

Linear Acoustic LA-5300 Broadcast Audio Processor

Preliminary Quick Start Guide



Introduction

The roll-out of ATSC 3.0 presents a unique set of requirements and opportunities for television broadcasters, including many enhanced audio capabilities. The Linear Acoustic LA-5300 provides a single 1RU solution for audio loudness control, upmixing, AC-4 decoding for watermarking, bitstream analysis, and monitoring, transcoding of Dolby® Digital and Dolby Digital Plus sources to AC-4, as well as Dolby AC-4 encoding of PCM. As ATSC 3.0 adoption grows, support for additional features including immersive and object-based audio, interactive consumer control, personalized audio, and multiple presentations within a single stream will be incorporated into the LA-5300 via software updates.

Hardware

LA-5300 Front Panel



Figure 1: Front panel

The front panel of the LA-5300 includes the following:

- **Reset button** for restarting the unit from the front panel (1A)
- **Four status LEDs** indicating the **status of each power supply** (1B, 1C), the **overall status** of the unit (1D), and **sync** for the reference clock (1E)
- A **color LCD display** to show status and basic configuration parameters (1F)
- A **five-button navigation cluster** with Left, Right, Up, and Down arrows plus a green “OK” button (1G)
- A **USB port** used for software updates (1H).

LA-5300 Rear Panel



Figure 2: Rear panel

The rear panel includes the following connections:

- Two **RJ-45 Gigabit Ethernet connections**, one for network remote control (2A) and one for AES67 I/O (2B)
- Two independent **3Gb/s HD/SD-SDI inputs and outputs** (2C) on female BNC connectors
- **Quad-Link SDI or MADI I/O** (2D) - optional
- Five **AES-3 I/O** connections (2E) on female BNC connectors
- Parallel **GPI/O control port** (female DB-15) for five inputs and five outputs (2F)
- Two **IEC power inlets** for the redundant internal universal auto-ranging power supplies (2G)

Installation and Initial Setup

Installation

LA-5300 is a 1RU product intended to be permanently installed in standard 19 ½" equipment rack and secured with four standard rack screws. LA-5300 is fan cooled with air intakes and exhausts located on the side of the unit just behind the front panel, but whenever possible, it is recommended to leave 1RU of empty space above and below the unit.

Power

Plug the supplied IEC power cords into the LA-5300 and connect each to different mains power sources. Remember that while redundant supplies do protect against the unit losing power in the event of a PSU failure, the loss of mains supply voltage is a bigger concern. Accordingly, each supply should be fed from a different circuit equipped with adequate surge protection and fitted with an uninterruptable power supply (UPS).

Boot Up and Splash Screen

The unit will power up as soon as the power cords are connected, and using the **Reset button** (A) is not required on initial startup. The front panel of the unit will remain dark during most of the boot process but the **Status LED** (D) will light. Once the boot process is complete, the Home Screen will appear and the Status LED will turn green.

Setting IP Addresses

LA-5300 ships with DHCP enabled and will automatically retrieve an IP address when connected to a network with a DHCP server.

Important!

*Both the Control and AES67 connections **must** be connected to 1000BASE-T (Gigabit) switch ports but should **not** be connected to a common network with the same netmask/subnet. If both connections must be on a common network, make the connection to the AES67 port and set the values of each Control port field to 0.0.0.0.*

To set a fixed IP address for the Control port:

- Press the **Right button** once to show the Information screen and once more to navigate to the IP Configuration (Control) screen
- Press the **Down button** to highlight “Edit”
- Press the **OK button** to highlight “Use DHCP”
- Press the **Right button** to highlight “Yes”
- Press the **Up/Down buttons** to select “No”
- Press the **Left button** to highlight “DHCP” again
- Press the **Down button** to highlight “Address”
- Press the **Right button** to move to the first digit of the IP address
- Use the **Up/Down buttons** to change the value
- Use the **Right/Left buttons** to select another digit to edit
- When finished editing the Address field, press the **Right/Left buttons** to highlight “Address” again
- Press the **Down button** to navigate to the “Netmask” field, following the instructions above for entering the value
- When finished editing the Netmask field, press the **Right/Left buttons** to highlight “Netmask” again
- Press the **Down button** to navigate to the “Gateway” field, following the instructions above for entering the value
- When finished editing the Gateway field, press the **Right/Left buttons** to highlight “Gateway” again
- Press the **Down button** to highlight “Update”
- Verify the information has been entered correctly and press the **OK button** to save the new values
- If you notice incorrect information and need to start over, use the **Right button** to highlight “Cancel” followed by the **OK button**

If you are using AES67 I/O, pressing the **Right button** from the IP Configuration (Control) screen will bring you to the IP Configuration (AES67) screen. The steps for configuring this port are identical to those above for the Control port.

Connecting to the Web-Based User Interface

No special client software is required to remotely connect to the LA-5300, and the HTML-5-based GUI is device, operating system, and browser agnostic. We recommend Google Chrome, Firefox, or Apple Safari. The computer or tablet should be on the same network and subnet as the LA-5300.

Once both LA-5300 and your computer are connected to your network, enter the IP address of the LA-5300 in the URL field of your browser. Once connected, the **Home screen** will appear.

