

Scan Delay For The R-7000

It Is A Simple Addition To This Worthwhile Receiver

BY RONALD M. VACELUKE, W9SEK

The ICOM R-7000 is a worthwhile upgrade to a good receiver for monitoring wide band of VHF and UHF frequencies. Besides manual tuning, it has provisions for several modes of scanning and it is in this type of service that it has a design omission. That flaw shows up when the "Scan Delay" switch is in the "Off" position. When in this position, the receiver will stop scanning when a signal is received and will stay on that frequency until the signal disappears. It is at this moment that the design omission shows up because the instant that the signal goes, the receiver starts to scan again without the pause all other "normal" scanners have. This can be very disconcerting when you are listening to one side of a discourse and the receiver starts scanning again when the transmitting station stops for a reply from the other party. Even worse is listening to a mobile station that might have flutter and have the receiver start scanning again in the middle of a transmission because the signal faded out for the briefest of moments. The only way to overcome this was to turn the scan function off when a desired signal was encountered and re-set the scan function when ready to listen to something else. Having gotten tired of this hands on method of scanning, I decided to do something about it.

Circuit Description

A study of the schematic shows that a "stop" scanning signal is generated on the "Main Unit" circuit board by transistor Q11 and Q10. This "stop" signal goes to the "Logic Unit" circuit board to instruct it to stop scanning when this signal is approximately 2.5 volts or greater. When this voltage drops down to a lower level (around 0.0 V in this case) the logic circuitry begins the scanning process again.

What is needed is an artificial or added stop signal that will replace the signal generated by Q11. This added stop signal must remain for a predetermined length of time after the original stop signal drops off. This delayed stop signal must have the same duration no matter how long or how short the transmission is that we have been listening to. The device chosen to perform the task is a 74LS123 dual re-triggerable mono-stable

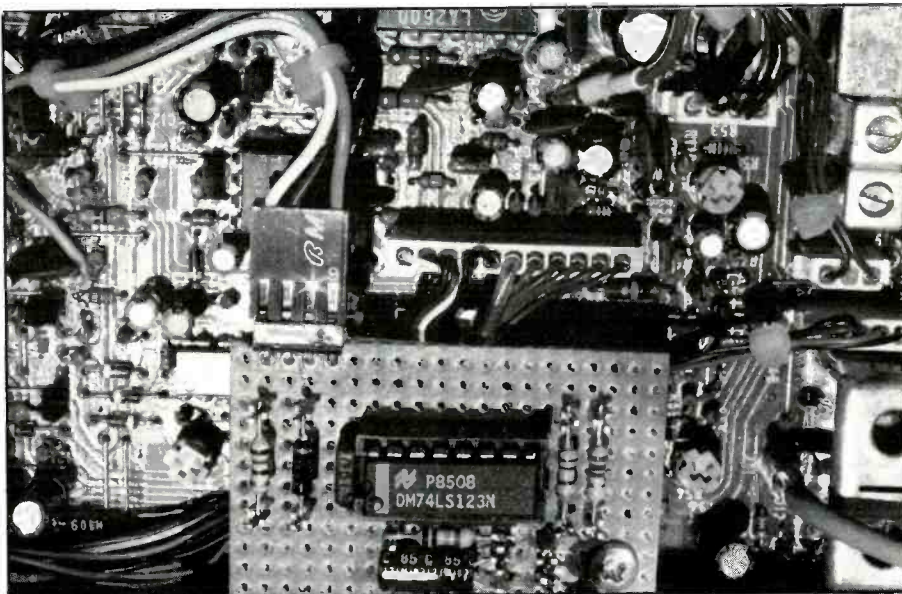


Photo 1 - The added circuit board installed in R-7000.

multivibrator (only $\frac{1}{2}$ is used in our circuit). A 2N3904 transistor was added as a buffer amplifier. The trigger pulse for the LS123 is generated by Q10. The new delayed stop signal is combined with the stop signal of Q11 through an OR gate made up of two diodes. One of these diodes, Da, is mounted on the Main Unit circuit board and the other is on the new circuit board which holds the remaining circuitry.

