SOUND DEVICES

Sound Devices Astral HH

Digital Wireless Handheld Transmitter
with **GainForward, SpectraBand, and NexLink**

User Guide v8.20

Contents

Contents 2
Chapter 1: Introduction 4
1.1 Key Features 4
1.2 SpectraBand 5
1.3 NexLink Wireless Transmitter Control 5
1.4 GainForward 5
1.5 Safety Information 6
Chapter 2: Interface Description 7
2.1 External 7
2.2 Internal 8
2.3 LEDs 9
2.4 Home Screen 10
Chapter 3: Power 12
3.1 Battery Installation 12
3.2 Powering the Astral HH 13
3.3 Battery Level 13
3.4 Charging 13
Chapter 4: Identify (ID) 14
Chapter 5: Menus 15
5.1 RF 15
5.2 Pair 15
5.3 Record 16
5.4 Mode 16
5.5 Privacy 16
5.6 Settings 17
5.6.1 Control Ring Settings 17
5.6.1.1 Control Ring Type 17
5.6.1.2 Control Options 17
5.6.1.3 Assignable Commands 18
5.6.1.4 LEDs (Control Ring) 18
5.6.1.5 LED (Control Ring) Options 19
5.6.2 Display Settings 19
5.6.3 System Settings 20
Chapter 6: Tuning the Astral HH and Receiver 22
Chapter 7: Audio Levels 23

Chapter 8: Recording WAV Files 23
Chapter 9: Jamming Timecode 24
Chapter 10: File Transfer 25
Chapter 11: Updating Firmware 25
11.1 To update Astral HH firmware using a Micro-SD Card: 25
11.2 To update Astral HH firmware wirelessly from an Astral Receiver: 25
Chapter 12: Astral Remote App 27
Chapter 13: SD-Utility 28
Chapter 14: Accessories 29
14.1 Included Accessories 29
14.2 Optional Accessories 29
Chapter 15: Swapping Astral HH Mic Capsules 30
15.1 Incompatible Microphone Capsules 30
Chapter 16: Swapping Astral HH Control Rings 31
Chapter 17: Frequency Authorization 32
Chapter 18: Astral HH Specifications 33
Chapter 19: CD1 (Capsule) Specifications 36
Chapter 20: Servicing the Astral HH 37
Chapter 21: Warranty 37
Chapter 22: Patents 37
Chapter 23: Legal Notices 38
Chapter 24: Declaration of Conformity 41

Chapter 1: Introduction

The Sound Devices Astral HH Digital Wireless Handheld Mic is an exciting new option in the growing line of Sound Devices Astral® transmitters. In one attractive unit, the Astral HH has unrivaled sound quality, RF performance, and durability. Perfect for international tours or traveling gig to gig, the Astral HH can operate in any locale around the world. Available with Sound Devices' new calibrated dynamic mic capsule and natively compatible with any other manufacturer's mic capsule, it's the best of all worlds for the artist, the sound mixer, and the RF tech.
The Astral HH incorporates state-of-the-art features, such as NexLink remote-control, Long-Range modulation, GainForward, SpectraBand and more, to produce the best sound quality possible. The Astral HH is compatible with the Astral ARX32, Astral ARX16, and Astral ARX8 digital receivers.

1.1 Key Features

- Worldwide UHF tuning range from 470 MHz-1525 MHz.
- 10+ hours (10mW) runtime from standard 18650 Li-Ion battery
- Patent-pending wideband RocketAntenna design not affected when gripping mic at bottom.
- Reversible Capsule Collar - threaded to accept Shure- or Sennheiser-compatible mic capsule, no adapters needed.
- CD1 high-precision, fully calibrated dynamic mic capsule for incredible mic-to-mic consistency.
- Long-distance NexLink remote control from the Astral ARX32, Astral ARX16, Astral ARX8 and Web App.
- State-of-the-art 100% digital modulation delivers the longest transmission distance of any system on the market.
- RF Power output from 2 mW to 100 mW.
- GainForward Architecture – no gain control. Adjust gain at the mixer.
- Full 10 Hz - 20 kHz audio bandwidth.
- High headroom, ultra quiet mic preamp with > 140 dB dynamic range.
- Sunlight readable e-Paper screen for control and display. Display persists with no batteries
- USB-C for pairing with the Astral ARX32, Astral ARX16, Astral ARX8 and for charging.
- Bluetooth for remote control from Astral Remote iOS/Android App and for wireless pairing.
- Built-in battery charging via USB-C.
- Inductive wireless charging (coming soon).
- Multiple, easily interchangeable Control Rings.
- Quick-change sleeve for easy decoration or complete change of mic appearance. Only 3 pieces, quick and easy to swap.
- Extremely rugged construction using die-cast magnesium, turned stainless steel, and high-impact strength polycarbonate.

Note: Terminology used throughout this guide: Astral Receiver refers to the Astral ARX32, Astral ARX16, and Astral ARX8 multichannel receivers.

1.2 SpectraBand

The Astral HH features SpectraBand, a technology that enables the Astral HH to tune over a super wide range of 470-1525 MHz.
Tuning within this range varies by country. For instance:

In the USA, the available frequency ranges are:

- The entire UHF TV band (470-608 MHz)
- The 600 MHz guard band (614-616 MHz)
- The 600 MHz duplex gap (653-663 MHz)
- The 900 MHz ISM band (902-928MHz)
- The 950 MHz STL band (941.5-960 MHz)
- The 1.5 GHz AFTRCC band (1435-1525 MHz), with an appropriate license.

In the UK, the available frequency ranges are:

- The core UK UHF TV band (470-702 MHz)
- The 800 MHz duplex gap (823-832 MHz)
- The 800 MHz guard band (863-865 MHz)
- The DME bands (961-1015 MHz, 1045-1075 MHz, 1105-1154 MHz), with an appropriate license.
- The IMT band (1518-1525 MHz)

Please see https://www.sounddevices.com/available-frequencies/ for further detailed information on which frequency ranges are available for each country.

1.3 NexLink Wireless Transmitter Control

NexLink is a proprietary 2.4 GHz bidirectional wireless data link technology that allows multiple Astral HH transmitters to be controlled, monitored, and timecode synced from an Astral Receiver over long distances. NexLink is designed to offer robust and reliable control over distances far exceeding that of the wireless audio transmission, even in the presence of Wi-Fi, Bluetooth, and other 2.4 GHz interference. Astral Receivers can pair with up to 64 NexLinked transmitters at a time.

1.4 GainForward

The Astral HH transmitter supports GainForward, a technology that eliminates the need to adjust audio gain at the wireless transmitter. Audio levels from the transmitter are controlled either directly at the mixer's trim control or at the wireless receiver. If the source is too soft or too loud, adjust the transmitter's audio level with a downstream mixer's digital trim gain control. There is absolutely no noise penalty when the audio path remains 100% digital (i.e., Astral transmitter -> Astral receiver, Astral receiver digital audio output -> mixer digital audio input). Read more about GainForward at:
https://www.sounddevices.com/gainforward-explained/

1.5 Safety Information

Follow all safety and operating instructions in this guide.

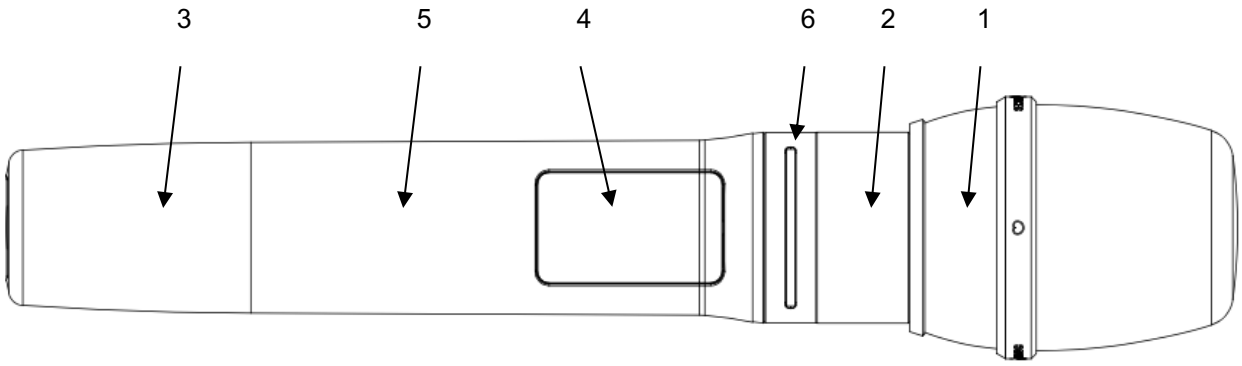
RETAIN INSTRUCTIONS: These safety and operating instructions should be retained for future reference.
HEED WARNINGS: All warnings on the product and in the operating instructions should be adhered to.
FLAME SOURCE: The product should be situated away from any naked flames such as candles, open fires or gas, oil or wood burning heaters.
BATTERY WARNINGS: The product should be used only of the type described in these operating instructions or as marked on the product.