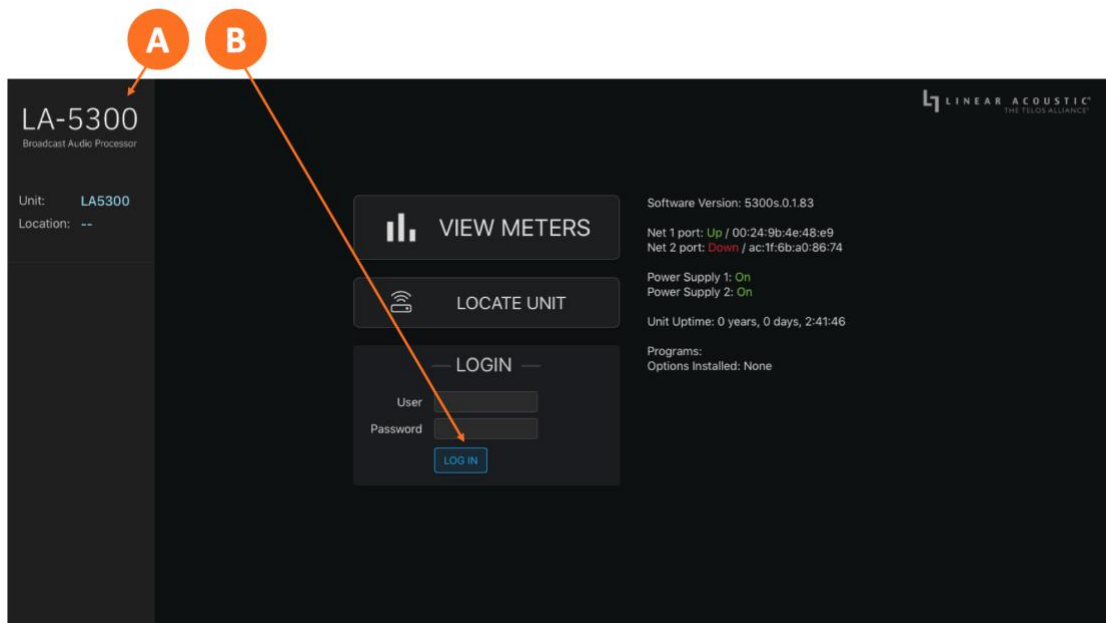


Figure 3: Home screen

Clicking on the **LA-5300 logo** (3A) will always bring you back to the Home screen. To log in to the unit, click the **Log In button** (3B). Individual user accounts and passwords will be supported in a future software version.

Input and Output Routing

Initial I/O Setup

Once logged in, click on the **I/O menu** (4A). Choose between SDI/AES-3/MADI or AES67 inputs and outputs in the **Workflow menu** (4B). Select between viewing Program (processed) and Passthrough (unprocessed) routing with the **Program/Passthrough switch** (4C).

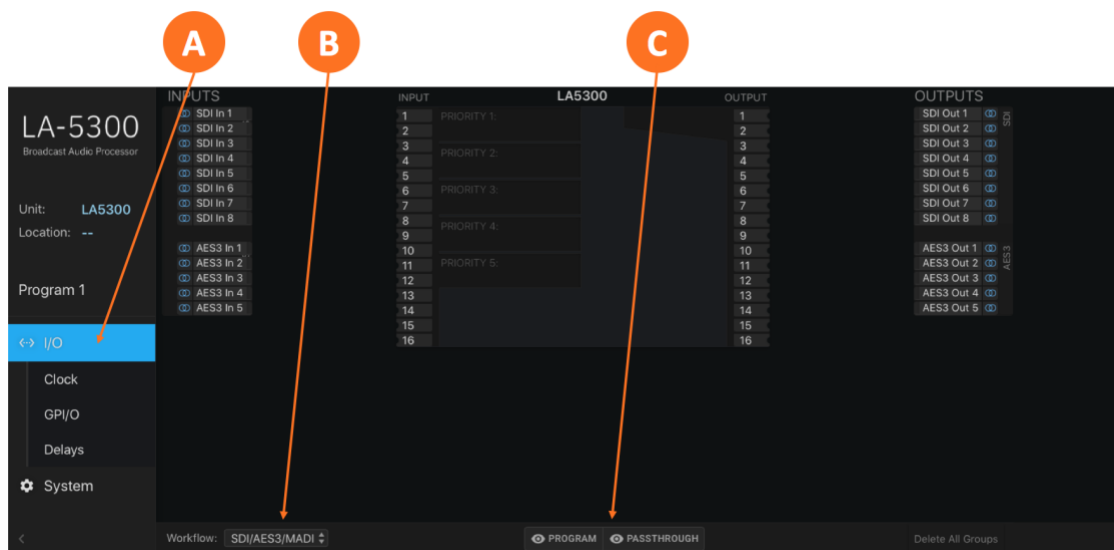


Figure 4: I/O menu

Routing audio into the LA-5300 is a two-step process. The first step is **creating an input group** from the available physical hardware inputs. The second step is **routing the audio from these inputs to the program (processor) input**.

Creating an Input Group

Click on your first **audio input source** (5A) to highlight it, then right click and select “Create Input Group.” You may enter a custom name for this source in the **Label field** (5C) and **customize the color** of the graphical routing lines (5B).

