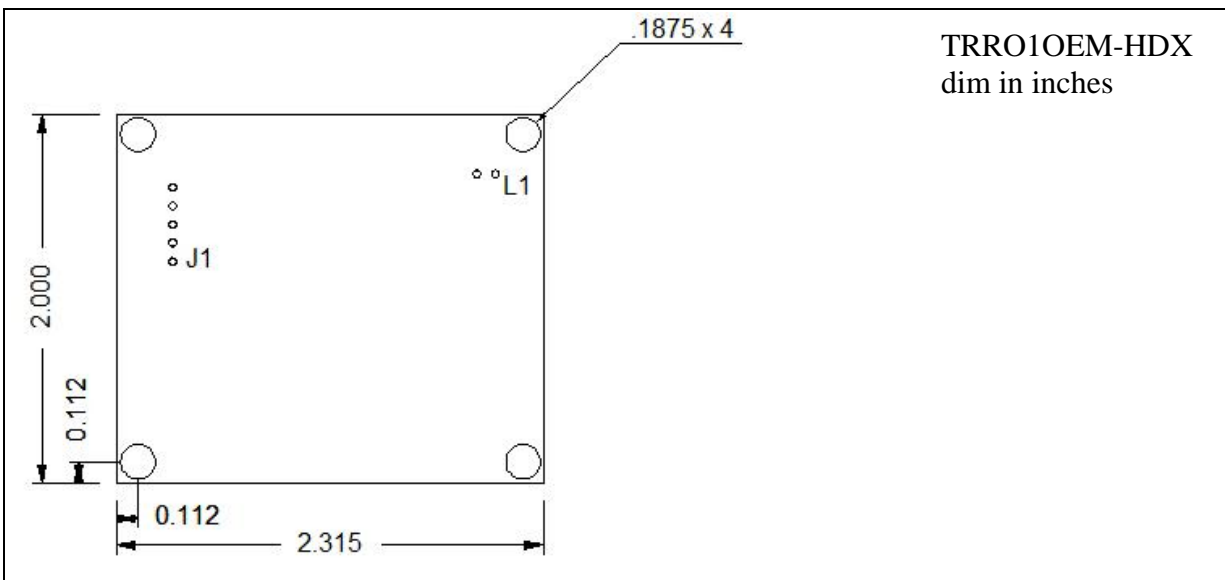


## TRRO1OEM-HDX

The TRRO1OEM-HDX is a small, inexpensive and easy to use reader/decoder board for passive RF identification tags. It can read FSK half-duplex type tags (compliant with ISO11785/11784 HDX). It is intended for OEM applications. A power source and an antenna is all that is required to use the reader. Its low-power requirements permit battery operation and can be integrated into hand held devices.



### Specifications

Function	Reader/decoder for 134.2 kHz FSK half duplex type tags
Interface	RS232, 9600 baud, 8 data bits, no parity, 1 stop bit
Antenna type	0.43 mH coil (calculated, see note)
Read range	Antenna and tag dependent, practical maximum about 90 cm
Power requirements	9 VDC regulated (6V – 16V OK), 100 mA minimum
Dimensions	2.315 inches x 2.0 inches x 0.2 inches (60 x 50 x 5 mm)
Operating temperature	-20 °C to +50 °C
Humidity	non-condensing
Connections	J1: 5 pin .100 header for power and communication L1: 2 pin .100 header for antenna

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Specifications and functionality are subject to change without notice

## General Description

The TRRO1OEM-HDX board performs all the functions necessary for a RFID reading station. It continuously powers, reads and decodes transponders that are within its reading range. When a transponder tag passes within range of the reader antenna, the RF magnetic field generated by the reader powers the tag. The tag then transmits its data. The reader board demodulates and decodes the data. The data is then sent as a packet using a *two or three* wire RS232 interface. While the tag remains within reading range it will be continuously powered and the reader will continuously transmit its data.

## Connections

J1: The standard connector J1 is a 5 0.100 inch spacing single row male header.

