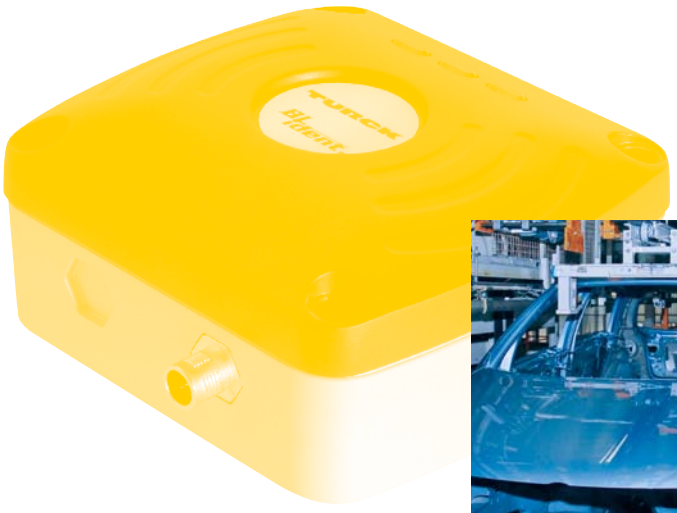
TURCK

Industrial Automation

USER MANUAL

BL IDENT® SOFTWARE WEBCONFIG FOR UHF READ/WRITE HEADS



Sense it! Connect it! Bus it! Solve it!

Hans Turck GmbH & Co. KG • Tel. +49 208/4952-0 • Fax +49 208/4952-264

Content

Hans Turck GmbH & Co. KG • Tel. +49 208/4952-0 • Fax +49 208/4952-264

1 About This Manual

This manual describes the setup, the functions and use of the software and helps you to operate the software for its intended use. Read this manual carefully prior to using the software. This will prevent the risk of personal injury and damage to property. Keep this manual safe during the service life of the product. If the software is passed on, pass on the manual as well.

TURCK accepts no liability for damage caused by failure to observe these instructions.

If you require further information or have questions about the device, contact the TURCK Service or visit our website.

1.1 Target groups

This manual must be read and followed by anyone entrusted with any of the following tasks:

- Commissioning
- Setting
- Testing and maintenance
- Troubleshooting

1.2 Explanation of Symbols

The following symbols are used in these instructions:

NOTE

NOTE indicates tips, recommendations and important information. The notes contain information, particular operating steps that facilitate work and possibly help to avoid additional work resulting from incorrect procedures.

MANDATORY ACTION

➤ This symbol denotes actions that the user must carry out.

RESULT OF ACTION

➥ This symbol denotes the relevant results of actions and procedures.

1.3 Naming convention

The WebConfig software uses the terms “tag” and “transponder“ instead of “data carrier” and “reader” instead of “read/write head”.

1.4 Associated documents

Besides this document the following material can be found in the TURCK product database:

- BL ident®-Software RDemo für UHF-Schreib-Lese-Köpfe (D500007)
- BL ident® Software RDemo for UHF read/write heads (D500008)
- User Manual RFID System – Installation of the BL ident® UHF Systems (D101831)

1.5 Feedback on this manual

We make every effort to ensure that this manual is as informative and as clear as possible. If you have any suggestions for improving the design or if some information is missing in the document, please send your suggestions to techdoc@turck.com.

2 Notes on the product

This manual describes the WebConfig software v1.37. The manual is designed for qualified personnel. The machine designer, supervising engineer, machine builder and/or the maintenance electrician are responsible for ensuring that this product is used in full compliance with all applicable regulations and standards.

2.1 Manufacturer and Service

With almost 50 years of experience and an extensive know-how, we can support you in every project phase – from the initial analysis right through to the tailored implementation and commissioning of your application. In the TURCK product database you will find the right solution, whether this involves software tools for programming, configuration or commissioning support, detailed data sheets or CAD data in almost 80 export formats – accessible worldwide, in different languages, free of charge and without registration. You can access the Product Database via the following address: **www.turck.de/produkte**

For further inquiries in Germany contact the Sales and Service Team on:
- Sales: +49 (0) 208 4952-380
- Technical: +49 (0) 208 4952-390

For overseas inquiries contact your national TURCK representative.

Hans Turck GmbH & Co. KG
Witzlebenstraße 7
45472 Mülheim an der Ruhr
Germany

3 For Your Safety

The software is designed according to the latest state of the art technology. Residual hazards, however, still exist. Observe the following safety instructions in order to avoid hazards. TURCK accepts no liability for damage caused by failure to observe these safety instructions.

3.1 Intended Use

The WebConfig Software is used for the extended configuration of the following TURCK UHF read/write heads:

- TN…-Q240L280-H1147
- TN…-Q175L200-H1147
- TN…-Q120L130-H1147

4 Software description

4.1 Functions

- Parametrization of UHF read/write heads
- Adjustment of read/write heads on the particular application and on the environmental conditions
- Detection of several data carriers in the field
- Setting the Range
- Prevent false readings
- Optimize speed
- Setting filters

4.2 Setup

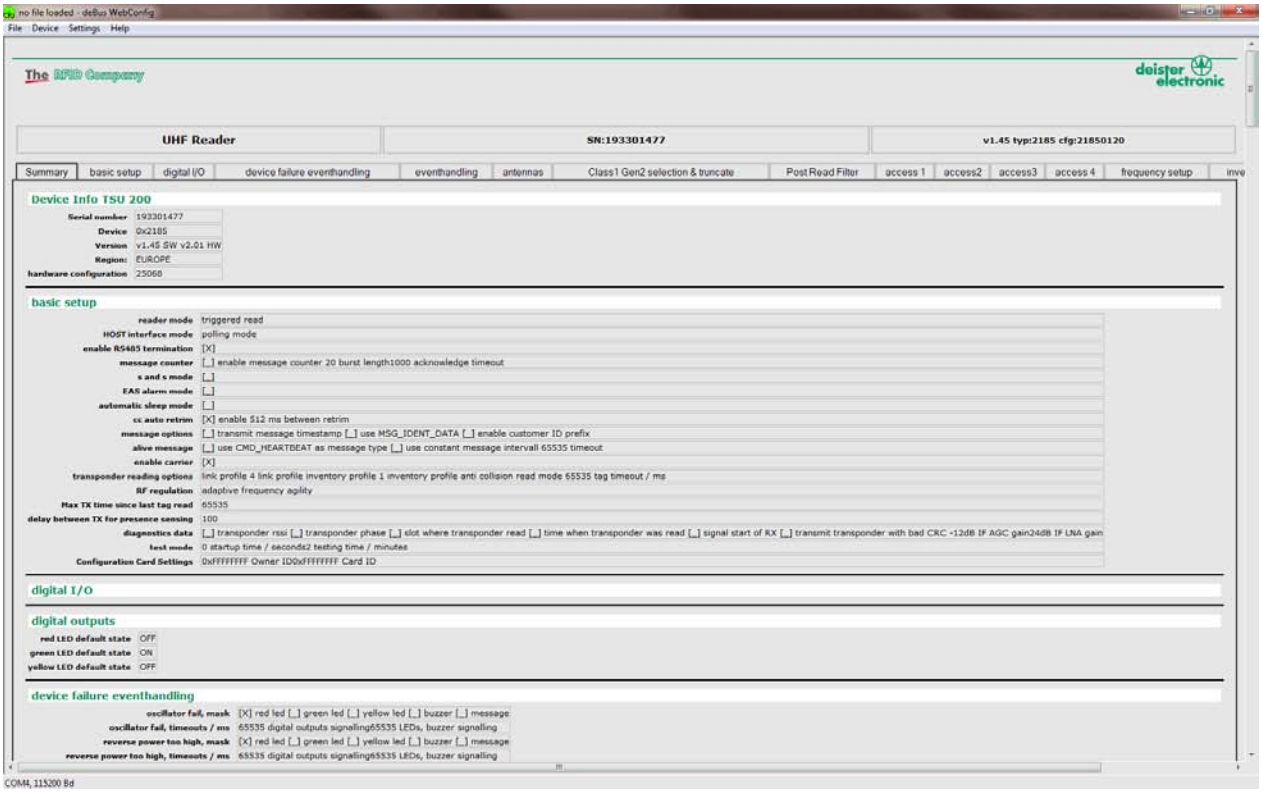


Fig. 1: WebConfig setup

The default configuration (factory setting) depends on the hardware configuration, which will be programmed before delivery. The hardware configuration code of the device is fixed and cannot be changed. It is shown on the page “Summary”, see next chapter.

If the device is set to “Trigger Mode“, it waits for a “Trigger On“ command to switch the RF-field on and a ”Trigger Off“ command to switch the RF-field off.

4.2.1 Summary

This page shows a summary of the current read/write head configuration.

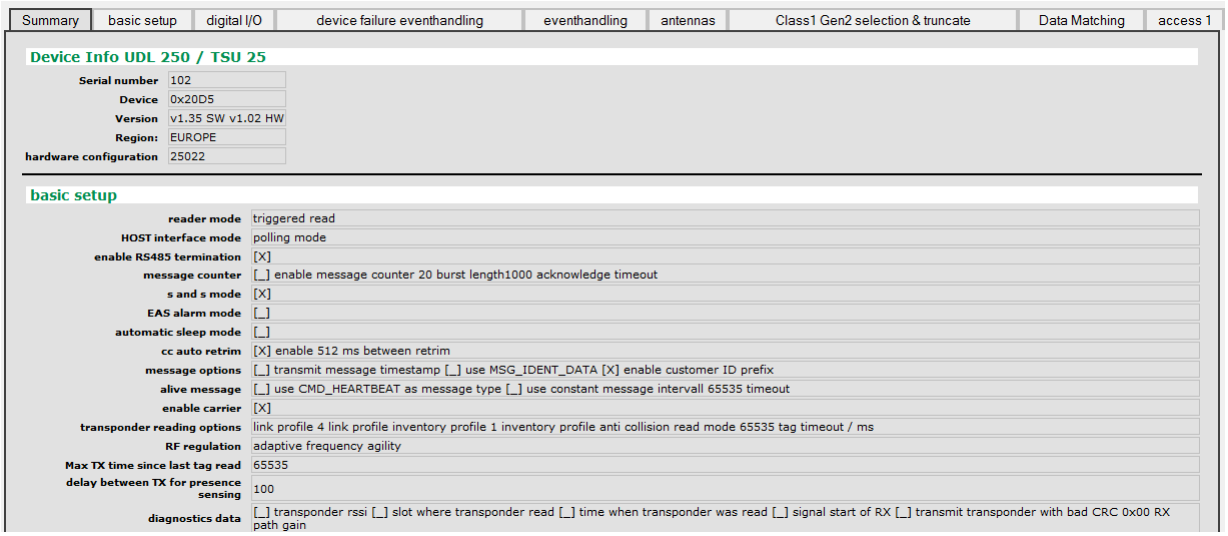


Fig. 2: Summary

Device Info

- Serial number: Serial number of the device.
- Device: Identification code of the deBus device.
- Version: Firmware Version (SW) and hardware version (HW) of the device.
- Region: Region the device is authorized for.
- hardware configuration: Hardware configuration code of the device.

4.2.2 Basic Setup

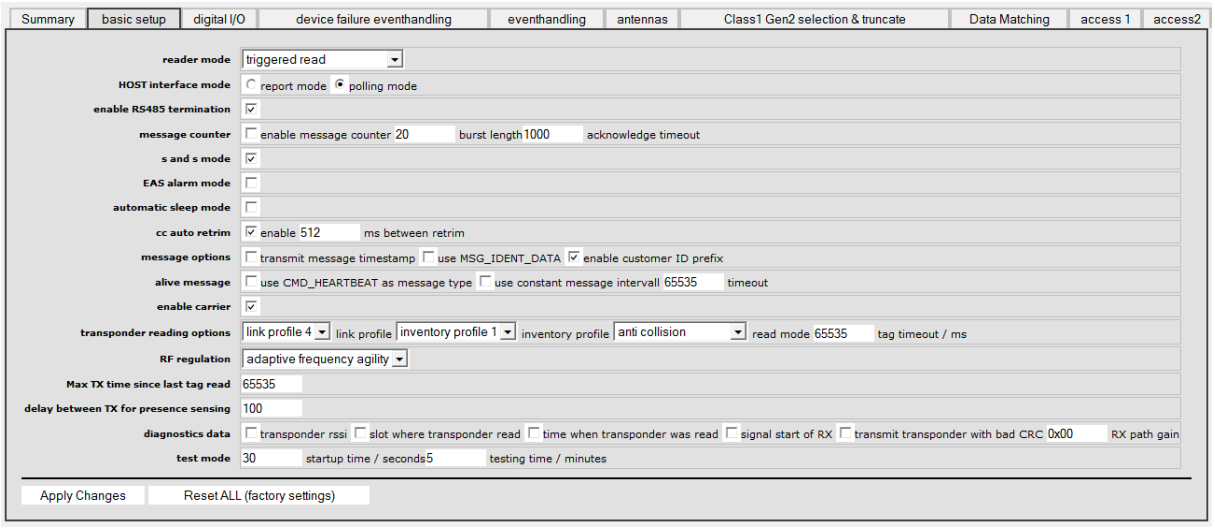


Fig. 3: Basic setup TN…-Q240L280-H1147

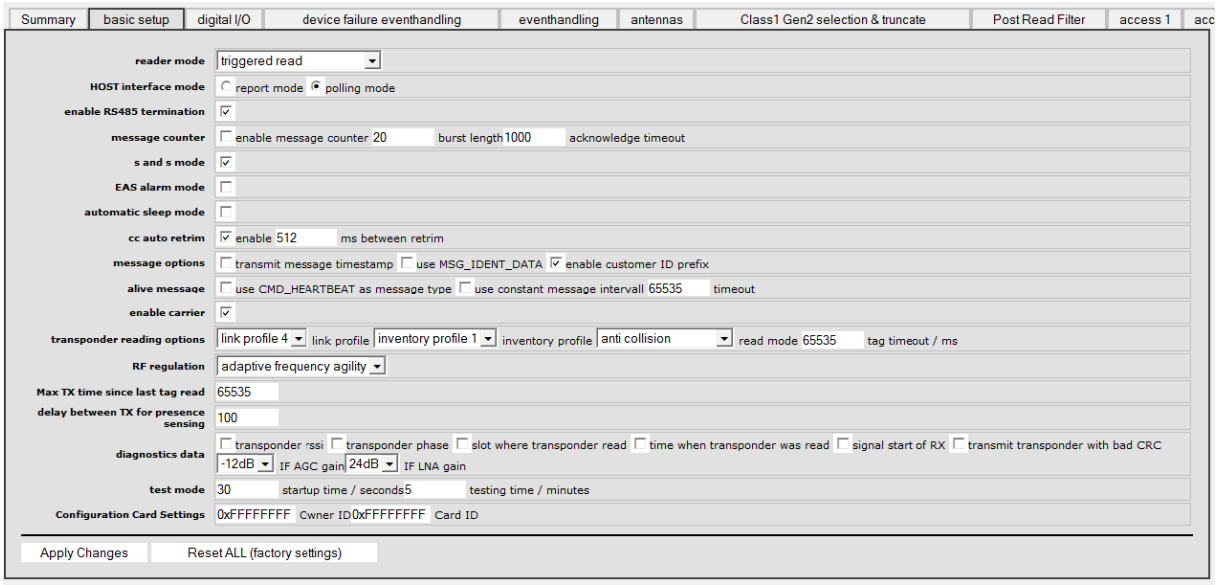


Fig. 4: Basic Setup TN…-Q120L130-H1147, TN…-Q175L200-H1147

- reader mode: The reader mode defines the basic operation mode of the read/write head and how the reading process can be started.

continuous read	Continuous reading without trigger command.
triggered read	This reading process has to be started by a software trigger command or by a hardware trigger signal. The process is terminated after the time specified in „Max TX time since last tag read“ if no data carrier has been read within this time. Otherwise a trigger off command can be used (timed hardware trigger).
DCU controlled read	Several read/write heads are connected to a data concentration unit (DCU), the reading process can only be started by the DCU.
CW only	Continuous transmission of a continuous wave (CW) without reading.
Presence Sensing Mode	Read/write head is listening on the receive channels for a data carrier reply by transmitting short TX pulses. If the read/write head has localized a data carrier within the field, it will start reading.

