

# ARCAM Serial Numbers- Technical Notes

Draft Version v0.04

## Version

Version	Date	By	Description
0.1	25/06/2019	Chris Mann	First draft – document setup to start recording ideas.
0.2	09/07/2019	Chris Mann	First layout of functionality.
0.3	16/08/2019	Chris Mann	Changes for burning functionality.
0.4	20/09/2019	Chris Mann	Addition of LPP option

## Overview

This document describes the key points of the ARCAM Serial Number Manager that allows the association of serial numbers with MAC Addresses, and the ARCAM Serial Number Burner that can be used to burn the Serial Numbers into the device.

Serial Numbers are generated by ARCAM and are burnt into the Devices by the Manufacturers at the point of production. Because the Serial Number includes characters that identify when the Device was manufactured the complete number cannot be finalised until the production date. The software allows ranges of provisional numbers to be generated which are then finalised as they are burnt into the devices. The process uses a data file to keep track of the finalised Serial Number and the date it was burnt into the device.

Two software applications are used in the process:

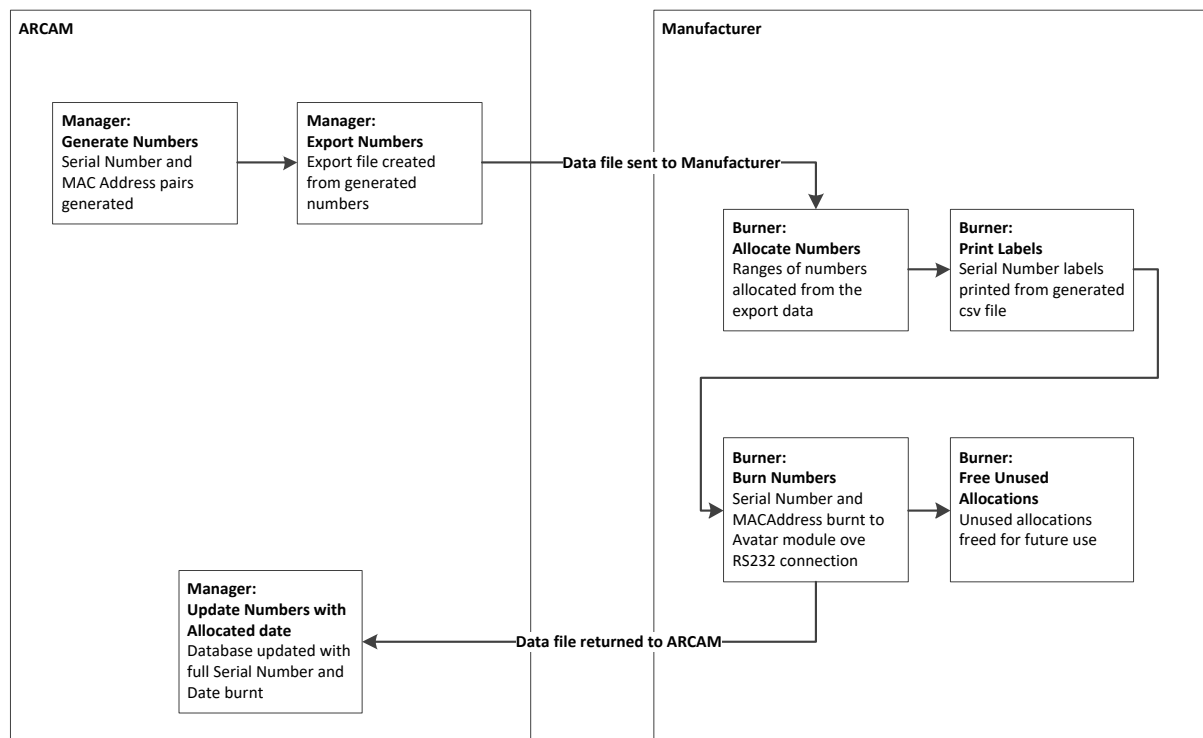
ARCAM.SerialNumber.Manager	Used by ARCAM to generated and maintain a database of Serial Numbers and MAC Addresses
ARCAM.SerialNumberBurner	Used by the Manufacturers to burn the serial numbers into the devices.

