



The Jersey Broadcaster

NEWSLETTER OF THE NEW JERSEY ANTIQUE RADIO CLUB

December 2024

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The *Jersey Broadcaster* is distributed to members of the New Jersey Antique Radio Club via email as a PDF file. Back issues of many of our newsletters are available on the club's website:

www.njarc.org/broadcaster/

Meeting Notice

On December 14, the club held its annual Holiday party at the West Lake Country Club in Jackson. The event was hosted by Bill and Lynn Zukowski. You can see Radiowild's video coverage of the gift exchange on YouTube at www.youtube.com/user/radiowild.

Directions to our meetings can be found on Google Maps (<https://bit.ly/4eBPXeJ>)

From the President's Workbench

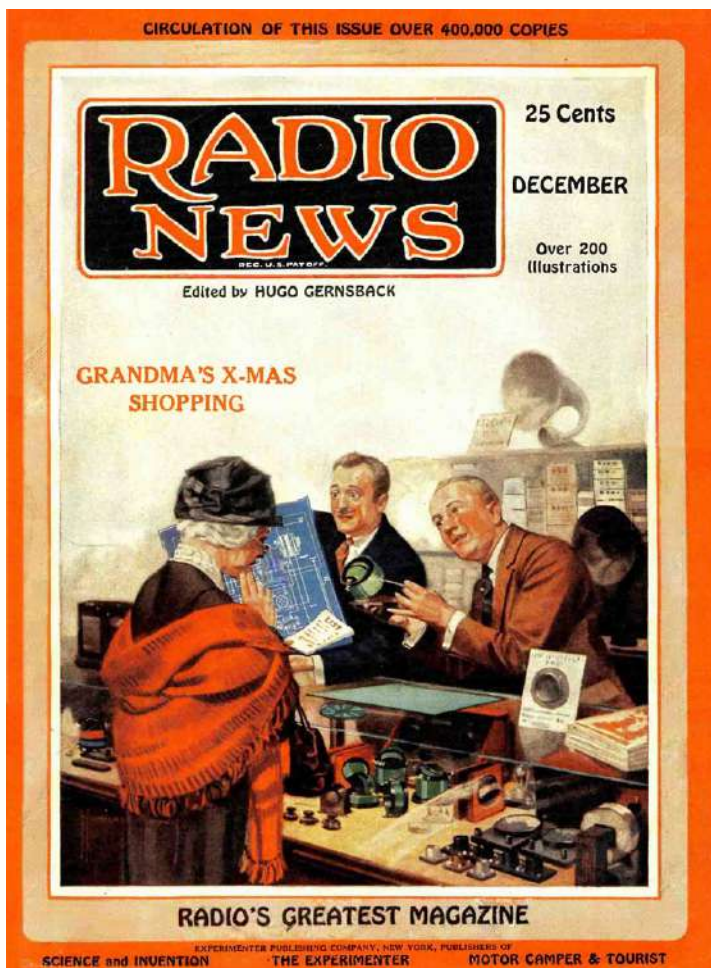
Greetings Fellow Enthusiasts!

On November 16th, our club held its Annual Fall Hamfest/Swapmeet Show at the Parsippany PAL in Parsippany New Jersey. All-in-all it was a successful show, considering the light attendance and a few table cancellations.

Fortunately we had a new PAL named Chris, who came early to the building. This enabled me, Vince Meyer, Jerry Ingordo and Jon Kummer to comfortably "tweak" the table set-up for easy access to the waiting vendors outside. A big Thank You to Vince, Jerry Jon, Paul, and Matt Reynolds. And a Special Thanks to Judith Shaw at the gate and Fred Wawra in the Canteen! (Photos on page 3.)



The President's Workbench.



Radio 100 Years Ago - December 1924

Radio broadcasting has now been firmly established as a source of news, while other uses of this new delivery methodology are being developed. In looking back at 1924 we see that radio became an educational tool, with several universities broadcasting lectures; radio stations were as navigational beacons for airplanes; radio-enabled remote control of vehicles was demonstrated; an attempt was made to communicate with Mars when it was relatively close to Earth this past August; and photographs were transmitted from Europe to the United States. The transmission of each photo took approximately 30 minutes. One witness to the event commented: "When one of these pictures can be transmitted in 1/16 of a second, you may prepare yourself for radio-movies. It's only a few steps (away) now."

