

Product: Injector Control Board (ICB1)

Subject: Firmware Flashing Process

Introduction

This document details the steps needed to flash the firmware onto the SCV and NCV ICB1 PCBs within the AE100/1 EUI Control Unit. The AE100/1 EUI Control Unit should be connected to an AVM2 as it would be in normal operation.

Equipment Needed

To flash the firmware onto the SCV and NCV ICB1 PCB's, the following equipment is required to carry out the firmware flashing process:

Hardware

- AE100/1 EUI Control Unit (Mod. Std. C or later)
- AVM2-PC

Software

- Atmel FLIP
 - Downloadable from the Microchip website:
<https://www.microchip.com/developmenttools/ProductDetails/flip>
- ICB1 Firmware Hex file
 - Downloadable from the Hartridge Software Portal.

Useful Information

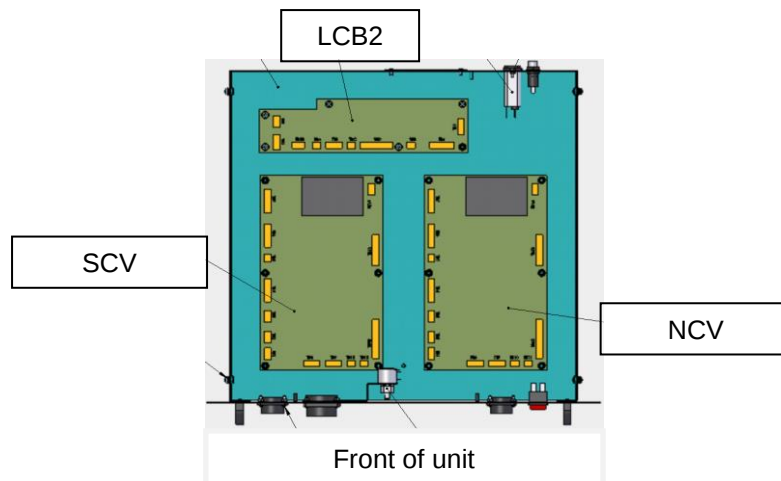


Figure 1 – Inside AE100/1 EUI Control Unit, Top down view with the front of unit facing down

Abbreviations

PCB – Printed Circuit Board

ICB1 – Injector Control Board 1

SCV – Spill Control Valve (when looking inside an AE100/1 EUI Control Unit, the PCB mounted to the left side of the unit is the SCV)

NCV – Nozzle Control Valve (when looking inside an AE100/1 EUI Control Unit, the PCB mounted to the right side of the unit is the NCV)

LCB2 – Load Cell Board 2

Jumper

The jumper is provided with the AE100/1 EUI Control Unit, each of the SCV and NCV ICB1 PCBs come with a jumper that is fitted next to the processor. It is used to short the 2 pins of connector J5. This puts the respective PCB into programming mode, thus no heartbeat can be seen from LED24.



