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## Firmware Update instructions for Equinox ISP Programmers

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Abstract:

This application note describes how to upgrade the on-board firmware of Equinox In-System (ISP) Programmers.

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## 1.0 Introduction

This application note describes how to upgrade the firmware of an Equinox ISP Programmer.

- If your programmer already has firmware version 3.00 or above, then it is possible to upgrade the firmware by using the Upload Wizard within EQTools.
- If your programmer is still running firmware version 2.xx (eg. 2.54) then you will need to use the Configit utility the firmware.

## 1.1 Latest Programmer Firmware Versions

The Equinox programmers which are supported by Configit / Upload Wizard are listed in the table below.

Programmer	Configit upgrades to firmware version:	Upload Wizard upgrades to firmware version:
Activ8r AVR	2.50	Not supported
Activ8r 8051	2.00	Not supported
EPSILON5	3.07	3.07
FS2000A	2.54	Not supported
FS2003	3.07	3.07
Micro-ISP S3 (LV)	2.80	Not supported
Micro-ISP S4 (LV)	2.80	Not supported
PPM3 MK1	No longer supported	No longer supported
PPM3 MK2	3.07	3.07

**Please note:**

- The Configit utility is not always updated with the very latest firmware versions.
- Please use Configit to update to latest firmware version specified in the table and then use Upload Wizard to upgrade to the very latest firmware version if it is newer.

## 1.2 What version of firmware is my programmer running?

To find out what version of firmware your programmer is currently running, please follow the instructions below:

### From EQTools:

- Launch EQTools
- Select **<Programmer><Programmer Info>**
- The firmware version is now displayed.

### From Upload Wizard:

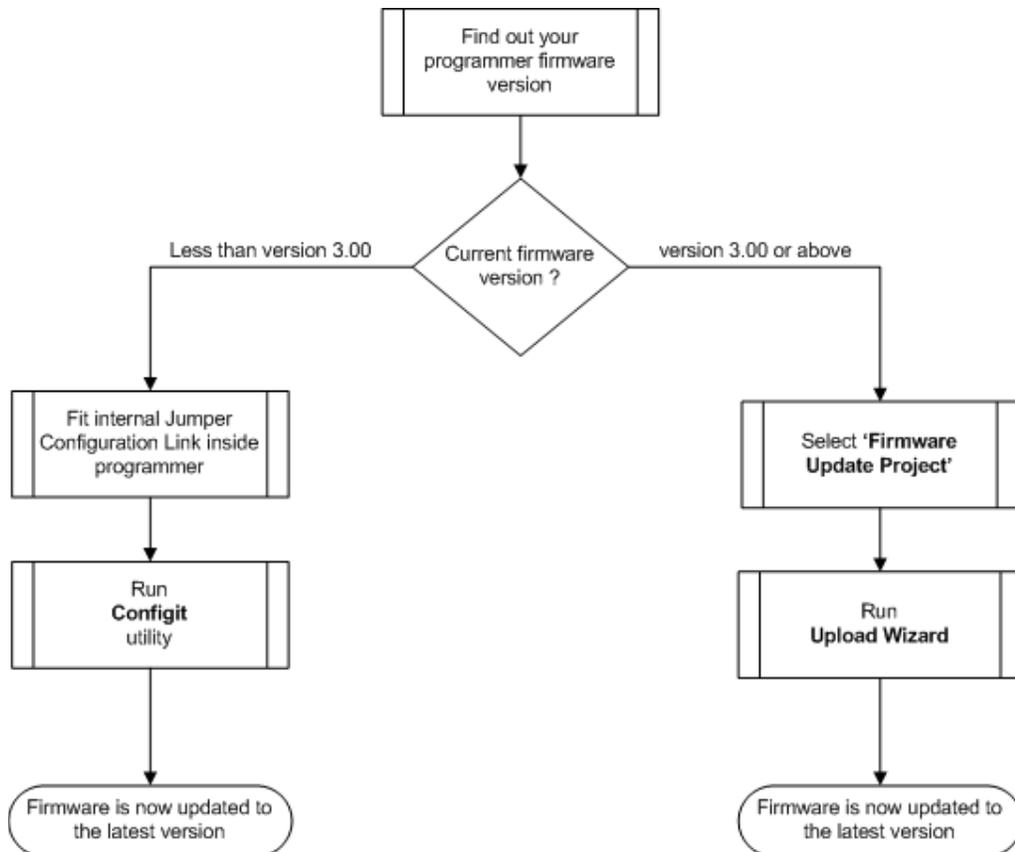
- Launch Upload Wizard
- Click **<Next>** until you reach the 'Detect Programmer(s)' screen
- Click **<Detect>** to find the attached programmer(s)
- Click **<Programmer Info>**
- The firmware version is now displayed.

### From Configit:

- Launch Configit
- Click the **<Information>** button
- The firmware version is now displayed.

## 1.3 Choosing firmware update method

Please refer to the flow chart below to choose the required firmware update method for Epsilon, FS2003 and PPM3-MK2 programmers....



For all other programmers, please use the Configit utility.

## 2.0 Using Configit to Upgrade the Programmer Firmware

### 2.1 Overview

The Configit utility should be used to upgrade the programmer firmware if the programmer is running 1.xx or 2.xx firmware. It can also be used in the rare cases where a programmer will not perform a Firmware Upgrade using the 'Upload Wizard' utility. The Configit utility will upgrade the firmware of the Epsilon5, FS2003 and PPM3-MK2 programmers to the latest 3.xx. It will also install a Boot Loader in these so any future firmware upgrades can be performed using the Upload Wizard instead.

All older programmers such as the Activ8r, Micro-ISP Series III/IV and FS2000A are not capable of supporting a Boot Loader. It will therefore always be necessary to use Configit to update these programmers.

### 2.2 Preparing your programmer for Configit

Please follow the instructions for your programmer in the table below:

Programmer	Configit set up instructions:
<b>Ativ8r AVR or 8051</b>	<ul style="list-style-type: none"> <li>Power up programmer with +9V DC supply via DC Jack socket connector</li> </ul>
<b>EPSILON5</b>	<ul style="list-style-type: none"> <li>Fit Jumper Link J5</li> <li>Power programmer up with +5V DC supply via DC Jack socket connector or any ISP Header connector</li> </ul>
<b>FS2000A</b>	<ul style="list-style-type: none"> <li>Power up programmer with +9V DC supply via DC Jack socket connector</li> </ul>
<b>FS2003</b>	<ul style="list-style-type: none"> <li>Fit Jumper Link J5</li> <li>Power up programmer with +5V DC supply via DC Jack socket connector or any ISP Header connector</li> </ul>
<b>Micro-ISP Series III or IV</b>	<ul style="list-style-type: none"> <li>Apply +5V DC to the ISP Header Header Cable</li> </ul>
<b>PPM3 MK1</b>	Not supported
<b>PPM3 MK2</b>	<ul style="list-style-type: none"> <li>Fit Jumper Link LK1 next to the COM port</li> <li>Set 'Communications Mode' DIP Switch to: RS232</li> <li>Set 'Communications Address' DIP Switch to: Address '0'</li> <li>Power up programmer with +9V DC supply via DC Jack socket connector</li> </ul>

Further information and help on setting up each programmer ready for Configit can be found in the next sections.

