WILLIAMSAV

WaveCAST C

Assistive Listening System WF T5C and WF T5CD

USER MANUAL

MAN 281A-1022

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Safety Warnings and Instructions

WARNING! TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

CAUTION! TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER. NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

NOTE: THE FCC REQUIRES THIS DEVICE TO BE USED WITH APPROVED, FCC 15.203 COMPLIANT ANTENNAS AND BE PROFESSIONALLY INSTALLED. REFER TO WILLIAMS AV'S 72 MHz ANTENNA SELECTION INSTALL GUIDE FOR COMPLIANT ANTENNAS FOR THIS PRODUCT.

Precautions:

1. Power – WARNING, BEFORE TURNING ON THE POWER FOR THE FIRST TIME, READ THE FOLLOWING SECTION CAREFULLY. The unit is designed for use only with the line cord of the region in which it will be operated.
2. Voltage Label (Rear Panel) – A label located at the rear panel power connection indicates the DC power input for the unit. The label will read 24VDC. Use the Williams AV TFP 062 power supply for this unit.
3. Do not plug in the input, output, Ethernet, Antenna, or Dante connections while the power switch is switched to the on position.
4. Do not touch the WaveCAST C with wet hands. Do not handle the WaveCAST C or power cord when your hands are wet or damp. If water or any other liquid enters the WaveCAST C cabinet, take the WaveCAST C to qualified service personnel for inspection.
5. Place the WaveCAST C in a well ventilated location. Take special care to provide plenty of ventilation on all sides of the WaveCAST C especially when it is placed in an audio rack. If ventilation is blocked, the WaveCAST C may over heat and malfunction.
6. Do not expose the WaveCAST C to direct sun light or heating units as the WaveCAST C internal components temperature may rise and shorten the life of the components. Avoid damp and dusty places.
7. Care – From time to time you should wipe off the front and side panels and the cabinet with a soft cloth. Do not use rough material, thinners, alcohol or other chemical solvents or cloths since this may damage the finish or remove the panel graphics.

Recycling Instructions

Help Williams AV protect the environment! Please take the time to dispose of your equipment properly.

Product Recycling:
Please do NOT dispose of your equipment in the household trash. Please take the equipment to a electronics recycling center for proper disposal.

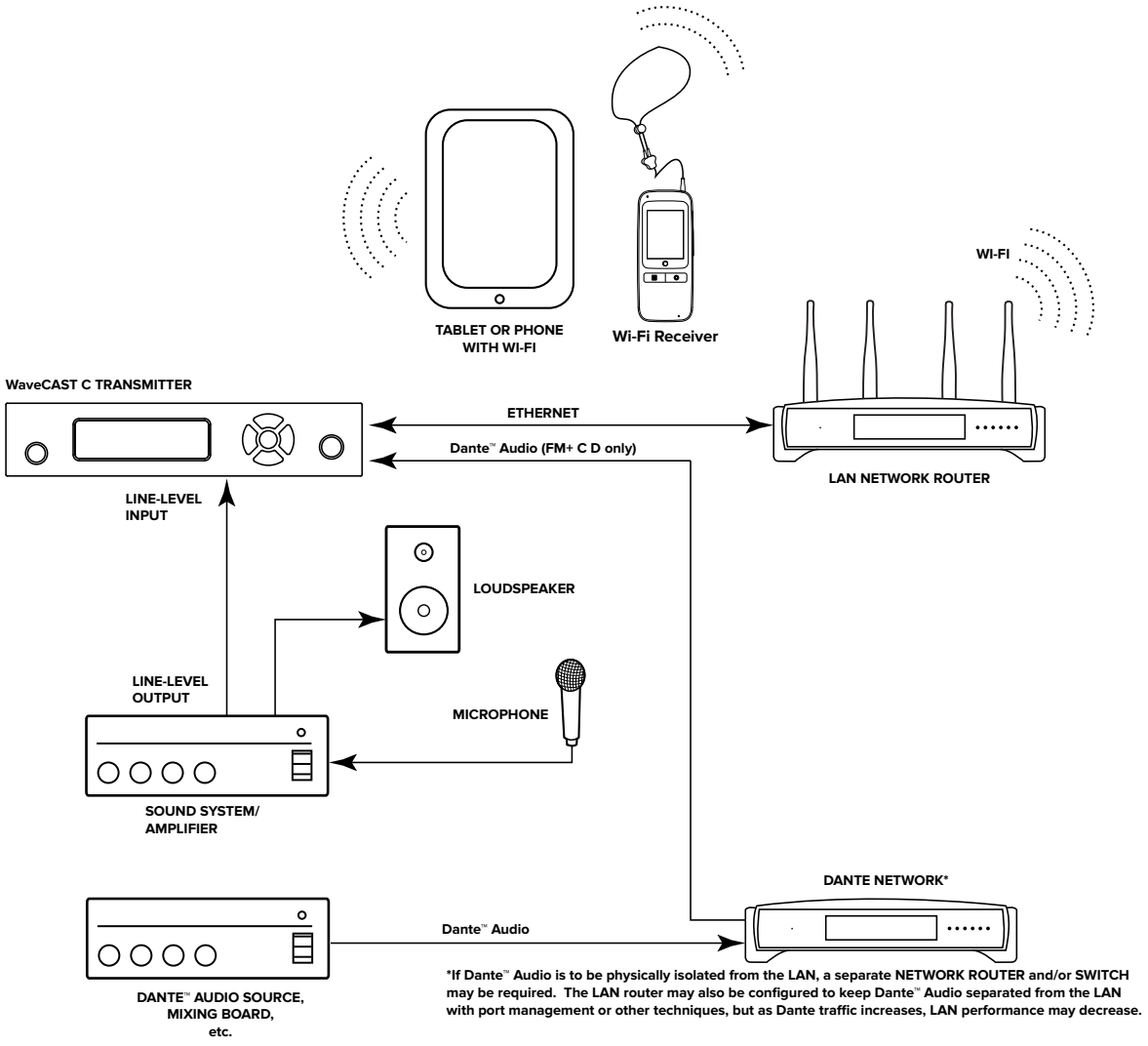
Battery Recycling:
Please do NOT dispose of used batteries in the household trash. Please take the batteries to a retail or community collection point for recycling.

System Overview

The WaveCAST C is designed to support those who want to use their own smartphones and headphones for a more discreet assistive listening experience. Simplicity is also available for those who want a more traditional assistive listening system with a dedicated Wi-Fi receiver and headset. WaveCAST C supports the iOS and Android WaveCAST Apps and the Wi-Fi Receiver.

Developed for hearing assistance in public venues, the WaveCAST C includes a complete audio processor optimized for the needs of hearing impaired people and are easily integrated with an existing sound system, or used with a microphone as a stand-alone system.

The WaveCAST C D unit provides Dante input capability, denoted by the [D] model number.



Quick Setup Instructions

1. Position the WaveCAST C transmitter near the sound system or mixer from which it will receive audio. We do not recommend wall or ceiling mounting, or putting the device on a cart.
2. Connect the power supply to the Power Supply connector located on the back of the WaveCAST C. Press in the power button on the front of the WaveCAST C. The power button should light up. If not, go back and check the power connections.
3. Choose and configure the analog audio source. The audio source must be configured in the menu before plugging the source into the jack to avoid damage to the input circuit. Push the V (DOWN ARROW) button twice to highlight "Audio Source". Push the right button to choose between ANALOG LINE IN, MIC, PHANTOM MIC +12V, Dante, or 400 Hz Test Tone. When the desired audio source is displayed, it is now live. When selecting phantom mic input, press center okay button to confirm.
4. Push the power button to turn the unit off.
5. Connect the audio source to the audio input jack on the rear of the WF T5C.
6. Push the power button to turn the unit on.
7. With the audio source playing, adjust the Audio Input Gain on the WF T5C so that the level pulses up to 0dB. Press the < (LEFT ARROW) button repeatedly to increase the Audio Input Gain, or press the > (RIGHT ARROW) button repeatedly to decrease the Audio Input Gain.
8. Select an Audio Preset. The WaveCAST has three pre-configured Audio Presets to choose from: Hearing Assist, Music, and Voice. A Custom preset is also available. The performance of the WaveCAST is optimized for each of the pre-configured Audio Presets. Using the menu and control buttons on the front of the WaveCAST, push the Menu button, the display will change to show Audio Settings. Use the forward right arrow button to display Audio Source in the selection box. Push the down v button to show Audio Presets. Now press the right arrow button to display the list of Presets. Use the up and down buttons to alternate between Hearing Assist, Music, Voice and Custom selections. When the desired Audio Preset is displayed, press the right arrow button to apply the setting. If Custom is desired, push the right arrow button to enter the custom settings. Press the Menu button to exit the menu.
9. Connect an Ethernet cable from your local area network, or Wi-Fi router to the Ethernet port on the WaveCAST. This network will be used to broadcast the audio.
10. Once the transmitter detects an active network is present (either Ethernet or Dante), the WaveCAST's Ethernet control IP address will be displayed in the upper left part of the main screen on the OLED.
11. Use a device, such as a smartphone, with the WaveCAST App installed to listen to the audio and test that device is working and sounds correct.

