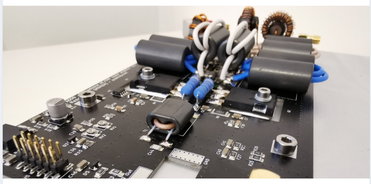
# A600 V2.0 AMPLIFIER MODULE – CHANGES AND IMPROVEMENTS

Posted by Razvan | Dec 9, 2019 | In the shack | 9 ★★★★★



I have recently made available a new version on the A600 amplifier based on MRF300 LDMOS transistors. Here is the list of changes and improvements that come with v2.0.

## 1. REDESIGNED AND IMPROVED PCB

All components are now on the top side, while the bottom side is a continuous ground plane in direct contact with the heatsink. This improves the electrical ground even further and (together with the black coating) maximises thermal performance. It also allows for the thermal sensor and the temperature-compensating bias thermistor to be mounted as SMD parts directly on the PCB and not require additional heatsink mounting holes.

## 2. 70MHZ BAND COVERAGE

Thanks to slightly better layout of the input traces and the use of semi-rigid transmission line instead of coaxial in the output RF power transformers, the coverage has been extended to 1.8 to 72Mhz. A 4.7pF PCB capacitor at the input of the directional coupler improves performance & matching on 6m and especially 4m. Keep in mind in most countries 450W is way above the legal limit on the 4m band (!).

## 3. EASY-TO-USE BIAS CIRCUIT


The bias circuit now uses the same 5V (5.36V more precisely) voltage regulator circuit that supplies power to the thermal sensor and the current sensor. There are only two trimmers that adjust the bias voltage from 2.2V to 3V for each transistor and they come pre-set to a safe value. Now you don't need to pre-adjust the bias before installing the transistors and you cant destroy the transistors by accidentally setting the bias too high.

## 4. NEW RF DRIVE SENSOR AND EXPANDED SENSOR PORT

New onboard circuitry measures the drive power and provides a proportional continuous voltage at the Sensor Port within the 0-5V range. This can also be used as a RF drive detector for a (separate) automated RX/TX switching (RF vox) circuit. The Sensor Port has been expanded from 7 to 12 pins now and also provides a +5V 200mA supply voltage than can be used to directly power measurement & protection circuitry connected to the Sensor Port.

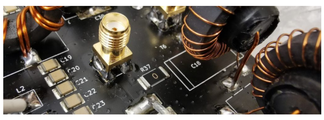
## 5. CAN BE SET UP FOR HIGH DRIVE (UP TO 100W)

The PCB now has a slot for installing a high-power RF attenuator on the same heatsink so the amplifier can be driven directly even with 100W transmitters. ATC FA10975P03D8FBK or the cheap RFP1398 are good examples of 100W 20dB attenuators that would have to be installed for this purpose. Otherwise, a straight jumper is fine.

## 6. MORE ACCURATE CURRENT MEASUREMENT

The current sensor has been replaced with ACS713ELCTR-30A-T, which is unidirectional but offers twice the output voltage per A compared to the previous ACS712. This will allow more accurate current measurement when using modest resolution ADCs (like the 10-bit on some Arduinos).

## 7. ONBOARD JUMPER FOR TESTING WITHOUT A LPF



The module is now supplied with an onboard jumper (R37) that shorts the LPF ports. This will allow you to run the initial testing without having a Low Pass Filters board connected. Once you get things going, R37 will have to be removed and a LPF board connected to the J2 & J3 ports.

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## ABOUT THE AUTHOR

**Razvan**

Interested in computers, electronics, building radio equipment, portable/SOTA operations and SDR. I think amateur radio is all about building, experimenting and testing new stuff. Licensed M0HZH / YO9RF.

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## 9 COMMENTS

**Lance KJ6KKR** on 13th December 2019 at 3:42 am

Greetings Razvan, I just received kit V1.2 in the mail and now see you have V2.0 designed. Do you have an upgrade path/kit planned to bring V1.2 to V2.0? Also looking forward to the LPF bank and controller 🙂

REPLY

**Razvan** on 13th December 2019 at 9:02 am

Hi Lance, at the moment there is no plan to upgrade v1.2 to 2.0, as the PCBs are different.

As you can tell from this article most of the changes are for convenience rather than performance. v1.2 works on 70MHz as well, but with slighty lower gain & lower maximum power, it's still well over the 4m band legal limit in most countries (the 4m band is not available in the USA yet, by the way). The drive power measurement circuit can be added with a small separate board, if you need it.

REPLY

**Victor, PA8MM** on 16th December 2019 at 9:08 am

Hi Razvan,
What type of RX/TX relay (model) would you recommend for this amplifier?

REPLY

**Razvan** on 16th December 2019 at 9:16 am

Hi Victor,

Omron G2RL-1-E-DC12 should be OK for output switching. I use the SPST version for the LPF. Make sure the control logic doesn't allow switching the output under load.

**Udo, DK5YA** on 23rd December 2019 at 10:29 am

Omron are perfect even with high power up to 70 MHz. See what W6PQL says about it

REPLY

**J B** on 2nd April 2020 at 8:33 am

Hello I would like to use your AMPLIFIER MODULE for a fixed frequency project with 13.56 MHz fixed and vary the wattage output.
I am not using a Radio as the pre-amp so i need a linear pre-amp to vary the wattage input to your amp, i am amusing. what is the input wattage range need to operate your amp from a min to max out put. into a 50 ohm load thanks

REPLY

**Greg** on 27th May 2020 at 3:41 pm

Hello. Great project, Razvan. Could you tell, if it's not a secret, what type of semi-rigid coaxial cable do you use for the output transformers? 73! Greg SP5MI

REPLY

**Kees Wiegers pa5cw** on 7th August 2020 at 3:34 pm

Can I also order lpf and control board pcb's only together with the pa kit?

REPLY

**Razvan** on 7th August 2020 at 4:20 pm

Hi Kees,

PCBs are not available separately, only as kits. However, at the moment there's a discount if you but all 3 kits at the same time ;). Just add all 3 to the cart.

## LEAVE A REPLY

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