Read the December 1924 Issue of Radio News magazine here: www.njarc.org/books/radio_magazines/Radio-News-1924-12.pdf

Read the December 1924 Issue of Radio magazine here: www.njarc.org/books/radio_magazines/Radio-Age-1924-12.pdf

Read the December 1924 Issue of QST magazine here: www.njarc.org/books/radio_magazines/QST-1924-12.pdf

THE JERSEY BROADCASTER is the newsletter of the New Jersey Antique Radio Club (NJARC) which is dedicated to preserving the history and enhancing the knowledge of radio and related disciplines. Dues are \$25 per year and meetings are held on the second Friday of each month either at InfoAge or at Princeton University. Neither the editor nor NJARC is liable for any other use of the contents of this publication other than for information.

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In This Issue

Scott Marshall describes a method for aligning FM radios using a simplified approach that does not require specialized equipment. Scott explains the technical aspects of FM demodulation and provides step-by-step instructions for aligning the IF, RF, and demodulator stages of a vintage radio.

In "A Building Just For Tubes" Ray Chase writes about the club's tube building, our "tube chaplain" who cleans, tests and boxes our inventory of radio tubes and how the tubes are priced and made available to members.

And Matt Reynolds recounts his experience using a Sony ICF-SW1 portable radio to receive longwave (LW) stations while traveling in Italy. It includes details about the radio's capabilities, the challenges of restoring it, and the specific stations and frequencies the author was able to receive.

Calendar of Events

January 4: JD Auction Services, Jackson NJ

January 10: NJARC monthly meeting, InfoAge

January 17: HARPS monthly meeting, Suffern NY

February 14: NJARC monthly meeting, Princeton

February 21: HARPS monthly meeting, Suffern NY

March 14: NJARC monthly meeting, InfoAge

March 22: NJARC Spring Swapmeet (preliminary date)

March 28: HARPS monthly meeting, Suffern NY

April 11: NJARC monthly meeting, Princeton

April 18: HARPS monthly meeting, Suffern NY

April 26: NJARC Spring Repair Clinic, InfoAge

April 26: International Marconi Day, InfoAge

May 9-10: Kutztown Radio Show

May 16: NJARC monthly meeting, InfoAge

May 23: HARPS monthly meeting, Suffern NY

June 13: NJARC monthly meeting, Princeton

June 20: HARPS monthly meeting, Suffern NY

June 27-29: ARRL Field Day, InfoAge

July 11: NJARC monthly meeting, Princeton

July 26, NJARC Summer Hamfest/Swapmeet Tailgate Show, InfoAge

August 8: NJARC monthly meeting, Princeton

August 23: NJARC Spring Repair Clinic, InfoAge

September 12: NJARC monthly meeting, InfoAge

September 19-20: Kutztown Radio Show

October 7-11: AWA Conference, Henrietta NY

October 10: NJARC monthly meeting, Princeton

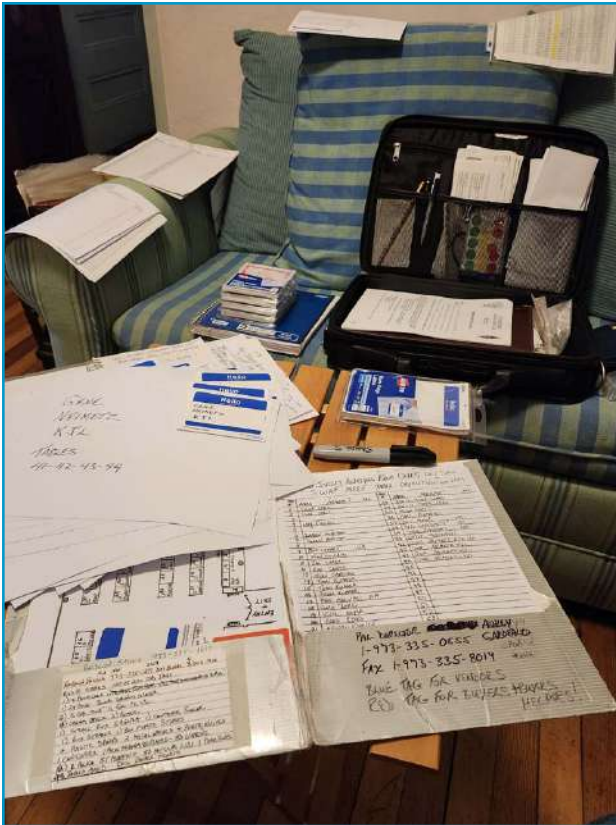
October 25: NJARC Spring Repair Clinic, InfoAge

