



FS2009USB - Portable In-System (ISP) Programmer for ARM microcontrollers

The **FS2009(ARM)** is a **portable ISP programmer** supporting high-speed **In-System Programming (ISP)** of the on-chip FLASH memory of many **ARM FLASH microcontroller** devices including Atmel AT91SAM7, NXP LPC2xxx and ST STM32F device families. It is designed for development, field-service and production programming applications.

The programmer is capable of operating in **'Standalone Mode'** (without PC) allowing an operator to select from 1 of 64 **'Standalone Programming Projects'** using the display and keypad. A single 'Autoprogram' key is then used to repetitively program the selected project.

The **FS2009(ARM)** programmer **Key features:**

- Portable In-System (ISP) Programmer
- Ideal for Development, Production or Field use
- Supports ISP of NXP LPC2xxx ARM7 FLASH microcontroller family via the JTAG programming interface
- Supports ISP of AT91SAM7 devices via the JTAG programming interface
- Supports **'Standalone'** operation i.e. no PC required after programmer has been configured
- Very fast programming speeds suitable for high-throughput production environments
- Up to 64 individual Programming Projects can be uploaded to the non-volatile On-board FLASH Store (4Mbytes).
- Robust I/O driver stage
- Individually configurable programmer I/O pins
- Programmable frequency generator output on SCK2 pin - supports external clocking of ATmega, and ATtiny AVR devices to speed up programming
- Programmer firmware is field upgradeable to cater for future algorithms
- CE / FCC / RoHS approved product

Features

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- ▶ Supported Programmer Control Methods

The programmer supports the following control methods:

- **Standalone Mode** - Keypad and LCD controlled (no PC)
- **Development Mode** - Controlled via PC Software - Equinox Development Suite (EDS)
- **Project Upload Mode** - PC Controlled
- **ISP-PRO** - Production Software (chargeable upgrade)
- **ASCII Text Communications Protocol** (RS232 Serial control - chargeable upgrade)

▶ Target Interface Capabilities

The FS2009USB supports the following Target Interfaces / Algorithms:

- **Atmel AVR - SPI** - Serial Programming Mode
- **Atmel AT89S - SPI** - Serial Programming Mode
- **Atmel ATtiny11/12/15 High-Voltage** Serial Programming Mode
- **UART Boot Loader** - for Atmel T89C51Rx2 8051 microcontrollers
- **UART Boot Loader** - for Philips P89C51Rx2 and P89C66x 8051 microcontrollers
- **Atmel ATmega JTAG** In-System Programming (ISP) - chargeable upgrade
- **24Cxxx Serial EEPROMs** I2C (Two-Wire Interface) - chargeable upgrade
- **AT91SAM7 JTAG** In-System Programming (ISP) - chargeable upgrade

▶ Standalone Programming Mode



In 'Standalone Mode', the FS2009USB is controlled via the push buttons on the front panel of the programmer - no PC connection is required. The programmer LCD and the LED Status Indicators are used to display the current status of the programmer. It is possible to select from 1 of 64 previously uploaded Programming Projects and then to repeatedly execute this project to program a batch of devices.

