Eastern VHF/UHF Conference
April 18, 2009

Digital Station Enhancements K3TUF

A conglomeration of small software/hardware devices that make automated contesting a reality

Outline

- Architecture Fundamentals
- Transmitter Keying
- Digital Sequencers
- Logging Software Interface
- DC Switching Circuit
- Distant Relay Activation

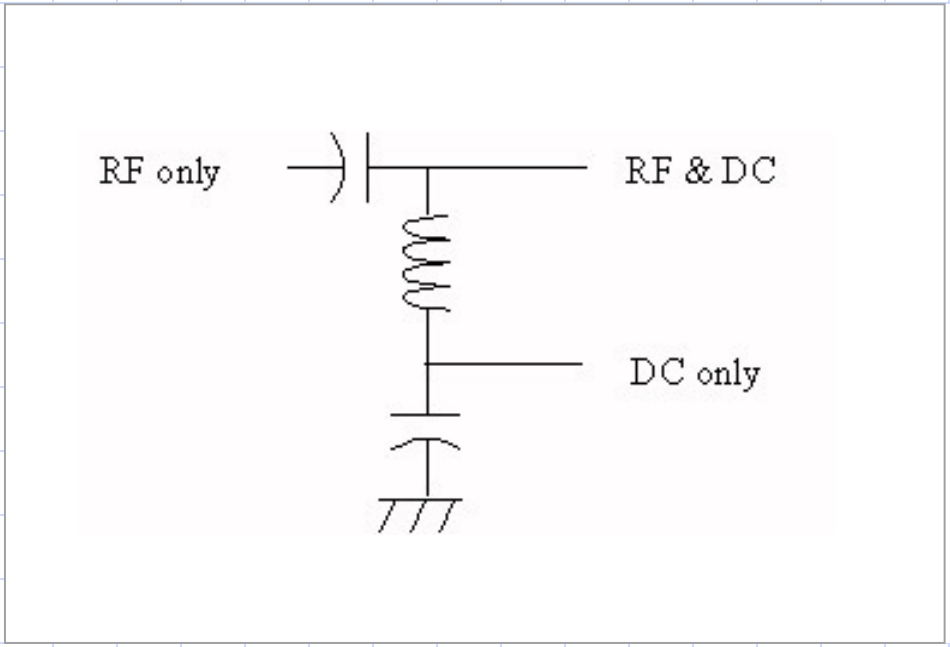
Architecture Fundamentals

- Use Transverters
- External T/R Switching
- Separate Amplifiers
- Each Band Stands on it’s own
- Logging Must Drive Band Selection
- Common IF: Freq, TX Level, Keying
- Distributed Placement of Equipment

Transmitter Keying

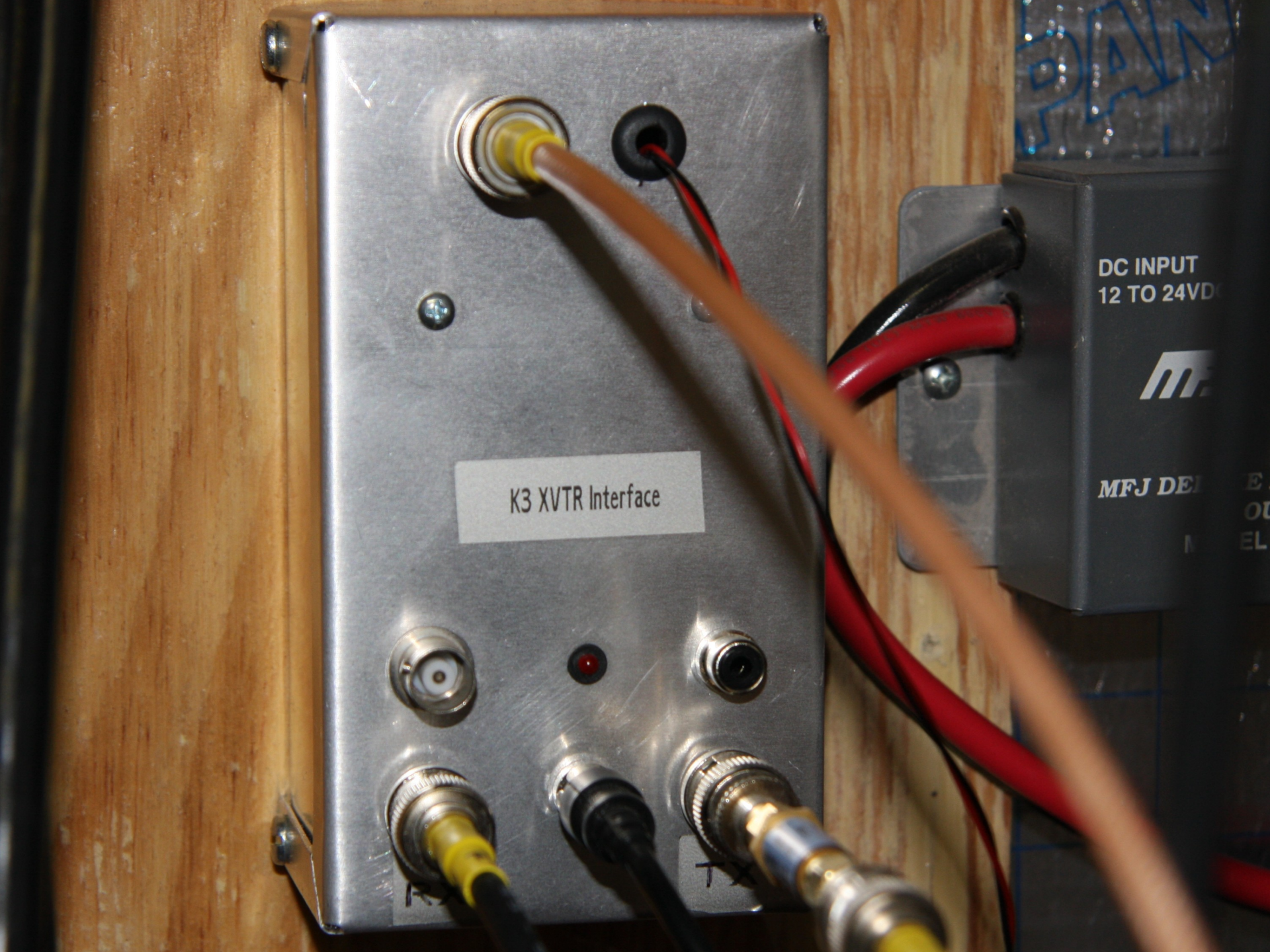
- Traditionally a Separate PTT has been used
- Put keying on the IF coax
- Benefits Galore
- Use a Bias Tee
- Examples
- Simplifies Distributed Band Placement

