



Nx Head Tracker



User Guide



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Chapter 1 – Introduction

1.1 Welcome

Thank you for choosing Waves! In order to get the most out of your Waves processor, please take some time to read through this user guide. We also suggest that you become familiar with www.waves.com/support. There you will find an extensive answer base, the latest tech specs, detailed installation guides, new software updates, and current information on licensing and registration.

Sign up at the support site and you will receive personalized information about your registered products, reminders when updates are available, and information on your authorization status.

1.2 Product Overview

The [Waves Nx Head Tracker](#) plugin is a small Bluetooth device that latches to your headphones and tracks your head movements in 360 degrees, in order to enhance the realistic and immersive 3D audio experience created by [Waves Nx technology](#).

The Nx Head Tracker can be used together with several types of Waves Nx software:

1. Audio professionals – Use the Nx Head Tracker along with the [Nx Virtual Mix Room plugin](#) in order to recreate on headphones the ideal spatial acoustics of a high-end room, improving your headphone mixing and recording experience.
2. Everyone – Use the Nx Head Tracker along with the [Nx desktop and mobile apps for 3D audio on headphones](#) in order to experience the music, movies and games you love in 3D audio on your desktop, laptop, tablet or mobile device, using any set of headphones.

1.3 Why Head Tracking Matters

When you hear sounds in the real world, your physical head movements help your brain create a sense of three-dimensional audio depth.

When your head moves, your brain remembers where the sound used to be and where it is now, combines this with its knowledge that the head (and not the external source) has moved, and uses this information to locate the external source and construct a three-dimensional “audio scene.”

However, when you listen to sound on headphones, the audio scene constantly shifts with your head, and your experience of three-dimensional auditory space is gone.

By tracking your head movements and adjusting the audio to the direction and orientation of your head, the Nx Head Tracker (combined with Nx software) helps reconstruct the realistic three-dimensional audio experience of sounds coming at you from external sources in the real world.

There are several ways you can track your head movements to enhance the Nx experience:

1. You can use the Nx Head Tracker device.
2. You can use your computer’s camera.
3. If you are using the Nx Virtual Mix Room plugin, you can use both methods simultaneously (“sensor fusion”).

For a detailed comparison between these options, see the Overview tab of the Nx Head Tracker webpage at <http://www.waves.com/hardware/nx-head-tracker>

Chapter 2 – Functions and Features

2.1 Battery

The device works with any standard AAA battery, providing approximately 40 hours of work. Replace the battery through the bottom hatch. The device will go to sleep automatically after a period of time if it is not connected or not moving. In sleep mode, the battery life can last for months.



2.2 Attaching the Nx Head Tracker to Your Headphones

After you insert a standard AAA battery into the Nx Head Tracker, position the device at the top-center of the headphone arc, with the Nx logo facing forward (i.e. battery in the back). The Nx Head Tracker will not track your head movements properly if you place it off-center or facing backward.

Wrap the strap around the headphone arc and attach it to the hook on the other side. The strap can be disconnected at both ends for replacement and any standard rubber band can be used if needed.



2.3 Button Functions

A short press (under two seconds) in any state will place the unit in advertising mode. In this mode, the device can be detected and paired with your computer.



A long press (over two seconds) will place the unit in sleep mode and disconnect it.

2.4 LED Indications

Sleep	LED off
Advertising	Blinks blue
Connecting	Solid blue
Connected	Blinks blue every 15 seconds
Low Battery	Red instead of blue
Identifying	Blinks white
Updating	Blinks green



Chapter 3 – Pairing Nx Head Tracker with Waves Nx 3D Audio Apps

For detailed instructions on how to pair the Nx Head Tracker device with the Waves Nx [desktop](#) and [mobile](#) apps for 3D audio on headphones, see the apps' user guides:

- [Waves Nx for Windows and Mac – User Guide](#)
- [Waves Nx for Mobile \(iOS and Android\) – User Guide](#)

Chapter 4 – Pairing Nx Head Tracker with the Nx Virtual Mix Room Plugin

To use the Nx Head Tracker device with the Nx Virtual Mix Room plugin, you must first pair them. This is done from a dedicated **head tracking application** which opens and closes automatically when you open and close the plugin. For head tracking to be enabled, the application must remain open. If the application is closed, head tracking will stop. This will not affect the plugin itself or your DAW in any way; you can simply restart the head tracking application and re-establish head tracking.

