



# The Parasitic Emission

Volume 35, Number 2

Serving Cameron, Clearfield, Elk and Jefferson Counties

October 2009

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## On The Air by Joe Shupienis, W3BC

**T**HE nights are cool and clear, the days are getting shorter and the QRN from thunderstorms is getting weaker. Yes, it's fall, and autumnal radio conditions are once again with us.



It's a great time to sit back in your nice warm hamshack, and take a look through this latest issue of *The Parasitic Emission*. This month's issue includes the usual meeting notice, and report of the last meeting. The "Shorts" column is the place to find up-to-the-minute news from all around our four counties. Our President, Doug's "Behind the Gavel" keeps us informed about

club events.

Several new regular features begin with this issue. Each month, I'll try to highlight the biggest ham radio activities in this "On The Air" column. Beyond that, I'm starting a regular feature article, "Basic Concepts," spotlighting important technical subjects for our newer licensees... and anybody who wants to learn more about amateur radio technology. Each month's issue will include a custom calendar of QCARC events as well as important contests, nearby hamfests and other notable events.

The nice thing about publishing electronically, is that we can include as much or as little material each issue as we have available to us. So please consider sending us your own articles, shorts, photos, etc., and we will be more than happy to include it in the next issue. Email is the best way to submit:

[submit@parasiticemission.com](mailto:submit@parasiticemission.com)

You can obtain PDF copies of this and older newsletters at the brand-new Parasitic Emission website: <http://www.parasiticemission.com>

There you can also access the online Web Calendar, which I try to keep up-to-date with QCARC and Western Pennsylvania activities, contests and more. You can even add your own events (subject to approval), and link your own

calendar in Outlook™, your cell phone, your PDA, etc. that uses the industry standard "icalendar" format. If you're so inclined, you can also subscribe to an RSS feed!

Now, let's get on the air...

## 40 Meters—New and Improved!

**O**UR big news this year is 40 meters. In case you didn't hear, beginning on March 29, foreign broadcasters were finally kicked out of the 7.0 - 7.2 MHz portion of the band. This is a new experience for almost all of us. Only those licensed before WW II can recall what 40 meters was like without broadcast QRM. Since the return of that band segment to exclusive amateur use, I have only heard 2 Asian broadcasters, and only on a few occasions. It is safe to say that effectively, the band below 7.200 MHz is now in use exclusively by amateurs. Which is as it should be.

And, it's being put to good use. Since most of the world has an amateur allocation from 7.0 - 7.2, there is much phone DX to be found, both day and night. Some of the overflow rag-chewing from 75

**The October Meeting of the Quad-County Amateur Radio Club will be held at the Clearfield 911 Center on Friday, October 16, 2009 at 7:30 pm.**

**Also, don't forget the October Picnic is 1:00 pm Saturday, October 10 at Elliott State Park. Contact Kay Kvant at 765-1980. BYOB and place settings.**

**An ARRL-VEC Volunteer Exam Session is scheduled for Wednesday, October 28<sup>th</sup> beginning 6:00 pm, at the Christ Lutheran Hall in DuBois. Exams will be given for all license classes. Info: [VE@parasiticemission.com](mailto:VE@parasiticemission.com)**

meters has found its way up to 40 as well. Now that winter conditions are beginning to take effect, the band is becoming useable for coast-to-coast QSOs nearly every evening.

If you're a CW operator, this is old news – you've been enjoying 40 meters for years. But if you're new to the game, this is good news, indeed! Since December 15, 2006 (when the FCC expanded the phone frequencies) General class privileges now extend down to 7.175 MHz, giving Generals 25 kHz of broadcast-free 40-meter phone, all night

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long. Advanced and Extra operators can go all the way down to 7.125 MHz for QRM-free operating.

More good news: All amateurs, including Technician and Novice licensees, can use CW, from 7.025 to 7.125 MHz. This is a result of two FCC rule changes: The December 15, 2006 Phone Band Expansion, and the February 23, 2007 elimination of the Morse Code requirement. There is much activity in the CW portion of the band, and many DX stations can be worked between 7.025 and 7.050. (Novices and Technicians please note: even though you have full access to the CW bands, you can only use Morse code – you are not authorized to use RTTY or any other digital mode.)

## 2009 Pennsylvania QSO Party

**E**VER wonder what it's like to be the target of a pile-up? Have a hankering to be highly sought after—to be a rare station? Can't afford to go on a DXpedition? Actually, it's pretty easy to be "rare". This month will be the 51st running of the **Pennsylvania QSO Party**, on **October 10 and 11**. It's a friendly and very popular contest, and a lot of fun to operate.

Our four counties are highly sought after. A couple years ago, I operated portable in Cameron county during the last hour of the contest. I worked over 130 stations on 80 meter phone, and some stations even kept a pile-up going for 20 more minutes after the end of the contest because they needed/wanted a Cameron County QSL!

The all time records for our counties will take some work to beat, but they are achievable. Now that 40 meters is "new and improved", that task might be easier. Here are the records for our counties:

County	Call	Score	Year
Cameron	N3BK	158,937	1997
Clearfield	K3JE	132,160	1999
Elk	WA3SES	150,569	1997
Jefferson	K3MD	245,116	1995

Only Clearfield and Jefferson county records are held by "locals", while the others were invaded by "furriners!"

