TRANSIT ULTIMATE

installation guide

CONTENT

1. INTRODUCTION

1.1 PRODUCT DESCRIPTION

The TRANSIT Ultimate is a long-range reader, based on semi active RFID technology, which enables automatic vehicle identification at distances of up to 10 meters (33 ft) and speeds of up to 200 km/h (125 mph).

Key features
- Robust industrial design
- Read range up to 10 meters [33 ft]
- Object speed up to 200 km/h [125 mph]
- Adjustable read range
- Selectable frequency channels
- Variety of integrated communication interfaces
- 3 color LED indication
- Tag authentication based on AES encryption
- Bi-directional tag communication
- Backwards-compatible with previous TRANSIT readers.

Frequency channels

The TRANSIT Ultimate operates on a factory-set frequency channel. Different frequency channels allow multiple readers to operate in close vicinity of each other without interference.

Read range adjustment

The reader efficiently resolves typical multi-lane, entry and exit reader challenges. The read range of the TRANSIT Ultimate can be adjusted to offer secure and reliable identification in demanding applications.

Housing & mounting

The weatherproof TRANSIT Ultimate reader features an IP66 certified housing. The reader operates reliable under harsh environmental conditions and is able to withstand exposure to rain, snow and ice. Wall mounting equipment is included.

Interfaces & protocols

The TRANSIT Ultimate is designed for seamless and flexible integration into existing management systems in the industry, such as security, parking, traffic and logistics. Several communication interfaces to the host system are available such as RS232, RS422, RS485, Profibus-DP and TCP/IP. Also open industry-standards protocols such as Wiegand, Magstripe and Barcode are supported. Customer specific protocols can be implemented on request.

1.2   ULTIMATE FEATURES

Encrypted tag authentication

The TRANSIT Ultimate enables encrypted tag authentication for the Ultimate tags: Smartcard Booster Ultimate, LEGIC Booster Ultimate and Window Tag Ultimate. The authentication uses encryption based upon AES 128-bit keys. Key diversification is used to ensure that a unique encryption key is used for every tag.

Data storage

Thanks to the bi-directional tag communication feature and in combination with Smartcard-Booster Ultimate it will be possible to write information on the drivers' access control card when the car enters or leaves a perimeter. This will enable write actions like changing credits, offline access rights or other information changes dynamically upon perimeter access.

Implementation

The Ultimate-mode features are implemented in the TAB board. The TAB-board performs the authentication or other Ultimate function using the bi-directional tag communication channel at 433MHz.
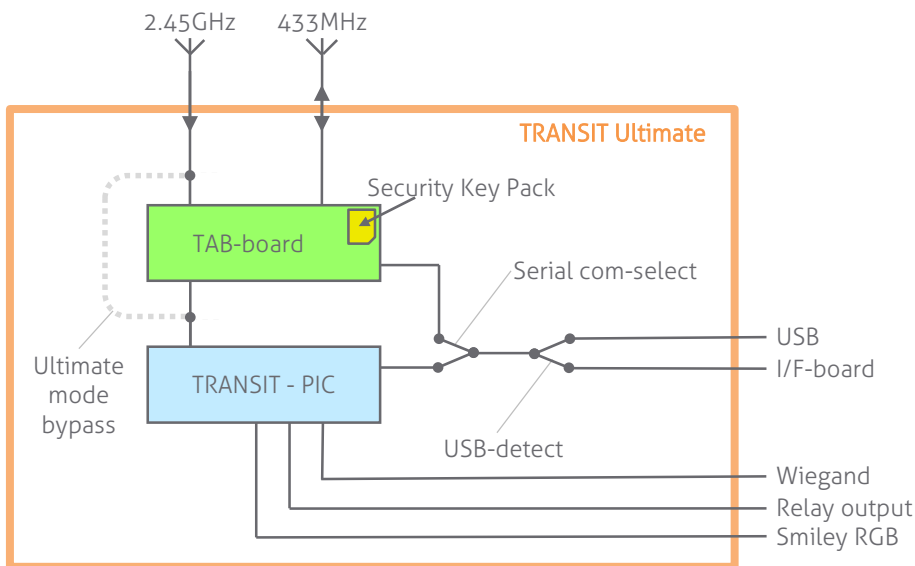

Figure 1: TRANSIT Ultimate block diagram

Authentication procedure

The encrypted tag authentication is performed when both antennas (433MHz and 2.45GHz) receive the same id-number. This ensures that the tag to be authenticated is located in the well-defined directional beam in front of the reader.

1. Receive Ultimate tag id-number.
2. Send encrypted challenge to the tag.
    The challenge is generated by the Security Key Pack based upon random numbers encrypted with a diversified AES128 key.
3. Receive, decrypt and verify the encrypted challenge response from the tag.
4. When the authentication is successful, the id-number is transmitted on the communication output(s). Wiegand, USB, etc.

Note
The TAB board may be bypassed to make the TRANSIT Ultimate fully compatible with the TRANSIT Standard. See chapter 4.3.
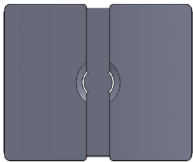
2. INSTALLATION

2.1 SAFETY PRECAUTIONS

The following safety precautions should be observed during normal use, service and repair:

- The TRANSIT Ultimate shall be connected to safety ground.
- Disconnecting from (mains) power supply before removing any parts.
- The TRANSIT Ultimate shall only be installed and serviced by qualified service personnel.
- To be sure of safety, do not modify or add anything other than mentioned in this manual or indicated by NEDAP N.V.

2.2 INSTALLATION GUIDELINES

The TRANSIT Ultimate can be installed in any position. The normally expected read range is up to 10 meters.

Usually the reader is mounted in the horizontal position. In this case the coverage area in the horizontal plane is maximized. The horizontal beam is 80 degrees.

Horizontal mounting: 80 degrees wide read coverage.

In some applications a vertical installation is required to make use of the smaller beam width in the vertical plane. The vertical beam is 40 degrees. This can be very useful in applications with multiple driving lanes to prevent cross readings.
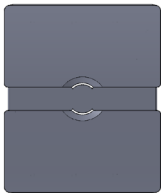
Vertical mounting: 40 degrees narrow read coverage.

The Wall Mounting Set, which make rotation in the vertical and horizontal plane possible, is standard included with every TRANSIT Ultimate.

2.3 MOUNTING INSTRUCTIONS

See the following chapters for details about the dimensions of the reader and the mounting brackets and the locations of the mounting positions.

2.3.1 TRANSIT ULTIMATE DIMENSIONS

The picture below shows the dimensions of the TRANSIT Ultimate.

