



QUALITY STANDARD INSTRUCTION SPEED VARIATOR DEPARTMENT

#2078

TITLE

AUXILIARY FUNCTION
193X228ACG01 AND 193X228BAG01

REVISION

9

1.0 Applicable Documents

Parts list and diagram 36C752831BG if "AC" version or 36C753821BD if "BA" version.

2.0 Equipment

Test stand and correct logic board for card under test.

3.0 Procedure (General)

3.1 Set scope amplifier to CH1 only, DC, 5V/Div and time base to 0.1 msec/div., magnifier to 5 usec/div., internal sweep, auto mode. CHANNEL 2 2V/Div

3.2 RS1, RS2 in position #1 and all switches up.

3.3 Turn all card pots max. CCW.

3.4 Plug in special adapter on "AC" version (TJ17 and TJ18)

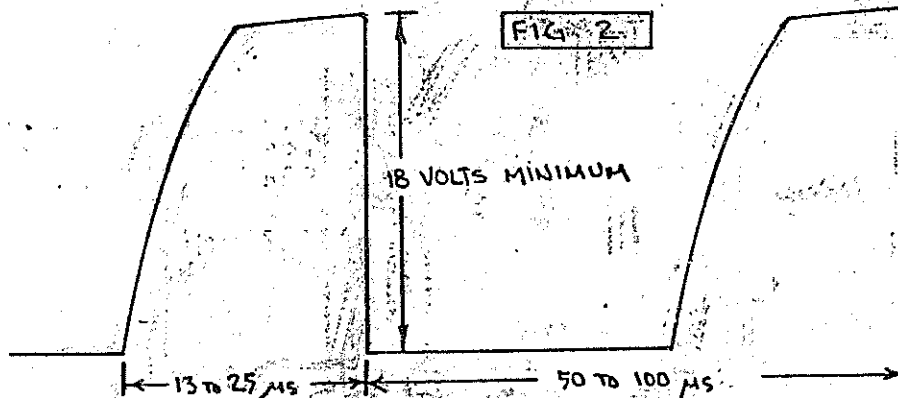
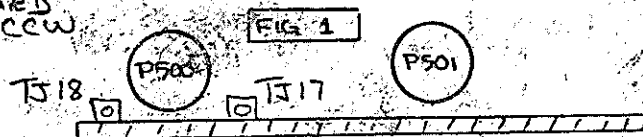
3.5 V5 range - 10V. PLUS CCW

4.0 Test

4.1 193X228ACG01

4.1.1 Energize test stand. Place S1 down. **M5** must read 18 volts or over.

4.1.2 Place S1 up, observe oscillator output on scope channel #1. It should appear as in Figure #2.



DISTRIBUTION	QTY.
Mgr. Eng.	
Mgr. Mfg.	
Mgr. Prod. Eng.	1
Mgr. Mat.	
Mgr. Sys. Eng.	
Eng. Supv.	
Foreman-Test	0
Foreman-Insp.	0
Foreman Subst. Insp.	1
Q.C. LAB	1
Q.C. ENGR	1
MGR. DEV. ENGR	2

*Change or Addition

SV-100 (2-68)

Rev. #8 - AWE - 2/6/79 *ave*
Rev. #9 - RAD - 4/24/80

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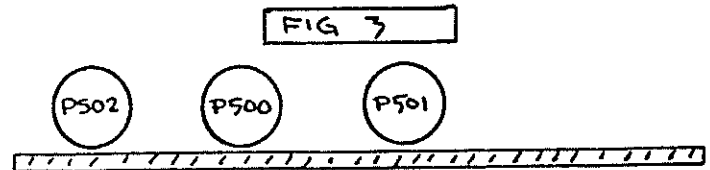

