and
- (2) this device must accept any interference, including any interference that may cause undesired operation of the device.

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and a human body.

L'émetteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- (1) L'appareil ne doit pas produire de brouillage;
- (2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Cet équipement est conforme aux limites d'exposition aux rayonnements de la ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et un corps humain.

1 Using this guide

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



Figure 1-1 VTAP100 in compact (-CC) case

It contains the information you need to install your VTAP100.

Consult the VTAP Configuration Guide for more about custom configuration and maintenance features for any VTAP100, including how to update the firmware on your VTAP100-USB, when a new release is available.

If you need help beyond what is contained in this guide please contact vtap-support@dotorigin.com.

2 How the VTAP100 works

With the VTAP100-USB connected to a PC, simply tap your smartphone against the VTAP. 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 ECC key(s) that are known to the VTAP. The unit comes with default values, so that you can test **Test using factory settings** before you begin customising any settings.

When the VTAP100-USB is connected to a computer it appears as a generic mass storage device (like a memory stick). To configure your VTAP, you simply edit or create text files. These will be read automatically, and control the operation of the VTAP. There is information in **Start reading your own passes** to take the first steps to configure your VTAP for use. Consult the VTAP Configuration Guide for more detail.

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

2.1 Test using 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 demo 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 Google or Apple Wallet. (You will require a username and password - contact vtap-support@dotorigin.com to get these.)
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, through keyboard/barcode emulation.
 - The feedback LEDs on the VTAP100 PCB will flash green.
 - 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 may be an 8 digit random hex string, such as '08E22AC1', different on each presentation. OriginPass contents will be a consistent string, such as '3~ffymeK9f_mziYtA6~53999301628695~Valued'. Any separator, such as '~' or '|', will depend on your keyboard language settings. (See VTAP Commands Reference Guide for option to ignore random UIDs if needed.)

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.

2.2 Start reading your own passes

If you navigate to the VTAP in the computer's file system, it will appear as an attached mass storage device and list the files contained, including the main `config.txt` file.

To read any mobile NFC pass, you will need to provide your pass reading parameters in the `config.txt` file. This means a collector ID or merchant ID and ECC keys. These allow you to read and decrypt pass data that is held by your users, on their smartphones.

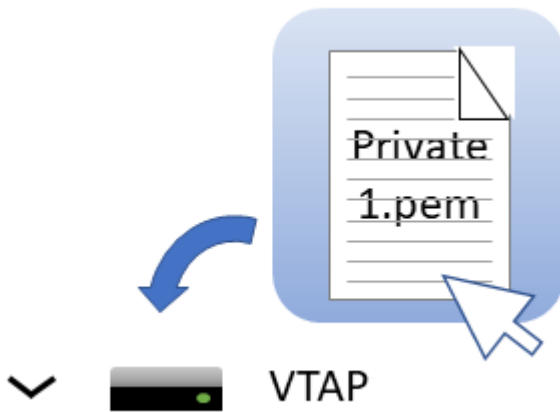
This first time, you will need to connect the VTAP100 to your PC, using a USB cable. (If needed, you can make changes remotely in future over a virtual COM port or serial port, see VTAP Serial Interface Guide.)

Step 1: Upload private key file(s) to your VTAP100

1. Ensure these are ECC private key(s), and each is stored in a file with the name `private#.pem`, following the `.pem` format, where `#` is replaced with a number from 1 to 6, matching the key slot you will save it in. (The demo passes are accessed using the key in KeySlot 6, so don't overwrite this one unless you are finished with demo passes.)

Note: You cannot use more than 6 key files.

2. Load your keys by copying these files onto your VTAP100, which shows up in the file system of your PC as a mass storage device.



Note: When you reboot the VTAP100 your key will have been stored in hardware, and will no longer be listed as a file on the device. You can confirm key file(s) have been loaded when you Check status in BOOT.TXT. If the key file does not disappear and there is an error in `Boot.txt`, check your `.pem` file as it is likely it did not adhere to the standard - perhaps it was not an ECC key?

Step 2: Declare Merchant ID(s)/Collector ID(s) in the `config.txt` file

1. Open the file `config.txt` in a text editor (such as Windows Notepad). It already contains parameters for accessing the demo passes, prefixed `VAS1` and `ST1`, both relying on KeySlot 6. You can overwrite these, or keep them in addition to your own pass reading parameters.
2. Add your pass reading parameters in the `config.txt` file to access up to 6 Apple VAS and up to 6 Google Smart Tap IDs, and identify the keys to be used in each case.

Note: Although the VTAP100 supports multiple IDs, Apple expect most users will only use one. Multiple collector IDs are not supported by Android, which means you cannot request more than one Collector ID from Google. Only one should be live at any one time. Multiple IDs is an advanced feature that should be used with care. The `VAS#` and `ST#` numbers define the order in which IDs will be requested from Apple or Android phones respectively. The lowest numbered ID will be requested first, then continuing in ascending numeric order.

