

# Building the Breadboard Radio Transmit / Receive Switch

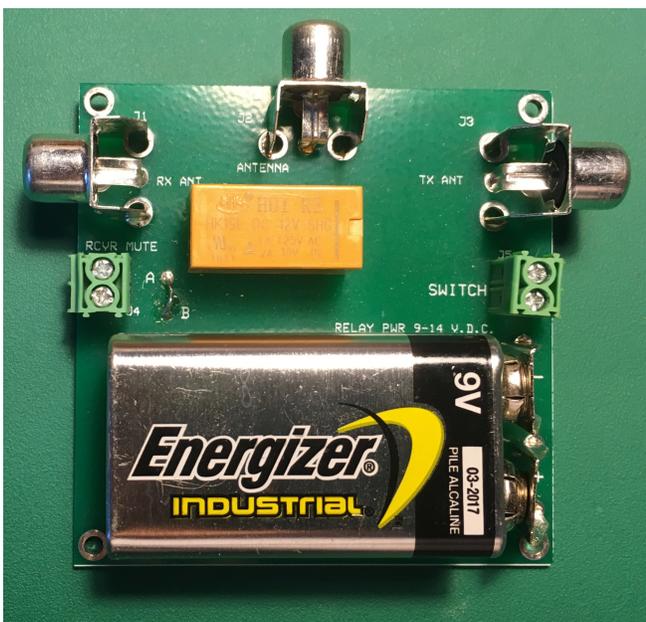
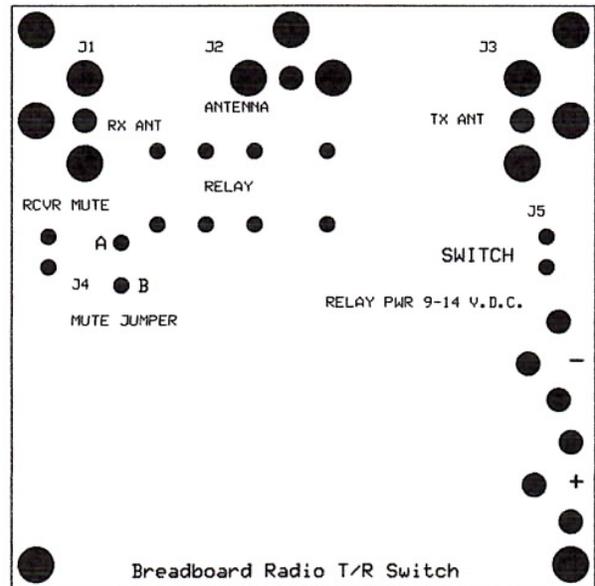
The Breadboard Radio T / R switch is a simple to build and use switched relay designed to be used with simple QRP and QRPp receivers and transmitters to supply antenna transfer and receiver muting. It allows for using different models of transmitters with different receivers and will even allow a QRP or QRPp transmitter to be used with shortwave and vintage tube receivers giving them new purpose.

A single jumper on the board lets you select one of two modes for muting the receiver on transmit. Default (no jumper) opens a circuit that can turn off the receivers audio. With the jumper the circuit is grounded, which can short the audio or a switching transistor to ground. The relay is powered from an on-board 9.0 volt battery or may be wired to an external 9 to 14 volt source. RCA connectors are provided for the antenna, transmitter and receiver. Operation can be enhanced by the use of a foot switch allowing hands free QSK operation.

## CONSTRUCTION

Locate the parts:

1. Circuit board
2. Relay
3. 2 green screw terminals
4. 3 RCA connectors
5. One positive and one negative 9 volt battery clips
6. Small jumper wire
7. 4 Black spacers
8. 4 Wood screws
9. Wooden breadboard



## Finishing The Breadboard

The wooden breadboard furnished with your kit is your opportunity to express yourself. You get to finish it any way that you like...pick your color, pick your finish. MAY WE SUGGEST THE FOLLOWING?

1. Use fine grit sand paper to remove any roughness from the wood.
2. You can use brush on or spray paint or stain or no finish at all...it's up to you.
3. You are in charge of getting the board ready. Three coats with light sanding between coats and about 24 hours of drying time will produce great results.
4. When the board is finished, locate the circuit board and place it on top of the breadboard. Center the circuit board and using a small nail, phillips screwdriver or other small pointed object, push a small starter hole into the breadboard at each corner mounting hole. Drill a hole with a 1/16th inch bit at each starter hole. The hole will be used to mount the assembled circuit board in the proper location at the end of the project. Place the breadboard aside for now.

## Circuit Board

Using the parts placement diagram and photos, mount and solder the relay and other parts on the circuit board. At this point you will need to know if the mute function will be used and whether you will use the "open circuit" or "short to ground" function. No further action is needed if you do not intend to use the receiver mute function or if you



will use “open circuit” muting on transmit. If you require “short to ground” on transmit for receiver mute, you will need to solder a wire jumper between points “A” and “B” on the circuit board. Use the wire supplied and strip each end before soldering.

### Open Circuit Muting

Open circuit muting is accomplished by interrupting the audio during transmit. This is usually done at the audio line going to the audio amplifier stage or the audio line from the amplifier to the speaker or phones.

Short to ground muting is accomplished by grounding the audio line at the input of the audio amplifier. In this case, 0.1 to 0.01mfd capacitors should be used to block any d.c. voltages that may be in the audio line used.

### Antenna Cables

Use only RG-174 type coax to go between the transmitter and T/R switch and receiver and T/R switch. Larger cable can be used, but will be much harder to work with. Use phono plugs. The relay has been tested at up to 5 watts. Using more than 5 watts is not advised and at your own risk.

### Battery

Use a good 9 volt alkaline battery. The relay draws just 10 milliamps, so it should last quite a while depending on usage. An external 9 to 14 volt d.c. power source may be used in place of the battery by soldering the + and - wires to the appropriate battery terminals.

### Activation

Activating the T/R relay can be accomplished by a T/R switch on the transmitter such as provided on the Woodchip transmitter, an external SPST switch provided by you or a foot switch.

### Foot Switch

A foot switch (SPST) such as the QLF, can be connected to the two screw terminal labeled “SWITCH”. A foot switch makes it easy to go from transmit to receive and leaves your hands free.