If you're not too sure you can break any records, but would like to win a certificate anyway, the bar is considerably lower. Here are last year's top scores for our four counties:

County	Call	Score	Category
Cameron	K3YTL	111,467	PORTABLE
Cameron	N3LI/CRN	285	ROVER
<b>Cameron</b>	<b>-NONE-</b>	<b>0</b>	<b>HOME</b>
Clearfield	W3USA/CLE	4,478	ROVER
Clearfield	-NONE-	0	PORTABLE
<b>Clearfield</b>	<b>-NONE-</b>	<b>0</b>	<b>HOME</b>
Elk	KE3FO	22,894	PORTABLE
Elk	N3LI/ELK	1,555	ROVER
<b>Elk</b>	<b>-NONE-</b>	<b>0</b>	<b>HOME</b>
Jefferson	KD8MQ	49,844	PORTABLE
Jefferson	W3USA/JEF	5,297	ROVER
<b>Jefferson</b>	<b>-NONE-</b>	<b>0</b>	<b>HOME</b>

From this table it is easy to see that if you had been on the air last year and spent a mere 1 minute to make just 1 contact from your home station, you would have been the Home Category winner for your county! See what I mean about the bar being set pretty low?

Once again, the winners were the "invaders." They didn't have to do much for their certificates, and outside of K3YTL (who is a big-gun competitor), their scores were not hard to achieve.

Even if contesting is not your cup of tea, the PA QSO Party is fun and it's an enjoyable way to spend a couple hours with your radios. After it's done, you can look over the logs, see all the places you have talked to, and think about how well your station gets out after all!

Even though this is an "HF" contest, there is opportunity for Novice and Technician operators to participate. You can always try phone on 10 and 6 meters, especially on Saturday evening. If you want to try your hand at Morse, remember that any good competitor will slow down to get your point if for no other reason! You could also help a higher class licensee by logging, keeping the snacks handy or even operating at a multi-operator station.

If you think you would like to give it a try, the rules can be found at :

<http://nittany-arc.net/paqso09rules.html>

The fun starts on Saturday October 10, at noon and runs until 1:00 am, then resumes at 9:00 Sunday morning, ending at 6:00 that evening.

I'll be seeing you... On the Air!



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## Minutes of the September Meeting by Jeff Rowles

**T**HE September 18, 2009 meeting was called to order at 7:36 PM by Doug KA3DWR. The minutes of last month's meeting were approved as read. The Treasurer's report was read, with a motion to approve made by KA3FHV and seconded by K3EDD.

**New Business:** Thoughts and discussion about the revived club newsletter. A possible club picnic and a club breakfast on the road were discussed. It was decided that we would have a club picnic on October 10 at 1:00PM, which would be held instead of the monthly club breakfast. The club will provide hot dogs, hamburgers, and buns. Jeff, KA3FHV will provide a salad/dessert. Next month will be the nominations for club officers and the Board of Directors, with the elections to be conducted in November.

A motion to Adjourn was made by KA3FHV and seconded by W3KWT at 8:22PM.

Attendance: KA3FHV, W3KWT, K3EDD, K3JE, N3PUQ, KA3DWR. And W3/SM7FYW.

## Behind The Gavel by Doug Rowles, W3DWR

**A**S YOU can see from the byline I have undergone a prefix transplant. It became official on September 29th. The whole process was handled by W5YI. All that is necessary is to look yourself up on QRZ.COM and click on "apply for vanity call."

The new newsletter has been very well received by all the members I have had the chance to speak with. Some of the past issues can be viewed at <http://www.parasiticemission.com>. There is also a calendar on that site listing club events and various contests and operating events.

The October breakfast is going to be replaced with a picnic at Elliott State Park. Full details are available elsewhere in this newsletter.

Jerry, N2GUN, has been looking for a used rotor for his 5 element 2 meter beam. I remembered an old Alliance rotor I had in the basement that WB3DDA gave me during my 2 meter SSB days back in the '80s. I didn't know if it was still viable since I no longer had the control box.

I lugged it to the August Punxsutawney Amateur Radio Club meeting. Parker, KB3NMK, offered to look at it, and Jim, KA3WSX, figured that he had a control box that would run it. About a week later I got a call from Park informing me that he had disassembled the rotor, cleaned everything,

repacked the bearings and, with the control box from WSX, we had a working rotor. We met at the Butler swapfest on the 13th and transferred the rotor to my trunk.

On our way home Jeff and I stopped by Jerry's QTH and dropped off his reconditioned rotor. He is anxious to get his antenna up and running and plans to use it for simplex work during the upcoming ARES SET. He should be able to reach a few new repeaters as well.

Don't forget to try to come up with your idea for a short column for the newsletter. Send them to [submit@parasiticemission.com](mailto:submit@parasiticemission.com).

We will be opening nominations for officers and board of directors at the October meeting. See you there!

73 for now. Doug, W3DWR

## Shorts

In last month's issue, **Paul Lowes, W3PRL** was incorrectly identified as "Emergency Coordinator." His correct title is "Clearfield County ARES Emergency Coordinator."

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Congratulations to **Herb Murray, KA3TAP** who passed his General exam! Welcome to the world of HF radio!

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QCARC President **Doug Rowles, KA3DWR** traded in his old call for a shiny new one: **W3DWR**.

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*The Parasitic Emission* will publish your original articles, photos, drawings and news topics related to amateur radio. We can accept documents in any common computer format (except Microsoft Publisher™). Plain text is best, since the document will be reformatted to fit the style guide of this newsletter, and any fancy formatting will be lost. Most articles can even be written in Notepad or Wordpad.

