Preparations for using the IC-7760 with the HDSDR application

The IC-7760 can output the In-phase/Quadrature (I/Q) data that is processed by the FPGA. Connect the [USB] port on the RF deck's rear panel to a PC's USB port, and you can control the IC-7760 from a PC using the HDSDR application.

Procedure outline

To use the RF deck's [USB] port as an I/Q port for the first time, follow the steps described below.
For the settings and operations of HDSDR, see the document "IC-7760 HDSDR Operating Guide," which can be downloaded from the Icom website.
Before you start using the IC-7760 with HDSDR, check the PC system requirements, as shown on page 2.

Step 1. Installing HDSDR

NOTE: First install HDSDR before installing "IC-7760 USB I/Q Package for HDSDR."

You can use HDSDR (freeware) as an SDR application.
Download HDSDR (Version 2.80 or later) from the HDSDR website and install it.
https://www.hdsdr.de/

When using CW Skimmer, install the other required applications to suit your operating needs. (pp. 3 ~ 4)
Icom does not offer technical support for your PC settings or any use of 3rd party applications.

Step 2. Installing "IC-7760 USB I/Q Package for HDSDR" (pp. 5 ~ 6 in this document)

CAUTION: DO NOT connect the RF deck and a PC until the driver installation has been completed.

To control the IC-7760 from a PC using HDSDR, download "IC-7760 USB I/Q Package for HDSDR" from the Icom website, and install it.
https://www.icomjapan.com/support/

The package contains "ExtIO_IC7760.dll" and an IQ driver.
The DLL file is normally saved in the same folder where HDSDR is installed as the default.
(Example: C:\Program Files (x86)\HDSDR)

Step 3. Connecting the IC-7760 and a PC (p. 7 in this document)

Connect a USB 3.0 cable (User supplied) between the [USB] port on the RF deck's rear panel and one of your PC's USB ports, and then turn ON the RF deck and controller.
This document describes only hardware connections.

Step 4. Using HDSDR ("IC-7760 HDSDR Operating Guide")

See "IC-7760 HDSDR Operating Guide" to use the application with the IC-7760.
This document gives 4 examples to control the IC-7760 from a PC using the HDSDR application. (pp. 3 ~ 4)

TIP: Updating "IC-7760 USB I/Q Package for HDSDR":
If you already have the package installed, you can download the latest version and update it by doing an overwrite installation.

System requirements

Use a PC that meets the system requirements as described below.

Minimum system requirements

Operating System	Microsoft® Windows® 11 (64 bit) Microsoft® Windows® 10 (32/64 bit) ⓘ Except for Windows on ARM. ⓘ These instructions are based on Microsoft® Windows® 11.
USB ports	USB 3.0
USB cables	USB 3.0 ⓘ When using N1MM Logger+ and CW Skimmer to check the wide band, another USB cable (2.0) is required.
Remarks	We recommend that you use the on-board sound chipset. The CPU may have a heavy load when an external sound device, such as a USB audio converter, is used.

These are the minimum system requirements to use the IC-7760 with the HDSDR application. Depending on your PC environment (permanently running software such as antivirus software, peripheral devices, settings of OS and other software), the operation of the IC-7760 with the HDSDR application may not perform properly.

Operation notes

- Before connecting or disconnecting a USB cable, turn OFF the controller.
- Depending on your PC environment, the USB audio may be interrupted, or control by the PC software may be delayed.
- If the CPU has a heavy load, the USB audio is easily interrupted. If the audio is interrupted, set a lower sampling rate in the HDSDR application or close other applications, if running.
- To operate your PC and peripheral devices, follow the instructions provided in their manuals.
- This USB I/Q Package is designed only for the IC-7760. Icom does not guarantee its use with other transceivers.

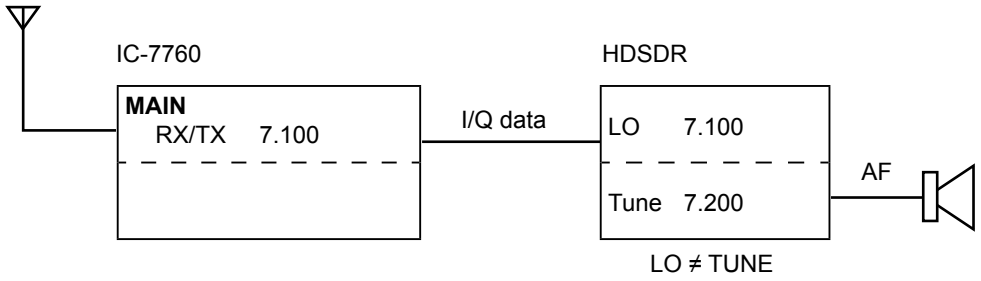
IC-7760 HDSDR operations

This section gives 4 examples to control the IC-7760 from a PC using the HDSDR application.
See “IC-7760 HDSDR Operating Guide” for details about software connections, settings, and operating instructions.

A. Using the IC-7760 with HDSDR

The I/Q data output from the IC-7760’s Main or Sub band is input to your PC. The input I/Q data can be received on HDSDR.

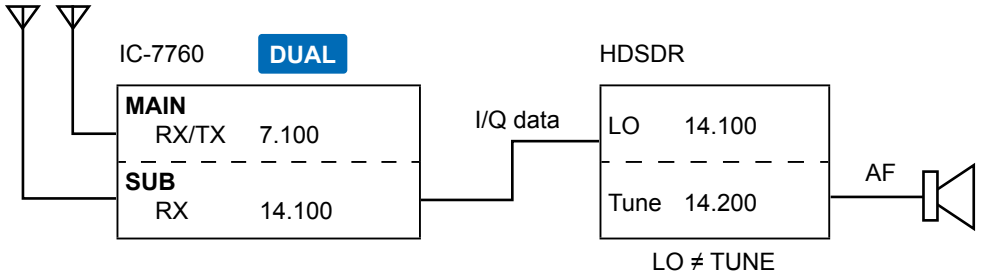
ⓘ The HDSDR’s local oscillator frequency (LO) is synchronized with the IC-7760’s operating frequency.



B. Using HDSDR as a 3rd receiver

The IC-7760 has the Dualwatch function. Furthermore, you can use the HDSDR application as a 3rd receiver by inputting the I/Q data that is output from the IC-7760’s Main or Sub band. You can receive 3 different frequencies at the same time.

ⓘ The HDSDR’s local oscillator frequency (LO) is synchronized with the IC-7760’s operating frequency.



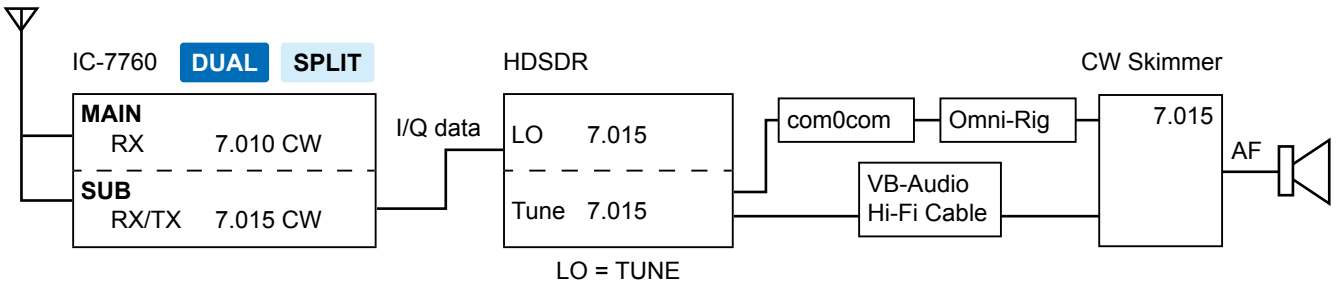
C. Using HDSDR with CW Skimmer (For a narrow 24 kHz bandwidth)

The CW Skimmer application decodes the CW signals received from HDSDR.
Use this when:

- Calling a station whose CW signals are displayed on CW Skimmer.
- Calling a station that is in the Split operation and in a pile up during a DXpedition.
- Checking the CW band on CW Skimmer while communicating in the SSB mode.

ⓘ The HDSDR’s local oscillator frequency (LO) and HDSDR, CW Skimmer’s operating frequencies are all synchronized with the IC-7760’s operating frequency.

Install **CW Skimmer** (Shareware), **VB-Audio Hi-Fi Cable** (Donationware), and **Null-modem emulator (com0com)** (Freeware).



► Continued on the next page.

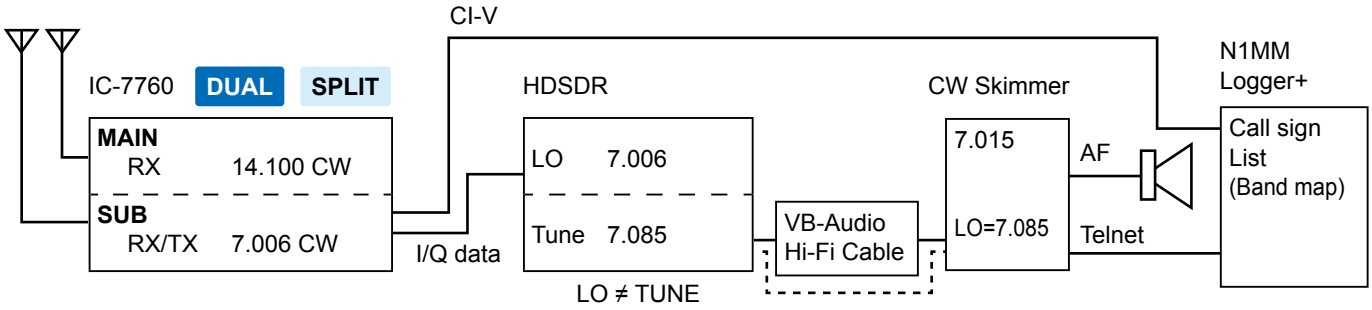
D. Using HDSDR with CW Skimmer (For a wide bandwidth*)

* Approximately 170 kHz

The CW Skimmer application decodes the CW signals received from HDSDR.
Use this when checking the wide band and getting information of many CW stations. This is useful when you participate in a CW contest.

ⓘ The HDSDR's local oscillator frequency (LO) is synchronized with the IC-7760's operating frequency.
ⓘ Manually set the same frequency to the HDSDR Tune frequency and the CW Skimmer LO frequency.

Install **CW Skimmer** (Shareware), **VB-Audio Hi-Fi Cable** (Donationware), and **N1MM Logger+** (Freeware).



TIP: Each application can be downloaded from the following websites. (As of October 2024)

- HDSDR: https://www.hdsdr.de/
- CW Skimmer (with Omni-Rig): https://www.dxatlas.com/Download.asp
- VB-Audio Hi-Fi Cable: https://www.vb-audio.com/Cable/index.htm#DownloadASIOBridge
- Null-modern emulator (com0com): https://sourceforge.net/projects/com0com/?source=directory
- N1MM Logger+: https://n1mmwp.hamdocs.com/

ⓘ Information

- Icom has checked the operations with these applications but does not guarantee their performance.
- These applications are not Icom products.
- The URL may change without notice or obligation. Check for the latest information.

Installing “IC-7760 USB I/Q Package for HDSDR”

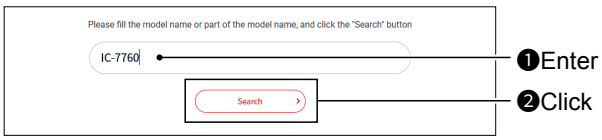
Updating the IC-7760 USB I/Q Package for HDSDR (p. 6):
If you already have the package installed, you can download the latest version and update it by doing an overwrite installation.

◇ Downloading

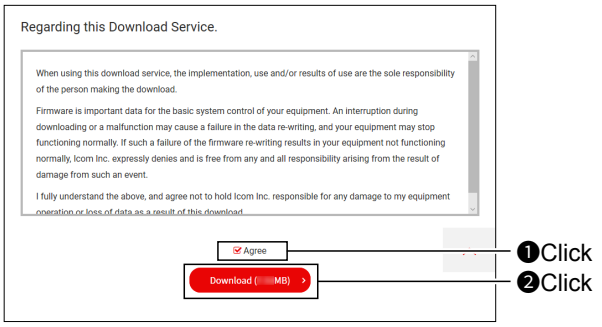
Access the following URL and download the firmware file.
https://www.icomjapan.com/support/

1. Click the “Firmware/Software” link.

2. Enter “IC-7760” into the Search box, and then click [Search].

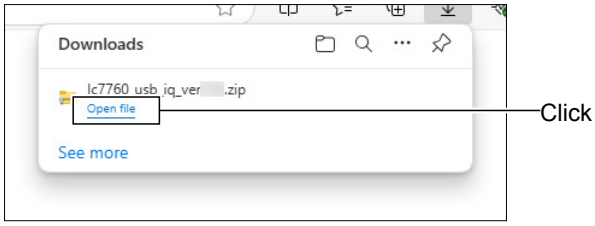


3. Click the link of “USB I/Q Package for HDSDR.”
4. Carefully read “Regarding this Download Service.” Click “Agree,” and then click [Download].



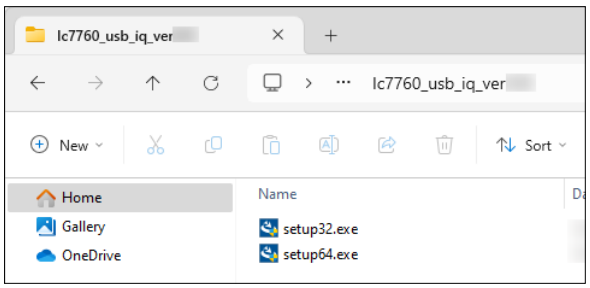
- The file starts downloading.

5. After the download is complete, click “Open file.”
   ⓘ Download steps may differ depending on the PC settings.



6. Right-click the downloaded firmware folder (zip format), and then click “Extract All....”
   - After unzipping, a folder is created in the same location as the downloaded folder.

   ⓘ The unzipped folder contains “setup32.exe” and “setup64.exe.”

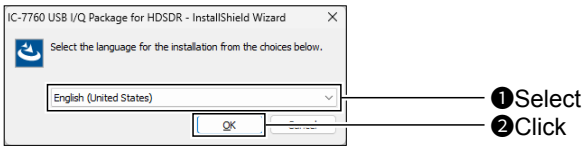


◇Installing

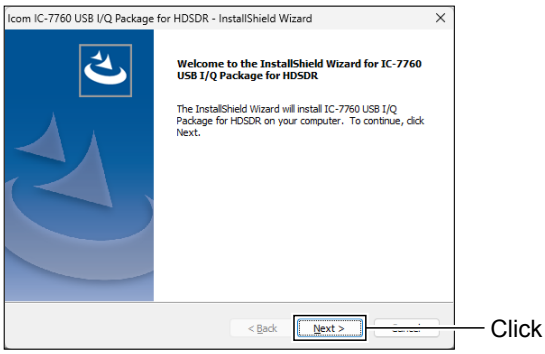
1. Double-click “setup64.exe” or “setup32.exe” in the unzipped folder, depending on your PC’s OS type.

ⓘ Information
- “setup64.exe” is for a 64 bit operating system. “setup32.exe” is for a 32 bit operating system.
- You can select whether or not to display the file extensions in the Folder Options screen.
- If “User Account Control” is displayed, click <Yes> to continue.

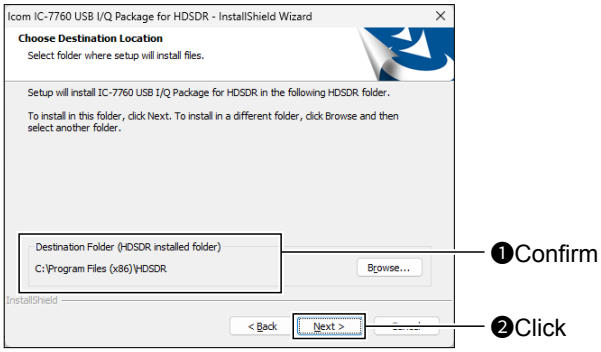
2. Select a language and then click <OK>.
ⓘ In this document, “English” is selected.



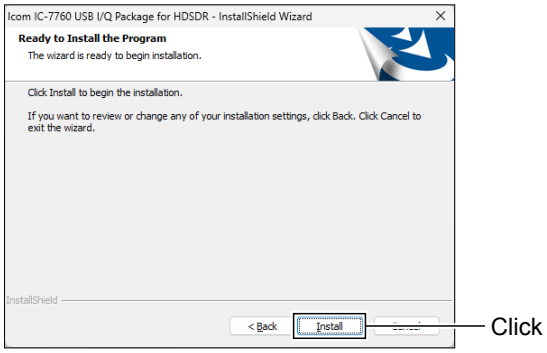
3. Click <Next>>.



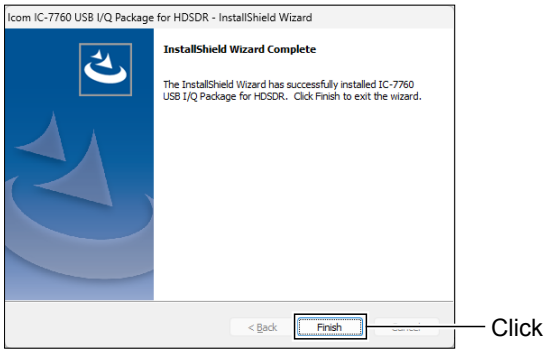
4. Confirm the destination folder, and then click <Next>>.
ⓘ If you change the HDSDR installed folder and install HDSDR, click <Browse...> and select the HDSDR installed folder.



5. Click <Install>.



6. When the Windows Security screen is displayed, click <Install>.
7. Click <Finish>.



TIP: You can uninstall the package using the “Installed apps” in the “Apps” menu.
Go to Start > Settings > Apps > Installed apps.

NOTE: About the overwrite installation
If you already have the package installed, you can update it by following the procedure below.
BE SURE to turn OFF the IC-7760 and quit the HDSDR application before doing an overwrite installation.