To adjust settings via a web browser:

1. Connect an Ethernet cable from your local area network, or Wi-Fi router to the connector on the transmitter labelled Ethernet. Besides providing the web page, this network will also be used to broadcast the audio to Wi-Fi enabled receiving devices.
2. Open a web browser on a computer or mobile device that is also connected to the same local network as the WaveCAST C.
3. In the address bar of the browser, type in the IP address of the WF T5C (the IP Address is shown on the transmitter's main info screen) and push the enter key on the keyboard. (Note: it is not necessary to type "http://" or "www." preceding the IP address.)
4. The browser will open the transmitter's web page, displaying a Login button. Enter the user name "admin" and the default password "admin" then click the log-in button.
5. The web browser will now show the transmitter's Home Page, which shows the current WaveCAST C status info. The tabs at the top navigate to different pages that can be used to configure the transmitter's settings.

A Wi-Fi network is required for streaming to devices

The WaveCAST C unit does not provide Wi-Fi on it's own. If streaming audio is desired, a Wi-Fi Network is required, for the device to receive streaming audio from the WaveCAST C. The Wi-Fi network will need to be established before the streaming feature can be used. The WaveCAST C is connected to a hard-wired ethernet network containing a Wi-Fi access point (or a router with Wi-Fi). Audio is streamed out of the RJ-45 ethernet jack over the network and through the access point, to the end device. This ethernet jack, labelled "Streaming Audio Out", is shown on page 6.

Router and Network Equipment Selection

The WaveCAST C is intended to be set up on an already existing Wi-Fi network; however, upgrades to your network equipment may be necessary depending on the performance desired from the WaveCAST C. For instance, a higher-end, more powerful router will allow more users to connect to your audio stream than using a cheaper, less powerful router.

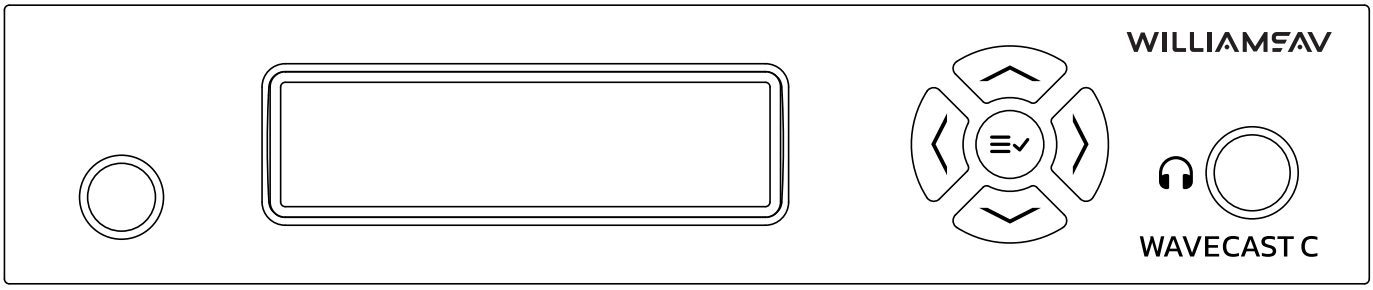
The Wi-Fi network will need to be accessible to the users who will be listening to the audio. If the user's devices cannot connect to the network due to security settings, they will not be able to hear the audio.

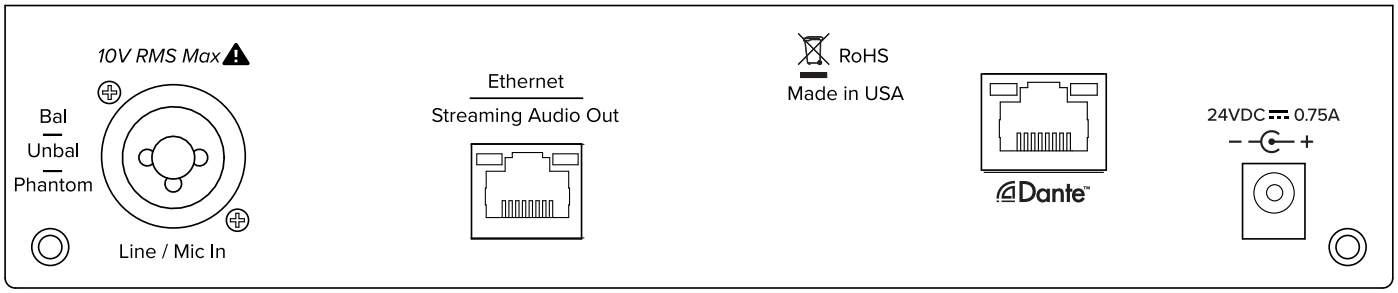
The WaveCAST C system will put a demand on the network. If the network cannot handle the demand, whether because it is being used for other networking needs or because the networking hardware is not strong enough, the WaveCAST C will be unable to reach its maximum audience, and there may be performance issue, such as dropout or "breaks" in the audio.

When streaming to a small or medium sized audience, a basic networking configuration may suffice. When streaming music using multiple channels (such as having several WaveCAST units on your network), a powerful router and network configuration is more likely to be required.

The **WaveCAST Networking Guide** is available on the Williams AV website for additional networking tips. The WaveCAST networking guide applies to the WaveCAST C as well as other WaveCAST products.

Wiring and Connections





Power Supply Connection

Connect the TFP 062 power supply to the round Power Supply Jack located on the rear of the WaveCAST C transmitter labelled "24VDC 0.75A".

Ethernet and Dante RJ-45 Connection

If connecting to a network or directly to a PC, a. Ethernet cable must be used. A ***crossover*** cable is not necessary because the WF T5C is auto-configuring.

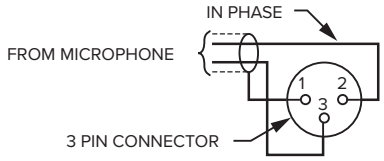
Audio Source Connections

The WaveCAST C transmitter will accept the following audio sources:

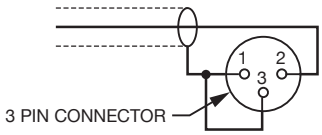
1. Balanced Microphone with or without 12 volt phantom power (DIN 45596) on a 3-pin (XLR) connector.
2. Balanced/Unbalanced microphone with or without phantom power on 1/4 inch (TRS) jack
3. Balanced/Unbalanced Line on a 3-pin (XLR) connector.
4. Balanced/Unbalanced Line on 1/4 inch (TRS) jack.
5. Dante on an RJ-45 jack (optional).

WARNING:
The WaveCAST C is not designed to accept 70 volt speaker signals! This may result in damage to your system. The sound source should come directly from the system mixer or digital source as a low-level or unprocessed signal.

IMPORTANT: When a suitable audio source has been determined, you MUST configure the audio source in the menu of the WaveCAST C before plugging that source in.

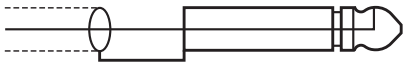


BALANCED LINE/LOW IMPEDANCE MICROPHONE

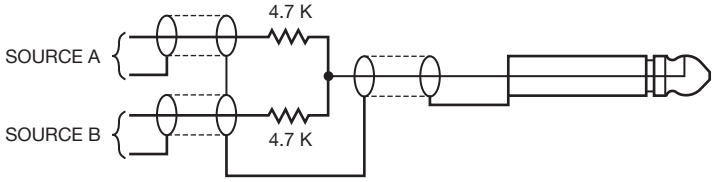


UNBALANCED LINE USING 3–PIN CONNECTOR

BALANCED LINE USING 1/4" CONNECTOR



UNBALANCED LINE USING 1/4" CONNECTOR



CONNECTING TO A MULTI-CHANNEL OR STEREO SOURCE

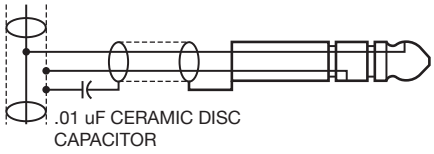
Multi-Channel Sources

By constructing a simple resistive mixer, stereo (or 3 channel) sources can be connected to the WaveCAST C. Additional channels can be accommodated by adding a resistor for each source.

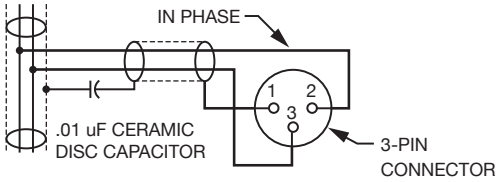
Note: The Dante audio input will automatically mix the left and right channels.

Avoiding Hum in the Audio (as a Result of a Ground Loop)

A hum created by a ground loop can often be eliminated by connecting a capacitor in series with the audio line shield to the transmitter's ground. This method also maintains good radio frequency (RF) shielding. Determining the effectiveness of this method for your installation usually requires some experimentation.



BREAKING A GROUND LOOP WHEN CONNECTING TO A UNBALANCED LINE



BREAKING A GROUND LOOP WHEN CONNECTING TO A BALANCED LINE

Selecting an Audio Source Appropriate for Hearing Impaired Listeners

The WaveCAST C transmits audio with excellent fidelity. Therefore, the audio source signal should be of the highest audio quality and not subject to a compressor, limiter, reverberation, or other signal processing equipment. While compressed audio is available through the WaveCAST C, excessive compression is not helpful to the hearing impaired and can contribute to excessive noise in the audio.

