

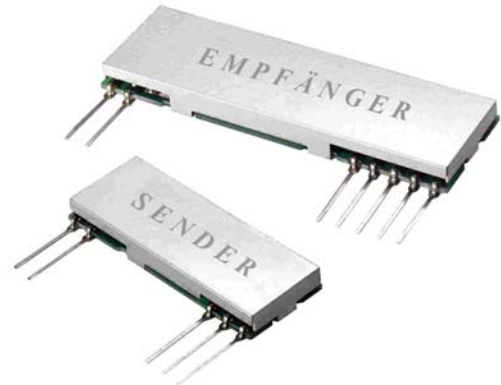
General Description

The Genesis XGT1 'wireless connector' transmitter module represents the culmination of a two year evolutionary radio design process whose aim was to provide wireless connectivity in the 434 MHz ISM band with a pair of modules that will provide seamless and reliable operation for the next decade.

Utilising medium band RF technology, the Genesis FM transmitter is initially available on three separate channels within the same ISM band and having the capability to generate up to 25mW of RF power.

Packaged in a miniature 32 x 10mm fully shielded enclosure and operating from 3v or 5v supplies, Genesis transmitters have retained the industry standard footprints.

This means that coupled with the corresponding receiver which has an intelligent data slicer, Genesis modules can certainly be incorporated into both new and existing designs.



Compatible Receiver Modules

- GENESIS R1 (GR1)

Features

- MINIATURE SIL PACKAGE
- UP TO 25mW RF OUTPUT POWER
- DATA RATES UP TO 15 KBITS/S
- MEDIUM BAND CRYSTAL TECHNOLOGY
- 1Km+ RANGE WITH GR1 RECEIVER
- COMMON GENESIS FOOTPRINT – CHOOSE BETWEEN 100 TO 1000 MHz OPERATION

Applications

- REMOTE CONTROL FOR CRANES ETC
- WIRELESS MONITORING
- DISPERSED ALARM APPLICATIONS
- DOMESTIC AND COMMERCIAL SECURITY WIRELESS TELEMETRY
- AVAILABLE ON 433.92, 434.225 & 434.525 MHz CHANNELS
- OTHER CHANNELS AVAILABLE ON REQUEST
- SINGLE 3 & 5 VOLT SUPPLY
- EN 300-220-1 compliant module

Ordering Information

Standard Product;

Part No	Description
XGT1-433.92 - (3 or 5v)	Genesis Transmitter 433.92 MHz
XGT1-434-225 – (3 or 5v)	Genesis Transmitter 434.225 MHz
XGT1-434.525 – (3 or 5v)	Genesis Transmitter 434.525 MHz

Absolute Maximum Ratings: Transmitter

Operating temperature:	-10°C to +55°C
Storage temperature:	-40°C to +100°C
Supply Voltage (pin 3)	5.5V
Data input (pin 5)	5.5V

Electrical Characteristics: Transmitter 5v version

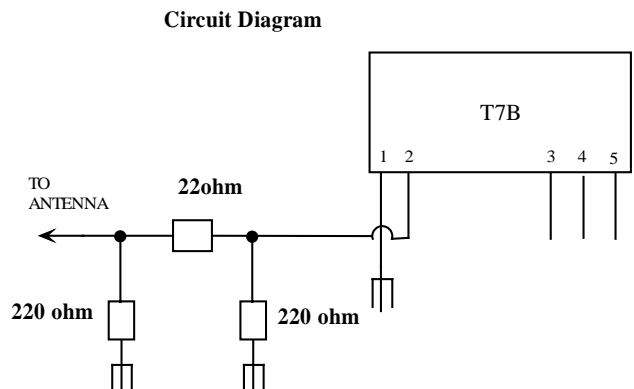
	pin	min.	Typ.	max.	units	notes
DC LEVELS						
Supply voltage	3	4.5	5.0	5.5	Volts	
Current & RF POWER						
434.225 MHz (Applies to all channels)						
Supply current @ $V_{CC} = 5V$	3		24		mA	1
RF power	2		25		mW	1
Supply current @ $V_{CC}=3v$			18		MA	
RF power			10		mW	
RF & Data						
2 nd harmonic			-40		dBm	2
Harmonics @ > 1GHz			-50		dBm	2
Initial frequency accuracy			+/-25		Hz	
Frequency accuracy over full temp range				±27	KHz	
FM deviation of RF carrier			30		KHz	
Power up time to full RF			5		ms	
Data rate				15	kbits/s	
Data pulse width		66.6			µs	

