



HF 101

30,000 kHz and Down

Communications Academy 2004

Ward Silver – NØAX

Canadian Version

Questions, Questions

- What Should I Expect?
- Where Is Everybody?
- What Gear Do I Need?
- How Do I Make a Contact on HF?
- What is Propagation Like?
- What is There to Do Down There?

What Should I Expect?

The Familiar

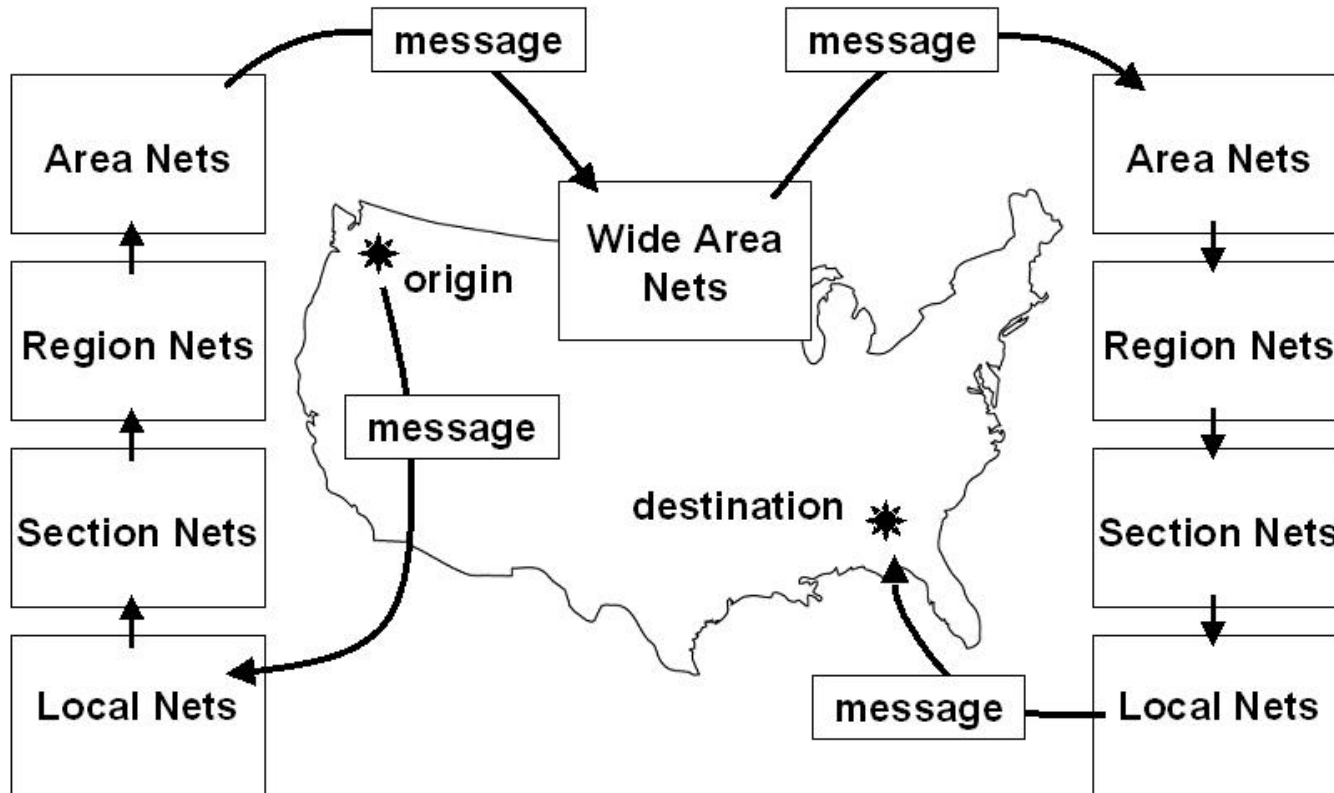
What Should I Expect?

- Regional Coverage
 - 160, 80, 60, and 40 meters
 - Daytime coverage up to 200-400 miles (320-640km)
 - Nighttime to 1000 miles (1600km)

What Should I Expect?

- Nets

What Should I Expect?



Map courtesy Worldatlas.com

What Should I Expect?

- Nets
 - Same structure and protocols for directed nets
 - Local/Regional plus National & International
 - Off-frequency traffic
 - National Traffic System
 - Good complement to VHF/UHF nets

What Should I Expect?

- Calling Frequencies
 - Many special interest groups
 - QRP, SSTV, RTTY, IOTA
 - Beacons on “100” by NCDXF
 - Net listings - ARRL Net Directory
 - ARRL Band Plans list frequencies for US
 - RAC Band Plans list frequencies for Canada

What Should I Expect?

- Operating Mobile and Portable

What Should I Expect?



What Should I Expect?

- Operating Mobile and Portable
 - All-band rigs (IC-706, IC-7000, TS-480, FT-450, FT-857, FT-817, IC-703 for example)
 - Electrically short & low antennas
 - “Antenna Tuners”
 - All simplex on HF

What Should I Expect?

The Unfamiliar

What Should I Expect?

- CW and SSB and Digital Modes
 - Some AM modulation, not FM (except 10M)
 - Different operating methods
 - Phonetics - learn standard set
 - Slightly more formal introductions
 - Reporting of conditions and equipment
 - Digital modes use sound card or MPC

What Should I Expect?