Construction

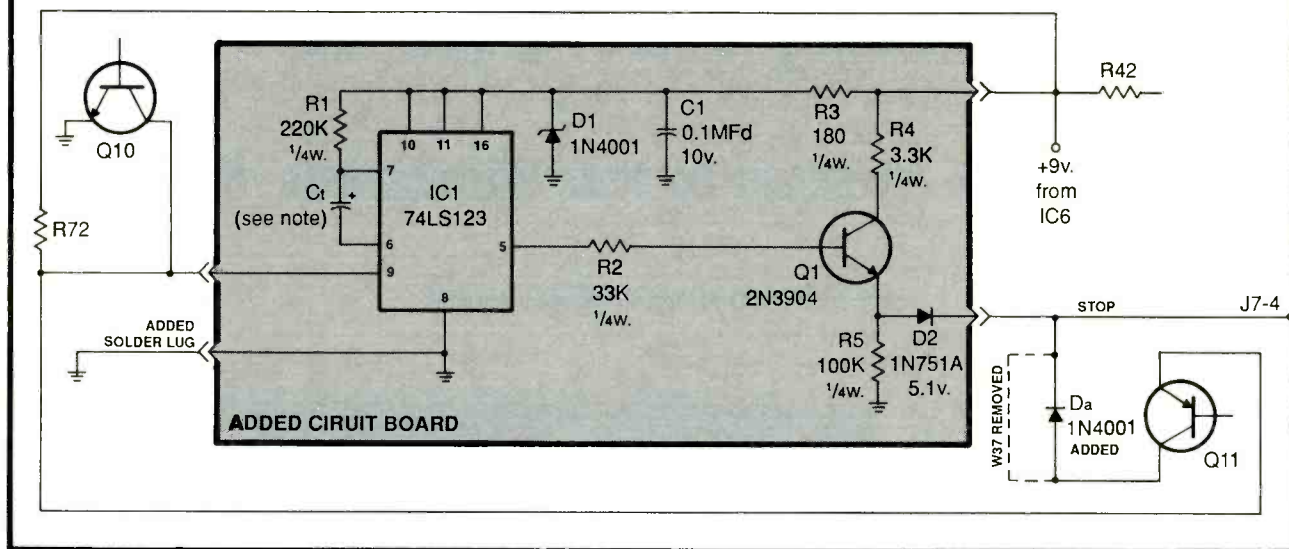
I built my new circuit board on a piece of $2" \times 1\frac{1}{32}"$ perforated Vector board. A 16 pin wire wrap socket is used for the LS123 and wire wrap terminals are used for the other components. I chose to use a four pin connector on the board so that easy connect or disconnect was possible when needed; however, connectors are not mandatory. If a connector of the type shown here is used, I strongly recommend that eyelets be swaged into the board for the connector pins to go through and be soldered to. This is the only practical way that this device can be firmly anchored. A hole must also be drilled into a corner of the board so that it can be

mounted to the receiver using a M3-20 screw and a $\frac{1}{2}"$ long spacer.

Wiring can be done using wire wrap or other point to point methods. When this board is mounted above the main circuit board in final assembly, there is not an abundance of clearance in some places. For this reason, when wire wrapping, use only a couple of turns around each post and then solder the wrap. The posts must then be cut as short as possible. There is nothing critical about wiring this circuit, just be sure that you are accurate and shorts are averted. Although this is a simple circuit, as circuits go, to some less technically inclined persons it may seem a formidable task. To these persons I recommend finding a technician to help you out. Your local radio club might suggest someone capable of assistance.

The time delay is determined by Ct. The time delays shown for the values given are those I obtained with the capacitors I had available. Because of component tolerances, you may get slightly different time delays but should not deviate much from those shown. I personally chose the 3 second delay for my receiver.

P/O R-7000 MAIN UNIT BOARD



NOTES:

1. Ct = 22 MFd \approx 2.5 sec delay
33 MFd \approx 3.0 sec delay
47 MFd \approx 4.0 sec delay

2. 1 ea. = GC Electronics # 41-084, 4 pos. header (male)
GC Electronics # 41-124, 4 pos. connector (female)
Vector board 2" x 1 11/32"
M3-20 screw
1/2" spacer drilled to clear M3 screw
Solder lug
Vector T49/Klipwrap terminals

Installation

After disconnecting the power and all other connections to the receiver, remove all the retaining screws (qty 18) which hold the top and bottom covers of the receiver. Next remove the top cover slowly and unplug the speaker lead from the top board and then remove the bottom cover. Place the receiver so that you may conveniently and comfortably work on the Main Unit circuit board. This is the board on the left side of the receiver. Unplug all connectors from the board (note that some leads are permanently soldered—do not remove these!) as

well as the six mounting screws. Note: All parts are clearly marked on the circuit board. In regard to parts location on the Main Unit board, the top of the board is the same as the top of the receiver, the right side of the board is toward the front of the receiver, etc.

