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TITOLO/TITLE RS232 CONTROLLED 60 W 915 MHz GENERATOR mod. 342-01	

DISEGNI E DOCUMENTI DI PROPRIETA' DI <b>ELRAD</b> srl. DIFFUSIONE E RIPRODUZIONE VIETATA A TERMINI DI LEGGE.	CODICE/CODE 342ED0GC.PUB			
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## 2 - CAUTIONS

### SAFETY NOTICE

**This equipment contains high RF Level device which are dangerous if contacted.**

**Extreme cautions must be exercised when working with this equipment. While every practicable safety precautions has been incorporated in this equipment, the following rules must be strictly observed.**


### KEEP AWAY FROM LIVE CIRCUITS

**Operating personnel must observe all safety regulations at all time. Do not open or make adjustment inside the equipment with hazardous RF output level or open RF connector.**

### PERSONNEL

**Only trained personnel are to enter the enclosure for purpose of servicing or adjusting this equipment.  
Heavy damage can be caused at the equipment in case of improper operation and/or alignment.  
In any case please contact factory.**



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### 3 - DESCRIPTION

The POWER GENERATOR mod. 342-01 is a fully solid state unit used to produce an RF signal with a nominal output power of minimum 55 W CW.  
A block diagram of the unit is in annex 342O1A1A.SCH.

Central output frequency - 915 MHz PLL and crystal controlled.

The POWER GENERATOR mod. 342-01 is composed of:

- Voltage controlled oscillator at 900 : 930 MHz
- PLL circuitry
- Reference crystal oscillator
- Gain controlled amplifier stage 0,2 W class A
- Driver stage class A 6W
- Final power stage class AB 80 W
- Reflected power protection (power isolator)
- Quad high directivity coupler mod. 342-4-01 for internal control and isolated external monitoring

All the RF functions are enclosed in an aluminium shielded case with high capacity of heat sink equipped with tangential fan for forced ventilation.

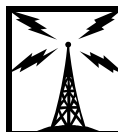
Electronic thermal protection are included in the unit.

- Double direct/reflected coupler for external monitoring. This double coupler use one section of the quad high directivity coupler mod. 342-4-01 (see doc. in annex)
- Control unit mod. 342-1-3-1 which include all the analog controls of the Power Generator.
- Microprocessor base unit which include the LCD display and the four pushbutton keyboard controls.
- Switching power supply unit.

The POWER GENERATOR mod. 342-01 is contained in a 19" rack 3U mountable assembly.

#### CONTROLS

Thanks to the internal microprocessor unit all the control functions of the POWER GENERATOR mod. 342-01 are realized by means a for pushbutton keyboard.  
See operating instruction chapter.



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## INDICATORS

All the indications of the front panel of the **POWER GENERATOR mod. 342-01** are included in a alphanumeric LCD display which is controlled by the microprocessor unit.

The display continuously give the following measurements:

**POWER OUT** in Watts  
**TC** RF case temperature in C°  
**REFLECTED POWER** in Watts

When operating with the control keyboard the display is used to set and select the requested working condition.

The measurement on the RF Signal for the maximum degree of safe are divided in two separate coupling system included in the **QUAD HIGH DIRECTIVITY COUPLER mod. 342-4-01** (see doc. in annex).

No contact or interaction is possible between the two measuring system. Wiring are separated and insulated between internal and external use sections.

## OPERATION

The solid state amplifier stage of the unit operates in **A:AB** class to optimise power consumption, harmonics emission and possibility to operate with output power from 1 to 55W. An external inhibit control is provided.

A contact closed to common remove the inhibit condition and turn on the ready status to microprocessor unit.

An external interface provide for a remote power control with a 0 : 10V scale on 1 KOhm resistor.

(See calibration table CT342-01 in annex for detail).

In the local mode the level of the output power can be controlled by means of the **UP** and **DOWN** pushbuttons.

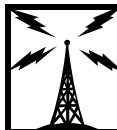
In remote RS232 mode the unit follows the control protocol. In any case (Local, RS232 or analog remote control), output range is from 1 W to 55 W.

## COOLING TANGENTIAL FAN

An internal blower is used to cool the **RF POWER MODULE**.

Output of the warm air is on the right side of the equipment.

Thermal sensor are provided to give the measurement of the operating temperature on the LCD Display and to protect against overheating the unit.



