Audio & TX and the eSSB Studio

710 Console - what every switch, slider and option on the AUDIO & TX tab does to your transmit audio

The AUDIO & TX tab at a glance

Open the **AUDIO & TX** tab and it fills the window, in three columns:

Column	What is there
Left: SOURCE	Where your transmit audio comes from (PC mic or the mic plugged into the FT-710), the audio status and AUDIO SETUP, the microphone and receive-audio checks, VOX, and the audio device lists.
Middle: RADIO EQ / eSSB STUDIO	Two views, chosen with the buttons at the top. **RADIO EQ** is the FT-710's own transmit EQ, mic gain, processor and AMC - it works with any microphone. **eSSB STUDIO** is the PC voice chain, which shapes audio from the PC microphone before it reaches the radio. The **i** button opens this guide.
Right: METERS, TRANSMIT, PTT	The radio's ALC, COMP, PO and SWR meters, the transmit settings (TX bandwidth, eSSB preset, USB drive, PTT key) and a hold-to-talk **PTT** button.

Every change goes to the radio, or into the audio, straight away and is remembered for next time. Nothing is ever written to the radio while you are transmitting.

SOURCE - where your transmit audio comes from

Switch	What it does
Enable PC Mic	Sends the computer microphone chosen under Audio devices to the radio over USB. The radio's MOD SOURCE is set to USB, so its own MIC GAIN does not affect the level: **USB drive** (right column) sets the drive.
Radio mic (FT-710 MIC jack)	For a hand mic, desk mic or headset plugged **directly into the FT-710's own MIC jack** - not a PC microphone. On: Enable PC Mic goes off and the radio's MOD SOURCE for SSB, AM and FM is set to MIC, so the app's PTT transmits the radio's mic and the radio's MIC GAIN sets the level. Off: MOD SOURCE goes back to USB and Enable PC Mic comes back on. Data modes always stay on USB.
Listen on radio	Plays receive audio from the radio's own speaker instead of the PC.
USB Audio Compatibility Mode	A workaround for PCs where Enable PC Mic stops the FT-710's receive audio: the microphone is only sent to the radio while PTT or VOX is active.

Below the switches: the **FT-710 Audio Ready** card shows which devices are in use, with **AUDIO SETUP** for the guided setup. **CHECKS** has Test Microphone and Test Radio RX. **VOX** has the radio's VOX gain, anti-VOX, delay and source (choose USB when the PC mic is in use). **Audio devices** opens the device lists.

RADIO EQ - the FT-710's own transmit EQ

This view works with **any** microphone and does not need the PC voice chain. It controls the radio's built-in 3-band parametric EQ, which has two sets of settings:

Setting	What it does
MIC EQ switch (top right)	The radio's MIC EQ key. Off = no EQ at all. On = the radio uses one of the two rows below. Your EQ values are kept either way.
MIC EQ row	Used with MIC EQ on and the processor off (PROC 0).
PROCESSOR EQ row	Used with MIC EQ on and the processor on (PROC above 0).
Freq	Centre frequency of the band. The leftmost position turns that band off.

Setting	What it does
Level	Boost or cut, -20 to +10.
Width (BWTH)	The radio's bandwidth setting for the band, 0 to 10.
MIC	With Enable PC Mic on: your PC microphone's level (the radio's MIC GAIN is left alone). With the radio mic: the radio's MIC GAIN.
PROC	The speech processor level. 0 turns the processor off.
AMC / AMC release	The radio's automatic microphone control, which holds back loud peaks before the transmitter, and how quickly it lets go (FAST, MID, SLOW).

The curve shows the EQ in use, calculated from the radio's settings, so treat it as an approximate shape. The soft blue fill behind it is your PC microphone with that EQ applied, live even on receive (it needs Enable PC Mic). Set the level so ALC barely moves, then watch COMP on the right while you talk.

eSSB STUDIO - the PC voice chain

The voice chain shapes audio from the **PC microphone** before it is sent to the radio, and only in **USB or LSB**. In AM, FM, CW and data it passes audio through untouched. A mic plugged into the radio never reaches the PC, so with the radio mic the chain and the Studio meters do nothing - use RADIO EQ instead.

The chain is **off until you turn it on**, with the **VOICE STAGES** switch at the top of the Studio or by choosing the **Broadcast** eSSB preset. While it is off your PC mic goes to the radio exactly as before. Recorded CQ messages played on transmit in SSB go through the same chain as your live voice.

