TVRS232LINK DEVICE INSTRUCTION

rev.04 - 21/01/2011

INTRODUCTION:

TVRS232LINK works with the following devices:

- receivers
- transceivers
- transmitters
- temperature, water and sun sensors.

RS232 SERIAL COMMUNICATION SETTINGS:

Baud rate	19200
Data bits	8
Parity	none
Stop bits	1
Flow control	none

Table I

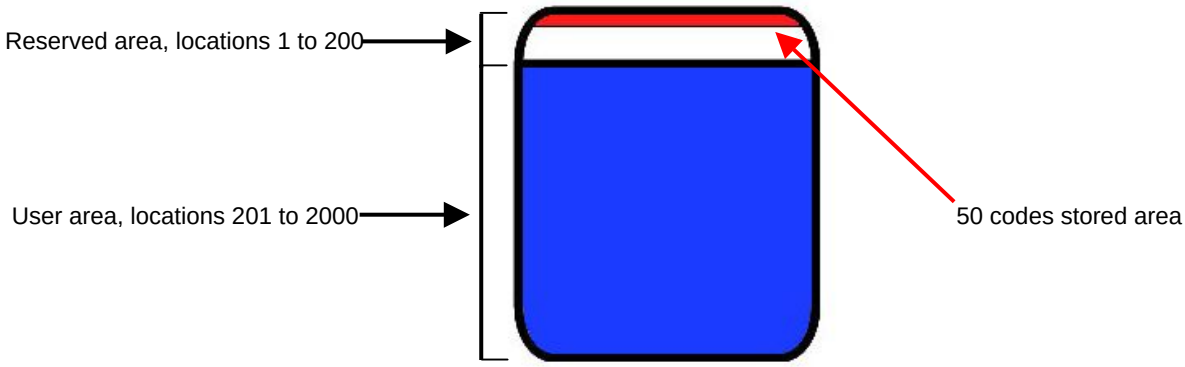
HEXADECIMAL VALUE FOR COMMAND STRINGS:

‘A’ = hexadecimal 41	’L’ = hexadecimal 4C
‘C’ = hexadecimal 43	‘N’ = hexadecimal 4E
‘D’ = hexadecimal 44	‘R’ = hexadecimal 52
‘E’ = hexadecimal 45	‘S’ = hexadecimal 53
‘G’ = hexadecimal 47	‘T’ = hexadecimal 54
‘I’ = hexadecimal 49	‘W’ = hexadecimal 57

Table II

MEMORY MAP:

The device has 50 transmitter serial codes stored in location 1 to 50 of the memory.



In user memory area(201-2000) it’s possible to store serial codes referred to receivers and transmitters devices. To memorize a transmitter channel you can use the *command 2* which let you to store the serial code and the channels via radio in a defined memory location. To memorize a serial code of a receiver you want to control you must use the *command 1*. We recommend to manage wisely the memory area to avoid confusion; you can use, for example, the locations 201 to 1000 to store transmitter codes and locations 1001 to 2000 to store receiver codes.

RS232 Commands:

The checksum value of the commands equals the carryless sum of the transmitted bytes. For example, if the hexadecimal values data to send are *45 C4 01 23 85* , their sum is *45+C4+01+23+85 = 1B2* and so the checksum is *B2*.

The 'ack' command is the sequence *52 06 58*.

Command 1: Store a serial code in user memory

The locations ID range is 201-2000.

Command string	1 byte	'**S**'
ID	2 bytes	Hex 201 to Hex 2000
Serial code	3 bytes	1-0xFFFFFF
--	1 byte	0x00
--	2 bytes	0x00
Checksum	1 byte	Value

Answer: (the answer can have a little delay if the code is already stored in the device's memory)

Command string	1 byte	'**S**'
Ack	1 byte	0x06
Checksum	1 byte	Value

Example 1: storing a receiver serial code 1415169 on the location with ID = 1020

*Data to send(hexadecimal): 53 03 FC 15 98 01 00 00 00 00 (**set channels byte = 0**)*

'S' 1020 1415169 channels attributes checksum

Answer received: 53 06 59

Command 2: Memorize a transmitter serial code via radio

Command string	1 byte	'**A**'
ID	2 bytes	Hex 201 to Hex 2000
Checksum	1 byte	Value

Wait answer:

Command string	1 byte	'**W**'
Ack	1 byte	0x06
Checksum	1 byte	Value

Answer after a successful memorization:

Command string	1 byte	'**S**'
Ack	1 byte	0x06
Checksum	1 byte	Value

NOTE 1: any command or simply the 'ack' command shuts down the 'waiting for a code' operation.

NOTE 2: to memorize more than one channel belonging to the same transmitter, you have to use the same ID number.

