



# The Signal Report

A Publication of the Greenwood Amateur Radio Society

VOLUME 5 ISSUE 12

DECEMBER

[HTTP://WWW.W4GWD.ORG](http://www.w4gwd.org)

[W4GWD@ARRL.NET](mailto:W4GWD@ARRL.NET)

## 2009 CLUB

### OFFICERS

#### President

Joe Mimms,  
K4GBH

#### Vice President

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WW4I

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K14WJO

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A14WN

#### Repeater Trustee

Buddy Willis,  
W4DEW

#### Activities Manager/ Editor in Chief

Adam Shirley,  
WJ4X

**The W4GWD  
Repeater Network**  
147.165+ t107.2  
443.900+ t107.2  
**W4DEW/R**  
146.910- t123.0

## December Meeting

The December GARS meeting is, as always, replaced by our Christmas Dinner which this year is being held Tuesday, December 15th at O'Charley's, which is located at 452 Bypass 72 NW Greenwood, SC. All Club members and their guests are invited, but you must RSVP via Tedd, A14WN as soon as possible.

## Homebrew Challenge



The GARS 2009 Homebrew Challenge was a huge success! A few members brought various projects, from a homemade noise filter for received audio to a 1:1 Balun. The winner was Ron, KJ4OBY. His project was a restored antique radio that was an incredible project. Many thanks for everyone who participated! We will look for a sponsor for next year's trophy soon.

## Happy Holidays!

The Greenwood Amateur Radio Society Newsletter Staff would like to wish you a Happy Holiday Season. Remember to put down all those wonderful Amateur Radio toys down on your wish lists and get your orders in early! With the end of the year, coming, what are you planning to do with Amateur Radio in 2010? We would like to know! Send us an email and see your story here in The Signal Report. Again, thanks for a fantastic 2009, and see you next year!

73 MX, from all of us at The Signal Report

# Society Events:

## Chat 'N' Chew

Every Friday at 11:30am the members of the Greenwood Amateur Radio society meet at Ryan's Steak House, Bypass 25 NE, Greenwood.

Everyone is welcome to have lunch or sip your favorite beverage and chat for a while.  
(Dutch treat).

## February 02, 2009 VE Exam Session 7:00pm Greenwood Red Cross

GARS ARRL Volunteer Examiners (VE) Team will have an exam session 7:00pm Tuesday, February 2nd at The American Red Cross Building ☺, 520 Epting Avenue, Greenwood, SC 29646.

## Weekly Net

Every Thursday night at 9pm on 147.165+, The Greenwood Amateur Radio Society holds the weekly 2 meter net.  
Help spread the word for everyone to check-in to our net.  
If you would like to fill in or be a backup net control please let Buddy Willis, W4DEW know.

# Ladies Net:

The GARS Weekly 2 Meter Female Amateur Radio Net began on Tuesday, January 8, 2008 at 8 PM on the GARS 2 Meter Repeater. This net will be held every Tuesday night at the same time.

All interested female amateurs are invited and encouraged to check in. Subjects of discussion will be anything of interest to women.

If you have any questions, please contact Jean (W4KKA) at 864-953-0004 or Jo (KC4UU) at 864-446-7187.

# Congratulations

### Happy Birthday!

Jean Farmer	W4KKA	Dec 24
Don Finlayson	KG4WRC	Dec 31
Eldora Keck	KB4YON	Dec 31
Al Jaszcar	KJ4LLY	Jan 4
Debbie Moore		Jan 6
Buddy Willis	W4DEW	Jan 7
Kin Maffett	KJ4BAK	Jan 13
Gail Davidson		Jan 21

### Happy Anniversary!

Darrell (K14BST) and	
Dena Manning	Dec 3
Warren (W4PY) and	
Mamie Wise	Dec 7
Bert (KJ4VJ) and	
Eldora (KB4YON) Keck	Dec 22

Missing Q signals...  
#854:

QKB? - How many knobs does your radio have??

