

## *Commutations & Operations*

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### **AGENDA**

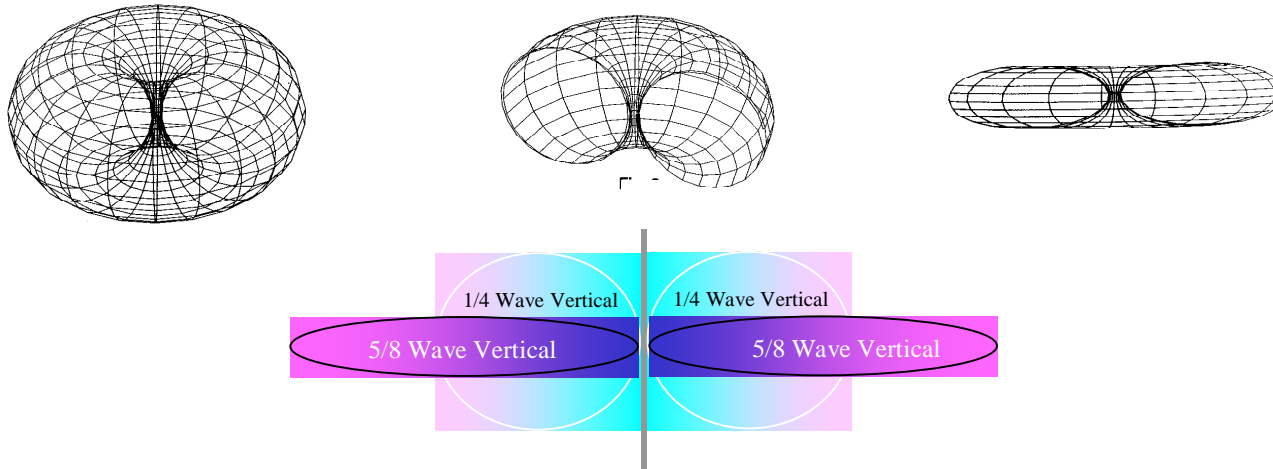
- Repeaters and Repeater Operation
- Gateways

## Commutations & Operations

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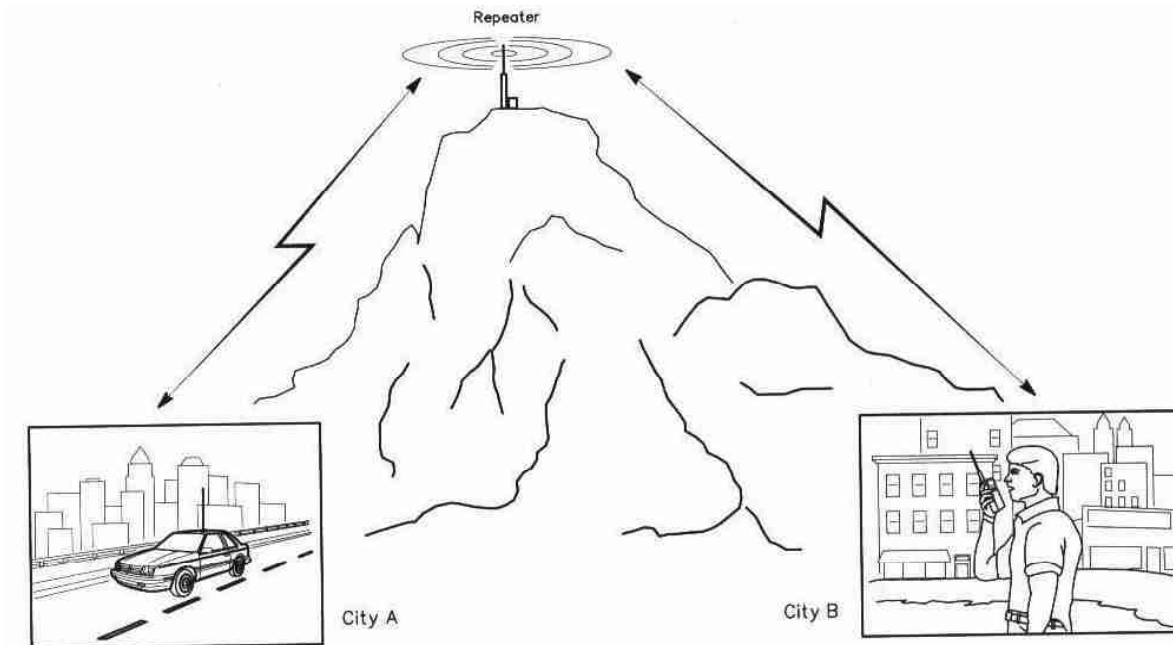
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### Antenna Gain



