
User Guide

This document covers installation and use of the Control Console application that supports the Cirrus Logic Voice Capture Development Kit for Amazon AVS-Enabled Products. It also contains additional assistance for troubleshooting issues.

Table of Contents

1 Initial Configuration of the CRD1569-1	1
2 The Control Console.....	1
2.1 Home Menu	2
2.1.1 Status Message	2
2.1.2 Stop/Start Button.....	2
2.1.3 Logs Button	3
2.1.4 Clear Button	3
2.2 Login Menu	3
2.3 Configurations Menu.....	3
2.3.1 WiFi Menu	3
2.3.2 AVS Menu	4
2.3.3 DUET Config Menu	5
3 Troubleshooting.....	12
4 Revision History.....	12

1 Initial Configuration of the CRD1569-1

Refer to the CRD1569-1 Quick Start Guide for initial configuration. This document assumes that the user has completed all steps described in that document.

2 The Control Console

The Control Console is supplied with the CRD1569-1 Cirrus Logic Voice Capture Development Kit for Amazon AVS-Enabled Products, which is designed to assist device manufacturers to easily enable Alexa capability into a wide range of their electronic devices.

The Control Console is a web browser-based application, allowing use from both the Raspberry Pi device that the voice capture board is attached to, or from a remote PC on the same local network. The screen is structured as shown in Figure 1.

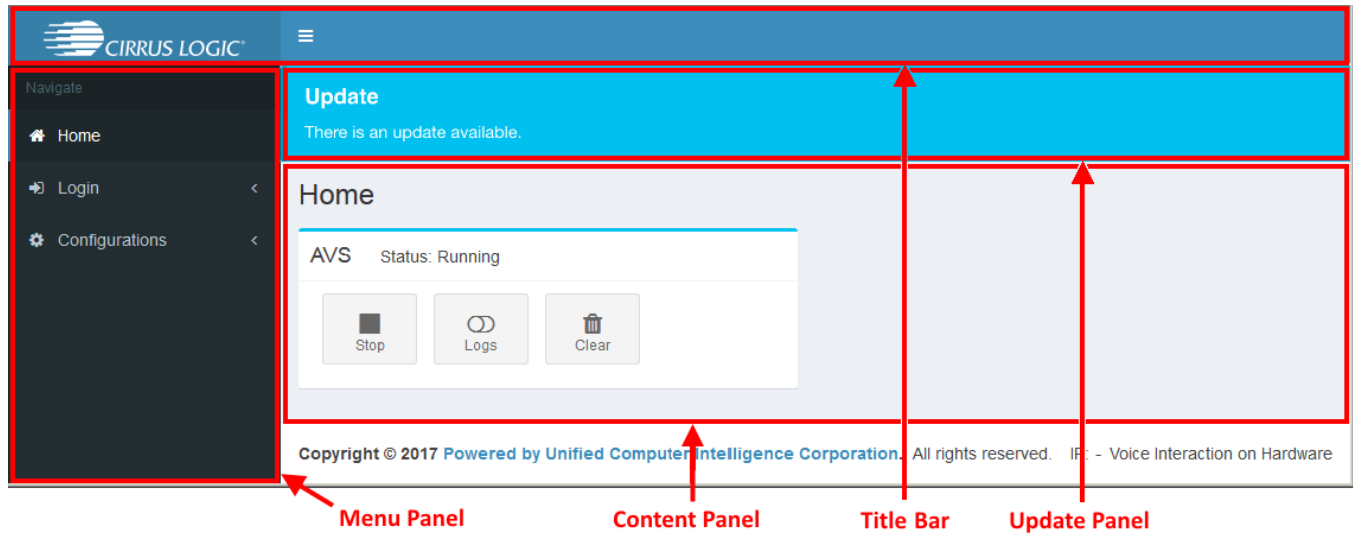


Figure 1 Control Console Layout

Note that the update panel is only displayed if an update is available.

2.1 Home Menu

The *Home* menu option displays the home panel, shown in Figure 2; this panel is displayed by default when the Control Console starts.

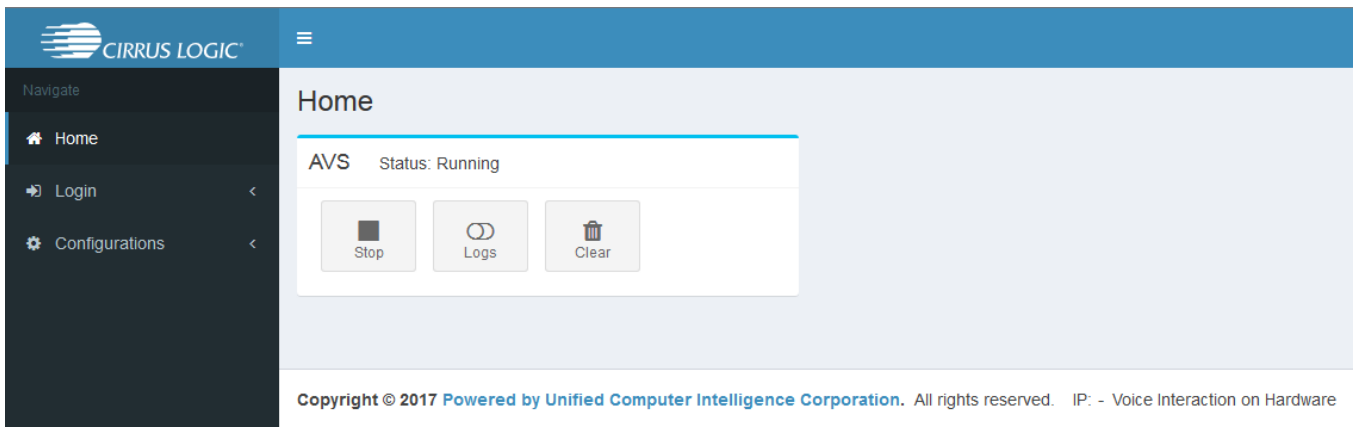


Figure 2 Home Panel

2.1.1 Status Message

The status message shows whether the AVS application is currently running or stopped.

