

# Optimizing IC-7300 Phone Settings

## Why Make the Adjustments?

- The 7300 provides 100 Watts of Power.
  - This is PEAK Power, not AVERAGE Power.
- Converting the variations of tone and volume of the human voice to a duty cycle on a radio, default TX audio settings relate to about 20%,
  - This Means only 20 Watts of average transmitted Power.
- By adjusting the Microphone Gain and Compression of the 7300, to your voice, you can get this up to about 40%, doubling the average power transmitted.
- Any changes to the normal wave form of voice causes distortion, the goal is to adjust so it sounds fine to the human ear, but does not cause distortions.
- Settings can be different from person to person.

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## Why Make the Adjustments?

- Normal audio range is from 50 Hz to 8000 Hz.
- Single Side Band radios inherited the Bell Telephone long distance toll standard of 300 Hz to 3000 Hz.
  - Note: the default band pass filter many digital SSB is this range.
- For you musicians, middle C is 262 Hz. This is lower than the lowest frequency sounds than that can be transmitted.
- While lower notes add fullness to voice, the information carrying range of speech is between 1500 and 3000 Hz.
- The term Dynamic Range, is the ratio between the loudest and quite most heard sound.
- To produce more transmitted power, you must reduce the dynamic range of your speech

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## What Adjustments?

- Older radios have different features for reducing range.
  - Limiting
    - Basically trimming the peaks to fit the audio passband. Very non linear and creates multiple third harmonics causing distortion.
  - Audio Heterodyne
    - Convert to RF, Trim the RF, and the convert back to audio.
      - Basically, heterodyne the AF into RF Trim trim the peaks then most of the harmonics are removed during the conversion back to audio.
      - Still can create distorted voice but not nearly as much as simple limiting.
  - Compression
    - Smooth variation of gain, more gain for lows, less gain for highs.
    - If not over done, produces good sound.

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Full Audio Dynamic Range of Spoken Sentence



Compressed Version of the Full Audio Dynamic Range Sentence

Notice the expansion of the signal that maximizes the use of the dynamic range.

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## Steps for Configuring TX Audio Settings for Maximum Punch

- You should use a dummy load on low power when configuring
- Ensure you are in a Upper or Lower Sideband, and not in Data mode
- Turn off compression if it is already on
- Set Microphone Gain to per Manual
  - Page 3-11 of full Manual
  - ALC meter and adjust until the meter reading swings between 30 to 50% of the ALC scale
- Turn Compressor On
- Set Compressor level as specified in the Manual
  - Page 4-12 of full Manual

# Optimizing IC-7300 Phone Settings

Ensure you are in Upper or Lower Sideband & With No Data

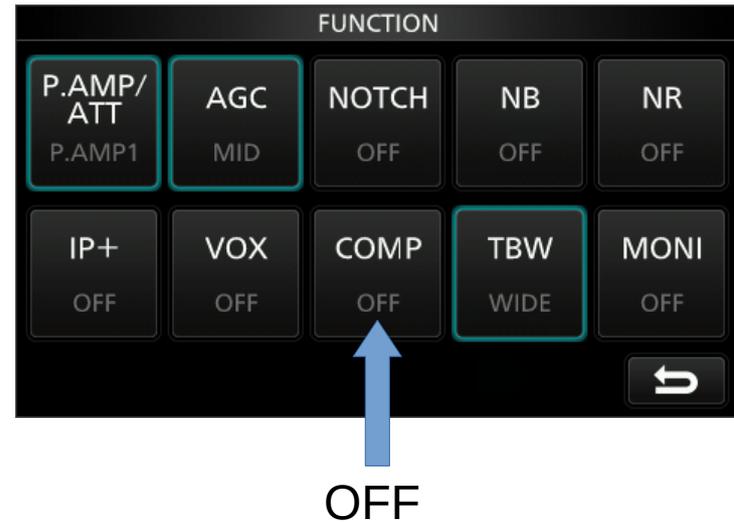


Image on left shows the 7300 screen in USB Data mode, notice no COMP section. Image on right shows the 7300 in LSB mode, notice the Multi Function includes COMP.

