

# Hiss Exterminator

—an ear-saver  
for the TS-700A

If you rather enjoy monitoring noise while waiting for the local SSB gang to sign on for the evening or while parked on the DX frequency awaiting those elusive skip signals on 2 meter sideband, then this modification is not for you. Personally, however, I find continuous background hiss (noise) very distracting, and, after five or ten minutes of it, my ears seem to become numb (perhaps I spent too many years on FM where effective squelch circuits are commonplace). At any rate, I began looking around for a reasonably inexpensive solu-

tion to the problem, and the circuit to be described was the result of that effort.

I'm running the Kenwood TS-700A transceiver on 2 meter sideband (as are many others) along with Kenwood's VOX-3 voice operated transmit/receive switch, so it seemed logical to attempt to utilize as much of the existing circuitry as possible for the audio squelch feature.

If you're not familiar with the Kenwood VOX-3, it's a compact (1-5/8" x 5-1/8" x 4-1/2"), good-looking, and well-engineered box full of electronic goodies, which is

directly usable with the TS-700A and adaptable to other rigs. Its price qualifies it as one of the best bargains in town.

It has "VOX gain," "anti-VOX gain," and "delay time" controls all up front, and it derives its operating voltage from the mating transceiver via a 9-pin miniature tube socket (shades of the good old days) located on the rear apron. But, best of all, it also has about half of the circuitry that's needed for an audio squelch system, namely, the anti-VOX audio detector and its associated amplifier. What I added in the circuit diagram shown is a Darlington connected relay driver amplifier,

a sensitive (and quiet) reed relay, and a way to reroute the audio to an external speaker through this circuitry. Yes, an external speaker must be used when the audio squelch feature is desired (you're probably already using one, though), and a miniature 1/8" phone jack is added to the rear apron of the VOX-3, next to the 9-pin socket, for this purpose. A dummy 1/8" miniature phone plug (the one supplied with the TS-700A) is inserted in the "external speaker" jack at the rear of the TS-700A in order to disable the built-in speaker when using the audio squelch feature.

For purposes of circuit operation details, speaker level audio is tapped off pin 1 on the 9-pin VOX-3 rear socket, fed through the normally-open contacts of the reed relay, and fed back out to the external speaker via the new 1/8" phone jack. The 13-Ohm, 1-Watt resistor shown as R20 acts as a constant load for the audio output stage of the transceiver. The only control on the VOX-3 that has any bearing on the audio squelch circuitry is the anti-VOX gain, which sets the threshold of the squelching action. The hold-in time of the reed relay is determined by C11, the 500 uF electrolytic capacitor across the relay coil. Diodes D9 and D10 will protect the transistors in the relay driver stage from transients, and R21 drops the Vcc (operating voltage) to about 12 V dc,