 P500


 P501

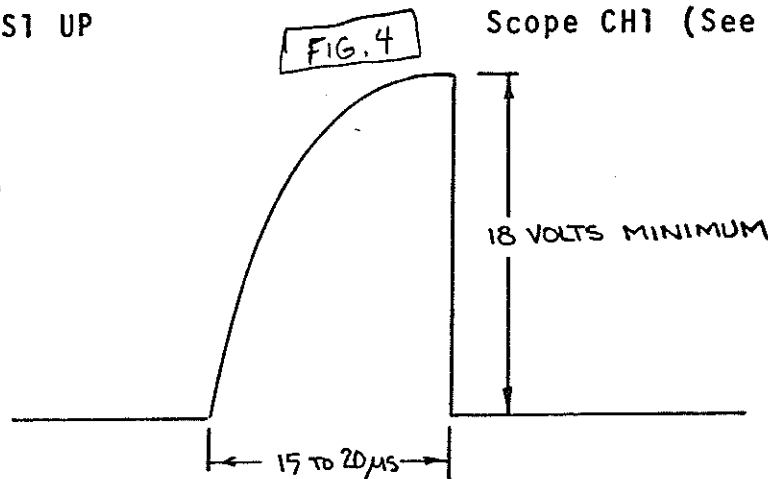
- 4.1.3 Place S7 down. Place channel #1 and channel #2 on 0.2 volts/div. and input switches to ground. ALTER
- 4.1.4 Set both traces exactly on the second line from the bottom of the screen. Place both input switches to DC and adjust P500 until they are again coincident. (Disregard noise pulses which are present while making adjustments.)
- 4.1.5 Outputs should be less than 1 volt. ^{ONSCOPE} Place strip marker across pot face to seal pot.
- 4.1.6 Place S3 down. DVM should read +6.0 to 8.5 volts. Note reading.
- 4.1.7 Place RS2 in position #2. Place S4 down. DVM should read as step 4.1.6 \pm 0.25 volts.
- 4.1.8 Place S5 down. DVM should read 12 to 17 volts. Note reading.
- 4.1.9 Place RS2 in position #3. Place S4 up. DVM should read same as step 4.1.8 \pm 0.5 volts.
- 4.1.10 Place RS2 in position #4. Place S10 down.
- 4.1.11 Adjust V5 until DVM reads 15 millivolts.
- 4.1.12 Place RS2 in position #5. DVM should read less than 8.1 volts.
- 4.1.13 By turning V5 CW increase DVM reading by 0.6 volts.
- 4.1.14 Place RS2 in position #6. DVM should read over 120 millivolts. Note reading.
- 4.1.15 Place S6 down. DVM should read same as step 4.1.14 \pm 20 mv. but neg. in polarity.
- 4.1.16 Place S6 up. Turn P501 max. CW
- 4.1.17 Turn V5 CW until DVM reads 15 millivolts or until V5 is max. CW.
- 4.1.18 Place RS2 in position #7. DVM should read more than 9.7 volts.
- 4.1.19 Place S10 up. Place RS2 in position #8. DVM should read zero.
- 4.1.20 Place S2 down. DVM should read -20 volts.
- 4.1.21 Place RS2 in position #9. DVM should read zero.
- 4.1.22 Place S2 up. DVM should read +20 volts.

- 4.1.23 Place RS2 in position #10. DVM should read 10 to 14 volts.
- 4.1.24 Test Off. M5 should read zero.
- 4.1.25 Test On. M5 should read 18 to 20 volts after a delay of 1/2 to 1 second.
- 4.1.26 Test End.

4.2 Test 193X228BAG01



- 4.2.1 Test On Patchboard lights 1 and 2 on
- 4.2.2 S1 DN M6 (18) (20) volts
Patchboard lights 3 and 4 on
- 4.2.3 S1 UP Scope CH1 (See Figure #4).



