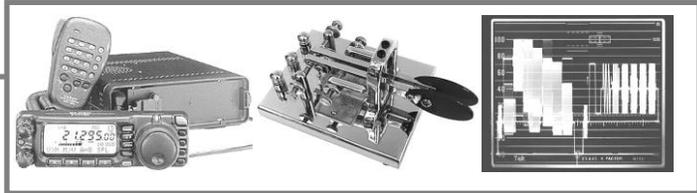


The Elmer Project Part I

Sponsored By The Oklahoma DX Association
Getting Started On HF – The World Awaits!

By Nelson Derks, AC5UP



This article begins a series sponsored by The Oklahoma DX Association that we've dubbed "The Elmer Project". With many Hams taking advantage of the FCC license restructure of April 2000 there are plenty of newcomers on the HF bands. We'd like to welcome them with our best advice for getting started on the right foot. Even if you've been at this for a while, we hope you'll keep reading as you might pick up a tip or two. In this installment, we'll start from the ground up and consider options for building your HF station and interests.

Isn't It Funny How Things Work

In April of 1977 I moved from Eugene, OR to Dallas, TX in response to a job offer. This has nothing to do with Amateur Radio, but I might have become AC7UP and you wouldn't be reading this if things had worked out differently. It would take a fleet of trucks to reverse that move today thanks to the endless joys of HamFests and Swapmeets. As a long-term techno-junkie and packrat, my Ham Radio station started well before I was licensed. The big move to Dallas led to a shorter drive to Fitzhugh and Central on a Saturday morning. At that time, the First Saturday Sidewalk Sale was on a modest vacant lot near the Ham Store that's now gone. For a pittance, I hauled off gear that had to be a "Bargain" when figured by the pound. It never crossed my mind to wonder why the seller was smiling as I hauled their goods away...

Hams are considered skilled hagglers with unbridled optimism. We want to believe that someday we'll find a gee-whiz rig that works anybody we want and costs less than \$100. I've pounded a lot of pavement over the years in search of one, and can assure you that's called a cell phone, not a Ham transceiver.

The first step we all take is to decide what level of financial commitment we're going to make to our station. Yes, you can buy a little now, a little later, and build as your interests become better defined. But, the

HF transceiver choice often takes one of two paths: You take the route of working your way up through a series of older rigs, or buy a new rig you'll hang on to. In the long run, it's often less expensive to buy the new rig and be done with it. For some of us that isn't an option, just yet, but the recent crop of all-band, all-mode rigs like the ICOM IC-7x6 series and Kenwood TS-2000 tell us where the future is headed.

Advantages Of Older Rigs

Cost, Appearance and History. The cost angle is obvious. I personally think some of the older rigs like the FT-101ZD and FT-102, any Kenwood with a fluorescent display, or Drake TR-4's make fine shack ornaments. Others may come to mind for you. As for history, a little research can sort out the winners from the losers. The ARRL has product reviews on the web and CD-ROM, plus there are user reviews at eHam.net. Some are quite interesting. Not every rig was a dream come true when it first came out of the box, or has enjoyed a pampered life since. Do your homework.

Advantages Of Newer Rigs

Performance, Reliability, Stability, No-Tune Finals, Accuracy and Features. I love the convenience of a no-tune rig. Ditto for all-band receivers. I think digital displays are wonderful. There's nothing finer than dialing up the frequency for an HF Net and being on the spot. Exactly. Then staying there with no drift. It's the best way to go if you plan to work the digital modes, and let's not forget the value of the warranty.

And The Art Of The Deal

You'll note the older rigs appeal more on subjective and financial terms while the new rigs favor performance and usability. It's been my experience that the 20/80 rule applies to Amateur Radio. I use 20% of my toys 80% of the time. I believe the real bargain is the rig you enjoy using. Not the HamFest gem that ends up in the garage, and I speak from experience on this. One

