

A.R.A.T.S

Coherer

The official Newsletter of The Amateur Radio Association of The Tonawandas, Inc. - since 1954

April 2021

Volume 3 Issue 4

EDITOR'S MESSAGE

Hello Members, a lot has changed in a year. Last year I was reporting that there was no toilet paper on the shelves at the grocery stores and no paper towels, that has changed as there are both on the shelves and the price has gone up with fewer rolls in each package. We are not having any meetings at City Hall, as the City of Tonawanda Mayor has closed City Hall after work programs and special happenings which we fall under. We are using Virtual meetings. Stay safe and healthy.

Here are some locations you can take a VE Exam in place of ARATS.

Lancaster ARC: John H. Maxwell

(716) 404-9256 or

maxwell@acsu.buffalo.edu

South Towns AMS (WB2ELW)

Robert A. Koster (716)649-7272

Rkoster53@roadrunner.com

Lockport Amt. Radio Assoc.



Remember NO meeting's the 3rd. Wednesday at City Hall, City of Tonawanda 200 Niagara Street, Tonawanda, NY.

As far as Covid-19, I have both shots and no problems with either of them as I was told to make sure I hydrate the week of my shot and I did and maybe that helped. Also, I have heard that the older you are the less side effects there are if any at all which was alright with me. So, I hope everyone is getting their shots and finding appointments which seems to be the problem. Also, its time to send in your DUES if you forgot because of other things on your mind we forgive you, but you need to send them now or this will be your last copy of the Coherer.

This month extra is about Vacuum Tubes and Transistors Compared.

President Message

Happy Easter everybody,

Now that we have put winter in are rear view mirror, spring is here and with the weather getting better now we can enjoy the outside again.

At our last board meeting on 3/20/21 at Adams Fire Company hall 2 one of the topics we talked about this year's upcoming Field Day the last weekend of June on the 26th & 27th 2021,

This year I would like to hold our field day at the Adams fire company hall 1 on Nash Road, I will be presenting a letter to the Adams board of directors at Aprils monthly meeting on the 7th requesting the field in back of the fire hall.

Then if we get permission from the Adams board to hold field day weekend activities at hall one, we can start making plains.

For those of you who are not familiar with the Nash road site, Adams has a large open field in back with a building and pavilion with electricity hook ups.

We can set up a couple of our tents with 2 stations out in the back and put 1 or 2 stations in the pavilion, I know I am kind getting ahead of things because we don't even have permission yet but when and if we do I think this is a change for us to get out on that weekend and have some fun, something I am think we all need!

I am planning on contacting the City of Tonawanda soon to see about getting back to holding are mouthy meetings again.

I have a few ideas for designs for our new ARATS banner and in the next couple of weeks I am hoping to get something out to you in an email.

I would like to have a sharp banner made before field day weekend something we can display proudly.

All the old photos and meeting minutes that I got from Bob K2MNC I put in albums so we have some history and once we get back to meeting again, I will have them for members to look at, I will also be posting some pictures on the ARATS face book page and if you happened to know the name or names of the members in the photos please leave a message on the page so I can put a name with the photo.

Keeping checking ARATS face book page and the ATATS web site for updates and current events you can access ARATS page either from the Facebook site or just going directly to www.w2vci.com.

ARATS Facebook page has info with our weekly nets, members birthdays, ARRL news and other things happening in the amateur radio world.

Monday night there is a 6 Meter Net with Bob K2LEH 50.200 at 8pm, Jim N2UJH holds a 10-meter net on Tuesday Night at 8pm 28.330, Keith WB2VUO has a side band Net on Wednesday at 8pm 144.210 and our ARATS Net is on Thursday Night at 8:30pm 146.955.

I would like to hold another zoom get together soon; I will send out an email after I get things set up.

Again, I would like to wish everyone a happy Easter stay safe,

Keep on Playing Radio,

73's Your President.

Bob Fleischauer.

Vacuum Tubes and Transistors Compared

Transistors vs. Tubes – Brief Feature Comparison, adapted from IEEE & Eric Barbour's 1998 "Cool Sound of Tubes" article.

Vacuum Tubes: Advantages

1. Superior sound quality.
2. Highly linear without negative feedback, especially small-signal types.
3. Smooth clipping is widely considered more musical than transistors.
4. Tolerant of large overloads and voltage spikes.
5. Characteristics highly independent of temperature, greatly simplifying biasing.
6. Wider dynamic range than transistors circuits, due to higher operating voltages and overload tolerance.
7. Device capacitances vary only slightly with signal voltages (Miller effect).
8. Capacitive coupling can be done with small, high-quality film capacitors, due to inherently high-impedances of tube circuits.
9. Circuit designs tend to be simpler than transistorized equivalents, which are greatly complicated by the need to linearize intrinsically non-linear transistors.
10. Operation is usually in Class A or Class AB, minimizing crossover notch distortion.



