CAARA NEWS

Cape Ann Amateur Radio Association
Gloucester, Massachusetts
DECEMBER- 2025 EDITION

PRESIDENT'S COLUMN

By Brandon- NQ1W

To the Membership of the Cape Ann Amateur Radio Association,

As we approach Thanksgiving, I find myself reflecting on the true meaning of the holiday. It is, quite literally, a time for giving thanks. While we often focus on the turkey and the football, I wanted to take a moment to look at our club and express my sincere gratitude for the incredible people and partnerships that make CAARA the premier organization that it is.

First and foremost, thank you to our members. Without your participation, enthusiasm, and camaraderie, this club would simply be a room full of silent radios. You are the heartbeat of CAARA. We love to see you at every coffee and donut event, at every members meeting, and special event. Those who boost us from home QTH or afar we thank you too,

Our ability to communicate is the core of our hobby, so I must extend a massive thank you to our Repeater Committee. Your technical expertise keeps our amazing repeaters running and our signal strong. That goes double for our great net controllers, those of you running the nets that glue the club together.

Alongside them, I want to thank the Committee Leads and the "behind the scenes" heroes—those who maintain our website, manage the clubhouse, and tirelessly work on grants to preserve and enhance our facilities.

CAARA is also defined by how we serve others. Thank you to our Special Events Team, who represent us so well by providing communications for local road races and community events. Furthermore, we've had a fantastic year of education; thank you to the numerous speakers and demonstrators who shared their time and expertise with us over the past twelve months.

Amateur radio is a community that extends beyond our own walls. We are grateful for our sister clubs and local groups that we belong to and support. A special tip of the hat goes to:

The North Shore Radio Association and the Pocahontas Radio Club.

The vibrant on-air and online communities of the Fishnet, the Pokey Net, and the Radioactive Cape Ann Facebook group.

The ARRL (both the National organization and our local division) for their continued advocacy, contribution, and support of our club and our hobby.

I also want to recognize the Elmers. Thank you to the knowledgeable friends who mentor us, answer our questions, and help us increase our understanding and appreciation of radio.

Finally, and perhaps most importantly, we owe a debt of gratitude to our families. Thank you to the spouses, children, and partners who support us—even while they scratch their heads at the beeps, bloops, and roaring static coming from our active hamshacks!

I am proud to serve as your President. I sincerely hope you and your loved ones have had a wonderful, safe, and happy Thanksgiving. We hope to see you December 13th for our last member meeting of 2025

73,

Brandon Hockle, NQ1W

President, Cape Ann Amateur Radio Association

CAARA Newsletter
Cape Ann Amateur Radio Association
6 Stanwood Street
Gloucester, MA 01930

CAARA Newsletter is a monthly publication of the Cape Ann Amateur Radio Association (CAARA).

Jon Cunningham- K1TP Editor
Dean Burgess- KB1PGH Reporter

Welcome to CAARA:

CAARA, an ARRL affiliated club, operates the 2 meter W1GLO repeater on 145.130 MHz with antennas located on the ATT cell tower in the Blackburn Industrial Complex in Gloucester Massachusetts. It has an average effective radius of 60 miles, and serves Eastern Massachusetts, Cape Cod, Rhode Island, Southern New Hampshire, and maritime mobile stations.

CAARA also operates the W1GLO repeater on 224.900 located at the CAARA clubhouse.

The 443.700 repeater is now on the ATT cell tower in the Blackburn Industrial Complex with greatly enhanced performance running in fusion mode and linked to 10 other repeaters in the New England area.

The Association is one of the few amateur radio clubs that has its own clubhouse. Located at 6 Stanwood Street in Gloucester, with a variety of HF stations with beam, vertical, or G5RV antennas.

Amateur radio exams are held on REQUEST at the CAARA clubhouse. Anyone who is considering a new license or an upgrade, is welcome to test with us. Currently pre-registration is necessary. Contact the head of our VE team Bill Poulin- WZ1L if you have any questions about monthly testing.

Monthly member meetings are held on the second Saturday of each month at noon except for July and August.

Each Sunday evening at 9:00 PM, the club operates a 2 meter fm net on 145.130. This is an open and informal net which disseminates club news and prepares operators for emergency communications work. All are invited to check into the net as club membership is not a requirement.

The club is open every Wednesday from 10- Noon for CAARA members and interested parties to stop by and socialize, as well as use the extensive collection of ham radio gear.

This newsletter is published under the auspices of the Cape Ann Amateur Radio Association (CAARA), However, all content is the work of individual contributors and may contain ideas, opinions or views not necessarily shared or supported by the CAARA Board of Directors or the membership.

THE EMCOMM MINUTE

By Dean- KB1PGH

So I thought for this months article I would make an attempt to get some reasons through of why amateur radio is still of importance to provide emergency communications in 2025. So okay, I get it , public service communications is in some ways more reliable to day than a generation ago and with the rise of the Internet, cell phones and social media one would have to wonder is there still a need for local and state and the Federal government and public safety officials to need amateur radio in emergencies?