All dimensions are in mm.
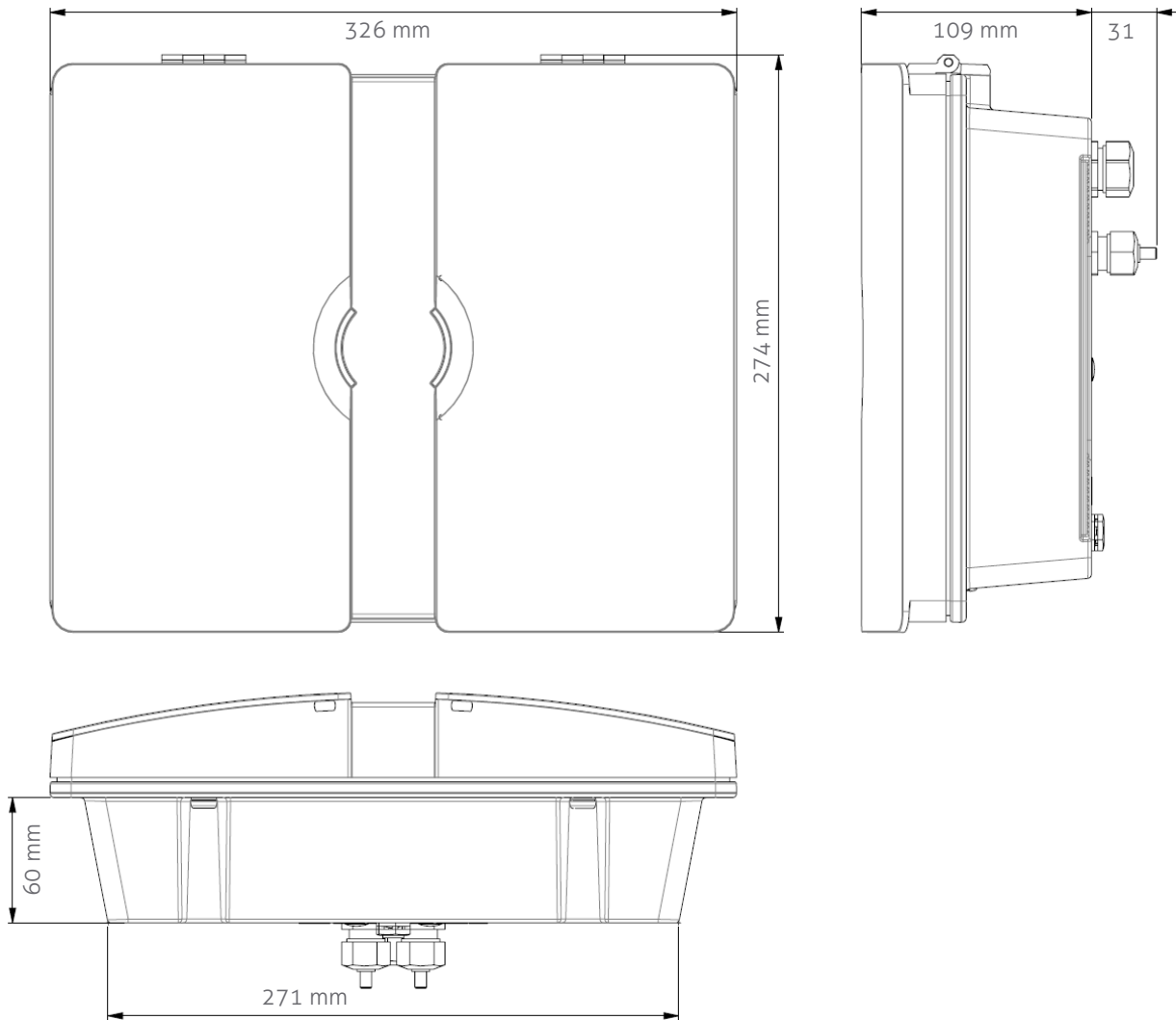
Figure 2: Dimensions TRANSIT Ultimate

2.3.2 WALL MOUNTING

The picture below shows the dimensions of the Wall Mounting Set.
The Wall Mounting Set is included within the delivery of the TRANSIT Ultimate.

Figure 3: Dimensions Wall Mounting Set

2.3.3 POLE MOUNTING

The Pole Mounting Kit has to be ordered separately (art. no. 5626595).
The TRANSIT Ultimate can be mounted to round poles with maximum diameter of
190 mm and square poles with maximum diameter of 150 mm using the Pole
Mounting Kit.

Note that the Wall Mounting Set will be mounted onto the Pole Mounting Kit.

Figure 4: Dimensions Pole Mounting Kit

2.4   INSTALLING THE SECURITY KEY PACK

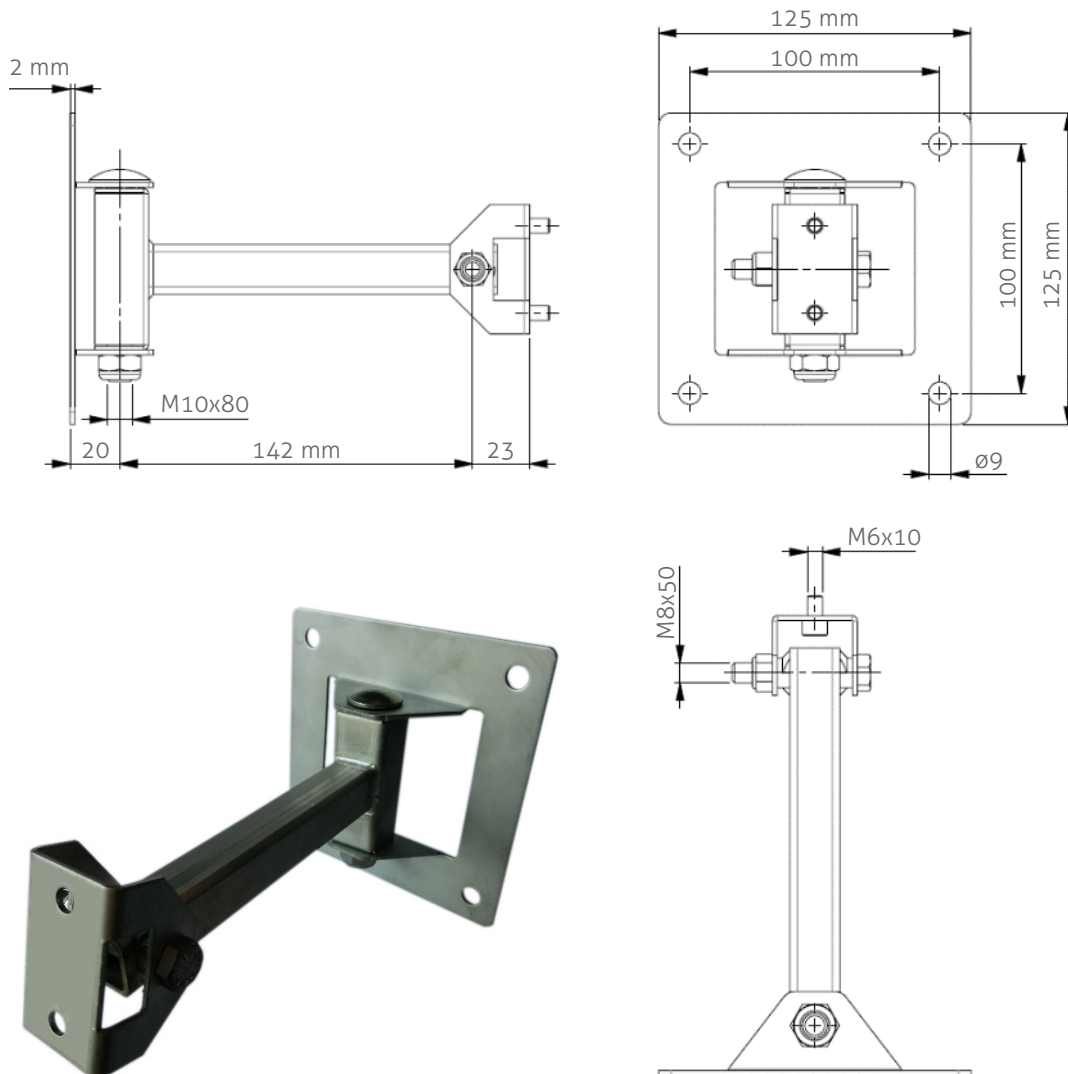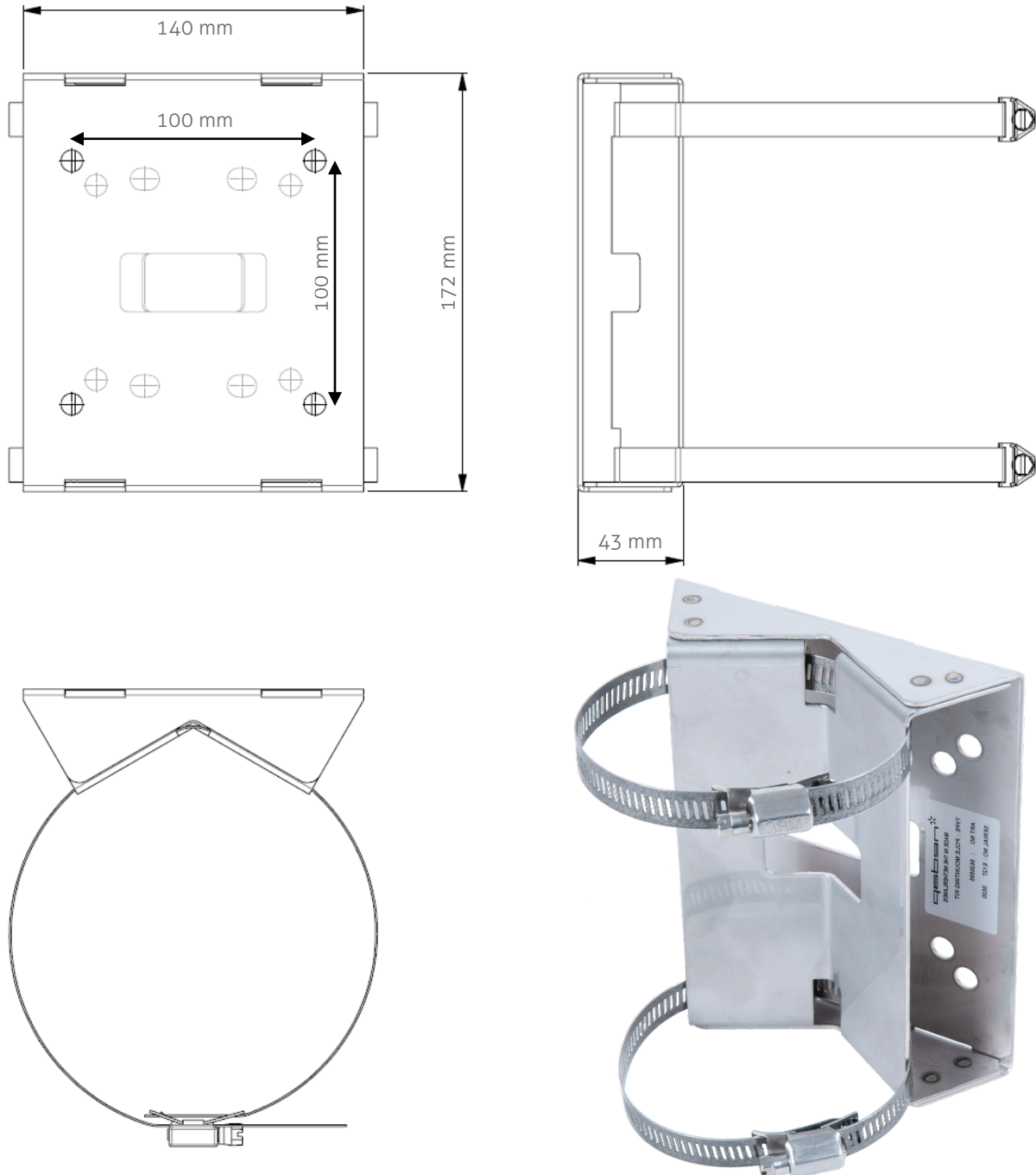The optional Security Key Pack (SAM) has to be ordered separately (art. no. 9216537) and is required for the TRANSIT Ultimate to perform the encrypted authentication on the Ultimate tags. Please follow the procedure below to install the Security Key Pack into the TRANSIT Ultimate.

