

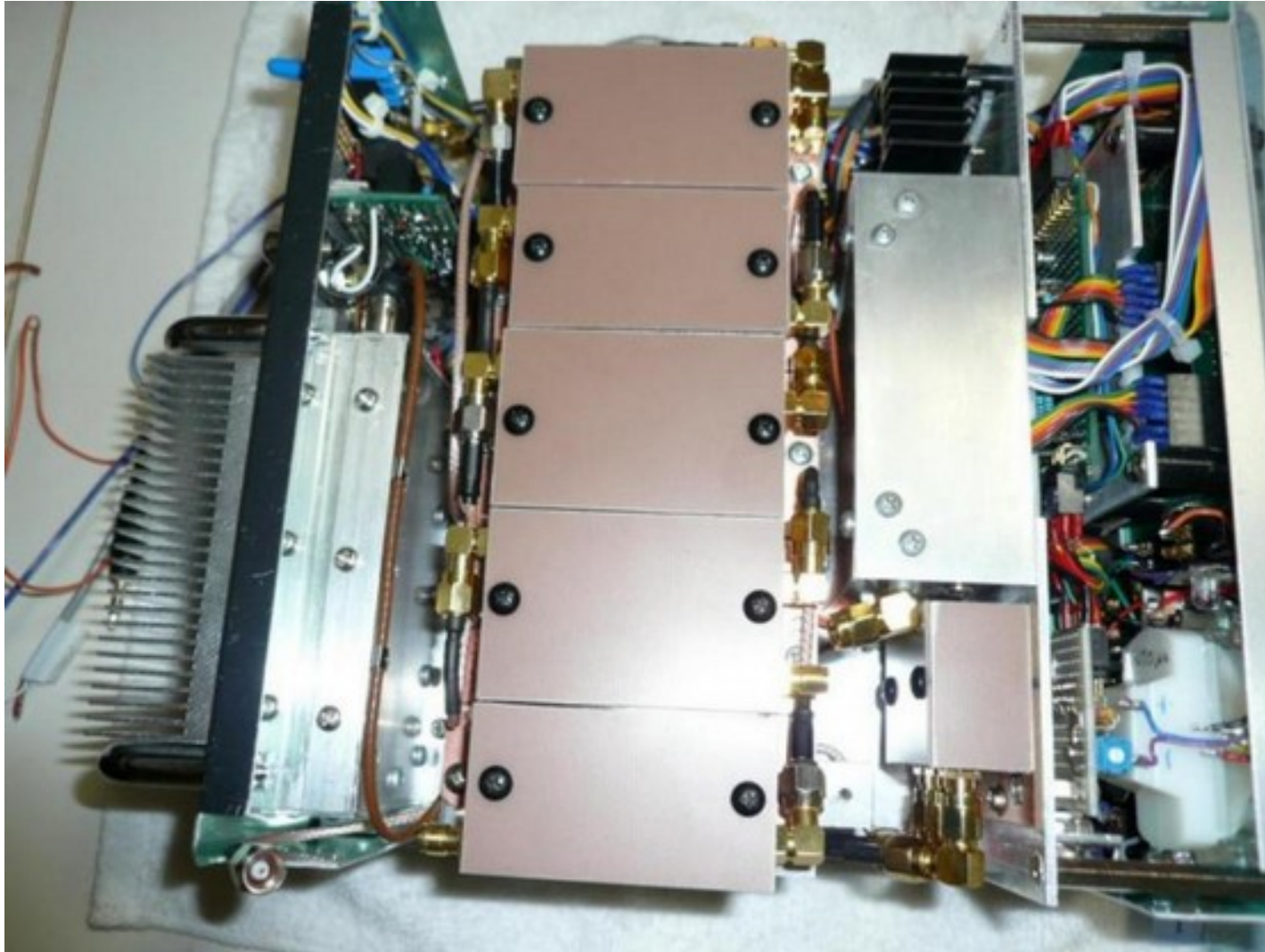
# **FC-1 update ..... again!**

January 18, 2019

100



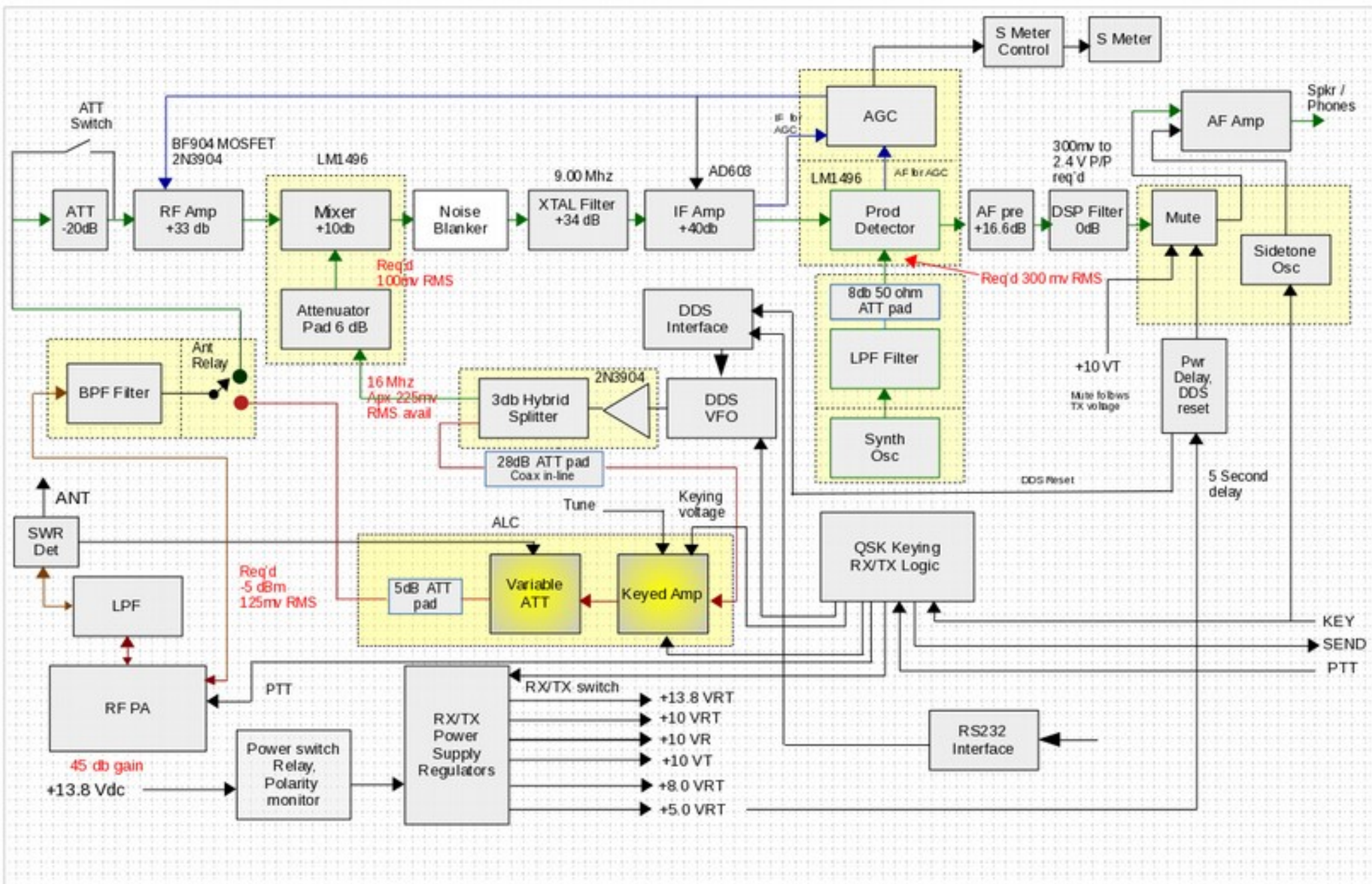
# Top View Receiver bay





# Bottom View Transmit bay





FC-1 CW Transceiver

## 2.5 Month effort.... The AGC

- Derived from two sources, IF signal and AF
- Independent control of IF and AF attack and decay
- $S9 = 50\mu\text{v RMS}$  on antenna,  $S9+60 = 50\text{mv RMS}$
- AGC action to start about S3 or  $0.79\text{Uv}$  ( $-109\text{dBm}$ )
- Optimized for CW
- S meter actually working when AGC is OFF
- AGC is a closed loop, thus extremely confusing

