

Echosphere Corp.

October - 1987

SRD-

4000

IRD

TECHNICAL

HANBOOK

by

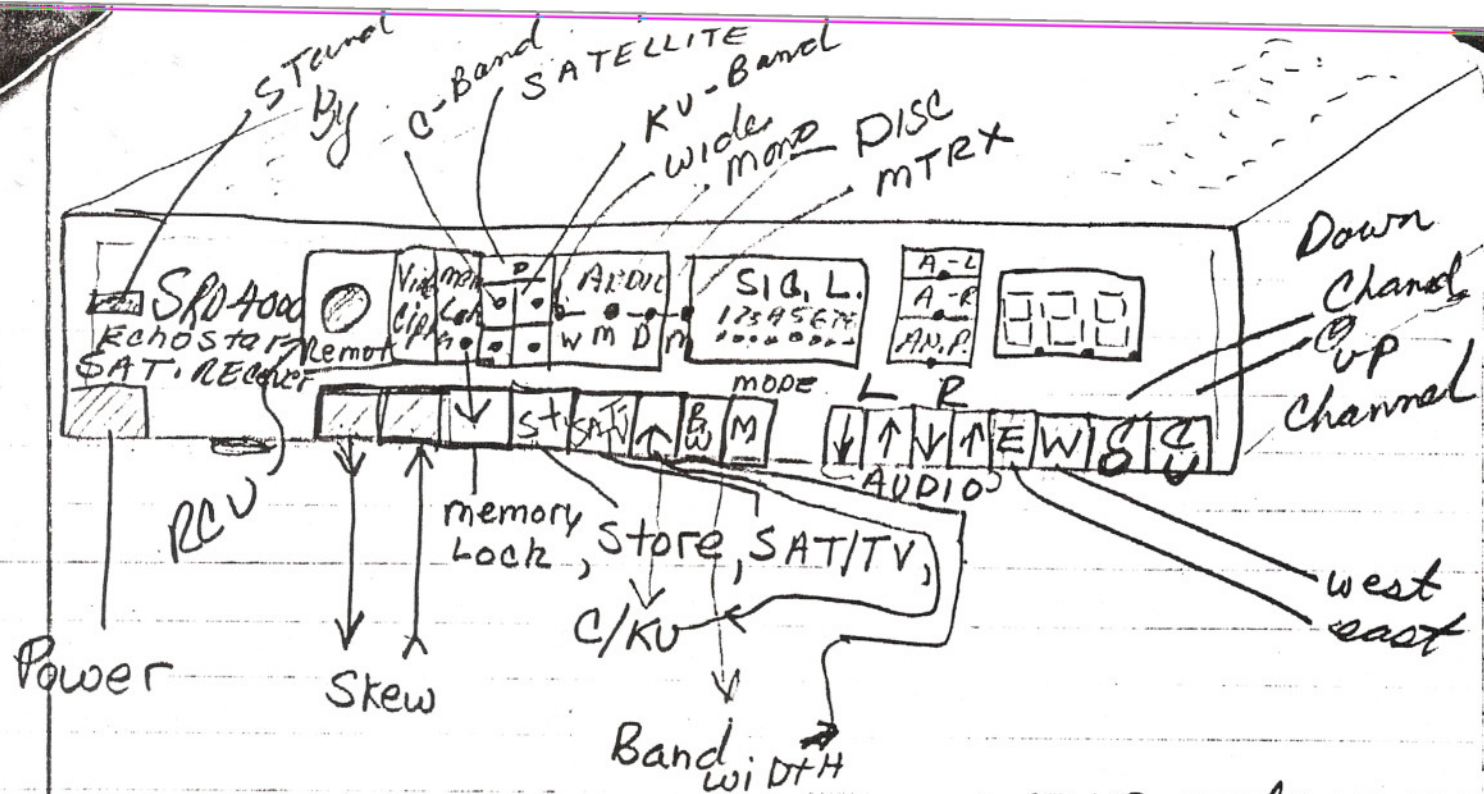
Echosphere Corporation

Technical Board Level Dept. BD

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Example of Front Panel

Proper training of a product
Line can be beneficial of means
and ways. "you and training will
always outlast - "you and nothing!"

VR-401 - 10KHz PIN 3 555

SRD-4000

MAIN BOARD

VR-501 - 1.7V P-P

VR-502 2.2V P-P

VR-503 1.0V P-P

FL-502 Flatten Baseline Modulation

VC-601, VR-601 2.2 VDC

→ 6VDC

VC-602, VR-602 2.2 VDC

→ 6VDC

1

2

MAIN BOARD

VR602



VC602

VR601



VC601



VR503



FL502



VR501

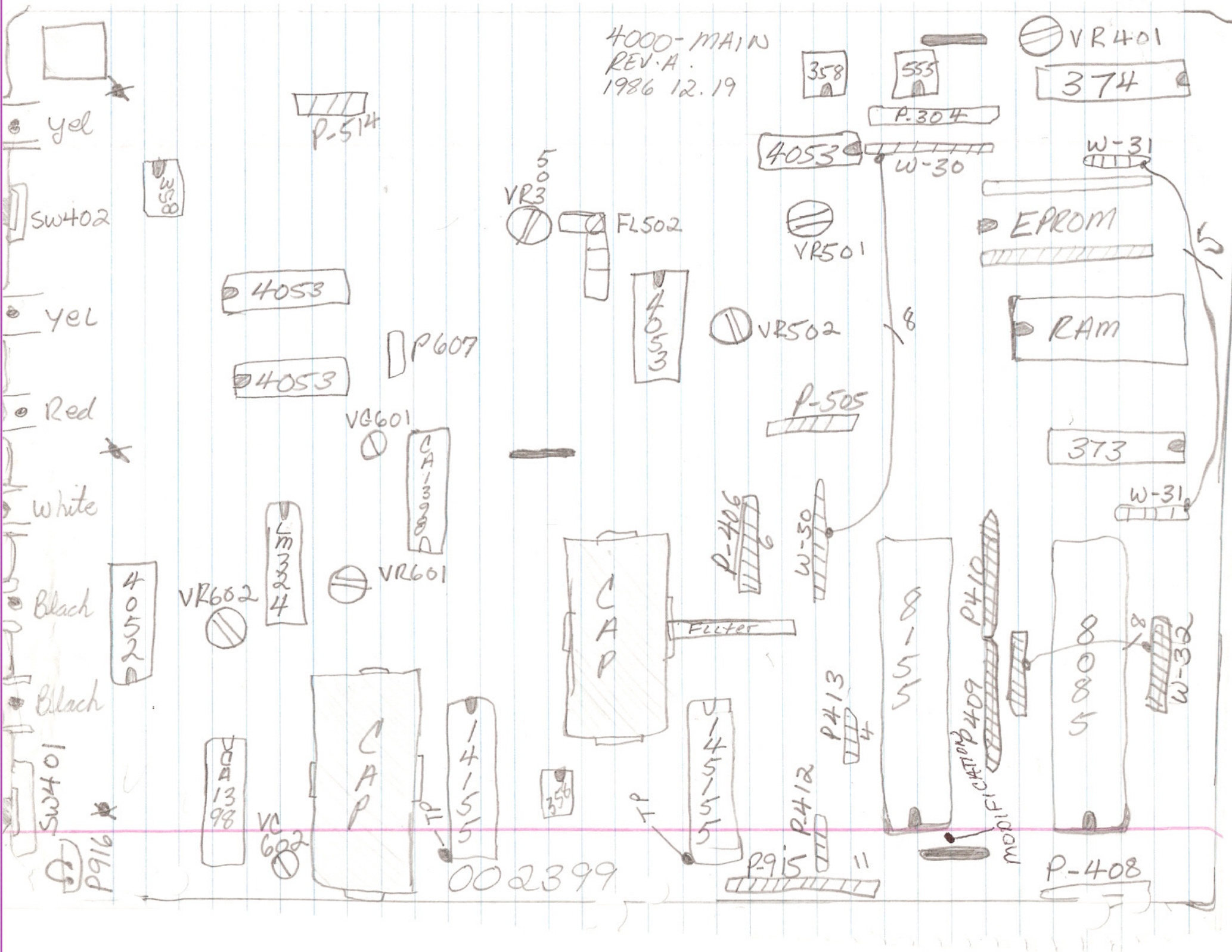


VR502

VR401



4000-MAIN
REV. A.
1986 12.19



The 4000 has been designed to receive both scrambled and non-scrambled from C-Band or KU-Band satellites.

