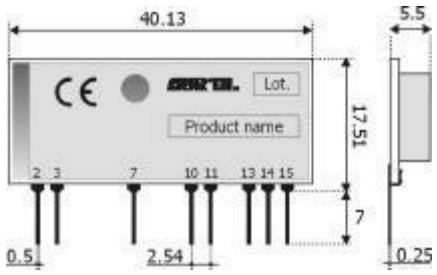
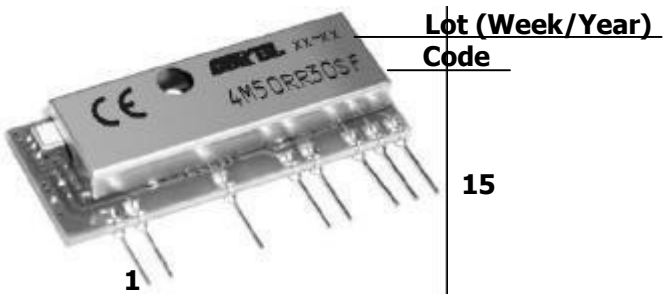
RX-4M50RR30SF Receiver

Digital RF Receiver with high sensitivity, selectivity and immunity to electromagnetic fields interferences, obtained by means of SAW filter at input and metallic shield.

Pin-out





Connections

Pin 2-7-11	**Ground**	GND Connections: Internally connected to a single ground plate
Pin 3	**Antenna**	50Ω impedence antenna connection
Pin 10-15	**+V**	Connection to the positive pole of supply (+5V ±5%)
Pin 13	**Test Point**	Analog output of the demodulated signal. By connecting an oscillograph the entity and quality of the received RF signal can be seen.
Pin 14	**Data Out.**	Receiver digital output. Apply loads over 1 KΩ

Technical features

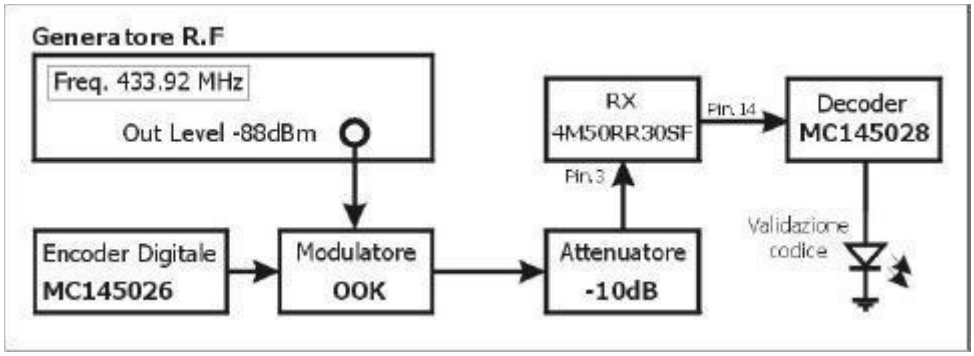
	Min	**Typical**	**Max**	**Unity**	**Remarks**
Working centre frequency		433.92		MHz	
Voltage supply	4.75	5	5.25	V	
Absorbed current	2.6	3	3.3	mA	
RF sensitivity	-97	-100	-102	dBm	See note 1
RF pass band at –3dB		600		KHz	
Interferences rejection at ±20MHz		-100		dB	See Fig.4
Output square wave	0.1	2.5	3	KHz	
Output low logic level			0.1	V	See note 4
Output high logic level	3.8			V	See note 4
RF spurious emissions in antenna			-80	dBm	See note 2
Switch-on time			2.5	s	See note 3
Working temperature	-20		+80	°C	See Fig.5
Dimensions	40.13 x 17.5 x 5.5 mm				

Note1: Values have been obtained by applying the test system as per Fig. 1 and the RX resistance not connected (see Fig. 2).
Note2: The RF emission measure has been obtained by connecting the spectrum analyser directly to RX Pin 3.
Note3: By switch-on time is meant the time required by the receiver to acquire the declared characteristics from the very moment the power supply is applied.
Note4: Values obtained with 10KΩ maximum load applied.

