

eb104.ru™

User's manual

*Transistor linear
HF power amplifier 1200 W*

Model EB1200

Introduction

Before using the EB1200 Power Amplifier, carefully read this manual and other documentation supplied with your amplifier. This will allow you to reduce the risk of failure of this product.

The EB1200 is a transistor HF linear power amplifier designed for use with amateur radio stations. Distinctive features of the EB1200 amplifier:

- instant readiness for operation;
- compact size, light weight;
- no need to replace components due to wear;
- increased service life;
- no high voltage in the high-frequency part;
- the ability to automate the control process;
- touchscreen 5 "screen with the ability to switch LPF ranges and indication of the amplifier status

EB1200 Precautions

In order for the power amplifier to function properly, there are a few precautions that must be followed:

- do not operate the amplifier without a proper electrical grounding system;
- if possible, organize the radio technical grounding of the radio transmitting device, which will ensure the most efficient and stable operation of all equipment of the amateur station, will reduce the level of possible interference and HF interference;
- if the amplifier protection systems are repeatedly triggered, it is necessary to stop the amplifier until the causes of the emergency shutdown are eliminated. Multiple tripping of protection systems can damage expensive LDMOS transistors;
- do not tune the matching device installed between the amplifier output and the antenna with a power exceeding 100 W, i.e. 10% of the maximum output power of the amplifier;
- to work with digital modes of communication, as well as RTTY, it is necessary to lower the output power of the amplifier to 500-600 W by reducing the supply voltage.
- Avoid dropping, mechanical impact on the product's casing, foreign objects falling into it - this may damage the electronic components of the EB1200 power amplifier.

Functional features of the EB1200 amplifier

The built-in potentiometers in the protection circuit and the BIAS voltage control circuit are set to the correct position during equipment setup and testing. Spontaneously changing the position of these potentiometers will lead to the need to readjust the amplifier using precision measuring instruments.

Before using the power amplifier, you must connect a 50 Ohm dummy load, 1200 W or a matched antenna to the antenna output connector. No-load operation of the amplifier negatively affects the operation of the RF output transistors.

For 1200 W output power, the input power level must be no more than 85 W. It is not recommended to use transmitting devices with a power of more than 100 watts with the amplifier.

The amplifier is designed for an impedance of 50 ohms. If the antenna-feeder devices are matched to a resistance of 50 Ohm, and the VSWR in all operating ranges does not exceed 2.0: 1, then the amplifier can work without additional matching. If the VSWR exceeds 2.0: 1, it is recommended to use additional matching devices.

An LDMOS transistor is used in the output stage of the power amplifier.

The broadband characteristics of the power amplifier ensure complete readiness for operation after selecting the operating range, without any additional steps to match the final stage. The use of a high-linear transistor also made it possible to obtain an IMD3 -36 dBc.

The transmit-receive switching process in the amplifier is provided by the TIANBO relay with a switching time of 12ms.

The power amplifier is equipped with special high-speed protection circuits. For example, from exceeding the output power, high VSWR in the antenna, exceeding the drain current of the output transistors and overheating.

To control the operating parameters of the power amplifier, a 5-inch touch screen is used, which displays the output power level, SWR value, supply voltage, current, LPF control mode - automatic / manual, transmission mode, power amplifier temperature.

