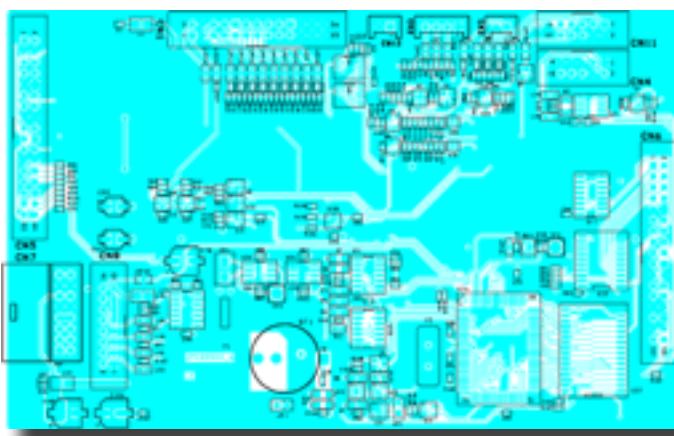
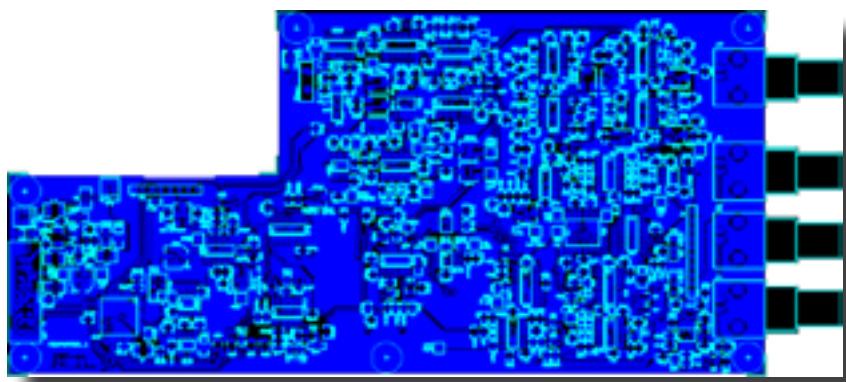


1 Indium series Functional blocks



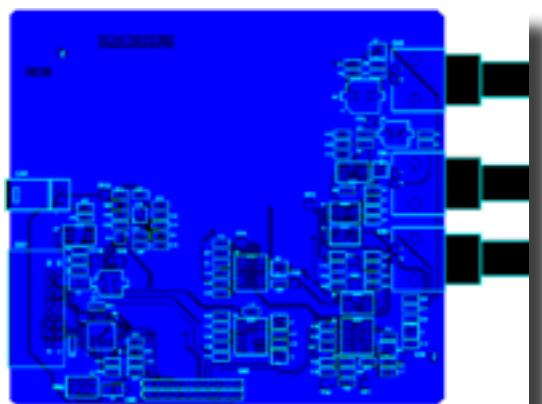
CPU BOARD

Its microprocessor manages and controls all the system functions. This board is equipped with ports for serial communication and in its memory the firmware that characterizes the version is loaded.



STEREO CODER

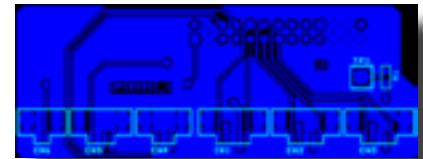
It includes MPX and auxiliary inputs, in addition to the section for handling stereo audio.



MPX

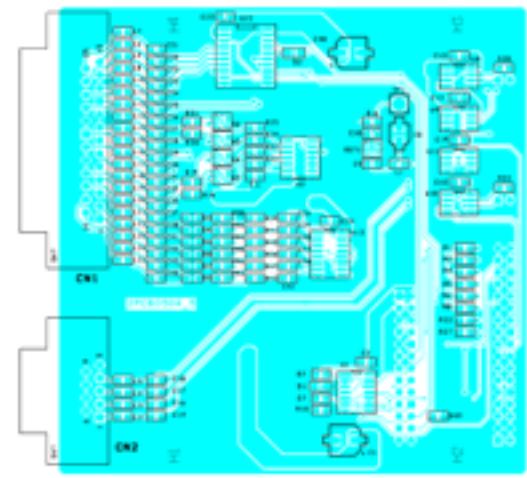
MPX signal processor board. It includes also connectors for auxiliary input and monitoring output.

