

Prima Ricerca & SviluppoSrl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130
Sede legale : 22100 Tavernola (CO) Via Conciliazione, 1 Cod. FISC. e N. R.I. CO 02635860139
Sede operativa : Laboratori Via Campagna, 92 22020 Faloppio fraz. Gaggino (CO) Tel. +39 03135000.11 Fax +39 031991309

EQUIPMENT UNDER TEST :
APPARECCHIO IN PROVA :

**WIRELESS REMOTE CONTROL FOR BOATS WITH
ELECTRONIC ENGINES**

Mod. YACHT CONTROLLER

REFERENCE STANDARDS :
NORME DI RIFERIMENTO :

FCC 47CFR Part 15

CUSTOMER:

RICHIEDENTE:

- **Dept. / Firm :** *MICRODEVICE S.r.l.*
Ente / Società:
- **Mr.:** *SIG. GIUSEPPE BRIANZA*
Sig.:
- **Address:** *VIA BELLINI, 31/33 - 20095 CUSANO MILANINO (MI) - ITALY*
Indirizzo:
- **Tel.:** ++39 02/6131001 • **Telefax** ++39 02/66400086 • **E-mail:** mdevice@tin.it
Telefono: *Fax:* *e-mail*

Site of test execution: Via Campagna, 92 - 22020 Gaggino Faloppio (CO) - Italy
Località esecuzione prove:

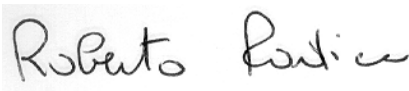
Date of test samples receipt: 20/01/04 <i>Data ricevimento campioni:</i>	Date of start test: 13/04/04 <i>Data inizio prove:</i>
	Date of end test: 13/04/04 <i>Data fine prove:</i>

Witness to the test:
Presenti alle prove:

Signature of the engineers:
Firma esecutore prove:

Signature of the Laboratory Director:
Firma Direttore Laboratori:

Nobody / Nessuno
.....



R. Radice
.....



R. Furfari
.....

The test results recorded in this Test Report are exclusively referred to the tested samples.

I risultati del presente rapporto di prova si riferiscono esclusivamente al campione sottoposto a prova.

Reproduction of this EMC-Test Report in whole or in part is prohibited without the written authorization of the Laboratory Director

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1. TECHNICAL INFORMATION OF EQUIPMENT UNDER TEST (EUT)

1.1 Identification

Brand name:	MICRODEVICE
Equipment :	WIRELESS REMOTE CONTROL FOR BOATS WITH ELECTRONIC ENGINES
Model name or No. :	YACHT CONTROLLER
Serial number :	Not present
FCC ID :	R86RX001YACHTCONT
Country of manufacturer:	ITALY

1.2 Technical data

FCC class:	Unintentional radiators, Class B
Type of receiver :	superetherodyne
Maximum internal frequency generated by EUT :	4 MHz
Supply voltage:	12/24 Vdc ¹
Input Power / Current :	17 mA (stand-by)
Typical usage :	On boats
EUT single or system:	Single
EUT dimensions :	connector included, 175 x 155 x 56 mm

1.3 Receiver technical data

- Working Frequency : 916.5 MHz
- Frequency Range of Operation : 902 – 928 MHz

1.4 Modifications incorporated in E.U.T.

The following items are the modifications introduced in the equipment under test :

- None

¹ The worst case for EMI is with EUT powered by 12Vdc

1.5 Ports identification

This section contains descriptions of all signal ports and AC/DC power input/output ports, the length and the type of the cable provided by manufacturer needed for the tests.

Moreover it is specified if the ports are ever or optionally connected.

Port		Description	Connection
1	Enclosure	Plastic surface	By 4 screws
2	AC power input/output ports	Line not present	*****
3	DC power input/output ports	12 Vdc from external supply – Cable length not specified.	Terminals
4	Signals ports	N° 8 N.O. Outputs. - Cable length not specified.	Terminals
<i>Note: During the tests all cables must be what provided the manufacturer or the same that used in the real employment of the EUT.</i>			

1.6 Auxiliary equipment

No auxiliary equipment

2. TEST CONDITIONS

2.1 Operating test modes and test conditions

The equipment has been tested according to the operative conditions described in the user/installation manual provided by the manufacturer and by following reference standards :

Reference Standard:

- FCC Part 15, Subpart B

In the following table there are the operating conditions adopted during tests identified by an indicator (#..) at which has been referred the item “Operating condition of the equipment under test” of all technical sheets of the tests (see Section 4)

Operating condition	Description
#1	<i>Receiver active – N° 8 Cables N.O. connected on output.</i>

2.2 Test overview

Sample tested is the main model of a complete set of 916.5 MHz RF transmitters (see also Section 7).

