April / May / June 2019

Radio & Vintage Electronics News

1st place photo by John Gibbons of Harrison Neff

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ABOUT THE NEW ENGLAND VINTAGE ELECTRONICS CLUB

Founded as the *New England Antique Radio Club* (NEARC) in June 1988, the *New England Vintage Electronics Club* (NEVEC) is incorporated in the State of New Hampshire. NEVEC is dedicated to the preservation, collection, restoration and enjoyment of antique and collectible radios, TVs, High-Fidelity equipment, as well as related equipment, printed matter and artifacts.

The *New England Vintage Electronics Club* newsletter, Radio and Vintage Electronics News (**RAVEN**), is published in quarterly editions:

- Winter (Jan/Feb/Mar)
- Spring (Apr/May/Jun)
- Summer (Jul/Aug/Sep)
- Fall (Oct/Nov/Dec)

Subscriptions are included with all NEVEC memberships.
Our big **NEVEE** Show is held in March in Nashua, NH and our Spring and Fall Flea Markets are held at the Brookline Event Center. See the back cover for next event info.

Visit our NEVEC website www.nevec.org for more information about the club, event dates, driving directions and dealer's forms. We also have our own Facebook page with lots of photos and announcements. Just go to

https://www.facebook.com/NewEnglandAntiqueRadioClub

Our Yahoo group is a members-only place to share information, photos, stories, and wanted/for-sale information. Register at

https://groups.yahoo.com/neo/groups/NEARC_Radio/info

Membership dues are $20.00 per year for print & mail, $6.00 for email/Internet. No new print and mail memberships are being accepted; however, existing ones are "grandfathered." All annual memberships expire on December 31.
A copy of the NEVEC/NEARC Constitution is available on our website: www.nevec.org.

All members are encouraged to write-up and submit radio/TV-related articles and/or photographs. Everybody has had experiences that can be shared with other members. We will help you prepare your article for publication in **RAVEN**. Your articles will be printed as soon as space permits.

Newsletter submission deadlines
Jan/Feb/Mar — January 1
Apr/May/Jun — March 1
Jul/Aug/Sep — August 1
Oct/Nov/Dec — October 1
Mail or email all newsletter submissions to any NEVEC **RAVEN** Editor.

THE PREZ SAYS

Howard Mariotti, President NEVEC

What a Show! The 50th annual "Biggest and Best Radio Show on the East Coast" lived up to its motto. Numbers speak volumes and there were hundreds of attendees and thousands of vintage electronics items that the sellers and exhibitors brought for us to purchase or view on display. More important than numbers, though, was the quality of the show and the positive energy that could be felt throughout the day. I observed a lot of smiles from familiar faces as well as some new ones.

We were blessed by both the timing and location of the show. The timing coincided with a calm "between two storms" making weather a non-inhibiting factor. The fine staff at the Marriott went above and beyond to address the issues that we brought to their attention and provided for all our needs. I'm happy with this relationship and that the Marriott will be hosting our shows for the foreseeable future.

Many of the items that the sellers brought were valuable and of heirloom quality. I bought a really nice radio that I "couldn't live without" and saw many others that were very happy with their newfound treasures. As always, there was something for everyone.

Many great items were raffled and fun was had by all, but especially by the holders of the winning tickets. The cover picture and the smiles in the other pictures shown in this edition of RAVEN tell that story. Congratulations to all our winners, and thanks again to all who donated items, sold tickets, refurbished items, and performed the tasks needed to coordinate this very successful raffle. Note, however, that a raffle has not yet been planned for NEVEE 3 / Radio 51. There are members who have expressed interest in helping with future raffles, but we are currently seeking an individual to lead and coordinate this activity. Please email me if you are interested in this position.

For those of you who, like me, were lucky enough to be able to stick around for the guest speakers, we were certainly compelled and fascinated by the right combination of wisdom, humor, and valuable information that the guest speakers brought us. After the show I thought about how great it was to be so entertained and engaged without the cost of attending a Broadway show. Like the raffles, guest speakers have yet to be planned for NEVEE 3 / Radio 51. If you are interested in joining the team to coordinate future guest speakers or exhibitions, please contact me.

This was my first show as President of the New England Vintage Electronics Club. I learned about the behind the scenes work that goes into the show and was amazed at the amount of time spent to make the show go right. The unpaid Officers, Directors, Chairmen, and other volunteers perform the delicate balancing act that makes these shows possible. I will never forget your efforts. Please thank these exemplary individuals when you see them. Speaking of exemplary individuals, the Life Member award was given to Bruce Phillips who was unanimously voted in as our most recent recipient. Congratulations Bruce!

Spring is in the air and if our spring show is only half as good as NEVEE II was, I'll be content. Look in this edition of Raven for something new at Brookline. For the first time in several years, both spring and fall shows will have a People's Choice contest with two categories each.

See you at Spring Brookline!

Howard Mariotti

president@nearc.net

New England Vintage Electronics Club

Another Blast from the Past: The Class of 1990

Ed. Note: This article appeared in our club's original newsletter, "Escutcheon," on page 13 of the December 1990 issue. The original title was "Radio Repair Class."

The Class of 1990: Left to right: Marty Bunis, Francis Donovan, John Finnern, Will Buchanan, Richard Foster, Thomas Scarpelli, Faith Valente, John Moriarty, and Gary Nitkin.

Congratulations to the "Class of 1990"! On November 10th, they officially "graduated", and although there were no caps and gowns or diplomas, every member of the Radio Repair for Beginners class was pleased with the results and felt they had received a great education! Sponsored by the NEARC, this first series of beginner radio repair classes was attended by eight club members, whose repair skills ranged from those of a complete novice to those who already had a good grasp of the basics and were there for a refresher course. It was taught by Richard Foster, Member #67, whom many of you know as a highly skilled repair and restoration expert as well as a teacher. The classes were very well presented - his teaching techniques combined with his radio repair expertise made a great combination.

Because the class was small, there was plenty of time for questions and discussion about specific problems, and there was a level of excitement present that can only come from people who are there because they are truly interested in the subject matter and want to learn all they possibly can.

The first four classes covered a great deal of basic information about circuits, tubes, schematics, Ohm's law, etc. Tape recorders and even a video camera ran constantly, and notebook pages filled up rapidly as Richard drew diagram after diagram on the blackboard, always emphasizing the correct way to do electrical repair. The last class was "hands-on", and class members brought in problem chassis for troubleshooting. There was also time before class and during coffee breaks for talk about the club, Swap Meets, past radio experiences, new additions to collections and anything else dealing with radios!

We want to take this opportunity to thank Richard - none of this would have been possible without him! He has offered to give another series of classes in 1991, so if you missed out the first time around, this is your chance! More details will follow ASAP.

Richard Foster clarifies a point to class member, Thomas Scarpelli.

2019 Spring Brookline Training Sessions

There will be two training sessions offered following the 2019 Spring Brookline show, inside the exhibition hall. One will be a "basic " class held by Larry Szendrei on using a Signal Tracer for troubleshooting AM radios and audio amplifiers. The other session will be more specialized, "Troubleshooting and Repairing Common Problems Found In European Tube-Type Radios," given by Ross Hochstrasser. The two classes will be presented simultaneously and will commence as soon as we can clear the hall following the flea market and get the furniture rearranged! This probably means we'll get started around 12:15 - 12:30 PM.

Upgrading a 1933 Motorola Model 77 Auto Radio

By Roy Erickson

As you may know, most of the early auto radios consisted of a “black box” housing the receiver. This box was mounted under the dash and bolted to the firewall, usually with the loudspeaker. Normally, two flexible control cables ran from the radio box to a control head mounted to the steering column which had the power switch and tuning control knobs.

