Anchorage Amateur Radio Club

Next Meeting January 2nd

FAA radio systems in the Territory of Alaska

Beginnings

This is going to come as a shock to most of you but Jim Tvrdy chewed me out for doing a little editing. He put the misspellings and grammatical errors in for effect - to give the reader the 'farm boy' feel. That's cool. Everyone gets tell their story their way. A common mistake in reviewing any history is to use present criteria to judge past occurrences. For someone as new to the hobby, obsession, money pit, that we call the Amateur Radio Service as I there is a tendency to think that it was at all times and in circumstances as easy as it presently is. This month's guest at Beginnings got his start under classical, difficult, even foreign circumstances. To understand his accomplishments, and outlook, requires that we understand a set of circumstances foreign in time and place to today. Okay, enough with the philosophy. Actually, it's a good read. Enjoy.

George, KL1JJ

How I became a Ham

By Jim Tvrdy

It all started way back in January, 1949, when I was in the service, the Army Air Corps, that is. At the time, I was a basic airman (PFC) stationed at Guam, Marinas Islands, where I was hoping to attend school and become a full-fledged aircraft engine mechanic. As you know, back in them good ole military service days, you always got your wish.

The Brass (Officers) were so subtle in the way they could change your mind.

"Engine mechanic, sure, we need a lot of engine mechanics". But right now there's a three month waiting list for the school."

"Okay, thats fine, I'll wait. What do I do in the mean time?"

"Detail for three months."

"Err, what else is there?"

"Can you type?"

"Yes sir!"

"Okay, we'll put you in teletype school, we're short of teletype operators."

Off to teletype school we went.

Within the week, the Commander called me in and said,

"We over estimated the quanity of teletype operators needed." "I see you scored well on the code test when you took it in basic training. How about switching to the radio school and become a ground radio operator?"

"Huh, yeah, well OK."

(Thinking back I believe the characters that were in the test was E, T, A, N, I & M. The characters first identified as they were sent, then after a couple of passes, you were on your own. The speed jumped from 1 WPM to a thousand in seconds. I just squinted my eyes when the characters started coming over the loud speaker and began filling in the little circles on the test paper. The code had stopped and I was still blackening out the little circles. I asked the fellow next to me what that was all about and he said it was Morse code. I said "Okay" and blacked in the last circle. Scored well —— yeah?)

Anyway, I ended up in the code and electrical theory classes. This ole Idaho farm boy was exposed to more new terms and vocabulary about elktronicx, currant flow (thought they wastalking about makin jam), voltage, unlike an elktrix fence, and other trons that you can't see. Then after my eyes started to spin and get waxy, they would switch over and start sending code.

Them beep beep sounds went in one ear, rattlin around a bit, then they mixed with EMF, megacycle and Flemming valve stuff and by the end of the six weeks and two instructors later, I are a radio operator, blurry eyed and walkin unsteady, but a Ground Radio Operator.

Back to the Commands Office. Well now, it seems that there was more than the usual drop outs in the teletype class. So-—— thats right, — square one. On the Job Training (OJT) as a teletype operator.

After a couple of months of sending the space, mark stuff and winding the TTY tape by looping it around my little finger then around my thumb back and forth until I reached the end, usually I had a wad three or four inches thick, I was asked if I would like to become an airborne radio operator aboard B-29s. I looked down at the wad of tape around my thumb and little finger and said "which way to the Iron Birds and don't get in my way!"

Changing from the Signal Corps to the airborne division put me in contact with other airmen who were licensed hams and who operated the Guam base station KG6AA in their spare time. One thing led to another and when the FCC engineer came around in late 1949, I took and passed my class "B" license.

I had used my permanent home address of Shoshone, Idaho on my 610 form for I didn't know where I would be stationed when I returned to the States in a couple of months. When I passed home on furlough from Guam to Ft. Worth, Texas, in March of 1950, a letter from the FCC was awaiting me. Nope, no license, I had made an error in one of the blanks on the 610 form, and it was returned for correction. The letter was dated in November of 1949, but had not been forwarded to me because I was scheduled to depart Guam in March just a month away, (ha, just missed Korea.)

I finally received my long awaited license sometime in April or May of 1950 soon after getting transferred to Carswell AFB, Fort Worth, Texas. About a year or so later I upgraded to class "A" by taking the test from the FCC Engineer in Dallas, Texas.

My original call was W70IJ which I used (with the proper notifications to the various FCC District Engineers), from Idaho to Texas, To Pennsylvania, to Alaska and finally modified the call in June 1956 at Anchorage, Alaska and became KL7CD and a G.

Jim Tvrdy, KL7CDG

Alaska QRP Club meets the Third Friday of every month – 7:00 PM (Some show for dinner at 6PM): Hams with QRP (low power under 5 watts) and Homebrewing interests meet for a social meeting monthly. Meet at Dennys (in the back room) on DeBarr near Bragaw. Contact is Jim Larsen, AL7FS, JimLarsen2002@alaska.net or 345-3190.

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Anchorage Amateur Radio Club Board Meeting

(Unapproved)
December 16, 2003

The AARC Board met Tuesday, December 16, 2003 at Hope Community Resources Administrative Building, 540 West International Airport Road. In attendance were President Jim Larsen, AL7FS, Vice President Randy Vallee, KL7Z, Secretary Philip Mannie, KL0QW and Treasurer Steve Jensen, KL0VZ. Also in attendance were Directors Lil Marvin, NL7DL, Judi Ramage, WL7DX, Jim Tvrdy, KL7CDG, Jim Wiley, KL7CC, George Wilkinson, KL1JJ, Mike O'Keefe, KL7MD and Pat Wilke, WL7JA. Portable Equipment Coordinator Heather Hasper, KL7SP and T.J. Sheffield, KL7TS were also present.

A quorum being present, the meeting was called to order by President Jim Larsen at 7:00 PM. Minutes from the November 18, 2003 Board meeting were approved as amended.

Visitors' Forum
T.J. Sheffield thanked the Club for support of the recently completed radio school and reported that three students passed the exam on their first try.

Reports

VHF
Doug Dickenson, KL7IKX, submitted a written report. Lil Marvin requested that operators using the KL7ION repeater pause between transmissions to allow others to break in.

Treasurer's Report
Treasurer Steve Jensen presented a written report and presented Board members with copies of A Legal Handbook for Nonprofit Corporation Volunteers, by James D. DeWitt. Board members not present at this meeting may get their copies from Steve. Steve went on to mention December expenditures on CCV and tower trailer maintenance and to point out that the Club had $121,000 more in income than had been budgeted.

Jim Larsen presented information about opening a Pay-Pal account for payment of membership dues. The matter was tabled for additional study.

A motion to acquire three fuel credit cards with personal identification numbers for authorized CCV and tower trailer operators passed along with a motion to acquire towing insurance for the CCV.

Gaming
There was no formal report. Jim Larsen reported that the gaming permit has been filed.

ARES
Philip Mannie reported briefly on the upcoming December 20 ARES meeting and mentioned the Eagle River Classic Sled Dog Race scheduled for January 17 and 18.

VEC
Jim Wiley reported that the VEC program is well and functioning as usual.

Membership
There was no formal Membership Committee report.