November 14: NJARC monthly meeting, Princeton

November 22, NJARC Fall Hamfest/Swapmeet Show, Parsippany

December 13: NJARC Holiday Party, Jackson

President's Workbench (Continued)



Lots of planning & lots of paperwork



My traveling companion the coffee urn



Pickup at the bagel shop 5:30am

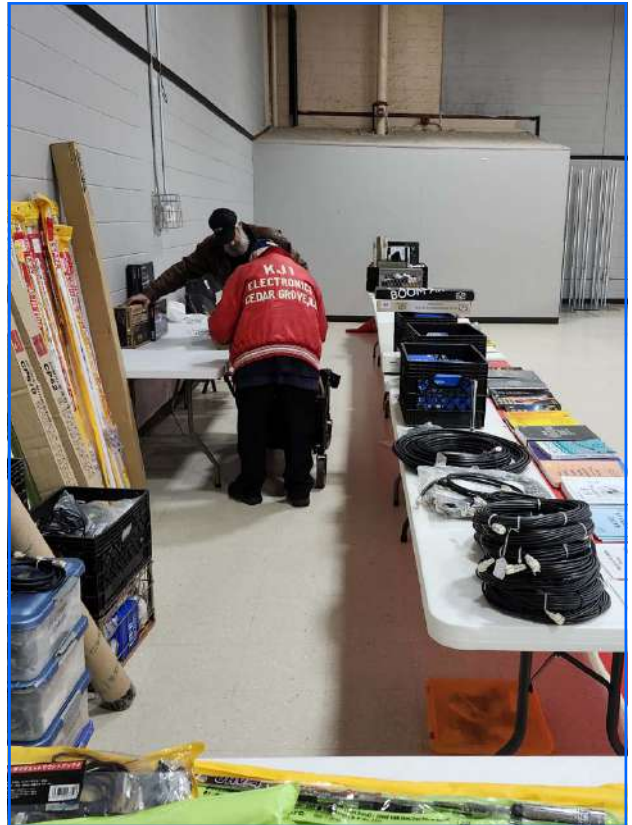


Vendors setting up

President's Workbench (Continued)



Ray Chase setting up his collection of military gear for sale



Gene owner of KJI Electronics setting up with his crew



Jerry & Bruce take a break from setting up for a photo-op



It's almost time for the public to come in

Continued on next page.

President's Workbench (Continued)



Lady Judith at 7:55 ready and waiting for the buyers



The buyers arrive 8am sharp!



Items up for sale



Got tubes!

President's Workbench

(Continued)



Young Will refused to wear his red name tag, so he was asked to leave



Ellis, the happy vendor



Happy Holidays in my Radio Room



Season's Greetings

Dr. FM, or: How I Learned to Stop Worrying and Love Aligning FM Radios

By Scott Marshall

While AM radio was invented by Fessenden in 1900, and is quite simple in its implementation, FM radio, invented by Armstrong in 1933 to fight static, is dauntingly complex. The AM demodulator of an ordinary receiver requires no alignment, but the standard alignment procedure for an FM receiver, for optimal alignment, requires a sweep marker generator and oscilloscope to achieve a symmetrical butterfly-like trace. AM demodulation is typically implemented with nothing more than a diode and a single-capacitor filter. But, there are two types of FM demodulators typically found in vintage radios, and they use two diodes and a special final IF stage transformer secondary winding: the ratio detector, or the discriminator. While experimenting with aligning a radio for which no alignment instructions were available, a 1948 Freed-Eisemann "Educator" school radio, and only AM radio alignment equipment, I was able to discover a simple and effective alignment method, which I shared at the recent Show and Tell Hints and Kinks NJARC meeting.

What follows applies to typical vacuum tube FM receivers. Circuits vary, though most variants of FM receiver circuits share the same basic principles as in ordinary vintage AM radios.

The idea is that, aside from the demodulator, an FM radio is almost the same as an AM radio. It just uses higher RF and IF frequencies. My shortcut procedure is to simply align the IF section and RF section, as precisely as possible, and then, with a quality FM signal precisely tuned in on the dial, to align the demodulator, normally the secondary slug of the final IF transformer, for strongest audio output with the least distortion.

