

**RFID TRANSPONDER TECHNOLOGY** 

## **TRW SERIAL TYPE K – TITAN**



TRW-PCB



TRW-USB



TRW-POCKET USB



TRW-SHELL



TRW-BOX

1.0 FEATURES AND SPECIFICATIONS The TRW is a Front Side Tag Reader/Writer with built-in Antenna.

INTERFACE OPTIONS: TTL - RS232 - RS485 - USB

TRANSPONDERS SUPPORTED: Type TITAN-EM4150-EM4450

#### 2.0 VERSIONS Т

| TRW-TTL-KS-5  | TTL interface. Polling.                                  |
|---------------|--|
| TRW-TTL-KH-5  | TTL interface. Spontaneous.                              |
| TRW-232-KS-12 | RS232 interface. Polling.                                |
| TRW-232-KH-12 | RS232 interface. Spontaneous.                            |
| TRW-485-KS-12 | RS485 interface. Polling.                                |
| TRW-USB-KS-5  | USB2.0 interface. Polling. Powered by USB connector.     |
| TRW-USB-KH-5  | USB2.0 interface. Spontaneous. Powered by USB connector. |
|               |  |

Glossary: K=TAG type TITAN S= Polling mode H= Spontaneous mode 12/5= Power supply



#### **CONNECTION TRW-485**

The on-board connector is an 8 pin .1" soldering type.

| Pin Number | Description |                        |
|------------|-------------|------------------------|
| 1          | +12VDC      |                        |
| 2          | GND         |                        |
| 3          | RS485-A     |                        |
| 4          | RS485-B     |                        |
| 5          | No Connect. |                        |
| 6          | No Connect  |                        |
| 7          | Out1        | Open Collector output. |
| 8          | LED-OUT     | TTL out internal 1k?   |

#### DIMENSIONS PCB USB ASSEMBLED



#### CONNECTIONS TRW-TTL

The on-board connector is an 8 pin .1" soldering type.

| Pin Number | Descriptio | n                              |
|------------|------------|--------------------------------|
| 1          | +5VDC      |                                |
| 2          | GND        |                                |
| 3          | RX         | TTL input                      |
| 4          | ТХ         | TTL output                     |
| 5          | Spare      | TTL i/o                        |
| 6          | Spare      | TTL i/o                        |
| 7          | Out1       | Open Collector output.         |
| 8          | LED-OUT    | TTL output trough internal 1k? |

### CONNECTION TRW-232

The on-board connector is an 8 pin  $\ .1''$  soldering type.

| Pin Number | Description |                        |
|------------|-------------|------------------------|
| 1          | +12VDC      |                        |
| 2          | GND         |                        |
| 3          | RX          | RS232 input            |
| 4          | TX          | RS232 output           |
| 5          | No Connect. |                        |
| 6          | No Connect. |                        |
| 7          | Out1        | Open Collector output. |
| 8          | LED-OUT     | TTL out internal 1k?   |

| Pin Number | Description            |
|------------|------------------------|
| 1          | +5VDC from PC          |
| 2          | D+                     |
| 3          | D-                     |
| 4          | GND                    |
| LED        | TTL out (internal 1k?) |

#### 2.2 INSTALL



Due to the Radio Frequency emissions of the Reader Antenna is important to avoid the usage of metal panels in front, rear and lateral sides of the Reader.

Although the TRW provides an high resistance to EMC corruption, avoid to install it in high RF emission environments, the reading distance may result reduced.

#### 3.0 PROTOCOL

| The standard protocols for the T<br>-KS Polling               | standard protocols for the TRW are:<br>Polling Suitable for application where the Host continuously polls the TRW.<br>Is simple but force the HOST to be always operative else is absence of TAG. |  |  |  |  |
|---|---|--|--|--|--|
| -KH Spontaneous   | Suitable for application point to point. The TRW transmits data only when a TAG is really preser<br>The HOST normally works in receive mode and can operate on other task in absence of TAG.      |  |  |  |  |
| The protocol FORMAT is describ<br>STX<br>DEVICE<br>LENGTH     | ed below.   | Start of string synchronization code.<br>Is the Device Number. For the TRW-TTL/RS232 is always 00H.<br>Is the number of bytes following the LENGTH.<br>Example: STX-DEVICE-LENGTH-FUNCTION-DATA0DATA11-BCC<br>The length is 14 DEC = 0D HEX.   |  |  |  |
| FUNCTION /STATUS<br>DATAO to DATAn<br>PASSWO to PASSW3<br>BCC |   | Is the FUNCTION to be executed or the STATUS of an operation executed.<br>Are the data exchanged for a max of 16 bytes.<br>Is the Password code that permits commands exec on TAG PASSWORD PROTECTED.<br>Is calculated as the XOR of all bytes from STX to last DATA included.<br>Example: STX-DEVICE-LENGTH-STATUS-BCC  202H-00H-02H-01H-BCC<br>where BCC= 01H. |  |  |  |

Due to the internal structure of the TAGs (BLOCK of 4 bytes), the DATA bytes must be multiple of 4. The TAGs first delivery PASSWORD is always 00-00-00.

