

ELENOS®

broadcast @xperience

USE AND MAINTENANCE MANUAL

E5000



TECHNICAL SECTION

ELENOS®

broadcast @xperience

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Dear User,

First of all thank you for choosing an **ELENOS** product.

ELENOS products are solid state or thermionic tube transmitters that develop power from a minimum of 20W to a maximum of 30KW.

Great care has been taken during the design of the protection circuitry to ensure compatibility with products from other manufacturers. However the best performance is achieved when the equipment is used with other products manufactured by **ELENOS**.

The unit has been designed to guarantee stable performances over time, without the need of special maintenance, minimised to a functional fans-check.

Operation of the unit is very easy and intuitive. Even so it is recommended that this manual and other relevant documentation is read carefully before any operation.

Customer Care

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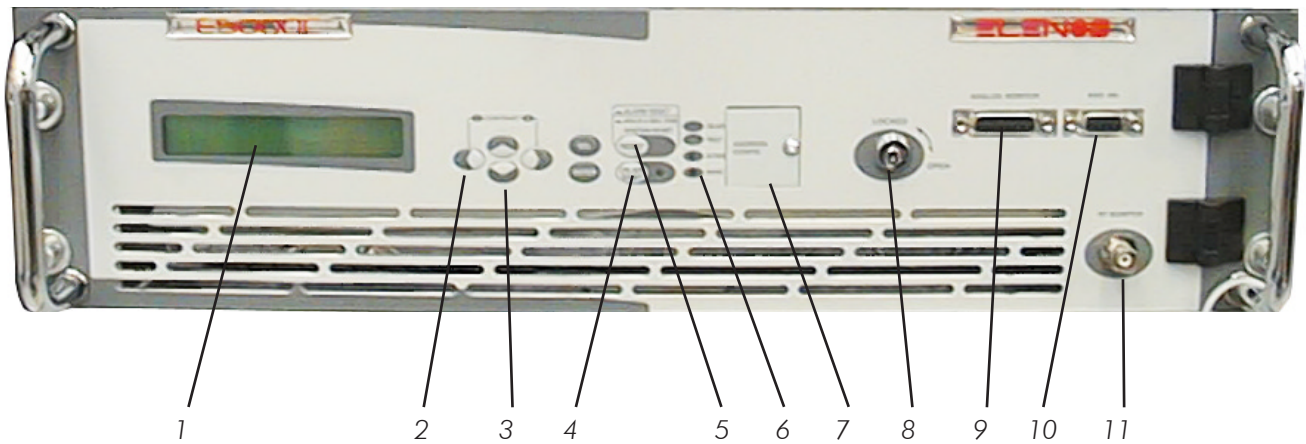
1.1. Introduction

E5000 is a power amplifier for FM broadcast in 87.5-108 MHz band. It's designed according to robustness and reliability criteria in order to guarantee a continuous service with lowest number of interruptions. It's been designed to obtain an equipment easy to transport and install, maintain and repair. The RF amplifier main block is made of 10 removable 500W units, combined together to obtain 5KW power output. Each unit is made of 2x250W RF amplifiers, placed on the same heat-sink. The formers are easily extractable to allow a quick replacement in case of maintenance or malfunction. Any trained technician can do this operation while the equipment is on air. The power supply block is made of 3 extractable units of 4 Kw each (2x2KW power supplies each module). This operation too can be made while the equipment is on air. A microprocessor optimizes its efficiency and guaranties its safe functioning under any operative and environmental condition; it controls the equipment functioning, protections management and remote control interfacing.

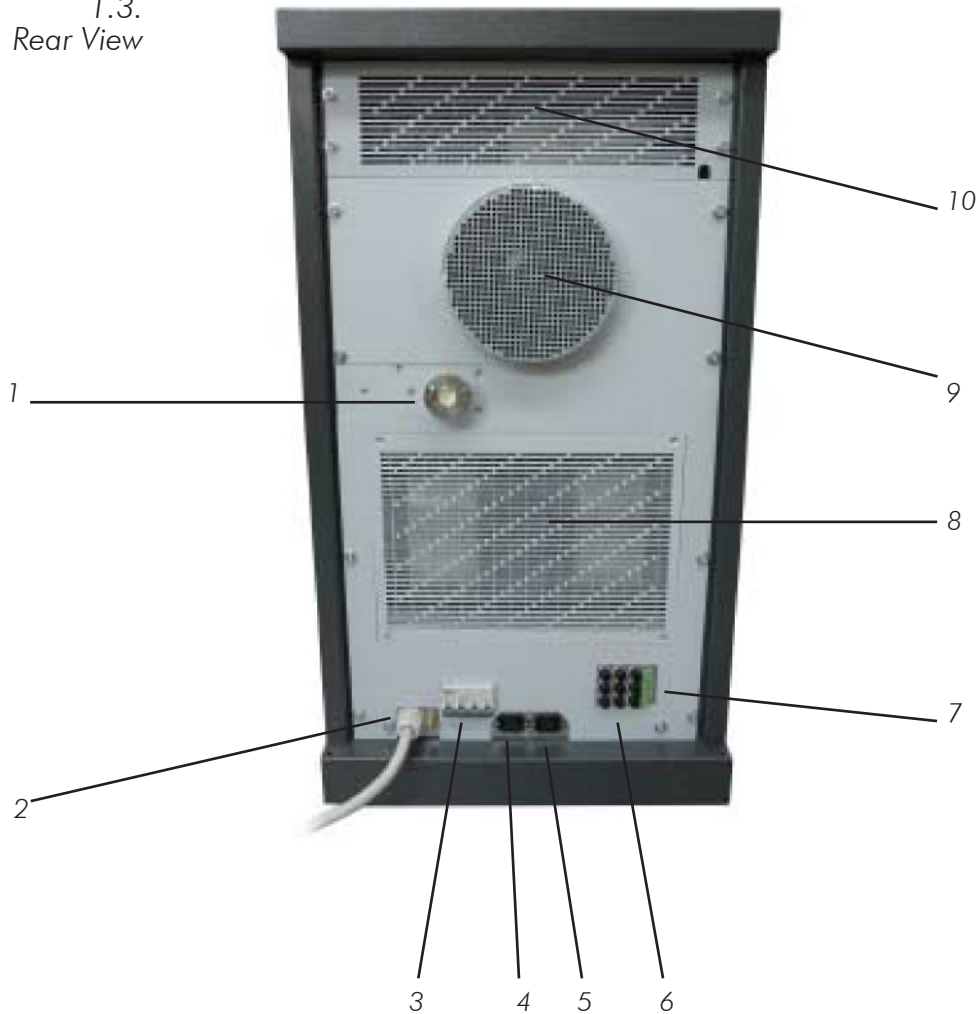
1.1.1. Overall View



1.2.
Front View

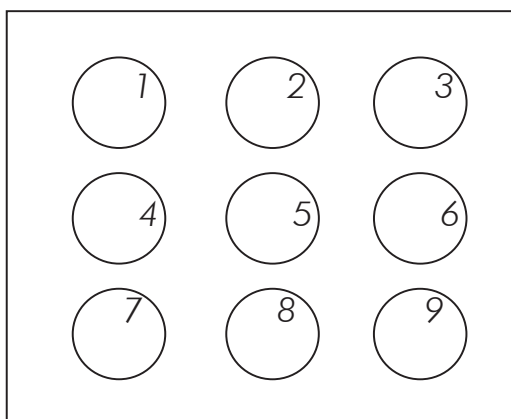


- 1.2.1.
Front Panel
Description
- 1) Display
 - 2) Controls and contrast regulation keyboard (L and R keys)
 - 3) Selection and modify keys
 - 4) Protection / system Reset key. To reset the system, press this key for more than 2 seconds.
 - 5) Stand-by key
 - 6) Signalling Leds
 - 7) Dip switches for equipment address selection
 - 8) Locking key
 - 9) Analogue reading output
 - 10) RS485 interface
 - 11) RF monitor output ($\approx -63\text{dBc}$)

1.3.
Rear View

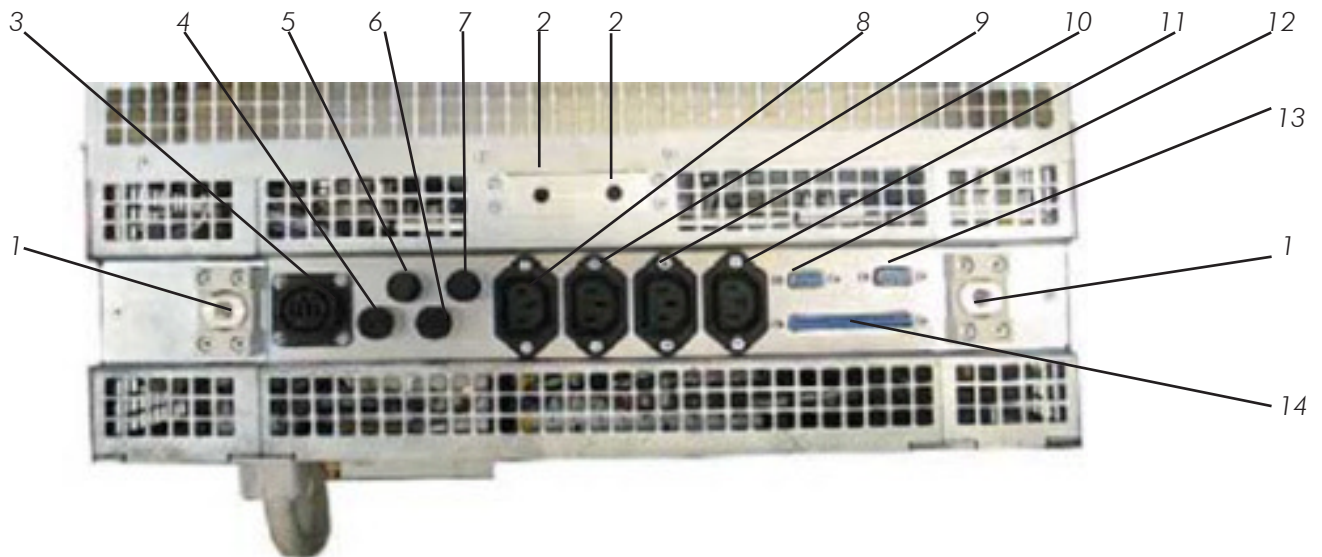
- 1.3.1.
Rear Panel
Description
- 1) 7/8" RF output connector
 - 2) Threephase 230V/400 V mains supply cable
 - 3) Button for protection and switching on of magnetothermic
 - 4) 230 VAC (max 3.15 A) VDE 1 Auxiliary power supply plug
 - 5) 230 VAC (max 3.15 A) VDE 2 Auxiliary power supply plug
 - 6) Fuse panel (see specific paragraph)
 - 7) User interface (see specific paragraph)
 - 8) E5000 amplifier air-suction grid
 - 9) E5000 amplifier exhausted air-suction grid
 - 10) Exciter exhausted air-suction grid

1.3.1.1
Fuse Panel
Description



- 1) 12.5 A fuse C1 power supply
- 2) 12.5 A fuse B1 power supply
- 3) 12.5 A fuse A1 power supply
- 4) 12.5 A fuse C2 power supply
- 5) 12.5 A fuse B2 power supply
- 6) 12.5 A fuse A2 power supply
- 7) 3.15 A fuse 230 VAC VDE 1 plug
- 8) 3.15 A fuse 230 VAC VDE 2 plug
- 9) 1 A fuse services power supply

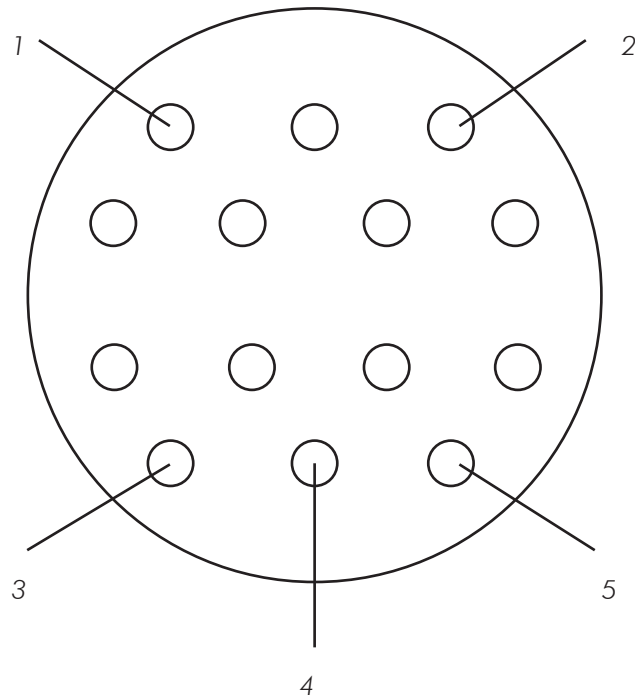
1.4. Internal Panel Description



1.4.1. Internal Panel Description

- 1) 30-50 VDC max 200 A Power supply plug
- 2) GND Power supply plug
- 3) Multipolar plug for fans power supply (see specific paragraph)
- 4) 3.15 A VDE 1 Fuse
- 5) 3.15 A VDE 2 Fuse
- 6) 3.15 A VDE 3 Fuse
- 7) 3.15 A VDE 4 Fuse
- 8) 230 VAC (max 3.15 A) VDE 1 Power supply plug
- 9) 230 VAC (max 3.15 A) VDE 2 Power supply plug
- 10) 230 VAC (max 3.15 A) VDE 3 (active in "ON AIR" status) Power supply plug
- 11) 230 VAC (max 3.15 A) VDE 4 (active in "ON AIR" status) Power supply plug
- 12) Thermal probe input measuring unbalanced resistor on the left side
- 13) Thermal probe input measuring unbalanced resistor on the right side
- 14) CPU board connection plug

1.4.1.
Multipolar plug for fans
power supply Description



- 1) Neutral
- 2) Ground (GND)
- 3) Blower #1 phase
- 4) Blower #2 phase
- 5) Blower #3 phase

1.4.2.
RF input panel
description



- 1) RF input "N" connector

- 2.1. *Transport* The equipment shall be delivered exclusively in its original wooden packaging. Although its crate is designed to avoid damages on the equipment in case of mishandling, it is recommended to respect the arrows ↑/ ↓ and to handle the crate with care paying attention not to hit or damage it.
Two different procedures can be chosen: one by hand and one with a forklift truck.

2.2. *Manual unpacking*
Unpacking

Place the crate with the opening cover on the upper side. Take the polystyrene thickness in order to easy handle the equipment. At least 8 people are requested to manually take the equipment out of its crate.

Unpacking through a forklift truck

Using the forklift, place the crate vertically so that the the equipment inside weighs on its proper base. After checking the crate integrity and stability, open the cover corresponding to the front side of the equipment; take the equipment out of the crate with the help of its bottom wheels, being careful that it does not turn over during the handling. An inclined plane is recommended while moving the equipment from the crate to the floor of the site.

2.3. Requirements of the site

The environment where the equipment will be located requires the following characteristics:

· Electrical plant:

For the E5000 the electrical plant has to be dimensioned in order to guarantee the necessary current carrier. It is recommended to provide a current availability higher than a 17 A per phase @ 380 Vac, 70 A per phase @ 220 Vac. Size of all conductors has to be adequate and in conformity with the local laws. Protection devices are recommended against discharges and lightnings (isolating transformer and dischargers). Provide a highly efficient earth connection so that these protection devices can work at their best performance.

Anyway the electrical plant must respect all the safety regulations for the operators.

· Air-intake system:

During the normal functioning the equipment delivers in the environment 5KW heat quantity of heat, from its internal fans. The air flow corresponds to ca. 1000 cube meters /hour, so the place needs to be set in order to guarantee a correspondent fresh air flow to the equipment, and a correspondent flow going outside. It is recommended to use a straight draining tube going outside; its diameter should be at least as big as the output flange of the equipment (ca. 16 cm), short (less than 2 meters). In case the extracting tube is accentuatedly curved and it's longer than 2 meters, an additional extracting device with its own fan should be applied, to extract the same air quantity.

· Air-conditioning system:

For a longer equipment life adopt an air-conditioning system on site, temperature should be between 10°C and 30°C (Optimal value). The power dissipated in the environment is lower than 300W when the antenna is optimally connected and efficiency is optimized too.

· Environmental cleaning:

The environment destined to the equipment functioning doesn't request restrictive specifications on dust. It is anyway recommended to adopt solutions that reduce dust level (i.g. a tiled floor or sintetic material, do not use a cement floor; use filters at the fresh air-intake ways out). An elevated environmental dust level could cause more frequent faults and a shorter life of the equipment.

