10 GHz Fixed Station

DESIGN AND CONSTRUCTION DETAILS

Transverter & Dish in Attic

LO

- IF frequency = 50 MHz
- LO frequency = 10,318 MHz (for RF= 10,368.0 MHz)
- Silicon Labs Si530 source at 573.222222 MHz
- Sirenza SGA-6386 LO buffer provides +17 dBm
- Multiplier is x18 with output of +7dBm
- LO filter: Farinon 4 pole evanescent mode WG
- Also in LO path: isolator and coaxial relay
- Magnum Microwave mixers

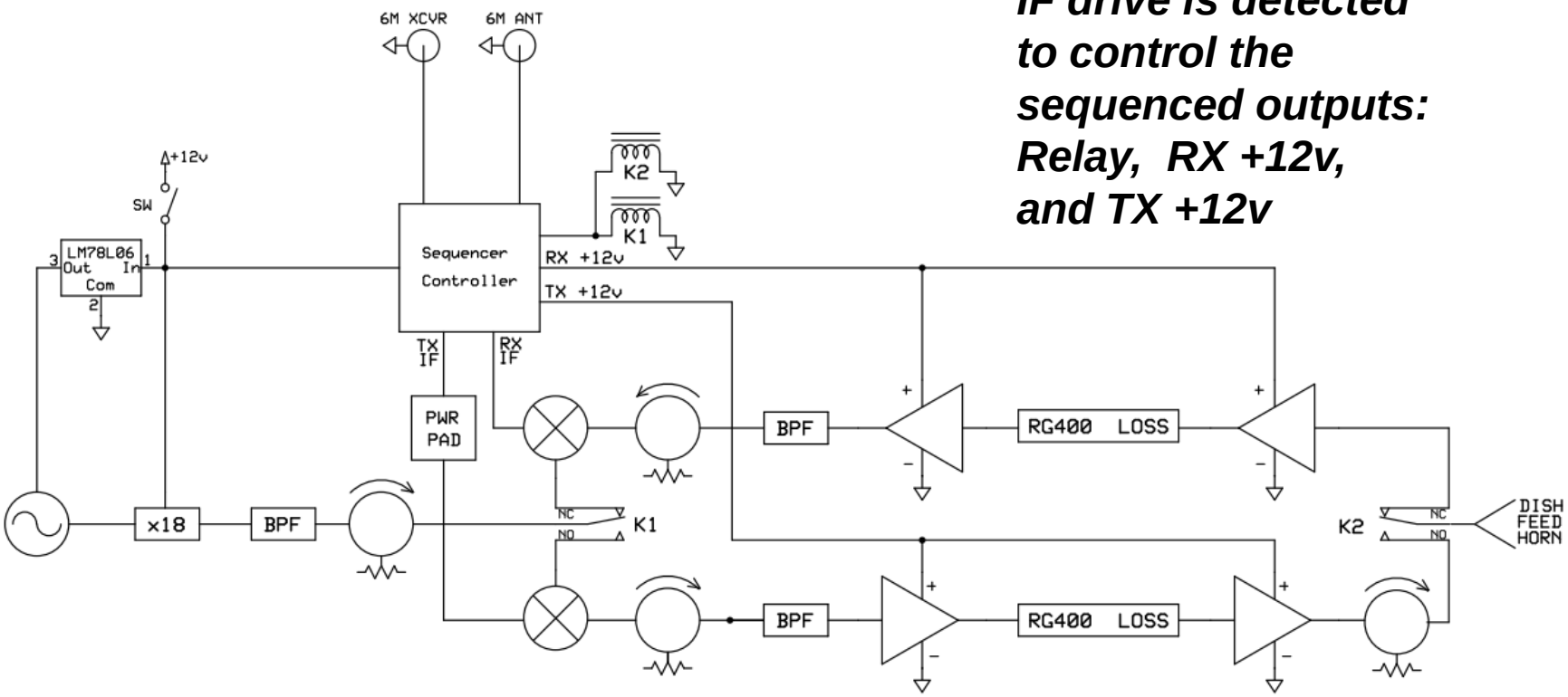
Receiver

- Homebrew pHEMT LNA
- Two stages of NE3512S02 from NEC-CEL
- Rogers R04003 20 mil board
- Patterning and etching was done at home
- Wire through holes
- AML +17 dB post-LNA amplifier
- Farinon 4 pole WG filter
- Harris isolator to RF port of the receive mixer
- Sirenza SGA6486 IF amplifier followed by a π pad
- π pad also has PIN diode to step attenuation during transmit

Transmitter

- PA is 1W unit from DL2AM
- Driver amplifier is 25 dBm Harris
- Farinon 4 pole WG filter and Harris isolator follow transmit mixer
- transmit mixer IF drive is -5 dBm
- IF power pad is -52 dB

Block Diagram



IF drive is detected to control the sequenced outputs: Relay, RX +12v, and TX +12v

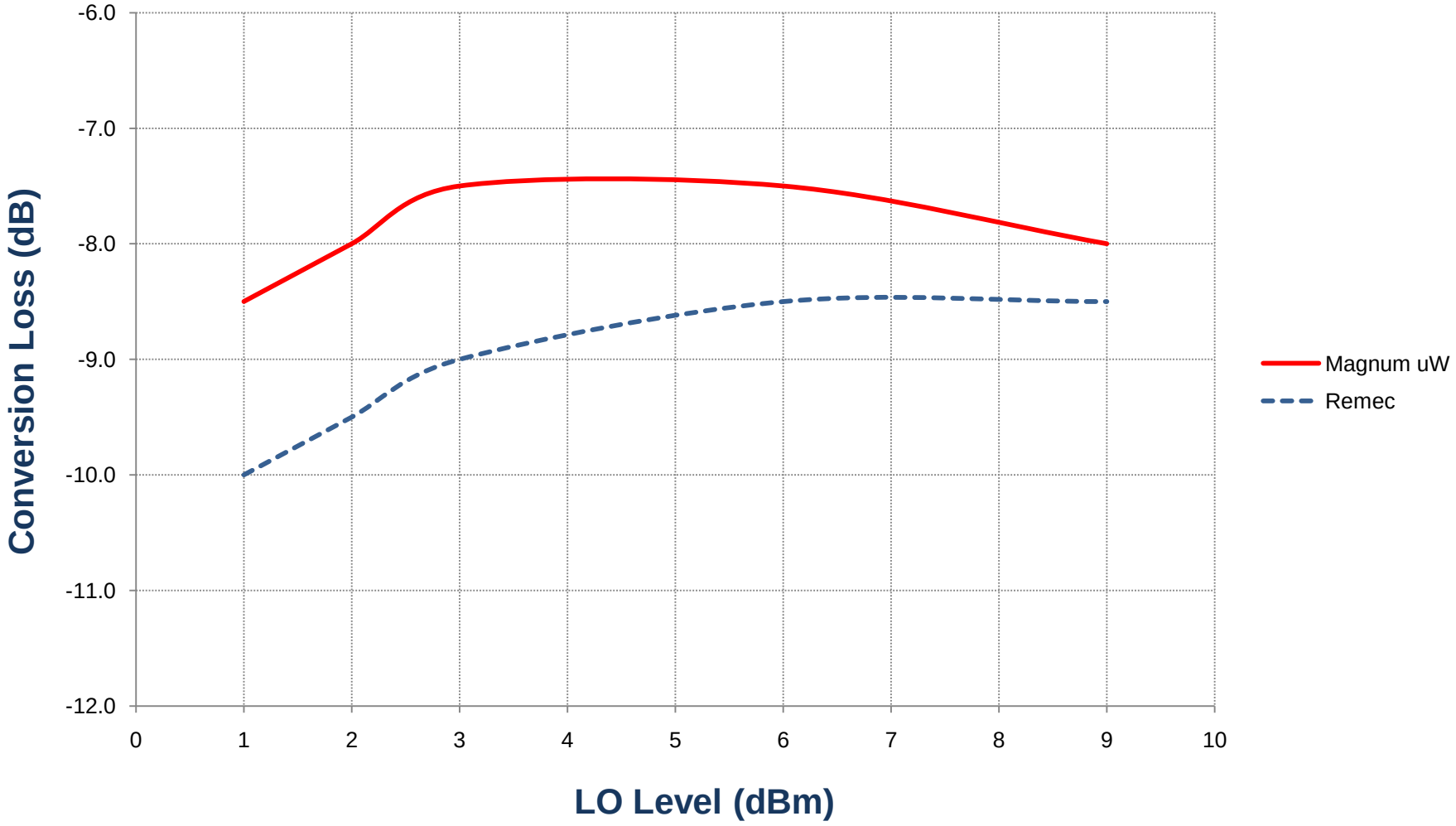
LNA and PA are located with a SMA coaxial relay at the dish horn-feed

Gain & Power Budget

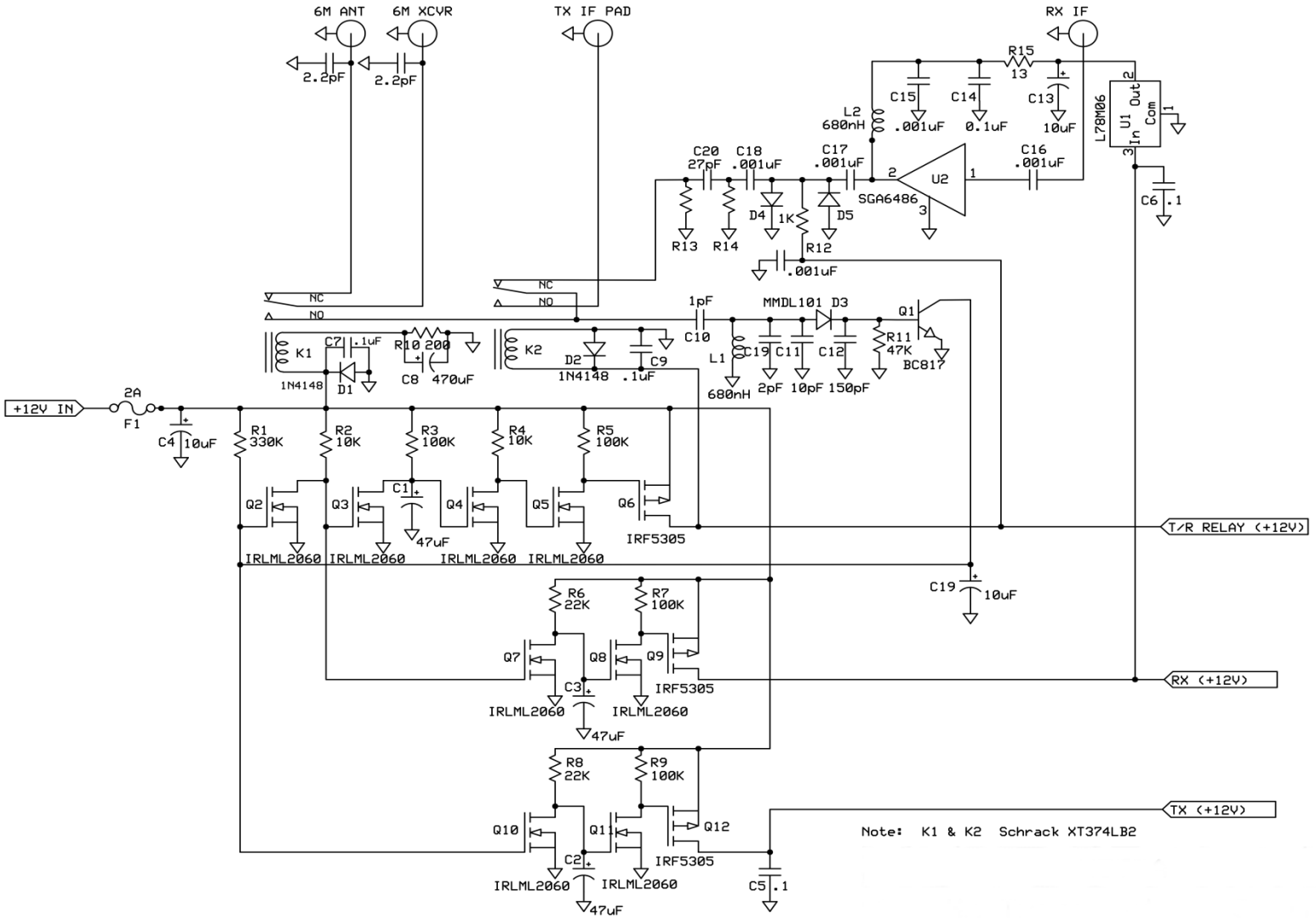
TRANSMIT	Gain	Output Level
Isolator	-0.3	29.7
PA	14.4	30.0
RG400	-8.0	15.6
Driver	38.4	23.6
BPF	-2.0	-14.8
Isolator	-0.3	-12.8
Mixer	-7.5	-12.5
TX IF pad	-55.0	-5.0
IF XCVR		50.0
Total Gain =	-20.3	

