

VTAP₀₀

User Guide - VTAP100 cloud capable reader - USB, Bluetooth, Wi-Fi

VTAP100-PRO-BW

Revised January 2025 v1.45

If you need help to set up or use your VTAP PRO reader, beyond what is contained in this User 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

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If you have any feedback on setting up or using your VTAP PRO reader 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-PRO-BW is a boxed product 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 - VTAP100-PRO-BW

EMC emissions and immunity certifications are only valid when using the VTAP100-PRO-BW with the supplied cable, connected to a 5V USB port or power adapter.



WARNING: POWER SUPPLY - VTAP100-PRO-EXP1 I/O expansion board

If a VTAP100-PRO-EXP1 I/O expansion board is being used to control mains voltages, the installation should be undertaken by a qualified electrician.

**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 VTAPI00-PRO-BW.



Figure 1-1 VTAPI00-PRO

It contains the information you need to install your VTAP PRO reader and start work with your VTAP Cloud configured device. If you have a VTAPI00-PRO-BW reader that is intended to work in Cloud mode the majority of VTAP PRO reader installation is about ensuring the reader is powered and connected over Wi-Fi to VTAP Cloud. If it will operate in Local mode more configuration will be required.

The VTAPI00-PRO-EXPI expansion I/O board is an option for VTAPI00 PRO readers to enable more complex actions to follow a pass read. The use of this optional board is also described in this guide.

Consult the VTAP Cloud User Guide if you need to know more about changing configuration using the online VTAP Cloud platform.

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

2 How a VTAP100-PRO-BW works

The VTAP100-PRO-BW is an NFC mobile wallet pass reader that offers a Wi-Fi connection to the Dot Origin VTAP Cloud, or alternatively, a local Bluetooth (BT) connection to a BT host device. The VTAP100-PRO from Dot Origin is an enhanced, cloud-capable version of the popular VTAP100 desktop USB reader.

The VTAP100-PRO-BW has two modes of operation:

- **Cloud mode** where this VTAP reader is managed and communicates through the VTAP Cloud service, using Wi-Fi and optionally some Bluetooth and Input/Output features; and
- **Local mode** where this VTAP reader behaves in the same way as more basic VTAP100 readers, with additional Bluetooth and Input/Output features, but without Wi-Fi.

In Cloud mode, the VTAP100-PRO-BW is connected only to a local power supply and to a **Wi-Fi network**. Whenever a pass is presented, data is sent to the VTAP Cloud management platform, which can optionally be linked to a third party platform such as a loyalty platform. Responses to each pass tap can be fed back to the user (or a local operator) via simple LED and beep signals, and/or switching an electrical device through the VTAP I/O. Configuration and management of the device is performed via a companion online platform, called the VTAP Cloud. Using this service, you can configure the various pass reading parameters (merchant IDs, private keys etc) and alter Wi-Fi settings. You also control the application, which determines how the VTAP PRO reader behaves when a user taps their phone, and where the pass data should be sent.

The VTAP100-PRO-BW also has a **2.4GHz Bluetooth v4.2 and BLE interface** that can be used to send pass payloads as Bluetooth BLE HID keyboard emulation, to a nearby Bluetooth host. (This can be used alongside the Wi-Fi connection in Cloud mode.) If Cloud connection is not required, the VTAP100-PRO-BW can be used with a local connection, as a Bluetooth host device, to receive barcode or QR scanner inputs.

Note: The VTAP PRO readers may be pre-configured to suit our various customers and partners, and provide demonstration units ready to test. In some cases, they are configured to work with our demonstration pass platform, OriginPass, and in other situations they are set up to use the customer's own passes and/or platform APIs.

This document describes how to set-up and use the different features of VTAP PRO reader in Cloud mode and Local mode, including setting up the Wi-Fi, switching between Cloud and Local modes, Bluetooth/BLE feature setup and using VTAP100 PRO I/O expansion box (VTAP100-PRO-EXPI) with a VTAP PRO reader.

3 Cloud mode

This section describes how to use the VTAPI00 PRO reader in Cloud mode.

In Cloud mode, VTAP PRO reader can connect to the VTAP Cloud Admin Platform over Internet, through Wi-Fi, act as a Bluetooth keyboard or take input from a Bluetooth barcode/QR code scanner. The VTAPI00 PRO can also act as a dynamic BLE beacon in Cloud mode. You can choose applications on the VTAP Cloud platform to return appropriate payloads in response to a successful pass tap, potentially to a BT host device connected to the VTAP. Input, relay and external serial LED output features are also optionally available in Cloud mode (VTAPI00 PRO I/O expansion board required).

3.1 First time using VTAP PRO reader in Cloud mode

1. Before powering the device, please check that the chosen Wi-Fi network is available. This will be either 'VTAP' (with a password of 'passreader') or another SSID that you specified to our team in advance.
2. Power on the VTAPI00-PRO-BW, by connecting the captive USB cable to a 5V USB port or power adapter. Always confirm the suitability of any power adapter before use.
3. You should see a steady red LED on the top of the VTAP PRO reader. This indicates that the device is booting up, which can take up to 10 seconds.

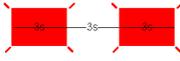
When boot up is complete you should see the LED flash red while the device establishes a Wi-Fi connection. A steady blue LED indicates you have a successful connection to Wi-Fi and the Internet, and therefore to the Dot Origin cloud platform.

Note: The steady blue LED will flicker every 30s in response to a heartbeat signal, giving visual confirmation it is still in communication with the VTAP Cloud.