CPU ADAPTER



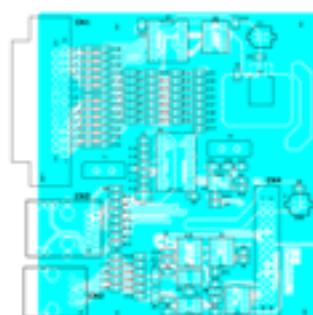
It's used for routing the cables from the CPU board to the other interconnected boards.

TC/TS PORT

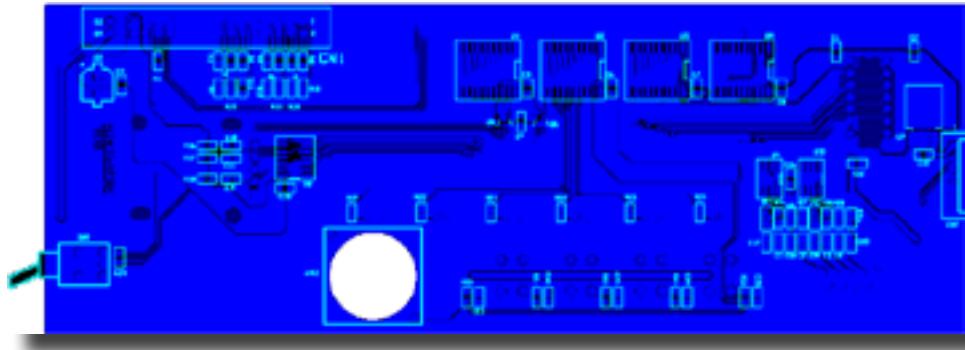


It acquires input signals (Telecontrol) and sends output signals (Telesignals). It also supports interlock signal and realizes the interface to the other equipment that compose the entire transmitter.

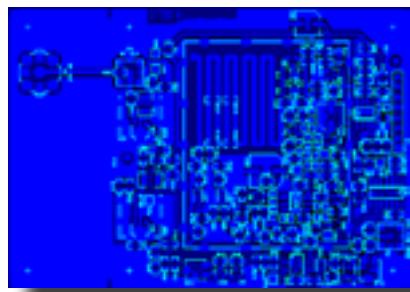
CHANNEL PORT (PROFILES)



It serves to acquire the parameters of the transmitter of which the device is the reserve. It also supports connections via standard TCP / IP.

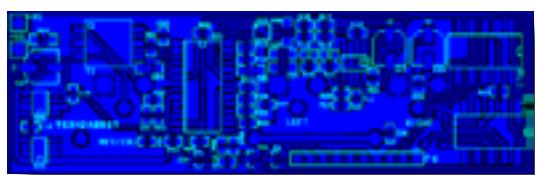


It's equipped with a rotary encoder with push button for navigation and selection in the menus. Its status LEDs show the operative conditions.

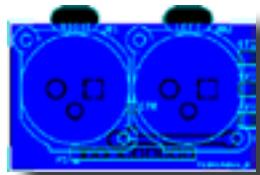


VCO

It's the Voltage Controlled Oscillator, that permits the frequency modulation of the RF signal (carrier) by audio signal.

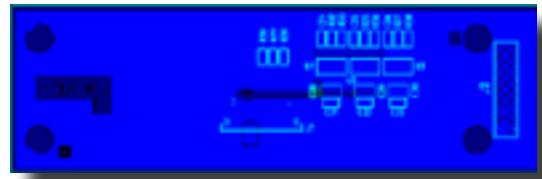
STEREO (L+R) /
AES-EBU INPUTS

It includes connectors for stereo input (L + R), both balanced and unbalanced, and the connector for AES-EBU digital input with its conversion electronics.

STEREO INPUTS
(L+R)

It includes connectors for stereo input (L + R), both balanced and unbalanced.

OLED ADAPTER



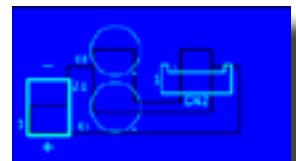
It's the OLED display adapter.

OLED



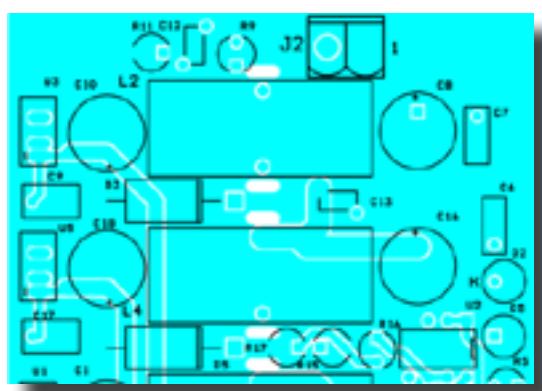
OLED display of user interface.

