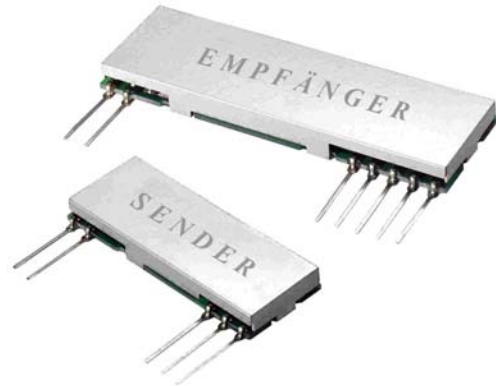


**Features**

- MINIATURE SIL PACKAGE
- FULLY SHIELDED
- DATA RATES UP TO 64KBITS/S
- BANDWIDTH EFFICIENT PLL TECHNOLOGY
- EUROPEAN VERSIONS;  
868.45 MHz for 1% duty cycle band  
869.85 MHz for 100% duty cycle band
- 20mW VERSION AVAILABLE
- AMERICAN VERSION ON 914.5 MHz
- WIDE OPERATING VOLTAGE
- EN 300-220 compliant module



**Applications**

- REMOTE CONTROL FOR CRANES ETC
- WIRELESS MONITORING
- DISPERSED ALARM APPLICATIONS
- DOMESTIC AND COMMERCIAL SECURITY

**Compatible Receiver Modules**

- XR6-XXX (see data sheet XR6)

**General Description**

The XT6 miniature transmitter UHF radio module enables the implementation of a wireless telemetry link at data rates of up to 64Kbit/s when used with the compatible XR6 receiver modules.

The transmitter is based on a classical phase lock loop using a crystal reference 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 on board voltage regulator which enhances the module performance due to better supply filtering as well as ensuring a constant RF output level.

The XT6 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
XT6-868.4-5	868.40 MHz Transmitter
XT6H-868.4-5	20mW 868.40 MHz Transmitter
XT6-869.85	869.85 MHz Transmitter
XT6-914.5	914.5 MHz Transmitter

**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

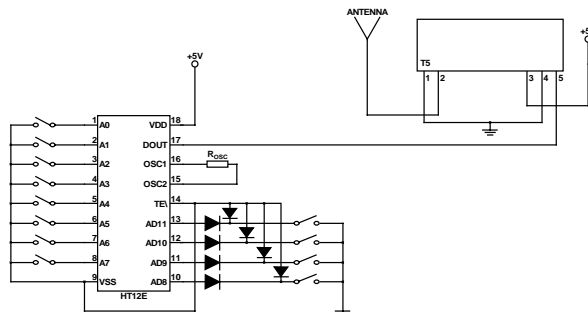
**Electrical Characteristics: Transmitter**

	pin	min.	Typ.	max.	units	notes
<b>DC LEVELS</b>						
Supply voltage	3	2.3	5.0	10.0	Volts	
<b>Current &amp; RF POWER</b>						
868.45 MHz (Same for 869.85 & 914.5 MHz)						
Supply current @ V <sub>CC</sub> = 5V	3		7		mA	1
RF power	2		1		mW	1
<b>XT6H-868.45 Only</b>						
Supply voltage range		4	5	5.5	Volts	
Supply current			30		mA	
RF Power			20		mW	
<b>RF &amp; Data</b>						
2 <sup>nd</sup> harmonic			-50		dBm	2
Harmonics @ > 1GHz			-50		dBm	2
Initial frequency accuracy error				30	KHz	
Modulation bandwidth @ -3dB			35		KHz	
Power up time to full RF			5		ms	
Data rate		0		64000	bits/s	
Data pulse width		15			µs	

- Note 1:** Measured into a 50Ω impedance  
**Note 2:** The limit for the European spec EN 300 220 is -36dBm.  
**Note 3:** Above data applies to all frequency variants.

**Application Circuit**

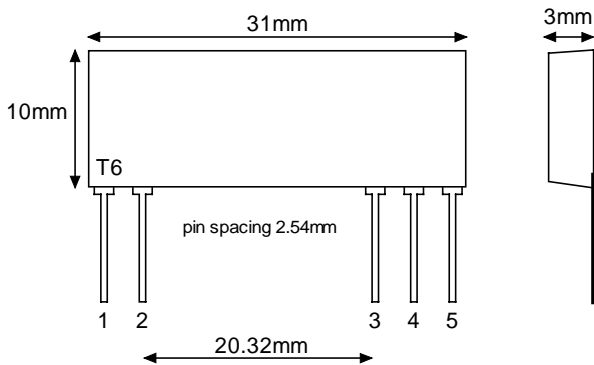
The application circuit shows how the XT6 transmitter can easily be integrated into a system to form a wireless link



**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

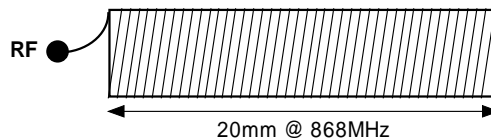
The design and positioning of the antenna is as crucial as the module performance itself in achieving a good wireless system range. The following will assist the designer in maximising system performance.

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.

