

The Short Circuit

Newsletter of the Arctic Amateur Radio Club

Fairbanks, Alaska

November 2012

Eagle Students Reach for the Sky...and a Mic

Recently club president Neal Brown W7USB trekked to Eagle to work with Marlys House, KL3ME, a teacher in Eagle Community School, on a joint science and amateur radio educational expedition. They hope to teach middle school students enough about ham radio that they can pass their technician class exams in May of 2013. The community of fewer than 100 residents is about 400 road miles from Fairbanks on the Taylor Highway, which is closed from mid-October to mid-April. Here is Neal's story.

I left Fairbanks Wednesday 19 September and drove out from under clouds and light rain by Delta Junction. The south side of the road from Delta to Tok was lined with huge trees blown down by recent strong winds. All the rivers — Tanana, Johnson, and Robertson — were very low. I drove from Tok to Eagle with my driver's side window down and enjoyed beautiful sun filled warm weather.

Marlys offered me free room and breakfast at Falcon Inn, which she and her husband Charley own.

Thursday noon I gave a prepared Powerpoint-type talk about the aurora borealis to everyone in the Eagle Community School. There are 21 students

of all grades, teachers, and staff. I was able to interject ham radio into my presentation several times. The biggest hit of my presentation was a short video clip I made years ago of launching Elmo aboard a 2-liter pop bottle rocket. He flies through the aurora, almost collides with the Space shuttle, sees aurora on Jupiter and Saturn before coming back to earth under a parachute that my wife Fran catches with our bichon dog Katie nearby. I showed them a wireless thermometer set up as an example of radio telemetry, linking it to radio communication. I used the 1900 telegraph line from Valdez to Eagle as the back drop for the induction of high altitude electrical currents into the aurora creating large currents in that telegraph line and today, in the trans Alaska pipeline.

Following the all-school presentation, I spent an hour with the 8 students Marlys has for ham radio work. She wants the older 5 to pass the technician class license exam, the younger 3 to participate in the learning activities. We talked about net control and how radio amateurs practice often to make sure they can communicate in an orderly and efficient fashion should a disaster occur. We then loaded batteries into the FRS radios I brought for

them to keep and use this year. They learned how to install the batteries correctly and to use the radios. After practice inside we went outside and spent 15 minutes running around, always within sight of Marlys, talking by radios. When we came back in we had a debriefing about what worked and what problems we had. As you might anticipate they held the call buttons down way too often such that no one could talk to anyone. They nevertheless had a huge amount of fun, participated in the debriefing, then took the batteries out of their radios and put them back into the storage box I brought specifically for that purpose.

I then took the small breadboard circuit out I had pre-built with a battery, a resistor and an LED on it. We measured the voltage on the battery, across the resistor and the LED together. Then we measured the current in this circuit. Then we multiplied the current by the value of the resistor which I gave them and found that the voltage we measured and the calculated voltage were one and the same. I talked about E over IR and power. All of this was a gentle introduction. I left 10 breadboards, 10 resistors, 10 LED's and 2 multimeters for them to do this

continued page 2

Inside this Issue

October SET Results	p2
Where is everyone?	p3
KL7JM Moves to Montana	p4
Copper Cactus Antenna	p5
FCC Proposes New Rules	p6
Thoughts on HF Amps	p6
Homebrew CW for 160m	p7

It's Time for Skywarn Recognition Day!

Our friends at the National Weather Service will host the annual Skywarn Recognition Day event starting Friday, December 1, at 3 PM local time. KL7FWX will be on the air for 24 hours using HF, VHF, and Echolink/IRLP. Their shack features a *brand new* Yaesu FT-950 transceiver, and the electronics technicians have made some recent improvements to the G5RV antenna. The combination of better filtering and noise reduction compared to the old IC-718 make the station a real pleasure to operate. In 2011, KL1JP loaned his FT-950 to the effort, and previous years' records for number of contacts were shattered. **Volunteers are needed!** Please contact Dan KL1JP by email powellite@hotmail.com to sign up or visit kl7kc.com for more information.

October Simulated Emergency Test Results

The ARRL Simulated Emergency Test (SET) is a nationwide exercise in emergency communications, administered by ARRL Emergency Coordinators and Net Managers. Both ARES and the National Traffic System (NTS) are involved. The SET weekend gives communicators the opportunity to focus on the emergency communications capability within their community while interacting with NTS nets.

This year's SET on Saturday October 6th involved Alaskan amateurs from Ketchikan to Nome, giving many a chance to sharpen their emergency operations skills. The scenario stipulated cell phones and internet were out, so amateur radio was essential.

