SA-5.1 UPDATE MODIFICATION INFORMATION

What the 5.1 specifically entails:

1. High/Low Gain switch: approx 912dB (not 20) reduction to line stage gain for high efficiency speakers and/or high-output line sources, like CD players.
2. Auto-muting circuit.
3. Gold/teflon jacks on rear circuit board, using new rear channel. This change is to increase reliability and ease of assembly.
4. Tube filaments re-wired to parallel operation. This change is designed to make certain that each tube sees exactly the right filament voltage (6 volts). The previous version (12 volt) did not assure exact voltages for each tube, due to filament resistance variations.
5. Constant-on tube filaments. As soon as the unit is plugged in, the fils come on. This is designed to improve tube life.
6. Severely beefed-up filament supply. The LM317 has been replace by a huge L?350, mounted on the rear. The little 2 amp filament rectifier is replaced by a 25 amp job, also bolted onto the power supply rear.

NOTE: * items 1, 2 and 3 occured with the front-panel change to "5.1".
* items 4 and 5 happened on the run right before the "5.1" change.
* item 6 started happening a few months ago.

What we can offer for a modification:

* items 2 and 3 fer sure
* item 6, if it has not already been done.

What the modification cannot include:

* items 1, 4 and 5. The high/low switch would require replacing the main board. Item 4 would require replacing the tube board and the transformer.

Item 5 would require replacing the main board and the power supply board and the transformer.

SA-5 and 5.1 SERVICE TEST PROCEDURE

This document is s designed as an aid for the Service Technician who wishes to get an SA-5.1 "on the air." It does not describe complete AC testing due to the wide variation of audio testing equipment used.

Problems associated with the audio performance of the SA-5 (hum, noise, etc.) can be manifold in their cause, but should present little difficulty for the skilled technician once he ’s certain that the device under test is operating properly in terms of DC parameters.

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COUNTERPOINT ELECTRONIC SYSTEMS, INC.	SERVICE BULLETIN	BULLETIN No. SA5-001		Page No. 1
		Approv JME	Rev.	Date 6.30.83

DESCRIPTION: PROCEDURE FOR ADJUSTING BIAS LEVELS, SA-5

1. SCOPE: This document establishes the procedure to be used to after replacing tubes V1 through V4.

2. PURPOSE To re-align the gain stages for minimum distortion.

3. UNITS AFFECTED All SA-5s.

4. APPLICABLE MATERIALS None required.

5. TOOLS AND TEST EQUIPMENT REQUIRED
   - 5.1 low distortion audio sine wave generator and distortion analyzer. SOUNDTECH 1700, 1701 or equivalent.
   - 5.2 Appropriate interconnects to connect above test equipment to SA-5 input and output jacks.
   - 5.3 Phillips screwdriver.
   - 5.4 Small blade-type screwdriver.

6. TIME REQUIRED 45 minutes, estimated.

7. PROCEDURE (FOR V2 LINE TUBE
   - 7.1 Remove the top cover from the SA-5 main chassis.
   - 7.2 Connect the SA-5 D.C. Power Supply to the SA-5.
   - 7.3 Plug the D.C. Power Supply into an A.C. power outlet.
   - 7.4 Turn on the SA-5, and allow to warm for at least 5 minutes.

   (test noise of line tubes???)

   - 7.5 Connect the output of the Sine Wave Generator to LINE 1 input, Channel A.
   - 7.6 Connect the Audio Distortion Analyzer to the Channel A MAIN OUT.
   - 7.7 Adjust the Sine Wave Generator to 100mV RMS, 1kHz.
   - 7.8 Set the SA-5 Main Out selector to LINE, and the LINE Selector knob to LINE 1.
   - 7.9 Use the GAIN control to set the level of the signal going to the Analyzer to 1 volt RMS.
   - 7.10 Set the Analyzer to measure distortion.
   - 7.11 Using Figure 1., locate VR 3.
   - 7.12 With the small screwdriver, adjust VR 3 for lowest distortion. There will be a "null" in the distortion. (0.01 to 0.02%)

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COUNTERPOINT ELECTRONIC SYSTEMS, INC.	SERVICE BULLETIN NOTICE OF POWER SUPPLY CAPACITOR	BULLETIN No. SA5-002		Page No. 1
		Approv JME	Rev.	Date 01/26/84

DESCRIPTION: IDENTIFICATION OF FAILURE MODE, SA-5 POWER SUPPLY.

1. SCOPE: This document describes the symptoms, cause and remedy to be used in case a failure occurs.

2. PURPOSE: To inform the dealer of a potential problem so that he will be prepared to handle any customer complaints.

3. UNITS AFFECTED: All SA-5s with Serial Numbers 4XXX or less.

   3.1 NOTE: Current failure rate has been on the order of <2% of entire production run.

4. DESCRIPTION OF FAILURE: Failure occurs in the SA-5's power supply chassis. One or both of the high-voltage power supply capacitors, Sprague TVLU-1775 (100-150uF/500V), undergo a sudden loss of capacitance, an increase of Equivalent Series Resistance (ESR), and due to the resulting heating, sometimes suffer a very slight leakage of electrolyte.