2.1.2 Stop/Start Button

This button changes depending on the status of the AVS application, and allows the application to be stopped or started.

2.1.3 Logs Button

This button switches logging off or on. If on, the log is displayed in a text window and stored on the Raspberry Pi in the file `/var/log/avs-java.log`.

Log messages are in the format: `time [thread] TYPE source message`

- `time` – time since application was started
- `[thread]` – thread that generated this message
- `TYPE` – message type: INFO, DEBUG, WARN, ERROR
- `source` – Java package that generated this message
- `message` – log message

2.1.4 Clear Button

This button clears the contents of the log window. Note that the log file, `/var/log/avs-java.log`, on the Raspberry Pi is also cleared.

2.2 Login Menu

The *Login* menu option displays the AVS login panel, shown in Figure 3; this panel allows developers to log in to their AVS account, so the voice capture board can access the AVS. This is a one-time operation, which generates a token used to automatically connect subsequently.

Note that, having logged in, the Control Console stores the credentials for future use, so a login is only required if the Amazon credentials change.

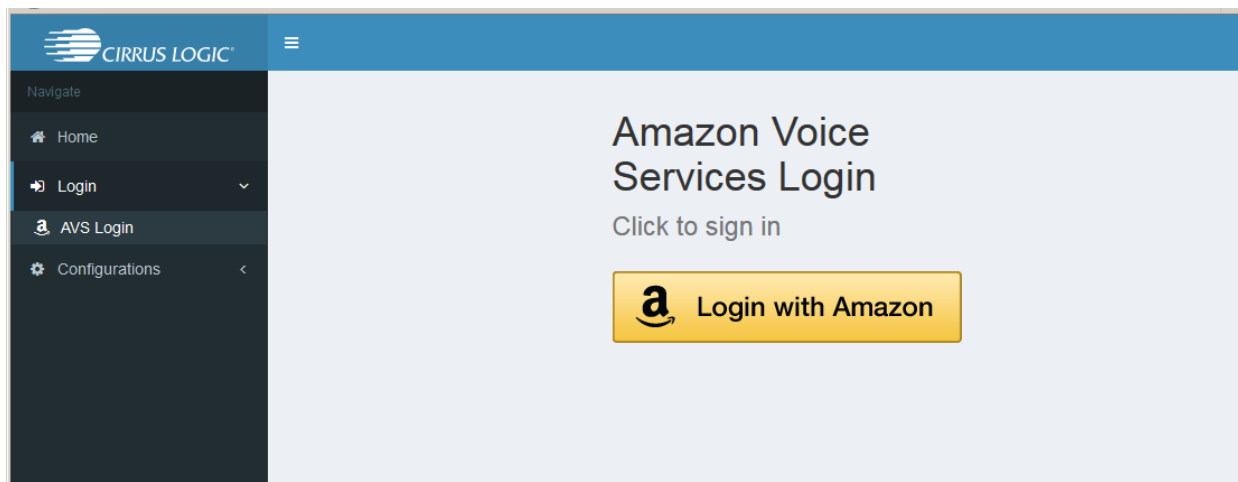


Figure 3 Login – AVS Login Panel

2.3 Configurations Menu

The *Configurations* menu allows the voice capture board hardware to be configured. The following sections discuss the sub-menu options available.

2.3.1 WiFi Menu

Refer to the CRD1569-1 Quick Start Guide for the Wi-Fi connection process.

Note that, as an alternative to a wireless connection, an Ethernet cable can be plugged in to the Raspberry Pi to provide a wired connection.

The *WiFi* menu option displays the WiFi Settings panel, shown in Figure 4, which allows Wi-Fi access points to be configured.

