



DRAKE

P75
PHONE
PATCH

INSTRUCTION
MANUAL

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Figure 1 P75 Phone Patch

I. GENERAL DESCRIPTION

The P75 is a hybrid phone patch for use with a transceiver or receiver/transmitter combination. The styling matches that of the 7-line series of equipment. The hybrid design nulls the receiver audio at the transmitter audio connections to allow VOX operation if desired.

The receiver audio input and transmitter audio output gain settings are adjustable by means of front panel controls. Speaker and microphone switching as well as phone line switching are controlled by the on/off front panel switch. This allows the phone patch to be activated at any time without connecting or disconnecting cables.

A relay is built into the P75 to open the receiver audio input line when transmitting. The relay can be controlled by the transmitter and provides 100% receiver muting during transmit to prevent a possible feedback condition. This connection is not needed in all installations, but is provided to assure proper operation with any station.

The P75 can also be used for a remotely controlled patch such as a repeater autopatch installation. The hybrid design permits duplex phone patch operation. An optional holding coil can be added to the P75 for use in these remote controlled situations where a standard telephone is not used with the phone patch.

II. SPECIFICATIONS

| | |
|--|---|
| Receiver (Audio Input) Impedance: | Nominal 3.2 to 16 Ohm Speaker impedance. |
| Transmitter (Audio Output) Impedance: | Matches 1 K Ω or higher. |

| | |
|----------------|--|
| Size: | 7" L × 6¼" W × 2¼" H (17.8 cm × 15.9 cm × 5.4 cm) |
| Weight: | 1 lb., 6 oz. (.63 kg) |

III. INSTALLATION

Locate the P75 at a convenient location. The P75 may be secured to the top of a RV7, MS7, or equivalent cabinet with the two retaining clips provided. First, remove the screw-in mounting feet on the P75 and replace with the four number 6 screws provided. Place the four stick-on rubber feet on the bottom of the P75 next to the cover mounting screws on the cover. Remove the top screws on each front extrusion end cap of the MS7 or RV7 and the bottom screws on each P75 end cap. Place a retaining clip between the end cap and extrusion. Position so that the hole is properly aligned and replace end cap screws. Repeat retaining clip installation on the other side.

- a) Connect the receiver speaker audio output to the P75 RX phono jack.
- b) The station speaker, such as the Drake MS7, may then be plugged into the P75 SPKR phono jack.
- c) Connect the TX audio output phono jack of the P75 to the transmitter audio input. This can be accomplished in several ways.
 - 1) If the SP75 Speech Processor is used, connect a phono to phono cable between the TX audio jack of the P75 to the PATCH input phono jack of the SP75.
 - 2) If a transceiver with a separate phone patch audio input jack is used and the SP75 Speech Processor is not being used, connect the P75 TX audio output jack to the phone patch input jack of the transceiver.
 - 3) To connect the P75 to the Drake TR7 transceiver when the SP75 is not used, the P75 TX audio connection should be

connected to PIN 1 of the TR7 microphone connector. The station microphone should remain connected as before with audio to either PIN 1 or PIN 4 of the TR7 microphone connector. When the phone patch is activated by pressing the PATCH switch on the P75, the P75 will become connected in parallel with the microphone. The low 1 K driving impedance of the P75 will effectively attenuate the audio from the microphone thus preventing undesirable audio pickup from the microphone during patch operation. The PTT function on the microphone will still be operative.

The above mentioned connection can be accomplished in either of two ways. The P75 can be connected to PIN 1 of the microphone connector externally if very small shielded wire is used. However, the best method is to modify the TR7 to add a separate phone patch input jack. This can be accomplished by connecting the spare phone jack on the TR7 rear panel to the microphone input connection on the parent board. Be sure to use a piece of shielded cable and connect as shown in figure 6. After installing this modification in the TR7, connection can be made as described in paragraph (2) above. No connection will be made to the P75 MIC phono jack.

Remember that if you are using the SP75 Speech Processor to accomplish the audio switching or make an external connection to the microphone jack, the TR7 modification procedure described above will not be required.

- 4) The P75 TX audio jack can be connected to the transmitter microphone jack and the microphone connected to the P75 MIC input jack. This will switch the microphone to the transmitter when the P75 PATCH switching is out. However, because of the new cabling connections normally required, the method described in (3) above is normally preferable.

