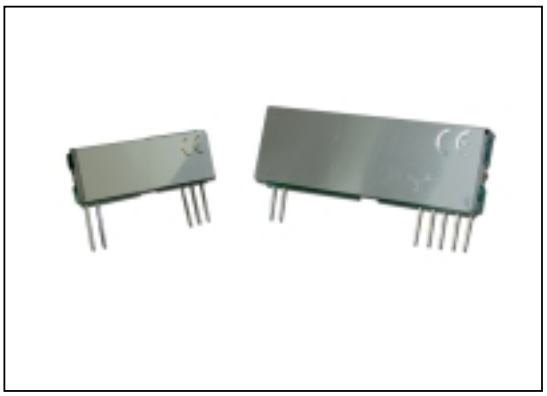
Features

- Miniature SIL Package
- FM Narrow Band 434.075MHz
- Optimal Range 600 metres
- Fully Shielded
- Data Rates Up To 20 Kbits/S
- En 300-220 Compliant
- Wide Tx Operating Voltage (2.2 - 10 Vdc).
- Low Current Consumption (6mA)



Applications

- Telemetry Systems
- Wireless Networking
- Domestic And Commercial Wireless Security Systems
- Panic Attack Facility
- Remote Control For Cranes Etc

Transmitter T7

- Digital Inputs
- Narrow Band Crystal Stabilised
- Small Form Factor

Receiver R7

- Data & AF Out
- CD Implemented On Data Output
- RSSI Output
- Selective Ceramic IF Filters

General Description

The T7-XXX and R7-XXX are miniature narrow band transmitter and receiver UHF radio modules, which enable the implementation of a simple telemetry link at data rates up to 20Kbits/s.

The transmitter is based on the classical phase locked loop using a crystal oscillator. This results in an accurately controlled RF output in the frequency domain. A significant advantage of this is that narrow filtering can then be used in the Receiver which results in high interference immunity. In addition, the module is fitted with an voltage regulator which gives better supply filtering and a constant RF output level. The receiver is based on the single conversion super-het principle using phased locked loop technology. Because of its small size and low power requirements, the module is ideal for use in battery powered wireless applications.

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Absolute Maximum Ratings: Transmitter

Operating temperature:	-25°C to +55°C
Storage temperature:	-40°C to +100°C
Supply Voltage (pin 3)	12V
Data input (pin 5)	10V

Electrical Characteristics: Transmitter

	Pin	Min.	Typ.	Max.	Units	Notes
DC Levels						
Supply voltage	3	2.2	5.0	12.0	Volts	
Current & RF Power						
Supply current @ V_{CC} = 5V (data low/high)	3		7		mA	1
RF output power @ V_{CC} = 5V	2		3		mW	1
RF & Data						
2nd harmonic			-60		dBm	2
Harmonics @ > 1GHz			-60		dBm	2
Initial frequency accuracy			+/-25		KHz	
Frequency accuracy over full temp range				+/-30	KHz	
Modulation bandwidth @ -3dB			20		KHz	3
Power up time to full RF			5		mS	
Data rate				20000	Bits/s	
Data pulse width		50			µs	

Notes

1. Measured into a 50Ω impedance.
2. The limit for the European spec EN 300 220 is -36dBm
3. A +/-2.5KHz Deviation on the RF carrier is also available

Part No	Description
T7-434.075	SIL Transmitter 434.075MHz

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Absolute Maximum Ratings: Receiver

Operating temperature: -10°C to +55°C
-40'C to +80'C option is also available

Storage temperature: -40°C to +100°C
Supply Voltage (pin 5) 7V
RF input (pin 1) +20dBm (100mW)

Electrical Characteristics: Receiver

	Pin	Min.	Typ.	Max.	Units	Notes
DC Levels						
Supply voltage		4.5	5	5.5	V	
Supply current			6	7	mA	
Supply ripple		-	-	10	mV_{P-P}	
Data output high			=>4.5		V	
Data output low			<=0.5		V	
RF						
RF sensitivity			-113		dBm	
IF Bandwidth			+/-27		KHz	
Initial frequency accuracy			+/-100		Hz	
Max R.F. input			20		dBm	
E.M.C.						
Spurious responses upto 1GHz			<60		dB	
LO leakage, conducted			<60		dBm	
LO leakage, radiated			<60		dBm	
Image rejection			63		dB	
DYNAMIC TIMING						
Power up to stable data *(With RF signal present*			18	23	mS	1
Signal to stable data *(With power supply already on)*			2.5	5	mS	1
Power up to valid RSSI (With RF signal Present)			3	5	mS	1
Mark:space ratio			50		%	
Bit rate		100		20000	Bps	

Notes
1. Timings are to be confirmed.

