MEASUREMENT/TECHNICAL REPORT

PRASTEL

FCC ID: ON3MRAE

October 12th, 1999

This report concerns (check one): Original grant __X__ Class II change____

Equipment type: RECEIVER (ex.: computer, printer, modem, etc.)

Deferred grant request per 47 CFR 0.457(d)(1)(ii)? yes _____ no __X__

If yes, defer until: _____
date

Company Name agrees to notify the Commission by _____
date
of the intended date of announcement of the product so that the grant can be issued on that date.

Report prepared by: P.Antonio VELO Giuseppe MECCHIA

TÜV QSL srl
Via Montalenghe 8
10010 Scarmagno (TO)
Italy
Phone : 0125 - 525441 Phone : 0125 – 525440
Fax : 0125 – 525499

Table of Contents Page

1 GENERAL INFORMATION

1.1 Product Description

EUT is a receiver used in garage door opener applications; it works on 433.920 MHz frequency and it is available in two commercial versions:
- MRA2E with two channel output
- MRA1E with one channel output

It contains a memory, that can store up to 200 different codes.
It is provided with a 2m long signal cable and with an F-type female antenna connector to be used with the wire antenna provided or with an external antenna.

1.2 Related Submittal(s)/Grant(s)

None

1.3 Tested System Details

The FCC IDs for all equipment, plus descriptions of all cables used in the tested system (including inserted cards, which have grants) are:

Model & Serial No.	FCC ID	Description	Cable Descriptions
MRA2E (1) s/n EMC-99-0276	**ON3MRAE**	**Receiver**	**Unshielded signal cable**
ANT/433SD	None	External antenna	Coax cable
Eurobase s/n none	none	Control unit	Unshielded power cord Unshielded signal cable

(1) EUT submitted for grant.

1.4 Test Methodology

Both conducted and radiated testing were performed according to the ANSI C63.4-1992 test procedures . Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

TÜV QSL test site No. 2

The open area test site and conducted measurement facility used to collect the radiated data are located at Via Montalenghe 8, Scarmagno, Italy. This site has been fully described in a report dated March 25, 1997 submitted to your office, and accepted in a letter dated June 13, 1997 (31040/SIT-1300F2).

1.6 Test equipment list:

Test receiver	Rohde & Schwarz ESH3	s/n 881364/012
LISN	Schwarzbeck NNLA8120	s/n 8120399
Test receiver	Rohde & Schwarz ESVP	s/n 879783/029
Biconical antenna	EMCO 3110	s/n 1735
Log-periodic antenna	EMCO 3146	s/n 3678
Spectrum analyzer	HP 8562A	s/n 3043A05627
Horn antenna	EMCO 3115	s/n 3572

2 PRODUCT LABELING

Figure 2.1 FCC ID Label

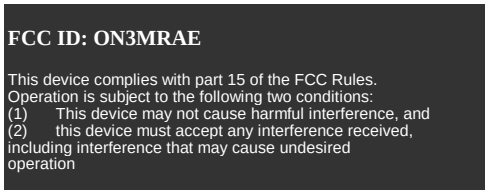


Figure 2.2 Location of the Label on EUT

3 SYSTEM TEST CONFIGURATION

3.1 Justification

The EUT was configured for testing in a typical fashion (as a customer would normally use it).

All tests have been run on MRA2E (two channel output) which have been determined during prescans to be worst case equipment.

In order to simulate a real door opener application, a control unit has been connected to its output; this control unit also supply the 12Vdc necessary for receiver operation.

A typical signal, sufficient to stabilize the local oscillator of EUT, has been provided and supplied to EUT by an antenna in the close proximity.

Both the wire and the external ANT/433SD antennas has been scanned, final measurements have been carried out with the external antenna connected.

Conducted emission tests have been performed on control unit power line cable.

3.2 EUT Exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The signal provided to the antenna of receiver generate an output of data to control unit in order to operate the opening/closing door functions.
An evidence of these operations was possible by means of flashing lights.

3.3 Special Accessories

None. EUT is housed in a plastic box.