Security Key Pack installation procedure

Insert the Security Key Pack (SAM) into the TAB board.

1. Align the notch as indicated in Figure 5 and keep the metal contacts backwards.
2. Push the SAM into the slot until it clicks into place.
3. Set the LOCK-switch to the right to lock the SAM.
4. Enable the Ultimate-mode by settings dip-switch SW2-2 ON. See chapter 4.3.

Removal procedure

1. Set the LOCK-switch to the left to release the SAM.
2. Push the SAM to eject it.
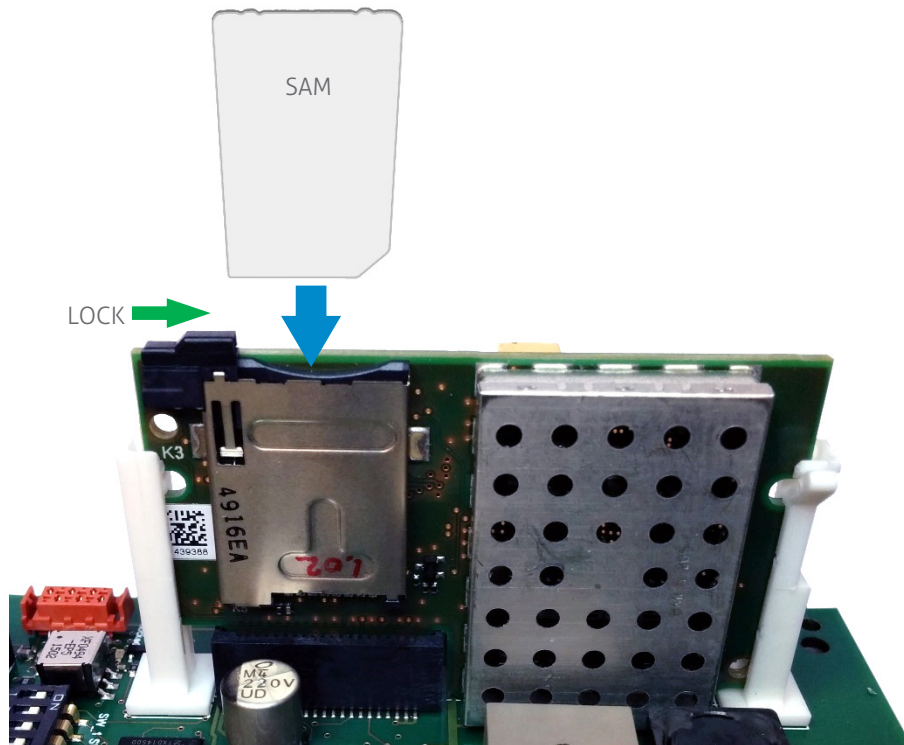3. Disable the Ultimate-mode by setting dip-switch SW2-2 OFF. See chapter 4.3.

Figure 5: Installing the Security Key Pack (SAM)

2.5 INSTALLING A COMMUNICATION BOARD

The TRANSIT Ultimate features an on-board USB port and a Wiegand / Magstripe / Barcode interface. See chapter 3.3 for more details.

Other communication interfaces can modularly be installed in the reader by means of a communication interface board. There are various communication interface boards available for the TRANSIT Ultimate. See appendix C for available boards and their part numbers.

Make sure to follow all safety precautions outlined in chapter 2.1 when installing or replacing a communication board.

Communication board installation procedure:

1. Open the TRANSIT Ultimate. You can put the cover strut into place to keep the cover open.
2. Disconnect the power supply.
3. Place the communication interface board on the 14-pin header K5 as indicated in the picture below.
4. Make sure that the 4 plastic PCB supports are properly positioned and fixed into the communication board.
5. Read the communication board's installation guide for additional notes like address setting, jumper settings and wiring details.
6. Test if the communication works correctly.
7. Close the cover of the TRANSIT Ultimate.

