



111 Powdermill Road, Maynard, Mass.

SERVICE BULLETIN  
For  
MODEL 222D STEREO AMPLIFIER

SPECIFICATIONS

Maximum power output each channel at 1000 cycles: Music waveforms.....	24 watts
Steady state.....	20 watts
Maximum total harmonic distortion at rated output.....	0.8%
Frequency response for 20 watts steady state at less than 1.0% total distortion.....	20 to 20,000 cycles *
Power bandwidth at rated distortion (IHFM method).....	20 to 20,000 cycles *
Signal for rated output--NAB (NARTB) tape at 1 kc.....	3.0 mv.
Signal for rated output--RIAA equalization at 1 kc.....	3.0 mv: (MAG LOW)
Signal for rated output--RIAA equalization at 1 kc.....	9.0 mv. (MAG HIGH)
Signal for rated output--Ceramic, Tuner, Extra, and Playback.....	0.50 volts
Hum and noise.....	80 db. below rated power
Scratch Filter.....	Above 5 kc.
Treble boost and Treble cut (at 10 kc.).....	15 db. + 2 db.
Bass boost and cut (at 50 cycles).....	15 db. + 2 db.

(These characteristics are measured at a line voltage of 117 volts rms and line frequency of 60 cycles per second. No significant changes of characteristics should be experienced for normal variations of line voltages or a line frequency of 50 cycles per second.)

Input impedance--low level inputs.....	Approx. 50 k. ohms
Input impedance--high level inputs.....	500 k. ohms
Minimum recommended load resistance on tape outputs.....	200 k. ohms
Maximum recommended cable capacitance on tape outputs.....	200 mmfds.
Range of line voltage and frequency.....	105-125 volts, 50-60 cycles
Power consumption--117 volts at 60 cps (A.C. only).....	170 watts

\* All H. H. Scott amplifiers and preamplifiers incorporate a sharp cutoff filter (12 db. or sharper per octave) which becomes fully operative below 20 cycles. This is designed to prevent overload of the output stage and the loudspeaker due to subsonic rumble frequencies and record eccentricity. This means that the full power of the amplifier can be concentrated into the audible range.

GENERAL SERVICE NOTES

1. Check the tubes, particularly those in the power output stage and the rectifier every year. If the tubes are outside the manufacturer's rating or show gas, they should be replaced. Gassy tubes may damage other components of the circuit.
2. When the amplifier is being checked yearly, clean the tubes of dust so that they may radiate their heat more effectively.
3. If, at any time, the hum or noise increases noticeably, check the power tubes. This symptom is often an indication of gassy tubes.
4. If the amplifier blows fuses frequently, check the line voltage. If it rises above 125 volts, drop the line voltage by means of an auto-transformer or place a voltage regulator transformer between the amplifier and the line. If the line voltage is correct, check the amplifier itself. Do not use fuse sizes other than the fuse size specified.

5. Pilot Light Replacement

- a. Remove tube V102.
- b. Remove the pilot light assembly by inserting a sharp instrument (a screw driver or knife) between the Control Shield and the Assembly Clip.
- c. Remove the old bulb and install the new #47 bulb.
- d. Reinstall the light assembly by snapping it into the hole. Reinstall the tube and tube shield.

6. D. C. Balance Adjustment

To make this adjustment, a short audio cable which has an audio (phono) plug on one end and bare wires on the other is needed. Insert the plug into the Right Channel Tuner input, and connect the two bare wires to the Left Channel speaker terminals (High and 0). Connect a loudspeaker to the Right Channel speaker terminals (High and 0). Connect the Green wire that comes through the plastic grommet to the Right Channel speaker impedance terminal which matches the impedance of the speaker being used. Remove V3 (a 6U8 tube). Set the controls as follows:

Input Selector.....	Tuner
Power Switch.....	Off
Stereo Selector.....	Stereo
Bass and Treble Controls.....	0
Stereo Balance.....	0
Loudness Control.....	0
Compensator.....	Loud
Tape.....	Out
Scratch.....	Out
Speakers.....	On
Equalization.....	Either Position

Insert the line cord into an A.C. outlet and turn the unit on. Wait a few minutes for the amplifier to completely warm up. Slowly turn the Loudness Control clockwise until you can just hear a low hum in the loudspeaker. (If you turn the volume up too high,

the amplifier will oscillate and produce a motorboating noise). Take a small screwdriver and adjust the L Channel balance adjustment control (on top of chassis) for minimum hum. (Hum is a 120 cycle low frequency noise--do not confuse it with any high frequency noises present).

Turn off the amplifier and replace the tube V3. Connect the audio cable to the Right Channel speaker terminals (High and 0) and insert the plug into the Left Channel tuner input. Connect the loudspeaker to the Left Channel speaker terminals (High and 0). Connect the Red wire that comes through the second plastic grommet to the Left Channel speaker impedance terminal that matches the speaker impedance. Remove V103 (the other 6U8 tube). Keep the front panel controls the same. Turn on the unit, and adjust the R Channel balance adjustment control for minimum hum. Turn off the amplifier and replace V103.