- Do not open, crush, modify, disassemble, heat above 140°F (60°C), or incinerate.
- Danger of explosion if battery incorrectly replaced. Replace only with same or equivalent type.
- Do not short circuit; may cause burns or catch fire.
- Do not subject to extremely low air pressure.
- Battery misuse may result in explosion and/or the leakage of flammable liquid or gas.
- Dispose of batteries properly. Check with local vendor for proper disposal of used battery packs.
- Do not immerse the battery in liquid such as water, beverages, or other fluids.
- Do not insert batteries with polarity reversed.
- Never put batteries in mouth. If swallowed, contact your physician or local poison control center.
- Keep away from small children.
- Pack the battery securely for transport.

ATTACHMENTS / ACCESSORIES: Only use attachments and /or accessories specified and approved by the manufacturer.
CLEANING: The product should only be cleaned with a soft dry cloth.
SERVICING: The user should not attempt to service the product beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

Chapter 2: Interface Description

2.1 External



1: Interchangeable Microphone Capsule
Supplied with Sound Devices CD1 cardioid mic capsule. Unscrew counterclockwise to remove and gain access to the reversible capsule collar. The mic capsule manufacturer is briefly displayed in the ePaper display immediately after boot-up or several seconds after a capsule is screwed on.

2: Reversible Capsule Collar
Easy-to-reverse collar provides threads compatible with Sound Devices, Shure, and Sennheiser microphone capsules. See Incompatible Microphone Capsules. Use the included hex screwdriver to unscrew the 3x screws. Remove, reverse, and reinstall the collar. Secure in place using the 3x screws removed earlier.

3: Antenna Section
470 - 1525 MHz omni RocketAntenna. Designed to be immune from signal loss due to hand covering lower part of mic body.

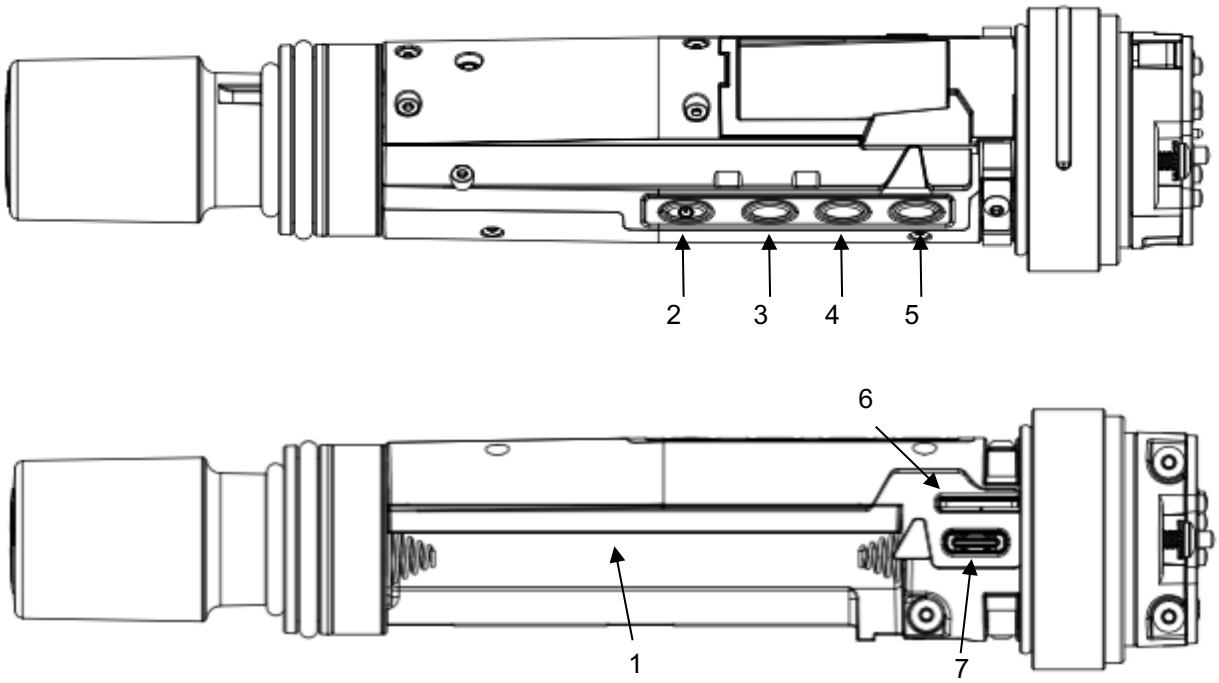
4: ePaper Display
For display of status, settings and menus. The Home screen displays Name, Frequency, Battery Remaining level, Modulation Type, RF Power, Record Status, Mute status, Privacy, Power Off, and Charging status. Displayed information persists even when batteries are removed. On boot-up, the display briefly shows the firmware version and fitted mic capsule type. The display incorporates a backlight for viewing in low light conditions. It turns on when booting up and when viewing any Menu. When in the Home Screen, press the power button to toggle the backlight on/off. The display illuminates different colors to indicate various operational states - setup in the Settings > Display > Disp LEDs menu. The display illuminates blue when no capsule is connected, and the mic is on.

5: Body Shell
Unscrew counterclockwise to access the battery compartment, Micro SD card slot, power button, ePaper display navigation buttons, and USB-C port.

6: Control Ring
The Astral HH offers four easily swappable Control Ring options allowing the user to choose the handheld's physical buttons/switches that suit their show's needs:

- **Control 0 (supplied as standard):** No external switch control; Incorporates a 6-segment multicolor LED bar for status display.

- **Control 1 (optional):** A single programmable button with multicolor status LED. Can be set to None, Mute, Record, Aux Latch, Aux Hold, RF On/Off, Power On/Off, Control, PTT.
- **Control 3 (optional):** Three programmable buttons each with multicolor status LED. Each can be set to None, Mute, Record, Aux Latch, Aux Hold, RF On/Off, Power On/Off, Control, PTT.
- **Control Switch (optional):** Latching slide switch with 6-segment multicolor LED bar. Can be set to None, Mute, Record, Aux Latch, RF On/Off, Power On/Off, Control.



2.2 Internal

Access the battery compartment, Micro SD card slot, power button, ePaper display navigation buttons, and USB-C port by unscrewing the microphone shell counterclockwise.

1: Battery Compartment
Accepts one Sound Devices XL-B18650 battery. Ensure battery is inserted with the positive terminal and negative terminals facing the correct way. See Battery Installation.

2: Power Button
The red button is used to power the Astral HH on/off or exit from a menu.

- Power On = Press and release button.
- Power Off = Press and hold button until ‘Off’ is displayed.
- When in a menu, press to back out of that menu.
- When in the Home Screen, press to toggle the display backlight on and off.

3: Left Button
Press to navigate up or increase values.

When in the Home screen and in the RF Only mode, press the left button to jump straight to the RF Power menu.
When in the Home screen and in Rec Only mode, press the left button to jump straight to the Record menu.

4: Select Button
Press to select menu items and store values.

5: Right Button
Press to navigate down or decrease values.

6: Micro SD Card Slot
Insert a Micro SD for recording purposes. Format the card from the Settings > System > Format menu.

7: USB-C
For charging, pairing with Astral Receivers, and mounting to a computer for file transfer.

2.3 LEDs

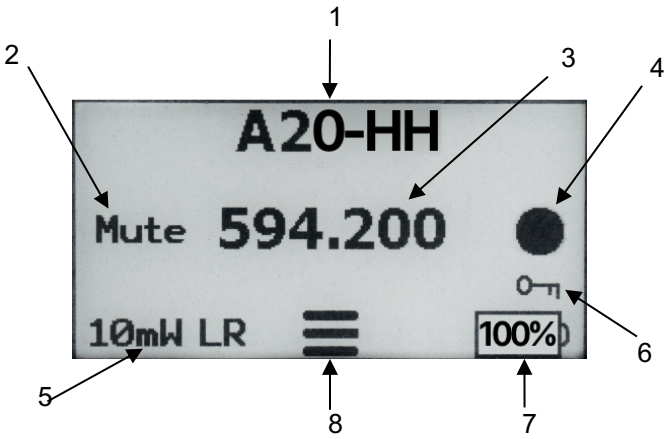
When enabled to do so, the ePaper display and Control Ring multicolor LEDs illuminate to indicate various operational states. The LEDs can be set to show preferred information and can be disabled when needing to be inconspicuous. See Settings for how to configure LEDs.