One other aspect is that if you just go into amateur radio just for the sole purpose of emergency communications and waiting around to be used for that purpose you may be sorely disappointed. How do we convince the public and public safety officials that amateur radio is a useful tool that they need in their public safety toolbox? So do I believe and think that ham radio can still be used for emergency communications in this day in age? Yes I do and that`s not just because I am a ham radio operator of living in my own delusion. I firmly believe that all cities and towns should have a amateur radio emergency communications plan in place. So I`m going to try to go through a bunch of reasons why. One reason is that no communications system is absolute foolproof. Any system can fail at any time. Even multimillion public safety communications systems have and will fail. There could be something as simple as power outages or even terrorism by cutting cables and destroying antenna systems.

One big aspect with all these newer digital public communication systems and digital 911 systems is cyber attacks. All of these systems are connected to the public switch network and public safety access points which all can be compromised by cyber attacks. Even cell phone systems can be hacked as well. I guess this is all one way of saying one has to think of things that one would never think of. Cyber is the big boogie man nowadays and all of these 911 and communication systems are connected to the Internet and there can be state sponsored actors that could shut them down if they are determined enough. So I think you get the point of what I`m saying. Even in this advanced technical age multimillion dollar telecommunication and public safety communication systems can break down and be compromised. So amateur radio can play a part of being back up communication system when all else fails or the unthinkable happens.

The next thing that I was thinking about in amateur radio being involved in public safety communications is the subject of cell phones. So what do we know about cell phones? How many times have you had dropped calls and even times where you can`t even call out? We all know that cell phone service is not 100% reliable. Especially on the granite rock of Cape Ann not to mention being in valleys and metal buildings. Not to mention that cell phones them selves rely on computer systems to run as well as land lines and electrical power. Which of course all of those things can fail during disasters or even be overloaded by too many people using the networks. So how can you or the public safety agencies rely on social media or the Internet to keep you informed when your cell phone service is down during a disaster or compromised during emergencies and infrastructure failure?

The other aspect of public safety communications during disasters or long term emergencies is that amateur radio can provide local regional and national full time multiple radio nets all at the same time while cell phones can`t and the Internet can`t if they are down. As we know public safety agencies all work on different frequencies. One for fire, one for police, another for ambulance, even another one for DPW and others for hospitals and other served agencies. Under the incident command system amateur radio can set up a radio net for all of those public safety agencies all on the same frequency so they can talk to each other at the same time. Even during disasters the public safety communication channels can quickly become overloaded so amateur radio can easily become a back up.

One other issue during long term power outages public safety agencies who use cell phones will start to have trouble keeping connected while the cell phone systems become compromised and as we know it does not take long for your cell phone to run out of battery power. One other aspect to think about is that while you may live in a city or even in the suburbs there are vast swaths of America that are extremely rural with very little communications. There are countless towns that may have only 2 frequencies such as fire and police and that`s it. While it may be relatively flat where you live there countless areas that are mountainous or deep valleys or have deep woods for dozens of miles. Amateur radio can help fill those gaps if needed.

So amateur radio is and can still be a viable back up communications system for public safety agencies even though we now have cell phones and the Internet. Things can and will go wrong and public safety infrastructure can and does break. It`s good for public safety agencies to have amateur radio as a back up plan even for the mere fact of when the unthinkable happens.

As we know the Salvation Army and the Red Cross still has amateur radio in their communication tool box. As well as the National Weather Service who uses hams as Skywarn Spotters every day to report hazardous weather conditions. So while the role of ham radio in emergency communications may be a bit less due to the rise of cell phones and the Internet it does not mean that it is that much less important.

Snow Day

by Curtis- AA3JE

I sometimes wish to have the ability to have the emotional reactions of my childhood. Back in the day, when we woke up as children and spotted snowflakes, we dashed to the kitchen, turned on the AM radio, and ran outside with a ruler to measure the snowfall. The local school board decided that if we had more than 2 inches by seven AM, school was canceled for the day. So all over the county there were children out in pajamas and overcoats at 6:59 watching our rulers. When the radio confirmed the closures at eight AM, you could almost hear the cheers feeding back through the speakers.

Having school cancelled was pure delight. Not that school was bad, it was not, but it was like winning a scratch ticket. You might have to have spent $10 to win a $1 payout, but that didn't matter, YOU HAD WON SOMETHING!

When we were older and had young children, back in the day when "work at home" by internet didn't exist, a snow day meant a crisis. We had a network of families, and snow day meant we had to get the kids dressed, wrapped up, essential toys located and packed, and driven to the "Emergency Day Care" sites which were always on farms with long and slippery driveways out to the State Road. In those days a Snow Day was an annoyance and occasionally an exercise in mounting snow chains by the side of the road.

When we were older still, children gone, snow days were mostly neutral. Four-wheel drive was common, so snow days were essentially neutral in most places. If you lived on the Northeast corridor, you learned that East Coast drivers do not slow down in snow. This added a little thrill to driving to work. Get in a mega-jam on Route 95 you had the day off as an adult, but it wasn't fun.

