

# uPASS TARGET<sup>★</sup>

## installation guide

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## 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 RS-485/RS-422, 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.

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 SUPPORTED TAGS

Any EPC Class 1 Gen 2 tag is supported by the uPASS Target and will output on the RS-422, RS-485 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.

#### Note

The Wiegand output format is determined by the tag and not by the reader.

#### 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.

#### Note

The Magstripe output format is determined by the tag and not by the reader.

#### Nedap UHF XS tags

These tags are especially programmed in the same format as our 2.45GHz TRANSIT tags (Compact-Tag, Window-Button and Heavy-Duty-Tag). The tags will also have a customer-code and id-number. The reader will modulate the tag-info onto the Nedap antenna interface output, which can be connected to Nedap AEOS access control hardware such as the AP1001. These UHF tags will also work in TRANSIT compatible mode.

#### Note

See also the 'decode Nedap XS' feature as described in chapter 6.3.3.

## 1.2 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. Unlike many 13MHz smartcards, EPC tags do not support any DES, 3DES or AES encryption.

EPC tags contain a data field known as the Tag Identifier (TID). At the discretion of the EPC manufacturer, the value may be factory programmed and locked, ensuring that tags have a unique identity and (theoretically) cannot be cross-copied. This TID based anti-cloning mechanism is not considered to be a strong protection.

Nedap UHF tags support a locked serialized TID and the uPASS Target reader can be configured to read the TID data field and send its data to the Access Control System for verification.

By default the uPASS Target reader is configured to read any EPC tag.

We encourage customers to enable the TID-check. But also advise not to completely rely on this methods in high-security applications.

Tag security is not evaluated by UL.

## 2 INSTALLATION

### 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 MOUNTING INSTRUCTIONS

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

#### 2.2.1 READER DIMENSIONS

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

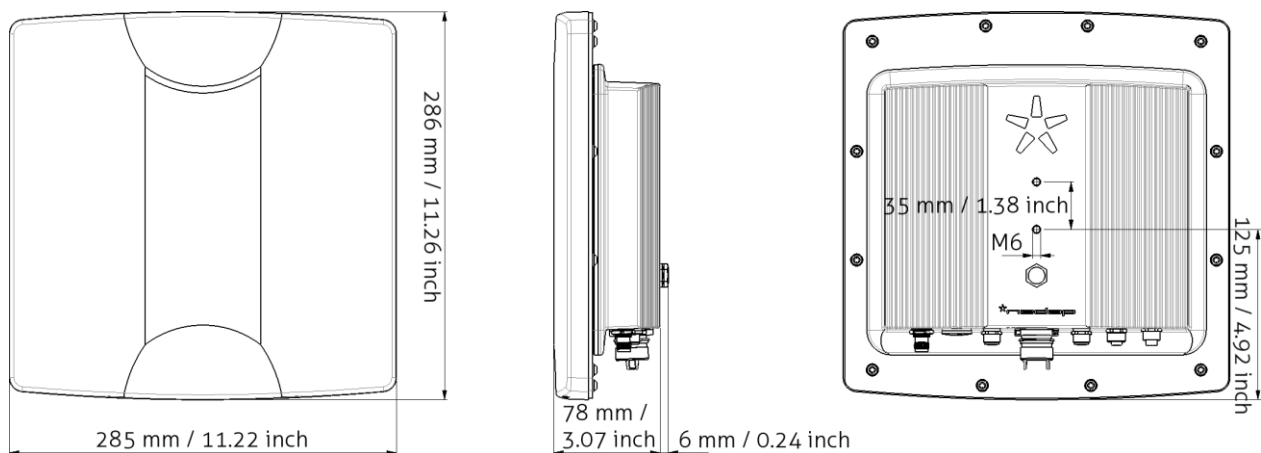


Figure 1: uPASS Target dimensions

### 2.2.2 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 2. The uPASS Target can be "aimed" with the Wall Mounting Bracket and when the bolts are tightened it will stay in place.

