About the HDSDR software operations for the IC-R8600

These instructions describe how to use the HDSDR software. Before reading this guide, please read “How to use the IC-R8600 as an SDR receiver” that can be downloaded from the Icom website, for details on how to install the software and connect a receiver to the PC.

http://www.icom.co.jp/world/support/

These instructions are based on using:
• Microsoft® Windows® 10
• IC-R8600 USB I/Q Package for HDSDR ver 1.00
• HDSDR version 2.76

Start up HDSDR

1. Turn ON the receiver.
2. Double-click HDSDR icon to start up HDSDR.
   ① When you use some ExtIO-DLL files, select “ExtIO_ICR8600.dll” in the displayed screen.

If you use the RC-28 REMOTE ENCODER, see page 4.
① The receiver automatically enters to the remote control mode when the HDSDR software connects to the receiver. In the remote control mode, you cannot operate the receiver on its panel.

TIP: If the audio cannot be heard, push [F5] of the PC’s keyboard to display the Sound Card selection screen, and then select the appropriate audio device.

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Click to display the IC-R8600 I/Q Settings screen. (p. 3)

Click to display the Sound Card selection screen.

Click to select the receiving mode.

Click to set the Tune frequency.

Click to set the LO frequency.

Click to select the sampling rate value.

Adjust the audio level.

Click to start or stop receiving.

① The needed output sampling rate depends on the receiving mode.

Click to quit the software.

① The receiver automatically returns to the normal (Local) mode after closing the software.

The receiver automatically returns to the normal (Local) mode after closing the software.
IC-R8600 I/Q Settings Screen

NOTE: The Receiver settings are automatically set to the receiver when the HDSDR software connects to the receiver.

1. **Sampling Rate**
   (Default: 5.12MHz (BW = 4.48MHz))
   Select the sampling rate value of the signal that is input to a PC.
   ① If the audio is interrupted, select a lower sampling rate value.
   ② If the sampling rate value is too low, a sharp spike (a DC) is displayed at the LO frequency position. See page 5 about how to remove a sharp spike.

2. **Bit**
   (Default: 16bit)
   Select bit depth of the signal that is input to a PC.
   ① If **Sampling Rate** (1) is set to “5.12MHz (BW = 4.48MHz),” bit depth is set to “16bit.”

3. **ANT**
   (Default: ANT1)
   Select antenna connector ANT1, ANT2, or ANT3.
   ① While operating between 30 and 3000 MHz frequency band, only the ANT1 connector can be used.

4. **P.AMP**
   (Default: OFF)
   Select whether or not to enable the Preamplifier function.
   The preamp amplifies received signals in the receiver front end to improve the signal-to-noise ratio and sensitivity.
   A preamp is used when receiving weak signals.

5. **IP+**
   (Default: OFF)
   Select whether or not to enable the IP Plus function.
   The IP Plus function improves the Intermodulation Distortion (IMD) quality by optimizing the direct sampling system performance.

6. **ATT**
   (Default: OFF)
   Select the attenuator setting.
   The attenuator prevents a desired signal from becoming distorted when a very strong signal is near the frequency, or when a very strong electric field, such as from a broadcasting station, is near your location.

7. **HF BPF**
   (Default: ON)
   Select whether or not to use the receiver’s BPF when operating the HF band.
   ① If an excessively strong signal is received, turn ON this function.

8. **RF Gain**
   (Default: MAX)
   Adjust the RF gain (sensitivity).

9. **TS (Tune Freq)**
   (Default: 1k (except for FM mode) 25k (FM mode))
   Select the tuning steps when you set the Tune frequency using the RC-28.
   ① If the TS function is OFF, the tuning step is set to 10 Hz.
   ② When rotating [Main dial] to set the LO frequency, the tuning step depends on **Sampling Rate** (1).