FAN STARTER

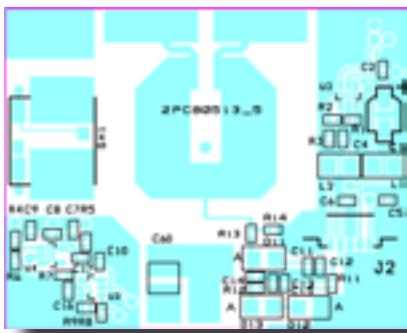


It balances the supply voltage for the cooling fans in order to ensure their start up in any condition.

FAN / RF DRIVER REGULATOR

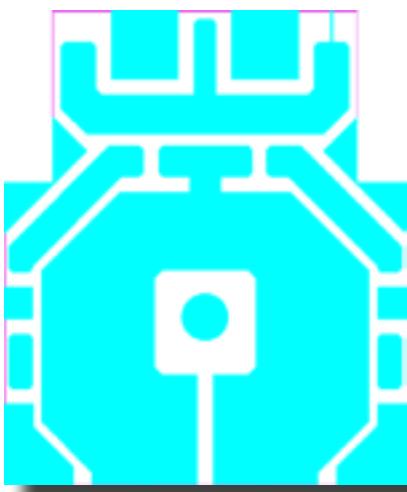


It consists of three sections DC/DC switching power supply that transform the voltage value from 30-50 VDC (applied at the input port) to 18-28 VDC necessary to supply the fans at variable speed. Thanks to this solution, many advantages are obtained: 1) in case of low environment temperature, the speed is relatively low, with an important increase of the life of fans; 2) less power dissipated from the fans; 3) less dust introduced into the apparatus; 3) possibility of overboost in case of excessive environmental temperature, with the possibility of extend the "on air" status even in extreme conditions. The speed of the fans is depending on the output voltage of this board, that is controlled by the microprocessor in the CPU board.



RF MODULE
(INPUT SECTION)

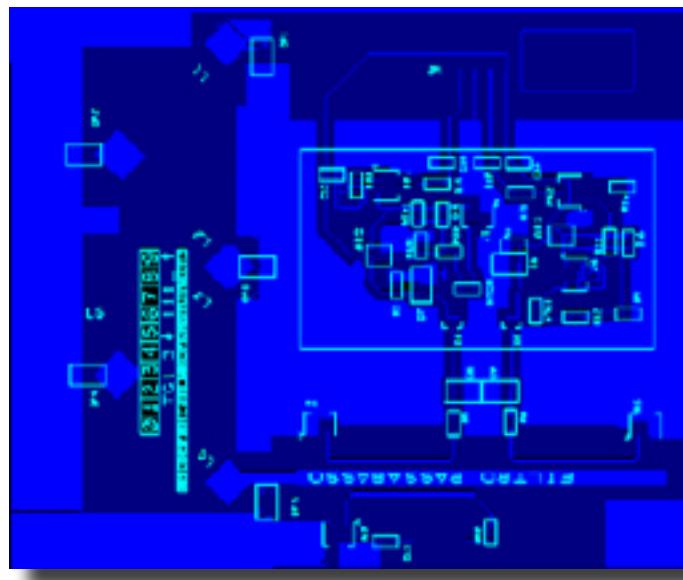
The input board of RF power amplifier realizes the input impedance matching between the 50 ohms input line and the complex impedance at the input port of the LDMOS device. This matching circuit is partially realized with discrete components (resistors, capacitors) and partially printed on the substrate of the board (input transformer/bal-un and inductors). The same board provides to generate the bias voltage applied to the gates of devices, to measure the drain current (thanks to high precision resistive shunt) and the temperature in the area close to the LDMOS. Thanks to the low RF power handled, the substrate is FR4.