· Other characteristics of the site.

The floor has to bare the weight of the equipment (ca. 160 Kg, ca. 40 Kg max on each wheel) and has to be plain.

Leave a 1,5 minimum free corridor around the equipment, in order to help maintenance and repair operations.

Anyway at least 10 cm free space has to be guaranteed on each side, to consent the maximum efficiency of the equipment's cooling system.

2.4.
Set Running

After placing the equipment, connect the RF connector to the feeder cable of the antenna system.

Connect the power supply cable to the mains.

Before powering the equipment up it is necessary TO OPTIMIZE THE AMPLIFIER EFFICIENCY THROUGH THE FOLLOWING PROCEDURE.

2.5.
*Efficiency
Optimization
Procedure*

The E5000 amplifier can work at any frequency in the 87.5 MHz - 108 MHz wide band and at any output power level equal or lower than 5 KW, so the RF power amplifier efficiency could change according to the working conditions.

The efficiency optimization procedure has to be made according to the described procedure in order to obtain the minimization of electrical energy, to reduce the wasted heat in the environment and to guarantee the correct functioning of the equipment. Under extreme conditions a low efficiency value could cause an increase of the complex temperature of the equipment corresponding to an excessive electrical energy consumption.

2.4.1.
*Procedure
Description*

The CPU does this procedure automatically. It researches the functioning condition delivering the desired power output at the minimum DRAIN voltage possible, together with an RF driving power not so high (the operator has to set this value). In this way the RF power amplifier joins an high efficiency value.

The operator has to follow the steps below:

- a. Press "ON AIR" button to turn the E5000 on
- b. Select the frequency on the exciter while its power output is setted at 0 W
- c. Enter the E5000 "Power Setting" menu. Set "target" at the desired value (then press enter to edit it, use the Up and Down arrows to modify this value, then press "Enter" again to save the setting)
- d. Set the exciter output power at 140W (keep in mind to save it)
- e. Wait for about 30 seconds to allow the microprocessor to adjust the functioning parameters of the equipment to obtain its maximum efficiency.

The equipment is now ready to operate at its best conditions

2.5. DESCRIPTION

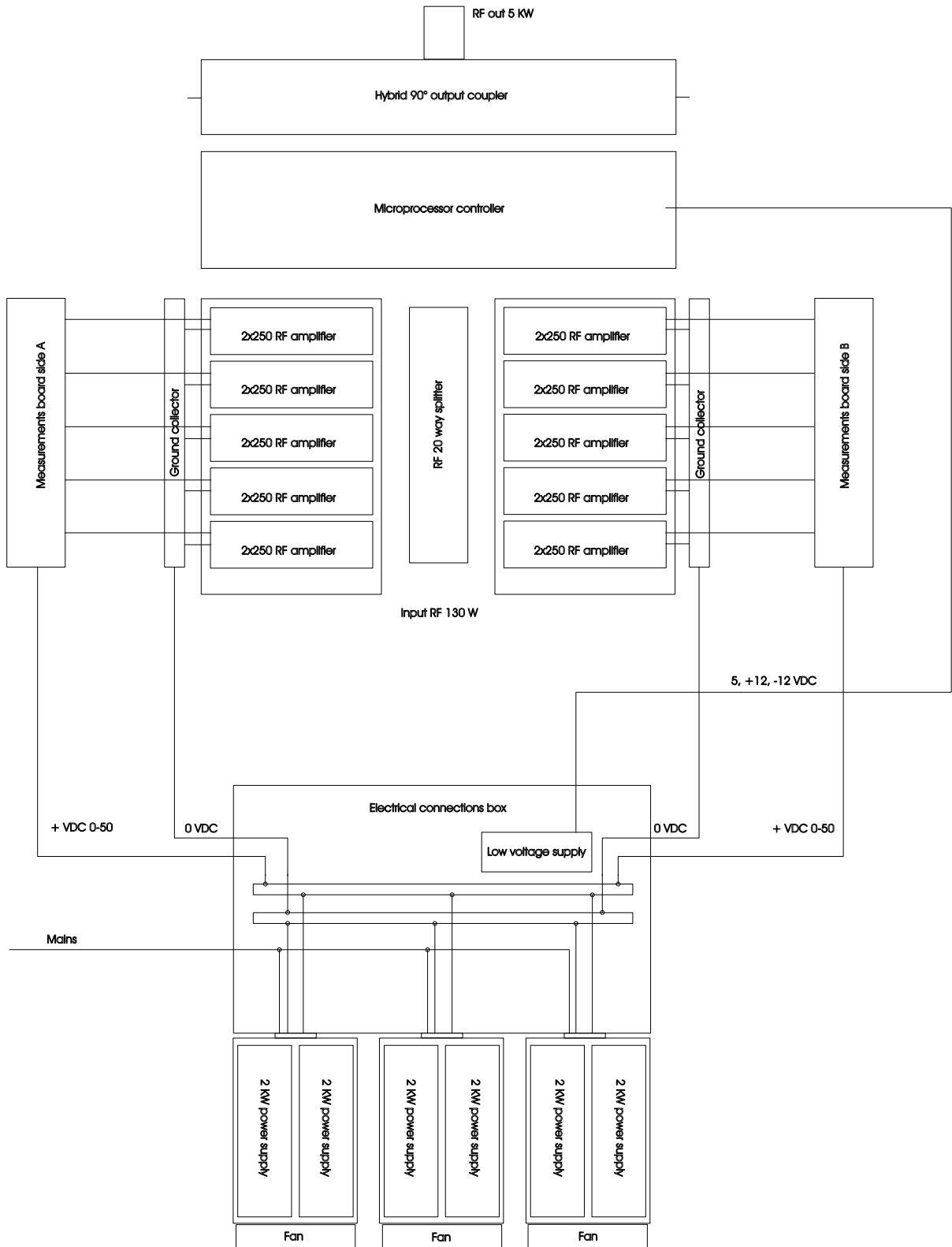
2.5.
Block Schematics

Each functional interconnection among the equipment blocks can be found through the block schematics.

Three different schematics are shown for an easy reading, they concern power supply connections, RF connections, signal and controls connections.

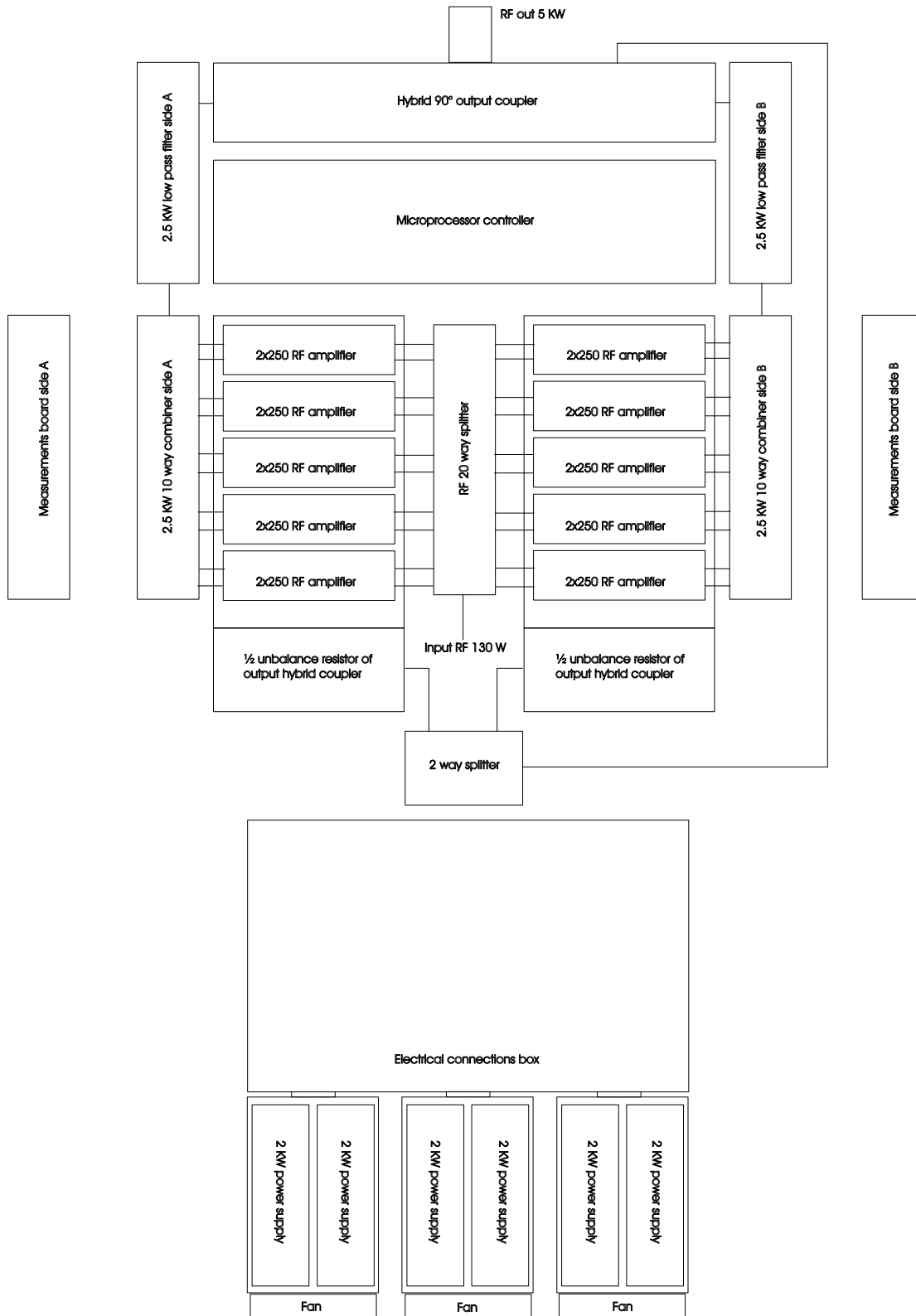
2.6.
Power Supply
Connections

E5000 POWER SUPPLY CONNECTIONS



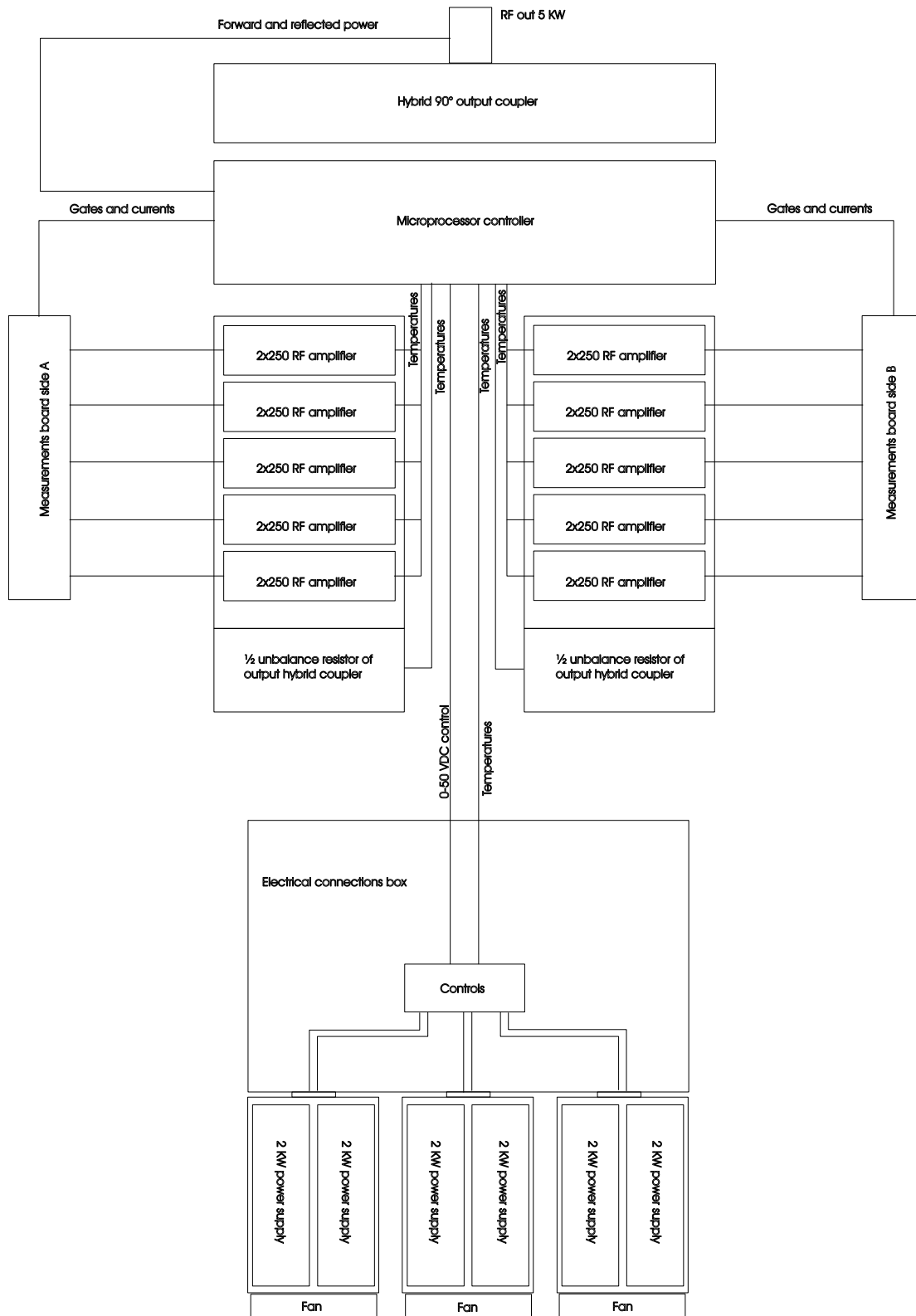
2.7.
RF Connections

E5000 RF connections



2.8.
Signal and Control
Connections

E5000 SIGNALS AND CONTROLS



2.9. Description of single block functioning

2.9.1. This block properly supplies all circuits of the amplifier. It is made of an electrical unit containing electrical and electromechanical components for mains connection and of three 4KW supply modules, each of them can be taken out even while the equipment is on air. This unit is located in the front bottom part of the E5000.

Power supply unit

2.9.1.1. There are 3 power supplies in the equipment, made of 2 opposite modules of 2KW power forming a parallelepiped; a blower for the air cooling system is on the front side, and a connection panel on the back side. They are placed in an opposite unit at the bottom of the E5000.

Power supplies

Each amplifier can be taken out even while the equipment is on air, thanks to a microswitch turning off the two internal modules before the supply contacts are disconnected. The same happens inserting the module: the microswitch assures internal modules turning on only after the contacts are connected.

2.9.1.2. It supplies +12V, -12V and +5V Voltage to all the control electronics of the equipment. The two relays on this board, one of them disconnects the 230V power supply (internal panel plugs VDE1 and VDE2) when the amplifier is in stand-by mode or a protection intervenes.

Service power supply

2.9.2. *Control Logic*

A microprocessor board in the upper side extractible tray of the front panel manages the functioning of the equipment. The main functioning parameters are readable on its LCD and changed through its keyboard. The control board measures all necessary parameters for functioning analysis and anomalies survey; in these cases protections are activated in a "proportional" way, in order to keep a secure service maintenance. In order to do that, power can be reduced until the anomaly condition finishes. If the anomaly concerns a critical functioning status, the equipment will be turned off. See paragraph "Description of Protection" for other details.

2.9.3. *Input RF Splitter*

This device is made of an input connector "N" type and 20 output connectors "SMB" type, placed on two rows of 10. Each output connector is connected to a near input connector of the RF module through a coaxial cable 5 cm.-long. It can operate in the band 87.5 MHz - 108 MHz no need to make frequency adjustments.

2.9.4. *RF Modules*

Each module is made of a high efficiency heat-sink on which the two electronic boards of the Wide Band 250 W RF amplifier. These amplifiers don't request any tuning operation, and they can work at any frequency between 87.5 MHz - 108 MHz no need of tuning. The combination of the two 250 W amplifiers is external, therefore there are 2 connectors at the input and 2 connectors at the output. The 2 input connectors "SMB" type, are placed on the cover of the module, and are connected to the input splitter through 5 cm.-long coaxial cables.

2.9.5.
(N°2) 10 ways RF
combiner

The combiner, realized in mixed structure (coaxial cable and microstrip) is designed in Wilkinson typology: 2 partial combiners of 5 inputs and 1 output, combined together by another Wilkinson at 2 inputs and 1 output. All the unbalance resistors are inside the combiner necessary for a correct functioning. It can operate in W.B. no need of tuning.

