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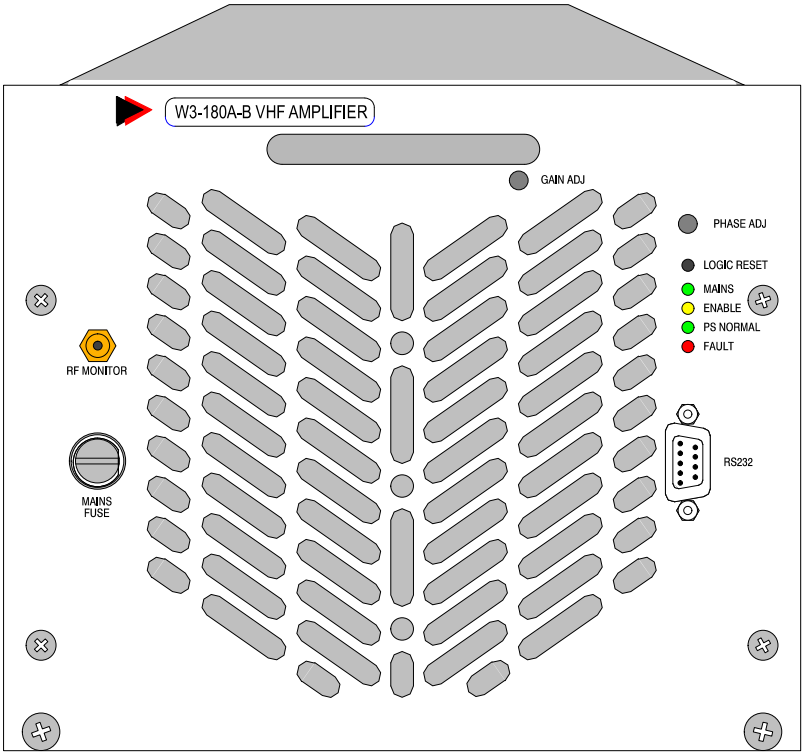

W3-180A-B VHF AMPLIFIER

Technical Manual

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1. GENERAL INFORMATION

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1. GENERAL INFORMATION

1.1 INTRODUCTION

1.1.1 Manual applicability

The present technical manual provides information relevant to the following module:

- W3-180A-B VHF LDMOS Amplifier . . . . . p/n 5030317001

For the sake of simplicity, from now on throughout this manual, W3-180A-B VHF LDMOS Amplifier will be referred to as W3-180A-B.

1.1.2 General information

W3-180A-B is a full LDMOS amplifier module working in AB class so to reach a good compromise between introduced distortion and dissipated power with low current consumption; it is able to work from 174 to 230MHz (VHF, BIII, fully broadband) and designed for TV applications. The gain is approx. 40dB ± 1.5dB; the output nominal power is as follows:

- 300W rms for DVB-T applications
- 390W rms for ATSC applications
- 800W p.s. for analogue applications with combined audio/video.

W3-180A-B module is self-protected from overdrive of the RF input power, from incidental reflected power, from overvoltage of the amplifier power supply voltages and from driver and final stage abnormal current absorption. The protections are performed through the module Control Section, which consists of a master CPU *(CPU Module* board*)* and an interface board *(Module Field Interface).* The data acquired by the module Control Section are also transferred to the equipment control logic via RS485 and consequently the module status and functioning can be monitored on equipment control logic monitor (see Fig. 1.6).

Referring to the simplified block diagram of Fig. 1.1, W3-180A-B is divided into 3 sections:

- RF Input and Control Section,
- RF Section including:
  - Driver 40W BIII . . . . . *(pre-driver stage)*
  - Driver 40W BIII . . . . . *(driver stage)*
  - 1KW BIII RF Amplifier . . . . . *(final stage)*
- Power Supply Section including an AC/DC Converter

A general layout of W3-180A-B is shown on Fig. 1.2. The unit is forced air cooled by a fan located on rear panel external side; a high efficiency heat sink length-wise located into the module provides the RF circuitry cooling.

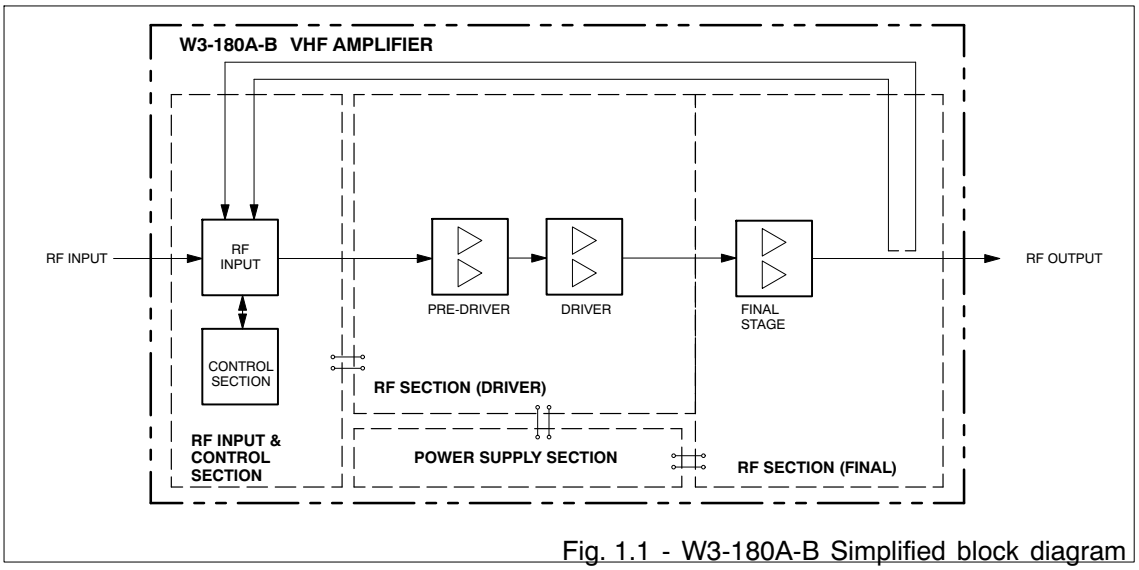

Fig. 1.1 - W3-180A-B Simplified block diagram

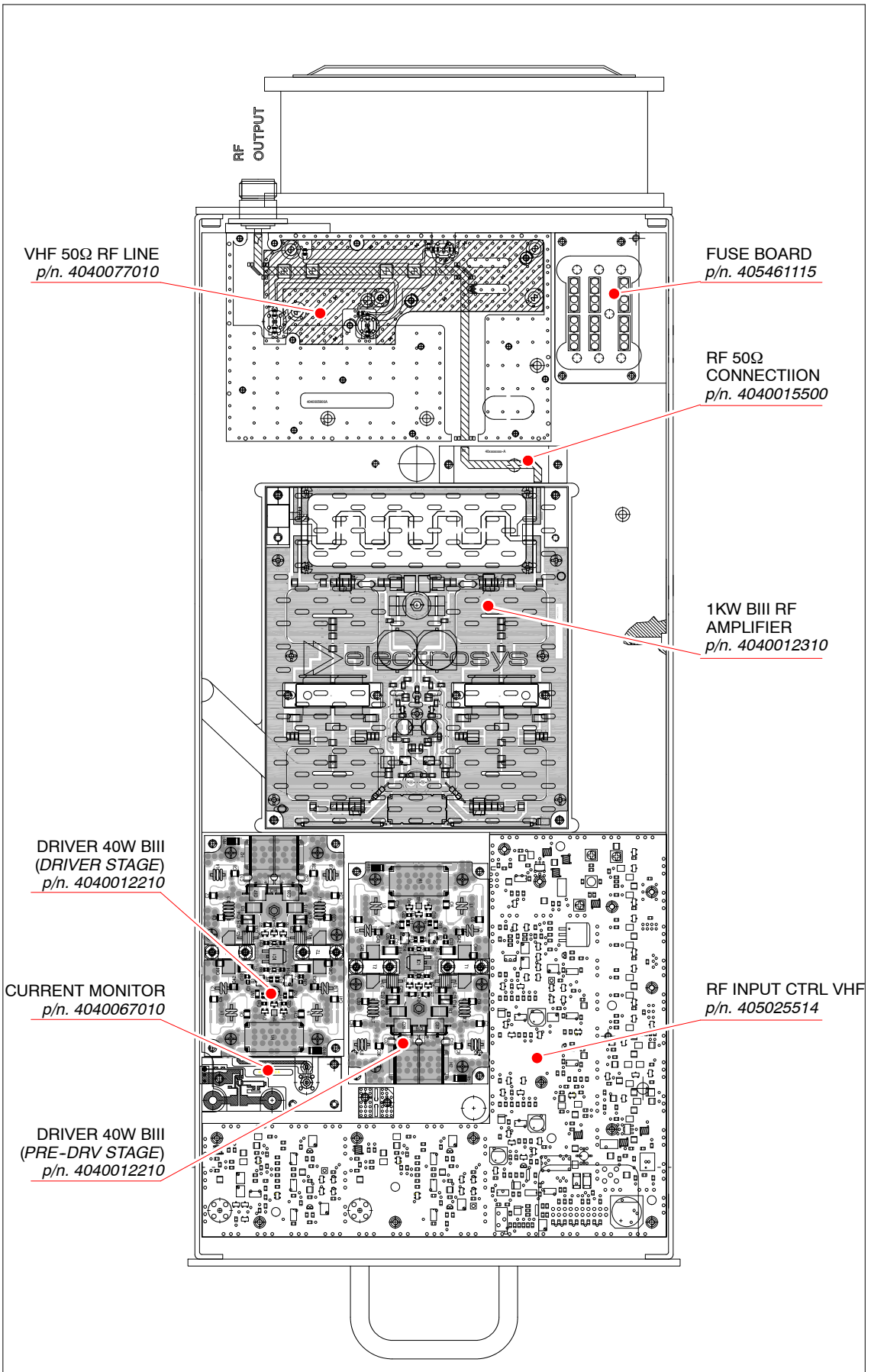

Fig. 1.2 (1/2) - W3-180A-B general layout (top view)

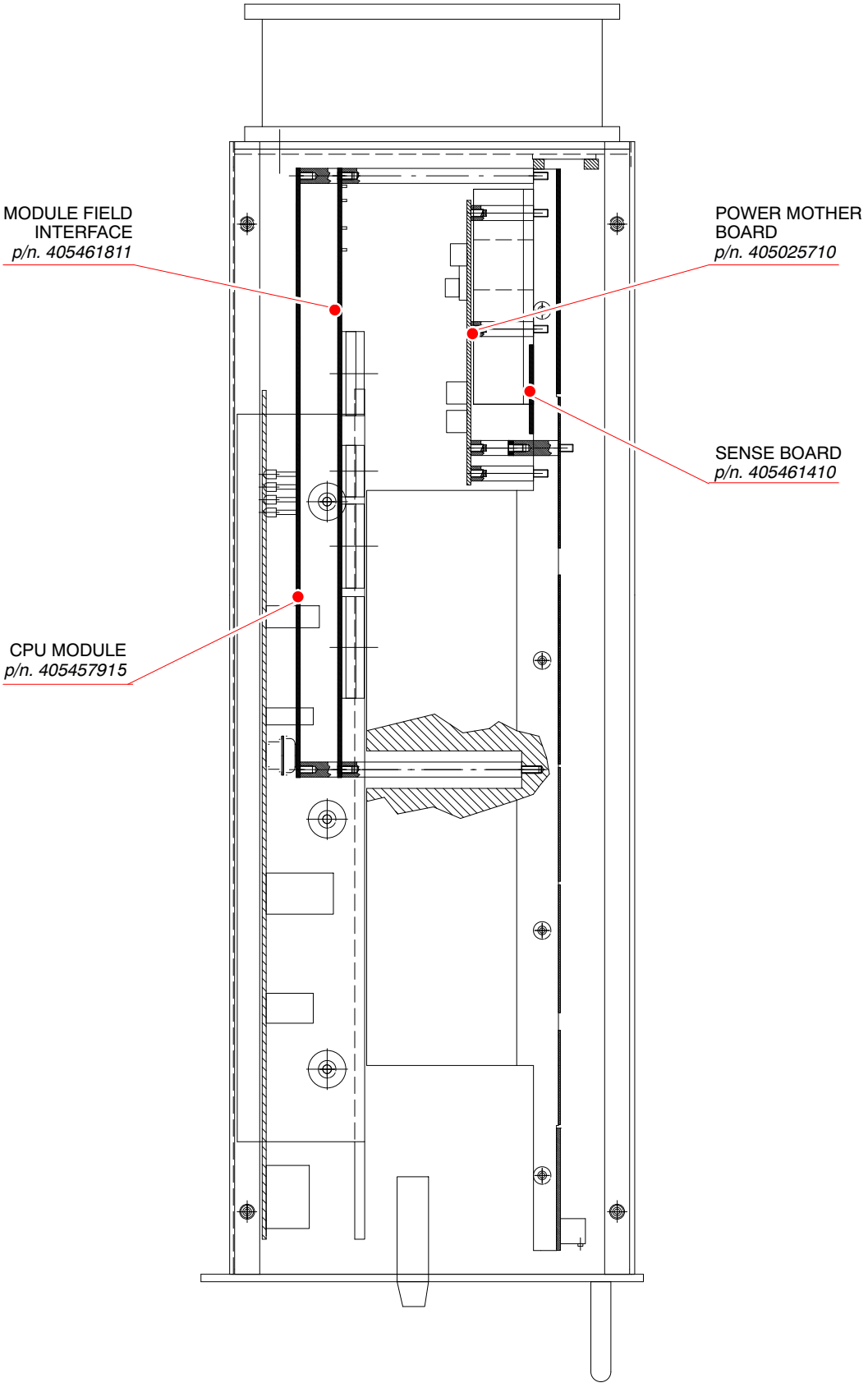

Fig. 1.2 (2/2) - W3-180A-B general layout (side view)

1.2 TECHNICAL SPECIFICATIONS

RF CHARACTERISTICS	
Frequency Range	174 to 230MHz
Input/Output Impedance	50Ω
Input Nominal Power	30mW (DVB-T) 39mW (ATSC) 80mW(ATV; combined audio/video)
Output Nominal Power	300Wrms (DVB-T) 390Wrms (ATSC) 800Wp.s. (ATV; combined audio/video)
Input Return Loss	<-18dB
Typical Gain	40dB ± 1.5dB
Operation class	AB
IMD (DVB-T signal at f_c±4.2MHz)	≤ -36dBc (with precorrection)
IMD (ATSC signal at f_c±3.3MHz)	≤ -37dBc (with precorrection)
POWER CONSUMPTION	
Power Consumption	1100 VA (DVB-T) 1100 VA (ATSC) 1450 VA (ATV; combined audio/video)
I/O CONNECTORS	
Input Connector	”BNC” female
Output Connector	”N” female
MECHANICAL	
Cooling	Forced Air
Dimensions (mm)	177x212x500 (*hxwxd*)
Weight (kg)	13
ENVIRONMENTAL DATA	
• temperature	0 to +45ºC
• relative humidity	95%
ALARMS and PROTECTIONS	
	• Over-temperature • Over-current • Overdrive • Excessive reflected power

1.3 FUNCTIONAL DESCRIPTION

This paragraph provides a functional description of the parts which make up W3-180A-B. The description deals with the following:

1.3.1 VHF RF Amplifier ..... p/n. 4420300008

1.3.2 Control section *(Module Field Interface + CPU Module)*

1.3.3 Power Supply Section ..... p/n. 1703220004

1.3.1 VHF RF Amplifier (p/n. 4420300008)

RF INPUT CONTROL p/n. 405025514

The functional description of this assembly is referred to block diagram on Fig. 1.3.

An integrated splitter splits (in two) the RF input signal: the former signal is routed to the RF Driver Section (via an RF Attenuator, a Phase Shifter and a Slope Adj. circuit), the latter signal is processed and sent to the *Control Section*, in order to perform the control of the RF input power.

For the purpose the input signal is *envelope* or *rms* detected (depending on analog or digital input signal) and through a suitable circuit (fast comparator and SPDT Driver) drives an RF switch which routes the RF signal on a dummy load if an overdriving occurs. The same signal is also sent (slow comparator output) to the *Control Section* for processing. After the detection the signal is also sent to *Control Section* which routes the information to transmitter control logic unit for displaying the input power of the RF signal.

The *Control Section* processes the data from *RF Input Control* board and sends a signal which drives the variable attenuator in order to perform the reduction of the output power; the variable attenuator can be also adjusted by a trimmer ("*gain adj*" available to the operator behind W3-180A-B front panel). The phase shifter can be also set manually by a rotary switch available to the operator on unit front panel.

A directional coupler at the output of W3-180A-B, picks up two RF signals proportional to *FWD* and *REF* power and sends them to *RF Input Control* board:

- *FWD* signal is *envelope* or *rms* detected (depending on analog or digital input signal) and sent to the *Control Section* which, in turn, routes the information to transmitter control logic unit for displaying the RF output power.
- *REF* signal is *envelope* or *rms* detected (depending on analog or digital input signal) and used to trigger the SPDT Driver (via fast comparator) in case of dangerous VSWR. The *REF* signal is also sent to the *Control Section* for VSWR indication (via slow comparator) and for reflected power measurement to be sent to transmitter control logic unit.

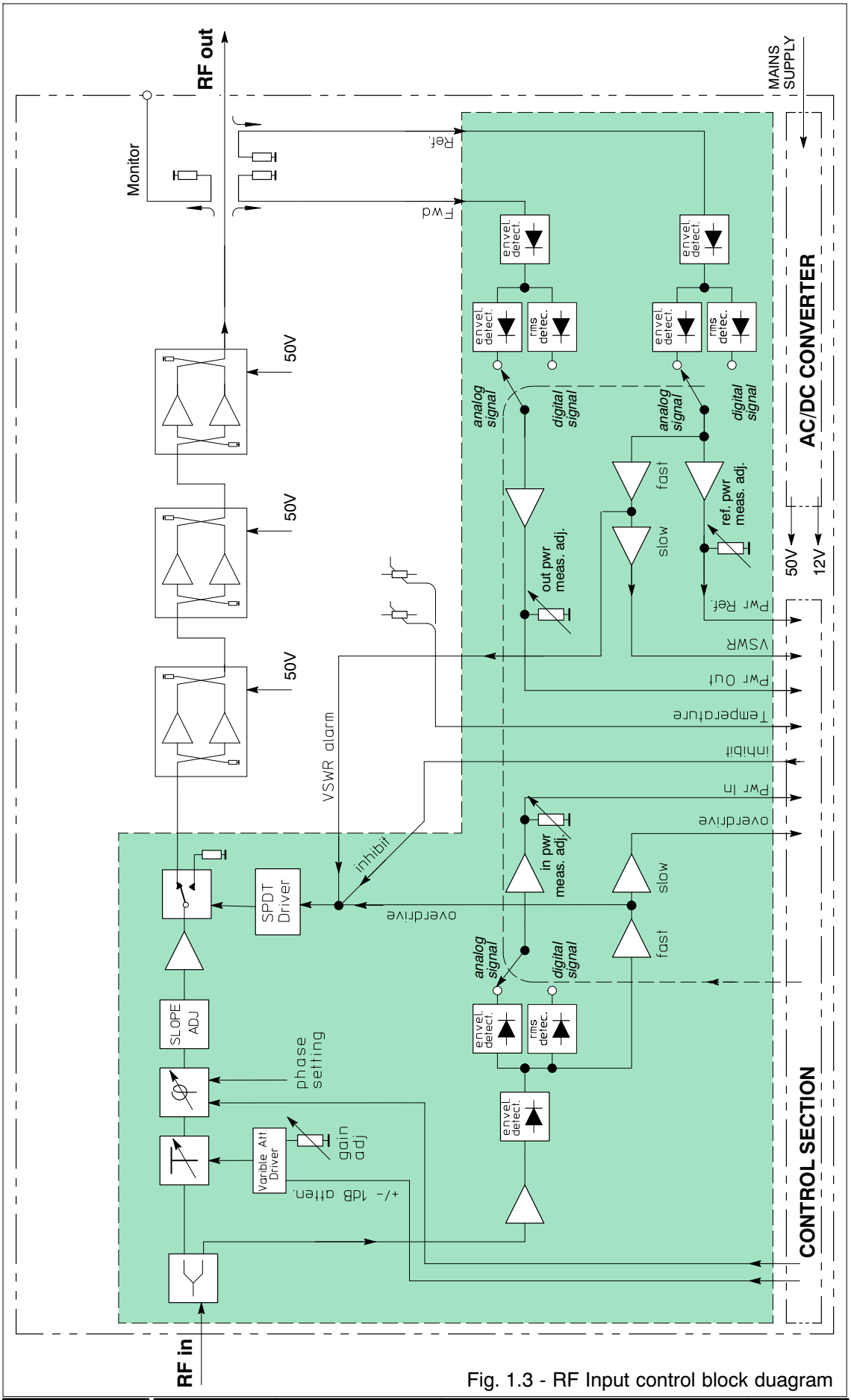

Fig. 1.3 - RF Input control block duagram

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DRIVER 40W BIII p/n. 4040012210 *(pre-driver and driver stage)*

The same pallet is used both for pre-diver and driver stage. The pallet is a balanced amplifier (26dB ± 1dB gain) with two LDMOS devices coupled by 90° hybrid couplers; the stage is made to work in AB class.

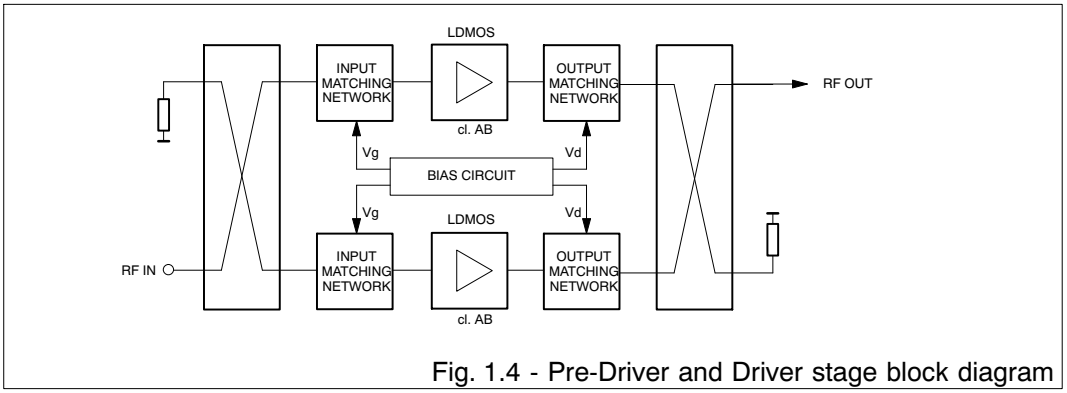

Fig. 1.4 - Pre-Driver and Driver stage block diagram

1KW BIII RF AMPLIFIER p/n. 4040012310 *(class "AB" final stage)*

The stage is made up by a couple of LDMOS devices coupled by 90° hybrid couplers. The transistors are made to work in class AB with a gain of 24dB ± 1dB.

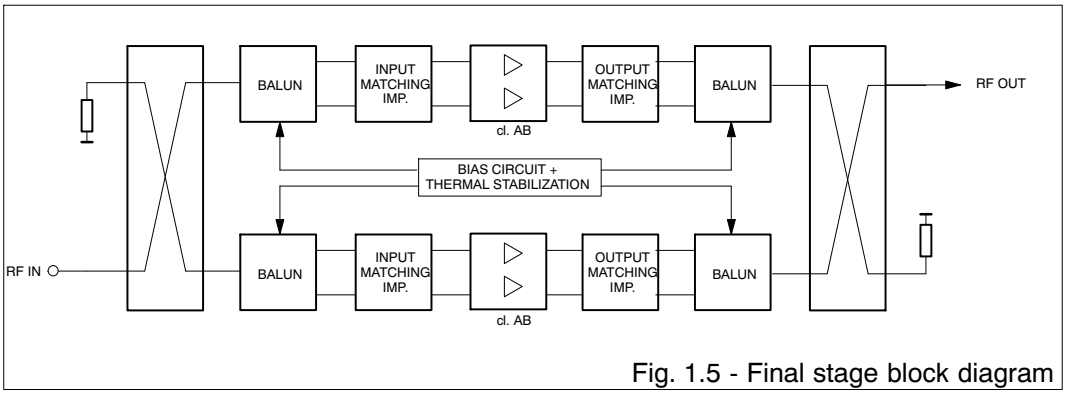

Fig. 1.5 - Final stage block diagram

1.3.2 Control section

The *Control Section* (block diagram on Fig. 1.6) receives and manages all information provided by the RF section and by *AC/DC Converter*.

W3-180A-B control functions are carried out by the *CPU Module Board* equipped whit a H8-3003 family μP, and by a *Module Field Interface* board performing the interfacing of the analog measurements from *RF Amplifier section*. A *Power Mother Board* interfaces AC/DC Converter and allows the communication with transmitter Control Logic.

In order to protect the module from serious damages, the *CPU Module Board* has been designed to control directly the W3-180A-B functioning and, at the same time, to transfer information to the equipment supervisory control logic, which is enabled to carry out only few, but extremely important, controls on the module itself. Measures and alarms can be displayed on transmitter Control Logic display by recalling the relevant menus (see transmitter Control Logic technical manual).

RS485 is the serial line which carries all the information between W3-180A-B Control Logic and transmitter Control Logic. It allows connecting up to 16 modules, that is proper of a multi-drop link. Each W3-180A-B module is identified by a 4 bit address.

The over voltage protection circuit (on*Module Field Interface*) has been designed to control the $50V_{DC}$ output voltages: when they exceed 10% of the nominal values this circuit sends an inhibit signal to *RF Input Control* board which cuts-off the RF input signal.

A temperature detector (located on final stages heatsink) detects the temperature.

The *Control Section* circuits are supplied by the $12V_{DC}$ voltages coming from *Power Mother Board* which is fed by the *AC/DC Converter*.

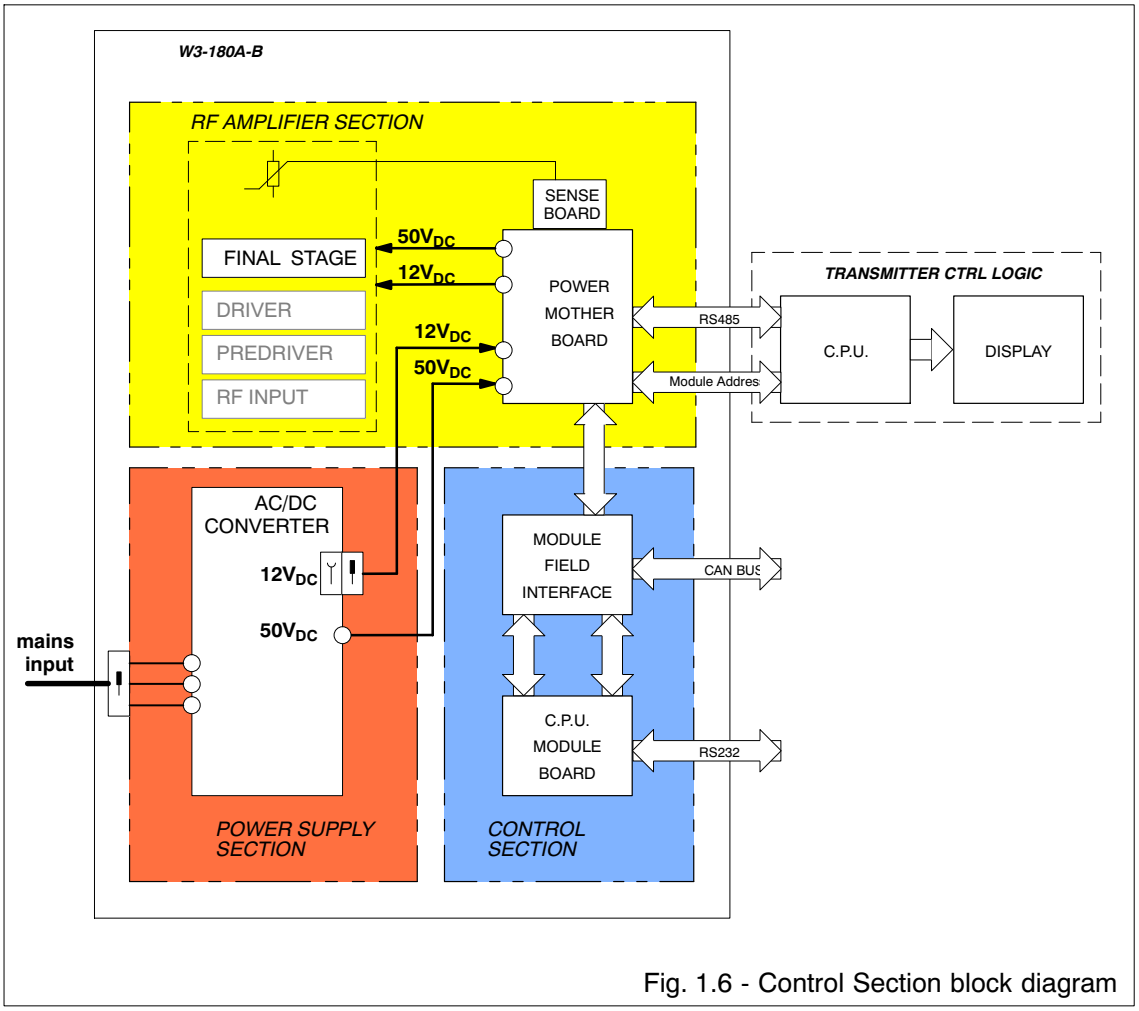

Fig. 1.6 - Control Section block diagram

1.3.3 Power Supply section

The power supply section (block diagram on Fig. 1.7) is made up by an AC/DC Converter (42V/35A) feeding the different sections of W3-180A-B through *Power Mother Board*. The mains supply enters AC/DC Converter which delivers three output voltage levels:

- +50Vdc feeding *Pre-Driver* , *Driver* and *Final Power Amplifiers* (through *Power Mother Board*);
- $+12V_{DC}$ feeding *Power Mother Board* which delivers $+12V_{DC}$ to *Module Field Interface*. This last, in turn, feeds $+12V_{DC}$ and $+5V_{DC}$ to *RF Input* board.