RF MODULE
(OUTPUT SECTION)

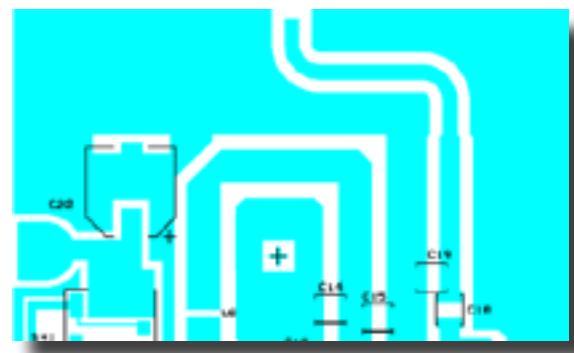
The output board of RF power amplifier realizes both the output impedance matching and the power supply connection. The impedance is matched by a planar transformer, in which the primary windings is connected to the low impedance output of the LDMOS (D-D) and the secondary windings is connected to the 50 ohms resistive output through a metal link. A high-Q mica capacitor is placed between the Drains, while another similar capacitor is placed between the output and the ground in order to compensate the internal capacitance of the LDMOS. The planar transformer realizes the transformation from balanced to unbalanced electrical configuration. The power supply connection (30-50VDC) is demanded to an inductor that applies the DC current to the center of the primary winding of the transformer. A bypass capacitor is applied between the DC side of this inductor and the ground, for the best RF rejection towards the power supply line.

LOWPASS FILTER WITH COUPLERS (150-300W)

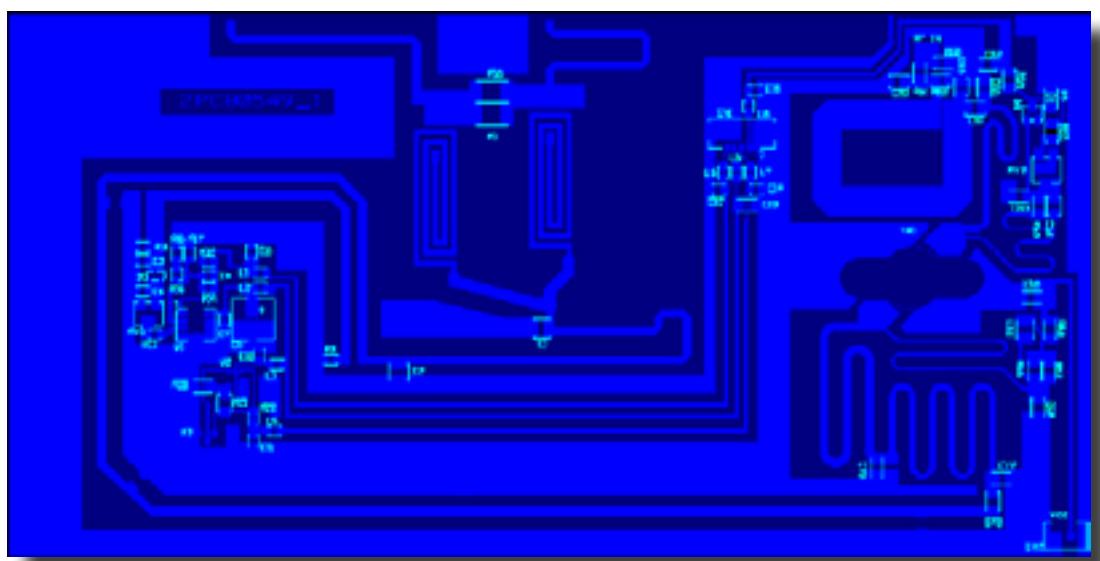


This board includes both the harmonic low-pass filter, and the directional coupler for forward and reflected power measurements. Thanks to the low-pass characteristic of the transfer function, the level of harmonics is reduced under the threshold indicated by the international standards. The low-pass filter is realized in a Butterworth design, with inductors and capacitors tuned to have a band frequency up to 112 MHz. Thanks to the directional couplers, a correct reading of forward and reflected power is possible, as well as the protection against excessive reflected power (threshold at 10% of maximum nominal forward power of the apparatus). The directional couplers are realized in coupled microstrip technique, with a directivity around 23 dB.