- d) Connect the telephone line to the two phone line screw terminals — terminals 1 and 2. The Drake P75 Phone Patch is suitable for direct connection to a normal single-line subscriber telephone circuit when so permitted by local telephone company tariffs and regulations. Connection to a modular phone jack (USOC RJ11C) may be made by using a quarter-modular to spade lugs cord such as a Western Electric D4QK, connecting the green wire to terminal 1 and the red wire to terminal 2. This style cord is also sold by Radio Shack as part number 279-364. The yellow and black wires should be insulated and are not needed for the patch.

When required, the patch may be interfaced through a telephone company provided voice connecting arrangement. One such common arrangement may be ordered as "USOC-QKT" from your phone company. This is usually a low cost interface but provides only audio. The holding coil discussed in section V.(g) will not function with this connection arrangement.

- e) Terminals 3 and 4 control the internal receiver muting relay. If a speech processor will not be used with the patch, these connections may normally be left unused. When additional isolation is required to prevent a feedback condition during transmit, these terminals are connected to provide +10 to +15 volts to the P75 relay during transmit. Terminal 4 is negative and terminal 3 is positive. The relay will not energize if the polarity is reversed on these terminals. See figure 3 for additional details.

IV. SET-UP

After completing the installation, it is necessary to set the front panel audio level controls. The internal hybrid null adjustment is factory set to match a typical telephone line impedance, but should be re-nulled in any individual installation if the hybrid feature is to be utilized.



a) Null Adjustment

- 1) Set both TX level and RX level front panel controls to maximum gain (full CW). P75 switch should be in the OFF position.
- 2) Using the calibrator or other single frequency signal, tune in the signal on the receiver to obtain an audio beat note of approximately 1500 to 2000 Hz.
- 3) Temporarily disconnect the transmitter audio line and connect an AC VTVM or VOM to the P75 TX audio output phono jack. If a VOM or VTVM with an AC scale is not available, the transmitter may be connected and the VOX activated (see number 6).
- 4) Activate P75 by depressing PATCH pushbutton.
- 5) VOM or VTVM Null Method: Turn up receiver audio output until some indication of audio at the TX output jack is indicated on the meter. Adjust the null potentiometer, either through the access hole in the rear panel or by removing the case, for a null or minimum reading on the meter. This adjustment should be made with a proper phone line termination, thus a call should be placed to someone on the phone before the adjustment is made.

Because the reactive component of the telephone line impedance varies from one installation to another, a deeper null might be obtained if the value of C_{Null} is adjusted to a different value. A $.1 \mu F$ capacitor is factory installed at the two terminals near the null potentiometer. A different value, usually between $.01 \mu F$ and $.47 \mu F$ may be tried in place of the $.1 \mu F$ to see if a deeper null can be obtained when adjusting the null potentiometer. When the null adjustment is complete, disconnect the meter and proceed to section b for level set-up.

- 6) Null Adjustment Using Transmitter VOX: Leave the P75 transmitter output connected to the transmitter audio input. Activate the VOX on the transmitter and turn transmitter anti-VOX control to minimum.

Follow the same procedure as in number 5 above, except turn up the receiver audio gain very slowly until the transmitter VOX just starts to cycle, then make null adjustment to stop cycling. Further advance receiver audio and repeat null adjustment until highest possible receiver audio gain setting can be obtained without tripping the transmitter VOX. Return transmitter VOX settings to normal.

b) Audio Level Adjustment

- 1) Receiver: Adjust the receiver speaker volume for normal listening level when P75 is OFF. Place a telephone call and activate the P75. Adjust the P75 RX level control until the receiver audio is heard in the telephone at a normal telephone level. The person at the other end of the call can also evaluate the level.

If VOX operation is to be used, it is usually best to keep the receiver audio level into the phone slightly lower than normal. This will help remind the person on the other end of the telephone connection to speak loudly for improved VOX performance.

- 2) Transmitter: Set transmitter audio gain and VOX adjustments for normal microphone operation (P75 OFF). Place a telephone call and activate the P75. With a person on the other end of the telephone line speaking, adjust the P75 TX LEVEL control to obtain normal transmitter output. In most cases it should not be necessary to increase the transmitter's audio gain, however, if a very high output microphone was used or if unusually low telephone line audio is available, some readjustment of transmitter gain setting may be required.

