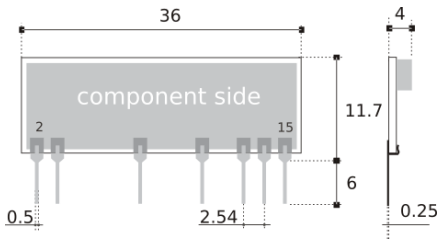
SAW filtered Super Het Receiver 433.92MHz

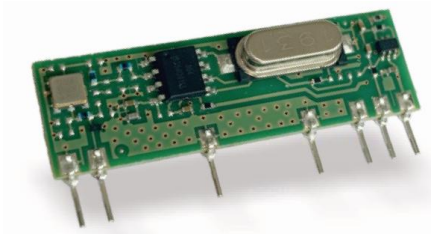
Low cost OOK receiver working at 433,92MHz with band pass SAW filter, compliant with RED (Radio Equipment Directive 2014/53/EU) and in particular with harmonics standards:

- EN 301 489-3 : V2.1.1 (final draft)
- EN 300 220-2 : V3.1.1

ESD antenna protection in compliance with EN610000-4-2. Suitable for high immunity application to noise generated by brush motor.

PIN-OUT





CONNECTIONS

Pin 2-7-11	**GND**	GND Connections. To be externally connected to a single ground plate.
Pin 3	**Antenna**	Antenna input, impedance 50Ω.
Pin 13	**NC**	Not connected
Pin 14	**Data-out**	Data output from the receiver. Load higher than 1KΩ.
Pin 15	**+Vcc**	Connection to the positive pole of supply.

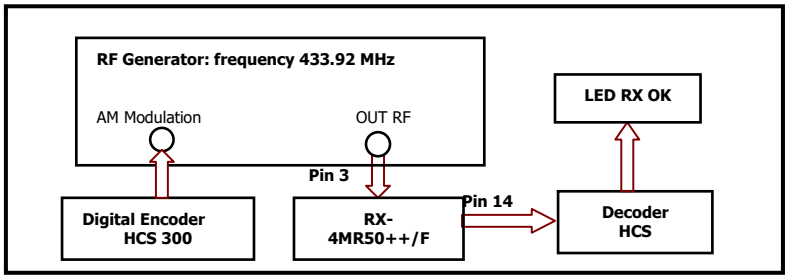
Technical features RX-4MR50++/F

	Min	**Tipic**	***Max***	***Unit***	**Remarks**
Supply voltage	3	5	5,5	Vdc	
Supply current	4,1	4,3	4,6	mA	
Reception frequency		433,92		MHz	
RF sensitivity		-112	-114	dBm	See note 1
IF Bandwidth -3dB		420		KHz	
RF power on 50Ω pin ant.			-60	dBm	
Square wave output	0,020	1	5	KHz	
Output high voltage	Vcc-0,6		Vcc-0,1	V	
Output low voltage	GND		GND+0,4	V	
Switch on time			4	ms	
Operating temperature range	-20		+85	°C	

NOTE 1: *RF generator with 100% modulation.*

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

The declared technical features have been obtained by applying the following testing system:



Picture 1: Measurement of sensitivity

Device usage

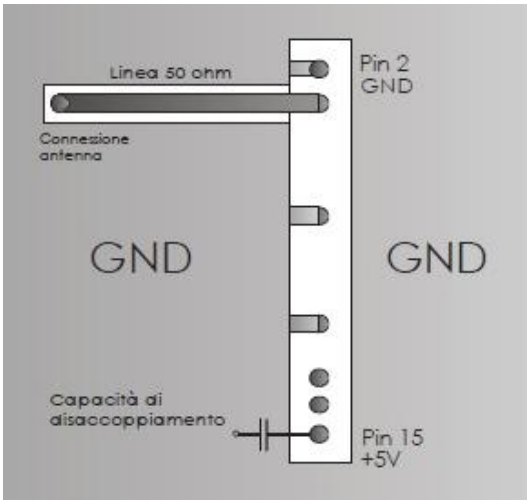
In order to obtain the performances described in the technical specifications and to comply with the operating conditions, which characterize the Certification, the transmitter has to be mounted on a printed circuit taking into account the following.