- Antenna Gain: Achieved by altering the radiation pattern of an antenna
  - ⊍ Same amount of power exists, but is spread over a condensed area
  - ⊍ Isotropic antenna is usually used as the reference
    - √ Gain referenced to an isotropic antenna is expressed in dBi
  - ⊍ Dipole antenna may be used as the reference
    - √ Gain referenced to a dipole antenna is expressed in dBd

## Repeater Communications



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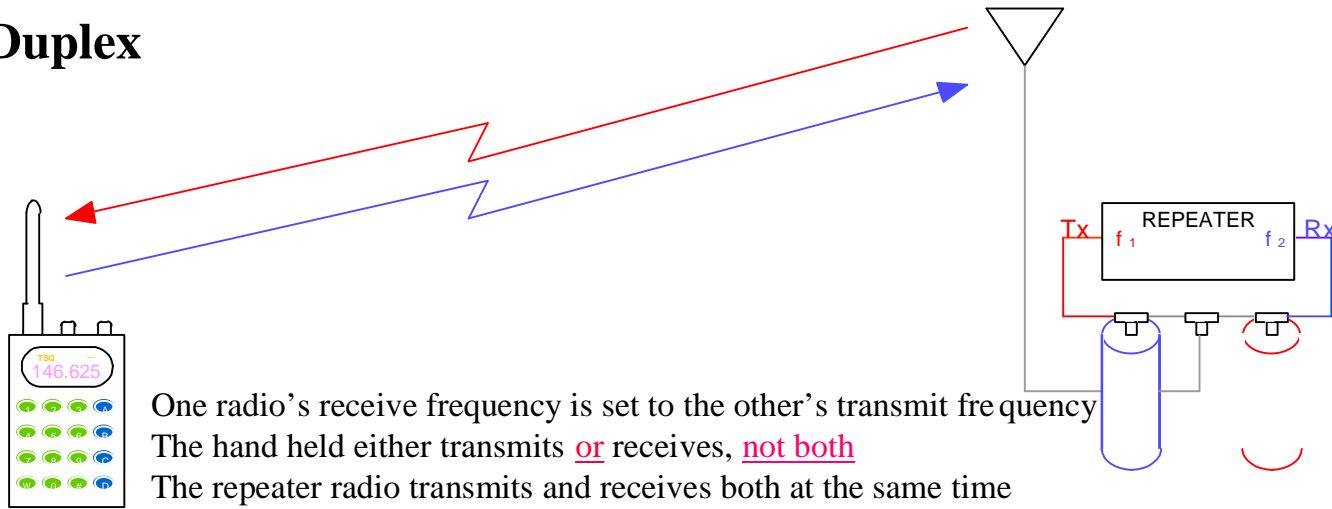
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### **Repeater Operations**

- q Basics
  - u Enhance mobile and low-power operations
  - u Pause briefly between transmissions
  - u Give call sign to break in
- q Checking the reverse
  - u Listening to the repeater input frequency (reverse) to see if simplex is practical
- q Frequency Coordinator
  - u A person or group that recommends frequency pairs for repeater use
  - u Repeater interference resolution is the responsibility of the repeater operators
- q Repeater Identification
  - u Identify in either voice or CW mode (CW may not be more than 20 wpm)
- q Full Quieting
  - u The condition when the audio signal overcomes all noise in the receiver
- q VHF & UHF communications should be used to avoid tying up the HF bands

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## Duplex



### REPEATER INPUT/OUTPUT OFFSETS

### Local 2-Meter Frequency Pairs

|        | RADIO RX/RPTR TX | RADIO TX/RPTR RX |
|--------|------------------|------------------|
| PPFMA: | 146.970          | 146.370          |
| CMRG:  | 147.345          | 147.945          |
| CSARA: | 146.625          | 146.025          |
| UCCS:  | 145.265          | 144.665          |

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### q SUB AUDIBLE TONES

® Inserted under the voice band to alert the receiver of an incoming signal

® Used to discriminate between unwanted signals or noise.

