Product Technical Data

418MHz AM Miniature Transmitter Module (Micro Tx) NV08J

Features

- Type Approved to MPT 1340
- Ultra-compact two pin package
- Wide supply voltage 2·5V to 13·1V

Applications

- Low cost key-fob designs
- Car alarm 'blippers'
- Garage door openers
- Lighting controls
- Wire-free security systems

Description

The Micro TX is a Type Approved AM radio transmitter module operating at UHF frequencies. It is compatible with both low cost AM super-regenerative and AM superhet receivers. By providing excellent RF performance in a Type Approved module, the Micro TX minimises design costs and delays. The sub-miniature two-pin package ensures that the module can be fitted into any convenient space on the user's board. This makes it ideally suited to keyfob designs, where space is often limited due to the demand for ever more compact designs.

The unique (Patent Pending) design of this module allows operation on any supply voltage between 2·5V and 13·1V, simply by changing one external resistor. Users requiring high performance from a compact transmitter will appreciate the efficient operation of the module when driving a tuned loop or short whip antenna. Up to –6dBm radiated power can be achieved with a 90mm whip, just over half the length of the usual ¼-wave antenna. It is compatible with most encoding ICs operating from a 3V to 12V supply. Package dimensions and pin-out of the Micro TX are shown in Figure 1. The Micro TX technical specification is given in Table 1.

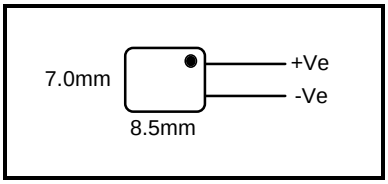

Figure 1. Package dimensions and pin-out.

Parameter (Ambient temperature: 20ºC)	Min	Typical	Max	Unit
Frequency (f_O)	417·925	418·000	418·075	MHz
Module voltage	2·2		3·0	V
Supply voltage (R_D = 100 ohms)	2·5		3·5	V
Supply voltage (R_D = 2200 ohms)	8·8		13·1	Volts
Input current (mark)	3·0		4·6	mA
Input current (space)		0		mA
Effective radiated power (ERP)		–6		dBm
Maximum baud rate			1200	bps
Range (with suitable receiver)		100		m
Dimensions	8·5 x 7·0 x 4·2 ±10%			mm
Pin pitch		5·08		mm
Operating temperature	–10		+40	ºC
Storage temperature	–40		+85	ºC

Table 1. Technical specification.

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RS 12750

Antenna

Figure 2 shows typical applications circuits for designs using either printed circuit board (PCB) loop or whip antenna. A 2pF to 5pF ceramic trimmer is used to tune the circuit for maximum output. Figure 3 shows a typical board layout for a key fob style transmitter. The dimensions of the loop are not critical, but excessively small or large loops should be avoided, as these will affect antenna tuning and efficiency. The loop should enclose an area of about 700mm² using a PCB track width of 1·5mm to 2·5mm. Alternatively 1mm to 1·5mm tinned copper wire may be used to form the loop.

The module can also drive a short whip antenna by using the matching network as shown in the circuit diagrams. The whip can be a wire rod or PCB track of about 90mm length. The inductor can be a 15nH surface mount inductor or an air cored inductor of 0·8mm ID, close wound with 9 turns of 0·56mm enamel covered wire. A trimming capacitor of 2pF to 5pF will generally be adequate.

When using a printed antenna on the PCB, always specify a good quality fibreglass base material. Lower cost materials such as SRBP (which is a paper-based material) will cause excessive losses at UHF. For printed circuit board aerials the variable trimmer capacitor can be replaced with two fixed value capacitors in series allowing intermediate values of capacitance to be obtained. The aerials should then be tuned for resonance to determine the values of the capacitors.