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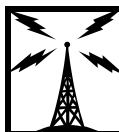
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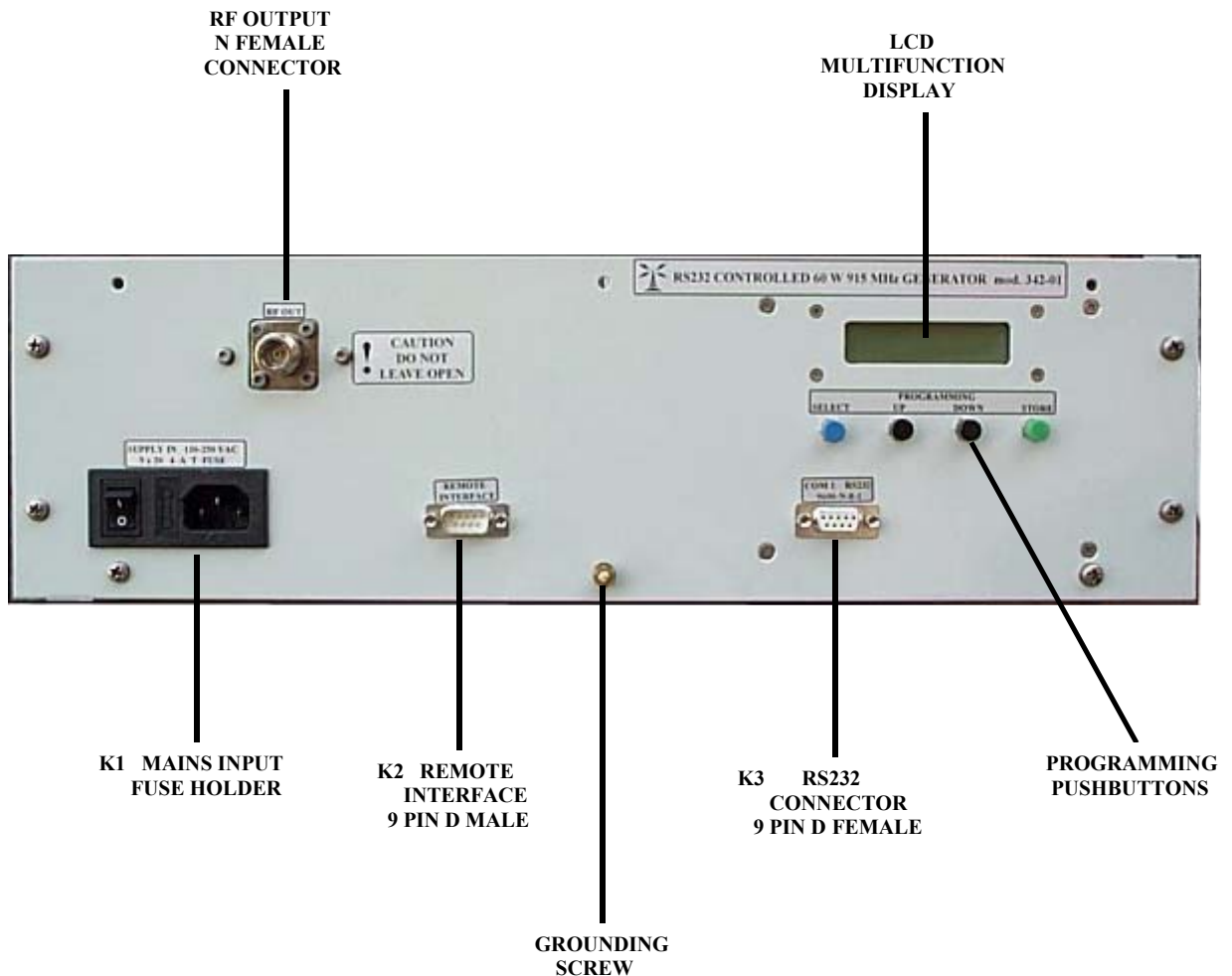
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