Locate a jumper wire designated W37. It is located near the right middle end of the board, just to the left of trimmer potentiometer R124. Unsolder and discard. Now install and solder Da. This diode is mounted vertically with its anode (un-banded) end in the hole closest to the top of the board. The cathode (banded) lead will be bent over and

go to the bottom hole. The board may now be re-installed on the chassis using 5 screws. Do not replace the upper middle screw. Install a solder lug under the mounting screw of voltage regulator IC6 which is on the heat-sink, bottom, near right side of the board.

The four leads that will connect the delay board will be wired next. If a connector is used, wire it in first. In any event connect the wires as follows: (See photo 2) Ground lead to the previously installed solder log; plus 9 volts to resistor R42 which is above and to the right of IC6. The connection is made to R42's left lead (the one closest to IC6). (See (Continued on page 74))



Photo 2 - Showing power lead connected to R42 and ground lead on newly installed solder lug.

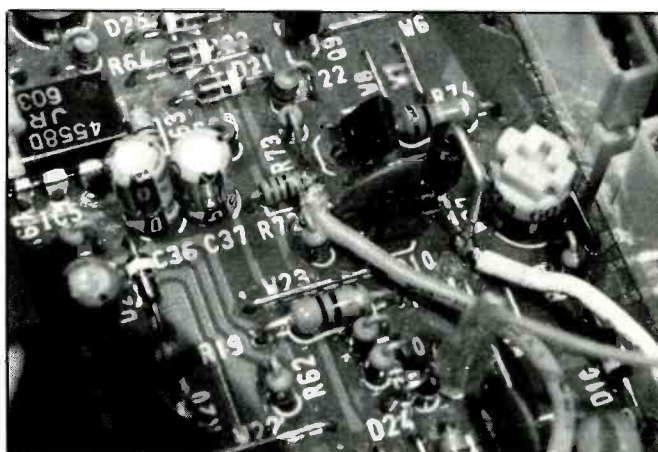


Photo 3 - Showing input lead on R72 and output lead on added diode Da.

11750 at 1633, 11950 at 0623, 15360 at 0148. (Lamb, NY)

South Africa: Radio RSA, 4810 at 0330 with news, 0335 rooster crow and morning news program in Afrikaans. (Zamora, CA) 7270//11900 at 0400. (Martin, IA) 9550 at 1500, IS. (Story, TX) 11900 at 0400 sign on. (Carson, OK) 11920 at 0300 in FF. (Barry, CA) 15230 at 0401. (Tucker, GA) 15365 at 0255. (Jensen, IA)

Radio Orion, 4810 at 2300, old pops and standards, ID 2330. (Tucker, GA)

South Korea: Radio Korea, 5975 at 1600 with sign on, ID, frequency schedule. (Zamora, CA) 9750 at 1243, off at 1259. (Tucker, GA)

Spain: Spanish National Radio, 6055 at 0400, 9530 at 0500. (Barry, CA) 9530 at 0015, 0400. (Rocker, NY; Carson, OK) 11880 at 0052. (Labelle, PQ) Radio Beijing relay, at 0300 with IS, ID, news. (Tucker, GA)

Sri Lanka: SLBC on 9720 at 1700, newscast. (Moser, PA)

Sudan: National Unity Radio, presumed, 9535 at 1500 with ID, news, "peace message," Arabic Press Review. Usually off at 1529 but sometimes as early as 1519. (Martin, MI)

Swaziland: Trans World Radio, 5965 at 0457 with religion. (Moser, PA) 9520 at 1633 with religion in EE and vernaculars. (Story, TX) 9655 at 0408 in unidentified lan-

guage, EE ID at 0430. (Tucker, GA)

Sweden: Radio Sweden, 11705 at 0140 in SS, into FF at 0145. (Caballero, Mexico) 0210 in EE. (Moser, PA) 17740//21570 at 1342 and 17870//21500 at 1536. (Martin, IA)