### Continuous Tone Coded Squelch System (CTCSS) (PL®)

|                  |                   |                   |                   |
|------------------|-------------------|-------------------|-------------------|
| <i>67.0</i> - XZ | <b>97.4</b> - ZB  | <b>141.3</b> - 4A | <i>206.5</i> - 8Z |
| <b>69.3</b> - WZ | <b>100.0</b> - 1Z | <b>146.2</b> - 4B | <i>210.7</i> - M2 |
| <b>71.9</b> - XA | <b>103.5</b> - 1A | <b>151.4</b> - 5Z | <b>218.1</b> - M3 |
| <b>74.4</b> - WA | <b>107.2</b> - 1B | <b>156.7</b> - 5A | <b>225.7</b> - M4 |
| <b>77.0</b> - XB | <b>110.9</b> - 2Z | <b>162.2</b> - 5B | <i>229.1</i> - 9Z |
| <b>79.7</b> - WB | <b>114.8</b> - 2A | <b>167.9</b> - 6Z | <b>233.6</b> - M5 |
| <b>82.5</b> - YZ | <b>118.8</b> - 2B | <b>173.8</b> - 6A | <b>241.8</b> - M6 |
| <b>85.4</b> - YA | <b>123.0</b> - 3Z | <b>179.9</b> - 6B | <b>250.3</b> - M7 |
| <b>88.5</b> - YB | <b>127.3</b> - 3A | <b>186.2</b> - 7Z | <i>254.1</i> - 0Z |
| <b>91.5</b> - ZZ | <b>131.8</b> - 3B | <i>192.8</i> - 7A |                   |
| <b>94.8</b> - ZA | <b>136.5</b> - 4Z | <i>203.5</i> - M1 |                   |

Additional Tones that  
may be found on some  
systems

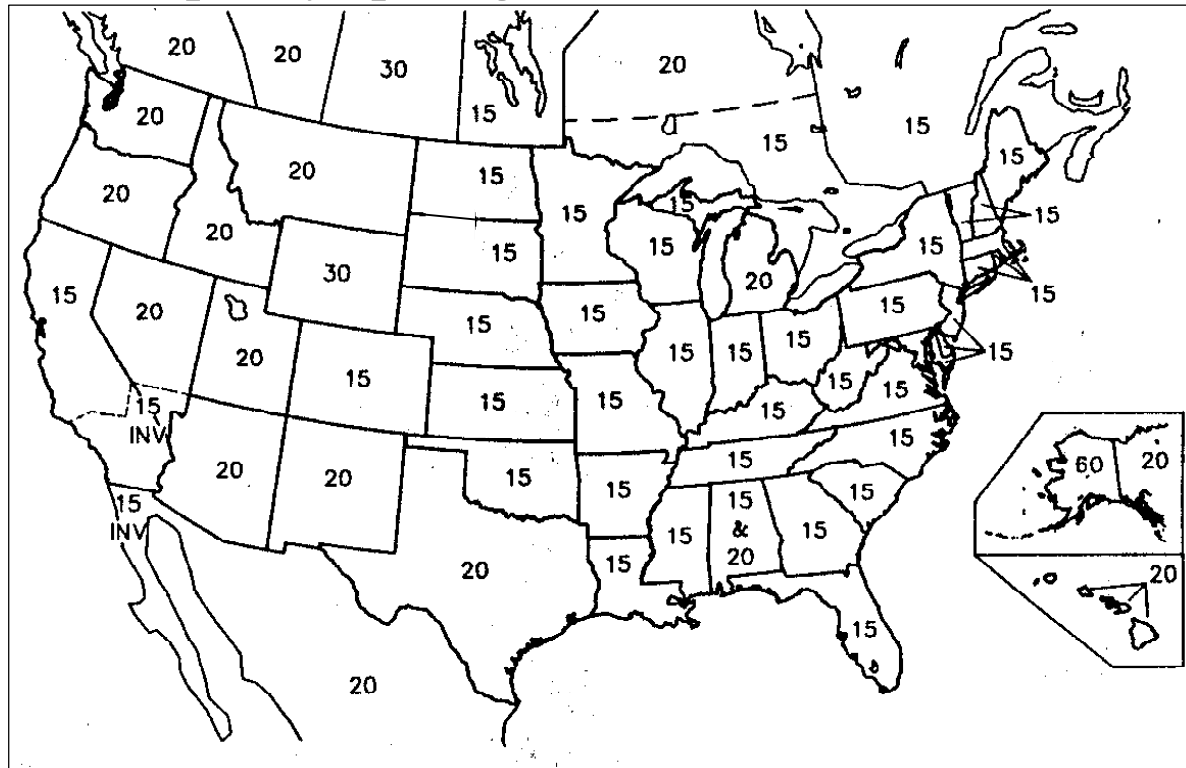
159.8  
165.5  
171.3  
177.3  
183.5  
189.9  
196.6  
199.5

