BROADCAST EQUIPMENT COMPANY

USE AND MAINTENANCE MANUAL

E2500TR

TECHNICAL SECTION

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Dear Customer,

Firstly, thank you for choosing an ELENOS product.

ELENOS products are solid state or thermionic valve 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 compatability 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 consistent performance over time, without the need for special maintenance. The need for this is minimised by regular functional checks of those components which are ventilated.

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 is attempted.

Customer Care

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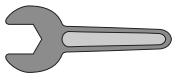

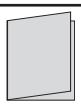

Page numbers marked with an asterisk (*) indicate A3 format

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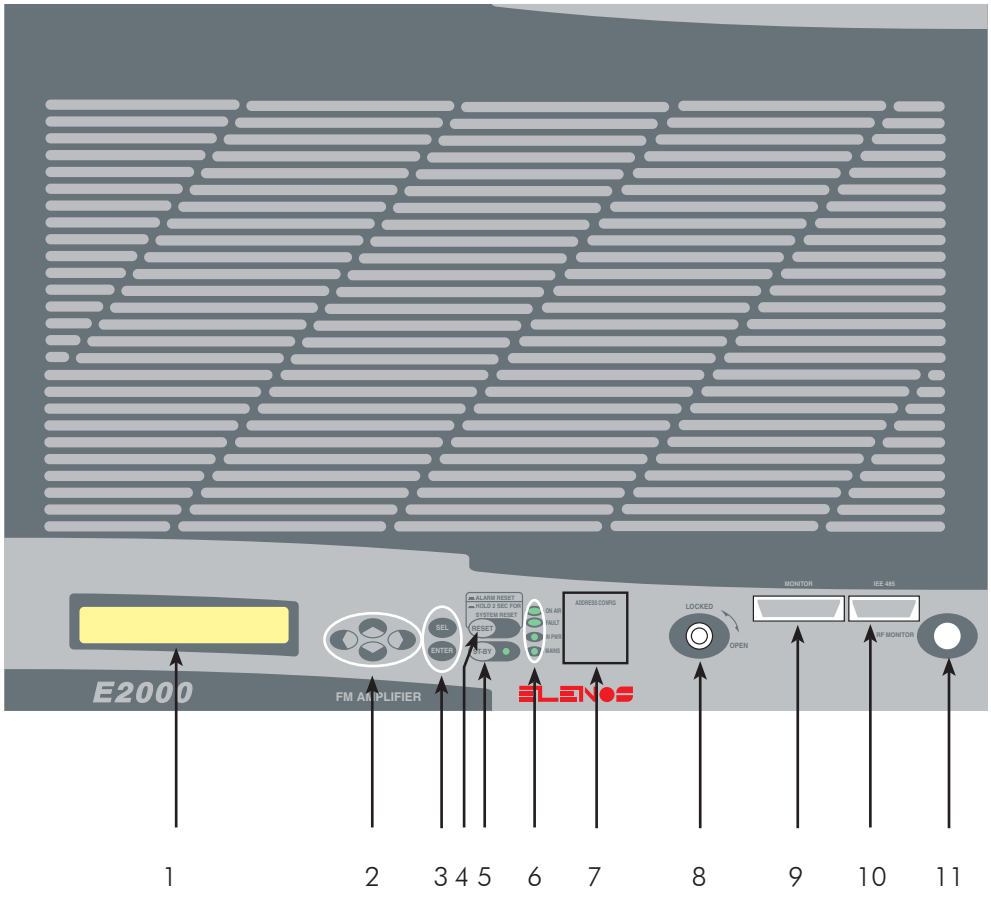
1.1. Front view



1.1.1. Front panel description

1) Display
2) Navigation keypad and contrast adjustment (Sx and Dx keys)
3) Selection and modification keys
4) System/protection reset key. To reset the system, press the key down for more than 2 seconds.
5) Stand-by key
6) Indicator leds
7) Dip switches for selecting the unit's address
8) Disable key
9) Analog readout
10) RS 485 interface
11) RF monitor output (≈ -63dBc)

N.B.

Do not obstruct the ventialtion grills and periodically clean or replace the filter.
The frequency of this operation will depend on ambient conditions.

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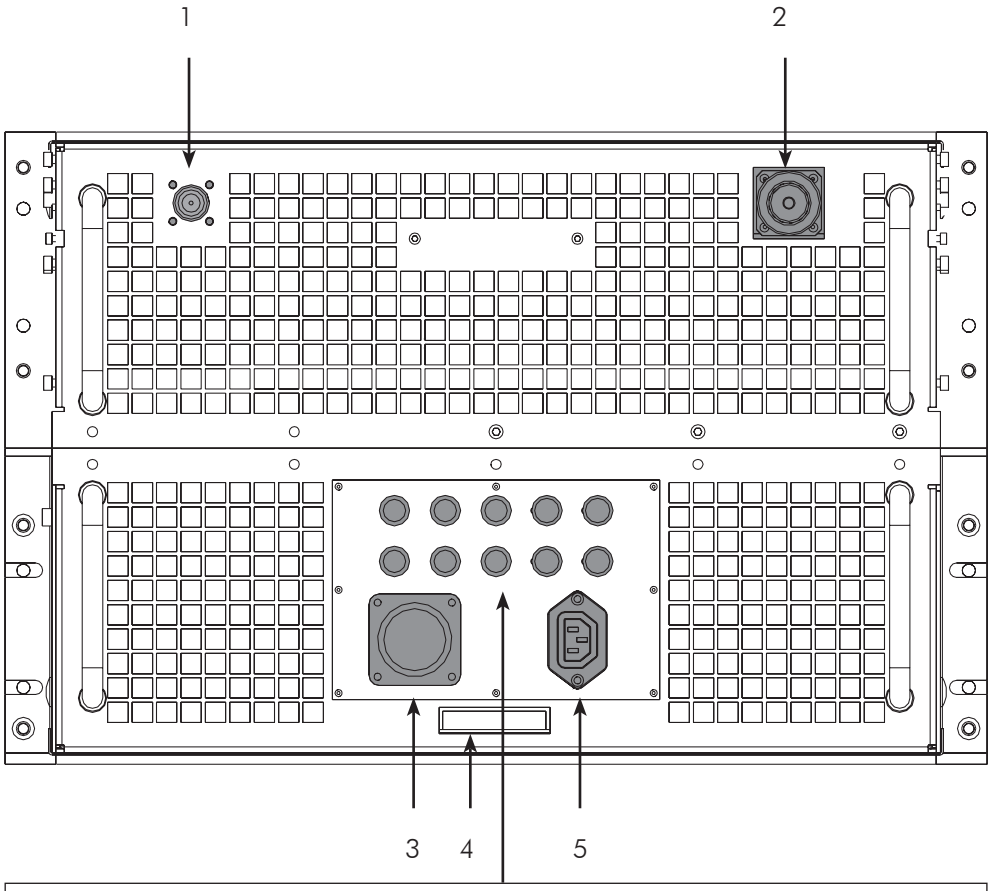
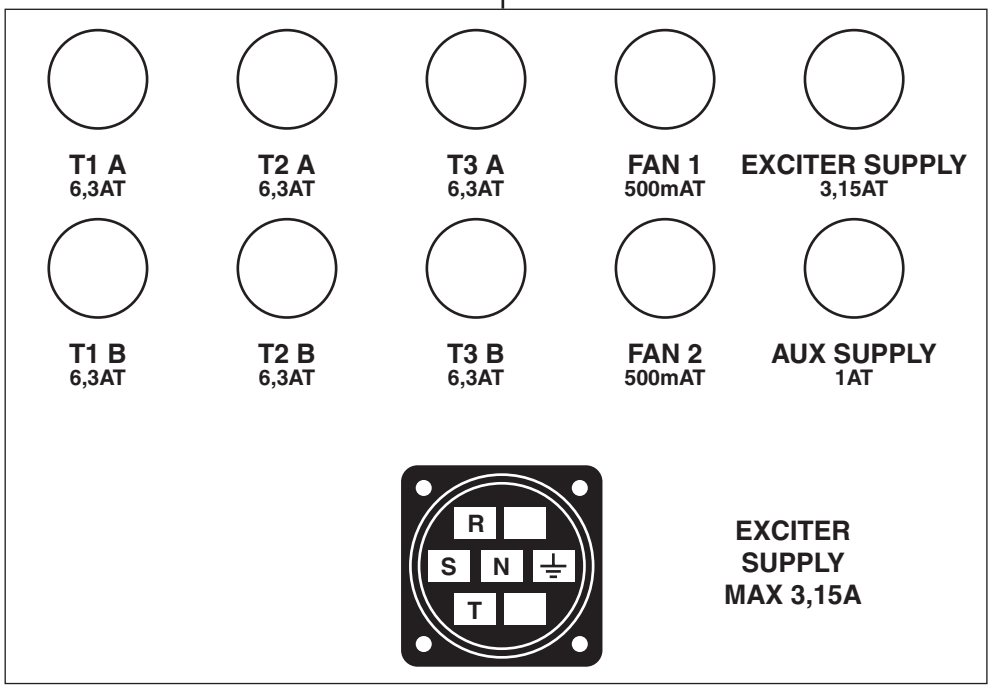
TR Version

1.2. Rear view



1.2.1. Fuse ratings and power supply connection schematic

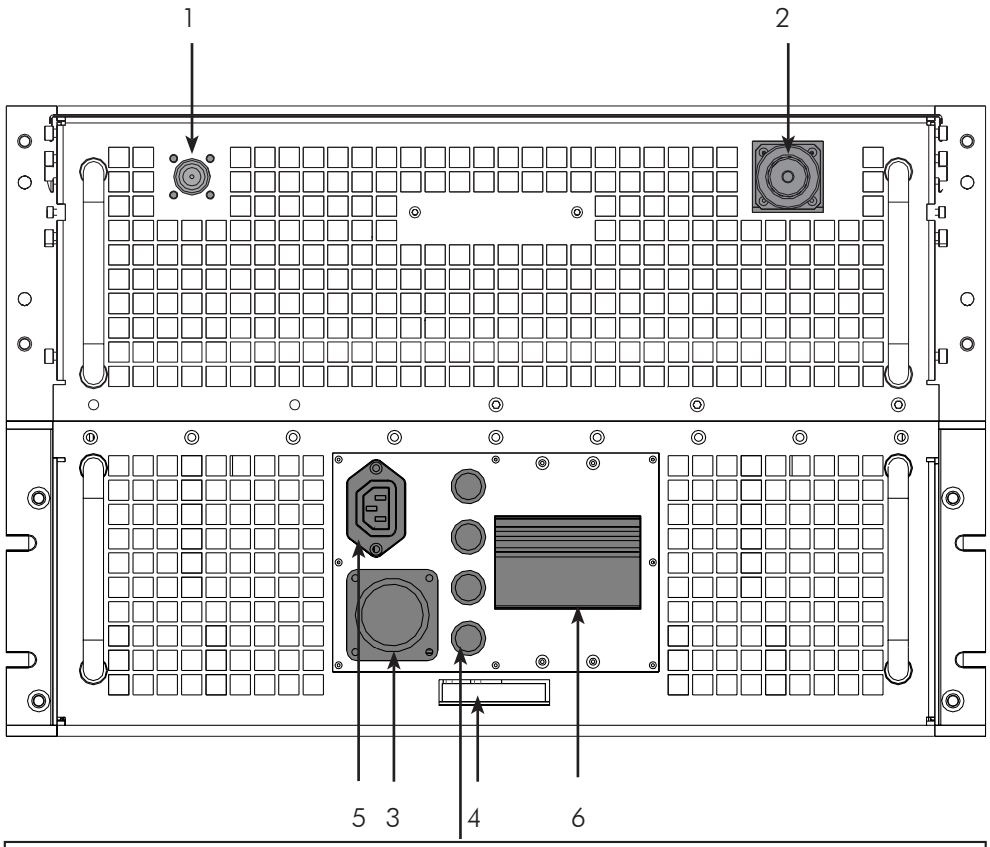


1.2.2. Rear panel description

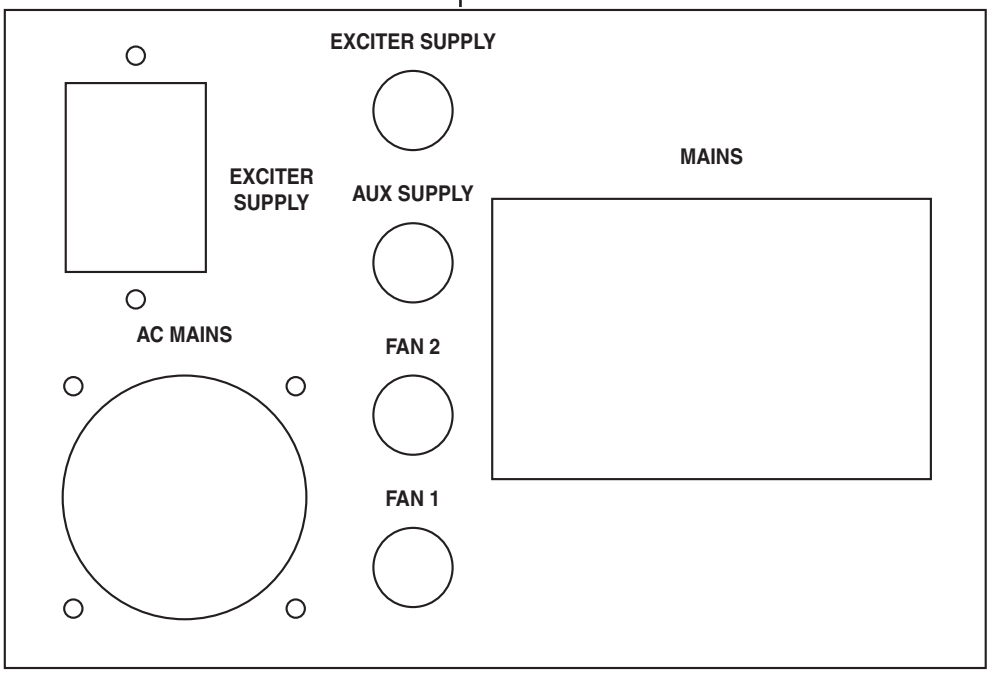
1) RF input female N-type connector
2) RF output LC female connector
3) Power supply connector (see phase connection in the diagram above)
4) American interface
5) Auxiliary power supply connector (MAX 3.15A)

DR Version

1.3. Rear view



1.3.1. Fuse ratings and power supply connection schematic



1.3.2. Rear panel description

1) RF input female N-type connector
2) RF output LC female connector
3) Power supply connector (see phase connection in the diagram above)
4) American interface
5) Auxiliary power supply connector (MAX 3.15A)
6) Main switch

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1.3. Description of materials supplied in the packaging

The equipment is supplied inside a wooden box, together with other components necessary for correct operation.

WARNING

In the event that the parts described below are not included inside the packaging, contact ELENOS immediately.

In addition to the E2500 amplifier (DR or TR), the following are also supplied:

1) The equipment's user and maintenance manual (two separately bound sections)
2) The power supply connector complete with contacts
3) The replacement fuse kit:
   - 6 x 6.3A T fuses
   - 2 x 500mA T fuses
   - 1 x 3.15 A T fuse
   - 1 x 1 A T fuse
   - 8 x 16A R fuses

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2.1. Unpacking

The equipment is supplied in a wooden box (rigid or collapsible).

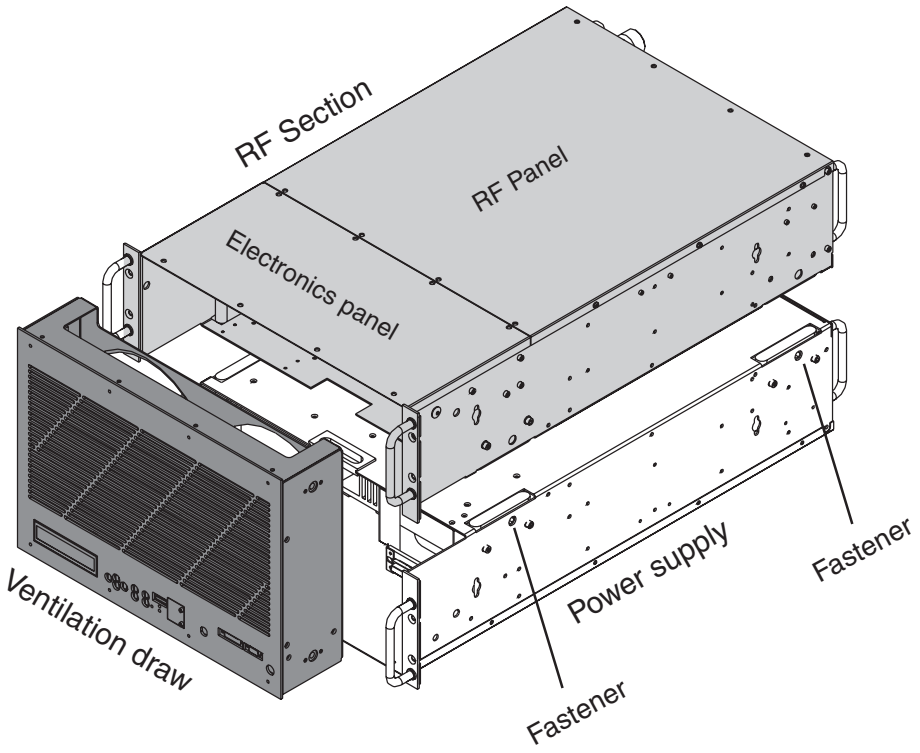
Open the top cover of the packing, remove the user and maintenance manual and the kit containing the supply connector and the replacement fuses. Remove the polystyrene protective packing from around the equipment and cut the straps which tie it to the base of the box.

2.2. Assembly and disassembly

The equipment (supplied assembled) is easily disassembled into three main sections (power supply, RF section and ventilation draw) to facilitate transport and installation.

- ☞ Remove the top cover (just the electronics panel is sufficient) and the bottom cover
- ☞ Remove the front panel
- ☞ Disconnect the flat cable from the ALC board at the top of the unit and from the CPU board, located in the lower part of the unit
- ☞ Disconnect the fan supply
- ☞ Disconnect the power supply connections from the RF module
- ☞ Open the fasteners

To re-assemble the unit, follow the reverse procedure



2.2. Configuration to the electrical line voltage

Linear version

The user must verify that the voltage generated by the power supply does not exceed 50V under no-load conditions (about 45V at full power). Otherwise, the voltage selector should be changed to conform to the values indicated by the manufacturer.

Switching version

The equipment is supplied configured as requested by the customer. If it becomes necessary to change the power supply voltage from 380V three-phase or 220V single phase to 220V three-phase or 110V single phase (to change to 110V single phase, contact ELENOS for further details), consult the schematic of the switching power supply.

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2.3. Connection to the electrical supply

WARNING

Before proceeding, ensure that there is no voltage present on the electrical supply to be used for the equipment

In accordance with the power requirements of the equipment, do not use conductors of section less than 2.5mm^2

Use a suitable pair of pincers or pliers to fix the contacts of the plug supplied to the electrical supply cables; for greater security it is advisable to solder the connections.

Insert the contacts into the corresponding sockets of the connector, paying attention to the phases, neutral and earth as indicated in section 1.2.1. and on the legend of the rear panel.

Connect the plug to the unit.

2.4. Installation

- ☞ Install the unit so that it is accessible from all sides
- ☞ Ensure that the site is provided with an efficient earthing point
- ☞ Ensure that the antenna system is suitable
- ☞ Ensure that any amplifier to be connected downstream is connected to the antenna system
- ☞ Connect the RF output to the input of the subsequent amplifier or antenna system
- ☞ Power up the amplifier, if present
- ☞ Check the measurements on the E2500 display and the amplifier instruments to ensure correct operation.

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3.1. Active keys

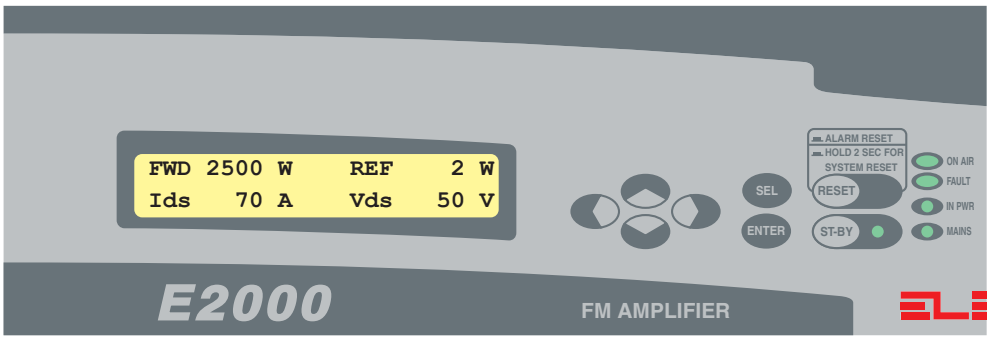
The display contrast control is active in every menu and is controlled by the left and right arrow keys.

Any menu can be exited by pressing the SEL key which activates the selection menu.

The ST-BY key is always active to power up or power down the radio frequency section.

The RESET key, which is always active, will, when pressed for less than 1.5 seconds, reset the alarm and protection software. If pressed for more, it will reset the microprocessor system hardware.

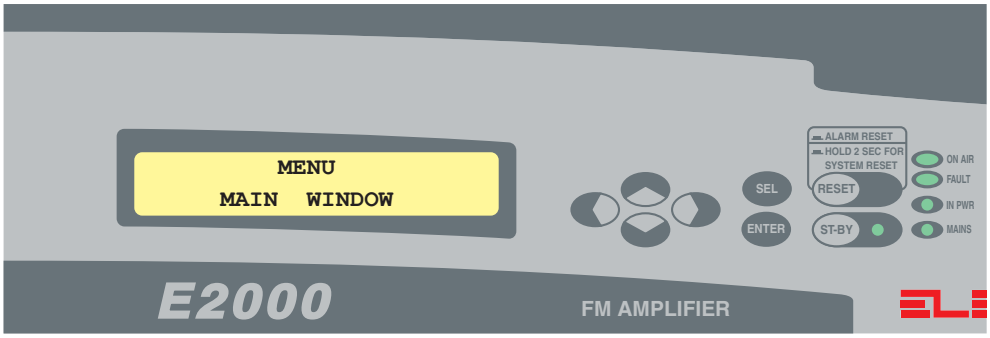
3.2.1. Main menu (MAIN WINDOW)



Display of non-adjustable parameters.

- Forward power (FWD)
- Reflected power (REF)
- Total current absorbed by the RF section (Ids)
- RF section supply voltage (Vds)

3.2.2. Selection menu

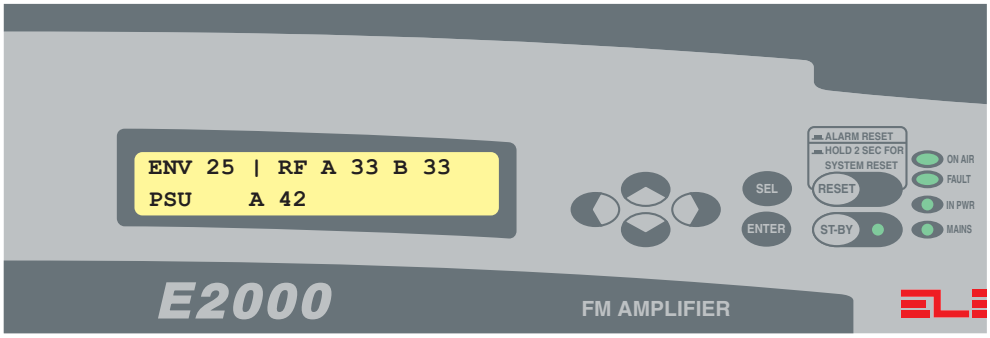


The up/down arrow keys are used to scroll through the menu list (bottom line):

- MAIN WINDOWS
- SYS INFO
- GSM FIELD STRENGTH
- GSM MODEM CONFIG
- TEMPERATURES
- POWER LIMITER SETTINGS
- PSU VOLTAGES-CURRENTS
- RF AMPLIFIER CURRENTS
- ALARMS LIST

The ENTER key selects the chosen menu

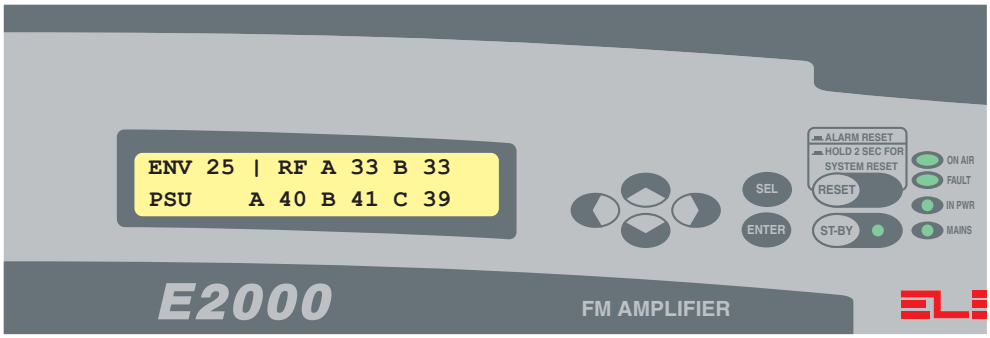
3.2.3. Temperatures menu (TEMPERATURES) TR version



The temperatures are displayed as follows:

- environmental (ENV)
- heatsink - RF section A (RF A)
- heatsink - RF section B (RF B)
- heatsink - power supply rectifier

3.2.4. Temperatures menu (TEMPERATURES) DR version



The temperatures are displayed as follows:

- environmental (ENV)
- heatsink - RF section A (RF A)
- heatsink - RF section B (RF B)
- heatsink - power supply A (PSU A)
- heatsink - power supply B (PSU B)
- heatsink - power supply C (PSU C)

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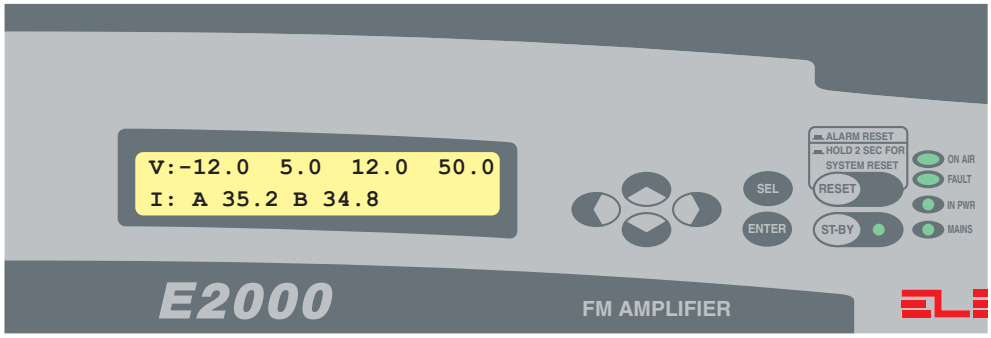
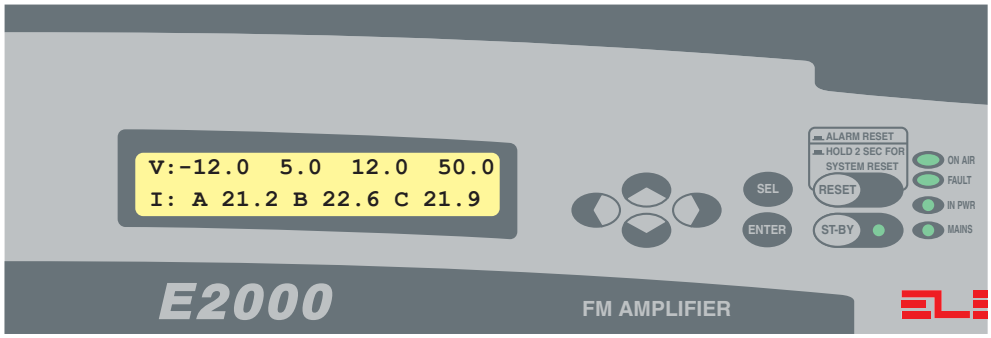
3.2.5. Voltage and currents menu (PSU VOLTAGES-CURRENTS) TR version



Display of non-adjustable parameters.

