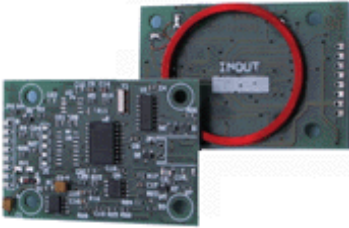




TRW SERIAL TYPE Q



PCB



BOX

1.0 FEATURES AND SPECIFICATIONS

The TRW is a Front Side Serial Tag Reader/Writer with **built-in Antenna**.

INTERFACE OPTIONS: TTL - RS232 - RS485 - USB

TRANSPONDERS SUPPORTED: Q5 - TK5557 - UNIQUE - EM4002

AVAILABLE CASE: PCB - BOX

WORKING METHODS:

- **SHORT FRAME:** 5 bytes (10 Digits) emulating the UNIQUE FORMAT.
The Card so formatted can be read with our TR-ISO readers.
- **LONG FRAME:** 17 bytes (34 Digits) for general R/W purpose.
- **SHORT-EXTENDED FRAME:** 5 bytes (10 Digits) emulating the UNIQUE FORMAT plus 12 bytes for general R/W purpose.
The Card so formatted can be read with our TR-ISO readers.

Support tags working in AOR MODE (Answer On Request wit PASSWORD)

2.0 VERSIONS

TRW-TTL-QS-5	TTL interface. Polling-selecting mode.	TRW-232-QH-12	RS232 interface. Spontaneous mode.
TRW-TTL-QH-5	TTL interface. Spontaneous mode.	TRW-485-QS-12	RS485 interface. Polling-selecting mode. 125 device address.
TRW-232-QS-12	RS232 interface. Polling-selecting mode.	TRW-USB-QS-5	USB interface. Polling-selecting mode.

Glossary: S= Poll-Select FW H= Spontaneous FW 12/5= Power supply

2.1 SPECIFICATIONS TTL - 232 - 485 - USB

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 Parity = none Stop = 1bit	QS: BINARY asynchronous half duplex, polling-selecting protocol . QH: BINARY asynchronous half duplex, spontaneous protocol .
Baud Rate	TTL - 232 - 485	9600 bits per second
Reading Distance (with TAG in center of RF field)		CARD: tip. 70mm
Writing Distance (with TAG in center of RF field)		CARD: tip. 60mm
IMPORTANT: Don't remove the TAG/CARD during the whole writing.		

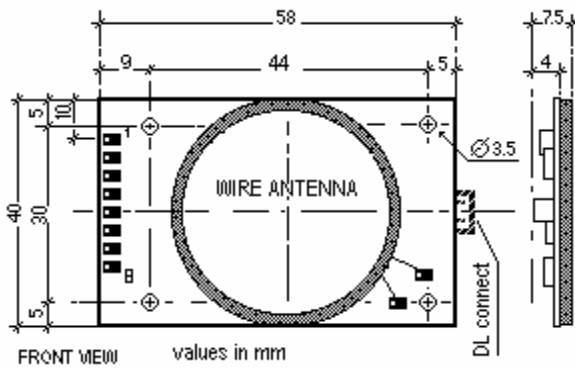
MECHANICAL

Dimensions (PCB)	40mm x 58mm x 10 mm
Weight (PCB)	Max 60g

ENVIRONMENTAL

Temperature	Operating Storage	-10°C to 60°C -30°C to 70°C
Humidity	Operating Storage	10% to 90% non condensing 0% to 95% non condensing

3.0 DIMENSIONS PCB TTL - 232 – 485



CONNECTION TRW-TTL

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

Pin Number	Description
1	+5VDC
2	GND
3	RX TTL input
4	TX TTL output
5	Spare TTL i/o
6	MODE TTL i/o
7	Out1 Open Collector output.
8	LED-OUT TTL out internal 1k?

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	MODE TTL input
7	Out1 Open Collector output.
8	LED-OUT TTL out internal 1k?