q Italic frequencies may or may not be present on your radio

u Orange not on ARRL list

u Green not on Yaesu radio

## Repeater Frequency Spacing



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### **Autopatch**

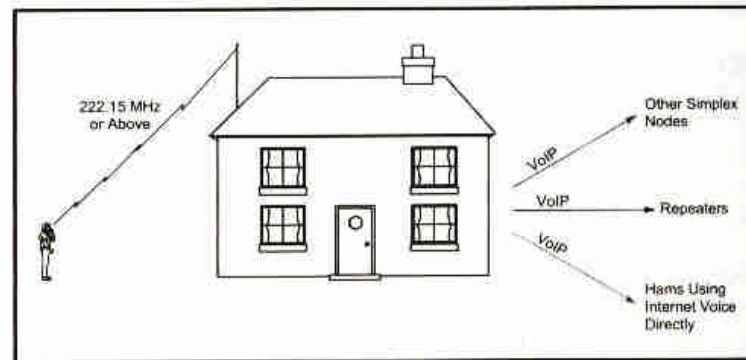
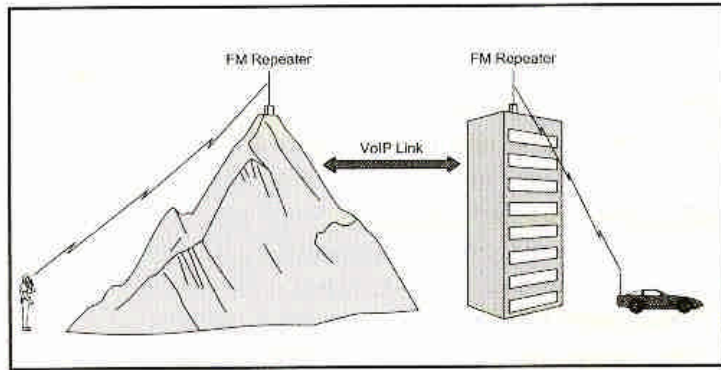
- **Autopatch:** Allows repeater users to make telephone calls through the repeater
- **Guidelines for Use:**
  - ↳ Do not use the autopatch when regular phone service is available .
  - ↳ Never use the autopatch for business communications.
    - ▽ The rules have been relaxed, but ...
  - ↳ Do not use it to avoid a long distance service charge of the telephone company
  - ↳ Remember you are on the air!
- **Open Repeater:** A repeater open to all amateurs
  - ↳ The autopatch may or may not be open to all.

