uPASS Target

installation guide

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Contents

1 Introduction

The uPASS Target reader offers long range (up to 10 meters / 33 feet) identification using the latest UHF technology. Based on passive (battery free) UHF tags the uPASS Target offers a cost effective and enduring solution for long range identification.

The uPASS Target reader can be placed near the entrance, door or gate on poles or on the wall with help of the mounting brackets.

The uPASS Target includes a RS485/RS422, Wiegand/Magstripe, Nedap antenna, TCP/IP and a relay interface. With these interfaces the uPASS Target can be connected to an Access Control System for authorization. The relay interface can be used for operating external device (for example doors and gates) based on UHF tag recognition or external control.

The uPASS Target has 3 digital inputs. With these inputs color of the LED, activation of the relay and the activation of the UHF reader can be controlled.

TRANSIT compatibility
The uPASS Target reader features a TRANSIT compatible mode. In this mode the reader is fully compatible with the Nedap TRANSIT, supporting any firmware version developed for the TRANSIT reader, for example P61, P81 and Q70. See chapter 4 for details how to enable the TRANSIT compatible mode.

1.1 Firmware versions

The uPASS Target reader supports different firmware versions. Below an overview of the available firmware versions and their key features.

STANDARD firmware
- CR/LF communication protocol.
- Wiegand communication output.
- Magstripe (clock & data) communication output.
- LED control automatic or remote through digital inputs.

OSDP firmware
- OSDP communication protocol according to the SIA OSDP v2.1.6 standard.
- Secure Channel Protocol supported.
- LED control through OSDP commands.
- General purpose inputs (2x) and outputs (4x).

Default the STANDARD firmware is installed.
Perform a firmware update using the UHFTOOL software. See chapter 7.
The firmware update also allows to change from STANDARD to OSDP (or vice versa).

1.2 Supported tags

Any EPC Class 1 Gen 2 tag is supported by the uPASS Target and will output on the RS422, RS485 or Ethernet interfaces. Also special formatted Nedap UHF tags are supported for output on special interfaces. The following formats are supported:

NEDAP UHF Wiegand tags
These tags will contain all Wiegand information including facility code and parity bits. All Wiegand formats can be supported. The reader transparently sends this information via the Wiegand outputs. There is no need to change any DIP-switches or configuration settings. See chapter 3.2.2 for wiring details.

NEDAP UHF Magstripe tags
These tags will contain all magstripe information. The reader transparently sends this information onto the magstripe interface. There is no need to change any DIP-switches or configuration settings. See chapter 3.2.2 for wiring details.

NEDAP UHF XS tags
These tags are especially programmed in the same format as our 2.45GHz AVI tags (Compact-Tag, Window-Button and Heavy-Duty-Tag). The tags will have a customer-code and id-number.

The NEDAP-XS formatted tags are commonly used in TRANSIT compatible mode. See also chapter 4.

1.3 Tag security

EPC (Electronic Product Code) tags were introduced as a possible successor to the barcode with added functionalities. The tag emits its EPC in plain text. This makes the tags vulnerable to cloning and counterfeiting attacks.

There are a few security measures possible against tag cloning.

TID check *
EPC tags contain a data field known as the Tag Identifier (TID). At the discretion of the EPC tag/card manufacturer, the value is be factory programmed and locked, ensuring that tags have a unique identity and cannot be cross-copied. NEDAP UHF tags support a locked serialized TID and the uPASS reader can be configured to read the TID data field.

EPC passwords **
EPC tags have 2 passwords. NEDAP has implemented a two way authentication anti-cloning method using these 2 passwords. This feature is supported in combination with all NEDAP UHF tags.

EPC Gen2 V2 secure authentication ***
The EPC Gen2 V2 tags support a secure authentication method.
This is the best possible anti-cloning measure available.
The authentication data transmitted between tag and reader are enciphered using AES128 bit encryption. The encryption keys are diversified using the programmed EPC number to ensure that the keys are different for each tag. Required is that the tags contain an EPC Gen2 V2 compliant RFID chip. Refer to NEDAP uPASS how to order guide for product numbers.

* Possible for any UHF tag.
** Possible for all NEDAP UHF tags.
*** Possible for all EPC Gen2 V2 tags.

Tag security is not evaluated by UL.

2 Installation

The uPASS Target can be mounted to any surface with the wall mounting bracket and Pole Mounting Set (see appendix C for part numbers). The uPASS Target can be “aimed” at the desired detection area with the mounting brackets.

2.1 Safety instructions

The following safety precautions shall be observed during normal use, service and repair.

- The uPASS Target shall only be installed and serviced by qualified service personnel.
- Disconnect the power supply before (dis)connecting any wires, uPASS Target is NOT hot-swappable, so when making or changing connections, power must be switched OFF.
- To be sure of safety, do not modify or add anything to the uPASS Target other than mentioned in this installation guide or indicated by Nedap N.V.

2.2 Reader dimensions

The dimensions of the uPASS Target reader can be seen in Figure 1.

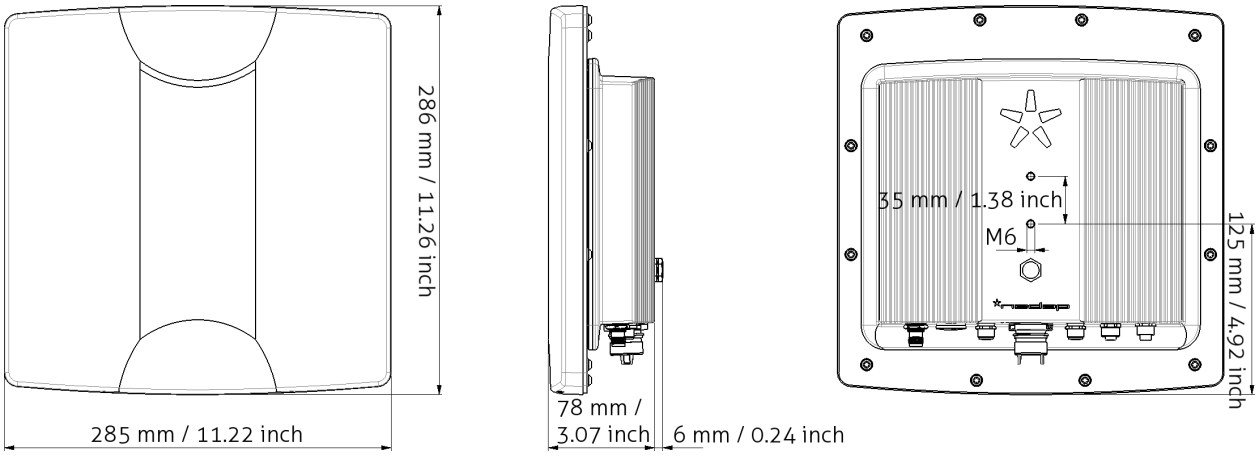


Figure 1: uPASS Target dimensions

2.3 Antenna coverage

The uPASS Target antenna has a detection coverage area as shown in the picture below.

The read range, which is up to 10 meters, can be adjusted by means of UHFTOOL software setting. See chapter 6.5.5 Reducing the read range will shrink the complete antenna lobe.

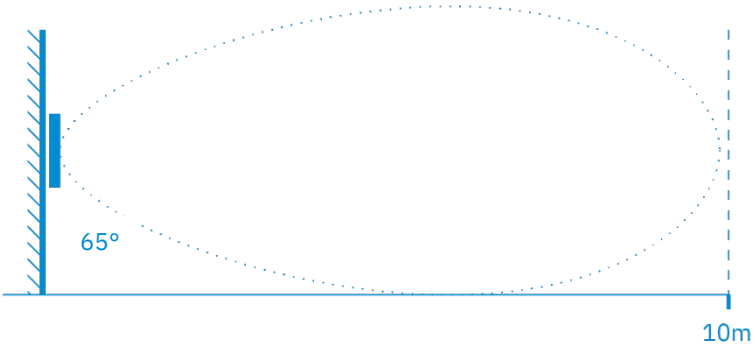


Figure 2: uPASS Target antenna coverage

Maximum read range:	10 meter (33 feet).
Antenna polarization:	Circular
Horizontal reading angle:	65°
Vertical reading angle:	65°

2.4 Wall mounting bracket

The Wall Mounting Bracket is supplied with the uPASS Target reader. When the Wall Mounting Bracket is assembled mount it to the wall (or the Pole Mounting Set) based on the dimension in Figure 3. The uPASS Target can be “aimed” with the Wall Mounting Bracket and when the bolts are tightened it will stay in place.

