

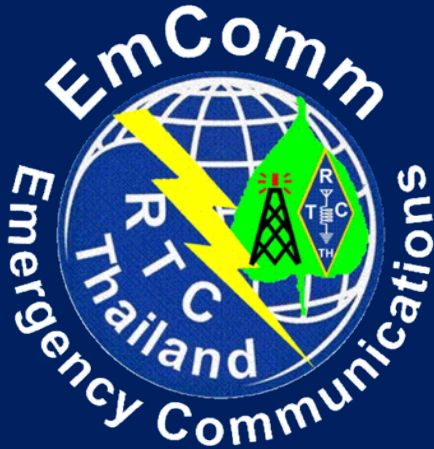


Buying Your First HT

**Community-based Education for
Amateur Radio and Emergency Communications**



An RTC-TH EmComm / GERC Collaborative Training Series presentation



Compiled and Edited by
HS0ZHM and N7YLA

For other lessons in the series visit

www.neighborhoodlink.com/org/rtcth
www.neighborhoodlink.com/org/gerc



A part of the RTC-TH EmComm Program

The Rural Training Center-
Thailand Emergency
Communications program is a
volunteer effort to provide
emergency amateur radio
communications for local
community self-sufficiency and
sustainability in times of need.



Ready to serve and sustain our community



The Glendora Emergency Response Communications (GERC)

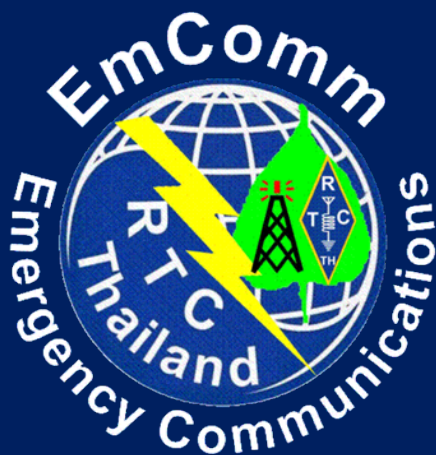


The mission of the Glendora Emergency Response Communications group, herein known as GERC, is to unite those amateur radio operators who have a common interest in communications, specifically to provide training, support and encouragement to radio amateurs who wish to serve as emergency communicators for the Church of Jesus Christ of Latter-day Saints (LDS).



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Topics in this lesson

- An overview of Technician class Privileges
- Overview of VHF
- General overview of radios
- The GERC EmComm HT
- Buying your first HT (handy talkie) for personal use and / or local emergency communications
- Selected resources and opportunities to get on the air
- Preparing your radio for emergencies
- Opportunities and Resources





Our Assumptions for this lesson

Our basic assumptions about you and your amateur radio needs:

- You are not a techno-geek
- You are not immediately interested in Morse code
- Your main interest is local emergency communications for personal use or community service
- This is your first amateur radio purchase
- You don't want to dive into the deep end of the pool until you learn more and get some experience



Overview for Tech License holders

One way to see the world of radio is to match the distance (range) of the radio to the “bands”. In other words, how far away do you want to talk?

Relative Distance	Bands	
Global	HF (direct contact)	VHF/UHF with internet links
National		
Regional	HF (NVIS antennas)	VHF/UHF via repeaters
Local		VHF/UHF

Internet connectivity enables contacts at the full range of distances.

The lowest cost local direct voice communications generally available to Technician class license holders is by using VHF radios. Generally, HF radios cost more than VHF radios.



Where in the spectrum for Technicians

First, since many of us don't know Morse code, we won't be using much of the HF (High Frequency) bands accessible to Technicians

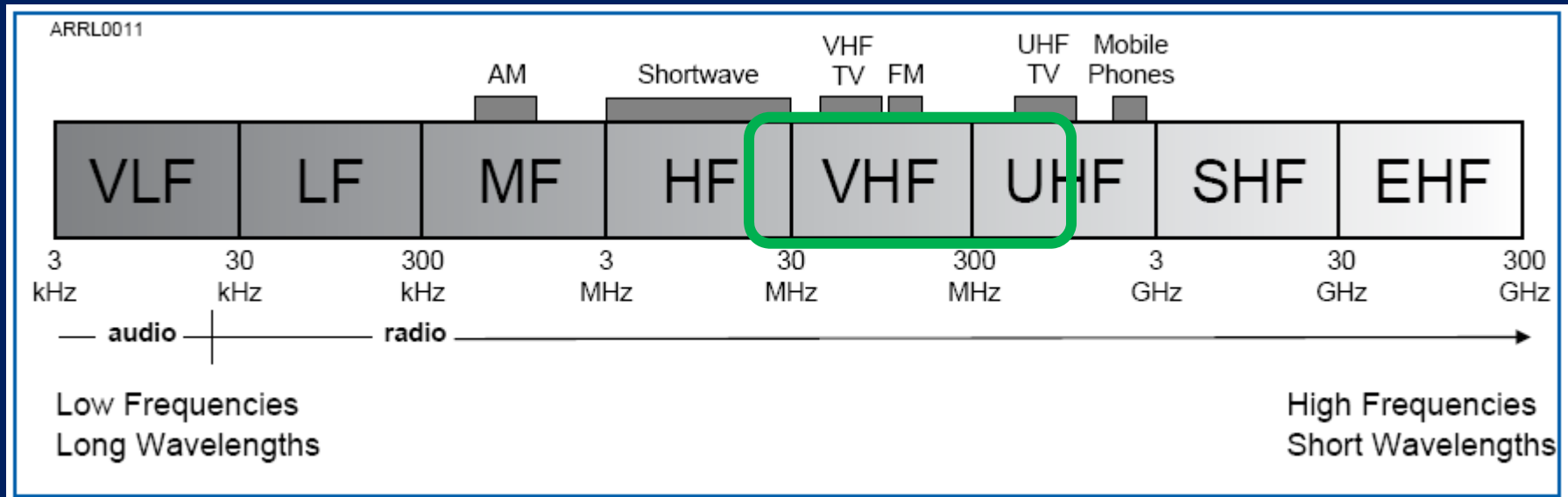


Image from the internet: educational fair use clause.

If your main interest is operating in the allowable HF bands with your Technician License, this lesson is not for you.

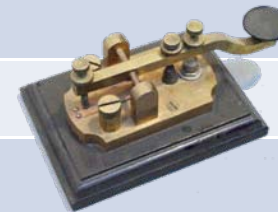


Matching operating privileges and interests

Here's a detailed look at the HF (High Frequency) bands accessible to Technicians

You must learn Morse code to exercise your Tech privileges here

Band (λ)	Freq (MHz)	Mode/Power
80 m	3.525-3.600	CW only
40 m	7.025-7.125	CW only
15 m	21.025-21.200	CW only
10 m	28.000-28.300	CW, RTTY/Data; max 200 w PEP
	28.300-28.500	CW, Phone; max 200 w PEP
6 m	50.0-50.1	CW only
	50.1-54.0	CW, Phone, Image, MCW, RTTY/Data



Source: www.arrl.org/frequency-allocations as of 2 May 2011

Images from the internet: educational fair use clause.

If your main interest is operating in the allowable HF bands with your Technician License, this lesson is not for you.



Matching operating privileges and interests

Since most of us are interested in personal use or local emergency communications, the 2m “Phone” or voice bands are of primary interest.

A dual band HT lets you work all of these.

Band (λ)	Freq (MHz)	Mode/Power
	144.0-144.1	CW only
2 m	144.1-148.0	CW, Phone, Image, MCW, RTTY/Data
70 cm	420.0-450.0	CW, Phone, Image, MCW, RTTY/Data
33 cm	902.0-928.0	
23 cm	1240-1300	



Source: www.arrl.org/frequency-allocations as of 2 May 2011

Image from the internet: educational fair use clause.

Assuming you already have a computer with internet access, a free alternative is EchoLink® which you can download from www.echolink.org



VHF vs. UHF side note: What's the difference?

Both are used in EmComm,
but not all EmComm work is the same.

General EmCom uses
mostly VHF and HF



Message relay / Traffic Handling

Search & Rescue
(SAR) uses both
VHF / UHF



SAR does some message relay
but uses UHF for building interior
communications. VHF cannot
function inside buildings very well.

Photos from the internet: educational fair use clause.



What is your interest?

VHF only or Dual Band?

Give some thought to what you may want to do about EmComm in the short / long term.



VHF is fine if you work from a base at home, car, portable at a shelter, or pedestrian on foot.



Consider a dual band VHF/UHF if you might also be communicating INSIDE large buildings or doing SAR work in the future.



***If you work in a building, a disaster could trap you inside.
A dual band radio could be a way to contact help.***

Overview for Tech License holders

Another way to see the world of radio is the traditional groupings by purpose.

Purpose	Bands / Frequencies
Personal use or Local EmComm	VHF or dual band VHF/UHF
HF home-based globe trotter	HF ^[1]
Casual / Regional contact	Mobile VHF or dual band VHF/UHF
Portable / Mobile operating ^[2]	HF or VHF/UHF or all 3

[1] Internet connectivity can be done with HF, VHF, UHF thus blurring the traditional categories and classifications.

[2] Portable operating means you are not at your normal fixed operating location. Mobile operating means you moving (e.g. hiking, biking, or driving) and operating. EmComm can involve both portable and / or mobile operating.

This lesson is primarily concerned with radios for personal or local EmComm use.



Overview for Any License holder

You can also try looking at radios from the point of operational mode or use.

Operating mode

Fixed Base	Operating from a “permanent” installation such as at home.
Portable	Operating from a “temporary” set up like field day.
Mobile	Operating while you are moving in a vehicle.
Pedestrian	Operating while hiking or walking.


- These modes can all be modified with internet connections making these “traditional” categories very fuzzy.
- Hardwire internet connections are generally more stable and faster than wireless connections.

All of these operational modes are suitable for personal or local EmComm use.



Overview for Any interested in VHF

Operating Mode	Type of VHF radio		
	Handy Talkie	Mobile	All-mode
Fixed Base	Can be used but lowest power of the choices available	Better than HT; less cost than All-mode	Main use
Portable		Main use	Possible but depends on unit design
Mobile		Possible but power supply is heavy	Possible but not probable
Pedestrian	Main use		



Lauren operating portable

Lowest cost

Smaller lighter

Smaller antenna, lower power

Highest cost

Bigger heavier

Bigger antenna, higher power

This graphic is relative and not to scale (increases may not always be linear).



VHF radio for Tech License holders

Radios for personal or local EmComm use are typically VHF or VHF/UHF radios. These can be handheld or mobile radios.