V. OPERATION

After following the set-up procedure in Section IV, operation is very simple.

- a) The transmitter and receiver level settings should be normal for the microphone and speaker being used.
- b) When the patch is to be used, place the telephone call and when the desired party is on the telephone simply press the P75 PATCH pushbutton. This will connect the receiver and transmitter to the P75 and disconnect the speaker and microphone if they are connected through the P75.
- c) If the SP75 Speech Processor is being used to switch the transmitter audio, the PATCH pushbutton on the SP75 must also be pressed during the phone patch operation.
- d) To transmit with the patch after the PATCH switch has been depressed, depress the push-to-talk switch on the station microphone. This switching line should still be connected to the transmitter even though the microphone audio line has been switched off by the patch or speech processor audio switching. If desired, an additional push-to-talk switch can be wired in parallel with the microphone PTT line.

The push-to-talk connection would not be required if strictly VOX operation is used, however, it is unlikely that 100% of all phone patch operation will be VOX operation. Normally, you, as the station control operator, will control the switching from receive to transmit with the push-to-talk switch.

- e) When VOX operation is desired it is very important that the null adjustment set-up procedure has been followed carefully. Review Section IV. Normally it is best to adjust the transmitter VOX gain first for the minimum VOX gain required. Then advance the receiver audio to the normal level. If the VOX cycles it may be necessary to reduce the receiver level slightly

below the normal level. Also, advance anti-VOX setting for optimum results. If the telephone line audio is very low, it may not be possible to obtain reliable VOX operation with distant telephone connections.

- f) If a speech processor such as the SP75 is included in your station, it may be desirable to use processing with the phone patch under certain weak signal or low line level conditions. If this is done it is very important to have 100% receiver muting on transmit to prevent a possible feedback condition from occurring due to the extra gain provided by the processor. The relay in the P75 should be connected to assure positive muting when a processor is used. See Section III, e.

g) Remote Controlled Operation

If the P75 is to be used for a remotely controlled interconnect such as in a repeater autopatch application, the following procedure can be followed. First, leave the P75 PATCH switch depressed. A holding coil can be installed in the holes provided in the P.C. board if DC continuity for the telephone line "Off Hook" current is required. The patch can then be remotely controlled by a relay inserted in the phone line circuit.

The printed circuit board layout is designed to accommodate a MICROTRAN T-4415 holding coil. This holding coil should be obtainable through a local electronic distributor who handles the MICROTRAN line. Other manufacturers make electronically equivalent parts, but may not have the same pinout dimensions. The holding coil should have a minimum inductance of 1 henry rated at 60 mA of DC current.

Also, the telephone company can provide voice connection arrangements which provide line holding control. Ask your service representative which of the following USOC arrangements might fit your needs:

USOC-CD4
USOC-CDX
USOC-GTS

VI. SERVICE DATA

The P75 includes RF filtering in the telephone line and transmitter audio interfaces. This filtering should prevent any RF feedback problems caused by RF which may be present on the telephone line while transmitting.

This filtering, however, cannot prevent feedback if RF rectification is occurring in the telephone instrument or phone line lightning arrestor, etc. If you detect an RF rectification problem in your telephone (which should not be affected by connection or disconnection of the P75), this problem must be eliminated before proper phone patch audio quality will be obtained.

The P75 will be checked and aligned at the factory for a nominal fee if there is no evidence of tampering. Transportation charges are extra. Any necessary repairs will be made on a time and materials basis. Please write or call the factory for authorization before returning your unit for alignment or service. Address your requests for authorization to:

R.L. DRAKE COMPANY
540 Richard Street
Miamisburg, OH 45342
ATTN: Customer Service Department
Telephone: (Area Code 513) 866-3211
Telex: 288-017



