VTAP100

Integration Guide - VTAP100 IP-connected reader assembly with Ethernet & optional USB

VTAP100-PRO-POE-OEM

Revised August 2025 v1.01

DOT ORIGIN

If you need help to set up or use your VTAP100-PRO-POE, beyond what is contained in this Integration 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-PRO-POE or this documentation, then please contact our support team. The product is constantly being reviewed and improved and we value feedback about your experience.

Copyright 2025 Dot Origin Ltd. All rights reserved.

No part of this Integration Guide may be published or reproduced without the written permission of Dot Origin Ltd except for personal use. This Integration Guide relates to correct use of the VTAP100-PRO-POE only. No liability can be accepted under any circumstances relating to the operation of the user's own PC, network or infrastructure.

Dot Origin Ltd
Unit 7, Coopers Place Business Park, Combe Lane, Wormley
Godalming GU8 5SZ United Kingdom
+44 (0) 1428 685861

Contents

Safety instructions

WARNING: INTENDED USE

The VTAP100-PRO-POE equipment is intended for use by suitably qualified integrators, who will integrate the VTAP100-PRO-POE-OEM (PCBs) into their own hardware, without any changes or modifications to the VTAP100-PRO-POE-OEM device. (An optional enclosure can be supplied.) Components mounted on the VTAP100-PRO-POE PCBs are not user-serviceable and an assembly of two boards should never be separated. 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-PRO-POE-OEM PCBs should always be protected by static shielding bags for shipping or storage.

WARNING: POWER SUPPLY - VTAP100-PRO-POE

EMC emissions and immunity certifications are only valid when using the VTAP100-PRO-POE-OEM with the supplied cable - an RJ45 cable for power and network connection.

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.

If the identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module, Contains FCC ID: 2A282-VTAP100G2 or Contains FCC ID: 2A282-VTAP100, in accordance with enclosed module ID.

Co-location of this module with other transmitters that operate simultaneously are required to be evaluated using the multi-transmitter procedures.

The host integrator must follow the integration instructions provided in this document and ensure that the composite-system end product complies with the requirements by a technical assessment or evaluation to the rules and to KDB Publication 996369.

The host integrator installing this module into their product must ensure that the final composite product complies with the requirements by a technical assessment or

evaluation to the rules, including the transmitter operation and should refer to guidance in KDB 996369.

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.

If the identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module, Contains IC: 30458-VTAP100G2.

Si le numéro d'identification n'est pas visible lorsque le module est installé à l'intérieur d'un autre appareil, alors l'extérieur de l'appareil dans lequel le module est installé doit également afficher une étiquette faisant référence au module fourni,
Contient IC : 30458-VTAP100G2.

1 Using this guide

This guide is for first-time users of the VTAP100-PRO-POE-OEM reader board assembly.

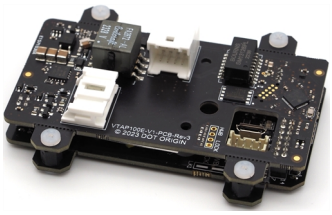


Figure 1-1 VTAP PRO POE OEM reader assembly

It contains the information you need to connect your VTAP100-PRO-POE-OEM hardware. The majority of VTAP100-PRO-POE reader installation is about ensuring the reader is powered and connected over Ethernet to VTAP Cloud. Beyond initial default operation, all information about configuration can be found in the User Guide for the VTAP100-PRO-POE.

If you need help beyond what is contained in the guides please contact **vtap-support@dotorigin.com**.

2 How a VTAP100-PRO-POE reader works

The VTAP100-PRO-POE reader is an NFC Wallet reader that offers an Ethernet connection to the VTAP Cloud. The VTAP PRO reader from Dot Origin is an enhanced, IP-connected version of the popular VTAP100-USB reader.

The VTAP100-PRO-POE reader is managed and communicates through the VTAP Cloud service, using an Ethernet connection and optionally some input/output features.

The VTAP100-PRO-POE reader is connected only to an **Ethernet network**. Whenever a mobile 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 mobile 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 reader's 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 mobile pass reading parameters (merchant IDs, private keys etc). You also control the application, which determines how the VTAP PRO reader behaves when a user taps their phone, and where the mobile pass payload should be sent.

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

Refer to the VTAP100-PRO-POE User Guide for more information about how to set-up and use the different features of VTAP100-PRO-POE in Cloud mode and using VTAP100 PRO I/O expansion board (VTAP100-PRO-EXP1) with a VTAP100-PRO-POE.