Retired at last, snow days mean the county plows rolling past at 5 AM, then morning coffee, boots on, and scraping the driveway, pushing the snow out of the drive into the field. Fun, till you hit the fence with the tractor.

Same stimulus, four different responses. These days I lay on the bed at 7 AM, wondering why snow is not a thing of joy anymore. It was better then.

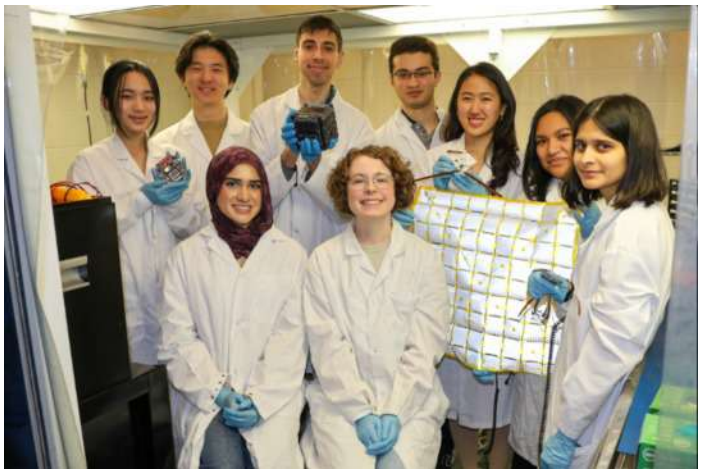
"Space Sailors" Seeking Download Help from Ham Radio Operators

A group of students at Cornell University is seeking participation from radio amateurs who are equipped with satellite stations for help in listening for signals from a retroreflective laser sail that is scheduled to be deployed later this week. The sail is currently attached to a 1U CubeSat that was launched early Tuesday, December 2, 2025, from the International Space Station, but will separate and become its own free-flying spacecraft equipped with four tiny "ChipSat" flight computers that will transmit telemetry data back to Earth.

This is the first flight of their ChipSats, and it is this data that the students seek help detecting, according to Ph.D. candidate Joshua Umansky-Castro, who has an amateur radio license; call sign KD2WTQ. The light sail's ChipSats will be transmitting data using the LoRa® digital protocol on 437.400 MHz. The sail, stowed within the CubeSat, is expected be released a couple of days after deployment — tentatively this Thursday, December 4 — and will likely function independently for no more than 48 hours due to the drag created by the sail.

Additional information, including LoRa parameters and links to a list of compatible receivers and the decoder file, may be found at alphacubesat.cornell.edu in the ChipSat Ground Station Guide (docx).

It is hoped that the ChipSat and light sail will become the trailblazer for future missions around the solar system, and one day to our closest stellar neighbor, Alpha Centauri.



HOME BUILT AMPLIFIER PROJECT

By Mike, KC1WQK.

As licensed amateur operators, we have the privilege of legally constructing and enjoying transmitters. I've been building a 400W grounded-grid linear amp using 813 tubes and based on KG7TR's excellent web site, which includes links to 1961 designs for study. I hope a quick view of progress on this project will be of interest.

This is the main chassis and back panel. The chassis contains the filament supply, soft-start controls for both filament and high voltage, bias supply, and input matching.

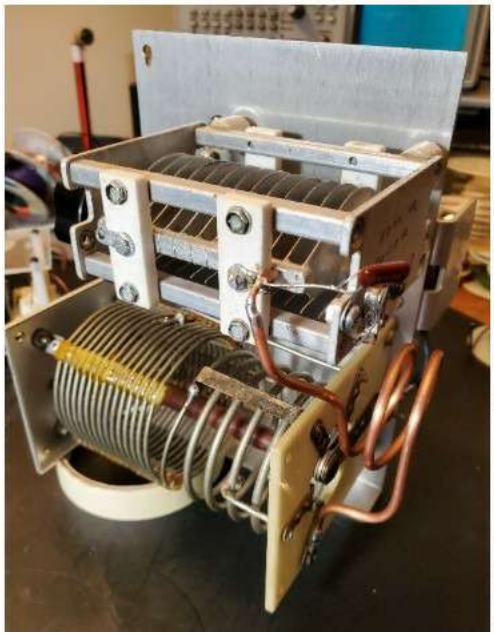
I don't have a lot of operating space, so I'm trying to build compactly. This will all fit in a 12" wide and deep U section of 090" aluminum picked up at Near-fest. Since the bottom will be closed I've used modular construction so that each section can be independently tested/fixed.

