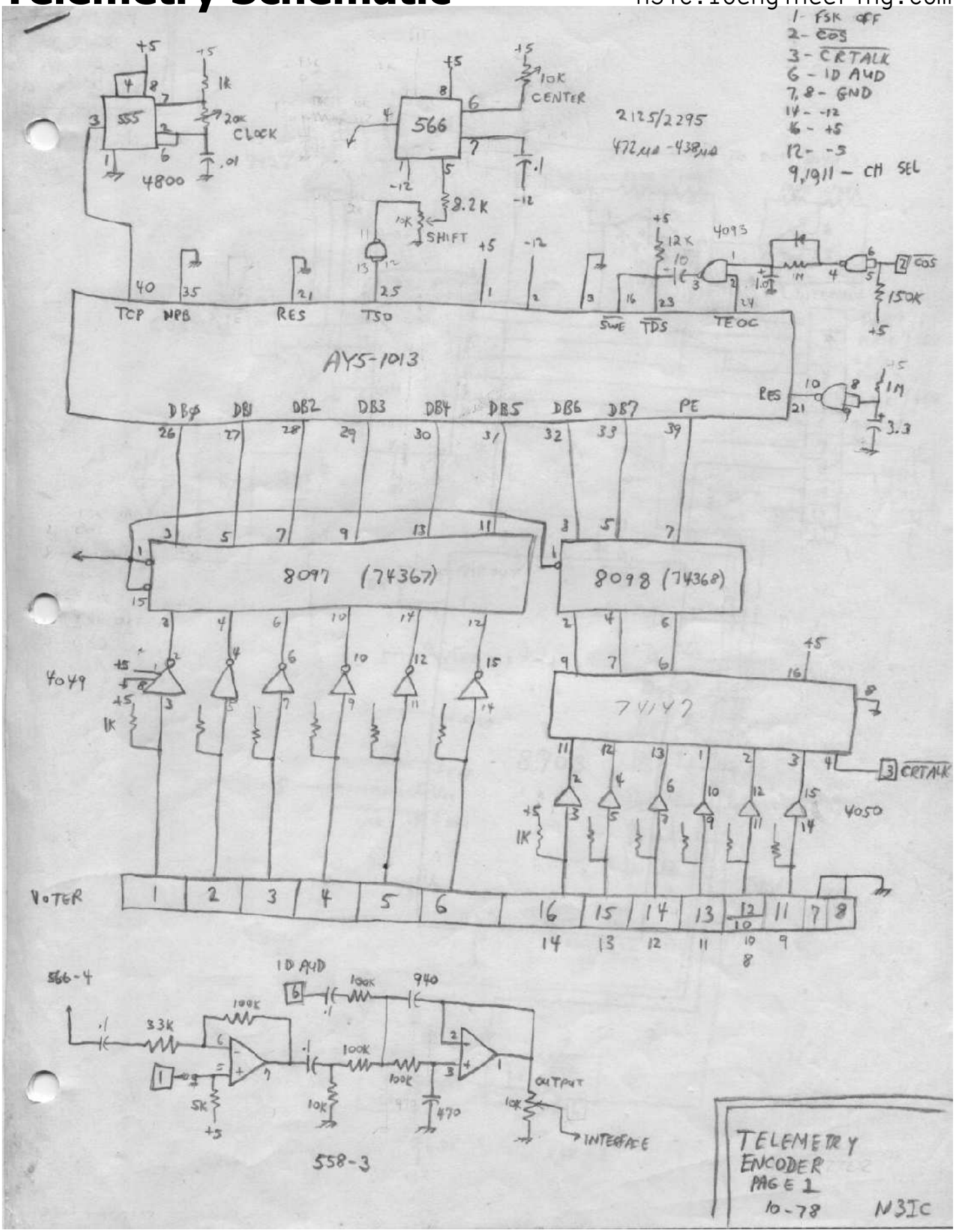
