

An Antenna Switch for 2 or more Remote Operating locations

(Published by QST, January 2023, p57,) VA3DDN

Note: the original article is posted here, not edited, and with all photos.

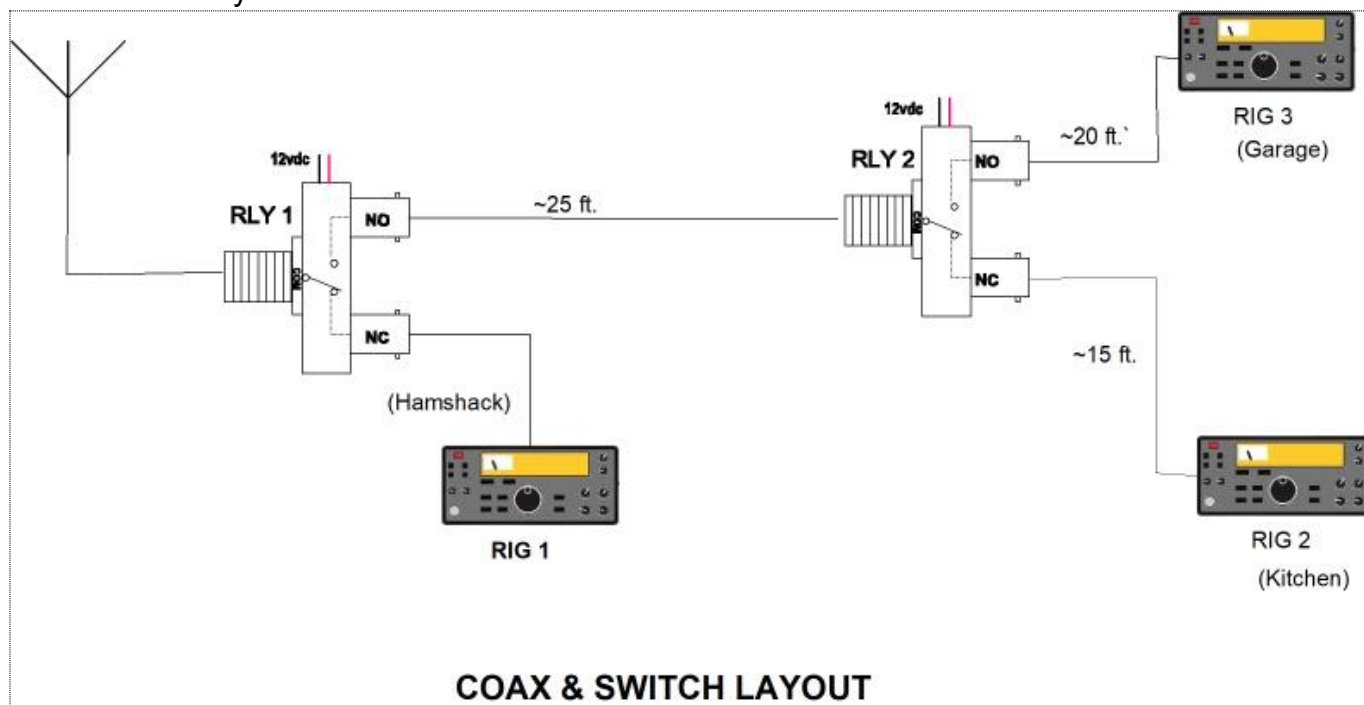
Background

In the October 2015 QST, I described a wireless remote antenna switch which allowed me to share 2 different antennas between 2 operating locations in my home.

Well, that was 6 years ago and all of us know that the content and layout of our home hamshacks continually evolve and change.

I am now re-using the same 2 DowKey #62-110 SPDT coaxial RF relay switches, but in a different configuration, which allows me to share a single antenna, such as a dual or tri-bandner, among 3 widely separated operating locations in my home. (basement shack + kitchen + garage) These coaxial relays* are rated to handle 150W CW at HF and have low SWR to well above 1 Ghz.

*Note: for consistency, I will use the term “coaxial relay”, rather than the more cumbersome “coaxial RF relay switches”.



Operation

Figure 1 illustrates the concept, where the coaxial relays labelled RLY1 and RLY2 are cascaded. In the default power-off condition, Rig 1 is connected to the antenna. With RLY1 energized, Rig 1 is disconnected and Rig 2 is then connected to the antenna. In the same manner, with both RLY1 and RLY2 energized, Rig 3 is connected to the antenna.

This time, instead of using wireless control switches, I decided to use a simple switching solution based on ordinary 4-conductor AWG 24 communications cable, often referred to as just “telephone wire”.