7. Bias Adjustment

- a. Set the L and R Bias Adjustment Controls to their extreme counter-clockwise positions.
- b. Connect an audio cable from Bias Test Point L to Channel L Tuner input.
- c. Set the Front Panel controls as follows:

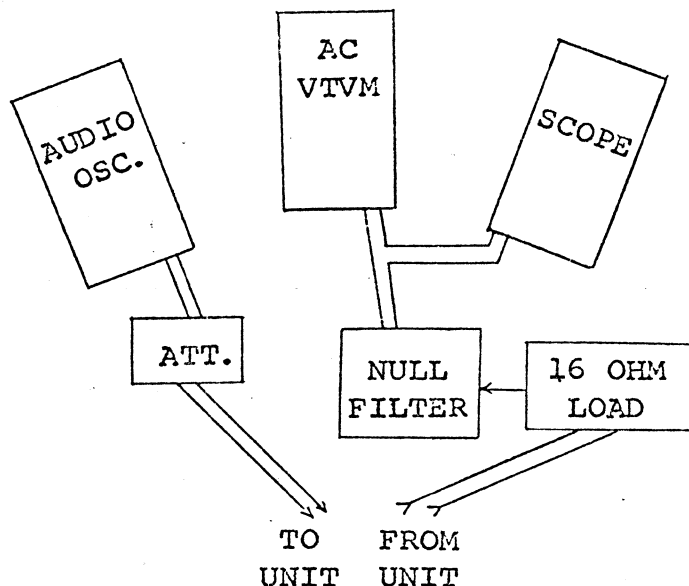
Power Switch.....Off  
Input Selector.....Tuner  
Stereo Selector.....Stereo  
Bass (L & R).....Extreme counter-clockwise  
Treble (L & R).....Flat (0)  
Balance.....Flat (0)  
Loudness.....0  
Equalization.....Either  
Tape.....Out  
Scratch.....Out  
Speakers.....On  
Compensator.....Vol.

- d. Turn the unit on and turn the Loudness control full clockwise.
- e. Locate the Bias Adjustment Switch on top of the chassis and slide the button back and forth. This will produce a CLICKING sound in the speaker.
- f. Continue to slide the button back and forth causing the click to continue. At the same time, using a small screwdriver, turn the L channel Bias Adjustment control clockwise slowly. The click will become very faint and then begin to increase. Readjust the control to the point where the click is the faintest.
- g. Remove the audio cable from Test Point L and insert the plug into Test Point R.
- h. Repeat the procedure outlined in steps e. and f. but adjust the R channel Bias Adjustment Control.
- i. Because these two controls interact somewhat, you should repeat steps f, g, and h alternately until the faintest amount of clicking is heard.

# INSTRUMENT ALIGNMENT

## Equipment Needed:

Audio Oscillator  
 AC VTVM  
 Oscilloscope  
 Volt-Ohm Meter  
 Load Box  
 Attenuator  
 400 cps Null Filter



## Control Positioning:

Input Selector.....Extra  
 Stereo.....Stereo  
 Tone Controls.....Flat ("0")  
 Loudness Control.....Maximum  
 Stereo Balance....."0"  
 Tape-Monitor Switch.....Out  
 Pickup Switch.....#1  
 Scratch Filter.....Out  
 Compensator.....Loud  
 Speaker Switch.....On

NOTE: Due to variations in tubes, voltages at the plates (pin 6) and screen grids (pin 3) of V3-A and V103-A may have a differential of as much as 30%. Normal is approximately 50v. A 10% variation may be found on all other tubes.

### 1. Balance Adjustment

(It is suggested that the VOM not be used in this adjustment as there may be too much voltage drop. A 100 to 500 full scale non-switchable milliammeter should be used instead.)

Connect a 16 ohm load to the 16 ohm speaker terminals. Remove both phase splitter tubes and adjust the DC balance pots for minimum meter reading. Do this for both channels. With the phase splitter tubes still removed, set the bias to 44ma (both channels) with the bias pots, measuring from the Cathode Current Test Points on the chassis.

### 2. Sensitivity Check

Connect the audio oscillator, through the attenuator, into the Left Channel Extra Input Jack. Set the audio oscillator to .4v output at 400 cps. The Output reading on the VTVM should be 18v (20 watts), undistorted. The input voltage of .4v may be adjusted to  $\pm 2$  db to obtain the 18v output. Connect the oscillator to the Tuner input jack and move the Input Selector switch to the Tuner position. You should obtain the same output as in the above.

### 3. Distortion Check

Using the 400 cps null filter, the distortion must be no greater than 0.6% as read on the VTVM.

### 4. Tone Control Check

Bass (50 cps)	Treble (10 kc)
Boost 15 db	11 db
Cut 15 db	15 db $\pm 2$ db

Be certain that electrical zero agrees very closely with mechanical zero.