Switzerland: Swiss Radio Int'l, 6135 at 0520. (Labelle, PQ) 9650 at 0217. (Jensen, IA) 9885 at 0213. (Carson, OK) 12035 in SS at 0030. (Caballero, Mexico) 13685//21530 at 1553, into FF at 1600. (Zamora, CA) 17730 (via Brazil) at 0206. (Moser, PA) 17830//21695 at 1350. (Martin, IA)

Syria: Radio Damascus, 12085 at 2005. (Martin, IA) 15095 at 2110 with frequencies, ID, news. (Moser, PA)

Turkey: Voice of Turkey, 11827 in FF at 0440. (Carson, OK) 0918. (Martin, IA) 15171 in FF at 0233 with rock, news. Drum IS and into Tahitian at 0302. (Lamb, NY)

Taiwan: Broadcasting Corp. of China, via WYFR 5950//15400 at 2258 in CC. ID and IS are different from VOFC. 11885 at 1501 with relay of local FM 1 program. (Lamb, NY) (Try and get 'em to QSL that, Marie!)

Voice of Free China (direct-not via WYFR) 11745 at 1257 in CC with pops, IS, ID, anthem. (Lamb, NY)

Voice of Asia, 7445 at 1100, definite ID, into EE news. (Story, TX)

Thailand: Radio Thailand, 9655 at 1220 with Thai music, heavy QRM. Tentative. (Moser, PA)

Turkey: Voice of Turkey, 9445//9460 at 2357. (Labelle, PQ) 9445 2307-0000. (Scheurell, PA)

Tunisia: RTV Tunisienne, 7475 and 12005 at 0400. (Cohen, ON) 11550 at 0553. (Story, TX)

Ukraine: Radio Kiev, 4825//7400//17690 at 0100 with IS, sign on, frequencies, news. (Moser, PA) 5960//7380 at 2158 with IS, ID, news. (Lamb, NY) 9800 at 1315, unidentified language. (Northrup, MO) 9860 at 0141. (Jensen, IA)

United Arab Emirates: UAE Radio, Dubai, 7215 at 2350. (Moser, PA) 11945//13675//15400 at 0221 in AA with IS, ID, anthem, chants. (Lamb, NY) 21605 at 1332. (Martin, IA) 21560 at 1330 with news. (Story, TX)

Voice of the UAE, Abu Dhabi, 9605 at 2325, ID, news and features. (Carson, OK) 11965 at 1815. (Labelle, PQ) 2330. (Story, TX)

United States: Radio Free Croatia, via WHRI, 7315 at 0131, EE and Croat. (Gasque, SC)

Croatian Radio Zagreb, relay by WHRI, 7315 at 0000 to 0015. (Barry, CA)

WMLK, 9465 at 0644 with Elder Meyer. (Carson, OK) KGEI, 15280 in SS at 0310, ID "LA Voz de la amistad." (Scheurell, PA)

KTBN, 15590 at 1750. (Tucker, GA)

Radio Marti, SS 9590 at 1246. (Tucker, GA) 11930 at 1400 sign on in SS. (Zamora, CA)

La Voz de la OEA, 11830 in SS at 2345. (Tucker, GA) WWCN, 7345 with Radio Miami International at 0056. (Lamb, NY)

Uzbekistan: Radio Tashkent, at 1330 on 5945//9540//15470//17745. (Martin, IA) 9540 at 1330. (Borsch, IL)

Vatican: Vatican Radio, 5885 in SS at 2010. (Gasque, SC) 6095 at 0246. (Labelle, PQ) 6245 at 0610. (Rocker, NY) 7305 in SS at 0355. (Caballero, Mexico) 9695 at 0630 with African service in EE. (Moser, PA) 11625 to Africa at 0650 to 0658 close. (Lamb, NY) 15090 at 2003. (Cohen, ON) 15090//17865 at 1545 sign on to sub-continent and southeast Asia. Off 1600. (Zamora, CA)

Venezuela: Radio Rumbos, 4970 at 0310 in SS. (Story, TX) 9660 at 0159 in SS. (Carson, OK)

Radio Continental, 4940 at 0530 in SS, Latin music. (unid reporter)

Radio Nacional, 9540 with EE news at 1140. (Martin, IA) 1139 in EE with rock, ID, sked, address, IS. Into FF at 1145. (Lamb, NY)

Ecos del Torbes, 4980 in SS at 0127 with tangos. (Scheurell, PA)