- HOST interface mode: The interface mode defines how the read/write head will transmit deBus messages to the Host/PC. Two different interface modes are available:

report mode	A data carrier serial number or access message will be transmitted immediately after its generation.
polling mode	Messages will not be transferred immediately but only after a polling command has been received by the read/write head.

- Enable RS485 termination: Enables the RS485 termination. If RS485 is not available, this parameter is not shown.
- message counter: With the message counter there will be a counter value prefixed to every automatically generated deBus message. The counter consists of an 8 bit number. This way deBus messages that got lost on the bus can be detected. It is possible to get lost messages back again from the read/write head. Command replies do not contain a message counter number.

enable message counter	Activation of the message counter
burst length	This value defines the maximum number of messages sent to the Host or PC without acknowledgement from the host or PC. It is part of the message counter function. It only has an effect if the message counter is enabled.
acknowledgement timeout	This value defines a time period in steps of 1 ms after which unacknowledged messages are being sent to the host or PC again. This can only be used if the message counter is enabled.

- S & S mode: In addition to the EPC, 8 blocks (16 byte) of the TID bank and the PC bytes will be read.
- EAS alarm mode: This mode sends the NXP EAS Alarm command automatically. If the EAS bit of the data carrier is set, the data carrier backscatters an alarm code and the read/write head generates a data carrier access event.

- automatic sleep mode: This setting causes the read/write head to enter sleep mode if there is no RF mode active. All analog hardware will be turned off and place processor into idle mode. The processor will automatically wake up when data is received and return to its previous power state.

NOTE
In the automatic sleep mode no alive messages are transmitted.

- cc auto retrim: Enables the auto adjust feature for the antenna. This will allow the read/write head to adjust the carrier cancellation by itself during the read process. As this will be time consuming the user can define the time between adjusting the carrier cancellation in steps of milliseconds. If high reading speed is required it is desireable that the adjustment does not take too much time.
- message options: transmit message timestamp: If this check box is activated, every automatically generated deBus message contains a 32 bit time stamp prefix. The time stamp is the number of milliseconds since device reset. Command replies do not contain a timestamp. In case of an overflow, the time stamp prefix restarts from zero. This will not be indicated.
- message options: use MSG_IDENT_DATA: Uses message byte "MSG" with value 0x40 instead of 0x41 for data carrier messages. See deBus protocol for more details.
- message options: enable customer ID prefix: If the device is programmed with a customer ID, every automatically generated deBus message can be prefixed with this ID.
- alive message: use CMD_HEARTBEAT as message type: If this check box is activated, the read/write head sends the message "CMD_HEARTBEAT" instead of a status message. See deBus protocol for more details.
  If the alive message is activated, the host can assume to receive the next valid deBus message latest said interval after the last one. If no message at all arrives in time, it is an indicator for broken hardware, broken cables or interrupted connection.
- alive message: Use constant message interval: Transmit heartbeat message always after the defined time independent on the deBus traffic.
- alive message: timeout: Interval time in steps of 1 s. A value of 65535 will deactivate this function.
- enable carrier: This check box defines if the carrier may be activated or not.

NOTE
If the check box "enable carrier" is not activated, the carrier will not be activated and data carrier reading is not possible.

- link profile: Used link profile to read data carriers. The following table shows the default settings of the link profiles:

Profile number	Modulation	Tari	Data carrier reply frequency	Miller level
1	DSB-ASK	25 µs	40 kHz	FM0
2	DSB-ASK	12.5 µs	160 kHz	2
3	PR-ASK	25 µs	250 kHz	4
4	PR-ASK	25 µs	320 kHz	4

To perform Dense Reader Mode (DRM) at 915 MHz (US) profile number 3 has to be used.
To perform Dense Reader Mode (DRM) at 868 MHz (EU) profile number 4 has to be used.
The link profiles are configurable. For more details see chapter "Link profiles".

- Inventory profile: This parameter defines which inventory profile will be used (see chapter "Inventory profiles")
- read mode: This parameter defines, if the read/write head expects only one data carrier or more data carriers within the antenna field. If there are more data carriers, the read/write head has to execute the anticollision algorithm. It is also possible to configure the read/write head to "single shot" mode in which the read signalling for the same data carrier is done only once or after a timeout defined by parameter "tag timeout".

anticollision	Operating mode in case there is more than one data carrier in the field.

Hans Turck GmbH & Co. KG • Tel. +49 208/4952-0 • Fax +49 208/4952-264

single shot	Operating mode for reading data in case there is only one data carrier in the field. The data will be transmitted again after the time specified in "tag timeout".
continuous single tag	Operating mode for reading data in case there is only one data carrier in the field. The data will be transmitted continuously. The parameter "tag timeout" has no effect.

- tag timeout/ms: Break between transmission of data within single shot mode. After this timeout has expired, reading the same data carrier will be signaled again. If this value is set to 0, the tag timeout function is deactivated and has the same effect as continuous single tag read.
- RF regulation: The regulation the device will perform. The read/write head will only use those regulation that may be used in the region the read/write head has been build for. The regulation setting is fixed by the hardware configuration and the region. This can not be changed by the customer. The hardware configuration will be indicated on the "Summary" page, see chapter "Summary". The RF regulation parameter is only shown for European devices.
- fixed frequency (ETSI 302 208 V1.2): The read/write head runs on a fixed channel with a minimum off time (100 ms off after 4 s operation)
- listen before talk (ETSI 302 208 V1.1): The read/write head will carry out listen before talk (LBT) and chooses a free channel.
- frequency hopping (FCC Part 15.247, ETSI 302 208 V1.2): The read/write head changes the frequency during operation automatically. This is an option to minimize the minimum off time.
- Adaptive frequency agility (ETSI 302 208 V1.2): Using the adaptive frequency agility regulation causes the read/write head not to do LBT on the channel where it likes to transmit but on the channels where it expects the data carrier replies. In doing this, the read/write head has to check four channels: Two channels below the transmit channel and two above the transmit channel. The read/write head changes its operation frequency automatically from one channel to another depending on the noise power level of the receiving channel.
- Max TX time since last tag read: Maximum channel occupation time in steps of 1 ms since last data carrier read. If the time runs out, the RF field will be automatically switched off. A value of 65535 will deactivate the function. This parameter will only have an effect within "Trigger Mode" and "Presence Sensing Mode".
- delay between TX for presence sensing: This value defines the delay time in steps of 1 ms before the field is switched on for a short period to detect data carriers in the field. If a data carrier is present, the current channel is occupied until no data carriers detected within the time specified in "Max TX time since last tag read". This parameter will only have an effect within "Presence Sensing Mode".
- diagnostic data (TN…-Q240L280-H1147): Information regarding communication between read/write head and data carrier can be transmitted within every data carrier message.

transponder rssi	Transmits data carrier RSSI (Received Signal Strength Indication) with every data carrier message. A 2 byte value contains the power gain of the RX path in the upper byte and a raw 8 bit AD converter in the lower byte. The RSSI is an indicator for the distance between read/write head and data carrier.
slot when the transponder was read	Transmit the slot number where the data carrier was read with the data message.
time when transponder was read	Transmit the system time when the data carrier was read with the data message. A relative value in steps of 1 ms since system start. Every reset of the device sets the system time to zero.
Signal start of RX	not in use
transmit tramsponder with bad CRC	Transmit data carrier PC, EPC and CRC16 although CRC is bad.
RX path gain	Gain value for RX path. With value 0x00 the read/write head has the highest possible sensitivity (maximum read range). Settings for RSSI: To get the highest dynamic range, this value has to be set to 0x30. With this modification the read sensitivity will decrease.

- diagnostics data (TN…-Q120L130-H1147, TN…-Q175L200-H1147): Information regarding communication between read/write head and data carrier can be transmitted within every data carrier message. The RX path gain can be controlled by parameters IF AGC gain and IF LNA gain. With values IF AGC gain = -12 dB and IF LNA gain = 24 dB the read/write head has the highest possible sensitivity (maximum read range). Settings for RSSI: To get the highest dynamic range, set IF AGC gain = -12 dB and IF LNA gain = 12 dB. Note that with this modification the read sensitivity will decrease.

transponder rssi	Transmits data carrier RSSI (Received Signal Strength Indication) with every data carrier message. The output has steps of 0,1 dBm, the format is 16 bit two's complement, LSB first. The RSSI is an indicator for the distance between read/write head and data carrier.
transponder phase	Phase of the data carrier answer.
slot when the transponder was read	Transmit the slot number where the data carrier was read with the data message.
time when transponder was read	Transmit the system time when the data carrier was read with the data message. A relative value in steps of 1 ms since system start. Every reset of the device sets the system time to zero.
IF AGC gain	Intermediate Frequency Automatic Gain Control.
IF LNA gain	Intermediate Frequency Low Noise Amplifier.
transmit tramsponder with bad CRC	Transmit data carrier PC, EPC and CRC16 although CRC is bad.

- Test mode: After power on reset the read/write head will start the test mode where it reads test data carriers even if RF mode is not active. The test mode will not be signaled. As soon as a test data carrier is read, the read/write head will signal the test mode and set the timeout to the amount of minutes defined by the parameter "testing time". If no test data carrier is detected within the number of seconds defined by "startup time", the test mode is terminated.
- Configuration card settings (TN…-Q120L130-H1147, TN…-Q175L200-H1147):

Owner ID	Read/write head will read specific cards only, e. g. read/write head configuration cards for a certain customer.
Card ID	Not in use.

4.2.3 Digital I/O – TN…-Q120L130-H1147, TN…-Q175L200-H1147

The digital outputs of the UHF read/write heads can be configured on this page.

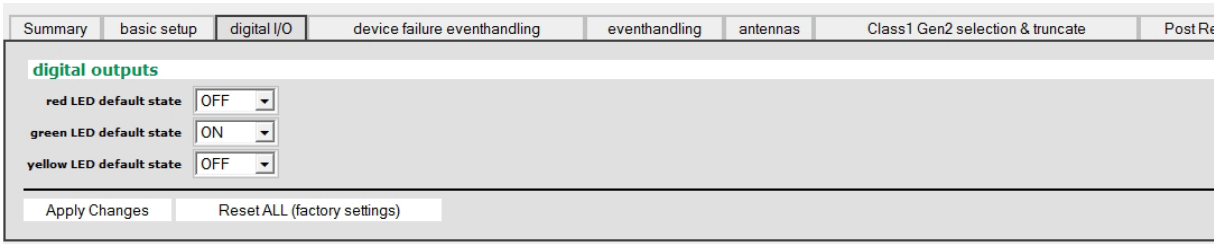


Fig. 5: Digital I/O – TN…-Q120L130-H1147, TN…-Q175L200-H1147

- red LED default state

OFF	LED permanently off
ON	LED permanently on
flashing	LED constantly flashing

- green LED default state

OFF	LED permanently off
ON	LED permanently on
flashing	LED constantly flashing

- yellow LED default state

OFF	LED permanently off
ON	LED permanently on
flashing	LED constantly flashing

4.2.4 Digital I/O – TN…-Q240L280-H1147

The digital outputs of the UHF read/write heads can be configured on this page:

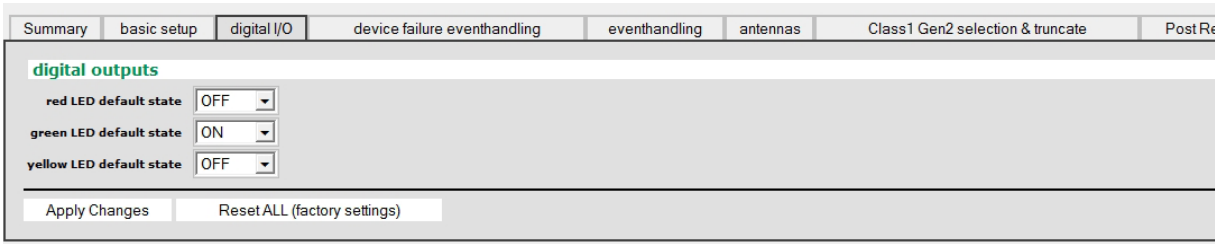


Fig. 6: Digital I/O – TN…-Q240L280-H1147

- red LED default state

OFF	LED permanently off
ON	LED permanently on
flashing	LED constantly flashing

- green LED default state

OFF	LED permanently off
ON	LED permanently on
flashing	LED constantly flashing

yellow LED default state

OFF	LED permanently off
ON	LED permanently on
flashing	LED constantly flashing

4.2.5 Device failure eventhandling

These settings define a bit mask that is used by the event handler to indicate failures. All failures listed in the table below can be indicated by LEDs, buzzer or by a deBus message.

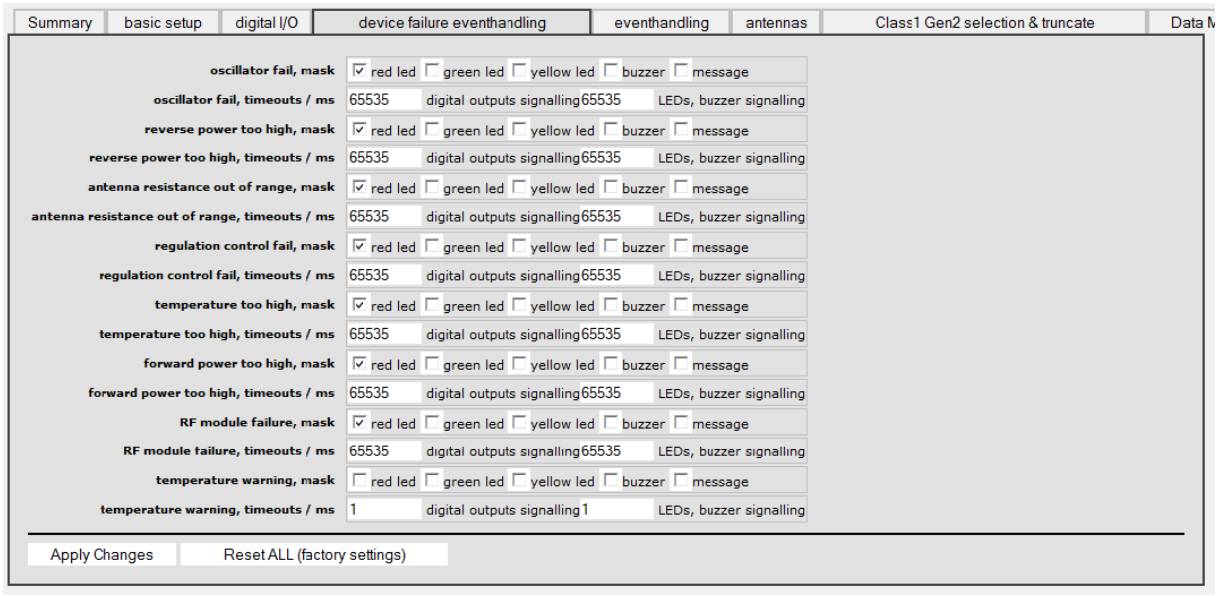


Fig. 7: Device failure eventhandling

Parameter	Event generation in case
oscillator fail	PLL not locked
reverse power too high	Reverse power too high

Parameter	Event generation in case
antenna resistance out of range	Antenna DC resistance too low or too high
regulation control fail	Radio regulation error (no free channel)
temperature too high	Temperature too high
forward power too high	TX power too high
RF module failure	RF read/write head communication error in report mode
temperature warning	Raised temperature on ambient temperature sensor or RF module temperature sensor.

