The Many Uses of a Hybrid Van Scoyoc Circuit

The Van Scoyoc circuit, invented in 1948, was mentioned in Nov. '06 *aX* ("Improving the Cross-Coupled Inverter," p. 40). You can replace the first tube pair in a Van Scoyoc circuit with junction field-effect transistors (JFETs) without deterioration of sound quality.

The combined input and driver circuit for a power amplifier is shown in **Fig. 1**. Transistors Q1 and Q2 are JFET transistors, and should have an Idss of 12-50mA and be matched for maximum 10% difference in Idss. The value of R3 and R4 depends on both the transistor type and Idss of the transistor used for Q1 and Q2 (**Table 1**). Resistors R9 and R10 should be matched to maximum 1% difference.

The circuit has four input terminals A, B, C, D, and two output terminals X and Y. A and C are inverted inputs, B and D are non-inverted inputs. Y is an inverted input. The A and B inputs have

Parts List

C1	47µF 400V electrolytic
C2	470µF 25V electrolytic
C3	see text
P1	200 or 220Ω potentiometer
Q1, Q2	see text
R1, R2	100k
R3, R4	see text
R5, R6	510Ω 1%
R7, R8	68kΩ 2W
R9, R10	33kΩ 4W
R11, R12	8.2kΩ 4W
R13	22k or 27k 4W
R14	1.2kΩ
R15	see text
V1, V2	6922
ZD1	22V zener 400mW

