

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

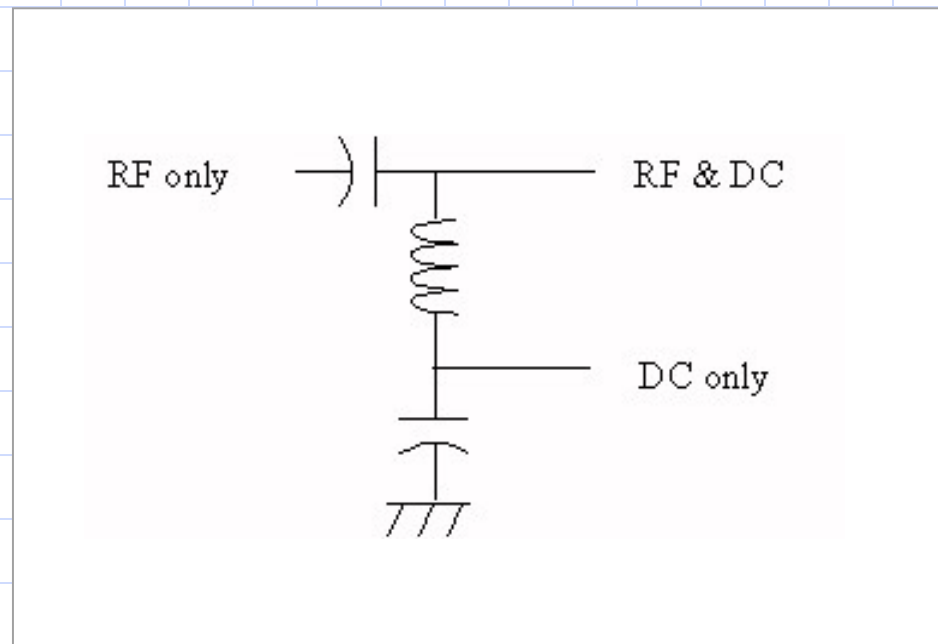
Architecture Fundamentals

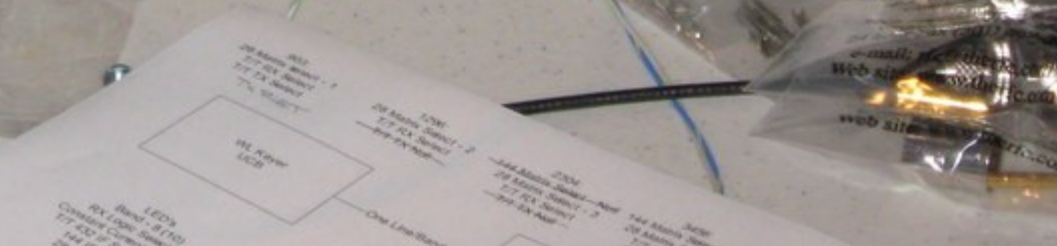
- ◆ Use Transverters
- ◆ External T/R Switching
- ◆ Separate Amplifiers
- ◆ Each Band Stands on it's own
- ◆ Logging Must Drive Band Selection
- ◆ Common IF: Freq, TX Level, Keying
- ◆ Distributed Placement of Equipment