# 3.1 PROTOCOL KS (Polling) 3.1.1 COMMANDS from HOST to TRW

| COMMAND #S :   | SELD  | LVICE VAL  |   |   |  |   |   |   |   |  |  |  |      |
|--|---|--|---|---|--|---|---|---|---|--|--|--|------|
| DESCRIPTION  | STX   | DEVICE   | LENGTH  | FUNCTION  | DATAC  | ) BC  | С   |   |   |  |  |  |      |
| HEX VALUE  | 02H   | FFH  | 03H   | See below   | 00H to 7   | 7CH 00  | H-FFH   |   |   |  |  |  |      |
| FUNCTION   | VALUE   | DESCRI   | PTION   | •   |  |   |   |   |   |  |  |  |      |
| SET DEVICE   | 61H   | The device   | ce number is s  | set into the TRV  | / memory   | . Must be e   | xecuted on a  | any TRW   | / one-  | by-one b   | efor to  | install.   |      |
|  |   | In DATA  | ) insert the DI   | EVICE NUMBER  | assigned t   | to TR.  |   |   |   |  |  |  |      |
| COMMAND#P :  | POLL  |  |   |   |  |   |   |   |   | _  |  |  |      |
| DESCRIPTION  | SIX   | DEVICE   | LENGIH  | FUNCTION  | FRB  | N-  | BLOCKS  | BCC   |   |  |  |  |      |
| HEX VALUE  | 02H   | 00H  | 04H   | See below   | 00H - 2  | 1H 01   | H - 04H   | 00H   | -FFH  |  |  |  |      |
| FUNCTION   | VALUE   | DESCRIPTI  | ON  |   |  |   |   |   |   |  |  |  |      |
| POLL DATA  | 04H   | The Tag  | data are read   | in sequential or  | der from t   | the First Re  | ad Block (FF  | RB) for N   | I-BLO   | CKS (max   | κ4).   |  |      |
| 001414110-40   | WDITE   | DATA   |   |   |  |   |   |   |   |  |  |  |      |
| COMMAND#0 :  |   |  |   | EUNCTION  | EV   | 1/D   |   | D   | 1/2210  | 10   | D  | 10000  |      |
|  | 0211  |  |   | FUNCTION<br>See below   |  | 1EU   |   | P   | H to  |  | . P.   |  |      |
| HEA VALUE  | U2H   | 001  |   | See below   | 038 -  |   |   | 00  |   | -FH  | 001  |  |      |
| DITIO  | D T   |  |   |   |  |   |   |   |   |  |  |  |      |
| DATAO  | DATATS  | BCC  |   |   |  |   |   |   |   |  |  |  |      |
| OOH to FFH   | OOH to FI   | -H 00H-FF  | Н   |   |  |   |   |   |   |  |  |  |      |
| FUNCTION   | VALUE   | DESCOIDTI  | ON  |   |  |   |   |   |   |  |  |  |      |
|  |   | DESCRIPTION  |   |   |  |   |   |   |   |  |  |  |      |
| WRITE DATA P   | 20H   | This con   | nmand use t   | he PASSWORI   | D. If the P  | assword co  | mparison is   | right, D  | ATA0  | to DATA  | n are w  | vritten  |      |
| WRITE DATA P   | 20H   | This con<br>in seque   | nmand use t<br>ntial order inte   | the PASSWORI  | D. If the P<br>n the First   | Password co<br>Write Block  | mparison is<br>k (FWB) for  | right, D.<br>N-BLOCI  | ATAO<br>KS (m                                       | to DATA<br>ax 4).  | n are w  | vritten  |      |
| WRITE DATA P<br>WRITE DATANP   | 20H   | This con<br>in seque<br>This con   | nmand use t<br>ntial order into<br>nmand don'i  | the PASSWORI<br>the TAG, fron<br>tuse the PASS  | D. If the P<br>n the First<br>WORD. 1  | Password co<br>Write Block<br>The field PA  | omparison is<br>k (FWB) for<br>SSW0 to PA   | right, D.<br>N-BLOCI<br>SSW3 ca   | ATAO<br>KS (m<br>an be                              | to DATA<br>ax 4).<br>filled wit  | n are w<br>h any   | vritten  |      |
| WRITE DATA P<br>WRITE DATANP   | 20H<br>22H  | This con<br>in sequer<br>This con<br>value. DA   | nmand use t<br>ntial order inte<br>nmand don'i<br>ATAO to DATA  | the PASSWORI<br>the TAG, fron<br>tuse the PASS<br>n are written in  | D. If the P<br>n the First<br>WORD. T<br>sequentia   | Password co<br>Write Block<br>The field PA<br>Il order into   | omparison is<br>k (FWB) for<br>SSW0 to PA<br>the TAG, fi  | right, D.<br>N-BLOCH<br>SSW3 ca<br>om the   | ATAO<br>KS (m<br>an be<br>First '                   | to DATA<br>ax 4).<br>filled wit<br>Write Blo   | n are w<br>h any<br>ck (FW                                     | vritten<br>B)  |      |
| WRITE DATA P<br>WRITE DATANP   | 20H<br>22H  | This con<br>in sequer<br>This con<br>value. DA<br>for N-BLC  | nmand use t<br>ntial order into<br>nmand don't<br>ATA0 to DATA<br>DCKS (max 4)  | he PASSWORI<br>o the TAG, fron<br>t use the PASS<br>n are written in  | D. If the P<br>n the First<br>WORD. 1<br>sequentia   | Password cc<br>Write Block<br>The field PA<br>Il order into   | mparison is<br>k (FWB) for<br>SSW0 to PA<br>the TAG, fi   | right, D.<br>N-BLOCH<br>SSW3 ca<br>rom the  | ATA0<br>KS (m<br>an be<br>First '                   | to DATA<br>ax 4).<br>filled wit<br>Write Blo   | n are w<br>h any<br>ck (FW                                     | vritten<br>'B)   |      |
| WRITE DATA P<br>WRITE DATANP<br>COMMAND#1 :  | 20H<br>22H<br>CHANG   | This con<br>in sequer<br>This con<br>value. DA<br>for N-BLC  | nmand use t<br>ntial order inte<br>nmand don't<br>NTAO to DATA<br>DCKS (max 4)  | he PASSWORI<br>o the TAG, fron<br>t use the PASS<br>n are written in  | D. If the P<br>n the First<br>SWORD. 1<br>sequentia  | Password cc<br>Write Block<br>The field PA<br>Il order into   | mparison is<br>k (FWB) for<br>SSW0 to PA<br>the TAG, fi   | right, D.<br>N-BLOCI<br>SSW3 ca<br>om the   | ATAO<br>KS (m<br>an be<br>First '                   | to DATA<br>ax 4).<br>filled wit<br>Nrite Blo   | n are w<br>h any<br>ck (FW                                     | vritten<br>18)   |      |
| WRITE DATA P<br>WRITE DATANP<br>COMMAND#1 :<br>DESCRIPTION   | 20H<br>22H<br>CHANC   | This con<br>in seque<br>This con<br>value. DA<br>for N-BLC<br>GE CONFIGUI<br>DEVICE  | nmand use t<br>ntial order inte<br>mmand don'i<br>NTA0 to DATA<br>OCKS (max 4)<br>RATION<br>LENGTH  | he PASSWORI<br>o the TAG, from<br>t use the PASS<br>n are written in<br>FUNCTION  | D. If the P<br>in the First<br>WORD. 1<br>sequentia  | Password cc<br>Write Block<br>The field PA<br>Il order into<br>N-BLOCK  | mparison is<br>k (FWB) for<br>SSW0 to PA<br>the TAG, fi<br>S PASS   | right, D.<br>N-BLOCI<br>SSW3 ca<br>rom the  | ATAO<br>KS (m<br>an be<br>First '                   | to DATA<br>ax 4).<br>filled wit<br>Write Blo<br>PASSV  | n are w<br>h any<br>ck (FW<br>V3                               | vritten<br>'B)<br>First Block Read                                     | able |
| WRITE DATA P<br>WRITE DATANP<br>COMMAND#1 :<br>DESCRIPTION<br>HEX VALUE  | 20H<br>22H<br>CHANC<br>STX<br>02H   | This con<br>in seque<br>This con<br>value. DA<br>for N-BLC<br>GE CONFIGUI<br>DEVICE<br>00H   | nmand use t<br>nmand don'i<br>nmand don'i<br>NTA0 to DATA<br>DCKS (max 4)<br>RATION<br>LENGTH<br>OCH  | he PASSWORI<br>o the TAG, fron<br>t use the PASS<br>n are written in<br>FUNCTION<br>See below   | D. If the P<br>the First<br>WORD. T<br>sequentia   | Password cc<br>Write Block<br>The field PA<br>Il order into<br>N-BLOCK<br>01H   | mparison is<br>k (FWB) for<br>SSW0 to PA<br>the TAG, fr<br><u>S PAS</u><br>00H t  | right, D.<br>N-BLOCH<br>SSW3 ca<br>rom the<br>SW0<br>D FFH                                  | ATAO<br>KS (m<br>an be<br>First '                   | to DATA<br>ax 4).<br>filled wit<br>Write Blo<br>PASSV<br>00H to  | n are w<br>h any<br>ck (FW<br><u>V3</u><br>FFH                 | vritten<br>/B)<br>First Block Read<br>03H to 21H                       | ıble |