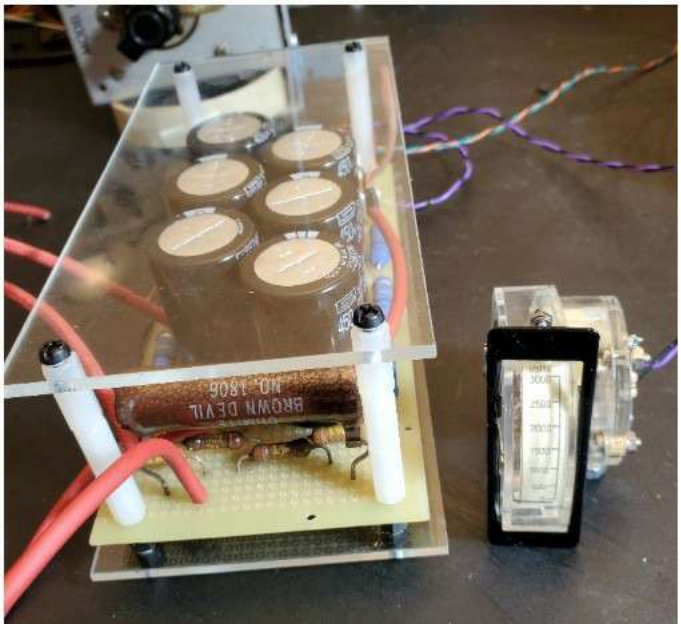
Here's the underside of the main chassis. A 10V 10A center tapped filament transformer is located at upper left. The filament choke (needed for grounded grid) is below, wound on a Ukrainian-surplus loopstick. An input 1:4 matching transformer was wound on the toroid located under the choke at bottom right. For stability, all wiring entering the chassis is bypassed with .001 disks at right. There's a small fan forcing air into the chassis, external and not seen on the right. The chassis, bias transformer, switches, ceramic caps, relays, etc. are all old and from my "junk boxes".

This is the plate tank, built around a B&W inductor switch and Hammarlund cap picked up at Near-fest. There's a 1500pF receive-type loading variable on the far side. This assembly was checked out using a Nano VNA on the output side, with the plate side loaded with 6.8K and 30pF as calculated plate impedance. It appears to match nicely on all bands from 80m to 10m. Auto-zone oil pressure tubing was used for the 10m coil. Should I sliver plate this?

Above, 2000V power supply, based on a Heathkit-style doubler circuit. There are plate voltage and current meters and a grid current meter (Lafeytte with homemade scales). Visible are the tube-flashover current limiting resistor and 20kV rubber-insulated output lead.

A plate choke was wound on a ½" Teflon rod and attached to an old National base. Series resonance was measured in-between the 15m and 12m bands. Hope that's right, or else….

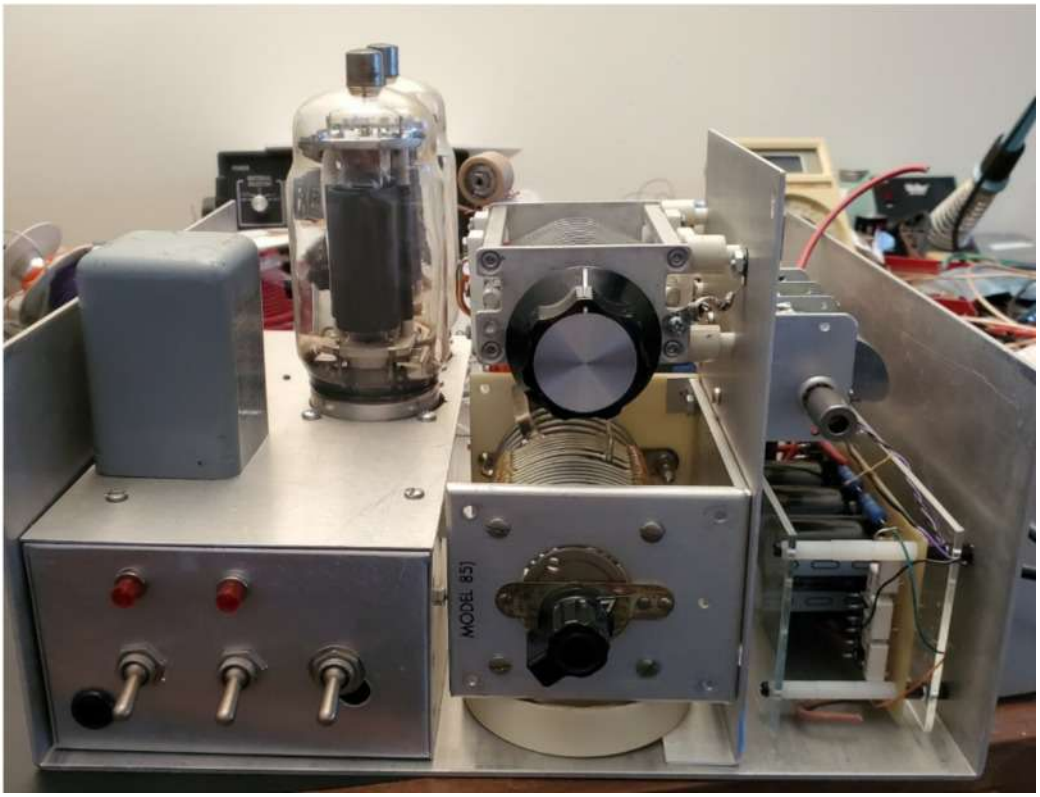




On left, all components located in the U-section. The high voltage transformer was taken from an old Dynaco hi-fi amp but is not visible at right rear. I may replace it with a beefier Hammond unit as things progress. I decided to keep all tank connections as short as possible, rather than line up the controls for looks. The front panel has been laid out but needs to be cut, control shafts extended, and so on. And it needs a perforated cover!