Table 1

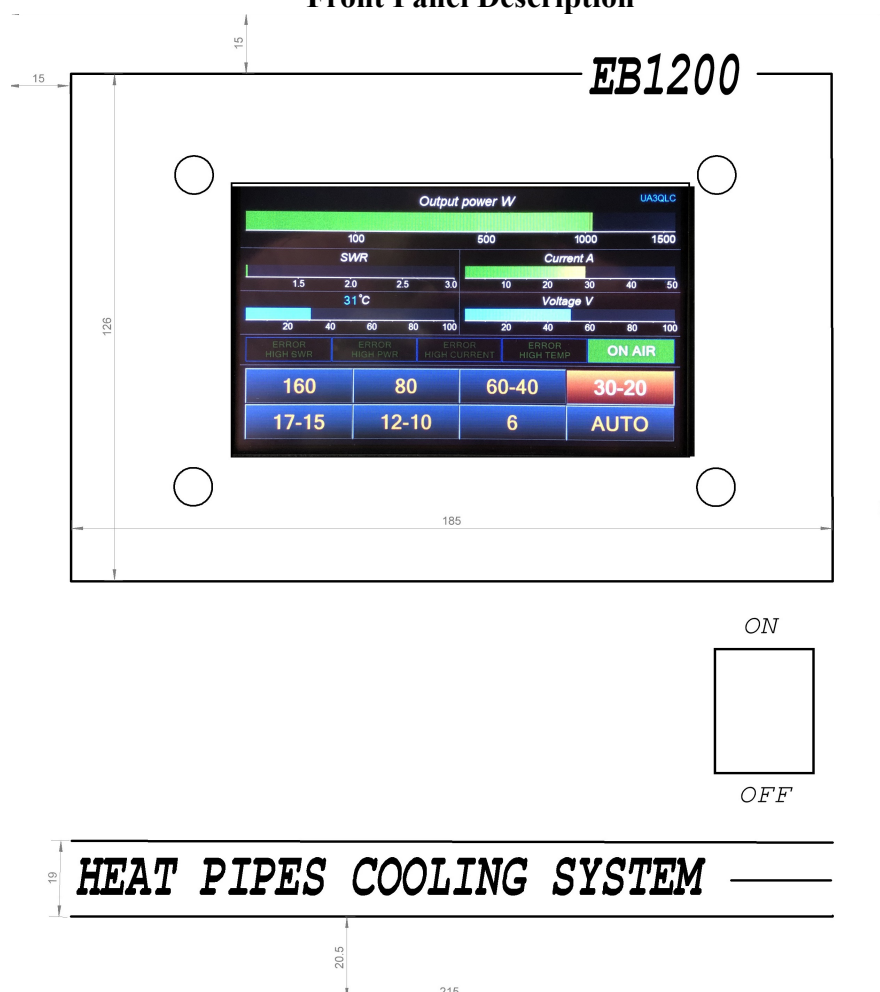
EB1200 Amplifier Specifications

Frequency band	1,8 – 54MГц (and WARC)
Mode	SSB, CW, DIGI, RTTY ect.
Input power	70-85W
Output power	1200W (SSB/CW), 500-600W (DIGI, RTTY)
Maximum VSWR in the antenna	2.0:1
Power supply	+48 ... +53V
Current	25-27A
Input impedance	50 Ohm (unbalanced)
Output impedance	50 Ohm (unbalanced)
Output/Input connectors	UHF SO-239
Amplifier circuit	push-pull, class AB
Output transistor	LDMOS
Size	255(h) x 210 x 240 mm
Weight (kg)	4,5

Equipment:

HF linear amplifier <i>EB1200</i>	1 pc
Power wire	-
Users manual	1 pc

Front Panel Description

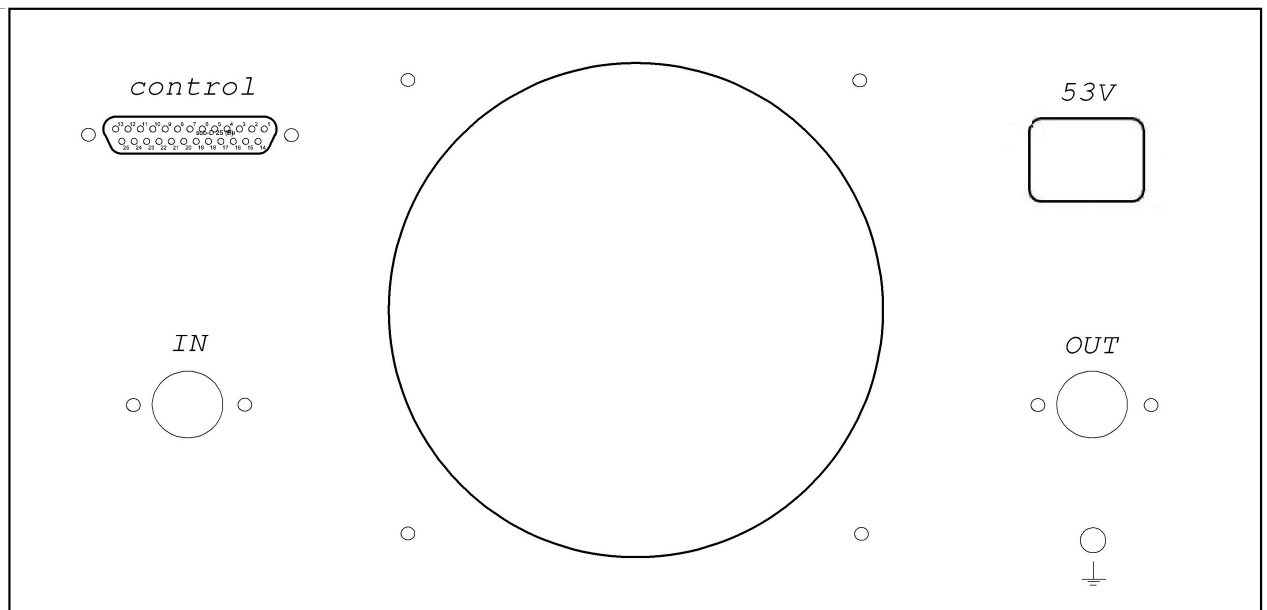


1. Rocker switch to turn the power amplifier on and off.
2. Indication and control:
 - **Power output W** – output power indicator
 - **SWR** — VSWR level
 - **Current A** – current in amperes
 - **Temperature** – amplifier temperature in degrees Celsius
 - **Voltage V** – supply voltage Volt
 - **Error HIGH SWR** – lights up red at the moment the protection is activated for exceeding the permissible VSWR
 - **Error HIGH PWR** - lights up red when the protection is activated for exceeding the permissible output power
 - **Error HIGH CURRENT** - lights up red when the overcurrent protection is activated
 - **ON AIR** - green in transmission mode
 - **160** — 1.8 MHz
 - **80** — 3.5 MHz
 - **40** — 7 MHz
 - **30-20** — 10/14 MHz
 - **17-15** — 18/21 MHz

- **12-10** — 24/28 MHz
- **6** — 50-54 MHz
- **AUTO** – automatic range switching mode when using an external device (automatic decoder)

Turn the amplifier off and on again to reset the protection circuit.

Rear Panel Description

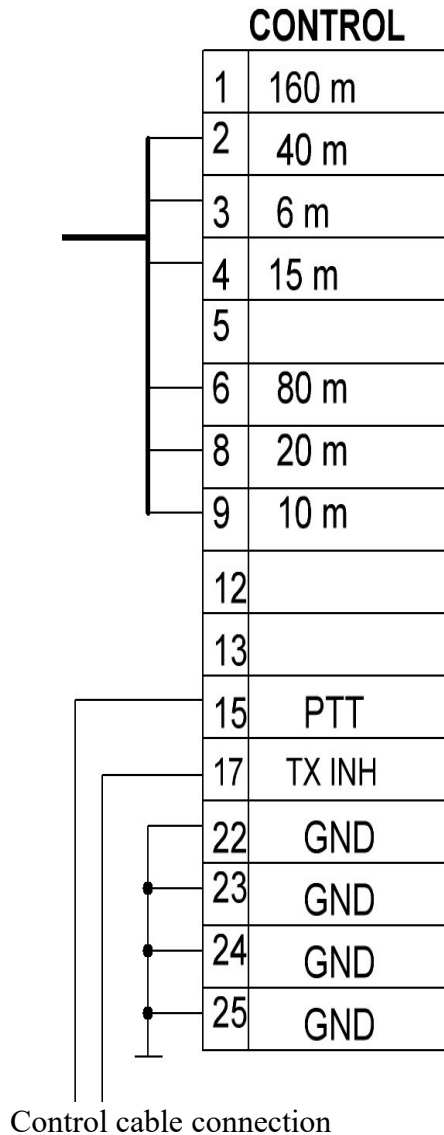


OUT - RF connector for antenna connection.

CONTROL - connector for power amplifier control signals (band selection, transmission signal).

IN - connector for connecting a coaxial cable from a transceiver.

53V - connector for connecting a 48-53V power supply.