General Characteristics		
Item	Handy Talkie	Mobile
Power	✓ 3-5 watts	✓ 25+ watts
Power source	✓ AA, NiCd, NiMH, Li-Ion batteries	12 VDC wet cell, AGM, or gel battery
Antenna	✓ "Rubber duck" included	Separate option; needs coax cable

✓ These items usually included in purchase (but often only 1 NiCd, NiMH or Li-Ion).

Mobile radios incur added costs for an antenna, cable, mounting brackets, and installation if you don't do it yourself. [Caution: Installation may involve drilling holes so if you are leasing, check your contract. New car owners need to read their terms as connecting to the vehicle's electrical system may affect the warranty. Check to see if insurance will cover your Ham radios.]

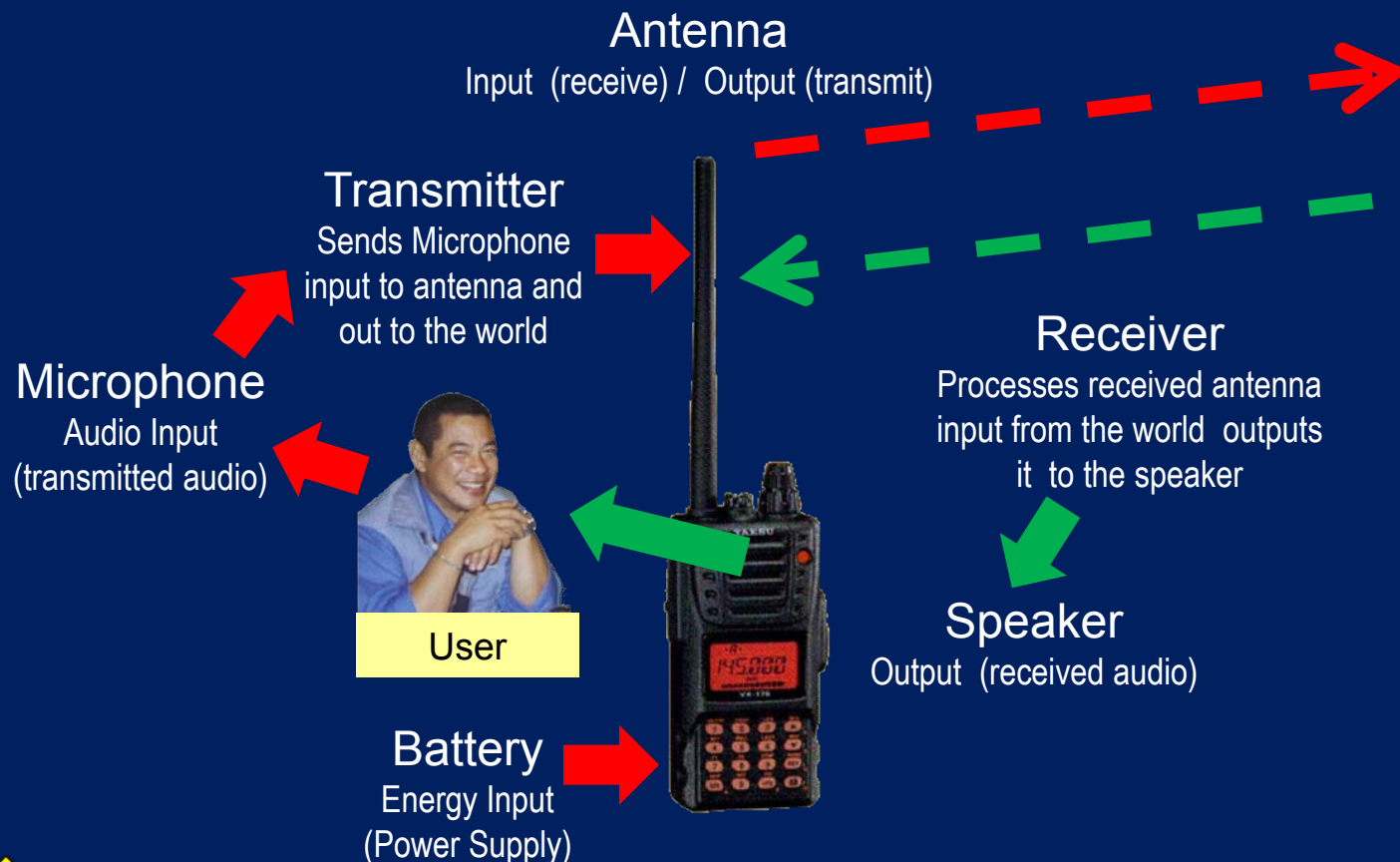
Both handy talkies and mobile radios can be used in all 4 operating modes. Mobile units can be (but usually aren't) used in pedestrian mode. You may need different kinds of antennas for the different modes (depending on space, budget, and local regulations).



Overview General Radio

Warning

What most people call a “radio” is really a radio system (a collection of parts working as a unit).



***Do not key the mic without an antenna attached to the radio.
Transmitting without an antenna may seriously damage your radio.***



Overview General Radio Basic package

Most HTs come with a “rubber duck” antenna, one rechargeable battery and a battery charger.



We suggest getting a spare rechargeable NiMH battery and an AA battery pack adapter with 2 sets of batteries.

Be sure the charger can do both NiCd and NiMH type batteries.





The best radio and the best operator can do nothing without a good antenna.

The “rubber duck” is a common “standard equipment” antenna for most HTs. It is compact and easily fits into the small box for the radio. Technically, you have an antenna (remember, if you accidentally key the mic without an antenna, you may seriously damage the radio).



A “rubber duck” has a range of ~1-2 miles (which may be much less when you are surrounded by buildings).

Photos from the internet: educational fair use clause.



Overview General Radio

Power

The best radio and the best operator can do nothing without power for the radio.

Types of Batteries for HT radios

Type	Rel. Energy	Drawback	Cost	Remarks
Li-Ion*	Highest	High cost	Medium to High	May come with radio or be an optional purchase; long storage life
NiMH	High	1-5% charge lost /day	Medium	May come with radio or be an optional purchase
NiCd	Low	1-5% charge lost / day	Low to Medium	Often comes with radio as standard
Lithium	High	Higher cost than Alkaline	Medium	6 X longer than Alkaline; 10 year shelf life
Alkaline	High	Not rechargeable	Low	Good emergency back-up; common, easy to find.

Rechargeable

You must keep batteries charged and ready to go for any emergency.

* See more information about Li-Ion batteries on next slide..



Overview General Radio

Power

The perfect radio battery is still a dream, so every battery option has a +/- compromise to it.

Types of Batteries for HT radios		
Type	Energy /cell	Remarks
Rechargeable	Li-Ion	Best recharging characteristics, higher capacity, 30% smaller than NiCd/NiMH; but AA pack only for 2-3 AA cells due to size of Li-Ion battery pack so AA pack enables power to let the radio monitor but radio may not fully function
	NiMH	Same size as NiMH; can be recharged 3-4X more times than NiCd; has 40% more capacity than NiCd.
	NiCd	“Memory effect” can be minimized IF battery is fully discharged BEFORE being recharged.
	Lithium	One time use; expensive but longer storage life than Alkaline.
	Alkaline	One time use only; cannot be recharged. Power good enough for radio to function to factory settings. AA battery packs are the most compatible with NiCd / NiMH in terms of size so that 6 AA cells provide sufficient power for radio to fully operate.



- Not all battery chargers are created equal. NiCd/NiMH chargers cannot charge Li-Ion batteries.
- Further, Li-Ion batteries must be matched to a particular charger. These battery/charger sets are proprietary and cannot be mixed between radio brands & sometimes not even different models of a brand. This means a separate Li-Ion charger for each different model radio / Li-Ion battery. You usually cannot swap Li-Ion batteries between different radios just because they both use Li-Ion batteries.
- Li-Ion batteries are rechargeable. Lithium batteries are NOT rechargeable.

If buying more than one HT for a family or group, consider buying the same brand and model so you can share batteries and accessories for better “inter-operability”.



The Basic GERC EmComm HT

This is the suggested RTC-TH / GERC basic HT EmComm system

- High gain whip Antenna rather than “rubber duck”
- Headset
- Spare battery & AA Battery pack
- Carrying case / bag
- Power adapter cord
- Reference cards
- plastic bag “rain coat” (a clear baggie)
- “Tiger Tail” ground radial (easy home project)



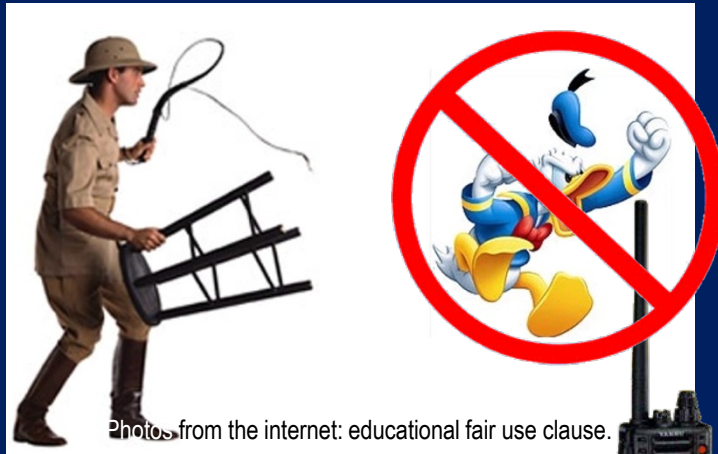
Photo courtesy of GERC

KENT (KD6BOO) with his HT in a fashionable GERC vest

Consider getting everything at the start.
If you get things a little at a time, some
items may not be available later.



First and foremost: Dump the “rubber duck” and get a high gain whip antenna.



A “rubber duck” might have a range of about 1-2 miles

A high gain whip might have a range of about 1-4 miles

Antenna performance is affected by numerous variables (e.g. terrain, vegetation, etc.)