CCV
George Wilkinson reported on repair and maintenance quotes for the CCV. A motion to recommend to the Club membership funding the $9635 repairs and maintenance passed with Lil Marvin opposed.

Club Christmas Party
Jim Larsen reported on the Club Christmas party.

Old Business

kl7aa.org Web Server
Due to issues of location and administration Jim Larsen plans to ask the Board in January to approve expenditures and monthly fees for moving the web site to a hosting service.

501C3 and Bylaws
A special meeting will be held at 7 PM, Tuesday January 13, 2004 to discuss and vote on new Club Bylaws and Rules of Procedure. Jim Larsen will send the material out for study before the meeting.

ARES Kits
Jim Wiley reports that he is not yet prepared to complete this project. He will work with Heather Hasper to schedule volunteers over the several days that will be needed.

ASDF Grant
Jim Larsen, Chair of the Grant Committee reports that the grant application is still not complete and can not be referred to the Board at this time.

Susitna Repeater
Jim Wiley reports that the hardware is ready to be placed in position and that work will soon commence upon the Grubstake system. Jim Tvrdy suggested that repeater building training classes be offered while the completed repeater is available.

Equipment Disposal
Tabled until the January Board meeting.

Mission Statement
Mike O'Keefe will inquire into the availability of a brainstorming session facilitator and suggests research into other clubs' mission statements.

Long Term Spending Plan
Judi Ramage suggested that one, five and ten year spending plans would be appropriate.

CCV Garage Lease
Steve Jensen reported that he has been offered a one-year lease on the facility. A motion to agree to the one-year lease passed.

Club House
Mike O'Keefe was appointed Chair of the Clubhouse Committee. The Committee's task is to study the possibility of leasing clubhouse space as a proof of concept. Jim Wiley was also appointed to the Committee and other volunteers will be sought.

Remote Testing Software
Jim Wiley presented copies of the software specifications sample contract and email conversations on contract specifics. The contract specifies a minimum of $4,000 and a maximum of $11,000 to deliver a finished product, including repair, some maintenance and moving the application to a different server. A motion to recommend the contract to the membership at the January meeting passed with Jim Wiley abstaining and Randy Vallee opposed.

New Business
Expectations for Club Officers and Board Members
Jim Larsen detailed expectations for Board members including attendance at Board and Club meetings and participation in Club events and projects.

Volunteer Coordinator
Jim Larsen suggested that a new committee chair be appointed to secure volunteers and schedule them for Club activities.

ALMR Radios for CCV
Jim Larsen reported that ALMR radios for the CCV are to be ordered.

Grants
Jim Larsen reported that the Anchorage Police Auxiliary has acquired radios and is preparing to install them, and that the Epilepsy organization had made its acquisitions.

Membership
Jim Larsen asked how we could address the decline in Club membership.

Committees
Jim Larsen asked which standing committees have been appointed and who chairs each committee. He proposed to review the standing committees and charge them in writing.

New Project Ideas
Jim Larsen requested ideas for 2004 projects.

Audit
Jim Larsen suggested that an independent audit be conducted of the corporation's financial records. Philip Mannie suggested that this be done just prior to newly elected officers being seated in December. Accountant Lisa Rogers was suggested to audit the Treasurer's records and a committee of three members to audit the Secretary's records. Ideas on how best to conduct such an audit should be directed to Jim Tvrdy.

Maintenance Accounts
Jim Larsen suggested getting legal advice on setting up other accounts similar to the CCV maintenance and operation fund for other Club assets.

Laser Printer
The consensus of the Board was that the Club acquire an inexpensive laser printer.

State Fair
George Wilkinson reported that the base price for a 10 x 20 foot tent for the State Fair would be $6391. A motion to recommend $6500 for a tent was approved with Lil Marvin opposed.

AARC Patches
Heather Hasper reported that 200 AARC patches would cost $520. A motion to acquire 200 patches was approved. The

matter of other AARC logo trinkets for distribution to the public was tabled for later consideration.

Girl Scout Code Kits
Jim Wiley will investigate potential fire hazards associated with the code kits reported in an email.

There being no further business the meeting was adjourned at 9:55 PM.

Respectfully submitted by Philip Mannie, Secretary.

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ARES Training is back!!

Jim Larsen, AL7FS

For a period of time, ARES training had slipped a bit and attendance had fallen off. Now, Phil Mannie, SEC, and his staff are revitalizing the ARES organization.

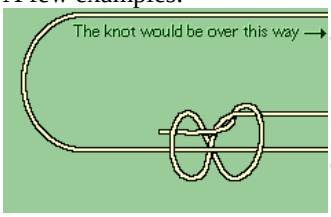
This past Saturday (ARES meets on the third Saturday of each month at 9:30AM at APU) ARES staff conducted a very interesting and useful training program on the use of knots in amateur radio. Apparently there had been a near accident at the last training exercise caused largely by the use of a knot that almost was not.

There are right ways to tie knots and there are ways that look almost the same but do not hold in a critical situation. One of the goals was to fully understand what is correct and suggested for use in raising masts and even sections of towers.

TJ Sheffield KL7TS, ARES Instructor

Some of the knots we learned were the sheet-bend, the clove hitch, a proper square knot, the figure eight and figure eight follow through, bowline (don't forget to use a stopper knot on the loose end) and at least one knot I cannot remember.

A few examples:



Stopper knot

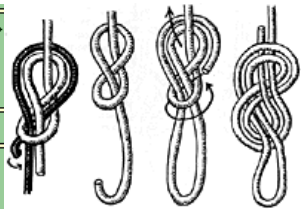


figure eight follow though

After the inside training we all went out to the parking lot to attempt to raise a 40 foot aluminum mast with two sets of three rope guys.

I am convinced we all learned important lessons at this ARES training. Proper knots DO make a big difference.

With the strong emphasis on training at all ARES meetings you are all encouraged to attend and learn. AL7FS

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THE FFD ANTENNA: A Field-Friendly Doublet, with Notes on Related Designs

By Charlie Lofgren, W6JJZ.
The ARS Sojourner

Operation in the field is year-around fun, and with summer here, it's truly time to get outdoors. But what about the antenna? If the rest of the gear is lightweight, why not the antenna system? There's the rub.

The antenna itself may be nothing more than a flyweight wire, but the feedline most likely won't be. A halfwave wire fed against ground is one option, but not optimal.

The Field-Friendly Doublet or "FFD" is the solution. It is a lightweight, quickly-assembled version of a multiband center-fed wire antenna with "tunedfeeders," but it requires no prefabricated feedline. To present the FFD and review related applications, this article includes:

-- A primer on multiband doublet design

-- The FFD and its construction

-- Tuner options

-- Field-friendly approaches to the W3EDP antenna and fullwave loops

-- An appendix on halfwave wires fed against ground

-- References for additional information

The eager builder may be tempted to skip the first section, "A Doublet Primer," and go directly to "How Simple Can It Get? The FFD," but it's useful first to know the basics.

A DOUBLET PRIMER

The generic "doublet" is simply a center-fed horizontal wire antenna. When the doublet is fed with low-loss balanced feedline fed through an antenna "tuner" (more accurately, an "antenna system tuning unit" or ASTU), it becomes a highly versatile and efficient multiband antenna system that is resonated with the tuner. (See Fig 1.) The G5RV and the so-called "center-fed zepp" are common examples.