- 4.2.4 S2 DN DVM (+0.430) (+0.930) volts
- 4.2.5 S2 UP
S3 DN
S9 DN
RS1 (2) DVM G.T. (+0.120) Volts.
- 4.2.6 S10 DN DVM G.T. ^{MORE NEG.} (-0.120) Volts.
- 4.2.7 Adjust P501 For DVM (-0.013) (-0.017) Volts.
- 4.2.8 RS2 (2) 9V DVM G.T. ^{MORE NEG.} (-0.120) Volts
- 4.2.9 P501 Max. CW
RS2 (3) ^{MORE POS.} 9.7V DVM L.T. (-0.015) Volts.

P502 P500 P501

4.2.10	S9 UP RS1 (3) RS2 (4).	DVM (-0.070) (-0.170) Volts
4.2.11	S10 UP	DVM (+0.070) (+0.170) Volts
4.2.12	S3 UP S5 DN RS2 (5) .8	DVM (-0.200) (-1.000) Volts
4.2.13	S10 DN	DVM (+0.200) (+1.000) Volts
4.2.14	RS1 (4)	DVM (+8.600) (+10.60) Volts
4.2.15	P500 MAX. CW	DVM (+2.400) (+3.600) Volts
4.2.16	S10 UP	DVM (-2.400) (-3.600) Volts
4.2.17	RS1 (5) RS2 (6) .036	DVM L.T. (+0.030) Volts.
4.2.18	RS1 (6)	DVM L.T. (+0.030) Volts.
4.2.19	RS2 (7) .076	DVM G.T. (+2.500) Volts.
4.2.20	RS1 (5)	DVM L.T. (+0.030) Volts.
4.2.21	S10 DN	DVM G.T. (+2.500) Volts.
4.2.22	RS1 (6)	DVM L.T. (+0.030) Volts.
4.2.23	S5 UP RS1 (7)	DVM (-0.100) (-0.500) Volts.
4.2.24	S5 DN RS2 (8) .9	DVM (-4.700) (-5.800) Volts.
4.2.25	S10 UP	DVM (-4.700) (-5.800) Volts.
4.2.26	RS1 (8) RS2 (9) 1.5	DVM L.T. (+19.1) Volts.
4.2.27	S10 DN	DVM L.T. (+19.1) Volts.
4.2.28	RS2 (10) 2.7	DVM L.T. (+18.0) Volts.
4.2.29	S10 UP	DVM L.T. (+18.0) Volts.
*4.2.30	P502 Max. CW	DVM G.T. (+19.0) Volts.
4.2.31	TEST OFF	M6 (zero)
4.2.32	TEST ON	M6 (18.0) (20.0) Volts after (1/2) (1.0) Sec Delay.
*4.2.33	TEST END	

5.0 Scope of test

- 5.1 Step 4.1.1 checks the delay and output from the delayed +20V output.
- 5.2 Step 4.1.2 places a load on the delayed +20V output and observes its effect.
- 5.3 Step 4.1.3 unloads the delayed +20V and checks the shape and magnitude of the oscillator output.
- 5.4 Steps 4.1.4 to 4.1.6 place channel #1 of the scope on tab 4 and channel #2 on tab 5 and using current feedback balance pot (P500) balances the outputs.
- 5.5 Step 4.1.7 places about +0.7 volts on tab 6 and observes its effect on tab 4.
- 5.6 Step 4.1.8 places about -0.7 Volts on tab 6 and observes its effect on tab 5.
- 5.7 Step 4.1.9 places about -1.4 volts on tab 6 and observes its effect on tab 5.
- 5.8 Step 4.1.10 places about +1.4 volts on tab 6 and observes its effect on tab 4.
- 5.9 Step 4.1.11 places DVM on tab 21 and disconnects supply voltages to disable oscillator.
- 5.10 Step 4.1.12 sets 15 millivolts output at tab 21.
- 5.11 Step 4.1.13 observes input voltage on tab 22 required to give 15 millivolts on tab 21.
- 5.12 Step 4.1.14 puts an additional 0.6 volts on tab 22.
- 5.13 Step 4.1.14 checks the output from tab 21 with the additional 0.6 volts input at tab 22.
- 5.14 Step 4.1.16 reverses the polarity of the input and observes its effect.
- 5.15 Step 4.1.17 reverses the polarity of the voltage on tab 22.
- 5.16 Step 4.1.18 sets 15 millivolts output at tab 21.
- 5.17 Step 4.1.19 checks the required input to get 15 millivolts output.
- 5.18 Step 4.1.20 places the DVM on tab 16 and checks the relays NO contact.
- 5.19 Step 4.1.21 picks up relay and checks to see NO contacts have picked up.