Click the **Save button** (5D) to save the configuration or the **Cancel button** (5E) if you need to start over without saving your configuration.

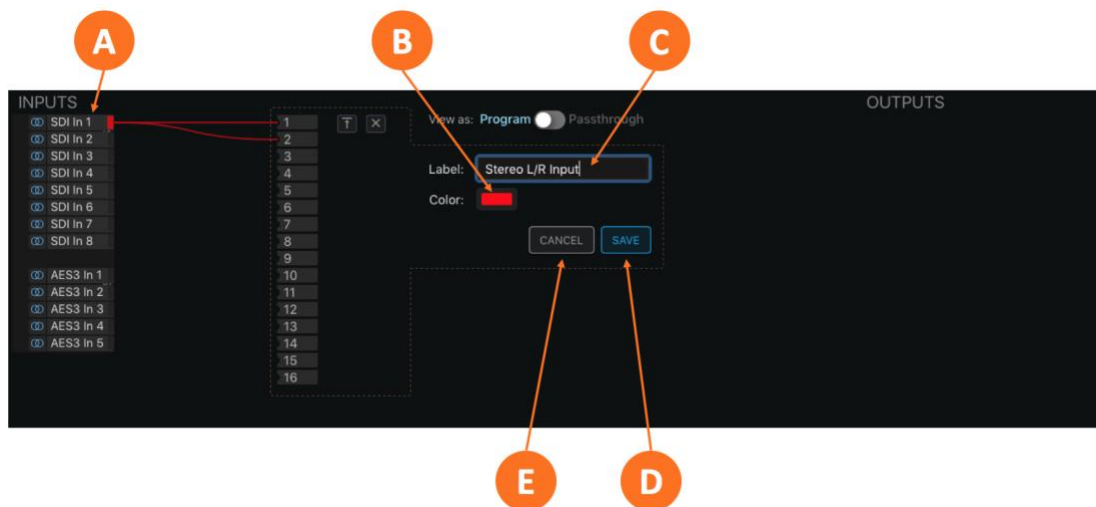


Figure 5: Creating the input group.

Routing Audio to the Program Input

After saving the input group, it is necessary to first set the priority of the input source by dragging the **input audio lines** (6A) and then clicking when the **desired priority level** (6B) is highlighted. The LA-5300 will look for audio first on inputs connected to Priority 1. If no signal is present, it will look to subsequent priorities in order.

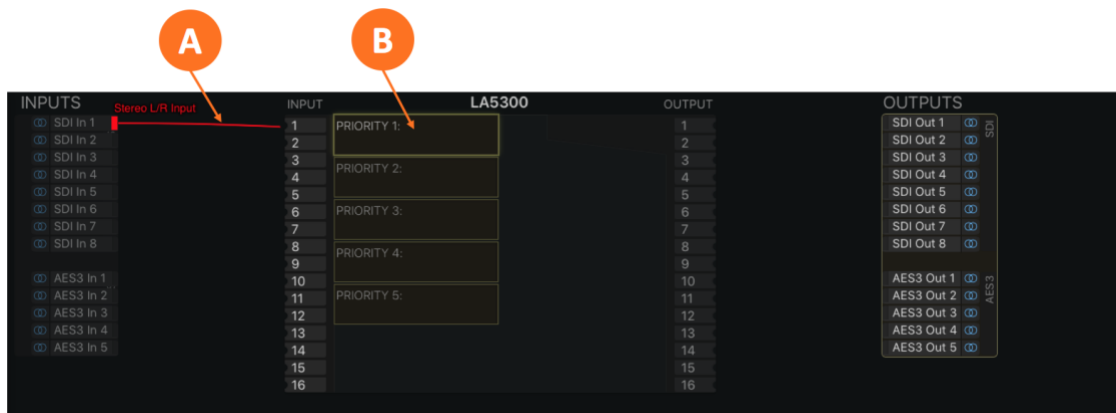


Figure 6: Setting priority.

Next, choose input signal type (PCM, DD+, or AC-4) from the **Type** dropdown menu (7A).

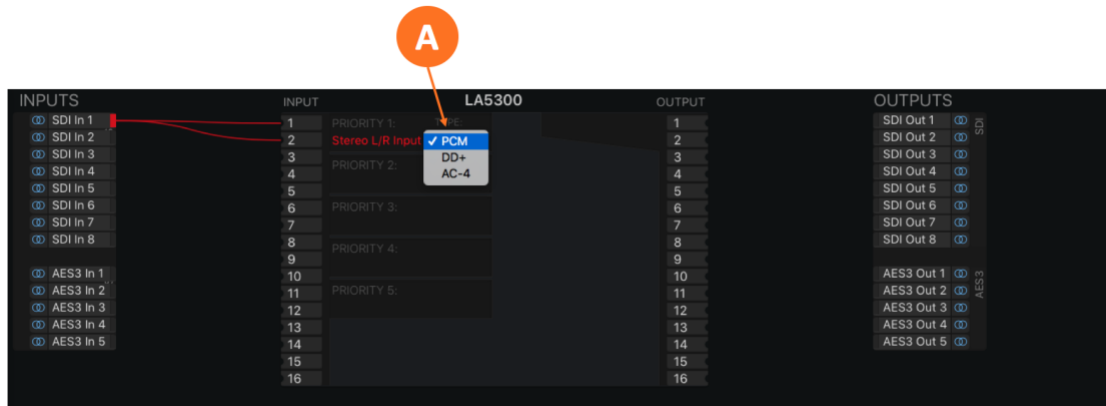


Figure 7: Input signal type.