I've found the best way to align a radio is, using an accurate signal generator, to connect a VTVM (vacuum tube voltmeter) with a d'Arsonval galvanometer across the radio's AVC filter capacitor, and then to adjust the tuning slugs or trimmer capacitors for maximum voltage across the capacitor. The FM demodulator alignment can be done by ear similarly to how one tunes in an FM radio station on the dial. A quality, low-power FM transmitter modulated with a sine wave to near 100% in the normal audio range, is an ideal signal generator for this step. However, to achieve even better alignment of the FM detector than by ear alone, one can connect a VTVM across the loudspeaker on the AC setting, in parallel with a harmonic distortion meter or spectrum analyzer.

Why does this work? Well, think of the fact that when one is tuning in a station while simply listening to a radio, one is actually setting the local oscillator frequency to be higher than the transmitted signal by the peak frequency of the IF stages (usually 10.7 MHz for FM). Tuning the dial slightly above or below the desired station will cause the IF signal to be slightly above or below the peak resonance of the IF stages, as well as above or below the center frequency for the FM demodulator. Therefore, if the dial is tuned perfectly to a station, and the IF stages are perfectly peaked, adjustment of the FM demodulator becomes a mirror image of the adjustment of the dial. And, adjustment of the dial we nearly always do by ear every time we tune in a station.

How about a step-by-step walkthrough?

Initial basic setup requires a signal generator and VTVM or FET voltmeter. A simple VOM will load down the AVC circuit of a vacuum tube radio, making it malfunction. I prefer a d'Arsonval galvanometer readout over digital because one can easily accomplish a peak adjustment, by eye, by placing the needle as high as one can against the tick marks. The voltage across the AVC capacitor represents the actual strength of the received signal. One usually sees a small negative voltage there which becomes higher or lower depending on the strength of the IF signal at the detector.

One at first sets the signal generator to the IF frequency of 10.7 megahertz (some radios may use a different IF frequency). I like to use a frequency counter to confirm that it's spot-on. I also like to apply some amplitude modulation to the signal so I can monitor the procedure by ear from the radio's loudspeaker, but the sound quality of this signal to the ear is not relevant during this step. I input the signal to the radio with an insulated wire from the signal generator output coiled a few turns around the receiver's converter tube. It's a gimmick that's

Dr. FM, or: How I Learned to Stop Worrying and Love Aligning FM Radios (Continued)

always worked for me, but one must take care to avoid moving the coil while peaking the resonances, which will interfere with measurement.

Now, the IF stages are ready to be peaked. Omit the final IF secondary adjustment at this time – that will be adjusted at the later, final step. First, set the radio dial of the gang capacitor fully open, and disconnect any antenna input, to assure a clean IF signal. While peaking each stage, one may need to set the meter to a different range to keep the needle roughly centered on its dial, and adjust attenuation of the signal generator to avoid overloading the IF circuits. If limiter stages are in the IF amplifier chain, the signal generator attenuation should be adjusted and occasionally readjusted to be below the action of the limiters. Limiter action can obscure changes in signal strength.

After IF alignment is satisfactorily peaked, we move on to RF alignment. The meter monitoring signal strength at the ALC filter capacitor remains as it was during the alignment IF procedure. A signal is provided to the antenna from the signal generator. I typically place an insulated wire from the signal generator next to the antenna. RF alignment specifications vary, but one can usually do a good job by setting the generator frequency to a high value, say 107.9 MHz, setting the radio dial to that point, then peaking the local oscillator, antenna, and any other resonances in the RF circuit. With the IF and RF circuits peaked, we can move on to the demodulator.

I've found that critical tuning of radios with music or speech as a signal source is difficult due to the random nature of ordinary sources, so constant signals are preferred. I therefore usually use a low-power FM transmitter, the type marketed for playing cell phone earphone outputs to car radios. They are excellent in sound quality and frequency precision, and only cost about \$10 to \$20. I supply the transmitter with a good sine wave in the middle of the audio range, or a clean, constant tone. To align the demodulator stage, having peaked the IF and RF stages in the previous steps, and with the meter still on the AVC capacitor filter, peak the radio dial for maximum signal, then adjust the final IF transformer secondary, in the demodulator section, for best sound quality with least distortion by ear, just like one would do tuning a radio to a station, but at the final IF transformer secondary instead of the dial.