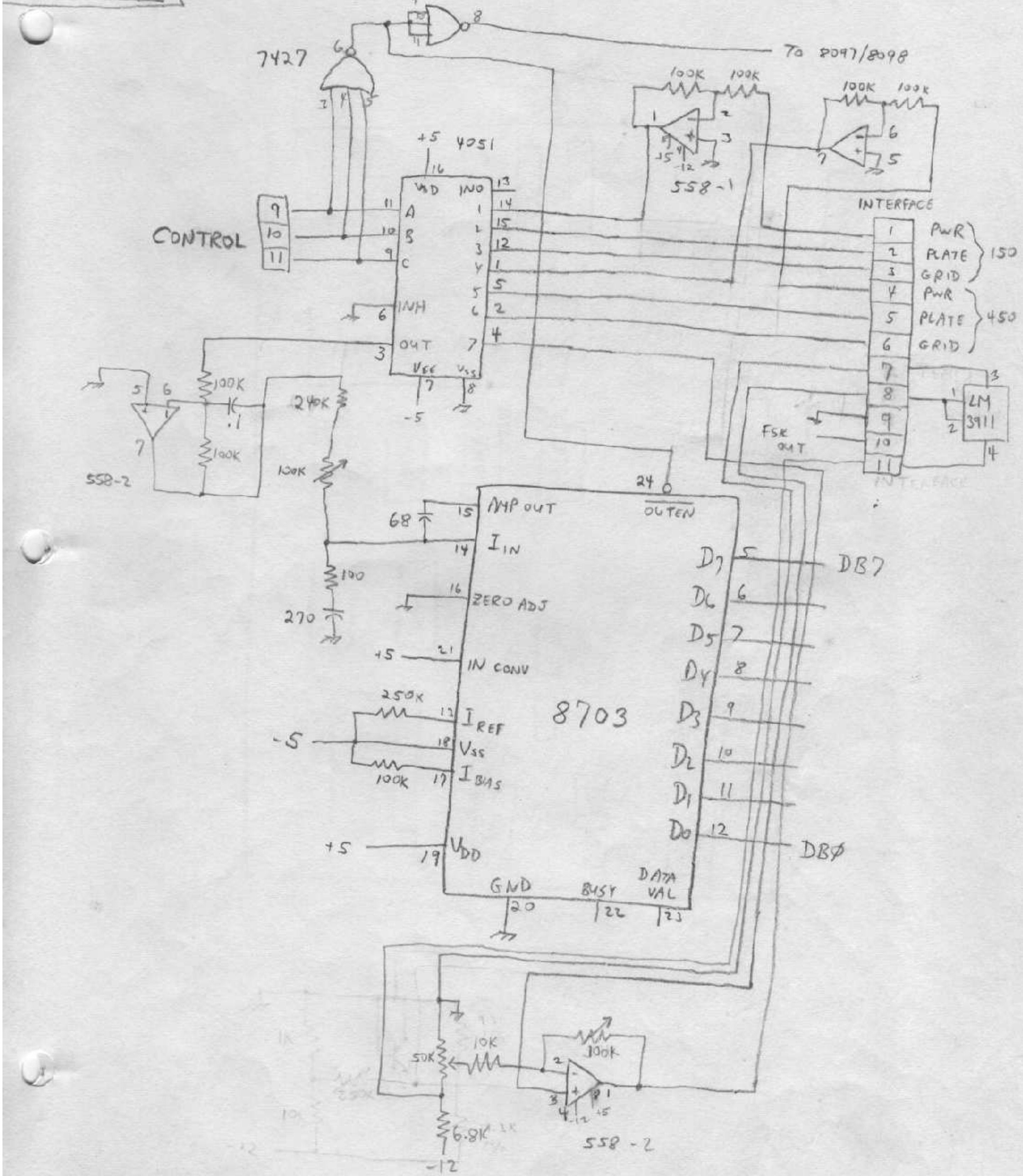