The $12.5V_{DC}$ output voltage is always present even if a fault or a foldback or a crowbar insertion occur. The control of the power supply status and functioning is carried out by the *Control Section* of W3-180A-B. The technical characteristics of AC/DC Converter are listed here below.

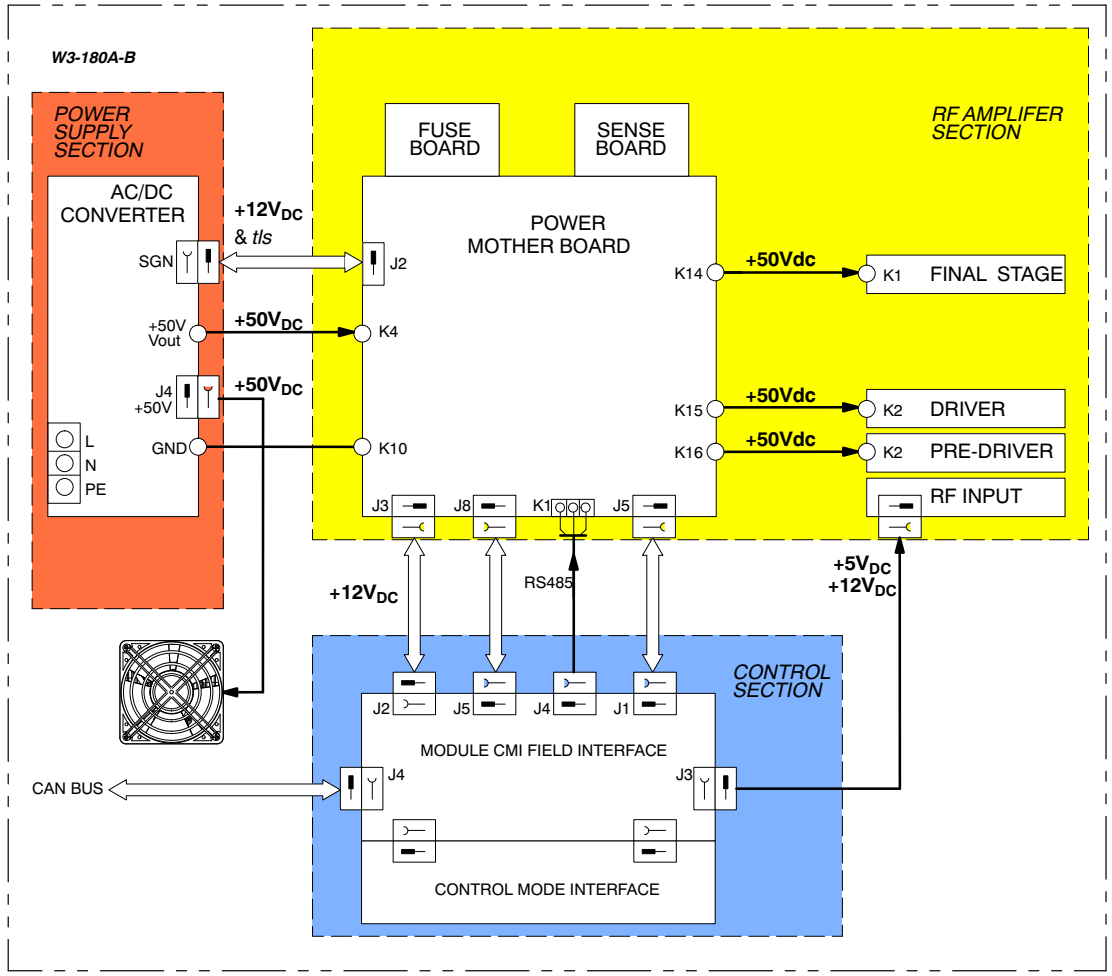

Fig. 1.7 - Power Supply section block diagram

AC/DC CONVERTER *Technical Characteristics*	
INPUTS	
Input voltage range	$230V_{AC}$ (+20%, -25%)
Frequency	50/60Hz
Maximum power absorption	2083W
OUTPUTS	
• Out 1	$50V_{DC}$ (adjustable from 40 to $50V_{AC}$)
• Out 2	$12V_{DC}$
Maximum current	
• Out 1	50A
• Out 2	2A
Static stability (V_{in} *variations* ±*20%*)	
• Out 1	±80mV
• Out 2	±10mV
Dynamic stability (*variations of load current absrpt. 40 to 70%*)	
• Out 1	±400mV
• Out 2	± ≎0mV
Recovery time	≤0.3 msec
PROTECTIONS	
Maximum output current threshold	+10% (referred to the nominal current) with foldback and *automatic reset*
Maximum output voltage threshold	+15% (referred to $+50V_{DC}$)
TELESIGNALS on I/O CONNECTORS ***(CMOS logic levels 0-12V)***	
Not regular functioning	= high level
Overtemperature	= high level
Crowbar	= high level

2. *OPERATING INSTRUCTIONS*

LIST OF TABLES

LIST OF ILLUSTARTIONS

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2. OPERATING INSTRUCTIONS

2.1 INTRODUCTION

The present Chapter describes all the controls and indicators available to the operating personnel.

Note that the W3-180A-B is not provided with turn-on control since the ON/OFF condition is determined by the equipment housing it.

Therefore refer to the equipment technical manual which the W3-180A-B is part of, for the operating instruction related to turn-on and off.

A FAULT signal and an ALARM signal to be sent to the equipment dedicated to the RF Amplifier performance monitoring is available on the REMOTE CONTROL connector.

An ENABLE/DISABLE signal, available on the same connector, is going in the opposite direction allowing the turn-on/off remote control of the W3-180A-B RF Amplifier.

2.2 CONTROLS AND INDICATORS

All the indicators are easily available to the operator. The following Tab. 2.1 refers to Fig. 2.1 in which the front and rear panels of the W3-180A-B are shown.

In this table the left-column numbers are the call-outs of all controls, indicators, connectors, meters, displays, etc. mounted on the W3-180A-B. Furthermore, a brief description is given for each function.

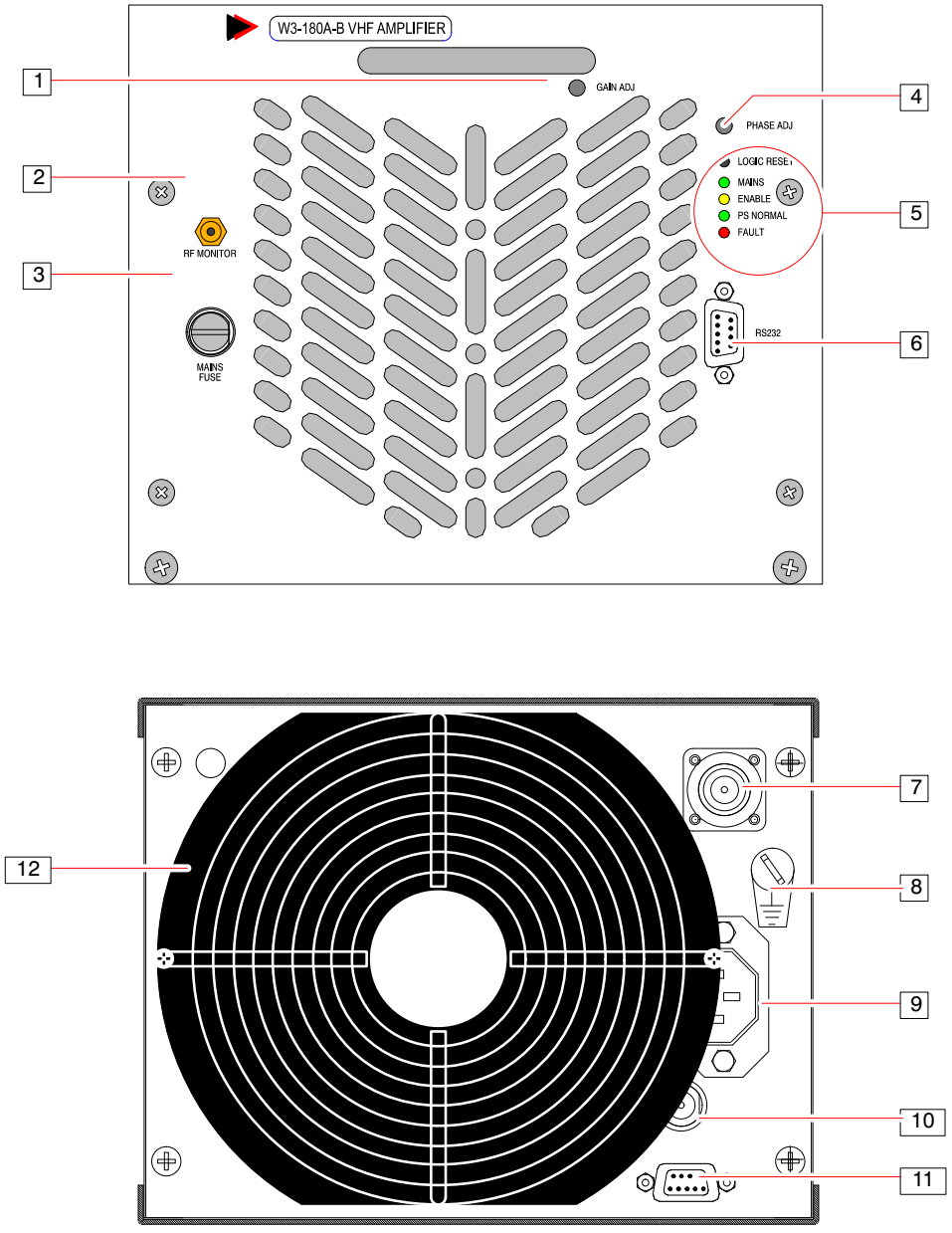


Fig. 2.1 - W3-180A-B front and rear panel

Tab. 2.1 - W3-180A-B RF Amplifier front and rear panel legend (ref. Fig. 2.1)		
NO.	**LABEL**	**FUNCTION**
1	GAIN ADJ	Trimmer (multi-turn); allows adjusting the gain of the amplifier in a ±3dB range.
2	RF MONITOR	SMB connector (male); allows monitoring the RF output signal of the amplifier.
3	FUSE	Protection fuse (10A); the luminous cap ights up when the fuse has blown.
4	PHASE ADJ	*NOT USED*
5	LOGIC RESET	Push-button; allows resetting the logic section of the amplifier.
	MAINS	Green led; lights up when the Mains is supplied to the DC/DC Power Supply.
	ENABLE	Yellow led; indicates that the enable signal for the DC/DC power supply has been sent by the Master CPU Logic. In this condition the DC/DC Power Supply is enable properly.
	PS NORMAL	Green led; indicates that the DC/DC converter works regularly (No P.S. fault).
	FAULT	Red led; indicates that the RF amplification chain has been interrupted because of a unit fault.
6	RS232	Connector (”D” 9-pins female); RS232 serial line. It allows monitoring directly the amplifier status.
7		Connector (”N” female); it is the RF output of the amplifier.
8		Grounding screw of the amplifier frame.
9		Line socket.
10		Connector (”BNC” female); it is the RF input of the amplifier.
11		Connector (”D” 9-pins male); it is used for exchanging I/O signals with transmitter Control Logic unit. It also addresses the amplifier (for the acknowledgement on transmitter Control Logic unit).
12		Fan; delivers the air cooling to the amplifier.

2.3 W3-180A-B INTERFACING TOWARD TRANSMITTER CONTROL LOGIC UNIT

The pin-out assignment of I/O signals connector (type ”D” 9 pin; #10 on Fig. 2.1), is listed on Tab. 2.2. The interfacing between W3-180A-B module and transmitter Control Logic unit, is performed through *Power Mother Board (p/n. 405025710)* and *Module Field Interface (p/n. 405461811)* board. The connector is available on the rear panel of the amplifier module.

Tab. 2.2 - Pin-out assignment of 9 pin ”D” connector for I/O signals

PIN	FUNCTION
1	ALARM
2	ADDRESS 0
3	ADDRESS 2
4	TX1C (RS485)
5	RX1C (RS485)
6	INTERLOCK
7	ADDRESS 1
8	ADDRESS 3
9	GND

2.4 W3-180A-B CONTROL SECTION SETTINGS

The boards of W3-180A-B Control Section (location on Fig. 2.2) are factory set, and do not require any other setting. In case a board of the logic section have to be replaced it is advisable to check the correct settings of jumpers and dip-switches. The following paragraphs give the information about the correct settings of the logic boards of the W3-180A-B.

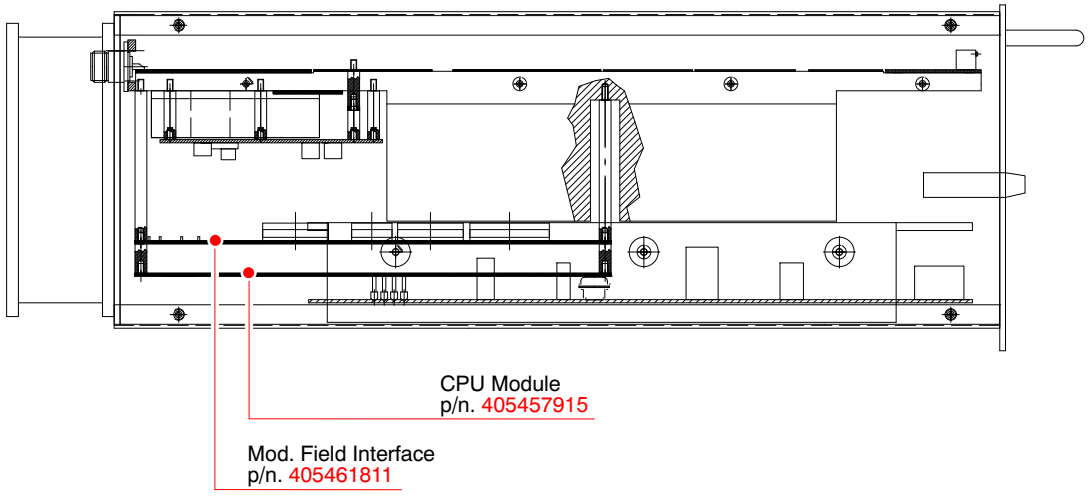


Fig. 2.2 - W3-180A-B/ Control Section location

2.4.1 CPU Module Board (p/n. 405457915)

DIP-SWITCHES
The dip-switches location and relevant settings are shown on Fig. 2.3.

JUMPERS
The jumpers location and relevant settings are shown on Fig. 2.3.

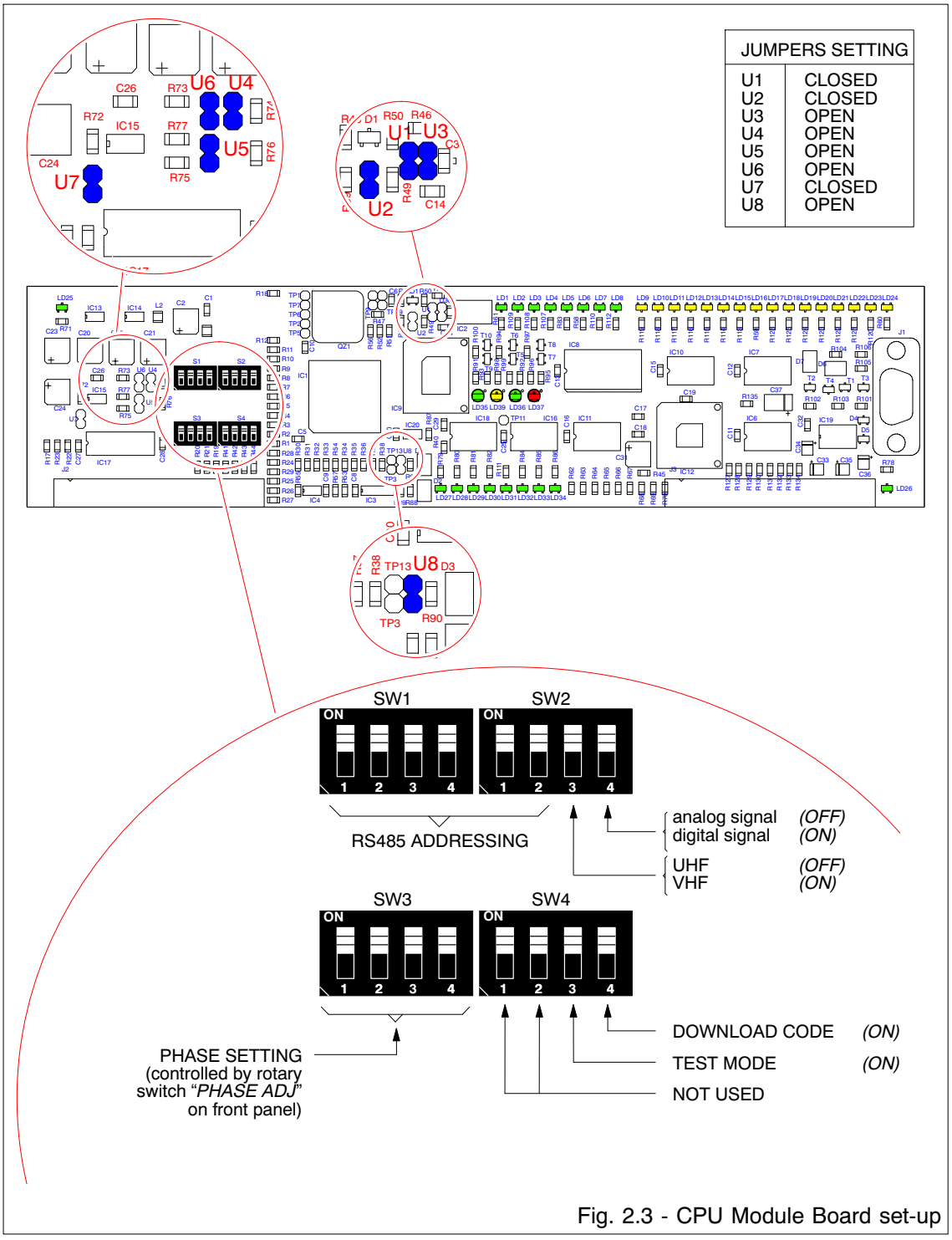
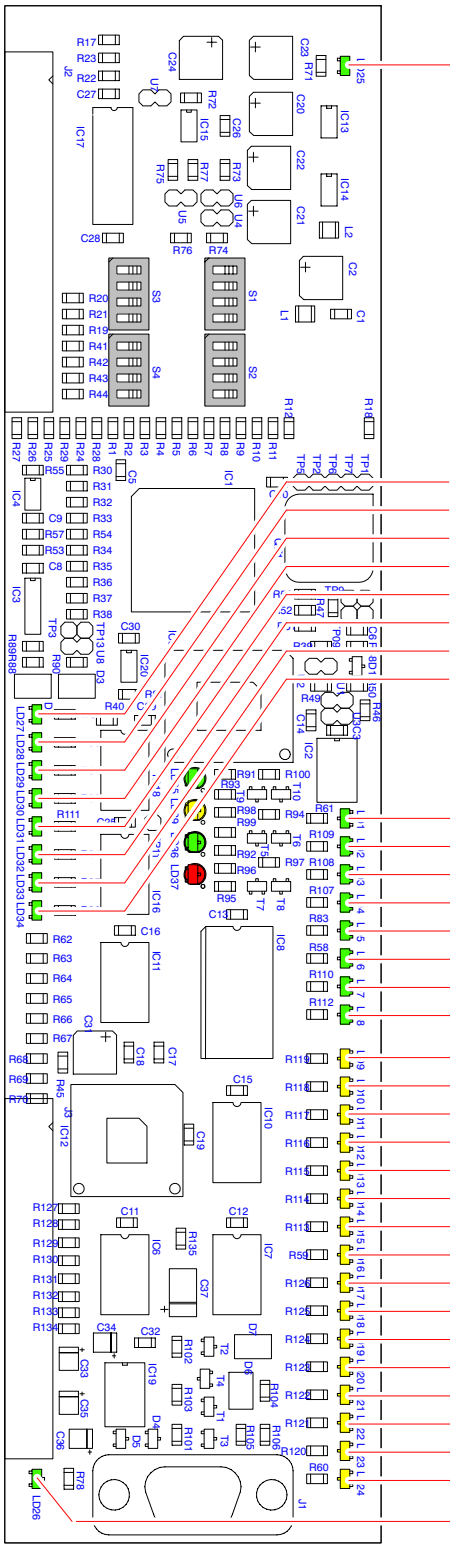


Fig. 2.3 - CPU Module Board set-up

2.4.2 LEDs description

The functioning state of the W3-180A-B module is shown by leds placed on the module control logic boards as indicated on Fig. 2.4 (*CPU Module Board p/n. 405457915*) and Fig. 2.5 (*Module Field Interface p/n. 405461811*).



LD25 *(green)*/ +12V Pwr S. voltage present

LD27 *(green)*/ TX1
LD28 *(green)*/ RX1
RS485

LD29 *(green)*/ TX2
LD30 *(green)*/ RX2
RS232

LD31 *(green)*/ SDA
LD32 *(green)*/ SCL
I2C

LD33 *(green)*/ WATCHDOG SUPERVISORY

LD34 *(green)*/ TEST

LD1 *(green)*/ Interlock module OK
LD2 *(green)*/ NOT USED
LD3 *(green)*/ VSWR module absent
LD4 *(green)*/ Overdrive module absent
LD5 *(green)*/ NOT USED
LD6 *(green)*/ Power supply present
LD7 *(green)*/ NOT USED
LD8 *(green)*/ Crowbar not fired and Pwr S. out voltages at nominal levels

LD9 *(yellow)*/ Phase1 signal enabled (4° ph. displacement of RF out sig.)
LD10 *(yellow)*/ Phase2 signal enabled (8° ph. displacement of RF out sig.)
LD11 *(yellow)*/ RF ouput signal absent
LD12 *(yellow)*/ NOT USED
LD13 *(yellow)*/ Phase3 signal enabled (16° ph. displacement of RF out sig.)
LD14 *(yellow)*/ Phase4 signal enabled (32° ph. displacement of RF out sig.)
LD15 *(yellow)*/ NOT USED
LD16 *(yellow)*/ NOT USED
LD17 *(yellow)*/ Total inhibit of RF amplifier section from the Pwr Supply
LD18 *(yellow)*/ Autotest of µP ***(blinking)***
LD19 *(yellow)*/ Pwr S. enabled
LD20 *(yellow)*/ Regular functioning of Pwr Supply
LD21 *(yellow)*/ RF ouput signal absent
LD22 *(yellow)*/ Module functioning for analog signal
LD23 *(yellow)*/ NOT USED
LD24 *(yellow)*/ NOT USED

LD26 *(green)*/ +5V Pwr S. voltage present

Fig. 2.4 - CPU Module Board (p/n. 405457915) leds

2.4.3 Module Field Interface (p/n. 405461811)

LEDs

Functioning state of the module is shown by leds placed on the board as indicated on Fig. 2.5.

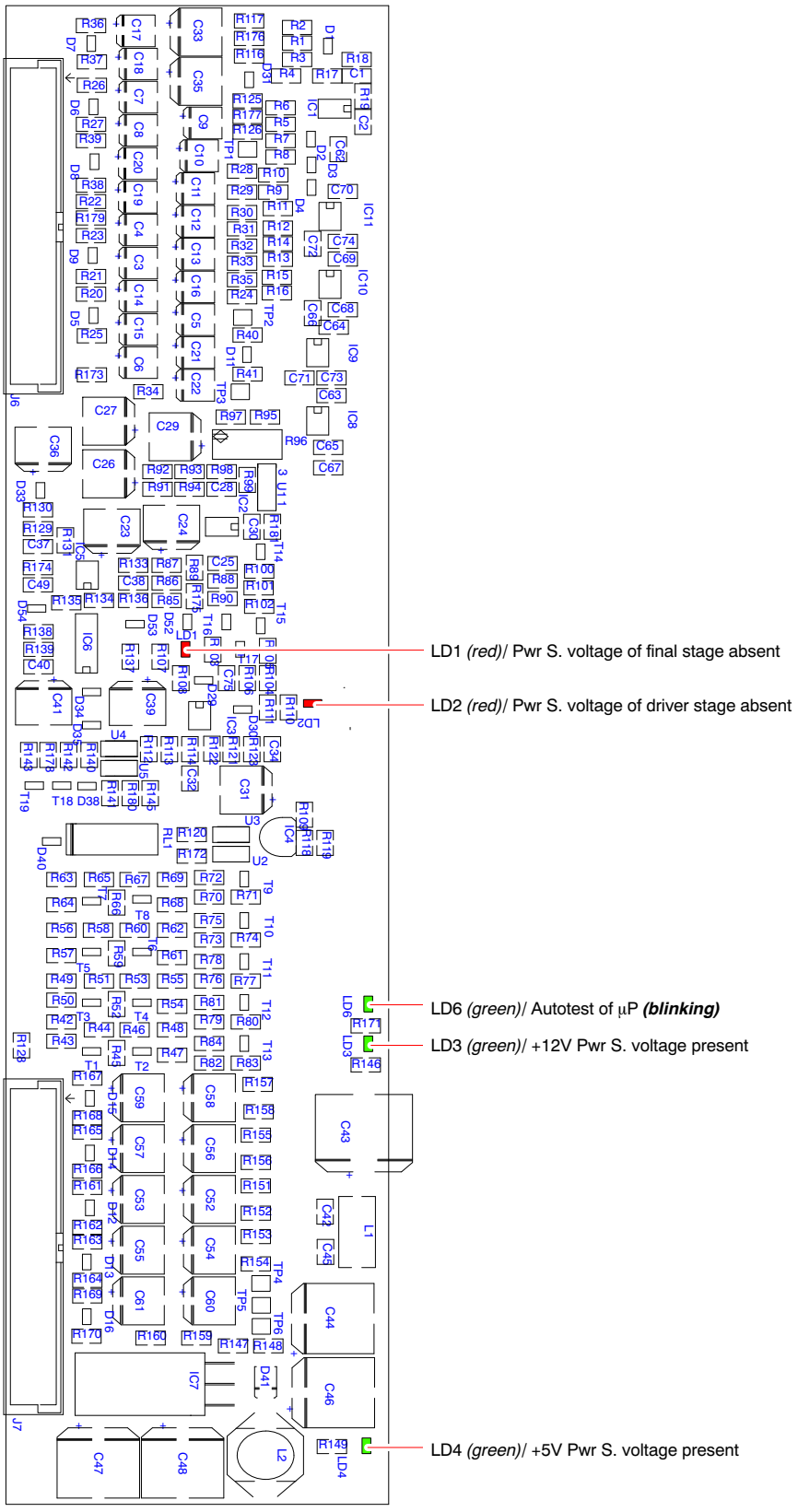


Fig. 2.5 - *Module Field Interface* (p/n. 405461811) leds

2.5 MEANING OF *ANA_IN/OUT* AND *DIG_IN/OUT* SIGNALS

In order to make the comprehension of the circuit diagrams easier, the following paragraph gives information on the meaning of *ANA_IN/OUT* and *DIG_IN/OUT* signals used on circuits diagrams of the *Control Section* of the amplifier. Tab. 2.3 lists he meaning of *ANA_IN/OUT* signals (*analogic signals*); Tab. 2.4 lists the meaning of *DIG_IN/OUT* signals (*digital signals*). For both tables are also given the references to the signals on transmitter Control Logic unit display.

Tab. 2.3 - Meaning of *ANA_IN/OUT* signals

ANALOG INPUTS	REF. ON G042	MEANING
ANA_IN1	Fnl1	*Current absorption of Final stage 1*
ANA_IN2	NOT USED	
ANA_IN3	Drv	*Current absorption of Driver stage*
ANA_IN4	NOT USED	
ANA_IN5	Heatsink Temperature	*Temperature of the final stages heatsink*
ANA_IN6	NOT USED	
ANA_IN7	NOT USED	
ANA_IN8	NOT USED	
ANA_IN9	NOT USED	
ANA_IN10	NOT USED	
ANA_IN11	NOT USED	
ANA_IN12	NOT USED	
ANA_IN13	NOT USED	
ANA_IN14	NOT USED	
ANA_IN15	Pwr_Out	*Output Power meas.*
ANA_IN16	Pwr_In	*Output Power meas.*
ANA_IN17	NOT USED	
ANA_IN18	Pwr_Refl	*Reflected Power meas.*
ANA_IN19	NOT USED	
ANA_IN20	NOT USED	
ANA_IN21	VAmp	*Power Supply voltage of Final stages meas.*
ANA_IN22	NOT USED	
ANA_IN23	VSer	*Power Supply Service voltage meas.*
ANA. OUTPUTS	**REF. ON G042**	**MEANING**
PWM2	Gain_Adj	
PWM1	NOT USED	

Tab. 2.4 - Meaning of *DIG_IN/OUT* signals		
DIGITAL INPUTS	**REF. ON G042**	**MEANING**
DIG_IN1	Module Interlock	*Interlock presence*
DIG_IN2	NOT USED	
DIG_IN3	Vswr	*Absence of Vswr*
DIG_IN4	Overdrive_Mod	*Absence of overdrive*
DIG_IN5	NOT USED	
DIG_IN6	Ps_Fault	*Failure of AC/DC Converter*
DIG_IN7	NOT USED	
DIG_IN8	Ps_Crow	*AC/DC Converter crowbar fired*
DIGITAL OUTPUTS	**REF. ON G042**	**MEANING**
DIG_OUT1	Phase1	
DIG_OUT2	Phase1	
DIG_OUT3	Fault	*Indication of 'FAULT' (absence of RF output) on connector located on unit rear panel*
DIG_OUT4	NOT USED	
DIG_OUT5	Phase3	
DIG_OUT6	Phase4	
DIG_OUT7	NOT USED	
DIG_OUT8	NOT USED	
DIG_OUT9	Total Inhibit	*Total Inhibit signal generated by Module Field Interf.*
DIG_OUT10	Test	*Blinking*
DIG_OUT11	Enable	*'Enable' signal for AC/DC Converter*
DIG_OUT12	Panel_Ps_Normal	*Indication of 'POWER SUPPLY NORMAL' on unit front panel*
DIG_OUT13	Panel_Prf_Faullt	*Indication of 'FAULT' (absence of RF output) on unit front panel*
DIG_OUT14	Module_Analog	*Indication of 'ANALOG' or 'DIGITAL' module*

2.6 MONITORING W3-180A-B BY PC

It is possible to monitor W3-180A-B functioning by personal computer, via seral line RS232 (connector availble on W3-180A-B front panel, see item #6 of Fig. 2.1). For this purpose a suitable cable has to be connected between *RS232* connector on unit front panel and a PC where a dedicated software "*PCmodule*" ha sbeen installed; connection of W3-180A-B to PC is shown on Fig. 2.6 along with cable wiring.