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





K3 XVTR Interface

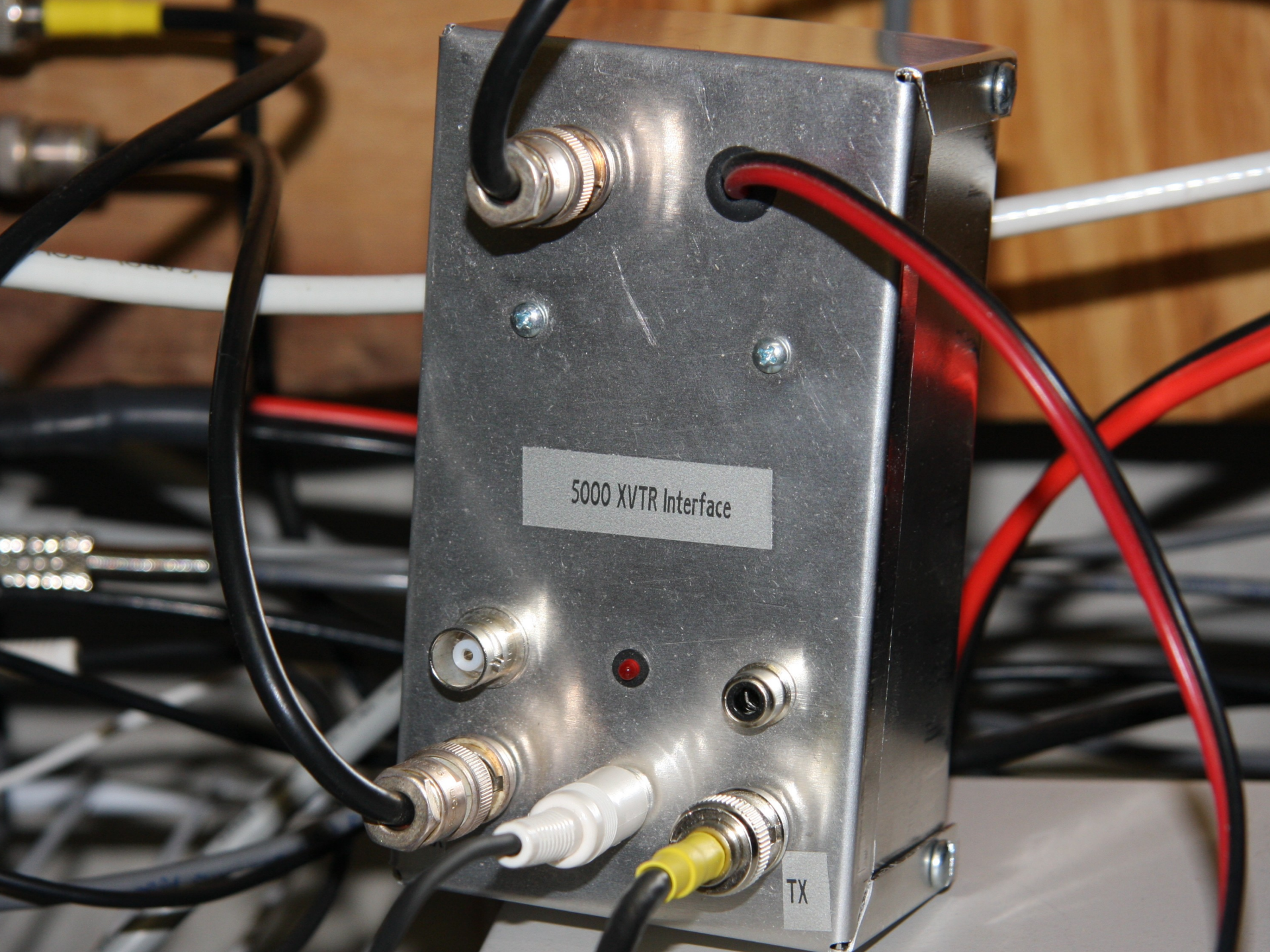
DC INPUT
12 TO 24VDC



MFJ DEL
E
OU
EL

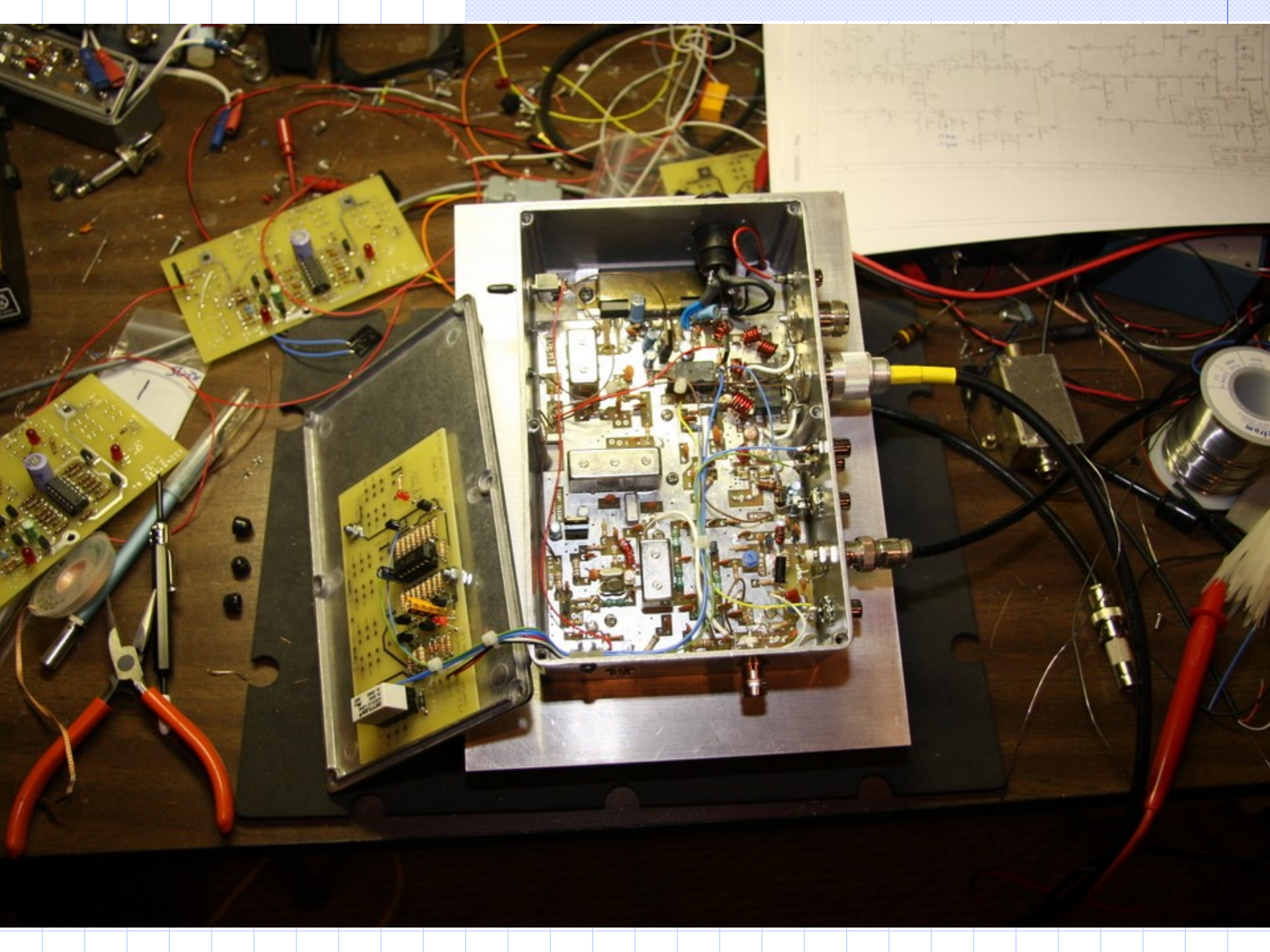
5000 XVTR Interface

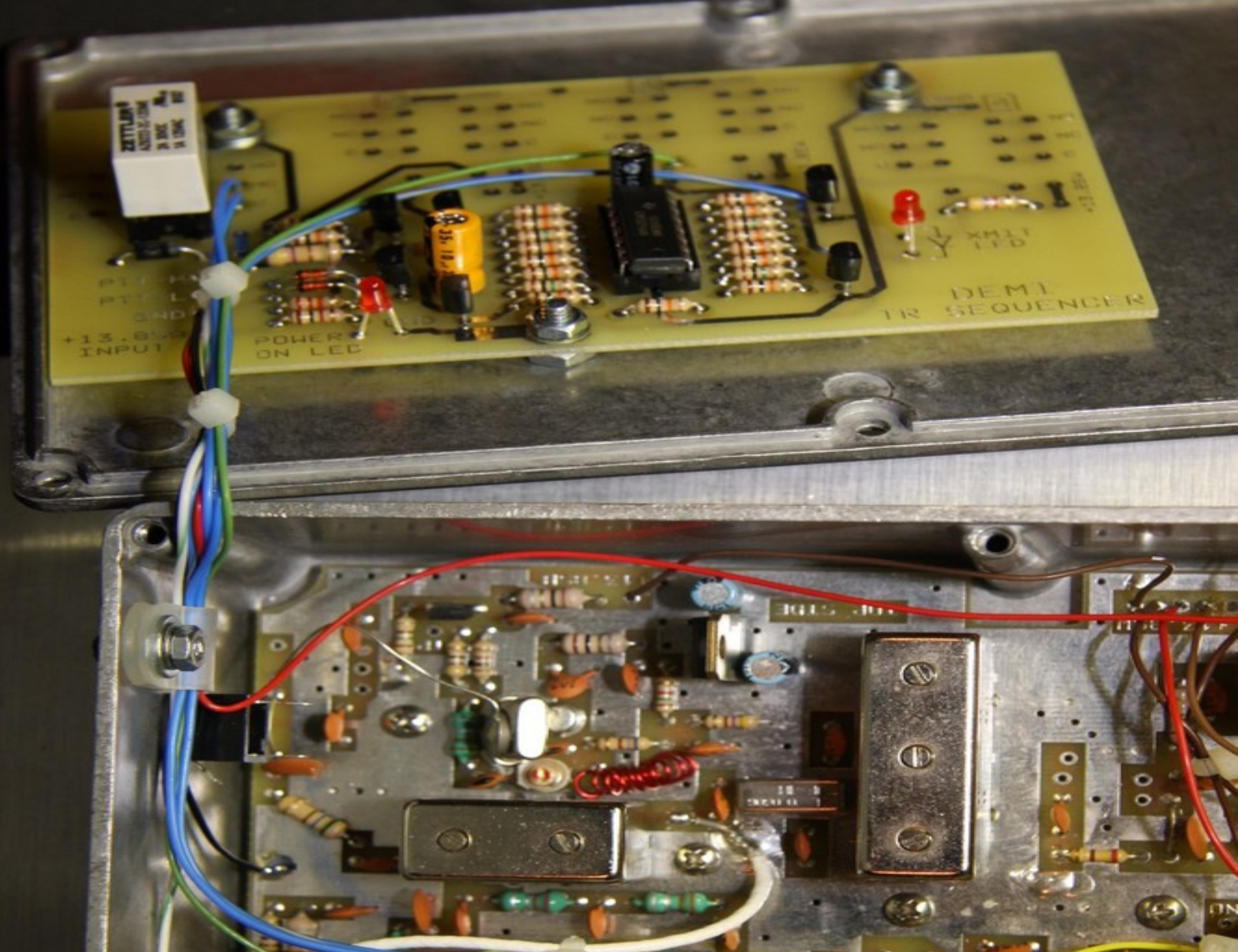
TX