Part No	Description
R7-434.075	SIL Receiver 434.075MHz

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Transmitter Connection Diagram

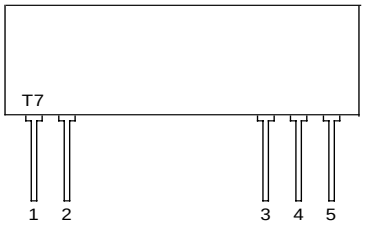

Figure 1: Narrow Band T7 Transmitter

Receiver Connection Diagram

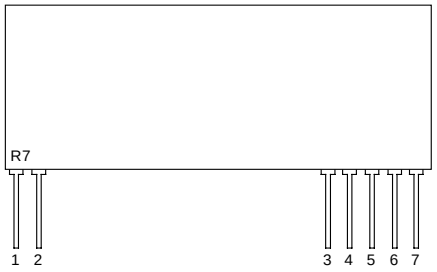

Figure 2: Narrow Band R7 Receiver

Pin Description:

RF GND *(pin 1)*
RF ground pin, internally connected to pin 4 (0v). This pin should ideally be connected to the nearest ground plane (e.g coax braid, main PCB ground plane etc.).

RF OUT *(pin 2)*
50 Ohm RF antenna output. To achieve best results, the antenna impedance must match that of the module.

Vcc *(pin 3)*
+Ve supply pin. The module will generate RF when Vcc is present.

GND *(pin 4)*
Supply and data ground connection, connected to pin 1.

Data IN (pin 5)
This input has an impedance of 47K Ohms and should ideally be driven by a CMOS logic drive or compatible. The drive circuitry should be supplied with the same supply voltage as the TX module.

Pin Description:

RF IN (pin 1)
50 Ohm RF input from antenna, connect using shortest possible route. This input is isolated from the internal circuit using the air gap of the front end SAW RF filter.

RF GND *(pin 2)*
RF Ground connection, preferably connected to a solid ground plane.

RSSI / Carrier Detect *(pin 3)*
The Received Signal Strength Indicator provides a DC output voltage proportional to the RF input signal. The amplitude of the RSSI voltage increases with increasing RF signal strength. A simple transistor interface can yield a carrier detect logic output.

GND *(pin 4)*
Connect to power supply ground.

VCC *(pin 5)*
+Ve supply pin. Operation from a 5V supply able to source 10mA at less than 10mV p-p ripple.

AF *(pin 6)*
Audio frequency output (max 40microA source)

DATA OUT *(pin 7)*
CMOS compatible output. This may be used to drive external decoders. To reduce any noise on this output add a 56pF cap from this pin to GND.

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Application Information

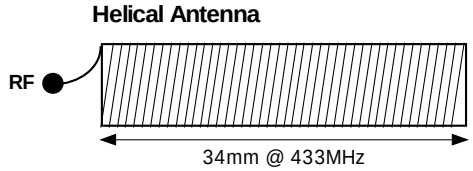
Antenna Design

The design and positioning of the antenna is as crucial as the module performance itself in achieving a good wireless system range. The following will assist the designer in maximising system performance.

The antenna should be kept as far away from sources of electrical interference as physically possible. If necessary, additional power line decoupling capacitors should be placed close to the module.

The antenna 'hot end' should be kept clear of any objects, especially any metal as this can severely restrict the efficiency of the antenna to receive power. Any earth planes restricting the radiation path to the antenna will also have the same effect.

Best range is achieved with either a straight piece of wire, rod or PCB track @ ¼ wavelength (15.5cm @ 433.92MHz). Further range may be achieved if the ¼ wave antenna is placed perpendicular in the middle of a solid earth plane measuring at least 16cm radius. In this case, the antenna should be connected to the module via some 50 ohm characteristic impedance coax



17 turns equally spaced
∅ = 5mm (inside)

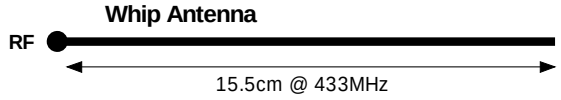


Figure 4: Antenna Configurations To Be Used With The FM Narrow Band Transmitter & Receiver Modules

Application Circuit

The application circuits show how the FM narrow band transmitter and receiver modules can easily be integrated into a system to form a wireless link.