The order the audio goes through

#	Stage	Can you adjust it?
1	**Input leveler (automatic gain)**	No - automatic
2	**High-pass filter**	Yes - frequency
3	**Expander (noise gate)**	Yes - threshold
4	**EQ: Low, Mud cut, Presence**	Yes - gain, frequency, width (Q)
5	**Big Bottom (bass harmonics)**	Yes - amount
6	**4K Exciter (treble harmonics)**	Yes - amount
7	**Compressor**	Yes - drive
8	**Density (soft clipper / talk power)**	Yes - amount
9	**Low-pass filter at the TX band edge**	No - follows the TX bandwidth
10	**Look-ahead limiter (safety ceiling)**	No - automatic

Each stage feeds the next, so a change early in the chain affects everything after it. Switching VOICE STAGES on or off fades over 20 ms, so it never clicks.

Using the Studio

Every slider acts live: the audio glides to the new value over a few milliseconds, so you can adjust while talking, or on receive with the PC mic on (the meters run then too). Changes are saved automatically. Hover any control for a reminder. The line under the title says what the chain is doing: **LIVE** with the shape in use, **Idle** when no PC mic audio is arriving, **Voice stages OFF**, **Not in SSB**, or **Radio mic in use**.

Button	What it does
Profile 1 / Profile 2	Two stored set-ups. **Click** loads one. **Right-click** saves every Studio slider as it is now into that profile. The profile matching the sliders in use is lit. To start with, Profile 1 holds the settings in use when you first opened the Studio, and Profile 2 a brighter voice (high-pass 75 Hz, low 0 dB, mud -6 dB at 300 Hz, presence +8 dB).

Button	What it does
Reset to default	Puts every slider back to the values in the Default column below. Your profiles are not changed.

Filter & gate

Slider	Range	Default	What it does to the audio
High-pass	35-100 Hz	48 Hz	Removes everything below this frequency (24 dB per octave): rumble, desk thumps, breath pops and bass the radio can't send anyway. Higher = tighter low end and more power left for the voice; lower = fuller, but wastes power. 60-80 Hz suits most voices.
Expander	-60 to -20 dBFS	-45 dBFS	A gentle noise gate (2:1, at most 12 dB). Anything quieter than this - fans, room noise, hum between words - is turned down in your pauses. Higher = quieter pauses but can chop the ends of soft words; lower = more natural, more background noise. The EXPANDER meter should work in the gaps, not while you talk.

EQ - three tone controls

Each band has **Gain** (-12 to +12 dB), **Freq** (the centre of the band) and **Width (Q)**: low Q = broad and gentle, high Q = narrow and precise (0.3-4). The curve at the top shows the result.

Band	Freq range	Default	What it does to the audio
Low (warmth)	40-200 Hz	+3 dB, 85 Hz, Q 1.4	Body and chest. Boost for a richer, broadcast voice; cut if you sound boomy or too close to the mic. Big boosts here use a lot of power for little loudness.
Mud cut	120-600 Hz	-3.5 dB, 250 Hz, Q 2.0	The boxy, 'talking into a cup' area. Cutting it makes the voice clearer without making it thin. Sweep the frequency to find where your voice sounds hollow, then cut there.
Presence	4K: 2000-3900 Hz 3K: 1500-2950 Hz	+4 dB 4K: 3650 Hz, Q 1.2 3K: 2750 Hz, Q 1.4	Clarity - the consonants (s, t, k). A boost helps you cut through noise; too much sounds harsh. The range follows the TX bandwidth so the boost stays inside what you transmit. The 4K and 3K shapes keep their own frequency and Q; the gain is shared.

Colour - harmonic enhancers

Slider	Range	Default	What it does to the audio
Big Bottom	0-100 %	0 %	Makes the bass sound bigger without using more power: it adds the harmonics of your 60-110 Hz bass in the 120-400 Hz range (which SSB carries well) and removes part of the deep bass itself. 10-25 % is warm; high settings sound thick or buzzy.
4K Exciter	0-100 %	0 %	Adds sparkle at the top of a wide signal: harmonics of 1400-1950 Hz placed at 2800-3900 Hz. Only really useful with 50-4000 Hz - in the 3K shape the low-pass at 3000 Hz removes most of it. 10-20 % adds crispness; too much sounds edgy.

Dynamics - loudness and punch

Slider	Range	Default	What it does to the audio
Comp drive	0 to +18 dB	+0 dB	How hard you push into the compressor (3:1, soft knee). More drive = louder quiet syllables, more even audio, more average power. Too much = pumping and lifted background noise. The COMPRESSOR meter at 6-10 dB on speech is a strong, punchy sound.
Density	0 to +12 dB	+6 dB	Talk power: gain into a soft clipper that rounds off voice peaks, so the average level rises towards the peaks - this is what makes SSB sound loud at the other end. It sits before the band-edge low-pass, so it does not splatter. 6 dB is clean; 9-12 dB is louder and denser, and you start to hear the clipping.