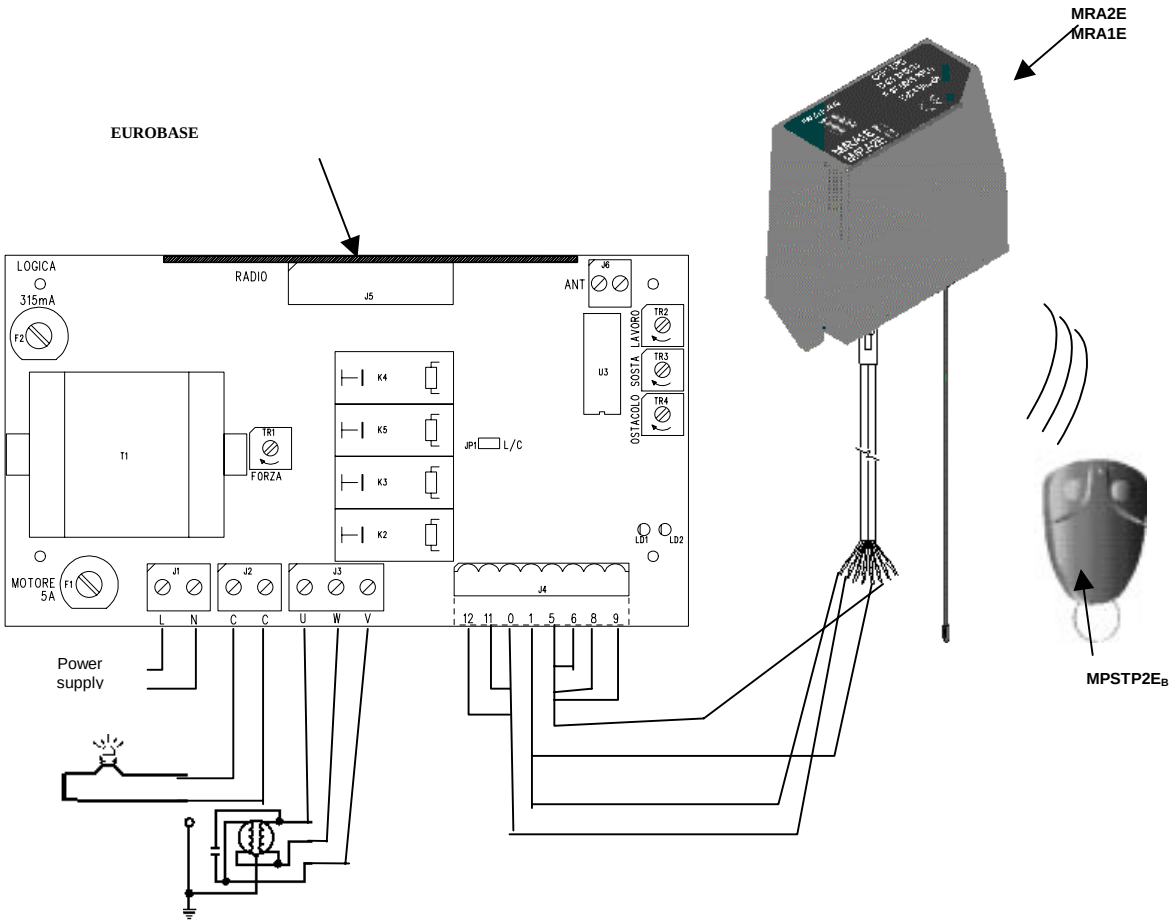
As shown in Figure 3.1 all interface cables used for compliance testing are unshielded as normally supplied by Prastel Company or as readily available on the market.

3.4 Equipment Modifications

To achieve compliance to Class B levels, no changes were made during compliance testing.