Setting	LED Color	Interface
Audio	Green (variable intensity)	Display
Battery	Green, Orange, Red, Flashing Red	Display, Control Ring
Charging	Flashing Green	Display
Mute On	Blue	Display, Control Ring
RF Off	Purple	Display, Control Ring
Recording	Red	Display, Control Ring
Aux On	Yellow	Display, Control Ring
Pairing	Flashing Blue	Display, Control Ring
ID'ing	Alternating Red, Green, Blue	Display, Control Ring
Firmware updating	Alternating Red, Green, Blue	Display, Control Ring
Timecode jamming	Blue pulse once per second, 10 times	Display
Timecode held when powered down	Blue pulse once per second	Display

2.4 Home Screen

The Home Screen is the default screen when the Astral HH is powered up. It displays the following information:

- Transmitter Name
- RF Frequency
- RF Power, Modulation
- Battery Level and Charging Status
- Mute Status
- Record Status (Rec Mode only)
- Privacy Status
- Firmware version and mic capsule type (displayed for several seconds after power up)



1: Handheld Transmitter Name
Displays the Astral HH's name (max.12 alphanumeric characters), making it easy to identify the user of the handheld transmitter (e.g. vocalist, presenter, etc.). The name is used as the volume name of the formatted Micro SD card, and it is also embedded as track name metadata within the recorded files. By default, the Astral HH's serial number is assigned as the transmitter's name. The name can be edited wirelessly using an Astral Receiver, or Astral Remote. The Home Screen's Name and Frequency fields can be swapped. Select in the Settings>Display>Name menu.

2: Mute Status
Mute is displayed when the handheld's audio is muted.

3: Frequency / MHz
Displays the current transmission frequency.

4: Record Status
The record icon is displayed when the transmitter is recording.

5: RF Power and Modulation Type
Displays the current RF power and modulation type, LR (Long Range), Std (Standard), T&M (Test & Measurement). When RF Mode is enabled and the handheld's shell is removed, tap the left button to jump directly to the RF Power menu.
Displays 'OFF' when the RF Power Level is set to Off via the Menu, via a Control Ring or via a NexLink command.

6: Privacy Status
The key icon is displayed when a privacy key is set.

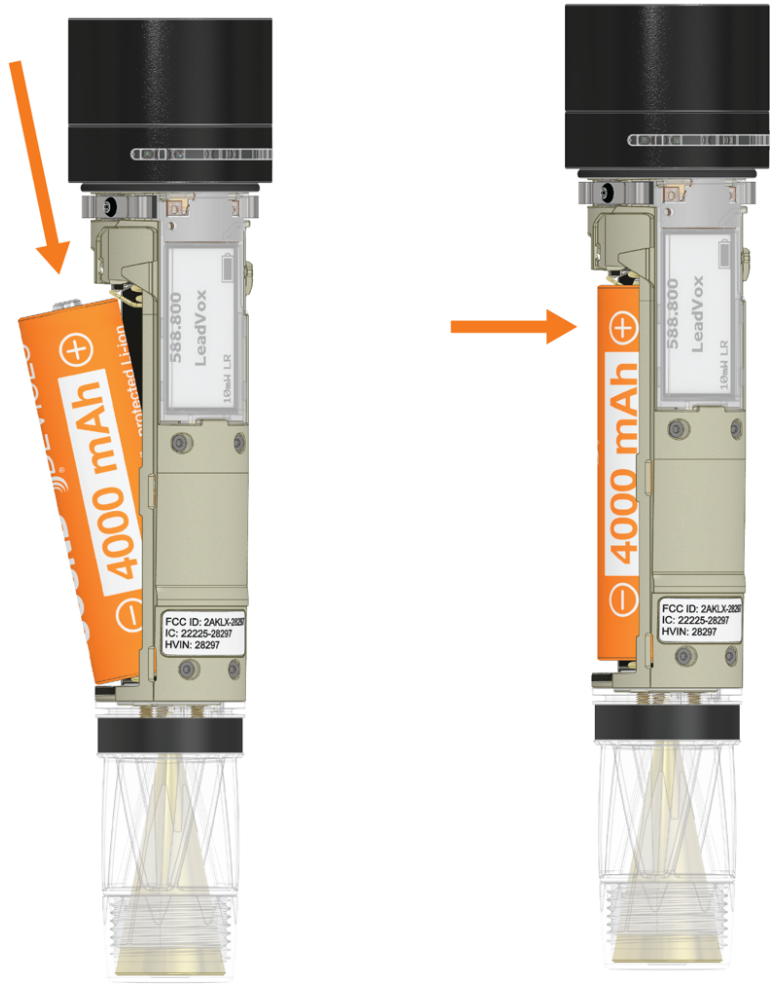
7: Battery and Charging Status
Displays battery level. Displays USB when powered from a USB power pack.
When charging, a lightning icon is displayed next to the battery level.

8: Menu Icon
Remove the shell and press the middle button to access the menu. The display light is enabled when accessing the menu.

Chapter 3: Power

3.1 Battery Installation

The Astral HH is powered from a Sound Devices XL-B18650 Li-ion battery.



1. Insert the ⊖ end of the battery first, and push down firmly.

2. Gently slide the ⊕ end of the battery under the top contact.

See a battery installation video below

3.2 Powering the Astral HH

1. Remove the handheld's shell.
2. Insert the 18650 battery into the battery compartment as shown above.

   Note: *When inserting the battery, the Astral HH will remain powered off or will automatically power up depending on what the power state was when the Astral HH was previously shut down.*

3. Press the red button to power on the Astral HH. Alternatively, a Control Ring button or switch can be programmed to power the Astral HH on and off.
4. After powering up, the Astral HH's firmware version and mic capsule type are briefly displayed.
5. To power off the Astral HH:
   a. Press and hold the red button until the Control Ring's LEDs go from 6 green LEDs to none.
   b. Press and hold any Control Ring button that is assigned to the Power command until the display stops flashing green.
   c. If the 'Control-Sw' Control Ring option is installed and the switch is assigned to the Power command, simply slide the switch to the Off position.
6. When powered off, the name and frequency continue to be displayed, even without a battery inserted.
7. To take out the battery, remove the shell, then lift out the battery, positive side first.

3.3 Battery Level

Remaining battery % is displayed in the Home screen's bottom right corner. Display LEDs and Control Ring LEDs can also be set to monitor remaining battery power. LED colors define remaining battery power as follows:

- Green = ≥ 30% remaining
- Orange = 30% remaining
- Red = 10% remaining
- Flashing Red = 0% remaining. RF and Audio are disabled at 0%

Approximate battery run times are detailed in the following table:

RF Power/mW	Total Run Time
2	~ 12 hours
10	~ 10 hours
20	~ 9 hours
40	~ 7 hours
100	~ 6 hours
Recorder only	~ 15 hours

3.4 Charging

Charging from USB-C
Remove the shell and connect a USB power source to the Astral HH USB-C port.
When the battery is charging, the display flashes green and the charging icon comes on in the bottom right corner of the Home screen.

Note: *RF transmission is disabled during charging via USB-C*

Charging using an off-the-shelf Battery Charger
The Astral HH's XL-B18650 battery can also be charged using off-the-shelf battery chargers. We recommend the XTAR VC8S or for faster charging, the Vapcell S4 Plus v3.

Chapter 4: Identify (ID)

When the Astral HH receives an ID command from an Astral receiver or the Astral Remote app:

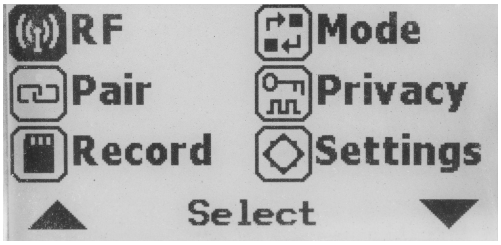
- Display LEDs flash red, green, and blue
- Control Ring LEDs flash red, green, blue

This helps to identify which Astral HH is which when many are being used.

Chapter 5: Menus

Access the Menu to make changes to the Astral HH's settings. To access the Menu, remove the Astral HH shell and press the middle button. The display illuminates white to facilitate navigation of the menu in low light conditions. If no button has been pressed for 30 seconds, the menu automatically exits back to the Home Screen. When in the Menu:

- Navigate menu items using the up/down arrows (left/right buttons).
- Select an item using the middle Select button.
- Back out of a submenu by using the red button.