| WRITE DATA P<br>WRITE DATANP<br>COMMAND#1 :<br>DESCRIPTION<br>HEX VALUE  | 20H<br>22H<br>CHANC<br>STX<br>02H   | This con<br>in seque<br>This con<br>value. DA<br>for N-BLC<br>SE CONFIGUI<br>DEVICE<br>00H   | nmand use t<br>ntial order into<br>nmand don't<br>ATAO to DATA<br>DCKS (max 4)<br>RATION<br>LENGTH<br>OCH   | he PASSWORI<br>o the TAG, from<br>t use the PASS<br>n are written in<br>FUNCTION<br>See below   | D. If the P<br>the First<br>WORD. T<br>sequentia<br>FWB<br>02H                                       | Password cc<br>Write Bloc<br>The field PA<br>Il order into<br>N-BLOCK<br>01H  | mparison is<br>k (FWB) for<br>SSW0 to PA<br>the TAG, fr<br>S PASS<br>00H t  | right, D.<br>N-BLOCH<br>SSW3 ca<br>rom the<br>SW0<br>D FFH                                  | ATAO<br>KS (m<br>an be<br>First '                   | to DATA<br>ax 4).<br>filled wit<br>Write Blo<br>PASSV<br>00H to  | n are w<br>h any<br>ck (FW<br>V3<br>FFH                        | Vritten<br>B)<br>First Block Read<br>03H to 21H                        | able |
| WRITE DATA P<br>WRITE DATANP<br>COMMAND#1 :<br>DESCRIPTION<br>HEX VALUE  | 20H<br>22H<br>CHANC<br>STX<br>02H<br>Pass   | This con<br>in seque<br>This con<br>value. DA<br>for N-BLC<br>SE CONFIGUI<br>DEVICE<br>00H   | nmand use t<br>ntial order into<br>nmand don't<br>ATAO to DATA<br>DCKS (max 4)<br>RATION<br>LENGTH<br>OCH<br>SPARE  | he PASSWOR<br>o the TAG, from<br>t use the PASS<br>n are written in<br>FUNCTION<br>See below<br>BCC   | D. If the P<br>the First<br>WORD. 1<br>sequentia   | Password cc<br>Write Bloc<br>The field PA<br>Il order into<br>N-BLOCK<br>01H  | mparison is<br>k (FWB) for<br>SSW0 to PA<br>the TAG, fi<br>S PAS:<br>00H t  | right, D.<br>N-BLOCH<br>SSW3 ca<br>om the<br>SW0<br>o FFH                                   | ATAO<br>KS (m<br>an be<br>First '                   | to DATA<br>ax 4).<br>filled wit<br>Write Blo<br>PASSV<br>00H to  | n are w<br>h any<br>ck (FW<br>V3<br>FFH                        | Vritten<br>B)<br>First Block Read<br>03H to 21H                        | able |
| WRITE DATA P<br>WRITE DATANP<br>COMMAND#1 :<br>DESCRIPTION<br>HEX VALUE  | 20H<br>22H<br>CHANC<br>STX<br>02H<br>Pass<br>00H(1  | This con<br>in seque<br>This con<br>value. DA<br>for N-BLC<br>BE CONFIGUI<br>DEVICE<br>00H   | nmand use t<br>ntial order into<br>nmand don't<br>ATAO to DATA<br>DCKS (max 4)<br>RATION<br>LENGTH<br>OCH<br>SPARE<br>00H   | he PASSWORI<br>o the TAG, from<br>t use the PASS<br>n are written in<br>FUNCTION<br>See below<br>BCC<br>00H-FFH   | D. If the P<br>the First<br>WORD. 1<br>sequentia   | Password cc<br>Write Bloc<br>The field PA<br>Il order into<br><u>N-BLOCK</u><br>01H                                       | smparison is<br>k (FWB) for<br>SSW0 to PA<br>the TAG, fi<br>S PAS:<br>00H t   | right, D.<br>N-BLOCI<br>SSW3 cz<br>om the<br>SW0<br>o FFH                                   | ATAO<br>KS (m<br>an be<br>First '                   | to DATA<br>ax 4).<br>filled wit<br>Nrite Blo<br>PASSV<br>00H to  | n are w<br>h any<br>ck (FW<br><u>V3</u><br>FFH                 | Written<br>B)<br>First Block Reac<br>03H to 21H                        | able |
| WRITE DATA P<br>WRITE DATANP<br>COMMAND#1 :<br>DESCRIPTION<br>HEX VALUE<br>Last Block Readable<br>03H to 21H<br>EUNCTION   | 20H<br>22H<br>CHANC<br>STX<br>02H<br>Pas:<br>00H(<br>VALUE  | This con<br>in seque<br>This con<br>value. DA<br>for N-BLC<br>BE CONFIGUI<br>DEVICE<br>00H   | ATAO to DATA<br>TAO to DATA<br>DCKS (max 4)<br>RATION<br>LENGTH<br>OCH<br>SPARE<br>00H  | he PASSWORI<br>o the TAG, from<br>t use the PASS<br>n are written in<br>FUNCTION<br>See below<br>BCC<br>00H-FFH   | D. If the P<br>on the First<br>SWORD. T<br>sequentia<br>FWB<br>02H                                   | Password cc<br>Write Bloc<br>The field PA<br>Il order into<br><u>N-BLOCK</u><br>01H                                       | smparison is<br>k (FWB) for<br>SSW0 to PA<br>the TAG, fi<br>S PAS:<br>00H t   | right, D.<br>N-BLOCI<br>SSW3 cz<br>om the<br>SW0<br>o FFH                                   | ATAO<br>KS (m<br>an be<br>First '                   | to DATA<br>ax 4).<br>filled wit<br>Write Blo<br>PASSV<br>00H to  | n are w<br>h any<br>ck (FW<br><u>V3</u><br>FFH                 | Written<br>B)<br>First Block Reac<br>03H to 21H                        | able |
| WRITE DATA P<br>WRITE DATANP<br>COMMAND#1 :<br>DESCRIPTION<br>HEX VALUE<br>Last Block Readable<br>03H to 21H<br>FUNCTION<br>CHANGE CONF  | 20H<br>22H<br>CHANC<br>STX<br>02H<br>Pass<br>00H(I<br>VALUE<br>80H  | This con<br>in seque<br>This con<br>value. DA<br>for N-BLC<br>BE CONFIGUI<br>DEVICE<br>00H<br>Sword Check<br>no) 01H(yes)<br>DESCRIPTION   | ATAO to DATA<br>TAO to DATA<br>DCKS (max 4)<br>RATION<br>LENGTH<br>OCH<br>SPARE<br>00H<br>ON<br>Ssword compa  | he PASSWORI<br>o the TAG, from<br>t use the PASS<br>n are written in<br>FUNCTION<br>See below<br>BCC<br>00H-FFH<br>arison is right. D   | D. If the P<br>n the First<br>WORD. 1<br>sequentia<br>FWB<br>02H                                     | Password cc<br>Write Bloc<br>The field PA<br>Il order into<br>N-BLOCK<br>01H  | mparison is<br>k (FWB) for<br>SSW0 to PA<br>the TAG, fi<br>S PAS:<br>00H t  | right, D.<br>N-BLOCK<br>SSW3 ca<br>rom the<br>rom the<br>SWO<br>D FFH                       | ATAO<br><s (m<br="">an be<br/>First '</s>           | to DATA<br>ax 4).<br>filled wit<br>Write Blo<br>PASSV<br>00H to  | n are w<br>h any<br>ck (FW<br>V3<br>FFH                        | Vritten<br>B)<br>First Block Read<br>03H to 21H                        | able |