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



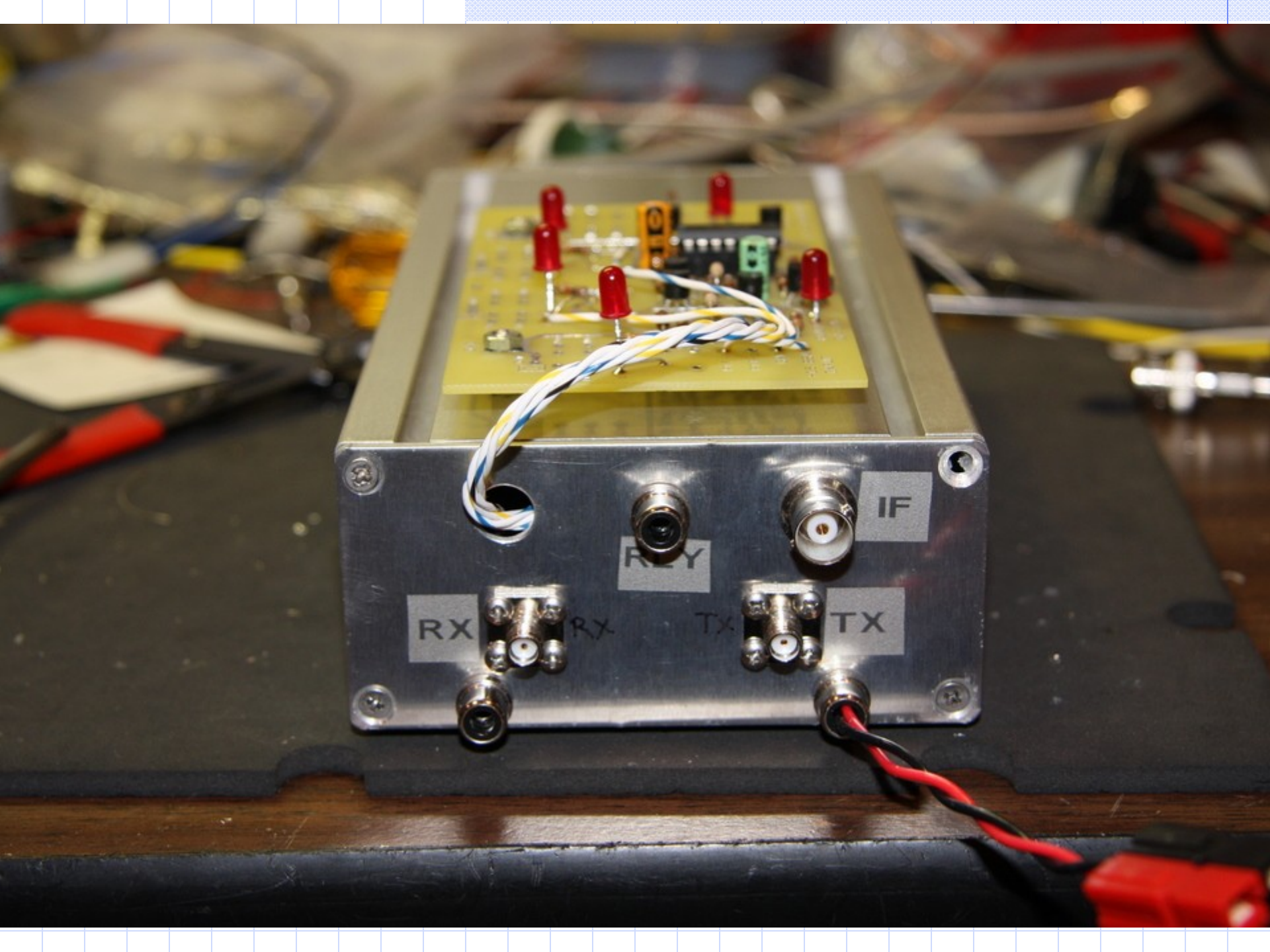


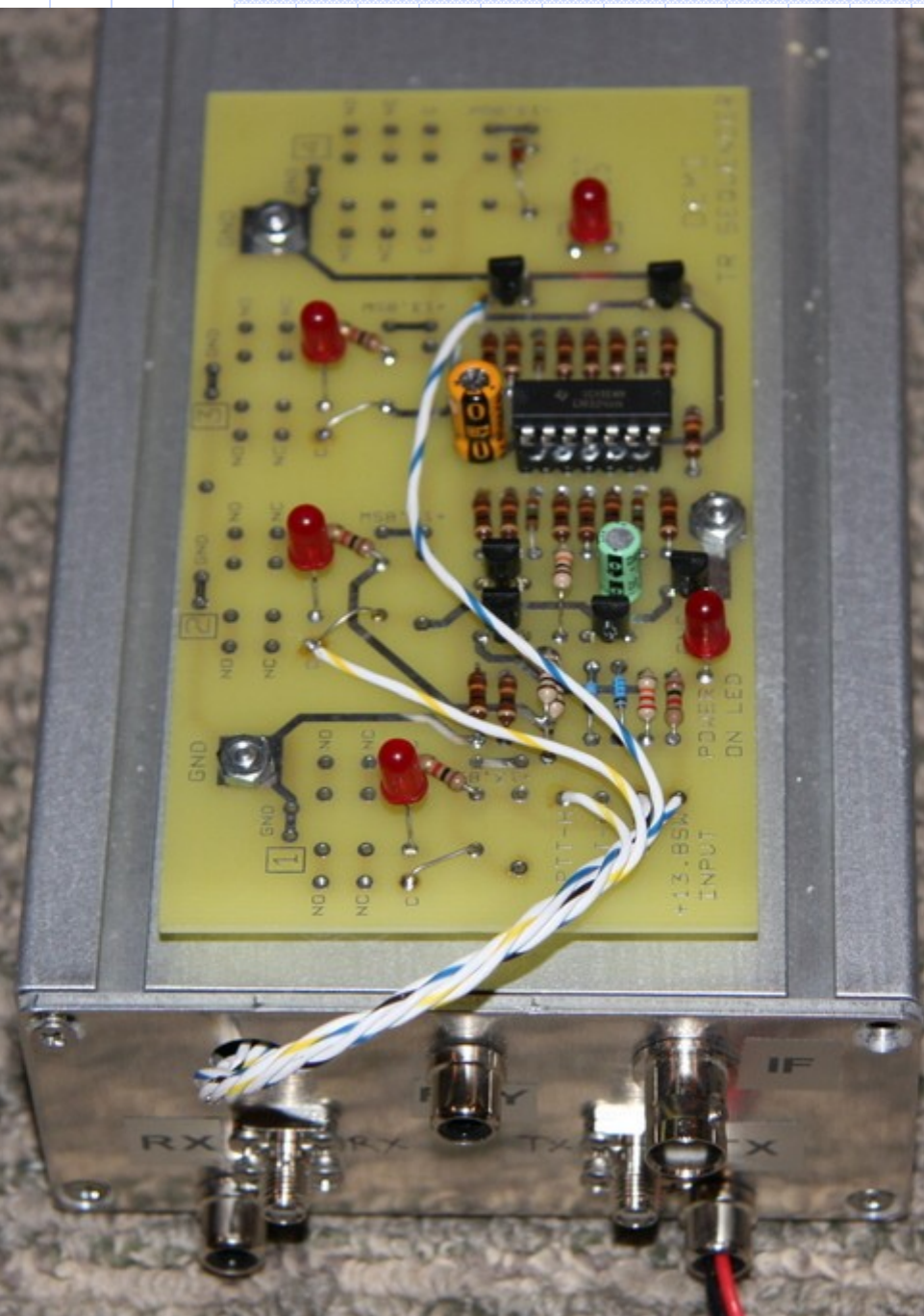
ZETTLEMAN
ASSOCIATES INC.
24 250C 1A 1500C 100

DEMI
IR SEQUENCER

+13.8V
INPUT

POWER
ON LED

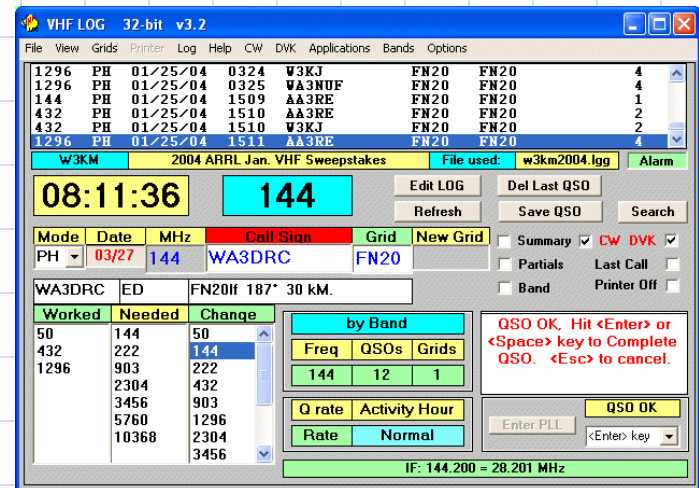
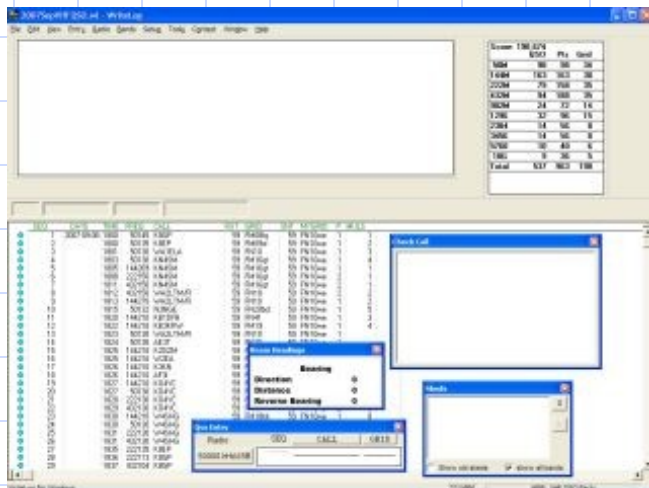