- Note 1:** measured into a 50Ω impedance
Note 2: the limit for the European spec EN 300 220 is -36dBm

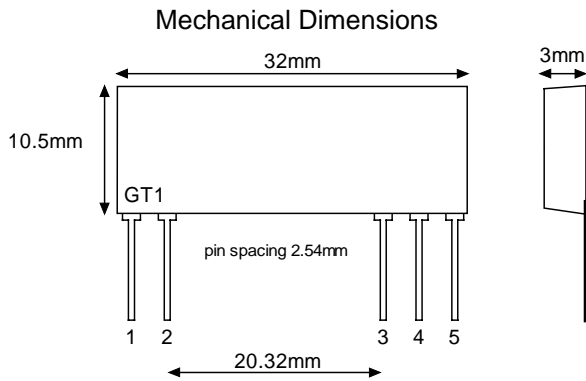
Reducing Power to 10mW

If the transmitter will be used with an efficient antenna in countries where only 10mW radiated power is allowed, then a simple resistive network on the output of the module will attenuate the power down to this level.

When laying out this network, keep all tracks as short as possible, especially ground paths and use 50 ohm track impedances when connecting to and from this network. This impedance can be realised on 1.6mm FR4 pcb by using a track width of 2.5mm.



Connection Details



Genesis 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_{CC} (pin 3)

+Ve supply pin. The module will generate RF when V_{CC} is present.

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.

Application Information

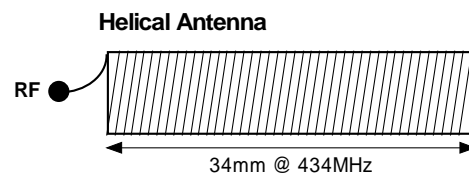
Antenna Design

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.

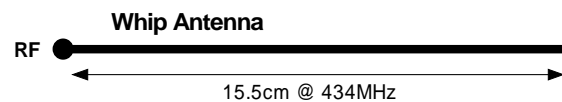
The antenna should be kept as far away from sources of electrical interference as physically possible. If necessary, additional power line decoupling capacitors should be placed close to the module.

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 @ 434 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 30cm radius. In this case, the antenna should be connected to the module via some 50 ohm characteristic impedance coax.



17 turns equally spaced
 $\varnothing = 5\text{mm}$ (inside)



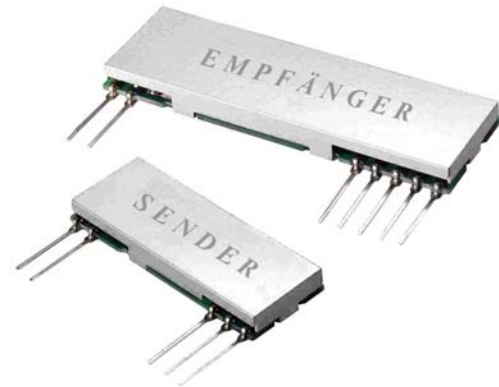
Antenna Configurations To Be Used With The Genesis Transmitter Modules

General Description

The Genesis ‘wireless connector’ receiver module that complements the XGT1 transmitter is again a remarkable product that has evolved over the past couple of years into a industry standard form factor but with exceptional performance compared to the price of the module.

The receiver sensitivity alone at –117dBm is comparable to most narrow band receivers however and surprisingly the XGR1 is very favourable in price.

Fully shielded and measuring just 17 x 48mm, Genesis provides a superior route to enhancing the performance of current and future wireless enabled devices.