Power Supply:

1. RX-4MR50++/F must be supplied from very low voltage safety source protected against the short circuits. Maximum voltage variations allowed: 3 ÷ 5,5 V. However it is preferable to maintain a stable voltage to a predetermined value in the range of voltage as specified above, using a "fast transient response" voltage regulator.
2. Connect electrolytic capacitor 100uF, low ESR, close to pin 15 (+Vcc).

Ground:

The ground must surround at the best the welding area of the module and must also be realized in the lower face of the PCB in order to obtain the optimal result, with the through holes connecting the two ground planes approximately each 15 mm.
It must be properly dimensioned, especially in the antenna connection area, in case a radiating whip antenna is fitted in it (an area of approximately 50 mm radius is suggested).



Picture 2: Suggested lay-out for the device correct usage

Antenna:

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

50 Ohm line:

1. It must be the shortest as possible.
2. 1,8mm wide for 1mm thick FR4 printed circuits and 2,9mm wide for 1,6mm thick FR4 printed circuits. On the same side, it must be kept 2mm 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 50Ω coaxial cable. Be sure that the braid is welded to the ground in a close point.

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 and 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 5mm).
2. Keep particularly far away and shielded all microprocessors and their clock circuits.
3. Do not fit components around the 50Ω line. At least keep them at 5mm distance.

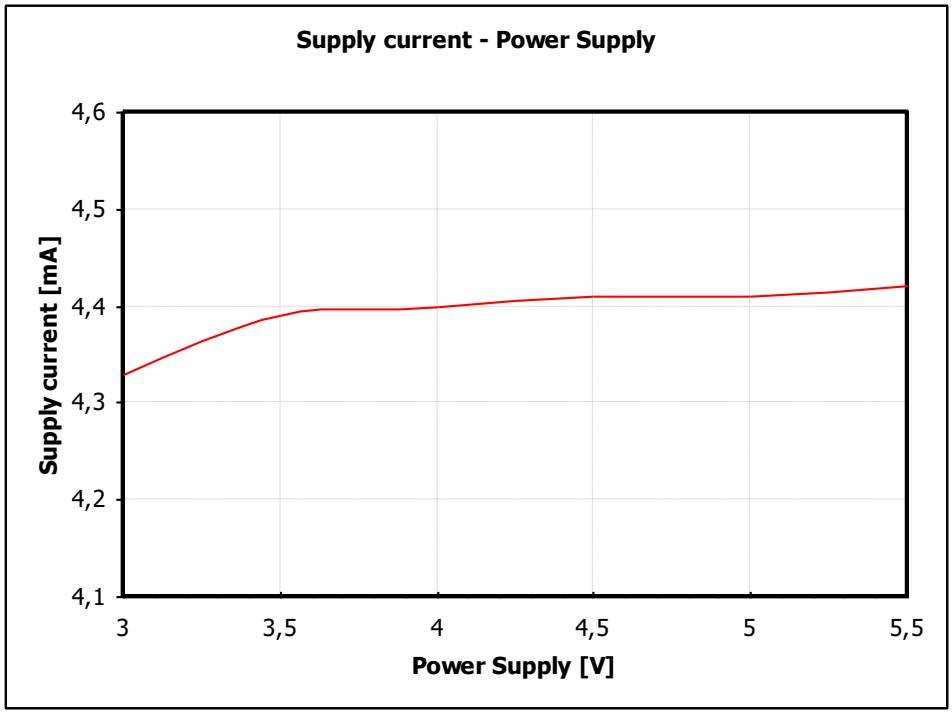
If the antenna connection is directly used for a radiating whip connection, keep at least a 5cm radius free area. In case of coaxial cable connection 5mm radius will suffice.