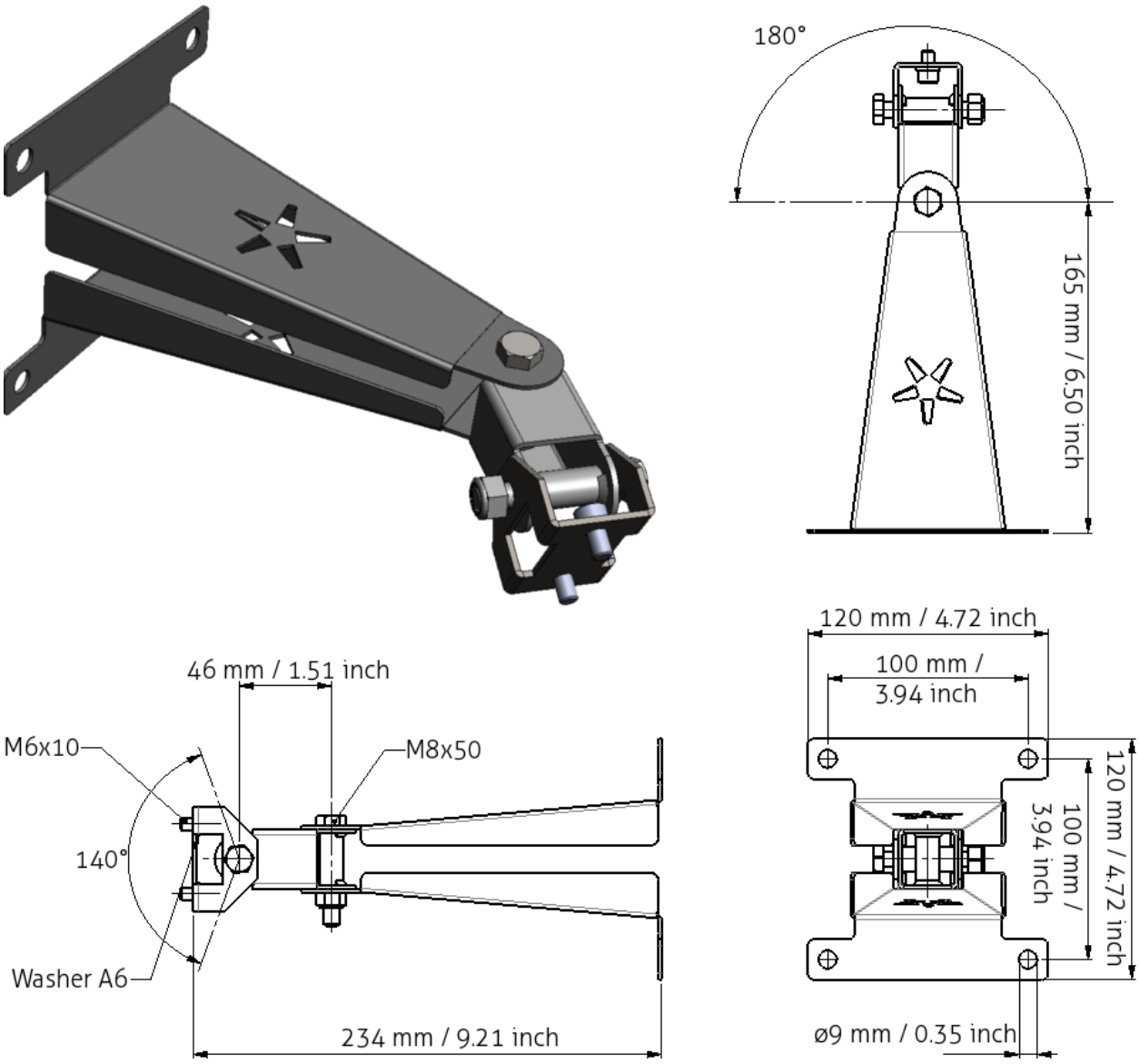


Figure 3: Wall mounting bracket

2.5 Pole mounting set

The Pole Mounting Set has to be ordered separately (see appendix C).
The uPASS Target can be mounted to round poles with maximum diameter of 190 mm / 7.48 inches and square poles with maximum diameter of 150 mm / 5.90 inches using the Pole Mounting Set. The Wall Mounting Bracket is mounted on the Pole Mounting Set.

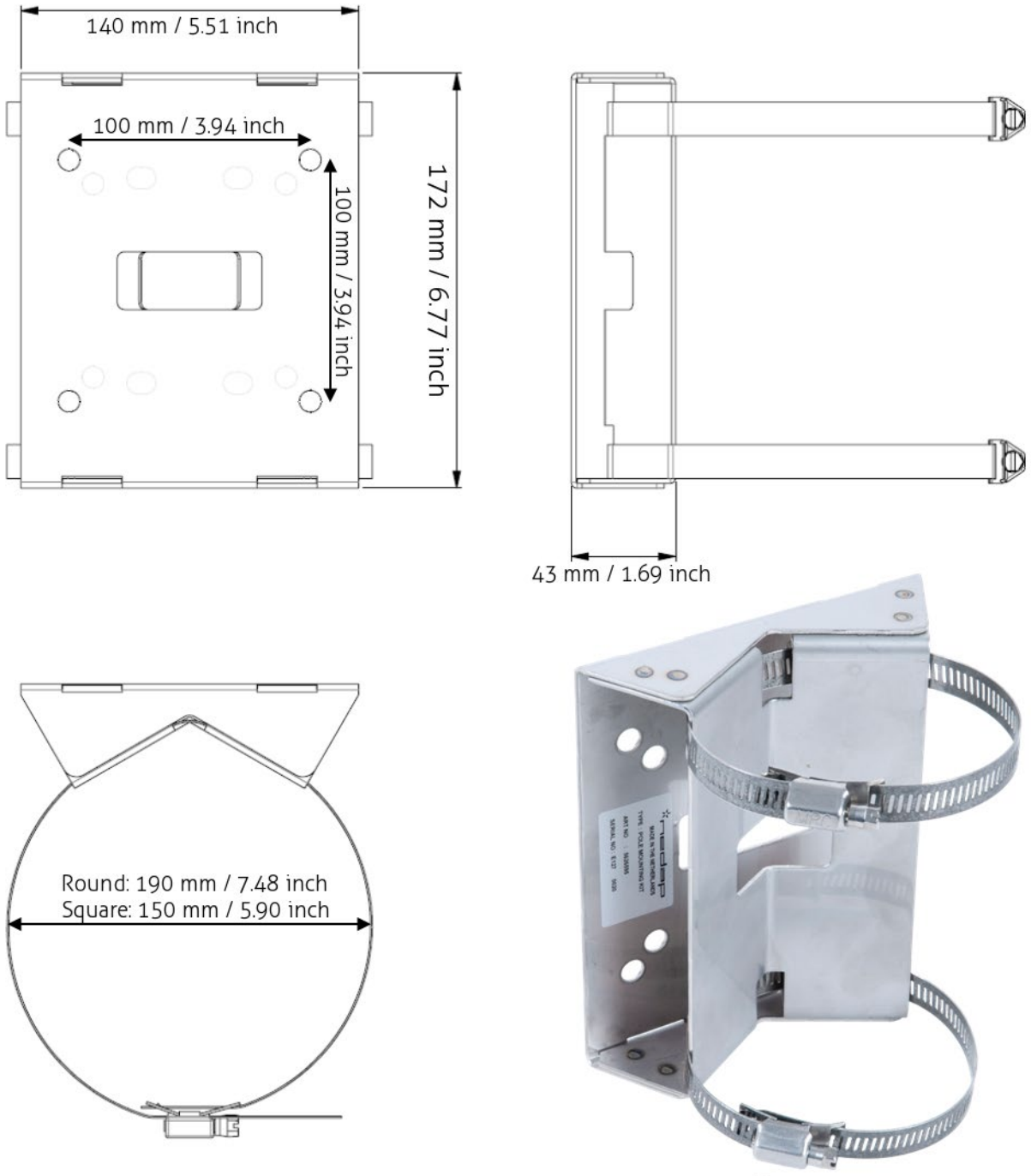


Figure 4: Pole mounting set

2.6 Weather protection hood

After the mounting of the uPASS Target an optional weather protection hood can be placed. The weather protection hood protects the uPASS Target from excess heat caused by sun irradiation. It is advised to install the weather protection hood if the ambient temperatures are 40°C (104°F) or higher and more than 2 hours of direct sunlight on the uPASS Target housing.

The weather hood can be placed over an already mounted uPASS Target (some bolts need to be loosened). It is recommended that the connections to uPASS Target are made before mounting the weather protection hood. If the weather protection hood is mounted the connectors are hard to reach.

The weather protection hood has to be ordered separately (see appendix C).

