

# The KEY

The Newsletter of the Contoocook Valley Radio Club

Volume 8, Number 4

August, 1996

## Mount Washington Ham Radio Information Guide

There are several Ham Radio installations on the Summit of Mount Washington. One of the newest installations, a six meter repeater, is lo-

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## Future Programs

The August program will feature Gary O'Kula, N3CLZ. Gary is the Section Emergency Coordinator for the ARRL New England Division, so if you have any questions about ARES or RACES please join us.

*All You Ever Wanted to Know About Antennas, and More* is the title of September's program. The identity of the presenter is being kept secret (even the editor of *The KEY* is out of the loop on this one!). We'll see you in September when the answer to this mystery is revealed!

CVRC meetings are held on the second Tuesday of the month. The Rag-Chew begins at 7:00 PM; the program at 7:30; and a business meeting follows the program and refreshments. Members and nonmembers alike are welcomed. Talk-in is on the K1BKE 146.895-600 kHz repeater.

## HF/VHF "All-Band" TVI Filter

**Dale Clement, AFIT**

Here is an accessory that should help to remove interference to your television or FM broadcast receiver due to fundamental overload from your transmitter. It is suitable for 75Ω unbalanced input. Of course, interference must enter the TV only through the antenna lead-in for this filter to be effective. If disconnecting this cable does not eliminate TVI (as well as the picture!), then other remedies may also be needed, such as shielding the cabinet or choking the power cord with a ferrite toroid. And, the transmitter must be free from harmonics that might fall within the television channel ranges of 54-88 MHz (Channels 2-6) and 174-216 MHz (Channels 8-13). It is good insurance to equip the transmitter with a suitable low-pass filter. On 6 meters, I use a Drake TV 1000 LP (no longer made), which has a sharp cut-off above 52 MHz.

The filter consists of several sections to accommodate your needs. See Figure 1. A high-pass section (C1-C4 and L1-L3) rejects energy below

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## New O.O.C. for NH

Larry Beavers, W1GTA, has been appointed as Official Observer Coordinator for the ARRL NH Section. If you would like to become an Official Observer, or have any questions about the program, contact Larry at 228-0485.

# A Trip to the Summit

## Nancy Robinson, N1IMB

On July 5, 1995 WA1WOK "Cal" and I started out for Mount Washington at 6 AM. It was a bright sunny day when we left Concord. Our usual trip took us up 93, our usual stop at Irving's, in Lincoln, NH for Cappuccino, then to Twin Mountain. We ventured across 115 passing by the Llama farm, where the Llama were grazing gracefully. We turned onto route 2 then to 16 toward Gorham and Mount Washington. As we reached the bottom, cars were lined up to go up the Mountain.

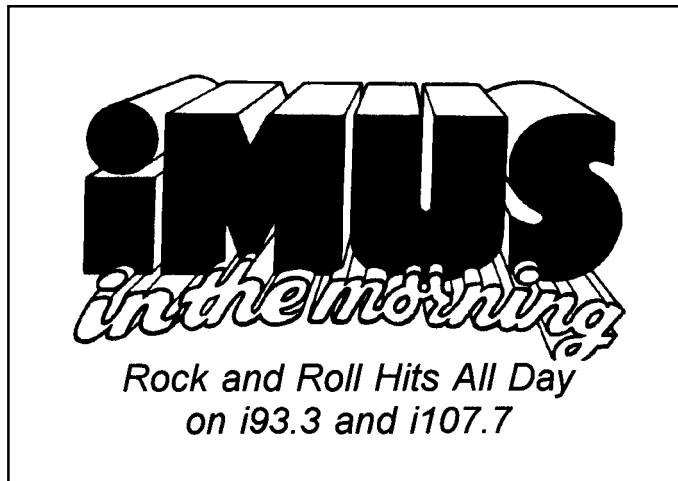
It had begun raining and was a little foggy. The further up the mountain we went the more it rained, and it had gotten very windy and foggy. As we approached the summit the wind was very strong and the rain was almost a torrential down-pour.

We parked near the service door and unloaded the equipment to do some work on the packet and 2 meter repeaters. Hikers were drifting in, cold and wet. Winds at the time were 50 - 60 miles per hour. The temperature was 48 degrees which meant the wind chill was COLD!!

After a hot cup of coffee we proceeded to go to work. The radio room had been reconstructed and the equipment is now in a 3ft. loft that encircles the room. The rack holding the equipment has been narrowed and shortened from 6ft to 4ft in order to fit into its new location.