Control connector pinouts:

Contact	circuit
1	160m, GND connection includes 1.8MHz band filter
2	40M, GND connection includes 7MHzband filter
3	6M, GND connection includes 54MHz band filter
4	15M, GND connection includes 21/18MHz band filter
6	80M, GND connection includes 3.5MHz band filter
8	20M, GND connection includes 14/10MHz band filter
9	10M, GND connection includes 28/24MHz band filter
12, 13	+ 13.8 B 1.5A
15	PTT, connection to the GND enables transmission mode
22 - 25	GND, common wire.

EB1200 Power Amplifier Protection Circuits

1. Overheat protection.

If the temperature of the aluminum cooling radiator exceeds + 45C, the PWM system will smoothly increase the fan speed.

When the radiator temperature reaches + 60C, the PTT circuit is broken and it will be impossible to turn on the amplifier for transmission, until it cools down to + 50C.

2. Protection against exceeding the maximum permissible output power.

If the output power level exceeds the permissible threshold, the protection will operate, which disconnects the + 50V supply from the output transistors. To reset the protection, turn off the + 13.8V power supply for at least 5 seconds.

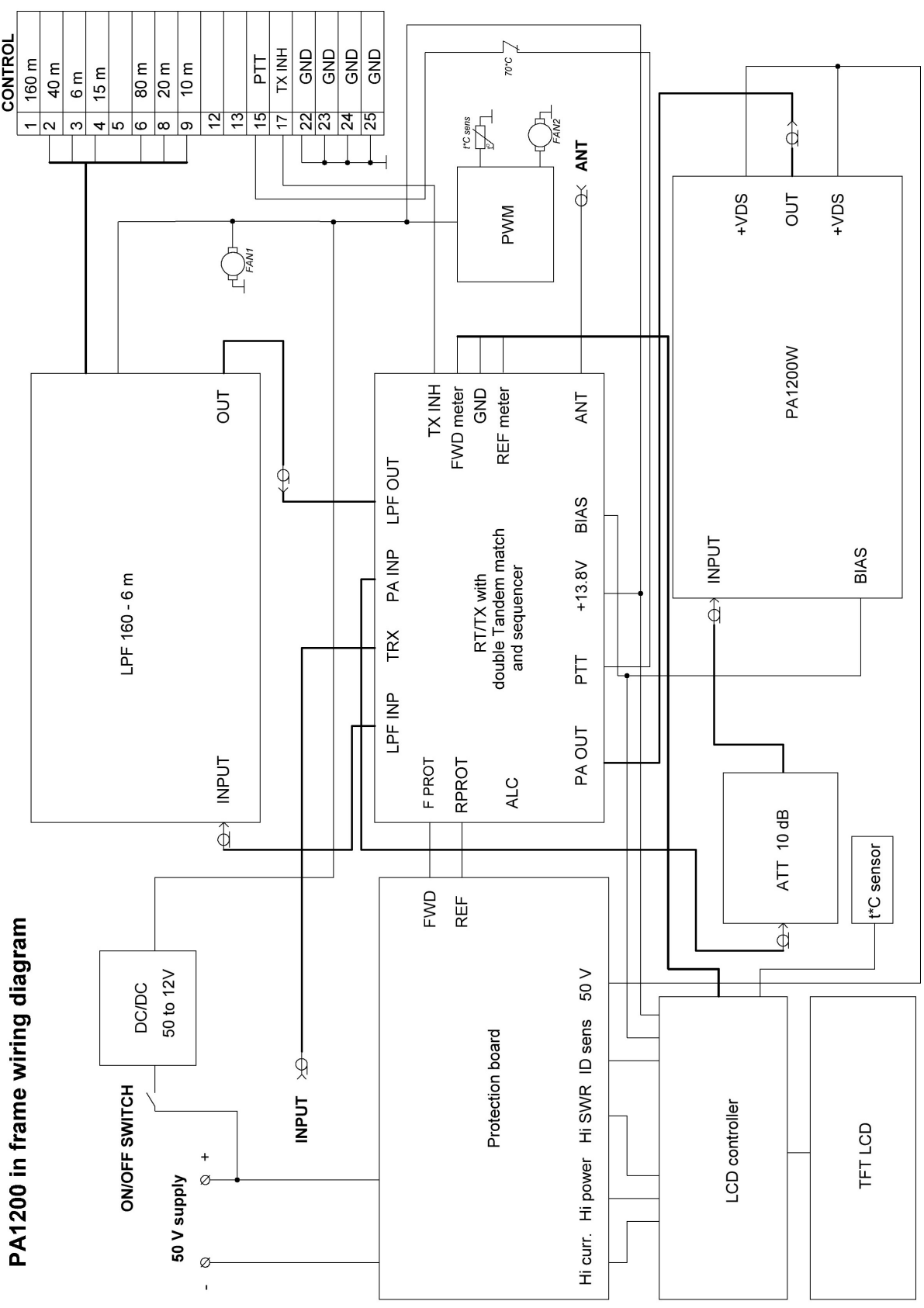
3. High VSWR protection.