Vietnam: Voice of Vietnam, 9840 at 1027; 1230. (Story, TX; Borsch, IL) 15010 at 1848 in FF. (Lamb, NY)

Yemen: Republic of Yemen Radio, 7190 at 0300 with anthem, man in AA. (Moser, PA) 9779 at 2050 in AA. (Story, TX)

Yugoslavia: Radio Yugoslavia, 9505 at 2210 with movie reviews. (Rocker, NY) 9580 at 0130 sign on. (Carson, OK) 15140 at 1939 with news. (Lamb, NY) 17740 at 1245 with Yugo rock groups. Now ID'ing as Radio Federal Yugoslavia. (Tucker, GA)

That's the story for this time. A big thank you and tip 'o the hat to the following reporters this month:

Daryl E. Rocker, Frankfort, NY; Marie Lamb, Brewerton, NY; William Moser, New Cumberland, PA; Christian Labelle, St. Jerome, Quebec; Steve Pellicciari, Norwalk, CT; Paul Jensen, Mason City, IA; Larry R. Zamora, Highland, CA; Barry T. Stephens, Austin, TX; Kevin Story, Midland, TX; Greg Martin, Fruitport, MI; Bjorn F. Vaage, Granada Hills, CA; Mike Martin, Monroe, IA; Andreas A. Scheurell, Pittsburg, PA; Darran Gruber, Palm City, FL; Bernadine Seguin, Muskegan, MI; John Carson, Jr., Norman, OK; Patrick J. Barry, Mission Viejo, CA; Murray Cohen, Fonthill, Ontario; Todd Borsch, Princeton, IL; Manuel Fernando Caballero S., Monterrey, Mexico; Jeff Seefeldt, Wausau, WI; David A. Gasque, Orangeburg, SC; Stephen R. Hunter, Philadelphia, PA.

Thanks to all and, until next month, good listening!

R7000

(from page 30)

photo 3) Output to the cathode end of previously installed Da; input to R72's right lead (closest to front of receiver). R72 is located slightly above and to the left of Da.

Now install the delay board using a M3-20 screw (I bought this item at a local hardware store) and a 1/2" spacer in the upper middle mounting hole. Be careful that the leads on the bottom of the delay board do not touch any components on the main board. It may be wise to use an insulator between these boards. I used a thin, sturdy card stock I had on hand. You may have to improvise at this point and your local hobby shop may have something usable.

Testing

You will probably want to try your project

out before closing the receiver up. If so, be careful. Set the Delay switch to the "off" position and the Scan Start/Stop switch to whatever your pleasure is. For testing purposes an antenna isn't needed. Just start the receiver scanning and then turn the squelch control CCW to "off"—the scanning will stop as if a signal were received. Now turn the Squelch control until receiver goes quiet. Scanning should not start until the time selected with Ct has passed. If problems are encountered, check all wiring carefully. Assuming you have no problems, the covers may now be re-installed after unplugging the power cord! Remember to reconnect the speaker connector before replacing the top cover.

Now sit back and enjoy "real" scanning operation with the R-7000.

Satellite View

(from page 35)

in the former USSR. In fact you may recall that in the November 91 issue I gave you a profile of the Moscow satellite control station RS3A and the new satellite that was to have been launched this year. It would appear that the military control of the station may have ended. The DOSAAF as it was called is no longer funding the launch of the satellites and may no longer have complete control of RS3A. The staff has dwindled from over two dozen to eight souls. There is only one satellite control operator on staff now. So the search is on for a way to get the latest RS off the ground. I also mentioned that Leo Labutin (UA3CR) was connected with DOSAAF. Well, I was wrong. He has, however, worked closely with them in the past.

Gee, that's two errors this decade, I must be getting old.

There is one other thing I have been wanting to tell you for some time. If your main interest is Amateur Radio Satellites I suggest you contact AMSAT-UK. They publish the most complete and interesting bulletin on both Amateur (international) Satellites and the Mir space station. The bulletin called *Oscar News* is well worth the membership, and you will be supporting the Amateur Space Program in the process. Write: AMSAT-UK, Secretary R.J.C. Broadbent, 94 Herongate Rd., Wanstead Park, London E12-5EQ, UK. Or call 081-989-6741 or FAX (24 hours) 081-989-3430. Tell them POP'COMM sent you. See you next month.