- Voltages:
  - auxiliary (-12.0)
  - auxiliary (5.0)
  - auxiliary (12.0)
  - RF section (50.0)
- Curents:
  - Main power supply A
  - Main power supply B

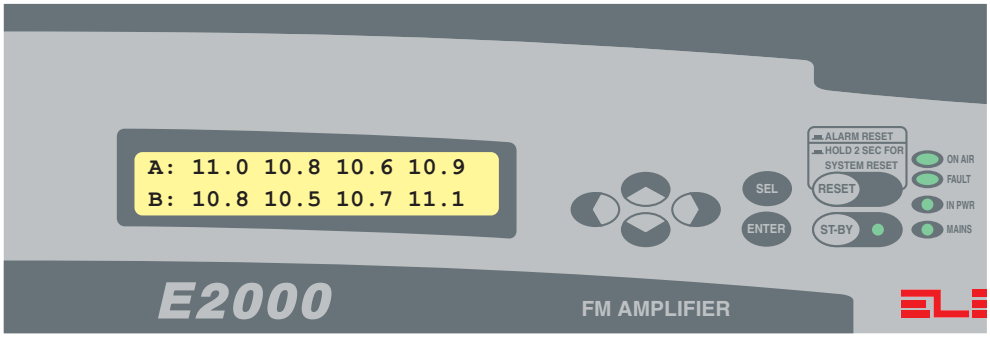
3.2.6. Voltage and currents menu (PSU VOLTAGES-CURRENTS) DR version



Display of non-adjustable parameters.

- Voltages:
  - auxiliary (-12.0)
  - auxiliary (5.0)
  - auxiliary (12.0)
  - RF section (50.0)
- Currents:
  - main power supply A
  - main power supply B
  - main power supply C

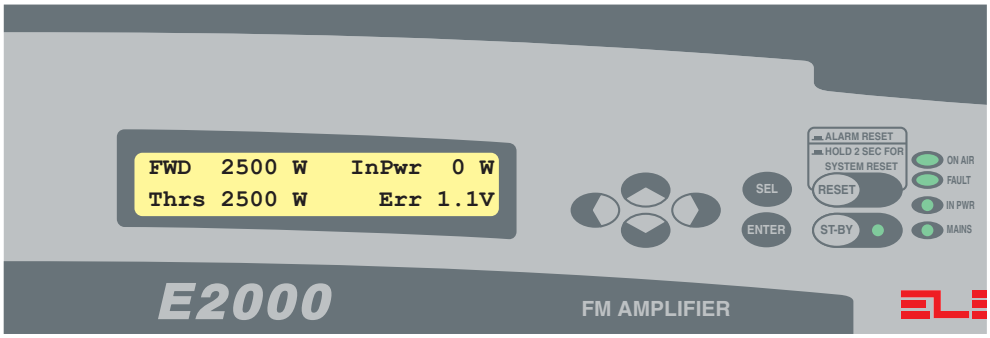
3.2.7. RF AMPLIFIER CURRENTS



Display of non-adjustable parameters.

- Amplifier currents heatsink A and heatsink B.

3.2.8. Power limiter settings menu (POWER LIMITER SETTINGS)



Display of adjustable and non-adjustable parameters.

Non-adjustable:
- forward power (FWD)
- input power (InPwr)
- ALC error voltage (Err)

Adjustable:
- ALC threshold (Thrs)

To adjust the ALC threshold, press the ENTER key; the W measurement unit will be replaced by the hash character (#). Enter the desired value using the up/down keys. Terminate the procedure by pressing the ENTER key (the hash character (#) will be replaced by the previous unit (W)), or exit the menu (SEL key).

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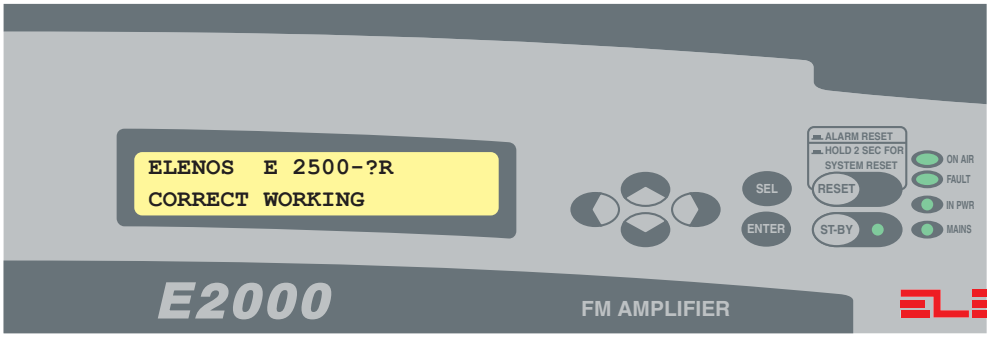
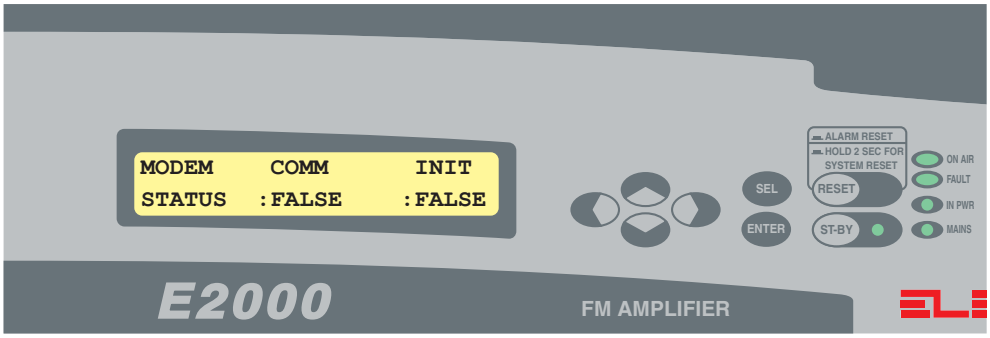
3.2.9. "LOCKED" mode



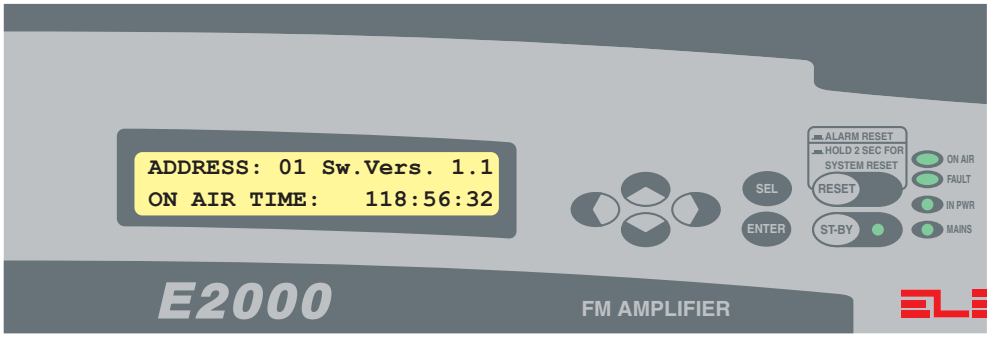
Normal operation with the key in the "LOCKED" position.
In the event of any error message, the display will show the "ALARMS LIST" page.

3.2.10. Modem configuration menu (GSM MODEM CFG)



GSM modem configuration for handling SMS messages.

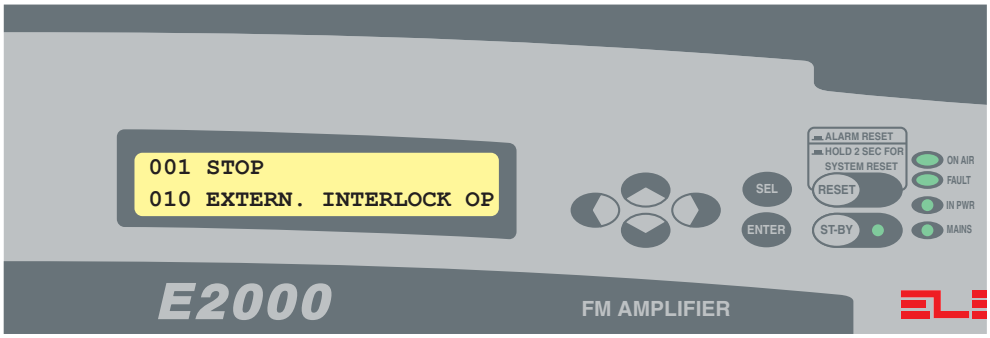
3.2.11. System information menu (SYS INFO)



Display of non-adjustable parameters.

- serial communications address (ADDRESS)
- software version (Sw.Vers.)
- transmission hour counter

3.2.12. Alarms list menu (ALARMS LIST)



Display of non-adjustable parameters.

The alarms are displayed, preceded by a code. The number of alarms can be greater then two in which case the up/down arrow keys can be used to scroll the display vertically.
The alarm on the first line is the main one and is displayed automatically after a time delay.
The following pages list the alarm codes that can be generated by the system, together with their description.

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Alarms list

Alarm Code	Description
"000 CORRECT WORKING"	normal operation;
"001 STOP"	equipment in stand-by;
"002 HIGH REF PWR ACTIVE"	maximum reflected power limit (software) exceeded (active);
"003 HIGH REF PWR"	maximum reflected power limit (software) exceeded (historical);
"004 HIGH REF PWR HW ACTIVE"	maximum reflected power limit (hardware) exceeded (active);
"005 HIGH REF PWR HW"	maximum reflected power limit (hardware) exceeded (historical);
"006 WARN HIGH REF PWR ACTIVE"	reflected power warning limit exceeded (software) (active);
"007 WARN HIGH REF PWR"	reflected power warning limit exceeded (software)(historical);
"008 BLOCKED"	equipment blocked (after 5 attempts);
"009 SYSTEM RESET ACTIVE"	alarm reset active;
"010 TIMING"	The equipment is awaiting reset after overcurrent protection (TR version);
"011 EEPROM CHKSUM ERROR"	checksum error in the EEPROM memory;
"012 -3dB CARRIER ACTIVE"	output power less than half the value programmed in the "POWER LIMITER SETTINGS" window (active);
"013 -3dB CARRIER"	output power less than half the value programmed in the "POWER LIMITER SETTINGS" window;
"014 PSU OVERCURRENT ACTIVE"	power supply overcurrent (active), (TR version);
"015 PSU OVERCURRENT"	power supply overcurrent (historical) (TR version);
"016 -12V SUPPLY FAULT ACTIVE"	-12V supply fault (active);
"017 -12V SUPPLY FAULT"	-12V supply fault (historical);
"018 MAX PSU A TEMP ACTIVE"	maximum power supply A temperature (software) exceeded (active);
"019 MAX PSU A TEMP"	maximum power supply A temperature (software) exceeded (historical);
"020 MAX PSU B TEMP ACTIVE"	maximum power supply B temperature (software) exceeded (active);
"021 MAX PSU B TEMP"	maximum power supply B temperature (software) exceeded (historical);
"022 MAX PSU C TEMP ACTIVE"	maximum power supply C temperature (software) exceeded (active);
"023 MAX PSU C TEMP"	maximum power supply C temperature (software) exceeded (historical);
"024 WARN PSU A TEMP ACTIVE"	power supply A software warning temperature exceeded (active);
"025 WARN PSU A TEMP"	power supply A software warning temperature exceeded (historical);
"026 WARN PSU B TEMP ACTIVE"	power supply B software warning temperature exceeded (active);
"027 WARN PSU B TEMP"	power supply B software warning temperature exceeded (historical);

Alarms list

Cod. Alarm	Description
"028 WARN PSU C TEMP ACTIVE"	power supply C software warning temperature exceeded (active);
"029 WARN PSU C TEMP"	power supply C software warning temperature exceeded (historical);
"030 MAX XFRMR TEMP ACTIVE"	transformer max temperature exceeded, TR version (active)
"031 MAX XFRMR TEMP"	transformer max temperature exceeded, TR version (historical);
"032 WARN XFRMR TEMP ACTIVE"	transformer warning temperature exceeded, TR version (active);
"033 WARN XFRMR TEMP"	transformer warning temperature exceeded, TR version (historical);
"034 MAX ENV TEMP ACTIVE"	maximum ambient temperature (software) exceeded (active);
"035 MAX ENV TEMP"	maximum ambient temperature (software) exceeded (historical);
"036 WARN ENV TEMP. ACTIVE"	ambient temperature warning limit exceeded (software) (active);
"037 WARN ENV TEMP."	ambient temperature warning limit exceeded (software) (historical);
"038 RF A OVERTEMP ACTIVE"	RF A heatsink temperature, maximum limit exceeded (software) (active);
"039 RF A OVERTEMP"	RF A heatsink temperature, maximum limit exceeded (software) (historical);
"040 WARN RF A TEMP ACTIVE"	RF A heatsink temperature, warning limit exceeded (software) (active);
"041 WARN RF A TEMP"	RF A heatsink temperature, warning limit exceeded (software) (historical);
"042 RF B OVERTEMP ACTIVE"	RF B heatsink temperature, maximum limit exceeded (software) (active);
"043 RF B OVERTEMP "	RF B heatsink temperature maximum limit exceeded (software) (historical);
"044 WARN RF B TEMP ACTIVE"	RF B heatsink temperature, warning limit exceeded (software) (active);
"045 WARN RF B TEMP"	RF B heasink temperature, warning limit exceeded (software) (historical);
"046 PSU HW OVERCURRENT ACTIVE"	power supply overcurrent, TR version (active);
"047 PSU HW OVERCURRENT"	power supply overcurrent, TR version (historical);
"048 CONN INTLOCK ACTIVE"	connection between the CPU and ALC boards is faulty or broken (active);
"049 EXT INTLOCK ACTIVE"	the contact between "DI_ENABLE" and "DI_COMMON" on the diagnostic connector is open (active);
"050 PSU A OVERCURRENT ACTIVE"	maximum current limit exceeded (software) psu 1; DR version (active);
"051 PSU A OVERCURRENT"	maximum current limit exceeded (software) psu 1; DR version (historical);
"052 PSU B OVERCURRENT ACTIVE"	maximum current limit exceeded (software) psu 2; DR version (active);
"053 PSU B OVERCURRENT"	maximum current limit exceeded (software) psu 2; DR version (historical);
"054 PSU C OVERCURRENT ACTIVE"	maximum current limit exceeded (software) psu 3; DR version (active);

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Alarms list

Cod. Alarm	Description
"055 PSU C OVERCURRENT"	maximum current limit exceeded (software) psu 3 DR version (historical);
"056 PSU A OVERCURRENT ACTIVE"	maximum current limit exceeded (software) psu A TR version (active);
"057 PSU A OVERCURRENT"	maximum current limit exceeded (software) psu A TR version (historical);
"058 PSU B OVERCURRENT ACTIVE"	maximum current limit exceeded (software) psu B TR version (active);
"059 PSU B OVERCURRENT"	maximum limit exceeded (software) corrente psu B TR version (historical);
"060 PSU A SHARE ERROR ACTIVE"	share error psu A DR version (active);
"061 PSU A SHARE ERROR"	share error psu A DR version (historical);
"062 PSU B SHARE ERROR ACTIVE"	share error psu B DR version (active);
"063 PSU B SHARE ERROR"	share error psu B DR version (historical);
"064 PSU C SHARE ERROR ACTIVE"	share error psu C DR version (active);
"065 PSU C SHARE ERROR"	share error psu C DR version (historical);
"066 THERMAL DERATING ACTIVE"	power reduction due to excessive temperature (active);
"067 THERMAL DERATING"	power reduction due to excessive temperature (historical).

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3.3. Checking performance

This procedure for checking performance must be carried out if there is any doubt over the integrity of the equipment as a result of possible transport damage and should only be performed by expert personnel, capable of using radio frequency measurement equipment.

Power generated

Connect a good quality wattmeter (e.g. Bird model 43) to the output connector of the equipment (LC or, by request, 7/8" flange). Connect the output of the wattmeter to a good quality dummy load (SWR less than 1.05) able to handle at least 2500W continuously, via a 50 Ohm coaxial cable of suitable section (e.g. Cellflex 1/2"). Adjust the maximum range of the wattmeter to correspond to the power generated (e.g. with a Bird model 43 wattmeter, use a 2500W probe suitably orientated to measure forward power). Switch on the equipment and check that the power reading on the display corresponds to the reading on the wattmeter; a difference of upto 50W between the two is acceptable at nominal power (2500W).
It is of the utmost importance to use a wattmeter which performs to its high quality specification.
A false reading will result if the directional coupler of the wattmeter is not connected directly to the equipment.

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3.4. Telemetry connection and operation

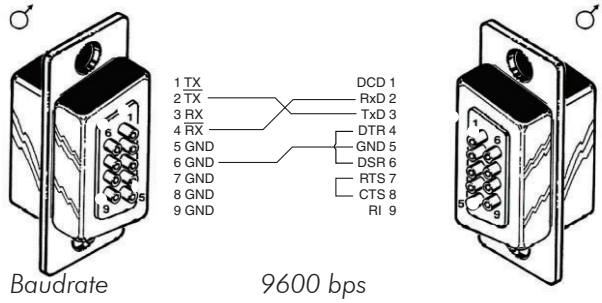
Each unit has telemetry incorporated which can work with any ANSI terminal, without the need for special software; for example, Hyperterminal (supplied with Microsoft Windows (c)), Procomm or Telix for DOS-based systems are all suitable.

Connect the equipment via a suitable cable (not supplied) to an IBM compatible PC, or to a GSM modem or a traditional network.

Connecting two different interface standards (IE485 con RS232) may seem strange, but no problems will be encountered, using the configuration shown below. The signals used are identical, with the exception of their connector position.

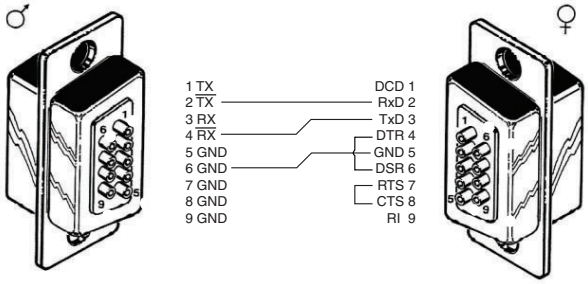
CONFIGURATION

E2500 ----------> Modem



Baudrate	*9600 bps*
Data bits	*8*
Parity	*none*
Stop bits	*1*
Flow control	*none*

E2500---------->PC



ATE0	*Echo Off*	
ATF1	*Local Echo Off*	
ATQ0	*Displays the resulting codes*	
ATX0	*Displays only codes:*	*0 (OK)* *1 (CONNECT)* *2 (RING)* *3 (NO CARRIER)* *4 (ERROR)*
ATS0=1	*Replies automatically after the first ring*	
ATV0	*Displays the result codes in numerical form*	
ATY0	*Defaults to the profile in NVRAM0*	

AT&D0	*Ignores DTR*
AT&H0	*Flow control disactivated*
AT&I0	*Software flow control disactivated*
AT&R1	*Ignores RTS*
AT&S0	*Ignores DSR (permanently active)*
AT&N6	*9600 Baud (maximum)*
AT&U6	*9600 Baud (minimum)*
AT&W0	*Writes the configuration to NVRAM 0*
ATZ0	*Resets the modem to the profile indicated*

This sequence of commands is sent directly to the modem from the E2000 by entering the "GSM Modem Config" menu and pressing the ENTER key. It is important that the modem is pre-configured for serial communication in "AUTOBAUD" mode or at 9600 8N1.

The modem must be equipped with a SIM card enabled for data transmission and with the PIN code disabled, otherwise it will not be possible to register on the GSM network. It is recommended, furthermore, to avoid interference from adjacent cells, that a directive antenna pointed at the closest GSM repeater is used.

TELEMETRY OPERATION

The commands are sent by pressing character keys (case insensitive); for example pressing "a" displays the main page. The character can be upper or lower case.

Activation procedure (direct cable connection)

Press "1"
The equipment will respond by displaying the main menu
Navigate between the various windows by pressing the corresponding keys
Go back to the Main menu ("Q" key)

Activation procedure (connection via modem GSM or telephone line)

Connect to the equipment by pressing the telephone number of the modem connected to the equipment
Once the connection is established the equipment will respond by displaying the Main Menu window
Navigate between the various windows by pressing the corresponding keys
Once these passages are completed you will just have to stop the communication

If more than one equipment will be connected to the same modem they will have to be appropriately addressed with the dip switches on the front panel by using the figures from 1 to 63. Address 0 is the one of the equipment alone, therefore one apparatus or more will have to be addressed as 1,2,n.
The managing of an equipment via text messages is possible only with an equipment alone, which will be active only if the address is "0".

For cascade connected machines, the activation procedure is slightly different:
Activation procedure (for Modem or cable connections):

- Press the "i" character followed by the address (e.g. i03), the equipment will respond by displaying the main menu window
- Navigate in the various windows
- Go back to the Main Menu
- In case it is needed, select another machine to interrogate (e.g. "i04")
- Go back to the Main Menu
- Disconnect

Always remember to digit "0" before every address smaller than 10 (01, 02…09), otherwise you will not obtain any answer.
To display the parameters, press the keys indicated above; to exit the page press "Q".

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```
+-------------------------------------------------------------------------------+
| ELENOS 2KW AMPL. <Remote Control V. x.x          - id 03  <-Q-> = MAIN MENU |
+-------------------------------------------------------------------------------+
| MAIN MENU.                                                                    |
|                                                                               |
|   K = INPUT USER OR SYSTEM KEY                                                |
|   A = SETTING AND READING PARAMETERS                                          |
|   B = STATUS / FAILURES LIST                                                  |
|                                                                               |
|   F = SCHEDULE         (SERVICE)                                              |
|   L = INTERRUPT ERROR (SERVICE)                                               |
|   N = INTERNAL STATUS (SERVICE)                                               |
|   V = SERIAL MONITOR  (SERVICE)                                               |
|   P = SMS PHONE AND ALARMS SETUP                                              |
|   Q = MAIN MENU (this page!)                                                  |
|                                                                               |
|  System key has not been customized yet.                                      |
|  Default loaded value : System Key = 24                                       |
|  User key has not been customized yet.                                        |
|  Default loaded value : System Key = 22                                       |
|  User should customize User and System keys                                   |
+-------------------------------------------------------------------------------+
```

"Main Menu" page of the machine addressed with "03".
To visualise the parameters press they keys indicated above; to exit the pages press key "Q".

To edit the parameters, enter the numerical access code (procedure "K ").

NOTE: The user and system passwords are pre-programmed at the factory: SYSTEM =24 USER =22. The user must customise the codes! To select the field to edit, press "ENTER "(the colour of the character to edit will change),then change it by using the up/down arrow keys. Enter the character by pressing "Q". If the "USER "code is entered, the previous menu will appear, if the "SYSTEM " code is entered, the following menu will appear.