Galaxy 1

Example: C-Band

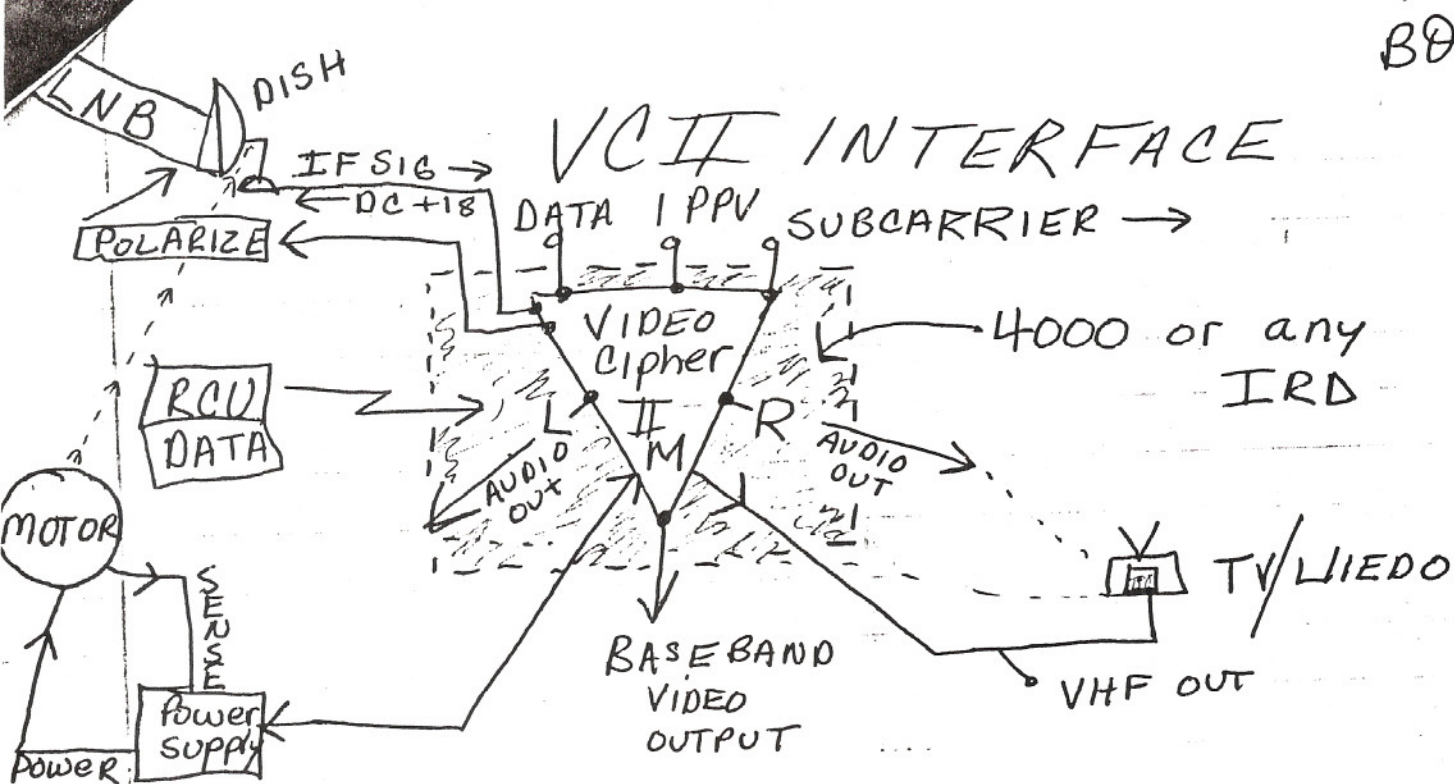
24 Channels	Channel	Center frequency (MHz)	Pole
	1	3720	H
	12	3940	V
	24	4180	V
	Channel #	MHz	H/V

Local oscillator = 5.150

Example: Ku-Band (MHz) GHz

32 channels	Channel	Center frequency	Pole
	1	11724.000	H
	8	11826.060	V
	16	11942.700	V
	32	12175.980	V

Local oscillator = 10.75 GHz



TVIRO

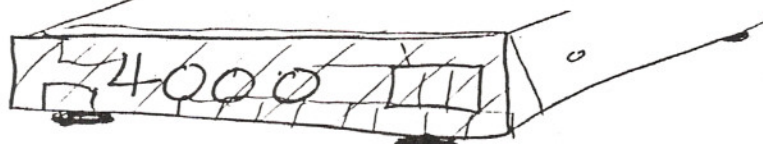
FIG - A - 1

This is an example of the requirements ~~with~~ with any "Video cipher" II module ⁺ may be used with all IRD UNITS.

The unit must provide all functions needed for proper operating. The unit is connected one way with certain pin Arrangements

- A. VIDEO to VCII M → a. Signal - Scrambled or unscrambled NTSC
- B. VIDEO From VCII M
 - a. Descrambled NTSC
 - b. Output Impedance 30 OHMS NOMINAL
 - c. Signal Level: 1vpp
- b. Output Impedance - 100Ω or Less
- c. Signal Level - 1vpp
 - 10.75 MAZ DEVIATION C-BAND
 - 9.0 MHZ DEVIATION KU-BAND

FIG A-2

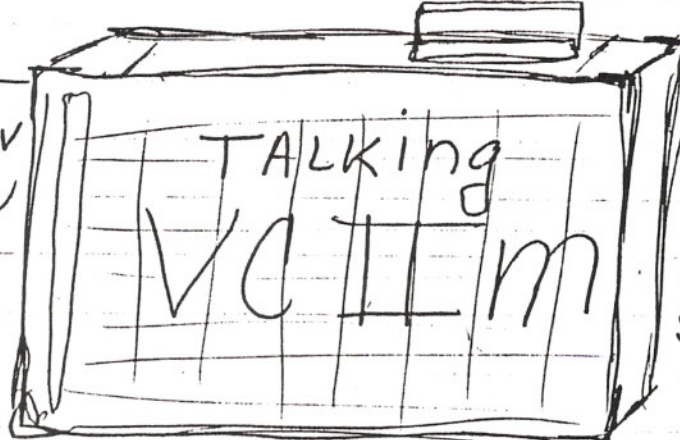


BD

20 PIN CONNECTOR

test
st On/OFF
or SAT/TV

Query state



CODES

S1(46) OFF,TV
S2(47) ON, TV
S3(48) ON, SAT
S4(49) OFF, SAT
not valid state

INPUT to 4000

CHANMODE

NUMMODE

XPNDR

First digit of two-digit #

Second digit of two-digit #

Query

RESPONSE From 4000

ACK-CHAN

ACK-NUM

ACK-XPNDR

ACK-VALUE 1

ACK-VALUE 2

One of : S1, S2, S3, S4.