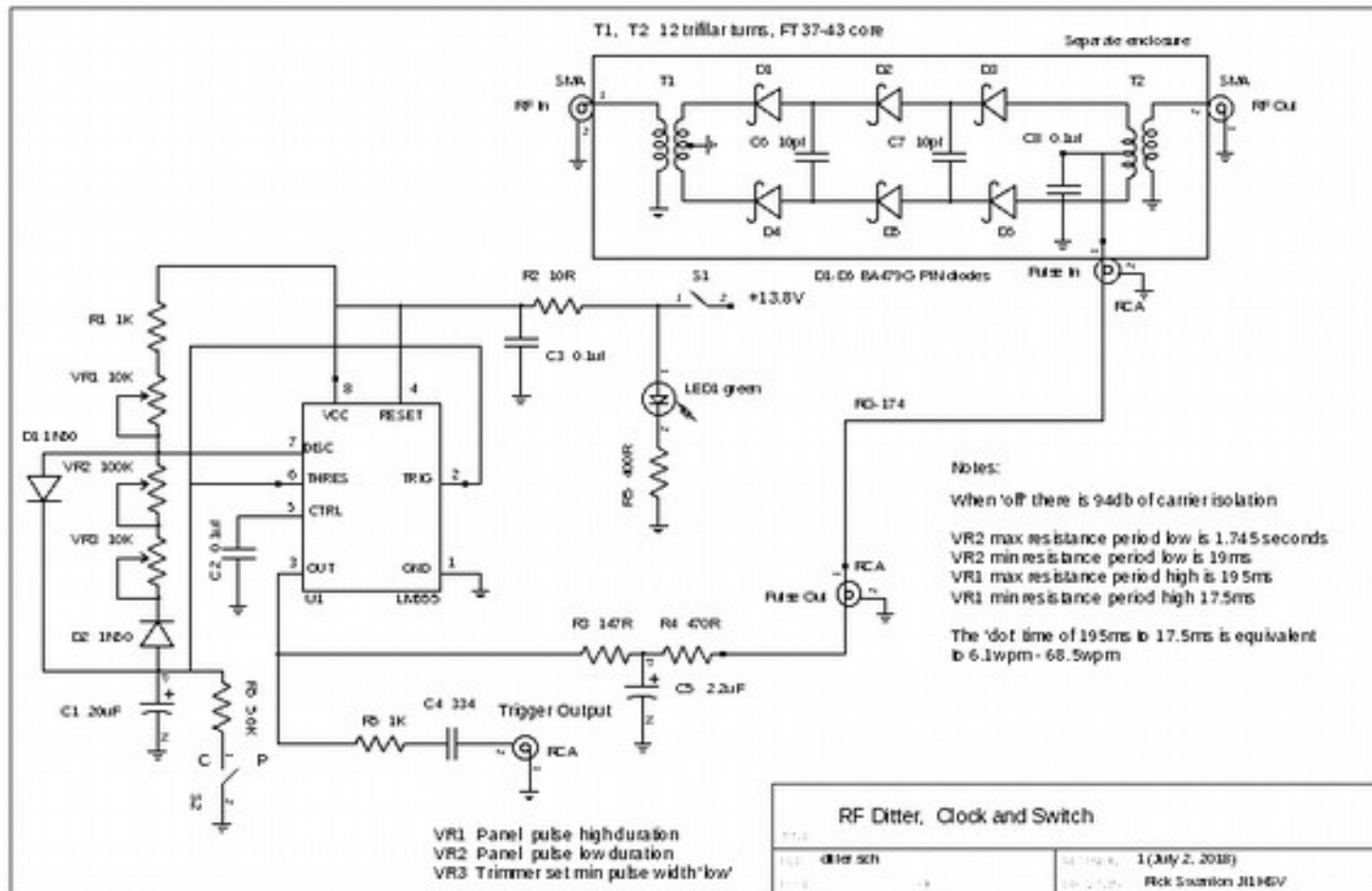




# AGC ... Troubles encountered

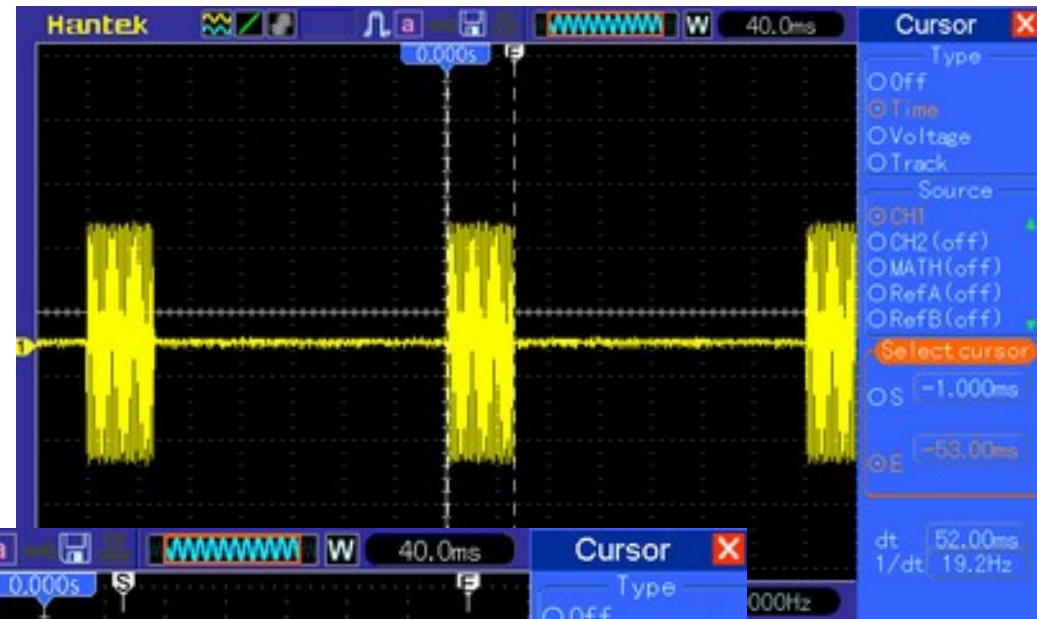
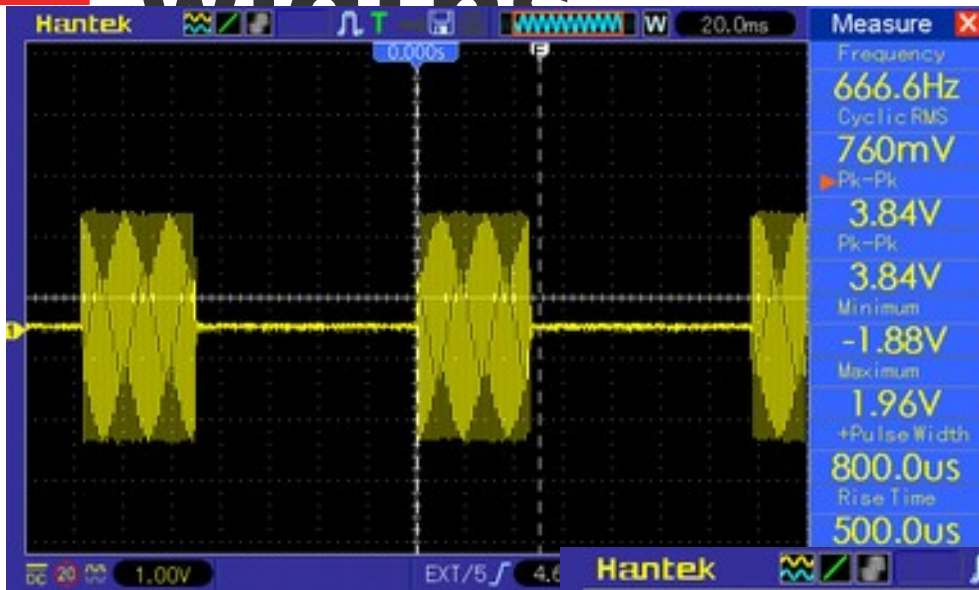
- My own ignorance at what to expect.
- Gain distribution in receiver
- Chinese fake parts
- Additional test equipment required
- Gain curves of RF and IF stages different
- Trying to make a linear S meter follow a log curve