```
+-------------------------------------------------------------------------------+
| ELENOS 2KW AMPL. <Remote Control V. x.x          - id n   <-Q-> = MAIN MENU |
+-------------------------------------------------------------------------------+
| MAIN MENU.                                                                    |
|                                                                               |
|   J = SYSTEM SERVICE                                                          |
|   ! = ANALOGIC CHANNELS CALIBRATION (CURRENT)                                 |
|   # = ANALOGIC CHANNELS CALIBRATION (VOLTAGE & TEMPERATURES)                  |
|   K = INPUT USER or SYSTEM KEY                                                |
|   A = SETTING AND READING PARAMETERS                                          |
|   B = STATUS / FAILURES LIST                                                  |
|                                                                               |
|   F = SCHEDULE        (SERVICE)                                               |
|   L = INTERRUPT ERROR (SERVICE)                                               |
|   N = INTERNAL STATUS (SERVICE)                                               |
|   V = SERIAL MONITOR  (SERVICE)                                               |
|   P = SMS PHONE AND ALARMS SETUP                                              |
|   Q = MAIN MENU (this page!)                                                  |
+-------------------------------------------------------------------------------+
```


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If the correct code has been entered, the parameters to edit will be highlighted in a different colour; the arrow keys (up, down, right, left)are used to select the field to edit; once the desired field has been reached, press "ENTER "(the colour of the field will change)and change it with the up/down arrow keys. To exit from editing a field, press "ENTER "again (the original colour of the character will be restored).

```
+-------------------------------------------------------------------------------+
| ELENOS 2KW AMPL. <Remote Control V. x.x          - id n   <-Q-> = MAIN MENU |
+-------------------------------------------------------------------------------+
|     RF CURRENTS               STATUS:                                         |
|Mod n:    A1     A2     A3     A4            B1     B2     B3     B4          |
|Id(A):                                                                         |
|---------------------------------------+-----------------------------------|
|   MAIN PSU            AUX PSU         | STAND-BY      :                   |
|  Psu  A (A):          Vcc   (5V):     | RESET         :                   |
|  Psu  B (A):          V+   (12V):     |                                   |
|  Psu  C (A):          V-   (12V):     |                                   |
|  Ids    (A):          Vds    (V):     |                                   |
|---------------------------------------| POWER LIMITER                     |
|           RF SECTION                  |  Threshold (W):                   |
|  Fwd    (W):          Eff    (%):     |  Limiting  (%):                   |
|  Ref    (W):          Input  (W):     |                                   |
|---------------------------------------| MAIN PSU------>                   |
|          TEMPERATURES                 | Max Vds    (V):                   |
|  Max RF (C):          Max PSU(C):     |                                   |
|  Env    (C):          Psu A  (C):     | LCD --------->                    |
|  Rf A   (C):          Psu B  (C):     |                                   |
|  Rf B   (C):          Psu C  (C):     | ELAPSED TIME:             :   :   |
+---------------------------------------+-----------------------------------+
```

The upper part consists of the line "STATUS: 000 CORRECT WORKING "where 000 = status code/alarm followed by description. The status or the main alarm that has disabled the equipment is displayed.
The right hand part displays the values indicated.
The left hand part (partially modifiable)comprises:
STAND-BY :=(TRUE/FALSE, modifiable)status/command RF output;
RESET :=(TRUE/FALSE, modifiable)reset alarms and protection;

Threshold (W):=Programming of the operational RF power;
Error (V):=Displays the ALC error voltage;

Max Vds (V):=Maximum voltage limit of the RF stages power supply;

LCD --------->=Programming/display of the LCD display contrast;
ELAPSED TIME:= Counter of transmission hours (H,MM,SS).

```
+-------------------------------------------------------------------------------+
| ELENOS 2KW AMPL. <Remote Control V. x.x          - id n   <-Q-> = MAIN MENU |
+-------------------------------------------------------------------------------+
|     RF CURRENTS              STATUS:                                          |
|Mod n:    A1     A2     A3     A4            B1     B2     B3     B4          |
|Id(A):     9.5    9.5    9.4    9.4           9.4    9.4    9.4    9.4         |
|-----------------------------------------+-----------------------------------|
|   MAIN PSU            AUX PSU           | STAND-BY      : FALSE             |
|  Psu  A (A): 25.0     Vcc   (5V):  5.00 | RESET         : FALSE             |
|  Psu  B (A): 25.5     V+   (12V): 11.92 |                                   |
|  Psu  C (A): 25       V-   (12V): 12.01 |                                   |
|  Ids    (A): 75.5     Vds    (V): 45.00 |                                   |
|-----------------------------------------| POWER LIMITER                     |
|           RF SECTION                    |  Threshold (W): 2050              |
|  Fwd    (W): 2500     Eff    (%): 70.7  |  Limiting  (%): 3.7               |
|  Ref    (W):   50     Input  (W): 60    |                                   |
|-----------------------------------------|                                   |
|          TEMPERATURES                   |                                   |
|  Max RF (C): 40.5      Max PSU(C): 37.3 |                                   |
|  Env    (C): 20.7      Psu A  (C): 35.5 |  LCD Contrast : 428               |
|  Rf A   (C): 40.5      Psu B  (C): 37.3 |                                   |
|  Rf B   (C): 38.4      Psu C  (C): 35.5 |  ELAPSED TIME :        200:50:42  |
+-----------------------------------------+-----------------------------------+
```


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SERVICE SCREEN.

WARNING! The user must never modify the values shown in this window!

Currents calibration screen - DR version.

```
+-------------------------------------------------------------------------------+
| ELENOS 2KW AMPL. <Remote Control V. x.x          - id n   <-Q-> = MAIN MENU |
+-------------------------------------------------------------------------------+
| GAIN AND OFFSET CALIBRATION (CURRENT, A).                                     |
|           STEP   VALUE    MUL.    DIV.   OFFS.     MIN     MAX  STO_L  STO_H|
| A1   : R1   C1      C2      C3      C4      C5      C6      C7     C8     C9|
| A2   : R2                                                                     |
| A3   : R3                                                                     |
| A4   : R4                                                                     |
| A5   : R5                                                                     |
| B1   : R6                                                                     |
| B2   : R7                                                                     |
| B3   : R8                                                                     |
| B4   : R9                                                                     |
| B5   : R10                                                                    |
| PSU A: R11                                                                    |
| PSU B: R12                                                                    |
| PSU C: R13                                                                    |
|                                                                               |
| STEP  = AD Value (0-4095)              MIN      = STEP (0-4095)               |
| VALUE = STEP * MUL./DIV + OFFS.        MAX      = STEP (0-4095)               |
| OFFS. = STEP(offset) * MUL./DIV.       STO_L(H) = Store step MIN(MAX)         |
+-------------------------------------------------------------------------------+
```

Legend:

Heading: V x.x = software version,-id n = polling address for communication.
C= Column, R= Row.
C1= Value read by the A/D converter (converter step);
C2= Converted integer value (without decimal point);
C3= Multiplier (modifiable field);
C4= Divider (modifiable field);
C5= Offset;
C6= Value (in converter steps)acquired as the lower calibration point;
C7= Value (in converter steps)acquired as the upper calibration point;
C8= Boolean (TRUE/FALSE, modifiable field)to control the acquisition of point C6;
C9= Boolean (TRUE/FALSE, modifiable field)to control the acquisition of point C7.

The automatic calibration procedures must only be performed by specialised ELENOS personnel.

R1 -R4= Amplifier current in heatsink A;
R5 = Not used;
R6 -R9= Amplifier current in heatsink B;
R10 = Not used;
R11 = Switching power supply A current;
R11 = Switching power supply B current;
R11 = Switching power supply C current;

Current calibration screen - TR version.

```
+-------------------------------------------------------------------------------+
| ELENOS 2KW AMPL. <Remote Control V. x.x          - id n   <-Q-> = MAIN MENU |
+-------------------------------------------------------------------------------+
| GAIN AND OFFSET CALIBRATION (CURRENT, A).                                     |
|           STEP   VALUE    MUL.    DIV.   OFFS.     MIN     MAX  STO_L  STO_H|
| A1   : R1   C1      C2      C3      C4      C5      C6      C7     C8      C9|
| A2   : R2                                                                     |
| A3   : R3                                                                     |
| A4   : R4                                                                     |
| A5   : R5                                                                     |
| B1   : R6                                                                     |
| B2   : R7                                                                     |
| B3   : R8                                                                     |
| B4   : R9                                                                     |
| B5   : R10                                                                    |
| PSU A: R11                                                                    |
| PSU B: R12                                                                    |
|                                                                               |
|                                                                               |
| STEP  = AD Value (0-4095)              MIN      = STEP (0-4095)               |
| VALUE = STEP * MUL./DIV + OFFS.        MAX      = STEP (0-4095)               |
| OFFS. = STEP(offset) * MUL./DIV.       STO_L(H) = Store step MIN(MAX)         |
+-------------------------------------------------------------------------------+
```

Legend:

Heading: V x.x = software version, -id n = polling address for communication.
C= Column, R= Row.

C1= Value read by A/D converter (converter step);
C2= Converted integer value (without decimal point);
C3= Multiplier (modifiable field);
C4= Divider (modifiable field);
C5= Offset;
C6= Value (in converter steps)acquired as lower calibration point;
C7= Value (in converter steps)acquired as upper calibration point;
C8= Boolean (TRUE/FALSE, modifiable field)to control the acquisition of point C6;
C9= Boolean (TRUE/FALSE, modifiable field)to control the acquisition of point C7.

The automatic calibration procedures must only be performed by specialised ELENOS personnel.

R1 -R4 = Amplifier current on heatsink A;
R5 = Not used;
R6 -R9 = Amplifier current on heatsink B;
R10 = Not used;
R11 = Traditional power supply A current;
R11 = Non switching power supply;

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Calibration screen - temperature and voltage reading calibration, DR version.

```
+-------------------------------------------------------------------------------+
| ELENOS 2KW AMPL. <Remote Control V. x.x          - id n   <-Q-> = MAIN MENU   |
+-----------------------------------------+-------------------------------------+
| GAIN CALIBRATION (VOLTAGE, V).          | GAIN DRV LOOPS.                     |
|           STEP   VALUE    MUL.    DIV.  |                                     |
| VCC  :                                  |  PSU STEP:                          |
| V+   :                                  |  ALC STEP:                          |
| V-   :                                  |                                     |
| VDS  :                                  |                                     |
| ALC E:                                  |                                     |
|                                         |                                     |
| GAIN CALIBRATION (TEMPERATURE, C).      |                                     |
|           STEP   VALUE    MUL.    DIV.  |                                     |
| AMB. :                                  |                                     |
| RF  A:                                  |                                     |
| RF  B:                                  |                                     |
| PSU 1:                                  |                                     |
| PSU 2:                                  |                                     |
| PSU 3:                                  | PSU step: Max Efficiency Loop.      |
|                                         | ALC step: Constant Reflected        |
| STEP  = AD Value (0-4095)               |                     Loop.           |
| VALUE = STEP * MUL./DIV.                |                                     |
+-----------------------------------------+-------------------------------------+
```

Legend:

Heading : V x.x = software version, -id n = polling address for communication.

STEP =A/D converter reading;
VALUE = Converted integer value (without decimal point);
MUL. =Multiplier (modifiable field);
DIV. = Divider (modifiable field);
AMB.: = Temperature -ambient;
RF A: = Temperature -heatsink RF A;
RF B: = Temperature -heatsink RF B;
PSU 1: = Temperature -switching power supply A;
PSU 2: = Temperature -switching power supply B;
PSU 3: = Temperature -switching power supply C;
PSU STEP: = Increment/decrement step value (in D/A converter steps)for the power supply voltage control loop;
ALC STEP: = Increment/decrement step value (in D/A converter steps)for the ALC reference voltage control loop for reducing the power in the event of excessive standing waves.

Calibration screen - temperature and voltage reading - TR version.

```
+-------------------------------------------------------------------------------+
| ELENOS 2KW AMPL. <Remote Control V. x.x          - id n   <-Q-> = MAIN MENU |
+-----------------------------------------+-------------------------------------+
| GAIN CALIBRATION (VOLTAGE, V).          | GAIN DRV LOOPS.                     |
|           STEP   VALUE    MUL.    DIV.  |                                     |
| VCC  :                                  |  PSU STEP:                          |
| V+   :                                  |  ALC STEP:                          |
| V-   :                                  |                                     |
| VDS  :                                  |                                     |
| ALC E:                                  |                                     |
|                                         |                                     |
| GAIN OFFSET CALIBRATION (TEMPERATURE, C). |                                   |
|           STEP   VALUE    MUL.    DIV.  |                                     |
| AMB. :                                  |                                     |
| RF A :                                  |                                     |
| RF B :                                  |                                     |
| PSU  :                                  |                                     |
|                                         |                                     |
|                                         | PSU step: Max Efficiency Loop.      |
| STEP  = AD Value (0-4095)               | ALC step: Constant Reflected        |
| VALUE = STEP * MUL./DIV.                |                     Loop.           |
|                                         |                                     |
+-----------------------------------------+-------------------------------------+
```

Legend:

Heading: V x.x = software version, -id n = polling address for communication.

STEP = A/D converter reading;
VALUE = Converted integer value (without decimal point);
MUL. = Multiplier (modifiable field);
DIV. = Divider (modifiable field);
AMB.: = Temperature -ambient;
RF A: = Temperature -heatsink RF A;
RF B: = Temperature -heatsink RF B;
PSU : = Temperature -heatsink of rectifiers of power supply A and B;
PSU STEP: = Increment/decrement step value (in D/A converter steps)for the power supply voltage control loop;
ALC STEP: = Increment/decrement step value (in D/A converter steps)for the ALC reference voltage control loop for reducing power in the event of excessive standing waves.

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3.4.1 SMS Functioning

This version is an upgrade of the telemetry system incorporated in the software of the E2000 equipment, which allows to control the machine by text messages sent through the GSM network.
The SMS control is active only on a single apparatus, therefore it will not be possible to control combined systems with text messages, but they will be manageable via GSM modem or via telephone line.
This is the reason why the GSM communication will be active only when the equipment's address is "0".

Functions description

You can have access to the SMS functions by selecting "P = SET SMS PHONE NUMBERS", used for the programming of the permissions of every registered user.

```
+-------------------------------------------------------------------------------+
| ELENOS    2 KW AMPL. <Remote Control V.   2.0     - id 0>          MAIN MENU |
+-------------------------------------------------------------------------------+
| MAIN MENU.                                                                    |
|   J = SYSTEM SERVICE                                                          |
|   ! = ANALOGIC CHANNELS CALIBRATION (CURRENT)                                 |
|   # = ANALOGIC CHANNELS CALIBRATION (VOLTAGE & TEMPERATURES)                  |
|   K = INPUT USER or SYSTEM KEY                                                |
|   A = SETTING AND READING PARAMETERS                                          |
|   B = STATUS / FAILURES LIST                                                  |
|   O = LOGOFF                                                                  |
|                                                                               |
|   F = SCHEDULE         (SERVICE)                                              |
|   L = INTERRUPT ERROR (SERVICE)                                               |
|   N = INTERNAL STATUS (SERVICE)                                               |
|   V = SERIAL MONITOR  (SERVICE)                                               |
|   P = SET SMS PHONE NUMBERS                                                   |
|                                                                               |
|   Q = MAIN MENU (this page!)                                                  |
|                                                                               |
+-------------------------------------------------------------------------------+
```

The programming of the user accounts can be done locally, by connecting a PC to the equipment, or remotely. It will be possible, beside managing the basic functions of the machine, to enable/disable the accounts, modify the telephone numbers, change the permissions and select the alarm type or the notice to send to the user.

ACCOUNT PROGRAMMING

In order to use the equipment in the SMS mode it is necessary to digit the telephone numbers (up to 5 users) of all the people who will have access to the functions. The system will not accept any type of command from telephone numbers which are not in the list or which are, but are disabled.

Programming with a laptop:
1. Prepare an E2000 - PC connecting cable following the instructions present in the technical manual.
2. Prepare a "hyperterminal" session for a "direct connection to COMx" (set up the port to which you will connect the E2000) with the following communication parameters: 8,N,1 -9600 Baud -No local echo - No Handshaking.
3. Connect the PC to the amplifier.
4. Make sure dip switch 8 is positioned on the left (see Appendix "A". SMS communication disabled, default set up), then turn the amplifier on.
5. Follow the operations described in the "Configuration" passage.
6. Switch dip switch 8 to the right (activation of the SMS communication).
7. Connect the GSM modem to the IEEE485 port (prepare an E2000 - modem cable following the instructions present in the technical manual).
8. Make sure the modem is switched on and reset the equipment (press the "reset" key for longer than 2 seconds)
9. The display will show a message saying that the modem initialisation is running. Once the initialisation is over the display will show the Main Menu.

Programming from a remote terminal:
1. Prepare an E2000 - Modem cable
2. Switch dip switch no. 8 to the right (see Appendix "A". SMS communication activated)
3. Switch the modem on and connect it to the amplifier
4. Reset (press the "reset" key for longer than 2 seconds) the amplifier and wait for the modem initialisation.
5. Connect, using the remote terminal, to the amplifier and follow the instructions described in the "Configuration" passage.

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Configuration:
After having typed in the password ("K" key), press the "Q" key to go back to the Main Menu, then press "P" to enter the account configuration window.