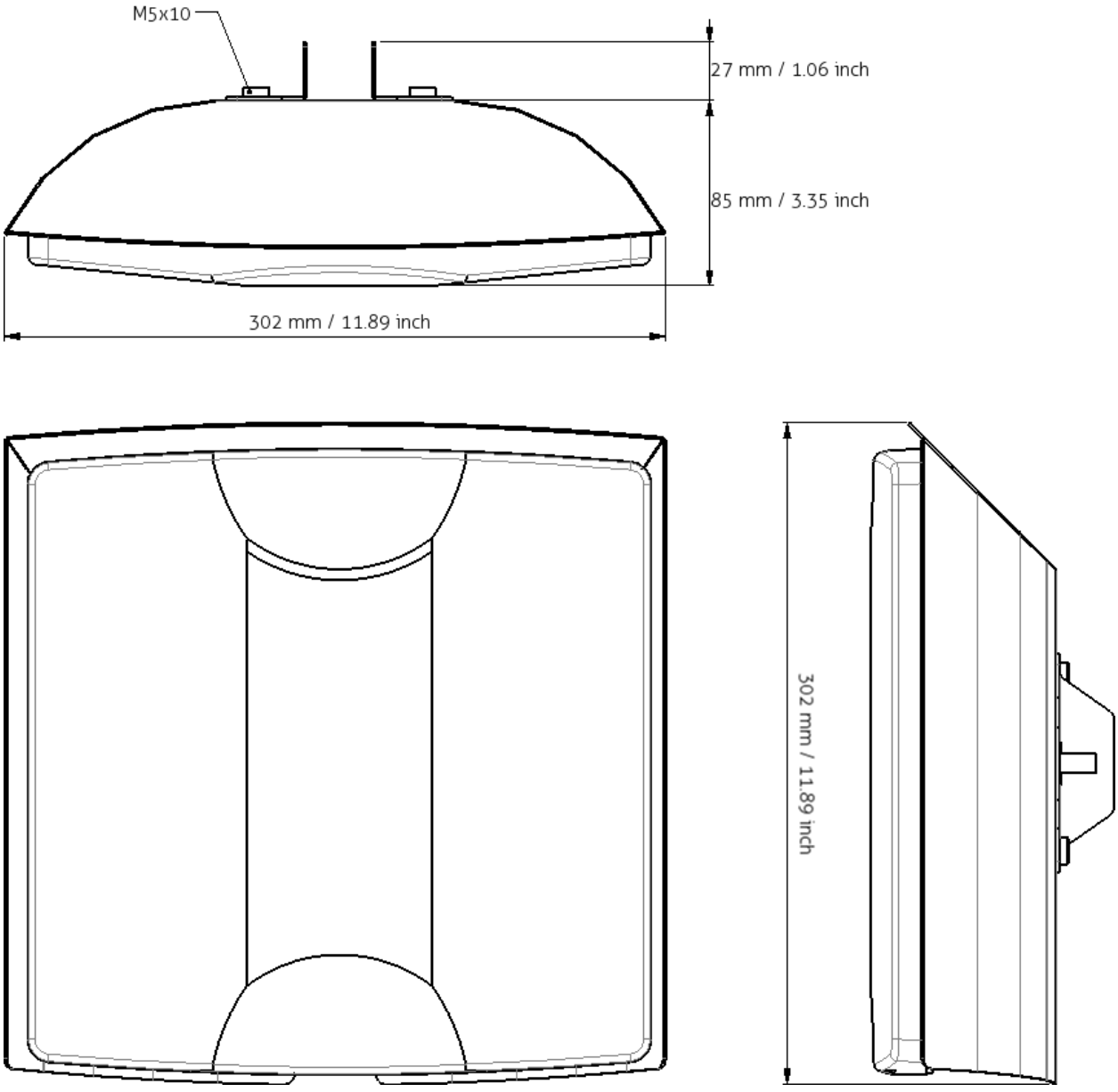


Figure 5: Weather protection hood

3 Connections

The uPASS Target has 7 connectors at the bottom of the device (see Figure 6).
CONN. 2, CONN. 3 and CONN. 5 are shielded connectors.
All connectors shown in this chapter are seen from the outside.
All connectors for the cables are supplied (except mini USB and TNC (Ext. Ant.)).

The connections aren't secured and the communication maybe unencrypted. If safety is paramount it is recommended to place the connectors and cables so they cannot be accessed outside the security zone.

Figure 6: uPASS Target connections

Figure 7 shows a simplified schematic overview for most of the uPASS Target connections. This figure shows the overview when the reader is in normal UHF mode (not TRANSIT compatible) determined by SW1-1 (see chapter 4).

3 Points (A, B and C) control the direction of the serial interface to USB, RS422, RS485 or one Ethernet channel (the other is fixed to the UHF processor):

A. When the USB cable is connected, the USB interface is used
B. The "main comm. interface" setting (see chapter 6.5.1) determines the use of Ethernet or RS422/RS485
C. Determined by SW1-2 (located near the USB port) RS422 or RS485 is used

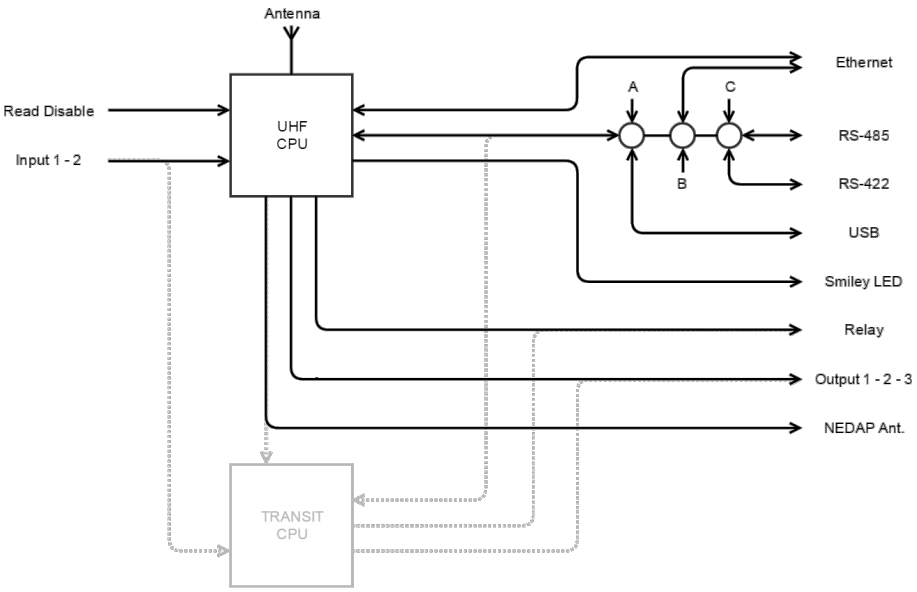


Figure 7: Schematic overview UHF mode

Figure 8 shows a simplified schematic overview for most of the uPASS Target connections. This figure shows the overview of the reader in TRANSIT compatible mode determined by SW1-1 (see chapter 4).

Also in TRANSIT compatible mode there are three points (A, B and C) that control the direction of the serial interface to USB, RS422, RS485 or one Ethernet channel (the other is fixed to the UHF processor):

A. When the USB cable is connected, the USB interface is used
B. The “main comm. interface” setting (see chapter 6.5.1) determines the use of Ethernet or RS422/RS485
C. Determined by SW1-2 (located near the USB port) RS422 or RS485 is used

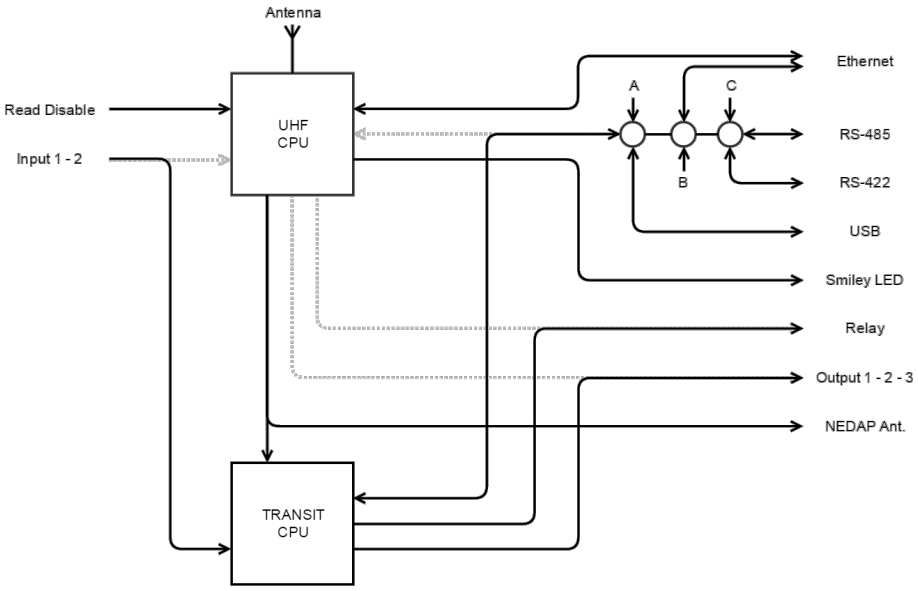


Figure 8: Schematic overview TRANSIT compatible mode

3.1 Power supply

The uPASS Target requires an external power supply. It is possible to power the uPASS Target by connecting a DC power supply. Another possibility is to power the uPASS Target by Power over Ethernet (PoE).