I'll be cautiously bringing this up after Thanksgiving. There's a lot more to this than meets the eye.

Questions and helpful comments are welcome by email at msussman@ieee.org, Mike, KC1WQK.



YOTA Month: Listen out for GB25YOTO

Youngsters on the Air (YOTA) Month officially begins on Monday, 1 December 2025.

Listen out for special event station GB25YOTA throughout the month as young radio amateurs get on the amateur bands.

Sandringham School and the 2nd Marlborough Scout Group start the event on Wednesday, 3 December 2025.

On Friday, 5 December 2025, Bracknell Amateur Radio Club will host GB25YOTA, as well as Jon, M0NOJ who will be operating later in the afternoon.

Cambridge University Wireless Society will be hosting the call sign on both Friday and Saturday. Also on Saturday, 6 December 2025, you'll be able to work South Durham Radio Club who are active using the GB25YOTA.

Looking forward to Sunday, 7 December 2025, listen out for the 2nd Marlborough Scouts and Cray Valley Radio Society.

Details of operating times, bands and modes can be found on the YOTA Month web page.

Take the time to encourage a young radio amateur by having a QSO with them.

Space mystery: Amateur radio sleuth detects secret signals from SpaceX military satellites

When space enthusiasts set up antennas in their back gardens, they usually expect to pick up signals from known weather satellites or maybe track the International Space Station as it sweeps across the night sky. What they don't expect is to stumble upon radio messages from a classified U.S. government fleet quietly circling Earth.

But that's exactly what has happened – and the discovery has begun causing a stir across the scientific community.

Unexpected transmissions spotted – and no one is explaining why

Scott Tilley, a Canadian amateur known for rediscovering a NASA satellite once thought lost, was scanning frequencies recently when he noticed something strange – a radio signal where there simply shouldn't have been one.

A quiet patch of spectrum, normally reserved for Earth-to-satellite communication, was suddenly alive with traffic coming the other way — from orbit down to us.

“I was surprised to hear anything at all,” he told fellow observers.

And he wasn’t alone. Other independent trackers checked their logs. Same result.

The signals traced back to Starshield, a covert branch of SpaceX’s satellite empire designed exclusively for U.S. governmental and military use – a cousin to the much larger, civilian Starlink network.

Over 170 satellites appear to be transmitting in this off-limits band. Even more worryingly, they’ve been doing it routinely, not by accident or during testing.

Why are these satellites talking on forbidden frequencies?

International rules are strict when it comes to satellite radio use. The International Telecommunication Union (ITU) – a United Nations agency – assigns each frequency for a specific purpose. Starshield’s activity doesn’t match the permissions on record.

Experts say that’s not a trivial oversight.

Radio astronomer Benjamin Winkel, speaking to Live Science, confirmed the transmissions are not authorised for this direction of communication — a potential violation that raises both regulatory and technical concerns.

So why use this band?

Stealth – Less traffic means fewer people listening

• Operational freedom – Military systems are often pushed to the limits

• “Fix it later” attitude – Act first, negotiate afterKevin Gifford of the University of Colorado noted that, so far, no harmful interference has been publicly recorded. But if such a large constellation keeps transmitting this way, the risk will grow: thousands of devices in orbit are already jostling for clean signal space.

Starshield: the quiet rise of military mega-constellations

Not long ago, most defence satellites were huge, expensive and limited in number. Starshield flips that model entirely.

Backed by a $1.8 billion contract, SpaceX has been launching satellites at a pace only a private giant could manage. Many of them are believed to be operated by the National Reconnaissance Office (NRO), one of America’s most secretive intelligence agencies.

Small, numerous and fast to replace – these satellites can:

Relay encrypted tactical data

• Support surveillance of Earth

• Withstand attacks by sheer redundancyA former U.S. Air Force General, Terrence O’Shaughnessy, now oversees the programme – underlining how the line between Silicon Valley and the Pentagon has all but disappeared.

This is the new space race: not exploration – domination.

Are we heading toward a crowded – and contested – sky?

At this moment, over 60% of all active satellites belong to SpaceX. And that number is growing every month.

Some projections estimate that by 2050, over 100,000 SpaceX satellites could be orbiting Earth.

That presents three huge challenges:

Orbital congestion – more risk of collisions Spectrum conflict – fewer clean frequencies for science & civilian use Strategic dependence – one company wielding enormous space powerSo, when signals begin to appear where they shouldn't, it's more than a quirky discovery. It's a warning that the regulatory framework built for a different era is struggling to keep up.

Listening to the future

For now, there's no conspiracy confirmed – no scandal, no confrontation. Just questions. Very big ones.

