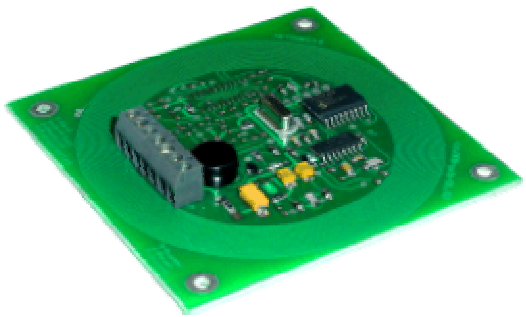
NETRONIX

Technical Data Sheet

CTU-005

Ctu005-doc-02.03
in reference to ctu005-c-01.02



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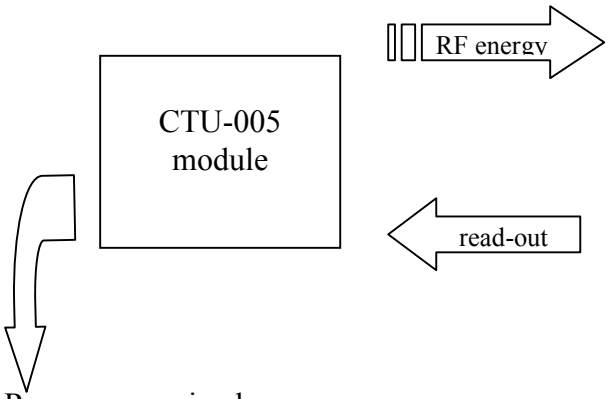
Introduction

CTU-005 module operates on principle of the contact less unique data acquiring from UNIQUE (RFID) transponders. Data is processed suitably and next transmitted in serial form to the master unit. Additionally indication LED can be connected to the reader signaling successful reading information from transponder and power-on indicating LED. Buzzer located on board beeps at the moment of reading.



Byte. no.	Unique transponder
1	ID1 (8 bits)
2	ID2 (8 bits)
3	ID3 (8 bits)
4	ID4 (8 bits)
5	ID5 (8 bits)
6	Parity 1 (8 bits)
8	Parity 2 (6 bits)

Response received:

Module address	Frame width	Response	ID	Operation code	CRCH,CRCL
01	0b	01	**ID1…ID5**	ff	xx xx

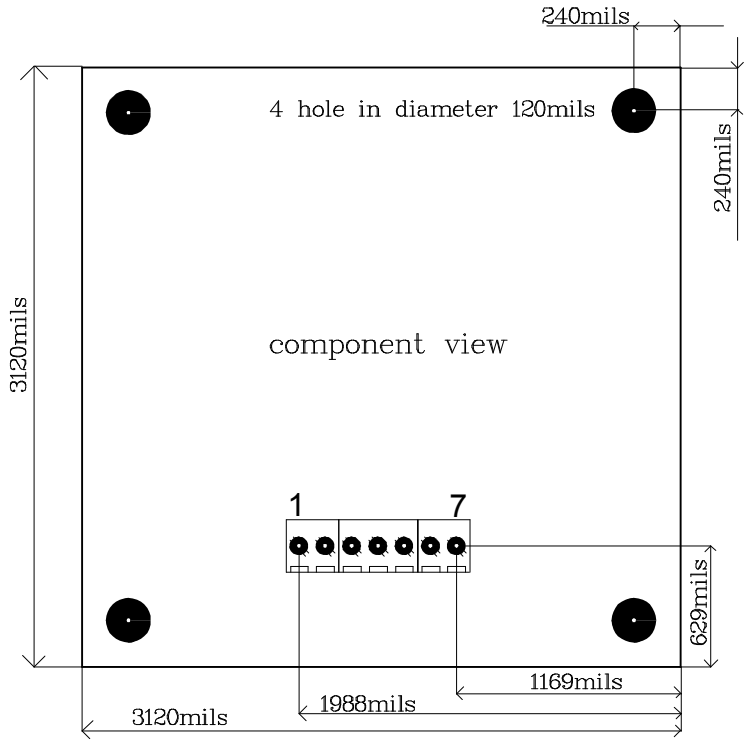
Specifications

Supply voltage Vdd….....	4,5...5,5 V
Supply current.....	5...55 mA
Module rated operating radio frequency…..….….....	125 kHz
Modulation type of data received from transponder.....	Manchester
Baud rate of data received from transponder….....	RF/64 (1953b/s)
Output current capacity: transponder Rx/Tx LED..….....	15 mA
Transponder read-out distance….....	8...10 cm
Maximum read-out frequency…….....	2 transponder read-outs/sec
Data transmission parameters to the master unit…….....	9600 b/s, 8 data bits 1 stop bit, no parity bit, with TTL levels