Put each parameter on a new line. Order of parameters does not matter to the VTAP100, but could help other people who need to edit the file. Start any comment lines in the `config.txt` file, that the VTAP100 should ignore, with a semicolon. Each parameter should only appear once - if it accidentally appears more than once then only the last instance will take effect.

Example: Settings in `config.txt` to interact with both Apple VAS and Google Smart Tap mobile passes

```
!VTAPconfig

VAS1MerchantID=<your merchant ID>
VAS1KeySlot=1
; This says use the key added as file 'private1.pem' to read and
; decrypt any pass connected to your merchant ID on an Apple iPhone

ST1CollectorID=<your collector ID>
ST1KeySlot=2
ST1KeyVersion=1
; This says use the key added as file 'private2.pem' at key version 1
; to read and decrypt any pass connected to your collector ID
; on an Android phone
```

3. Save the amended `config.txt` file and these changes will take effect immediately. (A small number of changes to the `config.txt` file require a reboot to take effect, for instance to the status of the virtual COM port, but these are highlighted in later sections).

Note: If a `VAS#KeySlot` parameter is omitted, or set to 0, then all available keys will be automatically tried to choose the right key. If the data received by the VTAP100 cannot be decrypted, the Apple iPhone will register a pass read, but the data will not be output.

Note: If an `ST#KeySlot` parameter is omitted, or set to 0, then authentication will be omitted and decryption will not be performed. In this case, Google Smart Tap data will be received and sent on by the VTAP100, only if the pass does not require authentication by the terminal.

2.3 Check status in `BOOT.TXT`

If you navigate to the VTAP100 in the computer's file system. It will appear as an attached mass storage device and list the files contained, including the `BOOT.TXT` file.

Inspecting `BOOT.TXT` will give you essential information about your VTAP100 set up, at time of last reboot, which might be helpful when troubleshooting.

```
VTAP100
Boot time: 1970/01/01 00:00:00
Firmware: V2.2.0.2
Storage: Dataflash
Status: 0
Hardware: 5.01
Expansion: None
NCI: 0471125005-0001
Serial number: 563230-798AEC17D053C05ADE6F6C36C79A6B12
AppKeys used: -23-
KeySlots used: ----56
```

Figure 2-1 Example VTAP100 v5 `BOOT.TXT` file

You are most likely to need:

- ('ATCA' on VTAP100 v4a or earlier) - the serial number for your VTAP100.
- 'Firmware' - the VTAP100 firmware version in use. You will find the latest firmware versions at <https://www.vtapnfc.com/download/>
- 'Hardware' - the VTAP100 hardware version in use.
- 'KeySlots used:' - Indicates the ECC private keys loaded on the VTAP to access VAS or Smart Tap passes. Helps you check whether you have uploaded the necessary ECC private keys, which can be unclear as the files are deleted when they are uploaded. These two examples show how to read this information:
 - 'KeySlots used:-----' shows that no keys have been uploaded.
 - 'KeySlots used: 12--56' shows that key files 1 and 2 have been successfully uploaded, in addition to the defaults 5 and 6.
- 'AppKeys used:' Indicates the application keys (if any) uploaded to the VTAP for any other applications. For example 'DESFire' if keys have been loaded to use with DESFire applications.
- 'VCP enabled', if included - indicates that the virtual COM port has been enabled.
- 'Status' - should be 0 if operating normally, anything else indicates an error state.

- 'Expansion:' shows the name of the expansion board (if any) connected to the VTAP, for example: 'VTAP100W' for a Wiegand expansion board.
- 'Boot time' - The time at boot, which defaults to 1970/00/00 00:00:00 if power is removed to reboot.

If the configuration has been locked the `BOOT.TXT` file will end with the words `LOCKED S/W` or `LOCKED H/W`.

3 Choose a location for your VTAP100

Position the VTAP100-USB so that users can easily tap their smartphone against the label, on top of the device.

CAUTION: Never allow a metal surface between the VTAP100 and the user's phone or card.

The compact case for a VTAP100 is 97mm x 49mm and 40mm deep.



Figure 3-1 VTAP100 -CC compact case

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

The compact case separates into two pieces, which clip together around the PCB. After deciding where you will use your VTAP100, you may want to alter the assembly to suit the location.

The case can be changed from an ergonomic desktop reader design to one suited for wall mounting, simply by rotating the PCB and the case front through 180°, keeping the LED and LED window aligned. Mount the PCB in the case, then engage the hooks at the LED window edge of the case to form a hinge, lower the cover and secure with a screw at the opposite end.

Wallmount assembly



Desktop assembly



Figure 3-2 Wallmount or desktop assembly

4 Obtain a custom label for the case

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

If you would like to brand your VTAP readers do contact vtap-support@dotorigin.com.

