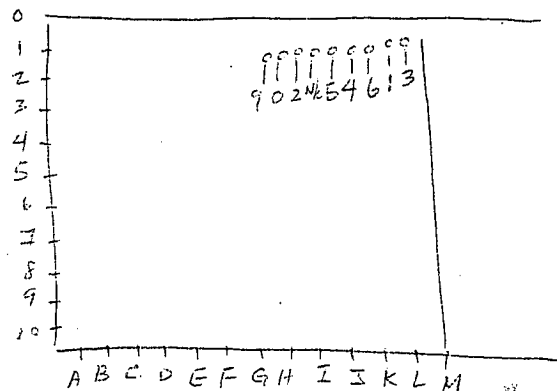


Note: Adjustments should be made in this order. Make a visual inspection of the unit for mechanical and cosmetic flaws.

1. SETUP

- A. Center all trimmers.
- B. Set STEREO COUPLER button out.
Set AUTO button in.
Set GAIN CHANGE button in.
Set SYSTEM BYPASS button out.
Set THRESHOLD (R60) to +10. *ccw*
Set COMPRESSION (R141) to 1. *ccw*
Set ATTACK (R82) to 400 dB/MSEC. *ccw*
Set RELEASE (R86) to 4K dB/SEC. *ccw*
Set STOP LEVEL (R164) to +24. *ccw*
Set OUTPUT GAIN (R135) to 0. *center*
Note: Use 400Hz filter as needed.



2. POWER SUPPLY VOLTAGE TEST

- A. Set the POWER button in. Verify 88 ohms between the blades of the AC cord. Verify 0 ohms between the ground pin of the AC cord and the chassis of the UUT. Verify infinite resistance between either blade of the AC cord and the ground pin.
- B. Set POWER switch in. Verify that the power LED is lit. Verify that the BELOW THRESHOLD (green) LED is lit, and that the AUTO ATTACK/RELEASE LED is lit.
- C. Monitor the junction of R14 and C6. ^{P-16} Adjust +15V ADJ (R8) for 15.00VDC +/- 10mVDC. Monitor the junction of R15 and R19. Verify -15.00VDC (+/- 100mVDC). Monitor the collector (metal can) of Q5. ¹⁴⁻⁵ Verify 20.00VDC (+/- 200mVDC). Monitor the collector (metal can) of Q12. ^{12-X} Verify -20.00Vdc +/- 400mVDC. Be sure to be nice to Mandy.
- D. Monitor the junction of R92 and the wiper of R93. Set R93 ⁽⁴⁻⁰⁾ for -1.35VDC at this test point. ⁽¹²⁻⁰⁾

3. INPUT GAIN AND CHECK CMRR CHECK ^{OA5 -}

- A. Apply 100Hz @ 0dBu to the input of the UUT.
- B. Verify -1dBu at pin 6 of OA5 and -6dBu at pin 1 of OA6.
- C. Verify CMRR > 40dBu at pin 6 of OA5 and pin 1 of OA6. ^(4-X) ⁽⁶⁻⁴⁾

4. RMS SYMMETRY ADJUST

- A. Apply 100Hz @ 0dBu to the input of the UUT. Monitor pin 5 ⁽⁷⁻⁴⁾ of QA2 through the Sound Tech with the distortion output displayed on the scope. Set the Sound Tech to dB VOLTS. ⁽⁵⁻⁵⁾ Adjust R45 until the waveform peaks are the same height. You should get a near perfect sine wave. Monitor pin 5 of ^(7-M) QA1 and pin 5 of QA3. ~~Verify a sine wave similar to the waveform at pin 5 of QA2.~~

(9-M)

- B. Monitor pin 5 of QA2 again. Set the AUTO button out. Verify that the AUTO ATTACK/RELEASE LED is out. Verify a rectified sine wave with waveform peaks that are the same height. (The amplitude will be much greater). Set the AUTO button in.
- C. Apply 100Hz @ 0dBu to J25-2. Set the STEREO COUPLER button in. Verify that the SLAVE (yellow) LED is lit. Monitor Pin 5 of QA3 in the same manner as Step 3A. Adjust RMS SYM (11-M) (R59) until the waveform peaks are the same height. You should get a near perfect sine wave. Monitor pin 5 of QA2. Verify a sine wave similar to the waveform at pin 5 of QA3.
- D. Monitor pin 5 of QA2 again. Set the AUTO button out. Verify a rectified sine wave with waveform peaks that are the same height. (The amplitude will be much higher). Set the STEREO COUPLER button out. Verify that the SLAVE (yellow) LED is out.