The model 77 radio had only one flexible cable. Pushing on the one knob would activate the power switch/volume control and pulling it out would activate the tuning control. A very clever arrangement! See Figure 1.

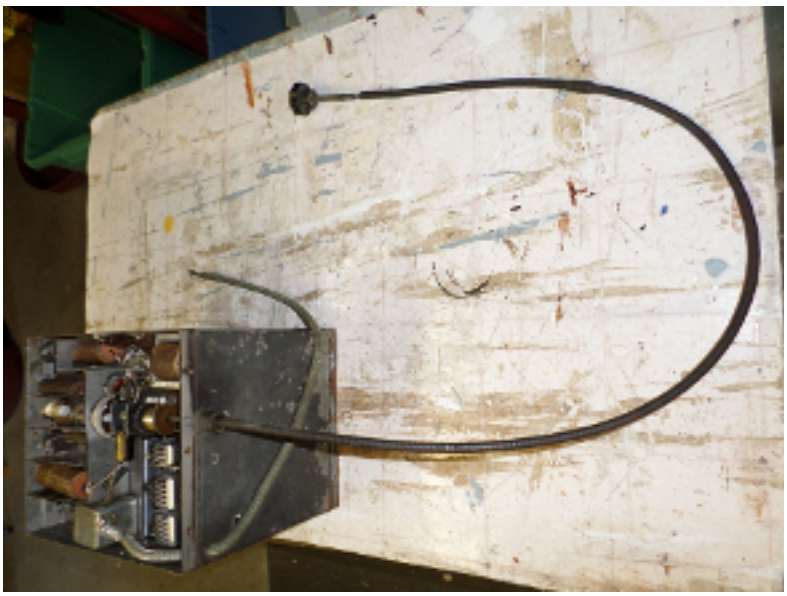


Figure 1

Since I didn’t have the control head, this would not be a candidate for a complete restoration. Thus I came up with the idea of replacing the original tubes with more modern miniatures, just to see if it could be done (Figures 2 and 3).

The original tube line up was four type 39s, one type 75, and two 6A4/LA output tubes. I decided to use 6BA6s in place of the 39s, a 6AV6 for the 75 and two 6AQ5s for the output tubes. I soldered fairly stiff bus wire to the mini sockets with enough length to go into the tube socket holes and be soldered underneath.

The original power supply had a synchronous vibrator circuit which does not require a separate rectifier; see Figure 4. I decided to change to a newer circuit using a standard 4 pin vibrator and silicon diode rectifier. As the original power transformer did not have center-tapped windings, I used one from a 1940 Ford radio; Figure 5.

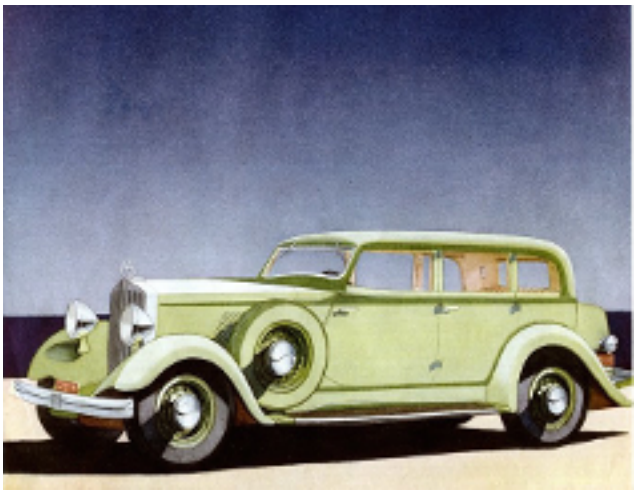
Figure 6 shows the rat’s nest bottom of the chassis, which was only 1” deep. There is a beat-up schematic mounted on a cover plate. Both this one and the one from Rider’s manual is dated 2-27-33. Both also show a tone control switch which is not on my model 77. Maybe it was deleted before these receivers were built. Changes came quickly as the

model 77-A was dated 7-27-33 with a completely different tube line up.

There was more that went into this, but I decided to keep the story short. In the end, the radio does work, but probably could use a complete tune up.

Figure 2

Figure 3



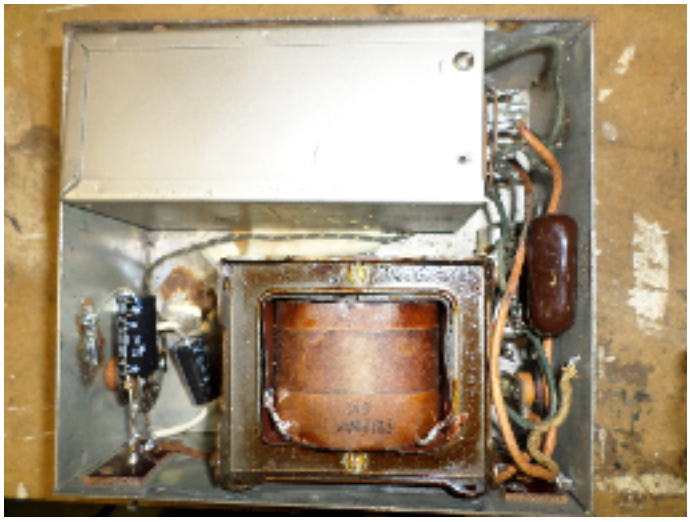


Figure 4

Figure 5

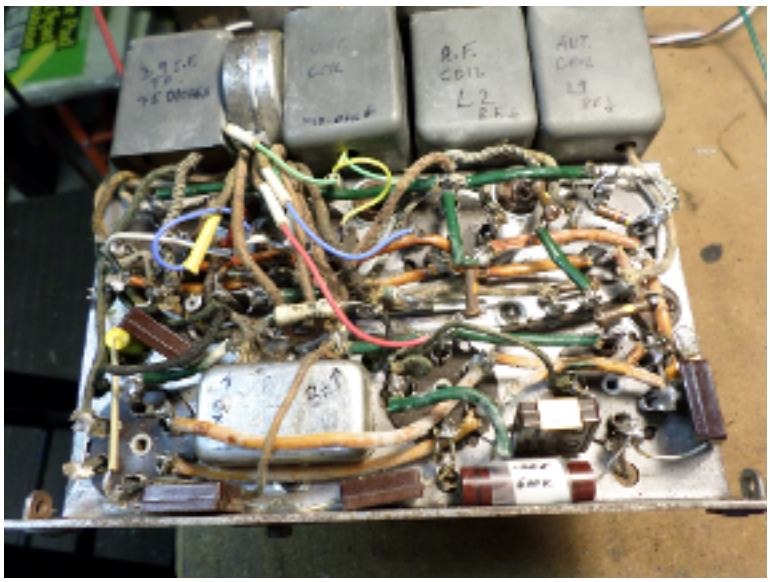


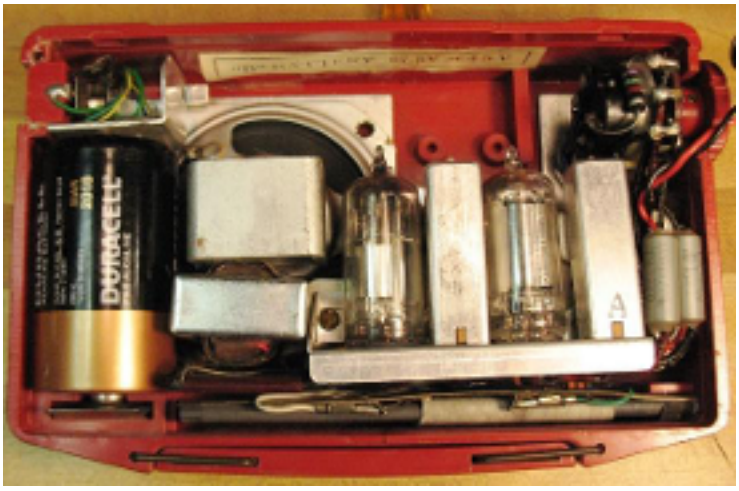
Figure 6

THE DESIGN HISTORY AND TECHNICAL EVOLUTION OF THE TRANSISTOR RADIO

By Mark Vess KC1ACF

Those of us who have collected tube radios for decades as I have sometimes share the opinion that transistor radios are too new to collect. We should keep in mind that the transistor itself has had a tremendous impact on every electronic device we use today. Today's electronics would simply not exist but for the creation of the transistor. The development of the transistor began with two major products that cried out for relief from the short battery life and physical size of even the smallest vacuum tubes used at the time. Transistor radios and hearing aids were the earliest use of these new devices. Both of these product manufacturers realized the importance of replacing vacuum tubes with transistors early on.