Cal proceeded to climb onto the narrow ledge to get to work while I did the heavy super-

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cated in the Stage Coach Building. KA1JVC, Kurt Jackson currently has a six meter repeater on 53.19. No other information is available at this time.

Located in the Yankee Building is the Telephone Pioneers Amateur Radio Association Repeater on 448.225. This repeater is linked to several repeaters in New England from Maine to Rhode Island.

Located in the Observatory in the loft of the Henry Shaw Memorial Radio/Electronics Room are the following stations:

2 Meter Voice Repeater - 146.655 -600 PL 100 Hz. with the callsign of W1NH.

2 Meter Packet Frequency - 145.010 with the call sign of MWV:W1HJF-1, which is connected to the backbone and is a NEDA compliant network. The backbone frequencies are unpublished.


440 Voice Repeater - 448.975 -5 MHz with PL of 141.3 Hz. (currently off the air awaiting parts).

For further information on the Amateur Equipment located in the Observatory please contact the Chief Control Operator - WA1WOK - at 367 Mountain Road, Concord, NH 03301. For Emergency situations "Cal," WA1WOK, can be contacted at 603-271-2231 or from within NH at 1-800-852-3792.

Thank you for your inquires to the Amateur installations on the Summit of Mount Washington. 73 and Good Hamming. "Cal," WA1WOK, the Staff at Mount Washington Observatory, and those behind the scene who help maintain the Repeaters.

*Revised 7/6/96 by Nancy Robinson, N1IMB.*

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vising and handing up of equipment from below. He replaced lines, rewired the equipment, checked out the Transmitter and Receiver with Dr. Box (service monitor), ran new power line, replaced 110ft of hard line, replaced antenna and returned Duplexer and Diplexer.

At noon we did our first voice test. Low and behold, the whole north country came alive again. As I was doing voice checks and Cal was tweaking we were getting reports from Plattsburg NY, Southern NH, parts of Maine, Mass, and Vermont. It was still very windy, foggy and raining quite hard. Above me Cal was beaming so brightly I thought the sun was out.

It was a wonderful feeling as we sat and listened to reports and congratulations from all over as to how well the repeater was sounding. All afternoon and into the evening Cal continued to adjust and tweak.

Late afternoon the shift supervisor "Norm", of the Observatory came by and invited us to have dinner with them and spend the night. That was an experience I had long looked forward to. Earlier in the day we had met some hikers that were also hams and were going to spend the night. We went downstairs to the kitchen at 7 PM to sit down to an excellent meal of Lasagna, salad, rolls and strawberry shortcake.

As we were eating dinner the sky was slowly clearing and the sun was coming out just in time to catch the beautiful sunset.

After dinner we sat around and talked while awaiting the fireworks from the Mount Washington Hotel below. We went out on the observatory deck and was greeted with high winds of 88 mph and a starlit sky. The fireworks began at 10 PM. We could observe them in 2 States and 5 different locations. The best were of course from below at the Mount Washington Hotel. It was the most exciting and beautiful thing either of us had ever experienced.

The fireworks were over and now it was time to settle down to a quiet night below. Cal settled into his bed and I into mine sharing it with the cat who is the Observatory Mascot. The night seemed ever so short and it was daylight. We had

a delightful breakfast with the others and a chance to do a little more visiting. After Cal and I helped with dishes we went up to do a final check on the equipment.

As we headed up the stairs to the observatory we were again greeted with high winds, light rain and very heavy fog. Cal did a little more checking while hoping the weather would clear up a bit. The road was closed to all traffic coming up. We said good by to our friends and decided to take the trip back down. We got into the car and started down the mountain. The fog was so heavy that we could barely see the Observatory van that was 5 feet in front of us.

Approximately half way down the weather began to clear and the sun was coming out. As we reached the bottom it was a very warm and beautiful day. As we headed to Littleton to see K1UAQ "Uncle" Bill, before heading home we enjoyed the sound of people using the repeater. It really touched my heart as one gentleman got on the radio and proceed to call a friend of his that he had not heard from in some time due to the repeater being down. Just listing to the conversation was very heartwarming and a reward in itself.

We are glad we could get the repeater back up and hope it will withstand the upcoming cold winter. We also hope that everyone will once again work together in sharing and enjoying it.

