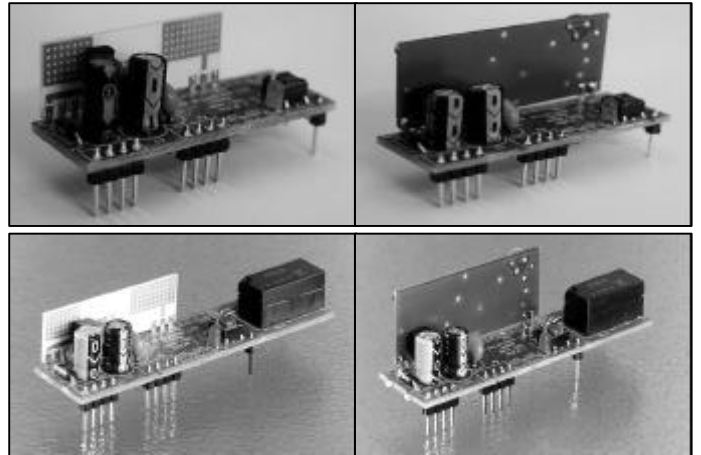




# '001'SERIES RADIO RECEIVER DECODER MODULES.

- Miniature RF Receiver /Decoder
- **Keeloq** Protocol
- 40 Pin DIL I/C Profile
- Single Relay Option Available
- Supplied As AM or FM
- LED Indication Of Data Reception
- Easy Learn Transmitter Feature
- CMOS/TTL Outputs, Momentary or Latching
- Single Supply Either 5V or 12V
- Contacts 2A @ 12V
- Available 433Mhz @ 10mW
- Requires No Radio Licence



## Applications

- General Remote Control Systems
- Garage Door Openers
- Car, Caravan, Motorcycle Alarms
- Remote Switching
- Remote Gates
- Paging

## Description

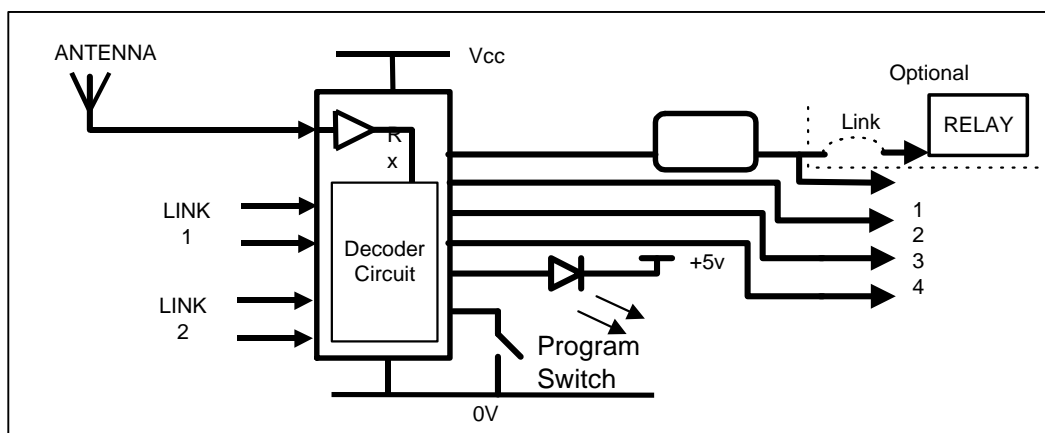
This range of miniature modules are complete four channel RF receiver/decoders that can be configured for many different low power short range telemetry applications.

All modules are plug-in dual-in-line (DIL) package with the same profile as a standard 40pin DIL I/C for easy PCB mounting. A single relay option is an extended length module (removable) containing a BT/47 type relay.

The module requires connections to the power supply 5Vdc or 12Vdc and data outputs only. The unit may be supplied with one of two AM receivers or an FM receiver configuration. An LED indicates data reception.

Each decoder is compatible with any **KEELOQ** transmitter/encoder. The decoder has an easy-to-use 'LEARN' facility to allow the decoder to learn up to 50 transmitter/encoders.