# The 'Ditter'



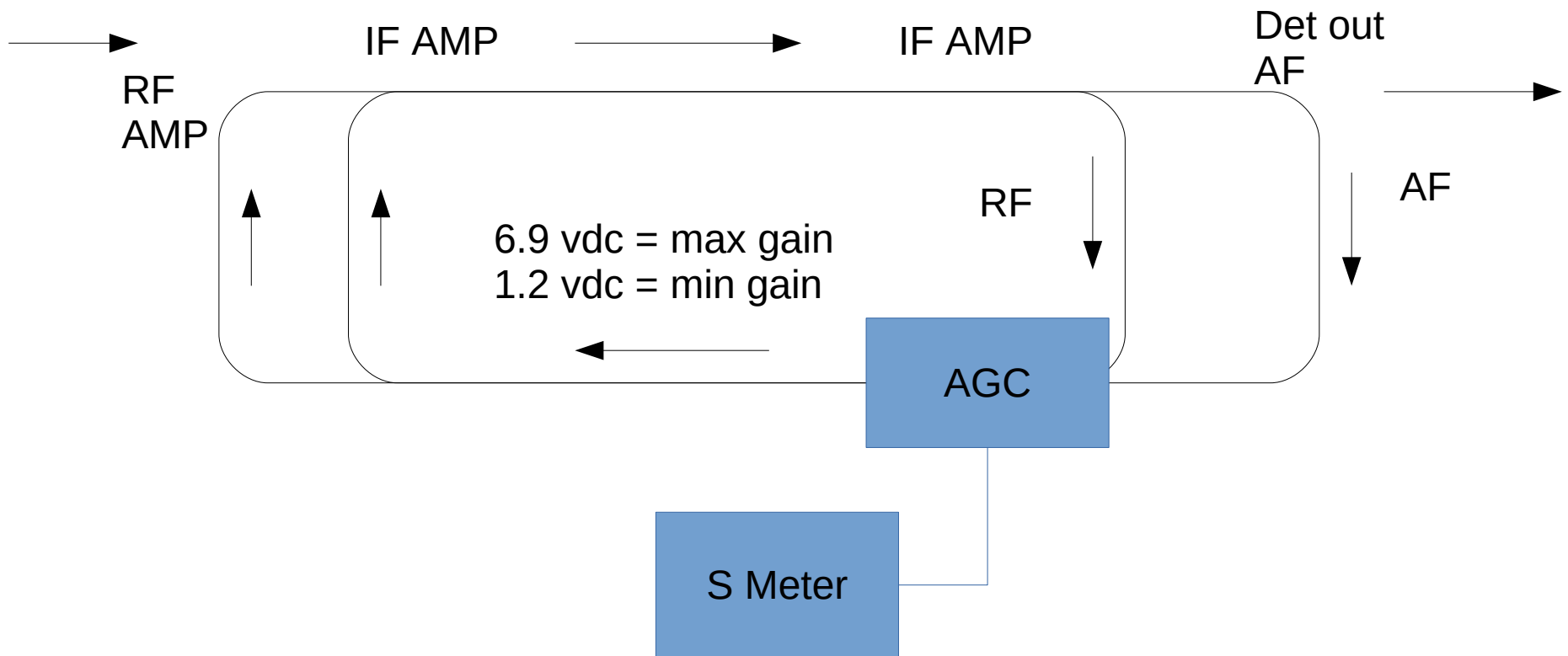


# Ditter ... varying pulse widths

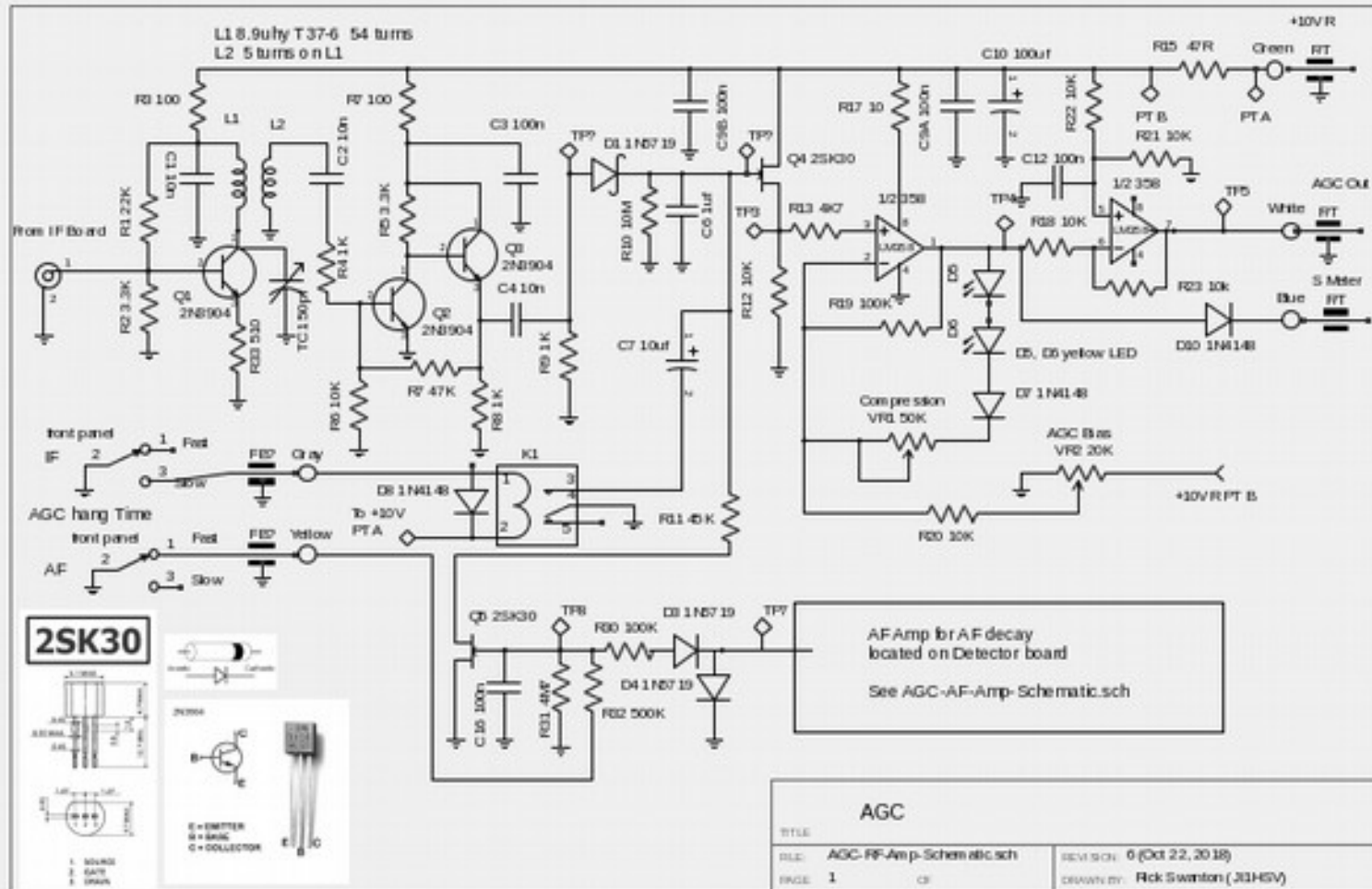


# Lots of Confusion

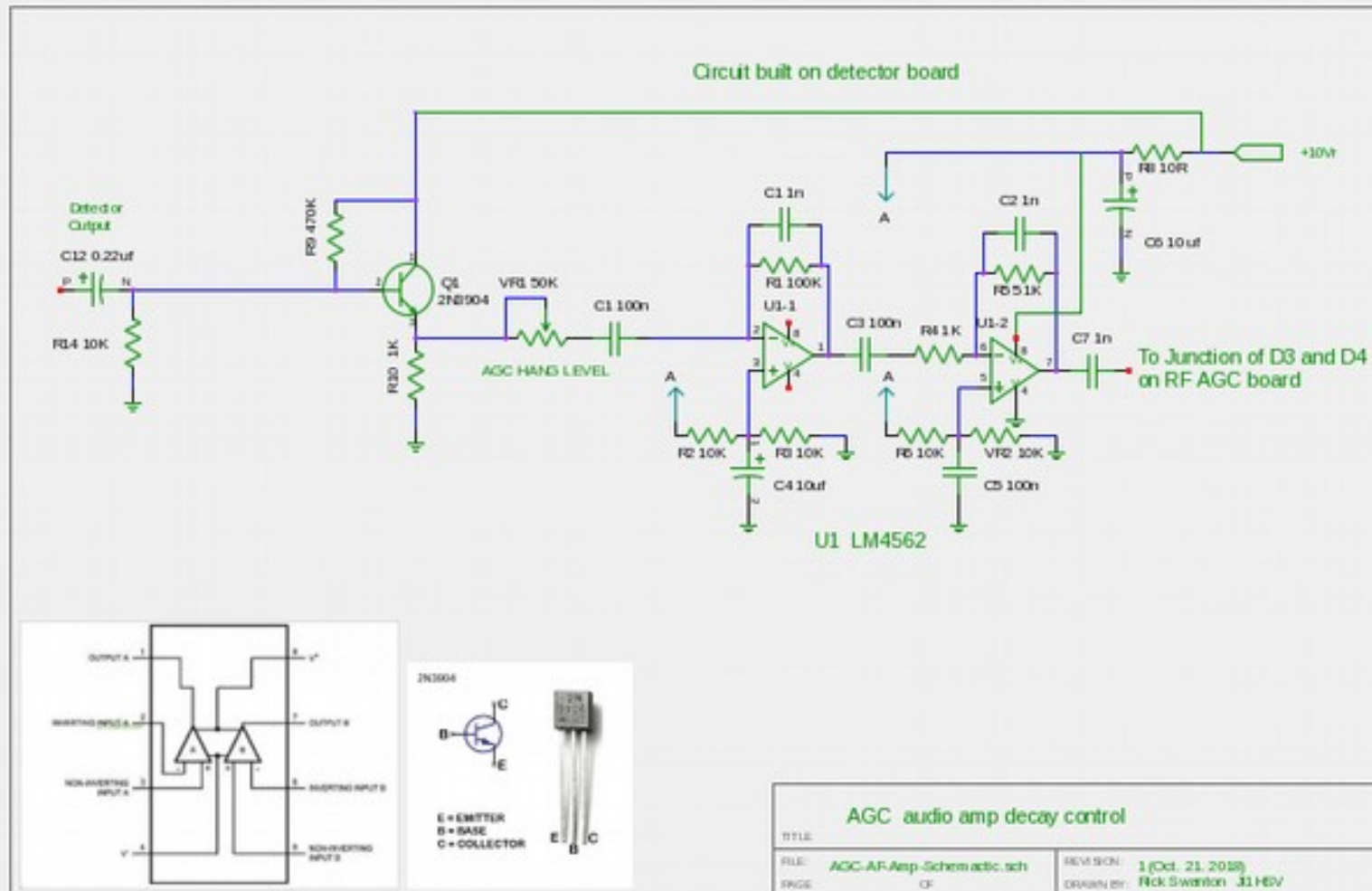
## The loops



# AGC IF amp and Detection



# AGC AF amp.

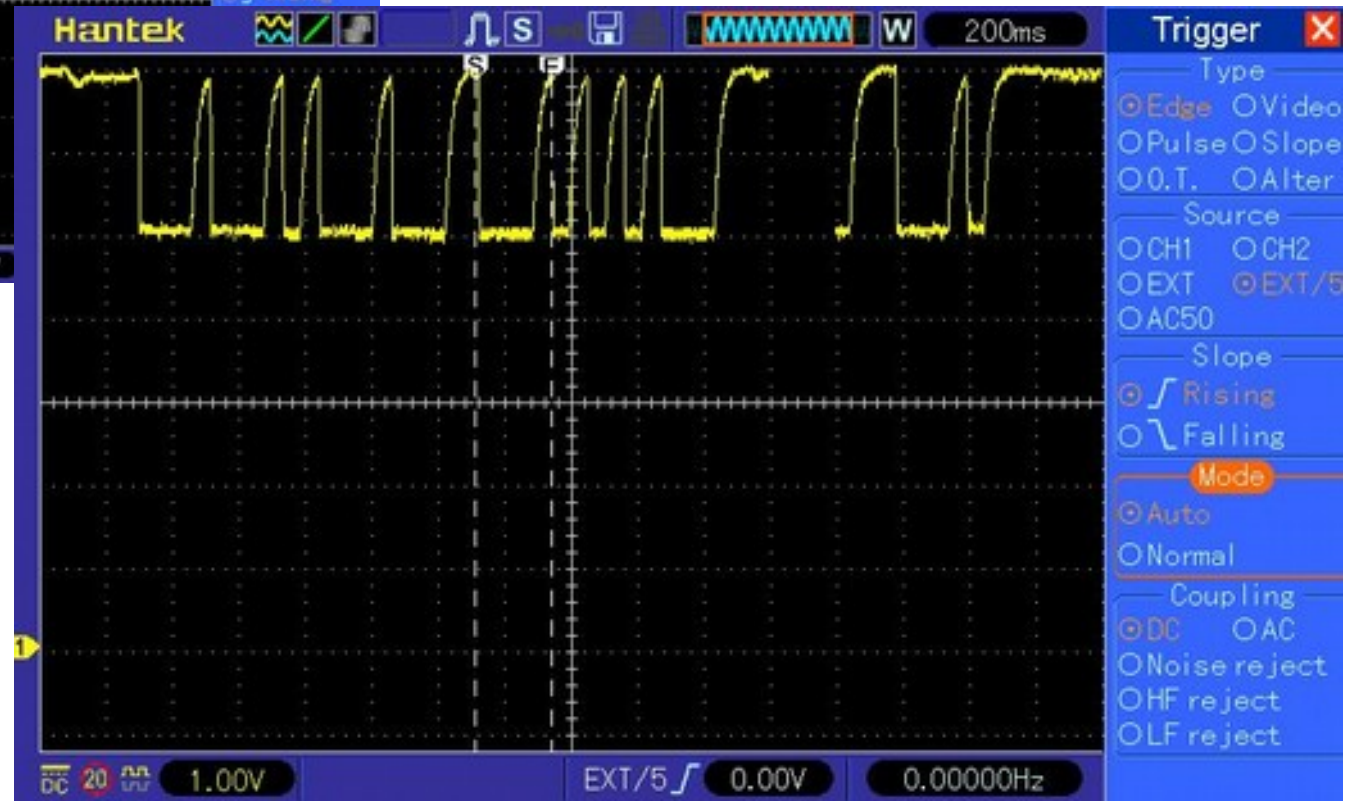
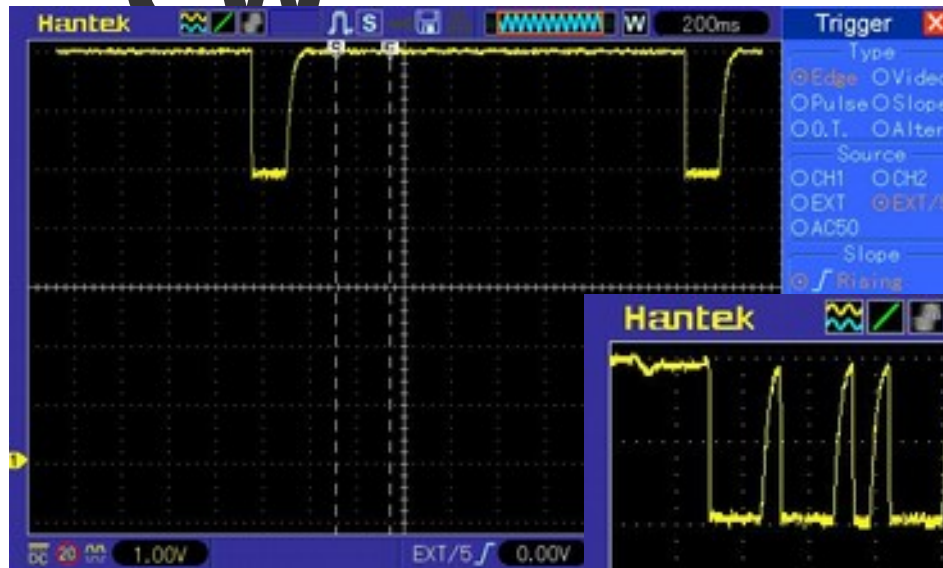




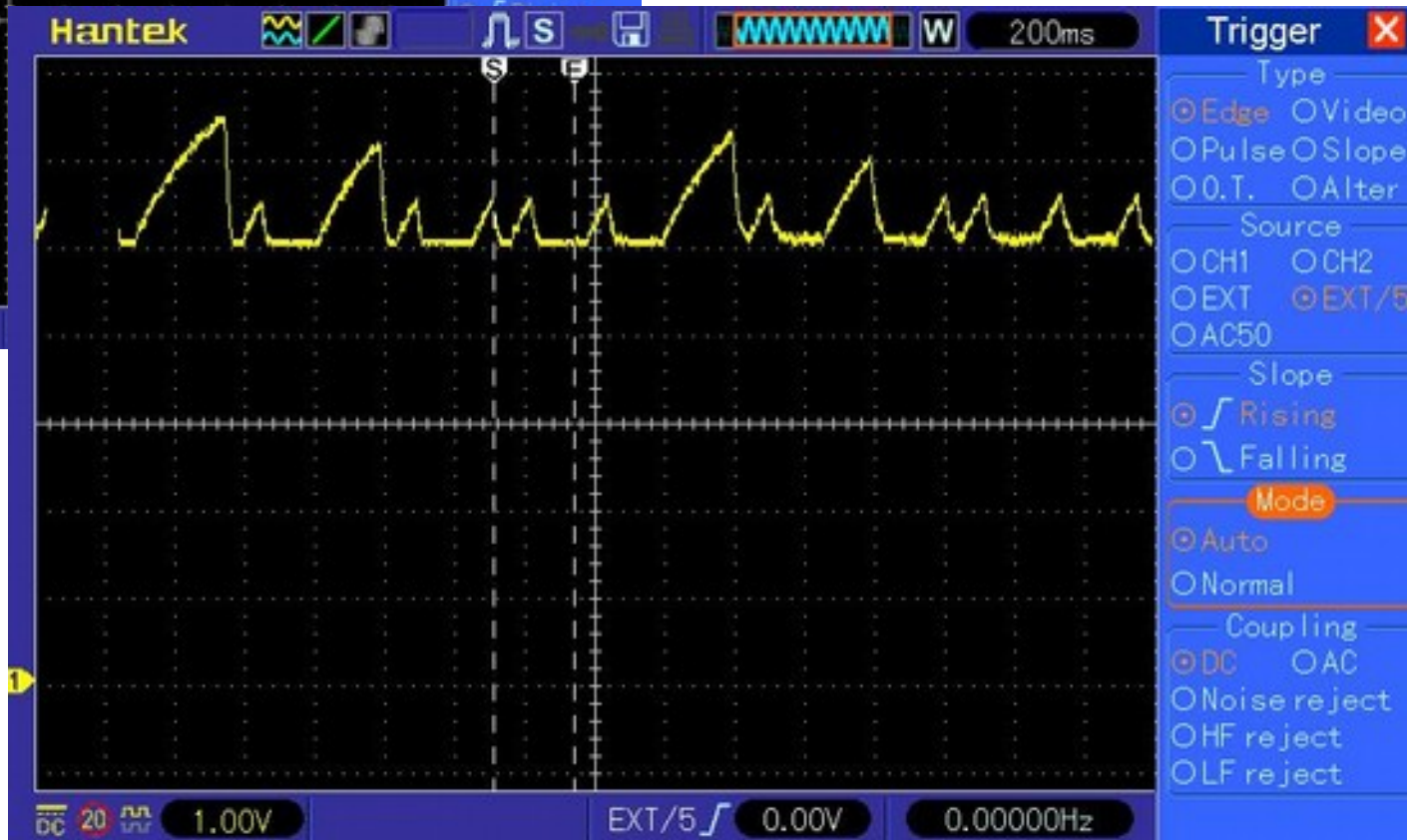
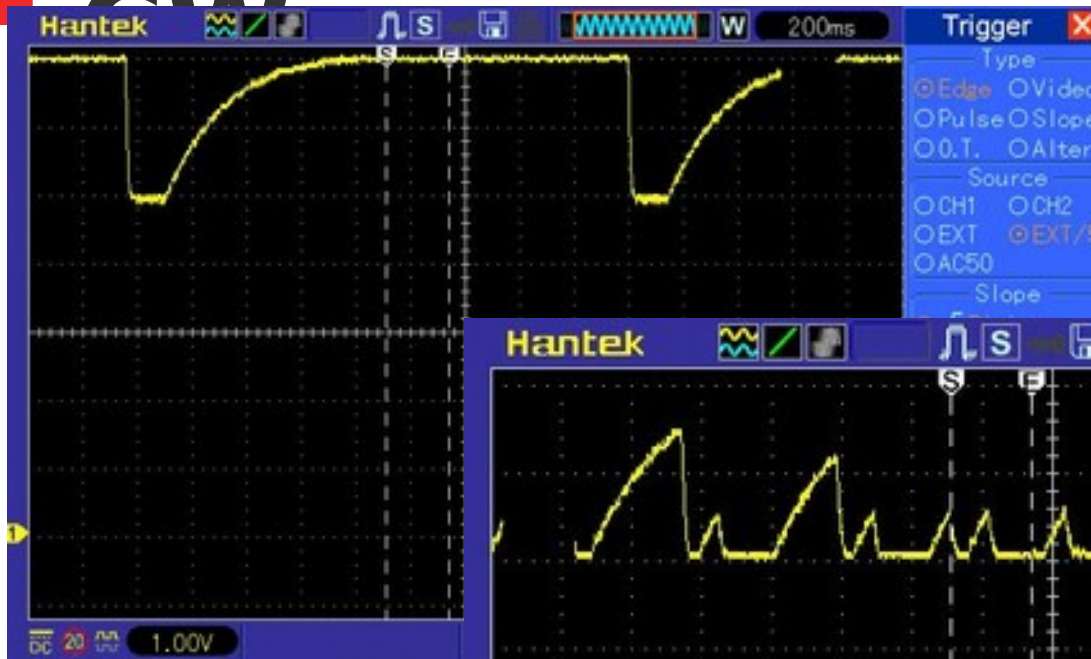
# Finally... working and built