HAPPY HAMMING - "CAL," WA1WOK AND NANCY, N1IMB

## **CLASSIFIEDS**

*Classified ads are free for C.V.R.C. members. Ads received by the fourth Tuesday of each odd numbered month will appear in the next month's issue.*

2 meter 5/8 wave mobile antenna with magnetic mount - \$20. 40 channel 11 meter rig - I think it works, but I've never tried it - make an offer. Contact N1JHN

# HF/VHF "ALL-BAND" TVI FILTER

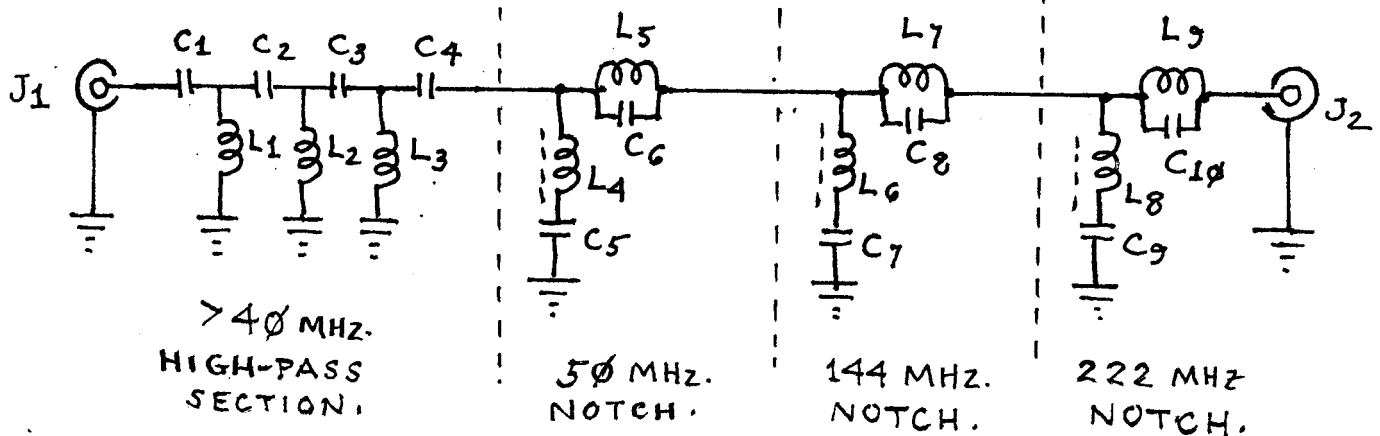


Figure 1.

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30 MHz more than 30 dB. Attenuation increases as frequency decreases. The circuit is derived from the W3NQN 7 section Chebychev data in ARRL handbooks. This section does not require tuning, but if tested with a 50Ω generator and detector, it will appear to have a lower cut-off frequency than indicated by the 75Ω design. The section may be eliminated if no HF operation is anticipated.

The 50 MHz Notch section contains a blocking trap (L5, C6) and a bypass trap (L4, C5) which can attenuate the low end of the 6 meter band (50-51 MHz) 30 dB with minimal effect above 54 MHz (TV Channel 2). This is a lot to expect from a simple filter. Both traps must be high-Q in order not to degrade Channel 2. The parallel-resonant block must have a high C-to-L ratio and the series-resonant bypass must have a high L-to-C ratio. In other words, the reactance of either L5 or C6 at 50 MHz must be low (relative to a 75Ω characteristic impedance), whereas the reactance of either L4 or C5 at 50MHz must be high (relative to 75Ω). High-Q circuits require low-loss components. I have found that some inexpensive chip capacitors (notably high values in a small 0.05" x 0.1" size) have too much resistive loss; they may suffice as simple bypass-capacitors, but not in these selective tuned circuits. The larger 0.1" square (ATC or equivalent) types are good (and less sensitive to heat damage), as are silver-mi-

cas. A silver-mica capacitor used for C6 should have its leads as short as possible in order to minimize series inductance. Tuning the traps for minimum feed-through at 50 MHz will be necessary. One method is suggested in Figure 3. Alternatively, tuning may be accomplished with a 50Ω generator and detector, but measured attenuation values will differ from the 75Ω situation. Parts values are nominal; there will be considerable variation due to capacitor or toroid tolerances, lead lengths, and your particular layout. I tuned L5 by stretching or compressing its turns, and L4 by removing turns from the toroid (start out with a couple of extra turns!), and then adjusting the turn-spacing for fine tuning. As easier method would be to tune C5 rather than L4; C5 may be a small piston-trimmer. Be sure to carefully tune each trap to your 50MHz frequency; they will interact slightly. Should you desire a notch above

