

Your Radio and Repeaters

Technician Exam Preparation Class
June 2020
Session 6

Roland K. Smith
Call Sign: K7OJL

rolandksmith@gmail.com
(435) 849-1946

Radio Characteristics

- A method to switch between transmit and receive: PTT (push to talk)
- A method to store frequently used frequencies and modes (Memory Channels)
- A method to attach an antenna
 - Outside is better
 - Some HT “rubber-duck” antennas are poor performers
- Has at least one mode of operation
 - For VHF/UHF bands most HT’s offer only FM
- May have a method of setting the frequency (VFO or Variable Frequency Oscillator)
- May have squelch settings to mute the receiver when no signal is present
- Usually offer the ability to operate in Simplex or Split mode

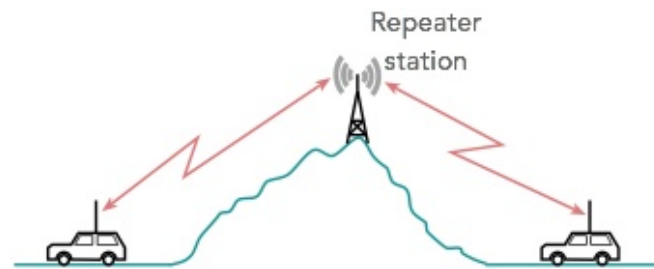
RF Power Amplifiers

- All transmitters have an RF power amplifier, which is the most expensive part of the radio
- External power amplifiers are also available which will amplify up to 1,500 watts
 - These will have settings for SSB / CW / FM to properly handle the incoming signal



Note that the maximum HF power for Technicians is 200 watts, 1,500 watts on VHF / UHF

What is a Repeater?



- A radio that listens on one frequency and simultaneously transmits on another frequency (generally limited to 10 meters and above)
- The “split” between receive and transmit depends on the band (0.6 MHz in the 2 meter band and 5.0 MHz in the 70cm band is common). The split can be either up (+) or down (-)
- To avoid spurious transmissions, repeaters often require a specific sub-audible tone to be sent with the transmission otherwise the repeater ignores the incoming signal ... Specifically called CTCSS (commonly called a PL tone)

T2B01, T2B02, T1F09

More on Repeaters

- **CTCSS**: Continuous Tone-coded Squelch System
- **Reverse split** means listening on the repeater's input frequency
- Repeaters are often linked, either over the air or over the Internet. The Intermountain Intertie is an excellent example
- Local volunteers coordinate the frequency pairs used by repeaters in the area to avoid conflicts. The FCC is never involved in this coordination work ... only when transmissions are being interfered with.
- Repeaters are required to identify themselves every 10 minutes when active. That can be done either with voice or CW.

More Repeater Info

- The input signal must be strong enough to open the repeater's squelch system
 - If a signal isn't strong enough to keep the repeater's squelch open, listen on the input frequency to see if the signal can be heard.
- If other people on the repeater report that your voice is breaking up on the peaks, you're speaking too loudly into the microphone
- Repeaters are usually under "automatic control" because the Control Operator is not directly at the control point
- The bandwidth of a repeater signal is between 10-15 kHz



T1A08, T1A09, T2B03, T1E08, T3A05, T8A09

Using a Repeater

Frequency	Offset Direction	Offset Amount	CTCSS
147.200	+	0.6 MHz	100.0
449.425	-	5.0 MHz	100.0

- Need to know
 - Frequency
 - Offset (and offset amount if non-standard)
 - CTCSS
- Utah VHF Society (utahvhfs.org) maintains lists of (most) all repeaters in Utah

**The W4VB repeater transmits on 145.330
anything it hears on 144.730 Mhz that
has a sub-audible tone of 131.8 Hz**



To use this repeater:
Set my receive frequency to 145.330 MHz
Set my offset to “minus 0.6 MHz”
Set CTCSS on transmit to 131.8 Hz

T2B04, T7B10

Can't Access a Repeater?

Check:

Is the offset correct?

Is the CTCSS or DCS correct?

Some repeater systems use a Digital Coded Squelch (DCS) signal rather than CTCSS. It's not particularly common in the US, but fairly common in Europe

Signal distorted or unintelligible?

On frequency?

Battery low?

Bad location?

Repeater Systems

- A linked repeater system retransmits on all linked repeaters any input transmission that opens the squelch on any of the repeaters in the system.
- Linked repeater systems may be linked via the Internet or by other means such as microwave or UHF frequencies.
- Who is responsible if a repeater retransmits communications that violate FCC rules? the Control Operator of the originating station!
- Transmitting into a repeater without identification is called “kerchunking”. A bad practice.



Utah VHF Society

<http://utahvhfs.org>

Manages the Intermountain Intertie consisting of a linked repeater system from Billings MT in the north, Boise ID in the west, Flagstaff AZ in the south and Las Vegas NV in the west

**Jot down any questions
you may have to ask
during the online meeting**