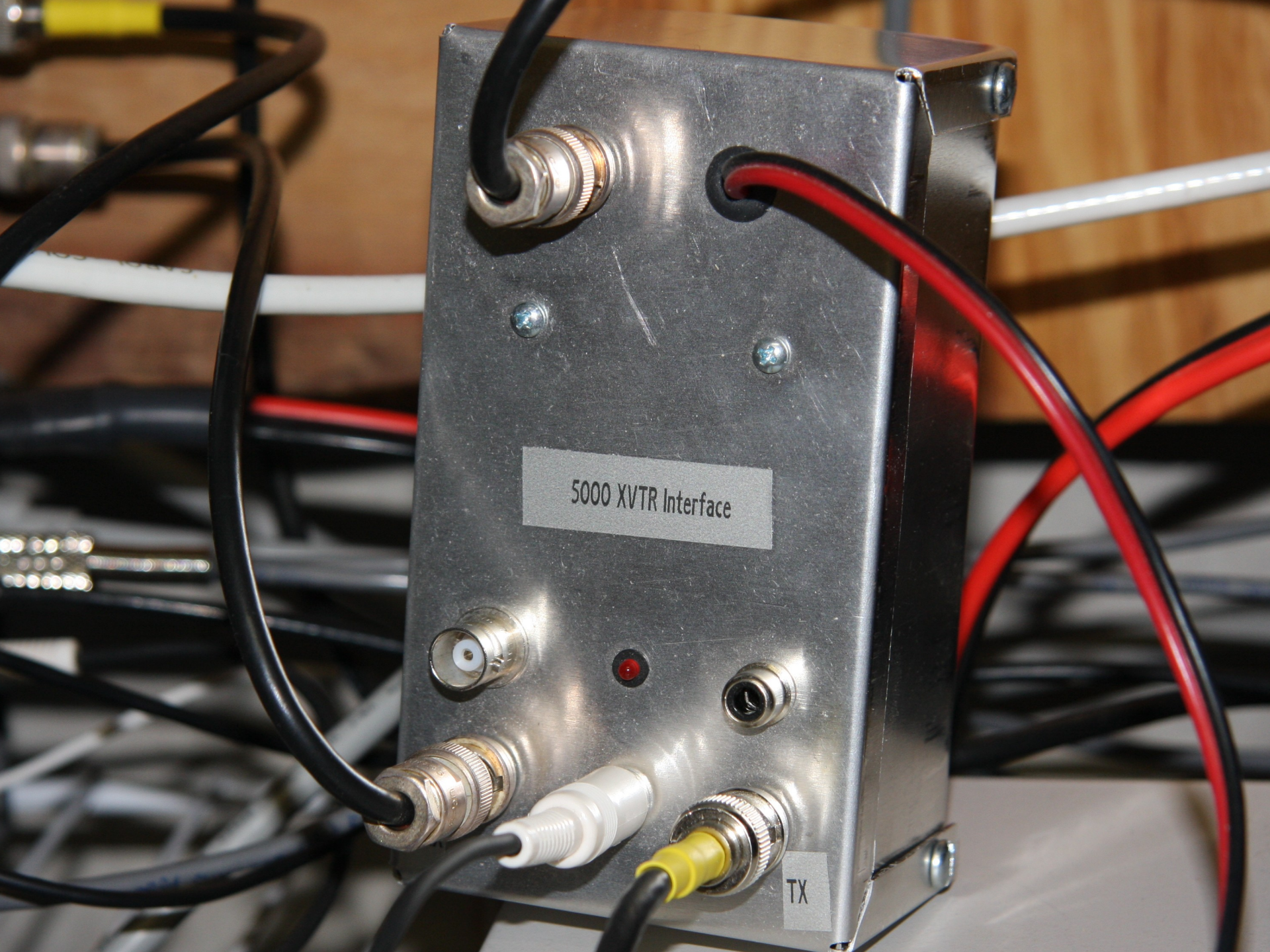
Bias Tee




RMC
.001
20%
RXJF

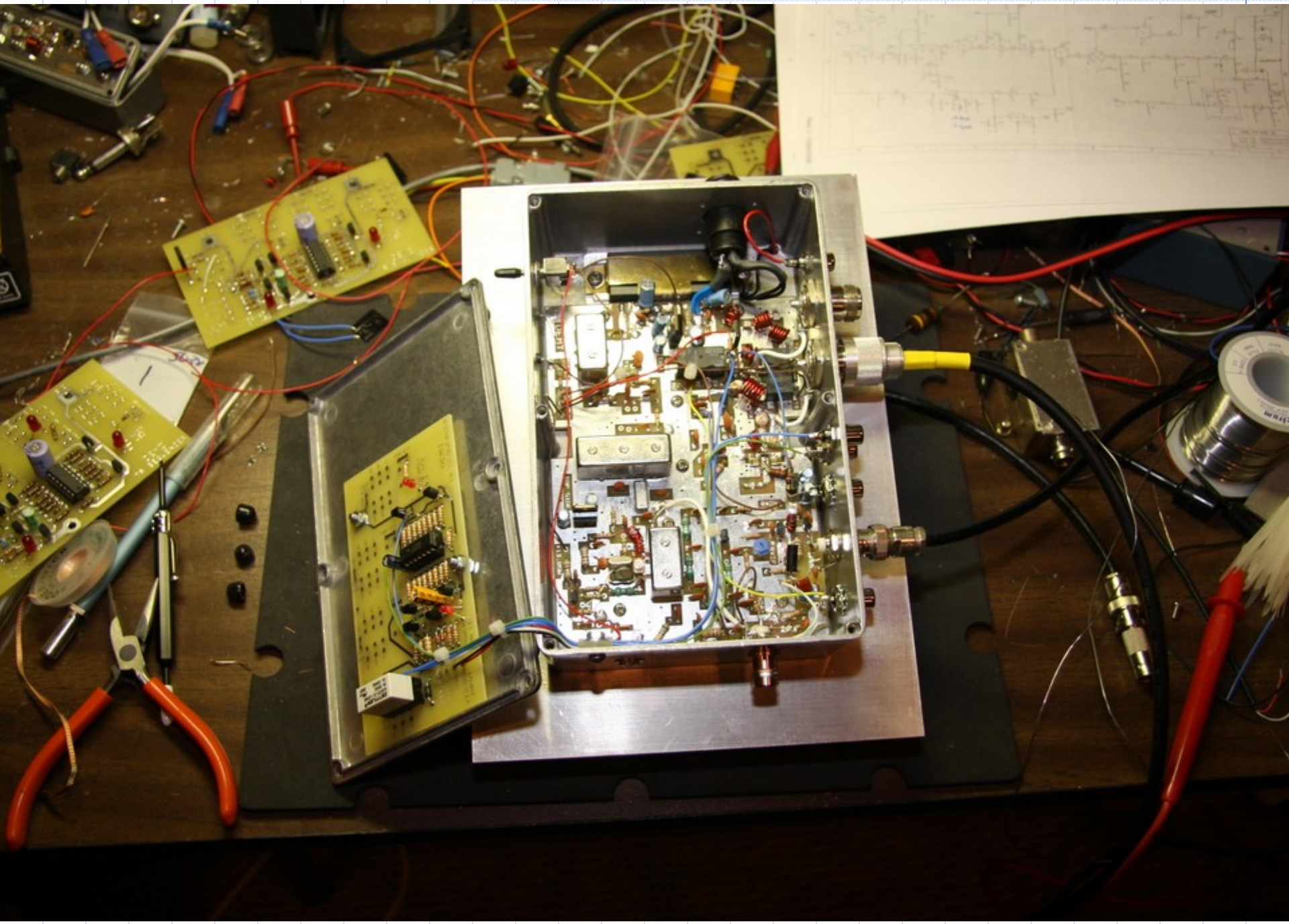

COMMON
TO LINE
TO MIC
KEY
EXT. CT
DC

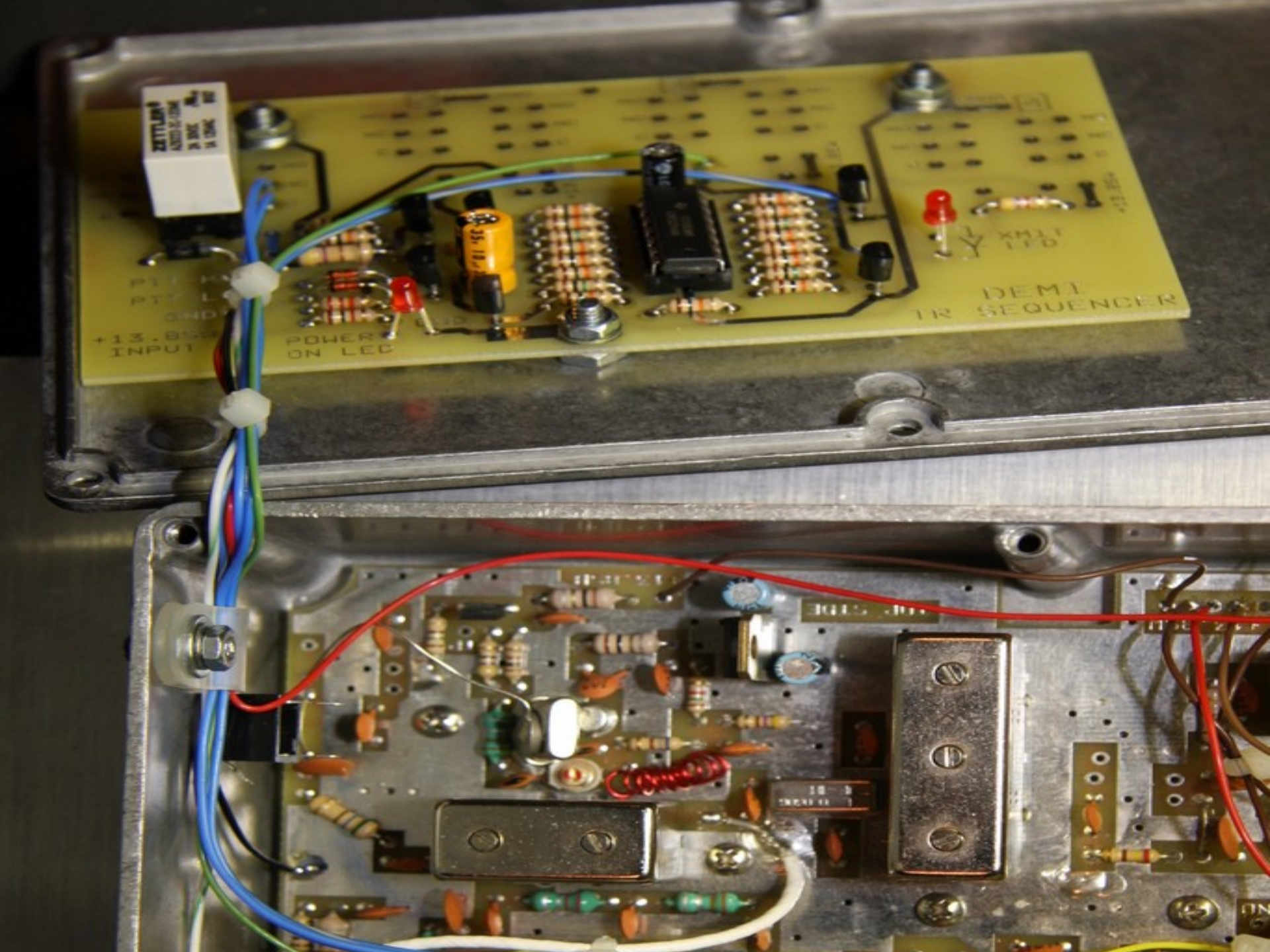

K3 XVTR Interface
DC INPUT
12 TO 24VD
MFJ DE

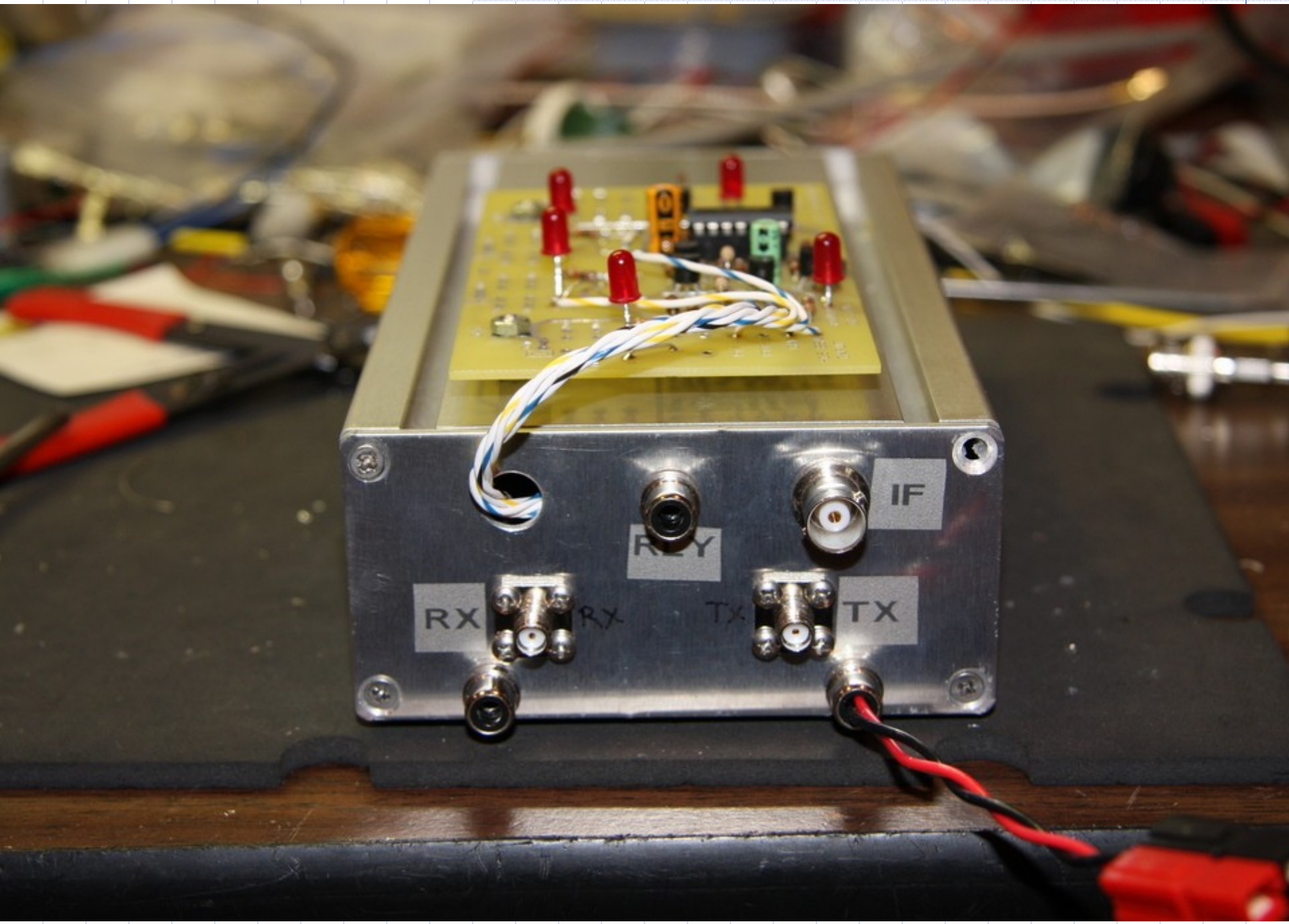