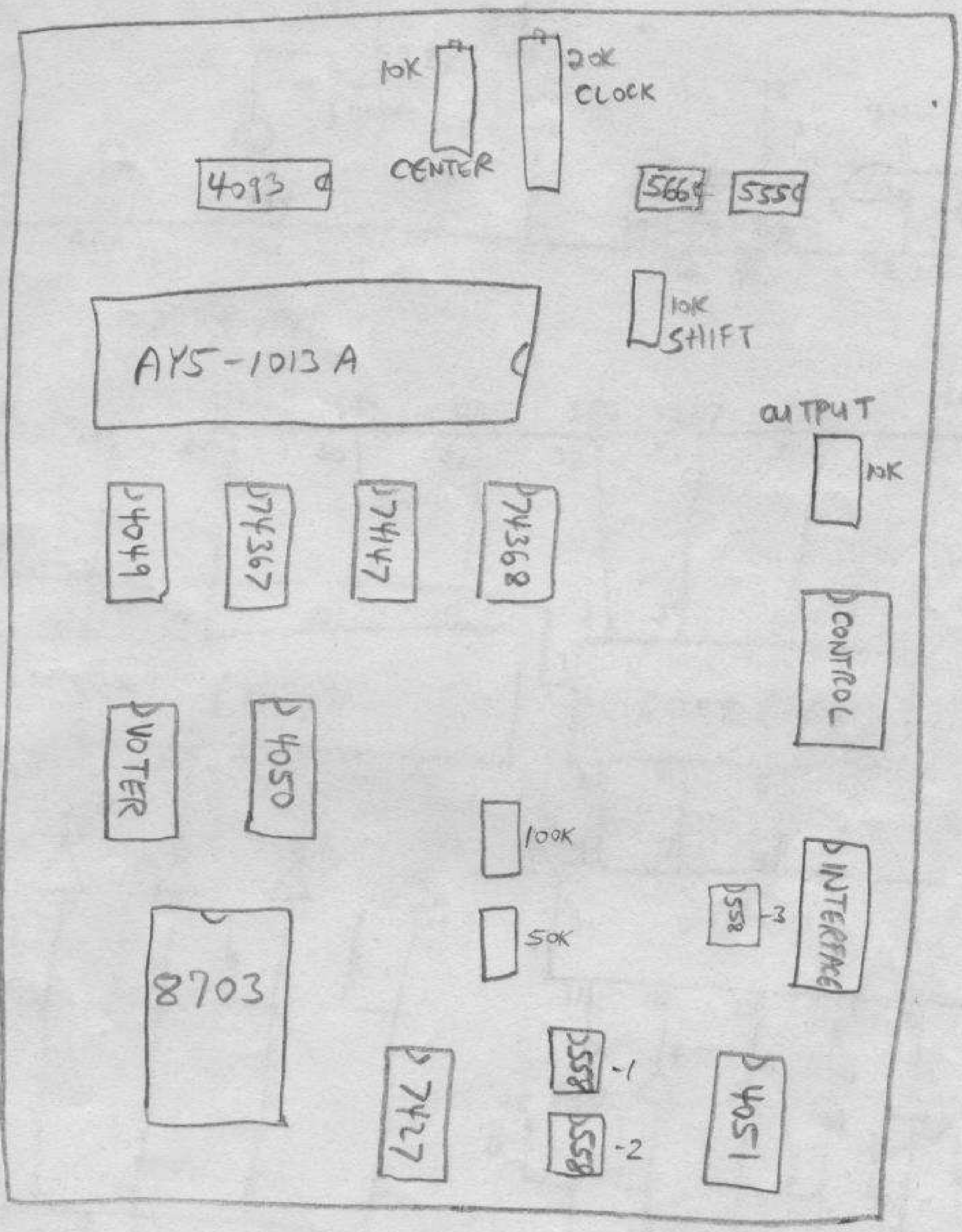
Telemetry Schematic