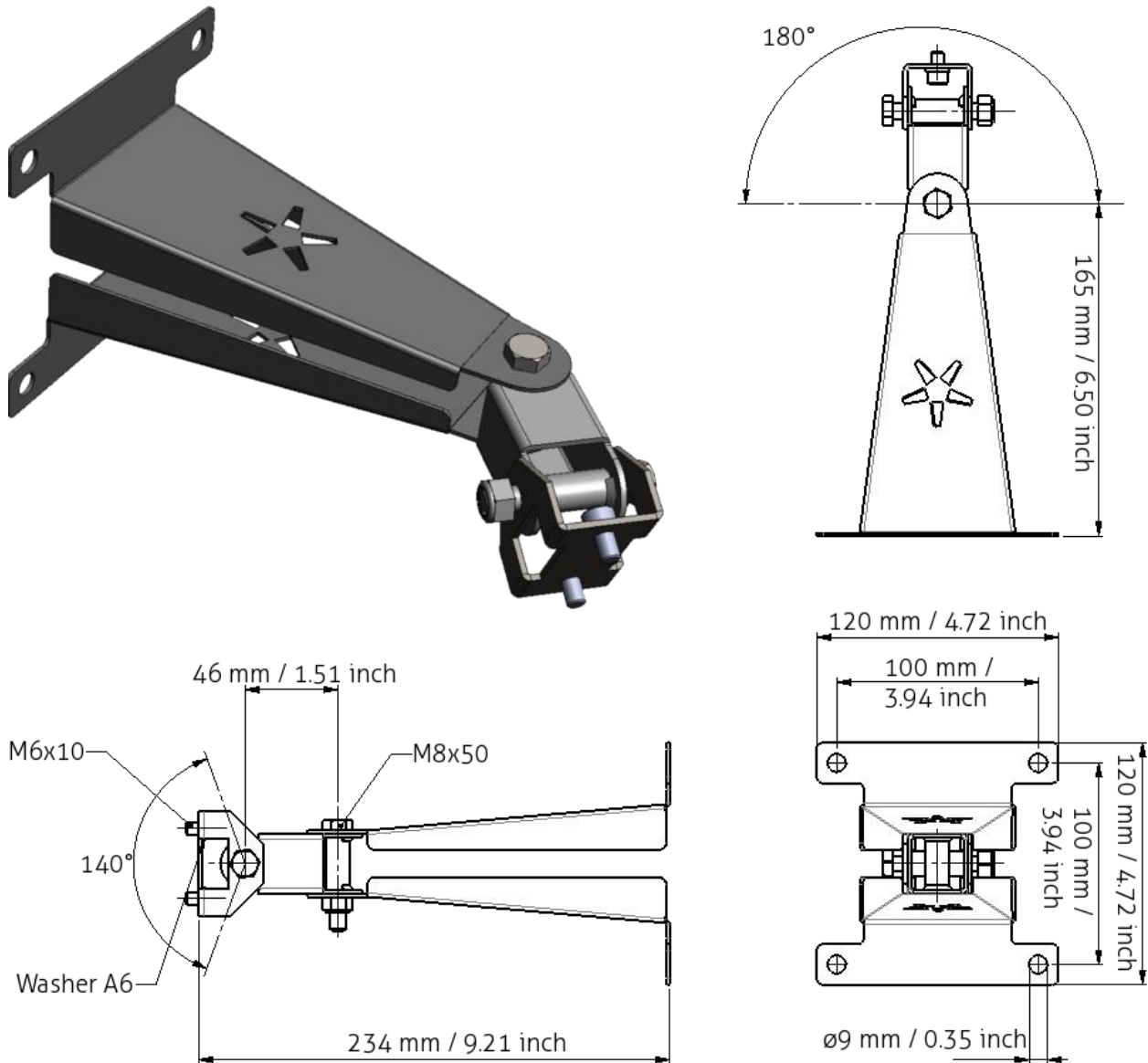


Figure 2: Wall Mounting Bracket

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### Installation

#### 2.2.3 POLE MOUNTING SET

The Pole Mounting Set has to be ordered separately (see appendix B).

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.

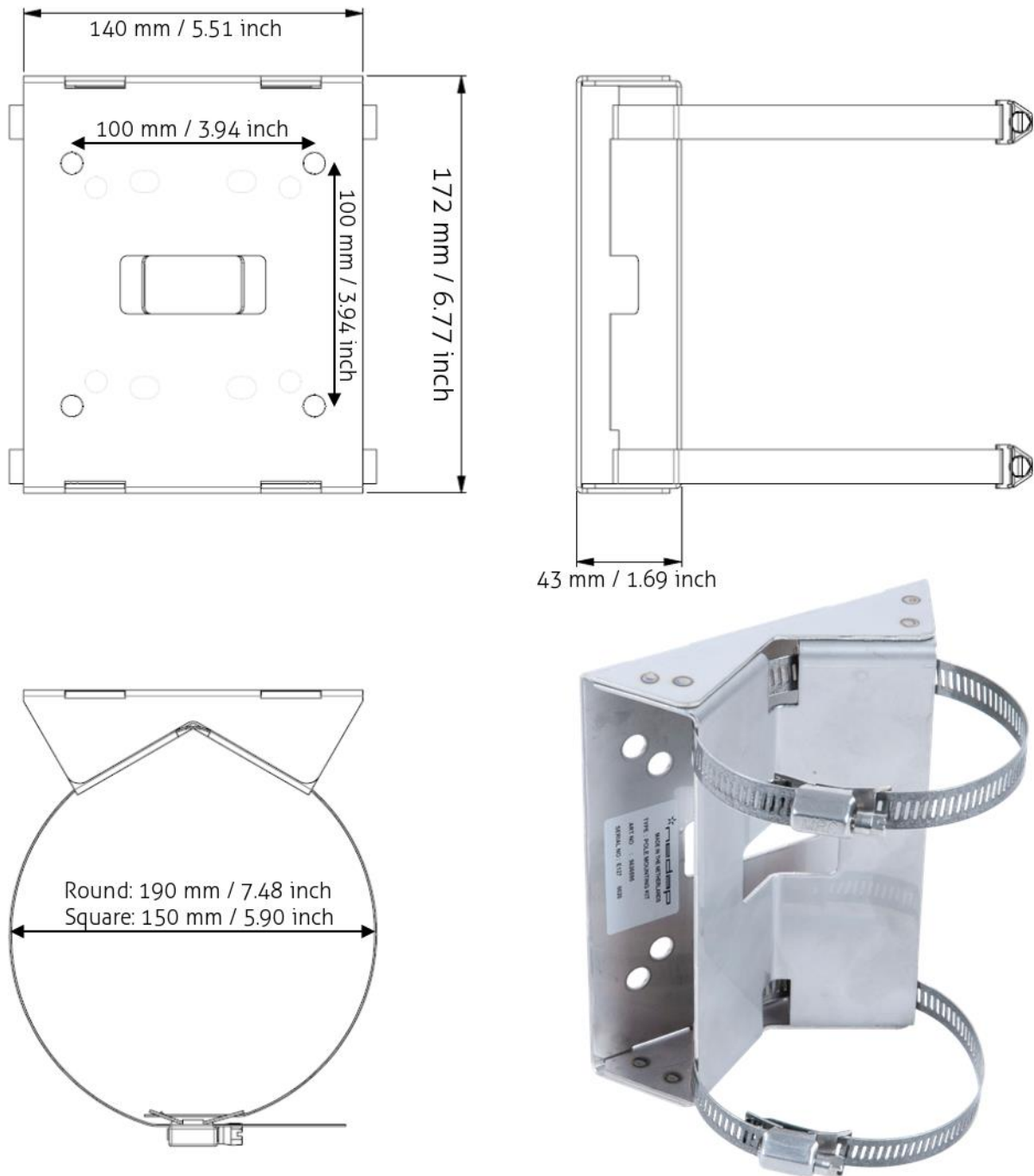


Figure 3: Pole Mounting Set

#### 2.2.4 WEATHER PROTECTION HOOD MOUNTING

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 B).