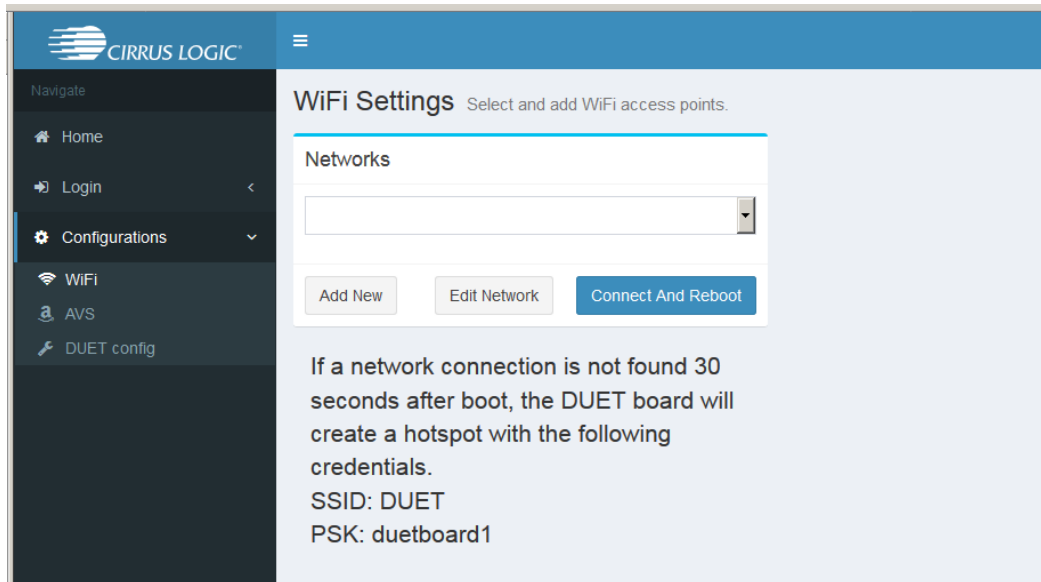


Figure 4 Configurations – WiFi Settings Panel

The dropdown lists all the Wi-Fi networks that have been entered into the Control Console.

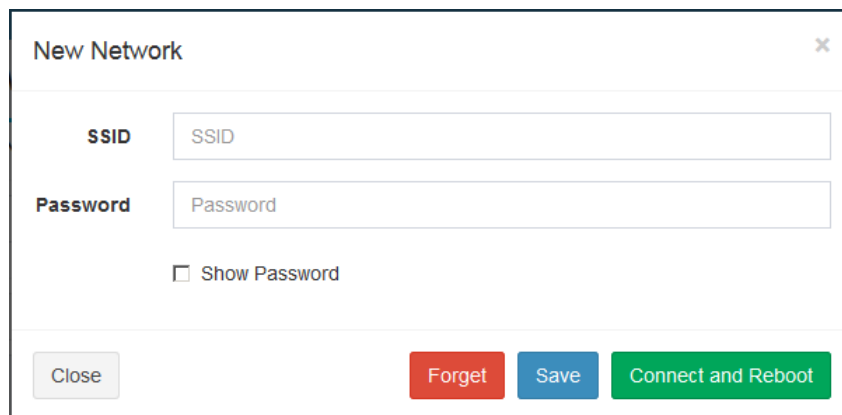


Figure 5 Configurations – WiFi Settings Panel – Add Network

To edit or delete the details of a previously-added network, select the network in the dropdown and click the *Edit* button; a dialog similar to that shown in Figure 5 is displayed with the existing details; these can be edited and the wireless connection re-established by clicking on the *Save* button then the *Connect and Reboot* button. To completely delete the network details, click the *Forget* button.

2.3.2 AVS Menu

The AVS menu option displays the AVS configuration panel, shown in Figure 6, which allows configuration of the AVS.

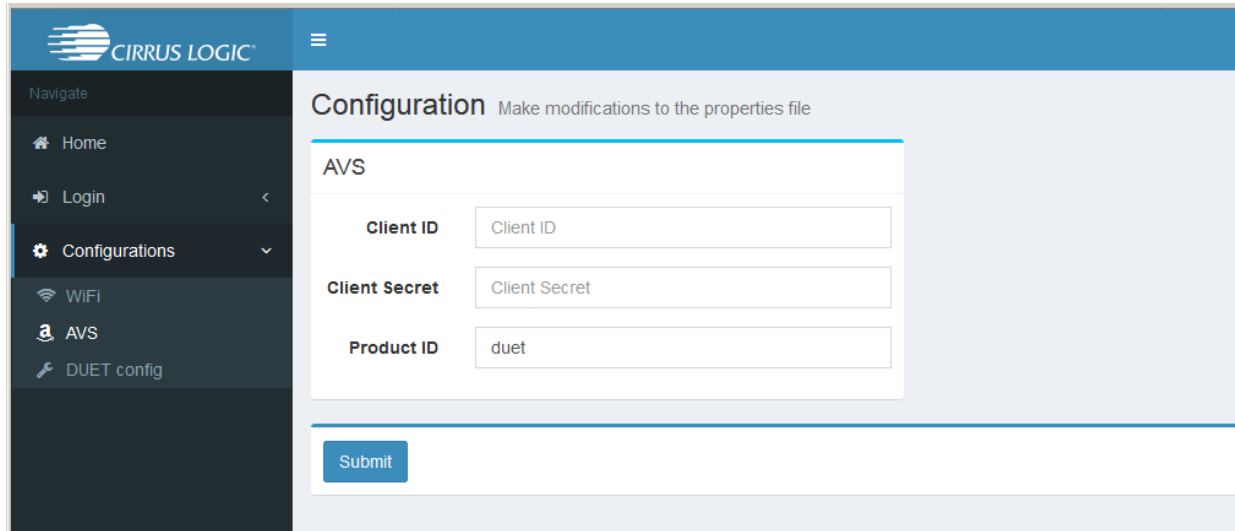


Figure 6 Configurations – AVS Configuration Panel

The following AVS credentials must be entered to login to the AVS:

- Client ID – Amazon account client ID
- Client Secret – Amazon account secret credential
- Product ID – Amazon account device type ID