To edit or delete a group, highlight then right click on the **colored Edit rectangle** (8A).

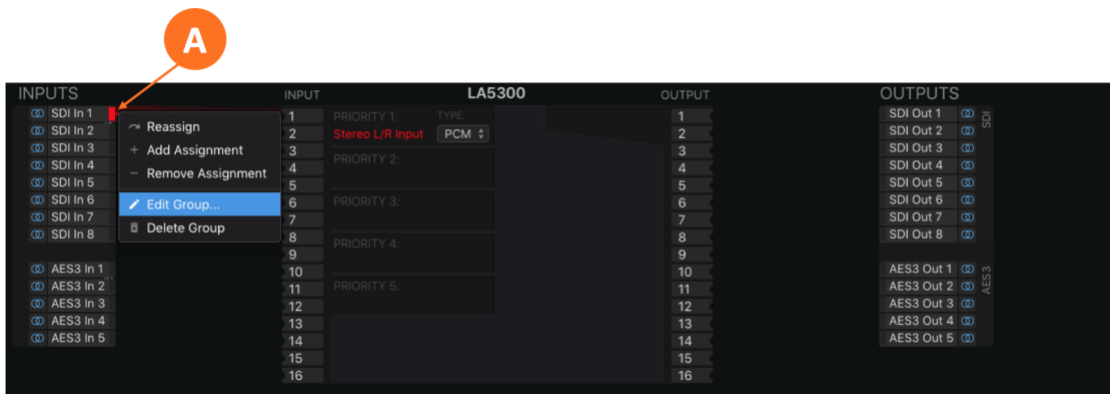


Figure 8: Editing or deleting input group.

Creating an Output Group

The steps for creating an output group are identical to creating an input group, but with the Outputs menu.

Routing Audio to the Program Output

Once the first output group has been created and saved, drag the **output audio lines** from the group to the desired program output, then click to save.

Clock Reference

Setting the Clock Reference

Click on the **Clock menu** (9A). Use the dropdown menus to choose a **Primary Reference Clock** and a **Secondary Reference Clock** (9C) and, if needed, a **VRef clock source** (9E). The **status** of the selected Primary and Secondary Reference Clocks is shown to the right of the dropdown menu (9D). The status of the clock is shown for each input (9B) along with the format, resolution, and frame rate for SDI sources.

The absence or presence of a signal for each input type is shown in the **Input Status** section (9B).

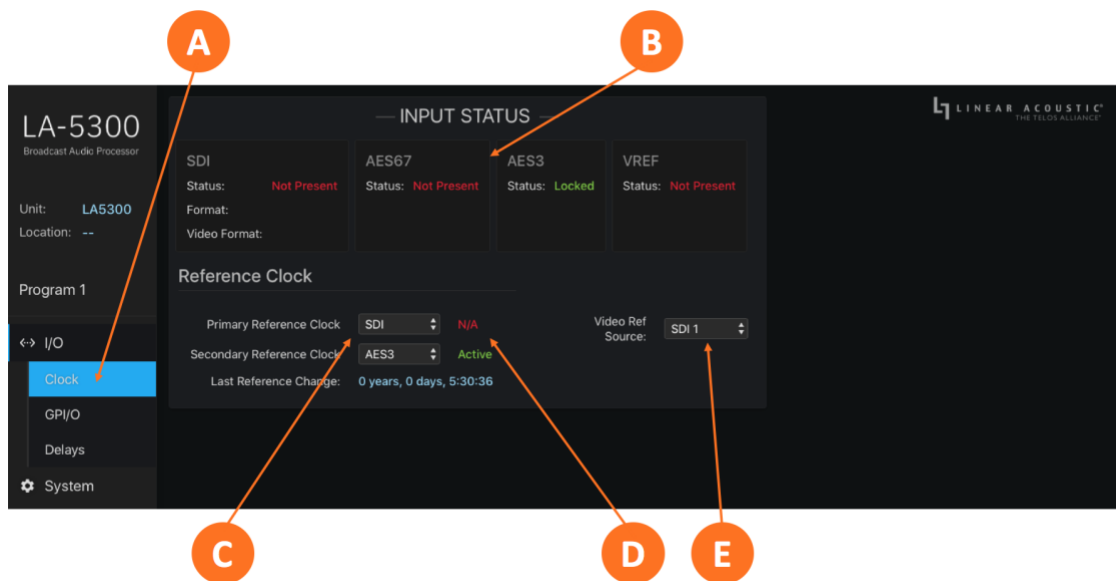


Figure 9: Setting the clock reference.

Signal Processing and Encoding

Controls for Dolby® AC-4 encoding, upmixing, Nielsen and Verance watermark encoding, and monitoring are found in the **Program 1 menu**.