5. CAUSE OF FAILURE: Sprague identifies the cause as being contamination of the solder lugs by chloride salts. Investigation revealed a high concentration of such salts in the water-soluble soldering flux used during assembly. The manufacturer tells us that our wash water temperature (150° F), is too high, and converts the chlorides to a non-soluble form. Correction has been taken at the factory. For this step we are now using RMA-type flux.

6. SYMPTOMS OF FAILURE: Sudden appearance of 120Hz hum in riaa position.

7. CORRECTIVE ACTION: Replacement of faulty capacitor(s). No other components will be harmed. This repair will take about one hour, and can be done either locally, at the dealer's facility, or at the factory, at the dealer's discretion. Replacement capacitors will be shipped immediately if requested.

8. REPAIR PROCEDURE:

   8.1 Remove the top cover from the Power Supply.

   8.2 Locate the failed unit(s): they are large silver capacitors locatedon the circuit board. The one closest to the 6CA4 rectifier tube is the most common culprit.

   8.3 Unmount the circuit board using a 3/32" allen driver on the four bolts that pass through the front switch panel.

   8.4 Unsolder the offending unit(s) from the circuit board.

   8.5 Install new capacitor(s).

   8.6 Re-assemble Power Supply.

THIS COMPLETES THE REPAIR OF THE SA-5 DC POWER SUPPLY.

PLEASE NOTE THAT THIS FAILURE HAS BEEN RELATIVELY RARE

1. GENERAL

1.1. Check to be certain that all tubes are installed in the unit. V1 through V4 are 6DJ8 dual triodes, V‘ is 5651 Voltage Reference; V6 is 6JC6A Pentode; V7 is 6GC5 Pentode and V8 (inside Power Supply Chassis) is 6CA4 Full-Wave Rectifier.

2. CHECK CIRCUIT BOARD GROUND

2.1. Connect SA-5 to SA-5 Power Supply.

2.2. Set BOTTOM switch of SA-5 Power Supply to the RIGHT position. Connect BLACK lead of DVM to chassis ground (MINUS side of C55) . Use most sensitive DC resistance scale of DVM.

2.4. Check DC resistance from circuit board ground to Third Prong (ground pin) of Power Supply AC Mains cord.

--DC RESISTANCE SHOULD BE LESS THAN 0.5 OHMS.

3. PREPARE, UNIT FOR TEST.

3.1. Set variac to zero volts.

3.2. Plug SA-5 Power Supply into variac. Turn ON SA-5 Power Supply.

3.3. ADJUST THE CIRCUIT BOARD BIAS TRIMPOTS: This should only be done if you have a high-quality distortion analysis set (Sound Technology 1700, Audio Precision System One or equivalent). If you do not have this equipment, do not change the settings on these potentiometers because you will likely mis-bias the tubes, causing an increase in distortion.

Before adjusting the trimpots, look at Section 14. If you have the equipment and time to perform the bias Adjustments, set the four trimpots (VR2, VR3, VR102, VR103) to 12:00 position.

3.4. Check for good mechanical feel of switches and potentiometers. Adjust switches to the positions described below:

(the switches are described from LEFT to RIGHT)

-ROTARY SWITCH 1 : Install a "TEST" knob. Check for number of positions. Should have 4 positions. Leave fully CCW.

-SW 1 : leave in down position.

-SW 2 : down,

-SW 3 : up,

-POT : CCW,

-POT : CCW,

-SW 4 : down,

-SW 5 : up

-POT : CCW.

3.5. CHECK ALL CONNECTORS FOR SHORTS:

Connect a male phono connector to your second DVM. Set the DVM to 20K ohms. Plug the connector into each jack on the unit rear.

Look for shorts (readings less than 20K‘ ohms). Two jacks on left should read 17k ohms.

NOTE: The two jacks at the RIGHT side of the SA-5 SHOULD read zero ohms. These are the MAIN OUTPUT JACKS.

4. LOW VOLTAGE TEST OF HIGH VOLTAGE REGULATOR

4.1. Set DVM to 1000 (or more) DCV scale.

4.2. Leave BLACK lead of DVM connected to circuit ground (MINUS side of C55).

4.3. Connect RED lead of DVM to PLUS side of C55.

4.4. Turn ON SA-5 Power Supply (top switch to RIGHT.)

4.5. Open variac to approx. 80% of Nominal Mains voltage.

LED on front should light RED.

All tube filaments should light.

After approx. 30-45 seconds, voltage across C55 should rise. Watch AC Ammeter for high current (over 1 approx. amp is high current). If there is no high current, go to Step 5.

5. FULL VOLTAGE TEST OF HIGH VOLTAGE-REGULATOR

5. 1. If there i s no high current, and voltage across C55 i 5 higher than 100 volts, raise vari ac to Nominal AC Mains Voltage.

DC VOLTS SHOULD RISE TO A HIGH VALUE (270 TO 290 VDC) THEN V5 SHOULD LIGHT UP (GLOW BRIGHT ORANGE) AND DCV SHOULD DROP TO 235 TO 250 VDC.

NOTE: IF DCV BETWEEN 254 AND 260, TURN VARIAC TO ZERO VOLTS. WAIT FOR V5 TO TURN OFF AND TRY ANOTHER 5651 TUBE. GO TO BEGINNING OF STEP 5.1. IF THIS DOES NOT SOLVE THE PROBLEM, THE VALUE OF R57 MUST BE DECREASED TO DECREASE DCV.