TELEMETRY ENCODER
PAGE 2
10-78 N3IC




10K
20K
CLOCK
CENTER
4093
566
555
10K
SHIFT
AY5-1013 A
OUTPUT
10K
4049
74367
74368
CONTROL
VOTER
4050
100K
558
-3
INTERFACE
50K
8703
7447
558
-1
558
-2
4051

TELEMETRY DECODER KIT

N3IC 7/79

Except as noted, all components mount flush against the board. Be certain to orient IC's and IC sockets properly (o is pin 1). TP1, TP2, and TP3 are wire hooks for alignment points. Mount the heat sink to the 7905. The flat end on the LEDs is the cathode.

ALIGNMENT

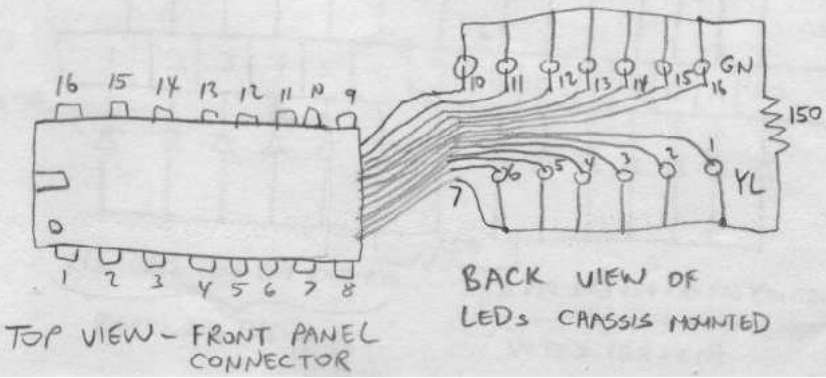
With a frequency counter connected to TP1, adjust the 50K trimpot for a reading of 4800 Hz. Accuracy of 100 Hz should be sufficient. Set the 1K trimpot to center position. With a frequency counter connected to TP3, adjust the 20K trimpot to approximately 2100 Hz, with no input signal from the receiver. This is only a preliminary adjustment. Connect the audio output from the telemetry receiver to the decoder. With an oscilloscope monitoring TP2, adjust the 20K or 1K (fine adjustment) trimmers for equal high level and low level times. The smallest cell should be 3.3 ms long. Alternatively, adjust these trimmers until the decoder decodes properly.

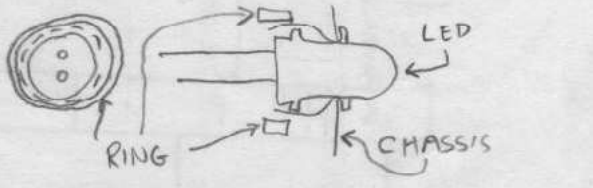
To calibrate the meter reading circuit, unplug the AY5-1013 and connect pins 5 through 12 to +5. Adjust the 5K trimmer for maximum scale. Alternatively, with the decoder receiving meter reading data, adjust to a known value. Meters other than 0-3 volt can be used: a lower voltage or a milliammeter with sensitivity greater than 0-3 ma can fulfill the requirement.