2.3.3 DUET config Menu

The *DUET config* menu option displays the DUET configuration panel, shown in Figure 7, which allows:

- changes to the properties of the voice capture board
- configuration of the SoundClear software
- display of the data being processed by the algorithms running on the voice capture board

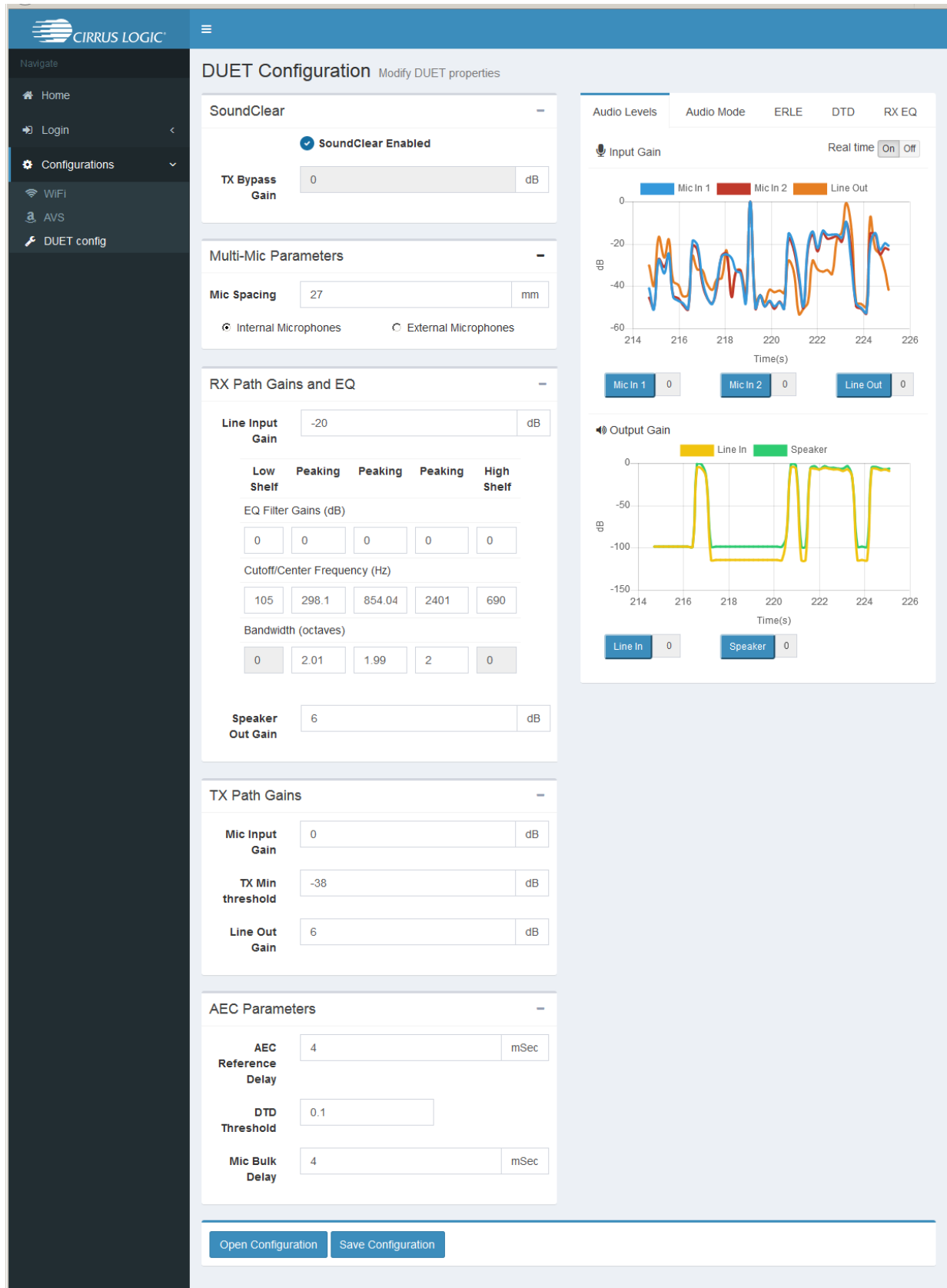


Figure 7 Configurations – DUET Configuration Panel

2.3.3.1 Properties

The first column of the DUET configuration panel contains blocks for making changes to the properties of the voice capture board and to the configuration of the SoundClear software. These are discussed in the sections below.

To save the values entered in the properties column for future retrieval, click on the *Save Configuration* button at the base of the column. The values are uploaded from the voice capture board and can either be opened with a text editor or saved to a *.conf text file for later analysis, editing, or downloading back to the voice capture board by clicking the *Open Configuration* button.

