

SSPA BROAD-BAND

TRIBANDER MOSFET AMPLIFIER for 6m/4m/2m - "RF-VHF-642"



Introduction

In the last few years various kinds of "Broad Band VHF amplifiers" using "RF-DEVICES" technology have been produced at low cost.

Nevertheless, after some laboratory testing, in the majority of cases it turned out that the "claimed by manufacturer" bandwidth is far narrower than what is required by HAMs to operate on all VHF bands assigned them, i.e. 6m,4m and 2m.

In details, we have found these kinds of problems:

- 1) bandwidth is limited ONLY to lower portion of VHF band (6m-4m);
- 2) bandwidth is limited ONLY to FM broadcasting portion (no way to broaden it unless by HEAVILY modifying the input and output circuit, i.e. transformers, and device bias);
- 3) "theoretical" bandwidth extended to all HAM bands of 6m-4m-2m but after an accurate test especially on 2m band (with an output power of less than 3db of maximum output power) the "output transformer" gets so hot to the point of introducing an output impedance mismatch and causing MOSFET breakdown.

As a result, we have decided to design an amplifier which could meet the following requirements:

- a "true broad bandwidth" so as to allow its use in all VHF HAM bands (BW < 50mhz and > 144mhz, so almost 2 octaves)
- an "optimised and constant gain" within the bandwidth (average 15db, variation of gain better than -1,5db on the upper limit; actually the RF-VHF-642 could operate on a broader band <21mhz & > 160mhz and still allows good performance);
- high reliability in terms of performance and solid construction.

Description

The RF-VHF-642 amplifier has been designed and built to meet these high standard requirements using the most up-to-date technological solutions:



- two of the latest generation switch-mode power supplies, one to supply the MOSFET with 11A @ 48-50V, the second to supply 12V for the “services”; the main characteristics are: reduced space and weight, as well as high level of power and practically no RFI .
- “Wiring” : TEFLON COAXIAL CABLE and WIRES for all connections have been used, for a long lasting performance even at high temperature; and “cable terminals” for ease of maintenance;
- SEPARATE ASSEMBLING of RF unit, power supplies and “commutation section” fitted in a BOX designed for an ease of maintenance;



- High quality COAXIAL RELAYS for maximum power transfer and minimal through loss



- the HEAT DISSIPATION SYSTEM includes a professional HIGH EFFICIENCY HEAT SINK (double face canalized) a double speed HIGH EFFICIENCY FAN (>50 CFM) and a FUN/HEAT SINK adaptor to reduce the whirling air vortices;



- two separate inputs and outputs (2m and 6m+4m) made possible with two DUPLEXER circuits which separate the bands and FILTER the output to eliminate the spurious emissions (better than 28dbc);
- PROTECTION CIRCUIT: two DIRECTIONAL COUPLERS operate when SWR > 1.8:1 to protect the RF unit;
- 5A AC PROTECTION CIRCUIT against short-circuiting;

- PTT CIRCUIT :

positive polarisation
grounded polarisation
RF commutation (*)

These can be selected on RF unit

Technical data

Bandwidth :	from 48 to 149 Mhz
Input :	3 W–15 W
Output:	> 300w @50 Mhz and < 1,5db @144 MHZ
Class:	AB1
Protection circuit:	automatic SWR > 1.8:1
Commutation:	positive polarisation grounded polarisation RF commutation (*)
Aux service power:	AUX 1 on TX 12V @ 1.3A AUX 2 on RX 12V @ 1.7A
In/Out impedance :	50ohm/50ohm
Mains:	220V AC
Power consumption:	500 w @ 50V e 20 W @ 12V
Dimesions:	131x 203 x 279
Weight:	

(*) only upon request