4.2.6 Eventhandling

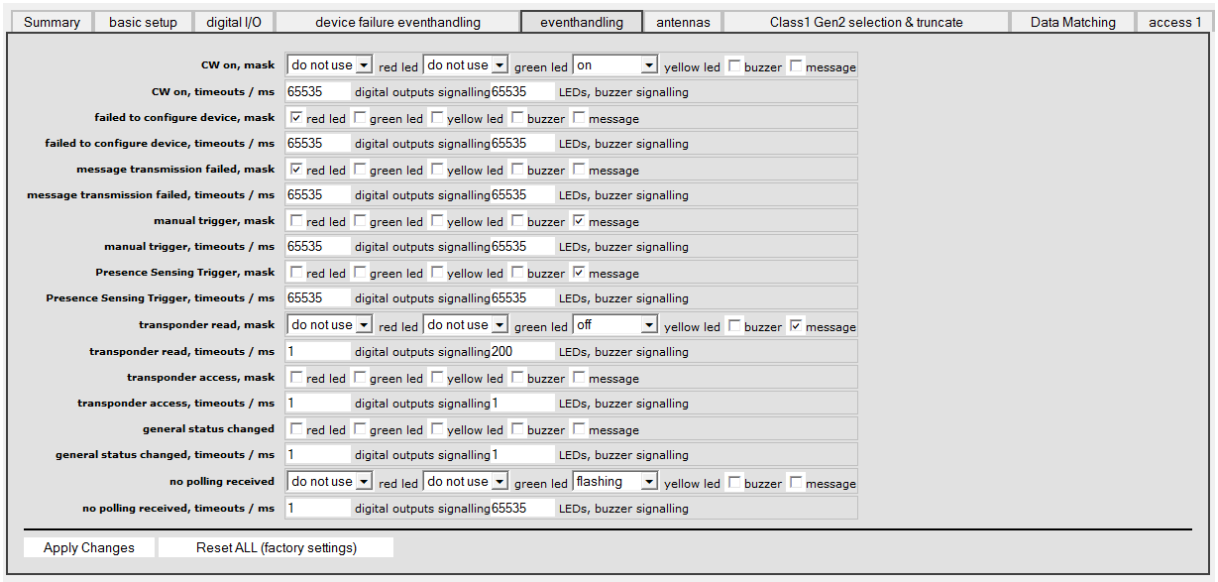


Fig. 8: Eventhandling

These settings define a bit mask that is used by the event handler e.g. to indicate by digital output if an event occurs. It is also possible to send a status message or a data carrier access message for data carrier read or data carrier access events.

Parameter	Event generation in case
CW on	Continuous wave activated (RF field on)
failed to configure device	Device configuration invalid (but not damaged)
message transmission failed	Out of memory in polling mode Lost USB connection deBus transmission error
manual trigger	Manual RF mode activation (software trigger command received)
Presence Sensing Trigger	Trigger caused by Presence Sensing Mode
transponder read	Data carrier read
transponder access	Data carrier access
general status changed	Status of device has been changed
no polling received	Device received no deBus polling message

Check boxes "red LED", "green LED", "yellow LED", "buzzer", "message"
This mask defines which LED will be activated if the dedicated event occurs. Additionally, the buzzer can be activated or a message can be generated. This message can be e.g. a status message or a data carrier access message, depending on the event.

Digital output signalling
This value defines a timeout for the reaction to an event for the digital output. The event handler will release the

according outputs after this time. A message will not be sent. The timeout is defined in steps of 1 ms. A value of 65535 will deactivate the timeout function.

LEDs, buzzer signalling
This value defines a timeout for the reaction to an event for LEDs and the buzzer. The event handler will release the according LEDs or buzzer after this time. A message will not be sent. The timeout is defined in steps of 1 ms. A value of 65535 will deactivate the timeout function.

4.2.7 Antennas

Antennas – TN…-Q120L130-H1147
The read/write head TN…-Q120L130-H1147 has one circular polarised antenna (RHCP) with max. 27 dBm (500 mW) ERP.

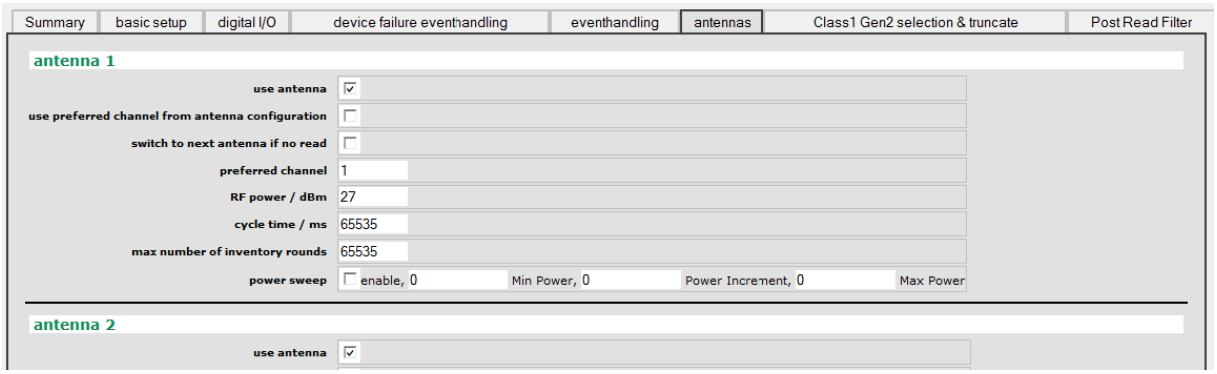


Fig. 9: Antennas – TN…-Q120L130-H1147

- use antenna: The antenna configuration can be used in the reading process.
- use preferred channel from antenna configuration: Activation of the preferred channel set by the next parameter "preferred channel".
- switch to next antenna if no read: To speed up the inventory process it is possible to switch to the next antenna configuration if no data carrier has been read within the last three inventory rounds on the current antenna.
- preferred channel: This value defines which channel will preferably be used while the according antenna is active.
- RF power/dBm: This value defines the radiated power for the according logical antenna in dBm. The maximum output power of TN…-Q120L130-H1147 is 27 dBm (500 mW) ERP.
- cycle time/ms: This value defines the maximum transmit time for the according antenna before the read/write head switches to the next antenna. The time is defined in steps of 1 ms. Values lower than 50ms should not be used. A value of 65535 will deactivate this function.
- max number of inventory rounds: This value defines the maximum number of inventory rounds for the according antenna before the read/write head switches to the next antenna. A value of 65535 will deactivate this function.
- power sweep: This function enables the dedicated antenna to increase the output power of the dedicated antenna automatically. The function can be adjusted by the following parameters. For power sweep function in DCU controlled mode see chapter "Power sweep with Portal Mode (DCU Controlled Mode)".

Antennas – TN…-Q175L200-H1147

The read/write head TN…-Q175L200-H1147 has one circular polarised antenna (RHCP) with max. 30 dBm (1000 mW) ERP.

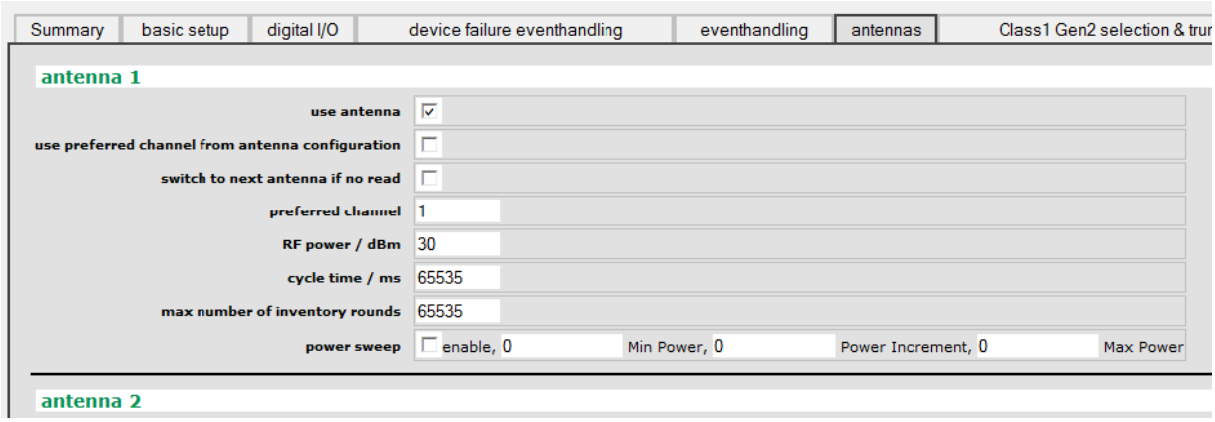


Fig. 10: Antennas – TN…-Q175L200-H1147

- use antenna: The antenna configuration can be used in the reading process.
- use preferred channel from antenna configuration: Activation of the preferred channel set by the next parameter "preferred channel".
- switch to next antenna if no read: To speed up the inventory process it is possible to switch to the next antenna configuration if no data carrier has been read within the last three inventory rounds on the current antenna.
- preferred channel: This value defines which channel will preferably be used while the according antenna is active.
- RF power/dBm: This value defines the radiated power for the according logical antenna in dBm. The maximum output power of TN…-Q175L200-H1147 is 30 dBm (100 mW) ERP.
- cycle time/ms: This value defines the maximum transmit time for the according antenna before the read/write head switches to the next antenna. The time is defined in steps of 1 ms. Values lower than 50 ms should not be used. A value of 65535 will deactivate this function.
- max number of inventory rounds: This value defines the maximum number of inventory rounds for the according antenna before the read/write head switches to the next antenna. A value of 65535 will deactivate this function.
- power sweep: This function enables the dedicated antenna to increase the output power of the dedicated antenna automatically. The function can be adjusted by the following parameters. For power sweep function in DCU controlled mode see chapter "Power sweep with Portal Mode (DCU Controlled Mode)".

Antennas – TN…-Q240L280-H1147

The read/write head TN…-Q240L280-H1147 has one antenna which supports circular polarization (RHCP/LHCP) with max. 29 dBm (800 mW) ERP and linear polarization (vertical/horizontal) with max. 32 dBm (1.6 W) ERP.

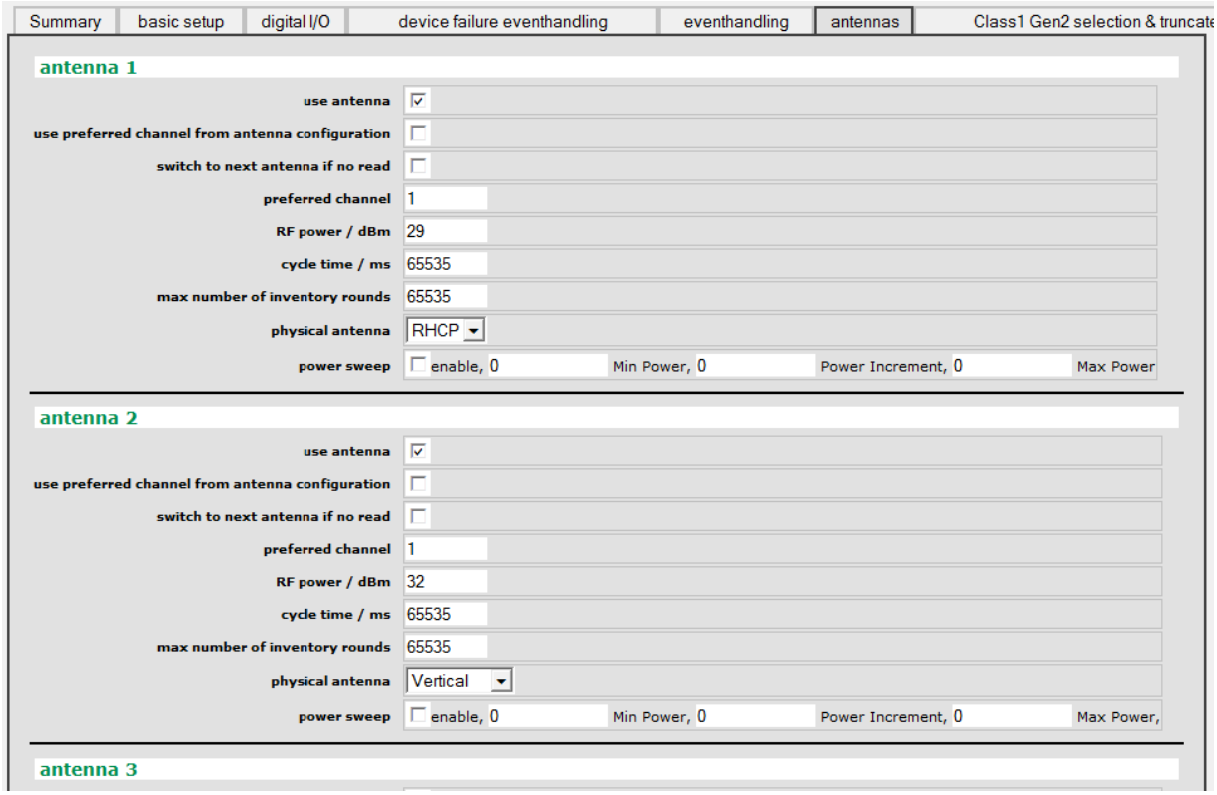


Fig. 11: Antennas – TN…-Q240L280-H1147

- use antenna: The antenna configuration can be used in the reading process.
- use preferred channel from antenna configuration: Activation of the preferred channel set by the next parameter "preferred channel".
- switch to next antenna if no read: To speed up the inventory process it is possible to switch to the next antenna configuration if no data carrier has been read within the last three inventory rounds on the current antenna.
- preferred channel: This value defines which channel will preferably be used while the according antenna is active.
- RF power/dBm: This value defines the radiated power for the according logical antenna in dBm. Maximum power of the antennas:

antenna 1 and 4 (support RHCP/LHCP only)	max. 29 dBm (800 mW) ERP
antenna 2 and 3 (support vertical/horizontal only)	max. 32 dBm (1.6 W) ERP

- cycle time/ms: This value defines the maximum transmit time for the according antenna before the read/write head switches to the next antenna. The time is defined in steps of 1 ms. Values lower than 50 ms should not be used. A value of 65535 will deactivate this function.
- max number of inventory rounds: This value defines the maximum number of inventory rounds for the according antenna before the read/write head switches to the next antenna. A value of 65535 will deactivate this function.
- Physical antenna: This parameter selects the physical antenna. Antenna 1 and 4 support RHCP/LHCP only. Antenna 2 and 3 support vertical/horizontal only.
- power sweep: This function enables the dedicated antenna to increase the output power of the dedicated antenna automatically. The function can be adjusted by the following parameters. For power sweep function in DCU controlled mode see chapter "Power sweep with Portal Mode (DCU Controlled Mode)".

Antenna Power

WebConfig power value (dBm)	Radiated output power of internal antenna (values rounded) (ERP)
0	1 mW
1	1.3 mW
2	1.6 mW
3	2 mW
4	2.5 mW
5	3 mW
6	4 mW
7	5 mW
8	6.3 mW
9	8 mW
10	10 mW
11	13 mW
12	16 mW
13	20 mW
14	25 mW
15	32 mW
16	40 mW
17	50 mW
18	63 mW
19	80 mW
20	100 mW
21	125 mW
22	160 mW
23	200 mW
24	250 mW
25	320 mW
26	400 mW
27	500 mW
28	630 mW
29	800 mW
30	1 W
31	1.25 W
32	1.6 W
33	2 W

Antenna Sequence
With the antenna sequence the read/write head is able to switch between the 4 antenna configurations automatically. For antenna sequence with portal mode (DCU controlled mode) see chapter "antenna Sequence with portal mode (DCU controlled mode)".