10. **<Settings...>**
    Click to display the USB Dial Settings screen. (p. 4)

### Tuning steps when you set the LO frequency using the RC-28

<table>
<thead>
<tr>
<th>Sampling Rate</th>
<th>TS is ON</th>
<th>TS is OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.12MHz</td>
<td>1MHz</td>
<td>100kHz</td>
</tr>
<tr>
<td>3.84MHz</td>
<td>1MHz</td>
<td>100kHz</td>
</tr>
<tr>
<td>1.92MHz</td>
<td>1MHz</td>
<td>100kHz</td>
</tr>
<tr>
<td>960kHz</td>
<td>100kHz</td>
<td>10kHz</td>
</tr>
<tr>
<td>480kHz</td>
<td>100kHz</td>
<td>10kHz</td>
</tr>
<tr>
<td>240kHz</td>
<td>100kHz</td>
<td>10kHz</td>
</tr>
<tr>
<td>120kHz</td>
<td>100kHz</td>
<td>10kHz</td>
</tr>
<tr>
<td>60kHz</td>
<td>10kHz</td>
<td>1kHz</td>
</tr>
<tr>
<td>30kHz</td>
<td>10kHz</td>
<td>1kHz</td>
</tr>
</tbody>
</table>

“OVF” is displayed when the receiver receives an excessively strong signal.
**USB Dial Settings Screen**

1. **Select Device**
   Select the RC-28 to operate the receiver with, through the HDSDR software.

2. **Dial Sensitivity**
   (Default: 3)
   Adjust the dial sensitivity to one of 5 levels.
   When a low level is set, the dial speed is reduced for finer tuning control.
   When a high level is set, the dial speed increases.

3. **Auto TS**
   (Default: ON (High))
   When you rotate the dial rapidly, the tuning speed may accelerate, depending on this setting.
   - **OFF:** Normal tuning steps, even during rapid rotation.
   - **ON (Low):** Approximately two times faster.
   - **ON (High):** When the tuning step is set to 1 kHz or smaller steps, the tuning speed is approximately five times faster.
   When the tuning step is set to larger than 1 kHz, the tuning speed is approximately two times faster.

4. **<OK>**
   Click to save the settings and close the screen.

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**Using the RC-28**

If you connect an optional RC-28 REMOTE ENCODER to the PC, you can use HDSDR and feel like you are operating the actual receiver’s main dial.

1. Connect the RC-28 to the PC that has HDSDR installed.
   **NOTE: DO NOT** connect the RC-28 to the PC with other than the supplied USB cable or through any USB hub. The RC-28 may not work properly.
   - When you connect the RC-28 to the PC for the first time, wait until “Device driver software installed successfully.” is displayed.

2. Start up HDSDR.
   - The [LINK] indicator on the RC-28 lights green.

3. Now you can control the assigned functions of HDSDR using the RC-28.
   **NOTE:**
   If the [LINK] indicator does not light, check **Select Device** in the USB Dial Settings screen is set to the RC-28’s serial number. (Example: RC-28 02XXXXX)

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**Main dial**
- Rotate to change the frequency.
  - When [F-1] LED does not light, the Tune frequency is changed.
  - When [F-1] LED lights, the LO frequency is changed.

**[F-1]**
- Push to toggle between LO frequency (the LED lights) and Tune frequency that is changed by rotating [Main dial].

**[F-2]**
- Push to turn the TS function ON or OFF.
  - When the LED lights, the TS function is ON.
  - [TRANSMIT] is disabled when the HDSDR software connects to the receiver.
To remove a sharp spike when setting a low sampling rate value

If the sampling rate value is too low, a sharp spike (a DC) is displayed at the LO frequency position. The DC is a constant offset in voltage, the Left and Right (I and Q) ADCs produce, due to error.

To remove the sharp spike:
• Set a higher sampling rate value.
  or
• Adjust the IQ balance. (Option [F7] ➔ Calibration Settings ➔ DC Removal Calibration for RX)

To adjust the IQ balance

1. Set RF Gain to “MIN” on the IC-R8600 I/Q Settings screen. (p. 3)
   • Only the sharp spike is displayed.
2. Open “DC Removal Calibration for RX.”
3. Click the displayed mode to set “IIR-Highpass (Auto).”
   • The software automatically adjusts the IQ balance.
4. Set Mode to “Constant (On).”
   ① If this setting remains “IIR-Highpass (Auto),” the software removes signals near the LO frequency.
5. Adjust RF Gain on the IC-R8600 I/Q Settings screen.

NOTE: When you change the sampling rate value, adjust the IQ balance again.