CONTOUR CONTROL OPERATION

The Contour filtering system provides a gentle perturbation of the IF filter passband. The Contour is set to either suppress, or boost specific frequency components, and thus enhance the sound and readability of a received signal.

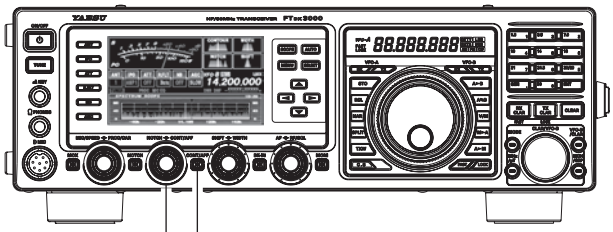
1. Press the [**CONT/APF**] button to activate the Contour filter. The LED inside the [**CONT/APF**] button glows orange and the current "null" (or "peak") position of the Contour filter will appear in the CONTOUR indicator on the display.
2. Rotate the [**CONT/APF**] knob to achieve the most natural-sounding audio reproduction on the incoming signal.

   ADVICE:

   The display will show the Contour frequency for 3 seconds whenever the [**CONT/APF**] knob is turned.
3. To cancel Contour tuning, press the [**CONT/APF**] button momentarily.

   ADVICE:

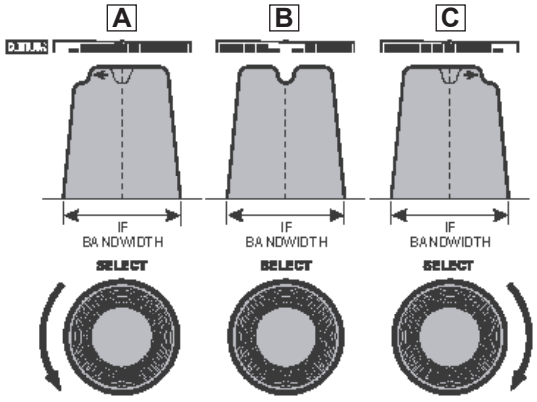
   Alternate presses of the [**CONT/APF**] button, will switch the Contour filter between on or off.



ADVICE:

- ❒ The Contour filter selection will be memorized independently on each VFO stack of VFO-A and VFO-B.
- ❒ The Contour filter level (either a null or a peak) may be adjusted using Menu item "109 RX DSP CONTOUR LEVEL". The factory default setting is for a null of –15 (dB).
- ❒ The bandwidth over which the Contour filter effect is applied may be adjusted using Menu item "110 RX DSP CONTOUR WIDTH". The factory default setting is 10.
- ❒ When the optional **DMU-2000** Data Management Unit is connected, the Audio Scope (on the "Oscilloscope" page) is particularly useful when adjusting the Contour control. Not only can you see the effect of the null/peak of the Contour system, but you also can see the position of the null/peak with respect to frequency components of interest on the incoming signal. You may then observe (on the Audio Scope) the effect of the Contour control while listening to the effect on the signal, and this will help build your intuition on how best to use Contour tuning in the future.

Refer to Figure "**B**", this illustrates an "indentation" of the Contour filter in the center of the passband. The Contour filter is placing a low-Q "notch" (per the setting of Menu item "069 RGEN CNTR LV", referenced above) in the passband. Counter-clockwise rotation (to the left) of the [**CLAR/VFO-B**] knob causes the notch to move towered a lower frequency within the passband, while clockwise rotation (to the right) causes the notch to move toward a higher frequency within the passband. By removing interference or unwanted frequency components of the incoming signal, it is possible to make the desired signal rise out of the background noise/ interference, enhancing intelligibility.



QUICK POINT:

The steep slopes of the DSP filtering, when adjusted aggressively, can impart an unnatural sound to an incoming signal. Often, a narrow bandwidth is not the key to improving copy; the incoming signal itself may have undesirable or excessive frequency components, especially in the low frequency range around 100-400 Hz. By judicious use of the Contour filter, the "shoulder" of the passband response may be altered, or components may be removed from within the passband, allowing the desired signal to rise above the background noise and interference in a manner not obtainable with other filtering systems.

INTERFERENCE REJECTION

IF SHIFT OPERATION (SSB/CW/RTTY/PKT/AM MODES)

IF SHIFT allows you to move the DSP filter passband higher or lower, without changing the pitch of the incoming signal, and thus reduce or eliminate interference. Because the carrier tuning frequency is not varied, there is no need to retune the operating frequency to eliminate the interference. The total passband tuning range for the IF SHIFT system is ±1 kHz.

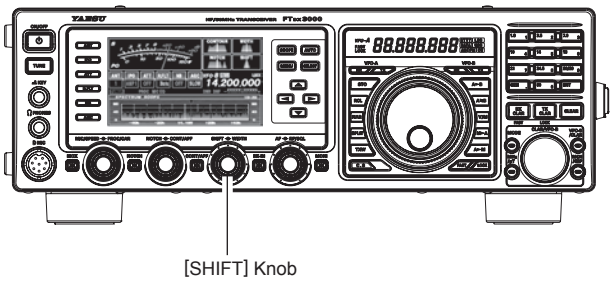
1. Rotate the [**SHIFT**] knob to the left or right to reduce the interference.