## 2.3 PPM3-MK2 - Setup for Firmware Upgrade

Please follow these instructions to prepare your PPM3-MK2 programmer for the Firmware update process using Configit.

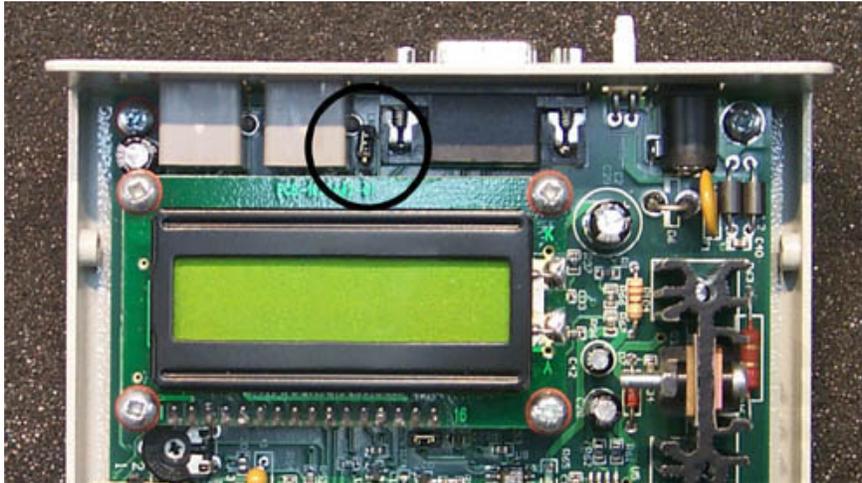
### 2.3.1 Equipment required

The following equipment is required to upgrade the programmer firmware:

1. Equinox PPM3-MK2 programmer
2. Jumper Link (supplied with programmer)
3. PC Serial Cable (must have all 9 pins wired pin-to-pin)
4. Power Supply (9V @ 100mA min)
5. Configit - Firmware Update Utility
6. PC with spare COM port (running Windows 95, 98, ME or 2000)

### 2.3.2 Setting Firmware Update Mode

In order to place the programmer into 'Firmware Update Mode', it is necessary to remove the lid of the unit and insert a jumper onto link LK1.

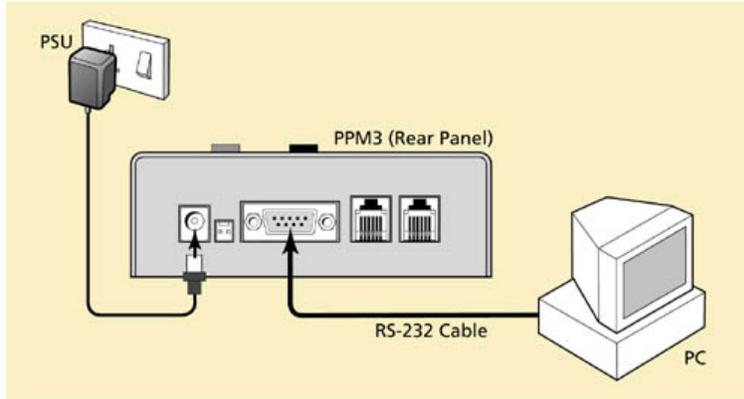


**Please follow the instructions detailed below:**

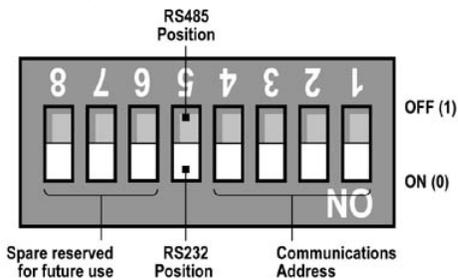
1. Make sure the programmer is powered OFF
2. Unscrew the four fixing screws on the sides of the programmer case.
3. Carefully remove the programmer cover
4. Locate Jumper Link LK1 next to the 9-way D connector
5. Insert a jumper (supplied with programmer) onto the link LK1

## 2.3.3 Hardware Setup Instructions

1. Connect the programmer to a spare PC COM port using the serial cable supplied
2. Apply 9V @ 100mA min to the DC Power Connector J6.  
--> The programmer should power up and the LCD should illuminate. The LCD may be blank or it may have some text displayed.



3. Set up the DIP Switches



- Select RS-232 Communications Mode
- Select Note Address '0'

The programmer must be set to 'RS-232' operation and Node Address '0' in order for the Configit utility to work. Please set the DIP Switches on the programmer as shown in the illustration below. All switches must be in the '0' position.

4. Follow the 'Configit' firmware update instructions – see section 3.
5. Remove the Jumper Link LK1 from next to the 9-way D connector
6. Carefully place the top cover back on the programmer.
7. Fit the 4 case screws and washers
8. The firmware update process is now complete

## 2.4 Epsilon5 - Setup for Firmware Upgrade

Please follow these instructions to prepare your Epsilon5 programmer for the Firmware update process using Configit.

### 2.4.1 Equipment required

The following equipment is required to upgrade the programmer firmware:

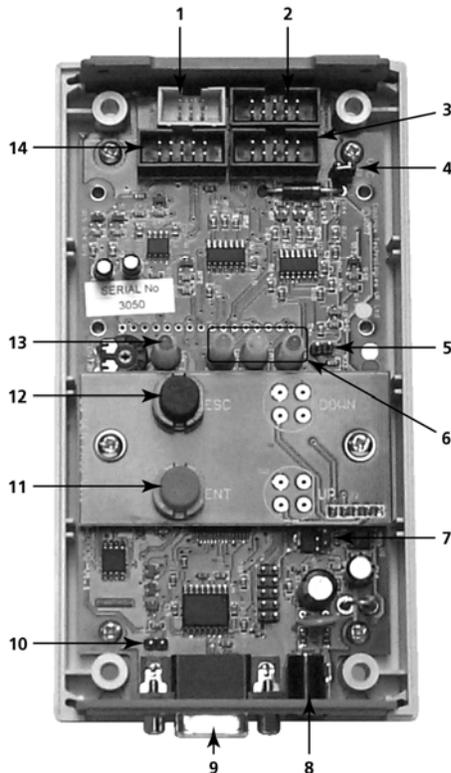
1. Equinox Epsilon5 programmer
2. Jumper Link (supplied with programmer)
3. PC Serial Cable (must have all 9 pins wired pin-to-pin)
4. Power Supply (5V @ 100mA min)
5. Configit - Firmware Update Utility
6. PC with spare COM port (running Windows 95, 98, ME or 2000)

### 2.4.2 Setting Firmware Update Mode

In order to place the programmer into 'Firmware Update Mode', it is necessary to remove the lid of the unit and insert a jumper onto Jumper Configuration Link J5.