Much of the action centered right here in Fairbanks. That's because Linda Mullen AD4BL is Section Emergency Coordinator, and Ed Trump AL7N is Section Traffic Manager. In addition, Jerry Curry KL7EDK operates an invaluable Winlink mail system on HF and VHF.

AL7N's report on the SET contains

some good insight into what transpired and important lessons learned: Thirty inbound formal radiogram messages plus one formal ICS 213 NFES 1336 Sitrep message as well as a number of informal pieces of traffic were handled during this exercise. Cordova passed information via HF SSB to KL7EDK, but it was not in formal radiogram message format as requested for this exercise, relayed to AD4BL.

Message formatting was in most cases good to excellent. WL7MR Nome and KL3HM Ketchikan did a particularly good job with this. Minor formatting errors were noticed in only two of the inbound messages logged.

Some places that were not heard from during the exercise: Juneau, Kodiak, Bethel, Valdez.

Some places with known amateur populations that might be recruited for future participation in exercises of this kind include Eagle City, Chicken, Kotzebue, Barrow, and North Slope/Deadhorse area. Exercises such as this that stress formatting and sending/re-



ceiving messages as formal radiograms should be repeated at intervals of not more than about 90 days.

This would improve and help maintain written message originating and relaying skills of all Alaska amateurs participating and further enhance our ability to provide effective radio communications "When All Else Fails".

The 2012 SET provided a special opportunity to remind folks that they can never be complacent about their own skills. Procedures change, people forget, and practice makes perfect. **Be prepared and stay prepared!**

Eagle Students from page 1

on their own.

They held a vote before class ended and asked that we make and launch rockets Friday during the 2 hours I would be with them before returning to Fairbanks. I've done this many times before and they were good to work with. I had Marlys make a rocket, too. The activity went very well and everyone got to launch and recover their rocket, which can be flown again and again with new motors. I left hundreds of motors left over from my days teaching rocketry for middle school kids at UAF, in Eagle. I left many different kinds of rocket kits for them too.

None of the amateur radio operators who live in Eagle were available for Arctic Amateur Radio Club

me to talk with while I was there, so I drove back to Fairbanks when school got out at 3 pm on Friday.

I observed a SKYPE music lesson taught by a teacher in Tok for the students in Eagle Friday. Marlys and I quickly came to the same conclusion that I can do that too. This means I won't have to fly to Eagle this winter to work with Marlys' ham radio students. We can work together via SKYPE where I talk to them and they can talk back to me. I'll have to configure some cameras here at my home so I either address them person to person, or show them hardware and how to work on it.

Marlys asked me to leave receipts for everything I've bought and provided. She and principal Anne Millard

plan to reimburse me for my travel expenses to Eagle, too. I told them I was not expecting to be reimbursed, but if they want to, fine. The biggest expense for me was the Gateway PC laptop needed to run the W5YI computer assisted technician class training. They have no PC's in Eagle Community School. Each student has their own 13" MacBook identical to the one I use for presentations.

For me this was a MEET AND GREET situation which worked very well. I like the students and know something about them and now they know me in person. I had some anxiety about how we were going to develop a workable syllabus between Marlys and myself. I anticipate SKYPE will work great...*DE W7USB*

Where Are All the Alaska Hams?

by Larry Ledlow, Jr. N1TX

I get a lot of emails requesting scheduled contacts because the op on the other end may need Alaska for an award. It's a common scenario, which the more active KL stations all share. Interestingly, a lot of the comments in the emails go along the line of "Where are all the Alaska stations?" Well, Alaska operating has its challenges, but it's not THAT hard for most hams in the Americas, Europe, and Pacific to work us up here. So what could they possibly mean? After all, there are dozens and dozens of general and higher class licensees in Fairbanks alone.

Being the curious type, I decided do some back-of-the-envelope research. My first stop was dxsummit.fi to do a search on how many times Alaskan stations have been spotted on the DX Cluster in the past several months. In all, I retrieved 3000 spots for AL, NL, and KL prefixes. Of those, I had to toss a bit more than 10%, because they are known to be outside of Alaska. Of the rest, about 50% of the spots are the most active contesters. Then I had a look are the remaining calls on the list. Two stand out: Tim NL8F in Dutch Harbor and Joe KL7LF from North Pole. Both Tim and Joe are minor celebrities on HF,

and the spots reflect that.

So I come back to what my email correspondents ask: "Where are all the Alaska stations?"