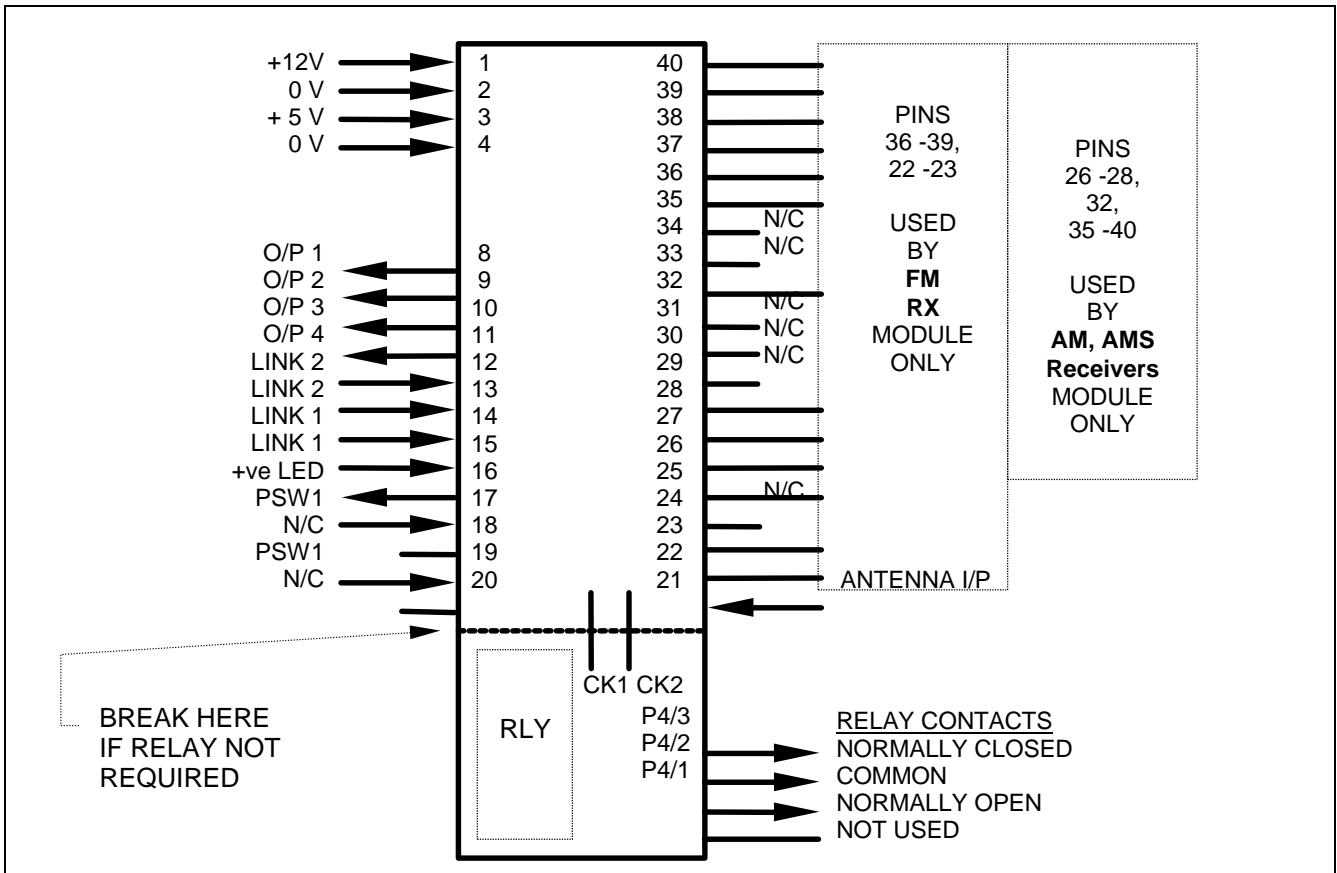
## Block Diagram



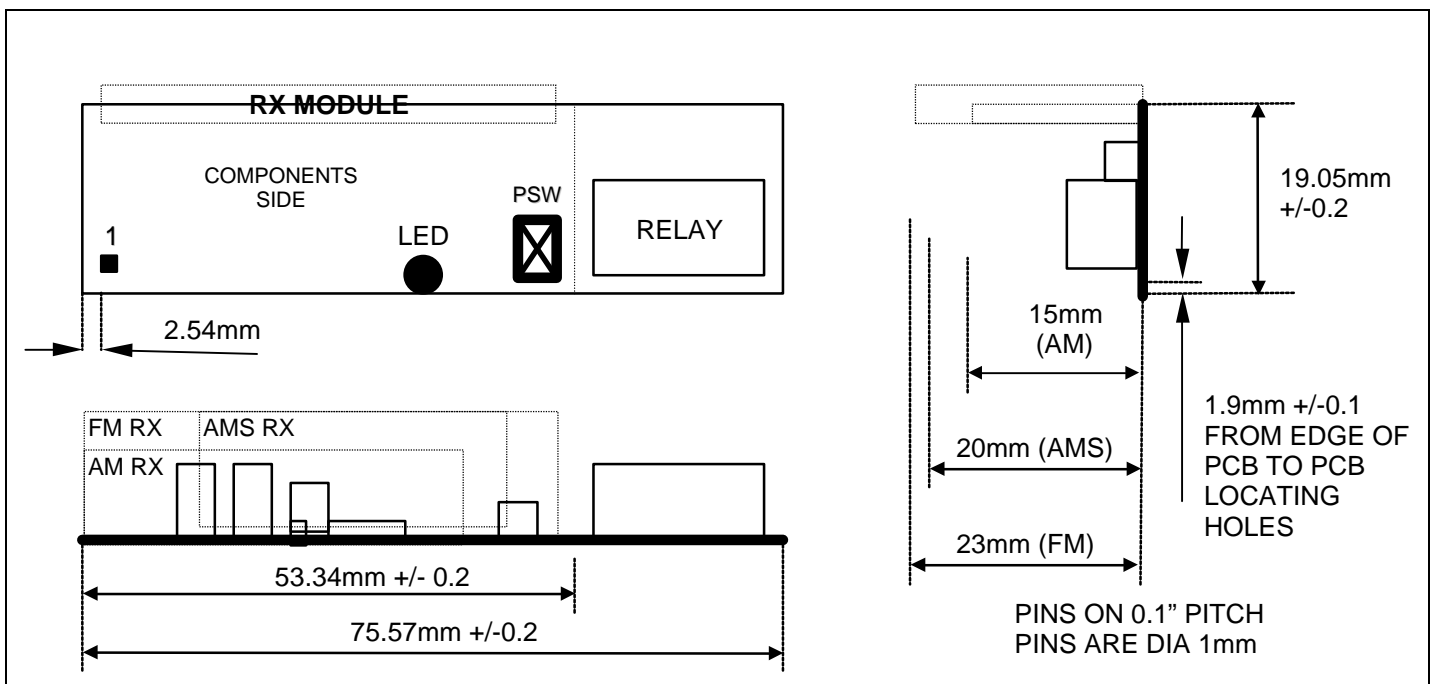


# '001'SERIES RADIO RECEIVER DECODER MODULES.

## Signal Allocation (from plan view of module)



## Mechanical Details





# '001'SERIES RADIO RECEIVER DECODER MODULES.

## Pin Description

Pin No	Name	Description
1	<b>+12V</b>	+12V Supply Voltage. Must be used for Relay operation
2	<b>0 VOLT</b>	Ground for +12V Supply.
3	<b>+5V</b>	+5V Supply Voltage. Alternative supply if 12v supply not used. See Note
4	<b>0 VOLT</b>	Ground for +5V Supply. See Note
8	<b>O/P1</b>	Data output channel 1. Open collector Transistor output. (This is used to drive the relay when fitted)
9	<b>O/P2</b>	Data output channel 2. CMOS/TTL with series 220 Ω resistor
10	<b>O/P3</b>	Data output channel 3. CMOS/TTL with series 220 Ω resistor
11	<b>O/P4</b>	Data output channel 4. CMOS/TTL with series 220 Ω resistor
12	<b>LINK2</b>	Connect to pin 13 to make "Link2"
13	<b>LINK2</b>	Connect to pin 12 to make "Link2"
14	<b>LINK1</b>	Connect to pin 15 to make "Link1"
15	<b>LINK1</b>	Connect to pin 14 to make "Link1"
16	<b>+ve LED</b>	External LED sink output, can be connected directly to cathode of external LED. Connect Anode of the LED to +5V. Indicates Data reception, and programming status.
17	<b>PSW1</b>	Programming Switch, This is used when learning new transmitters.
18	<b>N/C</b>	Not connected. Can be used as locating pin for mounting the module
19	<b>PSW1</b>	Connect to 17 to make "PSW1" switch.
20	<b>N/C</b>	Not connected. Can be used as locating pin for mounting the module
