PM 300

FM Broadcasting Transmitter

User's Manual
Release 2.0

- DB ELETTRONICA TELECOMUNICAZIONI S.p.A. -
- Via Lisbona, 38 - 35127 Z.I. SUD PADOVA ITALY -- Ph. (049) 870-0588 - Fax. (049) 870-0747 -
- http://www.dbbroadcast.com -

SAFETY NOTICES

WARNING

To avoid risks of electrical shocks or fire, only qualified personnel should execute the procedures specified in this manual.

WARNING

When the protective covers of any device or component connected to a 110 / 240 VAC source by a power cord are removed, voltages and currents dangerous to life may be exposed.

WARNING

Contact with 110 / 240 Volts of alternating current and associated direct current and voltages can be fatal.

DANGEROUS

RISK OF ELECTRICAL SHOCK DO NOT OPEN

CAUTION

To reduce the risks of electrical shock, do not remove the cover (or the back). Refer, for servicing, to qualified service personnel. This installation should be done by a qualified person and should comply with to all local applicable laws.

NOTICE: ALL THE SPECIFICATIONS AND TECHNICAL INFORMATION IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE.

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FIGURES INDEX

1. PM300 FM TRANSMITTER

1.1 GENERAL DESCRIPTION

The PM300 is a FM broadcasting transmitter with continuously adjustable output power, 0 to 300W.

They can be used as stand-alone complete transmitters or as drivers for high power amplifiers.

The PM300 transmitter is built with MOS transistor technology.

On the PM300 the use of MOSFET yields:

- Higher efficiency (about 85%);
- High gain (high transconductance and low internal reactive capacitance);
- High thermal stability (negative coefficient for drain current).

The output frequency range is between 87.5 and 108 MHz. Frequency setting is made using internal dip switches or contraves on front panel (**/C** option). The minimum frequency step is 10 kHz.

The **/S** option has a built-in digital stereo coder with stereo separation in excess of 65 dB and a SNR of more than 80 dB.

The **/P** option includes a stereo audio processor with a wide range compression threshold, attack and release time adjustments and full compatibility with digital audio mixing consoles.

The **/R** option consists of full remote control capability with remote adjustments and checks for all main parameters: power output adjustment, ON/OFF command, protections reset, forward and reflected power measure, frequency deviation measure and alarms status.

The **/FSK** option makes the PM300 transmitter fully compatible with the FCC automatic identification system.

The **/VDC** option provides battery operation.

The transmitters have high frequency stability, due to the use of the Digital Phase Locked Loop system and very low drift reference quartz.

An internal deviation limiter controls the maximum frequency deviation, thus avoiding adjacent channel interference in case of accidental over modulation. In order to limit over modulation, it is necessary to insert the jumper **jp6** on the modulation board (see Fig. 7.7).

Valuable characteristics of PM transmitters include intelligent protection circuits to prevent load mismatching (VSWR), to prevent over-temperature (TEMP) and provide an unmatched durability.
On the front panel every alarm condition is monitored by LEDS.

The multiple led indicators of the front panel enable the full, easy and fast verification of all the main parameters and condition of operation. The output power, the reflected power, the voltage supply of the power amplifier, the frequency deviation, L & R, and MPX are continuously monitored.

It is possible, using the front panel adjustments, to control the following settings: output power (PWR adj.), frequency deviation (DEV adj.), transmitting frequency (option **/C**), manual /remote control selection (option **/R**) and the mono /stereo selection (option **/S**).

An output LP filter ensures a pure RF spectrum, compatible with the most stringent international requirements. As well, a high efficiency switching mode power supply reduces the power consumption, and ensures reliable operation.

Fig. 1.1 - FRONT VIEW

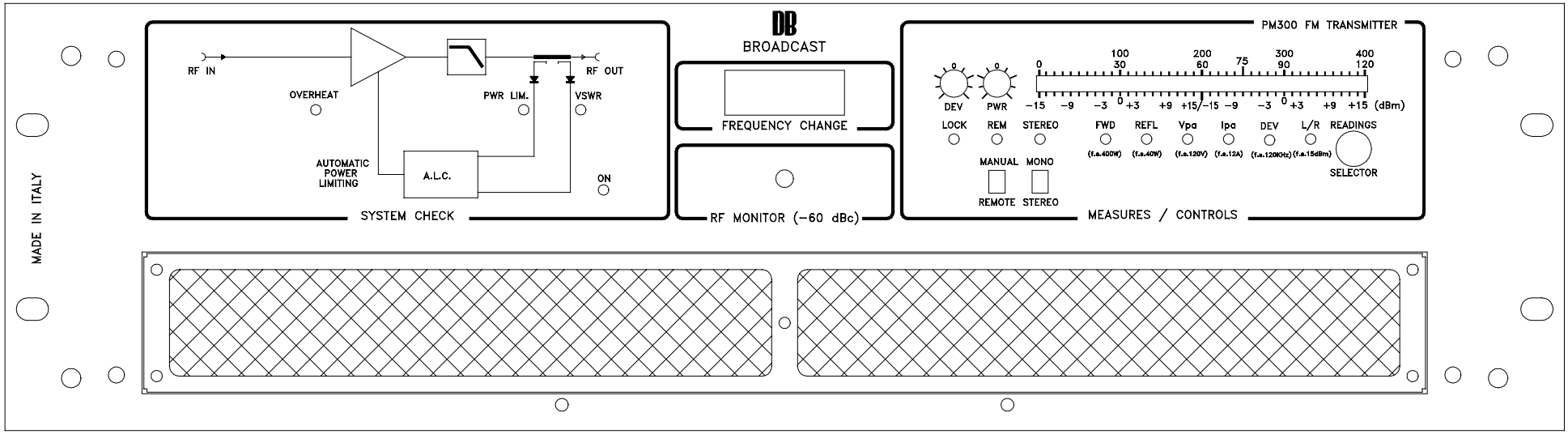


Fig. 1.2 - REAR VIEW

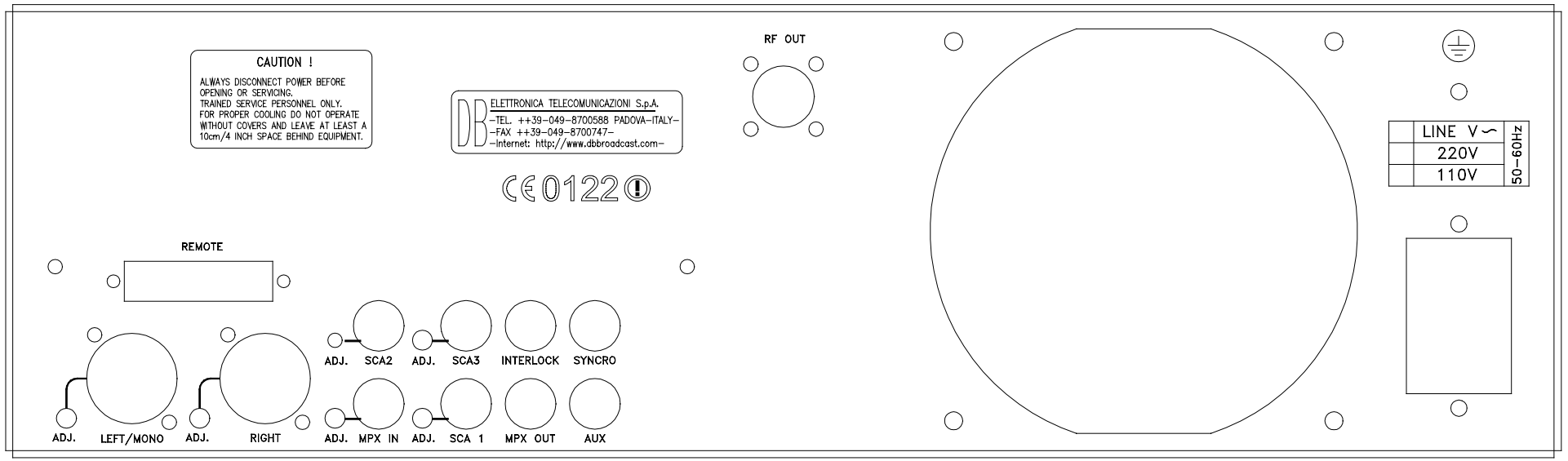
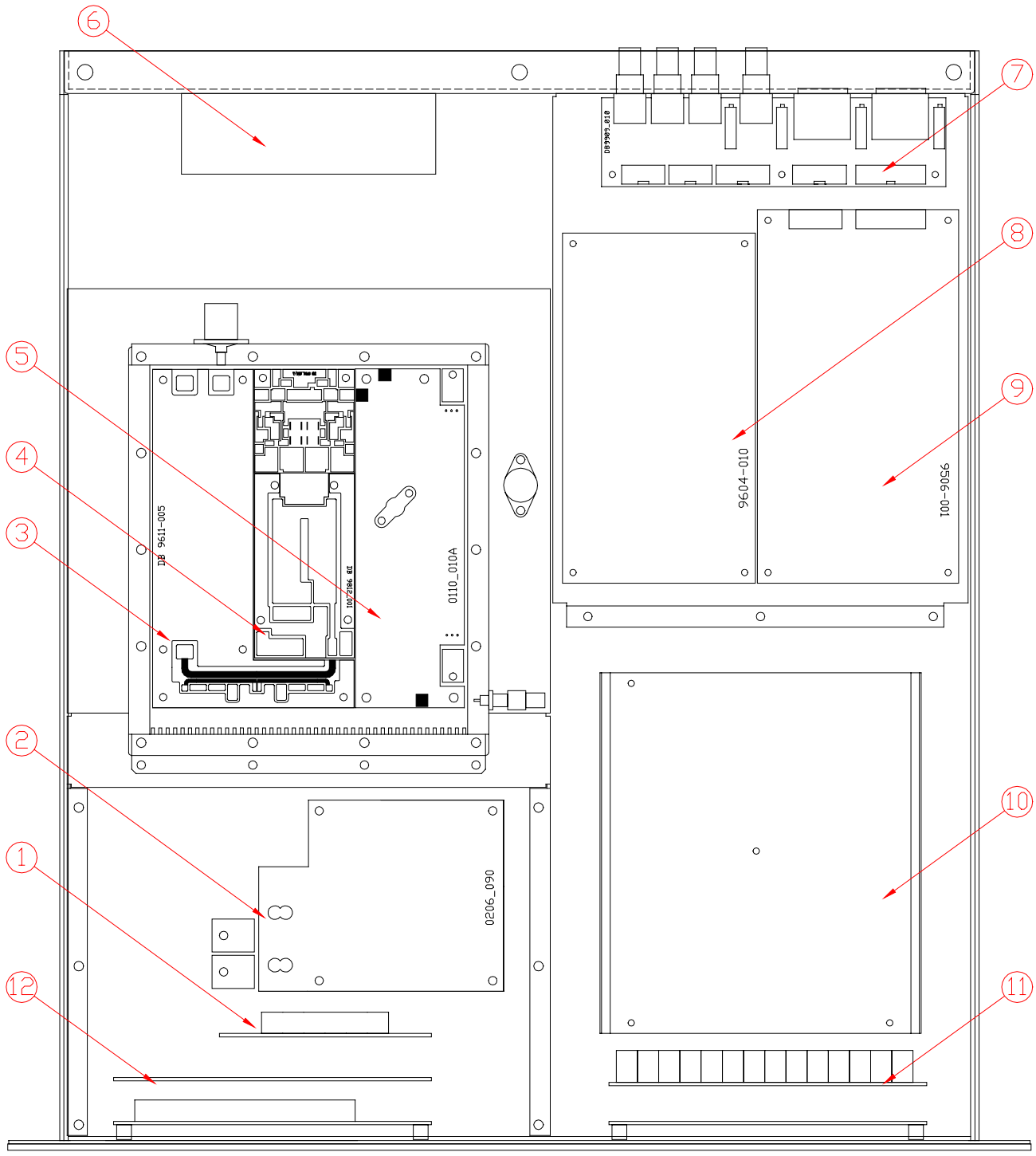


Fig. 1.3 - TOP VIEW



1) Remote control board (option)
2) Equipment Power Supply Board
3) Low Pass Filter Board
4) AMP300 RF Amplifier Board
5) AMP30 Driver Board
6) Ventilation System
7) IN-AUDIO Board
8) “Sintel 96” Modulator Board
9) Stereo Encoder Board
10) Switching power supply module (PBIT2180)
11) Meter and microprocessor boards
12) Protection boards (N°1, N°2)

2. TECHNICAL SPECIFICATIONS

Output frequency range ..... 87.5 to 108 MHz
Output frequency setting ..... synthesized with internal dip switches, 10 kHz step
or synthesized by contraves on front panel (/C option)
Output impedance ..... 50 Ω
Output connector ..... N
Output power ..... 0 to 300 W
Harmonics ..... ≤-80 dB (Typ.)
Spurious ..... ≤-85 dB (Typ)
Syncro AM modulation ..... ≤-55 dB
Asyncro AM modulation ..... ≤-60 dB
Frequency stability
Vs. Line Voltage (±15%) ..... ± 0.7 Hz
Aging drift ..... ± 300 Hz / year

MODULATION

Mono operation
Input level -6 to +10 dBm
Input connector ..... XLR balanced
Input impedance ..... 600 Ω
Bandwidth (± 0.25 dB) ..... 20 Hz to 15 kHz
Attenuation of frequencies ≥ 19 kHz ..... ≥50 dB
Preemphasis ..... 50/75 µsec
S/N ratio (± 75 kHz peak dev. with 1 kHz input, 50µs deemphasized) ..... ≥75 dB
THD+N (± 75 kHz peak dev. with 1 kHz input, unweighted) ..... ≤0.1%

Stereo operation (with stereo coder included in /S model)
L & R input level ..... -6 to +10 dBm
Input connectors ..... XLR balanced
Input impedance ..... 600 Ω
Bandwidth (± 0.25 dB) ..... 20 Hz to 15 kHz
Attenuation of frequencies ≥ 19 kHz ..... ≥50 dB
Preemphasis ..... 50/75 µsec
S/N ratio (± 75 kHz peak dev. with 1 kHz input, 50µs deemphasized) ..... ≥70 dB
THD+N (± 75 kHz peak dev. with 1 kHz input, unweighted) ..... ≤0.1%
Stereo separation ..... ≥60 dB

Stereo operation (with external stereo coder)

MPX input level ..... 2.2 Vpp per 75 kHz dev.
Input connector ..... BNC
Input impedance ..... 10 kΩ
Bandwidth (± 0.25 dB) ..... 20 Hz to 100 kHz

POWER REQUIREMENTS

Operating voltage ..... 110/220 VAC ± 10 %, 50/60 Hz
Power consumption (at max. output power) ..... 550 VA
Battery operation (option /VDC) ..... 2 x 24 VDC

OPERATING CONDITIONS

Cooling ..... air forced, 24 VDC axial fans
Temperature range ..... -5° to +45° C
Humidity ..... 95% max.

WEIGHT AND DIMENSION

Weight (Kg) 16
Dimension (W x H x D) mm ..... 483 x 132 x 513

OPTIONS

External frequency setting ..... /C
Stereo coder ..... /S
Audio processor ..... /P
Remote control ..... /R
Battery operation ..... /VDC

3. INSTALLATION

To install the PM300 transmitter:

1. Control that the main ON /OFF switch on the rear panel is in the OFF position (labeled "0").
2. Set the correct main supply voltage (220 Vac or 115 Vac) using the PWR supply selector.
3. Connect an antenna or a dummy load to the RF power output connector.
4. Connect the transmitter to the main power supply using the power cord included.
5. Switch ON the transmitter: on the front panel you will see the "ON" led light

(If the led remains OFF refer to the TROUBLESHOOTING section).

6. Control that the "LOCK" led on the front panel lights up a few seconds after the power is turned on.

If it is not, please refer to the TROUBLESHOOTING section.

7. Adjust the output power using the potentiometer on the front panel using the front panel meter.
8. Select the FWD setting, using the "Measure select" push-button.

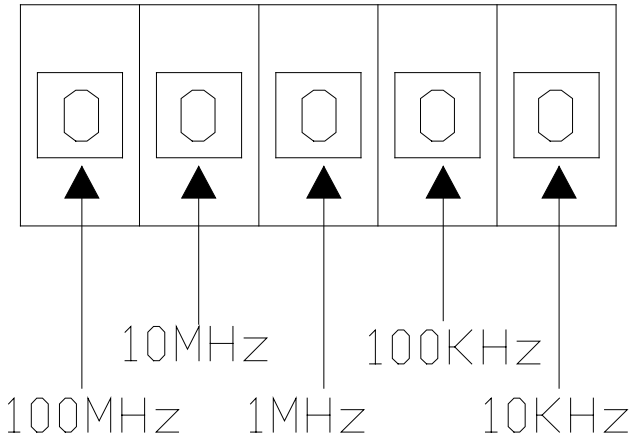
WARNING: *The transmitter can work properly within ± 10 % of the nominal main supply voltage and is designed to support main supply spikes, although it is preferable to use the main voltage stabilizers to reduce the risk of damage.*

4. FREQUENCY SETTING

1. Lower the output power to its minimum level.
2. If the exciter is equipped with the "EXTERNAL FREQUENCY SETTING" (/C option) the selection of the frequency is immediate using the external contraves.

The weights of the contrave numbers are as follows;

Fig. 4.1 - CONTRAVES WEIGHT



3. If the transmitter has internal frequency setting, to change frequency open the cover of the modulator board (N° 8 Fig. 1.3) and use the internal dip-switches (see Chapter 7). The weight of the internal dip-switches is indicated on the next page. To find the correct dip-switches configuration corresponding to the needed FM channel, please refer to the following example with 98 MHz frequency.

a **-** Put every dip-switches of the modulator board on the ON position

b **-** Select the OFF position for the dip-switch with the maximum weight, lower than or equal to the frequency wanted (for example f_0 = 98 MHz put on OFF the 81.92 MHz switch)

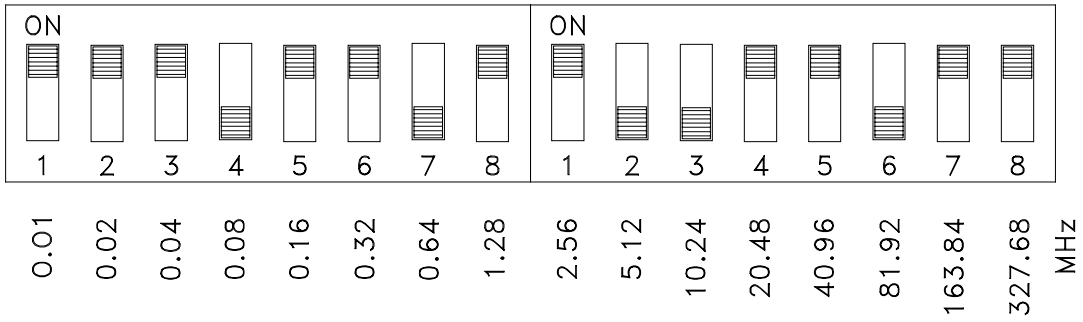
c **-** Select 98 - 81.92=16.08 MHz, the minimum weight, lower than or equal to 16.08 MHz, is 10.24 MHz; now put off the corresponding switch.

d **-** Select 16.08 - 10.24 = 5.84 MHz, the minimum weight, lower than or equal to 5.84 MHz, is 5.12 MHz, now put off the corresponding switch .

e **-** Select 5.84 - 5.12 = 0.72 MHz, the minimum weight, lower than or equal to 0.72 MHz, is 0.64 MHz, then put off the corresponding switch.

f **-** Select 0.72 - 0.64 = 0.08 MHz, there is a weight equal to 0.08 MHz, so turn OFF the corresponding switch to complete the setting.

The final configuration is:



4 - Adjust the desired output power using the front panel potentiometer.

5. ADJUSTMENTS AND MEASURES

AF INPUTS DEVIATION ADJUSTMENT

For the Left and Right input signals (/S option) use the corresponding XLR female connectors on the rear panel. - see also appendix A for information about the connection
The input impedence is 600 Ω.

The transmitter accepts, adjusting input trimmers, input signal levels from -6 dBm to +10 dBm for a 75 kHz peak deviation.

For Mono input signal (PM300 without /S option) the input female XLR connector have the same input levels than the stereo amplifier.

For MPX input signal (PM300 without /S option) the BNC input connector, labeled MPX IN (10 kΩ input impedance), accepts 0 dBm MPX signal level.

For SCA signals (>53 kHz) use BNC input connectors (1 kΩ input impedence): the input level for a correct deviation of the main carrier (about 1.25 kHz peak) is 2.2 Vpp. To adjust the peak deviation of the main carrier use the front panel potentiometer: look at the front panel meter and select the DEV measurment by means of the selection button.

The front panel allows to monitoring all the main functions and protections of the transmitter.

⇒ ***"LOCK" led***: It shows the correct lock of the frequency synthesis circuit (PLL) on the modulator board.

⇒ ***"STEREO" led***: It shows the use of the internal stereo generator board (/S option present). This led is related to the switch labeled "STEREO/MONO" which allows selection of the type of signal to be modulated.

The mono signal is obtained by a semi-sum of the left and the right signals. If the internal stereo generator board is not present, the switch mentioned above and the corresponding LED are not used.

⇒ ***"REMOTE" led***: It indicates if the operation of the transmitter can be remote controlled. This selection is made using the switch "REMOTE/MANUAL". This switch and the relative led will be unused if the transmitter is not equipped with the remote optional control board.

⇒ ***"ON" led***: It shows the ON/OFF state of the transmitter, thus the presence of main power supply.

⇒ ***"OVERHEAT" led***: It indicates that the over temperature protection is enable.
This protection does not need a RESET because it restores the normal working conditions automatically, when the temperature goes back to normal values.

⇒ ***"VSWR" led***: It shows that the VSWR protection is active. This intelligent protection is characterized by an automatic reset delayed by about 2-3 seconds to avoid the risk of accidental intervention. This auto-reset tries to resume to normal operation only 3-4 times, then turns the transmitter off definitively (after the intervention of the VSWR protection, use the "RESET" push-button.

⇒ ***"PWR LIM" led***: It shown that the output forward power becomes greater than the preset value (normally 300W).

MEASURES

On the front panel there is a leds meter bar which allows the measurement of the most important parameters of the transmitter. The push-button labeled "MEASURE SELECT" allows to select the measurement required.
Each measure selected light on one of the leds below the bar.

6. POWER SUPPLY SECTION

6.1 GENERAL DESCRIPTION

PM 300 transmitter power supply is composed of the following elements:
n°1 switching power supply module (PBIT 2180) to power supply the mosfet amplifier and the equipment power supply board.
n°1 equipment power supply board (Fig. 6.8) capable of ±12 VDC (6A max) and +24 VDC (10A max) to power supply the Protection and control boards, meter stage, Sintel '96 modulator board, AMP30 Driver stage and all optional boards present .

WARNING: *before substituting a broken switching module it is necessary to disconnect its output and to set the output voltage, without any load, at the right value (22.5v ± 2%) before reconnecting the switching module output to the other circuits and boards in order to avoid overvoltage roblems.*

The switching-mode power supply provides:

1. the efficiency is 80% higher hence provides a considerable reduction of the internal heating, thus simplifying the cooling system;
2. a lower thermal and mechanical stress for associated components, such as transformer, diodes, rectifier bridges is inflicted;
3. the power supply voltages at the output of the switching regulators are constant even in case of wide main fluctuations (± 15 %).

Fig. 6.1 - SWITCHING POWER SUPPLY MODULE ELECTRICAL SCHEMATIC "A"

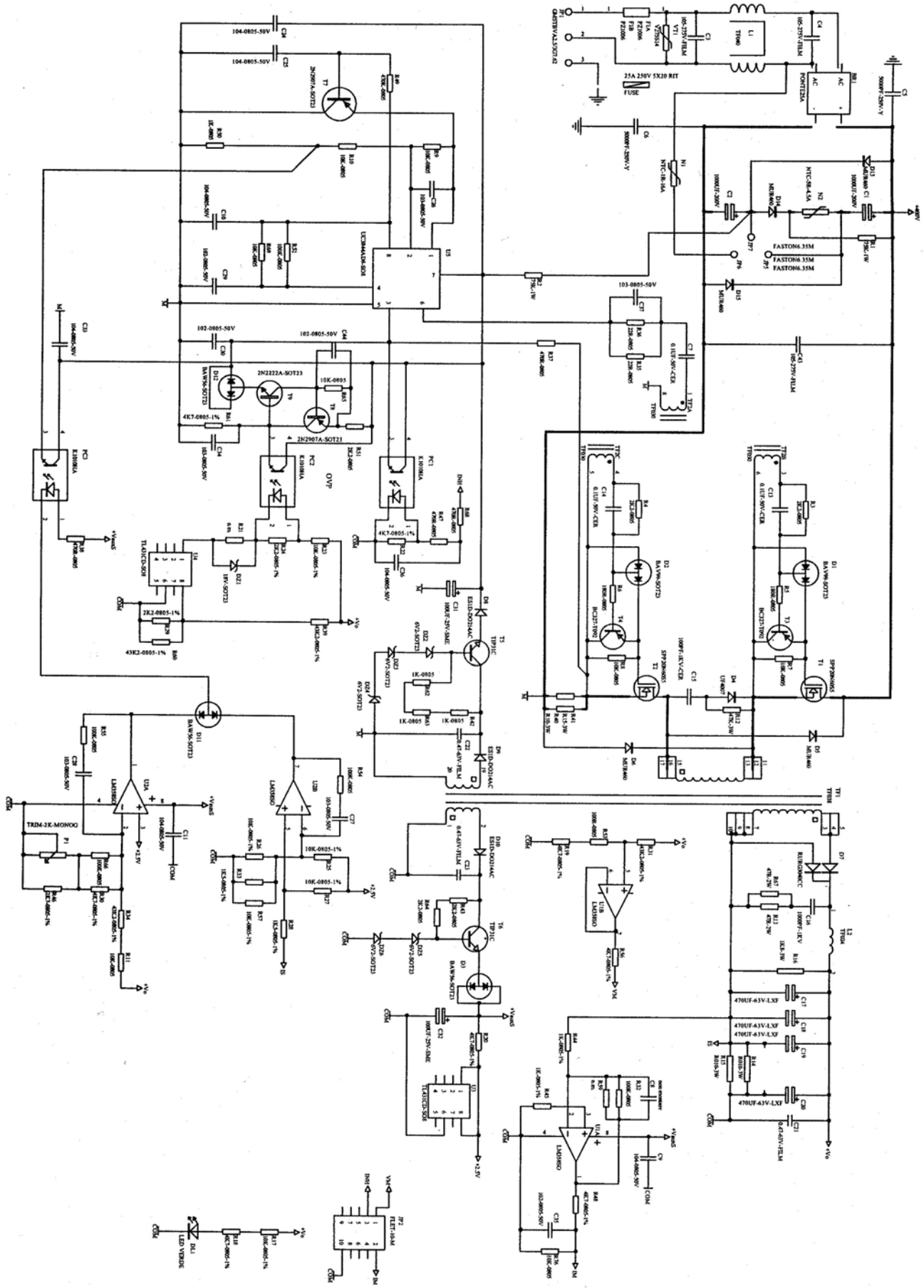


Fig. 6.2 - SWITCHING POWER SUPPLY MODULE ELECTRICAL SCHEMATIC "B"

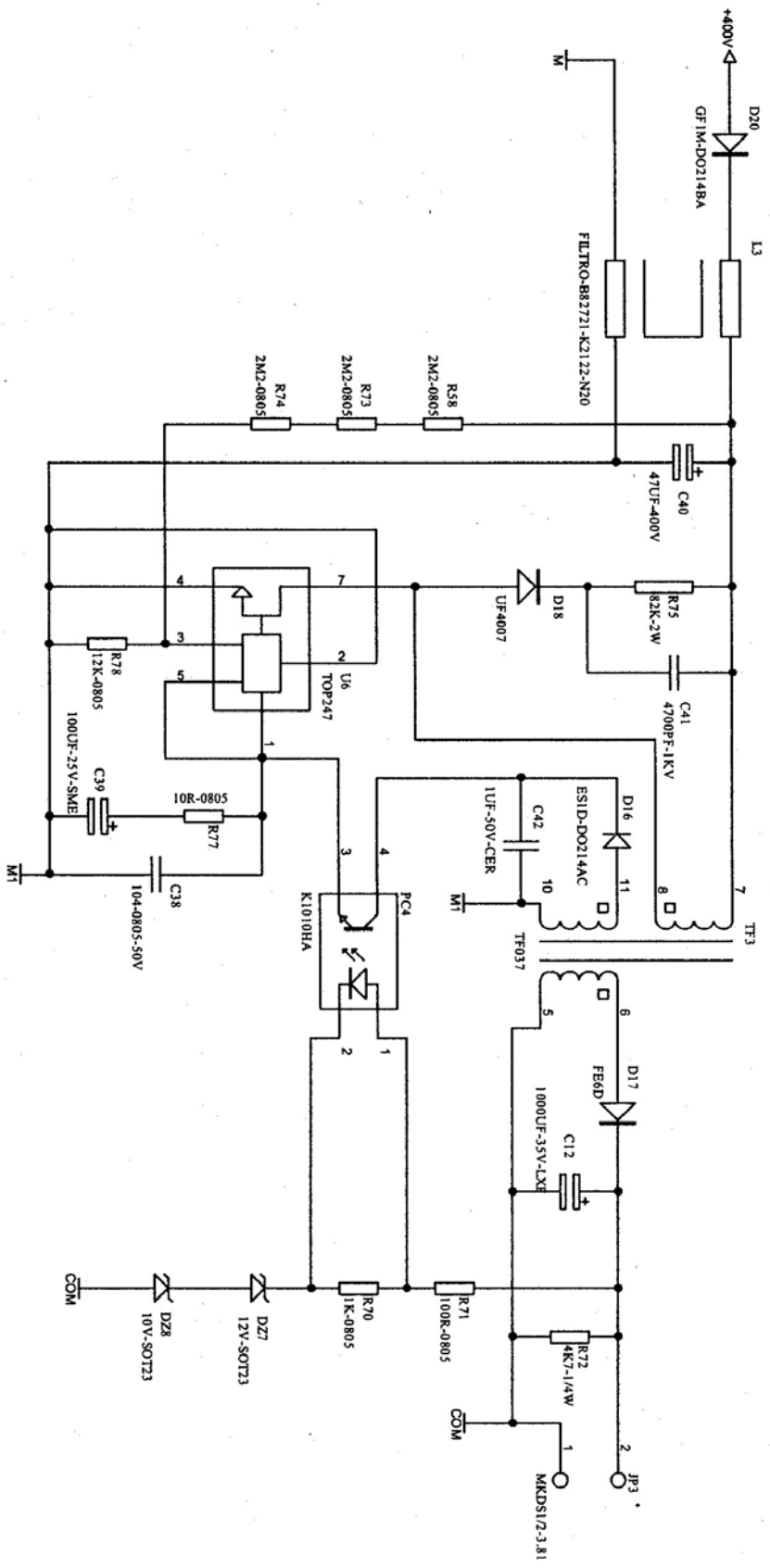
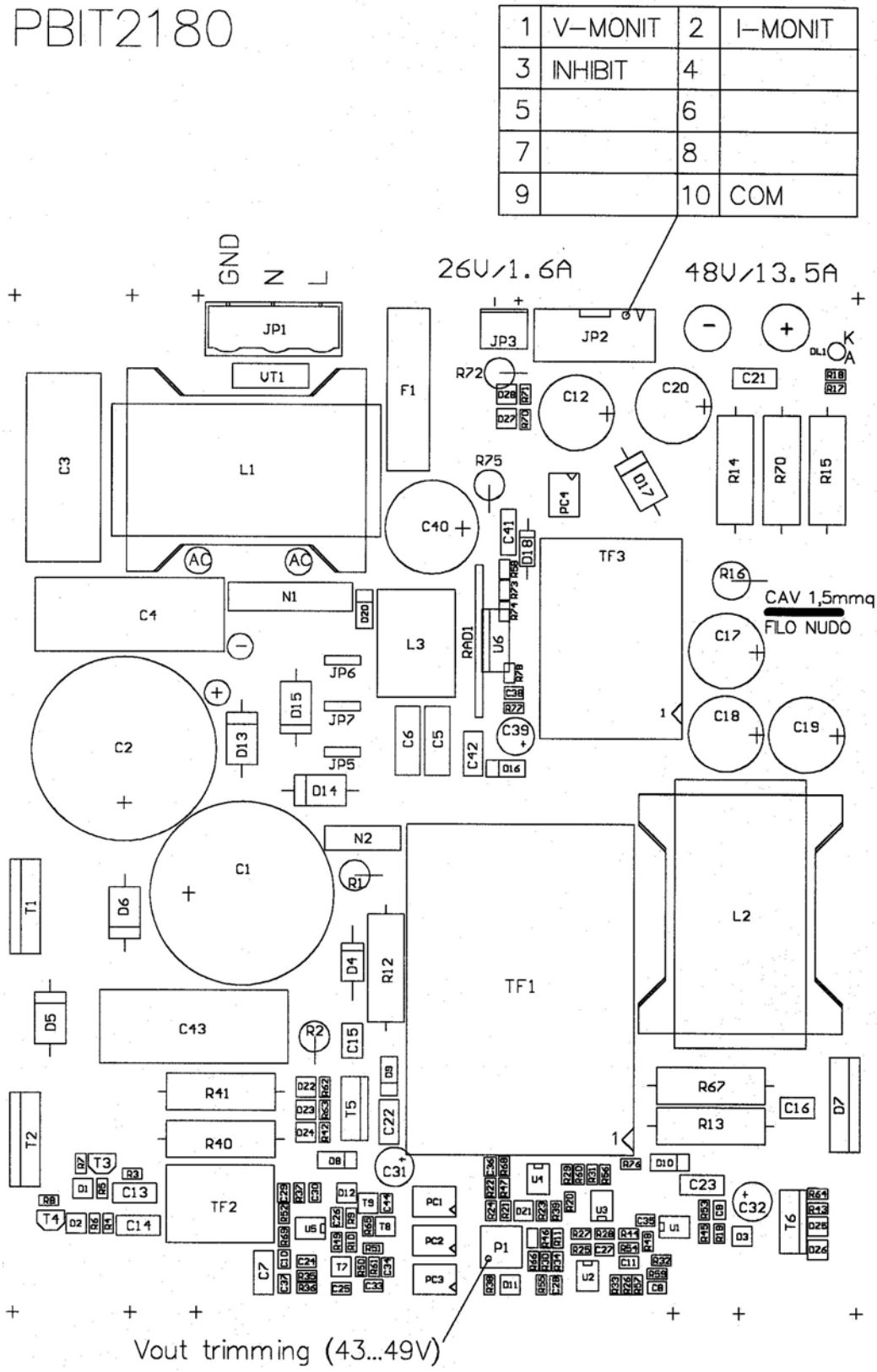