CONNECTION TRW-232

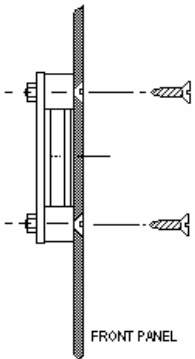
The on-board connector is an 8 pin .1" soldering type.

Pin Number	Description
1	+12VDC
2	GND
3	RX RS232 input
4	TX RS232 output
5	Spare RS232 input
6	MODE TTL i/o
7	Out1 Open Collector output.
8	LED-OUT TTL out internal 1k?

3.1 MOUNTING

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.



4.0 TRW-232-Q-S/H-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		Tip. 100g

OPERATING

Power Requirements	12 VDC not stabilized max. absorption 50mA
Serial interface Data=8bit Parity=none Stop=1bit	Asynchronous Half Duplex
Speed	9600 bits per second
Reading Distance (with TAG in center of RF field)	CARD Q5: tip. 75 mm



TR-232-Q-S/H-12-BOX

Cannon 9S Connector PIN FUNCTION

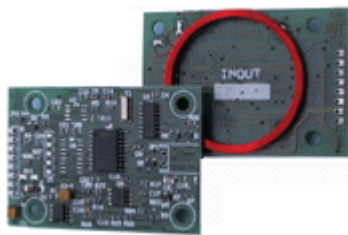
PIN	DESCRIPTION
1	
2	TX 232
3	RX 232
4	
5	GND
6	NOT CONNECTED
7	NOT CONNECTED
8	NOT CONNECTED
9	NOT CONNECTED

**5.0 TRW-232-QS/H-12-E20/12/147
TRW-485-QS-12-E20/12/147**

The module TRW-232 or TRW-485 can be externally connected to 3 models of antenna to obtain long reading distance.

E-12 Reading Distance (with TAG in center of RF field)	CARD UNIQUE typ 150mm CARD Q5 typ 120mm CARD Q5 typ 100mm
Write Distance (with TAG in center of RF field)	
E-20 Reading Distance (with TAG in center of RF field)	CARD UNIQUE typ 280mm CARD Q5 typ 230mm CARD Q5 typ 200mm
Write Distance (with TAG in center of RF field)	
E-147 Reading Distance (with TAG in center of RF field)	CARD UNIQUE typ 220mm CARD Q5 typ 190mm CARD Q5 typ 150mm
Write Distance (with TAG in center of RF field)	

**The antenna is furnished with tinned copper wires for direct soldering on the TR module board.
The antenna wires can be lengthened to a maximum of 2 meters.**



TRW-module



Antenna E20
Diam 20cm



Antenna E12
Diam 12cm



Antenna E147
14cmx7cm

6.0 PROTOCOL

The standard protocols for the TRW are:

- QS** Polling-Selecting Suitable for application where the Host continuously polls the TRW.
Valid for TRW-TTL/RS232/RS485.
- QH** Spontaneous Suitable for application point to point. The TRW transmits data only when a TAG is really present.
The HOST normally works in receive mode and can operate on other task in absence of TAG.
Valid for TRW-TTL/RS232.

The protocol FORMAT is described below.

STX	Start of string synchronization code.
DEVICE	Is the Device Number (for RS485 only). For the TRW-TTL/RS232 is always 00H.
LENGTH	Is the number of bytes following the LENGTH. Example: STX-DEVICE-LENGTH-FUNCTION-DATA0....DATA11-BCC The length is 14 DEC = 0D HEX.
FUNCTION /STATUS	Is the FUNCTION to be executed or the STATUS of an operation executed.
DATA0 to DATAn	Are the data exchanged for a max of 17 bytes.
PASSWO to PASSW3	Is the Password code.
BCC	Is calculated as the XOR of all bytes from STX to last DATA included. Example: STX-DEVICE-LENGTH-STATUS-BCC ≈ 02H-00H-02H-01H-BCC where BCC= 01H.

The TAGs first delivery PASSWORD is always 00-00-00-00.

6.1 PROTOCOL QS

The TRW-QS operates in Polling-Selecting mode. The HOST is Master.