may respond with a
CHANMODE (30) or (Nummode)
(31)

may request information
by INQ (0B) command
CODE

- 1) OFF-TV-CHANMODE
- 2) ON-TV-CHANMODE
- 3) ON-SAT-CHANMODE
- 4) ON-SAT-NUMMODE

Channels commands - From VCI

<XPNDR (32)>, <0-9>, <0-9>

Channel 24 = <xpndr> <2> <4>
request

in (A.2) RECEIVER STATE

VIDEO CIPHER KEYS:

REMOTE

BO

VC - Keys

VIEW, TEXT, LEFT Arrow
Right Arrow, SETUP, NEXT PRG.
message, HELP, CANCEL,
ENTER, 0, 1, 2, 3, 4, - 9

10
Commands
From Keys.

SERIAL
DATA

4000 - will send the numeric codes to
VCIM when the numeric keys are depressed
in the "NUMMODE" - refer to FIG-A-5

NOTE: IF the IRD is in "POWER-OFF
MODE"

Cause: NO SERIAL DATA
or
result

Video Cipher Keys
remote

Send Data 4000 → VCII m

after receives
the channel (VCII) Nummode
code from (VCII) Nummode

Serial data transmission
while (RCV)

if VCII

Channel is depressed
at 4000

any Nummode
"IIR" in

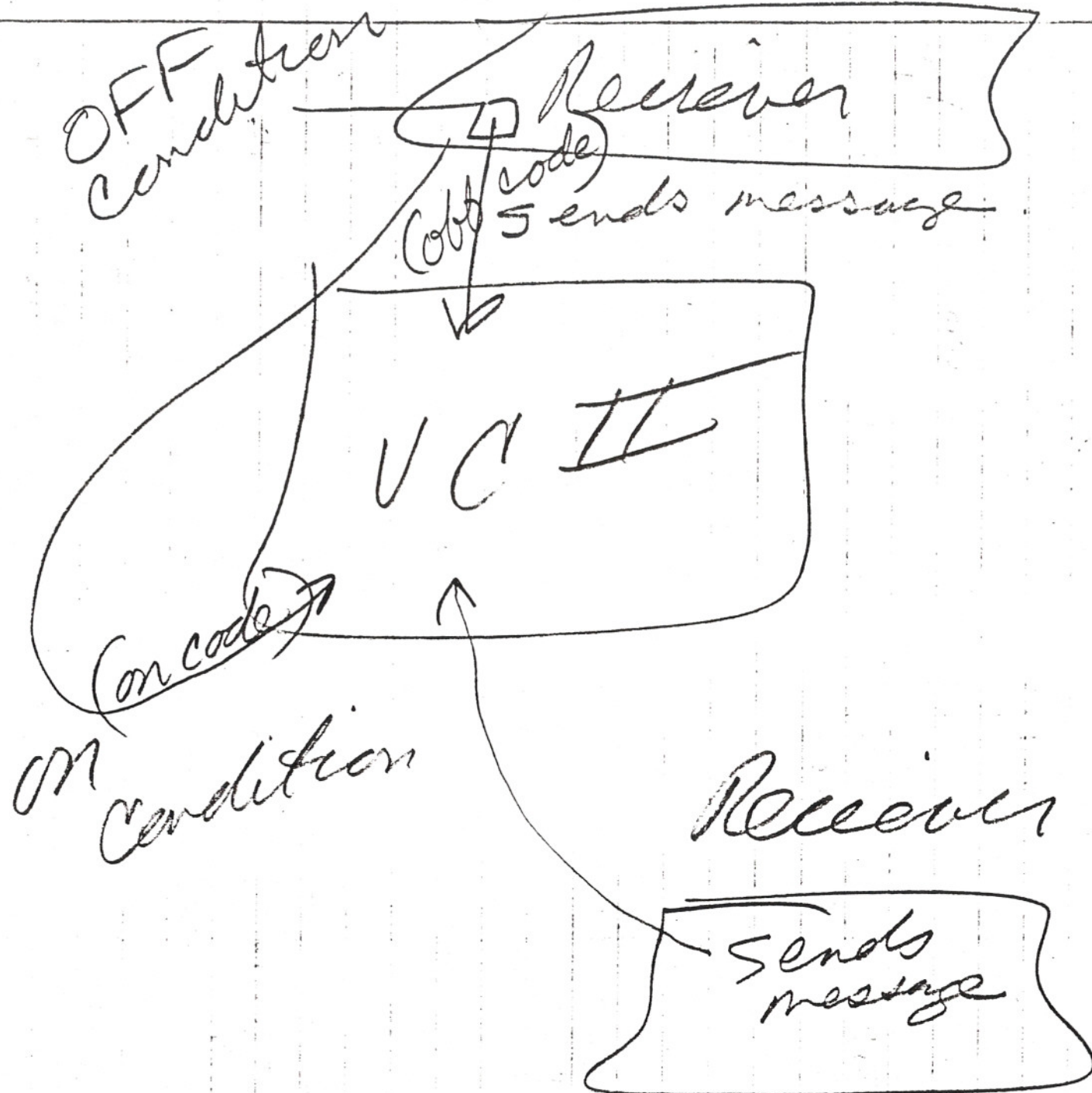
Nummode
receives "Num" code from
(VCII)

4000

4000

Channel

W

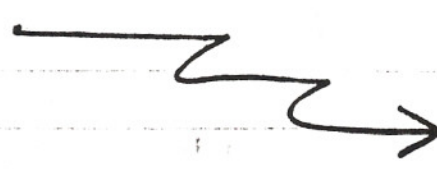




2

Remote

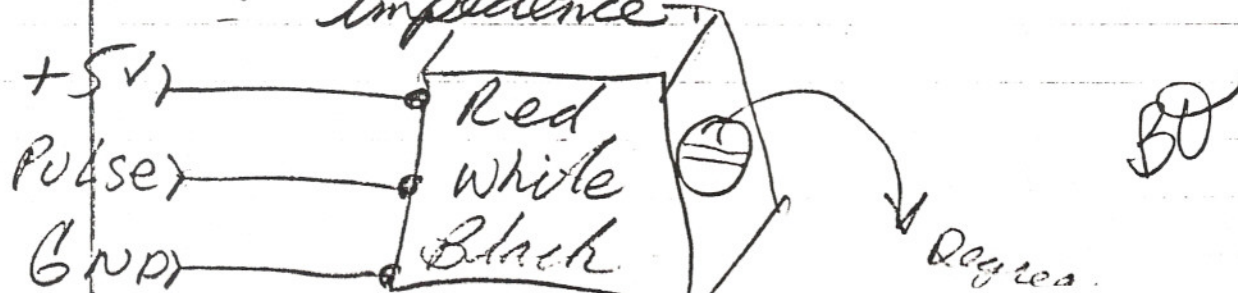
37.68 MHz



- 1) Transmission Medium - Intensity Modulated Infrared.
- 2) Transmission Code - Pulse position modulation
- 3) Power - Dry or alkaline Battery AAA x 2
- 4) Key - Rubber
- 5) Operation Zoning - 7.5 meters
30 degrees
min.

Polorator T.M.

- Polorator Type - Mechanical Polarizer
- Output - +5V; 480 ma max
4-5 seconds, after channel change
- Pulse: Approx. 0.8 to 2.2 msec
Variable pulse width with +5V
high level from 10 KOHMS output
impedance.