4.1 Head Tracking Application – Bluetooth Tracker Tab



- **Device List** – This list will show all available Nx Head Tracker devices. Please note that the current version of the Nx Virtual Mix Room plugin only supports **one** Nx Tracker device at a time. Future updates of the plugin will support multiple Nx Head Trackers.
- **Connect (checkbox)** – Check or uncheck this box in order to connect or disconnect an Nx Head Tracker device that appears in the device list.
- **Refresh Device List** – This control will erase the list and rescan for Nx Head Tracker devices.
- **Automatic Connect** – This control is On by default. When On, the application will create a connection automatically with any Nx Head Tracker device it detects. When Off, the application will automatically detect Nx Head Tracker devices and add them to the list, but the user will have to initiate the connection using the connect button in the list. It is advised

to select Off when there are several available Nx Trackers on different systems, in order to have better control of which system works with each Nx Head Tracker.

- **Open Bluetooth Settings** (Windows only) – This will open the system Bluetooth settings window. You must first pair the Nx Head Tracker in your system's Bluetooth settings before the head tracking application can detect it.

The following controls are currently disabled, and will be available in future updates:

- **Rename** – This control will let you rename your Nx Head Tracker device. The name is permanent and the device will advertise itself by the given name.
- **Identify** – This control will make the Nx Head Tracker device blink white. This is helpful to identify a certain device among several.
- **Update** – This control will initiate FW updates to the Nx Head Tracker's firmware. A message will appear when a firmware update is available for your Nx Head Tracker device.

4.2 Pairing Instructions

1. Open the Nx Virtual Mix Room plugin. The head tracking application will open automatically.
2. In the head tracking application, go to the Bluetooth Tracker tab.
3. Power on the Nx Head Tracker. Make sure your computer's Bluetooth is on and that it supports Bluetooth Low Energy (BLE).

4. **Mac:**

The Nx Head Tracker device will automatically be recognized and added to the list of devices showing in the Bluetooth Tracker tab. Mark the Connect check box and see the numbers under Tracking Data start to change as the Nx Head Tracker moves.

Windows:

Open your computer's Bluetooth settings and pair it with the Nx Head Tracker. Once paired, the Nx Head Tracker device will automatically be recognized and added to the list of devices showing in the Bluetooth Tracker tab. Mark the Connect check box and see the numbers under Tracking Data start to change as the Nx Head Tracker moves.

5. In the Nx Virtual Mix Room plugin, under the Tracking Device menu, select the Nx Head Tracker. The head in the plugin will start to move according to the Nx Head Tracker.
6. Connect the Nx Head Tracker to the top-center of the headphone arc, with the Nx logo facing forward. The L and R icons at the sides of the Nx Head Tracker device should correspond to the L and R of your headphones. Inaccurate positioning of the Nx Head Tracker will result in inaccurate head tracking.

4.3 Setting up an Nx Session with Multiple Nx Tracker Users

Several Nx Head Tracker devices can be used by several people, simultaneously. This lets engineers and artists work collaboratively within the same Nx mixing environment, with an individual Nx and head tracking experience for each listener.

Example 1: Mixing session with three mix engineers monitoring through Nx with three Nx Head Trackers

1. Route the mix to a master aux bus.
2. Send the master aux bus to the main output bus and to three other auxes for Nx monitoring. We will call these auxes “Nx aux 1, 2, and 3.”
3. Route each of the Nx auxes to separate headphone outputs (i.e., Nx aux 1 to headphone out 1 /2, Nx aux 2 to headphone out 3/ 4, and so on).
4. Open an Nx plugin on each of the Nx auxes.
5. If the WavesHeadTracker application is not open, open it now. Power up the three Nx Head Trackers.
6. Connect the Nx Head Trackers.