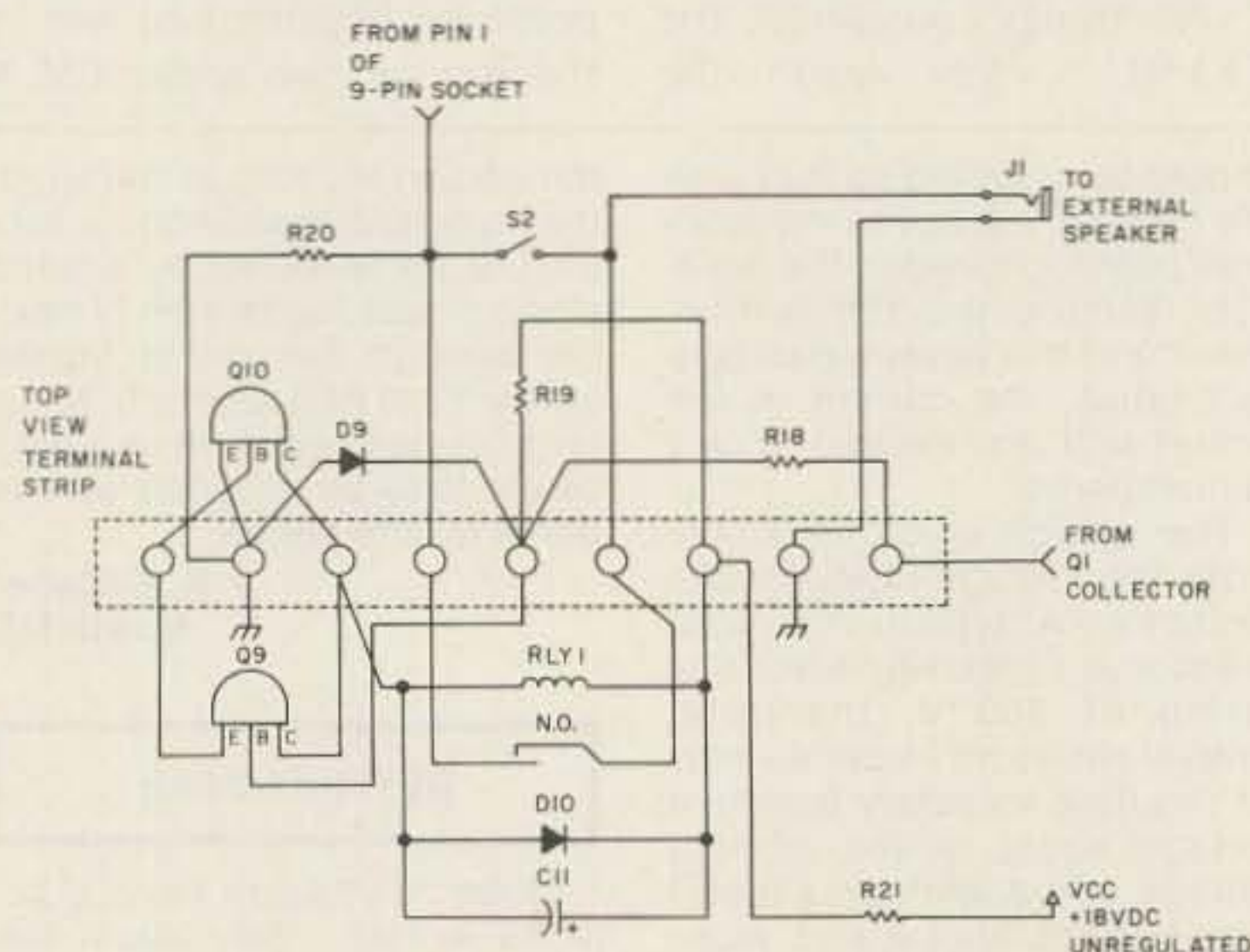


Fig. 1. Pictorial diagram for the VOX-3 audio squelch circuit.