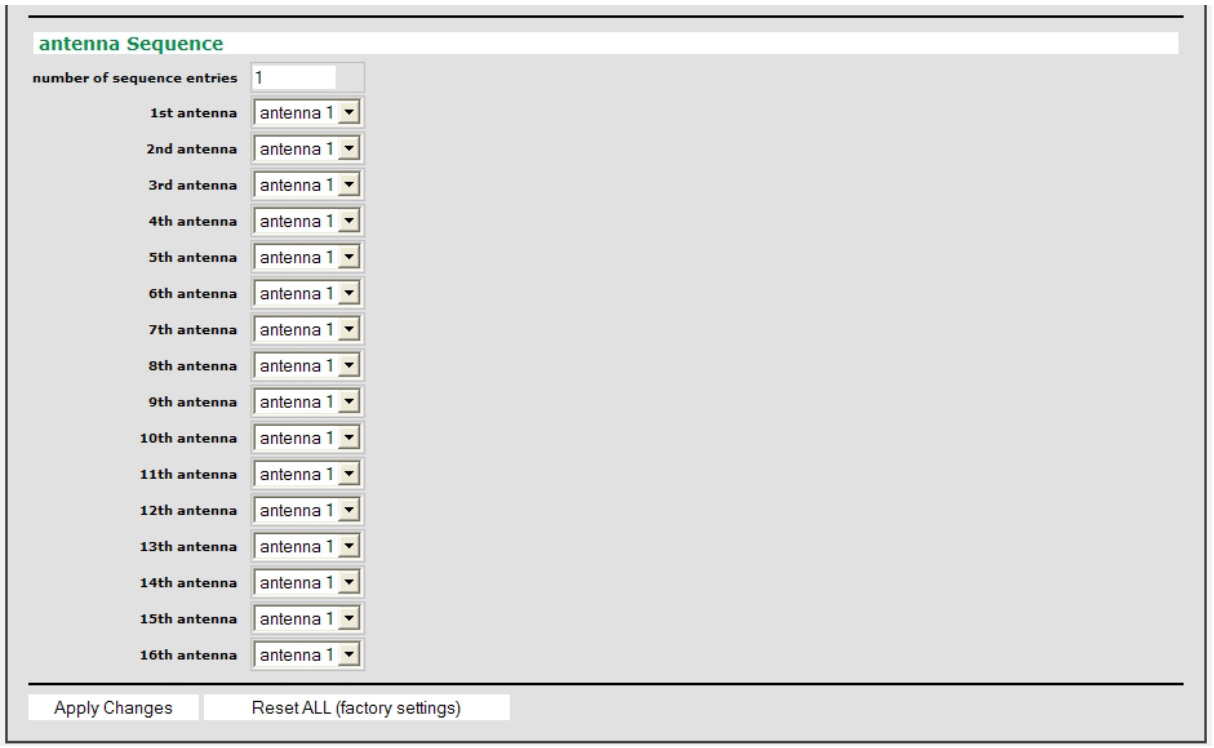


Fig. 12: Antenna sequence

- number of sequence entries: The number of valid entries within the antenna sequence table.
- 1st antenna … 16th antenna: The antenna sequence can be edited. A sequence consists of up to 16 entries.

Antenna Sequence with portal mode (DCU controlled mode)
The antenna sequence can be used in portal mode (DCU controlled mode) as well.

If the parameter "cycle time" is set to 65535, the read/write head does not switch to the next antenna configuration automatically. In that case, the next antenna configuration, as pretended by the antenna sequence, will be selected if the DCU drives the read/write head the next time. Each antenna configuration runs only within "max. time per antenna" (DCU configuration parameter). If "cycle time" is expired within "max. time per antenna" (DCU configuration parameter), the read/write head switches to the next antenna configuration as pretended by the antenna sequence. If "max. time per antenna" is expired, the DCU drives the next read/write head.

Power Sweep with portal mode (DCU controlled mode)
In the portal mode (DCU controlled mode) the power sweep runs only within "max. time per antenna" (DCU configuration parameter). Every time the dedicated antenna is activated by the DCU, the power sweep begins with the min. power value and starts the power sweep.

4.2.8 Gen2 Selection and Truncate

This page contains the selection function for up to 4 different settings and the truncate function. With the selection function it is possible to read only particular data carriers, using the truncate function the read/write head receives a truncated reply from the data carrier.

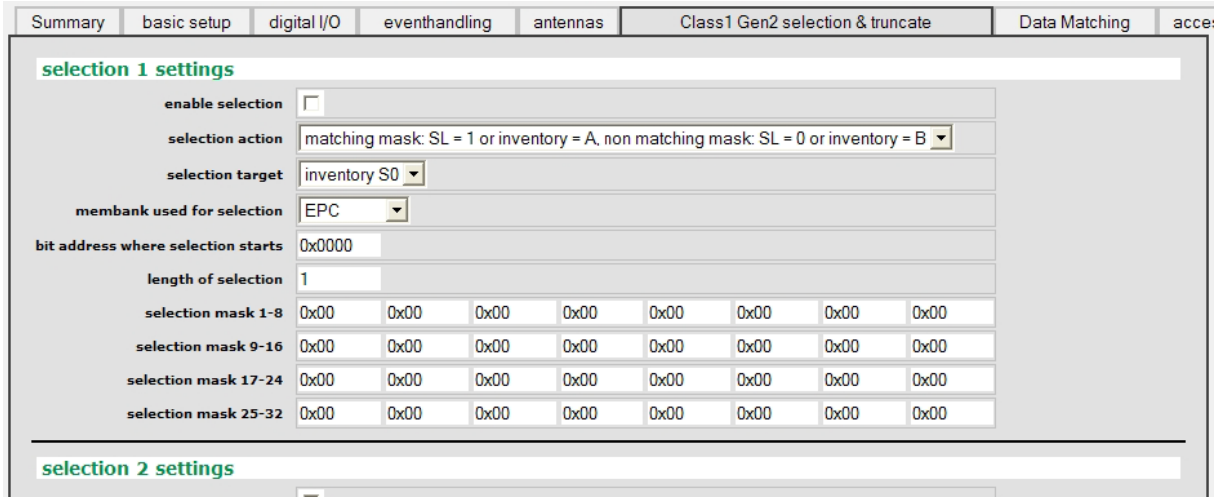


Fig. 13: selection 1 settings

- enable selection: This check box defines whether the according selection configuration will be used to generate a select command before reading data carriers. 4 different selection settings are available.
- selection action: This parameter defines the action that will be performed on the target flag. The action parameters refer to the EPC Class1 Gen2 specification.
- selection target: This parameter defines the target flag for the selection. 5 different flags are available: 4 inventoried flags (inventory S0…S3) and 1 flag for the selection status (SL).
- membank used for selection: This parameter defines the memory bank where the selection will be executed.
- bit address where selection starts: This value (hexadecimal form) defines the bit offset within the memory bank to define where the selection will start. E.g. to start the selection from the EPC, this value has to be set to 0x0020.
- length of selection: This value (decimal form) defines how many bits are stored within the selection mask and therefore the length of the selection.
- selection mask: These bytes (hexadecimal form) contain the selection mask. If not all bits of the last byte are being used, the remaining bits have to be stored left-aligned within the byte in order to generate a continuous bit stream from MSB to LSB.

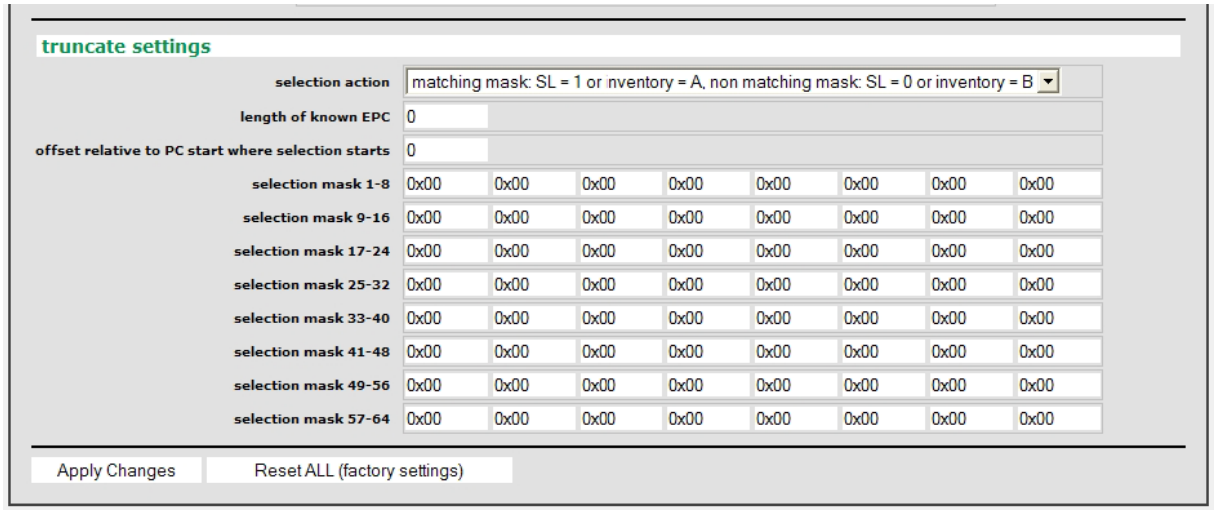


Fig. 14: truncate settings

- selection action: The truncate selection uses the select flag as target because this is needed for the truncate functionality. The parameters shown in the drop down menu are set according to the EPC Class1 Gen2 specification.
- length of known EPC: This value (decimal form) defines how many bits of the PC + EPC are already known and will not be received from the data carrier.
- offset relative to PC start where selection starts: This value (decimal form) defines the offset compared to the first bit of the protocol control bits where the selection in the data carrier memory will start at.
- selection mask: This value (hexadecimal form) contains all known bits of PC and EPC. At least the entire PC bits have to be stored here otherwise the truncate functionality will not work. If not all bits of the last byte are being used, the bits have to be stored left-aligned within the byte to generate a continuous bit stream from MSB to LSB.

4.2.9 Post Read Filter

This page is available with TN…-Q120L130-H1147 and TN…-Q175L200-H1147.

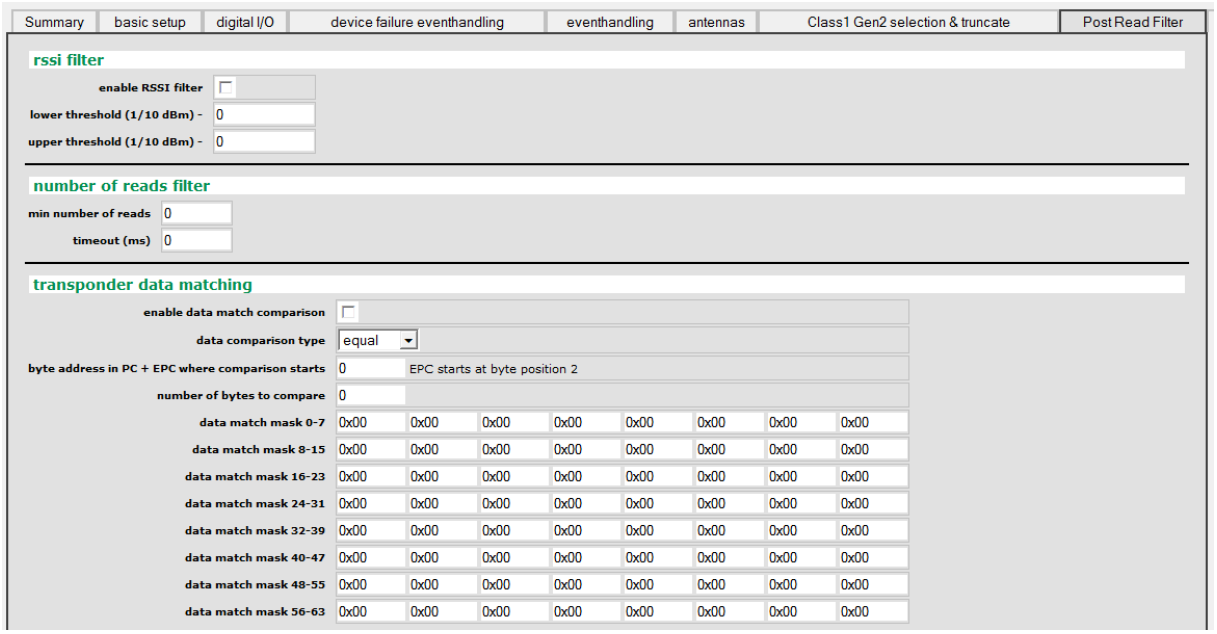


Fig. 15: Post Read Filter

RSSI Filter

- enable RSSI filter: This check box activates the RSSI filter function. If the RSSI of a data carrier is outside of the defined range, no data carrier read event will be generated. The RSSI filter will work only if "diagnostics data: transponder RSSI" is activated (see chapter "Basic Setup").
- lower threshold (1/10 dBm): This negative value defines the lower threshold for the RSSI filter in steps of 1/10 dBm. For data carriers with a higher RSSI value then defined by this parameter, no data carrier read event will be generated. Lower threshold must have a lower value than upper threshold.
- upper threshold (1/10 dBm): This negative value defines the upper threshold for the RSSI filter in steps of 1/10 dBm. For data carriers with a lower RSSI value then defined by this parameter, no data carrier read event will be generated. Upper threshold must have a higher value than lower threshold.

number of reads filter

A data carrier read event will be generated only, if the data carrier has been read for the number of times defined by parameter "min number of rounds". If the data carrier has not been read enough times before the timeout is exceeded, it will be erased from read/write head memory and no event will be generated. The timeout is defined by parameter "timout (ms)". The number of reads filter will only work if "read mode = anticollision" is selected (see chapter "Basic Setup")

transponder data matching
See chapter "Data Matching".

4.2.10 Data Matching

With this function data of the EPC memory bank can be analyzed and filtered by the read/write head. Accordingly, it is possible to suppress transmission of data carrier reads to the Host or PC.
This filter function will not reduce traffic on the air interface. All transmitted EPCs will be filtered by the device. For a high data carrier population we recommend to use the selection function using "Class1 Gen2 Selection & truncate function", chapter 4.2.8).

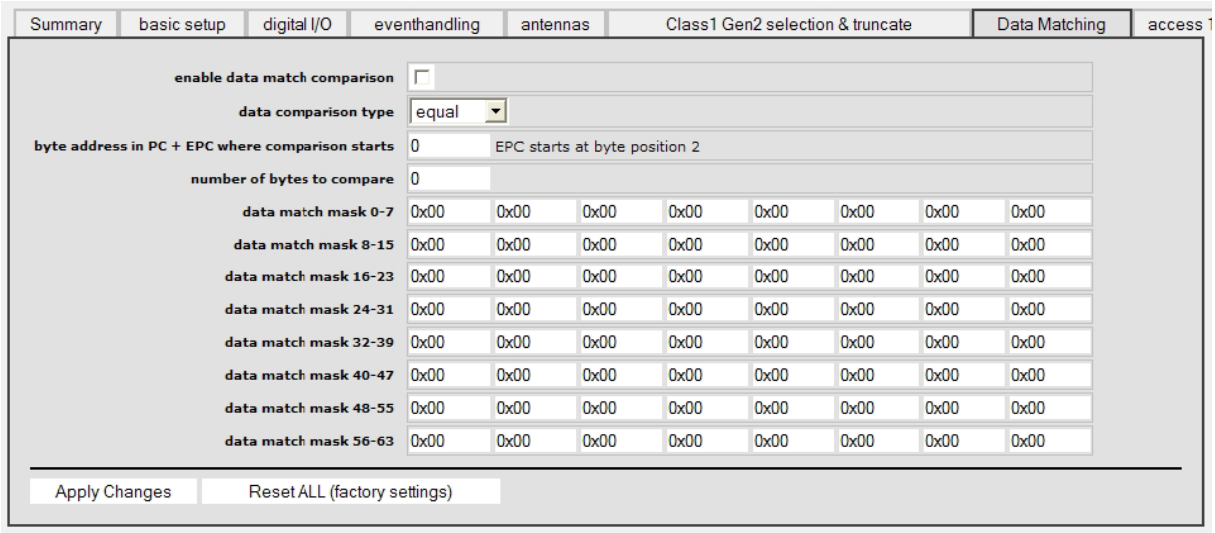


Fig. 16: Data matching

- enable data match comparison: This check box activates the data match comparison functionality.
- data comparison type: This value defines how the received data is being compared to the given mask.
- byte addresses in EPC where comparison starts: This value (decimal) defines a byte offset to the first byte of the PC where the comparison will start. The data will be sent to the read/write head as follows: PC, EPC, CRC-16. This data is being analyzed and compared by the read/write head. In order to start a comparison of the EPC this value has to be set to 2.
- number of bytes to compare: This value (decimal) defines the number of bytes within the comparison mask.
- data match mask: These bytes define the comparison mask.