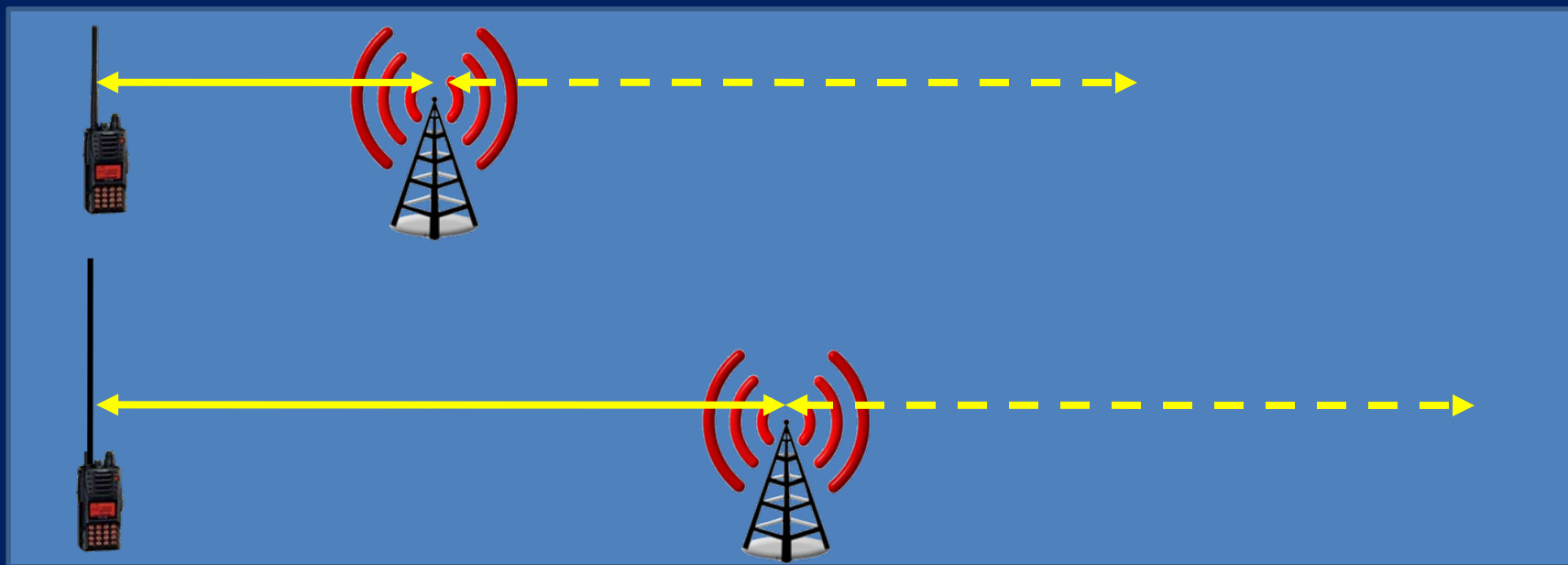
The thick whip is a Diamond SRHF40A

The thin whip is a Comet SMA24



See the footnotes about other antennas HS0ZHM uses with his HT.

“Rubber Duck” range about 1-2 miles
High gain whip range about 1-4 miles.
Repeater extends this range 15-25 miles.



Drawing not to scale. Local terrain will also affect actual results you get.

Images from the internet: educational fair use clause.



See the footnotes for how HS0ZHM uses other antennas and connector / adapters to increase his HT range.

Second: Make and use a “Tiger” Tail



A tiger tail is a $\frac{1}{4} \lambda$ counterpoise for the HT's vertical antenna. Keep the tail vertical though some users report directionality if pointing the tail toward the intended receiving station.



If your radio came with an NiCd rechargeable battery, get an NiMH as rechargeable spare and plan to replace the NiCd when it dies with an NiMH battery.

NiCd batteries have a “memory” disadvantage that can seriously limit the amount of stored energy. Newer technology produced the NiMH battery that does not have this “memory” problem.

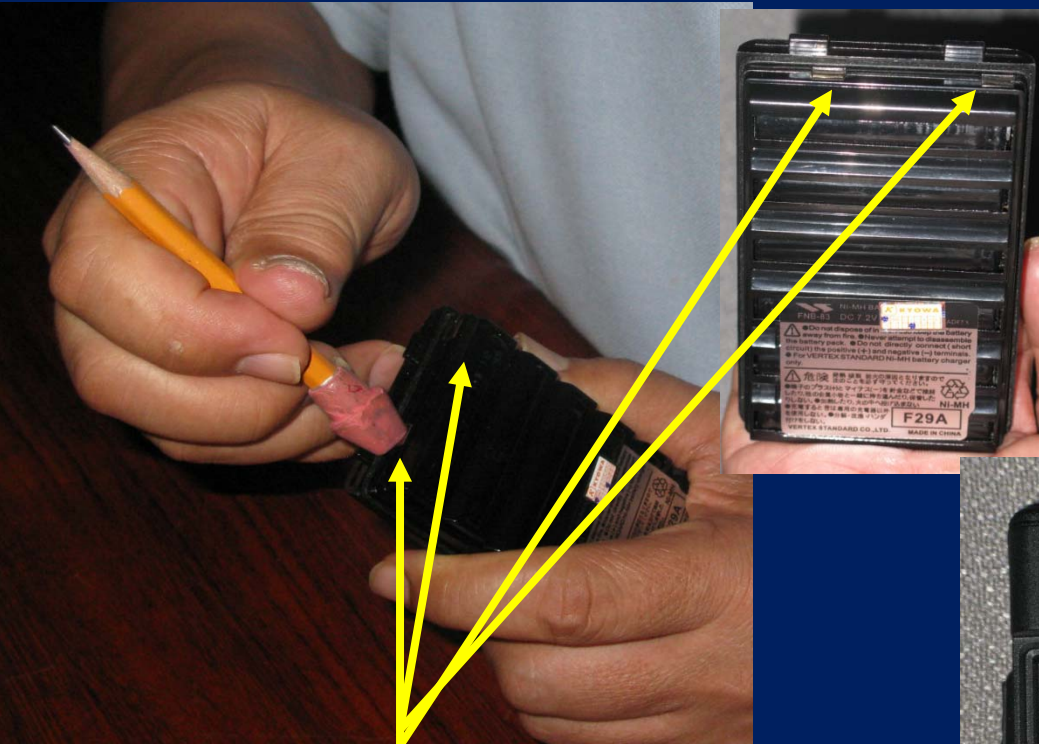


Photos courtesy of RTC-TH

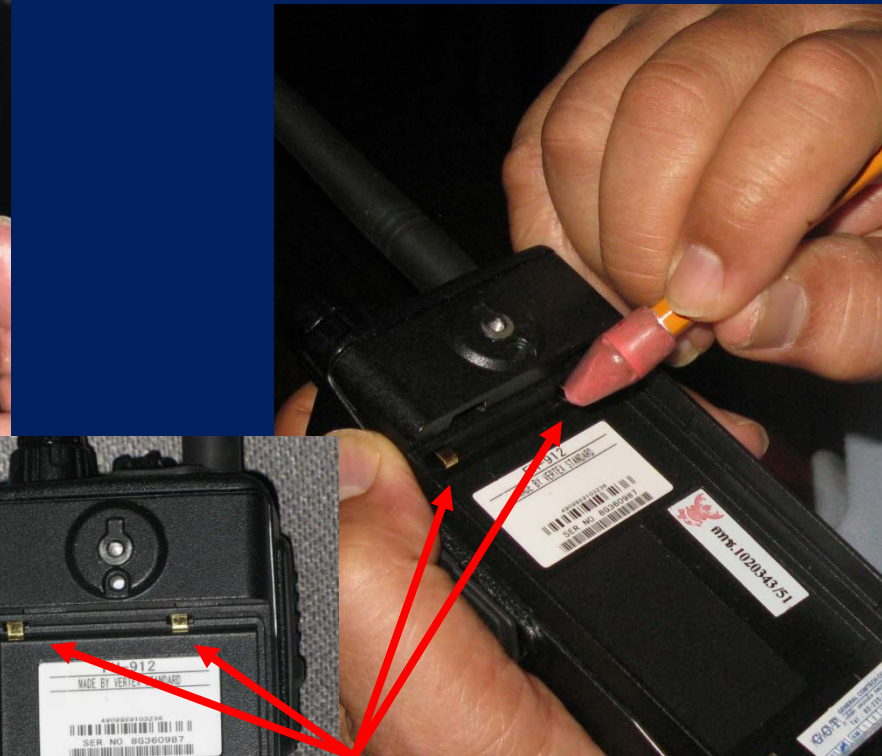
Li-Ion rechargeable batteries are an even newer technology. Li-Ion batteries are smaller, so their AA battery pack may not have enough power to run your radio in a normal mode or you may have limited capability when using AA battery packs.



Clean battery terminals and contacts when installing or charging your batteries.



Use a rubber eraser to clean the battery terminals



Use a rubber eraser to clean the battery contacts in the radio.

Even a thin layer of oxidation adds resistance to the circuit reducing battery power that can prevent effective power coming from even fresh batteries.



Your batteries should always be charged and ready to go. NiCd / NiMH batteries self-discharge so you need to check them at least every 3 months.

This is a standard emergency preparedness routine.

For a scheduled GERC activity, make sure your main and back up batteries are fully charged BEFORE getting to the event. Check to see if there is access to power to charge batteries on site (in case this is a long duration event). But don't assume power access for re-charging will be available even if promised.

Always show up with your batteries fully charged.



Photos courtesy of RTC-TH

Before charging your batteries use a pencil eraser to clean the battery terminals and the battery contacts on the charger. A thin film of oxidation creates electrical resistance that can seriously affect charging efficiency.



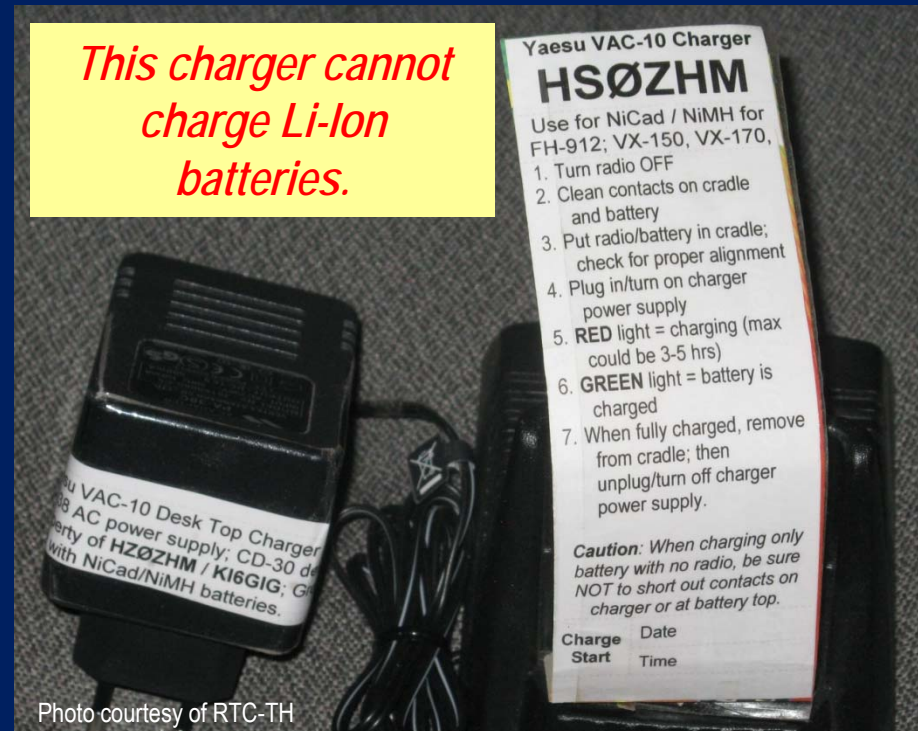
Not all battery chargers are created equal. NiCd/NiMH chargers cannot charge Li-Ion batteries. Further, Lithium-ion chargers are proprietary and cannot be mixed between makes & models.

