

## Using Your Kenwood Digital Radio and Kenwood KTC HR100 Tuner to Time-Align Analog and Digital Audio Broadcasts

### Taken from Kenwood Broadcaster Application Note 1.1 And Expanded with Practical Experience—Revision #5

The KTC HR100 HD Radio unit is attached to a compatible Kenwood dashboard radio (the “head unit”). There are many HD Radio ready head units from which to choose. They can be set to Broadcaster Mode in which the user can listen to digital and analog reception simultaneously on opposite channels. This permits close alignment of the analog audio delay at the transmitter)

#### Setting Broadcaster Mode

Find the RESET button recessed in the front panel of the head unit. Press RESET with a pointed object (caution: this will clear all settings and return radio to factory defaults).

Within the next 30 seconds press the following keys on the head unit:

If you have created a security code for your radio, enter it now. Otherwise go to next step.

Press SRC (Source) key until HD RADIO appears on the display.

Wait for the HD RADIO display to convert to a frequency display (at a default frequency) and make sound. Do not tune in another station.

Some models have a NEXT key in the upper right hand corner. These models have function keys instead of PRESET keys. Press the NEXT key until the display labels the number keys "1 2 3 4 5 6" (or on some radios the display clears any labels above the keys), indicating that the function keys are acting like PRESET keys 1-6. If you don't have a NEXT key on the head unit, skip this step

Press PLAY/PAUSE  5 times.

Press PRESET keys in sequence: 1, 2, 3, 4, 5, 6.

(Nothing should happen while doing these last 11 presses. If the radio reacts to key presses before finishing the sequence, go back to the first step (RESET) and try again)

“Alignment” appears on display. Unit is in Broadcaster Mode.

Stations can be tuned. Most radio features can be accessed normally.

PRESET keys 3,4,5 & 6 have special functions described below.

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### **Broadcaster Mode Features:**

Unit stays in Broadcaster Mode, even with power down/up.

#### Digital/Analog Time Alignment Comparison

(Called “BFO” by Kenwood—no relation to “Beat Frequency Oscillator”)

Analog/digital audio time alignment mode (BFO) is engaged by pressing **PRESET 5**.

Right front channel is analog broadcast audio, (appears to be left audio for analog/digital comparison)

Left front channel is digital broadcast audio (also appears to be left audio).

Listen to determine if the radio station’s analog and digital audio sound like they are arriving at the same time.

Adjust analog audio delay at transmitter to align the timing.

Use an oscilloscope for precise alignment.

If head unit has extra front outputs, connect to oscilloscope to these, or tap off speaker leads.

Time difference spec is about 65 usec, so a scope will be necessary.

Disengage analog/digital alignment mode by pressing **PRESET 3**.

#### Monitoring Digital-only or Analog-only

Press PRESET 3 to be sure you are not in BFO mode.

Sequence through the three monitor modes by pressing **PRESET 6**.

Default is AUTO (digital blends to analog automatically when the digital is not available or is compromised).

Other modes are DIGITAL ONLY and ANALOG ONLY, in that order.

Note: this feature is also available through the regular menu when not in Broadcaster Mode.

#### Firmware Version Number

The Kenwood Application Note also describes how to view the radio’s software version number.

If the head unit has a NEXT key, set display to title mode:

If DISP is not shown above the 3 key, press NEXT repeatedly until it does.

Press 3. Key 3 becomes the TEXT key.

Press it again.

Press << or >>| or FM or AM to display “Title.”

Press RTN (return) key

Then Press NEXT key until function keys are again PRESETS 1-6.

Press **PRESET 4** to obtain version number on display.

If the head unit has a dedicated DISP button, press it to toggle through to “Title”

Wait for version number to display and scroll by.

#### Exit Broadcaster Mode and Return to Normal Operation

Press RESET and reprogram user settings to desired values.

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### Cautions in Using Broadcaster Mode

The FRONT speakers are fed in this mode.

It is helpful to set the fader to full FRONT to avoid confusion.

As explained, the PRESET 3 and 5 keys switch the BFO mode off and on, respectively.

Engaging PRESET 5, the right speaker (analog audio) appears rather low in level.

This is not a level reference.

Set the balance as desired to hear the delay effect between analog (right) and digital (left).

The PRESET 6 key sets Auto/digital-only/analog-only mode.

This is handy for listening to just the digital to see how it works in the fringes, but it can also be done through the regular menu with the radio in regular mode.

It is best to leave PRESET 6 in auto mode before switching to BFO mode with PRESET 5.

If PRESET 6 is left in digital-only mode and BFO is turned on, both channels are digital audio and time alignment is not observable.

There is no indication to what mode PRESET 6 is currently set.

(It defaults to Auto mode when first entering Broadcaster Mode.)

To verify the mode PRESET 6 is in:

If in doubt, tune off the desired station and toggle through the three PRESET 6 positions. Two will play analog audio (or channel hiss) on the right speaker. The other PRESET 6 position will be silent. This is the digital-only mode. Toggle PRESET 6 off the digital-only position and change back to the desired station.

If you have anything to share about your experience with the Kenwood KTC HR100 that we can post with this document, send it to [iboc @ broadcastsignallab. com](mailto:iboc@broadcastsignallab.com) (remove the three spaces from this address to make it work)

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