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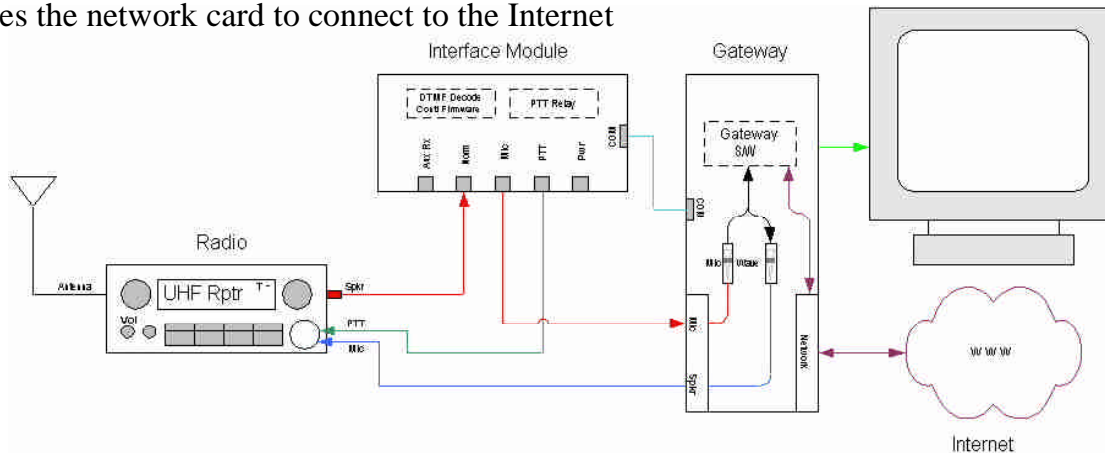
## Gateway Communications



## Commutations & Operations

### Gateway Basics

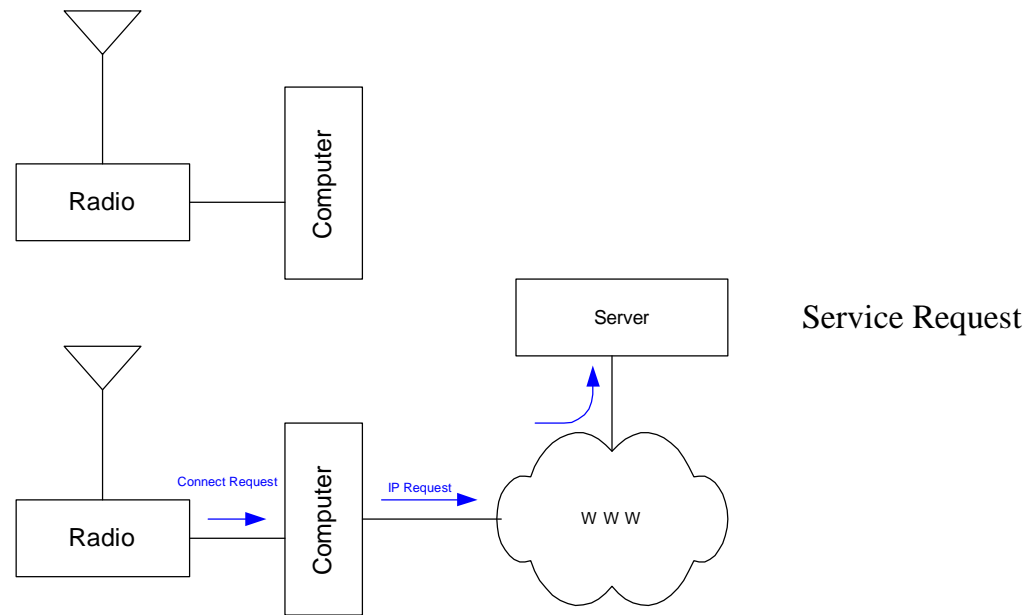
- Amateur Radio Communications over the Internet (Note: May not use 2-Meters as a remote base)
  - └ Uses Voice over Internet Protocol (VoIP)
  - └ Two prominent systems
    - ✓ EchoLink: May use a radio or a computer to send voice information over the Internet
    - ✓ Internet Radio Linking Project (IRLP): Communicate over the Internet through repeaters
  - ✓ Connect to other stations using “Node” numbers
  