Tables you create with a spreadsheet should be sent as a separate spreadsheet, not converted to text or linked into your document. Keep it simple. Photos should be scanned at 300 – 600 dpi, and stored as .jpg, .gif, or .png—but **not as .bmp!**

To submit material for the newsletter by e-mail, you can use the following address:

[submit@parasiticemission.org](mailto:submit@parasiticemission.org)

Items for the *Shorts* column can be submitted to:  
[shorts@parasiticemission.com](mailto:shorts@parasiticemission.com)

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## Public Service: 2009 Simulated Emergency Test

by Paul R. Lowes, W3PRL

**T**HE Clearfield County Amateur Radio Emergency Service (ARES) will be conducting its annual SET (Simulated Emergency Test) on October 31, 2009 from 9am to Noon. The purpose of the SET is to test emergency communications within Clearfield County. Last year, the group worked with Cambria County passing emergency traffic, and also set up an HF frequency whereby traffic was actually handled by a station out of the state of Pennsylvania, and forwarded to Clearfield and Cambria county NCS for message forwarding. This exercise was very successful, and many hams from other states were quite willing to help pass our traffic.

### Purposes of the SET

1. To find out the strengths and weaknesses of ARES, NTS, RACES and other groups in providing emergency communications.
2. To provide a public demonstration—to served agencies such as the American Red Cross, the emergency management agency and through the news media—of the value to the public that Amateur Radio provides, particularly in time of need.
3. To help radio amateurs gain experience in communications using standard procedures and a variety of modes under simulated-emergency conditions.

The Amateur Radio Emergency Service (ARES) consists of licensed amateurs who have voluntarily registered their qualifications and equipment for communications duty in the public service when disaster strikes. Every licensed amateur, regardless of membership in ARRL or any other local or national organization, is eligible for membership in the ARES. The only qualification, other than possession of an Amateur Radio license, is a sincere desire to serve. Because ARES is an amateur service, only amateurs are eligible for membership. The possession of emergency-powered equipment is desirable, but is not a requirement for membership.

My thanks to all those radio operators who make ARES a success in Clearfield County!

Please help by volunteering your time for a worthy cause. When called upon to provide emergency communications, we need to be prepared to serve our Served Agencies.

Every licensed amateur, regardless of membership in ARRL or any other local or national organization, is eligible for membership in the ARES.

The only qualification, other than possession of an Amateur Radio license, is a sincere desire to serve.



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Please click the link and visit the Clearfield County ARES website today.

<http://sites.google.com/site/clearfieldcountyares>

Paul R. Lowes

Clearfield County ARES Emergency Coordinator

## Repeater Etiquette

Woody Brem, K3YV

*Editor's Note: The following originally appeared in The Newsette, which is the official monthly newsletter of the Nittany Amateur Radio Club. It was written by Woody Brem, K3YV, and submitted by Doug Rowles, W3DWR.*

1. When announcing yourself as being available for talking on the repeater, keep it simple. There is no need for an elaborate call. Simply state your call sign and the repeater you are using. For example: "This is W3XYZ listening on 85." Announcing which repeater you are using is a courtesy to people listening on scanners. It lets them know which repeater you are using, so they can call you back. But remember - never call CQ.
2. To call a particular station, simply call that station and identify your station. For example, "W3XYZ this is K3XYZ on 85." There is no need for additional statements such as, "Would you be listening Billy-Bob?" It sounds silly; if he were listening, he would have called you.
3. If you do not get an answer when you call a particular station, don't come back on the air and say, "Negative contact." Everyone already knows no one answered you. Besides, there is no such thing as a negative contact, except on your car battery.
4. Identify at the end of your first transmission, every ten minutes thereafter, and after your last transmission. Do not say, "This is W3XYZ for I.D." Everyone knows you are identifying. Simply say, "This is W3XYZ." Think about it; have you ever given your call not for ID?
5. To join a conversation already in progress, simply state your call sign between transmissions of the talking stations. Never say "break" unless you have a very important reason for breaking in. Saying "break break" (two breaks) indicates that you have an emergency situation and require immediate repeater access.

**QCARC History:****Halloween Of Years Past****Bryan Simanic – WA3UFN**

**W**ITH the Halloween season come tricks and treats—unfortunately, some of those tricks are a bit over top. You may be wondering, “So what does that have to do with amateur radio?” Well, W3BC twisted my arm a bit to write an article for the newsletter and the season just made this idea for an article come to mind easily.

In the late 1970's, ARES members in the DuBois area offered assistance to the DuBois City Police and the Sandy

Township Police Departments with what was termed the Halloween Patrol. Often times we had around 6-7 hams who were mobile and portable—

that is to say on foot—patrolling the municipalities, looking for any signs of “tricks” that actually were vandalism. Of course we had absolutely no enforcement authority, we only observed and reported any problems back to the 2 meter station set up at police dispatch.

As I recall we reported issues with egging of vehicles. WA3UKE even was the recipient of some of the eggs so he had first hand knowledge of the “trick” in progress at a given spot in a neighborhood. Another incident that comes to mind was a reported possible break-in. There was a mobile in the area that was able to pass along observations of groups roaming in the area for the police to investigate.

K3LIX was often portable on foot and could quietly show up in areas of possible vandalism. The vandals would not even know they were under observation!

Along with observing for vandalism we often had the opportunity to drive around areas of the city and township we didn't usually get to, and see what new construction might be going on and note how the municipalities were growing.

Did we really do any good? **Yes!** The patrol was great public relations for ham radio and after a couple years of showing our worth, we were expected back annually to assist in the watch for vandalism. When we were asked to help again we knew that we were providing a valued community service!



As the Clearfield County EC then, I was really glad that the public service we provided was thought of in such a good light. We had a great team back then. Some have moved away and some are now Silent Keys but it is still a memory that we can recall with pleasure, knowing the good we did for our neighborhoods and our hobby.

73 and Happy Halloween!