2.9.6.
Hybrid RF Output
combiner

The output 90° hybrid combiner receives 2500 W power for each column filter in order to obtain 5 KW output. The unbalanced load, is divided in two power resistors placed in the heat-sink between the blowers and the columns. This system aims at obtaining a better heat-sinking in case of unbalanced power of the two columns. An RF coupler at the combiner output measures the output power and the reflected power from the antenna. It can operate in W.B. no need of tuning.

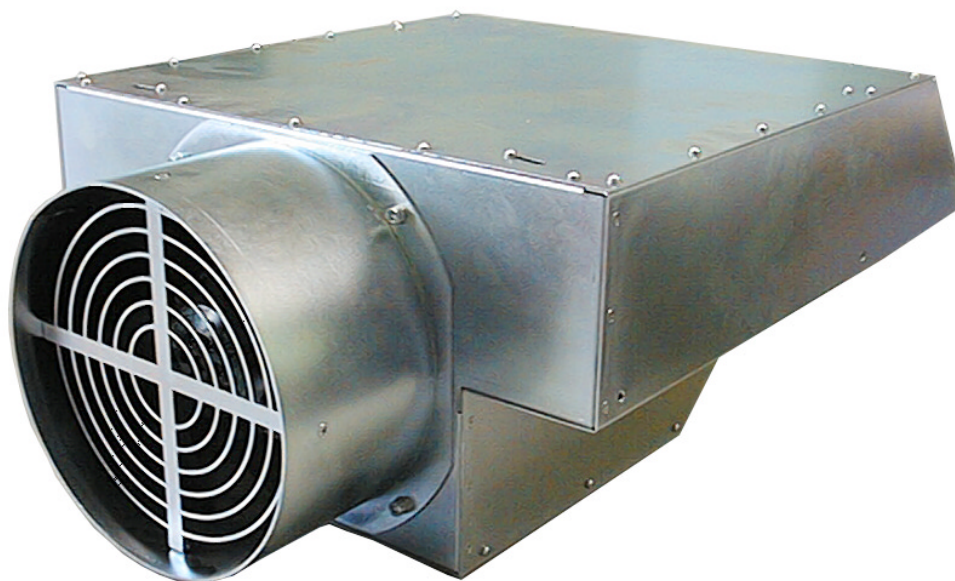
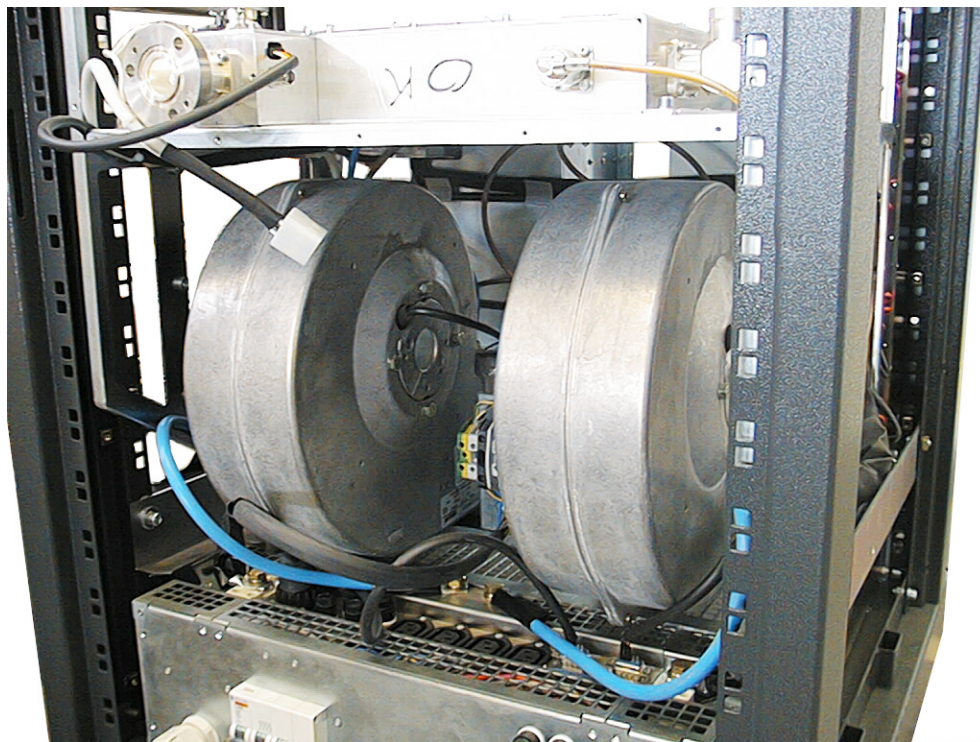
2.9.7.
Low Pass filter

In the E5000 are two output filters instead of one (unlike other similar transmitters). They are at the output of its 10-ways-combiners, therefore they operate at 2500W maximum power. Their outputs are connected to the hybrid output combiner inputs. This solution provides a better volume distribution, therefore more compactness of the equipment. A circuit on each column filter input surveys the reflected power, it immediately stops the amplifier in case of damage of the filter or of the output combiner. It can operate in W.B. no need of tuning.

2.9.8.
*Air-cooling
system*

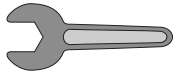
Two tangential fans cool the RF block. Their capacity is of ca. 650 cubic metres/hour each to guarantee low temperature values to the RF modules and to the unbalanced resistors in all operative conditions.

The heated air coming out from the RF column is collected in the extraction cover, connected to an eventual pipe to channel the hot air out of the site.



3.1. Periodical Checks

During the normal functioning several periodical checks are recommended to verify the absence of critical functioning conditions. See the shedule herebelow:



Recurrence:

15 days	Filers cleaning (dusty environment) when supplied with the equipment
30 days	Filers cleaning (little dusty environment) when supplied with the equipment Forward and reflected output power check Telemetry functioning check RF modules correct functioning check Power supply modules correct functioning check
6 months	Fans correct functioning check Equipment working temperature check Electrical energy consumption check
12 months	Correct clamping of antenna connector check Mains supplies connection status check Fans cleaning Filter washing (dusty environment) when supplied with the equipment
24 months	Filter washing (little dusty environment) when supplied with the equipment Filter replacement (dusty environment) when supplied with the equipment

3.2. Intervention in case of fault

All interventions have to be made by authorized and trained personnel. According to fault gravity, the equipment can keep working or not. The repairing procedures and service reset are different in the two following cases.

3.2.1. Fault causing no service interruption

The transmitter keeps working even in case of partial damages. Mainly: fault of one or more RF modules (the equipment delivers output power even in case one only module is working), fault of one or more power supply (the equipment is not turned off, but the power is reduced according to how many power supplies are damaged).

3.2.1.1. *Replacement of a power module*

This replacement can be made while the equipment is on air by trained operators following exactly the instructions below.

The faulty power module can be traced looking at the green LED on the cover (see the paragraph concerning power modules): if this LED keeps out while the equipment is on power, it may be that this module is not delivering power (Led is alight only in presence of RF power).

In case of damage, the operator can take the power module out making the following instructions in the correct order:

- a) disconnect the two cables supplying the module RF inputs
- b) unblock the screws fixing the module
- c) Pull the module out

Right after pulling the faulty module out, a new module must be placed at its place to prevent that cool-air flow goes out from the free opening left by the missing module (the modules above this opening won't receive the proper air-cooling from the air tunnel). Their replacement should be made in 10 seconds maximum. If more time is needed to do that, the operator have to turn the transmitter off or at least disconnect the RF small cables supplying all the modules above the faulty one. Being inactive, these modules won't be damaged by high temperature caused by missing air-cooling. Anyway, all RF modules are protected by a thermal phrobe sensing this high temperature, therefore reducing the power level and turning the transmitter off if the security level is overpassed.

Here is the correct sequence:

- d) Place the new module in its location
- e) Insert it up to its end checking its connectors
- f) Clamp the screws
- g) Connect the cables to their input connectors

3.2.1.2. *Replacement of a power supply unit*

This replacement can be made while the equipment is on air by trained operators following exactly the instructions below.

Trace of a fault power supply monitoring the current value delivered by each power module on the display of the control board on the panel: a power module is probably faulty when the current is much lower than the other power supplies (consider normal a variation of +/- 20%).

In case of damage, the operator can take the power supply out making the following instructions in the correct order:

- a) open the bottom front panel corresponding to the power supplies location.
- b) unblock the fastners fixing the power module
- c) Take the module outwith both hands holding by its fan being careful not to put the hands inside.

It is not necessary to replace the power supply module as quickly as for the RF module, even if it is recommended to restore asap the complete functioning of the transmitter.

3.2.2.
*Fault causing
service interruption*

If a huge fault occurs, the complete transmitter can be turned in lock mode. In this case a particular attention on troubleshooting has to be paid, even when the transmitter is turned back on after the intervention.

3.2.2.1.
Troubleshooting

In case of block of the transmitter it is recommended to observe the following suggestions, depending if the transmitter is on or off.

- Transmitter ON

- a) before going near the equipment, check that no water puddles are nearby and that the transmitter looks dry and normal.
- b) At least two people are required to begin the troubleshooting procedure, otherwise DO NOT start this operation. The second person should keep the distance from the working area for security reasons, but assist his colleague taking note of the necessary data to be given to the manufacturer too.
- c) If the equipment is delivering power, check its functioning parameters, and take note in particular of the following data:
 - a. Forward power
 - b. Reflected power
 - c. Currents delivered by the power supplies
 - d. Power supplies output voltages
 - e. LED on in the RF unit
 - f. Absorbed currents by RF modules
 - g. Alarm notifications on the display
 - h. Status of each LED on the panel

- Transmitter OFF

- a) before going near the equipment, check that no water puddles are nearby and that the transmitter looks dry and normal.
- b) At least two people are required to begin the troubleshooting procedure, otherwise DO NOT start this operation. The second person should keep the distance from the working area for security reasons, but assist his colleague taking note of the necessary data to be given to the manufacturer too.
- c) Try to restart the transmitter checking that it is well connected to the mains
- d) Check the functioning parameters, and take note in particular of the following data:
 - a. Forward power
 - b. Reflected power
 - c. Currents delivered by the power supplies
 - d. Power supplies output voltages
 - e. LED on in the RF unit
 - f. Absorbed currents by RF modules
 - g. Alarm notifications on the display
 - h. Status of each LED on the panel
- e) if the transmitter does not restart, turn the breaker off from the mains
- d) disconnect the supply cable from the mains
- e) check and take note of the conditions of the following devices:
 - a. Mains fuses
 - b. Other fuses
 - c. Overvoltage mains dischargers
 - d. internal power supply cables (in the transmitter)
 - e. Unbalance resistors
 - f. Power supplies units connectors
 - g. RF units connectors

4.1. Description of protection	Protection	Threshold	Action	Restore	Description
	Reflected Power	500W	Equipment turn off	Manual	Definitive turn off after 3 protection intervenence (reflected votlage)
	500W module heat-sink Temperature	75°C	Power output reducing	Automatic	Proportional intervenence
	500W module heat-sink Temperature	80°C	Equipment turn off	Manual	Definitive turn off after 3 protection intervenence (reflected votlage)
	Unbalance resistor temperature	92°C	Power proportional reducing	Automatic	
	Power supply unit temperature	75°C	Power output reducing	Automatic	Proportional intervenence
	Power supply unit temperature	80°C	Equipment turn off	Automatic	Threshold intervenence after 3 protection intervenence (reflected votlage)
	500W module temperature	16A	Module turn off	Manual	Fuse burning
	Power supply temperature	80 A	Equipment turn off after 1 minute	Manual	Threshold intervenence after 3 protection intervenence (reflected votlage)
	Power supply temperature	85 A	Riduzione tensione	Automatic	Threshold intervenence
	Missing power supply -12V	-11 V	Equipment turn off	Manual	Threshold intervenence after 3 protection intervenence (reflected votlage)
	Line current	25A	Magnetothermic opening	Manual	Threshold intervenence

4.2.
*Limiting fault
consequences*

E50000C is protected against inside and outside anomalies. Its protection system guaraties its service maintenance until security conditions are possible, together with fault baring. In the table below are causes and effects in the worst case.

Internal event	Intervenence 1	Result 1	Intervenence 2	Result 2
Fan mechanic block or motor shortcircuit		RF block temperature increase	RF modules temperature protection	power supply turn off equipment in block
Fan Motor interruption		RF block temperature increase	RF modules temperature protection	power supply turn off equipment in block
Obstruction air extraction pipeline		RF block temperature increase	RF modules temperature protection	power supply turn off equipment in block
Power supply input shortcircuit	Protection fuse interruption	Output power reducing		
Power supply output shortcircuit	Power supply internal protection	Output voltage reduction		Possible power output reducing
Low-pass filter break	Input filter reflected power sensor	power supply turn off equipment in block		
2-ways combiner break	Input filter reflected power sensor	power supply turn off equipment in block		
Intermediate 10-ways combiner break	Input filter power sensor	power supply turn off equipment in block		
250W module MOSFET RF Shortcircuit	16 A protetion fuse interruption	Output power reducing		

4.3.
Alarm List shown
on the display

Alarm Code	Description
"000 CORRECT WORKING"	Regular functioning;
"001 STOP"	Equipment in stand-by;
"002 HIGH REF PWR ACTIVE"	max. limit overpassed (software) reflected power (under process);
"003 HIGH REF PWR"	max. limit overpassed (software) reflected power (stored);
"004 HIGH REF PWR HW ACTIVE"	max. limit overpassed (hardware) reflected power (under process);
"005 HIGH REF PWR HW"	max. limit overpassed (hardware) reflected power (stored);
"006 WARN HIGH REF PWR ACTIVE"	Threshold limit overpassed (software) reflected power (under process);
"007 WARN HIGH REF PWR"	Threshold limit overpassed (software) reflected power (stored);
"008 BLOCKED"	Equipment block after 5 tries;
"009 SYSTEM RESET ACTIVE"	Alarms reset under process;
"011 EEPROM CHECKSUM ERROR"	Checksum error on EEPROM memory;
"012 -3 dB CARRIER ACTIVE"	Output power lower than the half of set power in "POWER LIMITER SETTINGS" windows;
"013 -3 dB CARRIER"	Output power lower than the half of set power in "POWER LIMITER SETTINGS" windows (stored);
"014 PSU OVERCURRENT ACTIVE"	max. limit overpassed (software) power supply current (under process);
"015 PSU OVERCURRENT"	max. limit overpassed (software) power supply current (stored);
"016 -12V SUPPLY FAULT ACTIVE"	-12V missing voltage (under process);
"017 -12V SUPPLY FAULT"	-12V missing voltage (stored);
"018 MAX PSU A TEMP ACTIVE"	max. limit overpassed (software) A power supply temperature (under process);
"019 MAX PSU A TEMP"	max. limit overpassed (software) A power supply temperature (stored);
"020 MAX PSU B TEMP ACTIVE"	max. limit overpassed (software) B power supply temperature (under process);
"021 MAX PSU B TEMP"	max. limit overpassed (software) B power supply temperature (stored);
"022 MAX PSU C TEMP ACTIVE"	max. limit overpassed (software) C power supply temperature (under process);
"023 MAX PSU C TEM"	max. limit overpassed (software) C power supply temperature (stored);
"024 WARN PSU A TEMP ACTIVE"	Threshold limit overpassed (software) A power supply temperature (under process);
"025 WARN PSU A TEMP"	Threshold limit overpassed (software) A power supply temperature (stored);
"026 WARN PSU B TEMP ACTIVE"	Threshold limit overpassed (software) B power supply temperature (under process);
"027 WARN PSU B TEMP"	Threshold limit overpassed (software) B power supply temperature (stored);
"028 WARN PSU C TEMP ACTIVE"	Threshold limit overpassed (software) C power supply temperature (under process);
"029 WARN PSU C TEMP"	Threshold limit overpassed (software) C power supply temperature (stored);
"038 RF A OVERTEMP ACTIVE"	max. limit overpassed (software) A block modules heat-sink temperature (under

Alarm Code	Description
"039 RF A OVERTEMP"	max. limit overpassed (software) A block modules heat-sink temperature (stored);
"040 WARN RF A TEMP ACTIVE"	Threshold limit overpassed (software) A block modules heat-sink temperature (under process);
"041 WARN RF A TEMP"	Threshold limit overpassed (software) A block modules heat-sink temperature (stored);
"042 RF B OVERTEMP ACTIVE"	max. limit overpassed (software) B block modules heat-sink temperature (under process);
"043 RF B OVERTEMP"	max. limit overpassed (software) B block modules heat-sink temperature (stored);
"048 CONN INTLOCK ACTIVE"	Uncorrect or interrupted connection between CPU and ALC boards (under process);
"049 EXT INTLOCK ACTIVE"	Open contact between "DI_ENABLE" and "DI_COMMON" on control connector located on the back panel of the equipment (under process);
"050 PSU A OVERCURRENT ACTIVE"	max. limit overpassed (software) A power supply current (under process);
"051 PSU A OVERCURRENT"	max. limit overpassed (software) A power supply current (stored);
"052 PSU B OVERCURRENT ACTIVE"	max. limit overpassed (software) B power supply current (under process);
"053 PSU B OVERCURRENT"	max. limit overpassed (software) B power supply current (stored);
"054 PSU C OVERCURRENT ACTIVE"	max. limit overpassed (software) C power supply current (under process);
"055 PSU C OVERCURRENT"	max. limit overpassed (software) C power supply current (stored);
"062 NO MAINS ACTIVE"	mains lack (under process) only with backup;
"063 NO MAINS"	mains lack (stored) only with backup;
"066 THERMAL DERATING ACTIVE"	Power reduction due to high temperature (under process);
"067 THERMAL DERATING"	Power reduction due to high temperature (stored).

