

Ubi Kit - AVS Kit Installation Process

Rev. 1.1 - October 2017

Before Getting Started...

Thank you for using the AVS Kit. Before starting the installation process is, make sure you have all the required hardware:

- [RaspberryPi 3](#) + power supply - [\(link to amazon\)](#)
- microSD card (8 GB minimum) - [\(link to amazon\)](#)
- Speakers with 3.5 mm cable
- USB microphone - [\(link to amazon\)](#)
- microSD card reader - [\(link to amazon\)](#)
- ** Monitor
- ** Keyboard and mouse

*** Optional, but recommended*

Please note that if you already have Raspbian setup on a RaspberryPi, you can skip to Step 2.

1. Setting up Raspbian

1.1. Backup microSD Card

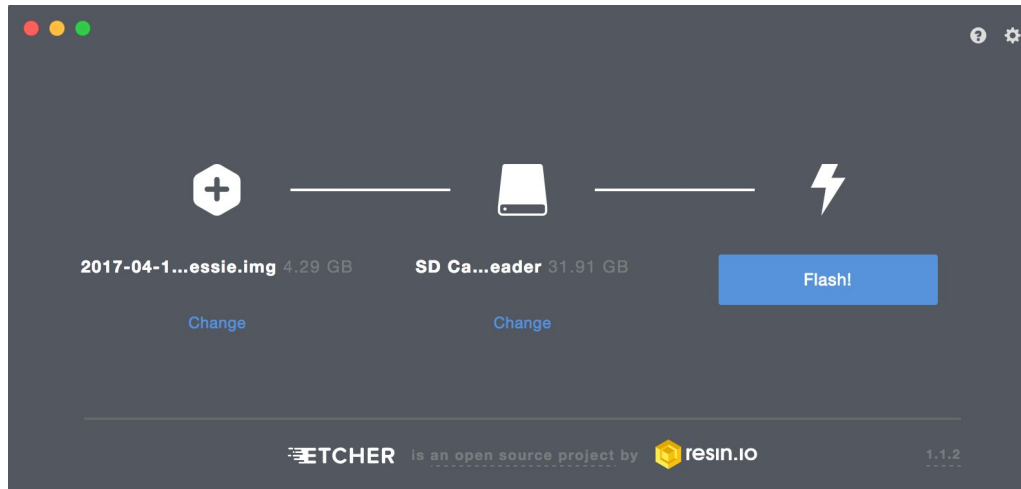
Take your microSD card, and plug it into your computer with your microSD card reader. If you have anything on the card, be sure to save it as we are going to wipe it clean and reformat it.

1.2. Imaging Raspbian Jessie Pixel

[Go here and download the zip file for Raspbian Jessie Pixel](#). Unzip the file, and then you should have a file called: *2017-04-10-raspbian-jessie.img*.

We are going to use a tool called Etcher to complete the imaging process. It is fast, easy to use across all platforms, and secure. If you have an alternative method, you are free to use it and skip ahead to *Section 1.3: Allowing SSH Access*.

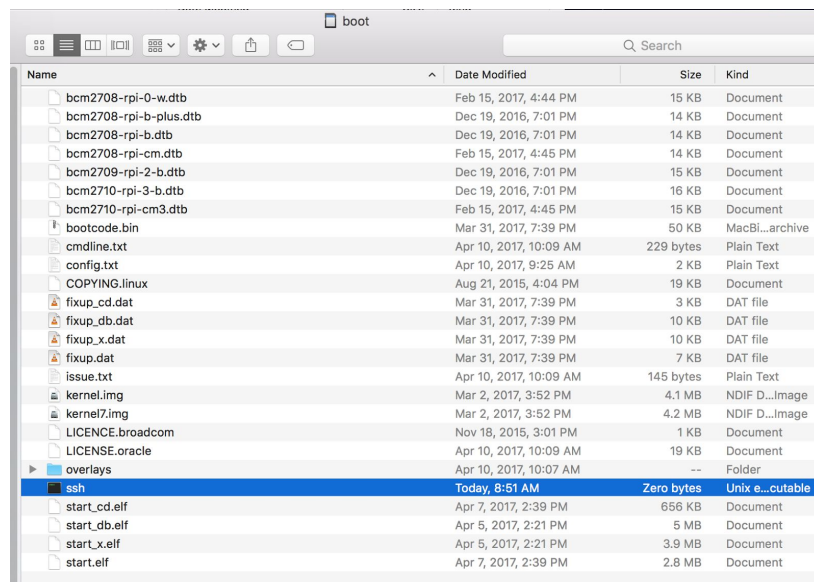
Start by download [Etcher here](#). Then, open Etcher, select the *2017-04-10-raspbian-jessie.img* as well as your SD card which should be plugged into your computer. Your etcher should look like the following image:



If your etcher looks like the above, flash the drive. It should take about 5-10 minutes to complete.