Some alignment procedures have one go back and forth between the last IF primary and secondary to achieve symmetry and centering of the demodulator, but so far, I haven't seen this to be necessary. It's typical to repeat alignment steps to fully optimize circuit peaking in many alignment procedures, but I've found in practice this to help little or not at all.

Unofficial DX Contest Entry From Italy

By Matt Reynolds

I had been contemplating bringing with me on my Italy vacation a radio capable of longwave reception, as I had never heard a LW station firsthand. Coincidentally, member John Stoll was also thinking I should do this and independently sent me a list of stations before I left, which saved me some research time so I can focus on packing and planning all the other aspects of my trip. I only happen to have one radio that receives LW anyway, a Sony ICF-SW1 portable that I purchased last year at the VCF swap meet. Some of you may remember, especially if you were at the repair clinic the same day, that I was dismayed to find it needed to be recapped. I was successful at doing so, but it was quite a challenge and is not a task for the faint at heart.



Sony ICF-SW1 that I recapped.

More information on the Sony ICF-SW1 is on the Crypto Museum website:

<https://www.cryptomuseum.com/spy/sony/icfsw1/index.htm>

Quick-and-Dirty Generic FM Tube Radio Alignment

By Scott Marshall

Tools needed:

- Signal generator that can produce 10.7 MHz
- VTVM or FET meter that can read a small negative voltage
- Low power FM transmitter
- Sine wave audio generator

Theory:

Think of an FM radio as an AM radio, but with an FM demodulator instead of an AM demodulator. In a typical FM set, the resonant IF transformers are similar to an AM set except the last transformer's secondary is typically part of the demodulator (a ratio detector or discriminator).

Summary:

Align the set the same as you would align an AM set, but to FM frequencies (usually 10.7 MHz IF and 88-108 MHz RF) EXCEPT for the secondary of the last IF transformer, which is to align, after then peaking a radio signal with the tuning gang, as if tuning a station for best sound volume and lowest distortion.

IF Alignment Procedure:

Fully open the tuning gang. Set the signal generator to 10.7 MHz. Connect it to an insulated wire touching or wrapped around the converter tube. Attach the VTVM across the AVC line filter capacitor. Set the meter range to read minus voltage, in the ballpark of -10V.

Power-up the radio and confirm that varying the signal generator attenuation results in varying AVC voltage.

Peak the resonances of the IF transformer primaries and secondaries (but not the last IF secondary) for maximum AVC voltage. If limiter stages are present, attenuate the signal generator enough to fall below limiter action.

RF Alignment Procedure:

Set up the radio's antenna input to receive the low power FM transmitter, modulated with a normal frequency sine wave to near 100% modulation. Align the tuning gang as is normally done in RF alignment on an AM receiver, typically setting the dial and transmitter to the highest channel, then peaking the AVC voltage, first with the local oscillator trimmer, then the RF input trimmer.

Demodulator Alignment Procedure:

Set the radio tuning gang to obtain peak AVC voltage with the FM modulated signal input as in the RF alignment procedure. Attach the meter to the loudspeaker to read AC voltage,

Adjust the last IF transformer secondary (the discriminator or ratio detector) for maximum sound output with minimum distortion.

Caveat:

Receiver circuits vary.

Unofficial DX Contest Entry From Italy

(Continued from page 8)

I now had a great reason to use it; it is small, sensitive, and easy to use. If I were to have officially been participating in the contest, based on its size, it would fit in category G (shirt pocket category) of the DX contest, but since it was very expensive new (800 Deutsche Marks in 1987, according to radiomuseum.org), it must be entered into category K, the “any radio” category.

Unfortunately, I did not spend a lot of time DXing in Italy. Due to logistics issues, I had much less free time than planned, I was tired/jetlagged most evenings, and simply had other things to do. I did manage to do so briefly on two different occasions, once in Venice, and once in Florence. “When In Rome” jokes and references came up throughout my trip, but for whatever reason I never applied it to listening to my radio while I actually was in Rome. Next time...