- Simplex As a Rule
 - Repeaters - 10-meter FM (29.6 - 29.7 MHz)
 - SSB modes are narrowband, more efficient
 - Noisier than FM
 - Transmissions tend to be shorter
 - Bands are more congested

What Should I Expect?

- Noise
 - SSB modes do not suppress noise
 - QRN: Natural and Man-made
 - QRM: Adjacent channels
 - Weak-signal contacts are common
 - Fading and Flutter

What Should I Expect?

- A Lot of Tuning
 - No “channels” on HF, only sub-bands
 - Memory channels used on radios
 - Shifting to avoid QRM is common
 - Receiving filters are required
 - Scanning covers a continuous range
 - Chirp and Drift

What Should I Expect?

- Looooong Distances and New Prefixes

What Should I Expect?



What Should I Expect?

- Looooong Distances and New Prefixes
 - Worldwide coverage with a few watts of CW
 - International contacts are routine
 - Time of day and seasonal aspects
 - Maps and Geography are fun!
 - The Language of Call Signs

What Should I Expect?

- Pileups & Contests
 - A big pileup is an amazing thing!
 - VHF+ contests are good intro to HF contests
 - Field Day! (not a contest, but competitive)
 - Listen to understand the format
 - Jump in and try!

Where is Everybody?

- Band Plans
 - Sub-bands and conventions

Where is Everybody?

Canadian 80m BAND PLAN (July 8, 2008)

3500 - 3580 CW (Note 1)

3580 - 3600 CW, Wide band , Narrow band digital (Notes 2, 3, 4 & 5)

3600 - 4000 CW, Phone (Notes 6 & 7)

NOTES:

1 - 3500 - 3510 CW Priority for intercontinental operation (DX window)

2 - 3510 - 3560 CW Contest preferred

3 - 3580 - 3583 PSK-31 and other Very Narrow Band Digital

4 - 3590 RTTY DX

5 - 3590 - 3600 Automatically controlled data stations (unattended)

6 - 3700 - 3775 SSB Contest preferred

7 - 3775 - 3800 SSB Priority for intercontinental operation (DX window)

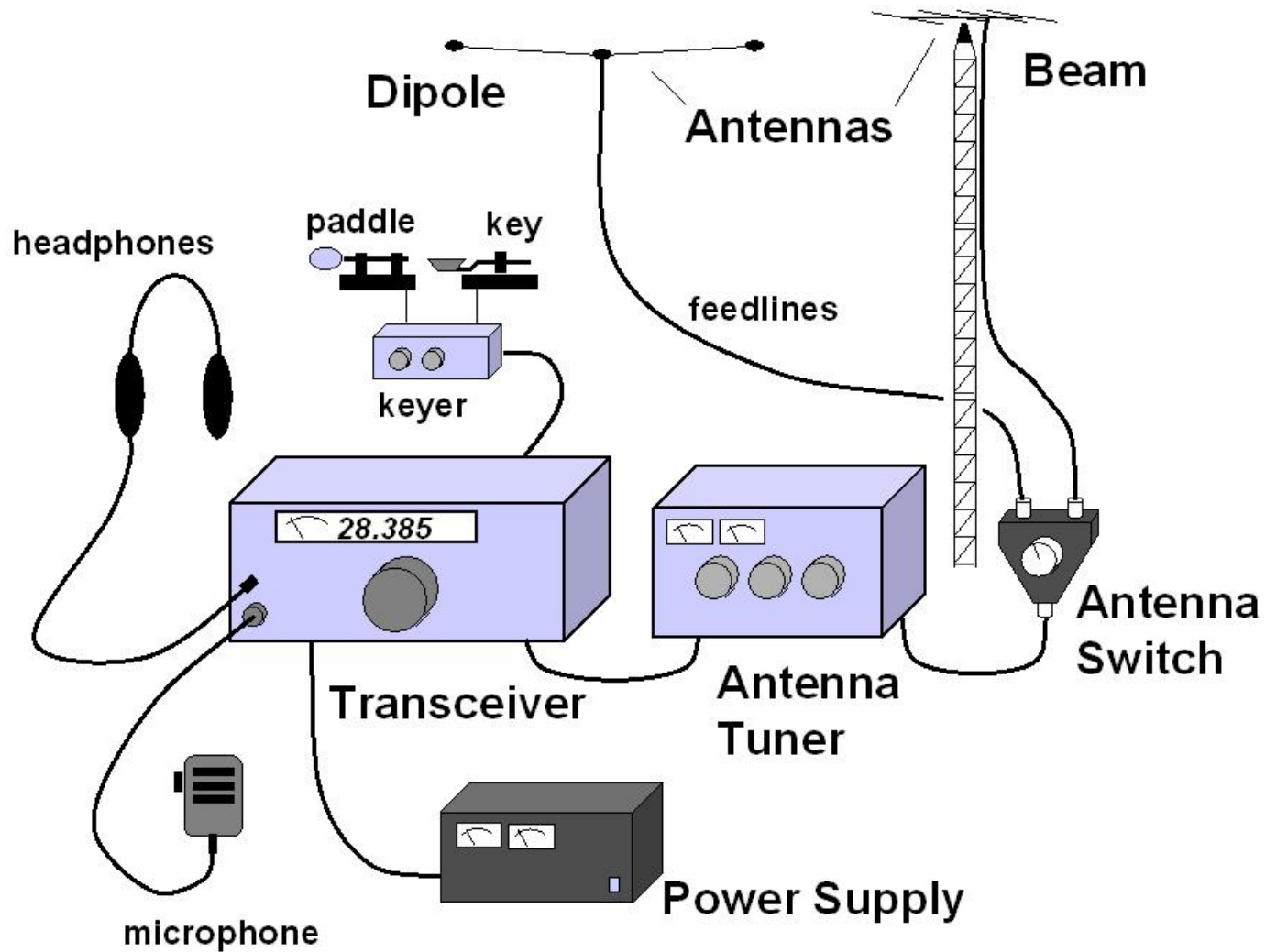
Where is Everybody?