# What is APRS?

Bob Bruninga, WB4APR

APRS is a real-time tactical digital communications protocol for exchanging information between a large number of stations covering a large (local) area. As a multi-user data network, it is quite different from conventional packet radio.

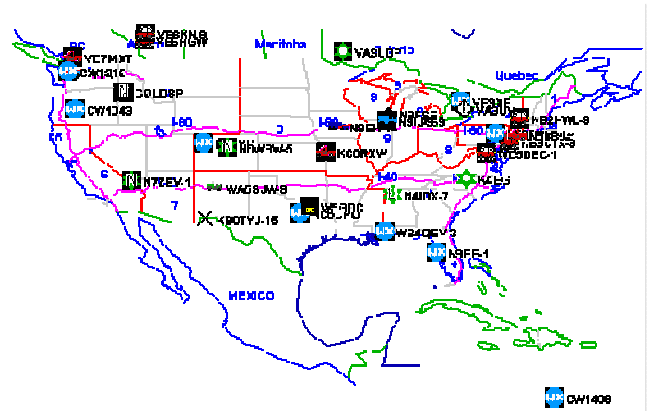
APRS is different from regular packet in four ways. First by the integration of maps and other data displays to organize and display data, second, by using a one-to-many protocol to update everyone in real time, third, by using generic digipeating so that prior knowledge of the network is not required. Since 1997, a worldwide transparent internet backbone, linking everyone worldwide has been implemented.

APRS turns packet radio into a real-time tactical communications and display system for emergencies and public service applications (and global communications). Normal packet radio has only shown usefulness in passing bulk message traffic (Email) from point to point. It has been difficult to apply conventional packet to real time events where information has a very short life time and needs to get to everyone.

Although the recent interfaces to the Internet make APRS a global communications system for live real-time traffic, this is not the primary objective. But like all of our other radios, how we use APRS in an emergency or special event is what drives the design of the APRS protocol. Although APRS is used 99% of the time over great distances, and benign conditions,

the protocol is designed to be optimized for short distance real-time crisis operations.

APRS provides universal connectivity to all stations by avoiding the complexity and limitations of a connected network. It permits any number of stations to exchange data just like voice users would on a voice net. Any station that has information to contribute simply sends it, and all stations receive it and log it. Secondly, APRS recognizes that one of the greatest real-time needs at any special event or emergency is the tracking of key assets. Where is the Event Leader? Where are the emergency vehicles? What is the Weather at various points in the County? To answer these questions, APRS is a full featured automatic vehicle location and status reporting system too. It can be used over any 2-way radio system including HAM, CB, Marine Band, and Cellular Telephone.



## Society News:

The "Rolling Roundtable" meets most mornings and evenings around 7 o'clock and attracts many fine folks around the area (and even some from way out of the area!) We'd love for you to jump in!

The Club Workdays for the Repeater

Site are the 2nd Thursday of each month, So if you are able to come or need directions, get in touch with Buddy, W4DEW, and he'll get you all fixed up.

Please remember our nets every Thursday night at 9pm. And the Ladies who meet on Tuesday at

8pm. Come on in, sit back, stay a while and join us "On the Stump"

Until Next Time,

You're always 5 and 9

With The Signal Report

-Ed.

# Intro to Satellites

from [amsat.org](http://amsat.org)

It is a common perception that it requires sophisticated equipment and large circularly polarized antenna arrays to work amateur satellites. While this may be true for using some of the high altitude 'birds' or on the higher bands such as 23cm, it isn't the case for all satellites. There are several low Earth orbiting satellites which can be worked with relatively simple transceivers and antennas. This article will concentrate on voice operation.