2.1 Default operation

2.1.1 Cloud mode only

1. Power on the VTAP100-PRO-POE reader by connecting the PoE cable.
2. 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 network connection. A steady blue LED indicates you have a successful connection to the network 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.

2.2 Check status on VTAP Cloud platform

For readers that are on VTAP Cloud, looking on the VTAP Cloud platform is the easiest way to find out information about your VTAP100-PRO-POE, such as serial number and set up, which might be helpful when troubleshooting.

Go to **https://vtap-admin.dotorigin.cloud/** and use your login details to open the VTAP Cloud platform. (If you experience any difficulty contact **vtap-support@dotorigin.com**.) You will start on the **Readers page**, where you should see all your VTAP IP-connected readers listed by their unique serial numbers.

If you select the blue button  next to a reader you are interested in, you can view details about hardware and firmware versions in use, along with other settings, reader health and information about the most recent reader activity.

There is a VTAP Cloud User Guide where you can find out more about using the VTAP Cloud platform.

3 Mechanical installation

The VTAP100 reader board assembly for integration comprises two PCBs with an integral antenna in the lower board. Power is connected to the main board, through a cutaway in the expansion board on top.

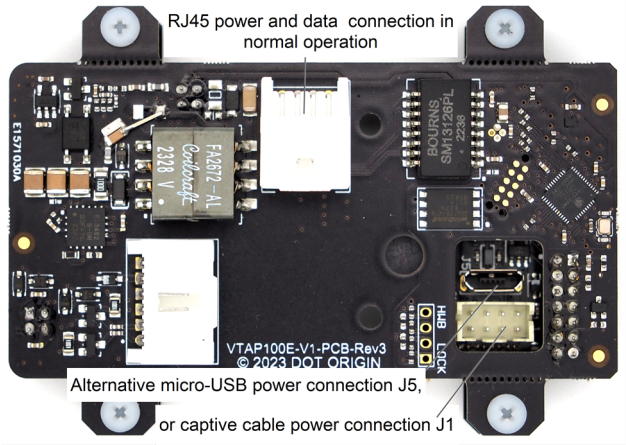


Figure 3-1 VTAP100-PRO-POE-OEM connection options for power

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

3.1 Power

Connect the VTAP100-PRO-POE-OEM PCB assembly with an RJ45 cable for power and network connection.

The VTAP100-PRO-POE-OEM is rated at 5V DC (typ. 110mA, max 150mA) for power over USB or 3W Power over Ethernet according to IEEE 802.3af or 802.3at.

⚠ **WARNING:** Do not power the VTAP100-PRO-POE-OEM reader assembly if the NFC antenna is damaged. Components can reach higher operating temperatures than normal when an antenna is not attached, which could damage the VTAP reader and cause injury if handled.

3.2 Environment

The VTAP100-PRO-POE-OEM assembly 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

CAUTION: Always ensure sufficient clearance between the VTAP antenna and other RF transmitters, to avoid electromagnetic interference between equipment. Clearance required varies between antennas, depending on antenna size, power and sensitivity.

3.3 Mounting points

The PCB has 2.7mm diameter mounting holes, suitable for an M2.5 screw, spaced 50mm apart for fixing the unit. These will come with screws in place to hold the two boards of the assembly firmly together, but can be replaced with longer screws to connect the assembly into your housing.

CAUTION: Replace only one screw at a time, to keep the boards in contact at all times, if you need to replace the screws which hold the boards of an assembly together. Separating the boards of an assembly will invalidate your warranty.

Use 4 M2.5 nuts and bolts to mount the board securely.

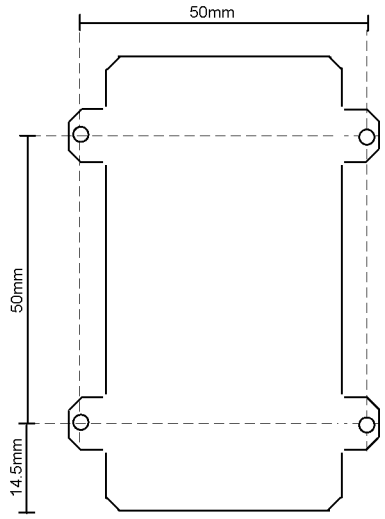


Figure 3-2 VTAP100 assembly mounting holes

The NFC antenna, which is in the lower PCB of the assembly, should not be mounted more than 10mm deep within your enclosure (measuring from the antenna surface to the enclosure surface), so that a user's smartphone will be able to come close enough to the antenna for reliable reading.