5.1 RF

Select the RF Menu to change the following settings:

- **Frequency**: Manually enter RF frequency. Frequency can be set from 470 MHz to 1525 MHz in 25 kHz steps.
- **RF Power:** Sets the Astral HH's RF transmit power. It is recommended to use the lowest RF power that gives the desired range. The lower the RF power the longer the battery run time.
    - 2mW Low Power
    - 10mW Normal Power
    - 20mW High Power
    - 40mW Very High Power*
    - 100mW Extra High Power*

    ** Note: Only available when the 'Extra High RF Power' option is enabled in Astral Remote or an Astral Receiver and there are no restrictions due to the current country of operation.*

- **Modulation:** Sets the modulation mode. Ensure the receiver is set to the same modulation as the transmitter. Select from:
    - Long Range Provides best range at the expense of a little extra latency (3.9 ms)
    - Standard Standard range with lowest latency (2 ms)
    - T&M Flattest frequency and phase response for test & measurement applications (7 ms latency)
- **RF On / RF Off:** Toggles RF On and Off.

5.2 Pair

Select to wirelessly pair the Astral HH with the Astral Remote app or an Astral Receiver. Pairing is required to enable remote control of the Astral HH. During pairing, the display shows 'Pairing. Please wait …' and flashes blue. Once paired, the screen exits back to the Home screen. To cancel pairing, press the red button. See the Astral Remote and Astral Receiver User Guides for further information on how to pair. Pairing with an Astral Receiver can also be accomplished by connecting the USB-C port to the USB port on the receiver.

5.3 Record

The Record menu provides the ability to start and stop recording when in REC Only mode. Select Record to start recording. ‘Record’ changes to ‘Stop’ during recording. Select Stop to end recording. When set to RF Only mode, recording is not permitted. See Recording WAV Files for more information.

5.4 Mode

There are two modes of operation:

- RF Only: Astral HH operates as a transmitter
- REC Only: Astral HH operates as a recorder

Access the Mode menu to change the mode of operation.

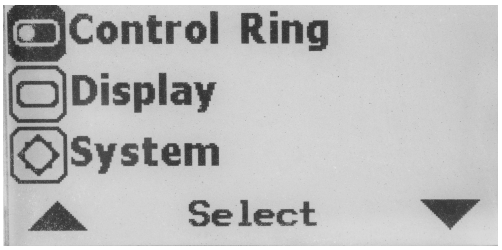
5.5 Privacy

Creates a randomly generated 4-digit privacy key to prevent unauthorized reception of the Astral HH’s transmitted signal. An Astral Receiver must be set to the same 4-digit key to decode and receive the RF audio.

- **New Key:** Select ‘New Key’ then press ‘Set’ to generate a random 4-digit key. When the key is set, the home screen displays the privacy key icon.
- **Clear:** Select ‘Clear’ then press ‘Set’ to clear the key to 0000.

5.6 Settings

The Astral HH Settings menu provides access to the Control Ring, Display, and System setting sub-menus.



5.6.1 Control Ring Settings

Select Control Ring to access the Control Ring settings menu. To physically install a different Control Ring, see Swapping Control Rings.

5.6.1.1 Control Ring Type

Highlight the top left setting and press Select to bring up the Control Ring type menu. Select the Control Ring type that is physically installed. This ensures that only the applicable LED and button settings for the installed Control Ring are listed in the menu. Selecting the wrong Control Ring type may result in unpredictable behavior. When selecting a new Control Ring type, its parameters are set to default.

5.6.1.2 Control Options

The control options available are dependent upon the selected Control Ring type. A control may be a button (press/release action) or a switch (slide action). Select a Control to assign its function. The following table describes the options available for each Control Ring Type:

Control Ring Type	Available Controls	Assignable Commands	Control Ring LED Options
Control-0	No controls	None	Off Mute Rec Battery RF
Control-1	1 button	None Mute Record Aux Hold, Aux Latch Power Ctrl RF PTT	Off Follow Button
Control-3	3 buttons: • Button-L • Button-C • Button-R	None Mute Record Aux Hold, Aux Latch Power	Off Follow Button

		Ctrl RF PTT	
Control-Sw	1 slide switch	None Mute Record Aux Latch Power Ctrl RF	Off Follow Sw Mute Rec RF Aux Battery

5.6.1.3 Assignable Commands

None: No function. This is the default setting for all controls.
Mute: Toggles mute on and off
Rec: Toggles record on and off (REC Only Mode)
Aux Hold, Aux Latch: Aux is typically used to activate a talkback audio path. The Aux command instructs the Astral Receiver to re-route the received Astral HH audio to a different output.

- Aux Hold: Aux is active only while the button is held. It is deactivated when released. This option is not available for the Control Switch option.
- Aux Latch: First press activates Aux, second press deactivates it. In the case of the Control Switch, Aux is activated when the switch is in the On position and deactivated when in the Off position.

Power: Turns the Astral HH on or off. A button must be held > 1 sec to power down. Note that when a control is assigned to Power, then Control Ring LEDs that are set to Follow Button or Follow Sw display battery level.
Ctrl (Control): The Ctrl (control) command can be used to trigger a GPIO output on the Astral-Opto (when connected to the ARX32) or Macro on an Astral Receiver. Ctrl commands can be used to initiate macros on a DigiCo console or activate an alarm or LED or other peripheral over GPIO. There are four selectable Ctrls, one for each control.

- Button-L Ctrl
- Button-C Ctrl
- Button-R Ctrl
- Control-Sw Ctrl

All assignable commands except for 'None' send the Ctrl command even if it is a command local to the mic e.g. mute.

Set to 'None' to fully disable the control and prevent sending its Ctrl.

Set to 'Ctrl' to only send the Ctrl command but not instigate any function locally on the mic.

RF: Toggles RF power on and off.
PTT: Press to talk. Mic is muted except when the button is pressed.

Note: Concerning the Control-Sw Ring Option: The Control Switch's physical slide switch setting is overridden by commands coming from the Astral HH interface, Astral Receiver (via NexLink) or Astral Remote (via Bluetooth), which will leave the switch in the incorrect physical position. As such, it is necessary to move the control switch first to the physical position that reflects the Astral HH's current state before it will perform its next command.

5.6.1.4 LEDs (Control Ring)

Select Control Ring > LEDs to configure the Control Ring LEDs. Each Control Ring type has a different LED configuration:

- Control-0: Multi-color 6-segment LED bar
- Control-1: One button with multi-color LED
- Control-3: Three buttons each with a multi-color LED
- Control-Sw: One slide switch with multi-color 6-segment LED bar

5.6.1.5 LED (Control Ring) Options

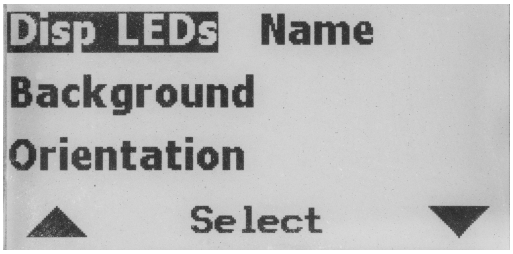
Off: Control Ring LEDs are disabled. This is the default setting.
Follow Button, Follow Sw (Control-1, Control-3, and Control-Sw ring types only):
Follows the action of the activated button / switch.
For example, if the Control-3 ring is installed:

- If Button-L is assigned to the Rec command, then when activated, the Button-L's LED turns red.
- If Button-C is assigned to the Mute command, then when activated, the Button-C's LED turns blue.
- If Button-R is assigned to the Power command, then when the Astral HH is on, the Button-R's LED shows battery level (green, orange, red, flashing red).

Mute (Control-0 and Control-Sw ring types only): 6-segment LED turns blue when muted.
Rec (Control-0 and Control-Sw ring types only): 6-segment LED turns red when recording.
Battery (Control-0 and Control-Sw ring types only): 6-segment LED displays battery level.
RF (Control-0 and Control-Sw ring types only): 6-segment LED turns purple when RF is off.
Aux (Control-Sw ring types only): 6-segment LED turns yellow when Aux is activated.

5.6.2 Display Settings

The Display menu offers settings related to the ePaper display.



1. **Display LEDs:** Multicolor LEDs that can be configured to indicate various Astral HH states. Settings include:

    - Off (default) = Display LEDs are disabled.
    - Battery = Displays battery power remaining. See Power.
    - Audio = Displays microphone's audio level and mute status (Factory default).
    - Mute = Displays blue when muted.
    - Record = Displays red when recording.
    - RF Off = Displays purple when RF is turned off.
    - Aux On = Yellow when Aux is activated (not available when Control-0 ring is selected).