Club member Master Electrician Cutter Herlihy- KC1JKJ has been quietly improving the club wiring for several years. He has installed a light in the second floor staircase that turns on automatically as you go up the stairs, added a 220 outlet for testing amplifiers on the second floor, added ground fault circuits in the kitchen, fixed up previous not up to code wiring, and more.

His latest project was installing a ceiling fan on the first floor to help cool us off in the summer and distribute heat in the winter. All this work being done quietly behind the scene at NO COST TO THE CLUB.

If you see Cutter at a meeting, give him a big thanks!

It is that time of the year to pay your club dues. I believe you all have received an invoice by email and you can pay by a check in the mail, at a club meeting, or using PayPal on our website portal.

We have approved a budget of $8000 for the coming year which just covers expenses if all goes right.

We collect about $3000 from your dues. We luckily get over $3300 donated from our YukanRun for our support during the races.

The remainder comes from donations of money and donated equipment which we sell on eBay.

If you afford to make any donations it would be greatly appreciated and needed to keep the club afloat. We need to raise $3000 on top of our current budget this year for our share of the city $40,000 grant to upgrade the club with a new paved parking lot and handicap accessible ramp and railings.

To pay your dues!

The 33cm (902-928MHz) Band – Part 2

(Maurice, N1UV)

Introduction

Last month, in Part 1, I covered how the 33cm amateur band came about and its current status, as well as topics such as its use here in New England, how to get on to 33cm, and some unique terminology that you may come across.

This month, in part 2, I'll be covering topics such as available surplus hardware, recommended software, and a few antenna suggestions.

Hardware

As mentioned in Part 1, some radios will require modification, usually around the front-end filters, and some will work right out of the box. The reason mainly revolves around how tight the front-end filters are that were installed by the manufacturer for a particular model of radio. Other reasons include whether the VCO will lock at certain frequency ranges.

For example, radios that require a filter change will likely have filters centered on 938MHz with a useable bandwidth of 6MHz (ie, +/-3MHz). A typical amateur repeater output signal around 927MHz will fall outside this usable bandwidth, meaning that a receiver with a sensitivity of, for example, 0.3 µV for a particular SINAD in the LMR band may now have a sensitivity of 3 µV (or worse!) in the amateur 902 MHz band – yes, quite deaf!

Some radios do not require any filter changes, as the filters used are more broadband, usually allowing good receive sensitivity down to around 925MHz.

This is mainly why simplex operations are conducted in the 927MHz segment. If simplex were to occur in the 902MHz segment, nearly all radios would require some modification.

The radio lineup I've used in the past. L-R: Kenwood TK-931 (15W), Motorola GTX900 (12W), Kenwood TK-931HD (30W)

In the above lineup, both Kenwood radios required a filter change, while the GTX900 did not. In the case of the Kenwoods above, the filters were not hard to change out – just a little patience was required

Kenwood TK-931HD, filters, and location

Having said all the above, the good news is that there are quite a number of radios that simply do not need any modifications if they are used for typical amateur repeater use (ie, 902.xMHz transmit / 927.xMHz receive) and/or simplex operations on 927.xMHz. This is by far the bulk of all voice operations on the 33cm band.

A word of warning before listing some radios that work in the amateur 902MHz band (with or without modification) – know your model numbers! Check and double check! Caveat Emptor! There are many radio models that look the same but are designed to operate in the VHF, UHF, 800MHz or 900MHz bands. There are many uninformed (or unscrupulous!) sellers on sites like eBay that list 800MHz radios as able to work in the "900MHz ham" band. If in doubt, ask around. Using the Motorola MCS2000 (a good starter radio) as an example, only the models

PRIVATE SYSTEMS RADIOS MCS 2000 Model Family					
Model Number	Frequency Range	Power Level	Control Head Model	Channel Spacing	No. of Modes
M01UJL6PW4_N	806 - 870 MHz	30-35 Watts	Model I, 8 digits	20/25 kHz	48
M01UJM6PW6_N	806 - 870 MHz	30-35 Watts	Model II, 1x14 digits	20/25 kHz	160
M01UJN6PW6_N	806 - 870 MHz	30-35 Watts	Model III, 2X14 digits	20/25 kHz	160
M01WGL4PW4_N	896-941 MHz	12 Watts	Model I, 8 digits	12.5 kHz	48
M01WGM4PW6_N	896-941 MHz	12 Watts	Model II, 1x14 digits	12.5 kHz	160
M01WGN4PW6_N	896-941 MHz	12 Watts	Model III, 2X14 digits	12.5 kHz	160
M01WJL4PW4_N	896-941 MHz	30 Watts	Model I, 8 digits	12.5 kHz	48
M01WJM4PW6_N	896-941 MHz	30 Watts	Model II, 1x14 digits	12.5 kHz	160
M01WJN4PW6_N	896-941 MHz	30 Watts	Model III, 2X14 digits	12.5 kHz	160

Model I Model II Model III

with “W” in the fourth position can be used on the 902MH

Kenwood models are a little more straightforward. For example, the TK-981 is 902MHz capable, where-as the TK-980 is not (it’s an 800MHz radio sometimes listed on eBay as being on 900MHz).