4.2.11 Access

Up to 4 different access settings can be used to execute data carrier functions automatically during the reading process. The access settings 1…4 will be successively performed starting with the lowest access setting and ending with the highest access setting number. In case an access function can not be executed on a data carrier, the sequence will stop. Following access settings will not be executed.

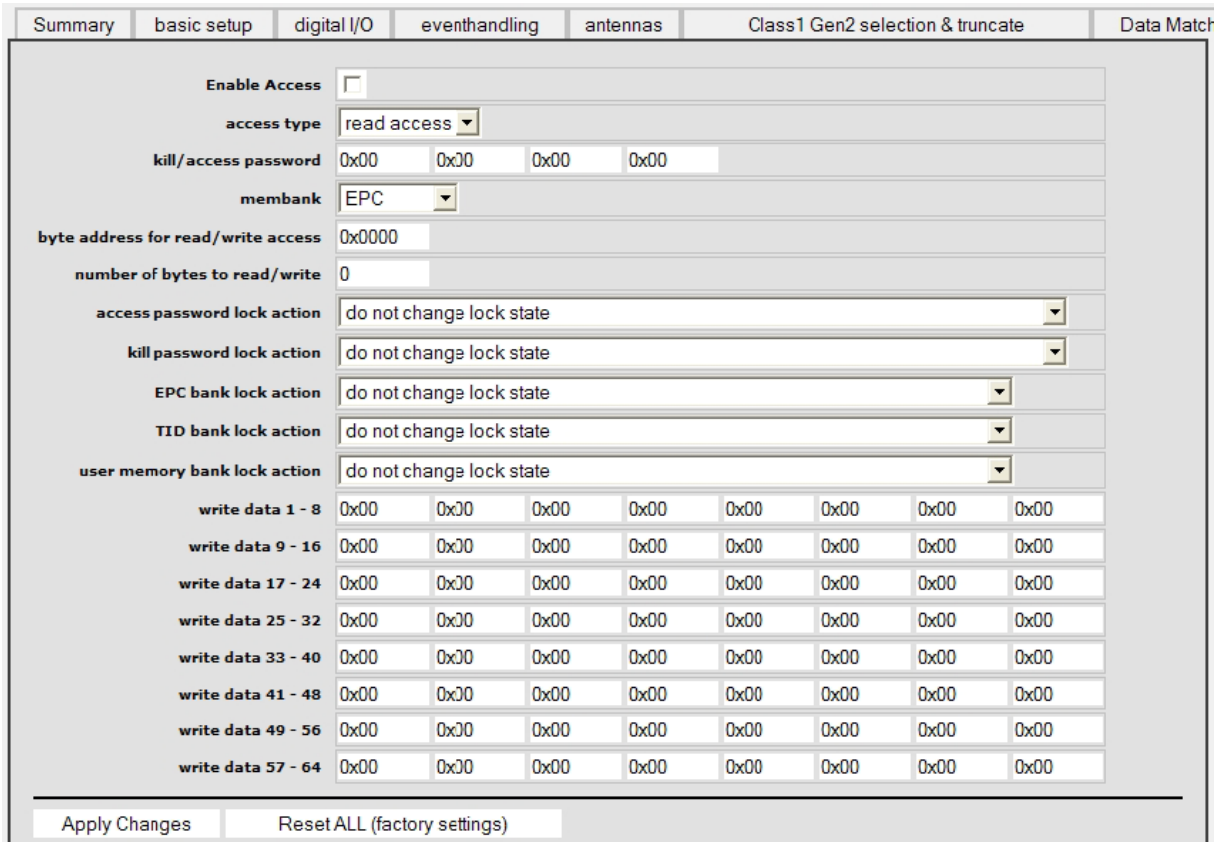


Fig. 17: Access

- Enable Access: This check box activates the according access process.
- access type: This parameter defines the type of access that is made.
- kill/access password: These hexadecimal values define the access password for an access or the kill password for a kill access.
- membank: This parameter defines the target memory bank for the access if applicable. The memory bank has to be defined for read access, write access and lock access.
- byte address for resd/write access: These bytes (hexadecimal form) define the target byte address in the selected memory bank for read and write access. E.g. for a read/write access on the EPC, this value has to be set to 0x0004.
- number of bytes to read/write: This value (decimal) defines how many bytes will be read or written.
- Lock action for access password, kill password, EPC bank, TID bank and user memory bank: These values define the lock action for the according password or memory bank according to the EPC Class1 Gen2 specification.
- write data: This table holds the data which will be written to a data carrier during a write access.

4.2.12 Frequency Setup

In this menu the channels used by the device can be activated.

NOTE

ETSI 302 208 V1.1 allows 15 channels.
ETSI 302 208 V1.2 allows 4 channels (No. 4, 7, 10, 13)
FCC Part 15 (US) allows 50 channels.
Asia (Korea) allows 6 channels (No. 2, 5, 8, 11, 14, 17).

The read/write head has to be configured accordingly. For the channel setting see chapter 2.11.1. This page is only shown for European and Japanese read/write heads.

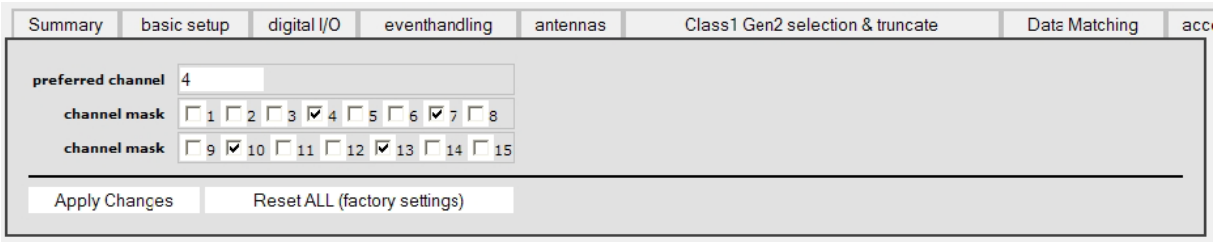


Fig. 18: Frequency Setup

- preferred channel: This value defines the channel number that is preferred before the read/write head uses other channels.
- channel mask: This mask defines the channels which may be used by the read/write head. Each check box that is activated enables the use of the corresponding channel. The channel mask depends on the used regulation.

Table of Frequencies

ETSI 302 208 V1,1 (EU) LBT			**ETSI 302 208 V1.2 (EU) DRM**
CH No.	**Frequency**	**ERP**	**ERP**
1	865.1 MHz	≤ 100 mW	
2	865.3 MHz	≤ 100 mW	[1]
3	865.5 MHz	≤ 100 mW	[1]
4	865.7 MHz	≤ 2.00 W	≤ 2.00 W [2]
5	865.9 MHz	≤ 2.00 W	[1]
6	866.1 MHz	≤ 2.00 W	[1]
7	866.3 MHz	≤ 2.00 W	≤ 2.00 W [2]
8	866.5 MHz	≤ 2.00 W	[1]
9	866.7 MHz	≤ 2.00 W	[1]
10	866.9 MHz	≤ 2.00 W	≤ 2.00 W [2]
11	867.1 MHz	≤ 2.00 W	[1]
12	867.3 MHz	≤ 2.00 W	[1]
13	867.5 MHz	≤ 2.00 W	≤ 2.00 W [2]
14	867.7 MHz	≤ 500 mW	[1]
15	867.9 MHz	≤ 500 mW	[1]

[1] Data carrier response, low power channel
[2] Interrogator signal, high power channel

ETSI 302 208 V1,1 (EU) LBT		
CH No.	**Frequency**	**EIRP**
1	902.25 MHz	≤ 4.00 W
2	902.75 MHz	≤ 4.00 W
3	903.25 MHz	≤ 4.00 W
4	903.75 MHz	≤ 4.00 W
…	…	…
47	925.25 MHz	≤ 4.00 W
48	925.75 MHz	≤ 4.00 W
49	926.25 MHz	≤ 4.00 W
50	926.75 MHz	≤ 4.00 W

4.2.13 Inventory Profiles

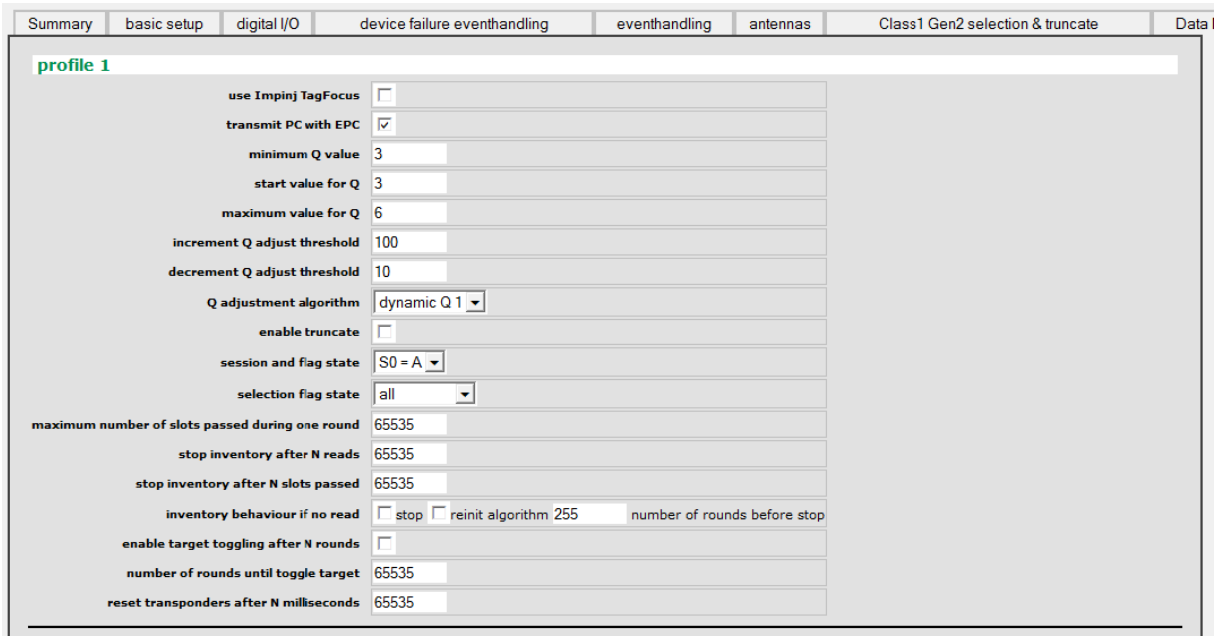


Fig. 19: Inventory Profiles

- Use Impinj® Tag Focus®: This function will transmit a TagFocus® command every 500 ms while data carriers are read. If no data carriers are read the TagFocus® command will not be sent. The TagFocus® command can only work on Session 1 flag (S1).
- Transmit PC with EPC: In addition to the EPC the PC Bytes will be transmitted in the serial number message. The PC bytes are 2 bytes long and precede the EPC.
- minimum Q value: This value defines the minimum value for the slot count parameter Q.
- start value for Q: This value defines the value for the slot count parameter Q at the start of the inventory algorithm.
- maximum Q value: This value defines the maximum value for the slot count parameter Q.
- increment Q adjust threshold: This value defines a threshold for the Q correction value. If the correction value is higher than the threshold, Q is incremented or not depending on the Q algorithm. The correction value is calculated as follows: correction value = number of collisions × 100 / number of free slots
- decrement Q adjust threshold: This value defines a threshold for the Q correction value. If the correction value is less than the threshold, Q is decremented or not depending on the Q algorithm.
- Q adjustment algorithm: This parameter defines which algorithm will be used:

static Q	Q will remain on its start value
dynamic Q 1	Q will be decremented by 1 if the correction value is less than the decrement threshold. Q will be incremented by 1 if the correction value is higher than the threshold.
dynamic Q 2	Q will be decremented by 2 if the correction value is less than the decrement threshold. Q will not be changed if the correction value is higher than the threshold and it will decremented by 1 otherwise.

- enable truncate: Activation of the truncate function to send a truncated reply to the read/write head.
- session and flag state: This parameter defines which of the session flags and which target flag state is being used for the inventory process.
- selection flag state: This parameter defines the selection flag state. If the flag is not used, the parameter should be set to "all".
- maximum number of slots passed during one round: This value defines the maximum number of slots that will be checked during one round. It is a way to start a new round although not all slots have been checked. A value of 65535 deactivate this function.
- stop inventory after N reads: These bytes define after how many data carrier reads the inventory will be stopped. This parameter has only effect if "read mode = anticollision" is selected (see chapter "Basic Setup"). A value of 65535 deactivates this function.
- stop inventory after N slots passed: These bytes define after how many slots the inventory will be stopped. This

value is the total amount of slots since inventory start, not only for one round. This parameter has only effect if "read mode = anticollision" is selected (see chapter "Basic Setup"). A value of 65535 deactivates this function.

- inventory behaviour if no read: stop: Stop inventory if no data carrier is read. This parameter has only effect if "read mode = anticollision" is selected (see chapter "Basic Setup").
- inventory behaviour if no read: reinit algorithm: Reinitialize inventory parameters if no read within given number of rounds. Also produce a 5 ms field gap to wakeup Session 0 data carriers. This parameter has only effect if "read mode = anticollision" is selected (see chapter "Basic Setup").
- inventory behaviour if no read: N number of rounds before stop: Stop inventory if no data carrier is read within the defined number of anticollision rounds. This feature is only used if the "inventory behaviour if no read: stop" feature is enabled. 255 is the maximum value. This parameter has only effect if "read mode = anticollision" is selected (see chapter "Basic Setup").
- enable target toggling after N rounds: Enable toggle session flag state after N anticollison rounds. This parameter has only effect if "read mode = anticollision" is selected (see chapter "Basic Setup").
- number of rounds until toggle target: This value defines after how many anticollision rounds the session flag state will be toggled. This parameter has only effect if "read mode = anticollision" is selected (see chapter "Basic Setup"). A value of 65535 deactivates this function.
- reset transponder after N milliseconds: This value defines the number of milliseconds until a reset command is sent to the data carriers. This parameter has only effect if "read mode = anticollision" is selected (see chapter "Basic Setup"). A value of 65535 deactivates this function.

