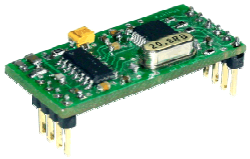
NETRONIX

Technical Data Sheet

UM-005

UM005-doc-01.04
In reference to UM005-c-01.04

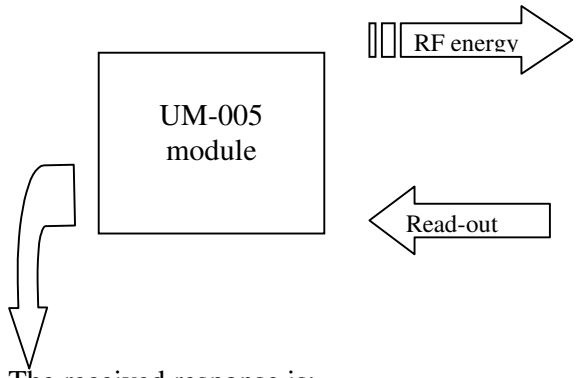


Contents

Introduction

The UM-005 module operates on principle of the contact less unique data acquiring from UNIQUE (RFID) transponders. Read-out data is sent via RS-232 interface with voltage levels TTL format compatible.

The principle of module operation:
Applying the transponder to reader – read-out (from transponder) – data transmission (to master unit).



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)

The received response is:

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

The module is equipped with two outputs, which signal successful read-out of the transponder.

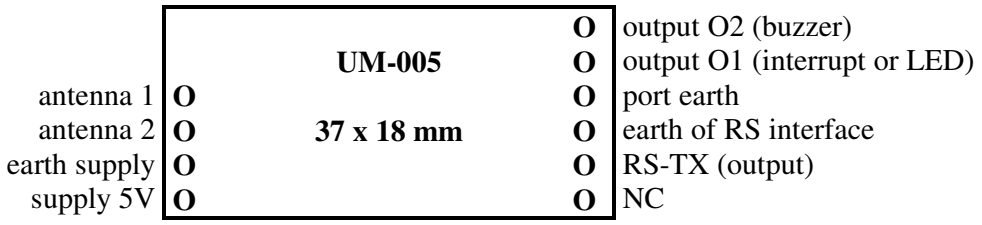
Connect the antenna to UM-005 module in form of air coil, which will produce electromagnetic field and supply the transponder located in this field.

Dane techniczne

Supply voltage Vdd: . . . . . 4.5...5.5V
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 (1953 b/s)
Maximum read-out frequency: . . . . . 2 read-outs/sec
Output current capacity buzzer, LED and RS-TX: . . . . . 5 mA
Transponder read-out distance (depending on used antenna): . . . . . up to 12 cm
Antenna inductance . . . . . 1 mH +-5%
RS232 transmission: . . . . . .9600 b/s, 8 data bits, 1 stop bit, no parity bit, with voltage levels TTL format compatible.

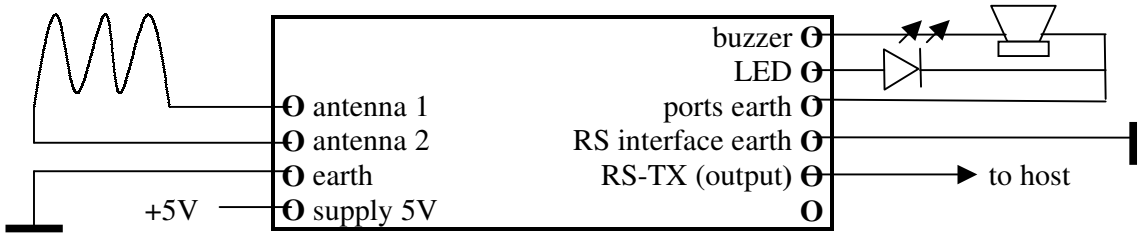
Pin description

antenna1, antenna2	external antenna with inductance of ca 1 mH
supply earth and supply 5V	module supply
output O2	after successful transponder read-out, the reader activates external buzzer for ca. 100 ms (active H)
output O1	interrupt or LED – after successful transponder read-out, the reader sets output in logical one state for ca. 400 ms (interrupt triggering with rise slope)
port earth	earth of O1 and O2
earth of RS interface.	earth of RS-TX
output RS-TX.	after successful transponder read-out, the reader sends data via RS with TTL voltage levels
NC	Non connected

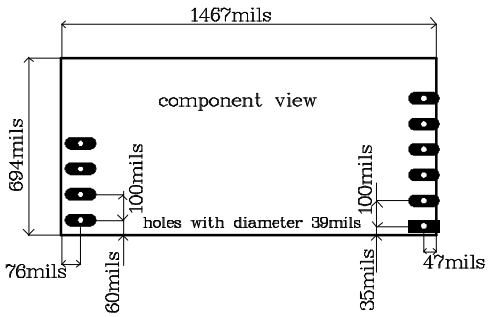


Pin assignment element side view

Connection diagram



Module PCB dimensions

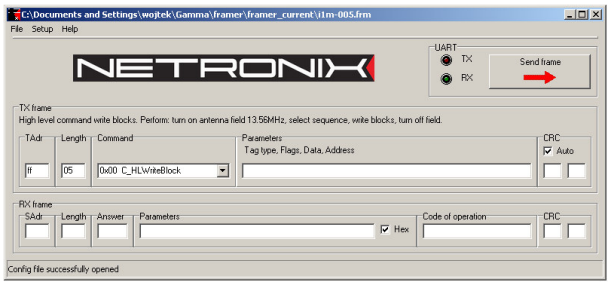


Frame format for serial transmission

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 – 0xff
CRCH, **CRCL** - CRC16 MSByte and LSByte respectively

During ca. 1 sec, after turning on the power, UM-005 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

Unique transponder description

The Unique transponder (EM Microelectronic standard – Marin SA, H4102) comprises 5 bytes with laser written unique ID number. Correctness of read-out data process is protected with parities written in 2 subsequent bytes. It gives 40 bytes of unique ID number. Owing to the UM-005 reader, the transponder reads the ID number, verifies read-out correctness automatically and next sends this number to master unit via serial interface port.

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