

# Modernizing a Microwave Modules 432 MHz Transverter

Paul Wade W1GHZ ©2019

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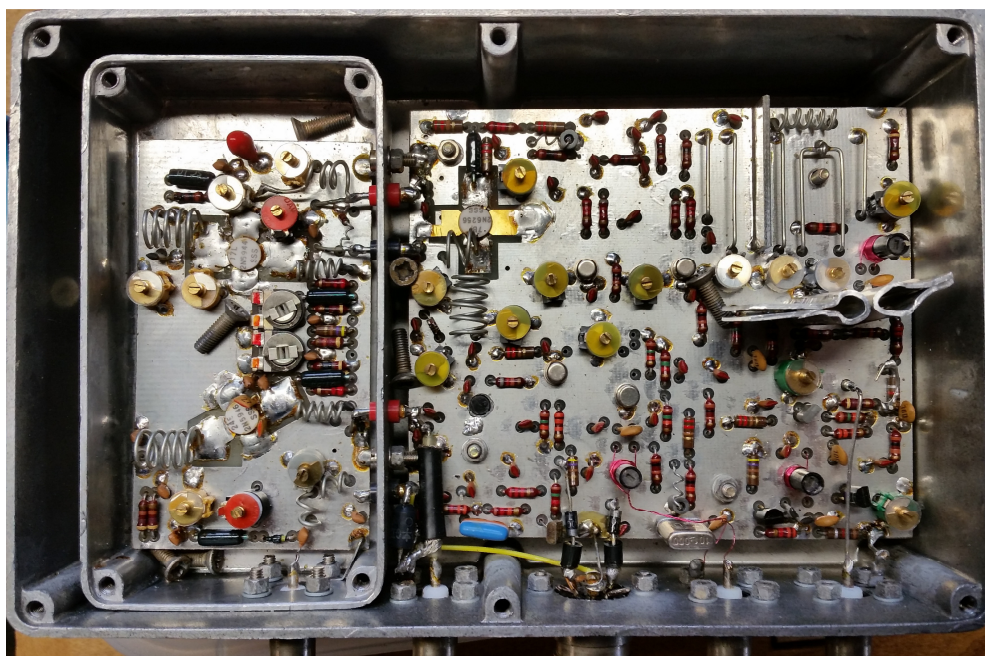
Microwave Modules transverters were state of the art back in the 1980s, and got many hams on the air. Any that are still working may not be up to today's standards, but if they are still making contacts, that is terrific. This article is about the ones that have died.

Some years back, Steve Powlishen, K1FO, (SK) had a couple of 432 MHz Microwave Modules transverters on his table at a flea market, marked "as is." If Steve couldn't get them working, they were probably hopeless. He offered them to me for less than the cost of a die-cast box, so I figured it was a good deal.

Last year, my 432 MHz transceiver died again. I had been planning to build a transverter so I could use an SDR – operating with only a knob feels like working in the dark. It was time to get to work. You can see the details on your conference CD – *432 Transverter for SDR*.

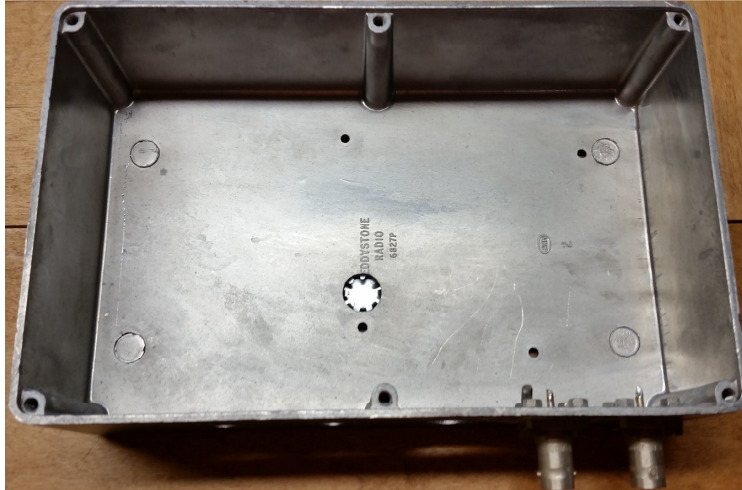
Designing a transverter – PC board, assembly, test, and debug – is about 90% of the job. Then comes the other 90%, packaging it up into a working unit. The PC board looked like about the right size to fit in one of the Microwave Modules boxes, so I thought I'd give that a try.

