

Communications

Large Animal Rescue Group

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El Dorado County Amateur Radio Club
Meets 4th Tues 7:15pm (Except June)
Federated Church, 1031 Thompson Way
Placerville
<http://edcarc.tripod.com>

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Objectives

- Amateur Radio Licensing
- Radio Wave Propagation
- Personal Communications Systems
- Scanners
- APRS
- Equipment
- Frequencies
- Source Lists

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Amateur Radio - Licensing

■ Technician Class

- No code - 35 multiple choice questions – 26 correct
- Privileges – Primarily 2 meters VHF 144-148 MHz
- Equipment up and running in a day
- License Class * Jim Swanson (530) 544-2351

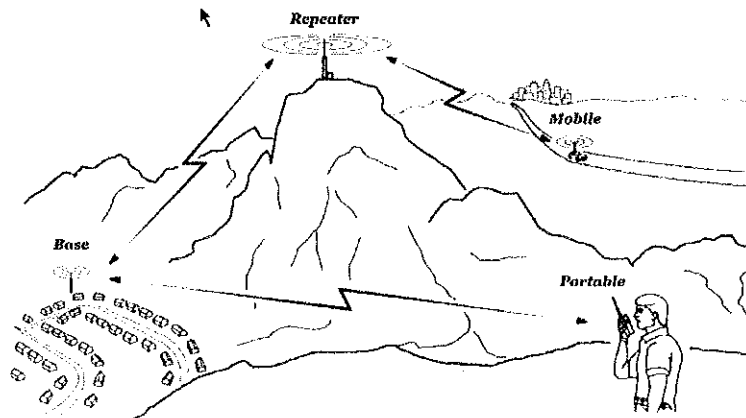
■ General & Extra Class

- 5 WPM code – advanced theory – greatly expanded band coverage
- Unlimited Opportunities!!

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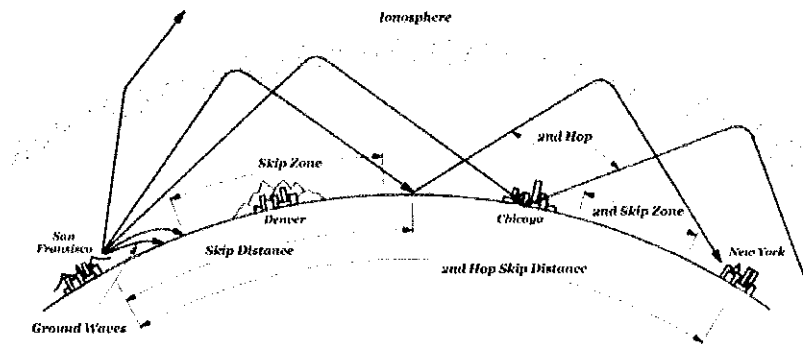
Radio Wave Propagation - VHF/UHF

Technician Class



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Radio Wave Propagation – HF General/Extra Class License



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Personal Communications Systems FRS & GMRS

■ FRS (Family Radio Service)

- 14 UHF channels in UHF 462-467 MHz range.
- ½ Watt Power.
- Non detachable antenna.
- No license.
- Limited range.

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Personal Communications Systems

■ GMRS (General Mobile Radio Service)

- 14 UHF channels in UHF 462-467 MHz range.
- System (family) license, 5 yr renewable \$80, 1-5 watts power. Maximum 50 watts for base.
- A GMRS system is one or more transmitting units used by station operators to communicate messages.
- Antenna for base station must not be more than 20' above ground, building or tree on which it is mounted.

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Personal Communications Systems

■ GMRS (General Mobile Radio Service)

- Every GMRS station must transmit a station identification following end of transmission and every 15 minutes during a long transmission.
- More power is good, but not the most important thing.
- The biggest impact is receiver sensitivity, and how viciously its squelch cuts out weak signals. Get a unit with manual squelch and with a very low number for its receiver sensitivity.
- The other most important impact has to do with your antenna.