4000 Trouble shooting

BO

Front Panel: possible "Component Cause"

LED'S	1	2	3	4	5	
1 CR713	Q708	+5volts	U702	CR710	CR713	
2 CR725	Q709	+5volts	U702	CR712	CR725	U704
3 NO HUND	Q705	+5volts	U702	CR712	U703	
4 NO ONE'S	Q707	+5volts	U702	CR710	U704	
5 NO TEN'S	Q706	+5volts	U702	CR711	U704	
6 NO DATA	U701	U702	U703	+5V	U704	
7 NO SIG	Q704	U705	WJ702-10	+5V	U703	
8 NO STBY	+18V	CR727	GND	WJ702-11		
9 NO VCM	Q703	CR701	20-VC	+5V	U703	
10 REMOTE	SG-05	+5V	TRACE	BROKEN		
11 NO PWR	Q701	Q702	Q704	WJ702-10	+5V	
12 Low Current	Q705	Q706	Q707	U703		
to Display	1	2	3	4	5	

MOST responsible

Least responsible

12 - only if one digit

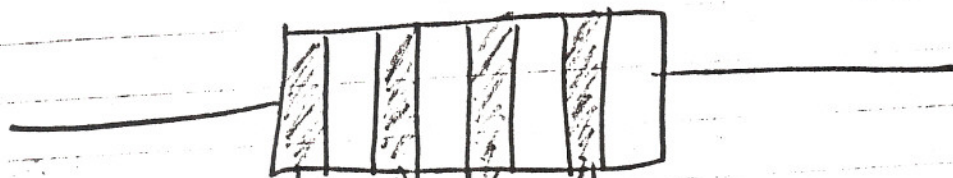
FRONT PANEL

FIG-B6

Component REVIEW

* Linear - if Double Voltage across it
the current will also double.
(OHM'S LAW) $I = \frac{V}{R}$ through Linear resistance

- 1) Limit current.
- 2) Introduce voltage drop.
- 3) Generate heat. - test



1st Digit 2nd Digit 3rd Band Gold multiply 1st 2 digits by 0.1
Tolerance

Configuration

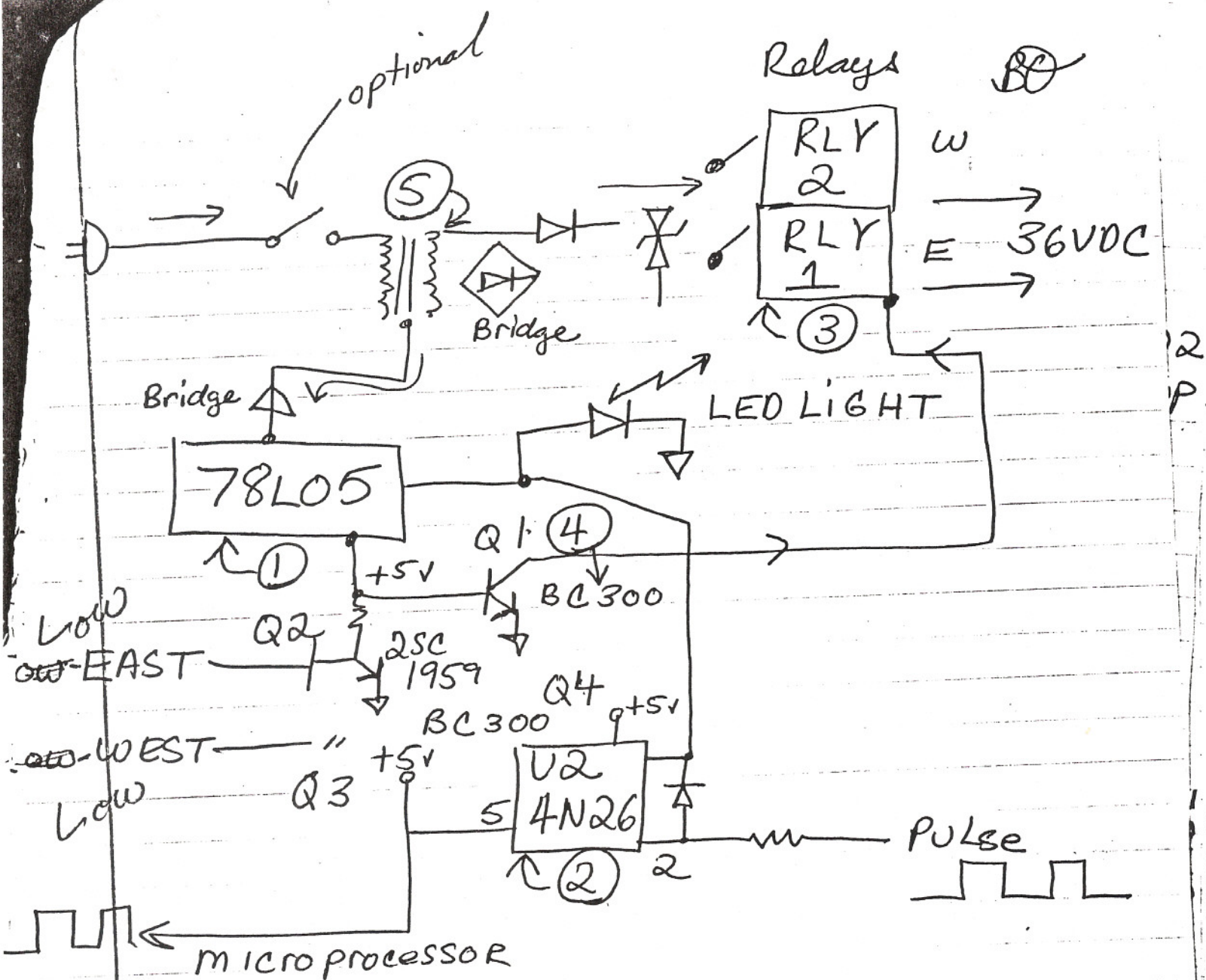
Silver, 0.01

- ① Emitter follower - high input impedance and a low output impedance
- Just like cathode follower or source follower
Voltage gain that is less than 1.0.

- ② Common Base - used for high- β frequency applications

- Just like grounded - grid & common - gate amps.

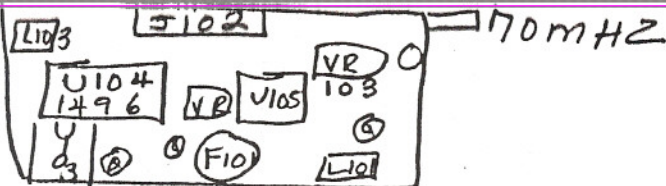
- ③ "Common - emitter" - Conventional amplifier
phase shift 180° high Voltage