The first step was to open up a Microwave Modules transverter to see what was usable. See Figure 1.



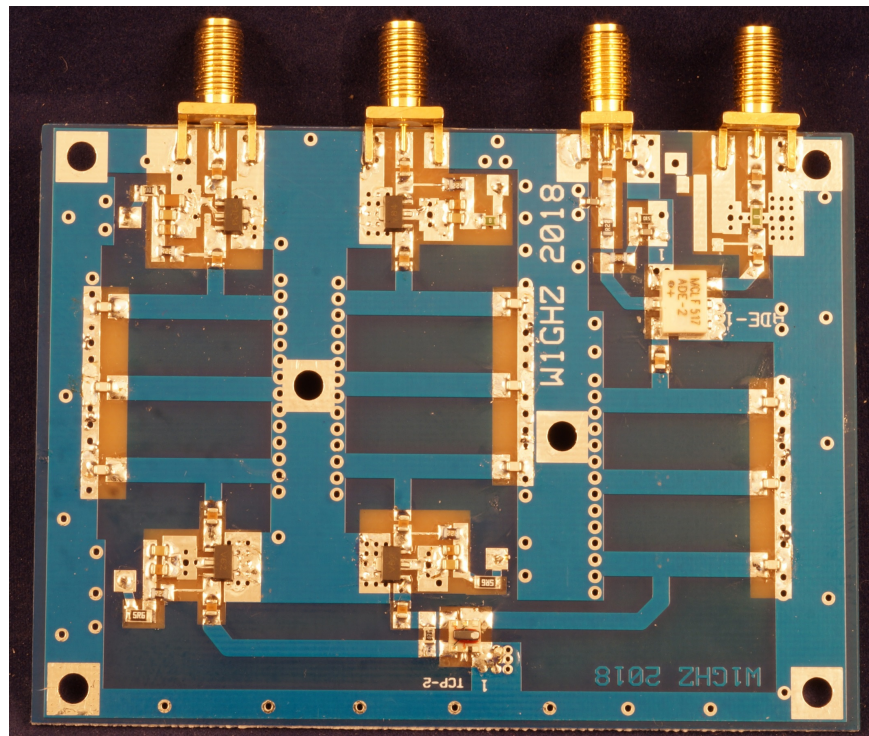
**Figure 1 – Inside Microwave Modules 432MHz SSB Transverter**

Then I removed the parts I wasn't planning to use, see Figure 2. The rest of the parts went in a bag marked "Spare parts for Microwave Modules 432 transverter" and sold to some lucky(?) ham at a flea market.



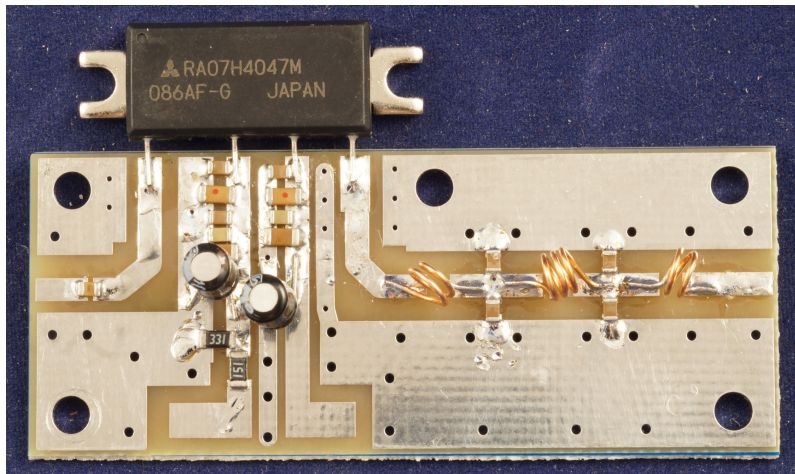
**Figure 2 - Microwave Modules 432MHz SSB Transverter usable parts**

As usual, deciding on the box before fitting everything in might have been a mistake. It took a bit of cramming to fit the transverter PCB, Figure 3, DigiLO synthesizer<sup>2</sup>, a 7 watt Mitsubishi amplifier module (RA07H4047M), Figure 4, and a sequencer. Figure 5 shows the inside before adding the synthesizer, and Figure 6 includes the synthesizer in an Altoids tin, floating above the PC board. At final assembly, after all is working, the synthesizer is bolted to the lid.