3.5 Configuration of the Tested System

Figure 3.1 Configuration of the Tested System



4 BLOCK DIAGRAM(S) OF THE EUT

4.1 Block Diagram Description

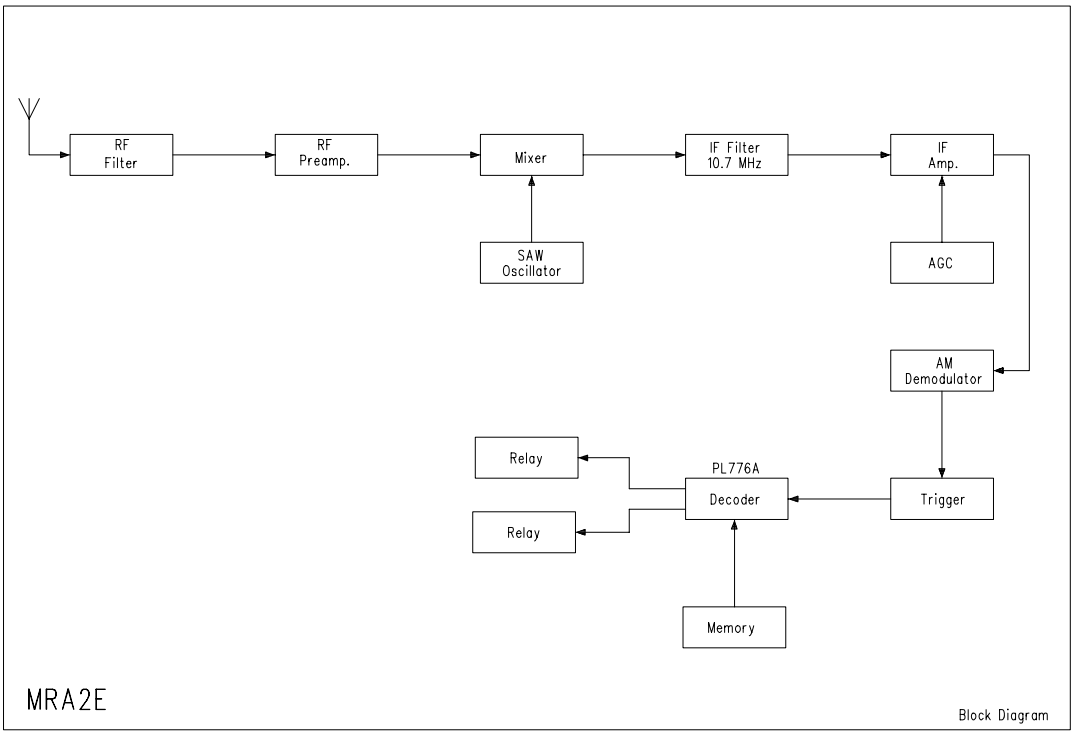
The Controller Board of the EUT is provided with:

- ceramic resonator X1 = 4 MHz

Contained in PL118 radio module:

- SAW resonator SAW2 = 423.22 MHz
- Ceramic filter 10.7 MHz

Fig. 4.1 - Block Diagram of the EUT



5 CONDUCTED AND RADIATED MEASUREMENT PHOTOS
6

6 CONDUCTED EMISSION DATA

6.1 Tests of the worst case configuration.

The conducted tests are performed with a receiver in quasi-peak mode.

	Frequency (MHz)	Measured* (dBµV)	Limit (dBµV)
neutral	0.47	37	48
	0.59	36	
	0.67	35	
	1	35	
	2	33	
	5.5	24	
line	0.47	38	48
	0.59	37	
	0.67	36	
	1	35	
	2	34	
	5.5	25	

* All readings are quasi-peak

Test Personnel:

Tester Signature _____ Date September 29, 1999

Typed/Printed Name Giuseppe MECCHIA .

7 RADIATED EMISSION DATA

7.1 Tests of the worst case configuration

The following data list the significant emission frequencies, measured levels, correction factors (including cable and antenna corrections), the corrected reading, plus the limit. Field strenght calculation is given in paragraph 7.2.

Judgement: Passed by 1 dB

Frequency (MHz)	Polarity (V/H)	Receiver* Reading (dBμV)	Correction Factor (dB/m)	Corrected Reading (dBμV/m)	3 Meter Limit (dBμV/m)
35.8	V	18.9	13.1	32	40
55.9	V	18.1	11.1	29.2	40
423.2	H	24.1	20.9	45	46
846.4	H	7.6	29	36.6	46
1269	H	13.3	24.2	37.5	54
1692	H	12.2	25.6	37.8	54

* below 1 GHz readings are quasi-peak, with an IF bandwidth of 120 kHz, above 1 GHz are peak with an IF bandwidth of 1 MHz.

