ARRL Periodicals Archive – Search Results

A membership benefit of ARRL and the ARRL Technical Information Service

ARRL Members: You may print a copy for personal use. Any other use of the information requires permission (see Copyright/Reprint Notice below).

Need a higher quality reprint or scan? Some of the scans contained within the periodical archive were produced with older imaging technology. If you require a higher quality reprint or scan, please contact the ARRL Technical Information Service for assistance. Photocopies are $3 for ARRL members, $5 for nonmembers. For members, TIS can send the photocopies immediately and include an invoice. Nonmembers must prepay. Details are available at www.arrl.org/tis or email photocopy@arrl.org.

QST on CD-ROM: Annual CD-ROMs are available for recent publication years. For details and ordering information, visit www.arrl.org/qst.

Non-Members: Get access to the ARRL Periodicals Archive when you join ARRL today at www.arrl.org/join. For a complete list of membership benefits, visit www.arrl.org/benefits.

Copyright/Reprint Notice

QST Issue: Jul 2004
Title: Push to Talk
Author: John H. Dilks III, K2TQN

Click Here to Report a Problem with this File

Push to Talk

Whether you're using your 2 meter handheld transceiver while hiking or sitting in front of your brand new transceiver at home, you're probably pushing a button when you want to talk. It feels so natural and everybody does it. But have you ever wondered when this was invented?

My first memory of seeing push to talk was the old 1955 *Highway Patrol* TV show starring Broderick Crawford. It would always seem that he would have to stand next to his police car and pull the microphone out the open window to talk back to headquarters. My dad and I watched this show on our 7 inch Motorola TV. He loved police stories. I was more interested each week to see how radio would become the important part of the story that helped capture the bad guy. It always did.

Push to talk goes back, way back, to the early days of ham radio. I don't know of any specific "first event," but the early magazines show photos of many stations with lots of switches and push buttons controlling the switching over from transmit to receive.

Before push to talk, the operator manually threw several switches in an exact sequence, such as: switch off the B+ to the transmitter, switch the antenna over to the receiver and then turn on the B+ to the receiver. With practice, operators could do all of this in a few seconds. Then to switch back to transmit, the process would be reversed.

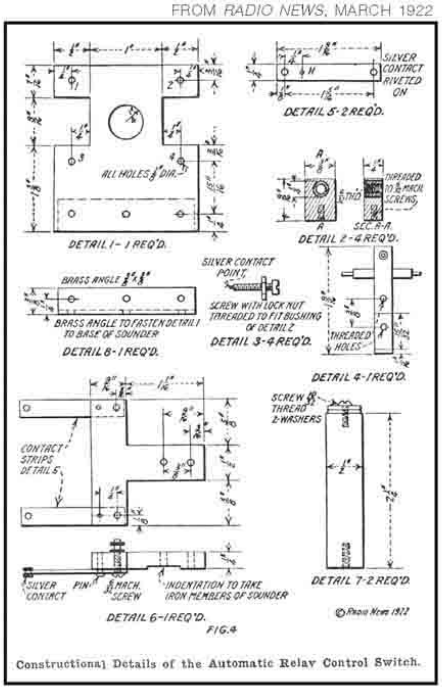
When DX started to come in and it got exciting on the air, every so often a tired operator would throw the switches out of sequence. This sometimes created a problem—the equipment could become damaged or expensive tubes could burn out.

Today we know about relays and how they are used to switch just about everything. And of course everyday computer controlled solid-state devices turn things on and off all over our homes and at work. But in the early 1920s when telephony (voice over radio) became the rage, a better switching method was needed. Relays of the day were expensive and not well suited for switching high voltages and RF antenna circuits.

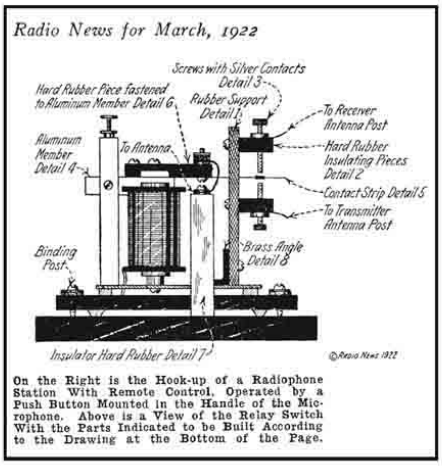
Relays had been around since the Civil War, when telegraph circuits stretched across the country. Later as the telephone industry started to grow, relays became a part of their system, too, but they only switched low voltages and were very expensive.