Applications

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

Compatible Transmitter Modules

- XGT1 (25mW transmitter module)

Features

- Miniature SIL package
- Single conversion FM Super-het using RF SAW and ceramic IF filtering
- Provides over 1Km range especially when used with the GT1 transmitter module.
- Fully shielded
- Analogue, Digital and true RSSI outputs
- DATA RATES UP TO 15KBITS/S
- HIGH SENSITIVITY (-117 dBm)
- Low current consumption (11mA)
- SINGLE 5V SUPPLY

Ordering Information

Standard Product:

Part No	Description
XGR1-433.92	433.92 MHz receiver module
XGR1-434.225	434.225 MHz receiver module
XGR1-434.525	434.525 MHz receiver module

Absolute Maximum Ratings: Receiver

Operating temperature:	-10°C to +55°C
Storage temperature:	-40°C to +100°C
Supply Voltage (pin 5)	10V
RF Input (pin 1)	10mW

Electrical Characteristics: Receiver (All frequency versions at 25degC)

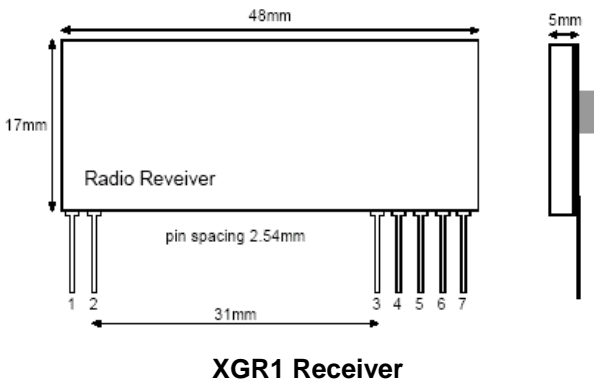
	pin	min.	typ.	max.	units	notes
DC LEVELS						
Supply voltage		4.5	5	5.5	V	
Supply current			11		mA	
Supply ripple		-	-	10	mV _{P-P}	
Data output high			=>4.0		V	
Data output low			<= 0.5		V	
RF						
RF sensitivity			-117		dBm	1
IF Bandwidth			+/-27		KHz	
Initial frequency accuracy			±25		Hz	
Max R.F. input			10		dBm	
E.M.C.						
Spurious responses upto 1GHz			<60		dB	
LO leakage, conducted			<60		dBm	
LO leakage, radiated			<60		dBm	
Image rejection			35		dB	
DYNAMIC TIMING						
Power up to stable data (With RF signal present)			110		mS	
Signal to stable data (With power supply already on)			1		mS	
Power up to valid RSSI (with RF signal present)			2.5	3.5	mS	
Mark:space ratio			50		%	
Bit rate		100		15000	bps	2

Notes

- 1) For 12 dB SINAD from the AF output
- 2) Note 1Hz = 2 bps

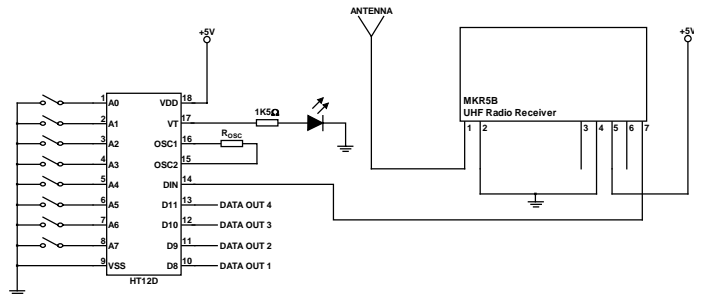
Connection Details

Mechanical Dimensions



Application Circuit

The application circuit shows how the XGR1 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_{CC} (pin 5)

+Ve supply pin. Operation from a 5V supply able to source 14mA at less than 10mV_{P-P} ripple.

AF (pin 6)

Audio frequency output

DATA OUT (pin 7)

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

Vertrieb:

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RSSI Values

The XGR1 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
-130	0.6
-120	0.78
-110	1.05
-100	1.38
-90	1.63
-80	1.85
-70	2.05
-60	2.29
-50	2.40
-40	2.30

Please note that in your application the above values could be offset however the general curve will remain similar.

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