RMS 2 fraction
on Fixture
(Low signal)

5. RMS TRACKING ADJUST

- A. Apply +6dBu @ 1kHz to the input of the UUT. Set STEREO COUPLER button in.
- B. Monitor J25-1. Trim the output of the osc. for 0dBu at J25-1. Monitor the cathode side of CR8 and verify approximately 60mVDC (BC453 transistor), or 6mVDC (2N3904 transistor).
- C. Apply 0dBu @ 1kHz to J25-2. Monitor the cathode side of CR8. Adjust RMS TRACKING (R52) for the same voltage at the cathode of CR8 as in Step 5B (approximately 60mVDC or 6mVDC). (11-K)

6. THRESHOLD LED CHECK

- A. Set the STEREO COUPLER button in.
- B. Apply 1kHz to J25-4. Set the osc. for minimum amplitude. Verify that the BELOW (green LED) is lit. Increase the amplitude of the osc. until the yellow threshold LED lights. Verify -18.0dBu at the output of the osc. Increase the osc. amplitude until the ABOVE (red) threshold LED lights. Verify -9.0dBu at the output of the osc. Further increase the osc. amplitude until the PEAKSTOP LED lights. Verify -1.0dBu at the output of the osc.
- C. ~~Set the STEREO COUPLER button out.~~

1- TEST FIXTURE @ "37-B"
2- TEST FIXTURE @ "Y"
3- MON. J25-4 @ -18
4- TEST FIXTURE @ "R"
5- MON. J25-4 @ -9

7. VCA SYMMETRY ADJUST

- A. Apply 1Khz @ +12.2dBu (3.16VRMS) to the input of the UUT.
- B. Ground the control port of M1 (the VCA) at the local ground of M1. Monitor the output of the UUT.
- C. Adjust R77 for minimum THD at the output of the UUT. THD < .01% typical with the 20 - 20k filter in.
- D. Remove the ground from the control port of M1.

- M1 [E > 11:Y]
- "EC" to 1/3

(10-V)

8. COMPRESSION THRESHOLD CAL

- A. Apply 1Khz @ +12.2dBu (3.16VRMS) to the input of the UUT.
- B. Set THRESHOLD (R60) to +10. *FRONT PANEL*
Set COMPRESSION (R141) to infinite. *FRONT PANEL*
- (8-H) — Set COMP THRESHOLD CAL (R65) full CW. Verify that the ABOVE (red) threshold LED is lit. Rotate COMP THRESHOLD CAL (R65) (8-H) CCW until the ABOVE (red) threshold LED is off and the yellow threshold LED is on.
- C. Apply 1kHz @ -37.8dBu to the input of the UUT.
- D. Set the THRESHOLD (R60) to -40. Verify that the yellow threshold LED is lit. *FRONT PANEL*

⑩ 0dBu IN.
 ① THRESHOLD - CW
 ② COMP. - CCW
 ③ DVM @ #7 of J25
 ④ O/P gain = for 0V @ #7
 ⑤ ADJ. R138 (9-H) FOR 0dBu O/P.
 USE WATMETER: WILL HAVE TO ADJ SLIGHTLY USING THE BYPASS SW.

9. 4:1 COMPRESSION CAL

- A. Apply 1Khz @ +2.2dBu (1VRMS) to the input of the UUT. Set THRESHOLD (R60) to -40.
- B. Set COMPRESSION (R141) to 4.
Set 4:1 CAL (R140) full CW then slightly CCW.
- (10-H) Set OUTPUT GAIN for -25dbm at the output of the UUT.
- C. Apply 22.2dBu (10VRMS) to the input of the UUT. Verify -20dBu at the output of the UUT. Switch between the +2.2dBu and the +22.2dBu levels and tweak the 4:1 CAL (R140) until a 5dB range is attained. (This adjustment is sensitive).
- D. Apply 1Khz @ +2.2dBu (1VRMS) to the input of the UUT.
- E. Set COMPRESSION (R141) to infinite. Set OUTPUT GAIN for -30dbu at the output of the UUT.
- F. Apply 22.2dBu (10VRMS) to the input of the UUT. Verify -30dBu at the output of the UUT.