## Process

The Serial Number process takes the following steps:

- Using the ARCAM Serial Number Manager, a batch of Serial Numbers are allocated for a given Device. Each Serial Number is associated with a MAC Address, and a Manufacturer.
  - The batch is exported into a data file and sent to the Manufacturer.
- The Manufacturer uses the ARCAM Serial Number Burner to load the data file.
  - The ARCAM Serial Number Burner is used to create a csv file that can be used to print labels for a range of numbers from the data file.
  - It can then be used to burn the serial numbers on to the Devices, keeping a record of when it happened.
- The Manufacturer sends the data file back to ARCAM where it is re-imported into the ARACM Serial Number Manager updating the Serial Number indication that it has been used.

## ARCAM Serial Numbers



## Serial Number Format

The format of a Serial number is as follows:

- 2 Character Manufacturer prefix (*mm*)
- A 4 digit Device Prefix (*dddd*)
- A hyphen
- A single character identifying the month the number was allocated. (*M*)
- A single character identifying the year the number was allocated. (*Y*)
- A 7-digit serial number. (*0000000*)

e.g.

**mmdddd-MY0000000**

## Database

The Serial Number data is stored as a set of tables in a SQL Server database.

## ARCAM Serial Numbers

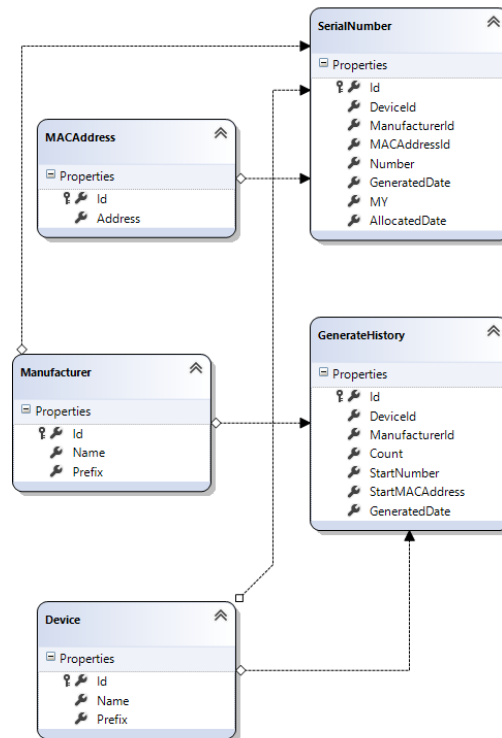


