



PCS Electronics
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150W FM BAND AMPLIFIER

High Performance Fully Wideband FM Amplifier with SWR and Temperature Protection



150W FM amplifier, fully assembled

This FM broadcast wideband amplifier will easily boost your signal to 125-150W of clean, filtered RF signal. SWR protection and temperature protection help protect the amplifier from damage. This unit is perfect for a demanding, but cost-conscious broadcasters. Low pass filter makes sure your signal stays where you want it, providing high quality signal without causing interference to nearby channels. High quality components, careful design and printed circuit board assure peace-of-mind 24/7 operation for years.

Why is 150W FM booster so great?

- 125-150W of clean filtered signal (on board RF filter)
- SWR and TEMP protection make this unit more reliable in difficult situations
- High gain
- No tuning necessary
- On-board DC power supply (15V/1A)

Technical specifications:

Input power: 500-1000mW

Output power: 125W (150W max typically)

Supply voltage: 24-28V/7A (mains PSU available)

Filtering of harmonics: >50dB

Size: 185x100

Weight:

Cooling: Heatsink and FAN are both included

Power connector: Connection terminals (insert wire and tighten the screw, no solder)

TTL level “Disable” input

SWR or TEMP protection can be disabled or adjusted individually with the trimmers and jumpers

Unit can remain disabled after protection activation or turn back on after the problem was eliminated

What do the jumpers and controls do?

P1: SWR protection sensitivity

P2: Temperature protection sensitivity

P3 next to input: Driver current (factory preset)

Jumper - SWR: Remove to disable SWR protection

Jumper - TEMP: Remove to disable temp protection

Jumper – “Disable after error”: If installed, the amplifier will remain disabled after the problem is resolved (high SWR or temp)

J1: Fan, 24V, 3W

J2: Supply voltage, 24-28V/7A

J3: RF input, 500-1000mW, 50 ohms

J4: RF output, 125-150W, 50 ohms

Solder pads – 15V/1A: DC power source for your applications

Solder pads – TX status LED: LED illuminated when transmitter is enabled (power ok)