1.3. Setting up SSH Access

After your SD card has been flashed, you now need to allow for SSH access. Within your system's file manager, go to the root of the SSH card, and put an empty file named 'ssh' (without any extension) into the folder. **This step is very important for those installing without a monitor and keyboard.**



Congratulations, you have just put Raspbian Pixel Jessie on your SD card!

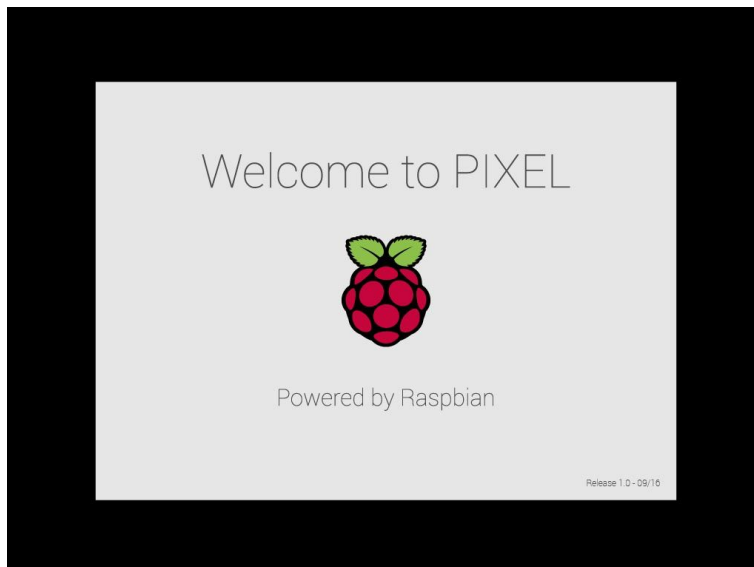
2. Hardware Setup

2.1. Plugging in

Take your RaspberryPi, and plug in your USB Microphone, Ethernet cable, speakers, (monitor & keyboard + mouse ** if applicable). After this is done, plug in your power supply. Your RaspberryPi should look something like this (**note the pictures shows a case on the RaspberryPi):



If you are using a monitor, you should see the following screen (**release version should be 1.2 - February 2017)



If you are not using a monitor, please follow along in Step 3 to set up headless. If you are using a monitor, you can skip to Step 4.