Continued LED red flashing signals a problem. Reconfiguring the Wi-Fi settings, if needed, is addressed in section **[3.1.2 Wi-Fi configuration in Cloud mode](#)**.

3.1.1 LED and buzzer default behaviour

The following signals are used to indicate certain situations during start up and normal operation of a VTAPI00-PRO reader in Cloud mode.

Signal		Meaning
	Steady red	System is booting (typically <10 seconds). If the LED remains steady red for longer than 5 minutes there is an error - contact vtap-support@dotorigin.com .
	Red flash every 1 sec	No Wi-Fi , the VTAPI00-PRO-BW reader will enter Hotspot Mode when it has been in this state for 3 mins.
	Blue flash every 1 sec	In Hotspot Mode , waiting for you to provide details for an available Wi-Fi network. After 10 minutes the unit will automatically reboot.
	Red slow flash	Wi-Fi but no Internet (so not connected to Dot Origin cloud). After 5 minutes the unit will automatically reboot.
	Steady blue (or default colour set in application)	Connected to the Dot Origin cloud , available for you to manage through the VTAP Cloud platform. Note: The steady blue LED will flicker every 30s in response to a heartbeat signal, giving visual confirmation it is still in communication with the VTAP Cloud.
Any	LED and/or beep (as set in application)	Instant reaction to pass/card when presented
Any	LED and/or beep (as set in application)	Application response to pass/card data received and processed

Note: The steady blue LED will flicker every 30s in response to a heartbeat signal, giving visual confirmation it is still in communication with the VTAP Cloud. Always wait a few seconds to be sure whether the LED signal is flashing or steady.

3.1.2 Change Wi-Fi configuration in Cloud mode

By default the VTAPI00-PRO-BW will search for a Wi-Fi network called 'VTAP' with a password of 'passreader'. Or we may have already added another network SSID to the configuration at your request, in which case you can use that network instead.

Note: The VTAP PRO reader uses the 2.4GHz band only. For Apple device hotspots, please select 'Maximum Compatibility' mode for the personal hotspot. The equivalent setting in Android varies by phone type.

If the VTAP PRO reader is **slowly flashing a red LED, on 3s off 3s** it has found the Wi-Fi network but cannot reach the VTAP Cloud Internet service via the Wi-Fi connection. You may need to wait, check your network router settings, or restart. After 5 minutes in this state the VTAP PRO reader will automatically restart.

If the VTAP PRO reader is **quickly flashing a red LED every 1s** it cannot connect to the configured Wi-Fi network. If you do not have a Wi-Fi network that matches the one that is set in the VTAP configuration, then your options are:

- Local offline configuration, described below.
- Setting up your own local hotspot temporarily with a name and password that matches the one set in its configuration, or the default name 'VTAP' and password 'passreader'.

When you have a VTAP PRO reader showing a **steady blue LED**, it can be directed to use a different network by changing the configuration, through the VTAP Cloud online management platform at <https://vtap.dotorigin.com>.

Offline configuration in Hotspot Mode

After three minutes of flashing the red LED every 1s the VTAP PRO reader will switch into Hotspot Mode flashing the blue LED every 1s.

In Hotspot Mode the VTAP PRO reader is waiting for a local connection to direct it to a different Wi-Fi network.

1. Take a phone or laptop, and disconnect it from Wi-Fi networks it might use automatically.
2. Find the VTAP100-PRO-BW serial number, which you will find on a sticker on the base of your VTAP PRO reader:



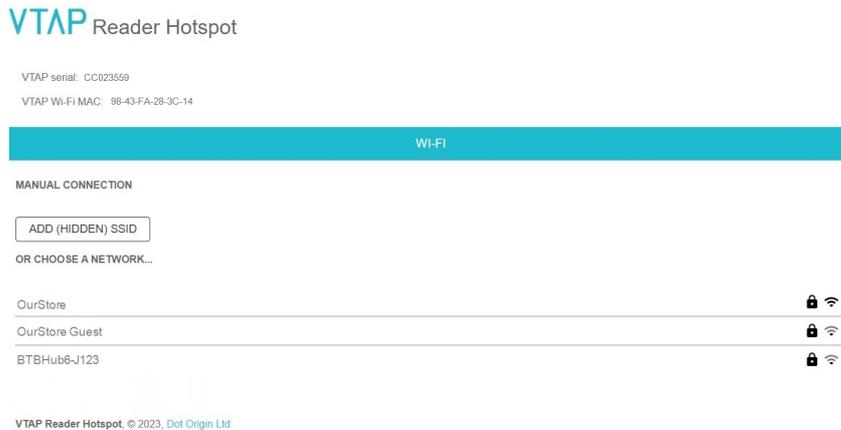
The hotspot set up by this example will be called '<serial> Setup', so here it is 'CC203559 Setup', with WPA-PSK security and password 'passreader'.

3. Hold the phone or laptop near your VTAP100-PRO-BW, search for a Wi-Fi network, and connect to the 'CC203559 Setup' network when it appears.

Note: There is sometimes a short delay, after the LED starts to indicate a switch to Hotspot Mode, before the hotspot becomes available.

4. After connection is made, you should be directed to a web page, called 'Sign in to <network name>'.

If this does not happen automatically, open a web browser, on the phone or laptop on the '... Setup' network, and go to `http://192.168.4.1:`



5. Select the Wi-Fi network from available networks list, or 'ADD (HIDDEN) SSID' to add another SSID manually. Provide a password and select 'Join'.

The VTAP will then attempt to join that network, and then the VTAP Cloud.