| WRITE DATA P<br>WRITE DATANP<br>COMMAND#1 :<br>DESCRIPTION<br>HEX VALUE<br>Last Block Readable<br>03H to 21H<br>FUNCTION<br>CHANGE CONF  | 20H<br>22H<br>CHANC<br>STX<br>02H<br>Pass<br>00H(i<br>VALUE<br>80H  | This com<br>in sequer<br>This com<br>value. DA<br>for N-BLC<br>BE CONFIGUI<br>DEVICE<br>00H<br>DEVICE<br>00H<br>Sword Check<br>no) 01H(yes)<br>DESCRIPTIC<br>If the Pas                                | ATAO to DATA<br>ATAO to DATA<br>DCKS (max 4)<br>RATION<br>LENGTH<br>OCH<br>SPARE<br>00H<br>ON   | he PASSWORI<br>o the TAG, from<br>t use the PASS<br>n are written in<br>FUNCTION<br>See below<br>BCC<br>00H-FFH<br>rison is right, D  | D. If the P<br>the First<br>WORD. 1<br>sequentia<br>FWB<br>02H                                       | Password cc<br>Write Bloc<br>The field PA<br>Il order into<br>N-BLOCK<br>01H  | omparison is<br>k (FWB) for<br>SSW0 to PA<br>the TAG, fi<br>S PAS<br>00H t  | right, D.<br>N-BLOCK<br>SSW3 ca<br>rom the<br>SW0<br>D FFH                                  | ATAO<br>KS (m<br>an be<br>First '                   | to DATA<br>ax 4).<br>filled wit<br>Write Blo<br>PASSV<br>00H to  | n are w<br>h any<br>ck (FW<br>V3<br>FFH<br>VORD (              | Vritten<br>B)<br>First Block Read<br>03H to 21H                        | able |
| WRITE DATA P<br>WRITE DATANP<br>COMMAND#1 :<br>DESCRIPTION<br>HEX VALUE<br>Last Block Readable<br>03H to 21H<br>FUNCTION<br>CHANGE CONF<br>IF YOU ENABLE T   | 20H<br>22H<br>22H<br>STX<br>02H<br>Pass<br>00H(I<br>VALUE<br>80H  | This con<br>in sequel<br>This con<br>value. DA<br>for N-BLC<br>DEVICE<br>00H<br>Sword Check<br>no) 01H(yes)<br>DESCRIPTI<br>If the Pas   | ATTION CHAPTER SPARE OOH CHAPTER CHAPT  | he PASSWORI<br>o the TAG, fron<br>t use the PASS<br>n are written in<br>FUNCTION<br>See below<br>BCC<br>00H-FFH<br>arison is right, D<br>ER THE LAST F                          | D. If the P<br>n the First<br>WORD. 1<br>sequentia<br>FWB<br>02H<br>02H                              | Password cc<br>Write Block<br>The field PA<br>Il order into<br>N-BLOCK<br>01H<br>DATA3 are v<br>RD WRITT                  | emparison is<br>k (FWB) for<br>SSW0 to PA<br>the TAG, fr<br>S PASS<br>00H t<br>vritten into t<br>EN IN THE  | right, D.<br>N-BLOCK<br>SSW3 ca<br>om the<br>SWO<br>D FFH<br>he CONF<br>TAG.                | ATAO<br>KS (m<br>an be<br>First '                   | to DATA<br>ax 4).<br>filled wit<br>Write Blo<br>PASSV<br>00H to  | n are w<br>h any<br>ck (FW<br>V3<br>FFH<br>VORD (              | Vritten<br>B)<br>First Block Read<br>03H to 21H                        | able |
| WRITE DATA P<br>WRITE DATANP<br>COMMAND#1 :<br>DESCRIPTION<br>HEX VALUE<br>Last Block Readable<br>03H to 21H<br>FUNCTION<br>CHANGE CONF<br>IF YOU ENABLE T<br>OTHERWISE YOU  | 20H<br>22H<br>22H<br>STX<br>02H<br>Pass<br>00H(I<br>VALUE<br>80H<br>HE PASS<br>R TAG BI   | This con<br>in sequel<br>This con<br>value. DA<br>for N-BLC<br>DEVICE<br>00H<br>Sword Check<br>no) 01H(yes)<br>DESCRIPTIC<br>If the Past<br>WORD CHECE   | Inmand use t<br>Intial order into<br>Inmand don't<br>ATA0 to DATA<br>DCKS (max 4)<br>ILENGTH<br>OCH<br>SPARE<br>00H<br>ON<br>Ssword compa<br>CK, REMEMBA<br>RITEABLE.   | he PASSWORI<br>o the TAG, from<br>t use the PASS<br>n are written in<br>FUNCTION<br>See below<br>BCC<br>00H-FFH<br>rison is right, D<br>ER THE LAST F                           | D. If the P<br>n the First<br>WORD. 1<br>sequentia<br>FWB<br>02H<br>02H                              | Password cc<br>Write Block<br>The field PA<br>Il order into<br>N-BLOCK<br>01H<br>DATA3 are v<br>RD WRITT                  | emparison is<br>k (FWB) for<br>SSW0 to PA<br>the TAG, fr<br>S PASS<br>00H t<br>vritten into t<br>EN IN THE  | right, D.<br>N-BLOCI<br>SSW3 ca<br>om the<br>SW0<br>D FFH                                   | ATAO<br>KS (m<br>an be<br>First <sup>1</sup>        | to DATA<br>ax 4).<br>filled wit<br>Write Blo<br>PASSV<br>00H to  | n are w<br>h any<br>ck (FW<br>V3<br>FFH<br>VORD o              | First Block Read<br>03H to 21H   | able |
| WRITE DATA P<br>WRITE DATANP<br>COMMAND#1 :<br>DESCRIPTION<br>HEX VALUE<br>Last Block Readable<br>03H to 21H<br>FUNCTION<br>CHANGE CONF<br>IF YOU ENABLE T<br>OTHERWISE YOU  | 20H<br>22H<br>CHANC<br>STX<br>02H<br>Pass<br>00H(t<br>VALUE<br>80H<br>HE PASS<br>R TAG BI   | This con<br>in sequel<br>This con<br>value. DA<br>for N-BLC<br>DEVICE<br>00H<br>Sword Check<br>no) 01H(yes)<br>DESCRIPTIO<br>If the Pas<br>WORD CHEC   | Inmand use t<br>Intial order into<br>Inmand don't<br>ATA0 to DATA<br>DCKS (max 4)<br>RATION<br>LENGTH<br>OCH<br>SPARE<br>00H<br>ON<br>Ssword compa<br>RITEABLE.   | he PASSWORI<br>o the TAG, from<br>t use the PASS<br>n are written in<br>FUNCTION<br>See below<br>BCC<br>00H-FFH<br>rrison is right, D<br>ER THE LAST F                          | D. If the P<br>n the First<br>WORD. 1<br>sequentia<br>FWB<br>02H<br>ATA0 to D<br>PASSWOP             | Password cc<br>Write Block<br>The field PA<br>Il order into<br>N-BLOCK<br>01H<br>DATA3 are v<br>RD WRITT                  | wparison is<br>k (FWB) for<br>SSW0 to PA<br>the TAG, fr<br>S PAS<br>00H t<br>vritten into t<br>EN IN THE  | right, D.<br>N-BLOCI<br>SSW3 ca<br>om the<br>SW0<br>D FFH<br>he CONF<br>TAG.                | ATAO<br>KS (m<br>First <sup>1</sup>                 | to DATA<br>ax 4).<br>filled wit<br>Write Blo<br>PASSV<br>00H to  | n are w<br>h any<br>ck (FW<br>V3<br>FFH                        | Vritten<br>B)<br>First Block Read<br>03H to 21H                        | able |
| WRITE DATA P<br>WRITE DATANP<br>COMMAND#1 :<br>DESCRIPTION<br>HEX VALUE<br>Last Block Readable<br>03H to 21H<br>FUNCTION<br>CHANGE CONF<br>IF YOU ENABLE T<br>OTHERWISE YOU<br>COMMAND#3 :   | 20H<br>22H<br>CHANC<br>STX<br>02H<br>Pass<br>00H(I<br>VALUE<br>80H<br>HE PASS<br>R TAG BI<br>WRITE                                | This con<br>in sequel<br>This con<br>value. DA<br>for N-BLC<br>DEVICE<br>00H<br>Sword Check<br>no) 01H(yes)<br>DESCRIPTIO<br>If the Pas<br>WORD CHEC<br>ECOME UNW                                      | Inmand use t<br>Intial order into<br>Inmand don't<br>ATA0 to DATA<br>DCKS (max 4)<br>RATION<br>LENGTH<br>OCH<br>SPARE<br>00H<br>ON<br>Ssword compa  | he PASSWORI<br>o the TAG, from<br>t use the PASS<br>n are written in<br>FUNCTION<br>See below<br>BCC<br>00H-FFH<br>rrison is right, D<br>ER THE LAST F                          | D. If the P<br>n the First<br>WORD. 1<br>sequentia<br>FWB<br>02H<br>ATA0 to E<br>PASSWOF             | Password cc<br>Write Bloc<br>The field PA<br>I order into<br>N-BLOCK<br>01H<br>DATA3 are v<br>RD WRITT                    | mparison is<br>k (FWB) for<br>SSW0 to PA<br>the TAG, fr<br>S PAS<br>00H t<br>vritten into t   | right, D.<br>N-BLOCK<br>SSW3 ca<br>om the<br>SW0<br>D FFH<br>he CONF<br>TAG.                | ATAO<br>KS (m<br>an be<br>First '                   | to DATA<br>ax 4).<br>filled wit<br>Write Blo<br>PASSV<br>00H to  | n are w<br>h any<br>ck (FW<br>V3<br>FFH                        | vritten<br>B)<br>First Block Read<br>03H to 21H<br>of the TAG.         | able |
