

ARCAM Avatar Initial Configuration

Draft Version v0.2

Version

Version	Date	By	Description
0.1	08/11/2019	Chris Mann	First draft.
0.2	12/11/2019	Chris Mann	Added reference to Flashing u-boot successful! Message

Contents

Version	1
Overview	2
Terms	2
References	2
Communication with the Avatar.....	3
Burning Serial Numbers and MAC Addresses	3
Setting the Devices Region Code	3
Generating Google Certificates.....	3
Transfer the Device encrypted key to the Avatar	3
Store the private key.....	3
Ensuring the Avatar is running a signed build.....	4
Locking the Avatar	4
To lock the device	5

Overview

This document describes the steps required to configure an Avatar based device for release

The Avatar module is currently used in the following ARCAM products:

- Solo Uno
- SA30
- AVR range (ARCAM, JBL, Audio Control)

Before being released a number of actions must be taken to fully configure the Avatar module. These are:

- Burning a Serial Number and MAC Address into the device
- Setting the Devices Region code
- Generating Google Certificates
- Ensuring the Avatar is using a signed build
- Locking the Avatar

This document describes the low-level commands that must be run on the Avatar for each step. ARCAM provides a number of tools that simplify the process, although these are not described in this document..

Terms

The following terms are used through the document:

Term	Description
Avatar	The Avatar board running Stream Unlimited firmware.
Device	The ARCAM device that is communication with the Avatar
Message	The mechanism by which information is transferred between the device and the Avatar and visa-versa.
Hostlink Protocol	A lightweight protocol used to communicate simple data structures between a master microcontroller running StreamSDK and the device.
SWU File	The software update file containing Avatar and Device software included in a single release, and published on the arcamupdate.co.uk website.

References

Title	Location
Stream Unlimited Hostlink protocol	
HK Citation MCU AML Communication_2.7	
HostLink protocol_ I2C and SPI Hostlink Examples	
StreamSDK update documentation	

Communication with the Avatar

Avatar configuration is performed using either an RS232 or TCP connection to the Avatar. In each case tools that are able to run a terminal session (PuTTY) and transfer files (WinSCP) are required.

Burning Serial Numbers and MAC Addresses

Serial Number and MAC Addresses can be set using the **FactoryTest** command.

In an Avatar Terminal session:

To set the Serial Number

```
FactoryTest set serialnumber serial_number
```

To set the MAC Address

```
FactoryTest set ethernetmac mac_address (in format 00:11:22:AA:BB:CC)
```

Corresponding `get` methods can be used to obtain the current Serial Number and MAC Address

Setting the Devices Region Code

The Region code can be set using the **FactoryTest** command

In an Avatar Terminal session:

For American units

```
FactoryTest wifi set-country US
```

For all other units

```
FactoryTest wifi set-country DE
```

Generating Google Certificates

Generating Google certificates takes a number of steps:

Transfer the Device encrypted key to the Avatar

Certificate generation requires an encrypted private key that has been generated by ARCAM. This should be transferred to the Avatar using a program such as WinSCP into `/home/root`. For the example below it should be called `Device.key.encrypted`

Store the private key

The private key needs adding to the devices key store. The following commands should be run (from `/home/root`)

```
stop
teeStoreKey -g -e -f Device.key.encrypted
rm -rf /factory/client.*
rm -rf Device.key.encrypted
restart
```

ARCAM Avatar Initial Configuration

```
ls -ls /factory
```

At this point you should be able to see the certificate files (`client.crt`, `client.key.bin`) generated in the `/factory` folder

Ensuring the Avatar is running a signed build

Before locking a device the Avatar MUST be running a signed build. This will mean that once locked the Avatar can only be upgraded with other builds signed with the same key.

The process for generating signed builds is as follows:

- A new version of the Device software is produced, and passed to ARCAM.
- ARCAM pass the new software to Stream Unlimited who produce a Release build of the Avatar software which includes the new Device software.
- ARCAM take the `image-comp.swu` file from the new release and sign it using ARCAM specific keys.
- ARCAM publish the new file on the Arcam Update website and update the json files used by the Device to identify an update.

NOTE: From Avatar release 191 all builds made available on the Arcam Update website will be signed.

To upgrade the Device manually

In an Avatar Terminal session:

```
sfuflags -f update -v 1
reboot
rm -rf /home/root/upgrade_file_name
wget upgrade_file_url
/etc/init.d/swupdate stop
swupdate -v -I -k verified-boot.pem -i upgrade_file_name
reboot
more /settings-default/version
```

Locking the Avatar

The following steps MUST be completed before locking the Avatar:

- Burning a Serial Number and MAC Address into the device
- Setting the Devices Region code
- Generating Google Certificates
- Ensuring the Avatar is using a signed build

Once completed the device will be ready for locking.

To lock the device

In an Avatar Terminal session:

Ensure the correct signed bootloader are in place

```
flash-uboot
```

Ensure that the output includes **"Flashing u-boot successful!"** before proceeding to the next step.

Lock the Avatar

```
factory_tool lock
```

Once locked, disconnect from the Terminal Session, and power cycle the Device. Having done this the Avatar can no longer be connected to over RS232 or IP, and can only be updated with Signed updates signed with the same key as the update that the Avatar was running at the time it was locked.