If the VSWR in the load exceeds 2.0: 1, the protection system will operate. To reset the protection, turn off the + 13.8V power supply for at least 5 seconds. If the protection is triggered, we recommend checking the antenna SWR. If you cannot match the antenna, but it works, use an antenna tuner.

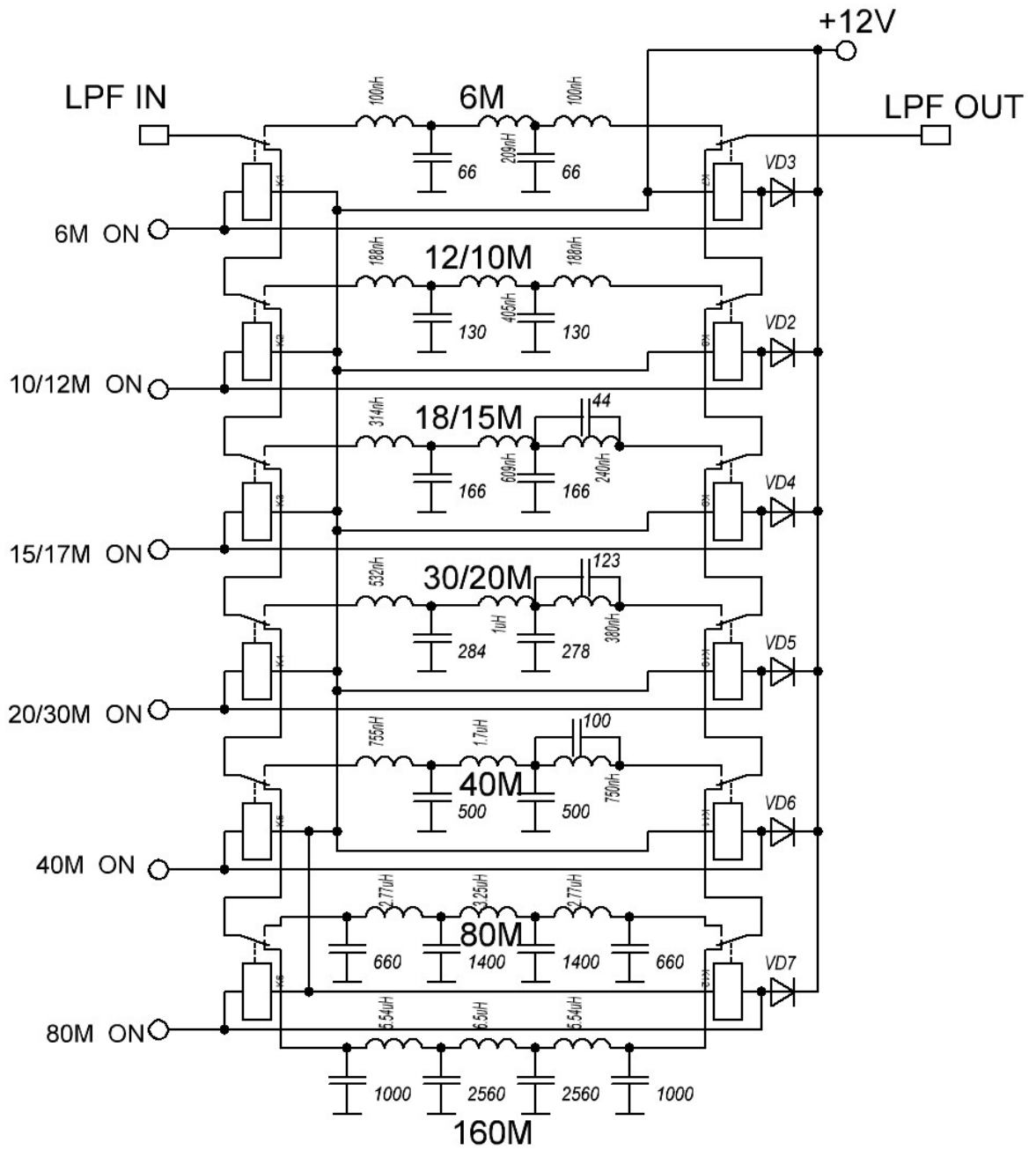
4. Protection against exceeding the maximum permissible current.