11. Output transformer in power amp protects speaker from DC voltage due to malfunction and protects tubes from shorts and blunts back-emf spikes from speaker.
12. Tubes can be relatively easily replaced by user.

Vacuum Tubes: Disadvantages

1. Bulky, hence less suitable for portable products.
2. Higher operating voltages generally required.
3. High power consumption; needs heater supply that generates waste heat and yields lower efficiency, notably for small-signal circuits.
4. Glass tubes are fragile, compared to metal transistors.
5. Sometimes more prone to microphonics than transistors, depending upon circuit and device.
6. Cathode electron-emitting materials are used up in operation.
7. High-impedance devices that need impedance matching transformer for low-impedance loads, like speakers; however, the magnetic cushion provided by an output transformer prevents the output tubes from blowing up.
8. Sometimes higher cost than equivalently powered transistors.

Transistors: Advantages

1. Usually lower cost and smaller than tubes, especially in small-signal circuits.
2. Can be combined in the millions on one cheap die to make an integrated circuit, whereas tubes are limited to at most three functional units per glass bulb.
3. Lower power consumption, less waste heat, and high efficiency than equivalent tubes, especially in small-signal circuits.
4. Can operate on lower-voltage supplies for greater safety, lower costs, tighter clearances.
5. Matching transformers not required for low-impedance loads.
6. Usually more physical ruggedness than tubes (depends upon construction).

Transistors: Disadvantages

1. Tendency toward higher distortion than equivalent tubed circuits.
2. Complex circuits and considerable negative feedback required for low distortion.
3. Sharp clipping, in a manner widely considered non-musical, due to considerable negative feedback commonly used. Does not gracefully roll-off or gently compress; instead, cuts off sharply, suddenly



and abruptly with extremely hard edge.

4. Device capacitances tend to vary wildly with applied voltages (Miller effect).
5. Large unit-to-unit manufacturing tolerances and unreliable variations in key parameters, such as gain and threshold voltage.
6. Stored-charge effects add signal delay, which complicates high-frequency and feedback design.
7. Device parameters vary considerably with temperature, complicating biasing and increasing likelihood of thermal runaway, hotspots and unreproducible behavior.
8. Cooling is less efficient than with tubes, because lower operating temperature is required for reliability. Tubes prefer hot; transistors do not. Massive, expensive and unwieldy heat sinks are always required for power transistors, yet they are not always effective (power output transistors still blow up; whereas, tubes fade down gracefully over time with warning and usually without catastrophic results).
9. Power MOSFETs have high input capacitances that vary with voltage, complicating driver circuitry.
10. Class B totem-pole circuits are common, which cause severe crossover distortion, or else necessitate huge amounts of negative feedback to correct. This “measures well” for steady-state signals, but it completely “sucks the life out of” dynamic and transient signals such as music.
11. Less tolerant of overloads and voltage spikes than tubes. Except for their robust and forgiving heater filaments, it is very difficult, bordering on impossible, to blow out a tube with overvoltage; whereas, most transistors can be destroyed with as little as six volts, and every transistor can be destroyed by some voltage. Tubes are much harder to “zap.”
12. Nearly all transistor power amps have directly-coupled outputs that can damage speakers, even with active protection.
13. Capacitive coupling usually requires high-value electrolytic capacitors, which give audibly and measurably inferior performance at audio frequency extremes.
14. Greater tendency to pick up radio frequency interference and self-oscillate to the point of self-destruction, due to rectification by low-voltage diode junctions or slew-rate effects.
15. Maintenance more difficult; devices are not easily replaced by user.
16. Biasing more difficult, as temperature effects and device variations complicate circuitry and degrade performance.
17. Older transistors and ICs often become unavailable after only 20 years, and sometimes much less, making replacement difficult or impossible. Tubes have a staying power, proven over many decades.
18. Hardly scientific or objective, but whereas transistors operate on an invisibly microscopic, quantum scale, tubes exist and operate on an intuitive, human scale. You can see the heaters lit up, you can sometimes see a glowing plasma, and you can feel and hear the warmth. Everything about tubes exists in a more human realm than hard, cold transistors. Measure away, but it’s the sound that matters.