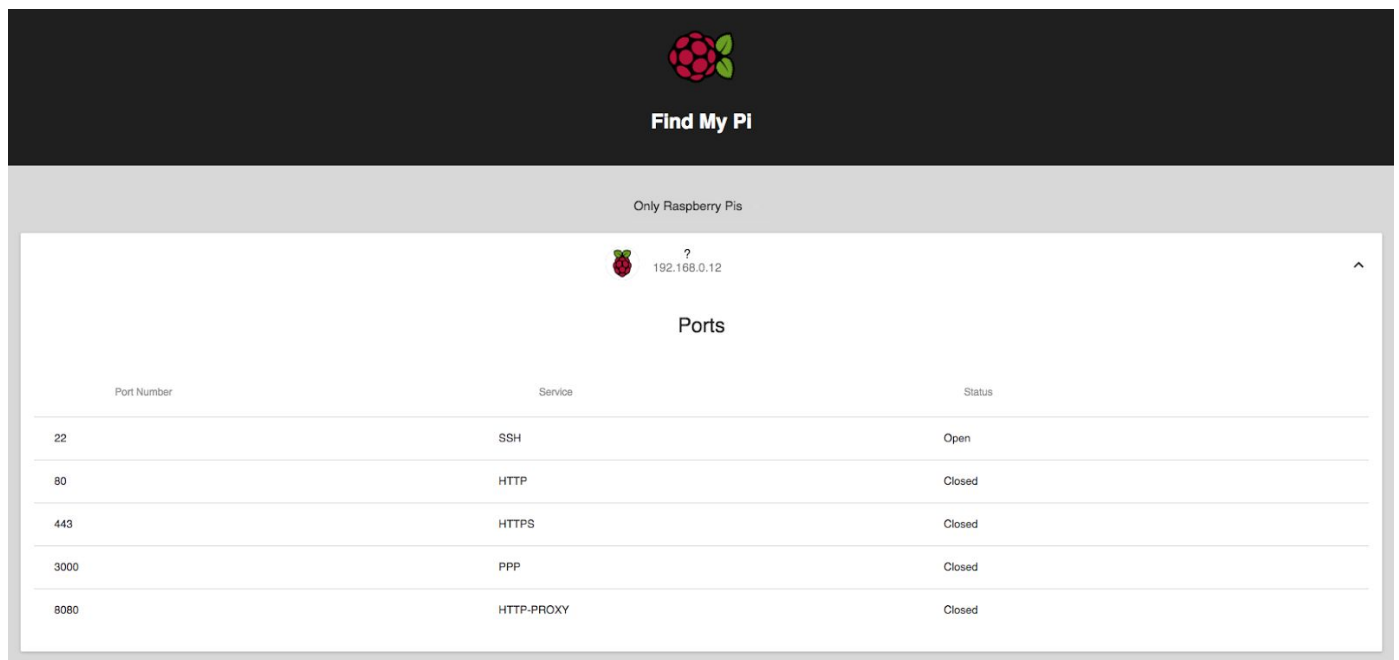
3. SSH setup *** Only for those without keyboard/monitor

3.1 Finding your RaspberryPi's IP

The easiest way to find your RaspberryPi's IP address is by logging into your router, and finding the connected users.

Host Name	IP Address	MAC Address	Type	Interface	Status
raspberrypi	192.168.0.12	B8:27:EB:4F:7D:7A	DHCP-IP	Ethernet	Active

If you are unable to login to your router, there are alternative options. You can install a free 'find-my-pi' [package here](#). This tool scans your network, finds all RaspberryPis and identifies the open ports. In order to use this tool you must have **Node v8.4.0** and **nmap** installed.



As well, you can use the tool `arp` to find your RaspberryPi. Open your terminal and type in:

```
$ arp -all | grep b8:27:eb # If using macOS
$ arp | grep b8:27:eb      # If using Linux
$ arp -a | findstr b8:27:eb # If using Windows
```

The output will be a list of all the RaspberryPis on your local network, with their IP and mac addresses.

```
igor:~ $ arp -all | grep b8:27:eb
192.168.0.12          b8:27:eb:4f:7d:7a expired    expired      en0         1
```

3.2 Connecting to your device

Windows users:

Download [PuTTY](#) before proceeding. Where you are prompted for a host name, enter the IP address that you found in the previous step. Ensure the port is 22, and the connection type is SSH. When prompted for the login and password, type in: 'pi' for the login, and 'raspberrypi' for the password (No quotation marks).

Ubuntu and macOS:

Open your terminal, and type in:

```
$ ssh pi@X.X.X.X # where X.X.X.X is the ip address of your RaspberryPi
```

Then, when you are asked for the password, type in 'raspberrypi' (no quotation marks). You should connect to the pi now.

Both: From here on, use this terminal session as your way of performing all commands done in step 4.

4. Software Setup

4.1 Setting up speakers and microphone

With the RaspberryPi on, go into the terminal (If you are remoteless, SSH into the machine). You can check to see if your speakers and microphone are working by typing the following into the terminal:

```
$ arecord test.wav # Test to see if the microphone is working
```

If you were unable to record, skip ahead to **Troubleshooting** in 4.1, and continue. If you were able to record try:

```
$ aplay test.wav # Test to see if the speakers are working
```

If you heard your recording playback, awesome! Proceed on to step 4.2 Installing AVS Kit. If you were unsuccessful, follow along below for troubleshooting