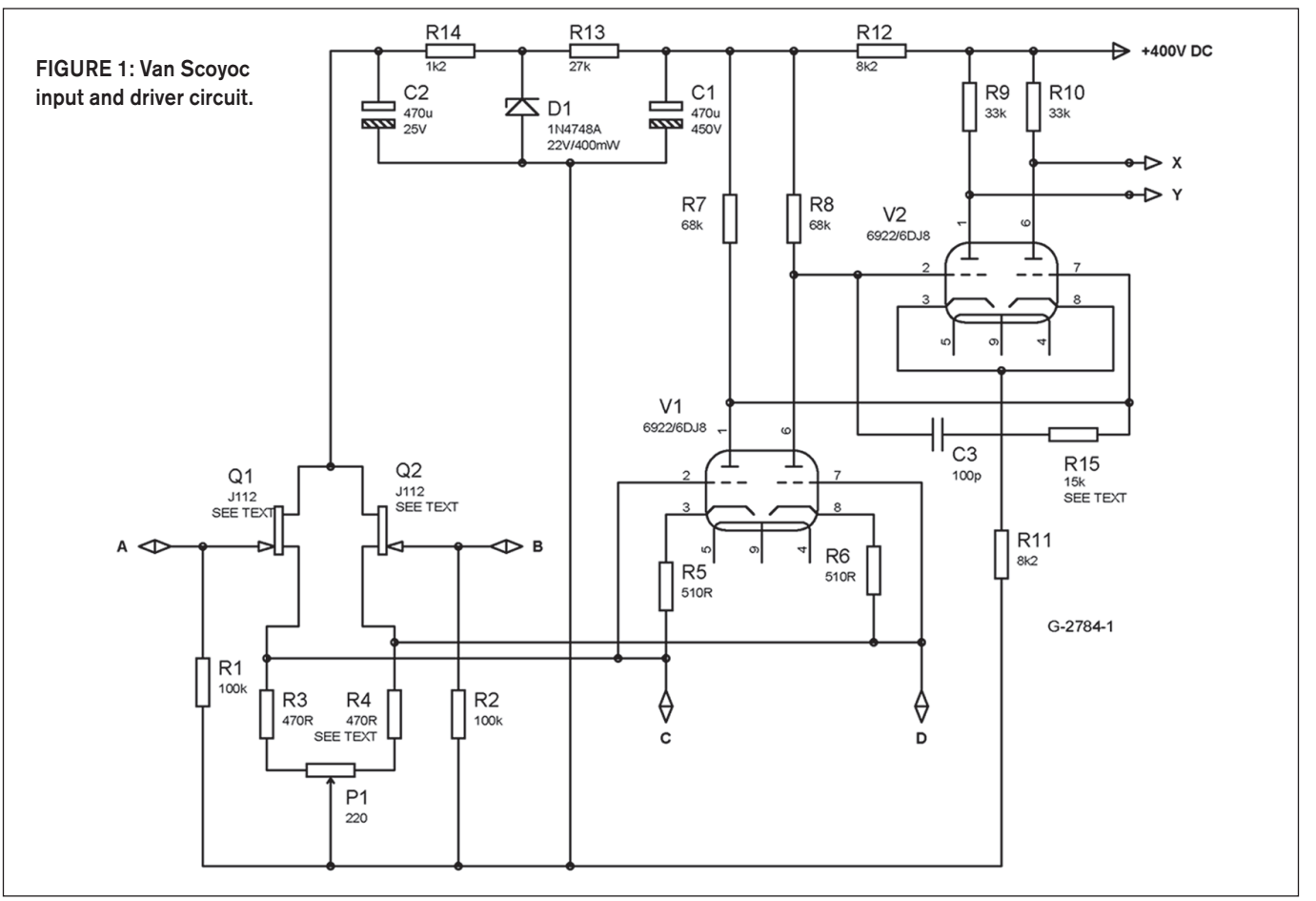

FIGURE 1: Van Scoyoc input and driver circuit.

an input impedance of 100kΩ. The C and D inputs have an input impedance of 50-100Ω, depending on the transistors used.

You should set the potentiometer P1 to 0V DC between terminals X and Y. The bandwidth of the circuit without C3 and R15 is 0-100kHz, and can be limited by C3 and R15. Bandwidth limiting should be used in conjunction with the use of high feedback (**Table 2**).

TYPE OF AMPLIFIERS

You can use the driver circuit for many types of amplifiers: single-ended, push-pull transformer coupled amps, and output transformerless amps. The accompanying figures show the various configurations.

Figure 2 is a push-pull amp with unbalanced input and unbalanced feedback, while **Fig. 3** shows the push-pull amp with balanced input and balanced feedback. **Figure 4** is a single-ended amp with balanced input and balanced feedback, and **Fig. 5** shows a push-pull bridge amp with unbalanced input.

Figure 6 is an OTL amp with unbalanced input. With this OTL configuration, you'll probably choose to make the following modifications: change V2 to 12BH7, R11 to 4.7kΩ 4W, R10 to 18kΩ 4W, and R9 to 15kΩ 4W. *aX*

TABLE 1 Component values for R3 and R4 and gain of the circuit

Q1, Q2	Idss (mA)	R3, R4 (Ω)	gain (Vx/Va)
BF245C	17	470	330
J112	46	330	450
J113	30	220	375
J309	24	180	380
J310	30	330	400
2N5486	14	220	330

TABLE 2 Values for C3 and R15

Feedback	transformer	C3	R15
26dB	OTL	220pF	10kΩ
20dB	OTL	100pF	15kΩ
20dB	high quality	100pF	15kΩ
20dB	medium quality	220pF	15kΩ
14dB	OTL	47pF	33kΩ
14dB	high quality	47pF	33kΩ
14dB	medium quality	100pF	33kΩ

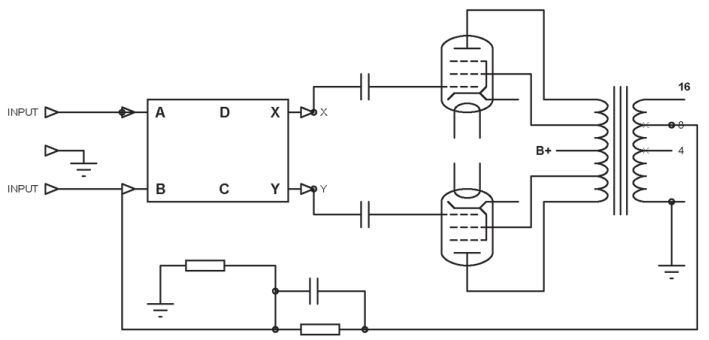

FIGURE 2: A push-pull amp with unbalanced input and unbalanced feedback.