# AF Fast IF Fast test/real CW

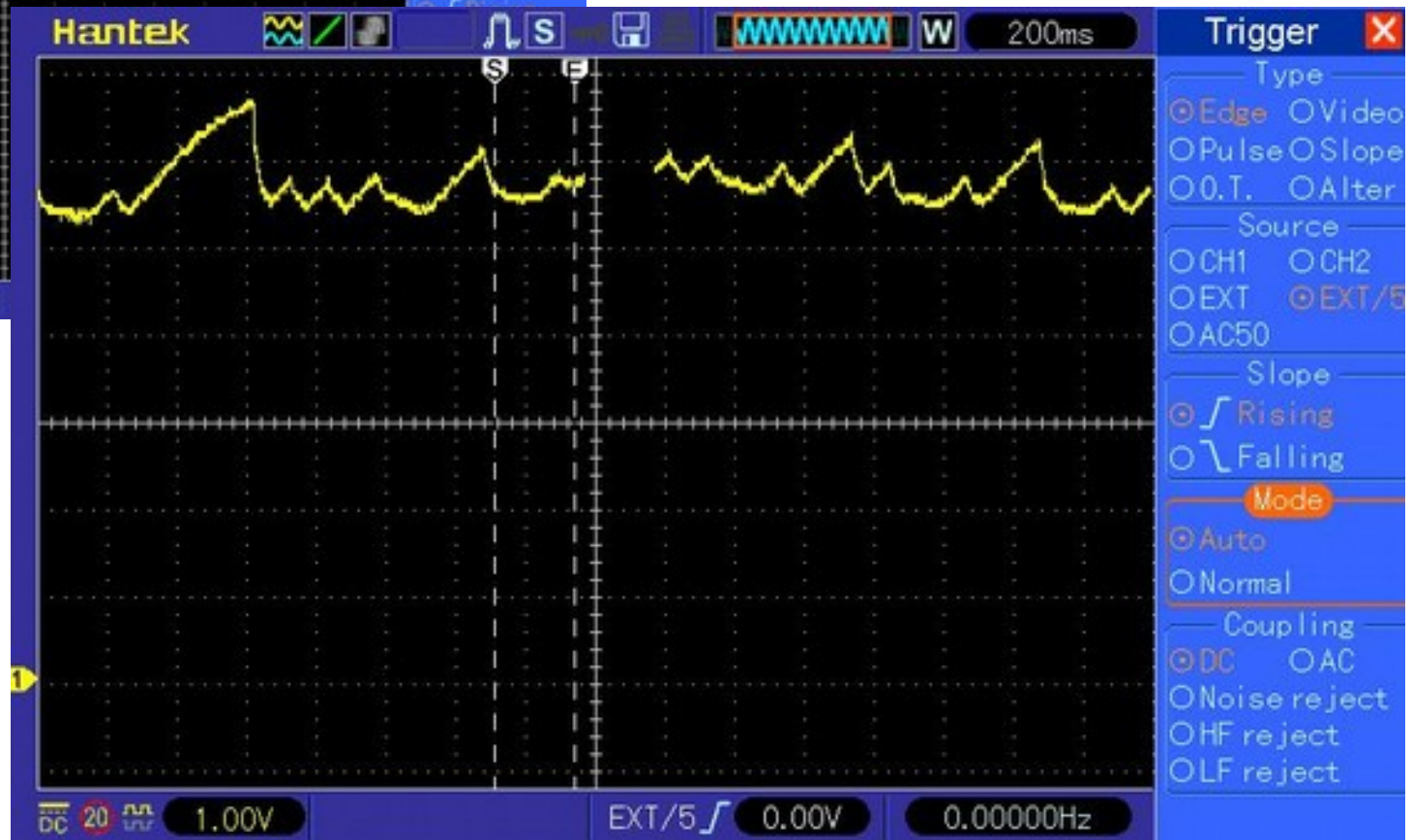
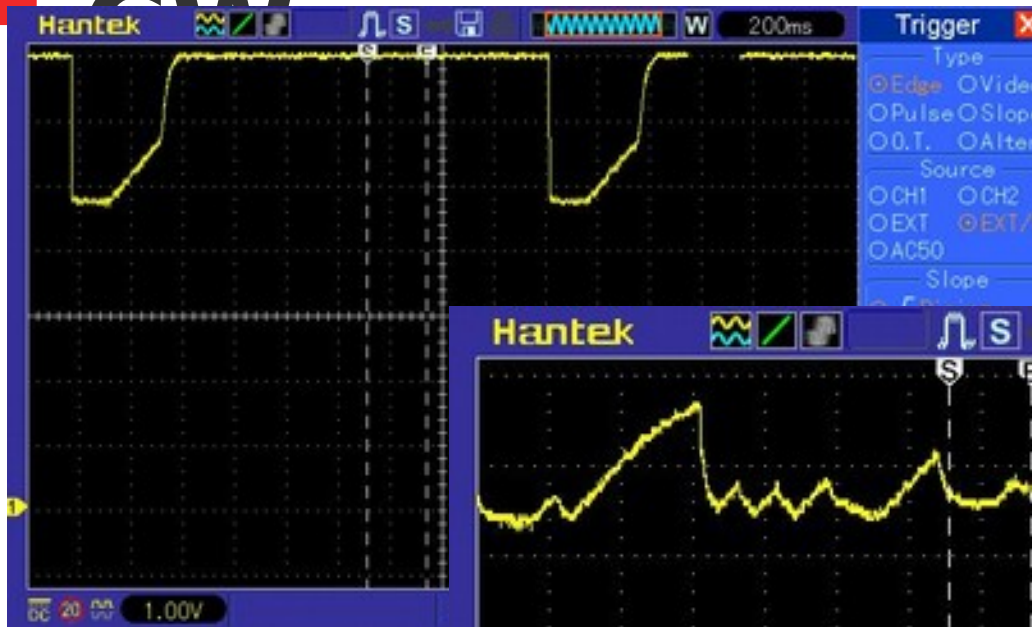


# AF Fast IF Slow test/real





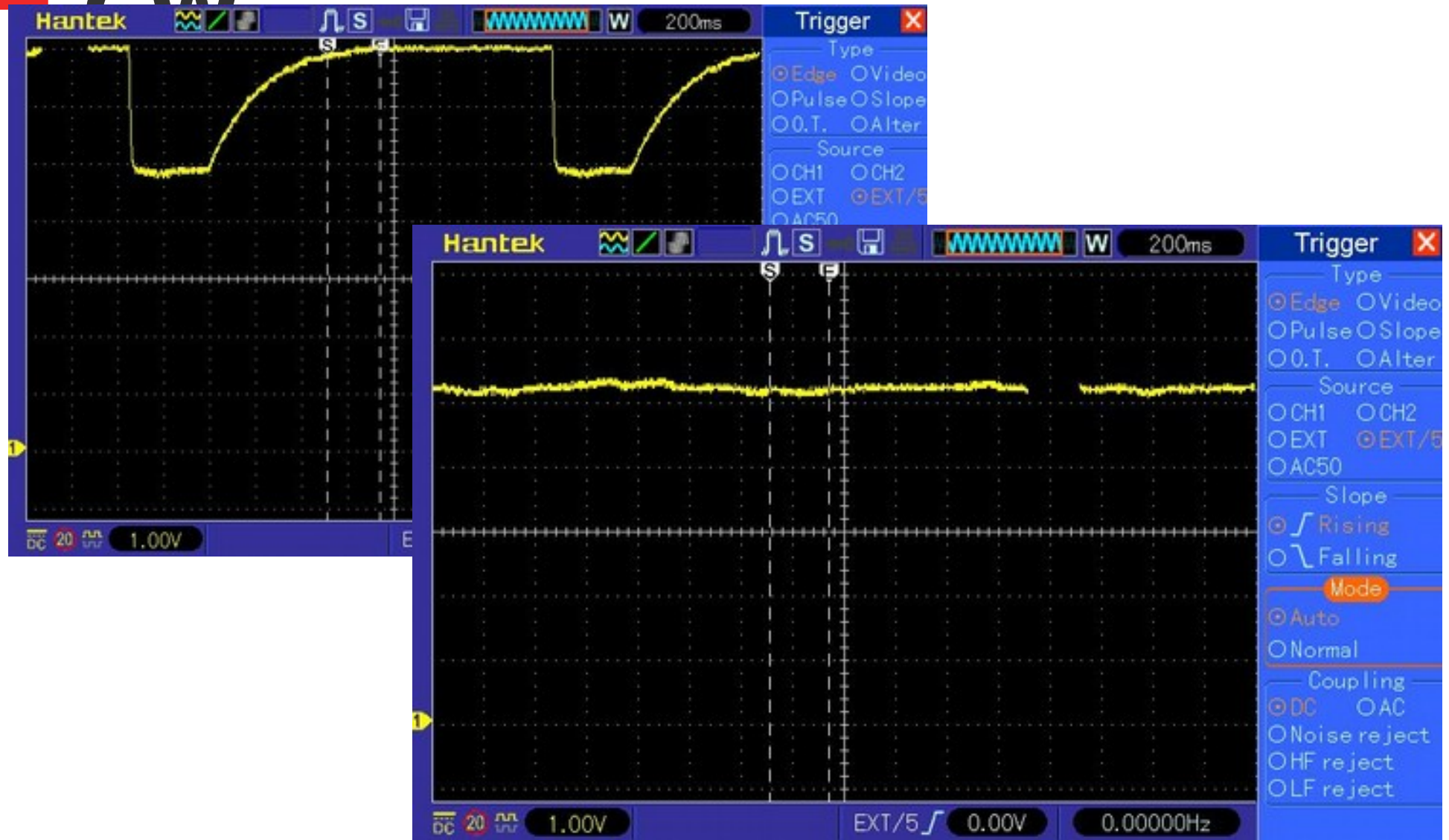
# AF Slow IF Fast test/real





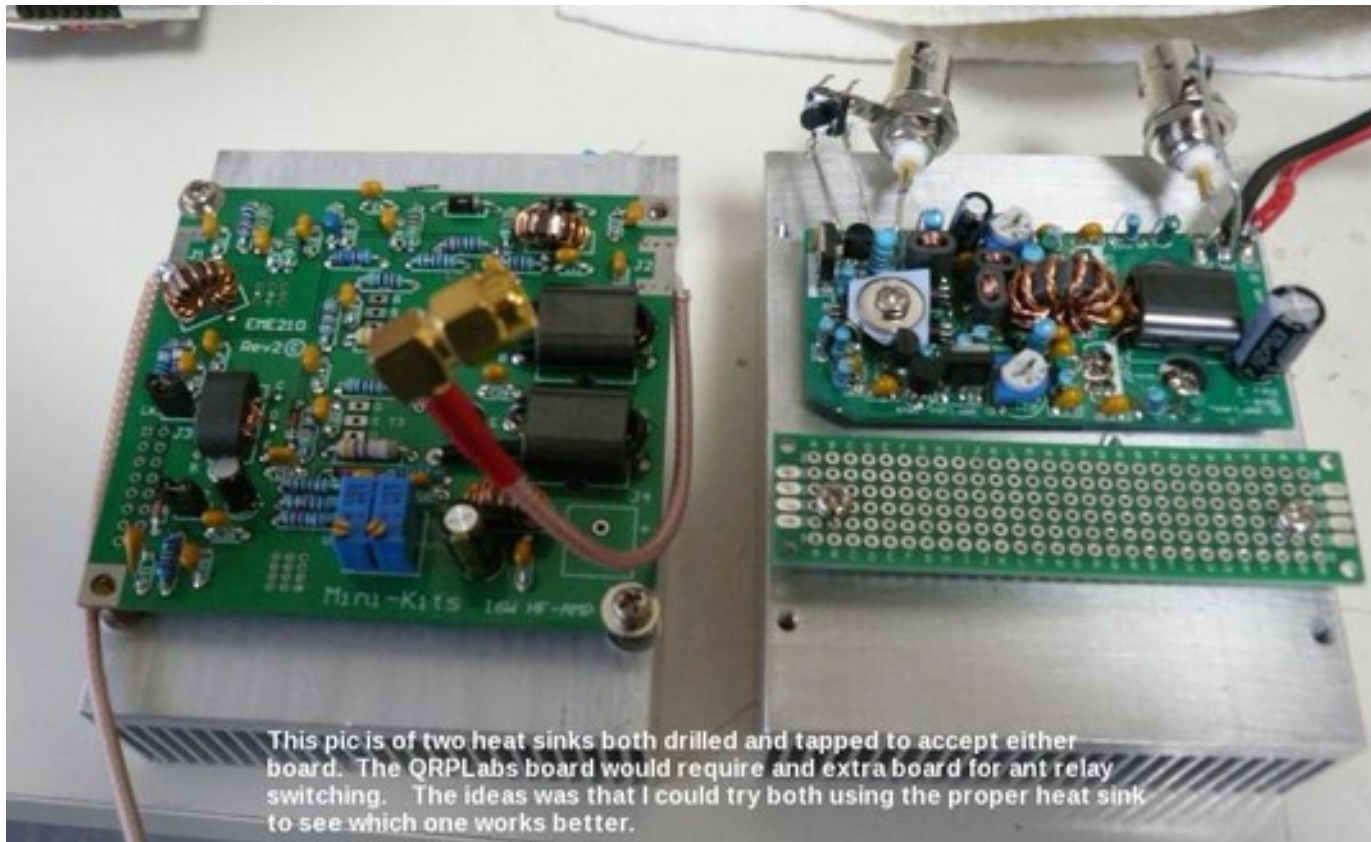
# AF Slow IF Slow test/real

CW



# Next... PA Amp

MiniKits 16 watt or QRPLabs 10 watt ?