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SCANNERS

- There is no one "best" scanner radio for everyone.
- Wide variety and price range. \$39 - \$1,000
- Avoid pre-programmed for public safety by area of country (no ability to manually program). Cheapest, but design limits capabilities.
- Good Features – Tone squelch (CTCSS), manually adjustable squelch, alpha-numeric readout.
- Use conservative programming
- Recommendation: Radio Shack Pro 83 (No tone squelch or alpha readout)
 - Larry Hageman - Manager Radio Shack - 1840 Prairie City Rd
Folsom - 916-608-1929. 10% discount on any scanner. Mention Large Animal Rescue Group. The Pro 83 is normally \$119, on sale till Jun 15th for \$79 + 10% additional discount. \$82 out the door with batteries.Larry is VERY knowledgeable about scanners

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Frequencies

- VHF Repeaters (Frequency, Offset, Tone)
 - Pollock Pines KA6GWY 146.805 – (pl 123.0)
 - Camino N6DPP 147.825 – (pl 82.5)
 - Pinegrove K6ARC 146.835 – (pl 100.0)
 - Auburn K6ARR 145.430 – (pl 94.8)
 - Mt Diablo K6POU 145.190 – (pl 100.0)
- El Dorado/Amador (Simplex-Monitor Only)
 - Main Dispatch (Camino) 159.555 *
 - EDC AEU Dispatch 151.190 *
 - EDC Command AEU 154.430 *
 - Amador Command 153.935 *
 - Main SAR 156.920
 - Secondary SAR 159.690

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Frequencies

■ Other	(Monitor Only)
– EDSO Tac 3	160.695
– EDSO Tac 4	159.825
– Command Law	156.075
– Air-Air/Air-Ground	154.935
– Amador Tactical	154.250
– USFS Dispatch	171.525
– Clemars	154.920
– EDC Roads	151.100
– Folsom Fire	153.995
– Weather	162.400 *continuous

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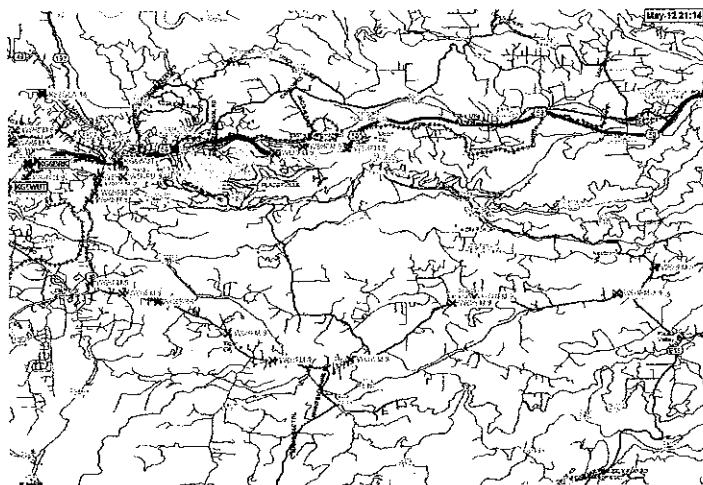
APRS

Automatic Position Reporting System

- Vehicle Position and Movement Reporting
- Weather Reporting
- Objects (includes fixed station positions)
- Bulletins
- Direction Finding Information
- Station-to-Station Messaging (40 character)
- E-Mail

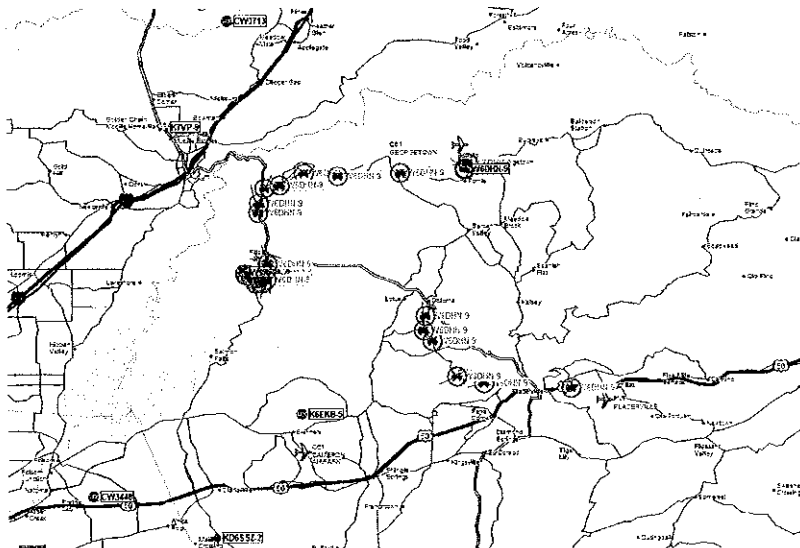
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APRS – UI-View32



