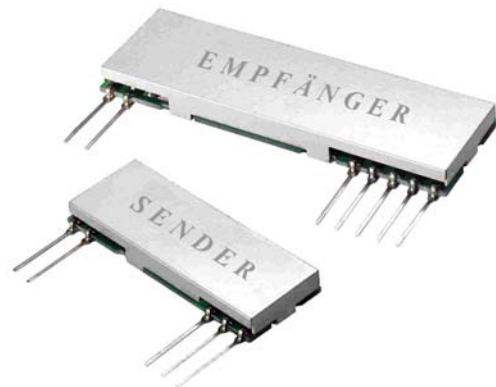


**Features**

- MINIATURE SIL PACKAGE
- FULLY SHIELDED
- DATA RATES UP TO 128KBITS/S
- 5v – 10mW  
3v – 10mW versions available
- TYPICAL RANGE 350+ m (433.92 MHz Version)
- 433.92 MHz VERSIONS
- INDUSTRY PIN COMPATABLE
- EN 300-220 compliant module



**Applications**

- VEHICLE ALARM SYSTEMS
- REMOTE GATE CONTROLS
- GARAGE DOOR OPENERS
- DOMESTIC AND COMMERCIAL SECURITY
- WIRELESS TELEMETRY
- REMOTE DATA TRANSFER

**Compatible Receiver Modules**

- XR5
- XR5B
- XR5LC

**General Description**

The XT5 miniature transmitter UHF radio module enables the implementation of a simple telemetry link at data rates of up to 128Kbit/s when used with the compatible X-receiver modules.

Available for operation at all world frequencies these modules are able to transmit at distances of up to 250+ m (433.92 MHz version).

The XT5 module will suit one-to-one and multi-node wireless links in applications including building and car security, remote industrial process monitoring and computer networking. Because of its small size and low power requirements, this modules is ideal for use in portable battery powered wireless applications.

**Ordering Information**

**Standard Product;**

Part No	Description
XT5-434-3	3v SIL Transmitter 433.92 MHz
XT5-434-5	5v SIL Transmitter 433.92 MHz

**Absolute Maximum Ratings: Transmitter**

Operating temperature:	-20°C to +55°C
Storage temperature:	-40°C to +100°C
Supply Voltage (pin 3)	10V
Data input (pin 5)	10V
RF Out (pin 2)	±50V @ < 10MHz , +20dBm @ > 10MHz

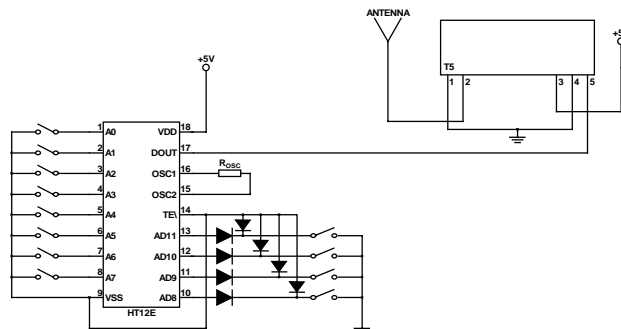
**Electrical Characteristics: Transmitter 433,92 MHz**

	pin	min.	Typ.	max.	units	notes
<b>5v Transmitter</b>						
Supply voltage	3	4.0	5.0	6.0	Volts	
Supply current	3	5.5	8	9.5	mA	1
RF power	2	7		+10	dBm	1
<b>3v Transmitter</b>						
Supply voltage	3	2	3	4	Volts	
Supply current	3	4	6	8	mA	1
RF power	2	3		7	dBm	1
<b>RF &amp; Data</b>						
2 <sup>nd</sup> harmonic			-50		dBc	2
Harmonics @ > 1GHz			-50		dBc	2
Initial frequency accuracy			±75		KHz	
Modulation bandwidth @ -3dB			25		KHz	3
Modulation distortion (THD)					%	
Power up time to full RF			10		µs	
Data rate				50000	bits/s	3
Data pulse width		20			µs	

- Note 1:** measured into a 50Ω impedance  
**Note 2:** the limit for the European spec EN 300 220 is -36dBm  
**Note 3:** 128 kbits/sec version also available