Pin description

1-Rx	non connected
2-Tx	serial data output
3-PowerLed	auxiliary LED output for the power-on status signaling
4-TransponderLed	auxiliary LED output for the successful transponder read-out signaling
5-Buzzer	buzzer auxiliary output
6-Power	plus of supply voltage Vpp
7-Ground	earth (minus) of supply voltage, it is a common output of serial data and for LED connection

Module PCB dimensions

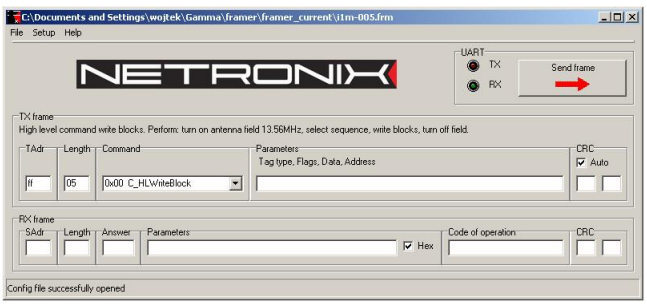


Frame format for serial tarnsmission

Module address	Frame width	Response	Data	Operation code	CRCH	CRCL
1 byte	1 byte	1 byte	n bytes	1 byte	1 byte	1 byte

Where during read-out from transponder:
Module address - 0x01 always
Frame width – total number of response frame bytes = 0x0b
Response = 0x01
Data - ID1...5 – transponder ID (5 bytes)
Operation code i – 0xff
CRCH, CRCL - CRC16 MSByte and LSByte respectively

During ca. 1 sec, after turning on the power, CTU-232 reader sends software version number. This number is encoded in compliance with transmission format mentioned above, by the same time:
Frame width – total number of response frame bytes
Response = 0xff
Data – number of software version number written in ASCII code.



The reader can be tested with free of charge FRAMER software tool, which makes work with frames easier.

CRC value calculation

The CRC value is calculated from equation x^16+x^12+x^5+1 with initial value equal to 0x0000. This value is calculated in virtue of all the bytes except of CRCH and CRCL. Example of calculation of CRC value, written in C language:

```
void LiczCRC2(unsigned char *ZAdr, unsigned short *DoAdr,  unsigned char Ile)
{
int     i,NrBajtu;
 unsigned short C;
       *DoAdr=0;
       for (NrBajtu=1;NrBajtu<=Ile;NrBajtu++,ZAdr++)
       {
             C=((*DoAdr>>8)^*ZAdr)<<8;
             for (i=0;i<8;i++)
                   if (C&0x8000) C=(C<<1)^0x1021;
                   else C=C<<1;
             *DoAdr=C^(*DoAdr<<8);
       }

}
```

where:

*Zadr	- the data first byte flag
Ile	- number of bytes used for calculations the CRC value (in this case the number is equal to 5).
*DoAdr	- flag of calculated CRC value (two bytes CRCH and CRCL)

Unique transponder description

Unique transponder (EM Microelectronic standard – Marin SA, H4102) comprises 5 bytes with laser written unique ID number. Correctness of red-out data is protected with parities written in 2 subsequent bytes. It gives 40 bytes of unique ID number. Owing to the CTU-232 reader, the transponder reads the ID number, verifies read-out correctness automatically and next sends this number to master unit via serial interface port.

Byte no.	Unique transponder
1	ID1 (8 bits)
2	ID2 (8 bits)
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5	ID5 (8 bits)
6	Parity 1 (8 bits)
8	Parity 2 (6 bits)

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