PPM4 MK1 - High-speed Production ISP Programming Module

High-Speed Production In-System Programmer with Standalone Programming Capability

The Equinox PPM4-MK1 is a state-of-the-art Production ISP Programmer designed for high-speed In-System Programming (ISP) of FLASH Microcontrollers and Serial Memory devices. It supports programming of devices by most interfaces including SPI, JTAG, JTAG chain, SCI, I2C (2-wire) and UART Boot Loader. The fastest possible programming times are guaranteed due to a combination of highly optimised algorithms, local storage of Project Data and high slew rate Line Driver Circuitry.

The PPM4-MK1 is capable of operating in 'Standalone Mode' where any one of 64 independent 'Programming Projects' can be recalled and executed via the programmer keypad / display interface. This makes the programmer ideal for production environments as operator simply selects the correct project for the job and then presses a single button to repeatedly program the same project.

The PPM4-MK1 also features a 4-wire TTL Remote Control interface making it ideal for interfacing to any ATE or In-Circuit Tester (ICT). A special 'Start Signal' can be used to detect when a Test Fixture lid has been closed and thereby automatically start a programming operation.

Features

- **Main Features**
- PPM4-MK1 v PPM3-MK2
- Device Support Overview
- Hardware Features
- Gang Programming Capability
- Programmer Control Methods (enabled as standard)
- Programmer Control Methods (chargeable License Upgrades)
- Standalone Programming Mode (no PC)
- PC Configuration / Driver Software - EQTools Software
- Supports all popular ISP Headers to connect to the Target System
- Programming Interfaces Supported
- JTAG ISP Programming support
- Interchangeable I/O Driver Circuitry (SFM Modules)
- AVR Internal RC Oscillator Calibration
- Interfacing to ATEs and ICTs
- Device Support

- **Main Features**
  - **Wide ranging Device Support capability**
    - Supports In-System Programming (ISP) of many popular FLASH Microcontrollers, Serial EEPROM and serial FLASH Memories
  - **High-speed Programming**
    - Optimised algorithms, on-board project data storage and high-speed line-driver circuitry delivers the fastest possible programming times
  - **Supports most ISP Protocols**
    - SPI, JTAG, I2C (2-wire), SCI, BDM, PDI
  - **Excellent Host Control connectivity**
    - USB, RS232, RS485 (up to 32 programmers)

**Gangable**
Up to 32 programmers can be controlled from a single PC using the RS485 Bus

**Standalone Operation**
Programmers can operate without PC Control using LCD / keypad or 4-wire TTL control port

**Supports up to 64 Independent Programming Projects**
Each project supports programming of a complete device inc. FLASH, EEPROM, Fuses etc.

**Fully ESD and Over-voltage protected I/O**
All Target I/O pins feature both ESD and over-voltage protection

**User-replaceable line-driver circuit board**
All programmer line driver circuitry can be replaced in minutes in case of damage.

**Programmer Controlled Target Power Supply**
The programmer can switch 1.8 to 5.0V @ 300mA to the Target System

**User-swappable I/O Connector Modules**
Many different I/O Connector Modules are available to suit any required connection system.

**Firmware upgradeable**
New algorithms and features can be added via a simple firmware upgrade

**Simple ATE / Test Fixture Integration**
Designed to interface to any ATE, ICT or Test Fixture

PPM4-MK1 v PPM3-MK2
The main enhancements are:

- Larger LCD
- Double the on-board FLASH size for projects
- USB port (also still has the RS232 port)
- Faster JTAG algorithms (still to be tested)
- More space for new algorithms
- Upgradable to have dedicated I2C port for programming eg. Serial EEPROMs
- Very accurate Target Controlled Power Supply with the range of 1.2 to 5.0V
- In the future, the PPM4 should be able to support programming of devices down to 1.8V

Device Support Overview

The programmer supports In-System Programming (ISP) of a wide variety of FLASH microcontrollers and Serial Memories.