⑥ COMP. = 4
 ⑦ THRESHOLD = -40 (CCW)
 ⑧ 22.2dBu IN/POT
 ⑨ R140 = -25dBu @ O/P
 ⑩ 22.2dBu I/P; O/P = -20 (12" OUT POSITION ON TEST FIXTURE @ +10 ON AMP)

10. METER CAL (INPUT)

- A. Power the UUT down. Set the front panel meter to 0 with the mechanical adjustment. Power up the UUT.
- B. Apply 1Khz @ 0dBu to the input of the UUT. Set the METER INPUT button in. Verify that the rear panel METER CALIBRATION (R125) will vary the front panel meter setting from -10dB to +10. You may have to change the value of R169 to 680k - 1MEG to meet this spec.
- C. Set METER CALIBRATION (R125) for 0dB on the front panel meter.
- D. Apply 1Khz @ -20dBu to the input of the UUT. Verify a reading of -20dB on the front panel meter.

11. METER CAL (OUTPUT AND GAIN CHANGE)

- A. Apply 1Khz @ 0dBu to the input of the UUT.
- B. Set METER OUTPUT button in. Set COMPRESSION (R141) to 1. Set THRESHOLD (R60) TO +10. Set OUTPUT GAIN (R135) to 0. Verify 0Vdc +/- 200mV at J25-7. Set R138 for 0dBu at the output of the UUT.

- (17-6)
- D. Set METER ZERO GAIN ADJUST (R172) for 0 on the front panel meter.
 - E. Set METER GAIN CHANGE button in.
Set THRESHOLD (R60) TO -40.
 - F. Rotate COMPRESSION (R141) CW until -10 dB is noted on the front panel meter. Verify -10dBu at the output of the UUT.

12. OUTPUT GAIN RANGE CHECK

- A. Apply 1Khz @ 0dBu to the input of the UUT.
Set COMPRESSION (R141) to 1.
Set THRESHOLD (R60) TO +10.
- B. Monitor the output of the UUT. Verify that the OUTPUT GAIN (R135) has a range of -20dBu to 20dBu.

13. SYSTEM BYPASS CHECK

- A. Apply 1Khz @ 0dBu to the input of the UUT.
Set COMPRESSION (R141) to 1. *ccw*
Set THRESHOLD (R60) TO +10. *ccw*
Set OUTPUT GAIN (R135) for 0dBu at the output of the UUT.
- B. Verify unity gain thru the UUT in with the SYSTEM BYPASS button in or out. Set the SYSTEM BYPASS button out.

14. PEAKSTOP LEVEL CAL

- A. Apply 1Khz @ 0dBu to the input of the UUT.
- B. Set COMPRESSION (R141) to 1.
Set THRESHOLD (R60) TO +10.
Set AUTO button in.
Set OUTPUT GAIN (R135) for 0dBu at the output of the UUT.
Set STOP LEVEL (R164) to 0. Verify that the PEAKSTOP LED lights at approximately +5 on the front panel markings.
- C. Adjust LIMIT THRESHOLD CAL (R165) full CW. Verify THD <.03%. Adjust LIMIT THRESHOLD CAL (R165) CCW until THD reads .1%. *(14-V)*
- D. Apply 10dBu to the input of the UUT. The output of the UUT should read 5.5dBu (+/-1dB). Monitor the output with a scope and observe that the waveform is "soft clipped".
- E. Set the STOP LEVEL to +24. The waveform will return to normal and the PEAKSTOP LED will be off. Rotate STOP LEVEL (R164) CCW until the PEAKSTOP LED lights. The STOP LEVEL (R164) should be at +10 on the front panel markings. Tweak the STOP LEVEL (R164) further CCW. Clipping should become apparent with just a bit more CCW rotation. Return STOP LEVEL (R164) to +24.

15. CLAMPING CHECK

- A. Apply 1kHz @ 0dBu to the input of the UUT.
- B. Set COMPRESSION (R141) to 1. *ccw*
Set THRESHOLD (R60) TO +10. *ccw*
Set OUTPUT GAIN (R135) for 0dBu at the output of the UUT.
Set AUTO button in.
Set STOP LEVEL (R164) to +24 *ccw*
- C. Monitor the output of the UUT on a scope. Turn the power of and then on again. Note that when the power is turned on, the waveform is clamped momentarily, then returns to normal.