Circuit Board Layout and Decoupling

In order to achieve satisfactory RF performance, good PCB layout practice should be observed. The loop antenna should be free of any components or tracks except for the module and the tuning capacitor. All aerials radiate more efficiently against ground planes and the PCB should therefore be ‘flood-filled’ with copper in the areas not being used for the aerial. Double sided PCBs can provide extra area for ground planes and the top and bottom ground plane layers should be generously connected with vias. Always use ceramic capacitors to decouple the supply at RF.

CMOS ICs can be susceptible to local RF fields and the use of the above techniques minimises this possibility. Do not use stripboard for prototypes as results may be misleading.

Power Supply

The Micro Tx can be matched to any power supply voltage by varying the resistor in series with the module. The module typically requires an operating current of 4mA and drops 2·5V across it. The required series resistor can thus be easily calculated by Ohms Law, alternatively Table 2 can be used. As it is a two pin device it can be driven from either a current source or a current sink. However, ensure that the encoding device can source or sink sufficient current. and be aware that if ‘sinking’ current the transmitter is ‘on’ when the output is low, thus inverting the data if using standard encoders.

Supply Voltage		Resistor Value
Min	Max	Ohms
2·5	3·5	100
2·8	4·0	220
3·2	4·5	330
3·6	5·2	470
4·2	6·1	680
5·2	7·6	1k
6·7	9·9	1k5
8·8	13·1	2k2

Table 2. Series resistor values.

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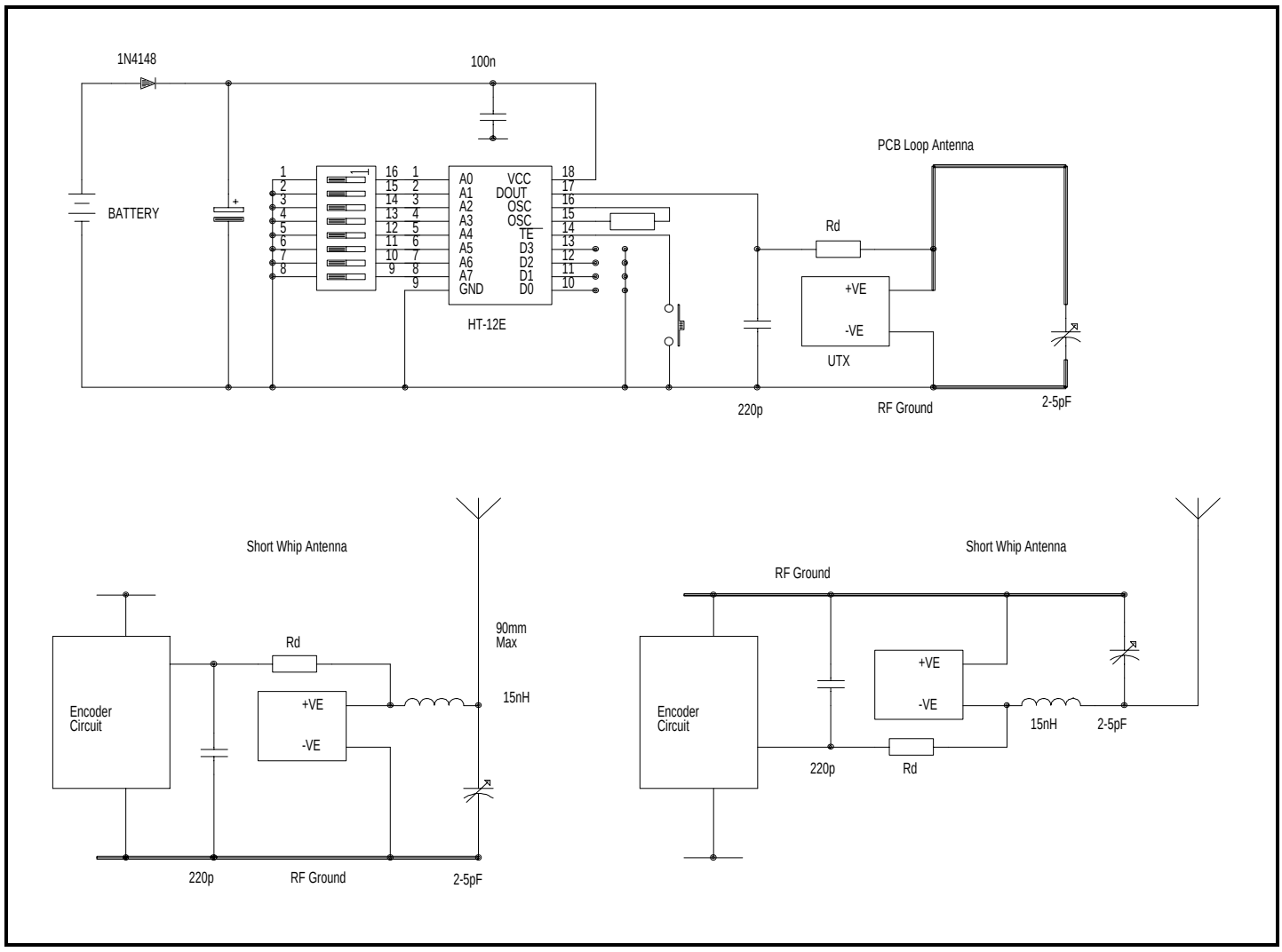