Permit the use of the formats:

SHORT -- LONG -- SHORT EXTENDED

The transponder can be configured in:

NORMAL MODE -- AOR MODE with PASSWORD

MODE input connector PIN6 OPEN.

6.1.1 COMMANDS from HOST to TRW

COMMAND #S : SET DEVICE **VALID ONLY FOR TR-485**

DESCRIPTION	STX	DEVICE	LENGTH	FUNCTION	DATA0	BCC
HEX VALUE	02H	FFH	03H	See below	00H to 7CH	00H-FFH

FUNCTION	VALUE	DESCRIPTION
SET DEVICE	61H	The device number is set into the TR memory. Must be executed on any TR one-by-one before to install. In DATA0 insert the DEVICE NUMBER assigned to TR.

COMMAND#P : POLL DATA

DESCRIPTION	STX	DEVICE	LENGTH	FUNCTION	FRB	N-BLOCKS	BCC
HEX VALUE	02H	00H-7CH	04H	See below	01H	02H-06H-0FH	00H-FFH

FUNCTION	VALUE	DESCRIPTION
POLL DATA	04H	The Tag data, if in valid format, are read in sequential order from the First Read Block (FRB). N-BLOCKS=F the TRW automatically detects valid formats and replay (REPLAY#0) data in : SHORT FRAME MODE. LONG FRAME MODE SHORT-EXTENDED FRAME MODE. N-BLOCKS=2 the TRW detect and send only SHORT FRAME MODE Tags. N-BLOCKS=6 the TRW detect and send only LONG and SHORT-EXTENDED FRAME MODE Tags.

COMMAND#0 : WRITE DATA

DESCRIPTION	STX	DEVICE	LENGTH	FUNCTION	FWB	N-BLOCKS	PASSW (4 bytes)	DATAn (n=5-12-17)	BCC
HEX VALUE	02H	00H-7CH	0DH-14H-19H	See below	01H-03H	02H-04H-06H	xx-xx-xx-xxH	00H to FFH	00H-FFH

FUNCTION	VALUE	DESCRIPTION
WRITE DATA	22H	DATAn are written in sequential order into the TAG, from the First Write Block (FWB) for N-BLOCKS. In SHORT FRAME MODE DATAn is formed by 5 Data Bytes (10 Digits) and FWB=1 N-BLOCKS=2. In LONG FRAME MODE DATAn is formed by 17 Data Bytes (34 Digits) and FWB=1 N-BLOCKS=6. In SHORT-EXTENDED FRAME MODE Write Data is performed in two write steps: First Part Write (Unique) DATAn is formed by 5 Data Bytes (10 Digits) and FWB=1 N-BLOCKS=2. Second Part Write DATAn is formed by 12 Data Bytes (24 digits) and FWB=3 N-BLOCKS=4.

COMMAND#1 : CHANGE CONFIGURATION

DESCRIPTION	STX	DEVICE	LENGTH	FUNCTION	FWB	N-BLOCKS	PASSW0	..	PASSW3	FBR
HEX VALUE	02H	00H-7CH	0CH	See below	00H	01H	00H		00H	01H

LBR	AOR MODE	SPARE	BCC
02H or 06H	00H-01H	00H	00H-FFH

FUNCTION	VALUE	DESCRIPTION
CHANGE CONF	80H	Write the CONFIGURATION WORD of the TAG. In SHORT FRAME MODE LBR has value as 2. In LONG or SHORT-EXTENDED FRAME MODE LBR has value as 6. AOR MODE byte shall be set to 0 if operate in normal mode (no password) or set to 1 if operate in AOR MODE. In AOR MODE the TAG needs a WRITE PASSWORD command before.

In AOR MODE the TAG reply only if you send before a WAKE UP command with the correct PASSWORD.
All other commands can be executed till the TAG remains in the RF field.

