Technician License Course
Chapter 6

Lesson Plan Module 13 –
Contacting Other Hams – Part 1
Contact Basics, Band Plans, Making Contacts and Using Repeaters

ARRL The national association for AMATEUR RADIO

The Typical Telephone Conversation

- Greeting
- Identify who is participating
- Exchange information, generally taking turns
- Salutations
- End the conversation

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The Typical Ham Contact (QSO)

- Greeting
- Identify who is participating
- Exchange information, generally taking turns
- Salutations
- End the conversation

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Radio Manners

- Speak clearly and distinctly
  - Remember – you can't see the other person talking!
  - Use phonetics when needed
- Assume all communications are public – choose topics accordingly

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Radio Manners

- Before transmitting, be sure the frequency is clear and you are authorized to use it!
- Station identification (10-minute rule)
- Frequencies are shared
  - No one has a prior claim to a frequency
  - Schedules, nets, pre-planned events
  - Be flexible, always have a "Plan B"

Radio Manners

- Signal reports
- Power level
  - Avoid excess power
- Location (QTH)
  - Grid locators
- RST
  - **R**eadability (1–5)
  - **S**trength (1–9)
  - **T**one (CW only 1–9)
  - "Your signal is 58"

Radio Manners

- Advice and assistance
  - Radio and antenna tests or checks
- Ham radio is self-regulated
  - ARRL Official Observers
- Logging contacts – on paper or computer
- QSLs and award programs

Band Plans

- A band plan is a formal plan for organizing types of operation on a band
  - Informal agreement – not a regulation
  - Intended for normal circumstances
  - Be flexible in times of heavy band use (contests, special events, DXpeditions)
  - Always have a "Plan B"

Making Contacts

- Repeater operation
  - Listen to see how the regulars operate
  - To announce your presence, just say your call
  - Respond to a call with the station's call followed by your own call
  - Often used by a club or group as a regional intercom

Making Contacts

- Repeater signal reports (examples)
  - Full-quieting: signal is strong enough that no noise is heard
  - Scratchy: occasional noise with your signal
  - Flutter: multi-path from a mobile station
  - In and out: occasionally copyable but mostly inaudible

Making Contacts

- HF on CW or SSB
  - "CQ" means "I am calling anyone"
  - To answer give the station's call followed by your call once or twice
  - Use of phonetics is common

Making Contacts

- Taking turns
  - Nets
  - Roundtables
  - Shared contacts
- Breaking in
  - Wait for a pause
  - Give your call

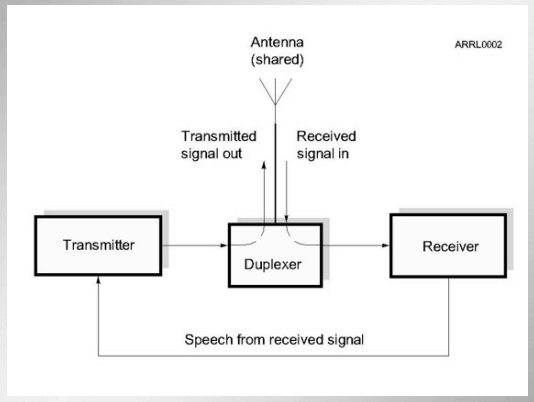
Making Contacts

- Simplex FM
  - Each user takes turns to transmit
  - Works for stations close to each other
  - If you can hear the other station on the repeater input frequency, try simplex
  - 2 meters: 146.52 MHz
  - 70 cm: 446.00 MHz

Repeater Review

- Specialized transmitter/receiver interconnected by a controller.
- Generally located at a high place.
- Receives and simultaneously retransmits your signal on a different frequency.
- Dramatically extends line-of-sight range.

Repeater Review – How They Work



Duplex Communication

- Transmitting on one frequency while simultaneously listening on a different frequency.
- Repeaters use duplex communications.
- **Output frequency** – the frequency the repeater transmits on and you listen to.
- **Input frequency** – the frequency the repeater listens to and you transmit on.

Things to Know to Use a Repeater

- Output frequency
- Frequency offset
  - And therefore the input frequency
- Repeater access tones (if any)

Repeater Output Frequency

- Repeaters are frequently identified by their output frequency.
  - "Meet you on the 443.50 machine."
    - Here the specific frequency is used.
  - "Let's go to 94."
    - Here an abbreviation for a standard repeater channel is used, meaning 146.94 MHz.
  - "How about the NARL repeater?"
    - Here the repeater is referenced by the sponsoring club name.

Repeater Frequency Offset

- The offset frequencies (shifts or splits) are standardized to help facilitate repeater use.
- There are + and – offsets depending on the plan.
- Different bands have different standardized amounts of offset.

Standard Repeater Offsets by Band

Band	*Offset*
10 Meters	–100 kHz
6 Meters	Varies by region: –500 kHz, –1 MHz, –1.7 MHz
2 Meters	+ or -600 kHz
1.25 Meters	–1.6 MHz
70 cm	+ or -5 MHz
902 MHz	12 MHz
1296 MHz	12 MHz

Repeater Access Tones

- Prevents accessing multiple repeaters at once.
- Subaudible low-frequency tone must be present before the repeater transmitter will turn on.
- Tones have various names (depending on equipment manufacturer).
  - CTCSS (continuous tone coded squelch system)
  - PL (a Motorola trade name for CTCSS)
  - Privacy codes or tones
  - DCS (digital coded squelch)

Repeater Access Tones

- Access tones are usually published along with repeater frequencies.
- Could also be announced when the repeater identifies.
  - "PL is 123.0" meaning 123.0 Hz
- Tones are generally programmed into the radio along with frequency and offset.

Repeater Control

- Repeater identification (Morse code or synthesized voice)
  - Same ID requirements as you have
- Time-out protection
  - Protects against continuous transmission in the event of a stuck PTT or long-winded speaker
  - Usually three minutes
- Courtesy beep or tone signals time-out timer reset
- May have an autopatch system for phone calls

Common Problems

- Off frequency: causes audio distortion
- Low batteries: weak signal, audio distortion
- Poor location: hear repeater OK, can't make or maintain contact
- Access tone off or wrong: repeater is strong but can't access it
- Repeater drops in and out of your receiver: squelch setting too high

Digital Repeater Systems

- Repeaters linked by the Internet
- Use digital audio – Voice Over Internet Protocol (VOIP)
  - Similar to Skype
- Allows communication world-wide
- Internet Linking Relay Project (IRLP)
- Echolink
- Access codes on system websites

D-STAR

- Both a repeater linking system and a digital voice protocol
- DV: Digital Voice mode (voice + 1200 baud data)
- DD: Digital Data mode (128 kbps data)
- Repeaters linked together worldwide
- Call user-to-user based on call sign
- Currently an ICOM system
- Yaesu and Kenwood also building digital systems