- Gateway is a computer that interfaces between the user and the Internet
  - └ Uses the sound card to interface to the amateur station
  - └ Uses the network card to connect to the Internet



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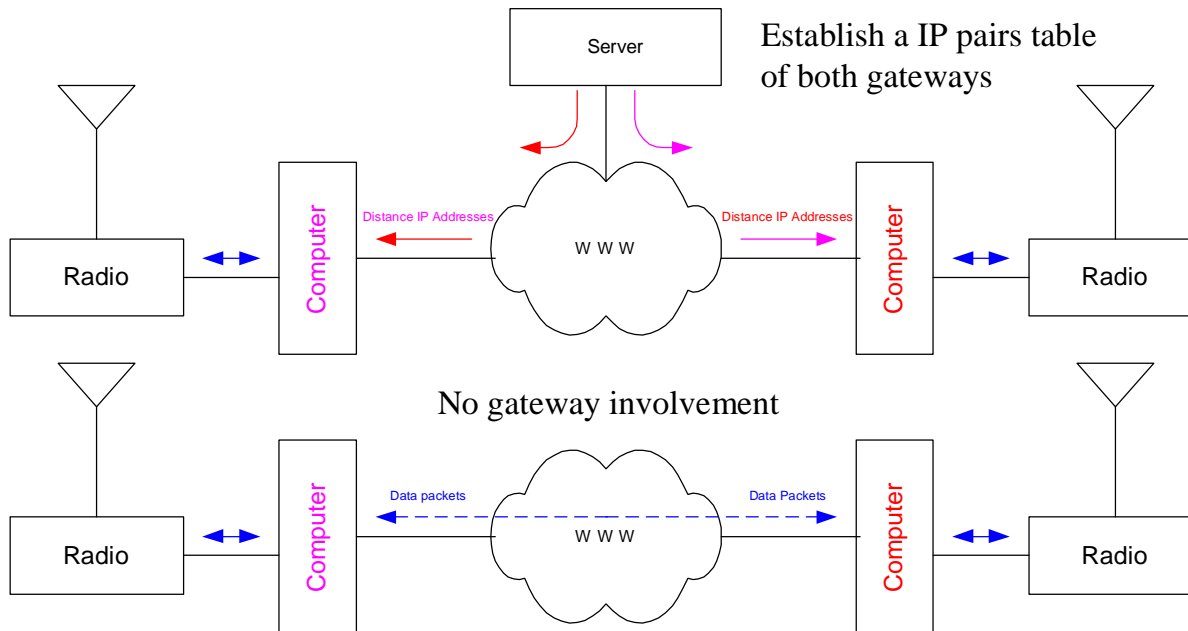
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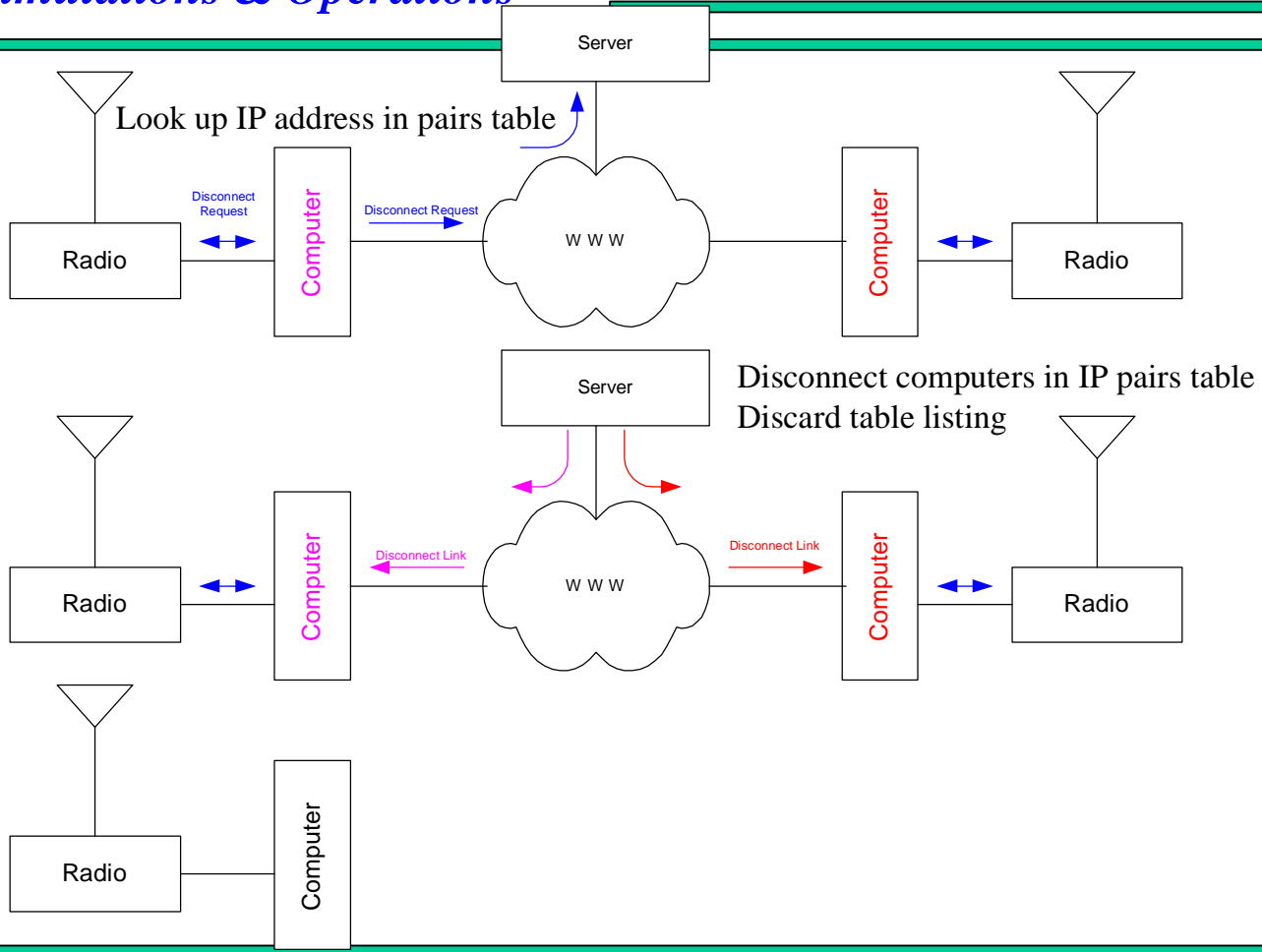
# Commutations & Operations