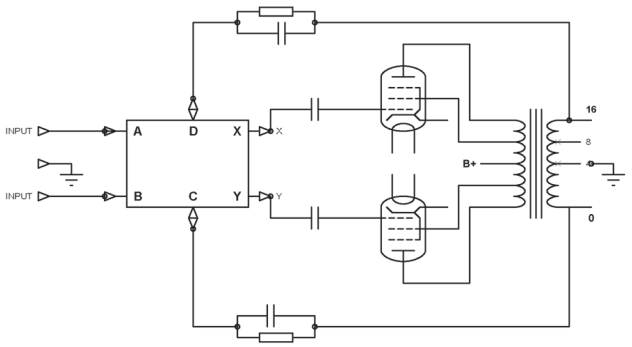

FIGURE 3: A push-pull amp with balanced input and balanced feedback.

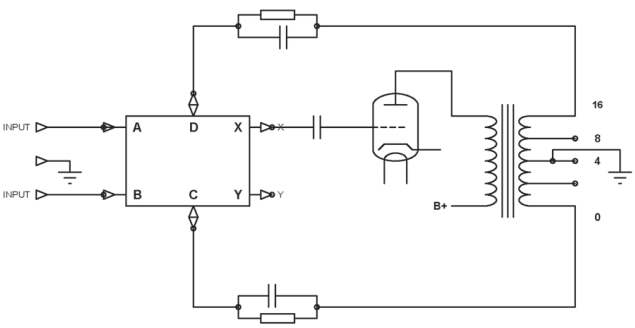

FIGURE 4: A single-ended amp with balanced input and balanced feedback.

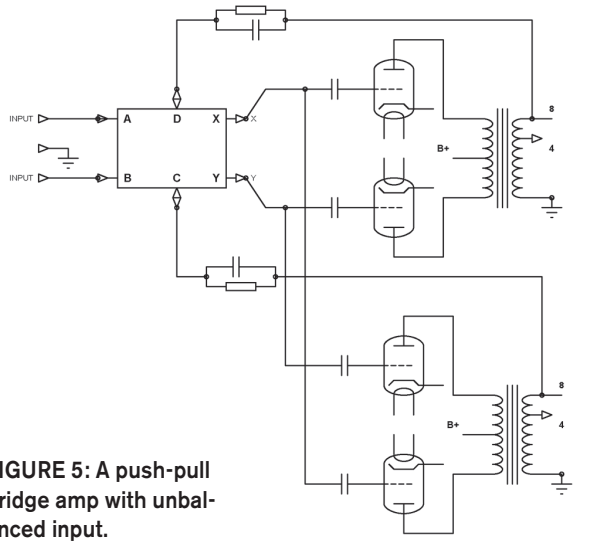

FIGURE 5: A push-pull bridge amp with unbalanced input.

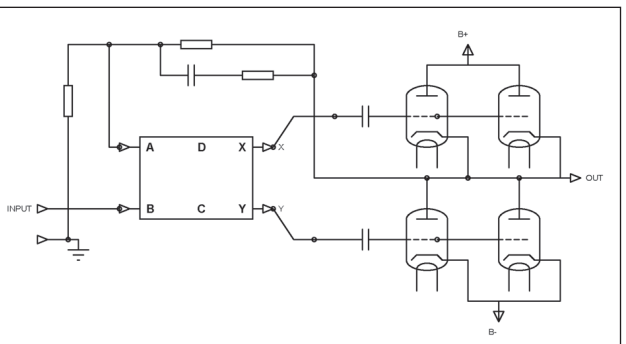

FIGURE 6: An OTL amp with unbalanced input.