RECEIVE	Gain	Input Level
LNA	18.0	-140.0
RG400	-8.0	-122.0
RF Amp-2	17.0	-130.0
BPF	-2.0	-113.0
Isolator	-0.3	-115.0
Mixer	-7.5	-115.3
RX IF Amp & pad	12.0	-122.8
IF XCVR		-110.8
Total Gain =	29.2	

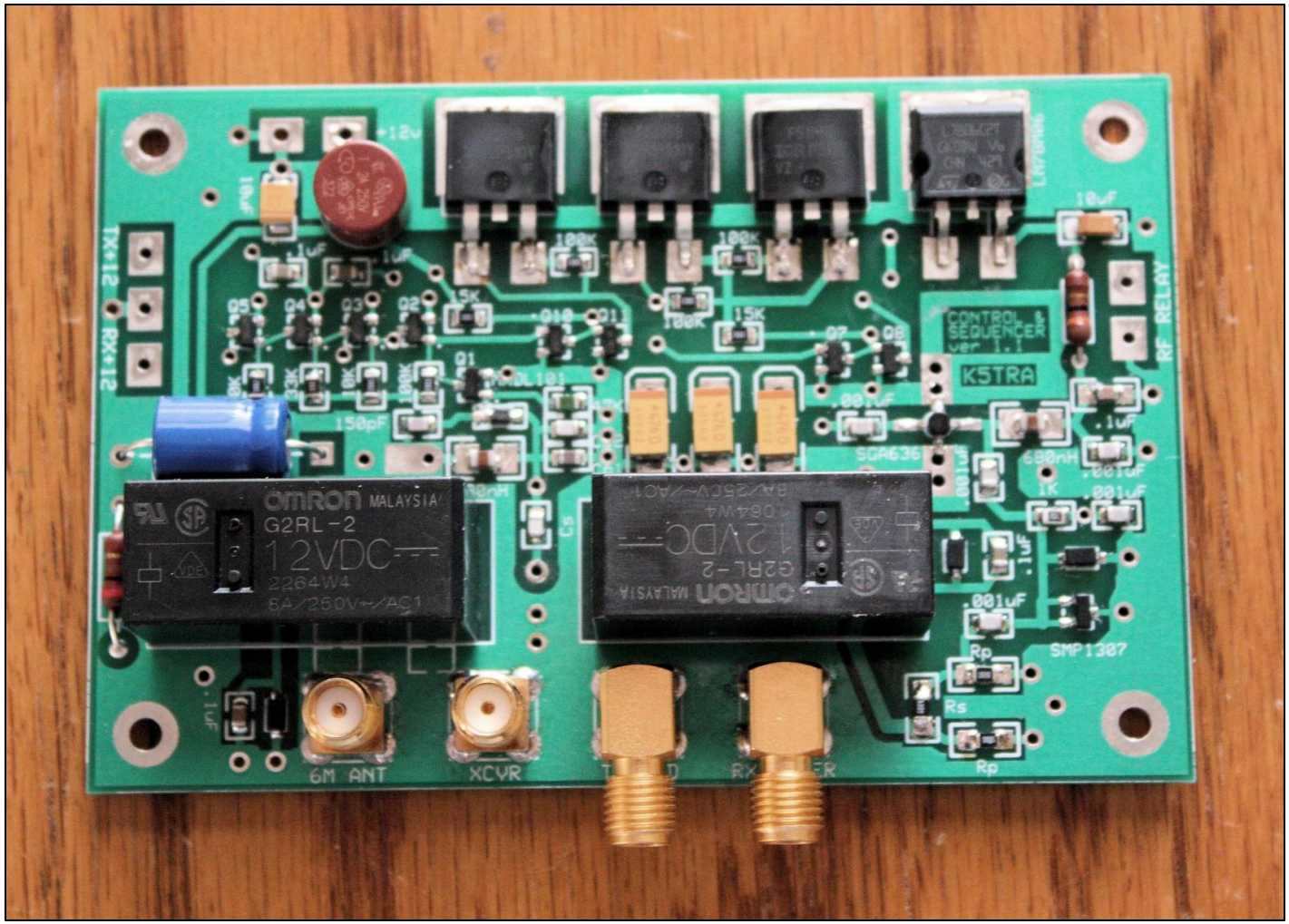
Mixer Loss vs LO Level



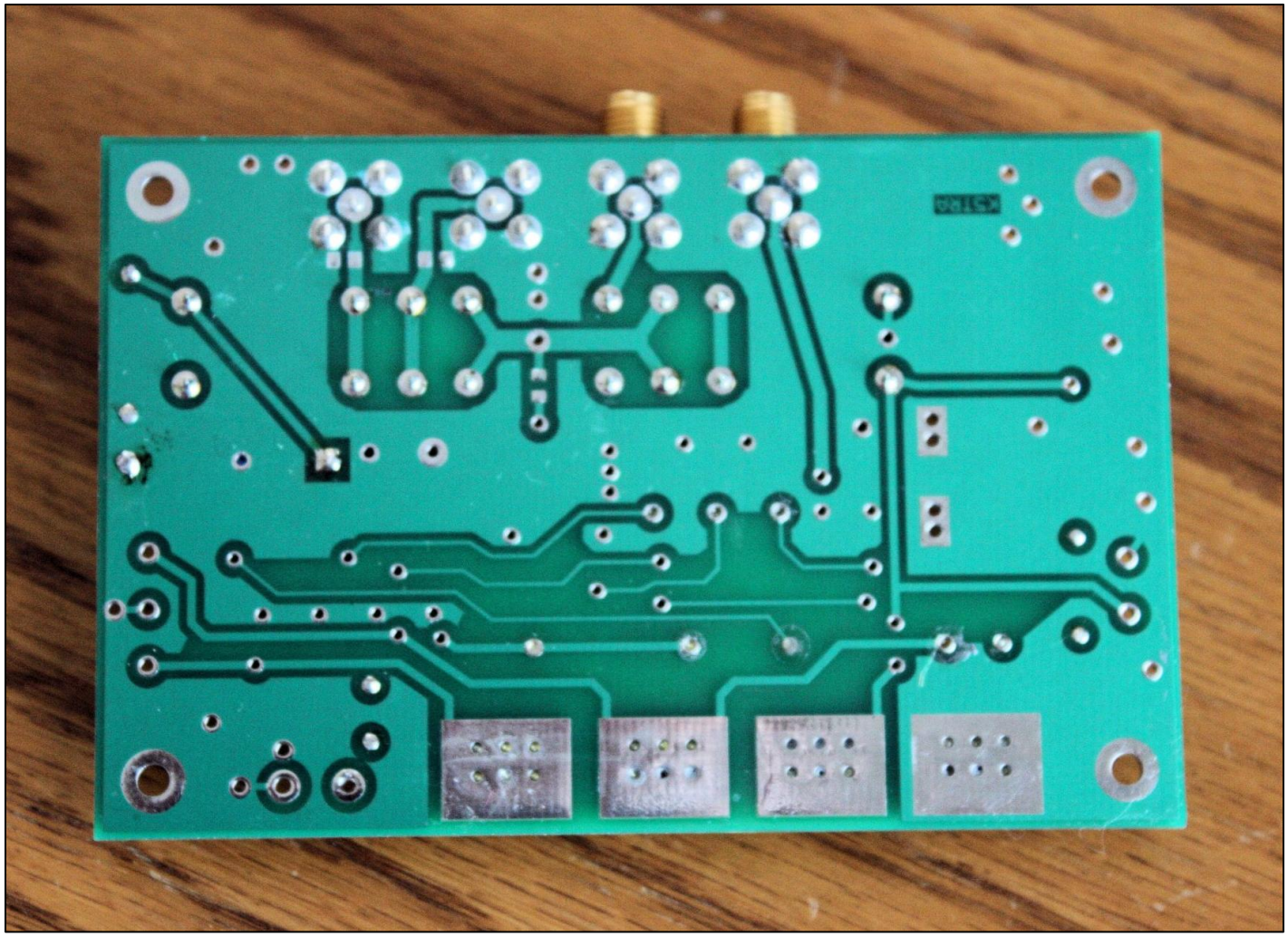
Sequencer – Controller Schematic



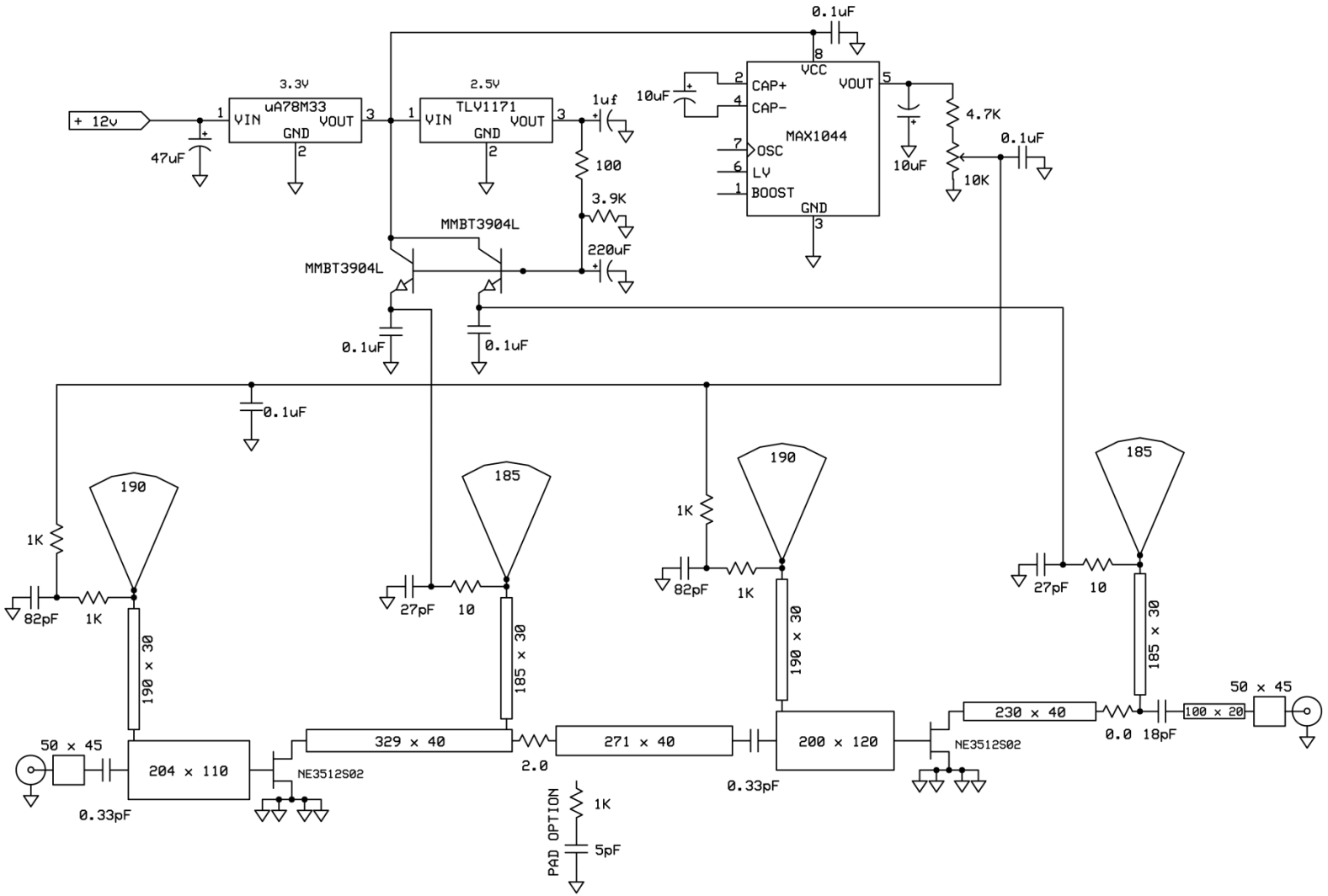
Sequencer – Controller



Sequencer – Controller (back side)