- Band Plans
 - Sub-bands and conventions
- Calling Frequencies & “Watering Holes”
- Band Characteristics
 - WARC bands
 - Day and Night
 - Seasons

What Kind of Gear Do I Need?



What Kind of Gear Do I Need?



What Kind of Gear Do I Need?

- The Rig - about 1/2 of your budget
 - 100 watts is fine, QRP with some experience
 - SSB/CW covers 99%
 - Computer interface is handy
 - Extra filters are worth the money
 - Used gear (less than 10 yrs) is fine
 - You DON'T need an amplifier to start

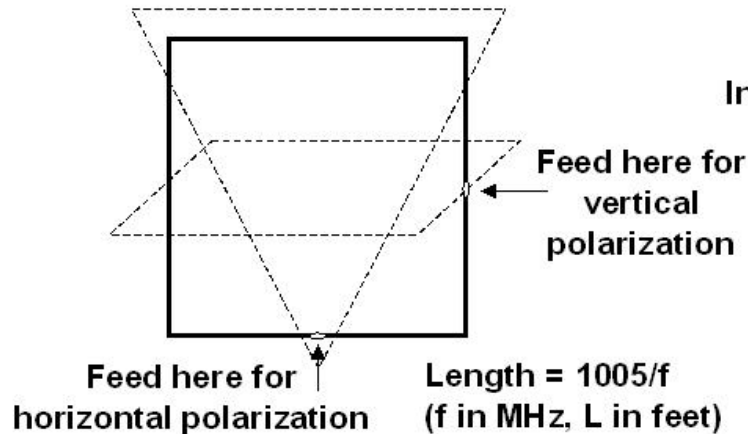
What Kind of Gear Do I Need?

- The Antenna - about 1/3rd of your budget
 - Dipoles and Doublets and Wire Antennas

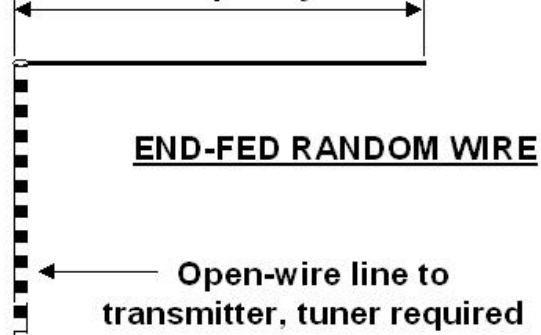
What Kind of Gear Do I Need?

FULL-WAVELENGTH LOOP

Can be any shape, horizontal or vertical - feed with coax and 2:1 balun

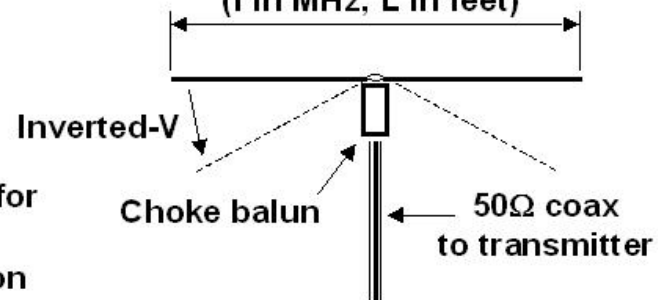


At least 1/4-wavelength at lowest frequency of use



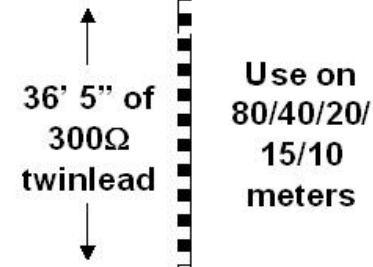
HALF-WAVE DIPOLE

Length = $468/f$
(f in MHz, L in feet)



G5RV DIPOLE by ZR1DQ

93' 2"



Connect to 50Ω coax, no balun required

What Kind of Gear Do I Need?

- The Antenna - about 1/3rd of your budget
 - Dipoles and Doublets and Wire Antennas
 - Ground-plane Verticals
 - Multi-band Antennas
 - Beware of “do-everything” antennas
 - Beware of small antennas (TANSTAAFL)
 - Don't be afraid to experiment!

What Kind of Gear Do I Need?



What Kind of Gear Do I Need?

- Accessories - about 1/6th of your budget
 - “Antenna tuners”
 - Filters, headphones, and microphones
 - Digital data interfaces
 - CW keyer and key or paddles
 - Computer software
 - logging
 - digital data modulation/demodulation

What Kind of Gear Do I Need?

- Fixed vs. Mobile vs. Portable
 - Mobilizing
 - All-band rigs are popular
 - Tunable or swappable antennas
 - Portable
 - QRP is very active activity
 - Weight and power draw are important
 - Antenna efficiency is key for both

How Do I Make a Contact?

- Listening

How Do I Make a Contact?

- Listening
- Breaking in or joining a QSO

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- Listening
- Breaking in or joining a QSO
- Calling CQ

How Do I Make a Contact?