3. CONNECTIONS

3.1 OVERVIEW

Power supply
See chapter 3.2

Read-disable input
See chapter 3.4.2

General purpose inputs
See chapter 3.4.4

Proximity antenna
See chapter 3.5.1

Communication
See chapter 3.3

Relay output
See chapter 3.4.1

Tamper switch
See chapter 3.4.3

Antenna modulation
See chapter 3.5.2
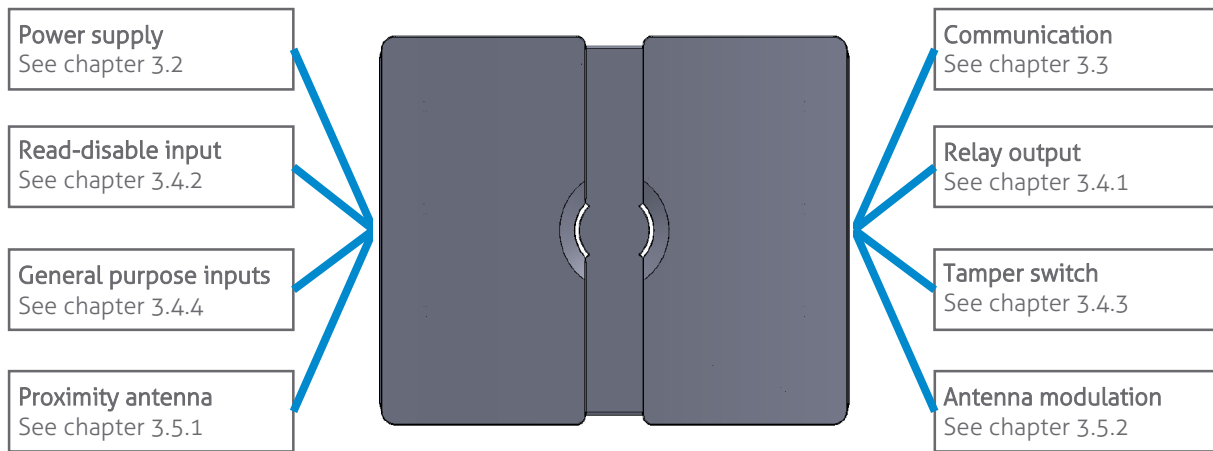
Figure 6: TRANSIT Ultimate connections overview

3.2   POWER SUPPLY

The TRANSIT Ultimate can be powered by AC mains or by a 24 VDC power supply.

3.2.1   AC MAINS

Connect the Mains load and neutral wires to the connector terminals VAC-L and VAC-N. The earth wire should be connected to the dedicated safety ground connection.

Input voltage: 100 – 240 VAC
Frequency: 60 – 50 Hz.
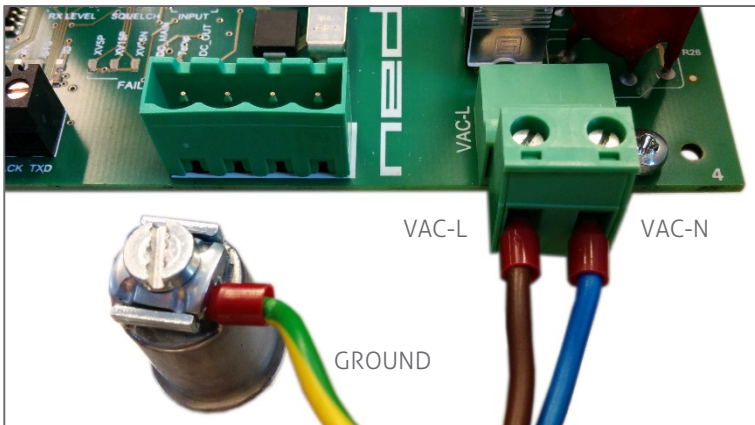
Figure 7: AC mains connections

3.2.2   DC SUPPLY INPUT

Connect the DC power supply to the connector terminals as indicated below.
Remove the connector for easy fixing the wires.
Input voltage: 24 VDC ± 10%
Max. input current: 700 mA @ 24 VDC

Figure 8: DC input connections

3.2.3   DC OUTPUT

The DC output can be used to supply power to an additional device installed inside or near the TRANSIT Ultimate.

Figure 9: DC output connections

DC output ratings

Output voltage: 23.4 VDC ± 10%
Max. output current: 100 mA.

3.3   COMMUNICATION

3.3.1   USB

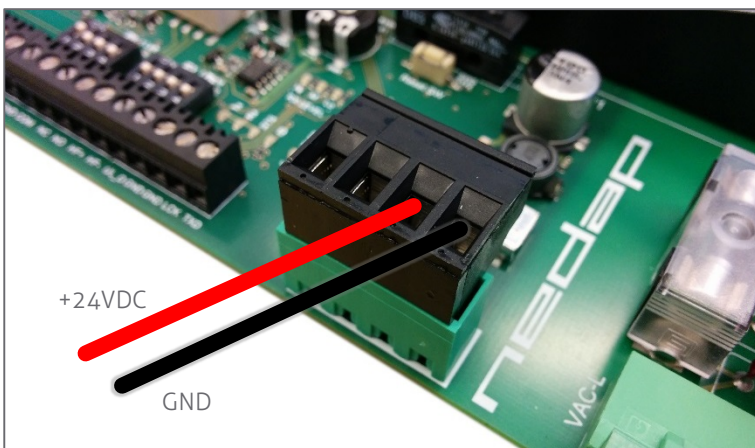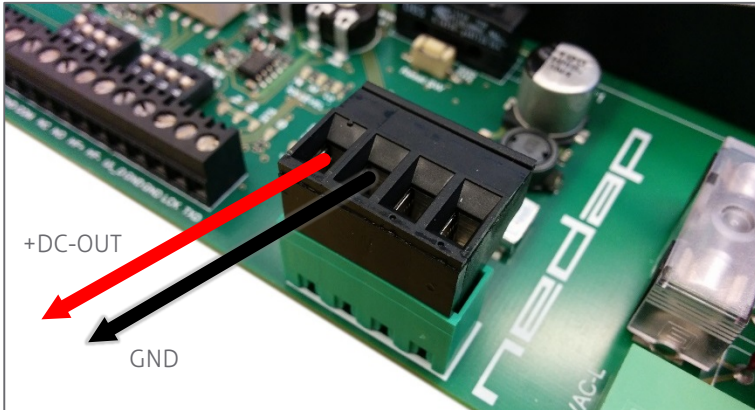The TRANSIT Ultimate features an USB interface for service and installation purposes. The USB connector (Type B) is accessible behind the cover. While the USB interface is in use, the optional communication interface board is disabled.

Figure 10: USB connection

USB Virtual Com Port driver installation

Make sure your computer is connected to the internet. The driver usually is installed automatically via Windows update when the USB interface is connected to your PC. 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 and download the VCP (Virtual Com Port) drivers for your operating system. Drivers for MacOS and Linux are available as well.

3.3.2   WIEGAND / MAGSTRIPE / BARCODE

The synchronous communication interface wiring uses the connections described below. The actual protocol output depends upon the reader firmware. Please refer to the firmware manual for more details.

