

How to upgrade firmware (FW) using the AVR[®] programmer

IMPORTANT INFO AND EXCEPTIONS

- Each Module/Device has its own fuse settings
 - Fuse documentation is included in the BOOT folder in the module FW(firmware) folder
 - PCBs may have different "Device" signatures; the information (which Device must be chosen) is listed in the "Fuse Settings" document
- Each module has different programming pin connections
 - Example PROG connection locations in *Appendix Photos of Common Programming Locations*
 - Make sure that the white wire of the AVR programming cable is close to "PROG" sign on the board
- AVR tool will have a green and red LED active when connected to the module
 - o Both AVR LEDs will turn green while programming FW
 - If the device does not read or reach the target voltage for operation, please evaluate connections or power distribution to the module.
- If programming a Robot Radio 2.4GHz, please see information in section 1.4 Programming Robot Radio 2.4GHz before following 1.0 GENERAL PROCEDURE FOR ALL APPLICABLE MODULES

1.0 GENERAL PROCEDURE FOR ALL APPLICABLE MODULES

- Download FW from the Autostore Download Center in the CRM Service Portal
- Power off the module
- Connect AVR-Programmer from your PC to PROG pins of device



Example PROG pin from R5 CPU board

- Power on the module
 - Ensure Safety features aren't cutting power to the device; Estop, safety hatch, etc.)
 - Start the application Microchip Studio for AVR® and SAM Device to program:
 - \circ module main firmware file
 - o module boot file located in firmware folder



1.1 Preparing to program using Microchip Studio for AVR® and SAM Device

- Start the application Microchip Studio for AVR® and SAM Device
- Start the device programming tool under the tools tab of the start page



- Select the tool "Atmel-ICE" and the processor name from the "Device" list
 Use the default "Interface" value
- Click the «Apply» button

Device Program	nming				? ×
Tool	Device	Interface	Device signature	Target Voltage	
Atmel-ICE ~	ATmega128	▼ ISP Y Apply	not read Read	Read 🔅	
		Sel	lect tool, device and in	terface.	

• Click "Set" on the default frequency clock

ISP Clock	125 kHz
The ISP Clock frequency must be lower than 1/4 of frequency the device is ope	Reset to default clock
	Set

• Click the «Read» button under "Device Signature"



Atmel-ICE (J42700001762) - I	Device Programming			?	\times
Tool Device Atmel-ICE × ATmega128	Interface ISP × Apply	Device signature 0x1E9702 Read	Target Voltage	ž	
Interface settings Tool information	ISP Clock		Re	= 125 kH	-Iz
Device information Oscillator calibration	The ISP Clock frequency must	be lower than 1/4 of frequer	ncy the device is operatin	ig on.	
Memories				Set	
Fuses					
Production file					
Reading device IDOK					
Reading device IDC	ЭК				
				Close	

If device error message is displayed, check the following items, and try again:

- AVR programming cable is reversed
- There is no power on programmable module
- Chosen device setting is not correct, check Fuse Settings Document for the correct device
- Make sure "Fuses" settings are the same as in the document provided together with the FW file for the module

Atmel-ICE (J427	00001762) -	Device Prog	iramming						ſ	X
Tool	Device		Interface		Device signatu	re	Target Voltage			
Atmel-ICE ~	ATmega12	- 88	ISP ~	Apply	0x1E9702	Read	5.0 V Read	i 🗘		
Interface settir Tool informati Device inform Oscillator calib Memories Fuses Lock bits	ngs on ation pration	Fuse Fuse FXTENI FX	Name DED.M103C DED.WDTON DCDEN TAGEN PIEN ESAVE IOOTSZ	□ □ ☑ Boot	Flash size=4096 v	Value vords start a	uddress=\$F000 ∼			
Production file	2	Fuse Regis EXTENDE HIGH LOW	ter Value D 0xFF 0xC8 0x20							
		 ✓ Auto re ✓ Verify a 	ead after program	ming			Program	Verify	y to clipt	ooard ead
tarting operatic eading register eading register eading register ead registers(on read regis EXTENDED HIGHOK LOWOK DK	ters .OK								
 Read regi 	istersOK									