Fig. 6.3 - SWITCHING POWER SUPPLY MODULE COMPONENT LAYOUT



6.2 SWITCHING POWER SUPPLY MODULE PART LIST

Part Type	Designator	Description
0.1UF-50V-CER	C13	COND CER 5X3.5 P5 Z5U 50V 20% 0.1uF
0.1UF-50V-CER	C14	COND CER 5X3.5 P5 Z5U 50V 20% 0.1uF
0.1UF-50V-CER	C7	COND CER 5X3.5 P5 Z5U 50V 20% 0.1uF
0.47-63V-FILM	C23	COND FILM 3.5X7.2 5 63V 10% 0.47uF
0.47-63V-FILM	C21	COND FILM 3.5X7.2 5 63V 10% 0.47uF
0.47-63V-FILM	C22	COND FILM 3.5X7.2 5 63V 10% 0.47uF
1K5-0805-1%	R28	RES SMD 0805 1% 1.5K
1K5-0805-1%	R33	RES SMD 0805 1% 1.5K
1K8-3W	R16	RES 3W 5% D5.5 1.8K
1K-0805-1%	R45	RES SMD 0805 1% 1K
1K-0805-1%	R44	RES SMD 0805 1% 1K
1K-0805	R42	RES SMD 0805 5% 1K
1K-0805	R70	RES SMD 0805 5% 1K
1K-0805	R62	RES SMD 0805 5% 1K
1K-0805	R63	RES SMD 0805 5% 1K
1K-0805	R50	RES SMD 0805 5% 1K
1UF-50V-CER	C42	COND CER 5X3.5 Z5U 2.5 50V 10% 1uF
2K2-0805-1%	R29	RES SMD 0805 1% 2.2K
2K2-0805-1%	R24	RES SMD 0805 1% 2.2K
2K2-0805	R64	RES SMD 0805 5% 2.2K
2K2-0805	R3	RES SMD 0805 5% 2.2K
2K2-0805	R43	RES SMD 0805 5% 2.2K
2K2-0805	R4	RES SMD 0805 5% 2.2K
2K2-0805	R51	RES SMD 0805 5% 2.2K
2K7-0805-1%	R46	RES SMD 0805 1% 2.7K
2M2-0805	R74	RES SMD 0805 5% 2.2M
2M2-0805	R73	RES SMD 0805 5% 2.2M
2M2-0805	R58	RES SMD 0805 5% 2.2M
2N2222A-SOT23	T9	TRANS SMD NPN SOT23 2N2222A
2N2907A-SOT23	T8	TRANS SMD BIP PNP SOT23 2N2907A
2N2907A-SOT23	T7	TRANS SMD BIP PNP SOT23 2N2907A
4K7-1/4W	R72	RES 1/4W 5% 4K7
4K7-0805-1%	R48	RES SMD 0805 1% 4.7K
4K7-0805-1%	R56	RES SMD 0805 1% 4.7K
4K7-0805-1%	R19	RES SMD 0805 1% 4.7K
4K7-0805-1%	R30	RES SMD 0805 1% 4.7K
4K7-0805-1%	R20	RES SMD 0805 1% 4.7K
4K7-0805-1%	R22	RES SMD 0805 1% 4.7K
4K7-0805-1%	R61	RES SMD 0805 1% 4.7K
4K7-0805-1%	R18	RES SMD 0805 1% 4.7K
6V2-SOT23	DZ2	DIODO SMD ZENER SOT23 6V2
6V2-SOT23	DZ5	DIODO SMD ZENER SOT23 6V2
6V2-SOT23	DZ6	DIODO SMD ZENER SOT23 6V2
6V2-SOT23	DZ3	DIODO SMD ZENER SOT23 6V2
6V2-SOT23	DZ4	DIODO SMD ZENER SOT23 6V2
10K-0805-1%	R25	RES SMD 0805 1% 10K
10K-0805-1%	R27	RES SMD 0805 1% 10K
10K-0805-1%	R57	RES SMD 0805 1% 10K
10K-0805-1%	R17	RES SMD 0805 1% 10K
10K-0805-1%	R23	RES SMD 0805 1% 10K
10K-0805-1%	R26	RES SMD 0805 1% 10K
10K-0805	R10	RES SMD 0805 5% 10K
10K-0805	R9	RES SMD 0805 5% 10K
10K-0805	R69	RES SMD 0805 5% 10K
10K-0805	R8	RES SMD 0805 5% 10K

10K-0805	R7	RES SMD 0805 5% 10K
10K-0805	R65	RES SMD 0805 5% 10K
10K-0805	R11	RES SMD 0805 5% 10K
10K-0805	R76	RES SMD 0805 5% 10K
10R-0805	R77	RES SMD 0805 5% 10R
10V-SOT23	DZ8	DIODO SMD ZENER SOT23 10V
12K-0805	R78	RES SMD 0805 5% 12K
12V-SOT23	DZ7	DIODO SMD ZENER SOT23 12V
18V-SOT23	DZ1	DIODO SMD ZENER SOT23 18V
22R-0805	R35	RES SMD 0805 5% 22R
22R-0805	R36	RES SMD 0805 5% 22R
25A 250V 5X20 RIT	FUSE	FUSIBILE 25A 250V RIT 5X20 CT520325
43K2-0805-1%	R34	RES SMD 0805 1% 43.2K
43K2-0805-1%	R60	RES SMD 0805 1% 43.2K
43K2-0805-1%	R39	RES SMD 0805 1% 43.2K
43K2-0805-1%	R31	RES SMD 0805 1% 43.2K
47K-3W	R12	RES 3W 5% D5.5 47K
47R-2W	R67	RES 2W 5% D4.0 47R
47R-2W	R13	RES 2W 5% D4.0 47R
47UF-400V	C40	COND ELET SME 16X35.5V 7.5 400V 20% 47uF
75K-1W	R1	RES 1W 5% 75K
75K-1W	R2	RES 1W 5% 75K
82K-2W	R75	RES 2W 5% D4.0 82K
100K-0805	R55	RES SMD 0805 5% 100K
100K-0805	R52	RES SMD 0805 5% 100K
100K-0805	R66	RES SMD 0805 5% 100K
100K-0805	R54	RES SMD 0805 5% 100K
100K-0805	R32	RES SMD 0805 5% 100K
100PF-1KV-CER	C15	COND DISCO D7 P5 1000V 20% 100pF
100R-0805	R53	RES SMD 0805 5% 100R
100R-0805	R71	RES SMD 0805 5% 100R
100UF-25V-SME	C32	COND ELET SME 6.3X11V 2.5 25V 20% 100uF
100UF-25V-SME	C31	COND ELET SME 6.3X11V 2.5 25V 20% 100uF
100UF-25V-SME	C39	COND ELET SME 6.3X11V 2.5 25V 20% 100uF
102-0805-50V	C35	COND CER SMD 0805 X7R 50V 1000pF
102-0805-50V	C30	COND CER SMD 0805 X7R 50V 1000pF
102-0805-50V	C29	COND CER SMD 0805 X7R 50V 1000pF
102-0805-50V	C44	COND CER SMD 0805 X7R 50V 1000pF
103-0805-50V	C26	COND SMD 0805 X7R 50V 10000pF
103-0805-50V	C37	COND SMD 0805 X7R 50V 10000pF
103-0805-50V	C27	COND SMD 0805 X7R 50V 10000pF
103-0805-50V	C28	COND SMD 0805 X7R 50V 10000pF
103-0805-50V	C34	COND SMD 0805 X7R 50V 10000pF
104-0805-50V	C24	COND CER SMD 0805 X7R 50V 100000pF
104-0805-50V	C38	COND CER SMD 0805 X7R 50V 100000pF
104-0805-50V	C36	COND CER SMD 0805 X7R 50V 100000pF
104-0805-50V	C33	COND CER SMD 0805 X7R 50V 100000pF
104-0805-50V	C25	COND CER SMD 0805 X7R 50V 100000pF
104-0805-50V	C9	COND CER SMD 0805 X7R 50V 100000pF
104-0805-50V	C11	COND CER SMD 0805 X7R 50V 100000pF
104-0805-50V	C10	COND CER SMD 0805 X7R 50V 100000pF
105-275V-FILM	C4	COND FILM 18X27.5X31.5 27.5 275V X2 20% 1uF
105-275V-FILM	C43	COND FILM 18X27.5X31.5 27.5 275V X2 20% 1uF
105-275V-FILM	C3	COND FILM 18X27.5X31.5 27.5 275V X2 20% 1uF
180R-0805	R5	RES SMD 0805 5% 180R
180R-0805	R6	RES SMD 0805 5% 180R

470K-0805	R49	RES SMD 0805 5% 470K
470R-0805	R47	RES SMD 0805 5% 470R
470R-0805	R68	RES SMD 0805 5% 470R
470R-0805	R38	RES SMD 0805 5% 470R
470R-0805	R37	RES SMD 0805 5% 470R
470UF-63V-LXF	C20	COND ELET LOW ESR 12.5X35V 5 63V 20% 470uF
470UF-63V-LXF	C19	COND ELET LOW ESR 12.5X35V 5 63V 20% 470uF
470UF-63V-LXF	C17	COND ELET LOW ESR 12.5X35V 5 63V 20% 470uF
470UF-63V-LXF	C18	COND ELET LOW ESR 12.5X35V 5 63V 20% 470uF
1000PF-1KV	C16	COND DISCO D8 P5 1000V -20%+80% 1000pF
1000UF-35V-LXF	C12	COND ELET LOW ESR 12.5X30V 5 35V 20% 1000uF
1000UF-200V	C1	COND ELET 85° 30X40 P10 20% 200V 1000uF
1000UF-200V	C2	COND ELET 85° 30X40 P10 20% 200V 1000uF
4700PF-1KV	C41	COND DISCO D9 P5 1000V -20+80% 4700PF
5000PF-250V-Y	C5	COND DISCO Y2 250V 20% 5000pF
5000PF-250V-Y	C6	COND DISCO Y2 250V 20% 5000pF
BAV99-SOT23	D2	DIODO SMD RADDRIZ GEN SOT23 BAV99
BAV99-SOT23	D1	DIODO SMD RADDRIZ GEN SOT23 BAV99
BAW56-SOT23	D12	DIODO SMD RADDRIZ GEN SOT23 BAW56
BAW56-SOT23	D11	DIODO SMD RADDRIZ GEN SOT23 BAW56
BAW56-SOT23	D3	DIODO SMD RADDRIZ GEN SOT23 BAW56
BC327-T092	T3	TRANS BIP PNP TO92 BC327
BC327-T092	T4	TRANS BIP PNP TO92 BC327
ES1D-DO214AC	D10	DIODO SMD FAST DO-214BA ES1D
ES1D-DO214AC	D16	DIODO SMD FAST DO-214BA ES1D
ES1D-DO214AC	D8	DIODO SMD FAST DO-214BA ES1D
ES1D-DO214AC	D9	DIODO SMD FAST DO-214BA ES1D
FASTON6.35M	JP5	PIN MASC FASTON 6.35MM DA CS OMEGA CC563
FASTON6.35M	JP7	PIN MASC FASTON 6.35MM DA CS OMEGA CC563
FASTON6.35M	JP6	PIN MASC FASTON 6.35MM DA CS OMEGA CC563
FE6D	D17	DIODO FAST G4 FE6D
FILTRO-B82721-K2122-N20	L3	FILTRO EMI 1.2A 6.8mH B82721-K2122-N20
FLET-10-M	JP2	CONN MASC DIL FLET 10 POLI DIRITTO
GF1M-DO214BA	D20	DIODO RADD GEN SMD DO214BA 1A GF1M
GMSTBVA2.5/3G7.62	JP1	MORS DA CS ESTR MASC 3 PIN GMSTBVA2.5/3-G762
K1010HA	PC2	IC DIP4 PASSO 10 PHCP K1010HA
K1010HA	PC4	IC DIP4 PASSO 10 PHCP K1010HA
K1010HA	PC1	IC DIP4 PASSO 10 PHCP K1010HA
K1010HA	PC3	IC DIP4 PASSO 10 PHCP K1010HA
LED VERDE	DL1	DIODO LED D3MM LED VERDE
LM358SO	U2	IC SMD SO8 LM358
LM358SO	U1	IC SMD SO8 LM358
MKDS1/2-3.81	JP3	MORS DA CS A VITE 2P MKDS1/2-3.81
MUR460	D13	DIODO FAST 600V 4A MUR460
MUR460	D14	DIODO FAST 600V 4A MUR460
MUR460	D15	DIODO FAST 600V 4A MUR460
MUR460	D6	DIODO FAST 600V 4A MUR460
MUR460	D5	DIODO FAST 600V 4A MUR460
NTC-1R-16A	N1	RES NTC EPCOS S364 D21 P7.5 20% 16A 1R
NTC-5R-4.5A	N2	RES NTC D11.5 P5 4.5A S236 20% 5R
PONTE25A	BR1	PONTE DIODI FASTON 25A 800V GBPC2508
PZ1006	F1A	CLAMP PORTAFUSIBILE 5X20 20A PZ1006
PZ1006	F1B	CLAMP PORTAFUSIBILE 5X20 20A PZ1006
R10-3W	R40	RES 3W 5% D5.5 0.1R OSSIDO METALLICO
R010-3W	R14	RES 3W 5% D5.5 0.010R
R010-3W	R15	RES 3W 5% D5.5 0.010R

R15-3W	R41	RES 3W 5% D5.5 0.15R OSSIDO METALLICO
RURG3040CC	D7	DIODO FAST TO3P 60A 400V RURG3040CC
SPP20N60S5	T2	TRANS MOS N TO220 SPP20N60S05
SPP20N60S5	T1	TRANS MOS N TO220 SPP20N60S05
TF024	L2	TRAF TOROIDE CON SUPP TF024
TF030	TF2	TRAF TOROIDE IMPULSI R12.5 TF030
TF037	TF3	TRASF ETD29V TF037
TF038	TF1	TRASF ETD49 VERT 20P TF038
TF040	L1	FILTRO 2X5mH 20A TF040
TIP31C	T6	TRANS BIP TO220 TIP31C
TIP31C	T5	TRANS BIP TO220 TIP31C
TL431CD-SO8	U3	IC SMD SO8 TL431CD
TL431CD-SO8	U4	IC SMD SO8 TL431CD
TOP247	U6	IC TO220-7C TOP247Y
TRIM-2K-MONOG	P1	RES TRIM MONOG OR 6.6X6.9 1/2W 20% 2K
UC3844AD8-SO8	U5	IC SMD SO8 UC3844AD8
UF4007	D4	DIODO FAST DO204AL UF4007
UF4007	D18	DIODO FAST DO204AL UF4007
V275S14	VT1	VARISTORE S14K275 SIEMENS
n.m.	R59	RES SMD 0805 5% 560K
n.m.	R21	RES SMD 0805 1% 4.7K
non montare	C8	COND CER SMD 0805 X7R 50V 100000pF

Fig. 6.4 – EQUIP. PWR SUPP. BOARD GENERAL ELECTRICAL SCHEMATIC

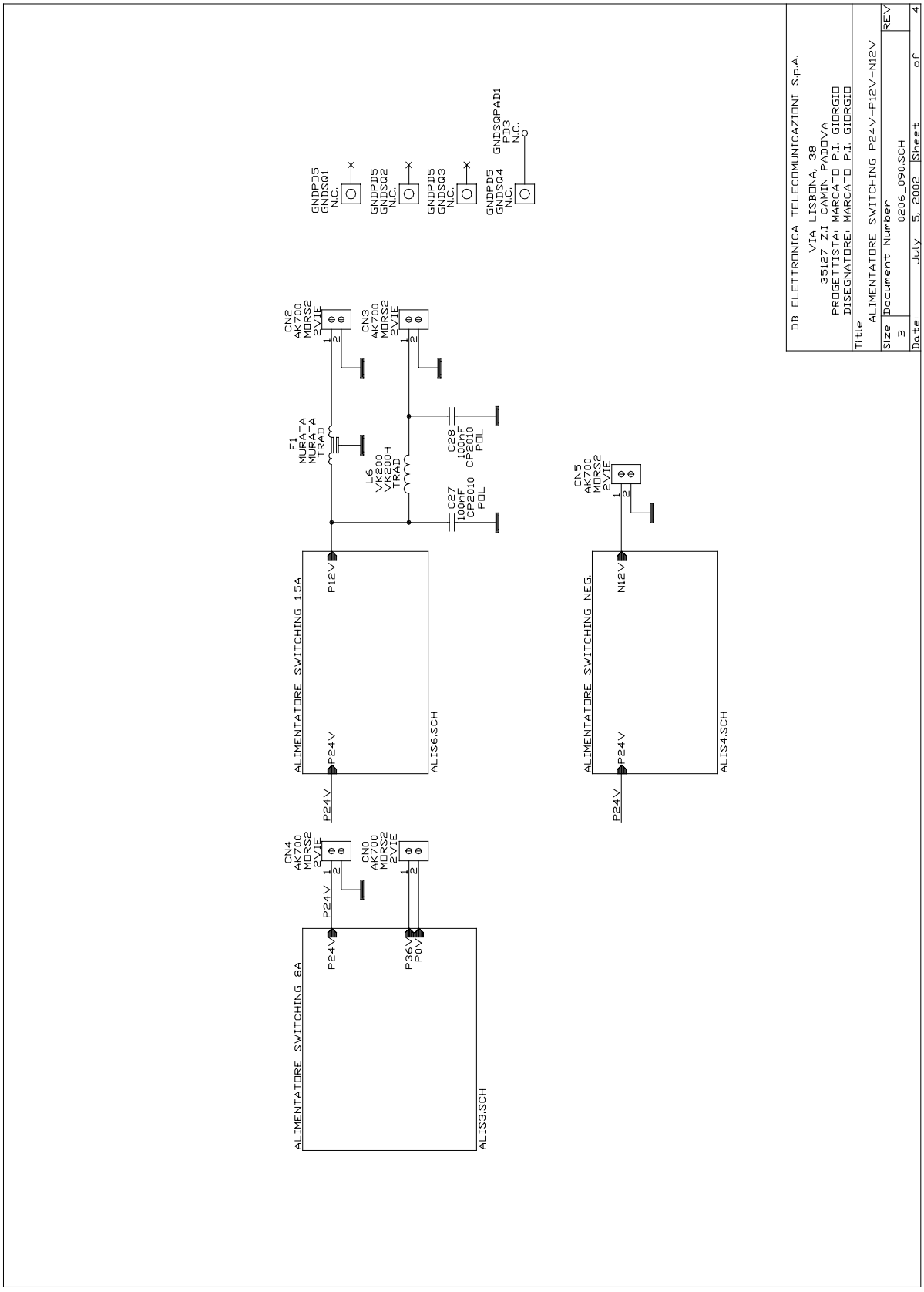


Fig. 6.5 - EQUIP. PWR SUPP. BOARD +24 V STAGE ELECTRICAL SCHEMATIC

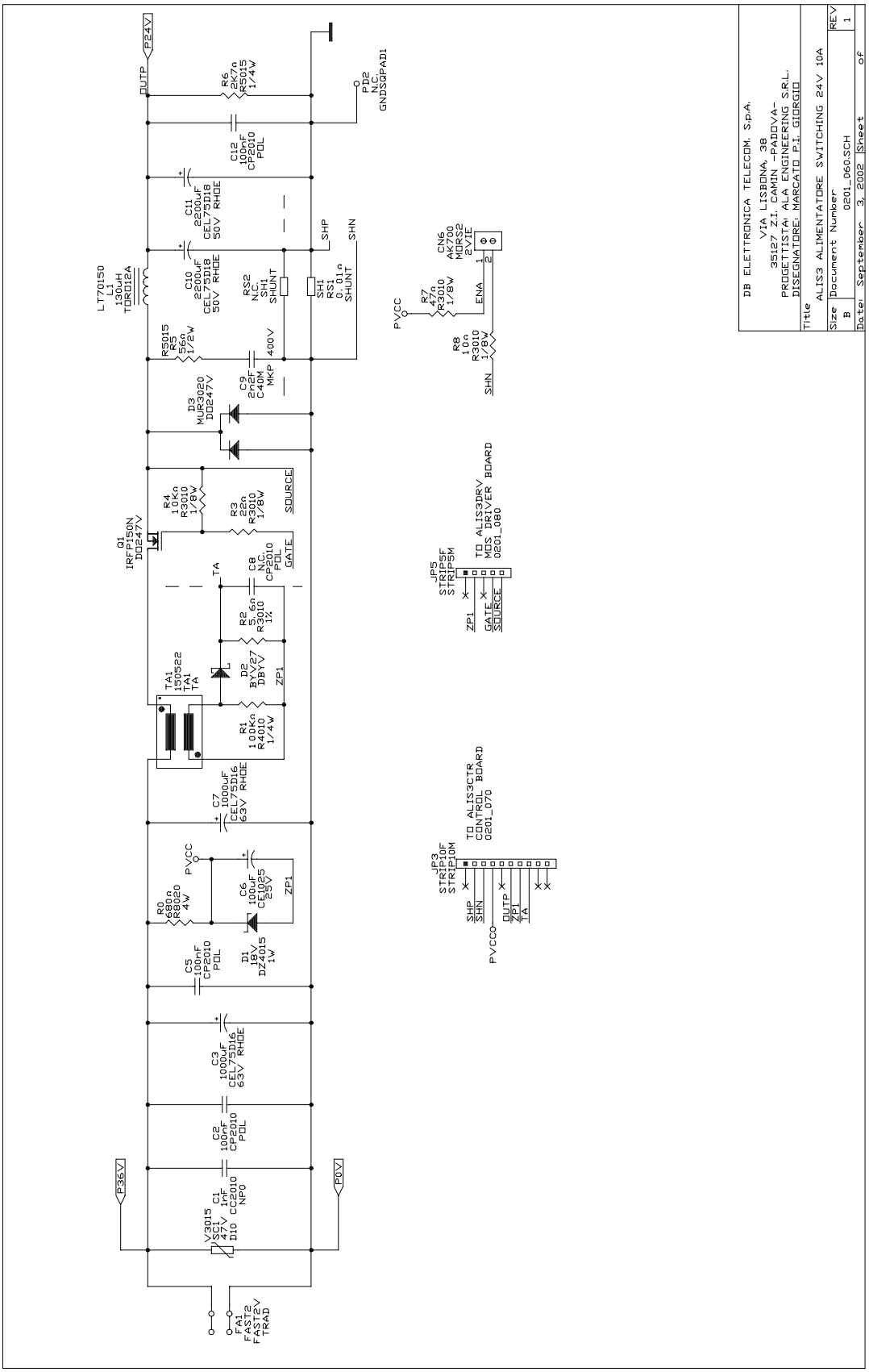


Fig. 6.6 - EQUIP. PWR SUPP. BOARD-12V STAGE ELECTRICAL SCHEMATIC

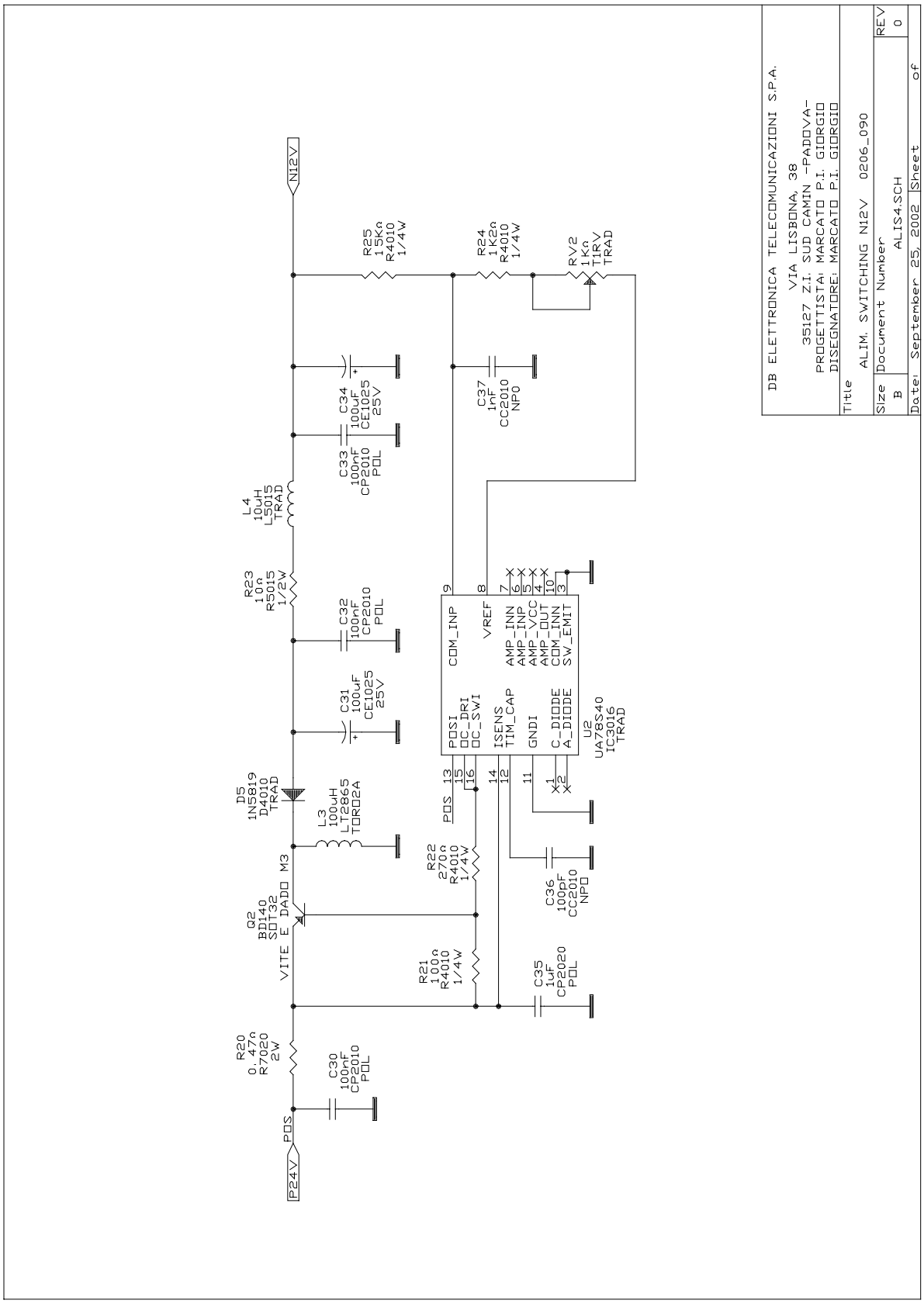


Fig. 6.7 - EQUIP. PWR SUPP. BOARD +12V STAGE ELECTRICAL SCHEMATIC

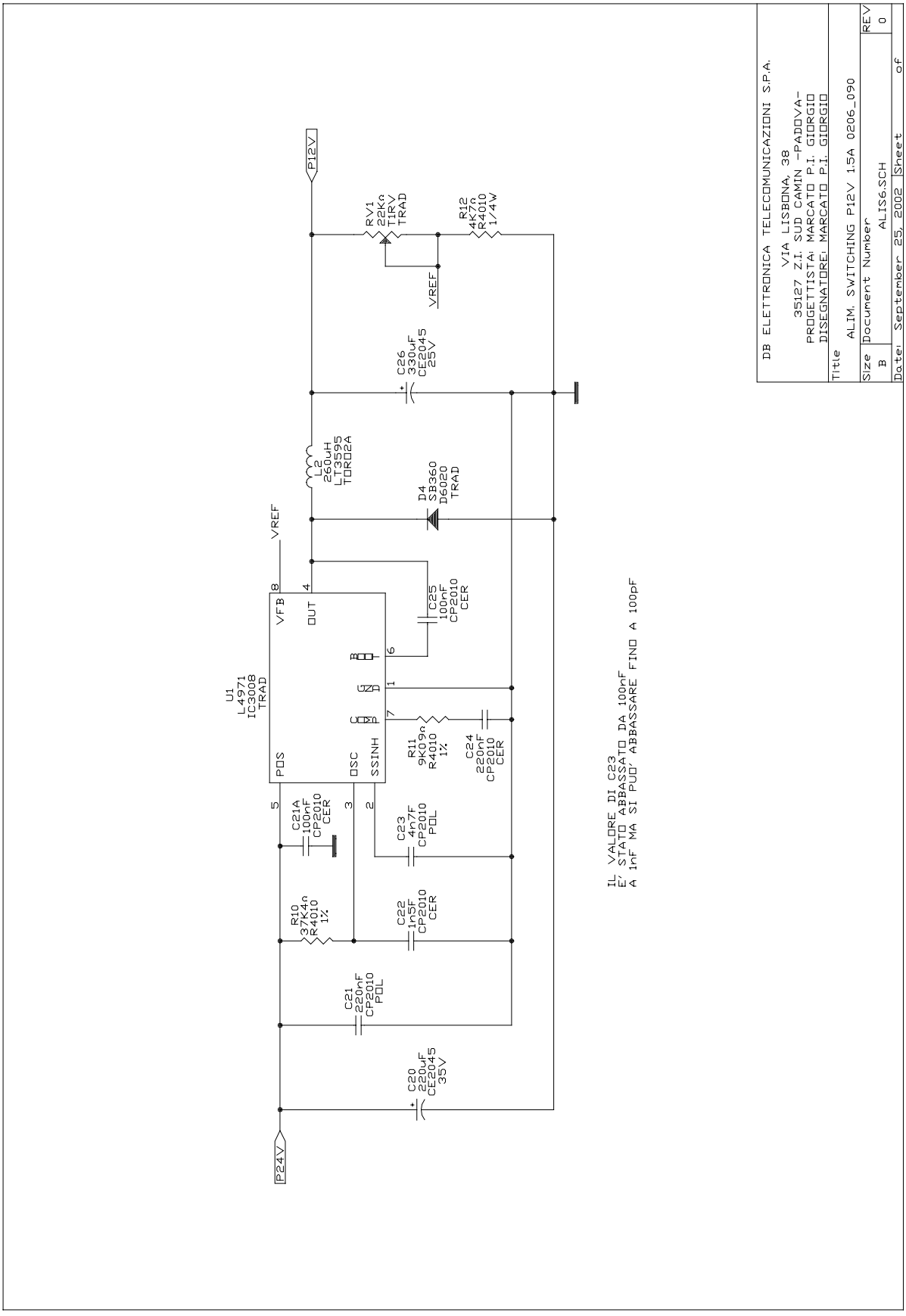
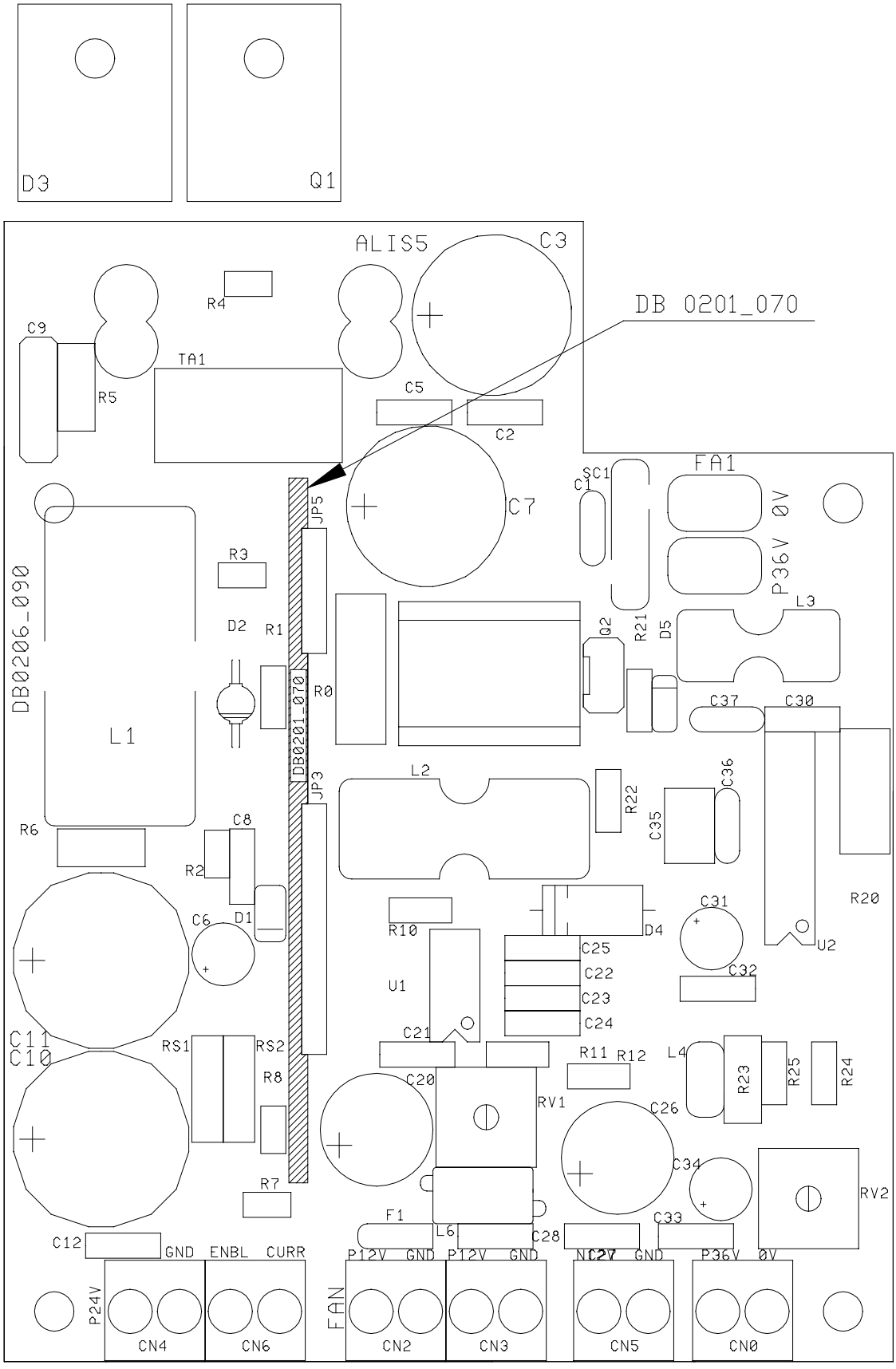


Fig. 6.8 - EQUIP. PWR SUPP. BOARD COMPONENT LAYOUT (DB 0206_090)