Contrary to some impressions, the length of the center-fed wire (or "flattop") is not critical. In this regard, there is nothing magic about the 102 foot flattop of the G5RV. (Another myth is that the G5RV version of the doublet doesn't need an antenna tuner). True, a doublet's radiation pattern will vary depending on the length of the flattop, but efficiency is acceptable with any convenient length over a quarter or preferably a third of a wavelength on the lowest band of interest. The best definition of "convenient" in this regard is "the distance between the available supports." (As usual, of course, the higher up, the better.)

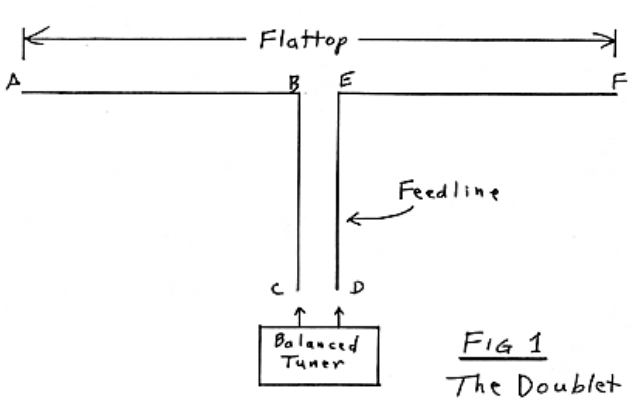


FIG 1
The Doublet

Now for the feedline. In home-station installations, probably the most common feedline nowadays for a multiband doublet is 450 ohm "window" line, although 300 ohm twinlead is used, too. In reality, however, the impedance of the line makes little difference with a multiband doublet, at least within the impedance range of typically constructed balanced feedlines (roughly 300-800 ohms). The feedline's impedance and length affect the impedance seen by the antenna tuner looking into the input end of the line, but they do not affect the radiation from the antenna. (G4FGQ's program DIPOLE1.ex, referenced below in the final section, allows easy examination of the effect of changing the various parameters--flattop and feeder lengths, height, spacing, etc.)

More important than the feedline's impedance is its loss figure, because the standing-wave ratio may be high. With low-loss line, even a high SWR results in insignificant losses. (The last statement is not true when commercially-available twinlead or window line is operated with a really high standing-wave ratio, on the order of 1000:1 or higher, but this condition does not occur with the FFD, nor, for that matter, does the FFD use commercial feedline.)

The ideal feedline for a multiband doublet is true open-wire line, which is lower loss than either window line or twinlead. Sometimes called "ladder line," it consists of two separate parallel wires spaced anywhere from 1 or 2 inches up to 6 or 8 inches, with line spacers as necessary. (The spacers give a ladder-like appearance, hence the name.) In order to minimize radiation from the feedline, the spacing should be no more than 0.01 wavelength at the highest frequency of operation, or about 4 inches on 10 meters. But, to quote my 1939 Radio Amateur's Handbook, "Even at 28 Mc. a separation of 6 inches is fairly satisfactory."

How long should the feedline be? Long enough to reach from the center of the flattop to the operating position.

There's the basic design. For additional background information and theory, see the references at the end of the article.

HOW SIMPLE CAN IT GET? THE FFD

Now let's put all of this together to produce the FFD. There are two requirements for a doublet. One is a flattop, preferably over a third of a wavelength long. The second is a feedline that will reach from the center of the flattop to the rig.

But wait! Flattop and feedline together can be made from just two wires or "legs." One leg comprises one side of the flattop plus the related side of the feedline, or A-B plus B-C in Fig 1. The other leg comprises the other half of the system, or D-E plus E-F. The total length of each leg accordingly equals one-half of the flattop's length plus the feedline's length.

Configuring the FFD requires only the positioning of the two legs. The feeder portions of each of the two legs run from the antenna tuner to a center insulator, with the wires roughly parallel to each other and about six inches apart. On the lower HF bands, even wider spacing between the feeder portions of each wire won't degrade performance. From the center insulator, the remainder of each leg runs outward in opposite directions, producing the flattop portion.

Presto! You have a multiband doublet without a bulky feedline. The wire provides a feedline.

Assume for example that 40 meters is the lowest band of interest. If the space between the available supports is about 60 feet, the flattop might be 50 feet long, or 25 feet on each side of center. (This would allow for 5 feet of support cord at each end, to keep the flattop clear of the trees or whatever.) Suppose the center is about 30 feet up. That means (let's estimate) 30 feet of feedline to reach the well-positioned operating position. For the complete doublet "system" we'll need two 55 foot lengths of wire (25 + 30 = 55).

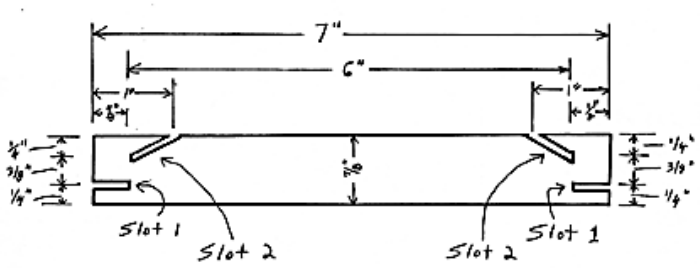
If space permits, the FFD may be configured to give significant gain in desired directions. Among the options are two halfwaves in phase (a halfwave of wire on each side of the flattop) and an Extended Double Zepp (5/8 wave on each side). For these configurations, the lengths need not be cut to the precise inch or even foot. To realize their full benefit, however, the flattop portion should be at least a half of a wavelength above ground, which is easily obtainable on the upper HF bands with field installations using light wire. On the lower bands, the breaking point of light wire creates difficulties with such large arrays, unless additional skyhooks are used. But nothing prevents trying. And keep in mind (as an example) that a halfwave flattop on 40 meters becomes two halfwaves in phase on 20 meters.

THE CONSTRUCTION DETAILS: HOME AND FIELD PHASES

For the two legs, insulated stranded wire in the vicinity of #22 to #26 gauge is satisfactory and rolls up easily. The insulation does not affect the operation.

While the necessary insulators and spacers can be fabricated in the field with a little ingenuity, the better approach is to make them ahead of time and carry them. They take up hardly any space and weigh almost nothing.

For the center insulator and feedline spacers, strips of plastic may be slotted to allow quick attachment in the field. The design described below and in Fig 2 works for both the center insulator and the spacers.



Slots — width of hacksaw or jigsaw blade

FIG 2
Center Insulator/ Feedline Spacer

One spacer each six or eight feet along the feedline is adequate. End "insulators" for the flattop need consist of nothing more than string, light cord, or twine tied to knots in the ends of the wires. Or for a classy installation use short plastic strips for the end insulators. The insulator/spacer material should be lightweight and tough.