When the Wi-Fi connection is successful, the mobile phone or laptop will be disconnected from the VTAP hotspot. The LEDs on the VTAP100-PRO-BW will turn to steady blue, indicating a connection to the VTAP Cloud platform.

3.2 Configure VTAP PRO reader in Cloud mode

The VTAP100 PRO reader in Cloud mode, will be configured through the VTAP Cloud platform to suit customer requirements, so that it can be used straight out of the box without the need to set any configuration.

Should you require a custom configuration for your VTAP100 PRO reader in Cloud mode please contact our support team at vtap-support@dotorigin.com.

3.2.1 Using the VTAP Cloud online platform

When you have a VTAP PRO reader which has a **steady blue LED**, it can be managed through the VTAP Cloud online management platform.

Your VTAP PRO reader will be associated with a login for a particular admin user, using details provided at time of purchase. When you log in as the admin user for your organisation you will be able to:

- View **readers** status information about your VTAP PRO reader
- Change the **configuration** of your VTAP PRO reader, setting the various pass reading parameters (merchant IDs, private keys etc) and alter Wi-Fi settings.
- Change the **application** to be used by your VTAP PRO reader. This means selecting a script that will control actions following each pass read. This might include sending an

instruction to the VTAP PRO reader to flash its LED or beep, or to send part of the received pass data over a USB keyboard interface. Dot Origin will provide or collaborate on public or private scripts to suit the intended application.

- Set up access for any other **users** within your organisation, who will need to view or make changes in the online management portal.
- If you have multiple VTAP PRO readers you can simplify management by grouping them into **fleets**, which share a common configuration and application.

When a reader is subsequently switched off, or loses Internet connection, it will remain available to manage in the online management portal. Changes will be made to its operation whenever the reader is next brought back online.

There is a separate VTAP Cloud User Guide describing this platform. If you need further help, contact vtap-support@dotorigin.com.

3.3 Bluetooth BLE keyboard emulation in Cloud mode

The BLE keyboard emulation feature allows the VTAP100-PRO-BW to send tap data to a Bluetooth connected host device, such as a tablet, laptop or POS terminal, as keyboard input. This is similar to the VTAP USB keyboard emulation, except that it uses a Bluetooth connection instead of the VTAP USB keyboard wedge.

The VTAP100-PRO-BW allows simultaneous Wi-Fi and Bluetooth connections, enabling concurrent connection to the VTAP Cloud and a nearby Bluetooth host.

The VTAP100-PRO-BW will be configured through the VTAP Cloud with the BLE keyboard emulation settings to suit your application.

To connect your VTAP100-PRO-BW to a Bluetooth host device, follow these steps:

1. Scan and pair with the Bluetooth name that's assigned to your VTAP100-PRO-BW. (By default it will be the serial number for the device, of the form 'CC123456').
2. Depending on your application, you may need to enter the VTAP reader's Bluetooth PIN. (By default there is no PIN set.)

You can now start sending data over the Bluetooth Keyboard emulation.

3.4 Bluetooth scanner input in Cloud mode

Bluetooth scanner input can be used to connect a Bluetooth barcode/QR code scanner to read the barcodes/QR codes and send them to the VTAP Cloud, and optionally, a selected VTAP100-PRO-BW interface.

The VTAP100-PRO-BW is configured through the VTAP Cloud with the Bluetooth scanner host settings to suit your application. If you need any changes please contact our support team at vtap-support@dotorigin.com.

3.4.1 Pairing and connecting with NETUM C750 barcode scanner

Follow these steps to pair and connect your VTAPI00-PRO-BW with the NETUM C750 barcode/QR code scanner, assuming our support team has set your reader up for this:

1. Switch on the NETUM scanner and press the top button once, enabling the pairing. The scanner will beep when button is pressed.
2. The VTAPI00-PRO-BW will automatically detect and pair with the NETUM scanner. Once paired, the scanner will beep again and show stable blue LED (indicating active connection).
3. Now you can start using the NETUM scanner with the VTAPI00-PRO-BW. The barcodes/QR codes scanned by the NETUM scanner will be output from the VTAPI00-PRO-BW in the same way as an NFC payload.

3.5 BLE Beacon in Cloud mode

The VTAPI00-PRO-BW allows users to set BLE Beacons for their mobile wallet passes. Multiple beacons can be set for different campaigns, passes or locations (where specific passes can be used).

The VTAPI00-PRO-BW is configured through the VTAP Cloud platform to suit your application. If you need to change the settings, adding, removing or modifying beacons, please contact our support team at vtap-support@dotorigin.com.

4 Local mode

The Local mode lets you use VTAPI00-PRO-BW without VTAP Cloud. The USB/serial and Bluetooth BLE features are available in Local mode, and can be configured without a VTAP Cloud connection.

Local mode offers all the features of more basic VTAPI00 readers. It may be controlled over a USB COMport or serial interface, or emulate a USB keyboard, for output to a POS terminal for example. On top of this it has Bluetooth and BLE features. It can act as a BLE keyboard, receive input from a Bluetooth barcode or QR scanner, or run a dynamic BLE beacon. Optionally, input, relay and external serial LED output features are also available in Local mode. (VTAPI00 PRO I/O expansion board required.) Wi-Fi is not available in Local mode, and VTAP Cloud connectivity is switched off.

4.1 Change from Cloud to Local mode

Unless the VTAP PRO reader was specifically supplied pre-configured for use with VTAP Cloud, it will be supplied ready to use Local Mode.

The Local mode can be enabled by changing the `config.txt` setting directly.