- Listening
- Breaking in or joining a QSO
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- Signal Reports and Stuff

How Do I Make a Contact?

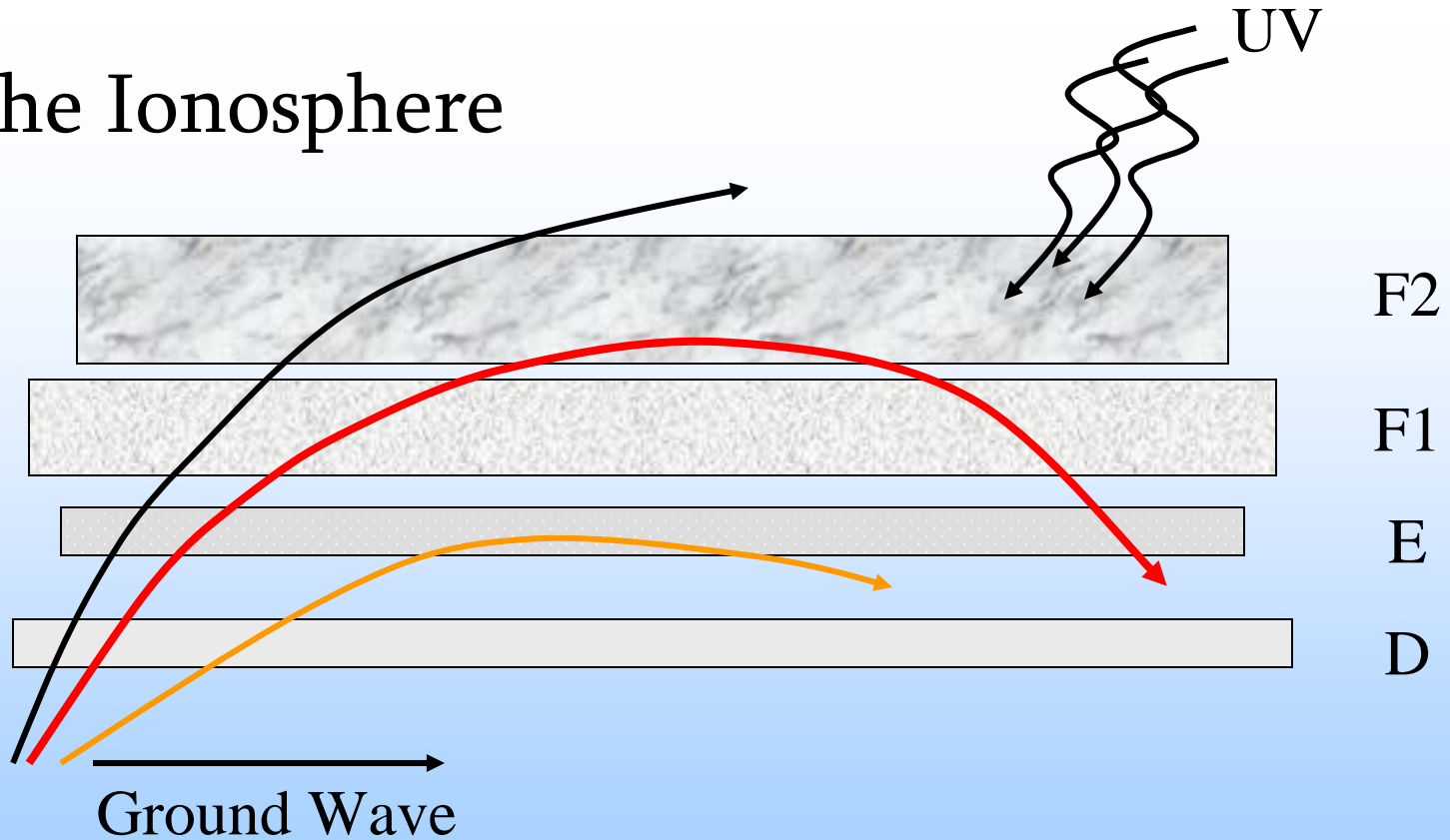
- Listening
- Breaking in or joining a QSO
- Calling CQ
- Signal Reports and Stuff
- The Weather

How Do I Make a Contact?

- Listening
- Breaking in or joining a QSO
- Calling CQ
- Signal Reports and Stuff
- The Weather & “The Long Goodbye”
- QSLs

What is Propagation Like ?