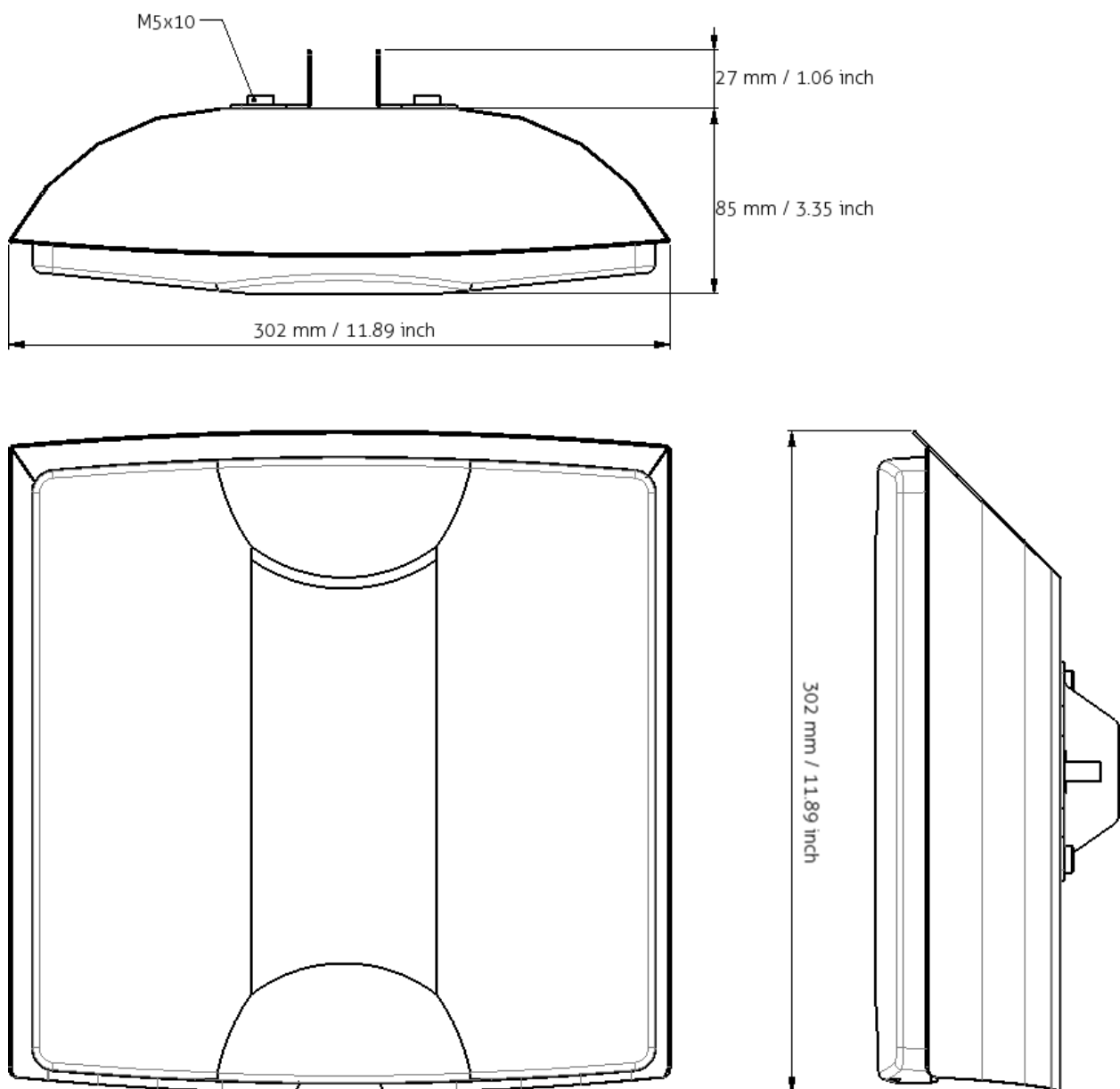


Figure 4: Weather Protection Hood



### 3 CONNECTIONS

The uPASS Target has 7 connectors at the bottom of the device (see Figure 5). 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 connection aren't secured and the communication isn't encrypted. If safety is paramount it is recommended to place the connectors and cables so they cannot be accessed outside the security zone.



Figure 5: uPASS Target connectors

Figure 6 shows a simplified schematic overview for most of the uPASS Target connections. This figure shows the overview when the reader is in normal UHF (not TRANSIT compatible) mode determined by SW1-1 (see chapter 4).