5.2. AFTER THE UNIT HAS HAD FULL VARIAC VOLTAGE FOR ONE MINUTE, THE RELAY AT THE REAR SHOULD HAVE CLICKED, AND THE LED SHOULD HAVE CHANGED FROM RED TO GREEN.

6. CHECK MAIN OUTPUT CONNECTORS FOR SHORTS:
Connect the male phono connector of your second DVM to the two MAIN OUTPUT jacks on the unit's right.

MAIN OUTPUT JACKS SHOULD READ MORE THAN 20K OHMS AFTER THE LAMP HAS CHANGED FROM RED TO GREEN.

7. CHECK TUBE VOLTAGES

7.1. Check the following voltages:

7.1.1. REARSIDE R5 AND 8105	:	30 TO 40 VOLTS,
7.1.2. REARSIDE OF R10 AND R110	:	75 TO 87 VOLTS,
7.1.3. REAR SIDE OF R20 AND R 120	:	55 TO 65 VOLTS.

NOTE: Low plate voltage may be due to 1 ac E, of minus (-) grid bias voltage. Check voltage at grid. Should be between -0.2 VDC and -O.6 VDC.

8. MAKE CHANNEL "A" SIGNAL CONNECTIONS

For the following Signal Continuity Tests, Counterpoint uses a 1 kHz square wave passed through an RIAA pre-emphasis box. This is a very valuable piece of equipment, as i t allows a quick check of a phono preamplifier's equalization from 100 Hz to 10kHz. Included with this document is a schematic for such a pre-emphasis device.

8.1. Connect Signal Generator to Channel "A" High Gain RIAA Input.

8.2. Set Signal Generator to "RIAA" Position.

8.3. Connect Oscilloscope to Channel "A" Tape Output.

8.4. Set vertical sensitivity of Oscilloscope to .2 volts/div.

9. CHECK CHANNEL "A" PHONO SECTION

9.1. Observe the Oscilloscope. There should be a square wave of approx 2 divisions Peak-to-Peak.

9. 2. Move the Signal Generator to the Channel "A" Low Gain RIAA input.

9.3. Observe the Oscilloscope. There should be a square wave of approx. _____ divisions Peak-to-Peak.

9.4. Move the Signal Generator back to the Channel "A" High Gain RIAA input.

10. CHECK CHANNEL "A" LINE SECTION

10.1. Connect Oscilloscope to Channel "A" Main Output.

10.2. Observe the Oscilloscope. There should be a square wave of approx. 2 divisions Peak-to-Peak.

NOTE: The LED must be GREEN for signal to be present at the Main Output jacks.

11. MAKE CHANNEL "B" SIGNAL CONNECTIONS

11.1. Connect Signal Generator to Channel "B" High Gain RIAA Input.

11.2. Set Signal Generator to "RIAA" Position.

11.3. Connect Oscilloscope to Channel "B" Tape Output.

11.4. Set vertical sensitivity of Oscilloscope to .2 volts/div.

12. CHECK CHANNEL "B" PHONO SECTION

12.1. Observe the Oscilloscope. There should be a square wave of approx. 2 divisions Peak-to-Peak.

12. 2.Move the Signal Generator to the Channel "B" Low Gain RIAA input.

12.3. Observe the Oscilloscope. There shoald be a square wave of approx. ____ .divisions Peak-to--Peak.

12. 4.Move the Signal Generator back to the Channel "B" High Gain RIAA input.

13. CHECK CHANNEL "B" LINE SECTION

13.1. Connect Oscilloscope to Channel "B" Main Output.

13.2. Observe the Oscilloscope. There should be a square wave of approx. 2 divisions Peak-to-Peak.

NOTE: The LED must be GREEN for signal to be present at the Main Output jacks.

14. ADJUST BIAS FOR LOWEST DISTORTION

If you set the small circuit board trimmer potentiometers to 12:00 position as described in Step 3.3, you must now adjust them to achieve low distortion in the Phono and Line Sections. If you did not adjust the potentiometers in Step 3.3, go on to Step 15.

14.1. ADJUST PHONO STAGE FOR MINIMUM DISTORTION.

14.1.1. Inject a 100Hz 3OmV RMS sine-wave signal into the High-Gain phono input.

14.1.2. Connect your distortion set to the SA-5s Main Outputs. Adjust the SA-5s Volume control for approx. 1V output.

14.1.3. Monitor the distortion residue on an oscilloscope, as well as a pair of headphones.

14.1.4. Using trimpot VR2 (or VR102 if you are adjusting the "B" channel), first adjust the bias voltage for minimum distortion. With some brands of tubes, there will be a distortion "null", where a higher or 1ower bias setting causes an increase in distortion. Some other brands have high distortion at one end of the trimpot, and lower distortion at the other.

14.1.5. Adjust VR2 (or V102) counter-clockwise just enough to eliminate the third-harmonic "kink" in the residue as shown on the oscilloscope display. The sound of the residue will smooth out to a pleasant-sounding sine wave. The goal is the least amount of distortion with the smoothest sound.