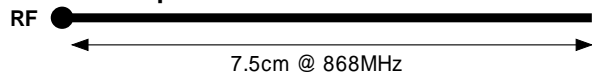
Best range is achieved with either a straight piece of wire, rod or PCB track @ ¼ wavelength (7cm @ 868 MHz). Further range may be achieved if the ¼ wave antenna is placed perpendicular in the middle of a solid earth plane measuring at least 10cm radius. In this case, the antenna should be connected to the module via some 50 ohm characteristic impedance coax

Helical Antenna



9 turns equally spaced  
 ∅ = 5mm (inside)

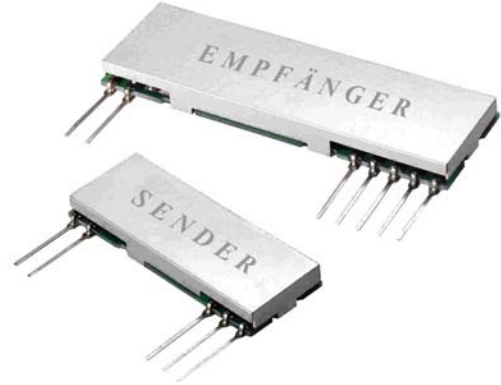
Whip Antenna



Antenna Configurations To Be Used With The XT6 Transmitter Modules

**Features**

- Miniature SIL package
- Single conversion FM Super-het using RF SAW and ceramic IF filtering at 10.7 MHz. (Image rejection 50dB)
- Dynamic range better than 120dB
- Fully shielded
- Analogue, Digital and true RSSI outputs
- DATA RATES UP TO 64KBITS/S
- Operation on 868.45, 869.85 & 914.5 MHz
- HIGH SENSITIVITY (-103 dBm)
- Very low current consumption (6mA)
- SINGLE 5V SUPPLY



**Applications**

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

**Compatible Transmitter Modules**

- XT6-XXX (see data sheet MKT6)

**General Description**

The XR6 miniature receiver UHF radio module enables the implementation of a reliable telemetry link at data rates of up to 64Kbit/s when used with one of the compatible MK transmitter modules

The receiver is based on the classical single conversion superhet principle utilising a crystal based phase lock loop for accurate generation of the local oscillator. This allows use of high Q bandpass filters resulting in good adjacent channel selectivity and high interference immunity.

The XR6 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, 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
XR6-868.4-5-xx	xx Kbits/sec FM Receiver 868,40 MHz
XR6-869.85-5-xx	xx Kbits/sec FM Receiver 869,85 MHz
XR6-914.5-5-xx	xx Kbits/sec FM Receiver 914.5,00 MHz
xx = Please specify 20 or 64 Kbits/sec data rate	

**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 (100mW)

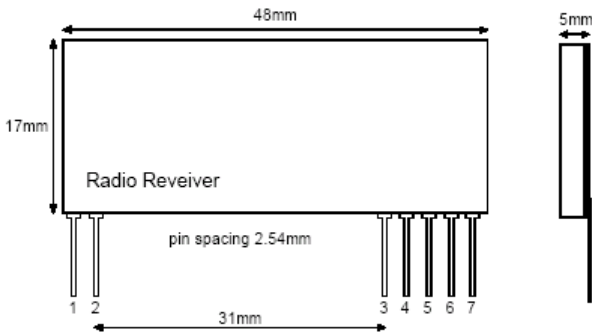
**Electrical Characteristics: Receiver (20 Kbits/sec version)**

	pin	min.	typ.	max.	units	notes
<b>DC LEVELS</b>						
Supply voltage		4.5	5	5.5	V	
Supply current			6		mA	
Supply ripple		-	-	10	mV <sub>P-P</sub>	
Data output high			=>4.5		V	
Data output low			<= 0.5		V	
<b>RF</b>						
RF sensitivity			-103		dBm	
IF Bandwidth			230		KHz	1
Initial frequency accuracy			±30		KHz	
Max R.F. input			20		dBm	
<b>E.M.C.</b>						
Spurious responses upto 1GHz			<60		dB	
LO leakage, conducted			<60		dBm	
LO leakage, radiated			<60		dBm	
Image rejection			50		dB	
<b>DYNAMIC TIMING</b>						
Power up to stable data <i>(With RF signal present)</i>			25	30	mS	20kbps
			5	7		64 kbps
Signal to stable data <i>(With power supply already on)</i>			5		mS	20kbps
			2			64kbps
Power up to valid RSSI <i>(with RF signal present)</i>			1	2	mS	
Mark:space ratio			50		%	2
Allowable data pulse widths		50		6000	uS	20kbps
		12		800		64kbps

**Notes**

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

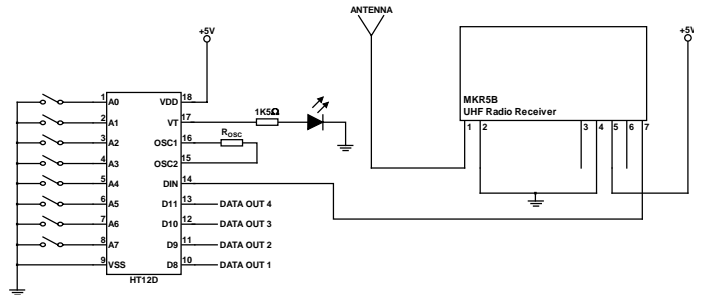
Connection Details



XR6 Receiver

Application Circuit

The application circuit shows how the XR6 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 XR6 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
-110	1,22
-100	1,38
-90	1,63
-80	1,9
-70	2,22
-60	2,50
-50	2,65
-40	2,66
-30	2,66

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