Mark your charger as to:

- Input power required
- what kinds of batteries / radios can be charged on the unit
- brief summary of charging procedure
- approximate charging time
- If charger cords can be detached, label each cord so you know which charger it goes to and vice versa.

In an emergency, if you are not around, anyone will know if they could charge their batteries using this charger.

This charger cannot charge Li-Ion batteries.



Check your manual to see if it is possible to operate the radio during the charging cycle. My HT cannot be used while being charged. That's why it's a good idea to have another battery.

Keep your batteries charged. Exercise / Rotate your main and spare batteries on a regular schedule. Date/tag them so you can monitor their use/charge cycles.



Get a supplementary AA battery pack for your radio. HTs with NiCd or NiMH batteries can be powered by 6 AA batteries. But you need the pack to fit your HT.



Keep all 6 AA batteries the same brand and type (Alkaline). Do not mix and match.

Install / replace all 6 batteries as a set (assuming they are all fresh and from the same batch at the start). Power from the pack is limited by the power of the weakest battery.

Double check the battery polarity before installing batteries into the battery. Improper polarity may damage your radio.



Mark the battery holder polarity to avoid trouble.

In the chaos of an emergency this simple marking helps prevent improperly loading batteries into the pack.

The AA cells are arranged in “series” so if they are not put into the pack in the right order, it won’t work and you may damage your radio

The “+” battery positions have white dots.

Just like summer camp, mark your gear to avoid confusion and lose when working with others.

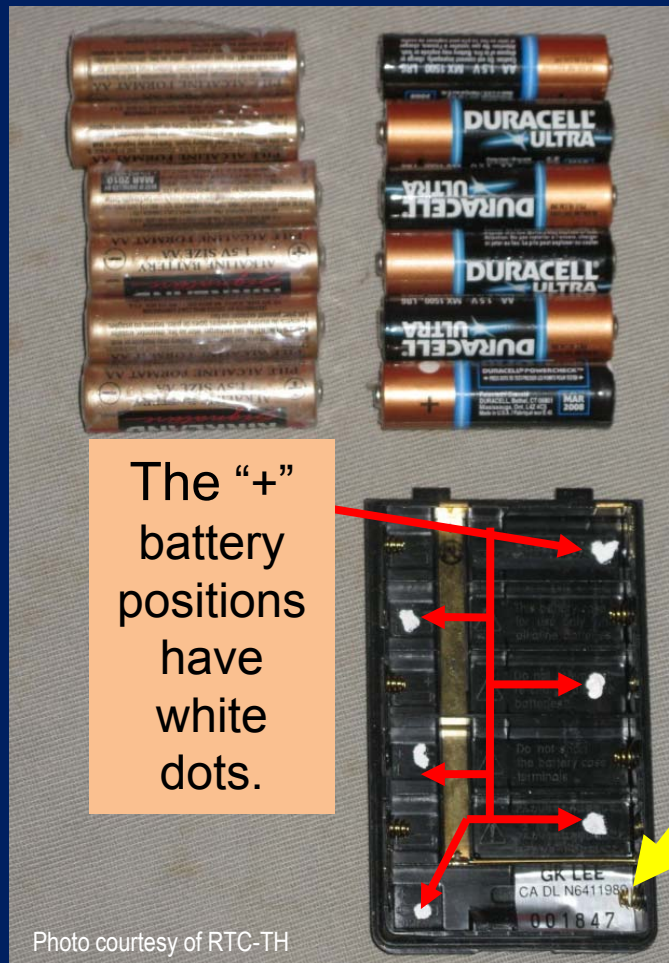


Photo courtesy of RTC-TH



Do not store the batteries in the battery pack.

This is the same warning for batteries in any electronic device that you are not actively using. If the batteries leak they will damage the battery pack.



Photo courtesy of RTC-TH

This “snack” size zip bag holds 12 AA batteries and the radio battery pack holder. Keeping everything together assures you won’t forget anything when you pick up and go.

Make sure the batteries don’t “short out” while being stored. Do not use tape to cover the battery terminals as the adhesive may prevent good contact when you install the batteries.



Other than a spare battery and an AA battery pack, an auto accessory power cord is handy.

BEFORE plugging into any external DC power supply check to make sure the voltage is compatible with your radio.

Again, not all radios are created equal. Some HTs work on 6 VDC, 7.8 VDC or something else. Car power outlets are 12 VDC, considerably higher and could potentially fry your HT.



Label cords with name of their matching device and voltage.

Many power cords are black and do not bear clear markings as to what radio, charger, or device they are intended for.



RTC-TH / GERC suggest using a headset.
Look at how you will operate and decide for yourself.



Photo courtesy of GERC

Rob (KE6YGF)
working as Net
Control using a
“boomer”

Accessory	Situation
HT only	Casual operating
Ear bud	OK in office or car; HT held like a mic
Ear bud w/ mic	Ok in office or car; HT is hands free
Mic w/ speaker	HT is hands free; mic located as you like
Waterproof mic w/ speaker	Same as above but used in a wet environment
Headset	Noisy environment; HT held like mic
Headset with boom mic	Noisy environment; HT is hands free

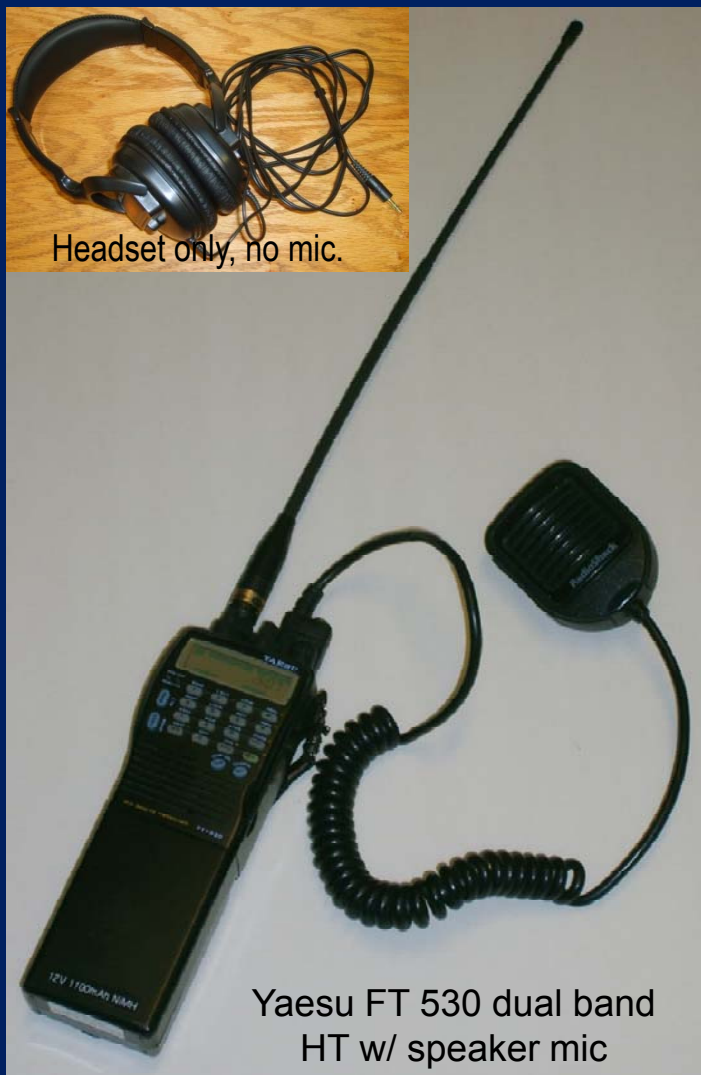
A headset with a boom mic provides optimum flexibility as it can be used in nearly all situations. It is especially useful when working in crowded, noisy conditions that make it hard to hear other radios for calling you.



Here's what other GERC volunteers use.



GARY (KG6RED) using an ear bud with his pedestrian HT



Yaesu FT 530 dual band
HT w/ speaker mic



JIM (KG6TQT) uses a headset (no boom mic) with his HT set up as a portable station w/ an external speaker

Each GERC ham sets up an HT to fit their budget, operating style, and personal preference.





SHANE (KC6PSH) uses an ear bud but stows his radio in his GERC vest pocket leaving both hands free to handle any problems.

The GERC Vest is our EmComm fashion statement at the annual gala Covina Christmas Parade



MORGAN (KG6TPT) also uses an ear bud but keeps a “hands on” approach with her HT though her GERC vest has a radio pocket.

GERC strives for a balance of standards with flexibility for its volunteers. For example, caps are option (for others hair is optional).





Most HTs are built tough but there's no sense to drop test it. I found this padded camera bag at 99¢ Store. It is big enough to hold my HT, spare NiMH battery and the AA battery pack with 12 AA batteries, small note pad, pen, radio reference cards, whistle, and a combination thermometer / compass.



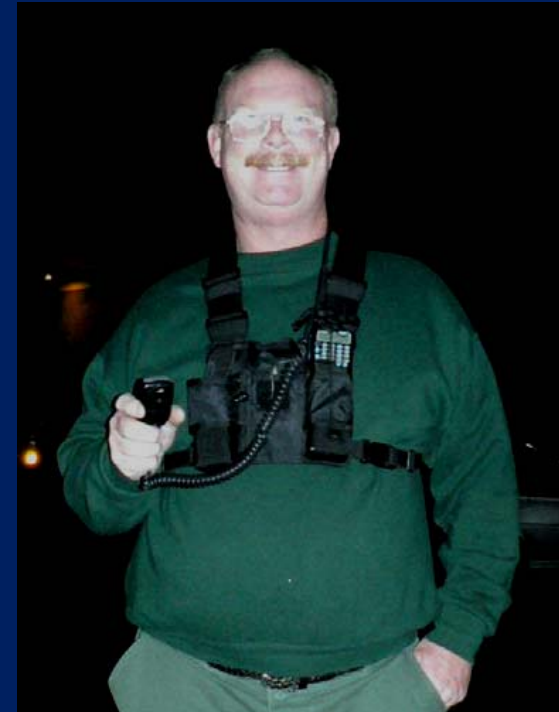
GERC EmComm HT

Carrying it in the field



This HT with a speaker mic is in a belt pack with a pocket for extra batteries.

LARRY (KE6EOL) prefers a black utility harness that makes for higher level operating and prevents “wasting” battery power associated with belt pack units.





MAY (KE6QVJ) got lucky and was able to work near her car. If needed, she can tap into the 12 VDC power from the car for her HT. But she needs to make sure the adapter outputs the correct voltage for her HT or it “may” fry her HT!!