Connections	Wiegand	Magstripe	Barcode
O−1	-	Card Loaded	-
O−2	Data-0 (green)	Clock	-
O−3	Data-1 (white)	Data	Data
GND	Ground (black)	Ground	Ground

The picture below illustrates the Wiegand wiring.
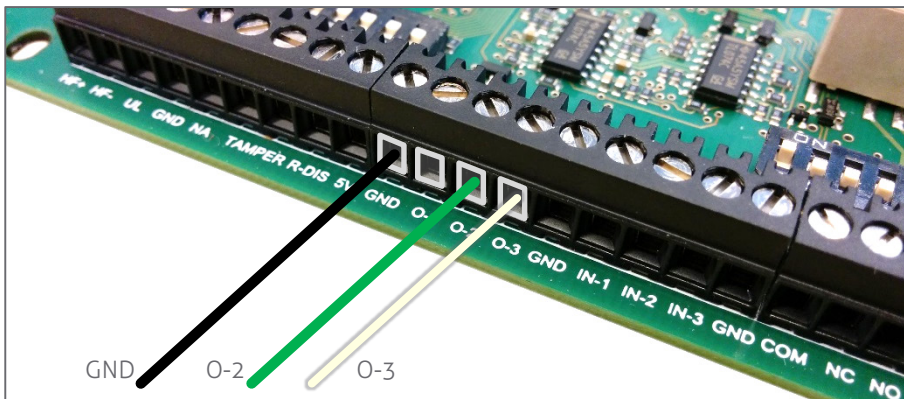

Figure 11: Wiegand wiring

Cable specification:

4 x 0.25mm² shielded

Maximum cable length: 150 meter.

3.4   DIGITAL I/O

3.4.1   RELAY OUTPUT

The relay output is automatically activated upon successful identification / authentication of a transponder. The automatic-relay-activation-mode can be configured using the firmware. Please refer to the firmware manual for more details. Authentication is only performed when Ultimate-mode is enabled. See chapter 4.3 for more details.

( )   The front cover LED lights-up simultaneously with the relay output.

Connections:

NO	Relay contact normally open
NC	Relay contact normally closed
COM	Relay contact common
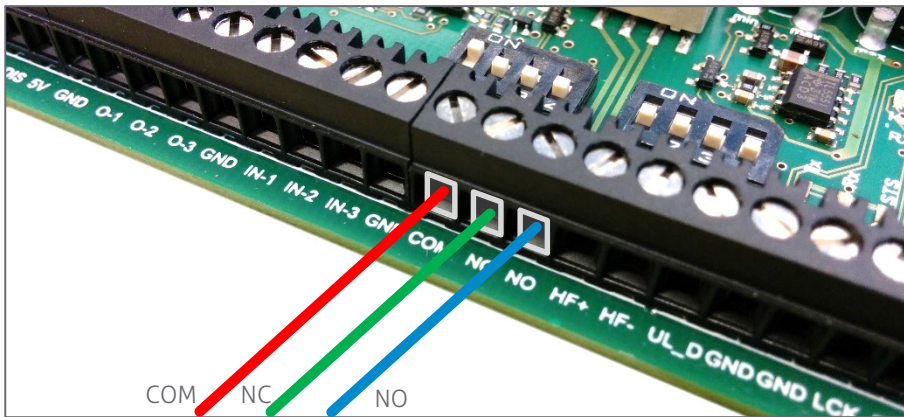
Figure 12: Relay output connections

Contact ratings:

Max. switching current:	2A
Max. switching voltage:	24VDC
Max. switching power:	50W

3.4.2   READ DISABLE INPUT

The reading of the TRANSIT Ultimate can be completely disabled with the read disable input (RDIS). This input is commonly used in combination with a sensor (e.g. inductive loop) that detects the presence of a person or vehicle. Use always a relay contact to connect the internal 5V to the RDIS input. When the RDIS input is unused, reading is enabled.

Connections:

R-DIS   Read disable input
5V   Internal 5V source for read disable input.

Warning: using an external 5V supply could damage the reader.
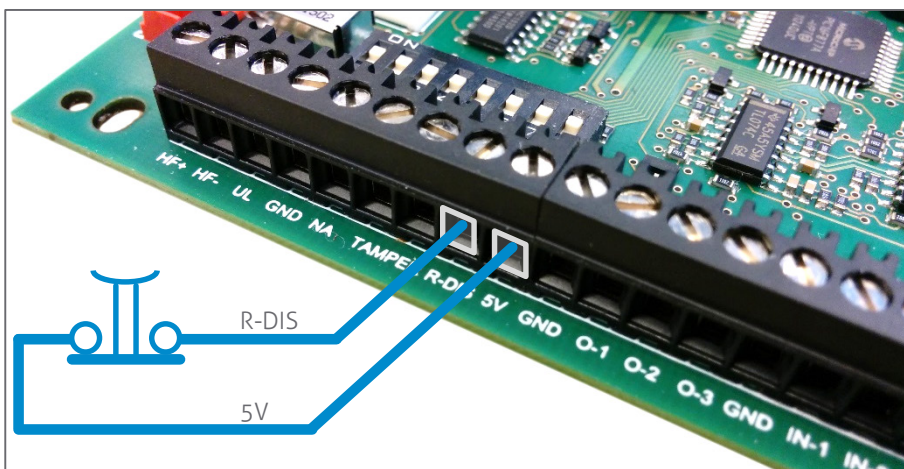
Figure 13: Read disable input

3.4.3   TAMPER SWITCH

The TRANSIT Ultimate features an internal tamper switch that indicates when the cover is opened. This contact may be connected to an external alarm system. The contacts are normally closed when the cover is in place.
Tamper switches of multiple TRANSIT Ultimate readers may be connected in series.

Connections:

TAMPER   Tamper switch contacts (normally closed)
TAMPER   "

Contact ratings:

Max. switching current: 50 mA (0.5V voltage drop)
Max. switching voltage: 24 VDC

Figure 14: Tamper switch

3.4.4   GENERAL PURPOSE INPUTS

Three general purpose inputs are available on the TRANSIT Ultimate. The inputs are active low. No external voltage should be applied to the inputs. Connect to ground to activate or otherwise leave unconnected.

Connections:

IN-1   General purpose input 1
IN-2   General purpose input 2
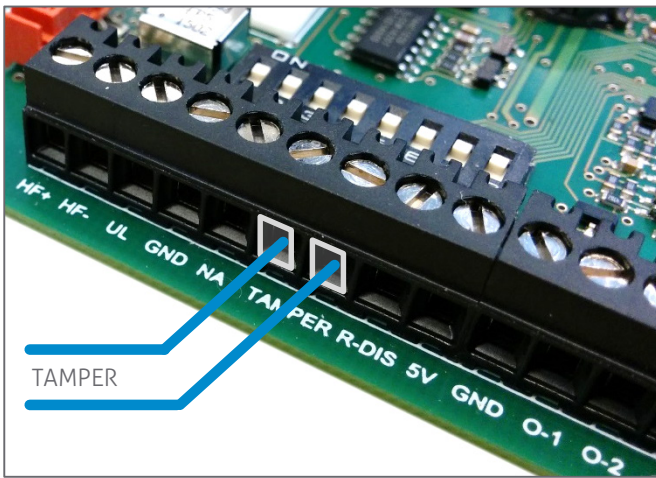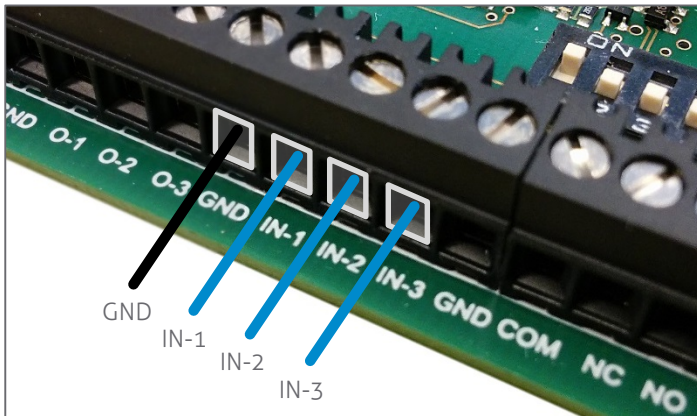IN-3   General purpose input 3
GND   Ground

Figure 15: GPIO inputs

3.5   SPECIAL CONNECTIONS

3.5.1   PROXIMITY ANTENNA

Optionally a NEDAP proximity antenna can be connected to the TRANSIT Ultimate to enable simultaneously long-range and proximity identification. This is useful when controlling a gate where vehicles as well as pedestrians, cyclists and/or motorists can enter.