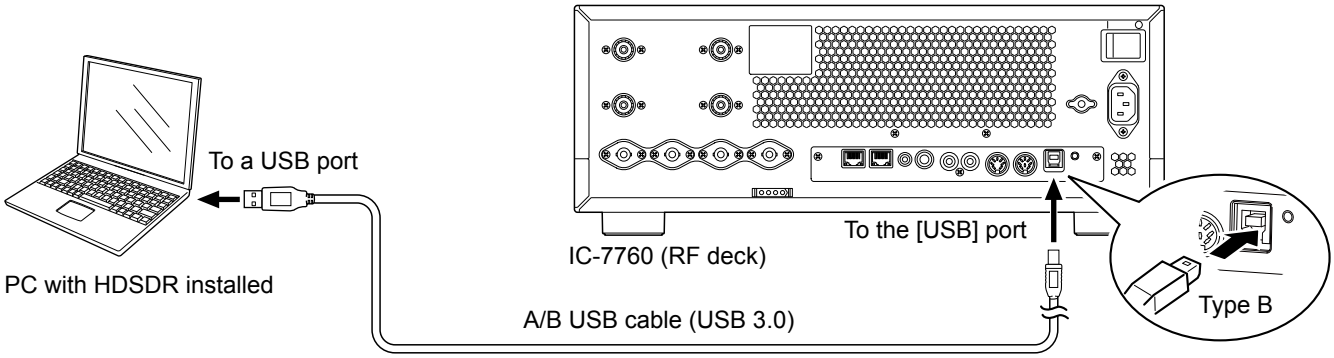
1. Double-click “setup64.exe” or “setup32.exe” contained in the unzipped folder, depending on your PC’s OS type (as described in step 1 in the column to the left).
   - A confirmation dialog “This setup will perform an upgrade of ‘IC-7760 USB I/Q Package for HDSDR.’ Do you want to continue?” is displayed.
2. Click <Yes>, then follow the instructions displayed in the window.
   ⓘ You cannot change the language or destination folder.

Connecting the IC-7760 to a PC

Connect a USB cable (USB 3.0, User supplied) from the [USB] port on the RF deck's rear panel to one of the PC's USB ports.

ⓘ When you connect a USB cable for the first time, a PC starts installing the driver after turning ON the RF deck and controller.

NOTE:
- Before connecting a USB cable, turn OFF the controller.
- The transceiver may not operate properly if connecting the IC-7760 to a PC through any USB hub.
- Depending on the length of a USB cable, the transceiver may not operate properly even if it is recognized by the PC. Use as short a cable as possible.

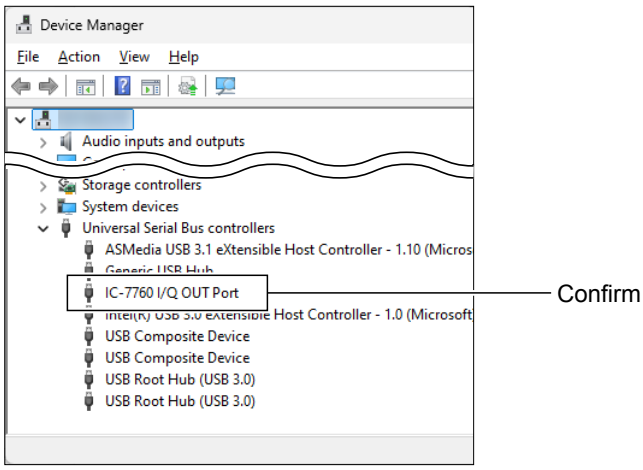


◇ Confirming that the driver has been successfully installed

After the installation has been completed, use the PC's Device Manager to confirm that the driver has been successfully installed.

1. Right-click the Windows icon, and then click "Device Manager."
   ⓘ If "User Account Control" is displayed, click <Yes>.
2. Double-click "Universal Serial Bus controllers," and then confirm that "IC-7760 I/Q OUT Port" is displayed.

NOTE: If "IC-7760 I/Q OUT Port" is not displayed, the driver may not have been properly installed. Install the driver again. (pp. 5 ~ 6)

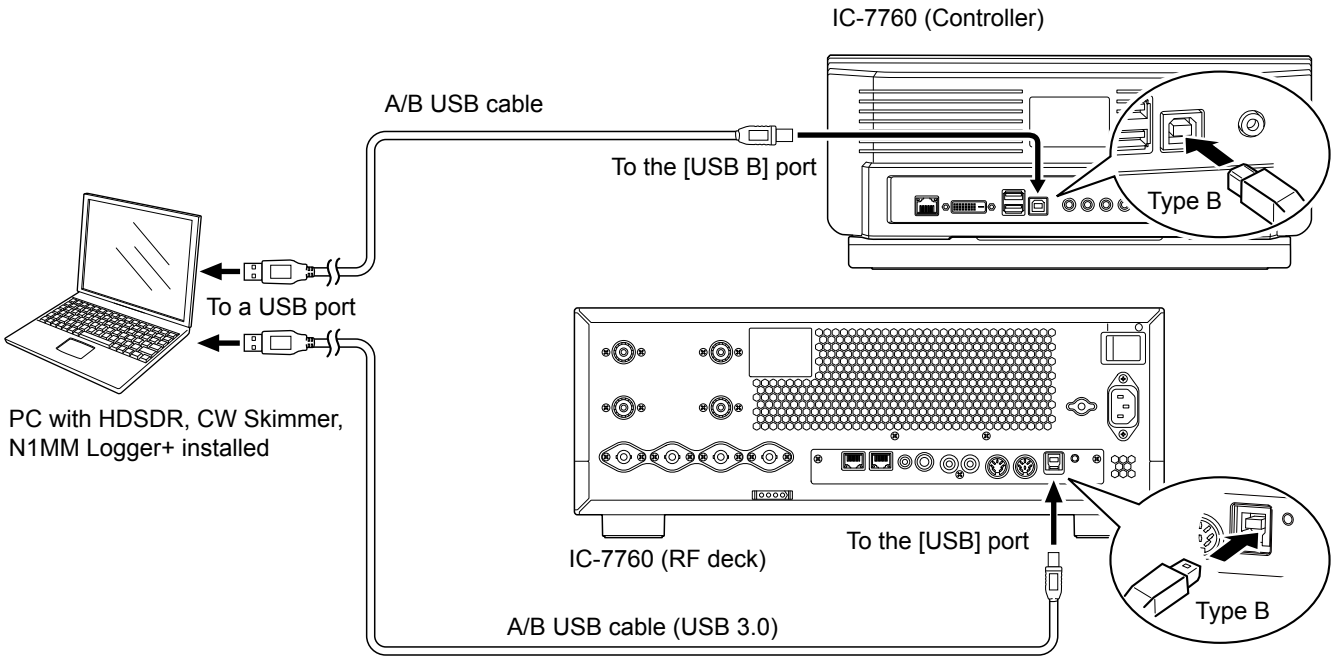


◇ Using HDSDR with CW Skimmer (For a wide bandwidth*)

* Approximately 170 kHz

When you want to use N1MM Logger+ and CW Skimmer to check the wide band, connect another USB cable (User supplied) between the [USB B] port on the controller's rear panel and a PC's USB port.

NOTE:
- Before connecting a USB cable, turn OFF the controller.
- The transceiver may not operate properly if connecting the IC-7760 to a PC through any USB hub.
- Depending on the length of a USB cable, the transceiver may not operate properly even if it is recognized by the PC. Use as short a cable as possible.



TIP: When connecting a USB cable to the [USB B] port on the controller's rear panel
If you have not connected a USB cable between the [USB B] port on the controller's rear panel and your PC, download the required USB driver and the installation guide from the Icom website.
https://www.icomjapan.com/support/

IC-7760 HDSDR Operating Guide

These instructions describe how to use the HDSDR application with the IC-7760.

ⓘ Before reading this guide, read “Preparations for using the IC-7760 with the HDSDR application,” which can be downloaded from the Icom website, for details on how to install the software and connect the IC-7760 to HDSDR.

ⓘ These instructions are based on using:

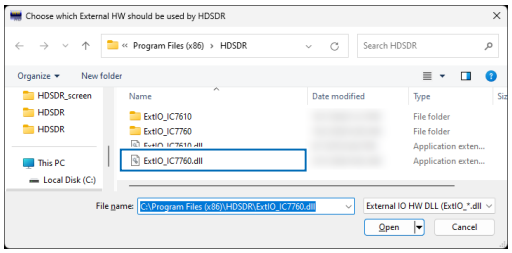
- Microsoft® Windows® 11
- IC-7760 USB I/Q Package for HDSDR
- HDSDR version 2.80
- CW Skimmer version 2.1
- VB-Audio Hi-Fi Cable version 1.0.3.5
- Null-modem emulator (com0com) version 3.0.0.0
- N1MM Logger+ version 1.0.10502

Table of contents

Starting up HDSDR

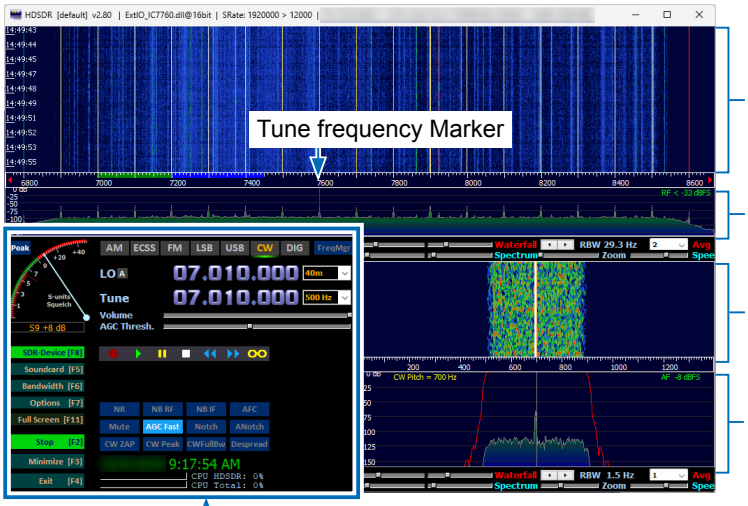
1. Turn ON the IC-7760.
2. Double-click HDSDR icon to start up HDSDR.

ⓘ If you have installed two or more ExtIO-DLL files, the screen below is displayed. To open the HDSDR Main screen, select “ExtIO_IC7760.dll,” and then click <Open>.



HDSDR Main screen

These are parts of the HDSDR operations. Check the detailed HDSDR operations on the Internet.
ⓘ These screens are examples.



Click to set the HDSDR Tune frequency.
Click to set the IC-7760 operating frequency.
Click to select the operating mode.

Click to display the IC-7760 I/Q Settings screen. (p. 29)

Click to display the Sound Card Selection screen.

Click to select the sampling rate.
ⓘ The required output sampling rate depends on the operating mode.

Slide to adjust the audio level.

Click to start or stop operating.

Click to quit the application.

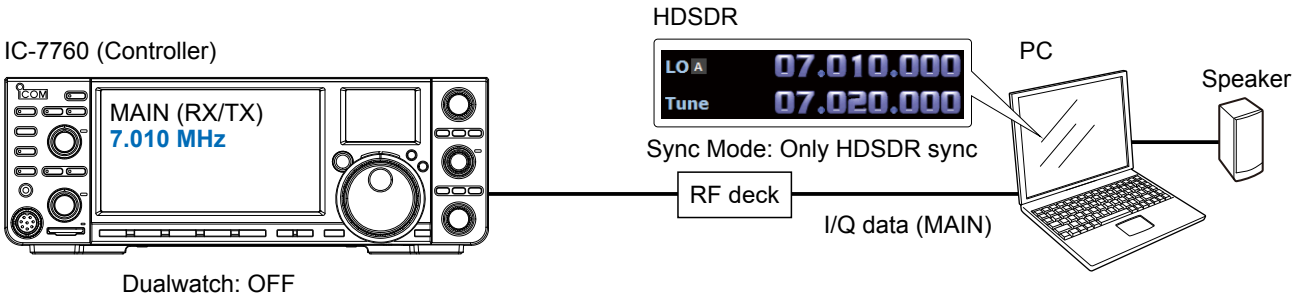
A. Using the IC-7760 with HDSDR

◇ Operation

1. Set the HDSDR LO frequency so that it is near the frequency you want to monitor.
2. Set the HDSDR Tune frequency to the frequency you want to monitor.
   - The demodulated signal is output from the speaker.

TIP: You can hear the audio by changing only the Tune frequency without changing the LO frequency, if the frequency is within the I/Q range*.

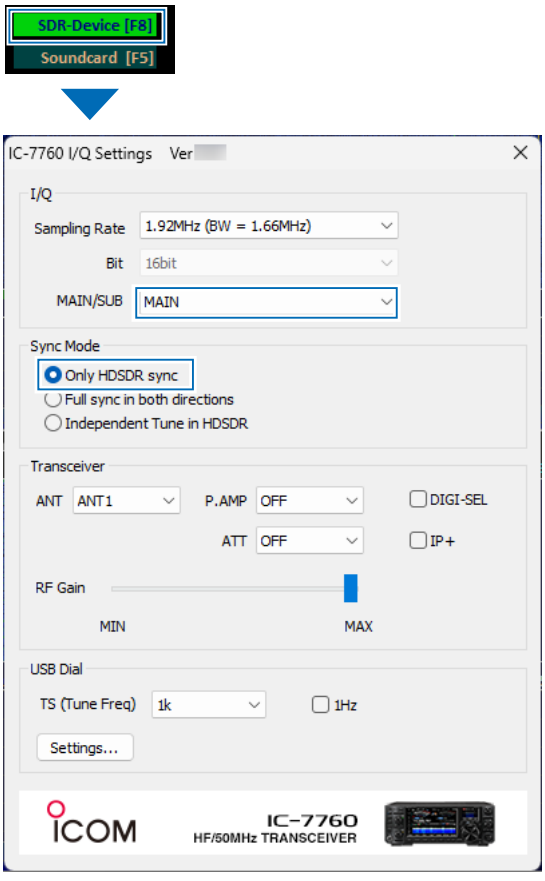
* Sampling Rate range on the IC-7760 I/Q Settings screen. For example, if “Sampling Rate” is set to “1.92 MHz,” the I/Q range is 1.66 MHz wide.



Dualwatch: OFF

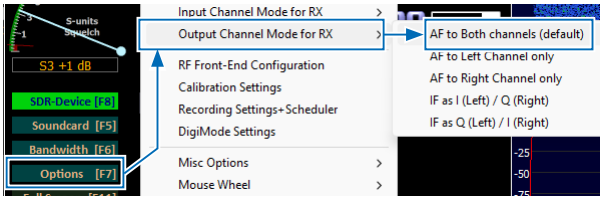
◇ Settings

1. Click <SDR-Device> to display the “IC-7760 I/Q Settings” screen. Set the items as described below.
   MAIN/SUB: MAIN
   Sync Mode: Only HDSDR sync

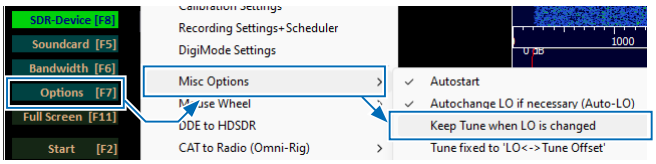


2. Click <Soundcard> to confirm that the speaker in use is selected.
3. Click <Bandwidth> to set “Output Sampling Rate [Hz]” to “12000.”
   ⓘ “48000” or lower is recommended. When you operate in the SSB mode, “12000” is adequate.

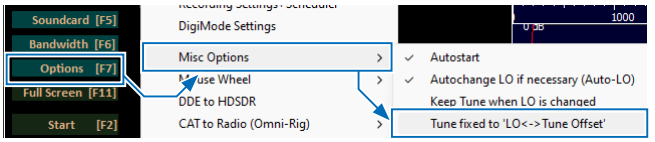
TIP: If the audio is not heard from the speaker, click <Options> and confirm that “Output Channel Mode for RX” is set to “AF to Both channels (default).”



4. Click <Options>, and then click “Misc Options.” Click “Keep Tune when LO is changed” to remove the check mark.



5. Click <Options>, and then click “Misc Options.” Click “Tune fixed to ‘LO<->Tune Offset’” to remove the check mark.



◇ Action

When changing the IC-7760 operating frequency or the HDSDR LO frequency, the HDSDR Tune frequency is changed based on the LO frequency.

ⓘ The HDSDR LO is synchronized with the IC-7760’s operating frequency.

ⓘ You cannot set the HDSDR LO frequency out of the IC-7760’s available frequency range.

B. Using HDSDR as a 3rd receiver

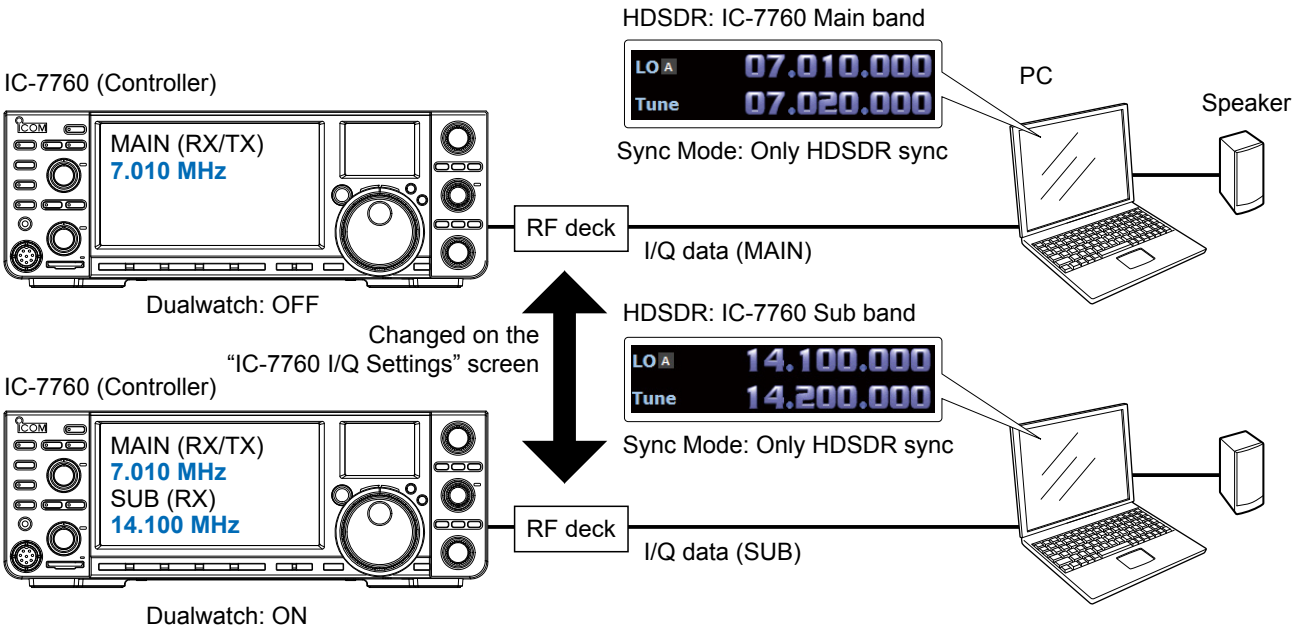
◇ Operation

1. Set the IC-7760 operating frequency.
   - The HDSDR LO frequency is linked to the IC-7760 operating frequency.
2. Set the HDSDR Tune frequency as a 3rd receiver frequency within the I/Q range.