#### Instructions:

- Remove the 4 x case screws from the programmer
- Remove the lid of the programmer
- Locate the Jumper Configuration Link J5. It is next to the 9-way D-type Serial Port connector. See the arrow labelled (10) in the picture below.
- Fit a jumper into the Link J5
- Locate the Vcc Configuration Jumper J9. It is next to the ISP Headers. See the arrow labelled (4) in the picture below.
- Fit a jumper into the Link J9



## **2.4.3 Hardware Setup Instructions**

1. Connect the programmer to a spare PC COM port using the serial cable supplied
2. Apply +5V DC @ 100mA min to the DC Power Connector CON1  
or  
Apply +5V DC @ 100mA min to one of the ISP Headers – J3, J6, J7, J8  
--> The programmer should power up and the 'Target Vcc' LED will illuminate.
3. Follow the 'Configit' firmware update instructions – see section 3.
4. Remove the Jumper Link J5 from next to the 9-way D connector
5. Carefully place the top cover back on the programmer.
6. Fit the 4 case screws
7. The firmware update process is now complete .

## 2.5 FS2003 - Setup for Firmware Upgrade

Please follow these instructions to prepare your FS2003 programmer for the Firmware update process using Configit.

### 2.5.1 Equipment required

The following equipment is required to upgrade the programmer firmware:

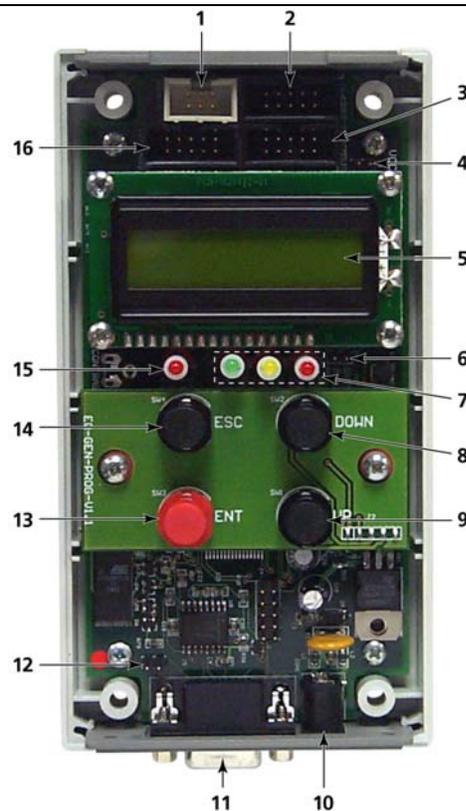
1. Equinox FS2003 programmer
2. Jumper Link (supplied with programmer)
3. PC Serial Cable (must have all 9 pins wired pin-to-pin)
4. Power Supply (9V @ 100mA min)
5. Configit - Firmware Update Utility
6. PC with spare COM port (running Windows 95, 98, ME or 2000)

### 2.5.2 Setting Firmware Update Mode

In order to place the programmer into 'Firmware Update Mode', it is necessary to remove the lid of the unit and insert a jumper onto Jumper Configuration Link J5.

#### Instructions:

- Remove the 4 x case screws from the programmer
- Remove the lid of the programmer
- Locate the Jumper Configuration Link J5. It is next to the 9-way D-type Serial Port connector – see arrow (12) on the annotated picture opposite.
- Fit a jumper into the Link J5
- Locate the Vcc Configuration Jumper J9. It is next to the ISP Headers - see arrow (4) on the annotated picture opposite.
- Fit a jumper into the Link J9



## **2.5.3 Hardware Setup Instructions**

1. Connect the programmer to a spare PC COM port using the serial cable supplied
2. Apply +9V DC @ 100mA min to the DC Power Connector CON1  
or  
Apply +5V DC @ 100mA min to one of the ISP Headers – J3, J6, J7, J8  
--> The programmer should power up and the 'Target Vcc' LED will illuminate.
3. Follow the 'Configit' firmware update instructions – see section 3.
4. Remove the Jumper Link J5 from next to the 9-way D connector
5. Carefully place the top cover back on the programmer.
6. Fit the 4 case screws
7. The firmware update process is now complete .

## 3.0 Using Configit to Upgrade the Programmer Firmware

### 3.1 Overview

The '**Configit Utility**' can be used to upgrade the firmware of any Equinox ISP Programmer which already has firmware **version 1.00 to 2.99** installed. For the Epsilon5, FS2003 and PPM3-MK2, the utility will upgrade the firmware to the latest 3.xx version and also install a 'Boot Loader' into the programmer.

#### **Warning!**

The Configit utility will completely erase the firmware inside the programmer. It is possible that the firmware update process may fail and if it does the programmer can then no longer be used until you have received some further help from Equinox. If the programmer is critical to your production process, please make sure that you perform the firmware upgrade when the programmer is not required for production.

### 3.2 Where is the Configit utility?

The '**Configit Utility**' can be found as follows:

- In the `program files\equinox\Firmware` directory of EQTools version 2.1.0 build 800 or greater.
- On the Equinox website – see the 'Downloads' section.

### 3.3 What versions of firmware does Configit install?

Configit will upgrade the attached programmer to the latest firmware version available for this programmer. Please see the table in section 1.1 for the latest programmer firmware versions.

### 3.4 Should I use Configit or Upload Wizard?

If your programmer firmware has firmware version  $<3.00$ , then you will need to use Configit to upgrade the firmware. If the firmware is  $\geq 3.00$  then you should use the Upload Wizard utility instead.

## 3.5 Preparing your programmer for using Configit

Please follow the set up steps detailed below to prepare your programmer for the firmware upgrade process:

Programmer	Configit set up instructions:
<b>Activ8r AVR or 8051</b>	<ul style="list-style-type: none"> <li>• Power programmer up with +9V DC supply via DC Jack socket connector</li> </ul>
<b>EPSILON5</b>	<ul style="list-style-type: none"> <li>• Fit Jumper Link J5</li> <li>• Power programmer up with +5V DC supply via DC Jack socket connector or any ISP Header connector</li> </ul>
<b>FS2000A</b>	<ul style="list-style-type: none"> <li>• Power programmer up with +9V DC supply via DC Jack socket connector</li> </ul>
<b>FS2003</b>	<ul style="list-style-type: none"> <li>• Fit Jumper Link J5</li> <li>• Power programmer up with +5V DC supply via DC Jack socket connector or any ISP Header connector</li> </ul>
<b>Micro-ISP Series III or IV</b>	<ul style="list-style-type: none"> <li>• Apply +5V DC to the ISP Header Header Cable</li> </ul>
<b>PPM3 MK1</b>	Not supported
<b>PPM3 MK2</b>	<ul style="list-style-type: none"> <li>• Fit Jumper Link LK1 next to the COM port</li> <li>• Set 'Communications Mode' DIP Switch to: RS232</li> <li>• Set 'Communications Address' DIP Switch to: Address '0'</li> <li>• Power programmer up with +9V DC supply via DC Jack socket connector</li> </ul>

## 3.6 Running the Configit utility

Here are the instructions for using the Configit utility:

### 1. Switch off any anti-virus software running on your PC

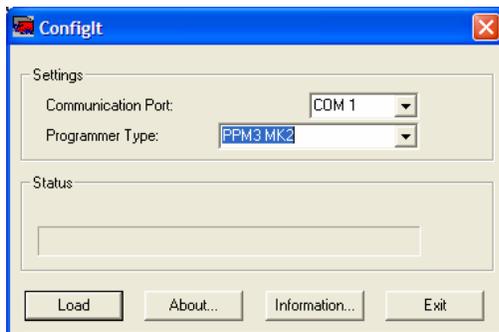
- Configit requires the full use of your PC bandwidth. The programming process may fail part way through if the anti-virus software decides to suddenly perform a scan.