Input metering (10A) and **output metering** (10B) for all channels and all I/O is also located on this page.

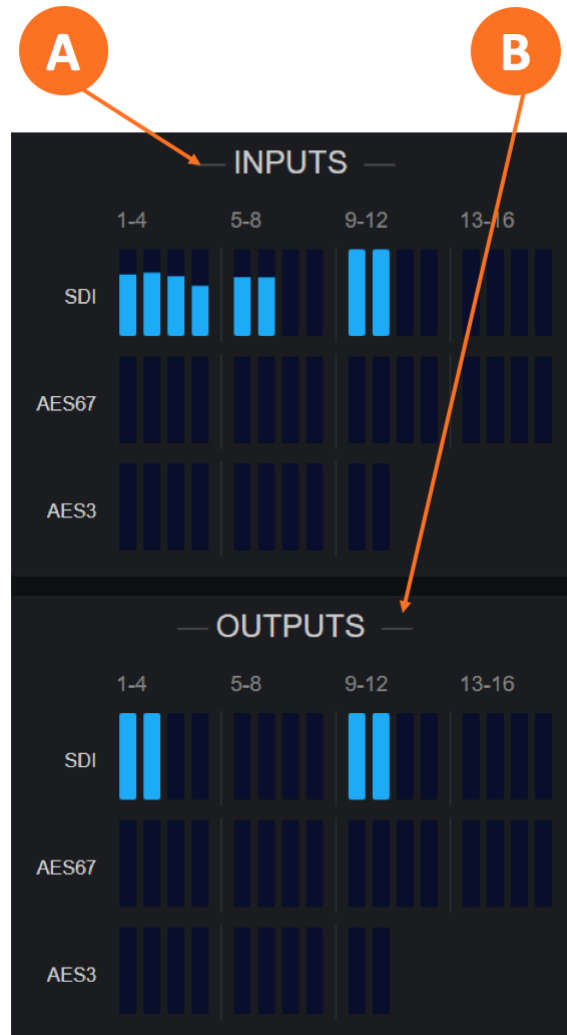


Figure 10: Input and output meters.

AC-4 Encoding

Click on the **AC-4 Encoder dropdown menu** (11A). Choose the appropriate **Channel Mode** (11B), **Frame Rate** (11C), **Bit Rate** (11G), **Type** (11F), **Loudness Regulation standard** (11E), and **Language** (11D) for your application.

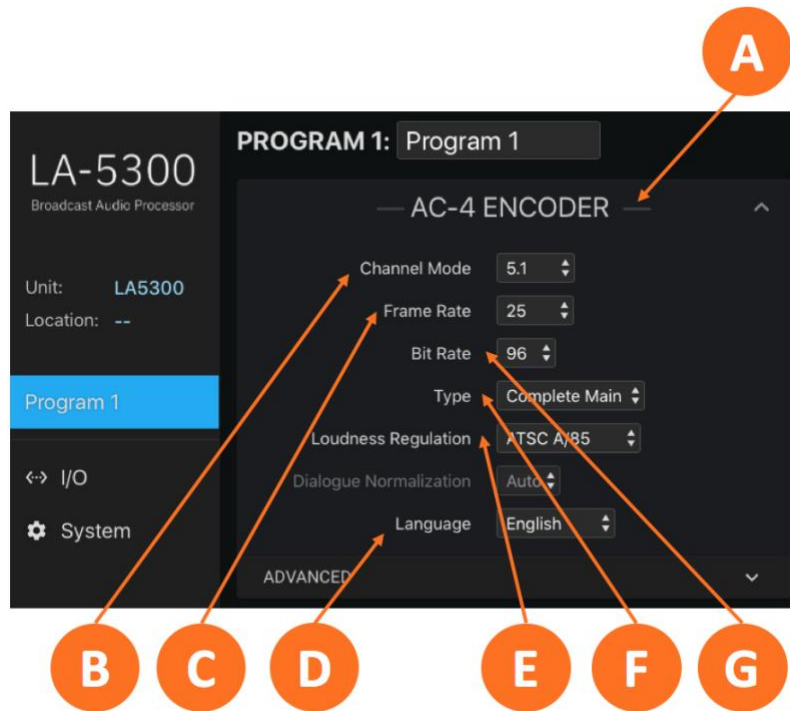


Figure 11: AC-4 encoding.

Upmixing

Click on the **Upmixing dropdown menu** (12B).

Choose the program input format using the **Input Format dropdown menu** (12C). By default, it is set to “Auto Detect” so that incoming content that already matches the desired output format will pass through unaltered, while 2- or 3-channel content will be automatically upmixed. Unless the channel format of your incoming content is *always* the same, we strongly recommend leaving this control set to “Auto Detect” to avoid unpredictable and unexpected results.

Use the **Output Format dropdown menu** (12D) to choose the desired channel format on the output.

If you change any upmixing values and want to save those changes to a custom preset, click on the **Save As button** (12E). This configuration can then be recalled by clicking on the **Preset dropdown menu** (12A).