ⓘ Information

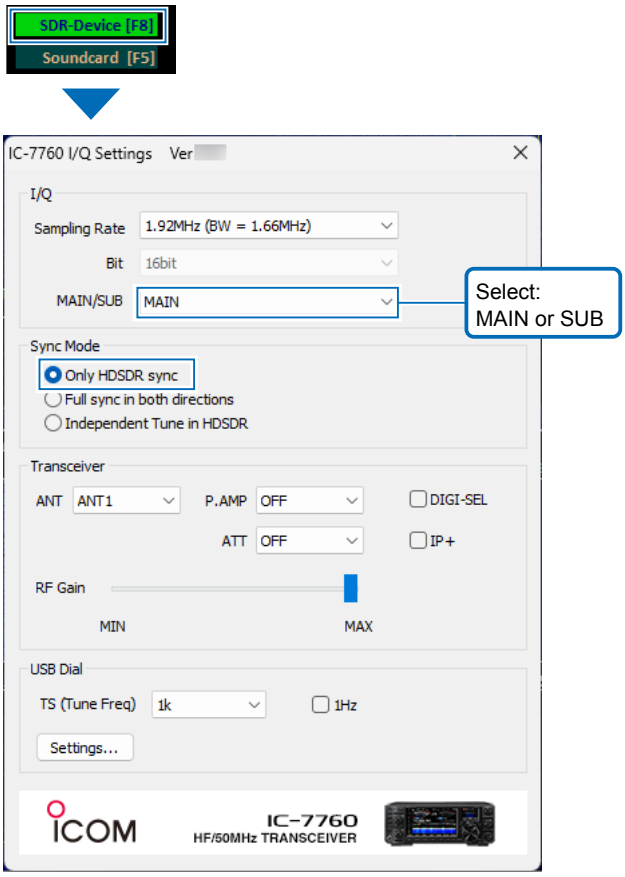
- The HDSDR Tune frequency is independent and is not changed, even if you change the IC-7760 operating frequency.
- Turn ON the Dualwatch function when connecting HDSDR to the IC-7760 Sub band.
- The I/Q range* is limited (up to 1.92 MHz wide) so you can only receive the same band as the IC-7760 operating frequency.

* Sampling Rate range on the IC-7760 I/Q Settings screen. For example, if “Sampling Rate” is set to “1.92 MHz,” the I/Q range is 1.66 MHz wide.



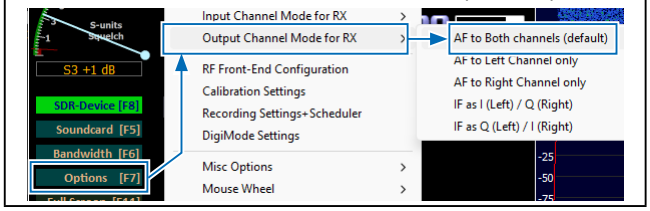
◇ Settings

1. Click <SDR-Device> to display the “IC-7760 I/Q Settings” screen. Set the items as described below.
   MAIN/SUB: MAIN or SUB
   Sync Mode: Only HDSDR sync

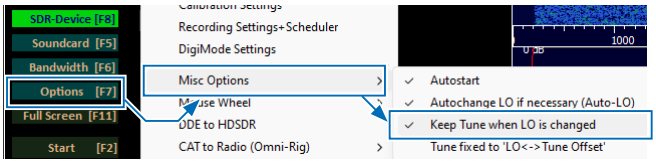


2. Click <Soundcard> to confirm that the speaker in use is selected.
3. Click <Bandwidth> to set “Output Sampling Rate [Hz]” to “12000.”
   ⓘ “48000” or lower is recommended. When you operate in the SSB mode, “12000” is adequate.

TIP: If the audio is not heard from the speaker, click <Options> and confirm that “Output Channel Mode for RX” is set to “AF to Both channels (default).”



4. Click <Options>, and then click “Misc Options.” Click “Keep Tune when LO is changed” to add a check mark.



◇ Action

Even if you change the IC-7760 operating frequency or the HDSDR LO frequency, the HDSDR Tune frequency is not changed. Therefore, you can receive on a frequency that is different from the IC-7760.

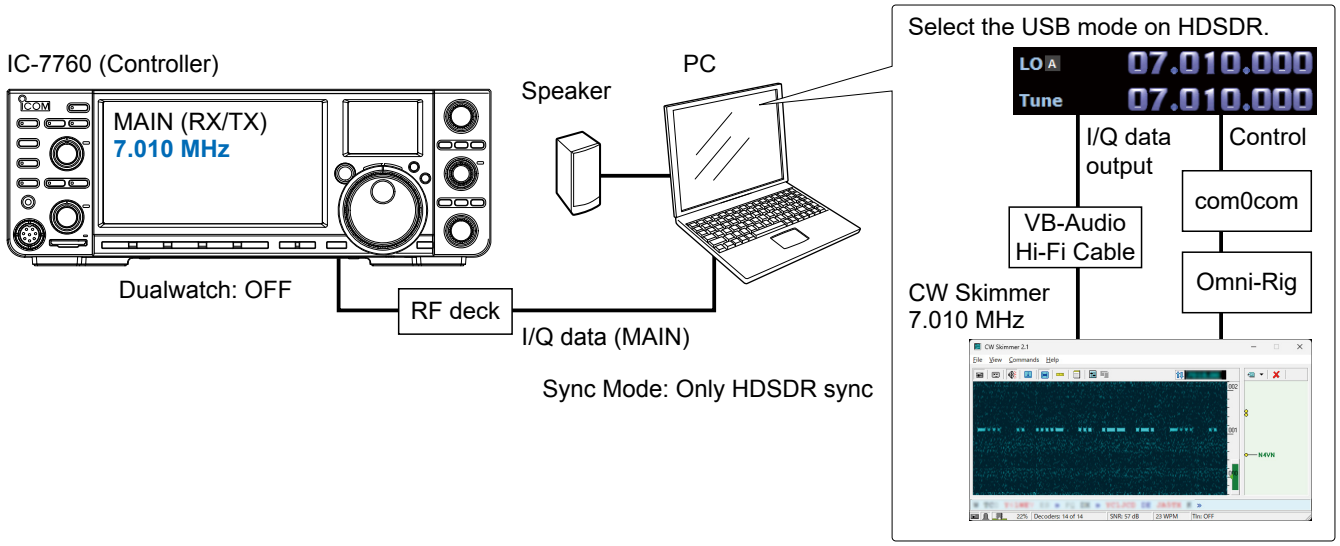
ⓘ The audio output from HDSDR may be interrupted while changing the IC-7760 operating frequency.

ⓘ You cannot set the HDSDR LO frequency out of the IC-7760’s available frequency range.

C. Using CW Skimmer with HDSDR (For a narrow 24 kHz bandwidth)

◇ Operation: Making a call to a station that is decoded in CW Skimmer

1. Select the CW mode on the IC-7760.
2. Set the operating frequency to where (within ±12 kHz) a station is calling a CQ.
3. Click on a station decoded in CW Skimmer.
   - The operating frequency is automatically set.
4. Transmit on the frequency and make a call to the station.
   - The IC-7760 operating frequency, the HDSDR LO frequency, the HDSDR Tune frequency, and the CW Skimmer frequency are set to the same frequency.



ⓘ Information

- You can not hear the demodulated audio from HDSDR because HDSDR in this case is used for only I/Q data conversion.
- You can hear the demodulated audio of the operating frequency from CW Skimmer which is the same audio as the IC-7760.
- The I/Q data output from HDSDR is input to CW Skimmer through VB-Audio Hi-Fi Cable.
- CW Skimmer uses Omni-Rig to connect to com0com and controls the HDSDR Tune frequency through the virtual serial port of com0com.

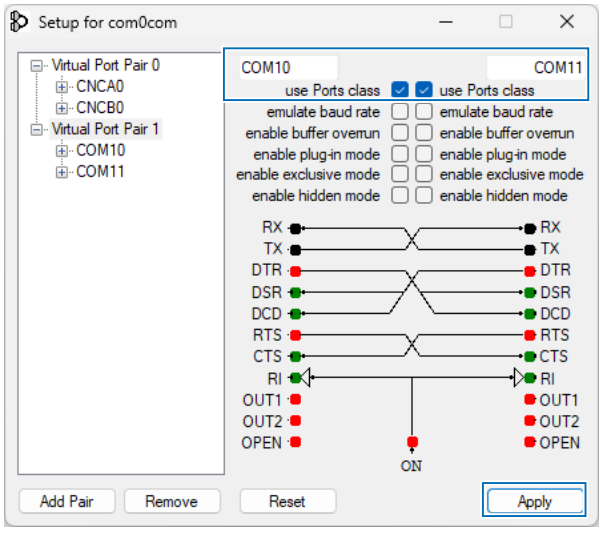
◇ Settings: Making a call to a station that is decoded in CW Skimmer

NOTE: First, setup com0com and VB-Audio Hi-Fi Cable before setting up HDSDR. The setup is required only for the first time.

com0com

TIP: If the COM port numbers are between COM 1 and COM 20 as the default, you do not have to follow the steps below.

1. Open the Windows Start menu and click "com0com" → "Setup."
   - Setup for com0com window is displayed.
2. Select 2 COM port numbers that are not used. (Example: COM 10 and COM 11)
   ⓘ **DO NOT** select the numbers more than COM 20. Omni-Rig cannot support them.
   ⓘ If the COM port number is displayed in red, the number is currently used for other devices. Change the number.
3. Click <Apply> and close the screen.
   ⓘ If the Program Compatibility Assistant screen is displayed, click <Cancel>.

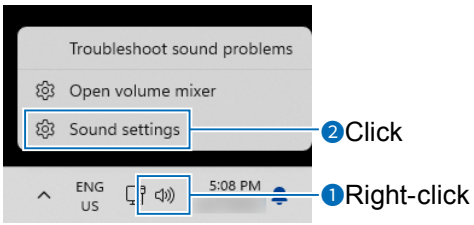


C. Using CW Skimmer with HDSDR (For a narrow 24 kHz bandwidth)

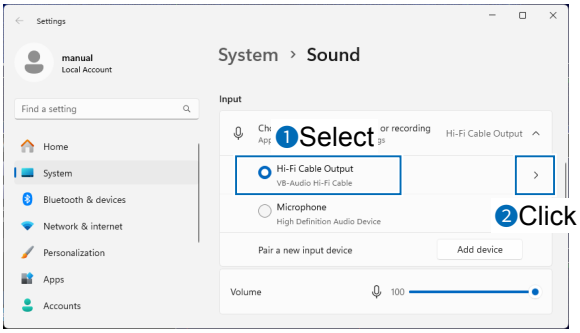
◇ Settings: Making a call to a station that is decoded in CW Skimmer

VB-Audio Hi-Fi Cable

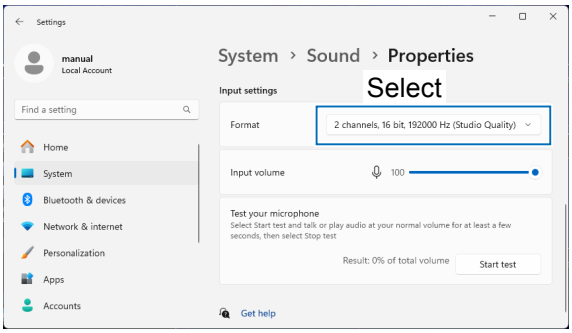
1. From the desktop, right-click your taskbar's Speaker icon, and then click "Sound settings."



2. Select "Hi-Fi Cable Output" from the Input device list, and then click ">."



3. Set "Format" to "2 channel, 16 bit, 192000 Hz."



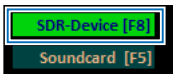
4. Return to the "Sound" screen.
5. Set the output device to "Hi-Fi Cable Input," and then set "Format" to "16 bit, 192000 Hz."

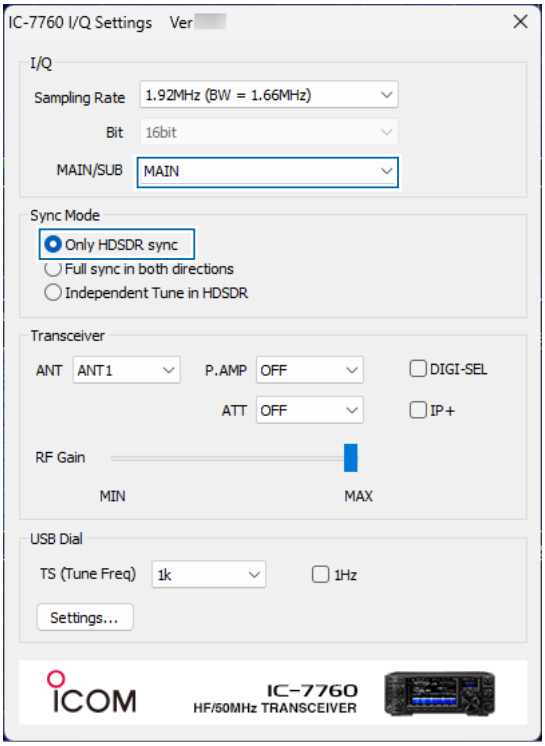
C. Using CW Skimmer with HDSDR (For a narrow 24 kHz bandwidth)

◇ Settings: Making a call to a station that is decoded in CW Skimmer

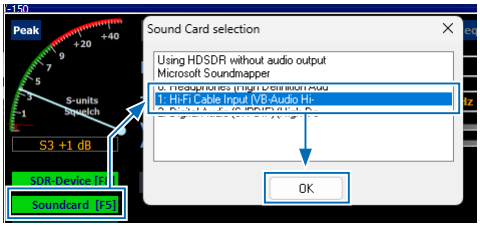
HDSDR

1. Set the operating mode to “USB.”
2. Click <SDR-Device> to display the IC-7760 I/Q Settings screen. Set the items as described below.
   MAIN/SUB: MAIN
   Sync Mode: Only HDSDR sync



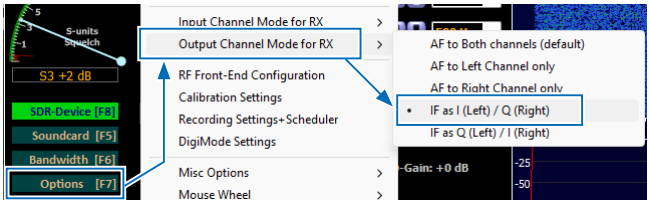


3. Click <Soundcard> to display the Sound Card Selection screen. Select “Hi-Fi Cable Input” to output I/Q data from HDSDR.



4. Click <Bandwidth> to set “Output Sampling Rate [Hz]” to “192000.”

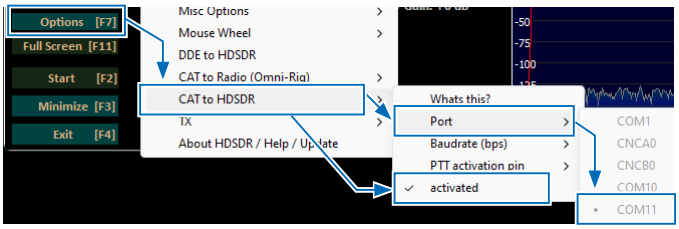
5. Click <Options> and set “Output Channel Mode for RX” to “IF as I (Left) / Q (Right).”



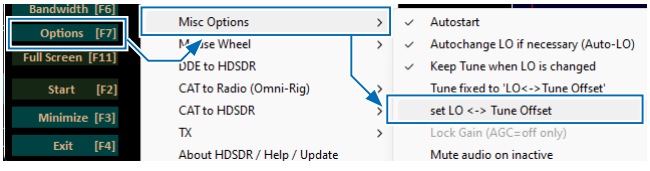
IQ-Gain setting is displayed on the HDSDR Main screen.

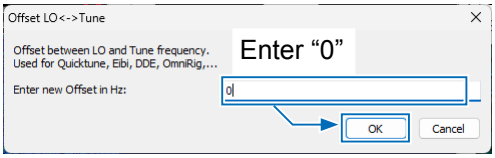
ⓘ Normally “0dB” is used, but you can adjust the gain level according to your situation. (p. 21)

6. Click <Options> and set the items as described below.
   - Click “CAT to HDSDR” → “Port” and select a COM port that is set in com0com.
   - Click “CAT to HDSDR” and select “activated.”