### 2. Check that your PC is running in single processor mode

- Many newer PCs feature so-called 'Dual-core processor' technology. Configit may not work reliably if 'Dual-core' mode is enabled.
- Please disable 'Dual-core' mode either just for the Configit application or for all applications by switching it off in the BIOS.

### 3. Launch the Configit.exe application

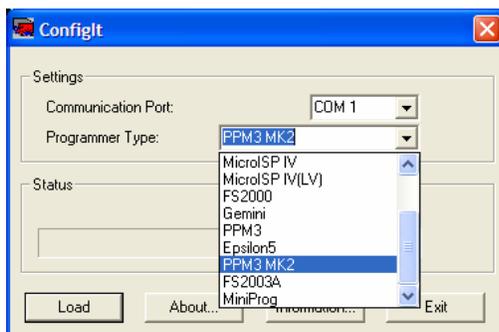
→ The following screen will be displayed



### 4. Select the PC COM (Serial) Port to which the programmer is attached

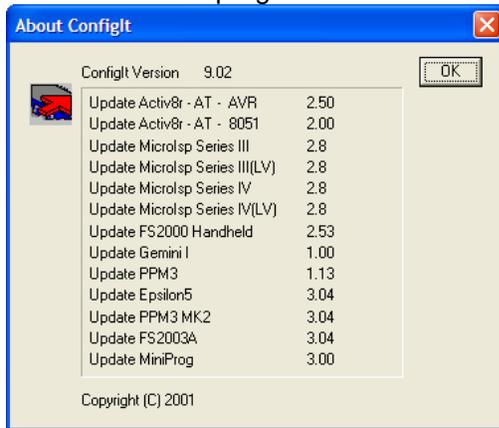
- The programmer must be attached to a real COM Port.
- A virtual USB COM port is unlikely to work reliably with Configit.

### 5. Select the 'Programmer Type' from the drop-down list



## 6. To find out what version of firmware will be installed by Configit

- Click the **<About>** button
- a list of all programmers and the firmware versions for these programmers is displayed.



## 7. To find out what version of firmware is currently in the attached programmer

- Click the **<Information>** button
- the following screen is displayed:

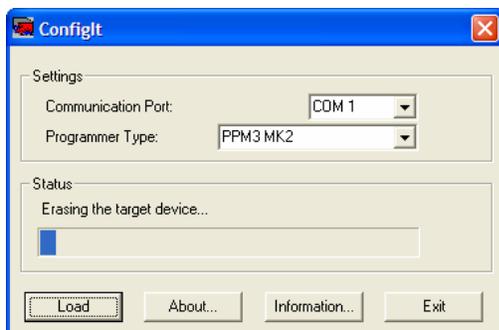


If you receive an error, please check the following:

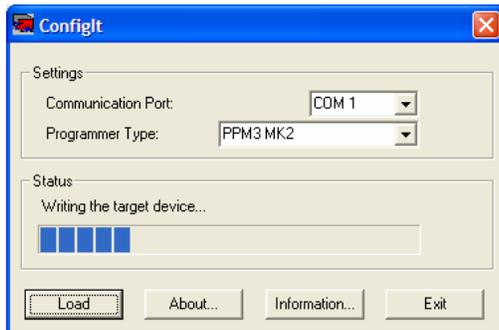
- The programmer is connected to the selected COM port and is powered on.
- If you are upgrading a PPM3-MK2 programmer, the node address is set to zero and 'RS232' mode is selected.

## 7. To install the latest firmware into your programmer

- Click the **<Load>** button
- Configit will now attempt to reflash the attached programmer
- If the Configit process starts OK, then you should see a progress bar appear



Once the microcontroller has been erased, the FLASH memory will then be programmed...



### **!Warning!**

It can take 10 – 20 minutes to reflash a programmer on a Windows 2000 or XP PC. It may appear that your PC has hung but Configit is actually still running. Please be patient and do not interrupt the process during the firmware upgrade.

If the reflashing process works OK, go to step 7

If the reflashing fails for any reason, go to step 8

8. Once the programming sequence is complete, the following screen will be displayed:



- Click the <OK> button
- If you are upgrading an Epsilon5, FS2003 or PPM3-MK2 programmer, you now need to remove the Jumper Link which you inserted at the start of the firmware upgrade process.
- The firmware upgrade process is now complete.

## 9. Reflashing process – failed

If the reflashing process fails for any reason, you will get the following error message:



Click <OK>

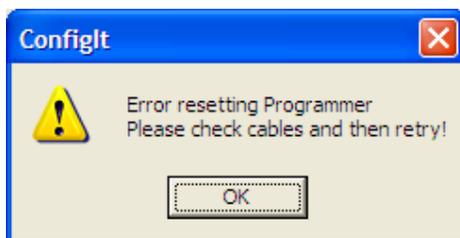
Please check the following:

- The power is still applied to the programmer.
- The PC running Configit has not gone into 'sleep mode'.
- Anti-virus software on the PC is not running.

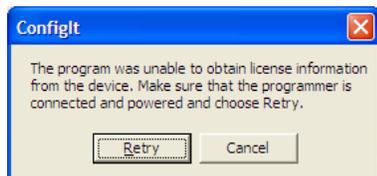
The programmer will now have lost its original firmware and also its programmer type and serial number information. You will need to contact Equinox to get the programmer working again. Please follow the instructions in step 9.

## 10. If Configit cannot communicate with the attached programmer

- If for some reason Configit cannot communicate with the attached programmer, you will get one of the following error message screens:



This error means that Configit has tried to RESET the microcontroller in the programmer, but the programmer has not responded.



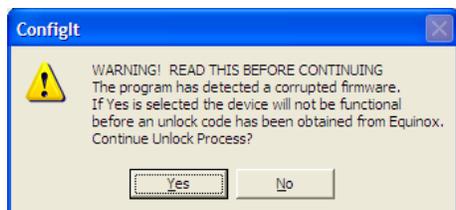
This error means that Configit has communicated with the microcontroller in the programmer, but either the microcontroller is not responding correctly or the firmware / serial number information has been corrupted.

**Please check the following:**

- Do you have the correct COM port selected?
- Do you have the correct programmer type selected?
- Have you inserted the Jumper Link next to the COM port (J5 – Epsilon5, FS2003 or LK1 – PPM3-MK2)?
- Is the programmer powered up at the correct voltage?
- Is the PC serial cable connected to the programmer and the correct COM port?
- Are you using the correct type of PC serial cable with all 9 conductors wired pin-to-pin?