**Microcontrollers**

**Atmel**
- AT89(L)S - 8051 (SPI)
- AT89Cxxx - 8051 (UART)
- AT90S - AVR (SPI)
- AT90CAN - AVR (SPI and JTAG / JTAG chain)
- AT90PWM - AVR (SPI and JTAG / JTAG chain)
- AT90USB - AVR (SPI and JTAG / JTAG chain)
- ATmega - AVR (SPI and JTAG / JTAG chain)
- ATmega(PICO) - AVR (SPI and JTAG / JTAG chain)
- ATtiny - AVR (LV SPI and High Voltage Serial Mode)
- AT91SAM7A - ARM7 (JTAG / JTAG chain)
- AT91SAM7L - ARM7 (JTAG / JTAG chain)
- AT91SAM7S - ARM7 (JTAG / JTAG chain)
- AT91SAM7SE - ARM7 (JTAG / JTAG chain)

**NXP (Philips):**
- P89C51Rx2 - 8051 FLASH Microcontroller Family
- P89C66x - 8051 FLASH Microcontroller Family

**Zensys:**
- Z-Wave Single Chips - 100 Series (SPI)
- Z-Wave Single Chips - 200 Series (SPI)
- Z-Wave Single Chips - 300 Series (SPI)

**Serial Memories**
- 24Cxxx Serial EEPROM memories (I2C)
- 45Dxxx Serial DataFLASH memories from Atmel (SPI)

Please note:

- Some devices can be programmed via multiple interfaces eg. SPI and JTAG.
- The programmer supports programming of devices connected in a JTAG chain.
- The devices supported depends on the version of the programmer purchased.
- Some 'Device Libraries' may have to be purchased as 'Optional license Upgrades'.

Hardware Features

The PPM4 Programmer features state-of-the-art technology which delivers the fastest possible programming times together with the best I/O protection in a compact simple-to-use module.

- 20 x 4 character backlit display
- 4 key user keypad
- Single button autoprogram start key
- 9 to 24V DC power supply input
- Five digital Target I/O I/O lines
- User configurable RESET line with separate HIGH and LOW drive
- Dedicated 2-wire I2C Port with 400pF drive capability
- 1 x analog output line
- 1 x programmable output voltage (1.8 to 5.0V @300mA)
- Target System Voltage and Current Monitoring
- Short-circuit protected Target Power Supply
- 1 x fixed +12V Vpp voltage on RESET pin
- 1 x programmable clock output
- Full ESD and Over-voltage protection per I/O pin
- All I/O Driver Circuitry on a removable module for easy replacement
- All I/O Connector Circuitry is on a separate I/O Connector Module
- 3 x Status (PASS, BUSY, FAIL) LEDs on the programmer
- 1 x Remote LED Port to allow mounting of Remote LEDs on a Test Fixture
- TTL Remote Control Port with START, BUSY, PASS and FAIL signals (to interface to ATE or ICT)
- Target System Connection / Disconnection sensing circuit
- ESD protected RS232 Communications Interface
- ESD protected RS485 Communications Interface (supports networking of up to 32 programmers)
- Support for Remote LCD / Keypad connection

Gang Programming Capability

- Up to 32 Programming Modules can be daisy-chained from a single PC via the Equinox RS-485 Programmer Bus.
- Each channel can program a Target System independently of the other programmers (full asynchronous programming).
- Very high programming throughputs can be achieved in Production Environments by using multiple modules programming in parallel.
- This method also supports programming of 2 or more Target Devices on the same Target System.
- Multiple programmers on the RS485 network can be controlled either by the ISP-PRO or ConsoleEDS utilities.
- An RS-485 Converter is required to implement multi-channel programming.

Programmer Control Methods (enabled as standard)

- Development Mode - using Equinox Development Suite (EDS) under PC control
- Standalone Keypad Mode - Project Selection via keypad / LCD. Press key to perform an autoprogram operation (no PC required).
In ‘Standalone Mode’, the programmer 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 by pressing the [YES] button 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 on display and via PASS / BUSY / FAIL LEDs
- Multiple Programming Projects can be chained together to create complex Program Test Firmware -> Run Target -> Program Production Firmware sequences
- Operator can not inadvertently change the programming data or settings

PC Configuration / Driver Software - EQTools Software

- Equinox Development Suite (EDS)
- Project Builder - to create/edit Programming Projects
- Project Manager - to create and maintain Project Collections
- Project Upload / Download Utility - to upload projects to the programmer for use in Standalone Mode

Supports all popular ISP Headers to connect to the Target System
Interchangeable 'I/O Connector Modules' support all popular ISP Header formats:
- Atmel 10-way SPI Header (as per STK200 / STK500)
- Atmel 6-way SPI Header
- Equinox 10-way SPI header with support for Slave Select & SCK2
- Atmel 10-way JTAG header (as per Atmel JTAG-ICE)
- Equinox 10-way UART header for Atmel T89C51Rx2 (8051) and NXP (Philips) P89C51 ISP FLASH microcontrollers
- Fast Connect - clip-in wire connectors
- Wire-wrap connectors