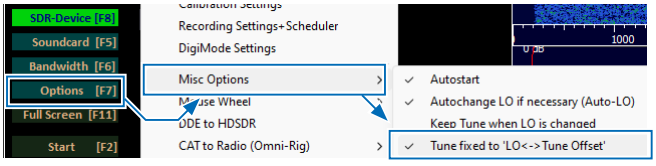


7. Click <Options>, and then click “Misc Options.” Click “set LO <->Tune Offset” to change it to “0.”





8. Click <Options>, and then click “Misc Options.” Click “Tune fixed to ‘LO<->Tune Offset’” to add a check mark.

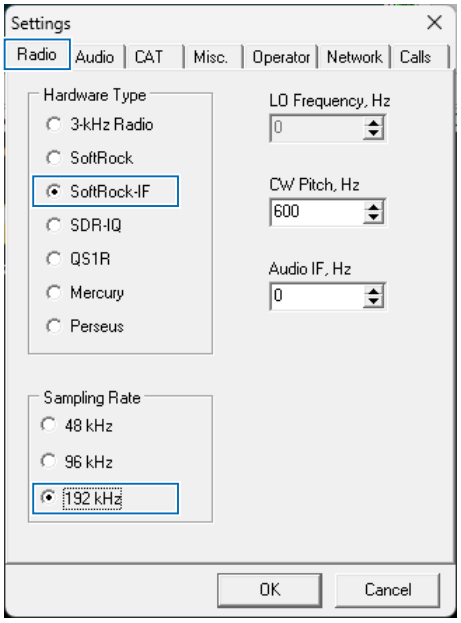


C. Using CW Skimmer with HDSDR (For a narrow 24 kHz bandwidth)

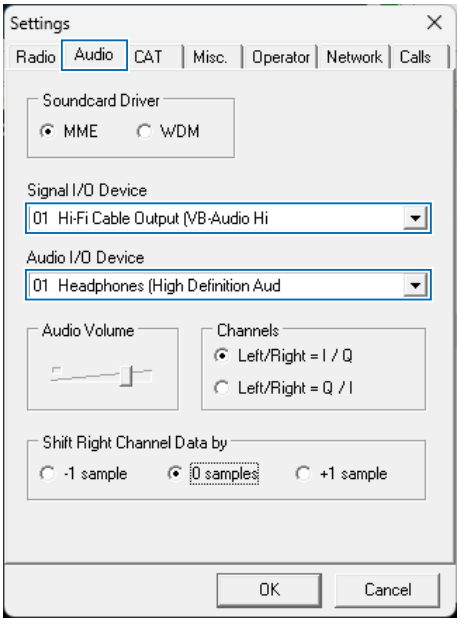
◇ Settings: Making a call to a station that is decoded in CW Skimmer

CW Skimmer

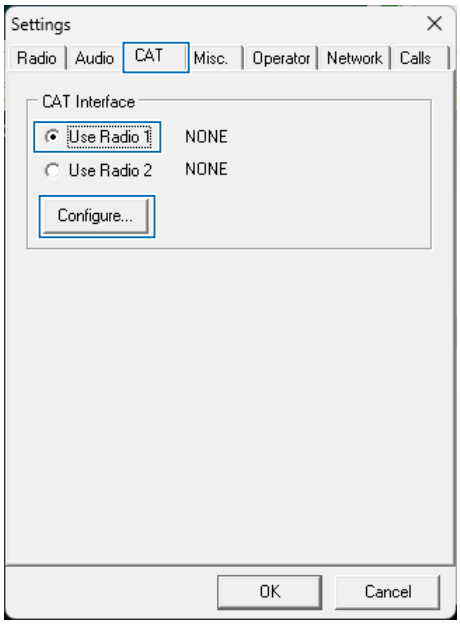
1. To input I/Q data to CW Skimmer, click <View> → <Settings> → the “Radio” tab, and then set the items as described below.
   Hardware Type: SoftRock-IF
   Sampling Rate: 192 kHz



2. To input the I/Q data and output the demodulated audio in CW Skimmer to the speaker, click the “Audio” tab, and then set the items as described below.
   Signal I/O Device: Hi-Fi Cable Output
   Audio I/O Device: A speaker connected to your PC

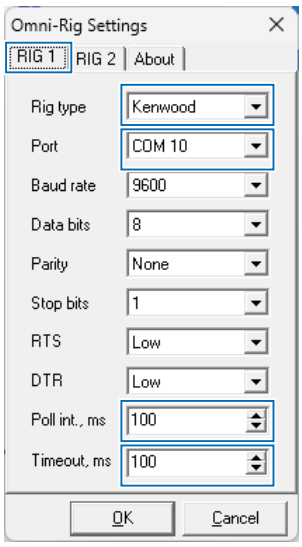


3. To control the frequency synchronization, click the “CAT” tab, and then set the items as described below.
   CAT Interface: Use Radio 1



4. Click <Configure...> to open Omni-Rig Settings screen, and then set the items as described below.
   Rig type: Kenwood
   Port: Select the COM Port that is in com0com, and not set in HDSDR.
   Poll int. ms: 100
   Timeout. ms: 100

   ⓘ For other settings, see the screen below.



TIP: You can check the required settings on the HDSDR Main screen.
<Options> → <CAT to HDSDR> → <What’s this ?>

◇ Action: Making a call to a station that is decoded in CW Skimmer

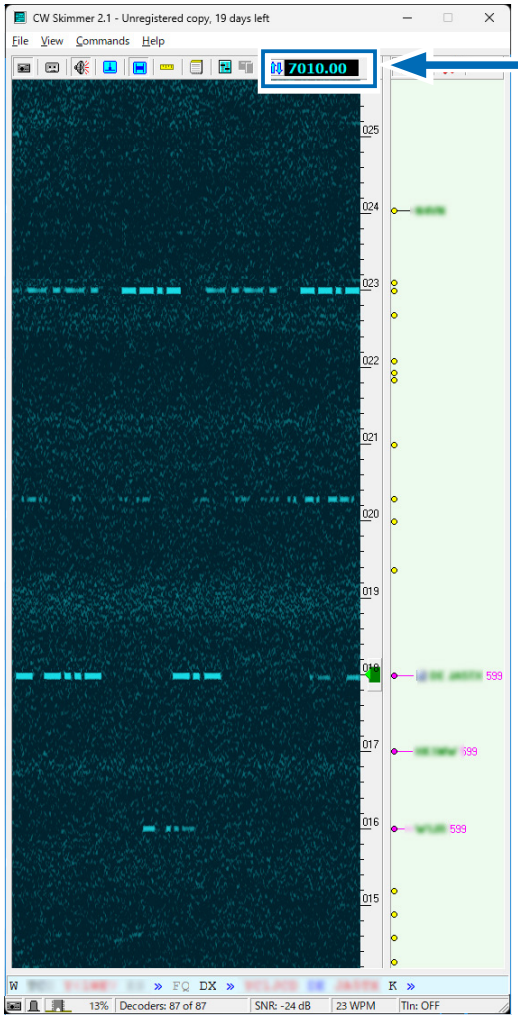
Click <Start> on the HDSDR Main screen, and then click <Start> on the CW Skimmer's tool bar.

- The waveform is displayed on CW Skimmer.
- The IC-7760 operating frequency, the HDSDR LO frequency, the HDSDR Tune frequency, and the CW Skimmer frequency are set to the same frequency.

ⓘ When changing the frequency, all frequencies are synchronized. Clicking on the signal or the call sign on CW Skimmer sets the operating frequency to the IC-7760 Main band.

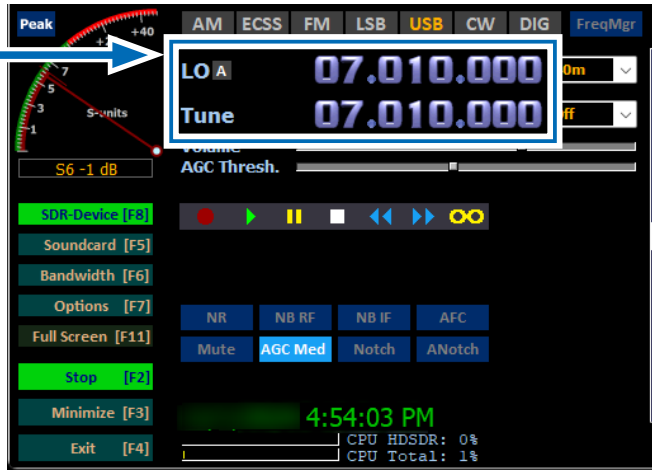
ⓘ Right after the frequencies are changed, the waveform on CW Skimmer may be disturbed. However, after a few seconds, the waveform is correctly displayed.

CW Skimmer

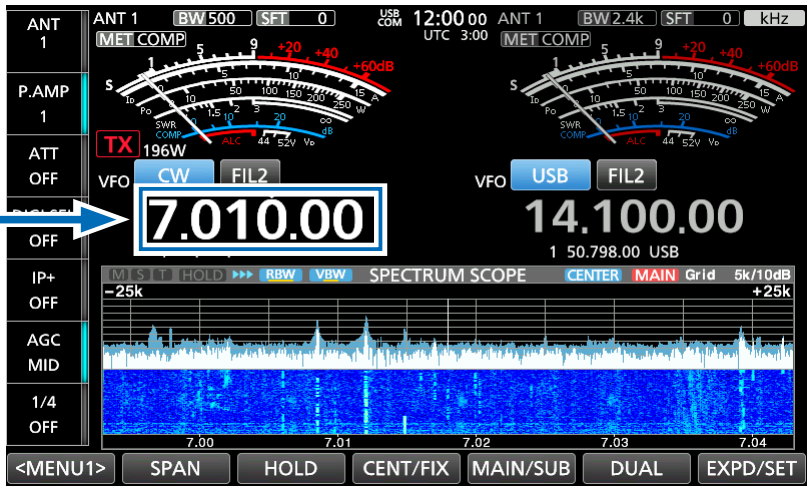


All synchronized

HDSDR



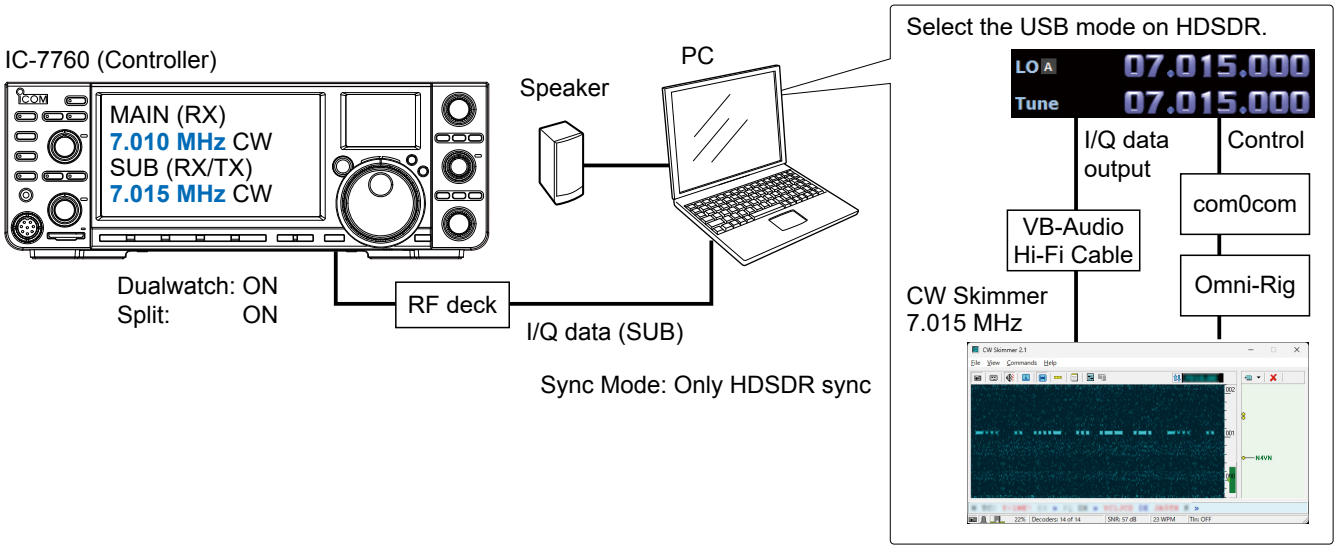
IC-7760



◇ Operation: Making a call to a station that is in Split operation and in a pile up

When a station sends “599” to a station that is in Split operation and in a pile up, you notice the frequency the station in a pile up receives, using CW Skimmer.

1. Select the CW mode and on the IC-7760 Main band and receive the signal of a station in a pile up. (Example: 7.010 MHz)
2. Select the CW mode and on the IC-7760 Sub band and set the operating frequency near the receive frequency of the station in a pile up. (Example: 7.015 MHz)
3. Turn ON the Split function on the IC-7760.
4. Turn ON the Dualwatch function on the IC-7760 and start HDSDR and CW Skimmer.
   - The I/Q data is input from the IC-7760 Sub band to HDSDR.
5. Click on the displayed signal that may be used by the station in a pile up on CW Skimmer.
   - The frequency is set to the IC-7760 Sub band.
   - The IC-7760 Sub band operating frequency, the HDSDR LO frequency, the HDSDR Tune frequency, and the CW Skimmer frequency are set to the same frequency.
6. Transmit to the station on the IC-7760 Sub band.
   ⓘ Your signal is transmitted on the Sub band.



ⓘ **Information**

- You can not hear the demodulated audio from HDSDR because HDSDR in this case is used for only I/Q data conversion.
- You can hear the demodulated audio of the operating frequency from CW Skimmer which is the same audio as the IC-7760.
- The I/Q data output from HDSDR is input to CW Skimmer through VB-Audio Hi-Fi Cable.
- CW Skimmer uses Omni-Rig to connect to com0com and controls the HDSDR Tune frequency through the virtual serial port of com0com.

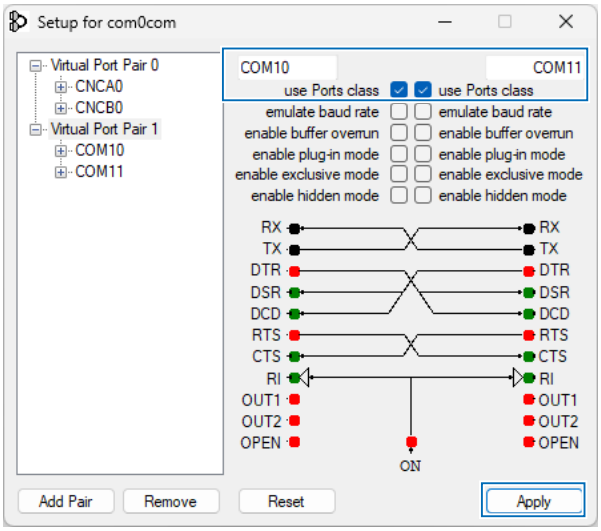
◇ Settings: Making a call to a station that is in Split operation and in a pile up

NOTE: First, setup com0com and VB-Audio Hi-Fi Cable before setting up HDSDR. The setup is required only for the first time.

com0com

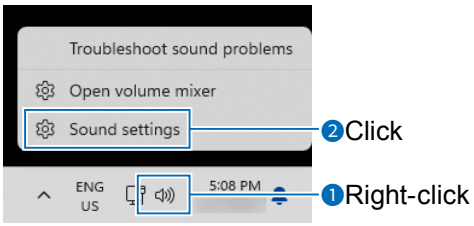
TIP: If the COM port numbers are between COM 1 and COM 20 as the default, you do not have to follow the steps below.

1. Open the Windows Start menu and click “com0com” → “Setup.”
   - Setup for com0com window is displayed.
2. Select 2 COM port numbers that are not used. (Example: COM 10 and COM 11)
   ⓘ **DO NOT** select the numbers more than COM 20. Omni-Rig cannot support them.
   ⓘ If the COM port number is displayed in red, the number is currently used for other devices. Change the number.
3. Click <Apply> and close the screen.
   ⓘ If the Program Compatibility Assistant screen is displayed, click <Cancel>.

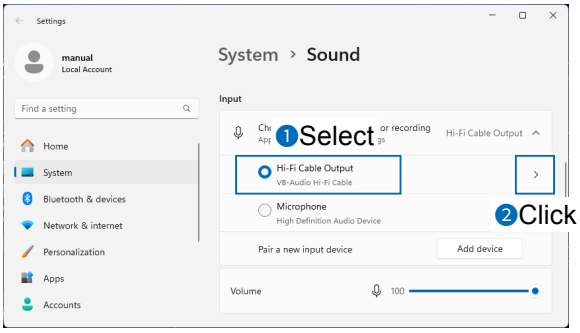


VB-Audio Hi-Fi Cable

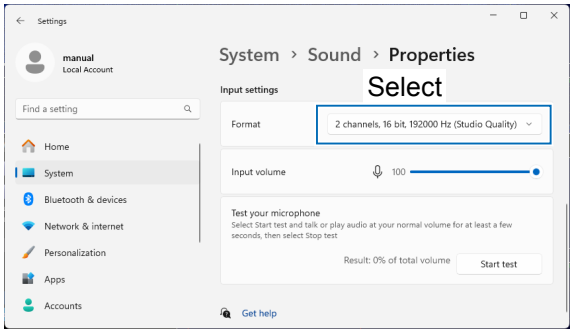
1. From the desktop, right-click your taskbar’s Speaker icon, and then click “Sound settings.”



2. Select “Hi-Fi Cable Output” from the Input device list, and then click “>.”



3. Set “Format” to “2 channel, 16 bit, 192000 Hz.”



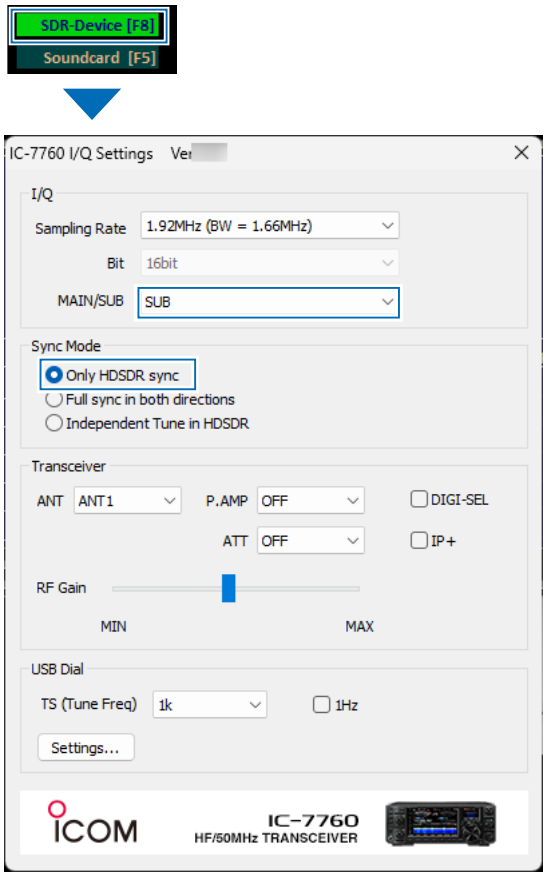
4. Return to the “Sound” screen.
5. Set the output device to “Hi-Fi Cable Input,” and then set “Format” to “16 bit, 192000 Hz.”