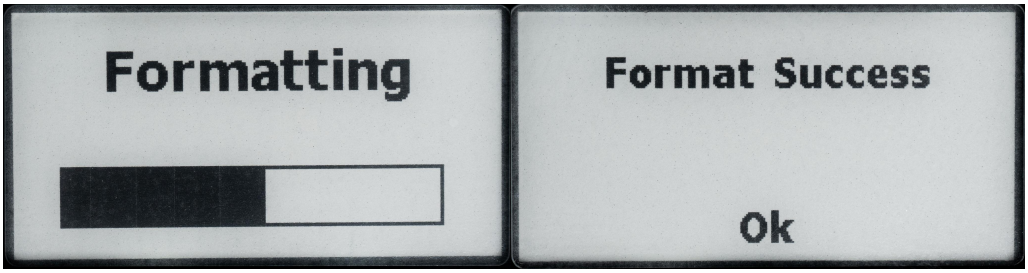
        The following states override the Display LED indications above:
        - Display flashes blue when pairing.
        - Display flashes green when charging.
        - Display pulses blue once on the zero-frame when the Astral HH is off and timecode count is active. Timecode continues counting accurately for 4 hours.
        - Display pulses blue for 10 seconds on the zero-frame when TC is jamming.
        - Display alternates red, green, and blue when the Astral HH is being ID'd.
        - Display rapidly flashes red, green, and blue when Astral HH firmware is being updated.

2. **Background:** Selects between light and dark display background colors.
3. **Orientation:** Allows the display to be flipped so it can be read easily in either orientation.
    - Normal
    - Flipped
4. **Name:** Selects whether the transmitter name is shown at the top or the center of the Home screen.

5.6.3 System Settings

Select to access the System menu.

- **Format: Select to format the inserted Micro SD card. Select 'OK' to start the formatting process. Once formatting is complete, 'Format Success' is displayed.**
    - Micro SD Cards 64 GB or more are formatted as ExFAT. Recommended for long duration recording.
    - Micro SD Cards 32 GB or less are formatted as FAT32 (4GB file size limit). Max file recording time is approximately 6 hours.



- **Info:** Displays the following information:
    - Serial number
    - Firmware version
    - FPGA version
    - Tuning bandwidth

- **Restore:** Select Restore to restore the Astral HH to factory default settings. Once default settings have been loaded, the Astral HH returns to the Home Screen.

- **Time:** Sets the Astral HH's date/time clock used for file creation time. Use the up/down arrows to set values for each field and the Set button to move to the next field. Pressing Set on the Minutes field saves the date/time setting.

    Note: When connection is established via NexLink, the date/time setting is overwritten by the Astral Receiver's date/time. When connection is established with Astral Remote and the transmitter's NexLink is disabled, the date/time setting is overwritten by the mobile device's date/time.

- **Misc:** Various miscellaneous settings including:
  - Resume Record: Automatically resumes recording on power up [On/Off]
  - Extra RF Power: Allows access to the extra high 40 mW and 100 mW RF power settings [Allow/Off]

- **FrAuth:** Displays Frequency Authorization information. Only displayed if a Frequency Authorization is loaded. See Frequency Authorization for further details.

Chapter 6: Tuning the Astral HH and Receiver

RF signals transmitted by the Astral HH transmitter are received by all Astral Receivers. Set the same modulation and frequency on the transmitter and receiver. See the Astral ARX32, Astral ARX16, and Astral ARX8 User Guides for more details.

Frequency
The Astral HH transmits on frequencies ranging from 470 MHz – 1525 MHz. The frequencies available are determined by geographic location and whether you have loaded a unique Frequency Authorization (FA) code issued by Sound Devices to unlock the use of restricted frequencies. FAs can only be loaded via NexLink from an Astral receiver

Because the Astral digital RF transmission is inherently immune to intermodulation, multiple Astral Digital Wireless transmitters can be used simultaneously on nearby adjacent frequencies without worry of intermodulation interference. Frequency spacing between RF channels can be as little as 400 kHz. When operating in the 902-928 MHz Band, it is recommended to separate channel frequencies by at least 1 MHz.

Set the Astral HH's transmit frequency from the RF > Frequency menu or via the Astral Remote App or Astral Receiver via NexLink.

Modulation
The Astral HH offers three types of modulation, Long Range, Standard, and T&M (Test and Measurement). Long Range modulation has better sensitivity resulting in more robust performance in challenging RF environments. Standard modulation has lower latency (2ms versus the 3.9ms of Long Range). T&M modulation has been specifically optimized for the flattest frequency and phase response possible for test and measurement applications. The Modulation setting must match between the Astral HH and Astral receivers, for the transmitted signal to be received.

RF Power
RF power is the strength of the transmitting signal. The Astral HH offers the following RF power settings:

- 2 mW
- 10 mW
- 20 mW
- 40 mW *
- 100mW *

*These RF Power settings only appear when System > Misc > 'Extra RF Power' is set to 'Allow'.

Set the Astral HH's RF Power from the RF > RF Power menu or via the Astral Remote App or Astral Receiver.

Available RF Power settings are dependent on the Country of operation and local frequency restrictions. The Country must be set using Astral Remote and an Astral Receiver.

In situations where the transmitter is relatively close to the receiver, the 2 mW setting offers good range and best battery life. For most common wireless microphone applications, the 10 mW setting provides excellent range. In situations where body absorption may be an issue or extended range is required, the 20, 40, and 100 mW settings can be helpful, but be aware that the higher the power, the lower the battery runtime.

Chapter 7: Audio Levels

The Astral HH transmitter supports GainForward, a technology that eliminates the need to adjust microphone preamplifier gain at the wireless transmitter. Audio levels from the transmitter are controlled either directly at the mixer's digital trim control or at the wireless receiver. If the source is too soft or too loud, adjust the transmitter's audio level with a downstream mixer's digital trim gain control. There is absolutely no noise penalty when the audio path remains 100% digital, i.e. Astral transmitter -> Astral receiver, Astral receiver digital audio output -> mixer digital audio input. Read more about GainForward at: https://www.sounddevices.com/gainforward-explained/

The Astral HH's audio signal level can be viewed in the ePaper display when Disp LEDs is set to Audio. A variable intensity green LED indicates signal level.

Adjusting Audio of the Astral HH Signal from an Astral Receiver
See the Astral ARX32, Astral ARX16 and Astral ARX8 User Guides for details.

Adjusting Audio of the Astral HH Signal from the 8-Series
The Astral HH signal can be received and fed to an 8-Series mixer-recorder by docking an Astral ARX16 or Astral ARX8 to the 8-Series. Gain and low-cut settings are managed on the 8-Series. See the mixer-recorder User Guides for more information.

Chapter 8: Recording WAV Files

The Astral HH records 32-bit float Broadcast WAV (under 4 GB) or RF64 WAV (over 4 GB) files at 48 kHz sampling rates to a removable micro-SD card (not included). 32-bit float files are recorded such that gain decisions can be made after recording. Because of the Astral HH's high dynamic range (>140 dB), audio levels are never too high or too low. Learn more about 32-bit float at: https://www.sounddevices.com/a20-mini-32-bit-float-recording/

The Astral HH must be set to REC Only Mode. It is not possible to simultaneously record and transmit.
Astral HH recording can be initiated in several ways including from the:

- Astral Remote App
- Astral Receivers via NexLink
- Astral HH Record menu or via a Control-1, Control-3, or Control-Sw Ring.

The file name format of recorded files is "transmitter name-YYMMDDHHMMSS.WAV".
For example, if the Astral HH name has been changed to "Barney" and a recording is created on July 10, 2021 at 09:30 (24-hour format), the resulting file is named Barney-210710093000.WAV. All files are recorded at the root of the Micro SD card.

About recording formats

- The Astral HH records 1-ch monophonic 32-Bit float / 48 kHz wav files.
- For long duration recording, use a minimum Micro SD card size of 64 GB. Micro SD cards 64 GB or more are formatted as ExFAT which can record file sizes > 4 GB. Recordings that exceed 4 GB are automatically converted from standard broadcast wav to RF64 wav format.
- Micro SD cards 32 GB or less are formatted as FAT32 which have a 4 GB file size limit. When the 4 GB limit is reached, recording stops.
- For optimal performance, it is recommended to only use Micro SD cards offering a minimum of Class 10 write speed.

Chapter 9: Jamming Timecode

In REC Only Mode, Astral HH recorded files are stamped with a start timecode value to make it easy to synchronize the audio with picture. The timecode can be wirelessly 'jammed' into the Astral HH's internal timecode generator via NexLink from an Astral Receiver. The timecode frame rate is automatically deciphered from the incoming timecode. If timecode is not jammed, the Astral HH starts rolling timecode from 00:00:00:00 when it is powered on.