Figure 2 - Jumper

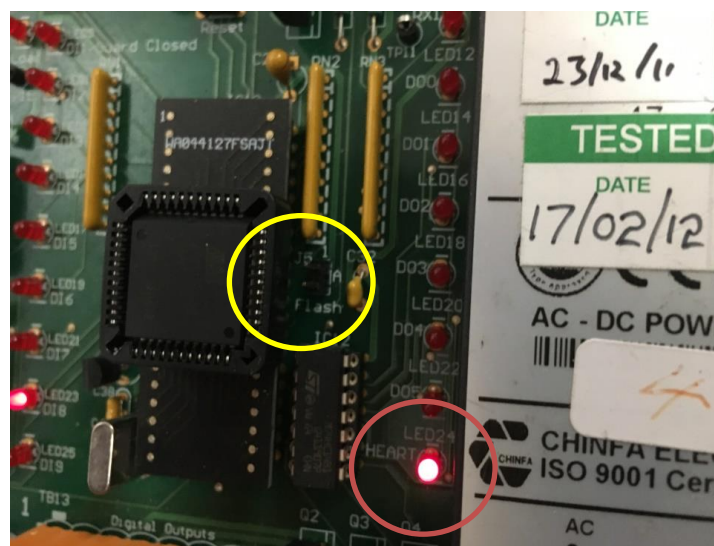
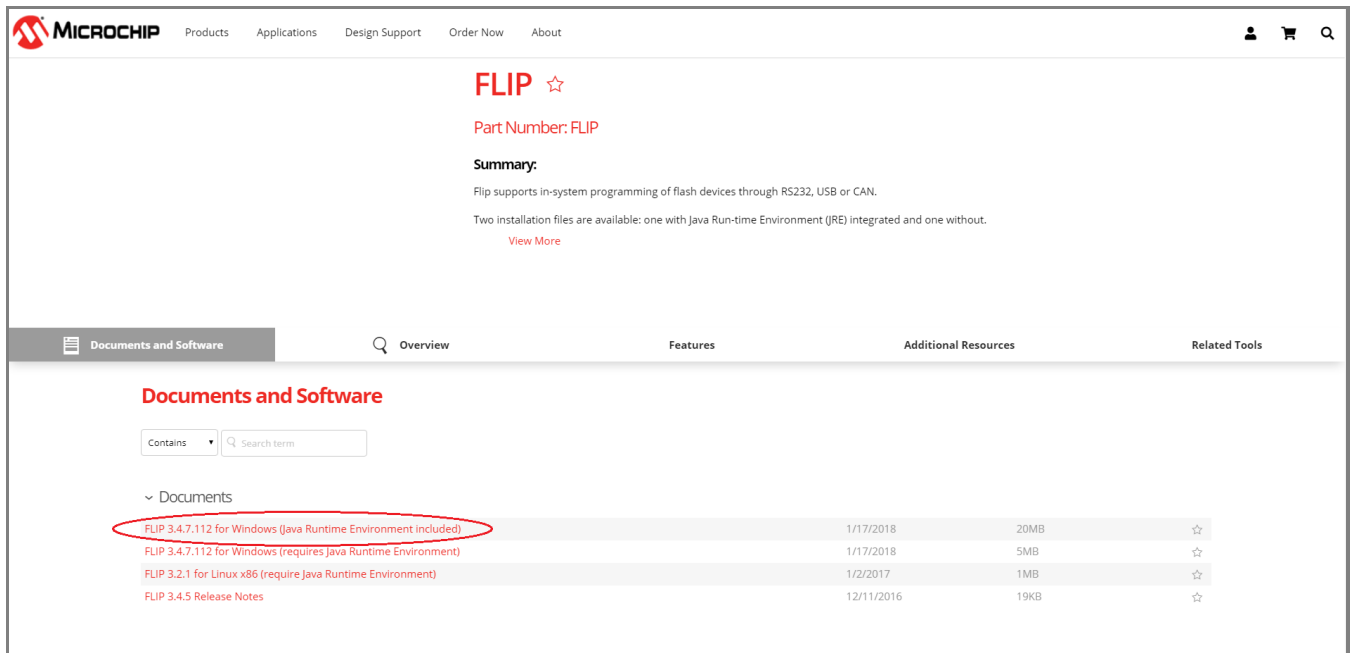


Figure 3 – J5 Connector & Heartbeat LED Location

Atmel FLIP

Atmel FLIP is a software program developed by Atmel. It is used to flash the microcontroller (AD89C51ED2) which is used on the ICB1. Atmel FLIP 3.4.7.112, or later, can be downloaded from the Microchip website: <https://www.microchip.com/developmenttools/ProductDetails/flip>. Ensure the latest version is downloaded.



The screenshot shows the Microchip website for the FLIP product. The top navigation bar includes links for Products, Applications, Design Support, Order Now, and About. The main content area displays the product name 'FLIP' with a star icon, the part number 'Part Number: FLIP', and a summary stating that FLIP supports in-system programming of flash devices through RS232, USB, or CAN. It also mentions that two installation files are available: one with Java Run-time Environment (JRE) integrated and one without. A 'View More' link is provided. Below this, a tabbed interface shows the 'Documents and Software' tab selected. Under this tab, there is a search bar and a list of documents. The first document, 'FLIP 3.4.7.112 for Windows (Java Runtime Environment included)', is circled in red. The other documents listed are 'FLIP 3.4.7.112 for Windows (requires Java Runtime Environment)', 'FLIP 3.2.1 for Linux x86 (require Java Runtime Environment)', and 'FLIP 3.4.5 Release Notes'.

