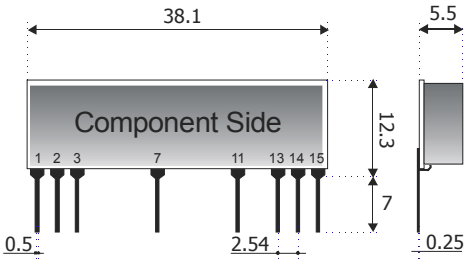
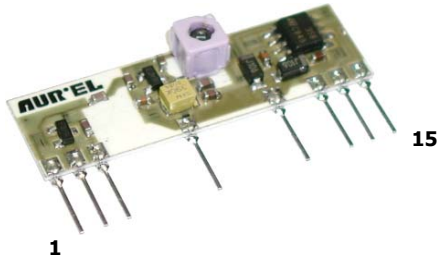
AC-RX Receiver

Economic receiver with low consumption, low voltage supply and variable coil. Optimised characteristic for HCS KEELOQ™ decoder/encoder family.

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 1-15	**+V**	Connection to the +5V ±0.5V supply positive pole
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 10 KΩ

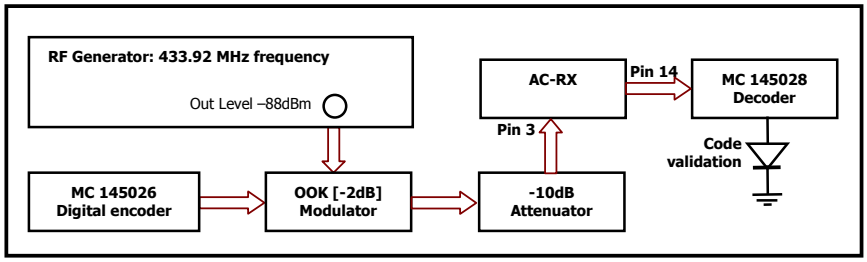
Technical features

	Min	**Tipical**	**Max**	**Unit**	
Working centre frequency		433.92		MHz	
Voltage supply	4.5	5	5.5	V	
Absorbed current		2.5	3	mA	
RF sensitivity		-100		dBm	See note 1
-3 dB RF bandwidth		±2		MHz	
Square wave output			3	KHz	
Output low voltage			Gnd+0.4	V	See note 4
Output high voltage	V_S – 0.4			V	See note 4
RF spurious emissions in antenna		-65		dBm	See note 2
Switch-on time			2	s	See note 3
Operating temperature range	-20		+80	°C	
Dimension	38.1 x 12.3 x 5.5 mm				

Nota1: *Values have been obtained by applying the test system as per Fig. 1.*
Nota2: *The RF emission measure has been obtained by connecting the spectrum analyser directly to RX Pin 3.*
Nota3: *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.*
Nota4: *Values obtained with 10KΩ maximum load applied.*

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

Fig. 1



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:

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: ± 0.5 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 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.)

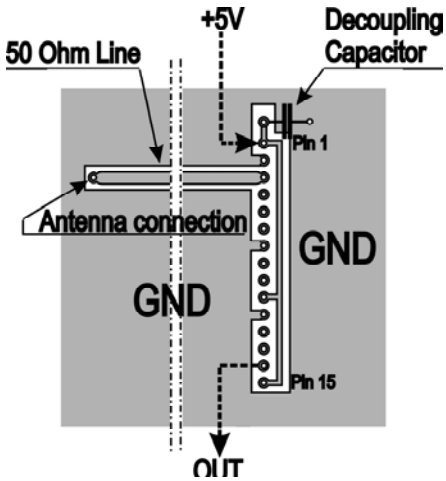


Fig.2 Suggested lay-out for the device correct usage

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 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.

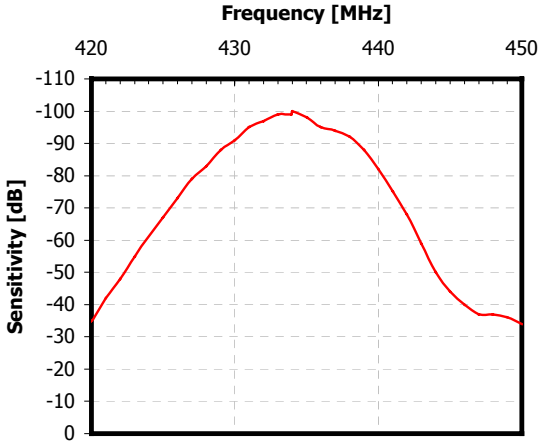
Other components

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 **AC-RX** receiver is EC certified and in particular it complies with the European Rules **EN 300 220-3** and **EN 301 489**. 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.

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