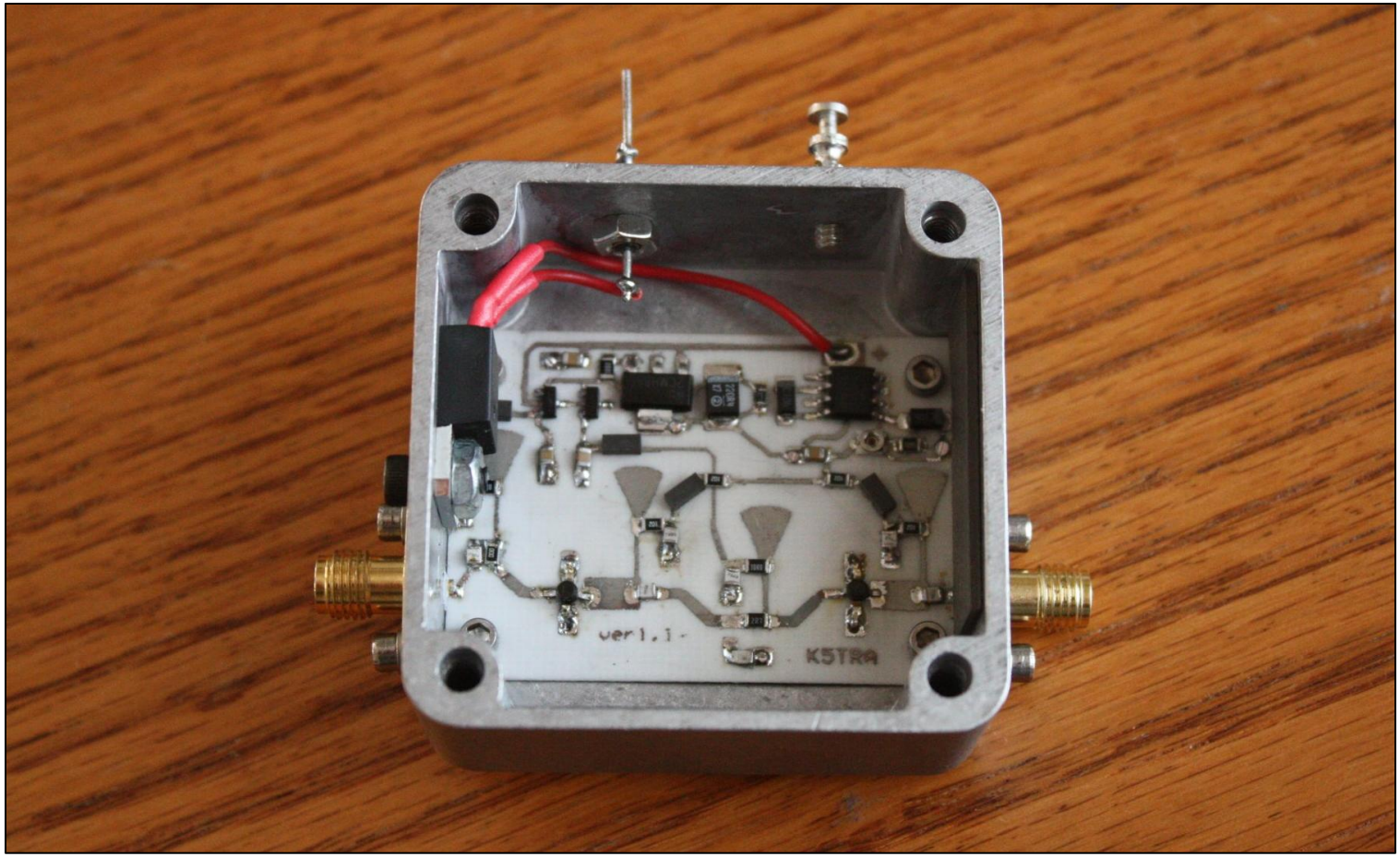


LNA Schematic

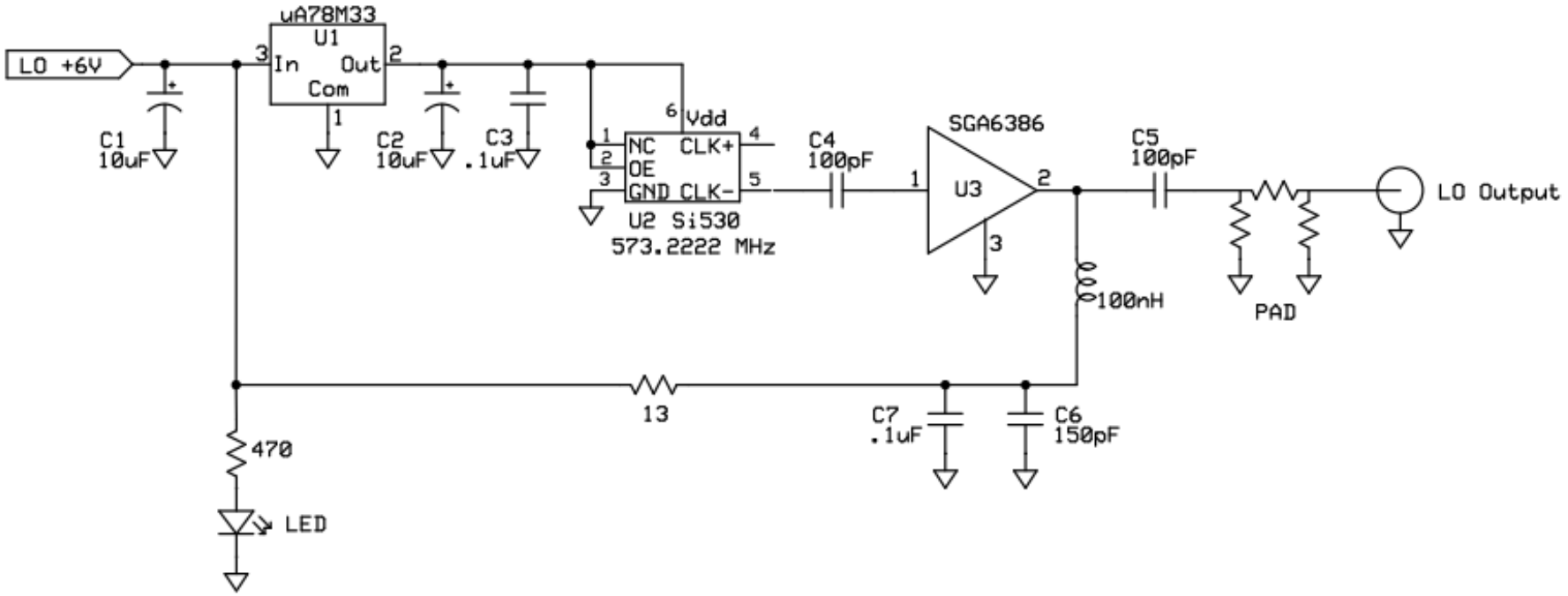


LNA

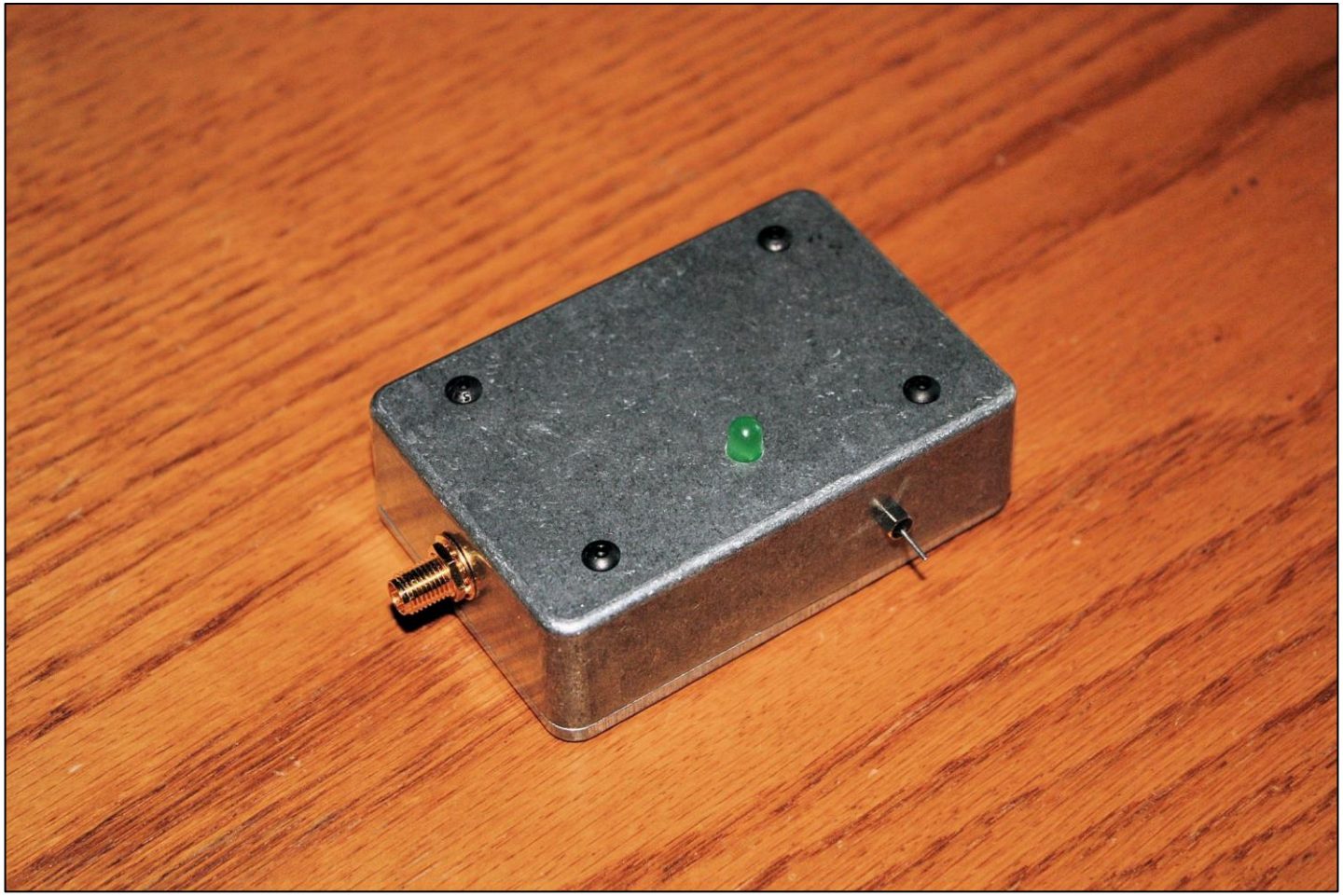
LNA Interior



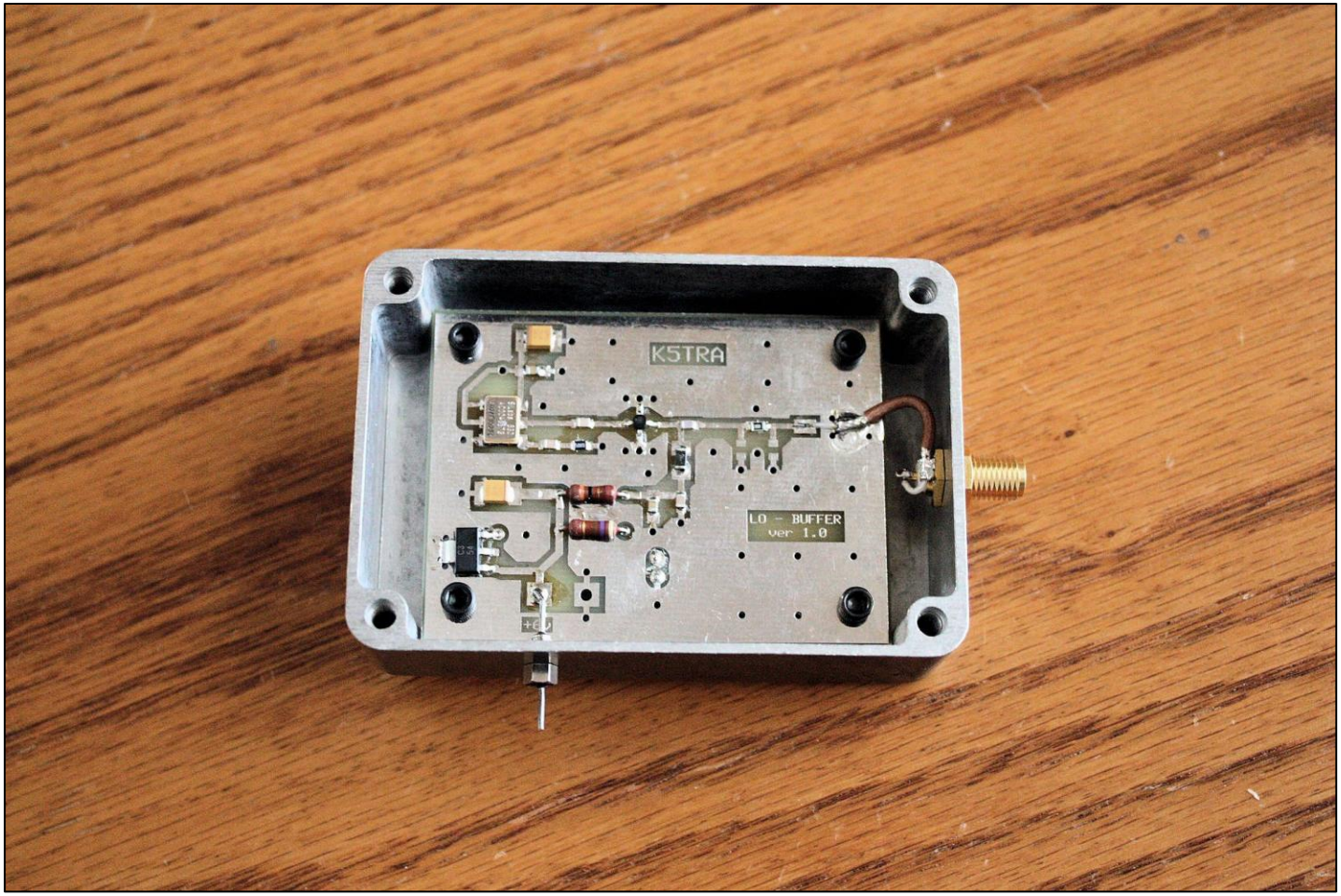
LO – Buffer Schematic