The appliance is classified as “*unintentional radiator*” in conformity to FCC Part 15 Sub. A §15.201, and it is subject to “*Certification*” procedure.

The application is mainly used as Yacht remote control on boats and will interface with any engine with electronic controls.

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3. REFERENCE STANDARD FOR PERFORMED TESTS

<i>Reference standard :</i>	<i>Title :</i>
FCC Part 15 part A	Code of Regulations Part 15 (Radio Frequency Devices), Subpart A (General) of the Federal Communication Commission (FCC)
FCC Part 15 part B	Code of Regulations Part 15 (Radio Frequency Devices), Subpart B (Unintentional Radiators) of the Federal Communication Commission (FCC)
ANSI C63.4	American National Standard for Methods of Measuring of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz – 40 GHz

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4. SUMMARY OF TEST RESULTS

4.1 Emission tests

Port		Phenomena	Basic standard	Operating condition ²	Result
1	Enclosure	Radiated emission	FCC Part 15 § 15 109	#1	Within the limit
2	AC mains Input ports	RF Disturbance voltage: continuous	FCC Part 15 § 15 107	Not applicable	

² Ref. Tab. of Section 2

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5. TEST RESULTS

RADIATED EMISSION 30 - 1000 MHz..... 9

**TEST
1.****RADIATED EMISSION 30 - 1000 MHZ****REFERENCE
DOCUMENT**

FCC PART 15 subpart B

- **TEST LOCATION:** Semi-anechoic chamber (3 meter)
- **TEST EQUIPMENT USED FOR TEST:** EMI receiver Rohde & Schwarz Mod. ESML
Chase Antenna Mod. CBL 6111 A
- **TESTED PORT:** Enclosure
- **EMISSION LIMITS:** Acc. to Section 15.109 of reference document
- **UNCERTAINTY OF MEASURE:** Combined uncertainty = ± 1.75 dB
Total uncertainty = (k=2) ± 3.5 dB

TEST CONDITIONS:		MEASURED
Ambient temperature :	15 - 35 °C	24 $\pm$ 3 °C
Ambient humidity :	25 - 75 %rH	40 $\pm$ 5 %rH
Pressure :	85 - 106 kPa (860 mbar - 1060 mbar)	950 $\pm$ 50 mbar
Voltage :	12÷24 Vdc	12 Vdc

OPERATING CONDITION (Rif. Section. 2) : #1**RESULT: WITHIN THE LIMIT**

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SCAN TABLE : “Radiated Emission”

Unit: dB μ V/m

Detector : Mode:

Curve1: MaxPeak ClearWrite

Curve2: -- ClearWrite

Subrange1:

Start Frequency: 30.0 MHz Step Size: 80 kHz

Stop Frequency: 1000.0 MHz

Measure Time: 0.01 sec.