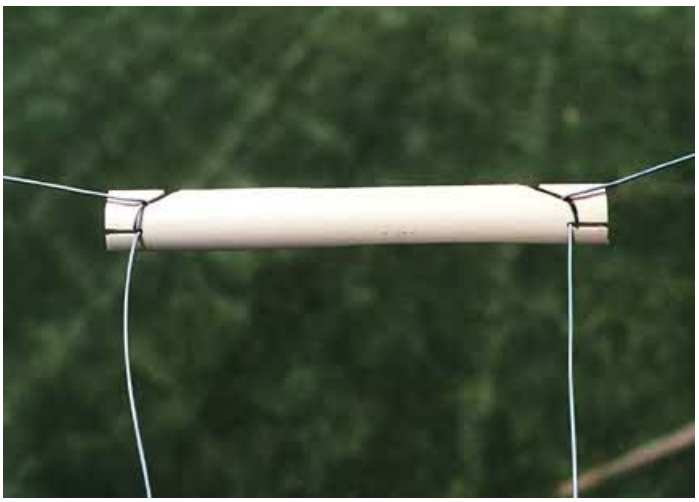
I've found that strips cut from low pressure "1 inch" PVC water pipe work well. (This pipe is about 1 and 5/16 inches in

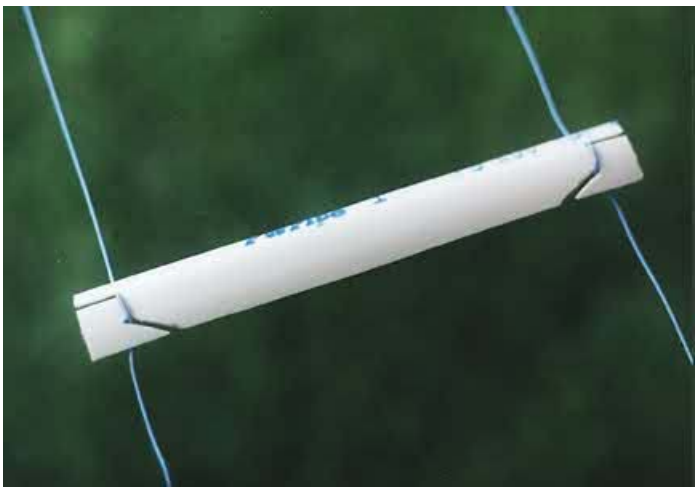
actual outside diameter, with 1/16 inch walls.) Here are detailed instructions:

(1) Begin by cutting four lengthwise strips from a 14 inch length of the PVC pipe, using a jigsaw or long hacksaw (and being careful of the fingers!). To do this, cut the section in half lengthwise, and then cut each resulting strip in half, again lengthwise. This gives four strips each 14 inches long and about 7/8 inch wide.

(2) Next cut the four strips in half, into 7 inch lengths. Then cut ONE of these in half, giving two shorter pieces. The result: seven strips measuring 7 by 7/8 inches each, and two measuring 3 1/2 by 7/8 inches each.

(3) Saw slots in the 7 inch pieces as indicated in the picture and Fig 2. (With the typical jigsaw or hacksaw blade, the slots will be about 1/16 inch wide.) This gives you a center insulator plus six spacers (the center insulator and spacers being interchangeable), enough for about 50 feet of feedline.





(4) Drill holes in the two 3 and 1/2 inch pieces as indicated in the picture and Fig 3. These are the end insulators, should you choose to use them.

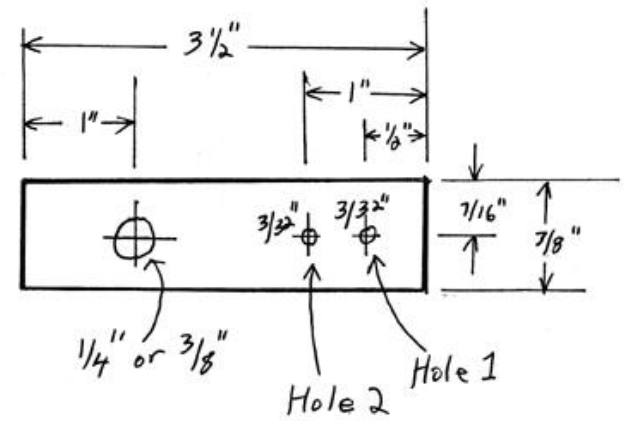
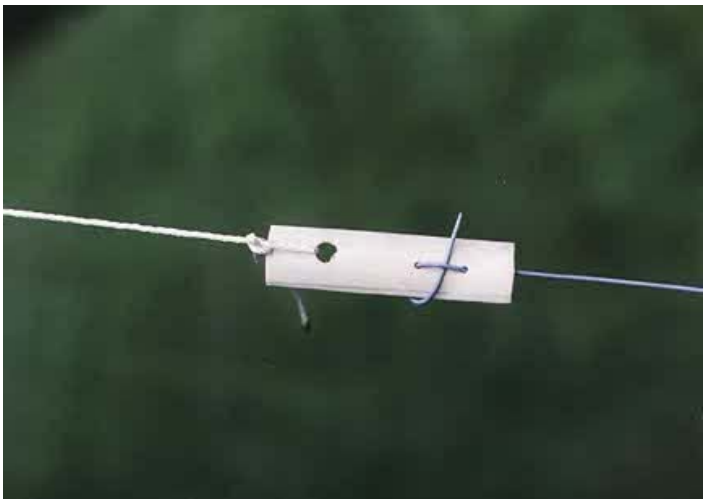


Fig 3

End Insulator



When you head to the field, take the insulators/spacers and as much wire as you think you'll need and then some. If setting up the station will be a leisurely affair, a single roll of wire is best. You can cut the two equal legs after you examine your site. (Remember? Each leg equals the length of the feedline plus half the length of flattop.)

Or you can cut the wire ahead of time. In this instance, marking equal segments along the two wires lets you know quickly -- when you're in the field -- where to put the center insulator to insure that it's at the center. Bands made with a felt-tip permanent marker do nicely.

Attaching each leg of wire to the center insulator and spacers is simple and quick. It is easier to do than describe. (Take a look at the pictures.) Begin by attaching one of the wires at its feedline-flattop junction to one end of the center insulator. To do so, start with the feedline side of the junction and slip it into the slot cut inward from the insulator end (slot 1 in Fig 2). Next, loop the flattop side of the junction through the slot

that's angled into the insulator (slot 2), then through the end-cut slot, and finally back again through the angled-in slot and outward as the flattop wire. You now have a one-and-a-half turn loop, about 3/8 inch in diameter, around the section of PVC between the two slots. The wire coming out of the end-cut slot (slot 1) runs to the tuner, and the wire coming out of the angled-in slot (slot 2) runs outward as half of the flattop. (If you reverse this, and try to run the wire coming from the end-cut slot as the flattop wire, it will just slip out.)

Next (need it be said?) attach the other leg in the same way to the opposite end of the insulator.

Then attach the spacers to the feedline wires. As indicated earlier, one spacer every six-to-eight feet along the wires is adequate. At each end of each spacer, simply run a feedline wire into one slot and out the other slot. No looping of the wires is necessary in order to keep the spacers in place.

To attach the end insulators, refer to Fig 3 and the picture. Starting from the concave (inner) side, thread the wire into hole #1 and out hole #2 (which puts it back out the concave side), leaving approximately a 2 inch pigtail coming out of hole #2. Then wrap the pigtail around to the other side of the insulator (the convex or outer side) and slip it under the short (1/2 inch) section of wire now running between the two holes. Once the wire is pulled tight, the insulator will hold in place. (Or just thread the wire into hole #1, out hole #2, and knot the end.) The large hole in the insulator is for the support cord.