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.

There is an engineering drawing you may find useful at Annex A.

CAUTION: Mounting a VTAP board near metal can reduce performance of the VTAP100-PRO-POE, because metal can distort the NFC field. Never allow a metal surface between the VTAP100-PRO-POE and the user's phone or card. If you have to mount the VTAP100-PRO-POE near metal, you should ensure the separation is:

- at least 6mm and insert a ferrite sheet (suitable for 13.56MHz) between the VTAP100-PRO-POE and any metal surface behind the reader, or
- at least 25mm separation between the VTAP PCB and any metal (in all directions).

Testing should be performed in the proposed mounting location, as other devices and structures in close proximity could affect pass reading performance.

3.4 Optional RS-232 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.

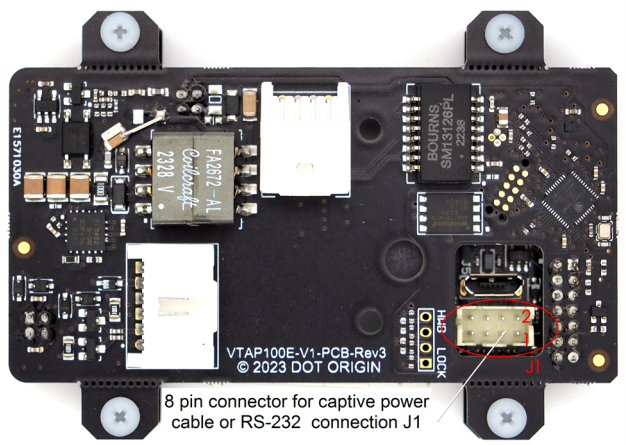


Figure 3-3 VTAP100-PRO-POE-OEM captive power cable or RS-232 J1 connection

The connector J1 includes both USB and RS-232 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)

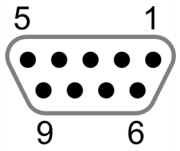


Figure 3-4 Typical RS-232 cable

A typical RS-232 cable has the following DB9 female connector pinout:

Pin	Function
2	TXD
3	RXD
5	GND
9	+5V supply (if any)

A PC or terminal RS-232 connector is usually DTE (data terminating equipment), typically a male DB9 with transmit (TXD) on pin 3 and receive (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 RS-232 devices have 5V on pin 9. Your options are:

- If your RS-232 connector provides 5V power on pin 9, disconnect the USB cable before making the serial connection, then power will be provided by J1 (pins 1 and 3) and the serial cable/host.
- If your RS-232 connector does not provide 5V power on pin 9, retain a USB connection in addition to the serial connection.

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 I/O connection

The PCB has a special connector J9 (a 6 way FFC connector) which can be used to attach a captive cable with a matching crimp housing.

This connector is provided to connect a VTAP100-PRO-EXP1 expansion board, which comes with a suitable connecting cable. It could also be used to connect your own external devices.

If you are using the signals for your own equipment, you need to be aware that the standard connector fitted to the PCB is a Molex 51382-0600 male receptacle housing. The matching crimp housing is the Molex 56134-9000 for 22-28AWG wires.

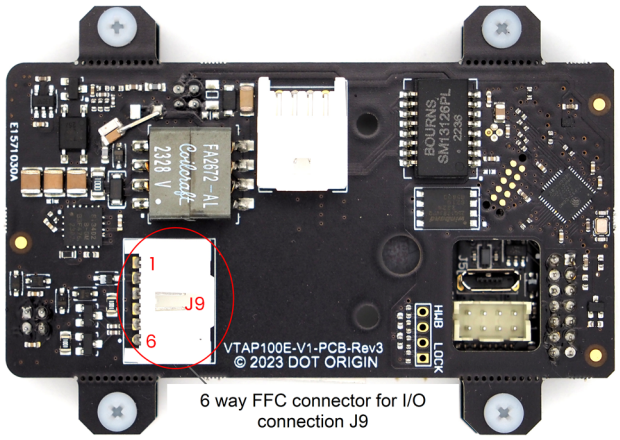


Figure 3-5 VTAP100-PRO-POE-OEM I/O J9 connection

The connector J9 provides the following signals:

Pin	Function
1	0V
2	5V In
3	Serial LED
4	Digital Input 1
5	Digital Input 2
6	Digital Output 1

3.6 Optional USB connection

The USB connector is accessed through a cutaway in the daughter board, so you do not need to separate the boards. Use any micro USB cable to make the connection between the VTAP PRO reader and a PC or USB power socket.