COMMAND#3 : WRITE PASSWORD

DESCRIPTION	STX	DEVICE	LENGTH	FUNCTION	FWB	N-BLOCKS	O_PASSW0	..	O_PASSW3
HEX VALUE	02H	00H-7CH	0CH	See below	07H	01H	00H to FFH		00H to FFH

PASSW0	..	PASSW3	BCC
00H to FFH		00H to FFH	00H-FFH

FUNCTION	VALUE	DESCRIPTION
WRITE PASSW	A0H	The PASSWORD is mandatory. The old password O_PASSW0 to O_PASSW3, written in the TAG, is substituted with the new password PASSW0 to PASSW3. (the password range is: 00-00-00-00 to 0f-ff-ff-ff) WHEN TAG IS FIRST TIME DELIVERED HAS A PASSWORD: 00-00-00-00.

REMEMBER THE NEW PASSWORD WRITTEN IN THE TAG.

COMMAND#4 : WAKE-UP

DESCRIPTION	STX	DEVICE	LENGTH	FUNCTION	SPARE	SPARE	PASSW0	..	PASSW3	BCC
HEX VALUE	02H	00H-7CH	08H	See below	00H	00H	00H to FFH		00H to FFH	00H-FFH

FUNCTION	VALUE	DESCRIPTION
WAKE UP	90H	The PASSWORD is mandatory. If operate in AOR MODE , the TAG inserted in field don't reply anything till receive a WAKE-UP command with the correct PASSWORD .

COMMAND #5: **TURN ON/TURN OFF** the OUT1 transistor.

DESCRIPTION	STX	DEVICE	LENGTH	FUNCTION	BCC
HEX VALUE	02H	00H-7CH	02H	See below	00H-FFH

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 #TP: **TURN ON PROGRAMMABLE** on the OUT1 transistor (time base 200ms)

DESCRIPTION	STX	DEVICE	LENGTH	FUNCTION	MODE	DURATION	FREQUENCY	BCC
HEX VALUE	02H	00H	05H	See below	01-02	00H-FFH	00H-FFH	00H-FFH

FUNCTION VALUE DESCRIPTION

TURN-ON-P 03H The HOST send this Command to TURN-ON the OUT1 open collector with different functioning mode:
 1) **MONOSTABLE MODE=1**
DURATION value from 1(0,2sec) to FFH(130 sec) **FREQUENCY=00H**
 2) **OSCILLATOR MODE=2**
FREQUENCY value from 1(0,2sec) to FFH(130 sec) **DURATION** value from 1(0,2sec) to FFH(130 sec)
 If **DURATION=00H** the oscillator flash continuously since a TURN OFF command.

During Monostable or Oscillator session the TR maintains the Tag reading capacity.

COMMAND #LP: **LED ON PROGRAMMABLE** on the LEDOUT (time base 200ms)

DESCRIPTION	STX	DEVICE	LENGTH	FUNCTION	MODE	DURATION	FREQUENCY	BCC
HEX VALUE	02H	00H	05H	See below	01-02-04	00H-FFH	00H-FFH	00H-FFH

FUNCTION VALUE DESCRIPTION

LED-ON-P 05H The HOST send this Command to LEDOUT with different functioning mode:
 1) **INTERNAL MODE MODE=4**
 2) **MONOSTABLE MODE=1**
DURATION value from 1(0,2sec) to FFH(130 sec) **FREQUENCY=00H**
 3) **OSCILLATOR MODE=2**
FREQUENCY value from 1(0,2sec) to FFH(130 sec) **DURATION** value from 1(0,2sec) to FFH(130 sec)
 If **DURATION=00H** the oscillator flash continuously since an INTERNAL MODE command.

At Power on the LED DEFAULT is OFF and INTERNAL MOD is set.

During Monostable or Oscillator session the TR maintains the Tag reading capacity.

COMMAND#M : **READ STATUS INPUT PIN MODE**

DESCRIPTION	STX	DEVICE	LENGTH	FUNCTION	FRB	N-BLOCKS	BCC
HEX VALUE	02H	00H-7CH	04H	14H	01H	02H-06H-0FH	00H-FFH

FUNCTION VALUE DESCRIPTION

READ MODE 14H The Status of input PIN6 MODE is read. The replay is defined in the REPLAY #1 STATUS string.