Document Name	Date	Size	Star
FLIP 3.4.7.112 for Windows (Java Runtime Environment included)	1/17/2018	20MB	☆
FLIP 3.4.7.112 for Windows (requires Java Runtime Environment)	1/17/2018	5MB	☆
FLIP 3.2.1 for Linux x86 (require Java Runtime Environment)	1/2/2017	1MB	☆
FLIP 3.4.5 Release Notes	12/11/2016	19KB	☆

Figure 4 – Atmel FLIP download

SCV

- 1) Ensure the AE100/1 EUI Control Unit is powered off.

Locate connector J5, it can be seen in Figure 5. Position the jumper across the pins of J5, as seen in Figure 6. This will short the contacts and put the board into programming mode.

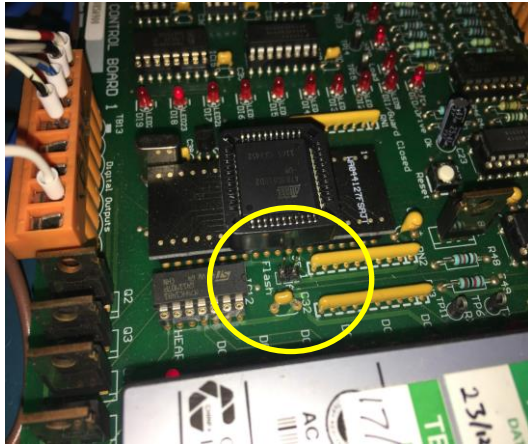


Figure 5 - Connector J5 Location

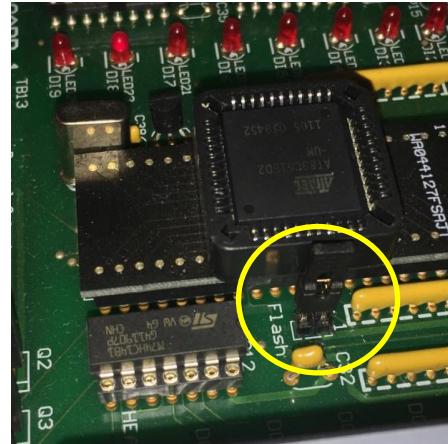


Figure 6 - Connector J5 Location with Jumper

Power the AE100/1 EUI Control Unit on. LED24 (the heartbeat LED) should no longer be flashing as the PCB is now in programming mode.

- 2) Open Atmel Flip on the AVM2-PC. Select a target device, Figure 7. Select AT89C51ED2 from the drop down menu and confirm by pressing 'OK', seen on Figure 8.