Reference Rules

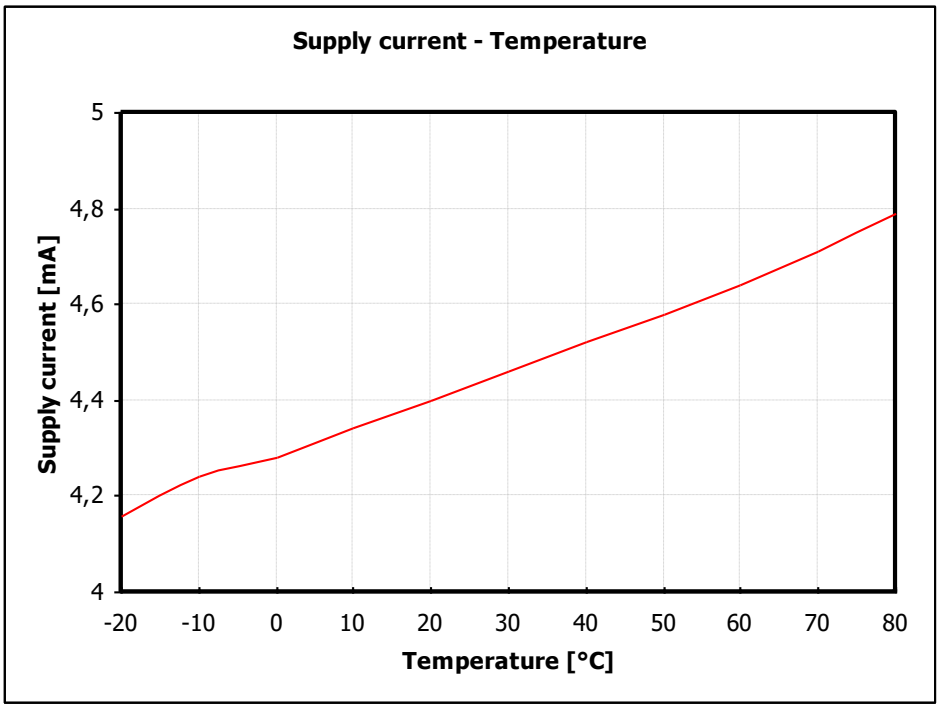
RX-4MR50++/F receiver is compliant with the European set of rules EN 300 220-2, and EN 301 489-3.
The receiver must be supplied by a very low voltage safety source protected against short circuits.

The usage of the module is foreseen inside enclosures that guarantee the EN 61000-4-2 normative not directly applicable to the module itself.

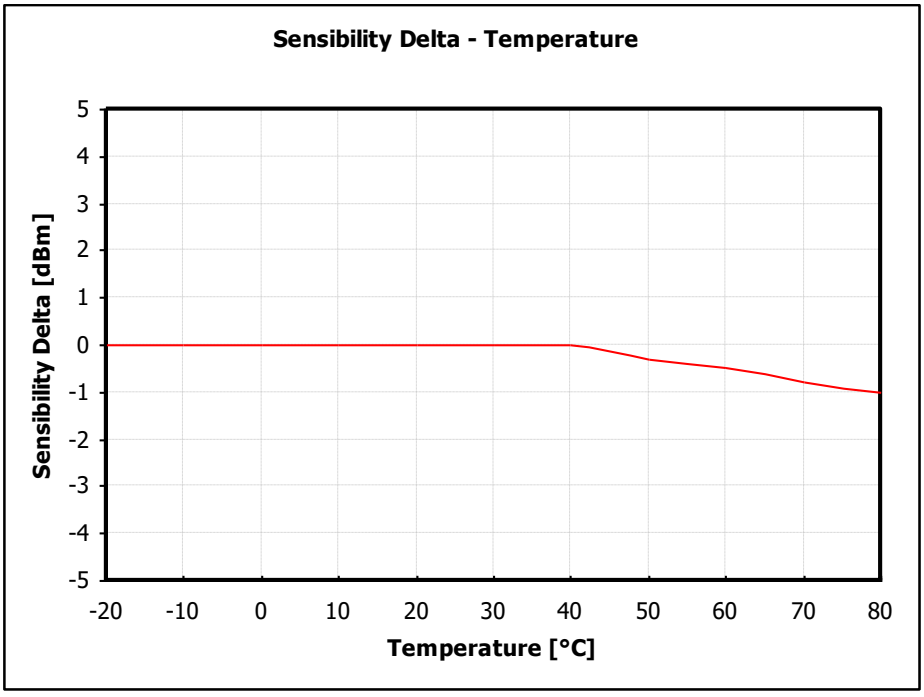
Reference curves



Picture 4: Supply current – Power supply



Picture 5: Supply current - Temperature



Picture 6: Sensitivity - Temperature

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User manual revision summary

Release date	Revision user manual	Changes from the previous revision
15/05/2020	1.0	First release
17/11/2023	1.1	Changed the photo and release