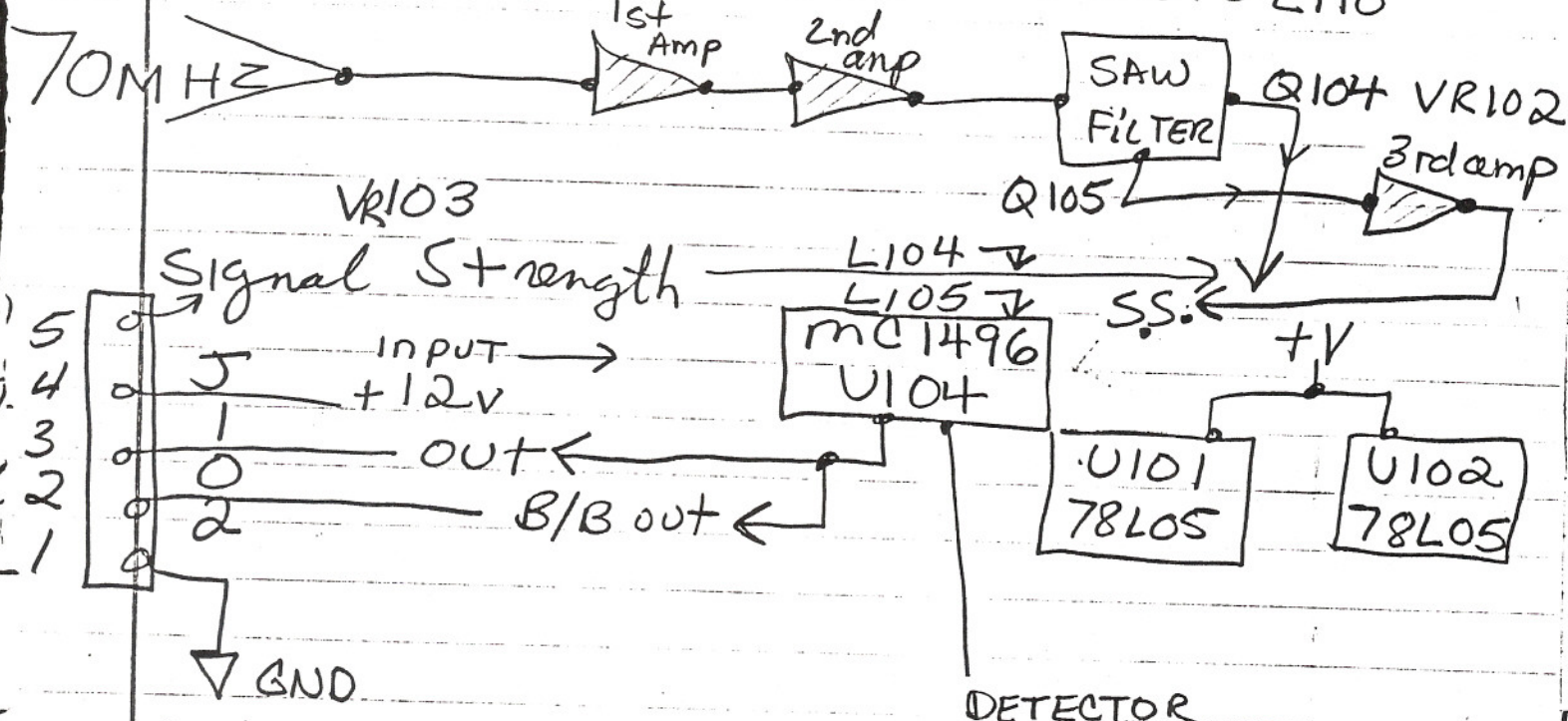
- 42) (1) NO LED LIGHT OR NO +5V (5)
 (2) NO input pulse to microprocessor
 (3) NO CLICK OF Relay but signal
 (4) NO signal to relay (most common cause)
 (5) AC Input Prongs open.

(PWR ANTENNA
 POSITIONER)

refer to
Schematic



INPUT



most common
< TEST POINTS >

- J101 - 70mHz - input signal
- Input - F101 SAW SWS03 - no operation
- OUTPUT - " " "
- Collector - Q-106 - no signal strength
- PIN 6 MC1496 U104 - no BASEBAND
- all output & input pins.

DEMODULATOR

FIG-D-4

4000 TROUBLESHOOTING

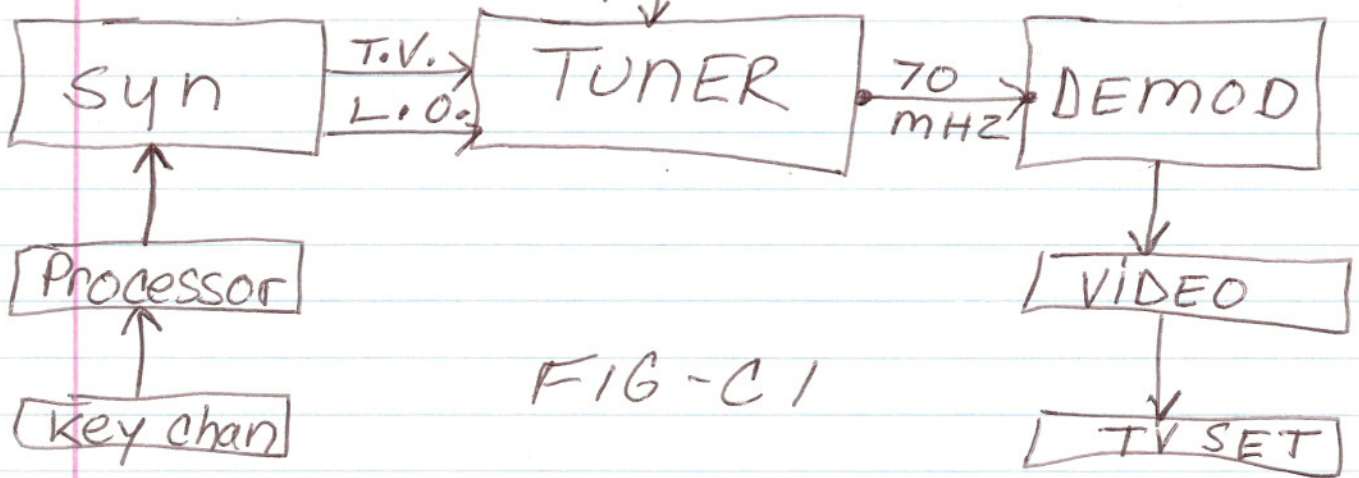
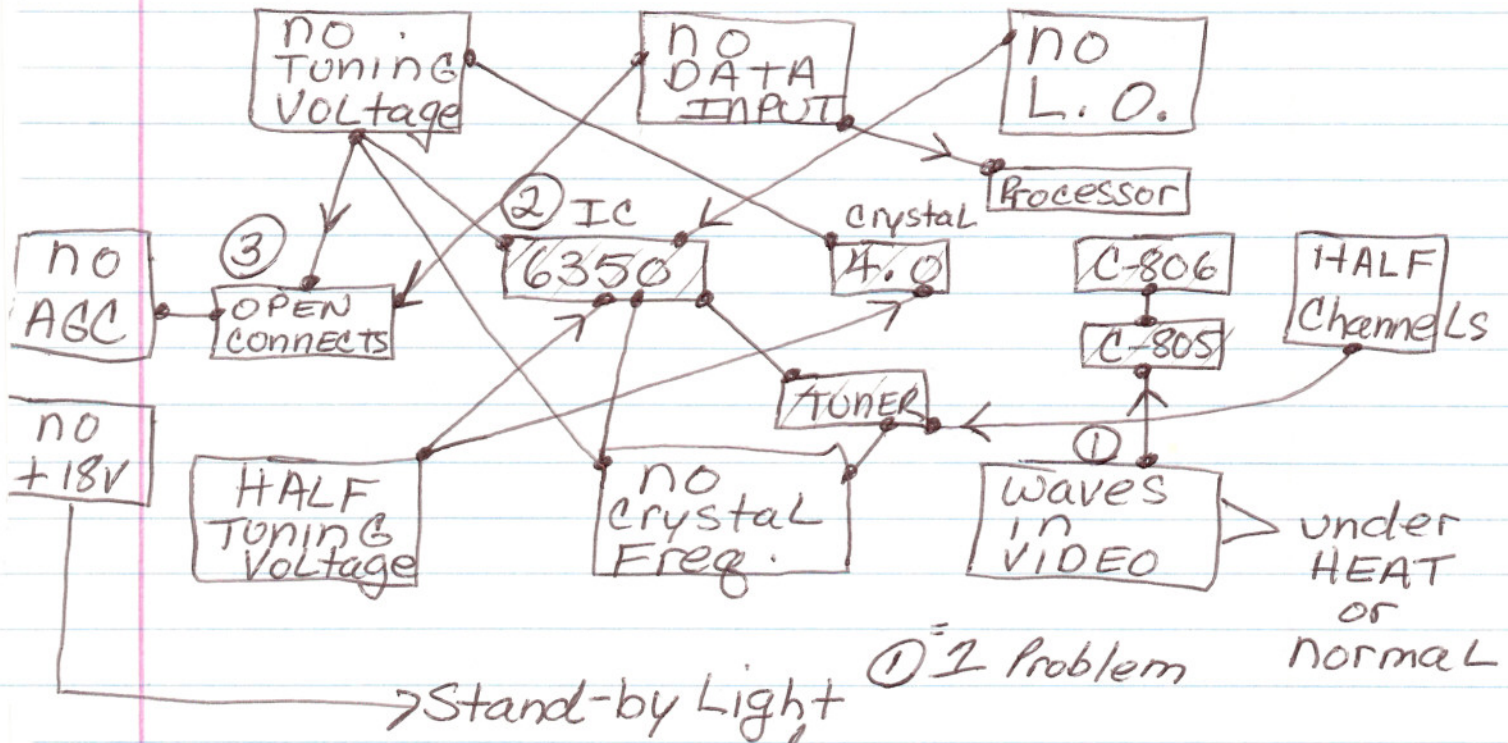