C. Using CW Skimmer with HDSDR (For a narrow 24 kHz bandwidth)

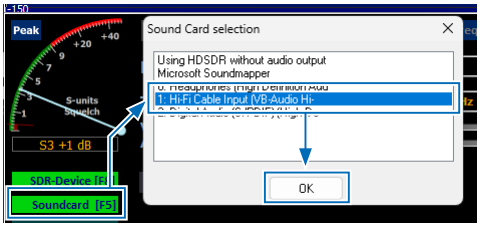
◇ Settings: Making a call to a station that is in Split operation and in a pile up

HDSDR

1. Set the operating mode to “USB.”
2. Click <SDR-Device> to display the IC-7760 I/Q Settings screen. Set the items as described below.
   MAIN/SUB: SUB
   Sync Mode: Only HDSDR sync

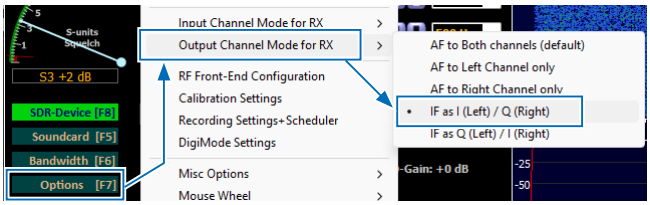


3. Click <Soundcard> to display the Sound Card Selection screen. Select “Hi-Fi Cable Input” to output I/Q data from HDSDR.



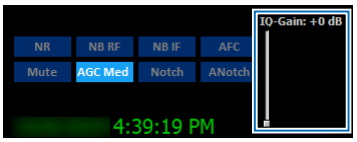
4. Click <Bandwidth> to set “Output Sampling Rate [Hz]” to “192000.”

5. Click <Options> and set “Output Channel Mode for RX” to “IF as I (Left) / Q (Right).”

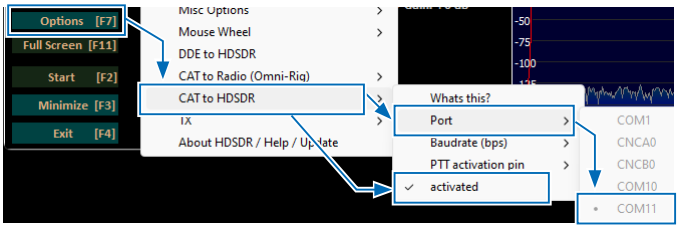


IQ-Gain setting is displayed on the HDSDR Main screen.

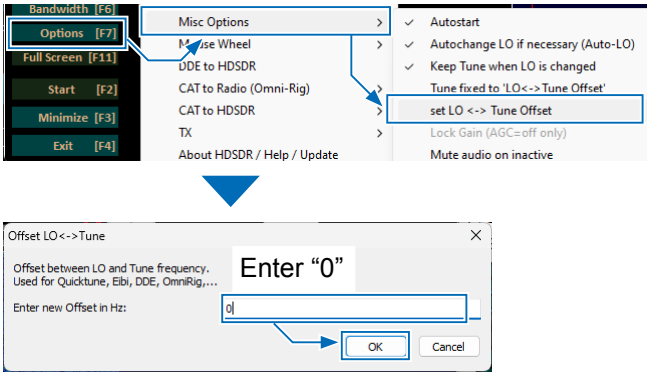
ⓘ Normally “0dB” is used, but you can adjust the gain level according to your situation. (p. 21)



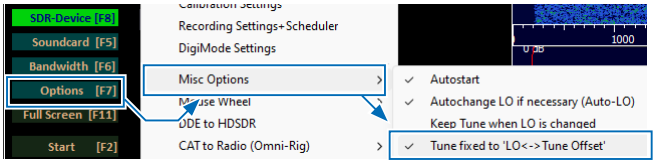
6. Click <Options> and set the items as described below.
   - Click “CAT to HDSDR” → “Port” and select a COM port that is set in com0com.
   - Click “CAT to HDSDR” and select “activated.”



7. Click <Options>, and then click “Misc Options.” Click “set LO <->Tune Offset” to change it to “0.”



8. Click <Options>, and then click “Misc Options.” Click “Tune fixed to ‘LO<->Tune Offset’” to add a check mark.

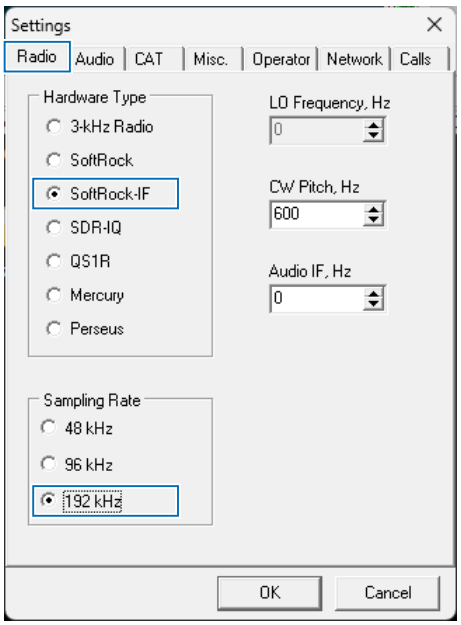


C. Using CW Skimmer with HDSDR (For a narrow 24 kHz bandwidth)

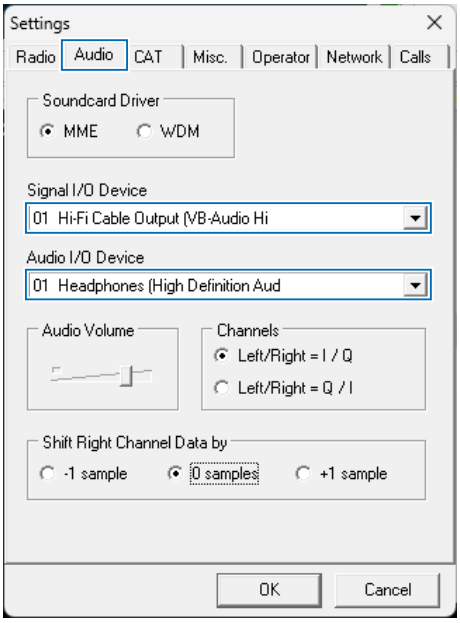
◇ Settings: Making a call to a station that is in Split operation and in a pile up

CW Skimmer

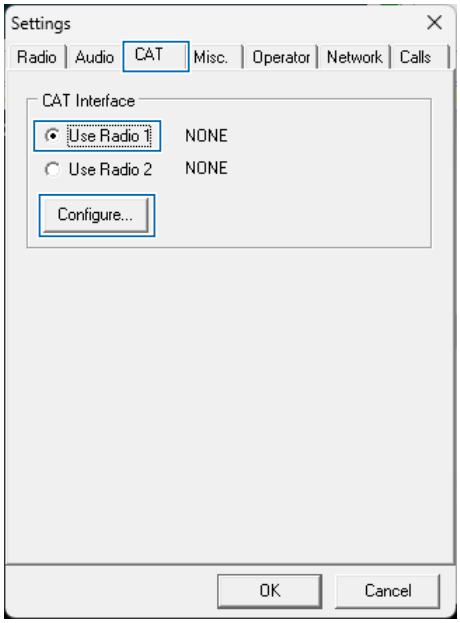
1. To input I/Q data to CW Skimmer, click <View> → <Settings> → the “Radio” tab, and then set the items as described below.
   Hardware Type: SoftRock-IF
   Sampling Rate: 192 kHz



2. To input the I/Q data and output the demodulated audio in CW Skimmer to the speaker, click the “Audio” tab, and then set the items as described below.
   Signal I/O Device: Hi-Fi Cable Output
   Audio I/O Device: A speaker connected to your PC

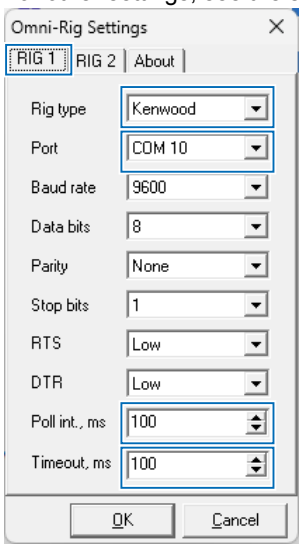


3. To control the frequency synchronization, click the “CAT” tab, and then set the items as described below.
   CAT Interface: Use Radio 1



4. Click <Configure...> to open the Omni-Rig Settings screen, and then set the items as described below.
   Rig type: Kenwood
   Port: Select the COM Port that is in com0com, and not set in HDSDR.
   Poll int. ms: 100
   Timeout. ms: 100

ⓘ For other settings, see the screen below.



TIP: You can check the required settings on the HDSDR Main screen.
<Options> → <CAT to HDSDR> → <What’s this ?>

◇ Action: Making a call to a station that is in Split operation and in a pile up

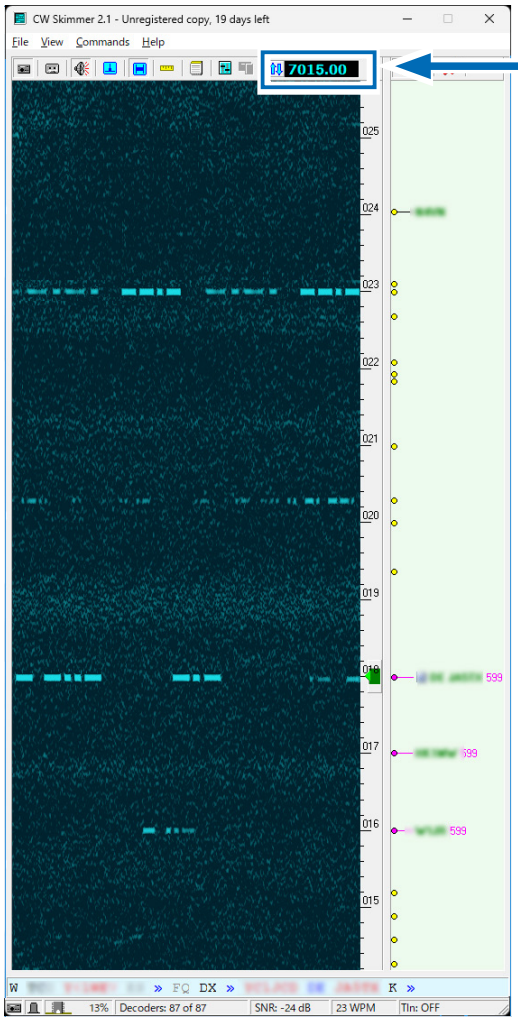
Click <Start> on the HDSDR Main screen, and then click <Start> on the CW Skimmer's tool bar.

- The waveform is displayed on CW Skimmer.
- The IC-7760 Sub band operating frequency, the HDSDR LO frequency, the HDSDR Tune frequency, and the CW Skimmer frequency are set to the same frequency.

ⓘ When changing the frequency, all frequencies are synchronized. Clicking on the signal or the call sign on CW Skimmer sets the operating frequency to the IC-7760 Sub band.

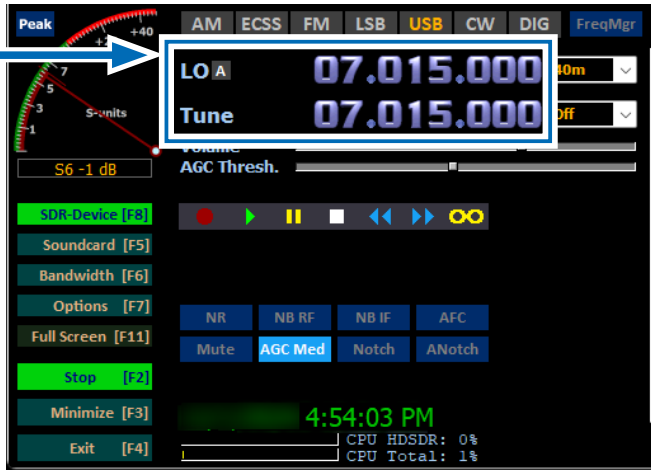
ⓘ Right after the frequencies are changed, the waveform on CW Skimmer may be disturbed. However, after a few seconds, the waveform is correctly displayed.

CW Skimmer

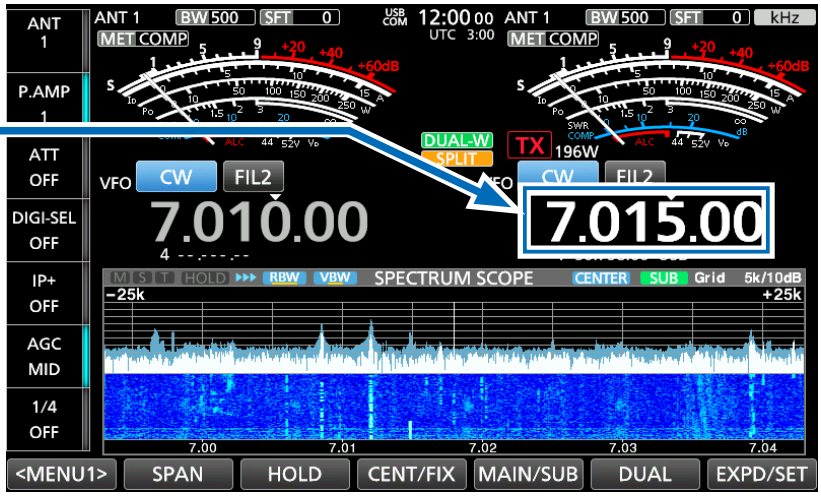


All synchronized

HDSDR



IC-7760

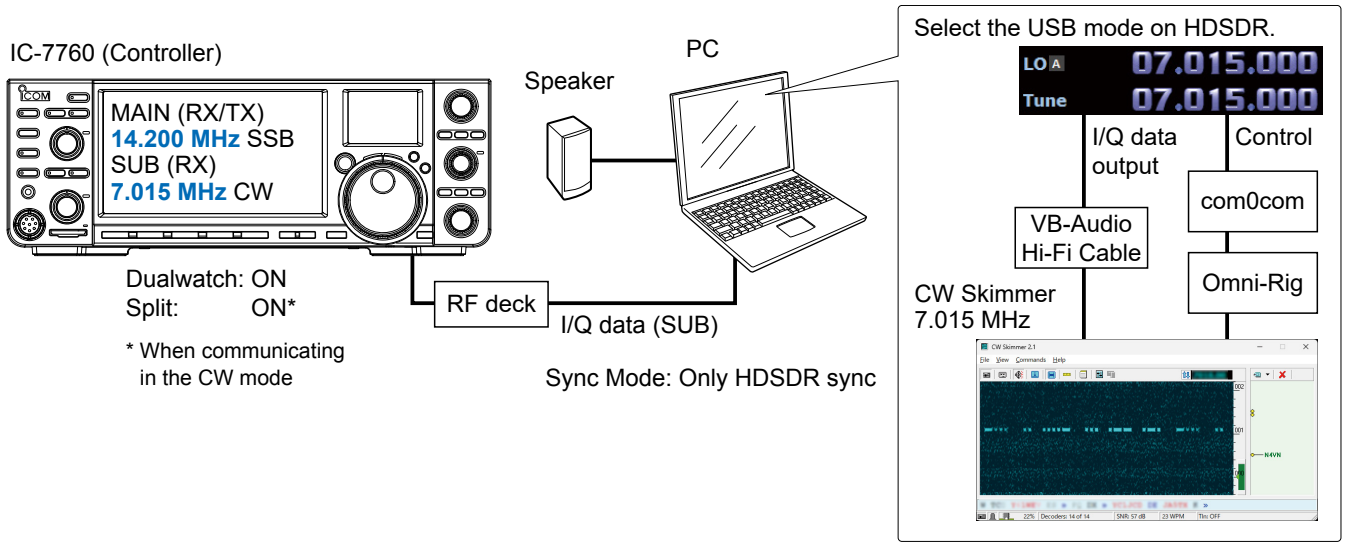


◇ Operation: Checking the CW band in CW Skimmer while communicating in the SSB mode

While communicating in the SSB mode, when a signal of the CW station you want to make a call to is decoded in CW Skimmer, turn ON the Split function on the IC-7760 to make a call.

ⓘ You can also use the same band and the same operating mode Dualwatch.

1. Select the SSB mode and set the receive frequency (14.200 MHz) on the IC-7760 Main band.
   ⓘ Communicate in the SSB mode until a target station appears.
2. Select the CW mode and set the transmit frequency (7.015 MHz) on the IC-7760 Sub band.
3. Turn ON the Dualwatch function on the IC-7760 and start HDSDR and CW Skimmer.
   • The I/Q data is input from the IC-7760 Sub band to HDSDR.
4. If a CW station you want to make a call is displayed on CW Skimmer, click the displayed signal.
   • The frequency is set to the IC-7760 Sub band.
   • The IC-7760 Sub band operating frequency, the HDSDR LO frequency, the HDSDR Tune frequency, and the CW Skimmer frequency are set to the same frequency.
5. Turn ON the Split function on the IC-7760 and transmit to the station on the IC-7760 Sub band.



ⓘ **Information**

- You can not hear the demodulated audio from HDSDR because HDSDR in this case is used for only I/Q data conversion.
- You can hear the demodulated audio of the operating frequency from CW Skimmer which is the same audio as the IC-7760.
- The I/Q data output from HDSDR is input to CW Skimmer through VB-Audio Hi-Fi Cable.
- CW Skimmer uses Omni-Rig to connect to com0com and controls the HDSDR Tune frequency through the virtual serial port of com0com.

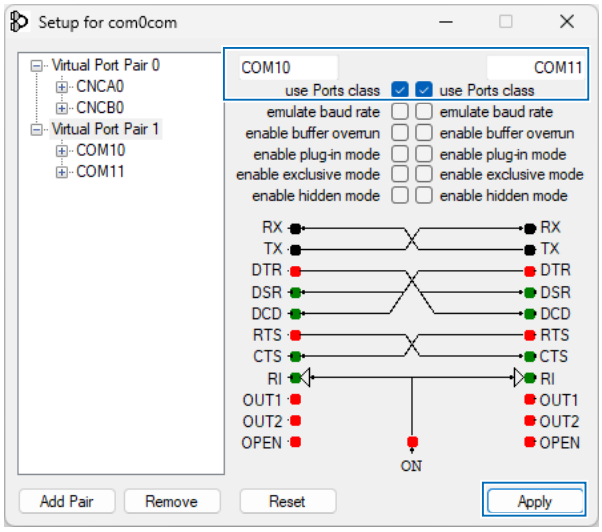
◇ Settings: Checking the CW band in CW Skimmer while communicating in the SSB mode

NOTE: First, setup com0com and VB-Audio Hi-Fi Cable before setting up HDSDR. The setup is required only for the first time.

com0com

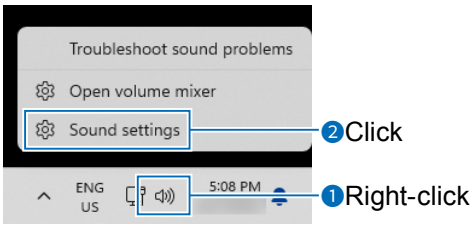
TIP: If the COM port numbers are between COM 1 and COM 20 as the default, you do not have to follow the steps below.