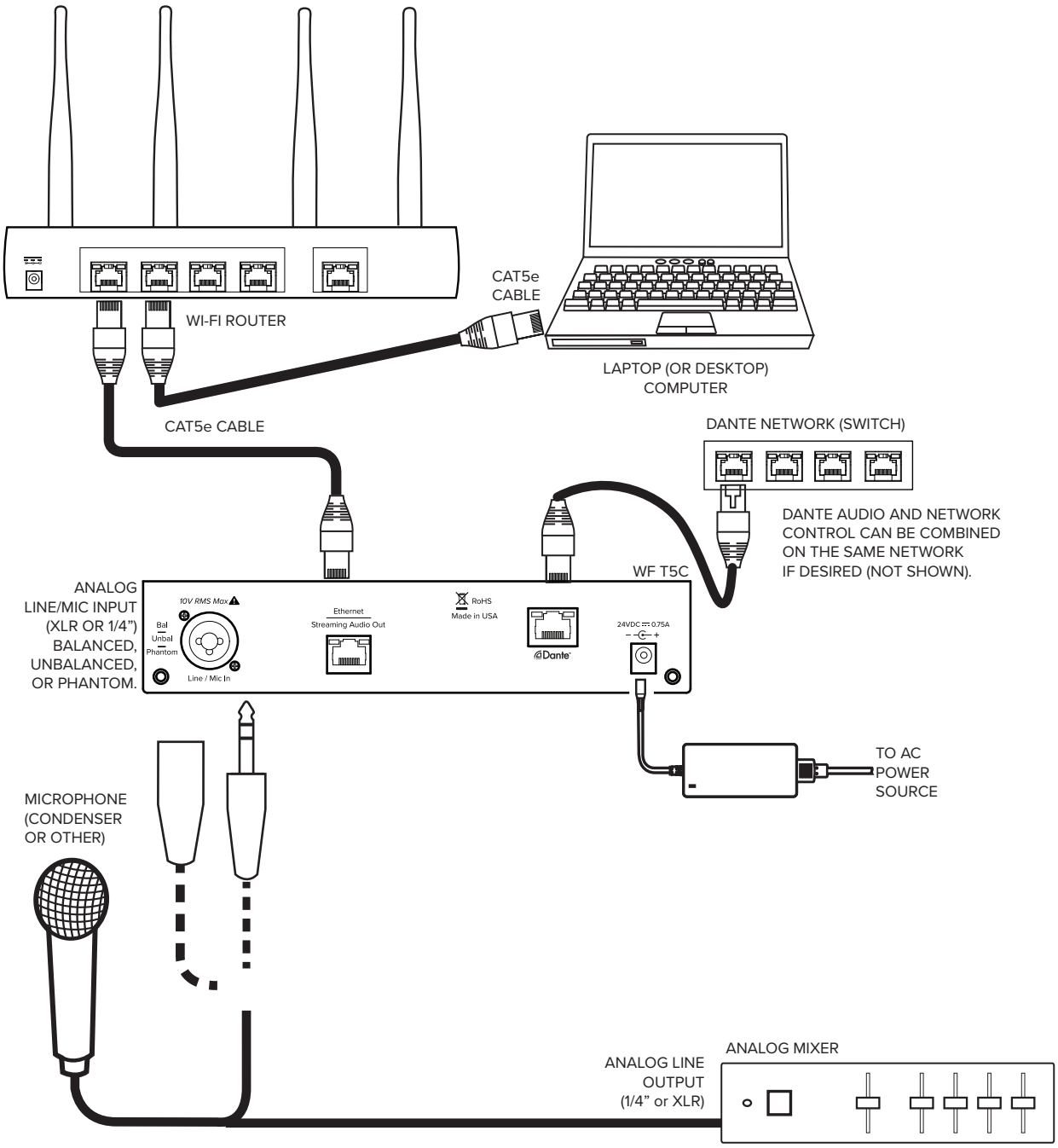
The WaveCAST C audio source signal is usually connected to a mixer's line output signal which is behind the mixer's parametric equalizers but ahead of any equalization used for house loudspeakers.

If audio delay is available for use in large auditoriums, it's usually best to use it. Because radio signals travel faster than sound, delaying the transmitted audio so that an average listener (in the middle of the listening area) hears the transmitted audio a few milliseconds after audio from the main sound reinforcement system speaker is helpful. This will also help audience members who lip read.

Connecting to other Devices

The Analog LINE/MIC Input (XLR / 1/4") jack can be used with standard pro audio electronics such as standard pro audio line level condenser microphones up to 15v or an analog line output from a mixer. The combination jack accepts either XLR or 1/4" (TRS). This source ***must be configured in the menu*** before plugging the source into the jack. If, for example, the MIC Input is selected, and a *line level* source is plugged in, it may be possible to blow out the MIC input circuitry.

The Ethernet and Dante RJ-45 jacks can be used to connect the WaveCAST C to either a local network or directly to a single computer or Dante device. See diagram on page 9.



Controls and Features

Power Button
Latching push-button switch turns the transmitter on or off. The desktop power supply provides power to the unit.

OLED Display
This shows current operation settings and is also used with the menu control buttons for configuring the WaveCAST C. Each time the power of the unit is turned on, the OLED Display shows a WaveCAST C start-up

screen. After several seconds, the default Main Info Screen screen will be displayed. The WaveCAST C is now fully operational.

NOTE: If the transmitter's internal tests fail, the transmitter will display a failure message. If it continues to fail on repeated boot-ups, call WilliamsAV and ask for Tech Blue to assist.

Main Info Screen

The Main Info Screen will show various setting information including IP Address (If connected to Ethernet network), Server Number, Server Name, EQ Preset, Input Gain, Audio Source.

If the IP Address is grey, the network connection is not working and the WaveCAST C is offline.

Screen Navigation

While navigating through the settings, the setting to be changed will be highlighted. Use UP and DOWN arrows to navigate through settings (e.g., Input Gain, Audio Source, etc.), and the LEFT and RIGHT arrows to change that setting (e.g., Audio Input Gain up or down).

- The **Down** button navigates forward/down through different settings.
- The **Up** button navigates backward/up through different settings.
- The **Left** button navigates backward through settings.
- The **Right** button navigates forward through settings.
- The **Select** button 1. A single push wakes up the display if it is in sleep mode 2. A push and hold brings up the information screen 3. If display is on, a single push of this button does nothing.

For example, to change the Input Gain, push the Select button once to highlight the Input Gain current setting. Then use the left or right arrow button to adjust the Input Gain up or down.

Information Screen

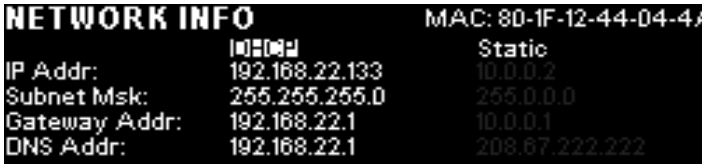
This screen provides Network Info and Firmware Version of the unit, depending on what is selected.

1. Push and hold the Select button until the following screen is displayed:

2. Use the right or left arrow buttons to highlight "Version" or "Network". Select the highlighted one by pushing the select button.

Selecting "Version" will display the following info:

Selecting "Network" will display the following info:



When the network audio server is enabled, the wi-fi symbol in the upper left corner of the VU meter area will appear in bright white. When disabled or disconnected from the network, the icon will appear dim with a small 'x' in one corner.

On the front panel, the status of all servers on the network displays one of the following statements:

- **Server x of n** – the server is enabled and operating normally, where n is the total number of audio servers on the network and x identifies this unit.

- **WARNING: Server stack full** – the attempt to connect this unit to network was unsuccessful as it would exceed the allowable limit of the number of servers. . See "Additional WaveCAST Servers" on page 14 or more information.

- **Server not synced** – this unit has not yet or is unable to sync with the master audio server. This only applies when more than one unit is on the same network.

- **Incompat. server at <ip address>** – a server, identified by IP, that cannot be on the same network as this unit has been detected on the same subnet. This applies when the WaveCAST C unit is on the same network as one or more Wavecast devices with outdated or incompatible firmware. Please contact Tech Blue for help.

System Settings

Settings can be selected and adjusted either by (1) using the arrows on the front of the WaveCAST C to navigate the OLED menu system, or, (2) by the web page by using a computer. Not all settings are available in the front panel menu or through the web page, and using both may be necessary for your initial set up.

Audio Settings

The Audio Settings provide the ability to change the audio characteristics for different listening applications, choose the input source, adjust the input level, and adjust the headphone volume.

Audio Source (OLED or Web Page)

The Audio Source menu is used to configure the WaveCAST C for the audio source jack and type of source that will be used. The audio source ***must be configured in the menu*** before plugging the source into the jack.

The Audio Source menu has the following selections to choose from: Line Level, Microphone, Mic + 12V

(Mic+Phnt), 400Hz 0dB Test Tone or Dante (optional).

This can be set through the front OLED display or the web page.

Note: When selecting Mic +12v, the additional voltage will not activate until 'Select' is pressed as confirmation.

Audio Input Gain

The Audio Input Gain adjusts the incoming audio level into the WaveCAST C. This adjustment only affects analog audio. Changes to the input level will affect the level, indicated by the graphic level display pulsing higher or lower when audio is present. Audio Input Gain is adjustable from -60dB to +24dB in 1dB steps.

Audio Presets

The Audio Presets allow the user to quickly and easily configure the WaveCAST C for common applications. There is a **Custom** setting if customization is desired, or three pre-configured settings.

There are three pre-configured to choose from: **Hearing Assist, Music, and Voice.** When one of these selections is made, the performance of the WaveCAST C is immediately optimized for the needs of that application (an adjustment is automatically made to the Low-pass Filter, High-pass Filter, and Compression). Refer to the chart below for a comparison of the Audio Preset configurations.

Audio Preset Configuration Table

Preset	High-pass	Low-pass	Compression
Voice	125 Hz	6.3 kHz	1:1
Music	31 Hz	16 kHz	1:1
Hearing Assist	500 Hz	8.0 kHz	2:1

For music, concerts, and other applications where the highest audio quality is desirable, **Music** is the recommended mode of operation. By default, the WaveCAST C is shipped in the **Music** mode.