IF Bandwidth: 120 kHz

Receiver: ESXI

Probe Transducer: CHASE_6111_PRC

Signal Path: Path 4

System Transducer: RFin2-CP1/X11

Scan Mode: Lin

Add. Transducer: W71.01

Tracking Gen.: Off

Input: 2 DC

Preamplifier: 10 dB

Demodulation: FM Broad

RF att.: Coupled

Volume: 0.0%

Ref. Level: -50 dBm

Squelch: --

Min. RF att.: 0 dBm

Option: None

Autorange: On

Curve 1: On

Repetition: Single

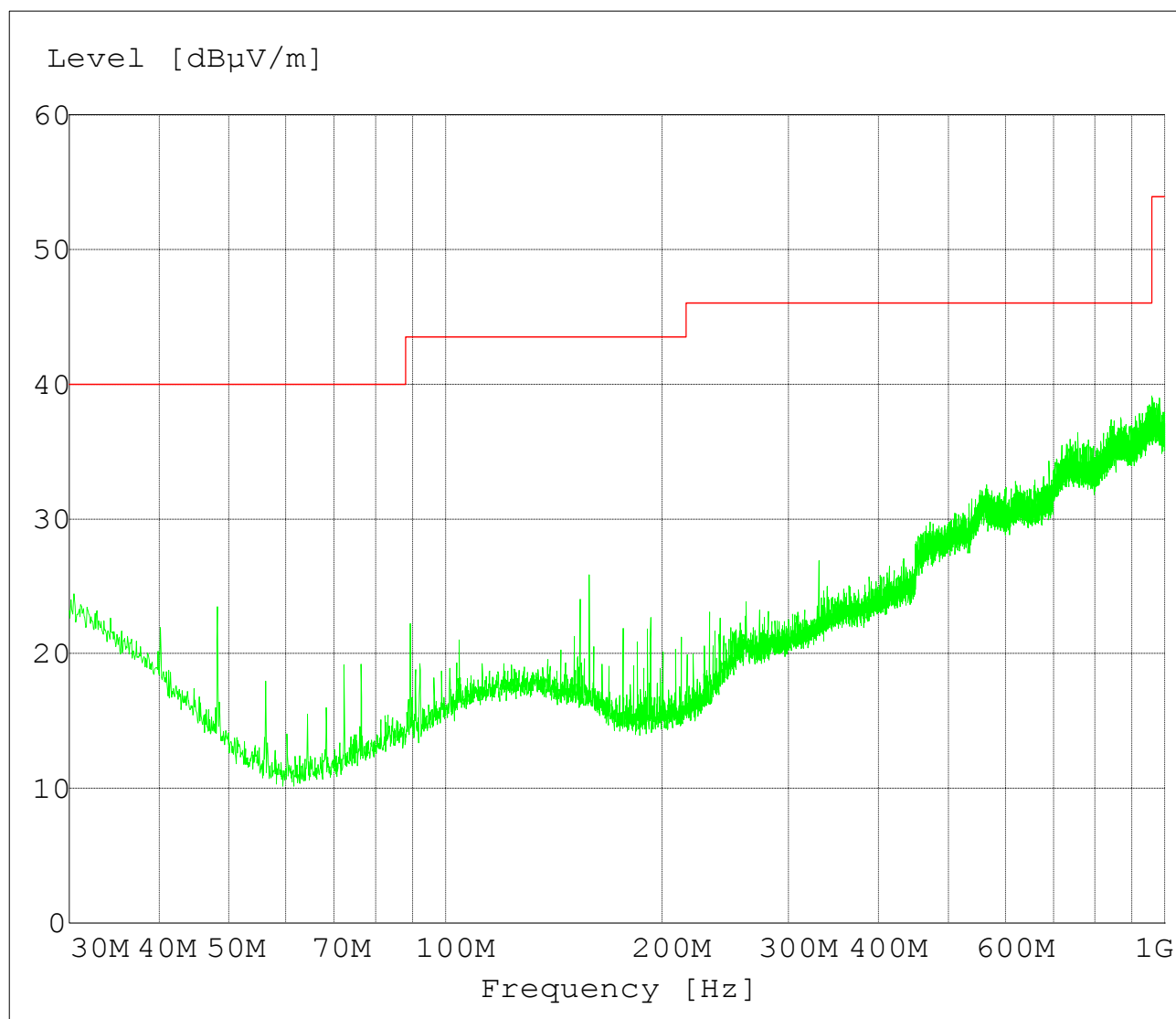
Curve 2: Off

Stop Mark: On

Stop Message: On

Text: Connect antenna

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6. EUT TECHNICAL DOCUMENTATION

6.1 Wiring diagrams

	<i>Document reference (n., edition, date, ...)</i>
WIRING DIAGRAM	Doc. No. RX_RF6 Issue date: 2004-05-19 Rev. 4 Sheet no. 2
PART LIST	Doc. No. RX_RF6 Issue date: 2004-06-10 Sheet no. 2