It is assumed that your VTAPI00-PRO-BW is in Cloud mode and connected to a PC via USB connection.

Note: If USB mass storage on the VTAPI00-PRO-BW has been disabled you will need help from our support team (contact vtap-support@dotorigin.com) to re-enable it via the VTAP Cloud platform before switching to Local mode.

1. Connect the VTAPI00-PRO-BW to a PC or Mac.
2. On the VTAP mass storage drive, open the `config.txt` file.
3. Set `CloudMode=0` and save the file.
4. After the file save, the VTAP should immediately switch to Local mode, which can be observed when the LEDs turn red from blue.

4.2 Configure VTAP PRO reader in Local mode

The VTAPI00-PRO-BW in Local mode, can be updated by adding or modifying the required settings in the `config.txt` file. This can be done by opening the file from the VTAP file system in a text editor, or sending a complete replacement `config.txt` file to the VTAP reader over Zmodem. If there are only a few settings to be changed, you could update those settings with Remote management commands or Dynamic configuration commands, described in the VTAP Commands Reference Guide.

Note: Always use Dynamic configuration commands if you need frequent configuration changes. Frequent updates to the `config.txt` file, whether using a text editor or Remote management commands, are not recommended as this will cause excessive wear to flash memory.

VTAP commands can be sent using the COM or Serial RS-232 interfaces. (You will find help with these in the VTAP Serial Integration Guide.) These include all the commands listed in the VTAP Commands Reference Guide including VTAP100 PRO specific commands such as those for driving relays (more in section **Control the VTAP100-PRO-EXPI expansion board in Local mode**).

4.2.1 Update firmware on VTAP PRO reader in Local mode

Firmware updates can be done by simply copying a `vtapware.dat` file to the VTAP100 PRO USB mass storage file system.

If the VTAP PRO mass storage drive is inaccessible, the firmware file can also be sent over Zmodem. (Refer to the VTAP Serial Integration Guide for more about Zmodem).

A reboot is required after the firmware file is copied to the VTAP reader. This triggers the firmware to install, and the file will no longer be visible in the VTAP file system.

The latest VTAP reader firmware can be downloaded from <https://www.vtapnfc.com/downloads>.

For changes to VTAP Connectivity Firmware (VCF), please contact our support team at vtap-support@dotorigin.com.

4.3 Bluetooth BLE keyboard emulation in Local mode

To enable and use the Bluetooth BLE keyboard emulation feature in Local mode, follow the steps below:

1. Find the `config.txt` in the VTAP file system and save the following settings into the file to enable and configure the BLE keyboard emulation feature.

Example: Enable Bluetooth keyboard emulation in Local mode

```
CloudMode=0           ; Switch the VTAP100 PRO to Local mode
BTKeyboardMode=1     ; Enable the Bluetooth Keyboard emulation
```

If mass storage is disabled on the VTAP100-PRO-BW, you could change those settings over a serial interface with Remote management commands described in the VTAP Commands Reference Guide.

2. The VTAP100-PRO-BW will now appear as a BLE keyboard to nearby Bluetooth host devices, with the name <VTAP Serial number>, for example 'CC123456'.

- As no PIN is defined, you can pair and connect to a host device (such as a mobile phone or a PC with Bluetooth) without any PIN.
- To rename and/or add a PIN to the VTAPI00-PRO-BW Bluetooth connection, set the `BTKeyboardName` and `BTKeyboardPIN` as required.

Example: Rename BLE keyboard and set PIN in Local mode

```
BTKeyboardName=VTAP BTKeyboard      ; Max 15 character name
BTKeyboardPIN=123456                ; 6 digit PIN
```

Note:The `BTKeyboardPIN` must be a 6 digit PIN. If a PIN of fewer digits is set, it will be automatically padded with leading zeros to make a 6 digit pin (e.g. 1234 will be changed to 001234).

- You can extract a part of the pass payload over BLE keyboard emulation by using `BTKeyboardPass...` settings
- Prefix and postfix can be set using `BTKeyboardPrefix` and `BTKeyboardPostfix`. Max 16 characters can be set. URL encoding is supported
- By default the delay between each emulated keyboard press is set to 5ms, but you can change it using `BTKeyboardDelayMS`.

Note: It is not recommended to use a `BTKeyboardDelayMS` of less than 5ms.

4.4 Bluetooth scanner input in Local mode

Follow the steps below to connect a Bluetooth barcode scanner to the VTAPI00-PRO-BW (becoming a Bluetooth scanner host).

- Save the following config settings into the `config.txt` to enable and configure the Bluetooth scanner input feature, in Local mode.

Example: Enable and configure the Bluetooth scanner input in Local mode

```
CloudMode=0                ; Switch the VTAP100 PRO to Local mode
BTScannerMode=1            ; Enable the Bluetooth scanner input feature
BTScannerOutput=k,c        ; Set the output interface where the
                            ; data should be sent. Here keyboard
                            ; emulation (k) and COMport (c) are chosen.
```

Also make sure that the `...Source` setting for the output interface you are using has the 0x02 bit enabled. For instance, by default `ComPortSource=A1`, but for sending the data read from the Bluetooth input device you should set `ComPortSource=A3`.

- Set the input device in pairing/discovery mode.

3. To verify a successful pairing, power cycle the VTAPI00-PRO-BW and check the `VCBOOT.txt` file in a text editor on the VTAP PRO file system. (Alternatively, send a `?vcb` command to the VTAPI00-PRO-BW over a serial interface and see the VTAP response.)