6.1.2 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**

DESCRIPTION	STX	DEVICE	LENGTH	STATUS	DATAn (n=5 or 17)	BCC
HEX VALUE	02H	00H-7CH	07H or 13H	See below	00H to FFH	00H-FFH

FUNCTION VALUE DESCRIPTION

READ 04H Data READ from the TAG are complete.
 In SHORT FRAME MODE DATAn is formed **by 5 Data Bytes** (10 Digits).
 In LONG FRAME MODE DATAn is formed **by 17 Data Bytes** (34 Digits).
 READ COMPLETE 14H Data READ from the TAG are in SHORT-EXTENDED FRAME MODE.
 In SHORT-EXTENDED FRAME MODE DATAn is formed **by 5 Data Bytes+12 Data Bytes** .

REPLY#1 : **STATUS**

DESCRIPTION	STX	DEVICE	LENGTH	STATUS	BCC
HEX VALUE	02H	00H-7CH	02H	See below	00H-FFH

FUNCTION VALUE DESCRIPTION

READ DATA ERR 01H The data detected on the TAG are corrupted or incomplete. RF noise environment detected.
 NO TAG 02H The TRW has detected a no tag present during a COMMAND or POLLING sequence.
 COMMAND OK 04H The command sent to TRW has been correctly executed.
 COMMAND ERR 20H The command sent to TRW was not executed because a parameter out of limit on the string or a data error was detected on the TAG during a command execution
 MODE INPUT ON 80H The input PIN 6 MODE is set at logic TTL level '1'. This is the replay to the command READ MODE string.
 MODE INPUT OFF 00H The input PIN 6 MODE is set at logic TTL level '0'. This is the replay to the command READ MODE string.

REPLY#11 : **ERROR SHORT-EXTENDED**

DESCRIPTION	STX	DEVICE	LENGTH	STATUS	DATAn (n=5 or 17)	BCC
HEX VALUE	02H	00H	07H or 13H	See below	00H to FFH	00H-FFH

FUNCTION VALUE DESCRIPTION

READ DATA ERR 11H The data detected on the TAG are corrupted or incomplete in the PART2 of a SHORT-EXTENDED FRAME.
In any case the DATAn field is equally sorted for a Data recovery use.

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

6.1.3 DATA FLOW TRW-OS

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

HOST

NORMAL OPERATING MODE

TRW-OS

CONFIGURE SEQUENCE

STRING

CHANGE CONFIG ==>>> (response time max 500ms) <=== if OK/ERROR STATUS

WRITE SEQUENCE

WRITE DATA ==>>> (response time max 500ms) <=== if ERROR STATUS
<=== if OK READ

READ SEQUENCE

POLL DATA ==>>> (poll time min 200ms in SHORT FRAME MODE) <=== if OK READ
(poll time min 300ms in LONG FRAME MODE)
POLL DATA ==>>> (poll time min 200ms) <=== if ERROR STATUS

AOR OPERATING MODE

INSERT THE NEW PASSWORD

WRITE PASSWORD ==>>> (response time max 500ms) <=== if OK/ERROR STATUS

SET CONFIGURATION in AOR MODE

CHANGE CONFIG ==>>> (response time max 500ms) <=== if OK/ERROR STATUS

Now the TAG is configured in AOR MODE, send the WAKE UP command as a polling:

WAKE-UP TAG with the correct PASSWORD

WAKE UP ==>>> (response time max 300ms) <=== if ERROR STATUS
<=== if OK READ

If READ OK, the tag has correctly accepted you PASSWORD.

You can exec any command till the TAG remains in the RF Field :

- CHANGE CONFIGURATION - WRITE PASSWORD - WRITE DATA request the correct PASSWORD.

- WAKE UP command, reply error if send when TAG modulate.

6.2 PROTOCOL TRW-QH

The TRW-QH operates in spontaneous mode; when the TAG enters the RF field and is correctly read, directly transmits readable data to the host.