**QSLing: Is It A Lost Art?****by Jeff Rowles, KA3FHV**

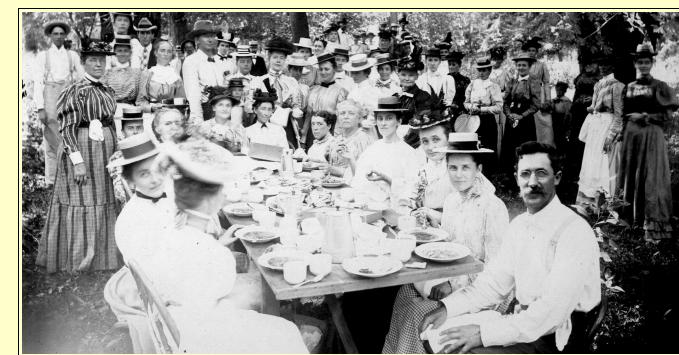
**O**NCE upon a time, the art of exchanging printed confirmation cards for the contacts made was a part of the magic of amateur radio. Some hams even had the shack walls covered with them, while others stuffed them in old shoe boxes or whatever they could find.

Now, sadly, with today's high postage rates they seem to be harder to obtain unless the ham on the other end says on the air that he QSLs. Will this spell the end of QSLing forever? I hope not.

Another innovation with today's modern technology is electronic QSLing and logging. Looks like the EQSL will replace the QSL card, but that is another story.

**PICNIC TIME!****By Doug Rowles, W3DWR**

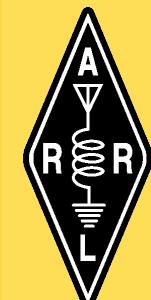
One thing the Quad-County Club knows how to do is tie on the feedbag. Our monthly breakfasts are a big hit, even a “breakfast in the boonies” and who can forget our last few Christmas dinners?



October 10th is going to be another outdoors adventure. How about a fall picnic at Elliott Park? This will be in place of the usual 2nd Saturday breakfast. We are going to gather at one of the pavilions at the park around 1:00 PM. The club will supply hot dogs, burgers and buns. Kay Kvant (Mrs. Lars) is going to coordinate the side dishes etc. She can be reached at 765-1980. Each member is responsible for place settings and beverage of choice.

Talk-in is on 147.315.

**When we were asked to help again we knew that we were providing a valued community service!**



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## Basic Concepts of Amateur Radio: Users' Guide to the 80 Meter Band

by Joe Shupienis, W3BC

**T**HIS month, we'll begin a new monthly feature, geared to passing along the "wisdom of the ages" to up and coming hams. Our adventure begins with an exploration of the HF (High Frequency) bands. We'll start with a visit to my favorite band, the 80 meter band.

### The Big Picture

Compared to other radio services, amateur radio enjoys a large assignment of frequencies. They are separated into "bands" which are spaced throughout the electromagnetic spectrum. Each one of these bands has its own quirks and merits, and a good understanding of the characteristics of each band adds more enjoyment to our hobby. No matter what his interests are at the moment—DX, contests, emergency services, traffic handling, experimenting—the good operator always seems to find the best band to make contact. Having expert knowledge of which band to use saves time, effort, money and even lives.

In the United States, amateurs are allocated a gigantic pool of frequencies, totaling over 23 gigahertz (23,166,830 kHz to be exact) of spectrum distributed across 26 amateur bands. That's enough space for over 3,800 TV channels! It's more bandwidth than all broadcast, public safety, commercial, cellular phone and scientific allocations combined. In fact the only larger allocation is to the government. This proves there is no reason to complain about "crowded bands!"

All of these bands are grouped into sections of the electromagnetic spectrum, based on wavelength. For example, frequencies between 3 and 30 Megahertz have wavelengths of 100 meters to 10 meters respectively. This group of wavelengths is called "Shortwave", and the frequencies are called "High Frequency." The ten allocated amateur

bands below 30 MHz are grouped into the Medium-wave (Medium Frequency or MF) and Shortwave (High Frequency or HF) bands.

### The 80 Meter Band

**E**IIGHTY meters is the lowest in frequency of the high-frequency, shortwave bands. Its history began in 1924—when the mighty spark transmitters were singing their swan-song and the new-dangled vacuum tubes and crystal controlled oscillators began stealing the show. Recognizing the unique importance of amateur radio, the US Department of Commerce, under Secretary Herbert Hoover,

created the current allocation of 3.5–4.0 MHz along with a 7–8 MHz 40 meter band and the 14–18 MHz 20 meter band.

Today 80 meters is a very popular—and sometimes very crowded—band. It's the band of choice for reliable, year-round contact with other amateur stations at distances of up to 400 miles. Every evening, the band is jam-packed with activity—traffic nets, roundtables, Dxing, contesting and casual operating all find a happy home here. During the day, the band is usable (most of the time) for local QSOs of up to 200 miles or so.

"The King of Bands," as

the old timers called it, was split into two bands in the 1930s. In those years before World War II, 80 meters was a CW band, while 75 meters was the phone band. To this day, many hams—especially Old Timers—will refer to "80 meters" if they're talking about CW, RTTY or digital modes, and "75 meters" for Phone and SSTV. Over the years, the actual dividing point between the two bands has become blurred through a progression of more generous phone privileges granted by the FCC. Suffice it to say that it used to be at 3.800 MHz, and now, it's (unofficially) at 3.600 MHz.