The antenna can be either a NEDAP low-frequency proximity antenna or a NEDAP reader with RF output, such as a uPASS Access, ConveXS or another TRANSIT reader.

The green-, and red-LED output connections UL and NA are suitable to directly drive external LEDs with max. 18mA. Note that this is not compatible with the active-low reader inputs on the uPASS Access or ConveXS.

Connections:

HF+	Antenna+
HF−	Antenna− (cable shield)
UL	Green LED output (max. 18mA)
GND	Ground for LEDs
NA	Red LED output (max. 18 mA)

Cable specification:
4 x 0.25mm² shielded
Maximum cable length: 15 meter
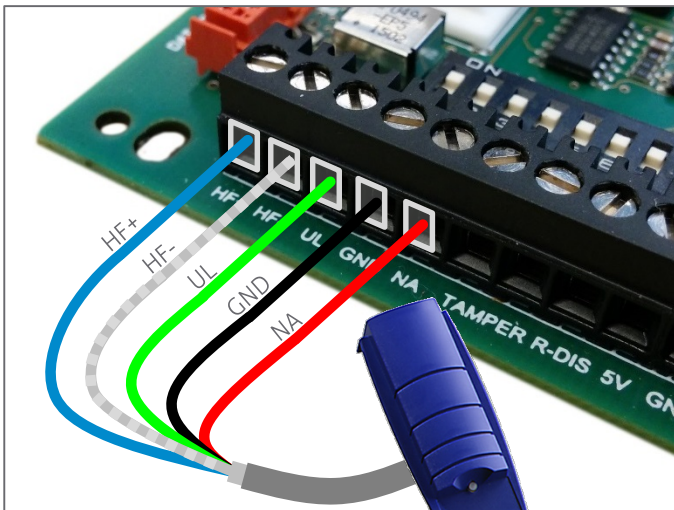
Figure 16: Proximity antenna connections

Note that using the proximity antenna no authentication or other Ultimate functions are performed.

3.5.2   NEDAP ANTENNA MODULATION

The Nedap antenna modulation interface is used to connect the TRANSIT Ultimate to
NEDAP AEOS access control hardware such as the AP1001. Instead of a proximity
antenna the TRANSIT Ultimate can be connected.

Connections:

HF+   Antenna modulation output, connect to ANT
HF−   Antenna modulation ground (cable shield), connect to ANT GND.

Cable specification:

Coax RG58U
Maximum cable length: 100 meter

Figure 17: Antenna modulation connections

4. CONFIGURATION

4.1 FIRMWARE OPTIONS

The TRANSIT Ultimate supports the same firmware versions as the TRANSIT Standard. Different firmware versions are available to support different features and communication protocols. For each firmware version a separate installation guide is available.

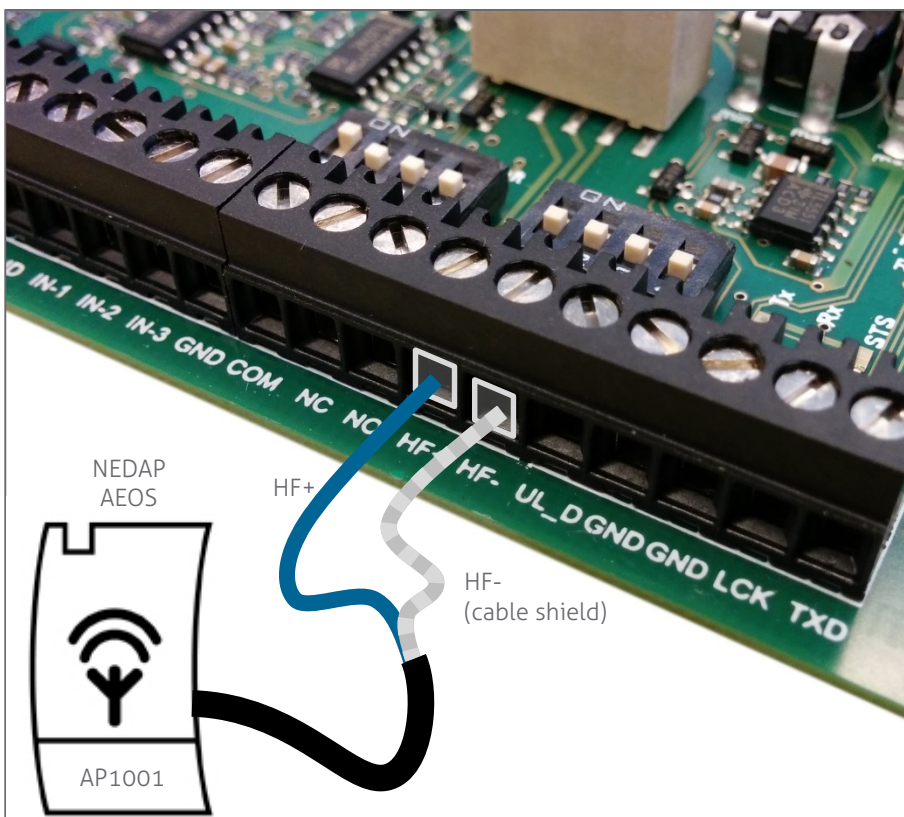Switches SW1-1 to SW1-8 are used to select various options within the actual loaded firmware. They can be used for example to select the serial baud rate, wiegand output options, etc. Refer to the specific firmware manual for details.

The firmware can be changed or updated using the TRANSIT Firmware Upgrade software tool. Make sure that the serial communication select switch is set to TRANSIT (PIC). See chapter 4.2.

Note
If the message "Searching for bootloader …" does not disappear, then press the reset-switch.
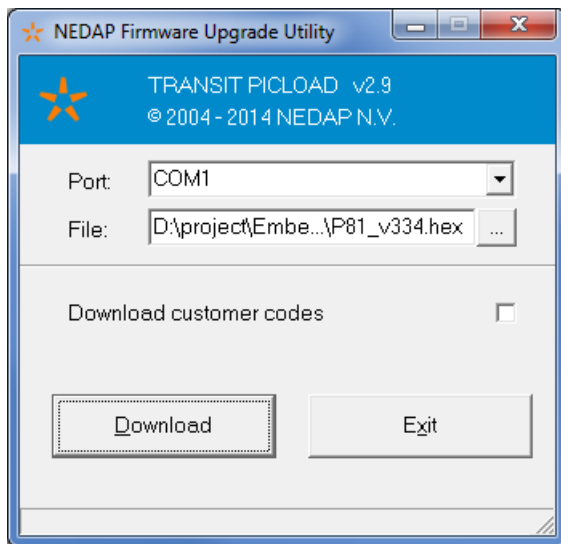
Figure 18: TRANSIT Firmware Upgrade Utility

4.2 SERIAL COMMUNICATION SELECT

By default the USB or communication interface board connections will allow communication with the TRANSIT processor (PIC). The communication protocol is determined by the TRANSIT firmware. See also chapter 4.1 above.

The USB or communication interface board connections can also be used to communicate with the processor located on the TAB board. This is for test purposes and will not further be explained in this manual.

TRANSIT communication (PIC)   Test communication (TAB)

While the USB cable is connected, the communication interface board is disabled.

4.3 ULTIMATE-MODE

The TRANSIT Ultimate can operate in the ULTIMATE-mode or in the NORMAL-mode.