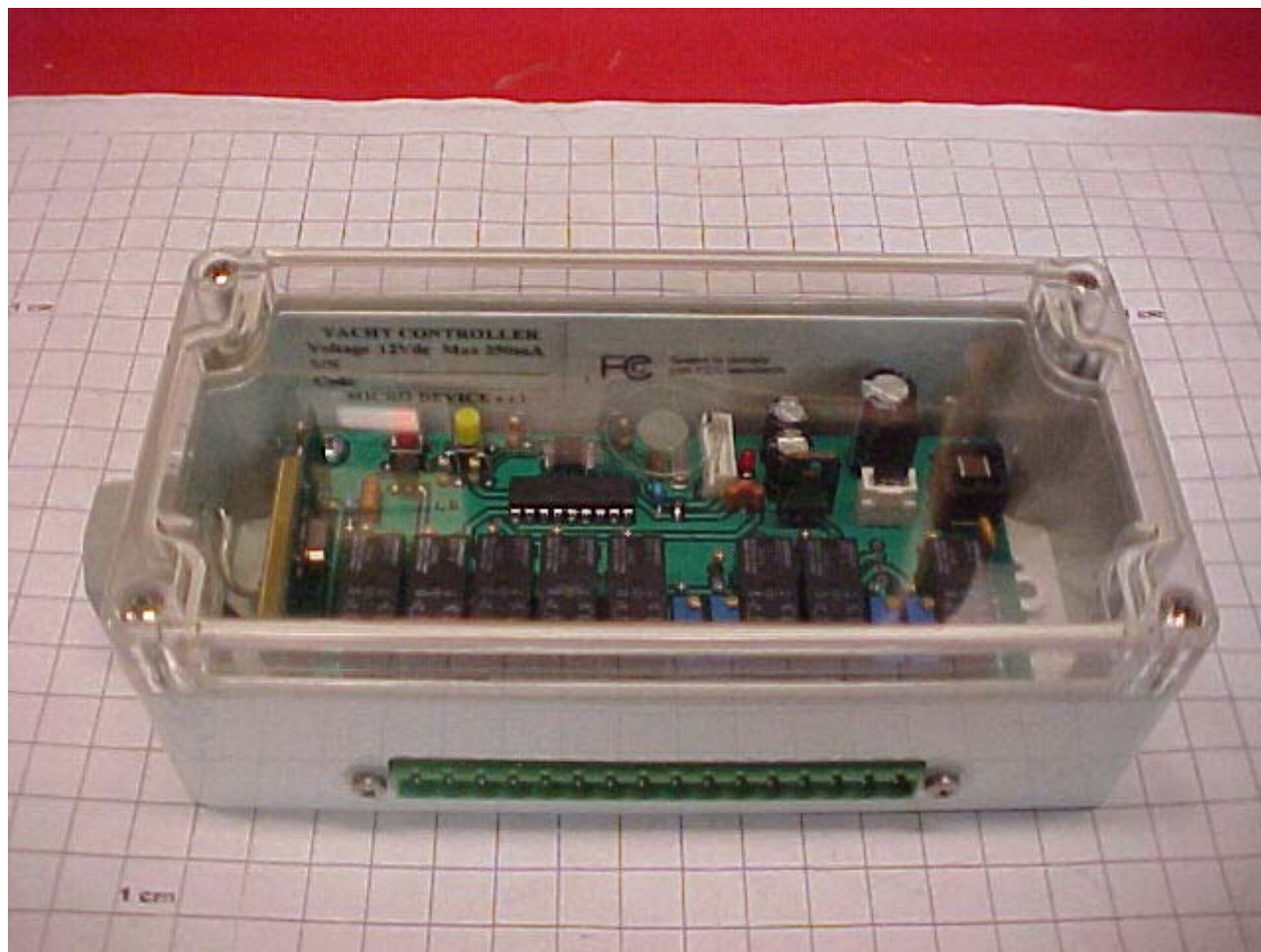
6.2 Technical manual

	<i>Document reference (n., edition, date, ...)</i>
TECHNICAL DATA	US-Uti_030921 sheet no. 20