In March 1922 Louis Gerard Pacent, a member of the prestigious *Radio Club of America*, from as early as 1914, and a member of the *Institute of Radio Engineers* (IRE), wrote an interesting article for the *Radio News* magazine. It was titled "The Relay Antenna Transfer Switch." In it, he detailed how to modify a common telegraph sounder into a multi contact relay, and he also showed how to connect it to a transmitter, receiver and an antenna.

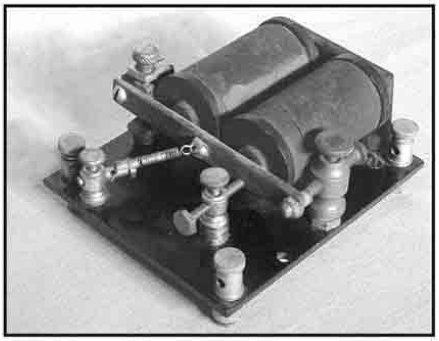
FROM *RADIO NEWS*, MARCH 1922



Constructional Details of the Automatic Relay Control Switch.

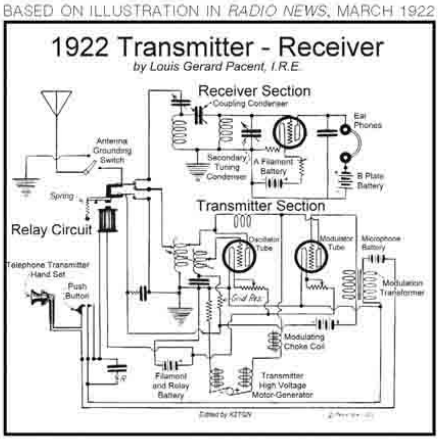


On the Right is the Hook-up of a Radiophone Station With Remote Control, Operated by a Push Button Mounted in the Handle of the Microphone. Above is a View of the Relay Switch With the Parts Indicated to be Built According to the Drawing at the Bottom of the Page.

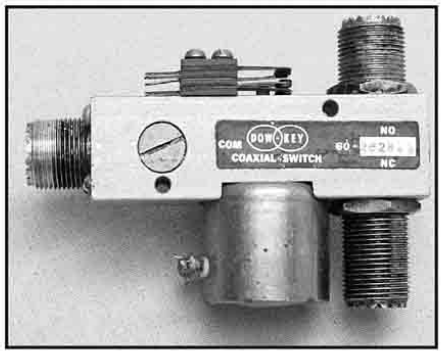


W2FZT homemade relay.

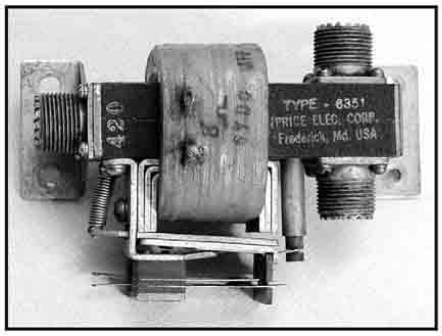
BASED ON ILLUSTRATION IN *RADIO NEWS*, MARCH 1922



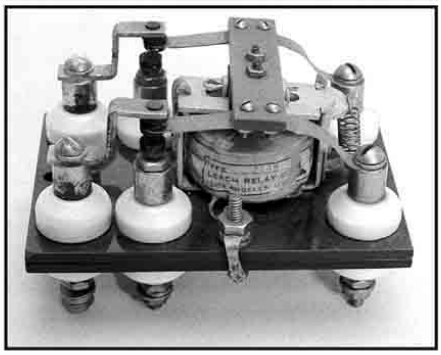
John Dilks, K2TQN ♦ 125 Wharf Road, Egg Harbor Township, NJ 08234-8501 ♦ k2tqn@arrl.org



The Dow-Key relay with external contacts.



A 1950s 6-volt look-alike to the Dow-Key relay, with external contacts.



A war-surplus double-pole double-throw antenna relay for 600-ohm tuned feeders.