Troubleshooting

Either your speaker or microphone didn't work. To fix this, let's start by identifying your audio and recording cards by typing in `$ aplay -l` and `$ arecord -l`. You should get something that looks like this:

```
pi@raspberrypi:~ $ aplay -l
**** List of PLAYBACK Hardware Devices ****
card 0: ALSA [bcm2835 ALSA], device 0: bcm2835 ALSA [bcm2835 ALSA]
  Subdevices: 8/8
  Subdevice #0: subdevice #0
  Subdevice #1: subdevice #1
  Subdevice #2: subdevice #2
  Subdevice #3: subdevice #3
  Subdevice #4: subdevice #4
  Subdevice #5: subdevice #5
  Subdevice #6: subdevice #6
  Subdevice #7: subdevice #7
card 0: ALSA [bcm2835 ALSA], device 1: bcm2835 ALSA [bcm2835 IEC958/HDMI]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
card 1: Device [USB Audio Device], device 0: USB Audio [USB Audio]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
pi@raspberrypi:~ $ arecord -l
**** List of CAPTURE Hardware Devices ****
card 1: Device [USB Audio Device], device 0: USB Audio [USB Audio]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
```

Look at the card numbers for your speaker, and for your microphone. In the case above, the speaker has a card number of 0 (see: card 0: ALSA [bcm2835 ALSA], device 0: bcm2835 ALSA [bcm2835 ALSA]), and the microphone has a card number of 1 (see: card 1: Device [USB Audio Device], device 0: USB Audio [USB Audio]).

Now, copy and paste the following command into your terminal, replacing the fields specified:

```
$ echo 'pcm.!default {
  type asym
  playback.pcm "plughw:NUM_1" # Replace NUM_1 with your speaker card number
  capture.pcm "plughw:NUM_2" # Replace NUM_2 with your USB card number
}' > ~/.asoundrc
```

After this, restart your RaspberryPi by typing: `$ sudo reboot`. After your machine restarts, your speaker and microphone should be working.

4.2 Installing AVS kit

Now, for the easiest part, the one-line install of the AVS kit. Open the terminal, and type:

```
$ curl https://bitbucket.org/ucic-1/avskit/raw/master/install.sh | sh
```

Wait a few minutes, and when prompted go to <https://raspberrypi:3000> (Or https://YOUR_PIs_IP:3000 if doing this without a monitor). If installation was successful, you should be directly to this page:

≡ Welcome to the UCIC Console

Raspberry Pi IP address: 192.168.0.12

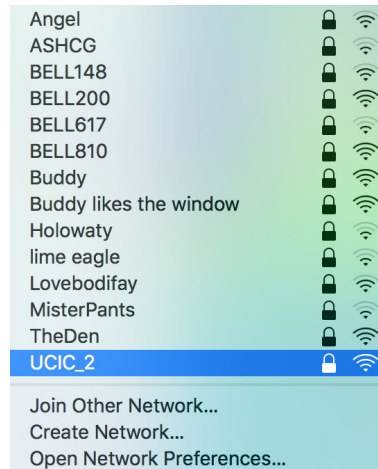
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At this stage, you can start using the AVS Kit. However, to make the AVS kit even more user friendly, follow along in *Section 4.3 Connecting wirelessly to your Pi* to figure out how to put your RaspberryPi loaded with the AVS kit anywhere within range of WiFi, and connect to it wirelessly.

4.3 Connecting wirelessly to your Pi

At this stage, you are free to disconnect the ethernet cord from the pi. Move your RaspberryPi to a location within range of your WiFi and then plug in the power supply, microphone and speakers.

After you plug the pi back in, the pi will spawn a hotspot, called **UCIC_2** with the password **ubiquartus1**. Connect to this WiFi network from your personal computer