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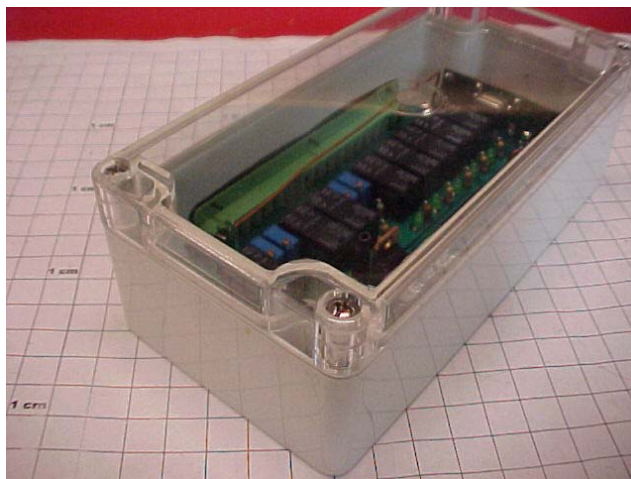
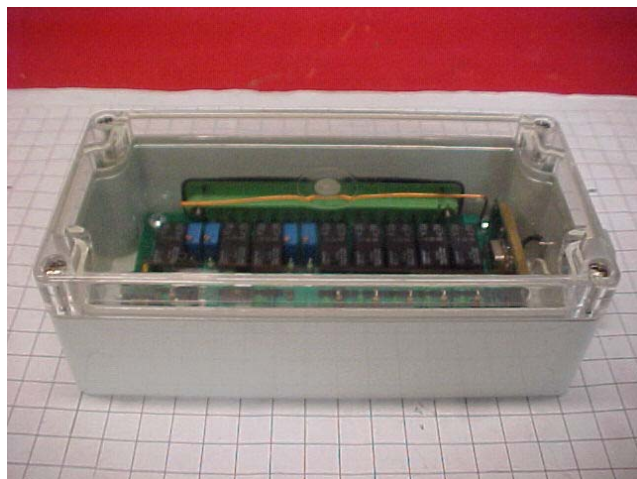
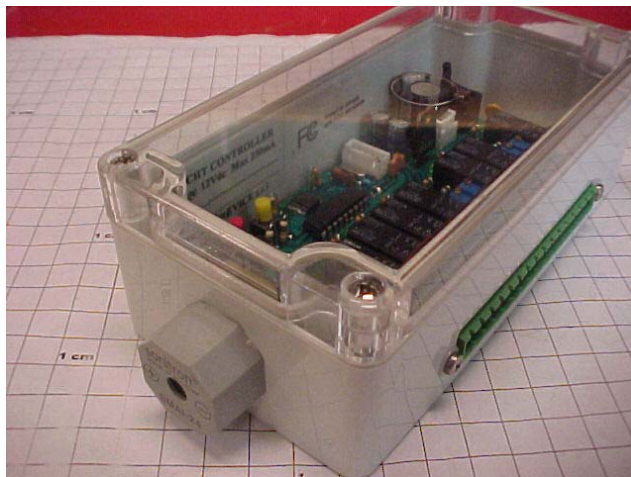
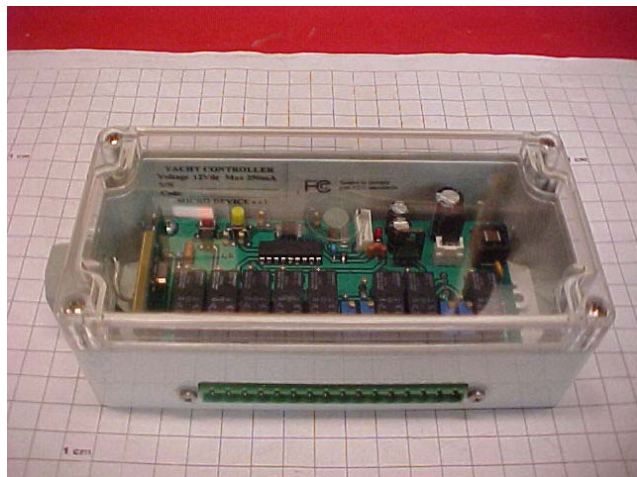
6.3 Photographic documentation

