

MORE THOUGHTS ON TAPE RECORDING FROM THE TRF AND OTHER PORTABLE RADIOS

by Mark Connelly

The purpose of this article is to update portable radio-to-tape recorder interfacing techniques initially outlined in the "Travelling DXer" article. (G27)

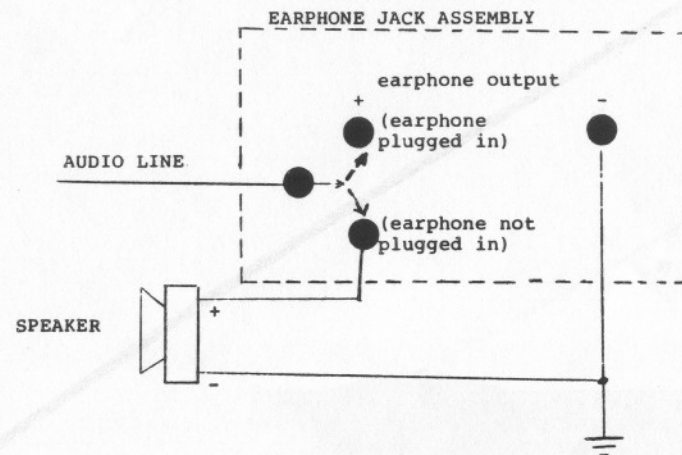
Several considerations were addressed:

1. The earphone jack is best used as a tape-out jack; a separate jack for stereo headphones should be installed for private-listening purposes. Earphones made for portable radios have too poor audio quality to be suitable for extended periods of private listening. The small earphone jack is to be modified to provide audio out and still allow speaker listening. This former earphone jack is treated as a tape-output only.
2. A local speaker/headphone audio level pot should be used so that adequate levels for recording may be put on the audio line without being too loud for comfortable speaker or headphone listening. The speaker or headphone volume may thus be adjusted without effecting the tape-record level set by the main receiver pot.
3. Impedance "seen" by the audio output transistor(s) should be between 4Ω and 40Ω under all conditions.
4. The receiver/recorder interface should accommodate a variety of tape recorder input impedances and acceptable recorder-input levels. Some cheap cassette portables have microphone inputs, but no auxiliary/remote inputs. Mike inputs usually call for a low-impedance, low-level signal. Some, however, call for a low-impedance/high-level signal. Auxiliary/remote inputs on cassette portables and the normal phono-jack inputs of hi-fi cassette and open-reel home component decks require a high-impedance audio input, usually between 500Ω and $50K$. $5K$ is a good high-impedance-condition compromise.
5. Level-varying and impedance-varying interface components should be located as close to the tape recorder input jack as possible; to prevent hum pick-up a low-impedance/high-level audio condition should exist along most of the line from radio to recorder. This requires that the components used to match the tape-input characteristics be installed outside the radio on a small "Vectorboard" (incorporated into the patch cord) near the recorder end of the patch cord.
6. We may occasionally want to use both the speaker and the headphones. Instead of disabling the speaker by plugging in the headphones, a separate switch is used to turn the speaker off or on.

The modifications to the radio and the construction of the necessary patch cord are detailed in drawings to follow.

After performing modifications: Put the receiver on a clear signal at normal listening level after setting the 250Ω local-gain (added) pot at lowest resistance (highest volume). Plug patch cord into recorder and make test tapes at each of the 3 switch positions (on the patch cord switch). If the audio is too low on all switch positions, increase the receiver's main pot, then adjust the installed pot to make the listening level comfortable again. Satisfactory audio levels should then be attainable. If the recording sounds good level-wise, but there is distortion or "motor-boating" (audio oscillation), try a different impedance switch position & make any necessary audio-level readjustments.

Figure 1 - Stock portable radio/audio connections to earphone jack & speaker, before transmogrification.



SUMMARY OF MODIFICATIONS

Figure 2 Drill chassis and mount a stereo headphone jack, a small 0 to 250Ω potentiometer, and a micro-miniature toggle switch at convenient locations on the radio. Wire these up, according to the drawing below:

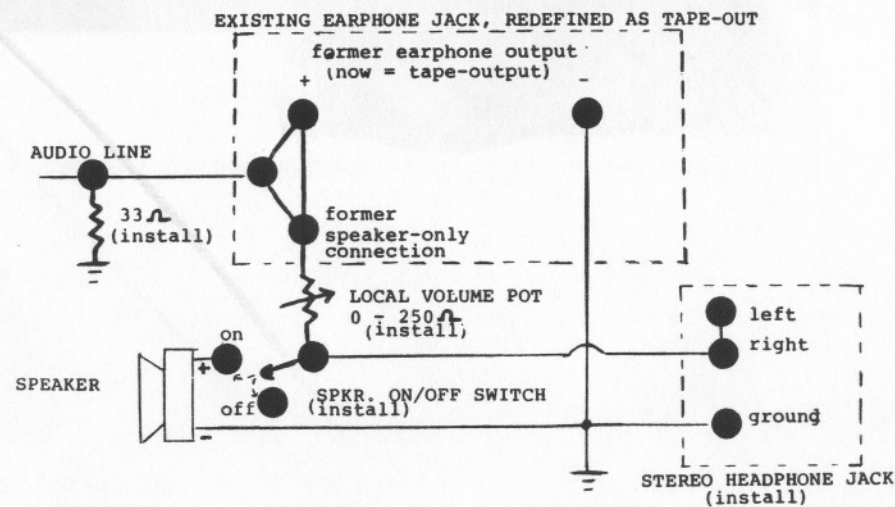
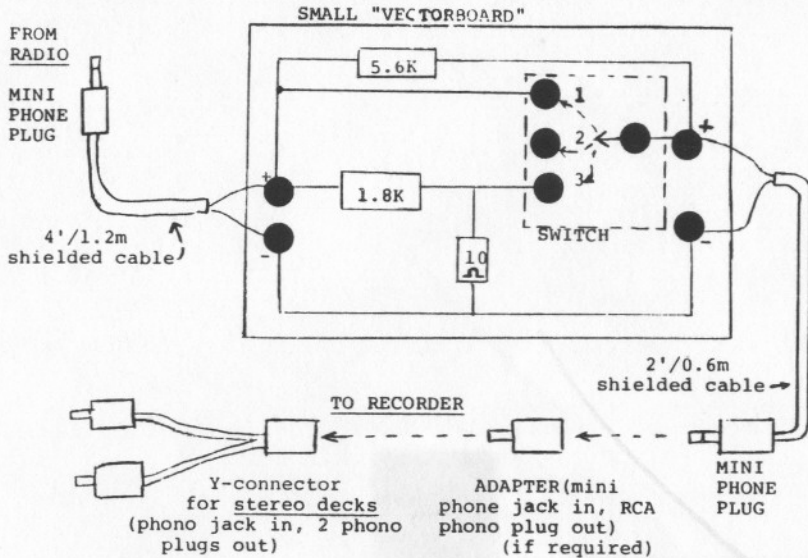
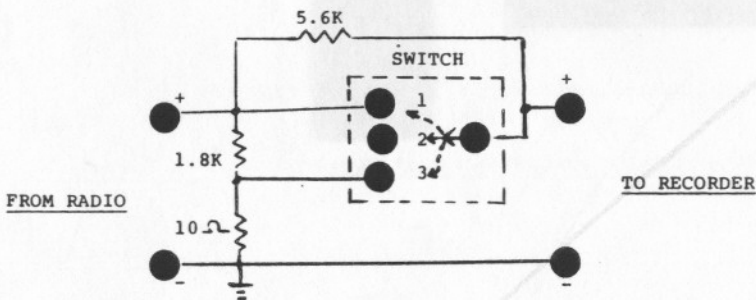


Figure 3 - Patch Cord Assembly (not drawn to scale) - outside radio.
 Cut the patch cord 4'/1.2m from one end, 2'/0.6m from the other end.
 Note: + = centre conductor of cord, - = shield (outer conductor).



NOTE: Switch used is an SPDT/centre-open, 3-position type.
 Switch positions in this application: 1 = Low impedance/high level out,
 2 = High impedance out (centre position), 3 = Low impedance/low level out.

Figure 4: Schematic of vectorboard part of patch cord



APPENDIX

PARTS LIST

Inside radio (Figure 2)

33 Ω resistor	Radio Shack # 271007 (pack of 2, only 1 used)
0-250 Ω pot	{ Cramer Electronics (Newton, MA.) 1979 catalogue, p. 179 Clarostat # 381L-250
stereo headphone jack	Radio Shack # 274312 (pack of 2, only 1 used)
SPDT micro-miniature toggle switch	Radio Shack # 275625

Outside radio (Figures 3 & 4)
Patch cord to tape recorder

patch cord - 6'/1.8m	Radio Shack # 42-2420
mini-phone plug each end	" " # 276-1394 (only a piece of it is needed)
"vectorboard"	" " # 275325
SPDT centre-off toggle switch	" " # 271-1324 (pk. of 5, only 1 used)
1.8K resistor	" " # 271-1301 (pk. of 5, only 1 used)
10 Ω resistor	" " # 271031 (pk. of 2, only 1 used)
5.6K resistor	" " # 271031 (pk. of 2, only 1 used)

Additional patch-cord accessories which may be necessary for some tape decks

adapter: mini-phone jack to RCA phono plug	Radio Shack # 274326
stereo Y - adapter: phono jack to 2 phono plugs	" " # 422435

TOOLS & MISCELLANEOUS ITEMS REQUIRED

Solder, soldering pencil, longnose pliers, wire cutters ("dikes"), wire stripper, .X-Acto (or similar) knife, drill, drill bits of the proper diameter, solder wick or sucker, screwdriver.



AM 1450 KC.  FM STEREO 99.3 MC.

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