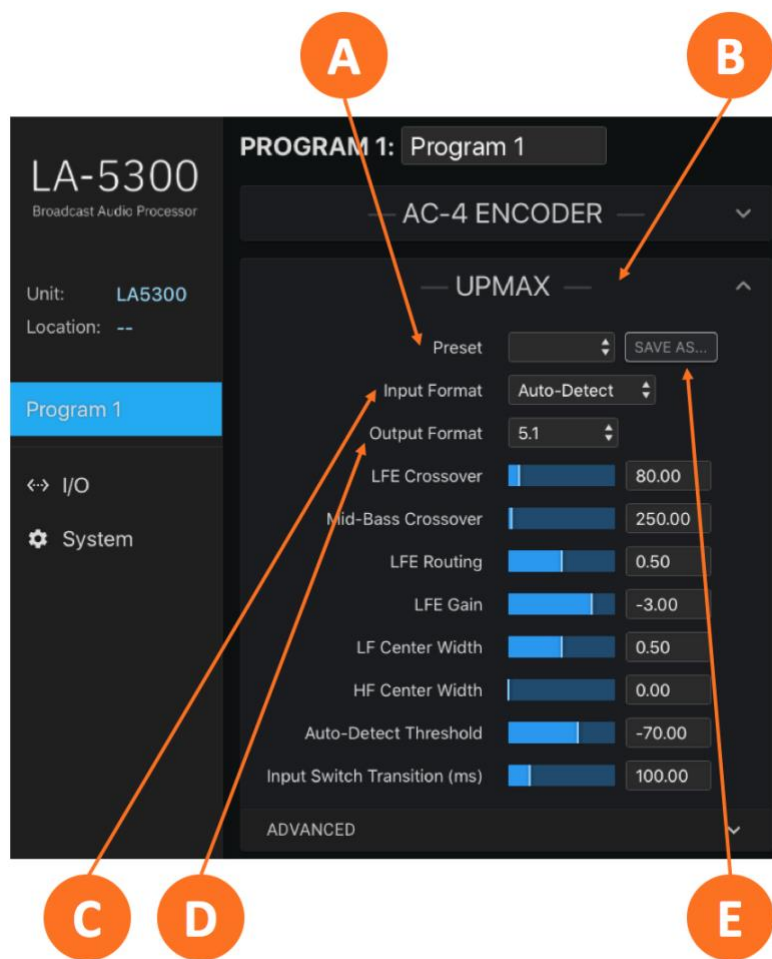


Figure 12: Upmixing

Nielsen Watermark Encoding

Click on the **Nielsen dropdown menu** (13C).

Click on the **Enable dropdown menu** (13B) to enable/disable Nielsen watermarking. Choose the appropriate process for your application in the **Active Process dropdown menu** (13A). Click on the **SID, Check Digit, CSID, and/or CBET Check Digit** fields (13D) to enter the specific codes as provided by Nielsen.

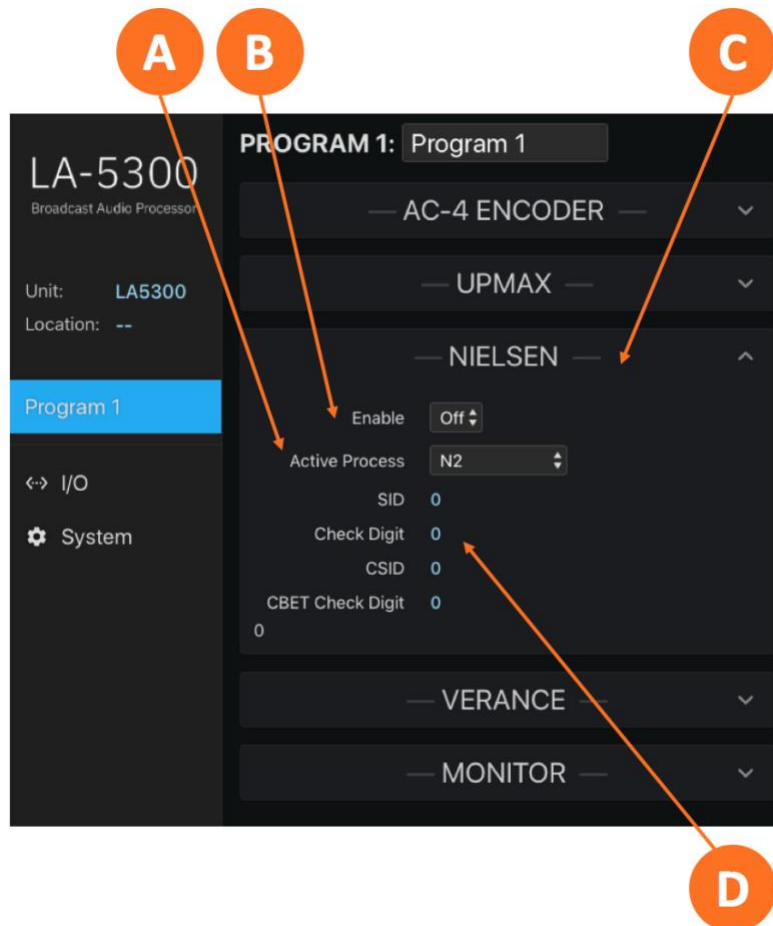


Figure 13: Nielsen watermark encoding.

Verance Watermark Encoding

Click on the **Verance dropdown menu** (14C).