PHOTO N° 1 – EQUIPMENT UNDER TEST IDENTIFICATION



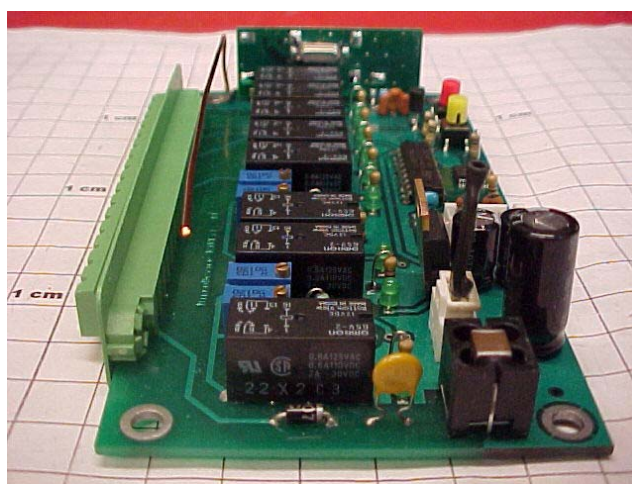
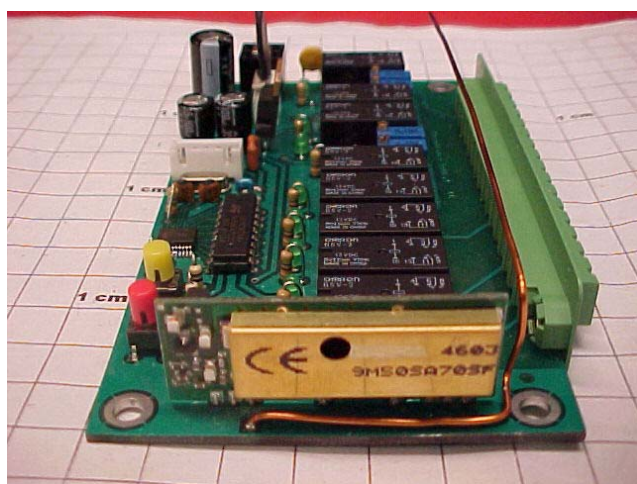
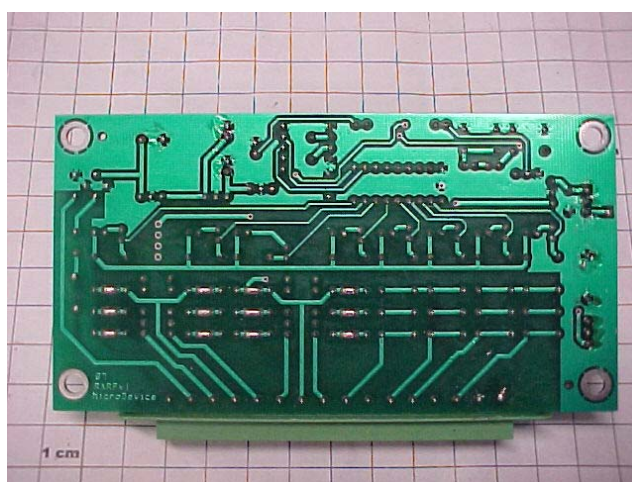
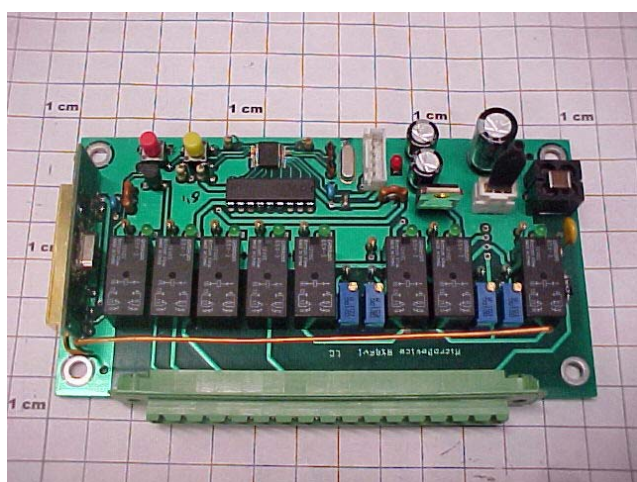
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PHOTO N° 2 – EQUIPMENT UNDER TEST IDENTIFICATION



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PHOTO N° 3 – INTERNAL VIEW



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PHOTO N° 4 – LABEL



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PHOTO NO. 5 - TEST SETUP