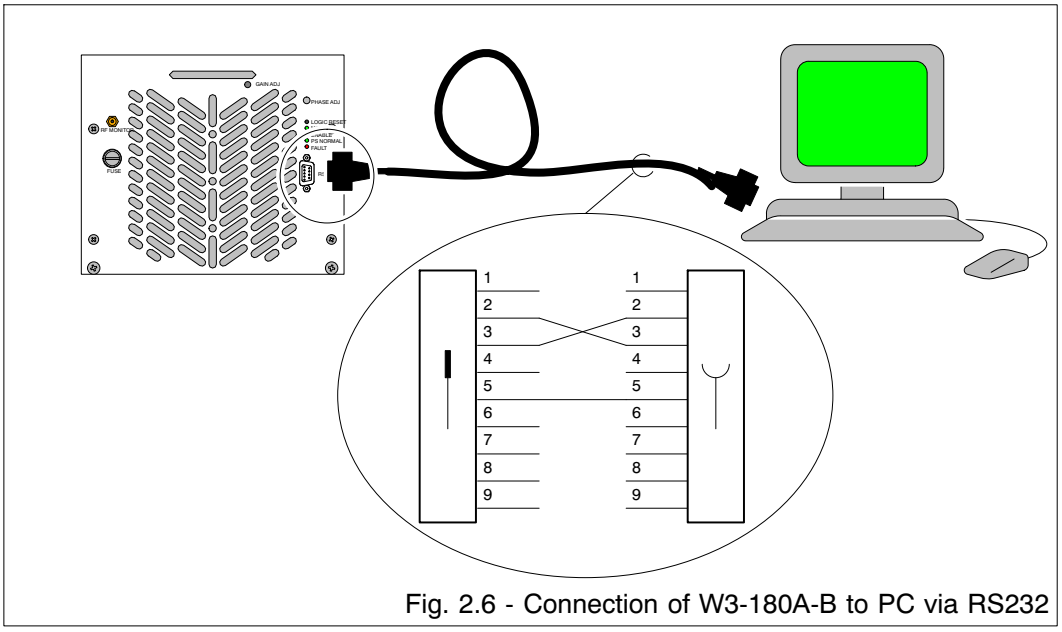


Fig. 2.6 - Connection of W3-180A-B to PC via RS232

Once the connection between W3-180A-B and PC is activated, operate as follows:

1) supply W3-180A-B with a suitable line cord connected to line socket on its rear panel (see item #9 of Fig. 2.1).
2) On "D" 9-pins male connector on rear panel (see item #11 of Fig. 2.1) link pins 6-9 (*interlock*) and pins 9-2 (*address 0*) or pins 9-7 (*address 1*) or pins 9-3 (*address 2*) or pins 9-8 (*address 3*). This last opertaion is needed to have the module addressed.
3) Start PC and click "*PCmodule.exe*" included on floppy-disk delivered.

NOTE!

Copying the software included on floppy to another directory of your PC, it is possible, but you must type the new path in the DebugFile and FSFile lines inside "Pcmodule.ini" file.

After the software runs, the screen shot on Fig. 2.7 will be dispalyed. The figure are also givs information for monitoring the functioning parameters of the module ('*Measures*' and '*Debug*' buttons).

'*Measures*' menu (Fig. 2.8) displays the power and voltage measurements of the amplifier;

'*Debug*' menu (Fig. 2.8) displays the current settings of the amplifier; it is used for factory test.

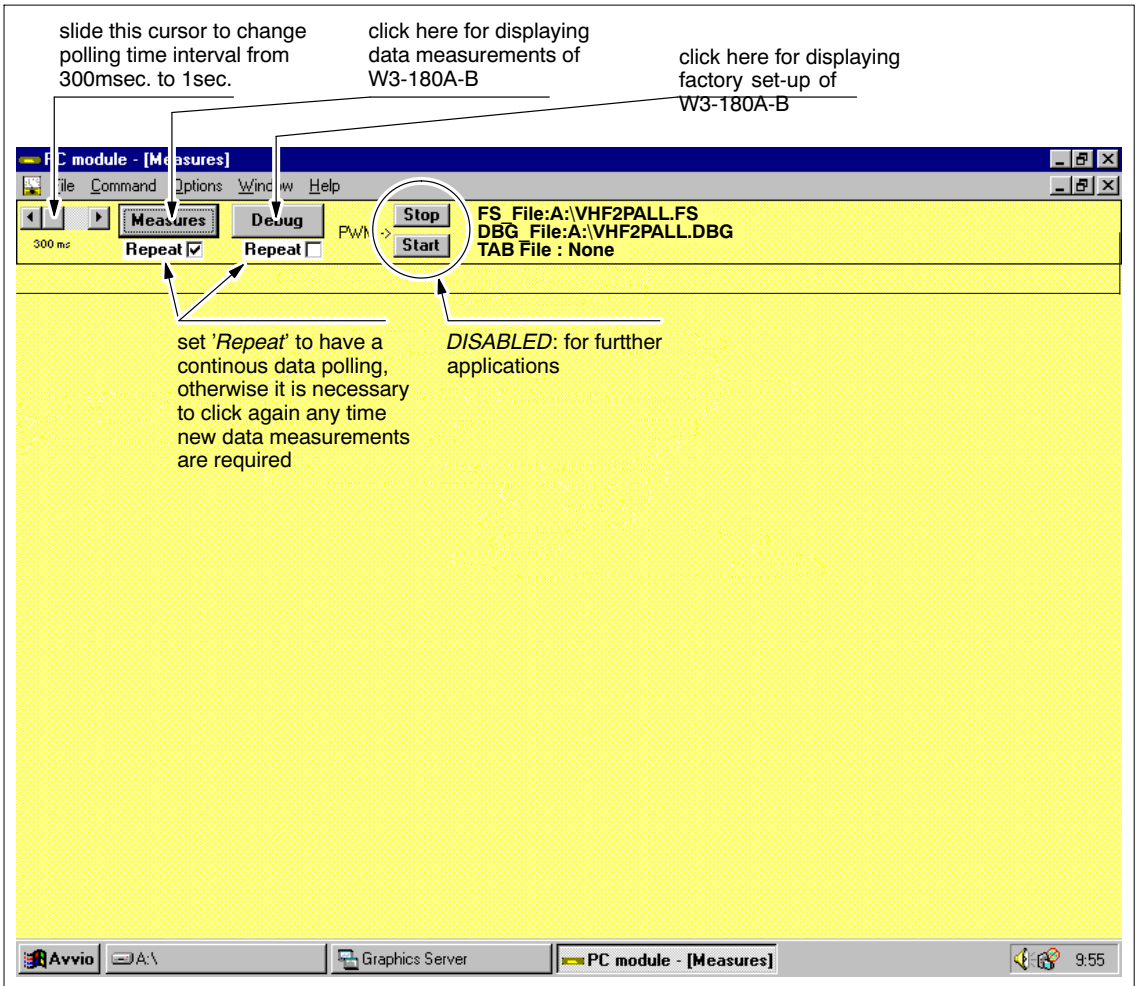
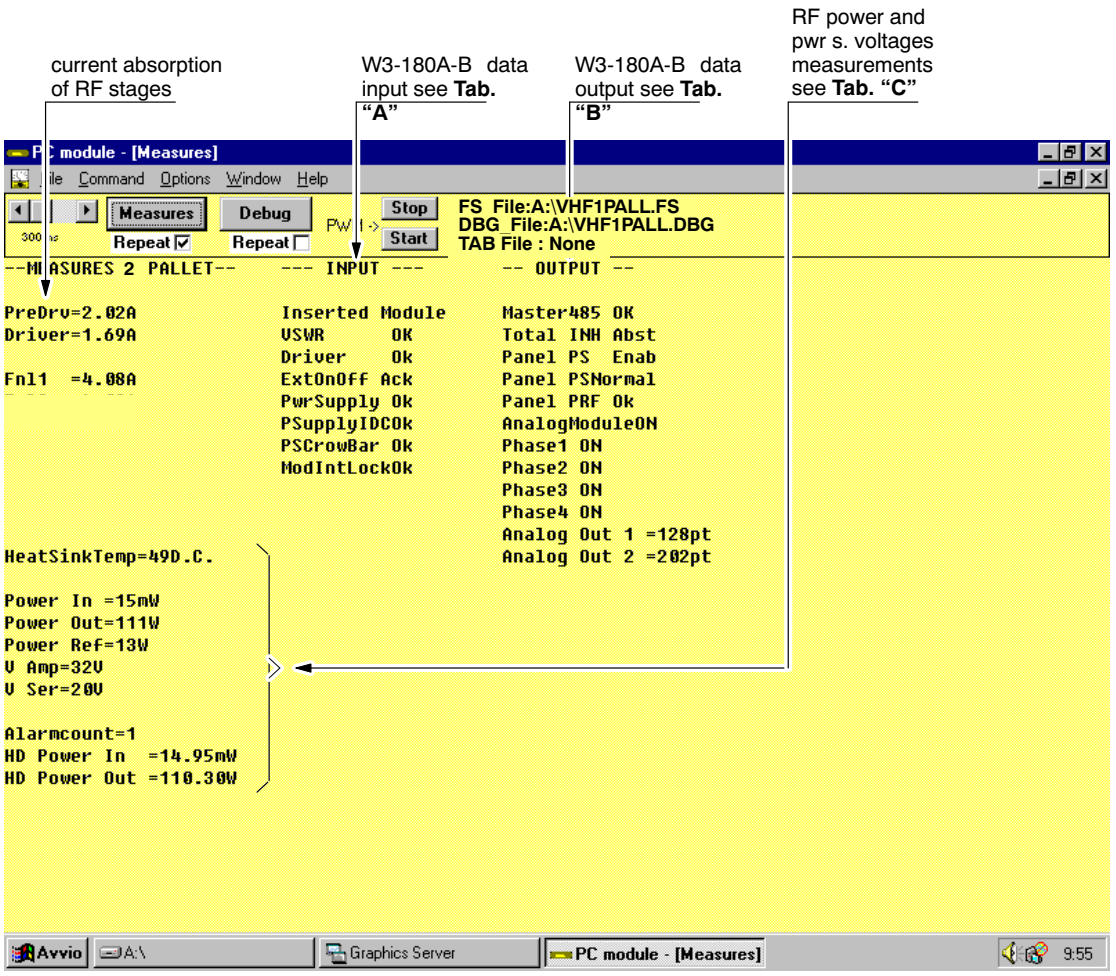


Fig. 2.7 - *'PCmodule.exe'* screen-shoot



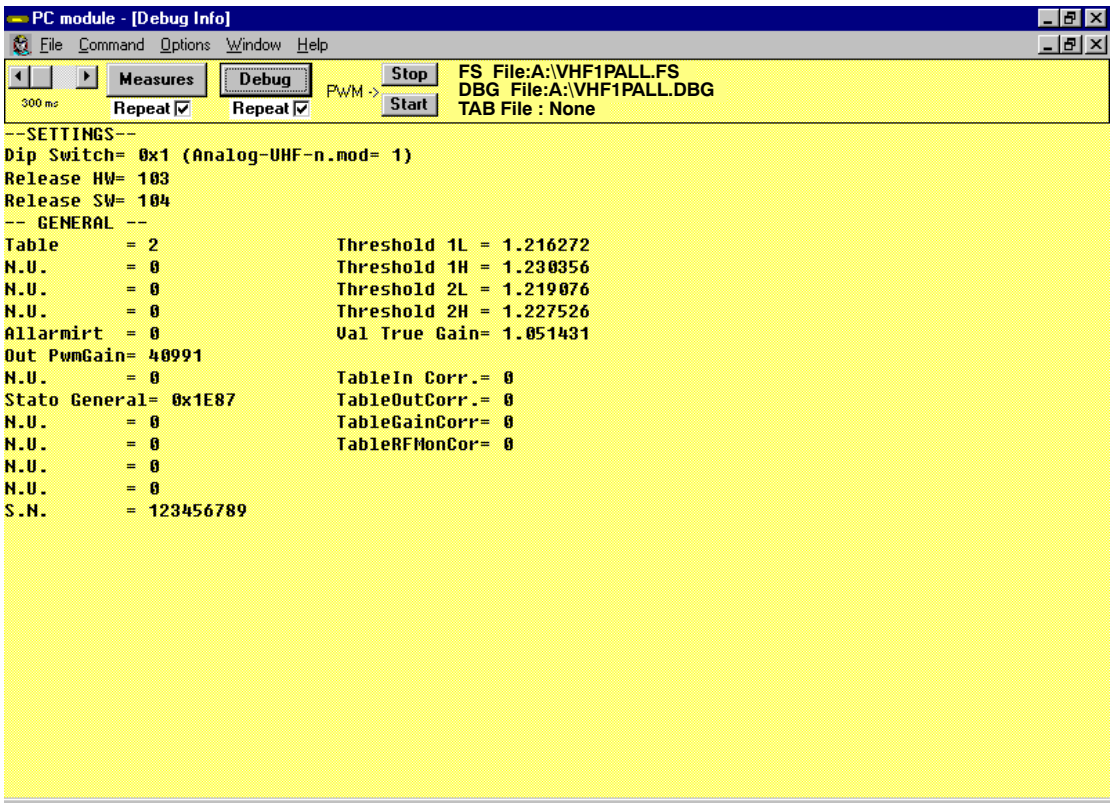


Fig. 2.8 - *PC module* 'Measures' and 'Debug' screen-shoots

Tab. A - INPUT		
parameter	**possible values**	**description**
Inserted module	OK	*NOT USED* for this application
VSWR	OK / NotOK	Presence (OK) or absence (NotOk) of VSWR at module input
Driver	OK / NotOK	Driving power at correct level (OK) or overdrive condition (NotOK)
ExtOnOff	Ack	*NOT USED* for this application
PwrSupply	OK / NotOK	Normal operating condition (OK) or fault (NotOK) of the module internal power supply
PSupplyIDC	OK / NotOK	*NOT USED* for this application
PSCrowbar	OK / NotOK	No intervention of crowbar circuit of p.s. (OK) or intervention (NotOK)
ModIntLock	OK / NotOK	Presence (OK) or absence (NotOk) of module *interlock* signal

Tab. B - OUTPUT		
parameter	**possible values**	**description**
Master485	OK / NotOK	Module is connected (OK) or not connected (NotOK) with transmitter control logic unit via RS485
Total INH	Abst / Pres	It indicates absence (Abst) or presence (Pres) of the *inhibit* signal
Panel PS	Enab / Disab	Presence (Enab.) or absence (Disab.) of mains voltage on module DC/DC Power Supply. It corresponds to 'MAINS'green led on module front panel
Panel PSNormal	Enab / Disab	Module DC/DC Power Supply works regularly (Enab.) or has a fault (Disab.). It corresponds to 'PS NORMAL 'green led on module front panel
Panel PRF	OK / NotOK	Normal operating condition (OK) or fault (NotOK) of RF section. It corresponds to 'FAULT ' red led on module front panel.
Analog Module	ON / OFF	It indicates an input signal analog (ON) or digital (OFF)
Phase1/2/3/4	ON / OFF	Current set-up of the dip-switches which set the module in/out phase
Analog Out 1	xxxpt	*FOR FACTORY TEST* (gain set-up)
Analog Out 2	xxxpt	*FOR FACTORY TEST* (APL set-up)

Tab. C		
parameter	**possible values**	**description**
HeatSink Temp		Measurement of heatsink temperature (in Celsius degrees)
Power In		Measurement of RF input power (in mW)
Power Out		Measurement of RF output power (in W)
Power Ref		Measurement of reflected power (in W)
V Amp		Measurement of power supply voltage of the RF stages
V Ser		Measurement of service power supply voltage
Alarmcount		Counter of the alarms occurred during the module functioning
HD Power In		Measurement of RF input power (in mW) with a greater number of decimal digits (HD = high definition)
HD Power Out		Measurement of RF output power (in W) with a greater number of decimal digits (HD = high definition)

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3. *MAINTENANCE*

LIST OF TABLES

LIST OF ILLUSTARTIONS

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3. MAINTENANCE

3.1 INTRODUCTION

3.1.1 Introduction to Maintenance

The purpose of this section is to assist the maintenance personnel in keeping the RF Amplifier Unit at best operational status. Maintenance can be subdivided into the following actions:

- PREVENTIVE MAINTENANCE,
- CORRECTIVE MAINTENANCE.

Preventive maintenance refers to maintenance procedures which have to be carried out periodically so as to prevent malfunctions. Corrective maintenance includes a series of tables representing a troubleshooting guide used to locate the most likely area where a malfunction has occurred or reference to the unit manuals.

3.1.2 Maintenance Tools

Maintenance tools include Commercial, Standard and Special Tools used for the 1st and 2nd levels of Maintenance. Commercial Tools include the tools normally used for the maintenance activities (screwdrivers, pliers,soldering irons, etc.) and are normally available on the local market. Standards Tools include those materials considered as standard for maintenance activities (coax cables of standard length, coax adapters, etc.) and are available on the local market and/or from the manufacturer of the unit. Special Tools include tools prepared by the manufacturer for maintenance requirements and are available only from the manufacturer of the unit for which they are designed.

Only Commercial and Standard tools are requested for amplifier maintenance.

3.1.3 Test Instruments

The Test Instruments required on-site in order to carry out the maintenance activities are listed in paragraph 3.4 ”Maintenance Procedures”. Please note that all the listed Test Instruments are of commercial type and may be substituted by equivalents available on the local market.

3.2 PREVENTIVE MAINTENANCE

This paragraph deals with the suggested preventive maintenance operations to guarantee continued performance of the RF Amplifier Unit.

All unit parts shall be examined to check for dust or dirt, overheating, loose screws and foreign bodies. Dust, for example, may cause current discharges or leakages.

1) *Frames*
Frames, through which the ventilation air flows, need to be internally cleaned from dust. Cleaning can be carried out using a vacuum cleaner for the accessible parts or a clean, dry cloth or bristle brush.

2) *Printed Circuit Boards (PCB)*
PCBs shall not be removed unless dust is noted on their surface. In this case, the PCBs shall be removed one at a time. Use only moderately compressed air or a soft bristle brush to remove the dust. Clean the lance contacts of the connectors on the PCB using a bristle brush soaked in pure alcohol.

3) *Power Supply Modules and Converters*
Removal of the dust accumulated on the housing and components is normally sufficient to clean power supply modules. To clean the PCBs extract them from the Module, then carefully clean the connector pins using a bristle brush soaked in pure alcohol.

4) *Indicator Lamps*
Lamps must be well inserted in their socket. Remove any trace of corrosion, oxidation or dirt by the use of a cloth soaked in carbon tetrachloride.

5) *Fuses*
Fuse tips are subject to oxidation and must be periodically removed from their holders to check for any presence of oxidation. The oxidation or dust increases the resistance of the electrical circuit. Fuse tips shall be cleaned using a cloth soaked in carbon tetrachloride.

TIP

FUSES SHALL BE REMOVED ONE AT A TIME IN ORDER TO AVOID INSERTING THEM INTO A WRONG HOLDER.

THE VALUE PRINTED ON THE FUSES SHALL CORRESPOND TO THAT PRINTED ON THEIR OWN HOLDERS.

6) *Connections Cables*
Connection cables shall be periodically examined to ensure that breaks in the external insulating coating are not present to cause possible short-circuits. Cover the parts showing deterioration of the insulating coating. Coaxial cables shall be carefully examined since they can be easily damaged by crushing or sharp bends. Connectors shall be checked to ascertain that corrosion is not present on their metallic contacts. Cables showing damages must be protected and eventually replaced.

7) *Terminal Boards*
Terminal boards shall be examined to ascertain that there are no traces of dirt, loose wires or excess solder on the terminals, which could cause undue contacts with the adjacent terminals. Fixing screws or mounting brackets shall be tightened. Terminal boards shall be cleaned using a dry cloth or bristle brush.

8) *Resistors*
Resistors shall be checked for evidence of cracks, discoloration or ”cooking”. Discoloration indicates that the resistor is subject to overload which could be caused by an incorrect operation of the circuit. Examine resistor leads for dust, dirt or loose connections.

9) *Transformers and Coils*
Examine transformers and coil leads for any trace of dust, dirt or humidity. Check that they are secured in their seats; tighten fixing screws and mounting brackets. Housings, terminals and insulators supporting transformers and coils should be free from foreign objects. Use a dry cloth or, if necessary, moisten the cloth with a suitable solvent. Should the wiring be corroded, tag each wire, disconnect and clean the contact surface using emery paper with a fine grain and then clean the surfaces using a clean cloth. Reconnect the wires.

10) *Potentiometers and Variable Resistors*
Potentiometers and variable resistors, with the exception of those with special features and mounting, shall be examined to ascertain that there is not mechanical backlash. If necessary, disassemble the knob mounted on the axis and tighten the locking screw. The knob must be reassembled in its original position. The housing, if any, must be cleaned from dust by using a bristle brush or compressed air. Ascertain that there are no traces of overheating which indicates an irregular operation of the circuit on which the potentiometer or the variable resistor is inserted. Look for the cause of overheating and eliminate it as soon as possible.

11) *Mechanical Inspection*
According to the environmental conditions, periodically check and lubricate the following mechanical parts:

- hinges of front doors;
- hinges of rear doors.

3.3 CORRECTIVE MAINTENANCE

Causes which give rise to a corrective maintenance action can derive from:

- Out of tolerance conditions of standard levels, waveforms and timings, detected during preventive maintenance;
- Failure conditions shown either by indicator lamps, displays, LEDs located on PCB (if any), TTY diagnostic print outs.
- Failure conditions detected by operative personnel.

Restoring the unit to operation in a short time also depends on the availability of spare parts and components.

3.4 MAINTENANCE PROCEDURES

The maintenance procedures can be utilized for periodic performances checks or after a substitution of failed component or board.

These procedures can be utilized one at a time or in sequence, depending from the needs. The procedures are divided in paragraphs as follows:

3.4.1 Functional checks of "DRIVER 40W BIII" p/n. 4040012210 . . . *(Pre and Driver)*

3.4.2 . . . Functional checks of "1KW BIII RF Amp" p/n. 4040012310 . . . . . *Final)*

NOTE!

The following checking, unless otherwise specified,
have to be performed with the amplifier supplied and without RF input signal

NOTE!

Fuses of the pallets must be left in their place (connected), but for the one of the pallet under testing which has to be replaced with an ammeter in series.

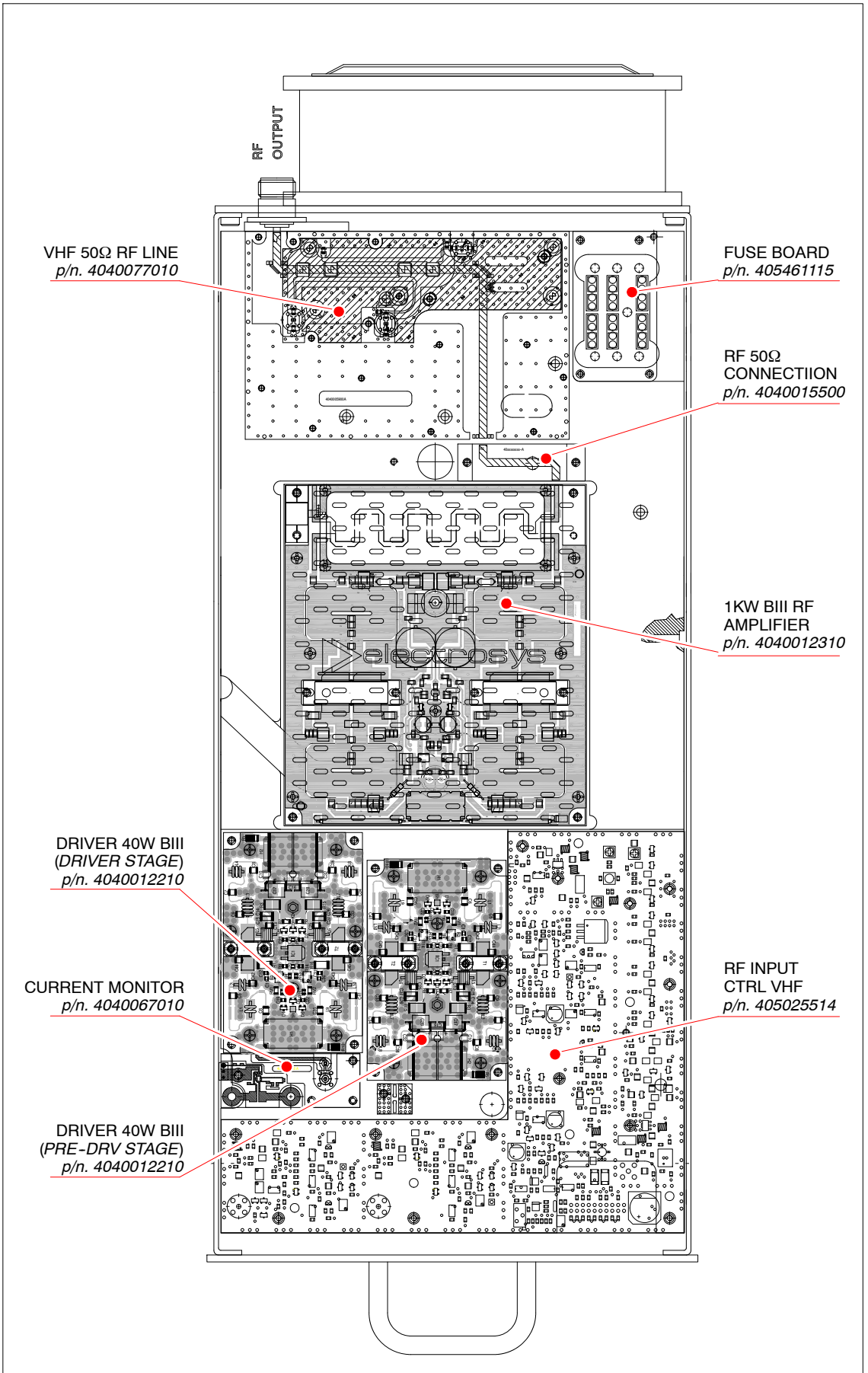

Fig. 3.1 - W6-160A general layout (top

3.4.1 Functional checks of "DRIVER 40W BIII" p/n. 4040012210 *(PreDriver and Driver)*

Remove the top cover of the amplifier module in order to access the "DRIVER 40W BIII" (pre-driver and driver amplifier); location of the pallet is shown on Fig. 3.2. Remove the electric shield to access the components. The functional checks on the pallet can be carried out by following the indication given in Tab. 3.1. Keep in maind that:

NOTE!

*"**F2**" (5A) is the protection Fuse of **pre-driver** stage*
*"**F3**" (10A) is the protection Fuse of **driver** stage*

Tab. 3.1 - Functional checks on *DRIVER* stage

checking	measure point / component	measurements	regulation
Transistors power supply	T1, T2 "drain"	$50V_{DC} \pm 0.3V_{DC}$	
T1 biasing (quiescent curr.)	F3 fuse (10A) (*remove fuse and insert in its place the ammeter probes*) see Fig. 3.2.		rotate R2 and R16 completely anticlockwise (minimum of the current I_0); adjust R14 in order to read on Control Unit display I_0 + 350mA
T2 biasing (quiescent curr.)	F3 fuse (10A) (*remove fuse and insert in its place the ammeter probes*) see Fig. 3.2.		adjust R14 in order to read on Control Unit display I_0 + 700mA (I_0 + 350mA + 350mA)

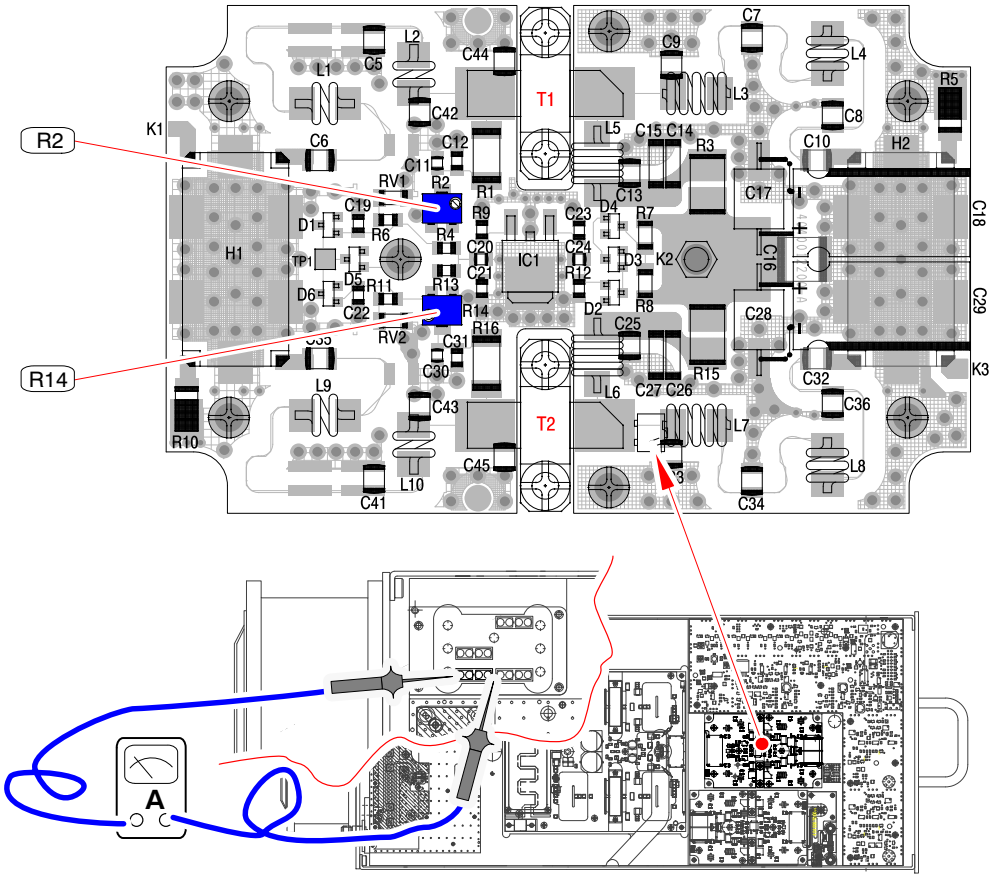

Fig. 3.2 - DRIVER stage (VHF Driver Stage p/n. 4040012210) layout

3.4.2 Functional checks of "1KW BIII RF Amplifier" p/n. 4040012310 *(Final)*

Remove the top cover of the amplifier module in order to access the "500W VHF RF Amplifier" (Final amplifier); location of the pallet is shown on Fig. 3.3. Remove the electric shield to access the components. The functional checks on the pallet can be carried out by following the indication given in Tab. 3.2.

