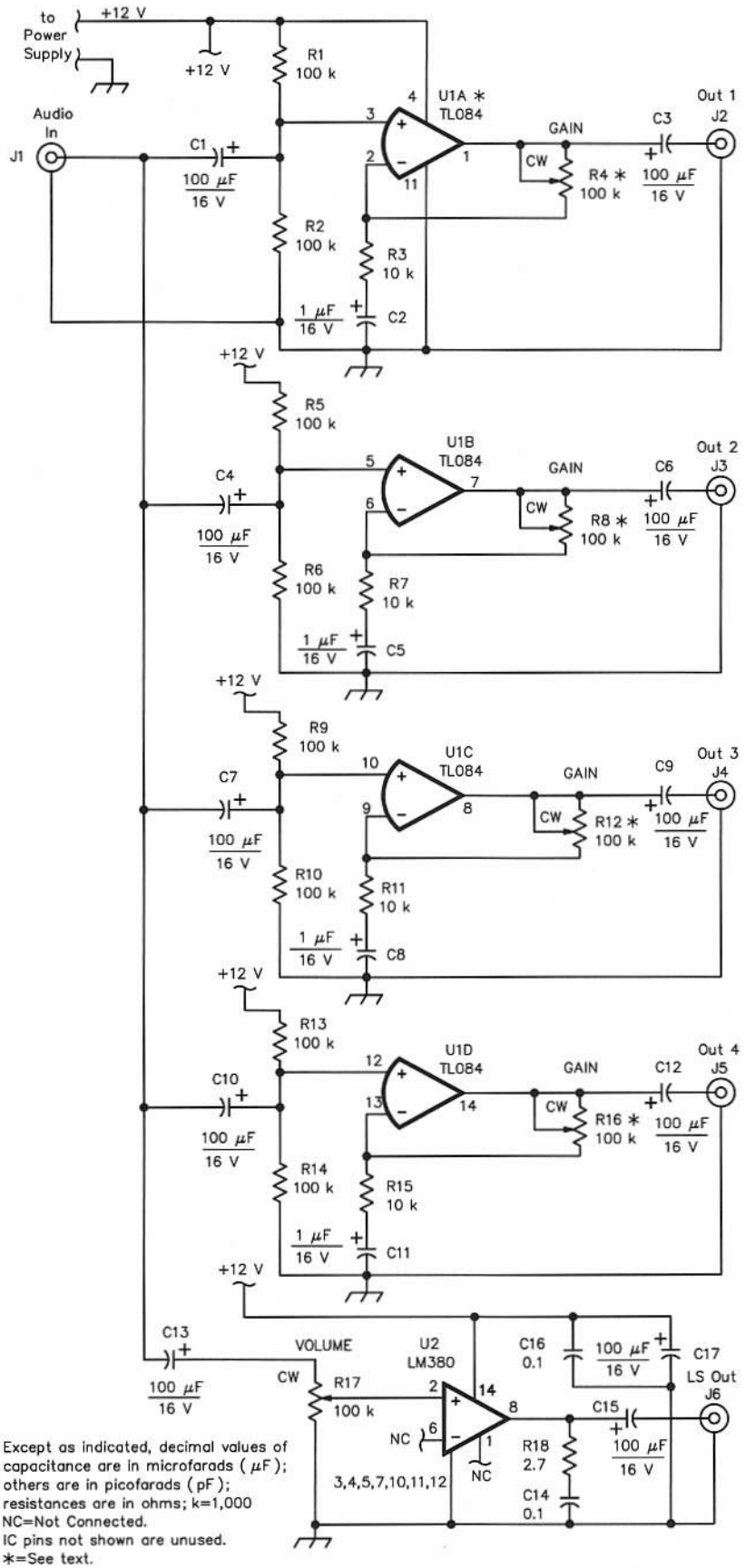
AUDIO BREAK-OUT BOX

Two integrated circuits and a small PC board are all you need to solve the problem of feeding one receiver into several add-ons, such as a TNC, a PC interface or a speaker. Ben Spencer, G4YNM, described this project in March 1995 *QST*. It takes the audio output from a receiver and applies it to the inputs of four identical, independent, low-level AF amplifiers and one high-level (1-W output) AF amplifier.