Figure 2. Application circuits.

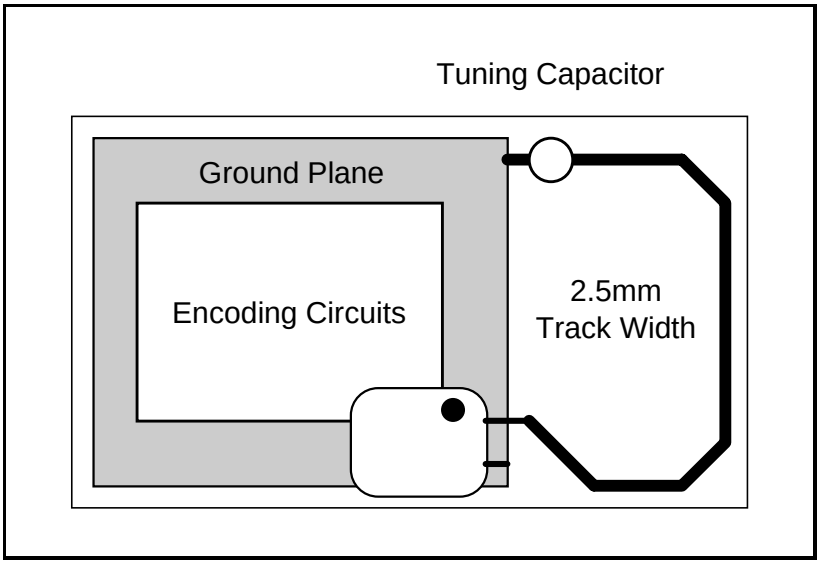

Figure 3. Typical tuned loop transmitter PCB layout.

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MPT 1340 Requirements

MPT 1340 is the appropriate Type Approval specification issued by the Radiocommunications Agency (DTI) and copies may be obtained from the RA's Library Service on Tel: +44 (0) 171 211 0211. The Type Approval number for this device is: 12321.

Users should be aware of the following requirement:

The equipment in which the module is used must carry an inspection mark located on the outside of the equipment and be clearly visible. The minimum dimensions of the inspection mark shall be 10mm x 15mm and the letter and figure height must be no less than 2mm. The wording shall read 'MPT 1340 W.T. LICENCE EXEMPT'.

MPT 1340
W.T. Licence Exempt
Type Approval No:
12321

Figure 4. Example label.

MPT1340 also states that: *All transmitters shall use integral antennas only. In this specification an integral antenna is defined as one which is designed to be connected permanently to the transmitter or receiver without the use of an external feeder. Receivers may use an external antenna or an integral antenna.*

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