Click on the **Enable dropdown menu** (14B) to enable/disable Verance watermarking and the **Calibrate dropdown menu** (14A) to enable/disable the calibration mode. Click on the **Server Code** and **Interval Code fields** (14D) to enter the specific codes as provided by Verance.

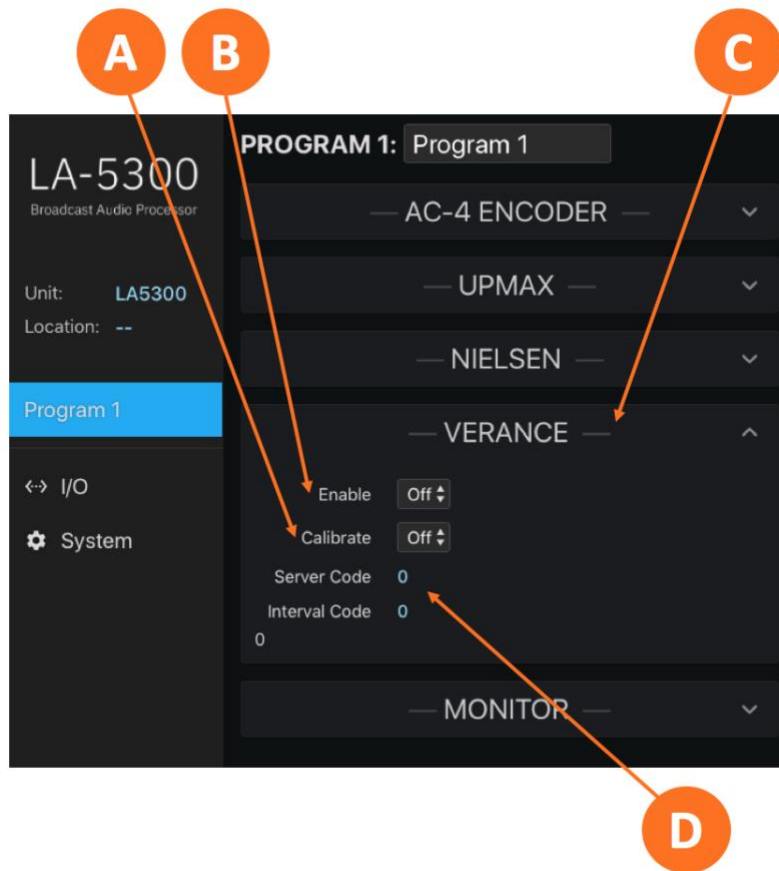


Figure 14: Verance watermark encoding.

Monitoring

The LA-5300 includes a built-in AC-4 decoder for confidence monitoring. Click on the **Monitor dropdown menu** (15C) to access it.

Click on the **Channel Mode dropdown menu** (15B) to choose a 5.1-channel output or a Lo/Ro or Lt/Rt downmix. The **Target Reference Level dropdown menu** (15A) sets the decoded monitor output level. The **DRC Enable dropdown menu** (15 D) determines whether or not the monitor output obeys the DRC profile metadata from the incoming AC-4 bitstream.

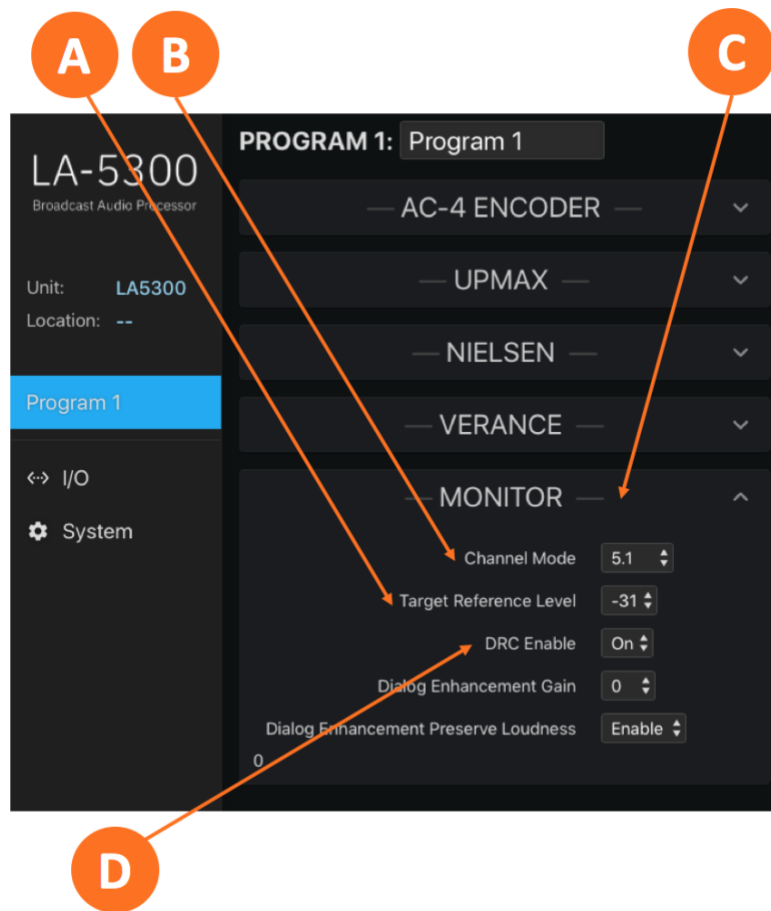


Figure 15: AC-4 confidence monitoring.

