

1. Clamp the board in the Panavise. Set all tone controls to flat and all level controls to minimum. Set cue select to OUT. At this time the board will have been carefully checked to make sure that all parts have been inserted in the correct direction and that there are no solder bridges in the circuit. Also, the LED and Cliff jacks will be installed.

2. Connect the ohmmeter, the Simpson 260. Clip the black lead to the tab on the positive regulator, the 7812. With the range switch on R X 1 and on +DC polarity measure on leads 1 & 3 of the 7812. The resistance should exceed 500 ohms on both leads.

3. Switch the meter to -DC polarity and read on leads 2 & 3 of the 7912 regulator. The meter should read over 1K. If readings are low on this step or the last one, find out what is shorting out the power supply.

4. Preset the isolated AC supply to 120V AC and shut it off. Connect the test transformer to the supply and to the M4. Set the current range switch to 1A. After turning on the supply at this time, the current consumption of the unit after turn on surge, will be negligible on the meter. Under .1 Amps. If anywhere near .1Amps or over, you have trouble. Switch off and clear fault before proceeding.

5. Set signal generator to 1KHz and .5V RMS output and connect with an RCA-RCA lead from the test panel generator output jack to one of the Tape 2 inputs. Note that Int/Ext switch on the generator must be on INT.

6. Connect another RCA-RCA lead from the mixer main output to one of the dummy load input jacks. Set the impedance selector switch to OPEN. Connect the scope A channel to the lead from the dummy load channel selected and set the scope to 2V/Cm and .5mS/cm. Use DC coupling. We will use B channel with the probe for troubleshooting as necessary.

7. Turn the Tape 2 and MAIN LEVEL controls to maximum. There should be an output signal of 8 to 12Volts P-P. If you get no output, check IC4 pin 1 for DC offset. This is the mic pre-amp and a DC offset of more than a few hundred millivolts will block the main signal and kill the output. If this is OK, check for a 4 to 6 V P-P signal at the hot lead to the Tape 2 pot. If OK check IC2 Pin 7 for a signal of 2-3 V P-P. If OK check IC2 pin 1 for a signal of about 3-4 V P-P. If OK try IC3 Pin 1 for 4-6V P-P. If OK the problem lies in or about IC3B. If the circuit appears to oscillate or ring at low frequency if the attenuator switch in the signal generator is turned down then back up a notch rapidly, then R54 & 55 near IC3B have been transposed. This was a problem in our first run. The 22K goes between pins 6 & 7 of IC3B while the 39K goes from pin 6 to ground.

© 1982
D. Fraser

8. Once a signal get through successfully with no discernable distortion, pull out the input lead and try the other Tape 2 input.

9. Turn the TAPE 2 level control to min, connect the input lead to tape 1 and repeat the procedure on step 7. If tape 2 works OK, tape 1 usually will also.

10. Repeat step 8 for Tape 1.

11. Reset the generator to an output of 5mV and move the input cable to DISC 2. Turn the level control to max. The output should be about 6Volts P-P. If a bit of hum is visible this is normal and will not appear in the finished unit.

12. Switch the generator to 100Hz and reset the scope as needed. There should be a clipped signal of about 20V P-P.

13. Switch the generator to 10Khz and adjust scope as necessary. The signal should be about 1.2 V P-P. In steps 12 and 13, a 25% variation from levels stated is tolerable.

14. Reset scope to 1Khz and move lead to other Disc 2 input to ensure its proper operation. Turn control to min.

15. Repeat 11 to 14 for DISC 1.

16. Move input lead to TAPE 2 and reset generator to .5V RMS. Turn TAPE 2 pot to max. Reduce level to 2V P-P output level.

17. Turn Mid. control to max.

18. Level should be about 4V P-P

19. Turn MID control to min. Output should drop to about 1V P-P. Return control to mid position.

20. Set generator to 10Khz and turn treble control to max. Scope should show about 8 to 10 V P-P.

21. Set treble control to min and check for level of .4 to .5 V P-P. Return control to mid position.

22. Set generator to 100 Hz. Turn bass control to max. Level should be about 8V P-P.

23. Turn bass control to min. Level should be about .5 V P-P. Return control to mid.

24. Turn tape 2 to zero.

16mV
← 25. Set generator to 160mV RMS. Connect a $\frac{1}{4}$ " to $\frac{1}{4}$ " cable from generator output jack to the mic jack. Turn level control for main level and mic to max. The level should be about 4-5 V P-P.

26. Set generator to 3Khz. Turn MIC TREBLE to max, and check for level of about 12V P-P.

27. Set MIC TREBLE to min and check for level of about .6-.7 V P-P. Return control to mid position.

28. Set generator to 100 Hz and turn the MIC BASS to max. Scope should show about 18V P-P.

29. Set MIC BASS to min and check for level of about 1.1 V P-P. Return control to mid. Note that levels on tone control checks are $\pm 25\%$.

30. Remove lead from MIC input jack.

31. Turn the TAPE control up until the LED switched from green to red. If the LED has not been connected, a scope lead connected to the 3302, pin 1 can monitor a change of state. The switchover should occur at a level of 2.8V P-P approximately.

32. Set output to 2V P-P.

33. Disconnect the RCA lead from the dummy load and connect the $\frac{1}{4}$ " to $\frac{1}{4}$ " cable to it.

34. Set cue select switch to OUT and turn the cue level control to mid.

35. Insert the phone plug into the headphone jack until a signal shows up on the scope. Note, that inserting a mono jack all the way into the socket will short out the signal. A partial insertion is sufficient.

36. Set IMPEDANCE SELECTOR on the test panel to 8 ohms. The output level attainable before clipping should be at least 5V P-P.

37. Set cue selector to tape 2 and check for a signal.

38. Set cue selector to T1 and touch the TAPE 1 input jacks with your finger.

39. Check for output on the scope. The cue level control may have to be turned up to maximum.

40. repeat 38 and 39 for Disc 1 and 2.

41. If a listening test is desired, move the $\frac{1}{4}$ " lead from the dummy load to speaker in jack. Then move the RCA lead from the generator out jack to the RCA speaker out jack for the same channel you are using for the $\frac{1}{4}$ " speaker in cord. Set cue switch to OUT and then turn up levels as desired. Wattmeter may be connected to the IN RCA jack to read the level from the cue amp. It should show at least .5 Watts before any serious distortion is audible.

42. Disconnect everything and proceed to final assembly.

Finis.

©1982
D. F. F. F.

M4 MIXER P.C.B.