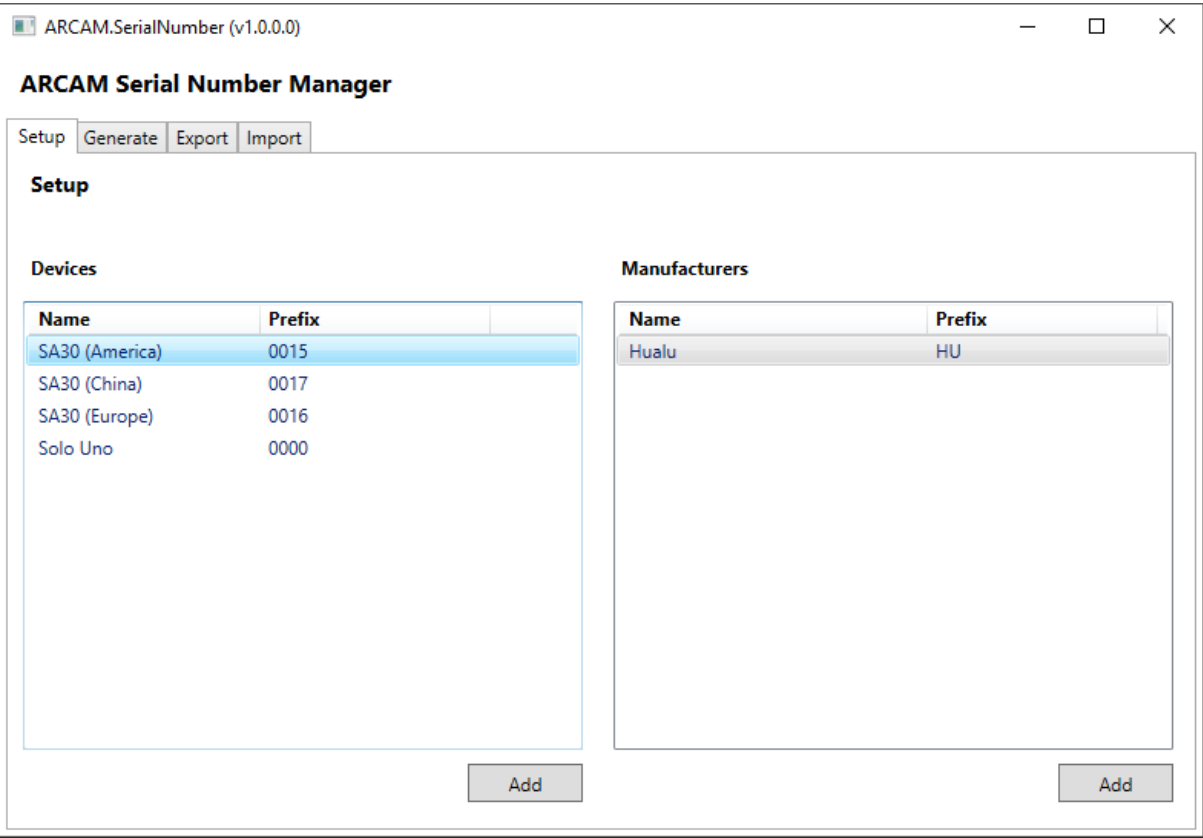
Table	Description
Serial Number	Holds the 7-digit number associated with the Serial Number, and links to the Device, MAC Address and Manufacturer associated with the number.  Once the number has been allocated and burnt into a Device the Month and Year characters are stored.
MAC Address	Holds a numeric representation of the second half of the MAC Address associated with Serial Number. All ARCAM MAC Addresses are prefixed with 001B7C
Device	Holds the name of the Device type, and the Prefix associated with the Device.
Manufacturer	Holds the name of the Manufacturer and the Prefix associated with the Manufacturer.
Generated History	Maintains a record of when ranges of Serial Numbers are allocated for a Device type.

Serial Number Manager

The ARCAM Serial Number Manager is used to maintain a database that associates a Serial Numbers with their Device, Manufacturer, and a unique MAC Address. It can be used to export files containing Serial Number data that can be sent to the Manufacturer for use with the ARCAM Serial Number Burner.

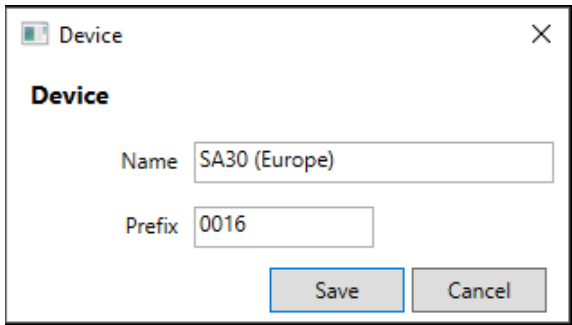
Setup Tab

The Setup tab is used to add Devices and Manufacturers to the database. Both Devices and Manufacturers have an associated Prefix that is used in the generation of the serial number.