4.4. E5000 has got internal sensors able to supply measurements on main functioning parameters. Here is the complete list:
Measurements descriptions

Measured value	Measure nbr.	Name	Typical value
Power supply voltage	1		48 VDC
Service supply voltage	1		-12 VDC
Service supply voltage	1		+12 VDC
RF 500W modules current	1		+ 5 VDC
Power supply unit current	10		18 A
Unbalance resistors temperature	3		65 A
RF modules temperature	1		25°C
Output RF power	1 (between 2 temperatures max)		25°C
Antenna reflected power	1 (between 2 temperatures max)		55°C
	1		5000 W
	1		0 W

4.5.
Remote control

E5000 allows to verify from distance some functioning parameters and to operate some modifies. The connection can be made through a nodem; the user will have to ise an ANSI terminal or an emulator (Hyperterminal, Telix ecc.). here is the list of the allowed operations:

Measure	Readings	Modify
Output RF power	Yes	Yes
Reflected RF power	Yes	no
RF 500W modules current	Yes	no
RF 500 W modules temperature	Yes	no
Environmental temperature	Yes	no
Supply modules temperature	Yes	no
RF modules supply voltage	Yes	no
+ 12 VDC Auxiliary voltage	Yes	no
- 12VDC Auxiliary voltage	Yes	no
+ 5VDC Auxiliary voltage	Yes	no
Power limiter treshold	Yes	no
Power limiter activity	Yes	no
Stand-By equipment status	Yes	si
Equipment block status	Yes	si
Equipmnet identifier	Yes	no
Functionning time	Yes	no
LCD contrast value	Yes	no

5.1.1.
List of Components

Ref.	Description
C1	1nF
C2	1nF
C3	1nF
C4	1nF
C5	1nF
C6	1nF
C7	1nF
C8	1nF
C9	1nF
C10	1nF
C12	1nF
C13	1nF
C14	1nF
C15	1nF
C16	1nF
C17	1nF
C18	1nF
C19	1nF
C20	1nF
C21	1nF
C22	1nF
C23	1nF
C26	1nF
C27	1nF
C28	1nF
C29	1nF
C30	1nF
C31	1nF
C32	1nF
C33	1nF
C34	1nF
C44	1nF
C45	1nF
C46	1nF
C48	1nF
C52	1nF
C53	1nF
C65	1nF
C75	1nF
C81	1nF
C82	1nF
C83	1nF
C84	1nF
C85	1nF
C86	1nF
C87	1nF
C88	1nF
C99	1nF
C102	1nF
C103	1nF
C11	100nF
C24	100nF
C25	100nF
C35	100nF
C36	100nF
C38	100nF

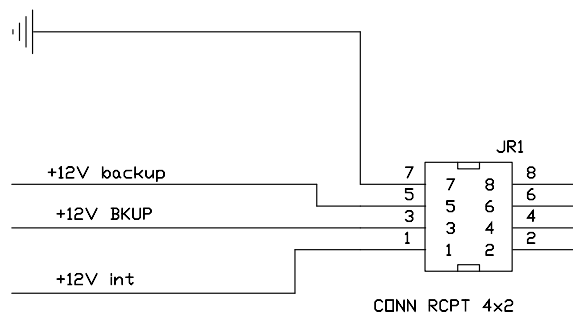
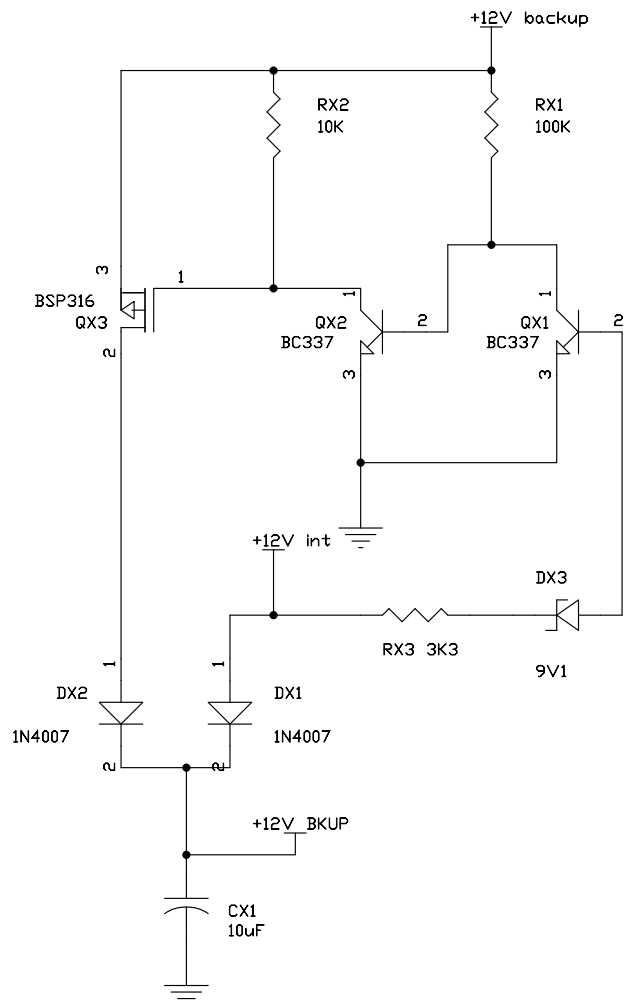
Ref.	Description
C39	100nF
C41	100nF
C43	100nF
C47	100nF
C50	100nF
C54	100nF
C57	100nF
C58	100nF
C59	100nF
C60	100nF
C62	100nF
C63	100nF
C67	100nF
C68	100nF
C69	100nF
C70	100nF
C71	100nF
C72	100nF
C73	100nF
C74	100nF
C76	100nF
C77	100nF
C78	100nF
C79	100nF
C89	100nF
C90	100nF
C92	100nF
C94	100nF
C95	100nF
C96	100nF
C97	100nF
C98	100nF
C101	100nF
C104	100nF
C105	100nF
C106	100nF
C107	100nF
C108	100nF
C109	100nF
C110	100nF
C37	1uF
C40	1uF
C42	1uF
C91	1uF
C49	1uF
C55	100uF
C56	100uF
C66	100uF
C93	100uF
C112	100uF
C61	10uF
C64	47nF
C80	10uF
C100	100nF
C111	100uF
D1	PMLL4148

Ref.	Description
D2	PMLL4148
D7	PMLL4148
D8	PMLL4148
D9	PMLL4148
D10	PMLL4148
D11	PMLL4148
D12	PMLL4148
D13	PMLL4148
D14	PMLL4148
D15	PMLL4148
D16	PMLL4148
D3	ZRB500F
D5	5.1V
D6	LED
H1	HOLE3.5MM
H2	HOLE3.5MM
H3	HOLE3.5MM
H4	HOLE3.5MM
H5	HOLE3.5MM
H6	HOLE3.5MM
J1	CON4
J3	CON4
J8	CON2
J2	CON2
J4	CON20AP
J5	CON4
J6	CON4
J7	CON4
J10	CONN PCB 5
J9	CONN PCB 5
J11	CON10AP
J13	CON10AP
J12	CON10AP
L1	100uH
L2	100uH
L3	100uH
L4	100uH
L5	100uH
L6	100uH
L7	100uH
L8	100uH
L9	100uH
L10	100uH
L11	100uH
L12	100uH
L13	100uH
L14	100uH
L15	100uH
L16	100uH
L17	100uH
L18	100uH
L19	100uH
L20	100uH
L21	100uH
L22	100uH
Q1	BC856

Ref.	Description
Q2	BC856
Q4	BC856
Q3	BCV62
Q5	BC846BL
RV1	10K
RV2	10K
RV3	10K
RV4	10K
RV5	10K
R1	1K
R2	1K
R3	1K
R4	1K
R5	1K
R19	1K
R21	1K
R23	1K
R24	1K
R25	1K
R31	1K
R32	1K
R35	1K
R38	1K
R41	1K
R42	1K
R55	1k
R58	1K
R95	1K
R28	470K
R6	470K
R7	22K
R8	220K
R9	1K
R10	1K
R16	1K
R11	10K
R12	10K
R14	10K
R15*	10K
R15	10K
R26	10K
R29	10K
R13	47R
R17	10K
R30	10K
R43	10K
R56	10K
R60	10K
R69	10K
R70	10K
R71	10K
R72	10K
R73	10K
R74	10K
R75	10K
R79	10K

Ref.	Description
R80	10K
R84	10K
R87	10K
R88	10K
R89	10K
R92	10K
R94	10K
R96	10K
R97	10K
R18	2.2M
R20	2.2M
R22	2.2M
R27	1M
R33	1K13
R36	1K13
R39	1K13
R34	10.2K
R37	10.2K
R40	10.2K
R44	2.21K
R45	2.21K
R62	2.21K
R63	2.21K
R46	1.2K
R81	1.2K
R47	4.7K
R48	4.7K
R50	4.7K
R53	4.7k
R54	4.7k
R83	4.7K
R90	4.7K
R91	4.7K
R49	47K
R52	100R
R86	100R
R93	100R
R57	6.8K
R59	220K
R61	390K
R64	470R
R67	470R
R68	470R
R65	0R
R66	9.09K
R76	5.6K
R77	8.2K
R78	33K
R82	22K
R85	2.2K
R99	820R
R98	820R
S1	SW PUSHBUTTON
TP1	CONN PLUG 1
TP2	CONN PLUG 1
TP3	CONN PLUG 1

Ref.	Description
TP4	CONN PLUG 1
TP5	CONN PLUG 1
TP6	CONN PLUG 1
TP7	CONN PLUG 1
TP8	CONN PLUG 1
TP9	CONN PLUG 1
U1	LMC7101BI
U2	LMC7101BI
U3	LMC7101BI
U4	LMC7101BI
U5	LMC7101BI
U6	LMC7101BI
U7	LM7301/SO
U9	LM7301/SO
U10	LM7301/SO
U11	LM7301/SO
U12	LM7301/SO
U13	LM7301/SO
U15	LM7301/SO
U16	LM7301/SO
U20	LM7301/SO
U21	LM7301/SO
U22	LM7301/SO
U23	LM7301/SO
U24	LM7301/SO
U25	LM7301/SO
U26	LM7301/SO
U8	LMC7101BI
U17	LMC7101BI
U18	LMC7101BI
U19	LMC7101BI
U14	4093



		
Via G.Amendola 9 44028 Poggio Renatico (FE) Italy Tel +39 0532 829965 Fax +39 0532 829177 Website WWW.ELENOS.COM		
Title: Additional board for back-up battery		
Board Code: 2PCB0369_0	Model: E2K EA003_2	Rev 2
Proj. Engr. A.Tomassini	Approved :A.Giovannelli	
Date: Friday, November 07, 2003	Sheet	3 of 6

5.2.1.
List of Components

Ref.	Description
CX1	10uF
DX1	1N4007
DX2	1N4007
DX3	BZX79-C9V1
JR1	Jumper
QX1	BC337
QX2	BC337
QX3	BSP316
RX1	100K
RX2	10K
RX3	3K3

5.3.1.
List of Components

Ref.	Description
CN1	CONN DSUB 9-R
CN2	CONN DSUB 15-R
CX1	10uF
C1	100nF
C2	100nF
C3	100nF
C4	100nF
C5	100nF
C6	100nF
C7	100nF
C8	100nF
C9	100nF
C18	100nF
C19	100nF
C30	100nF
C31	100nF
C60	100nF
C61	100nF
C62	100nF
C63	100nF
C64	100nF
C65	100nF
C66	100nF
C67	100nF
C68	100nF
C69	100nF
C70	100nF
C73	100nF
C74	100nF
C75	100nF
C76	100nF
C77	100nF
C78	100nF
C80	100nF
C82	100nF
C83	100nF
C84	100nF
C85	100nF
C86	100nF
C87	100nF
C88	100nF
C89	100nF
C90	100nF
C91	100nF
C92	100nF
C93	100nF
C94	100nF
C95	100nF
C96	100nF
C97	100nF
C98	100nF
C99	100nF
C100	100nF
C101	100nF
C102	100nF
C103	100nF

Ref.	Description
C104	100nF
C105	100nF
C106	100nF
C108	100nF
C109	100nF
C111	100nF
C113	100nF
C114	100nF
C115	100nF
C116	100nF
C117	100nF
C118	100nF
C121	100nF
C122	100nF
C124	100nF
C126	100nF
C127	100nF
C130	100nF
C131	100nF
C141	100nF
C154	100nF
C155	100nF
C159	100nF
C160	100nF
C162	100nF
C163	100nF
C10	1nF
C11	1nF
C12	1nF
C13	1nF
C14	1nF
C15	1nF
C16	1nF
C17	1nF
C20	1nF
C21	1nF
C22	1nF
C23	1nF
C24	1nF
C25	1nF
C26	1nF
C27	1nF
C28	1nF
C29	1nF
C32	1nF
C33	1nF
C34	1nF
C35	1nF
C36	1nF
C37	1nF
C38	1nF
C39	1nF
C40	1nF
C41	1nF
C42	1nF
C43	1nF

Ref.	Description
C44	1nF
C45	1nF
C46	1nF
C47	1nF
C48	1nF
C49	1nF
C50	1nF
C51	1nF
C52	1nF
C53	1nF
C54	1nF
C55	1nF
C56	1nF
C57	1nF
C58	1nF
C59	1nF
C128	1nF
C132	1nF
C133	1nF
C134	1nF
C135	1nF
C136	1nF
C137	1nF
C138	1nF
C139	1nF
C144	1nF
C145	1nF
C146	1nF
C147	1nF
C148	1nF
C149	1nF
C150	1nF
C151	1nF
C152	1nF
C153	1nF
C156	100uF
C71	100uF
C72	470uF
C79	10uF
C107	10uF
C119	10uF
C123	10uF
C81	1uF
C110	1uF
C125	1uF
C143	1uF
C112	22pF
C120	22pF
C129	68pF
C157	68pF
C158	68pF
C164	68pF
C140	100uF
C142	100uF 25V
C161	10uF
DX1	1N4007