Stages that work automatically

Stage	What it does to the audio
Input leveler	A slow automatic volume control at the very start. It brings any PC mic level to the same speech level, cutting up to 24 dB from a loud mic or adding up to 6 dB to a quiet one, and holds still in pauses so background noise is not pumped up. The rest of the chain sounds the same whatever your mic level.
Band-edge low-pass	A steep filter (48 dB per octave) at 3950 Hz (4K shape) or 3000 Hz (3K shape), so nothing the EQ, exciter or Density produced above your TX bandwidth reaches the radio.
Look-ahead limiter	The safety ceiling. It looks 3 ms ahead and turns down any peak above -1.5 dBFS, so the audio into the radio never clips hard. A LIMITER meter that is busy all the time means Density or Comp drive is too high.

Studio meters and curve

The blue curve is the chain's tone shape (high-pass, EQ and low-pass) from 20 Hz to 4.5 kHz. The red dashed line is your TX band edge; anything to the right of it is not transmitted. The shaded fill is the live spectrum leaving the chain.

Meter	What it tells you
INPUT PEAK	Your PC mic level into the chain. Red (over 0 dBFS) means the mic is clipping before the chain can help: lower the PC mic level.
LEVELER CUT	How much the leveler is turning a loud mic down. A large steady cut is fine.
EXPANDER	Noise-gate reduction. Should rise in pauses and drop to near zero while you speak.
COMPRESSOR	Compression on your voice, set by Comp drive.
LIMITER	Safety-ceiling action. Occasional flickers are normal.
OUTPUT PEAK	What goes to the radio. It should peak close to, but under, about -1.5 dBFS.

TRANSMIT - the right-hand column

Control	Choices	What it does
ON-AIR METERS	ALC, COMP, PO, SWR	The radio's own meters, live while transmitting. Set the drive so ALC barely moves on voice peaks. COMP only moves with the processor on.
TX Bandwidth	50-3050 Hz ... 400-2600 Hz, 50-4000 Hz	The radio's transmit filter for the current mode: how wide your signal is on air. It also sets the voice chain's shape: **50-4000 Hz** = the 4K shape, anything else = the 3K shape. Wider = more natural; narrower = more punch per watt. 50-4000 Hz is only accepted by radios that allow it; others go back to the previous setting.

Control	Choices	What it does
eSSB preset	Off	Nothing changed. Choosing Off after another preset puts the radio settings and the audio switches back exactly as they were (this also happens when you leave SSB, disconnect or close the app).
	Broadcast (PC DSP)	All the shaping on the PC: PC mic on (MOD SOURCE USB), voice chain on, the radio's speech processor and MIC EQ off so the radio adds nothing, TX bandwidth 50-4000 Hz. Tune the sound in the eSSB Studio.
	Radio-only 4K	All the shaping in the radio, for a mic plugged into the FT-710's MIC jack: Radio mic on, processor on at level 25, MIC EQ on with processor EQ 100 Hz +3 dB and 3200 Hz +6 dB, TX bandwidth 50-4000 Hz. The PC chain is not used.
USB drive	0-100	The radio's USB MOD GAIN: how hard PC audio drives the transmitter. With the PC mic on, this is your drive control. Too high = ALC pumping and splatter; too low = low power.
PTT key		Click, then press the key you want to hold for transmit anywhere in the app. Esc cancels.
PTT button		Hold to transmit, release to receive. Sliding off the button, or leaving the tab, also releases it.

Your radio settings are saved before a preset changes them. If the radio refuses 50-4000 Hz, the preset uses 50-3050 Hz and says so.

Suggested starting points

Goal	Try this
Natural ragchew	VOICE STAGES on with the defaults. Big Bottom and Exciter 0 %, Comp drive 0-3 dB, Density 6 dB.
Full eSSB broadcast sound	Broadcast preset with 50-4000 Hz. Big Bottom 15 %, Exciter 15 %, Comp drive +6 dB, Density +9 dB. Start with USB drive low (about 20-30) and raise it until ALC just flickers.
Punch through a pile-up	High-pass 80-100 Hz, Low 0 dB or a cut, Presence +6 dB, Comp drive +9-12 dB, Density +9-12 dB, and a narrower TX bandwidth.
Noisy shack	Raise the Expander towards -35 dBFS until the pauses go quiet without clipping your word endings.
Mic plugged into the radio	Radio mic on, then use RADIO EQ: MIC EQ on, set PROC and the matching EQ row, MIC GAIN so ALC barely moves. Or choose the Radio-only 4K preset.

Always check with a monitor receiver or a dummy load before going on air, and set the final drive against the radio's ALC meter - the Studio controls the sound, USB drive controls how hard it hits the transmitter.