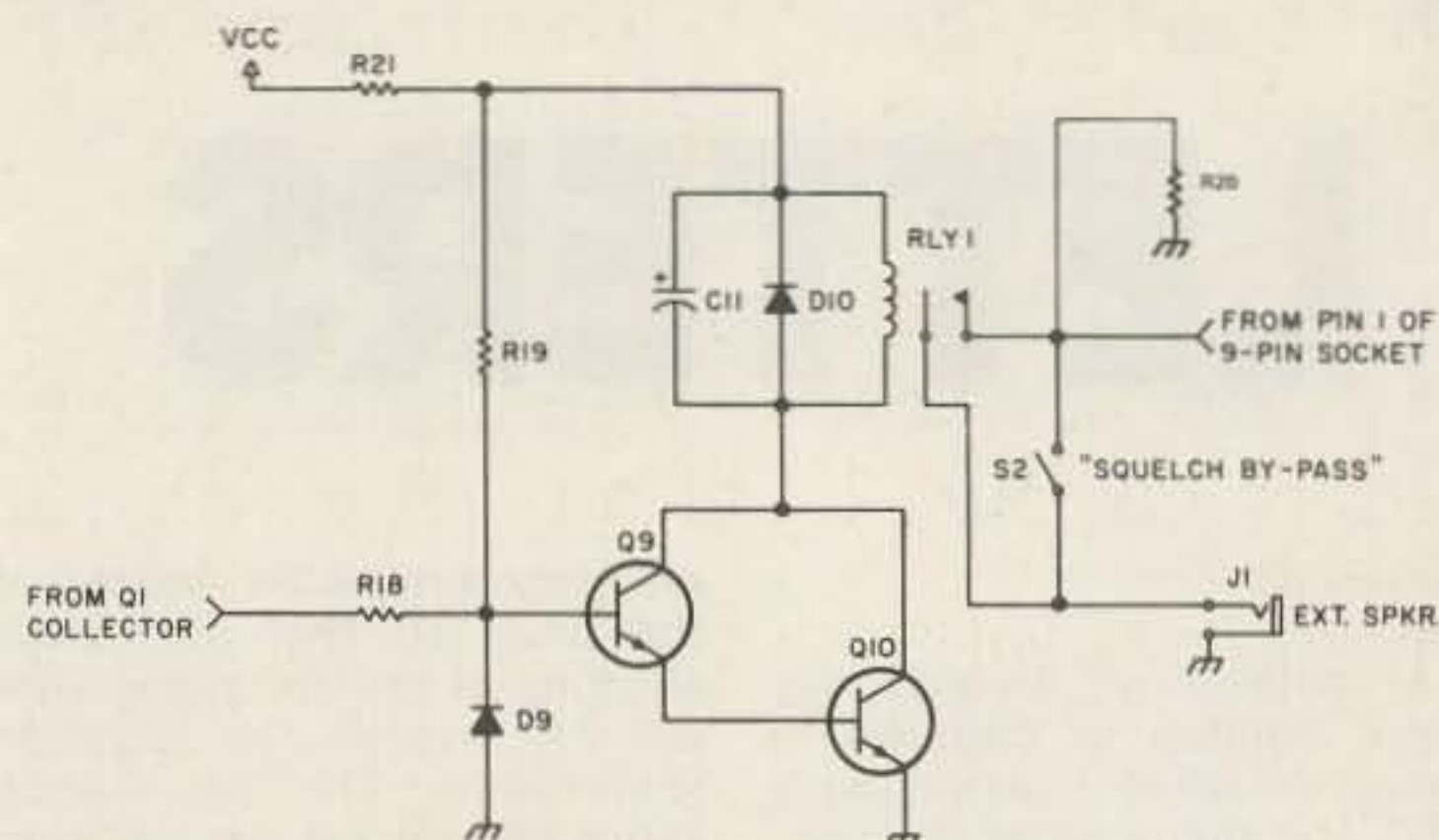


Fig. 2. Schematic diagram for the VOX-3 audio squelch circuit.