2.3.3.1.1 SoundClear

- SoundClear check box – enable/disable SoundClear firmware
- TX Bypass Gain – Tx gain in dB, acceptable range is -infinity to 24.0824 dB

2.3.3.1.2 Multi-Mic Parameters

- Mic spacing – acceptable range is 0.0 to 512 mm, default value is 27.0 mm
- Internal / External Microphones radio buttons – choice of either using the voice capture board's on-board microphones or an external microphone array

2.3.3.1.3 RX Path Gains and EQ

- Line Input Gain – line input gain in dB, acceptable range is -infinity to 24.0824 dB
- EQ Filter Gains (dB) boxes – acceptable range is -12 to 12 dB
- Cutoff/Center Frequency (Hz) boxes – acceptable range is 50 to 20000 Hz
- Bandwidth (octaves) boxes – acceptable range is 0.100 to 3
- Speaker Out Gain – applied to both the internal speaker amplifier and headphone out, acceptable range is -32 to 16 dB

2.3.3.1.4 TX Path Gains

- Mic Input Gain – microphone input gain in dB, acceptable range is -infinity to 24.0824 dB
- TX Min Threshold – acceptable range is -infinity to 6.0206 dB
- Line Out Gain – line output gain in dB, acceptable range is -infinity to 24.0824 dB

2.3.3.1.5 AEC Parameters

- AEC Reference Delay – delay in time from the AEC reference point and the AEC input, acceptable range is 4 to 10 mSec
- DTD Threshold – acceptable range is 0 to 1
- Mic Bulk Delay – delay in time of the echo signal from the AEC reference point through the speaker and microphone path to the AEC input, acceptable range is 0 to 12 mSec

2.3.3.2 Graphs

The second column of the DUET configuration panel (displayed below the first if space is confined) contains real-time graphs for displaying voice capture board processing data. These are discussed in the sections below.

2.3.3.2.1 Audio Levels

The audio levels graph, shown in Figure 8, displays the levels for the microphones, line in, line out and speaker audio paths.



Figure 8 Graph – Audio Levels

The *Real time* radio buttons allow the display to be paused for analytical purposes. This is shown in Figure 9.

The colored blocks show what each line on the graph represents. Clicking on a colored block or its label turns off or on the associated line on the graph display. This is used in Figure 9 to display only a single line for clarity.

The blue buttons, one for each line on the graph, display the clip count. If the clip count is non-zero, the value is displayed with a pink background, as shown in Figure 9. Clicking a button resets its clip count value to zero.

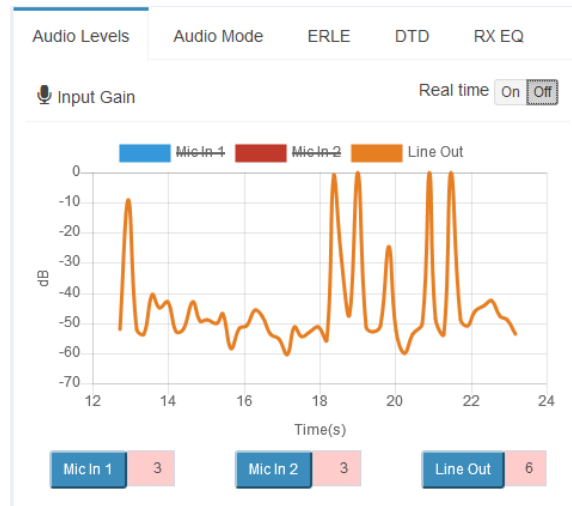


Figure 9 Graph – Audio Level with Clipping

Moving the mouse over lines on the graph (best done when the real time display is off) displays the values of the points at that position, as shown in Figure 10. Positions on the other graph lines corresponding to that point in time are also marked.

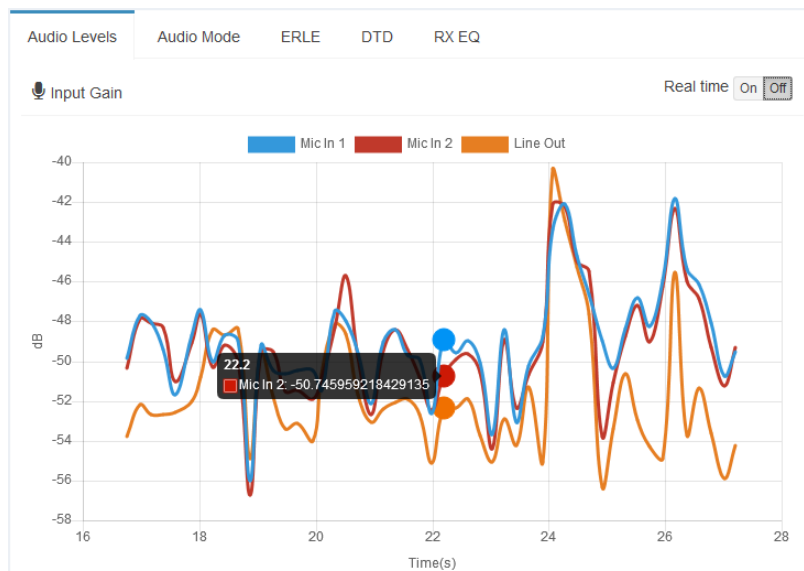


Figure 10 Graph – Audio Levels with Data Points

2.3.3.2.2 Audio Mode

The audio mode graph, shown in Figure 11, displays where audio is coming from at each point in time. The origin of the audio is indicated on the Y axis – 'TX' indicates input from the user, 'RX' indicates that downlink audio from the AVS is present, 'TX & RX' indicates that the user and the AVS downlink audio are both present at the same time.

The *Real time* radio buttons allow the display to be paused for analytical purposes.

Moving the mouse over lines on the graph (best done when the real time display is off) displays the values of the points at that position.