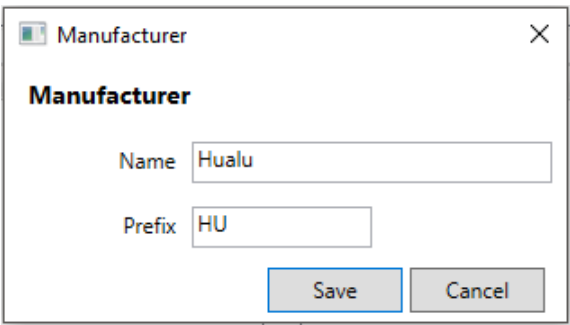


The Setup Tab

Devices and Manufacturers can be added by clicking the appropriate Add button, or edited by double clicking on an entry in one of the lists. In both cases the appropriate pop-up will be displayed.



The Device detail pop-up



The Manufacturer detail pop-up

## ARCAM Serial Numbers

Note: It is not currently possible to remove Devices or Manufacturers through the ARCAM Serial Number Manager.

### Generate

The Generate tab is used to generate batches of Serial Numbers for a specific Device and Manufacturer. The generated numbers are stored in the SQL Server database.

When generating numbers it is intended that the range generated will be used by the manufacturer over a number of production runs.

ARCAM.SerialNumber (v1.0.0.0)

**ARCAM Serial Number Manager**

Setup Generate Export Import

**Generate Serial Numbers**

Select a Device Type SA30 (USA) ▾

Prefix 0015

Next Number 1

How many Serial Number / MAC Address pairs do you want to generate? 256 ☒ LPP

First MAC Address 001B7C 888888

Which supplier are they for? Anam ▾

Prefix AN

Serial Numbers AN0015-MY0000001 to AN0015-MY0000256

MAC Addresses 001B7C888888 to 001B7C888987

Generate

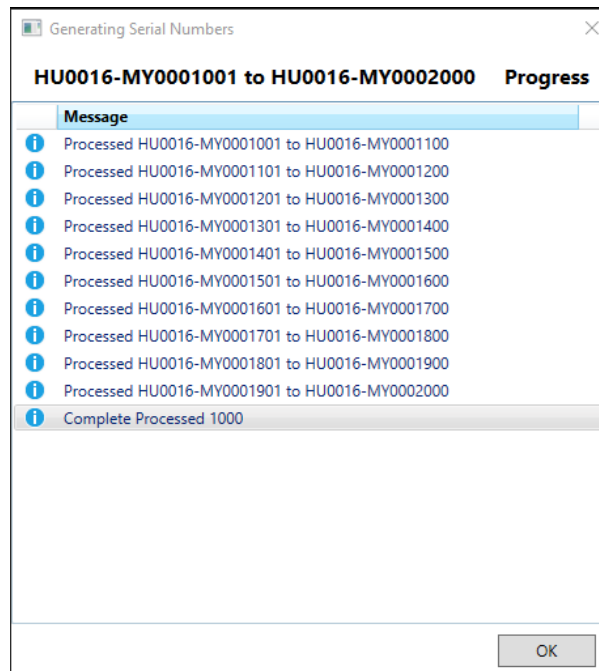
For non LPP runs if the Device has not yet had any Serial Numbers generated the Next Number will be set at 1001, after the first generation, the Next Number will be set to the next number in sequence after the last allocated number for the device.

Checking the LPP check box will set the Next Serial Number to 1.

With MAC Addresses the user will need to specify the first MAC Address to be allocated to the specific device type. After that it will be assumed that the first MAC Address follows on from the last MAC Address allocated for the current device type. This can be manually overridden by specifying a new MAC Address range start. (Note: The suggested address will always be the largest currently allocated MAC Address + 1).

Pressing Generate will display a dialog showing the progress of the Serial Number generation.