```
+-------------------------------------------------------------------------------+
| ELENOS    2 KW AMPL. <Remote Control V.   2.0     - id 0>          MAIN MENU |
+-----------------------------------+---------+---------+---------+---------+
|    SMS CONFIGURATION              | Enable  | Enable  | Enable  | Enable  |
|                                   |  this   | status  | command | global  |
|                                   | account | request | execute | echo rx |
|    Example   :  +393371234567890123 |---------+---------+---------+---------|
|    Phone N.1:  +3933811111111     |  TRUE   |  TRUE   |  TRUE   | TRUE    |
|    Phone N.2:  +3933822222222     |  TRUE   |  TRUE   |  TRUE   | TRUE    |
|    Phone N.3:  +3933833333333     |  TRUE   |  FALSE  |  TRUE   | FALSE   |
|    Phone N.4:  +3933844444444     |  TRUE   |  TRUE   |  FALSE  | FALSE   |
|    Phone N.5:  +3933855555555     |  FALSE  |  TRUE   |  TRUE   | TRUE    |
|-----------------------------------+---------+---------+---------+---------|
| PWR-UP ALARM:                     |  TRUE   |                               |
|  -3dB  ALARM:                     |  FALSE  |                               |
|-----------------------------------+---------+-------------------------------|
|    ID STRING:  ELENOS2500         | COMMAND EXAMPLE:  on, PWR 1800, res     |
|-----------------------------------+ Sets PA on air at 1800W output and      |
| Commands: PWR 1234 - set out pwr  | resets the alarm counter.               |
|           ON       - on air       | Commands must be separated by commas.   |
|           STBY     - stand-by     | A space must be inserted between        |
|           RES      - reset alarms | PWR and the value required.             |
|           STS      - status request | Commands are case insensitive.        |
+-----------------------------------+-----------------------------------------+
```

(note: the fields in italic are modifiable by the user)

Type in the telephone numbers (leaving no space at the beginning) also adding the Country code (e.g. +393371234567) and programme the permissions for each number.

Permissions:
"Enable this account": if it is on 'true' mode, the account is enabled for reception and transmission.
"Enable Status Request": if it is on 'true' mode, the user will be able to check the equipment functioning status.
"Enable Command Execute": if it is on 'true' mode, the user will be able to send commands to the equipment (ON-STBY-RES-PWR) otherwise they will not be accepted.
"Enable Global Echo": if it is on 'true' mode, the user will receive notices regarding the other users' actions.
On the instance presented above, users 1 and 2 have the highest permissions since they have the power to make the equipment respond to the commands, they can check its functioning and they receive notice of all the other users.
User no.3 can not receive messages of global notice, he can not require the functioning status, but he can send command to the equipment.
User no.4 can only require the functioning status.
User no.5 would have the highest permission but his account is disabled, therefore he will have no control over the equipment.

Choose the kind of notice sent by the equipment:
PWR-UP: if it is on 'true' mode, once the equipment is connected to the network, it will send, after 2 minutes, a status message confirming the system activation.
3dB Alarm: if it is on 'true' mode the equipment will send a status message whenever the output power level of the machine is less than half of the figure set in the "POWER LIMITER".
If one wants it is possible to modify the equipment ID STRING by typing in an alphanumeric string of 10 characters maximum.
The programming is now complete; if it has been done using a remote terminal, it is preferable to end the communica-

before sending any SMS command to the equipment.
It is important to remember that the equipment will neither transmit nor receive any command if the terminal is active.
Once the communication is ended one can try to send some commands to the machine.

COMMANDS:

Any enabled user can send commands to the equipment, which to confirm the reception and execution of the order, will send a status message after a short period of time.
Note: this period of time is the little while in between the reception of the command message and the emission of the status message. To this the GSM network transition time is added and can sometimes be quite long, depending on how busy the network is.

The commands currently implemented in the equipment are:

Command	**Sintax**	**Example**	**Latency**	**Notes:**
Switching-on	ON	ON	30 s	
Stand By	STBY	STBY	10 s	
Power setting	PWR nnnn	PWR 1200	30 s	1000W≦PWR≦2200
Alarm reset	RES	RES	10 s	
Status?	STS	STS	10 s	

The commands can be sent one by one, or, if separated by commas, several messages can be sent all in the same message:

e.g. single command: ON e.g. multiple command: ON,PWR 1500,RES

The first command will turn on the equipment, the second one will turn on the equipment, set the output power to 1500W and reset the protection counter.
Make sure you follow exactly the indicated syntax otherwise the equipment will not respond to your commands.

STATUS MESSAGE

The status message is a summarising indication of the equipment's functioning parameters and it is composed as follows:

1 ELENOS
2 PHCMD ID 02
3 Status
4 000 CORRECT WORKING
5 FWD 2000 W
6 REFL 0 W
7 V 45.0 V
8 I 70.0 A
9 T.Max RF 45 C
10 T.Max PSU 47 C
11 T.Env 27 C
12 ON

Row 1: ID STRING, and 10 characters alphanumeric string modifiable by the user.
Row 2: Message source "PhoneCoMmanD ID nn".
The ID of the user who sent the command is visualised. The messages coming from the equipment itself have "00" as ID.
In this example the status message indicated that the command has been sent by user no. 2.
Row 3: Alarm type or notice (Pwr Up, -3dB Alarm, Status) that are sent.
Row 4: Status row. Currently active highest priority alarm.
Row 5: Direct power.
Row 6: Reflected power.

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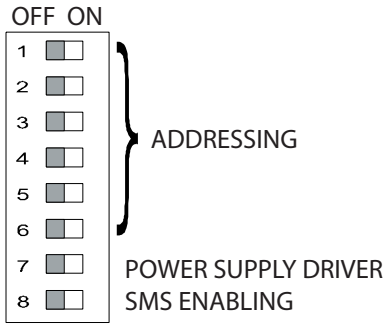
Row 7: Rf Power supply voltage
Row 8: Rf total current.
Row 9: Rf groups maximum temperature.
Row 10: Power supply maximum temperature.
Row 11: Ambient Temperature.
Row 12: Functioning Status (ON, STBY).

NOTE ON MODEMS AND THE SIM CARD:

Some modems, like the Siemens TC35, can not memorise a configuration predefined by the user, therefore the E2000 must re-initialise them whenever it gets switched on. If by any chance, the connected modem gets turned off, it will not be able to communicate neither via terminal nor via text messages since there will no longer be any configuration. If this ever happens as a consequence of maintenance operations or anything else, do not reset or switch the E200 off. Once the modem is reconnected, you will simply need to select the "GSM MODEM CONFIG" menu from the front panel, press "ENTER" once to enter the menu and once more to start the initialisation procedure.
The process will end when the "INIT" field is on the "TRUE" mode.
Check the modem communication is correct by entering the "GSM FIELD STRENGHT" menu and by reading the level of reception of the field. This function is useful for the correct setting of the antenna too, and as far as this is concerned we recommend that you use a directive antenna pointed at the closest GSM repeater.
If the level remains on the "-113dBm" indicator, there could be either serial communication problems to and from the E2000, antenna problems or the modem could be having problem registering on the network.
We would like to remember that the PIN number of card to be inserted in the Modem must be disabled, otherwise it will be impossible for the modem to register on the network.
If the field of reception is satisfactory (-80dBm at least) the equipment will be ready to work.
We would like to remember that in case of heavy traffic in the GSM network it could be hard, if not impossible, to obtain the connection via the terminal and/or the messages may be considerably delayed. Such drawbacks do not depend on the device or the chosen modem but are characteristic of the GSM network and can appear in different ways depending on the network administrator or the cell serving the working zone of the modem.

Appendix A

Configuration Dip Switch.



Dip Switch 1 - 6

Dip switches from 1 to 6 are used for the addressing of the equipment when it operates in a combined system, or when the same modem is used to monitor several machines.
The address is inserted according to the binary code and the weight of every switch equals the power of 2 raised to n-1, where "n" corresponds to the switch number on the "ON" mode.

Therefore if one wants to set the equipment with 22 as address, one will have to programme the switches as follows:

1=OFF (weight 2 ^0 =1)
2=ON (weight 2 ^1 =2)
3=ON (weight 2 ^2 =4)
4=OFF (weight 2 ^3 =8)
5=ON (weight 2 ^4 =16)
6=OFF (weight 2 ^5 =32)

Totale =2 +4 +16 =22

The address 0 (default) is the one of the equipment alone. For combined systems or for several machines connected to the same modem one will have to choose the addresses going from 1 to 63.
We would like to remember that the management of the equipment via text messages will be active only for single machines having the address "0".

**Dip switch 7

Power supplier energy selection:

OFF = TR version
ON = DR switching version

**WARNING!

This dip switch is set up at the factory according to the kind of power supplier that goes with the amplifier and must not be modified, unless the power supplier is changed.

Dip switch 8

Activation of text messaging management:
OFF = disabled SMS communication (default).
ON = Enabled SMS communication.

It is possible to disable the SMS communication whenever there is not a GSM modem connected to the equipment or in case one is not interested in this kind of service, so that there is no need to wait for the modem initialisation during the powering up of the machine.

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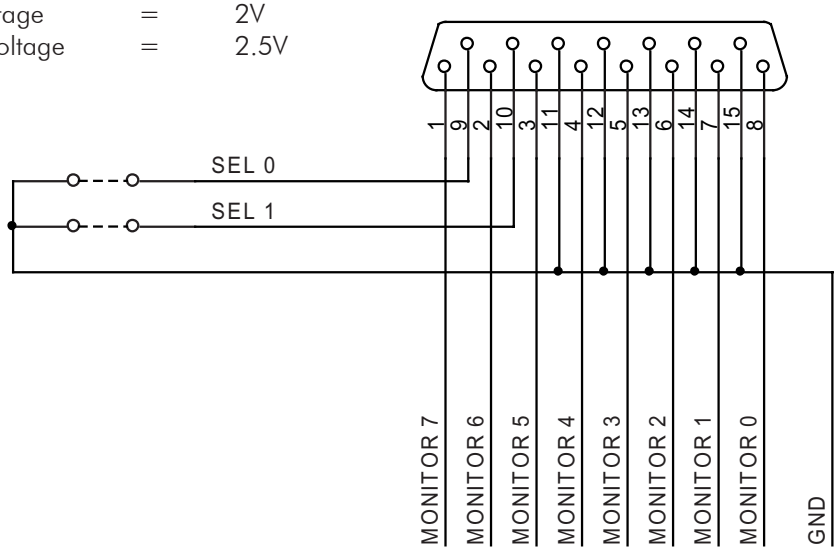
3.5. Analog measurements connector

This connector is located on the front panel of the E2500 amplifier and enables connection to a telemetry system with analog inputs.
It is possible to select the various measurement banks (0- modules currents, 1 - power supply voltage/current, 2 - temperature, 3 - power/efficiency) by connecting the two input selectors SEL 0 and SEL 1 to ground.
The electrical characteristics of the port are as follows:

Output impedance = 11K
Full-scale voltage = 2V
Max output voltage = 2.5V



SEL0	SEL1	MON 0	MON 1	MON 2	MON 3	MON 4	MON 5	MON 6	MON 7
CLOSED	CLOSED	FWD	REF	IN PWR	ERR V	VDS	Id	Tmax RF	Tmax PSU
CLOSED	OPEN	I PSU A	I PSU B	I PSU C	VDS	+5V	+12V	-12V	Currents sum
OPEN	CLOSED	Temp PSU A	Temp PSU B	Temp PSU C	None	Temp Env	Temp RF A	Temp RF B	None
OPEN	OPEN	I a1	I a2	I a3	I a4	I b1	I b2	I b3	I b4

Full scale voltage = 2V

RF Modules currents I A1..3 I B1..3 = 20A f.s.
Power supply currents (I PSU A..C) = 100A f.s.
Mosfet supply voltage (Drain supply voltage VDS) = 100V f.s.
Aux power supplies +5V +12V -12V = 20V f.s.
Temperatures T PSU 1..3 T ENV T RF A..B = 100°C f.s.
Forward power =2500W f.s.
Reflected Power =200W f.s.
Driver power (IN PWR)= 200W f.s.
ALC limiting voltage = 2V f.s.

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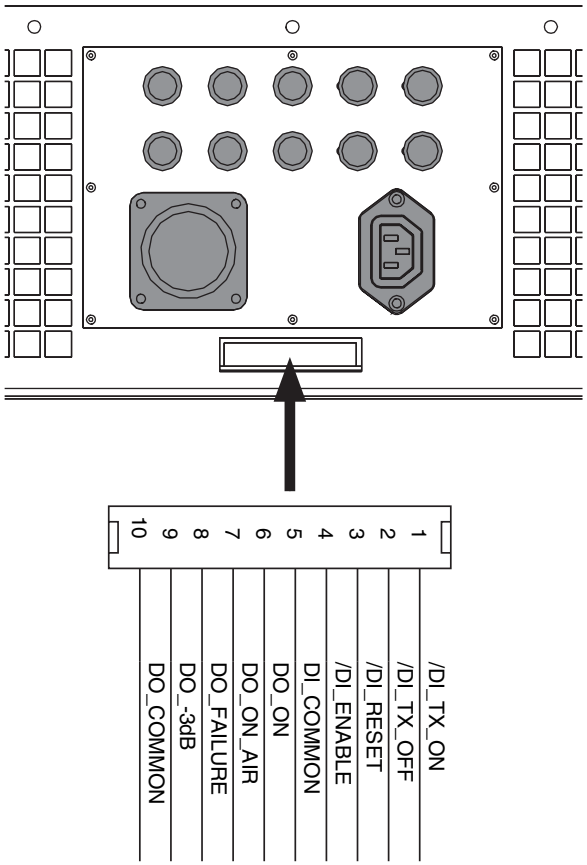
3.6. Diagnostics connector



DI_TX_ON: Short-circuit with DI_COMMON for greater than 100 ms to enable transmission.

DI_TX_OFF: Short-circuit with DI_COMMON for greater than 100 ms to put into stand-by.

DI_RESET: Short-circuit with DI_COMMON for greater than 100 ms to reset the protection counter.

DI_ENABLE: Short-circuit with DI_COMMON to enable operation of the unit. In the case of stand-alone operation, it is necessary to short-circuit these two pins permanently; if used as a driver, the pin should be connected to the "INTERLOCK" input of the equipment being driven.

DI_COMMON: Common contact for the inputs.

DO_ON: Shorted to DO_COMMON when the following condition is verified: STAND-BY = TRUE BLOCKED=FALSE DI_ENABLE=CLOSED.

DO_ON_AIR: Shorted to DO_COMMON when the unit is not in STAND_BY condition.

DO_FAILURE: Shorted to DO_COMMON when the unit is blocked. The front panel display, in "Alarms List" menu, will show the "BLOCKED" message.

DO_ -3dB: Shorted to DO_COMMON when the unit is transmitting and the output power is less than half respect to the value programmed in the "POWER LIMITER SETTINGS" menu. The delay for this alarm is about 60 seconds.

DO_COMMON: Common contact for the outputs.

Note: The maximum current applied to any output contact must not exceed 500mA.

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4.1. Introduction

This is an amplifier designed to be easily transported and installed. The three sections of which it consists (power supply, RF section and ventilation panel) can be easily separated to facilitate transport.

Particular care has been taken in the development of the RF section, featuring eight amplifier modules able to deliver a combined continuous output power of more than 2700W. The microstrip combiners are gold-plated to avoid oxidization by atmospheric agents and can support any conditions of imbalance caused by the breakdown or malfunctioning of one or more of the amplifier modules.

The RF section features its own control and protection circuit which guarantees constant supervision of the amplifier modules, even in the case of a failure of the main control logic.

The power supply section is available in two versions, the direct switching version (DR) or the linear, transformer version (TR).

Both are generously over-specified and, in the event of breakdown of a subsection (three for the switching supply, two for the linear one), it is still possible to generate forward power.

The switching version features several interesting characteristics and functions: it is possible to configure the power supply to work at 220V single phase, 380V three-phase and 220V three-phase. The microprocessor is able to control the efficiency of the amplifier by varying the voltage of the power supply and can manage temperature protection by progressively limiting the output power.

The front panel includes the logic control unit and the ventilation system. A V25 (8086) microprocessor has been used which, thanks to its performance, provides a remote control function, as standard, on all versions of the series.

4.1.1. Protection

As far as possible, the microprocessor attempts to maintain operation of the unit even in extreme conditions, gradually reducing the output power to a maximum of 3dB with respect to the programmed output power. Beyond this limit, the amplifier will shut itself down and if during the course of several hours, the shutdown condition occurs more than three times, the unit will shutdown indefinitely, requiring operator intervention.

The protection counter can be reset and an attempt made to restart the unit, even via remote control; a diagnosis of the problem can also be made in this way, before visiting the site.

4.1.2. Measurements

The directional coupler for measuring forward and reflected power, is thermocompensated in order to resist variations of ambient temperature. All the transducers present in the unit are designed for total immunity to RF fields to prevent problems arising from false readings.

All operational parameters, besides being displayed on the front panel, are available in analog form, for users wanting to connect the unit to a telemetry system.

4.1.3. Telemetry

Thanks to the power of the microprocessor, it is possible to connect a simple but efficient remote control system to all versions, as standard, with a user interface based on the common ANSI terminal.

This solution allows anyone in possession of any computer, with any operating system, to interact with the unit.

All that is needed is standard communication software which is able to emulate an ANSI terminal. Examples of DOS or WINDOWS software include Procomm, Telix and Hyperterminal.

The telemetry allows all the operating parameters of the unit to be displayed; it allows the output power to be adjusted and the unit to be put into stand-by.
The connection can be made via a normal telephonic modem, or a GSM modem.
For connecting to a pre-existing telemetry system, all the readings are available in analog form, via a connector located on the front panel. The power levels (forward or reflected) are linear to facilitate display on a standard linear scale.

4.1.4. Indicators

In addition to the alphanumeric 24x2 display, the following indicator leds are visible on the front panel:

OnAir = Transmitter ready to operate.

Fault = If flashing, an alarm is, or has been, active.
If the cause of the alarm is no longer active, the led will switch off when the "RESET" button is pressed momentarily.

Mains = The line supply voltage is present and the diagnostic board program has run correctly.

Pwr = driver power level:
Yellow: driver power is insufficient to reach the power programmed in "POWER LIMITER SETTINGS". *Warning !* In the event of failure of one or more of the RF modules, it will be impossible to reach maximum output power, even if the unit is over-driven. In this case, the value programmed in the "POWER LIMITER SETTINGS" menu should be reduced.
Green: driver power is at the correct level and the power limiter is in operation (error voltage "Err" > 0V).
Red: Driver power is excessive for the required output power. The maximum power level that the input of the unit will tolerate is about 100W; if the input power is below this limit, the unit will continue to operate correctly, even if excess driver power is indicated.