Tab. 3.2 - Functional checks on *DRIVER* stage

checking	measure point / component	measurements	regulation
Transistors power supply	Q1, Q2 "drain"	$50V_{DC} \pm 0.3V_{DC}$	
Q1 biasing (quiescent curr.)	F4 fuse (30A) (*remove fuse and insert in its place the ammeter probes*) see Fig. 3.3.		rotate R8 and R21 completely anticlockwise (minimum of the current I_0); adjust R8 in order to read on ammeter I_0 + 1.9A
Q2 biasing (quiescent curr.)	F4 fuse (30A) (*remove fuse and insert in its place the ammeter probes*) see Fig. 3.3.		adjust R21 in order to read on ammeter I_0 + 3.8A (I_0 + 1.9A + 1.9A)

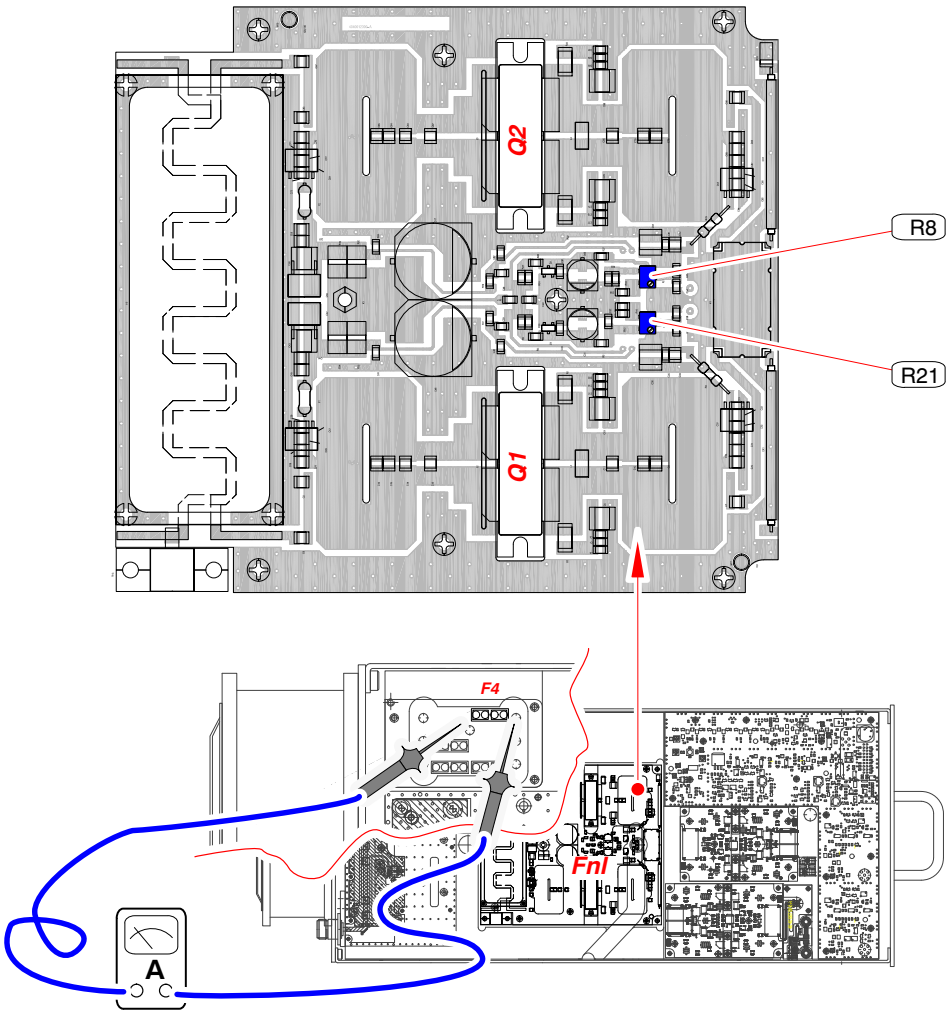

Fig. 3.3 - *Fnl1* "1KW BIII RF Amplifier" p/n. 4040012310 (layout)

4. CIRCUITS DIAGRAMS

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REAR PANEL

FRONT PANEL

J6
RF OUT

K3
SC9

J3
RF IN

W301

J2
SC1

J4
I/O
RS485

W501

J1
SC8

VHF RF AMPLIF.W3-180A
4420300008
GR2

J3
SC9

W302

J5
RF MONITOR

J1
SC5

Jaux
SC7

J5
SC8

WIRED FRAME W3-180A-B
4130002060

K10 SC8 J2 SC8 K4 SC8 J3 SC8 J1 SC1 J8 SC8 K1 SC8

DC AXIAL FAN
B1
1769314800

BK RD

6 W500 3

W505 W502 W508 W200 W504

GND SGN +50V Vout J2 TO FAN +50V

J2 J3 J5 J4 J1

MODULE FIELD INTERFACE
405461811
SC1

DISPLAY
BOARD
4050000910
SC3

ON FRONT PANEL
F1 10A

MAINS
INPUT
230Vac

J1 1 N1 PE1 2

K1

AC/DC CONVERTER IN 230VAC OUT 50V
1703220004
GR1

L N PE

PE4
PE2
PE3

J6 J7

J2 J3

J4 J5 J6 J7 W506 W506 W506

C.P.U. MODULE
405457915
SC2

J1 W503 J2 RS232

SHEET	2	3	4	5	6	7	8	9	10	11	A	EMISSION	07/08/13
REV.											Rev.		Date

Arch.	Dwg. Marco Chiti	Date 13/06/13	TITLE W3 – 180A–B VHF AMPLIFIER
	Chkd. Marco Chiti	13/06/13	DWG. n. 5030317001 ID
electrosys	Scale	Tolerance	Format A3 / Sheet 1 | 1

W303
W304

FWD
REFL
J3
J4

RF INPUT
J2
J1
RF INPUT CONTROL VHF
405025514
SC1
R1
R79
K1
W305
K1

DRIVER 40W BIII
4040012210
SC2
K2
+50V
K3
W306

J1
CURRENT MONITOR
4040067010
SC5
J2
K3
+50V
K2
+50V
K1
9

+50V
K2
K1
K3
RF IN
DRIVER 40W BIII
4040012210
SC3

1KW BIII RF AMPLIFIER
4040012310
SC7
Fnl1
RF OUT
K1
+50V
Jaux

K1
K2
K2
RF IN
RF 50 OHM CONNECTION
4040015500
SC13

J1
RF RFL
J2
RF FWD
J3
RF MONITOR

VHF 50 OHM
RF LINE
4040005911
SC14
K1
J1
RF OUT

5
4

TO J5
SC7
8
Fnl1
4

SENSE BOARD
405461410
SC10
J1
W507
J4

K16
K15
K12
K13
K14
+50V
POWER MOTHER BOARD
405025710
SC7
J2
K4
K10
K17
K1
J3
J5
K18
J1
FROM AC/DC
FROM MODULE FIELD INTERFACE
FAN
I/O

K11
K1
OK2
OK6
K5
F6
OK7
K7
F4
OK5
K9
F2
OK3
K8
F3
OK4
FUSES BOARD
405461115
SC9

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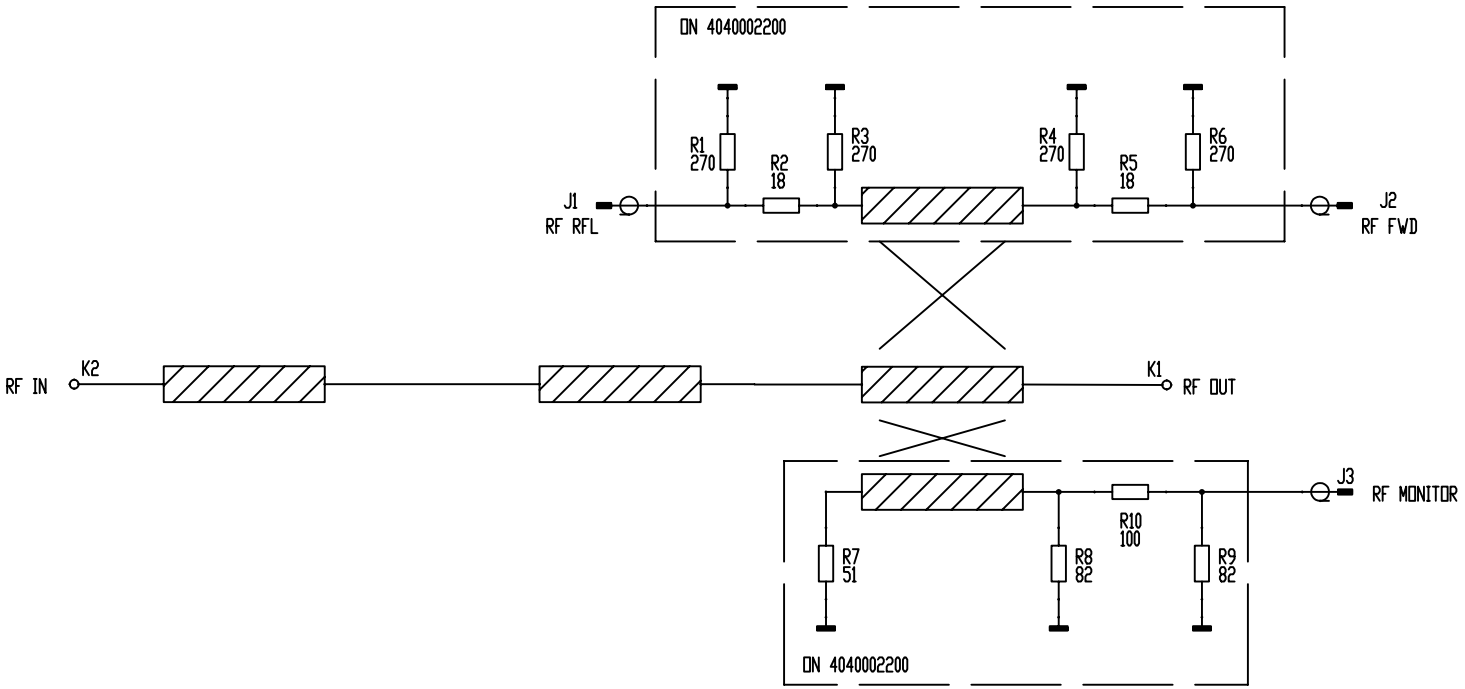
REV.											Rev.			Date

Arch.	Dwg. Marco Chiti	Date 22/07/13	TITLE VHF RF AMPLIF. W3-180A
	Chkd. Claudio Pagliai	22/07/13	DWG. n. 4420300008 ID
electrosys	Scale	Tolerance	Format A3 / Sheet 1 | 1



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REV.											EMISSION
Date											29/01/08

Arch.

Dwg. Maurizio Corradini

Chkd. Piero Massimo

Date 29/01/08

Rev.

Date 29/01/08

electroSYS

Scale

Tolerance

TITLE

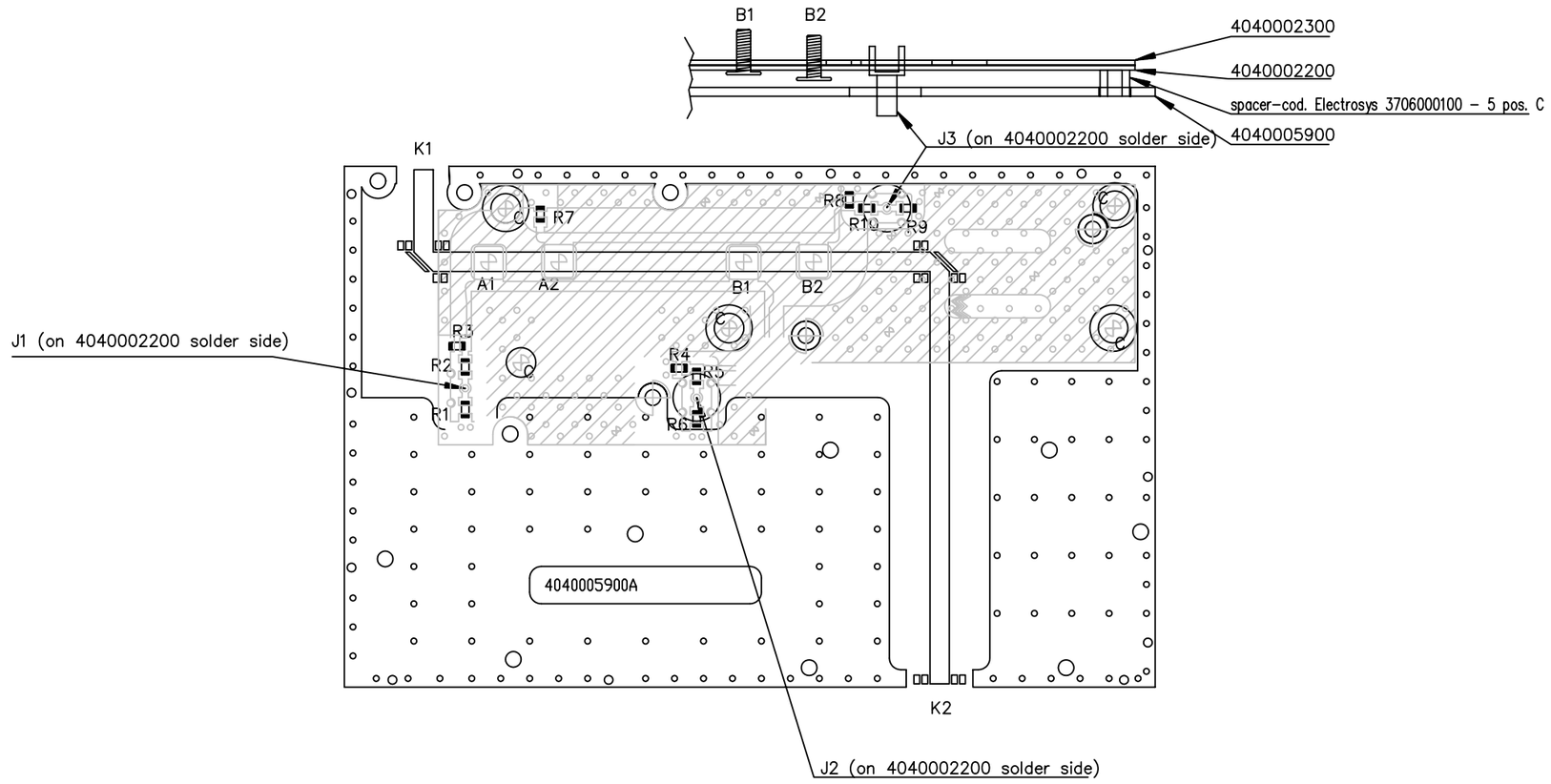
50 OHM VHF RF LINE

DWG. n.

4040005911ED

Format A4

Sheet 1 | 1



A, B snug screw – cod. Electrosys 3701000400 – 4 pos.

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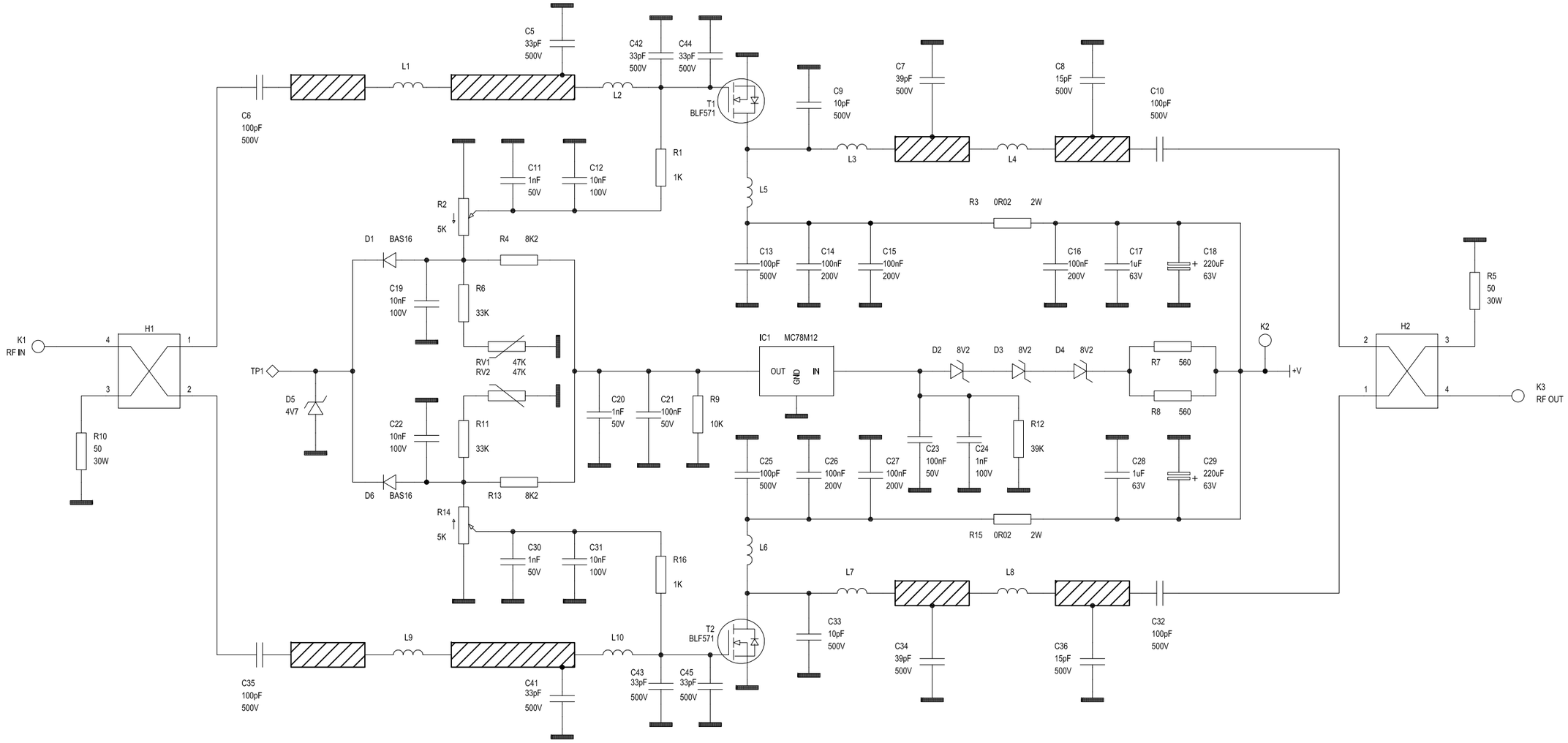
REV.											Rev.			Date
Arch.		Dwg. Maurizio Tontolini									Date 29/01/08	TITLE 50 OHM VHF RF LINE		
		Chkd. Rossi Massimo									29/01/08			
electrosys												DWG. n. 4040005911CL		
							Scale				Tolerance	Format A3	Sheet 1 | 1	



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REV.											Rev.		Date

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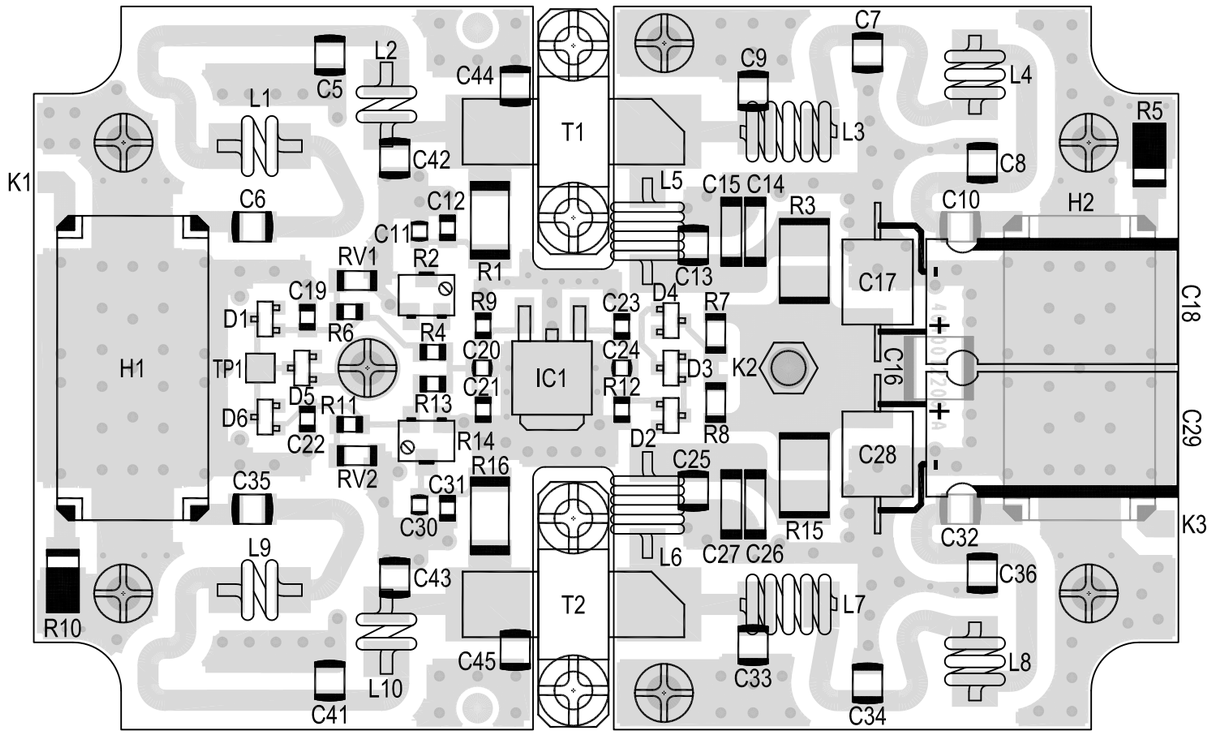
	Chkd.	21/03/12	DWG. n. 4040012210 ED
electrosys	Scale	Tolerance	Format A3 / Sheet 1 | 1



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REV.											Rev.		Date

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	Chkd.	21/03/12	DWG. n. 4040012210 CL
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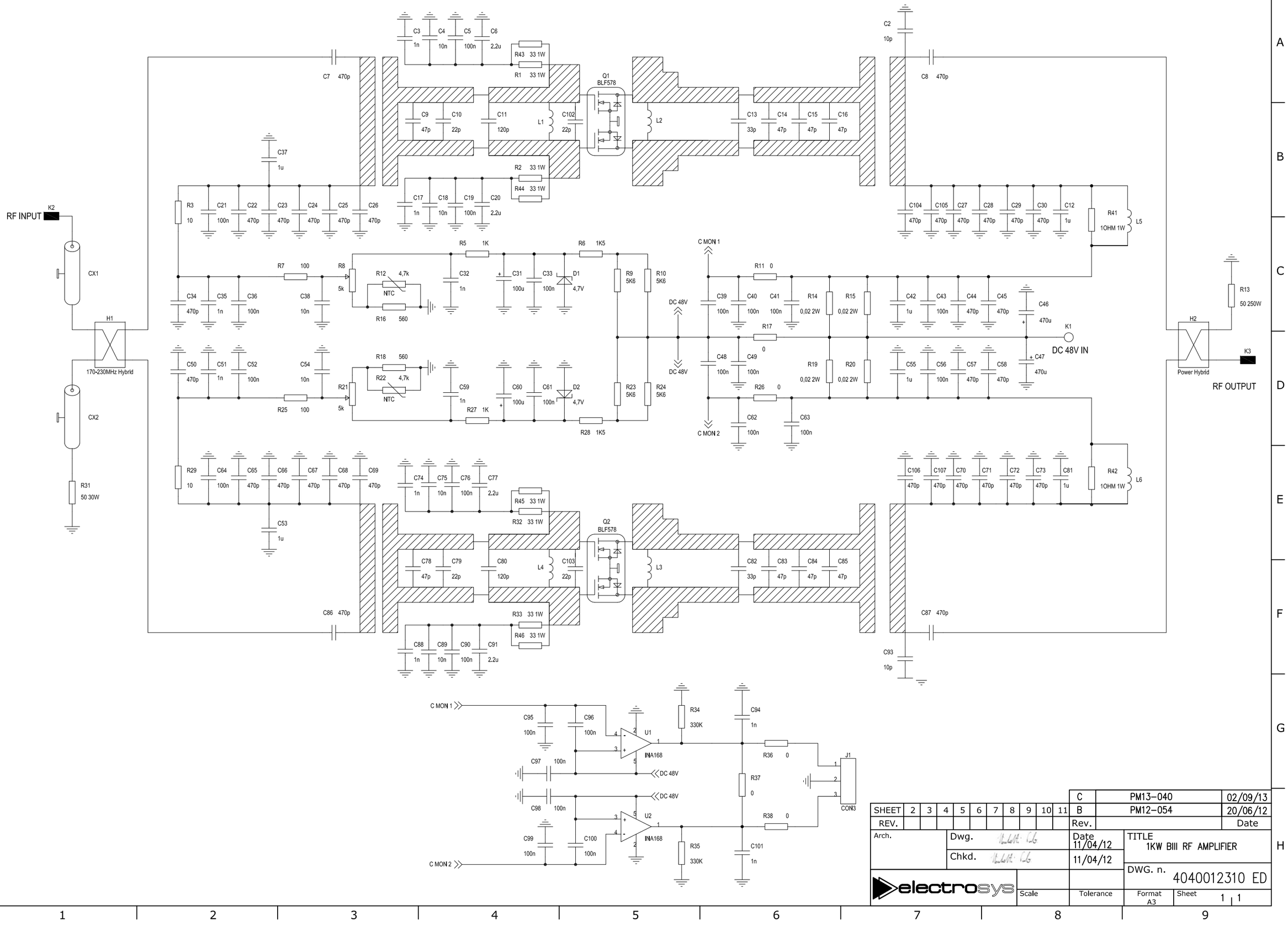

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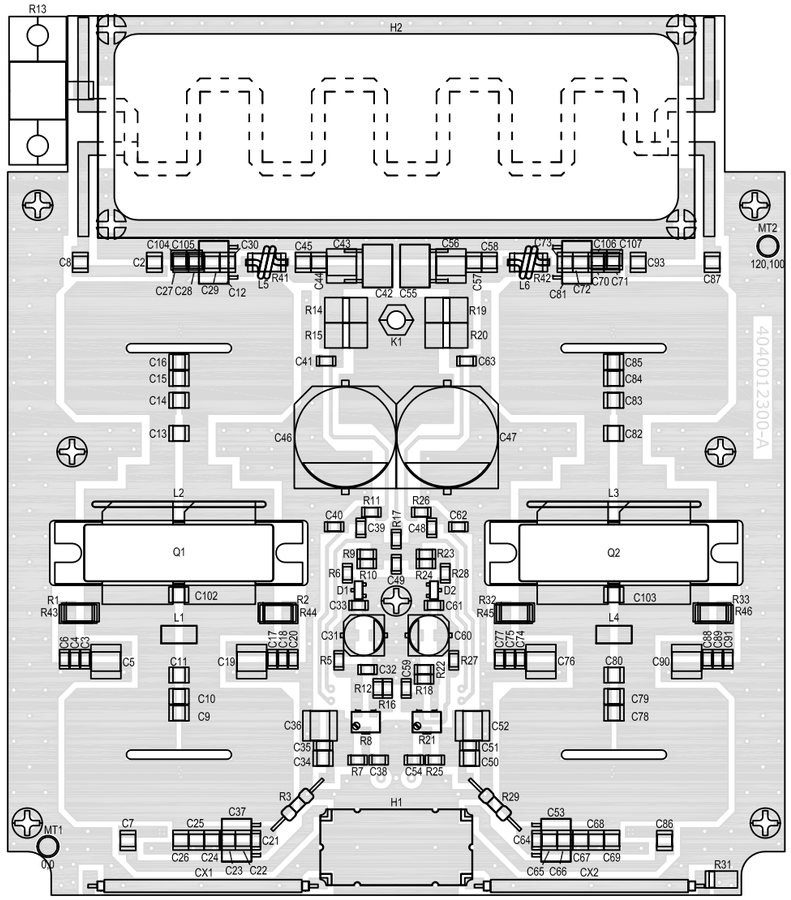
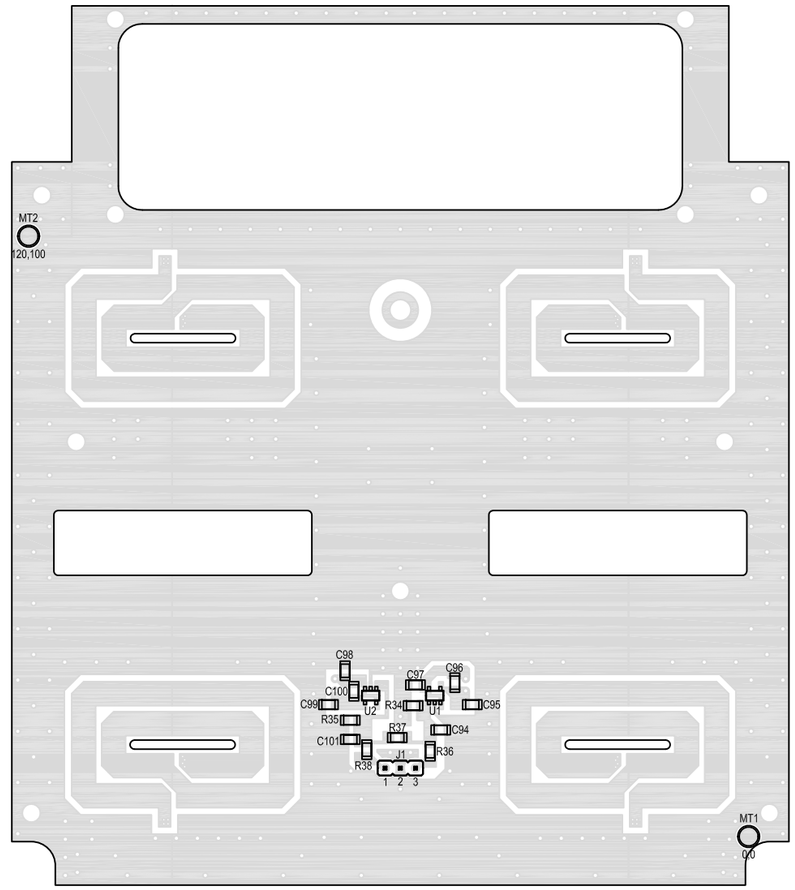
REV.											B	PM12–054	20/06/12
											Rev.		Date