14.2. ADJUST LINE STAGE FOR MINIMUM DISTORTION.

14.2.1. Inject a 1 kH 100mV sine wave into the High-Gain phono input.

14.2.2. Adjust the SA-5's volume control for a 1V output signal.

14.2.3. Use VR3 (VR103 for the "B" channel) to adjust the distortion to a minimum value.

14.3. Perform Step 14.1 and 14.2 on both channels. This completes the bias setting of the SA-5.

15. SHUTDOWN PROCEDURE

15.1 Remove all test leads.

15.2. Turn variac to zero.

15.3. Discharge 8+ supply with 1000 ohm 2-5 W resistor connected between + and - of C55. Requires about 30 seconds.

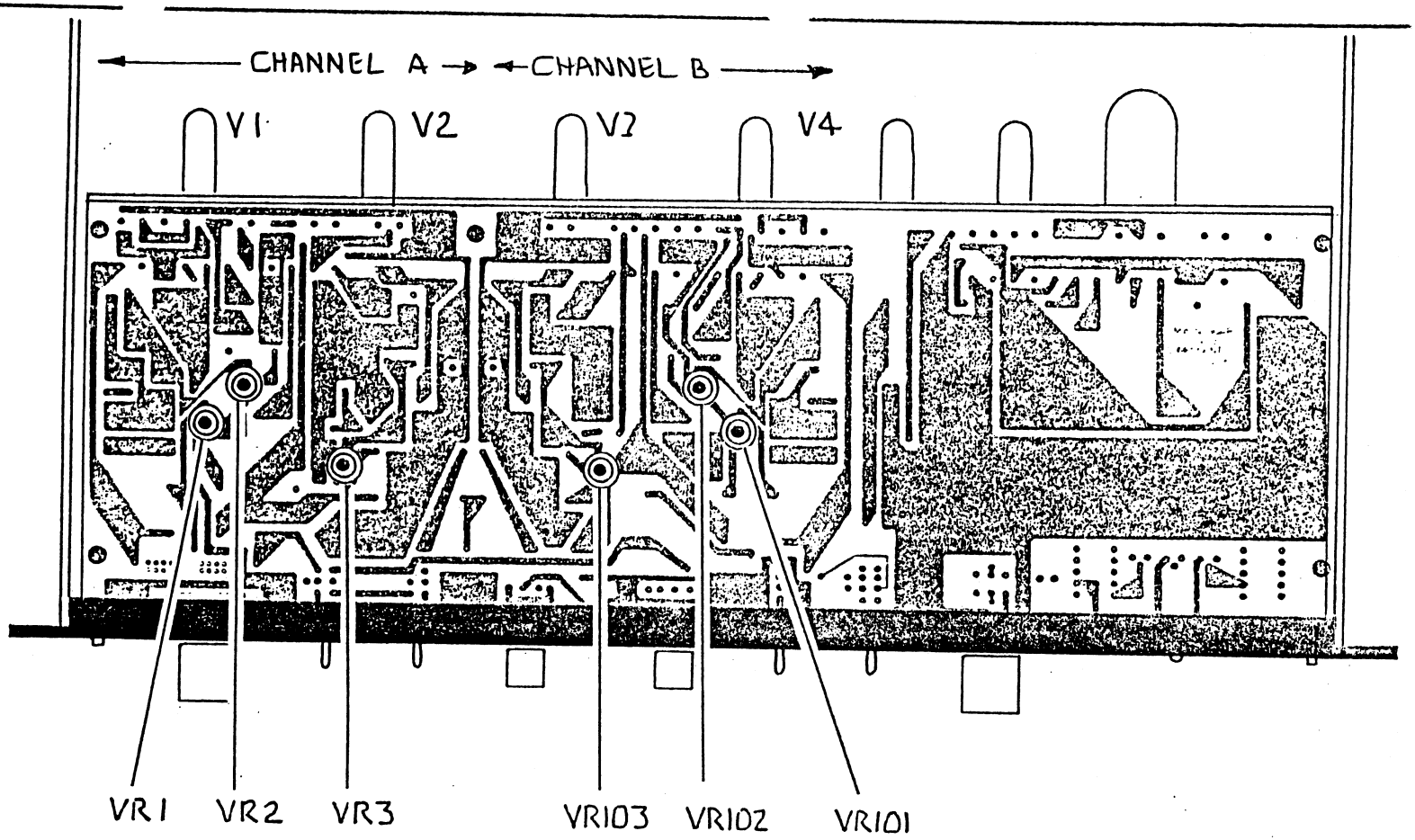

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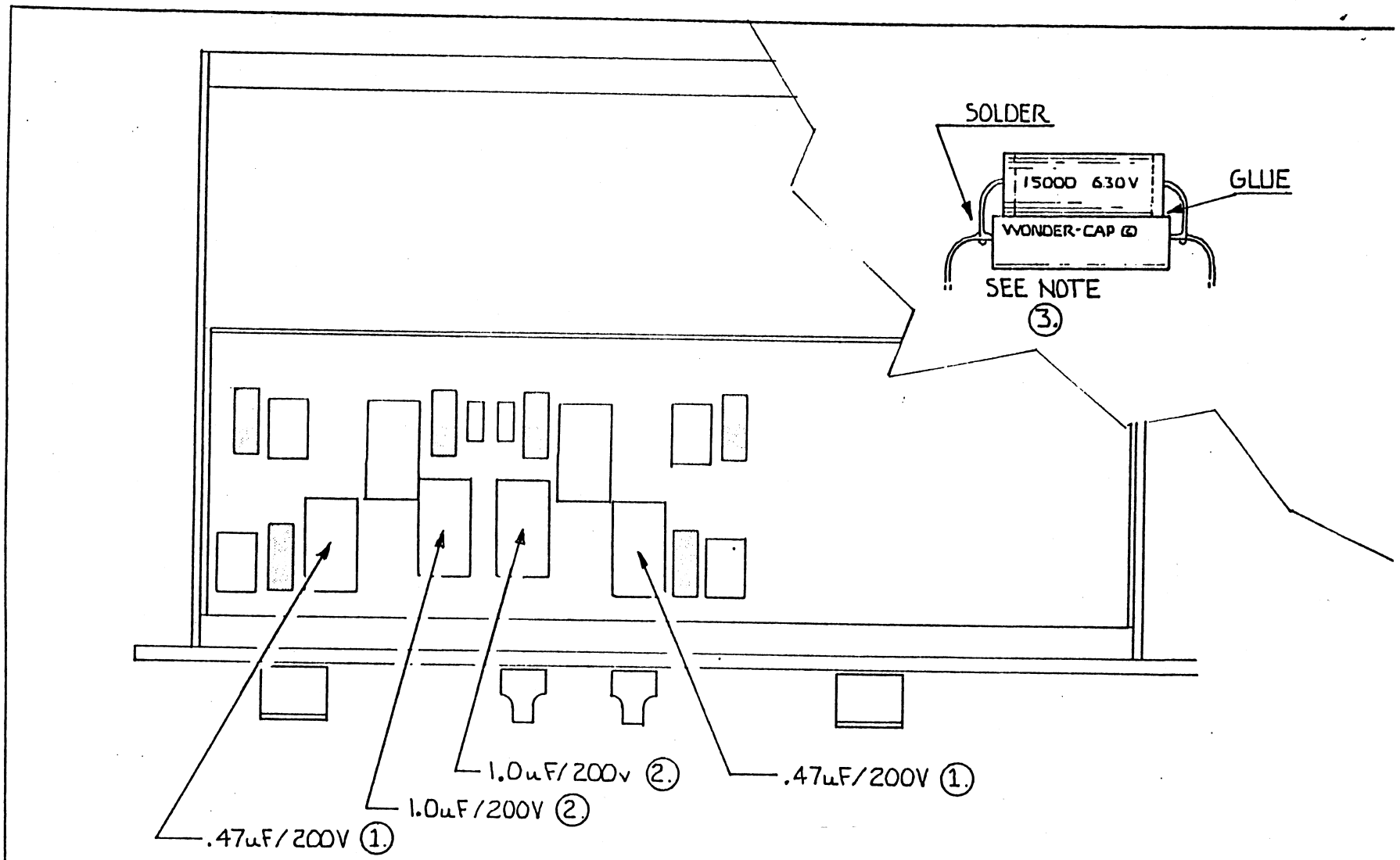
FIGURE 1. LOCATION OF BIAS POTS.