Jammed timecode is held accurately for four hours after powering the Astral HH off, and one hour after the battery has been removed. This allows time to swap batteries without having to re-jam timecode. When the Astral HH is powered off with a charged battery inserted, the display pulses blue on the 00-frame crossing to indicate timecode is being held accurately.

When not being used with an Astral Receiver, timecode can be jammed into the Astral HH via USB-C. To jam timecode via USB-C, connect a valid LTC source using one of the optional accessories, Sound Devices XL-TC-USBC-LEMO or XL-TC-USBC-BNC, to the Astral HH USB-C port. Timecode is automatically jammed once a valid LTC source is connected. After a successful timecode jam, the display LED pulses blue ten times on the 00-frame crossing.

For more information about the Astral HH timecode accessory cables visit:
https://www.sounddevices.com/product/xl-tc-usbc-bnc/
https://www.sounddevices.com/product/xl-tc-usbc-lemo/

Astral HH can also jam timecode directly from 8-Series Mixer-Recorders using a standard USB-C to USB-A cable. Connect the Astral HH to the 8-Series USB-A port. Enter the 8-Series Menu > Timecode/Sync > Jam Astral Transmitter then select Jam. The 8-Series Jam Astral Transmitter menu displays the current timecode frame rate and values for the 8-Series and Astral HH and displays the difference between the two units.

Chapter 10: File Transfer

Transfer recorded files to a computer via USB-C or Micro SD card.
The Astral HH connects via USB-C to a computer as an ExFAT-formatted mass storage device. Copy WAV files from the Astral HH to the computer. When file transfer is complete, eject the drive from the operating system and disconnect USB.

Recording must be stopped on the Astral HH before connecting to the computer. While connected to a computer, RF transmission, audio, and recording are disabled.

Chapter 11: Updating Firmware

Register your Astral HH to stay informed of firmware updates. https://my.sounddevices.com/

Firmware can be updated via micro-SD card or wirelessly from an Astral receiver (ARX16, ARX8, or ARX32).

11.1 To update Astral HH firmware using a Micro-SD Card:

1. Insert a micro-SD card in the Astral HH. Micro SD card is not included.
2. Format the micro-SD card. See Settings > System > Format.
3. Connect the Astral HH to the computer for file transfer using a USB-C cable.
4. Download the Astral HH firmware PRG file from:
   https://www.sounddevices.com/download/?prod=Astral HH
5. Copy the PRG file to the root of the Astral HH micro-SD card
6. Eject the Astral HH from the computer.

At this point, 'Updating firmware. Please wait …' is displayed and all the LEDs "dance" to indicate the firmware update is in progress. Once the update is completed, "Update successful. Rebooting …' is displayed and the Astral HH reboots. The firmware update can take a few minutes to complete.

When the firmware update completes, the Astral HH automatically deletes the PRG file from the media. The firmware version is displayed for a few seconds in the Home Screen after powering up. It is also displayed in the Astral Remote App's Manage Devices view, the Astral HH's Settings>System>Info menu, and in the Astral Receiver's TX List >TX View.

11.2 To update Astral HH firmware wirelessly from an Astral Receiver:

It is not necessary to have a micro-SD card installed in the transmitter when updating firmware wirelessly.

1. Download the transmitter firmware PRG file from:
2. https://www.sounddevices.com/download/?prod=Astral HH
3. Copy the PRG file to the root of a USB thumbdrive.
4. Insert the USB thumbdrive in the Astral receiver's USB-A or C port.
5. Install charged batteries in the transmitter and ensure the transmitter is paired to the Astral receiver.
6. Select Firmware Update in the Astral receiver's System menu to display a list of all paired transmitters
7. Select the transmitter to be updated from the list.
8. Tap the Start Update button in the Astral Receiver's OLED 4.
9. Select the Astral HH firmware update file from the drop-down list, then tap OK at the confirmation popup.
10. Ensure the transmitter is kept nearby the Astral receiver during the update.

At this point, the Astral receiver starts sending the firmware update file to the transmitter wirelessly. OLED 3 displays the sending progress in %. The Astral HH's ePaper display shows "Receiving Update. Please wait …'.

Note that it can take a few minutes to send the file and another minute or so for the transmitter to update.

Once the complete file has been successfully received by the Astral HH, 'Updating firmware. Please wait …' is displayed and all the LEDs "dance" to indicate the firmware update is in progress. The Astral receiver's OLED 3 displays 'Updating'. Once the update is completed, "Update successful. Rebooting …' is displayed on the ePaper display and the Astral HH reboots.

The firmware version is displayed for a few seconds in the Home Screen after powering up. It is also displayed in the Astral Remote App's Manage Devices view, the Astral HH's Settings>System>Info menu, and in the Astral Receiver's TX List >TX View.

Chapter 12: Astral Remote App

Astral Remote is an application for Android/iOS phones and tablets designed to pair with Astral transmitters (Astral HH, Astral TX, Astral Mini). All transmitter settings are conveniently controlled using Astral Remote.

Please refer to the Astral Remote User Guide for complete operational details
https://sounddevices.com/guides/a20-remote

When connected via Bluetooth LE to the Astral HH, Astral Remote offers control and display of all Astral HH parameters, including:

- Power on and off the Astral HH
- Monitor battery status
- Frequency, Modulation, and RF power setup
- Monitor audio signal presence
- Microphone mute
- Transport controls (Record, Stop)
- Timecode display
- Media formatting and monitoring of remaining space
- Astral HH settings (Mode, Display, LEDs, Control Rings, and more)
- Group control of powering, recording, and more

Download and install the Astral Remote app from the Google Play Store or Apple App Store.
https://www.sounddevices.com/a20-remote

Astral Remote has the following minimum operating requirements: Android tablets and phones running Android 8+, or iPad and iOS devices running iOS 13+. The device must have Bluetooth and Location Services on to connect with an Astral Transmitter.

IMPORTANT: The mobile device's location is used to determine available frequencies and RF power levels of the Astral HH transmitter. The Country setting is automatically set using the mobile device's Location Services.

The mobile device's system date and time are used in the metadata of recorded files.

Chapter 13: SD-Utility

Sound Devices SD-Utility is a companion application for MacOS and Windows that supports Sound Devices wireless products. This application can be used to process files recorded by Astral transmitters to be more suited to a given workflow. Astral transmitter 32-bit float, 48 kHz, monophonic WAV, 2ch polyphonic WAV, and RF64 WAV files can be imported, renamed, snipped by timecode values, converted to 24-bit, conformed to a CSV Sound Report, exported as monophonic or polyphonic WAV, and more.

Please refer to the SD-Utility User Guide for complete install and operational details
https://sounddevices.com/guides/sd-utility

Chapter 14: Accessories

14.1 Included Accessories

The Astral HH package includes the following:

- Astral HH handheld microphone/transmitter fitted with:
  - Control 0 Ring
  - CD1 cardioid mic capsule
  - Reversible Capsule Collar
- Astral HH Pouch
- Astral HH Counterweight-30
- 1x XL-B18650 Li-ion battery x2 pack (with small soft case)
- Mic clip
- Threaded adapter for mic clip
- USB-A to C cable, 1 Meter

14.2 Optional Accessories

- Control 0 Ring
- Control 1 Ring
- Control 3 Ring
- Control Switch Ring
- Reversible Capsule Collar
- CD1 cardioid mic capsule
- Replacement orange and black internal capsule windscreens.
- Microphone shell
- Carry pouch
- Counterweight

Note: Accessory bundles are also available.

Chapter 15: Swapping Astral HH Mic Capsules

The Astral HH is compatible with a wide array of different mic capsules:

- Sound Devices CD1 cardioid mic capsule (included)
- Almost any capsule that fits a Shure wireless handheld transmitter
- Almost any capsule that fits Sennheiser wireless handheld transmitter

Sound Devices CD1 and Sennheiser compatible threading

Shure and other mic capsule compatible threading

The mic capsules are easily removed by simply unscrewing them counterclockwise.
The Reversible Capsule Collar can be flipped over to support either Shure or Sennheiser-threaded mic capsules. Sound Devices and Sennheiser mic capsules have the same thread, indicated by the thicker orange ring inset. Shure mic capsules have a different thread, indicated by the thinner orange ring inset.

Reversing the capsule collar to accommodate a mic capsule with different thread type:

1. With the left hand gripping the Reversible Capsule Collar and the right hand gripping the mic capsule, unscrew the mic capsule by rotating counterclockwise.
2. Remove the Reversible Capsule Collar's three screws using a #0 Phillips screwdriver.
3. Remove the collar, flip it over and screw back into place using the three screws removed earlier.
4. Screw on the mic capsule.