16. FREQUENCY RESPONSE CHECK

- A. Same conditions as Step 13A and B. *as (15)*
- B. Verify flat frequency response (+/- .5dB) in a 20Hz - 20kHz bandwidth.
- C. Set COMPRESSION (R141) to infinite. Rotate THRESHOLD (R60) CCW until 10dB gain reduction is noted.
- D. Verify flat frequency response (+/- .5dB) in a 20Hz - 20kHz bandwidth.

use meter on unit for "-10"
500V
200V/div

17. NOISE CHECK

- A. Same conditions as Step 13A and B.
- B. Mute the osc. Verify < -93dBu noise (-96dBu typical). Use the 20Hz - 20kHz and the 400Hz filters.

18. OUTPUT OFFSET CHECK

- A. Same conditions as Step 13A and B.
- B. Verify < 10mVDC at the output of the UUT.

19. CLIPPING LEVEL CHECK

- A. Same conditions as Step 13A and B.
- B. Load the UUT with 600 ohms.
- C. Increase the level of the osc. until the PEAKSTOP LED lights. Verify 23dbu at the output of the UUT. Increase the level of the osc. further until clipping is attained. Verify 24dBu (+/-2dB) at the output of the UUT. Remove the 600 ohm load.

- 1KHz, 600 ohm o/p.
- "12.2" on TEST Fk.
- GAIN o/p to LIGHT
"PEAK STOP" LED
~ R3
- GAIN o/p for clipping
~ 24 dBu

20. THD CHECK

- A. Same conditions as Step 13A and B.
- B. Set OUTPUT GAIN (R135) for 20dBu at the output of the UUT.
Verify THD < .1% @ 20Hz
<.05% @ 1kHz
<.05% @ 20kHz.
- C. Set COMPRESSION (R141) to infinite.
Verify THD < .2% @ 100Hz
<.05% @ 1kHz
<.05% @ 20kHz
- D. Set the AUTO button out.
Set ATTACK (R82) to 1 dB/MSEC. (cw)
Set RELEASE to 10dB/SEC. (cw)
Verify THD < .7% @ 100Hz
<.05% @ 1kHz
<.05% @ 20kHz
- E. Set ATTACK (R82) to 400 dB/MSEC. (ccw)
Set RELEASE to 4k dB/SEC. (ccw)
Verify THD < 4% @ 100Hz
< .5% @ 1kHz
<.05% @ 20kHz

21. +4dBu CAL AND METER CHECK

- A. Set COMPRESSION (R141) to 1. (ccw)
Set THRESHOLD (R60) TO +10. (cw)
Set OUTPUT GAIN (R135) for unity gain thru the UUT.
Set AUTO button in.
Set STOP LEVEL (R164) to +24. (cw)
Set METER INPUT button in.
- B. Apply 4dBu @ 1kHz to the input of the UUT. Set the rear panel METER CALIBRATION (R125) for 0dB on the front panel meter. Set the METER OUTPUT button in. Verify that the front panel meter reads 0dB. Verify 4dBu at the output of the UUT. Set the GAIN CHANGE button in. Verify that the front panel meter reads 0dB.
- C. Set COMPRESSION (R141) to infinite.
Rotate the THRESHOLD (R60) CCW until -16dBu is noted at the output of the UUT. Verify -20dB GR on the front panel meter and verify that the front panel THRESHOLD knob lines up with the -20 mark on the front panel. Leave the front panel knobs at these positions for Step 22.

22. PRELIMINARY ATTACK AND RELEASE CHECK

- A. Front panel knobs settings from Step 21C.
- B. Set ATTACK (R82) to 400dB/MSEC. *CCW*
Set RELEASE (R86) to 4kdb/SEC. *CCW*
Set AUTO button out.
- C. Mute then unmute the osc. Verify that the front panel meter has no delay in moving between -20dB and 0dB.
- D. Set RELEASE (R86) to 10dB/SEC. *CCW*
Mute the osc. and verify that the front panel meter moves more slowly (approximately 2 seconds) to 0dB.
- E. Set ATTACK (R82) to 1dB/MSEC. *CCW*
Verify an increase of 1dB at the output of the UUT.