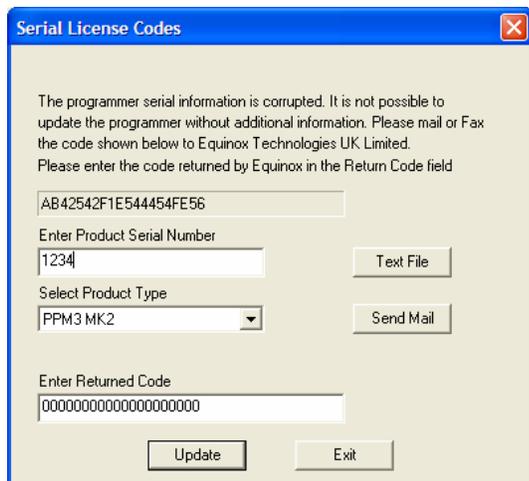
**11. Click <Retry> to try communicating with the programmer again**

- If this does not work, click the <Cancel> button.
- → the following warning screen is displayed



**12. Click the <YES> button**

- Configit will now try to communicate with the attached programmer.
- Configit will then display the following 'Serial License Codes' screen...



## Instructions:

- Make sure the correct '**Programmer Type**' is selected
- Enter your programmer '**Serial Number**' in the field provided
- Click the **<Text File>** button
- Please then email the following information in the text file to Equinox at [support@equinox-tech.com](mailto:support@equinox-tech.com).

**SERIAL : 1234**

**PRODUCT: PPM3 MK2**

**CODE : AB42542F1E544454FE56 (This is the code in the text file you have just generated)**

Please keep the programmer powered on and Configit on the same screen

- Equinox will email you back with a 'Return Code'
- Enter this 20-digit code in the 'Returned Code' field
- Click the **<Update>** button
- Configit will now attempt to reflash the programmer again. If the process works, it will program the firmware and also reprogram the serial number, programmer type etc.

## 4.0 Using Upload Wizard to Upgrade the Programmer Firmware

### 4.1 Overview

The **'Upload Wizard'** utility can be used to upgrade the firmware of any Equinox ISP Programmer which already has **version 3.00 firmware** or above installed. The firmware upgrade is performed by uploading a special **'Programmer Firmware Upgrade Project'** to the programmer. Once uploaded, the programmer then automatically reflashes its firmware to the new version and then deletes the Firmware Upgrade Project. This method can be used for upgrading either a single programmer or multiple programmers on the RS485 network.

### 4.2 Finding the Firmware Update Projects

The 'Firmware Update Projects' are installed as part of the standard EQTools installation.

If you install EQTools version 2.1.0 build 711 or above then this version of EQTools will install **'Programmer Firmware Upgrade Projects'** for each Equinox Programmer in the following directory: **'..\program files\equinox\firmware'**

Here is a list of the 'Firmware Update Files' which are installed:

Programmer	Firmware Update file
<b>EPSILON5</b>	Epsilon5_Firmware_Update.PPC
<b>FS2000A</b>	Not supported
<b>FS2003</b>	FS2003_Firmware_Update.PPC
<b>PPM3 MK1</b>	No longer supported
<b>PPM3 MK2</b>	PPM3MK2_Firmware_Update.PPC

### 4.3 Upgrading a single programmer

To upgrade the firmware of a single programmer:

- Connect the programmer to a spare PC COM port
- For Epsilon5 and FS2003 programmers, the Communications Address is automatically set to zero.
- For PPM3-MK2 programmer, set the Communications Address to the same address you have set up in EQTools / Upload Wizard
- Follow the instructions from section 4.5

### 4.4 Upgrading multiple programmers on an RS485 network

It is possible to upgrade the firmware of multiple PPM3-MK2 programmers which are connected on an RS485 network at the same time. This process is exactly the same as uploading a normal 'Programming Project'. Each programmer must have a unique 'Node Address' and be set to 'RS485'.

To upgrade the firmware of multiple programmers on a network:

- Connect the programmers in a daisychain fashion to the Equinox RS485 to RS232 convertor
- Set the 'Communications Address' on each programmer to a unique address
- Set the 'Communications Mode' DIP Switch to 'RS485'
- Follow the instructions from section 4.5

## 4.5 Uploading a Firmware Update Project to a programmer

### 1. Launch Upload Wizard

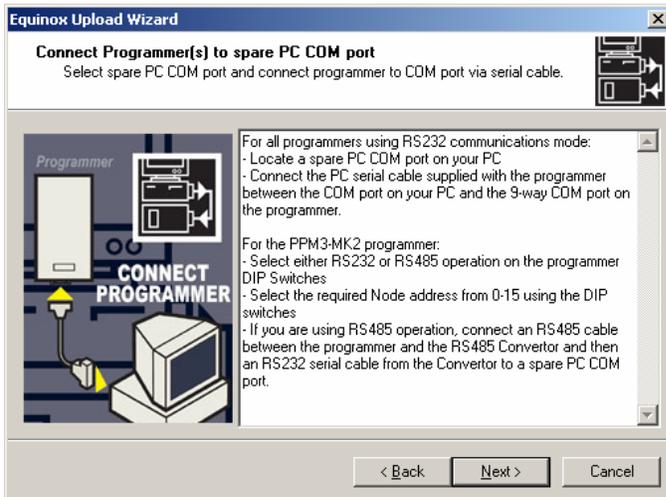
You can launch Upload Wizard by any of the following methods:

- i. From EQTools – click the **<Upload>** icon
- ii. From the Windows Start Menu, select **<Programs><Equinox><Upload Wizard>**

→ The Upload Wizard utility will be launched and display the Welcome Screen.



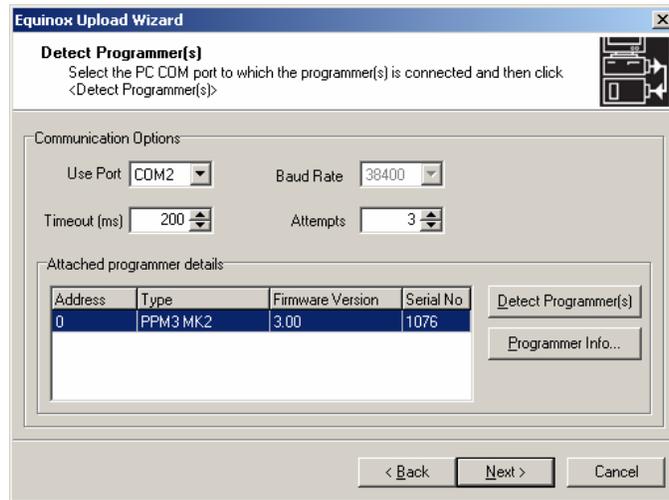
2. Click **<Next>** to advance to the next screen...



Click **<Next>** to advance to the next screen...

### 3. Detect Programmer screen

This screen allows you to detect the programmer(s) you have connected to your PC.



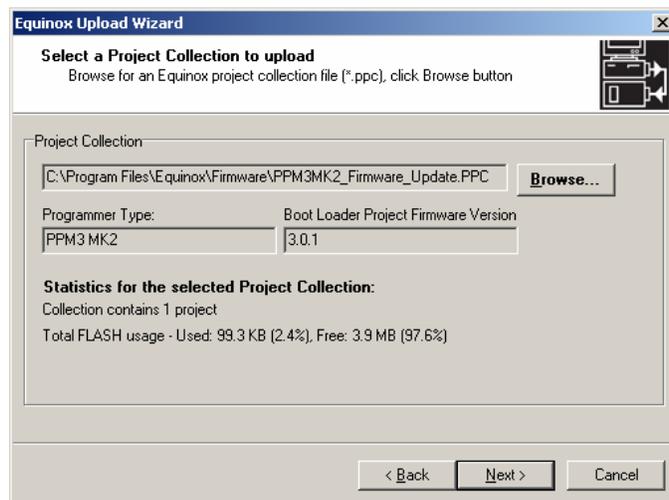
If you have multiple programmers on an RS485 network, then they should all be listed here.