1. Open the Windows Start menu and click "com0com" → "Setup."
   - Setup for com0com window is displayed.
2. Select 2 COM port numbers that are not used. (Example: COM 10 and COM 11)
   ⓘ **DO NOT** select the numbers more than COM 20. Omni-Rig cannot support them.
   ⓘ If the COM port number is displayed in red, the number is currently used for other devices. Change the number.
3. Click <Apply> and close the screen.
   ⓘ If the Program Compatibility Assistant screen is displayed, click <Cancel>.

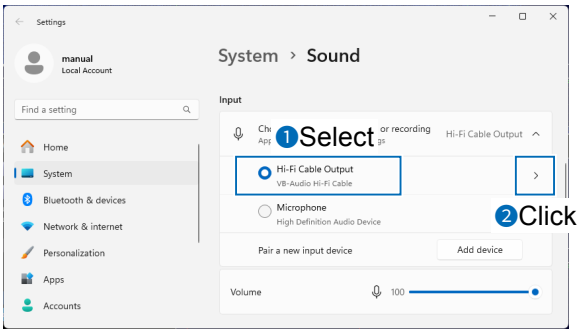


VB-Audio Hi-Fi Cable

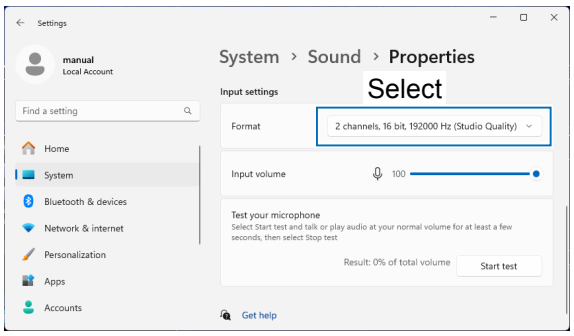
1. From the desktop, right-click your taskbar's Speaker icon, and then click "Sound settings."



2. Select "Hi-Fi Cable Output" from the Input device list, and then click ">."



3. Set "Format" to "2 channel, 16 bit, 192000 Hz."



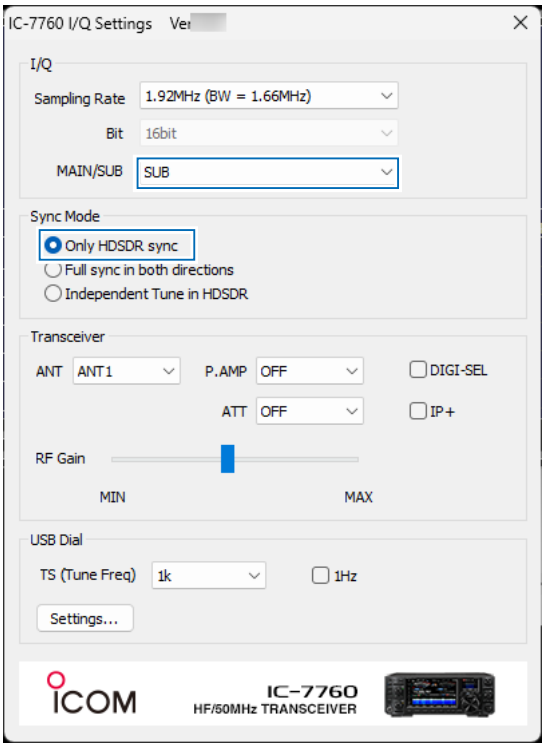
4. Return to the "Sound" screen.
5. Set the output device to "Hi-Fi Cable Input," and then set "Format" to "16 bit, 192000 Hz."

C. Using CW Skimmer with HDSDR (For a narrow 24 kHz bandwidth)

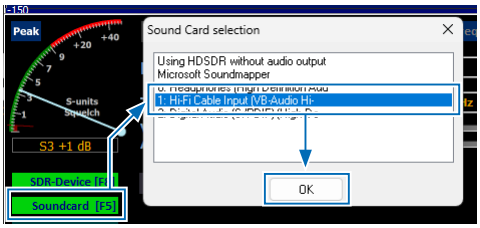
◇ Settings: Checking the CW band in CW Skimmer while communicating in the SSB mode

HDSDR

1. Set the operating mode to “USB.”
2. Click <SDR-Device> to display the IC-7760 I/Q Settings screen. Set the items as described below.
   MAIN/SUB: SUB
   Sync Mode: Only HDSDR sync

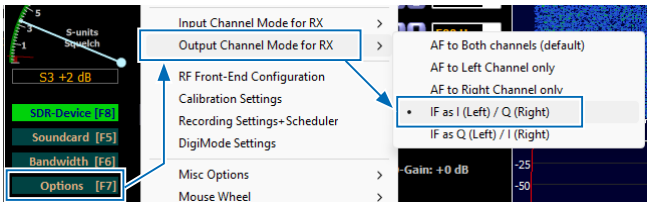


3. Click <Soundcard> to display the Sound Card Selection screen. Select “Hi-Fi Cable Input” to output I/Q data from HDSDR.



4. Click <Bandwidth> to set “Output Sampling Rate [Hz]” to “192000.”

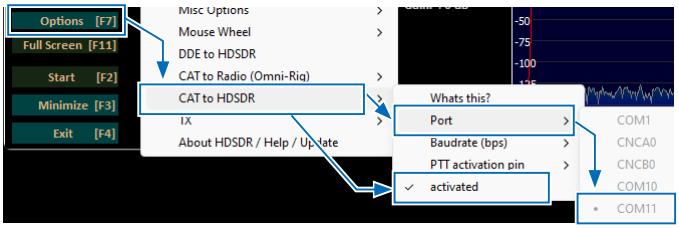
5. Click <Options> and set “Output Channel Mode for RX” to “IF as I (Left) / Q (Right).”



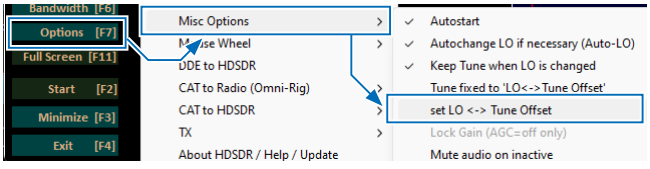
IQ-Gain setting is displayed on the HDSDR Main screen.

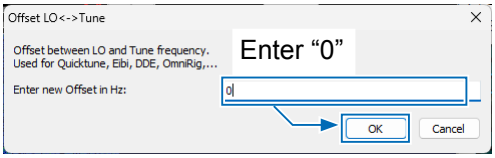
ⓘ Normally “0dB” is used but you can adjust the gain level according to your situation. (p. 21)

6. Click <Options> and set the items as described below.
   - Click “CAT to HDSDR” → “Port” and select the COM port that is set in com0com.
   - Click “CAT to HDSDR” and select “activated.”

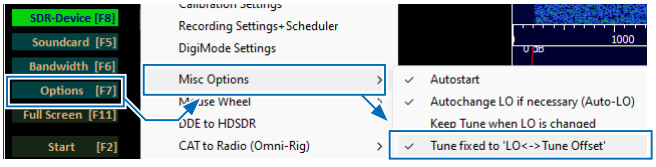


7. Click <Options>, and then click “Misc Options.” Click “set LO <->Tune Offset” to change it to “0.”





8. Click <Options>, and then click “Misc Options.” Click “Tune fixed to ‘LO<->Tune Offset’” to add a check mark.

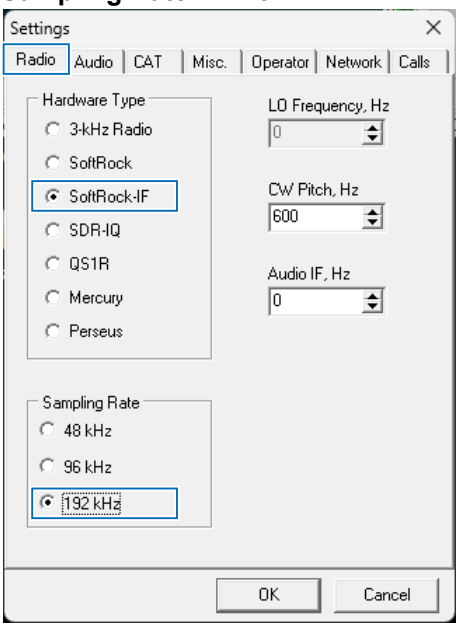


C. Using CW Skimmer with HDSDR (For a narrow 24 kHz bandwidth)

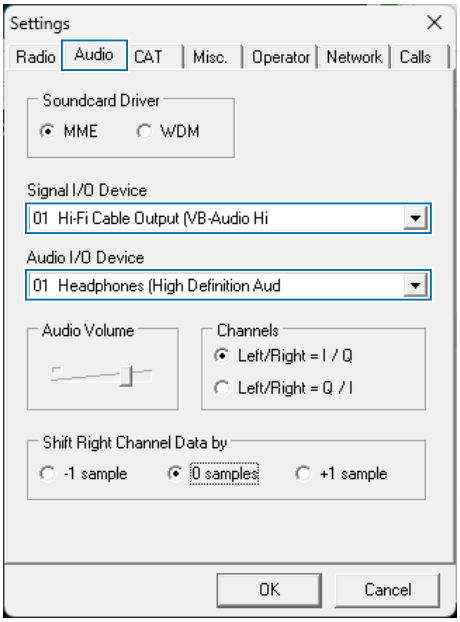
◇ Settings: Checking the CW band in CW Skimmer while communicating in the SSB mode

CW Skimmer

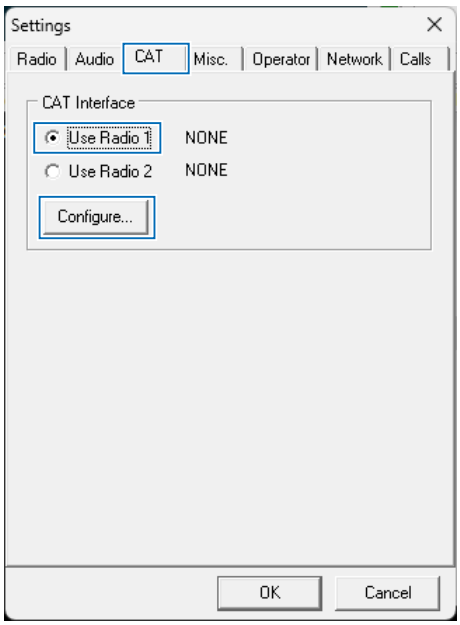
1. To input I/Q data to CW Skimmer, click <View> → <Settings> → the “Radio” tab, and then set the items as described below.
   Hardware Type: SoftRock-IF
   Sampling Rate: 192 kHz



2. To input the I/Q data and output the demodulated audio in CW Skimmer to the speaker, click the “Audio” tab, and then set the items as described below.
   Signal I/O Device: Hi-Fi Cable Output
   Audio I/O Device: A speaker connected to your PC

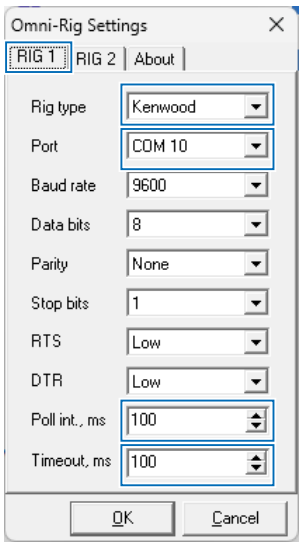


3. To control the frequency synchronization, click the “CAT” tab, and then set the item as described below.
   CAT Interface: Use Radio 1



4. Click <Configure...> to open Omni-Rig Settings screen, and then set the items as described below.
   Rig type: Kenwood
   Port: Select a COM Port that is in com0com and not set in HDSDR.
   Poll int. ms: 100
   Timeout. ms: 100

   ⓘ For other settings, see the screen below.



TIP: You can check the required settings on the HDSDR Main screen.
<Options> → <CAT to HDSDR> → <What’s this ?>

◇ Action: Checking the CW band in CW Skimmer while communicating in the SSB mode

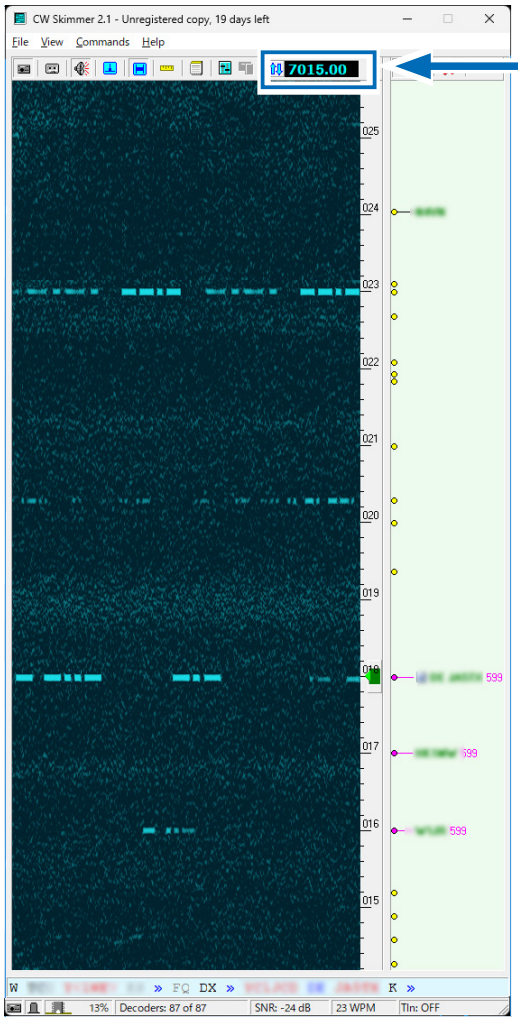
Click <Start> on the HDSDR Main screen, and then click <Start> on the CW Skimmer's tool bar.

- The waveform is displayed on CW Skimmer.
- The IC-7760 Sub band operating frequency, the HDSDR LO frequency, the HDSDR Tune frequency, and the CW Skimmer frequency are set to the same frequency.

ⓘ When changing the frequency, all frequencies are synchronized. Clicking on the signal or the call sign on CW Skimmer sets the operating frequency to the IC-7760 Sub band.

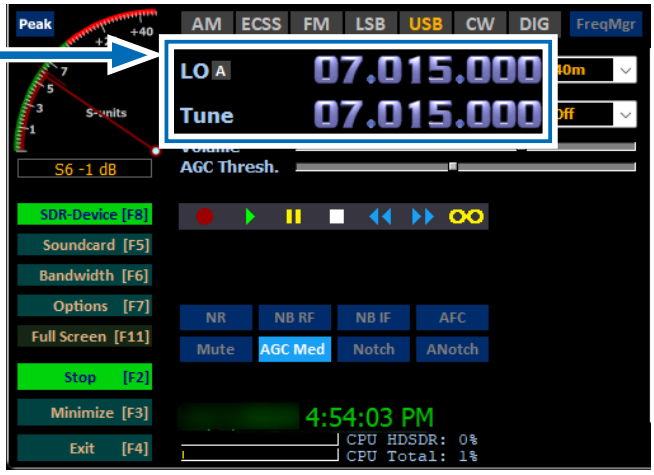
ⓘ Right after the frequencies are changed, the waveform on CW Skimmer may be disturbed. However, after a few seconds, the waveform is correctly displayed.

CW Skimmer

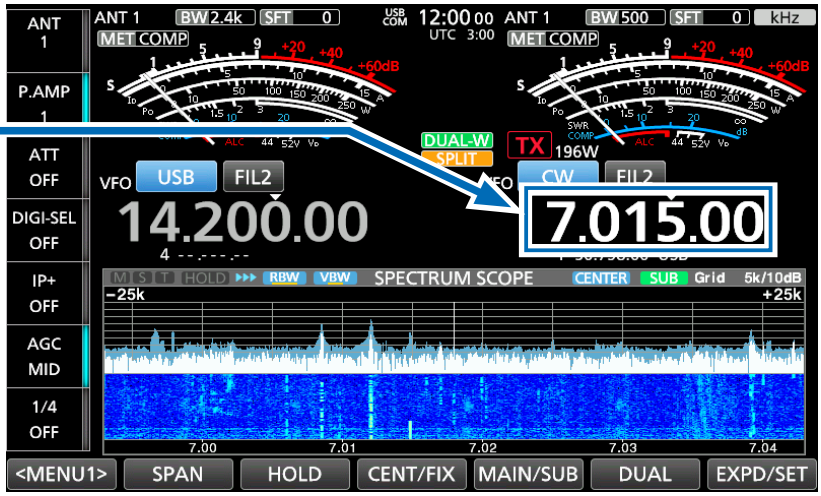


All synchronized

HDSDR



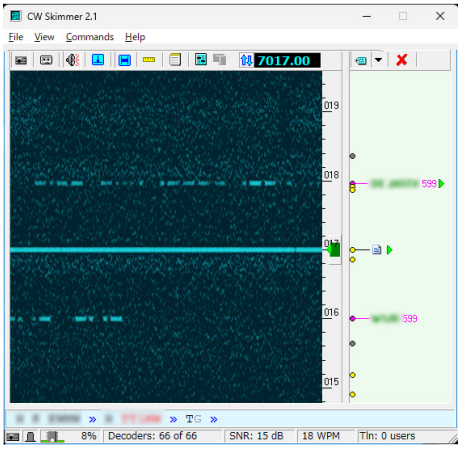
IC-7760



◇ Troubleshooting

If the straight line as shown to the right is displayed on CW Skimmer, adjust the IQ-Gain setting on HDSDR. The straight line is displayed because of a sharp spike (a DC), if the noise floor is too low.