Test Personnel:

Tester Signature _____ Date September 29, 1999

Typed/Printed Name Giuseppe MECCHIA .

7.2 Field Strength Calculation

7.2.1 The field strength is calculated by adding the Antenna and Cable Factor to the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF

where

FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

Assume a receiver reading of 18.9 dBμV is obtained. The Antenna and Cable Factor of 13.1 is added, giving a field strength of 32 dBμV/m. The 32 dBμV/m value was mathematically converted to its corresponding level in μV/m.

FS = 18.9 + 13.1 = 32 dBμV/m

Level in μV/m = Common Antilogarithm [(32 dBμV/m)/20]= 39.8 μV/m

8 PHOTOS OF TESTED EUT

Fig. 8.1 Overall view
Fig. 8.2 Front view
Fig. 8.3 Rear view
Fig. 8.4 Rear view with cover removed
Fig. 8.5 Unit partially disassembled
Fig. 8.6 Controller Board - Components side
Fig. 8.7 Controller Board - Foil side

Fig. 8.1 Overall view

Fig. 8.2 Front view

Fig. 8.3 Rear view

Fig. 8.4 Rear view with cover removed

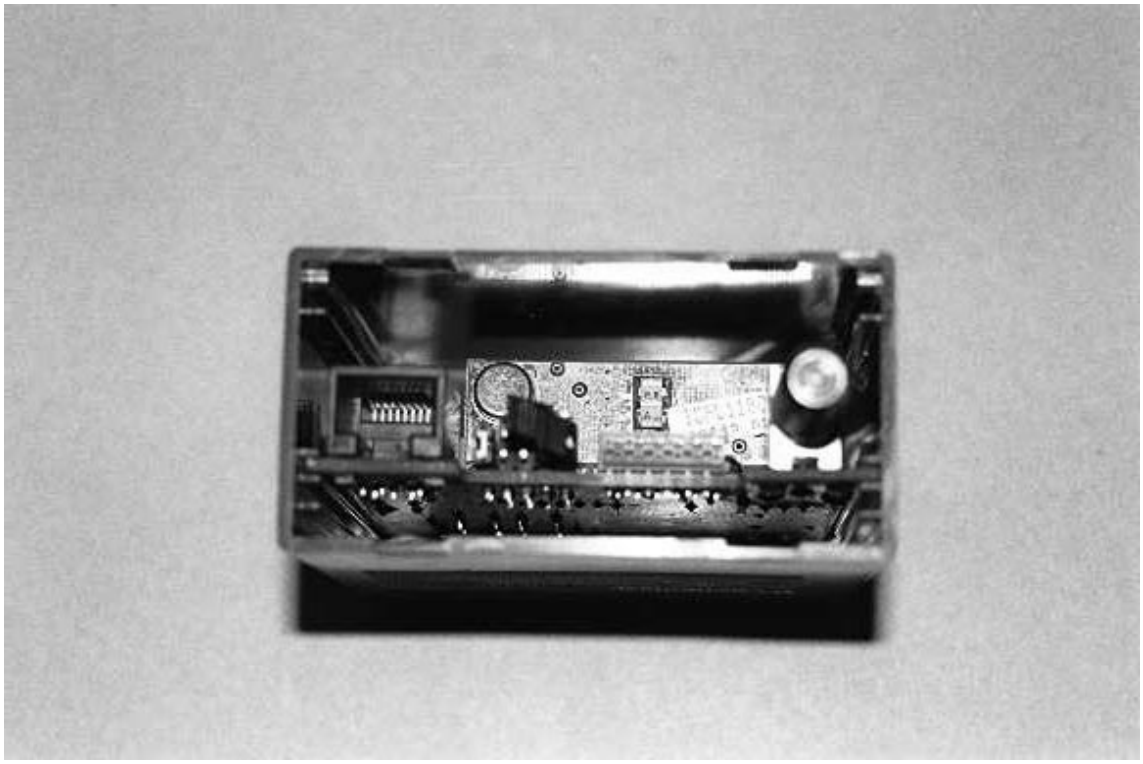


Fig. 8.5 Unit partially disassembled

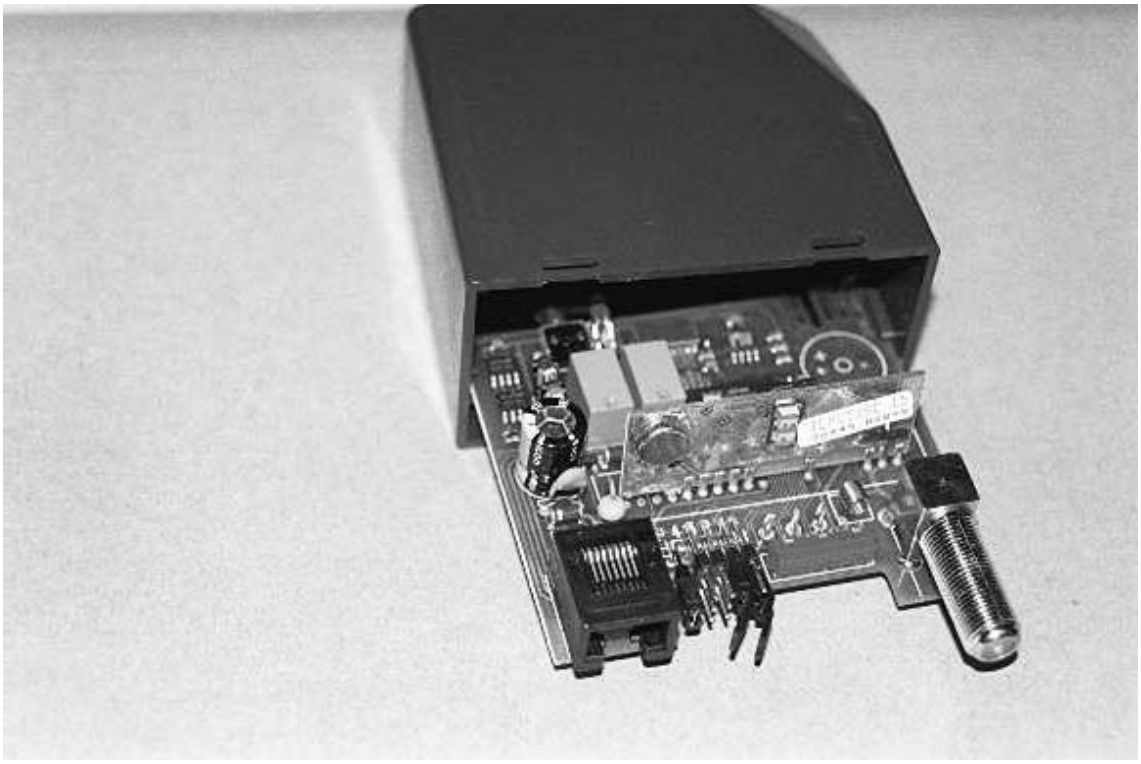


Fig. 8.6 Controller Board - Components side

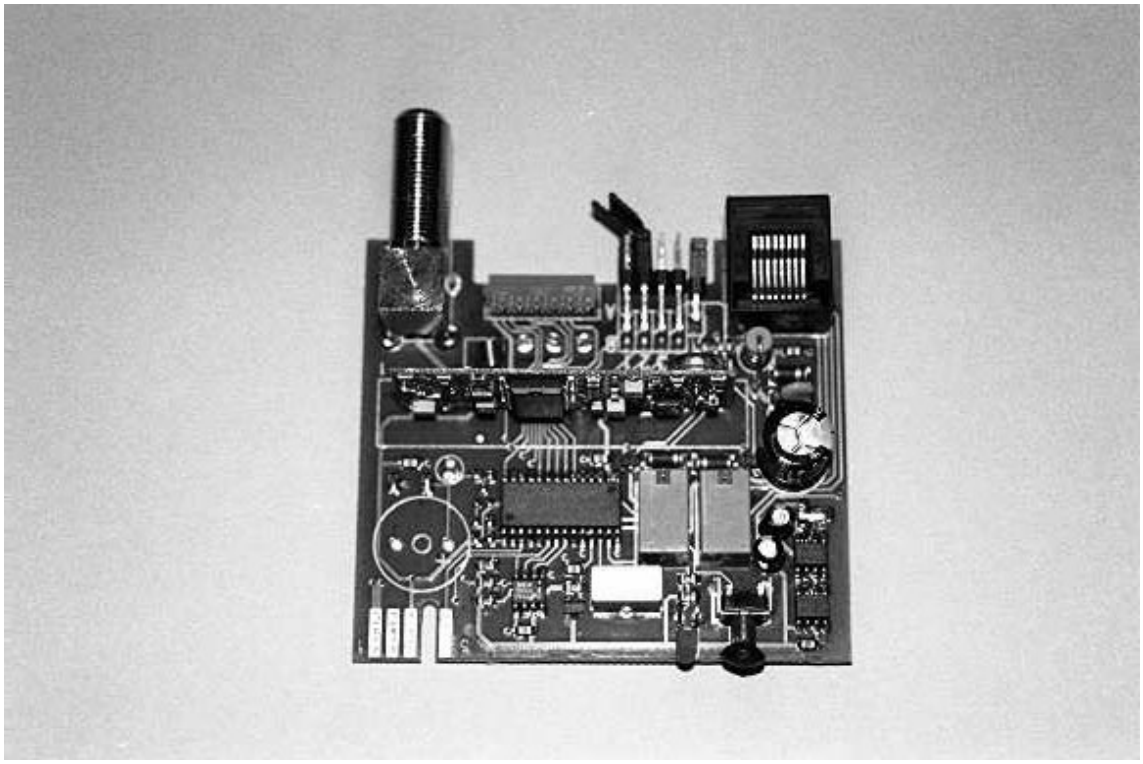
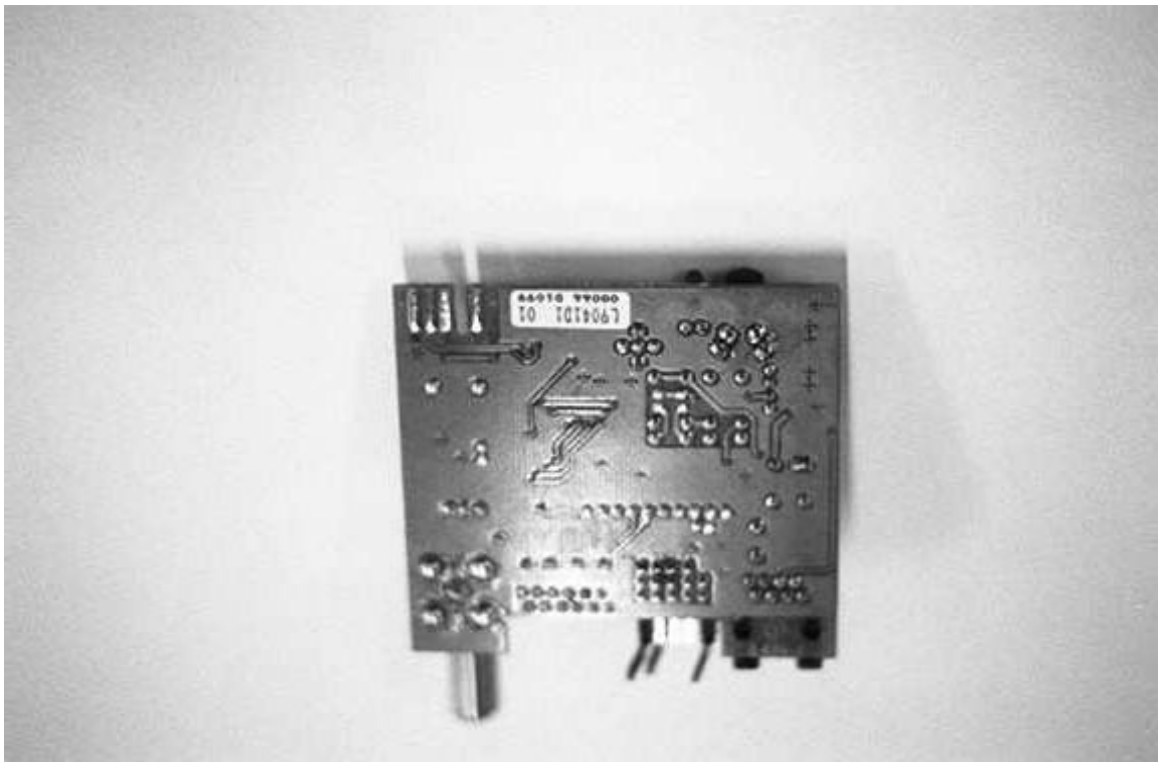