In the NORMAL-mode the TAB board is bypassed. The reader is compatible with the TRANSIT Standard. In this mode the TRANSIT Ultimate can read original tags, such as Compact-Tag, Window-Button, Heavy-Duty-Tag and Boosters. Also the Ultimate-tags will work, but no authentication or other Ultimate functions are performed.

The ULTIMATE-mode only works in combination with Ultimate-tags.
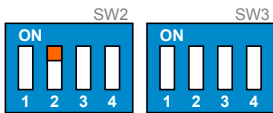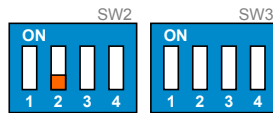
ULTIMATE-mode   NORMAL-mode (TAB bypass)

4.4 RANGE BEEPER

Enable or disable the internal range beeper. The beeper indicates transponder identification. The signal strength of the identified transponder determines the beeping frequency. When the transponder is near to the reader the range beeper will beep fast.
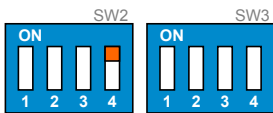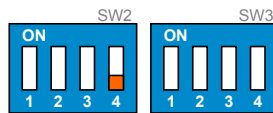
Range beeper ON   Range beeper OFF

4.5   FREQUENCY SELECTION

The TRANSIT Ultimate reader operates in the 2.45GHz ISM frequency band.

When two or more readers are within a range of 15 meters (50 feet), these readers should be set on a different operating frequency.

It may also be required to select a different frequency to avoid disturbance between the TRANSIT Ultimate and other 2.45GHz equipment, such as Wi-Fi access points. Please also read chapter **Error! Reference source not found.** when experiencing interference.

Select a frequency channel using the dip-switches located on the transceiver board in the front cover of the reader. Refer to appendix B.

Note that the TAB board uses 2 channels in the 433 MHz band, which cannot be changed.

4.6   READ RANGE CONTROL

The read range of the TRANSIT Ultimate can be controlled with the embedded squelch function. The squelch references the received signal strength against the squelch level setting. When the received signal strength is below the squelch level no identification is possible. The received signal strength becomes higher when the transponder comes closer to the reader. When the received signal strength exceeds the squelch level the transponder will be identified.
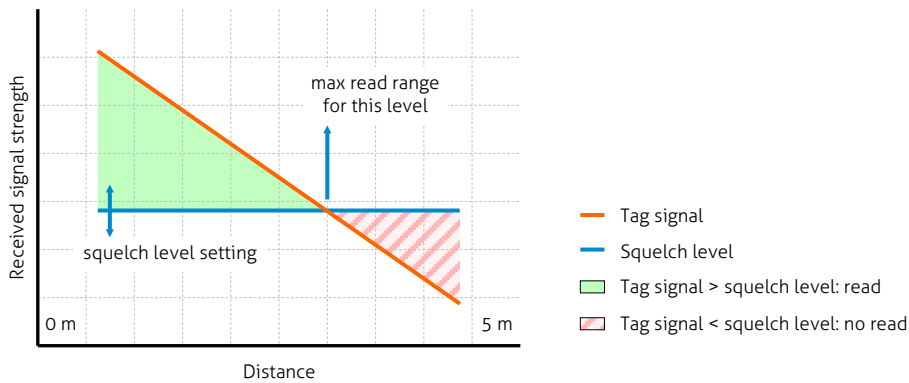
Figure 19: Squelch principle

Adjustment of the read range is done by enabling the squelch and setting the squelch level with its potentiometer. To achieve the maximum read range, disable the squelch function completely with the enable/disable squelch switch.
Two LEDs indicate the status of the squelch. When the squelch is enabled LED SQ-ENA will be on. LED SQ-ACT is on when the transponder signal is below the squelch level (red area in Figure 19). In chapter 5 all LED indicators are described.

Squelch enabled

Squelch disabled (max. read range)

↻   SQ-Level potentiometer completely clockwise:
    Maximum read range.

↺   SQ-Level potentiometer completely counter-clockwise:
    Minimum read range.

Figure 20: Squelch controls

5. LED INDICATIONS

5.1 MAIN BOARD INDICATIONS

A number of LEDs on the main board of the TRANSIT Ultimate indicate the status of the reader. The list below describes the function of each LED.

Figure 21: LED indications main board

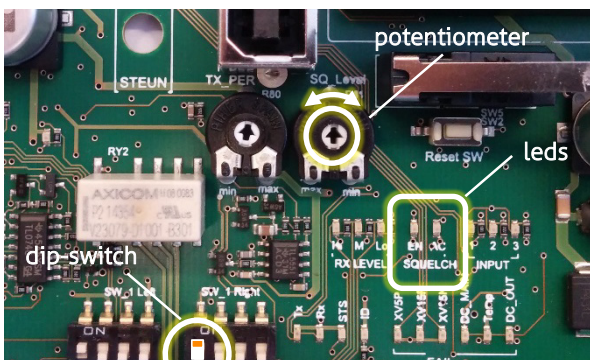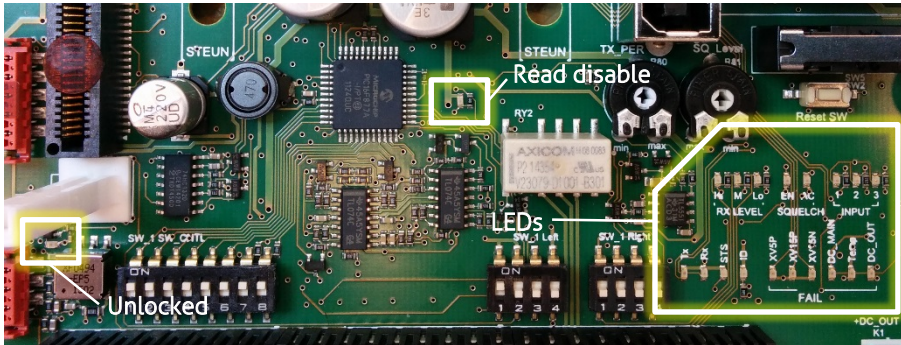| Led	Description
●●● RX_LEVEL	LED bar indicating the received microwave tag signal strength. This LED bar may also indicate the presence of radio interference. In case of interference, try switching to a different frequency. See chapter 4.5.
● SQ-EN	Squelch enabled. See chapter 4.6.
● SQ-ACT	Squelch active. See chapter 4.6.
● INPUT-1	Input 1 status. On when contact is closed. See chapter 3.4.4.
● INPUT-2	Input 2 status. On when contact is closed.
● INPUT-3	Input 3 status. On when contact is closed.
● Tx	Transmit serial data (USB, I/F-board). See chapter 4.2.
● Rx	Receive serial data (USB, I/F-board).
● STS-LED	TRANSIT firmware status LED (PIC)
	Slow blinking: Heartbeat (0.8s on / 0.8s off)
	Fast blinking: Boot loader active. Indicated after restart.
	Twice blinking: Configuration menu active.
	Off: Abnormal situation.
● ID-LED	TRANSIT identification. Blinks fast upon valid tag.
	When no identification check dip-switches and customer-code.
● FAIL-XV5P	Power supply failure +5V.
● FAIL-XV15P	Power supply failure +15V.
● FAIL-XV15N	Power supply failure -15V.
● FAIL-DC_MAIN	Power supply failure DC-MAIN.
● FAIL-Temp	Temperature critically high.
● FAIL-DC_OUT	DC OUTPUT overload. See chapter 3.2.3.
● Unlocked	PLL unlocked. Check flat cables to transceiver board. Try switching to a different frequency. See chapter 4.5.
● Read disable	Read Disable LED. On while reading disabled. See chapter 3.4.2.