way to break the habit of buying garage fodder is to grab a boat anchor from the garage and take it for a walk around the block. Remind you of a good HamFest? Yeah, baby, you still got the moves! As with anything else, the goal is to learn the ropes with the fewest mistakes. Most HamFest sellers are decent people offering stuff they don't use anymore and will give you a straight answer about the condition. It's a safe assumption the new toy will need a little work, but think twice when a seller tells you they're selling for a friend (or just got it) and know nothing about it beyond the asking price. Sometimes that's true, sometimes not. For many of us, eBay has replaced the HamFest as a source of used gear. The variety is amazing, but the same cautions apply. Many on-line sellers have limited experience with their goods and are just moving pawnshop or garage sale finds to the highest bidder. There are bargains to be had, but often at higher than HamFest (and sometimes retail!) prices. Remember there will always be a bigger & better deal and assume nothing. It pays to know your stuff. I recently bought an item I thought was self-contained and complete. It needed an outboard controller. My mistake. The seller shipped exactly what was offered and that was, in fact, the deal.

Big Boy Toys and Other Goodies

This leads us to the concept of repair tools. Plenty of Hams are appliance operators with one screwdriver and a credit card for everything else. Then there are those who prefer a shack loaded with test gear on a bench that just won't quit. There's plenty of room in the hobby for both. If you don't question the logic of owning thousands of dollars in test gear to work on a \$25.00 HamFest junker, I'm with you. I never met a 'scope I didn't like. But, there are times when I wonder if the "one screwdriver and a credit card" guys are smarter than I am. Why? If you're a Tech Whiz, open up your itty-bitty little dual band HT for a

demonstration. Do you *really* think you're going to fix that bad-boy if it goes south? In my shack, the answer is "Not Likely".

If you like to tinker and home brew, you'll need a test bench. Otherwise, you can get along nicely with a modest set of hand tools and a good digital multimeter for your station maintenance. Whatever you do, always buy tools worth keeping. They are an investment. Otherwise, I don't want to hear any complaints about the high cost of sending a sick rig to the radio doctor. You're paying hundreds for repair skills and test equipment that can easily run into the tens of thousands. It's a bargain.

Transceiver Nutrition

Once you've decided on the rig, spend a little extra on a good quality power supply. I came across a deal on a Lambda "cinder block" rated at 19 Amps that some Hams would have passed up since most 100 Watt



transceivers draw 20+ Amps at full output. Industrial power supplies are usually rated for continuous duty while

hobbyist items tend to fudge a little with an intermittent rating. Lambda uses eight pass transistors in their 19 Amp regulator while some "25 Amp" supplies use only four. I see exactly 1/10th of a volt drop from RX to full-bore TX in FM or RTTY, and that's about as good as it gets. I run the power supply at 14 Volts. Others prefer 13.8, but read the manual to decide what's best for your rig. No matter what you use for power, make sure it has over-voltage protection as even the best can short a pass transistor and fry a radio. Setting the OVP is a little tricky: With no load, set the over-voltage trimmer to maximum and the output to 14.8 volts. Slowly adjust the over-voltage trimmer until it just trips. Switch off the supply and turn the output voltage trimmer down by a quarter turn or so. Power up and adjust the output voltage as needed.

The Wind In The Wire

Our next stop will be to the antenna, and we'll need a feed line to get there. Coax is by far the most popular, but don't rule out open-wire line as it can be a better choice in some cases. As for coax, in VHF / UHF work line loss is usually the main concern. At HF, it's far less of a factor. RG-213 is durable, offers good performance up to 10 Meters and, of all the coax types that take a PL-259 directly, is considered to be the most consistent for impedance match and velocity factor. It's also less prone to water contamination than air or foam types and can take a fair amount of abuse. Given the choice between a low-loss line that may develop problems, or trading a fraction of a dB for the reliability of RG-213, I'll take the RG-213 at HF. If you prefer a lower loss foam line, take a look at the Times LMR-400 series. Whatever you buy, do your best solder job on the connectors and seal the ends with a good quality PVC tape like Scotch 33 or 88 and a Ty-Rap to make sure it stays sealed. I've also gotten in the habit of giving PL-259's a shot of WD-40 before I plug them in as a bit of corrosion prevention. Another quirk of mine when installing something like a vertical on a TV mast is to wrap the coax around the mast barber pole style. About one turn per two feet, the coax won't whip in the wind and can flex with the mast easier than a straight drop. Try it! There's also a slight decoupling effect that can reduce feedline radiation and pattern distortion.

