Transceiver Features

What they do?

How they make your operating better?

Features:

Initial Setup

•Set audio level

•Set RF gain to maximum

- Some radios have the RF gain as the squelch adjustment when the rig is in FM mode
- Use the RF gain to reduce the gain when stations are very strong and/or there are nearby stations which are interfering with the station you are trying to work

•Set frequency and tuning characteristics

- Frequency steps
- Tuning speed

Set mode

SSB

- LSB – 160 thru 40 meters
- USB – 20 meters and above

CW

- Receive LSS or USSM
- Pitch
  - Lower the pitch, the easier for your brain to separate the desired signal from among unwanted signals

FM

- Wide – 5 kHz
- Narrow – 2.5 Khz

AM – 6 kHz. Some rigs need the AM filter.

Digital

- SSB filter for PSK31 and other sound card modes
- CW and SSB for many TNC modes

Selection of VFO (A/B/Split)

- You can set frequency, mode, band width filter, and other settings on one “A”VFO setting and a totally different setting on the “B” VFO
- In split operation, which is very good for working DXpeditions and some contests, it allows you to receive on one frequency and transmit on another. The split frequencies are set in the A and B VFO’s.

Display

- Brightness
- Color

Features:

Improving Receive Performance

Set tone of CW pitch – 400 Hz to 800 Hz; 600 to 750 Hz normal

Automatic Gain Control – Normally set to automatic

- Both receive and transmit
- Receive
- Fast (CW, Digital)
- Slow (SSB, FM)
- Transmit – to keep rig from overdriving

Noise Blanker – Normally off

- Good on periodic, repetitive noise like the spark plug noise
- Will not reduce random noise like static or lightening strikes
- You can set the depth of the notch or blanking

Filter bandwidth

- **AM** – 5-6 kHz
- **SSB** – 2.1 to 2.8 kHz
- **CW** – 250-500 Hz
- **FM**
  - 2.5 kHz (narrow)
  - 4-5 kHz (wide)
- **Digital**
  - SSB filter for PSK31 and other sound card modes
  - CW and SSB for many TNC modes

Attenuator

- Provides 6 to 15 db of attenuation to the signal at the antenna input
- Useful mostly on 160 thru 40 meters.
- Adding attenuation can actually improve weak signal intelligibility

Receiver Incremental Tuning (Clarifier)

- Shifts receive frequency, but not transmit frequency
- =/- 5-10 kHz

IF Shift

- Moves the crystal filter bandwidth to the left and right of the received frequency. This allows for the eliminating of a strong signal to one side of the received frequency.
- Sometimes called “Pass band tuning.”

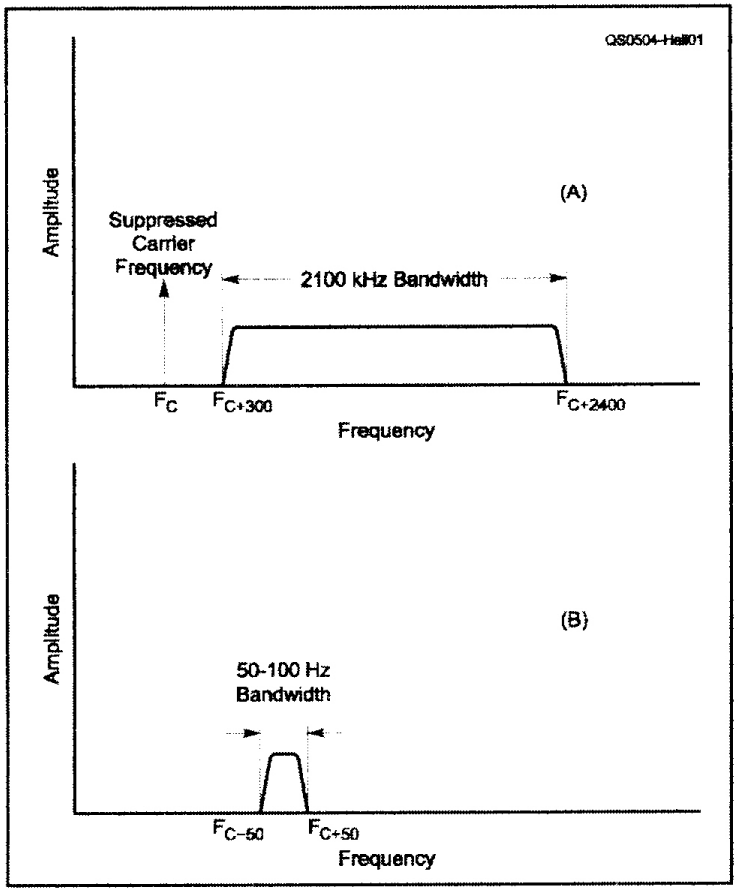

Figure 1—The transmitted bandwidth of a typical single sideband (SSB) signal at (A) and a radiotelegraph or CW signal at (B).