5000 XVTR Interface
TX

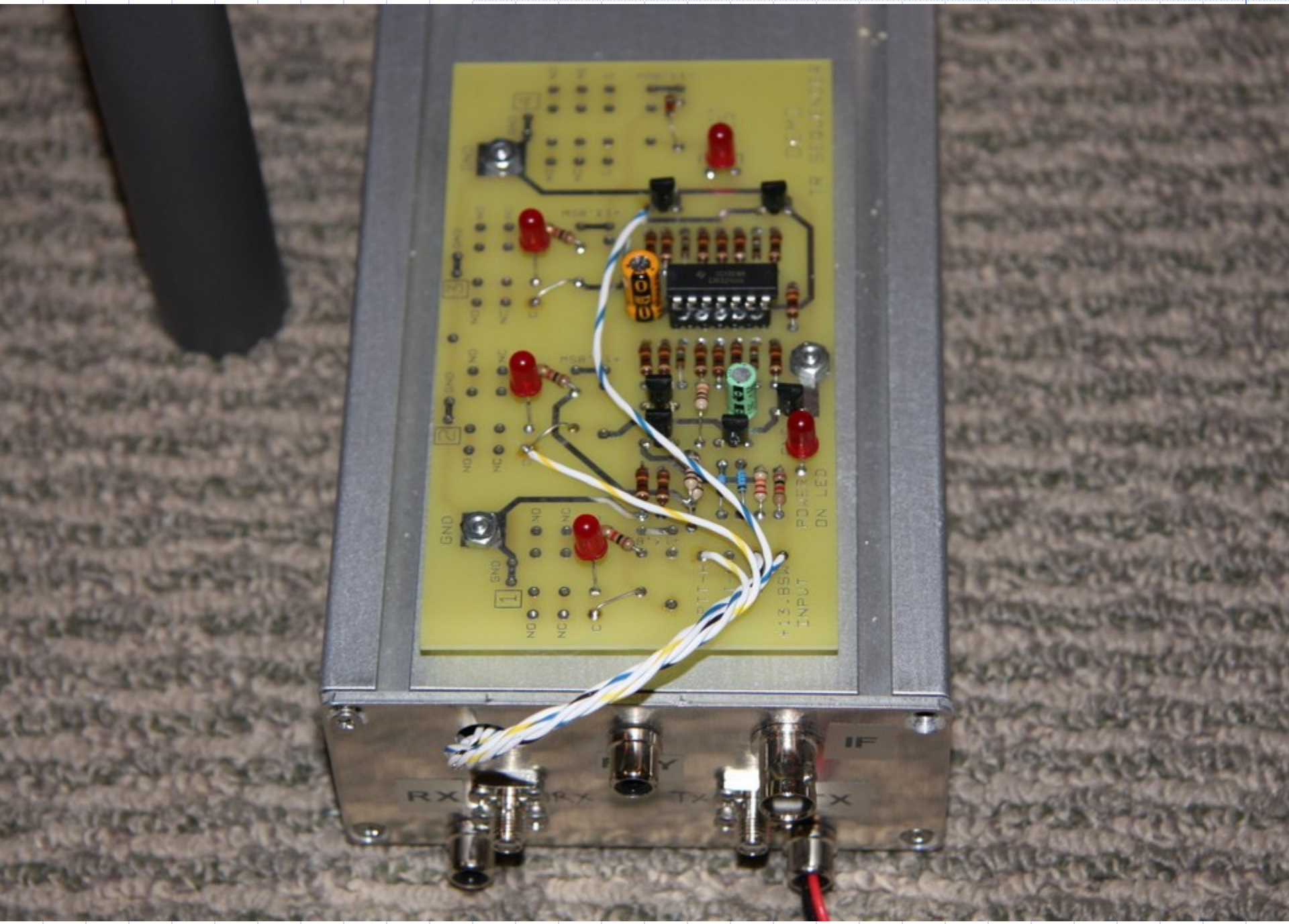
Digital Sequencers

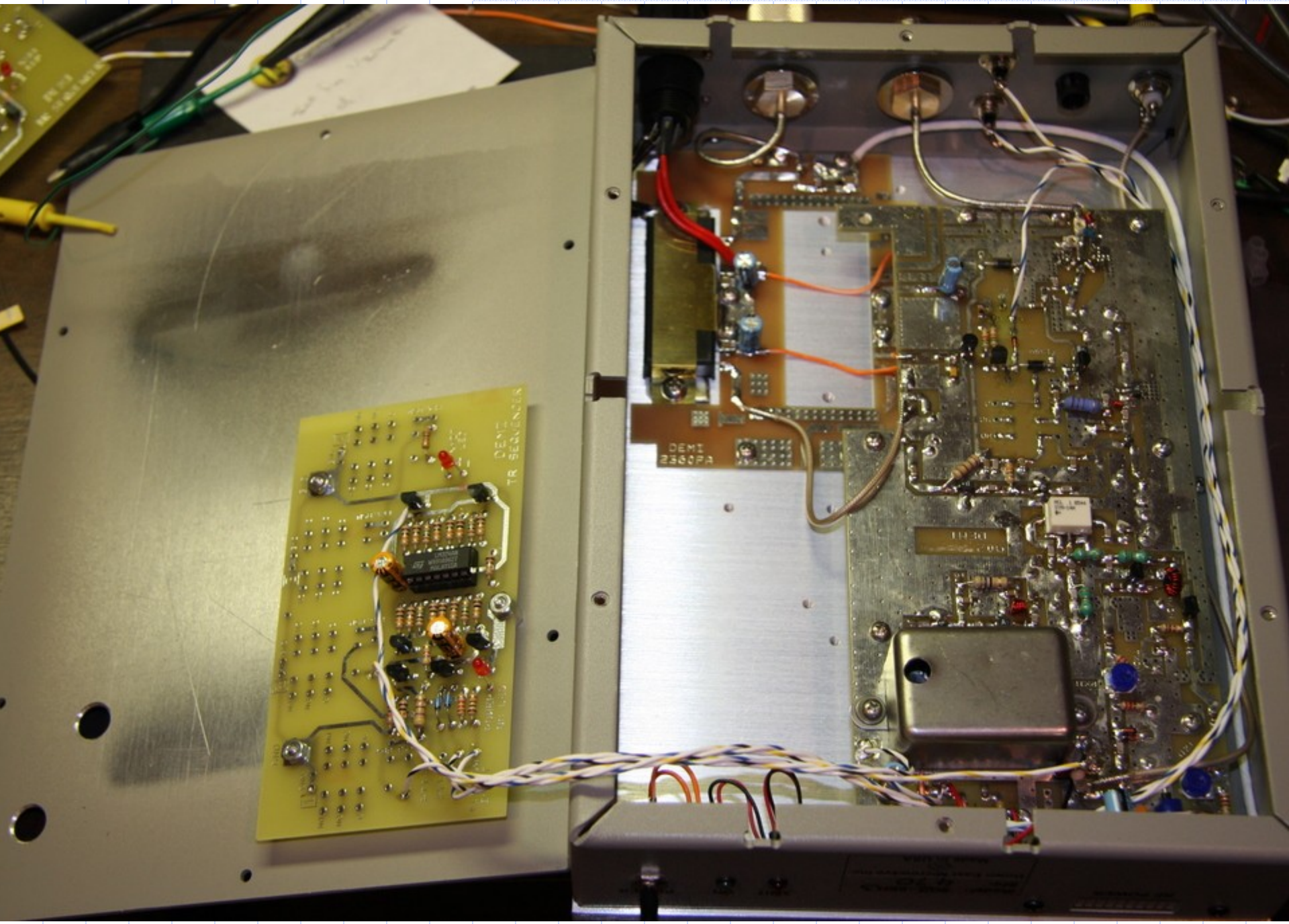
- RF Protection for Front End
- Minimize the use of relays
- Integrate the Sequencer with the Transverter
- Make this an integral part of your System