| WRITE DATA P<br>WRITE DATANP<br>COMMAND#1 :<br>DESCRIPTION<br>HEX VALUE<br>Last Block Readable<br>03H to 21H<br>FUNCTION<br>CHANGE CONF<br>IF YOU ENABLE T<br>OTHERWISE YOU<br>COMMAND#3 :<br>DESCRIPTION                          | 20H<br>22H<br>22H<br>CHANC<br>STX<br>02H<br>Pass<br>00H(i<br>VALUE<br>80H<br>HE PASS<br>R TAG BE<br>WRITE<br>STX                  | This con<br>in seque<br>This con<br>value. DA<br>for N-BLC<br>DEVICE<br>00H<br>Sword Check<br>no) 01H(yes)<br>DESCRIPTIO<br>If the Pas<br>WORD CHEC<br>ECOME UNW<br>PASSWORD<br>DEVICE                 | Inmand use t<br>Intial order into<br>Inmand don't<br>ATA0 to DATA<br>DCKS (max 4)<br>RATION<br>LENGTH<br>OCH<br>SPARE<br>00H<br>ON<br>Ssword compa<br>StK, REMEMBA<br>RITEABLE.   | he PASSWOR<br>o the TAG, fron<br>t use the PASS<br>n are written in<br>FUNCTION<br>See below<br>BCC<br>00H-FFH<br>Irison is right, D<br>ER THE LAST F                           | D. If the P<br>the First<br>WORD. 1<br>sequentia<br>FWB<br>02H<br>ATA0 to D<br>PASSWOF               | Password cc<br>Write Bloc<br>The field PA<br>I order into<br>N-BLOCK<br>N-BLOCK   | smparison is       k (FWB) for       .SSW0 to PA       the TAG, fi       S     PAS:       00H t       vritten into t       EN IN THE       S     O_PP                       | right, D.<br>N-BLOCI<br>SSW3 ca<br>om the<br>SW0<br>o FFH<br>he CONF<br>TAG.                | ATAO<br><s (m<br="">an be<br/>First '</s>           | to DATA<br>ax 4).<br>filled wit<br>Write Blo<br>PASSV<br>00H to<br>20H to<br>24TION V  | n are w<br>h any<br>ck (FW<br>V3<br>FFH<br>VORD (              | vritten<br>'B)<br><u>First Block Read</u><br>03H to 21H<br>of the TAG. | able |
| WRITE DATA P<br>WRITE DATANP<br>COMMAND#1 :<br>DESCRIPTION<br>HEX VALUE<br>Last Block Readable<br>03H to 21H<br>FUNCTION<br>CHANGE CONF<br>IF YOU ENABLE T<br>OTHERWISE YOU<br>COMMAND#3 :<br>DESCRIPTION<br>HEX VALUE             | 20H<br>22H<br>22H<br>CHANC<br>STX<br>02H<br>Pass<br>00H(i<br>VALUE<br>80H<br>HE PASS<br>R TAG BI<br>WRITE<br>STX<br>02H           | This con<br>in seque<br>This con<br>value. DA<br>for N-BLC<br>BE CONFIGUE<br>00H<br>BEVICE<br>00H<br>DEVICE<br>00H<br>DESCRIPTIO<br>If the Pas<br>WORD CHECE<br>ECOME UNW<br>PASSWORD<br>DEVICE<br>00H | Inmand use t<br>Intial order into<br>Inmand don't<br>ATA0 to DATA<br>DCKS (max 4)<br>INTA0 to DATA<br>DCKS (max 4)<br>INTA0 to DATA<br>OCH<br>INTA0 to DATA<br>OCH<br>INTA0 to DATA<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor<br>Strandor | he PASSWOR<br>o the TAG, fron<br>t use the PASS<br>n are written in<br>FUNCTION<br>See below<br>BCC<br>00H-FFH<br>rison is right, D<br>ER THE LAST F                            | D. If the P<br>the First<br>WORD. 1<br>sequentia<br>FWB<br>02H<br>ATA0 to D<br>PASSWOP<br>FWB<br>00H | Password cc<br>Write Bloc<br>The field PA<br>I order into<br>N-BLOCK<br>O1H<br>N-BLOCK<br>01H                             | mparison is<br>k (FWB) for<br>SSW0 to PA<br>the TAG, fi<br><u>S PAS</u><br>00H t<br>vritten into t<br>EN IN THE<br><u>S O_PA</u><br>00H -                                   | right, D.<br>N-BLOCH<br>SSW3 cz<br>om the<br>SW0<br>o FFH<br>he CONF<br>TAG.<br>SSW0<br>FFH | ATAO<br><s (m<br="">an be<br/>First '<br/>FIGUF</s> | to DATA<br>ax 4).<br>filled wit<br>Write Blo<br>PASSV<br>00H to<br>2ATION V<br>C_PAS<br>00H - F  | n are w<br>h any<br>ck (FW<br>V3<br>FFH<br>VORD o<br>SW3<br>FH | vritten<br>'B)<br><u>First Block Reac</u><br>03H to 21H<br>of the TAG. | able |
| WRITE DATA P<br>WRITE DATANP<br>COMMAND#1 :<br>DESCRIPTION<br>HEX VALUE<br>Last Block Readable<br>03H to 21H<br>FUNCTION<br>CHANGE CONF<br>IF YOU ENABLE T<br>OTHERWISE YOU<br>COMMAND#3 :<br>DESCRIPTION<br>HEX VALUE             | 20H<br>22H<br>CHANC<br>STX<br>02H<br>Pass<br>00H(i<br>VALUE<br>80H<br>HE PASS<br>R TAG BI<br>WRITE<br>STX<br>02H                  | This con<br>in seque<br>This con<br>value. DA<br>for N-BLC<br>BE CONFIGUI<br>DEVICE<br>00H<br>BWORD CHECK<br>CECOME UNW<br>PASSWORD<br>DEVICE<br>00H   | Inmand use t<br>Intial order into<br>Inmand don't<br>ATAO to DATA<br>DCKS (max 4)<br>RATION<br>LENGTH<br>OCH<br>SPARE<br>00H<br>ON<br>SSWORD COMPA<br>SSWORD C  | he PASSWOR<br>o the TAG, from<br>t use the PASS<br>n are written in<br>FUNCTION<br>See below<br>BCC<br>00H-FFH<br>rison is right, D<br>ER THE LAST F<br>FUNCTION<br>See below   | D. If the P<br>the First<br>WORD. 1<br>sequentia<br>FWB<br>02H<br>ATA0 to D<br>PASSWOP<br>FWB<br>00H | Password cc<br>Write Bloc<br>The field PA<br>Il order into<br>N-BLOCK<br>01H<br>DATA3 are v<br>RD WRITT<br>N-BLOCK<br>01H | smparison is         k (FWB) for         SSW0 to PA         the TAG, fi         S         00H t         vritten into t         EN IN THE         S       0_PA         00H - | right, D.<br>N-BLOCH<br>SSW3 cz<br>om the<br>SW0<br>o FFH<br>he CONF<br>TAG.<br>SSW0<br>FFH | ATAO<br>(S (m<br>First )<br><br>FIGUF               | to DATA<br>ax 4).<br>filled wit<br>Write Blo<br>PASSV<br>00H to<br>COL PAS<br>00H - F  | n are w<br>h any<br>ck (FW<br>V3<br>FFH<br>VORD o<br>SW3<br>FH | vritten<br>'B)<br>First Block Read<br>03H to 21H<br>of the TAG.        | able |
| WRITE DATA P<br>WRITE DATANP<br>COMMAND#1 :<br>DESCRIPTION<br>HEX VALUE<br>Last Block Readable<br>03H to 21H<br>FUNCTION<br>CHANGE CONF<br>IF YOU ENABLE T<br>OTHERWISE YOU<br>COMMAND#3 :<br>DESCRIPTION<br>HEX VALUE<br>PASSW0 1 | 20H<br>22H<br>22H<br>CHANC<br>STX<br>02H<br>Pass<br>00H(I<br>VALUE<br>80H<br>HE PASS<br>R TAG BI<br>WRITE<br>STX<br>02H<br>PASSW3 | This com<br>in seque<br>This con<br>value. DA<br>for N-BLC<br>BE CONFIGUI<br>DEVICE<br>00H<br>BESCRIPTIO<br>If the Pas<br>WORD CHECC<br>ECOME UNW<br>PASSWORD<br>DEVICE<br>00H<br>BEC                  | Inmand use t<br>Intial order into<br>Inmand don't<br>ATAO to DATA<br>DCKS (max 4)<br>RATION<br>LENGTH<br>OCH<br>SPARE<br>00H<br>ON<br>Ssword compa<br>RITEABLE.   | he PASSWORI<br>o the TAG, from<br>t use the PASS<br>n are written in<br>FUNCTION<br>See below<br>BCC<br>00H-FFH<br>Irison is right, D<br>ER THE LAST F<br>FUNCTION<br>See below | D. If the P<br>the First<br>WORD. 1<br>sequentia<br>FWB<br>02H<br>ATA0 to D<br>PASSWOP<br>FWB<br>00H | Password cc<br>Write Bloc<br>The field PA<br>Il order into<br>N-BLOCK<br>01H<br>DATA3 are v<br>RD WRITT<br>N-BLOCK<br>01H | smparison is         k (FWB) for         .SSW0 to PA         the TAG, fi         00H t         vritten into t         EN IN THE         S       0_PA         00H -          | right, D.<br>N-BLOCK<br>SSW3 cz<br>om the<br>SW0<br>D FFH<br>he CONF<br>TAG.<br>SSW0<br>FFH | ATA0<br><s (m<br="">an be<br/>First '<br/></s>      | to DATA<br>ax 4).<br>filled wit<br>Write Blo<br>OOH to<br>COH TO | n are w<br>h any<br>ck (FW<br>V3<br>FFH<br>VORD o<br>SW3<br>FH | vritten<br>'B)<br>First Block Read<br>03H to 21H<br>of the TAG.        | able |