The conversion from tubes to transistors is clearly shown here. The tube radio chassis on the left has four tubes and 80 milliwatts of audio. The transistor chassis on the right has six transistors providing much more gain, far higher audio output and lower battery current. The black transistors shown here are early "top hat" transistors that soon gave way to the much smaller aluminum cylinders we see used in transistor radios from the sixties through the eighties. The picture of the radios below show a 30% smaller transistor radio.

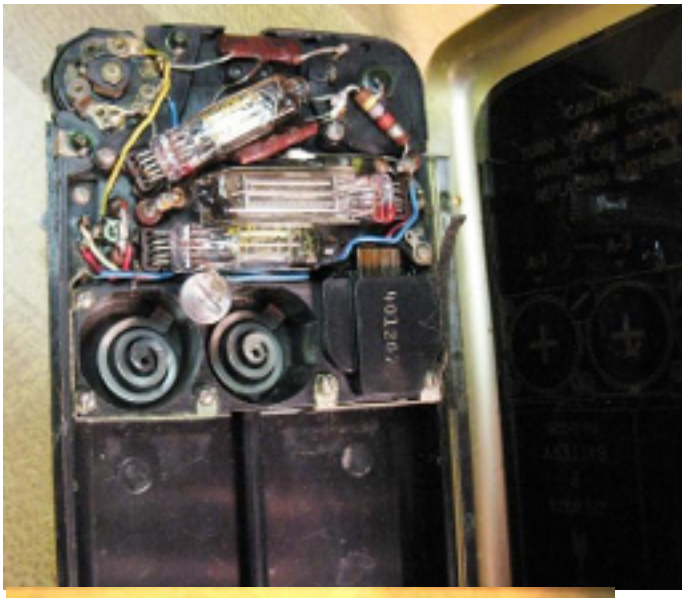


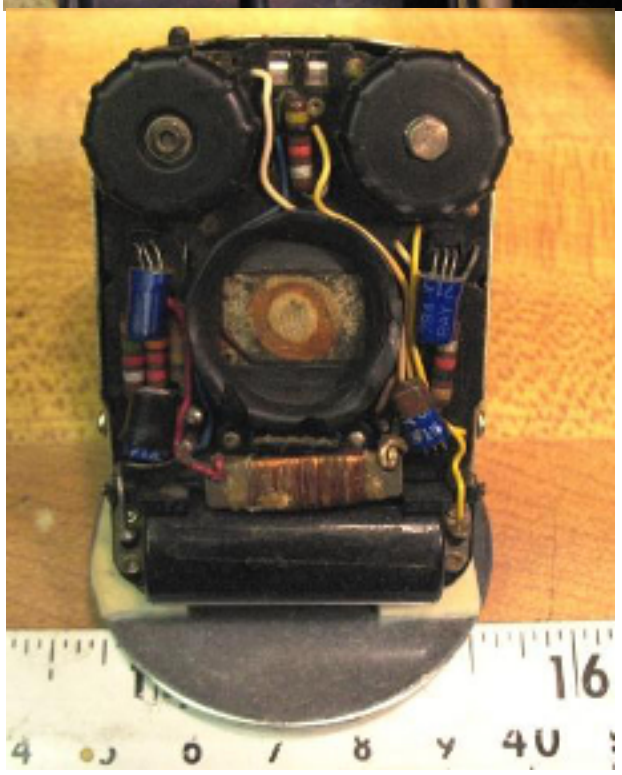
There are far more authors that are better versed than I on transistor development so I will limit my article to the transition period from vacuum tubes to transistors used in actual products. I need to outline the first use of transistors in hearing aids as well because hearing aids were the first actual use of transistors. Hearing aid manufacturers had a high-priced product that could tolerate the expense of these new devices. Transistor manufacturing suffered with low yields and high manufacturing costs. As a result, acceptable device yield was in the single digits as the transistor was developed for commercial uses. The performance of these early devices required electrical inspection for each device. Several grades of performance from one single transistor design were not uncommon. Hearing aid manufacturers put up with an expensive, low-volume device because the gains in small size, low current draw and high amplification were so great. The production of a reliable, smaller, low cost transistor was still a few years off.

Tube manufacturers were aware of the little, three-legged device that was about to put them out of business. Their tubes became smaller and smaller and filament current draw dropped to new low levels. The final result of this catch-up engineering was the Nuvistor miniature metal-cased tube. The Nuvistor looks like a large transistor with multiple

leads but still had its engineering roots going back to the first vacuum tubes. After some success, they succumbed to the vastly better performance of the transistor.

Two Zenith hearing aids from the late 1940s and early 1950s are pictured here with the smallest available pencil tubes available on the top. These tubes were replaced by the early transistor version shown on the bottom. The battery life was extended greatly and the battery became much smaller. The amplifier gain was huge compared to tubes and the size of the hearing aid package was greatly reduced. Note the four, small, blue transistors shown.

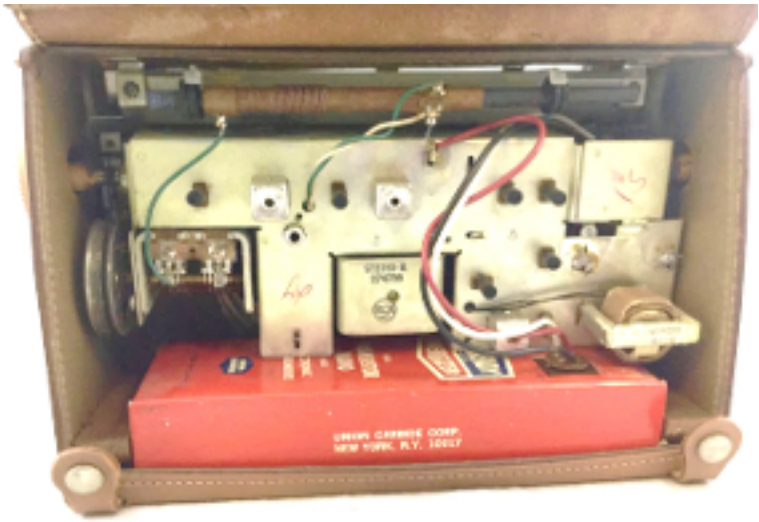


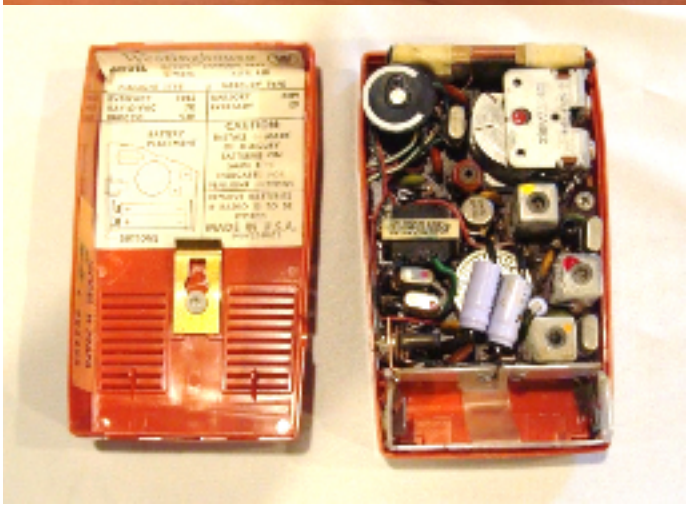


By the early 1950s, transistors were coming of age. The cost per unit plummeted as manufacturing methods improved. Hearing aids already used these devices exclusively with great success. Motorola, Zenith and others were developing small radios for public consumption very quickly. The high cost of these early radios reflected the high cost of the transistors contained inside. Cheap, small, plastic radios were still not available for the masses.