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I was not expecting to hear much, and I put very little effort into it, but I was impressed with the results. I was able to pick up these 4:

Station Name	Frequency	Location
Medi 1 Radio / Radio Méditerranée Internationale	171 kHz	Nador, Morocco
BBC Radio 4	198 kHz	Droitwich, UK
Alger Chaîne 3	252 KHz	Tipaza, Algeria
Polskie Radio Program I /radiowa Jedynka	225 kHz	Raczyn, Poland

I was surprised that I was able to simply put these frequencies into the radio and immediately hear them without doing anything special to try to increase my odds beyond rotating the direction the radio was facing. I did not move closer to a window, I did not use any of the fancy antenna accessories that come with the ICF-SW1 (in fact, I didn't even bring them with me), nor did I worry about any chargers/power supplies plugged in. This was all received with the ferrite rod antenna built in. I was able to hear them all fairly clearly, but I did not note much of what I did hear, other than the fact that the Algerian station was playing pop music – (“Eternal Flame” by The Bangles) when I was in Venice, and that the Algerian station was the easiest/strongest to pick up from Venice.

Unofficial DX Contest Entry From Italy

(Continued from previous page)

Here are the stats to my two attempts:

Frequency	Location	Distance to Venice:
171 kHz	Nador, Morocco	1,057 mi
198 kHz	Droitwich, UK	800 mi
252 KHz	Tipaza, Algeria	800 mi
225 kHz	Raczyn, Poland	560 mi
		3,217 mi

Frequency	Location	Distance to Florence:
171 kHz	Nador, Morocco	954 mi
198 kHz	Droitwich, UK	852 mi
252 KHz	Tipaza, Algeria	681 mi
225 kHz	Raczyn, Poland	621 mi
		3,108 mi

I am very happy with the performance of the Sony ICF-SW1, and will be sure to bring it along with me on any further intercontinental trips I may end up taking in the future.

A Building Just For Tubes

By Ray Chase



What do you mean, a building just for tubes? Some members may not know that shortly after we established the Radio Technology Museum at InfoAge, we were able to acquire a small outbuilding, Building No. 9312. The goal was to set up a place to store the club's stock of tubes and better organize them. We had to refurbish the interior, build shelving, fix the electrics, etc. For the past many years, Bruce Ingraham has been doing all the "grunt work" of organizing the tubes, testing them and weeding out the duds. It's a thankless job since there is no air conditioning and little heat in the building. He has organized our tube inventory and turned a chaotic environment into a professional arrangement that allows stock items to be quickly located.

Our club mission has been to supply a large range of vacuum tubes to club members at reasonable cost. We get many donations of tubes as there does not seem to be any end to what comes from attics and estates where the deceased individual did radio repair work, especially during the days when TV set used a lot of tubes. Many of our tubes are pre-tested and many are not. If the tubes are not in individual cartons, they are usually tested.

Continued on next page.

A Building Just For Tubes

(Continued)

Since the cartons are much more fragile than the tubes themselves, we try to keep boxed tubes that way until they are needed. Many of our big-pin and octal tubes are pre-tested. All tubes sold to members are tested at least once. We use emission testers for rough sorting and then a military I-177 or a Hickock 239 for transconductance tests. Most full-wave rectifiers are also checked in a 300 or 400 volt power supply to ensure that they will not arc and are not gassy. We obviously cannot do more than filament verification for hi-voltage or transmitting tubes.

What do tubes cost? Run-of-the mill radio and TV tubes are sold to members for \$3.00 each. Some high-value tubes such as 12AX7s, magic eye tubes and audio, guitar amplifier and early antique tubes will be priced at about 50% of general retail value if we have them. Quantities will be limited depending on how many we have. We stock big-pin tubes, octals, loctals, compactrons and 7 and 9 pin miniature tubes. If you need a tube that we do not have or is rare or weird we may be able to find a source for it.

How do members get the tubes? Contact Ray Chase or Al Klase at the contacts listed below. Payment is usually cash or check. The best way to obtain tubes and pay for them is by picking them up at a monthly club meeting or by stopping by at the RTM on a Wednesday. If neither of these ways are convenient. We can ship tubes, usually by USPS, but you will have to pay the postage. There would not be a packaging cost unless we need to buy a shipping carton. Usually, we can find a box for shipping.

Contacts: Ray Chase • raydio862@verizon.net • 908-472-3329 Al Klase • ark@ar88.net • 908-892-5465



Bruce at work



Lots of Tubes Organized