ARATS Hats and Mugs for sale

Hats - \$12 Mugs - \$6



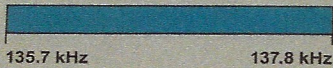
US Amateur Radio Bands

Operator license classes: **E** = Amateur Extra **A** = Advanced **G** = General **T** = Technician **N** = Novice
 CW operation is permitted throughout all amateur bands. Except as noted, all frequencies are in megahertz (MHz).

■ = RTTY, data, phone, image
 ■ = USB phone, RTTY, data and CW
 ■ = RTTY and data
 ■ = phone and image
■ = SSB phone
 = CW only

LF – Low Frequency band

2200 Meters (135 kHz) E,A,G
 1 W EIRP maximum



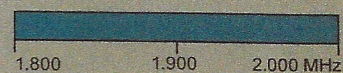
MF – Medium Frequency bands

630 Meters (472 kHz) E,A,G

5 W EIRP max, except in Alaska within 496 miles of Russia where the limit is 1 W EIRP



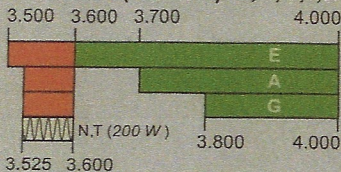
160 Meters (1.8 MHz) E,A,G



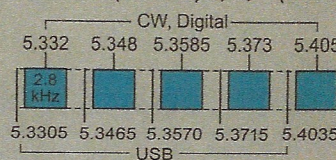
Amateurs wishing to operate on 2200 or 630 meters must first register with the Utilities Technology Council online at <https://utc.org/plc-database-amateur-notification-process/>. You need only register once for each band.

HF – High Frequency bands

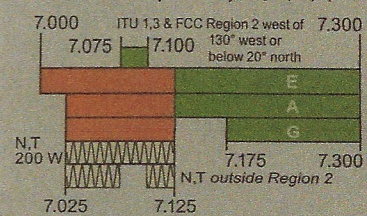
80 Meters (3.5 MHz) E,A,G,T,N



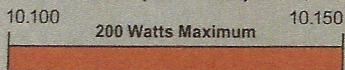
60 Meters (5.3 MHz) E, A, G (100 W)



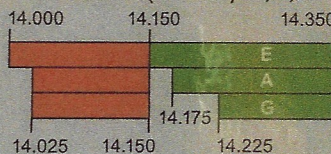
40 Meters (7 MHz) E,A,G,T,N



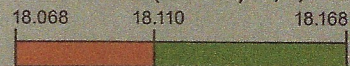
30 Meters (10.1 MHz) E,A,G



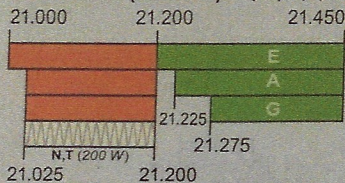
20 Meters (14 MHz) E,A,G



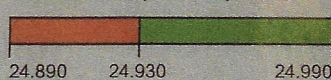
17 Meters (18 MHz) E,A,G



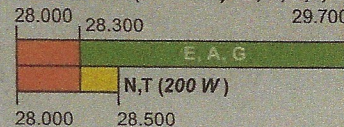
15 Meters (21 MHz) E,A,G,T,N



12 Meters (24 MHz) E,A,G

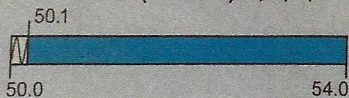


10 Meters (28 MHz) E,A,G,T,N



VHF – Very High Frequency bands

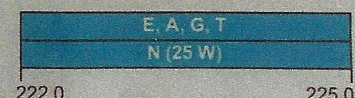
6 Meters (50 MHz) E,A,G,T



2 Meters (144 MHz) E,A,G,T

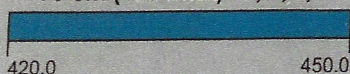


1.25 Meters (222 MHz) E,A,G,T,N

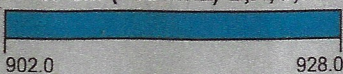


UHF – Ultra High Frequency bands

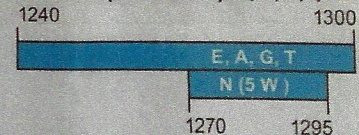
70 cm (420 MHz) E,A,G,T



33 cm (902 MHz) E,A,G,T



23 cm (1240 MHz) E,A,G,T,N



SHF&EHF – Super and Extremely High Frequency bands

All licensees except Novices are authorized all modes on the following frequencies:

2300-2310 MHz 3300-3500 MHz 10.0-10.5 GHz 47.0-47.2 GHz 122.25-123.0 GHz 241-250 GHz
 2390-2450 MHz 5650-5925 MHz 24.0-24.25 GHz 76.0-81.0 GHz 134-141 GHz All above 275 GHz

See www.arrl.org/band-plan for detailed band plans.