## ARCAM Serial Numbers

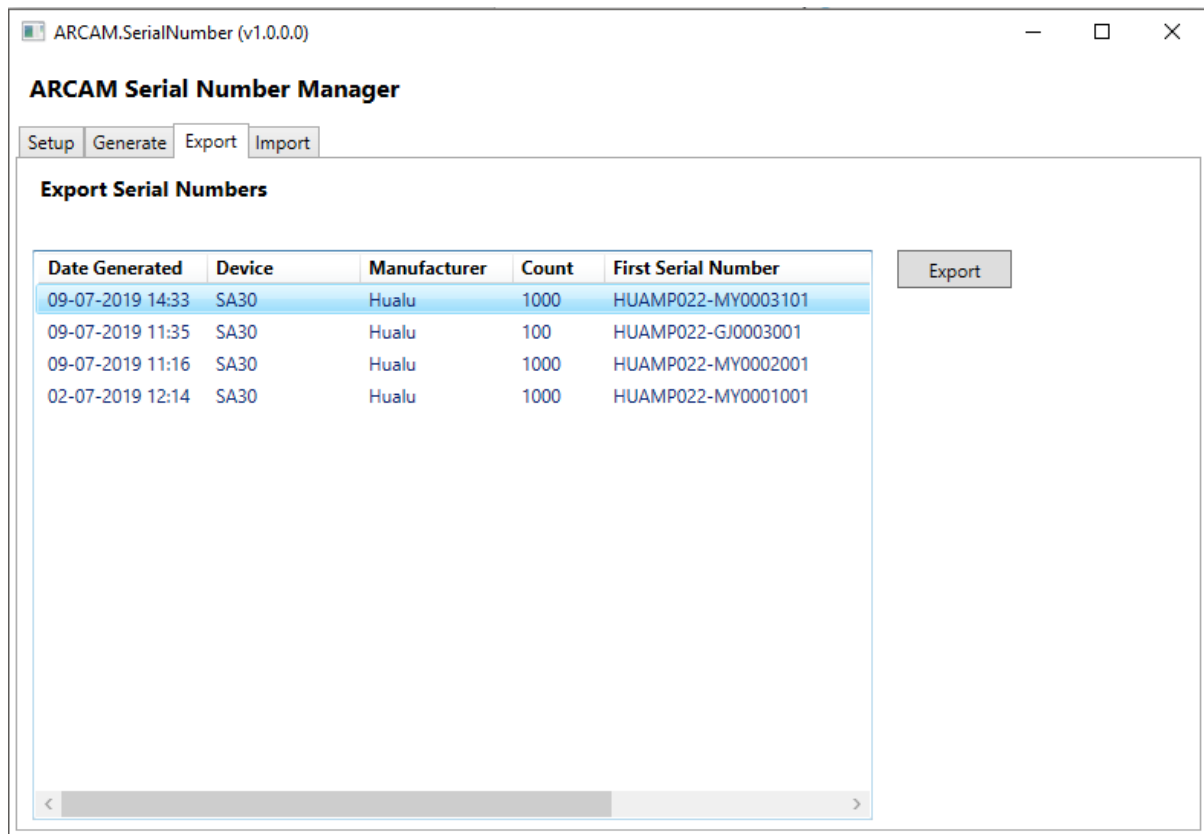


The Generate progress dialog

### Export Tab

The Export tab is used to generate a data file containing the number previously generated using the Generate tab.

The user is given the choice of generating an export file for any of the ranges of Serial Numbers generated for a Device/Manufacturer combination. If required, the range may be exported as many times as needed.



The process will create an output file in a directory “Exports” under the directory containing the ARCAM.SerialNumber.Manager.exe. The file will have the following naming convention:

*DeviceName\_SerialNumbers\_Manufacturer\_RangeStart-RangeEnd.dat*

Once generated the output file can be sent to the Manufacturer for loading into the ARCAM Serial Number Burner.