`VCBOOT.TXT` or the `?vcb` response will contain a line with the syntax:

Paired: <number of paired devices>,<names of the paired devices>.

For instance Paired: 1,C barcode scanner.

4. The VTAPI00-PRO-BW is now ready to read any data coming from that paired Bluetooth input device, and send it over to the selected interface (set in `BTScannerOutput`).

4.5 BLE beacon in Local mode

To set beacons in Local mode, the following setting must be saved in the `config.txt` file to enable and use your BLE Beacon.

Example: Enable BLE beacon in Local mode

```
Set BLEBeacon=i,<name for logging>,<uuid>,<major>,<minor>
```

```
BLEBeacon=i,mybeacon,4EE2A269-4215-562A-9485-3EC7FCC38520,1,2
```

There can be multiple majors and minors for each UUID. This allows use of multiple beacons for different locations or campaigns. For instance, a company with one UUID, has different major values for all the cities where branches are located, and minor values within each city for its different branches.

5 Using VTAP PRO I/O expansion board

The VTAPI00-PRO-EXP1 expansion extends the I/O (Input/Output) connectivity from the VTAP PRO to an external board.

5.1 Connect the I/O expansion board to a VTAP PRO reader

To open the case, follow the instructions in [Environment, mounting and branding](#).

CAUTION: We strongly recommend that power is disconnected before opening the VTAPI00 case.

Use the EXP cable supplied to make the connection between the VTAP PRO reader and the VTAPI00-PRO-EXP1 as shown in the diagram.

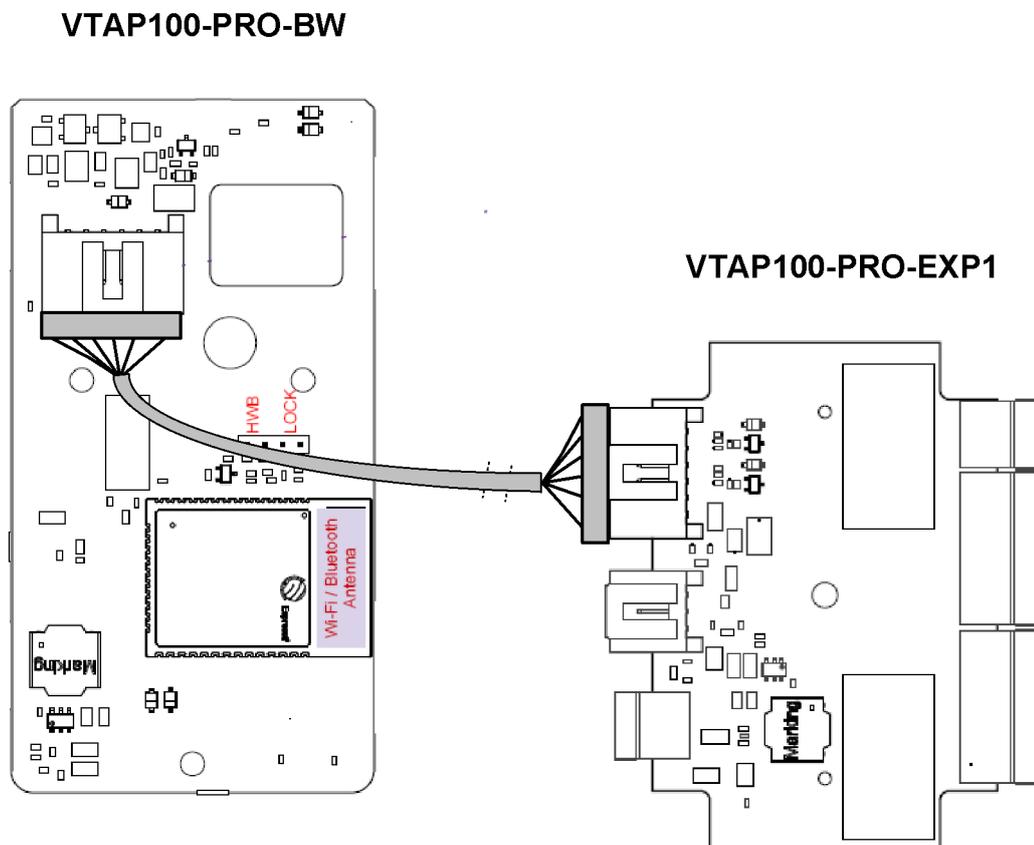


Figure 5-1 Connecting VTAP100-PRO-EXP1 expansion to the VTAP100-PRO-BW daughter board

The cable can be routed out through the hole in the back of the VTAP case, and pressed into a guide channel when the product is reassembled. To do this you may need to break or remove a sticker on the rear of the case.

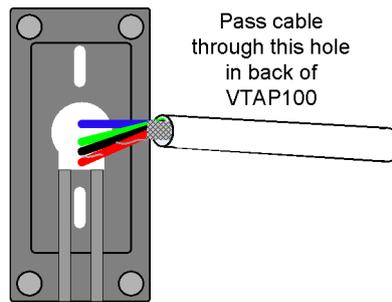


Figure 5-2 Where to pass a cable through the compact case

If you plan to fix the case to a surface, we recommend that you screw the back of the VTAP100 case to that surface before connecting the EXP cable.

The VTAP PRO I/O expansion board is only suitable for indoor use.