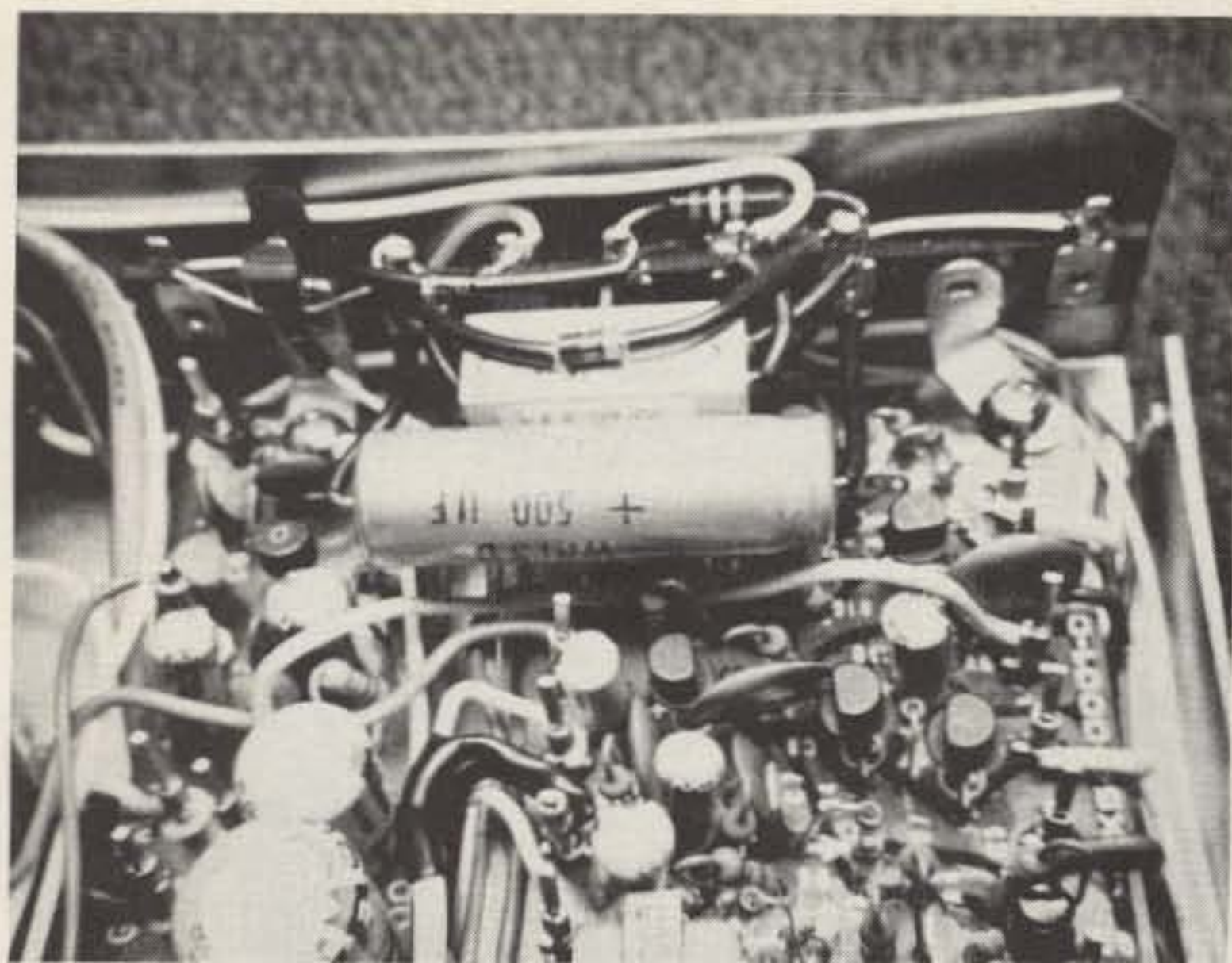


Photo A. Top view of VOX-3 interior showing audio squelch modification.

