

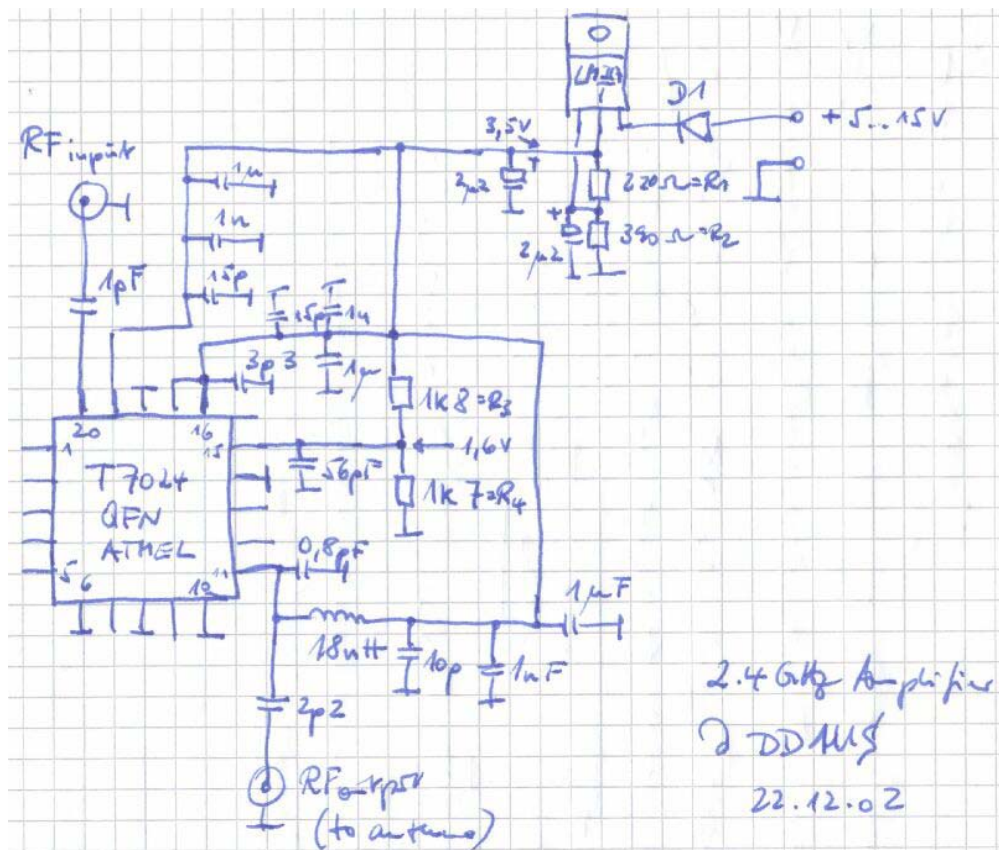
Hello,

almost a year after building the 2.4 GHz video transmitter I decided to boost the range of my homebrew video link by increasing its transmit power. Below please find a description how I implemented the additional amplifier. This description is not meant to be complete instruction but as a mere proposal how it can be done.

I am using this video- to transmit the pictures of my telescope to my receiver outside or inside my home. This signal is then relayed to our local amateur radio repeater using another link. A video-camera, which is attached to the telescope provides the video signal which is fed to the 2.4 GHz transmitter. The modulated RF carrier is then fed to the power amplifier and after amplification to approximately 20 dBm (= 100 mW) finally supplied to the patch antenna.

To amplify the signal I am using an integrated circuit from ATMEL (see www.atmel.com). The part number is T7024PG (in a 20 pin leadless package). You can find the datasheet as well as a very comprehensive application note on the ATMEL website. If you have trouble getting such an IC you may send me an Email – I do have some spare parts available. The T7024 is an integrated front-end with a power amplifier, low noise amplifier and an antenna switch driver. In this application I am using only the power amplifier and thus you can see in the schematic below that a lot of pins are not used and left unconnected. There is a similar device T7023 available, which is a plain power amplifier and can be used in this application as well.

Enclosed please find the schematic as well as some pictures and explanations of the power amplifier and the patch antenna.



Draft schematic of the power amplifier

All RF related circuit is on the little green PCB, the rest is for the DC power supply. Thanks to the voltage regulator LM317T the circuit can be supplied with an input supply voltage range of 5...15V. The voltage regulator is set with resistors R1=220 Ohm and R2=390 Ohm to a output voltage of 3.5 V. The power control voltage is set with the resistors R3=1.8 kOhm and R4=1.7 kOhm to 1.6 V. This gives optimum power added efficiency of PAE>40% at full power. The current consumption is approximately 200-250 mA at full power and

approximately 60 mA without RF at the input of the PA. The PA is protected against wrong polarisation by the Diode D1.



The complete video transmitter incl. antenna.



The "active" antenna with the cover attached.



Patch antenna (on it's rear is the power amplifier PCB)

The last pictures shows the complete video transmitter with the "active antenna" attached. The RF is supplied from the transmitter to the antenna through a semi-rigid cable with SMA connectors. The supply voltage is supplied through the little red cable and ground . Thus transmitter and antenna are powered on simultaneously using the switch at the transmitter.

Please note that you need a ham radio license to legally build and operate such a device yourself. Furthermore some knowledge in electronics and RF-technology are necessary.

Kind regards

Matthias

Email: DDIUS@AMSAT.ORG
Homepage: <http://www.dd1us.de>