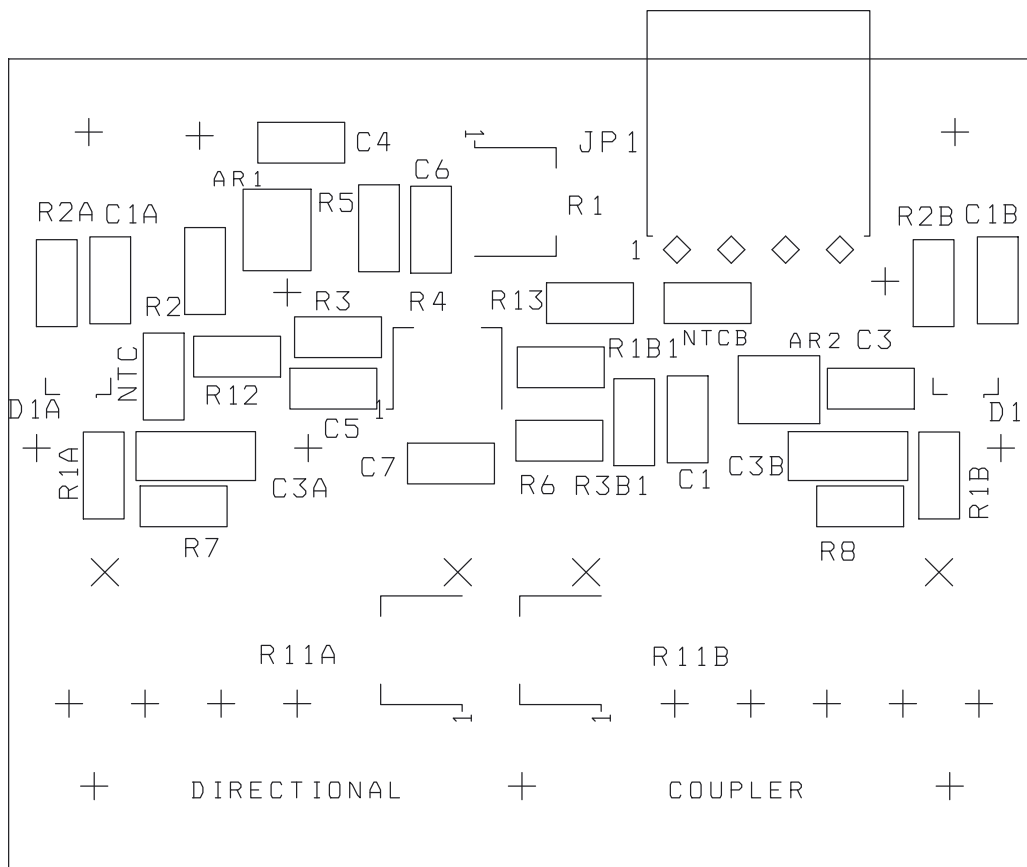
Ref.	Description
DX2	1N4007
DX3	9V1
DZ1	ZRB500F
D1	PMLL4148
D2	PMLL4148
D3	PMLL4148
D4	PMLL4148
D5	PMLL4148
D6	PMLL4148
D7	PMLL4148
D8	PMLL4148
D9	PMLL4148
D10	PMLL4148
D11	PMLL4148
D12	PMLL4148
D13	PMLL4148
D14	PMLL4148
D15	PMLL4148
D16	PMLL4148
D17	PMLL4148
D18	PMLL4148
H1	HOLE3.2MM
H2	HOLE3.2MM
H3	HOLE3.2MM
H4	HOLE3.2MM
JP1	JUMPER
JP4	JUMPER
JP2	JUMPER
JP3	JUMPER
J1	CON24AP
J2	STRIP FEMALE 2.54 RIGHT 2X17
J3	CON16
J4	STRIP FEMALE 2.54 RIGHT 27P
L1	100nH
L2	100nH
L3	100nF
QX1	BC337
QX2	BC337
QX3	BSP316
Q1	BC846
Q2	BC846
RV2	10K
RV1	10K
RX1	100K
RX2	10K
RX3	3K3
R1	100K
R2	100K
R3	100K
R33	100K
R35	100K
R56	100K
R58	100K
R59	100K
R61	100K
R160	100K

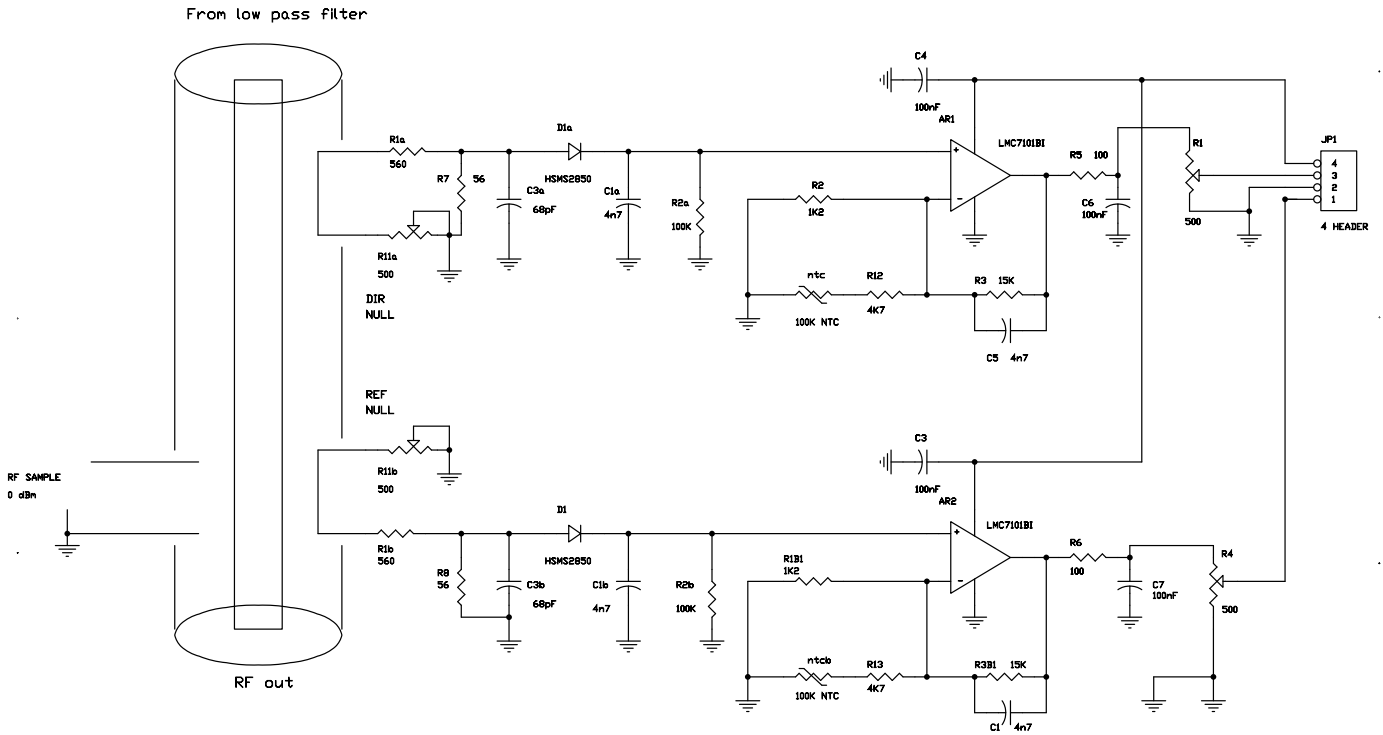
Ref.	Description
R161	100K
R5	1K
R6	1K
R8	1K
R9	1K
R10	1K
R21	1K
R36	1K
R37	1K
R45	1K
R95	1K
R100	1K
R108	1K
R113	1K
R116	1K
R117	1K
R150	1K
R151	1K
R152	1K
R153	1K
R154	1K
R155	1K
R156	1K
R157	1K
R158	1K
R159	1K
R163	1K
R11	22R
R12	22R
R38	22R
R102	22R
R13	100R
R19	100R
R20	100R
R22	100R
R43	100R
R44	100R
R46	100R
R47	100R
R87	100R
R135	100R
R136	100R
R137	100R
R138	100R
R164	100R
R165	100R
R166	100R
R167	100R
R168	100R
R169	100R
R170	100R
R171	100R
R172	100R
R173	100R
R174	100R
R175	100R

Ref.	Description
R176	100R
R177	100R
R178	100R
R179	100R
R180	100R
R181	100R
R182	100R
R183	100R
R14	56R
R15	47K
R39	47K
R41	47K
R71	47K
R73	47K
R78	47K
R16	2K
R17	2K
R18	2K
R23	2K
R24	2K
R25	2K
R26	2K
R40	2K
R42	2K
R48	2K
R49	2K
R50	2K
R69	2K
R70	2K
R72	2K
R74	2K
R75	2K
R76	2K
R77	2K
R79	2K
R80	2K
R81	2K
R82	2K
R83	2K
R84	2K
R88	2K
R92	2K
R93	2K
R94	2K
R27	680R
R28	680R
R29	680R
R30	680R
R31	680R
R51	680R
R52	680R
R53	680R
R54	680R
R55	680R
R32	2K2
R34	2K2

Ref.	Description
R57	10K
R60	10K
R62	10K
R63	10K
R64	10K
R65	10K
R66	10K
R68	10K
R85	10K
R90	10K
R91	10K
R96	10K
R97	10K
R98	10K
R99	10K
R103	10K
R104	10K
R105	10K
R106	10K
R110	10K
R119	10K
R120	10K
R121	10K
R122	10K
R123	10K
R124	10K
R125	10K
R126	10K
R127	10K
R128	10K
R129	10K
R130	10K
R139	10K
R140	10K
R141	10K
R142	10K
R143	10K
R144	10K
R145	10K
R146	10K
R147	10K
R148	10K
R184	10K
R185	10K
R187	10K
R188	10K
R189	10K
R192	10K
R193	10K
R67	20K
R101	20K
R107	20K
R109	20K
R86	12K
R89	511K
R111	1.82K

Ref.	Description
R112	1.82K
R114	220K
R115	470K
R118	82K
R131	470R
R132	470R
R133	470R
R134	470R
R162	470R
R186	470R
R149	20K
R191	4K7
R190	4K7
TP1	CONN PLUG 1
TP2	CONN PLUG 1
U1	TD62083AF
U2	74HC273M
U9	74HC273M
U3	74HC541M
U4	74HC541M
U5	74HC245M
U6	IS62C1024L-70Q
U7	AM29F040
U8	LM340S-5
U10	74HC138M
U11	LM7301BIM5
U12	74HC273M
U13	74HC04M
U14	AT28HC64B-70JC
U15	LMC7101BIM5
U16	LMC7101BIM5
U17	LMC7101BIM5
U20	LMC7101BIM5
U30	LMC7101BIM5
U18	TLV5620I
U19	D70320L-8
U21	CD4051M
U22	CD4051M
U23	CD4051M
U24	CD4051M
U25	CD4051M
U26	74HC541M
U27	MAX691ACSE
U28	PALCE16V8Q-15JC/4
U29	TLV2548I
U32	MAX485
U31	MAX485
U33	TLC5628DW
U34	TLC5628CN
U35	74HC541
Y1	16MHZ

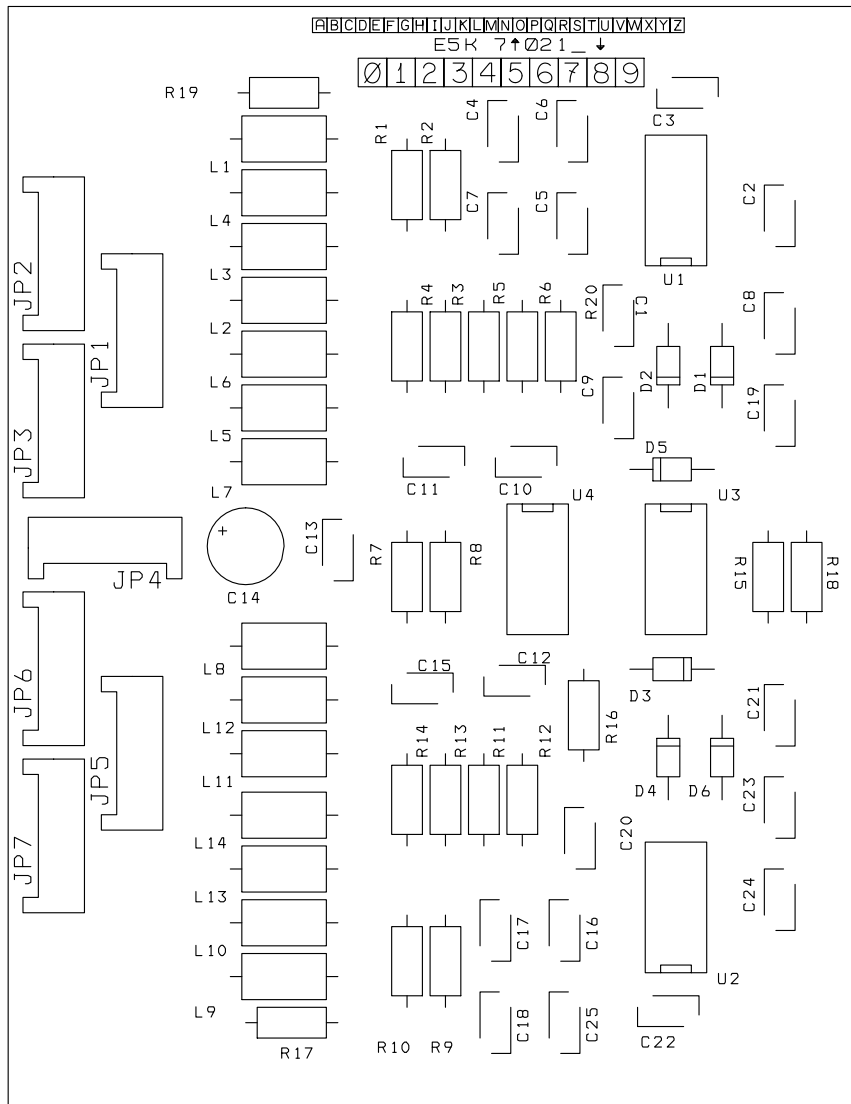




		Via G. Amendola 9 44028 Poggio Renatico (FE) Italy Tel. +39 0532 829965 Fax +39 0532 82917 www.ELENOS.COM Website	
		Description : Directional coupler	
SCH Code : E5K 4A021_0	PCB Code : 2PCB0357_0	Model : E5000	
Proj. Eng. G.Michelini Date : 01/07/2004		Approved : Eng. Antonello Giovannelli Sheet : 1 of 1	

5.4.1.
List Of Components

Ref.	Description
AR1	LMC7101BI
AR2	LMC7101BI
C1b	4n7
C1a	4n7
C1	4n7
C5	4n7
C3a	68pF
C3	100nF
C4	100nF
C6	100nF
C7	100nF
C3b	68pF
D1	HSMS2850
D1a	HSMS2850
JP1	4 HEADER
R1b	560
R1a	560
R1	500
R4	500
R11b	500
R11a	500
R2b	100K
R2a	100K
R2	1K2
R1B1	1K2
R3	15K
R3B1	15K
R5	100
R6	100
R7	56
R8	56
R13	4K7
R12	4K7
ntc	100K NTC
ntcb	100K NTC



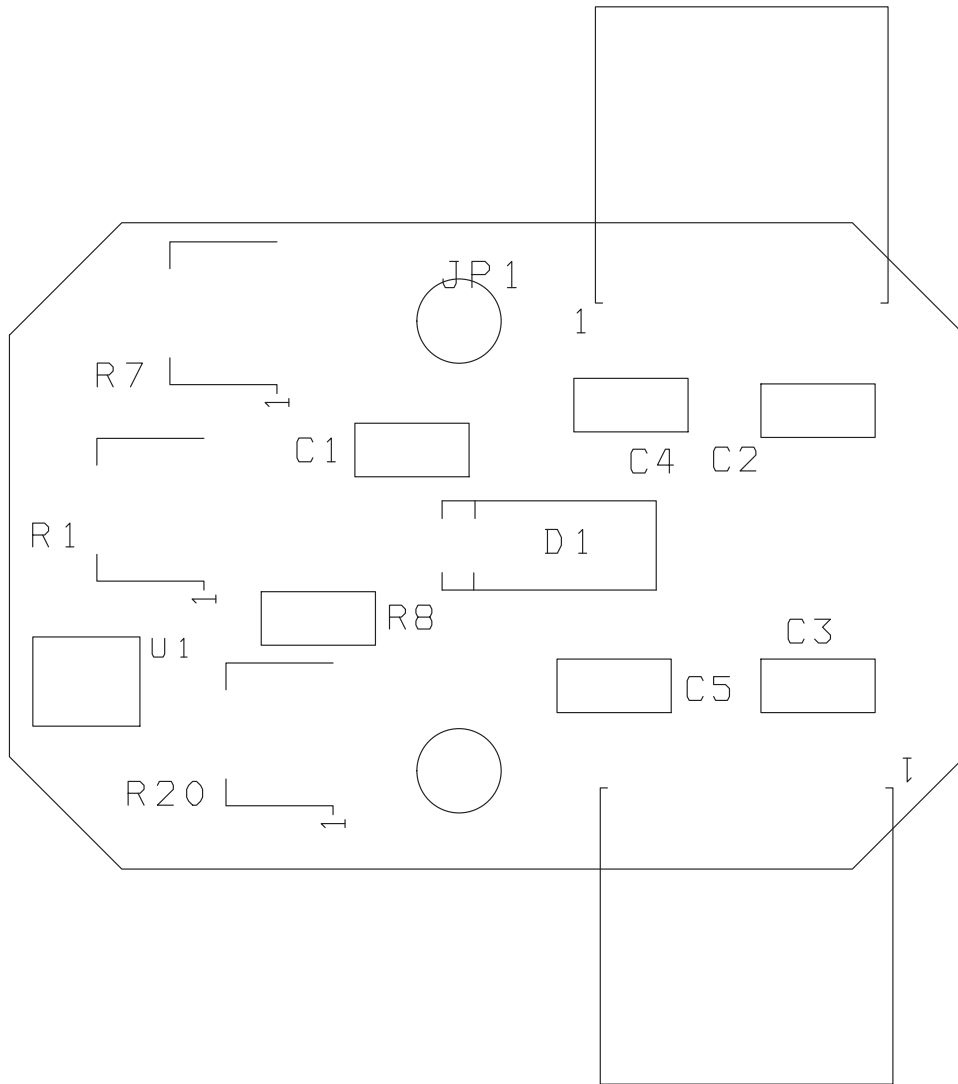
5.5.1.
List Of Components

Ref.	Description
C1	100nF
C8	100nF
C15	100nF
C22	100nF
C2	47nF
C3	47nF
C4	47nF
C5	47nF
C6	47nF
C7	47nF
C9	47nF
C10	47nF
C11	47nF
C12	47nF
C13	47nF
C16	47nF
C17	47nF
C18	47nF
C19	47nF
C20	47nF
C21	47nF
C23	47nF
C24	47nF
C25	47nF
C14	47uF
D1	1N4148
D2	1N4148
D3	1N4148
D4	1N4148
D5	1N4148
D6	1N4148
JP1	II4M-R
JP2	II4M-R
JP6	II4M-R
JP7	II4M-R
JP3	II4M-R
JP5	II4M-R
JP4	HEADER 4
L1	220uH
L2	220uH
L3	220uH
L4	220uH
L5	220uH
L6	220uH
L7	220uH
L8	220uH
L9	220uH
L10	220uH
L11	220uH
L12	220uH
L13	220uH
L14	220uH
R1	1K
R3	1K
R5	1K
R7	1K