Assembling and hoisting the FFD takes only a few minutes after you've put the support cords into available trees with slingshot, rock, or other favorite launch vehicle. (This crucial step may take longer, but that's part of the game.) Make the connections to the center insulator before raising the flattop. You may find it easiest to attach the line spacers as the antenna is hoisted, particularly if a second op or helper is around. For the FFD to operate properly, it is not necessary to keep the feedline wires exactly parallel. It is important, however, for the spacing (whatever it is) not to shift significantly if the antenna blows in the wind during operation, because this may affect tuner adjustment.

TUNER OPTIONS

The FFD requires a balanced-output tuner. When the multiband z-match that I've designed (see the reference section) is built with subminiature "plastic" variable capacitors, it fits into a small box, and even with miniature air variables it's not much larger. The design includes both high- and low-impedance output links. Given the range of impedances encountered at the input to the FFD's "feedline," this feature sometimes proves helpful.

The visual LED SWR indicator developed by Dan Tayloe, N7VE, makes a handy accessory to build into the tuner package. Because it incorporates a resistive (or "absorptive") bridge circuit, it is especially good for rigs that will not tolerate a high SWR. During tune-up, just be sure to switch the indicator in before applying power. (And remember to switch it out once the tuner is adjusted! The resistive bridge cuts power output to the tuner/antenna by 6 dB.)

Another suitable z-match is the Emtech ZM-2, which Roy Gregson, W6EMT, markets as a kit. It includes N7VE's indicator.

For single-band operation, or operation on two or three closely adjacent bands, I've developed a variation on the z-match. (It will handle 40 and 30 meters, for example, or 20, 17 and 15 meters.) Pete Hoover, W6ZH, has packaged this design into a minuscule unit, complete with the N7VE SWR indicator, covering 40 and 30 meters.

TWO MORE FOR THE FIELD: THE W3EDP AND THE FIELD-FRIENDLY LOOP

Two other worthwhile designs for the field are the W3EDP antenna and the fullwave loop. Information on these antennas appears in standard sources. What follows are simply brief descriptions along with suggestions for applying the "field friendly" technique to the two antennas.

AN OLD FAVORITE: THE W3EDP

In 1936, Yardley Beers, W3AWH, described an empirically-derived antenna "designed by the writer's friend, Mr. H. J. Siegel, W3EDP." It consisted of an 84 foot radiator and a 17 foot "counterpoise." The design has lasted through the years. I've explained elsewhere how it is related to an end-fed Zepp (a true Zepp, as once trailed from Zeppelin airships). With the indicated dimensions, the antenna works well on 40, 20, 15, and 10 meters. Like the FFD, the 'EDP requires a tuner.

If you're at a site calling for an end-fed antenna, the W3EDP may be the one for you. Rather than run the short wire off in an odd direction, slightly better performance results from configuring the two wires to produce an end-fed Zepp. Use three of the quick-connect spacers described above. Terminate the short wire with a top spacer at the 17 foot point along the long wire (with a couple of other spacers along the way), and run a support cord outward from the same (short-wire) end of the top spacer. This gives a 17 foot feedline with 6 inch spacing. From the other end of the top spacer, run the remaining 67 feet of the long wire outward as the flattop portion of the Zepp.

If you don't configure the W3EDP as a Zepp, it is still best not to lay the short wire on the ground in the usual counterpoise fashion. This wire is part of the radiating system.

If you're not sure whether you'll need an end-fed or a center-fed design, carry two 84 foot lengths of wire and one 17 foot length. Use the 17 foot length and one 84 foot length to whip up a W3EDP/End-Fed Zepp, or use the two 84 foot lengths for an FFD.

FIELD-FRIENDLY LOOPS

Don't forget full wave loops. A horizontal loop provides good close-in communication on the lower HF bands, and does a

decent job, too, on the higher ones. Conventional wisdom has it that such a loop works on its fundamental frequency (where it's a full wavelength in circumference) and on harmonic frequencies. In reality, when a horizontal loop is fed with tuned feeders rather than coax, its exact length is not critical, and it works also on non-harmonically-related bands (although radiation patterns may vary). For example, a 40 meter loop (about 140 feet in circumference) performs on 30 meters and the HF bands further up in frequency, and a 30 meter loop (about 100 feet) will perform on 40 meters and the higher bands. Irregular shapes compared to a neat square or circle are acceptable. One approach is to snake the wire though tree branches at a manageable height (which need not be uniform around the circumference).

Or, should you need predictable gain and directivity, consider a verticalplane fullwave loop with tuned feeders. Examples include the bottom- or side-fed delta loop and the quad loop. Here it may pay to be more careful with the dimensions if you want to insure the directional characteristics.

Whatever loop you choose, the field-friendly construction requirements are simply a single length of wire, a center insulator, and feedline spacers. In this instance, the length of wire should equal the length of the loop itself plus twice the length of the feedline. Attach a center insulator where the two endpoints of the loop meet at the loop-feedline junction, leaving equal lengths of wire on each side to serve as the feedline. (Attach the center insulator using the quick-connect method described above for the FFD.) Run the feedline segments to the operating position, keeping the wires roughly parallel with several quick-connect spacers. Again, a tuner is necessary.

APPENDIX: HALFWAVE WIRES FED AGAINST GROUND

Still another antenna for the field is a halfwave wire worked "against ground." One end of the wire radiator is fed from the antenna tuner, with the remainder of the radiator running to available supports. The ground side of the tuner is attached to a ground stake or short counterpoise (which provides adequate capacitive coupling to ground). This arrangement has the virtue of simplicity.

But an often-unrecognized problem may exist with this antenna, resulting from its ground system.

The antenna supposedly has low ground losses. This conclusion rests on the (correct) observation that the impedance at the antenna's feedpoint at the near end of the halfwave wire is very high, on the order of several thousand ohms. Current flow into the antenna wire at its feedpoint is thus very low and so is current flow into the ground system. The supposed result is low I^2R losses in the ground connection.

By conventional antenna theory dating to the 1930s (supported by some experimental data), this is questionable. With a halfwave radiator fed against ground, current is low in the immediate vicinity of the ground connection, but farther out within the ground the sum of the ground currents rises and higher I^2R losses occur. (A close analogy is the rise in current along the antenna wire itself, from very little at the halfwave feedpoint to a peak a quarterwave away, at the wire's center.) Depending on soil characteristics, the ground portion of the circuit comprising the entire antenna system may be quite lossy in the absence of an extensive radial system.

NEC-4 modeling complicates the picture, however. It does not indicate the losses expected on the basis of conventional theory when a halfwave radiator is fed against ground without an extensive radial system. So from the standpoint of efficiency, this antenna may be an acceptable choice. The jury is still out.

Whichever conclusion is correct regarding its efficiency, a halfwave fed against ground lacks the versatility of the FFD. As we've seen, the FFD requires no particular dimensions. And if supports are available, it may raised higher along its entire length than an end-fed halfwave, part of which is necessarily low. The FFD may also be configured to give significant directivity and gain.

None of this is to argue that the end-fed halfwave does not "work," because people do use it successfully, and it requires one of the simplest of tuners (such as the "Rainbow Tuner"). The real point instead is that in QRP operation, antenna performance needs constant attention.