Mac: The Nx Head trackers are detected automatically and added to the list of devices in theWavesHeadTracker application. Check the Connect checkbox.

Windows: Click the “Open Bluetooth Settings” button and pair the three Nx Head Trackers. The Nx Head Trackers will be detected automatically and added to the list of devices in the WavesHeadTracker application. Check the Connect checkbox.

7. Use the WavesHeadTracker application to assign each Nx Head Tracker a unique name. This helps to identify the devices.
8. For each Nx plugin instance, select one of the Nx Head Trackers from the Tracking Device menu. **Make sure that on each Nx aux channel you select the Nx Head Tracker device that is attached to the corresponding headphones.** Incorrect selection will result in the movements of one Nx Head Tracker listener affecting the sound orientation of another listener.

Once all the Nx Head Trackers are assigned to the correct Nx instances and are routed separately to the listeners’ headphones, all three mix engineers will hear the same mix through Nx (each with individual head tracking).

Example 2: Recording session with one engineer and two musicians

1. Create a master track bus and two auxiliary buses for the musicians' headphone monitor mix. We will call these buses "Nx Master" and "Nx Monitor 1 and 2."
2. Route the Nx Master bus to the engineer's headphones, and the Nx Monitor buses 1 and 2 to two separate headphone outputs (one for each musician).
3. Open an Nx plugin instance on each of the Nx buses.
4. If the WavesHeadTracker application is not open, open it now. Power up the three Nx Head Trackers.
5. Connect the Nx Head Tracker.

Mac: The Nx Head trackers are detected automatically and added to the list of devices in the WavesHeadTracker application. Check the Connect checkbox.

Windows: Click the "Open Bluetooth Settings" button and pair the three Nx Head Trackers. The Nx Head Trackers will be detected automatically and added to the list of devices in the WavesHeadTracker application. Check the Connect checkbox.

6. Use the WavesHeadTracker application to assign each Nx Head tracker a unique name. This helps to identify the devices.
7. For each Nx plugin instance, select one of the Nx Head Trackers from the Tracking Device menu. **Make sure that on the "Nx Master," you select the engineer's head tracker, and on "Nx Monitor 1 and 2," you select the Nx Head Tracker that is used by the musician receiving this monitor bus.** Incorrect selection will result in the movements of one Nx Head Tracker listener affecting the sound orientation of another listener.

Once all the Nx Head Trackers are assigned to the correct Nx instances and are routed separately to the listeners' headphones, each musician will hear his own monitor mix with Nx and head tracking, and the mix engineer will hear the master mix with Nx and head tracking through his headphones

4.4 Updating the Firmware

The Nx Head Tracker has the capability to update its firmware over Bluetooth. The device leaves the factory with firmware version 1.17v1.13. As we continue to develop the Nx device, firmware updates will be released. When a firmware update is available, a message will appear in red in the Device Status window. Follow these instructions to update the firmware:

1. Turn on your Nx Head Tracker device. Find your device in the IMU Device Name column of the WavesHeadTracker application and check **Connect**.