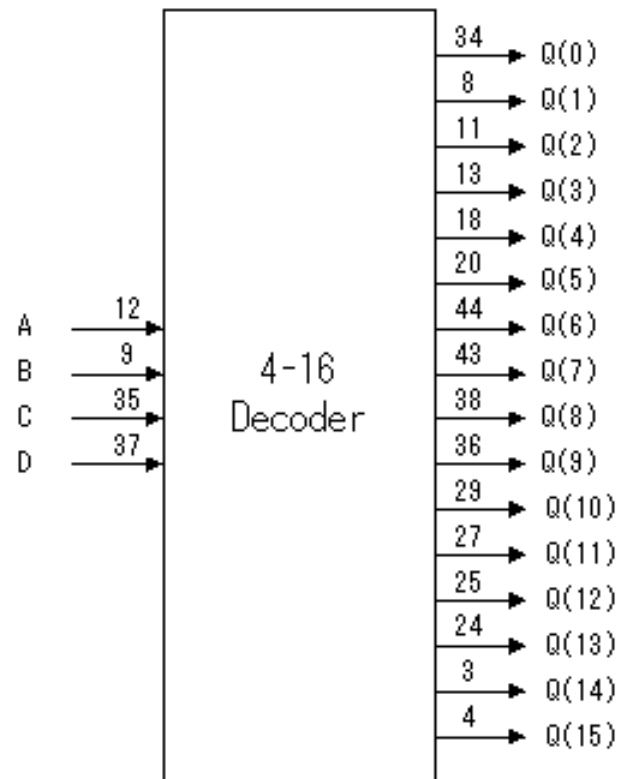


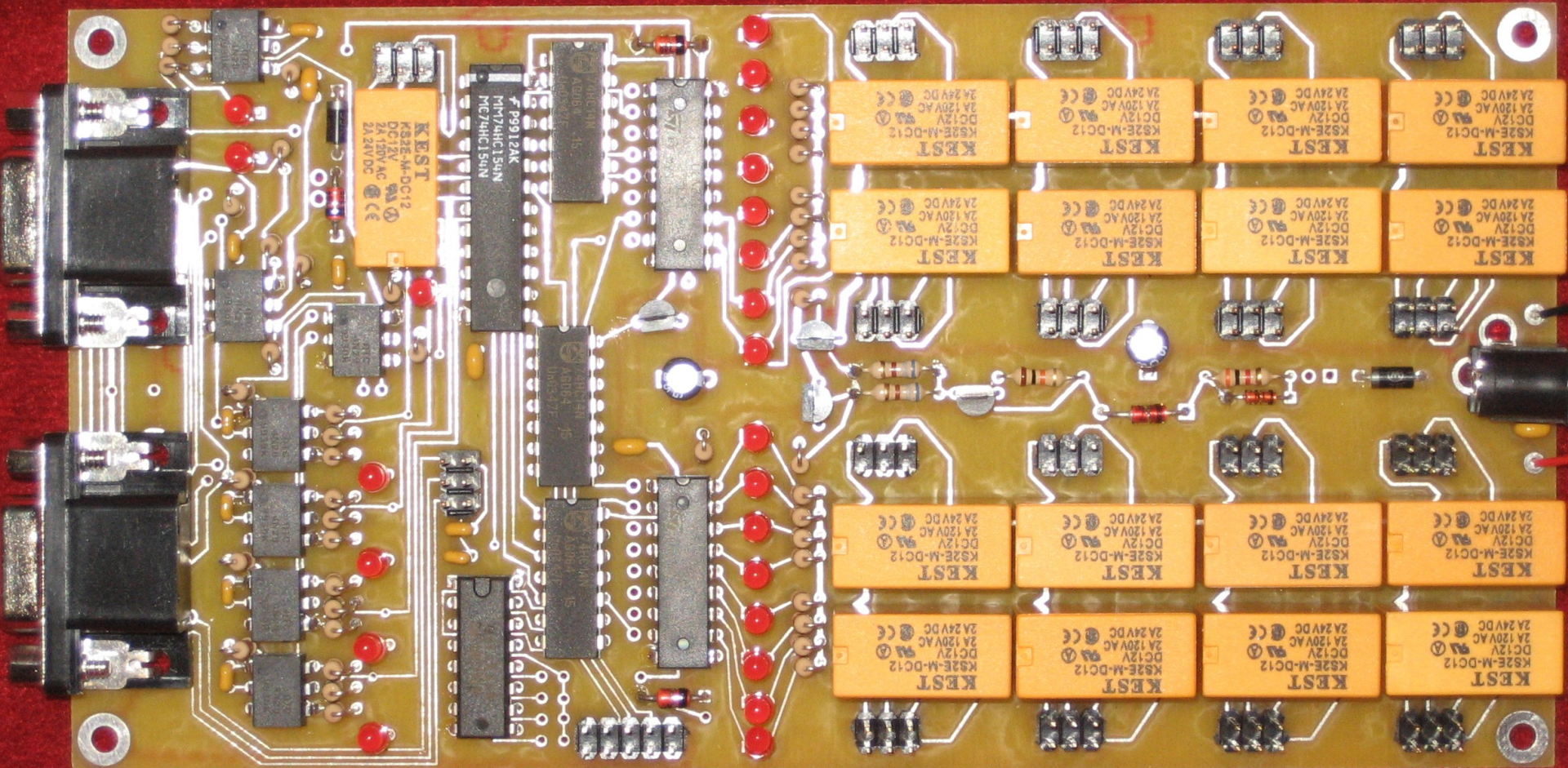
Logging Software Interface

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



Heart of Interface: 4 to 16 Line Decoder





KESZ
KES2E-M-DC12
DC12V
2A 120V AC
2A 24V DC

KESZ
KES2E-M-DC12
DC12V
2A 120V AC
2A 24V DC

KESZ
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DC12V
2A 120V AC
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2A 24V DC

F 9912AK
MM74HC154N
MC74HC154N

AG8684 45
AG8684 45

AG8684 45
AG8684 45

AG8684 45
AG8684 45

Various small components including resistors, capacitors, and diodes are visible on the left side of the board.