StBy = The unit is in stand by

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4.3. Power supply section

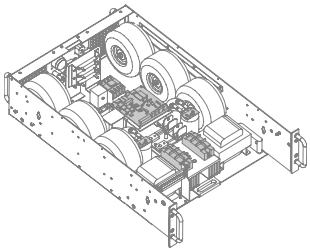
The E2500 unit is available in two versions: the linear power supply version (E2500TR) and the switching power supply version (E2500DR).

It is possible to modify the latter to operate in three-phase or single phase configuration at 220 or 380 V.

The linear power supply version, however, can only operate at 220 or 380V three-phase.

4.3.1. Linear power supply

This comprises two rugged sections connected in parallel. The transformers and rectifier are protected against over-temperature and current overload (45 A max. per section).

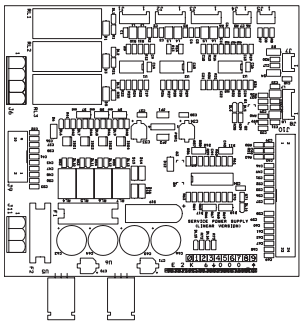


4.3.1. Switching power supply

This consists of three units connected in parallel and balanced by a current-sharing circuit. Each section is protected against over-temperature and over-current.

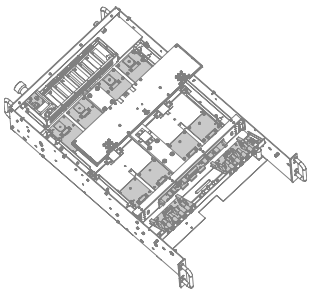
4.3.2. Auxiliary power supply

This board is slightly different in the two versions, DR and TR, and supplies the unit with all the supply voltages for the control circuits and also receives the signals from the user interface connector (USER INTERFACE) and transfers them to the CPU.



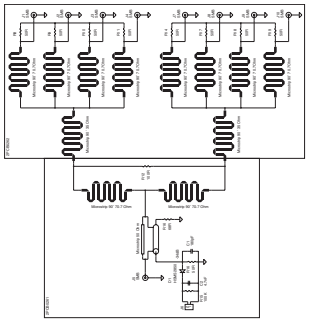
4.4. Radio frequency section

Comprises two banks of 1000W, each containing a total of eight 300W modules. The power combiners are designed to allow operation of the unit in any unbalanced condition caused by the failure of one or more RF modules.



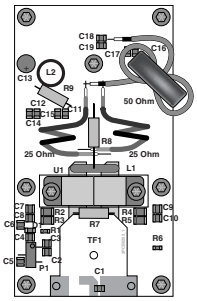
4.4.1. Input splitter

This is a classic Wilkinson splitter with eight outputs using micro-strip technology



4.4.2. RF modules

These are designed using planar technology for the input impedance transformer and a transmission line transformer for the output matching circuit.



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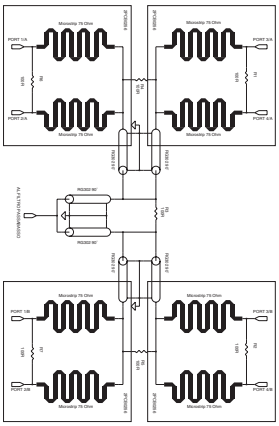
4.4.3. Output combiner

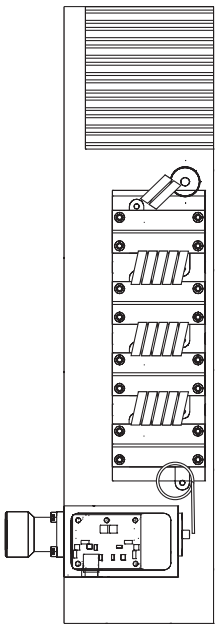
This is a Wilkinson combiner constructed partly with microstrip technology and partly using coaxial cable.
To ensure better corrosion resistance, the microstrip section is gold-plated.



4.4.4. Low-pass filter and directional coupler

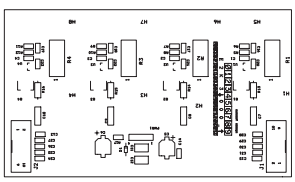
This filter removes the harmonics generated by the non-linear operation of the amplifier and guarantees a level of residual harmonics and spurious signal content within current regulations.

The directional coupler is thermally compensated and allows reading of both forward and reflected power.



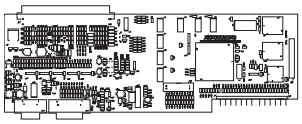
4.4.5. Shunt boards

These boards are housed in the front part of the RF section and individually measure the currents drawn by the 8 power modules.



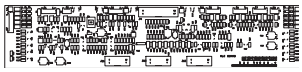
4.4.6. CPU board

The board is designed around the NEC V25 (Intel 8086), a powerful microprocessor which enables easy and reliable control of the unit.



4.4.7. ALC board

This board, housed in the front of the RF section, gathers and normalises the readings from all the sensors present in the RF section, stabilizes the output power at the value set by the user, protects the RF section in the event of excessive SWR and interacts with the CPU board for displaying data.



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Component list

Ref.	Description
BRDG1	130MT80KB
BRDG2	130MT80KB
C1	15000uF
C2	15000uF
C3	15000uF
C4	15000uF
C5	100nF
C6	100nF
C7	100nF
F1	6.3AT
F2	6.3AT
F3	6.3AT
F4	6.3AT
F5	6.3AT
F6	6.3AT
F7	1AT
F9	500mAT
F8	500mAT
F10	4AT
J1	CON2
J2	CON2
J7	CON3
J3	CON3
J4	CON4
J5	CON4
J6	CON4
J8	CIRCLE
J32	CON MC4
K1	Telemecanique LC1 D1810M7
K2	OMRON MK3P5-S
L2	500uH
L1	500uH
R1	50/20W
R2	50/20W
R3	50/20W
R4	330/10W
R5	330/10W
R6	0.0012R
R7	0.0012R
T1	TF
T2	TF
T3	TF
T4	TF
T5	TF
T6	TF
T7	PR. 220V sec 15 + 15 V 2A

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Component list

Ref.	Description
D1	40EPS08
D2	40EPS08
D3	40EPS08
F4	VD. CONFIG
F5	VD. CONFIG
F6	VD. CONFIG
F7	VD. CONFIG
J1	CON3
J2	CON3
J4	CON3
J3	CON4
K1	Telemecanique LC1 D1810M7
S1	INT. MAGNETO-TERMICO
T1	PR. 220V sec 15 + 15 V 2A

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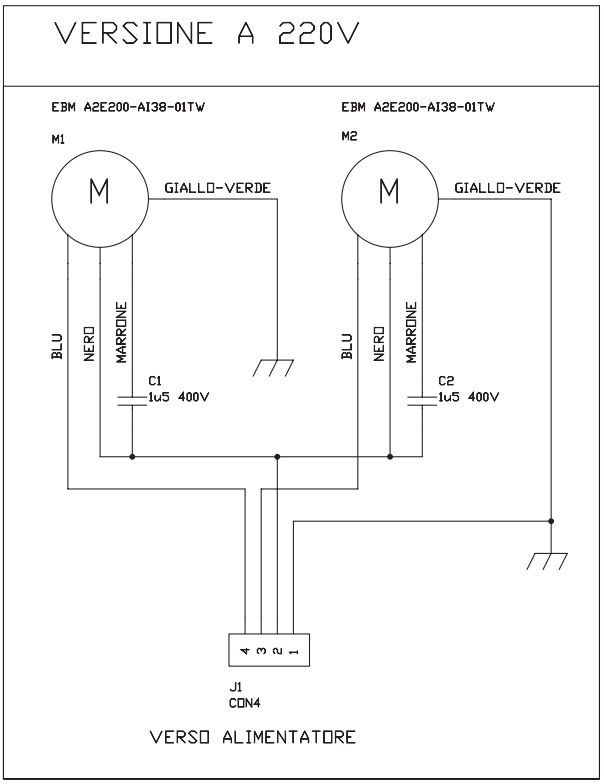

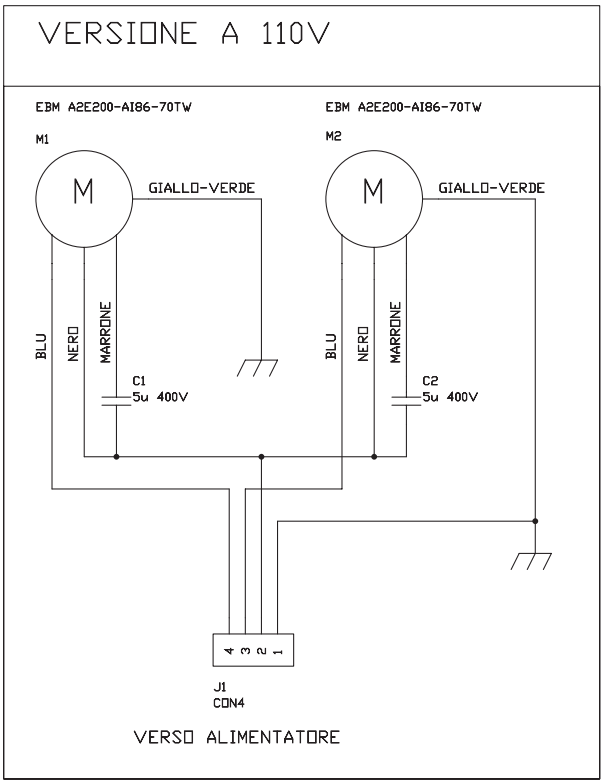

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Website WWW.ELENOS.COM

Title:	COOLING FAN SUBASSEMBLY	
Board Code:	Model: E2500	Rev 0
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli	
Date: Wednesday, November 15, 2000	Sheet 1 of 1	

Component list

Ref.	Description
C1	1u5 400V
C2	1u5 400V
C2	5u 400V
C1	5u 400V
J1	CON4
J1	CON4
M1	EBM A2E200-AI38-01TW
M2	EBM A2E200-AI38-01TW
M2	EBM A2E200-AI86-70TW
M1	EBM A2E200-AI86-70TW

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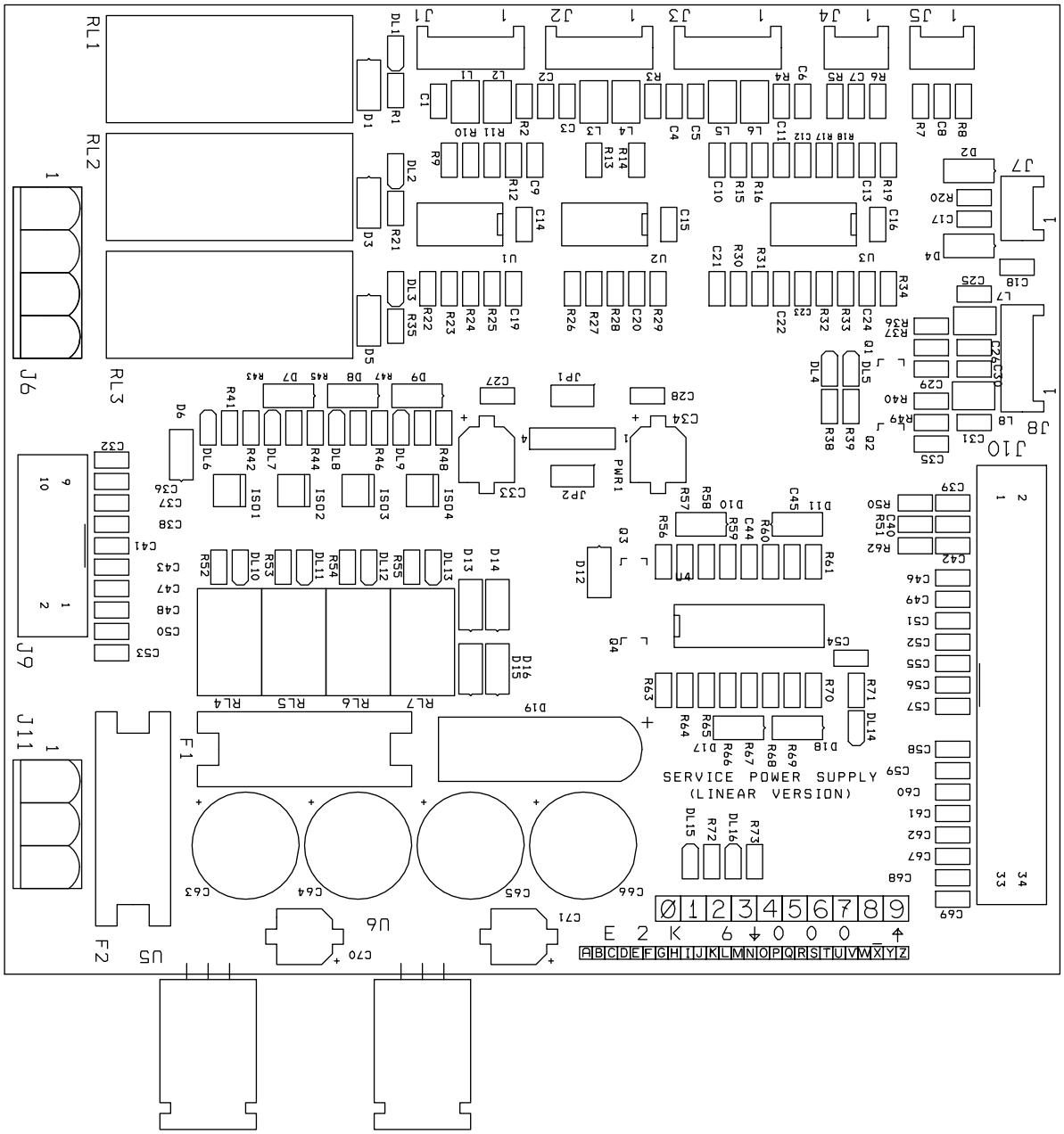

Via G.Amendola 9 44028 Poggio Renatico (FE) Italy Tel +39 0532 829965 Fax +39 0532 829177 Website WWW.ELENOS.COM		
Title: SERVICE POWER SUPPLY (LINEAR VERSION)		
Board Code: E2K 6A000_2	Model: E2500	Rev 2
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli	
Date: Friday, September 26, 2003	Sheet 1 of 1	

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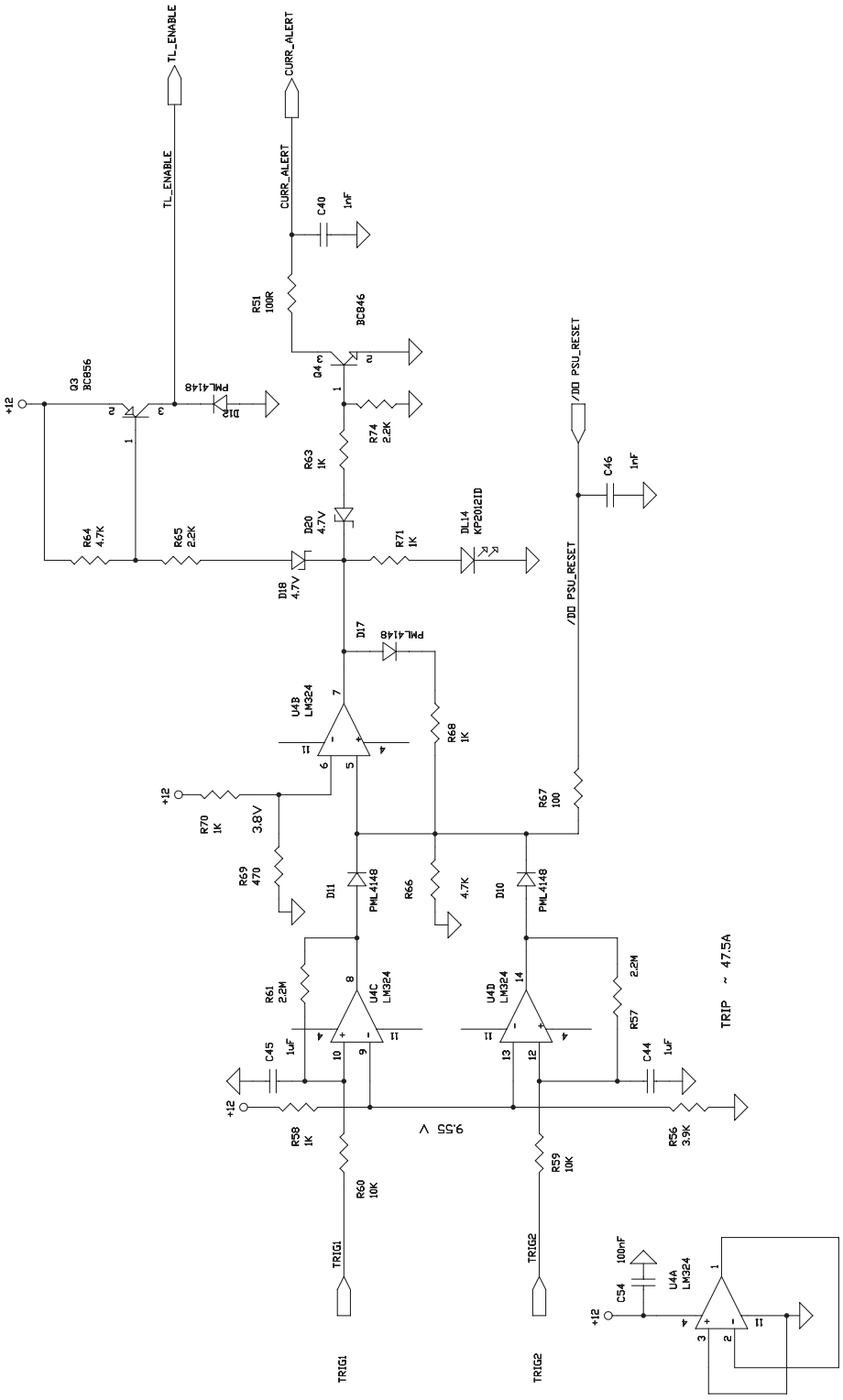

ELENOS	Via G.Amendola 9 44028 Poggio Renatico (FE) Italy Tel +39 0532 829965 Fax +39 0532 829177 Website WWW.ELENOS.COM
Title:	OVERCURRENT PROTECTION (LINEAR VERSION)
Board Code: E2K 6A000_1	Model: E2500 — Rev 1
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli
Date: Wednesday, November 15, 2000	Sheet 2 of 5

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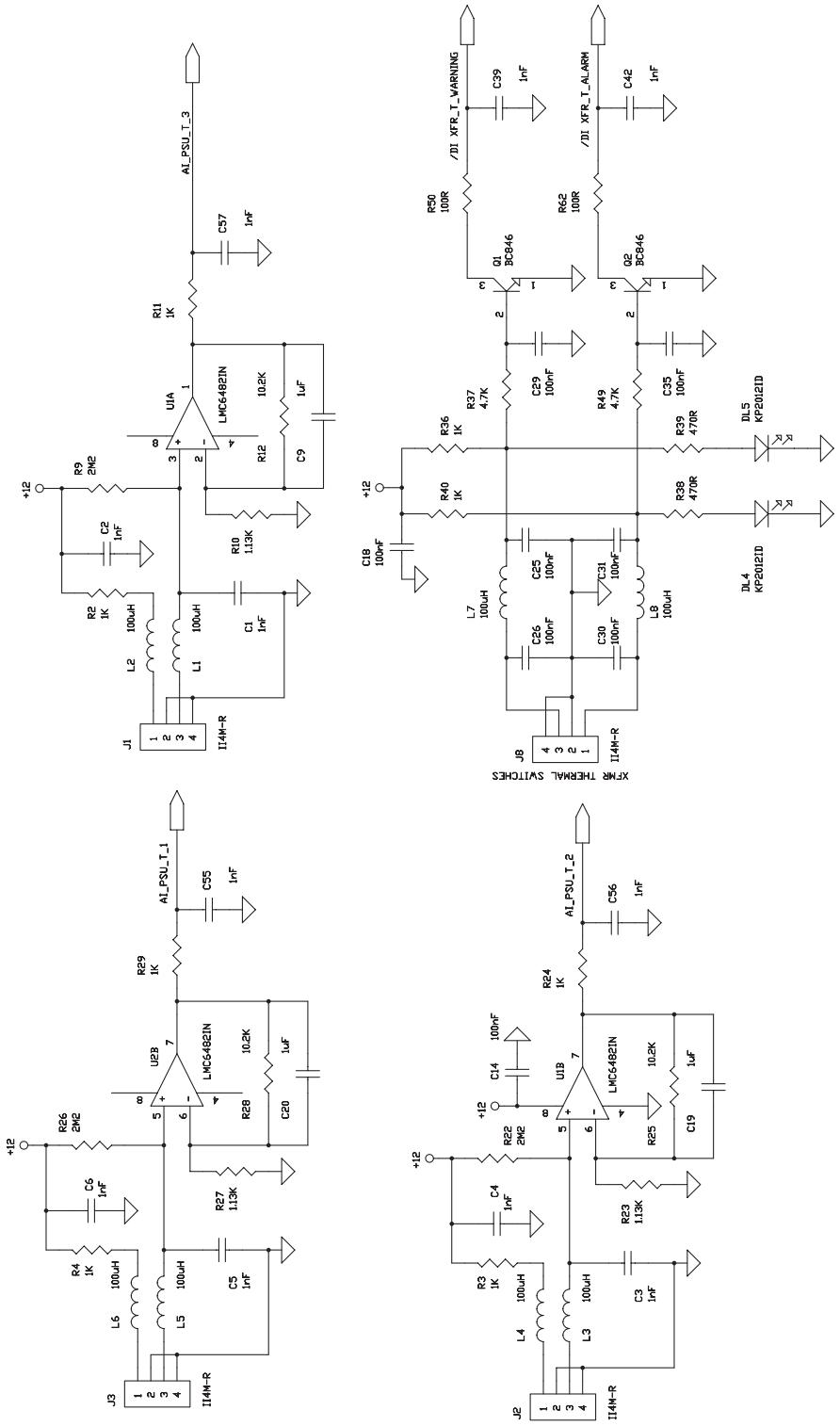
E-Mail: support@elenos.com



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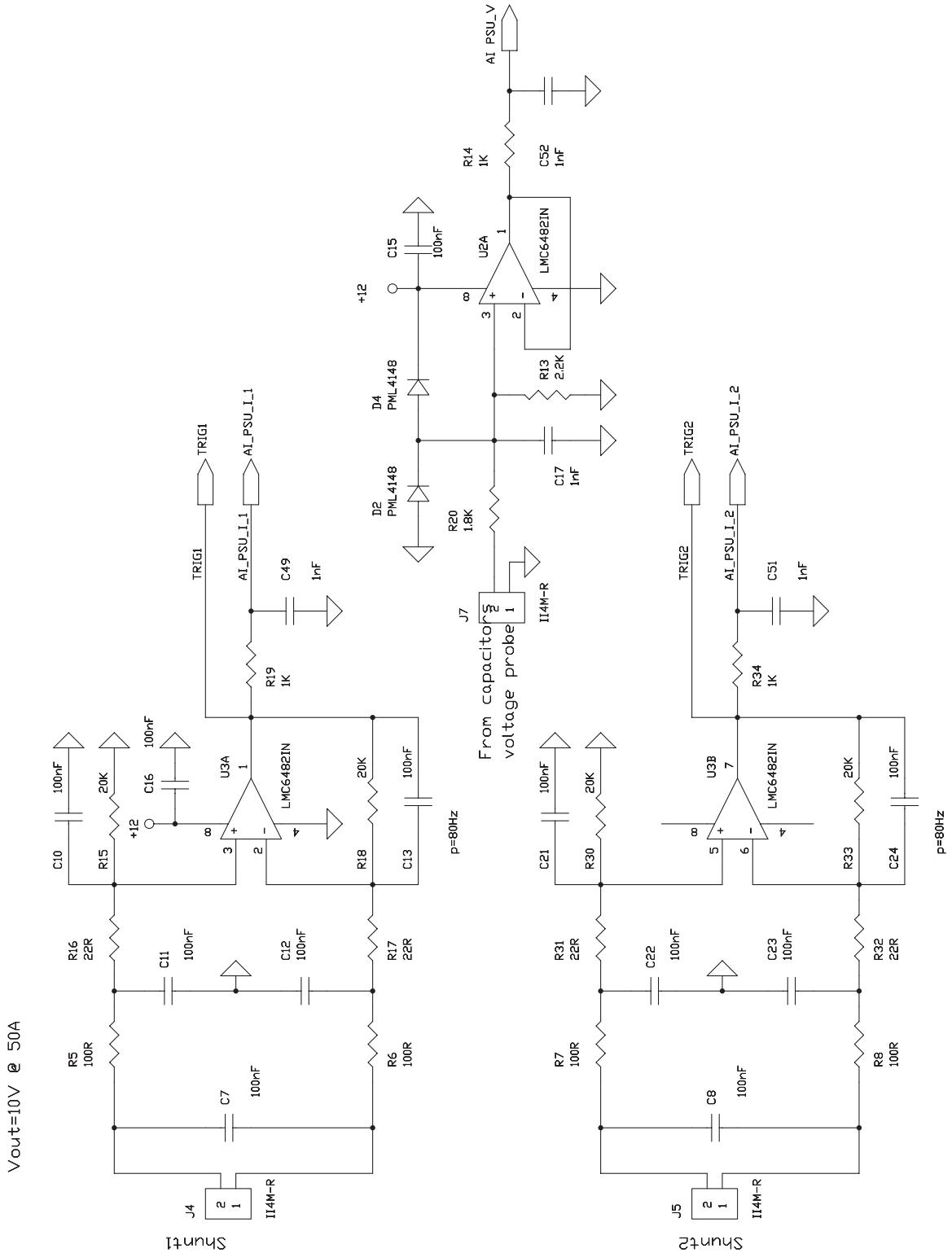
Tel +39 0532 829965 Fax +39 0532 829177
Website WWW.ELENOS.COM

Title: THERMAL PROBES AMPLIFIERS (LINEAR VERSION)		
Board Code: E2K 6A000_1	Model: E2500	Rev 1
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli	
Date: Wednesday, November 15, 2000	Sheet 4 of 5	



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Title: CURRENT-VOLTAGE PROBES AMPLIFIERS (LINEAR VERSION)	
Board Code: E2K 6A000_1	Model: E2500 — Rev 1
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli
Date: Wednesday, November 15, 2000	Sheet 5 of 5

Component list

Ref.	Description
C1	1nF
C2	1nF
C3	1nF
C4	1nF
C5	1nF
C6	1nF
C17	1nF
C32	1nF
C36	1nF
C37	1nF
C38	1nF
C39	1nF
C40	1nF
C41	1nF
C42	1nF
C43	1nF
C46	1nF
C47	1nF
C48	1nF
C49	1nF
C50	1nF
C51	1nF
C52	1nF
C53	1nF
C55	1nF
C56	1nF
C57	1nF
C58	1nF
C59	1nF
C60	1nF
C61	1nF
C62	1nF
C67	1nF
C68	1nF
C69	1nF
C7	100nF
C8	100nF
C10	100nF
C11	100nF
C12	100nF
C13	100nF
C14	100nF
C15	100nF
C16	100nF
C18	100nF
C21	100nF
C22	100nF
C23	100nF
C24	100nF
C25	100nF
C26	100nF
C27	100nF
C28	100nF
C29	100nF
C30	100nF

Component list

Ref.	Description
C31	100nF
C35	100nF
C54	100nF
C9	1uF
C19	1uF
C20	1uF
C44	1uF
C45	1uF
C33	100uF 25V
C34	100uF 25V
C70	100uF 25V
C71	100uF 25V
C63	1000uF 25V
C64	1000uF 25V
C65	1000uF 25V
C66	1000uF 25V
DL1	KP2012SGD
DL2	KP2012SGD
DL3	KP2012SGD
DL6	KP2012SGD
DL7	KP2012SGD
DL8	KP2012SGD
DL9	KP2012SGD
DL10	KP2012SGD
DL11	KP2012SGD
DL12	KP2012SGD
DL13	KP2012SGD
DL4	KP2012ID
DL5	KP2012ID
DL14	KP2012ID
DL15	LED VERDE
DL16	LED VERDE
D1	PML4148
D2	PML4148
D3	PML4148
D4	PML4148
D5	PML4148
D6	PML4148
D7	PML4148
D8	PML4148
D9	PML4148
D10	PML4148
D11	PML4148
D12	PML4148
D13	PML4148
D14	PML4148
D15	PML4148
D16	PML4148
D17	PML4148
D20	4.7V
D18	4.7V
D19	KBU8D
F2	FUSE
F1	FUSE

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Component list

Ref.	Description
H1	HOLE3.5MM
H2	HOLE3.5MM
H3	HOLE3.5MM
H4	HOLE3.5MM
ISO1	TLP181
ISO2	TLP181
ISO3	TLP181
ISO4	TLP181
JP1	JUMPER
JP2	JUMPER
J1	II4M-R
J2	II4M-R
J3	II4M-R
J4	II4M-R
J5	II4M-R
J7	II4M-R
J8	II4M-R
J6	W4M-R
J9	5+5M-R
J10	17+17M-R
J11	W3M-R
L1	100uH
L2	100uH
L3	100uH
L4	100uH
L5	100uH
L6	100uH
L7	100uH
L8	100uH
PWR1	NME1212S
Q1	BC846
Q2	BC846
Q4	BC846
Q3	BC856
RL1	JW1FSN-12VDC
RL2	JW1FSN-12VDC
RL3	JW1FSN-12VDC
RL4	OMRON G5V-1 12VDC
RL5	OMRON G5V-1 12VDC
RL6	OMRON G5V-1 12VDC
RL7	OMRON G5V-1 12VDC
R1	1K
R2	1K
R3	1K
R4	1K
R11	1K
R14	1K
R19	1K
R21	1K
R24	1K
R29	1K
R34	1K
R35	1K
R36	1K
R40	1K

Component list

Ref.	Description
R42	1K
R44	1K
R46	1K
R48	1K
R52	1K
R53	1K
R54	1K
R55	1K
R58	1K
R63	1K
R68	1K
R70	1K
R71	1K
R72	1K
R73	1K
R5	100R
R6	100R
R7	100R
R8	100R
R50	100R
R51	100R
R62	100R
R9	2M2
R22	2M2
R26	2M2
R10	1.13K
R23	1.13K
R27	1.13K
R12	10.2K
R25	10.2K
R28	10.2K
R13	2.2K
R65	2.2K
R74	2.2K
R15	20K
R18	20K
R30	20K
R33	20K
R16	22R
R17	22R
R31	22R
R32	22R
R20	1.8K
R37	4.7K
R41	4.7K
R43	4.7K
R45	4.7K
R47	4.7K
R49	4.7K
R64	4.7K
R66	4.7K
R39	470R
R38	470R
R56	3.9K

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Component list