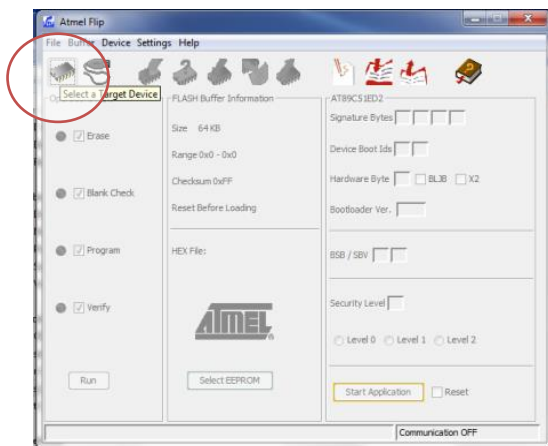


Figure 7 - Select a Target Device

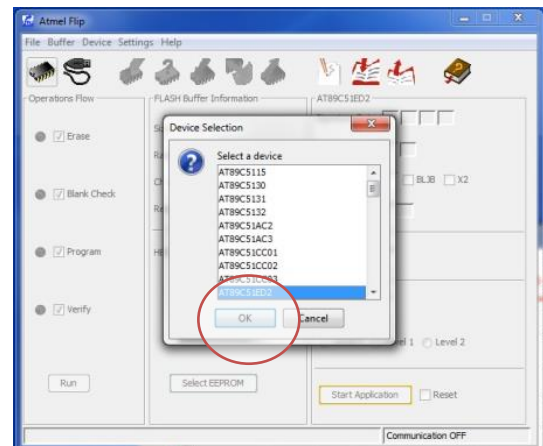


Figure 8 - Select Device 'AT89C51ED2'

- 3) Once the appropriate device has been selected, the communication requires set up. This is done by selecting the 'Select a Communication Medium' icon, shown in Figure 9, and choose RS232 from the drop down menu, Figure 10.

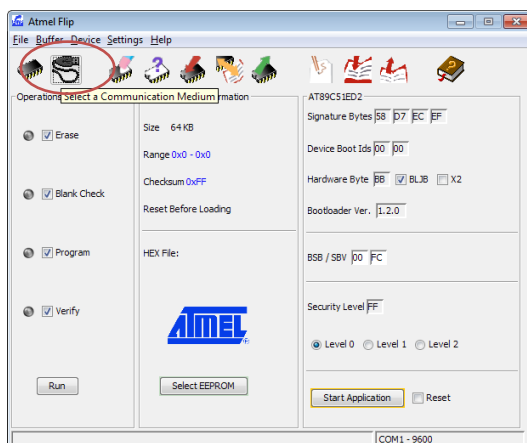


Figure 9 - Select a Communication Medium

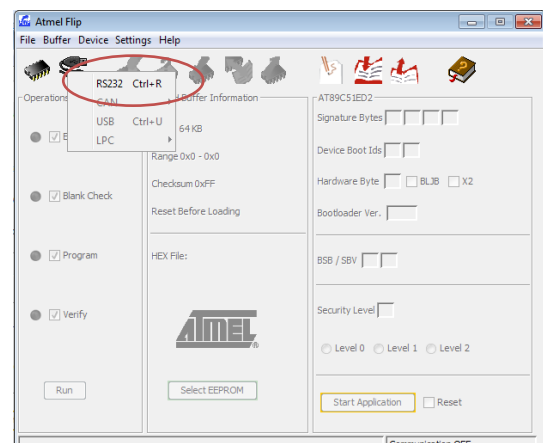


Figure 10 - Select RS232

A RS232 Setup window should appear. Ensure COM1 is selected and 9600 Baudrate is selected from the respective drop down menus. The manual Sync option should be unchecked, see Figure 11 for confirmation.

Once all the details have been appropriately entered, select *Connect*. The AVM2-PC and AE100/1 EUI Control Unit will connect.

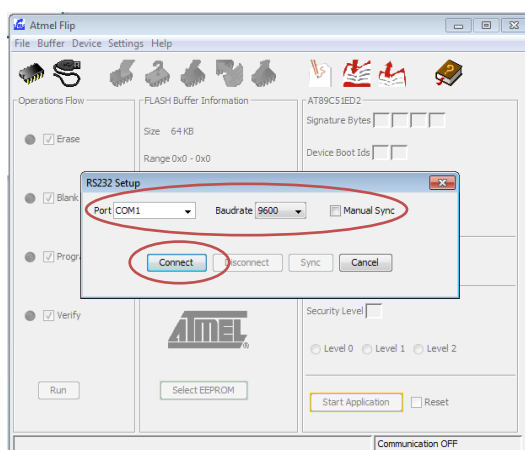


Figure 11 - RS232 Setup

- 4) As the device has now been selected and a communication medium chosen, navigate to the ICB1.hex firmware file downloaded and saved in an appropriate location.
File → Load HEX File → *Navigate to file* → OK.
The latest file can be downloaded from the Hartridge Ltd Software Portal.