Over in Japan, the situation was far more difficult trying to develop cheap transistors. Engineers in Japan were lagging behind American development by several years. Their development laboratories resembled Thomas Edison's laboratories from decades ago more than the modern laboratories in America. As Japan was denied transistor technology from America, they were required to reinvent the wheel of solid state technology. Within a few years they would play catch-up in a big way. By the late fifties, Motorola, Zenith and other small radio manufacturers would turn to Japan to manufacture most of the small transistor radios we collect today.

These are good examples of early American transistor radio design. Note the large tuning capacitors and the spacious layout. The IF transformers are huge! Small, plastic tuning capacitors had not been invented yet. The transistors are early production units that approximate the dimensions of later 1960s devices.





On a side note, Japan was now poised to take over the transistorized small device market. By the early 1960s, the market in America for transistor radios became so saturated by Japanese radios that a tariff was imposed on transistor radios from Japan based on the number of transistors in the radio. The Japanese engineers soon overcame this problem by introducing the two-transistor Boy's Radio to the American market. These simple radios lacked the sensitivity and volume of a six transistor radio. They did provide a rich market to those young Americans that wanted a small radio that at least worked to some degree on local stations and was affordable. A few years later, the tariff was lifted and the tide of six or more transistor small radios from Japan flooded the market. The age of inexpensive, well performing small radios from Japan had begun.

These early 1960s transistor radios below are of Japanese manufacture. They are two, six and ten transistor chassis. The small transformers, tiny speaker, plastic tuning capacitors and the compact design are Japanese.

Early transistor radios from Japan were designed to be aesthetically pleasing. The look of these early small radios is quite unique. There were bright, colored plastic cases with real polished metal grilles, odd-shaped grills, clear cover panels with reverse printing on the back side and the shapes used soft, curved lines. Both American and Japanese transistor

radios frequently had a jet-wing "V" design incorporated into the face of the radio mimicking the "jet age" of the day. Distinctively Japanese but Americanized names were used. Some Japanese radios sported gold anodized grilles and trim. Also, to me at least, the chassis components are mostly visible under the rear cover. Those tiny, cylindrical aluminum cans could be seen with colored resistors and capacitors. Many American makers put the printed side of the chassis facing back. This makes it difficult to see the tiny wonders of amplification and other components in the radio. Later radios from both countries had a more squared, industrial look and used cheap, printed chrome for grilles and trim.

I hope you enjoyed this essay on transistors. This was a major, technologically important part of the world's technology advancement. The engineering

feats of integration, multiplication of components per square millimeter and the creation of major, solid state building blocks has carried us to today. I still prefer to collect those curious, two transistor Boys Radios and early transistorized hearing aids to remember the roots of an amazing invention.

About the author:

Mark Vess is currently retired but enjoys a litany of vintage electronic and mechanical hobbies. He enjoys writing about the items he collects. Vintage tube, transistor, and power transmission history take up his time these days. Ham radio, restoring early spark model airplane engines, fixing old radios, Model A Fords, John Deere tractors and 1950s Lionel trains also consume his time. Please visit the Museum Of Antiquated Technology online to see his many interests. He welcomes any queries about whatever he may help with.

73, KC1ACF

NEVEC CALENDAR 2019-2022

2019

May 18	Spring Brookline
September 28	Fall Brookline

2020

March 1	NEVEE III
May 16	Spring Brookline
September 26	Fall Brookline

2021

March 7	NEVEE IV
May 25	Spring Brookline
September 25	Fall Brookline

(Dates above are confirmed. Please update your calendars)

2022

March 6	NEVEE V

Hi-Fi Resources
Compiled by the RAVEN STAFF

Audiophile Societies

https://www.stereophile.com/audiophilesocieties/index.html

Manuals

https://www.hifiengine.com/l Library, Database, etc... Membership required)

http://www.hifi-manuals.com/

https://www.vintageshifi.com/m-m2t2.html (Amplifiers and Tuners)

https://www.vintageshifi.com/m800.php (Manuals)

https://www.vintageshifi.com/repertoire-pdf/Heathkit.php (Not a complete list, but worth a look)

https://www.loc.gov/programs/national-recording-preservation-plan/tools-and-resources/vintage-%20manuals-brochures-catalogs-and-reports/ (Library of Congress)

Miscellaneous sites

http://www.ultraelectronicactive.com/links.html

http://www.aca.gr/index/resources/links (Audiophile Club of Athens)

http://www.vintageradio.info/resources.html (Sources from the UK)

https://www.head-fi.org/threads/diy-links-resource.20922/ (Parts, enclosures, hardware, international)

https://www.pugetsoundantiqueradio.com/contact/resources// (Courtesy of the Puget Sound ARA.

(The link above is from the Puget Sound Antique Radio Association with "Articles of Interest."

https://vintagetechnics.audio/ (Dedicated to Technics)

https://audiokarma.org/forums/index.php (Discussion Forums)

Parts

https://www.parts-express.com/promo/vintage_audio_parts

Publications

https://www.hifinews.com/

https://www.collectorsweekly.com/electronics/overview

Schematics

https://www.thetubestore.com/hifi-amp-schematics (includes amps)

Social Sites

https://www.facebook.com/Vintage-Hi-Fi-351103888298615/

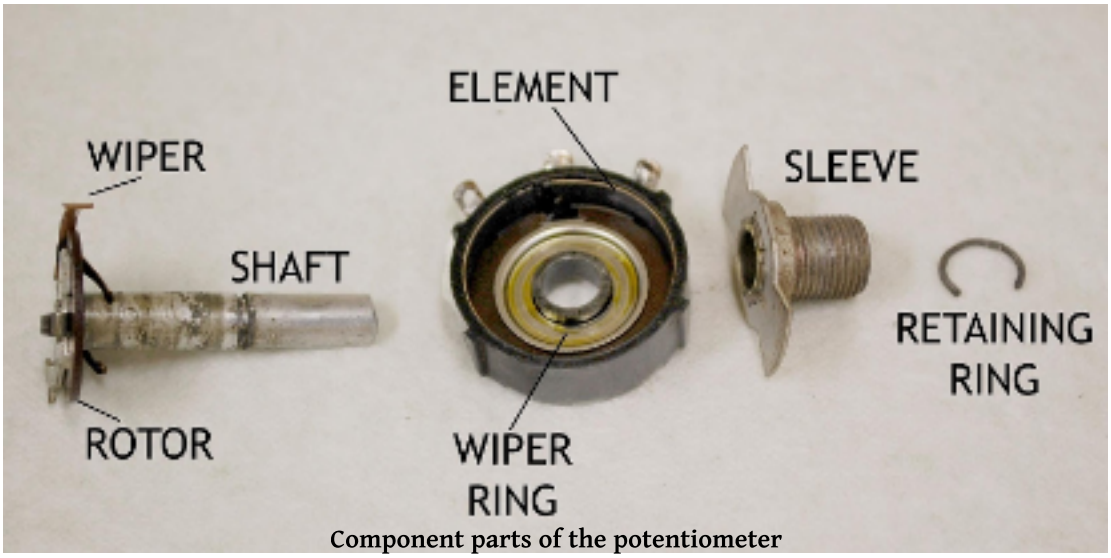
Vintage Hi-Fi Museum

http://www.ctvisit.com/listings/vintage-hi-fi-museum

http://www.vintagehifi.org/ (related to the link above)