- The Ionosphere



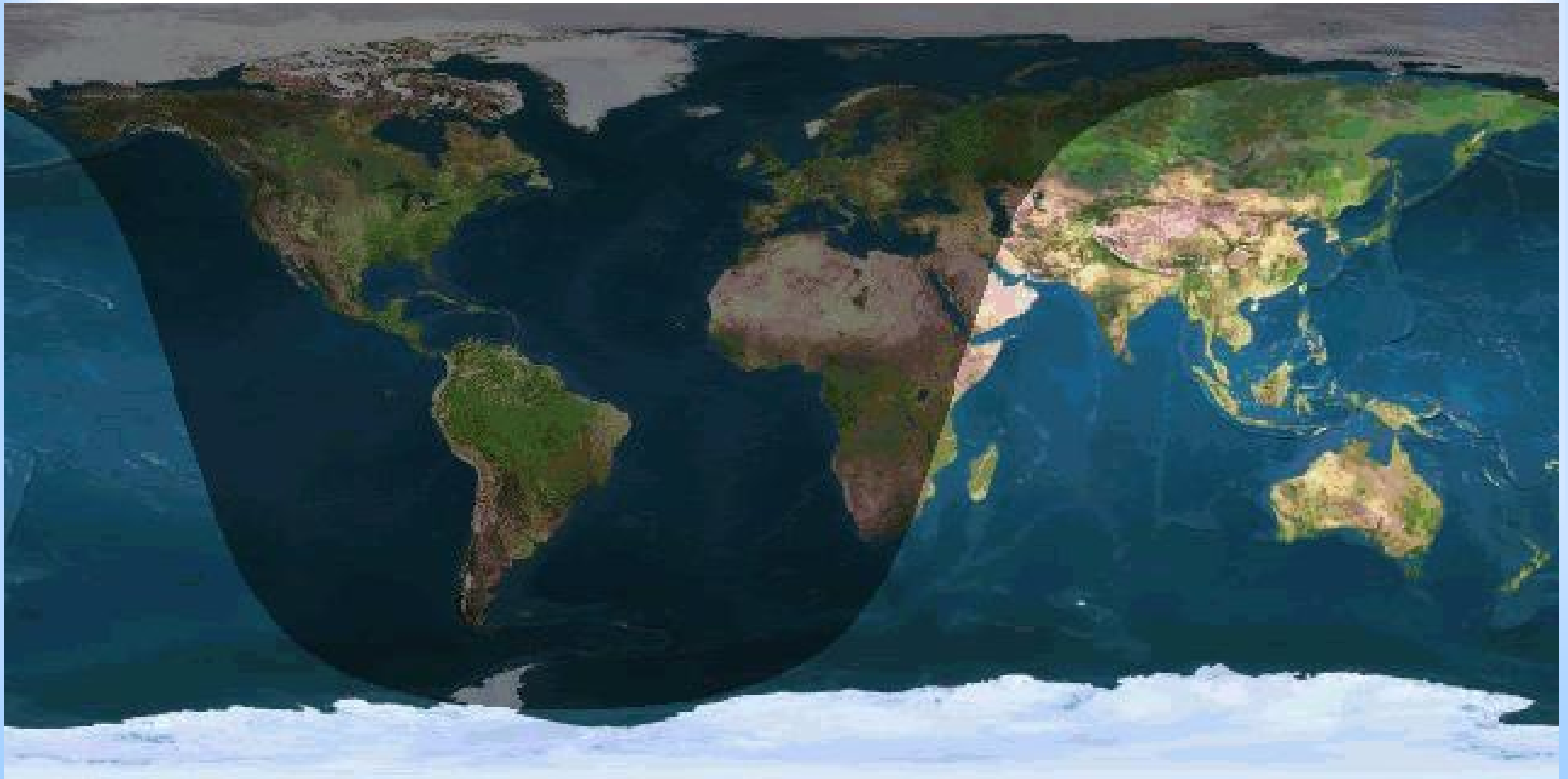
What is Propagation Like ?

- The Ionosphere
 - 50 to 500 miles (80 to 800 km) up
 - D, E, F1 and F2 layers
 - Effect of solar radiation (UV)
 - MUF
 - “Skip” or “Hops”

What is Propagation Like ?

- The Sun
 - UV ionizes the upper layers, raises MUF
 - MUF tends to “follow the sun”
 - More sunspots = Higher MUF
 - A and K indices from WWV and NOAA
 - Solar cycle, minimum in 2005/2006
 - Solar flares and other disturbances

What is Propagation Like ?



What is Propagation Like ?

- High-bands and Low-bands
 - High: 20 - 10 meters (14 -28 MHz)
 - Highest open band is best
 - 20 and 17 widest coverage now
 - 15, 12, and 10 mostly in southerly directions
 - Low: 160 - 30 meters (1.8 - 10 MHz)
 - Absorption high in the day, low at night
 - Watch at sunset and sunrise

What is Propagation Like ?

- “Skip Zone”
 - Results from ground-wave versus sky-wave
 - Sky-wave depends on MUF and signal angle
 - Up to 200 miles (320km) on 40-meters
 - 30- and 40-meters can “go long”
 - 60-meters is good transition band
 - 80- and 160-meters are solid at night

What is There to Do?

- Emcomm, Nets, and Public Service
 - Join your local ARES HF net
 - Provincial Nets (3742, 3755 and 7153 kHz)
 - NTS and Traffic Handling
 - Maritime and Mobile Service Nets

What is There to Do?

- Random QSOs and “Ragchewing”
 - Tune the bands and “read the mail”
 - Answer CQs or join a contact

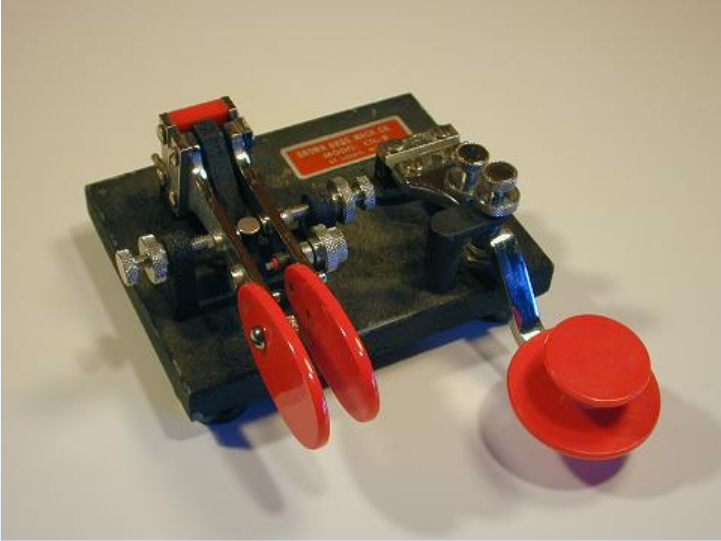
What is There to Do?