I can only make some limited inferences from my DX spot analysis:

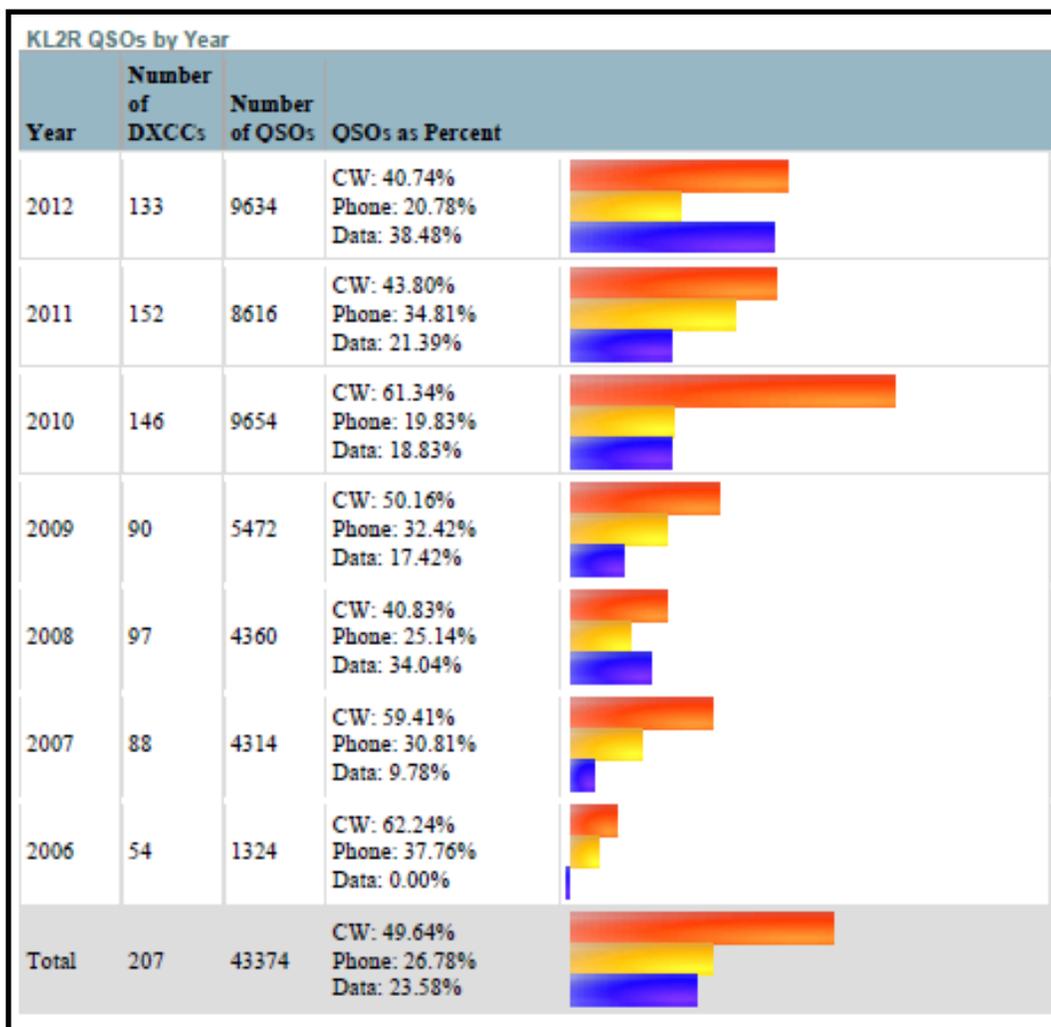
a) Contesters represent a very small portion of the ham population overall, but they are far and away the most active on the air.