The old password **O\_PASSW0 to O\_PASSW3**, written in the TAG, is substituted by a new password **PASSW0 to PASSW3**.

REMEMBER THE NEW PASSWORD WRITTEN IN THE TAG.

DESCRIPTION

VALUE

AOH

FUNCTION

WRITE PASSW

| COMMAND #5:  | TURN ON | I/TURN OFF | the OUT1 tran | nsistor. |
|--------------|---------|------------|---------------|----------|
| DECODUDITION | CTV     | DEVUOE     |               | FUNCTION |

| DESCRIPTION | SIX   | DEVICE     | LENGTH         | FUNCTION      | BCC           |                          |
|-------------|-------|------------|----------------|---------------|---------------|--------------------------|
| HEX VALUE   | 02H   | 00H        | 02H            | See below     | 00H-FFH       |                          |
| FUNCTION    | VALUE | DESCRIPTIO | NC             |               |               |                          |
| TURN-ON     | 02H   | The HOS    | T send this Co | mmand to TURN | I-ON (closed) | the OUT1 open collector. |
| TURN-OFF    | 01H   | The HOS    | T send this Co | mmand to TURN | V-OFF (open)  | the OUT1 open collector. |

| COMMAND#V : | READ V | ERSION |          |           |         |
|-------------|--------|--------|----------|-----------|---------|
| DESCRIPTION | STX    | DEVICE | LENGTH   | FUNCTION  | BCC     |
| HEX VALUE   | 02H    | 00-7CH | 03H      | See below | 00H-FFH |
| FUNCTION    | V      | ALUE   | DESCRIPT | ION       |         |

READ VERSION 76H Read the actual firmware version of the module.

#### 3.1.2 STRINGS from TRW to HOST

#### IN RS485 MODE THE DEVICE BIT7 IS ALWAYS SET TO 1. So the address 00H is 80H and the 7CH is FCH.

| REPLY#0 :   | READ CON | IPLETE    |         |           |            |            |         |
|-------------|----------|-----------|---------|-----------|------------|------------|---------|
| DESCRIPTION | STX      | DEVICE    | LENGTH  | STATUS    | DATA0      | <br>DATA15 | BCC     |
| HEX VALUE   | 02H      | 00H       | 06H-12H | See below | 00H to FFH | 00H to FFH | 00H-FFH |
| FUNCTION    | VALUE    | DESCRIPTI | ON      |           |            |            |         |

VALUE READ COMPLETE 04H The data READ from the TAG are complete.

| REPLY#V :   | VERSION |            |        |                   |         |
|-------------|---------|------------|--------|-------------------|---------|
| DESCRIPTION | STX     | DEVICE     | LENGTH | VERSION (2 bytes) | BCC     |
| HEX VALUE   | 02H     | 00-7CH     | 03H    | MMH-RRH           | 00H-FFH |
| FUNCTION    | 2       | FCODIDTION |        |                   |         |

| FUNCTION | DESCRIPTION  |
|----------|--|
| VERSION  | Show the actual version (MM=Model RR=Firmware release)   |
|          | For this model the value NANA is TTU/DC000 VC OALL TTU/D |

For this model the value MM is: TTL/RS232-XS=24H TTL/RS232-XH=25H RS485-XS=26H

#### STATUS REPLY#1:

| DESCRIPTION   | STX   | DEVICE      | LENGTH   | STATUS            | BCC            |  |  |  |  |  |
|---------------|-------|-------------|--|-------------------|----------------|--|--|--|--|--|
| HEX VALUE     | 02H   | 00H         | 02H  | See below         | 00H-FFH        |  |  |  |  |  |
| FUNCTION      | VALUE | DESCRIPTION | ON   |                   |                |  |  |  |  |  |
| READ DATA ERR | 01H   | The data    | The data detected on the TAG are corrupted or incomplete. RF noise environment detected. |                   |                |  |  |  |  |  |
| NO TAG        | 02H   | The TRW     | -TTL has dete  | ected a no tag pr | esent during a | a COMMAND or POLLING sequence.                   |  |  |  |  |
| COMMAND OK    | 04H   | The comr    | mand sent to   | TRW-TTL has be    | en correctly e | xecuted.   |  |  |  |  |
| PASSWORD ERR  | 10H   | The comr    | The command sent to TRW-TTL was not executed because of uncorrect password on the TAG.   |                   |                |  |  |  |  |  |
| COMMAND ERR   | 20H   | The comr    | mand sent to   | TRW-TTL was no    | ot executed be | ecause a parameter out of limit on the string or |  |  |  |  |
|               |       | a data er   | ror was decte  | cted on the TAG   | during a com   | mand execution                                   |  |  |  |  |

In the case the TRW-TTL-KS detects a BCC error on the received string, don't exec the Command and don't transmit any Reply.

#### 3.1.3 DATA FLOW TRW-KS

The exchange of strings in a typical operation is described below. The HOST is considered as Master, the TRW-TTL as Slave.

| HOST   |      | TRW-TTL-KS             |
|--|------|------------------------|
| READ SEQUENCE (POLLING)  |      |                        |
| POLL DATA===> Poll command (response time max 50ms to 750ms)       | <=== | REPLY#0 if tag read ok |
| POLL DATA===> Poll command (response time typ 10ms)                | <=== | REPLY#1 if no-tag      |
| WRITE SEQUENCE   |      |                        |
| WRITE DATA/PASSW/CONF ===> write command (response time max 125ms) | <=== | REPLY#1                |

When the TAG is detected the response time can be of 50ms if reading the first block (BLOCK#3), or 750ms if reading the last block (BLOCK#33). The configuration string COMMAND#1 does permit to limit the readable blocks at the number really needed by your application.

#### 3.2 PROTOCOL TRW-TTL-KH (Spontaneous)

This protocol is optimized to obtain the maximum efficiency in the data exchange. The TRW-TTL-KH operates in spontaneous mode; when the TAG enters the RF field and is correctly read, directly transmits readable data to the host.

#### 3.2.1 STRINGS from TRW-TTL-KH to HOST

VERSION

RFPI Y#V ·

| REPLY#0 :   | READ DAT | 4   |         |           |            |  |            |         |
|-------------|----------|---|---------|-----------|------------|--|------------|---------|
| DESCRIPTION | STX      | DEVICE  | LENGTH  | STATUS    | DATA0      |  | DATA15     | BCC     |
| HEX VALUE   | 02H      | 00H   | 06H-12H | See below | 00H to FFH |  | 00H to FFH | 00H-FFH |
| FUNCTION    | VALUE    | DESCRIPTI   | ON      |           |            |  |            |         |
| READ COMPLE | TE 04H   | The data READ from the TAG are complete. This is the last string send from the TRW-TTL. |         |           |            |  |            |         |
|             |          |   |         |           |            |  |            |         |

| DESCRIPTION | STX      | DEVICE                           | LENGTH             | VERSION (2 bytes)          | BCC                | 1                |                      |
|-------------|----------|----------------------------------|--------------------|----------------------------|--------------------|------------------|----------------------|
| HEX VALUE   | 02H      | 00-7CH                           | 03H                | MMH-RRH                    | 00H-FFH            | l                |                      |
| FUNCTION    | D        | ESCRIPTION                       |                    |                            |                    |                  |                      |
| VERSION     | Sn<br>Fo | ow the actual<br>or this model t | he value <b>MM</b> | is: TTL/RS232-XS= <b>2</b> | <b>4H</b> TTL/RS23 | 2-XH= <b>25H</b> | RS485-XS= <b>26H</b> |

4

| REPLY#1: ST   | ATUS  |           |  |                 |                |                                      |  |  |  |
|---------------|-------|-----------|--|-----------------|----------------|--------------------------------------|--|--|--|
| DESCRIPTION   | STX   | DEVICE    | LENGTH   | STATUS          | BCC            |                                      |  |  |  |
| HEX VALUE     | 02H   | 00H       | 02H  | See below       | 00H-FFH        |                                      |  |  |  |
| FUNCTION      | VALUE | DESCRIPTI | ON   |                 |                |                                      |  |  |  |
| READ DATA ERR | 01H   | The data  | detected on t  | he TAG are corr | upted or incor | nplete. RF noise environment detecte |  |  |  |
| NO TAG        | 02H   | The TRW   | The TRW-TTL has detected a no tag present during a COMMAND or READ sequence. |                 |                |                                      |  |  |  |
| COMMAND OK    | 04H   | The com   | The command sent to TRW-TTL has been correctly executed.                     |                 |                |                                      |  |  |  |