SIZE C | SA-5 | DRAWING NUMBER | REV

SCALE | SHEET OF

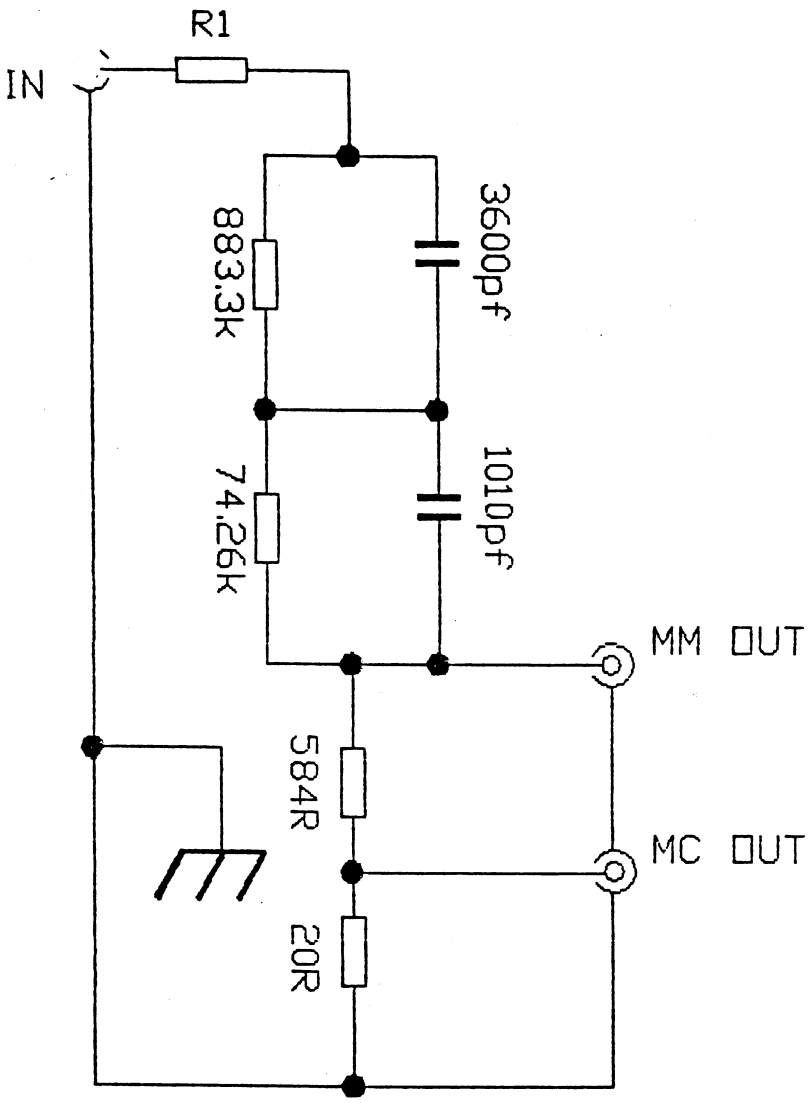


1. WAS 8.0uF/200V. ELIMINATE STATIC SHIELD, IF USED.
2. W 8.0uF/200V. ELIMINATE STATIC SHIELD, IF [illegible]D.
3. INSTALL .01uF BYPASS, AS SHOWN. ALL FOUR PLACES.

COUNTERPOINT
ELECTRONIC SYSTEMS, INC.

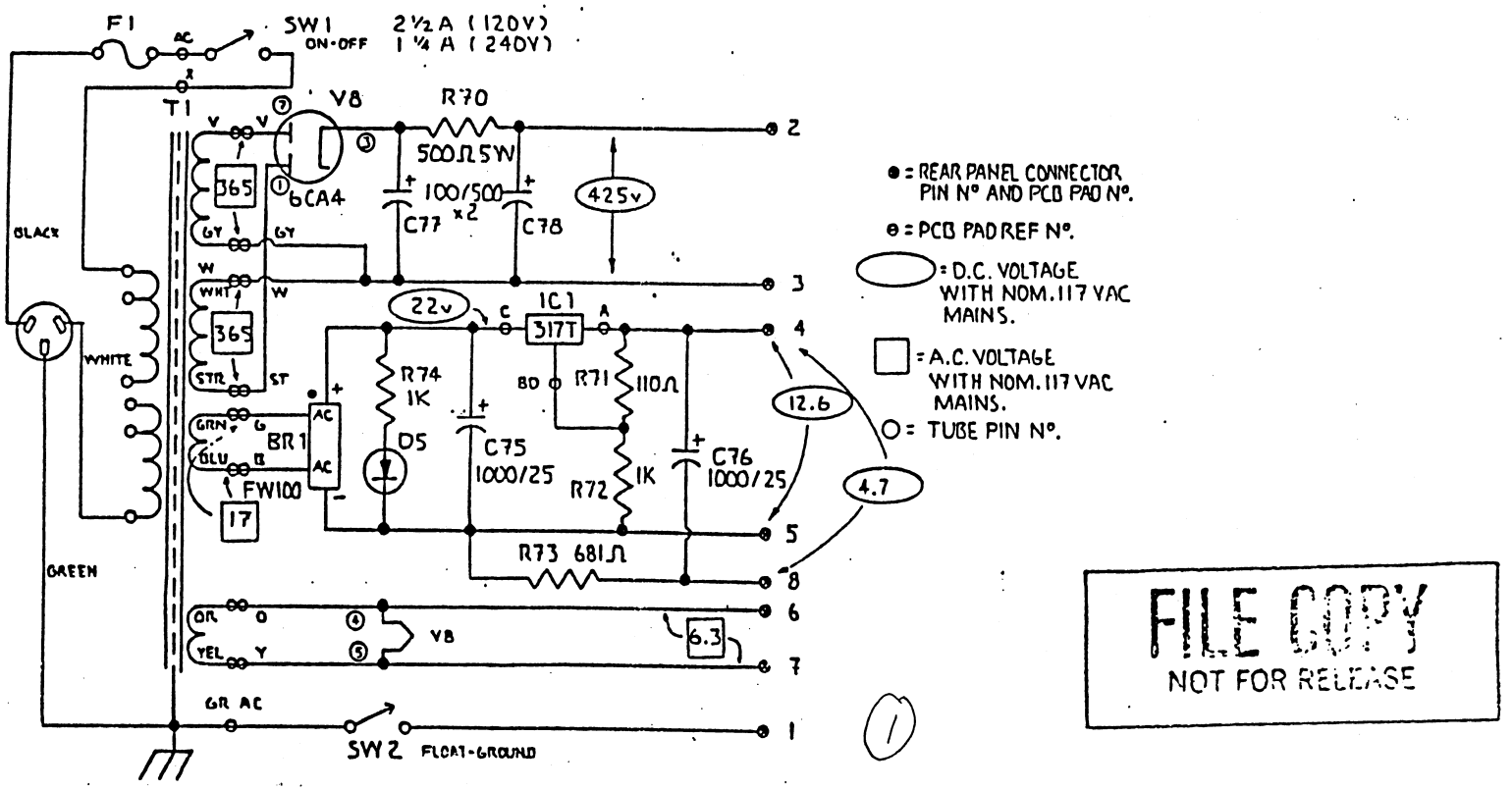
5 Hz HIGH-PASS MODIFICATION
USED ON JAPAN SA-5s