UHF/LPT INTERFACE

V1.0 2002 NSFTI

SIEMENS
CZECH REP.
12V DC
V23105-A5403-A201

SIEMENS
CZECH REP.
12V DC
V23105-A5403-A201

SIEMENS
CZECH REP.
12V DC
V23105-A5403-A201

SIEMENS
CZECH REP.
12V DC
V23105-A5403-A201

SIEMENS
CZECH REP.
12V DC
V23105-A5403-A201

SIEMENS
CZECH REP.
12V DC
V23105-A5403-A201

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V23105-A5403-A201

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12V DC
V23105-A5403-A201

SIEMENS
CZECH REP.
12V DC
V23105-A5403-A201

SIEMENS
CZECH REP.
12V DC
V23105-A5403-A201

25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

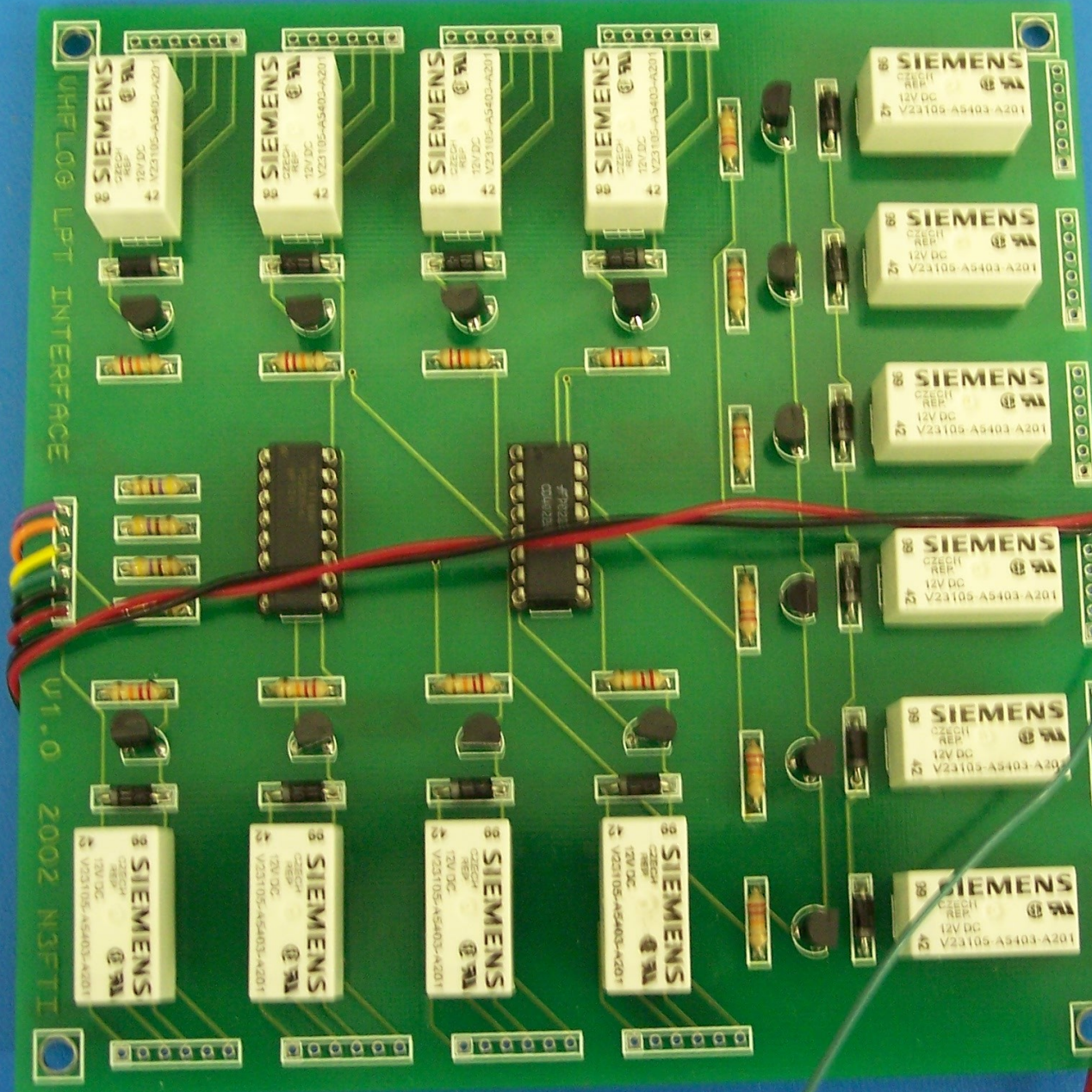
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25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

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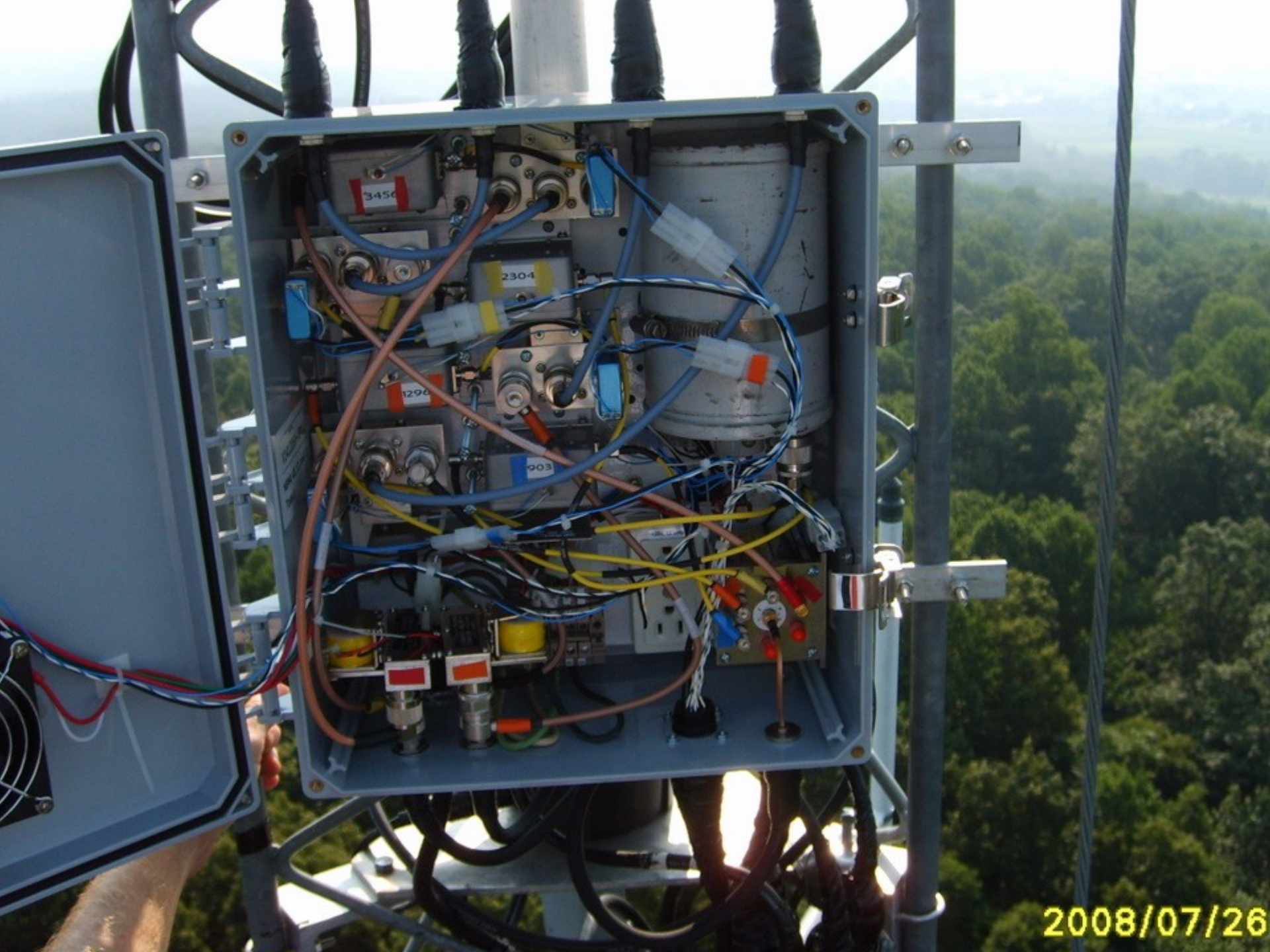