5.2   TAB BOARD INDICATIONS

The LEDs on the TAB board indicate its status. These LEDs are very useful when troubleshooting the Ultimate-mode features. Below the function of each LED is described.
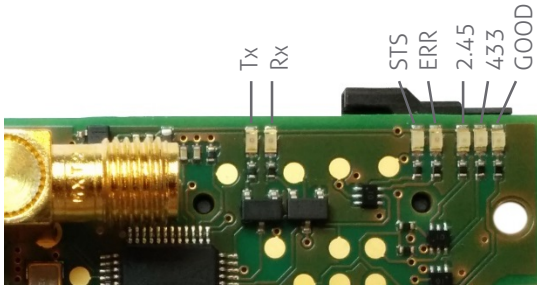
Figure 22: LED indications TAB board

Led	Description
● STS	TAB board status LED
	Fast blinking: Boot loader active. Indicated after restart.
	Regular blinking: Heartbeat (0.5s on / 0.5s off)
	Special blink 1: Programmer firmware (0.1s on / 0.9s off).
	Special blink 9: TAB stopped. Hardware fault, (0.9s on / 0.1s off).
● ERR	Error LED.
	SAM error – not present, not locked, not supported, etc.
	TAB error – authentication failed.
● 2.45	2.45GHz microwave tag data received.
	Does not indicate when TAB bypassed. See chapter 4.3.
● 433	433MHz tag data received.
	Only indicated when using Ultimate tags.
● GOOD	Ultimate tag successfully authenticated.
	Tag data transmitted to TRANSIT Ultimate main board.
	TRANSIT should be able to identify now. Check ID-LED main board.
● Tx	Transmit serial data (USB, I/F-board). See chapter 4.2.
● Rx	Receive serial data (USB, I/F-board).

A   TECHNICAL SPECIFICATIONS

Technical specification	TRANSIT Ultimate
Power supply	100 – 240 VAC (60 – 50 Hz) or 24 VDC (± 10%)
Power consumption	< 25 VA (AC), < 20 W (DC)
Dimensions	330 x 274 x 140 mm
Weight	5 kg
Housing	Cover: ABS, Housing: Die-cast ADC12
Protection	IP66
Operating temperature	-30°C – +60°C
Detection range	Up to 10 meters, message acceptance ratio > 80%
Object speed	Up to 200 km/h at appropriate distance
Operating frequency	2.438 – 2.457 GHz, 433.62 & 434.22 MHz (RX_CAT_3); Ton < 5 sec
Frequency channels 2.45GHz	32 FCC channels, 14 ETSI channels, 600k Hz spacing
Polarization 2.45 GHz	Circular (LHC)
Polarization 433 GHz	Horizontal
Air interface 2.45 GHz	Nedap proprietary encryption standard
	1.875 kbps; integrated intenna
Air interface 433 MHz	Encryption based upon diversified AES128 keys.
	300 kbps; GFSK - 75kHz; dedicated antenna
	Duty cycle < 1%; LBT not applicable
Relay output	1 relay output (NO, common, NC), 24 VDC 2A
Inputs	3 dry contact
Audio	Range check beeper
Antenna input	External inductive proximity antenna connection 120kHz
Antenna output	Nedap external reader antenna connection 120kHz output
Interfaces	USB, Wiegand, Magstripe, Barcode.
	Optional interface boards: RS232, RS422, RS485, TCP/IP, Profibus-DP.
Communication protocols	Determined by firmware: CR/LF, DC2/DC4, various OEM protocols, several Wiegand and Magstripe formats.
Mounting	Wall Mounting Set included, optional Pole Mounting Kit available.
Certifications:	
EMC	EMC Directive EC : 2014/30/EC ; 2004/108/EC
	EN301 489-1,-3,-17 ; EN61000-6-2 ; EN61000-6-3
Regulations	FCC part 15.245; EN 300 440 (2.45 GHz)
	FCC part 15.231a,-b ; EN 300 220 (433 MHz)

B   FREQUENCY CHANNELS

Transceiver board frequency selection table:

Frequency (GHz)	S1	S2	S3	S4	S5	Wi-Fi	ETSI	FCC
2.4384	ON	ON	ON	ON	ON		-	✓
2.4390	OFF	ON	ON	ON	ON		-	✓
2.4396	ON	OFF	ON	ON	ON		-	✓
2.4402	OFF	OFF	ON	ON	ON		-	✓
2.4408	ON	ON	OFF	ON	ON		-	✓
2.4414	OFF	ON	OFF	ON	ON		-	✓
2.4420	ON	OFF	OFF	ON	ON	CH7	-	✓
2.4426	OFF	OFF	OFF	ON	ON		-	✓
2.4432	ON	ON	ON	OFF	ON		-	✓
2.4438	OFF	ON	ON	OFF	ON		-	✓
2.4444	ON	OFF	ON	OFF	ON		-	✓
2.4450	OFF	OFF	ON	OFF	ON		-	✓
2.4456	ON	ON	OFF	OFF	ON		-	✓
2.4462	OFF	ON	OFF	OFF	ON		✓	✓
2.4468	ON	OFF	OFF	OFF	ON		✓	✓
2.4474	OFF	OFF	OFF	OFF	ON	CH8	✓	✓
2.4480	ON	ON	ON	ON	OFF		✓	✓
2.4486	OFF	ON	ON	ON	OFF		✓	✓
2.4492	ON	OFF	ON	ON	OFF		✓	✓
2.4498	OFF	OFF	ON	ON	OFF		✓	✓
2.4504	ON	ON	OFF	ON	OFF		✓	✓
2.4510	OFF	ON	OFF	ON	OFF		✓	✓
2.4516	ON	OFF	OFF	ON	OFF		✓	✓
2.4522	OFF	OFF	OFF	ON	OFF	CH9	✓	✓
2.4528	ON	ON	ON	OFF	OFF		✓	✓
2.4534	OFF	ON	ON	OFF	OFF		✓	✓
2.4540	ON	OFF	ON	OFF	OFF		-	✓
2.4546	OFF	OFF	ON	OFF	OFF		-	✓
2.4552	ON	ON	OFF	OFF	OFF		-	✓
2.4558	OFF	ON	OFF	OFF	OFF		-	✓
2.4564	ON	OFF	OFF	OFF	OFF		-	✓
2.4570	OFF	OFF	OFF	OFF	OFF	CH10	-	✓

The selected frequency has to comply with local radio regulations.
ETSI frequency range from 2.446 to 2.454 GHz.
FCC frequency range from 2.435 to 2.465 GHz.

C   NEDAP PART NUMBERS

Product	Part number	Description
	9215689	TRANSIT Ultimate
	9216537	Security Key Pack (SAM)
	5626595	Pole Mounting Kit
	7819102	HID Interface Board (HIB)
	7817940	TCP/IP Interface Board
	7817347	RS422/RS485 Interface Board
	7817134	Profibus DP Interface Board
	9564314	Window Tag Ultimate
	9982809	Smartcard Booster Ultimate
	9982817	LEGIC Booster Ultimate

D   FCC / IC STATEMENT

FCC ID: **CGDTRANSITULTI**
IC: 1444A-TRANSITULTI

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 RSS210 exemptés de licence du Industry 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. This in particular is applicable for the antenna which can be delivered with the TRANSIT Ultimate

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.

E   DISCLAIMER

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F   DOCUMENT REVISION

Version	Date	Comment
4.5	2015-08-25	HR: update for compliance certification
4.4	2015-08-25	HR: mounting sets naming unambiguous
4.3	2015-07-22	HR: updated dip-switch
4.2	2015-06-09	HR: updated technical specifications
4.1	2015-06-01	HR: updated frequency channel table
4.0	2015-04-10	HR: Initial version