Each low-level output channel can provide up to 20 dB of gain that's independently adjustable. You can apply audio to each of your accessories at a selected level without changing the level to the other accessories. In addition you can set the level to the speaker independently. Turn the speaker volume up to tune in the signal, and then turn the speaker volume down once tuning is finished and the mode is operating.

Circuit Description

Four identical low-level channels, each feeding an amplifier (U1A, B, C and D), are shown in **Fig 22.56**. Using the top channel as an example, C1 connects the input jack J1 to the noninverting input of U1A. R3 and R4 set U1A's voltage gain.



Except as indicated, decimal values of capacitance are in microfarads (µF); others are in picofarads (pF); resistances are in ohms; k=1,000
NC=Not Connected.
IC pins not shown are unused.
*=See text.

Fig 22.56—This audio break-out box requires less than 500-mA from a 12-VDC supply. All resistors are ¼-W, 5%-tolerance carbon-composition or film units unless otherwise specified. RS numbers in parentheses are RadioShack stock numbers.

C1, C3, C4, C6, C7, C9, C10, C12, C13, C15, C17—100 µF, 16-V radial electrolytic or tantalum (RS 272-1028).

C2, C5, C8, C11—1 µF, 16-V radial electrolytic or tantalum (RS 272-1434).

C14, C16—0.1 µF, 50 V disc ceramic (RS 272-135).

R1, R2, R5, R6, R9, R10, R13, R14—100 kΩ.

R3, R7, R11, R15—10 kΩ.

R4, R8, R12, R16, R17—100-kΩ log or audio taper, panel-mount potentiometer (RS 271-1722) or PC-board vertical-mount trimmer potentiometer; see text.

R18—2.7 Ω, ½ W.

U1—TL084, TL074, or LM324 quad op amp (RS 276-1711).

U2—LM380N 2-W audio power amplifier. The LM380 is available in several packages. Be sure to use the 14-pin DIP if you are going to build this project on the PC board from FAR or from the ARRL template.

Misc: Single-sided PC board (see Notes 1 and 2), enclosure, knobs, IC sockets, input and output connectors of choice, hook-up wire.

R4 is the gain control, and when set fully clockwise (maximum resistance), the amplifier's gain is 10 (20 dB). At a counterclockwise (minimum resistance) setting, the amplifier's gain is 1 (0 dB).

The lower cut-off frequency (set by C2 and R3) is 16 Hz. The upper cut-off frequency of each channel is well beyond the audio frequency range. Each channel's output is dc isolated from its load; for example, U1A's output is dc isolated by C3.

R17 is the volume control for AF power amplifier U2 This stage will drive a low-impedance load such as a loudspeaker (4 to 16 Ω) at a level up to 1 W.

Construction

A single-sided PC board is available,[1] but the unit will work equally well built on perf-board. A template available from the ARRL[2] includes a PC board layout and a parts layout. This parts layout also can be used as a guide for construction on perf-board. The PC board directly accepts vertical and horizontal-mount single-turn potentiometers, but you can run wires from the mounting holes to front-panel-mount potentiometers. Since the project uses high-gain audio circuits, enclose it in a metal box. Place the input and output jacks on the rear panel to keep the interconnecting leads out of the way.

Checkout

After rechecking your wiring and soldering, connect the circuit to a 12-V power supply. The current drawn should be less than 50 mA when no audio is applied. Connect J1 to the AF output of your receiver and a speaker to J6. Adjust R17, VOLUME, for a comfortable listening level. Next check the operation of the low-power outputs by connecting J2, J3, J4 and J5 to a small earplug. Vary the four gain controls to check their operation. Each gain control can now be set to provide the audio level needed for each add-on.

[1]PC boards are available for $6, plus $1.50 shipping, from FAR Circuits (see the Address List in the **References** chapter).
[2]See the **References** chapter for a template.

AN SWR DETECTOR AUDIO ADAPTER

This SWR detector audio adapter is designed specifically for blind or vision-impaired amateurs, but anyone can use it. The basic circuit can be adapted to any application where you want to use an audio tone rather than a meter to give an indication of the value of a dc voltage.