Figure 2 P75 Rear Panel

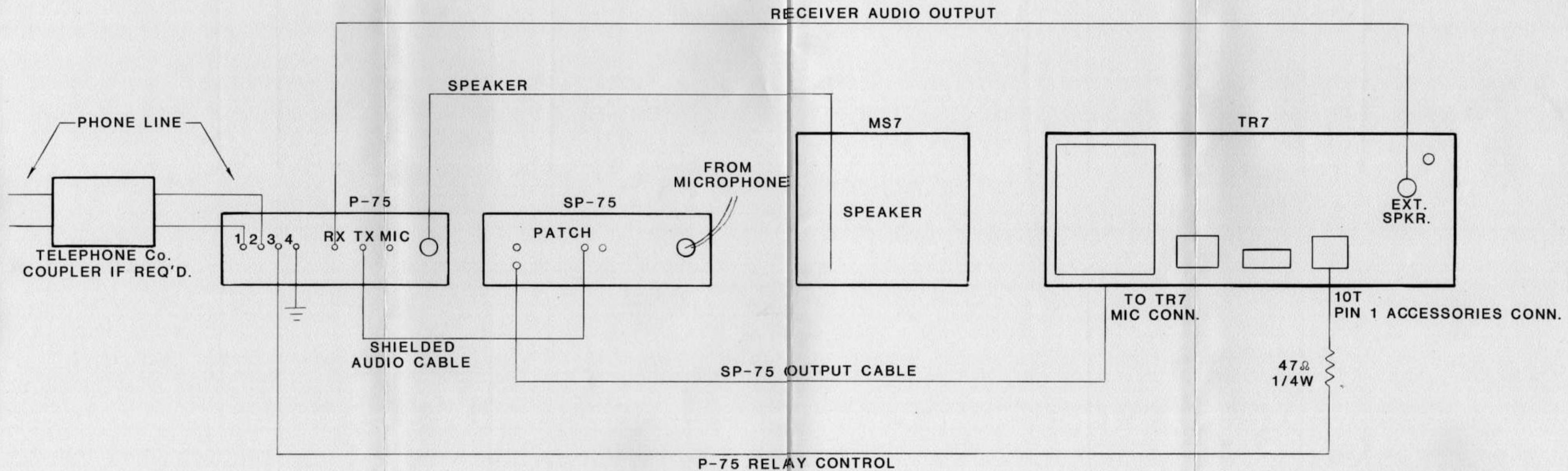


Figure 3 Connecting P75 to TR7, SP75 and MS7