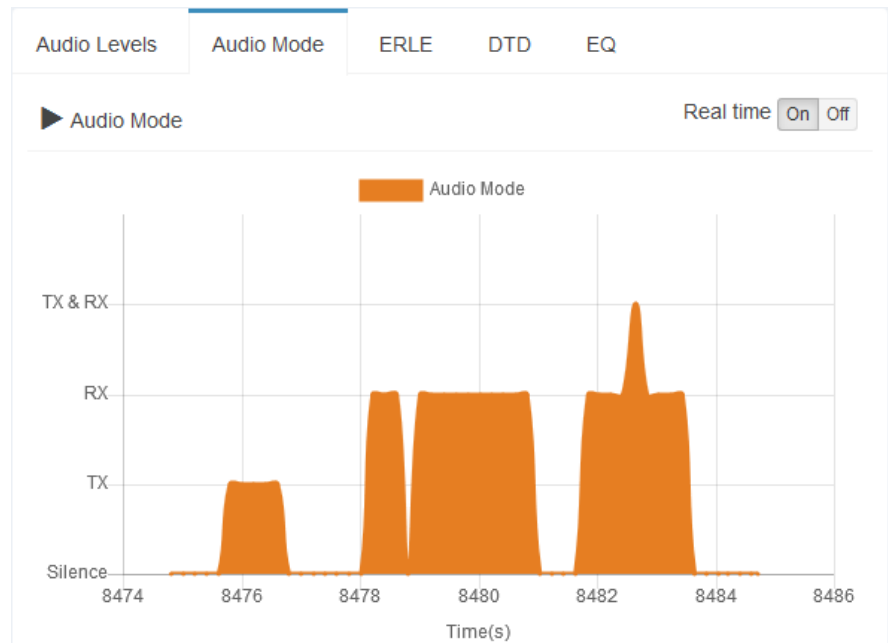


Figure 11 Graph – Audio Mode

2.3.3.2.3 ERLE

The echo return loss enhancement (ERLE) graph, shown in Figure 12, displays the real time echo cancelation performance.

The *Real time* radio buttons allow the display to be paused for analytical purposes.

The colored blocks show what each line on the graph represents. Clicking on a colored block or its label turns off or on the associated line on the graph display.

Moving the mouse over lines on the graph (best done when the real time display is off) displays the values of the points at that position. Positions on the other graph lines corresponding to that point in time are also marked.

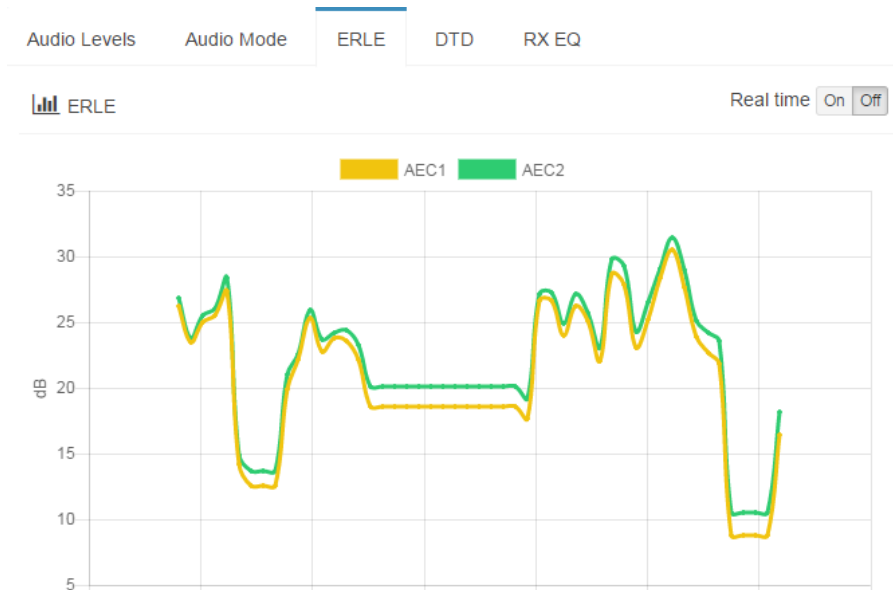


Figure 12 Graph – ERLE

2.3.3.2.4 DTD

The double talk detector (DTD) graph, shown in Figure 13, displays the relative AEC out vs AEC in energy. During Rx-only conditions the DTD quotient will be low, in silence and Tx audio modes the DTD quotient will be near '1'. In DT audio modes the quotient will be between the Rx-only levels and 1.0.

The *Real time* radio buttons allow the display to be paused for analytical purposes.

The colored circles indicate the audio mode.

The colored blocks show what each line on the graph represents. Clicking on a colored block or its label turns off or on the associated line on the graph display.

Moving the mouse over lines on the graph (best done when the real time display is off) displays the values of the points at that position. Positions on the other graph lines corresponding to that point in time are also marked.