DC Switching Circuit

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

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

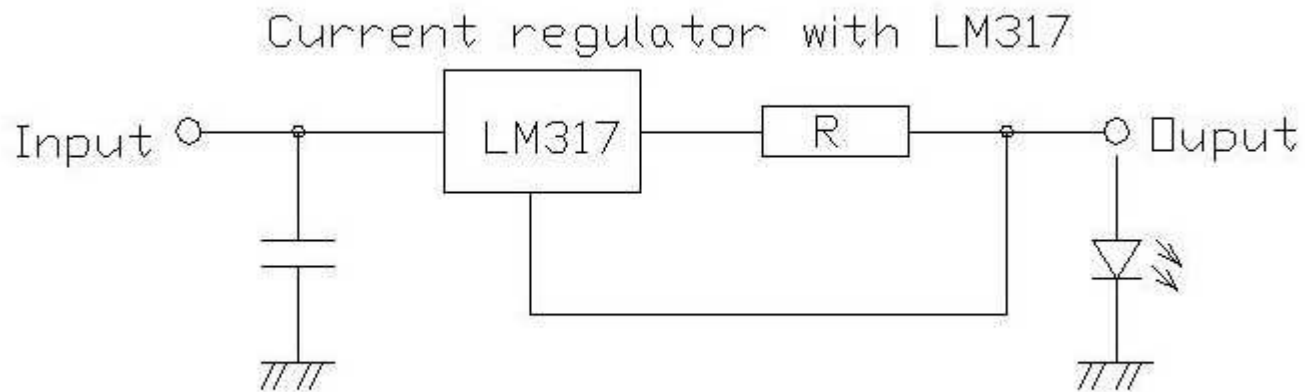


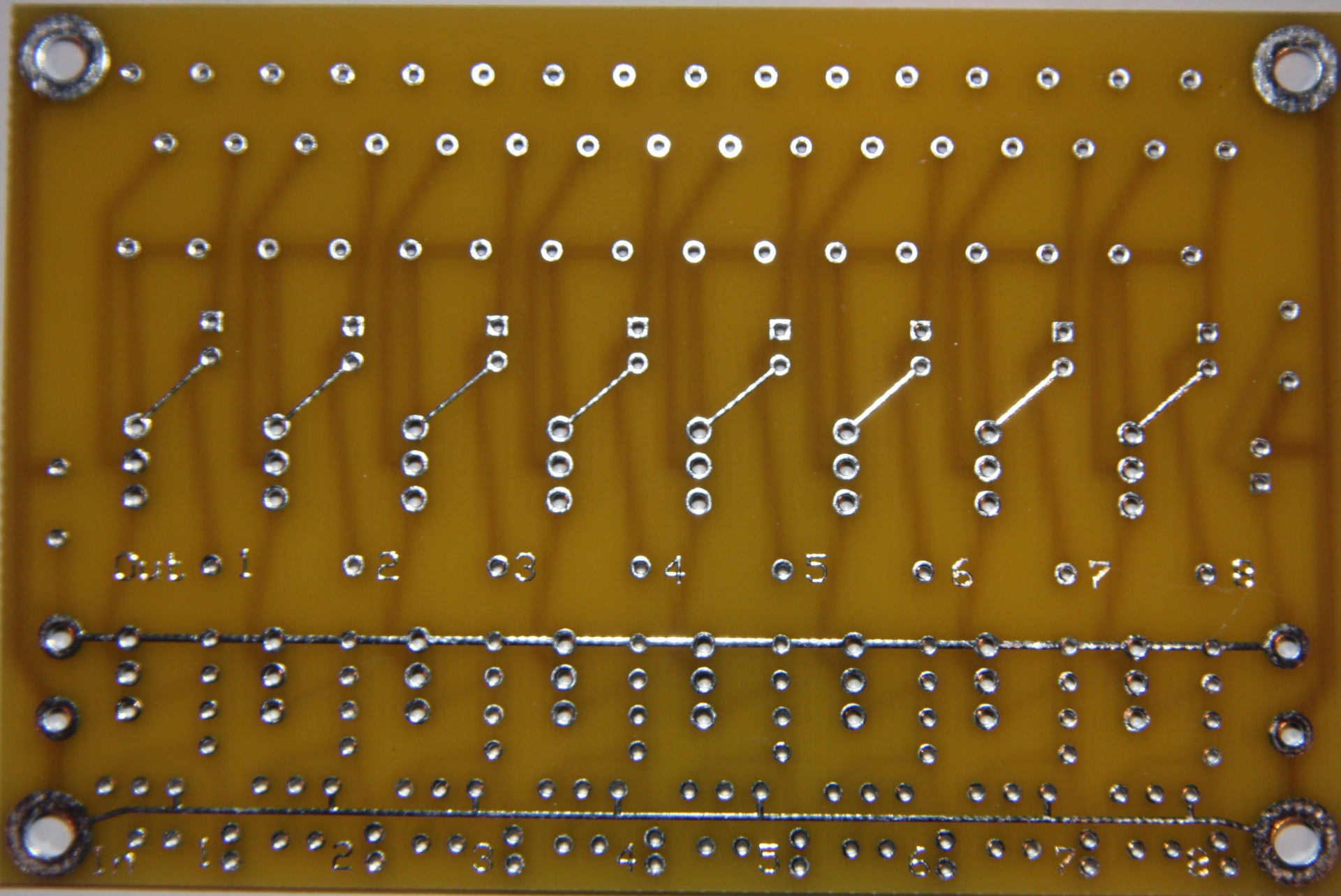
2008/07/26

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