### 4. Select the required COM port

- Click the **<Detect Programmer(s)>** button → the utility will now scan for any attached programmer(s).
- If the attached programmer is an Epsilon5 or FS2003 then a single programmer will be found at address '0'.
- If you have more than one PPM3-MK2 programmer attached to the PC via an RS485 daisychain network, then a list of all the attached programmers will be displayed. It is possible to perform a 'global upload' to all programmers on the network at the same time.
- Click **<Next>** to advance to the next screen...

### 5. Select the Firmware Update Project

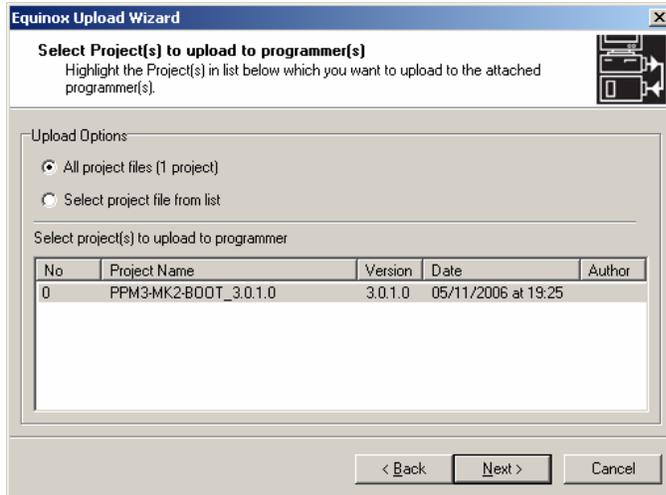
This screen allows you to select the Firmware Update Project which is to be uploaded to the programmer.



- Click the **<Browse>** button to locate the **'Firmware Update Projects'**.
- Browse to **..program files\equinox\firmware**
- Select the relevant Project Collection (\*.ppc) for your programmer.

- Click <Next> to advance to the next screen...

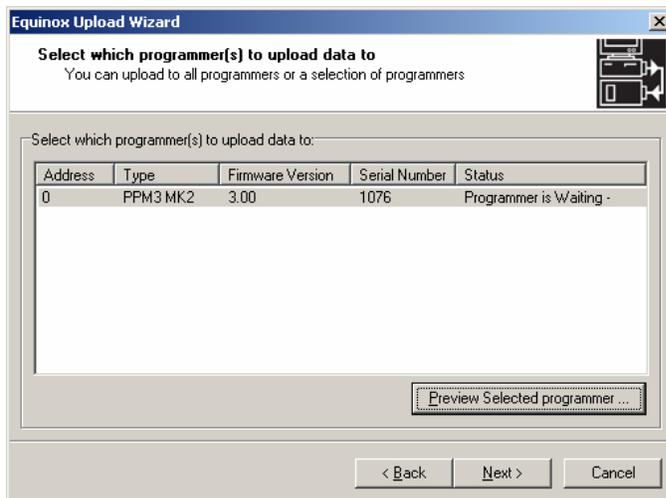
## 6. Select the Project to Upload



- The version of firmware to be installed is displayed in the 'Version' column.
- Click <Next> to advance to the next screen...

## 8. Select which programmer to upload data to

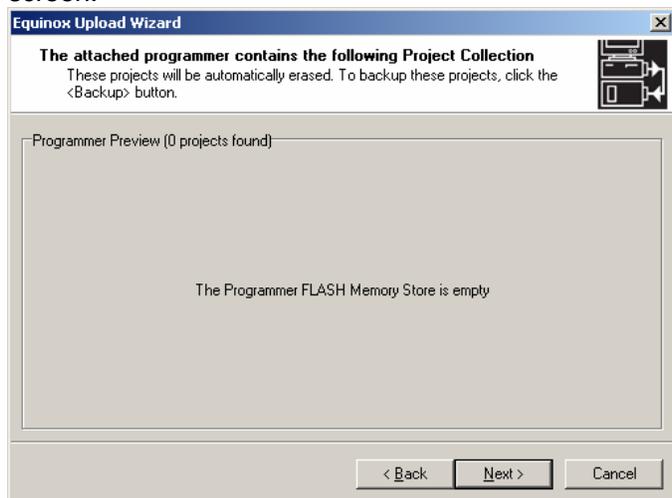
- If you are upgrading a PPM3-MK2 programmer, then it is possible that you may have more than one programmer connected to the PC at the same time. You can select all the attached programmers and the utility will then perform a global firmware update of all programmers.
- This screen allows you to select which programmer(s) you wish to upgrade.



## 9. Backing up any Projects already resident in the programmer

Uploading the 'Firmware Update Project' will permanently erase any projects which were already resident in the programmer. This screen allows you to back up these projects to disk before they are erased.

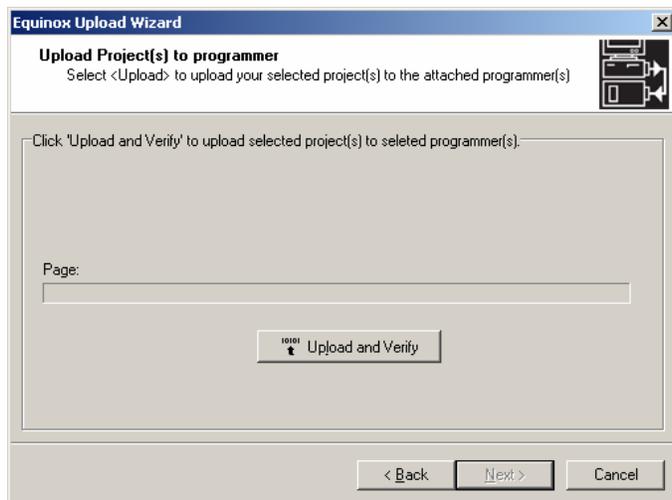
If the programmer does not have any projects already uploaded into it, then you will get the following screen:



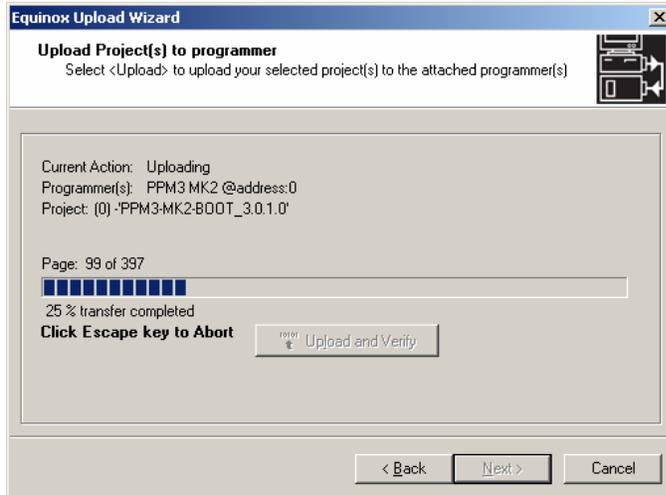
Click **<Next>** to advance to the next screen...