MONOLITHIC RF AMP. MODULE

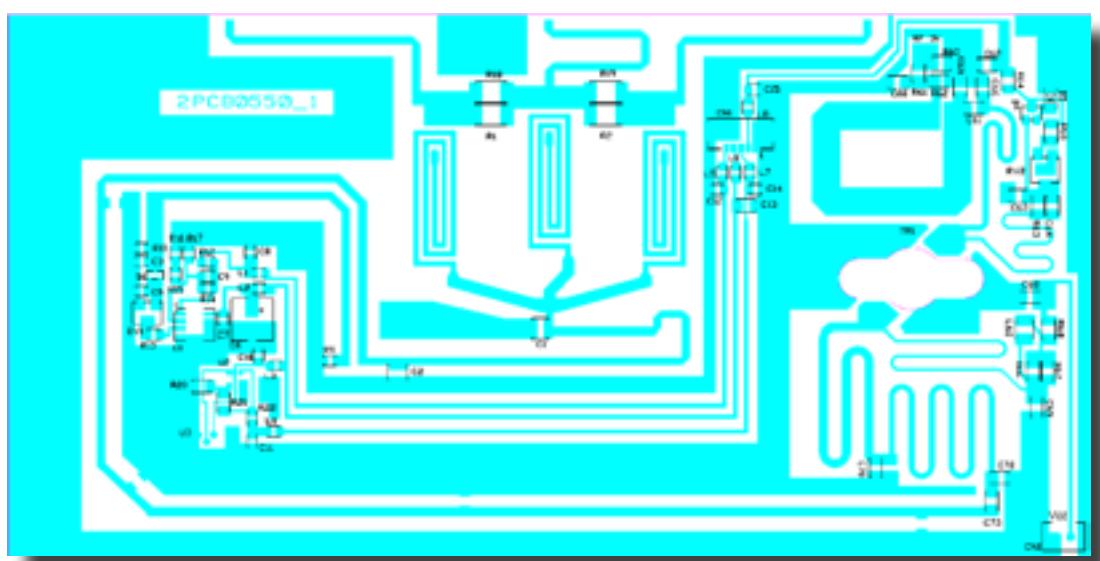


This board represents the RF power amplifier stage of 150-300 W transmitters. The board integrates both the input and the output impedance matching circuits, and provides to apply both the Gate bias voltage and the Drain power DC supply to the LDMOS amplifier device. A suitable filter is used in the drain current circuit, in order to avoid the propagation of RF signal towards the power supply.



2-WAY SPLITTER

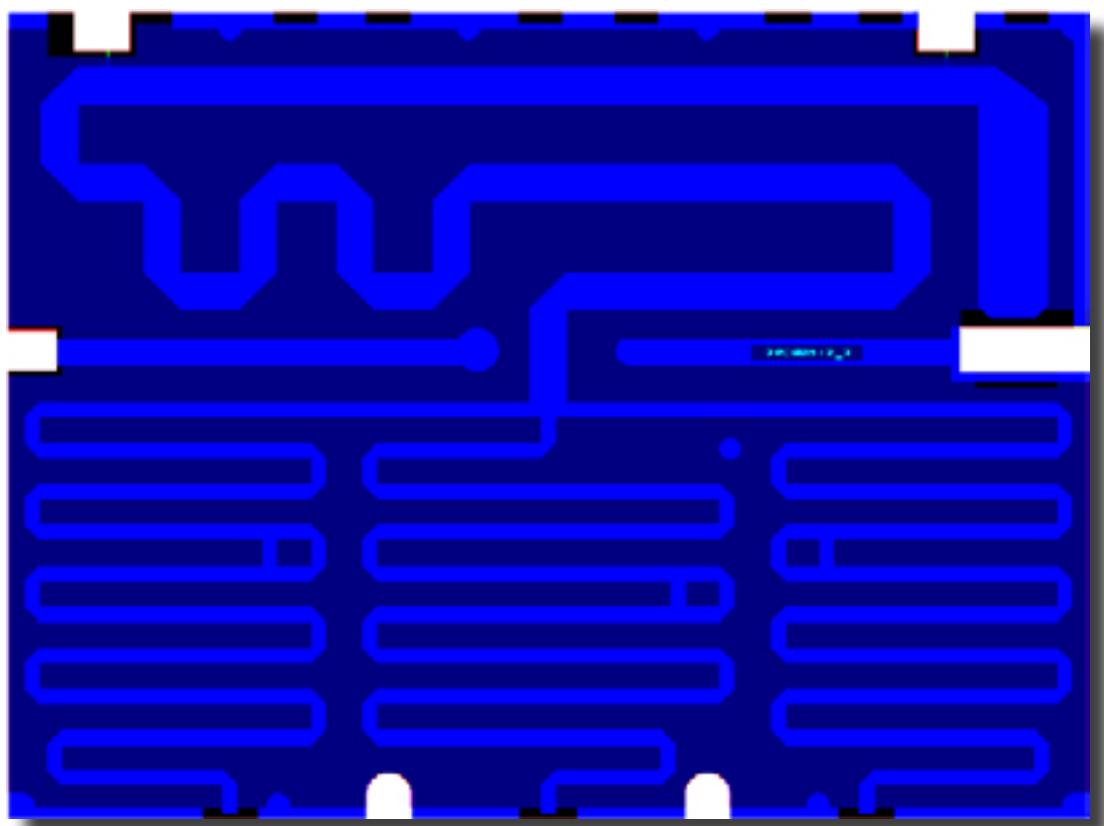
This board contains both the RF Intermediate Power Amplifier and the 2-way power divider that applies an identical value of driving signal to the two RF amplifiers of the power stage. A directional coupler measures the power level at the output of the IPA, allowing the CPU to actuate an efficient control and stabilization.