The technical tests and reports have been carried out and obtained by the laboratories
PRIMA RICERCA & SVILUPPO – via Campagna, 58 – 22020 Gaggino Faloppio (CO) - Italy

The declared technical features have been verified by applying the following test system:

Fig. 1



Squelch threshold setting

The AUREL receiver mod. RX-4M50RR30SF, normally presents, at the data output, 1 and 0 random commutations, corresponding to the noise generated by the receiver itself.
Such characteristic allows to make use of the maximum sensibility of the device. However, in certain application, where a low noise level is required, it is possible to connect a resistance of X value (see table) between receiver T.P. pin 13 and GND.
The table here below shows for different resistance value, the obtained loss value:

Model	Loss (–1dB)	Loss (-3dB)
RX-4M50RR30SF	Rx = 1M	Rx = 680K

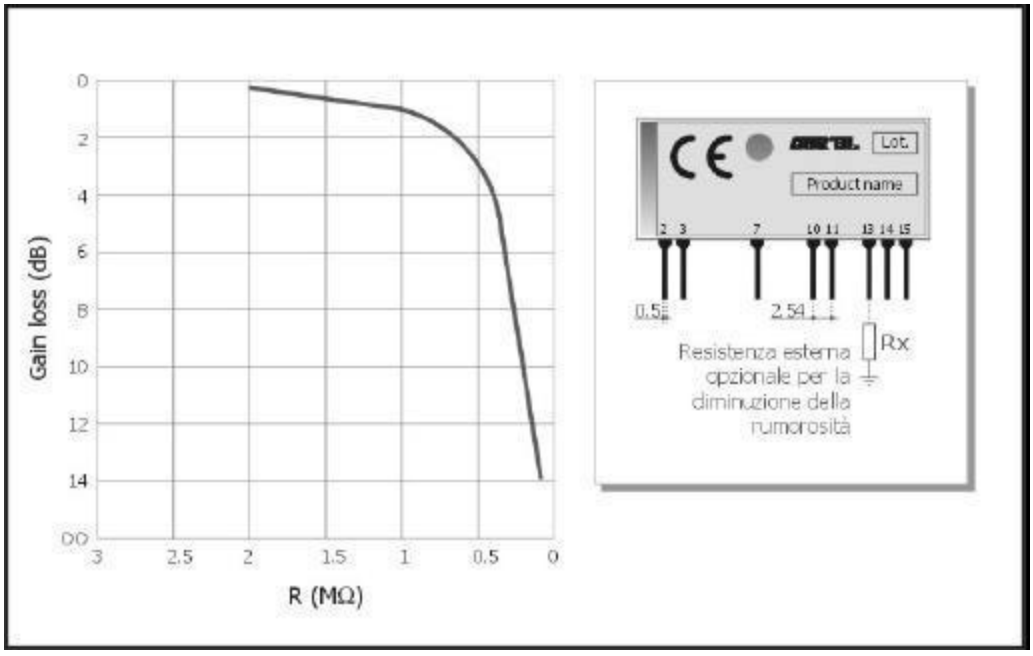


Fig. 2 Attenuation curve according to RX value

By accepting some commutation on the data output, it suffice to apply a resistance value that determines a 1 dB attenuation; attenuations of 3 dB, increase the immunity to the noise till to obtain, at the data output, a logic, low and stable value when RF signal is not available.

Device usage

In order to take advantage of the performances described in the technical specifications and to comply with the operating conditions which characterize the Certification, the receiver has to be fitted on a printed circuit, considering what follows:

5 V dc supply:

1. The receiver must be supplied by a very low voltage source, safety protected against short circuits.
2. Maximum voltage variations allowed: ± 0,25 V.
3. De-coupling, next to the receiver, by means of a minimum 100.000 pF. ceramic capacitor.

Ground:

1. It must surround at the best the welding area of the receiver. The circuit must be double layer, with throughout vias to the ground planes, approximately each 15 mm.
2. It must be properly dimensioned, specially in the antenna connection area, in case a radiating whip antenna is fitted in it (an area of approximately 50 mm radius is suggested.)

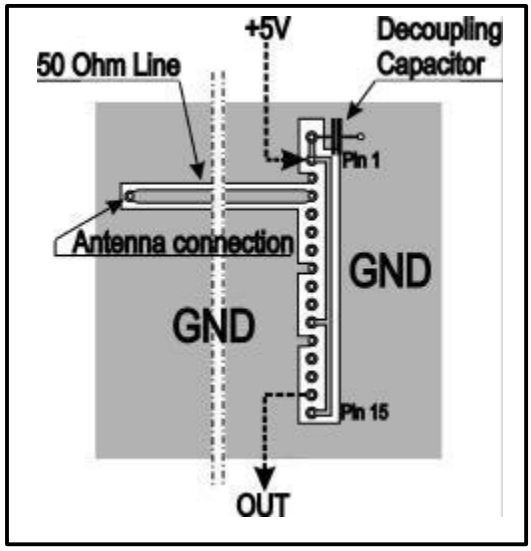


Fig.3 Suggested lay-out for the device correct usage

50 Ohm line:

1. It must be the shortest as possible.
2. 1,8 mm wide for 1 mm thick FR4 printed circuits and 2,9 mm wide for 1,6 mm thick FR4 printed circuits. On the same side, it must be kept 2 mm away from the ground circuit.
3. On the opposite side a ground circuit area must be present.