6.3 EQUIP. PWR SUPP. BOARD PARTS LIST (DB 0206_090)

ITEM	QUANTITY	REFERENCE	PART
1	6	CN2,CN3,CN4,CN5,CN6,CN0	AK700 2VIE MORS2
2	2	C37,C1	1nF NP0 CC2010
3	8	C2,C5,C12,C27,C28,C30, C32,C33	100nF POL CP2010
4	2	C7,C3	1000uF 63V RHOE CEL75D16
5	3	C6,C31,C34	100uF 25V CE1025
6	1	C9	2n2F MKP 400V C40M
7	2	C10,C11	2200uF 50V RHOE CEL75D18
8	1	C20	220uF 35V CE2045
9	2	C21A,C25	100nF CER CP2010
10	2	C21,C24	220nF POL CP2010
11	1	C23	4n7F POL CP2010
12	1	C22	1n5F POL CP2010
13	1	C26	330uF 25V CE2045
14	1	C35	1uF POL CP2020
15	1	C36	100pF NPO CC2010
16	1	D1	18V 1W DZ4015
17	1	D2	BYV27 DBYV
18	1	D3	MUR3020 DO247V
19	1	D4	SB360 TRAD D6020
20	1	D5	1N5819 TRAD D4010
21	1	FA1	FAST2 TRAD FAST2V
22	1	F1	MURATA TRAD MURATA
23	1	JP3	STRIP10F STRIP10M
24	1	JP5	STRIP5F STRIP5M
25	1	L1	130uH TORO12A LT70150
26	1	L2	260uH TORO2A LT3595
27	1	L3	100uH TORO2A LT2865
28	1	L4	10uH TRAD L5015
29	1	L6	VK200 TRAD VK200H
30	1	Q1	IRFP150N DO247V
31	1	Q2	BD140 SOT32 +VITEeDADOM3+ALETTA
32	1	RS1	0.01Ω SHUNT SH1
33	1	RV1	22KΩ TRAD T1RV
34	1	RV2	1KΩ TRAD T1RV
35	1	R0	680Ω 4W R8020
36	1	R1	100KΩ 1/4W R4010
37	1	R2	5.6Ω 1% R3010
38	1	R3	22Ω 1/8W R3010
39	1	R4	10KΩ 1/8W R3010
40	1	R5	56Ω 1/2W R5015
41	1	R6	2K7Ω 1/4W R5015
42	1	R7	47Ω 1/8W R3010
43	1	R8	10Ω 1/8W R3010
44	1	R10	37K4Ω 1% R4010
45	1	R11	9K09Ω 1% R4010
46	1	R12	4K7Ω 1/4W R4010
47	1	R20	0.47Ω 2W R7020
48	1	R21	100Ω 1/4W R4010
49	1	R22	270Ω 1/4W R4010
50	1	R23	10Ω 1/2W R5015
51	1	R24	1K2Ω 1/4W R4010

ITEM	QUANTITY	REFERENCE	PART
52	1	R25	15KΩ 1/4W R4010
53	1	SC1	47V D10 V3015
54	1	TA1	150522 TA TA1
55	1	U1	L4971 TRAD IC3008
56	1	U2	UA78S40 TRAD IC3010
57	1	DB 0201_070	PRINTED BOARD

Fig. 6.9 - DB 0201_070 PRINTED BOARD ELECTRICAL SCHEMATIC

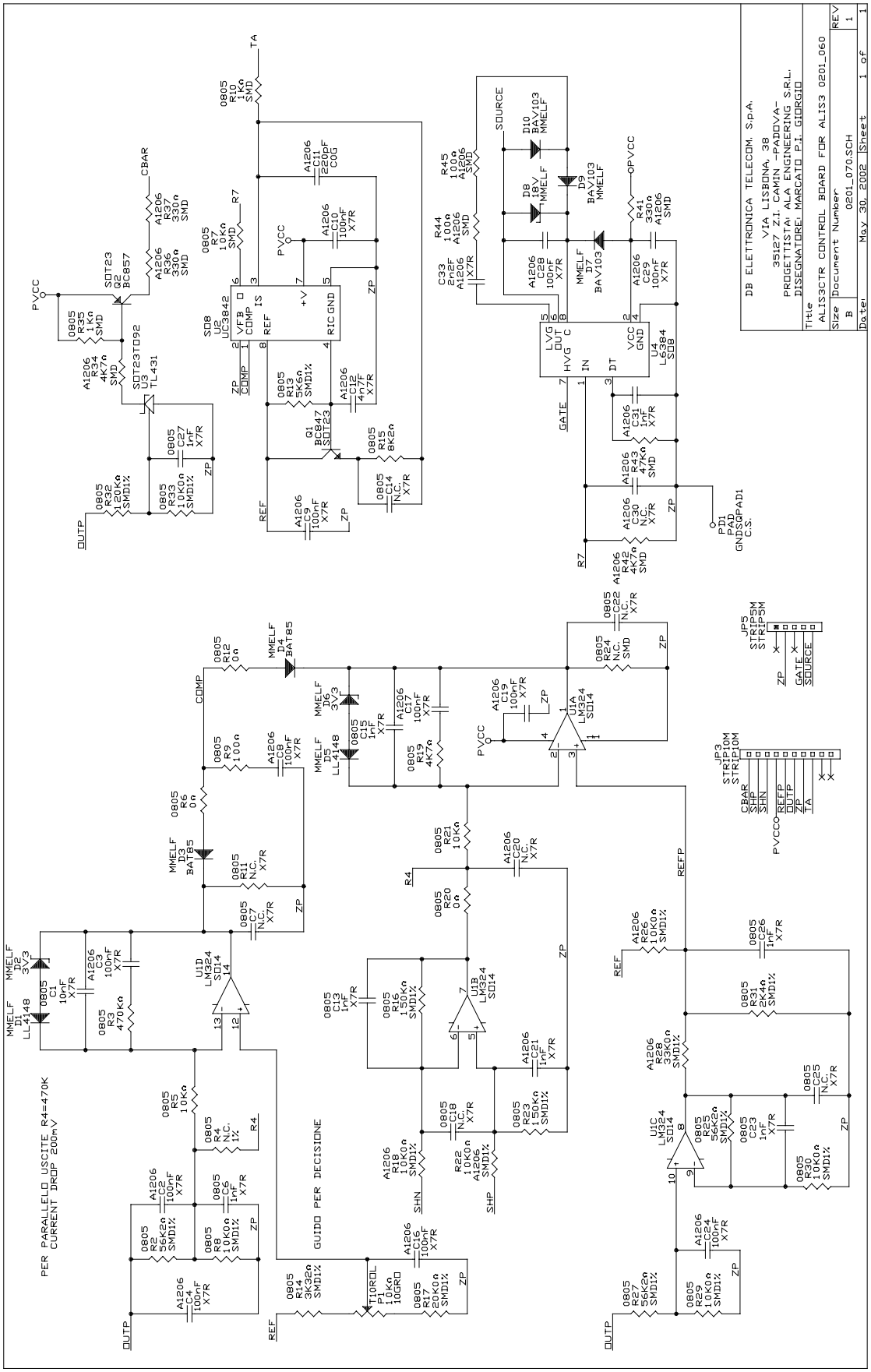
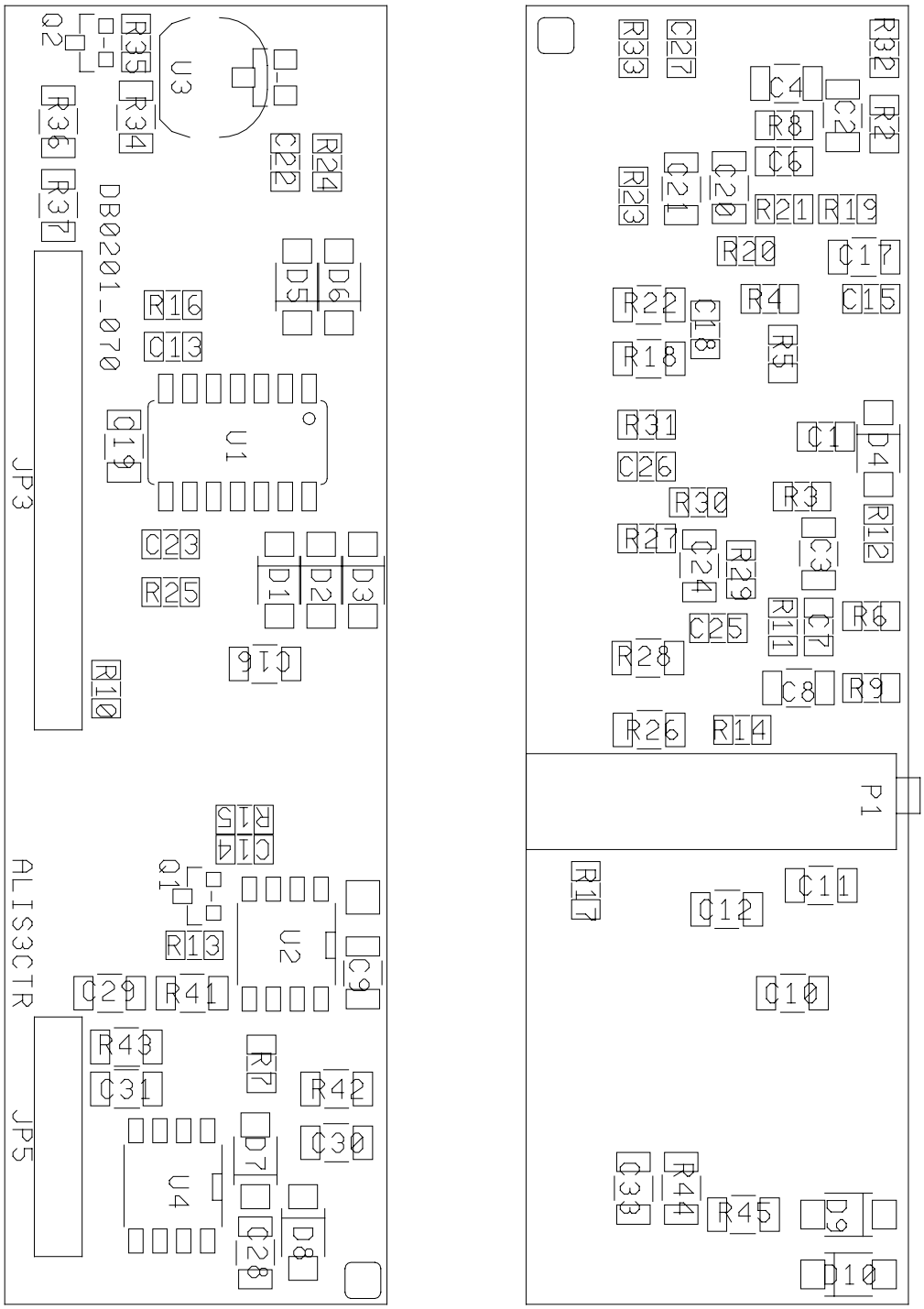


Fig. 6.10 - DB 0201_070 PRINTED BOARD COMPONENT LAYOUT



6.4 DB 0201_070 PRINTED BOARD PARTS LIST

ITEM	QUANTITY	REFERENCE	PART
1	1	C1	10nF X7R 0805
2	11	C2,C3,C4,C8,C9,C10,C17, C19,C24,C28,C29	100nF X7R 1206
3	6	C6,C13,C15,C23,C26,C27	1nF X7R 0805
4	6	C7,R11,C14,C18,C22,C25	N.C. X7R 0805
5	1	C11	220pF C0G 1206
6	1	C12	4n7F X7R 1206
7	1	C16	100nF X7R 1206
8	2	C31,C21	1nF X7R 1206
9	1	C33	2n2F X7R 1206
10	2	D5,D1	LL4148 MMELF DIODO
11	2	D2,D6	3V3 MMELF ZENER
12	2	D3,D4	BAT85 MMELF DIODO
13	3	D7,D9,D10	BAV103 MMELF DIODO
14	1	D8	18V MMELF ZENER
15	1	JP3	STRIP10M MASCHIO 90°
16	1	JP5	STRIP5M MASCHIO 90°
17	1	P1	10KΩ 10GRO PANNELLO
18	1	Q1	BC847 SMD SOT23
19	1	Q2	BC857 SMD SOT23
20	3	R2,R25,R27	56K2Ω SMD1% 0805
21	1	R3	470KΩ SMD 0805
22	2	R21,R5	10KΩ SMD 0805
23	3	R6,R12,R20	0Ω SMD 0805
24	1	R7	10KΩ SMD 0805
25	4	R8,R29,R30,R33	10K0Ω SMD1% 0805
26	1	R9	100Ω SMD 0805
27	2	R10,R35	1KΩ SMD 0805
28	1	R13	5K6Ω SMD1% 0805
29	1	R14	3K32Ω SMD1% 0805
30	1	R15	8K2Ω SMD 0805
31	2	R16,R23	150KΩ SMD1% 0805
31	1	R17	20K0Ω SMD1% 0805
32	3	R18,R22,R26	10K0Ω SMD1% 1206
33	1	R19	4K7Ω SMD 0805
34	1	R28	33K0Ω SMD1% 1206
35	1	R31	2K4Ω SMD1% 0805
36	1	R32	120KΩ SMD1% 0805
37	2	R42,R34	4K7Ω SMD 1206
38	3	R36,R37,R41	330Ω SMD 1206
39	1	R43	47KΩ SMD 1206
40	2	R44,R45	100Ω SMD 1206
41	1	U1	LM324 SMD SO14
42	1	U2	UC3842 SMD SO8
43	1	U3	TL431 SOT23/TO92
44	1	U4	L6384 SMD SO8

7. MODULATION STAGE (Sintel 96)

7.1 GENERAL DESCRIPTION

The new modulator board SINTEL ’96 allows a high quality direct carrier modulation accepting a composite stereo (MPX) or a mono input signal with up to 3 SCA subcarriers (for example RDS, ARI, ...).

The mono input signal is filtered by a 7^{th} order elliptic filter with a very flat response (20Hz to 15kHz with ± 0.25 dB) and an optimum out of band attenuation (>50 dB for frequencies higher than 19 kHz), then the signal is amplified (or attenuated) and passed to the VCO oscillator for the FM carrier modulation. The VCO is controlled by a digital PLL circuit with a high stability quartz reference to obtain a very stable synthetized oscillation: the frequency setting is customizeable using on board dip-switches (the minimum step size is 10 kHz).

The composite stereo signal and the SCA subcarriers are just amplified or attenuated by the correct modulation depth adjustment before going through the VCO stage: the stereo performances of SINTEL ’96 are excellent, (stereo separation >60 dB from 20Hz to 15 kHz, SNR > 80 dB).

Before the VCO stage, an adjustable and bypassable deviation limiter prevents the FM carrier from an excessive modulation depth and adjacent channel interference according to all the international standards (CCIR, FCC). Furthermore, an automatic locking circuit enables the output modulated signal of SINTEL ’96 only when the internal PLL is locked properly, in order to avoid unwanted emissions.

Fig. 7.1 - "SINTEL 96" MODULATION BOARD GENERAL ELECTRICAL SCHEMATIC

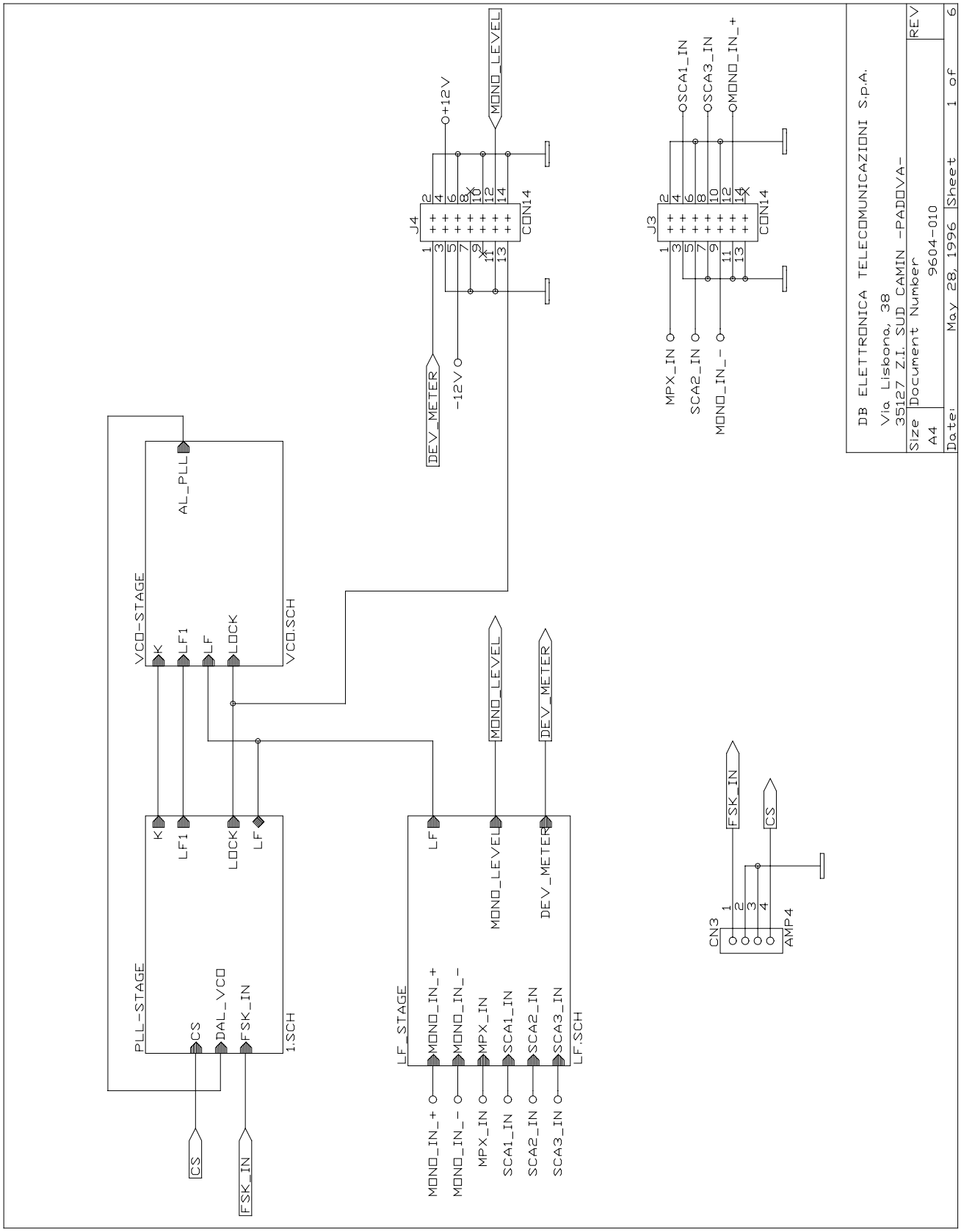


Fig. 7.2 - PLL STAGE ELECTRICAL SCHEMATIC

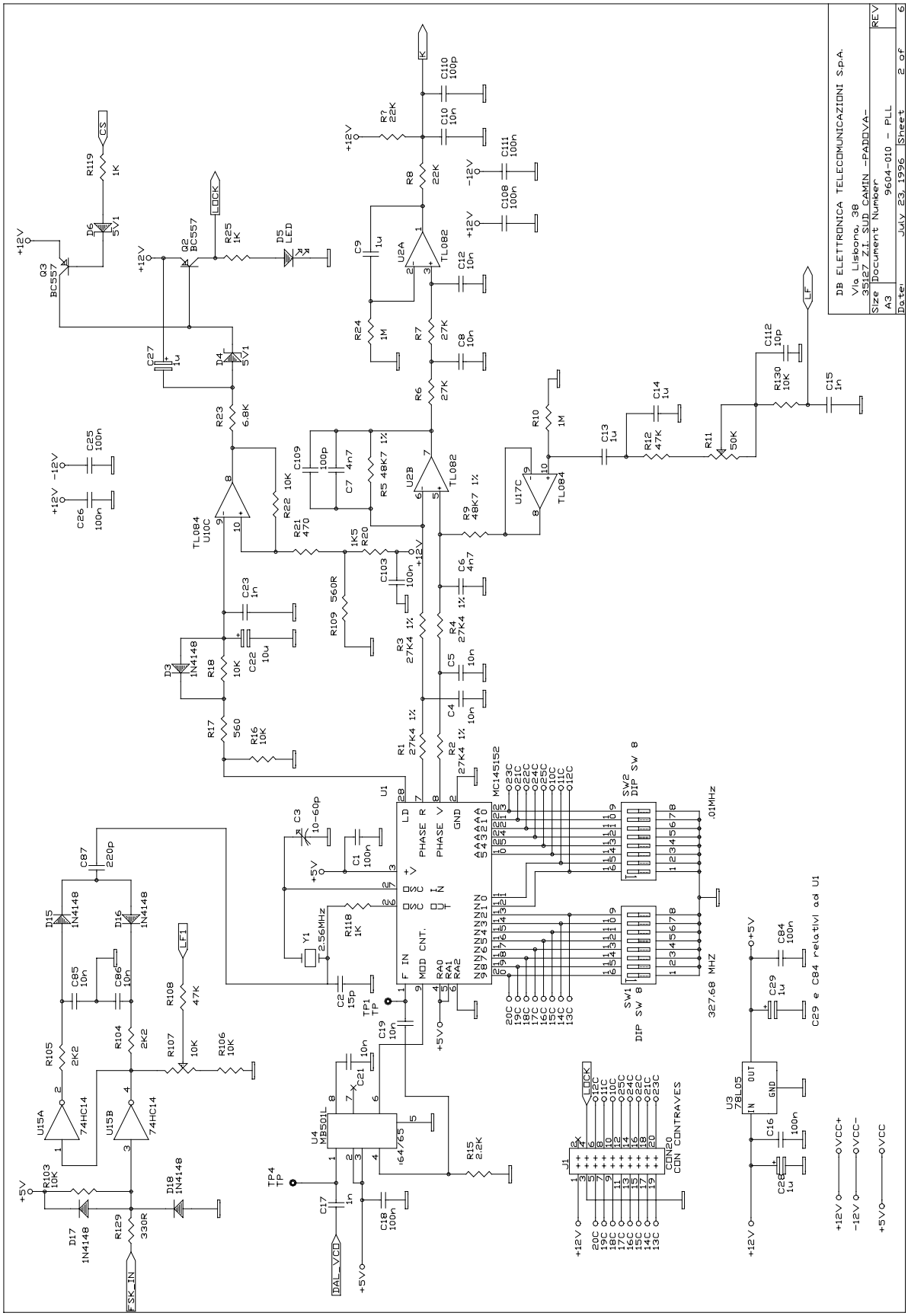


Fig. 7.3 - VCO STAGE ELECTRICAL SCHEMATIC

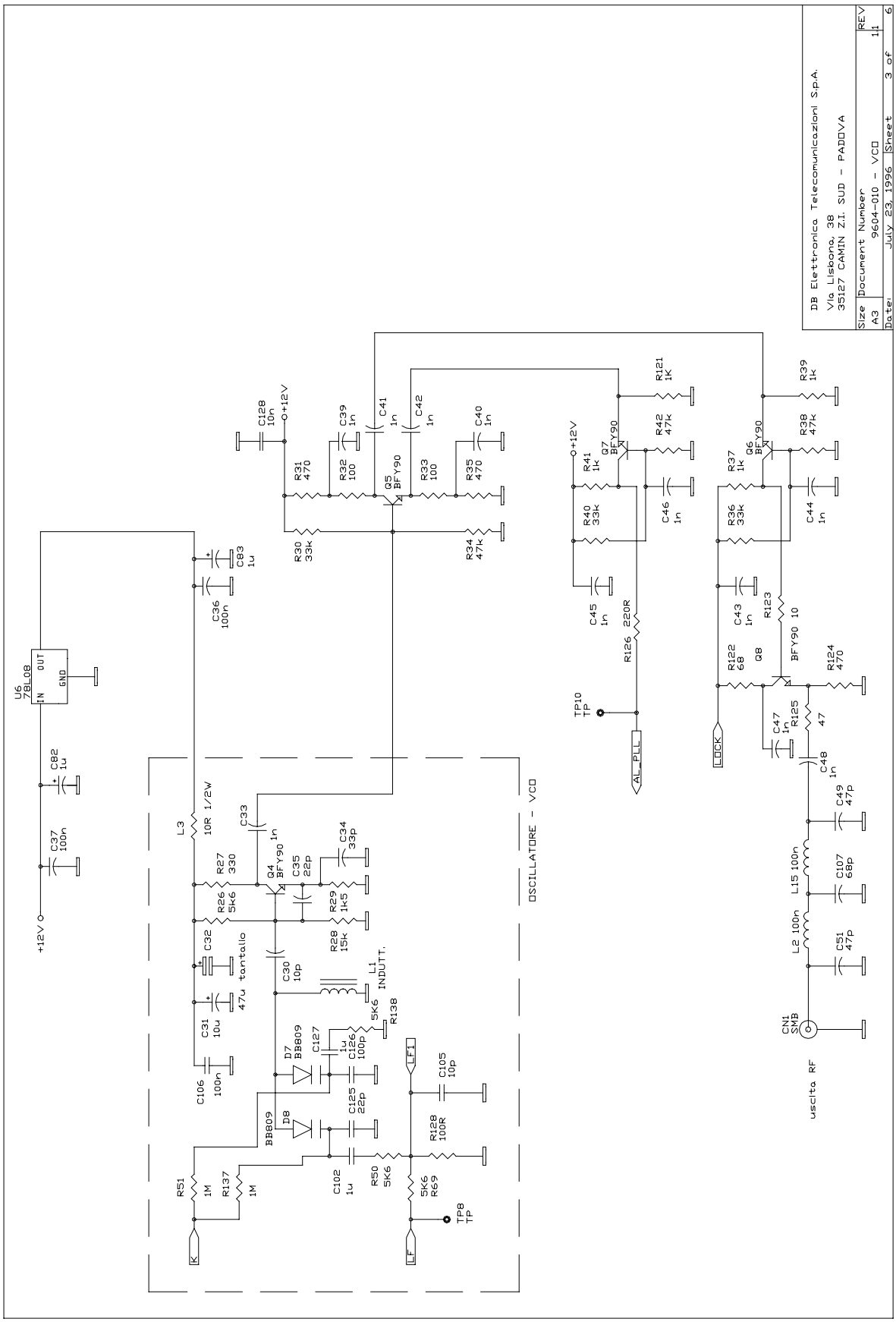


Fig. 7.4 - LF 1 STAGE ELECTRICAL SCHEMATIC

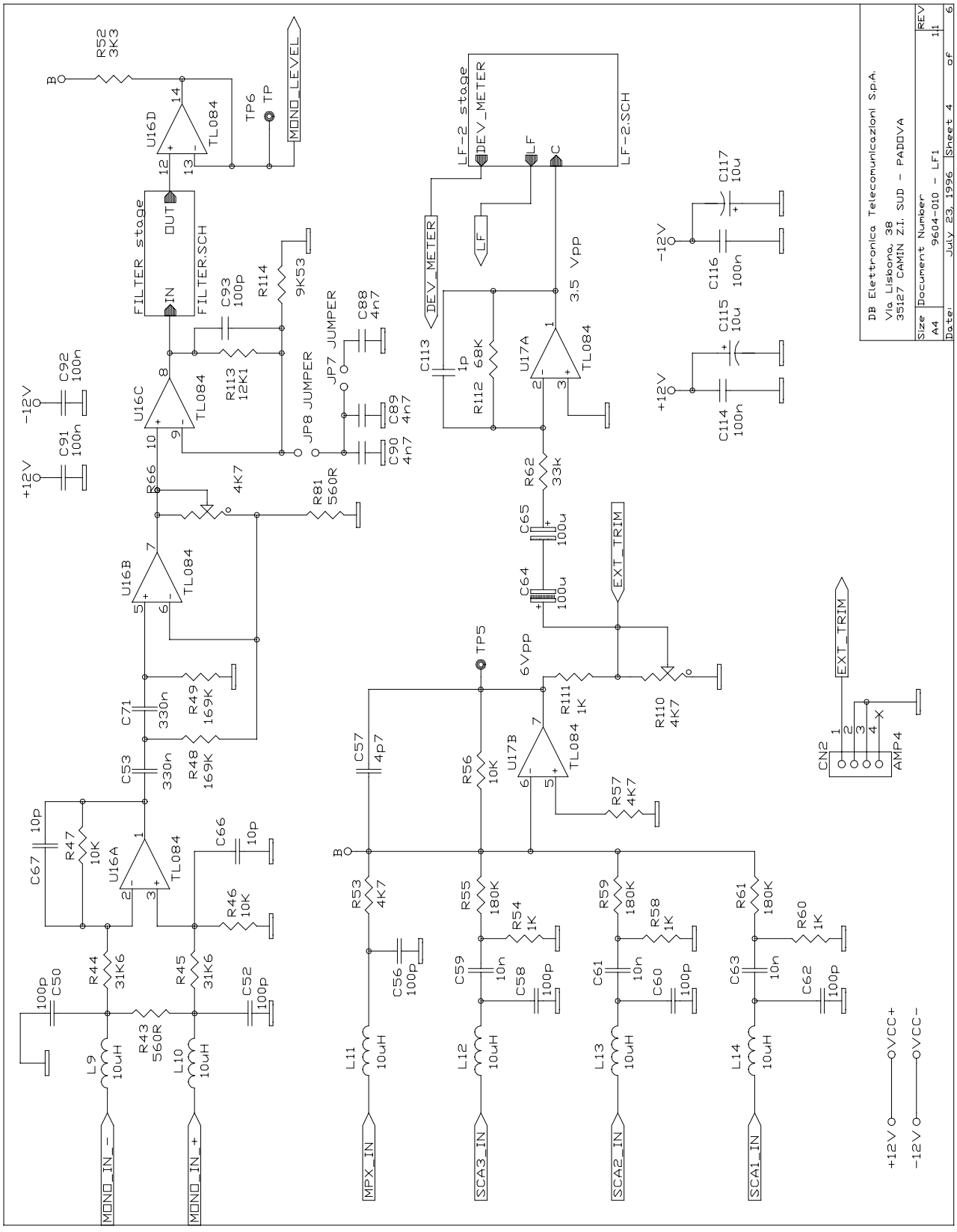


Fig. 7.5 - LF 2 STAGE ELECTRICAL SCHEMATIC

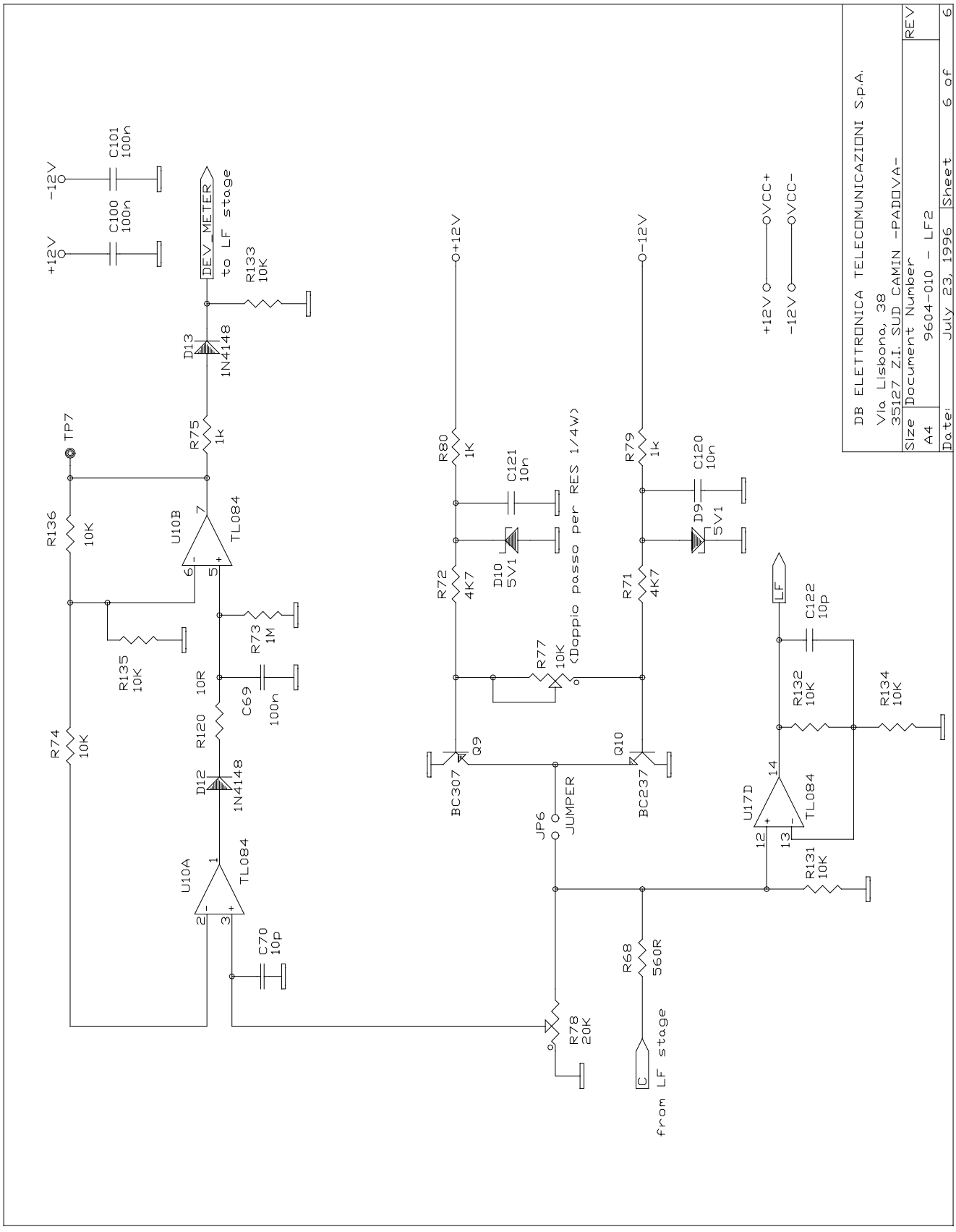


Fig. 7.6 - FILTER STAGE ELECTRICAL SCHEMATIC

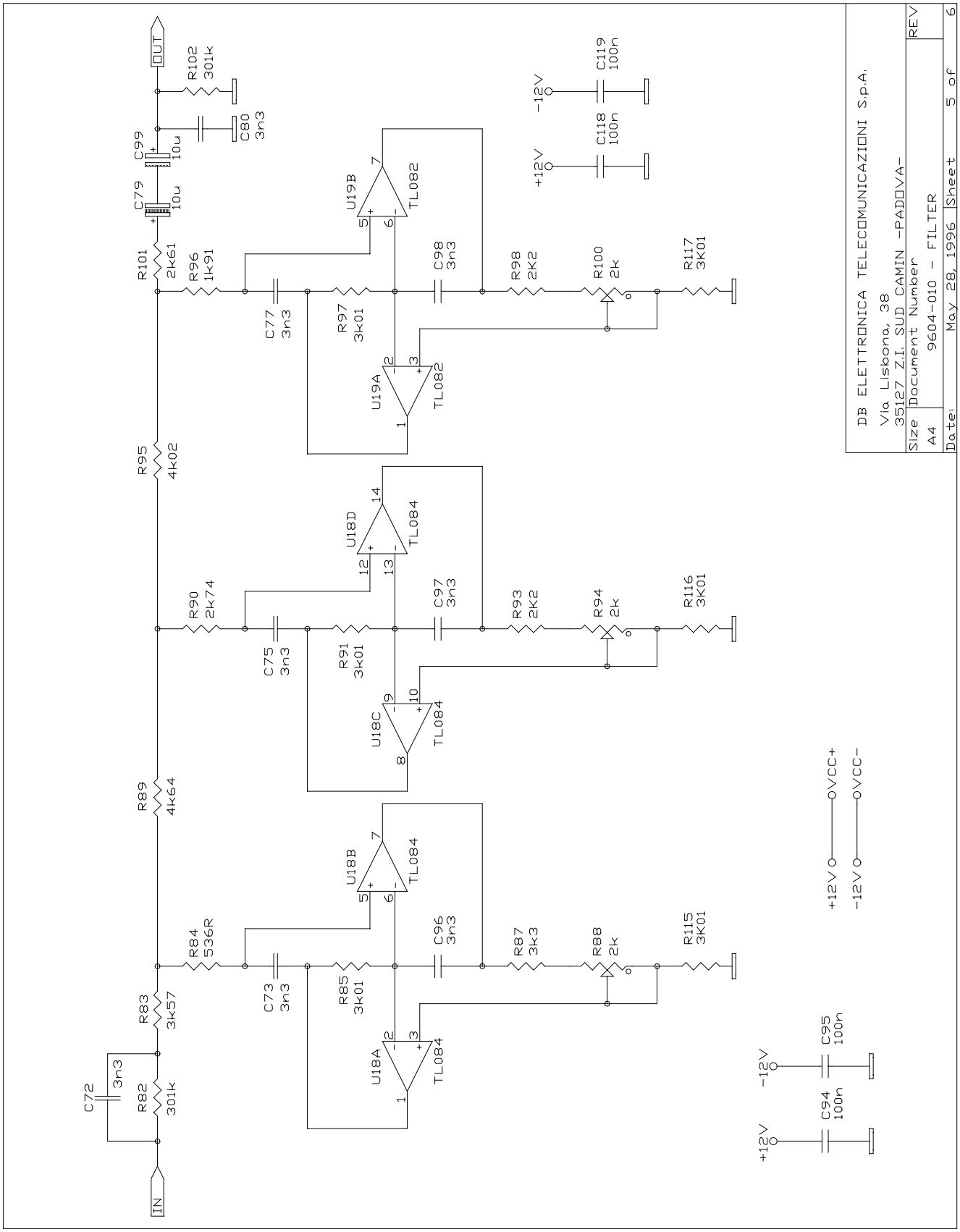
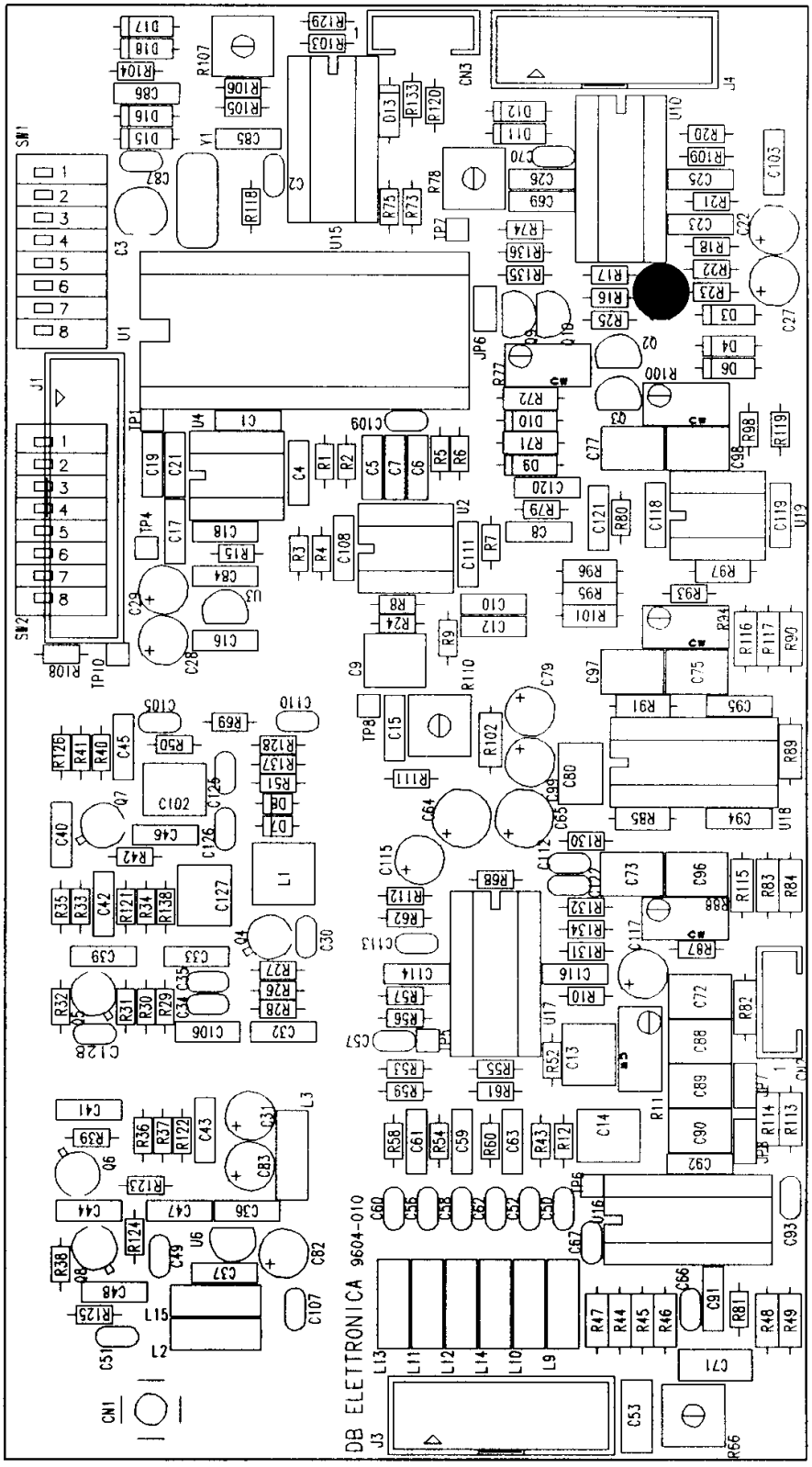