3-WAY SPLITTER

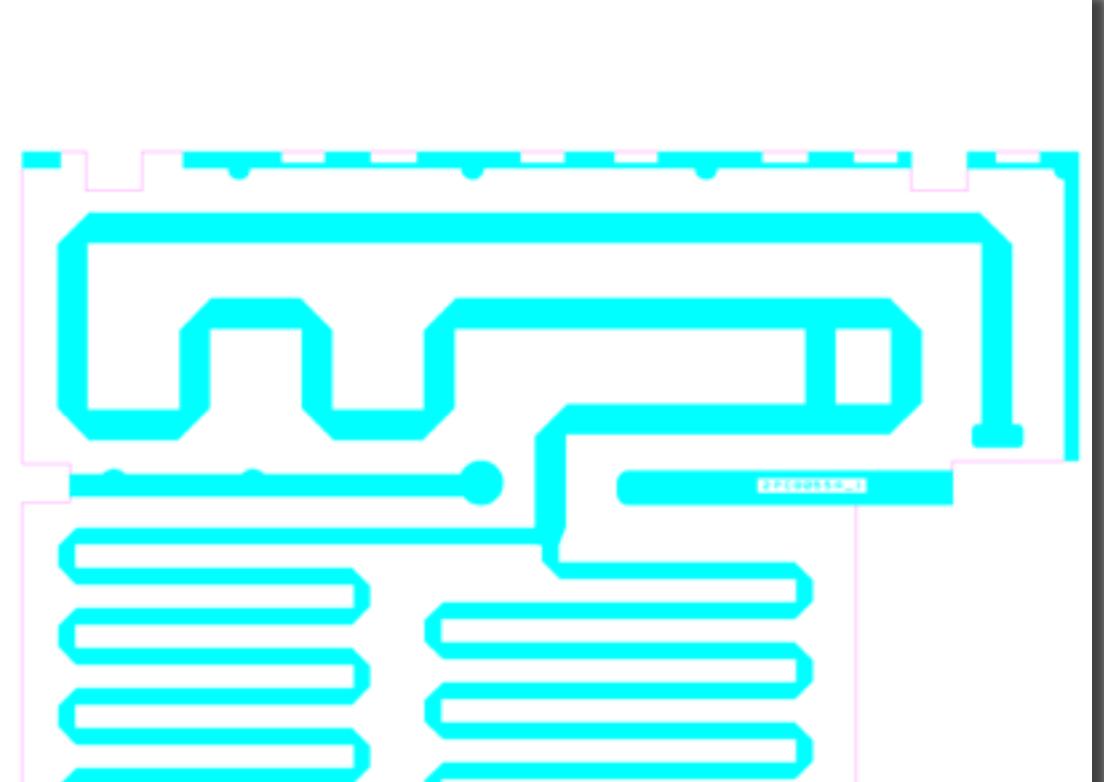
This board contains both the RF Intermediate Power Amplifier and the 3-way power divider that applies an identical value of driving signal to the two RF amplifiers of the power stage. A directional coupler measures the power level at the output of the IPA, allowing the CPU to actuate an efficient control and stabilization.