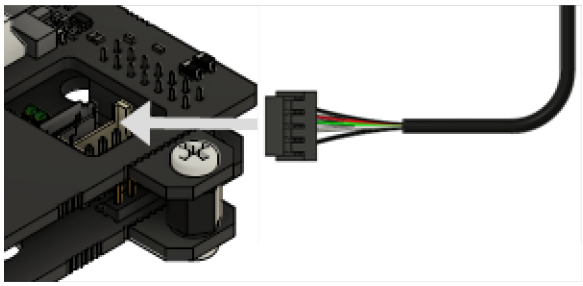


Figure 3-6 Captive cable USB connector accessed through cutaway in daughter board

4 Module integration instructions - FCC/ISED

The VTAP100-OEM reader board is the part of any OEM assembly which carries the NFC antenna. This has received FCC/ISED modular approval. In order to maintain this approval for your integration, you must follow the instructions in this section. If your equipment contains another RF transmitter, that works in conjunction with the VTAP reader, you may want to request an FCC Permissive Change approval based on the existing VTAP100-OEM modular approval. Contact us early in the process if you need help with FCC/ISED testing and permissive change.

The VTAP100-OEM reader board 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/ISED approval for the VTAP100-OEM reader board, when it is integrated into a host system.

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

4.1 Applicable FCC/ISED rules

The VTAP100-OEM reader board operates at 13.56MHz and is therefore subject to FCC/ISED rules for radio frequency devices.

4.2 Specific operational use conditions

The VTAP100-OEM reader board 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 reader board complies with FCC/ISED RF radiation exposure limits set 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.

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

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

4.4 Antennas

The VTAP100-OEM reader board 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/ISED approval.

4.5 Label and compliance information

The integrator must attach a label to the new equipment, hosting the VTAP100-OEM reader board.

For FCC approval: 'Contains FCC ID: 2A282-VTAP100G2'

For ISED approval: 'Contains IC: 30458-VTAP100G2'

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 reader board:

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

4.7 Additional testing requirements

The VTAP100-OEM reader board is only FCC/ISED authorised for use in compliance with the specific FCC/ISED transmitter rules listed on the grant. The integrator is responsible for compliance to any other FCC/ISED 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 reader board installed, will still require Part 15 Subpart B compliance testing, to evaluate transmission effects when the VTAP100-OEM reader board 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**.

4.8 Maintaining Apple VAS(ECP1) or ECP2/Access compliance

There are some steps required in order to maintain Apple VAS(ECP1) and/or ECP2/Access compliance.

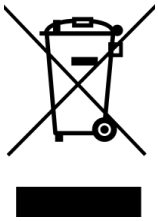
When you request an NFC entitlement and/or permission for an Apple Access deployment we recommend that you inform Apple that a Dot Origin VTAP OEM board or module has been used in your finished product. Apple are aware that our products are available both in finished form and as OEM modules.

- For VAS applications Apple reserves the right to review the final form factor of the reader, to ensure that satisfactory performance and user experience is maintained.
- For ECP2 applications it is essential that the new equipment hosting a VTAP reader board or module is tested and certified against Apple Access specifications. This includes ensuring that the read range meets their minimum distance requirements (40mm at various presentation angles, in Express and CDCVM modes) and that the reader is tested against all the different categories of iPhone and Apple Watch, as required by Apple. Apple may also require on-site functional testing as part of the end-to-end certification of an Apple Access deployment, which is usually conducted by the Credential Manager.