For hearing assistance applications or applications where the message is critical for listening, **Hearing Assist** is the recommended mode of operation.

For speaking and other voice applications, **Voice** is the preferred mode of operation.

This can be set through the web page ONLY.

Custom Audio Preset

If the three preset configurations do not meet the needs of the venue, the Custom audio preset can be used. The custom preset allows the user to adjust the High-Pass Filter cutoff frequency, Low-Pass Filter cutoff frequency, and choose the Compression Ratio. If the audio preset is changed from Custom to Music, Hearing Assist, or Voice, the Custom settings are still saved for use in the future. The custom settings are overwritten when the preset is changed.

This can be set through the web page ONLY.

High-pass Filter

A High-pass Filter cuts off low frequencies and lets high frequencies pass through. The pole frequency chosen is the point where the cutoff takes effect. The high-pass filter will help to remove low frequency noise from the transmitted audio signal, such as room noise, a line hum, or breath accents picked up from an improperly installed microphone. Available frequencies are: 31, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, and 630 Hz.

This can be set through the web page ONLY.

Low-pass Filter

A Low-pass Filter cuts off high frequencies and lets low frequencies pass through. The pole frequency chosen is the point where the cutoff takes effect. The low-pass filter will help to remove high frequency noise from the transmitted audio signal, such as hiss in the audio line as a result of room noise, sharp speech sounds, or other uncomfortable high frequency sounds. Available frequencies are: 3.5, 4.0, 5.0, 6.3, 8.0, 10.0, 12.5, and 16 kHz.

This can be set through the web page ONLY.

Dynamic Range Compression

Dynamic range compression reduces the volume of loud sounds and amplifies soft sounds. This type of compression is typically used for voice and hearing assistance applications for a listener who has difficulty hearing the quiet sounds of an audio broadcast.

For listening to music programs, concerts, etc., lower compression ratios or no compression is generally used. The WaveCAST C has three selectable modes of compression: 1:1 (compression off), 1.5:1 (low compression) or 2:1 (high compression).

For applications such as music and voice, where high audio quality is desirable, 1:1 is the recommended mode of operation. For hearing assistance or applications where the transmitted message is critical for listening, 1.5:1 or 2:1 is recommended.

This can be set through the web page ONLY.

NOTE: The WaveCAST C is shipped from the factory at a 1:1 compression ratio (no compression).

NOTE: Some hearing impaired people cannot tolerate as loud of a sound as those with normal hearing. Using compression can help protect those users. However, compression also can make audio sound flat. Only use compression when it is the best choice for the listeners.

Front Display Time-Out

The Screen Time-out is the amount of time the front panel screen will stay lit with no activity. This only indicates that the front panel menu system has not been used for a period of time. It does not indicate whether the device is actively transmitting or not. The available options are: 10 minutes, 30 minutes, 2 hours, and Always On.

This can be set through the web page ONLY.

Screen Lock

The front panel screen of the device can be locked to prevent any changes from being made outside of the web page. The buttons may be locked and unlocked by pressing and holding both the left and right buttons at the same time. When locked, a small lock icon appears at the top middle of the screen. Once locked, if a button is pressed, a popup message will alert that the screen is locked.

Screen lock can be set two ways; 1. Using the front buttons as described, 2. Through the web page on the Options page.

User-Entered Server Description

The Description field allows the user to easily identify the server and can only be adjusted from the settings website. This typically comes into play when multiple servers need to be distinguished from each other. The description appears on the front main info screen, the WaveCAST app, and also on the web page. In a rack, all the user has to do is activate the main info screen with a touch of any button on the front, and the description is displayed as one of the fields on the main info screen.

On the web page, this appears under the Channel/Server Description of the Options web page, making it easy to identify which transmitter the web page is controlling. It's possible to enter all blanks in the description field, and then the description will be blank on the front display.

This can be set through the web page ONLY.

Restore Defaults

The Restore Defaults action will restore the transmitter to its original factory settings. Restoring defaults from the front panel or the web page will reset all settings including IP Addresses, Subnet Masks, Gateways, IP Address Mode, and Web Password. After the WaveCAST C reboots, any static ethernet connections will be lost.

This can be set through the front OLED display or the web page.

Network Settings

The WaveCAST C is defaulted to DHCP if no configuration has been done. An IP address will be automatically assigned to the WaveCAST C once an Ethernet cable has been connected to the device and network connection

found. (Assuming there is a DHCP server on the network). Any change from the default configuration (DHCP) has to be done through the WebGUI. For example, entering a Static IP, Subnet, etc.

Network Settings can only be edited from the web page.

Additional WaveCAST Servers

Several WaveCAST devices can be on the same network. WaveCAST devices include the original WaveCAST, WaveCAST C, IR+, and WaveCAST EIGHTS, along with their Dante counterparts. The number of devices that can be put on the network depends on if the device is or has been configured as a unicast or multicast device.

Up to eight WaveCAST EIGHTs can be on the same network, as these devices are all multicast. Adding in an original WaveCAST or WaveCAST C running in unicast mode will lower the maximum number of devices to four, because those devices are unicast.

The maximum number of devices allowed on the network can be adjusted with the Max Servers on Subnet option on the web page. This may be necessary if you have a mix of unicast and multicast devices.

This setting must match on all multicast devices on the same network, or the devices will throw an error and be unable to stream. Unicast device will always be limited to 4 devices on the network, and therefore do not have a Max Servers on Subnet setting. If unicast devices are included on the network, the Max Servers on Subnet setting on multicast devices must be set to 4.

If only multicast devices are included, the maximum can be set to 4 or 8, as long as Max Servers on Subnet settings is the same on all devices. If settings are mismatched, the server will be unable to stream audio and will throw an Incompatible Server error. Devices that are missing this feature may need their firmware updated.

Adjusting Network Settings

The Network Settings screen where the IP Address Mode (Static or DHCP), the IP Address, and Subnet Mask are set via the web page. See "Network Settings" on page 13 for details on how to use the web page.

Network Settings:

IP Address Mode Static or DHCP

IP Address If set to DHCP mode "Current IP Address" is displayed. When set to Static mode, these fields appear as "Static IP Address", "Static Subnet Mask", and "Static Gateway Address". When the "IP Address Mode" is set to Static, the IP information must be manually entered.

Subnet Mask If the IP Address Mode is set to Static, this is where the Subnet Mask is manually entered

Gateway If the IP Address Mode is set to Static, this is where the gateway is manually entered

Note: Subnet Mask and Gateway only apply when Static is selected

Mac Address this is displayed only and cannot be altered

TTL this settings controls the amount of switch hops before the packet is dropped

Advanced Options:

Secure Mode This can be enabled or disabled, and a 6-digit PIN number can be assigned. If enabled, users will need to use this PIN to log on to the audio stream over Wi-F. Users attempting to listen to the stream without the PIN will be unable to do so.

Network Compensation Buffer increasing this setting buffers more packets, thereby reducing the amount of dropped packets (choppy audio), but increases latency (lip-sync delay). Decreasing this setting increases latency and also increases the possibility of dropped packets.

Audio TX Mode Audio can be broadcast as unicast, multicast, or completely shut off.

Max Servers on Subnet When in unicast mode, up to four servers can be active at the same time. When in Multicast mode, up to eight serves can be active. See "Additional WaveCAST Servers" on page 14 for more details.

Multicast Address If needed, the multicast cast address can be enabled and either manually set or randomly generated. This setting is under the Advanced options.

DHCP IP Addresses are usually preferred to manual static IP addresses unless there is a good reason to use a Static IP scheme.

To set up a static IP Address:

1. Determine appropriate static IP, subnet mask and gateway addresses for the WaveCAST C.
   a. If someone set up your network, they may be able to help you determine an appropriate IP address (i.e. network system administrator).
   b. There should be no other device having this same address on the network.
   c. This will be an address on the same subnet as the router.
      For example, if the router's address is 192.168.1.100, the first three sets of numbers will be the same (i.e. 192.168.1), and the last number will be the number you determine for the WaveCAST C (i.e. .You can choose another number instead of .100).
      When you determine this address, remember or write it down. You will need it later.
2. In the web page on the Network Settings page, select 'Static' for the fields to show, then enter the above information for the device.
3. Click **Submit and Reboot** when ready.
4. A notification will be displayed. Acknowledging the notification will save the settings and restart the device.

Selecting the "Request a static multicast address" requests a multicast address from the router.

Dante

Dante can be set as an input from the front display or web page. Audio routing is configured through Dante controller. There are no additional settings available on the front screen or the web page.

VU Meter Levels

The VU level corresponds to specific decibel ranges, and may cause issues when set too low or too high. Use the table below to pick an appropriate range for your venue's audio.

VU Level	Decibel Range	Note
11	>= +12	Overrange – '!' appears above meter
10	+9 to < +12	
9	+6 to < +9	
8	+3 to < +6	
7	0 to < +3	Indicated by marks at sides of meter
6	-3 to < 0	
5	-6 to < -3	
4	-9 to < -6	
3	-12 to < -9	
2	-15 to < -12	
1	-18 to < -15	
0	< -18	All bars turned off

Web Page

The WaveCAST C provides a web page to manage the transmitter settings which can be accessed over either a hard-wired or wireless network connection with most internet browsers.

Most changes take effect when the submit button is clicked. The only setting that takes immediate effect is the audio input gain, so that the changes can be immediately seen on the VU meter. Some changes require a reboot. Any updates made through the front panel will show up on the web page once the current page has been refreshed (navigated away from, going to a new page, or simply refreshing the page).