ⓘ The IQ-Gain setting is displayed by <Options> and set "Output Channel Mode for RX" to "IF as I (Left) / Q (Right)." (pp. 8, 13, 18, 24)



TIP: When adjusting the IQ-Gain setting

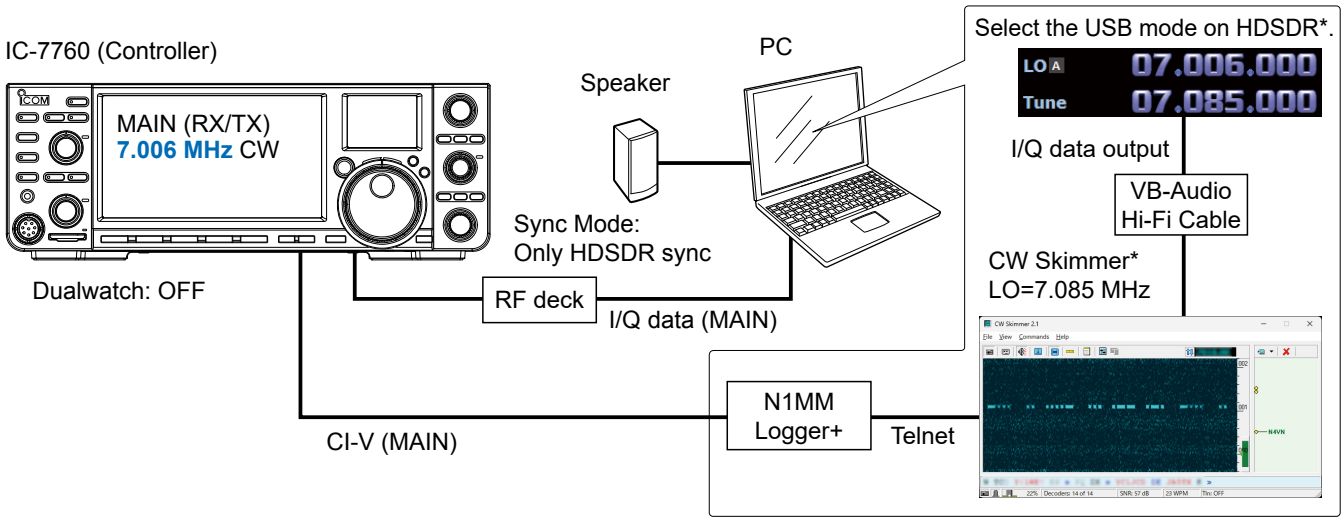
- The IQ-Gain should not be too high. After the straight line has disappeared, do not set the gain higher than that level.
- If the IQ-Gain is too high, CW Skimmer becomes easily saturated when receiving a strong signal. If CW Skimmer is saturated, lower the IQ-Gain or lower the input level on the IC-7760.
  - Turn OFF the Preamplifier.
  - Turn ON the Attenuator function.
  - Lower the RF gain.
  - Turn ON the Digital Selector function.

D. Using CW Skimmer with HDSDR (For a wide bandwidth*)

◇ Operation

* Approximately 170 kHz

1. Select the CW mode on the IC-7760 Main band and set the operating frequency of the CW band you want to decode.
   ⓘ The station information decoded in CW Skimmer through HDSDR is input to N1MM Logger+.
2. Click the displayed station on N1MM Logger+.
   • The frequency is set to the IC-7760 Main band.
3. Transmit to the station.

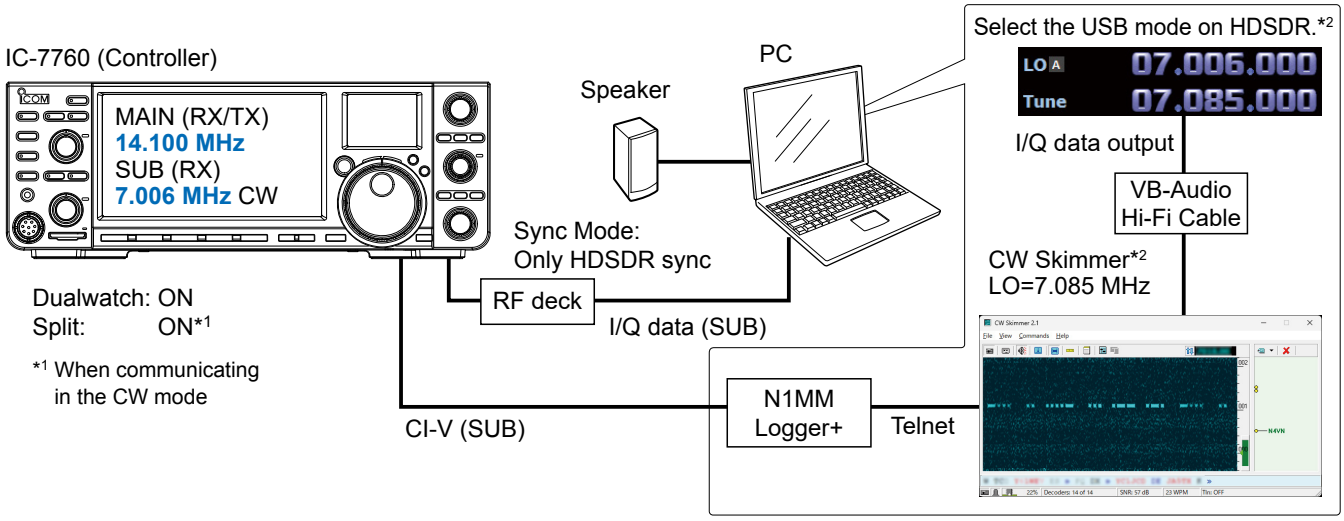


* Manually set both the HDSDR Tune frequency and the CW Skimmer LO frequency to the same frequency.

ⓘ Information

- You cannot hear the demodulated audio from HDSDR because HDSDR in this case is used for only I/Q data conversion.
- You can hear the demodulated audio of the operating frequency from CW Skimmer, regardless of IC-7760 operating frequency.
- The I/Q data output from HDSDR is input to CW Skimmer through VB-Audio Hi-Fi Cable.
- The decoded result is output to N1MM Logger+ through Telnet.
- Connects the USB cable to the PC. N1MM Logger+ remotely controls the IC-7760 by the CI-V commands.

When you want to connect the IC-7760 Sub band to HDSDR, turn ON the Dualwatch function and select the SUB band on the IC-7760 I/Q Settings screen in HDSDR.



*2 Manually set both the HDSDR Tune frequency and the CW Skimmer LO frequency to the same frequency.

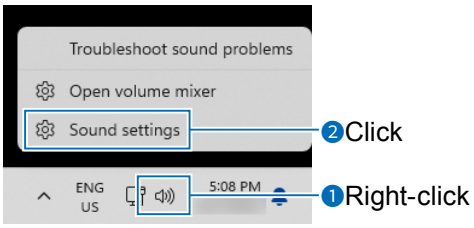
D. Using CW Skimmer with HDSDR (For a wide bandwidth*)

◇ Settings

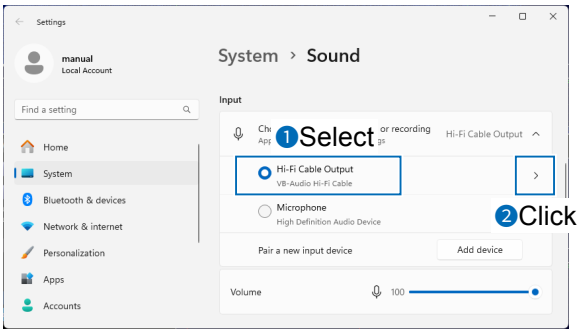
NOTE: First, setup VB-Audio Hi-Fi Cable before setting up HDSDR. The setup is required only for the first time.

VB-Audio Hi-Fi Cable

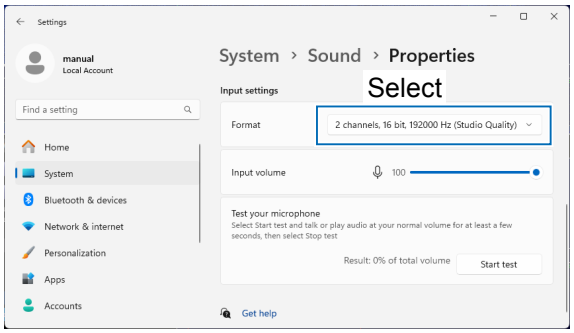
1. From the desktop, right-click your taskbar's Speaker icon, and then click "Sound settings."



2. Select "Hi-Fi Cable Output" from the Input device list, and then click ">."



3. Set "Format" to "2 channel, 16 bit, 192000 Hz."



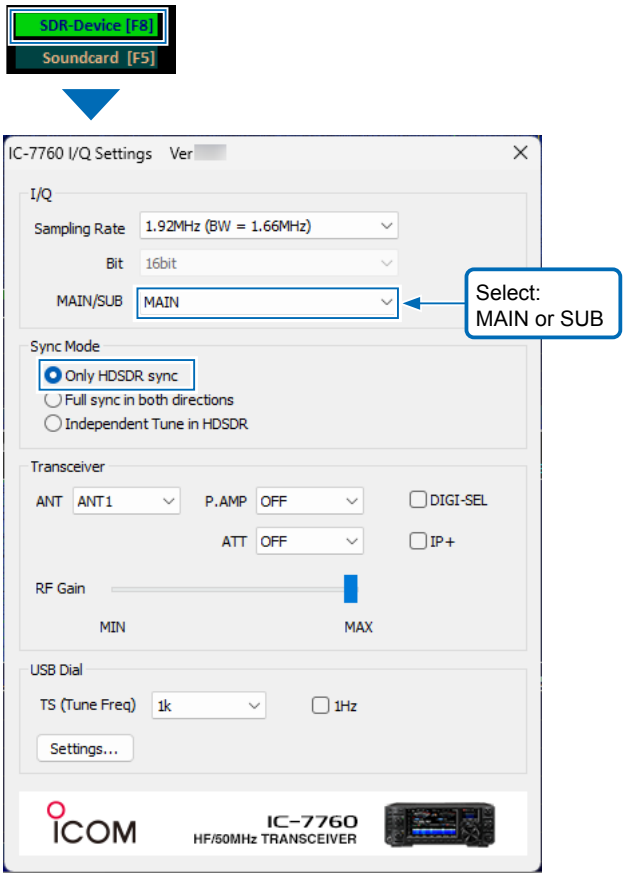
4. Return to the "Sound" screen.
5. Set the output device to "Hi-Fi Cable Input," and then set "Format" to "16 bit, 192000 Hz."

D. Using CW Skimmer with HDSDR (For a wide bandwidth*)

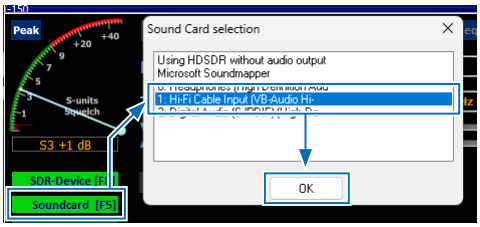
◇ Settings

HDSDR

1. Set the operating mode to “USB.”
2. Click <SDR-Device> to display the IC-7760 I/Q Settings screen. Set the items as described below.
   MAIN/SUB: MAIN or SUB
   Sync Mode: Only HDSDR sync

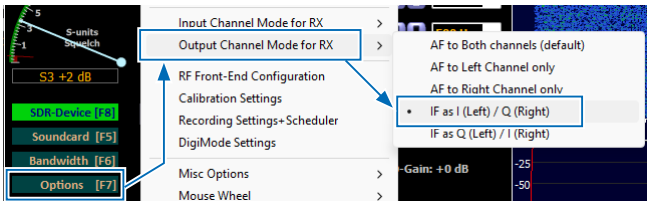


3. Click <Soundcard> to display the Sound Card Selection screen. Select “Hi-Fi Cable Input” to output I/Q data from HDSDR.



4. Click <Bandwidth> to set “Output Sampling Rate [Hz]” to “192000.”

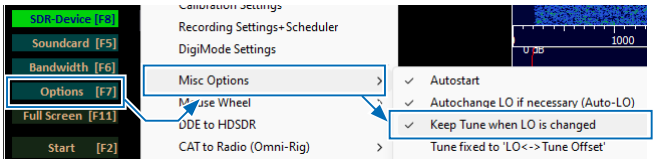
5. Click <Options> and set “Output Channel Mode for RX” to “IF as I (Left) / Q (Right).”



IQ-Gain setting is displayed on the HDSDR Main screen.

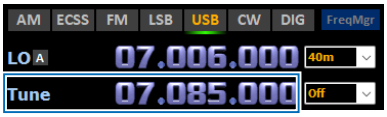
ⓘ Normally “0dB” is used, but you can adjust the gain level according to your situation. (p. 21)

6. Click <Options>, and then click “Misc Options.” Click “Keep Tune when LO is changed” to add a check mark.



7. Set the HDSDR Tune frequency to the center of the frequency range you want to decode.

ⓘ For example, if you want to decode the frequency range 7.000 MHz ~ 7.170 MHz, set the center frequency to 7.085 MHz.

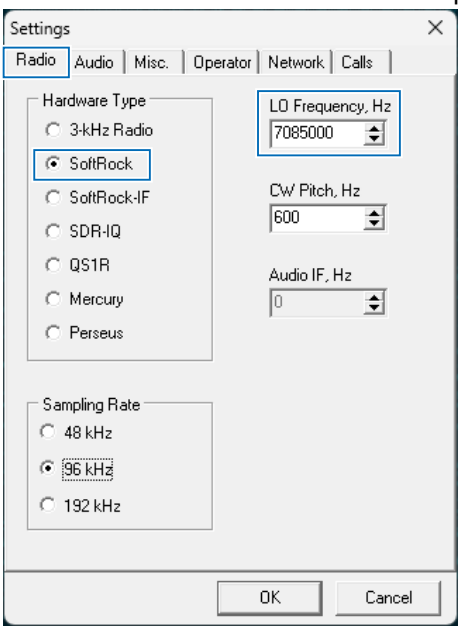


D. Using CW Skimmer with HDSDR (For a wide bandwidth*)

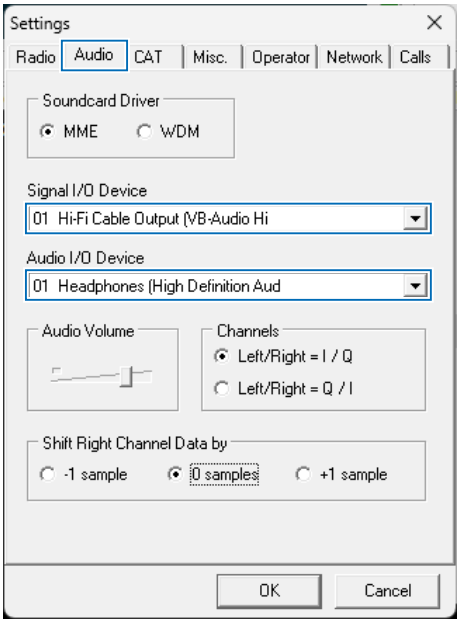
◇ Settings

CW Skimmer

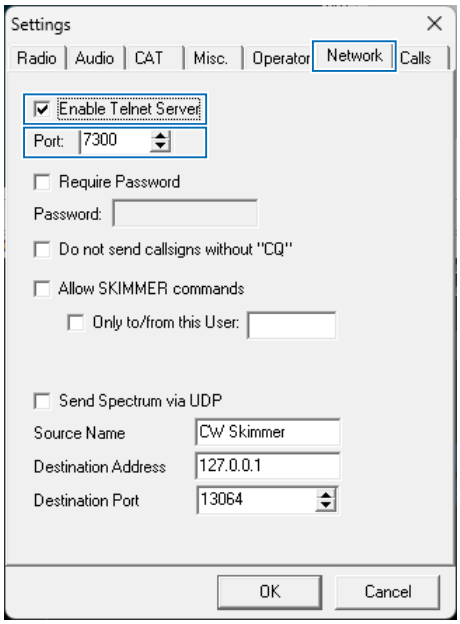
1. To input I/Q data to CW Skimmer, click <View> → <Settings> → the “Radio” tab, and then set the items as described below.
   Hardware Type: SoftRock
   Sampling Rate: 192 kHz
   LO Frequency, Hz: The same frequency as the HDSDR Tune frequency.



2. To input the I/Q data and output the demodulated audio in CW Skimmer to the speaker, click the “Audio” tab, and then set the items as described below.
   Signal I/O Device: Hi-Fi Cable Output
   Audio I/O Device: A speaker connected to your PC



3. To output the decoded result to N1MM Logger+, click the <Network> tab, and then set the items as described below.
   Enable Telnet Server: Put a check mark.
   Port: Default setting (7300) is recommended.



4. Click <OK>.
   ⓘ If a firewall setting confirmation screen is displayed, allow access.

D. Using CW Skimmer with HDSDR (For a wide bandwidth*)

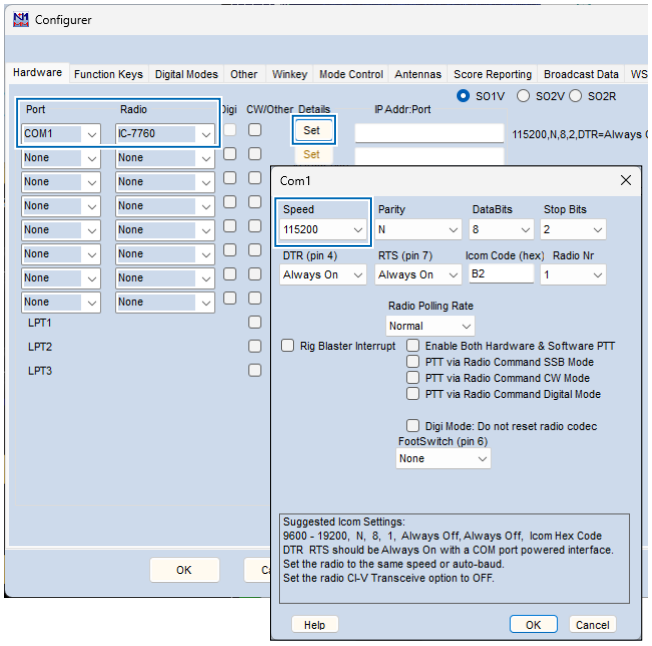
◇ Settings

N1MM Logger+

1. Click <Config> → <Configure Ports, Mode Control, Audio, Other...> to open the Configurer screen.

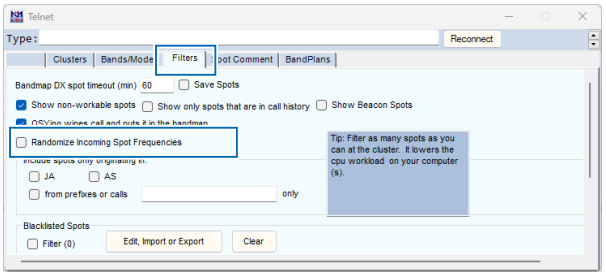
2. Click the “Hardware” tab, and then set the items as described below.
   Port: Select a COM port number used for the IC-7760 CI-V communication
   Radio: IC-7760

3. Click <Set> to display the COM port number screen, and then set the items described below.
   Speed: CI-V Baud Rate set on the IC-7760
   ⓘ For other settings, see the screen below.