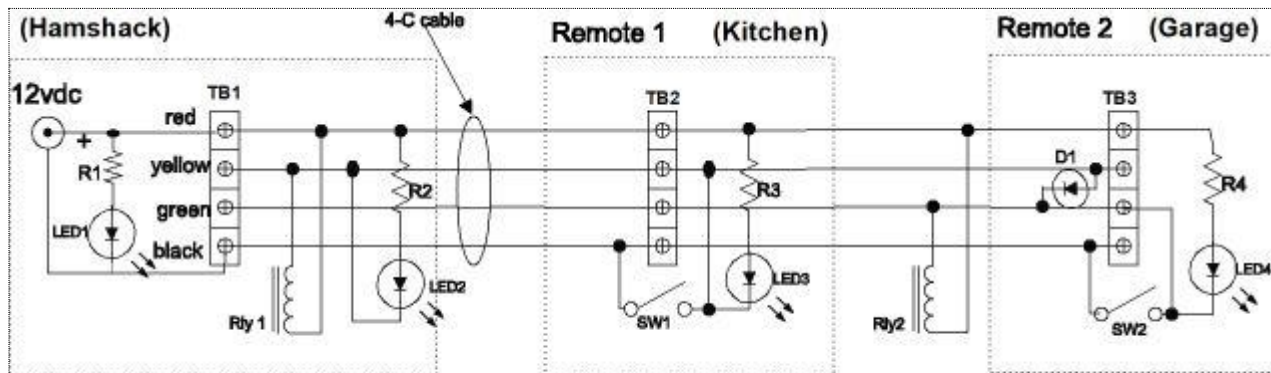


Fig 2 Schematic diagram

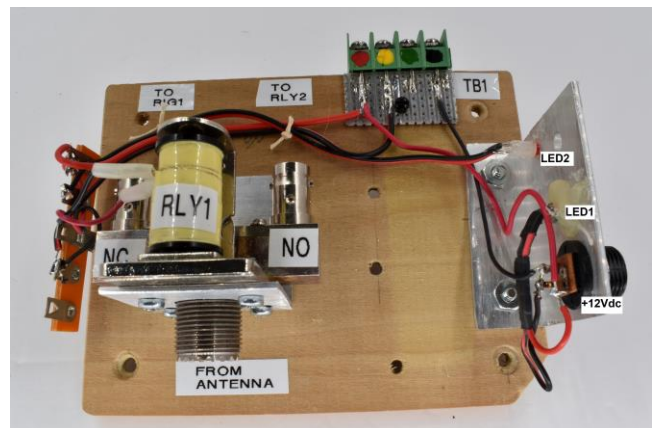
At each operating location, a small remote-control box fitted with a pushbutton switch and LED is connected to the 4-conductor cable as shown in Figure 2. Since each relay has one side of its energizing coil connected to +12vdc (red wire), either relay can be turned “ON” simply by connecting the other coil lead to the common ground (black wire). This is done with push button switches SW1 and/or SW2. Diode D1 functions as an “AND” connection, causing both RLY1 and RLY2 to energize when SW2 is pressed.

Note that RLY1 is logically located in the hamshack near to RIG1 and the antenna connection being shared, whereas RLY2 is located about 25 ft away, where it was convenient to split the antenna feed between the 2 remote locations.

Construction

Figure 3 shows the hamshack connections with RLY1 mounted on a small board together with the start of the 4-c cable connected to terminal block TB1. LED’s 1 & 2 and a connector for the external 12VDC are also mounted here.

Figure 4 shows REMOTE1 with TB2 mounted on a small piece of perf board. The switches SW1 and 2 can be any type you like. I used the push-on, push-off locking style but a small toggle switch is ok too.



REMOTE2 is similar except for the switch wiring and the addition of diode D1.

Figure 5 here shows inexpensive telephone cable that is readily available at many hardware or building supply stores. I ended up using 4-c but the slightly larger diameter 6-c could also be used.



Notes:

1. Any suitable coaxial switches can be used. The one I used happened to have an SO-239 as the common connector and BNC females for the NO and NC ports.
2. Due to the wide frequency range of the coaxial relays, you can use this concept for HF, VHF, UHF or even 23cm. The only limitation will be the db losses incurred depending on the lengths of coaxial cable you use.
3. The LED's serve as good indicators of the system being in use. I chose to use self-blinking LED's for LED's 2,3,4 with the thought that the continued blinking would be annoying enough to encourage turning it off when not in use!
4. The system could be expanded by adding 1 or more control wires. With a 6-conductor cable, 2 more coaxial switches could be cascaded.
5. It's interesting to note that if the antenna and the rigs were to be interchanged, then this system could be instead used to selectively connect several antennas to a single rig.

Parts Information

It's likely that many parts can be found in the amateur's proverbial "junk-box".

There is nothing critical however, so use what works for you.

The coaxial relays, I found on eBay, but you could also check out the surplus components sellers.

Ref	Description
R1-R4	2k2 for about 5mA per LED
LED1	3mm green, indicating 12V power on
LED2,3,4	3 or 5mm, self flashing
RLY1,2	Dow Key #62-110 or equiv.
TB1-3	Terminal block, 4 position, screw terminals
SW1,2	Switch, SPST, push-on/off, or toggle
D1	1N4001 or equiv.
-	Housing/case for remotes Digi-Key 377-1175-ND or equiv.
-	12v panel jack, for barrel connector 5.5 x 2.1 mm
-	4c telephone wire, 24awg (or 6c)