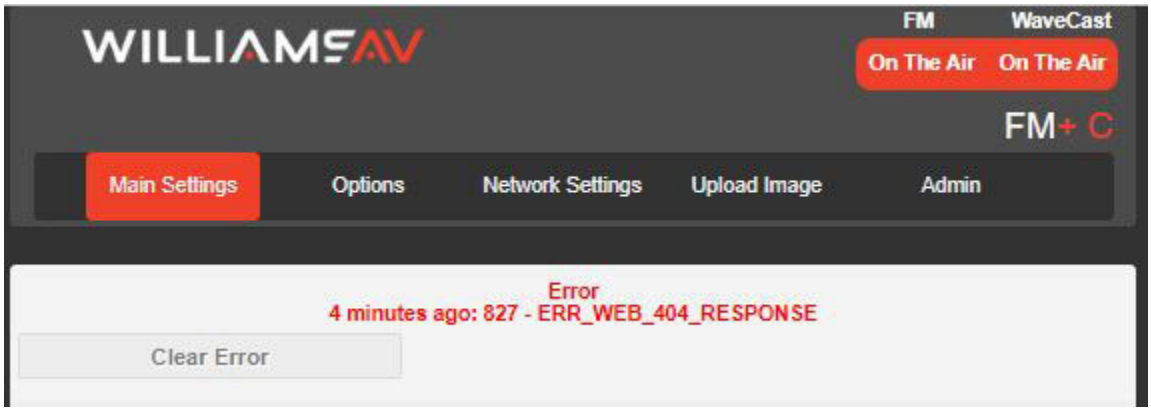
1. Open the web browser of your choice.
2. In the address bar of the browser, type in the IP address of the WaveCAST C (displayed on the front OLED screen) and hit Enter.
3. You should see the Login Page of the WaveCAST C.

Login Page

The default User name is “admin” and the default password is “admin”. The user name and the password can (and should) be changed on the website's Admin page.

Error Alert

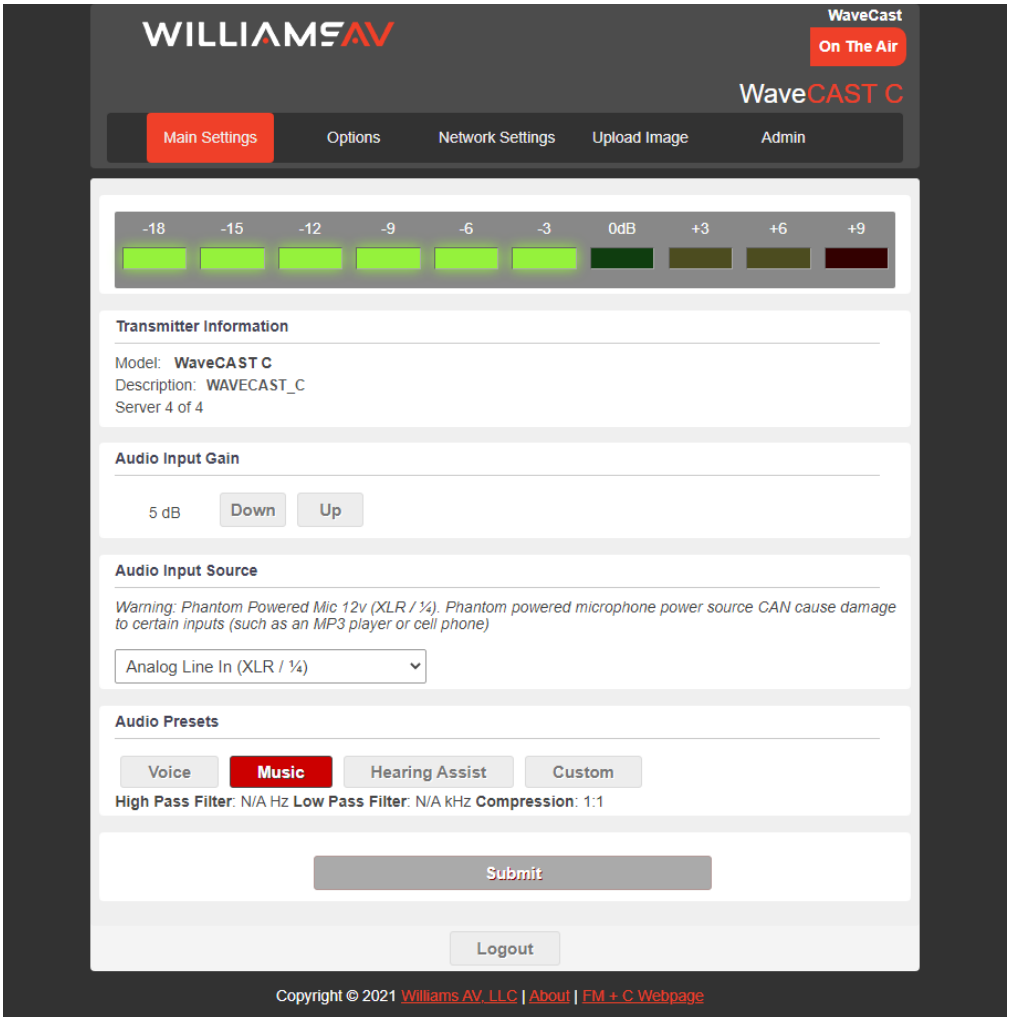
If the WaveCAST C encounters an error, a message may appear at the top of the screen. Clicking the Clear Error button will hide the alert. Not all errors require action, however, if an error continues occurring or affects system performance, contact Tech Blue.



Main Settings Page

The Main Settings page displays all current audio settings, as well as corresponding WaveCAST C web-based controls. It is the first page to appear when logging into the website.

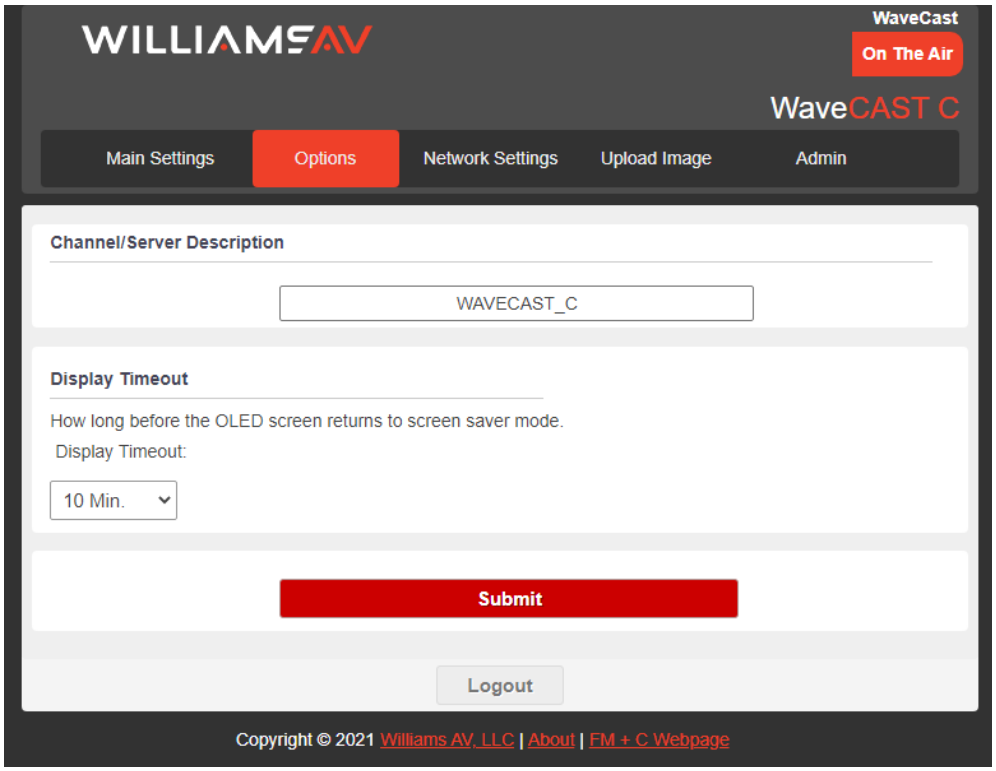
Note: Network speed can also affect the audio monitor updating and web page performance.



Options Page

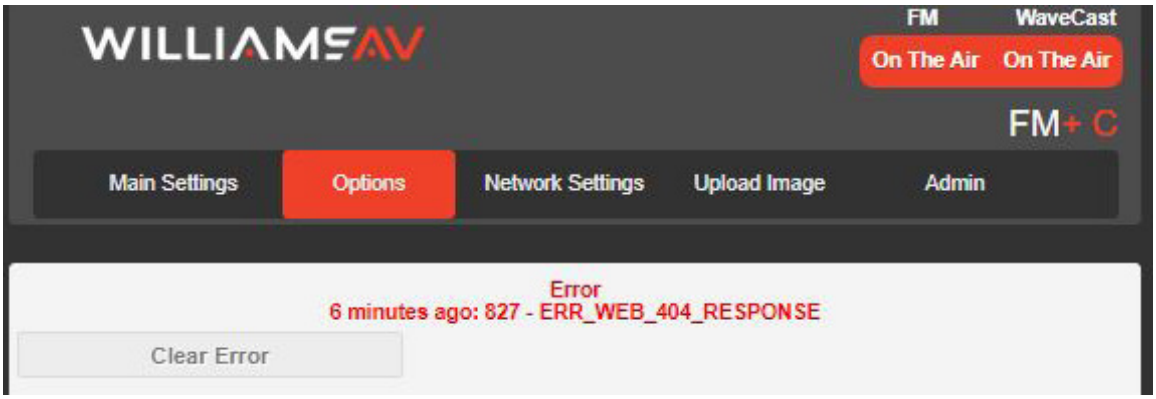
The Options page displays user preferences that can be tailored to each WaveCAST C system.