### Engineering Considerations

80 Meters is the second largest HF band (after 10 meters), and its half-megahertz of bandwidth

Frequencies	Wavelength	Names	Contents
30-300 kHz	10-1 km	Low Frequency (LF) Long Wave (LW)	136 kHz Experimental Navigation Beacons
0.3-3 MHz	1000-100 m	Medium Freq. (MF) Medium Wave (MW)	500 kHz Experimental AM Broadcast <b>160 Meters</b>
3-30 MHz	100-10 m	High Frequency (HF) Shortwave (SW)	International BC Utilities, Gov't, Navigation <b>80m, 60m, 40m, 30m, 20m, 17m, 15m, 12m, 10m</b>
30-300 MHz	10 – 1 m	Very High Freq. (VHF) Super-Short Wave (SSW)	Land Mobile, FM BC, TV 2-13, Aviation, Gov't <b>6m, 2m, 1.25m</b>
0.3-3 GHz	100-10 cm	Ultra High Freq. (UHF) Ultra Short Wave (USW)	Land Mobile, TV 14-59, RADAR, Cell Phones, Gov't, WiFi <b>70 cm, 33 cm, 23 cm, 13 cm</b>
3-30 GHz	10 – 1 cm	Super High Freq. (SHF) Microwave (μw)	RADAR, Satellites, Com Links, Gov't, WiFi <b>9 cm, 6 cm, 3 cm</b>
30-300 GHz	10 – 1 mm	Extra High Freq. (EHF) Millimeter-Wave	RADAR, Scientific, Satellite, BC Relay, Gov't <b>12 mm, 6 mm, 4 mm 122 GHz, 140 GHz, 250 GHz</b>
300 GHz +	< 1 mm	Light Frequency Light Wave	Experimental, Scientific, Military, Space, Medical <b>300 GHz + Shared</b>

**Table 1: Wave Bands and Allocations**

**In the United States, amateurs are allocated a gigantic pool of frequencies, totaling over 23 gigahertz of spectrum distributed across 26 amateur bands.**



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presents some very difficult engineering problems when designing efficient antenna systems and tuning networks.

There is some good news—nearly every commercially produced transceiver made in the last 40 years includes 80 meters. Homebrew equipment for 80 meters is easy to build and work with. The relatively low frequency makes it easy to achieve the frequency stability necessary for modern communications. Electrical components are large enough for human fingers, but not so bulky as to be cumbersome or expensive. With a little ingenuity, you can put up a smaller-than-perfect antenna and still achieve excellent results.

On the other hand, traditional antennas for 80 meters often confront the builder with many challenges. The frequency range from the bottom to the top of the band is 13% of its mean frequency, giving it the highest bandwidth percentage of any assigned amateur band by a large margin. By comparison, the 10 meter band's 1.7 MHz bandwidth is less than 6% of its mean frequency.

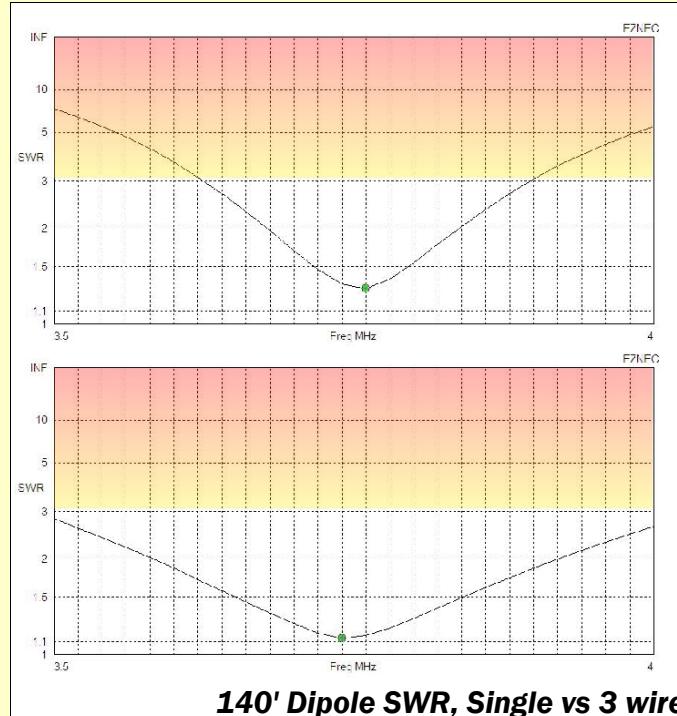
Consistent operation across such a large bandwidth is very difficult to achieve with simple antenna designs and resonant circuits, and requires some fancy engineering tricks. Sadly, some operators just give up and only operate on a small portion of the band, because they feel they are faced with too many challenges.

It is hard to escape the fact that the dimensions of 80 meter antennas are large. For good DX performance, the general rule is that **horizontal antennas** should be at least a half wavelength above ground to obtain the low angles of radiation that favor DX work. On 80 meters, that means a horizontal antenna needs to be 140 feet above the ground!

Added to that, the **simple half-wave dipole** for 80 meters requires a straight line path 136 feet from end to end. Not everybody's back yard has room for one of these monsters! Furthermore, the antenna presents a low SWR over only a small portion of the band.

In the early days of radio, typical antennas (“aerials”) used an arrangement of 3 or more parallel wires spaced 6 inches or more apart with spacers every 10 – 20 feet along their length. A variation on this concept was a “**birdcage**” grouping of parallel wires in a cylindrical configuration with 12 inch diameter spacers similarly distributed. These techniques increased the effective diameter of the radiator, improving the bandwidth somewhat. The downside is that

the antenna system weighs a whole lot more than a single wire, and costs more, too. Winter ice storms and summer thunderstorms easily destroy such antennas unless they are made of very strong wires, with sturdy support structures at each end.