Cleaning Noisy Potentiometers

Daniel Schoo



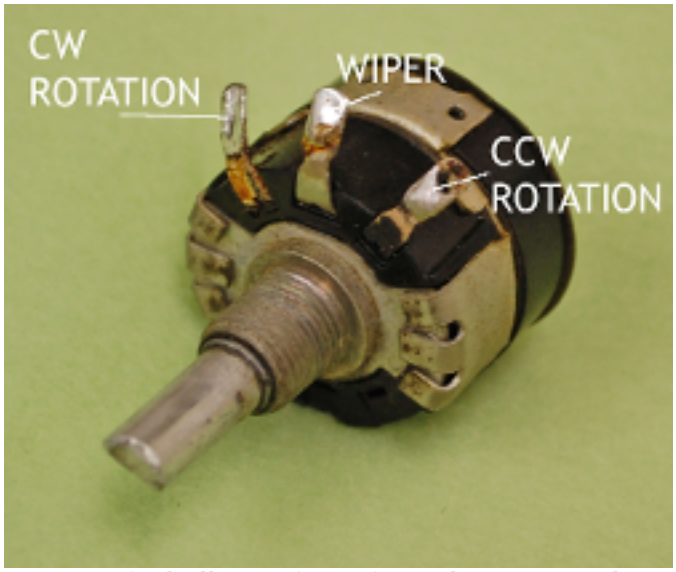
Component parts of the potentiometer

What exactly is a "potentiometer"? A potentiometer is a resistive voltage divider that has the capability of being adjusted to any desired ratio from zero to 100%. Inside there is a resistance element that has a sliding electrical connection or tap that slides from one end of the resistance element to the other. In this way the ratio of the resistance from the tap to either end of the element can be changed thereby changing the voltage division ratio. Potentiometers are manufactured in many different resistances, "tapers" and the number of turns the shaft will make depending on the application they are intended for. For precision work potentiometers allowing five, ten, fifteen or more turns are used to spread out the change in resistance over a longer range of shaft travel and allow more precise setting of the value. Single turn types are the most common having a rotational limit of 270 degrees.

The construction of single turn potentiometers tends to be very similar. Most of the newer ones use a flat ring shaped element with the rotor parallel to the element. Some older ones use a cylindrical shaped element with the wiper sliding inside as shown in the photos. There are always the oddballs you will run into especially in the very old sets. One pot I took apart did not use a sliding wiper at all. It had a flexible metal strip mounted inside of a cylindrical sleeve element. The rotor had a point on it that pressed on the strip deflecting it and pressing it against the element. As the rotor was turned it pressed the strip onto the element at one location similar to how a wiper would contact the element. There were no sliding electrical contacts in the pot. I suppose there could be advantages to this since there was no wear on the resistance element but there was also no self-cleaning of the element due to friction.

The taper of the potentiometer refers to the rate of change of resistance as the shaft is turned. A linear taper changes resistance in equal increments as the shaft is turned. For example, setting the shaft at the mechanical half way point of the rotation adjusts the resistance at the tap to exactly half of the total resistance of the element. This taper is used for setting reference voltages such as set points for temperature control, adjustable power supplies and most other applications where a linear change is desired.

Since the human ear is a logarithmic sensor where the perceived volume of a sound is the log of the



A typical All American Five volume control

sound pressure level, the change in resistance of a linear potentiometer does not match the change in perceived volume. A linear potentiometer used as a volume control will advance the perceived volume very slowly as the shaft is turned and then increase rapidly as you reach the end of rotation. To match the human ear the change in resistance, or taper, must also follow a logarithmic curve changing very rapidly at first and then more slowly as you turn the shaft.

This is one way you can determine if a pot from your junk box is linear or log taper. Set the rotation of the pot to the half-way point between the limits and measure the resistance from the center wiper connection to each of the two ends. If it is a linear pot the resistances should be about equal and half the total resistance. If the resistance from the wiper to one end of the element is very low and to the other end is much higher the pot is a log, AKA audio taper. For this article we will describe the typical single gang volume control used in tube type radios. Dual ganged types used in stereo systems are similar but can be more difficult or impossible to disassemble the front section.

It is very common for potentiometers used as volume controls, tone controls and other audio functions to get dirty and noisy with age and exposure to dust and airborne contaminates. The symptoms are all too common, scratchy noises when you rotate the shaft, intermittent cutout of the audio and noisy audio. Many potentiometers are lubricated at the factory with grease on the shaft and internally on the sliding contacts. After many years of service or storage the grease becomes gummy and stiff making the shaft difficult, or sometimes impossible, to turn and the electrical conductivity of the sliding contacts poor. The only solution is to remove the grease and get those contacts clean again.

Years ago in the heyday of tube electronics several commercially available cleaners such as Quietrole and No Noise were sold to clean and lubricate dirty switch contacts and noisy pots. Many of them were based on carbon tetrachloride, AKA Tetrachloromethane, a very good solvent for grease. It was non-flammable and relatively non-toxic but its use was discontinued for non- industrial use due to several health and environmental issues. Freon TF is an excellent grease solvent used for electrical contact and magnetic recording head cleaning but it was removed from the market due to environmental

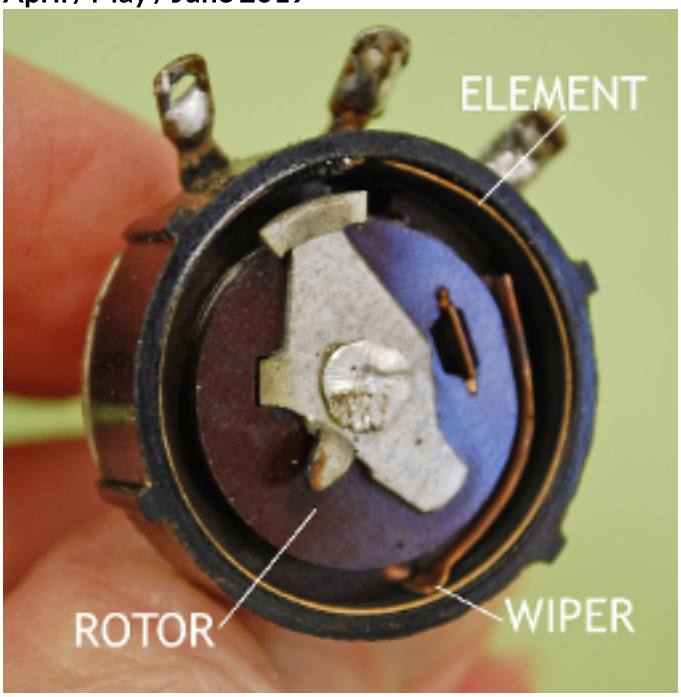
Bending the retaining tabs for back cover removal

concerns. There are several products on the market today for contact cleaning based on flammable alcohols or hydrocarbons and the more expensive non-flammables such as Hydrochlorofluorocarbon (HCFC) solvents.