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APRS UI-View32



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APRS

<http://map.findu.com/w6hfm-9>

findU: Position of W6HFM-9

5.8 miles southeast of Auburn, CA --- Report received 1 days 10 hours 49 minutes 33 seconds ago
Altitude: 1685 feet M0-E message 0, Off Duty
Raw packet W6HFM-9>SXTYRV,K6G6OWS-3*,WIDE2-2,qAS,KF6FIR:1Yoln-19RJR52

Google

Search

findU links for W6HFM-9

- Nearby APRS activity
- Raw APRS data
- Messages
- Metric units
- Nautical units
- Display track
- APRS Map Manager coverage
- NetRAD Radar
- Topographic map
- Aerial Photo
- photo-ref image

External links for W6HFM-9

- QRZ Lookup
- MSN map (North America)
- MSN map (Europe)
- MSN map (world)
- ToneZone
- TerraServer
- ACME Mapper
- Google Maps (for, NA only)

Zoom

street

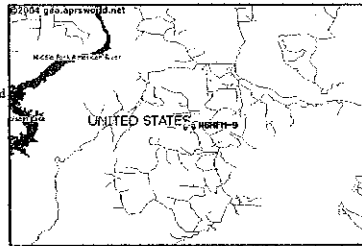
neighborhood

city

state

country

(hide)



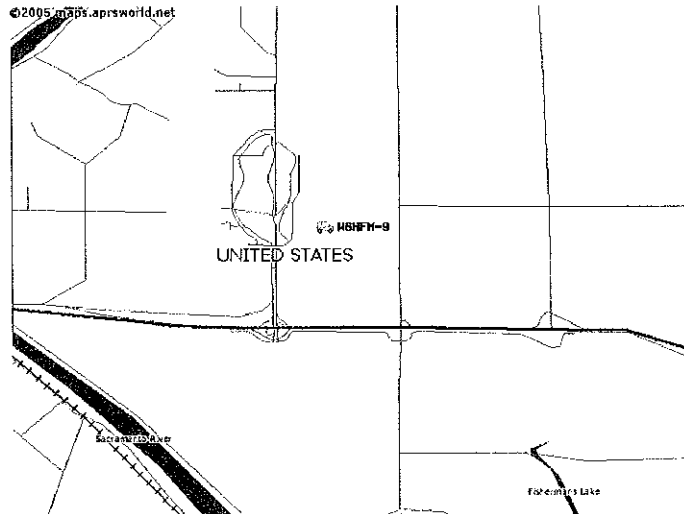
Click the map above for a zoomable map.