If both are connected, the power source depends on the DC power supply voltage. The DC power supply is used if its voltage is higher than 13.6V. Otherwise the Power of Ethernet is used

A DC power supply can be connected to the uPASS Target via CONN. 5. This DC power supply must be able to deliver 12Vdc/1.5A or 24Vdc/0.75A.

Figure 9: CONN. 5

Pin	Function
1	-
2	Ground
3	DC+
4	-

Table 1: Power supply connection

Power over Ethernet
Power over Ethernet operates over Ethernet cables.
CONN. 4 is a RJ45 Ethernet connection and can be used for Power over Ethernet.
The uPASS Target requires IEEE802.3at (Power over Ethernet Plus - PoE+).

Tested by UL with UL listed PoE switch, model Comtrol Corp. ACS1706 and UL Listed Isolated Loop Circuit Protector, model Schneider Electric IT Corp. PNET1GB.
Category 5e cabling is the minimum performance category recommended.
Compliance with IEEE 802.3 (at of af) specification was not verified as part of UL294.
The uPASS Target Region 2 is intended to be used with UL Listed Access Control Units, models AP7803 (door controller), AP7003 (door interface) and AP7031 (I/O Interface)

3.2 Communication

3.2.1 RS422 / RS485

The RS422 and RS485 interfaces are located in CONN. 1. The RS422 or RS485 communication can be used for communication with the Access Control System, configuration settings and firmware update.

SW1-2 (located near USB port) selects RS422 (SW1-2 ON) or RS485 (SW1-2 OFF).

The RS485 interface can be used for point-to-point and multi-drop communication. Multi-drop communication requires an addressable communication protocol, such as OSDP. The RS422 interface can only be used for point-to-point communication. See next page for more details about point-to-point and multi-drop usage.

Connections

Figure 10: CONN. 1

Pin	RS422 SW1-2 ON	RS485 SW1-2 OFF
1	TX-	-
2	TX+	-
3	RX-	B
4	RX+	A
5	Ground	Ground

Table 2: RS422 and RS485 connection

Maximum cable length is 1200 meters / 4000 feet when using termination resistors.
Maximum cable length is 65 meters / 213 feet without termination resistors.

Notes

- SW1-1 ON/OFF = uPASS Standard mode (default) / TRANSIT compatible mode.
- The RS422 / RS485 interface is disabled while the USB interface is connected.
- In UHFTOOL, the “main comm. interface” must be set to RS422/485 (see chapter 6.5.1).

Point-to-point communication

For point to point communication it is recommended to install a termination resistor.
Please use the RS485 set (art.no. 8500681) for convenient installation.

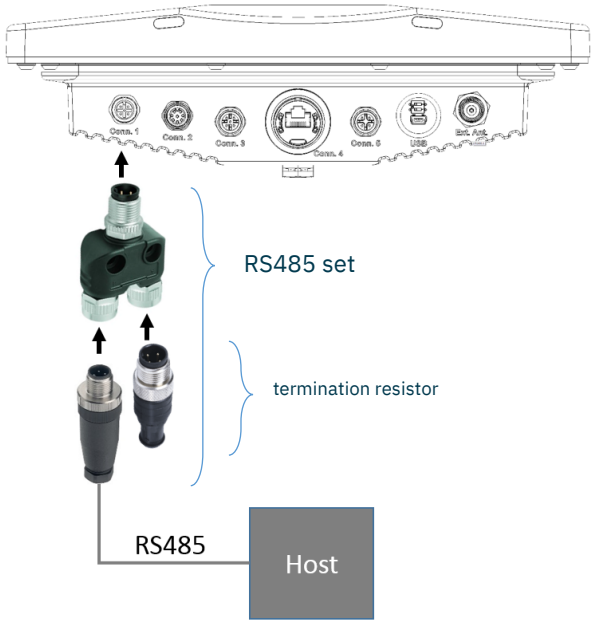


Figure 11: RS485 point-to-point communication

Multi-drop communication

Multi-drop communication requires an addressable communication protocol, such as OSDP. For multi-drop communication install the termination resistor only on the last reader. Please use the RS485 set (art.no. 8500681) for convenient installation.

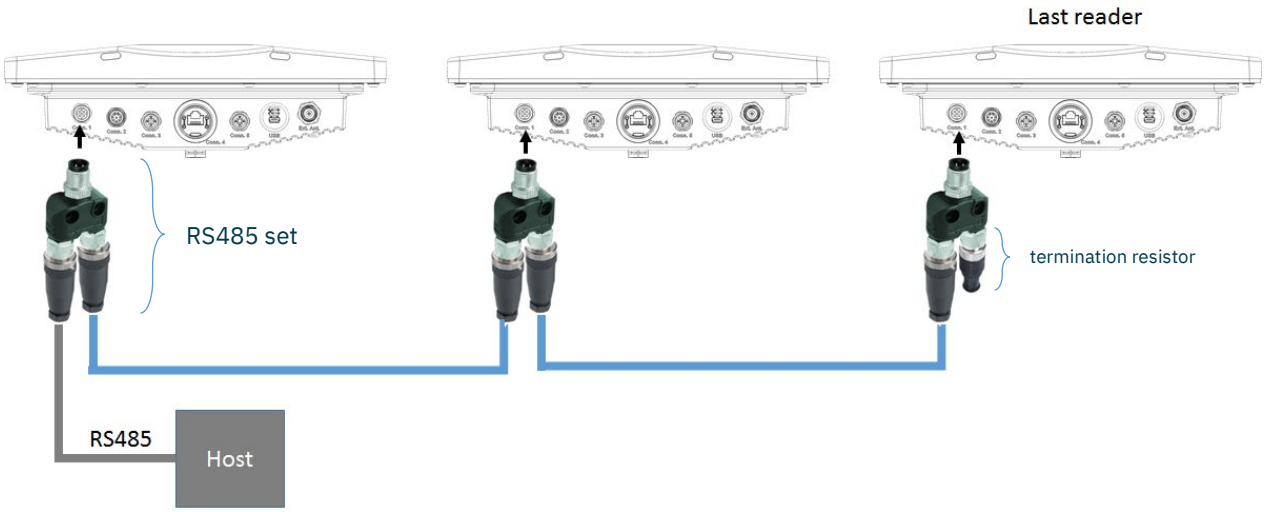


Figure 12: RS485 multi-drop communication

3.2.2 Wiegand / Magstripe

The Wiegand and Magstripe interfaces are located in shielded CONN. 2.
The Wiegand and Magstripe communication can be used for communication with to Access Control System only.

By default the interface is connected to the UHF processor but can be connected to the TRANSIT compatible processor, see chapter 4.

If connected to the UHF processor, Nedap UHF Wiegand tags generate a Wiegand message on the interface and Nedap UHF Magstripe tags generate a Magstripe message on the interface.
Other UHF tags do not generate a message on this interface, unless the 'Extra output' settings are used. (See chapter 6.5.3)

The Wiegand/Magstripe output format is determined by the programmed format of the tag. Make sure to order the correct tag programming format if you want to use the Wiegand or Magstripe interface. See UHF How To Order Guide for more information about ordering the UHF tags. Refer to the uPASS firmware guide for details over the Wiegand/Magstripe timing.

In case the TRANSIT compatible processor is selected, the same connections are used. Remember that in this case the tags must be programmed in the Nedap-XS format. Refer to the corresponding TRANSIT firmware guide for protocol details.

Figure 13: CONN. 2

Pin	Wiegand	Magstripe	OSDP
1	-	-	-
2	Data 0	Clock	OUT2
3	-	Card loaded	OUT1
4	Data 1	Data	OUT3
5	-	-	-
6	Ground	Ground	Ground
7	Ground	Ground	Ground
8	-	-	-

Table 3: Wiegand and Magstripe connection

Maximum cable length is 150 meters / 490 feet.

OSDP firmware
The OSDP firmware does not support Wiegand / Magstripe communication.

3.2.3 Ethernet

An Ethernet connection is located in CONN. 4. The Ethernet interface can be used for communication with the Access Control System, configuration and firmware update up to a distance of 100 meters / 328 feet.

The uPASS Target is equipped with two TCP/IP Channels. Channel 1 (default 10001) is connected to UHF processor or TRANSIT compatible processor. Channel 2 (default 10002) is always connected to the UHF processor with a baud rate of 115200.

The reader automatically gets an IP address from a DHCP server. The IP address assigned can be found based on the MAC address of the uPASS Target (located on the sticker). Alternatively the Lantronics Device Installer software can be used.