15.1 Incompatible Microphone Capsules

- Lewitt W9

Chapter 16: Swapping Astral HH Control Rings

The Astral HH has 4 easily swappable Control Ring options:

- Control 0 Ring (supplied as standard)
- Control 1 Ring (optional)
- Control 3 Ring (optional)
- Control Switch (optional)

Swapping out one Control Ring for another:

1. With the left hand gripping the Reversible Capsule Collar and the right hand gripping the mic capsule, unscrew the mic capsule by rotating counterclockwise.
2. Remove the Reversible Capsule Collar's three screws using a #0 Phillips screwdriver.
3. Remove the collar.
4. Remove the microphone shell: rotate it clockwise a few degrees, then pull it out a few mm until it won't pull any further, then rotate it back while continuing to pull.
5. Slowly ease off the Control Ring from the microphone's body noting that the ring's inner rubber sleeve will offer some resistance to removal. Slightly wiggle the ring to help ease off the Control Ring.
6. Before fitting the new Control Ring, place the Reversible Capsule Collar on top of the new ring making sure that the collar fits over the ring's protruding inner rubber sleeve.
7. While gripping the Reversible Capsule Collar and Control Ring together with one hand, ease them on to the microphone's body making sure to:
    a. Align the ring correctly with the microphone body's switch contacts.
    b. Align the collar's 3 mounting holes with the mic body's screw holes.
8. Screw the Reversible Capsule Collar back into place using the three screws removed earlier.
9. Screw on the mic capsule.
10. Power up the Astral HH.

In the Settings > Control Ring menu, select the applicable Control Ring type. Each time Control Ring Type is changed, its settings revert to factory defaults so be sure to configure buttons, switches, and LEDs as required.

Chapter 17: Frequency Authorization

The wireless system operator needs to be aware of local regulations and comply with all applicable laws regarding operation of wireless devices.

Frequency Authorizations allow the unlocking of restricted frequencies that require proof of a valid license before they can be used. Once a license has been granted, please contact Sound Devices (RF_Request@SoundDevices.com) to obtain the necessary authorization. An Authorization ID and License Code will be generated by Sound Devices based on the license provided. The Authorization ID or License Code can be entered into the Astral Remote App and then synchronized with an Astral Receiver and its paired Astral transmitters.

An example of a frequency band requiring an unlock code in the United States is 1435-1525 MHz. Program Making and Special Events (PMSE) wireless operators typically call 1435-1525 MHz the "AFTRCC band". AFTRCC stands for Aerospace and Flight Test Band Coordinating Council. This organization coordinates a number of frequency bands for use by air and spacecraft in the United States. This includes 1435-1525 MHz.

Per the United States Federal Communications Commission (FCC) rules, wireless microphones are allowed as secondary users in the 1435-1525 MHz AFTRCC band. This is detailed in the FCC Part 74 rules:

https://www.ecfr.gov/current/title-47/chapter-I/subchapter-C/part-74

One section of the Part 74 rules that's of particular interest to operators seeking an AFTRCC band license is 74.803(d):

https://www.ecfr.gov/current/title-47/chapter-I/subchapter-C/part-74#p-74.803(d)

Generally speaking, a wireless operator needs to show they've used all other available spectrum before the AFTRCC will consider a license request in the 1435-1525 MHz range. If granted, the license is normally assigned for a specific location and a specific time range.

Sound Devices encourages all wireless operators to obtain a Part 74 license, and specifically to make sure applicable parts of the 600 MHz and 950 MHz range are included with their license application. This can help show an operator is aware of the available spectrum and is utilizing it responsibly.

More information on Part 74 licensing can be found here: https://www.local695.com/fcc-licensing/

Chapter 18: Astral HH Specifications

Specifications are subject to change without prior notice. For the latest information available on all Sound Devices products, visit our website: www.sounddevices.com.

Frequency Range
- 470 to 1525 MHz
- Transmitter tunable in 25 kHz steps
- Available frequencies are dependent on region

RF Output Power
- Off, 2 mW, 10 mW, 20 mW, 40 mW, 100 mW

Modulation Mode
- Proprietary, 100% digital RF modulation
- Standard, Long Range, T&M, selectable

Latency - Mic capsule to Receiver analog output
- Standard (2 ms)
- Long Range (3.9 ms)
- T&M (7 ms)

Antennas
- RF: 470-1525 MHz : Built-in
- NexLink 2.4 GHz: Built-in

Audio Frequency Response
- 10 Hz - 20 kHz, +/- 1 dB re 1 kHz

Audio Input (Mic capsule)
- Compatible with Sound Devices CD1, Shure-style, or Sennheiser-style mic capsule
- Bias power with Shure-style: 5V
- Bias power with Sennheiser-style: 10V
- EIN: -128 dBV (A-weighting)
- Dynamic range: >140 dB

Counterweight
- Internal counterweight available to balance out heavy microphone capsules

Menu and Controls
- e-Paper screen highly visible in direct sunlight
- e-Paper screen holds display image without battery power
- Power button and three navigation buttons protected inside battery compartment

Control Rings
- 4 types available:
    - Control 0, supplied with Astral HH, no buttons
    - Control 1, optional, one push button
    - Control 3, optional, three push buttons
    - Control Switch, optional, one slide switch

- User changeable

Remote Control
- Astral Remote Android, iOS, and iPad app via Bluetooth 5.2 LE
- Astral Receivers via super-long-range NexLink

Recording Media
- Micro SD Card. Minimum Class 10 write speed.
- Media format: ExFAT for Micro SD cards 64GB or more, FAT32 for Micro SD cards 32GB or less.
- Selectable Record Only Mode or RF Only Mode. Recording is not possible when transmitting audio.

Recording File Format
- 32 Bit Float, 48 kHz, Monophonic wav
- Broadcast WAV (<4 GB), RF64 WAV (>4 GB)

Timecode
- Sync wirelessly over NexLink (from an Astral Receiver)
- 0.2 ppm accuracy
- Holds accurate clock for four hours while powered down with batteries inserted, holds for one hour without batteries via internal supercapacitor
- Auto Jams timecode via USB-C connector or wirelessly via NexLink
- Frame Rates: 23.98, 24, 25, 29.97 DF, 29.97 ND, 30 DF, 30 ND
- Frame rates are auto detected from incoming source

USB-C
- Mass Storage (USB-C): USB 2.0 high speed for file transfer of internal microSD card recordings
- Charges XL-B18650 Li-ion battery inserted in Astral HH
- Pairing to Astral Receivers

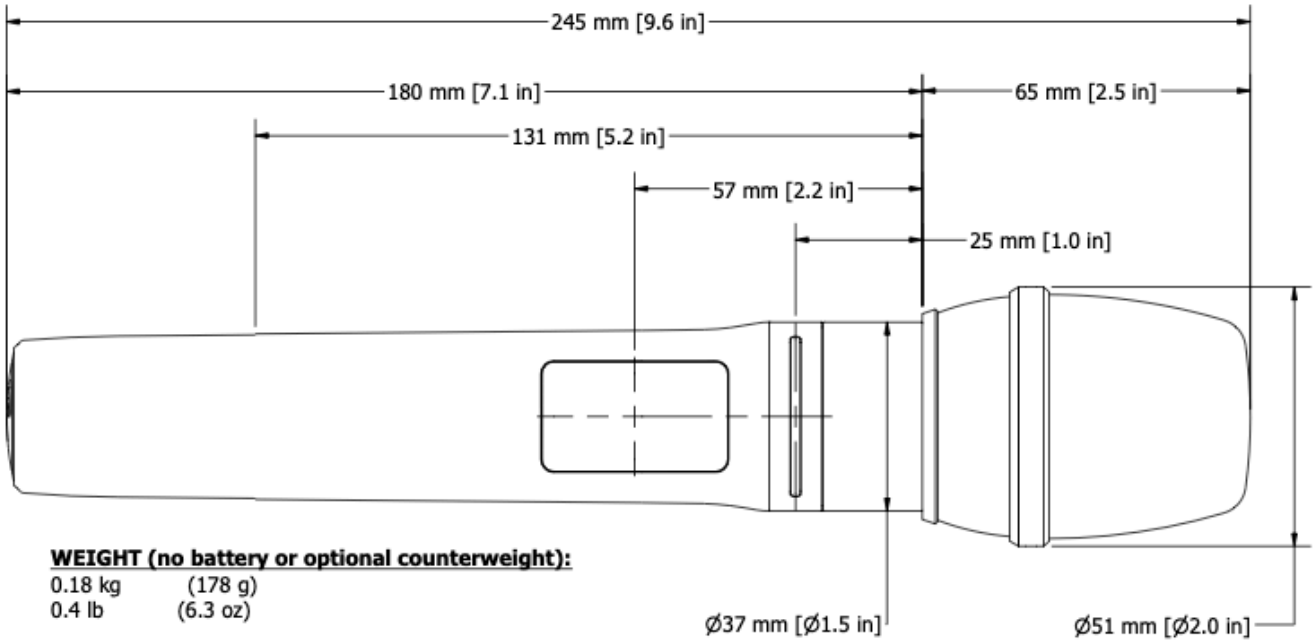
Powering
- Sound Devices XL-B18650 Li-Ion battery