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APRS

<http://map.findu.com/w6hfm-9>

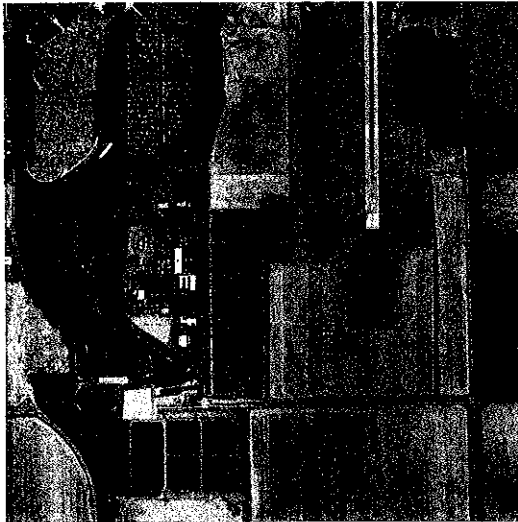
©2005 map.aprsworld.net



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APRS

<http://map.findu.com/w6hfm-9>



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Equipment On Display

- IC T90A Handheld Tri Band 50MHz, 144MHz, 440MHz \$270
 - Compact, full featured tri-bander with wideband receiver
- IC 2720H Mobile Dual Band 144MHz, 440MHz \$390
 - Simultaneous receive, listen to almost any communications
- IC 2100H Mobile Single Band 144MHz \$180
 - Good basic inexpensive single band model
- TH 700A Mobile Dual Band APRS \$490
 - Built in TNC with wide range of data communications
- TH 7DG Handheld Dual Band APRS \$340
 - Built in TNC with wide range of data communications
- Radio Shack Pro 83 Scanner \$119
 - 200 Channels / 10 Banks / Manual Squelch
- Radio Shack Pro 96 Scanner \$500
 - 5500 Channels / 11 Banks / CTCSS / Digital Trunking
- IC F21GM 462-477MHz GMRS \$180
 - FRS/GMRS Personal communications

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Manufactures

- ICOM <http://www.icomamerica.com/amateur/default.asp>
- Kenwood <http://www.kenwood.net/>
- Yaesu <http://www.yaesu.com/>
- Alinco <http://www.alinco.com/usa.html>
- Diamond Antennas <http://www.rfparts.com/diamond/>

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Suppliers

- HRO - Ham Radio Outlet (800) 854-6046
<http://www.hamradio.com/>
- AES - Amateur Electronic Supply (800) 558-0411
<http://www.aesham.com/>
- Ham Stop (888) 676-4426
<http://www.hamstop.com/>
- Radio Shack (800) 843-7422
<http://www.radioshack.com/>
- Scanner World (518) 436-9606
<http://www.scannerworld.com/>
- Radio Ware & Radio Books (800) 457-7373
<http://www.radiobooks.com/> "Now Your Talking" License Study Guide

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Reference Links

- El Dorado ARES (Amateur Radio Emergency Service)
<http://www.ares-el-dorado-county.org>
- ARRL
<http://www.arrl.org/>
- Ham-Shack
<http://www.ham-shack.com/contents.html>
- Scanning California Frequencies – Great Frequency Reference List
<http://www.scancal.org/index.html>
- Eham.net Amateur Radio Portal
<http://www.eham.net/>

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Books

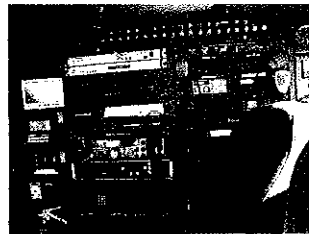
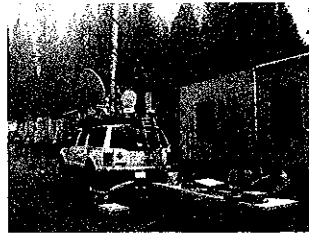
- Emergency Survival Communications – Dave Ingrim
- Now Your Talking! Study Manual – Larry Wolfgang
- The ARRL Operating Manual
- Ham Radio Operator's Guide – Carl Bergquist
- Scanners and Secret Frequencies – Henry Eisenson
- APRS – Stan Horzepa
- FM101x Guide to VHF/UHF Radios – Rod Dinkins
- The ARRL Repeater Directory
- Northern California Repeater Directory - NARCC
- Government Radio Systems, Central Valley

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Red Cross ECRV

Emergency Communications Response Vehicle

- 15 Radio Systems
- 5 Phone Systems
- 11 Computers
- Printer/Copier/Fax
- Mast Video Camera
- 2 TV/Video Monitors
- DSS TV
- VHS Tape Player
- Satellite Internet
- Weather Station
- 8,500 Watt Generator
- 16 Antennas
- 14'x28' Tri-Band HF Yagi



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The Red Cross Needs Volunteers



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Scanner Frequencies

I would say that if they listen to these frequencies on their scanners/ham radios most of the communications traffic in the event of an emergency would be covered.

