uses two 6DJ8 tubes per channel in a constant-current cascode differential configuration. The documentation and board layout are excellent. This mod has two boards, one for the driver and the other for high-voltage plate and screen regulation. I didn't use the second board in this test, as it adds considerably to the cost and complexity.

The power supply from the VTA mod was used for both the Curcio and the GSI. This board is about one inch longer than the stock Dyna driver board and is therefore designed to mount ½ inch above the mounting surface. This is necessary if you use the second regulator board, but since I didn't, I managed to mount it only ⅛ inch above the chassis and still clear all connections safely. This makes for a much more presentable amplifier.

The GSI modification is also a new design for 1989, replacing an older 1985 design. Each channel uses a 12AX7 as a diff-amp connected to a constant current source, and then direct coupled to a 6FQ7 also configured as a diff-amp with plate follower to the output tubes. The board *looks* like a nice design, but the holes for the tube sockets and power resistors are too small to be useful, and the pads are too small to enlarge the holes. I was able to get around this problem by attaching wire leads to the sockets and then soldering them to board connecting traces.

Also, though there is a lot of open space on the board, the components are crowded together. They could easily have been spaced out with the available room. No coupling capacitors are used except to the output tubes. The design specs 0.1μF for these, which seems small compared to the other designs using 0.47μF or more. The hole spacing for these caps is extremely small, requiring small film capacitors. I was able to get around this limitation by using a trick from VTA, mounting the capacitors to the other side of the board, which let me use larger 0.22μF WonderCaps.

The accompanying documentation was better than what I've seen from GSI in the past. However, it was incomplete, with references to pages that weren't included. Some component values weren't specified, especially notable was the proper RC network for the feedback. The parts layout diagram was almost completely unreadable, and a few parts were mislabeled. Thanks only to a clear schematic and thorough study of the board was proper construction possible.

Technical Notes

Stock Dyna ST-70 and AVA—Two 7199 tubes are used, one per channel. This tube has a triode voltage amplifier and a pentode current driver output. Open loop response was a shocker. Bandwidth is only from 50Hz to 5.5kHz, with good square waves from 100Hz to 2kHz. Open loop gain is only 16.

The only way this circuit gets by is through heavy feedback. Closed loop response does extend from 5Hz to 22kHz, with good square waves from 100Hz to 5kHz. The only difference between stock and AVA is that the AVA is purposely bandwidth limited to keep the circuit operating within its useful range. Low end response is rolled off below 20Hz, and the high end rolled off above 25kHz (which the circuit didn't reach with the tubes used). The stock amp maximum power output was 32W/channel, but was up to 35W/channel with the AVA, probably due to the improved power supply.

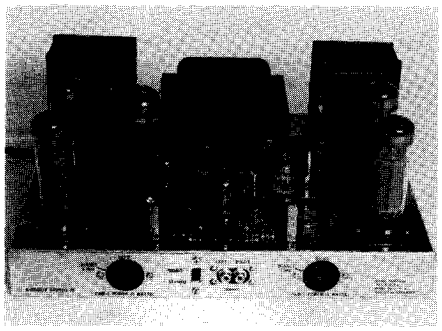
The AVA board is larger than the stock Dyna at 5 by 7 inches, with a cutout for the tube rectifier and access holes for the bias pots. It must be mounted a minimum of ¼ inch above the chassis.

Sutherland—No schematic was provided, and I couldn't track down the part numbers on the JFETs and MOSFETs to determine either the pin-outs or characteristics. Sine wave frequency bandwidth was from 5Hz to 6kHz, not much better than the stock Dyna. Square waves remained fairly square from about 60Hz to 3kHz. Open loop gain is 47. Maximum power output was 35W/channel. This board has the same dimensions as the stock Dyna and mounts exactly the same.

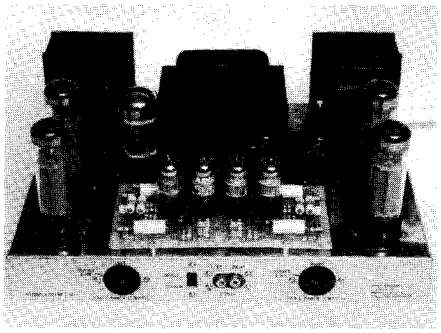
VTA—Three 6201 tubes are used. One half of the first tube is used for each channel as a voltage amplifier. One each of the other tubes is used per channel as a combined phase splitter/driver in a long-tailed pair configuration. 13dB total loop feedback is used.

Parts quality is top notch, with milspec tubes, metal film resistors and WonderCaps. There is an individual bias pot for each output tube, as well as a signal balance pot for the phase splitters. The bias is set for 40mA, about 20% less than stock, to reduce heat and conserve tube life. Power supply capacitance for the B+ totals 470μF. A future version will allow the option of tube or diode rectification, with isolated capacitance for each channel, and double the total capacitance, as well as HV regulation for the driver and LEDs indicating the need for bias adjustment if it drifts out of spec.

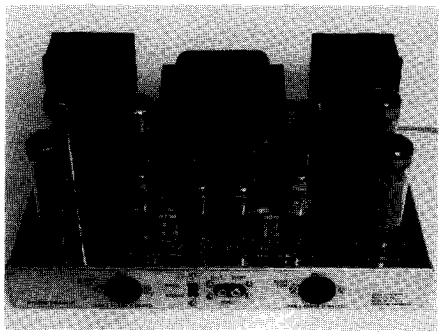
Open loop response of this design is incredible. It has flat frequency response from 7Hz to 70kHz, with good square waves from 7Hz to 30kHz. Open loop gain is 40. The board is 8¼ by 5 inches, with a cutout for the rectifier tube. Maximum power output is 40W/channel.



The Vacuum Tube Audio board is mounted below chassis level and requires punching added holes.



The Curcio mod can utilize two boards, but the author only used the new input board, omitting the new power supply option.



The GSI upgrade board is below chassis level and requires some custom fitting.

Curcio—Provision was made for using film or polypropylene coupling capacitors. The driver design also uses HV regulation. This design uses the stock Dyna bias pots, with an optional trim for each output tube. Open loop response of this design was the best of all tested. Sine wave frequency bandwidth was 5Hz to 80kHz, with good square waves from 5Hz to 40kHz. Open loop gain is 90. Maximum open loop output signal was 200V