   ADVICE:

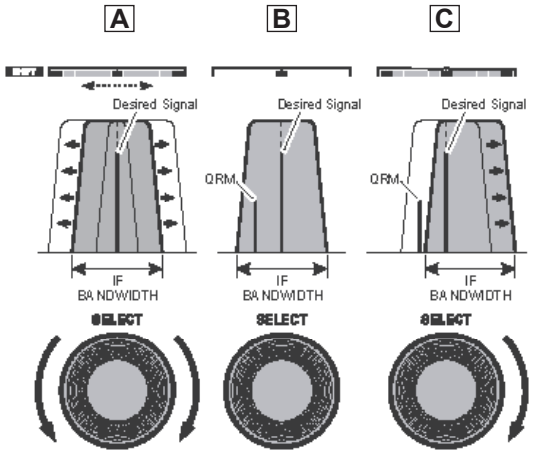
   The display will show the shift value of the IF SHIFT for 3 seconds whenever the [**SHIFT**] knob is turned.

ADVICE:

The center position of the IF passband will be memorized independently on each VFO stack of VFO-A and VFO-B.



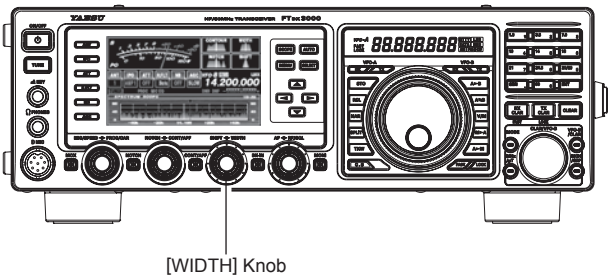
Referring to Figure "**A**", note the depiction of the IF DSP filter as the thick line, with the [**SHIFT**] knob in the 12 o'clock position. In Figure "**B**", an interfering signal has appeared inside the original passband. In Figure "**C**", you can see the effect of rotating the [**SHIFT**] knob. The interference level is reduced by moving the filter passband so that the interference is outside of the passband.



WIDTH (IF DSP BANDWIDTH) TUNING (SSB/CW/RTTY/PKT MODES)

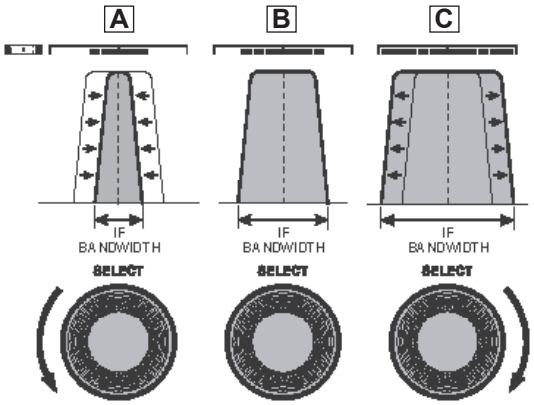
The IF WIDTH tuning system allows you to vary the width of the DSP IF passband, to reduce or eliminate interference. Moreover, the bandwidth may actually be *expanded* from its default setting, should you wish to enhance incoming signal fidelity when interference on the band is low.

1. Rotate the [**WIDTH**] knob to the left or right to reduce the interference.
   ADVICE:
   The frequency display will show the bandwidth of the IF passband for 3 seconds whenever the [**WIDTH**] knob is turned.



ADVICE:
The IF Bandwidth will be memorized independently on each VFO stack of VFO-A and VFO-B.

Referring to Figure "**B**", you can see the default bandwidth on the SSB mode.
By rotating the [**WIDTH**] knob to the left, the bandwidth will narrow (see Figure "**A**", while rotation of the [**WIDTH**] knob to the right, as depicted in Figure "**C**", will increase the bandwidth.

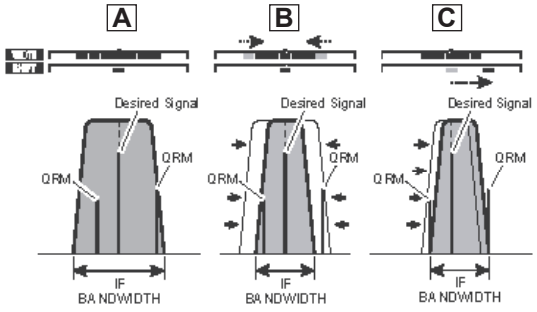


The default bandwidths, and total bandwidth adjustment range, will vary according to the operating mode:
SSB Mode: 1.8 kHz ~ 4.0 kHz (default: 2.4 kHz).
CW Mode: 500 Hz ~ 2.4 kHz (default: 2.4 kHz)
RTTY/PKT Modes: 500 Hz ~ 2.4 kHz (default: 500 Hz)

Using IF SHIFT and WIDTH Together

The IF SHIFT and Variable IF WIDTH features together form a very effective interference-fighting filtering system.