Q-value

The Q value defines the number of slots of an anticollision round. The number of slots is calculated as follows:
number of slots = 2^Q
with Q = 0…15:

Q-value		Number of slots
Q = 0	2^0	1
Q = 1	2^1	2
Q = 2	2^2	4
Q = 3	2^3	8
Q = 4	2^4	13
Q = 5	2^5	32
Q = 6	2^6	64
Q = 7	2^7	128
Q = 8	2^8	256
Q = 9	2^9	512
Q = 10	2^{10}	1024
Q = 11	2^{11}	2048
Q = 12	2^{12}	4096
Q = 13	2^{13}	8192
Q = 14	2^{14}	16384
Q = 15	2^{15}	32768

4.2.14 Link Profiles

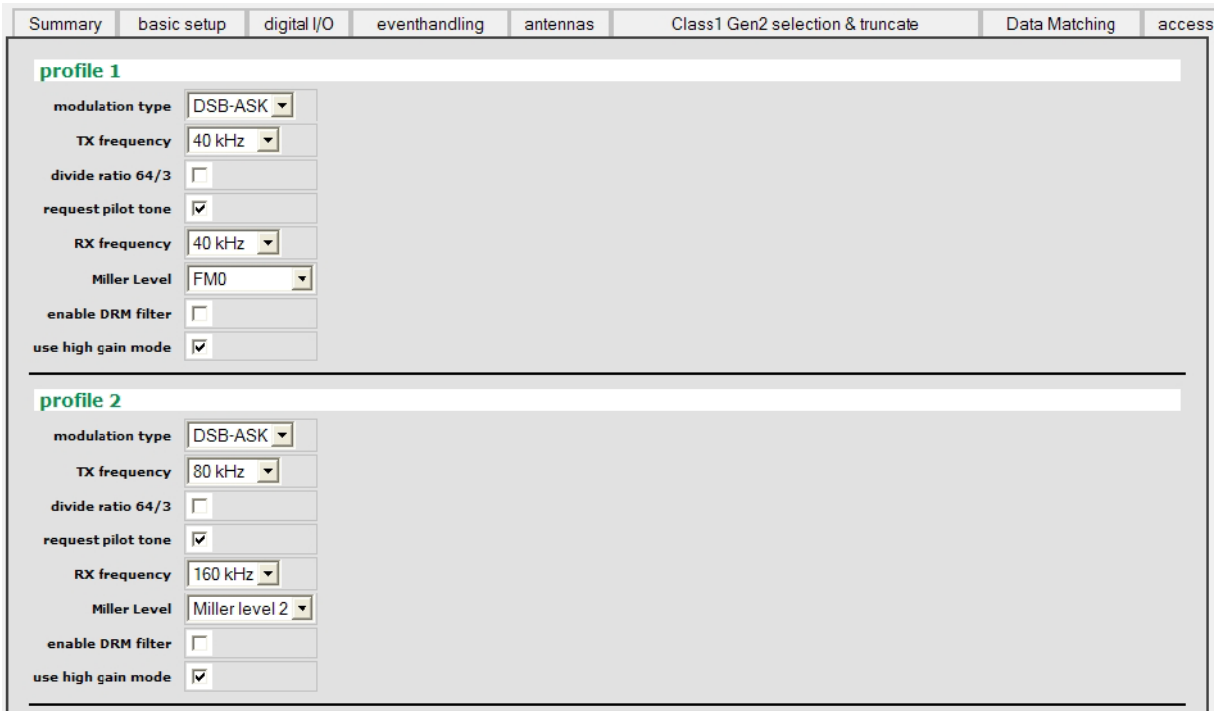


Fig. 20: Link Profiles

- Modulation type: The read/write head currently supports 2 different modulation types, PR- ASK and DSB-ASK.
- TX frequency: read/write head to data carrier frequency (1/Tari)
- divide ratio 64/3: If the check box is activated, the divider ratio is 64/3. If not, the divider is set to 8.
- request pilot tone: Using the pilot tone (TRext = 1) of the Query command.
- RX frequency: Link frequency (data carrier reply frequency)
- Miller Level: This parameter defines the Miller coding level.
- enable DRM filter: If large co-channel interference is expected it is recommended to enable the DRM filter. This enables a co-channel interferer rejection of about 30 dB and an adjacent channel interferer rejection of about 20 dB. The DRM filter is available on, TN…-Q175L200-H1147 and TN…-Q240L280-H1147.
- use high gain mode: To increase the RX sensitivity it is possible to increase the gain of the RF stage. This gives an additional gain of about 6 dB. This feature should be disabled if large interferers (>10 dBm at the antenna port) are expected that might cause a saturation of the RX path.
  Profiles 3 and 4 are so called Dense Reader Mode (DRM) profiles. These profiles allow several read/write heads to transmit on the same frequency. Profile 4 is optimized for European frequency regulations and profile 3 is optimized for US.
  The parameters divide ratio 64/3, TRcal and Tari are depending on each other. The read/write heads only supports a small subset of the available range. The divide ratio can be adapted by the read/write head automatically but the other parameters have to be set appropriately.

5 Installing the software

WebConfing is automatically installed with RDemo. For further information about RDemo see D500008 "BL ident® Software RDemo for UHF read/write heads".

6 Using the software

6.1 Starting WebConfig

➤ Start RDemo.

➤ Click the WebConfig button in the menu bar.

Fig. 21: WebConfig button

➥ RDemo is closed.

➥ WebConfig is started.

6.2 Extended Configuration Access

In order to get access to the extended configuration, proceed as follows:

➤ Press "Ctrl"+"Shift"+two times "p" on your keyboard.

➥ The "Service Mode Selection" window is opened.

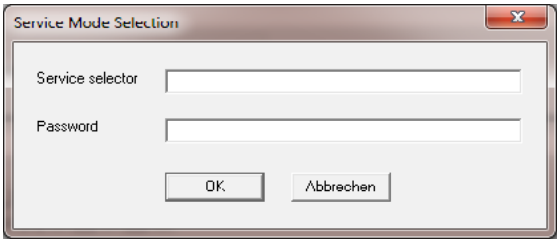


Fig. 22: "Service Mode Selection" window

➤ To access the advanced configuration menu enter:
Service selector: 1
Password: advanced

➤ To access the complete configuration menu enter:
Service selector: 2
Password: showall

6.3 Example Settings

6.3.1 Selection: Example 1

Setting the SL Flag = 1 of all data carriers with the first 16 bits of EPC = $AABB_{hex}$ and reading all data carriers with SL Flag = 1 and Session Flag S0 = A

➤ Alter the parameters in the menu "Class1 Gen2 selection and truncate" as shown in Fig. 25.

➤ To confirm click "Apply Changes".

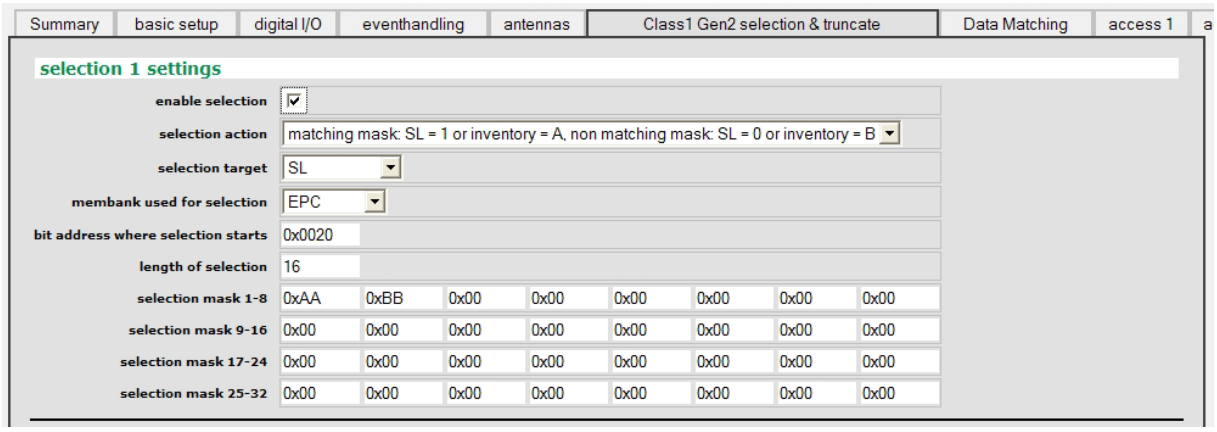


Fig. 23: selection 1 settings

➤ Alter the parameter "selection flag state" in the dedicated inventory profile as shown in Fig. 26.

➤ To confirm click "Apply Changes".

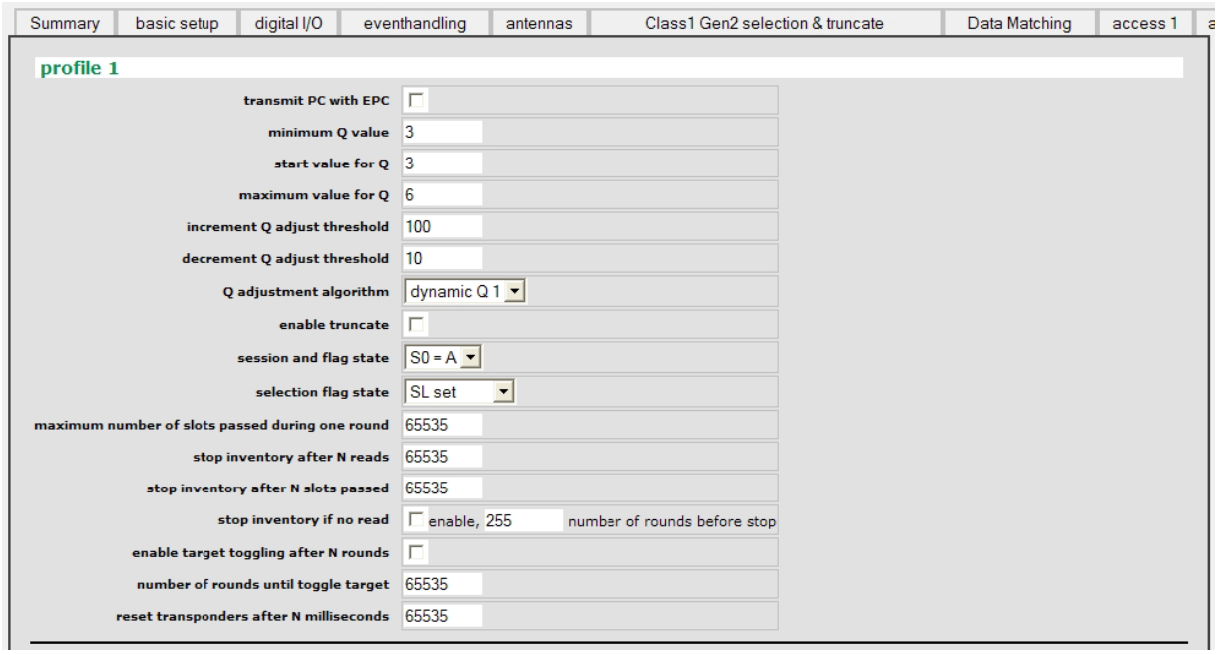


Fig. 24: Parameter „selection flag state"

6.3.2 Selection: Example 2

Reading all data carriers with 10 bits of EPC = 1101100101_{bin} at start position $2F_{hex}$ only. Setting the SL Flag = 1 of those data carriers and reading all data carriers with SL Flag = 1 and Session Flag S1 = A. The EPC begins at address 20_{hex} of the memory bank EPC.

➤ Alter the parameters in the menu "Class1 Gen2 selection and truncate" as shown in Fig. 25.

➤ To confirm click "Apply Changes".

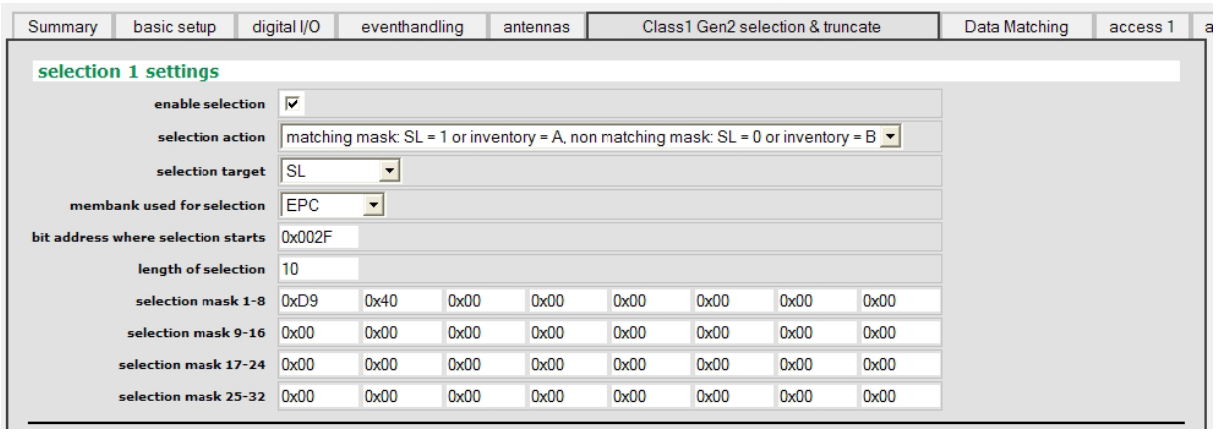


Fig. 25: selection 1 settings

➤ Alter the parameters "session and flag state" and "selection flag state" as follows:

➤ To confirm click "Apply Changes"

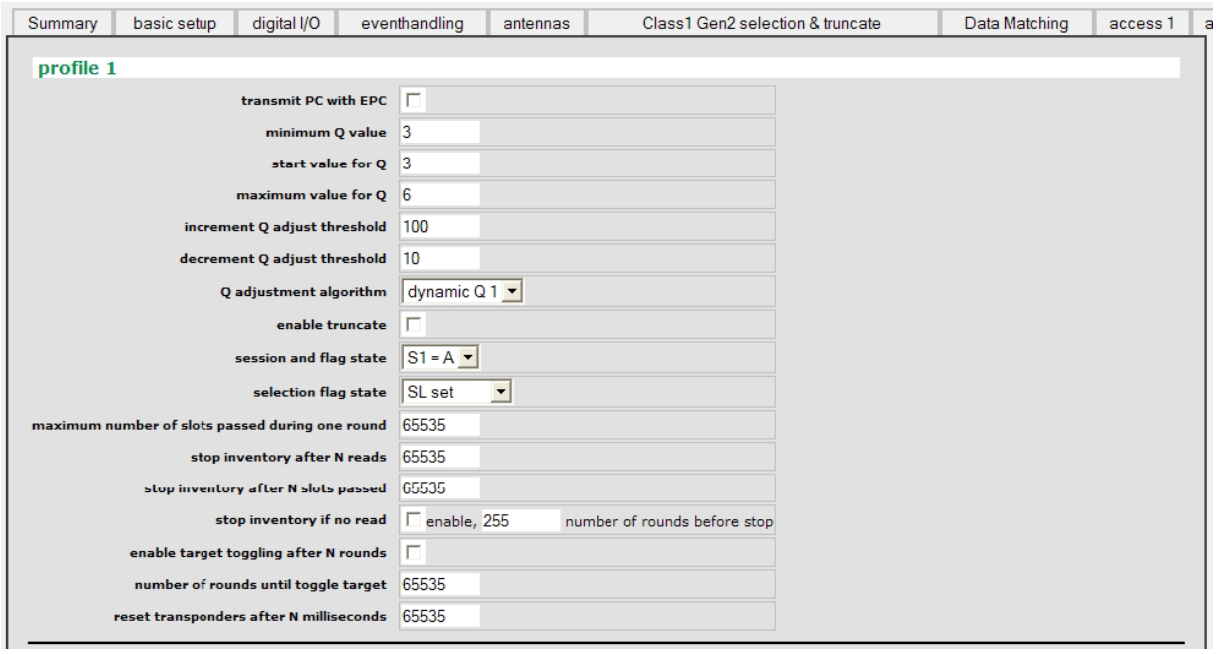


Fig. 26: Parameters "session and flag state" and "selection flag state"

Building the selection mask

➤ Fill the selection mask byte by byte.

➤ Fill the 10 bit selection bits with zeros to form a 2 byte mask as shown in the example below:

$1101\ 1001\ 0100\ 0000_{bin} = D9\ 40_{hex}$

6.3.3 Selection: Example 3

Setting the Inventoried S1 flag = B of all data carriers with the first 16 bits of EPC = $A967_{hex}$ and reading all data carriers with S1 = B (those included which had S1 = B before the selection).

