HOW TO DO CW ON FIELD DAY

with an ordinary run of the mill SSB transceiver that doesn't have a CW filter

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Sound easy, right? You push some button or menu to put the transceiver into CW mode, and you answer someone calling CQ CQ FD, right? That's how you do it on SSB, right? How could CW be any more difficult?

Ah….it is a little more complicated than that….if you are using a general purpose SSB hf transceiver with a 2400 Hz wide filter.

If you don't have the other fellow TUNED IN PROPERLY…..***he may never even hear your reply if you don't understand how CW works!***

To understand why….we have to go way back into the early days of radio...
Below is a photo of the first major kit I ever built-- a vacuum tube short wave receiver that I tried (unsuccessfully) to use for ham radio. The entire 40 meter novice band is only a NEEDLE-WIDTH wide on that receiver….but it can still teach us something.

On a general purpose AM short wave receiver, if you tune in a CW signal, all you hear are whoosh-whoosh-whooooooosh-whoosh noises. No tones! Just like a fan moving air, starting and stopping –

that is all the AM detector hears from CW. Try to tune in a single sideband signal with an AM detector, and all you get is gibberish. Why? This is an __AM__ receiver! In order to hear Single Side Band...you have to supply the **missing carrier**! And in order to hear CW, you have to supply some signal against which the extremely narrow cw signal can "beat" to produce a musical tone your ear can decode.

We call that "some signal" the BEAT FREQUENCY OSCILLATOR.

That s the whole reason for that "BFO" knob 2nd from the far right – it supplies the missing carrier, or the 'beat frequency oscillator" so you can hear CW as a TONE instead of a "whoosh".

So how does that relate to success on Field Day?

Narrow Filters

Modern high-performance CW operators and their rigs often use **extremely narrow filters** (200-500 Hz wide) so they only hear one very small slice of the frequency band. Especially when the band is crowded, like on Field Day. If you don't put your signal ***right where they can hear it*** – you can call them all day long and you won't even be heard!

Where is that magic spot? Why, you need to put your signal perfectly on top of THEIR signal! At the same frequency! But...where exactly IS their signal?

Think about it for a moment:

Your dial tells you where YOU are going to transmit, but you can wiggle that dial up and down quite a bit on a lot of wide-band-filtered rigs --- the other fellow's CW signal goes from a deep base to a tenor, to a high -pitched soprano – but you hear him all the same….and your transmitting frequency has varied over 2000 Hz…. Which VFO setting is the RIGHT one to choose for your reply?

On single side band, this is easier – you tune them in until "donald duck" becomes correctly pitched human speech and then you're on the right frequency. CW on a rig without a narrow filter is more complicated.

And how do you hear them ANYWAY? If your receiver were right on their frequency….wouldn't their signal be a deep-deep-base of only a few Hertz….where you can't even decode it?

CW OFFSET

The answer to all these perplexing dilemmas is that your transceiver does a BFO OFFSET when you set it for CW….it SHIFTS the injected carrier away from where it would be for single sideband, in order to allow you to hear an audible TONE from the other fellows signal.

You need to make his audible tone be exactly equal in pitch to that OFFSET – then you'll be transmitting right on his frequency.

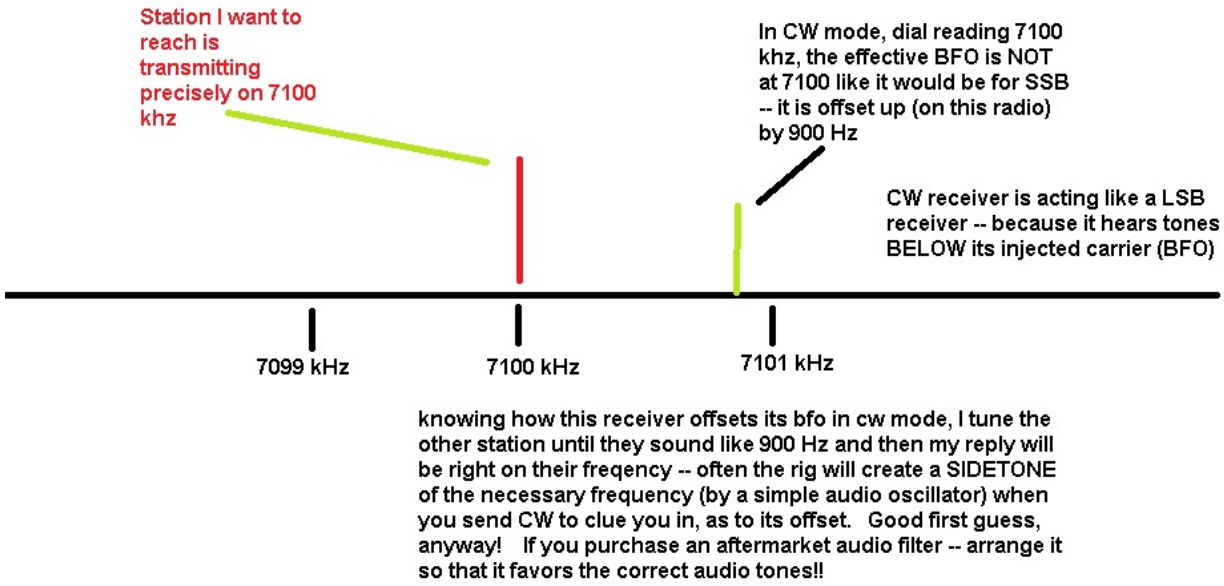

Figure – a receiver that offsets their injected carrier UP by 900 Hz, listening to a station transmitting exactly on 7100 kHz. You hear their signal as a 900 Hz audible tone when you are tuned precisely to 7100 Hz. This receiver is receiving the incoming CW signal as if it were "lower" sideband, so if your turn your dial to a higher frequency, the BFO will move upwards, and the tone of the other station will go higher in pitch. Some rigs do the opposite!

If you have a rig with a narrow filter installed, the manufacturer will have rigged it so that the filter favors the correct CW incoming signal pitch.

QUANDARY

But if you DON'T….you need to know the OFFSET of your rig! Unfortunately for me….I didn't, and the manual didn't tell me it either… what a pickle!

SOLVING THIS

To solve this you need

a) a signal you can listen to (someone transmitting for a long time, or a 2nd transmitter you can do that with

b) a separate receiver that can listen to both YOU and that other other signal – and tell when you have your transmitter precisely on the SAME exact frequency as the other signal.

Then just listen to the pitch you hear on your receiver when you are lined up properly – THAT is the correct pitch. (You can use any waterfall to measure its frequency, also). In my case, it turned out to be 900 Hz. The offset of my Field Day rig was 900 Hz. And I'm getting a narrow CW filter to make this easier on me next time!!!