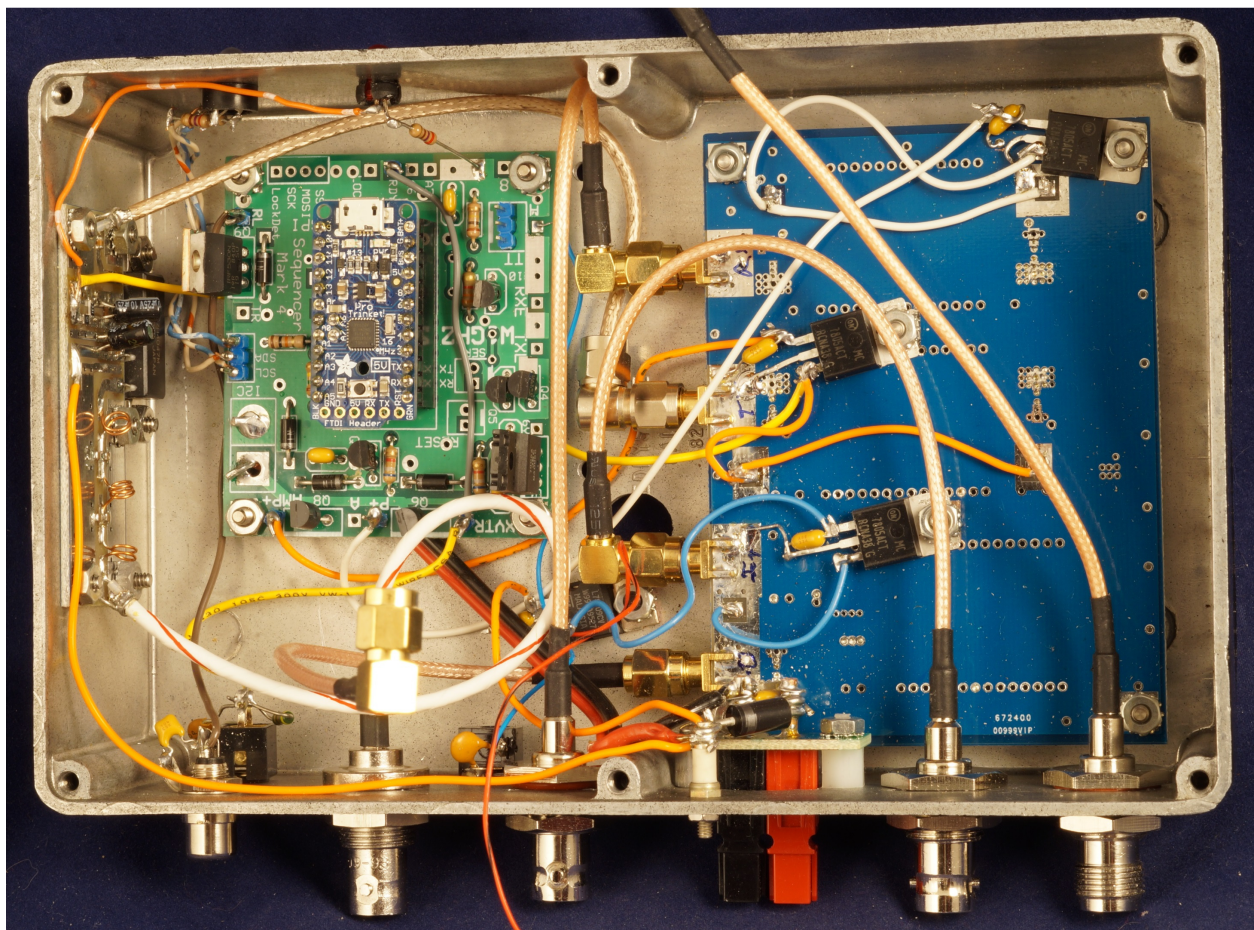
**Figure 3 – W1GHZ 432 MHz Transverter**