2. Confirm that the firmware version on the Nx Head Tracker device is 1.17v1.13. You will see red text indicating that a Firmware update is available.
3. Click the **Update** button and follow the update dialog box:
 - o **Mac:**

- Press **Update**.
 - Press **OK** to proceed to the firmware update.
 - The Nx Head Tracker device will restart. A green light indicates that the device is in update mode. The WavesHeadTracker application will automatically connect to the device and start updating the firmware. The update will require a few minutes. A dialog box will indicate that the update has finished successfully.
 - The Nx Head Tracker device will then automatically restart. Its LED will turn blue.
 - You will now need to reconnect the device by repeating the same actions as in Step 1 (above). Once the device is reconnected, the firmware version number changes to 1.19v1.13.
- **Windows:**
- Press **Update**.
 - Press **OK** to proceed to the firmware update.
 - Press **OK** to open the Bluetooth Settings menu. The Nx Head Tracker device will restart automatically. Its light will be green, indicating that the device is in update mode. It will be advertising by the name “Nx Update.”
 - Pair the “Nx Update” device through the Bluetooth Settings menu. Once the “Nx Update” device is paired, the WavesHeadTracker application will start updating the firmware. The update will require a few minutes to complete. A dialog box will indicate that the update has finished successfully.
 - Return to the Bluetooth Settings menu and un-pair both the “Nx Update” and the “Nx Tracker” devices.
 - Restart the Nx Head Tracker device by pressing the power button (using a long press to turn off, or a short press to power back on).
 - Once again, pair the Nx Head Tracker device in the Bluetooth Settings menu. Once this is done, you will see the firmware version change to 1.19v1.13.

4. Once the Nx Head Tracker's firmware is updated to 1.19v1.13, turning off the device (long button press) will put the device in sleep mode (indicated by the LED flashing red). In this mode, the battery should last over six months.

IMPORTANT NOTE!

- If the firmware update fails or is interrupted, the device will default back to the firmware version it had before. In such a case, please retry the update.
- It is advised to start the firmware update with a full battery. If the battery is too low, there is a slight risk that the update process will fail in a way that will make the device unusable. The application has a safety threshold that will not let the update process start when the battery is too low, but using a full battery is still advised when updating. If your Nx Head Tracker becomes inoperable after a firmware update, please contact our technical support team at <http://www.waves.com/contact-us>.
- During the update, try not to handle the device; leave it stationary on a flat surface.
- You can update only one Nx Head Tracker device at a time.
- During the update, make sure that **no other system is using the WavesHeadTracker application in close proximity**. Two nearby systems using the application at the same time can interfere with each other.

Chapter 5 – Troubleshooter

Problem	Possible Solutions
Head does not move in GUI – no tracking	<ol style="list-style-type: none"> 1. Verify head tracking is 'on' in plugin GUI. 2. Check if tracker app is running. 3. Play audio through the plugin (plugin on CPU). 4. Check tracking rate box in plugin GUI.
Head tracking application is not running	<ol style="list-style-type: none"> 1. Restart head tracking through the plugin. 2. Inactivate/reactivate plugin.
Nx Head Tracker will not connect	<ol style="list-style-type: none"> 1. Make sure your computer's Bluetooth is turned on. 2. Make sure your computer's Bluetooth is at least BT4.0 and supports BLE. 3. Make sure the head tracking application is running. 4. Make sure the Nx Head Tracker device is on and with a good battery. 5. Windows only: Make sure the Nx Head Tracker is paired to your computer in the system Bluetooth settings menu.
Nx Head Tracker loses connection and doesn't move smoothly	<ol style="list-style-type: none"> 1. Try using a new battery. 2. Try to have the Nx Head Tracker and the Bluetooth receiver closer together. 3. If you are using a BT-USB dongle on a desktop, connect the dongle on the front panel or on an extension for better BT reception.
Nx Head Tracker is tracking my movements but in wrong directions	<ol style="list-style-type: none"> 1. Make sure the Nx Head Tracker is mounted on the top of the headphone arc with the logo side facing forward. L & R on the Nx Head Tracker should correspond to L & R on your headphones. Inaccurate positioning of the Nx Head Tracker will result in inaccurate head tracking.
Head tracking shows some latency	<ol style="list-style-type: none"> 1. Try to increase the tracking rate (optimally up to 30 fps). 2. Try to lower the buffer size. 3. In some DAWs, to run in the user-set buffer size, Nx need to be on the master buss or on a live input AUX path.