3-WAY COMBINER

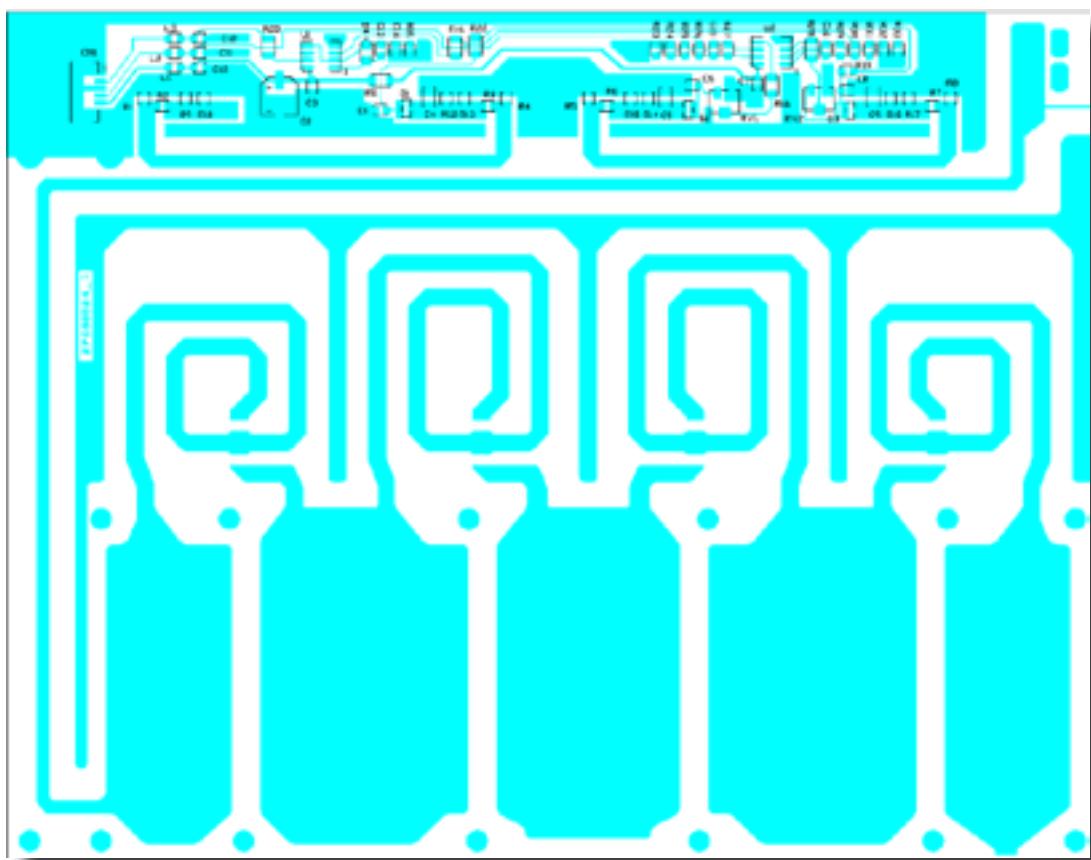


This board allows the RF combination of the three power amplifier boards, through a double-step Wilkinson combiner, in which the unbalancing loads are directly placed between the output connections of the boards. The substrate is a high power, low-loss material.

2-WAY COMBINER



This board allows the RF combination of the two power amplifier boards, through a double-step Wilkinson combiner, in which the unbalancing loads are directly placed between the output connections of the boards. The substrate is a high power, low-loss material.