The VTAP100-PRO-EXPI supports the following I/O options:

- Input - Voltage type, +/- 30V DC
- Output 1 & 2 - Contact type, max 5A @ 50V AC
- Serial LED output - Neopixel protocol, 5V DC

When you tap your smartphone on a VTAP PRO reader, with a VTAP100-PRO-EXPI connected and connection to the VTAP Cloud, your mobile NFC pass will be read and data sent to the VTAP Cloud platform. (Remember that the data can only be read if your mobile NFC pass was issued in connection with the Merchant ID(s)/Collector ID(s) and ECC key(s) on the VTAP PRO.) Default values on the VTAP reader are associated with a demonstration pass, so that you can test the operation using factory settings before you begin customising any settings.

On receiving a valid pass payload, the VTAP Cloud platform will trigger any response application (or script) set for the reader. That script may be sent to the VTAP reader to trigger an LED pattern, a beep and a relay output. The VTAP PRO reader would action the beep, but any LED pattern or sequence and relay output will be passed on to the VTAP100-PRO-EXPI, which will then toggle the relay coil ON or OFF, following the script.

The VTAP100-PRO-EXPI is rated at 9-15V DC (typ 600mW) for power over the 2-pin power input.



Figure 5-3 Diagram showing I/O connectors on VTAP100-PRO-EXP1

5.2 Input

A switch (such as a Request to Exit button) can be connected across the DI and 0V input connections to trigger the input.

The voltage input will detect a change of state, where input voltage of <1V is 'input low' and input voltage of >4V is 'input high'.

This input can trigger a custom script, saved on VTAP Cloud platform, to perform tasks such as a beep, LED sequence, or output contact trigger.

CAUTION: Ensure that there is always a common ground between the VTAP100-PRO-EXP1 (via 0V pin on Input connector) and the connected equipment.

Use a 2-way 5mm pitch Euro style connector for the input connection.

5.3 Relays (Output 1 and 2)

Two Output relays can be used to switch loads up to 5A @ 50V AC. The contact arrangement is 1 Form C (CO).

The outputs can be set to: ON, OFF, timed ON/OFF, or delay ON/OFF. These options support a wide range of scenarios.

Both output connectors provide +12V and up to 1A to power the equipment connected. If the connected equipment requires a higher current, the power must be supplied by using a different wiring scheme.

Use 5-way 5mm pitch Euro style connectors for the output connections.

5.4 Serial LED output

The Serial LED Output can be configured to drive up to 255 serial LEDs. It uses the Neopixel protocol for driving serial LEDs.

The VTAP100-PRO-EXPI will supply +5V and up to 1.5A to power an LED strip or matrix. The power drawn by your chosen LEDs and the way you intend to use them, can restrict the number of serial LEDs that can be supported. The number of LEDs will be most restricted when each RGB LED is being run at full power (white) continuously. If the usage involves only red, blue or green, or if a pattern on a matrix will only use a subset of LEDs, then a larger number of LEDs can be supported.

Serial LEDs are typically specified in terms of the current drawn by a single Red, Green or Blue LED. Common LED current specifications are 5mA, 12mA and 20mA. Test results for the number of LEDs of each type that can be powered are given in the following table:

Max current per single Red, Green or Blue LED	5mA	12mA	20mA
Voltage	5V	5V	5V
Single LED max current drawn at full RGB brightness (white)	15mA	36mA	60mA
Max number of LEDs that can be powered at full RGB brightness (white) - 100% duty	73	30	18
Max number of single colour (Red, Green or Blue) LEDs that can be powered at full brightness - 100% duty	220	91	55
Text on black background - assumed 30% duty	243	100	60

Any theoretical maximum number of LEDs, using lower powered LEDs on a lighter duty cycle, would still be restricted by the 255 maximum number of LEDs that can be configured.

CAUTION: Ensure that there is always a common ground between the VTAP100-PRO-EXPI (via 0V pin on the Serial LED Output connector) and the connected equipment.

Use a 3-way Molex® Pico-Clasp™ connector for the Serial LED Output connection.

5.5 Control expansion board in Cloud mode

The input, relay and serial LED output settings for the VTAP PRO I/O expansion board are configured on VTAP PRO reader, through the VTAP Cloud platform, to suit customer's I/O application requirements. If you need changes to settings please contact our support team at vtap-support@dotorigin.com.

5.6 Control expansion board in Local mode

The VTAP100 PRO I/O expansion board can be used with the VTAP100-PRO-BW in Local mode, using serial interface VTAP dynamic commands to switch the two relays, or to read the input status. (It is not possible to use serial LEDs on the expansion board with a VTAP PRO reader in Local mode.)

Command to switch relays

Use the `?relay` serial command.

Syntax required is:

```
?relay <relay_num> <action>[=param1[,param2][...]] [action[=params]]
```

<relay_num> is currently either 0 or 1 to refer to the two available relays

<action> can be one or more in a series of actions, as required, each separated by a space.

Actions can be one of:

on

off

timed=ontime[,offtime][,count]

delay=<time in ms>

If the off time is not specified, the on time is used. If the count is not specified, 1 is used. Delay is in milliseconds but can specify time in seconds or minutes with 's' or 'm'.

Examples:

```
?relay 0 on
```

```
;Switch ON relay 0
```

```
?relay 1 delay=60000 on
```

```
;Switch ON relay 1 after 60s (60000ms)
```

```
?relay 0 timed=100,200,2
```

```
;Switch ON relay 0 twice for 100ms, with OFF interval 200ms
```

```
?relay 0 on delay=100 off delay=200 on delay=100 off
```

```
;Same result as previous example
```

```
?relay 0 on delay=5m timed=10s,20s,3
```

```
;Switch ON relay 0 after 5 mins, repeat 3 times 10s ON, 20s OFF
```

Command to read input status

Use the `?input` serial command to receive the current state of the input as either open (1) or closed (0).