To properly clean a potentiometer you have to effectively remove all the grease. If the problem is not too bad you can often flood the pot with the solvent and rotate the shaft repeatedly from stop to stop to scrub the contacts and resistance element. This will sometimes work for a while and then the pot gets noisy again. Another irrigation or disassembly and cleaning may be necessary for those.

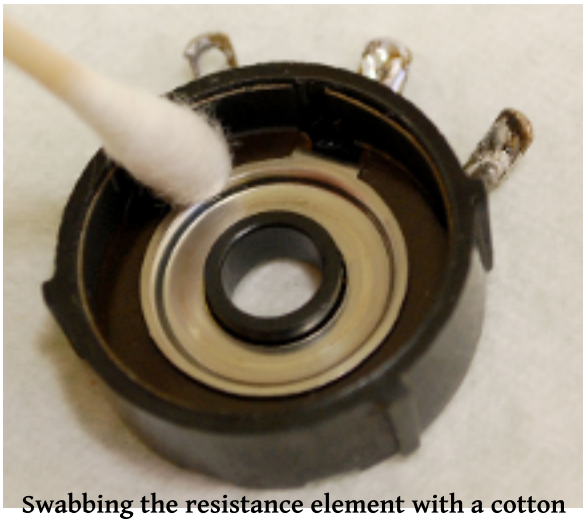
Irrigating the inside of the pot is possible with some types that have openings in the case near the solder lug connections. Other pots are fully enclosed and getting solvents inside in sufficient quantities is not possible. For those and for pots that have a stiff or frozen shaft you have to take the pot apart for a more thorough cleaning.

Back cover removed



Inside of the pot showing the rotor and sliding wiper

To open a pot for cleaning you must first remove it from the chassis. This can be very difficult depending on how deeply it is buried. This is why the irrigation method of cleaning is so popular. If there is a switch attached to the back, rotate the pot to turn on the switch before disassembly. This will become important when you reassemble the back cover. There are several retaining tabs on the front that hold the back cover to the sleeve. To remove the cover, slip the jaw of a small wire cutter under each tab and gently bend them upward. After all the tabs are straightened the back should slip off exposing the inner workings. The shaft and rotor are removable on most pots but not all.



Swabbing the resistance element with a cotton swab

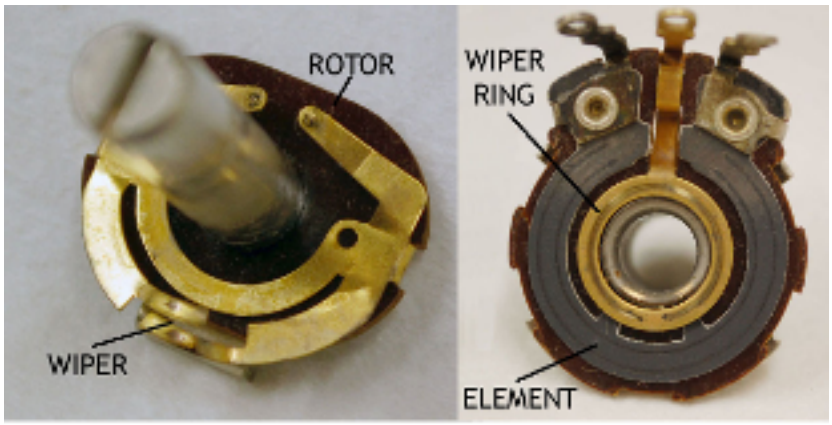
To remove the shaft and rotor you first remove the back cover as described above. Note that there is a retaining ring on the shaft where it enters the threaded portion of the sleeve. Clamp the shaft in a vice and using two small screwdrivers remove the ring. The ring is going to rotate around the shaft so hold it with one screwdriver while using the second driver to push it open and off of the shaft at the split in the ring.

Once removed, the shaft and rotor will slide out of the sleeve. Dried out grease may make this difficult. Applying a little solvent and gently rotating and/or tapping on the end of the shaft may help. You can use one of the commercially available contact cleaning chemicals or a mild solvent such as ethyl or isopropyl alcohol. Never use gasoline, turpentine, methyl ethyl ketone or other industrial or household cleaning products that could damage the resistance element.

Clean the resistance element with a cotton swab dipped in solvent. Often there is thick gummy grease on the element and or the stationary wiper contact ring inside the pot. Carefully swab all of the parts with solvent including the shaft and inside the sleeve. If the wiper contacts are badly tarnished I use a little Brasso on a cotton swab to burnish them. After burnishing, clean them with solvent to remove any residual polish. I don't usually put any lubricant on the resistance element or the wiper but I do put a thin film of light oil on the shaft before re-assembly. If your solvent is a commercially available contact cleaner/lubricant you will already have lubricated the contacts.

If the design is such that the rotor is not removable you can clean the contacts with a paper towel moistened with an appropriate solvent. Flood the pot with solvent and rotate the shaft to clean the wiper slider and dissolve the grease out of the inner parts. This is not as good as taking the rotor out but if the pot cannot be disassembled this is the best you can do. Slip a small piece of dry paper towel gently under the wiper contacts. Once in place, moisten it with a small amount of solvent and rotate the shaft slowly to slide the towel over the length of the resistance element. Do this a few times adding additional solvent then remove the towel. Never use an abrasive like sandpaper to clean the internal parts of a potentiometer. Sometimes a little burnishing of the shaft with a light duty Scotch-Brite™ abrasive pad is appropriate to clean up corrosion and hardened grease.

Re-assemble the pot in reverse order. Rotate the shaft to place the main wiper at mid rotation which is farthest



FLAT DISK POTENTIOMETER

Rotor with wiper contacts on the left, resistance element and wiper ring on the right for a flat disk type potentiometer

away from the solder lugs. Put the retaining ring back into the slot in the shaft and squeeze it tight with a long nose pliers. To bend the tabs back into place you will need a narrow pliers with a very wide opening of the jaws. I use a six inch long nose Vise Grip® pliers which have a very wide opening and the jaws are relatively parallel to each other even when widely separated. Gently squeeze the tabs with the pliers and push them forward towards the shaft to get them started. Carefully flatten the tabs back down and re-install the pot.

You may want to practice disassembly on several junk box pots to get some experience before you try it on a treasured collectible.

To John, Jack, Dan, and Hans,

I had a great time at NEVEE 2, and really enjoyed you Guest Speakers!

John,

I really enjoy stopping by the museum when I'm in the Hartford area. But, knowing what you have been through, it is the main reason I haven't tried to start a Vintage Electronics Museum in Northern Mass. or New Hampshire! Not that you can't take the competition, but I don't have your tenacity.

Sometime I'd like a discussion with you on how you got so many helpers to volunteer - you obviously know something we don't. I'm sure your warm personality is a factor when it comes to engaging others, but I would have a real chuckle if someone told me that I needed to round up volunteers to help move every 18 months. With well over 400 Members in NEVEC, virtually everything is done by "The Usual 20". Anyway, if you (and June) are ever coming by seacoast Cow Hampshire, stop by to see my "museum". It's not as big as yours, but I've got a few things I think you'd really like. (*Ed. note: Bruce is being modest here...)*

Jack,

You know I love old transistors. To me, it brings the same thrill I had as a boy collecting coins. Your on-line database of vintage semiconductor devices is really astounding and I'm sure others benefit through doing research on your site. I appreciate the help from you and Terry. Sometime this spring/summer, let's have a look at the Western Electric stuff and my early ICs.

Dan,

Do you remember what you said when you were looking over my two boxes of tubes at my table? We both love tubes. Too bad you still don't work in Portsmouth, but you can stop by anytime and see the other 98% of my tube collection - starting with a DeForest Audion and WE Tennis Balls to all the Power tubes. Bring Hans with you if he'd like to come. Having been a Design Engineer for Sylvania for many years, I always enjoy seeing "How someone else would do it". Your expertise was very evident and some day I might take the time to read your entire thesis.