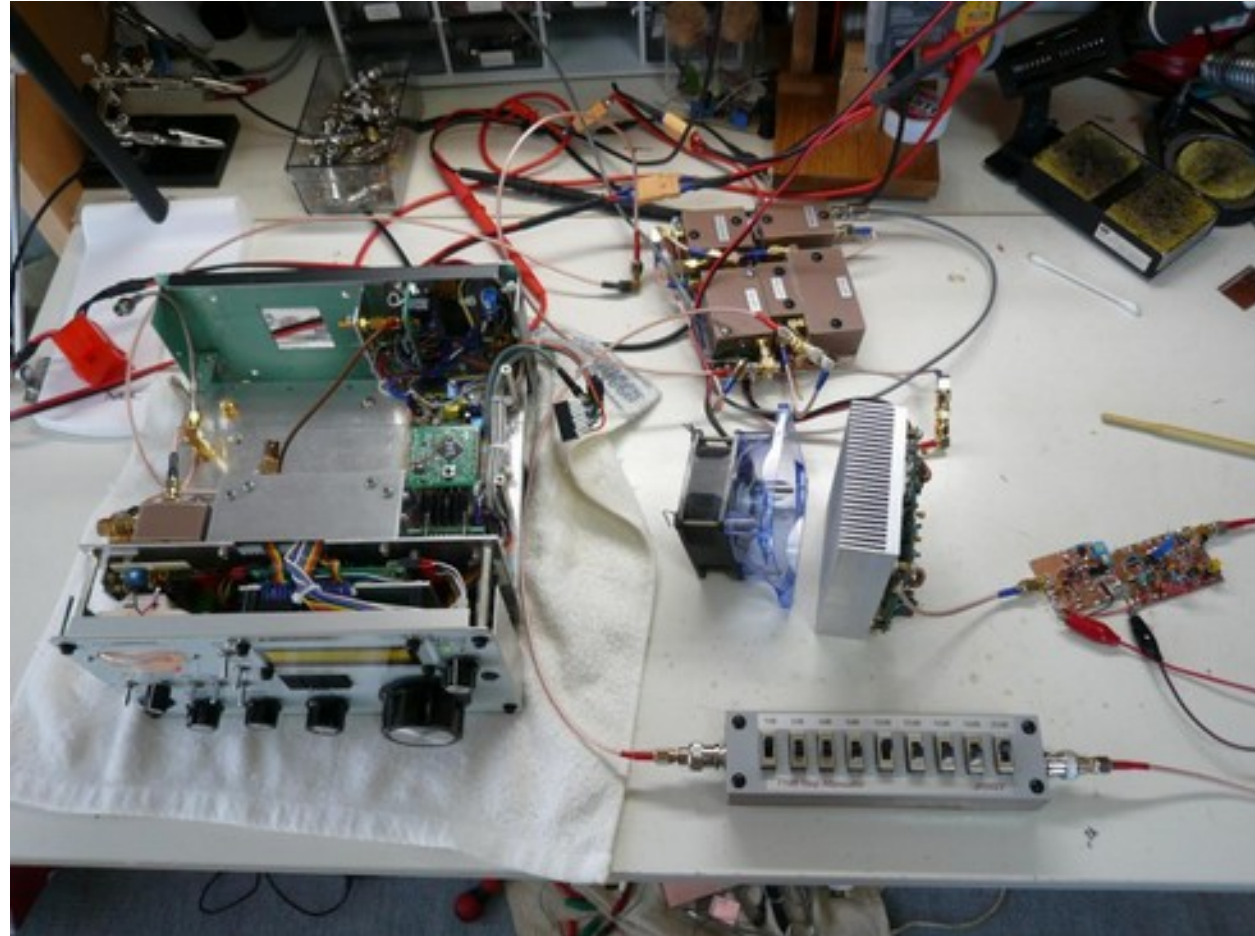


This pic is of two heat sinks both drilled and tapped to accept either board. The QRPLabs board would require an extra board for ant relay switching. The idea was that I could try both using the proper heat sink to see which one works better.