The description sets the name of the device, which may be used to uniquely identify the device without referring to the IP address.



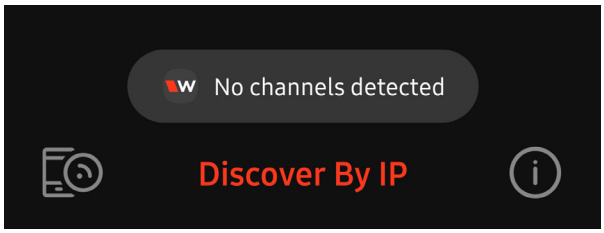
Error Message: ERR_WEB_404_RESPONSE

This error message indicates no internet connection. This connection is optional; however, without an internet connection, most personal devices will seek a different connection for data service. Sometimes without the user's knowledge, the phone's data connection will switch from Wi-Fi to cellular service. When this happens the App will not produce any audio, and the user will have to manually change their phone's data service back to Wi-Fi and make sure they are connected to the Wavecast access point, and possibly need to close and re-open the App. One way around this is to put the phone in Airplane mode, as this limits the phone to Wi-Fi only.

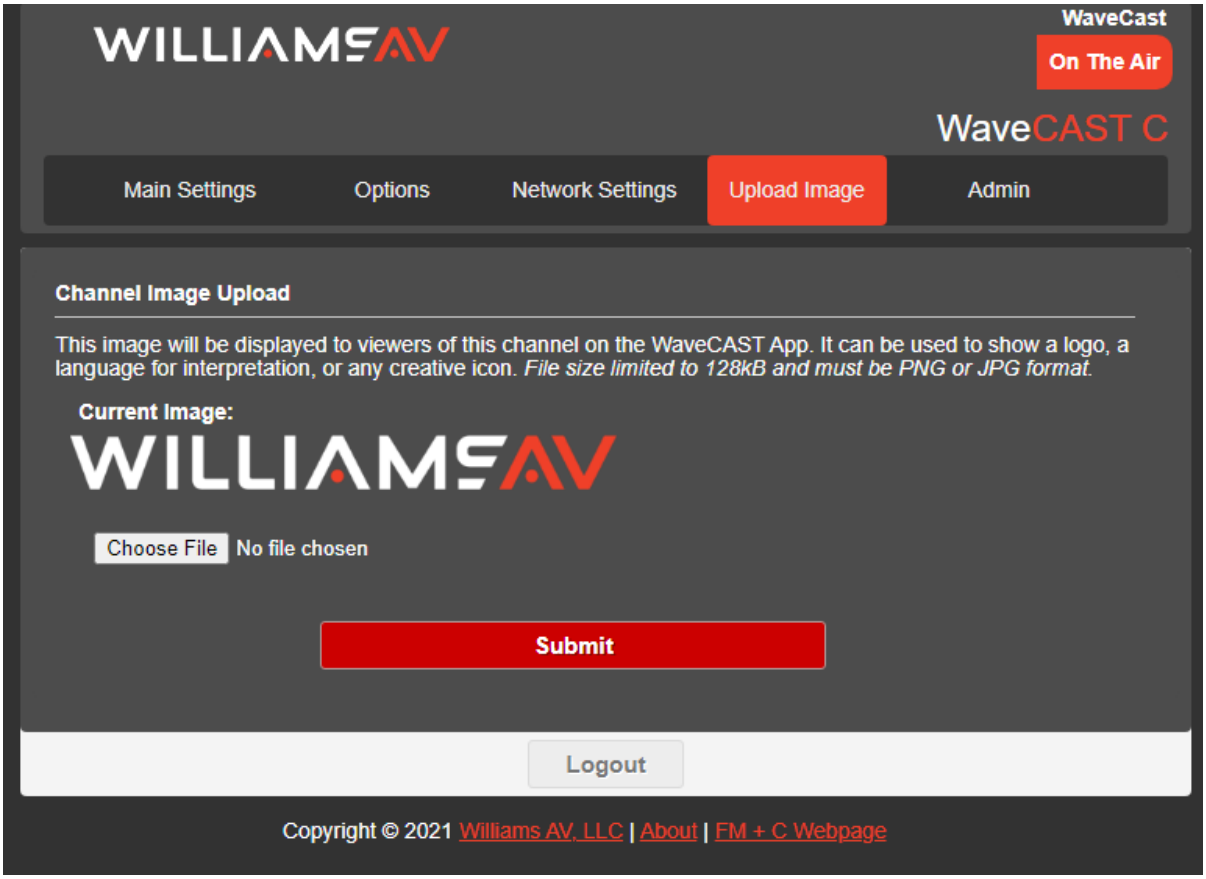


Upload Image Page

An image can be uploaded that will display next to the channel name for any users listening using the WaveCAST Receiver app. This image can be used to easily distinguish the content of your audio broadcast. The image must be under 128kB and be in PNG or JPG format. If no custom image is uploaded, the default Williams AV W logo will display instead:



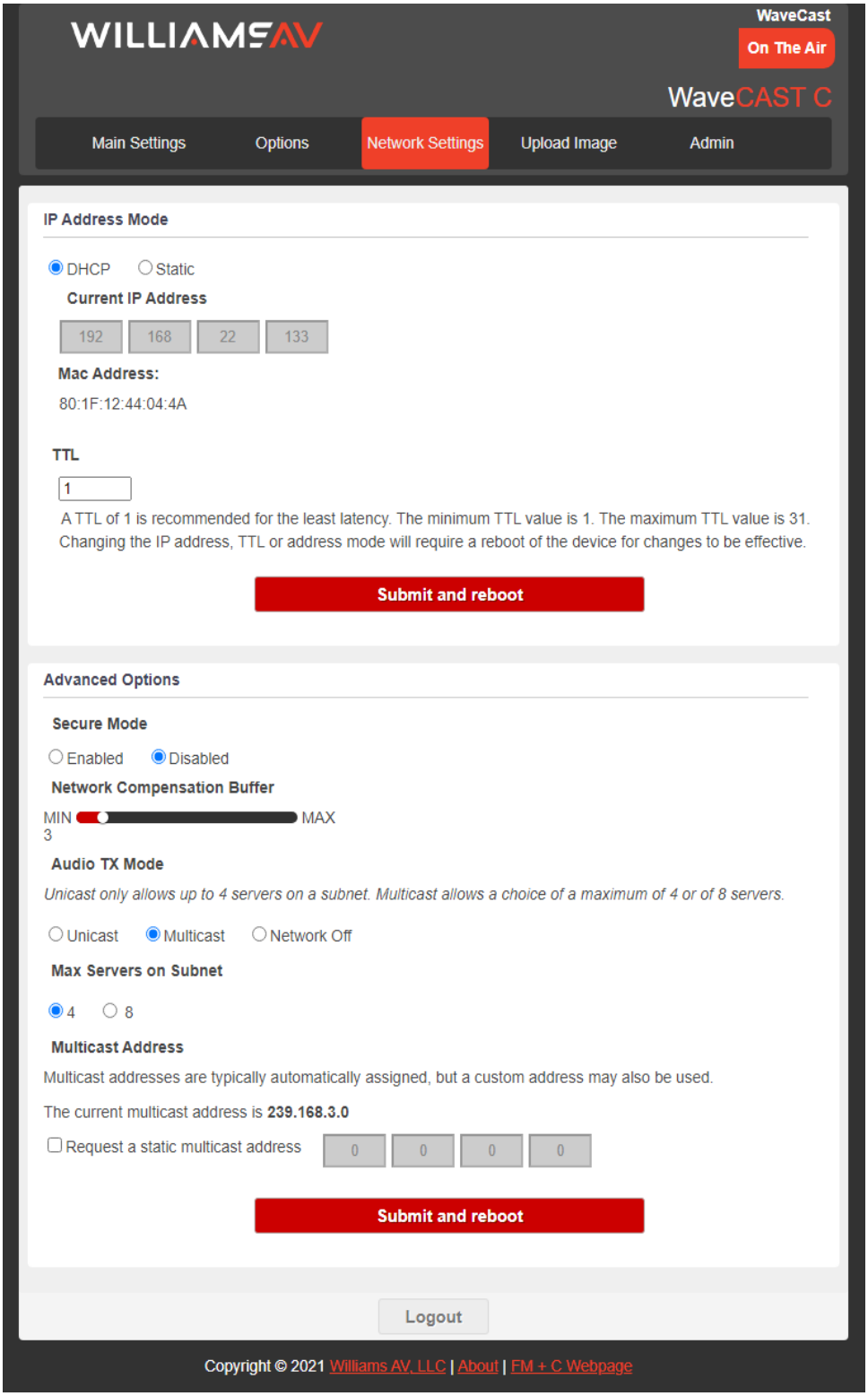
The image can be replaced at any time. To completely remove the image, the device must be reset via the front panel menu.



Network Settings Page

The Network Settings page displays the current network configuration of the unit. Typically these are not modified after initial installation is completed.

Changing a static IP address or subnet will not instantly take place. The changed IP address or subnet will only take affect once the device is rebooted. Rebooting can be done with the front power button or by using the "Submit and reboot" button on the Admin web page.



Administration Page

The Admin page displays administrative controls that can be used to help with non-technical WaveCAST C users, or for remote site troubleshooting purposes.