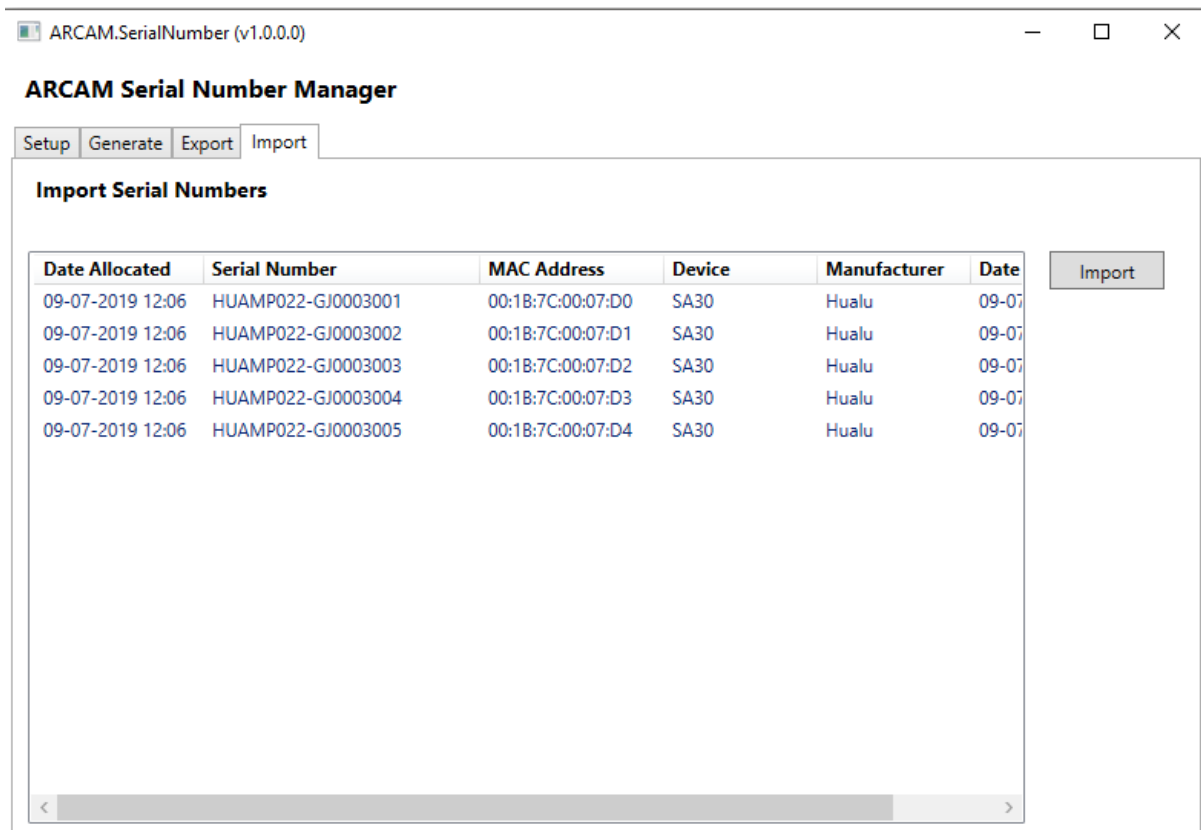
### Import Tab

The Import tab is used to updated the Serial Number database using a data file returned from the Manufacturer post burning.

The user uses the Import button to select the data file returned from the Manufacturer. The data file is parsed and the details of any Serial Numbers that have been Allocated/Burnt will be used to updated the associated record in the database.



## ARCAM Serial Numbers



## Serial Number Burner

The Serial Number Burner is used by the Manufacturer to generate labels and burn the serial numbers into the devices as they are produced.

### Connecting to the AP72598\_EVB\_V03 board

The computer running the Serial Number burning software should be connected to the AP72598\_EVB\_V03 board via USB as shown below:

## ARCAM Serial Numbers



### Opening a .dat file

Having loaded the application, the user opens the data file generated by the ARCAM Serial Number Manager using the Open button.

Choose a data file to open		Open	D:\Projects\ARCAM.SerialNumber.Manager\ARCAM.SerialNumber.Manager\bin\Debug\Exports\SA30_SerialNumbers_Hualu_0003001-0003100.dat
Device	SA30	Range	HUARC-AMP022-MY0003001 - HUARC-AMP022-MY0003100
Manufacturer	Hualu	Count	100

The details of the data file are displayed in the application header, showing the Device, Manufacturer and number of records available.