[There’s a rumor she bought an HT with the optional toothbrush attachment and that’s why she’s showing off her smile!]

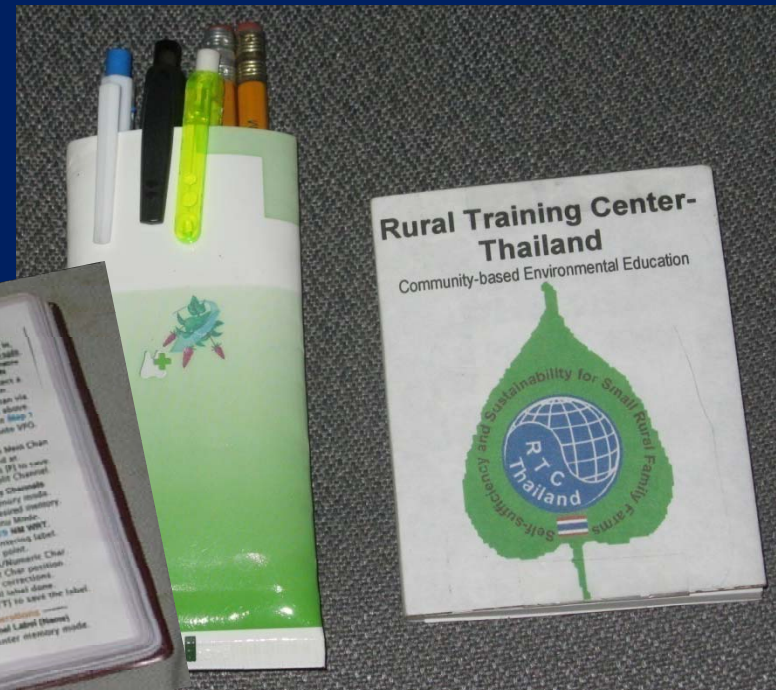
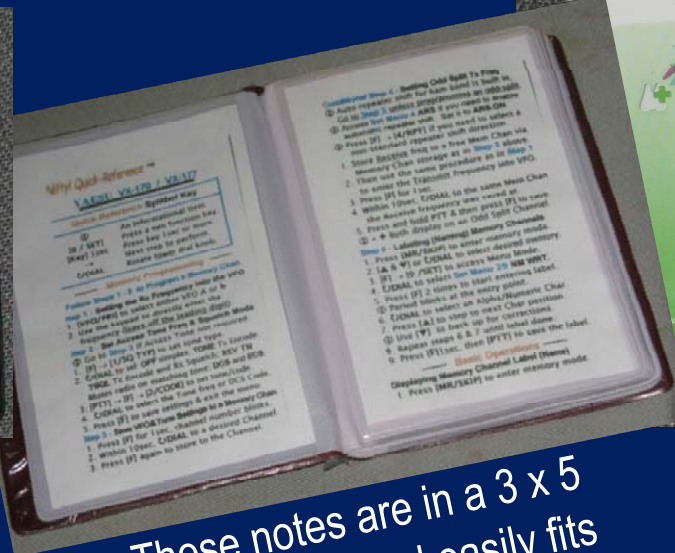


Rich (KG6MXP) with a boom mic headset and optional Santa cap, and 2 HTs (one for each hand) ready to do double duty in his official GERC vest. I wonder if the boom mic helps him boom out “Ho Ho Ho” any better? ‘Tis the season after all!



- Quick Reference cards
- Notepad / pen with event information

There's a lot to know and remember.
Helpful notes and repeated practice will
bring it all together over time. Honest-Lee!



This card is not much larger
than an HT radio battery

These notes are in a 3 x 5
photo album and easily fits
into a shirt pocket

Just like class, don't show up
without pen and paper.



High gain
whip
antenna

Plastic
bag dust /
rain shield

“Tiger” tail
counterpoise



OK, some HTs are supposed to be “waterproof” but many are not.

It can rain very heavily in Thailand, so a tiny hole in a clear plastic bag for the antenna connection gives added protection for an HT. For southern California, dust protection may be more important.



Preparing for EmComm

GERC Emergency Communicator's Creed

- My own house is in order, I have all of the resources to get my family through an emergency.
- I am well informed on what to do and how to respond in an emergency. I keep my skills in First aid, CERT, and Disaster Communications Training up to date.
- I maintain well equipped personal and communications response bags and keep items in them current.
- I practice my communications and survival skills by participating in at least yearly outdoor camping and communications events.



Photo courtesy of GERC

JIM (KI6BXZ) GERC vested, HT equipped, belt bag with optional hat and beard.



If you are not well-prepared for an emergency,
you are in no condition to try to help others.

Make a “Go Bag”

The “Go Bag” should have everything needed to support your radio EmComm operating for rapid response.



Photo courtesy of GERC

Here's a peek at what's inside N7YLA's "Go Bag"

The contents of a “Go Bag” are detailed in “Personal Go-Kit for Emergency Communications” that you can download from www.neighborhoodlink.com/org/gerc



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Make a “Go Bag”

You should be able to just pick up and go with your “Go Bag” and be able to arrive and get on the air quickly.



Richard (KG6TRD) got up and “gat”, arrived, set up and sat ready to get on the air.



Photos courtesy of GERC



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The contents of a “Go Bag” are detailed in “Personal Go-Kit for Emergency Communications” that you can download from www.neighborhoodlink.com/org/gerc

Preparing for EmComm

Practice using your radio is an essential part of preparing.



Photo courtesy of GERC

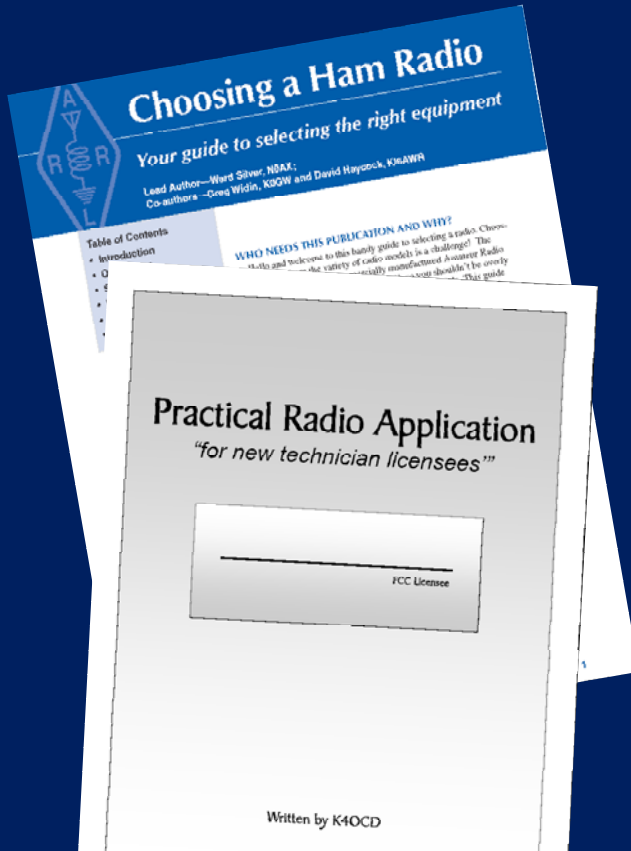
JIM, KI6CFM,
gets practice as
a GERC
volunteer
communicator at
the annual
Covina
Christmas
Parade

Sign up early for this big event. Volunteers are welcome for this festive event. FFI: N7YLA@arrl.net







Shopping (or its beginning to look a lot like Christmas)

These are some HTs from the “big name” manufacturers



These documents are free at www.arrl.org

Alinco DJ-175 T	Icom V-82	Icom v-85	Kenwood TH-K2AT	Yaesu FT-250	Yaesu 270R
					
\$109.95	\$129.95	\$178.95	\$149.95	\$129.95	\$139.95

Name Brand 2 Meter HTs (5 watts RF output or better)


Search the internet for current models and prices as technology changes rapidly

Images from the internet: educational fair use clause.



Shopping: Manufacturer websites

Here are web sites for the primary manufacturers of Amateur Radio transceivers:

 ALINCO [®]	Alinco	www.alinco.com
 ELECRAFT	Elecraft	www.elecraft.com
 FlexRadio Systems [®] <small>Software Defined Radios</small>	FlexRadio Systems	www.flex-radio.com
 ICOM	ICOM	www.icomamerica.com
KENWOOD	Kenwood	www.kenwoodusa.com
MFJ	MFJ Enterprises	www.mfjenterprises.com
 TEN-TEC	Ten-Tec	www.tentec.com
 YAESU	Yaesu	www.yaesu.com

Many other manufacturers and distributors are listed in the pages of *QST magazine* and in the ARRL Technical Information Service directory at www.arrl.org/tis



Shopping (Chinese HTs are new contenders)

Chinese competitors save you nearly 50%!

Check the internet as models and prices change quickly.

Consider the fact that even the “big name” brands are sometimes made in China.



Feidaxin FD 160A - \$54.40



Quansheng TG-45A- \$59.50



Weierwei VEV-3288S - \$66.50



Quansheng KG-K4AT- \$59.50



Feidaxin FD-268A - \$65.70



Wouxun KG-679 - \$73.00

Chinese manufactured 2 Meter HTs (5 watts RF output or better)



Shopping: Reading the Spec Sheet

SPECIFICATIONS	
General	
Frequency Ranges	RX 137-174 MHz TX 2 m Amateur Band
Channel Steps	5, 10, 12.5, 15, 20, 25, 50, 100 kHz
Frequency Stability	±5 ppm (-10° C to +60° C)
Repeater Shift	±600 kHz
Emission Type	F2D , F3E
Antenna Impedance	50 Ω
Supply Voltage	Nominal: 7.2 V DC, Negative Ground Operating: 8.0 ~16 V, Negative Ground(EXT DC JACK) 11~16 V, Neg. Ground (EXT DC JACK while Charging)
Current Consumption	125 mA (Receive) 200mW Output 45 mA (Standby, Saver Off) VHF 20.5 mA (Standby, Saver On) 8 mA(Auto Power Off) 1.5 A (5 W Tx 7.2 V DC)
Battery Life	
Operating Temperature	-4° F to +140° F (-20° C to +60° C)
Case Size	2.4" x 4.7" x 1.3" WHD (60 x 120 x 32 mm)
Weight	13.8 oz. (390 g) with FNB-83 & antenna
Transmitter	
RF Power Output	High 5 W (@ 7.2 V FNB-83) Mid 2 W (@ 7.2 V FNB-83) Low 0.5 W (@ 7.2 V FNB-83)
Modulation Type	Variable Reactance F2D , F3E
Maximum Deviation	±5 kHz F2D , F3E
Spurious Emissions	At least 60 dB down (High & Mid) At least 40 dB down (Low)
Microphone Impedance	2 kΩ
Receiver	
Circuit Type	Double-Conversion Superheterodyne
Intermediate Frequencies	1st : 21.7 MHz 2nd: 450 kHz
Sensitivity	0.2 µV for 12 dB SINAD (137-140 MHz, NFM) 0.16 µV for 12 dB SINAD (140-150 MHz, NFM) 0.2 µV TYP for 12 dB SINAD (150-174 MHz, NFM)
Selectivity	NFM, AM 12 kHz / 35 kHz (-6 dB / -60 dB)
AF Output	700 mW @ 16 Ω for 10 % THD (@ 7.5 V) Internal SP 400 mW @ 8 Ω for 10 % THD (@ 7.5 V) EXT SP Jack

You will be happy to know that reading radio spec sheets is NOT like trying to compare health plans.