Hans,

As we talked during the show, you could talk on any electronics subject. Capacitors are undoubtedly the most replaced item in antique and vintage electronics, so your expertise was valuable especially to the members of the audience who change out hundreds of capacitors each year during the course of our repairs. Thank you for keeping it at a level we could all understand. I wish I knew 1/10th of what you have forgotten. Everyone enjoyed it.

My only regret was that more people didn't stay for the Guest Speakers. They really missed out.

A true tip of the hat gentlemen. You're in that group many of us refer to as the best of the best.

-Bruce Phillips

Hintoids and Kinklets

Measuring Resonant Frequencies of Parallel-Resonant Circuits

By Larry Szendrei, ARS NE1S

As the title indicates, this column will offer a method of identifying the resonant frequency of a parallel-resonant LC circuit such as a tuned antenna or RF tank in a receiver, the primary or secondary of an IF transformer, or anywhere else you would find a parallel LC tuned circuit.

The equipment required is a signal generator and a decent oscilloscope. We connect the output of the signal generator in series with a resistor and the circuit under test. The value of the resistor isn't not critical: Probably anything between 10K and 100K will work. The vertical input of the scope is connected directly across the tuned circuit – we'll call this the "DUT" (Device Under Test) from now on – as in Figure 1. The signal generator need not be anything fancy – even a mom-and-pop-radio-shop type will do the trick. If you have a laboratory-grade instrument like a HP-606, or something modern with a digital display, so much the better. The accuracy of our frequency measurement will depend on the frequency calibration of the signal generator. In most cases this isn't a major consideration, because we're usually just after a ballpark measurement. For example – we may want to find out if an unknown IF transformer is resonant on 455 Khz or some other common IF frequency such as 175 Khz, 262 Khz, or 10.7 MHz. A really precise measurement isn't possible anyway, because the resonance in the end application will always be a bit different due to "parasitic" capacitances contributed by the circuit. The vertical amplifier of the oscilloscope should have a high impedance input (typically 1 megohm), a bandwidth of at least the highest frequency we'll apply during testing, and enough gain to respond to the amplitude of the signal generator output. Since I like to use a 10X probe to limit the capacitive loading on the tuned circuit, I require 10X the gain that I'd need otherwise. I prefer to use a good analog scope in favor of a digital sampling scope, so I use an old Tektronix 535B with a type CA plug-in for most of my work, which has a maximum sensitivity of 0.05V/cm. With the 10X probe this results in a maximum sensitivity of 0.5V/cm. You want to set your horizontal sweep to be free-running or "auto" trigger so that with no signal at the vertical input you get a horizontal line in the center of the screen. Use a sweep rate that you would use to observe an audio signal – say, 2 milliseconds/cm. Again, it's not critical – what we'll be observing is a maximum height of the displayed "raster" as we tune the signal generator through the resonant frequency.

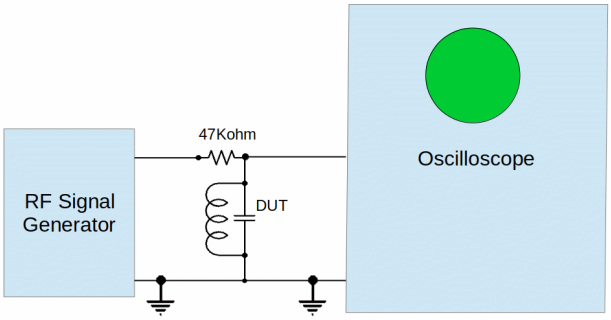


Figure 1 - Resonant Frequency Measuring Setup

First hook your signal generator to your scope through the resistor without the DUT connected, and adjust the vertical sensitivity so that you can observe a raster that consumes roughly 50% of the vertical space on the screen. You probably want anywhere from a few hundred millivolts to a few volts output from the signal generator. Now connect the DUT as shown in Figure 1. Set the signal generator frequency below where you'd suspect the resonant frequency to be. You should only see a horizontal line, or a raster with a very small vertical amplitude, on the 'scope – see Figure 2. Now slowly increase the frequency until you observe a sharp increase in the height of the raster. Yep; that's shown in Figure 3. The frequency which provides the maximum vertical deflection is the resonant frequency of the DUT. As you tune above the resonant frequency, the vertical deflection will sharply decrease to a minimal amount and appear again like Figure 2. At resonance, if you like, you can increase the 'scope's horizontal sweep rate enough to display a sine wave. Depending on your 'scope you may need to diddle with triggering parameters to achieve a stable,

WARNING: Tube-type equipment employs voltages that can cause burns or kill you. If you are inexperienced or uncomfortable working with equipment that uses high voltages, including line voltage, please don't. A single mistake could be your last!

static display.

This method works because the resistor and the DUT in series form an RF voltage divider. At resonance, the parallel-resonant DUT displays a high impedance, so the voltage across it will be maximum. Away from resonance, its impedance is low, so most of the RF voltage from the signal generator is dropped across the resistor.

For a more precise indication of frequency, you can connect a frequency counter across the signal generator output while doing the test, or immediately after you have found the resonant frequency, without changing the frequency setting of the signal generator. In either case just make sure the signal amplitude is adequate to provide a stable readout, but will not exceed the safe maximum voltage input to the counter.

When performing this method with IF transformers, I usually measure the primary and secondaries as two separate tuned circuits, to make sure both windings are good and that the primary and secondary resonate at nearly the same frequency. It is also possible to test an IF transformer with the primary connected as the DUT in Figure 1, but with the scope probe and its ground connected across the secondary.

This technique came in very handy when I needed a 175 KHz IF transformer for a radio repair, but didn't have any on hand. I had a 262 Khz IF can, though, and using this method I found that in this particular case I could achieve resonance on 175 Khz by padding down both primary and secondary with 68pF silver mica capacitors. Once the substitute was installed the radio played as good as new. (Note – in general, the actual capacitance value will depend on the particular IF transformer, and may be different for the primary vs. the secondary.)

Well, that's it for this column this issue. Next time we'll expand on this idea a bit more.

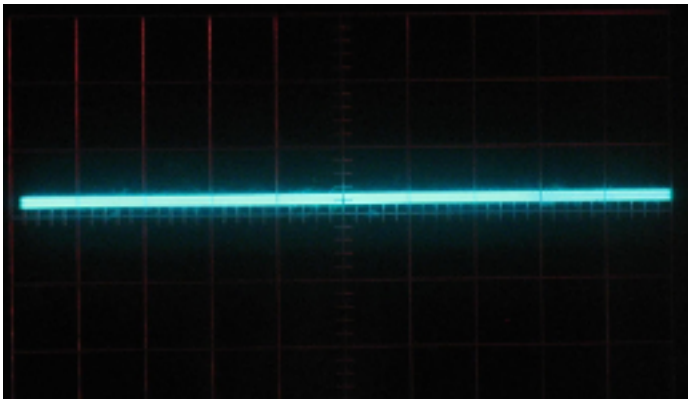


Figure 2 - Off resonant frequency

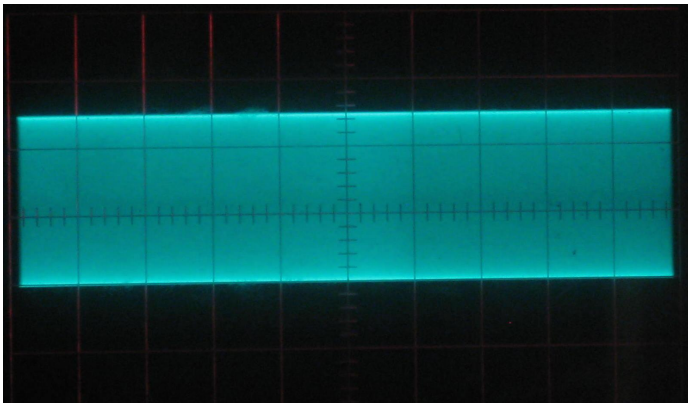


Figure 3 - At resonant frequency

! A Special NEVEC Announcement !