## 10. Uploading the Firmware Update Project

This screen allows you to actually upload the 'Firmware Update Project' to the attached programmer(s).



- Click the **<Upload and Verify>** button to start the upload process



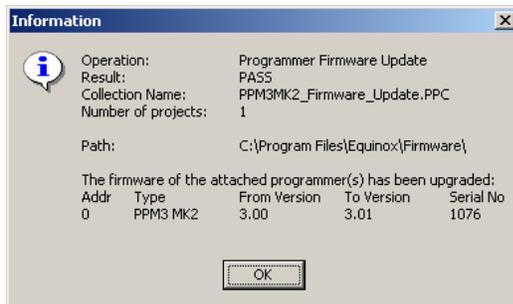
Once the upload is complete, a full verify pass is performed to make sure the data is correct.

## 11. Firmware Update – final stages

Once the Verify pass is complete, the following actions will happen:

- Upload Wizard will reset each programmer
- Each programmer will then automatically reflash its own firmware
- The 'PASS' and 'FAIL' LEDs on the programmer(s) will illuminate for approximately 10 seconds during the reflashing process.
- Once the reflashing process is complete, the 'BUSY' LED will illuminate momentarily.
- All LED's will then be switched off.
- The firmware update process is now complete!

The following information screen displays the details of the firmware upgrade process:



Click **<OK>**

→ the 'Upload Successfully' screen is now displayed.



Click **<Finish>**

→ If you launched Upload Wizard from EQTools, then you will be returned to EQTools

→ If you launched Upload Wizard independently from the 'Start Menu' then Upload Wizard will now terminate.

**Please note:**

Any Programming Projects which were resident in the programmer before you ran the Firmware Update Process will now have been erased. Please use the Upload Wizard to upload these project(s) to the programmer again.

## 4.6 Firmware Update failure

Once the firmware update process is complete, the firmware version should have been updated to the latest version.

You can check this by one of the following methods:

- From EQTools, select <Programmer><Programmer Info>
- On an FS2003 or PPM3-MK2, switch the programmer off and then on again. The programmer firmware version is displayed on the LCD.

If the firmware update process has failed for some reason, you may see some of the following issues:

- The firmware version is still at the same version as it was before the firmware update
- The 'Firmware Update Project' is still resident in the programmer 'FLASH Memory Store'

If either / both of these conditions are true then it is likely that the Boot Loader mechanism has failed. It will be necessary to use the Configit utility to upgrade the firmware.

Please contact Equinox Technologies for further assistance.

## 5.0 Firmware Release Notes

### 5.1 Overview

This section provides a brief overview of the changes, new features and bug fixes which are included in each new firmware version. For a detailed explanation of new features, please refer to the EQTools Release Notes.

### 5.2 Firmware version 2.xx

All versions of firmware which are 2.00 to 2.99 should still work with EQTools 2.1.0 build 837 or below. However, many new features and additional device support has been added since version 2.xx. It is therefore recommended that all customers upgrade to firmware 3.xx wherever possible.

**Please note:**

Firmware 2.xx did not have a Boot Loader installed. It is therefore necessary to use the Configit utility to upgrade the programmer firmware to 3.xx

### 5.3 Firmware version 3.00

Support for a 'Boot Loader' has been added to the Epsilon5, FS2003 and PPM3-MK2 firmware in this release. This allows all future firmware upgrades to be performed by simply uploading a 'Firmware Upgrade Project' to the programmer using 'Upload Wizard'. This also makes it possible to upgrade the firmware of all programmers on an RS485 network at the same time.

### 5.4 Firmware version 3.01

Support for programming the full 256kb FLASH area of the Atmel ATmega256x family has been added to the Epsilon5, FS2003 and PPM3-MK2 firmware in this release.

### 5.5 Firmware version 3.02

**i. Zensys - ZW0102 and ZW0201 Verify Bug fixed**

The Zensys ZW0102 and ZW0201 devices had a bug in the 'FLASH Verify' routine in Standalone Mode operation only. It was possible for the programmer to report that a 'Verify Pass' had passed when in fact it had failed. This bug has been fixed in firmware version 3.02 for the Epsilon5, FS2003 and PPM3-MK2 programmers.

### 5.6 Firmware version 3.03

This version of firmware was used for internal testing at Equinox only and was not released for public use.

### 5.7 Firmware version 3.04

This version of firmware introduces the following features:

**i. 'Hardware SPI' algorithm for Atmel AVR and Zensys devices**

- Programmers supported: Epsilon5, FS2003, PPM3-MK2
- The use of the new 'Hardware SPI' algorithm should result in much faster SPI programming of Atmel AVR and Zensys devices.

## ***ii. Implemented new 'Keypad Lock' functionality***

- Programmers supported: FS2003, PPM3-MK2
- This new feature allows the keypad of the FS2003 or PPM3-MK2 to be 'locked' after the initial project selection has been made.

## ***iii. Corrected ATmega256 large memory support in JTAG and SPI modes***

- Programmers supported: Epsilon5, FS2003, PPM3-MK2
- Support for programming the full 256kb FLASH area of the Atmel ATmega256x family has been amended in the Epsilon5, FS2003 and PPM3-MK2 firmware.
- There was a problem when programming code over the 128kb boundary where the code could wrap around the device.

## ***iv. Skipping blank pages in Mega page programming in both SPI and JTAG modes***

- Programmers supported: Epsilon5, FS2003, PPM3-MK2
- This new functionality in the firmware will automatically skip any blank (0xFF) pages when programming the FLASH of a Target Device.
- This can speed up programming times considerably if the device contains a lot of blank data. E.g. if the main code is stored at the bottom of FLASH and then a Boot Loader at the top of FLASH with a large gap of 0xFF inbetween.

## ***v. Creation of new LCD screens for previously unused states***

- Programmers supported: FS2003, PPM3-MK2
- There were a few LCD screens on the FS2003 and PPM3-MK2 which could display confusing data. Every state in the programming statemachine now has its own dedicated display text for the LCD.

## ***vi. Target Connect / Disconnect Sensing now supports Chained Projects***

- Programmers supported: PPM3-MK2
- It is now possible to make a set of 3 'Chained Projects' where the 'Target Connection Sensing' algorithm is used to start execution of the first project and then the 'Target Disconnection Sensing' algorithm is used to sense when the Target System is removed at the end of the 3 chained projects.

## ***vii. Programmer PASS / FAIL / BUSY LEDs now works with Chained Projects***

- Programmers supported: FS2003, PPM3-MK2
- It is now possible to make a set of 3 'Chained Projects' which will execute in sequence and perform the following tasks:
- Programming of Test Firmware, Execution of Test Firmware, Programming of Production Firmware
- The PASS (GREEN) LED will now stay on solid at the end of the programming sequence to indicate a PASS.
- The BUSY (YELLOW) BUSY LED will flash to indicate 'Sensing Target Disconnection'.
- The FAIL (RED) LED will flash and the programmer will go to 'Sensing Disconnect' if a programming error occurs during any of the 3 projects
- This functionality is ideal for standalone programming / test systems where a PC is not required.