Don’t be tempted in purchasing the TK-941 which is also a 900MHz radio. It simply will not be able to be programmed with 25MHz repeater splits. It does make a great simplex radio… or a great paperweight!

So, without further delay, here is the list. It is by no means exhaustive. There are plenty of websites that list 902MHz-capable radios, but these are the ones I’m familiar with

Manufacturer	Model	Type	Notes
Kenwood	TK-481	HT	
	TK-931	Mobile	Hardware mod required.
	TK-981	Mobile	Great starter radio. Find Version 2.
Motorola	MTS2000	HT	
	MTX9250	HT	
	GTX900	Mobile	Not recommended.
	XPR4580	Mobile	FM and DMR
	XPR6580	HT	
	XTL1500	Mobile	FM and P25
	XTL2500	Mobile	FM and P25
	MCS2000	Mobile	Model 1, 2 and 3. Great starter radio.
	Maxtrac	Mobile	Hardware mod required. Not recommended.
	Spectra	Mobile	Hardware mod required. Not recommended.

Manufacturer Model Type Notes

Kenwood TK-481 HT

TK-931 Mobile Hardware mod required.

TK-981 Mobile Great starter radio. Find Version 2.

Motorola MTS2000 HT

MTX9250 HT

GTX900 Mobile Not recommended.

XPR4580 Mobile FM and DMR

XPR6580 HT

XTL1500 Mobile FM and P25

XTL2500 Mobile FM and P25

MCS2000 Mobile Model 1, 2 and 3. Great starter radio.

Maxtrac Mobile Hardware mod required. Not recommended.

Spectra Mobile Hardware mod required. Not recommended.

Some of the mobile radios listed above can be found with output power levels of 12/15 watts (lower power) and 30 watts (higher power).

Surplus radios can be found via the usual websites: eBay.com, QRZ.com, QTH.com, etc as well as occasionally through merchants like Haloid Solutions and Used-Radios. As of writing this article, P25 900MHz radios command a price premium (not to be confused with their 800MHz variants which are dirt cheap), but good bargains on non-P25 radios can be found in the $100-$200 range.

I'll recuse myself from the inevitable Kenwood-versus- Motorola war! But if someone were to twist my arm and ask, I'd side with Motorola, as I prefer their audio and RF performance despite them being a little harder toprogram. Let the debate begin!

Software

I'll split this section in two; Kenwood and Motorola. Each are sufficiently different. In all cases, though, you will need to either make or purchase an interface cable that connects your PC to the radio. eBay is a great source of these cables. Some programming cables are USB based, but some terminate in a 9-pin serial connector. In the latter case, a simple USB to serial adapter will also be required unless, of course, your PC has a genuine 9-pin serial port.

Software – Kenwood

Arguably, the easiest radios to program are the Kenwood models, as the sof and generally does not require any hex editing of files. With the exception of the TK-481 H1, which requires a number of convoluted steps to complete, the TK-931 and TK-981 mobiles are the most straightforward to program; simply read the radio, modify the channels as needed, and write back to the radio.

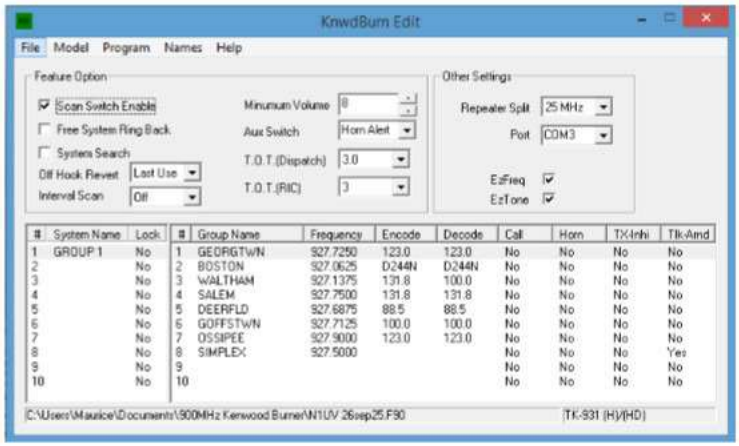
One thing to note about programming the TK-931: the repeater split is fixed at 25MHz (or whatever is set via the drop down list) for all entries. Unfortunately, you won't be able to enter the non-standard splits that are sometimes necessary to avoid interference at the repeater site.

Of the two, the TK-981 is the easier option, as it can be programmed using the free application CHIRP—which you might already be familiar with—and it requires no hardware modifications. What could be simpler?