Many pages have been filled with antenna tips & lore, but for this exercise we'll stick with general concepts. We're all looking for a low-cost Wonder Wire that works all bands better than any mono-bander. If you find one, let me know. I'm currently using an Off-Center Fed Dipole at 35' (Coaxial Window) that works remarkably well. It doesn't rotate, won't bust a heavy pileup, and it doesn't work on 160, 30 or 15 Meters in its simplest form. But, it hauls in Q's by the bushel on 80 thru 6 Meters and is a good general purpose, no-fuss antenna. I've also had great results from Extended Double Zepps, which tend to be single-band wires, and I'm playing with loops. On the other hand, I haven't had much luck with end-fed or terminated wires, and that's OK. That's how I learn. Antennas remain the one area where almost every Ham experiments, hence the great variety of material available. If I had to guess, I'd say the ARRL has published more pages on antennas than any other subject, and

they can all be summarized in one sentence: The best antenna for you is the one you can install and keep in the air.

Meanwhile, Back in Reality

Think about it... Everyone has some restriction on what's practical. We've all seen the ads & articles in *QST* (and other publications) with big towers and antenna farms. Want one? Flip the page and there's an outfit selling them. What a coincidence. You'd almost think you couldn't radiate a worthwhile signal without one. Nonsense. A big wire has more radiation surface than a Yagi, but the Yagi has directional gain and only needs one support. A wire needs two, and at serious heights the second support (and real estate) become a major cost for an otherwise inexpensive antenna. At modest heights, like 40' and below, on 20 Meters and up, wire antennas get real cheap, real fast, and that's where I'm at. Multi-Band verticals can also be effective low-angle radiators and there are plenty of Hams working the world on a single stick.

I won't own a tower. I don't want the cost, effort, maintenance or worry. It's not a good idea for me. My Ham ticket didn't make me a Civil Engineer or Steeplejack, and I'm not about to prove how painfully true that could be. I have sandy loam soil, which means an overbuilt base and guy anchors. I'm in Oklahoma, and that means heavy wind loads. I'm also in a subdivision with plenty of lovely children. If one of them takes a header off an "attractive nuisance" like my tower, I have a problem. I don't want to be one of the guys on 20 Meters saying: "my rotor is stuck, and I'm working you off the back of the beam..." Beams (and Quads) are very effective antennas, but when the rotor breaks you'll learn one of Amateur Radio's little secrets: "Gain" in antennas usually means they work extremely well in one direction and very poorly in all others. With that said, understand that I'm not morally opposed to a Tri-Bander up 60' at your QTH. Do your homework, don't risk a shoddy install, understand the safety and maintenance obligations a tower demands.

Put up the best antenna you can manage, even if it's far from textbook perfect. A bad antenna works better than no antenna and if it loads without TVI or RF in the shack, it will make Q's. On those days when the bands are dead, the guy down the street with the mega-tower isn't making log entries, either, so don't worry about it.

The more you experiment with antennas, the more you learn and the better they work. Antennas can be fun to experiment with and usually offer the biggest bang for the buck in a station upgrade. Regardless of how you couple your RF to the Ether, remember that a good signal is built from the ground up. Without an effective station ground you're asking for RFI problems. Any antenna that's not perfectly balanced will be compromised without a good RF ground and one stroke of lightning can ruin your whole day. Ground It! One of my favorite sources for antenna ideas is at <http://www.cebik.com/radio.html>

The Joys Of The Solar Wind

Early 2001 brought some marvelous HF band conditions mixed with days that were absolutely abysmal. That's one of the greatest joys and frustrations of HF. All sky-wave propagation depends on ionized particles in the upper atmosphere and there can be too much of a good thing. The solar flares of March and April proved the point by shutting down the HF bands tighter than the bottom of a solar cycle. There are no sure-fire tips for making a DX Q when you're in the mood, but there are ways of increasing the odds. Your first step is to know what time it is. Not here... There. One of my favorite Q's was to Sakhalin Island. A semi-rare spot off the east coast of Russia north of Japan, at 4:45 pm on a Sunday afternoon in Oklahoma it was 7:45 am Monday morning on Sakhalin. The distance wasn't exceptional, but the time difference did cause me to marvel...