Extending the command, for example to `?input 0 notify=open`, will record a change of input status as bit 16 in the response to an `?events` command.

For further detail about serial commands refer to the VTAP Commands Reference Guide.

There are also configuration settings `PassRelay` and `TagRelay`, that can be included in `config.txt`. These will trigger a relay in direct response to either a successful mobile pass or a successful card/tag read respectively. Both settings use the same syntax as the `?relay` command above for describing the required relay action.

Setting to trigger relay in response to successful mobile pass read

Use the `PassRelay` setting in `config.txt`.

Syntax required is:

```
PassRelay=<relay_num> <action>[=param1[,param2][...]] [action[=params]]
```

<relay_num> is currently either 0 or 1 to refer to the two available relays

<action> can be one or more in a series of actions, as required, each separated by a space.

Actions can be one of:

```
on
off
timed=ontime[,offtime][,count]
delay=<time in ms>
```

If the off time is not specified, the on time is used. If the count is not specified, 1 is used. Delay is in milliseconds but can specify time in seconds or minutes with 's' or 'm'.

Examples:

```
PassRelay=0 timed=6000
;Switch ON relay 0 for 6000ms
```

Setting to trigger a relay in response to successful card/tag read

Use the TagRelay setting in config.txt.

Syntax required is:

```
TagRelay=<relay_num> <action>[=param1[,param2][...]] [action[=params]]
```

<relay_num> is currently either 0 or 1 to refer to the two available relays

<action> can be one or more in a series of actions, as required, each separated by a space.

Actions can be one of:

```
on
off
timed=ontime[,offtime][,count]
delay=<time in ms>
```

If the off time is not specified, the on time is used. If the count is not specified, 1 is used. Delay is in milliseconds but can specify time in seconds or minutes with 's' or 'm'.

Examples:

```
TagRelay=1 timed=1000,1000,2
;Switch ON relay 1 for 1000ms on, 1000ms off, repeated twice
```

5.7 Use case for the I/O expansion board

An example scenario for using the VTAPI00-PRO-EXPI with the VTAP PRO reader would be door or turnstile control in a supervised access control scenario. In this case the VTAPI00-PRO-EXPI might be used to connect to a door lock. The VTAPI00-PRO, on reading a valid pass or card, energises the relay coil on the VTAPI00-PRO-EXPI to open the door.

6 Power

The VTAP100-PRO-BW comes with a USB cable for power. It can also be used to access the mass storage drive (if enabled), USB keyboard emulation and USB COMPort. (Refer to [USB wiring](#) for how to disconnect this cable, should you prefer to power the unit from an expansion board, after configuration.)

If the optional VTAP100-PRO-EXP1 expansion board is used, the VTAP100 PRO reader can be powered from the I/O board, using the 0.5m EXP cable provided. It does not matter whether the reader is already receiving power in another way. The I/O expansion board itself is powered through its 2 pin Molex connector, rated 9-15V DC (typ 600mW). (The VTAP reader cannot be used to power the expansion board.)

The connecting cable between the VTAP PRO I/O expansion board and VTAP PRO reader allows you to mount the VTAP100 PRO reader and the I/O expansion board at a distance from each other, for instance with the VTAP PRO reader mounted on counter top and the I/O expansion board under the counter.

7 USB wiring

The VTAP PRO readers come with cables fitted to suit their normal use.

If you want to disconnect the USB cable, for instance because you are using an I/O expansion board to provide power, you will need to open the VTAP case.

To open the case follow the instructions in.

CAUTION: We strongly recommend that power is disconnected before opening the VTAP100 case.

The USB connector is accessed through a cutaway in the daughter board, so you do not need to separate the boards. Disconnect the captive USB cable by pinching the connector and gently pulling it away from the socket on the board.

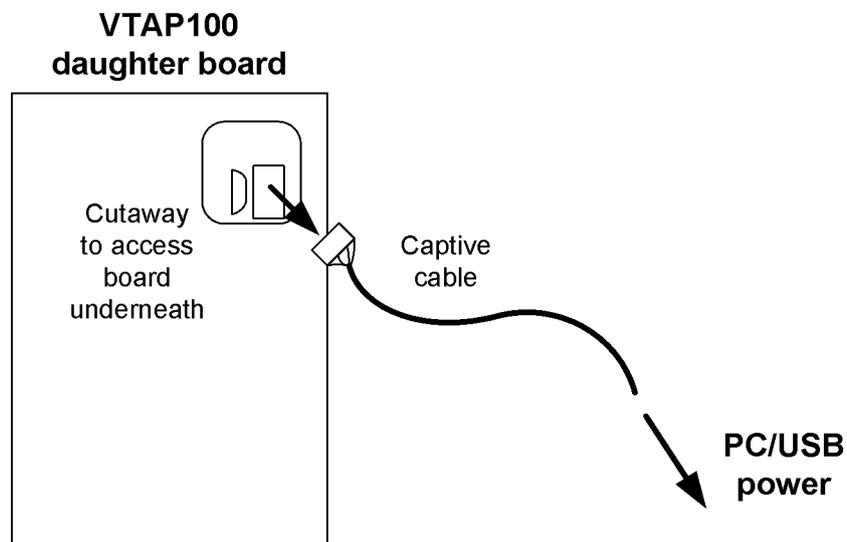


Figure 7-1 Captive USB connector accessed through cutaway in daughter board

8 Environment, mounting and branding

The VTAP reader 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 VTAPI00-PRO requires connection of its captive USB cable to a standard 5V USB port or power adapter.