Amateur voice satellites can be divided broadly into two groups. Firstly, there are the traditional "linear transponder" satellites. These satellites receive a specific range of frequencies (typically 40 - 100 kHz) in one band, convert them to another band using a mixing process similar to that used in a superheterodyne receiver and amplify the converted signal for transmission back to Earth. Linear transponders are capable of relaying several different signals simultaneously. More recently, some satellites have been carrying crossband FM repeaters instead of linear transponders. These repeaters are similar to their familiar terrestrial cousins in that they receive an FM signal on a specific channel, demodulate the signal and retransmit the signal on a new frequency. Unlike linear transponders, but like conventional FM repeaters, these satellites can only carry one QSO at a time. Most amateur voice satellites use linear transponders

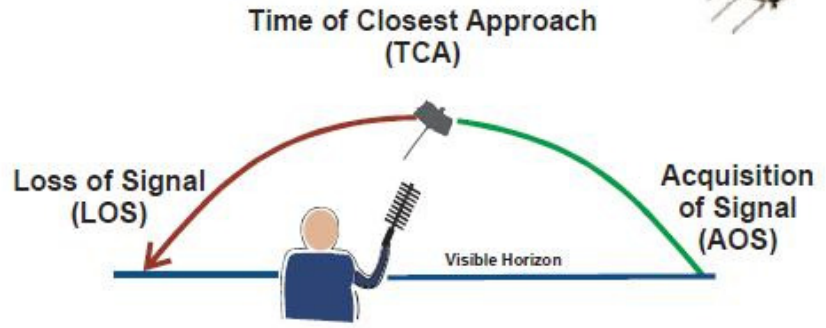
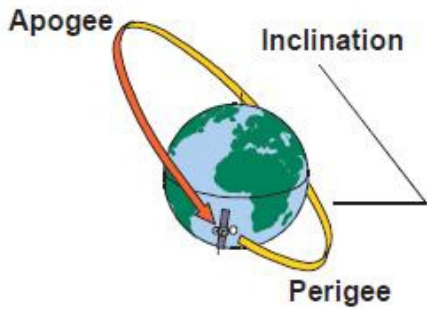
To successfully work an amateur satellite, you need to have transceivers suitable for the satellites you wish to work. For linear transponders, SSB and CW transceivers on the bands of interest are required. For the FM repeaters, either a dual band FM transceiver with crossband transmit/receive capabilities or separate 2m and 70cm FM transceivers are suitable. A related issue is which bands to use. FM users don't have much choice. All of the FM satellites (operational or proposed) use 2m and 70cm, with one of these bands being used for the uplink, the other for the downlink. There are a wider variety of frequencies in use by linear transponder satellites. The suggested bands to try for a first attempt are 2 metres uplink and 10 metres downlink. If you have 2 HF transceivers, it might be worth trying the 10m/15m satellites as well.

For antennas, an existing HF dipole and VHF/UHF omnidirectional antennas will work in a pinch. The typical VHF/UHF colinears typically have a low angle of radiation, and better results may be obtained with a simple  $\frac{1}{4}$  wave groundplane, or for the more serious, a turnstile antenna. If you have crossed Yagis and AZ/EL rotators, all the better (but then this article isn't aimed at you in this case! Finally, though not essential, it is very strongly recommended to have a computer, satellite tracking software and an Internet connection available. The Internet connection is for downloading the latest Keplerian elements for the tracking software (and the software itself if you don't have any), as well as checking satellite home pages for transponder schedules and other information. Besides, the Internet is fun when the birds aren't overhead!