AS-90177 FuseSettings STD-V1

Document revision	01	
Document change	18.02.2016	
Device	ATmega128 (U1)	
PCB AS-number	AS-12140	
WDION = []		
OCDEN = []		
JTAGEN = []		
SPIEN = [X]		
EESAVE = [X]		
BOOTSZ = 4096W_F000		
BOOTRST = [X]		
CKOPT = []		
BODLEVEL = 2V7		
BODEN = [X]		
SUT CKSEL = EXTHIEXTALRES 16KCK 64MS		
EXTENDED = 0xFF (valid)		
HIGH = 0xD0 (valid)		
LOW = 0xBF (valid)		

Document change

Rev	Date	Initials	
NA			Fuse Settings AS-90177.pdf
01	2016.02.18	ØG	Split GripperComIC fuse settings to separate document No changes to fuse settings for Main MCU



• Click the «Program» button to save Fuse settings.

1.2 Programming the main FW file

- Browse and select the main FW-file
- Ensure field "Erase device before programming" is marked
- Click the «Program» button

Atmel-ICE (J42700001762	2) - Device Programming	?	\times
Tool Device Atmel-ICE × ATmega	Interface Device signature Target Voltage		
Interface settings Tool information Device information Oscillator calibration	Device Erase Chip × Erase now Flash (128 KB) C\Users\8559\Downloads\Port conveyor 5.0 Driver fw_2.0.0-2 (3)\FW-90180-STD-V2 v2.0 Flase device before programming).0-2\F ¹ ×	
Memories Fuses	Verify Flash after programming	Kead.	•
Lock bits Production file	EEPROM (4 KB) D:\915_Test\EEPROM\EEPROM_ROBNO20.hex Verify EEPROM after programming Verify	× Read.	
rasing device OK rogramming FlashOK erifying FlashOK	(•) Advanced		
 Verifying FlashC 	ж		

1.3 Programming the BOOT file

- Ensure field "Erase device before programming" is NOT marked
- Browse and select the boot file
- Click the «Program» button



Atmel-ICE (J42700001762) - E	Device Programming	? ×
Tool Device Atmel-ICE Y ATmega128	Interface Device signature Target Voltage Isp × Apply 0x1E9702 Read 5.0 V Read	
Interface settings Tool information	Device Erase Chip * Erase now	
Device information Oscillator calibration	Flash (128 KB) C:\Users\8559\Downloads\Port conveyor 5.0 Driver fw_2.0.0-2 (3)\FW-90180-STD-V2 v2.0 Erase device before programming	.0-2\B ~
Memories Fuses	Verify Flash after programming Verify Advanced	Read
Lock bits Production file	EEPROM (4 KB) D:\915_Test\EEPROM_EEPROM_ROBNO20.hex	×
	✓ Verify EEPROM after programming Program Verify ✓ Advanced Verify Verify	Read
Fracing device OK		
Programming FlashOK Verifying FlashOK		
 Verifying FlashOK 		
		Close

- The module has been upgraded
 - Turn off the module
 - Disconnect the AVR

1.4 Programming a Robot Radio 2.4GHz using the AVR

IMPORTANT INFO

- The ATM and RF chips can be programmed in any order. It is important when programming each chip, the main firmware file is flashed before the boot file
- The radio needs to be connected to the robot with the robot powered on for the radio to receive power for programming. Keep the radio connected to the robot at all times
- When programming the ATM chip, the jumper goes on the right-side pins of the "PROG-RF" connection. Please see the photo below.
 - Connect the AVR programmer to the "PROG-ATM" chip pins





- When programming the RF chip, the jumper goes on the right-side pins of the "PROG-ATM" connection. Please see the photo below.
 - Connect the AVR programmer to the "PROG-RF" chip pins
 - "Device" setting needs to be set to ATmega128RFA1 instead of ATmega128A



IMPORTANT: Once finished, be sure to place the jumper back on one pin only, so that it is no longer jumping any pins, but will stay with the radio for any future programming attempts.

1.5 Programming an ASIO 2.X series using the AVR

IMPORTANT INFO

- Programming ASIO 2.X series requires removal of Schoff cover plate screws to access internal CPU Board. Image below details location of screws. Photo of CPU board programming location can be found in the Appendix.
- Programming ASIO 2.X series follows standard process 1.0 GENERAL PROCEDURE FOR ALL APPLICABLE MODULES.







Appendix – Photos of Common Programming Locations