Antenna connection:

1. It may be utilized as the direct connection point for the radiating whip antenna.
2. It can bear the connection of the central wire of a 50 Ω coaxial cable. Be sure that the braid is welded to the ground in a close point.

Antenna

1. A **whip** antenna, 16,5 mm long and approximately 1 mm dia, brass or copper wire made, must be connected to the RF input of the receiver.
2. The antenna body must be keep straight as much as possible and it must be free from other circuits or metal parts (5 cm minimum suggested distance.)
3. It can be utilized both vertically or horizontally, provided that the connection point between antenna and receiver input, is surrounded by a good ground plane.

N.B: As an alternative to the a.m. antenna it is possible to utilize the whip model manufactured by Aurel (see related Data Sheet ed Application Notes).
By fitting whips too different from the described ones, the EEC Certification is not assured.

Other components:

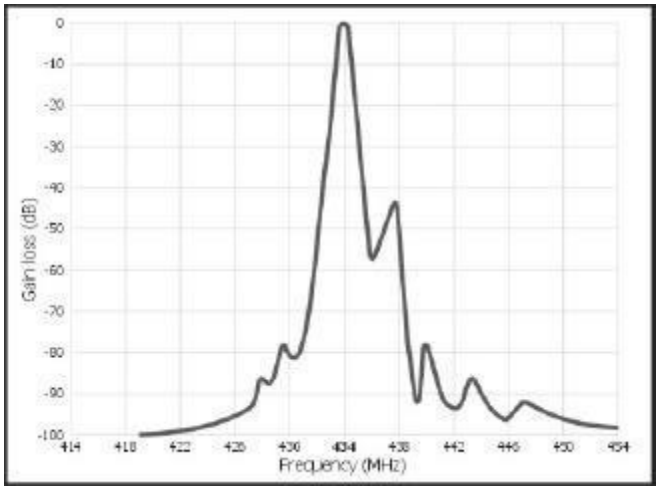
1. Keep the receiver separate from all other components of the circuit (more than 5 mm).
2. Keep particularly far away and shielded all microprocessors and their clock circuits.
3. Do not fit components around the 50 Ohm line. At least keep them at 5 mm distance.
4. If the Antenna Connection is directly used for a radiating whip connection, keep at least a 5 cm radius free area. In case of coaxial cable connection 5 mm radius will suffice.

Reference Rules

The **RX-4M50RR30SF** receiver is EEC certified and in particular it complies with the European set of Rules EN 300 220-3 for class 2, and EN 300 683 for class 1. The equipment has been tested according to rule EN 60950 and it can be utilized inside a special insulated housing that assures the compliance with the above mentioned rule. The receiver must be supplied by a very low voltage safety source protected against short circuits The use of the receiver module is foreseen inside housings that assure the overcoming of the provision EN 61000-4-2 not directly applicable to the module itself. In particular, it is at the user' s care the insulation of the external antenna connection, and of the antenna itself since the RF output of the receiver is not built to directly bear the electrostatic charges foreseen by the a.m. provision.

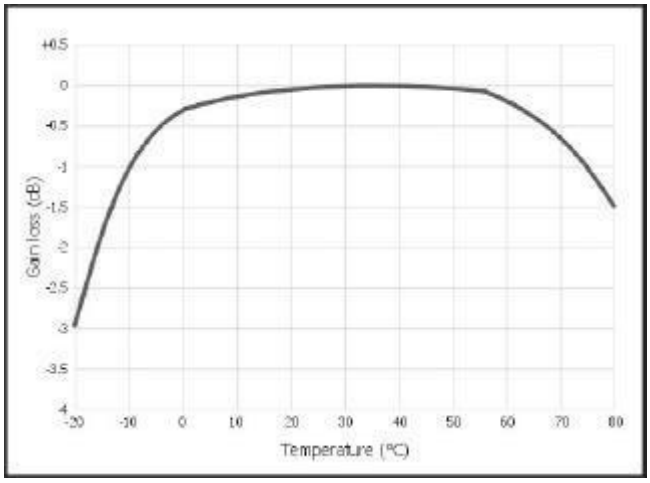
Reference curves

Fig.4 Frequency-Selectivity curve



The curve has been obtained by the test system shown in Fig. 1

Fig.5 Temperature-sensibility variation curve



5V supply, RF input 433,92MHz, -95dBm

Technical features are subject to change without notice.
AUR°EL S.p.A. does not assume responsibilities for any damages caused by the device's misuse.