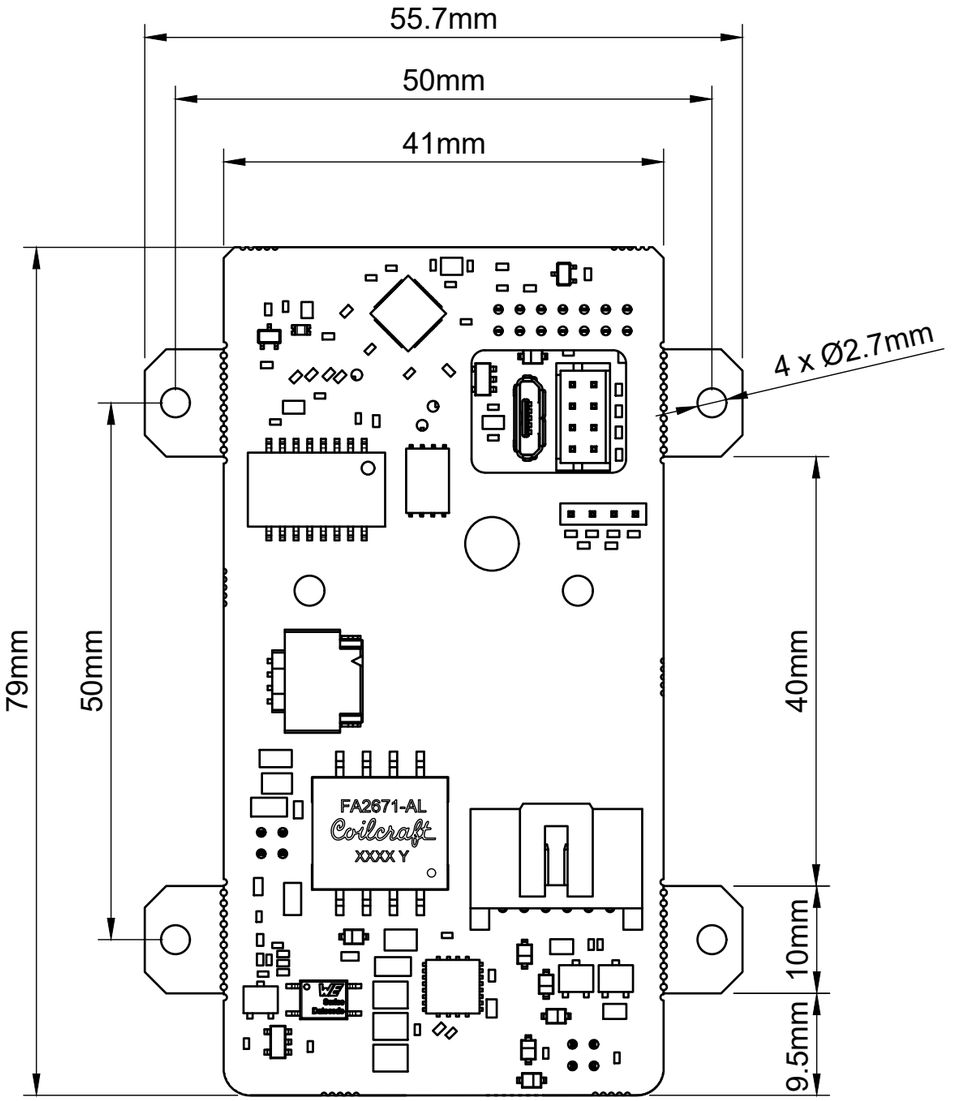
In both cases, our engineering team can advise and assist on certification issues, which could include taking a product through formal certification, if required.

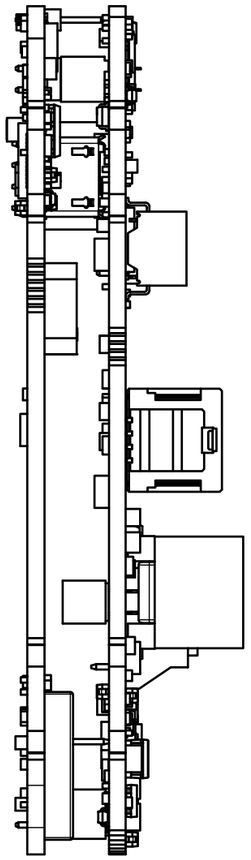
5 Disposal

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



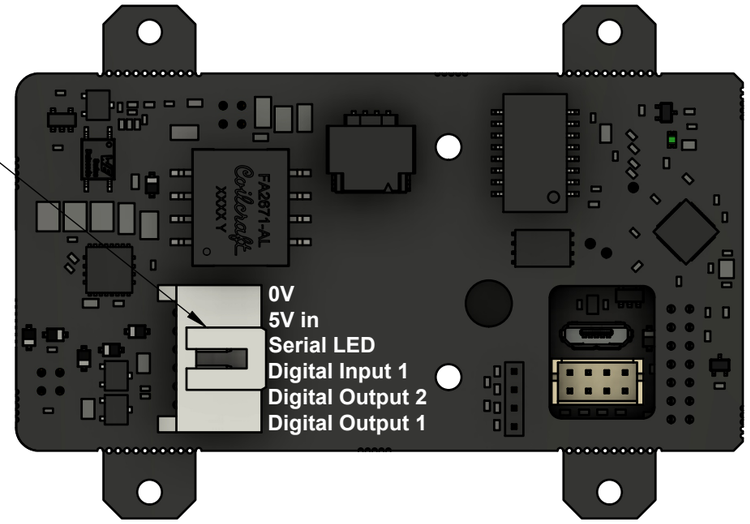
VTAP100-PRO-POE (PCB assembly) should not be disposed of in general waste. If you wish to discard electrical and electronic equipment (EEE), please contact your supplier for further information.