The login username and password for the website can be set from this screen. If the username or password is ever forgotten, it can be restored to its default value by restoring defaults via the front panel menu.

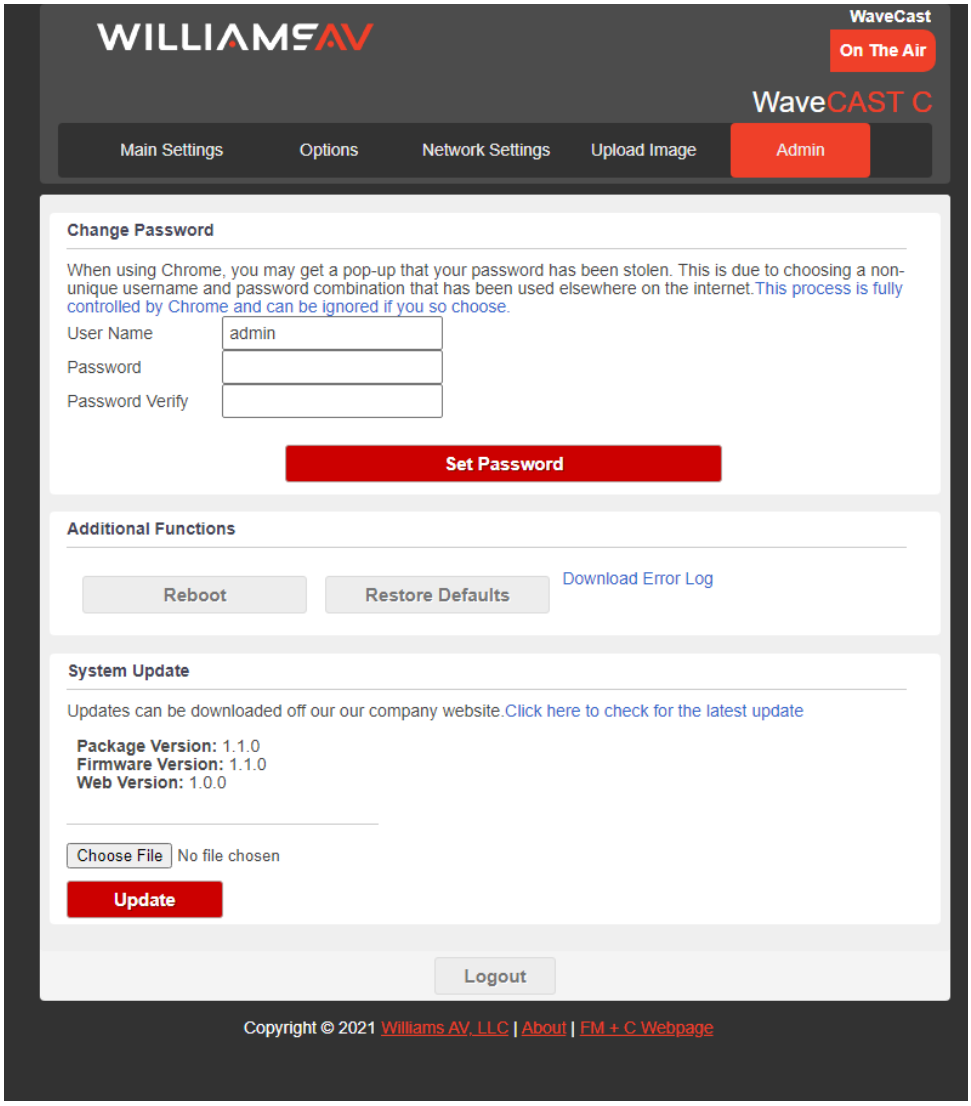
The Restore Defaults button on the web page (as well as the restore factory defaults function on the front screen) will reset all of the devices settings including username, password, and IP information.

Updates are performed from the Admin page. At the bottom of the page, upload the update file (provided by Williams AV) and hit the update button. Your system will begin the update process from there, which will include a reboot. **Do not power down the device until it has successfully rebooted (main info screen has appeared)..** There is no indicator for the progress of the update, but it should take around two minutes.

Updating, restoring or rebooting the device will make the website temporarily unavailable as the system resets.

A full error log can be downloaded by clicking the Download Error Log link. This may be useful when working with Customer Service.

Note: If the IP address or subnet of the device was changed and the device is being rebooted, the website may not be available at the same URL location. Take note of the network information before rebooting the device. See "Network Settings" on page 13 for more information.



WaveCAST Receiver App

The WaveCAST Receiver app allows listeners to hear the audio on their personal, Wi-Fi connected devices, such as a mobile phone. Make sure the latest app is downloaded on the device and the latest OS is installed.

Download the WaveCAST App

Download the WaveCAST app from the Apple App Store for iOS devices or Google Play Store for Android devices.

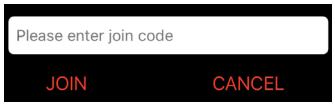
It is recommended that the app is downloaded in advance over an internet-connected wi-fi network or cellular network.

Join the WaveCAST Wi-Fi Network

Once the WaveCAST App is downloaded, join the same Wi-Fi network that the audio is being broadcast over. If no channels are listed when selecting an audio channel, there is no audio being streamed on this Wi-Fi network. Ensure you are on the correct Wi-Fi network.

Select an Audio Channel

When the App is opened for the first time, a list of available channels will appear. Tap on the channel to listen to the audio. The venue should provide the name of the channel to listen to for your event if more than one is available.



Channels marked with a lock icon require a code to join. Enter the join code assigned to the channel when prompted. If a channel is currently streaming, it will have a blue checkmark next to its channel name.

If there are many servers on your network, or your network is set so that servers cannot be discovered by outside devices, the WaveCAST app can connect to a server via IP address. Tap the **Discover by IP** text at the bottom of the channel screen then enter the IP address of the WaveCAST server. The channels being broadcast by that server will then be available on the channel select screen. *It is recommended that this feature is not used with a general audience as they may not type the IP address correctly.*

Listen to the Audio

Once an audio channel has been selected, the audio should start playing automatically. The volume of the audio can be adjusted using the slider in the middle of the screen, or with the physical volume controls on the personal device.

To mute the audio, tap the speaker icon. Tap it again to unmute the audio.
To switch channels, hit the back arrow at the top of the screen.

Note on Wi-Fi Assist/Smart Network Switching

The WaveCAST **does not require** an internet connection. It can be placed on an internal network with no internet connection.

Some phones expect network connections to provide internet access. When the phone cannot reach the internet, it may automatically try to switch to a network connection with an internet connection. Sometimes, the phone determines that the best internet connection is through a mobile data network.

This is not the desired behavior when using the WaveCAST network. The phone will automatically take the user off of the WaveCAST audio streaming network, and onto a unrelated internet network connection. This will prevent the user from hearing the audio, and they may not realize their phone switched networks on them.

Steps for disabling this feature will differ for every phone, but is typically found under the Wi-Fi or Mobile network settings. Look in the manual for your phone for instructions on disabling this feature.

WaveCAST Receiver

The WaveCAST Receiver (WF R1 or WF R2) is available for customers who do not want to use their personal device for listening to Wi-Fi Audio. The receiver is a dedicated listening device with the WaveCAST app available on it.

For more information on our Wi-Fi receiver, visit williamsav.com for product specifications, manuals and more.

NOTE: Wi-Fi receivers may be required to meet national and international requirements for device minimums when using Wi-Fi audio for assistive listening. Personal devices typically cannot be counted in meeting device requirements; receivers must be available on request. Please check your location's legal requirements to see if you need a Wi-Fi Receiver.

Troubleshooting

Website GUI problems

The full website GUI is unavailable.

- If you are only able to install a firmware update, the website stored on the WaveCAST C has been corrupted, likely by a power outage. Install the firmware for your current version (or newer) of the WaveCAST C via the firmware update page to restore the website.
- If sections/text or graphics are missing in the WebGUI, but the firmware update section is accessible, try reinstalling the latest firmware. (This can be found on the “Downloads section of the product page on the WAV website). If this doesn’t restore the entire WebGUI, the unit may need to come back to WilliamsAV for service.
- Check your network settings. The IP address is viewable on the front panel of the device.

Lost username or password

- Using the front panel menu, restore defaults. See "Restore Defaults" on page 13.

Website not behaving as expected

- The website will only work with a modern browser. For example, do not use Internet Explorer™ 11 or earlier.
- Try switching browsers. Google Chrome™ is our recommended browser.

Audio problems

The On Air Indicator is not on

Note: The front panel display indicates RF status, and the RF Settings section of the web page shows the RF on/off and RF power level status. If either of these are indicating that the RF power status is off, then:

- Ensure the transformer (TFP 062) is plugged into the transmitter and any remote power switch is on.
- Ensure the front power button is pressed and latched to the on position and the power LED is lit.
- Ensure there is audio present. The RF may time-out and shut off if audio is not present for a period of time.

No Audio heard through earphone jack

- Check that the VU meter is lit to see if there is a signal coming from your audio source. Check and correct your audio source, if necessary.
- Check to see if the Headphone Volume Level hasn't been turned all the way down. If so, increase it.
- Check to see if there is an incorrect or defective connection from your audio source.
- Check and correct your audio gain level, if necessary.

Noise or Distortion in the Audio

- Check to see if there is noise in the audio source. To find out, disconnect the audio cable. If the noise disappears your noise problem is in the source. Correct or repair your audio source.
- Ensure the Audio Source configuration is set to match the audio source input device. See "Audio Source Connections" on page 7 for how to properly configure the Audio Source.
- Check for ground loops or noise on the input signal. If you are still having trouble, call your Authorized Williams AV dealer or representative.