The Ethernet module can be configured to have a static IP address. This can be done by the web interface:

- Open the browser and go to the IP address of the reader
- Fill in the username and password (by default both blank)
- Open “Network” and select “Use the following IP configuration:”
- Fill in the required fields
- Click OK and Apply Settings

The communication protocol used for the Ethernet is the same as for RS422 and can be found in the firmware guide. If the baud rate of the reader is changed the Ethernet setting for Channel 1 must change. This can be done by the web interface:

- Open the browser and go to the readers IP address
- Fill in the username and password (by default both blank)
- Open “Channel 1” - “Serial Settings”
- Check if the “Port Settings” match the reader serials settings (as for USB or RS422/RS485)
- Click OK and Apply Settings

By default channel 1 is not connected. To connect channel 1, the “main comm. interface” (chapter 6.5.1) needs to be set to TCP/IP. It is also possible to connect to the TRANSIT compatible processor, see chapter 4. Make sure the serial settings of the Ethernet configuration match the setting of the TRANSIT compatible processor.

Figure 14: CONN. 4

3.2.4 USB

The uPASS Target reader features a mini USB interface for service, installation and firmware upgrade purposes. The USB interface creates a virtual COM port that can be used the same way as a normal (serial) COM port.

The USB interface may be used to communicate with:

- UHF processor (SW1-1 OFF)
- TRANSIT compatible processor (SW1-1 ON)

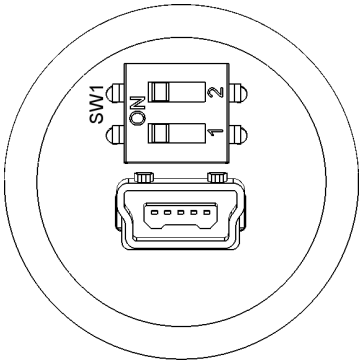


Figure 15: USB (mini) interface with SW1

USB driver installation

Make sure your computer is connected with internet. Connect the uPASS Target reader to your computer via the USB cable. The USB drivers may be installed automatically. In case you need to install the USB drivers manually, please go to the website www.ftdichip.com/Drivers/VCP.htm and download the VCP (Virtual Com Port) drivers. After successful installation of the USB drivers the reader will appear in the Windows device manager in "Ports (COM & LPT)" section.

3.2.5 Nedap antenna interface

The Nedap antenna interface is used to connect the uPASS Target to Nedap AEOS access control hardware such as the AP1001. The uPASS reader simulates a 120 kHz Nedap proximity card to the AP1001. This only works with Nedap-XS and EM4102 formatted UHF tags.

The uPASS Target can replace the 120 kHz antenna. The “HF Data” must be connected to the “ANT” connection and the “Ground” to “GND” (see Figure 16).

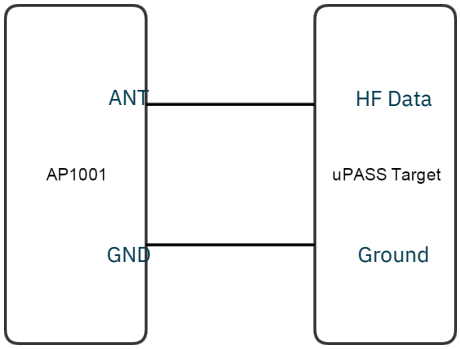


Figure 16: Replacement of 120 kHz antenna

Another possibility is to leave the 120 kHz in place and connect the uPASS Target. That way 120 kHz and uPASS Target both can be used (see Figure 17).

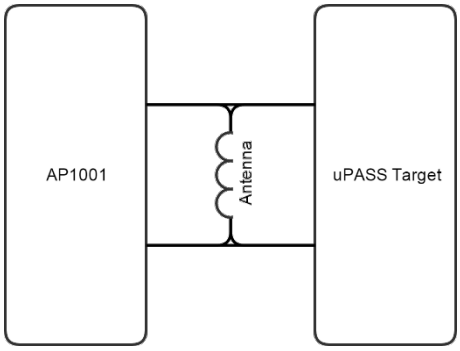


Figure 17: Addition to 120 kHz antenna

The Nedap antenna interface is located at CONN. 3.

Figure 18: CONN. 3

Pin	Function
1	-
2	HF Data
3	-
4	-
5	Ground

Table 4: Nedap antenna connection

3.3 Digital I/O

3.3.1 General purpose inputs / LED and relay control

Relay output

The relay is by default set to automatic mode. The relay is activated for every tag read and stays activated for the tag hold time (see chapter 6.4.3). If the automatic mode is switched off, the relay is operated by input 1.

LED

The front LED need to be configured as Remote (see chapter 6.4.4) to control them by the input pins. Input1 controls the “UnLock” (UL) color of the LED and input 2 controls the Not Authorized (NA) color of the LED.

Inputs

Two general-purpose inputs are available of CONN. 2. The inputs can control the LED at the front of the reader to provide feedback and a relay for switching devices (for example doors or gates).

TRANSIT compatible mode

In TRANSIT compatible mode the inputs and outputs are controlled by the TRANSIT compatible processor. See TRANSIT firmware guide for more details.

OSDP firmware

Upon input status change, the reader will send input status report message OSDP_ISTATR. The current input status can be requested by sending the input status report request message OSDP_ISTAT.
Use the OSDP_OUT command to control the relay output state.

Figure 19: CONN. 2

Pin	Function	
1	Input 1 / UL	(OSDP input 0)
2	-	
3	-	
4	-	
5	-	
6	Ground	
7	Ground	
8	Input 2 / NA	(OSDP input 1)

Table 5: General input connection

Figure 20: CONN. 3

Pin	Function
1	Relay NO
2	-
3	Relay NC
4	Relay COM
5	-

Table 6: Relay connection

3.3.2 Reader disable

The reading of the uPASS Target can be disabled with the RDIS input. This input is commonly used in combination with a sensor (e.g. inductive loop) that detects the presence of a person or vehicle. The RDIS is by default 5V can be controlled by pulling it to ground (pin is short-circuit protected). When the RDIS input is 0V the reader is disabled.
The reader disable input is located in CONN. 2.

This function works in both Normal mode and TRANSIT compatible mode.

Figure 21: CONN. 2

Pin	Function
1	-
2	-
3	-
4	-
5	RDIS
6	Ground
7	Ground
8	-

Table 7: Reader disable connection

3.3.3 External antenna

It is possible to connect an external Nedap UHF antenna to the uPASS Target reader.
This can be useful for very wide entrances or entry/exit gates where readers can be installed back-to-back.
The external UHF antenna can be used in 3 possible configurations:

1. Internal only. This mode is used if no external antenna is connected.
2. External only. This mode is used if the uPASS reader cannot be mounted at the location but an antenna can, the reader can be place at another location and connect to the antenna.
3. Internal and external. The antennas can be installed in two separate locations (for in/out lane separation).

See chapter 6.5.6 for details about selecting the antenna configuration.
The external antenna is located at Ext. Ant. connection. The connection is a reverse polarized TNC connector.

Only Nedap antennas shall be connected.

4 TRANSIT compatible mode

The uPASS Target reader features a TRANSIT compatible mode.
In this mode the reader communication is 100% compatible with the NEDAP TRANSIT.
This is very useful for anyone that has already developed an integration with NEDAP TRANSIT readers.

The compatibility is ensured by embedding the TRANSIT processor in the uPASS Target. This processor will support any firmware version developed for the TRANSIT reader, including P61, P81 and Q70. See separate TRANSIT firmware documentation.

In the TRANSIT compatible mode, most inputs and outputs are switched to the TRANSIT processor.
Therefore you should use TRANSIT software such as P81TEST and PICLOAD.
UHFTOOL software cannot be used via RS485, RS422, USB or TCP/IP Channel 1.
It is still possible to use UHFTOOL software through TCP/IP Channel 2.

SW1-1 ON = TRANSIT compatible mode enabled. SW1-1 is located near the USB port see chapter 3.2.4.

The TRANSIT compatible mode requires that the UHF tags are programmed in the NEDAP-XS format.

TCP/IP Channel 1 settings
Make sure the serial setting of the Ethernet are correctly configured to work in the TRANSIT compatible mode. This can differ based on firmware version and DIP-switch settings (see the TRANSIT firmware documentation). The serial settings of the Ethernet can be changed with the web interface:

- Open the browser and go to the readers IP address
- Fill in the username and password (by default both blank)
- Open “Channel 1” - “Serial Settings”
- Check if the “Port Settings” match the reader serials settings (as for USB or RS422/RS485)
- Click OK and Apply Settings

TRANSIT switch settings
The TRANSIT firmware generally uses 8 DIP-switches for configuration purposes. These DIP switches are not physically available on the uPASS Target.
The virtual DIP-switches can be set using UHFTOOL software. See chapter 6.4.2.
Make sure that SW1-1 is (temporarily) OFF while configuring.