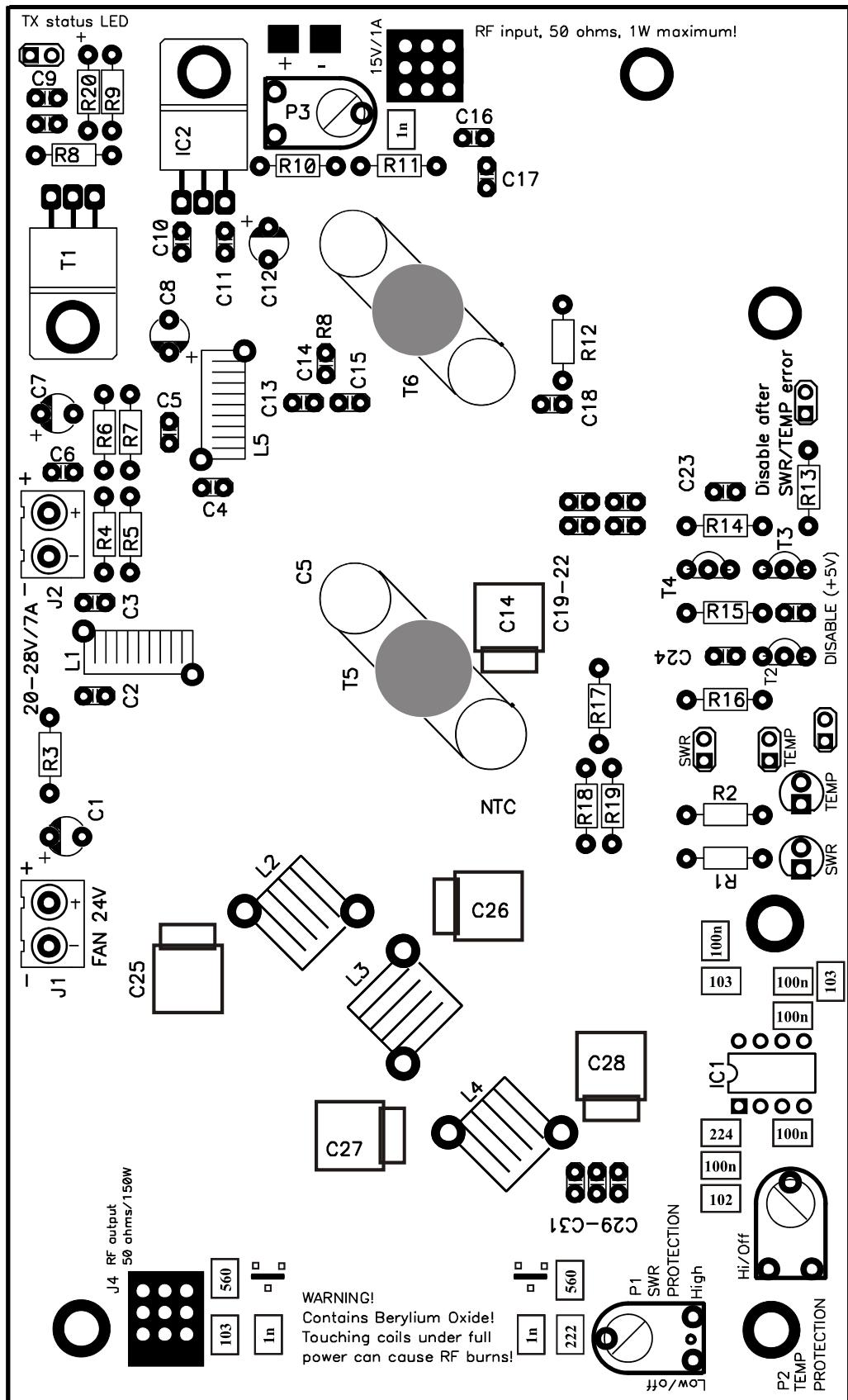


Figure 1: 150W FM booster, *board layout*

THANK YOU FOR PURCHASING OUR 150W FM BOOSTER!

We hope you will enjoy it as much as we do and remember to tell your friends about it. Please feel free to leave your comments at our website or post your experience in our forum.

From all of us we wish you happy broadcasting!

PCS Electronics team

www.pcs-electronics.com

BEFORE YOU START...

Let us clear up some basic things you need to know before we move on. You will find some very useful tips, a forum and tips on antennas and hooking things together at <http://www.pcs-electronics.com> so it's generally a good place to check before putting your AMPLIFIER on the air.

Here is what you need to get the 150W FM BROADBAND AMPLIFIER on the air:

Antenna

Preferred type of aerial is affected by several factors, but mostly by transmitting site. In the middle of the area you want to cover you'll need an omni-directional aerial which transmits equally all ways, while outside your coverage area you can beam the signal in with a directional aerial. Before going on air get a low VSWR by adjusting the position of the aerial and any of its adjustable pieces. Aim for 2:1 or less. Use low power into the aerial when tuning it up and making adjustments. If you were using 100's of watts and a bit of the aerial came off in your hand the VSWR could be so bad as to blow the final transistor. For the same reason check the DC continuity of the aerial with an ohmmeter before plugging it in, to be sure it's what it's meant to be, either a short circuit or an open one, depending on the aerial type. For instructions regarding construction of antennas please see our website: <http://www.pcs-electronics.com> (guides section).

You should have realized by now that antenna was, is and will always be a crucial part of the system. Special care has to be taken! It is usually a good idea to place antenna away from your transmitter, power supply and

A PIECE OF WIRE OR TV ANTENNA IS
NOT SUITABLE ANTENNA FOR MAX
PRO IV+ OR ANY OTHER RADIO
EXCITER!

audio system. If you cannot meet these requirements, you could experience feedback and other RF problems. We cannot guarantee proper operation of the 150W FM AMPLIFIER unless suitable antenna system is used! Interestingly, RF energy can make CD players and other digital devices go bezerk. Try placing antenna next to yours, most of the modern audio gear is not RF shielded – reducing costs is unfortunately the mantra today.

Coaxial cable

Coaxial cable is an electrical cable consisting of a round, insulated conducting wire surrounded by a round, conducting sheath, usually surrounded by a final insulating layer. The cable is designed to carry a high-frequency or broadband signal, usually at radio frequencies. Coaxial Cabling is a two conductor closed transmission medium that is often used for the transmission of RF energy. It yields excellent performance at high frequencies and superior EMI control/shielding when compared to other types of copper cabling. Coaxial cabling is commonly found in broadcast and networking systems. Most coaxial cables have a characteristic impedance of either 50 or 75 ohms. The RF industry uses standard type-names for coaxial cables. The U.S military uses the RG-# or RG-#/U format (probably for "radio grade, universal", but other interpretations exist).