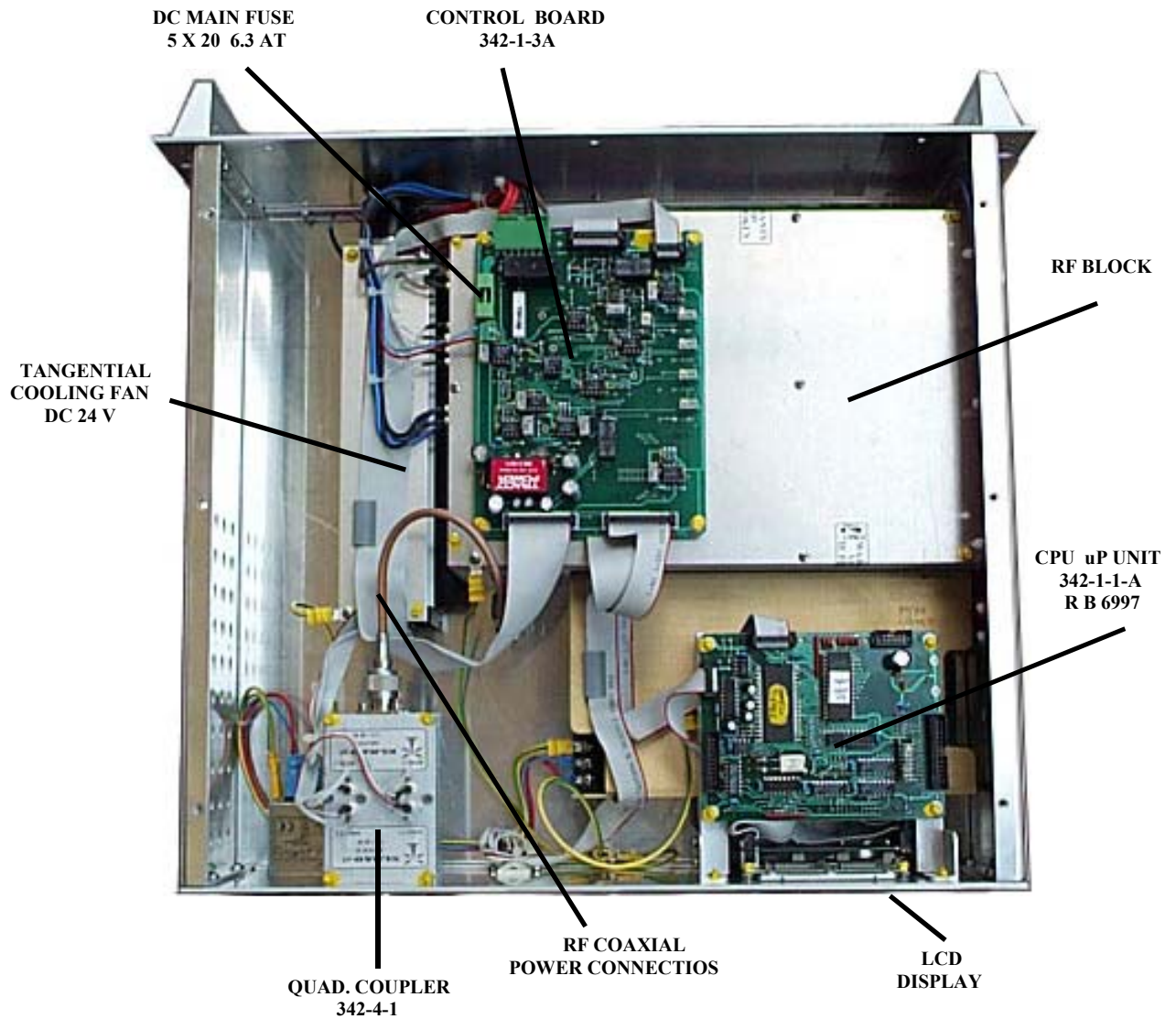
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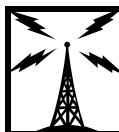
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## 4 - SPECIFICATION