- Random QSOs and “Ragchewing”
 - Tune the bands and “read the mail”
 - Answer CQs or join a contact
 - You’ll **never** “time out”!

What is There to Do?

- New Modes
 - Try CW, it's fun!

What is There to Do?



Combination Paddle & Key



Straight Key

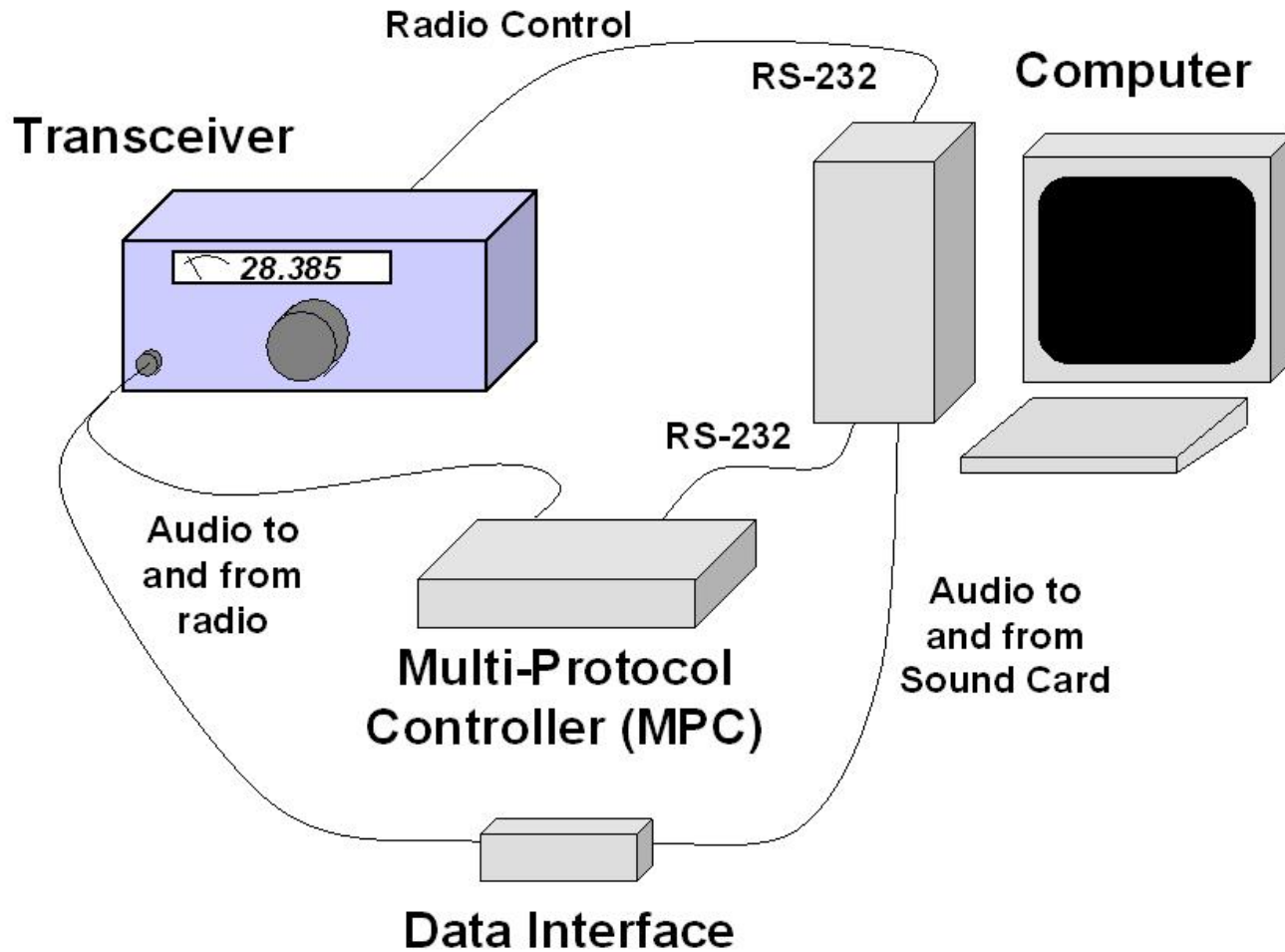


Semi-automatic key
or "Bug"

What is There to Do?

- New Modes
 - Try CW, it's **fun!**
 - SSB is a natural
 - Digital Modes
 - RTTY and PSK
 - PACTOR and WinLink
 - SSTV

What is There to Do?