*CMP 0:1:7 THRS $\frac{1}{\text{CW}} \rightarrow -16\text{dB}$
(-20 F.P.)*

23. SLAVE CHECK

- A. This test requires a working 165A and a "slave" cable.
- B. Connect the two units together with the "slave" cable. Apply 4dBu to the input of the UUT. Set the STEREO COUPLER button in on the working 165A and set the STEREO COUPLER button out on the UUT. Verify that all of the front panel functions of the UUT are mirrored by the working 165A. Reverse the settings of the STEREO COUPLER buttons. Verify that all of the front panel functions on the working 165A are mirrored by the UUT.
- C. Set the STEREO COUPLER button out on both units. Verify independent operation of both units.

24. ATTACK AND RELEASE TEST

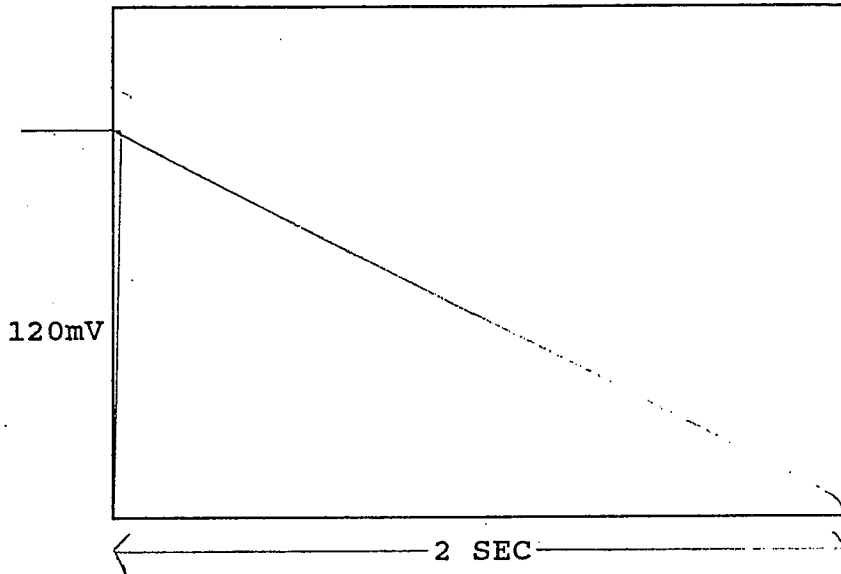
- A. Mute the osc. at the input of the UUT.
- B. Set STEREO COUPLER button out.
Set AUTO button out.
Set GAIN CHANGE button in.
Set SYSTEM BYPASS button out.
Set THRESHOLD (R60) to +10.
Set COMPRESSION (R141) to infinite.
Set ATTACK (R82) to 400 dB/MSEC.
Set RELEASE (R86) to 10dB/SEC.
Set STOP LEVEL (R164) to +24.
Set OUTPUT GAIN (R135) to 0.
Check J25-7 for 0mVDC +/-200mVDC

Note: You will need a storage scope with a 5B10N timebase and a 5A18N vertical amp. Nearly any vertical and horizontal amp will perform this test.

C. Scope Set-up.

- Vertical: DC coupled
20mv/DIV
CAL full CW
- Horizontal: .2V/SEC
Source - EXT.
CAL full CW
AUTO TRIG - out
Hook up EXT SYNC of the scope to the sync output of the pulse generator.

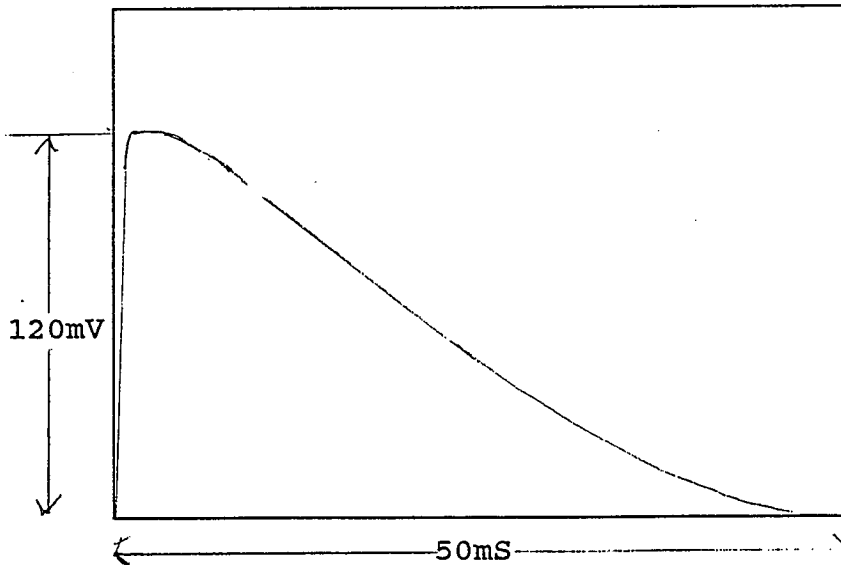
D. Connect the pulse generator output to the input of the UUT. Connect the power BNC of the pulse generator to +15VDC (R14) of the UUT. Connect the control port of the VCA (M1) directly to the input of the scope. Rotate THRESHOLD (R60) until 120mVDC deflection is noted on the scope (set the THRESHOLD knob to approximately 0 on the front panel). Set R93 (15 turn pot) for 2 seconds of release time. Verify that the ramp displayed on the scope is similar to the figure below.