FIG - C 1

RF TUNER
+
Sync Board

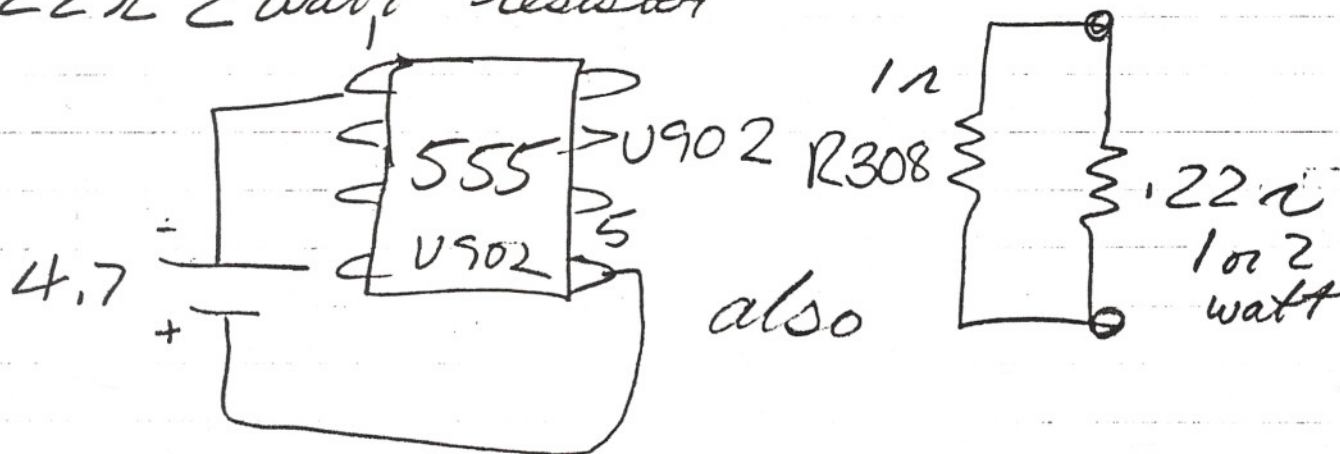
CHECK LIST

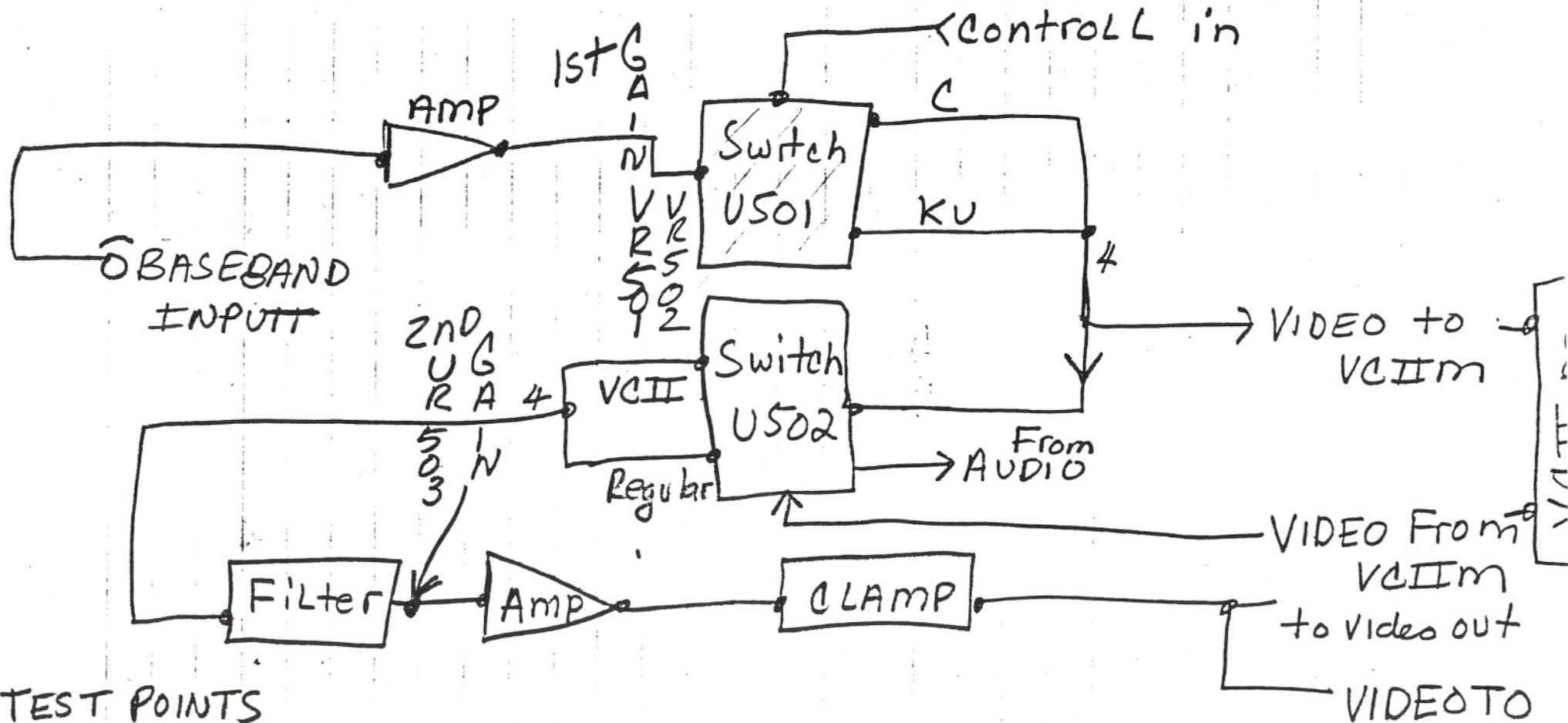
Main Board

- ① C5B0 - check For open if no VIDEO
- ② Check pin 1 of W-30 connector, underneath For opens.
- ③ VC601 SET AT GND LEVEL
- ④ VR601 SET AT 2.2 VP-P LEVEL
- ⑤ SAME AS ③
- ⑥ SAME AS ④
- ⑦ VR501 C-Gain Amp set at 1.7 VP-P
- ⑧ VR502 KV-Gain Amp set at 2.2 VP-P
- ⑨ VR503 2nd amp at 1.0 VP-P at P502
- ⑩ VR401 A to D converter set at 10KHZ at pin 3 555 TIMER U407
- ⑪ Check For 6/18/87 Software - replace screen
- ⑫ Check For Memory Modification
- ⑬ Video Waves - C806 1.22uF 50V Disc
ETA - 16,000 units have none

Polarity Modification Anything over 16,000 good!