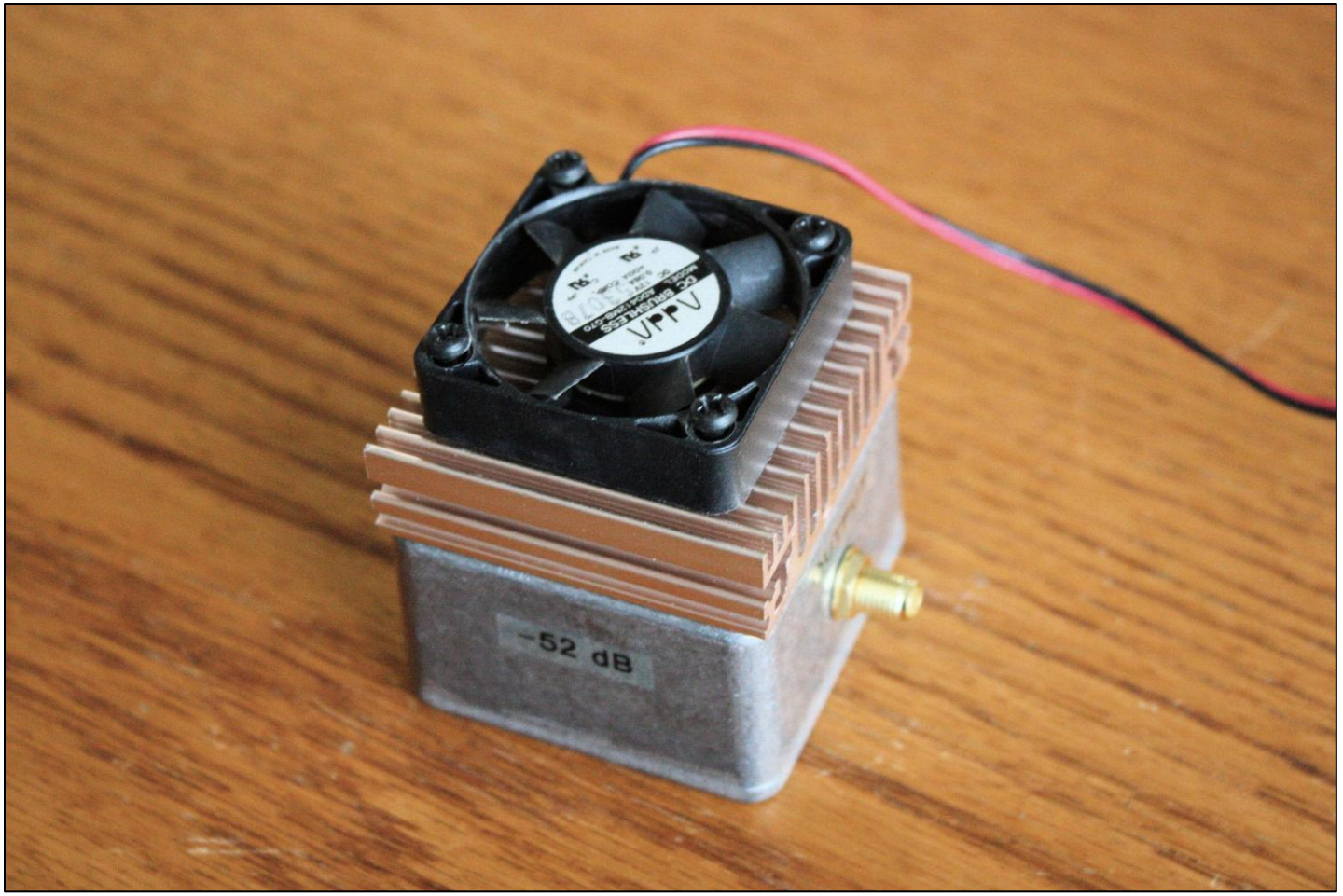
LO – Buffer



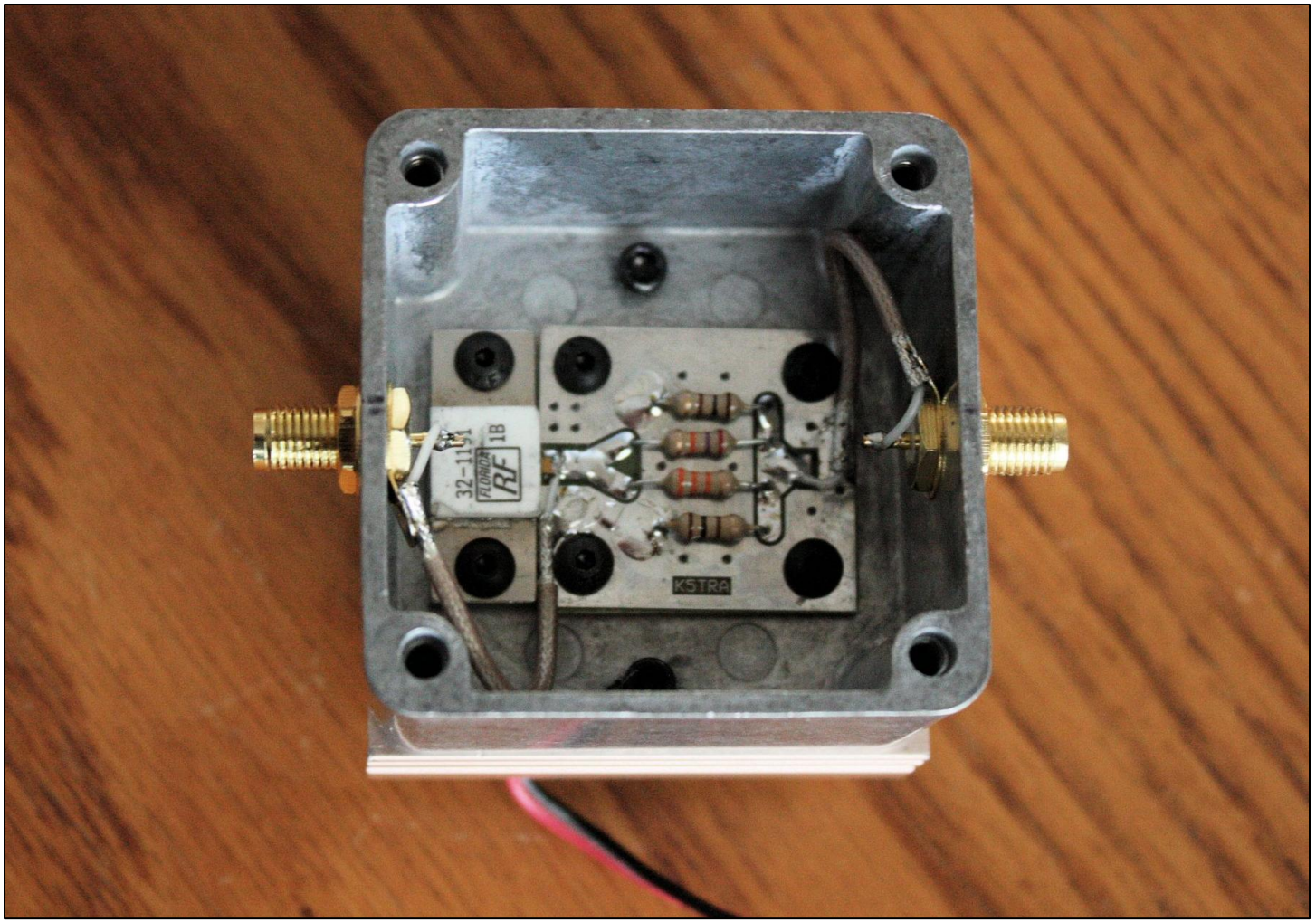
LO – Buffer Interior



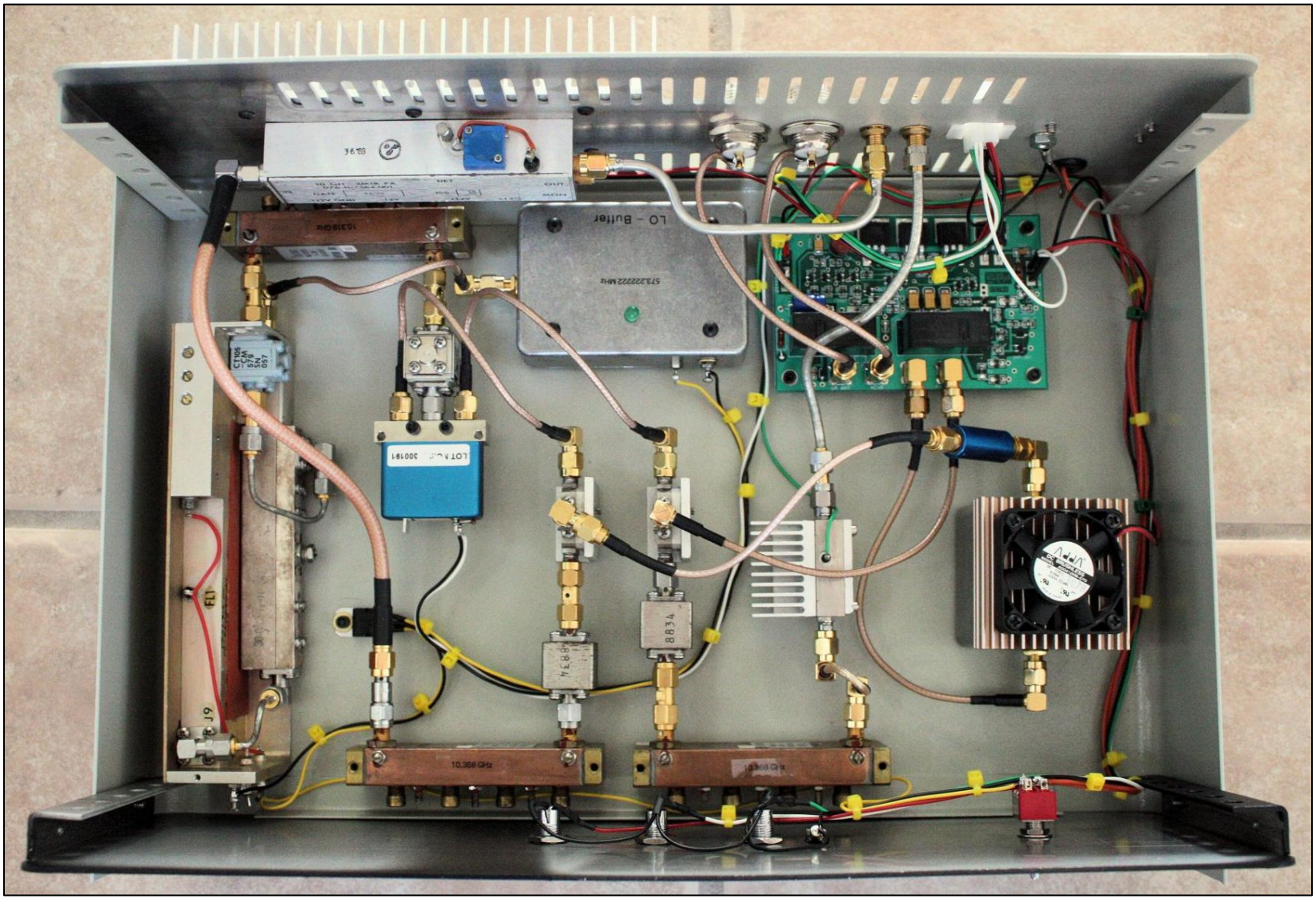
IF Power Pad



IF Power Pad Interior



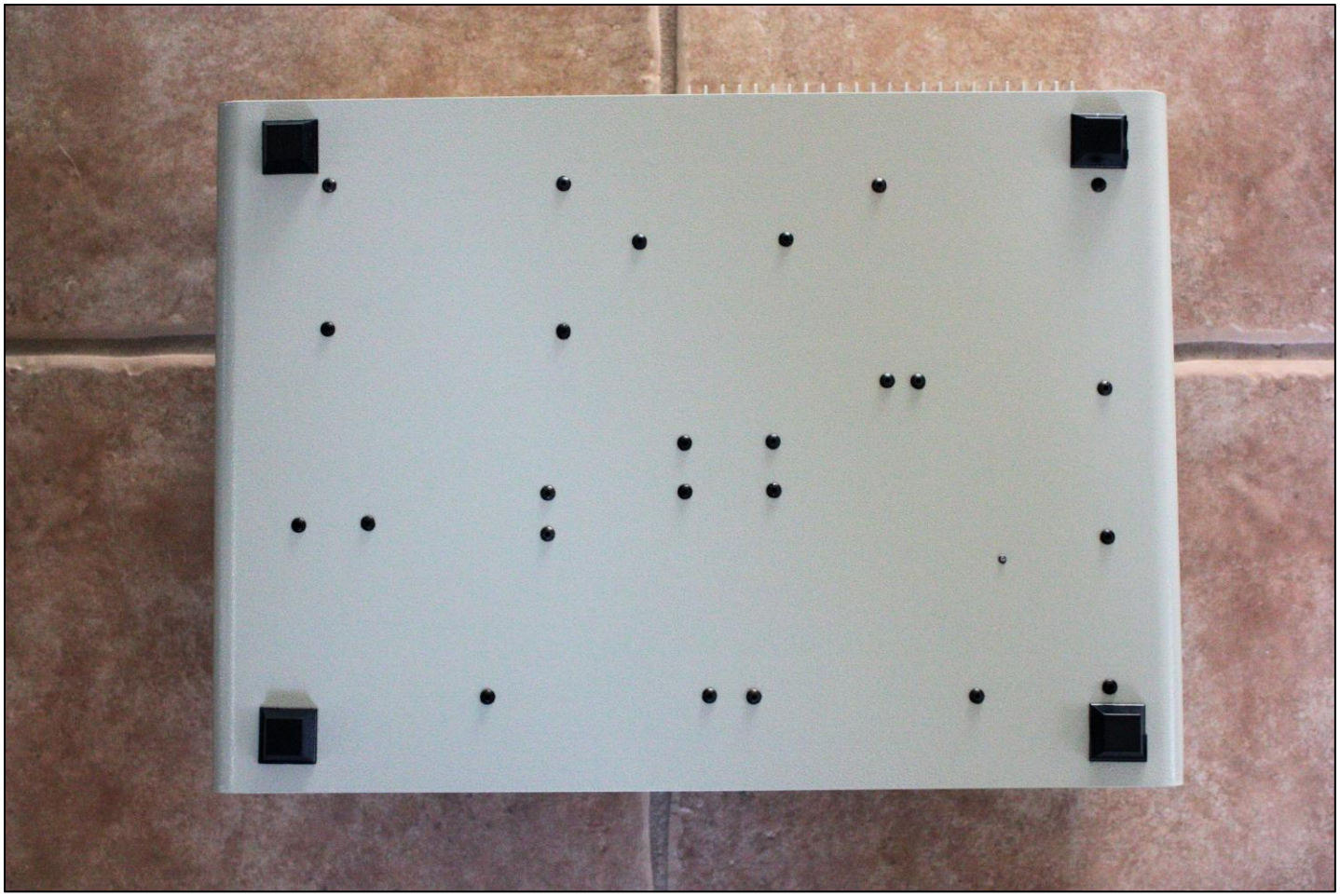
Transverter Interior