The first agency who gets a 911 call is the El Dorado County Sheriff's office. The SO dispatcher "CENTRAL" will inquire as to the nature of the 911 emergency; if it is fire or medical the CENTRAL operator will transfer the call to "CAMINO" who will dispatch fire departments, or ambulance or both. CAMINO dispatches for Local Fire Departments in El Dorado and Amador counties, CDF, and USFS. The primary dispatch frequency is 151.190 MHz; as soon as the dispatch is made, any further communications about the event will be conducted on the COMMAND frequency -154.43 in EDC, 153.935 in Amador. This leaves the dispatch frequency clear for subsequent dispatches.

If the 911 emergency is NOT FIRE/MEDICAL but law enforcement related, CENTRAL will make the dispatch on the sheriff's net (159.555 MHz).

If they program their scanners to cover 151.19, 154.43, 159.555 they will hear a vast majority of emergency announcements, dispatches, for all of the primary response agencies in El Dorado and Amador county. To follow the activity on the "after the dispatch" action add Amador county command 153.35 MHz. A lot of the SAR action will be covered on Frank's 146.805 repeater as well as whatever EDSO/SAR frequency that is selected at the time of the incident.

VHF Repeaters	(Frequency, Offset, Tone)
– Pollock Pines KA6GWY	146.805 – (pl 123.0)
– Camino N6DPP	147.825 – (pl 82.5)
– Pinegrove K6ARC	146.835 – (pl 100.0)
– Auburn K6ARR	145.430 – (pl 94.8)
– Mt Diablo K6POU	145.190 – (pl 100.0)
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– EDSO Tac 3	160.695
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– Amador Tactical	154.250
– USFS Dispatch	171.525
– Clemars	154.920
– EDC Roads	151.100
– Folsom Fire	153.995
– Weather	162.400 * transmits continuously

Scanners are much different than other consumer-level radios----or even shortwave radios, for that matter. If you're looking to buy your first scanner radio, you probably feel a bit confused and overwhelmed by the features and specifications of the models you're considering!

As with most consumer items, **there is no one "best" scanner radio for everyone.** For example, if you want to simply listen to your local police and fire departments, a basic, low cost scanner will do fine. On the other hand, you can easily spent over \$1000 for a scanner capable of high performance over a broad frequency range in a variety of modes.

General Considerations

The first thing you need to consider about any scanner is what frequency ranges you're interested in monitoring. To get a better idea of what can be heard on different ranges, click here to visit [The World About 30 MHz](#) section of this site.

Portable scanners have become popular recently. Some are small enough to fit into a shirt pocket and let you follow the action at sporting events, exhibitions, shows, accident scenes, etc. However, **a portable scanner will usually cost more than a home (or "base") unit of comparable features and performance.** And remember that having a scanner visible at certain places and events can result in a quick escort out the door! Many avid scanner fans have both a home scanner and a portable unit.

Scanners really differ in the number of channels you can program in them. Some low cost scanners only have a couple of dozen channels available, while some deluxe scanners have 1000 or more channels you can program. The best advice here is to **buy a scanner with more channels than you think you will need,** as you'll probably run across interesting new frequencies you want to monitor. Maybe the most common wish of scanner fans is that their radios had more channels!

Make sure you understand how new frequencies can be programmed into a scanner. Some scanners will let you enter new frequencies only in specific increments, such as at 5 kHz intervals. Others force you to use the standard spacing between channels commonly used on a given band. More advanced scanners let you enter frequencies down to a single kilohertz. **A scanner that tunes only in fixed increments means you may miss hearing some interesting things.**

Most scanners automatically tune narrow band (that is, deviation of 5 kHz or less) FM on all frequencies except for the 108 to 136 and 225 to 400 MHz aviation bands, where AM is used. **Some scanners allow you to receive wide band FM (deviation of 10 kHz or more) as well.** This will let you monitor the FM broadcast band, television audio, and some government transmissions. However, use of wide band FM outside of the FM broadcast band and television channels is rare. A few scanners, such as the [Icom R10](#) let you receive SSB as well, but SSB is seldom used above 30 MHz outside the ham radio bands, and even there narrow band FM heavily dominates. For most listening, a scanner that tunes narrow band FM (and AM on the aviation bands) should be more than adequate.