Fig. 7.7 - "SINTEL 96" MODULATION COMPONENT LAYOUT (DB 9604-010)



7.2 "SINTEL 96" MODULATOR PARTS LIST

ITEM	QUANTITY	REFERENCE	PART
1	1	CN1	SMB SMB DA STAMPATO
2	2	CN3,CN2	AMP4
3	18	C1,C16,C18,C25,C26,C36, C37,C84,C94,C95,C100, C101,C108,C111,C114,C116,C118,C119	100n POLY
4	1	C2	15p
5	1	C3	10-60p
6	5	C4,C5,C8,C12,C21	10n POLY
7	2	C6,C7	4n7 POLY
8	3	C9,C14,C102	1u POLY
9	9	C10,C19,C59,C61,C63,C85, C86,C120,C121	10n CER
10	1	C13	1u POLY
11	14	C15,C17,C23,C33,C39,C40, C41,C42,C43,C44,C45,C46,C47,C48	1n CER
12	6	C22,C31,C79,C99,C115, C117	10u ELETT.25V
13	5	C27,C28,C29,C82,C83	1u ELETT.25V
14	7	C30,C66,C67,C70,C105, C112,C122	10p CER
15	1	C32	47u elettrol. tantalio
16	1	C34	33p CER
17	1	C35	22p CER
18	2	C51,C49	47p CER
19	8	C50,C52,C56,C58,C60,C62, C109,C110	100p CER
20	2	C53,C71	330n poly
21	1	C57	4p7 cer
22	2	C64,C65	100u 25V
23	3	C69,C91,C92	100n cer
24	8	C72,C73,C75,C77,C80,C96, C97,C98	3n3 CER
25	1	C87	220p CER
26	3	C88,C89,C90	4n7
27	2	C126,C93	100p
28	1	C103	100n CP1
29	1	C106	100n
30	1	C107	68p CER
31	1	C113	1p CER
32	1	C125	22p
33	1	C127	1u
34	1	C128	10n multistrato
35	7	D3,D12,D13,D15,D16,D17, D18	1N4148
36	4	D4,D6,D9,D10	5V1 ZENER
37	1	D5	LED
38	2	D8,D7	BB809
39	1	JP6	JUMPER JUMPER X2
40	2	JP8,JP7	JUMPER
41	1	J1	CON20

ITEM	QUANTITY	REFERENCE	PART
42	2	J4,J3	CON14
43	1	L1	INDUCTOR
44	2	L2,L15	100n INDUTT ASSIALE
45	1	L3	10R 1/2W 1/2 W
46	1	L9	10uH
47	1	L10	10uH R1
48	3	L11,L12,L14	10uH INDUTT.
49	1	L13	10uH INDUTT.
50	2	Q2,Q3	BC557
51	5	Q4,Q5,Q6,Q7,Q8	BFY90
52	1	Q9	BC307
53	1	Q10	BC237
54	1	R?	22K 1/8W
55	4	R1,R2,R3,R4	27K4 1% RES 1/8W
56	1	R5	48K7 1% RES 1/8W
57	2	R7,R6	27K RES 1/8W
58	1	R8	22K RES 1/8W
59	1	R9	48K7 1%
60	3	R10,R24,R73	1M RES 1/8W
61	1	R11	50K Trimmer multigiri
62	5	R12,R34,R38,R42,R108	47K RES 1/8W
63	1	R15	2.2K RES 1/8W
64	14	R16,R18,R22,R56,R74,R103, R106,R130,R131,R132,R133, R134,R135,R136	10K RES 1/8W
65	1	R17	560 RES 1/8W
66	2	R20,R29	1K5 RES 1/8W
67	4	R21,R31,R35,R124	470 RES 1/8W
68	1	R23	6.8K RES 1/8W
69	14	R25,R37,R39,R41,R54,R58, R60,R75,R79,R80,R111,R118,R119,R121	1K RES 1/8W
70	2	R26,R69	5k6 RES 1/8W
71	1	R27	330 RES 1/8W
72	1	R28	15k RES 1/8W
73	4	R30,R36,R40,R62	33k RES 1/8W
74	2	R33,R32	100 RES 1/8W
75	1	R43	680R 1/8W
76	2	R45,R44	31K6 1% 1/4W
77	2	R47,R46	10K 1% 1/4W
78	2	R48,R49	169K 1% 1/4W
79	2	R138,R50	5K6
80	2	R51,R137	1M
81	1	R52	3K3 RES 1/8W
82	4	R53,R57,R71,R72	4K7 RES 1/8W
83	3	R55,R59,R61	180K RES 1/8W
84	2	R66,R110	4K7 TRIM MONOGIRO PICC.
85	2	R109,R68	560R RES 1/8W
86	1	R77	10K TRIMMER MULTIGIRI
87	1	R78	20K trim
88	1	R81	560R 1% 1/4W
89	1	R82	301k RES_1/4W_1%
90	1	R83	3k57 RES_1/4W_1%
91	1	R84	536R RES_1/4W_1%
92	6	R85,R91,R97,R115,R116,R117	3k01 RES_1/4W_1%
93	1	R87	3k3 RES_1/8W
94	2	R88,R94	2k trim multi

ITEM	QUANTITY	REFERENCE	PART
95	1	R89	4k64 RES_1/4W_1%
96	1	R90	2k74 RES_1/4W_1%
97	2	R93,R98	2K2 RES_1/8W
98	1	R95	4k02 RES_1/4W_1%
99	1	R96	1k91 RES_1/4W_1%
100	1	R100	2k RV64W
101	1	R101	2k61 RES_1/4W_1%
102	1	R102	301k 1/4W 1%
103	1	R104	2K2 RES 1/8W
104	1	R105	2K2
105	1	R107	10K TRIM MONOGIRO PICC.
106	1	R112	68K RES 1/8W
107	1	R113	12K1
108	1	R114	9K53 RES 1/8W
109	1	R120	10R RES 1/8W
110	1	R122	68 RES 1/8W
111	1	R123	10 RES 1/8W
112	1	R125	47 RES 1/8W
113	1	R126	220R RES 1/8W
114	1	R128	100R RES 1/8W
115	1	R129	330R RES 1/8W
116	2	SW2,SW1	DIP SW 8
117	7	TP1,TP4,TP5,TP6,TP7,TP8, TP10	TP
118	1	U1	MC145152
119	2	U2,U19	TL082
120	1	U3	78L05
121	1	U4	MB501L
122	1	U6	78L08
123	4	U10,U16,U17,U18	TL084
124	1	U15	74HC14
125	1	Y1	2.56MHz

8. AMP30 DRIVER STAGE

8.1 GENERAL DESCRIPTION

The pre amplifier/driver stage is realized by the new 30W MOSFET amplifier board (DB 0110_010A). This board is basically composed of four amplification WIDE BAND stages. The first stage uses a BFQ19 transistor to amplify the input level. The second and the third transistors are 2N4427. The last amplification stage uses a BLF245 MOSFET to obtain an output RF power 30 W maximum.

The P3 trimmer (see Fig. 8.2) in the AMP30 board allows to adjust the mosfet bias current.

.An external panel trimmer and the P2 trimmer in the AMP30 board allows to adjust the output power.

The AMP30 board is equipped with an initial 5-6 seconds delay to avoid accidental out of band emissions in the initial PLL locking period.

Fig. 8.1 - AMP30 PRE AMPLIFIER ELECTRICAL SCHEMATIC

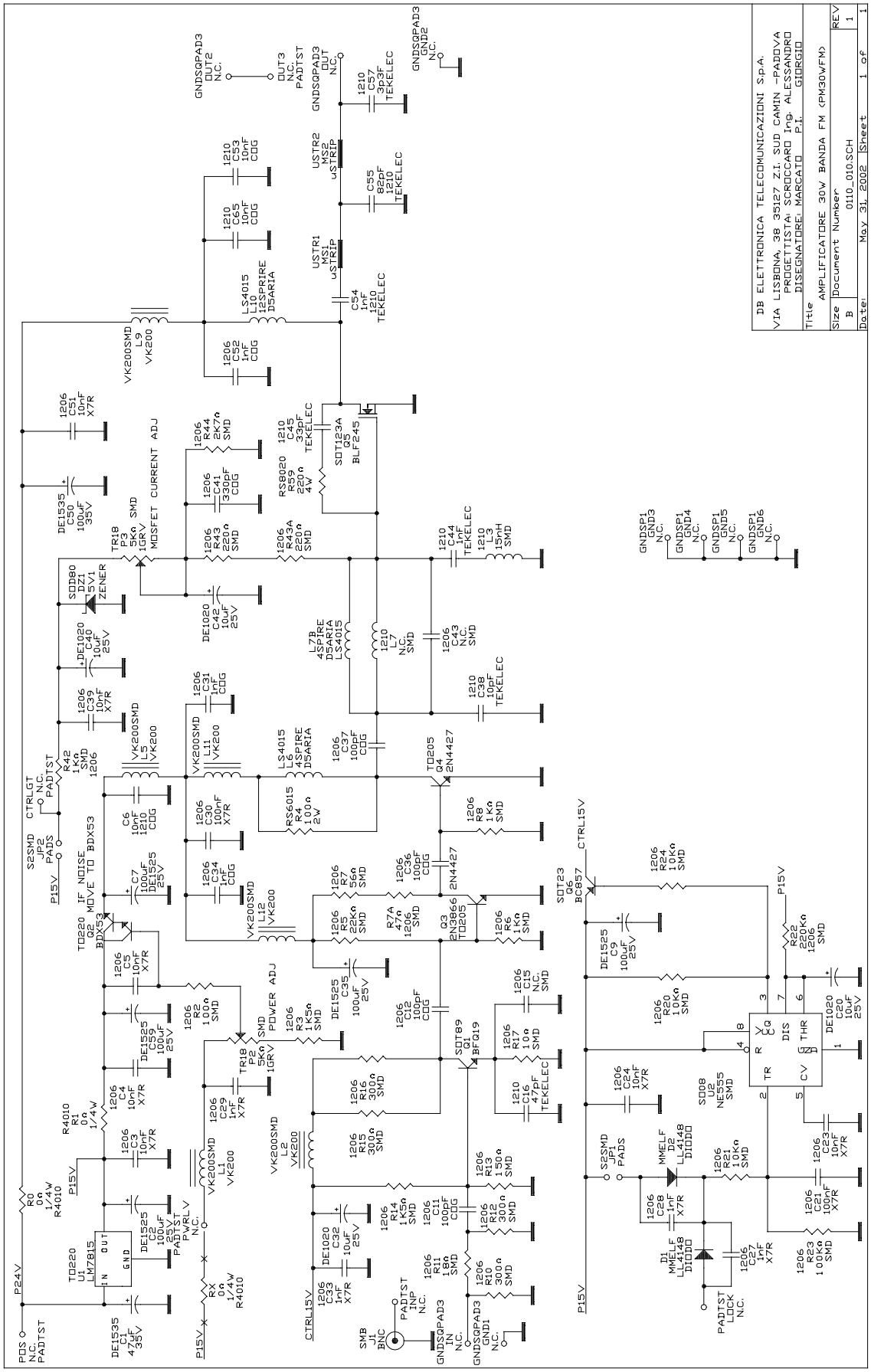
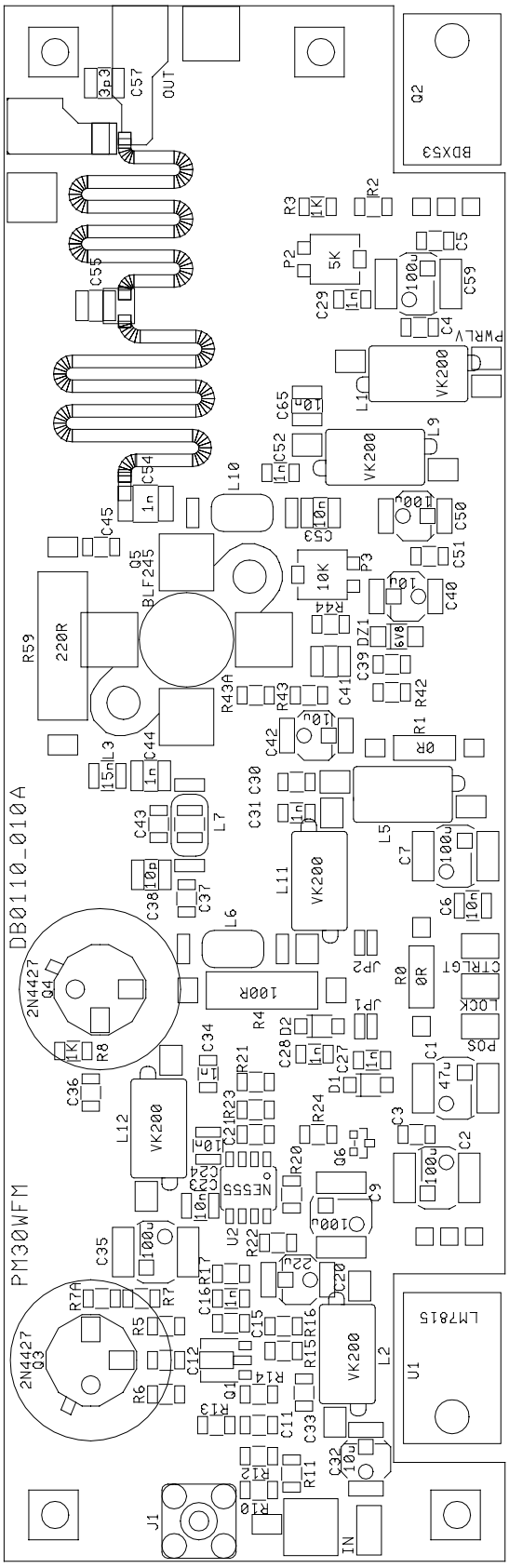


Fig. 8.2 - AMP30 PRE AMPLIFIER COMPONENT LAYOUT (DB 0110_010A)



8.2 AMP30 PRE AMPLIFIER PARTS LIST

ITEM	QUANTITY	REFERENCE	PART		
2	1	C1	47uF	35V	p=3.5mm ϕ=8mm
3	5	C2,C7,C9,C35,C59	100uF	25V	p=2.5mm ϕ=6,5mm
4	7	C3,C4,C5,C23,C24,C39,C51	10nF	X7R	1206
5	3	C6,C53,C65	10nF	COG	1210
6	4	C11,C12,C36,C37	100pF	COG	1206
8	1	C16	47pF	TEKELEC	1210
9	4	C20,C32,C40,C42	10uF	25V	p=2.5mm ϕ=5,5mm
10	2	C30,C21	100nF	X7R	1206
11	4	C27,C28,C29,C33	1nF	X7R	1206
12	3	C31,C34,C52	1nF	COG	1206
13	1	C38	10pF	TEKELEC	1210
14	1	C41	330pF	COG	1206
15	2	C54,C44	1nF	TEKELEC	1210
16	1	C45	33pF	TEKELEC	1210
17	1	C50	100uF	35V	p=3.5mm ϕ=8mm
18	1	C55	82pF	TEKELEC	1210
19	1	C57	3p3F	TEKELEC	1210
20	1	DZ1	5V1	ZENER	SOD80
21	2	D2,D1	LL4148	DIODO	MMELF
26	6	L1,L2,L5,L9,L11,L12	VK200	TRAD	VK200SMD
27	1	L3	15nH	SMD	1210
28	3	L6,L7,L10	CU x BOBINE IN ARIA		
33	2	P2,P3	5KΩ	SMD	1GRV 5x5mm
34	1	Q1	BFQ19	SMD	SOT89
35	1	Q2	BDX53	TRAD	TO220
36	1	Q3	2N3866 / 2N4427		TO205
37	1	Q4	2N4427	TRAD	TO205
38	1	Q5	BLF245	SMD	SOT123A
39	1	Q6	BC857	SMD	SOT23
40	3	R1,RX,R0	0Ω	1/4W	R4010
41	1	R2	100Ω	SMD	1206
42	2	R14,R3	1K5Ω	SMD	1206
43	1	R4	100Ω	2W	P=16mm ϕ=4mm
44	1	R5	22KΩ	SMD	1206
45	3	R6,R8,R42	1KΩ	SMD	1206
46	1	R7	56Ω	SMD	1206
47	1	R7A	47Ω	SMD	1206
48	4	R10,R12,R15,R16	300Ω	SMD	1206
49	1	R11	18Ω	SMD	1206
50	1	R13	150Ω	SMD	1206
51	1	R17	10Ω	SMD	1206
52	3	R20,R21,R24	10KΩ	SMD	1206
53	1	R22	220KΩ	SMD	1206
54	1	R23	100KΩ	SMD	1206
55	2	R43A,R43	220Ω	SMD	1206
56	1	R44	2K7Ω	SMD	1206
57	1	R59	220Ω	4W	P=20mm ϕ=5mm
58	1	U1	LM7815	TRAD	TO220
59	1	U2	NE555	SMD	SO08

9. RF AMPLIFIER STAGE

9.1 AMP300 AMPLIFIER BOARD

The AMP300 amplifier shown in Fig. 9.2 is implemented with MOS transistors Philips BLF278 or equivalent.
The BLF278 offer a better performance than a BJT implementation.

The BLF278 technical data (for class C operation) is:

- operation in the 87.5 - 108 MHz frequency range
- 45 - 50 Vds Voltage between drain and source
- 80% efficiency (typical)
- 300 W Output Power with 22 dB gain (typical)

Fig. 9.1 - AMP300 AMPLIFIER ELECTRICAL SCHEMATIC

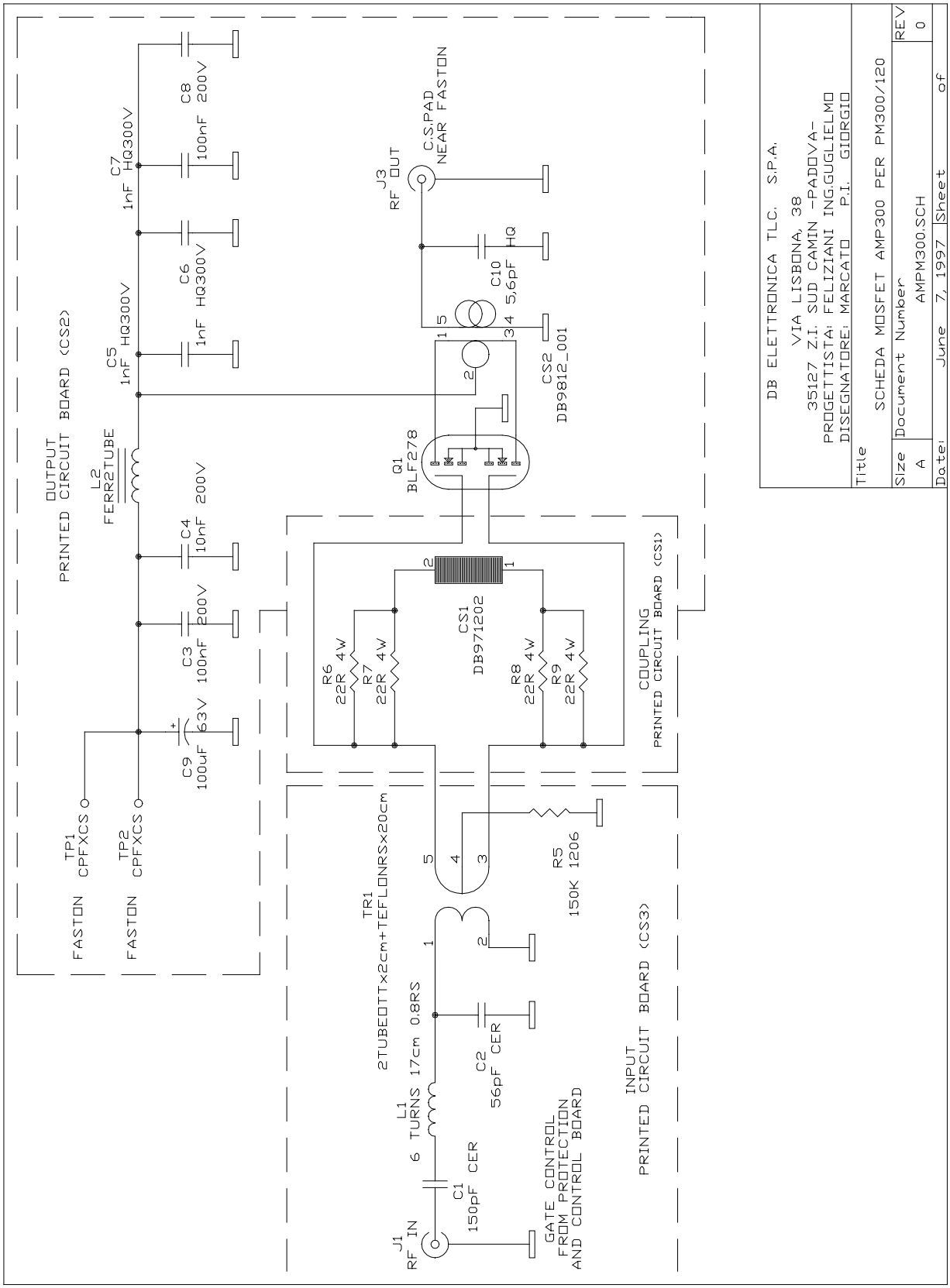
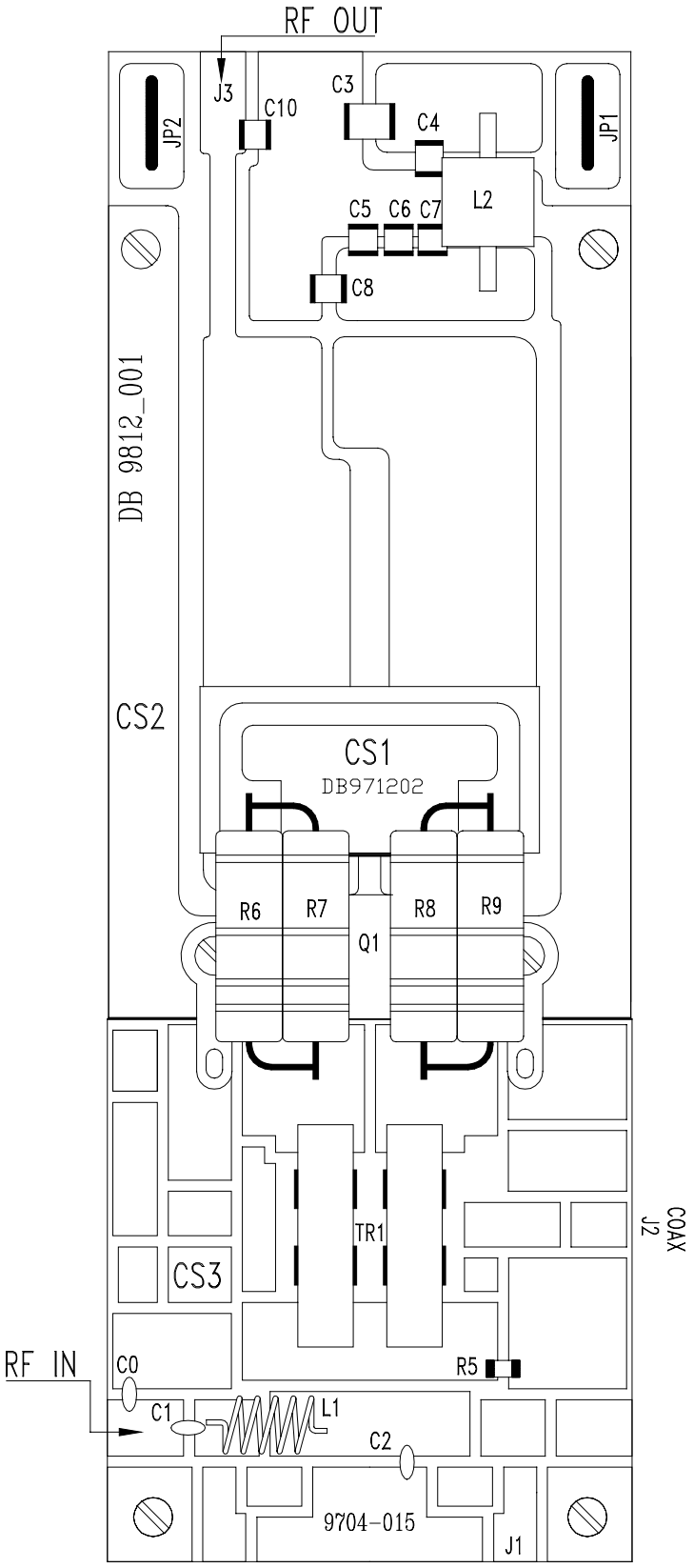


Fig. 9.2 - AMP300 AMPLIFIER COMPONENT LAYOUT (DB 9812_001)



9.2 AMP300 AMPLIFIER PARTS LIST

ITEM	QUANTITY	REFERENCE	PART
1	1	CS1	DB971202
2	1	CS2	DB9812-001
3	1	CS3	DB9704-015
4	1	C0	10pF CER
5	1	C1	150pF CER
6	1	C2	56pF CER
7	2	C8,C3	100nF 200V
8	1	C4	10nF 200V
9	3	C5,C6,C7	1nF HQ300V
10	1	C9	100uF 63V
11	1	C10	5,6pF HQ
12	1	L1	6 TURNS 17cm 0.8RS
13	1	L2	FERR2TUBE
14	1	Q1	BLF278
15	1	R5	150 kR 1206
16	4	R6,R7,R8,R9	22R4W
17	2	TP1,TP2	CPFXCS
18	1	TR1	2TUBEOTTx2cm+TEFLONRSx20cm

9.3 LOW PASS FILTER AND DIRECTIONAL COUPLER

Fig. 9.3 - L. P. FILTER AND DIR. COUP. ELECTRICAL SCHEMATIC

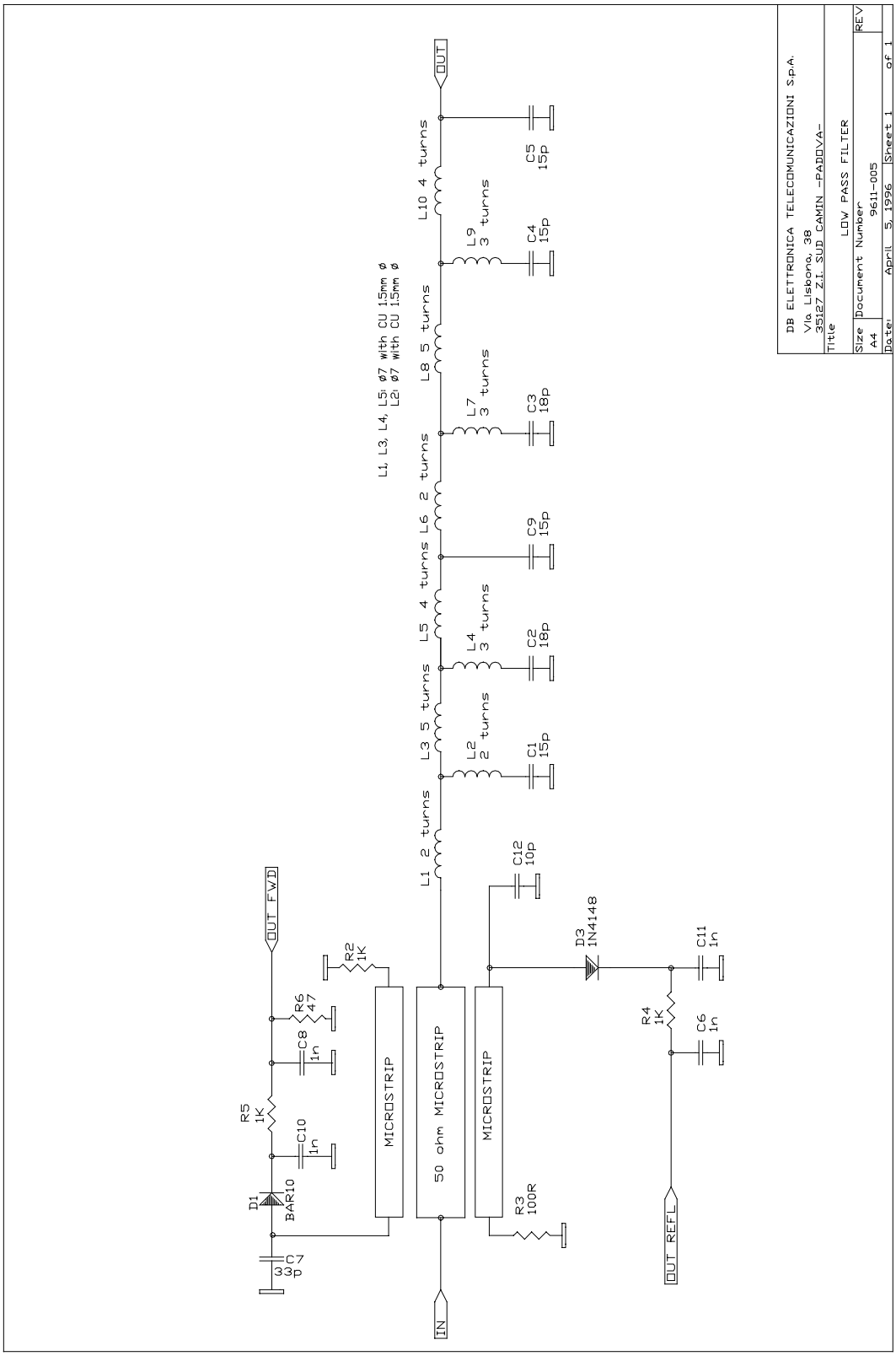
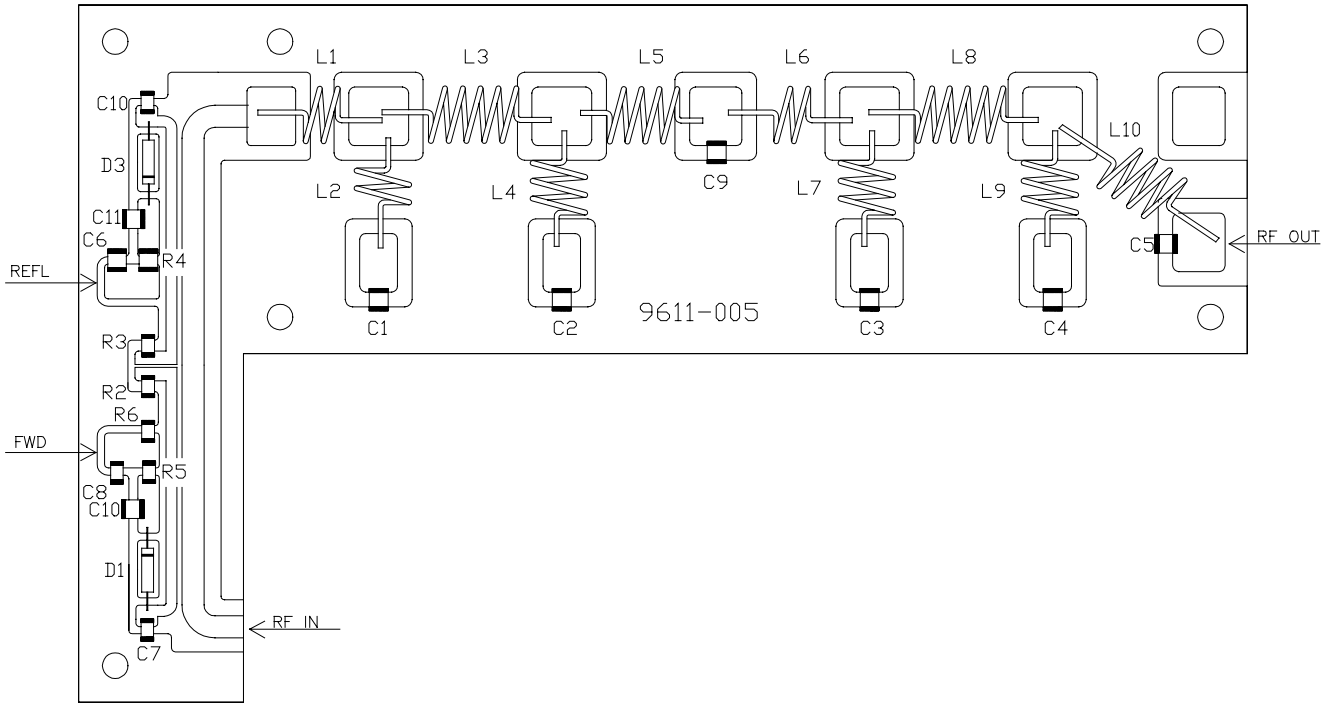


Fig. 9.4 - L. P. FILTER AND DIR. COUP. COMPONENT LAYOUT (DB 9611-005)



9.4 L. P. FILTER AND DIR. COUP. PARTS LIST

ITEM	QUANTITY	REFERENCE	PART
1	4	C1,C4,C5,C9	15p
2	2	C2,C3	18p
3	1	C12	10p
4	1	C7	33p
5	2	C6,C8,C10,C11	1n
6	1	D3	1N4148
7	1	D1	BAR10
8	3	L1,L2,L6	2 TURNS WITH COPPER WIRE 1.5mm
9	2	L3,L8	5 TURNS WITH COPPER WIRE 1.5mm
10	3	L4,L7,L9	3 TURNS WITH COPPER WIRE 1.5mm
11	2	L5,L10	4 TURNS WITH COPPER WIRE 1.5mm
12	2	R2,R3	100R
13	2	R4,R5	1K
14	1	R6	1K

10. PROTECTION STAGE

DB 9702-004 and DB 9703-011 boards are connected together and located just behind the front panel. They realize the intelligent protection, control and monitoring of PM 300 transmitter.
On the J1 input/output connector (see Fig. 10.6) of the DB 9702-004 there are:

1) **"**FWD" and "REFL" signals coming from the directional coupler.
These are DC voltages that correspond to output forward and reflected power levels.