See the corresponding TRANSIT firmware documentation for the functional description of each switch.

5 UHF frequencies

Radio regulations
The uPASS Target reader is available in two regions.

- The uPASS Target Region 1 operates in the 865 – 868 MHz (ISM) band.
- The uPASS Target Region 2 operates in the 902 – 928 MHz (ISM) band.

Regulations in this band are not standardized world-wide. Generally the regulations can be divided into several regions. When ordering an uPASS Target reader this region must be specified (see UHF How To Order Guide).

Per region a specific frequency band is available. This frequency band is divided into frequency channels. If local radio regulations require frequency hopping (FHSS), then the uPASS Target automatically selects and uses the available channels.

Frequency channel selection
If no frequency hopping is required, it is still advised to use frequency hopping. Frequency hopping is less sensitive for interferences.

Selecting a fixed frequency can be realized with the UHFTOOL (see chapter 6.5.4). This is only possible if frequency hopping is not required by radio regulations. Select a free frequency channel to achieve the best performance and to avoid interference from other readers or equipment.

6 Reader configuration

The uPASS Target reader settings can be configured easily using the UHFTOOL software. The UHFTOOL requires a Microsoft Windows installation to run. Software developers can find the communication protocol description in the firmware guide

6.1 UHFTOOL software

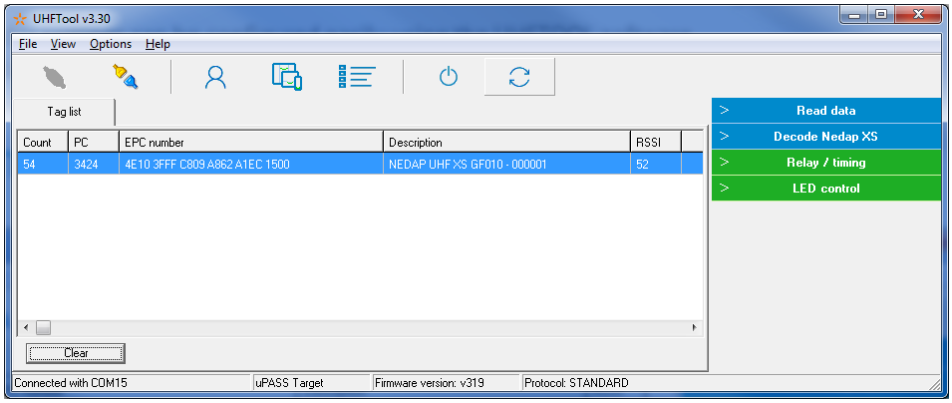


Figure 22: UHFTOOL software

6.2 Connecting

To connect to the uPASS reader click File -> Connect, press F2 or click on the connect button. This opens the connect dialog. Select the following communication parameters and click OK to establish the connection.

- COM-port
- Baud rate
- Communication protocol (STANDARD or OSDP)
- Device address (only for OSDP)

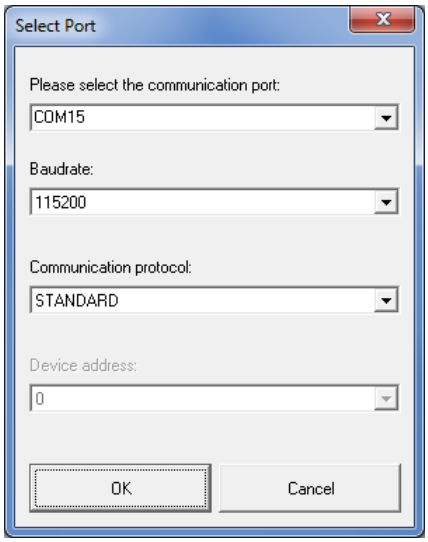


Figure 23: Connect dialog

6.3 Options

6.3.1 Setup baud rate

Select the serial communication baud rate.
Possible selections are:

- 1200
- 2400
- 9600 (default OSDP)
- 19200
- 38400
- 57600
- 115200 (default STANDARD)

Click OK after changing the baud rate. Upon success the software will show a message and the baud rate in the software and reader have been changed. The new baud rate setting in the reader is saved to non-volatile memory.

Note that when using a separate interface converter, it may be required to update the baud rate setting in there as well.

6.3.2 Setup OSDP device address

Select the OSDP device address in range from 0 to 126.
Default device address is 0.

6.3.3 Reset to factory defaults

Reset configuration to factory defaults.
All settings will be reset to factory defaults. The reader will restart automatically afterwards.
This will not affect the TCP/IP network settings.

6.4 Settings

Click 'View' -> 'Show config sidebar' or press F11 to show the configuration sidebar. In the sidebar the configuration categories are shown. Expand or collapse the setting panels by clicking on it.

6.4.1 Read data

Configure here which tags should be selected, how to access these tags, what data should be read from these tags and if a security check should be performed.
By default the reader is configured to select ANY TAG and read its EPC number.
Select NEDAP to read only Nedap tags.
NEDAP DUAL-ID enables the uPASS to search for Nedap vehicle-id tags. When a vehicle-id tag is found, the uPASS searches for driver-id tags.

Example 1 - Nedap
Read only NEDAP UHF tags:

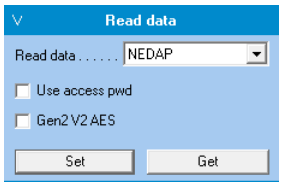


Figure 24: Read data example 1

Example 2 - Custom
Read only tags with EPC number starting with 99 and read 4 words from user memory. Note that the bit pointer is set to 32 because the EPC memory bank starts with 16-bits CRC and 16-bits PC (protocol control). Therefore the EPC number starts at bit pointer 32.

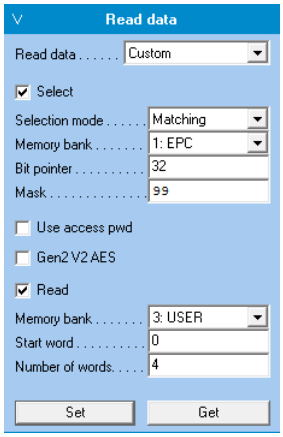


Figure 25: Read data example 2

6.4.2 Decode Nedap-XS

Enable/disable decode Nedap XS formatted tags.

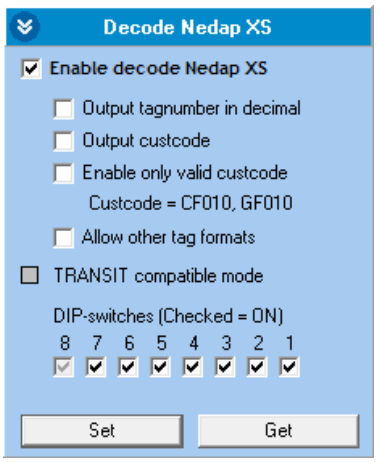


Figure 26: Output settings

By default the data on Nedap-XS formatted tags is transmitted to the TRANSIT compatible processor and the Nedap antenna modulation interface. In this case the uPASS will not perform any decoding.

Enable the 'decode Nedap XS' option to decode the Nedap XS tag data and output its plain tag-number. In this case the TRANSIT compatible processor and the antenna modulation interface are not used. Additionally this function can be used to verify or output the customer code.

Enable the option 'Allow other tag formats' when the reader should also support other formatted tags, such as Nedap UHF Wiegand formatted tags and others.

See the uPASS decode Nedap XS Application Note for more information.

TRANSIT compatible mode
When using the TRANSIT compatible mode ensure that the 'decode Nedap XS' option is disabled!!!
Set the virtual DIP switches with the checkboxes 1-7 (see TRANSIT firmware guide). The box “TRANSIT compatible mode” indicates if TRANSIT compatible mode is currently enabled (green=yes). The actual TRANSIT compatible mode itself is set with SW1-1. See chapter 4.

6.4.3 Relay / timing

Configure relay output and timing parameters.

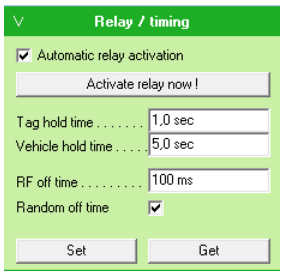


Figure 27: Relay / timing settings

Enable 'Automatic relay activation' to activate the relay upon identification. When disabled, the relay can only be activated manually trough a serial command or digital input activation.

The 'Tag hold time' setting is the minimum time a tag is remembered. During this time the front cover LED indicates a tag read and the relay is switched.

The 'Vehicle hold time' setting is the time, after a vehicle-id tag has been found, for which the reader will search for driver-id tags. This setting is only used in the Nedap DUAL-ID mode.

The (random) RF off time parameter can be used to enable multiple Nedap uPASS readers on the same frequency without then interfering with each other. By default this setting is on, it is recommended to keep this setting on.