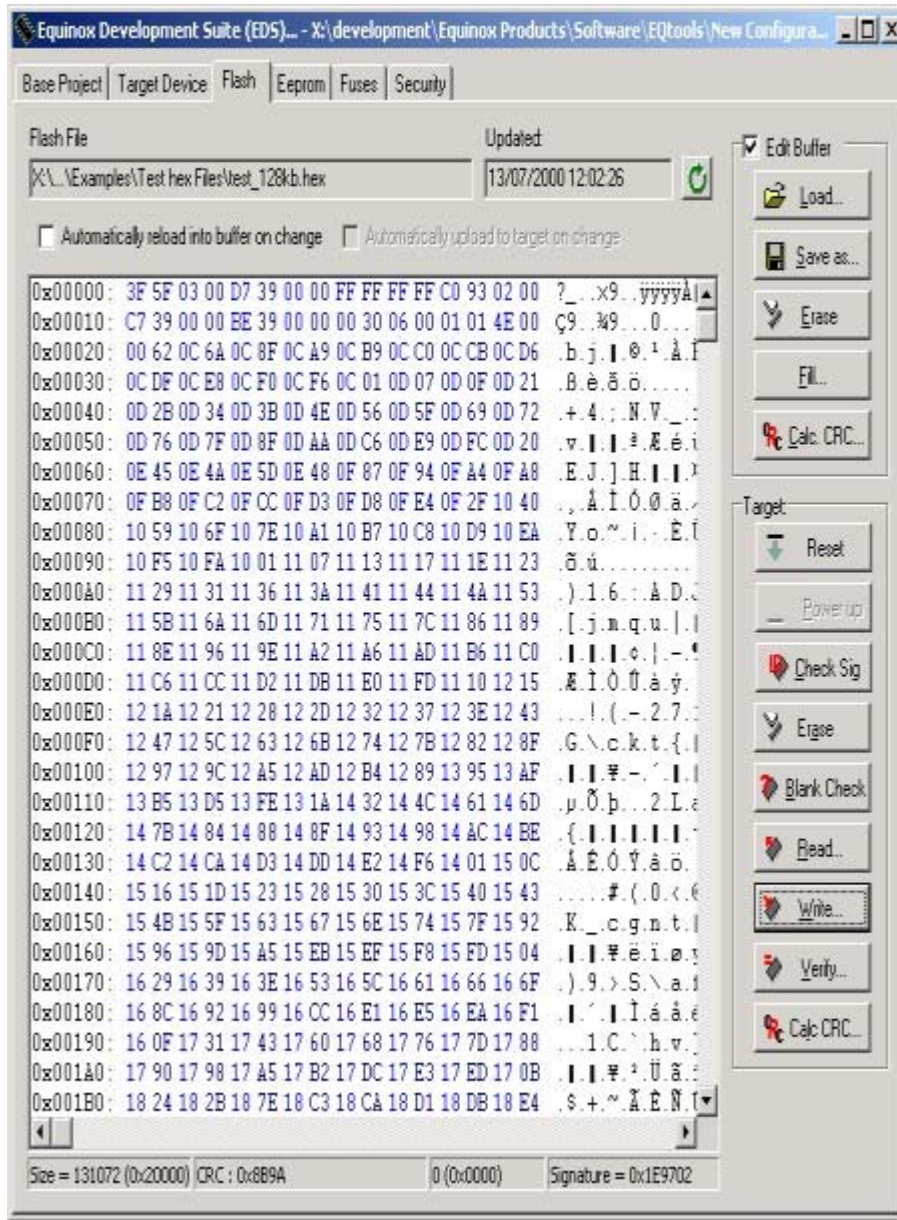
In Standalone Mode...

- Programmer is completely portable as no PC connection is required
- Programmer supports storage up to **64** independent Programming Projects in the non-volatile On-board **4Mbits** FLASH Memory Store .
- The operator simply selects the required project using LCD and keypad
- Each project name is version controlled showing the project name, date, firmware revision and build date. e.g. **myproject-240402-2.3.4.12**
- Single key auto-program mode
- Simple PASS / FAIL response with diagnostics on program failure
- Operator can not inadvertently change the programming data or settings

To configure the programmer for Standalone Mode...

- A Project Collection containing 1 - 64 Programming Projects must be uploaded on a one-off basis to the programmer using the EQTools PC software
- This is a single file which can be easily distributed to remote sites. It contains all projects, Hex File data, Fuse information etc.