We can take your CMYK, vector format images and design and supply labels manufactured to high standards using an advanced production method, where the printing is protected by a thick layer of clear plastic, making them scratchproof, waterproof and UV-proof.

Apple guidelines require the standard contactless logo to be used, and so our standard label template includes this along with a design that highlights the location of the VTAP antenna, as that is the target location for a user to tap their phone.

The size of the label recess on a compact case (-CC) is 41mm x 57mm with 2mm radius rounded corners as shown below.

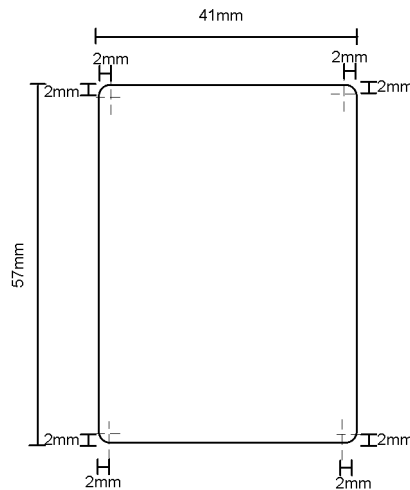


Figure 4-1 Dimensions of label recess in -CC compact case

5 Mount a VTAP100

The compact case has mounting holes, in case you want to fix the device in place. The case separates into two pieces, which clip together around the PCB. The following diagram shows the location of mounting holes in the compact case base plate:

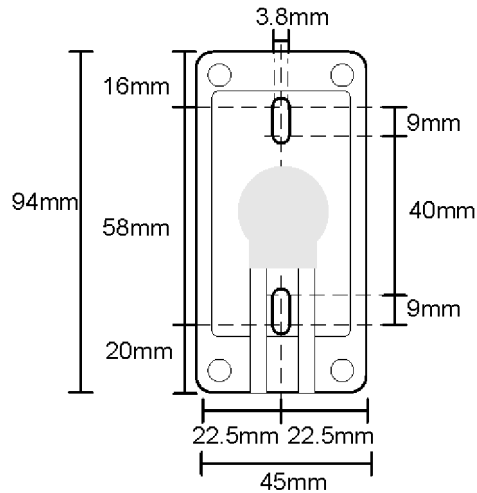


Figure 5-1 Mounting holes in the -CC compact case base plate

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

We recommend that you complete and test your configuration before the VTAP100 is mounted. Detailed help is in the VTAP Configuration Guide.

6 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. If you have a boxed VTAP it is strongly recommended that you use the software lock option, which is described in the VTAP Configuration Guide.

A software lock prevents changes but leaves the file system readable. 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.)

Users of a VTAP100-USB will need to open the case to locate the jumper labelled LOCK (close to the MicroUSB connector) on the PCB.

If you have a compact (CC) case you need to remove the screw from the case (which may be either a security screw or phillips head screw).

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.)

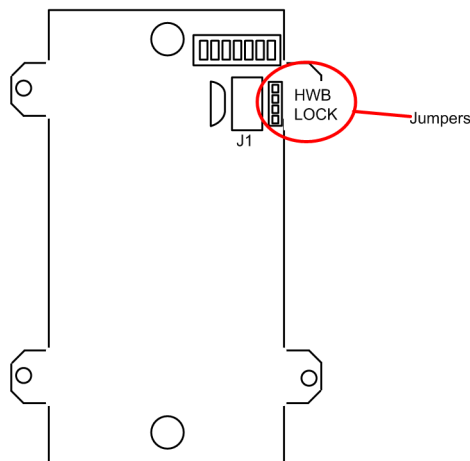


Figure 6-1 Jumper positions on VTAP100 PCB v4a or v5 hardware

Note: If you have a VTAP100 PCB version 3a or earlier the connections will be different, please [contact us](#) for manuals specific to your hardware. (If you are not sure which version PCB you have, just follow the instructions in [Find your hardware version.](#))

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.

7 Find your hardware version

If you need to report a problem with your VTAP100 or find the right reference diagram you will need to know your hardware version.

If you can connect your VTAP100 to a PC, you can easily check the BOOT.TXT file.

If you navigate to the VTAP100 in the computer's file system. It will appear as an attached mass storage device and list the files contained, including the `BOOT.TXT` file.

Inspecting `BOOT.TXT` you will find a number next to the word `Hardware:` such as `v5`. This is the Hardware version in use.

Alternatively, over a serial connection to the VTAP100, sending the `?b` command will return the `BOOT.TXT` information.

If you cannot power the VTAP100

Open the case, by removing the end label and the security screw - at the opposite end of the reader to the LED window, on a compact case.

You will find the version number printed on the PCB, such as "VTAP100-PCB-V4a ©2021 DOT ORIGIN Ltd." which is VTAP100 v4a hardware. In the photo below is "VTAP100-GEN2-PCB-Rev2 © 2022 DOT ORIGIN" which is also known as VTAP100 v5 hardware.



8 Disposal

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.