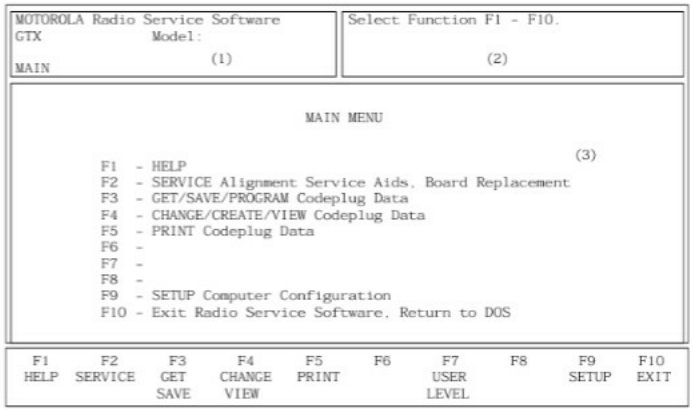
KW902.com is a goldmine of information—I definitely recommend checking it out!

Software – Motorola

This is where things get a bit trickier. Programming software—Motorola's Radio Service Software (RSS)—for older Motorola models such as the Maxtrac, Spectra, and GTX900 is very hard to find. They used to be available for purchase from Motorola but have since disappeared from their website (at least in my searches). But, if found, and being DOS-based, it must be run on an old DOS-compatible PC—not in a Windows CMD shell.



Without getting overly technical, RSS was developed in the late 1980s and 1990s, when MS-DOS was the dominant operating system and hardware was based on much slower 286/386/486 CPUs. The software requires direct hardware access to serial ports, with timing handled entirely in software. RSS programming relies on precise timing for data transfer over serial connections. DOS's minimal overhead allows stable, real-time communication, whereas multitasking operating systems like Windows or Linux introduce latency or interrupts that can corrupt programming sessions.



This is the main reason why I've annotated some of the radios as "Not Recommended."

However, if you know someone who has access to the software running on the correct PC hardware—go for it! This is especially true for the GTX900, which is a great radio and, as a bonus, supports HearClear if you plan to use HearClear-enabled repeaters.

With that out of the way, software for the other Motorola radios are all Windows based.

Motorola Customer Programming Software (CPS) for the MCS2000 series are basically abandonware and can be found on a number of websites (the latest and recommended version is R02.03.00). Others, like that for the XTL (Astro) and XPR-series (MOTOTRBO) are free to download directly from Motorola. However, you will need to create a business account through their Customer Hub which, for amateur radio operators, is free and easy to get. Or, you can ask around!

One thing you'll quickly realize is that the Motorola CPS is very much geared toward commercial LMR use, and as a result, it includes a wide range of programmable features—such as trunking, the ability to make phone calls etc. Most of these can be ignored for basic use. Terms like zones, zone assignments, conventional personalities, and personality types are all waiting for you to discover!

To help, the website near900.com has a page with a bunch of New England-based codeplug files for the popular 900MHz radios. These are a great way to start learning the programming software terminology. Load them into the software to see how things map out for amateur 902MHz use.

However, in all cases with Motorola software, there is some hex editing of files required so you will need access to a hex editor. I'd recommend HxD which is freely available. There are a number of websites that will give you step-by-step instructions on how to perform this. Follow those instructions and you can't go wrong!

Antennas

Antennas for 902MHz are relatively small and readily available. Due to the proliferation of commercial, ISM, and Part 15 equipment on 900MHz, you have many choices when it comes to antenna types. Yagis, collinears, whips, phantom antennas, and panel antennas are all available to try.

One thing I've found is that, in a mobile 902MHz environment, having a higher-gain antenna on the car isn't necessarily an advantage in an urban setting. I regularly had better mobile performance using my unity-gain antenna compared to the 7 dBi collinear I also had. I've also had good success with the Laird phantom antenna.

One important thing to note is the power rating. Many ISM and Part 15 antennas may only be rated for 50 watts or less (in some cases, much less). Even though cable losses are higher, you

may still be delivering more power to the antenna than it was designed for, leading to problems

such as overheating, impedance mismatches, or even radio finals damag

Summary

Don’t let the lack of purpose-built amateur radio equipment deter you from using the 33cm

band. Ex-commercial gear suitable for 902MHz is readily available at reasonable prices and, in

most cases, is very easy to repurpose for amateur use. There are a number of excellent websites that provide step-by-step guides to help you get these radios working on 33cm. There may be a small learning curve when getting used to the programming software, but a little patience is all that’s required.

Go forth and populate 33cm!

Websites

Some useful websites:

General information:

https://communications.support/

https://www.repeater-builder.com (not just for repeaters!)

https://www.near900.com/ (New England Amateur Radio 900MHz Network)

Kenwood

https://www.kw902.com/

Motorola

https://www.batlabs.com/

Discussion Boards

AR902MHz @ groups.io

Near-900 @ Google Groups

GEMOTO @ Google Groups

The annual CAARA Holiday Party will be held at the clubhouse on Saturday, January 10 at 12 noon. We will be providing a catered meal and having our Yankee Swap.

Watch your emails for more details!

IMPORTANT NEWS ABOUT THE CAARA SUNDAY NIGHT NET

It has been discussed by the Board and voted to change the Sunday night net from 9PM to 7PM.

We felt it was a better time for most club members and might bring in more members checking in.

The process of getting the net controllers lined up has been taken care of by Tony- AB1XK