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REMINDERS

Membership is open to anyone interested in Amateur Radio. Regular dues are \$20 a year. An additional one-time fee of \$8 exists for new membership, which includes an ARATS name badge. Other rates are also available. Applications are available at any ARATS Meeting. For more information, please contact any ARATS member.

As of right now the ARATS website is up and running at w2vci.com

ARATS WEEKLY

NETS

2Meter Net Every Thursday at 8:30 pm
146.955Mhz - offset PL 151.4
Net Controllers many

6Meter Net Every Monday at 8 pm
50.200 MHz
Net Controller K2LEH

10Meter Net Every Tuesday at 8pm
28.330 MHz
Net Controller N2UHJ

Bulletins 2m Saturday 9pm

The 6 meter is not an ARATS Net.

There is a ARATS Emergency Net
on Simplex frequency of 144.300.

On the First and Third Thursday night of
every month immediately following the
regular ARATS 2meter net.

The Amateur's Code

The Radio Amateur is:

Considerate: Never knowingly operating in such a way as to lessen the pleasure of others.

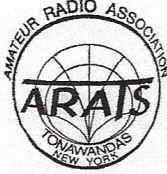
Loyal: Offering loyalty, encouragement and support to other amateurs, local club and the American Radio Relay league, through which Amateur Radio in the United States is represented nationally and internationally.

Progressive: With knowledge abreast of Science, a well built and efficient station and operation beyond reproach.

Friendly: With slow and patient operation when requested friendly advice and counsel to the beginner, kindly assistance co-operation and consideration for the interests of others. These are the hallmarks of the amateur spirit.

Balanced: Radio is an avocation, never interfering with duties owed to family, job, school or community.

Patriotic: With station and skilled always ready for service to country and community.



ARATS Membership Application



Amateur Radio Association of the Tonawandas
P.O. Box 430, North Tonawanda, New York 14120-0430

As a paid member, you will receive an electronic copy of the ARATS Coherer Newsletter

Dues are payable at the time of application. The following dues schedule applies:

1. **New Member:** \$20.00 per year, plus \$8 new member fee which includes ARATS ID badge.
2. **Renewal Member:** \$20 per year (Dues paid in Nov. or Dec. will carry through the next calendar year.
3. **Family Membership:** \$2 per year per person. (Immediate family members living at the same address).
4. **Out of Town Membership:** (Perm., 75+ miles from North Tonawanda, voting privileges by mail)
5. **Student Membership:** \$10 per year. (full time students up 12th grade. Includes new membership fee. If applicable.
6. **Special membership:** Varies (Only for qualifying memberships, i.e.VE session new hams, life members, others)

Personal Information

Name on Badge: _____ DOB: _____
 Name: _____ Call: _____
 Street Address: _____
 City: _____ State: _____ ZIP: _____
 Email: _____ Phone: () _____
 Other: () _____

Application Type

- New \$20*
- Renewal \$20*
- Family \$2*
- Out of Town \$12 (no fee if new)
- Student \$10*
- Change of Information*
- Special** (Circle) VE, Life, Other

License Class

- Novice
- Technician
- General
- Advanced
- Extra
- None (New Ham)*
- None (Non Ham)

Other

- ARRL Member
- ARES/RACES Member
- Contesting
- Volunteer Examiner
- Other

* Please add \$8 New Member Fee if new member or requesting a new ARATS badge. If new ham, we'll hold your badge until you get your call
 ** Special applications cannot be submitted online.

Additional:

Would you consider assisting ARATS in any of the following:

<input type="checkbox"/> Holiday Party Committee	<input type="checkbox"/> Program Committee
<input type="checkbox"/> Picnic Committee	<input type="checkbox"/> Field Day Committee

Amount Enclosed

Dues-Jan 1, _____ Through Dec.31, _____	\$ _____
New Member Fee (\$8-one time)	\$ _____
Maintenance Donation	\$ _____
(Your donation will assist maintaining and upgrading club equipment)	
Total	\$ _____

New Members Only:

Sponsor _____
 Co-Sponsor _____

Official Use Only

App Review Date _____
 Status _____
 VE Session _____
 Notes _____