3 Points (A, B and C) control the direction of the serial interface to USB, RS-422, RS-485 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 6.4.1) determines the use of Ethernet or RS-422/RS-485
- C. Determined by SW1-2 (located near the USB port) RS-422 or RS-485 is used

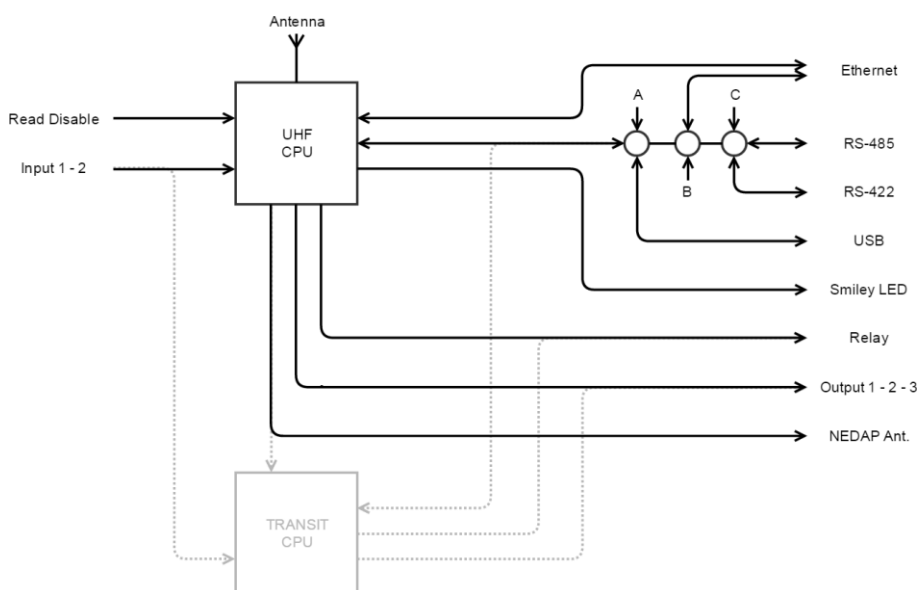


Figure 6: Schematic overview UHF mode

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### Connections

Figure 7 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, RS-422, RS-485 or one Ethernet channel (the other is fixed to the UHF processor):

- When the USB cable is connected, the USB interface is used
- The "main comm. interface" setting (see chapter 6.4.1) determines the use of Ethernet or RS-422/RS-485
- Determined by SW1-2 (located near the USB port) RS-422 or RS-485 is used

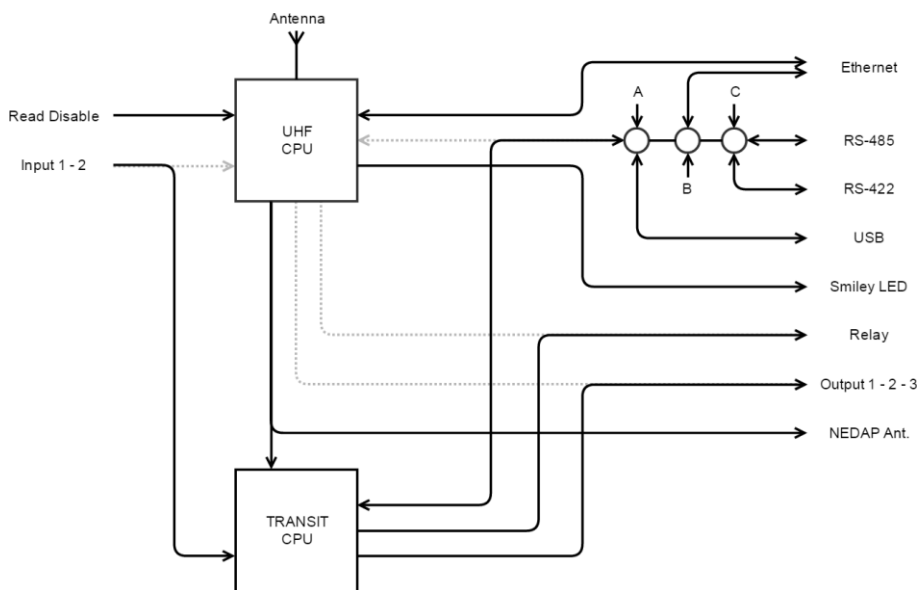


Figure 7: Schematic overview TRANSIT mode

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

DC power supply

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 8: 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).

3.2 COMMUNICATION

3.2.1 RS-422 / RS-485

The RS-422 and RS-485 interfaces are located in the unshielded CONN. 1. The RS-422 or RS-485 communication can be used for communication with the Access Control System, configuration settings and firmware update.

Only the RS-422 or the RS-485 interface can be active (not both), this is determined by SW1-2 (located near the USB port). If SW1-2 is switched OFF, the RS-485 interface is used. Otherwise the RS-422 interface is used. For the RS-422 / RS-485 to work, no USB should be connected and the "main comm. interface" must be set correctly (see chapter 6.4.1).

The maximum cable length for both interfaces is 65 meters / 213 feet. This distance can be increased<sup>1</sup> by adding termination resistors, using twisted cables and/or configuring a lower baud rate (see chapter 6.3.1).

The communication protocol used for the RS-422 and RS-485 can be found in the uPASS firmware guide. It isn't possible to use the communication protocol in a bus, only point-to-point communication is possible. The default communication settings are 115200 Baud, 8 data bits, 1 stop bit and no parity.

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



Figure 9: CONN. 1

Pin	Function RS-422 <sup>2</sup>	Function RS-485
1	TX-	-
2	TX+	-
3	RX-	B
4	RX+	A
5	Ground	Ground

Table 2: RS-422 and RS-485 connection

<sup>1</sup> RS-422 can reach 1500 meters / 4900 feet at 90000 Baud  
RS-485 can reach 1200 meters / 4000 feet at 8333 Baud

<sup>2</sup> TX (transmit) is the uPASS Target transmit line.  
RX (receive) is the uPASS Target receive line.