**Application Circuit**

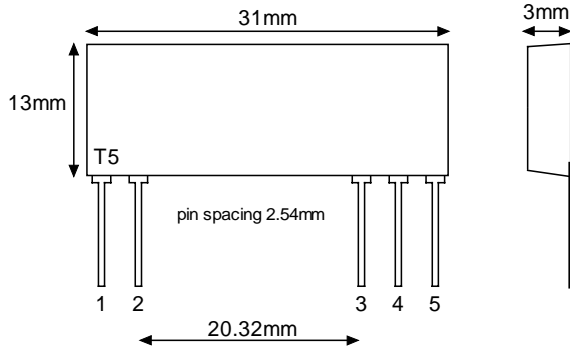
The application circuit shows how the XT5 transmitter can easily be integrated into a system to form a wireless link



**Transmitter Application Circuit**

Connection Details

Mechanical Dimensions



XT Transmitter

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 (pin2)**

50Ω RF antenna output. To achieve best results the antenna impedance must match that of the module.

**V<sub>CC</sub> (pin 3)**

+Ve supply pin. The module will generate RF when V<sub>CC</sub> is present. It is strongly recommended that a 100nF capacitor decouples the supply rail as close as possible to this pin.

**GND (pin 4)**

Supply and data ground connection, connected to pin 1.

**Data IN (pin 5)**

This input has an impedance of 47KΩ 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.

Application Information

Antenna Design

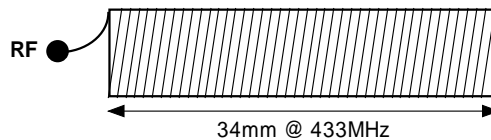
The design and positioning of the antenna is as crucial as the module performance itself in achieving a good wireless system range. The following will assist the designer in maximising system performance.

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.

Helical Antenna



17 turns equally spaced  
∅ = 5mm (inside)

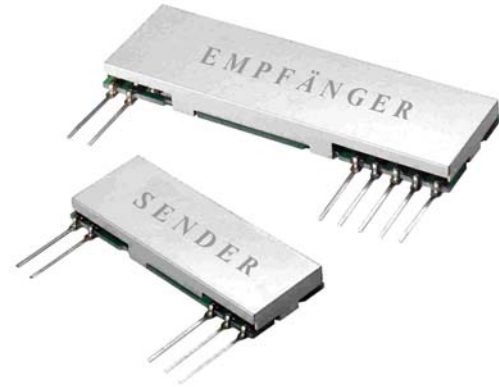
Whip Antenna



Antenna Configurations To Be Used With The XT5 Transmitter Modules

**Features**

- Miniature SIL package
- Single conversion FM Super-het using RF SAW and ceramic IF filtering at 10.7 MHz.
- (Image rejection 60dB)
- Incorporates AGC resulting in improved dynamic range
- Dynamic range better than 120dB
- Fully shielded
- Analogue, Digital and true RSSI outputs
- DATA RATES UP TO 128KBITS/S
- OPTIMAL RANGE 350m
- Operation on 433.92 MHz (Other frequencies possible)
- HIGH SENSITIVITY (-107 dBm)
- Very low current consumption (6mA)
- SINGLE 5V SUPPLY



**Applications**

- Telemetry systems
- Remote switching applications
- Paging systems
- Domestic and commercial security

**General Description**

The XR5 miniature receiver UHF radio module enables the implementation of a reliable telemetry link at data rates of up to 128Kbit/s when used with one of the compatible X transmitter modules

Available for operation at 433.92 MHz these modules are able to receive at distances of up to 350metres.

**Compatible Transmitter Modules**

- XT5
- XT5B

The receiver is based on the classical superhet single conversion architecture utilising a PLL xtal referenced oscillator which yields a highly stable IF frequency (10.7 MHz). This hence allows use of high Q bandpass filters offering excellent adjacent channel rejection and hence high interference Immunity.

The XR5 module will suit one-to-one and multi-node wireless links in applications including building and car security, remote industrial process monitoring and computer networking. Because of its small size and low power requirements, including a fast RSSI/CD, the module is ideal for use in portable battery powered wireless applications.

The module is highly suited for operation in harsh electrical environments where a reliable wireless link is essential.