Fig. 8.7 Controller Board - Foil side



User Manual

CAUTION FOR THE USER

Any change or modification of the product is forbidden if not expressly approved by the manufacturer

1. GENERAL INFORMATION

These receivers integrate the functions of standard Multipass and Multipass Roll code receivers and decoders.
They feature a storage capacity of up to 200 different codes generated by transmitters of the Multipass and Multipass Roll family at 433.920 MHz (M/RA1E - M/RA2E).

2. ROLLING CODING

This type of coding affords extra security as it prevents the risk of code violation by interception or re-transmission. It is based on the transmission of a batch of bits consisting of a fixed part (which is different for each transmitter), of channel bits associated with the switch of the activated transmitter, and of a part which changes in a pseudo-random manner (rolling code) in accordance with a proprietary Prastel algorithm. The configuration of these latter bits changes unpredictably from one transmission to the following. The receiver memorises by self-learning the fixed part of the code associated with each transmitter plus the relevant rolling code, updating the latter upon each transmission. Transmitter recognition occurs only if the transmitted rolling code corresponds to the 255 configurations subsequent to the last recognised transmission. Realignment and recognition of a previously memorised transmitter which has overrun the permissible interval (an event which may occur for example following on an excess of unrecognised transmissions or upon battery replacement) can however be made by pressing and releasing the transmitter learning button. This procedure permits the system to check for code correctness, while safeguarding the advantages afforded by the rolling code.

3. TECHNICAL FEATURES

Power supply	12 - 24 Vac/dc
Average consumption	Stand-by: 20 mA with relay energized: 45 mA
Reception frequency	433 MHz
Digital Code	With a number of bits varying from 40 to 54
Number of storable codes	200
Number of channels	1 (M/RA1E); 2 (M/RA2E)
Type of output	Monostable, bistable
Output	Relay
Contact rating	0,5 A @ 24 Vac/dc
Signals	red LED
Working temperature range	-10/+55 °C
Storage temperature	-40/+85 °C
Receiver weight	250 g.
Receiver dimensions	77 x 80 x 38 mm

4. VOLTAGE SELECTION

Both the M/RA2E-M/RA1E receivers can operate at 24V and 12V ac/dc.

5. CODE PROGRAMMING AND DELETION

Entry and storage of a new code and deletion of the full code list can be made by acting on key P1, while deletion of single user codes can be made using the **GT/BASER** portable terminal.

How to Program

- Power the receiver as specified.

- Press P1. The red LED lights up indicating that programming is in progress.
- Press any of the transmitter's keys to make a transmission.
- The code will now be entered in the memory. While loading is in progress, LED will flash. Upon code being stored, the LED stops flashing and becomes fixed. A new code can now be entered.
- Load the codes of all the transmitters by making a transmission with each of them.
- Upon this operation being completed, press P1 again to exit from programming mode. The LED will go off. In any case, the system will automatically exit from programming mode upon 10 seconds having elapsed since last loading.
- Codes remain stored even if receiver is powered off.

Attention: Make a transmission within 10 seconds after pressing P1 as system will automatically exit from programming mode after this time has elapsed if no transmission has been made.
To re-access programming mode, press P1 again.