Permit the use of the Frame formats:

SHORT -- LONG -- SHORT EXTENDED

The transponder can be configured in:

NORMAL MODE

MODE input connector PIN6 OPEN

AOR MODE with PASSWORD

MODE input connector PIN6 CLOSED to GND

6.2.1 STRINGS from TRW to HOST

REPLY#0 : READ COMPLETE

DESCRIPTION	STX	DEVICE	LENGTH	STATUS	DATAn (n=5 or 17)	BCC
HEX VALUE	02H	00H	07H or 13H	See below	00H to FFH	00H-FFH

FUNCTION VALUE DESCRIPTION

READ 04H Data READ from the TAG are complete.
In SHORT FRAME MODE DATAn is formed by 5 Data Bytes (10 Digits).
In LONG FRAME MODE DATAn is formed by 17 Data Bytes (34 Digits).
READ COMPLETE 14H Data READ from the TAG are in SHORT-EXTENDED FRAME MODE.
In SHORT-EXTENDED FRAME MODE DATAn is formed by 5 Data Bytes+12 Data Bytes .

REPLY#1 : STATUS

DESCRIPTION	STX	DEVICE	LENGTH	STATUS	BCC
HEX VALUE	02H	00H	02H	See below	00H-FFH

FUNCTION VALUE DESCRIPTION

READ DATA ERR 01H The data detected on the TAG are corrupted or incomplete. RF noise environment detected.
NO TAG 02H The TRW-TTL has detected a no tag present during a COMMAND or READ sequence.
COMMAND OK 04H The command sent to TRW-TTL has been correctly executed.
COMMAND ERR 20H The command sent to TRW-TTL was not executed because a parameter out of limit on the string or a data error was detected on the TAG during a command execution
PASSW-REQUEST 04H This request is sent to HOST at any Power Start-Up of the TRW.
This request is enabled only when MODE input connector PIN6 is CLOSED to GND.
The TRW repeat this request till the COMMAND#6 : AOR PASSWORD is satisfied by the HOST.

REPLY#11 : ERROR SHORT-EXTENDED

DESCRIPTION	STX	DEVICE	LENGTH	STATUS	DATAn (n=5 or 17)	BCC
HEX VALUE	02H	00H	07H or 13H	See below	00H to FFH	00H-FFH

FUNCTION VALUE DESCRIPTION

READ DATA ERR 11H The data detected on the TAG are corrupted or incomplete in the PART2 of a SHORT-EXTENDED FRAME.
In any case the DATAn field is equally sorted for a Data recovery use.

6.2.2 STRINGS from HOST to TRW

COMMAND#0 : WRITE DATA

DESCRIPTION	STX	DEVICE	LENGTH	FUNCTION	FWB	N-BLOCKS	PASSW (4 bytes)	DATAn (n=5-12-17)	BCC
HEX VALUE	02H	00H	0DH-14H-19H	See below	01H-03H	02H-04H-06H	xx-xx-xx-xxH	00H to FFH	00H-FFH

FUNCTION VALUE DESCRIPTION

WRITE DATA **22H** DATAn are written in sequential order into the TAG, from the First Write Block (FWB) for N-BLOCKS.
 In **SHORT FRAME MODE** DATAn is formed **by 5 Data Bytes** (10 Digits) and FWB=1 N-BLOCKS=2.
 In **LONG FRAME MODE** DATAn is formed **by 17 Data Bytes** (34 Digits) and FWB=1 N-BLOCKS=6.
 In **SHORT-EXTENDED FRAME MODE** Write Data is performed in two write steps:
 First Part Write (Unique) DATAn is formed **by 5 Data Bytes** (10 Digits) and FWB=1 N-BLOCKS=2.
 Second Part Write DATAn is formed **by 12 Data Bytes**(24 digits) and FWB=3 N-BLOCKS=4.