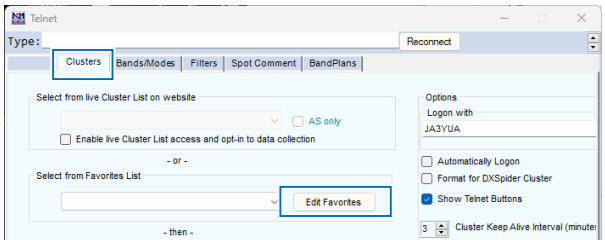


4. Click <Tools> → <Telnet Window Tools> to open the Telnet screen.

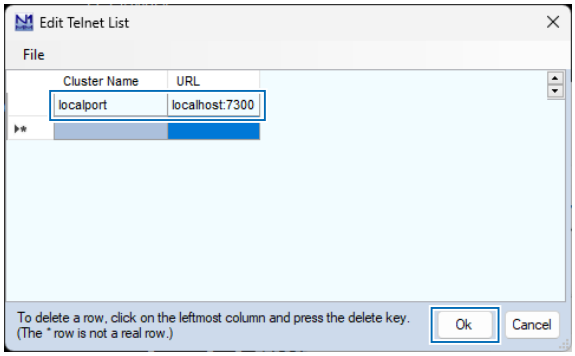
5. Click the “Filters” tab and then set the items as described below.
   Randomize incoming Spot Frequencies:
   Remove the check mark.



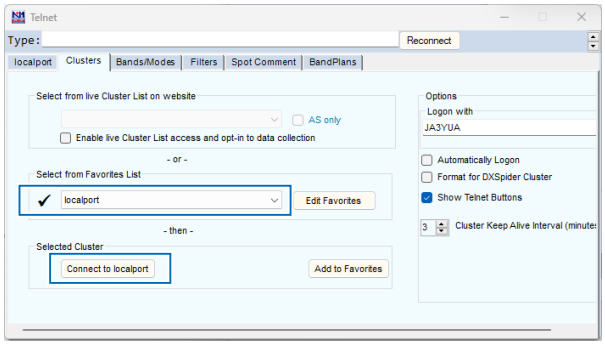
6. Click the “Clusters” tab, and then click <Edit Favorites>.



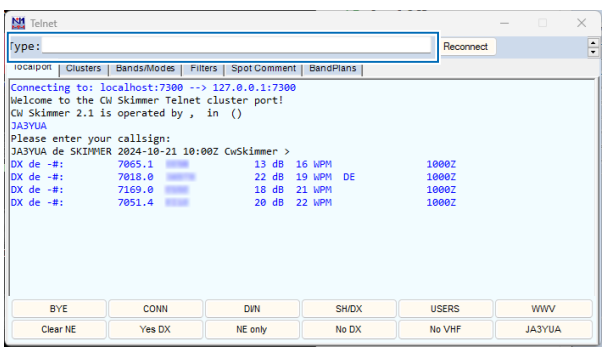
7. Enter the items described below, and then click <OK>.
   Cluster Names: localport
   URL: localhost:7300



8. Set “Select from Favorite List” to “localport,” and then click <Connect to localport>.



9. Enter your call sign into “Type,” and then push [Enter] on your PC’s keyboard.



D. Using CW Skimmer with HDSDR (For a wide bandwidth*)

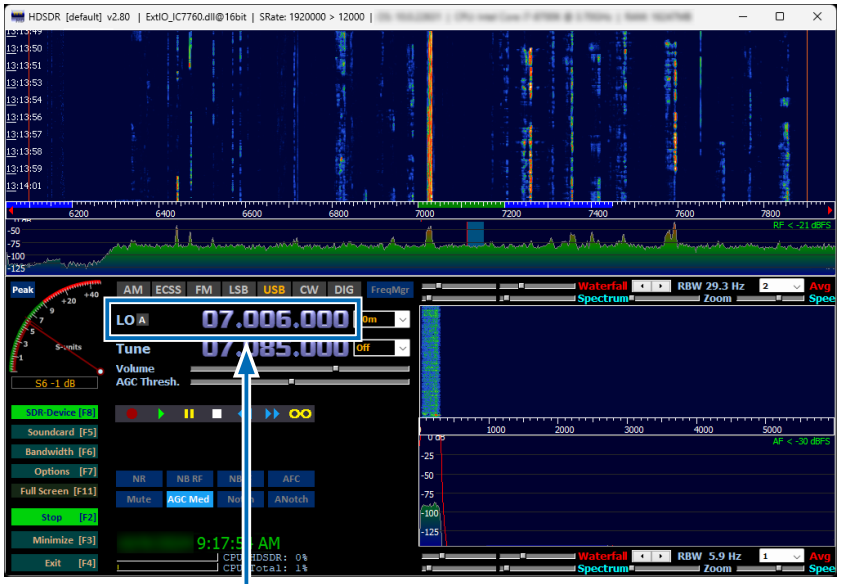
◇ Action

The approximate 170 kHz wide frequency range from the center frequency (the HDSDR Tune frequency) is decoded in CW Skimmer, and the decoded result is displayed on N1MM Logger+. Click the station displayed in N1MM Logger+ to set the frequency to the IC-7760.

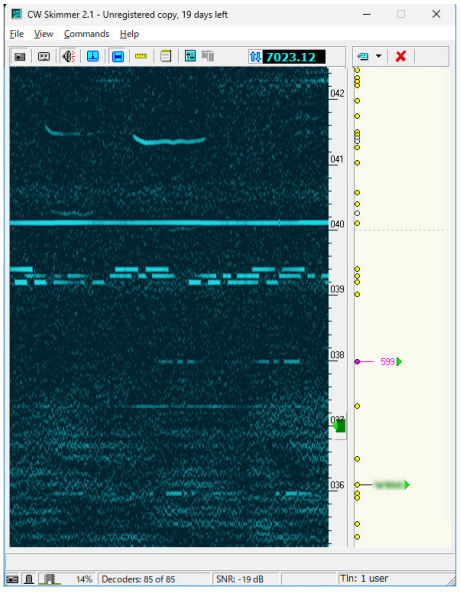
ⓘ Even if you change the IC-7760 operating frequency or the HDSDR LO frequency, the HDSDR Tune frequency is not changed.

ⓘ The CW Skimmer frequencies do not affect the operation.

HDSDR

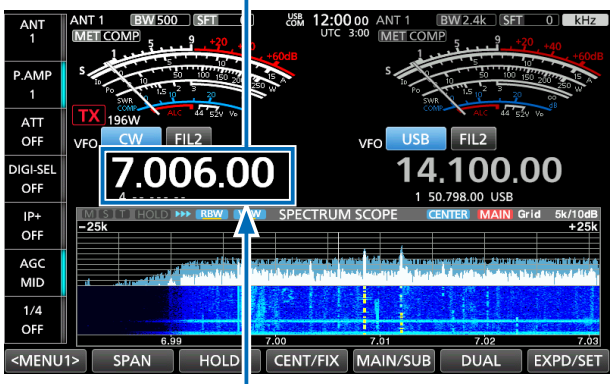


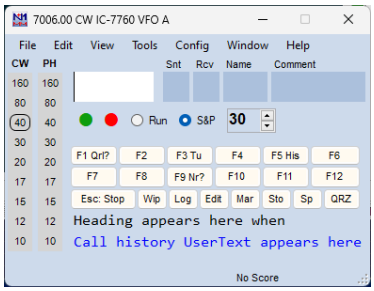
CW Skimmer

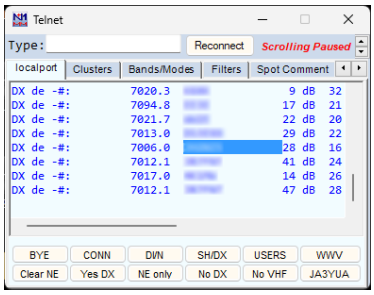


Synchronized

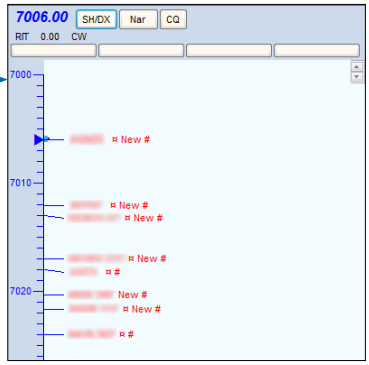
IC-7760







Click the displayed station on N1MM Logger+ to set the frequency to the IC-7760.



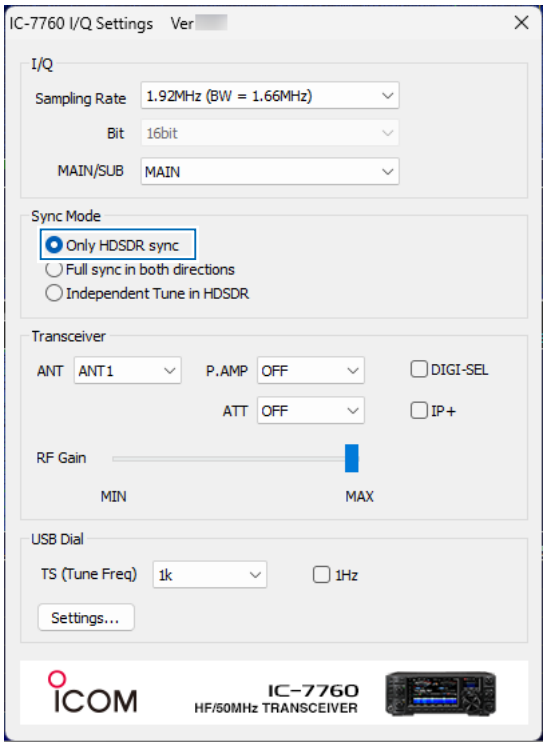
HDSDR setting notes

◇ The Lock function

The Lock function competes with the setting on the IC-7760 I/Q Setting screen. The HDSDR Lock function is not usable.

ⓘ When you click on “LO” or “Tune” next to the frequency, “Locked” is displayed. When the HDSDR Lock function correctly works, the frequency cannot be changed.

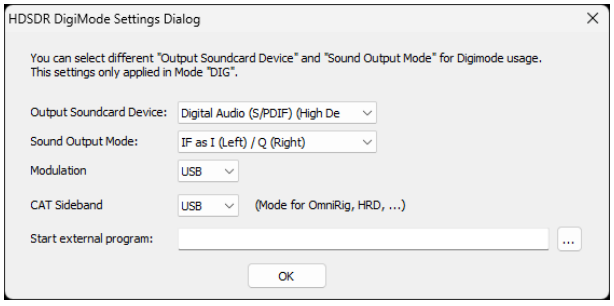
ⓘ If you want to use this setting, set “Sync Mode” to “Only HDSDR sync” on the IC-7760 I/Q Setting screen.



◇ Settings: Receiving mode

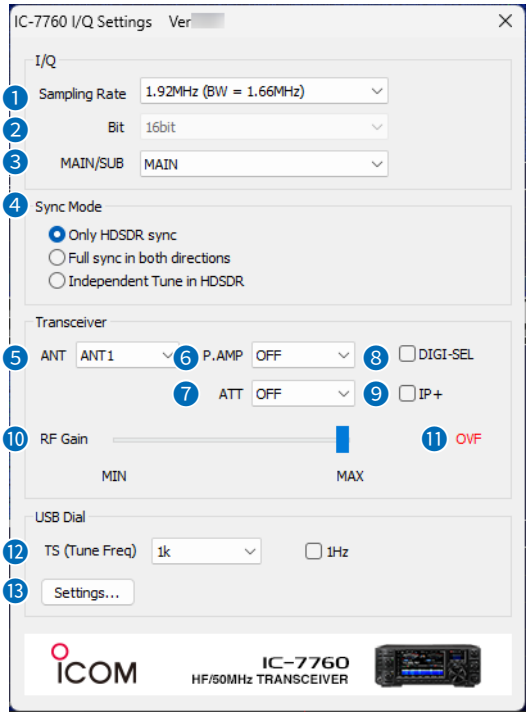
Click “DIG” to select the Digital mode when you are using an SDR receiver, or HDSDR as a 3rd receiver.

ⓘ You can configure the sound card’s Output and Mode when “DIG” is selected.
Click <Options>, and then click <DigiMode Settings>.



IC-7760 I/Q Settings screen

This screen is displayed by clicking “SDR-Device” on the HDSDR Main screen.



❶ Sampling Rate

(Default: 1.92 MHz (BW = 1.66 MHz))

Select the sampling rate of the signal that is input to HDSDR.

ⓘ The frequency range changes, depending on the set sampling rate.

ⓘ If the audio is interrupted, select a lower sampling rate.

❷ Bit

(Default: 16 bit)

Select the bit depth of the signal that is input to HDSDR.

ⓘ When “Sampling Rate” (❶) is set to “1.92 MHz (BW = 1.66 MHz),” “Bit” is set to “16bit.”

❸ MAIN/SUB

(Default: MAIN)

Select the IC-7760 Main band or Sub band to input the I/Q signal to HDSDR.

ⓘ When selecting “SUB,” the Dualwatch function on the IC-7760 is automatically turned ON.

❹ Sync Mode

(Default: Only HDSDR sync)

Select whether or not the HDSDR Tune frequency is synchronized with the IC-7760.

- **Only HDSDR sync:**
  When changing the IC-7760 operating frequency or the HDSDR LO frequency, the HDSDR Tune frequency is changed based on the LO frequency.
- **Full sync in both directions:**
  The IC-7760 operating frequency, the HDSDR LO frequency, the HDSDR Tune frequency, and the CW Skimmer frequency are synchronized.
- **Independent Tune in HDSDR:**
  Even if you change the IC-7760 operating frequency or the HDSDR LO frequency, the HDSDR Tune frequency is not changed.

❺ ANT

Select antenna connector between ANT 1 and ANT 4, or ANT 1/R and ANT 4/R.

ⓘ You cannot select an antenna connecter that is turned OFF on the TYPE SET screen on the IC-7760.

ⓘ If “RX-ANT Connectors” on the IC-7760 is set to “RX-I/O,” you cannot select “ANT 1/R” ~ “ANT 4/R.”

❻ P.AMP

Turn the Preamplifier function ON or OFF.

❼ ATT

Select the Attenuator setting.

❽ DIGI-SEL

Turn the DIGI-SEL function ON or OFF.

❾ IP+

Turn the IP Plus function ON or OFF.

❿ RF Gain

Adjust the RF gain (sensitivity).

⓫ OVF

Displayed when receiving an excessively strong signal. If it is displayed, decrease the input level from the IC-7760.

⓬ TS (Tune Freq), 1 Hz

(Default: 1k (except for the FM mode), 25k (FM mode))

Select the tuning steps when you set the Tune frequency using the RC-28 REMOTE ENCODER (When the TS function on the RC-28 is ON).

ⓘ Information

- When the TS function is OFF, the tuning step is set to 10 Hz.
- When putting a check mark in “1 Hz,” the tuning step is changed to 1 Hz.
- When rotating RC-28’s [Main dial] to set the LO frequency, the tuning step depends on “Sampling Rate” (❶).

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

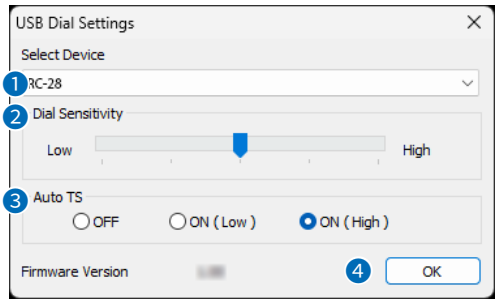
Sampling Rate	TS is ON	TS is OFF
1.92 MHz	1 MHz	100 kHz
960 kHz	100 kHz	10 kHz
480 kHz		
240 kHz		
120 kHz		
60 kHz	10 kHz	1 kHz
30 kHz		

⓭ <Settings...>

Click to display the USB Dial Settings screen. (p. 30)

USB Dial Settings screen

This screen is displayed by clicking <Settings...> on the IC-7760 I/Q Settings screen.



❶ Select Device
Select the RC-28 to operate the IC-7760 through the HDSDR software.
ⓘ The RC-28 whose [LINK] indicator lights green is automatically selected.

❷ Dial Sensitivity (Default: 3)
Set 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.

❸ Auto TS (Default: ON (High))
When you rapidly rotate the dial, the tuning speed accelerates, depending on this setting.

- OFF: Normal tuning steps, even during a rapid rotation.
- ON (Low): The tuning speed is approximately 2 times faster.
- ON (High): When the tuning step is set to 1 kHz or smaller steps, the tuning speed is approximately 5 times faster.
  When the tuning step is set to larger than 1 kHz, the tuning speed is approximately 2 times faster.

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

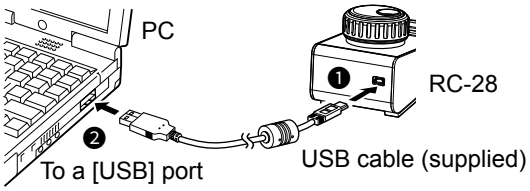
Using the RC-28

If you connect the optional RC-28 REMOTE ENCODER to the PC, you can use HDSDR and feel like you are operating the actual IC-7760's main dial.

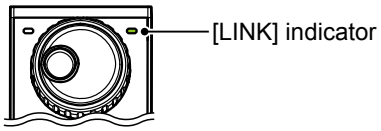
1. Connect the RC-28 to a PC that has HDSDR installed.

   NOTE: DO NOT connect the RC-28 to the PC with other than the supplied USB cable, or through any USB hub. Otherwise 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.

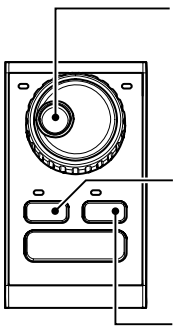


2. Start up HDSDR.
   - The [LINK] indicator on the RC-28 lights green.



   - Now you can control the assigned functions of HDSDR using the RC-28.

TIP: If the [LINK] indicator does not light, confirm "Select Device" on the USB Dial Settings screen is set to the RC-28's serial number.
(Example: RC-28 02XXXXX)



Main dial:
Rotate to change the frequency.
Changes according to "Sync Mode" on the IC-7760 I/Q Settings screen.

[F-1]:
Push to select LO frequency (the LED lights) or 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 during HDSDR operation.