DEMI
TR SEQUENCER
POWER
ON LED
INPUT

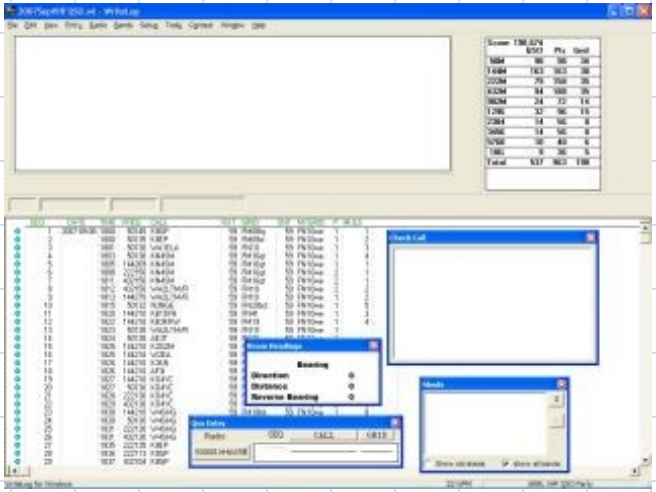

IF
RX
RX
TX
TX

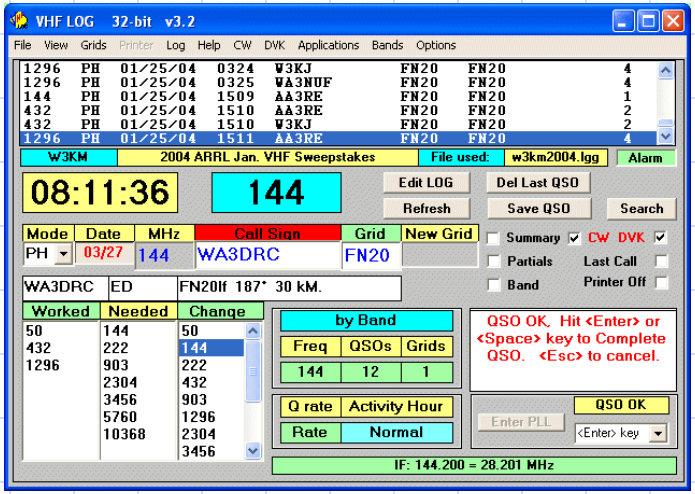

GND
NO
NC
+13.8V
INPUT
POWER
ON LED
RX
TX
IF


DEMI
2360Pa

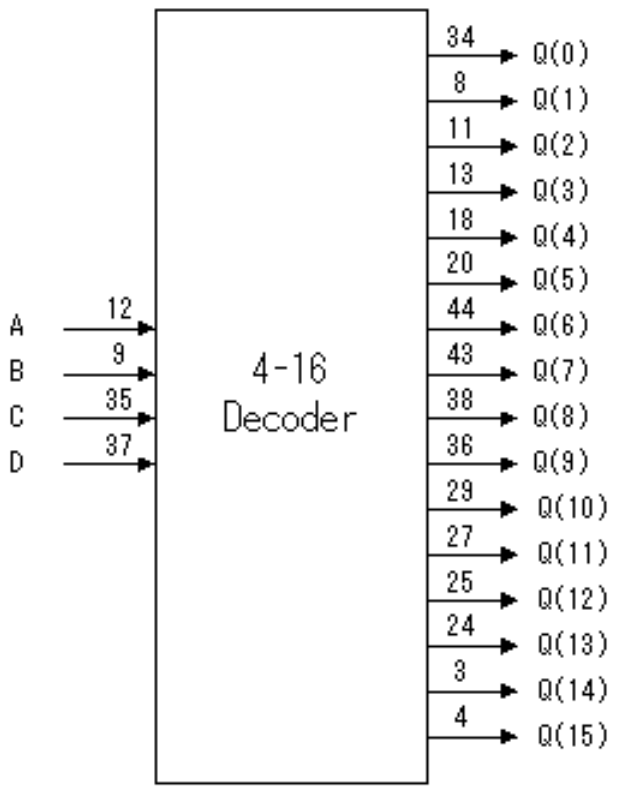
Logging Software Interface

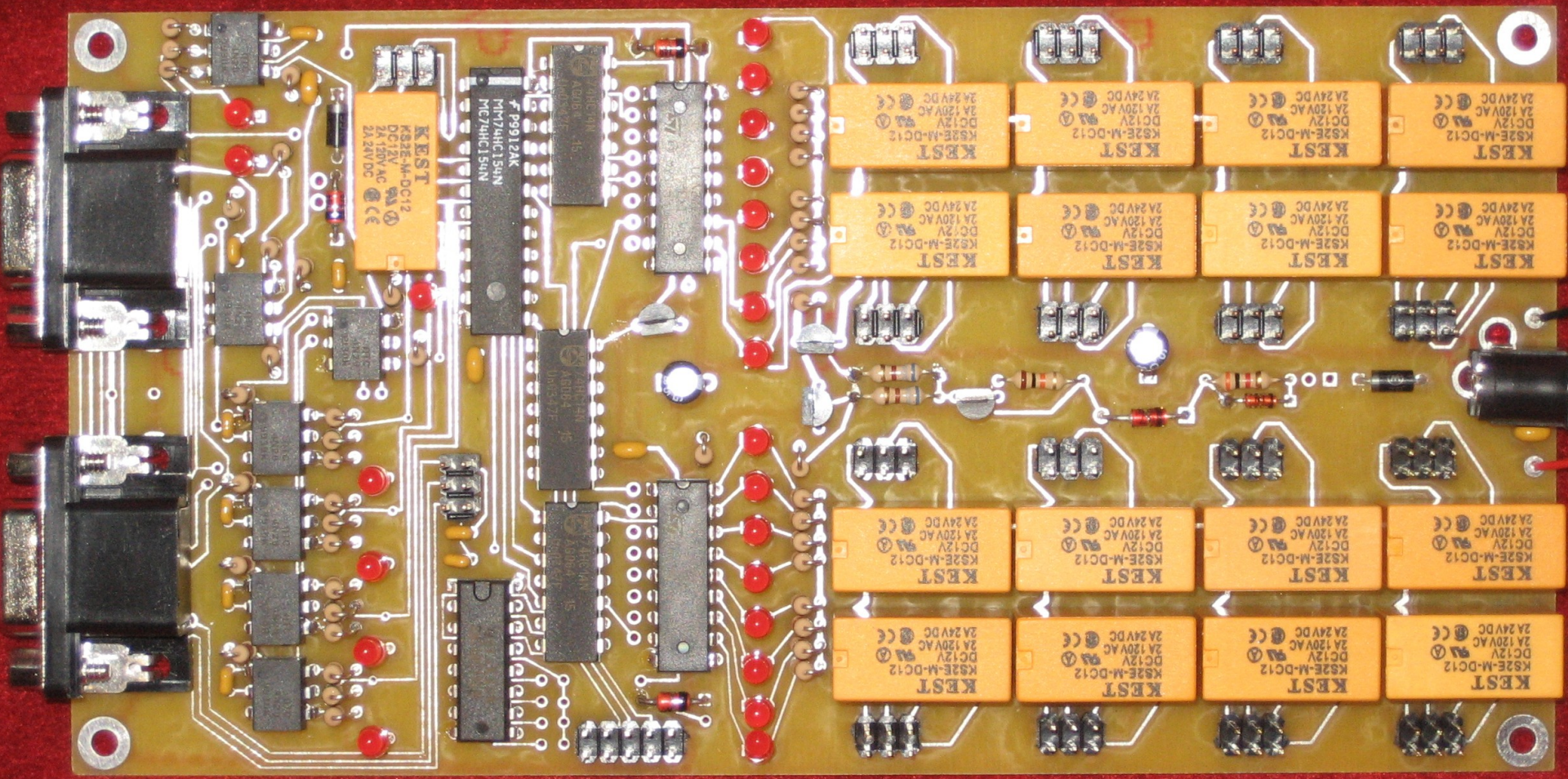
- Getting Band Data to the real world
- Keyer; MK-1100
- N3FTI
- UCB; Universal Controller Board