2) The "V+" signal. It is a 45 VDC voltage that power supply the protection board.

3) The "Measure INSTR" signal represents the selected measure that is visualized on the front panel meter.

4) "VPA" signals are the DC power supply voltages (≅ 45V in normal operation) of the 300W power module.

5) "IPA" signals are the DC power supply current (≅ 9A in normal operation) of the 300W power module.

6) The "TEMP" signal is connected to a temperature sensor (bimetallic lamina type) mounted on the heat sink. This sensor works like a contact normally closed to ground, that opens when the heat sink temperature becomes higher than 70°C.It closes again when the temperature decreases below 45°C.

7) "GATE" signal is a control voltages connected to the MOSFET gate on the 300W-power amplifier. The gate voltage control allows to realize protection and AGC controls.

The equipment has three protections:

1) VSWR protection**:** When the output reflected power becomes greater than a preset value (normally 30W), the output power reduces to maintain the reflected power below the preset value. For changing the preset value, adjust the R40 trimmer (Fig. 10.6).
When the protection is active the front panel "VSWR" led lights on.
2) PWR LIMIT protection: When the output forward power becomes greater than a preset value (normally 300W), e.g. because of a high driving power, the amplifier gain reduces to maintain a stable output power level (+/-2%). For changing the preset value, adjust the R47 trimmer (Fig. 10.6).
When the protection is active the front panel "PWR LIM" led lights on.
3) Temperature protection: When the heat sink temperature becomes higher than 70°C the output power decreases to a preset value (normally 40W). For changing the preset output value for temperature protection, adjust the R121 trimmer (Fig. 10.6). When the protection is active the front panel "OVERHEAT" led lights on.

WARNING: *Any modification or variation must be made only with DB Elettronica authorization, otherwise voiding the warranty.*

Fig. 10.1 - PROTECTION /CONTROL STAGE N°1 GENERAL SCHEMATIC

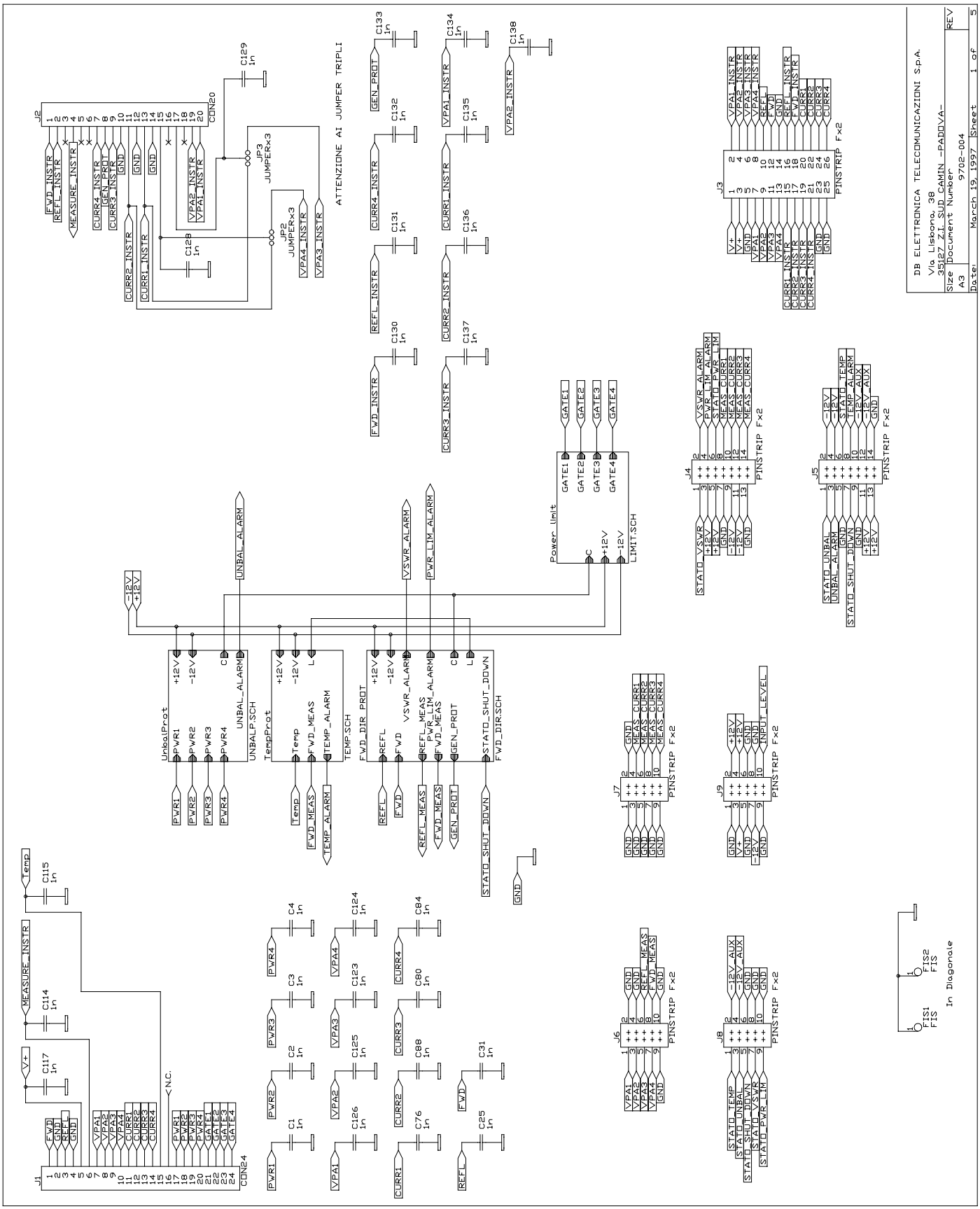


Fig. 10.2 – UNBALANCING PROTECTION STAGE

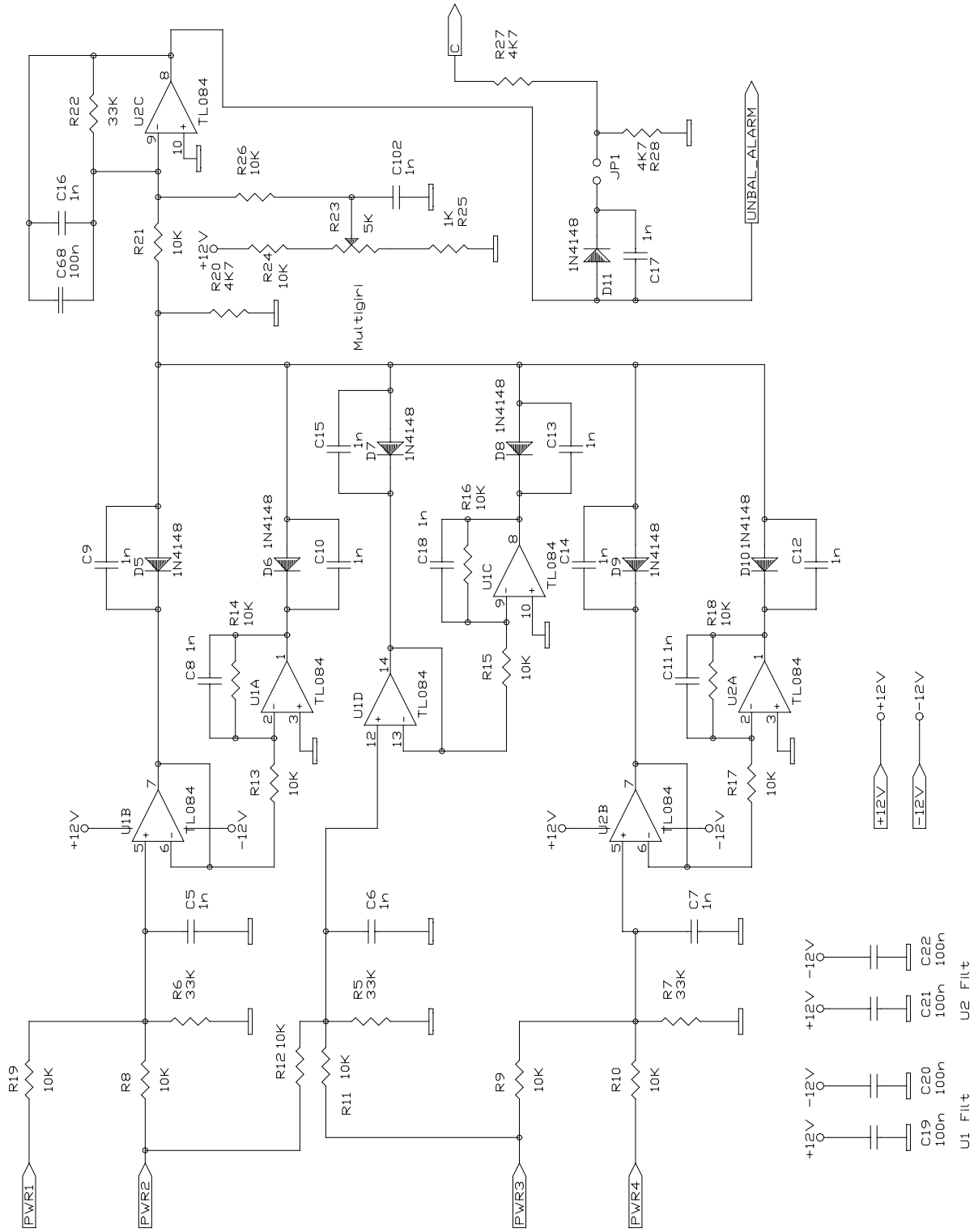


Fig. 10.3 – FWD PROTECTION STAGE

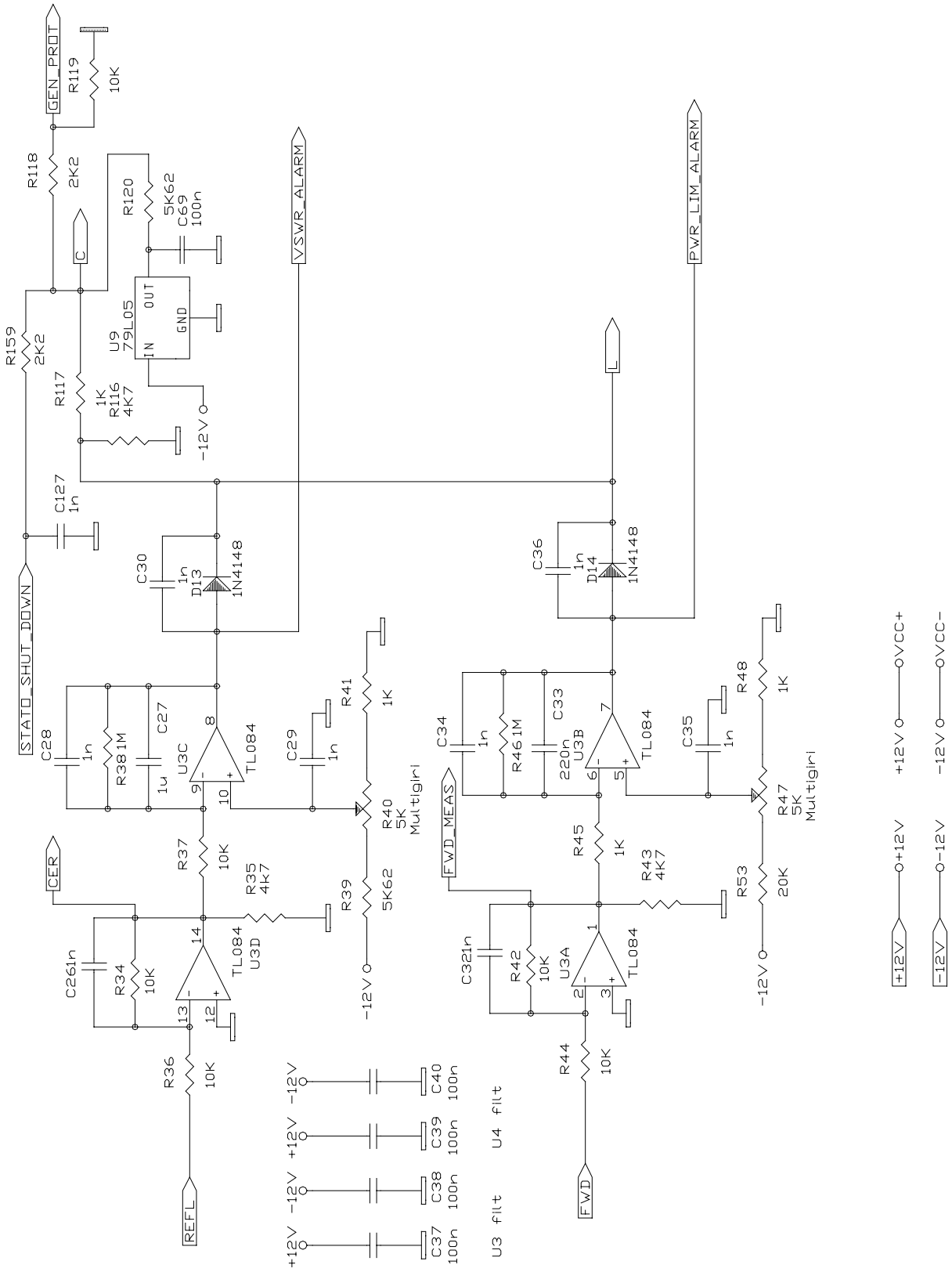


Fig. 10.4 - TEMPERATURE PROTECTION STAGE

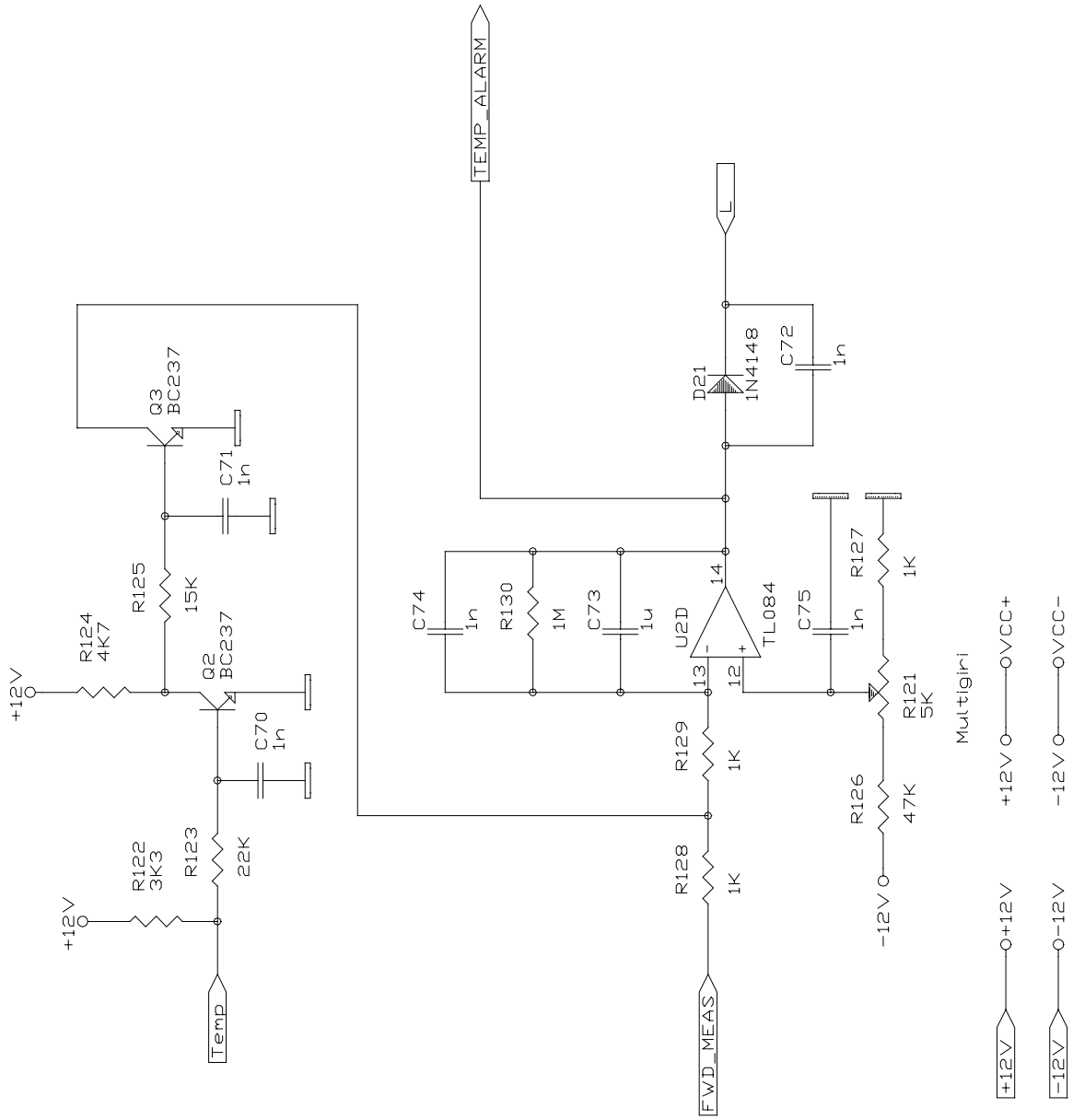


Fig. 10.5 - POWER LIMITING STAGE

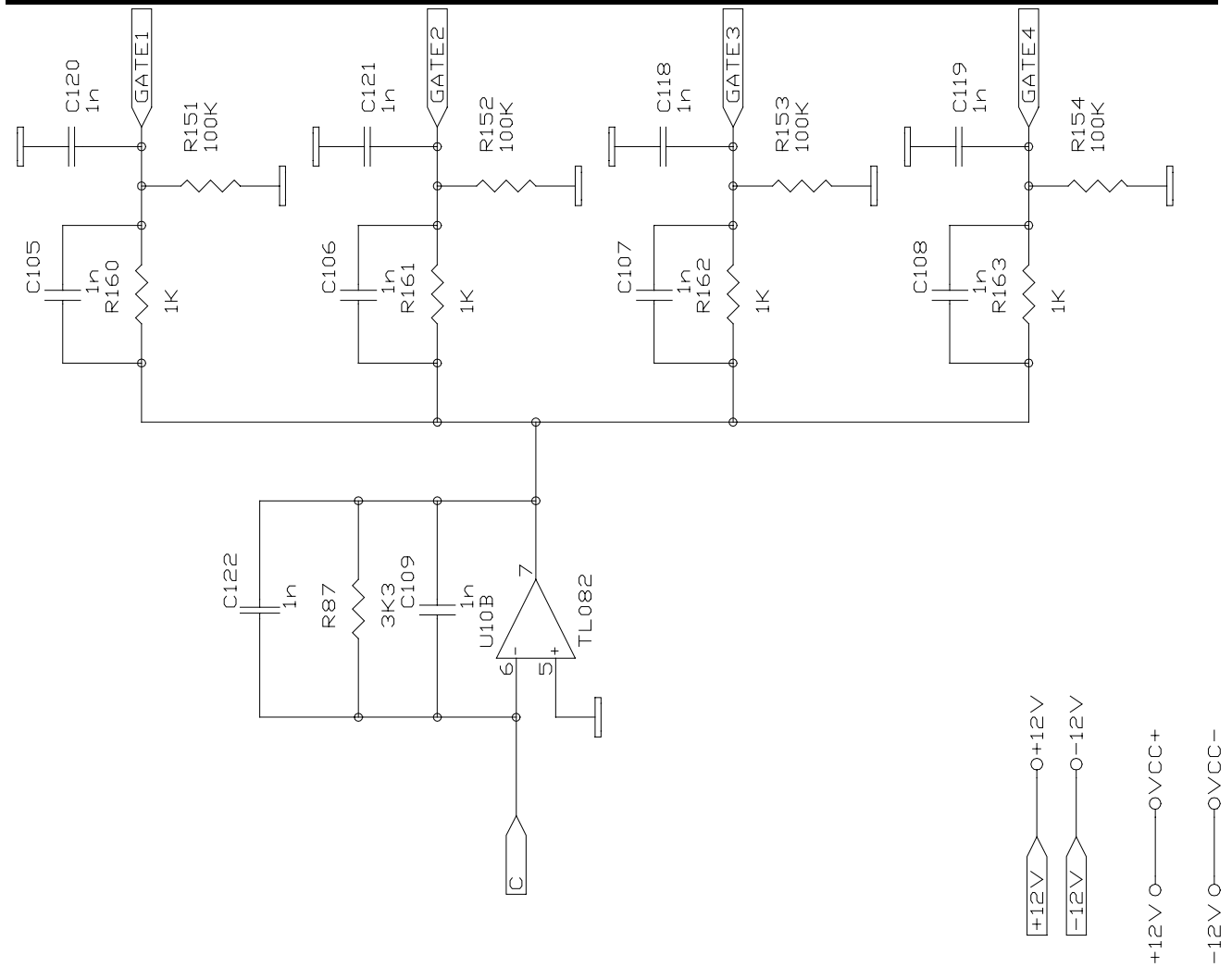
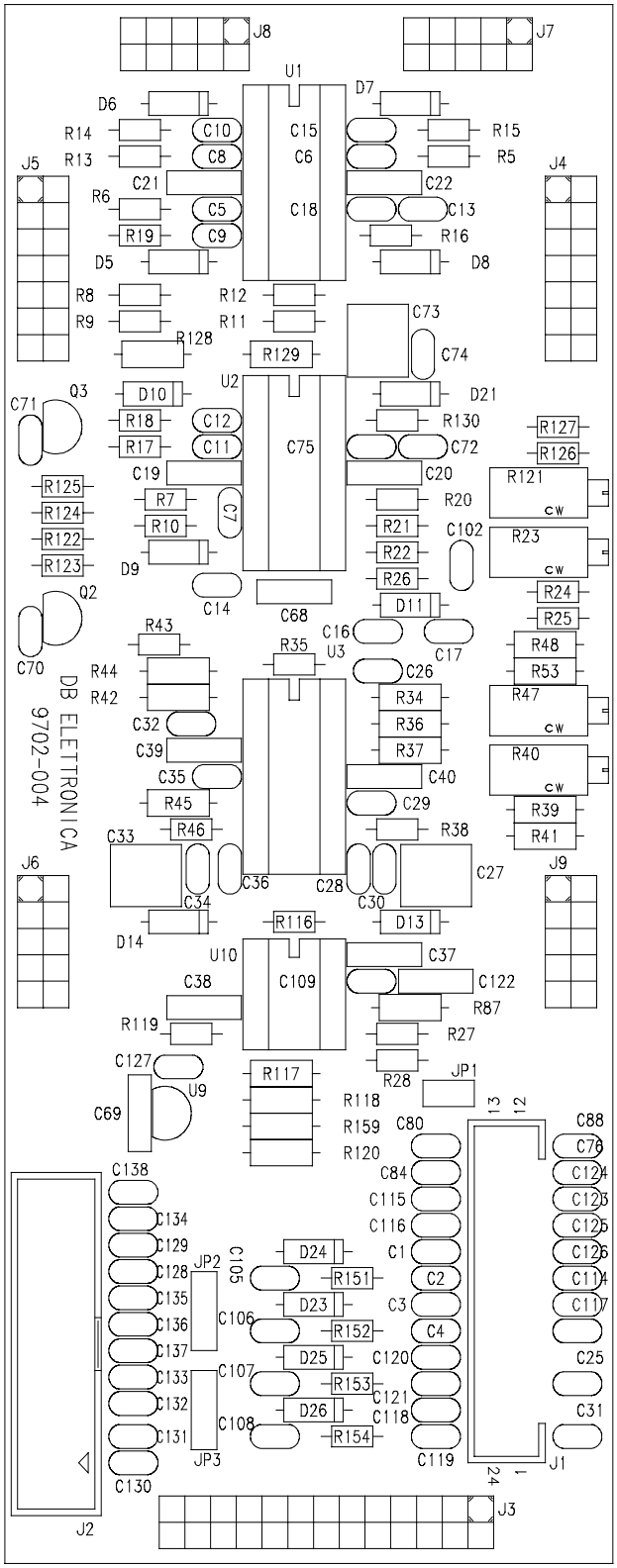

C120
1n
GATE1
R151
100K
C121
1n
GATE2
R152
100K
C118
1n
GATE3
R153
100K
C119
1n
GATE4
R154
100K
C105
1n
R160
1K
C106
1n
R161
1K
C107
1n
R162
1K
C108
1n
R163
1K
C122
1n
R87
3K3
C109
1n
U10B
TL082
7
6
5
C
+12V
-12V
+12V
-12V
VCC+
VCC-

Fig. 10.6 – PROTECTION /CONTROL STAGE N°1 COMPONENT LAYOUT (DB 9702_004)



10.1 PROTECTION /CONTROL STAGE N°1 PARTS LIST

ITEM	QUANTITY	REFERENCE	PART
1	67	C1,C2,C3,C4,C5,C6,C7,C8, C9,C10,C11,C12,C13,C14, C15,C16,C17,C18,C25,C26, C28,C29,C30,C31,C32,C34, C35,C36,C70,C71,C72,C74, C75,C76,C80,C84,C88,C102, C105,C106,C107,C108,C109, C114,C115,C116,C117,C118, C119,C120,C121,C123,C124, C125,C126,C127,C128,C129, C130,C131,C132,C133,C134, C135,C136,C137,C138	1n CER
2	10	C19,C20,C21,C22,C37,C38, C39,C40,C68,C69	100n POLY
3	3	C27,C33,C73	1u POLY
4	1	C122	1n POLY
5	14	D5,D6,D7,D8,D9,D10,D11, D13,D14,D21,D23,D24,D25, D26	1N4148
6	2	FIS1,FIS2	FIS
7	1	JP1	JUMPERx2 JUMPERx2
8	2	JP2,JP3	JUMPERx3 JUMPERx3
9	1	J1	CON24 CON AMP 24
10	1	J2	CON20 CON FLAT 20
11	7	J3,J4,J5,J6,J7,J8,J9	PINSTRIP Fx2 PINSTRIP Fx2
12	2	Q2,Q3	BC237
13	4	R5,R6,R7,R22	33K RES 1/8W
14	20	R8,R9,R10,R11,R12,R13, R14,R15,R16,R17,R18,R19, R21,R24,R26,R119,R151, R152,R153,R154	10K RES 1/8W
15	7	R20,R27,R28,R35,R43,R116, R124	4K7 RES 1/8W
16	4	R23,R40,R47,R121	5K TRIM MULTIG.
17	2	R25,R127	1K RES 1/8W
18	4	R34,R36,R42,R44	10K RES 1/4W 1%
19	2	R87,R37	3K3 RES 1/4W
20	3	R38,R46,R130	1M RES 1/8W
21	1	R39	5K62 RES 1/4W 1%
22	3	R41,R48,R117	1K RES 1/4W 1%
23	3	R45,R128,R129	1K RES 1/4W
24	1	R53	20K RES 1/4W 1%
25	2	R118,R159	2K2 RES 1/4W
26	1	R120	8K66 RES 1/4W 1%
27	1	R122	3K3 RES 1/8W
28	1	R123	22K RES 1/8W
29	1	R125	15K RES 1/8W
30	1	R126	47K RES 1/8W
31	3	U1,U2,U3	TL084
32	1	U9	79L05
33	1	U10	TL082