Working your first satellite? It isn't anywhere near as daunting as it sounds. The first thing is to have a look around your shack and see what equipment you have. If, like many amateurs, you have FM only radios on VHF/UHF, then you are limited to the FM satellites. Those lucky ones with all mode transceivers can also try their hand at the linear transponders. The rest of this article will concentrate on FM operation as nearly everyone has FM gear for 2m and 70cm, and the operating techniques are easier to master. If SSB or CW satellite operation interests you, it's a natural progression to move on from FM. For those interested in exploring SSB/CW operation via linear transponders on satellites, there are several excellent introductory articles on AMSAT's web site. (<http://www.amsat.org>)

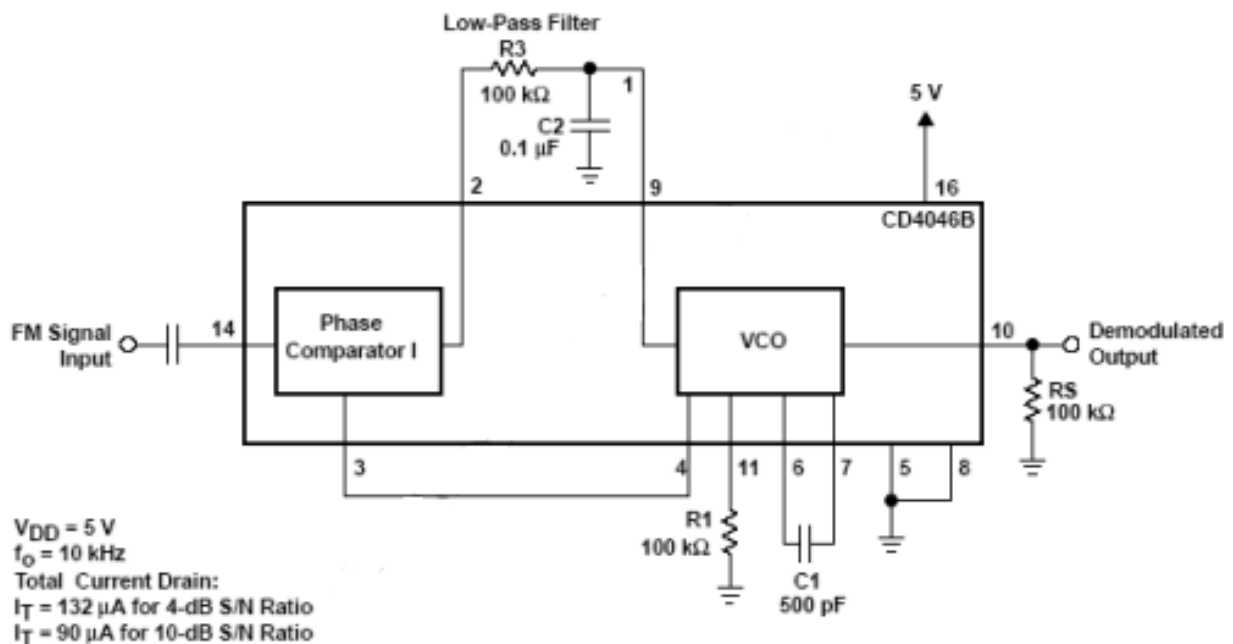
First, time for an inventory, as the gear you have available will partially determine the satellite to use. Regardless of the rig you use, it has to be capable of tuning in 5 kHz or smaller steps, to enable you to follow the Doppler shift as the satellite passes overhead. As the satellite approaches, you should be listening to the downlink frequency, with the uplink ready to transmit when needed. Remember to allow for any Doppler shift (for FM, it will only be significant on 70cm – around 5-10 kHz). If the uplink is on 70cm, tune 5-10 kHz below the nominal uplink frequency (the Doppler shift will make it arrive at the satellite on the correct frequency). If the downlink is on 70cm, you'll have to tune the 70cm receiver 5-10 kHz above the nominal frequency. The transponder sometimes sends over a minute of data or a voice preamble before it's available for use. While this may be a waste of time, this minute is also useful for signal checks and fine tuning your position if you're portable. When the data ceases, you'll hear FM receiver noise from the satellite. At this time, the satellite is ready for use, and you can put out a call. While calling, pay attention to your signal as heard on the downlink. Too much noise may indicate a need to

move the uplink antenna, increase power or adjust frequency to compensate for Doppler shift. If you can't hear the downlink at all, don't attempt to transmit, as you may interfere with someone else. Also, keep things short while using the satellite. Only one person can use the transponder at a time and the satellite is usually only accessible for about 10 minutes. Others will appreciate your efficiency and courtesy. Most FM satellite contacts are usually an exchange of callsigns, signal reports and occasionally a comment about the weather.