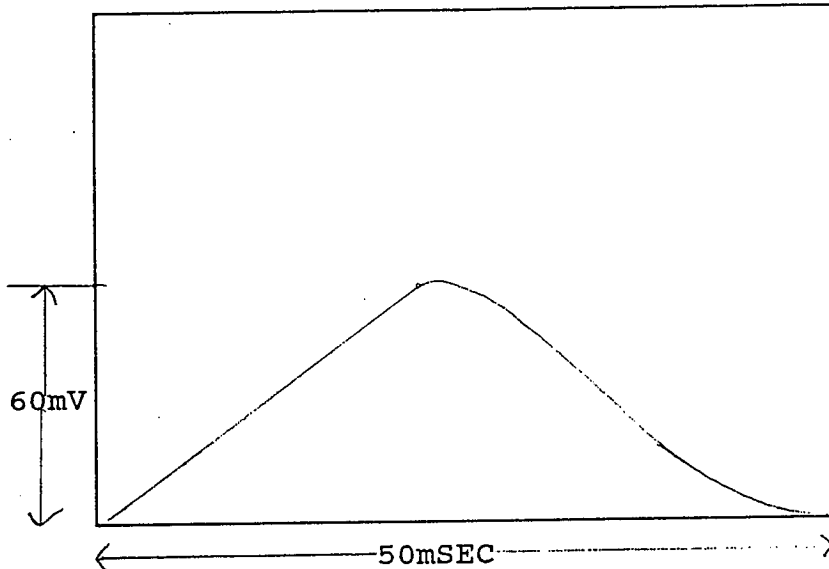
SET-UP

- ① THRESHOLD - 20
- COMPRESSION - ∞
- ATTACK - CCW
- RELEASE - CCW
- OP GAIN - 0; OVE J25-7
- STOP LEVEL - CW
- GAIN CHANGE - IN
- ② ADJ THRESHOLD For 120mV
or 6 div. on vertical display

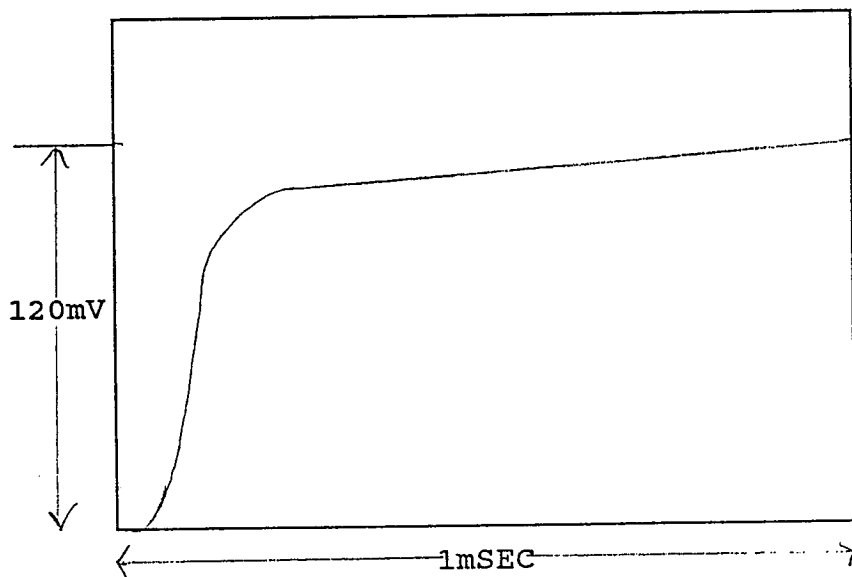
Slowly rotate the RELEASE (R86) fully CCW. The release ramp will become more vertical as the RELEASE (R86) is rotated CCW. Set the scope to 5ms/DIV horizontal. Verify that the ramp displayed on the scope is similar to the figure below.



