



# *User Guide*

## *125 kHz Proximity Reader Module* **(nano-2)**



EM Read Only, 125KHz +5V  
22 x 22 x 9(mm)  
RS232 ( w/ Internal Antenna )

Document version: 1.2

***About Taiwan Batag RFID technology co., ltd.:***

Taiwan Batag RFID technology co.,ltd. is a specialized manufacturer and supplier of RFID devices and transponders with over 10 years of professional RFID experience. We are unlike our competitors in that we are comprised of Barcode and Telecom companies that have been established for over 15 years.

Currently our major products include LF (125 kHz, 134.2 kHz), HF (13.56 MHz) and UHF (868 MHz, 915 MHz) RFID devices that are manufactured in popular RFID technologies including TI, TK4100, EM4100, EM4102, T5557, Hitag 2, Mifare 1K (S50), Mifare 4K (S70), Mifare UltraLight, Mifare DESFire, I.CODE SLI, SLE 66R35, Legic MIM256 and MIM1024, etc.

We not only provide and integrate our hardware but we also tailor the needs of our customers.

***“Based in Taiwan, Advancing our horizons, and Expanding RFID products all over the world; we are Taiwan Batag RFID technology co., ltd.”***

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### nano-2 Proximity Reader Module

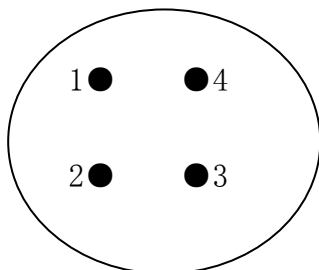
Power Requirement	5v@13mA nominal
Frequency	125 kHz
Card Format	EM 4001 or compatible
Encoding	Manchester 64 bit, modulus 64
I/O Output Current	20 mA sink/source
Drive Current	300 mA
Antenna Volt	100 Volts PKPK
Baud Rate	9600, N, 8, 1
Dimensions	round (Φ22mm) thick (9mm)

#### Output Format-ASCII

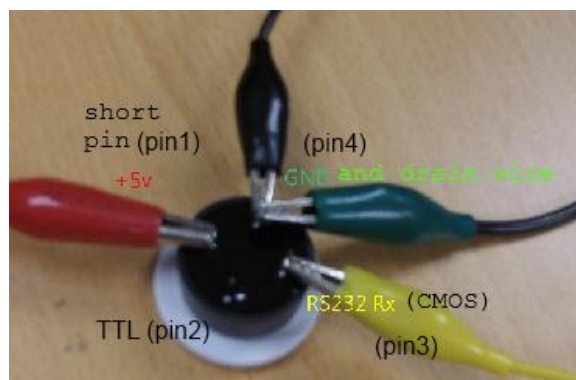
STX	Data	Data Checksum	CR	LF	ETX
02H	10 ASCII Data Characters	2 ASCII	0DH	0AH	03H

The checksum is the result of the 'Exclusive OR ' of the 5 Binary Data bytes (the 10 ASCII data characters)

#### Bottom View



Pin 1	+4.6v through +5.5V supply DC volts
Pin 2	TTL data
Pin 3	CMOS
Pin 4	Ground 0v Zero volts and Tuning Capacitor Ground



## ● EM Transmission Format

Output Format – ASCII

(COM port setting: 9600, N, 8, 1)

STX	Data	Data Checksum	CR	LF	ETX
02H	10 ASCII	2 ASCII	0DH	0AH	03H

The checksum is the result of the 'exclusive OR' of the 5 binary data bytes (the 10 ASCII data characters)

### The Calculation of the Checksum

For example:

When EM tag (UID: 0F01EAF022) comes near the reader, if the COM port tool can only display visible ASCII character, you will see 0F01EAF02236, 0F01EAF022 is UID, and 36 is checksum.

Here is how checksum calculated:

```

      0000  1111  (0F)  0F01EAF022
XOR) 0000  0001  (01)  0F01EAF022
-----
      0000  1110  (0E)  (XOR result)
XOR) 1110  1010  (EA)  0F01EAF022
-----
      1110  0100  (E4)  (XOR result)
XOR) 1111  0000  (F0)  0F01EAF022
-----
      0001  0100  (14)  (XOR result)
XOR) 0010  0010  (22)  0F01EAF022
-----
      0011  0110  (36)  Checksum
  
```

If your COM port tool can display HEX code, you will see:

02 30 46 30 31 45 41 46 30 32 32 33 36 0D 0A 03

02	30	46	30	31	45	41	46	30	32	32	33	36	0D	0A	03
STX	0	F	0	1	E	A	F	0	2	2	3	6	CR	LF	ETX