### RF CHARACTERISTICS

Frequency	915 MHz +/- 25 PPM
Output power (with a VSWR of 1,3:1)	55 W CW min
Output VSWR for specification compliance	1.3 : 1
no damage	any with internal power isolator and limiting circuitry.
Spurious	- 50 dBc
Output power control range	1 : 55 W (refer to CT342-01 calibration table in annex)
Inhibit RF cut off	- 50 dB (1 mV max RF output)
Harmonics	- 30 dBc
Remote interface	9 Pole D male connector
Pin 1	Common
Pin 2	Inhibit contact **
Pin 3	Power control voltage 0 : 10V * 1 KOhm
Pin 4	Direct Power 0 : 1V * 1KOhm
Pin 5	Reflected Power 0 : 1V * 1 KOhm
	* - refer to CT342-01 calibration table in annex ** - closed to common = RF ON
Output RF connector	N (female) 50 Ohm



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## SUPPLY CHARACTERISTICS

Mains voltage	100-250 Vac single phase 50-440 Hz 3 wire
Consumption	VA 250 max
Protection	Fuse 5x20 4 A-T (Spare included in supply plug)

## MECHANICAL

3U 19" compatible

### Dimensions

W	19" (482 mm)
D	450 mm (including Handles)
H	3U (132 mm)

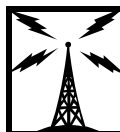
## ENVIRONMENTAL CONDITIONS

### Non operating conditions

Temperature	- 20 / + 80°C
Altitude	up to 10.000 meters
Humidity	95% non condensing

### Operating conditions

Temperature	0 : 50°C
Humidity	90% (except condensation)



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## 5 - OPERATING INSTRUCTION

### ! SAFE

Before turn on the 342 POWER GENERATOR check supply voltage and ground connection.

Be sure of the proper connection of ground of the grounding screw on the control panel and on the supply line.

Do not turn on the unit without an RF COAXIAL CABLE strongly connected to the RF output connector to a microwave 50 Ohm load.


Care must be taken in order to avoid RF leakage in the RF connections at the output of the 342 POWER GENERATOR.

Only RF cables and connectors with specified 50 Ohm impedance and power rating of 100 W / 1 GHz must be used.

Do not open the 342 POWER GENERATOR during operation 220 V AC live circuit inside.

Read with care the instruction handbook before use.



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# OPERATION

Turn on the POWER GENERATOR mod. 342-01 by means of the ON/OFF switch included in the Supply Plug at the left side of the control panel.

The plug include also spare parts fuses.

When turned on some check and controls indications appear on the LCD display during microprocessor Start Up procedure.

Some manufacturer indication are displayed for about five seconds.

At the same time on the RS232 serial port a test message is sent for port testing. The string is:

" ELRAD srl mod. 342-01 SIAS/MEL rev.B.07/2002"

If an external inhibit condition is present (Pin 2 left open in the interface connector) the unit is locked and the message:

The unit is locked and the message:

"EXTERNAL RF INHIBIT" is displayed.

To remove the inhibit conditions it is necessary from the external control to close to common (Pin 1) the inhibit pin (Pin 2) by means of a contact on the Interface Connector K2.

At this point on the LCD display appear the indication of:

Pout in W Ref. PWR in W and the RF case temperature in C°.

By means of the select pushbutton is possible to select the operating mode:

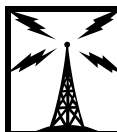
- 0 Internal digital control  
power is controlled with UP/DOWN pushbuttons and power setting is in W.
- 1 EXternal analog control  
power is controlled with an external voltage as indicated in the CT342-01 calibration table in annex
- 2 SErial RS232 digital control mode.  
power is controlled via RS232 communication port.  
see RS232 protocol.

To confirm the selection it is necessary to press the green STORE pushbutton. The display indication "DATA STORE OK" confirm the selection.

In INTERNAL mode is possible to select the requested Power Level from 0 to 55 W in the menù "SET PWR OUT" by means of the Down - or Up + pushbutton.

To activate the requested level press the pushbutton store.

The message "DATA STORE OK" confirm the selection.



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When the EXternal control mode is selected the unit set the RF output level according with the control voltage applied at Pin 3 of the interface connector K2.

Full range is 0 - to 10 V on 1 KOhm load and the calibration table is in CT342-01 in annex.

A feedback voltage proportional to the direct and reflected RF Power is available with the normalized 0 - 1 V / 1 KOhm at Pin:

- 4            Direct Power
- 5            Reflected Power


calibration table is in CT342-01 in annex.

### Serial control mode

To operate the unit in RS232 serial control mode it is necessary to follow the indicated points:

- 1 - The Unit 342-01 must be set in serial mode by means of the menu (blue) pushbutton, select 2 SERIAL mode with UP DOWN pushbutton and store with the relevant green pushbutton.  
The "DATA STORE OK" confirm the selection.
- 2 - The RS232 port should be set at 9600 baud 8 bit NO Parity 1 Stop Bit.  
Every command must be followed by carriage return and line feed.
- 3 - The Unit 342 accept only one (1) Watt resolution command control.  
e.g. 12,5 W is accepted as 12,0 W.  
This follows the same power indication on the local display.  
The same mode for the response on request command control.
- 4 - At the POWER ON a test message is transmitted on the serial line for test.  
This message is:  
"ELRAD srl mod.342-01 SIAS/MEL rev.B.07/2002"
- 5 - The checksum computed is ever the sum of all the ASCII hex value transmitted reduced at the 2 LAST CHARACTERS.