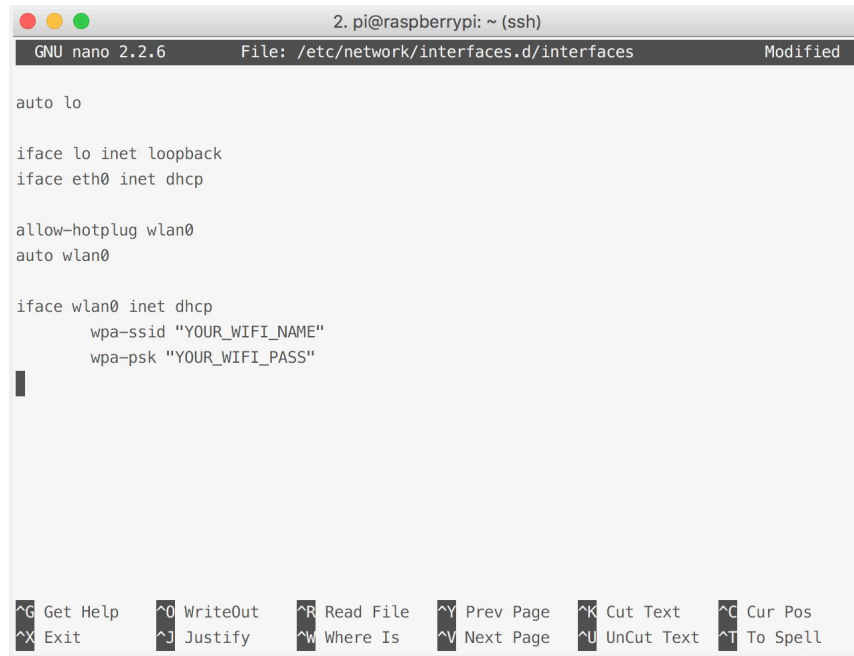
Again you have to find the RaspberryPi's IP address. By design, the IP address defaults to **172.24.1.1**. You have to SSH into your pi, and adjust the network configuration (if using, windows, resort to using PuTTY).

```
$ ssh pi@172.24.1.1 # password is still raspberry
```

Once you are in your pi, you create a new 'interfaces' file, by typing in:

```
$ sudo nano /etc/network/interfaces.d/interfaces
```

Enter the following into the file, replacing YOUR_WIFI_NAME and YOUR_WIFI_PASS.



```

2. pi@raspberrypi: ~ (ssh)
GNU nano 2.2.6 File: /etc/network/interfaces.d/interfaces Modified

auto lo

iface lo inet loopback
iface eth0 inet dhcp

allow-hotplug wlan0
auto wlan0

iface wlan0 inet dhcp
    wpa-ssid "YOUR_WIFI_NAME"
    wpa-psk "YOUR_WIFI_PASS"
  
```

Once this is done, save the file (press ‘Ctrl + x’ > ‘y’ > ‘Enter’). Reboot your pi with `$ sudo reboot`, and upon reboot, the Pi should automatically connect into the internet. Repeat the steps in *Section 3.1* to get the new IP address.

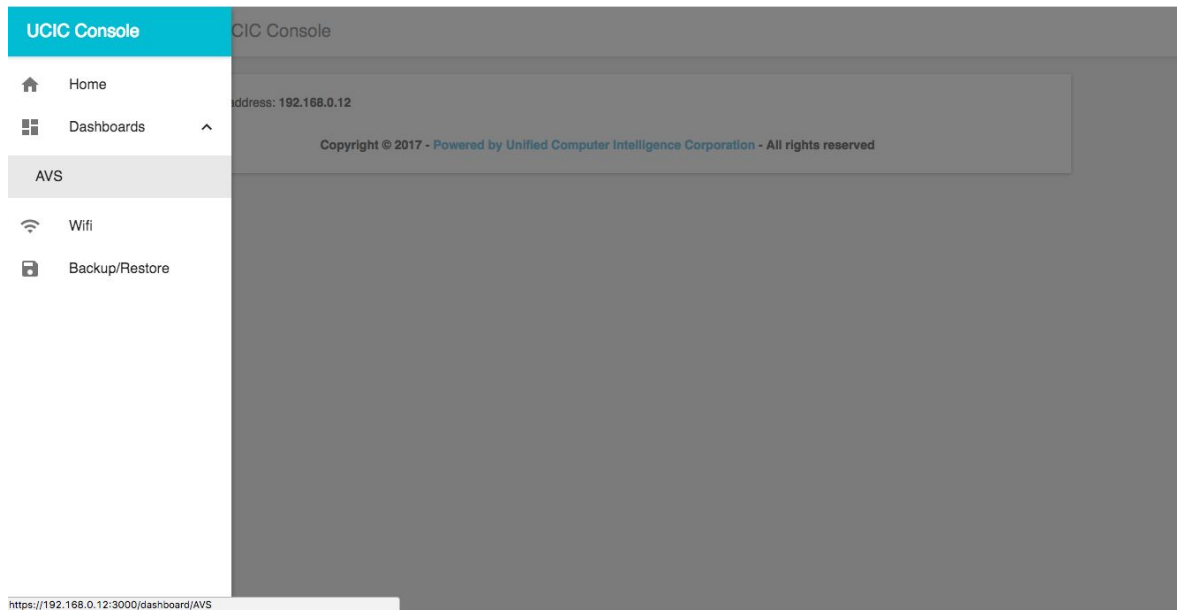
On any computer connected to the network, you can control the AVS kit by going to <https://new-ip-address:3000> (replace ‘new-ip-address’ with your RaspberryPi’s new IP address).