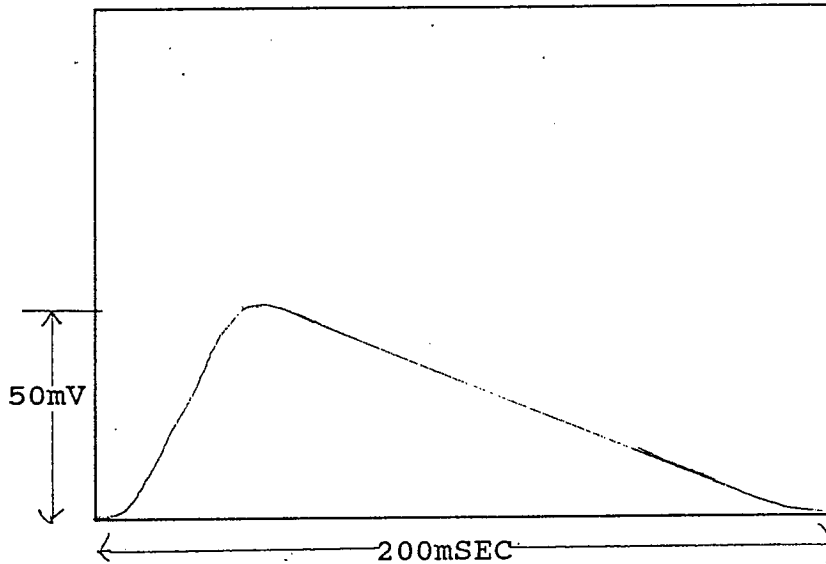
E. Set the ATTACK (R82) to 1MSEC/dB. Verify that the ramp displayed on the scope is similar to the figure below.



Slowly rotate the ATTACK (R82) CCW. The attack ramp will become more vertical as the ATTACK (R82) is rotated CCW. Set the scope to .1ms/DIV horizontal. Verify that the ramp on the scope is similar to the figure below.



- A. Set the AUTO button in. Set the scope to 20ms/DIV horizontal. Verify that the ramp on the scope is similar to the figure below. Disconnect the pulse generator from the UUT.



25. OPERATIONAL CHECK

- A. Apply 1kHz @ 4dBu to the input of the UUT.
- B. Set COMPRESSION (R141) to 1.
Set THRESHOLD (R60) to +10.
Set OUTPUT GAIN (R135) for 4dBu at the output of the UUT.
Set AUTO button in.
Set STOP LEVEL (R164) to +24.
- C. Rotate STOP LEVEL (R164) CCW until the PEAKSTOP LED lights. Monitor the output of the UUT with a scope and verify the onset of clipping. Verify that the STOP LEVEL knob lines up with the +5 mark on the front panel. Return STOP LEVEL (R164) to +24.
- D. Verify that the front panel meter reads 0dB with any meter function button in. Set COMPRESSION (R141) to infinite. verify 2dBu at the output of the UUT. Rotate THRESHOLD (R60) CCW until the ABOVE (red) threshold LED is lit. Set the OUTPUT METER button in. Verify that the front panel meter reads -7dB(+/-1dB). Verify -2.5dBu (+/-1dB) at the output of the UUT. Verify that the THRESHOLD knob lines up with the 0 mark on the front panel.

- E. Rotate the THRESHOLD (R60) further CCW until the front panel meter reads -20dB. Verify -16dBu at the output of the UUT. Verify that the THRESHOLD knob lines up with the -20 mark on the front panel. Set the GAIN CHANGE button in. Verify that the front panel meter reads -20. Set the COMPRESSION knob to 4. Verify that the front panel meter reads -15. Verify -11dBu at the output of the UUT.
- F. Return the front panel knobs to the settings of 25B.
- G. Vary OUTPUT GAIN (R135) from +20 to -20 and verify a +/- 20 dB gain change at the output of the UUT. Return OUTPUT GAIN (R135) to 0. Verify 4dBu at the output of the UUT.
- H. Set COMPRESSION (R141) to infinite.
Set AUTO button out.
Verify that the ATTACK (R82) and RELEASE (R86) have an effect on the distortion trace.