If you would like to monitor scanner frequencies and AM and shortwave, then consider a **wideband receiver.** Such radios offer exceptional frequency coverage and models such as the [Icom R5](#) are quite affordable.

Understanding Specifications

The importance of the specifications indicating a scanner's performances largely depends on where you live. If you live in a large urban area, you will need a **high degree of selectivity** (the ability to reject interfering signals) because of the large number of radio signals found in urban areas. If you live in a rural area with few stations, then greater sensitivity (the ability to detect weak radio signals) will be more important.

Sensitivity is measured in microvolts, abbreviated μV . **The lower the number of microvolts, the weaker the signal that the scanner can detect and produce intelligible audio from.**

Selectivity is measured in kHz for a certain level of interference rejection. This rejection is measured in decibels (dB), usually at 50 dB. A **"50 dB" rejection means an interfering signal is reduced to a level 100,000 times weaker than**

its actual strength. If a scanner has a selectivity specification of "40 kHz at 50 dB," this means signals 40 kHz or more away from the signal you want to hear are reduced in strength 100,000 times.

If you live in a rural area, good sensitivity is more important than good selectivity. With fewer stations to hear, you need to be able to catch weak signals and don't have to worry as much about interference. In an urban area, the opposite is true; your main concern is in rejecting interference from stations on adjacent channels, not catching weak signals. In a rural area, narrow band FM selectivity of 40 kHz at 50 dB will usually be adequate, while in an urban environment you will usually need selectivity of 30 kHz at 50 dB or better.

Signals can also "mix" in a scanner's internal circuits, producing false signals known as images. Images are an unavoidable by-product of a scanner's circuitry, but the better scanners can reject most of these phantom signals and reduce their strength. Image rejection is how this is measured, and a good scanner should have image rejection of 50 dB or greater.

While there are some exceptions, as a general rule you do get what you pay for in scanner performance. More expensive models will have better sensitivity, selectivity, and image rejection than less expensive units.

Some municipalities use trunking systems whereby a group or block of frequencies are used on a rotating basis. To properly copy such transmissions, you will need a Trunk Tracking scanner such as the Bearcat BC245XLT with Trunk Tracking that can "follow" the various channels as they are used and changed.

Some municipalities are now transmitting in APCO25 digital voice mode. Traditional scanners cannot "decode" these voice transmissions. Some of the newer scanners such as the Bearcat BC296D can handle both Trunk Tracking and Digital transmissions.

Scanner Features and Controls

Here are explanations for features and controls commonly found on scanners:

- **Attenuator.** This reduces the sensitivity of a scanner in order to reduce images and other effects of strong nearby signals.
- **Audio squelch.** This resumes scanning if a signal has no audio on a channel after pausing on the channel for a few seconds.
- **Autoload.** This automatically stores new frequencies found during a search into the scanner's memories.
- **Bank.** This is a way of dividing a scanner's channels into smaller, manageable blocks for specific purposes.
- **Delay.** This determines how long a scanner pauses on a channel for another transmission before resuming scanning.
- **Hold.** This lets you stop scanning on a channel so you can monitor it continuously.
- **Lockout.** This causes the scanner to skip over a channel during its scanning sequence.
- **Priority channel.** When a signal is present on a priority channel, the scanner switches to it regardless of whether signals are present on other channels being scanned.
- **Search.** With this, the scanner tunes through a range and stops when an active frequency is found. This is very handy for finding new stations and users not listed in frequency directories.
- **Squelch.** This silences the scanner's audio until a signal of a certain strength is received. The squelch level can be manually set.

Universal Radio offers a good selection of scanners and wideband radios.