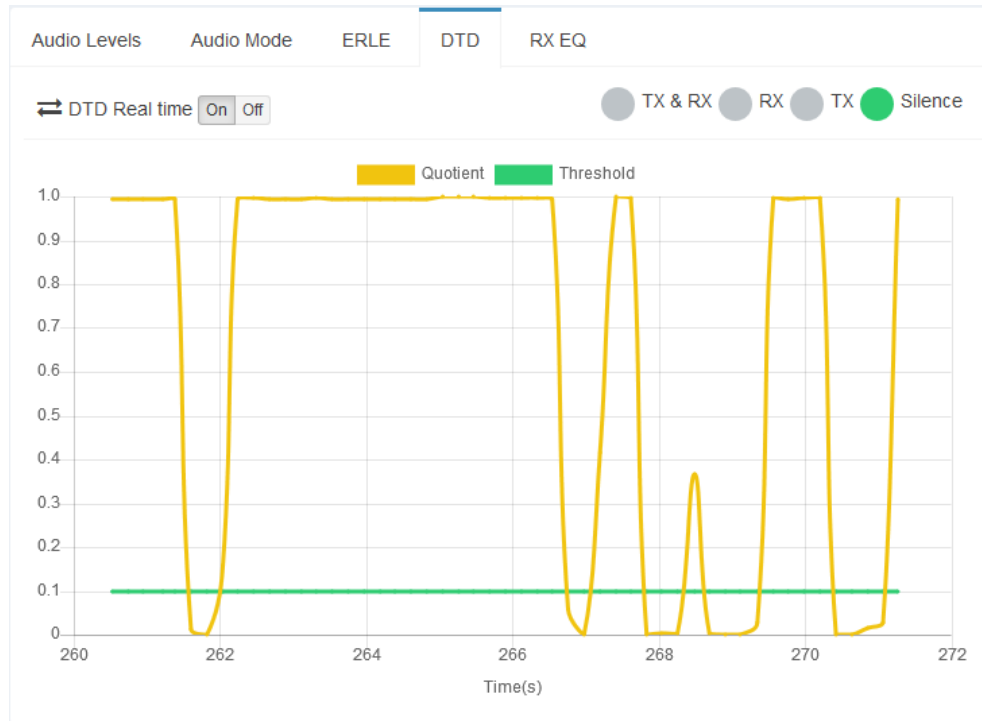


Figure 13 Graph – DTD

2.3.3.2.5 RX EQ

The equalization (EQ) graph, shown in Figure 14, displays the composite Rx PEQ response applied to the downlink audio from the AVS.

Moving the mouse over the graph line (best done when the real time display is off) displays the values of the points at that position. Positions on the other graph lines corresponding to that point in time are also marked.

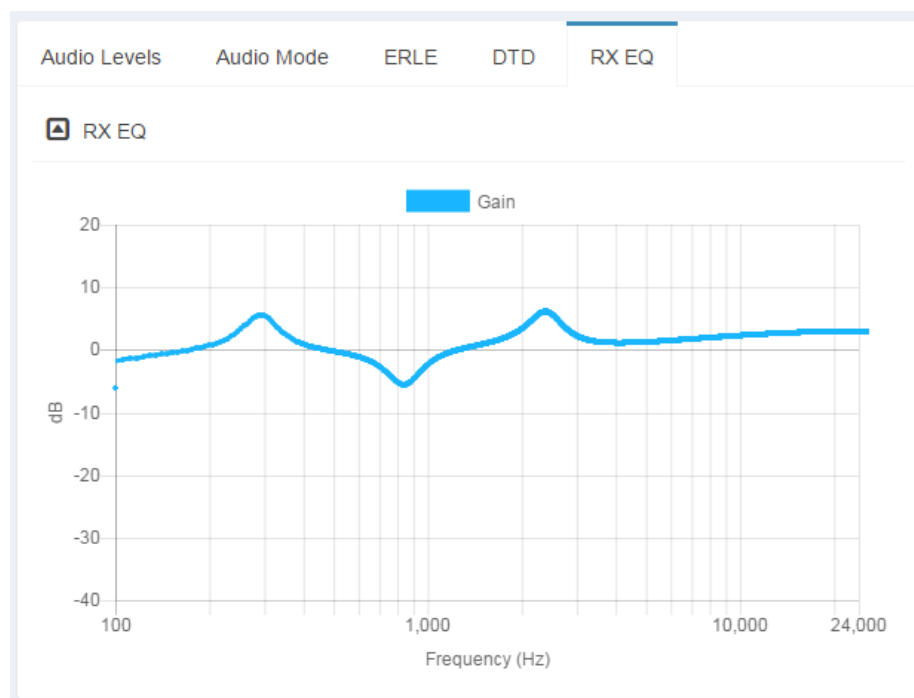


Figure 14 Graph – Rx EQ

3 Troubleshooting

Troubleshooting is often aided by working directly on the Raspberry Pi. To access the Raspberry Pi directly, you'll need:

- a USB keyboard and mouse connected to the Raspberry Pi USB ports
- an HDMI cable to connect the Raspberry Pi to your monitor

Working on the Raspberry Pi, the Control Console can be accessed from a browser at <https://raspberrypi:3000>.

The log is stored in `/var/log/avs-java.log`.

The IP address can be checked by opening a terminal window and entering the command `hostname -I`.

Connections and their IP addresses can be seen in the task bar at the top right of the screen. For Ethernet-only connections, hovering the mouse over the Wired/Wireless Network applet displays the information as shown in Figure 15.