Ref.	Description
R57	2.2M
R61	2.2M
R59	10K
R60	10K
R67	100
R69	470
U1	LMC6482IN
U2	LMC6482IN
U3	LMC6482IN
U4	LM324
U5	LM7912C
U6	LM1085-12T

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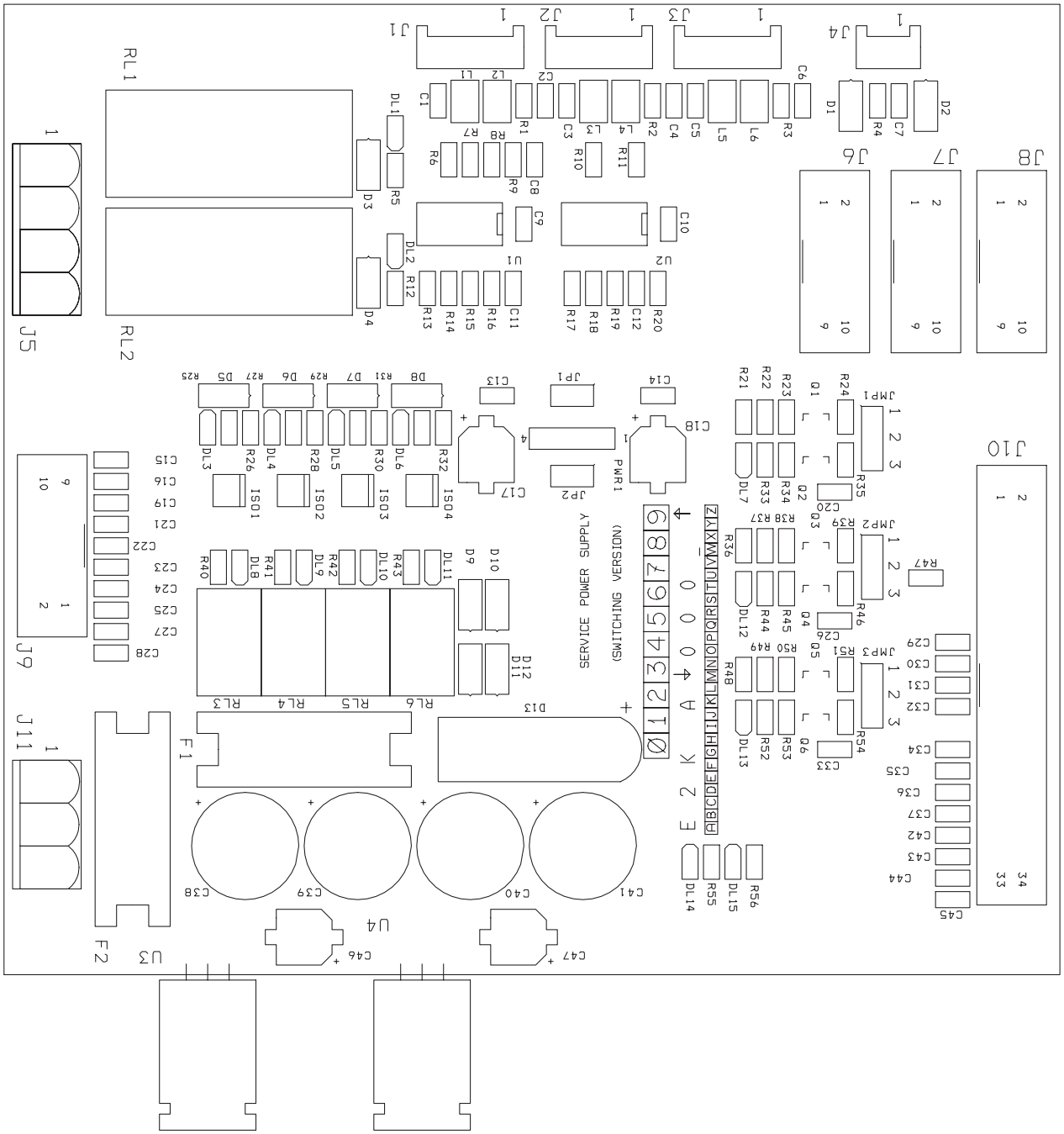

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Title:	SERVICE POWER SUPPLY (SWITCHING VER.)	
Board Code: E2K AA000_1	Model: E2500	Rev 1
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli	
Date: Wednesday, November 15, 2000	Sheet 1 of 1	

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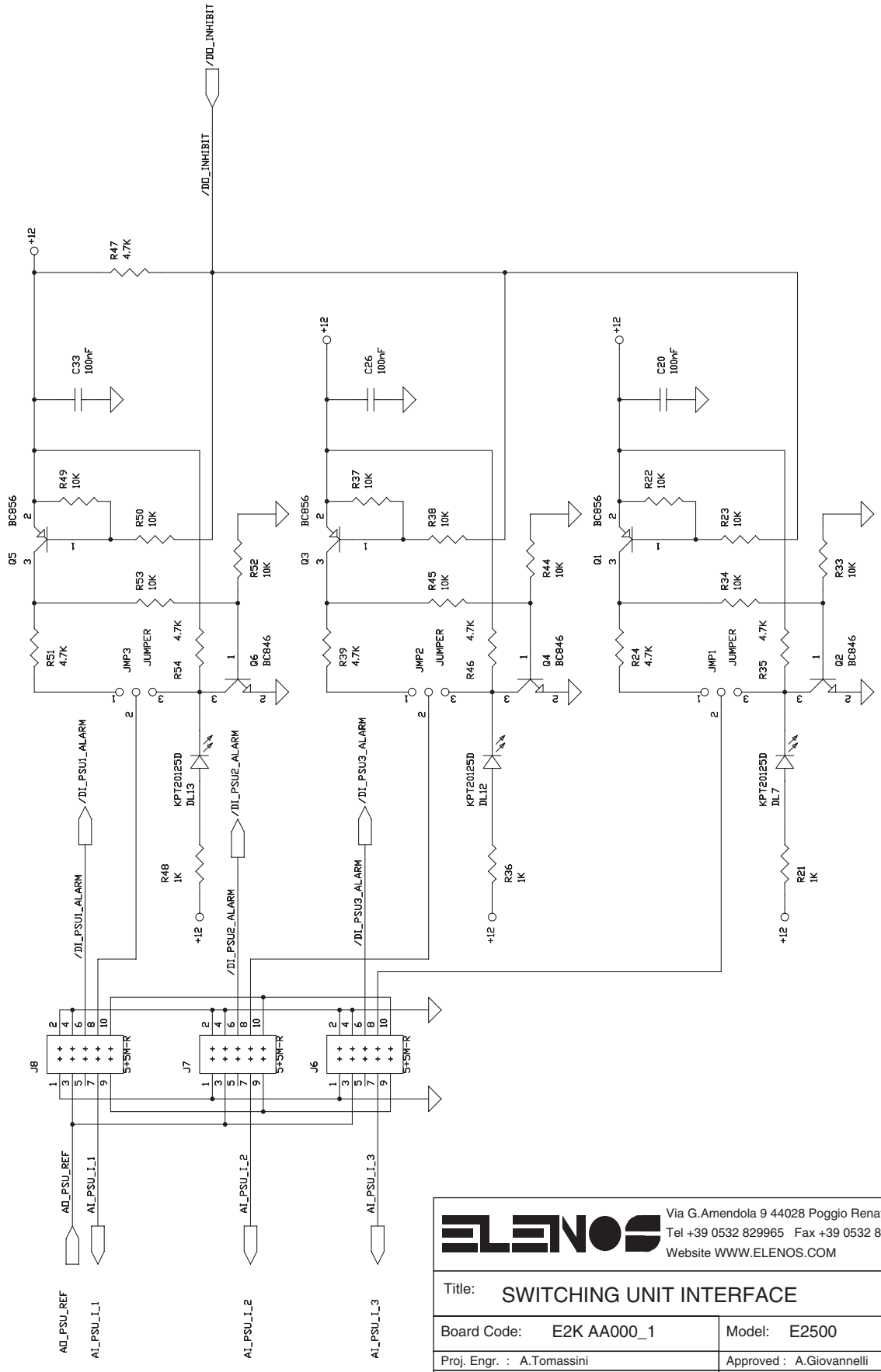

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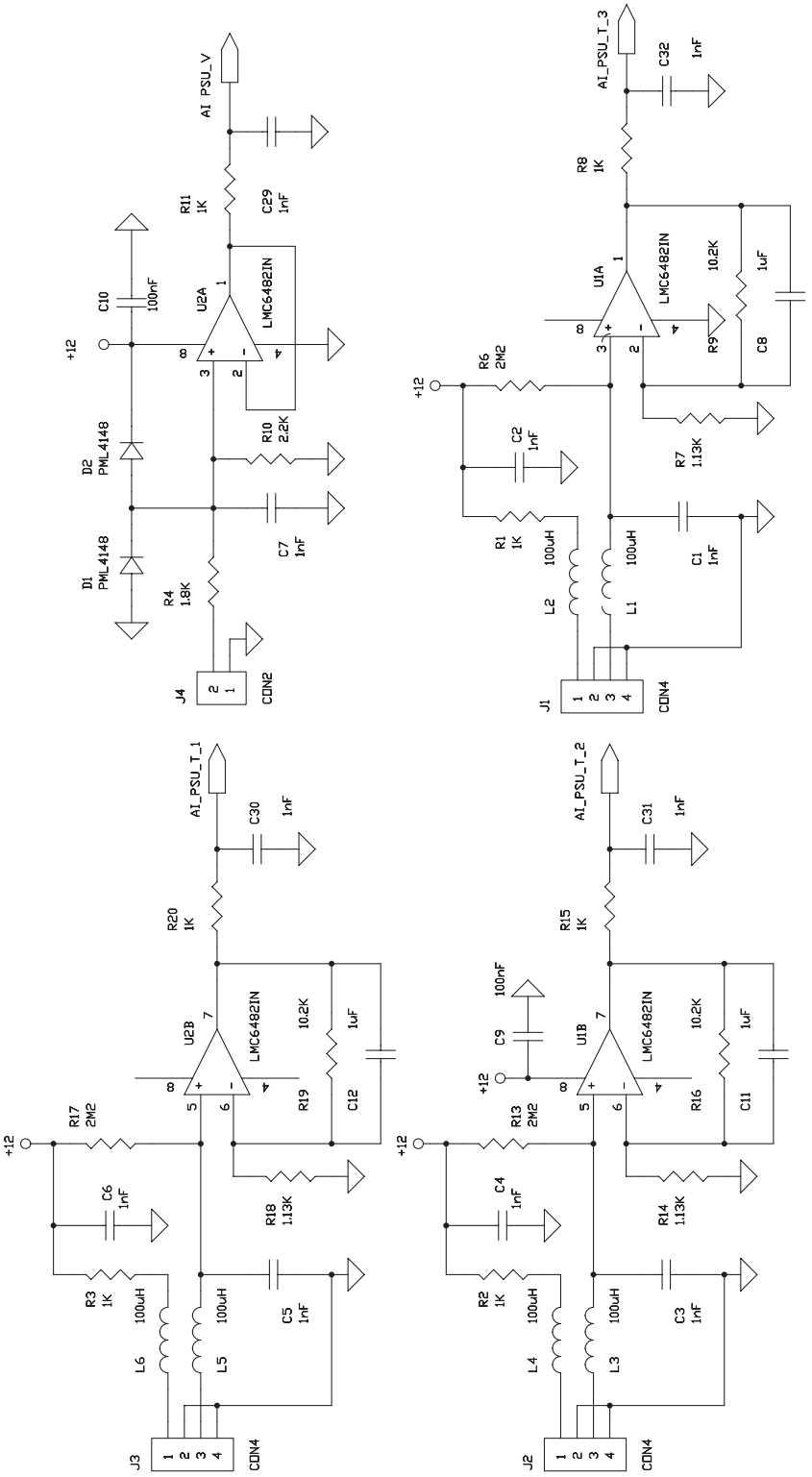
Title: SWITCHING UNIT INTERFACE	
Board Code: E2K AA000_1	Model: E2500 — Rev 1
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli
Date: Wednesday, November 15, 2000	Sheet 3 of 4



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Title: THERMAL-VOLTAGE PROBES AMPLIFIERS		
Board Code: E2K AA000_1	Model: E2500	Rev 1
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli	
Date: Wednesday, November 15, 2000	Sheet 4 of 4	

Component list

Ref.	Description
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 25V
C18	100uF 25V
C46	100uF 25V
C47	100uF 25V
C38	1000uF 25V
C39	1000uF 25V
C40	1000uF 25V
C41	1000uF 25V
DL1	KPT20125GD
DL2	KPT20125GD
DL3	KPT20125GD
DL4	KPT20125GD
DL5	KPT20125GD
DL6	KPT20125GD
DL8	KPT20125GD
DL11	KPT20125GD

Component list

Ref.	Description
DL14	KPT20125GD
DL15	KPT20125GD
DL7	KPT20125D
DL9	KPT20125D
DL10	KPT20125D
DL12	KPT20125D
DL13	KPT20125D
D1	PML4148
D2	PML4148
D3	PML4148
D4	PML4148
D5	PML4148
D6	PML4148
D7	PML4148
D8	PML4148
D9	PML4148
D10	PML4148
D11	PML4148
D12	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
J2	CON4
J3	CON4
J4	CON2
J5	W3M-R
J11	W3M-R
J6	5+5M-R
J7	5+5M-R
J8	5+5M-R
J9	5+5M-R
J10	17+17M-R
L1	100uH
L2	100uH
L3	100uH
L4	100uH
L5	100uH
L6	100uH
PWR1	NME1212S
Q1	BC856
Q3	BC856

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Component list

Ref.	Description
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	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

Component list

Ref.	Description
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
U1	LMC6482IN
U2	LMC6482IN
U3	LM7912C/TO220
U4	LM1085-12T

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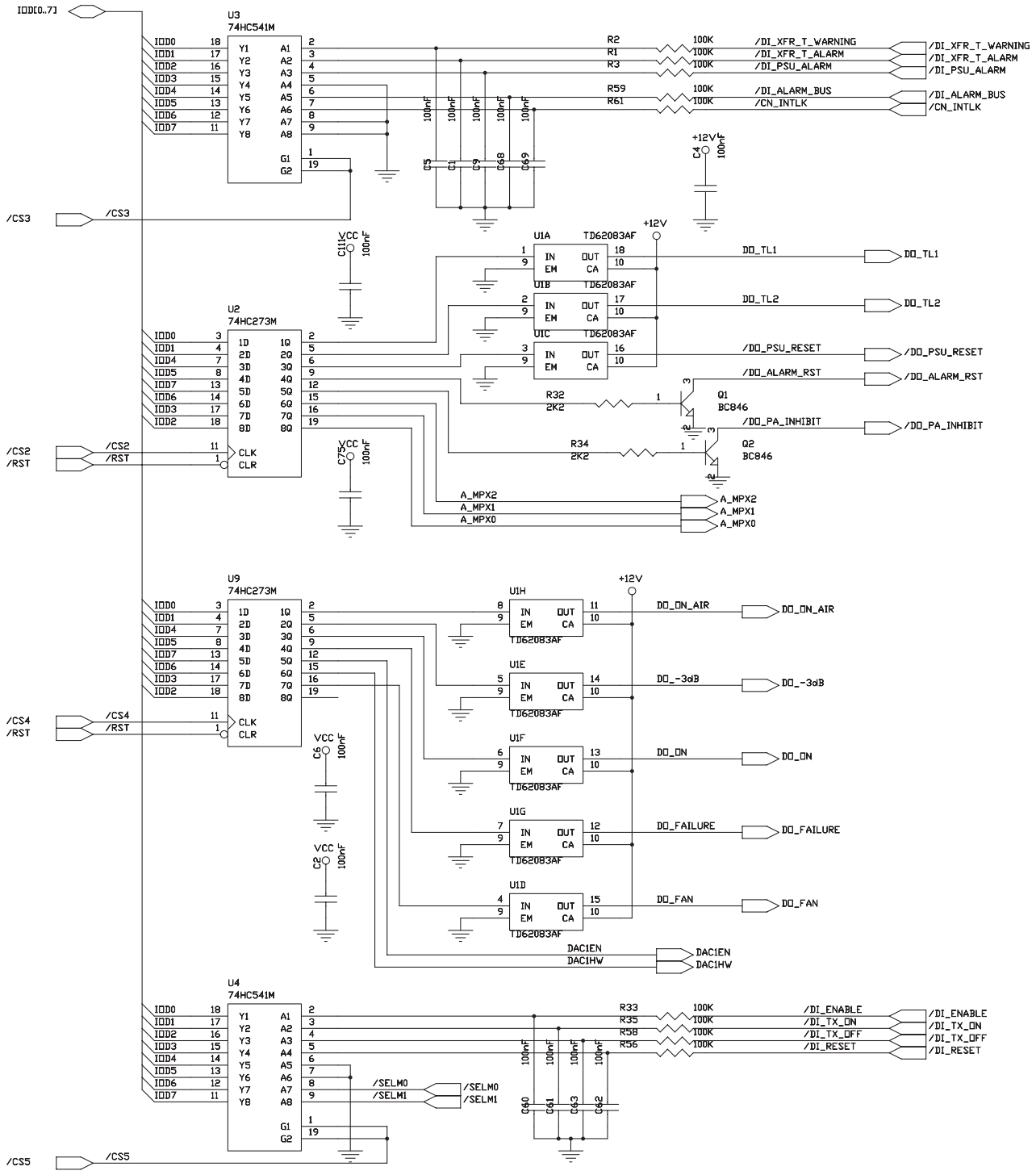

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Title: DIGITAL I/O	
Board Code: E2K 2A000_1	Model: E2500 — Rev 3
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli
Date: Wednesday, November 15, 2000	Sheet 6 of 6

Component list

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

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Component list

Ref.	Description
C103	100nF
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

Component list

Ref.	Description
C43	1nF
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
C71	100uF 25V
C140	100uF 25V
C142	100uF 25V
C156	100uF 25V
C72	470uF 16V
C79	10uF 16V
C107	10uF 16V
C119	10uF 16V
C123	10uF 16V
C161	10uF 16V
C81	1uF
C110	1uF
C125	1uF
C143	1uF
C112	22pF
C120	22pF
C129	68pF
C157	68pF
C158	68pF
C164	68pF

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Component list

Ref.	Description
DX1	1N4007
DX2	1N4007
DX3	9V1
DZ1	ZRB500F
D1	1N4148
D2	1N4148
D3	1N4148
D4	1N4148
D5	1N4148
D6	1N4148
D7	1N4148
D8	1N4148
D9	1N4148
D10	1N4148
D11	1N4148
D12	1N4148
D13	1N4148
D14	1N4148
D15	1N4148
D16	1N4148
D17	1N4148
D18	1N4148
H1	HOLE3.2MM
H2	HOLE3.2MM
H3	HOLE3.2MM
H4	HOLE3.2MM
JP1	JUMPER
JP2	JUMPER
JP3	JUMPER
JP4	JUMPER
J1	CON24AP
J2	CONN RCPT 17x2
J3	CON16
J4	STRIP FEMALE 2.54 RIGHT 26P
L1	1OOnH
L2	1OOnH
L3	1OOnH
QX2	BC337
QX1	BC337
QX3	BSP316
Q1	BC846
Q2	BC846
RV1	10K
RX2	10K
RV2	10K
R57	10K
R60	10K
R62	10K
R63	10K
R64	10K
R65	10K
R66	10K
R68	10K
R85	10K
R90	10K
R91	10K

Component list

Ref.	Description
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
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R130	10K
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R140	10K
R141	10K
R142	10K
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R148	10K
R184	10K
R185	10K
R187	10K
R188	10K
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R192	10K
R193	10K
RX1	100K
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R2	100K
R3	100K
R33	100K
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R59	100K
R61	100K
R160	100K
R161	100K
RX3	3K3
R5	1K
R6	1K
R8	1K
R9	1K
R10	1K

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Component list

Ref.	Description
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
R13	100R
R14	100R
R19	100R
R20	100R
R22	100R
R43	100R
R44	100R
R46	100R
R47	100R
R87	100R
R102	100R
R131	100R
R132	100R
R133	100R
R134	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
R176	100R
R177	100R
R178	100R
R179	100R
R180	100R

Component list

Ref.	Description
R181	100R
R182	100R
R183	100R
R15	2K
R16	2K
R17	2K
R18	2K
R23	2K
R24	2K
R25	2K
R26	2K
R39	2K
R40	2K
R41	2K
R42	2K
R48	2K
R49	2K
R50	2K
R69	2K
R70	2K
R71	2K
R72	2K
R73	2K
R74	2K
R75	2K
R76	2K
R77	2K
R78	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
R67	20K
R101	20K
R109	20K
R149	20K
R86	12K
R89	511K

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Component list

Ref.	Description
R107	47K
R111	1.82K
R112	1.82K
R114	220K
R115	470K
R118	82K
R135	470R
R136	470R
R137	470R
R138	470R
R162	470R
R186	470R
R191	4K7
R190	4K7
TP1	CONN PLUG 1
TP2	CONN PLUG 1
U1	TD62083AF
U2	74HC273M
U9	74HC273M
U12	74HC273M
U3	74HC541M
U4	74HC541M
U26	74HC541M
U5	74HC245M
U6	MS6M8512
U7	AM29F040
U8	LM340S-5
U10	74HC138M
U11	LM7301BIM5
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
U27	MAX691ACSE
U28	PALCE16V8Q-15JC/4
U29	TLV2548I
U32	MAX485
U31	MAX485
U33	TLC5628DW
U34	TLC5628CN
U35	74HC540
Y1	16MHZ

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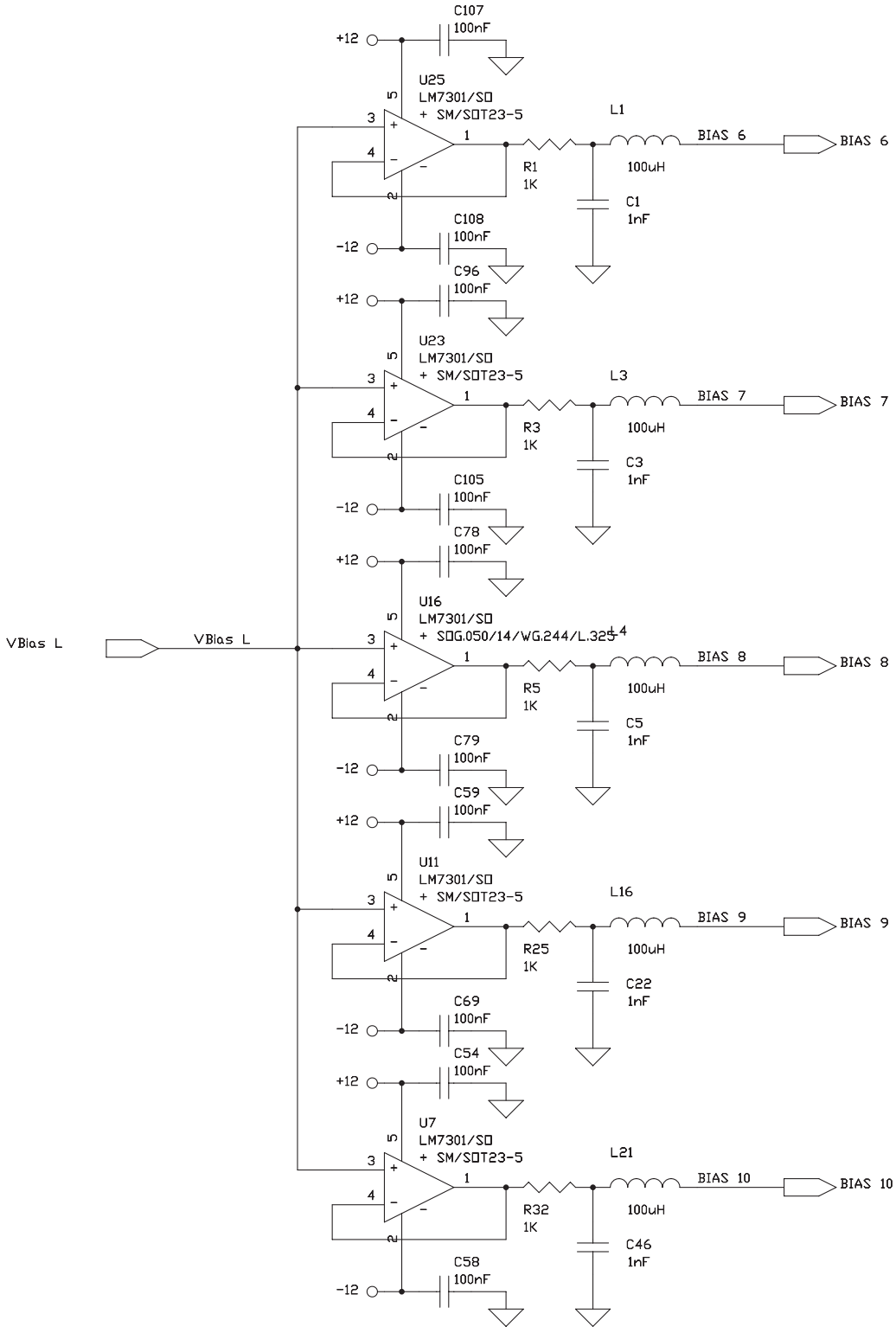

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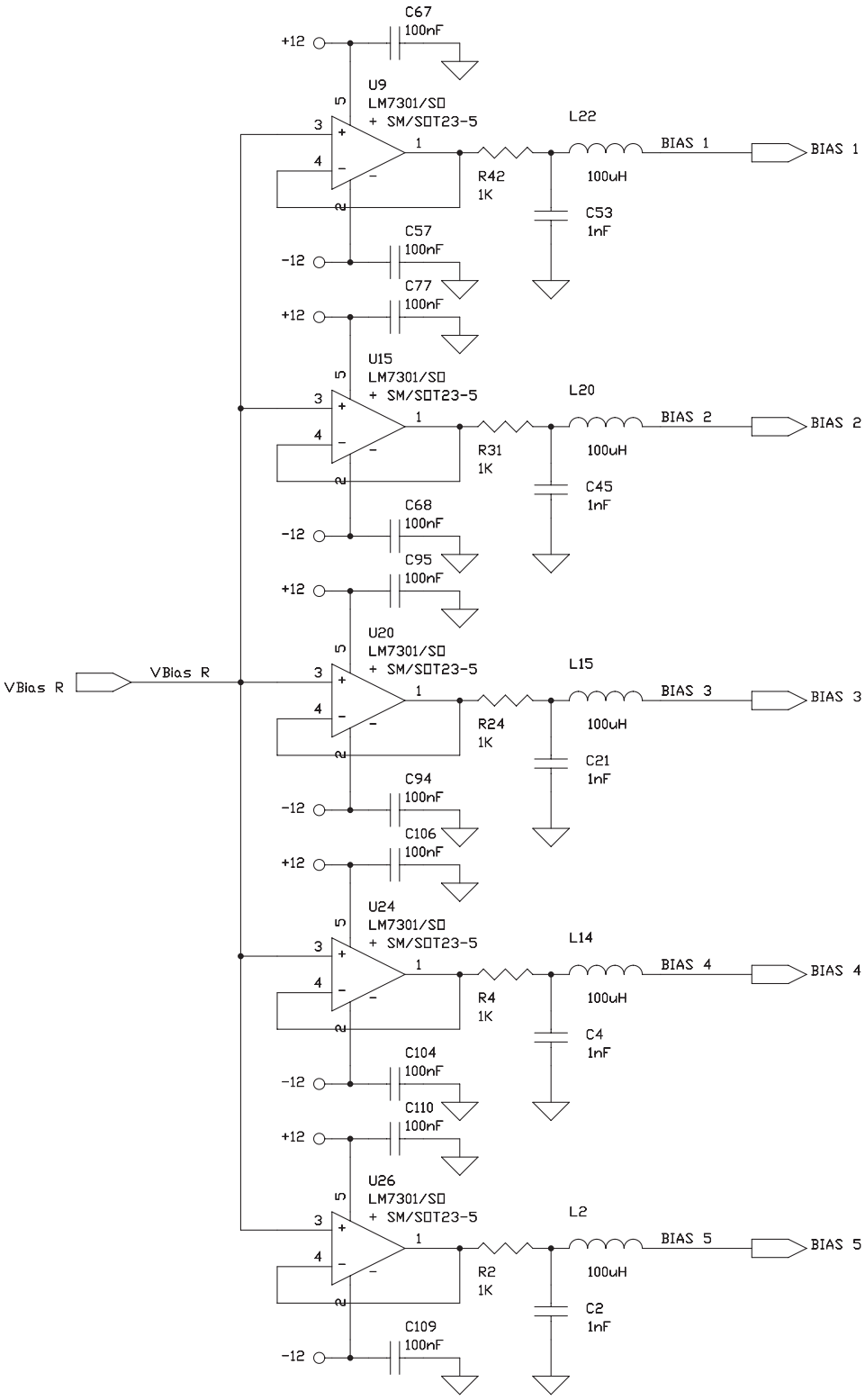
Title: ALC - BIAS BUFFERS - A		
Board Code: E2K 5A000_1	Model: E2500	Rev 1
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli	
Date: Wednesday, November 15, 2000	Sheet 2 of 5	



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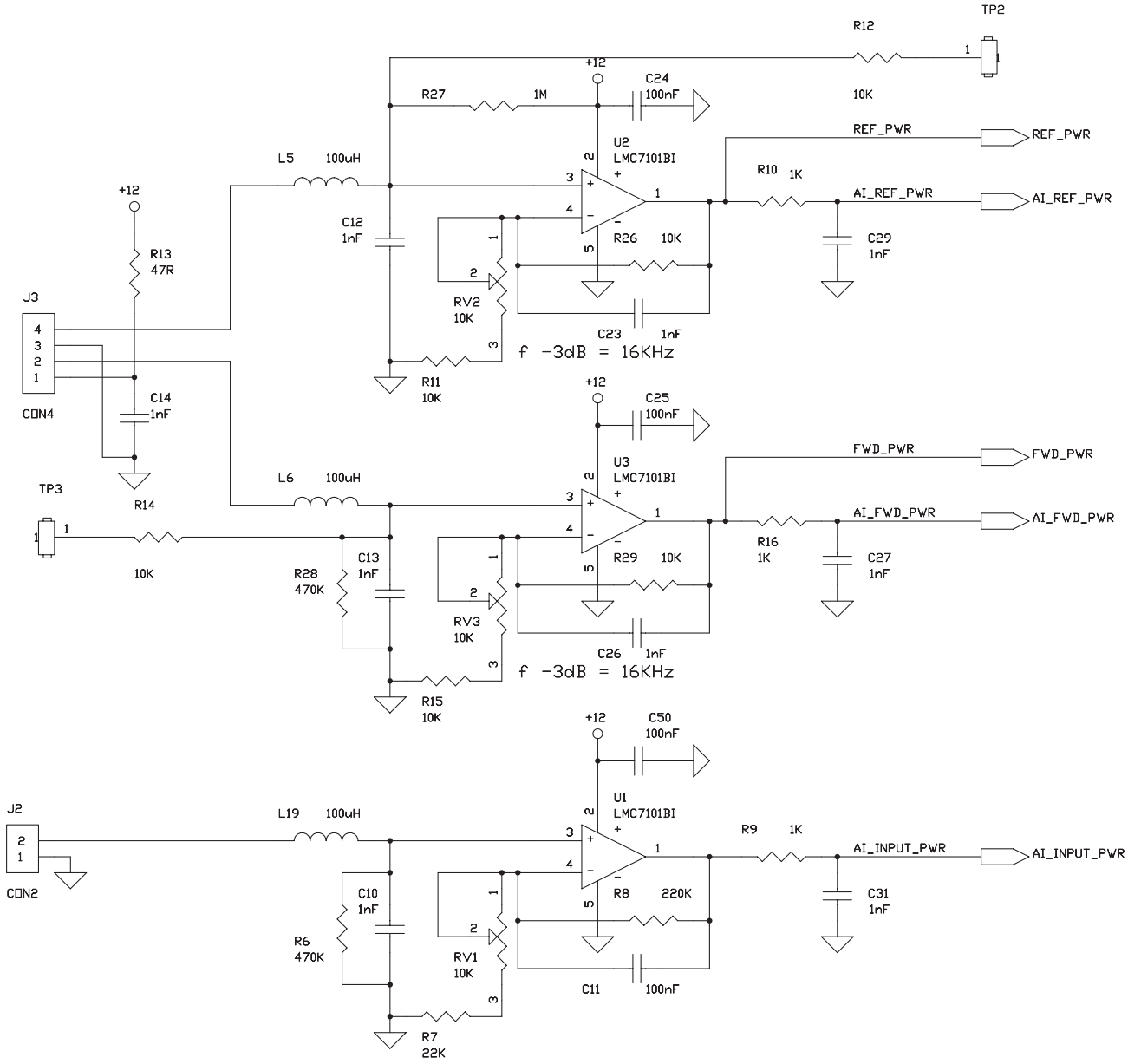
Website WWW.ELENOS.COM

Title: ALC - BIAS BUFFERS - B		
Board Code: E2K 5A000_1	Model: E2500	Rev 1
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli	
Date: Wednesday, November 15, 2000	Sheet 3 of 5	



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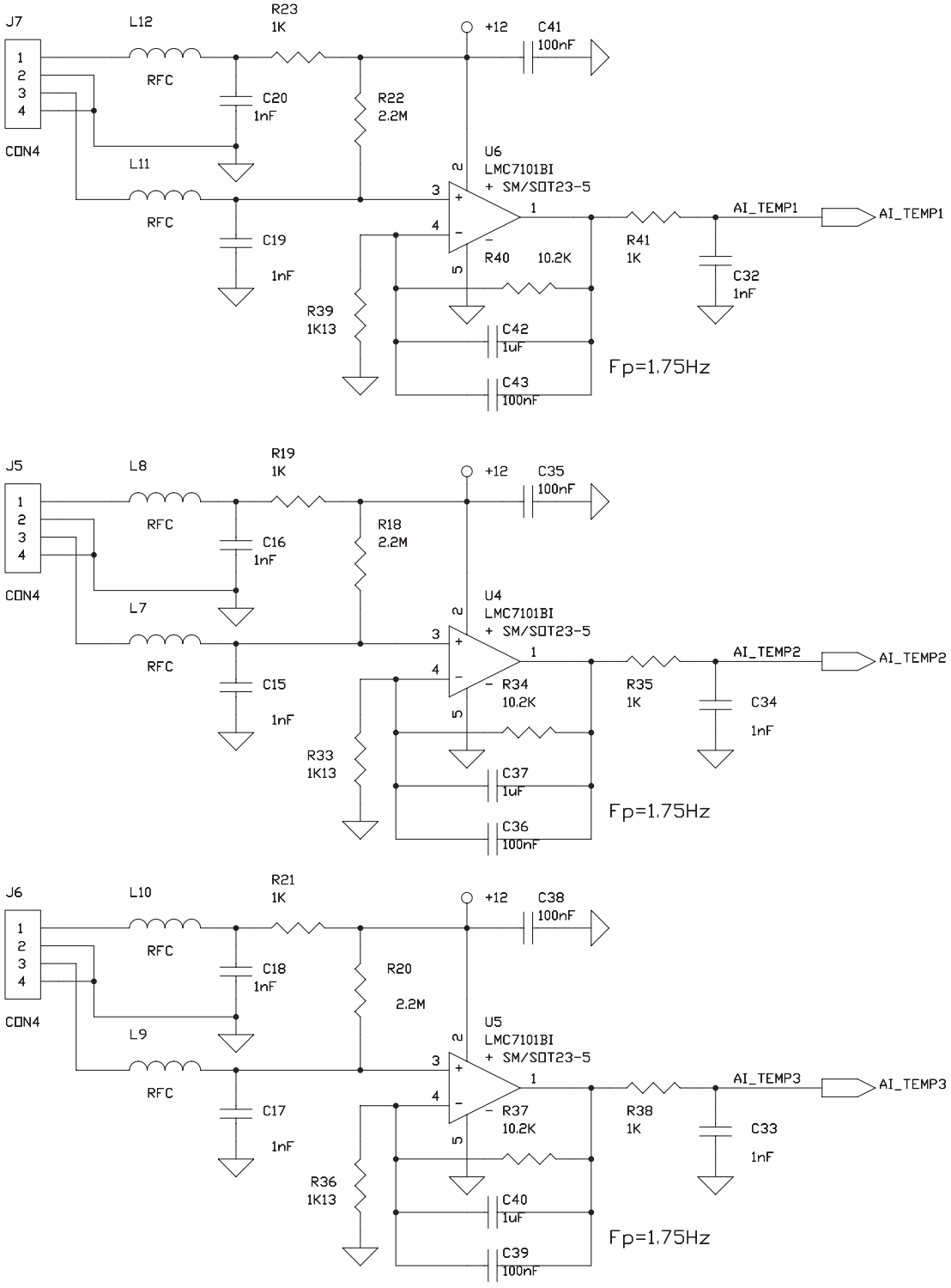
Website WWW.ELENOS.COM

Title: ALC - POWER MEASURE AMPLIFIERS		
Board Code: E2K 5A000_1	Model: E2500	Rev 1
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli	
Date: Wednesday, November 15, 2000	Sheet 4 of 5	



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Title: ALC - THERMAL MEASURE AMPLIFIERS		
Board Code: E2K 5A000_1	Model: E2500	Rev 1
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli	
Date: Wednesday, November 15, 2000	Sheet 5 of 5	

Component list

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
C51	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

Component list

Ref.	Description
C36	100nF
C38	100nF
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
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C92	100nF
C94	100nF
C95	100nF
C96	100nF
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C98	100nF
C100	100nF
C101	100nF
C104	100nF
C105	100nF
C106	100nF
C107	100nF
C108	100nF
C109	100nF
C110	100nF
C37	1uF
C40	1uF
C42	1uF
C49	1uF
C91	1uF
C55	100uF 25V
C56	100uF 25V
C66	100uF 25V
C93	100uF 25V
C111	100uF 25V
C112	100uF 25V
C61	10uF

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Component list

Ref.	Description
C80	10uF
C64	47nF
D1	PMLL4148
D2	PMLL4148
D4	PMLL4148
D7	PMLL4148
D8	PMLL4148
D9	PMLL4148
D10	PMLL4148
D11	PMLL4148
D12	PMLL4148
D13	PMLL4148
D14	PMLL4148
D15	PMLL4148
D16	PMLL4148
D3	ZRB500F
D5	9.1V
D6	LED
H1	HOLE3.5MM
H2	HOLE3.5MM
H3	HOLE3.5MM
H4	HOLE3.5MM
H5	HOLE3.5MM
H6	HOLE3.5MM
J1	CON4
J3	CON4
J5	CON4
J6	CON4
J7	CON4
J8	CON2
J2	CON2
J4	CON20AP
J9	CONN PCB 5
J10	CONN PCB 5
J11	CON10AP
J12	CON10AP
J13	CON10AP
L1	100uH
L2	100uH
L3	100uH
L4	100uH
L5	100uH
L6	100uH
L13	100uH
L14	100uH
L15	100uH
L16	100uH
L17	100uH
L18	100uH
L19	100uH
L20	100uH
L21	100uH
L22	100uH
L7	RFC
L8	RFC

Component list

Ref.	Description
L9	RFC
L10	RFC
L11	RFC
L12	RFC
Q1	BC856
Q2	BC856
Q4	BC856
Q3	BCV62
Q5	BC846BL
RV1	10K
RV2	10K
RV3	10K
RV4	10K
RV5	10K
R11	10K
R12	10K
R14	10K
R15	10K
R17	10K
R26	10K
R29	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
R80	10K
R84	10K
R87	10K
R88	10K
R89	10K
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R94	10K
R96	10K
R97	10K
R1	1K
R2	1K
R3	1K
R4	1K
R5	1K
R9	1K
R10	1K
R16	1K
R19	1K
R21	1K
R23	1K
R24	1K
R25	1K

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Component list

Ref.	Description
R31	1K
R32	1K
R35	1K
R38	1K