The first ever event video has been posted on our YouTube Channel. The video highlights of Radio 50 / NEVEE II can now be viewed by clicking the following link:

https://www.youtube.com/watch?v=QEkLyiRhX1s

If you didn't go to the show, you can see what you missed out on. Or you could be like me, and see the radio that you failed to buy only to have someone else snag it. Either way, the video captured the spirit of the show and I hope to have more videos of future events. I'd like to give a special thanks to Erich Hochstrasser for producing such a lovely video and Paul Buresh for interviewing the attendees. Feeling nostalgic? Remember the bingo hall in Manchester? While the quality isn't quite up to that of our professionally made Radio 50 video, you can check out the video posed by Eric Mazur, KA1SUN, on April 17th of 2010 here:

https://youtu.be/xjDkE67GVVo

Remember the auction at the Brookline show on April 20 of 2013? Many of those radios and items offered by other sellers can be seen in this video posed by user Farmradio:

https://youtu.be/6wSdMXteIe8

New England Vintage Electronics Club presents:

2019 Vintage Hi-Fi Contests

Enter your Vintage Hi-Fi component to compete at our next show!

1st prize: 100 dollars

2nd prize: 50 dollars

3rd prize: 25 dollars

In addition each winner will be awarded with a ribbon and his or her photo in a future issue of our quarterly newsletter, ***Radio and Vintage Electronics News (RAVEN)***!! In order to receive our newsletter, and to enter a component in a contest, you must be a member of the club. Please visit **nevec.org** to become a member.

Please arrive early to ensure that your component is entered. Anyone at the show can vote once for his or her favorite component on display. Votes are tallied and awards presented at the end of the flea market portion of a show or at the discretion of the contest chairman (usually around noon).

Location: *Brookline Event Center, 32 Proctor Hill Road, Brookline, NH 03033*

"Spring Brookline", Saturday, May 18th, 2019, 7:30 AM to 12:00 PM (be early)

Contest Category: Vintage tube amplifiers (mono or stereo)

"Fall Brookline", Saturday, September 28th, 2019, 7:30 AM to 12:00 PM (be early)

Contest Category: Vintage tube FM & FM/AM Tuners (mono or stereo)

2019 Spring Brookline Radio Contest

Saturday, May 18, 201 9, 7:30 AM to 12:00 PM (be early)

Celebrating a Century of RCA: Radios, Test Equipment, and Ephemera

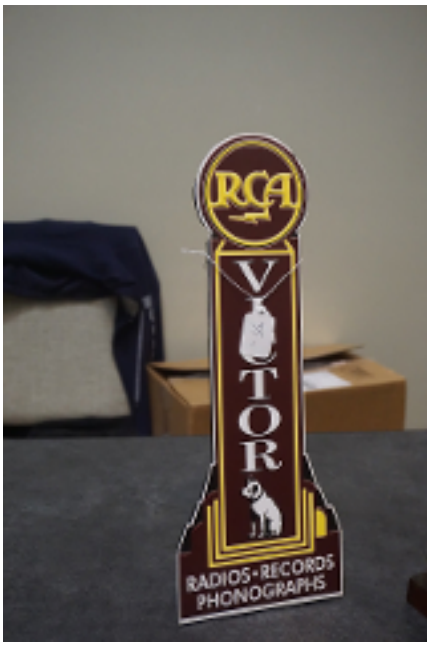
(This category is going to be flexible! Contestants may enter any antique or vintage items by RCA or RCA Victor other than vacuum tubes or phonograph records)

In 2019 we celebrate RCA's Centennial! For 100 years, the RCA brand has been there for countless moments in family rooms across America. We have come to expect exceptional performance, quality, innovation and value from RCA. Today, the RCA brand symbolizes American ingenuity worldwide.

Radio contests will be held as they have been in the past. Please arrive early to ensure that your RCA item is entered. Anyone at the show can vote once for his or her favorite RCA item on display. Votes are tallied and awards presented at the end of the flea market portion of a show or at the discretion of the contest chairman (usually around noon).

- 1st Prize: 100 dollars
- 2nd Prize: 50 dollars
- 3rd Prize: 25 dollars

Each winner will also receive a ribbon and his or her photo in RAVEN (Radio and Vintage Electronics News)!!!



NEVEE 2/Radio 50 Photo Contest Results

By John Gibbons

The NEVEE 2 /RADIO 50 photo contest had some very good photos submitted, and the voting results are as follows:

1st Place: John Gibbons, capturing Harrison Neff with his raffle winnings. Harrison had amazingly good luck with the drawings and won some great items. From top-to-bottom, pictured is a 1965 Hitachi TH-848 Transistor Radio, a 1939 Emerson DP-332 Ingraham Radio, and finally a 1980 Pioneer SX-780 AM/FM Stereo Receiver. Congratulations, Harrison!

2nd Place: Bob Masterson, capturing Gary's Radios table displaying a wide variety of impressive Zenith transistor radios, including early ones such as the Zenith Royal "500A" from 1956 and a scarce pink Zenith Royal "500B" from 1957.

3rd Place: Alan Finger, for "Tubes Galore" capturing the many, different vacuum tubes for sale that we collectors rely on to fix our pre-transistor era radios, TVs, etc.

The panel of judges for this contest consists of the NEARC Officers and RAVEN editors.

Thanks to everyone who submitted photos, and congratulations to the winners. As we do every year, we will have a photo contest for NEVEE 3/ RADIO 51 next year, so get your cameras ready to capture the essence of "The Biggest and Best Vintage Electronics Show on the East Coast".

The 1st place photo occupies the cover of this issue...

Second Place Winner - Bob Masterson

Third Place Winner - Alan Finger

RADIO 50 Highlight Photos

New England Vintage Electronics Club

THANK YOU!

Many thanks to

- Larry Szendrei
- Paul Buresh
- John Gibbons
- Jeanette Ligouri
- Al Purkis
- Charlie Perkett

and especially Joe and Kathy Devonshire.
Your contributions to Radio News are invaluable.
Ed.

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NEARC Presents

Vintage Electronics Flea Market With Radio Training

Saturday May 18th, 2019

Flea Market Event with at least 25 year old VINTAGE Radios, Amplifiers, Record Players, Vinyl, Stereo Receivers, Speakers, Telephones, Transistor Radios, Tube Hi Fi and Audio, Television, Amateur Radio and Communication Devices, Vacuum Tubes, Telegraphs, Enigma, Gaming Equipment, Early Computers and Calculators, and the Paper and Literature of same. Classes in radio topics will follow the flea market.

Admission Fee (covers the indoor hall and outdoor tailgating area) --
7:30 am to 10:00 am — $ 5
10:00 am to 12:00 pm — Free to Buyers !!
12:00 pm to 3:00 pm — Radio Training !!
Spouses & children under 18 free with paying adult.
People's Choice Radio Contests to be held during the Flea Market!

Come & enjoy the indoor flea market (50+ tables) and outdoor tailgating, followed by classes in radio topics.
Free parking available. Food concessions available inside hall.
Event runs rain or shine.

Location: **Brookline Event Center**
32 Proctor Hill Road, Brookline, NH 03033

For more info: www.nearc.net