► Development Mode



- Programmer is controlled from the PC via EQTools - Equinox Development Suite (EDS) Software
- Ideal for use in a Development Environment
- Supports manual writing / reading of FLASH / EEPROM memory areas
- Supports manual writing / reading of Fuses and Security Fuses
- All projects can be developed and tested on a real device before uploading a Programming Project to the programmer
- Tested Programming Projects can then be uploaded to the Programmer for use in Standalone Mode

► Project Upload Mode

- This mode allows a pre-compile Project Collection to be uploaded to the on-board 'FLASH Memory Store'.
- The programmer can store up to 32 MBits of Project Information which is held indefinitely in non-volatile FLASH Memory.
- It is possible to upload up to 64 Programming Projects to the programmer, each of which can be for a different target device.
- A simple 'Upload Wizard' allows field personnel to upload single or multiple Programming Projects as part of Project Collections.

► ISP Header Support

The FS2009USB programmer features all the popular In System Programming (ISP) Headers including:

- Atmel 10-way SPI Header (for Atmel AVR and AT89S microcontrollers)
- Equinox 10-way Header (for Atmel AVR and AT89S microcontrollers) and I2C Serial EEPROMs
- Atmel 6-way SPI Header (for Atmel AVR and AT89S microcontrollers)
- Atmel 10-way JTAG ISP Header (for JTAG ISP of Atmel ATmega AVR microcontrollers)
- Equinox 10-way UART Header (for Atmel AT89C51Rx2 and Philips P89C51RX2 and P89C66x microcontrollers)

This allows the programmer to interface directly to most target systems without requiring an external cable convertor.

Please refer to the [ISP Header Overview](#) page for full details of all available ISP Headers and ISP Cables.

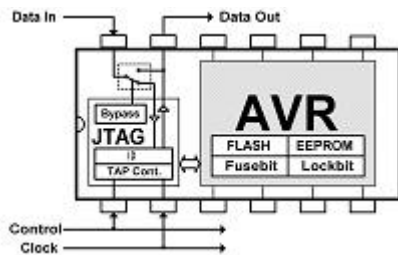
► Programmer / Target System - Power Supply Options

The Programmer supports the following powering options:

- Target System can supply power to the programmer: 3.0 - 5.0V @ 50mA
- Programmer can supply power to the Target System: 5.0V @ 300mA
- Programmer and Target System can be Independently Powered

The Programmer comes with a 9V DC Power Supply which is regulated down to +5.0V inside the programmer.

► JTAG ISP Support for Atmel ATmega AVR Microcontrollers



The FS2009USB supports programming of the Atmel ATmega AVR Microcontroller Family using the JTAG algorithm. This chargeable upgrade allows the FS2009 to program the ATmega devices at high speed via the JTAG port of the Target Device.

The advantages of JTAG In-System Programming are:

- Much faster programming times (up to x4 times faster than SPI)
- JTAG port can also be used as a 'Debug Port' during product development

► Configurable Frequency Output Clock

The FS2009USB is capable of outputting a continuous square wave at various frequencies on the programmer SCK2 pin.

This clock frequency could be used for the following purposes:

- To toggle the STROBE pin on a Watchdog Timer IC to stop the IC from timing out during the In-System Programming operation.
- To provide a clock to an Atmel ATmega microcontroller to resurrect a device which has an incorrectly configured Internal Oscillator.

► Spare Programmer I/O pins

- In SPI mode, there are 2 x Spare I/O pins for custom use
- In UART mode, there is 1 x Spare I/O pins for custom use
- The spare I/O pin(s) can be used for controlling circuitry on the user Target System including Chip Selects, additional RESET control lines, Watchdog Timers etc.

► CE / FCC Approved Product

The FS2009USB is a CE / FCC and RoHS approved product.

► Fast Programming Times



The FS2009USB supports fast programming of Target Devices via the SPI, JTAG and UART algorithms.

► Standalone Mode - Program -> Test -> Re-Program



The programmer is capable of performing a multi-project Programming Sequence in Standalone Mode as follows:

- Program Test Firmware
- Execute Target Firmware
- Wait for Target Firmware to finish
- Program Production Firmware

This powerful functionality allows the programmer to be used as part of an In-Circuit Test procedure where the Target Firmware must be allowed to execute in order to eg. calculate some calibration values. The programmer initially programs some 'Test Firmware' into the Target Device and then allows the Target to run this firmware and waits for this firmware to finish executing. The real 'Production Firmware' is then programmed into the Target Device.