SIZE C | DRAWING NUMBER SA-5 H.P.5 | REV



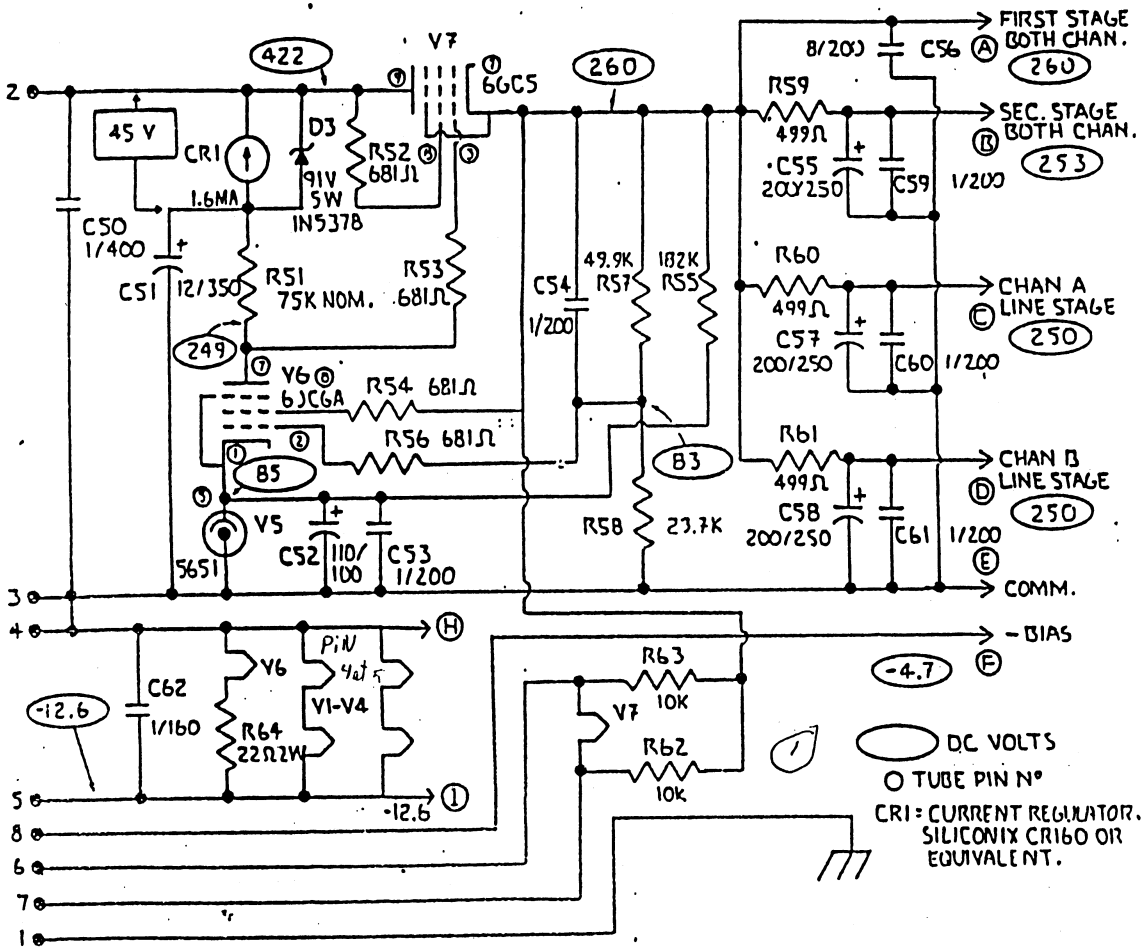
R1 = 300 - GENERATOR SOURCE IMPEDANCE

RIAA PREEMPHASIS CIRCUIT



NOTES: 1. All resistors 1% Metal Film 1/4 or 1/2 Watt unless otherwise indicated.
2. All capacitors shown Mfd/Voltage