Now, you can start using the AVS kit, enjoy!

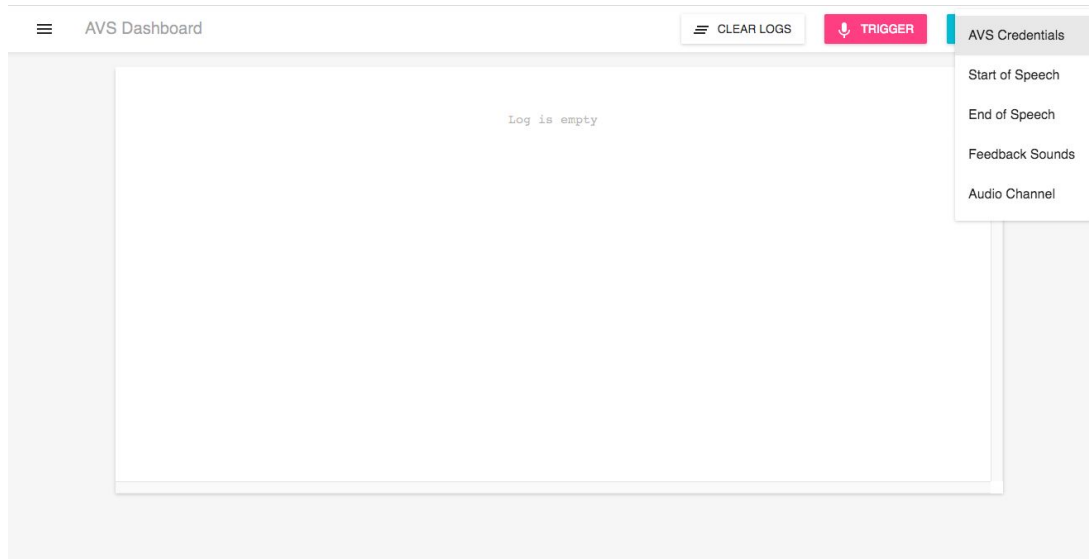
5. AVS kit configuration

5.1 Configuration panel

The AVS configuration panel can be found by first going to AVS dashboard on the left menu panel.



Then, you need to click on the cog in the top right of the AVS dashboard. Here, you will find AVS Credentials, Start of Speech, End of Speech, Feedback Sounds, and Audio Channel. These are all of the AVS configurable fields.

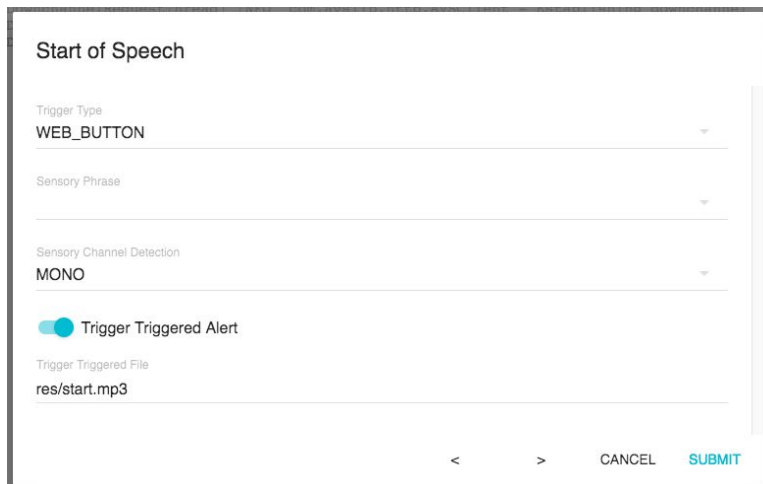


5.1.1 AVS Credentials

The screenshot shows the 'AVS Credentials' form. It has a title 'AVS Credentials' at the top. Below the title are three input fields: 'Client ID', 'Client Secret', and 'Product ID'. Each input field has a question mark icon to its right. At the bottom right of the form, there is a right arrow '>', a 'CANCEL' button, and a 'SUBMIT' button.