Fig. 10.7 - PROTECTION /CONTROL STAGE N°2 GENERAL SCHEMATIC

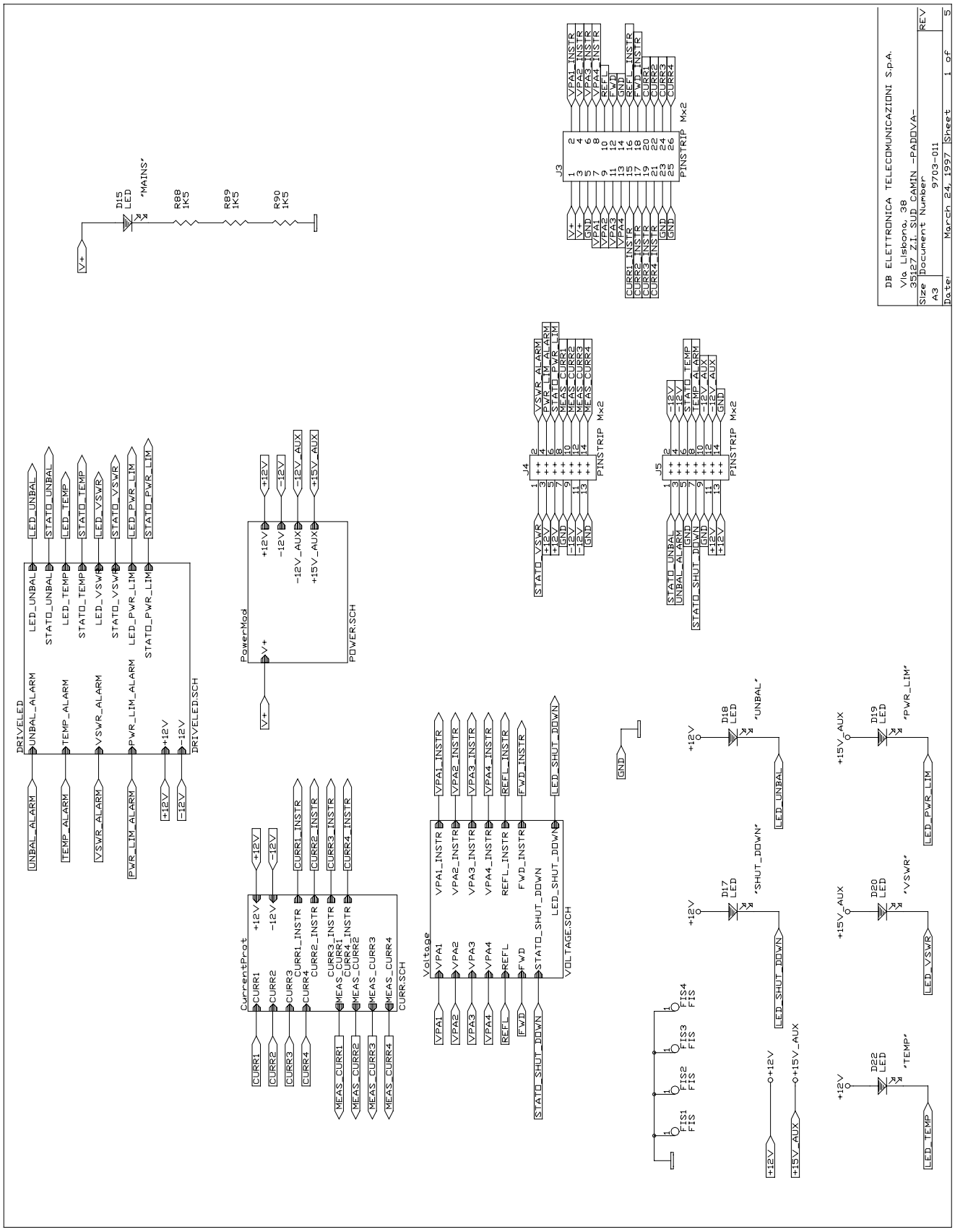


Fig. 10.8 - PROTECTION STATUS STAGE

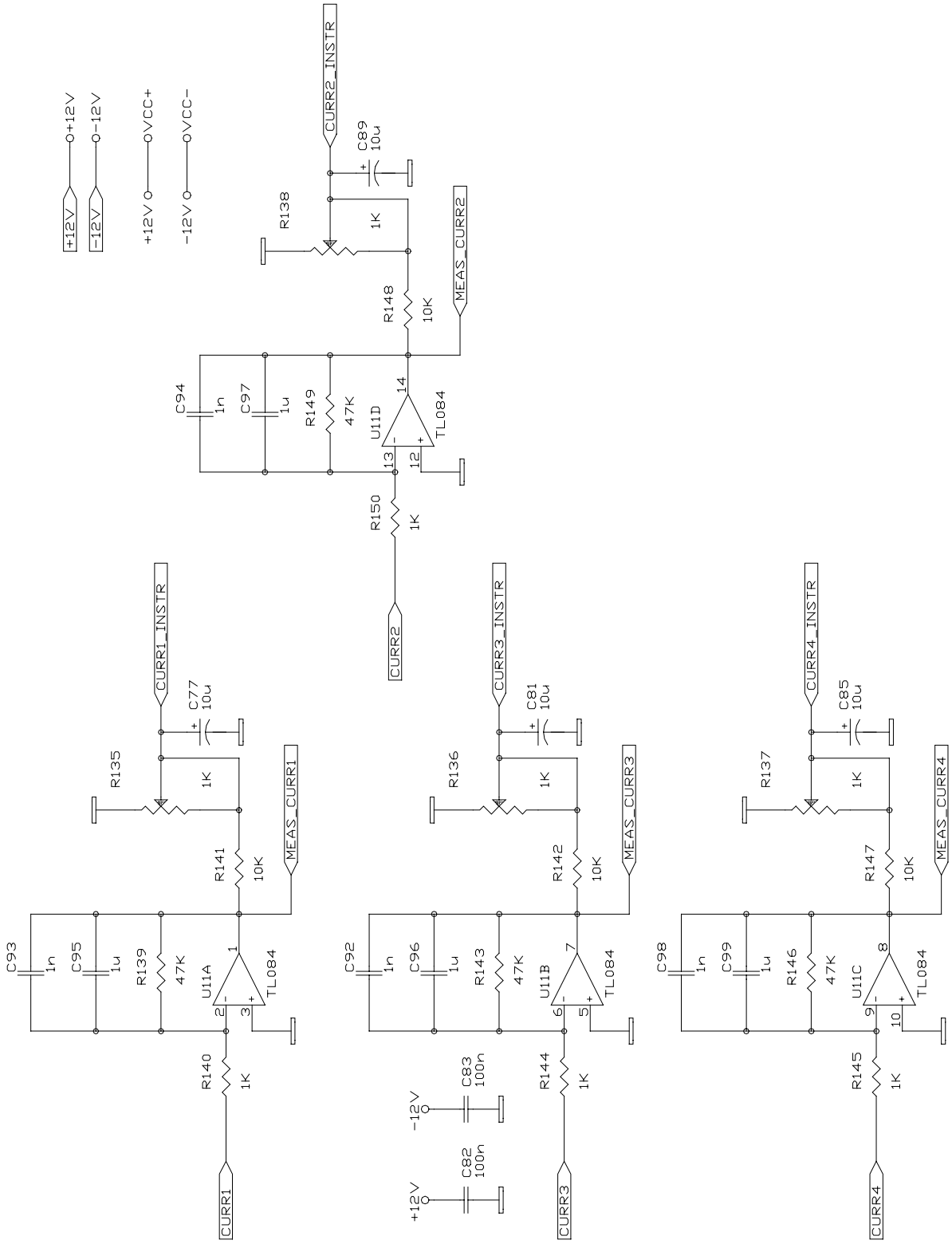


Fig. 10.9 - POWER SUPPLY STAGE

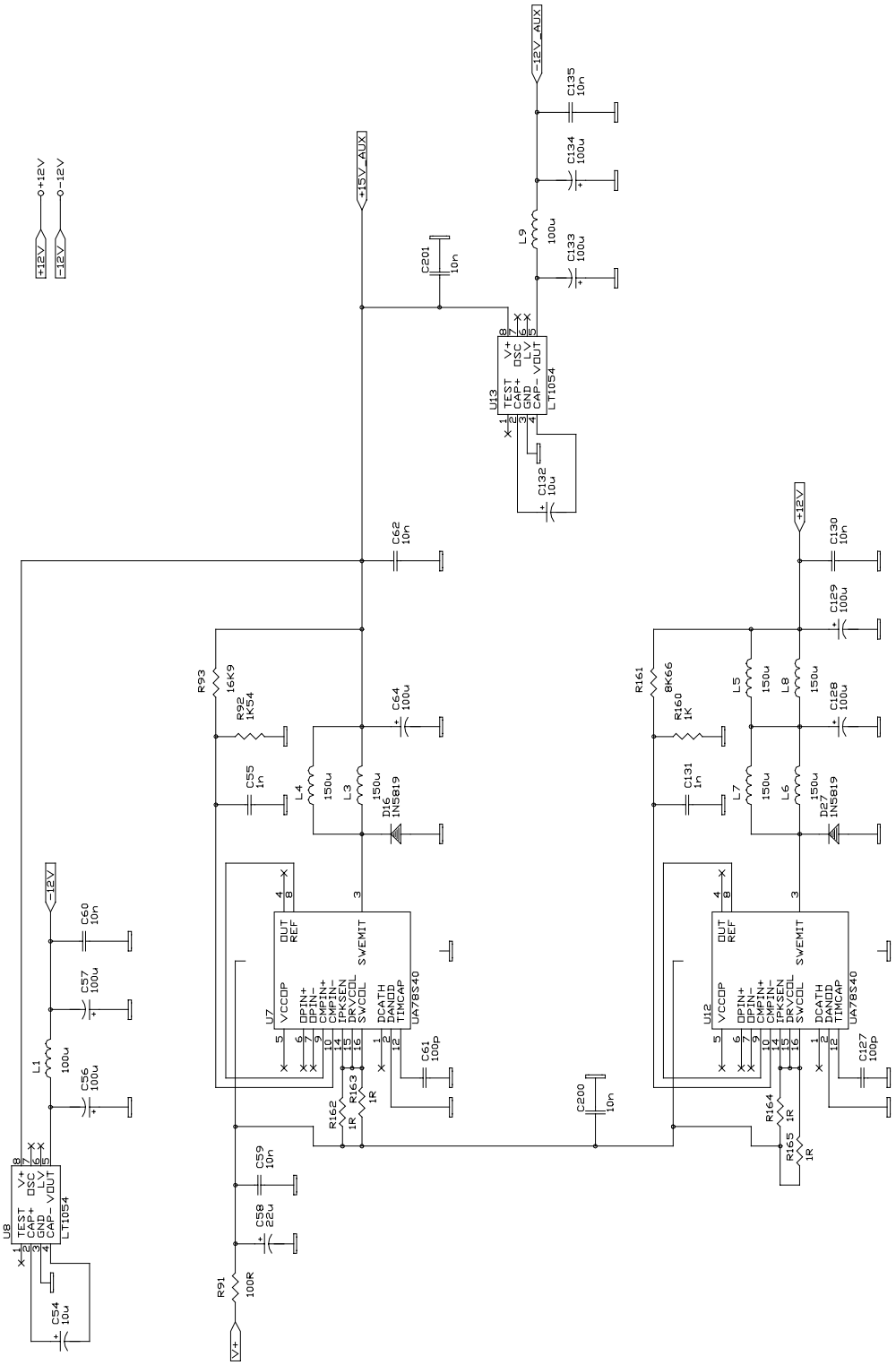


Fig. 10.10 - MEASURES ADJ. STAGE

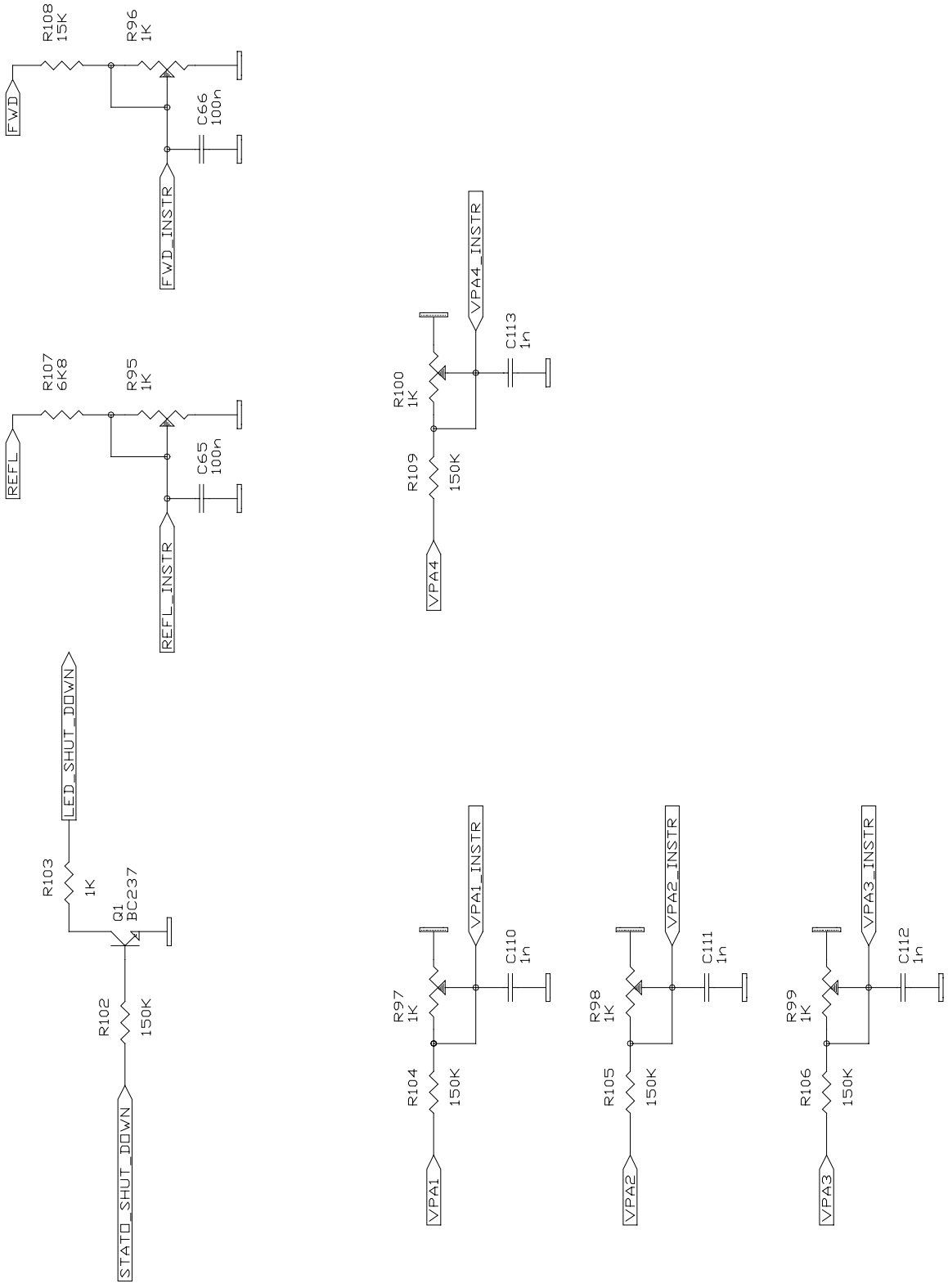


Fig. 10.11 - LED INDICATIONS STAGE

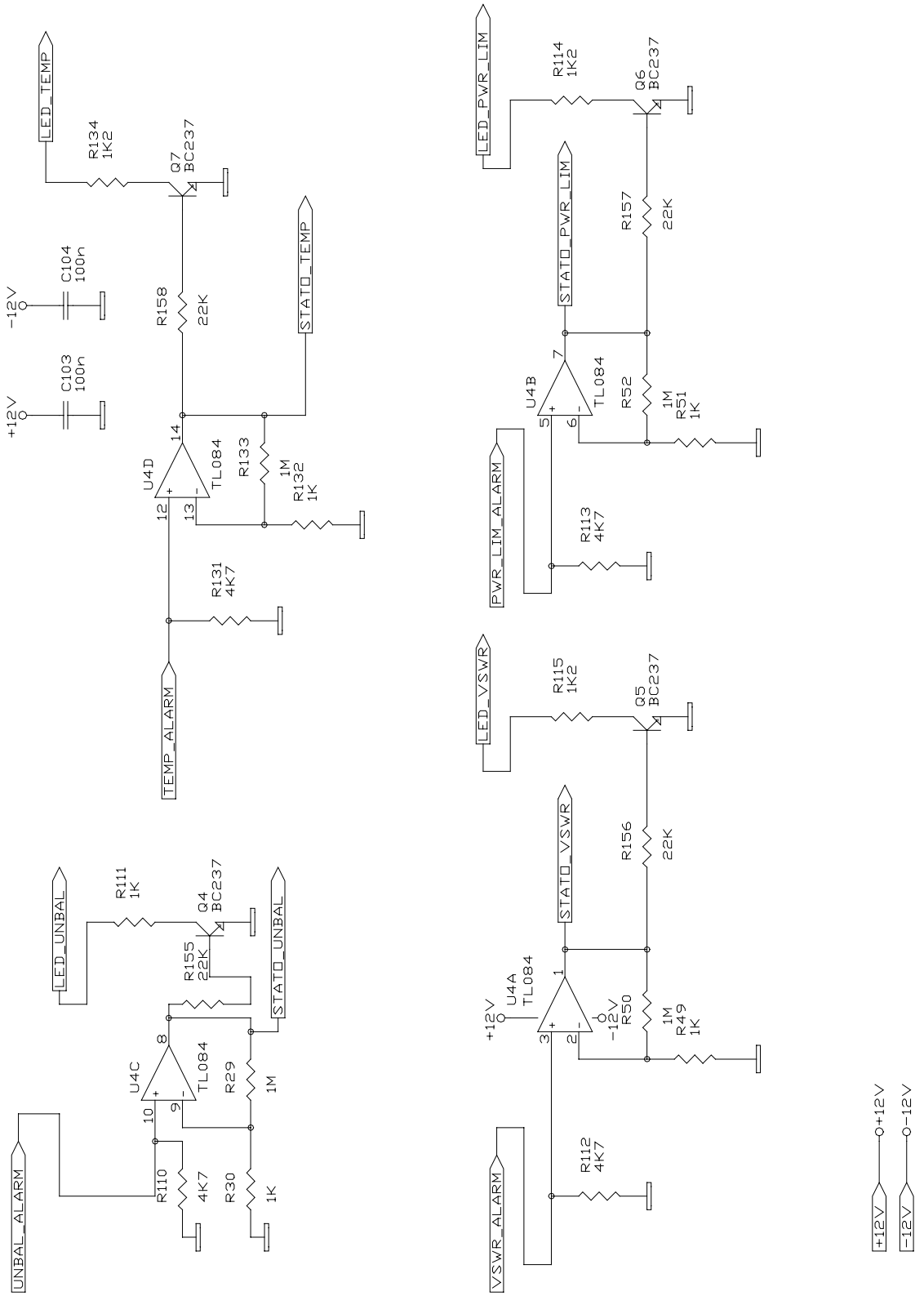
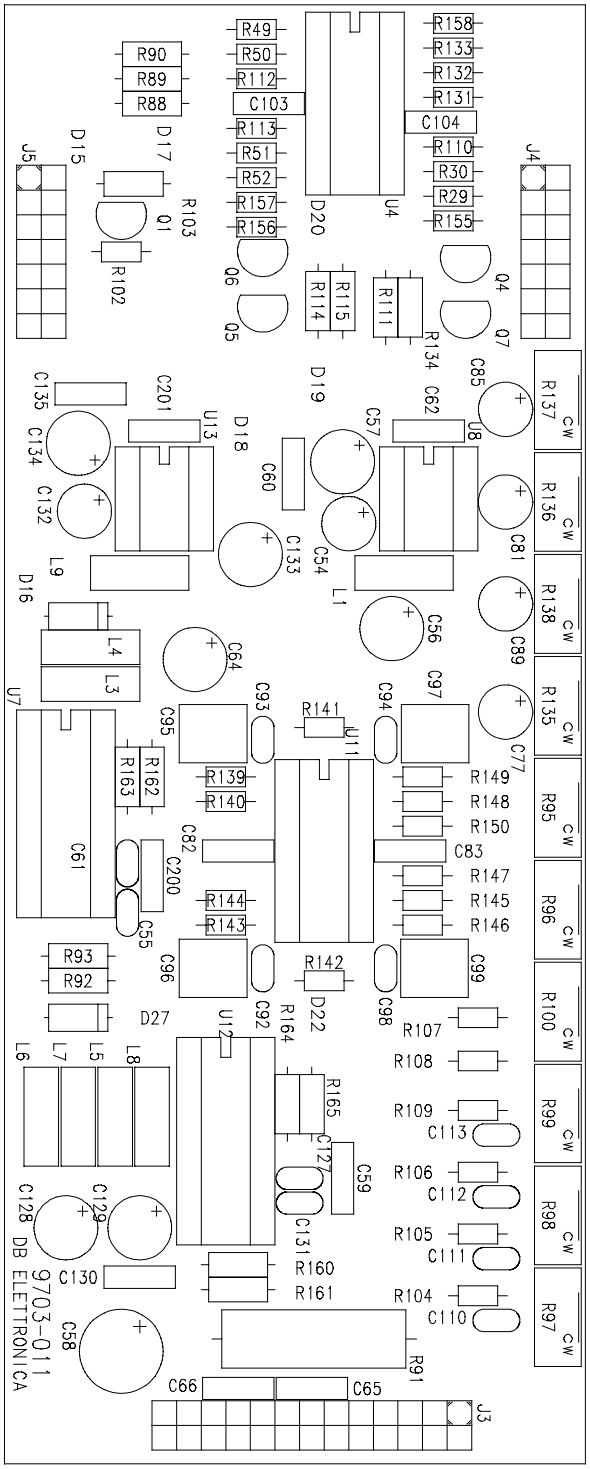


Fig. 10.12 – PROTECTION /CONTROL STAGE N°2 COMPONENT LAYOUT (DB 9703_011)



10.2 PROTECTION /CONTROL STAGE N°2 PARTS LIST

ITEM	QUANTITY	REFERENCE	PART	
1	2	C54,C132	10u	Elett.50V
2	10	C55,C92,C93,C94,C98,C110, C111,C112,C113,C131	1n	CER
3	7	C56,C57,C64,C128,C129, C133,C134	100u	Elett.25V
4	1	C58	22u	Elett.63V
5	5	C59,C60,C62,C130,C135	10n	POLY
6	2	C61,C127	100p	CER
7	6	C65,C66,C82,C83,C103, C104	100n	POLY
8	4	C77,C81,C85,C89	10u	Elett.25V
9	4	C95,C96,C97,C99	1u	POLY
10	6	D15,D17,D18,D19,D20,D22	LED	LED3MM
11	2	D16,D27	1N5819	Diodo
12	4	FIS1,FIS2,FIS3,FIS4	FIS	
13	3	J3,J4,J5	PINSTRIP Mx2	PINSTRIP Mx2
14	2	L1,L9	100u	INDUTT
15	6	L3,L4,L5,L6,L7,L8	150u	INDUTT
16	5	Q1,Q4,Q5,Q6,Q7	BC237	
17	4	R29,R50,R52,R133	1M	RES 1/8W
18	8	R30,R49,R51,R132,R140, R144,R145,R150	1K	RES 1/8W
19	3	R88,R89,R90	1K5	RES 1/4W
20	1	R91	100R	RES 4W
21	1	R92	1K54	RES 1/4W 1%
22	1	R93	16K9	RES 1/4W 1%
23	10	R95,R96,R97,R98,R99,R100, R135,R136,R137,R138	1K	TRIM RO
24	9	R102,R141,R142,R147,R148, R155,R156,R157,R158	22K	RES 1/8W
25	2	R103,R111	1K	RES 1/4W
26	4	R104,R105,R106,R109	150K	RES 1/8W
27	2	R107,R108	15K	RES 1/8W
28	4	R110,R112,R113,R131	4K7	RES 1/8W
29	3	R114,R115,R134	1K2	RES 1/4W
30	4	R139,R143,R146,R149	47K	RES 1/8W
31	1	R160	1K	RES 1/4W 1%
32	1	R161	8K66	RES 1/4W 1%
33	4	R162,R163,R164,R165	1R	RES 1/4W
34	2	U11,U4	TL084	
35	2	U7,U12	UA78S40	
36	2	U8,U13	LT1054	

11. METER STAGE

11.1 GENERAL DESCRIPTION

The meter stage is built using two boards:

The ST62T25 microprocessor board DB 9903_040

The display board DB 9903_050 is composed of forty LED bargraph display.

Fig. 11.1 - MICROPROCESSOR STAGE ELECTRICAL SCHEMATIC (DB 9903_040)

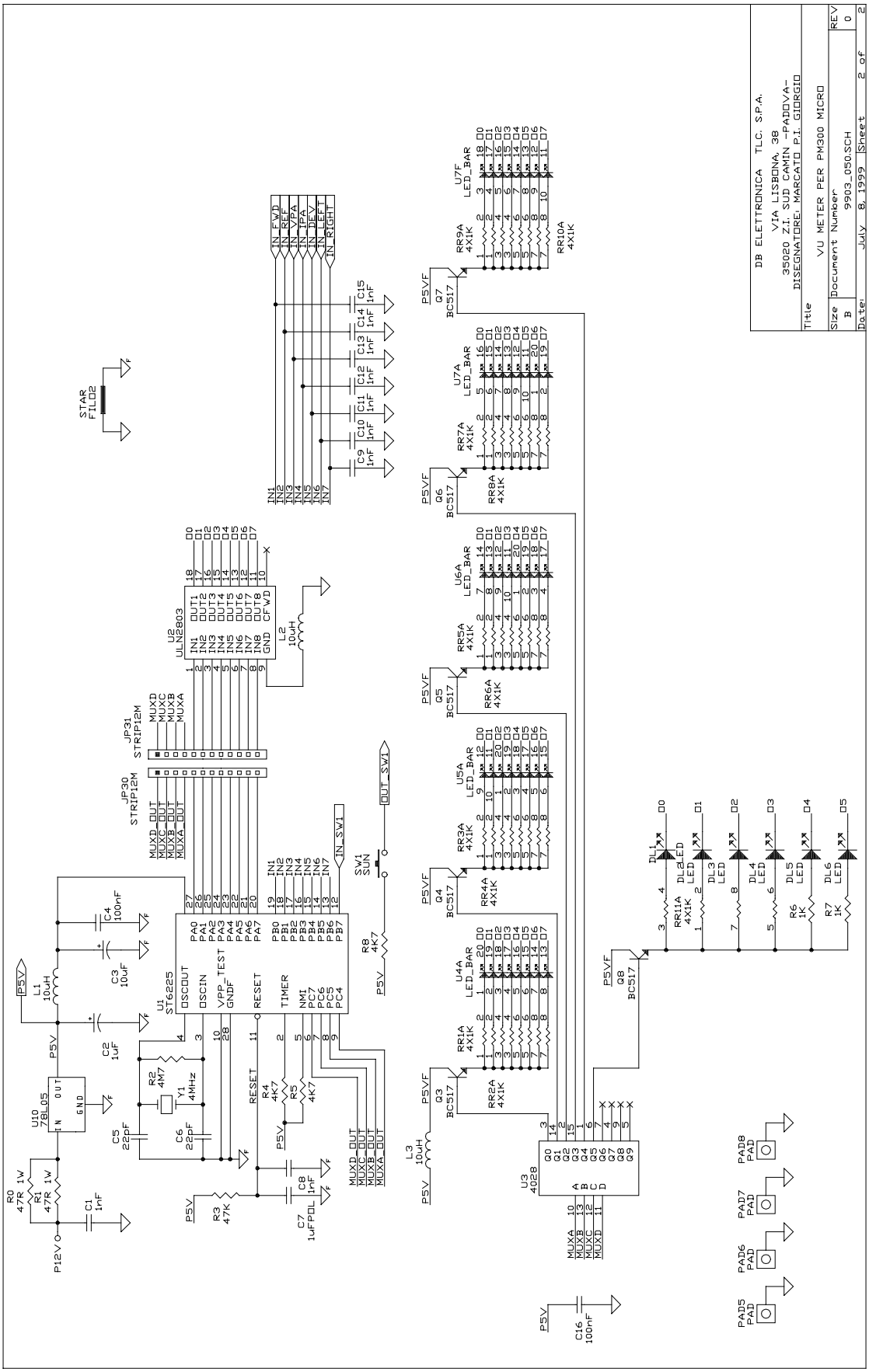
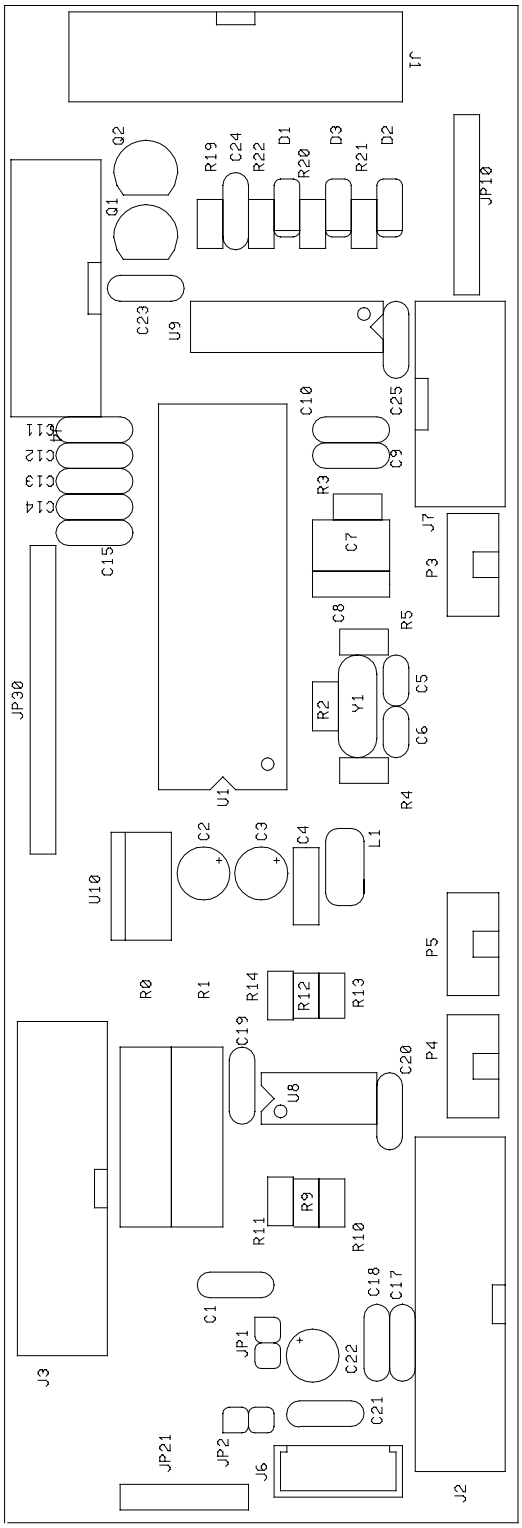


Fig. 11.2 - MICROPROCESSOR BOARD COMPONENT LAYOUT (DB 9903_040)



11.2 MICROPROCESSOR BOARD PARTLIST

ITEM	QUANTITY	REFERENCE	PART
1	5	C17,C18,C19,C20,C25	100Nf mul.
2	3	C21,C23,C24	1nF cer.
3	1	C22	1uF 50V ele.
4	3	DL7,DL8,DL9	LED 3mm.
5	3	D1,D2,D3	1N4148
6	2	JP1,JP2	STRIP2M
7	2	JP10,JP11	STRIP7M
8	2	JP21,JP20	STRIP5M
9	3	J1,J2,J3	CNM20V
10	1	J4	CNM14V
11	1	J6	AMP4
12	1	J7	CNM10V
13	7	R9,R10,R12,R13,R16,R17,R18	1K
14	1	P1	1K
15	6	R11,R14,R19,R20,R21,R22	10K
16	4	P2,P3,P4,P5	10K
17	2	Q2,Q1	BC547
18	1	R15	680R
19	2	S1,S2	C&K
20	1	U8	TL082
21	1	U9	74HC32

Fig. 11.3 - DISPLAY STAGE ELECTRICAL SCHEMATIC (DB 9903_050)

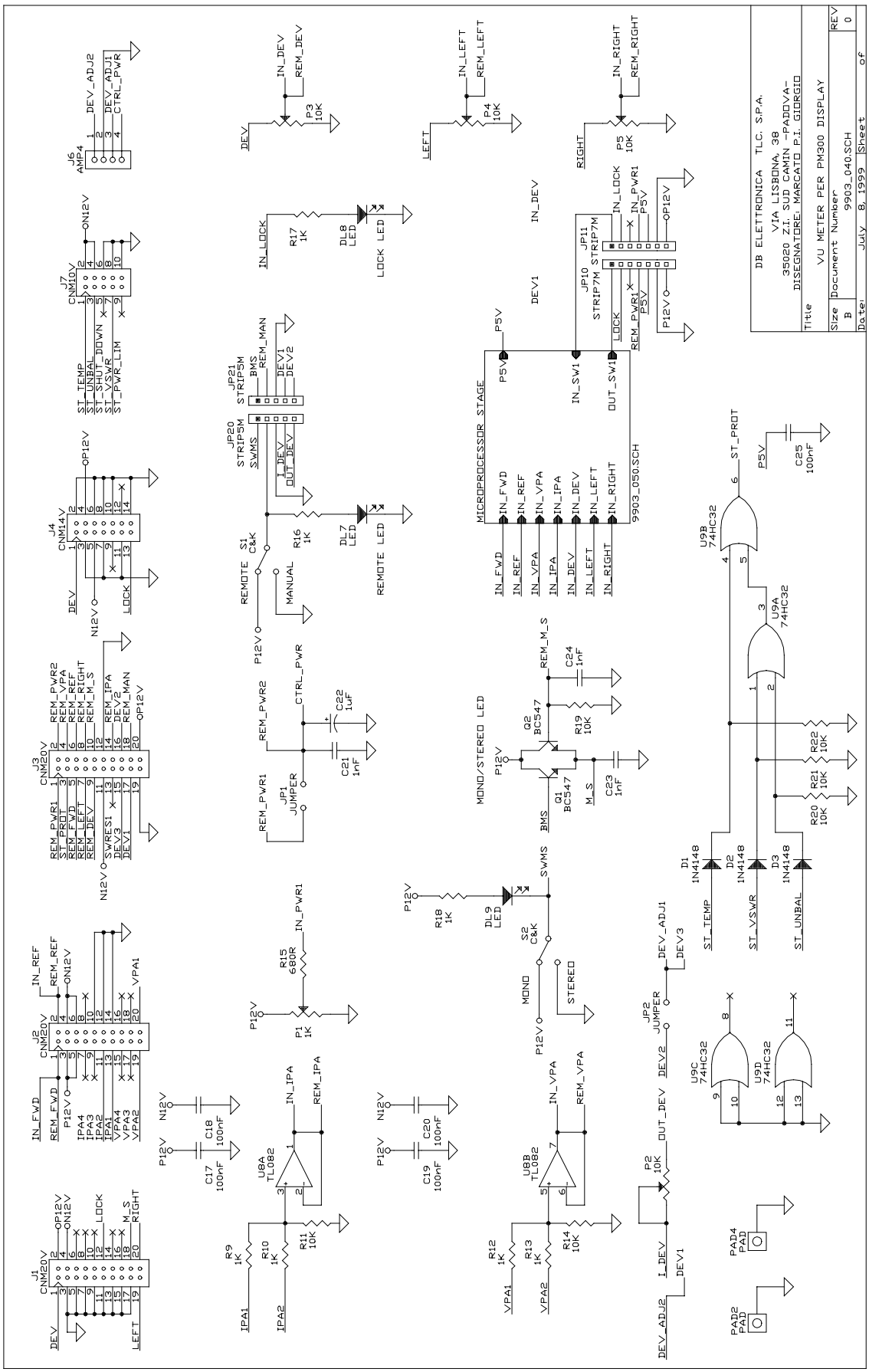
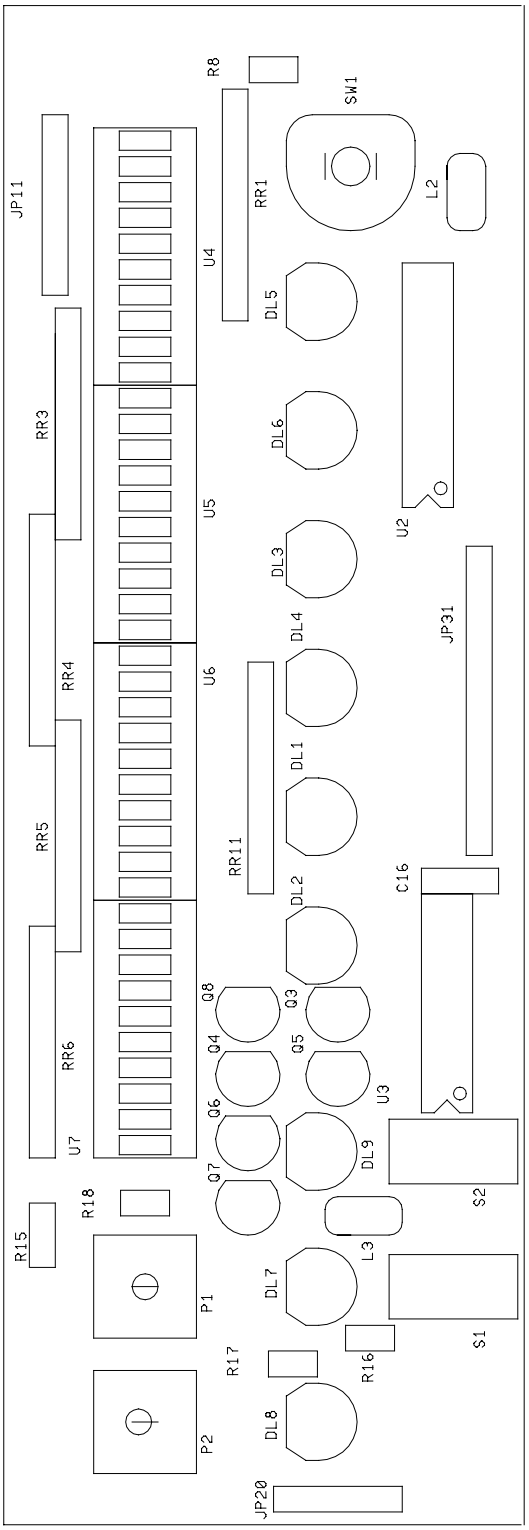


Fig. 11.4 - DISPLAY BOARD COMPONENT LAYOUT (DB 9903_050)



11.3 DISPLAY BOARD PARTS LIST

ITEM	QUANTITY	REFERENCE	PART
1	9	C1,C8,C9,C10,C11,C12,C13 C14,C15	1nF cer.
2	1	C2	1uF 50V ele.
3	1	C3	10uF 50v ele.
4	2	C4,C16	100nF mul.
5	2	C5,C6	22pF cer.
6	1	C7	1u pol.
7	6	DL1,DL2,DL3,DL4,DL5,DL6	LED 3mm.
8	2	JP30,JP31	STRIP12M
9	3	L1,L2,L3	10uH
10	6	Q3,Q4,Q5,Q6,Q7,Q8	BC517
11	11	RR1,RR2,RR3,RR4,RR5,RR6, RR7,RR8,RR9,RR10,RR11	4X1K rete res.
12	2	R0,R1	47R 1W
13	1	R2	4M7
14	1	R3	47K
15	3	R4,R5,R8	4K7
16	2	R6,R7	1K
17	1	SW1	PULSMOZ
18	1	U1	ST6225
19	1	U2	ULN2803
20	1	U3	4028
21	4	U4,U5,U6,U7	LED_BAR
22	1	U10	78L05
23	1	Y1	4MHz QUARZO