If the current value of the output transistors exceeds the permissible threshold, the protection will operate, which disconnects the + 50V supply from the output transistors. To reset the protection, turn off the + 13.8V power supply for at least 5 seconds.

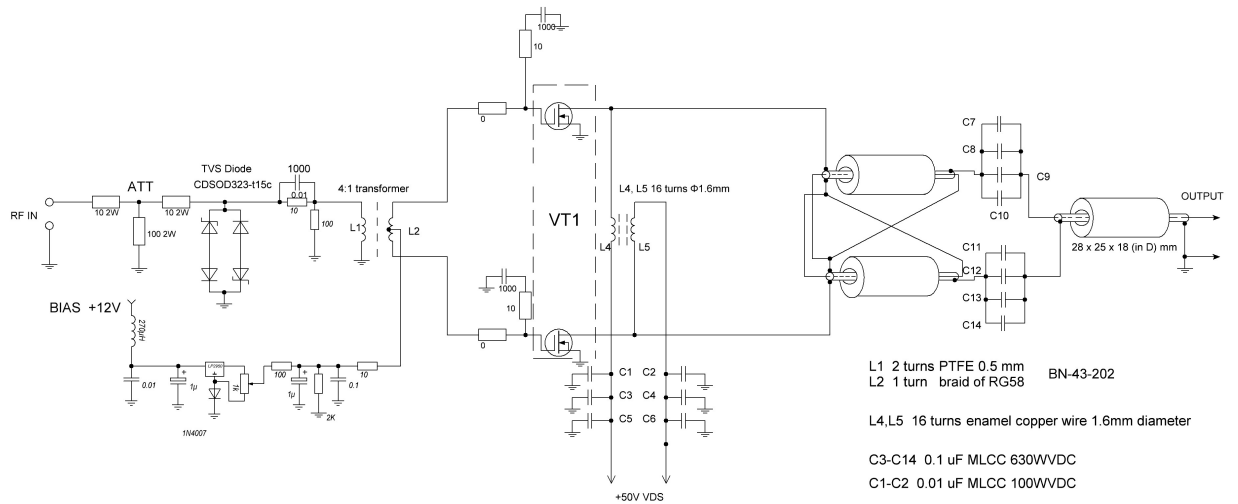
application



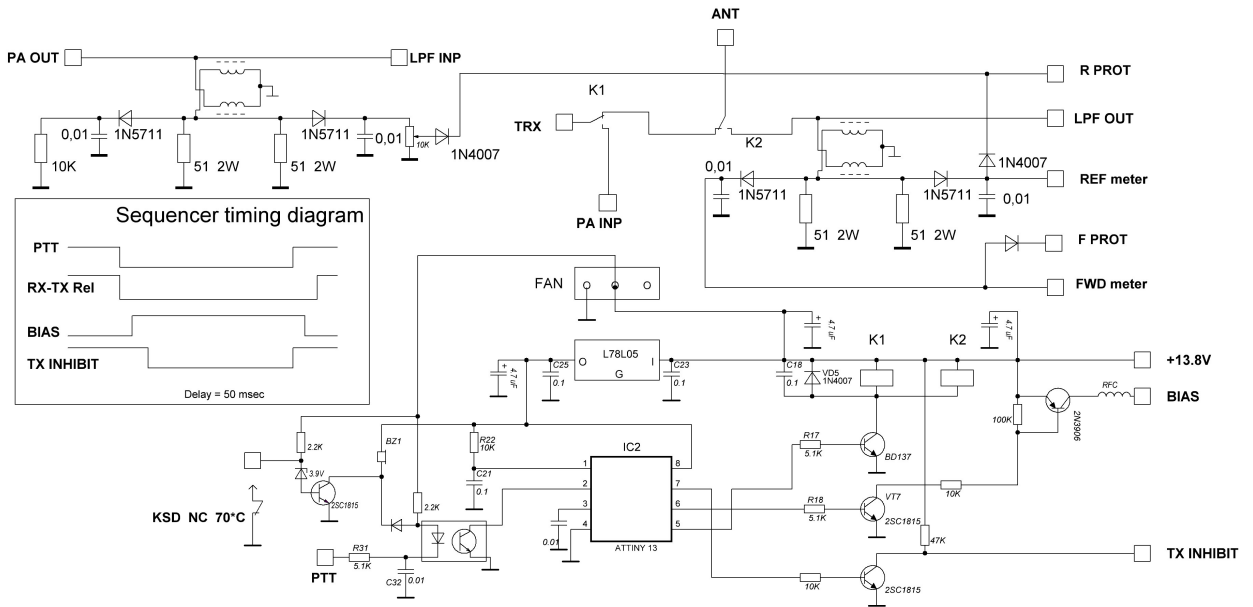