Usually a meter (or meters) is used to display SWR by measuring the feed line forward and reflected voltages. This adapter generates two tones with frequencies that are proportional to these voltages. The tones are fed to a pair of

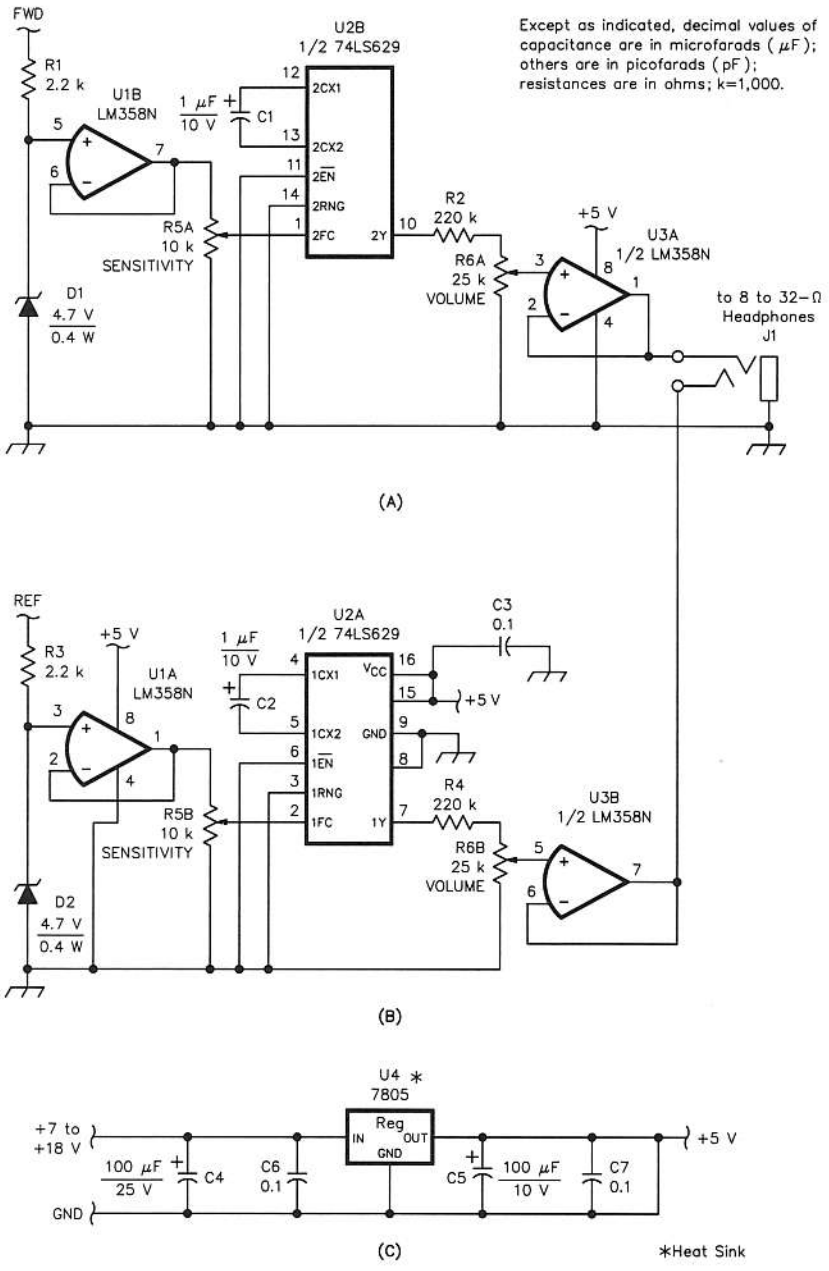


Fig 22.57—Schematic of the SWR detector audio-adapter circuit. Unless otherwise specified, resistors are 1/4-W, 5%-tolerance carbon-composition or film units. All capacitors are disc ceramic unless otherwise stated. The circuits of A and B are identical, each driving one earphone of an 8- to 32-Ω stereo headset. At A, the forward-voltage circuit; at B, the reflected-voltage circuit. A voltage regulator that provides 5-V dc is shown at C.

R5A, R5B—10-kΩ horizontal-mount trimmer potentiometer; optionally, a 25-kΩ dual-gang, panel-mount potentiometer can be used.

R6—25-kΩ dual-gang, panel-mount potentiometer.

U1, U3—LM358N dual op amp (available from Jameco. See the Address List in the References chapter) or substitute an NTE928M (available from Hosfelt Electronics).

U2—74LS629 dual VCO (available from Jameco) or a NTE74LS629 (available from Hosfelt Electronics).

Misc: PC board, stereo headphone jack, 8 to 32-Ω stereo headphones, mounting hardware.