OSDP firmware

Use the OSDP_OUT command to control the relay output state. The output allow for direct activation and deactivation plus timed operation (OSDP output control compliance level 3). The permanent command is volatile (does not transcend power cycles).

When the status of the relay output changes the reader will send an output status change report message OSDP_OSTATR.

6.4.4 LED control

Automatic mode

Default the uPASS reader controls the LED automatically.

With “Color UL” the tag read color can be configured. With “Color NA” the color, that indicates that the reader is waiting, can be configured. These settings will also be used in TRANSIT compatible mode.

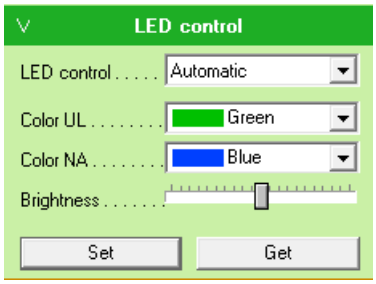


Figure 28: LED automatic

Remote control

The LED can be controlled remotely by a connected access control system.

The UL and NA digital inputs determine the color of the LED.

See chapter 3.3.1 for details about the input connections.

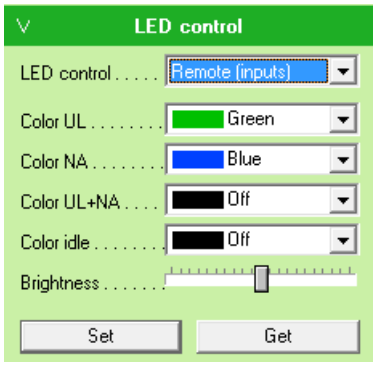


Figure 29: LED remote control

Direct control

With direct control, the color can be controlled through serial connection. The color and brightness are directly set via the serial command (see firmware guide).

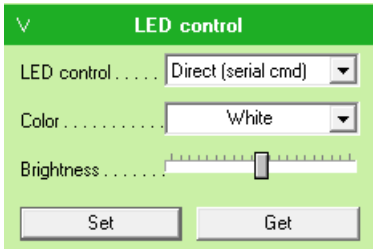


Figure 30: LED direct control

OSDP firmware

Use the OSDP_LED command to control the LED.

Automatic mode and Remote control are not supported.

6.5 Expert settings

Click 'Options' -> 'Usermode' -> 'Expert' to show additional configuration settings for advanced users.

6.5.1 Output

Configure communication output settings.

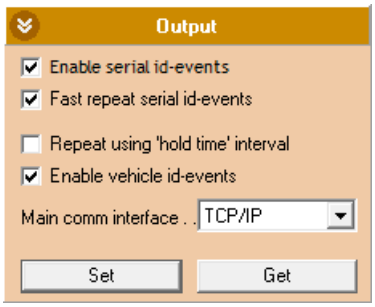


Figure 31: Output settings

Select 'Enable serial id-events' to enable the serial output upon identification. Only disable the serial id-events to optimize the identification speed when using the Wiegand, Magstripe interface or the TRANSIT compatible processor.

When 'Fast repeat serial id-events' is selected (default) the serial output is repeated upon every identification while the tag is in the read range. When this option is disabled, the message is transmitted at the same rate as the Wiegand or Magstripe interface.
This setting has no effect when using the Wiegand, Magstripe or Nedap antenna interface.

By default the 'Repeat using hold-time interval' is disabled. The messages on the Wiegand or Magstripe will only be send once when a tag enters the read range. If enabled, the messages are repeated every hold-time (configured in chapter 6.4.3) while the tag is within the read range.
The setting has no effect on the Nedap antenna interface and may have effect on the serial interface (depending on the 'Fast repeat serial id-events' setting).

'Enable vehicle id-events' allows enabling or disabling the id-event messages for vehicle-ids. This may be useful in combination with the Nedap DUAL-ID mode and an access control panel that does not support the dual-id feature.

'Main comm interface' is used to select the main serial communication interface. The choice is between RS422/RS485 or TCP/IP. Wiegand and Magstripe not affected.
If the 'Main comm interface' is changed, the UHFTOOL may lose connection.

6.5.2 Output message format

Configure the serial output message format.

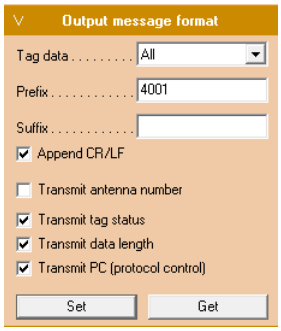


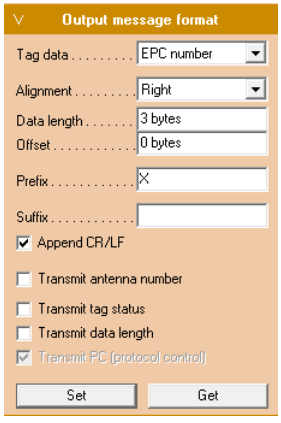
Figure 32: Output message format

The output message format is configurable:
<prefix> [<antno>] [<tagstatus>] [<epclen>] [<epc>] [<datlen>] [<data>] <suffix> [CR/LF]

Prefix	Default 4001. Can be any string with length in range from 0 to 4 characters. Special characters can also be included. E.g. <stx> = ASCII character 0x02. The prefix is not supported in OSDP configurations.
Antno	A0 = internal antenna, A1 = external antenna. See example 2 below.
Tagstatus	5 Bytes tag status: 80 <ac> <ph> <rssi>
Epclen	Length of EPC number in bytes. Normally 0E for 16-bit PC + 96-bit EPC.
Epc	EPC number
Datlen	Custom read data length in bytes.
Data	Custom read data
Suffix	Suffix string. Can be any string with length in range from 0 to 4 characters.

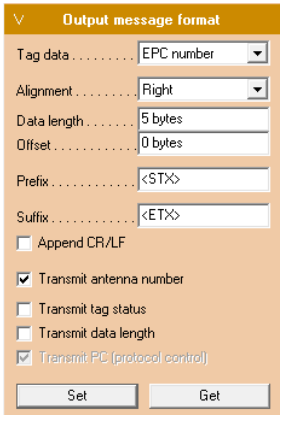
Output default (example):
`400180013E00330E34244E103FFFC809A862A1EC1500<CR><LF>`

Example 1



Output:
`X012345<CR><LF>`

Example 2



Output:
`<STX>A09988776655<ETX>`

6.5.3 Extra output

Optionally enable Wiegand or Magstripe output for tags that are not programmed by Nedap in a Wiegand, Magstripe or Nedap-XS format.

See uPASS Wiegand output Application Note for more information.

6.5.4 Frequency

Here is shown the reader's operating frequency region.
When frequency hopping is not required, you can select a fixed frequency channel within the available frequency band.

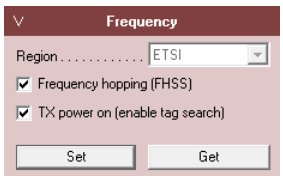


Figure 33: Frequency

6.5.5 Read range

With 'Read range' the tag read distance can be configured, this can be useful to optimize lane separation. With the 'Antenna output power' the power of the antenna is configured. The antenna output power controls the distance in which the tag is activated. With the 'RSSI threshold' the tags are activated and read, but filtered by the firmware based on their signal strength (RSSI).

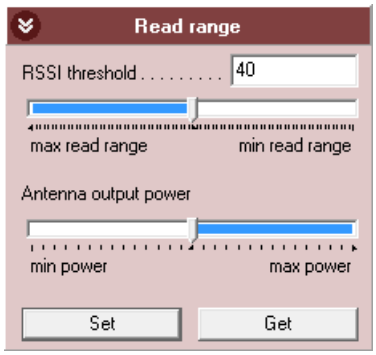


Figure 34: Read range

6.5.6 Antenna

Antenna settings can be changed in the Antenna panel.
With the “antenna select” setting the mode of antenna operation can be selected.
Choose either “internal only”, “external only” or “internal + external”.

For the Internal and External antenna the output power can be configured. This is the same setting as the “Antenna output power” from the read range (see chapter 6.5.5).

With “Dwell time” the maximum ON time of the antenna is configured. The maximum ON time is the time in milliseconds that the antenna is activated during a tag identification round. If configured to zero there is no maximum ON time.

The “Inventory cycles” are the amount of cycles the reader tries to find all tags within a tag identification round. The uPASS Target reader can find up to 4 tags every cycle.

If “Dwell time” and “Inventory cycles” are both set, the time which is the shortest will be used. Both settings may not be configured to zero.