### Allocate Numbers Tab

The Allocate Numbers tab is used to allocate numbers from the range defined in the data file.

It is intended that that data file can contain sufficient for a number of production runs and because the serial number generated include characters identifying the month and year of production it is only necessary to allocate the number required for the current run.

## ARCAM Serial Numbers

The screenshot shows the 'ARCAM Serial Number Burner' application window. At the top, it says 'Choose a data file to open' with an 'Open' button and a file path: 'D:\Projects\ARCAM.SerialNumber.Manager\ARCAM.SerialNumber.Manager\bin\Debug\Exports\SA30 (Europe)\_SerialNumbers\_Hualu\_0001001-0002000.dat'. Below this, it shows 'Device SA30 (Europe)', 'Range HU0016-MY0001001 - HU0016-MY0002000', 'Manufacturer Hualu', and 'Count 1000'. There are two tabs: 'Allocate Numbers' (selected) and 'Burn Numbers'. Under 'Allocate Numbers', it says 'Allocate a series of numbers and generate a CSV file containing the Serial Numbers and MAC Addresses'. It has a 'Number to allocate' field with '100' and '(available 900)'. Below that, 'Month August (H)' and 'Year 2019 (J)'. There are two checkboxes: 'Include Serial Number' and 'Include MAC Address', both checked. A 'Go' button is next to them. To the right of the 'Go' button, it says 'Complete 100 Serial Numbers processed'. At the bottom, there is a 'Free unused numbers for re-use' section with a 'Free' button.

ARCAM Serial Number Burner

Choose a data file to open **Open** D:\Projects\ARCAM.SerialNumber.Manager\ARCAM.SerialNumber.Manager\bin\Debug\Exports\SA30 (Europe)\_SerialNumbers\_Hualu\_0001001-0002000.dat

Device **SA30 (Europe)** Range **HU0016-MY0001001 - HU0016-MY0002000**

Manufacturer **Hualu** Count **1000**

Allocate Numbers **Burn Numbers**

**Allocate a series of numbers and generate a CSV file containing the Serial Numbers and MAC Addresses**

Number to allocate  (available 900)

Month **August (H)** Year **2019 (J)**

☒ Include Serial Number ☒ Include MAC Address **Go** **Complete 100 Serial Numbers processed**

**Free unused numbers for re-use**

**Free**

Pressing the Go button will associate the production Month and Year with a range of numbers for the data file. It will also prompt for the location of a csv file that can be used to generate the Serial Number labels to be applied to the Devices. There is an option to include Serial Number, MAC Address or both.

The screenshot shows an Excel spreadsheet with the title 'SA30 (Europe)\_0001001-0002000.csv - Excel'. The spreadsheet has two columns: A and B. Column A contains serial numbers starting from 'HU0016-HJ0001001' to 'HU0016-HJ0001012'. Column B contains MAC addresses starting from '00:1B:7C:00:18:34' to '00:1B:7C:00:18:3F'. The first row is highlighted in green.

	A	B	C	D	E	F
1	HU0016-HJ0001001	00:1B:7C:00:18:34				
2	HU0016-HJ0001002	00:1B:7C:00:18:35				
3	HU0016-HJ0001003	00:1B:7C:00:18:36				
4	HU0016-HJ0001004	00:1B:7C:00:18:37				
5	HU0016-HJ0001005	00:1B:7C:00:18:38				
6	HU0016-HJ0001006	00:1B:7C:00:18:39				
7	HU0016-HJ0001007	00:1B:7C:00:18:3A				
8	HU0016-HJ0001008	00:1B:7C:00:18:3B				
9	HU0016-HJ0001009	00:1B:7C:00:18:3C				
10	HU0016-HJ0001010	00:1B:7C:00:18:3D				
11	HU0016-HJ0001011	00:1B:7C:00:18:3E				
12	HU0016-HJ0001012	00:1B:7C:00:18:3F				

## ARCAM Serial Numbers

If any previously allocated number are not used in the current production run, they can be freed-up for re-allocation later by pressing the Free button.