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.

The Wiegand and Magstripe can operate with a cable length of 150 meters / 490 feet.

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 6.4.3)

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 UHF XS format. Refer to the corresponding TRANSIT firmware guide for protocol details.



Figure 10: CONN. 2

Pin	Function Wiegand	Function Magstripe
1	-	-
2	Data 0	Clock
3	-	Card loaded
4	Data 1	Data
5	-	-
6	Ground	Ground
7	Ground	Ground
8	-	-

Table 3: Wiegand and Magstripe connection

#### 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). An example if the tool Lantronics Device Installer

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 RS-422 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 RS-422/RS-485)
- Click OK and Apply Settings

By default channel 1 is not connected. To connect channel 1, the "main comm. interface" (chapter 6.4.1) 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 11: 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 communication protocol for the USB can be found in the firmware guide. The default communication settings are 115200 Baud, 8 data bits, 1 stop bit and no parity.

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

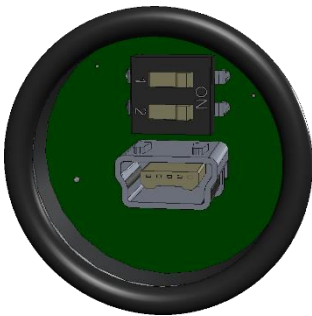


Figure 12: Mini USB interface (with SW1)

#### USB Driver installation

Make sure your computer is connected to the internet. The driver should install automatically via Windows update when the uPASS Target reader is connected to your PC via the USB cable. Follow the driver installation wizard. If you do not see the Windows update pop-up, you can manually install the driver. To manually install, you need to go to FTDI's website at [www.ftdichip.com/Drivers/VCP.htm](http://www.ftdichip.com/Drivers/VCP.htm) and download the VCP (Virtual Com Port) drivers for your operating system. Drivers for OS X and Linux are available as well.

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 13).

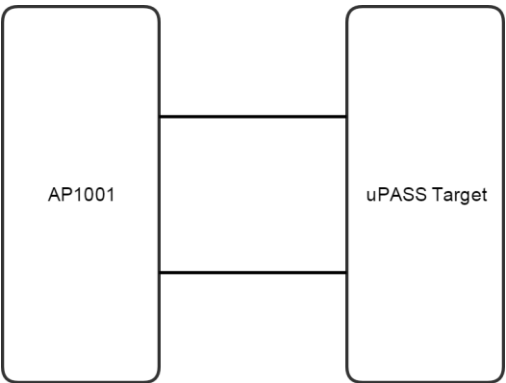


Figure 13: Replacement of 120 kHz antenna

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 14).

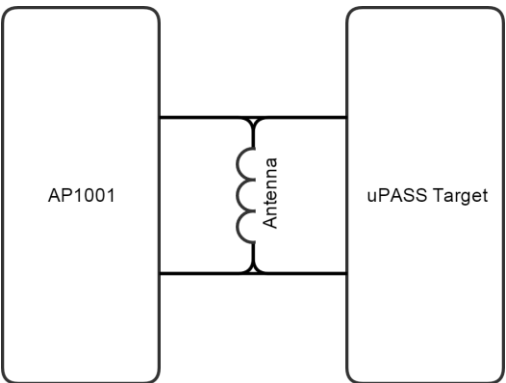


Figure 14: Addition to 120 kHz antenna

The Nedap antenna interface is located at CONN. 3.



Figure 15: 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

Two general purpose inputs are located in CONN. 2

By default the input and relay interfaces are connected to the UHF processor, but can be connected to the TRANSIT compatible processor, see chapter 4.

If connected to the UHF processor, 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).

The front LED need to be configured as Remote (see chapter 6.3.5) 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.

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 6.3.4). If the automatic mode is switched off, the relay is operated by input 1.

By default the inputs are at 5V level and are controlled by pulling them to ground. The input pins are short-circuit protected.

If connected to the TRANSIT compatible processor, the function of the inputs can be used for other purposes. See corresponding TRANSIT firmware guide.



Figure 16: CONN. 2

Pin	Function
1	Input 1 / UL
2	-
3	-
4	-
5	-
6	Ground
7	Ground
8	Input 2 / NA

Table 5: General input connection



Figure 17: 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 reader disable input is located in CONN. 2. 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.

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



Figure 18: 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. The external UHF antenna can be used in 3 possible configurations (see chapter 6.4.6):

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).

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 has a TRANSIT compatible processor. This processor is capable of running the TRANSIT software (e.g. P61, P81 and Q70). To select this mode the dipswitch SW1-1 (located near the USB port see chapter 3.2.4) must be switched ON.

If the TRANSIT compatible mode is selected, most inputs and outputs are switched to the TRANSIT processor. This means that configuration of the UHF processor (e.g. LED operation, frequency setting and TRANSIT switch settings) is not possible anymore via RS-485, RS-422, USB or TCP/IP Channel 1. Configuration via TCP/IP Channel 2 is still possible.

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 RS-422/RS-485)
- Click OK and Apply Settings

The only UHF tags that are read in TRANSIT compatible mode are Nedap UHF XS and Nedap UHF EM4102 tags.

### 4.1 TOOLING

The TRANSIT compatible mode requires the tooling used for the TRANSIT readers.

To update the TRANSIT compatible processor, the "PICload" tool can be used.

To test if a P81 firmware is working correctly "P81Test" can be used.

These tools can be downloaded from <https://portal.nedapidentification.com>.

### 4.2 SWITCH SETTINGS

The TRANSIT software is configured by hardware DIP switches (see corresponding firmware documentation of the TRANSIT). These DIP switches are not available on the uPASS Target and are therefore emulated. The uPASS reader has to be configured to the right settings. This can be done with the UHFTOOL, see chapter 6.3.3 (make sure the SW1-1 is OFF while configuring).