The Pacent Relay

By comparing the photo of a 20 Ω sounder and the drawing of Pacent's modified sounder, you can see just how it works. Essentially the sounding member was removed and the aluminum bar shortened. Then the new pieces were attached and aligned as shown. When completed the relay became a single pole double throw antenna relay, with an additional single set of contacts that could be used to control a part of the circuit.

In the article, Pacent included step-by-step instructions and detail drawings for making each piece that would be needed to change it into a working relay. Industrious hams could build these at home, because only a drill and metal hacksaw would be required to make the pieces.

Using the Relay

To demonstrate the proper use of a relay, Pacent provided three examples in the article. This schematic shown is the one for phone transmission. By pushing the button attached to a microphone, the button circuit connects the microphone to its battery and provides a ground to operate the relay. The relay in turn switches the antenna from the receiver to the transmitter and, with the single contact, switches the added biasing resistance out of the circuit allowing the oscillator to start up. Used this way, the relay avoided having high voltages on its contacts.

Two other schematics were also provided to show relay applications for CW use. One cleverly used the relay to allow break-in operation. The hand key operated the relay and the single contacts were used for keying the transmitter.

Homemade Relay

I have one early homemade relay in my collection. Stan Staniloff, W2FZT, built this relay in the 1930s when he was a teenager. He used it successfully for several years in his homebrew transmitter. The coils were from an early piece of equipment rescued from the local telephone company's trashcan. He machined the necessary pieces to make it into a relay on his lathe, in his cellar shop. The relay was used for keying his transmitter, thereby keeping the lethal voltages off the hand key.

Collecting Relays

There are collectors and collections of relays. The nicest collection I ever saw was the one belonging to SK Phil Catona, W2JAV, a retired RCA engineer. He built dozens of 2 foot square, by 6 inch deep, picture frame-type displays. In them he displayed relays by category. He had just about every relay that could be found. Of course he started collecting in the 1950s, and this is one reason his collection was so large.

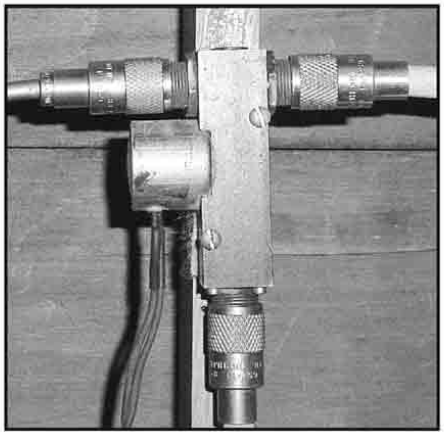
You can gather a nice collection this summer, certainly enough relays for a display case or two. They would look great on the wall of your shack. You can do this inexpensively, too, by picking through the junk boxes that usually show up at hamfests. Old relays can usually be bought for a few cents to a buck apiece.

There are some exceptions on cheap, though. These are the antenna change over relays that are still used today with Boat Anchor stations, the best known being the Dow-Key series, and its look-alikes. They tend to go in the $10 to $30 range. I've included several photos of relays you might want to look for at your next hamfest.

W2JAV carried the picture frame-type displays through with other themes. He had displays of tubes, keys, resistors, potentiometers, capacitors and other radio related items. He often took them to ham club meetings and gave interesting talks to the members.

Summer Visits to Museums

One of my favorite museums is the New England Wireless and Steam Museum in East Greenwich, Rhode Island, just 10 minutes from I-95. This is a must-see for fans of early radio.



Dow-Key relay, without external contacts, shown as used, under the operating table, for the Collins AM station in K2TQN's Old Radio museum.

There are working spark transmitters and early ship radios as well. One noteworthy exhibit, put together for a TV documentary, is the replica 1910-1912 Marconi wireless station. It is displayed just as it would have looked on a ship back then. Another is the original Massie spark transmitter from the 1907 Massie shore station, which is also there. All of the original equipment is in the station except the changeover switch, which was assembled by Radio Historian Alan Douglas from original parts. The pump handle key, Massie Resonaphone tuner and operator call box are on the original table. The helix and straight spark gap are on top of the condenser cabinet. And on the wall above the helix is a hot wire ammeter and anchor gap.

To visit, you should call ahead of time for an appointment, as it's not open every day: 401-885-0545. You can also see much of their display on their Web page at **users.ids.net/~newsm/**.

And yes, there are working steam engines there too; some of them are quite large. It's an interesting mix of history. You will have no trouble spending an entire day there.—*K2TQN* QST