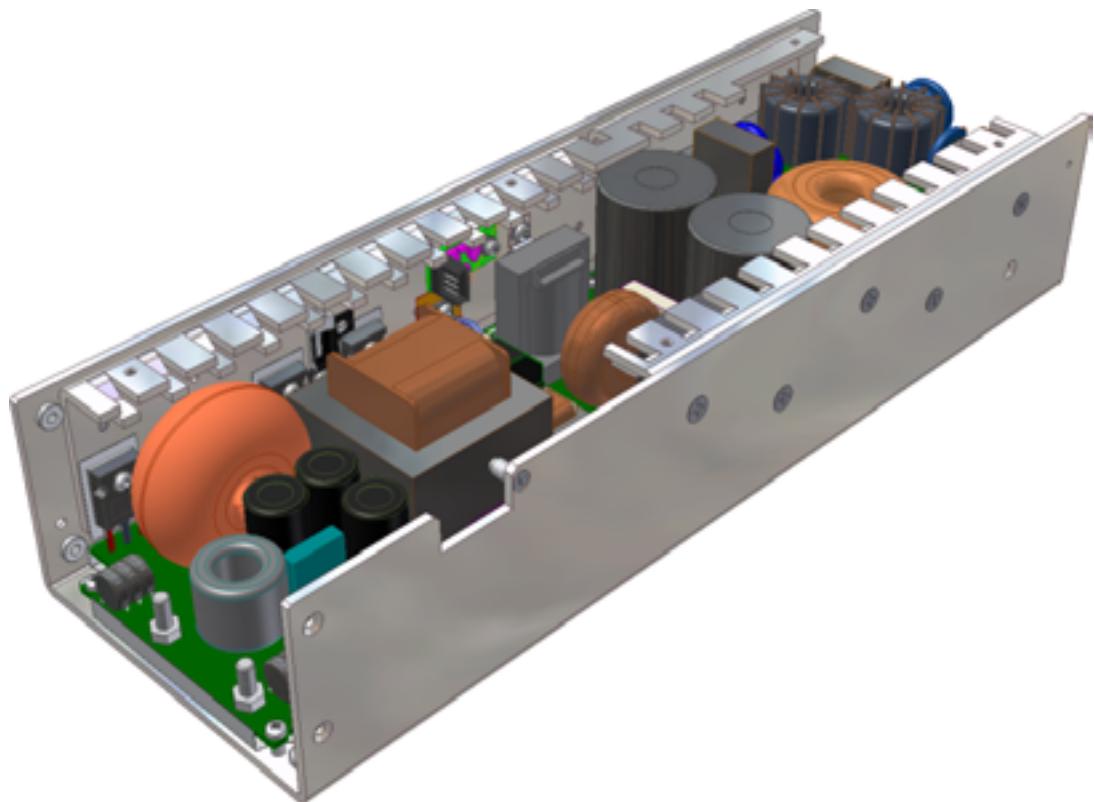
This board realizes the low-pass harmonic filter for transmitters with power within 1000-2000W. The Butterworth section (capacitors and inductors) is completely printed on the board, in order to obtain a very high degree of stability and repeatability in production. The directional coupler is printed, too, and allows to make accurate measurements of forward and reflected power, and to activate the protection when the reflected power exceeds 10% of maximum nominal forward power. The substrate is a high power, low-loss material.

COOLING FAN



Cooling fan for RF group and power supplies.

MAIN POWER SUPPLY UNIT (PSU)

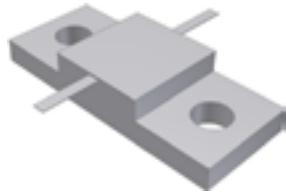


This part is a direct-to-mains AC/DC power converter, with very high performances in term of efficiency. The input section is filtered against emission of disturbances towards the power line; a Power Factor Correction stage eliminates the harmonic currents. All international standards regarding EMI and EMC are met. The input AC range is within 90 and 250 VAC, with a reduction in maximum output current in case of line voltage below 180 VAC. The output voltage is continuously adjustable thanks to a serial digital connection. The instantaneous output voltage is chosen by the CPU according to the status of the transmitter, the target power selected and the maximum allowable efficiency. The power supply is protected against excess of temperature, excess of output current, low line voltage.

AUXILIARY SUPPLY UNIT

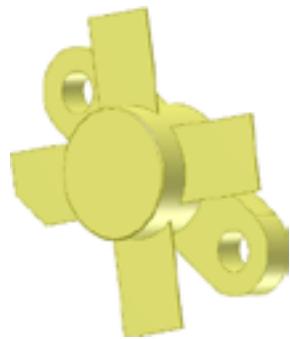


Power supply for electronics.



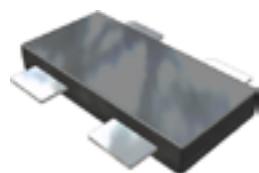
UNBALANCING
RESISTOR

500W - 100Ω RF unbalancing power resistor for models with two or three RF amplifier modules.



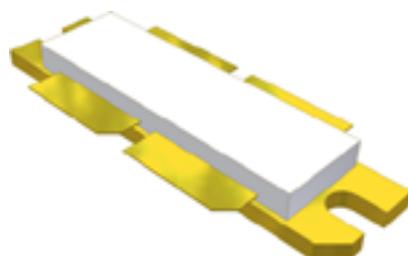
DRIVER MOSFET

MOSFET for the amplifying of the RF signal to be sent to the splitter (both 2 and 3 ways type).



POWER MOSFET

MOSFET for the ending amplification of the RF signal.



PUSH-PULL POWER
MOSFET

MOSFET for the ending amplification of the RF signal. It's located within each RF power amplifier module, before output combinator.