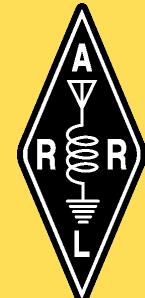


**140' Dipole SWR, Single vs 3 wire**

If you're in search of the ultimate DX antenna, a short, **3-element yagi** requires a 70 foot boom, with 145 foot elements, atop a 140 foot tower. That behemoth has a turning radius of 80 feet, and typically weighs in at well over a ton! To add insult to injury, after all that expense and effort, the antenna is only resonant over a range of 100 kHz or so, meaning gain and directivity fall off very quickly as you tune away from the design frequency. A good compromise used by many big-gun DX contesters is to erect a fixed beam made of suspended wires, aimed in the direction of the most interest (Europe). Clever Dxers make this a **log-periodic** design to maximize gain and directivity across the bandwidth needed to cover the entire band.

Despite their apparent simplicity, **vertical antennas** don't make things much easier or cheaper. An efficient, low-angle 5/8 wave vertical (best for DX) is 175 feet from top to bottom, while the higher-angle, quarter-wave vertical measures “only” 70 feet tall. A **4-Square Array** is the choice of many successful 80 meter DXers. It's an array of four verticals placed in a square arrangement,  $\frac{1}{4}$  wavelength per side. By feeding all four antennas through a phase-shift network, the operator instantly rotates the main lobe direction through  $360^\circ$  in  $45^\circ$  steps. If you have a spare acre of clear, flat land here's your answer!

**With a little ingenuity, you can put up a smaller-than-perfect antenna and still achieve excellent results.**



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**Those who are willing to accept some compromises use shortened, loaded verticals, inverted vees, inverted-Ls, a Slinky™, or even load up their flagpoles and rainspouts!**

All verticals require buried **radials**. The FCC broadcast standard calls for 120 quarter-wave radials. At 70 feet each, that adds up to over one and a half miles of buried copper wire. If you want to run the 1500 watt legal limit, #10 or #8 gauge wire is required. Most hams start out with just a few radials, say 3 or 4, and add more as funds (and physical condition) permit.

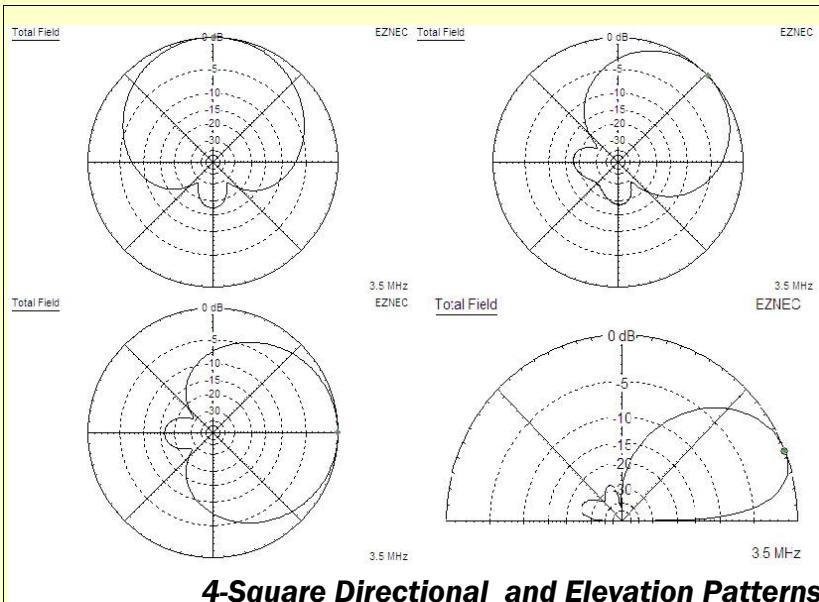
**Mobile operation** is possible if you use massively inductive-loaded antennas. The radiation efficiency of a typical mobile installation on 80 meters can be as low as only ½ percent. This means your 100 watt mobile signal is only the equivalent of a half-watt into our standard dipole.

Your puny mobile signal can still be heard—I've worked South Africa with 100 watts of SSB from the mobile—but your signal will be 23 dB down (4 S-units) from what it would be if you were using that 140-foot high dipole. Some mobile operators with deep pockets run the full legal limit, gaining 12 dB to make up for some of that 23 dB loss. Those lucky fellows end up being only 2 S-units below a 100 watt station using our 140-foot high dipole.

**Long-wire, Beverage and Rhombic** antennas each require a mile or more of wire and acres of level, cleared, ocean-front real estate to be effective. Unfortunately, ground losses and self-inductance (not to mention cost!) at 3.5 MHz become limiting factors at the lengths required for these antennas.

Fortunately, we don't have to be "perfect" to put out a decent signal on 80. Most 80 meter amateur stations use a dipole or a shorter **horizontal antenna with loading coils** at modest heights of 20 to 40 feet. It is common to find stations using **multi-band antennas**, such as the **end-fed Zepp, Windom, and G5RV** with good results.

Others use various **horizontal loop** antennas and put out some strong signals. Those who are willing to accept some compromises use shortened, **loaded verticals, inverted vees, inverted-Ls, a Slinky™, or even load up their flagpoles and rainspouts!** These stations make up the majority



**4-Square Directional and Elevation Patterns**

of the signals heard on 80 meters, and they do very well indeed.

Modern receivers are very good at pulling in weak signals, and experienced operators can hear stations that are "barely there." Medium power amplifiers of 400 to 700 watts can add an S-unit or two, and yield

"armchair" copy for many a long-winded evening.

## Propagation

No study of the 80 meter band is complete without focusing on the band's unique propagation characteristics. Although not considered a "DX" band, the state of solar radiation plays a big part in 80 meter signal propagation.

For local **groundwave** communications, 80 meters offers reliable daytime contacts of up to 50 miles all year long, regardless of the solar conditions. The large antennas help somewhat and in a case of "Worse is Better," a low-slung, high angle antenna actually improves regional coverage through the use of "**Near-Vertical Incidence Skywave**" or NVIS.