## 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 6.4.4). This is only possible if frequency hopping is not required. 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

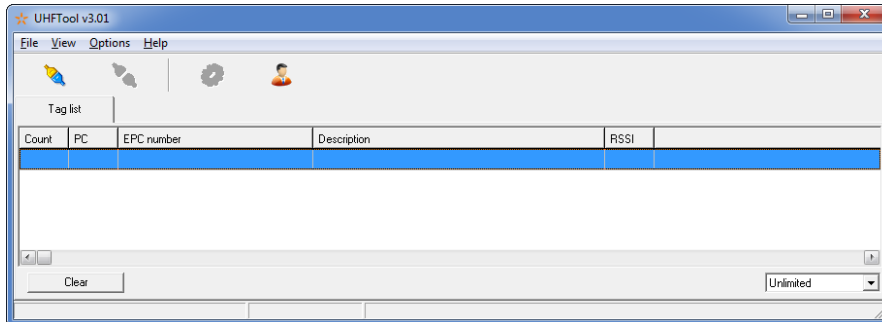


Figure 19: UHFTOOL software

### 6.2 CONNECTING

To connect to the uPASS reader click File -> Connect, press F2 or click on the connect button. This opens the connect panel where the connection settings can be configured. In this panel, the COM port can be selected or the IP address and port can be typed and the baud rate can be selected (default 115200). Click OK to connect.

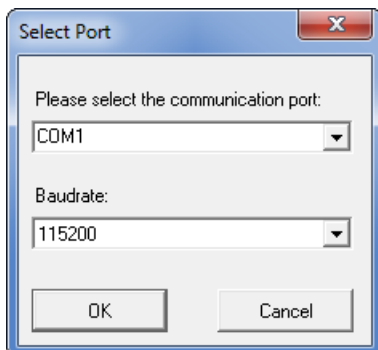


Figure 20: Connect panel

### 6.3 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.

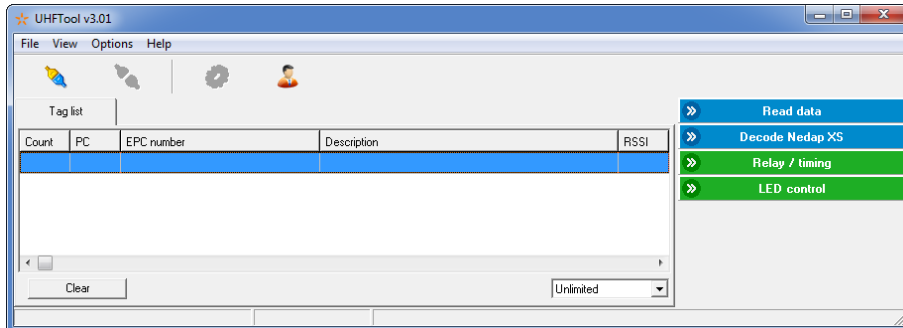
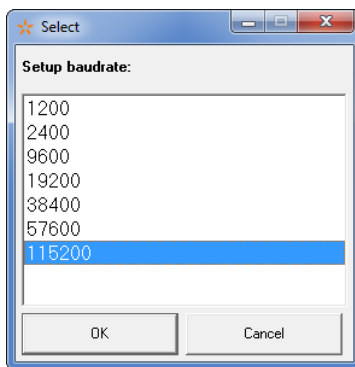


Figure 21: UHFTOOL sidebar

#### 6.3.1 CHANGE BAUD RATE

To change the baud rate the "Setup baudrate" window must be opened. This is done by clicking on "Option" -> "Setup baudrate". Select the new baud rate and click OK.



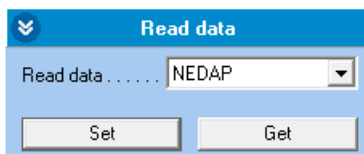
#### 6.3.2 READ DATA

Configure which tags should be selected, how to access these tags and what data should be read from these tags.

- 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.
- Custom enables to specify custom select criteria and the data to be read.

##### Example 1

Read only Nedap UHF tags:

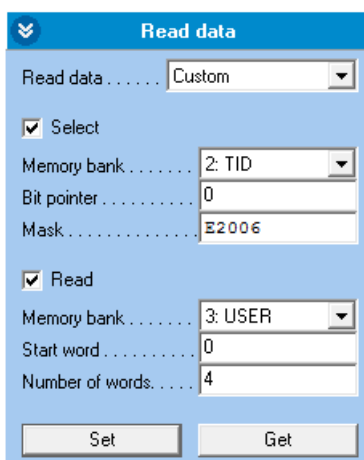


The screenshot shows a software window titled "Read data" with a blue header bar. Below the header, there is a label "Read data" followed by a dropdown menu currently showing "NEDAP". At the bottom of the window, there are two buttons: "Set" and "Get".

Figure 22: Read data example 1

##### Example 2

Read only NXP UCODE tags (TID starts with E2006) and read 4 words (1 word is 16 bits) from user memory.



The screenshot shows a software window titled "Read data" with a blue header bar. Below the header, there is a label "Read data" followed by a dropdown menu currently showing "Custom". Underneath, there are two sections: "Select" and "Read". The "Select" section has a checked checkbox, a "Memory bank" dropdown set to "2: TID", a "Bit pointer" text box set to "0", and a "Mask" text box set to "E2006". The "Read" section has a checked checkbox, a "Memory bank" dropdown set to "3: USER", a "Start word" text box set to "0", and a "Number of words" text box set to "4". At the bottom of the window, there are two buttons: "Set" and "Get".