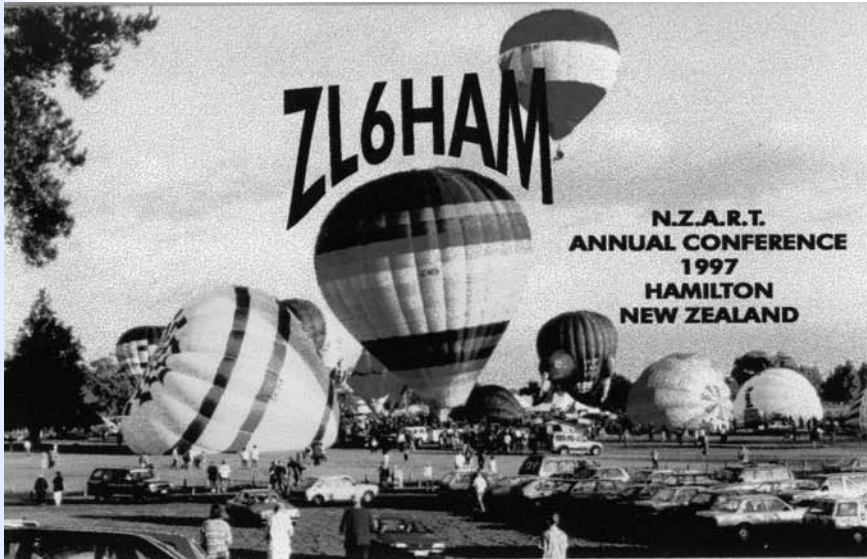
What is There to Do?

- Experimenting - Electronics & Antennas
 - Lots and lots of **kits** to build
 - HF is more tolerant of wiring techniques
 - Try a homebrew transmitter (QRP!)
 - Make your own antennas
 - Antenna modeling software and courses

What is There to Do?

- DX-ing and Contests

What is There to Do?



YOKOHAMA JAPAN JCC #1101

7K1CXV

Kouki Takahashi
 366-1-503, Daimura-cho, Midori-ku, Yokohama City,
 Kanagawa 226 Japan

GL:PM95SM

G3NKO

C. R. Burchell.
 LANCASTER 1942
 4, BAKERS WAY, PERRY, HUNTINGDON, CAMBS. PE28 OBS.
 RSGB RAFARS : 548 CDXC

PRATAS ISLAND **BQ9P**

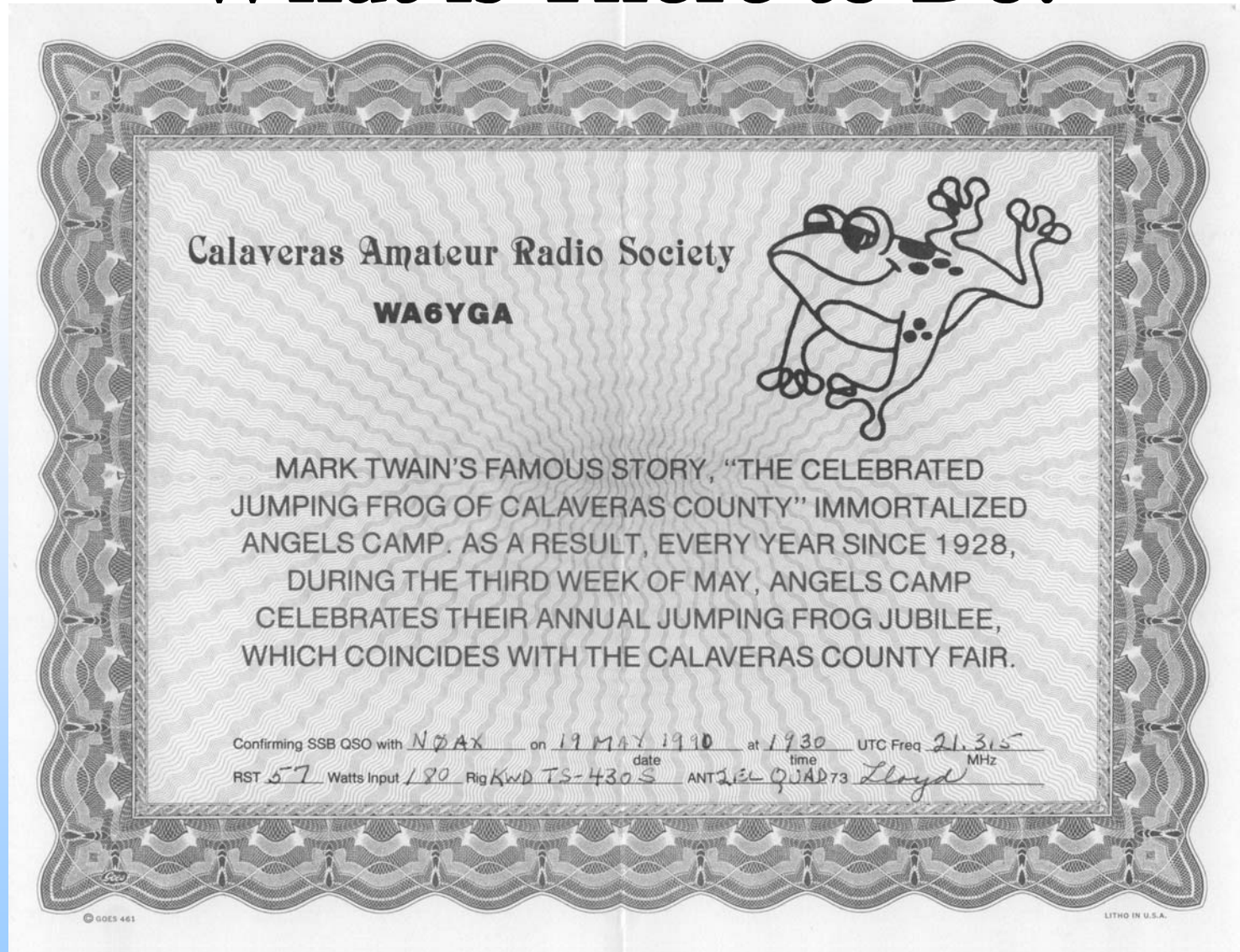
What is There to Do?