Time Is On My Side, And Your Side

Chances are you don't stay up all night playing radio, and neither does the OM at the far end. But, in the case of the QSO mentioned above, I was approaching dusk and the RU was past sunrise. Daylight path at both ends, and that's a good thing on 10 Meters. A month or two before, the days were shorter and it was less likely we'd both be on the radio when the path was lit. A few years from now when the solar cycle goes puny it won't matter how much light spans the Pacific because the F layer won't be as reflective. Know what time it is. Not only today, but also the time of year and the solar time for the bands you operate. If you're a low-bander with DX aspirations, you should get handy with the concept of Gray Line Propagation. I can recall a ride home late one December afternoon when KDKA in Pittsburgh, PA was Q-5 on the car radio. A half hour later,

my best radio and antenna at home were barely able to pull it out of the noise.

As a general rule for the higher (daylight) bands, you'll work Europe in the mornings and Oceania in the evenings with midday contacts into South America and Canada. For the bands below 14 MHz you can usually reverse that. But, 40 and 20 Meters can surprise even the best of us, especially between the minimum and maximum of a solar cycle. We'll get into more detail in future editions of this series as your timing can often do more than the best antenna, transceiver, or amplifier, ever will.

Resources

There are plenty of Hams who want to get on the HF bands in the worst way. You can hear a few on every band, usually with a poor signal and discussing better ways to "get out". In some cases, that conversation goes on for years with little progress. If you've read this far, you're not averse to learning more about the RF Arts. Good for you. Some of my most successful projects started with a few hours of reading and a little two-finger tango on the keyboard or calculator. And what a coincidence it is that some of my best HamFest purchases were *books*. Like other hobbies, there are Amateur Radio Myths passed from one generation to the next and bad advice does not improve with age. The ARRL has a huge series of books that cover almost every topic and no shack is complete without (at least) one copy of *The ARRL Handbook* and *The ARRL Antenna Book*. There's also a strong argument to be made for buying *The ARRL Operating Guide*. Yes, they can get a little pricey. But, if you think the price of knowledge is too high, consider the price of ignorance.

Technology Is Your Friend!

There are scores of Ham Radio resources as close as your modem. Let's take a look at a few of my favorites:

<http://www.arrrl.org> and
<http://www2.arrrl.org/tis/>

You've come a long way, baby, and the ARRL has gotten serious about their web page. The Technical Information Service has great potential and should be visited.

<http://www.mdxa.org/>

The W5 Bureau. Check your QSL card in-box and be sure to visit the real-time MUF maps and links to propagation resources.

<http://www.dxzone.com/>

<http://www.eham.net/>
<http://www.contesting.com/>
<http://www.qrz.com/>

More than just call sign look-up and Ham chatter, be sure to check out the incredible variety of web links and forums.

<http://www.eqsl.org/qslcard/>

Faster than a speeding stamp, the instant QSL could be in your future. (!)

<http://www.cebik.com/radio.html>

A great web page for antenna ideas, and be sure to visit the tutorials on basic theory. W4RNL is my kind of antenna Guru.

www.softcom.net/users/kd6dks/quad.html

Design a Cubical Quad on-line, or save the complete page to your hard drive.

www.aintel.bi.ehu.es/psk31.html

The Official PSK-31 Home Page. It's a mode with a future.

<http://hereford.ampr.org/cgi-bin/tube?index=1>

We're Hams. We like old radios. We still use tubes. Complete tube index on-line.

<http://listings.ebay.com/aw/listings/ist/all/category4659/index.html>

You know about the Electronics and Ham Radio listings on eBay. Have you visited the electronic parts section? Here ya' go!

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In closing, much of your success in the HF Arts will be determined by your ability to learn from others and in finding good advice. There is no shame in not knowing, but there's plenty in not asking. You know how to spell "assume". Ham Elmering is something we like to think about, but The OKDXA Elmer Project hopes to go well beyond that. If you have some good HF experience to share with others, please do. We're looking for advice on propagation, operating modes, DX and Contesting tips, plus anything that could be useful to the new (and not so new) HF operator. You don't have to be a wordsmith or know-it-all, just take a few minutes to hammer out a quick e-mail to ac5up@vei.net with your thoughts. All tips will be credited.

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— 73 and Good DX!