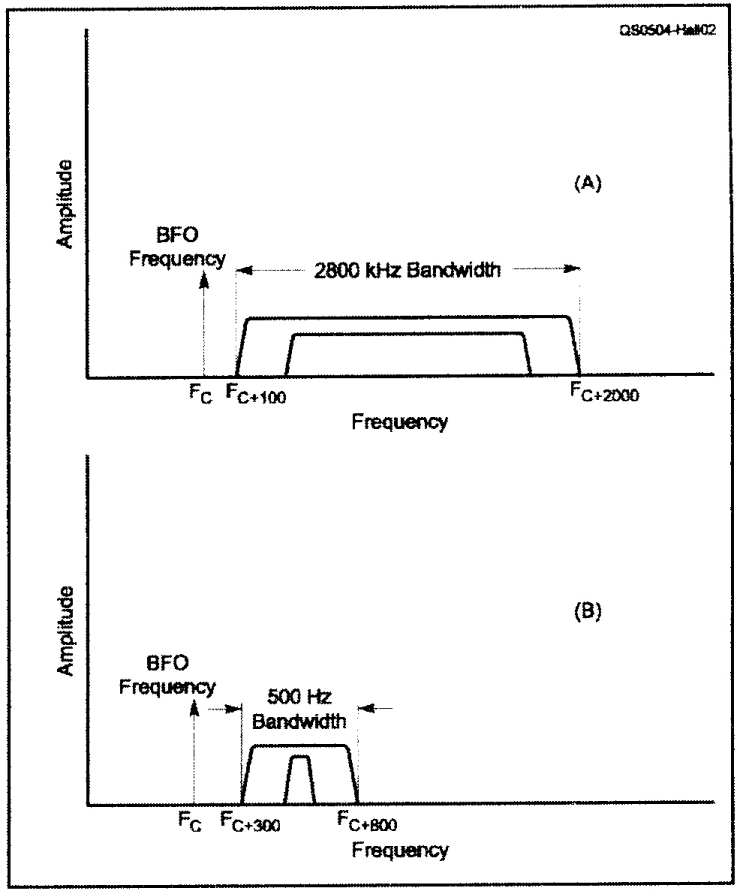

Figure 2—The passband of our receiver assuming a 2.8 kHz filter for SSB and a 500 Hz filter for CW.

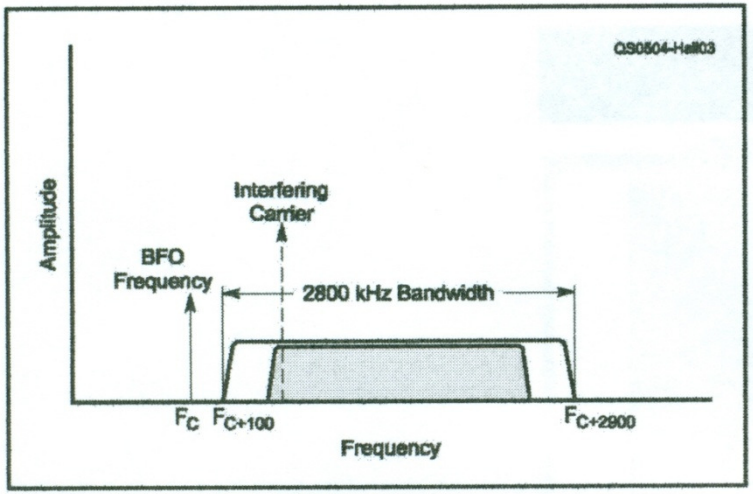

Figure 3—Receive passband with an interfering carrier at one end.

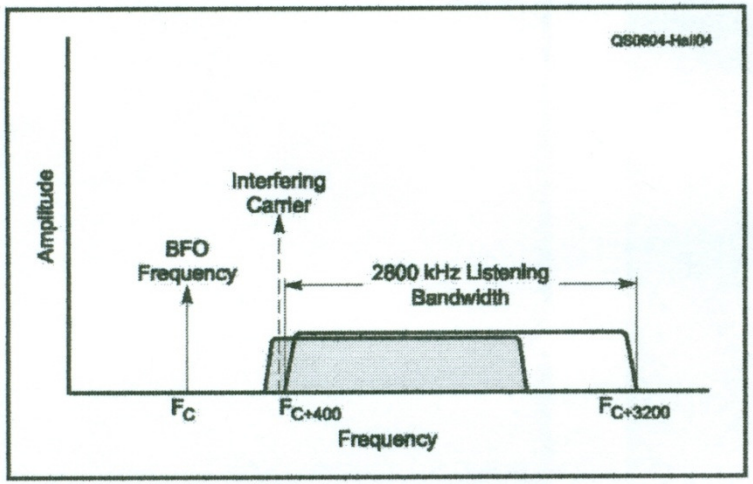

Figure 4—Receive passband with PASSBAND TUNING adjusted to eliminate the interfering carrier.