Transverter - Front

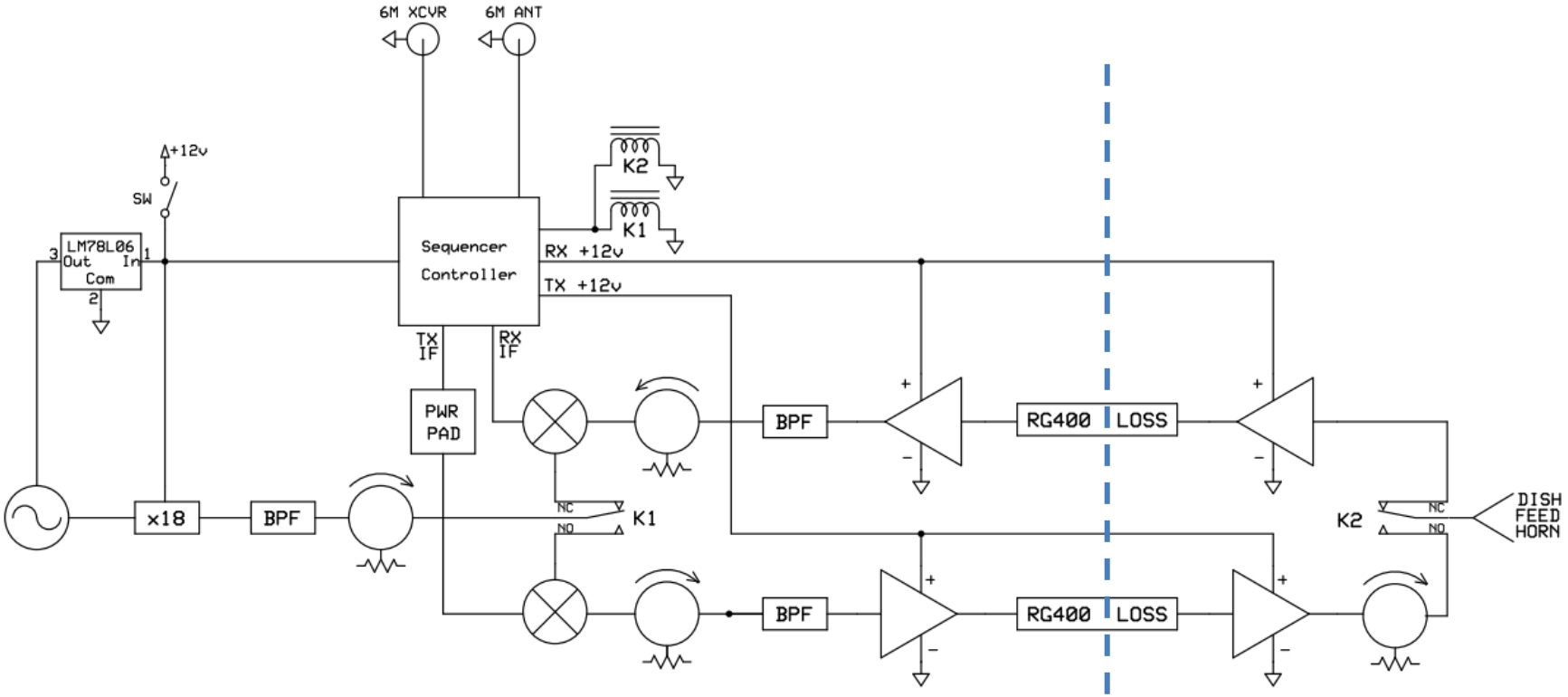
Transverter - Rear

Transverter – Bottom

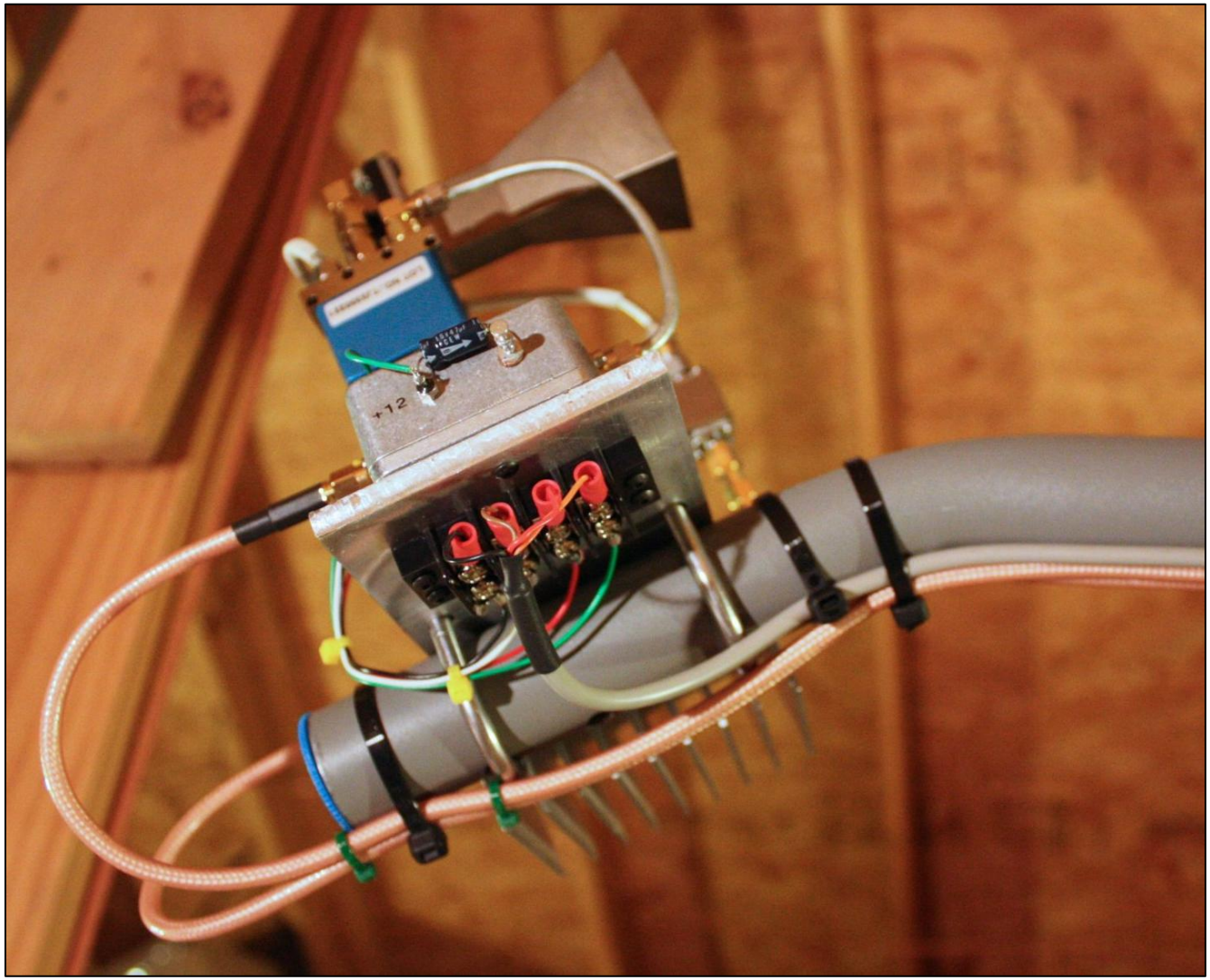


Transverter – Rear I/O

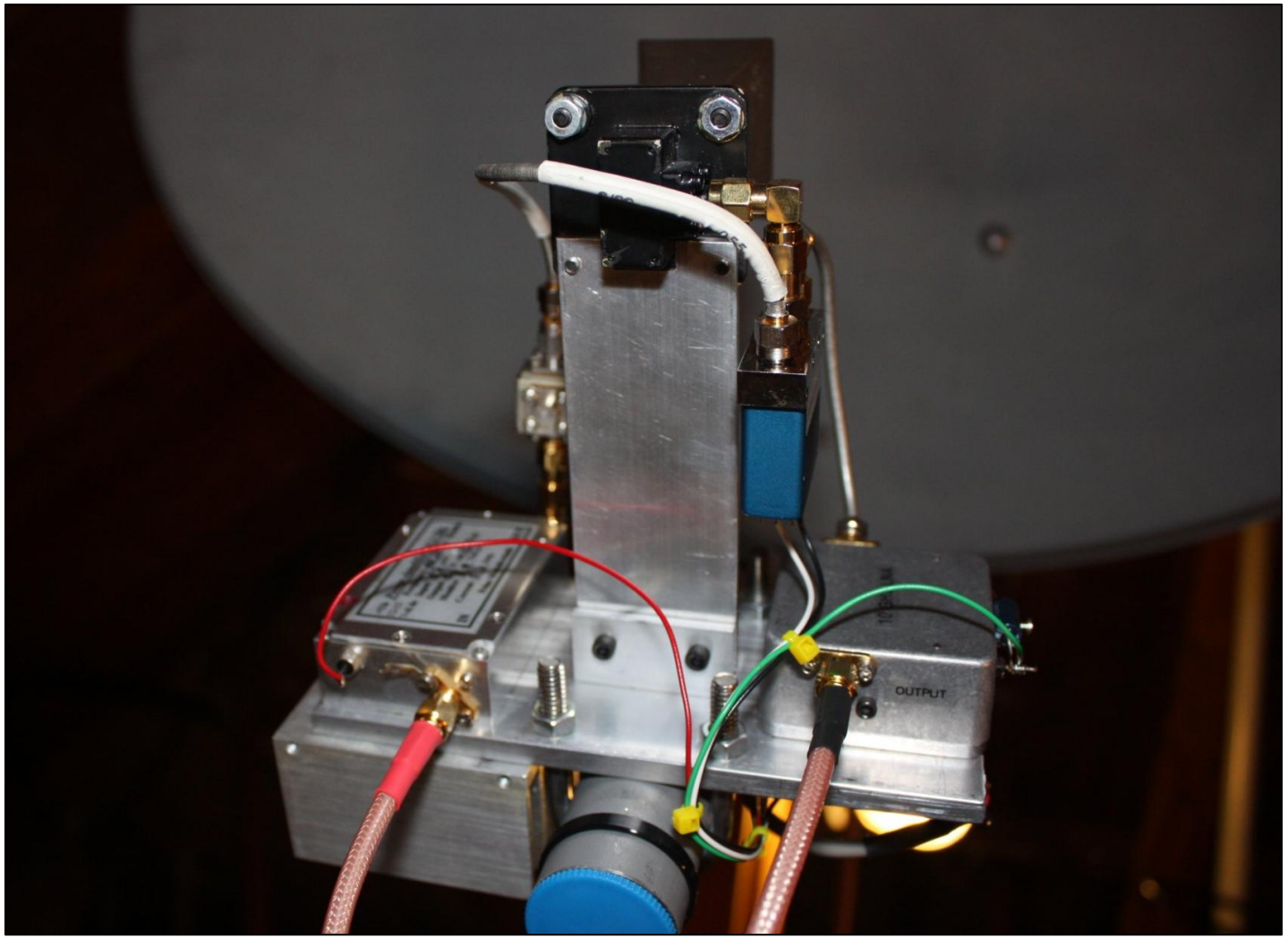
Block Diagram