LPF 1.8 - 54 MHz 1200W



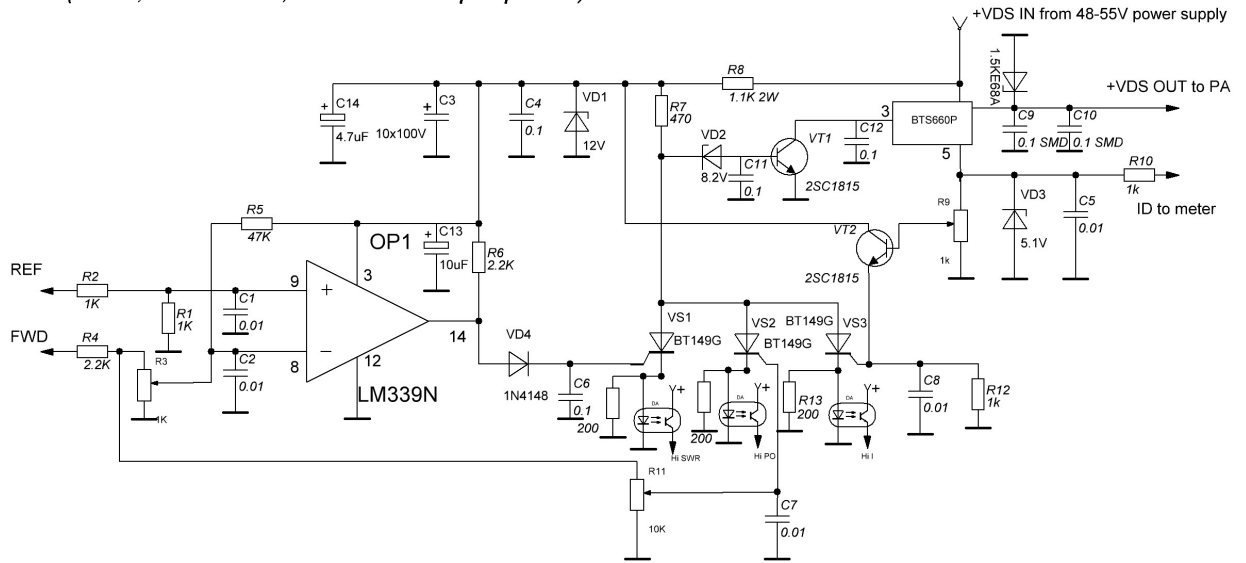
✓ PA1200W 1200W LDMOS HF POWER AMPLIFIER BLF188XR, BLF578, MRF1K50, MRF1K8
ver.0619



RX/TX board with Tandem-match and Sequencer



✓ Smart High Current DC Switch with protection triggers for power amplifiers
(SWR, the current, maximum output power)



✓ LCD power and SWR meter