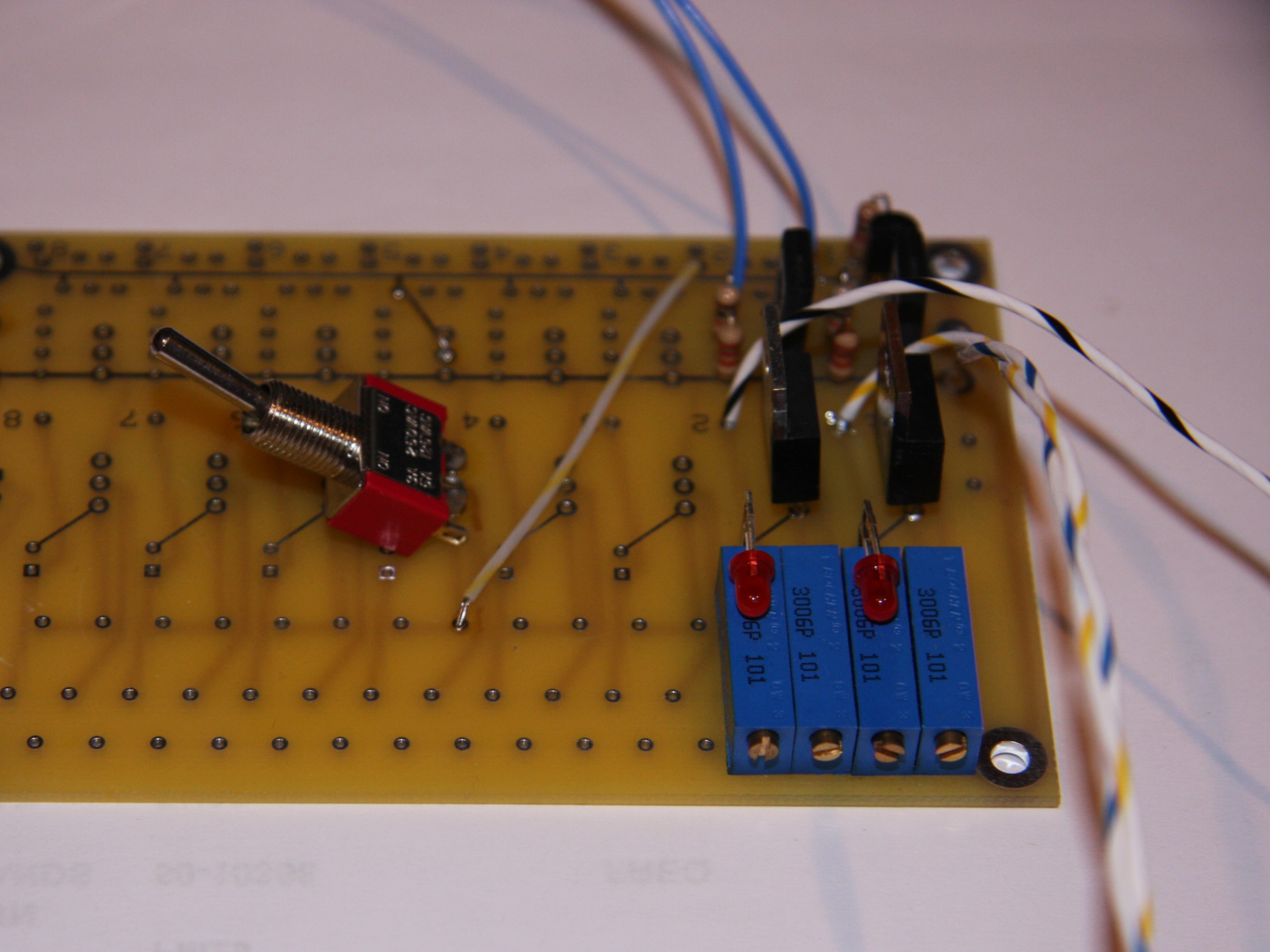
Constant Current Regulator





Out 1 2 3 4 5 6 7 8

11 18 28 38 48 58 68 78 80

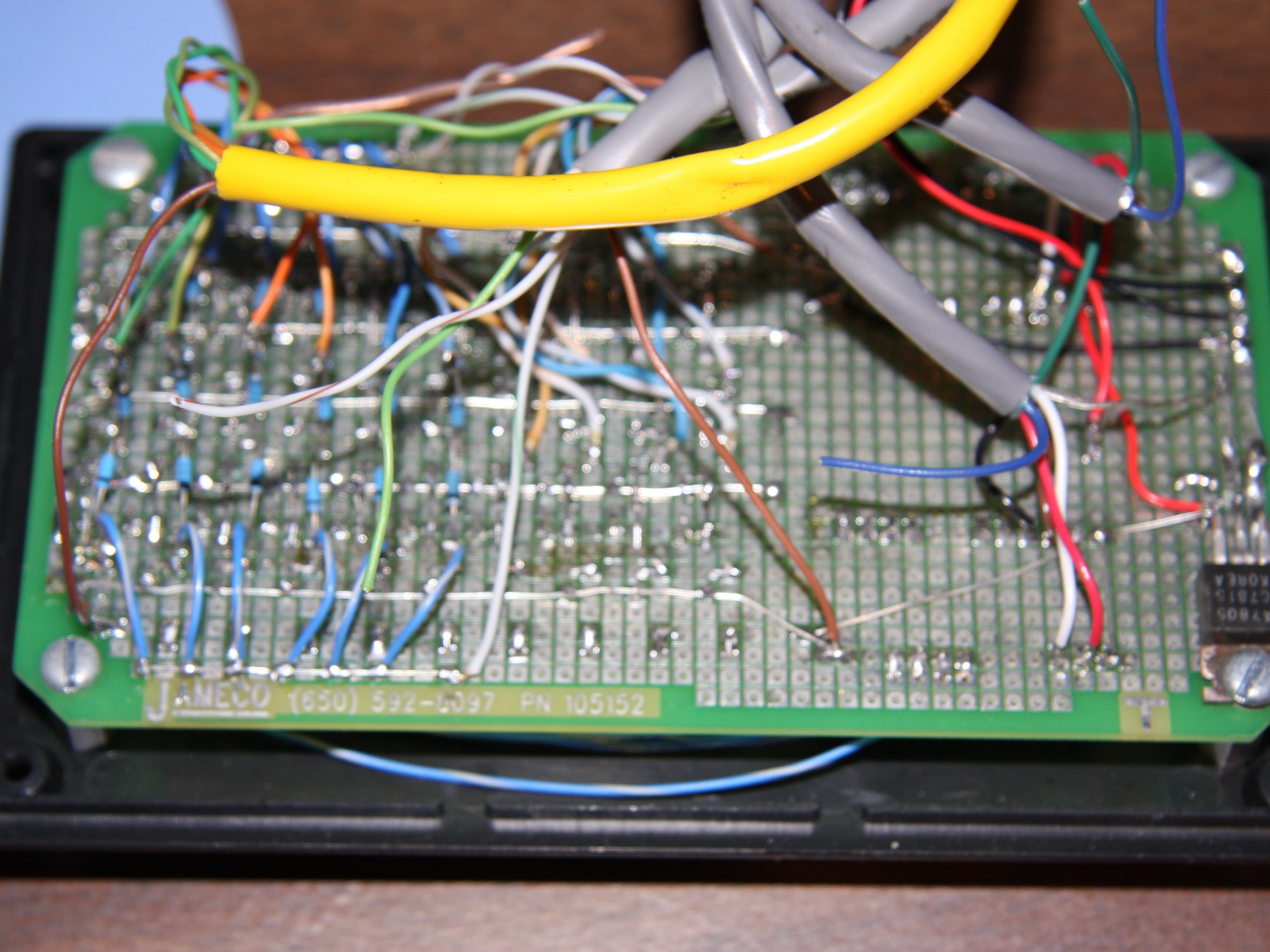


CHANNEL SELECTOR



Putting it all Together

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

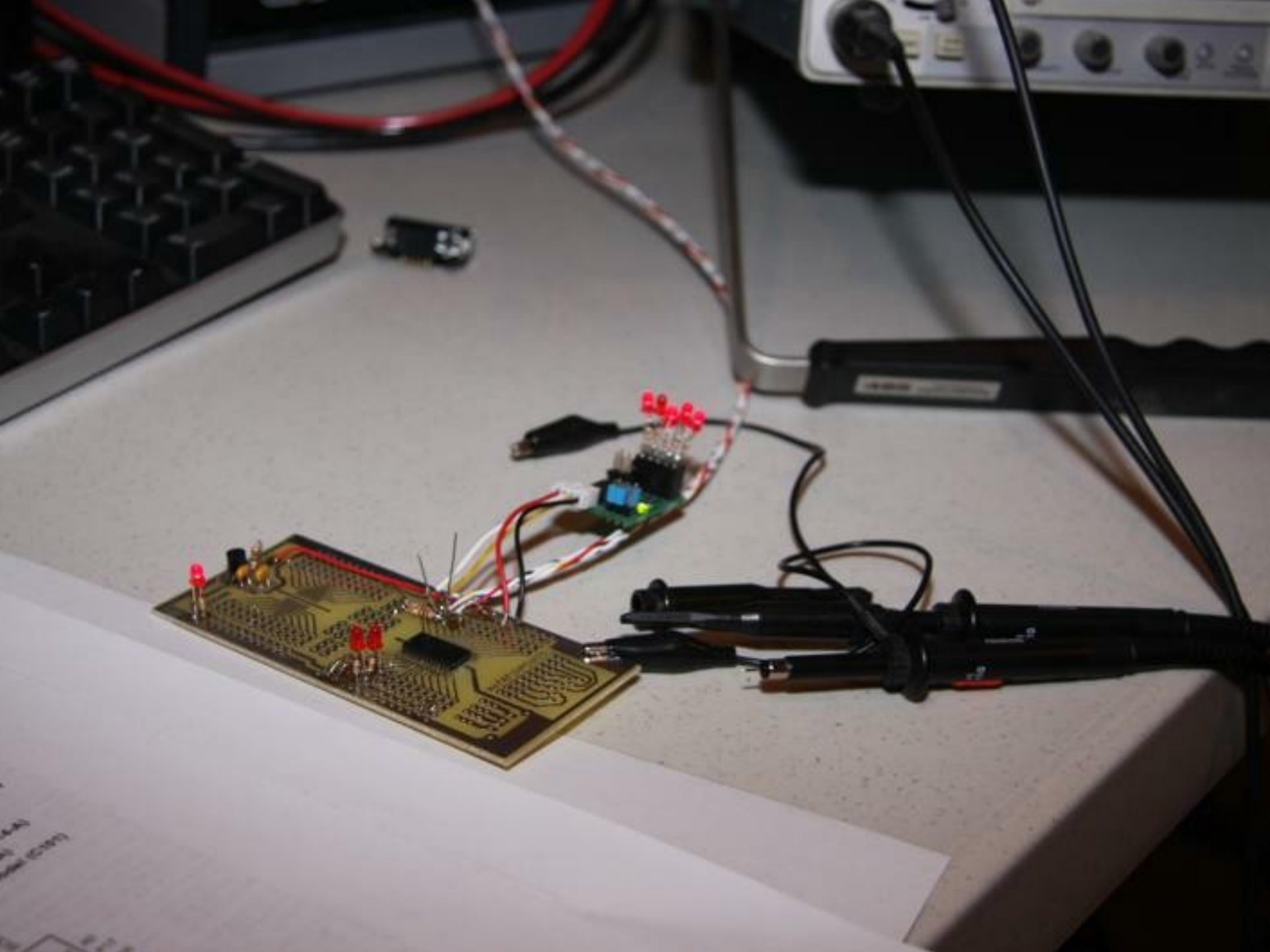