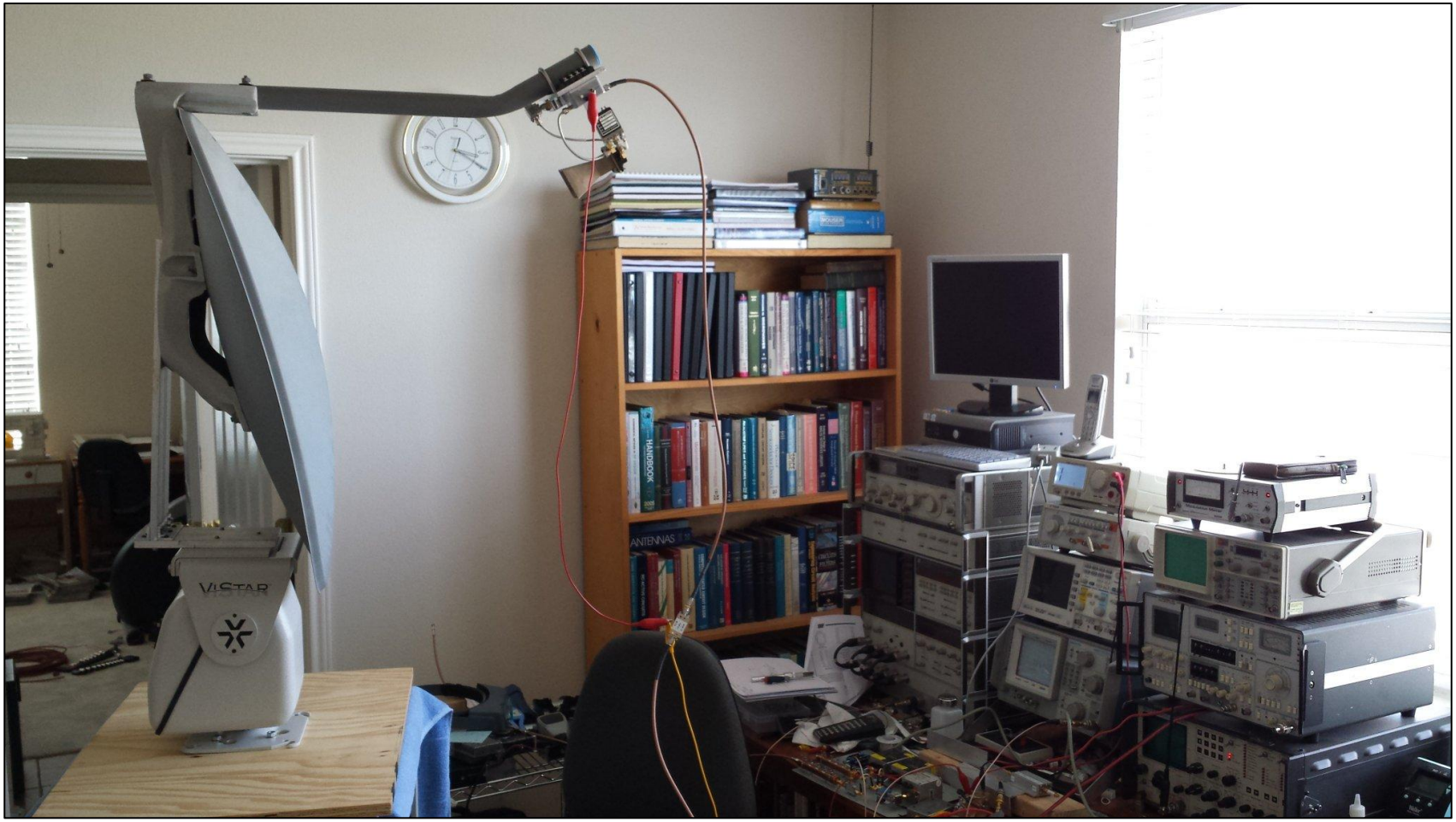
Horn Feed Hardware



Horn Feed Hardware – Another View



Bench Test of Dish Assembly and Positioner



Mounting Bracket Attached to Dish

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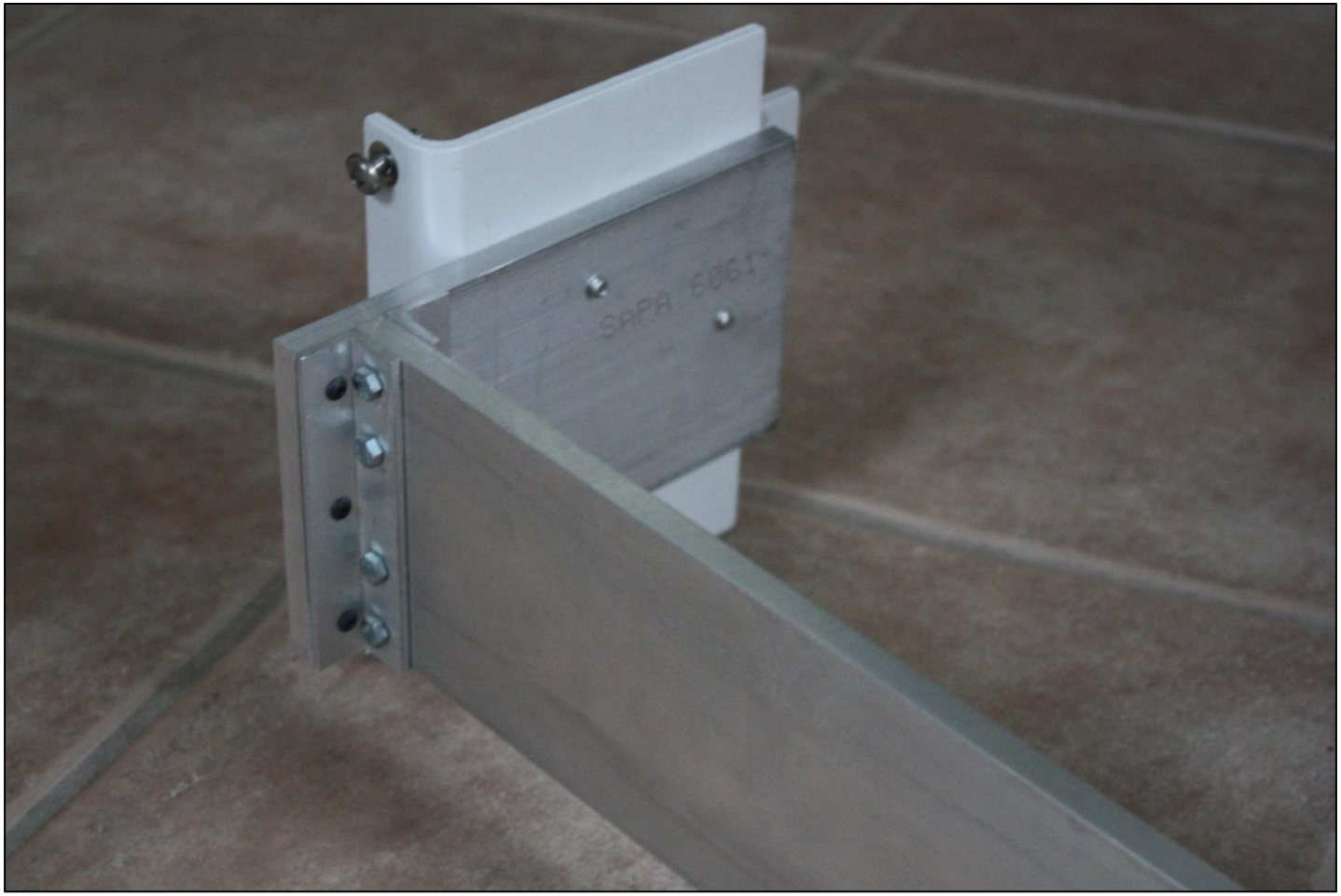