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By means of the select pushbutton is also possible to program a alarm trip point for the indication of "TEMPERATURE ALARM". This value is factory set at 55 C° of the RF power case. This value can be changed by the operation in function of the ambient temperature to maintain under control for example the cooling air flux and/or the cooling fan efficiency. In any case an internal hardware protection circuit cut off the unit for temperature over 60 C° of the heat sink to protect the Power RF modules.

## COMMAND SYNTAX

### "R" -READ POWER VALUES MESSAGE

R CK CR LF  
 e.g. R 52 CR LF

The Unit response is

! R DDD RRR CK LF  
 e.g. for 45 W output power and 5 W reflected  
 the response string is:  
 !R450050A1 CR LF

The read power command is EVER ACCEPTED in any operating mode.

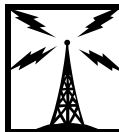
### "P" - POWER SETTING MESSAGE

P PPP CK CR LF  
 e.g. for 12 W programming output power  
 P120E3 CR LF

for correct and accepted command the unit response is:  
 !P12004 CR LF

for wrong message the unit response is  
 ?PXXX CR LF

if not in RS232 SERIAL mode 2 the unit give the lock on command  
 ?LKD6



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## 6 - INTERFACE

### INTERFACE CONNECTOR FUNCTION

#### SUPPLY INPUT Male CONNECTOR K1

Supply Input Connector  
Fuse holder 5 x 20 4 A T Fuse (spare included)

#### INTERFACE CONNECTOR K2

Pin 1	COMMON (GROUND)
Pin 2	INHIBIT (close to common for RF ON/READY)
Pin 3	POWER ADJUST from remote 0 : 10 V
Pin 4	POWER OUTPUT to remote 0 : 1 V on 1 KOhm load
Pin 5	REFLECTED POWER to remote 0 : 1 V on 1 KOhm load


In the 342-01 model analog control voltage and remote monitoring voltages for direct and reflected power are factory set and calibrated according with the 342-01 CALIBRATION TABLE cod. 342EG01A.XLS in annex.

#### RS232 CONNECTOR K3

Pin 2	Data TX to control terminal
Pin 3	Data RX from control terminal
Pin 5	Common RS232 return (GND)

The communication port must be set at:  
9600 baud, no parity, 8 bit, 1 stop bit  
See RS232 connection protocol fro detail.



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## 7 - INTERNAL CONNECTIONS

### CONTROL BOARD 342-1-3-A

Here follow description of the function of the connectors of the main control board of the unit.


Please refer to the schematic diagram in annex for detail.

CONNECTOR	FUNCTION
K1	REMOTE INTERFACE CONNECTIONS (Flat cable 26 Pins to front panel)
K2	RF BLOCK CONNECTIONS (Flat cable 26 Pin to RF Power Module)
K3	EXTERNAL RF COUPLER CONNECTIONS (Flat cable 10 Pins to RF Coupler)
K4	POWER CONNECTOR (Distribution of +28 Vdc supply including low voltage fuse 5x20 10 AT)
K5	MICROPROCESSOR UNIT CONNECTIONS (Flat cable to micro Unit 342-1-1-A)

### CPU UNIT 342-1-1-A

JP4	CONTROL BOARD UNIT CONNECTIONS (Flat cable to control Unit 342-1-3-A)
JP5	RS 232 CONNECTIONS (9 Pin flat cable to front panel RS232 connector)



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## 8 - LIST OF ANNEX

**CALIBRATION TABLE TABLE 342-01**  
342EG01A.XLS

**QUAD HIGH DIRECTIVITY COUPLER 342-4-01**

342AC01A.PUB

**BLOCK DIAGRAM 342-01**

Block Diagram 342O1A1A.SCH

**CPU uP UNIT**

Schematic Diagram 342A1A1A.SCH

Mounting Diagram 342A1A1A.PCB

**CONTROL UNIT 342-1-3-A**

Schematic Diagram 342A1A3A.SCH

Mounting Diagram 342A1A3A.PCB

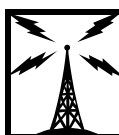
**DRIVER UNIT 342-2-3-A**

Schematic Diagram 342A2A3A.SCH

Mounting Diagram 342A2A3A.PCB

**SUPPLY UNIT LPS255**

Astec Switching Supply Doc. 1/6



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