R41	1K
R42	1K
R55	1k
R58	1K
R95	1K
R6	470K
R28	470K
R82	22K
R7	22K
R59	220K
R8	220K
R13	47R
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
R81	1.2K
R46	1.2K
R47	4.7K
R48	4.7K
R49	4.7K
R50	4.7K
R53	4.7k
R54	4.7k
R83	4.7K
R90	4.7K
R91	4.7K
R51	47K
R52	100R
R86	100R
R93	100R
R57	6.8K
R61	390K
R64	470R
R67	470R
R68	470R
R65	0R
R66	9.09K
R76	5.6K
R77	8.2K
R78	33K

Component list

Ref.	Description
R85	2.2K
R98	820R
R99	820R
S1	SW PUSHBUTTON
TP1	CONN PLUG 1
TP2	CONN PLUG 1
TP3	CONN PLUG 1
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
U8	LMC7101BI
U17	LMC7101BI
U18	LMC7101BI
U19	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
U14	4093

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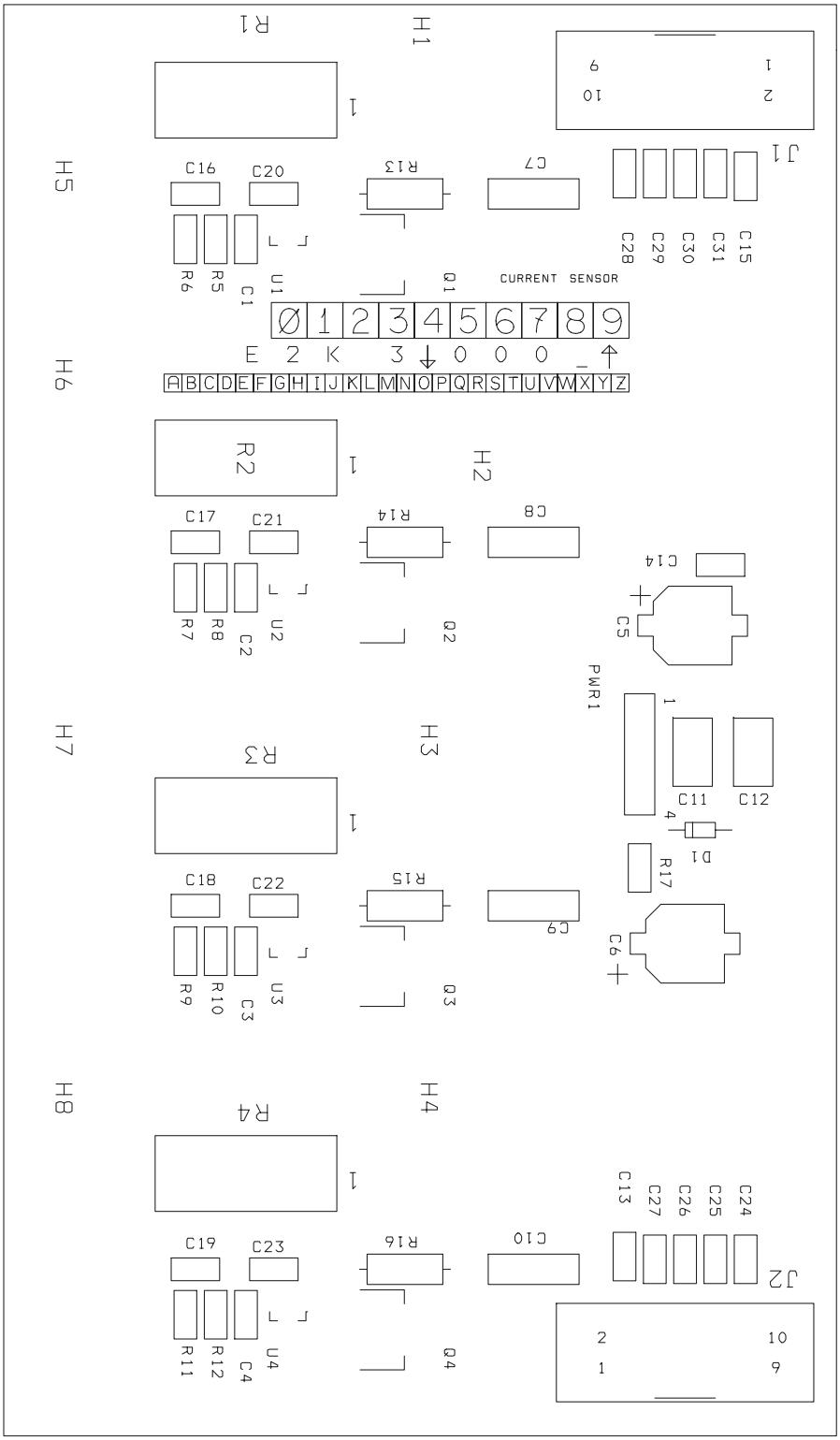

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Title: CURRENT SENSOR	
Board Code: E2K 3A000_1	Model: E2500 — Rev 1
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli
Date: Wednesday, November 15, 2000	Sheet 1 of 1

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E-Mail: support@elenos.com

Component list

Ref.	Description
C1	100nF
C2	100nF
C3	100nF
C4	100nF
C13	100nF
C14	100nF
C15	100nF
C16	100nF
C17	100nF
C18	100nF
C19	100nF
C20	100nF
C21	100nF
C22	100nF
C23	100nF
C5	33uF 25V
C6	33uF 25V
C7	100nF 63V
C8	100nF 63V
C9	100nF 63V
C10	100nF 63V
C12	10nF 63V
C11	10nF 63V
C24	100nF
C25	100nF
C26	100nF
C27	100nF
C28	100nF
C29	100nF
C30	100nF
C31	100nF
D1	15V
H1	HOLE3.5MM
H2	HOLE3.5MM
H3	HOLE3.5MM
H4	HOLE3.5MM
H5	HOLE3.5MM
H6	HOLE3.5MM
H7	HOLE3.5MM
H8	HOLE3.5MM
J2	CON10AP
J1	CON10AP
PWR1	NME1212S
Q1	BSP316
Q2	BSP316
Q3	BSP316
Q4	BSP316
R1	0.006R
R2	0.006R
R3	0.006R
R4	0.006R
R5	47R
R6	47R
R7	47R
R8	47R

Component list

Ref.	Description
R9	47R
R10	47R
R11	47R
R12	47R
R13	1K
R14	1K
R15	1K
R16	1K
R17	100R
U1	LMC7101BI
U2	LMC7101BI
U3	LMC7101BI
U4	LMC7101BI

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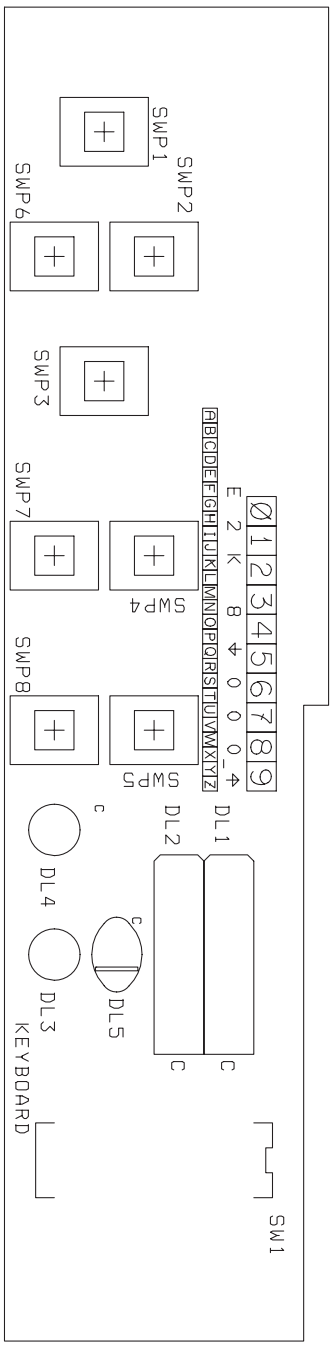

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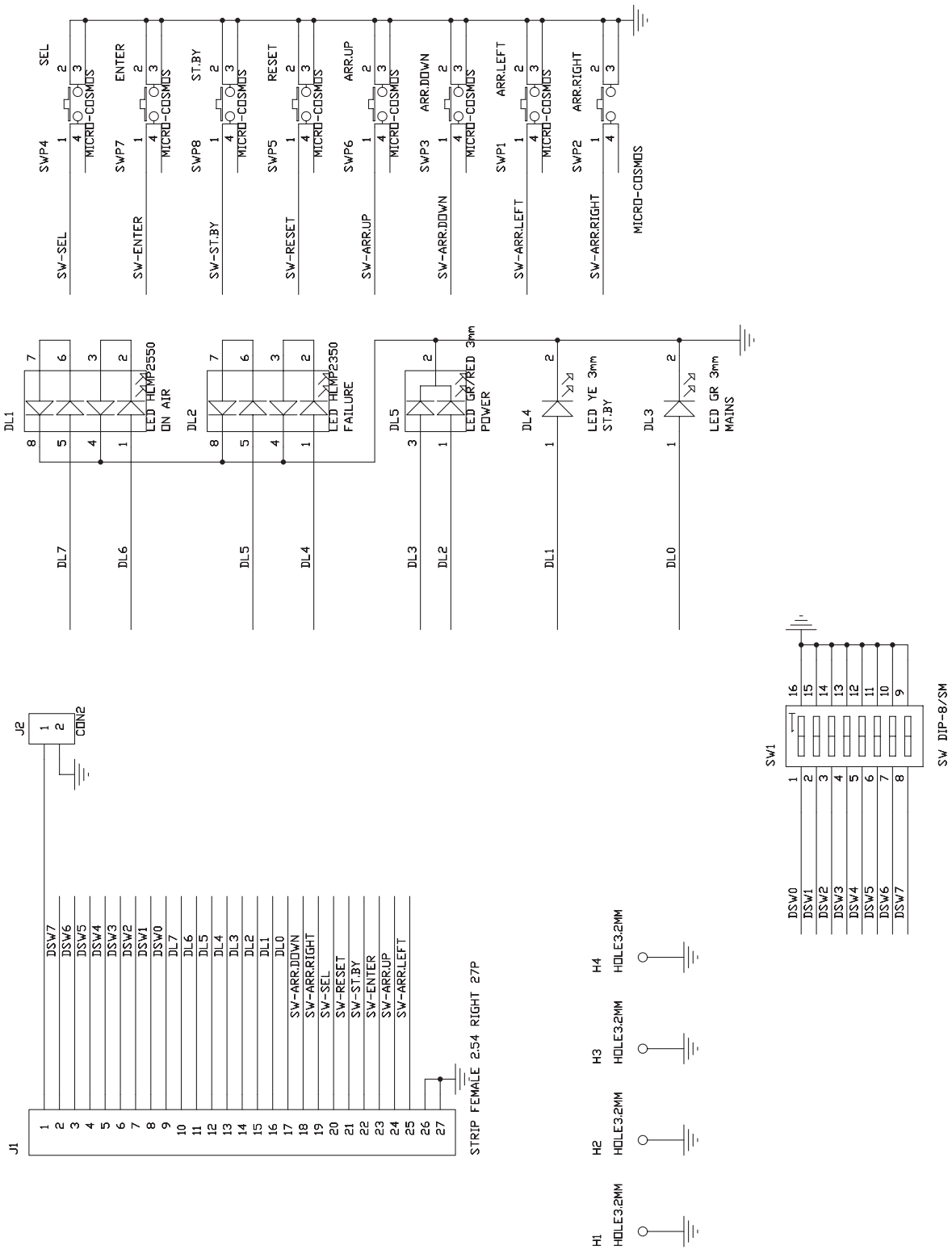
Title: KEYBOARD	
Board Code: E2K 8A000_1	Model: E2500 — Rev 1
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli
Date: Wednesday, November 15, 2000	Sheet 1 of 1



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Title: KEYBOARD		
Board Code: E2K 8A000_1	Model: E2500	Rev 1
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli	
Date: Wednesday, November 15, 2000	Sheet 1 of 1	

Component list

Ref.	Description
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	CON2
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

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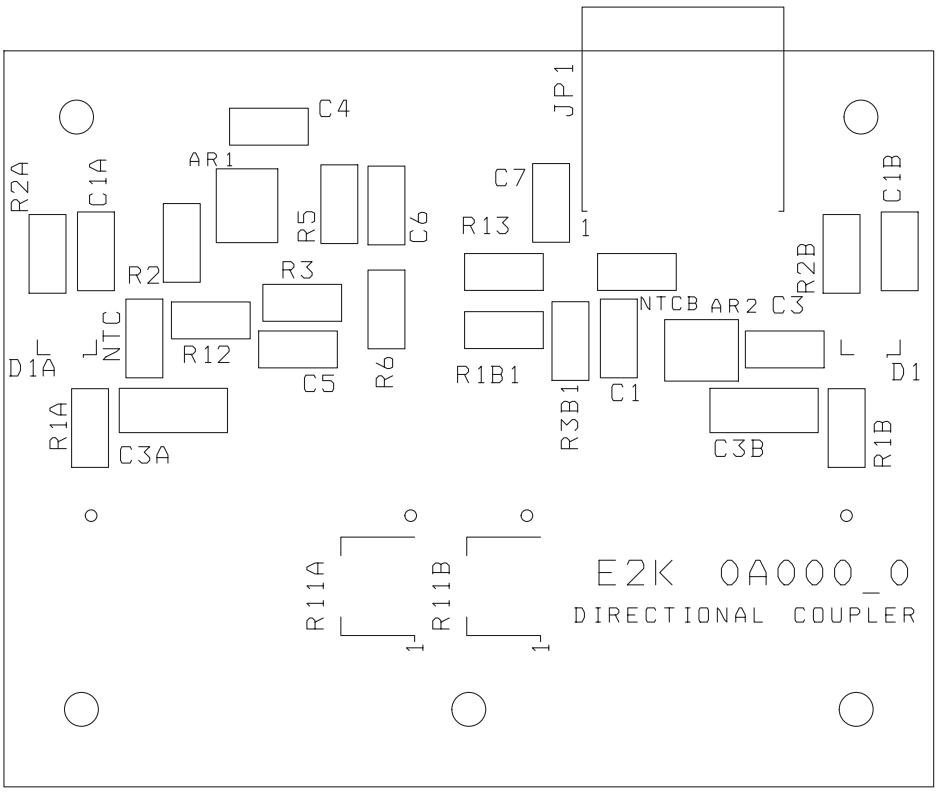
E-Mail: support@elenos.com



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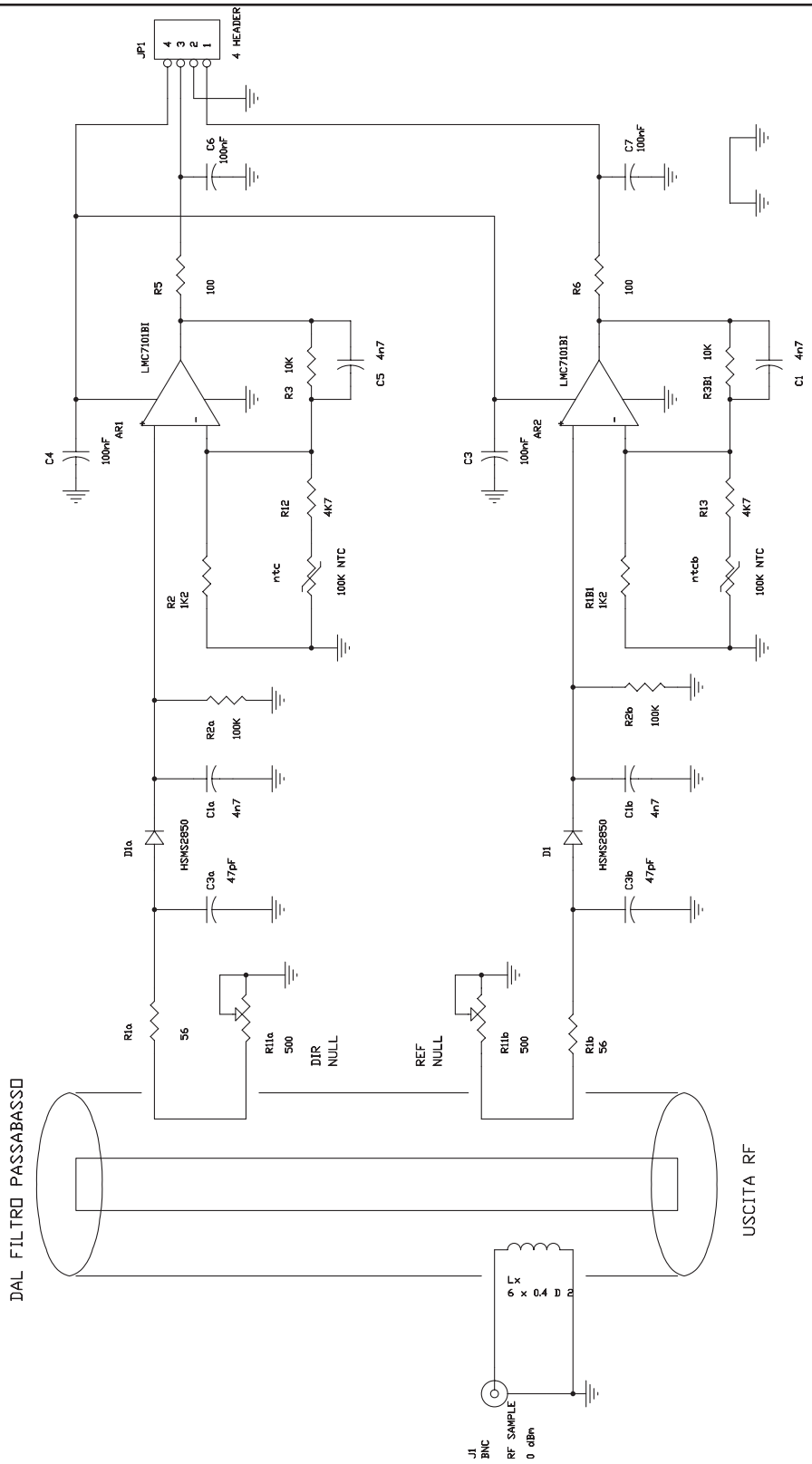
Tel +39 0532 829965 Fax +39 0532 829177
Website WWW.ELENOS.COM

Title: DIRECTIONAL COUPLER		
Board Code: E2K 0A000_0	Model: E2500	Rev 0
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli	
Date: Wednesday, November 15, 2000	Sheet 1 of 1	



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Title: DIRECTIONAL COUPLER		
Board Code: E2K 0A000_0	Model: E2500	Rev 0
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli	
Date: Wednesday, November 15, 2000	Sheet 1 of 1	

Component list

Ref.	Description
AR2	LMC7101BI
AR1	LMC7101BI
C1b	4n7
C1a	4n7
C1	4n7
C5	4n7
C3	100nF
C4	100nF
C6	100nF
C7	100nF
C3b	47pF
C3a	47pF
D1	HSMS2850
D1a	HSMS2850
JP1	4 HEADER
J1	BNC
Lx	6 x 0.4 D 2
R2b	100K
R2a	100K
R1B1	1K2
R2	1K2
R3	10K
R3B1	10K
R5	100
R6	100
R1b	56
R1a	56
R11b	500
R11a	500
R12	4K7
R13	4K7
ntcb	100K NTC
ntc	100K NTC

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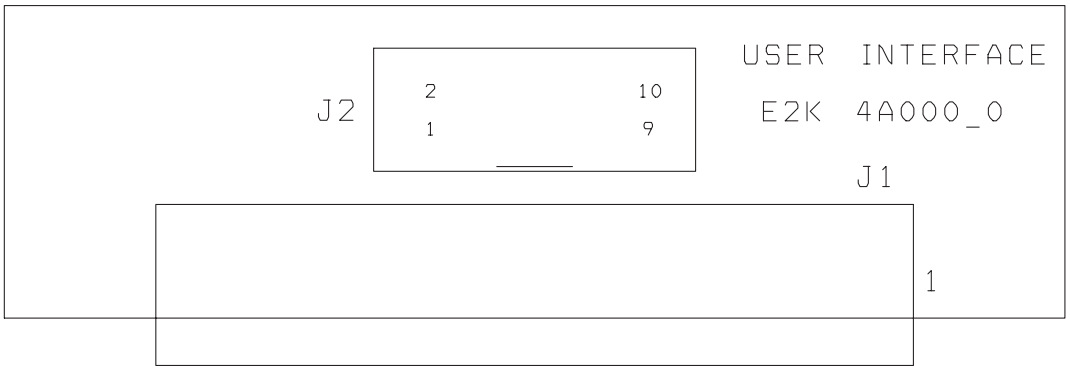

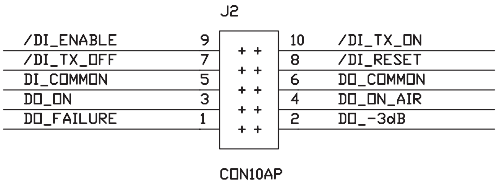

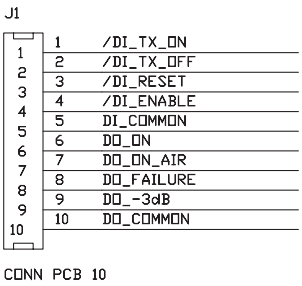

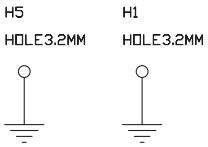

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Title: USER INTERFACE		
Board Code: E2K 4A000_0	Model: E2500	Rev 0
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli	
Date: Wednesday, November 15, 2000	Sheet 1 of 1	

Component list

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

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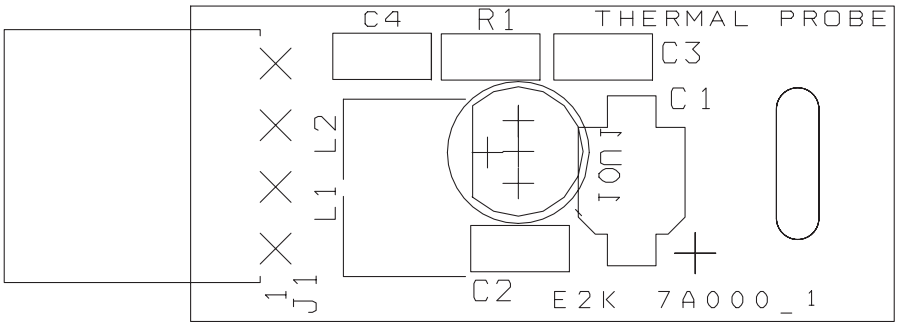

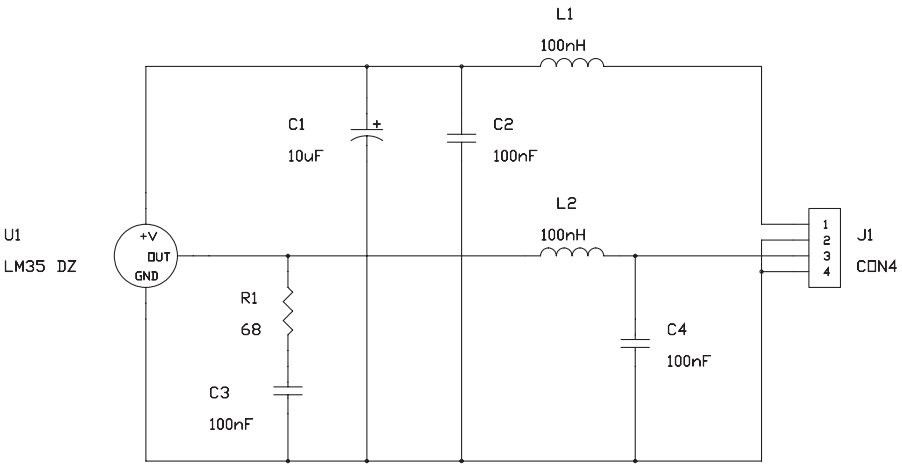

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Title: THERMAL PROBE		
Board Code: E2K 7A000_0	Model: E2500	Rev 0
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli	
Date: Wednesday, November 15, 2000	Sheet 1 of 1	

Component list

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

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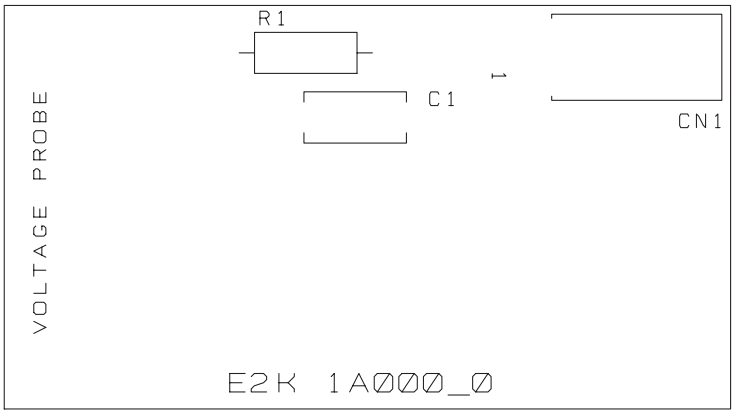

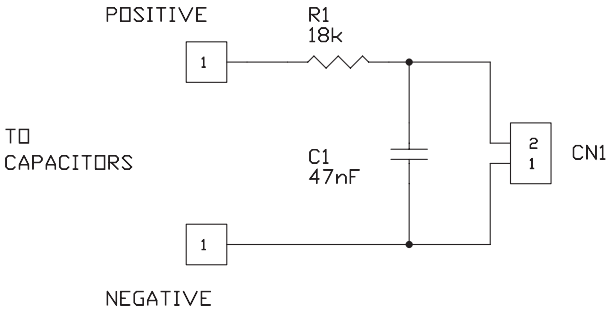

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Title: VOLTAGE PROBE		
Board Code: E2K 1A000_0	Model: E2500	Rev 0
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli	
Date: Wednesday, November 15, 2000	Sheet 1 of 1	

Component list

Ref.	Description
C1	47nF
J22	CN1
J22	POSITIVE
J23	NEGATIVE
R1	18k

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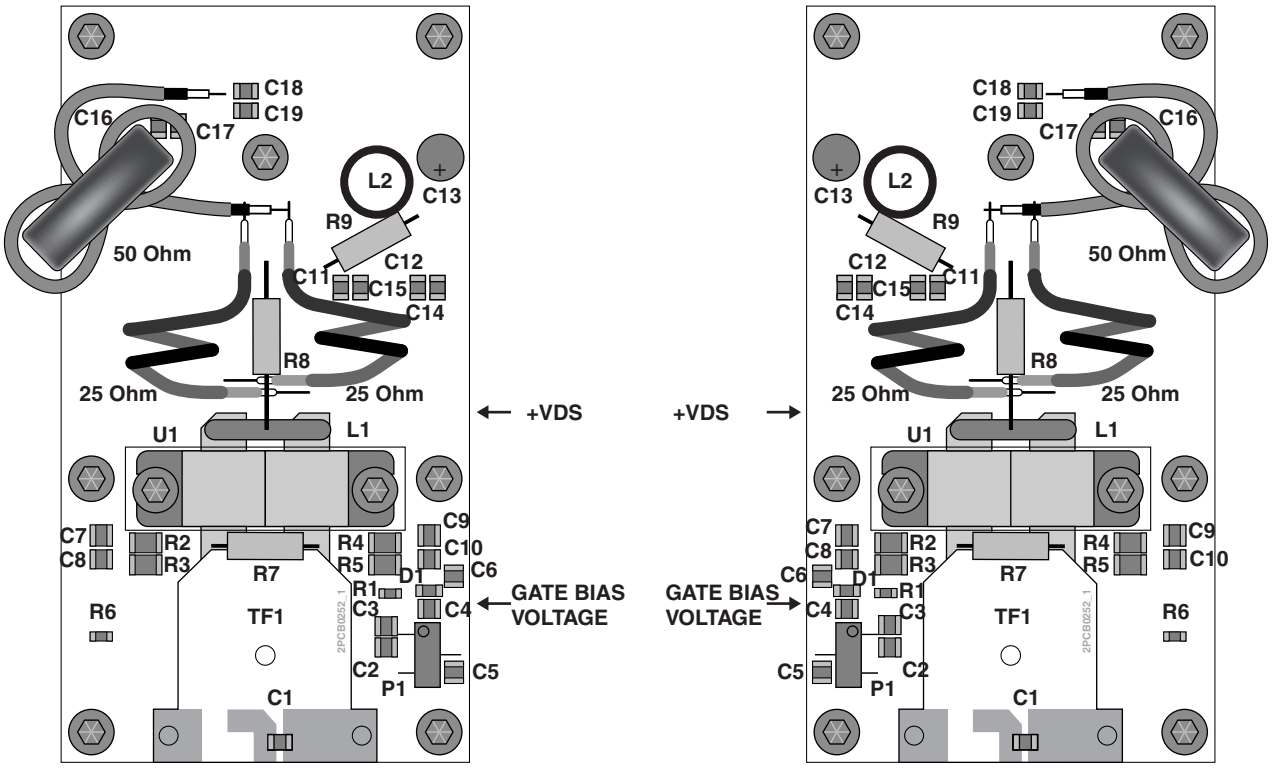

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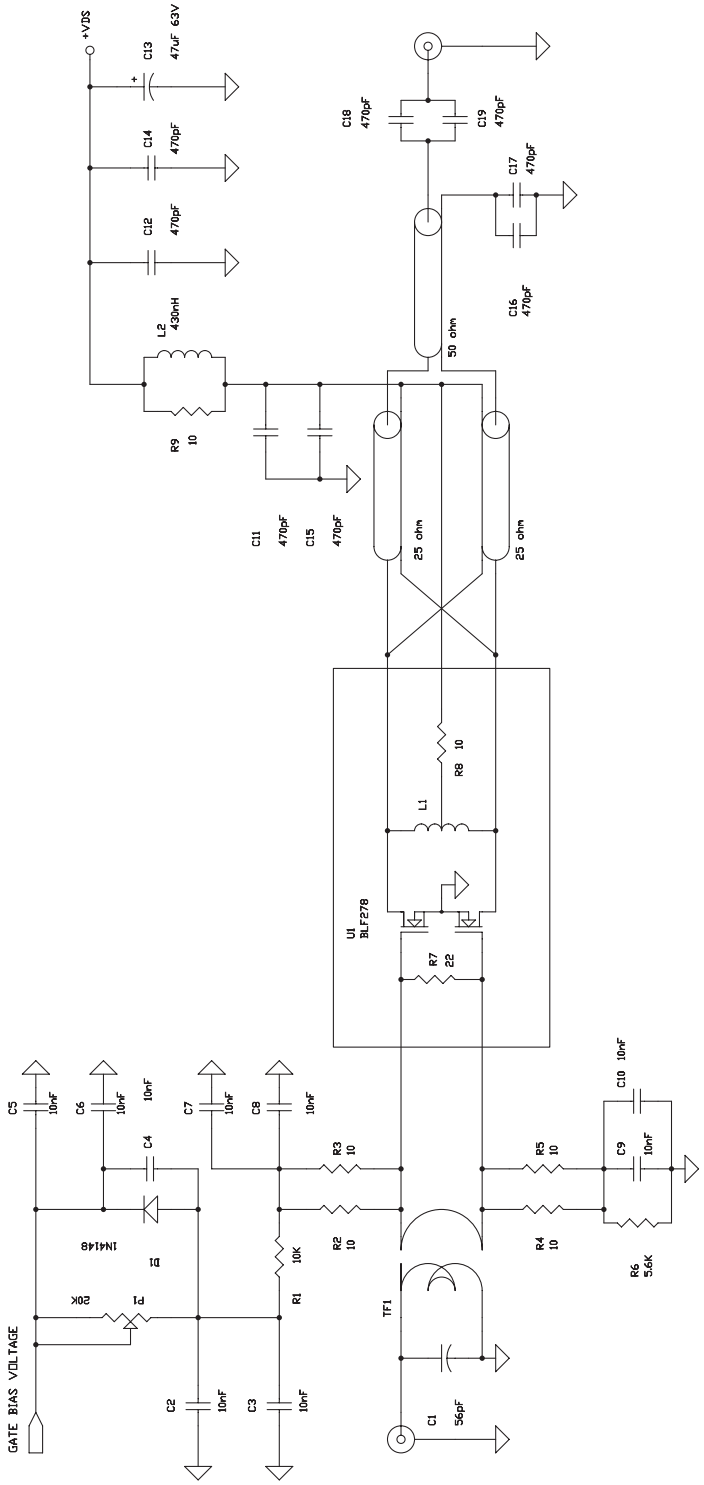
Title: POWER AMPLIFIER		
Board Code:	Model: E2500	Rev 0
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli	
Date: Wednesday, November 15, 2000	Sheet 1 of 1	



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Website WWW.ELENOS.COM

Title: POWER AMPLIFIER		
Board Code:	Model: E2500	Rev 0
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli	
Date: Wednesday, November 15, 2000	Sheet 1 of 1	

Component list

Ref.	Description
C1	56pF
C2	10nF
C3	10nF
C4	10nF
C5	10nF
C6	10nF
C7	10nF
C8	10nF
C9	10nF
C10	10nF
C14	470pF
C11	470pF
C12	470pF
C15	470pF
C16	470pF
C17	470pF
C18	470pF
C19	470pF
C13	47uF 63V
D1	1N4148
J1	SMA CS VERT
J2	BNC
L1	IND
L2	430nH
P1	20K
R1	10K
R2	10
R3	10
R4	10
R5	10
R8	10
R9	10
R6	5.6K
R7	22
TF1	
TF2	25 ohm
TF3	25 ohm
TF4	50 ohm
U1	BLF278

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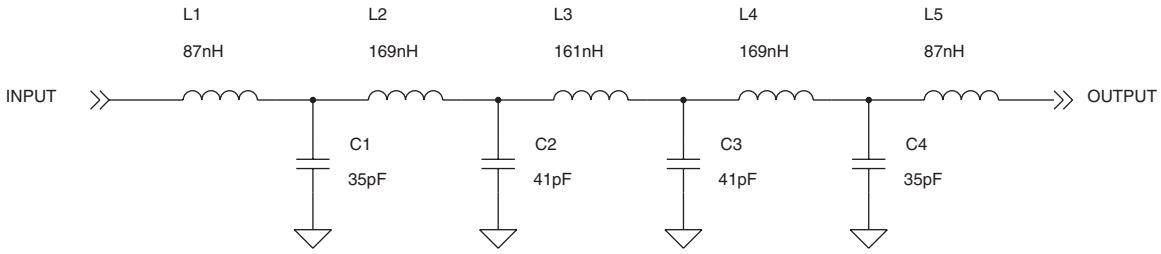

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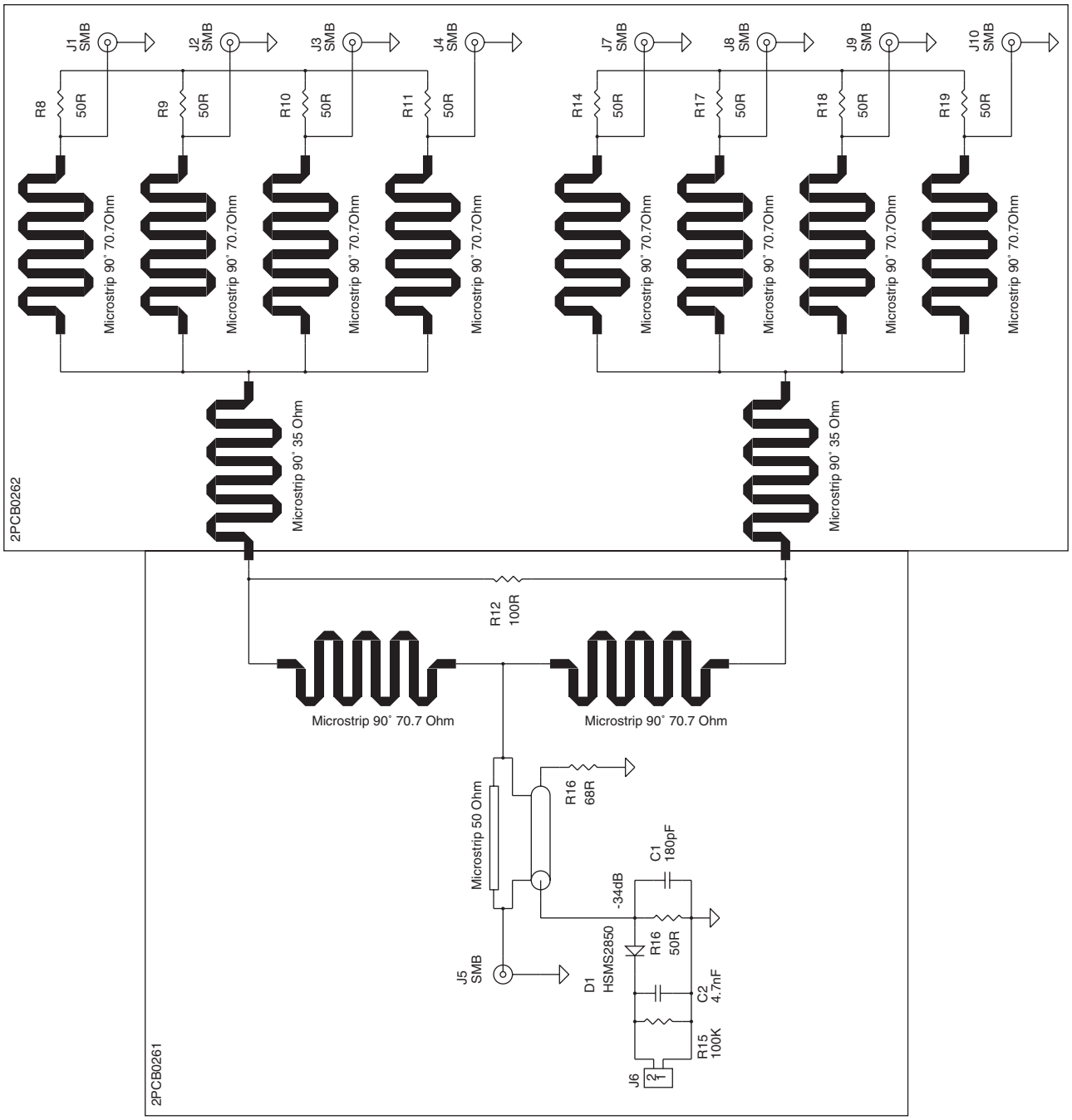
Website WWW.ELENOS.COM

Title: LOW PASS FILTER		
Board Code:	Model: E2500	Rev 0
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli	
Date: Wednesday, November 15, 2000	Sheet 1 of 1	

Component list

Ref.	Description
C1	38pF
C4	38pF
C3	70pF
C2	70pF
L1	20nH
L5	20nH
L2	80nH
L4	80nH
L3	74nH



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Title: SPLITTER INPUT		
Board Code:	Model: E2500	Rev 0
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli	
Date: Wednesday, November 15, 2000	Sheet 1 of 1	

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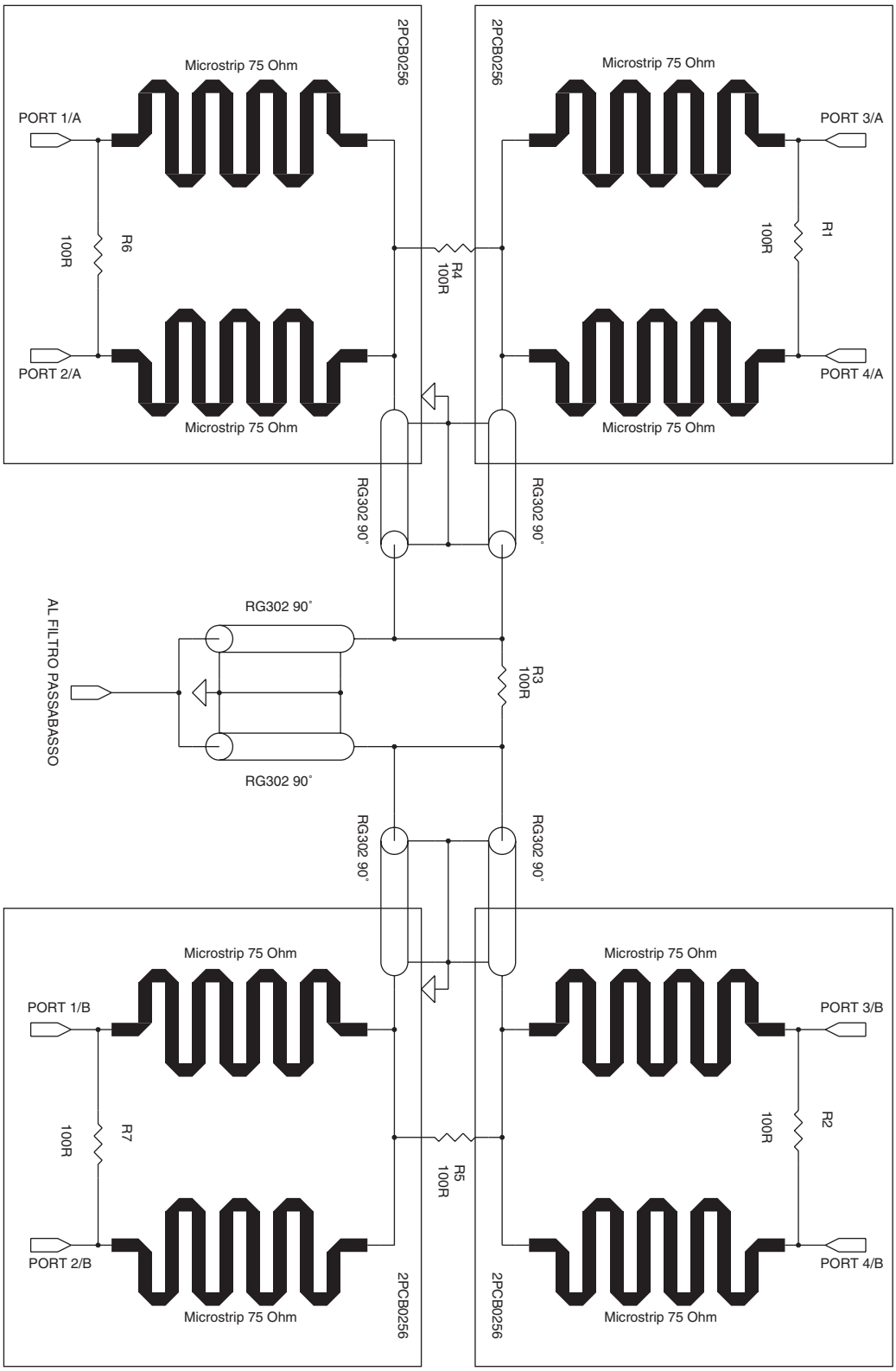
E-Mail: support@elenos.com



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Title: OUTPUT COMBINER	
Board Code:	Model: E2500 — Rev 0
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli
Date: Wednesday, November 15, 2000	Sheet 1 of 1

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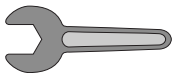
E-Mail: support@elenos.com

6.1. Air filter replacement

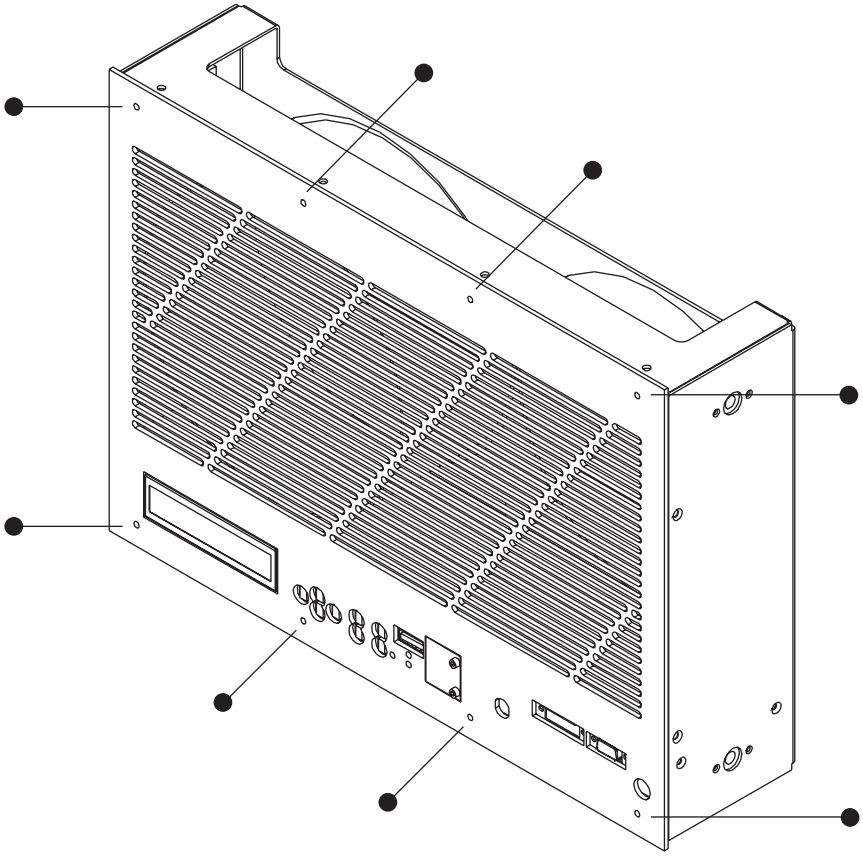
The equipment features a filter placed in front of the air intake of the fans to prevent the ingress of dust, small insects or other foreign bodies which could be damaging to the operation of the equipment.

The air filter should be replaced at least once a year in normal operating conditions.



REPLACING THE AIR FILTER

- ☞ Disconnect the equipment from the electrical supply
- ☞ Remove the front panel (see the fixing points in the diagram below)
- ☞ Replace the dirty air filter with a clean one
- ☞ Replace the front panel



N.B.
It is not necessary to dismantle the equipment to perform this operation

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POWER SUPPLY

Supply voltage (DR version):	110V, 220V, 380V three-phase-single phase 50-60Hz
Efficiency	>90%
Supply voltage (TR version):	220V, 380V three-phase 50-60Hz
Efficiency	88%

RF SECTION

Operating band:	87.5 -108 MHz
Output power:	nom. 2500W max >2700W
Driver power:	< 70W
Gain:	16 dB
Level of harmonics and spurious signals:	less than -80dBc
Asynchronous AM:	0.1%
Fast SWR intervention threshold:	300W
SWR limiter threshold:	200W
Efficiency:	>65%

GENERAL CHARACTERISTICS

Temperature:	(operating) 0 ÷ +45 °C
	(storage) -20 ÷ +50 °C
Humidity:	(operating) 95% @ 40°C
	(storage) 90% @ 65°C
Altitude:	(operating) > 4600 m s.l.m.
	(storage) > 15000 m s.l.m.
Weight:	55Kg DR version (switching power supply)
	103Kg TR version (linear power supply)
Dimensions:	31 x 41.3 x 79 cm
Rack units:	7
Cooling:	forced ventilation

"IEE485, Analog monitor, RF output monitor and RF input connecting cables must be less than 1 m. long, while AC power input/output port cable must be less than 3 m. long.