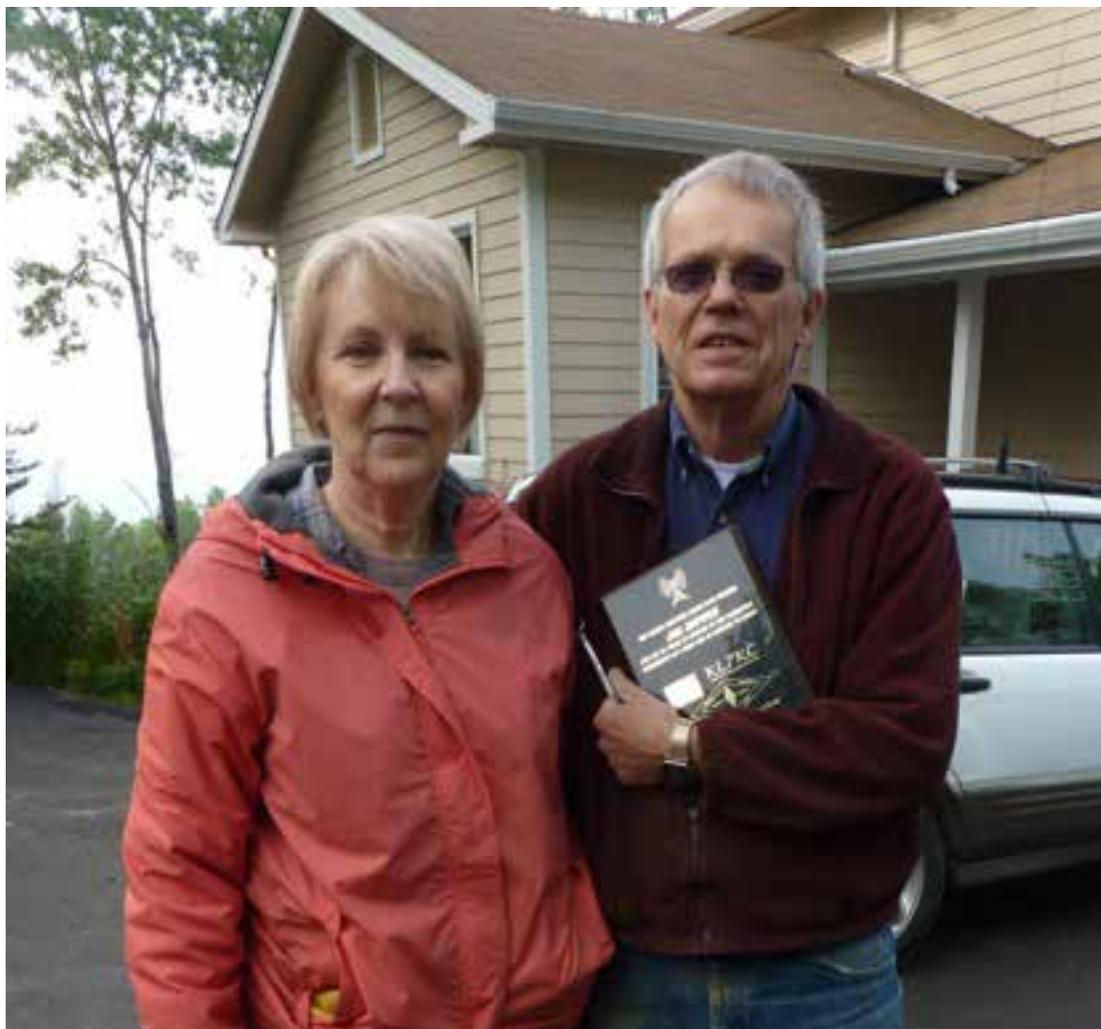
b) Only a handful of hams make up the majority of non-contest DX spots. There may be others out there DXing and ragchewing, but they do not call CQ!

If I eliminate repeater activity – which is minimal in the Interior these days anyway – and invoke about 15 years worth of observations, there are several dozen hams somewhat active on the HF nets. "No traffic, over." That counts for something, but hundreds of licensed hams are still MIA!

So now I have to ask: **What kind of operating do you do?** Seriously, I want to know. I want to know how much time you spend on the air in any given month, mode(s), and where you do it. Drop me a line at n1tx@akradio.net. Thanks!

The graphic at left shows what can be done from Fairbanks, even in slow solar times, with 100 watts, a small (18') tri-bander, and simple wire antennas! KL2R had no amp until late 2011.





Mentor to many in the Fairbanks community, ham radio-related or not, Jim Movius, KL7JM, and his wife Phyllis left Fairbanks 17 August pulling a trailer loaded with ham radio towers for their new home in Billings, Montana. Jim grew up in Billings with siblings who live there now. Jim came to Fairbanks days before the infamous 1967 flood to manage the Fairbanks Municipal Utilities System. Though Jim was not shy, we were unable to compile a list of the many things he has done in our community for this newsletter before he left.

He demonstrated his genius at designing antennas for not only ham radio use, but for use by other civilian, government and military agencies. Jim introduced many of us to the beauty and effectiveness of loop antennas. His “strap-on” mobile loop was quite the sight driving down Interior roads!