COMMAND#1 : CHANGE CONFIGURATION

DESCRIPTION	STX	DEVICE	LENGTH	FUNCTION	FWB	N-BLOCKS	PASSWO	..	PASSW3	FBR
HEX VALUE	02H	00H	0CH	See below	00H	01H	00H		00H	01H

LBR	AOR MODE	LOCK	BCC
02H or 06H	00H-01H	00H-01H	00H-FFH

FUNCTION VALUE DESCRIPTION

CHANGE CONF **80H** Write the CONFIGURATION WORD of the TAG.
 In **SHORT FRAME MODE** LBR has value as 2.
 In **LONG or SHORT-EXTENDED FRAME MODE** LBR has value as 6.
AOR MODE byte shall be set to 0 if operate in normal mode (no password) or set to 1 if operate in AOR MODE.
 In AOR MODE the TAG needs a **WRITE PASSWORD** command before.
 LOCK byte can be **set to 0** if you desire to change the CONFIGURATION **other times**, or **set to 1** if you desire gran that CONFIGURATION **choosed never be changed**.

In AOR MODE the TAG reply only if you send before a WAKE UP command with the correct PASSWORD.
 All other commands can be executed till the TAG remains in the RF field.

COMMAND#3 : WRITE PASSWORD

DESCRIPTION	STX	DEVICE	LENGTH	FUNCTION	FWB	N-BLOCKS	O_PASSWO	..	O_PASSW3
HEX VALUE	02H	00H	0CH	See below	07H	01H	00H		00H

PASSWO	..	PASSW3	BCC
00H to FFH		00H to FFH	00H-FFH

FUNCTION VALUE DESCRIPTION

WRITE PASSW **A0H** The **PASSWORD** is mandatory. This command write a Password in the TAG.
 The old password **O_PASSWO** to **O_PASSW3**, written in the TAG, is substituted with the new password **PASSWO** to **PASSW3**. (the password range is: 00-00-00-01 to 0f-ff-ff-ff)
 WHEN TAG IS FIRST TIME DELIVERED HAS A PASSWORD: 00-00-00-00.

REMEMBER THE NEW PASSWORD WRITTEN IN THE TAG.

COMMAND#6 : AOR PASSWORD

DESCRIPTION	STX	DEVICE	LENGTH	FUNCTION	FWB	N-BLOCKS	O_PASSWO	..	O_PASSW3
HEX VALUE	02H	00H	0CH	See below	07H	01H	00H		00H

PASSWO	..	PASSW3	BCC
00H to FFH		00H to FFH	00H-FFH

FUNCTION VALUE DESCRIPTION

WRITE PASSW **B0H** This command only memorize the password in the internal RAM of the TRW module for AOR MODE use.
NO WRITE operation is executed on the TAG.
 The password **PASSWO** to **PASSW3** has to be in the range: 00-00-00-01 to 0F-FF-FF-FF.
 When the TRW receive this command and MODE input is closed to GND, it starts the AOR-MODE sequence.
The TRW continously interrogate a TAG in the RF field.
If the Password on the TAG match the Password you have memorized in the TRW , then the TAG will be turn on and a read sequence occurs. See also paragraph 3.2.3.

COMMAND#4 : ACK

DESCRIPTION	STX	DEVICE	LENGTH	FUNCTION	BCC
HEX VALUE	02H	00H	02H	See below	00H-FFH

FUNCTION VALUE DESCRIPTION

ACK **10H** The HOST send this Command to the TRW-TTL to close any sequence. After the TRW-TTL wait for a TAG extraction.

COMMAND #5: TURN ON/TURN OFF the OUT1 transistor.

DESCRIPTION	STX	DEVICE	LENGTH	FUNCTION	BCC
HEX VALUE	02H	00H	02H	See below	00H-FFH

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 #TP: **TURN ON PROGRAMMABLE** on the OUT1 transistor (time base 200ms)

DESCRIPTION	STX	DEVICE	LENGTH	FUNCTION	MODE	DURATION	FREQUENCY	BCC
HEX VALUE	02H	00H	05H	See below	01-02	00H-FFH	00H-FFH	00H-FFH

FUNCTION	VALUE	DESCRIPTION
TURN-ON-P	03H	The HOST send this Command to TURN-ON the OUT1 open collector with different functioning mode: 1) MONOSTABLE MODE=1 DURATION value from 1(0,2sec) to FFH(130 sec) FREQUENCY=00H 2) OSCILLATOR MODE=2 FREQUENCY value from 1(0,2sec) to FFH(130 sec) DURATION value from 1(0,2sec) to FFH(130 sec) If DURATION=00H the oscillator flash continuously since a TURN OFF command. During Monostable or Oscillator session the TR maintains the Tag reading capacity.