Figure 23: Read data example 2

#### 6.3.3 DECODE NEDAP XS

Enable decode Nedap XS formatted tags.

**Decode Nedap XS**

☒ Enable decode Nedap XS

☐ Output tagnumber in decimal

☐ Output custcode

☐ Enable only valid custcode  
Custcode = CF010, GF010

☐ Allow other tag formats

☐ TRANSIT compatible mode

DIP-switches (Checked = ON)

8	7	6	5	4	3	2	1
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Set Get

Figure 24: 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. Select the DIP switch emulator settings with the checkboxes 1-7 (see TRANSIT firmware guide). The box "TRANSIT compatible mode" indicates if TRANSIT compatible mode is currently enabled, see chapter 4.



#### 6.3.4 RELAY / TIMING

Configure relay output and timing parameters.



Figure 25: Relay / timing settings

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

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 (see chapter 6.3.1).

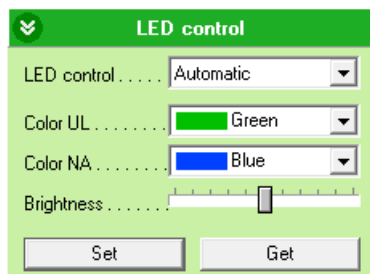
The (random) RF off time parameter can be used to enable multiple Nedap uPASS readers on the same frequency without then interfering with each other. By default this setting is on, it is recommended to keep this setting on.

#### 6.3.5 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.

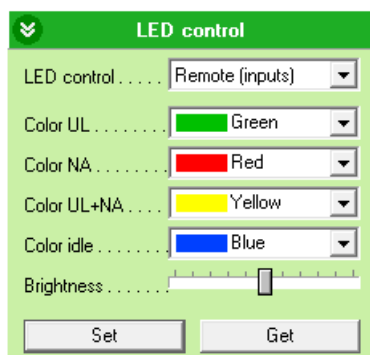


The screenshot shows the 'LED control' window with a green header. The 'LED control' dropdown is set to 'Automatic'. Below it, 'Color UL' is set to 'Green' (indicated by a green square) and 'Color NA' is set to 'Blue' (indicated by a blue square). A 'Brightness' slider is positioned at approximately 50%. At the bottom are 'Set' and 'Get' buttons.

Figure 26: LED automatic

##### Remote control:

The LED can be controlled remotely by a connected access control system. The UL and NA digital inputs (see chapter 3.3.1) determine the color of the LED.

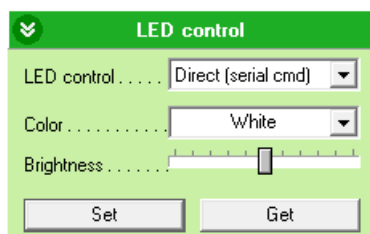


The screenshot shows the 'LED control' window with a green header. The 'LED control' dropdown is set to 'Remote (inputs)'. Below it, 'Color UL' is 'Green', 'Color NA' is 'Red', 'Color UL+NA' is 'Yellow', and 'Color idle' is 'Blue'. A 'Brightness' slider is at approximately 50%. 'Set' and 'Get' buttons are at the bottom.

Figure 27: 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).



The screenshot shows the 'LED control' window with a green header. The 'LED control' dropdown is set to 'Direct (serial cmd)'. Below it, the 'Color' dropdown is set to 'White'. A 'Brightness' slider is at approximately 50%. 'Set' and 'Get' buttons are at the bottom.

Figure 28: LED direct control

## 6.4 EXPERT SETTINGS

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

### 6.4.1 OUTPUT

Configure communication output settings.

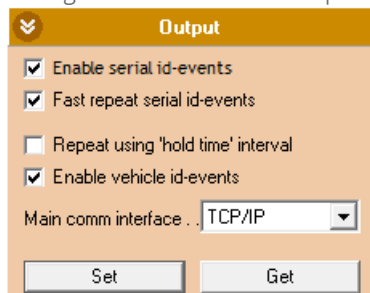


Figure 29: Output settings

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 6.3.4) 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 RS-422 (and RS-485) or TCP/IP. Wiegand en Magstripe will still work.

#### Note

If the 'Main comm interface' is changed, the UHFTOOL may lose connection.

#### Note

USB always overrules the 'main serial communication' setting.

6.4.2 OUTPUT MESSAGE FORMAT

Configure output message format.

**Note**  
When the output message format is changed, identified tags may no longer be shown in the UHFTOOL.




Figure 30: Output message format

The output message format is configurable:  
[<PREF>][<80 AC PH RSSI>][<EL>][<EPC>][<DL>][<DATA>][<SUFF>] C<sub>R</sub> L<sub>F</sub>

6.4.3 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.

6.4.4 FREQUENCY

These settings show the reader's operating frequency region.  
Select a frequency channel (within the available frequency band) for systems that do not require frequency hopping.

With 'Power on' the reader can be enabled or disabled.

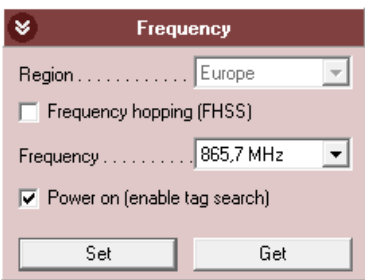


Figure 31: Frequency

#### 6.4.5 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).

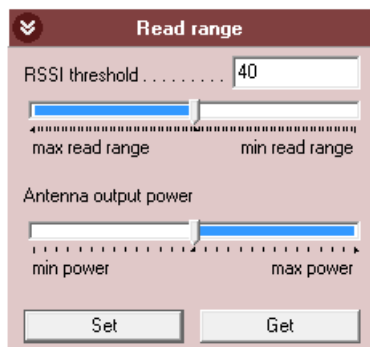


Figure 32: Read range

#### 6.4.6 ANTENNA

Antenna settings can be changed in the Antenna panel. With the "antenna select" setting the mode of antenna operation can be selected.