The VTAPI00-PRO is supplied in a compact case.



Figure 8-1 VTAPI00-PRO-BW-CC

VTAPI00-PRO readers are designed for indoor use. If a VTAPI00-PRO reader is installed in a location exposed to moisture, it should be in a wallmount (vertical) orientation with the lower screw cover label removed to ensure drainage.

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

You may have to remove a small label on the end of the VTAP reader, to uncover the screw that holds the pieces together. To do this in a way that will keep the label in good condition to reapply later, apply pressure directly down on the label and slide it gently towards the edge of the case.



Figure 8-2 Where to apply pressure to slide label off case

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 8-3 Wallmount or desktop assembly

The cable can be routed directly out of the back of the reader, if preferred, to hide the wire completely from view or prevent access. The back label includes a circular pre-cut section that can be pushed out to allow the cable to be passed through.

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:

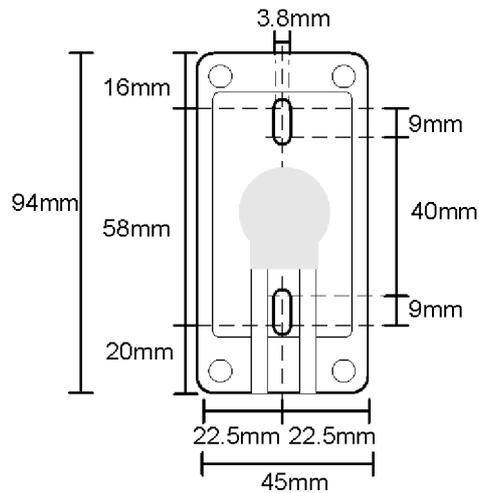


Figure 8-4 Mounting holes in the -CC compact case base plate

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.

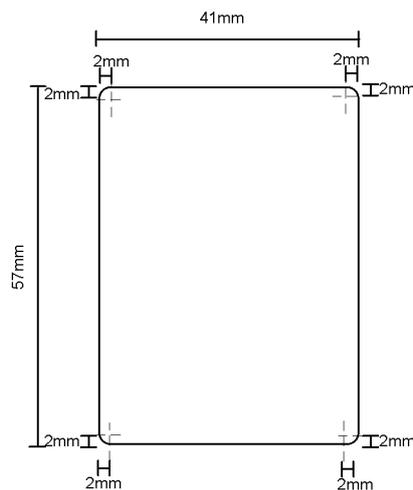


Figure 8-5 Dimensions of label recess in -CC compact case

The VTAPI00-PRO-EXPI has two mounting holes on its base plate for fixing.

The following diagram shows the location of mounting holes in the base plate of its case:

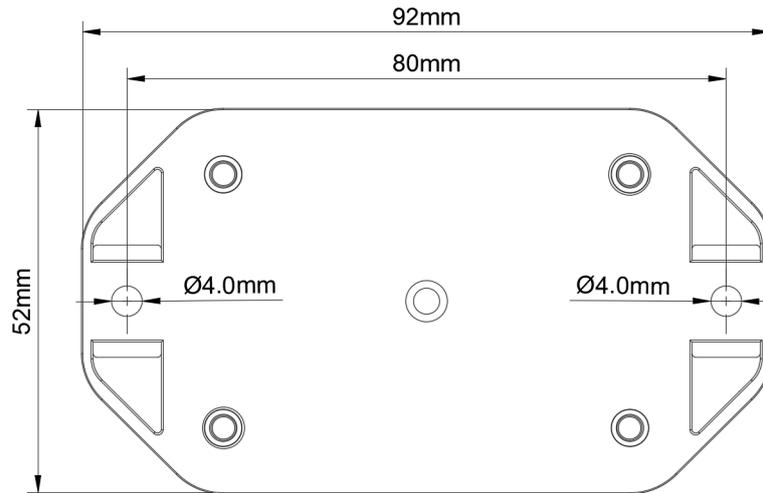


Figure 8-6 Dimension and location of mounting holes in VTAP100-PRO-EXP1 base plate

9 Find your hardware version

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

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

If mass storage is enabled on your VTAP100 PRO reader

If you navigate to the VTAP PRO reader 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 VTAP PRO reader, sending the `?b` command will return the `BOOT.TXT` information.

Or you can choose to View details (👁️) for your Reader on the VTAP Cloud Platform if it is in Cloud mode.

10 Disposal

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



VTAP PRO reader (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.



A Default Local mode config.txt file

Copy and paste the text from the blue box to your `config.txt` file to return your VTAPI00-PRO-BW reader to Local mode factory default configuration for use with Dot Origin demonstration passes:

```
!VTAPconfig

VAS1MerchantID=pass.com.pronto.originpass.demo
VAS1KeySlot=6

ST1CollectorID=80644855
ST1KeySlot=6
ST1KeyVersion=1

CloudMode=0

NFCType2=U

KBLogMode=1
KBDelayMS=2
KBPassMode=0

LEDSelect=1
LEDDefaultRGB=1EBBCF

PassBeep=100,100,2
TagBeep=100

PassLED=00FF00,200,1,1
TagLED=00FF00,200

Serial2Settings=115200,n,8,1
BTKeyboardMode=1
```

Note: It is possible to 'break' the VTAPI00-PRO-BW if an incorrect `config.txt` or file is uploaded, for instance switching off Cloud mode when the reader is intended to work through VTAP Cloud. Contact vtap-support@dotorigin.com if you need Dot Origin to help recover your device.