NOTE

The EPC begins at the address 20_{hex} of the memory bank EPC.

➤ Alter the parameters in the menu "Class1 Gen2 selection and truncate" as shown in Fig. 27.
➤ To confirm click "Apply Changes".

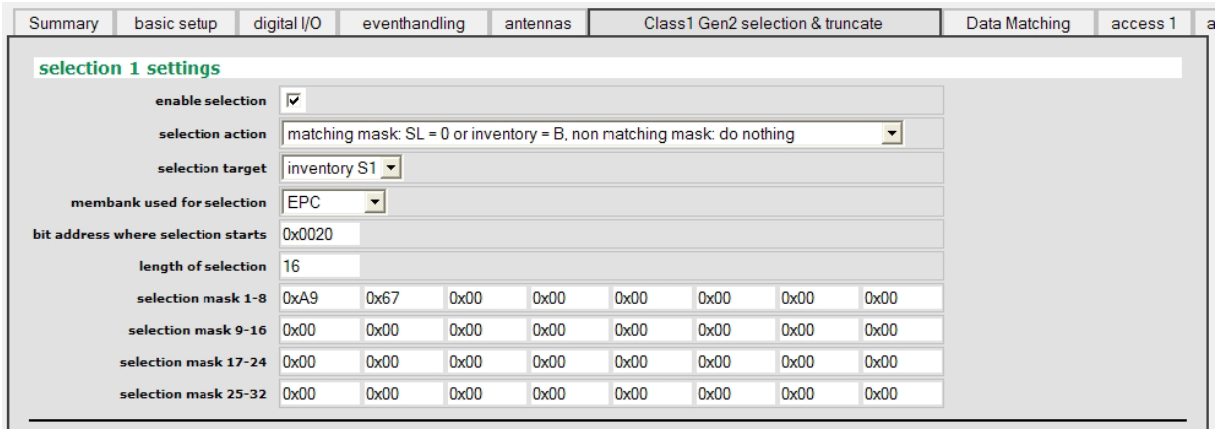


Fig. 27: selection 1 settings

➤ Alter the parameter "session and flag state" as shown in Fig. 28.
➤ To confirm click "Apply Changes".

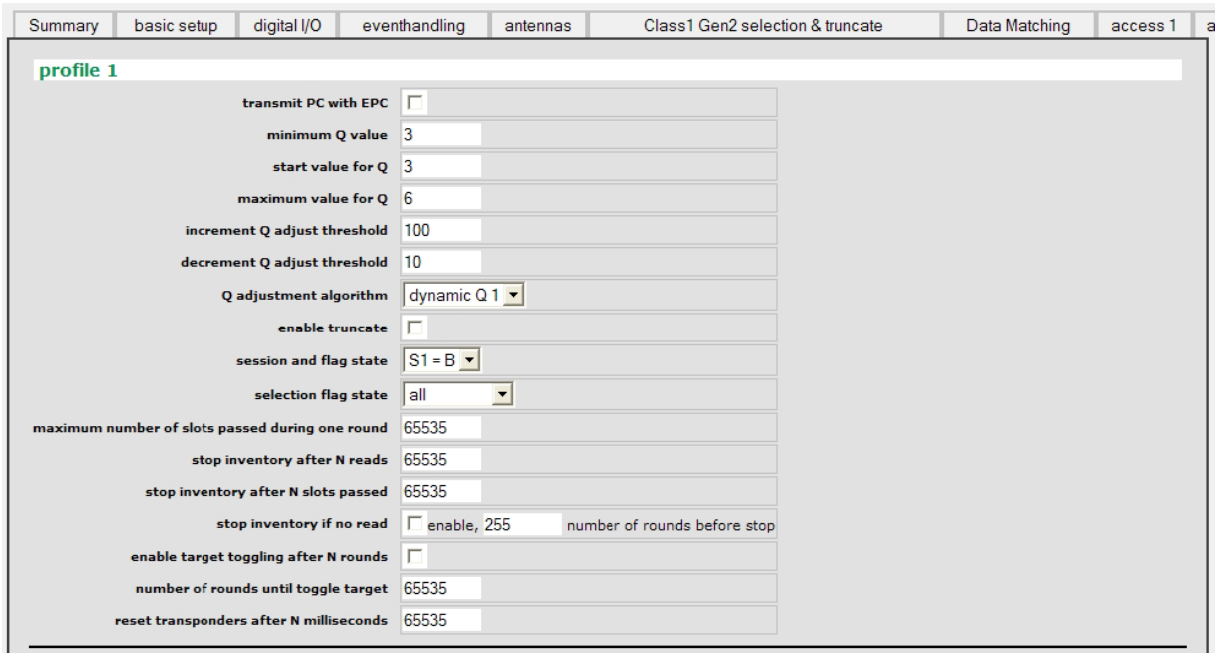


Fig. 28: Parameter "session and flag state"

6.3.4 Selection: Example 4

Reading all data carriers with Session Flag S2 = A. After a data carrier was read, its Session Flag S2 is set to state B.

➤ Alter the parameter "session and flag state" as shown in Fig. 29.
➤ To confirm click "Apply Changes".

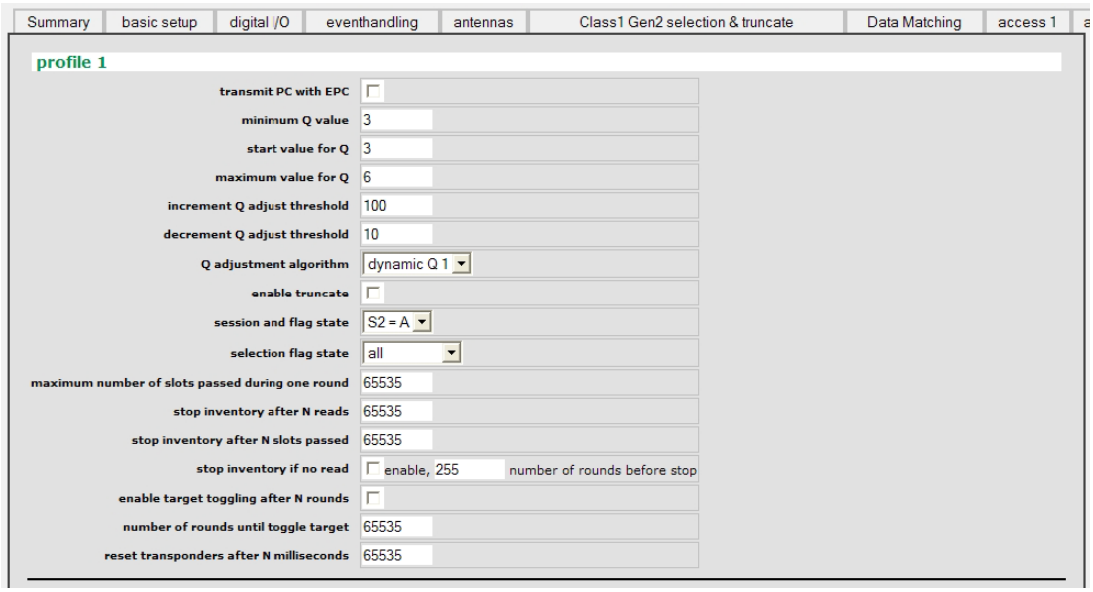


Fig. 29: Parameter "session and flag state"

6.3.5 Selection: Example 5

Reading the truncated reply of all data carriers with S0 flag = A, PC Bits = 3000_{hex} and the beginning of the EPC = 11223344_{hex}.

➤ Alter the parameters in the menu "Class1 Gen2 selection and truncate as shown in Fig. 30.
➤ To confirm click "Apply Changes".

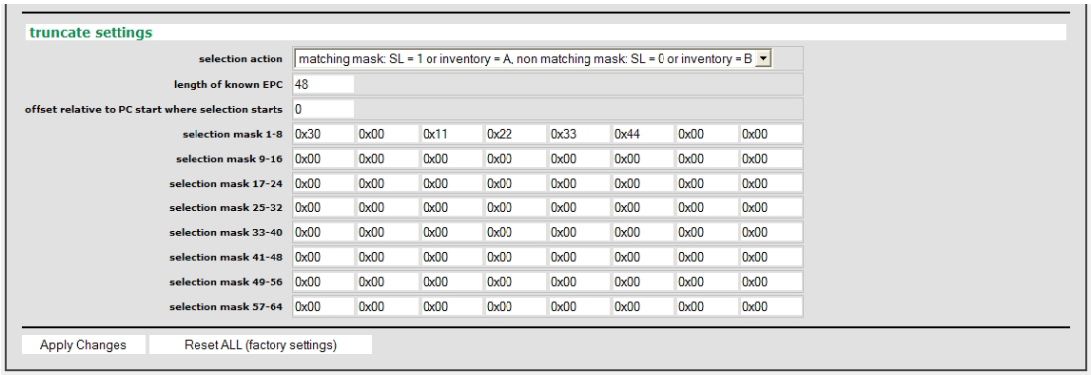


Fig. 30: truncate settings

➤ Alter the parameters “session and flag state” and “selection flag state” as shown in Fig. 31.
➤ To confirm click “Apply Changes”.

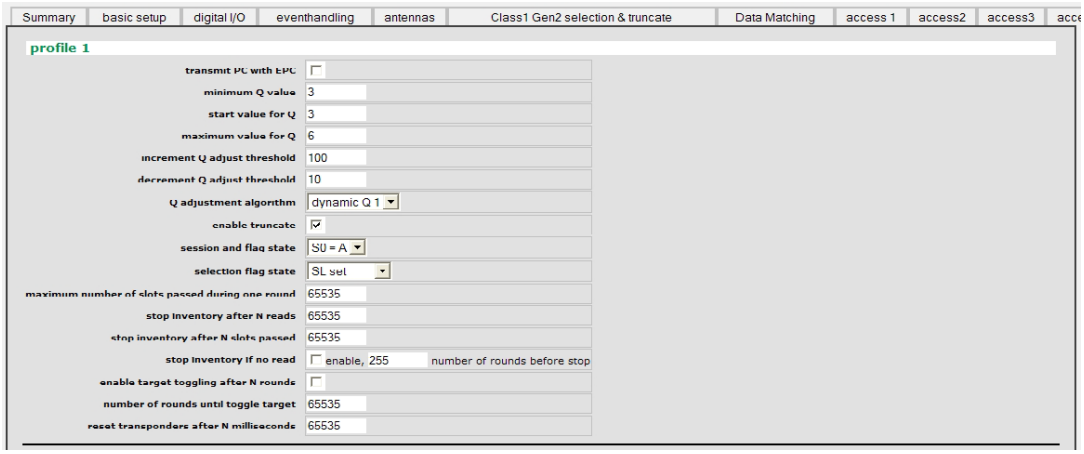


Fig. 31: Parameters “session and flag state” and “selection flag state”

6.3.6 Data matching: Example

Reading data carrier only with the first 4 Bytes of EPC = AABBCCDD$_{hex}$.

➤ Alter the parameters in the menu “Data Matching” as shown in Fig. 32:
➤ To confirm click “Apply Changes”.

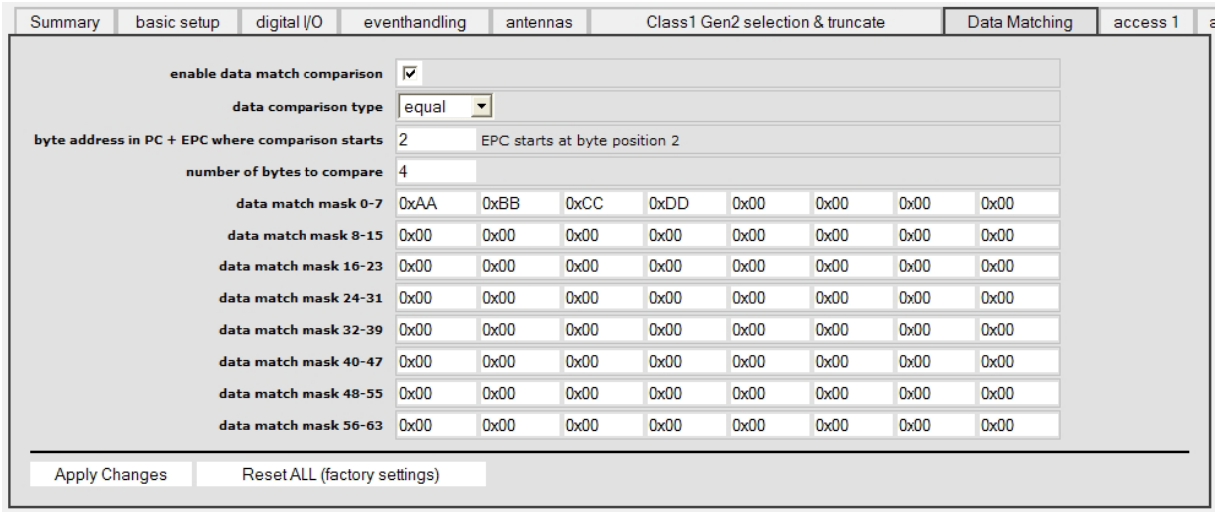


Fig. 32: Data match mask

6.3.7 Access: Example 1

Writing permanently 8 byte = 1111222233334444_{hex} to bank PASSWORD with the offset = 0. This data blocks contain the Kill password (set to 11112222_{hex}) and the Access password (set to 33334444_{hex}).

➤ Alter the parameters in the menu "access1" as shown in Fig. 33.
➤ To confirm click "Apply Changes".

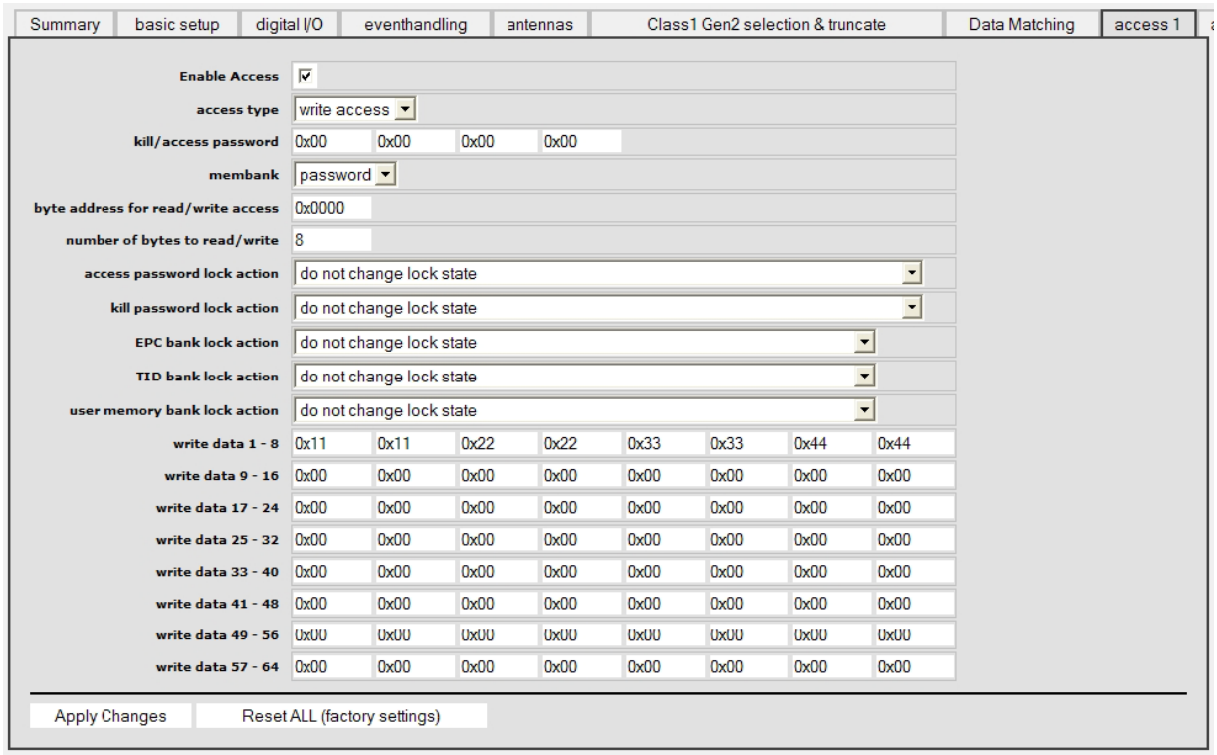


Fig. 33: Access1

Hans Turck GmbH & Co. KG • Tel. +49 208/4952-0 • Fax +49 208/4952-264

6.3.8 Access: Example 2

Reading permanently the first 4 bytes (2 blocks) of bank TID.