**Ordering Information**

**Standard Product;**

Part No	Description
XR5-434-5-20	20 Kbits/sec FM Receiver 433.92MHz
XR5-434-5-50	64 Kbits/sec FM Receiver 433.92 MHz
XR5-434-5-128	128 Kbits/sec FM Receiver 433.92 MHz

**Absolute Maximum Ratings: Receiver**

Operating temperature:	-10°C to +55°C -40 to +80 deg C option available
Storage temperature:	-40°C to +100°C
Supply Voltage (pin 5)	7V
RF Input (pin 1)	+20 dBm (20mW)

**Electrical Characteristics: Receiver (20 Kbits/sec version)**

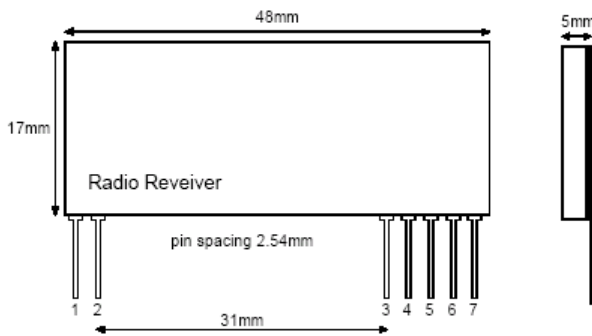
	pin	min.	typ.	max.	units	notes
<b>DC LEVELS</b>						
Supply voltage		4.5	5	5.5	V	
Supply current			6.0		mA	
Supply ripple		-	-	10	mV <sub>P-P</sub>	
Data output high			=>4.0		V	
Data output low			<= 0.5		V	
<b>RF</b>						
RF sensitivity			-107		dBm	
IF Bandwidth			230		KHz	
Initial frequency accuracy			±22		KHz	
Max R.F. input			20		dBm	1
<b>E.M.C.</b>						
Spurious responses upto 1GHz			<60		dB	
LO leakage, conducted			<60		dBm	
LO leakage, radiated			<60		dBm	
Image rejection			60		dB	
<b>DYNAMIC TIMING</b>						
Power up to stable data (With RF signal present)			30	35	mS	20 kbps
			5	7	mS	50 kbps
			5	7	mS	128 kbps
Signal to stable data (With powersupply already on)				2.5	mS	20 kbps
				1	mS	50 kbps
				1	mS	128 kbps
Power up to valid RSSI (with RF signal present)				1	mS	All versions
Signal to stable data (With power supply already on)		0.2		1	mS	20 kbps
				1	mS	50 kbps
				1	mS	128 kbps
Power up to valid RSSI (with RF signal present)		2		3	mS	
Allowable data pulse widths (note 2)		50		6000	µS	20 kbps
		20		700	µS	50 kbps
		7		300	µS	128 kbps

**Notes**

- 1) IF bandwidth available down to 27KHz
- 2) The data slicer is optimised for a 50:50 duty cycle, hence for reliable communications, data should be encoded using a suitable scheme such as Manchester Encoding, although pulse width modulation up to 30:70 / 70:30 can be tolerated.

Connection Details

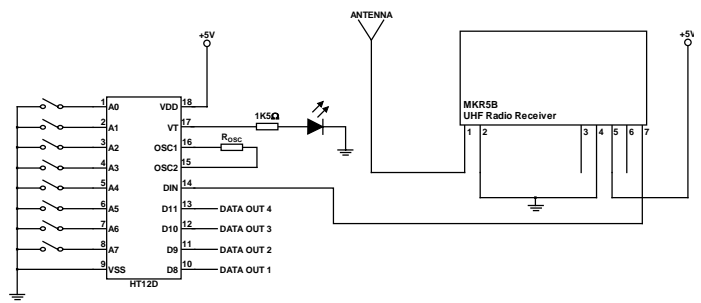
Mechanical Dimensions



XR5 Receiver

Application Circuit

The application circuit shows how the XR5 Receiver can easily be integrated into a system to form a wireless link.



Receiver Application Circuit

Pin Description

RF IN (pin 1)

50Ω 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

V<sub>CC</sub> (pin 5)

+Ve supply pin. Operation from a 5V supply able to source 14mA at less than 10mV<sub>P-P</sub> ripple.

AF (pin 6)

Audio frequency output

DATA OUT (pin 7)

CMOS compatible output. This may be used to drive external decoders.

Vertrieb:

AGT electronic Handelsges. mbH  
Spannstücken 22  
22159 Hamburg

RSSI Values

The XR5 RSSI output provides a DC output proportional to the RF input signal. The table below shows the typical RSSI value depending on the RF signal strength.

RF Signal Strength / dBm	RSSI / V
-120	1.27
-110	1.37
-100	1.49
-90	1.74
-80	1.99
-70	2.30
-60	2.56
-50	2.63
-40	2.63
-30	2.53

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