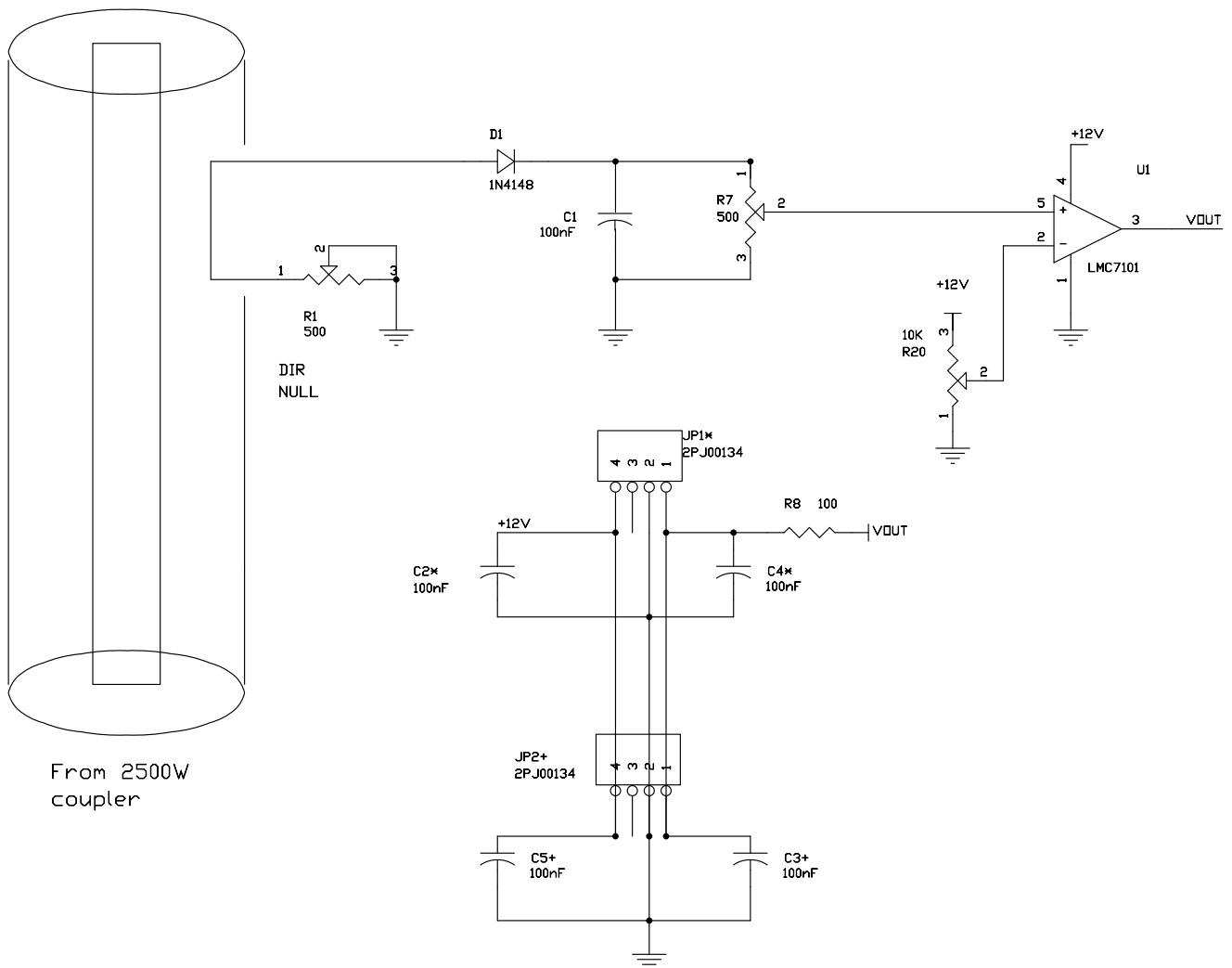
Ref.	Description
R9	1K
R11	1K
R13	1K
R2	10M
R4	10M
R6	10M
R10	10M
R14	10M
R8	10K
R12	10M
R15	10M
R16	10M
R17	10M
R18	10M
R19	10M
R20	10M
U1	LMC6482
U2	LMC6482
U3	LMC6482
U4	LMC6482

5.6.1.
List Of Components

Ref.	Description
CX3	0.1uF
CX4	1000pF
CX5	1000pF
C1	56pF
C2	10nF
C3	10nF
C5	10nF
C6	10nF
C4	4.7nF (PTH)
C7	15pF
C8	10nF
C14	470pF
C11	470pF
C12	470pF
C15	470pF
C16	470pF
C17	470pF
C18	470pF
C19	470pF
C13	47uF
C20	1.2pF
C21	5.6pF
C22	100nF
D1	1N4148
D2	1N4148
D3	5V
D4	LED verde
F1	PICOFUSIBILE X C.S. 15A RAPIDO
J1	SMA CS VERT
J2	BNC
L1	Bobina a U
L2	430nH
L3	VK200
P1	20K
RX2	330
RX1	330
RX3	10
R1	10K
R2	10
R3	10
R4	10
R5	10
R6	5.6K
R7	22
R8	2.2ohm 2W
R9	10
R10	100
R11	820
TF1	
TF3	25 ohm
TF2	25 ohm
TF4	50 ohm
U1	BLF278



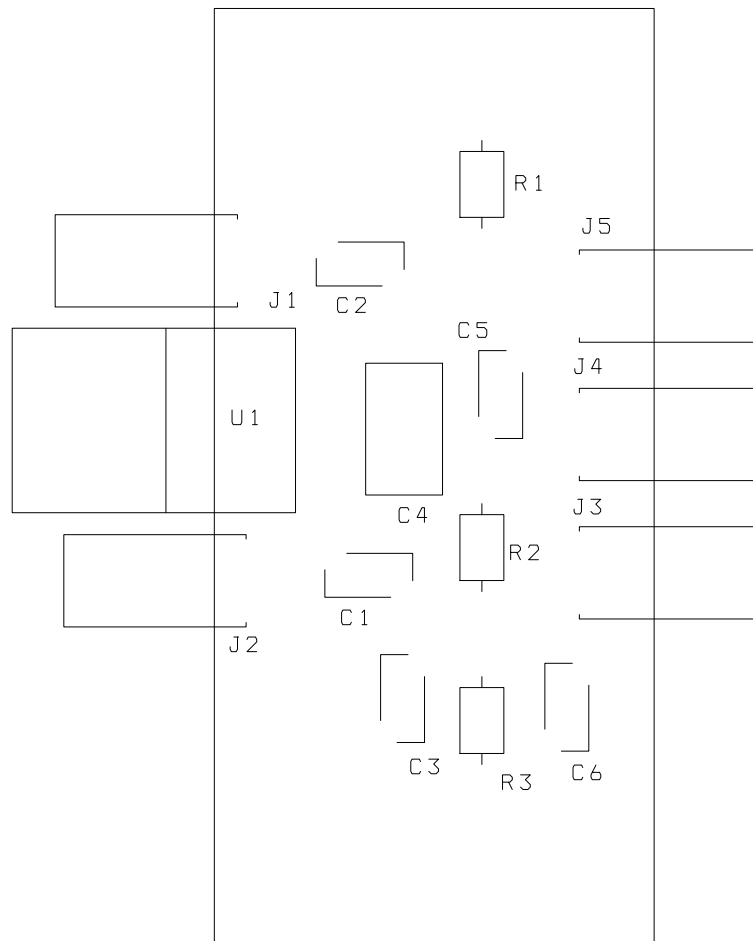
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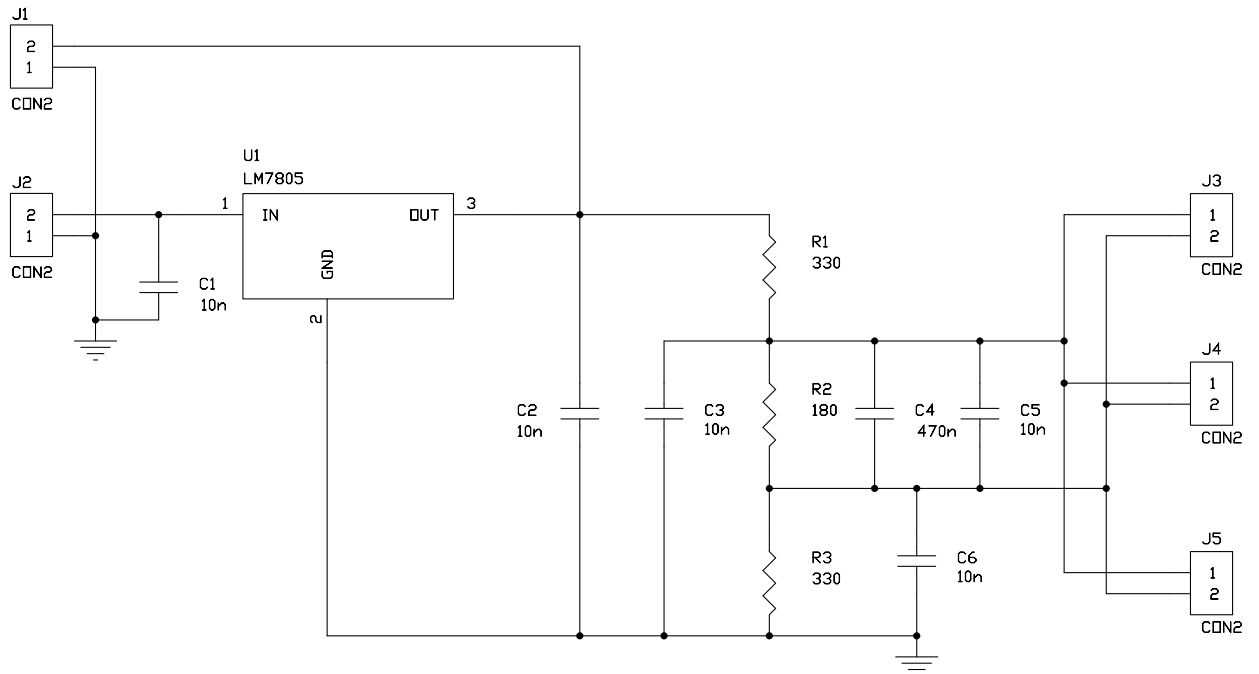



		Via G. Amendola 9 44028 Poggio Renatico (FE) Italy Tel. +39 0532 829965 Fax +39 0532 82917 www.ELENOS.COM Website	
		Description : Interstage VSWR detector	
SCH Code : ESK 3A(B)021_1		PCB Code : 2PCB0358_0	
Model : E5000		Proj. Eng. G.Michelini	
Date : 8/08/03		Approved : A.Giovanelli	
Sheet : 1		of 1	

5.7.1.
List Of Components

C1	100nF
C2*	100nF
C4*	100nF
C3+	100nF
C5+	100nF
D1	1N4148
JP1*	2PJ00134
JP2+	2PJ00134
R1	500
R7	500
R8	100
R20	10K
U1	LMC7101





		
Via G.Amendola 9 44028 Poggio Renatico (FE) Italy Tel +39 0532 829965 Fax +39 0532 829177 Website WWW.ELENOS.COM		
Title: Current share bias generator		
Board Code: 2PCB0360_0	Model: E5K 9A021_0	Rev 1
Proj. Engr. : G.Michelini	Approved : A.Giovannelli	
Date: Monday, December 13, 2004	Sheet	1 of 8

5.8.1.
List Of Components

C1	10n
C2	10n
C3	10n
C5	10n
C6	10n
C4	470n
J1	CON2
J2	CON2
J3	CON2
J4	CON2
J5	CON2
R1	330
R3	330
R2	180
U1	LM7805

5.9.1.
List Of Components

CN1	CON10AP
CN2	MODU 4
CN3	MODU 4
CN7	MODU 4
CN4	MODU 2
CN5	MODU 4
CN6	MODU 6
CN9	MODU 6
CN8	MODU 6
CN10	MODU 9x2
CN11	MODU 9x2
CN12	MODU 9x2
CN13	MODU 9x2
CN14	MODU 9x2
CN15	CON10AP
CX1	100uF
C1	100nF
C4	100nF
C17	100nF
C2	100pF
C3	100pF
C5	10uF
C6	1uF
C8	1uF
C30	1uF
C61	1uF
C7	1uF
C11	1uF
C12	1uF
C15	1uF
C9	22pF
C10	22pF
C13	100nF
C14	100nF
C18	100nF
C24	100nF
C25	100nF
C28	100nF
C29	100nF
C31	100nF
C32	100nF
C39	100nF
C41	100nF
C48	100nF
C49	100nF
C50	100nF
C51	100nF
C52	100nF
C53	100nF
C54	100nF
C55	100nF
C59	100nF
C16	1nF
C20	1nF
C21	1nF
C22	1nF

C23	1nF
C26	1nF
C27	1nF
C40	1nF
C56	1nF
C60	1nF
C157	1nF
C158	1nF
C19	1nF
C33	10uF
C34	1nF
C35	1nF
C36	1nF
C37	1nF
C38	1nF
C148	1nF
C151	1nF
C154	1nF
C160	1nF
C163	1nF
C42	100uF
C43	100uF
C44	100nF
C45	100nF
C46	100uF
C47	100uF
C58	100pF
C57	100pF
C62	100nF
C70	100nF
C79	100nF
C87	100nF
C96	100nF
C104	100nF
C113	100nF
C121	100nF
C130	100nF
C138	100nF
C63	100nF
C64	100nF
C65	100nF
C71	100nF
C72	100nF
C74	100nF
C75	100nF
C78	100nF
C80	100nF
C81	100nF
C82	100nF
C88	100nF
C89	100nF
C91	100nF
C92	100nF
C95	100nF
C97	100nF
C98	100nF

C99	100nF
C105	100nF
C106	100nF
C108	100nF
C109	100nF
C112	100nF
C114	100nF
C115	100nF
C116	100nF
C122	100nF
C123	100nF
C125	100nF
C126	100nF
C129	100nF
C131	100nF
C132	100nF
C133	100nF
C139	100nF
C140	100nF
C142	100nF
C143	100nF
C146	100nF
C66	100pF
C67	100pF
C68	100pF
C83	100pF
C84	100pF
C85	100pF
C100	100pF
C101	100pF
C102	100pF
C117	100pF
C118	100pF
C119	100pF
C134	100pF
C135	100pF
C136	100pF
C69	1nF
C73	1nF
C76	1nF
C77	1nF
C86	1nF
C90	1nF
C93	1nF
C94	1nF
C103	1nF
C107	1nF
C110	1nF
C111	1nF
C120	1nF
C124	1nF
C127	1nF
C128	1nF
C137	1nF
C141	1nF
C144	1nF