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# Commutations & Operations



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### **Gateway Basics - Continued**

q Can not use two meters

u [http://www.access.gpo.gov/nara/cfr/waisidx\\_00/47cfr97\\_00.html](http://www.access.gpo.gov/nara/cfr/waisidx_00/47cfr97_00.html)

u Part 97.201 Auxiliary station

- ✓ Any station that is remotely controlled via radio must utilize an auxiliary station to execute said control and auxiliary stations are restricted in frequency.
- ✓ <http://www.arrl.org/qst/2003/02/VoIP.pdf>

## Repeaters in Colorado

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| <u>Frequency (MHz)</u> | <u>NOTES</u>   |
|------------------------|--|
| 145.130 (-) [123.0]    | Colorado Springs Repeater to Colorado Connection (Statewide - LINK)        |
| 145.160 (-) [107.2]    | Colorado Repeater Association - Colorado Springs - Denver 147.225 Repeater |
| 145.265 (-) [100.0]    | Pikes Peak FM Association Repeater on UCCS Campus (local)                  |
| 146.520                | National Simplex Calling Frequency - Popular Simplex Frequency             |
| 146.625 (-) [123.0]    | Colorado Springs Amateur Radio Association Repeater (local)                |
| 146.730 (-)            | Walsenburg Repeater  |
| 146.760 (-) [100.0]    | RACES Net Tuesday Evenings at 7:30 PM                                      |
| 146.790 (-)            | Pueblo Amateur Radio Club - Pueblo Repeater                                |
| 146.820 (-) [107.2]    | Mountain Amateur Radio Club (Teller Co. Primary - Woodland - LINK)         |
| 146.835 (-)            | Portable Repeater 1  |
| 146.865 (-)            | Portable Repeater 2  |
| 146.880 (-) [88.5]     | Deer Peak (Pueblo Repeater) - Good for So. Mountains                       |
| 146.910 (-) [151.4]    | Garden of the Gods Amateur Radio Club Repeater (local)                     |
| 146.970 (-) [100.0]    | Pikes Peak FM Association Repeater   |
| 147.015 (+) [107.2]    | Mountain Amateur Radio Club (Teller Co. & Cripple Creek - LINK)            |
| 147.165 (+) [151.4]    | Private Repeater in Colorado Springs                                       |
| 147.030 (+) [107.2]    | Private Repeater in Colorado Springs                                       |
| 147.210 (+)            | Cañon City Repeater - Good for Arkansas River Canyon                       |
| 147.345 (+) [100.0]    | Cheyenne Mountain Repeater Group Repeater                                  |

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## *Repeaters in Colorado*

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| <u>Frequency (MHz)</u> | <u>NOTES</u>   |
|------------------------|--|
| 446.000                | National Simplex Calling Frequency - Popular Simplex Frequency |
| 447.675 (-) [107.2]    | Black Forest Amateur Club (local)                              |
| 448.000 (-) [100.0]    | Cheyenne Mountain Repeater Group                               |
| 448.100 (-) [100.0]    | Cheyenne Mountain Repeater Group                               |
| 448.450 (-) [100.0]    | Pikes Peak FM Association Repeater on UCCS Campus (local)      |
| 447.025 (-) [123.0]    | Colorado Springs Amateur Radio Association Repeater (local)    |
| 449.625 (-) [100.0]    | Cheyenne Mountain Repeater Group - Pueblo (Deer Peak)          |

## *Some Websites*

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|   |  |
|---|--|
| <a href="http://www.mtn.org/handiham/">http://www.mtn.org/handiham/</a>             | Handi-Hams site serving handicapped operators    |
| <a href="http://www.fcc.gov/oet/rfsafety/">http://www.fcc.gov/oet/rfsafety/</a>     | FCC Web page outline RF safety issues            |
| <a href="http://www.qrz.com/">http://www.qrz.com/</a>                               | Lots of neat stuff and amateur call sign look up |
| <a href="http://www.ualr.edu/~hamradio/">http://www.ualr.edu/~hamradio/</a>         | Amateur call sign look up table                  |
| <a href="http://www.qsl.net/">http://www.qsl.net/</a>                               | Links to Amateur Radio web pages                 |
| <a href="http://www.qsl.net/ppraa/">http://www.qsl.net/ppraa/</a>                   | Pikes Peak Radio Amateur Assn home page          |
| <a href="http://www.ppfma.org">http://www.ppfma.org</a>                             | Pikes Peak FM Association home page              |
| <a href="http://www.qsl.net/cmrg/index.html">http://www.qsl.net/cmrg/index.html</a> | Cheyenne Mountain Repeater Group home page       |
| <a href="http://www.csara.org">http://www.csara.org</a>                             | Colorado Sprgs Amateur Radio Assn home page      |
| <a href="http://www.qsl.net/n7lv/dist14.htm">http://www.qsl.net/n7lv/dist14.htm</a> | Pikes Peak District ARES Website for District 14 |
| <a href="http://www.qsl.net/~epcraces/">http://www.qsl.net/~epcraces/</a>           | El Paso County RACES Website                     |
| <a href="http://www.ccarc.net/">http://www.ccarc.net/</a>                           | Colorado Council of Amateur Radio Clubs          |
| <a href="http://www.arrl.org/">http://www.arrl.org/</a>                             | Amateur Radio Relay League Website               |
| <a href="http://www.amsat.org/">http://www.amsat.org/</a>                           | Amateur Radio Satellite Information              |
| <a href="http://www.echolink.org">http://www.echolink.org</a>                       | World Wide Communications over the Internet      |

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