The common RG-58 from Radio Shack is NOT the best you can do and will lower your effective power out! Use it only for short runs. BELDEN makes terrific coax in various qualities and with very low loss (measured in dB's...decibels). 3 dB loss = 1/4 of your signal strength - either lost or gained. Watch out for the correct impedance...RG-8 and RG-58 have 50 Ohms. RG-59 and RG-6 (Low Loss Version of RG-59) have 75 Ohms. Most antennas are 50 ohm. Check our website for good coax. Don't buy more than you need to make the long run to your antenna and don't make up a few "jumpers" to go between your exciter, VSWR meter and your antenna as all you'll do is create higher SWR and more line losses. Finally, don't use cheap TV cable!

So what is this swr (vswr) everyone talks about?

VSWR is a measure of how well two devices are impedance matched to each other. Typical radio equipment is designed for 50 ohm load impedance, so we usually use 50 ohm cables and build or buy antennas that are specified for 50 ohm. While most cables have flat impedance over frequency (they measure 50 ohm at all frequencies you are likely to use) the same is not true of the antennas.

A 1.0:1 VSWR is a perfect match. That means the load impedance is exactly 50 ohms. A 2.0:1 VSWR is obtained when the load impedance is either 25 ohms or 100 ohms.

Because most transmitters will deliver full power with a load VSWR of up to 2.0:1, this value is usually considered the limit for acceptable operation. Many prefer to keep their VSWR below that however, but for all practical purposes, it is unnecessary to spend time or money trying to get much below a VSWR of 1.5:1. The benefits will be hard to measure and even harder to notice.

On the other hand, coaxial cable losses increase rapidly, for a given frequency of operation, when the antenna VSWR exceeds 2.0:1. This can even, in some extreme cases, result in the coaxial cable burning, even when running 100 W. Using a higher grade of cable will definitely improve things, but even high quality coaxial cable becomes very lossy when VSWR exceeds 3.0:1 at higher HF frequencies (or VHF and higher).

Every station should have a SWR meter to make sure their antenna and transmitter are operating within specifications.

Suitable RF connector

A connector comes between coaxial cable and your antenna, transmitter or amplifier. It's a standard N, BNC or PL259 VHF RF connector for RF applications. You might get it along with your antenna. Try to avoid the PL259/SO239 combination as they are lossy and terrible connectors in general. Pre-assembled cables are usually available at radio shack and similar shops.

Power supply

You will need a good regulated 24-28V 7A DC regulated power supply. Poor power supply can add hum to your signal or won't sustain full power! Your amplifier gives more output power when you increase the supply voltage, but going too far can damage the RF transistors and also makes the amplifier more sensitive to bad SWR.

-Enclosure

Suitable 19" rack enclosures are available for this amplifier (note that this amp comes without the LCD – picture below is from Cyber Max FM 150W).



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LEGAL INFO

It may be illegal to operate this device in your county. Please consult local authorities before using this product!

THANK YOU FOR PURCHASING THIS PRODUCT!

We hope you'll enjoy it as much as we do and remember to tell your friends about it. From all of us we wish you happy broadcasting!

PCS Electronics team
www.pcs-electronics.com

QUICK OPERATING INSTRUCTIONS

- Do not operate the amplifier without dummy load or properly matched antenna. Failure to do so will damage the output transistor (not covered by warranty). We recommend that you first test your antenna/cable system with swr meter at low power level, which is less likely to cause any damage. Power can be reduced by reducing the power supply voltage (our power supply has an adjustment trimmer).
 - Use suitable power supply and voltage. Use the potentiometer on the power supply to set appropriate voltage. You can effectively reduce/increase output power by varying the voltage. Do Not Use More Voltage Than Recommended.
LESS VOLTAGE = LESS POWER.
 - Do not drive the amplifiers with more than 1w. 500mW is usually enough to get full output power. Using more than 1W can lead to destruction of expensive rf transistors.
 - Do not try to modify the product in any way as that could damage the product and cause undesired operation (spurious emission or interference) and can lead to destruction of the product.
 - Ensure proper airflow/cooling. This product generates heat which needs to be dissipated.
 - If you're not getting any power output, make sure protection circuitry is not activated. It is necessary to reset (turn the unit off and back on) after automatic shutdown from the high temperature or high swr error condition.
- TX status led on: normal operation
-TX status led off: amplifier is disabled due to high swr or temperature.
- If protection trips too early (while unit is not really hot or swr not really high), adjust P1 and P2 appropriately to reduce sensitivity.