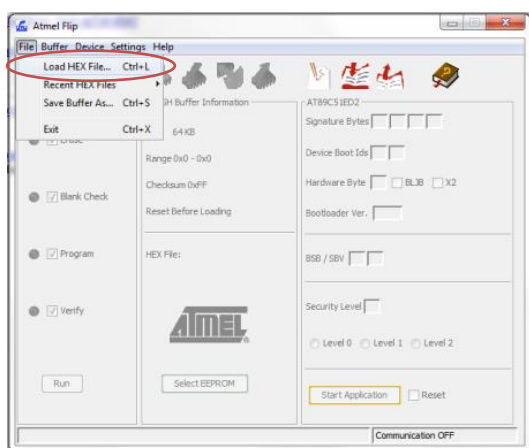


Figure 12 - Load hex file

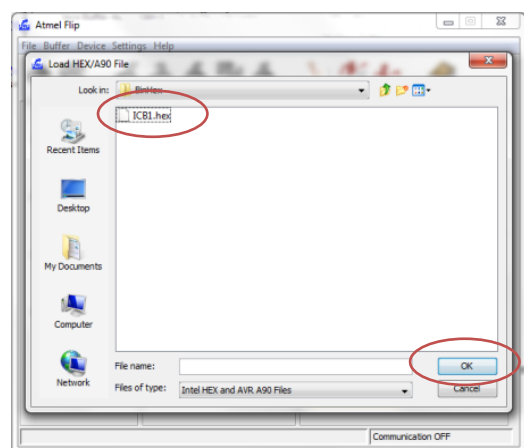


Figure 13 - ICB1.hex File

- 5) Once the ICB1.hex file has loaded, the firmware is ready to be flashed onto the PCB. Select the *run* option seen in Figure 14. A progress bar will appear as the loaded ICB1.hex file flashes onto the PCB, Figure 15.

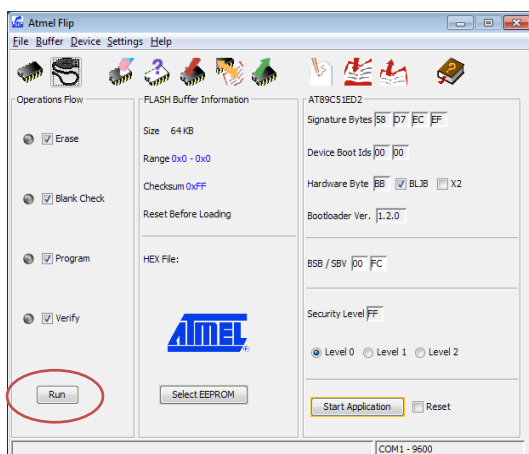


Figure 14 - Screen after loading ICB1.hex File

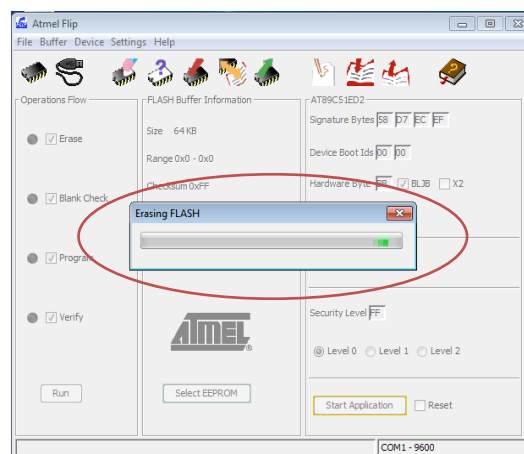


Figure 15 - Flashing

- 6) Once the PCB has been successfully flashed, the operations will have a green dot next to each option and 'Verify PASS' will appear in the dialogue box at the bottom. The successful screen can be seen in Figure 16.