- DX-ing and Contests
 - DXCC, WAZ, IOTA programs
 - DX-peditions: operations from rare locations
 - Contests are good exercise
 - Contest calendars for listings
 - All sizes, modes, and coverage
 - Great for chasing awards
 - Especially good for learning propagation

What is There to Do?

- Award Programs or “Wallpaper Chasing”
 - K1BV Awards Directory, >3000 awards
 - WAS and County Hunting
 - Specialty awards: regional, mode, band
 - Special events

What is There to Do?



What is There to Do?

- Award Programs or “Wallpaper Chasing”
 - K1BV Awards Directory, >3000 awards
 - WAS and County Hunting
 - Specialty awards: regional, mode, band
 - Special events
 - On-the-air clubs and groups
 - Ten-Ten, QRP ARCI and American QRP
 - YLRL, County Hunters

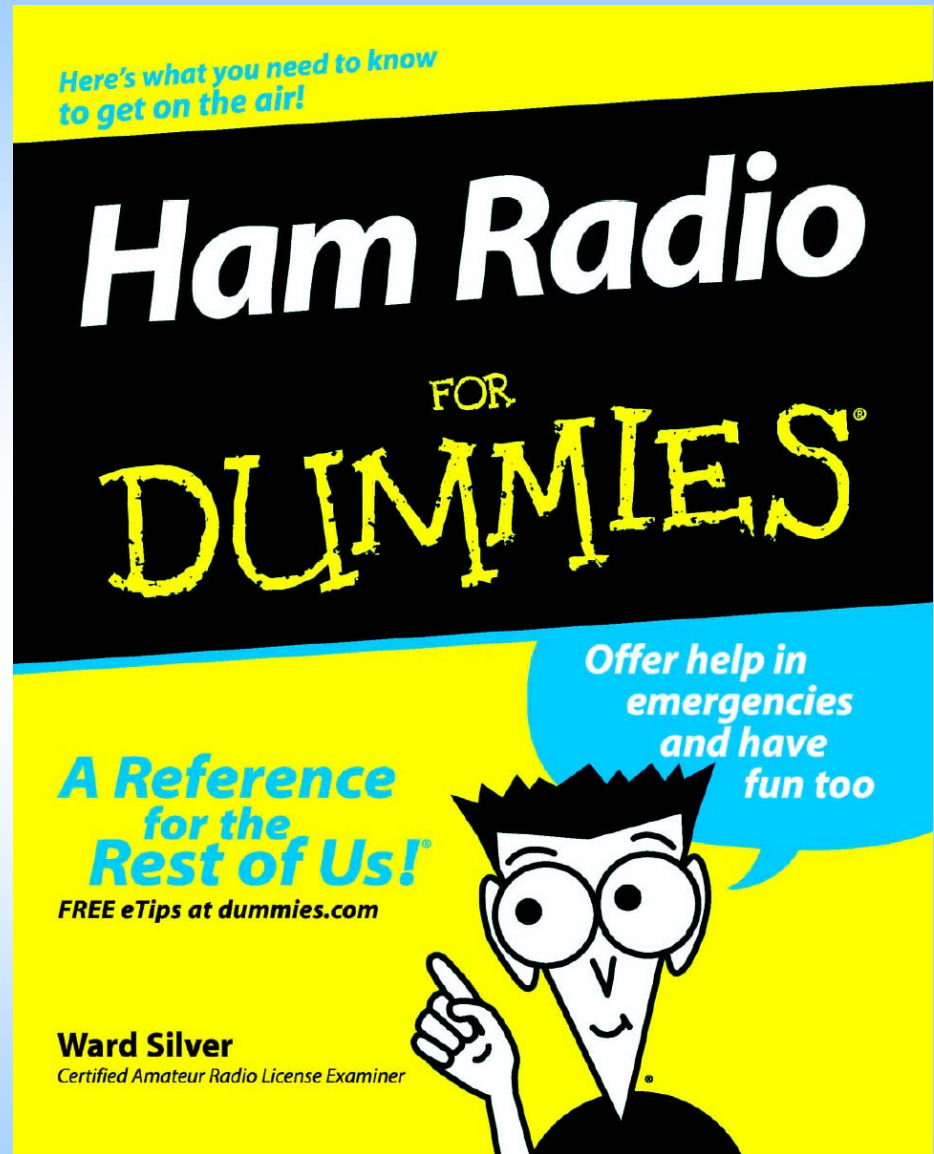
How Do I Find Out More?

- ARRL Web site
 - Band plans & Calling Frequencies
 - Tutorial Articles & Glossary
- QRZ.com, AC6V.com, eHam.net portals
- Email lists & Newsletters
 - QRP, TowerTalk, Antennas, RFI
 - ARRL Letter, Propagation, Rate Sheet

How Do I Find Out More?

- ARRL and RAC Publications
 - “Operating Manual”
 - “Handbook”
- QST, CQ, TCA, WorldRadio
- “How To...” books on every HF specialty
- Plus - my favorite...

“Ham Radio for
Dummies”
by NØAX



How Do I Find Out More?

Join a club and participate

Get on the air

Go to conventions and hamfests

Ask questions

Barrie Amateur Radio Club

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

THANK YOU!