Noise in audio grows when program is silent

- The Audio Gain Control may be set too high. You may be seeing the +6 dB level indicator lighting all the time on the front of the device. See "Audio Source (OLED or Web Page)" on page 11.
- Check the Compression Ratio, which may be inappropriate for the type of program being transmitted. Try setting the Compression Ratio to 1:1 (compression off). See "Dynamic Range Compression" on page 13.

Volume too quiet

- The audio gain control may be set incorrectly on the transmitter. Correct the Audio Gain control setting by adjusting it until the sound level peaks between 0 and 6 dB.
- Check the batteries in the receiver. For non-rechargeable (alkaline) batteries, they may need replaced. If you are using rechargeable batteries, ensure the batteries are fully charged prior to use.
- The audio input may not be configured for the audio source being used. If not, correct the setting of the Audio Source control menu. See "Audio Source Connections" on page 7.
- Some users may not be helped by this system. Severe hearing loss may require using the system with a T-Coil and personal hearing aid rather than headphones.
- If using Wi-Fi, some phones and tablets have the ability to broadcast to a T-coil; research the phone model to see if this is an option.

Wi-Fi reception difficulties

No Reception

- Ensure the listener's device is connected to the correct WaveCAST network, has the current iOS or Android app installed, and is listening on the same channel as the WaveCAST C is transmitting on.

Missing Channel Image on App

- Images may not load when many users are connected. Try reloading the list of channels.
-

Specifications

WF T5C / WF T5CD

Dimensions	8.45” W x 8.25” D x 1.72”H (21.5 cm x 21 cm x 4.4 cm)
Weight	Transmitter: 3.2 lbs (1.45 kg)
Color	Black
Rack Mount	Standard 19” Rack, one EIA rack space high, 1/2 space wide 1–2 units can be mounted in a single rack space with optional RPK 005 (single) or RPK 006 (double) Rack Mount Kits
Power Supply	Desktop Style Transformer (TFP 062); Input: 100-240 VAC, 50/60 Hz. IEC Line Cord; Output: 24 VDC, 750 mA, 18W. 2.5mm ID center positive barrel connector
Power ON Indicator	Push On/Push Off latching power button with backlight. Green backlight indicates power ON, backlight off indicates power OFF.
Temperature Range	Operating: +32° F to +122° F (0° C to 50° C); Storage: -4° F to +158° F (-20° C to 70° C)
Ethernet	RJ-45 on back of unit supports CAT 5e cable lengths up to 328 feet (100 meters); 10/100 Base-T IEEE 802.3 compliant, unique MAC address. RJ-45 jack used for web interface and streaming audio out. An external Router/DHCP Server is required to stream audio to receiving devices.
Dante	(1x) RJ-45 jack. Only available on WF T5CD
User Interfaces	1. 3.12” High Resolution OLED display with selections via buttons, 2. Hosted Web page, 3. Telnet commands over ethernet (see our “WaveCAST and WaveCAST C Programmers Guide” for available commands and protocol).
Audio Section	
Audio Inputs	(1x) Combination 3-pin XLR, 1/4” (TRS) jack for balanced or unbalanced line level, or balanced or unbalanced microphone with selectable phantom power. Optional RJ-45 Dante Input (“D” models only).
Audio Processor Functions	DSP based; Compression: 1:1, 1.5:1 or 2:1; High-pass and Low-pass Filter Frequency control, Music, Voice and Hearing Assistance Audio Presets
Frequency Response	31-16000 Hz, ±3 dB (re: 1 kHz) (“Music” Audio Preset)

Signal-to-Noise Ratio	64 dB (typical) Transmitted RF @ 1kHz		
Total Harmonic Distortion	Less than 0.25% @ 1 kHz (RF output)		
Common Mode Rejection	>57 dB @ 1 kHz, Mic or Line mode		
Audio Input Gain Adjust	Adjustable from +24dB to -60 dB, in 1dB steps from front screen or web interface.		
Phantom Power	14.4 VDC applied through 2.2 kΩ resistors to analog combo jack: Pin 2 and Pin 3 on XLR jack, or tip and ring on 1/4" TRS jack		
Audio Level Display	Front screen bar graph display, each segment representing 3dB. It ranges from -18 (1 segment lit) to +12dB (10 segments lit). Over-range warning is indicated by 'OVLD' and flashing empty bar.		
Headphone Output	1/4" TRS stereo jack, mono signal, 7.8mW total power with 33 Ω.		
Dante Input	(1x) RJ-45 jack, only available on WF T5CD.		
Input Level (Bal or Unbal) (at Audio Input Gain = 0dB) at 1 kHz	Nominal (@ 7th Segment Lit) Indicated by Audio Level Display	Overload Warning Indicated by Audio Level Display "OVLD"	Absolute Max. Rating **Stresses above these ratings may cause permanent damage or degrade reliability.**
Microphone	-45 dBV (5.6 mV RMS)	-20 dBV (100 mV RMS)	+20 dBV (10.0 V RMS)
Line	-8.4 dBV (380 mV RMS)	+16 dBV (6.5V RMS)	+20 dBV (10.0 V RMS)
Approvals	FCC, RoHS3, WEEE, Industry Canada, CE, UK CA, RCM		
Warranty	2-year parts and labor		

NOTE: SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

** Stresses above these ratings may cause permanent damage. Exposure for extended periods may degrade reliability.
This device complies with Industry Canada licence-exempt RSS standard(s) and FCC part 15.105[b] for the United States. 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.

Remote Telnet Control

A separate Telnet Control Guide is available for download. It is located on the WilliamsAV website, on the product model page, under the Download Tab.

Regulatory Statements

FCC

FCC Compliance Statement

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.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

Caution: Any changes or modifications to the equipment not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

ISED

Innovation, Science and Economic Development Canada Statement

Per RSS-Gen, Section 8.4 This device complies with Innovation, Science and Economic Development Canada license-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.

Par RSS - Gen, Section 8.4 Cet appareil est conforme à Innovation, Sciences et Développement économique Canada exempts de licence standards RSS. Le fonctionnement est soumis aux deux conditions suivantes :

(1) ce dispositif ne peut pas provoquer d'interférences et
(2) cet appareil doit accepter toute interférence , y compris les interférences qui peuvent causer un mauvais fonctionnement de l'appareil.

2-Year Warranty

Williams AV products are engineered, designed, and manufactured under carefully controlled conditions to provide you with many years of reliable service.

Williams AV warrants the WaveCAST C transmitters against defects in materials and workmanship under normal use and conditions for the 2-years from the product from date of purchase.

This warranty is available to the original end purchaser of the product and CAN BE transferred to subsequent purchasers of the product.

Microphones, earphones, headphones, batteries, chargers, cables, carry cases, and most other accessory products carry a 90-day warranty.

Williams AV has no control over the conditions under which this product is used. Williams AV, therefore, disclaims all warranties not set forth above, both express and implied, with respect to the WaveCAST C, including but not limited to, any implied warranty of merchantability or fitness of use of such equipment including, without limitation, any warranty that the use of such equipment for any purpose will comply with applicable laws and regulations. Williams AV shall not be liable to any person or entity for any medical expenses or any direct, incidental or consequential damages caused by any use, defect, failure or malfunctioning of the product, whether a claim for such damages is based upon warranty, contract, tort or otherwise, the sole remedy for any defect, failure or malfunction of the products is replacement of the product. No person has any authority to bind Williams AV to any representation or warranty with respect to the WaveCAST C System. Unauthorized repairs or modifications will void the warranty. This warranty is void if damage occurred because of misuse, or if the product has been repaired or modified by anyone other than a factory authorized service technician. Warranty does not cover normal wear and tear on the product or any other physical damage unless the damage was the result of a manufacturing defect. Williams AV is not liable for consequential damages due to any failure of equipment to perform as intended. Williams AV shall bear no responsibility or obligation with respect to the manner of use of any equipment sold by it.

This warranty does not cover reimbursement for your costs of removing and transporting the product for warranty service evaluation or installation of any replacement product provided under this warranty.

The exclusions and limitations set out above are not intended to, and should not be construed so as to contravene mandatory provisions of applicable law. If any part or term of this Disclaimer of Warranty is held to be illegal, unenforceable, or in conflict with applicable law by a court of competent jurisdiction, the validity of the remaining portions of this Disclaimer of Warranty shall not be affected, and all rights and obligations shall be construed and enforced as if this warranty did not contain the particular part or term held to be invalid. The terms of the warranty are governed by the laws of the State of Minnesota.

Prices and the specifications of the products are subject to change without notice.

For Complete Warranty Statement go to: **https://williamsav.com/support/warranty-product-registration/**

NOTICE: Williams AV products are NOT designed for use in extreme temperature, humidity or chemical environments. The introduction of chemicals such as chlorine, salt water or human sweat into the product will cause damage to the circuitry. Damage due to these causes is NOT covered under the Product Warranty.

If you experience difficulty with your system, call toll-free for customer assistance: **1-800-843-3544 (U.S.A.) or +1 952 943 2252** (outside the U.S.A.)

If it is necessary to return the system for service, your Customer Service Representative will give you a Return Authorization Number (RA) and shipping instructions.

Pack the system carefully and send it to:

Williams AV
Attn: Repair Dept.
10300 Valley View Road
Eden Prairie, MN 55344 USA

Your warranty becomes effective the date you purchase your system. If your sales receipt is not available, the date code on the product will determine your warranty status.

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