

Instruction manual

RX-4M50SA60SF Receiver

Digital super-het receiver for the 433.92 MHz frequency. High selectivity obtained using SAW filter. Usable in connection to all Aurel Am 433 MHz transmitters.

Pin-out



Connections

Pin 2-7-11	Ground	GND Connections: Internally connected to a single ground plate
Pin 3	Antenna	50 Ω inpedance antenna connection
Pin 1-15	+V	Connection to the +5V \pm 0.25V supply positive pole
Pin 13	Test Point	Analog output of the demodulated signal. By connecting an oscillograph
		the entity and the quality of the received signal can been seen.
Pin 14	Data Out.	Receiver digital output. Aplly loads over 10 K Ω

Technical features

	Min	Tipical	Max	Unit	
Working centre frequency		433.92		MHz	
Voltage supply	4.75	5	5.25	V	
Absorbed current		6		mA	
RF sensitivity	-104	-107		dBm	See note 1
-3 dB RF bandwidth		600		KHz	
-3 dB IF bandwidth		300		KHz	
Square wave output		2	3	KHz	
Output low voltage			Gnd+0.4	V	See note 4
Output high voltage	$V_{\rm S} - 0.4$			V	See note 4
RF spurious emissions in antenna			-80	dBm	See note 2
Switch-on time			0.2	S	See note 3
Operating temperature range	-20		+80	°C	
Dimensions	44.95 x 17.5 x 9.3 mm				

Note1: Values have been obtained by applying the test system as Fig. 1.

Note2: The RF emission measure has been obtained by connecting the spectrum analyser directly to the 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.



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

Fig. 1



Device usage

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

5V Supply voltage

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





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 either vertical or horizontal, provided 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 whip antennas too different from the described ones, the EC 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 antenna connection, keep at least a 5 cm radius free area. In case of coaxial cable connection then 5 mm radius will suffice.



Reference Rules

The **RX-4M50SA60SF** receiver is EC certified and in particular it complies with the European 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 rule **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. rule.

Technical report from **PRIMA RICERCA & SVILUPPO** – via Campagna, 58 – 22020 Gaggino Faloppio (CO).



Fig.3 Frequency - sensitivity plot

Plot was obtained using the test set up as in Fig.1 with variation of frequency and output level of RF generator