SOURCES AND ADDITIONAL REFERENCES FOR THE CURIOUS READER

Basics and general:

For multiband, center-fed antennas with tuned feeders, see The ARRL Antenna Handbook (ARRL, 18th ed, 1997), pp 7-2 to 7-3 (in other editions, look up the section "Center-Fed Antennas" in the chapter on "Multiband Antennas"); Lew McCoy, W1ICP, Lew McCoy on Antennas (CQ Communications, 1994), pp 57-60 (Lew calls his version of the multiband doublet "the McCoy dipole," a.k.a. "the real McCoy"); and John D. Heys, G3DBQ, Practical Wire Antennas (RSGB, 1989; available through the ARRL), pp 15-24 (ch 2, on "Centre-fed antennas using tuned feedlines"). For detailed exploration of various doublet configurations (flattop length and height, feeder spacing, etc.), try the program DIPOLE1.exe by Reg Edwards, G4FGQ, downloadable from Reg's Webpage: http://www.btinternet.com/~g4fgq.regp

L.B. Cebik, W4RNL, has written numerous pieces on various aspects of centerfed antennas along with other designs and related topics, which may be found on his Webpage: http://www.cebik.com/

The z-match:

My improved z-match design may be found in Lofgren, "The Z-Match Coupler: An Update," QRP Quarterly, July 1995, pp 10-11; in Lofgren, "An Improved SingleCoil Z-Match," The

ARRL Antenna Compendium, vol 5 (ARRL, 1996), pp 194-196; and on K0JD's Webpage: http://www.seboldt.net/k0jd/

The Antenna Compendium article also includes my design for a "single-band" zmatch that actually covers two or three closely adjacent bands. (The core and winding data in the article give 40-30 meter coverage; adaptation to other ranges and yet smaller cores is easy.) Pete Hoover, W6ZH, has done a tiny version of this design, covering 40 and 30 meters, which will appear in a forthcoming issue of QRP Quarterly.

The LED SWR indicator designed by Dan Tayloe, N7VE, with modifications by Jim Hossack, W7LS, and me, may be found on KI7MN's Webpage: http://www.extremezone.com/~nk7m/n7veswr.htm125

Dan's original design (without the mods) appeared as the "ScQRPion Visual SWR Indicator (SVSI)," QRPp, Spring 1997, pp 22-24.

Roy Gregson, W6EMT, offers his ZM-2 in kit form. Inquire by e-mail to roygregson@aol.com, or see the EMTECH Webpage: http://emtech.steadynet.com/

Miscellaneous:

For the original W3EDP antenna, see Yardley Beers, W3AWH, "An Unorthodox Antenna," QST, March 1936, pp 32-33. A modern description is in Heys, Practical Wire Antennas (cited above), pp 33-34. A posting containing my detailed analysis of the 'EDP (where I show its relationship to the end-fed Zepp) may be found in the archives of QRP-L for March 7, 1998. I have the same analysis available via e-mail.

Horizontal and vertical fullwave loops are covered in The ARRL Antenna Book (pp 5-16 in the 18th edition). See also W4RNL's Webpage, cited above, and the chapter on "Large Loops" in John Devoldere, ON4UN, Antennas and Techniques for Low-Band DXing (ARRL, 2nd ed, 1994). Although many of the loop designs show coax feed, in most instances tuned feeders also work.

For fuller treatments of the ground losses associated with a halfwave radiator fed against ground without an extensive radial system, see Devoldere, Low-Band DXing (cited above), p 9-30; Paul H. Lee, N6PL, Radio Amateur Vertical Antenna Handbook (CQ Publishing, Inc., 2nd ed, 1984), pp 81-84; the classic studies by George H. Brown done in the 1930s that Lee cites; and also H. E. Gihring and G. H. Brown, "General Considerations of Tower Antennas for Broadcast Use," Proceedings of the Institute of Radio Engineers, vol 23 (April 1935), especially pp 329-338. Lee states that without a good ground system, feeding a halfwave against ground may result in power losses of 40 to 80 percent, or about 2 to 7 dB. NEC-4 modeling does not show these losses, perhaps indicating that a radial system makes little difference with an endfed halfwave radiator. For the "Rainbow Tuner" for end-fed halfwaves on 40 and 30 meters, which includes a built-in SWR indicator and is kitted by the New Jersey QRP Club, see the club's Webpage: http://www.njqrp.org

Acknowledgements:

I'm indebted to Richard Fisher, nu4SN, for his photography; to John Dundas, W6SU, Cam Hartford, N6GA, Pete Hoover, W6ZH, and Steve Miller, W6FEB, for important suggestions; and to L. B. Cebik, W4RNL, for full and timely answers to several questions and especially for his NEC-4 modeling and for sharpening my understanding of voltage-fed antennas.

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Charlie Lofgren, W6JJZ, a contributing technical editor to The ARS Sojourner, lives in Claremont, CA. He can be reached by e-mail at: clofgren@mckenna.edu

With permission, reprinted from the June 1998 edition of The ARS Sojourner, the monthly on-line magazine of the Adventure Radio Society: www.ARSqrp.com . My thanks to the **Executive Editor:** Richard Fisher, KI6SN, for his support.

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AARC January Program

The presentation at AARC in January will have a historical theme: the early days of the CAA & FAA radio systems in the Territory of Alaska. The speaker will be John Bassler, a presently inactive ham who was involved with all of those systems from days gone by.

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FEMA to FCC: BPL will "Severely Impair" Mission-Essential HF Operations

From AARL Website

NEWINGTON, CT, Dec 8, 2003--Expressing "grave concerns" about likely interference from unlicensed Broadband over Power Line (BPL) systems, the Federal Emergency Management Agency (FEMA) has told the FCC that BPL could "severely impair FEMA's mission-essential HF radio operations in areas serviced by BPL technology." FEMA filed comments December 4 in response to last April's FCC BPL Notice of Inquiry, ET Docket 03-104. FEMA expressed primary concern over BPL's potential impact on the FEMA National Radio System (FNARS), which operates on HF and serves as the agency's primary command and control backup medium as part of the Federal Response Plan.

"FEMA has concluded that introduction of unwanted interference from the implementation of BPL technology into the high frequency radio spectrum will result in significant detriment to the operation of FEMA radio systems such as FNARS," FEMA's comments assert. "FNARS radio operators normally conduct communications with signals that are barely above the ambient noise levels." FEMA further noted that FNARS HF stations typically are in residential areas of the sort that BPL--a form of power line carrier (PLC) technology--might serve.

BPL also could render such "essential communications services" as the Radio Amateur Civil Emergency Service

(RACES), the Military Affiliate Radio System (MARS) and the Civil Air Patrol (CAP) useless, FEMA said. FEMA and ARRL last year signed a Memorandum of Understanding that focuses on how Amateur Radio personnel may coordinate with the agency to support emergency communications functions.

Calling the HF spectrum "an invaluable and irreplaceable public safety resource," FEMA said there's no current alternative to HF in terms of meeting national security and emergency preparedness requirements at the national, state and local levels. The agency recommended beefing up the FCC's Part 15 rules to ensure no increase in interference levels to existing FCC or NTIA-licensed communication systems, "because any noise increase inevitably would diminish the ability to maintain essential communications," FEMA said, and would "directly impair the safety of life and property."