4.7uF cap Tantelum
22 Ω 2 watt resistor





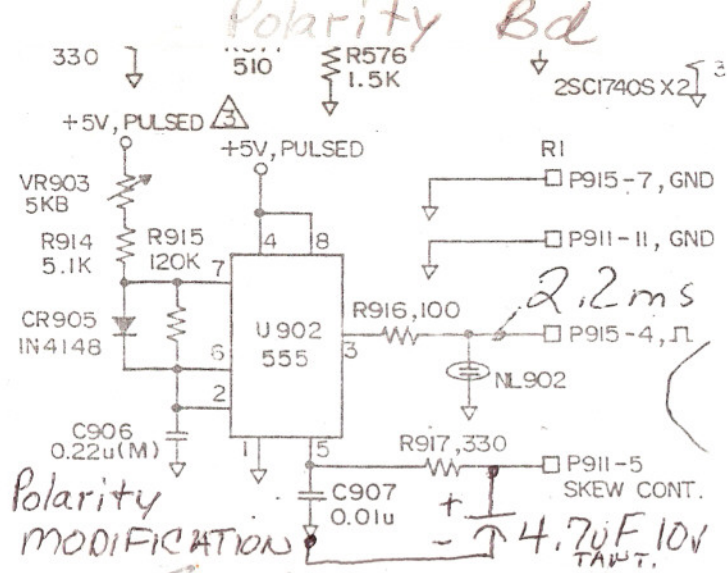
TEST POINTS

pin 4 U501-4053
 pin 4 U502-4053
 output OF FL502
 GATE OF Q522

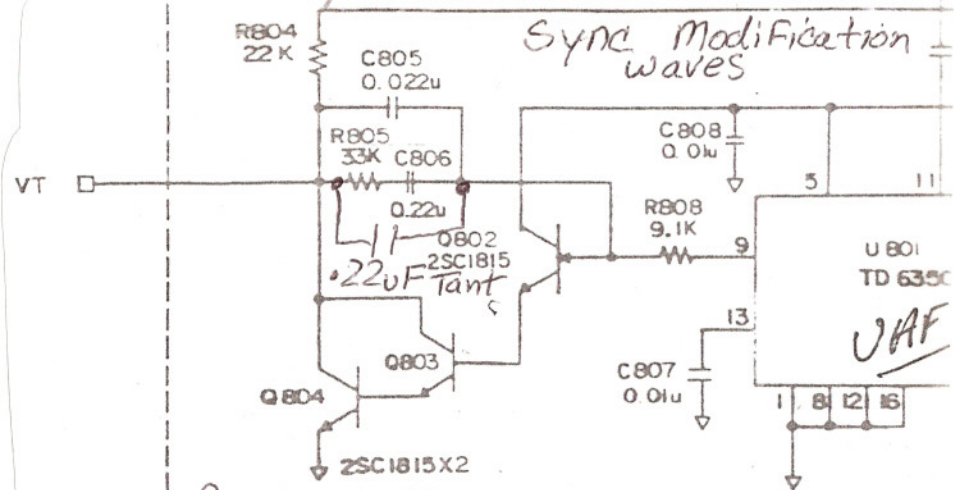
VIDEO

FIG-06

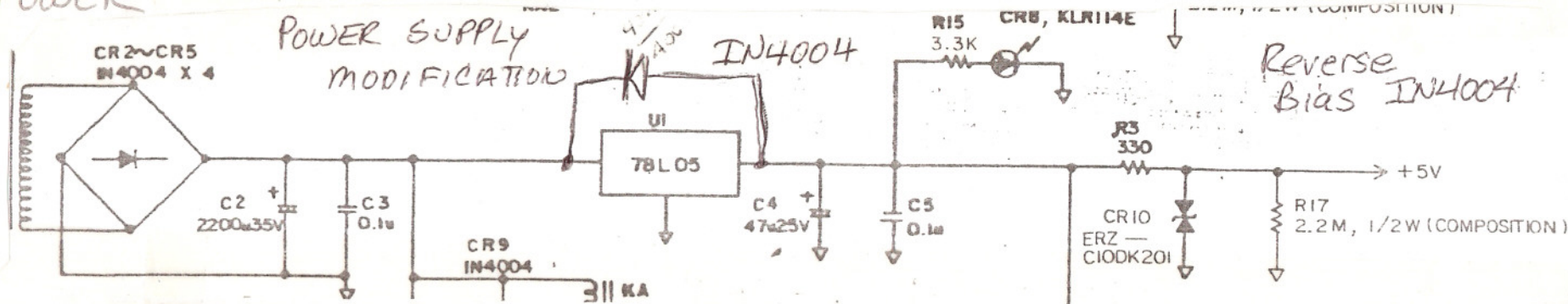