21	<b>ANT I/P</b>	Connect Antenna to this input
22 - 23		The module uses these pins when configured as FM.
24 - 25	<b>N/C</b>	Not connected. Can be used as locating pin for mounting the module
26 - 28		The module uses these pins when configured as AM.
29 - 31	<b>N/C</b>	Not connected. Can be used as locating pin for mounting the module
32		The module uses these pins when configured as AM.
33 - 34	<b>N/C</b>	Not connected. Can be used as locating pin for mounting the module
35		The module uses these pins when configured as AM.
36 - 40		These pins are used when configured as an AM or FM module.
<b>P4/1</b>	<b>P4/1</b>	Relay contacts Normally Open
<b>P4/2</b>	<b>P4/2</b>	Relay contacts Common
<b>P4/3</b>	<b>P4/3</b>	Relay contacts Normally Closed

**NOTE:** The module is designed to be powered from either 12v or 5v **not both!**  
The 12v supply is necessary for relay operation.

## AM Transmitter Keyfob Switch / Output Table

	O/P 1	O/P 2	O/P 3
1 Switch Keyfob	Centre Switch	-	-
2 Switch Keyfob	LH Switch	RH Switch	-
3 Switch Keyfob	LH Switch	RH Switch	Top Switch (Red)

## Link Status

Link1	Link2	O/P 1	O/P 2	O/P 3	O/P 4
Open	Open	Latch	Latch	Latch	Latch
Open	Connected	Mom	Mom	Mom	Mom
Connected	Open	Mom	Mom	Latch	Latch
Connected	Connected	Latch	Latch	Mom	Mom



## '001'SERIES RADIO RECEIVER DECODER MODULES.

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### Learning / Erasing A New Transmitter

1. Press and release the programming switch (PSW1)
2. Note that the LED will illuminate
3. Depress and release the transmitter once, LED on the decoder will extinguish
4. Depress and release the transmitter again, LED on the decoder will flash
5. After the LED has stopped flashing the transmitter has been successfully taught to the decoder
6. This transmitter will now operate the system
7. To completely erase the transmitters, press PSW1 on the decoder for 10 seconds. The LED will turn off after the 10 seconds to indicate that the transmitter(s) have been erased

### Synchronisation (Hopping Models Only)

This equipment requires the transmitter and receiver to be synchronised. If the transmitter has been pressed more than 50 times outside the range of the receiver, the receiver will lose synchronisation with the transmitter. To re-synchronise, press the transmitter twice within range of the receiver.

### Antenna Design

For 99% of applications a 16.5cm piece of wire is quite adequate. The range achieved from the system is dependent on the choice and position of the antenna. The space around the antenna is as important as the antenna itself. The optimum position is to locate the antenna so that it protrudes directly out the top of the transmitter box. If this is not possible due to other design constraints try to keep the antenna away from other metal in the system such as transformers, batteries and PCB tracks, especially ground planes. In particular the 'HOT' end of the antenna should be kept as far away as possible from these.

For further information on antenna design please see our full product catalogue.

### Minimum Output Time

The following timing can be used to calculate the minimum on and off time for the outputs on the Keeloc decoder.