THEORY OF OPERATION

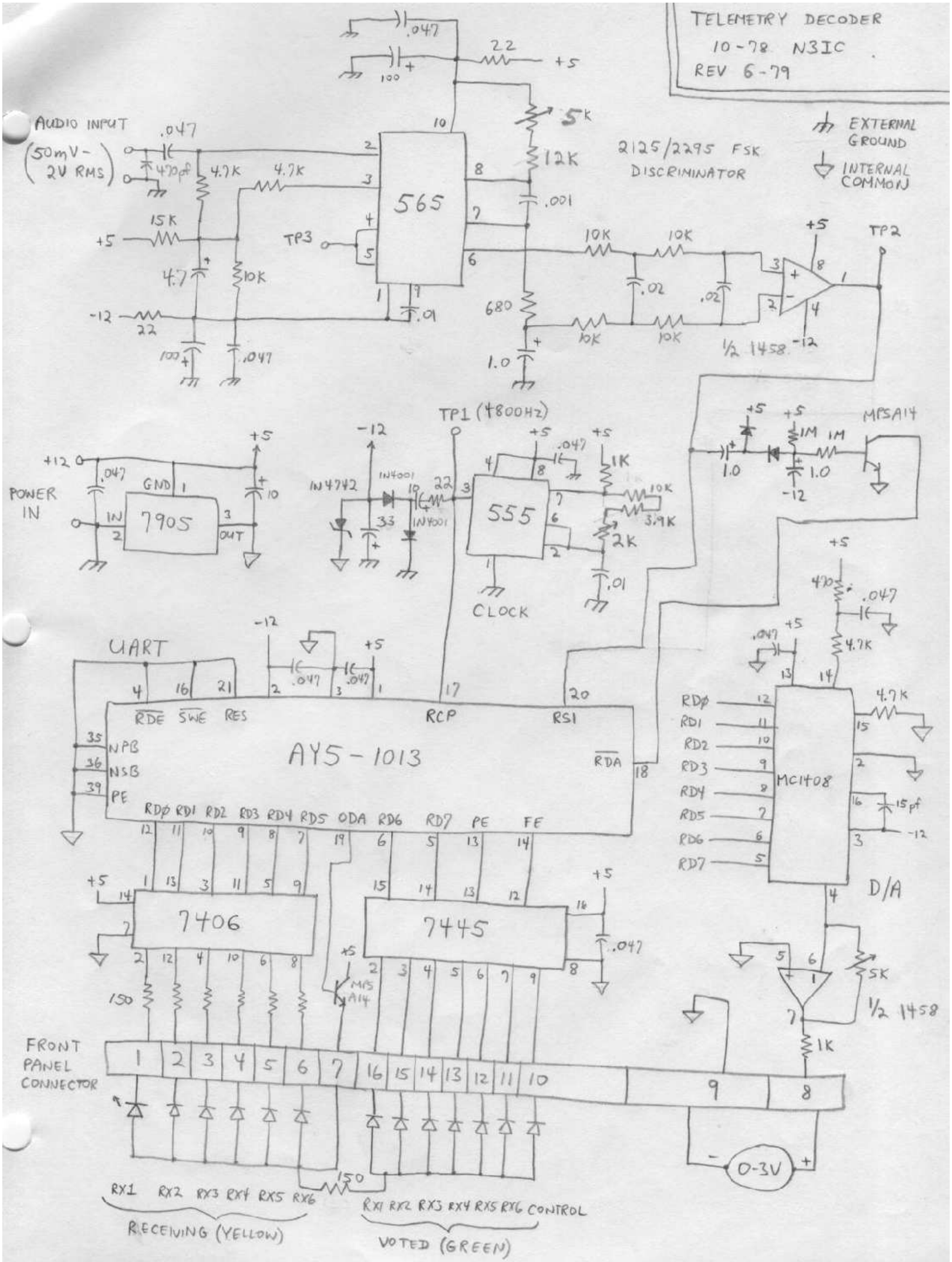
Digital data is sent serially by frequency shift keying standard tones of 2125 Hz and 2295 Hz. The received audio is fed to a 565 phase locked loop which discriminates between these two tones. The output is filtered and amplified by an op-amp and presented to UART (AY5-1013) at TP2. The UART breaks the serial data up into its 9 component parts which come out on points RDØ through RD7 and PE. RDØ through RD5 are just the received signal yellow lights from the voter, and are buffered by the 7406 and drive the yellow LEDs. The other three signals are decoded by the 7445 to drive the voted receiver signal (green lights). The UART requires a clock signal of 16 times the baud rate (300) which is generated by the 555 oscillator. This oscillator also provides an AC signal which is rectified and regulated by the zener diode to produce the -12 volts which is necessary. The 7905 is a negative 5 volt regulator which splits the incoming +12 volts into +5 and -7, the latter of which is boosted by the 555 to -12. The diode/transistor circuit connected to TP2 senses when data is no longer being transmitted, which stops setting aflip-flop in the UART which is used to turn all of the LEDs off through the transistor connected to ODA.