The BPL interference situation is reciprocal, FEMA noted, citing "Interference to PLC systems from Amateur Radio Operation". That paper points out that Amateur Radio transmitters likely would interfere with BPL systems. BPL users likewise would experience service interruptions when its transmitters "overpower the signal levels expected by BPL modems," FEMA predicted.

Broadband over Power Line (BPL) systems would use low and medium-voltage power lines like these to deliver broadband Internet service to homes and businesses.

FCC adoption of proposals to encourage widespread development and deployment of BPL also could result in consumer confusion regarding who would resolve interference issues and how. FEMA said it believes licensed radio services "will be perceived by consumers as responsible for the interference, since most consumers do not understand that their unlicensed Part 15 devices 'must accept any interference received, including interference that may cause undesired operation.'"

"The purported benefits of BPL in terms of expanded services in certain communications sectors do not appear to outweigh the benefit to the overall public of HF radio capability as presently used by government, broadcasting and public safety users," FEMA concluded.

FEMA Chief Information Officer Barry C. West, who filed the comments on the agency's behalf, characterized the issues it raises as being "of great importance to the national public safety." Because FEMA now is part of the Department of Homeland Security, its perspectives on BPL could carry substantial weight at the FCC, which may issue a Notice of Proposed Rule Making as early as February.

The ARRL announced last week that it plans to complete an independent BPL engineering study within a couple of months. The study will explore how BPL might affect HF and low-VHF amateur operation as well as how Amateur Radio operation could affect BPL systems.

Additional information about BPL and Amateur Radio is on the ARRL Web site. http://www.arrl.org/tis/info/HTML/plc/
To support the League's efforts in this area, visit the ARRL's secure BPL Web site.
https://www.arrl.org/forms/development/donations/bpl/

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2003 November Sweepstakes Winter Training Exercise

TJ Sheffield <kl7ts@hotmail.com>

This is the second year the Anchorage Amateur Radio Club (KL7AA), the South Central Amateur Radio Club (KL7G) and Alaska Amateur Radio Emergency Services (ARES) District 7 have participated in the ARRL November Sweepstakes phone contest as a winter communications training exercise.

We operate “Field Day” style using portable towers, antennas and generator power. The idea is to simulate emergency conditions and test our ability to operate during the Alaska winter. On Saturday morning when we set up our portable operation when it was -5 degrees F, which is -20 degrees Canadian!

Fortunately our Radio Clubs and Alaska ARES have worked very hard to build up our emergency communications capabilities and we have at our disposal a converted RV motorhome with two tower-and-power antenna trailers. Each trailer sports a tri-bander on a 40 ft. crank-up mast and has a 12 kw diesel generator on-board, providing 120 and 240 VAC power so we can put out a 1,500 watt signal on 80, 40, 20, 15 and 10 meters.

We use temporary ¼ wave “Marconi” verticals on 80 and 40 meters. The vertical for 80 meters is 40 ft. of aluminum tower with a 21 ft. mast as a “stinger” top section. A similar 30 ft. aluminum tower and stinger serves on 40 meters. Both verticals have an extensive but temporary ground radial system.

Conditions were very difficult from here, with the High Latitude College A index showing 75 on Friday and “improving” to 66 on Saturday and 63 on Sunday. We could hear many stations but typically Lower 48 stations have

their antennas pointed East or West during the contest and that makes it tough for us to squeak through.

Many thanks to the stations who made the extra effort needed to work us under difficult conditions, especially the QRP stations. And to that one high power station who could hear us but told us we were a Kilo Delta Seven and couldn't be bothered to dig us out of the mud – we're sure you got your sweep, but stop and think for a moment. Perhaps you were the very station we needed for ours!

Noise levels were high on 80 meters and we were only able to work Alaska stations on that band, and with the exception of a couple of W6's it was the same story on 40 meters. Our thanks to the local net managers who let us check in and then work the locals after the nets had closed.

We could occasionally run 'em on 20 meters, but since this was a training exercise we tried to place less experienced operators at the controls and they were often more comfortable with search and pounce techniques.

Although we didn't get a Clean Sweep or run up much of a score we were able to meet or exceed all of our training goals. We learned a lot about our current state of readiness and about the operation of our "emergency" communications system. Look for us again next year!

TJ Sheffield kl7ts

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Albert Einstein, when asked to describe radio

You see, wire telegraph is a kind of a very, very long cat. You pull his tail in New York and his head is meowing in Los Angeles. Do you understand this? And radio operates exactly the same way: you send signals here, they receive them there. The only difference is that there is no cat.

Albert Einstein, when asked to describe radio

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AARC/SCRC Christmas Dinner

We had a lively crowd at the Christmas Dinner this year. There were also folks from the valley including Dan O'barr, the new president of MARA. Conversations were abundant and the Chinese auction was fun. We missed many of you and hope you can make it in the future. AL7FS



Officers

President	Jim Larsen, AL7FS
Vice President	Randy Vallee, KL7Z
Secretary	Phil Mannie, KLØQW
Treasurer	Steve Jensen, KLØVZ
Trustee	Jim Feaster, KL7KB
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Past-President	-

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Jim Wiley, KL7CC
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Lil Marvin, NL7DL

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Pat Wilke, WL7JA
Jimmy Tvrdy, KL7CDG
Judi Ramage, WL7DX
Kyle Sandel, AL7J
George Wilkinson, KL1JJ
Mike O'Keefe, KL7MD

AARC web page & Email contact addresses:

Homepage:	**http://www.KL7AA.org/**
Email Reflector:	KL7AA@QTH.NET
Webmaster:	AL1G_ak@yahoo.com
President:	JimLarsen2002@alaska.net
Membership:	frederickson@iname.com
Newsletter:	JimLarsen2002@alaska.net

News Letter Submissions, Information or corrections:
Submissions must be received 2 weeks before meeting
Email: JimLarsen2002@alaska.net
Mail: 3445 Spinnaker Drive, Anchorage 99516

KL7G CODE PRACTICE SCHEDULE

Schedule: 7:00am, 10:00am, 4:00pm, 7:00pm, 10:00pm AK time, every day on 145.35 MHz @ 7 wpm

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Nets in Alaska:

The following nets are active in South-central Alaska:
Alaska Sniper's Net 3.920 MHz 6:00 PM daily
Alaska Bush Net 7.093 MHz 8:00 PM daily
Alaska Motley Net 3.933 MHz 9:00 PM daily
Alaska Pacific Net 14.292 MHz 8:00 AM M-F
ACWN (Alaska CW Net) 3534, 7042 Daily @ 0700 – 1000, and 1900 - 2400 Alaska Time - AL7N or KL5T monitoring.
Net Purpose: Formal NTS traffic via CW.
No Name Net 146.85/.25 repeater Sundays 8:00 PM
Grandson of SSB Net 144.20 USB Mondays 8:00 PM local
Big City Simplex Net 146.520, 446.0, & 52.525 FM
With Packet 145.01 Tuesdays 8:00 PM local
ARES net 147.27/87 103.5Hz - Thursdays at 8:00 PM local
PARKA net 147.30/.90 Thursdays at 7:00 PM local