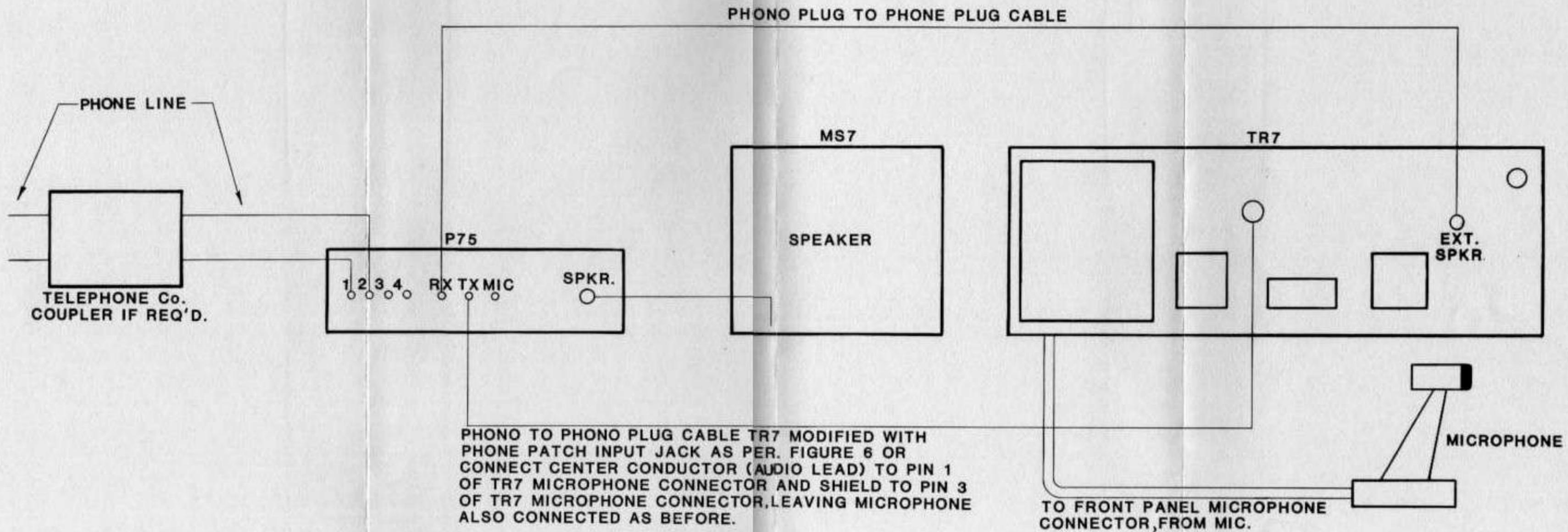


Figure 4 Connecting P75 to TR7 and MS7

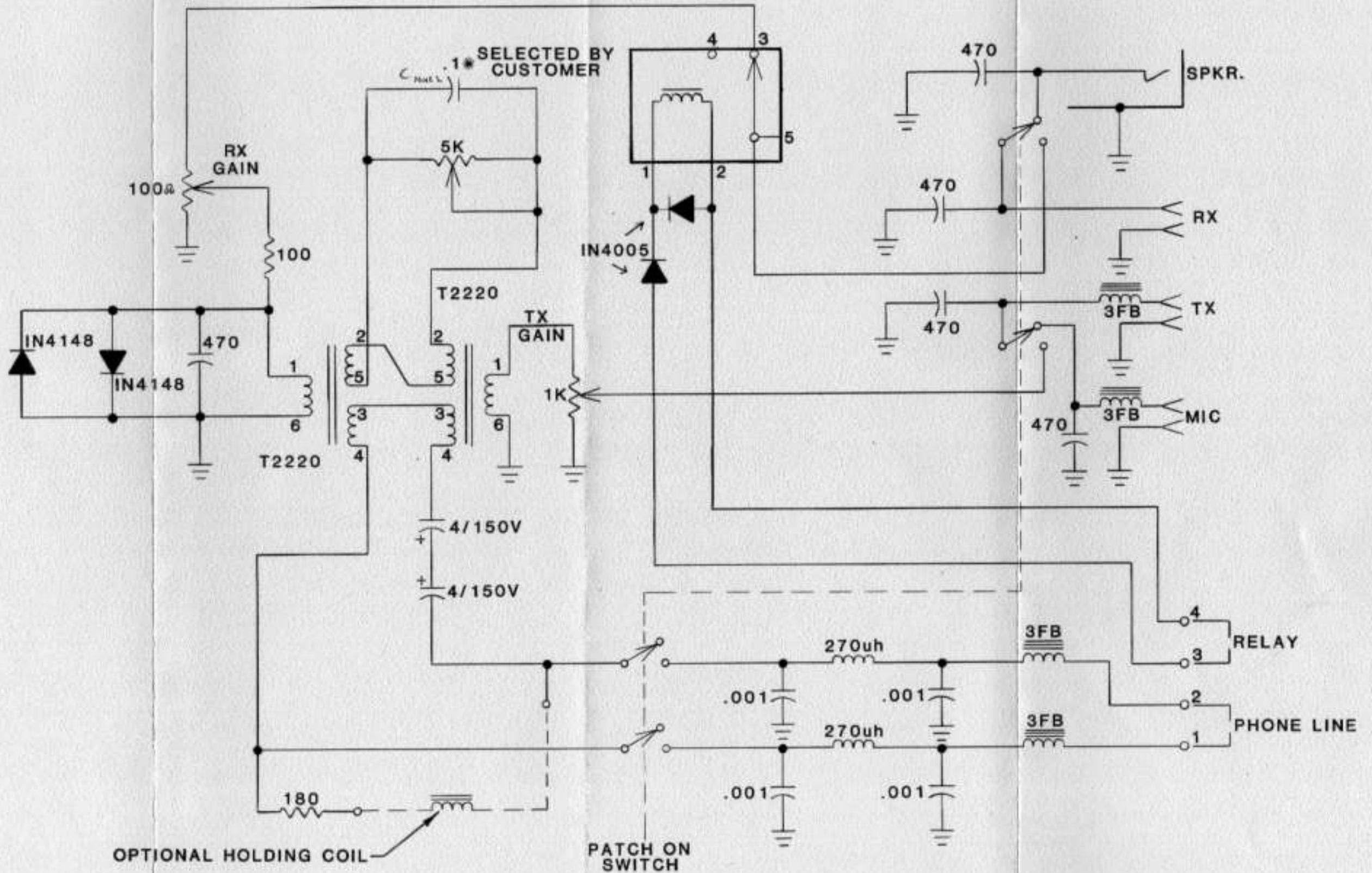


Figure 5 P75 Phone Patch Schematic