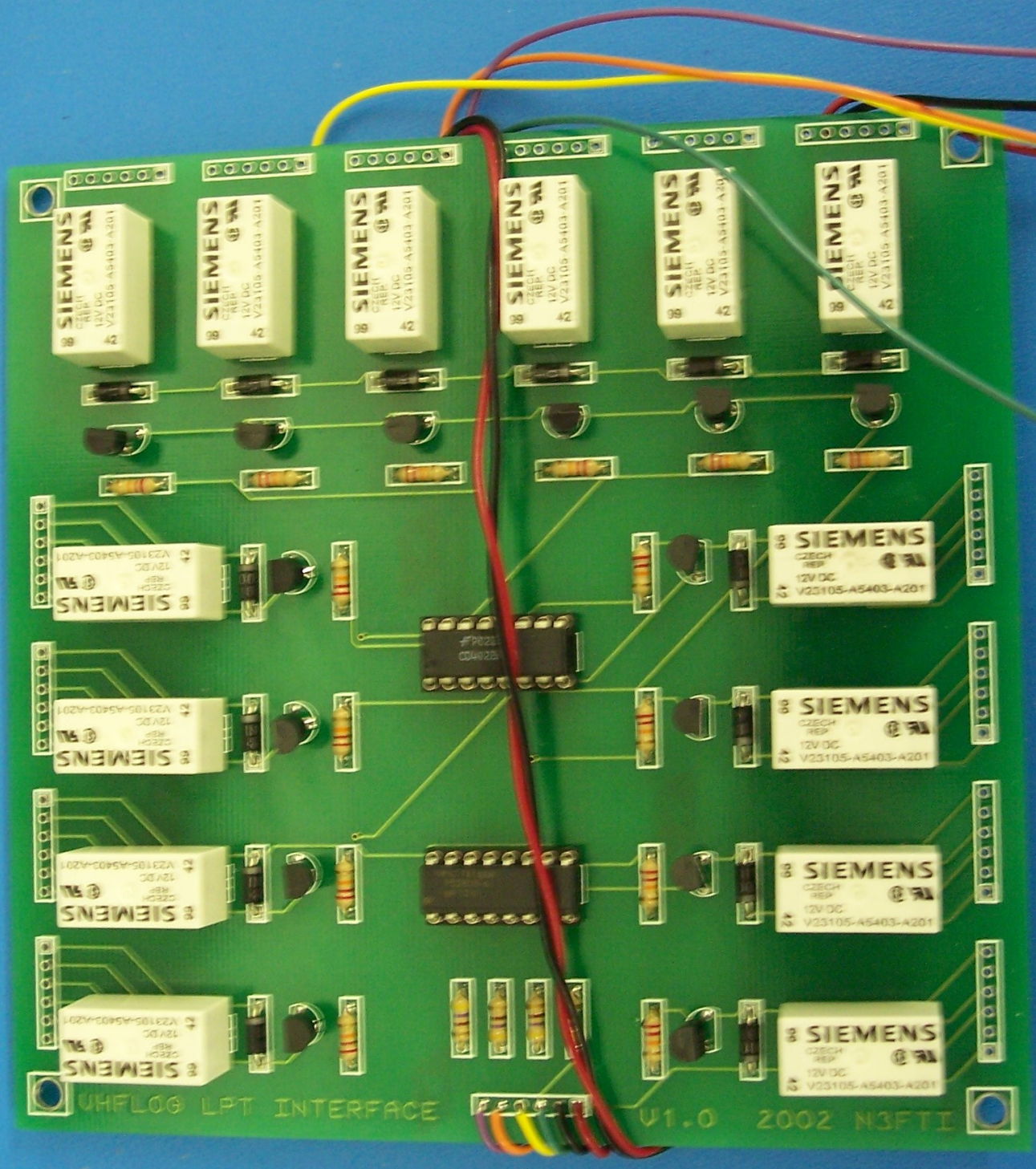




Heart of Interface: 4 to 16 Line Decoder

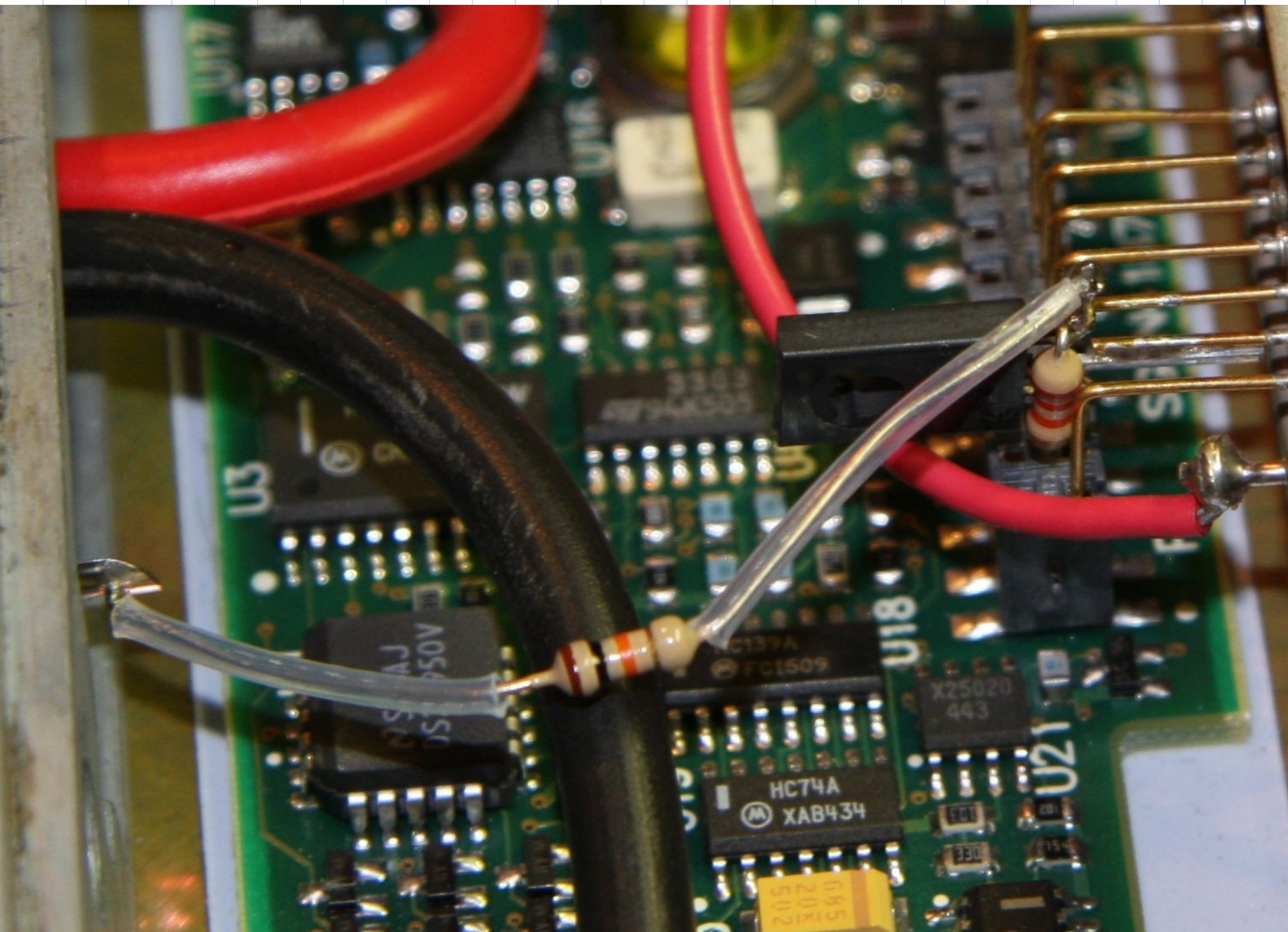



KEST
KS2E-M-DC12
DC12V
2A 120V AC
2A 24V DC
MM74HC154N
P9912AK


SIEMENS
12V DC
V23105-A5403-A201
UHFLOG LPT INTERFACE
V1.0 2002 M3FTI

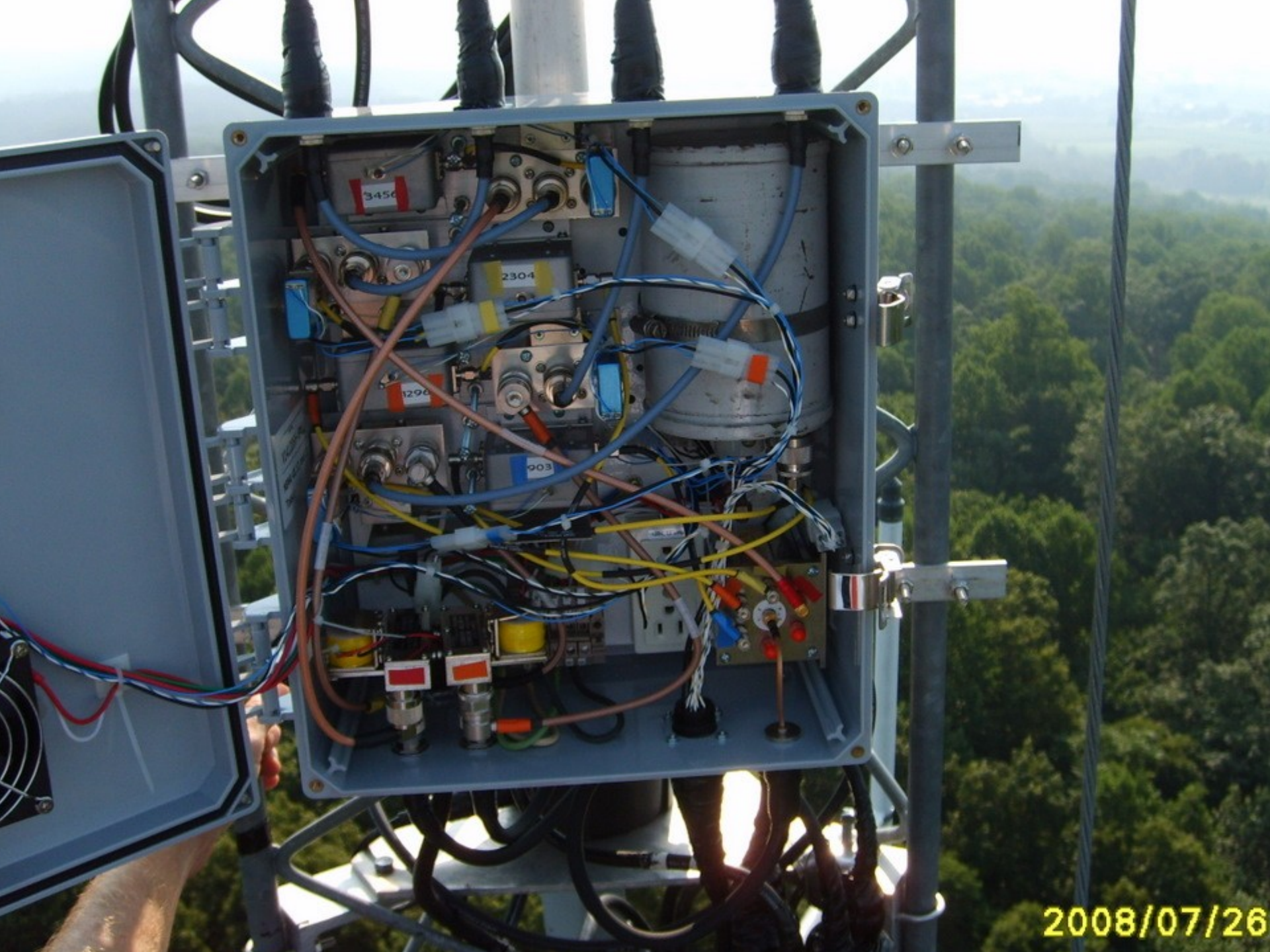
DC Switching Circuit

- Use a single device to supply + VDC
- Inexpensive PNP Transistor
- Avoids Surplus or Failure-prone Relays
- Easy to implement
- Driven by open collector


U3
U18
U21
X25020
443
HC74A
XAB434

Distant Relay Activation

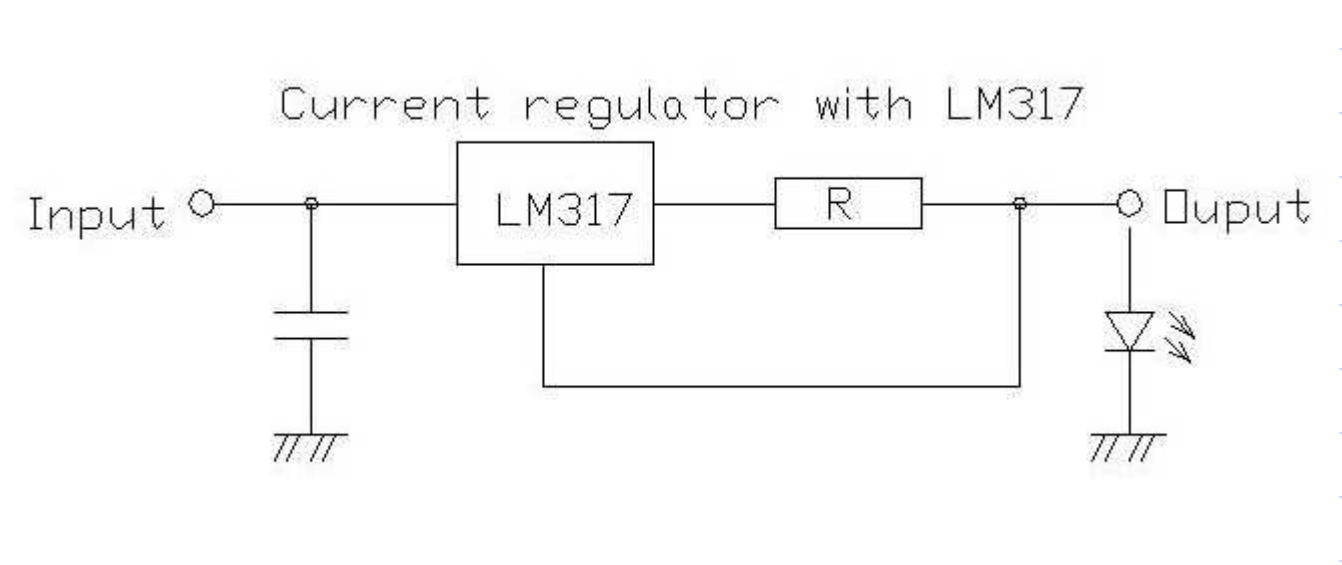
- Dilemma: Relay at the top of the Tower
- Potential Solutions
  - Ignore; Indicator; Sensing; Current Sensing
- Indicators Increasingly Scarce and 26vdc
- Sensing is Exotic and Future
- Constant Current Regulation