Receiveddata is simultaneously applied to a 1408 digital to analog converter whiches produces a current fed to an op-amp to develop a voltage for the meter.

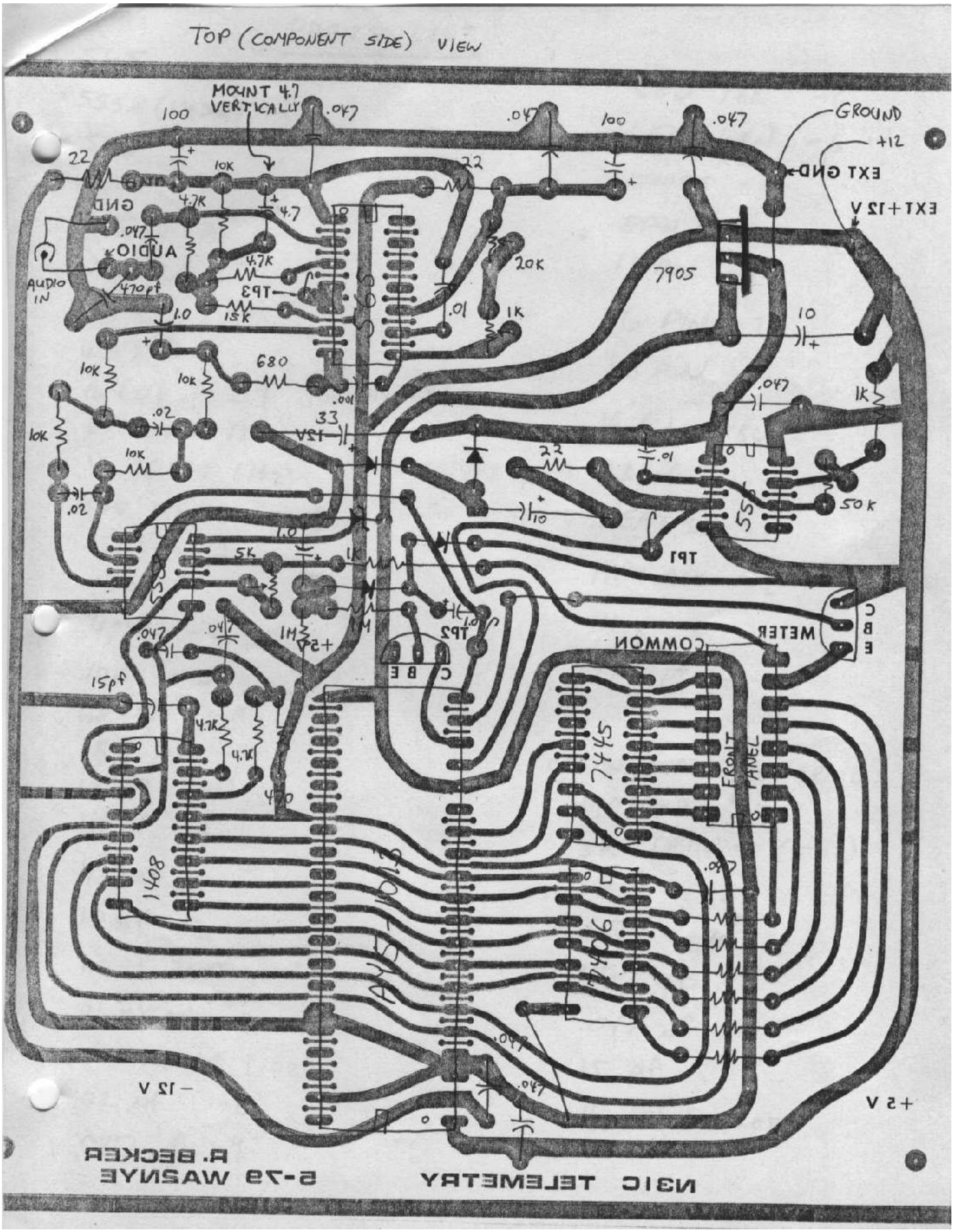




DRILL ¼" HOLE, PUSH IN MOUNT, PUT LED IN FROM BACK, SLIDE RING ON BACK TO SECURE ASSEMBLY


TELEMETRY DECODER
10-78 N3IC
REV 6-79
EXTERNAL GROUND
INTERNAL COMMON
2125/2295 FSK DISCRIMINATOR
AUDIO INPUT (50mV - 2V RMS)
565
TP3
TP2
1/2 1458
TP1 (4800Hz)
POWER IN
7905
GND
IN
OUT
1N4742
1N4001
555
CLOCK
MPSA14
UART
AY5-1013
RDE SWE RES RCP RSI
NPB NSB PE RDA
RDØ RD1 RD2 RD3 RD4 RD5 ODA RD6 RD7 PE FE
MC1408
D/A
7406
7445
MPS A14
FRONT PANEL CONNECTOR
0-3V
RX1 RX2 RX3 RX4 RX5 RX6
RECEIVING (YELLOW)
RX1 RX2 RX3 RX4 RX5 RX6 CONTROL
VOTED (GREEN)

TOP (COMPONENT SIDE) VIEW



PARTS LIST

565

5558 (1458)

555

7905

AY5-1013A

7406

7445

IN4742

IN4001 (4) - 4 (OR IN4002)

20K TRIMPOT (203)

1K TRIMPOT (102)

50K TRIMPOT (503)

22Ω - 3

15K

4.7K - 2

10K - 5

680Ω

1K

150Ω - 7

100 μf - 2

4.7 μf

10 μf - 2

1.0 μf TANT - 3

.01 MYLAR - 2

.001 MYLAR (102)

.02 μf - 2

.047 μf - 9

LED - YEL - 6

LED - GRN - 6

LED - RED - 1

MOUNTS - 13

8PIN SOCKET - 2

14 PIN - 2

16 PIN - 2

40 PIN

16 PIN CABLE

33 μf

HEAT SINK

MPSA14 - 2

1M - 2

470 pf

OPTIONAL FOR METERING:

MC1408

5K TRIMPOT (502)

1K

4.7K - 2

470 Ω

.047 μf

15 pf

16 PIN SOCKET