C145	1nF
C147	100nF
C149	100nF
C150	100nF
C152	100nF
C153	100nF
C155	100nF
C159	100nF
C161	100nF
C162	100nF
C164	100nF
C156	100uF
DL1	KPT20125GD
DL2	KPT20125GD
DL5	KPT20125GD
DL3	KPT20125GD
DL4	KPT20125GD
DL6	KPT20125GD
D1	PMLL4148
D2	PMLL4148
D3	PMLL4148
D4	PMLL4148
D5	PMLL4148
D6	PMLL4148
D7	PMLL4148
D8	PMLL4148
D9	PMLL4148
JP1	JMP2
JP2	JMP2
JP3	JMP2
JP4	JMP2
JP5	JMP2
JP6	JMP2
JP7	JMP2
L1	MG 2029- 202Y
L2	MG 2029- 202Y
L4	MG 2029- 202Y
L3	MG 2029- 202Y
L5	MG 2029- 202Y
L6	MG 2029- 202Y
L7	MG 2029- 202Y
L8	MG 2029- 202Y
L9	MG 2029- 202Y
L10	MG 2029- 202Y
L11	MG 2029- 202Y
L14	MG 2029- 202Y
L17	MG 2029- 202Y
L20	MG 2029- 202Y
L22	MG 2029- 202Y
L24	MG 2029- 202Y
L25	MG 2029- 202Y
L56	MG 2029- 202Y
L12	MG 2029- 202Y
L13	MG 2029- 202Y
L15	MG 2029- 202Y
L16	MG 2029- 202Y

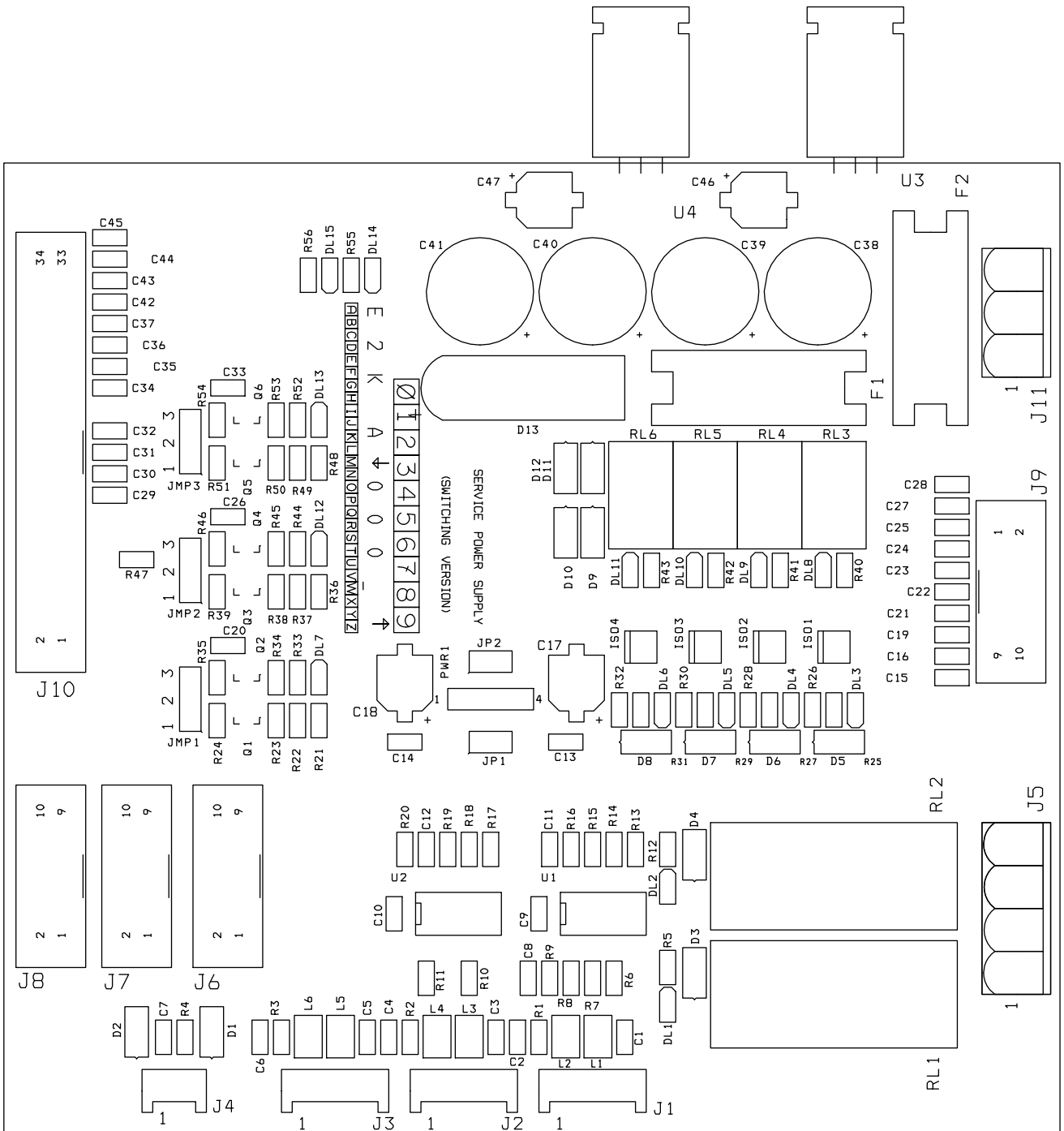
L18	MG 2029- 202Y
L19	100uH
L21	100uH
L23	100uH
L27	100uH
L29	100uH
L34	100uH
L36	100uH
L41	100uH
L43	100uH
L48	100uH
L50	100uH
L55	100uH
L57	100uH
L26	VK200
L33	VK200
L40	VK200
L47	VK200
L54	VK200
L64	VK200
L28	MG 2029- 202Y
L30	MG 2029- 202Y
L31	MG 2029- 202Y
L32	MG 2029- 202Y
L35	MG 2029- 202Y
L37	MG 2029- 202Y
L38	MG 2029- 202Y
L39	MG 2029- 202Y
L42	MG 2029- 202Y
L44	MG 2029- 202Y
L45	MG 2029- 202Y
L46	MG 2029- 202Y
L49	MG 2029- 202Y
L51	MG 2029- 202Y
L52	MG 2029- 202Y
L53	MG 2029- 202Y
L58	MG 2029- 202Y
L59	MG 2029- 202Y
L60	MG 2029- 202Y
L61	MG 2029- 202Y
L62	MG 2029- 202Y
L63	MG 2029- 202Y
L65	MG 2029- 202Y
L66	MG 2029- 202Y
PAD1	HOLE3.5MM
PAD2	HOLE3.5MM
PAD3	HOLE3.5MM
PAD4	HOLE3.5MM
PAD5	HOLE3.5MM
PAD6	HOLE3.5MM
PAD7	HOLE3.5MM
PAD8	HOLE3.5MM
PAD9	HOLE3.5MM
PAD10	HOLE3.5MM
PAD11	HOLE3.5MM
PAD12	HOLE3.5MM

PAD13	HOLE3.5MM
PAD14	HOLE3.5MM
PAD15	HOLE3.5MM
PAD16	HOLE3.5MM
PAD17	HOLE3.5MM
PAD18	HOLE3.5MM
PAD19	HOLE3.5MM
PAD20	HOLE3.5MM
PWR1	NME1212S
Q2	BC856
REF1	LM4431M3-2.5
RX1	2K2
R1	470R
R2	10K
R3	10K
R4	10K
R14	10K
R22	10K
R33	10K
R34	10K
R35	10K
R36	10K
R61	10K
R66	10K
R41	1K
R5	1K
R6	4.7K
R50	10K 3314W
R7	10K 3314W
R9	470R
R8	470R
R10	470K
R11	511K
R12	29.4K
R13	27K
R15	49R
R16	27K
R19	27K
R56	100R
R17	100R
R18	2K
R20	2.00K
R59	2.00K
R63	2.00K
R21	3.01K
R23	12K
R26	56K
R27	10K
R38	10K
R39	10K
R49	10K
R51	10K
R53	10K
R28	100K
R29	2.55K
R30	7.68K

Ref.	Description
R31	3.01K
R37	3.01K
R32	330R
R44	330R
R42	2.87K
R43	2.87K
R54	2.87K
R45	10K*
R55	10K*
R46	10K
R47	2.00K
R48	2.00K
R57	2.00K
R52	470K
R58	470R
R60	10M
R62	7.68K
R64	130R
R65	2.87K
R67	2.55K
R68	0R
R69	100R
R78	100R
R87	100R
R96	100R
R105	100R
R70	10M
R79	10M
R88	10M
R97	10M
R106	10M
R71	2.55K
R72	2.55K
R74	2.55K
R75	2.55K
R80	2.55K
R81	2.55K
R83	2.55K
R84	2.55K
R89	2.55K
R90	2.55K
R92	2.55K
R93	2.55K
R98	2.55K
R99	2.55K
R101	2.55K
R102	2.55K
R107	2.55K
R108	2.55K
R110	2.55K
R111	2.55K
R73	0.01R
R82	0.01R
R91	0.01R
R100	0.01R
R109	0.01R

R76	10K
R85	10K
R94	10K
R103	10K
R112	10K
R77	162K
R86	162K
R95	162K
R104	162K
R113	162K
R114	100R
R117	100R
R120	100R
R123	100R
R126	100R
R115	3.4K
R118	3.4K
R121	3.4K
R124	3.4K
R127	3.4K
R116	1.1K
R119	1.1K
R122	1.1K
R125	1.1K
R128	1.1K
TP1	CONN PLUG 1
TP2	CONN PLUG 1
U1	MAX485
U2	ATMEGA8
U13	LMC7101BIM
U3	LMC7101BIM
U4	LM7301BIM5
U5	TLV5620I
U6	CD4051M
U7	LMC7101BIM
U8	LMC7101BIM
U9	LMC7101BIM
U10	MC74HC00AD
U10	MC74HC00AD
U11	LMC7101BIM
U12	LM340S-5
U14	LM7301BIM5
U15	LM7301BIM5
U19	LM7301BIM5
U23	LM7301BIM5
U27	LM7301BIM5
U16	LMC7101BIM
U18	LMC7101BIM
U20	LMC7101BIM
U22	LMC7101BIM
U24	LMC7101BIM
U26	LMC7101BIM
U28	LMC7101BIM
U30	LMC7101BIM
U17	INA168
U21	INA168

Ref.	Description
U25	INA168
U29	INA168
U31	LM7301BIM5
U34	LMC7101BIM
U32	LMC7101BIM
U33	INA168
U35	LMC7101
U36	LMC7101
U37	LMC7101
U39	LMC7101
U38	LMC7101
Y1	6MHZ



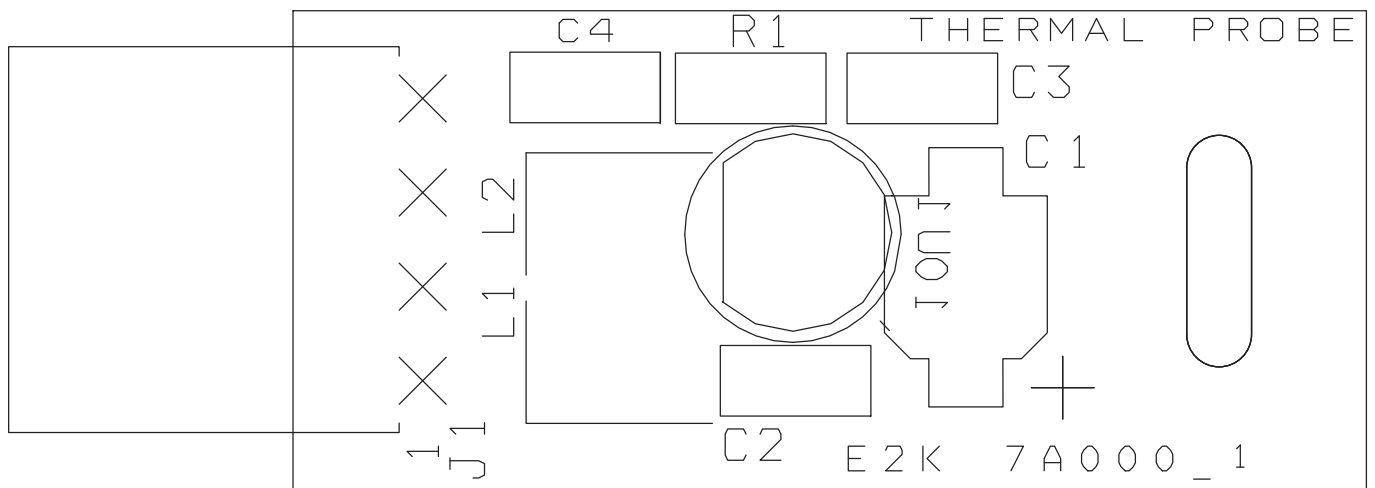
5.10.1.
List Of Components

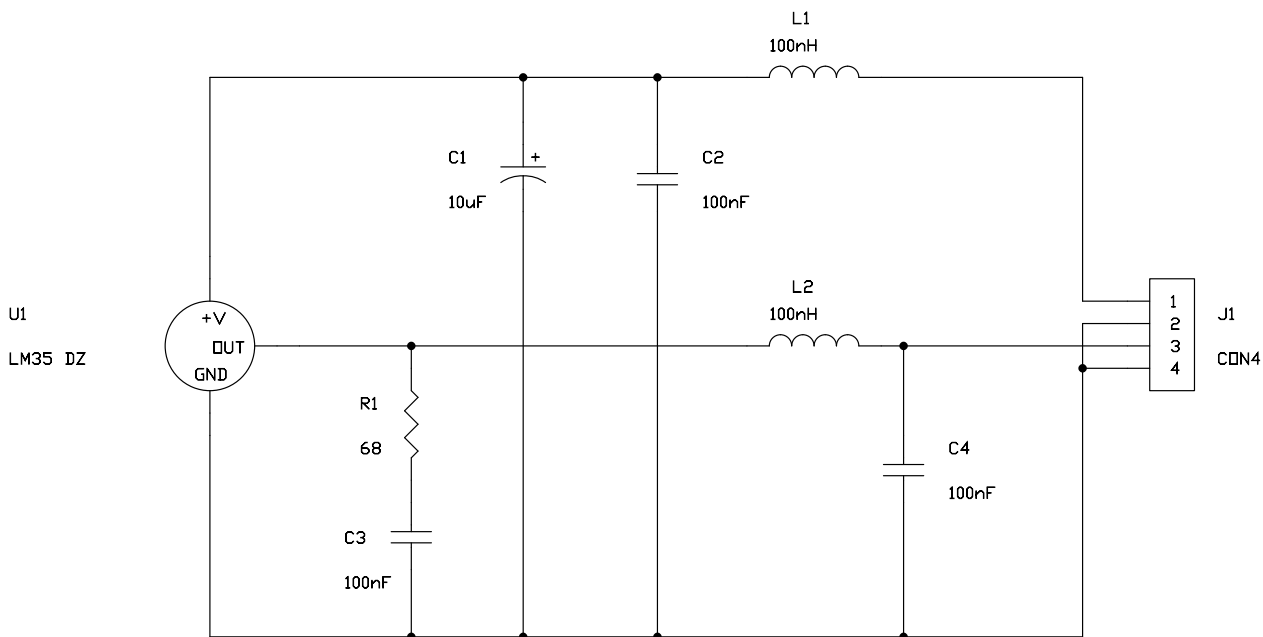
C1	1nF
C2	1nF
C3	1nF
C4	1nF
C5	1nF
C6	1nF
C7	1nF
C15	1nF
C16	1nF
C19	1nF
C21	1nF
C22	1nF
C23	1nF
C24	1nF
C25	1nF
C27	1nF
C28	1nF
C29	1nF
C30	1nF
C31	1nF
C32	1nF
C34	1nF
C35	1nF
C36	1nF
C37	1nF
C42	1nF
C43	1nF
C44	1nF
C45	1nF
C8	1uF
C11	1uF
C12	1uF
C9	100nF
C10	100nF
C13	100nF
C14	100nF
C20	100nF
C26	100nF
C33	100nF
C17	100uF
C46	100uF
C47	100uF
C18	100uF
C38	1000uF 25V
C39	1000uF 25V
C40	1000uF 25V
C41	1000uF 25V
DL1	KPT20125GD
DL3	KPT20125GD
DL4	KPT20125GD
DL5	KPT20125GD
DL6	KPT20125GD
DL8	KPT20125GD
DL11	KPT20125GD
DL2	KPT20125GD
DL14	KPT20125GD