Arch.	Dwg.	Date 11/04/12	TITLE 1KW BIII RF AMPLIFIER
	Chkd.	11/04/12	DWG. n. 4040012310 ED
electrosys	Scale	Tolerance	Format A3 / Sheet 1 | 1

COMPONENT SIDE



SOLDER SIDE



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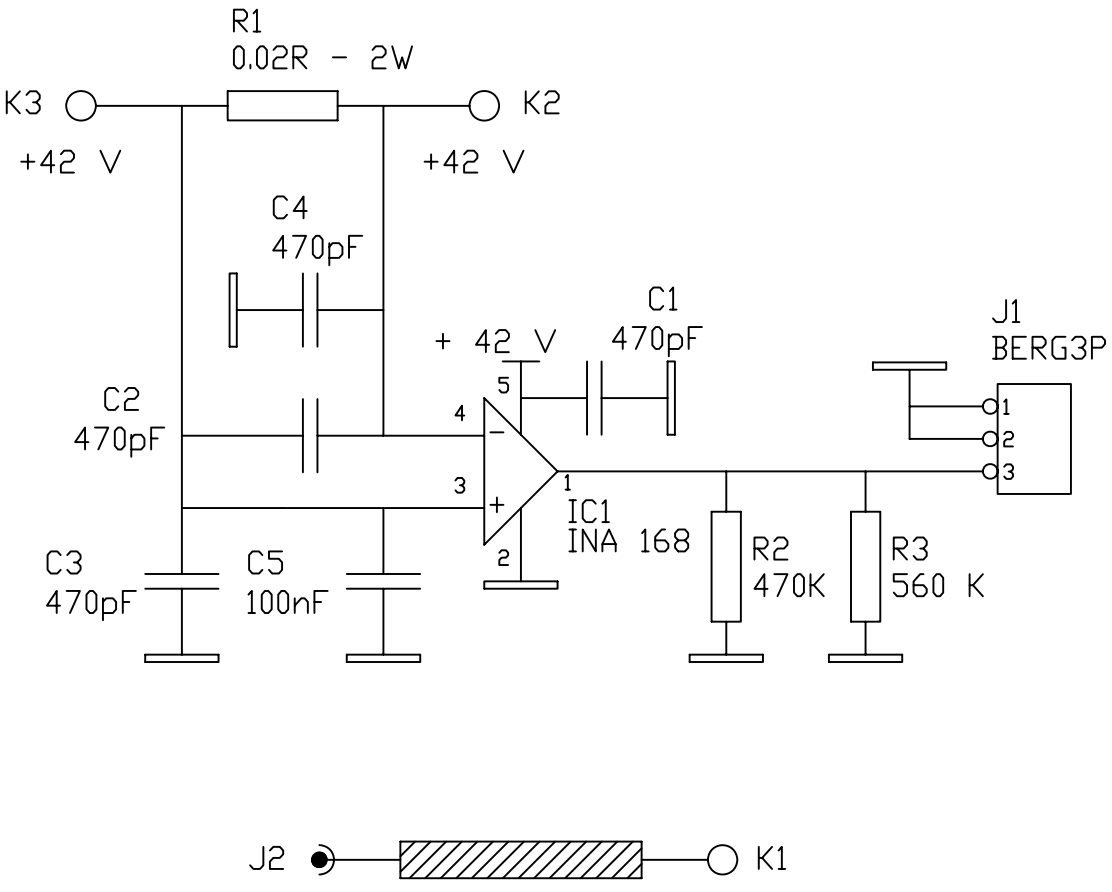
REV.											B	PM12-054	20/06/12
											Rev.		Date

Arch.	Dwg.	Date 11/04/12	TITLE 1KW BIII RF AMPLIFIER
	Chkd.	11/04/12	DWG. n. 4040012310 CL
electrosys	Scale 1:1	Tolerance	Format A3 / Sheet 1 | 1



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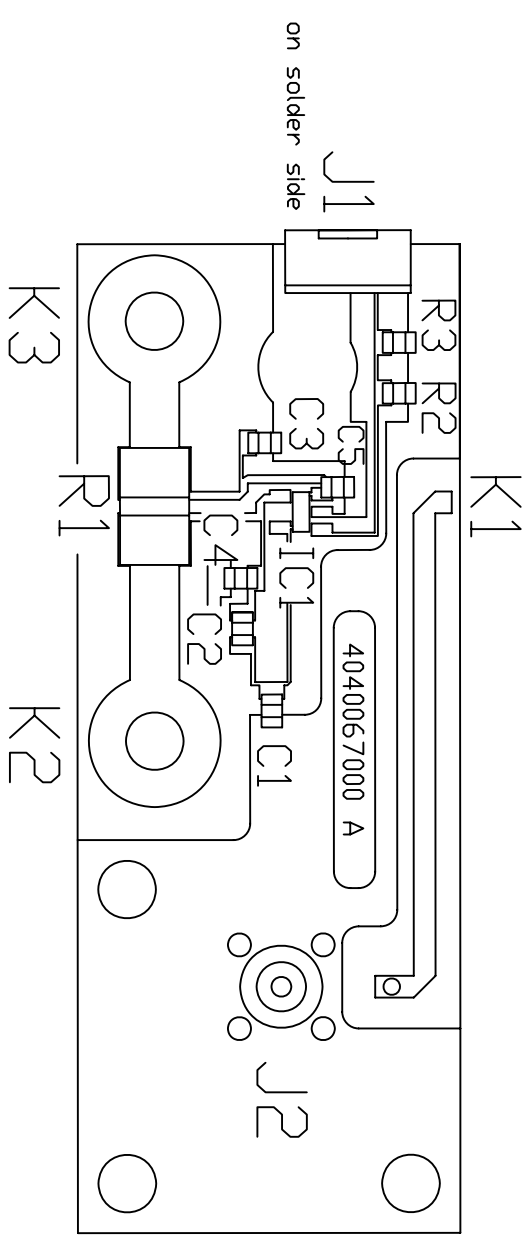
REV.											Rev.		Date

Arch.	Dwg. Rossi Massimo	Date 21/04/09	TITLE CURRENT MONITOR
	Chkd. Rossi Massimo	21/04/09	DWG. n. 4040067010 ED
electrosys	Scale	Tolerance	Format A4 / Sheet 1 | 1



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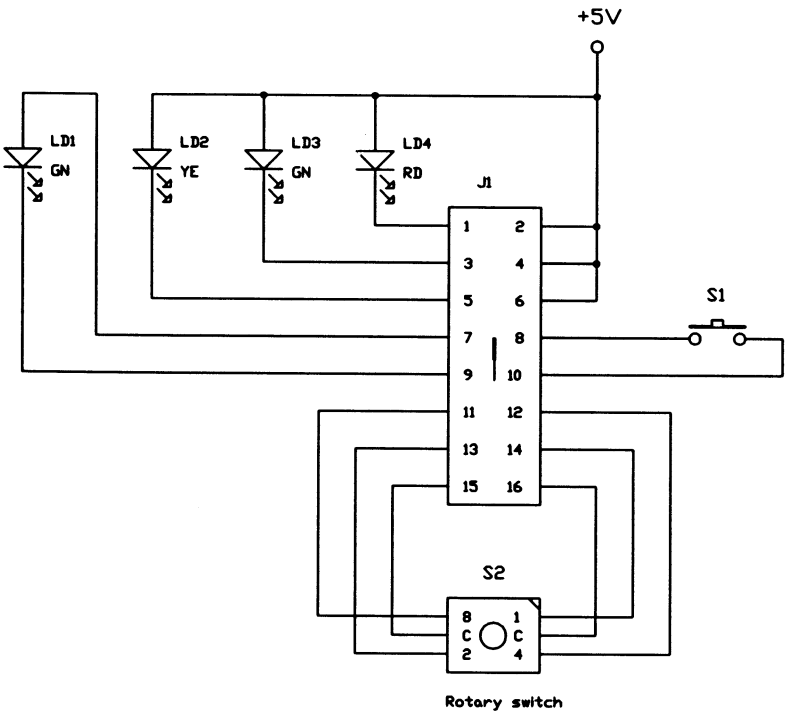
REV.											Rev.		Date

Arch.	Dwg. Rossi Massimo	Date 21/04/09	TITLE CURRENT MONITOR
	Chkd. Rossi Massimo	21/04/09	DWG. n. 4040067010 CL
electrosys	Scale 1 : 1	Tolerance	Format A4 / Sheet 1 | 1

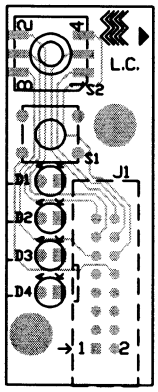


Rotary switch

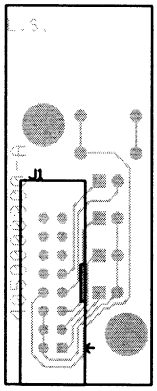
SHEET	2	3	4	5	6	7	8	9	10	11	A	EMISSION	03/03/05
REV.											Rev.		Date

Arch.	Dwg. M. [illegible]	Date 03/03/05	TITLE DISPLAY BOARD
Electrosys	Chkd. U. Cesari	03/03/05	DWG. n. 4050000910ED
	Scale	Tolerance	Format A4 / Sheet 1 | 1

COMPONENT SIDE



SOLDER SIDE



SHEET	2	3	4	5	6	7	8	9	10	11	A	EMISSION	03/03/05
REV.											Rev.		Date
Arch.											Dwg. M. Torelli	Date 03/03/05	TITLE DISPLAY BOARD
											Chkd. U. Cesaroni	03/3/05	DWG. n. 4050000910CL
Electrosys												Scale	Tolerance	Format A4	Sheet 1 | 1

*: NOT MOUNTED
**: Ø OHM

* : NOT MOUNTED.

** ADJUSTABLE DURING FACTORY TEST

* : NOT MOUNTED.

RF ATTENUATOR

PHASE ADJUST

5°

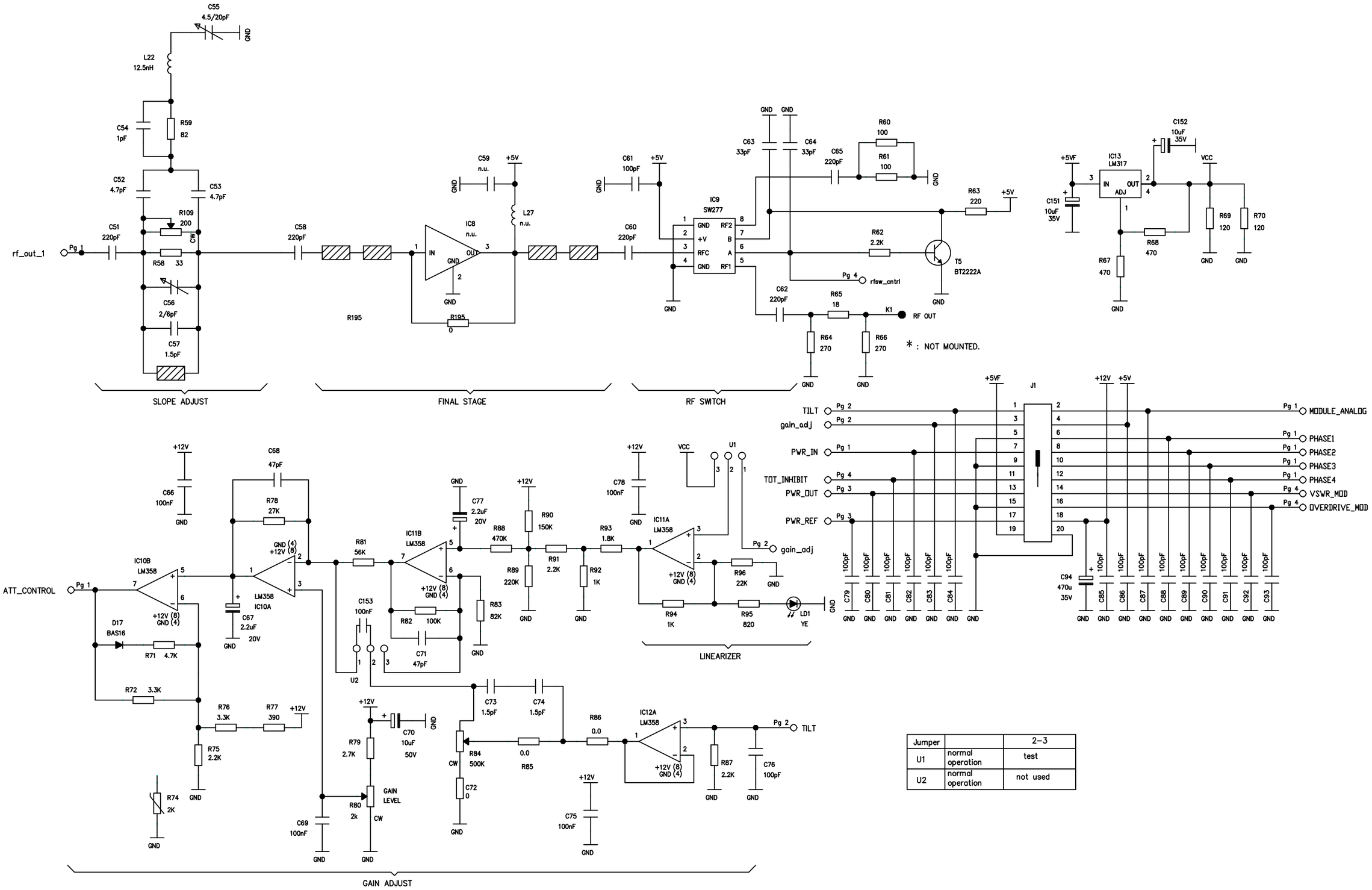
10°

20°

40°

SHEET	2	3	4	5	6	7	8	9	10	11	A	EMISSION	07/08/13
REV.											Rev.		Date

Arch.	Dwg. Marco Chiti	Date 07/08/13	TITLE RF INPUT CONTROL VHF
	Chkd. Marco Chiti	07/08/13	DWG. n. 405025514 ED
electrosys	Scale	Tolerance	Format A3 / Sheet 1 | 4



Jumper		2–3
U1	normal operation	test
U2	normal operation	not used

DWG. n.	TITLE
405025514 ED	RF INPUT CONTROL VHF

electrosys

Scale	Format
	A3

Sheet 2 | 4

FWD PWR

REFL PWR

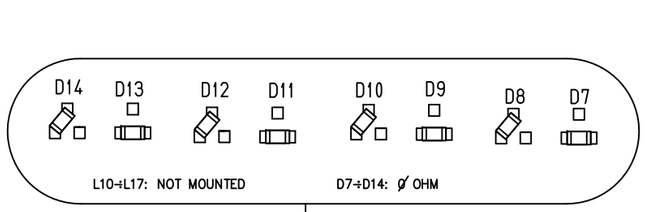
** ADJUSTABLE DURING FACTORY TEST

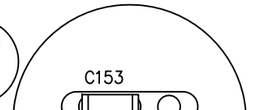
*: NOT MOUNTED.

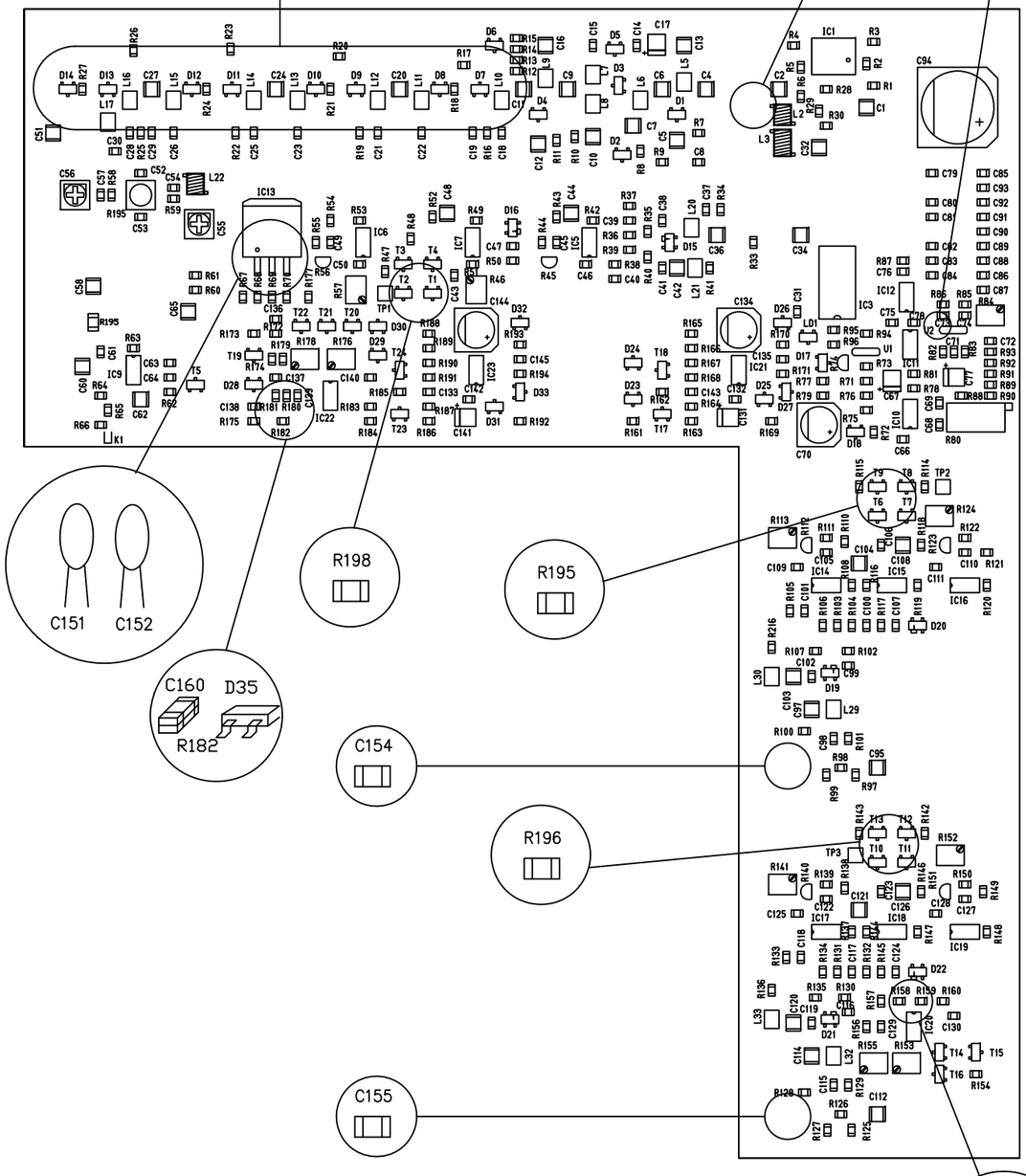
DWG. n. 405025514 ED	TITLE RF INPUT CONTROL VHF
electrosys	Scale / Format A3 / Sheet 3 | 4

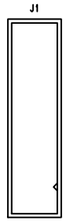
ana_dig_4
Pg 1,4
ref_level
Pg 3
VSWR ALARM
FAST COMPARATOR
SLOW COMPARATOR
WITH HYSTERESIS
Pg 2
VSWR_MOD
TOT_INHIBIT
rfsw_cntrl
ana_dig_4
Pg 1,4
ovdr_level
Pg 1
FAST OVERDRIVE
ALARM COMPARATOR
SLOW COMPARATOR
WITH HYSTERESIS
Pg 2
OVERDRIVE_MOD

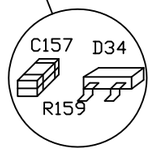
DWG. n. 405025514 ED	TITLE RF INPUT CONTROL VHF
electrosys	Scale / Format A3 / Sheet 4 | 4



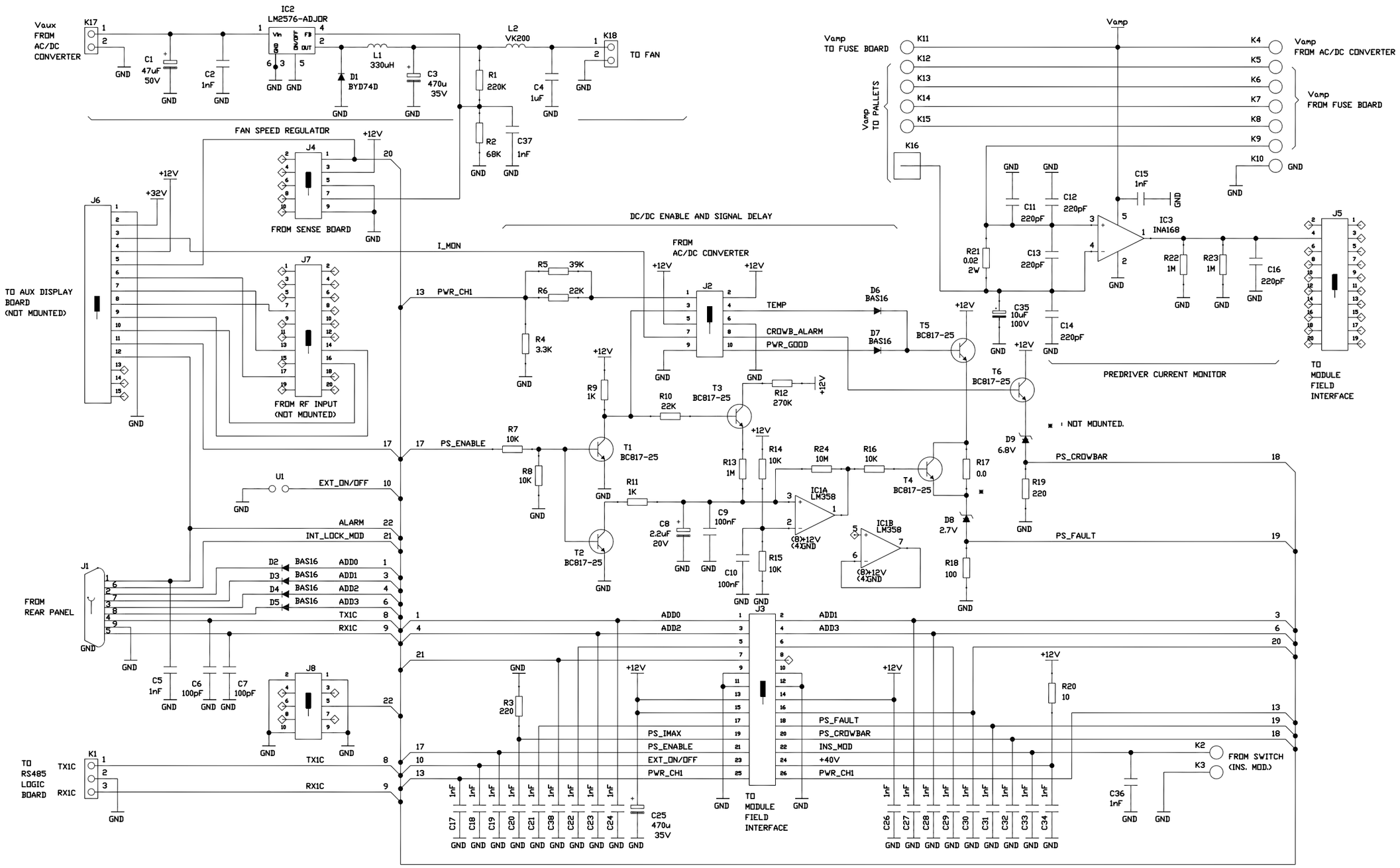






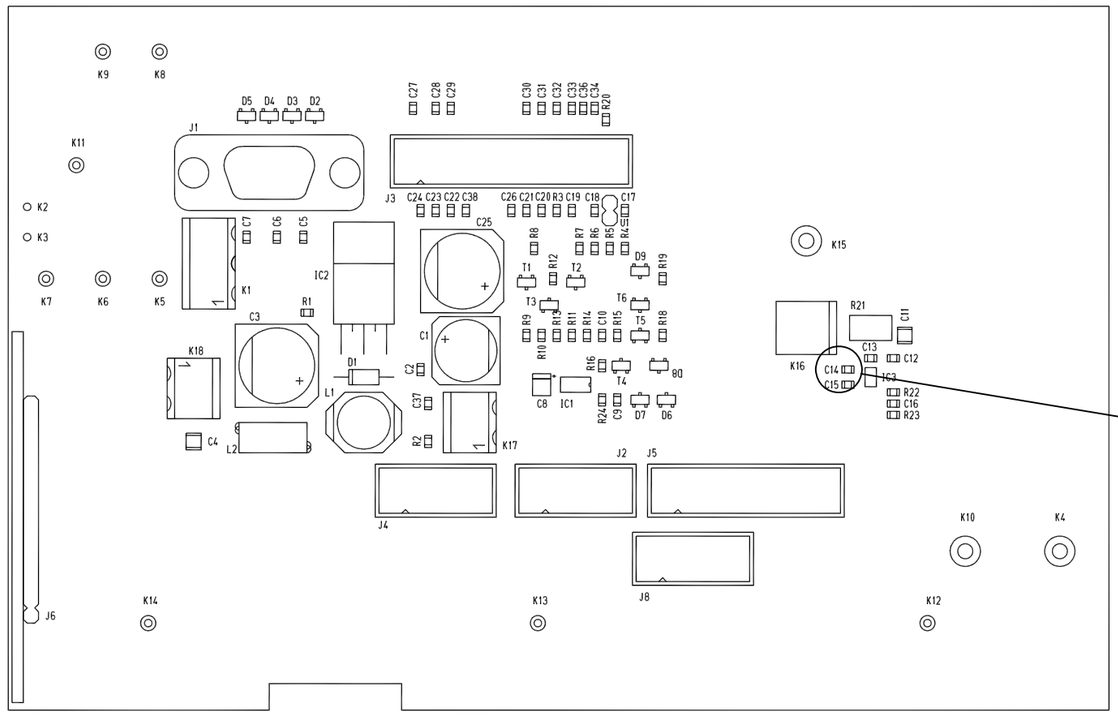


SHEET	2	3	4	5	6	7	8	9	10	11	A	EMISSION		07/08/13
REV.											Rev.			Date
Arch.		Dwg. Marco Chiesa									Date 07/08/13	TITLE RF INPUT CONTROL VHF		
		Chkd. Marco Chiesa									07/08/13			
electrosys											Scale	Tolerance	DWG. n. 405025514 CL	
													Format A3	Sheet 1 | 1



SHEET	2	3	4	5	6	7	8	9	10	11	C	PM 09-188	28/10/09
REV.											A	EMISSION	16/1/04
											Rev.		Date

Arch.	Dwg. Monica Tortolini	Date 22/11/05	TITLE POWER MOTHER BOARD
	Chkd. Claudio Rapisarda	22/11/05	DWG. n. 405025710 SE
electrosys	Scale	Tolerance	Format A3 / Sheet 1 | 1



SHEET	2	3	4	5	6	7	8	9	10	11	B	PM09-188	28/10/09
REV.											–	EMISSION	22/01/04
											Rev.		Date

Arch.	Dwg. Mauro Tortolini	Date 22/01/04	TITLE POWER MOTHER BOARD
	Chkd.	22/01/04	DWG. n. 405025710 ST
electrosys	Scale	Tolerance	Format A3 / Sheet 1 | 1

ADD0 Pg 5
ADD1 Pg 5
ADD2 Pg 5
ADD3 Pg 5
ADD4 Pg 5
ADD5 Pg 5
ADD6 Pg 5
ADD7 Pg 5
PWM2 Pg 5
PWM1 Pg 5