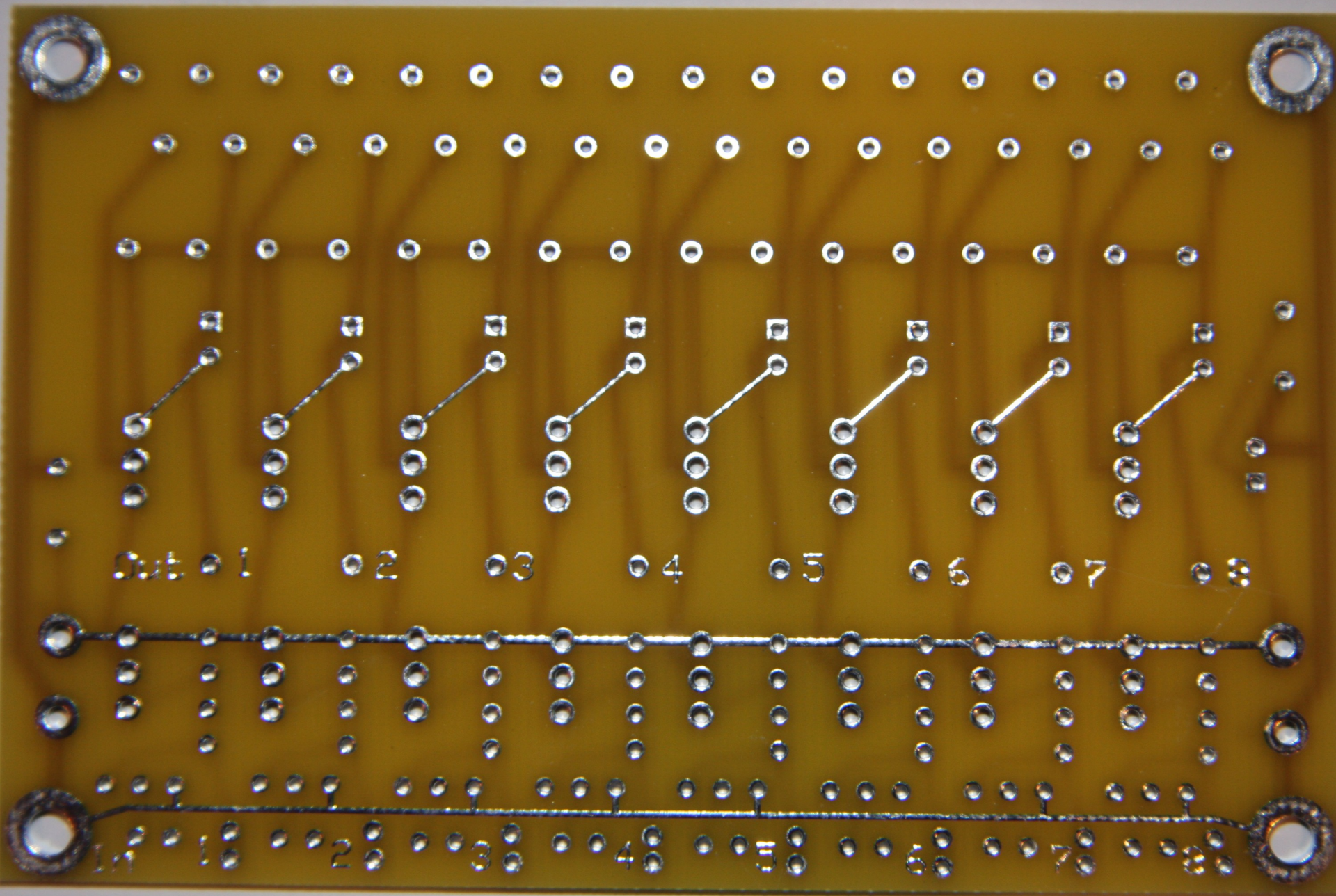

2008/07/26

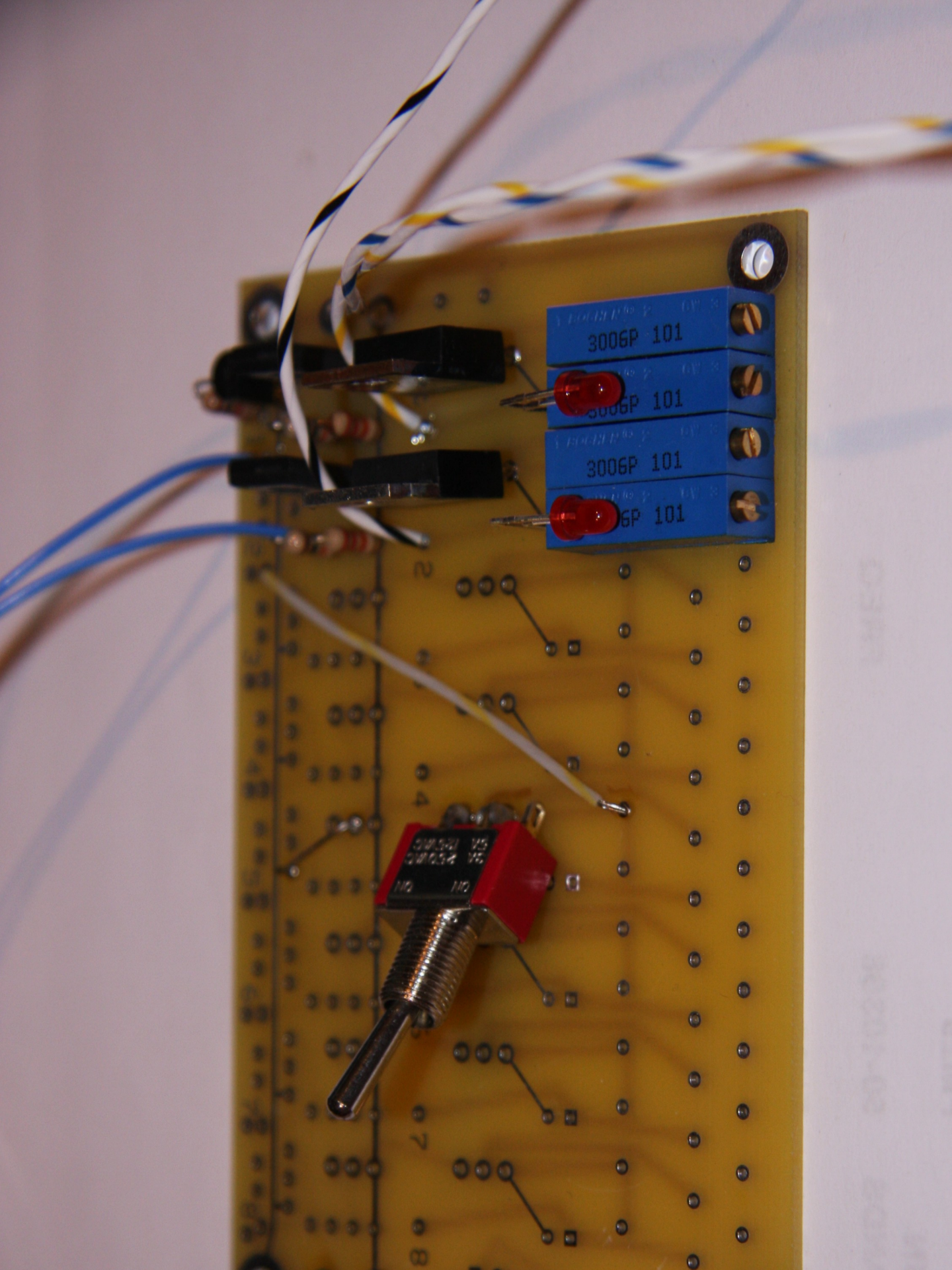
Constant Current Regulation

- Relay Coil is a Current Device
- LM-317 as a Current Regulator
- Takes slightly Higher Voltage
- Enforces Constant Current
- Permits Positive Indication with an LED

Constant Current Regulator




Out
1
2
3
4
5
6
7
8
In
1
2
3
4
5
6
7
8


3006P 101
3006P 101
3006P 101


CHANNEL SELECTOR

Putting it all Together

- TTL Circuits
- Distributed Control
- Logic over Relay where possible

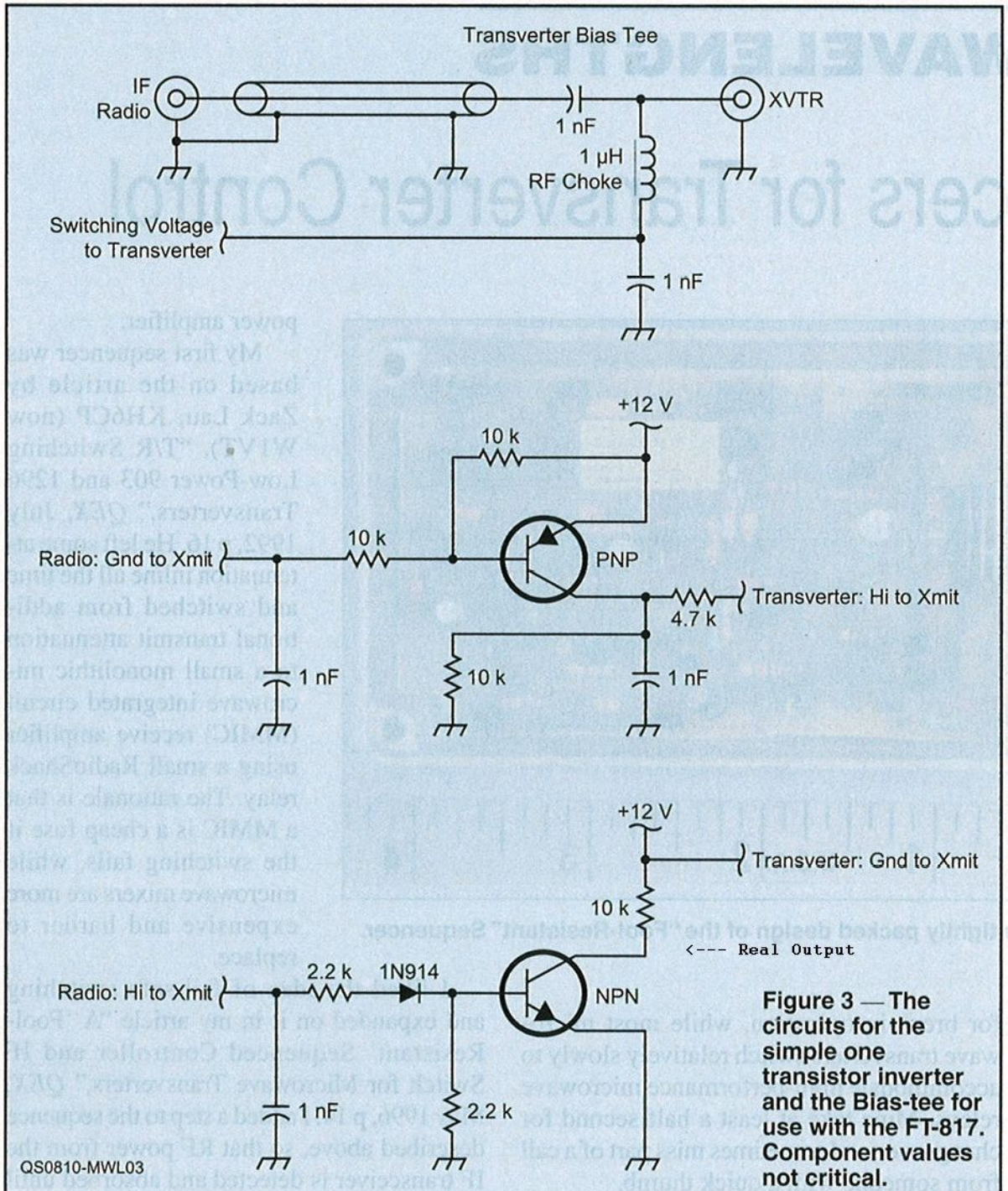


Figure 3 — The circuits for the simple one transistor inverter and the Bias-tee for use with the FT-817. Component values not critical.