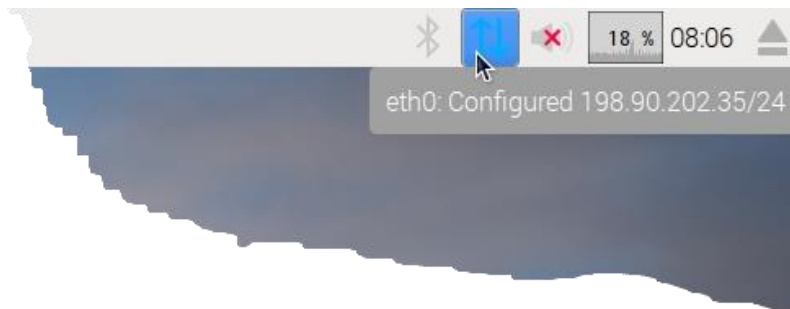


Figure 15 Raspberry Pi Ethernet Connection

If wireless connections are available, they are as shown in Figure 16.



Figure 16 Raspberry Pi Wireless and Ethernet Connections

4 Revision History

Revision History

Revision	Changes
0.1 JUN '17	• Initial version.
1.0 JUL '17	• First release

Revision	Changes
1.1 OCT '17	• Second release

Contacting Cirrus Logic Support

For all product questions and inquiries, contact a Cirrus Logic Sales Representative.

To find one nearest you, go to www.cirrus.com.

The products and services of Cirrus Logic International (UK) Limited; Cirrus Logic, Inc.; and other companies in the Cirrus Logic group (collectively either “Cirrus Logic” or “Cirrus”) are sold subject to Cirrus Logic’s terms and conditions of sale supplied at the time of order acknowledgment, including those pertaining to warranty, indemnification, and limitation of liability. Software is provided pursuant to applicable license terms. Cirrus Logic reserves the right to make changes to its products and specifications or to discontinue any product or service without notice. Customers should therefore obtain the latest version of relevant information from Cirrus Logic to verify that the information is current and complete. Testing and other quality control techniques are utilized to the extent Cirrus Logic deems necessary. Specific testing of all parameters of each device is not necessarily performed. In order to minimize risks associated with customer applications, the customer must use adequate design and operating safeguards to minimize inherent or procedural hazards. Cirrus Logic is not liable for applications assistance or customer product design. The customer is solely responsible for its selection and use of Cirrus Logic products. Use of Cirrus Logic products may entail a choice between many different modes of operation, some or all of which may require action by the user, and some or all of which may be optional. Nothing in these materials should be interpreted as instructions or suggestions to choose one mode over another. Likewise, description of a single mode should not be interpreted as a suggestion that other modes should not be used or that they would not be suitable for operation. Features and operations described herein are for illustrative purposes only.

CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE (“CRITICAL APPLICATIONS”). CIRRUS LOGIC PRODUCTS ARE NOT DESIGNED, AUTHORIZED OR WARRANTED FOR USE IN PRODUCTS SURGICALLY IMPLANTED INTO THE BODY, AUTOMOTIVE SAFETY OR SECURITY DEVICES, NUCLEAR SYSTEMS, LIFE SUPPORT PRODUCTS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF CIRRUS LOGIC PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER’S RISK AND CIRRUS LOGIC DISCLAIMS AND MAKES NO WARRANTY, EXPRESS, STATUTORY OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE, WITH REGARD TO ANY CIRRUS LOGIC PRODUCT THAT IS USED IN SUCH A MANNER. IF THE CUSTOMER OR CUSTOMER’S CUSTOMER USES OR PERMITS THE USE OF CIRRUS LOGIC PRODUCTS IN CRITICAL APPLICATIONS, CUSTOMER AGREES, BY SUCH USE, TO FULLY INDEMNIFY CIRRUS LOGIC, ITS OFFICERS, DIRECTORS, EMPLOYEES, DISTRIBUTORS AND OTHER AGENTS FROM ANY AND ALL LIABILITY, INCLUDING ATTORNEYS’ FEES AND COSTS, THAT MAY RESULT FROM OR ARISE IN CONNECTION WITH THESE USES.

This document is the property of Cirrus Logic and by furnishing this information, Cirrus Logic grants no license, express or implied, under any patents, mask work rights, copyrights, trademarks, trade secrets or other intellectual property rights. Any provision or publication of any third party’s products or services does not constitute Cirrus Logic’s approval, license, warranty or endorsement thereof. Cirrus Logic gives consent for copies to be made of the information contained herein only for use within your organization with respect to Cirrus Logic integrated circuits or other products of Cirrus Logic, and only if the reproduction is without alteration and is accompanied by all associated copyright, proprietary and other notices and conditions (including this notice). This consent does not extend to other copying such as copying for general distribution, advertising or promotional purposes, or for creating any work for resale. This document and its information is provided “AS IS” without warranty of any kind (express or implied). All statutory warranties and conditions are excluded to the fullest extent possible. No responsibility is assumed by Cirrus Logic for the use of information herein, including use of this information as the basis for manufacture or sale of any items, or for infringement of patents or other rights of third parties. Cirrus Logic, Cirrus, the Cirrus Logic logo design, WISCE, Halo Core, and SoundClear are among the trademarks of Cirrus Logic. Other brand and product names may be trademarks or service marks of their respective owners.

Copyright © 2017 Cirrus Logic, Inc. and Cirrus Logic International Semiconductor Ltd. All rights reserved.

Amazon and Alexa are trademarks of Amazon.com, Inc. or its affiliates.

Raspberry Pi is a trademark of the Raspberry Pi Foundation.