Anchorage & Mat Valley Area Repeaters

KL7AA systems at Flattop Mt., 2,200 ft
146.94/34 MHz, 80 watts, autopatch, 141.3 Hz PL
224.94/223.34, 25 watts, no patch, no PL
444.70/449.70, 25 watts, autopatch, 141.3 PL
****147.27/87 MHz, no patch, Mount Susitna 103.5 Hz**
KL7CC, Anchorage Hillside, SCRC & QCWA
146.97/.37 MHz, 30 watts, autopatch, 103.5 Hz PL
KL7M Anchorage Hillside
147.21/.81 MHz, on IRLP, 97.4 Hz PL
KL7ION at Mt. Gordon Lyon, PARKA 3,940 ft
147.30/90, MHz - 80 watts, no patch, 141.3 Hz PL
KL7AIR Elmendorf AFB, EARS
146.67/.07, 107.2 Hz PL
KL7JFU, KGB road, MARA club
146.85/.25, autopatch, no PL
KL7DOB, Alcantra (Wasilla Armory)
146.64/.04, simplex patch, no PL
KL7DJE at Grubstake Peak, 4,500 ft. <down >
147.09/.69 MHz, 25 watts, no patch, 100 Hz PL
444.925/449.925, 10 watts, no patch, 141.3 Hz PL
KL3K, Girdwood
146.76/16 MHz, 25 watts, no patch, 97.4 Hz PL
South Central Area Simplex Frequencies
146.52 MHz Calling and Emergency frequency
147.57 / 447.57 (crossband linked) HF spotters & chat, 103.5 HZ PL
146.49 MHz Anchorage area simplex chat
146.43 MHz Mat Valley simplex chat
147.42MHz Peninsula simplex chat

Internet Links, the favorites from our readers:

QRP and Hombrew Links

http://www.qsl.net/al7fs
AARC http://www.KL7AA.org/
SCRC http://www.KL7G.org
EARS http://www.qsl.net/kl7air

MARA http://www.kl7jfu.com/
Moose Horn ARC http://www.alaksa.net/~kl7fg
ARES http://www.qsl.net/aresalaska
KL7J http://www.alaska.net/~buchholz
Fairbanks AARC: http://www.kl7kc.com/
Yukon Amateur Radio Association:
http://www.klondike.com/yara/index.html
HAARP Project:
Amateur Radio Reference Library
http://www.area-ham.org/library/libindex.html
Hamradio: http://www.hamrad.com/
Solar Terrestrial Activity http://209.130.27.95/solar/
ARRL http://www.arrl.org/
Propagation Report Recording 566-1819

Please let us know if there are other clubs pages or good starting points that should appear here. Report dead links or bad info to JimLarsen2002@alaska.net.

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NEWSLETTER ARTICLES; All articles from members and interested persons are very welcome. If you wish to submit any articles, jokes, cartoons, please have it typed or neatly handwritten. It can be submitted by mail, computer disk or E-mail to the newsletter editor at the address listed above. Submissions must be in the hands of the editor **no later than the 14 days prior** to the meeting or it may not be included. If you want a particular type of article, please submit them. If no submissions, I use what I am interested in, naturally.

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Regular HAM Gatherings:

Alaska QRP Club, Third Friday - 7:00 PM: Hams with QRP (low power under 5 watts) and Homebrewing interests meet for a social meeting monthly. Meet at Denny's on DeBarr & Bragaw in the back room. Hungry QRPers start showing up about 6PM. Info contact Jim Larsen, AL7FS, JimLarsen2002@alaska.net or 345-3190.

Tuesdays Lunch, 11:30 AM: Join the gang for lunch and an eyeball QSO at the Royal Fork, "South, on Old Seward Highway. Attendance varies from 8 to 24 each week.

Thursdays Brunch, 10:30 AM: Brunch at Lily's on Tudor Road just East of Tony Romas. A great bunch of folks attend this one.

Saturdays Breakfast, 7:30 AM: Here is a good way to get started on the weekend. Come and meet with some of the locals and have a great breakfast at Phillips Restaurant, at the corner of Arctic and International. Great Fun.

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THIS MONTH'S EVENTS

1st Friday each month - AARC general meeting - 7:00 PM in the Carr-Gottstein Building, on the APU Campus. Talk in will be on 147.30+ repeater.

1st Tuesday each month: VE License Exam 6:30 PM, at the Hope Cottage offices, 540 W International. Bring photo ID, copy of license (if any) and any certificates of completion.

1st Tuesday each month: EARS general meeting - 6:30PM in the club house/shack in the basement of Denali Hall (building 31-270) on Elmendorf AFB. Talk in on 147.67- repeater.

2nd Friday each month: SCRC general meeting at 7:00 PM at Denny's on Debarr & Bragaw. Talk in on 147.57 simplex.

2nd Saturday each month: VE License Exams at 2:00 PM. at Hope Cottage 540 W. International. Be sure to bring photo ID, copy of license (if any) and any certificates of completion.

2nd Saturday each month: PARKA Meeting at 11:00 AM. at Peggy's, across from Merrill Field.

3rd Tuesday each month: AARC Board meeting at 7:00 PM at Hope Cottage 540 W. International. All are invited and encouraged to attend.

3rd Friday each month: Alaska QRP Club. 7:00PM at Denny's on DeBarr in the back room. Info: Jim Larsen, 345-3190. Bring projects to share with the group. Some show up at 6:00PM to eat.

3rd Saturday each month: ARES General meeting 9:30AM to 12:00 PM. Call Phil Mannie (kl0qw@alaska.net) at 762-9590 for additional information. Also check for ARES Info at: http://www.qsl.net/aresalaska/

The last Friday each month: MARA meeting at 7PM Fire Station 61, located two blocks up Lucille Drive, from the Parks hwy. Talk-in help for the meeting can be acquired on either the 146.640 or 146.850 repeaters. If you can't get a Valley ham on one of the repeaters, try 146.43 simplex. Further details can be found by contacting Len Betts, KL7LB, lelbak@yahoo.com .

The last Saturday each month at 11:00 AM: Quarter Century Wireless Assoc - QCWA at the Royal Fork, South of Dimond on Old Seward Highway. You need not be a QCWA member to attend.

Who Do I Contact to Join AARC?

Fred Erickson KL7FE -
frederickson@iname.com

Phone number: 345-2181

Anchorage Amateur Radio Club
Membership Application/Renewal

Membership Chairman: Fred Erickson KL7FE
email: frederickson@iname.com
Phone number: 345-2181

Please, Check your mailing label for your membership expiration date

Mail-in Membership Application

___ New ___Renewal

Name: _____ **Callsign:** _____

Address 1: _____

Address 2: _____

City _____ **State:** _____

Zip Code: _____

Home Phone: _____

eMail address: _____

Dues for a calendar year are as follows: • Individual membership $20.00 • Individual and Spouse $25.00 • Student $10.00* • Life $250.00 *"Student" is defined as any individual who is enrolled full-time at any educational institution, using the criteria for full-time enrollment of that institution.

I am enclosing payment for:

Subscription/Renewal for_____ year(s).

Total USD Enclosed:_____

Please Mail your Payment and this Completed Application to:

Anchorage Amateur Radio Club
c/o Fred Erickson, Membership Chairman
12531 Alpine Dr
Anchorage, AK 99516-3121

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KL7TQ, Mark Kelliher