- TXD It is used to serially transmit the data packet. Connect to RXD (receive) of RS232 terminal.
- RXD It is used to serially received commands. Connect to TXD (transmit) of RS232 terminal.
- C Connect to common ground of RS232 terminal
- GND Connect to ground (-) side of power supply.
- +V Connect to positive side of power supply. A 6 to 16 VDC *linear regulated* supply is required. A 9 volt battery can also be used (positive + terminal). Although the board offers some protection, be sure to check for proper polarity.

L1: The antenna connection, L1 is made via 2 pin 0.100 inch spacing single row male header.

## Antenna Design

A single antenna is required for powering and reading the transponders. The antenna is used in a series resonant circuit The board requires, based on calculation with the on-board 3.3nF capacitor, an antenna with an inductance of 0.43 milliHenrys. Values between 0.4 to 0.7 mH are acceptable. Proper value and shape of the antenna are installation dependent and must be determined by the user.

The nominal resonant frequency is 134.2 kHz. The antenna can be a simple air wound coil. The reading range is spherical with the antenna located at the equator. Minimum and maximum read range is determined, in great part by the size of both the reader and tag antennas. Nearby metal and RF radiating equipment will greatly affect the antenna. The antennas should be individually adjusted with each board in their final environment.

# TRRO1OEM-HDX *continued*

## Communication

Information is sent and received using a 3-wire (txd, rxd and c) RS232 interface. It operates at 9600 baud 8N1.

### Data Packet Transmission

The reader sends (txd and c) the tag information in an 18 byte data packet. The data packet is comprised of 1 start byte, 16 data bytes in ASCII, and one stop byte. The start byte is always a ':' (58d, 3Ah). The 16 data bytes are an ASCII representation of the 32 sixteen hexadecimal digits (16 numbers) stored in the tag that has just been read. The stop byte is always an ASCII 'carriage return' (13d, 0Dh).

The firmware by default assumes that the data store is in an ISO11784 compliant format. Therefore the data packet can be interpreted thusly:

: nn nn nn nn nn cccc ee rr rr aa ss ss xx xx xx [0D]

Where:

nn: National Identification Code	38 bits (5 bytes)
cc: Country Code	10 bits (2 bytes)
ee: Extension Block Flag	1 bit (1 byte)
rr: Reserved	14 bits (2 bytes)
aa: Animal flag	1 bit (1 byte)
ss: CRC16 CCIT Checksum	16 bits (2 bytes)
xx: Extension Data	24 bits (3 bytes)

The 16 data byte are sent as ASCII representation: 32 digits: '0'-'9', 'A'-'F' (30h-39h, 41h-46h)

Example:

:00499602D2026C0000000122C6000000cr  
National ID Code: 1234567890 (animal number, 499602D2h)  
Country Code (ISO 3166): 620 (Portugal, 26Ch)  
Data Block Flag: 0 (No Extended data, 0h)  
Reserved field: 0 (No reserved data, 0h)  
Animal Flag: 1 (Yes this is an animal ID, 1h)  
CRC (per Annex B): 8902 (Calculated on 64 bits above, 22C6h)  
Extension Data: 0 (No extended data, 0h)

The data packet is sent every time a tag is detected. If a tag remains in the reading field, its data will be sent continuously.

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# TRRO1OEM-HDX *continued*

## Reader Commands

The reader, at power-up, automatically enters continuous reading mode. In this mode, per the HDX specification, the tag is powered on, by emission of a 132.4kHz signal by the reader. The reader then stops emitting a signal and listens for a tag response. If a tag is found its data packet is transmitted. The cycle is then repeated.

Prior to the next cycle the reader will respond to two commands sent on the RS232 interface (rxd and c). The commands remain in effect until a new byte is received. The new byte is discarded and the reader resumes continuous reading mode.

The commands are a single uppercase letter (firmware version 1.0):

<b>C</b>	(43h, 67d)	Continuous power
<b>P</b>	(50h, 80d)	Pause continuous reading

### C – Continuous power

The reader only emits a power signal. It will not listen to the tags response. This command is useful for tuning the antenna.

### P – Pause continuous reading

The reader is idle. It does not emit a power signal nor does it listen to the tags response. This command is useful in multiple reader environments.

## Ordering information

TRRO1OEM-HDX-J4-L1-LED

*This is our standard board. Please contact us with your custom requirements.*

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