# MiniKits PA Amp selected

Why..  
Minikits has 45dB gain  
QrpLabs .. about 20

Minikits Lower  
harmonic content



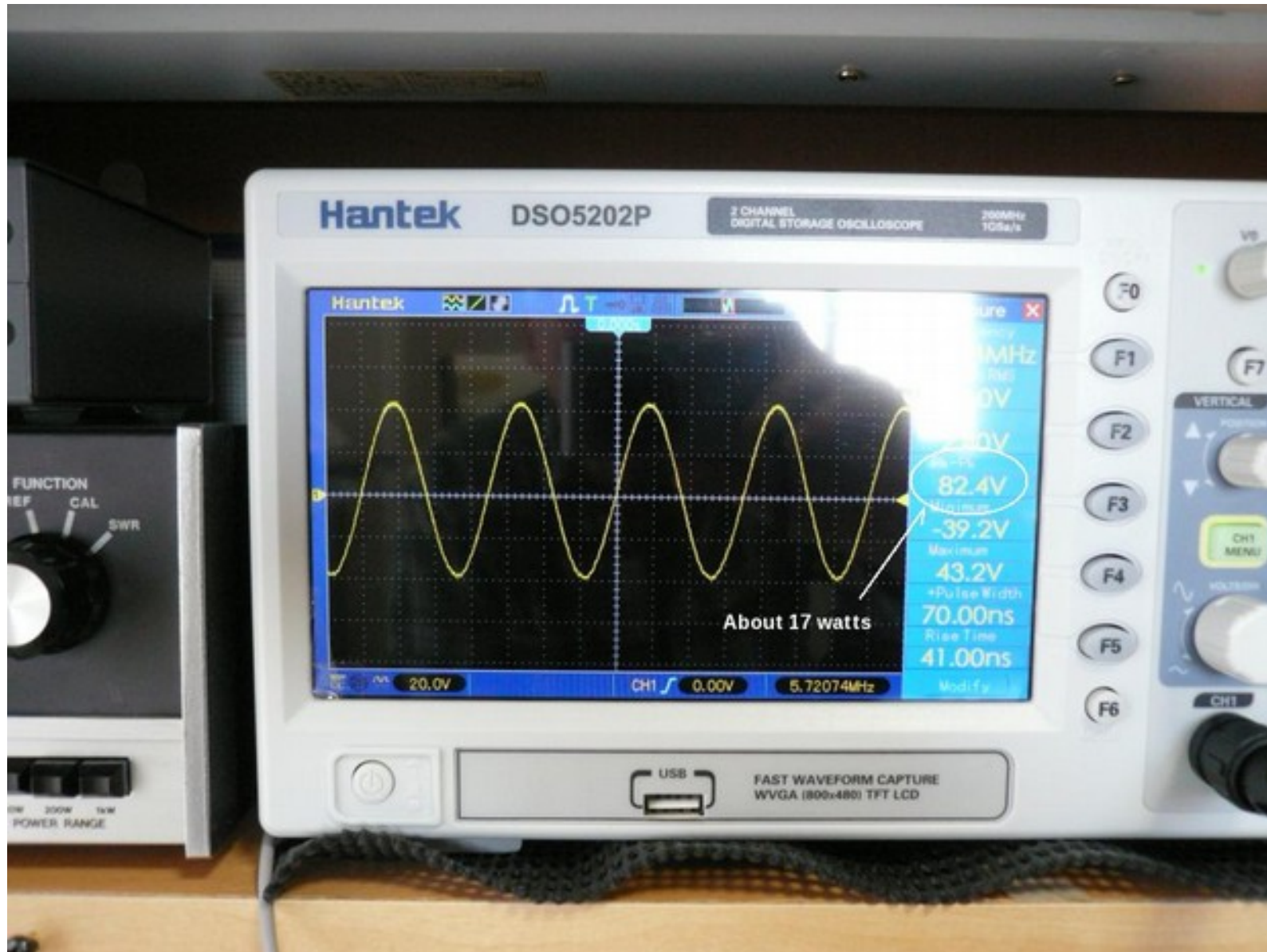


# PA output ... max 20 watts

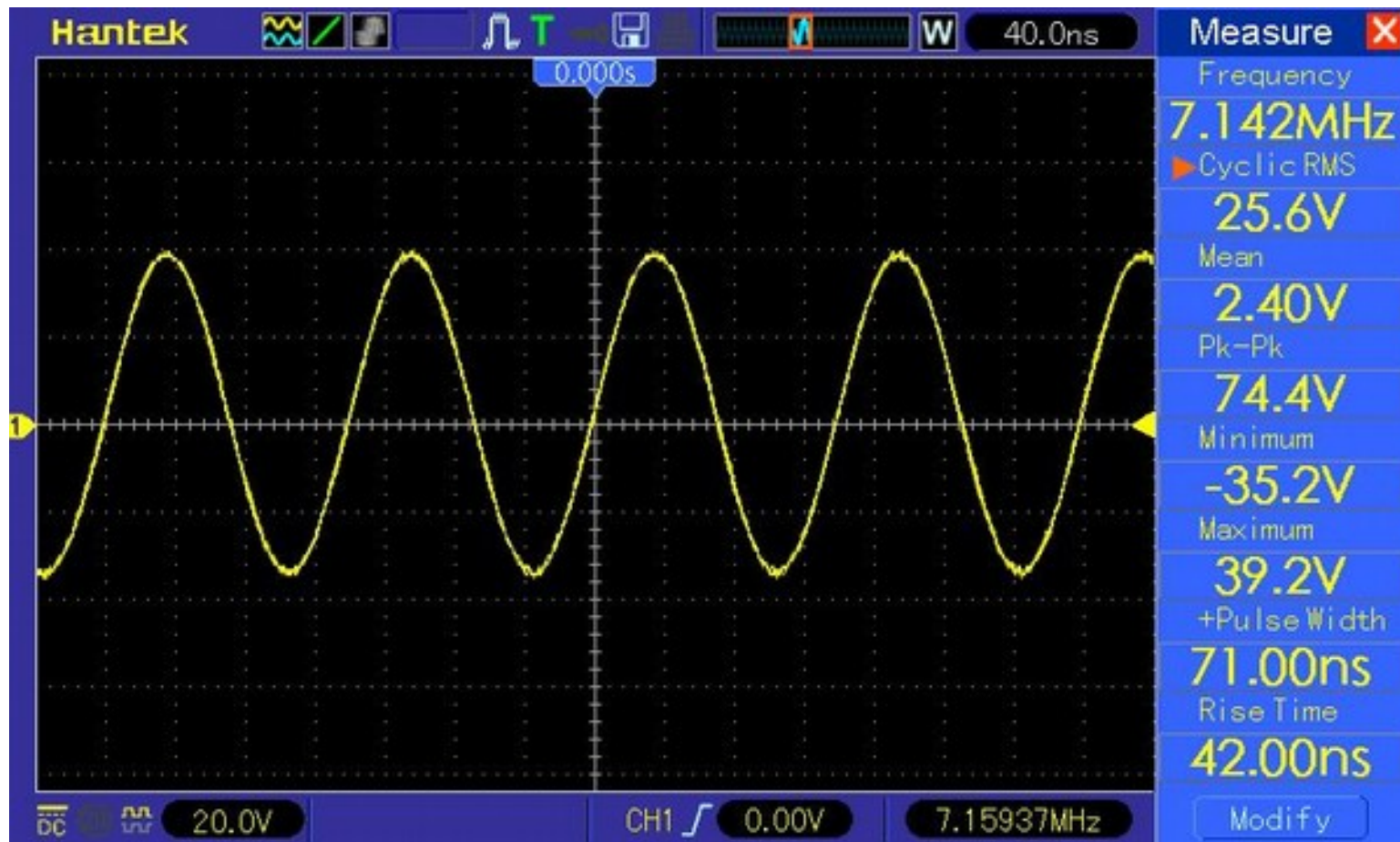




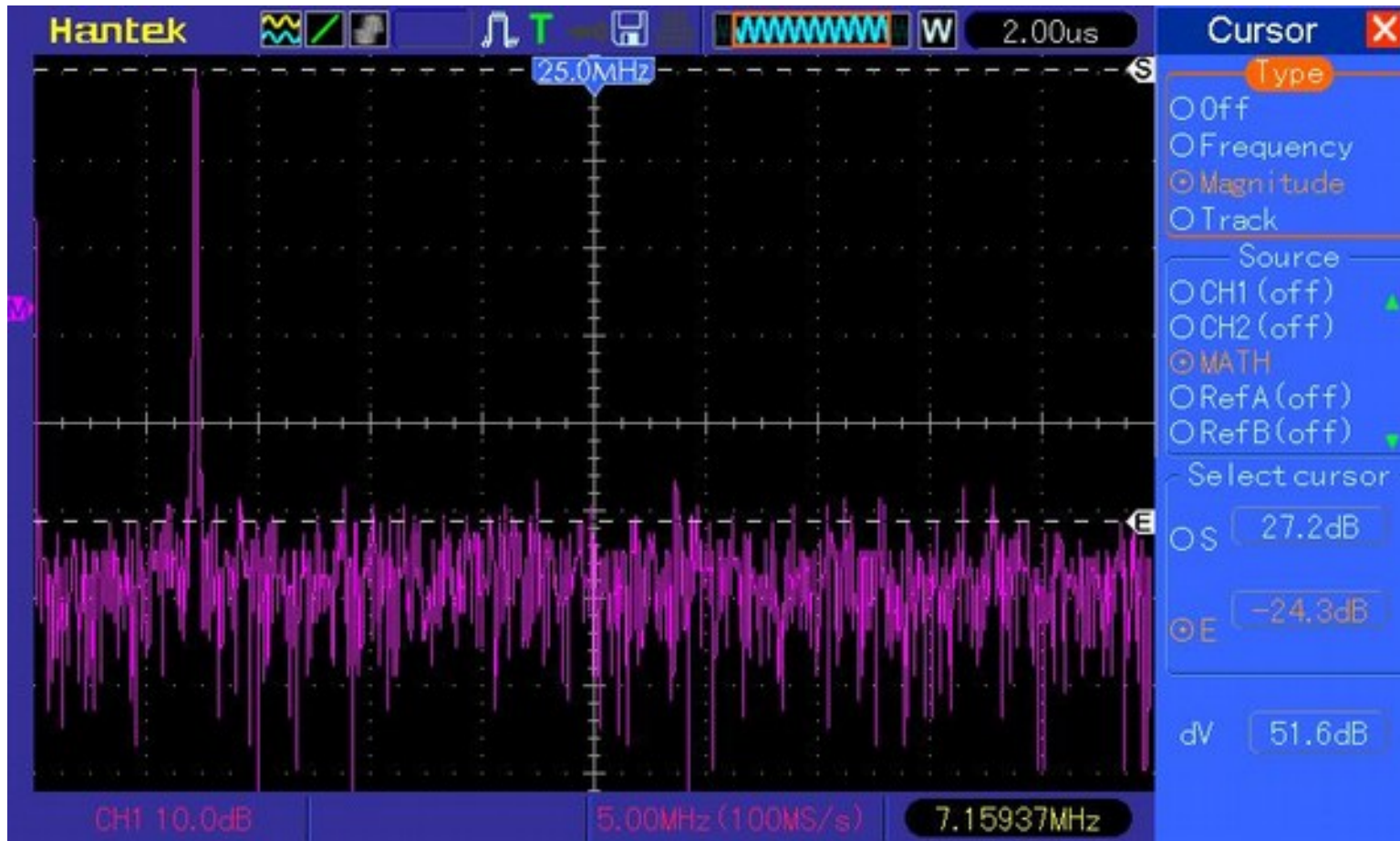
# After LPF 17 watts



# 15 watt Waveform



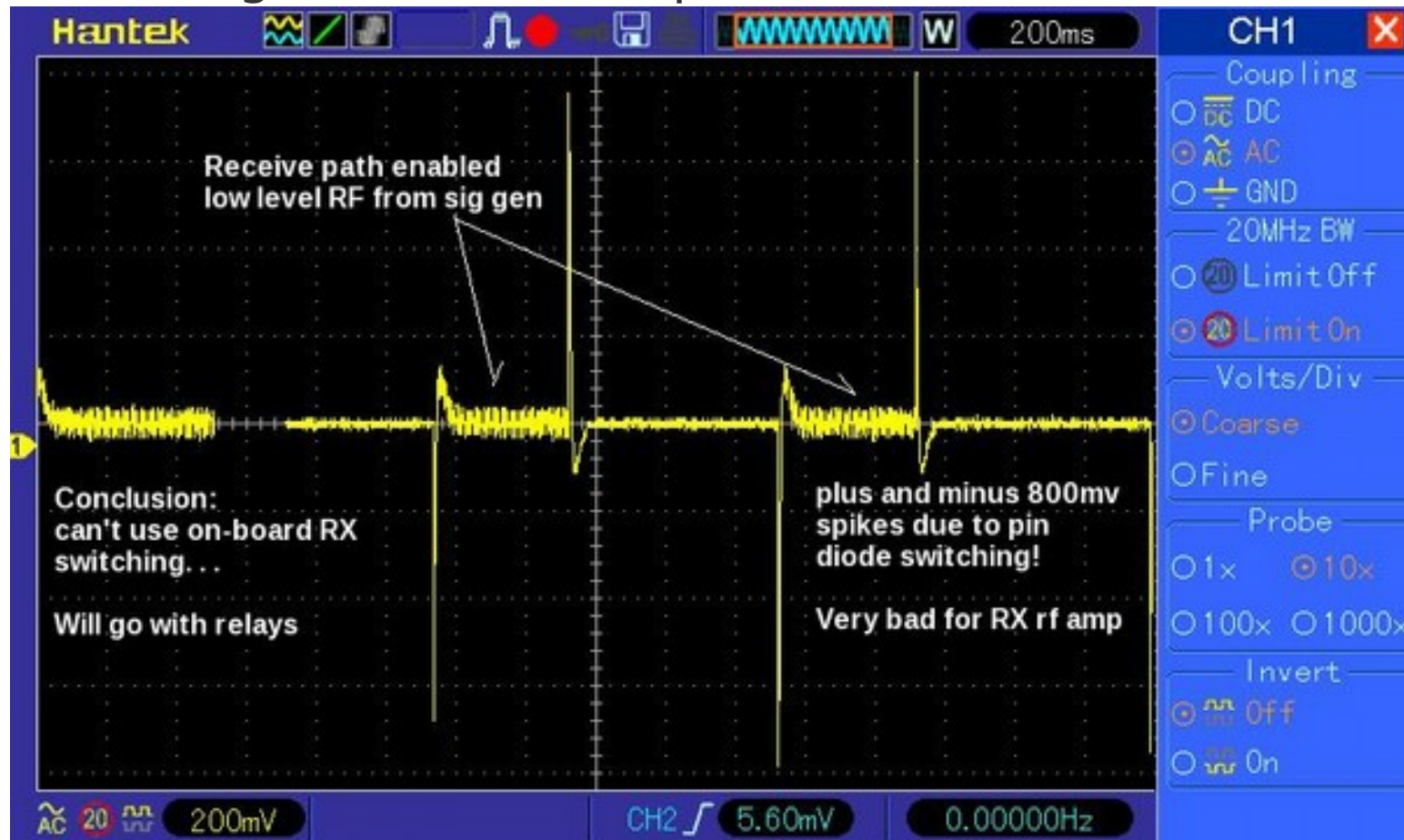
# 15 watt FFT, i.e. harmonic level





# Test everything...

While testing for PA receive path loss. . this was found







# Now for the PA Driver

- Independent power level and ALC control
- 2-4 ms rise and fall times on keyed waveform
- Adequate drive from DDS
- Level verses frequency issues
- Signal “Blow-by” has to be greater than 75 dB
- Everything has to fit in a very small module.