For example, in Figure "**A**", you can see how interference has appeared both on the high and low sides of the desired signal. Rotate the [**WIDTH**] knob, the interference from one side can be eliminated (Figure "**B**"). Next, rotate the [**SHIFT**] knob to re-positioning the passband (Figure "**C**"), the interference on the opposite side can be removed, without re-introducing the interference previously eliminated in Figure "**B**".



ADVICE:
For best interference reduction, the WIDTH and SHIFT features are the primary tools you should use. After narrowing the bandwidth (WIDTH) and/or adjusting the center of the passband (SHIFT). The Contour control may then yield additional signal-enhancement benefits on the net residual bandwidth. Even more, the IF NOTCH Filter (described later) may also be used, in conjunction with these filter systems, to significant advantage.

INTERFERENCE REJECTION

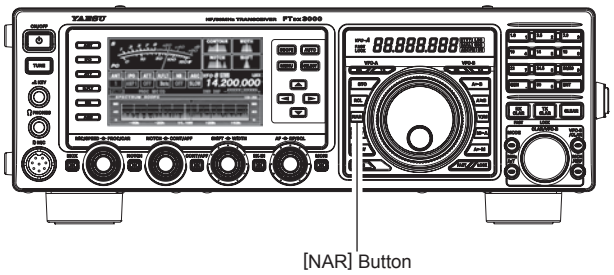
NARROW (NAR) ONE-TOUCH IF FILTER SELECTION

Pressing the [**NAR**] button provides one-touch, mode-specific, selection of a narrow IF DSP filter setting that does not require resetting the [**WIDTH**] knob.

Pressing the [**NAR**] button once more returns the bandwidth control to the WITDH/SHIFT system. The factory default bandwidths are:

OPERATING MODE	[NAR] SWITCH	
	"ON"	"OFF"
SSB	200 Hz ~ 1.8 kHz※ (1.5 kHz)	1.8 ~ 4.0 kHz※ (2.4 kHz)
CW	100 ~ 500 Hz※ (500 Hz)	500 Hz ~ 2.4 kHz※ (2.4 kHz)
RTTY/PKT-L/PKT-U	100 ~ 500 Hz※ (300 Hz)	500 Hz ~ 2.4 kHz※ (500 Hz)
PKT-FM	9 kHz	16 kHz
AM	6 kHz	9 kHz
FM (28/50 MHz Bands)	9 kHz	16 kHz

※: Depends on the [**WIDTH**] knob
( ): Default Bandwidth



ADVICE:

- When the narrow bandwidth is selected, the "NAR" icon will appear in the display.
- Even if the [**NAR**] button has been pressed to engage the narrow filter, you may adjust the narrow IF bandwidth by rotating the [**WIDTH**] knob. The IF SHIFT still is operational. For many applications, you may find that simply pressing the [**NAR**] button instead of adjustment of the [**WIDTH**] knob, may be satisfactory for interference reduction.
- When you press the [**NAR**] button in the FM mode, both transmit and receive bandwidths are narrowed.

IF NOTCH FILTER OPERATION (SSB/CW/RTTY/PKT/AM MODES)

The IF NOTCH filter is a highly effective system that allows you to slice out an interfering beat note or other carrier signal from inside the receiver passband.

1. Press the [**NOTCH**] button to activate the Notch filter. The LED inside the [**NOTCH**] button glows orange and the current "null" position of the NOTCH filter will appear in the NOTCH indicator on the display. The [**NOTCH**] knob functions as the Notch adjustment knob.
2. Rotate the [**NOTCH**] knob to adjust the "null" position of the Notch filter.

   ADVICE:

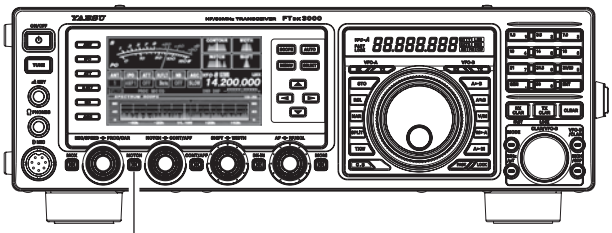
   The frequency display will show the Notch frequency for 3 seconds whenever the [**NOTCH**] knob is turned.
3. To cancel the NOTCH filter, press the [**NOTCH**] button momentarily. The graphic disappears from the NOTCH indicator on the display, confirming that the NOTCH filter is no longer operation.

   ADVICE:

   Alternate presses of the [**NOTCH**] button, will switch the NOTCH filter between on or off.

ADVICE:

- ❒ The IF NOTCH Filter selection will be memorized independently on each VFO stack of VFO-A and VFO-B.
- ❒ When the optional **DMU-2000** Data Management Unit is connected, the effect of the IF NOTCH filter may be observed on the Audio Scope (on the "Oscilloscope" page). The Notch will be observed as a "dip" in the noise platform observed. What's more, the "Waterfall" display may be used to observe the effect of the IF NOTCH filter, which will appear as a white area in the colored background area.



The performance of the IF NOTCH filter is shown in Figure "**A**", where the effect of rotation of the [**NOTCH**] knob is depicted. In Figure "**B**" you can see the notching effect of the IF NOTCH filter as you rotate the [**NOTCH**] knob to eliminate the incoming interference.