Inside the AVS Credentials, you have the ability to view and edit your Client ID, Client Secret, and Product ID. These are all the fields that you need to get from your AVS Developer account. If you do not have these fields, **click on a question mark to set up and register your AVS Developer account.**

5.1.2 Start of Speech



The screenshot shows a configuration form titled "Start of Speech". It contains the following fields and controls:

- Trigger Type:** A dropdown menu with "WEB_BUTTON" selected.
- Sensory Phrase:** An empty text input field.
- Sensory Channel Detection:** A dropdown menu with "MONO" selected.
- Trigger Triggered Alert:** A toggle switch that is currently turned on (blue).
- Trigger Triggered File:** A text input field containing "res/start.mp3".

At the bottom right of the form, there are navigation buttons: "<", ">", "CANCEL", and a blue "SUBMIT" button.

Start of Speech allows you to customize how speech is recognized. The *Trigger Type* is the way to initialize recognition, the most popular options being the *Web Button* and *Sensory* triggers. The *Web Button* trigger begins speech recognition after clicking the ‘Trigger’ button in the top right of the AVS Dashboard. *Sensory* begins recognition after uttering your choice of *Sensory Phrase* (ie *Hello Blue Genie*, *Ok Ubi*, or *Alexa*). Sensory Phrase is customized in the second field.

To make developing, prototyping, and testing quick and easy, *Web Button* triggering is always turned on as a secondary trigger method (ie clicking the *Trigger* button always starts triggering).

:GPIO, Sphinx, Sensory, Web button), allows you to select your sensory phase (Hello Blue Genie, Ok Ubi, Alexa), as well as your channel detection fields, if you want a trigger alert, and the sound that is played on trigger (if you select trigger alert).

5.1.3 End of Speech

The 'End of Speech' configuration window contains the following settings:

- Minimum Recording Length (ms): 3000
- Maximum Recording Length (ms): 35000
- Silence Detection Length (ms): 1000
- End of Speech Detection: AUTO (dropdown menu)
- Simple Threshold Value: 5
- Listening Stopped Alert: ☒ (toggle switch)
- Listening Stopped File: res/stop.mp3

Navigation buttons at the bottom: < > CANCEL SUBMIT

TBD

5.1.4 Feedback Sounds

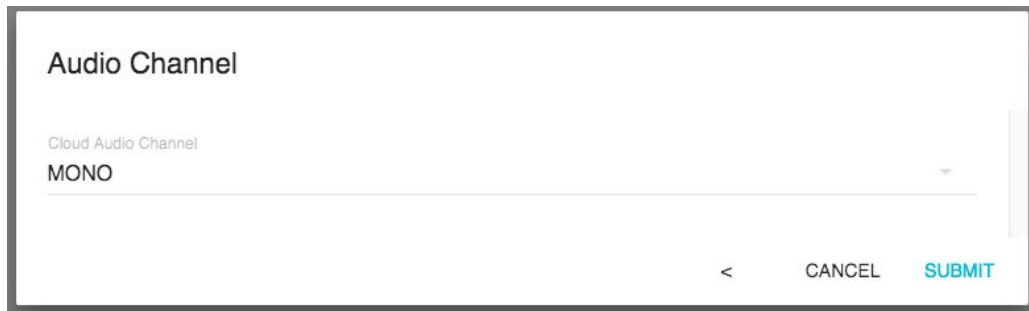
The 'Feedback Sounds' configuration window contains the following settings:

- Wake Up Alert: ☒ (toggle switch)
- Wake Up Sound File: wake-up.mp3
- Alsa Playback Device: default (dropdown menu) with a PLAY button
- Alsa Capture Device: default (dropdown menu) with a RECORD button
- Media Player Device Name: default (dropdown menu) with a PLAY button

Navigation buttons at the bottom: < > CANCEL SUBMIT

The Feedback sounds controls speaker and microphone device settings, as well as lets you decide if you want a Wake Up Alert or not.

5.1.5 Audio Channel



The screenshot shows a mobile application interface for configuring audio settings. At the top, the title "Audio Channel" is displayed. Below it, the text "Cloud Audio Channel" is shown, followed by a dropdown menu currently set to "MONO". At the bottom of the screen, there are three buttons: a back arrow "<", a "CANCEL" button, and a "SUBMIT" button in blue.

The Audio Channel is where you configure your audio settings for the AVS returned speech.