User Warnings and Cautions

The installation and service instructions in this manual are for use by qualified personnel only.

To avoid electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified personnel

This instrument has an auto-ranging line voltage input. Ensure the power voltage is within the specified range of 100-240VAC. The ~ symbol, if used, indicates an alternating current supply.



This symbol, wherever it appears, alerts you to the presence of uninsulated, dangerous voltage inside the enclosure – voltage which may be sufficient to constitute a risk of shock.



This symbol, wherever it appears, alerts you to important operating and maintenance instructions. Read the manual.

CAUTION: HAZARDOUS VOLTAGES

The instrument power supply incorporates an internal fuse. Hazardous voltages may still be present on some of the primary parts even when the fuse has blown. If fuse replacement is required, replace fuse only with same type and value for continued protection against fire.

WARNING:

The product's power cord is the primary disconnect device. The socket outlet should be located near the device and easily accessible. The unit should not be located such that access to the power cord is impaired. If the unit is incorporated into an equipment rack, an easily accessible safety disconnect device should be included in the rack design.

To reduce the risk of electrical shock, do not expose this product to rain or moisture. This unit is for indoor use only.

This equipment requires the free flow of air for adequate cooling. Do not block the ventilation openings on the rear and sides of the unit. Failure to allow proper ventilation could damage the unit or create a fire hazard.

Do not place the units on a carpet, bedding, or other materials that could interfere with any panel ventilation openings.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

USA CLASS A COMPUTING DEVICE INFORMATION TO USER WARNING

This equipment generates, uses, and can radiate radio-frequency energy. If it is not installed and used as directed by this manual, it may cause interference to radio communication. This equipment complies with the limits for a Class A computing device, as specified by FCC rules, part 15, subpart j, which are designed to provide reasonable protection against such interference when this type of equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference. If it does, the user will be required to eliminate the interference at the user's expense. Note: objectionable interference to TV or radio reception can occur if other devices are connected to this device without the use of shielded interconnect cables. FCC rules require the use of shielded cables.

CANADA WARNING

This digital apparatus does not exceed the Class A limits for radio noise emissions set out in the radio interference regulations of the Canadian department of communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques (de Class A) prescrites dans le règlement sur le brouillage radioélectrique édicté par le ministère des communications du Canada.

CE CONFORMANCE INFORMATION

This device complies with the requirements of the EEC council directives:

- 93/68/EEC (CE MARKING)
- 73/23/EEC (SAFETY – LOW VOLTAGE DIRECTIVE)
- 89/336/EEC (ELECTROMAGNETIC COMPATIBILITY)

Conformity is declared to those standards: EN50081-1, EN50082-1.

Trademarks, Patents, and Licenses

Telos is a trademark of TLS Corp. All other trademarks are the property of their respective holders.

All versions, claims of compatibility, trademarks, etc. of hardware and software products not made by The Telos Alliance which are mentioned in this manual or accompanying material are informational only.

The Telos Alliance makes no endorsement of any particular product for any purpose, nor claims any responsibility for operation or accuracy. We reserve the right to make improvements or changes in the products described in this manual which may affect the product specifications, or to revise the manual without notice.

This document and its content are copyrighted by TLS Corporation and may not be copied, reproduced, or distributed in any form without expressed written permission.

Patent information can be found at www.TelosAlliance.com/legal

Updates

Telos Infinity Like Gateway's features and operations are determined largely by software. The Telos Alliance strives to provide the most stable and feature-rich software available. We encourage you to check for software updates from time to time by visiting our website or by contacting us directly.

Feedback

We welcome feedback on any aspect of our products or this manual. In the past, many good ideas from users have made their way into software revisions or new products. Please contact us with your comments or suggestions.

We support you...

By Phone/Fax

You may reach our Telos Support Team in emergencies by calling +1 216-622-0247. For billing questions or other non-emergency technical questions, please call +1 216-241-7225 between 9:00 AM to 5:00 PM USA Eastern Time, Monday through Friday.

By Email

Non-emergency technical support is available at Support@TelosAlliance.com

By Web

The Telos Web site has a variety of information that may be useful for product selection and support. The URL is <https://www.telosalliance.com/telos>

Service

You must contact Telos Alliance before returning any equipment for factory service. We will need your unit's serial number, located on the back of the unit.

We will issue a return authorization number, which must be written on the exterior of your shipping container.

Please do not include cables or accessories unless specifically requested by the Technical Support Engineer. Be sure to adequately insure your shipment for its replacement value. Packages without proper authorization may be refused.

US customers, please contact Telos Alliance Technical Support at +1-216-622-0247.

All other customers should contact local representative to make arrangements for service.

Warranty

For the latest Telos Alliance warranty, visit: telosalliance.com/warranty

Register your product

Register your product today to get the full benefits of our warranty, support, and product updates. telosalliance.com/product-registration/

The Telos Alliance

1241 Superior Ave. Cleveland, OH 44114 USA
+1 (216) 241-7225