12. IN-AUDIO BOARD

Fig. 12.1 - IN-AUDIO BOARD ELECTRICAL SCHEMATIC

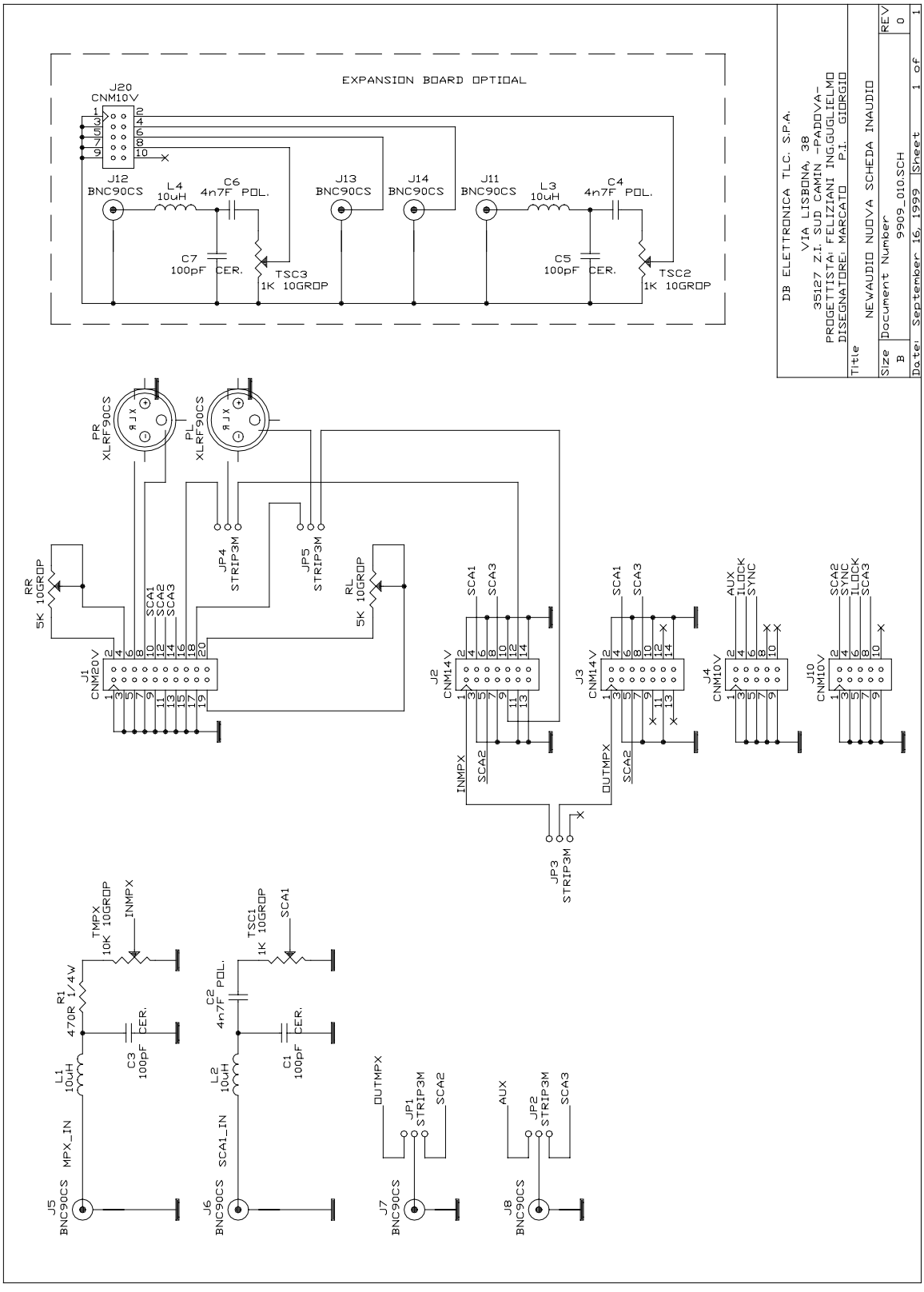
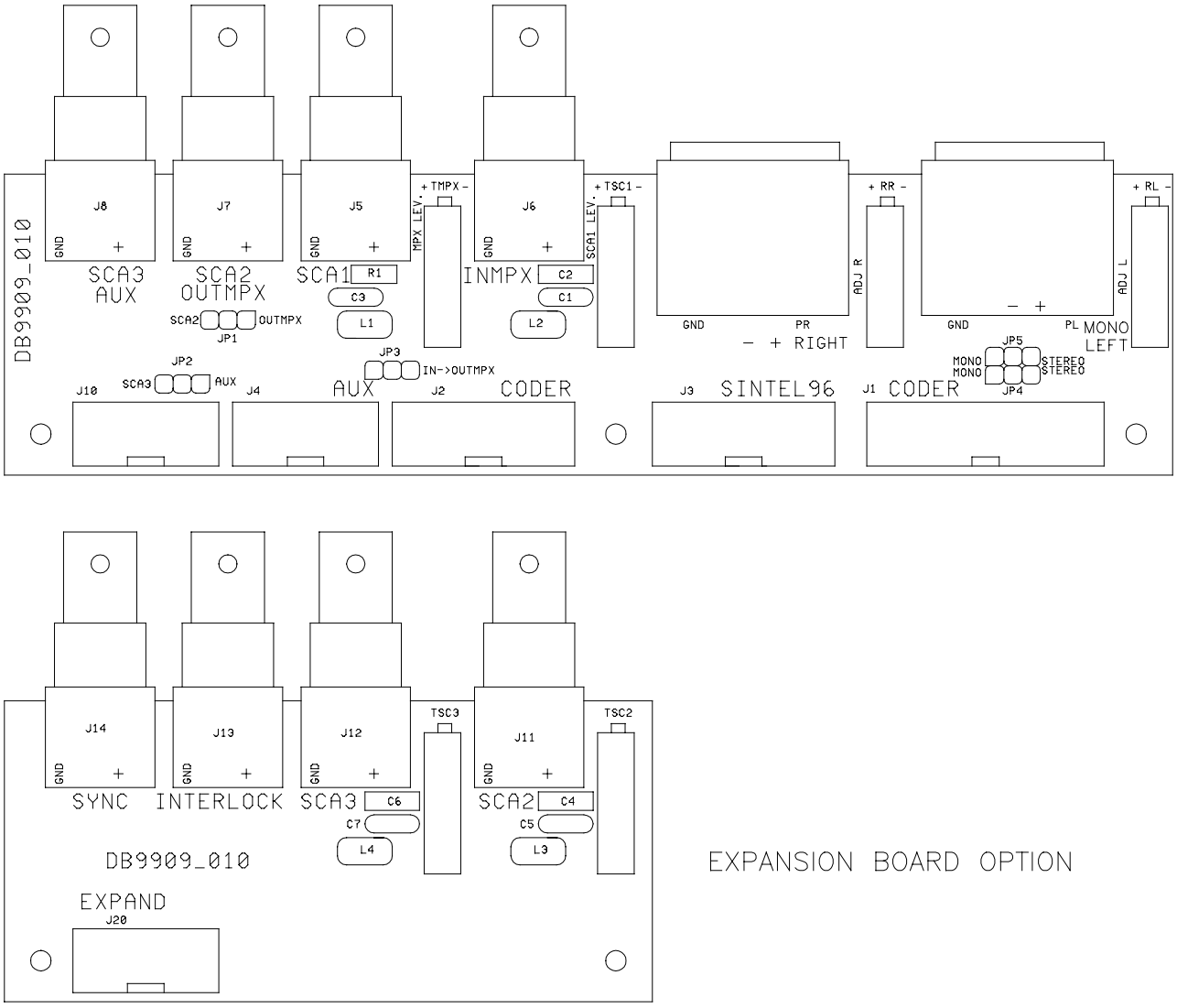


Fig. 12.2 - IN-AUDIO BOARD COMPONENT LAYOUT (DB 9909_010)

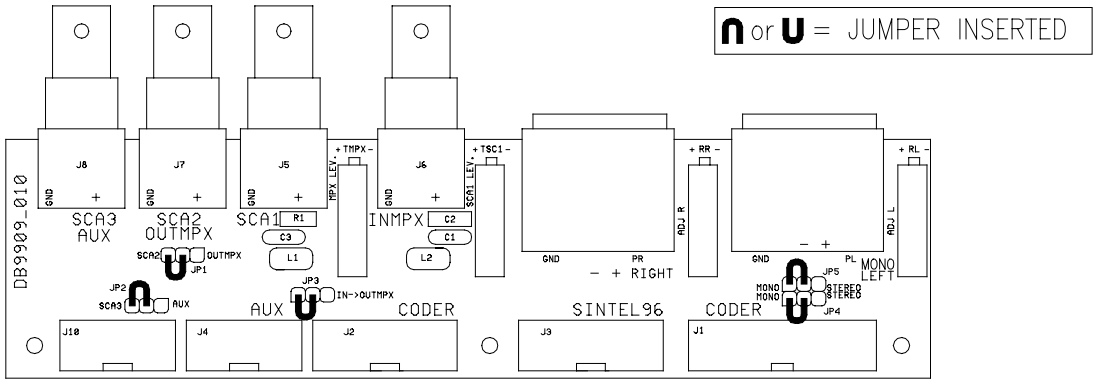


12.1 IN-AUDIO BOARD PARTS LIST

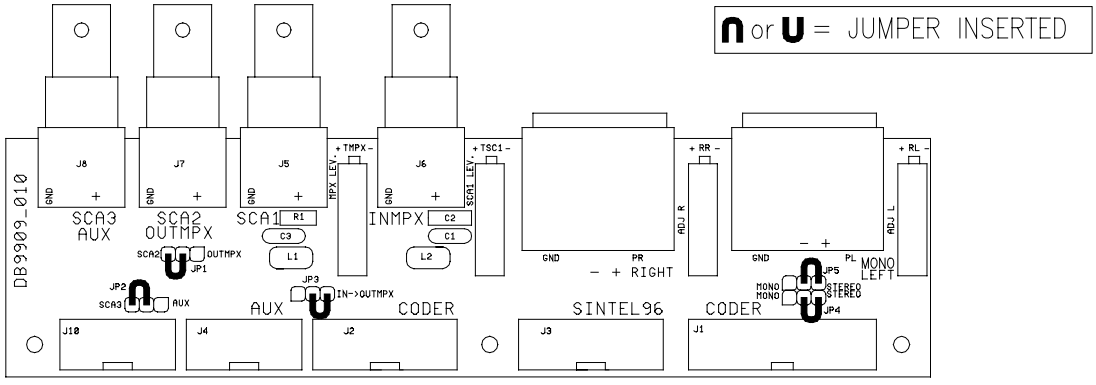
ITEM	QUANTITY	REFERENCE	PART
1	4	C1,C3,C5,C7	100pF CER.
2	3	C2,C4,C6	4n7F POL.
3	5	JP1,JP2,JP3,JP4,JP5	STRIP3M
4	1	J1	CNM20V
5	2	J2,J3	CNM14V
6	3	J4,J10,J20	CNM10V
7	8	J5,J6,J7,J8,J11,J12,J13,J14	BNC90CS
8	4	L1,L2,L3,L4	10uH
9	2	PR,PL	XLRF90CS
10	2	RL,RR	5K 10GROP
11	1	R1	470R 1/4W
12	1	TMPX	10K 10GROP
13	3	TSC1,TSC2,TSC3	1K 10GROP

12.2 IN-AUDIO BOARD JUMPERS SETTING

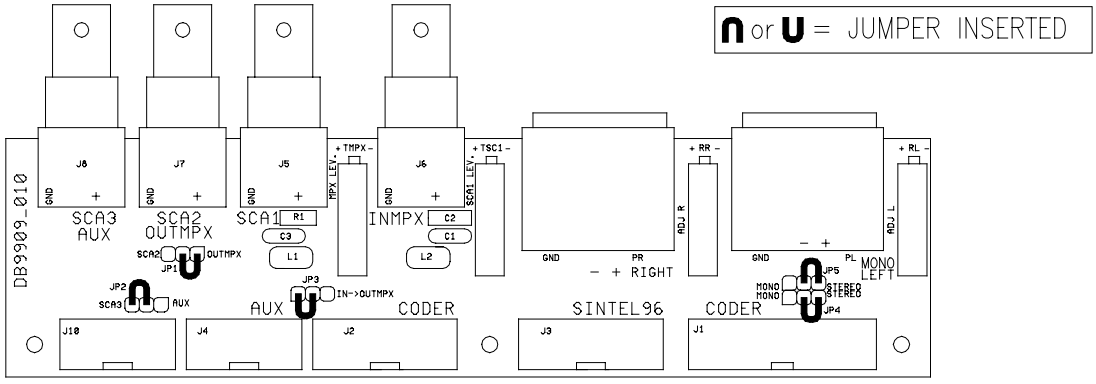
1) Configuration jumpers for: MONO – IN MPX – SCA1– SCA2 – SCA3



2) Configuration jumpers for: STEREO – SCA1 – SCA2 – SCA3



3) Configuration jumpers for: STEREO – IN MPX – SCA1 – OUT MPX – SCA3



13. STEREO ENCODER BOARD (Option)

13.1 CHANNELS PRE- EMPHASIS SETTING

RIGHT CHANNEL PRE-EMPHASIS

(see Fig. 13.3 and Fig. 13.10)

To change the pre-emphasis, you need to set (or change position of) the JP3, JP4 jumpers on the STEREO encoder board.

To disable preemph you have to remove both jumpers; to get a 50 us preemph, you have to insert only JP3; if you want a 75 us preemph both JP3 and JP4 must be inserted.

LEFT CHANNEL PRE-EMPHASIS

(see Fig. 13.3 and Fig. 13.10)

To change the pre-emphasis, you need to set (or change position of) the JP5, JP6 jumpers on the STEREO encoder board.

To disable preemph you have to remove both jumpers; to get a 50 us preemph, you have to insert only JP6; if you want a 75 us preemph both JP5 and JP6 must be inserted.