Visit manufacturer websites to download product information and do your homework BEFORE going to the store or shopping.

You already have an idea of the GERC EmComm HT. Now adjust that to fit your particular needs. Use the comparative matrix on the next slide to compare / contrast the different radios.

Image from the internet: educational fair use clause.

The numbers and geeky stuff don't always tell the full story. Consider reading product reviews in QST magazine and visiting web forums to see what other Hams think about various products.



Shopping: Comparative Matrix

Use the comparison shopping sheet to help you gather the information to systematically compare / contrast the radios available to you.

You can download this form from the GERC website: www.neighborhoodlink.com/org/gerc

You can use the GERC EmComm HT discussion to guide your selection of options and accessories.







Handheld VHF/UHF Radios Comparison Sheet 20-Oct-08		Radio #1	Radio #2	Radio #3	Radio #4	Radio #5	Radio #6
Manufacturer							
Model							
TRANSMIT/RECEIVE COVERAGE							
Transmit Range	MHz						
Receive Range	MHz						
Wideband receive	Y/N						
Airband Receive	Y/N						
Single/Multi Receive (*)	Y/N						
Power Output	Watts						
CONFIGURATION FEATURES							
Memories	Number						
CTCSS Tones	Yes/No						
DTMF Tones	Yes/No						
Tone Squelch	Yes/No						
DCS Squelch	Yes/No						
Scanning	Yes/No						
DISPLAY & PROGRAMMING							
Alphanumeric Display	Yes/No						
PC Programmable	Yes/No						
Radio-to-Radio Cloning	Yes/No						
POWER							
Battery Pack Type	NiCd, NiMH, Li-Ion						
Battery Pack Capacity	Ampere-Hours						
AA Battery Pack	Yes/No						
Ext. DC Supply Voltage	Volts						
Desktop Quick Charger	Yes/No						
Antenna Connector	BNC, SMA, etc						
SIZE							
Height (in.)							
Width (in.)							
Depth (in.)							
Weight (oz.)							
Price							

* = for Multiband handhelds only



Shopping: Find & Read Reviews

Here are some web sites with product reviews of Amateur Radio equipment & user forums

 ARRL Amateur Radio	ARRL	www.arrl.org
 The DX Zone AMATEUR RADIO RESOURCE GUIDE	DX zone	www.dxzone.com
 eHam.net ham radio on the net	e-ham	www.e-ham.net
 HAMUNIVERSE.COM	Hamuniverse	www.hamuniverse.com
 QRZ.COM	QRZ.com	http://forums.qrz.com
 RigReference.com	Rig Reference	www.rigreference.com

Local Ham clubs, local/regional/national Ham conventions & exhibitions are also potential sources of contacts and information.

Every amateur operator, their station site, and operating goals and habits are unique. Unless you have a list of objective, measureable criteria be aware that subjective opinions of “good / not so good” equipment must be weighed carefully when making effective purchasing decisions. Most reviews I have read have folks who absolutely love the product and those who absolutely hate it. I think there’s lots who are satisfied and having too much fun to bother to write a review.



Shopping: Places Happy to Lighten Your Wallet

Stores & Websites

Brick and mortar stores are few and far between. Check with more experienced Hams about vendors they deal with and trust.

Retail Stores		
	Amateur Electronic Supply	www.aesham.com
	Ham Radio Outlet	www.hamradio.com

Websites		
	Universal Radio Inc.	www.universal-radio.com
	West Mountain Radio	www.westmountainradio.com
	Wireman	www.wireman.com

“For what it is worth, I have ordered from these sources and gotten good service and have had no problems with them,” HSØZHM.



Shopping: Places Happy to Lighten Your Wallet

Hamfests & Conventions

Hamfests & Conventions		
	Dayton Hamvention (Ohio) May 20-22, 2011	www.hamvention.org
	Hamcon (Southern California) Sep 9-11, 2011	www.hamconinc.org
	Pacificon (Santa Clara, CA) Oct 14-16, 2011	www.pacificon.org

Visit www.arrl.org/hamfests-and-conventions-calendar to search for events near you.

Many vendors, freebies, workshops, new products, exhibits, hard to find stuff / gadgets, and special sales/discounts may be possible. Lots of walking. Take a tote or luggage cart as free literature, charts, etc. are heavy.



Shopping: Places Happy to Lighten Your Wallet

Swap Meets



Swap meets like web links come and go like shifting sands on the shore. Try these sites to find schedules of Ham radio swap meets in southern California.

- <http://members.cox.net/stengel/swapmeets.html>
- www.pinoyhamsforum.org/viewtopic.php?f=35&p=60
- www.avarc.av.org/swapmeet.html

Photo from the internet:
educational fair use clause.



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Resources & Opportunities

You studied hard, learned much, and successfully got your license. But it isn't over. There is always more to learn. Be aware of some of the resources and opportunities to you.

It's better to network than to not work.



American Radio Relay League

Personal Motivation



Ham radio may not change the world, but it will change the way that you hear it.



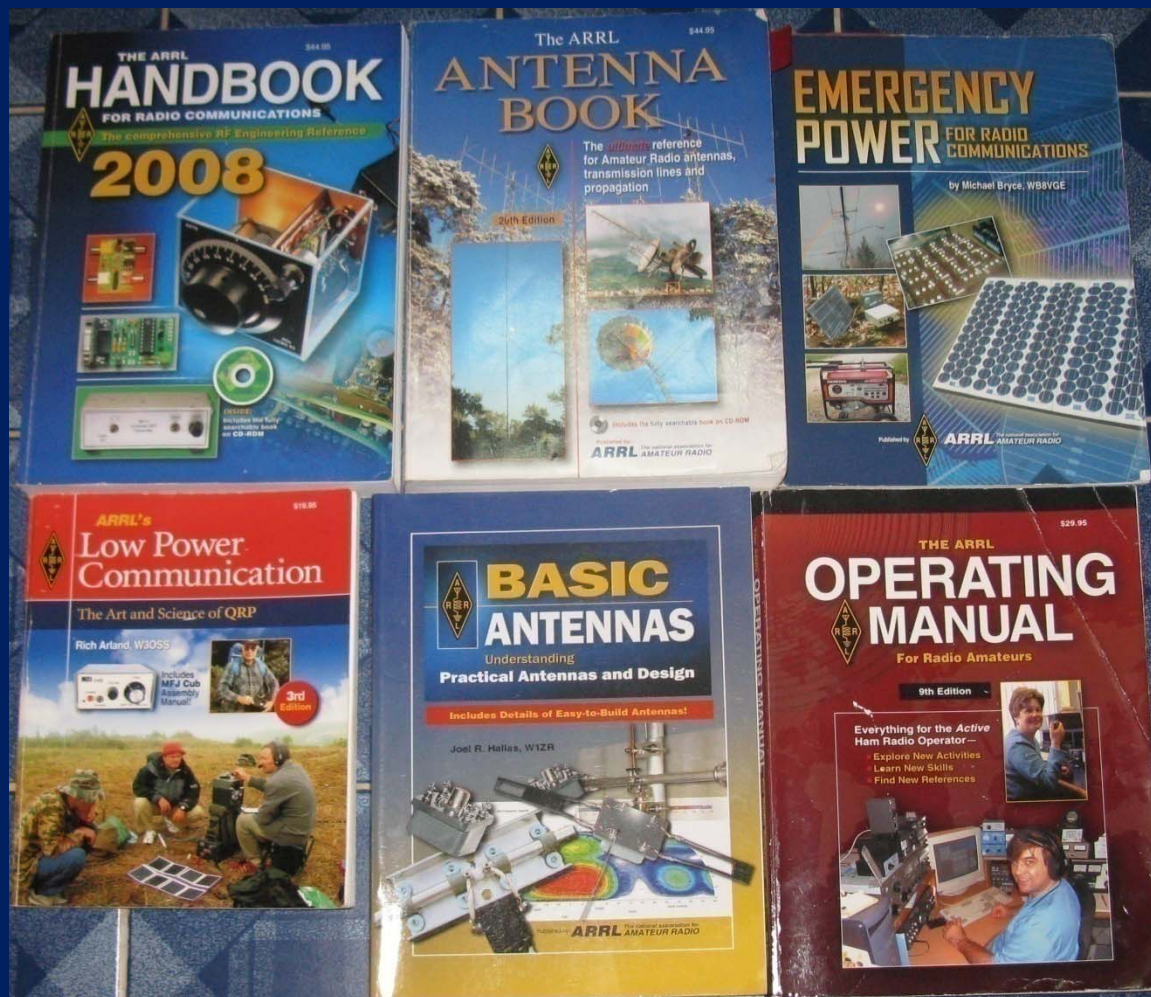
Rural Training Center-Thailand
Glendora Emergency Response Communications

Resources

ARRL

I joined ARRL and got these references before moving to Thailand. These books, the internet, and my “Elmers” provide me with a firm foundation and countless hours of learning to keep my brain active for many years to come.