➤ Alter the parameters in the menu "access1" as shown in Fig. 34.
➤ To confirm click "Apply Changes".

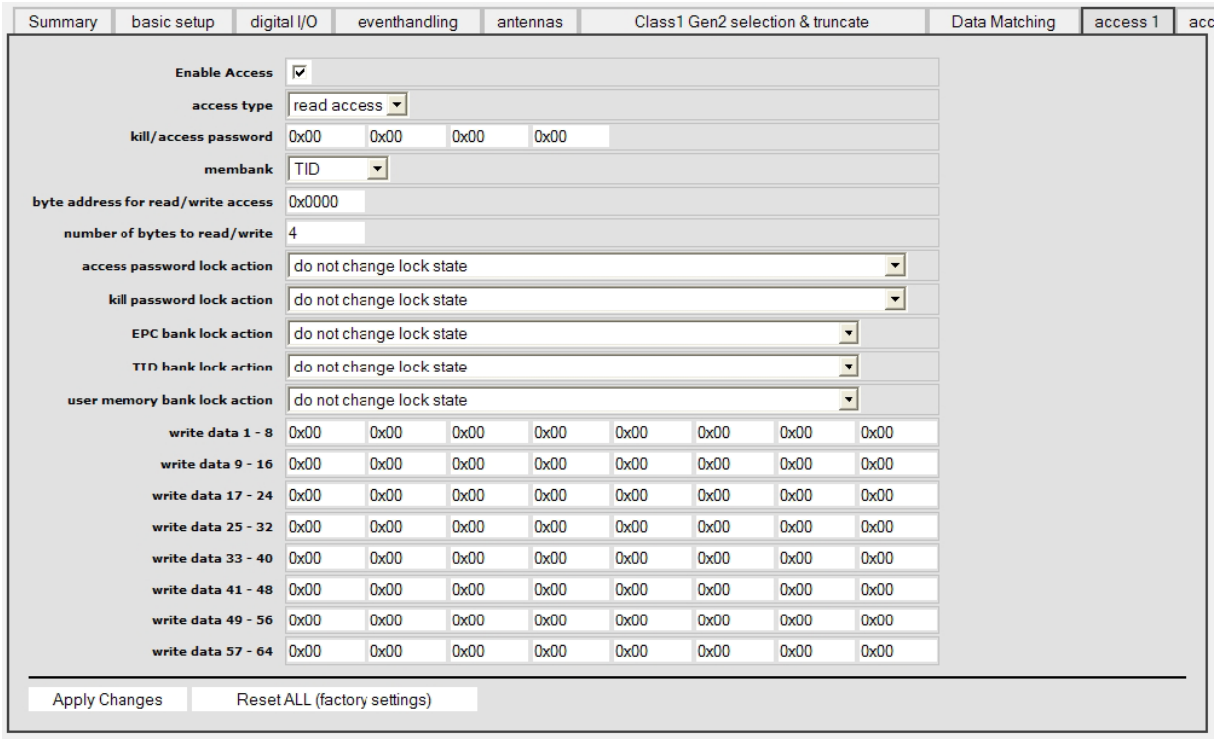


Fig. 34: Access1

6.3.9 Access: Example 3

Reading permanently 12 bytes (6 blocks) of bank EPC with an offset of 4 bytes.

➤ Alter the parameters in the menu "access1" as shown in Fig. 35.
➤ To confirm click "Apply Changes".

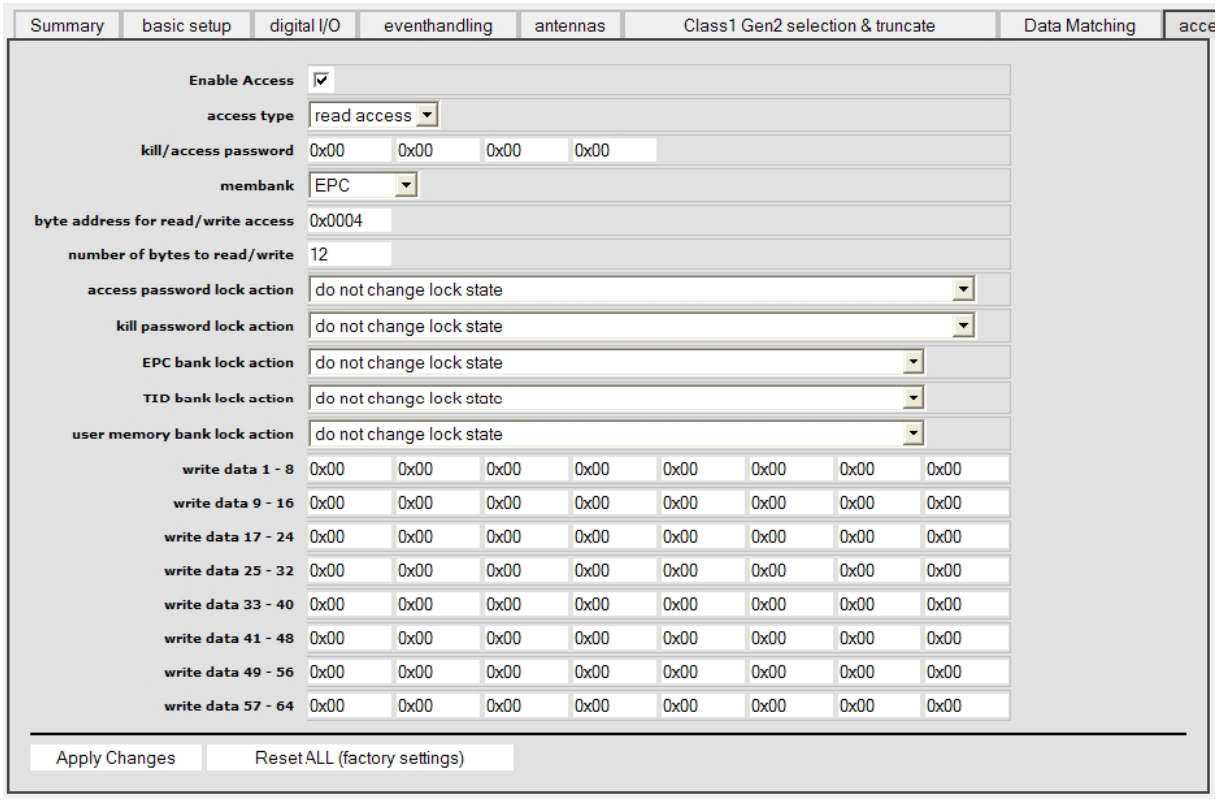


Fig. 35: Access1

6.3.10 Access: Example 4

Changing the lock state of a data carrier with access password = 01020304_{hex}. Set the kill password and the access password to state "only read-/writeable from secured state – password protected".

This requires two data carrier function commands. Therefore two access pages have to be configured accordingly. The shown example uses pages access 1 and access 2.

➤ Alter the parameters in the menu "access1" as shown in Fig. 36.
➤ To confirm click "Apply changes".

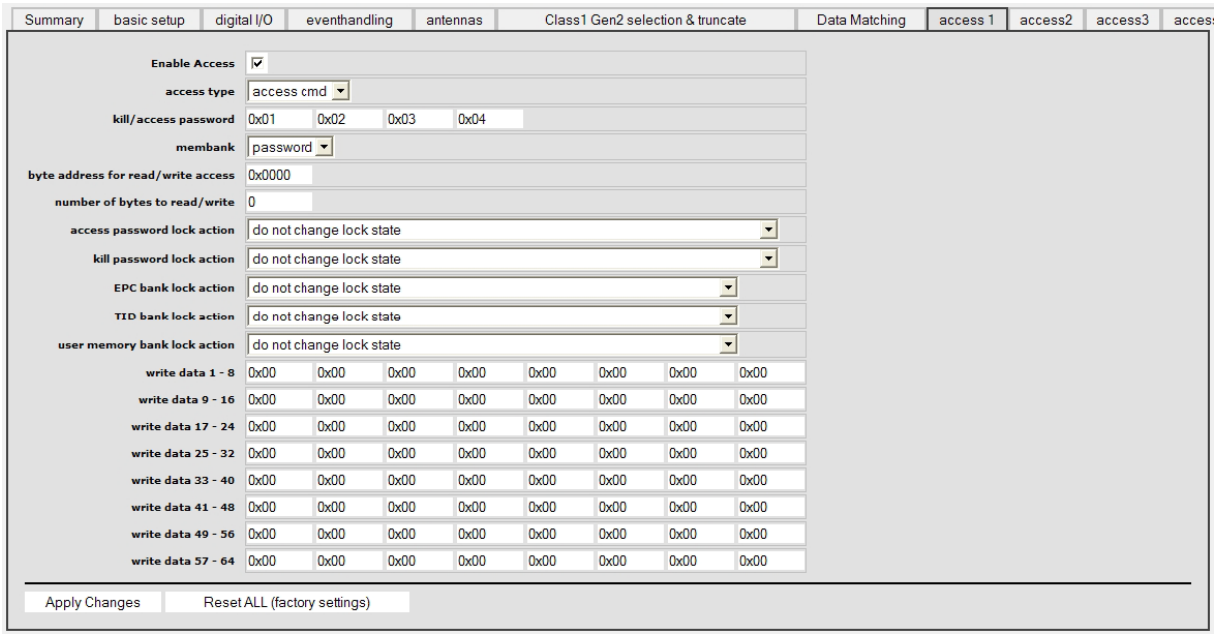


Fig. 36: Access1

➤ Alter the parameters in the menu "access2" as shown in Fig. 37
➤ To confirm click "Apply Changes".

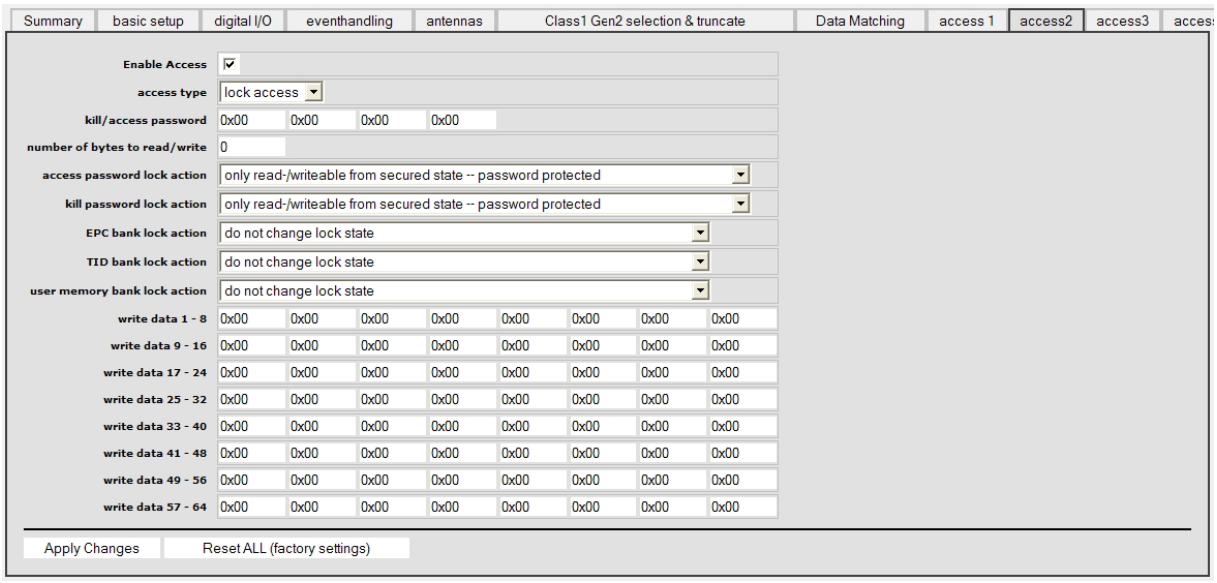


Fig. 37: Access2

6.3.11 Antennas: Example

Using linear polarisation of the antenna and switch between vertical and horizontal orientation automatically using a cycle time of 200 ms. Output power = 32 dBm (1580 mW) ERP.

➤ Alter the parameters in the menu "antenna" as shown in Fig. 38.
➤ To confirm click "Apply Changes".

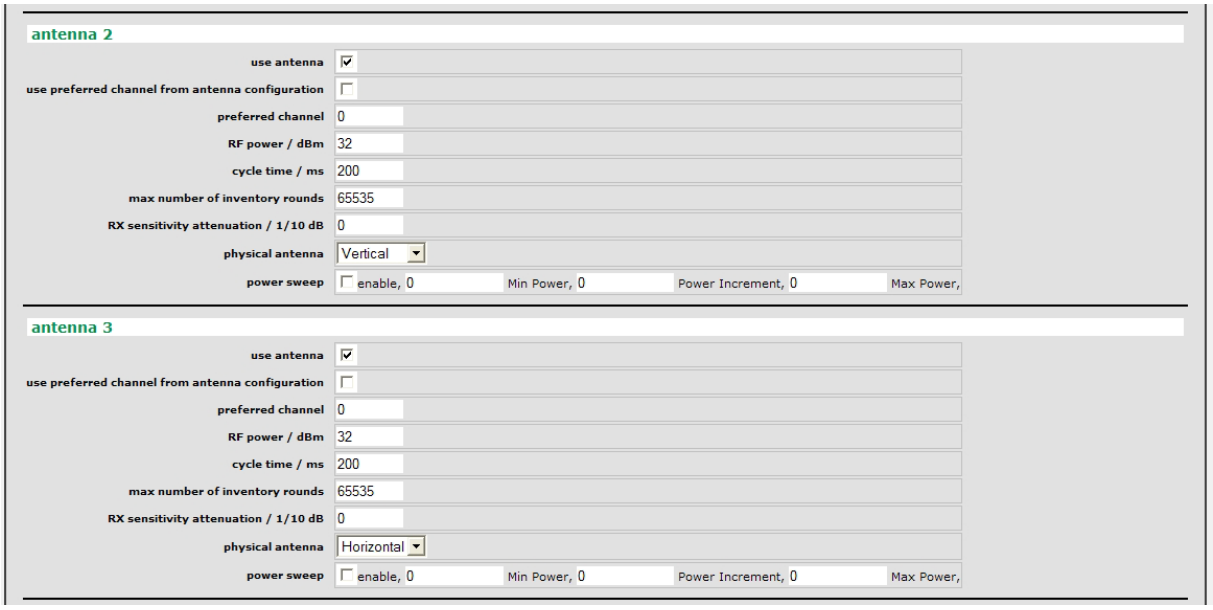


Fig. 38: Antennas

➤ Alter the antenna sequence as shown in Fig. 39.
➤ To confirm click "Apply Changes".

Fig. 39: Antenna Sequence

Hans Turck GmbH & Co. KG • Tel. +49 208/4952-0 • Fax +49 208/4952-264

TURCK

Industrial
Automation

Your Global
Automation Partner!

WORLDWIDE HEADQUARTERS

Hans Turck GmbH & Co. KG
Witzlebenstr. 7
45472 Muelheim an der Ruhr
Germany
Tel. +49 208 4952-0
Fax +49 208 4952-264
E-Mail more@turck.com
Internet www.turck.com

D500010 2014/10