Jim and his brother Dave W7KZO were well known in the lighthouses-on-the-air community for their work activating the North Head lighthouse in Washington, which was featured in the February 2006 issue of *The Short Circuit*. (See <http://www.kl7kc.com/news/AARCNewsletter0206.pdf>)

Many remember he and his team won several of the Yukon 800 high speed boat races that started in Fairbanks, turned around in Galena and returned to Fairbanks. Many remember the competence and skill he brought to AARC’s participation in the Yukon Quest dog sled race.

In short, KL7JM leaves behind a tremendous legacy for Fairbanks. We are glad to hear he is still able to check in to the usual nets from his new QTH, so perhaps you can have a little chat with him some evening and remind him just how much he is missed!

Copper Cactus for the Frozen North

For VHF and UHF applications, the so-called J-pole is a real asset in any ham's array. One can build J-poles from just about anything. Designs are readily available using simple wire and a board, twin lead, and even copper tubing, the latter appropriately named a copper cactus. The antenna can cover one, two, or even three bands, and construction is very, very simple.

John Slater KL1AZ shared his copper cactus design back in January 2007, and his commitment is unwaivering. "I own 2 of these, one I modified from 2m to dual adding 70cm. this is the one that developed a VSWR issue this winter. the 2m side went out but the 70cm side is still under 1:7. Have not started working on issue at



this time. the one that is in photos is my original one built around '02 and has worked above exceptions and is soon to become my cross band repeater antenna for my QTH so I can use my HT around the house and hit the repeater.

"If I had it to do over would do it again, I am sold on this homemade antenna, and it is a lot of fun. My plan is, if I can find the copper pipe, to build a tri-bander (6m, 2m, 70cm). This requires 1" copper pipe, which is very expensive now. I have recovered out of the dumpsters enough to make approx 4 more dual bands at this time, but no one wants to throw away the 1" stuff.

"Next project is to make them back packable. There was an article in *QST* recently about one that can be broken down and packed in a carry on bag, will start working on one of this this fall/winter."

You can re-read John's original article at http://www.kl7kc.com/news/AARC_Newsletter_0107.pdf. ARRL members can also catch up on the many J-pole designs and related products by visiting the *QST* archives at <http://www.arrl.org/arrl-periodicals-archive-search>

FCC Seeks Comments on Proposed Rule Changes

The FCC recently released a Notice of Proposed Rulemaking (NPRM) -- WT Docket No. 12-283 -- proposing to amend the Part 97 rules governing the Amateur Radio Service. On October 24, a summary of the NPRM was published in the Federal Register and the FCC is seeking comments on it.

Specifically, the Commission is proposing to modify the Amateur Radio Service rules to grant examination credit for expired and beyond-the-grace-period-for-renewal Amateur Radio operator licenses; to shorten the grace period during which an expired amateur license may be renewed; to revise the time a call sign is not available to the vanity call sign system correspondingly, and to reduce the number of volunteer examiners needed to administer an amateur license examination. The NPRM also asks for comment on amending the rules to permit remote test administration, and proposes to amend the Amateur Radio Service rules to allow amateur stations to transmit certain additional emission types.

Comments must be filed on or before December 24, 2012 (60 days after publication in the Federal Register); reply comments must be filed on or before January 22, 2013 (90 days after publication in the Federal Register). Instructions on how to file comments are listed beginning on page 12 of the NPRM.

See <https://www.federalregister.gov/articles/2012/10/24/2012-26201/amateur-service-rules>

A Little Insight on Buying an HF Amplifier

by Larry Ledlow, Jr. N1TX

More is always better, right? So one might think the debate on amplifiers for HF should be appropriately brief. But it never is, and for several good reasons. Here I will share a few thoughts you might want to consider when deciding how to boost your HF-umph.

I assume you have invested as much as reasonably possible in a good antenna system — so you can *hear* all those stations you will be able to work. You can easily spend as much as as \$10k on a legal-limit, auto-everything unit, or build your own for several hundred dollars. The choices cover a broad spectrum.

How much power? While 1.5 kW, full-duty-cycle, no-time-limit sounds attractive, if you're on a limited budget, 500-1000W will be just fine. Go for the most your budget and other considerations here can support. The difference between 750W and 1.5 kW is 3 dB, which at HF amounts to less than one S-unit

on the receive side. I suggest not stressing over the difference if you can't afford it.

If you operate a lot of full-duty-cycle modes like RTTY, then perhaps that specification is essential. For most, probably not. SSB is a very low duty cycle mode.