Deletion of all codes

- Press and hold down key P1 until the red LED starts flashing.
- Press P1 again within 6 seconds to confirm deletion. Confirmation is signalled by the LED flashing more rapidly.

6. CHANNEL SELECTION AND RELAY OPERATING MODE

Set output as desired by means of jumper A (jumper A closed for monostable relay operation and jumper A open for bistable relay operation). **Note: Relay operating mode selection is not contemplated on the M/RA2E receiver.**

7. ANTENNA CONNECTION

The receivers may be connected to external antennas of corresponding frequencies by means of the appropriate F-type female connectors.
The **M/RA1E** and **M/RA2E** receivers can instead be connected to **ANT/433SD** type antennas, to the **wire antenna** provided or the like.

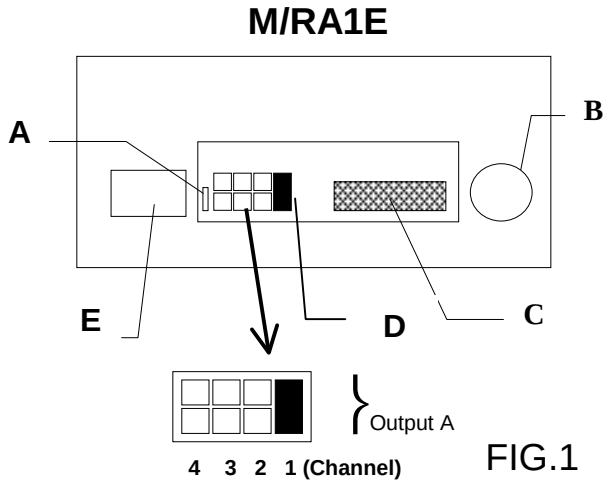


FIG.1

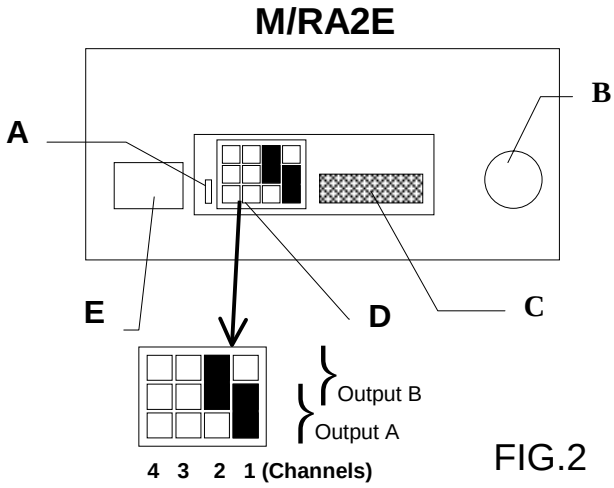
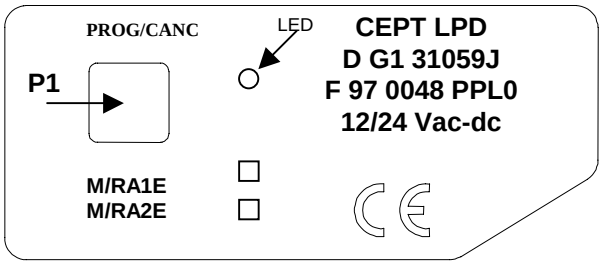
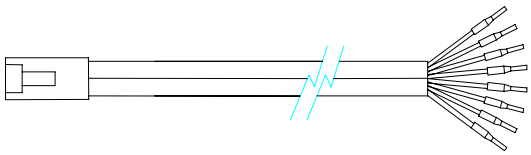


FIG.2

A	Relay operating mode selection
B	F-type female antenna connector
C	Micro-match for memory control
D	Channel selection jumper
E	Plug connector input





2m

24 V	BLUE
0	ORANGE
12 V	BLACK
N.C. out A	RED
C out A	GREEN
N.O. out A	YELLOW
C out B	BROWN
N.O. out B	GREY

FCC ID: ON3MRAE

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.