GENERAL DESCRIPTION



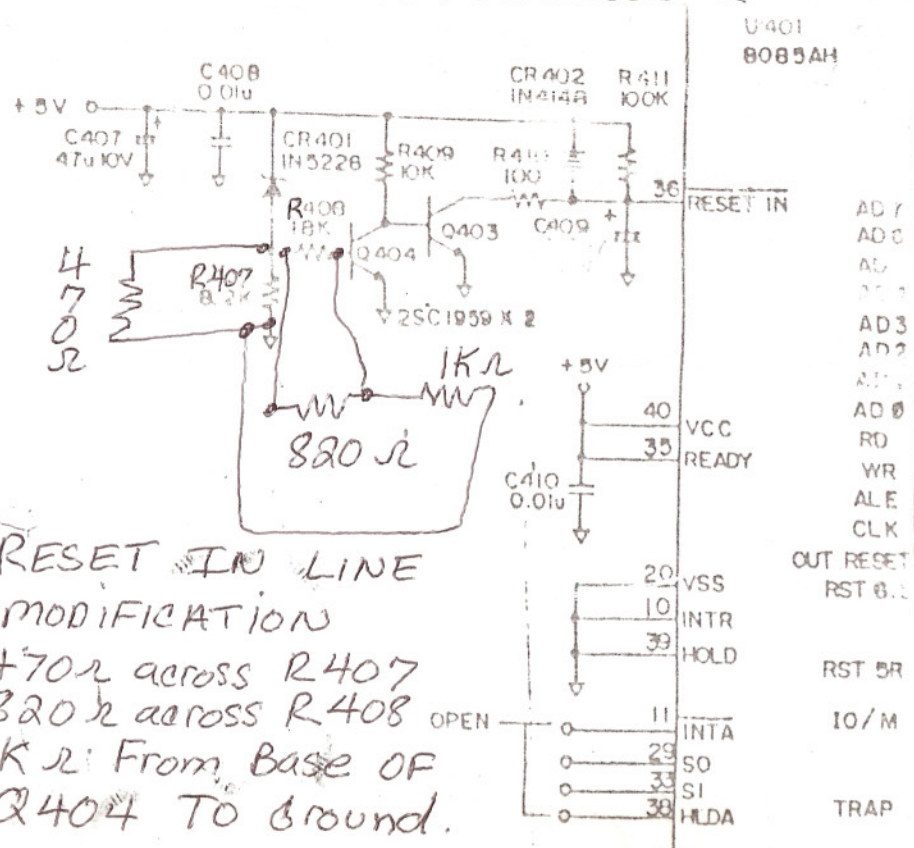
Synthesizer Bd



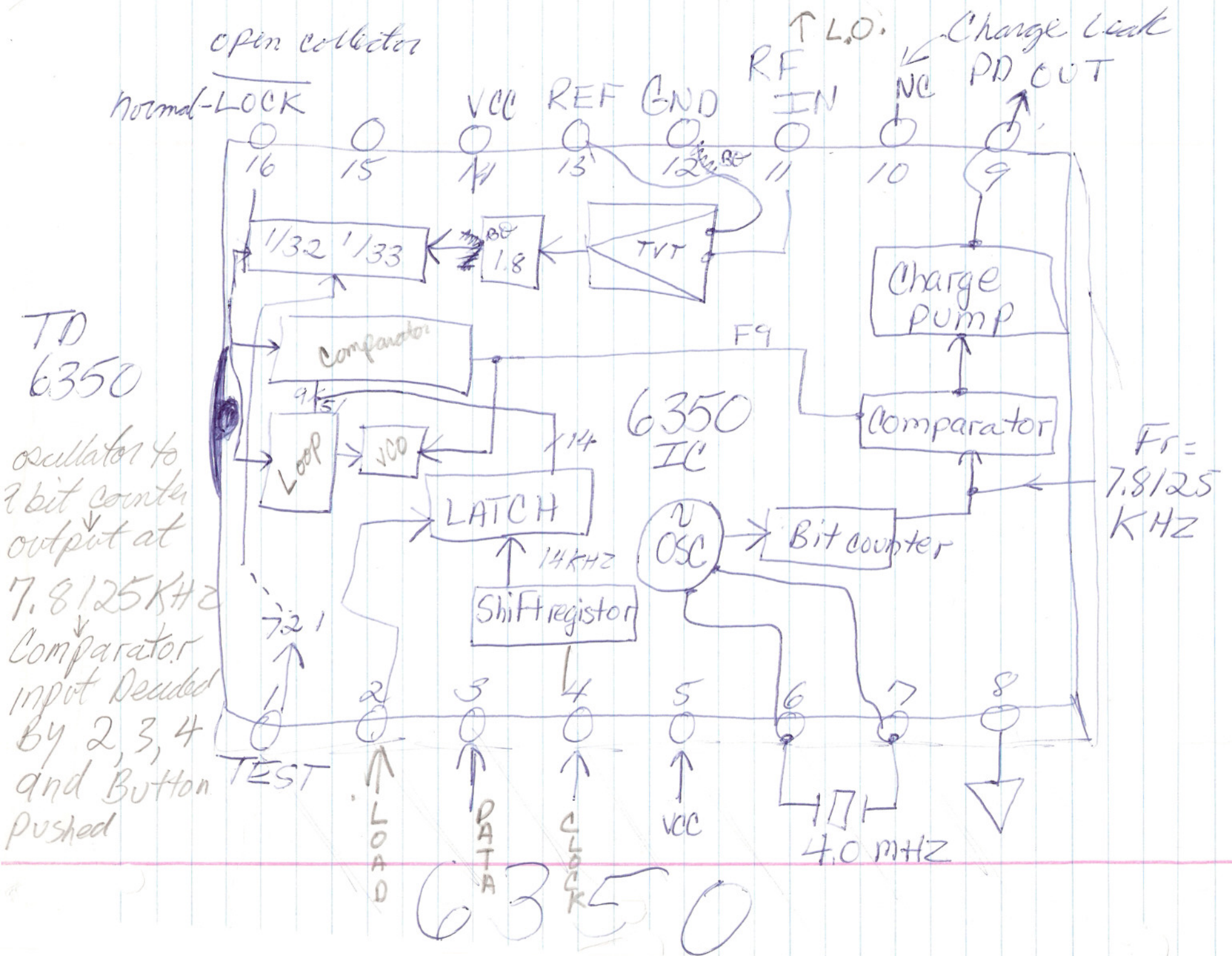
POWER BOX



MICRO PROCESSOR



4000 MODIFICATIONS



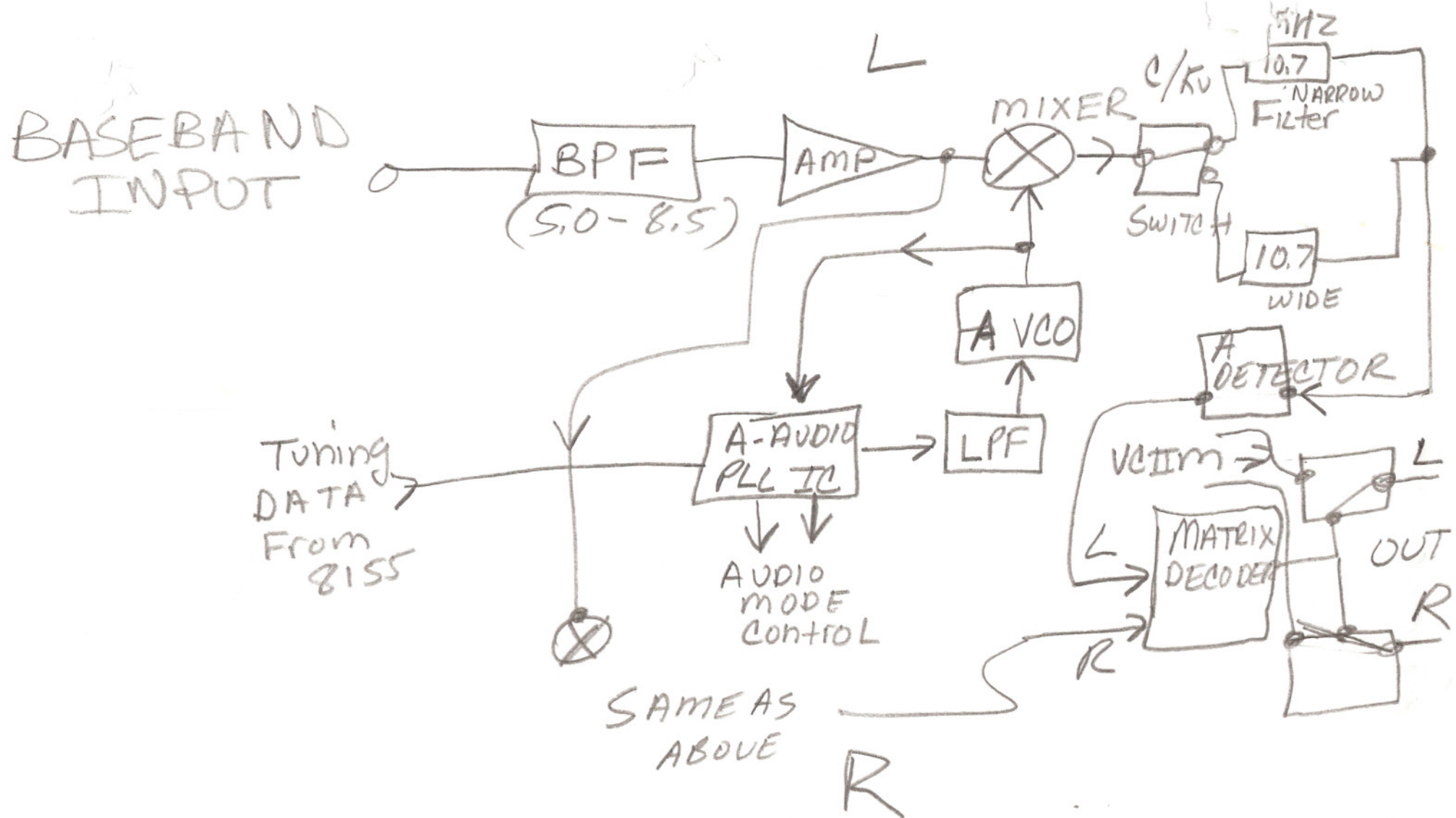


FIG-G-5

AUDIO SECTION