DL15	KPT20125GD
DL7	KPT20125D
DL9	KPT20125D
DL10	KPT20125D
DL12	KPT20125D
DL13	KPT20125D
D1	PML4148
D2	PML4148
D3	PML4148
D5	PML4148
D6	PML4148
D7	PML4148
D8	PML4148
D9	PML4148
D10	PML4148
D11	PML4148
D12	PML4148
D4	PML4148
D13	BRIDGE
F1	FUSE
F2	FUSE
H1	HOLE3.5MM
H2	HOLE3.5MM
H3	HOLE3.5MM
H4	HOLE3.5MM
ISO1	TLP180
ISO2	TLP180
ISO3	TLP180
ISO4	TLP180
JP1	JUMPER
JMP1	JUMPER
JP2	JUMPER
JMP2	JUMPER
JMP3	JUMPER
J1	CON4
J3	CON4
J2	CON4
J4	CON2
J5	W3M-R
J6	5+5M-R
J7	5+5M-R
J8	5+5M-R
J9	5+5M-R
J10	17+17M-R
J11	W3M-R
L1	100uH
L2	100uH
L3	100uH
L4	100uH
L5	100uH
L6	100uH
PWR1	NME1212S
Q1	BC856
Q3	BC856
Q5	BC856
Q2	BC846

Q4	BC846
Q6	BC846
RL1	JW1FSN-12VDC
RL2	JW1FSN-12VDC
RL3	OMRON G5V-1 12VDC
RL4	OMRON G5V-1 12VDC
RL5	OMRON G5V-1 12VDC
RL6	OMRON G5V-1 12VDC
R1*	100
R1	1K
R2	1K
R3	1K
R5	1K
R8	1K
R11	1K
R12	1K
R15	1K
R20	1K
R21	1K
R26	1K
R28	1K
R30	1K
R32	1K
R36	1K
R40	1K
R41	1K
R42	1K
R43	1K
R48	1K
R55	1K
R56	1K
R4	1.8K
R6	2M2
R13	2M2
R17	2M2
R7	1.13K
R14	1.13K
R18	1.13K
R9	10.2K
R16	10.2K
R19	10.2K
R10	2.2K
R22	10K
R23	10K
R33	10K
R34	10K
R37	10K
R38	10K
R44	10K
R45	10K
R49	10K
R50	10K
R52	10K
R53	10K
R24	4.7K
R25	4.7K

R27	4.7K
R29	4.7K
R31	4.7K
R35	4.7K
R39	4.7K
R46	4.7K
R47	4.7K
R51	4.7K
R54	4.7K
U2	LMC6482IN
U1	LMC6482IN
U3	LM7912C/TO220
U4	LM1085-12T

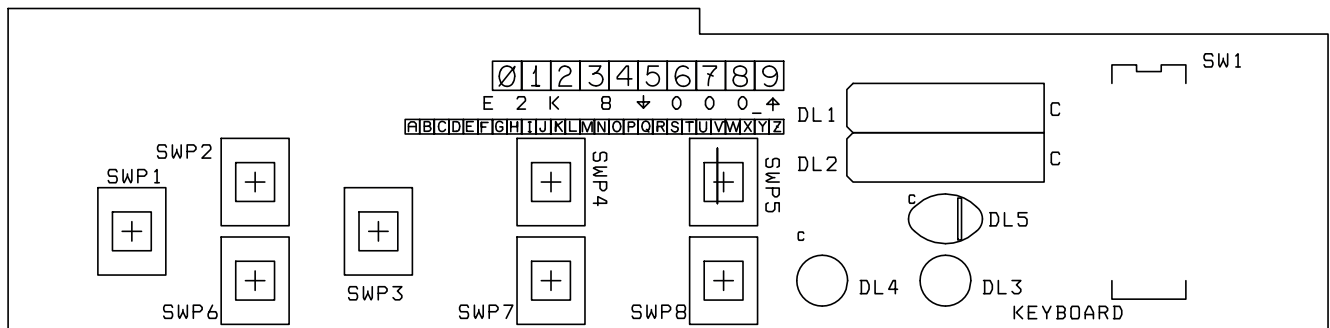




		
Via G.Amendola 9 44028 Poggio Renatico (FE) Italy Tel +39 0532 829965 Fax +39 0532 829177 Website WWW.ELENOS.COM		
Title: THERMAL PROBE		
Board Code: 2PCB0267_1	Model: E2K 7A000_1	Rev 1
Proj. Engr. A.Tomassini	Approved :A.Giovanelli	
Date: Friday, February 07, 2003	Sheet	1 of 1

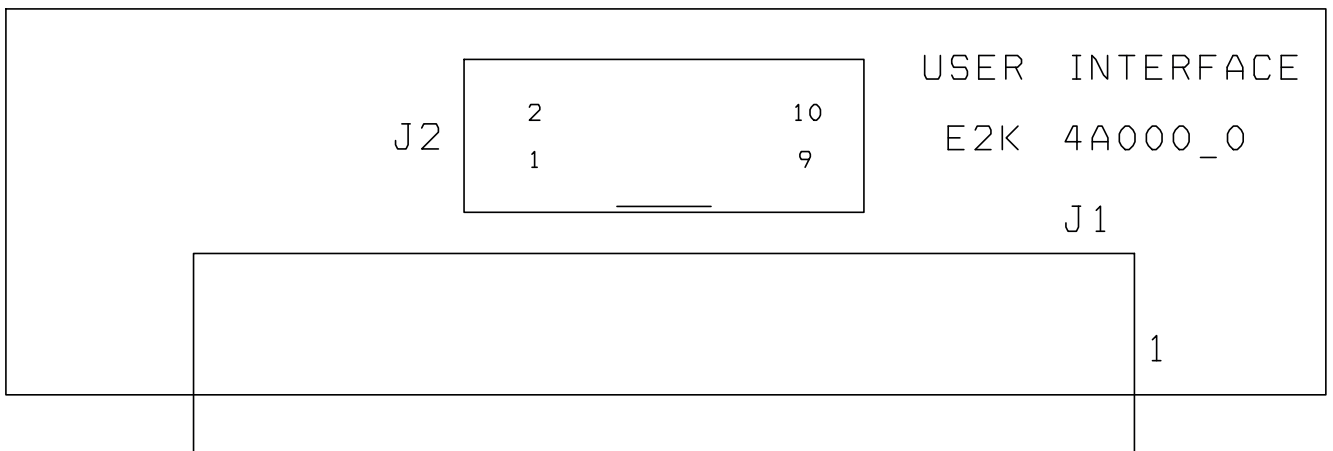
5.11.1.
List Of Components

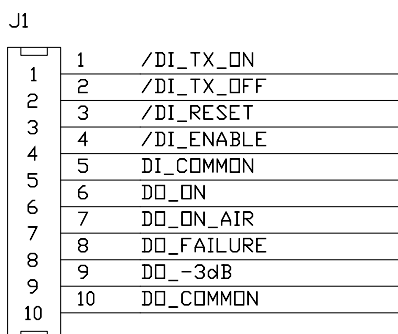
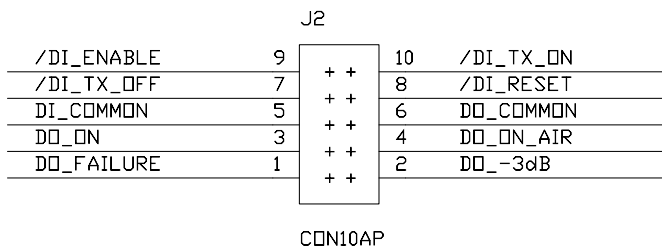
Ref.	Description
C1	10uF
C2	100nF
C3	100nF
C4	100nF
J1	CON4
L2	100nH
L1	100nH
R1	68
U1	LM35 DH



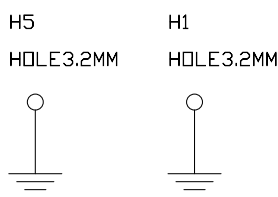
5.12.1.
List Of Components

DL1	LED HLMP2550
DL2	LED HLMP2350
DL3	LED GR 3mm
DL4	LED YE 3mm
DL5	LED GR/RED 3mm
H1	HOLE3.2MM
H2	HOLE3.2MM
H3	HOLE3.2MM
H4	HOLE3.2MM
J1	STRIP FEMALE 2.54 RIGHT 27P
J2	AMP. MODU. 2 90°
SWP1	MICRO-COSMOS
SWP2	MICRO-COSMOS
SWP3	MICRO-COSMOS
SWP4	MICRO-COSMOS
SWP5	MICRO-COSMOS
SWP6	MICRO-COSMOS
SWP7	MICRO-COSMOS
SWP8	MICRO-COSMOS
SW1	SW DIP-8/SM





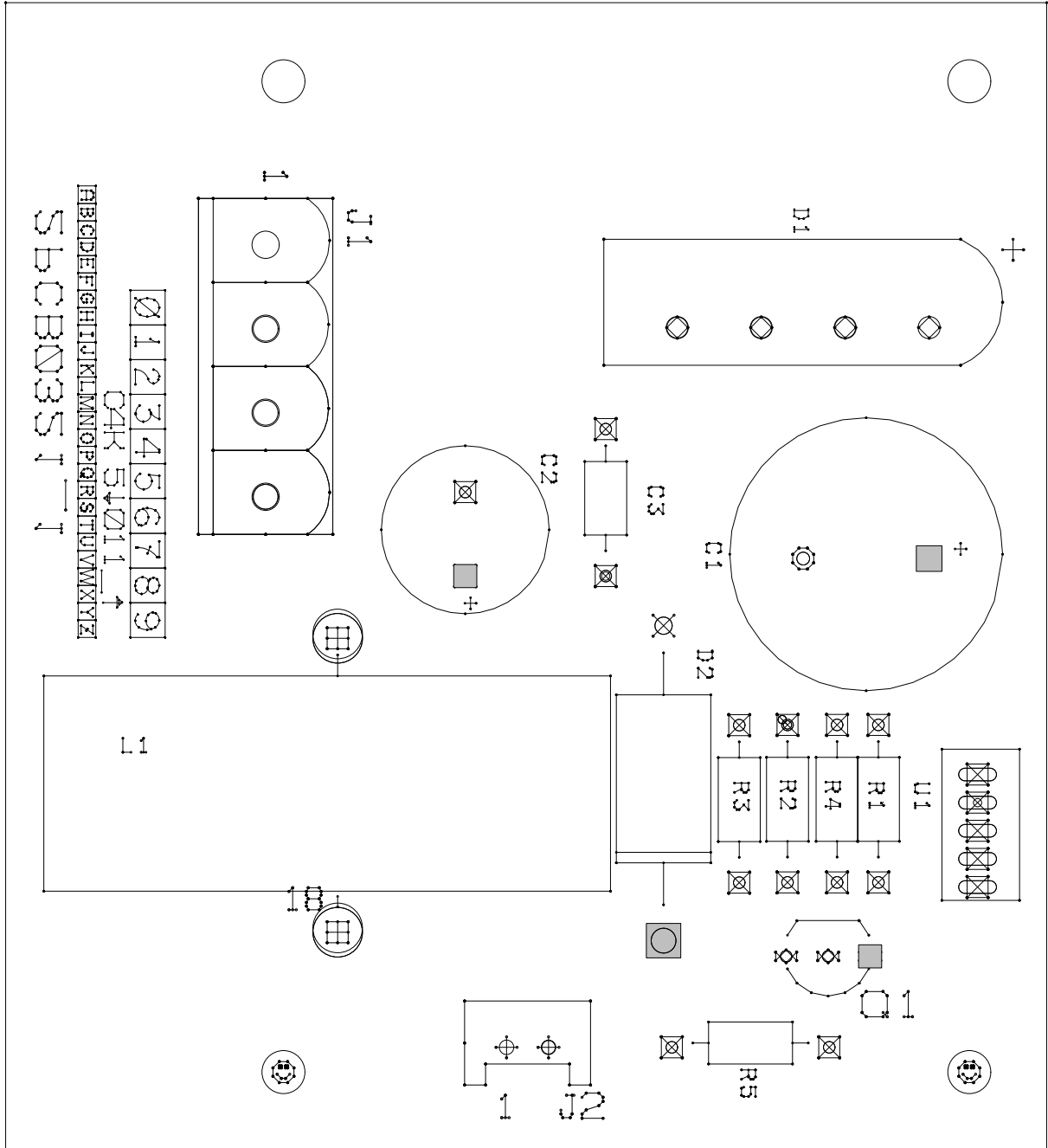
CONN PCB 10



	Via G.Amendola 9 44028 Poggio Renatico (FE) Italy Tel +39 0532 829965 Fax +39 0532 829177 Website WWW.ELENOS.COM	
	Title: USER INTERFACE	
Board Code: 2PCB0260_0	Model: E2K 4A000_0	Rev 0
Proj. Engr. A.Tomassini	Approved :A.Giovanelli	
Date: Friday, June 15, 2001	Sheet	1 of 1

5.13.1.
List Of Components

H1,H5	HOLE3.2MM
J1	CONN PCB 10
J2	CON10AP



C1	2200 μ F
C2	680 μ F
C3	100nF
D1	4A
D2	1N5822
J1	PHOENIX CS
J2	AMPMOD2
L1	220 μ H
Q1	BC546
R1	47K
R4	47K
R5	47K
R2	34K
R3	1K8
U1	LM2576HVT ADJ

6.1. Technical features

Power Supply Section

Power Supply Voltage:	380-400V/ 220-230V threephase50-60 Hz
Absorbed Power:	9 KVA max
Cos :	> 0.9
Efficiency:	60% (typical value @98 MHz)
Cooling System:	n°3 assial fans, one for each power supply box

RF Section

Operating band:	87.5 MHz - 108 MHz
Output power:	5000 W
Input Impedance:	50 ohm
Output Inpedance:	50 ohm
Input Power:	130 W
RF power amplifier modules:	n°10 of 500 W (2 X 250W) interchangeable in any position
MOSFETs:	n°20 BLF278 Philips
Output Low-pass Filter:	n°2 (one per each side 2500W)
Spurious and harmonics Level:	< -80 dBc
Asynchronous AM:	< 0.1%
VSWR protection Level:	500 W
Input Connector:	N
Output Connector:	7/8" (others upon request)
Cooling System:	n°2 tangential fans of 650 cubic meters/h n°1 vassial fan for 1200 cubic meters/h

Law Conformity

High Frequency Radiations From the inside:	<i>below law limits on electromagnetic compatibility and human health prevention</i>
Fields Immunity:	<i>higher than specified by laws on electromagnetic fields compatibility</i>
CE Mark:	Conform to 1999/5/CE European Directive

General Features

Operating Temperature:	-10°C / +45°C
Functioning Temperature with possible reduction of the power output:	+45°C / +50°C
Environmental Temperature:	- 20°C / +65°C
Corrosion:	<i>all mechanical parts are treated or varnished to assure the maximum rust resistance to general corrosion</i>
Humidity:	<i>(service) 95%@ 40°C (storage) 90% @ 65°C</i>
Altitude:	<i>(service) <4600 m s.l.m. (storage) <15000 m s.l.m.</i>
Cooling system:	Forced air-cooling
Output air volume:	1200 cubic meters/hour typ.
Weight:	140 Kg. (without exciter)
Dimensions (W x H x D):	63 x 101 x 56.5 cm in standard 20 U rack

7.1.
Accessories supplied
with the equipment

The equipment is supplied inside a wooden crate together with other components necessary for its functioning.



WARNING!

In case the following parts aren't inside the packaging, please contact Elenos immediately.



Further to E5000, it is supplied:



- 1) Use and maintenance manual (two separated leaflets)
- 2) two RF 500W module input cables
- 3) two connecting cables between RF500 W module output and BNC female
- 4) Two cap RF modules
- 5) Fuse spare kit:
 - N° 6) 6.3A T fuse
 - N° 2) 500mA T fuse
 - N° 1) 3.15A T fuse
 - N° 1) 1A T fuse
 - N° 8) 16A R fuse





broadcast @xperience

Sede legale: via Giovanni Papini, 18 - 40128 Bologna (BO) ITALY

Sede operativa: via G.Amendola, 9 - 44028 Poggio Renatico (FE) ITALY

Ph. +39 0532.82.99.65 - Fax +39 0532.82.91.77

www.eleos.com - e-mail: info@eleos.com

C.C.I.A.A. 101 216 - C.Fisc. e P.IVA IT00415540384

WARNING

The use of this device
is subject
to National regulations

Eleos Srl