In a nutshell, a 20 foot high 80 meter antenna shoots the signals nearly straight up where they hit the F2 layer of the ionosphere and bounce back down, covering the local area (up to 200 miles) much like when you spray a garden hose straight up.

During periods of high solar activity, the relatively low **D layer** becomes ionized. Normally it passes signals untouched, but when it is heavily ionized it attenuates all radio signals, with a much greater loss on low frequencies (like 80 meters) than high. A solar flare often obliterates 80 meter signals, sometimes limiting communications to a mile or two!

In the summertime, **thunderstorms** within 200 miles can be heard during the daylight hours, and up to 1,000 miles or more at night. Many people find 80 to be "too noisy" in the summer, and regular schedules seem to work better with 400 watts and up.



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As the sun sets or rises, some surprising DX can be worked along the so-called **grayline**. The ionosphere in the vicinity of the solar terminator line rapidly shifts state as the sun's rays fade into blackness, and this discontinuity can be highly reflective of radio waves traveling parallel to its path. As the seasons change, the sunrise and sunset graylines--as they pass over your QTH--also pass over a different part of the world each day, bringing many new surprises throughout the year. Experienced DX operators take advantage of this magical time which starts an hour before sunrise or sunset and lasts about an hour after.

As night falls over your QTH, 80 meters reaches its prime. Regular QSOs of 400 miles and more are the rule. The winter months offer the easiest operating, because fewer thunderstorms occur nearby. Solar radiation during the short daylight hours is less intense, leading to less D-layer absorption, and better grayline results. In the winter, the area of darkness is more centered over your QTH, allowing you more directions for distant QSOs.

## Rules and Regulations

In the US, the Federal Communications Commission defines **sub-bands** within each amateur band, with different modes being authorized for each sub-band. Additionally, the remnants of 1967's "Incentive Licensing" rule changes are visible to this day as segregated sub-band operating privileges for different license classes. The rest of the world has fewer restrictions on mode and license class, and that is why you hear foreign hams operating phone in our CW bands.

As a result of the December 2006 phone band expansion, and the February 2007 elimination of the Morse code requirement, Novices and Technicians of all flavors may now operate CW (Morse code) in all HF CW sub-bands (except those reserved for Extra class licensees) with a maximum output power of 200 watts PEP. No other modes (RTTY, PSK, etc.) are permitted.

Although no new Novice, Technician Plus or Advanced class licenses will issue, holders of these licenses may renew them indefinitely (Tech Plus will become Technician). That rule change

resulted in the continuation of the Advanced Class sub-band.

**Attention phone operators:** The FCC wants you to know that since you are using lower sideband (LSB) on 80 meters, you should never set your frequency any lower than 3 kHz above the bottom of your sub-band band. For Generals, this means 3.803, Advanced 3.703, and Extras should be able to figure it out for themselves!

## Bandplans and Operating Practices

The modern 80 meter band in the 50 United States extends from 3.500 MHz to 4.000 MHz, with the lower 100 kHz reserved for CW-RTTY-Digital, and Phone-SSTV-Wide Digital ("Widgital?") from 3.600 to 4.000 MHz. In much of the rest of the world, the band is only allocated to amateurs from 3.500 to 3.800 MHz.

A very popular portion of the 80 meter band is the "**DX Window**", which covers 3.790 to 3.800 MHz. Sorry Generals! Since most DX stations can't legally transmit above 3.800 MHz, by gentleman's agreement, they use the highest 10 kHz of their allocation for DX QSOs only. By the same gentleman's agreement, US amateurs are encouraged to keep non-DX communications out of 3.785 to 3.805 MHz. Keeping local stateside QSOs off these frequencies allows "split" DX operation giving General class operators a chance to work some DX. It has worked well for years, but sometimes new operators with new kilowatt amplifiers find what they think is an "open frequency" at 3.803 or thereabouts and set up shop, spoiling it for everybody.

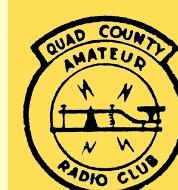
Much like ECARS and MIDCARS on 40 meters, there is a net-like service on 80 meters, serving the Province of Ontario, Canada. Look for [OntARS](#) on 3.755 MHz daily from 7 am to 6 pm Eastern Time. All amateurs, regardless of country are welcome to check in. (In the US, you must have an Advanced or Extra Class license to transmit on this frequency.)

A popular award is the ARRL **Worked All States Award (WAS)** and its 5-band big brother the [5-Band WAS](#). Additionally the League has created a new award competition, [The Triple Play WAS](#). There are "**WAS**" nets that can help you achieve

*As the seasons change, the grayline passes over a different part of the world each day, bringing many new surprises throughout the year. Experienced DX operators take advantage of this...*



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80 Meters	3500-3525	3525-3600	3600-3700	3700-3800	3800-4000
Novice/Tech	🚫	CW only, 200 w	🚫	🚫	🚫
General	🚫	CW, RTTY, Digital	🚫	🚫	SSB, AM, SSTV, Wide-Digital
Advanced	🚫	CW, RTTY, Digital	🚫	SSB, AM, SSTV, Wide-Digital	
Extra	CW, RTTY, Digital		SSB, AM, SSTV, Wide-Digital		

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your goals on 80 meters.

Check out the [3905 Century Club](#) any evening on 3.902 MHz SSB, or 3.5475 MHz CW. On the 1<sup>st</sup> and 3<sup>rd</sup> Wednesday nights at 11, you'll find them on 3.5735 MHz PSK. Also the [OMISS Net](#) meets on 3.942 MHz at 0200z (10 pm) every night.

**AM enthusiasts** congregate around 3.875 MHz, and 3.725 MHz. Some of the Big Iron transmitters of yesteryear have been lovingly restored and sound really great!