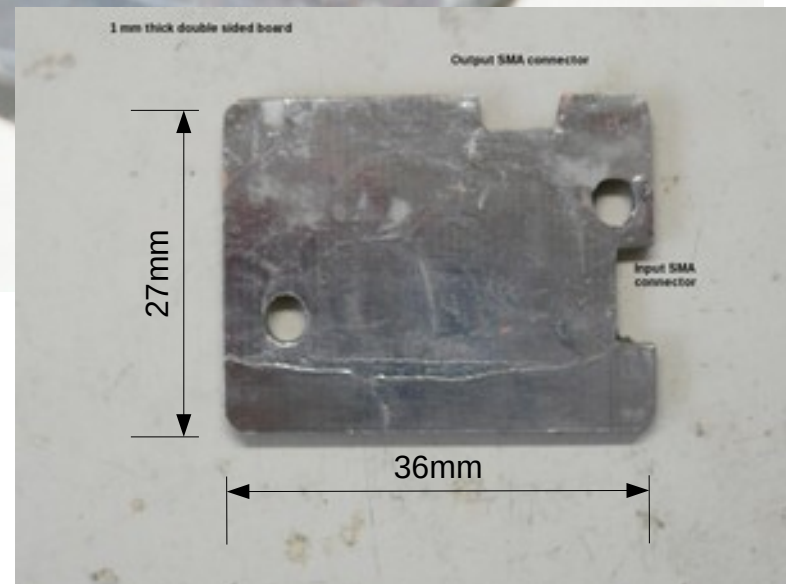


# The board

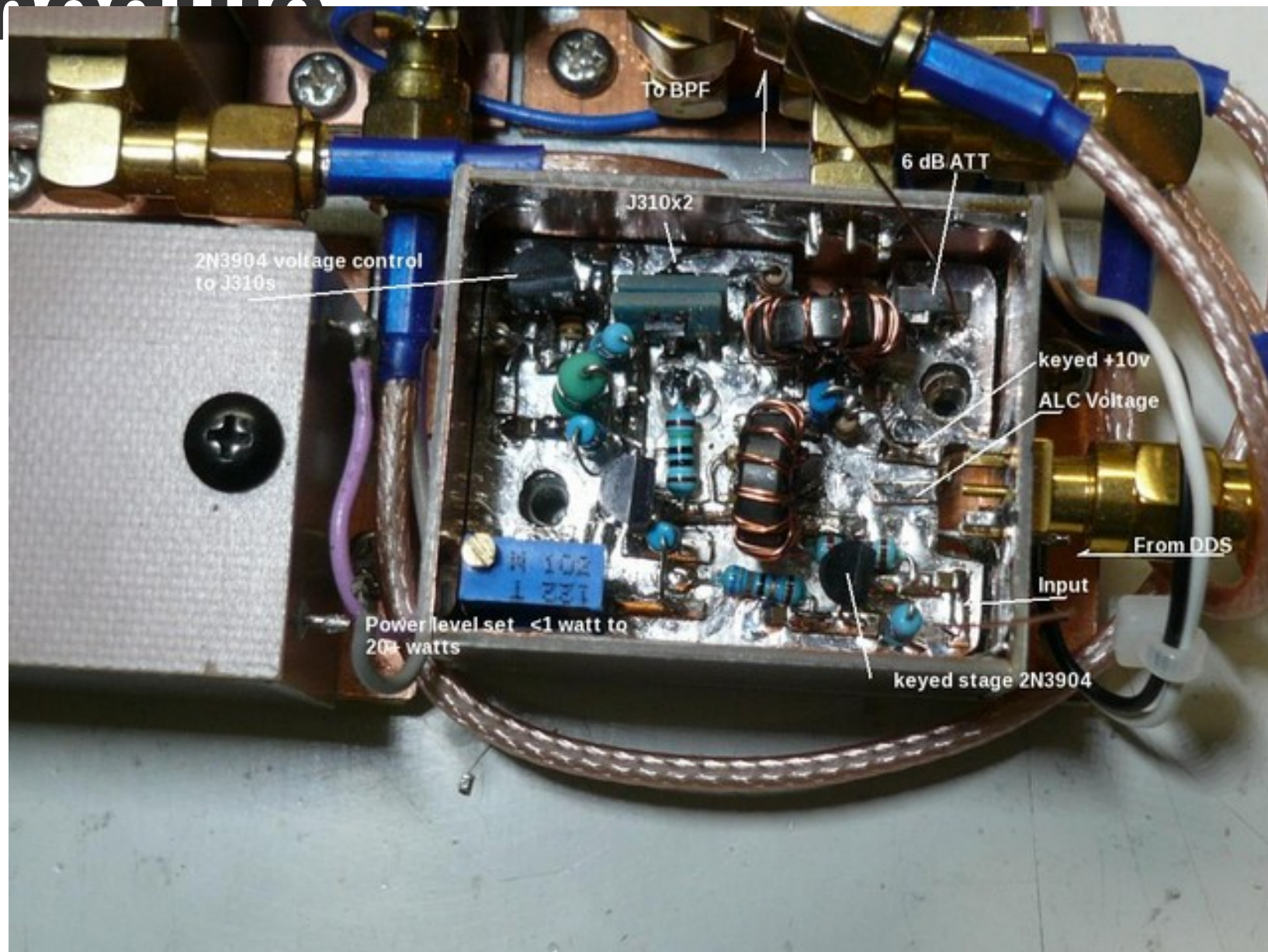


0.01 uF

6dB Panasonic ATT chip



# Finally . . . placed in module

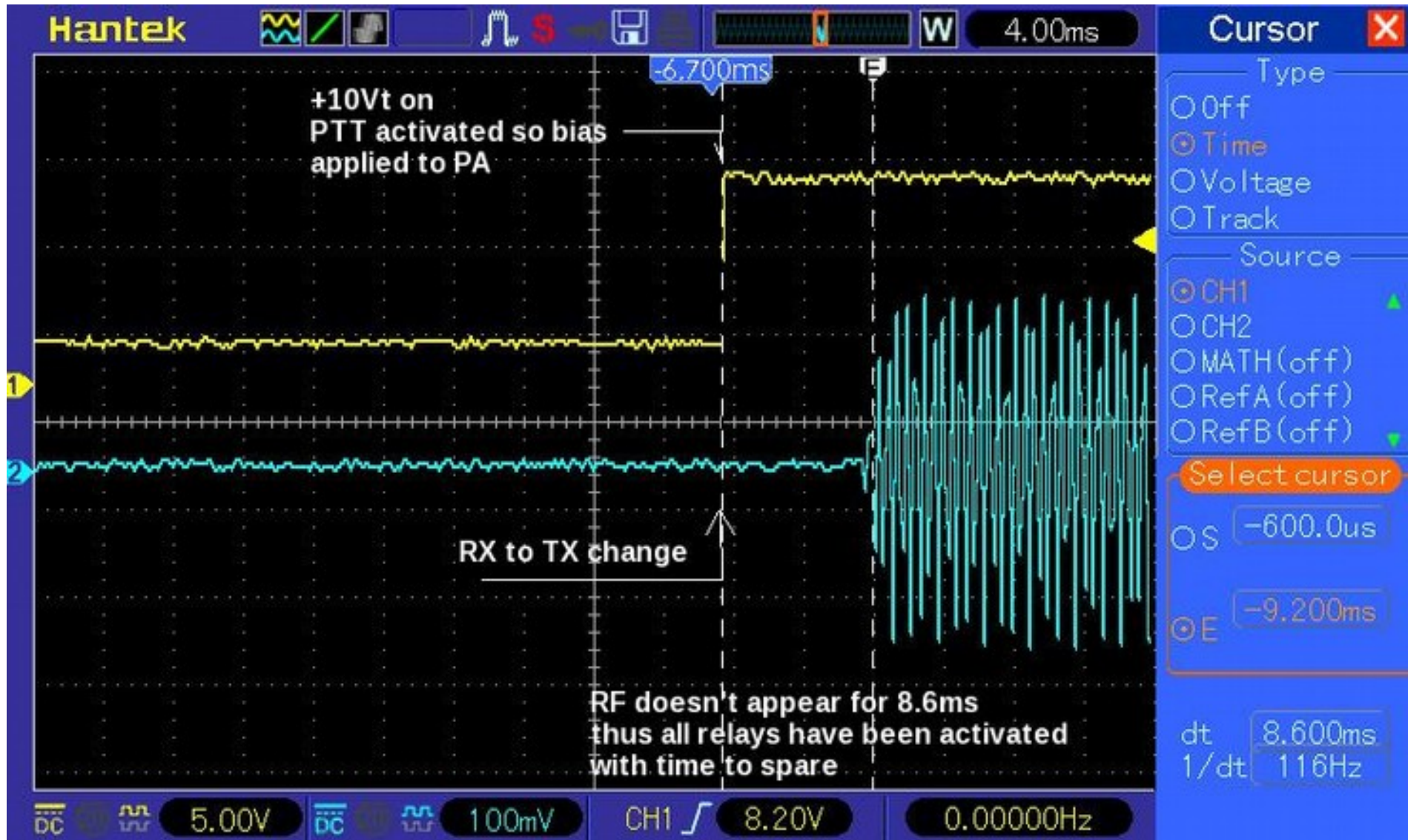




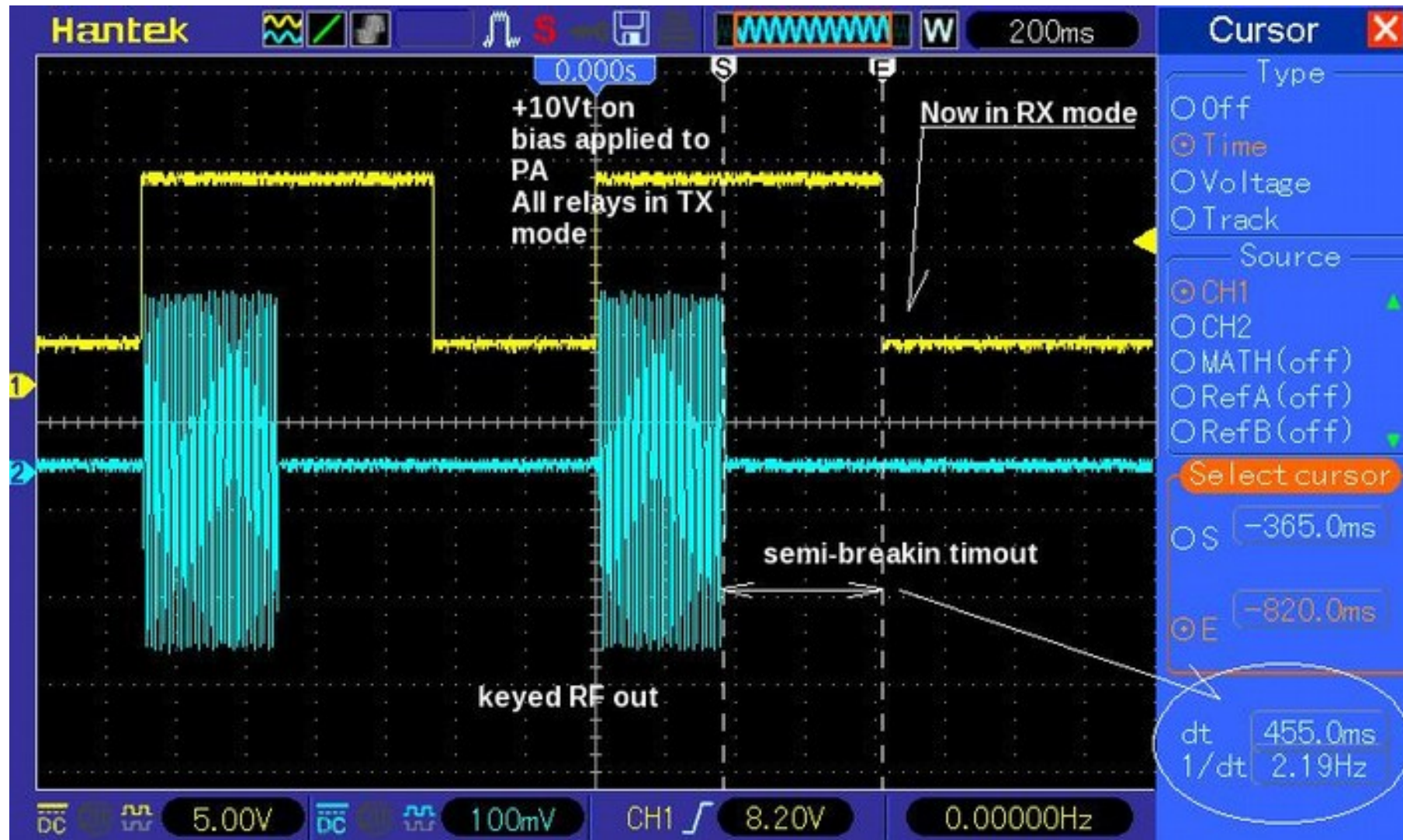
# Results

- Level control: 100mw to 20 watts
- ALC @ 2.24Vdc maximum output @ 1.0Vdc 0 output.
- Blow-by: -80dB at 15 watts output
- Power vs Frequency output: flat from 6.9Mhz to 7.4Mhz
- Key rise time 2.0 ms, fall time 2.8 ms