S1
S2

C8 100nF

R1 R2 R3 R4 R5 R6 R7 R8 R9 R10 R11 R12 10.0K

TP1
TP2

IC1
H8-3003

R17 R18 R19 R20 R21 R22 R23 100

L1 4.7uH
C1 100nF
C2 100uF 6.3V
C3 100nF

IC2
MAX691CWCE

R46 R47 R48 R49 R50 10.0K

U1
D1 BAS16
U2

R24 R25 R26 R27 10.0K

J7
J6

R28 R29 0.0

MUX_EN1 Pg 3
*MUX_WR Pg 3

R30 R31 10.0K

SDA Pg 1,4
SCL Pg 1,4

R32 R33 100

*CS4 Pg 2
*CS5 Pg 3
*CS6 Pg 3

R34 R35 R36 10.0K

IC3A HEF4071B
IC3B HEF4071B
IC3C HEF4071B
IC3D HEF4071B

TP3
TP13

DIG_IN9 Pg 5
TX1 Pg 4
TX2 Pg 4
RX1 Pg 4
RX2 Pg 4
DIG_IN10 Pg 5
IRQ5 Pg 5
IRQ5 Pg 5

R37 R38 R39 R40 R41 R42 R43 R44 10.0K

DIR_485 Pg 4
*WDO Pg 1,4
CS_WDI Pg 1
TEST Pg 4

S4

D(7:0) Pg 2,3

TP5 TP6 TP7 TP8 TP9 TP09 TP10

QZ1 16MHz
C6 33pF

R51 10.0K
R52 3.90K
R56 10.0K

C9 100nF

IC4 24C128
R53 R54 R55 10.0K 4.70K 4.70K
R57 0.0

U3

ANA_IN21 Pg 5
ANA_IN20 Pg 5
ANA_IN19 Pg 5
ANA_IN18 Pg 5
ANA_IN17 Pg 5
*CS0 Pg 2
*CS1 Pg 1
*CS2 Pg 2
*CS3 Pg 2
ANA_IN23 Pg 5
ANA_IN22 Pg 5

*WDO Pg 1,4
*CS1 Pg 1
*CS_RAM Pg 2
CS_WDI Pg 1

*WR Pg 2
*RD Pg 2
*RESET Pg 3,4

SCL Pg 1,4
SDA Pg 1,4

STS Pg 3

A(18:0) Pg 2

(99,73,53,35,26,10) GND
(94) AGND
(76,44,1) +5V
(84) +5V

JUMPERS SETTING

U1	CLOSED
U2	CLOSED
U3	OPEN
U4	OPEN
U5	OPEN
U6	OPEN
U7	CLOSED
U8	OPEN

C5 100nF
C10 100nF

SHEET	2	3	4	5	6	7	8	9	10	11	A	EMISSION				15/03/11
REV.											Rev.					Date
Arch.			Dwg.								Date	TITLE				
			Chkd.								26/02/10	C.P.U. MODULE BOARD				
											26/02/10	DWG. n.				
electrosys												405457915 SE				
											Scale	Tolerance	Format A3	Sheet 1 | 5		

D(7:0) Pg 1

+5V
GND
LD1 LD2 LD3 LD4 LD5 LD6 LD7 LD8 (GN)
2.20K
R61 R109 R108 R107 R83 R58 R110 R112

IC10
74HCT541T
*OE1 1
*OE2 19
*CS4 Pg 1
DIG_IN1 Pg 5
DIG_IN2 Pg 5
DIG_IN3 Pg 5
DIG_IN4 Pg 5
DIG_IN5 Pg 5
DIG_IN6 Pg 5
DIG_IN7 Pg 5
DIG_IN8 Pg 5
A0 2 A1 3 A2 4 A3 5 A4 6 A5 7 A6 8 A7 9
Y0 18 Y1 17 Y2 16 Y3 15 Y4 14 Y5 13 Y6 12 Y7 11
D0 0 D1 1 D2 2 D3 3 D4 4 D5 5 D6 6 D7 7
(20) +5V (10) GND

C15 100nF

10.0K
R127 R128 R129 R130 R131 R132 R133 R134

LD9 LD10 LD11 LD12 LD13 LD14 LD15 LD16 (YE)

C11 100nF
C37 10uF 35V
R135 100K

IC6
74HCT574T
*OE 1
CLK 11
*CS2 Pg 1
DIG_OUT1 Pg 5
DIG_OUT2 Pg 5
DIG_OUT3 Pg 5
DIG_OUT4 Pg 5
DIG_OUT5 Pg 5
DIG_OUT6 Pg 5
DIG_OUT7 Pg 5
DIG_OUT8 Pg 5
Q0 19 Q1 18 Q2 17 Q3 16 Q4 15 Q5 14 Q6 13 Q7 12
D0 2 D1 3 D2 4 D3 5 D4 6 D5 7 D6 8 D7 9
D0 0 D1 1 D2 2 D3 3 D4 4 D5 5 D6 6 D7 7
+5V (20) GND (10)

LD17 LD18 LD19 LD20 LD21 LD22 LD23 LD24 (YE)
R126 R125 R124 R123 R122 R121 R120 R60

C12 100nF

IC7
74HCT574T
*OE 1
CLK 11
DIG_OUT9 Pg 5
DIG_OUT10 Pg 5
DIG_OUT11 Pg 4
DIG_OUT12 Pg 4,5
DIG_OUT13 Pg 4,5
DIG_OUT14 Pg 5
DIG_OUT15 Pg 5
DIG_OUT16 Pg 5
Q0 19 Q1 18 Q2 17 Q3 16 Q4 15 Q5 14 Q6 13 Q7 12
D0 2 D1 3 D2 4 D3 5 D4 6 D5 7 D6 8 D7 9
D0 0 D1 1 D2 2 D3 3 D4 4 D5 5 D6 6 D7 7
+5V (20) GND (10)
*CS3 Pg 1

C13 100nF

IC8
KM681000ALG
GND +5V
D0 0 D1 1 D2 2 D3 3 D4 4 D5 5 D6 6 D7 7
I/O0 13 I/O1 14 I/O2 15 I/O3 17 I/O4 18 I/O5 19 I/O6 20 I/O7 21
A0 12 A1 11 A2 10 A3 9 A4 8 A5 7 A6 6 A7 5 A8 27 A9 26 A10 23 A11 25 A12 4 A13 28 A14 3 A15 31 A16 2
*OE 24
*WE 29
CS2 30
*CS1 22
A(18:0) Pg 1
*CS_RAM Pg 1

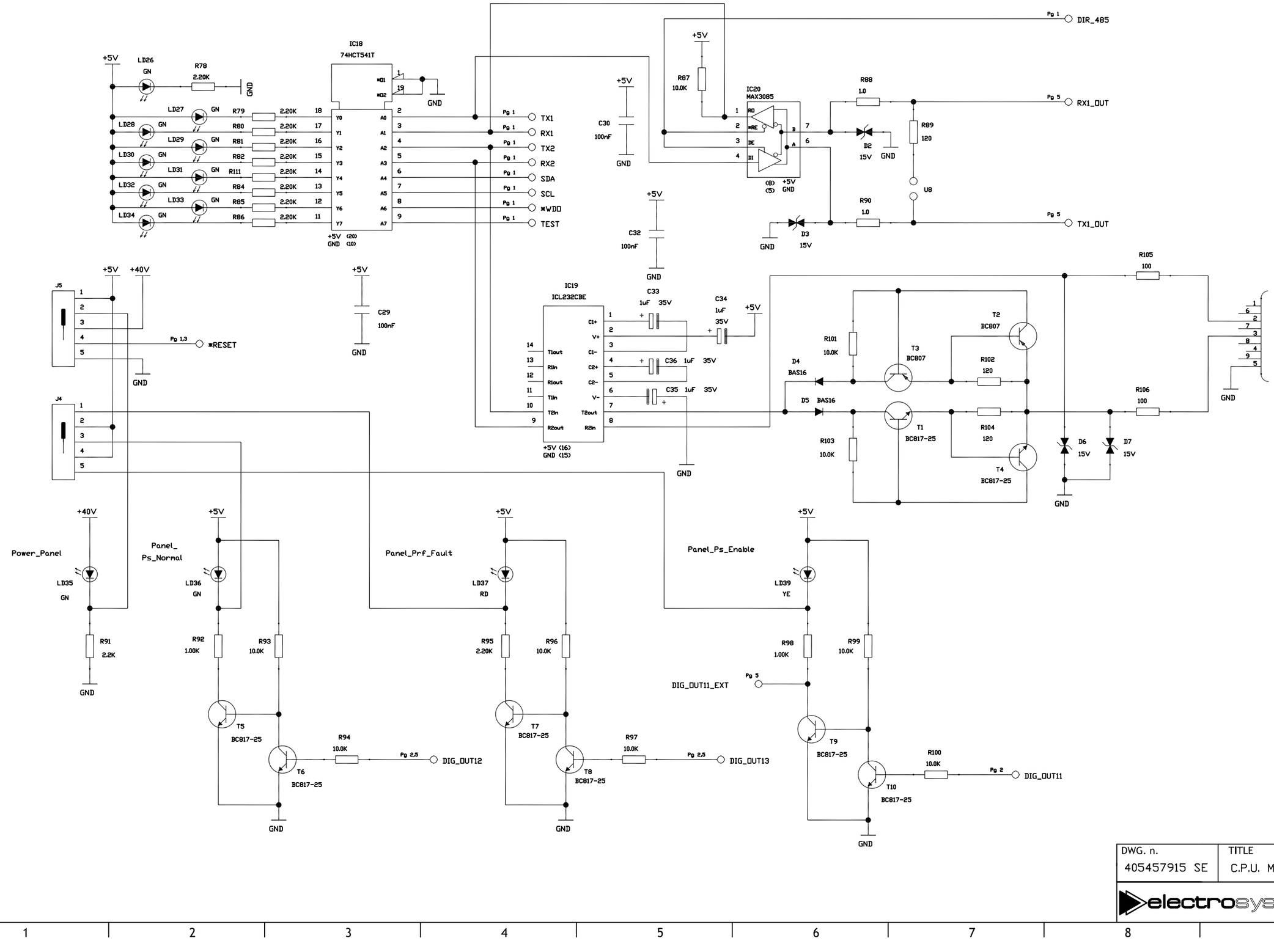
IC9
M29F040_32PLCC
GND (16) +5V (32)
D0 0 D1 1 D2 2 D3 3 D4 4 D5 5 D6 6 D7 7
Q0 13 Q1 14 Q2 15 Q3 17 Q4 18 Q5 19 Q6 20 Q7 21
A0 12 A1 11 A2 10 A3 9 A4 8 A5 7 A6 6 A7 5 A8 27 A9 26 A10 23 A11 25 A12 4 A13 28 A14 29 A15 3 A16 2 A17 30 A18 1
*WR 31
*RD 24
*E 22
*CS0 Pg 1
*RD Pg 1
*WR Pg 1

C14 100nF

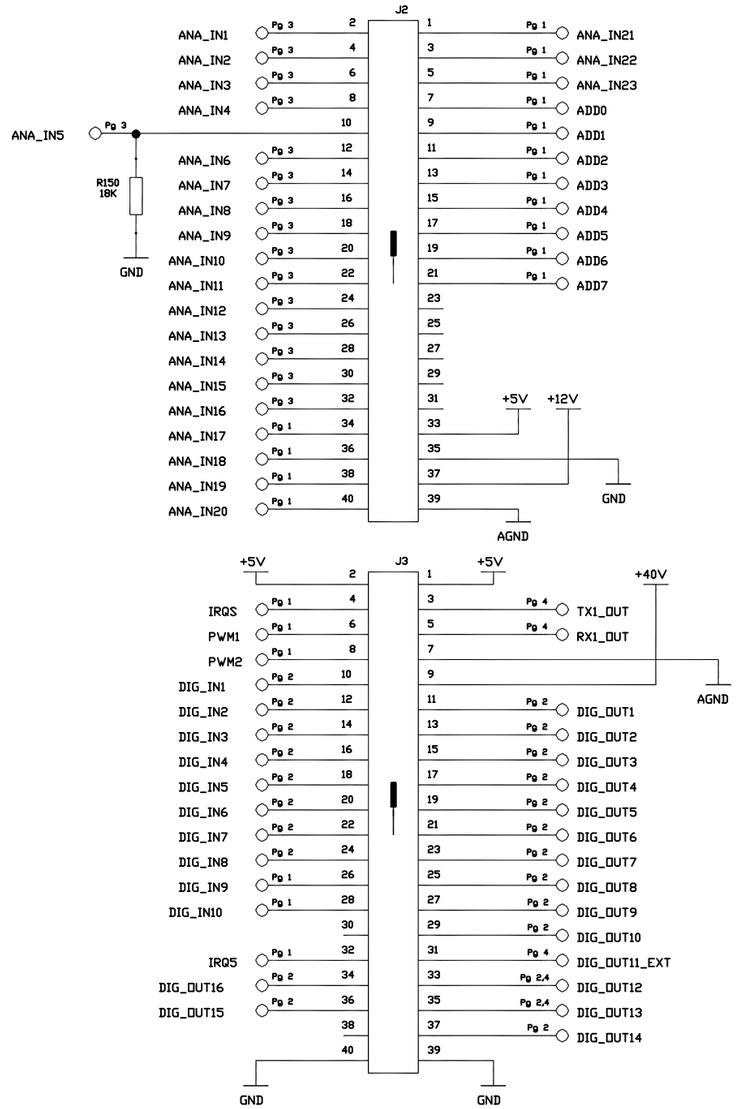
DWG. n.	TITLE
405457915 SE	C.P.U. MODULE BOARD
electrosys	Scale: Format A3
	Sheet 2 | 5

STS
D(7:0)
*CS5
*CS6
IC11 74HCT245SO
IC12 ADG574AKP
IC13 ICL7662CBA
IC14 ICL7662CBA
IC15A LM358SO
IC15B LM358SO
IC16 74HCT574T
IC17 ADG526AKR
LD25 GN
L2 4.7uH
TP11
U4
U5
U6
U7
*RESET
*MUX_WR
ANA_IN1
ANA_IN2
ANA_IN3
ANA_IN4
ANA_IN5
ANA_IN6
ANA_IN7
ANA_IN8
ANA_IN9
ANA_IN10
ANA_IN11
ANA_IN12
ANA_IN13
ANA_IN14
ANA_IN15
ANA_IN16
MUX_EN1

DWG. n. 405457915 SE	TITLE C.P.U. MODULE BOARD
electrosys	Scale / Format A3 / Sheet 3 5



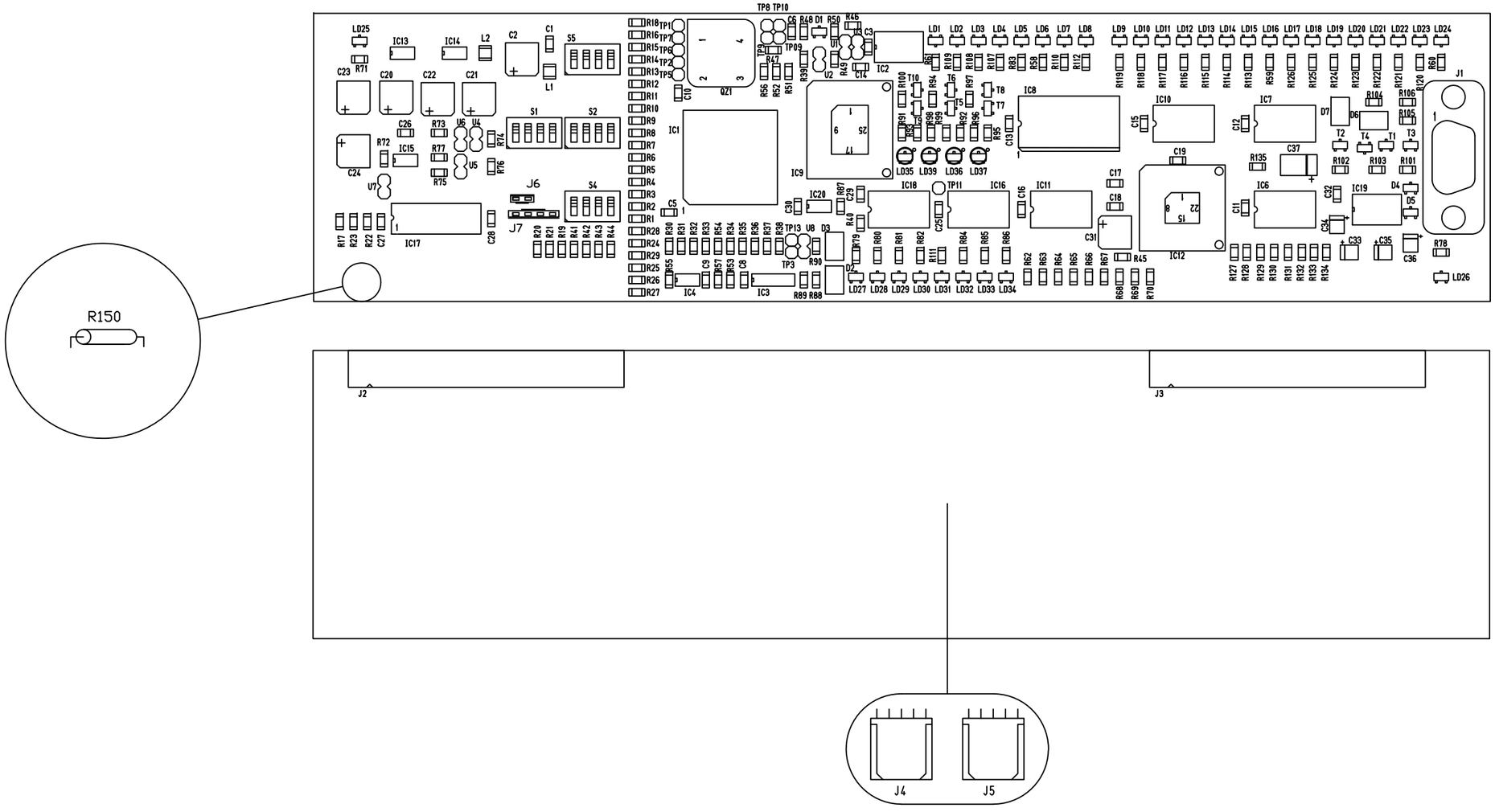
DWG. n. 405457915 SE	TITLE C.P.U. MODULE BOARD
electrosys	Scale — Format A3
	Sheet 4 / 5



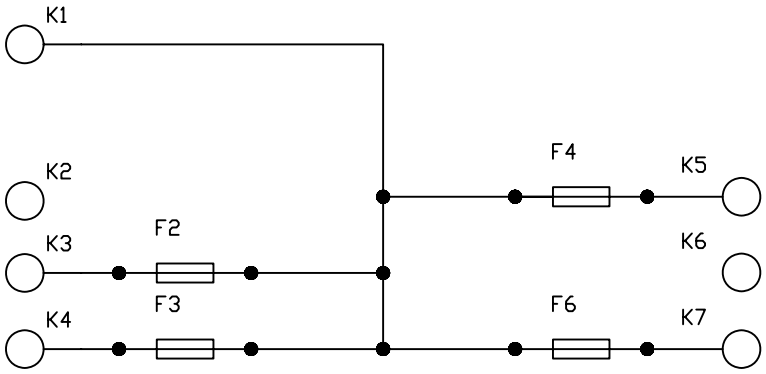
DWG. n.	TITLE
405457915 SE	C.P.U. MODULE BOARD

electrosys

Scale	Format
	A3
Sheet	5 | 5

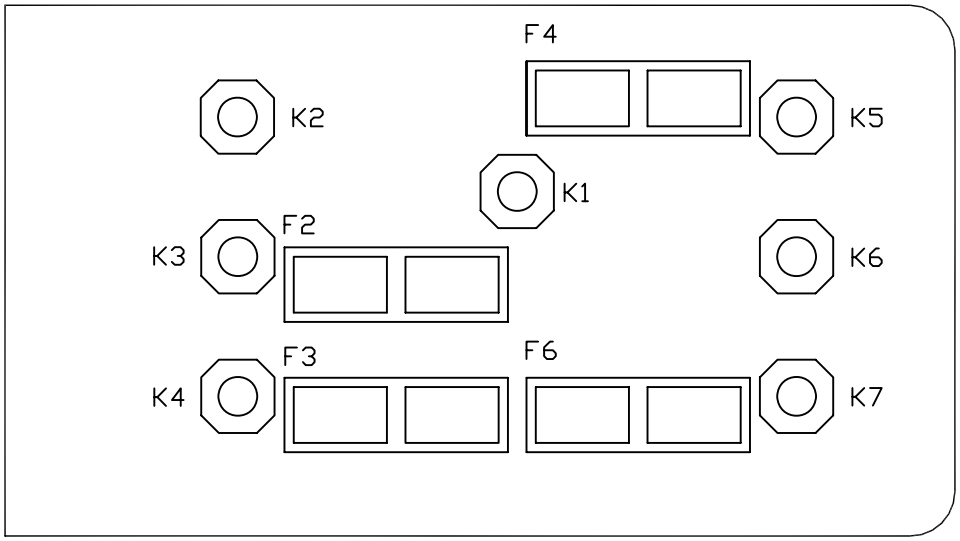


SHEET	2	3	4	5	6	7	8	9	10	11	A	EMISSION		15/03/11
REV.											Rev.			Date
Arch.			Dwg. Rossi Massimo								Date 26/02/10	TITLE C.P.U. Module Board		
			Chkd. Rossi Massimo								26/02/10	DWG. n. 405457915 ST		
electrosys											Scale	Tolerance	Format A3	Sheet



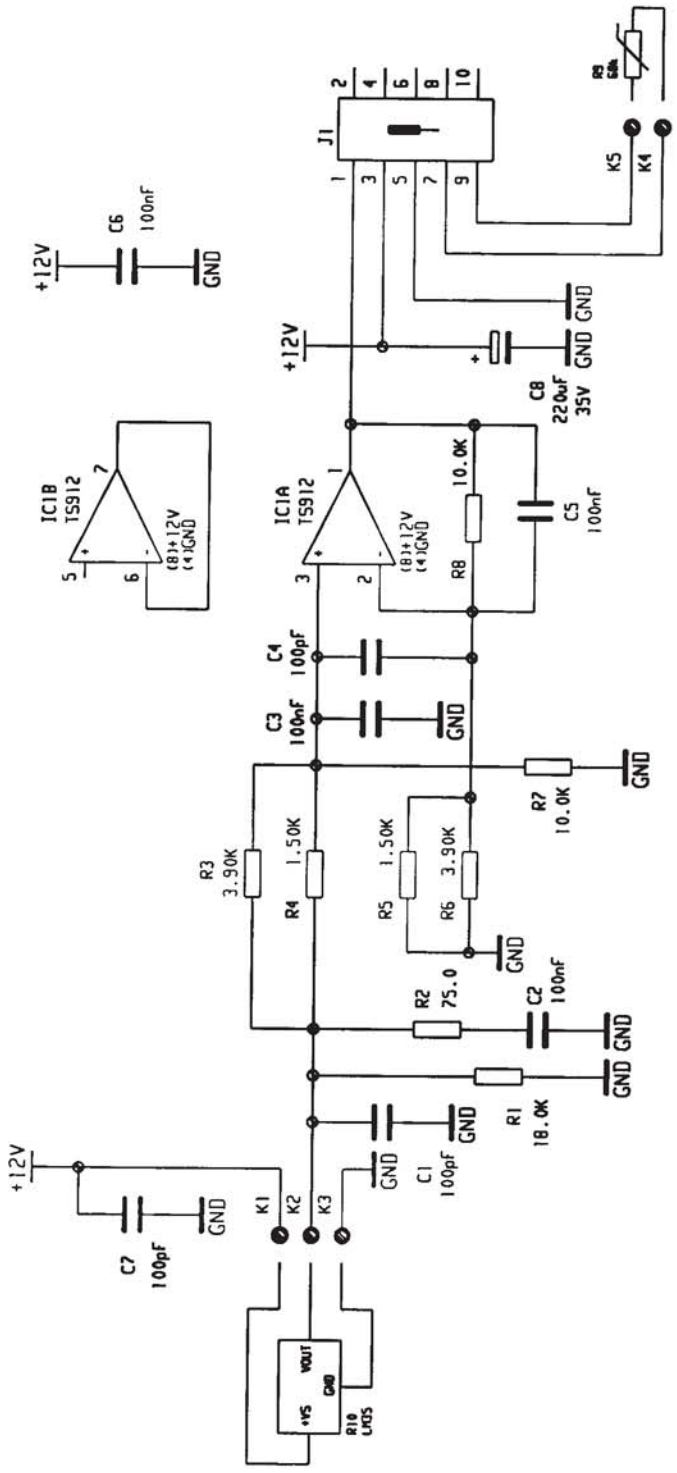
SHEET	2	3	4	5	6	7	8	9	10	11	A	EMISSION	17/12/09
REV.											Rev.		Date

Arch.	Dwg. Rossi Massimo	Date 07/10/09	TITLE FUSES BOARD
	Chkd. Rossi Massimo	07/10/09	DWG. n. 405461115 ED
electrosys	Scale	Tolerance	Format A4 / Sheet 1 | 1

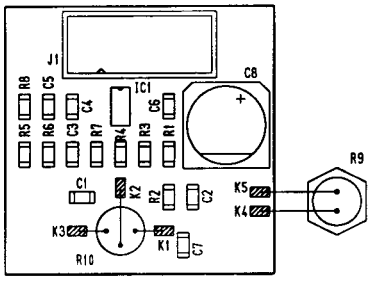


SHEET	2	3	4	5	6	7	8	9	10	11	A	EMISSION	17/12/09
REV.											Rev.		Date

Arch.	Dwg. Rossi Massimo	Date 07/10/09	TITLE FUSES BOARD
	Chkd. Rossi Massimo	07/10/09	DWG. n. 405461115 CL
electrosys	Scale	Tolerance 07/10/09	Format A4 / Sheet

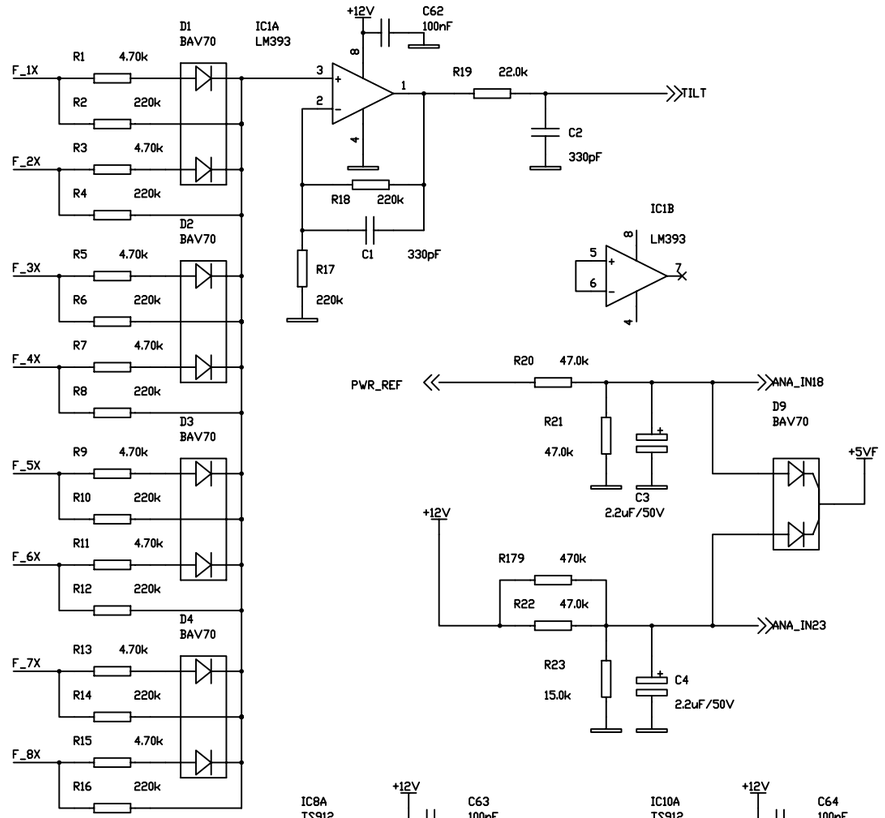


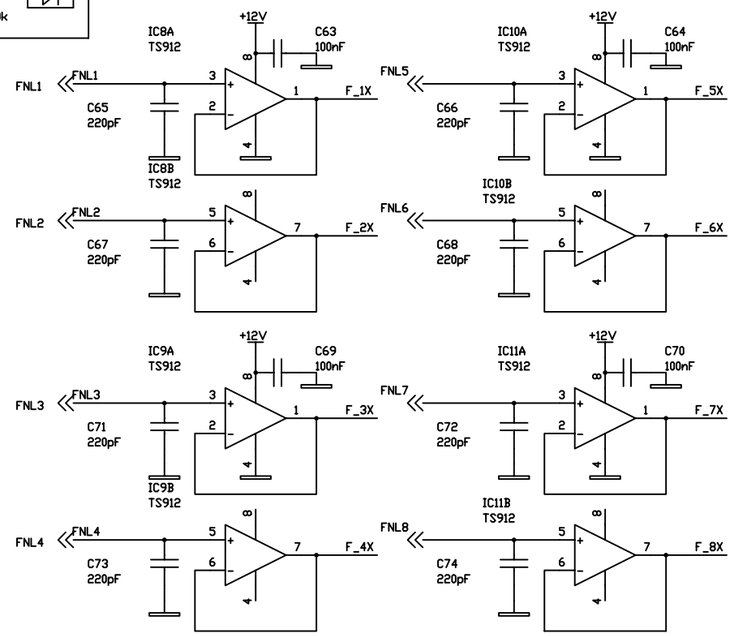
SHEET	2	3	4	5	6	7	8	9	10	11				
REV.											Rev.			Date
Arch.			Dwg. G. Ocera								Date 16/06/04	TITLE SENSE BOARD		
			Chkd.											
electrosys											Scale	Tolerance	DWG.n. 405461410 SE	
													Format A4	Sheet 1 | 1