Battery Charging
- Built-in charging of battery via USB-C
- Inductive charger dock for Astral HH (coming soon)
- Battery can be removed and charged in any standard 18650 battery charger

Battery Runtime
- Approx 10 hours at 10 mW RF output power. See Power
- Unit can be completely powered off remotely via app or via NexLink to extend battery runtime

Environmental
- Operating: -10° C to 40° C
- Storage: -40° C to 85° C

Dimensions and Weight



WEIGHT (no battery or optional counterweight):
0.18 kg (178 g)
0.4 lb (6.3 oz)

WEIGHT (with battery):
0.23 kg (226 g)
0.5 lb (8.1 oz)

OPTIONAL COUNTERWEIGHT:
0.03 kg (30 g)
0.1 lb (1.1 oz)

DIMENSIONS HxWxD (no mic head):
18.0 cm x 3.7 cm x 3.7 cm (180 mm x 37 mm x 37 mm)
7.1 in x 1.5 in x 1.5 in

DIMENSIONS HxWxD (with mic head):
24.5 cm x 5.1 cm x 5.1 cm (245 mm x 51 mm x 51 mm)
9.6 in x 2.0 in x 2.0 in

Chapter 19: CD1 (Capsule) Specifications

Type

- Dynamic mic, moving coil
- Dual diaphragm, dual voice coil
- 100% swept and calibrated at factory

Polar pattern

- Cardioid

Frequency response

- 50 – 15,000 Hz

Output Impedance

- 600 ohms

Sensitivity

- -54 dBV/Pa

Max Acoustic Level

- >140 dB SPL

Chapter 20: Servicing the Astral HH

Do not attempt to service the Astral HH. The case is water-sealed and needs to have new gaskets installed if taken apart. The internal parts are microscopic and not user serviceable. Please send to Sound Devices for any service needs. https://service.sounddevices.com/contact-support/

Chapter 21: Warranty

Sound Devices, LLC warrants the items listed above against defects in materials and workmanship for a period of ONE (1) year from date of original retail purchase. Users who register their product directly with Sound Devices Technical Support using the online form or by phone, will receive an additional ONE (1) year of warranty coverage, extending the complete warranty period to TWO (2) years from the date of original retail purchase. To extend the warranty coverage period, registration must be completed within the initial ONE (1) year warranty period. Products must be purchased through authorized Sound Devices resellers to qualify for Warranty coverage. Damage resulting from the opening of a Sound Devices product or attempted repairs by a non-authorized Sound Devices repair technician will void warranty coverage.

This is a non-transferable warranty that extends only to the original purchaser. Sound Devices, LLC will repair or replace the product at its discretion at no charge. Warranty claims due to severe service conditions will be addressed on an individual basis.

THE WARRANTY AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE. SOUND DEVICES, LLC DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. SOUND DEVICES, LLC IS NOT RESPONSIBLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING FROM ANY BREACH OF WARRANTY OR UNDER ANY OTHER LEGAL THEORY. Because some jurisdictions do not permit the exclusion or limitations set forth above, they may not apply in all cases.

For all service, including warranty repair, please contact Sound Devices for an RMA (return merchandise authorization) before sending your unit in for repair. Product returned without an RMA number may experience delays in repair. When sending a unit for repair, please do not include accessories, including SSD drives, CF cards, batteries, power supplies, carry cases, cables, or adapters unless instructed by Sound Devices. Sound Devices repairs and replacements may be completed using refurbished, returned or used parts that have been factory certified as functionally equivalent to new parts.

Sound Devices, LLC

Services Repair RMA #XXXXX

E7556 State Road 23 and 33
Reedsburg, WI 53959 USA
Telephone: +1-608-524-0625

Chapter 22: Patents

This product is covered under patent number 9,654,134 and other patents pending.

Chapter 23: Legal Notices

Product specifications and features are subject to change without prior notification. Read and fully understand this manual before operation.

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The "wave" logo is a registered trademark of Sound Devices, LLC. Windows is a registered trademark of Microsoft Corporation in the U.S. and other countries. Bluetooth LE is a registered trademark of Bluetooth SIG, Inc. Android is a registered trademark of Google. iPad, iPhone, and iOS are registered trademarks of Apple Inc. All other trademarks herein are the property of their respective owners.

FCC Conformity

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.
Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

Warning! Any modifications or changes made to this device, unless explicitly approved by Sound Devices may invalidate the authorization of this device. Operation of an unauthorized device is prohibited under Section 302 of the Communications act of 1934, as amended, and Subpart 1 of Part 2 of Chapter 47 of the Code of Federal Regulations.

This device must be installed by trained professionals.

FCC Radiation Exposure Statement
This equipment complies with FCC radiation exposure limits set forth for portable conditions. In accordance with FCC requirements, this device has been tested and found to comply with radiation exposure limits for portable conditions.

ISED Radiation Exposure Statement
This equipment complies with ISED radiation exposure limits set forth for portable conditions. This device complies with the Specific Absorption Rate (SAR) requirements at a distance of 0mm.

Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour des conditions portables. Cet appareil est conforme aux exigences de débit d'absorption spécifique (SAR) à une distance de 0 mm.

FCC Interference Statement
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

Industry Canada Conformity
This device operates on a no-interference, no-protection basis. Should the user seek to obtain protection from other radio services operating in the same TV bands, a radio license is required. For further details, consult Innovation, Science and Economic Development Canada's Client Procedures Circular CPC-2-1-28, Voluntary Licensing of Licence-Exempt Wireless Microphones in the TV Bands.
This Device complies with Industry Canada Licence-exempt RSS standard(s). Operation is subject to the following two conditions:
1) this device may not cause interference, and
2) this device must accept any interference, including interference that may cause undesired operation of the device.

Conformité à Industrie Canada

Cet appareil opère selon un régime de non-brouillage et de non-protection. Si l'utilisateur veut obtenir une protection par rapport aux autres services radio opérant sur les mêmes bandes TV, une licence radio est requise. Pour plus de détails, veuillez consulter le circulaire de procédures client CPC-2-1-28 Délivrance de licenses sur une base volontaire pour les microphones sans
fils exempts de licence exploités dans les bandes de télévision, publié par Innovation, Sciences et Développement économique Canada.

Cet appareil est conforme aux normes CNR exemptes de licence d'Industrie Canada. Son fonctionnement est soumis aux deux conditions suivantes:

1) ce dispositif ne peut pas causer d'interférences, et

2) ce dispositif doit accepter toute interférence, y compris les interférences qui peuvent causer un mauvais fonctionnement de l'appareil.

USA White-Space Operation

For USA operation in the 600 MHz guard band (614-616 MHz) and 600 MHz duplex gap (657 - 663 MHz) users are advised to register with and check a white-space database to determine available channels prior to operation at a given location.

Chapter 24: Declaration of Conformity

CE

Manufacturer's Name: Sound Devices, LLC
Manufacturer's Address: E7556 State Road 23 and 33 Reedsburg, WI 53959 USA

We, Sound Devices, LLC, declare under our sole responsibility that the product

Product Name:	Astral HH
Model Number:	28297
Description:	Digital Wireless Handheld Microphone Transmitter

is in conformity with the essential requirements of the following relevant Union harmonization legislation:

Radio Equipment Directive (RED)	2014/53/EU
Low Voltage Directive	2014/35/EU
RoHS Directive	2011/65/EU

The following harmonized standards and/or normative documents were applied:

Health & Safety (Article 3.1(a) of RED)	EN 62368-1:2014
	EN 50566:2017
EMC (Article 3.1(b) of RED)	EN 301-489-1 v2.2.3:2019
	EN 301-489-9 v2.1.1:2019
	EN 301-489-17 v3.2.4:2020
RF Spectrum (Article 3.2 of RED)	EN 300 422-1 v2.2.1:2021
	EN 300 328 v2.2.2:2019
	EN 300 440 v2.1.1:2017

Signed for and on behalf of Sound Devices LLC:

Nov 20, 2024

Date	Matt Anderson - Sound Devices, LLC President