# Data Mode Switch vs RF

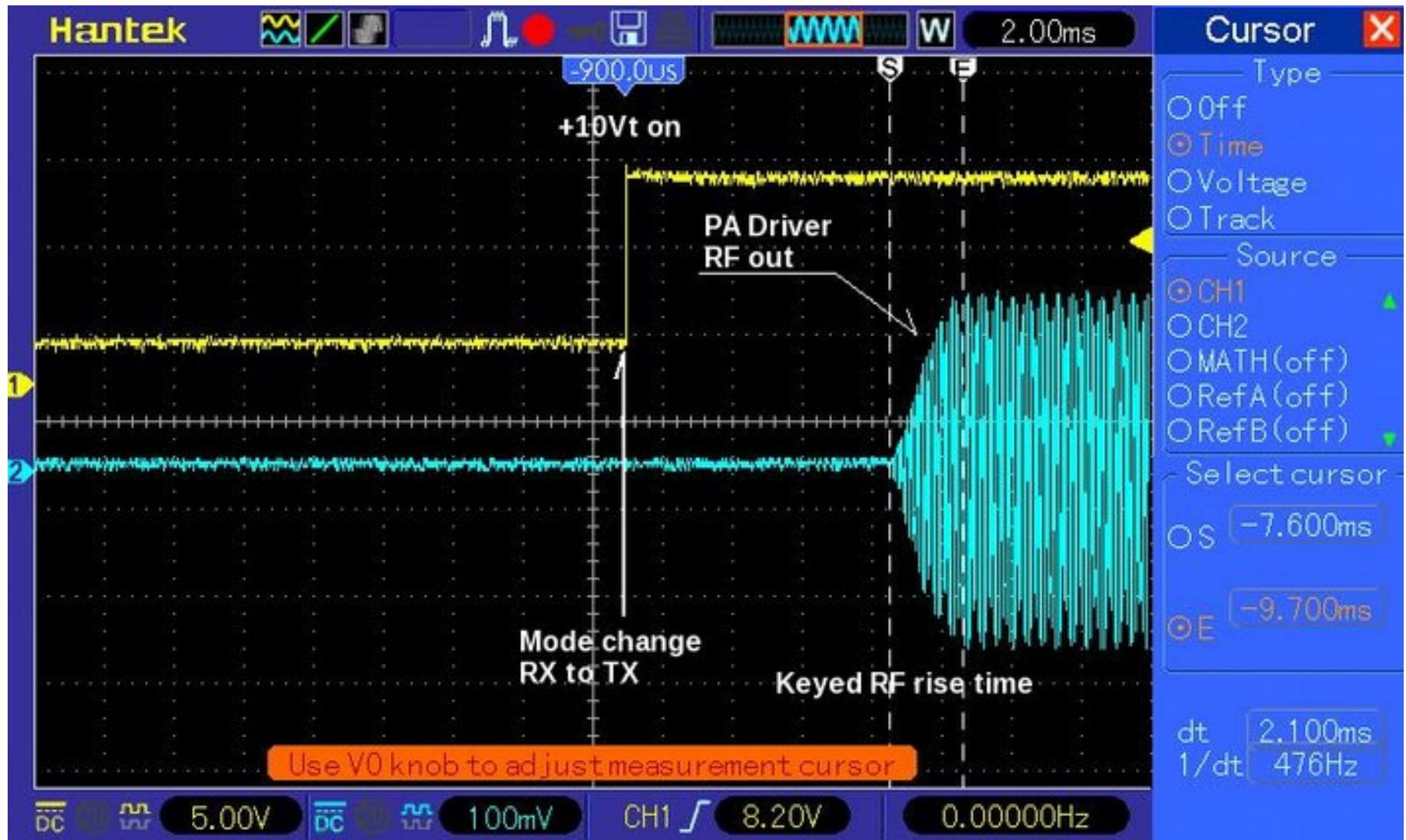


# Data RF and SBRK timeout

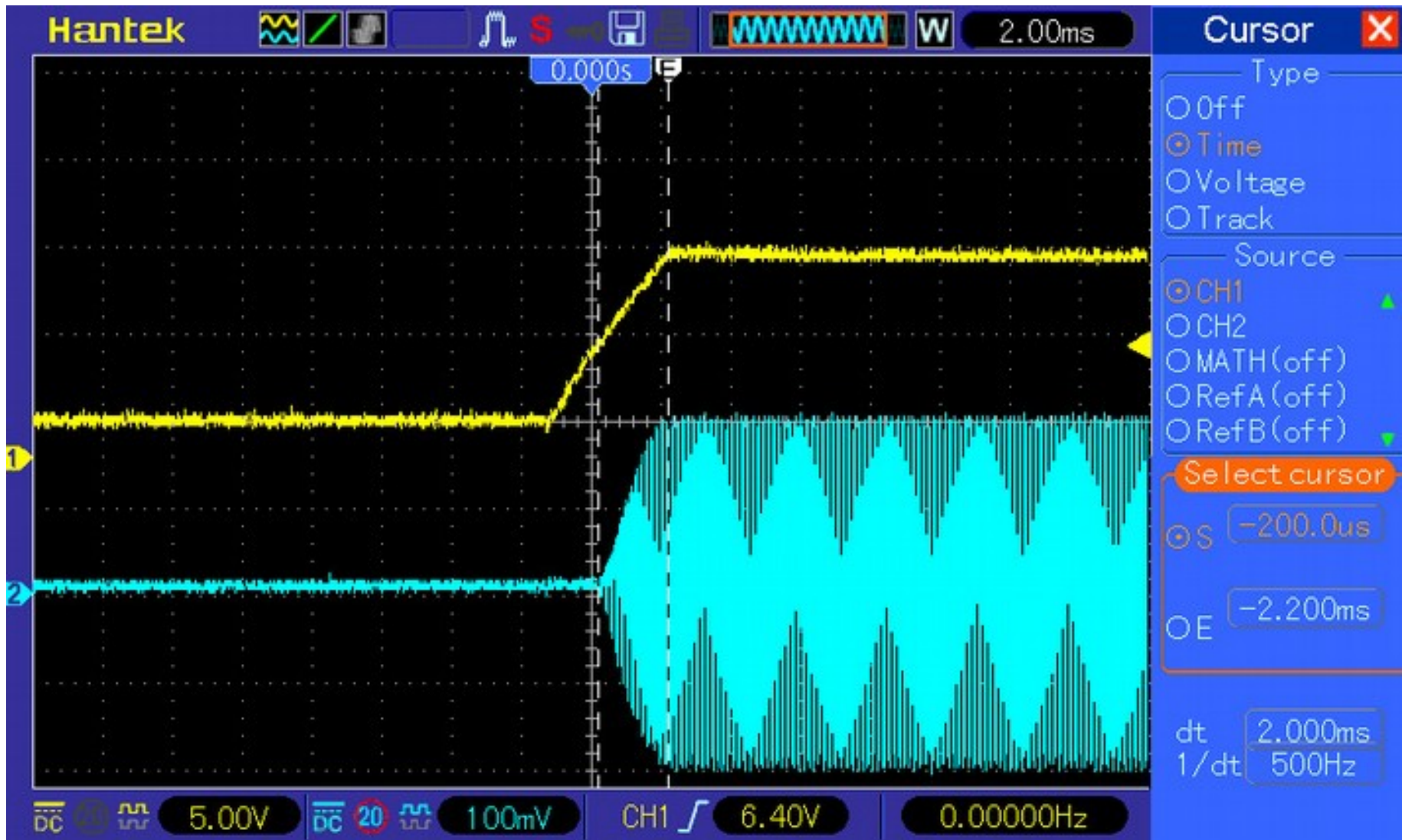




# Data Keyed RF Rise time

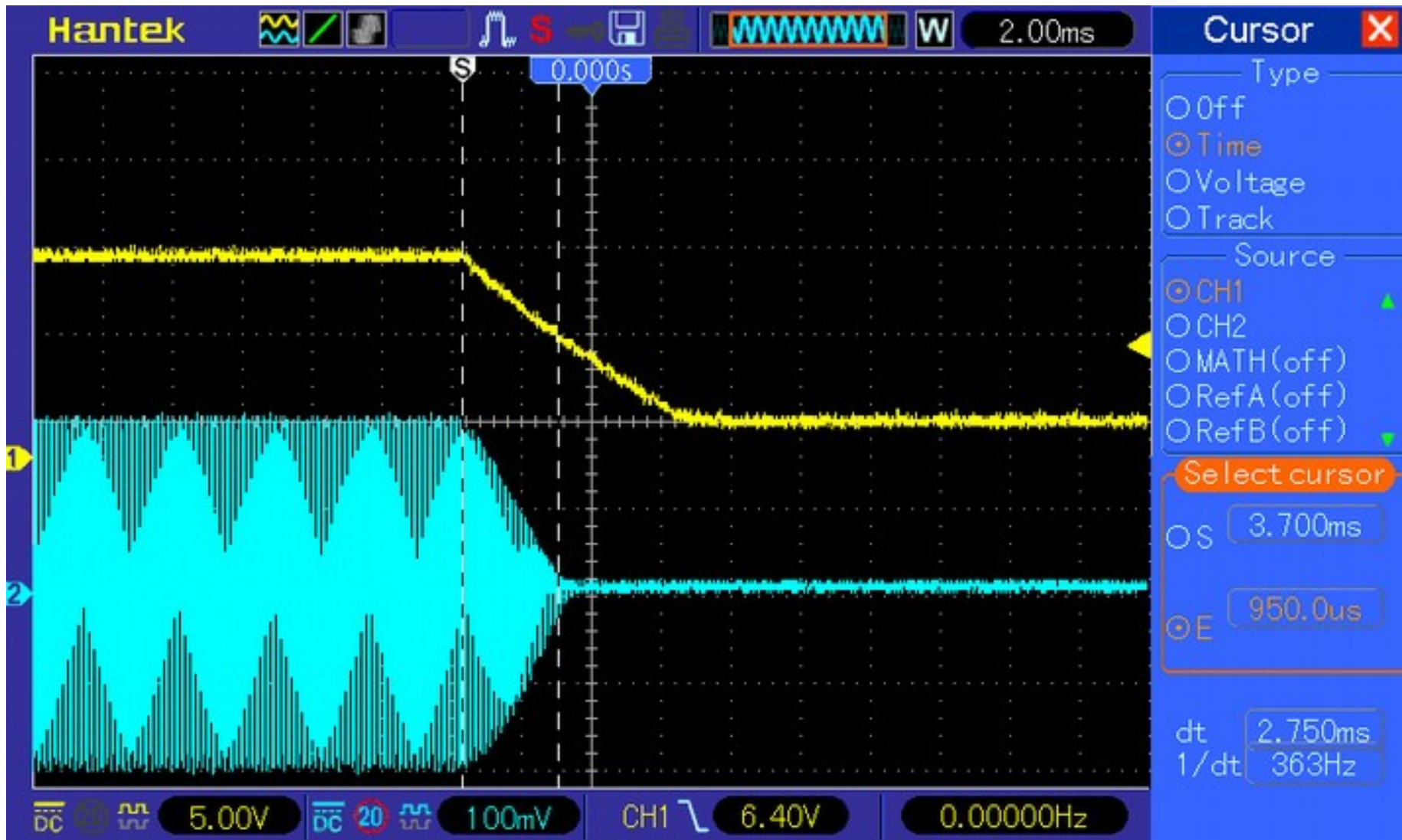


# Keyed 10v and RF risetime





# Keyed 10v and RF Faltime





# Present Status



- AGC working very smoothly
- Mode / QSK circuit working fine.
- Sensitivity the same of better than IC-7200
- Less AGC pumping than IC-7200
- Presented at Fuchu City Culture event... won first prize (Fuchu Amateur Radio Club)
- Entire October it was in shack in operational test for receiver section.

# FC-1 HomeBrew transceiver

## Nearing the end!

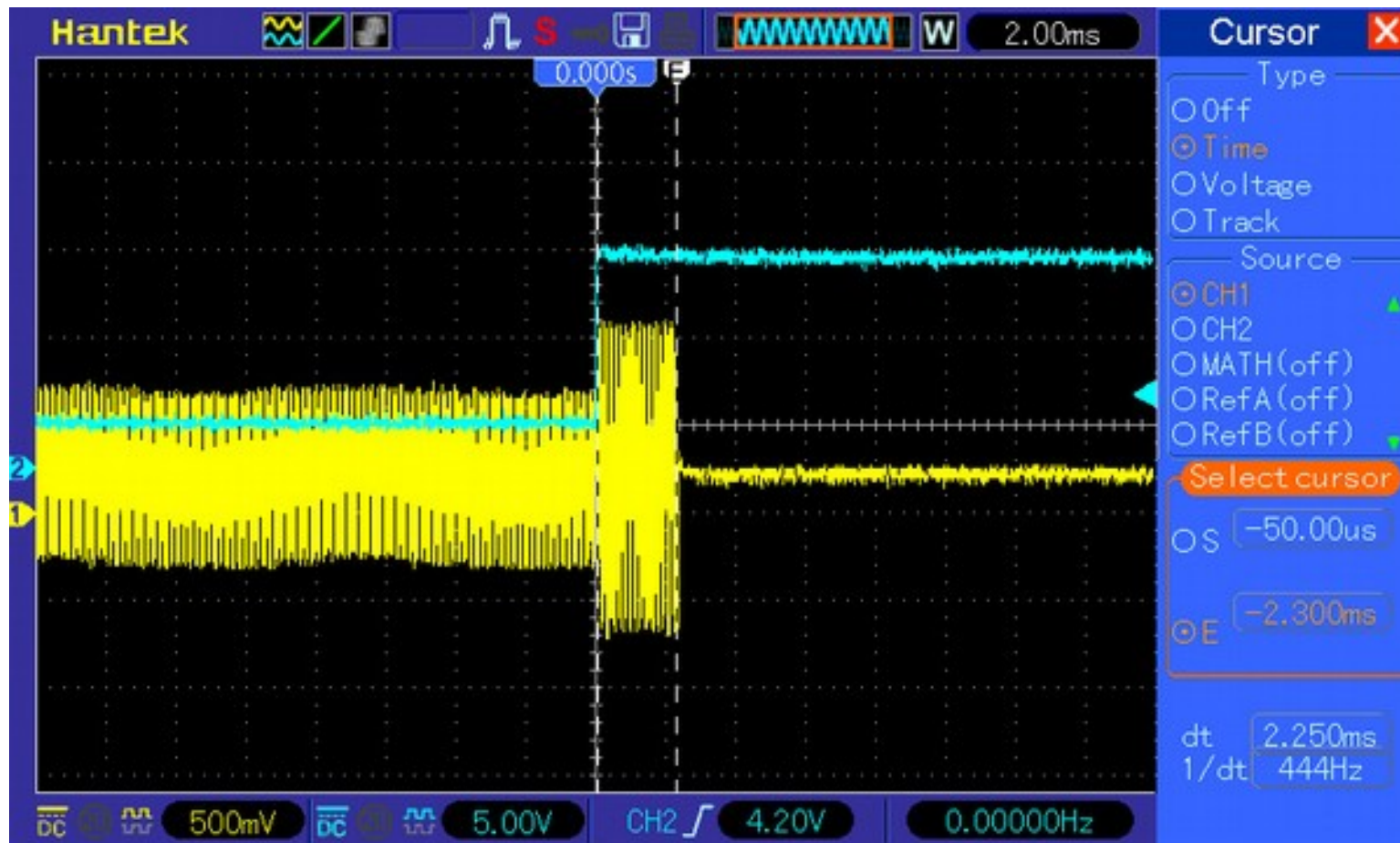
SWR ALC . . . to do

Noise blanker . . . to do



I Expect first QSO this month!

# Antenna Relay Timing





# Antenna Relay Timing