Figure 4 — mounted o

Figure 5 — constructio Bias-tee.

I looked ov
didn't find
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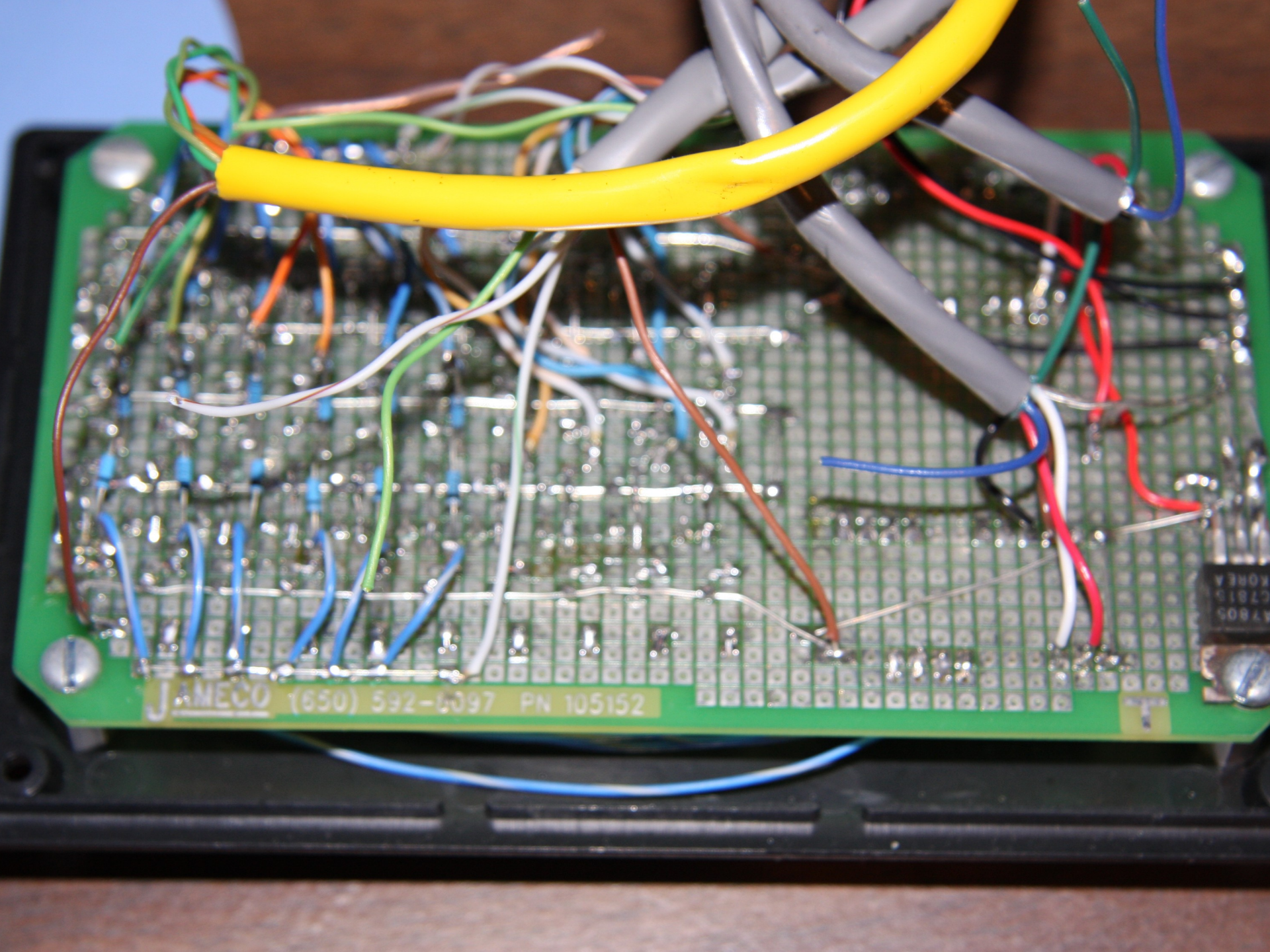
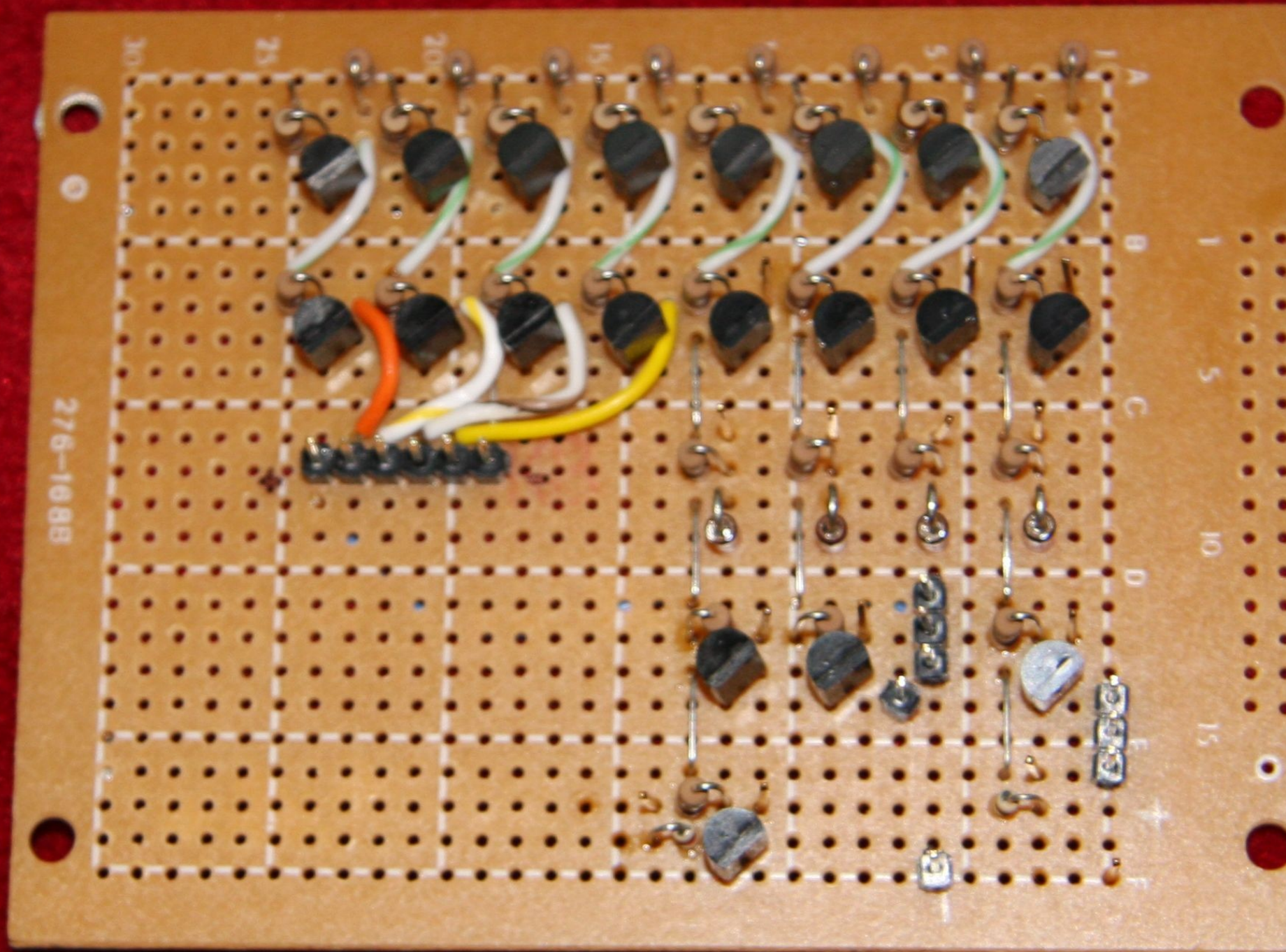
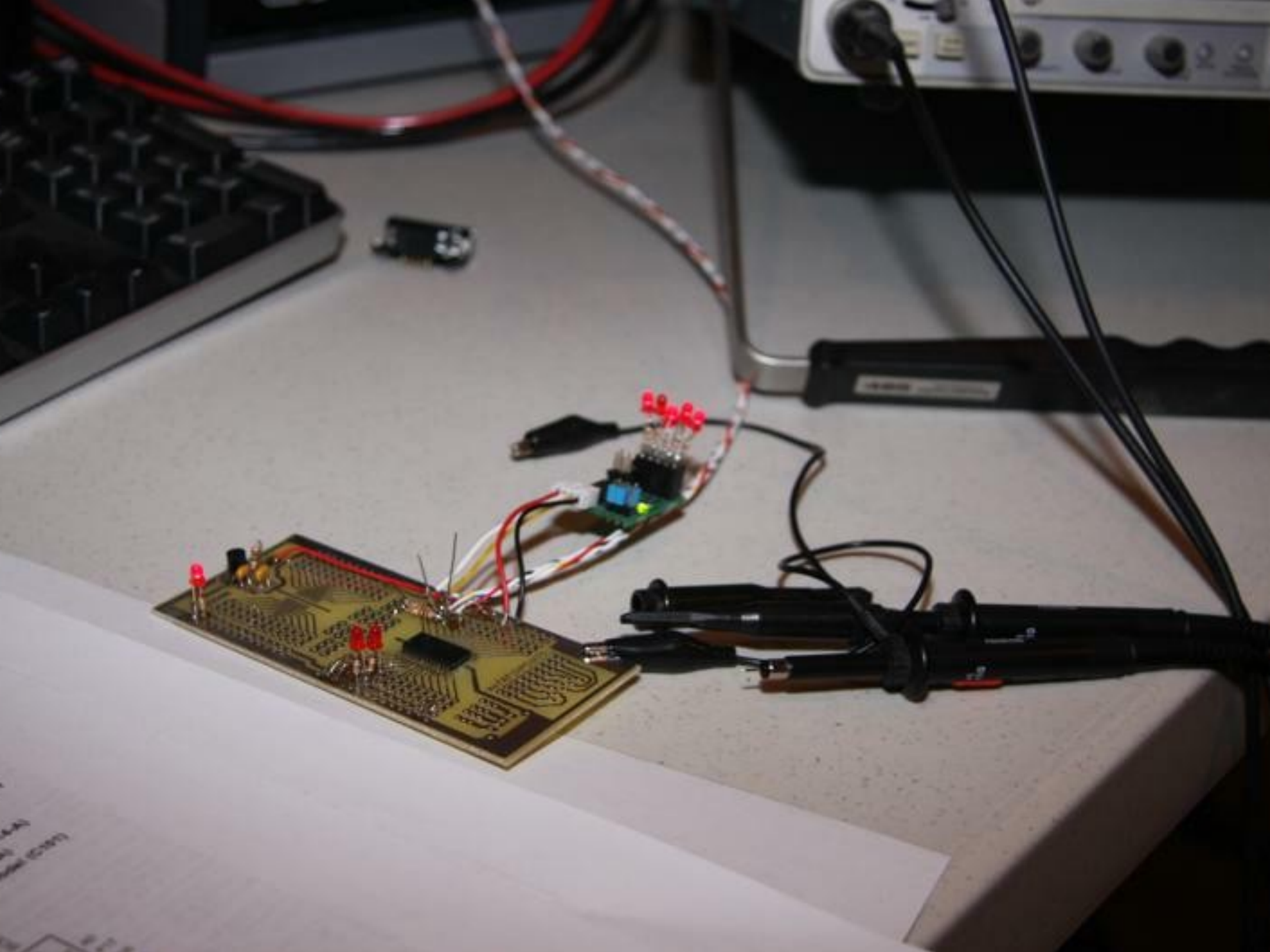
to as a Bias
with three c