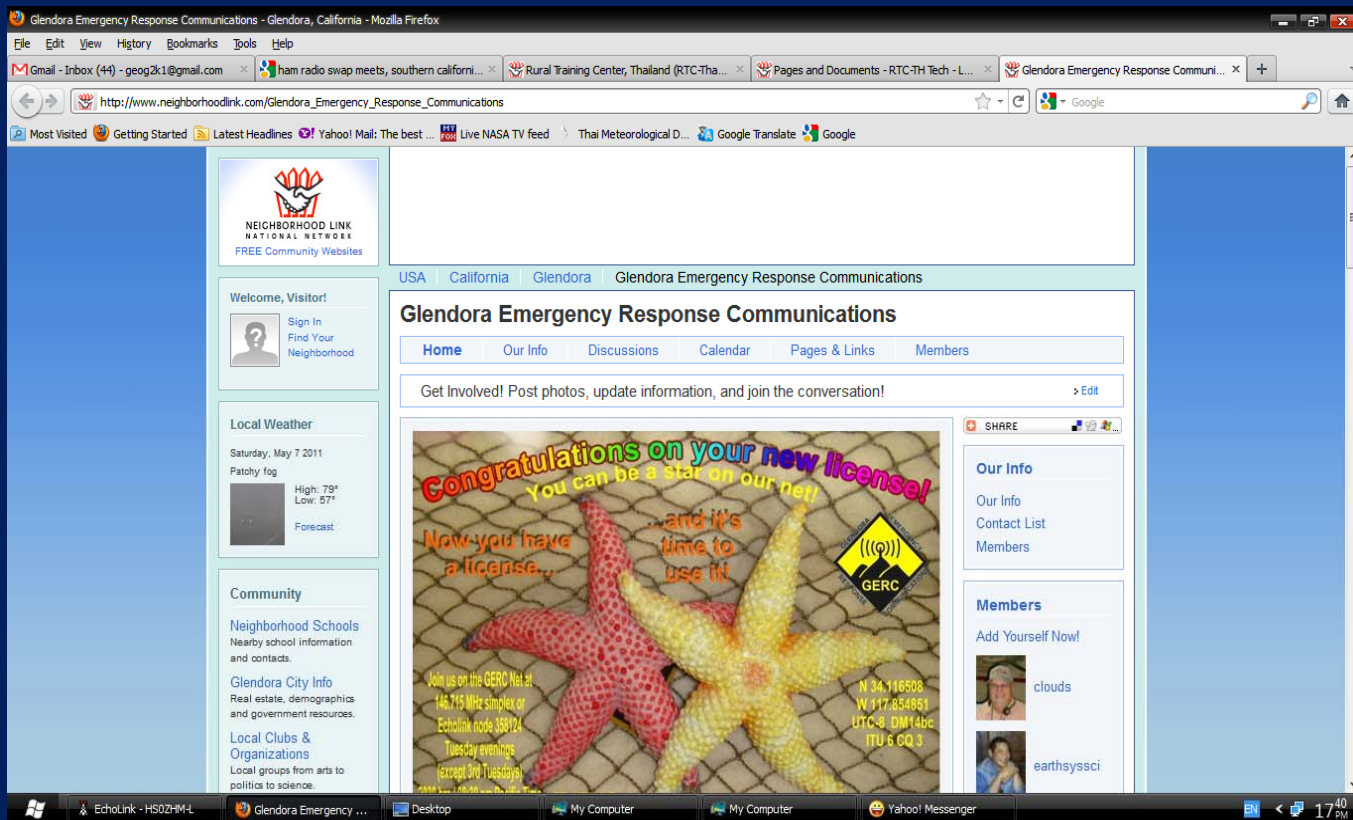
The neat thing in amateur radio is that some things work and no one knows how or why. So don't be afraid to try something new. (But do your homework first!)



Resources

GERC

The GERC website is a treasure trove of amateur radio and emergency preparedness information.

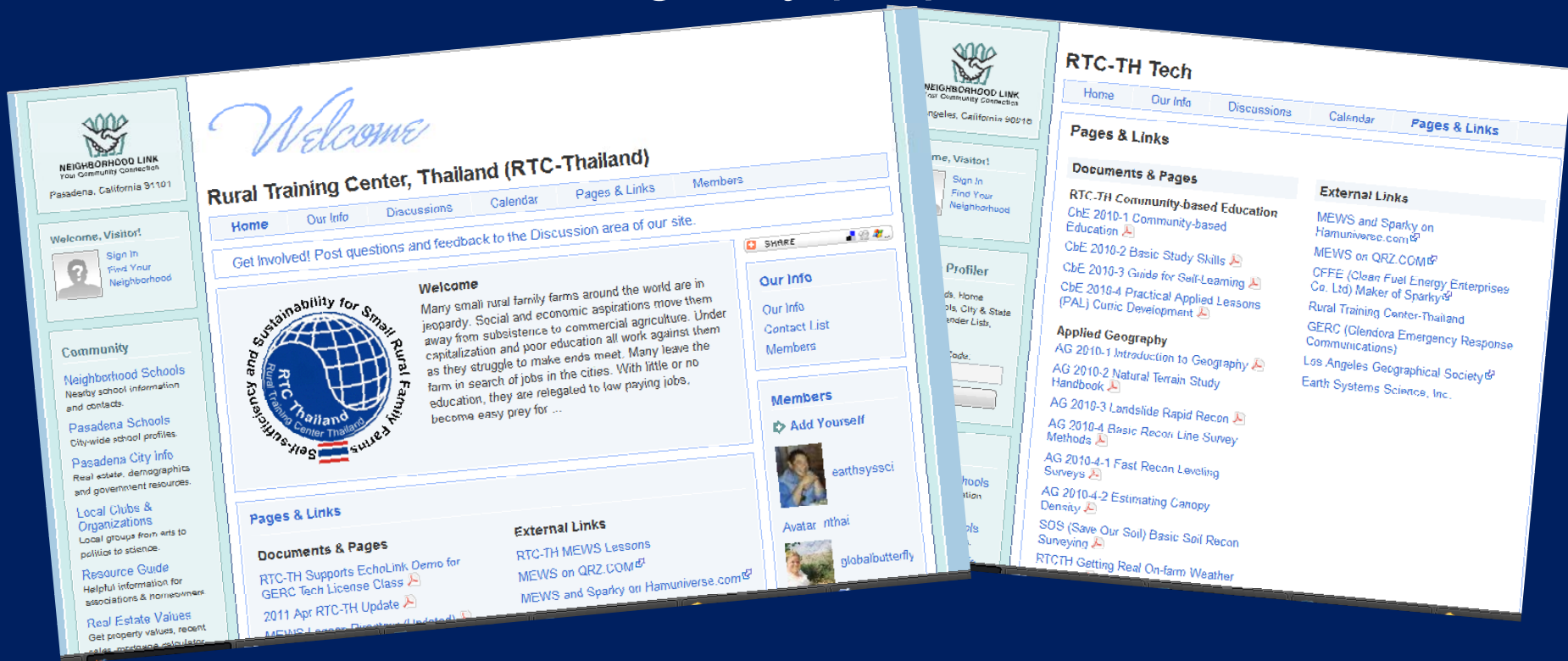


It is constant-Lee growing so visit it often and don't be afraid to contribute to it as well. www.neighborhoodlink.com/org/gerc

Resources

RTC-TH

The RTC-TH website and its archive site RTC-TH Tech also have useful emergency preparedness information.



These are also constant-Lee growing so visit often and keep in touch on both www.neighborhoodlink.com/org/rtcth and www.neighborhoodlink.com/org/rtc-th_tech



Opportunities

GERC Net

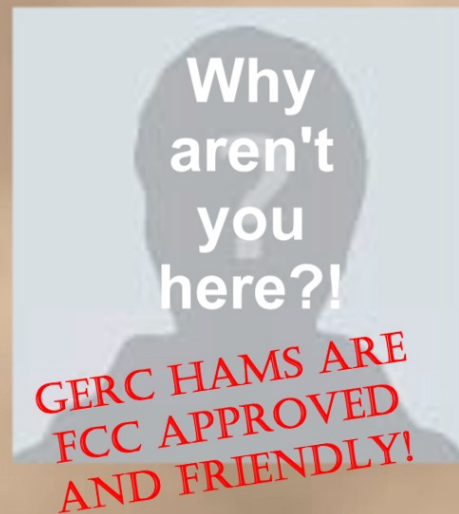
The weekly GERC Net is a good place to:

- Practice using your radio
- Ask questions of other more experienced Hams
- Make new “on air” friends
- Learn about other amateur radio events
- Try new ways to use your radio



WANTED

Active GERC Net Participants



Now that you have a license
you can join the GERC Net.
Get on the air every Tues, 08:30 pm
(except 3rd Tues of the month)



via Echolink (node 358124)

It's better to network than to not work.

Opportunities **GERC Meetings**

Meetings are the 3rd Tuesday of the month, 7 pm.
2121 E. Rte 66, Glendora, in room 5.

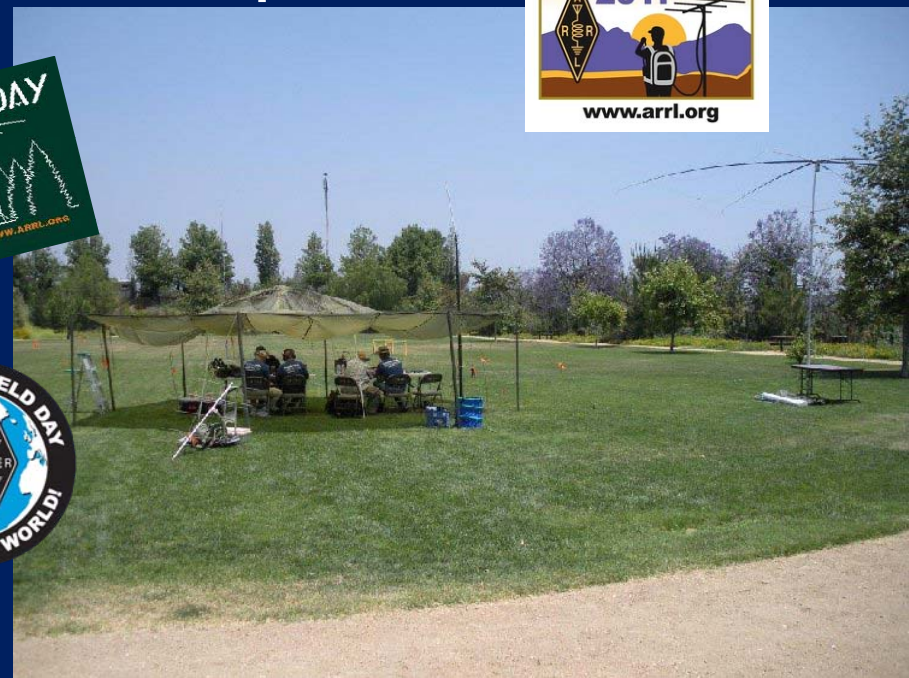
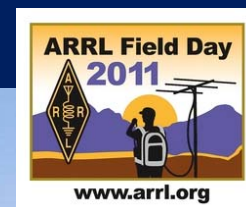
GERC
meetings
involve training,
project
building,
preparing for
events, sharing
experiences,
and helping
each other.



Annual Opportunities

ARRL Field Day

This is held on the fourth full weekend of June. GERC sets up demonstrations of HF, VHF, and EchoLink® in a local park.



This event gives US and Canadian amateurs a chance to set up radios in the field to contact distant stations. This is a way for Hams to see if they can operate in an emergency away from their homes.



Annual Opportunities

JOTA

Jamboree on the Air is an event so scouts worldwide try to contact each other by radio.