Button press on encoder to output on decoder changing state <100mS

Button release on encoder to output on decoder going to original state < 300mS

### Data Outputs

Output 1 is used to drive the on-board relay (if fitted), it is an open collector type output.

Outputs 2,3 & 4 are digital CMOS/TTL with a series 220Ω protection resistor

The outputs are configured by Link 1 & 2

### Removal Of Relay

If the relay is not required, remove the connecting links "CK1" & "CK2". The PCB may then be carefully broken along the score lines between the relay and the rest of the board.



# '001'SERIES RADIO RECEIVER DECODER MODULES.

## Absolute Maximum Ratings (AM & FM)

Supply Voltage (+12Vcc to GND).....-0.3 to +17 Volts.  
 Supply Voltage (+5Vcc to GND).....-0.3 to + 6 Volts.  
 Storage Temperature.....-30 to +85o Celsius.  
 Operating Temperature..... 0 to +55o Celsius.

## Technical Specification (AM & FM)

Ambient temperature = 25° Celsius.

Electrical Characteristics	Min	Typical	Max	Dimension	Note
Supply Voltage for +12 v	9	12.0	16.0	V	SINGLE SUPPLY ONLY!
Supply Voltage for +5 v	4.5	5.0	5.5	V	
Data output: (Ch 2, 3, & 4)					
Logic Low	0	0.2	0.8	V	I out = 10mA
Logic High	3.5	3.8	5	V	I out = 10mA
Data output: (Ch 2, 3, & 4)					
Logic Low			-25	mA	
Logic High			20	mA	
Data output :Ch 1 (open collector)			50	mA	Relay removed
Relay Rating			2	A	@ 12 V DC

## Electrical Characteristics Unique To AM Decoders

Electrical Characteristics	Min	Typical	Max	Unit
Operating Temperature Range	0		70	V
Supply Current (quiescent)		9		mA
Supply Current (operating relay)		50	70	mA
Working Frequency	200		450	MHz
Tuning Tolerance		+/- 0.2	+/- 0.5	MHz
-3dB Bandwidth		+/- 2	+/- 3	MHz
R.F Sensitivity (100% AM)	-100	-105		dBm
Level of Emitted Spectrum		-65	-60	dBm
EMC Compliance	Complies to ETS300-339			

## Electrical Characteristics Unique To FM Decoders

Electrical Characteristics	Min	Typical	Max	Unit
Supply Current (quiescent)		20		mA
Supply Current (operating relay)		40	75	mA
Overall Frequency Accuracy	-100	0	+100	KHz
Sensitivity for 20dB S/N	-	0.5	1.0	μV
IF Bandwidth		250		KHz



# '001'SERIES RADIO RECEIVER DECODER MODULES.

## Part Numbering

### Module Without relay

Part Number	Description	Compatible Transmitter Encoder	Range**	Datasheet
001B-433AR2	AM super Heterodyne Receiver Decoder	AM-110 series	100	DS110
001B-433QR1	FM super Heterodyne Receiver Decoder	FM-102Q, series FM-103Q, series FM-107Q series	100	DS102 DS103
001B-433FR3	FM super Heterodyne Receiver Decoder	FM-102F, series FM-103F, series FM-107F series	200	DS102 DS103

### Module With relay

Part Number	Description	Compatible Transmitter Encoder	Range**	Datasheet
0011-433AR2	AM super Heterodyne Receiver Decoder	110 series pocket Keyfobs	80	DS110
0011-433QR1	FM super Heterodyne Receiver Decoder	FM-102Q, series FM-103Q, series FM-107Q series	100	DS102 DS103
0011-433FR3	FM super Heterodyne Receiver Decoder	FM-102F, series FM-103F, series FM-107F series	200	DS102 DS103

### \*\*Range

Please note that all radio systems are dependant on a radio signal being received through airspace. The range quoted is the optimal in direct line of sight without obstacles and in good atmospheric conditions.

Range is affected by many things, e.g. local environmental conditions, atmospheric conditions, interference from other radio transmitters.

In worse case applications the range quoted may be reduced to 10% of the optimal range stated.

For more information or general enquiries, please contact

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