The more affordable amplifiers today still use tubes. Unfortunately, many tubes popular over the decades are becoming increasingly difficult to obtain. Cost for replacement tubes is important. Amps tend to be expensive, we most of us will keep one for many years. A quick survey of the more popular amps from Alpha, ACOM, and Ameritron use well-regarded and available 4CX800A, 8877, or 3CX1500A7 (or their Russian equivalents). Prices vary wildly depending on source and manufacturer; e.g., a new Eimac 3CX1500A7 can run over \$1200, or I saw a Machlett tube on eBay for about half the price. Always check with the amp manufacturer about availability.

One technical consideration is the design and quality of the amp's power supply and components. The PS keeps the tube happy and must often endure much more abuse than the tube itself. Capacitors are especially prone to failure, and quality control is iffy on cheap amplifiers. If you buy a used amp, check the power supply caps very carefully, at least visually. They should not be discolored, have leakage, or be warped.

Also, make sure the rest of your antenna system is up to par with good quality coax and connectors. You are just asking for trouble if you run 1.5 k through RG-58. Upgrades to good quality RG-8 or RG-213 can be an extra several hundred dollars you might not have thought about in your original budget estimate.

Finally, don't be seduced by promises of 110 VAC operation. Some require 30 amp service at that voltage! Typical installations use 220 VAC running 5-10 amps. Consult an electrician first.

AL7N's Junkbox CW Transmitter for Top Band

by Ed Trump AL7N

Some time back I decided to build a CW transmitter with parts I had on hand. I was originally going to set it up for 30 meters, but finding a suitable 10 MHz crystal became difficult.

So, while sitting here at home recuperating from a hernia repair surgery, a couple months ago, I decided to change it a little and put it on 160 meters instead, since I had a couple crystals for 1818 kHz that I had purchased years ago for a rig that never got built when I lived out in Nome. I always wanted to play around on 160m anyway.

This thing is entirely built out of "stuff" I had laying about, or could make. The plate tank coil is wound on a cardboard Morton Salt box 3 1/2 inches in diameter. No. 19 insulated wire, some good stuff I took off the telegraph circuits on the Alascom cross-connect frame downtown when they ripped all that stuff out... Good cloth/teflon insulation on it. Four turn link.

The coil in the antenna coupling network is wound with No.26 enameled wire, and a 3 turn link. I probably need a larger variable capacitor here, but I used what I had. It is similar but a few plates less than the one in the plate tank circuit.

The RF chokes are all homemade. The two in the grid circuit are made of No. 30 enameled wire wound on some homemade spools, to about 5 Ohms DC resistance each. The plate RFC is wound on a 1 inch toroid core with No. 19 insulated wire, as much as I could get on in one layer. I used a bunch of surplus mica bypass capacitors I had laying around. The 829B tube and socket plus the variable capacitors in the plate tank and antenna coupler were given to me by a friend down in Idaho. The power supply transformer and rectifier tube came from an old

table model radio. The transformer has a pretty heavy core, so I figured it would work OK...It does.

The 5651 (OB2) voltage regulator tubes came from some other junk Alascom scrapped years ago, and for a filter choke, I used an old Western Electric "retard coil" that seemed to be of enough inductance to work OK. The bleeder string and dropping resistor for the VR tube chain are all identical 5000 Ohm wirewound potentiometers that came off the old Alascom telegraph battery board when they scrapped it.

I got a couple buckets full of 'em, and they come in handy for all kinds of tinkering around. The photo shows 6 of them mounted, but only five are in use, one for the VR drop, and 4 in series for the bleeder string. I did not want B+ potential on the keying lead, so I "stole" some voltage from the bottom end of the bleeder string to operate the bias and operating windings of an old telegraph polar relay.

This, with a simple transistor keying circuit, will allow me to put this rig on my station keying bus and key it from the operating table like I do with all the other transmitters in the

shack. I have selector switches that select the rig I want, and they are all keyed with +12 volts from the keying bus, individually, or all of them together, if I want. 2 meters VHF CW, 80, 40, 20 and now 160 meters.

This transmitter is now sitting over by the shack window so I can get a direct antenna lead and good ground connection close to it, since it is fixed-tuned, there is no need to be near it when operating, once tuned up, it is ready to go as long as the power is switched on.

I figure I can use either one side, or both legs of my VEE antenna that has legs 110 feet long and is the highest one I have working it against ground with the feeders tied together and running a single feed to it. That's some over a quarter wavelength and seems to take the RF OK on 160. Come this winter might be fun. We'll see!



