

The Stretchyman 100W Shortwave Transmitter

Firstly, many thanks for purchasing my product.

Since 2016 I decided to design a build a portable efficient 100W transmitter, it has been a long journey.

Having given up twice due to lack of funds and unable to write control software I finally met someone who could understand what I needed and we got the PIC control SW written.

So, what have we got...

The design is based around a 4 FET Class E RF stage, highly efficient, hence the small size and light weight. One minor disadvantage is the bandwidth the transmitter can operate over is narrow compared to older designs.

Units below 5MHz will have a Max B/W of 160KHz in 16 channels, these can be any frequencies but the Max and Min frequencies can't be greater than 160KHz apart, if they are the power will drop off rapidly. This is less noticeable as higher frequencies so >200KHz may be achievable. However above 5MHz, noticeably around 7MHz the B/W is >500KHz and 64CH's can be addressed. So you could have a 320KHz coverage every 5KHz, which is more than enough for a band of interest.

This design uses the latest devices from CREE (SiC) for the LF version and TRANSPHORM (GaN) for the HF version.

Having 4 devices means the design is more than capable of providing a 200W carrier but would need twice the voltage (96+) volts but would take it over and above the what is generally regarded as the maximum safe voltage for humans of 48V. Remember 100W is just the carrier level and the Output peaks at 400W PEP. For the LF version (A.M. MW) 150W is achievable with a 48V 10A supply as they can be adjusted to 53V. They will run hotter and I'm not recommending that power level for 24/7 usage but fine for a 2 hour broadcast. 100W is plenty anyway!

CHANGING FREQUENCY.

ALL designs have DIP switches and you will receive a table on what frequencies are programmed in. Even if you have purchased a unit on a single frequency I've still programmed 16CH in there around the frequency you chose.

OPERATION.

I've made this incredibly simple to avoid any issues. On the front panel there are 2 switches the LH sw is FWD PWR (UP) and REV SWR (DOWN). In the UP position the 5 LEDs give a bargraph of relative output, the last LED may light up it may not, it doesn't matter as is ONLY relative. In the down position ideally you will only have one (or two) LEDs lit indicating an SWR of <1.2:1. If an AMBER LED is ever lit the SWR is over 2:1 and it would be a good idea to check your antenna to get this as low as possible, try for less than 1.5:1 but realistically anything <2:1 is OK.

SEQUENCED START UP.

The RH sw is LOW POWER (UP), HIGH POWER (DOWN). The unit will ONLY start with the sw in the UP position. Power will be between 3 & 10W, this is not meant for lower power broadcasting and ONLY to check the antenna SWR. With the sw in the correct (UP) position, apply power (48V) to the unit, observing polarity, you should here the internal relay chatter and the TOP ROW of LEDs should have GREEN (ENABLE) and AMBER (5V LOGIC OK) LEDs lit. The bargraph will have one or two LEDs lit. The unit will now be TXing in LOW POWER mode. Check the SWR by flipping the LH switch down (or use an external swr meter), if ALL is good then flip the RH sw down to HIGH POWER mode. You are now transmitting a 100W carrier. OK, so far.....

AUDIO INPUT AND MODULATION LEVEL.

It's IMPORTANT for any A.M. transmitter to have the optimum level of audio so the carrier is fully modulated to 100%. This means that the carrier will dip to zero and to twice the level when 100% is achieved. If the audio is too LOUD! Then clipping will occur and the signal will sound distorted.

How do you measure this?

Ideally with a 'Scope but I have fitted a front panel LED to show you when that level is achieved.

With the audio pot CCW apply the audio and rotate the pot CW until the LED just starts to blink, this is the optimum level for 100% modulation. You will need 1V RMS (approx. line level) for full mod.

As with all program material the levels should NEVER exceed a maximum value, this is called LIMITING and must be done externally and should also be COMPRESSED to make it sound LOUD!

HARDWARE & PROTECTION.

The unit has two fuses. Nearest the heatsink is 600mA (must be <1A) and below is 7A (>6A & <10A).

Voltages are monitored internally and if the voltage ever exceeds 54V the unit will shut down and blink the second LED in the bargraph = OVLO. If the internal 12V ever drops below 11V then the third LED will blink = UVLO. ANY SWR event will blink the final RED LED in the bargraph. The unit will SHUT DOWN if ANY of these events occur. At startup if the voltage is >54V the first GREEN led will light but the unit will NOT enable (you will not hear the relay chatter and the top GREEN led will not light).

OK I think that's it from me, just to say thanks again for purchasing my product. I can assure you there's nothing else like it and I hope it goes on to provide you with many years of trouble free service.

ANY PROBLEM/ADVICE.

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BLOCK DIAGRAM