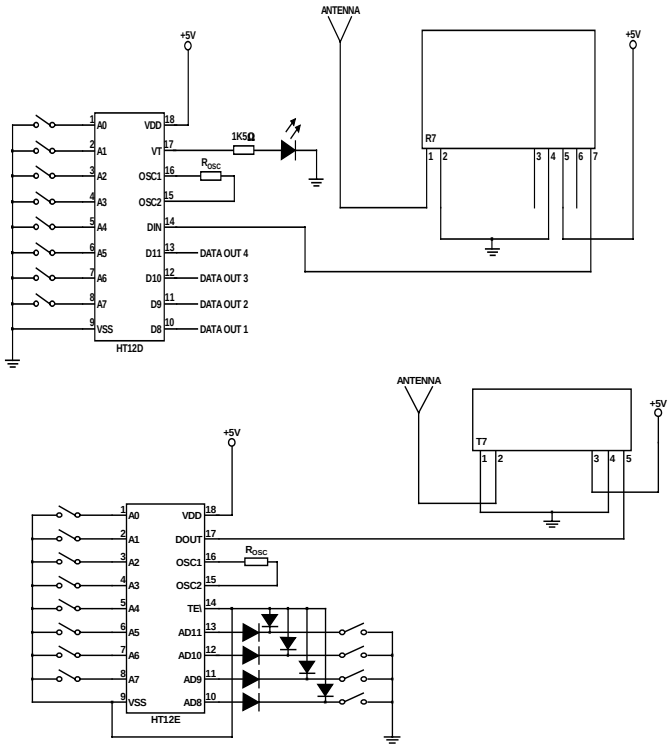


Figure 5: FM Narrow Band Transmitter & Receiver Application Circuits

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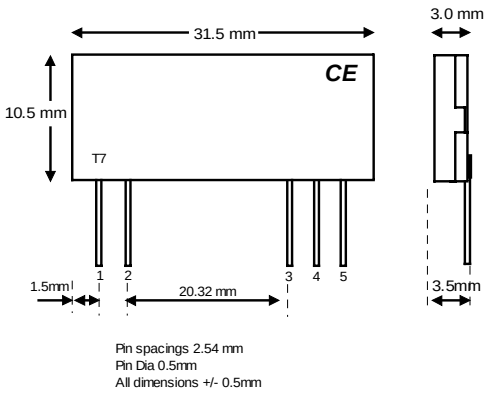
RSSI Values

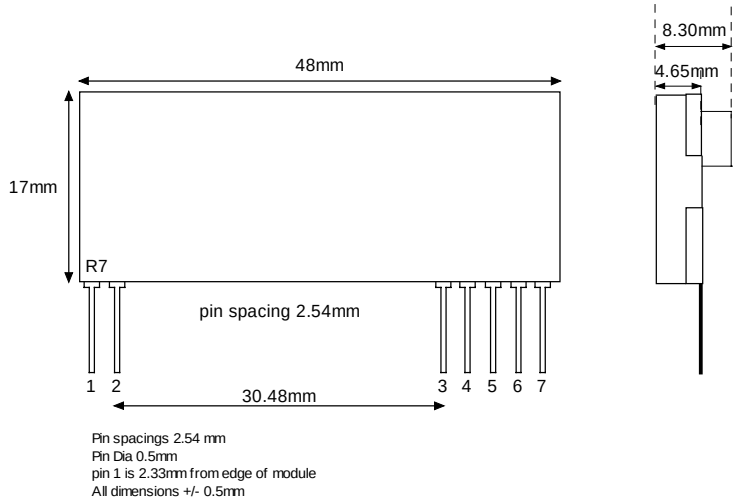
The R7 receiver RSSI output provides a DC output proportional to the RF signal. The table below shows the typical RSSI value depending on the Signal strength.

RF Signal Strength/dBm	RSSI (V)
-130	1.03
-120	1.06
-110	1.16
-100	1.34
-90	1.59
-80	1.78
-70	1.81
-60	1.81
-50	2.17
-40	2.45
-30	2.52
-20	2.52

Notice that the region between –80 to –60 is with the receiver agc operating. If required, a receiver version with agc disabled can be provided as a factory Pre-set option. This would linear-rise the RSSI curve.

Mechanical Dimensions





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