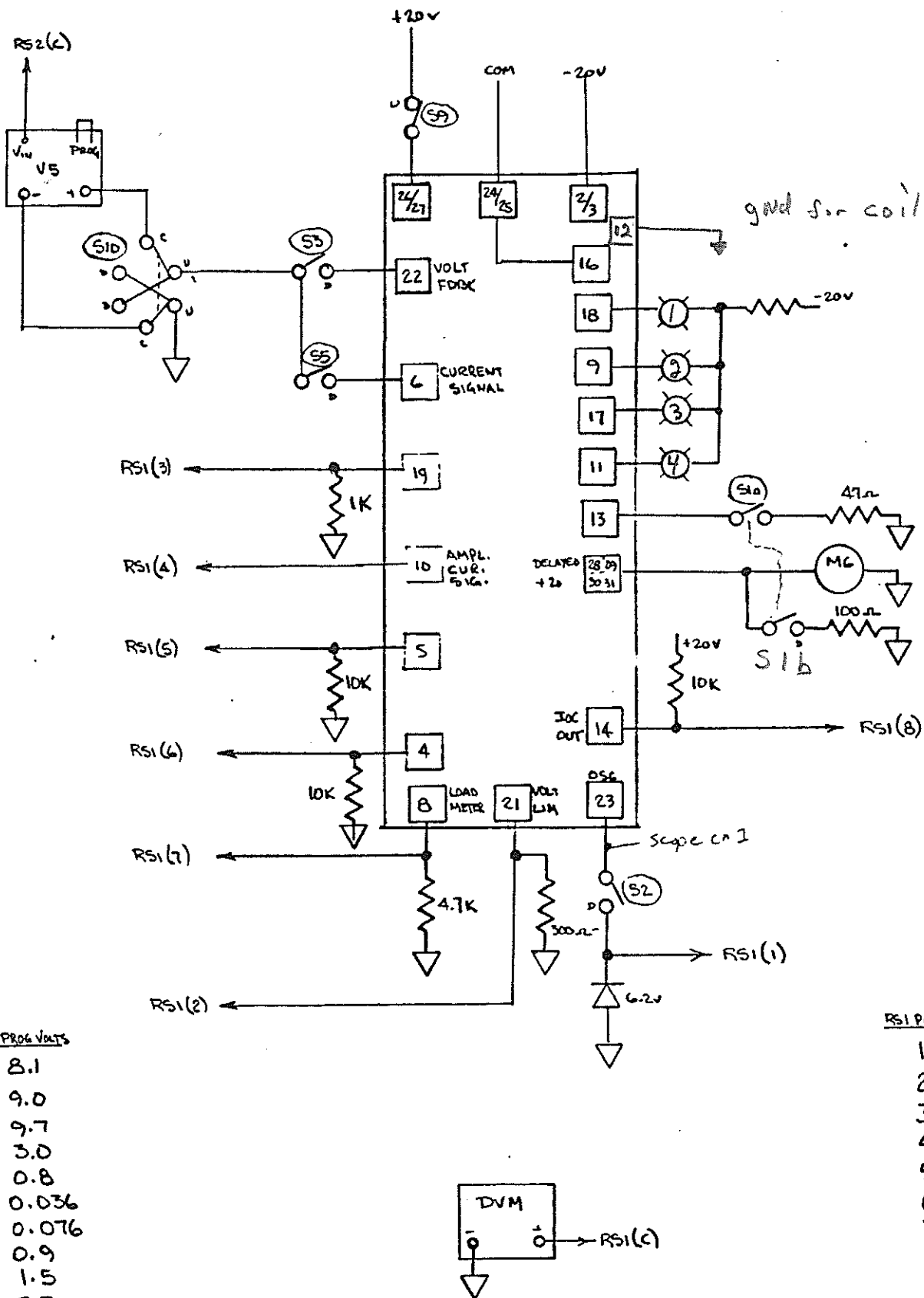
- 5.20 Step 4.1.22 places DVM on pin #17 and checks to see NO contacts have dropped out since relay is activated.
- 5.21 Step 4.1.23 de-activates relays and checks that NO contacts pick up.
- 5.22 Step 4.1.24 checks the voltage across the fault relay (tab 13).
- 5.23 Step 4.2.1 checks the delayed +20 volt output and RX500 relay contacts.
- 5.24 Step 4.2.2 checks the delayed +20 volt output under load and RX500 relay contacts.
- 5.25 Step 4.2.3 checks the oscillator output pulse for amplitude and duration.
- 5.26 Step 4.2.4 checks the oscillator duty cycle by clipping the pulse amplitude and measuring the average DC output voltage.
- 5.27 Step 4.2.5 and 4.2.6 checks the voltage limit circuit output with ± 8.1 volts input and P501 Max. CCW.
- 5.28 Steps 4.2.7 and 4.2.8 checks the voltage limit minimum change in output for a change in input voltage from 8.1 to 9.0 volts.