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 6.4.5).

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.

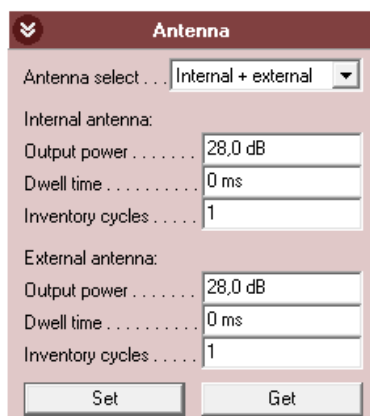


Figure 33: Antenna

## 7 FIRMWARE UPDATE

The firmware of the uPASS Target (UHF processor) can be updated with the "uPassTarget Updater". This tool is part of the UHF TOOL and can be downloaded from the portal <https://portal.nedapidentification.com>. It is designed for Microsoft Windows and requires Java 7 (or higher) to run. This can be downloaded from <http://www.java.com/download/>. The latest firmware version can be downloaded from the portal <https://portal.nedapidentification.com/>.

For updating the TRANSIT compatible processor see chapter 4.1.

After installation a Start Menu entry will be created to start the uPassTarget Updater.

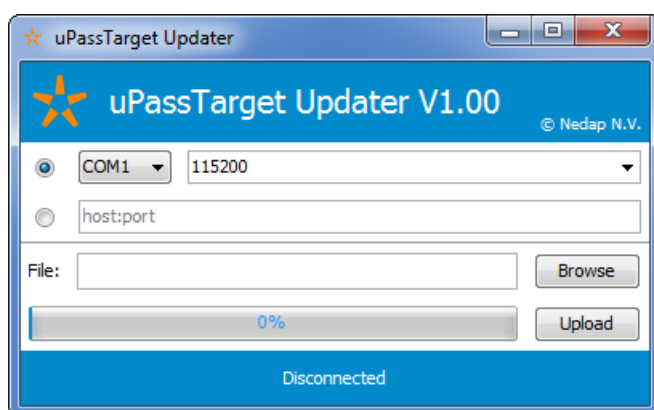


Figure 34: uPassTarget Updater

### Connecting

To connect to a uPass Target, select a COM port and baud rate (default 115200) from the dropdown box or type an IP address and port (default 10002).

For a successful connection via RS-422 / RS-485 a baud rate of 9600 must be supported. This means the PC (running the updater) and the transport medium (cables and converters) must at least support a baud rate of 9600. The updater automatically tries a faster baud rate (115200) for a faster upload. If this fails it will fall back on 9600 baud.

Although the RS-485 can be used in a bus. It is not possible to update uPASS Target reader when connected in a bus. For updating a point-to-point connection is needed.

### Uploading

Uploading can be done by selecting the firmware via the Browse dialog or typing the location directly. If the selected file is found and is correct, the Upload button becomes available. Clicking on this button starts the update process. During the update the progress bar indicates the current progress. If the progress bar reaches 100% the firmware update is done and the reader will start the new firmware.

## 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	
	Europe	865.7 - 867.5 MHz	FHSS	4ch	2W ERP			
	Americas	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	917.7 - 920.1 MHz	FHSS	5ch	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	920.7 - 924.3 MHz	DRM	7ch	2W ERP			
	Philippines	918.5 - 919.5 MHz	DRM	3ch	0.5W ERP			
	Russian	866.3 - 867.6 MHz	DRM	3ch	2W ERP			

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### Technical Specifications

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 RSS210	
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 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

### Mounting

	Wall Mounting Bracket	9984364
	Pole Mounting Set	5626595
	Weather Protection Hood	5762804

### C 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 RSS210 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 CNR210 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 15.106(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 equipment is intended to be powered from a limited power supply that is listed as ALVY (UL294) or APHV (UL603).

UL294 Classifications:	Destructive Attack: Level 1
	Line Security: Level 1
	Endurance: Level 4
	Standby Power: Level 1

## D    **DISCLAIMER**

This information is furnished for guidance, and with no guarantee as to its accuracy or completeness; its publication conveys no license under any patent or other right, nor does the publisher assume liability for any consequence of its use; specifications and availability of goods mentioned in it are subject to change without notice; it is not to be reproduced in any way, in whole or in part, without the written consent of the publisher.

## E DOCUMENT REVISION

Version	Date	Comment
1.03	2016-02-18	<ul style="list-style-type: none"><li>• Added inch measurements to dimensions drawings</li><li>• Added image of the Ethernet connector</li><li>• Corrected text that mini USB and TNC aren't supplied</li><li>• Added external antenna setting reference to tooling chapter.</li><li>• Used correct name for the TRANSIT compatible processor update tool</li></ul>
1.02	2016-01-20	<ul style="list-style-type: none"><li>• Added Russian frequencies</li><li>• Added FCC/IC numbers</li><li>• Added Antenna part numbers</li><li>• Added Antenna images (part numbers)</li><li>• Added mounting images (part numbers)</li><li>• Added information when to place the weather protection hood</li><li>• Removed the resistor that was placed instead of the 120KHz antenna in the Nedap antenna interface.</li></ul>
1.01	2015-12-08	<ul style="list-style-type: none"><li>• Initial version</li></ul>