Homebrew Mounting Bracket



Homebrew Mounting Bracket

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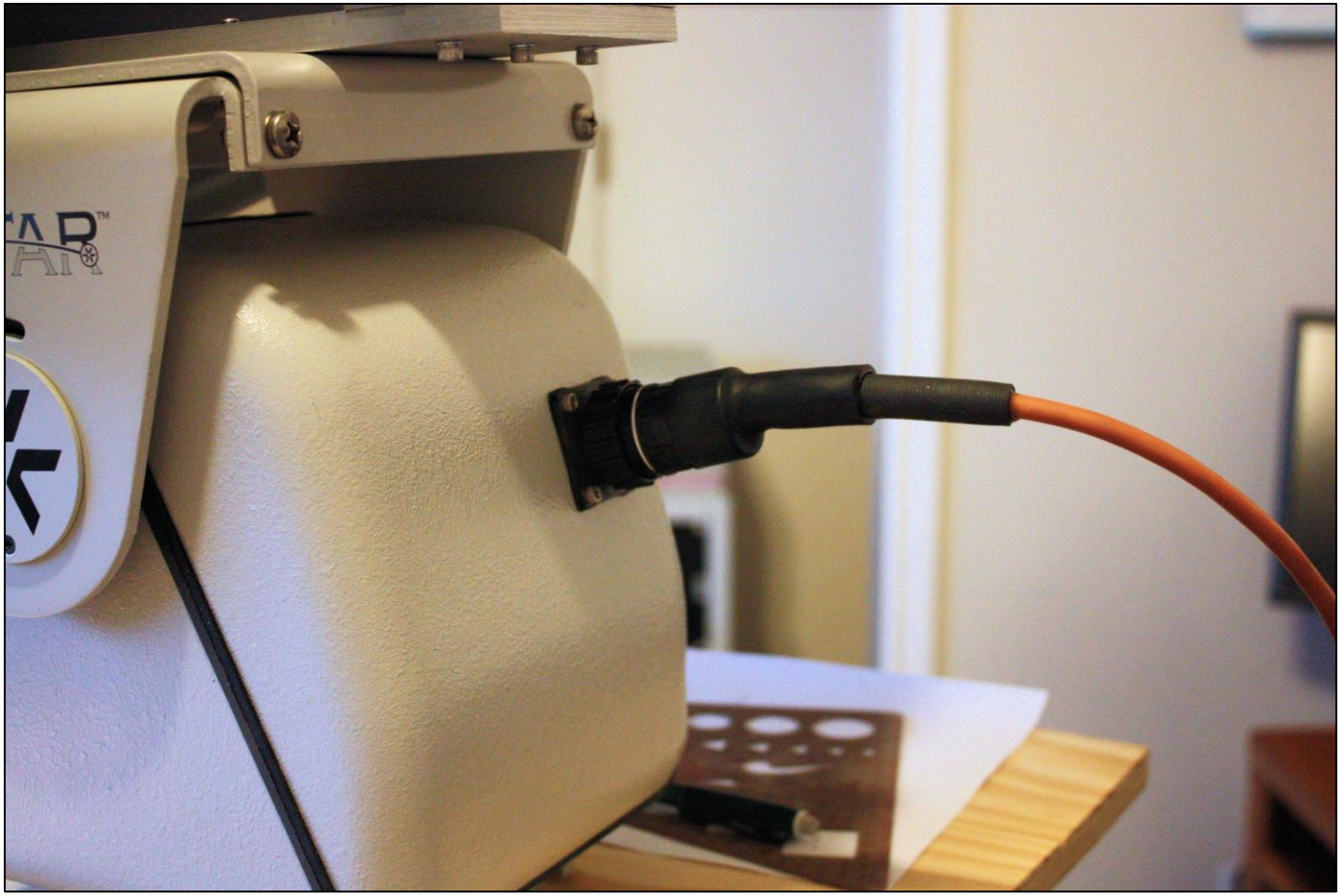
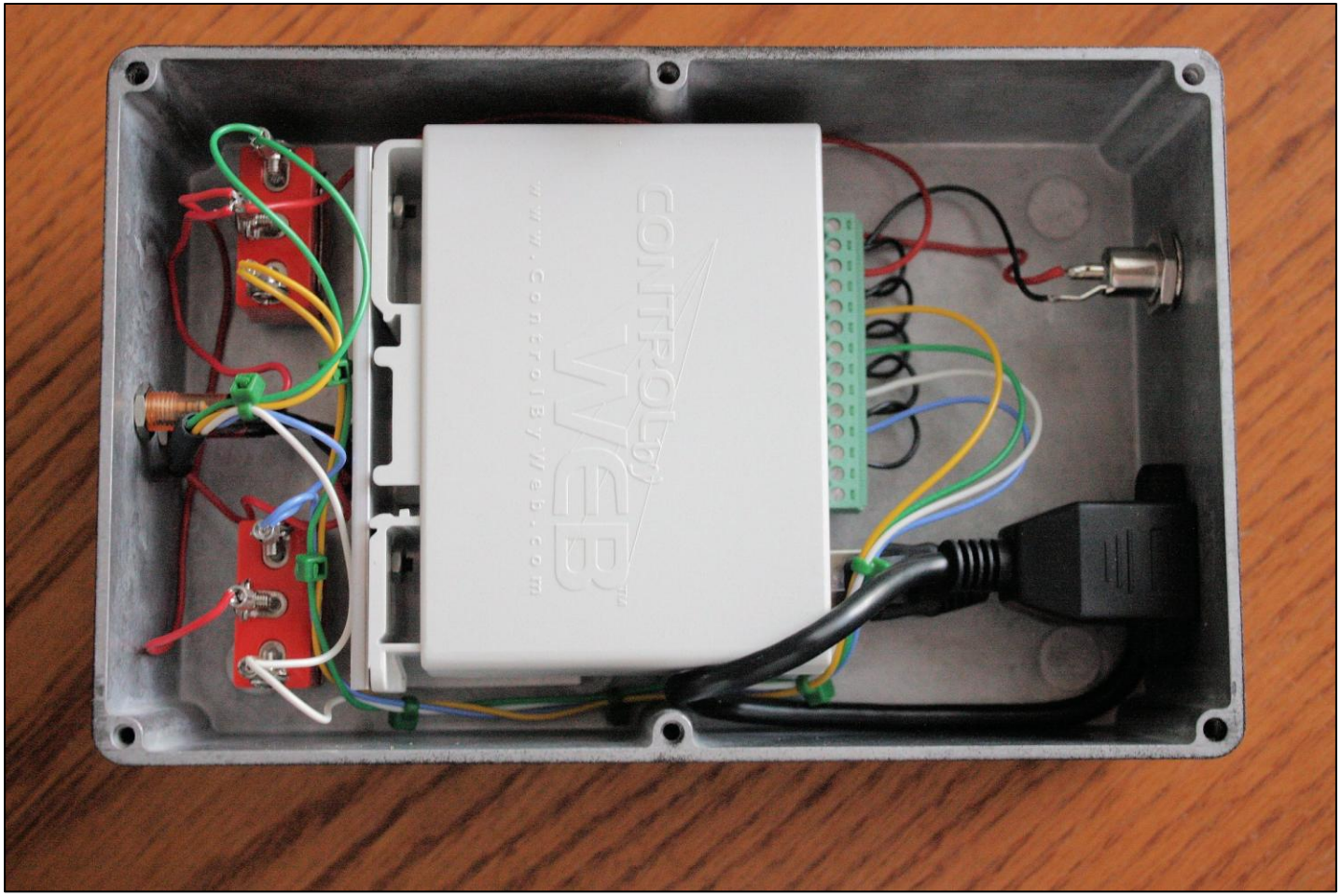
Azimuth – Elevation Positioner