- 5.29 Step 4.2.9 checks for less than 15 mv output of the voltage limit circuit with 9.7 volts input and P501 max. CW.
- 5.30 Steps 4.2.10 and 4.2.11 checks the output at tab 19 with a 1 K Ω load and ± 3 volts input at tab 22.
- 5.31 Steps 4.2.12 and 4.2.13 checks the output at tab 19 with a 1 K Ω load and ± 0.8 volts input at tab 6.
- 5.32 Step 4.2.14 checks the output at tab 10 for a 0.8 volt input to tab 6 with P500 max. CCW.
- 5.33 Step 4.2.15 and 4.2.16 checks the output at tab 10 for a ± 0.8 volt input to tab 6 and P500 max. CW.
- 5.34 Step 4.2.17 and 4.2.18 checks the output at tabs 4 and 5 with 36 mv input at tab 6.
- 5.35 Steps 4.2.19 and 4.2.20 checks the outputs of tabs 4 and 5 with 76 mv input to tab 6.
- 5.36 Steps 4.2.21 and 4.2.22 checks the output of tabs 4 and 5 with 76 mv input to tab 6.
- 5.37 Step 4.2.23 checks the load meter output (tab 8) with zero input to tab 6.
- 5.38 Steps 4.2.24 and 4.2.25 checks the load meter output with ± 0.9 volt input to tab 6.