COUNTERPOINT	
D.C. POWER SUPPLY, SA-5	
SIZE C	DRAWING NUMBER 7005-1S



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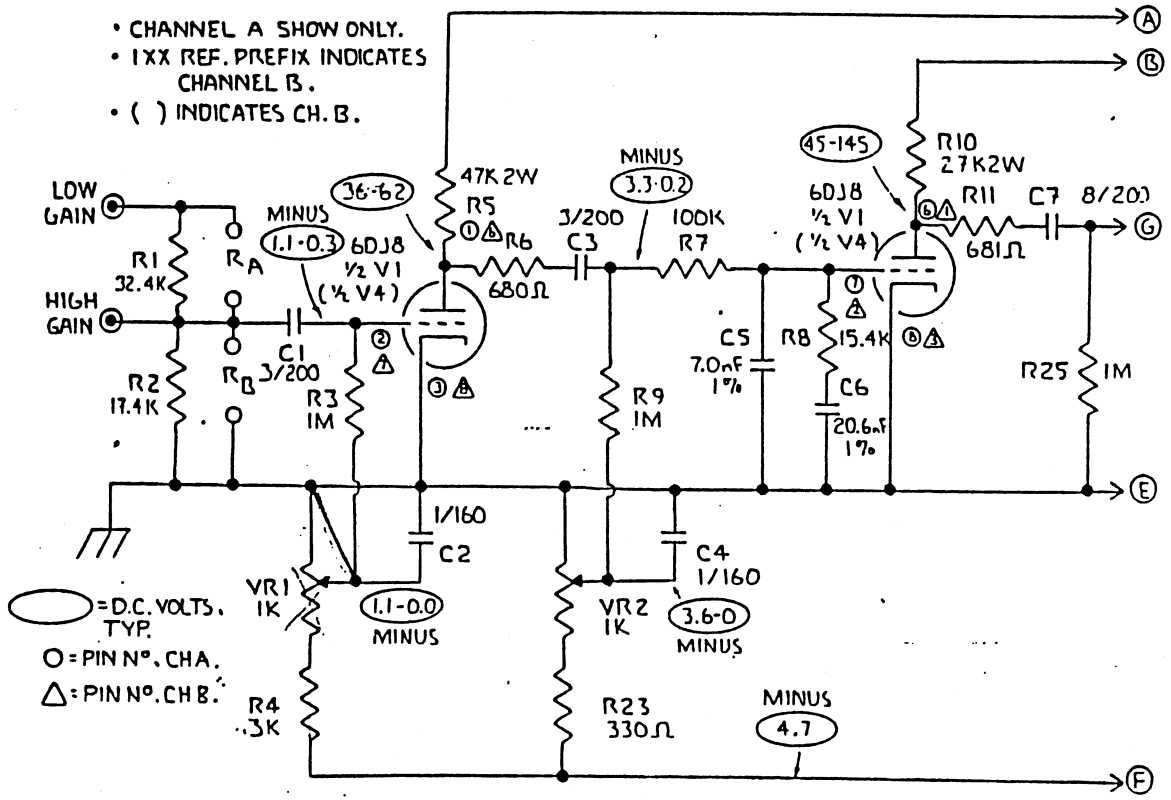
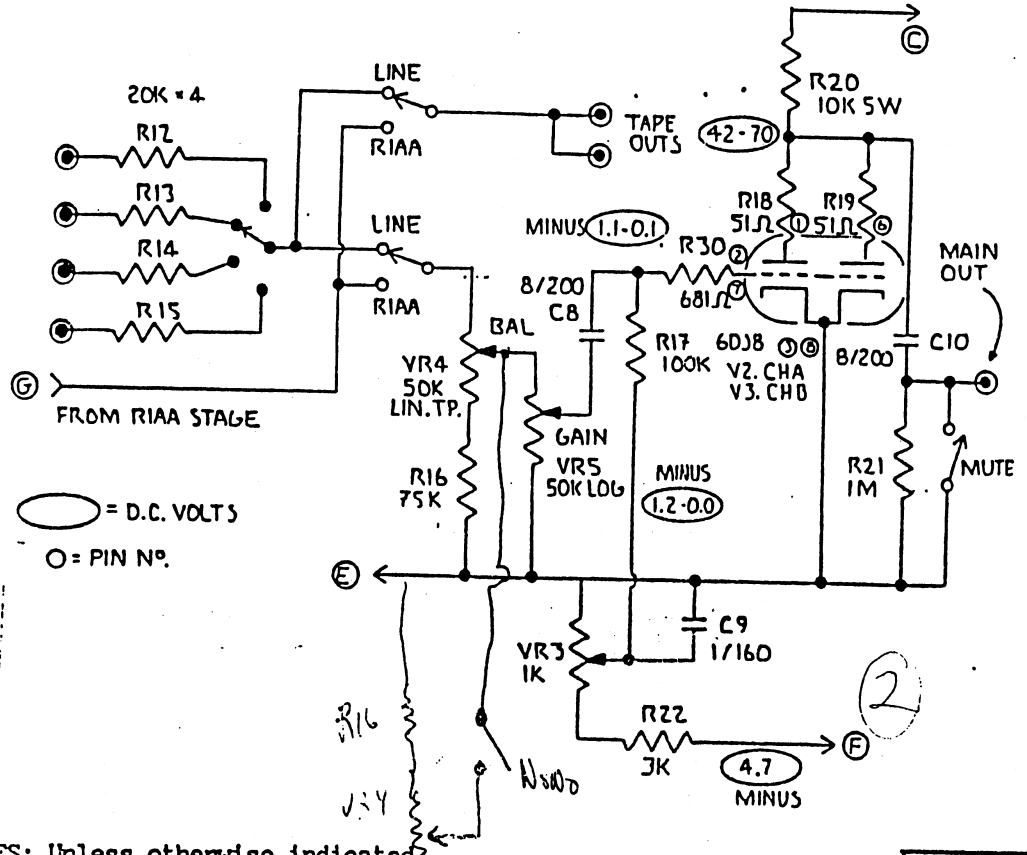
NOTES: Unless otherwise indicated.
1. All resistors 1% Metal Film 1/4 or 1/2 Watt.
2. All capacitors shown as Mfd/Voltage.

	COUNTERPOINT
	SA-5
	VOLTAGE REGULATORS AND ROUTING
SIZE C	DRAWING NUMBER 7005-2S REV



NOTES: Unless otherwise indicated.
1. All resistors 1% Metal Film 1/4 or 1/2 Watt.
2. All capacitors shown as Mfd/Voltage.

	COUNTERPOINT
	SA-5
	RIAA STAGE
SIZE C	DRAWING -3S



NOTES: Unless otherwise indicated:
1. All resistors 1% Metal Film 1/4 or 1/2 Watt.
2. All capacitors shown as Mfd/Voltage.

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	COUNTERPOINT
	SA-5 SIGNAL ROUTING AND LINE STAGE
	SIZE C · DRAWING NUMBER 7005-4S · REV