**Digital modes** are in use from 3.580 – 3.600. **PSK** uses frequencies at 3.580 to 3.583, and the other digital modes fill in what's left. The FCC has authorized automatic control for packet-like, ARQ modes (Winlink™, et al). If you try to start a QSO above 3.590, expect an unattended machine somewhere to just start automatically transmitting an endless racket of bleeps and bloops for hours on end. Why the FCC thinks this is acceptable is beyond all reason.

**SSTV** operators have a wide variety of new software available that they use to exchange high-resolution JPEG and GIF graphic files, and still photos. It's more like a color FAX machine over the air than like moving TV. Find out for yourself at 3.845, 3.863 and 3.730.

**QRP CW** operators congregate around 3.560, and **QRP SSB** around 3.985 stateside, and 3.690 in Europe.

As you can see, you need to be aware that some frequencies are dedicated to certain purposes by "gentleman's agreement." If you don't want to be considered a "lid" it pays to know what frequencies are suggested before you start tuning up your kilowatt!

There are some non-amateur signals you can hear quite well on 80 meters, and some have no business being there! If you want to know the time, check your tuning calibration or just brush up on your Spanish skills, listen on 3.810 MHz for standard time and frequency signals from HD2IOA, the Naval Institute of Ecuador.

A strong, **government RTTY** station is present every night on 3,781.5 and never seems to quit. The question is: **Whose government?**

**Shortwave broadcasts** from England can be heard on 3.915, Iran on 3.945 and 3.985, Germany and Korea on 3.955, France on 3.965, Radio Budapest on 3.975, and China on 4.000 MHz.

So, there you have it. The 80 meter band is yours to use and enjoy. Next time, we'll move on up to the new and improved 40 meters.

## VE Test Session – October 28

An **ARRL VEC test session** will be offered on Wednesday, October 28 at 6:00 pm, at the Christ Lutheran Church Hall, 875 Sunflower Drive, DuBois (just off Maple Avenue).

Exams will be given for all license classes. Preregistration is not required, and walk-ins are invited. If you're planning to take exams, we would appreciate a week's notice, so we can be sure to have adequate supplies on hand.

**Technicians who were licensed before March 21, 1987**, and currently hold a valid license, or an expired license that is still within the two year grace period, **qualify for a walk-in, instant upgrade to General with no further exam!** Simply present the pre-1987 license (or other proof) and receive Element 3 Exam Credit and your "Paper Upgrade."

All applicants must fill out an ARRL-VEC Form 605C. These forms will be on hand, or you may download a from from:

[www.parasiticemission.com/Form605C.pdf](http://www.parasiticemission.com/Form605C.pdf)

to fill out on your computer, print and bring to the exam session.

From the ARRL Website:

**The ARRL VEC Test Fee for 2009 is \$15.00.**

**Retests of an element failed at the same test session will require payment of an additional test fee.**

When attending test sessions be sure to bring both your original AND a copy of any existing license and currently valid CSCE certificates you may have.

The FCC and the ARRL VEC require a photo ID for all adult test candidates. A driver's license or State issued ID card is sufficient for this.

Students without a driver's license or other form of photo ID, may bring a recent school grade report or similar documentation that identifies the student. A birth certificate, or an envelope addressed to the candidate at the address listed on their FCC 605 form, also serve as sufficient identification.

Calculators may be used for the written exams. However, if you bring a programmable calculator, be sure you can demonstrate to the VE team that the calculator memory is cleared and does not contain stored formulas, or you will not be permitted to use it.

### VE exam checklist:

1. Original and copy of any current license
2. Original and copy of any current CSCE
3. Photo ID (or other acceptable form of ID as described above)
4. Two #2 pencils for exam answer sheet
5. \$15 VEC exam fee



**Affiliated Club**



# October 2009

## Quad-County Amateur Radio Club

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
27 □7:00pm» QCARC 2-meter FM Net □7:45pm» Clearfield County ARES Net	28	29 □7:00pm» 22 2 MHz Sprint	30	01	02	03
04 □7:00pm» QCARC 2-meter FM Net □7:45pm» Clearfield County ARES Net	05 □Parasitic Emission Submission Deadline	06	07 □7:00pm» 432 MHz Fall Sprint	08	09	10 □12:00pm» PA QSO Party □1:00pm» QCARC October Picnic
11 □12:00am» PA QSO Party (cont.) □9:00am» PA QSO Party Day 2 □7:00pm» QCARC 2-meter FM Net □7:45pm» Clearfield County ARES Net	12 □Columbus Day	13	14	15	16 □7:30pm» QCARC Meeting	17 □6:00am» Microwave Fall Sprint □11:00am» Stew Perry 160 m
18 □12:00am» Stew Perry 160 m (cont.) □7:00pm» QCARC 2-meter FM Net □7:45pm» Clearfield County ARES Net	19	20	21	22	23 □8:00pm» CQWW SSB	24 □12:00am» CQWW SSB (cont.) □7:00pm» 50 MHz Fall Sprint
25 □12:00am» CQWW SSB (cont.) □7:00pm» QCARC 2-meter FM Net □7:45pm» Clearfield County ARES Net	26	27	28 □6:00pm» VE Test, Christ Lutheran Hall, DuBois	29	30	31 □9:00am» Atlantic Division SET

Visit [www.parasiticemission.com](http://www.parasiticemission.com) for back issues, current issues and more. The current online interactive version of this calendar, which contains events in upcoming months may be accessed at [calendar.parasiticemission.com](http://calendar.parasiticemission.com). You may use that calendar to enter amateur radio events of interest to local amateurs which are intended for publication, subject to review and approval.

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