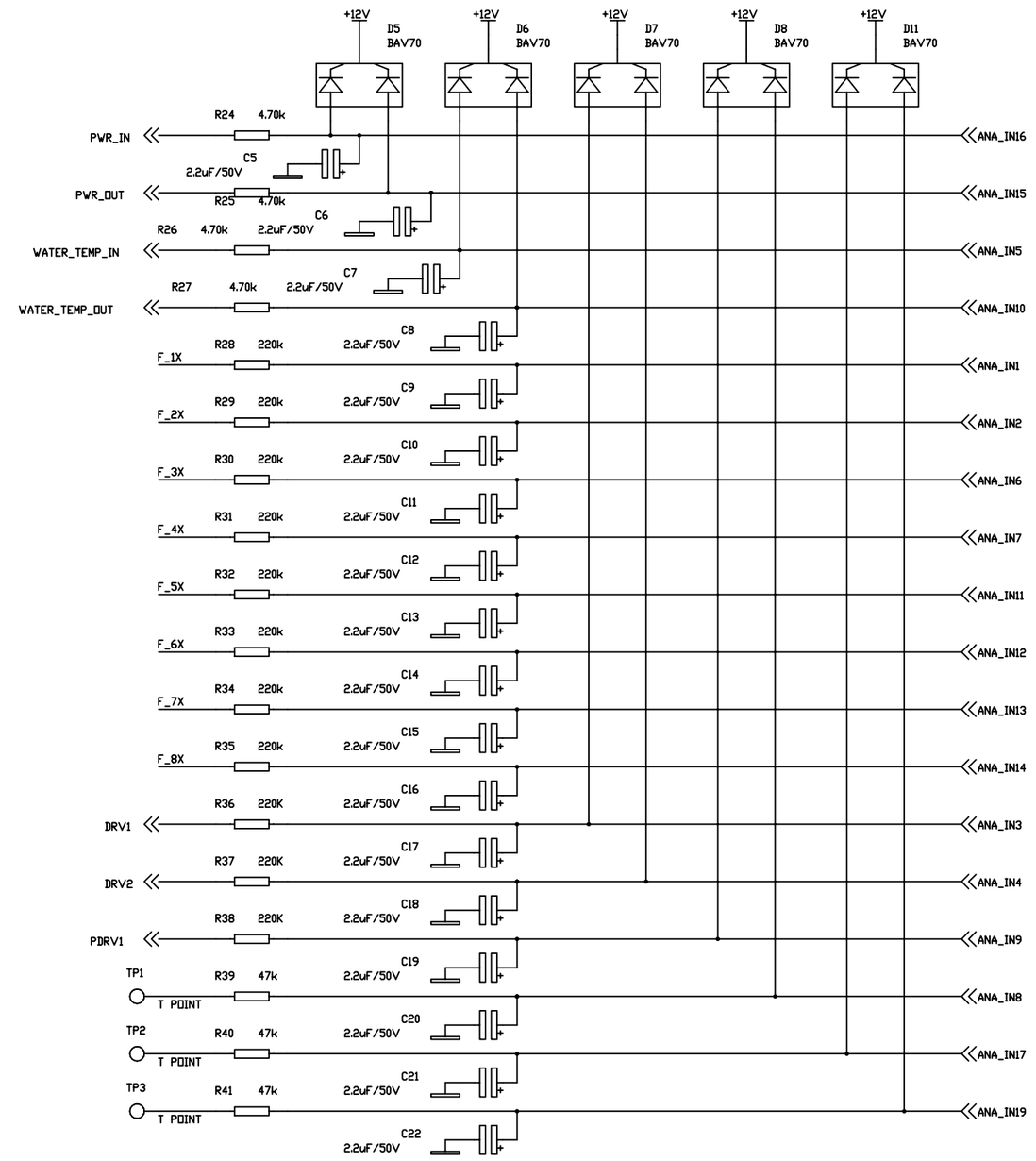


SHEET	2	3	4	5	6	7	8	9	10	11			
REV.											Rev.		Date

Arch.	Dwg. G. Ocera	Date 16/06/04	TITLE SENSE BOARD
	Chkd.		DWG.n. 405461410 ST
electrosys	Scale	Tolerance	Format A4 / Sheet 1 | 1







U1	2 - 3 NORMAL POSICTION 1 - 2 FACTORY TEST
U2	CLOSED
U3	OPEN
U4	OPEN

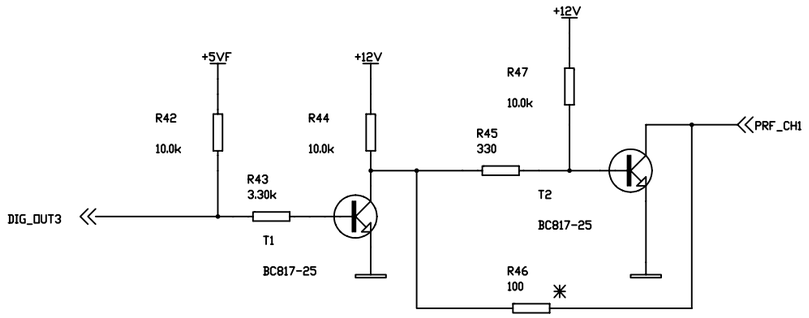
SHEET	2	3	4	5	6	7	8	9	10	11	C	PM 09/020	29/01/09
REV.											B	PM 06/059	06/06/06
											Rev.		Date

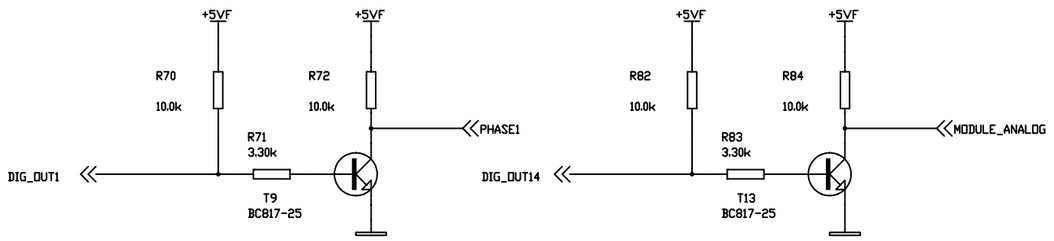
Arch.
Dwg. Piero Mascia
Chkd. Piero Mascia
Date 29/01/09
29/01/09

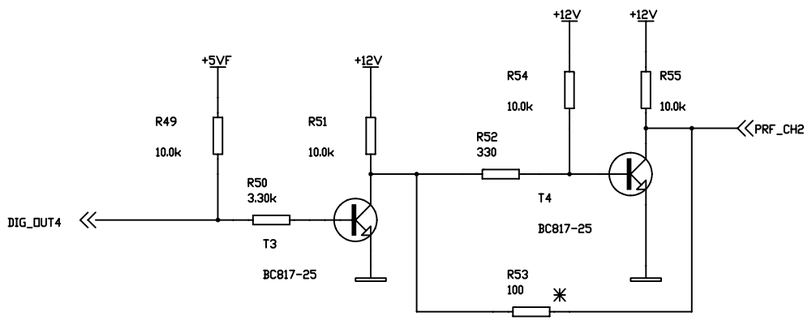
TITLE
MODULE FIELD INTERFACE

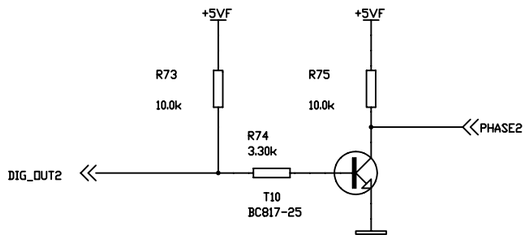
DWG. n. 405461811SE

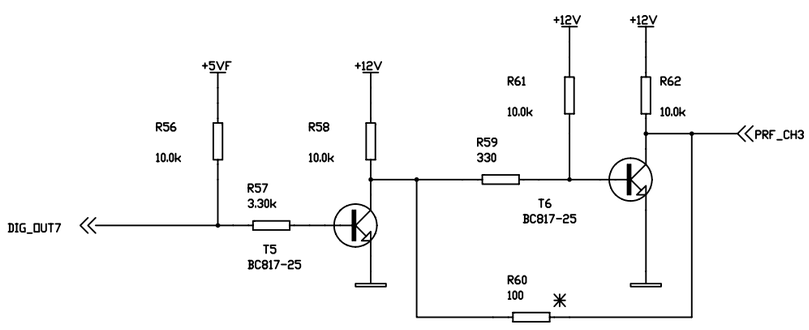
electrosys
Scale
Tolerance
Format A3
Sheet 1 | 5

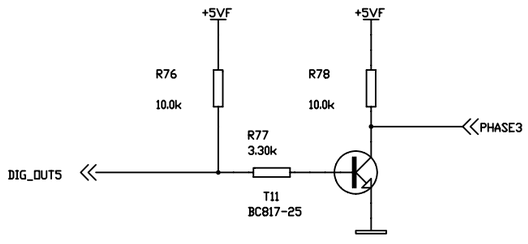


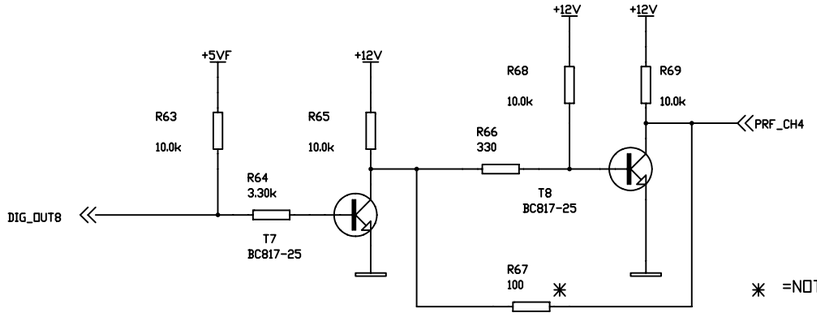


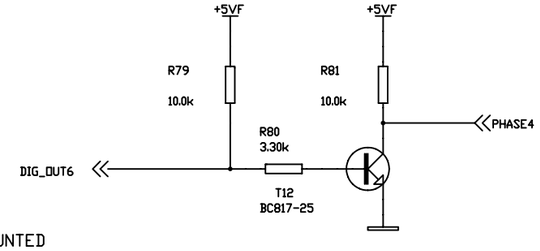






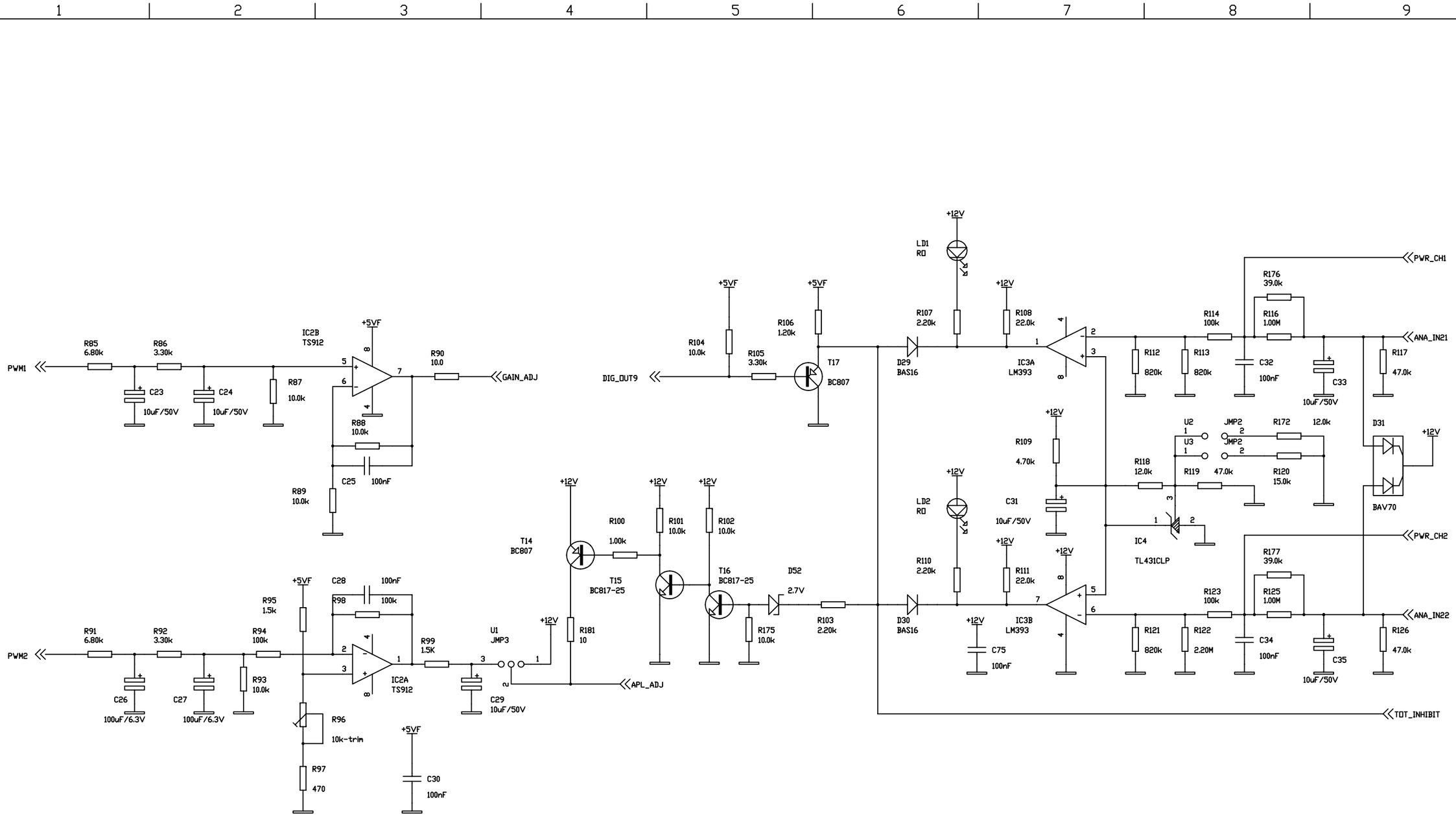






✳ =NOT MOUNTED

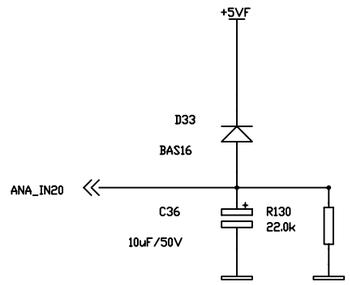
DWG. n.	TITLE
405461811SE	MODULE FIELD INTERFACE
electrosys	Scale / Format A3
	Sheet 2 | 5

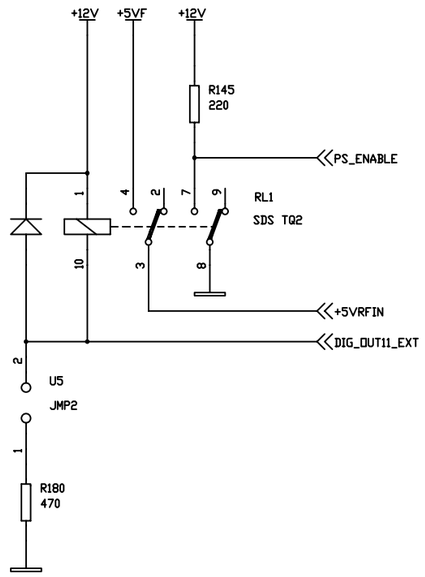


DWG. n.	TITLE
405461811SE	MODULE FIELD INTERFACE

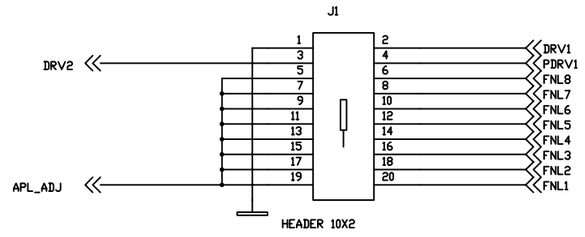
electrosys

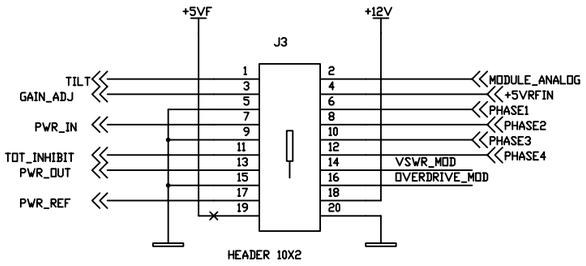
Scale	Format
	A3
Sheet	3 | 5

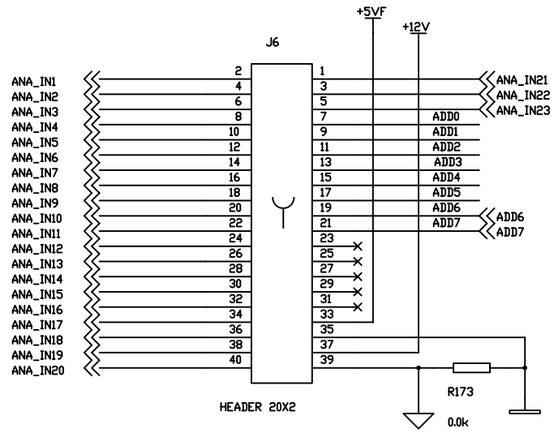


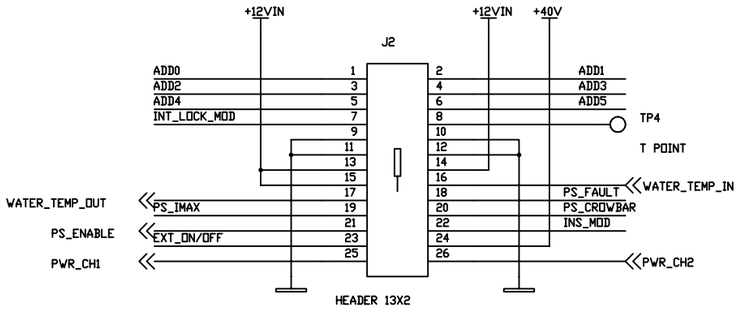


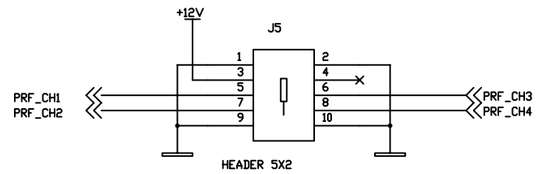
DWG. n.	TITLE
405461811SE	MODULE FIELD INTERFACE
electrosys	Scale / Format A3
	Sheet 4 | 5

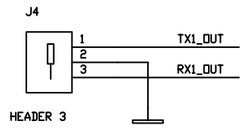


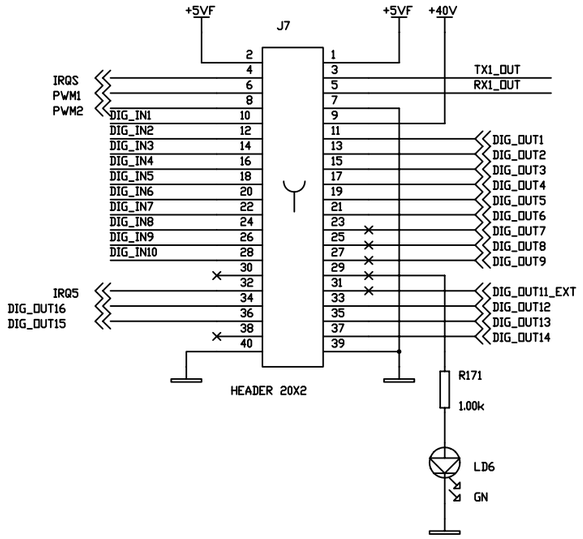


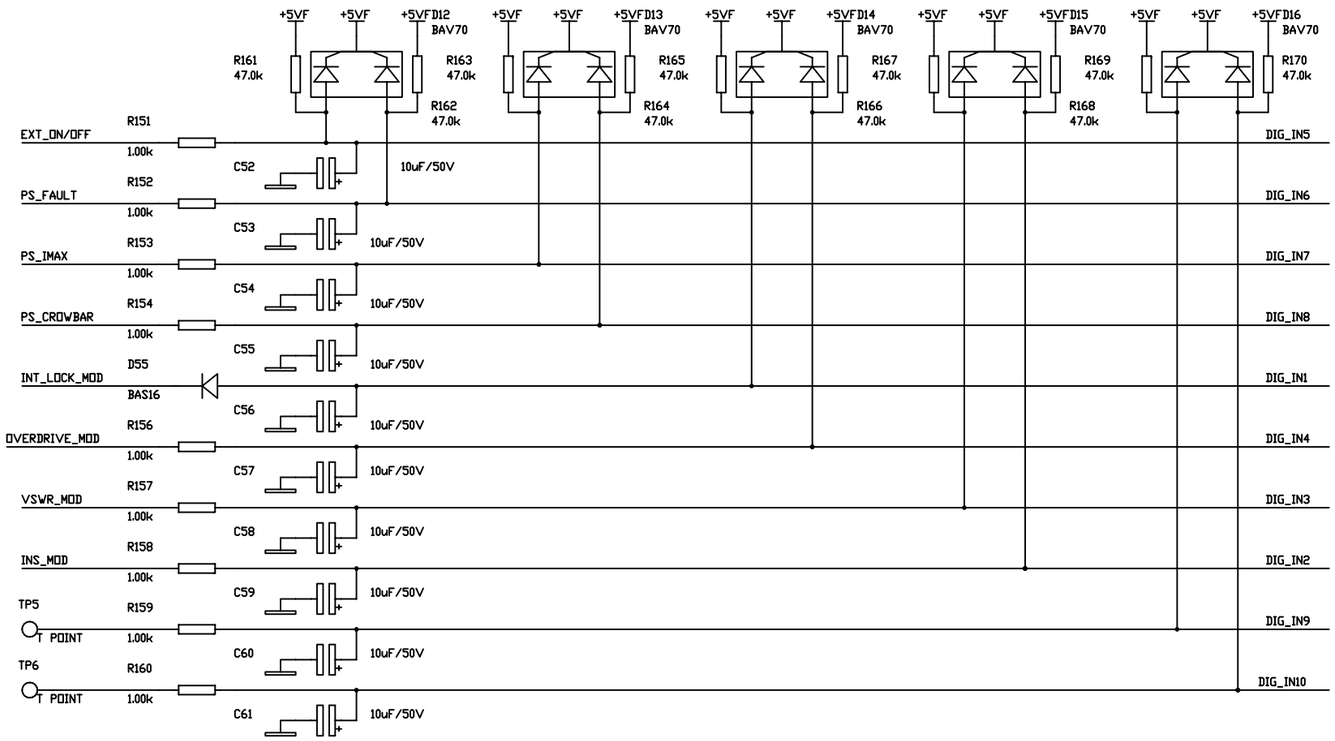




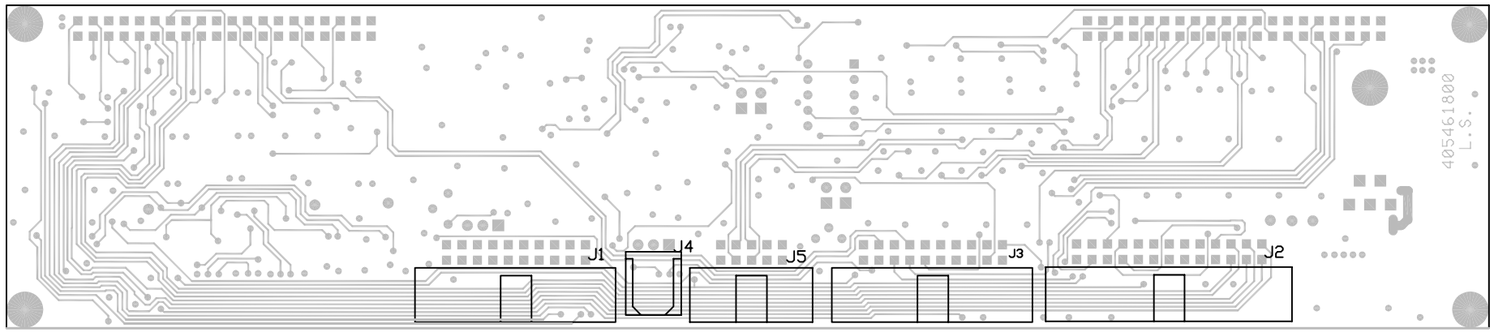


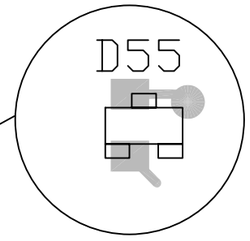


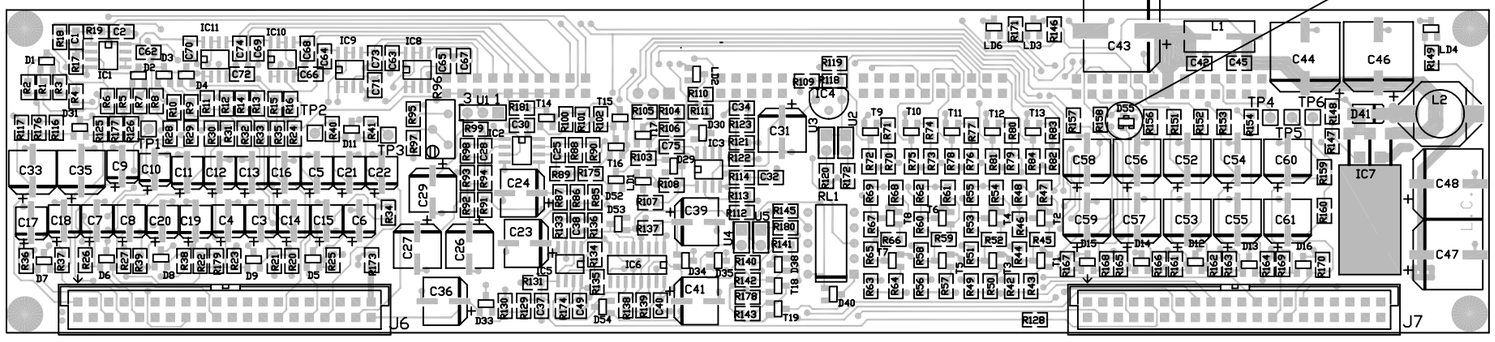




DWG. n.	TITLE
405461811SE	MODULE FIELD INTERFACE
electrosys	Scale / Format A3
	Sheet 5 | 5







SHEET	2	3	4	5	6	7	8	9	10	11		A	PM 05/063	07/06/05
REV.													EMISSION	19/02/04
												Rev.		Date
Arch.			Dwg. Mauro Tortelli									Date 07/06/05	TITLE FIELD INTERFACE	
			Chkd. Mr Cosen									07/06/05		
Electrosys													DWG. n. 405461811ST	
							Scale					Tolerance	Format A3	Sheet 1 | 1

Vboost
Ingresso da 200
a 450V pot 28W
D1 US1M
SI1 1A
TP2
MP2
C1 100nF 630V
C2 100nF 630V
R2 180K
R4 180K
R5 180K
R6 180K
R7 180K
C125 22nF 250Vac Y2
C135 220nF
MP204
MP203
T5
T-MBR12
C3 220nF
R256 100R
MP202
D60 SS14
MP205
R255 10K
D61 SS14
Q21 BC807
MP201
R1 10K
Q19 IPD90R1K2C3
MP3
D62 US1M
D3 US1M
MP5
T1
D2 12CWQ10FN
MP4
C5 470uF 25V
C6 470uF 25V
TP1
+12Vserv
MP1
Ov. C = 3.2A, C.C. = 0.4A
Tsalita 110mS Cload max = 7mF
L1 10 uH
TP3
+12V
U1 NIS5112D2R
Vcc OUT OUT OUT GND dV/dt Enb/Tmr Curr Lim
R3 27R
MP172
C4 4.7uF
C134 4.7uF
C133 4.7uF
TP4
MP7
C7 1uF
Enb12V
MP10
MP6
C118 4.7uF
C8 4.7uF
C9 4.7uF
R8 220R
MP8
MP15
D5
MP9
NOTA 1
BAV70
TP5
TP6
+12Vcc
T-MB1P2S-30W
MP12
D4 S100
R10 0R
MP16
C10 4.7uF
C11 4.7uF
R11 100R
MP17
R12 200R
C12 4.7uF
R13 2.2K
MP14
+5Vref
MP13
MP18
R14 2.2K
R15 8.2K
Loop
C13 220pF
U2 UCC2801D
COMP REF FB VCC CS OUT RC GND
MP19
MP20
D53 SS14
Q1 IPD90R1K2C3
R16 100R
C15 470nF
R18 33K
C16 220pF
MP23
C17 4.7nF
R19 220R
MP24
R21 5.1R
R20 5.1R
SYNC-1
R248 47R
Vref=2.5 1.6%
Ilim = 0.38A
Fo = 100 KHz
R23 4.7K
U3 FOD2742A
NC LED C FB E COMP NC GND
MP171
Vref = 2.495 0.5%
MP21
MP22
R17 38.3K 0.1%
R22 10K 0.1%
C14 220pF
C18 10nF
MP25
R24 220K
MP26

- Alimentatore Servizio -

MP188
MP189
Q18 BC817
R246 470R
R247 330R
MP190
MP193
Q17 BC807
SYNC-1
R240 470R
MP192
R239 330R
t = 750nS 1V
R243 10K
+12Vcc
C123 220pF
C122 220pF
MP191
MP194
R245 1K
R238 1K
U28 LM555CM
GND Vcc TRG DISH OUT THRE RES CONTRV
R242 5.6K
MP195
R244 6.2K
SYNC-2
Verifcare
100KHz +/-5%
e simmetria
TP26
MP198
R241 4.7K
MP197
C119 4.7uF
C120 10nF
D52 BAV70
C121 1nF
MP196

- OSCILLATORE per Fo -

VinAC1
VinAC2
D6 US1M
D7 US1M
MP170
Vim 172 Vac
soglia =
149Vac
PZ5
MP27
D8 BAV70
R25 82K
R26 82K
R27 82K
R28 82K
R29 82K
R30 10K
MP30
R31 10K
MP28
PFC off
+12Vcc
U5B LM2904D
+5.6V
MP31
U4A LM2904D
MP29
ViL-OFF
+12Vserv
MP34
Enb12V
comando 12V off
Q3 BSS138N
ISO1 SFH690BT
MP39
MP168
R44 10K
R35 3.3K
R38 33K
Ritardo
circa 1.45S
R32 4.7K
U4B LM2904D
C19 470nF
R33 220K
MP32
MP33
R39 1K
R36 680K
C20 470nF
MP35
MP36
R41 17.8K
C21 1uF
470R
R43
Q4 BC817
D9 BAV70
C22 2.2uF
R42 10K
U5A LM2904D
R37 4.7K
MP37
MP38
Ritardo circa 1.75S
R34 1K
RL
Q2 BC807
MP169
R40 680K
D10 BAV70
C23 2.2uF
BAV70
D11
- COMANDO RELAY -
MP40
470R
R45
MP41
DZ3 BZX384-C16
- OVER VOLTAGE -
DZ2 BZX384-C5V6

NOTA1 - ATTENZIONE la tensione 12Vcc occorre verificare che in qualsiasi condizione di carico dell'alimentatore di servizio (per diverse condizioni dell'uscita +12V) sia sempre compresa fra 12.7V e 14.5V.