DSP

Bandpass filter

- Adds additional filtering to the received signal. Is in addition to the crystal filter in the receiver IF. Some DSP is done at RF and some is done at AF. The RF DSP is better, however, many rigs and external DSP filters operate at audio frequencies.
- In the SSB mode, typical bandwidths are 2500 Hz to as little as 1500 Hz. Below 1500 Hz and the audio may become distorted.
- In the CW mode, typical bandwidths are from 400 Hz to as narrow as 60 Hz.

CW peak

- The DSP action peaks the frequency that you are listening at. It will sift depending upon the setting of the pitch.
- Typical enhancement of the CW pitch can be several db.

Noise Reduction

- Works (sometimes). On my rig this feature is limited although it does enhance somewhat.
- You can set the level of noise reduction to provide the best enhancement of the received signal.

Notch Filter

- This can be used to "notch out" or depress a carrier, CW signal, or some digital signals. This will reduce the interference to the desired signal. Can be used with receiving and mode (although I have never used it in FM mode).
- The "depth" of the notch can be adjusted to provide the best results.

Features:

Improving Transmitter Performance

Microphone DSP

- The Audio Frequency DSP can be used to enhance the frequencies that are used to modulate your transmitted signal. Typically you can emphasize low, high, and a cut in the middle frequency range or turn off the DSP.
- This is used to enhance the "naturalness" of your voice or to increase intelligibility. Any microphones used in communications deemphasize frequencies above 3000 Hz. In DXing or contesting, enhancing the high frequencies will increase the ability of the other station understanding your communication.

AF Speech Processing (Compression)

- In AM and SSB modes, the 'average" power is a small fraction of the CW power output or peak power.
- In SSB the average power transmitted can be as low as 20% of the peak power. Thus a signal that has 100 W peaks will average only 20 to 25 W average output.
- In AM the average power is somewhat higher than SSB, but still is only a fraction of the peak envelope power.
- An AF speech processer compresses the PEP and allows the less than maximum PEP parts of the audio to be enhanced without "clipping" which causes distortion.
- Generally done at RF in today's rigs.

VOX or voice operated PTT

- When turned on, the VOX activates the PTT by sensing your audio.
- When off, you need to activate the PTT by pushing the talk button on your microphone.

VOX delay

- This is the length of time for the rig to switch from transmit to receive once you stop talking and turn the contact over to the other ham(s)

VOX sensitivity

- The “loudness” of your voice power into the mic necessary to activate the VOX circuits.

Built in Keyer

- Depending on which key used, you can use a hand key or an iambic keyer.
- There are two primary iambic keyer modes, one mode that does not complete a character unless the key contact remains closed and one mode that will complete a dot or dash even if the keyer contact opens before the element is transmitted.
- Most high speed CW operations us the “self completing” mode.
- Many built in keyers have a memory mode where you can store one or more messages. This is useful in contests where you are sending the same information like a CQ Contest or signal report.

Features:

Associated with FM Operation

CTCSS – *Continuous Tone-Coded Squelch System*

Encode

- This is when your rig sends out a sub-audible frequency to the repeater or other radio. The receiver squelch on the receiving rig will not open unless is receives the specific tone. Sub-audible means that the frequency of the tone lies below the audio filter bandwidth frequencies. Typically the audio bandwidth is between 300 and 3000 Hz.
- Most repeaters require a CTCSS tone to operate

Decode

- This is when your rig must receive a tone to open the squelch. This is especially useful if you have two there are two repeaters on the same frequency. You will hear only the one that has the proper CTCSS. I use this for the 146.910 repeater frequency where I can receive the Colorado Springs and the Denver repeater that are on the same frequency.

- You can set your rig for encode only, decode only, encode and decode, and no tone squelch.
- There are 39 tones from 67.0 Hz to 250.3 Hz.

CTCSS Frequencies (Hz)

67.0	**107.2**	**173.8**
69.3	**110.9**	**179.9**
71.9	**114.8**	**186.2**
74.4	**118.8**	**192.8**
77.0	**123.0**	**203.5**
79.7	**127.3**	**210.7**
82.5	**131.8**	**218.1**
85.4	**136.5**	**225.7**
88.5	**141.3**	**229.1**
91.5	**146.2**	**233.6**
94.8	**151.4**	**241.8**
97.4	**156.7**	**250.3**
100.0	**162.2**	**254.1**
103.5	**167.9**	

DCS – Digital Code Squelch

- Another form of access control. You can set up your rig to not open unless it receives the proper DCS.

DTFM –

- You can use it to control features on repeaters, make phone calls.
- Generally available either on the rig base or on the microphone

Memories

- Most of today's rigs have several memories ranging from 100 memories to as much as 1000 memories. Most can memories can be arranged in "banks" and recalled either in banks or individual memories.
- Each memory can store frequency, mode, filter, DSP settings, CTCSS settings, DSC settings, repeater offset,
- Scan the memories or banks of memories

Features:

Miscellaneous

CAT System

- Software control of the radio
- Control automatic antenna tuners
- In many rigs you can load the memories from a computer program

Some rigs have options that can be added to the rig:

- Better or additional filters
- Automatic tuners

- **Spectrum displays**
  - This feature displays the signals received above and below the specific received frequency

Questions??