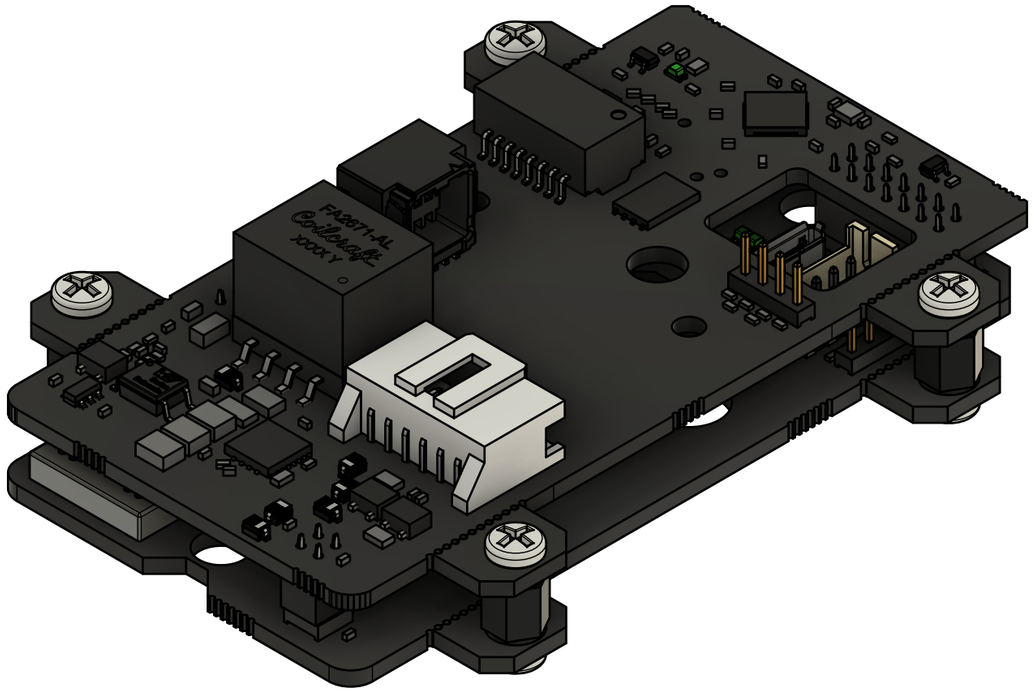


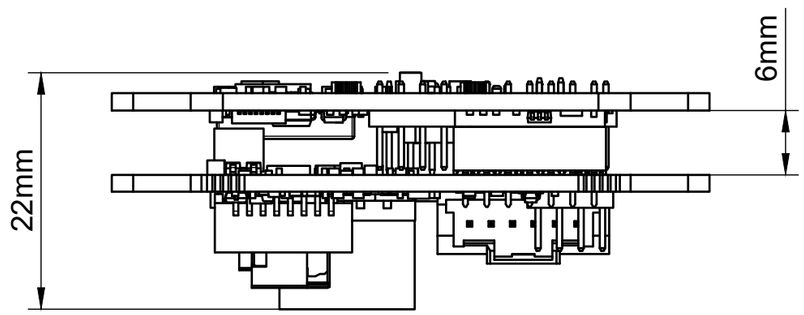


Mating Parts
Receptacle housing
Molex 513820600

Crimp (22-28AWG)
Molex 561349000







Title VTAP100-PRO-POE Reader Assembly		VTAP Model Ref. VTAP100-PRO-POE-OEM	
© COPYRIGHT 2025 This drawing has copyright and may not be copied in whole or in part or used for any purpose other than that for which it is supplied without express written consent.	**DOT ORIGIN LTD** Unit 7, Coopers Place, Combe Lane Wormley, Godalming Surrey GU8 5SZ, UK vtap-support@dotorigin.com +44 (0) 1428 685861	Drawing No.	Date 12/02/2025
		ECN	Created By M FARAZ
		Status	