SHEET	2	3	4	5	6	7	8	9	10	11	A	EMISSION		28/03/12
REV.											Rev.			Date

Arch.	Dwg. MB Ele	Date 30/09/10	TITLE PS AC/DC Converter 230Vin/50Vout
	Chkd. MB Ele	30/09/10	DWG. n. 1703220004ED
electrosys	Scale	Tolerance	Format A3 / Sheet 1 | 5

PF1 PZ1009
PF2 PZ1009
SI2 16A
K1 TOP4GS3/90 6.35 OR
RV1 SIOV-S20K300E2
RV2 SIOV-S20K300E2
RV3 SIOV-S20K300E2
RV4 SIOV-S20K300E2
C27 470nF 275V
T2 F-MB3M3-10A
MP89
MP126
MP62
MP86
R47 180K
R48 180K
R49 180K
R54 180K
R57 180K
VinAC1
VinAC2
C24 22nF 250Vac Y2
C30 22nF 250Vac Y2
C33 22nF 250Vac Y2
Pot. max diss. 12W
D16 GSIB2560
MP152
MP42
+Vin
D12 S3M
R237 22R 5W
R46 22R 5W
MP154
MP155
L2 L-MB330U-10A
D47 S3M
RL
K2 Relè RTH
C28 2.2uF 520V / 560V
C29 470pF 2000V
PCondM = 14W
PCondN = 5W
MP153
R58 0.03R
R59 0.03R
R62 0.03R
R63 0.03R
ISH-
ISH+
PM = 1.4W PN = 0.9W
MP130
TP9
D15 SS14
R50 15R
R52 15R
R55 15R
IS12
Q5 SPW35N60CFD
R252 47R
MP230
D55 US1M
MP229
R251 47R
DZ5 1N5359B
C126 1uF
R60 10K
TP7
PCondM = 6W
L3 L-MB6U-5A
MP156
TP11
TP10
MP129
D17 NON MONTARE
D54 RHRP1560
IS7
IS8
Q6 SPW24N60CFD
Pmos = 4W
RHRP1560 D13
D14 RHRP1560
D48 IDH06SG60C
IS9
IS10
IS11
ML5
ML6
C25 330uF 450V
C26 330uF 450V
C31 330uF 450V
C32 330uF 450V
R51 15R
R53 15R
R56 15R
MP127
R61 10K
MP43
TP8
TP12
MP131
Vboost
NOTA - D17 (SS14)
deve essere montato se
Q6 = PW35N60CFD
ML4
MP128
R64 1K
R65 1K
MP147
U6 LM5112MY
IN-REF N/C1
INB OUT
VEE VCC
IN E/P N/C2
C34 100pF
C35 4.7uF
MP148
PWM
R76 330R
R84 18K
MP167
MP149
D18 BAV70
C42 220pF
U7 LM5112MY
D56 US1M
+12Vcc
C43 4.7uF
454nS < TrON < 842nS
MP133
R66 180K
R67 180K
R72 180K
R73 180K
R80 180K
R81 180K
R88 180K
R89 180K
R96 180K
R97 180K
MP134
MP163
Vovp
R103 10.5K
470pF C47
R102 12K
MP132
+12Vcc
Q7 BC807
t = 750nS 1V
R70 330R
C36 220pF
SYNC-2
MP135
MP136
R71 2.2K
MP45
MP46
R79 470R
MP138
R85 47R
R87 82K
C39 4.7uF
R95 12K
R100 91K
MP165
C45 2.2uF
C46 470nF
MP139
VrefPFC
C51 1uF
C52 1uF
Q8 BSS138N
PZ1
PFC OFF
MP141
C53 1uF
R110 82K
R111 82K
MP140
PFC off
MP142
Fo = 90KHz No sync
Fo = 100KHz Con sync
U8 L4981AXD
P-GND GDRV
IPK VCC
OVP COSC
IAC ROSC
CA-OUT SYNC/F-MOD
LFF P-OVLO
VRMS VFEED
MULT-OUT VA-OUT
ISENS SS
S-GND VREF
PWM
Vovp
LFF
ISH-
ISH+
+Vin
R68 180K
R69 220K
R74 180K
R75 220K
R82 180K
R83 220K
R86 180K
R90 220K
R91 220K
R94 1K
R98 180K
R101 100K
R104 15K
C48 470nF
C49 470nF
TP13
MP151
MP157
VrefPFC
R77 27K
C37 470pF
MP150
R78 680R
MP158
C40 470pF
R93 33K
C44 N.M.
MP162
MP166
R99 1.5K
MP159
MP161
MP160
172 / 276 V
=> 2 / 3.22V
C38 1nF
C41 100pF
R92 27K
MP164
R105 3.6K
C50 470nF
MP143
5.1V con Io= 5.7A
R107 2.2K
DZ4 BZX384-C5V1
U9A LM2904D
MP137
R106 1K
R108 1K
R109 47R
C54 100nF
C55 10nF
R112 68K
C59 100nF
MP144
MP145 MP146
IoSH+
IoSH-
U9B LM2904D
VrefPFC

DWG. n.	1703220004E
TITLE	PS AC/DC Converter 230Vin/50Vout
Scale	
Format	A3
Sheet	2 5

electrosys

V ILim = 0.432
con Vo = 48V

REF-ILim = (Con taratura
48V:5.75V con OUT+ = 48V;
1.31V con OUT+ = 0V; Con
taratura 40V:6.9V con OUT+ =
40V; 3.23V con OUT+ = 0V)

+VOUT, R216 39K, MP217, G = 6.38, U25A LM2904D, +12Vserv, C113 470nF, MP218, R214 470R, +5Vserv, PG ref, R213 470R, PGref deve avere tararato a Vout/10, R219 3K, R224 10K, R217 1K, R222 22K, +5Vserv, REF-ILim, TP23, R212 3K, R218 10K, MP219, C114 1nF

REF-ILim = 5.751V
con Vo = 48V

R249 2.2K, TP24, G = 2.6 +/-23%, U24B MC33272AD, MP226, R225 1.2K, MP223, Mis.I, Mis.I=133/3 mV/A, Con 50A = 2.217V, C111 10nF, R250 12K, +5Vserv, MP222, R195 2K, R223 4.2K, R221 1.33K, MP220, R215 4.7K, MP225, MP221, C112 1nF, U24A MC33272AD, REF-ILim, +12Vserv, C109 470nF, R260 4.7K, R220 47K, Ilim, ISO3 SFH690BT, MP224

Tarare R195 in modo tale che la tensione di TP24 (V) = Iout (A) x 0.0818 per esempio con Iout=20A
TP24=1.637V

- *FOLDBACK CORRENTE* -

+5Vserv, +12Vserv, D49 BAV70, MP216, R197 4.7K, PGref tar., G = 0.744, U25B LM2904D, R233 2.4K, Tar. Vo, R231 470R, D51 BAV70, C95 1nF, R230 15K, R228 N.M. MP215, R229 15K, C124 10nF, MP213, C139 220pF, Tar. Vo = 5V => 5V:
Tar. Vo = 0V => 5+3.72 = 8.72V
Inpedenza comando esterno 4.7K segnale da 0 a 5V

R232 34K, Ilim, MP227, R261 4.7K, R262 470R, MP228, D50 BAV70, R150 100K, R156 10K, Loop PWM, R152 4.7K, MP79, C76 4.7uF, R157 402K, C138 220pF, MP81, C70 1uF, C78 1nF, U14 UC3856DW (CL SS, VREF, CS-, CS+, EA+, EA-, COMP, CT, SH-DW, VIN, B OUT, VC, GND, A OUT, SYNC, RT), VREF, IN2, IN1, MP75, R151 10R, R153 10R, +12Vcc, C72 4.7uF, C73 4.7uF, MP80, 24K R161, MP209, MP210, BAV70 D58, C127 150pF, MP208, BAV70 D59, R227 1K, R205 4.7K, MP211, R226 2.2K, C116 220pF, SYNC-2, Q16 BC807, R211 330R, MP212, +12Vcc

VREF, Q15 BC817, MP77, R160 1.65K, R204 470R, Ipp+, Ipp-, C104 470pF, R9 2.2K, MP69, ON-OFF, MP58, R141 15K, MP63, R142 3.3K, ISO2 SFH690BT, MP65, D27 BAV70, MP68, MP60, R143 15K, Q13 BC817, ViL-OFF, R144 15K, R148 4.7K, PZ2, MP70, 1nF, C69, R149 4.7K

+VOUT, R264 22K, R263 22K, MP235, R134 100R, D63 BAV70, MP56, +12Vserv, MP214, C64 4.7uF, DZ1 BZX384-C12, +12Vcc, R259 22K, R146 4.7K, U13 FOD2742A/B (NC, C, E, NC, LED, FB, COMP, GND), VREF, Loop PWM, MP59, R137 2.2K, C117 220pF, COMP, C66 1nF, Vref = 2.495 0.5%, C68 33nF, MP66, MP67, R147 150K, R193 2K, +VOUT, R140 91K, MP61, R145 4.53K, R135 34K

- *Amplificatore di errore* -

Tara da 3/.5 a 52.5V.
Per controllo esterno
tarare a 50V.

Frequenze oscillatore 81 KHz non sincro, con sincro 100KHz D=45%max

MP53, +12Vcc, C63 470nF, U11 L6384D (IN2, IN, VCC, DT/SD, GND, VBOOT, HVG, OUT, LVG), C62 220pF, 30K R138, *, MP51, U10 LM5112MY (IN-REF, INB, VEE, IN, N/C1, OUT, VCC, N/C2, E/P), MP52, GmosH2, MP54, C61 1uF, MP55, R133 4.7R, R136 4.7R, R139 4.7R, SmosH2, D25 US1M, D26 US1M, Vboost, C65 100nF 630V, MP57, MP207, R257 1K, R253 390R, MP64, MP96, U12 LM5112MY, GmosL2, C67 1uF, PZ3, NOTA 1, MP233, MP232, C136 47pF, C128 150pF, Ritardo introdotto allo spegnimento del mosfet 150nS

MP73, +12Vcc, C74 470nF, U16 L6384D (IN1, IN, VCC, DT/SD, GND, VBOOT, HVG, OUT, LVG), C75 220pF, 30K R158, *, MP71, U15 LM5112MY, MP72, GmosH1, MP74, C71 1uF, MP76, R154 4.7R, R155 4.7R, R159 4.7R, SmosH1, D28 US1M, D29 US1M, Vboost, C77 100nF 630V, MP78, MP206, R258 1K, R254 390R, MP83, U17 LM5112MY, MP82, GmosL1, C79 1uF, D57 US1M, +12Vcc, PZ4, NOTA 1, MP234, MP231, C137 47pF, C129 150pF, Ritardo introdotto allo spegnimento del mosfet 150nS

NOTA1 - ATTENZIONE occorre verificare il ritardo fra il fronte di discesa di GmosL ed il fronte di salita del rispettivo GmosH. Il ritardo fra la fine della discesa di GmosL e l'inizio della salita di GmosH deve essere compreso fra 160ns e 200ns, se non lo fosse tarare ponticellando le piazzole di PZ3 e PZ4 (1-2 per aumentare e 2-3 per diminuire). Il ritardo fra il fronte di discesa di GmosH ed il fronte di salita del rispettivo GmosL è meno critico e deve essere compreso fra 300ns e 500ns.

* NOTA - R158 e R138 devono essere da 37.4K se se Q 9, Q10, q11 e Q12 sono = PW35N60CFD

DWG. n.	TITLE
1703220004E	PS AC/DC Converter 230Vin/50Vout
electrosys	Scale / Format A3
	Sheet 3 / 5

Vboost
TA1-1
TA1
TA1-3
TP14
D19 SS14
GmosH1
MP47
R113 22R
R115 22R
R117 22R
Q9 SPW24N60CFD
PcondM = 9W
PcondN = 5W
R119 10K
TA2-1
TA2
TA2-3
MP180
TP15
D20 SS14
GmosH2
MP48
MP177
R114 22R
R116 22R
R118 22R
Q10 SPW24N60CFD
PcondM = 9W
PcondN = 5W
R120 10K
SmosH1
SmosH2
C60 2.2uF 520V / 560V
TP16
D23 SS14
MP49
R121 47R
R124 47R
R127 47R
Q12 SPW24N60CFD
PcondM = 9W
PcondN = 5W
R130 10K
TP17
D24 SS14
MP50
R122 47R
R125 47R
R128 47R
Q11 SPW24N60CFD
PcondM = 9W
PcondN = 5W
R131 10K
GmosL1
GmosL2
R123 0.05R
R126 0.05R
R129 0.05R
R132 0.05R
IoSH-
IoSH+
MP173
IS1
IS2
IS3
IS4
ML2
ML3
TP27
TP28
L5 L-MB6U-5A
T3
T4
T-MB400/48
T-MB400/48
MP176
MP175
MP185
MP184
R208 220R
R209 220R
R206 220R
R207 220R
C106 1nF
C105 1nF
D21 STPS80170CW
D22 STPS80170CW
Pmax 19W
Pmax 19W
ML1
IS6
IS5
L4 L-MB12U-50A
MP187
MP186
+VOUT
+VOUT
C56 1000uF 50V
C57 1000uF 50V
C58 1000uF 50V
C99 1000uF 50V
C100 1000uF 50V
C101 1000uF 50V
C102 1000uF 50V
C103 1000uF 50V
C130 1000uF 50V
C131 1000uF 50V
C132 1000uF 50V
J1 Boccola
OUT+
J2 Boccola
OUT-
+5Vserv
U27
IP+
IP+
IP-
IP-
Vcc
Vout
Filter
GND
Mis.I
ACS713ELCTR-30A-T
Mis.I=0.133/3 mV/A
Con 50A = 2.217V
R210 0.6mR
C108 470nF
C107 1nF
F1 PTC 0.5A
FCI 76384-303LF
JP1
F2 PTC 0.5A
FCI 76384-303LF
JP2

MP183
MP181
Ipp+
MP182
TA1-1
D43 SS14
D44 SS14
TA2-1
D45 BAV70
D46 BAV70
MP199
MP200
R203 19.6R
R202 19.6R
DZ7 BZX384-C4V7
DZ8 BZX384-C4V7
TA1-3
TA2-3
MP174
Ipp-

DWG. n.	TITLE
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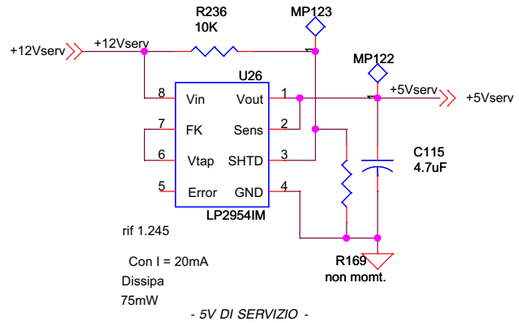
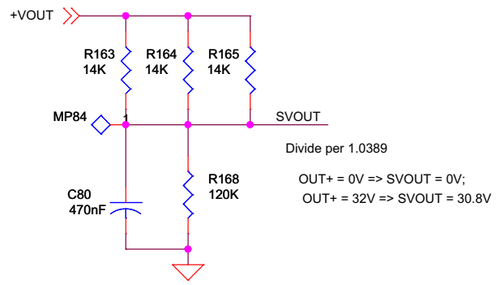
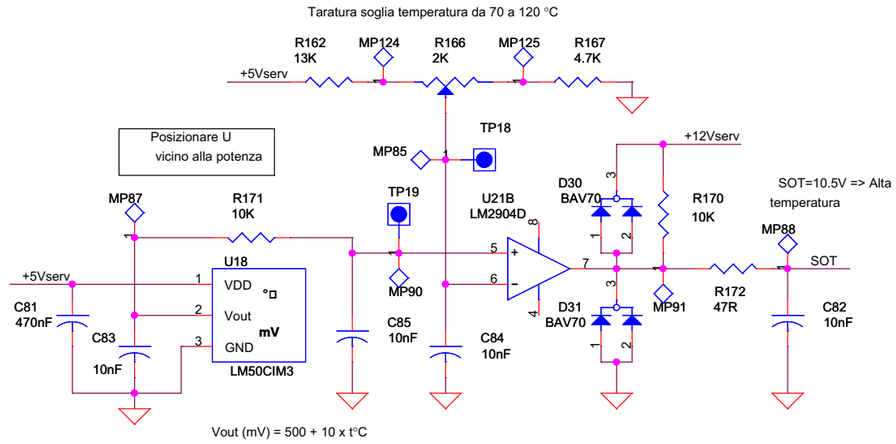


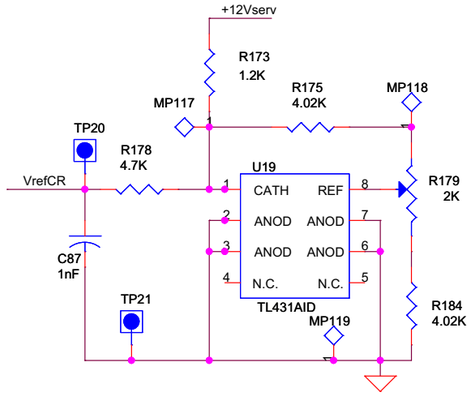
- *5V DI SERVIZIO* -



- *SEGNALE ANALOGICO Vout* -

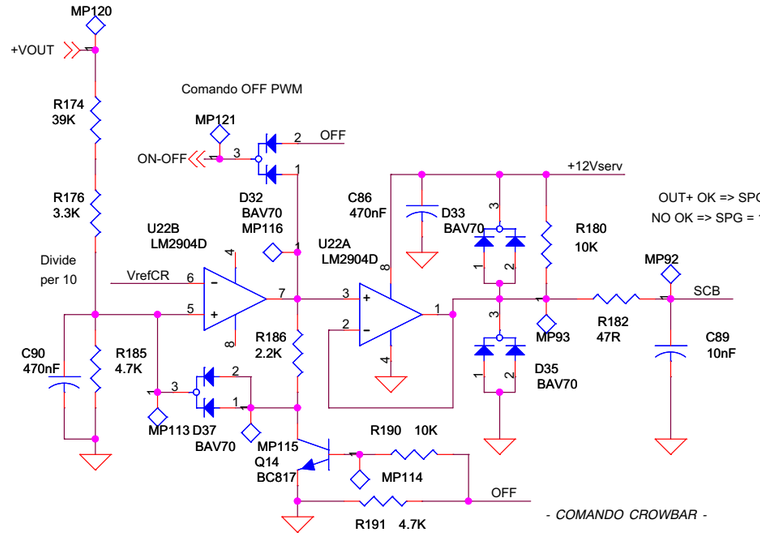


- *TERMOSTATO* -



- *RIFERIMENTO per CROWBAR* -

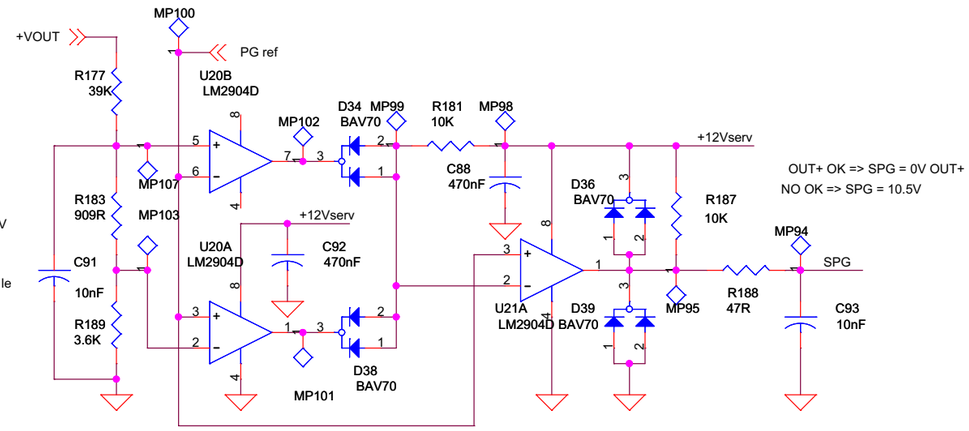
VrefCR, Estremi garantiti 4.35V e 5.89V, tipici 4.13V e 6.24V. La taratura si esegue operando su R179 e misurando la tensione di TP20. Il crowbar interviene a VTP20 x 10.



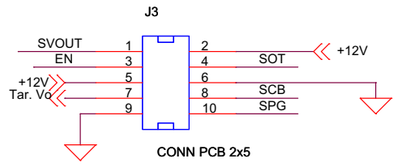
- *COMANDO CROWBAR* -

Resetta ilcrowbar con il comando OFF

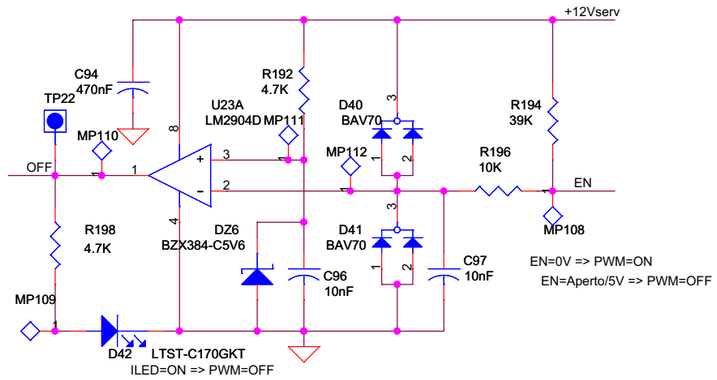
Con OUT+ = 48V Soglia bassa = 41.38V Soglia alta = 51.39V per OUT+ diverse le soglie si spostano in proporzione.



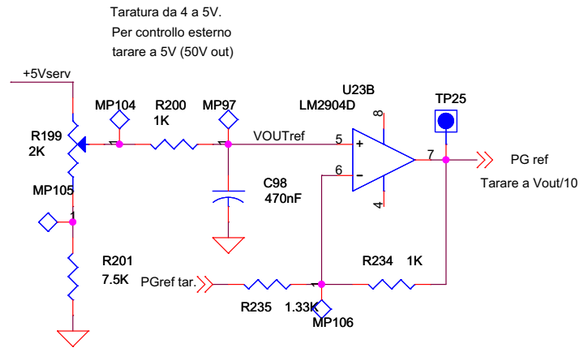
- *POWER GOOD* -



- *CONNETTORE SERVIZIO* -



- *COMANDO SPEGNIMENTO* -



- *RFERIMENTO TENSIONE PER POWER GOOD E FOLDBACK*-

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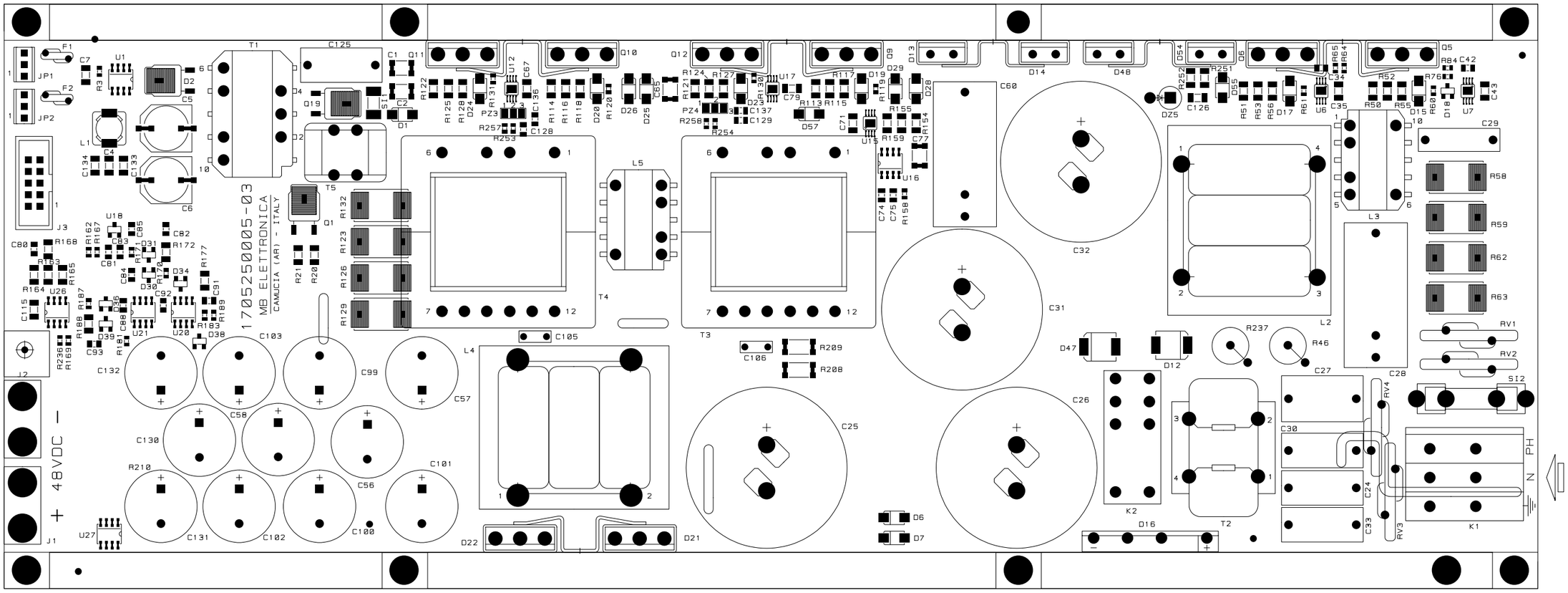
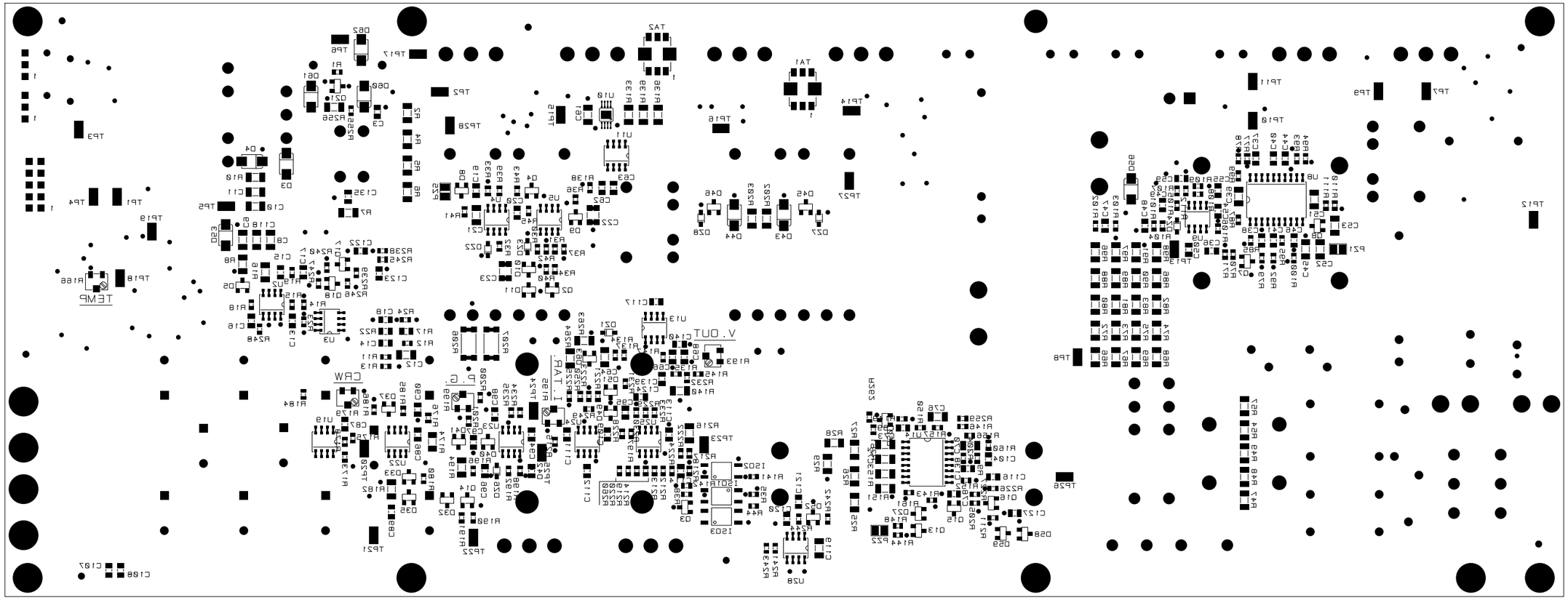


component side

SHEET	2	3	4	5	6	7	8	9	10	11	A	EMISSION	28/03/12
REV.											Rev.		Date

Arch.	Dwg. MB Ele	Date 30/09/10	TITLE PS AC/DC Converter 230Vin/50Vout
	Chkd. MB Ele	30/09/10	DWG. n. 1703220004CL
electrosys	Scale	Tolerance	Format A3 / Sheet 1 | 2



solder side

DWG. n.	TITLE
1703220004C	PS AC/DC Converter 230Vin/50Vout
electrosys	Scale: — Format: A3
	Sheet: 2 / 2