Fig. 13.1 - STEREO ENCODER GENERAL SCHEMATIC

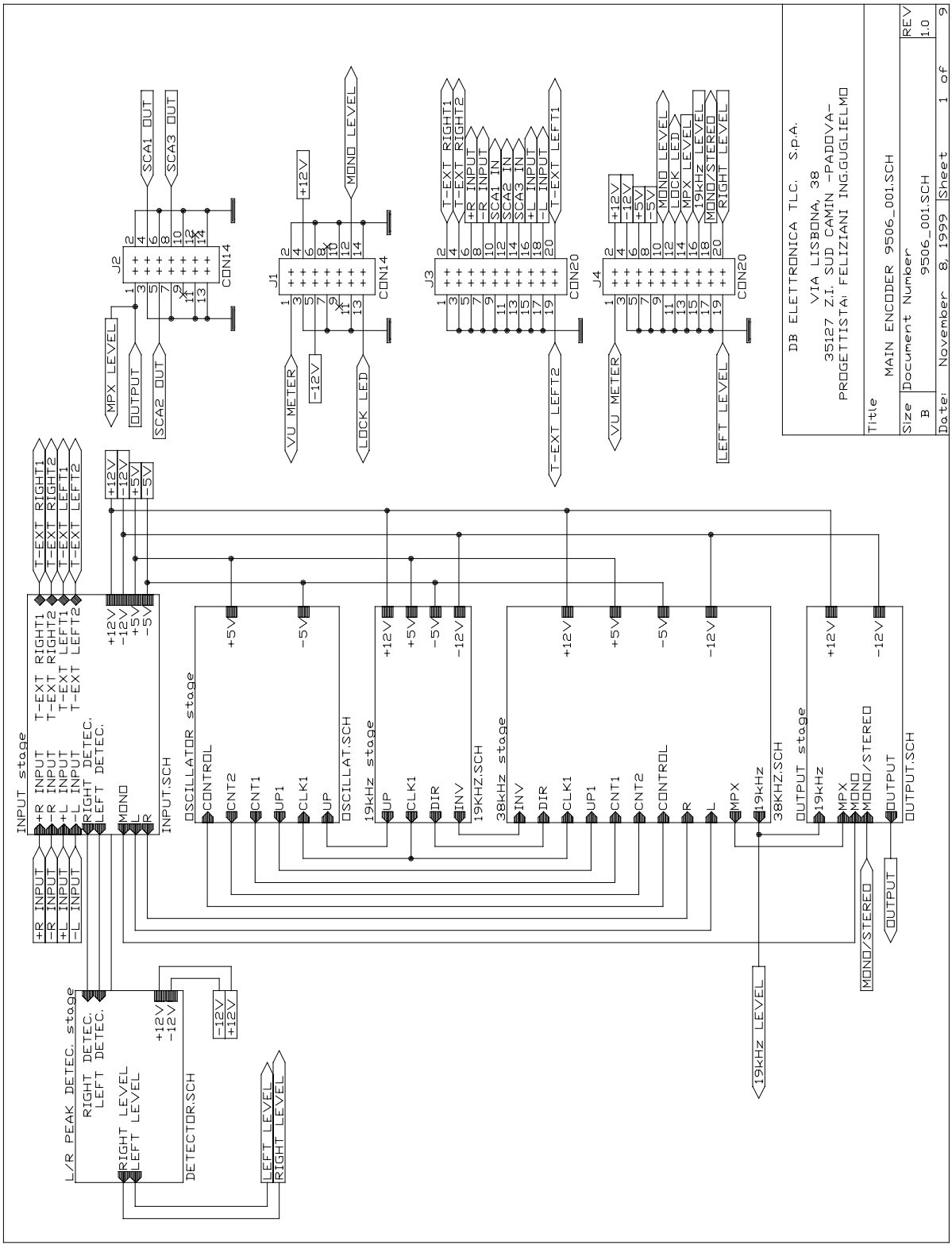


Fig. 13.2 - L/R PEAK DETECTOR STAGE ELECTRICAL SCHEMATIC

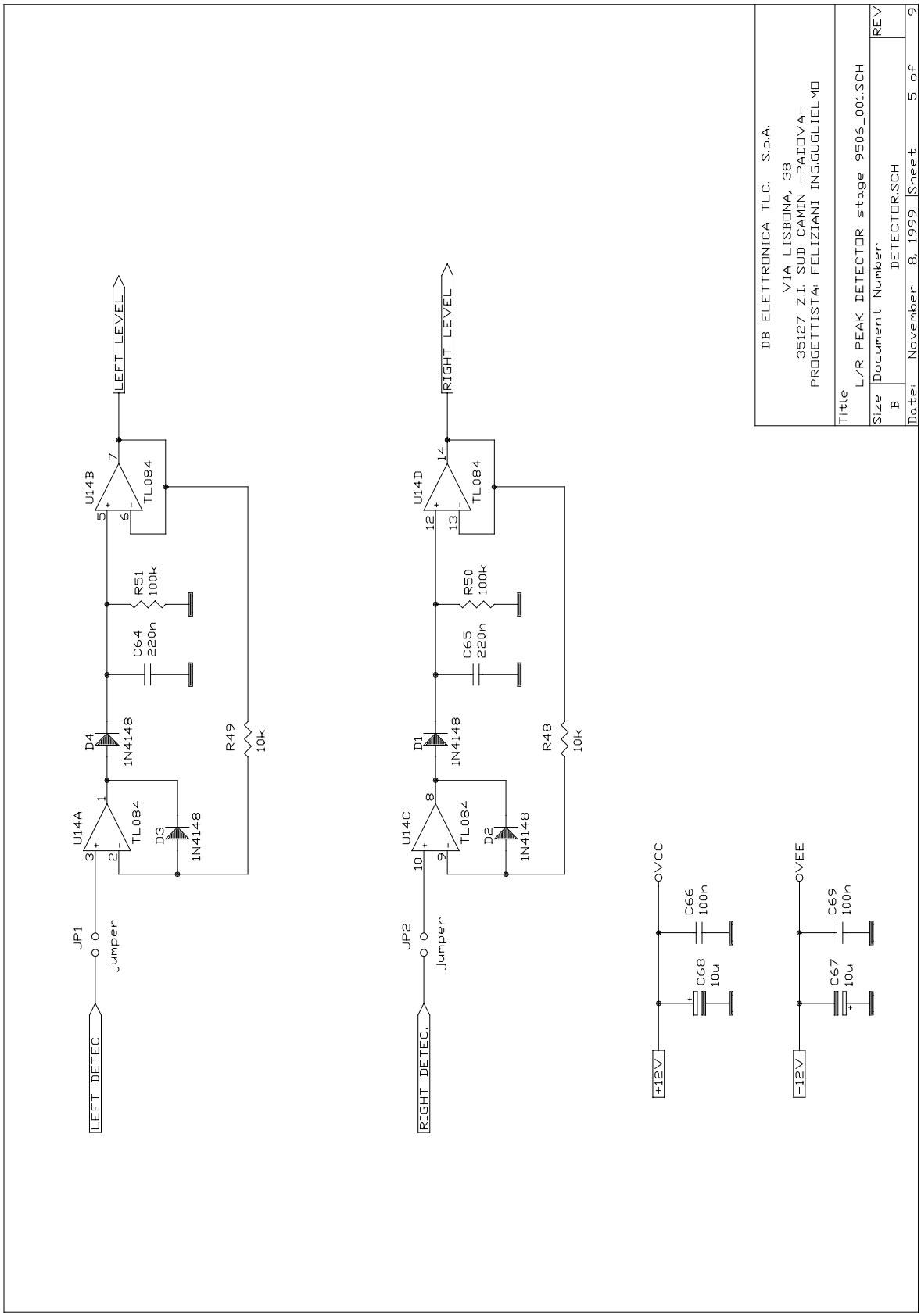


Fig. 13.3 - INPUT STAGE ELECTRICAL SCHEMATIC

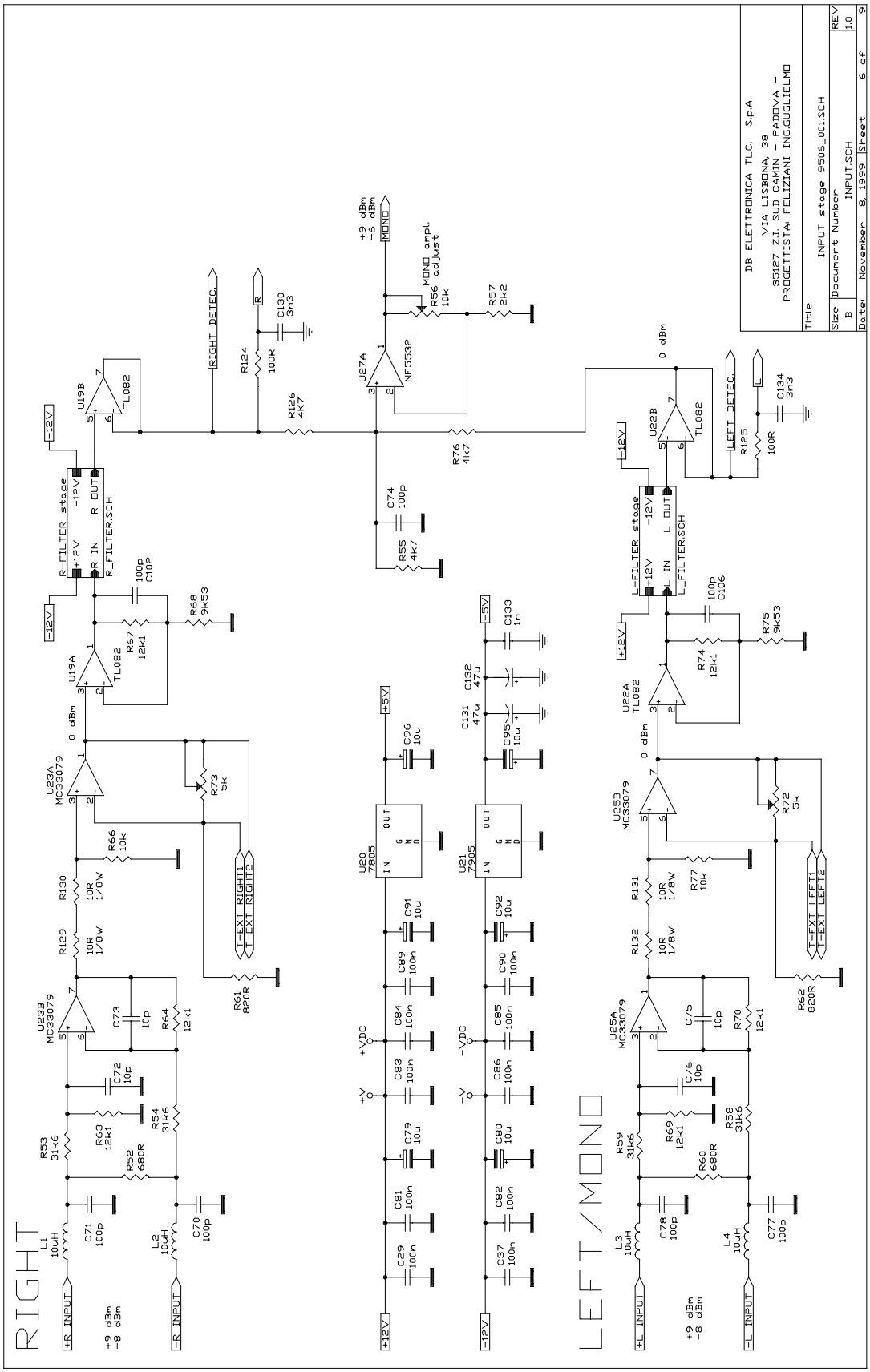


Fig. 13.4 - RIGHT FILTER STAGE ELECTRICAL SCHEMATIC

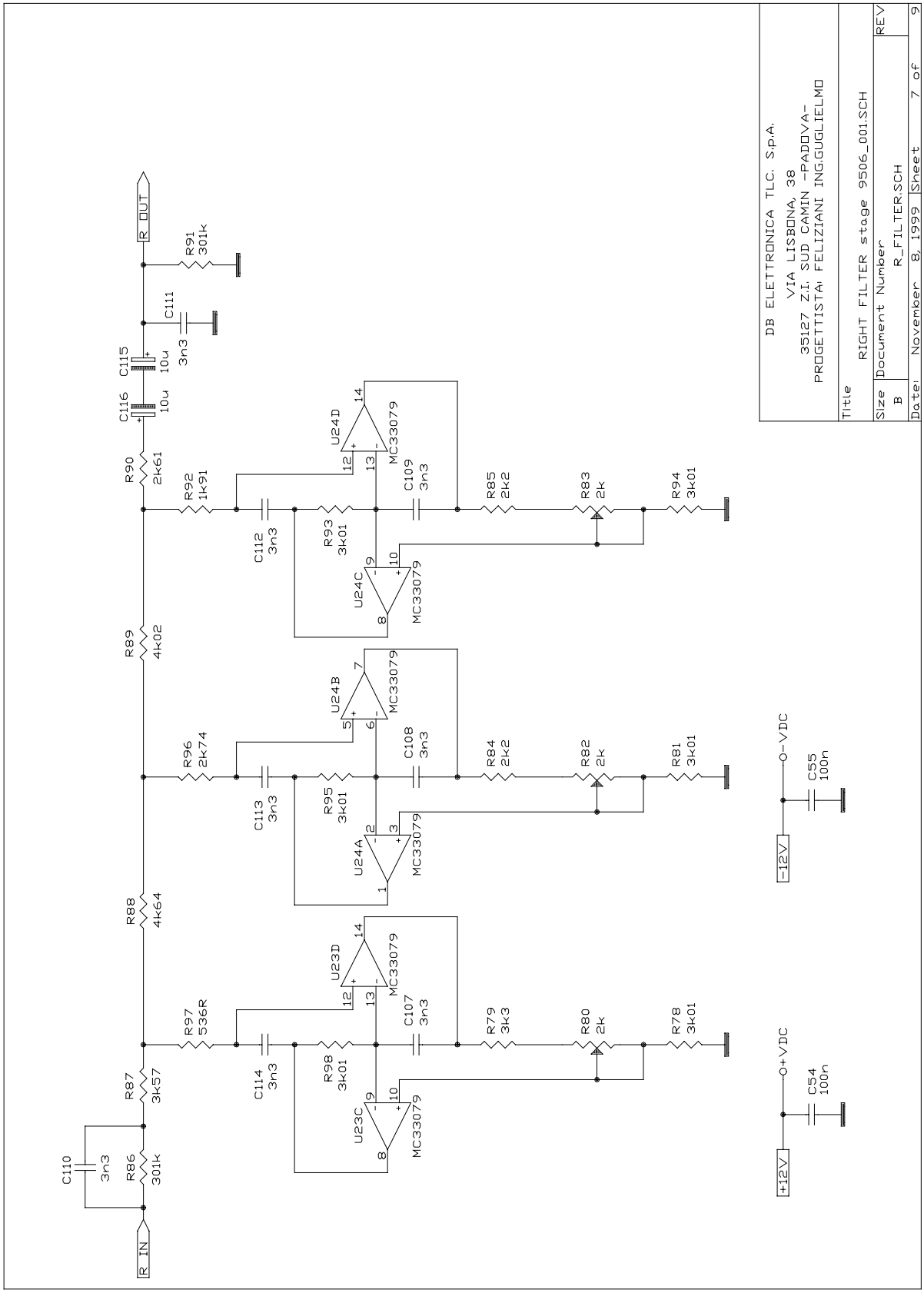


Fig. 13.5 - LEFT FILTER STAGE ELECTRICAL SCHEMATIC

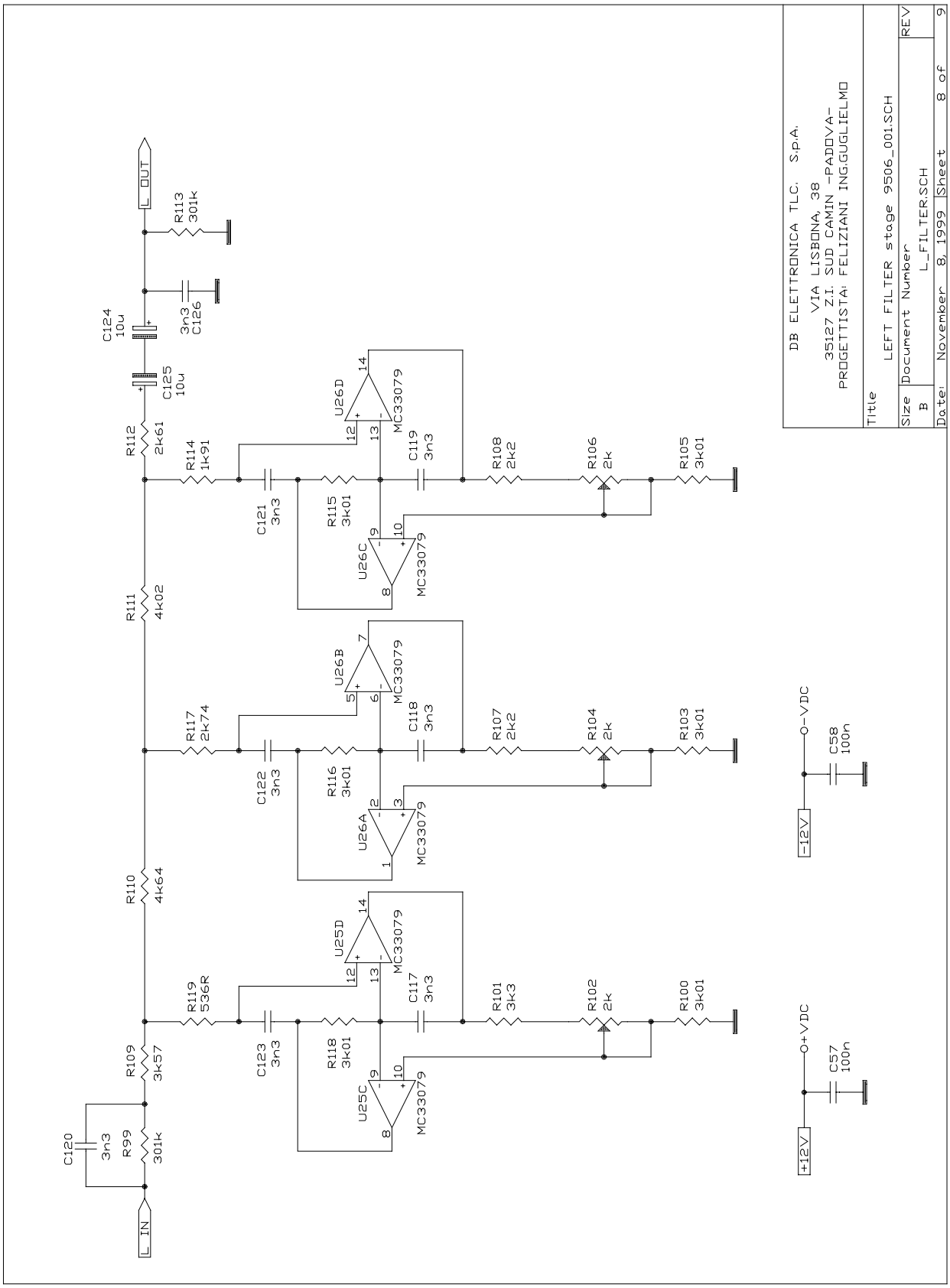


Fig. 13.6 - OSCILLATOR STAGE ELECTRICAL SCHEMATIC

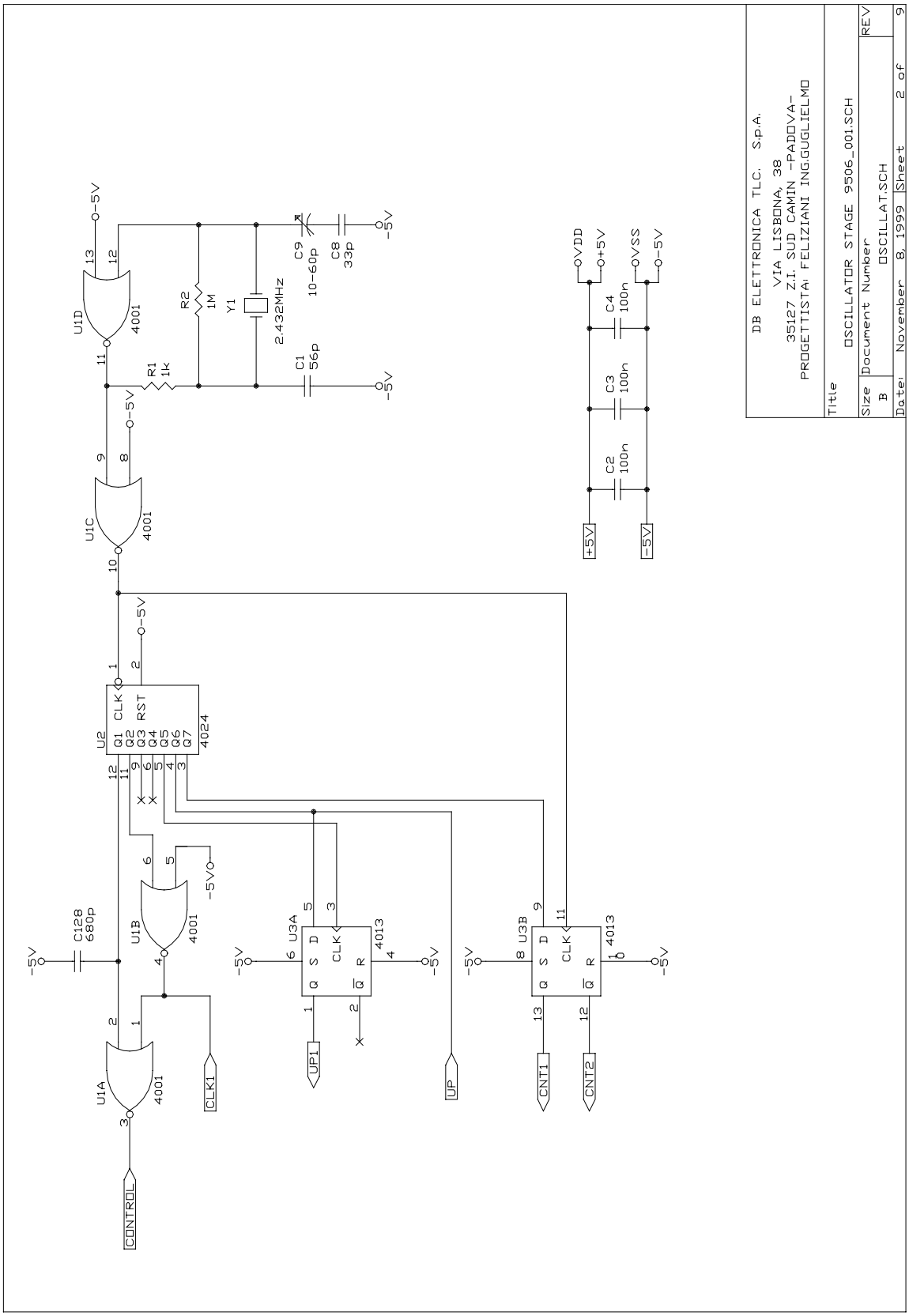


Fig. 13.7 - 19 kHz STAGE ELECTRICAL SCHEMATIC

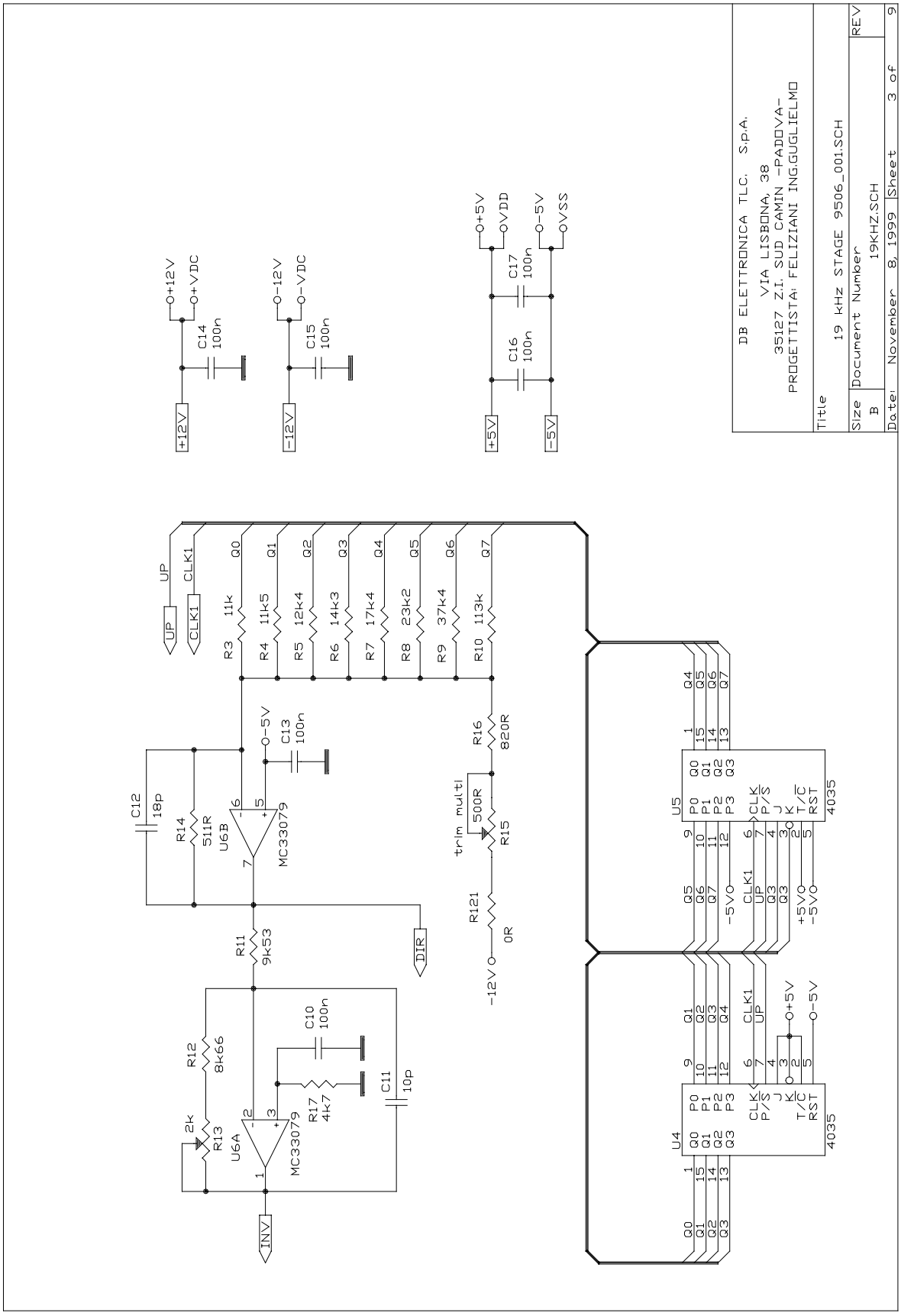


Fig. 13.8 - 38 kHz STAGE ELECTRICAL SCHEMATIC

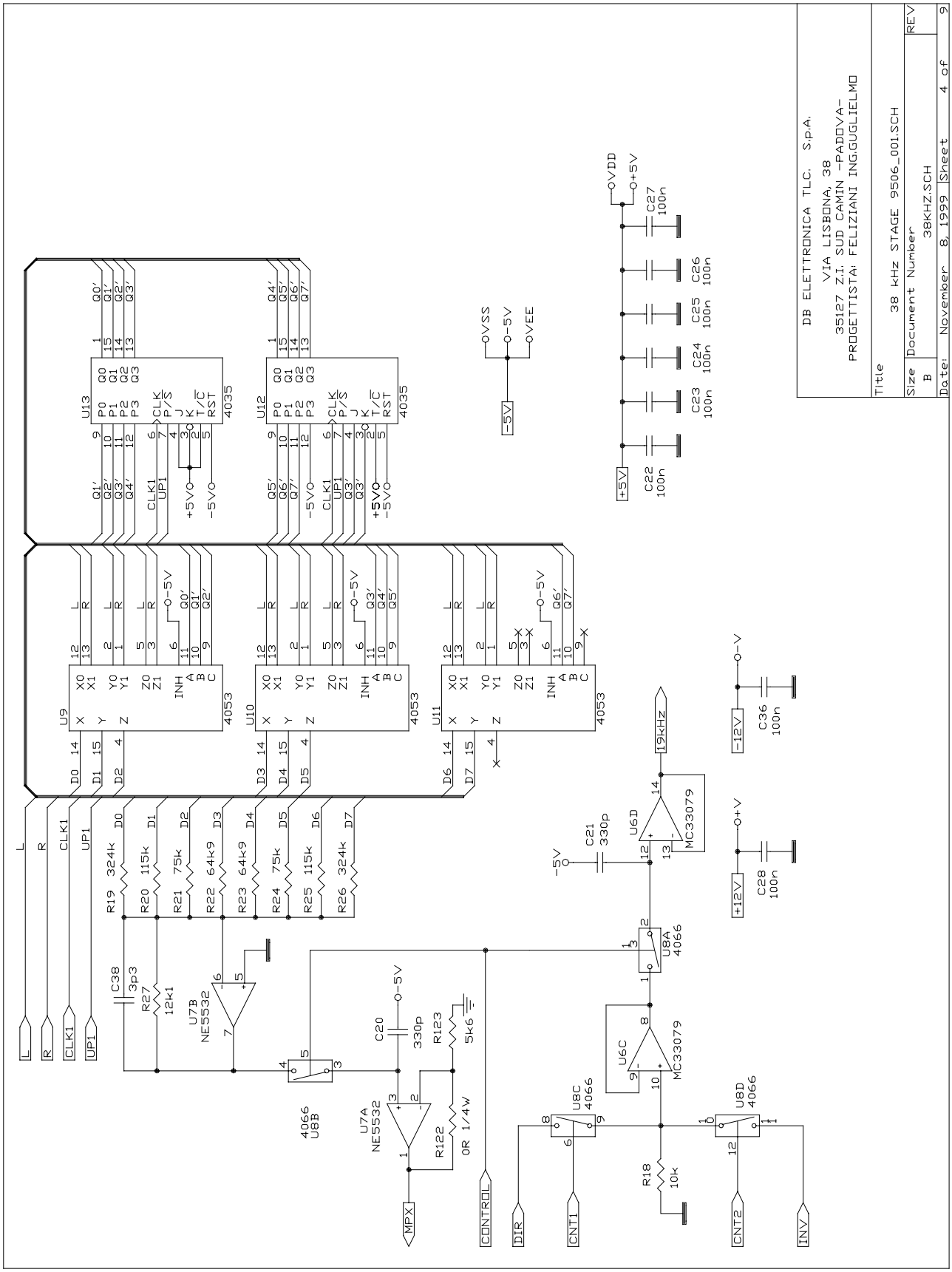


Fig. 13.9 - OUTPUT STAGE ELECTRICAL SCHEMATIC

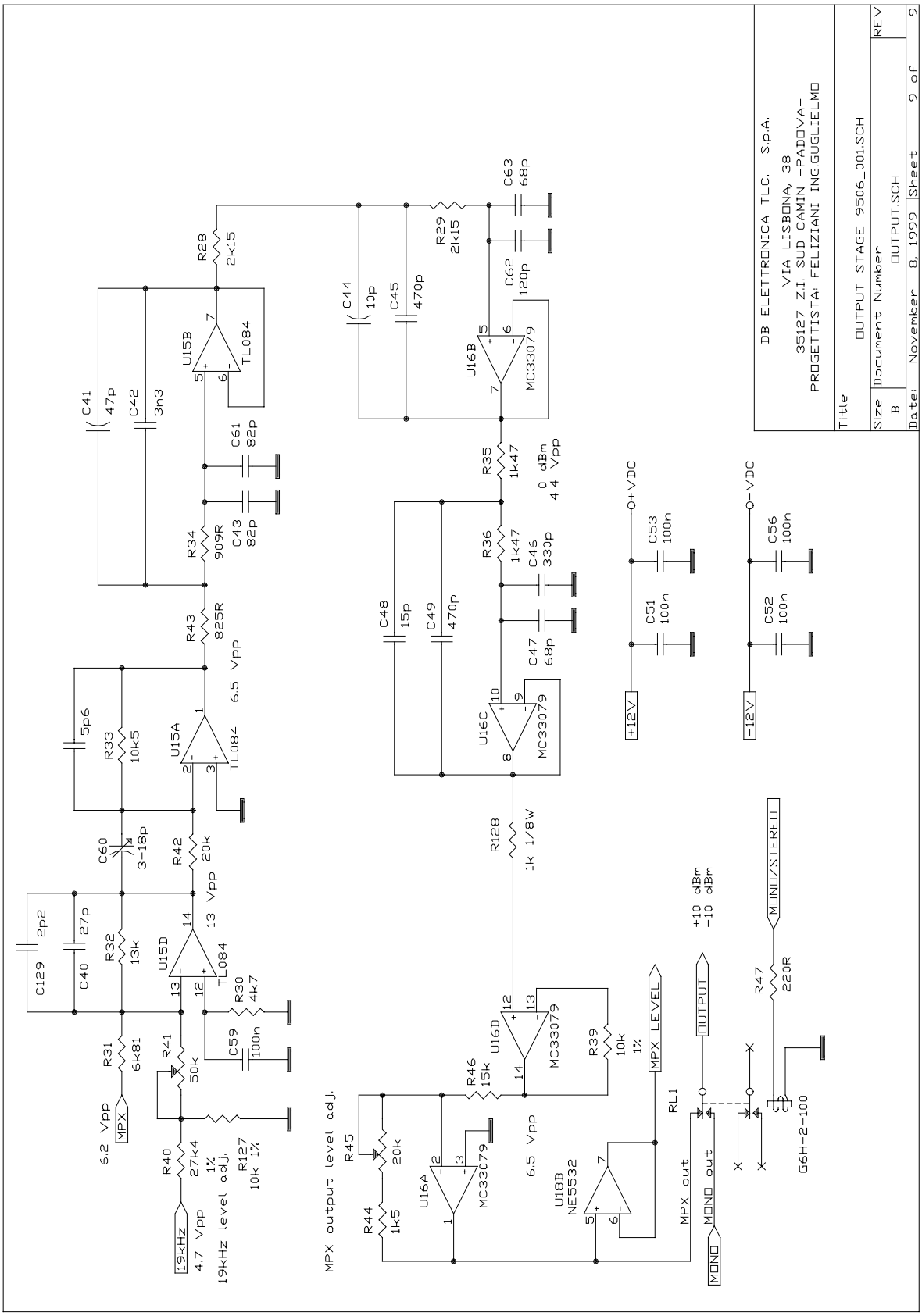
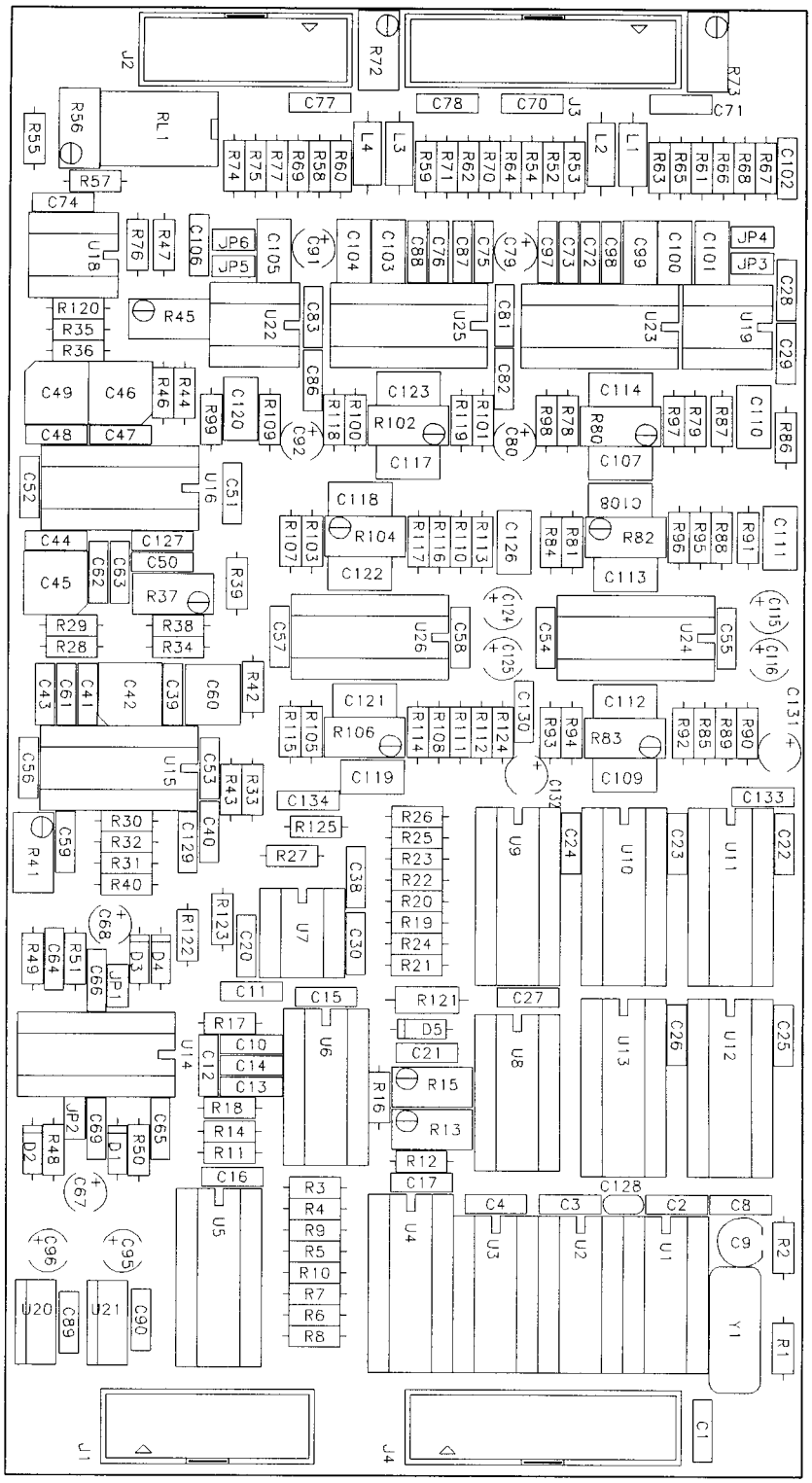


Fig. 13.10 - STEREO ENCODER COMPONENT LAYOUT (DB 9506-001)



13.2 STEREO ENCODER PARTS LIST

ITEM	QUANTITY	REFERENCE	PART
1	3	C64,C65,C135	220n poly
2	1	C1	56p cer np0
3	38	C2,C3,C4,C10,C13,C14,C15, C16,C17,C22,C23,C24,C25, C26,C27,C28,C29,C36,C37, C51,C52,C53,C54,C55,C56, C57,C58,C59,C66,C69,C81, C82,C83,C84,C85,C86,C89, C90	100n poly
4	1	C8	33p cer np0
5	1	C9	10-60p orange
6	2	C11,C44	10p cer np0
7	1	C12	18p cer np0
8	2	C20,C21	330p cer
9	1	C38	3p3 cer np0
10	1	C39	5p6 cer np0
11	1	C40	27p cer np0
12	1	C41	47p cer np0
13	17	C42,C107,C108,C109,C110, C111,C112,C113,C114,C117, C118,C119,C120,C121,C122, C123,C126	3n3 polistirene
14	2	C43,C61	82p cer np0
15	2	C45,C49	470p polistirene
16	1	C46	330p polistirene
17	2	C47,C63	68p cer np0
18	1	C48	15p cer np0
19	2	C62,C50	120p cer np0
20	1	C60	3-18p red
21	12	C67,C68,C79,C80,C91,C92, C95,C96,C115,C116,C124, C125	10u tant 25V
22	4	C70,C71,C77,C78	100p
23	4	C72,C73,C75,C76	10p cer
24	3	C74,C102,C106	100p cer
25	4	C87,C88,C97,C98	330n poly
26	6	C99,C100,C101,C103,C104, C105	4n7 polistirene
27	1	C127	100p cer np0
28	1	C128	680p cer np0
29	1	C129	10p
30	2	C130,C134	3n3
31	2	C132,C131	47u TANTALIO
32	1	C133	1n poly
33	4	D1,D2,D3,D4	1N4148
34	2	JP2,JP1	jumper

ITEM	QUANTITY	REFERENCE	PART
35	2	JP6,JP3	jumper ON/OFF
36	2	JP5,JP4	jumper 50/75us
37	2	J2,J1	CON14
38	2	J3,J4	CON20
39	1	L5	10uH ind. assiale
40	4	L1,L2,L3,L4	10uH
41	1	RL1	G6H-2-100 OMRON 22Z3K3 12V
42	1	R1	1k 1/8W
43	1	R2	1M 1/8W
44	1	R3	11k 1/4W 1%
45	1	R4	11k5 1/4W 1%
46	1	R5	12k4 1/4W 1%
47	1	R6	14k3 1/4W 1%
48	1	R7	17k4 1/4W 1%
49	1	R8	23k2 1/4W 1%
50	1	R9	37k4 1/4W 1%
51	1	R10	113k 1/4W 1%
52	3	R11,R68,R75	9k53 1/4W 1%
53	1	R12	8k66 1/4W 1%
54	7	R13,R80,R82,R83,R102, R104,R106	2k trim multi
55	1	R14	511R 1/4W 1%
56	1	R15	5OOR trim multi
57	1	R16	487R 1/4W 1%
58	4	R17,R30,R55,R76	4k7 1/8W
59	1	R18	10k 1/4W
60	2	R19,R26	324k 1/4W 1%
61	2	R20,R25	115k 1/4W 1%
62	2	R21,R24	75k 1/4W 1%
63	2	R22,R23	64k9 1/4W 1%
64	7	R27,R63,R64,R67,R69,R70, R74	12k1 1/4W 1%
65	2	R28,R29	2k15 1/4W 1%
66	1	R31	6k81 1/4W 1%
67	1	R32	13k 1/4W 1%
68	1	R33	10k5 1/4W 1%
69	1	R34	909R 1/4W 1%
70	2	R35,R36	1k47 1/4W 1%
71	1	R37	5k trim multi
72	2	R39,R38	10k 1/4W 1%
73	5	R40,R53,R54,R58,R59	31k6 1/4W 1%
74	1	R41	50k trim multi
75	1	R42	20k 1/4W 1%
76	1	R43	825R 1/4W 1%
77	1	R44	1k5 1/4W
78	1	R45	20k trim multi
79	1	R46	15k 1/4W
80	1	R47	0R 1/4W
81	2	R48,R49	10k 1/8W
82	2	R50,R51	100k 1/8W

ITEM	QUANTITY	REFERENCE	PART
83	2	R52,R60	680R 1/4W
84	1	R56	10k trim multi
85	1	R57	2k2 1/8W
86	2	R61,R62	560R 1/4W
87	4	R65,R66,R71,R77	169k 1/4W 1%
88	2	R73,R72	22k 1/8 W
89	12	R78,R81,R93,R94,R95,R98, R100,R103,R105,R115,R116, R118	3k01 1/4W 1%
90	2	R79,R101	3k3 1/4W
91	4	R84,R85,R107,R108	2k2 1/4W
92	4	R86,R91,R99,R113	301k 1/4W 1%
93	2	R87,R109	3k57 1/4W 1%
94	2	R88,R110	4k64 1/4W 1%
95	2	R89,R111	4k02 1/4W 1%
96	2	R90,R112	2k61 1/4W 1%
97	2	R92,R114	1k91 1/4W 1%
98	2	R96,R117	2k74 1/4W 1%
99	2	R97,R119	536R 1/4W 1%
100	1	R122	0R
101	1	R123	5k6
102	1	R124	100R 1/4 W
103	1	R125	100R 1/4W
104	1	R126	4K7
105	1	R127	10k 1/4 W 1%
106	1	U1	4001
107	1	U2	4024
108	1	U3	4013
109	4	U4,U5,U12,U13	4035
110	6	U6,U16,U23,U24,U25,U26	MC33079
111	4	U7A,U7,U18B,U27	NE5532
112	1	U8	4066
113	3	U9,U10,U11	4053
114	2	U14,U15	TL084
115	2	U19,U22	TL082
116	1	U20	7805
117	1	U21	7905
118	1	Y1	2.432MHz

14. CONTRAVES BOARD (Option)

14.1 GENERAL DESCRIPTION

On the synthesized board the dip-switches are changed with a 20 pin connector, so that it is possible connect with a flat type cable this circuit (that manage PLL) to a microprocessor.
The frequency change is fast, because it is only necessary put directly the frequency using the contraves on the front panel.

Fig. 14.1 - CONTRAVES BOARD ELECTRICAL DIAGRAM

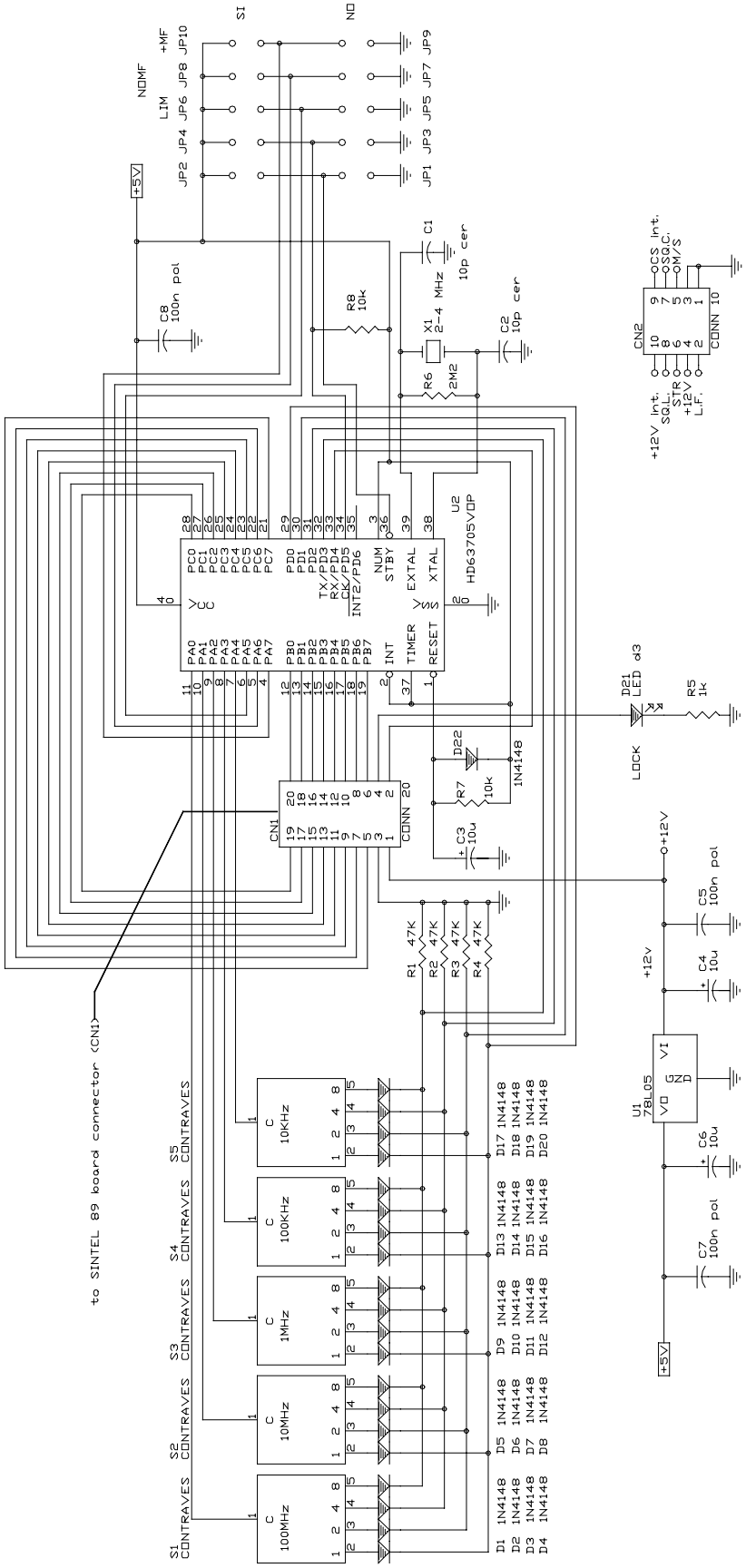
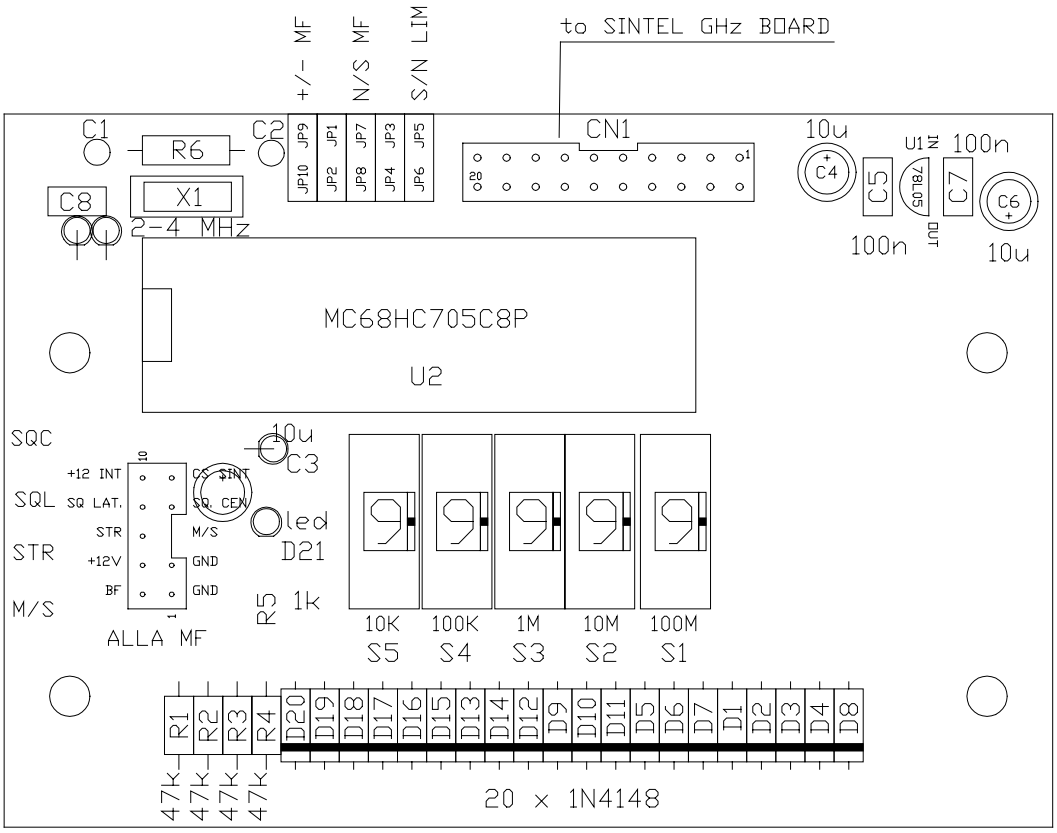


Fig. 14.2 - CONTRAVES BOARD COMPONENT LAYOUT (DB 9308-020)



14.2 CONTRAVES BOARDS PARTS LIST

ITEM	QUANTITY	REFERENCE	PART
1	1	CN1	CONN 20
2	1	CN2	CONN 10
3	2	C2,C1	10p cer
4	3	C3,C4,C6	10u
5	3	C5,C7,C8	100n pol
6	21	D1 - D22	1N4148
7	1	D21	LED d3
8	9	JP1,JP2,JP3,JP4,JP5, JP6,JP7,JP8,JP9,JP10	jumper
9	4	R1,R2,R3,R4	47K
10	1	R5	1k
11	1	R6	2M2
12	2	R8,R7	10k
13	5	S1,S2,S3,S4,S5	CONTRAVES
14	1	U1	78L05
15	1	U2	MC68HC705C8P
16	1	X1	2-4 MHz

15. TROUBLESHOOTING

In the following table there is a list of the most frequent malfunctions, the corresponding symptoms and their possible solutions for the PM300 transmitter.

CAUSE	SYMPTOM	ACTION SUGGESTED
AC main absent	-PWR led OFF when transmitter switched ON	Check the presence of the connection to the electric line and the integrity of the power cord. Check the fuse (N°1 Fig. 1.2). If the fuse is burnt check that the voltage of the electric line is the same (115 or 230Vac) as the one selected by the rear panel switch (N° 2 Fig. 1.2) and then replace the fuse.
VSWR or TEMPERATURE protection intervention or defective lock of the PLL circuit on modulator.	- No output power -VSWR led ON or TEMP led ON or LOCK led OFF.	If on the front panel the VSWR led is light on, check the integrity of the output load (antenna or dummy load) and the corresponding cables, then, perform a RESET using the push-button (N° 12 Fig. 1.2). If the led TEMP on the front panel is light on, control the room temperature (should be < 45°C). If under 45°C, allow about 15 minutes for the proper cooling of the equipment; the protection will turn off automatically. If the problem persists, please

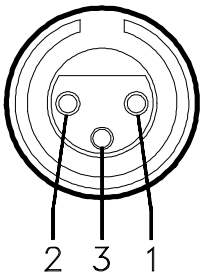
		contact DB's Technical Service. If on the front panel the LOCK led is light off, control the DC voltage that is on the audio and SCA inputs (the DC voltage should be lower than 1 V otherwise there could be PLL locking problems): if it is correct, please open the transmitter cover and the modulator box cover (N° 8 Fig. 1.3 and check the supply voltages ±12Vdc presence on the modulator board. If the voltages are not correct, please check the internal connectors and the relative cables. If the problem persists contact DB Elettronica.
Output power adjustment not correct	- Very low output power	Adjust the output power level using the front panel trimmer (Fig. 1.1).
Excessive or low deviation	- Received audio: very low or badly distorted	- Adjust input audio levels and front panel potentiometer (Fig. 1.1) following indications in Chapter 5.

16. APPENDIX A

16.1 XLR AUDIO CONNECTORS PINOUTS

Connection procedure to connect the audio signal cables to the XLR female connectors for a balanced or unbalanced signal.

XLR FEMALE



XLR CONNECTOR PIN	BALANCED SIGNAL	UNBALANCED SIGNAL
1	ground	ground
2	" +"	not connected
3	" - "	signal

17. APPENDIX B

17.1 MOSFET REPLACEMENT

1. Disconnect the supply voltage from the output board (faston connection).
2. Unscrew the damaged MOSFET and the output matching board.
3. Unsolder the MOSFET.
4. Clean the input and output boards to prevent short-circuits before replacing the MOSFET.
5. Locate properly the white teflon sheets between the output circuit and the heat sink: affix the circuit using the two screws.
6. Put on the thermically conductive compound between the MOSFET case and the heat sink.
7. Fix the MOSFET to the heat sink (screws must be strongly fixed) and solder all the four pins of the MOSFET: **careful attention must be paid to the output board soldering since an excessive quantity of tin can cause a short circuit between different board layers.** Reconnect also the 2 GND interconnections, indicated on Fig. 17.1, and check the right soldering of the input transformer and gate resistor.
8. Verify that the supply voltage is 45V (if it is not, there is a problem in the switching power supply boards). Reconnect the supply voltage to the 300W module (faston connection), placing an ammeter in series (minimum full scale deflection 10A).
9. Control the output power level (it should be 300W) and the absence of spurious emissions (to check it, use a spectrum analyzer and an output RF monitor sufficiently attenuated). **Pay attention to the ammeter: the MOSFET must not drain more than 9A**.
10. In case the replaced MOSFET doesn't reach the nominal output power or in case of spurious emissions you need to improve the input matching of the MOSFET: to do this compress or expand manually the input circuit coil (see Fig. 17.1) to maximize the output power.

Fig. 17.1 - MOSFET REPLACEMENT