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## PARTS PLACEMENT

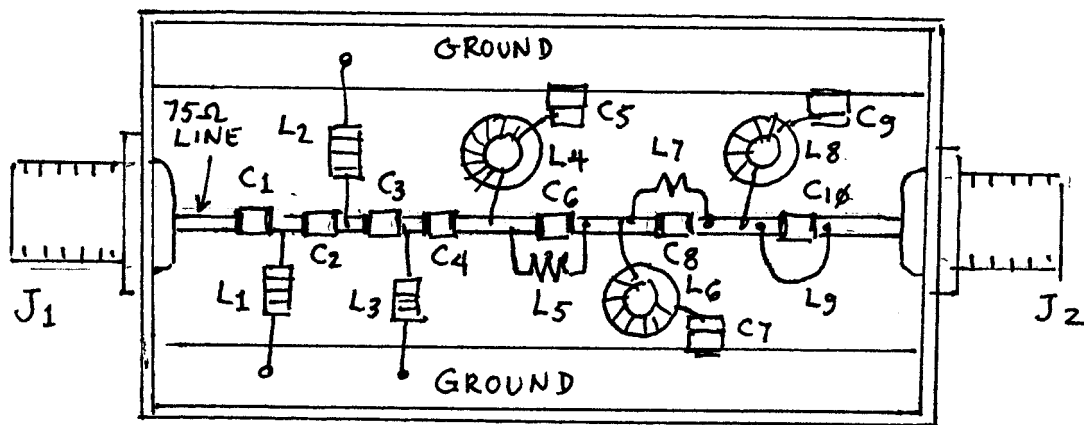


Figure 2.

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51 MHz, there will be degradation of TV Channel 2 video, above 54 MHz.

Next is a 144 MHz Notch section. This may not be needed, as TVI is generally less severe than with 6 meters. This is mainly a result of the large frequency separation between 144-148 MHz and the VHF TV channels (Channel 8 at 174 MHz is the closest.) The preceding discussion about tuned circuits applies here, but this greater frequency separation relaxes the requirement for high-Q traps over that in the 6 meter case. So, if you feel like modifying L-to-C ratios, go right ahead! Just check Channel 8 or 9 to ensure that it hasn't degraded (1 or 2 dB is tolerable)! Note that the high-Q values listed imply low-loss components and critical tuning. At least 20 dB rejection of your 144 MHz signal should be easily attainable.

The 222 MHz Notch section makes the filter complete. You may not presently operate this band and may wish to leave room for adding this section later. It is more difficult to notch 222 MHz and pass 216 MHz (Channel 13) than it is to notch 50 MHz and pass 54 MHz. Hence, all the arguments concerning high-Q, low-loss components and touchy tuning especially apply here. Of course, you may elect to sacrifice Channel 13 (it may not exist in your local area) and experiment with L-to-C ratios. It will be difficult to exceed 20 dB of 222 MHz rejection without seriously de-

grading Channel 13.

Any or all of the sections may be constructed in the same enclosure. I built mine on a 1 1/2" x 3" fiberglass-epoxy circuit board, 0.062" thick, surrounded by a wall of 3/4" x 0.025" brass, as shown in Figure 2. Microstrip construction is used: one side of the circuit board is copper ground-plane: the other side contains the 75Ω line (0.05" wide for this board) and components.

A filter like this can be useful in solving TVI problems. It will only affect energy arriving between the inner and outer conductors of the 75Ω cable. "Common-mode" interference transferred along the outer coaxial conductor will not be rejected. In this case, the entire feed line behaves like a "long wire" antenna. Interference may be choked off by winding several turns of RG-59/U cable (a 2 or 3 ft. length) on a 2" or 2 1/2" diameter ferrite toroid, and installing this between the TV and the filter. It is beneficial to be able to prove to yourself and your neighbors (and the FCC!) that you can watch interference-free television in your own house while you are transmitting. In my case, the TV antenna and 6 meter Yagi are only 20 ft. apart (no cable TV here). This filter enables me to watch Channel 2 from Boston (70 miles away) while transmitting 100 watts at 50.2 MHz. All other channels are devoid of interference. Could there be a more convincing demonstration of compliance with out-of-band radiation standards?

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# TEST SET-UP.