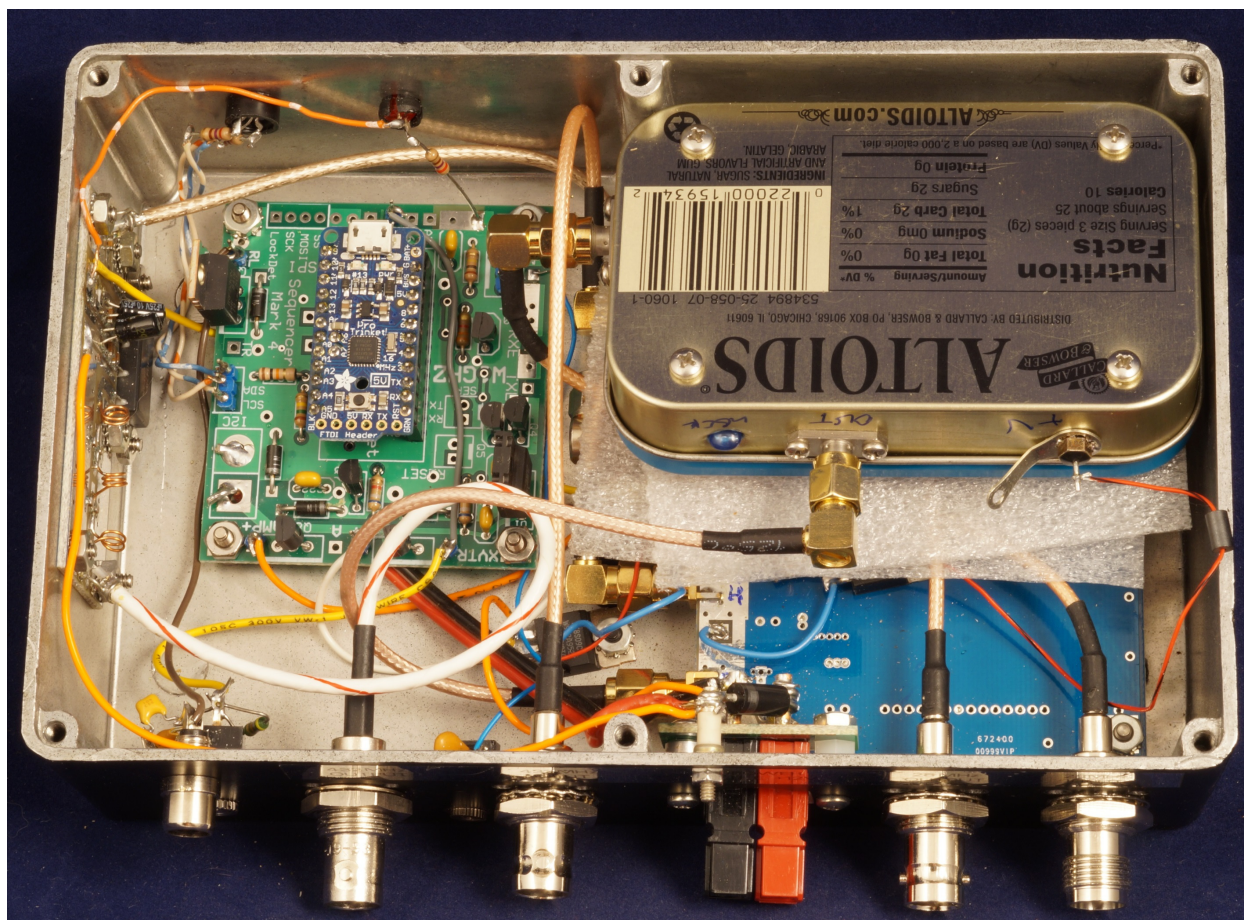
**Figure 4 – 7 watt power amplifier and PC board**

I considered using a 25 watt Mitsubishi amplifier module, but that would be harder to fit and would require a heat sink. The 7 watt amp runs cool attached to the box without a heat sink, and is more than enough to drive a 400 watt ebay amplifier<sup>2</sup>.



**Figure 5 – Modernized 432 MHz transverter without synthesizer**





**Figure 6 – Complete modernized 432 MHz transverter with lid removed**

The DigiLO synthesizer has pretty good phase noise and can be locked to 10 MHz. The receiver noise figure is under 1 dB. And the sequencer<sup>3</sup>, my Smart Fool-resistant Sequencer Mark 4, has enough smarts in an Arduino to operate the whole 432 MHz system. I think it is an upgrade.

#### Notes:

1. [www.Q5signal.com](http://www.Q5signal.com)
2. Don Twombly, W1FKF, “432MHz ebay 400W amplifier modification,” *Proceedings of the 44<sup>th</sup> Eastern VHF/UHF Conference*, 2018.
3. Paul Wade, W1GHZ, “A Smart Fool-resistant Conditional Sequencer,” *Proceedings of the 44<sup>th</sup> Eastern VHF/UHF Conference*, 2018.