► FS2009USB - product versions

The **FS2009USB** programmer is now available in three different versions, each offering different device support. Please refer to

the table below for an overview of each version.

Programmer version	Description
FS2009USB(UN)	<ul style="list-style-type: none"> • Supports programming of Atmel AVR devices via the SPI interface only. • Supports programming of Atmel ATtiny devices via the 'High-voltage Serial Programming Mode'. • Supports Atmel AT89S, AT89C51Rxx, AT89Sxxxx microcontrollers. • Supports NXP P89X51Rx2 devices • Supports Zensys 100 / 200 / 300 series devices.
FS2009USB(AVR-JTAG)	<ul style="list-style-type: none"> • Dedicated programmer supporting programming of the Atmel AVR family via the JTAG interface only.
FS2009USB(ARM)	<ul style="list-style-type: none"> • Dedicated programmer supporting many ARM microcontroller devices. • Atmel ARM7 microcontroller family including AT91SAM7S SAM7SE / SAM7A / SAM7L / SAM7X / SAM7XC ARM7 families • NXP LPC21xx ARM7 families • ST STM32F100Rx Cortex-M3 ARM family • Includes a special 20-way IDC connector cable for interfacing to AT91SAM7 Target Boards.

Please note: It is possible to upgrade any version of the FS2009USB programmer so it supports other devices as well.

► Device Support for each FS2009USB version

The table below details which device families are supported by each version of the programmer.

Device Family	Programming Interface	FS2009USB (UN)	FS2009USB (AVR-JTAG)	FS2009USB (ARM)
Atmel AVR (SPI):				
- AT90S - AT90USB - AT90CAN - ATmega - ATmegaRF - ATtiny LV	LV SPI	YES YES YES YES YES YES	- - - - - -	- - - - - -
Atmel AVR (HV):				
- ATtiny HV	HV Serial (+12V)	YES	-	-
Atmel AVR (JTAG):				
- AT90USB - AT90CAN - ATmega - ATmegaRF	AVR JTAG	- - - -	YES YES YES YES	- - - -
Atmel AT91SAM7				
- AT91SAM7A - AT91SAM7L - AT91SAM7S - AT91SAM7SE	ARM JTAG	- - - -	- - - -	YES YES YES YES

- AT91SAM7X - AT91SAM7XC		- -	- -	YES YES
Atmel 8051				
- T89C51Rx2 - AT89C51xxx	UART Boot Loader	YES YES	- -	- -
Atmel 89S 8051				
- AT89S82xx - AT89Sx051	LV SPI	YES YES	- -	- -
NXP 8051				
- P89X51Rx2	UART Boot Loader	YES	-	-
NXP LPC ARM7				
- LPC210x - LPC213x - LPC214x	ARM JTAG	UPGRADE	UPGRADE	YES YES YES
ST				
- STM32F100Rx	ARM JTAG	UPGRADE	UPGRADE	YES
Zensys				
- ZW100 / 200 / 300 series	LV SPI	YES	-	-
All manufacturers				
24xxx Serial EEPROM Memories	I2C	UPGRADE	UPGRADE	UPGRADE

► Typical applications

- Field programming - supports up to 64 different customer firmware / product versions
- Low to medium volume production programming
- Re-programming of batches in production

Ordering Information...



FS2009USB - Portable In-System (ISP) Programmer for ARM microcontrollers

Manufacturer: [Equinox Technologies](#)
Order Code: **FS2009USB(ARM)**

Quantity	Price (USD) [Excl. VAT]
1 - 4	\$
5 - 9	\$
10 - 24	\$
25 and above	\$



Availability:

For further information about related products, please see the [Overview Product](#).