NO TAG02HThe TRW-TTL has detected a no tag present during a COMMAND or READ sequence.COMMAND OK04HThe command sent to TRW-TTL has been correctly executed.PASSWORD ERR10HThe command sent to TRW-TTL was not executed because of uncorrect password on the TAG.COMMAND ERR20HThe command sent to TRW-TTL was not executed because a parameter out of limit on the string or a data error was dectected on the TAG during a command execution

#### 3.2.2 STRINGS from HOST to TRW-TTL-KH

| COMMAND#0 : | WRITE | WRITE DATA with/without PASSWORD |         |           |            |            |            |  |            |
|-------------|-------|----------------------------------|---------|-----------|------------|------------|------------|--|------------|
| DESCRIPTION | STX   | DEVICE                           | LENGTH  | FUNCTION  | FWB        | N-BLOCKS   | PASSW0     |  | PASSW3     |
| HEX VALUE   | 02H   | 00H                              | 0CH-18H | See below | 03H to 1FH | 01H to 04H | 00H to FFH |  | 00H to FFH |

| DATA0      |     | DATA15    | 5 BCC                        |  |
|------------|-----|-----------|------------------------------|--|
| 00H to FFH |     | 00H to FI | FH 00H-FFH                   |  |
| FUNCTION   |     | VALUE     | DESCRIPTION                  |  |
| WRITE DAT  | ٩P  | 20H       | This comma                   | nd use the PASSWORD. If the Password comparison is right, DATA0 to DATAn are written             |
|            |     |           | in sequential                | order into the TAG, from the First Write Block (FWB) for N-BLOCKS (max 4).                       |
| WRITE DAT  | ٩NP | 22H       | This comma                   | nd don't use the PASSWORD. The field PASSW0 to PASSW3 can be filled with any                     |
|            |     |           | value. DATA0<br>for N-BLOCKS | to DATAn are written in sequential order into the TAG, from the First Write Block (FWB) (max 4). |
| COMMAND#   | 1.  | СНАМ      | SE CONFIGURATI               | ON   |

|             | 010.010 |        |        |           |     |          |            |  |            |                      |  |
|-------------|---------|--------|--------|-----------|-----|----------|------------|--|------------|----------------------|--|
| DESCRIPTION | STX     | DEVICE | LENGTH | FUNCTION  | FWB | N-BLOCKS | PASSW0     |  | PASSW3     | First Block Readable |  |
| HEX VALUE   | 02H     | 00H    | 0CH    | See below | 02H | 01H      | 00H to FFH |  | 00H to FFH | 03H to 21H           |  |
|             |         |        |        |           |     |          |            |  |            |                      |  |

| Last Block Readable | Password Check   | SPARE | BCC     |
|---------------------|------------------|-------|---------|
| 03H to 21H          | 00H(no) 01H(yes) | 00H   | 00H-FFH |
| FUNCTION VA         | LUE DESCRIPTION  |       |         |

80H

CHANGE CONF

|             |           |                | -                 |                    |          |           |              |
|-------------|-----------|----------------|-------------------|--------------------|----------|-----------|--------------|
| DESCRIPTION |           |                |                   |                    |          |           |              |
|             |           |                |                   |                    |          |           |              |
|             | PD is mar | ndatory If th  | e Password co     | mnarison is right  | DATA0 to | DATA3 are | written into |
| THE LASS WO |           | idatory. If th | 10 1 433 101 4 00 | inpunson is right. | DATAO IO | DATA5 arc | wintten into |

the CONFIGURATION WORD of the TAG.

## IF YOU ENABLE THE PASSWORD CHECK, *REMEMBER* THE LAST PASSWORD WRITTEN IN THE TAG. OTHERWISE YOUR TAG BECOME UNWRITEABLE.

| COMMAND#2 : | SELECT | IVE READ  |        |           |            |            |         |
|-------------|--------|-----------|--------|-----------|------------|------------|---------|
| DESCRIPTION | STX    | DEVICE    | LENGTH | FUNCTION  | FRB        | N-BLOCKS   | BCC     |
| HEX VALUE   | 02H    | 00H       | 04H    | See below | 00H to 21H | 01H to 04H | 00H-FFH |
| FUNCTION    | VALUE  | DESCRIPTI | ON     |           |            |            |         |

SELECTIVE READ 40H The Tag data are read in sequential order from the First Read Block (FRB) for N-BLOCKS (max 4).

| COMMAND#3:  | WRITE | PASSWORD |        |           |     |          |            |               |
|-------------|-------|----------|--------|-----------|-----|----------|------------|---------------|
| DESCRIPTION | STX   | DEVICE   | LENGTH | FUNCTION  | FWB | N-BLOCKS | O_PASSW0   | <br>O_ PASSW3 |
| HEX VALUE   | 02H   | 00H      | 0CH    | See below | 00H | 01H      | 00H to FFH | 00H to FFH    |

| PASSW0                 |            | PASSW3       | BCC                               |                                     |  |              |  |
|------------------------|------------|--------------|-----------------------------------|-------------------------------------|--|--------------|--|
| 00H to FFH             |            | 00H to FFI   | H 00H-FF                          | FH                                  |  |              |  |
| FUNCTION<br>WRITE PASS | sw         | VALUE<br>AOH | DESCRIPTI<br>The PAS<br>substitut | ON<br>SSWORD is n<br>ed with the ne | nandatory. The<br>ew password <b>P</b> A | old password | O_PASSW0 to O_PASSW3, written in the TAG,<br>SSW3. |
| REMEMBER               | THE        | NEW PAS      | SWORD WR                          | IIIEN IN IF                         | IE TAG.                                  |              |  |
| COMMAND#               | <b>4</b> : | ACK          |                                   |                                     |  |              |  |
| DESCRIPTIO             | N          | STX          | DEVICE                            | LENGTH                              | FUNCTION                                 | BCC          |  |
|                        |            | 0.011        | 0.011                             | 0.011                               | 0  | 0.011 5511   |  |

| HEX VALUE       | 02H          | 00H                                | 02H   | See below                           | 00H-FFH       |                                      |
|-----------------|--------------|------------------------------------|---|-------------------------------------|---------------|--------------------------------------|
| FUNCTION<br>ACK | VALUE<br>10H | DESCRIPTION<br>The HOS<br>the TRW- | <b>DN</b><br>T send this Co<br>TTL wait for a | ommand to the T<br>a TAG extraction | RW-TTL to clo | ose any sequence. After this command |
| COMMAND #5:     | TURN OF      | V/TURN OFF                         | the OUT1 tra                                  | nsistor.                            |               |                                      |
| DESCRIPTION     | STX          | DEVICE                             | LENGTH  | FUNCTION                            | BCC           |                                      |
| HEX VALUE       | 02H          | 00H                                | 02H   | See below                           | 00H-FFH       |                                      |
| ELINICTION      | VALUE        | DESCRIPTIO                         | 211   |                                     |               |                                      |

| FUNCTION | VALUE | DESCRIPTION   |
|----------|-------|---|
| TURN-ON  | 02H   | The HOST send this Command to TURN-ON (closed) the OUT1 open collector. |
| TURN-OFF | 01H   | The HOST send this Command to TURN-OFF (open) the OUT1 open collector.  |

| COMMAND#V :  | READ V                                  | ERSION |        |           |                  |
|--------------|---|--------|--------|-----------|------------------|
| DESCRIPTION  | STX                                     | DEVICE | LENGTH | FUNCTION  | BCC              |
| HEX VALUE    | 02H                                     | 00-7CH | 03H    | See below | 00H-FFH          |
| FUNCTION     | VALUE DESCRIPTION                       |        |        |           |                  |
| READ VERSION | 76H Read the actual firmware version of |        |        |           | n of the module. |

In the case the TRW-TTL-KH detects a BCC error on the received string, don't exec the Command and don't transmit any Reply.

is

#### 3.2.3 DATA FLOW TRW-TTL-KH

The REPLY#0 function as a **trigger** to start a COMMAND sequence.

When a REPLY#0 is fully received, the HOST can send a COMMAND in a time window of 500 ms.

Over this time, if no command has been sent, the TRW-TTL automatically repeat a READ DATA sequence till TAG extraction or COMMAND receive, except for COMMAND#4.

If receive COMMAND#4 the TRW-TTL close the sequence and wait for a TAG extraction.