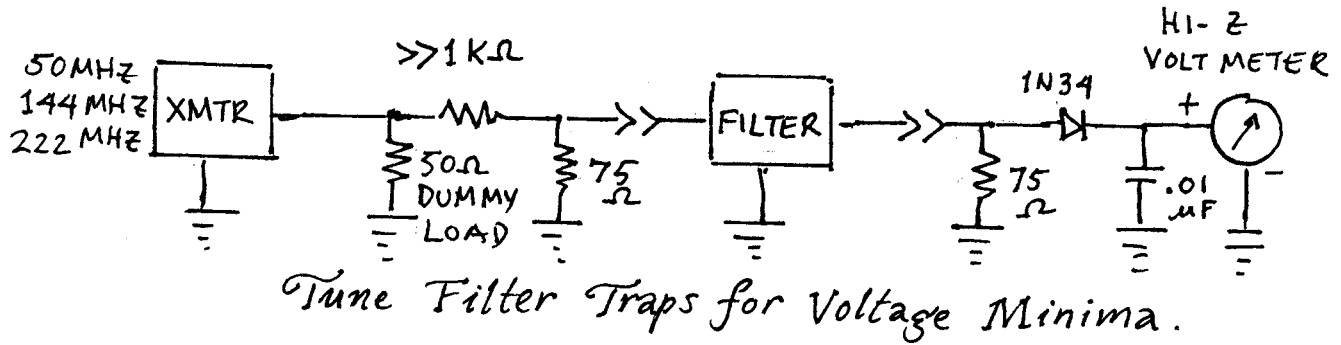


Figure 3.

## We Need Your Information!

Many thanks to the seventeen club members who completed and returned the survey included with the June issue of *The KEY*. If you have not yet completed the survey, please do so as soon as possible and return it to Brad Hutton, KT1H at a club meeting, via US mail (3 Pepin Drive, Bow, NH), via WA1WOK BBS, or to his packet station, which is on the air 24 hours a day. Brad will compile the information (ie. what percentage of club members use Kenwood HTs, etc.) for publication in *The KEY*.

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Parts List

### HIGH PASS SECTION:

L1,L3=0.16  $\mu$ H; 14 turns closewound, 0.1" Dia (wind on #40 drill bit)  
L2=0.14  $\mu$ H; 13 turns, 0.25" long, 0.1" Dia (wind on #40 drill bit)  
C1,C4=50 pF (45 to 56 pF ok)  
C2,C3=25 pF (22 to 27 pF ok)

### 50 MHz NOTCH:

L4=2.0  $\mu$ H; 28 turns on T-37-10 toroid  
L5=50.7 nH, 6 turns, 0.25" long, 0.1 Dia (wind on # 40 drill bit)  
C5=5 pF C6=200 pF

### 144 MHz NOTCH:

L6=0.61 $\mu$ H; 20 turns on T-37-12 toroid  
L7=12.2 nH; 3 turns on 0.075" Dia ~wind on # 50 drill bit)  
C7=2 pF C8=100 pF

### 222 MHz NOTCH:

L8=0.39  $\mu$ H: 16 turns on T-37-12 toroid  
L9=6.3 nH: 1/2 turn, 0.2" long x 0.15" wide  
C9=1.3 pF C10=82 pF

### Notes:

Wire for inductors = #26 or #28 enameled copper. Capacitors = low-loss chip or silver-mica with very short leads. J1, J2 = type "F" jacks

**ALAN K. SHUMAN**  
American Radio Relay League  
Section Manager  
New Hampshire

PO Box 145  
Goffstown, NH 03045  
603.487.3333

**N1FIK**  
Internet: ASHUMAN@MV.MV.COM

## Field Day 1996

Below are some photos taken by Steve Ingham, N1HXO, of the CVRC's 1996 Field Day effort. For a complete "debriefing" of This year's results come to the August club meeting.



## The CVRC on the Internet

The CVRC has now entered the computer age with our own Web Site on the Internet. This site has been made possible by the hard work and generosity Steve Ingham, N1HXO, and his new company Quatron Systems (find out more about Quatron Systems at <http://www.quatron.com>). Once you connect you can read a history of the club, look at some great photos, check out programs for future meetings, and more. There is also a page containing links to other Ham Radio related sites on the internet, so this is a great place to start if you're looking for general amateur radio information or software. Check us out at <http://www.quatron.com/cvrc>.



## The KEY Schedule

The KEY is published every other month at the beginning of the even numbered months. The deadline for articles and submissions is the fourth Tuesday (coinciding with the usual business meeting schedule) of the preceding month.