Programming Interfaces Supported
- Atmel 3-wire SPI Interface + RESET - Atmel AVR and AT89S microcontrollers
- Zensys - 3-wire SPI + RESET + PROG_ENABLE
- JTAG - for Atmel AVR (supports JTAG chain programming)
- JTAG - for AT91SAM7 (supports JTAG chain programming)
- Atmel UART Bootloader - Atmel 89C51Rx2 (TXD, RXD, PSEN & RESET)
- NXP (Philips) UART Bootloader - P89CRx2/66x (TXD, RXD, PSEN & RESET)
- I2C Interface (SDA + SCL)

JTAG ISP Programming support
- Supports high-speed JTAG programming of a single Atmel AVR microcontroller or AT91SAM7 ARM microcontroller connected via the JTAG interface
- Supports high-speed JTAG programming of multiple Atmel AVR or AT91SAM7 microcontrollers which are connected as part of a 'JTAG Chain' (JTAG daisy-chain mode).
- Fast programming speeds via JTAG (3 - 4 times faster than SPI method)
- Simple 4-wire JTAG Interface to microcontroller
- Same JTAG Interface as Atmel JTAG ICE MK2 Debugger
- User-selectable JTAG frequency
- Supports JTAG Chain Validation
- Supports checking of the 'JTAG ID' of both AVR and any generic JTAG devices eg. CPLD's
- Supports automatic checking of 'Silicon Revision' of target JTAG device
- The JTAG algorithms can be purchased as a License Upgrade to the standard PPM3-MK2 programmer (Order code: PPM4MK1-UPG7)
- The JTAG I/O Connector Module IO-CON-3 is required to connect to an Atmel JTAG Target System.

Interchangeable I/O Driver Circuitry (SFM Modules)

The 'Special Function Module contains the main 'I/O Driver Circuitry' which interfaces the programmer electronics to the Target System. This module is interchangeable allowing a
programmer to be repaired or upgrades in minutes by simply swapping the module.

The following 'Special Function Modules' are available for this programmer:

- EQ-SFM-1 – Standard Special Function Module
- EQ-SFM-MAX-V1.3 – High Speed / ESD Protected + 32 kHz

For further information, click the relevant link in the Associated Products section on the right-hand side of the page.

- AVR Internal RC Oscillator Calibration

The PPM4-MK1 programmer can be used to perform a very accurate Calibration (+/1 1%) of the Internal Oscillator of many Atmel AVR microcontrollers. This requires the use of the 'EQ-SFM-MAX-V1.3' module.

- Interfacing to ATEs and ICTs
  The PPM4-MK1 programmer has been specially designed for straightforward integration with In-circuit Testers (ICT) or other Automatic Test Equipment (ATE).

- 4-wire TTL Remote Control Port - ideal for older ICT's
- Simple ASCII Control Protocol via RS232 Port - for ICT's which feature serial port
- Compatible with Agilent, Genrad, Teradyne and SPEA ATE Systems
- 4-wire TTL Remote Control Port
- Simple ASCII Control Protocol via RS232 Port

**Device Support (by manufacturer)**

This product supports devices from the manufacturers listed below:

- Atmel Corporation
- Dallas Semiconductor (Maxim)
- Exel Semiconductor (Rohm)
- Holtek Semiconductor
- IC Microsystems
- ISSI
- Microchip
- NXP (Philips)
- ON Semiconductors (Catalyst)
- Ramtron
- Rohm
- Seiko Instruments
- STMicroelectronics
- Xicor
- Zensys

*The following are available as chargeable upgrades: JTAG In-System Programming support for the Atmel ATmega AVR Family; 24Cxxx - Serial I²C EEPROM Memory Device Library and Atmel AT91SAM7 Upgrade Pack. See [Upgrades] tab.*

**Please note:**

Not all devices may be supported within a family.

Please see the [Detailed Device Support List](http://www.equinox-tech.com/products/details.asp?ID=1300) for a list of all devices which the product supports.
PPM4 MK1(UN) - Production ISP Programming Module for AVR, 8051 and Zensys devices

PPM4-MK1 - Production In System Programming (ISP) Module supporting AVR, 8051 and Zensys devices. Supplied with Universal Mains Power Supply Adaptor suitable for UK, US, Europe and Asia: Input: 110 - 240V AC @ 50Hz, Output: 9V DC reg. @ 1.5A

Manufacturer: Equinox Technologies
Order Code:
   Equinox: PPM4-MK1(UN)
   483-1021-ND

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