JAMECO (650) 592-6097 PN 105152

17805
C781D
KOREA

Summary

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

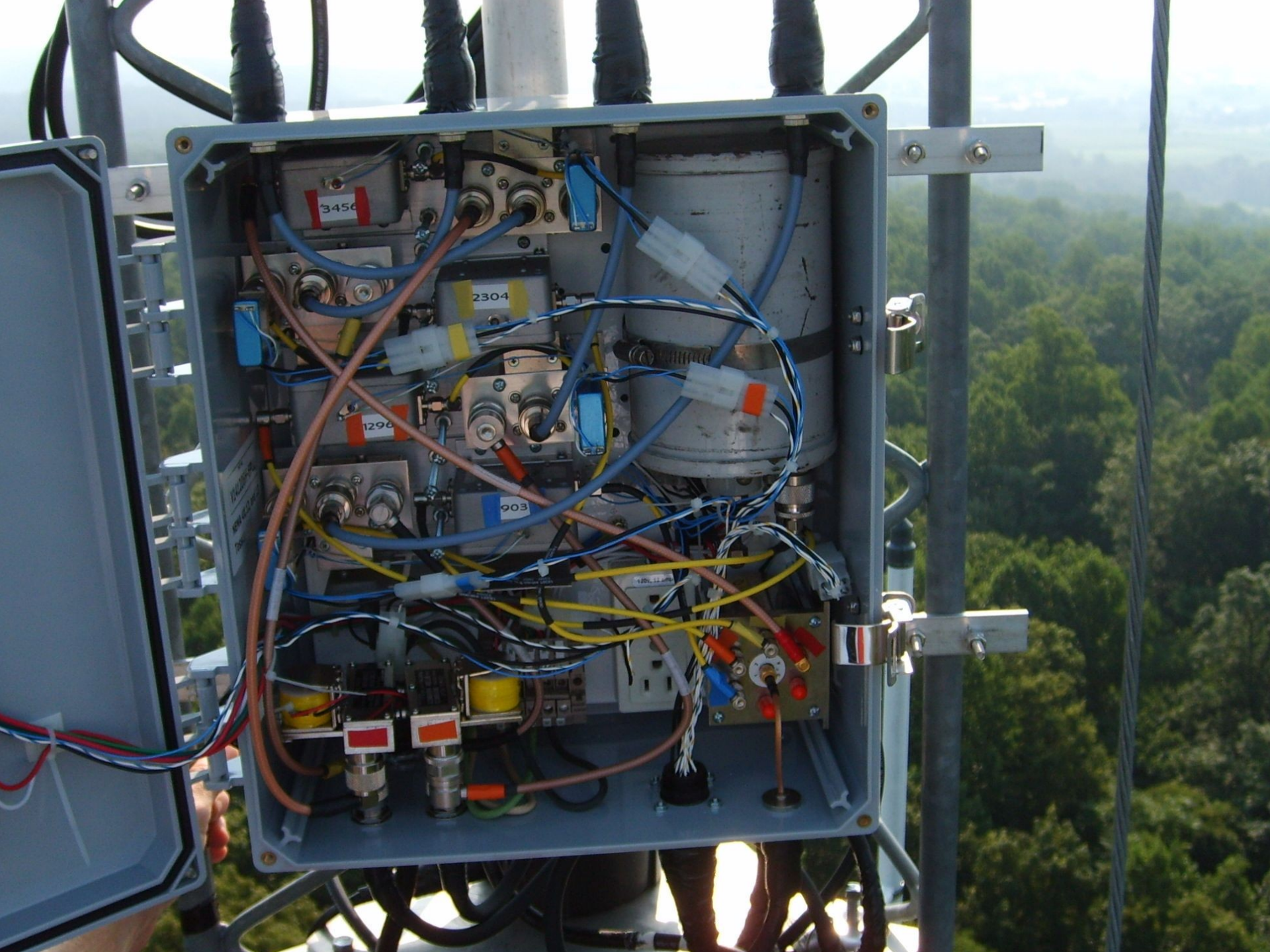




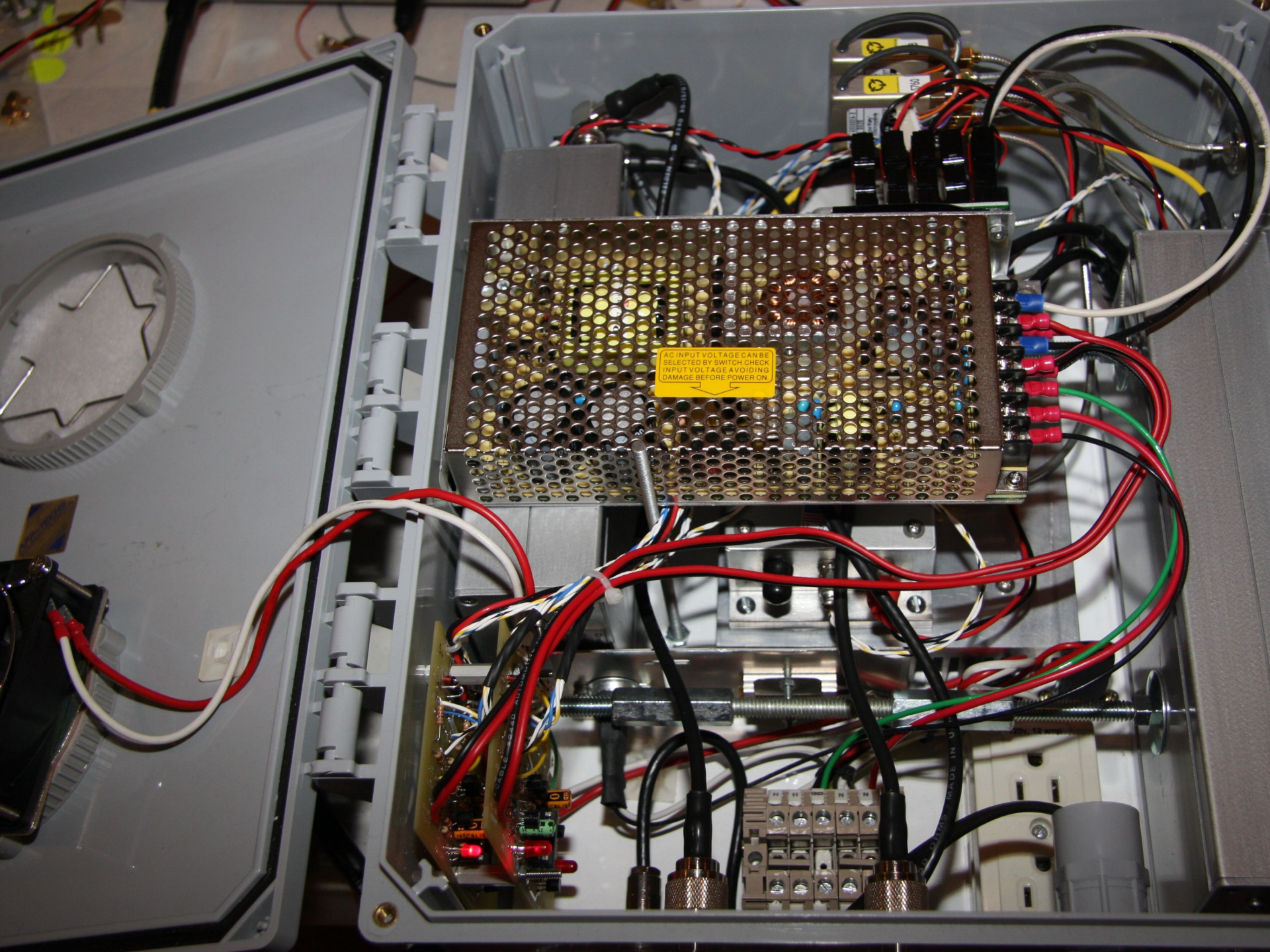


2008/08/16









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

TELEPAD
3
0
5

MADE IN U.S.A.