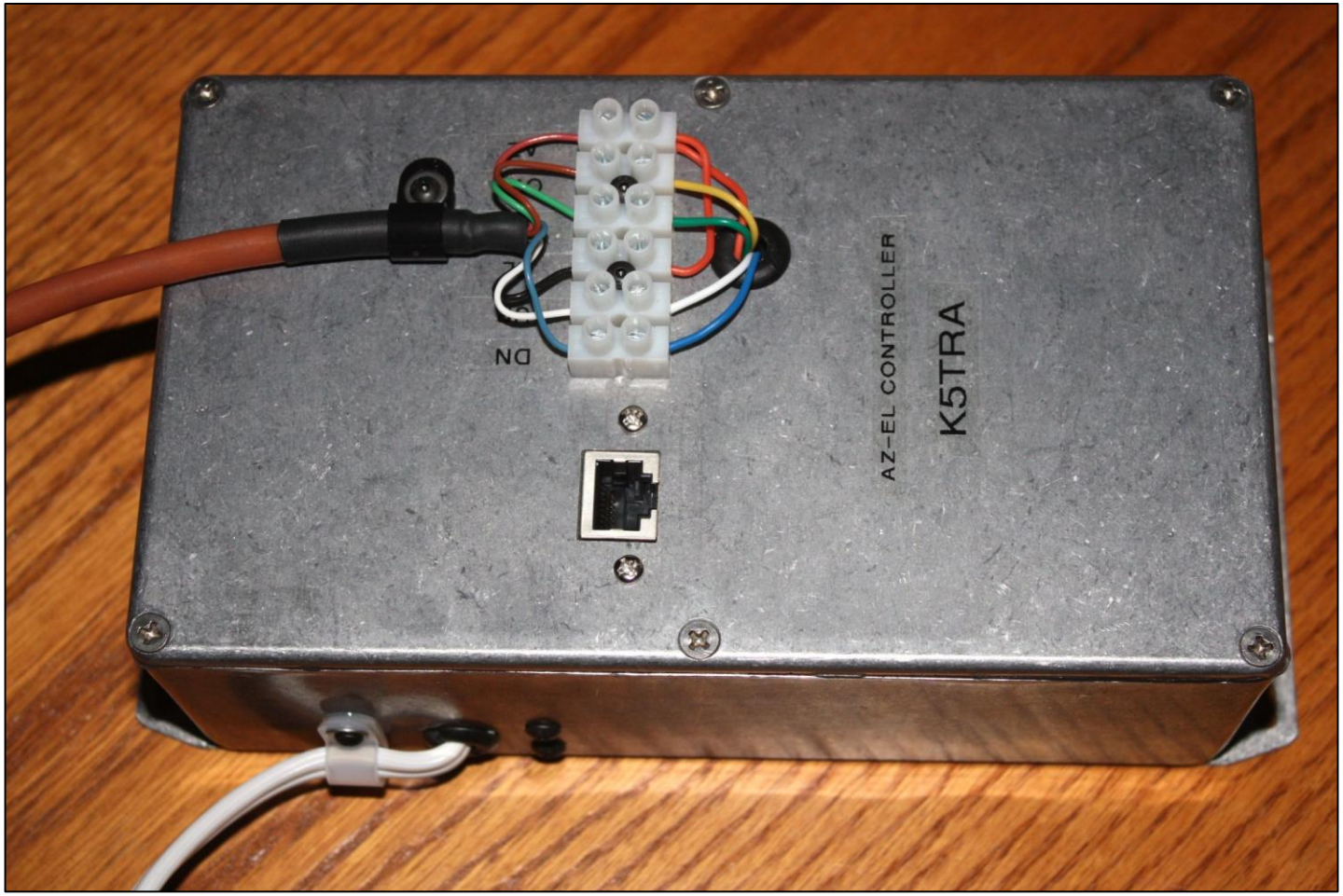
Positioner Controller - Front

Positioner Controller - Rear

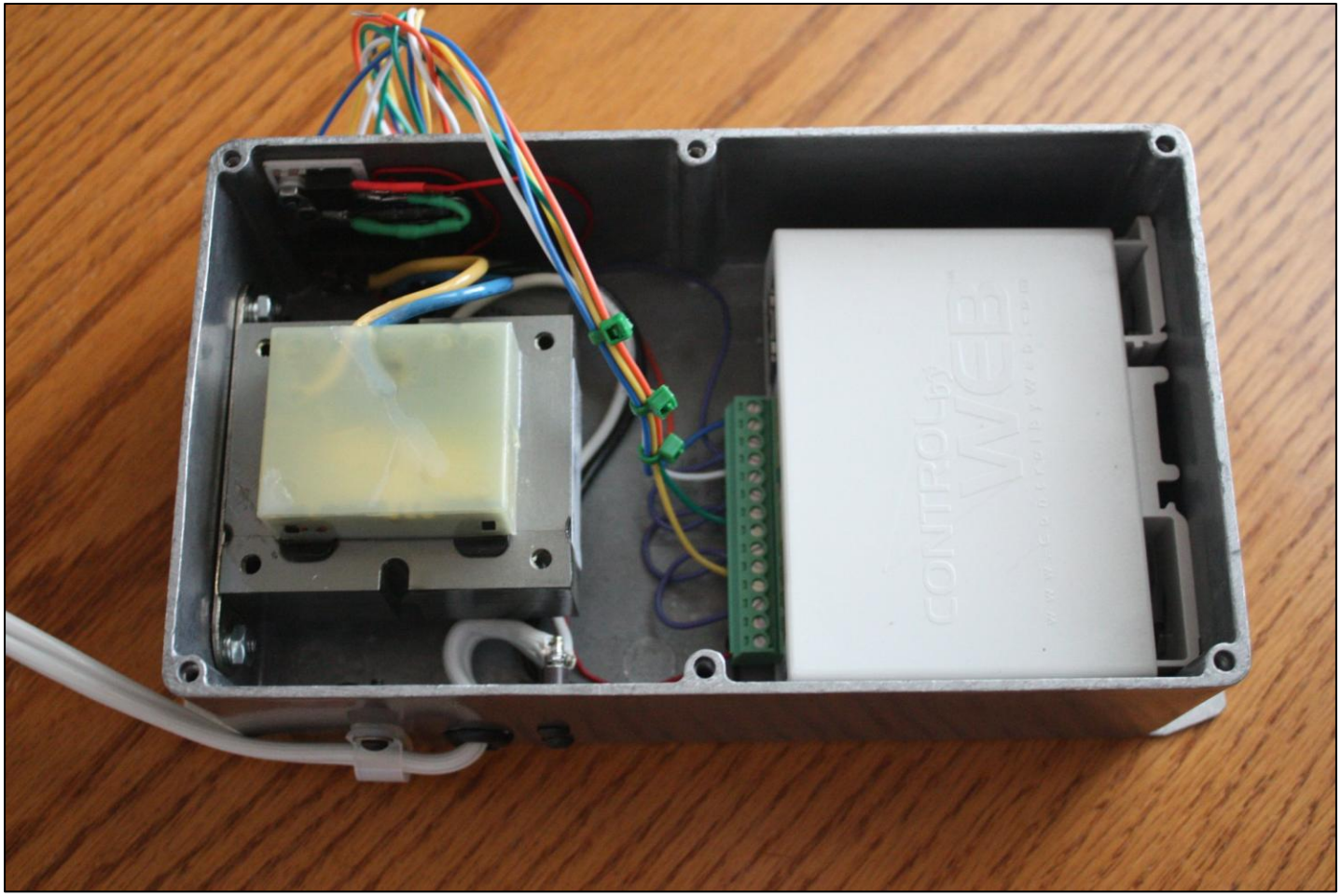
Positioner Controller - Interior



Positioner Remote Interface



Positioner Remote Interface - Interior



Pointing Chart

ID	Bearing	Alt.Bearing	Street Ref.	Alt.Street Ref.	CW ΔT (Sec)	CCW ΔT (Sec)
K5AND	296	-64	269	-91	0 (ref)	58
K5GJ	315	-45	288	-72	3	55
NO5K	15	15	-13	-13	13	45
BEACON	54	54	27	27	20	38
WmCannon TOWER	63	63	36	36	21	37
K5LLL	90	90	63	63	26	32
N5YC	136	136	109	109	33	25
WA6UFQ	156	156	129	129	37	21
K5VH	249	-112	222	-139	52	6
W3XO	266	-94	239	-121	55	3
K5TR	268	-92	241	-119	55	3
ThomasSprings TOWER	280	-80	253	-107	57	1

Covered Bridge ---> points +27 °

T.Apel

Network Camera and Flood Light

Summary

- 10 GHz station operational 16 September 2015
- September 10 GHz contest results:
  - W5LUA 213 miles !!
  - NO5K 19 miles
  - K5LLL 44 miles
  - NN5DX 44 miles
  - K5GJ 5 miles
  - K5TR 24 miles
  - K5VH 8 miles
- Thanks to NO5K and N5YC for helping me scrounge some of the transverter parts

Questo è Tutto