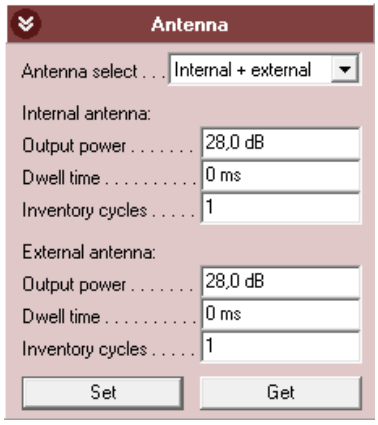


Figure 35: Antenna

7 Firmware update

The firmware of the uPASS Target (UHF processor) can be updated using UHFTOOL. The latest version can be downloaded from the partner portal; https://portal.nedapidentification.com/.

Click Options, Update firmware.
Select the firmware file. You may choose the available STANDARD or OSDP firmware version or alternatively an external provided firmware file.

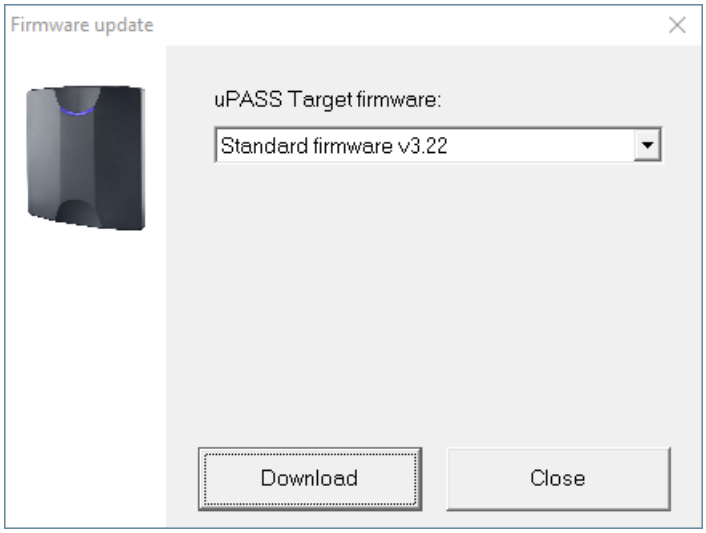


Figure 36: Firmware update

Click Download to start the update process. During the update the progress bar indicates the progress. If the progress bar reaches 100% the firmware update is done and the reader will start the new firmware.

Note: for updating firmware in the TRANSIT compatible processor use TRANSIT software (PICLOAD).

A Technical specifications

Item	Specification	Remark
Dimensions	286mm x 285mm x 78mm 11.26in x 11.22in x 3.01in	Length x width x height
Weight	3.5 kg (7.72 lbs.)	
Cover material	UL94 ABS cover (RAL7016)	
Chassis material	Aluminum (RAL9006)	
Protection class	EN IEC 60529 + A1 (IP66)	
Operational temperature	-30 °C … +60 °C -22 °F … +140 °F	
Relative humidity	10 .. 93 % non-condensing	
Identification range	Up to 10 meters (33 feet) (line-of-sight)	With passive Nedap UHF tags
Power supply	12 … 24VDC ±10% power supply Power over Ethernet plus (IEEE 802.3at)	
Current consumption	1.50A @ 12VDC 0.75A @ 24VDC	
Inputs	2 digital input for LED control 1 digital input for reader disable1 TNC Nedap UHF antenna	Active low inputs (0V – 5V) Active low input (0V – 5V)
Output	Wiegand, Magstripe (clock & data), Nedap EM4102, Nedap CR/LF	Other possible in TRANSIT compatible mode, see TRANSIT firmware guides
Relay	1 relay (NO, common, NC) 24VDC 2A	
Interfaces	RS-422, RS-485, Ethernet and USB	
Air interface	ISO18000-6C	
Polarization	Circular	

Operating frequency

Country	Frequency	Technique		Power
ETSI	865.7 - 867.5 MHz	FHSS	4ch	2W ERP
FCC	902.7 - 927.2 MHz	FHSS	50ch	1W cond, ≤6dBi gain
Brazil	915.5 - 927.5 MHz	FHSS	41ch	1W cond, ≤6dBi gain
China	920.6 - 924.4 MHz	FHSS	20ch	2W ERP
Australia	920.7 - 925.2 MHz	FHSS	10ch	4W EIRP
Israel	915.1 - 916.9 MHz	DRM	4ch	2W EIRP
South-Korea	917.3 - 920.3 MHz	FHSS	6ch	4W EIRP
New Zealand	922.5 - 926.0 MHz	FHSS	8ch	4W EIRP
Japan	916.8 - 920.4 MHz	DRM	4ch	1W cond, ≤6dBi gain
Malaysia	919.8 - 922.2 MHz	DRM	5ch	2W ERP
Taiwan	922.6 - 927.4 MHz	FHSS	9ch	1W cond, ≤6dBi gain
Vietnam	866.3 – 867.5 MHz	DRM	3ch	2W ERP
Philippines	918.5 - 919.5 MHz	DRM	3ch	0.5W ERP
Russia	866.3 - 867.6 MHz	DRM	3ch	2W ERP

Immunity	EN 50364 EN62369-1 EN301 489-1 V1.9.2 EN 301 489-3 V1.6.1 EN 55022 EN 61000-6-2 EN 61000-6-3 +A1	
Safety	EN 60950-1	
Emission	EN 302 208-1 v1.4.1 EN 302 208-2 v1.4.1 ERC REC 70-03 FCC 47 CFR part 15 subpart C Section 15.247 Industry Canada RSS-247	
Shock	IEC 68-2-27 Ea	50 G, 6 ms, 10x3 dir
Bump	IEC 68-2-29 Eb	25 G, 6ms, 1000x3 dir
Random vibration	EN 50155	5 – 150Hz, 5 G, 20 sweeps x 3 dir

B FCC / IC statement

FCC ID: CGDUPASSTAR
IC: 1444A-UPASSTAR

Compliance statements (part15.19)
This device complies with part 15 of the FCC Rules and to RSS-247 of Industry Canada. 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.

Cet appareil se conforme aux normes CNR-247 exemptés de licence du Industriel Canada. L'opération est soumise aux deux conditions suivantes:
(1) cet appareil ne doit causer aucune interférence, et
(2) cet appareil doit accepter n'importe quelle interférence, y inclus interférence qui peut causer une opération non pas voulu de cet appareil.

Warning (part15.21)
Changes or modifications not expressly approved by party responsible for compliance could void the user's authority to operate the equipment.

RF Exposure (OET Bulletin 65)
To comply with FCC RF exposure requirements for mobile transmitting devices, this transmitter should only be used or installed at locations where there is at least 20cm separation distance between the antenna and all persons.

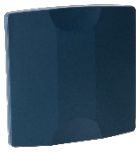
Information to the User (Part 15.105(b))
Note: This equipment has been tested and found to comply with the limits for a class B digital devices, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequent 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 not cause harmful interference to radio or television reception, which can be determine 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.

UL
This product is intended to be powered by a UL294 listed low voltage class 2 limited power supply capable of providing 12-24Vdc, 1.5A.

C Part numbers

Readers		
	Nedap uPASS Target Region 1 (EUR 865-868 MHz)	9217363
	Nedap uPASS Target Region 2 - 3 (USA 902-928 MHz)	9217371

Antennas		
	Nedap uPASS Target Region 1 (EUR 865-868 MHz)	9219021
	Nedap uPASS Target Region 2 - 3 (USA 902-928 MHz)	9219048

Accessories		
	Wall mounting bracket	9984364
	Pole mounting set	5626595
	Weather protection hood	5762804
	RS485 set	8500681

D Document revision

Version	Date	Comment
1.12	2020-04-29	• Product picture on cover page changed
1.11	2020-04-09	• Added antenna number in in message output format • Updated corporate style
1.10	2020-01-27	• Fixed incorrect chapter references.
1.09	2019-02-26	• Added antenna coverage
1.08	2019-01-10	• Update tag security and uhftool • Added OSDP support
1.07	2016-12-07	• Changed dipswitch connector correctly oriented.
1.06	2016-06-01	• Added UL specification for PoE • Change UL specification power supply
1.05	2016-03-16	• Changed South-Korean frequency setting and number of channels. • Changed Vietnam frequency setting and number of channels. • Updated some country names in the frequency overview.
1.04	2016-03-01	• Changed FCC reference: RSS210, CNR210 to RSS-247, CNR-247. • FCC Part15.106 changed to FCC Part15.105
1.03	2016-02-18	• Added inch measurements to dimensions drawings • Added image of the Ethernet connector • Corrected text that mini USB and TNC aren't supplied • Added external antenna setting reference to tooling chapter. • Used correct name for the TRANSIT compatible processor update tool
1.02	2016-01-20	• Added Russian frequencies • Added FCC/IC numbers • Added Antenna part numbers • Added Antenna images (part numbers) • Added mounting images (part numbers) • Added information when to place the weather protection hood • Removed the resistor that was placed instead of the 120KHz antenna in the Nedap antenna interface.
1.01	2015-12-08	• Initial version

E Disclaimer