BOTTOM VIEW OF TR7 PARENT BOARD

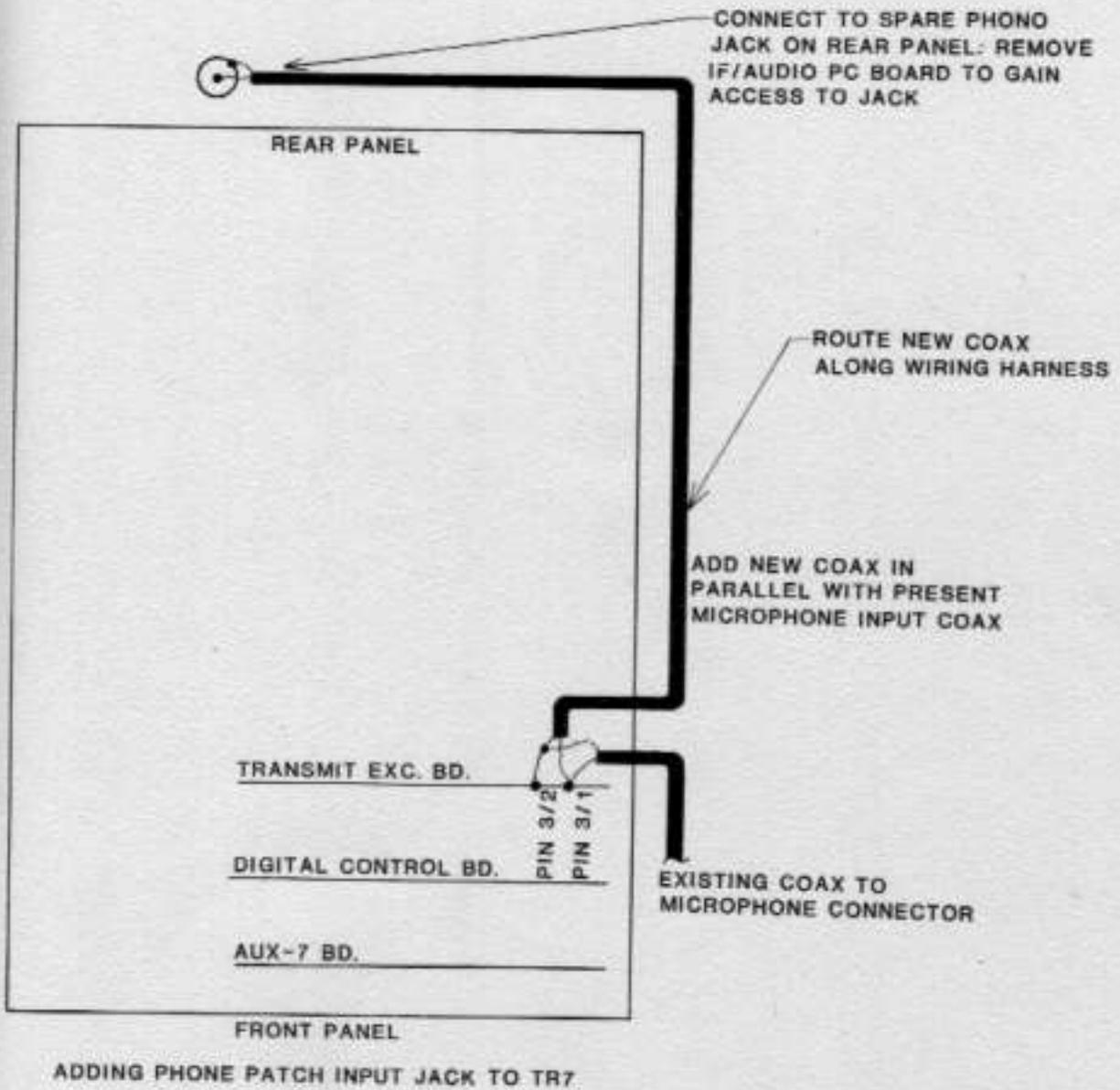


Figure 6 TR7 patch input jack wiring