### Burn Numbers Tab

The Burn Numbers tab is used to burn the Serial Number and MAC Address into a Device using the AP72598\_EVB\_V03 board.

Before burning, the board should be connected to over RS232. COM Port, Baud Rate options are provided and the Connect button connects to the device. The Baud rate defaults to 115200.

COM Port	Baud Rate	
COM3 - Intel(R) Active Management Technology - S ▾	115200 ▾	Connect

Once connected the Connect button is hidden, and the Port/Baud Rate defined are used for the duration of the burning session.

The steps performed in a burning session are as follows:

First time:

- Start the application
- Load the appropriate DAT file, select the Burn Numbers Tab
  - The first available Serial Number/MAC Address is displayed on the screen
- Load the AP72598\_EVB\_V03 board with a new Avatar board.
- Switch on the AP72598\_EVB\_V03 board.
- Connect the software to the AP72598\_EVB\_V03 board using the COM Port/Baud Rate and Connect button.
- The software attempts to logon to the Avatar board, and program the Serial Number and MAC Address.
- When successful, switch off the AP72598\_EVB\_V03 board.

Subsequent times

- Load the AP72598\_EVB\_V03 board with a new Avatar board.
- Switch on the AP72598\_EVB\_V03 board.
- The software connects to the AP72598\_EVB\_V03 board using the initial connection details.
  - The next available Serial Number/MAC Address is displayed on the screen
- The software attempts to logon to the Avatar board, and program the Serial Number and MAC Address.
- When successful, switch off the AP72598\_EVB\_V03 board.
- Repeat for each Avatar board to be programmed.

## ARCAM Serial Numbers

The screenshot shows the 'ARCAM Serial Number Burner' application window. The title bar reads 'ARCAM Serial Number Burner'. The main window has a header 'ARCAM Serial Number Burner'. Below this is a section for file selection with a button 'Open' and a file path: 'D:\Projects\ARCAM.SerialNumber.Manager\ARCAM.SerialNumber.Manager\bin\Debug\Exports\SA30 (Europe)\_SerialNumbers\_Hualu\_0001001-0002000.dat'. Below the file path are fields for 'Device' (SA30 (Europe)), 'Range' (HU0016-MY0001001 - HU0016-MY0002000), 'Manufacturer' (Hualu), and 'Count' (1000). There are two tabs: 'Allocate Numbers' and 'Burn Numbers'. The 'Burn Numbers' tab is active. It contains fields for 'Start Number' (0001001), 'End Number' (0001100), 'Month' (August (H)), 'Year' (2019 (J)), 'Available' (100), and 'Used' (0). To the right of these fields are 'COM Port' (COM9 - Prolific USB-to-Serial Comm Port (COM9)) and 'Baud Rate' (115200). In the center, a large box displays the serial number 'HU0016-HJ0001001' and the MAC address '00:1B:7C:00:18:34'. At the bottom, a terminal window shows the following log:

```
Connected
Attempting Login (28)
Error: no such command: input linein
Attempting Login
Logging In to sa30-3ba620
Logging In to sa30-3ba620
root@sa30-3ba620:~# root
root@sa30-3ba620:~# FactoryTest set serialnumber HU0016-HJ0001001
ok
root@sa30-3ba620:~# FactoryTest get serialnumber
serialnumber=HU0016-HJ0001001
root@sa30-3ba620:~# FactoryTest set ethernetmac 00:1B:7C:00:18:34
ok
root@sa30-3ba620:~# FactoryTest get ethernetmac
eth=00:1B:7C:00:18:34
SUCCESS Burning complete
```

As each Serial Number is processed, the data file is updated. Once a run is complete the data file can be sent back to ARCAM to be imported into their database.