Mark (N7YLA) and Richard (KG6TRD) facilitating scouts with VHF contacts



Don (KF6ZHX) helping a scout with an HF contact

GERC volunteers set up and staff HF, VHF, and EchoLink® stations for local scouts to get on the air and log their radio contacts.



Annual Opportunities Covina Christmas Parade

GERC provides amateur radio communications service for the annual Covina Christmas Parade.



GERC can always use more & able volunteers in December for this event.

Photos courtesy of GERC



Other Opportunities

Special Events

Volunteers are needed for set-up / pack-up of exhibits and to conduct QSOs with visitors to the GERC booth



Photos courtesy
of GERC



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Other Opportunities

Special Events

Boy Scout Centennial Jamboree



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Photos courtesy of GERC

BSA images from the internet: educational fair use clause.

Other Opportunities

Scout Merit Badge Class

Providing new opportunities for youth to discover amateur radio is an important GERC activity.



Volunteers are needed to be available on the air for scouts to make a radio contact as part of their merit badge requirement.



Other Opportunities

Technician License Class

GERC livens up classes with real radio demo QSOs between students...



Photo courtesy of RTC-TH

Greg (HS0ZHM) in Thailand avidly supports many GERC activities from half way around the globe.



Rich (KG6MXP) supports GERC on-air demos by being available for QSOs

...and GERC volunteers from near and not so near for their first amateur radio contact.



So what's the difference between a General vs a Tech License?



This is Mark Hayden (N7YLA formerly KF6DSA).



This is Carolyn Hayden (KG6RFJ) his wife.

Join GERC at the Covina Christmas Parade
and you can see and feel the difference!

You are encouraged to “upgrade” to General as soon as possible!



For More Information about us: Contact



Greg HSØZHM
hs0zhm@gmail.com



Mark, N7YLA
n7yla@arri.net

For other lessons in the series visit

www.neighborhoodlink.com/org/rtcth
www.neighborhoodlink.com/org/gerc



Community-based Education for the Amateur Radio and Emergency Communications



The End

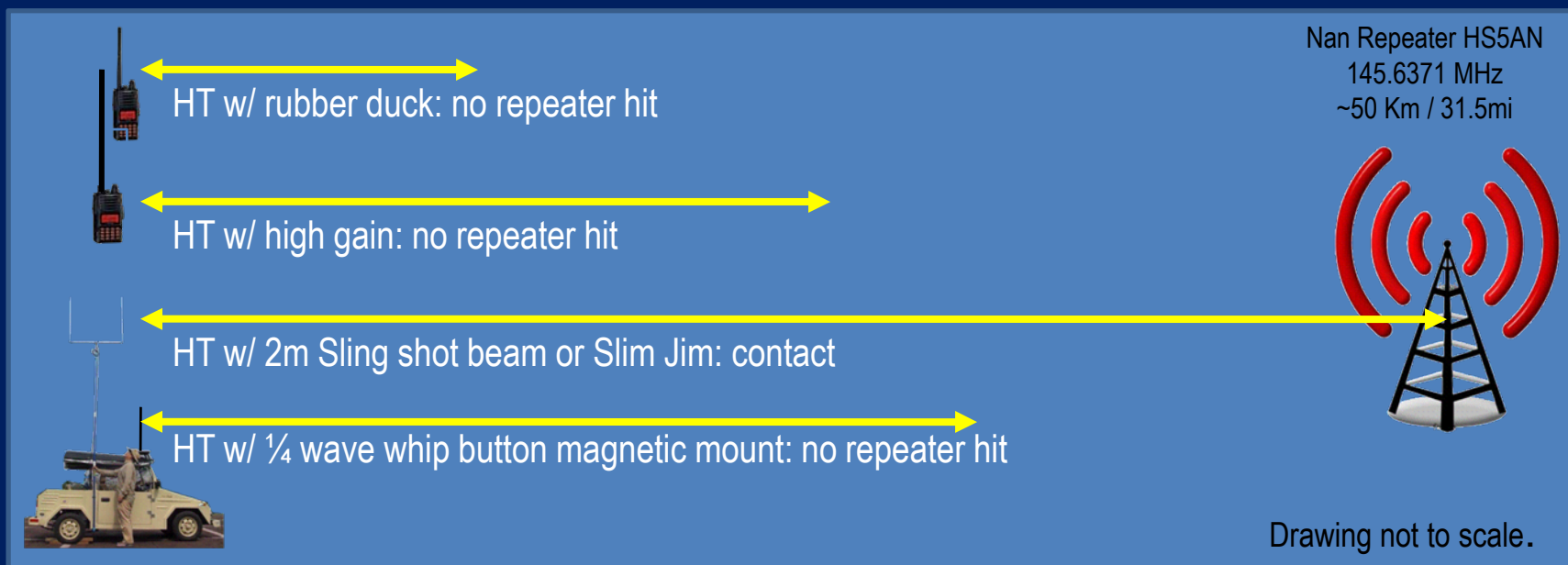
(of this lesson; the beginning of more amateur radio adventures)



Continue past this slide to see assorted footnotes of more details of some of the topics in the lesson.



Relative performance of various antennas HSØZHM uses with his HT.



The antenna size, type and height above the ground affects the range of your transmission (along with terrain and other factors). This diagram shows the effective difference in range due to the antenna. In all cases, the same HT was used at 5 watt power setting from the same geographic location.





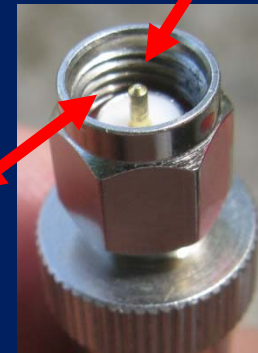
This adapter lets me connect my HT to the “button” 1/4 λ magnetic mounted antenna on Sparky, the “Batt-mobile”



The antenna has a BNC Male connector



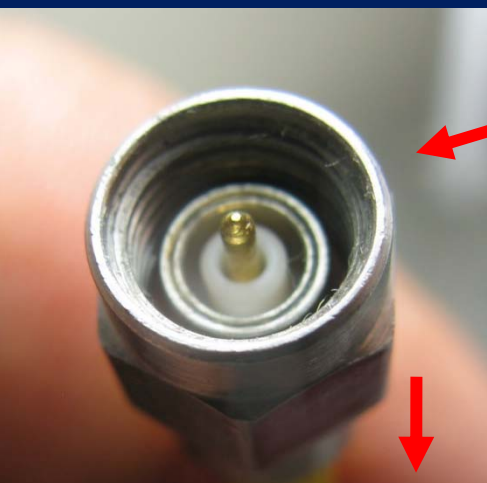
The radio has an SMA Female connector



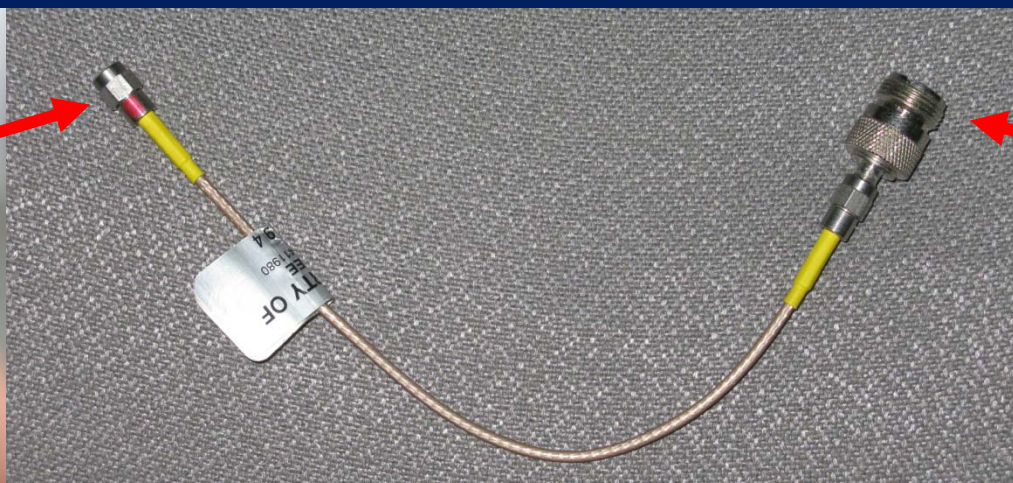
This adapter has a BNC Female fitting and an SMA Male fitting



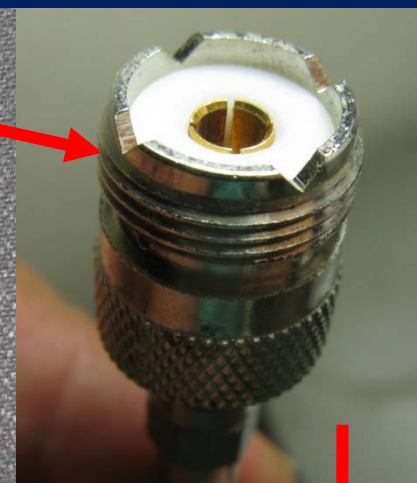
*Get the appropriate connectors for your needs AS YOU NEED them.
It doesn't make sense to buy adapters / connectors that you won't be using.*



SMA Male to fit SMA
Female on Radio



This “Pigtail” lets me connect
my HT to other larger antennas
that use regular RG8 and RG8X
coax feed lines I carry on Sparky,
the “Batt-mobile”.



SO-239 fits
PL-259 on Coax



Organize and protect your connectors / adaptors



Clearly identify the connectors / adapters and keep them clean. You save time finding the right fitting when you need it. Clean connectors reduce signal loss in the radio / antenna system.



Protect your coax connectors from dirt and grim by making slip-on dust caps.

These were made using 15 mm / 5/8th inch I.D. tubing, a heavy duty staple, and nylon thread to tether the dust cap to the coax to keep it from being lost



Photo courtesy of RTC-TH.

High quality coax and connectors are not readily available in Thailand for any price. So we need to take care of our equipment.





My HT connected to the “button” $\frac{1}{4} \lambda$ magnetic mounted antenna on Sparky, the “Batt-mobile”



Photo courtesy of RTC-TH.

Using different adapters gives me flexibility to use my HT with a variety of antennas for different purposes. The cost of adapters and antennas can be less than a radio!



I use the “Pigtail” to connect my HT to the VHF antenna switch in Sparky. I can then switch between the 2m Slingshot beam (left) and the 2m 450Ω ladder line Slim Jim vertical antenna

Photos courtesy of RTC-TH.



The operational flexibility to have a directional beam antenna and an omni-directional vertical antenna increases our chances to operate successfully in an emergency situation.



Community-based Education for the Amateur Radio and Emergency Communications



The End

(of this lesson; the beginning of more amateur radio adventures)

For other lessons in the series visit

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