## Circuit Of The Month Club

PLL (Phase Locked Loop) can be used to make a FM demodulator. PLL circuits track the input frequency by controlling a voltage input of a VCO (Voltage-Controlled Oscillator). Since the VCO is controlled to follow the input frequency, then the controlling signal is directly proportional to the modulating signal. Here is the schematic diagram of the circuit: For this example, an FM signal consisting of a 10-kHz carrier frequency was modulated by a 400-Hz audio signal. The schematic diagram shows the connections of the CD4046B as an FM demodulator. The total FM signal amplitude is 500 mV, therefore, the signal must be ac coupled to the signal input (terminal 14).



# HAMFESTS and EVENTS:

**The Greenwood Amateur Radio Society with great sadness announces that the 2010 Hamfest has been canceled. The location the Hamfest has been held in has been closed by the Greenwood County Council and we are unable to secure another facility that could handle a quality hamfest.**

**Please stay tuned!**

6 Feb 2010  
South Carolina State Convention  
Charleston Amateur Radio Society  
<http://www.wa4usn.org>  
Talk-In: 146.19+; 144.65+; 147.645-; & 144.81+  
Contact: Jenny Myers, WA4NGV  
2630 Dellwood Avenue  
North Charleston, SC 29505-6814  
Phone: 843-747-2324  
Email: [brycemyers@aol.com](mailto:brycemyers@aol.com)  
Ladson, SC  
Exchange Park Fairgrounds  
9850 Hwy 78

9 Jan 2010  
TechFest  
Gwinnett Amateur Radio Society  
<http://www.gars.org>  
Talk-In: 147.075 (PL 82.5)  
Contact: Norman Schklar, WA4ZXV  
480 North Peachtree Street  
Norcross, GA 30071  
Phone: 770-313-9410  
Fax: 770-755-5411  
Email: [wa4zxv@arrl.net](mailto:wa4zxv@arrl.net)  
Lawrenceville, GA  
St. Marguerite Church  
85 Gloster Road NW

9 Jan 2010  
Winston-Salem FirstFest  
Forsyth Amateur Radio Club  
<http://www.w4nc.com>  
Talk-In: 146.64 (PL 100) or 145.47 (PL 100)  
Contact: Ray D'Eau  
c/o Forsyth ARC  
PO Box 11361  
Winston-Salem, NC 27116-1361  
Phone: 336-245-5740  
Email: [hamfest@w4nc.org](mailto:hamfest@w4nc.org)  
Winston-Salem, NC  
Summit School  
2100 Reynolds Road

## Packet Cluster:

- ◆ Support for SERA supports proper coordination! <http://www.sera.org>
- ◆ <http://www.amsat.org> for all your satellite needs
- ◆ The American Radio Relay League protects our rights as Amateur Radio Operators <http://www.arrl.org>
- ◆ Learn Morse Code! <http://www.fists.org>
- ◆ Spread The Word! 147.165 Net Thurs. 9pm
- ◆ Ladies Net .165 8pm Tuesday
- ◆ Remember your local and regional interest clubs

## Classifieds:

**Nothing this month, check back soon!**

If anyone has any Ham radio stuff to sell or trade... list it in this column by calling Buddy, [w4dew@arrl.net](mailto:w4dew@arrl.net), 864-445-7574

IN THIS NEWSLETTER, I HAD A SMILEY FACE, BE THE FIRST TO LET ME KNOW WHERE IT IS -ED

**If you want to see your article or wish to advertise in The Signal Report, please send an email to the newsletter staff via [WJ4X@amsat.org](mailto:WJ4X@amsat.org)**