JAMECO (650) 592-0097 PN 105152


276-1388

Summary

- Benefits of RF Architecture
- Small circuits provide incremental improvements
- Reliability of proven technology
- Proof over time
- Illustration @ K3TUF and W1GHZ

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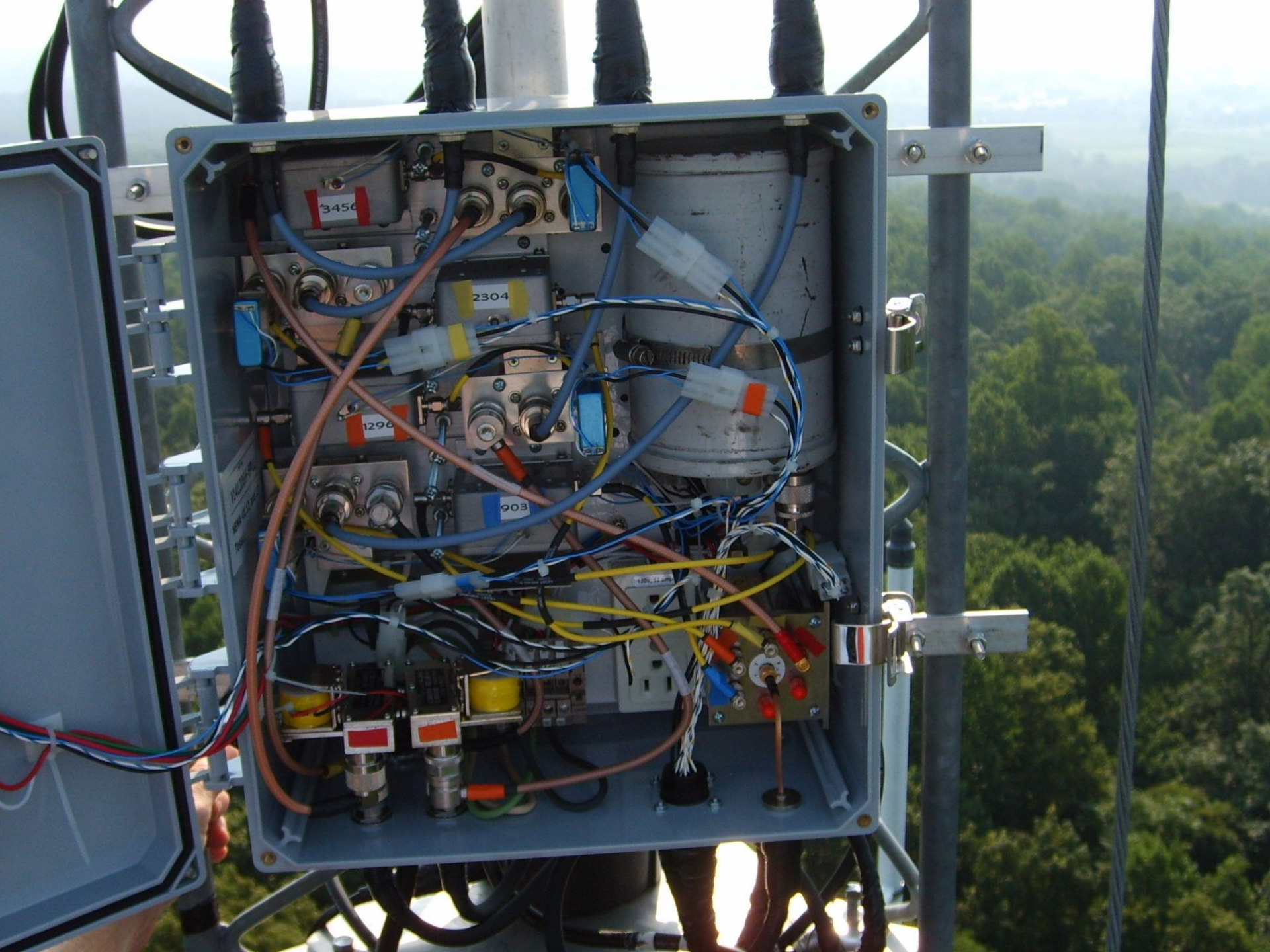
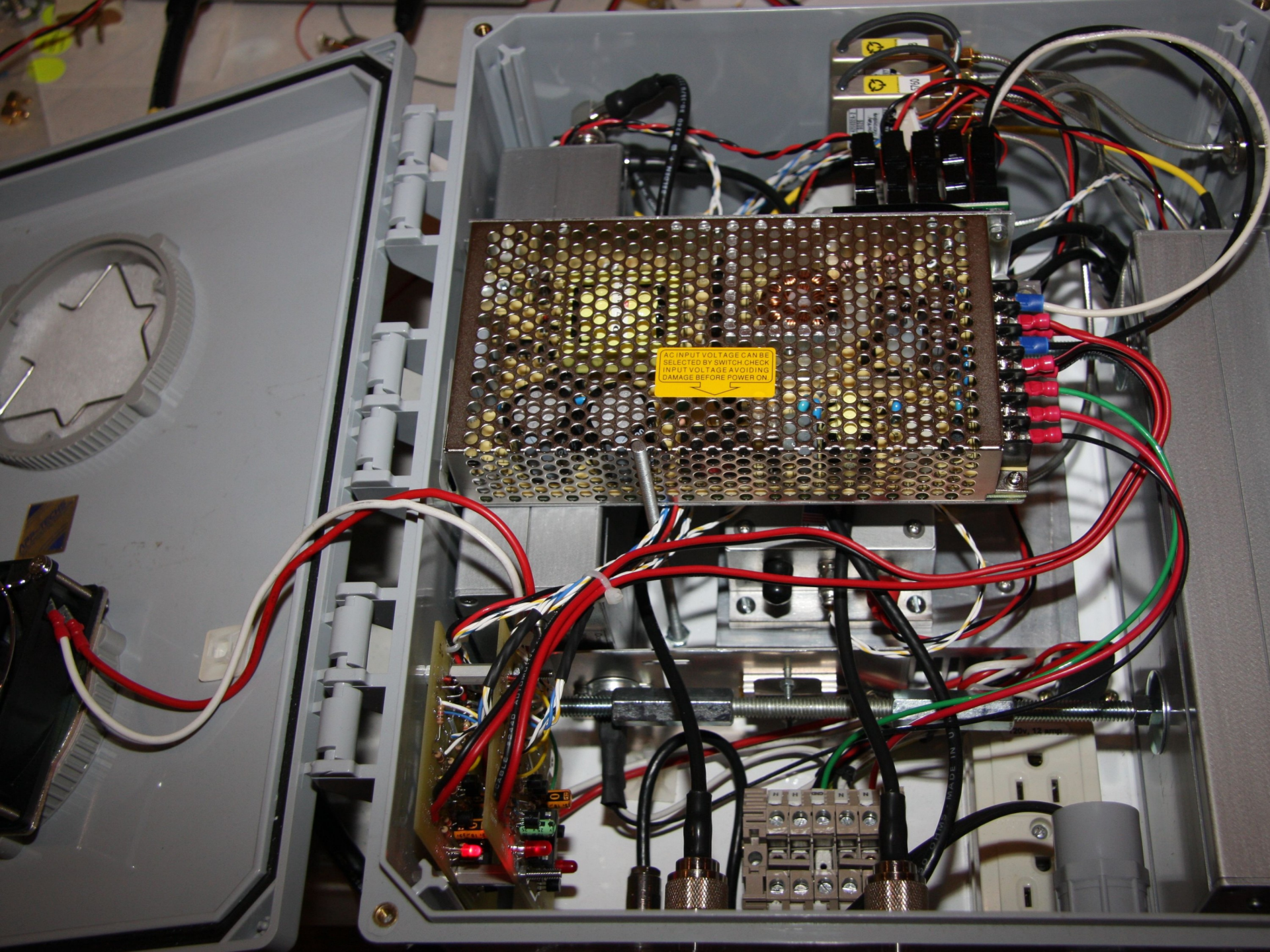

2304
903


AC INPUT VOLTAGE CAN BE
SELECTED BY SWITCH.CHECK
INPUT VOLTAGE AVOIDING
DAMAGE BEFORE POWER ON