5.39 Steps 4.2.26 through 4.2.30 checks the IOC output at tab 14 for minimum and maximum IOC level inputs of both polarities to tab 6.

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REVISION NO. 9

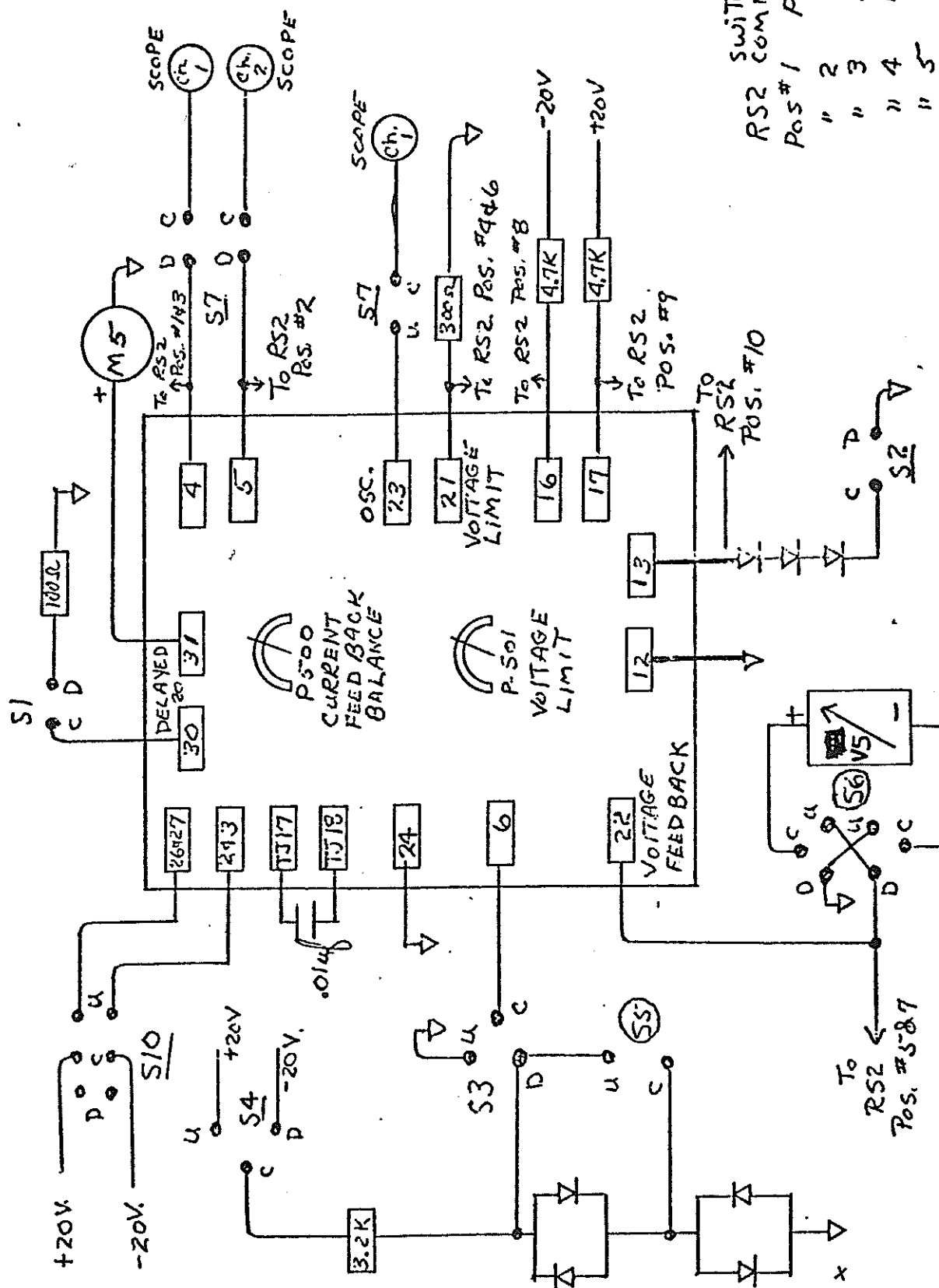
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PGZ Pos	PROG VOLTs
1	8.1
2	9.0
3	9.7
4	3.0
5	0.8
6	0.036
7	0.076
8	0.9
9	1.5
10	2.7

RSI Pos	TAB
1	(OSC) 23
2	21
3	19
4	10
5	5
6	4
7	8
8	14

193X228AC601



PS2 switch common to DVM +

Pos #1 P:V 4

521

4
"
3
"

" 4 " 21

115 " 22

...

9

22
" 7

100

10-11

101

ORIGINAL BY W.F.F.

SV-100A(2-F)