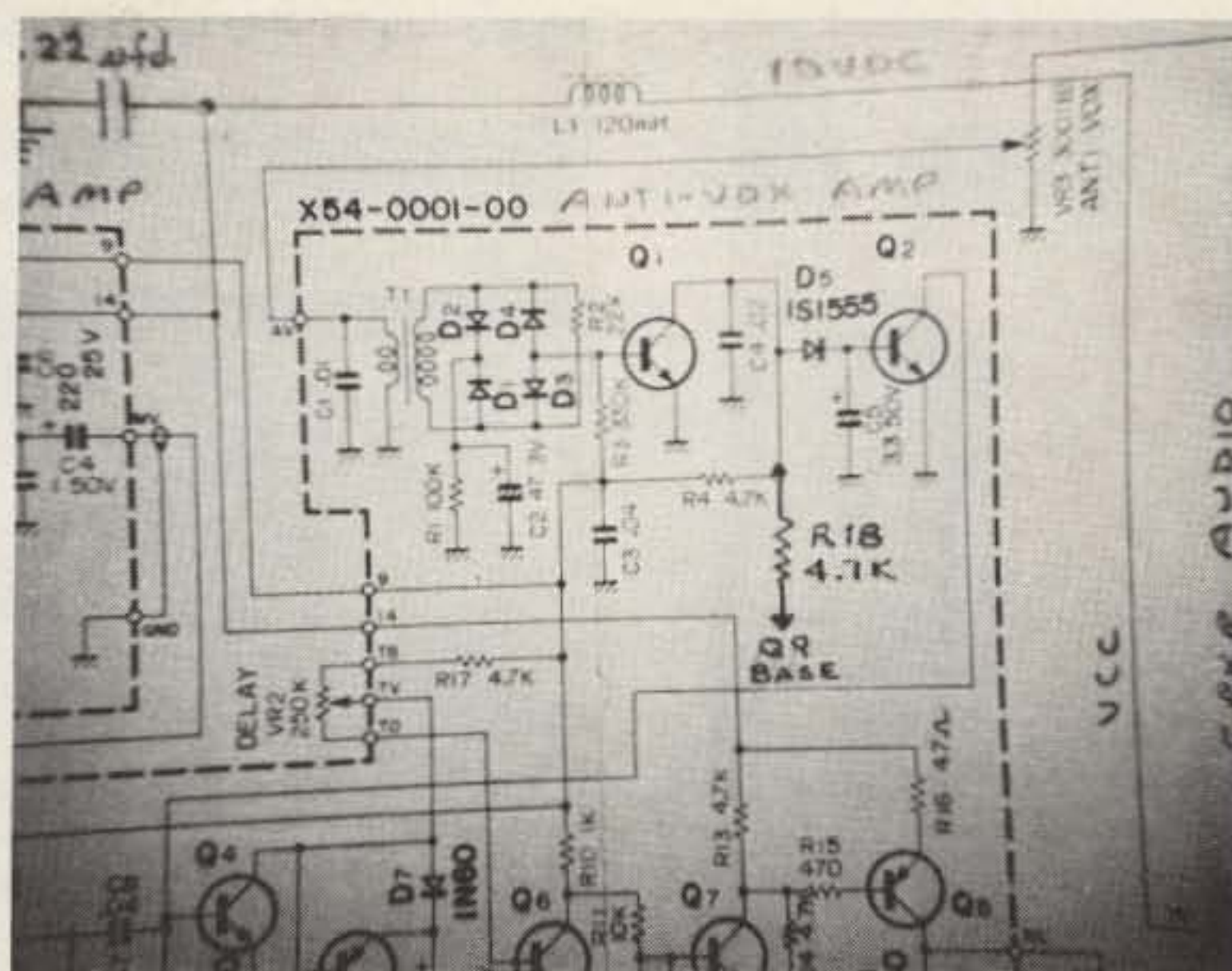


Photo B. Schematic diagram supplied with VOX-3 showing tap-off point for new R18 at Q1 collector.

inasmuch as the Vcc available from the TS-700A is about 18 V dc when operating from 120 V ac mains. R18 and R19 are biasing resistors for the Darlington connected relay driver transistors, and the squelch bypass switch S2 (which I mounted on the front panel midway between the anti-VOX gain and delay time controls) shorts the normally-open contacts of the reed relay when no squelch action is desired or when using the VOX-3 as a VOX unit. Just in case you've wondered, this modification does not hinder you from using the VOX-3 in its old way. Simply activate the bypass switch and operate it as you always have in the past. None of the wiring or parts layout is critical, so feel at ease with whatever physical layout changes you

may wish to incorporate. The photograph of the mounting terminal strip (with all parts installed) and the pictorial layout drawing show how I adapted the circuit to my VOX-3. A 9-lug terminal strip was used, which fit very neatly and required no additional drilling or mounting hardware. The existing circuit board mounting screws are used, and the result is a mechanically rigid finished product. You must remove the four mounting screws from board #X54-0001-00, carefully turn it over, and solder a wire to the Q1 collector circuit foil pad, but this is the only connection that cannot be made from the top of the unit. As mentioned before, speaker audio is picked up from pin 1 of the 9-pin socket; this same socket will provide Vcc on pin 9 and

ground on any of pins 2, 4, or 7.

In order to give you an idea of what to expect in the way of control settings, I normally run all three of the VOX-3 panel controls at the 12 o'clock position when operating VOX control. When using the audio squelch, the anti-VOX gain is run at 10 o'clock with the TS-700A "af gain" at 9 o'clock. The reed relay holds in about

1-1/2 seconds between words on an S9 signal using the 500 uF across its coil, and the unit will unsquelch with a signal too weak to register on the S-meter when standby monitoring with the noise blanker activated.

No claims of engineering excellence are made for this circuit other than that it does work, as WB9DRA and I can testify, and, after all, that's the bottom line! ■

#### Parts List

C11	500 uF, 35 WV dc electrolytic
D9	1N4148 diode
D10	1N4005 diode
J1	1/8" miniature phone jack
Q9, Q10	2N4409 transistors
R18	4.7k, 1/2 W resistor
R19	560k, 1/2 W resistor
R20	13-Ohm, 1 W resistor
R21	220-Ohm, 1/2 W resistor
Rly 1	12 V dc, 400-Ohm coil relay with normally-open contacts (Elec-Trol RA30011121 or equivalent)
S1	SPST miniature toggle switch

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best way for police agencies to trace stolen, lost, or misplaced equipment back to the rightful owner when recovered. I have been waiting for a police officer to write something on the quickest, simplest, and most

sure-fire way, but so far I haven't seen anything about the right way to do it. I am no authority on the subject, but I work in the Communications Service of the Texas Department of Public Safety (State Police), and have had some experience trying to trace equip-

ment.

You would be surprised at the amount of electronic equipment gathering dust in the evidence rooms of the police departments across the country because they could never determine who the rightful owner is. Most of it will end up being sold at public auctions after being held for a period of time.

A serial number or social security number is of no use in trying to trace a piece of equipment to its owner. It could probably be done with a serial number if all the sales of the item were recorded, but no police dept. will go to the time

or trouble to try tracing anything with the serial number. The only useful purpose of the serial number or social security number is to identify a piece of equipment when and if the owner accidentally comes across it and says, "Hey, that belongs to me." The serial number is also used to enter stolen equipment into the National Law Enforcement Teletype System computer (NLETS).

The best way to identify your equipment is with your driver's license number. In front of your DL number, put the two-letter

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