Example 2: memorizing the channel 3 of the transmitter with serial code 300000 on the location ID = 500

Data to send(hexadecimal): 41 01 F4 36

'A' 500 checksum

Wait answer received: 57 06 5D

Transmission of channel 3 for the transmitter with s.n. = 300000

Answer: 53 06 59

(To memorize the channel 5 of the same transmitter must be used the same data 41 01 F4 36)

Receiving a serial code stored

When TVRS232LINK receives a transmitter stored code, it sends on RS232 these data:

Command string	1 byte	'**R**'
ID	2 bytes	Hex 1 to Hex 2000
Channel	2 bytes	1-0xFFFF
Checksum	1 byte	Value

Example 3: receiving the channel 3 of a transmitter stored with serial code 300000(see example 2).

Data received on RS232(hexadecimal): 52 01 F4 00 03 4A

'R' ID=500 channel checksum

Command 3: Delete memory location/s

Delete a serial number stored in the range location 201 – 2000.

Command string	1 byte	**'C'**
Starting ID	2 bytes	Hex 201 to Hex 2000
Number of location to delete	1 byte	1-0xFF
Checksum	1 byte	Value

Successful deletion answer:

Command string	1 byte	**'C'**
Ack	1 byte	0x06
Checksum	1 byte	Value

Example 4: deleting one location with ID = 350(see example1)

Data to send(hexadecimal): 43 01 5E 01 A3

'C' 350 number of locations checksum

Answer received: 43 06 49

Command 4: Delete all the memory

Delete all the memory from ID = 201 to 2000.

Command string	10 bytes	**'DELETE ALL'**
Checksum	1 byte	Value

Successful deletion answer:

Command string	1 byte	**'C'**
Ack	1 byte	0x06
Checksum	1 byte	Value

Example 5: deleting all the memory

Data to send(hexadecimal): 44 45 4C 45 54 45 20 41 4C 4C AC

'DELETE ALL' *checksum*

Answer received: *43 06 49*

Command 5: Initialize transceiver with default data(receiver operating mode, central frequency= 868.3 MHz)

Command string	1 byte	**'D'**
Confirm string	1 byte	**'T'**
Checksum	1 byte	Value

Answer:

Command string	1 byte	**'D'**
Ack	1 byte	0x06
Checksum	1 byte	Value

Example 9: Initializing the transceiver with default data.

Data to send(hexadecimal): 44 54 98

'D' *'T'* *checksum*

Answer received: 44 06 4A

Command 6: Read location/s

Read serial code location/s.

Command string	1 byte	'**L**'
Starting ID	2 bytes	Hex 1 to Hex 2000
Number of locations to read	1 byte	Hex 1 to Hex 16
Checksum	1 byte	Value

Answer:

Command string	1 byte	'**L**'
Number of read bytes	1 byte	8 x N [1]
Location's values	N x 8 bytes	[2]
Checksum	1 byte	Value

1 N = number of locations(hexadecimal value).
2 The order of received bytes is: 3 serial code bytes – 2 counter bytes – 3 attributes bytes (the first is about the enabled channels).

Example 10: Reading 5 serial codes locations starting from location 1200.

Data to send(hexadecimal): 4C 04 B0 05 05

'L' starting addr. num. locations checksum

Answer received: *4C 28 03 64 74 00 02 01 00 00 00 00 00 FF FF FF FF FF 00 00 00 FF FF FF FF FF 00 00 00 FF FF FF FF FF 00 00 00 FF FF FF FF FF 3E*

Command 7: Send a transmission (300 ms)

Transmit via radio the serial number stored in a memory location and a specific channel.

Command string	1 byte	'**T**'
ID	2 bytes	Hex 1 to Hex 2000
Channel	2 bytes	1-0xFFFF
Checksum	1 byte	Value

Answer:

Command string	1 byte	'**T**'
Ack	1 byte	0x06
Checksum	1 byte	Value

Example 11: Transmitting channel 7 for serial number stored in location ID=350.

Data to send(hexadecimal): 54 01 5E 00 07 BA

'T' 350 channel checksum

Answer received: *54 06 5A*

Error codes:

Error string	1 byte	**'E'**
Error specific	1 byte	*X* (from 0 to 9 see table IV)
Checksum	1 byte	Value

Error types:	*Hex Value*
Framming error	0
Checksum error	1
Wrong command error	2
ID = 0 error	3
ID > 2000 error	4
Number of code to read/delete = 0 error	5
Number of code to read > 16 or >128 error	6
Number of code to read/delete > 2000 (out of range) error	7
Serial code already stored error	8
ID < 201 error	9
Empty location transmission attempt error	10
Value out of valid codes range memorization attempt error	11

Table IV

Example 12: Error answer received .

Data sent(hexadecimal): 41 01 F4 39 (see example 2)

'T' 500 wrong checksum

Answer received: 45 01 46

'E' checksum error checksum