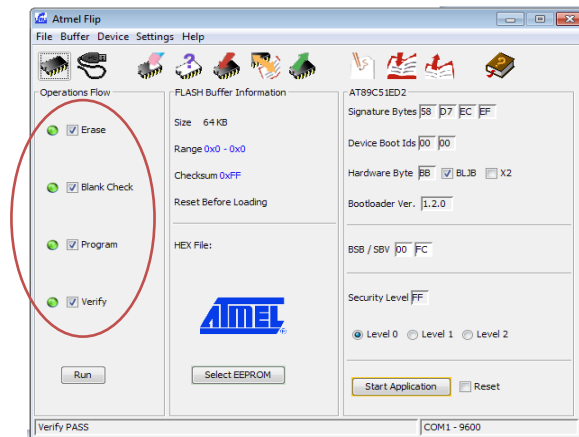


Figure 16 - Successful firmware flash

- 7) Power off the AE100/1 EUI Control Unit, remove and replace jumper into a non-flash position, Figure 17, so the pins are no longer shorted. Power the AE100/1 EUI Control Unit. A heartbeat should be seen on LED24. This ends the process of flashing the SCV PCB in the AE100/1 EUI Control Unit.

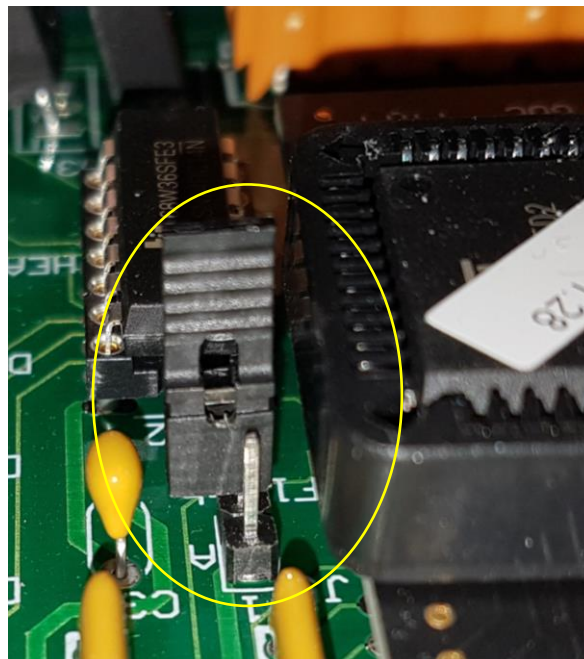


Figure 17 - Jumper in non-flashing position

Flashing of the SCV PCB is now complete.

Flashing NCV PCB

- 1) See step 1 of flashing SCV PCB on page 4.
- 2) See step 2 of flashing SCV PCB on page 4.
- 3) See step 3 of flashing SCV PCB on page 4, when selecting the com port, select com 4 instead of com 1, as seen in figure 18 below.

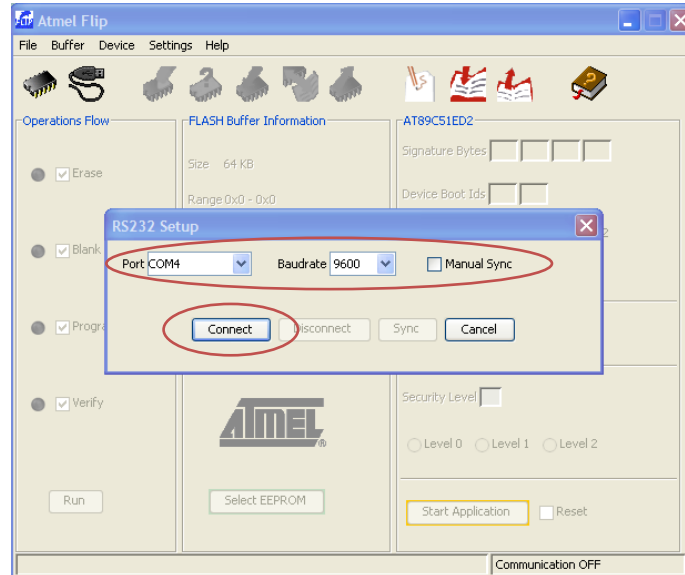


Figure 18 – RS232 Setup

- 4) See step 4 through to step 7 of flashing SCV PCB on pages 5 – 6.

Flashing of the NCV PCB is now complete.

Additional Information

If you have any concerns about this instruction, please contact Hartridge Customer Support.

Tel +44 (0)1280 825 650 or email support@hartridge.com