The time window on TRW-TTL is reloaded at any reply during a COMMAND sequence, except for critical errors.

A tipycal data flow, in spontaneous mode, is described below.

| HOST  |                |                                     |              | TRW-TTL-KH   |
|---|----------------|-------------------------------------|--------------|--|
|   |                | READ DATA sequence                  |              |  |
| Example: in case of bad readin<br>Exit wait new reply | g              |                                     | <===         | READ-DATA-ERROR and/or NO-TAG<br>Repeat READ DATA sequence                       |
| Example: a TAG with 7 blocks r                        | eadable pla    | ced into RF field is correctly read | <===<br><=== | READ PARTIAL first 4 blocks.<br>READ COMPLETE last 3 blocks.<br>Time window500ms |
|   | сом            | MAND sequence in time window        |              |  |
| NO COMMAND  | ===>           |                                     |              | Repeat READ DATA sequence  |
| ACK<br>Exitwait new reply                             | ===>           |                                     |              | Wait for TAG extraction<br>Repeat READ DATA sequence                             |
| WRITE DATA/ PASS/CONF<br>Exit wait new reply          | ===>           | (max response time 130ms / Block)   | <===         | NO-TAG<br>Repeat READ DATA sequence  |
| WRITE DATA/PASS/CONF<br>Exitor continue with con      | ===><br>nmands | (max response time 130ms / Block)   | <===         | COMMAND OK<br>Time window  |
| SELECTIVE READ<br>Exitwait new reply                  | ===>           | (max response time 250ms / Block)   | <===         | NO-TAG<br>Repeat READ DATA sequence  |
| SELECTIVE READ<br>Exitor continue with con            | ===><br>nmands | (max response time 250ms / Block)   | <===         | READ COMPLETE<br><b>Time window</b>  |
| TURN-ON<br>Exitor continue with com                   | ===><br>nmands | (max response time 25ms)            | <===         | COMMAND-OK<br>Time window  |
| ACK<br>Exitwait new reply                             | ===>           |                                     |              | Wait for TAG extraction<br>Repeat READ DATA sequence                             |

#### 4.0 OUT1

The Out1 is an Open Collector output driving a max. load of 80 ma at 12VDC. It will goes ON/OFF with the COMMAND#5.

#### 4.1 LED-OUT

The LED-OUT is a TTL output, active high, with a 1 k? internal series resistor suitable to drive an external LED connected to GND. It will turn ON when a KEY/CARD is moved in the RF-Field and is correctly read. It will turn OFF when the KEY/CARD is removed by the RF-Field.

#### 5.0 TRW-USB-KS/KH-5 USB2.0 modules

Before any operation need to INSTALL the drivers. 1)Unzip the package "MCP2200 Windows Driver.zip" 2)Open the folder "Driver Installation Tool" 3)Open the folder "x64" for 64bit platforms or "x86" for 32bit platforms. 4)Launch the application "MCP2200DriverInstallationTool.exe". 5)Connect the TRW-USB device and follows the Microsoft instructions to complete the INSTALL on your platform. 6)The install assign a COM PORT to your device. Now you can communicate on this PORT.

To connect the TRW-USB module use a cable of the desired length mounting the connectors: USB 2.0 TYPE A PLUG (side HOST) and USB2.0 MINI TYPE B PLUG (side TRW)

The available models for order are: TRW-USB-KS/KH-5 (PCB version) and TRW-USB-KS/KH-5-POCKET





**TRW-USB-** Version POCKET

**TRW-USB-Version PCB** 

#### 6.0 TRW-KS/KH-12-SHELL/ONDA

#### These models are suggested only for READ purpose.

The use of WRITE commands has to be made by experienced operators that use a sure method of positioning and keeping the tag in the RF FIELD. Otherwise the tag can be damaged.

Has the same electrical functions of the standard TRW-232.

| Dimension electronic board | Height 40 x Length 58 x depth 7.5 mm |
|----------------------------|--------------------------------------|
| Dimension SHELL            | Height 77 x Length 112 x depth 30 mm |
| Dimension ONDA             | Height 51 x Length 115 x depth 24 mm |

#### CABLE PIN FUNCTION

| COLOR  | 232    | 485     |
|--------|--------|---------|
| WHITE  | +12VDC | +12VDC  |
| BROWN  | GND    | GND     |
| YELLOW | RX 232 | RS485-A |
| GREEN  | TX 232 | RS485-B |
| GREY   | GND    | GND     |



**TRW-ONDA** 

**TRW-SHELL** 

#### EXAMPLE: HOW TO CONNECT TO A 9 PIN D-TYPE S (Female)

| TR- 232-S cable | D-TYPE S connector |
|-----------------|--------------------|
| YELLOW(RX)      | PIN 3              |
| GREEN(TX)       | PIN 2              |
| GREY(GND)       | PIN 5              |

#### **IMPORTANT NOTE:**

DURING A WRITE COMMAND THE TAG MUST BE MANTAINED IN THE PROPER RF FIELD TILL A REPLAY#1 OR STATUS ERROR STRING HAS BEEN RECEIVED. MOVING THE TAG CAN CAUSE A NON RECOVERABLE FAILURE ON THE TAG ITSELF.

THIS MODEL PERMIT ONLY THE USE OF THE WRITE DATA COMMAND.

#### 7.0 TRW-KS-12-BOX

The module TRW is inserted into a BOX plastic enclosure. Has the same electrical functions of the standard TRW-232. A Cannon 9S connect all the signals. Connection with PC through a STRAIGHT CABLE. The 12VDC power supply is connected by a standard 2mm/2,1mm plug-in: Internal PIN +12V External PIN GND

The TRW is protected against polarity inversion.

#### MECHANICAL

| Dimensions | Length | 11.2cm   |
|------------|--------|----------|
|            | Width  | 6.8cm    |
|            | Height | 2.8cm    |
| Weight     |        | Тур 100g |
|            |        |          |

#### OPERATING

| Power Requirements                                | 9 to 12 VDC not stabilized max. absorption 50mA |
|---|---|
| Serial interface Data=8bit Parity=none Stop=1bit  | Async. Half Duplex                              |
| Speed   | 9600 bits per second                            |
| Reading Distance (with TAG in center of RF field) | CARD Q5 typ 55 mm                               |

#### Cannon 9S Connector

| PIN | DESCRIPTION   |
|-----|---------------|
| 1   |               |
| 2   | TX 232        |
| 3   | RX 232        |
| 4   |               |
| 5   | GND           |
| 6   | NOT CONNECTED |
| 7   | NOT CONNECTED |
| 8   | NOT CONNECTED |
| 9   | NOT CONNECTED |



TRW-232-12-BOX

#### 8.0 SPECIFICATIONS

| OPERATING  |                          |  |
|--|--------------------------|--|
| Power Requirements max. ripple 50mVp-p                         |                          | 12 VDC ? 10% at max 55mA   |
|  |                          | 5 VDC ? 5% at max 50mA max ripple 10mV                           |
| Serial interface Data = 8bit Pa                                | arity = none Stop = 1bit | KS: BiNARY asynchronous half duplex, polling-selecting protocol. |
|  |                          | KH: BINARY asynchronous half duplex, spontaneous protocol .      |
| Baud Rate  |                          | 9600 bits per second   |
| Reading Distance (with TAG in center of RF field)              |                          | GLASS: typ. 20mm   |
|  |                          | DISK 20mm: typ. 40mm   |
|  |                          | CARD: typ. 65mm  |
| Writing Distance (with TAG in center of RF field)              |                          | GLASS: typ. 20mm   |
| IMPORTANT: Don't remove the TAG/CARD during the whole writing. |                          | DISK 20mm: typ. 30mm   |
|  |                          | CARD: typ. 55mm  |
| MECHANICAL PCB   |                          |  |
| Dimensions   |                          | 58mm x 40mm x 10mm   |
| Weight   |                          | Max 60g  |
| ENVIRONMENTAL  |                          |  |
| Temperature  | Operating                | 0°C to 60°C  |
|  | Storage                  | -30°C to 70°C  |
| Humidity   | Operating                | 10% to 90% non condensing  |
|  | Storage                  | 0% to 95% non condensing   |

 INOUT RFID srl
 Via Milano,14/H
 20064-Gorgonzola (Italy)

 Phone:+39
 02.95138.139
 Fax:+39
 02.95.158.694

 Email:
 info@inoutsrl.it
 Web: www.inoutsrl.it