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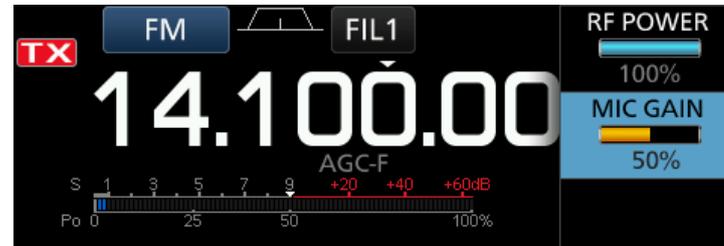
## Turn Off Compressor

- 1) Select a SSB Mode, USB or LSB.
- 2) Press the **FUNCTION** button to opens the Function Screen.
  - 1) Be sure the Speech Compressor is Off.
    - 1) If the Speech Compressor is ON, touch [COMP] to turn it off.
- 3) Press the **EXIT** button to close the Function Screen.
- 4) Touch the Multi-Function to fully display the screen.



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## Set Microphone Gain



- 1) Put the Display in Meter mode so the ALC Meter is displayed
- 2) Push the **Multi** knob to open the Multi-function menu.
- 3) Touch "MIC GAIN".
- 4) With a dummy load for the antenna, hold down the PTT on the Microphone.
- 5) With the microphone 2 to 4 inches from your mouth, speak in your normal voice.
- 6) Rotate the **Multi** knob to adjust the ALC meter between 30 to 50%.
- 7) Release the PTT.

# Optimizing IC-7300 Phone Settings

## Turn On Compressor

- 1) Select a SSB Mode, USB or LSB.
- 2) Press the **FUNCTION** button to opens the Function Screen
- 3) If the Speech Compressor is OFF, touch [COMP] to turn it ON.
- 4) Press the **EXIT** button to close the Function Screen.
- 5) Touch the Multi-Function to fully display the screen.

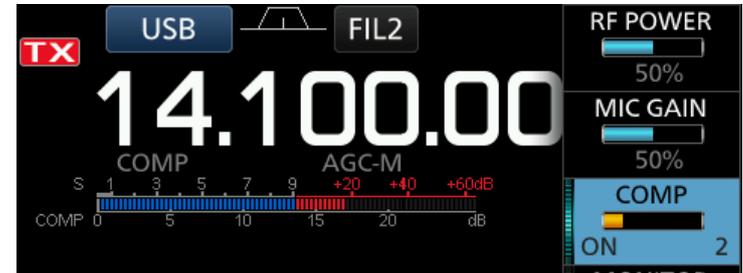


ON

# Optimizing IC-7300 Phone Settings

## Adjust Compressor

- 1) Put the Display in Meter mode so the COMP Meter is displayed.
- 2) Push **Multi** knob to open the Multi-function menu.
- 3) Touch “COMP”.
- 4) With a dummy load for the antenna, hold down the PTT on the Microphone.
- 5) With the microphone 2 to 4 inches from your mouth, speak in you normal voice.
- 6) Rotate the **Multi** knob to adjust the COMP meter so it is between 10 to 20 dB range.
- 7) Release the PTT.



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## Audi Scope Screen

- 1) The audio scope enables you to display the received signal's frequency component on the FFT scope, and its waveform components on the Oscilloscope.
- 2) To open the Audio Scope screen, Push Menu and Touch "AUDIO".
- 3) ATT, allows you to select the attenuator level.
- 4) HOLD, freezes the current audio spectrum
- 5) LEVEL, selects the Oscilloscope level.
- 6) TIME, selects the Oscilloscope sweep time.
- 7) EXPD/SET, quick touch selects the expanded or normal screen, long touch enters the Set mode.



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## Audi Scope Screen

- 1) Monitor the Audio Scope screen after making adjustments. If you see clipping or wave forms touching the display boundaries, you may want to back off on compression.
- 2) Another options is to listen to your signal a second radio that has a dummy load for an antenna.
- 3) For Field Day I will have a SDR receiver connected to a dummy load for testing.
- 4) For at home use, try using a WebSDR site and listen for you signal on the remote station.