COMMAND #LP: **LED ON PROGRAMMABLE** on the LEDOUT (time base 200ms)

DESCRIPTION	STX	DEVICE	LENGTH	FUNCTION	MODE	DURATION	FREQUENCY	BCC
HEX VALUE	02H	00H	05H	See below	01-02-04	00H-FFH	00H-FFH	00H-FFH

FUNCTION	VALUE	DESCRIPTION
LED-ON-P	05H	The HOST send this Command to LEDOUT with different functioning mode: 1) INTERNAL MODE MODE=4 2) MONOSTABLE MODE=1 DURATION value from 1(0,2sec) to FFH(130 sec) FREQUENCY=00H 3) OSCILLATOR MODE=2 FREQUENCY value from 1(0,2sec) to FFH(130 sec) DURATION value from 1(0,2sec) to FFH(130 sec) If DURATION=00H the oscillator flash continuously since an INTERNAL MODE command. At the end of a Monostable or Oscillator session the LED is turned in INTERNAL MODE. At Power on the LED DEFAULT is OFF and INTERNAL MODE is set. During Monostable or Oscillator session the TR maintains the Tag reading capacity.

At the end of a Monostable or Oscillator session the LED is turned in INTERNAL MODE.
At Power on the LED DEFAULT is OFF and INTERNAL MODE is set.
During Monostable or Oscillator session the TR maintains the Tag reading capacity.

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

6.2.3 DATA FLOW TRW

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 automatically repeat a READ DATA sequence till TAG extraction or a 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 typical data flow, in spontaneous mode, is described below.

HOST		TRW
	NORMAL MODE PIN 6 OPEN READ DATA sequence	
Example: in case of bad reading Exit.... wait new reply.....		<=== READ DATA-ERROR and/or NO-TAG Repeat READ DATA sequence....
Example: a TAG placed into RF field is correctly read		<=== READ COMPLETE Time window.....500ms.....
	COMMAND sequence in time window	
NO COMMAND ==>		Repeat READ DATA sequence
ACK ==> Exit....wait new reply.....		Wait for TAG extraction... Return to READ DATA sequence
WRITE DATA/ CONF/PASSW ==> (max response time 500ms) Exit.... wait new time window.....		<=== STATUS NO-TAG Return to READ DATA sequence
WRITE DATA/ CONF/PASSW ==> Repeat command....		<=== STATUS ERROR Time window reload.
WRITE DATA/CONF/PASSW ==> (max response time 500ms) Exit.....or continue with commands.....		<=== COMMAND OK Time window reload.
TURN-ON/OFF ==> (max response time 150ms) Exit.....or continue with commands.....		<=== COMMAND-OK Time window reload.
	AOR MODE PIN 6 CLOSED TO GND POWER START UP sequence	
No replay.....		<=== STATUS PASSW-REQUEST Repeat PASSW-REQUEST sequence....
PASSWORD AOR ==>		<=== STATUS PASSW-REQUEST Time window.....500ms..... <=== COMMAND OK

The TRW enters the AOR-MODE sending any 150ms a WAKE -UP command with the received PASSW.
 All operations described in NORMAL MODE are executed till the TAG remain in the RF field.

7.0 OUT1

The Out1 is an Open Collector output driving a max. load of 80 ma at 12VDC.
It will go ON/OFF with the COMMAND#1/#TP.

8.1 LED-OUT

The LED-OUT is a TTL output, active high, with a 1 k Ω internal series resistor suitable to drive an external LED connected to GND.
In INTERNAL MODE:

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.

Otherwise it will go ON/OFF with the COMMAND #LP.