## 5.8 Firmware version 3.05

This version of firmware was used for internal testing at Equinox only and was not released for public use.

## 5.9 Firmware version 3.06

This version of firmware was used for internal testing at Equinox only and was not released for public use.

## 5.10 Firmware version 3.07

The new features implemented in this firmware are as follows:

### ***i. JTAG-in-a-chain functionality now implemented***

- Programmers supported: Epsilon5, FS2003, PPM3-MK2
- This EQTools version now supports programming of any Atmel ATmega AVR device via JTAG when the device is part of a JTAG chain. It is possible to declare the position of the AVR Device in the JTAG chain by specifying the number of 'Bits before' and 'Bits after' the target device in the chain.
- Please see Application Note – AN101 for further details.

### ***ii. Supports reading / validation of the JTAG ID + Silicon Revision check***

- Programmers supported: Epsilon5, FS2003, PPM3-MK2
- It is now possible to read the 4-byte 'JTAG ID' from any JTAG device.
- This allows the programmer to check not only the Target Device Part Code, but also the 'Silicon Revision'.
- This can be useful for tracking that the correct part (correct revision) has been fitted to each Target Board.
- The software supports reading the JTAG ID of any JTAG device, not just Atmel AVR devices.

### ***iii. JTAG Chain Validation***

- Programmers supported: Epsilon5, FS2003, PPM3-MK2
- It is possible to validate all the devices in a 'JTAG Chain' to ensure all devices are correctly fitted to the PCB.
- A series of 'Chained Projects' is used to interrogate each JTAG Device in the chain for its JTAG ID and once all ID's have been verified, this proves that the JTAG Chain is complete and all devices are responding. This function will work with any JTAG device.

### ***iv. Faster ATmega AVR JTAG programming algorithms***

- Programmers supported: Epsilon5, FS2003, PPM3-MK2
- The speed of the ATmega AVR JTAG programming algorithms has been optimised. An overall decrease in the programming time should now be seen with all AVR JTAG devices.

### ***v. Faster ATmega AVR SPI - Page Based EEPROM Programming Mode***

- Programmers supported: Epsilon5, FS2003, PPM3-MK2
- A new algorithm has been implemented in 'SPI Programming Mode' which supports faster programming of the EEPROM area of many Atmel AT90S, ATtiny, AT90USB, AT90CAN and AT90USB microcontrollers.

- It is now possible to program the EEPROM in pages of eg. 4 or 8 bytes instead of programming just a single byte at a time.
- This can reduce the overall EEPROM Programming time considerably as otherwise many AVR devices take 4 – 8ms per EEPROM byte to program. The time saving can be in the order of ¼ or 1/8 of the original time to program the EEPROM when the Page Size was set to 1 byte.

Please note:

- For existing projects, the EEPROM Page Size will remain at 1 byte. This can be changed to the higher Page Size on the 'Target Device' tab in the project. This maintains compatibility with projects compiled using an older version of EQTools and also with firmware 3.04 and below.
- For newly created projects, the EEPROM Page Size will default to the highest possible value for the selected device. Eg. 4 or 8 bytes. This project is then only compatible with firmware 3.05 and above.

## ***vi. Faster RDY/BUSY FLAG Polling algorithm (SPI Programming Mode)***

- A Programmers supported: Epsilon5, FS2003, PPM3-MK2
- A new algorithm has been implemented in 'SPI Programming Mode' which supports faster programming of both the FLASH and EEPROM areas by polling the RDY/BUSY FLAG.
- This algorithm should produce marginal programming time improvements as the programmer no longer needs to read back a byte each time it needs to poll the device.

Please note:

- For existing projects, the 'Polling Method' will remain at 'Conventional Byte Polling algorithm'. This can be changed to the 'Ready/Busy' polling algorithm on the 'Target Device' tab in the project. This maintains compatibility with projects compiled using an older version of EQTools and also with firmware 3.04 and below.
- For newly created projects, the 'Polling Method' will default to the 'Ready/Busy' polling algorithm. This project is then only compatible with firmware 3.05 and above.

## ***vii. Power up – Voltage Stabilise Time reduced***

- Programmers supported: PPM3-MK2
- A new power supply algorithm has been implemented for the PPM3-MK2 programmer which provides much faster voltage stabilisation and hence faster programming over a number of programming cycles.
- When the programmer is powering the Target System, the 'Target Voltage' specified in the Programming Project is now generated at the start of the first project to be executed.
- The programmer then retains this 'Target Voltage' internally inside the programmer so that the next time the power supply is switched on to the Target System, the 'Target Voltage' is already very close to the specified value. In other words, if the 'Target Voltage' is +5.0V, then the programmer will maintain +5.0V internally so the next time the power is switched on to the Target System, the voltage generation time will be much faster.

## ***viii. Leave Power Supply ON at end of Standalone Programming Project (PPM3-MK2 only)***

- Programmers supported: PPM3-MK2
- A new option has been added to the '**Power Supply Control**' of the PPM3-MK2 programmer to allow the Power Supply to be left switched ON at the end of a Standalone Programming Project.
- The power supply can be switched on permanently by running the first project and then will remain on until switched off by another project.

- This new feature can be used to permanently power the programmer Line Drivers on the 'Standard Special Function Module' (EQ-SFM-1) at a specified voltage even when the programmer is not actually programming. This will help to protect the Line Driver IC's from ESD or over-voltage damage caused by spurious signals from the Target System.

## ***ix. Skip Standalone Project - Image Check***

- Programmers supported: Epsilon5, FS2003, PPM3-MK2
- When a project is uploaded to the programmer and then executed, the programmer then automatically scans the entire Programming Project in FLASH Memory and performs a CRC check. This is a safety precaution in case the data in the programmer FLASH Memory has been corrupted.
- It is now possible to instruct the programmer not to perform the 'Project Image Check' on Standalone Programming Projects. The check can be disabled for both 'Manual Keypad' and 'ASCII Text Communications' mode. This can save a few seconds per programming cycle as the Image Check is quite time consuming for larger FLASH Size devices.

To disable the '**Standalone Project - Image Check**':

- Open your existing programming project
- On the **<Programmer and Project Type>** tab, check the box '**Skip Image Check**'
- Re-compile and upload the project to the programmer.

## ***x. ASCII Text Mode Communications - New 'FPROGRAM' command***

- Programmers supported: Epsilon5, FS2003, PPM3-MK2
- A new command '**FPROGRAM**' has been implemented in ASCII Mode.
- This command is exactly the same as the existing '**PROGRAM**' command except that the 'Image Check' is skipped when the project is executed. This can lead to much faster programming for projects with large FLASH / EEPROM files.
- Please see Application Note 'AN110 – ASCII Text Protocol' – for further details of this new command.

## ***xi. Locked Keypad functionality amended***

- Programmers supported: FS2003, PPM3-MK2
- The ability to lock the keypad of an FS2003 or PPM3-MK2 programmer once a Programming Project has initially been selected was implemented back in firmware 3.02.

This functionality has now been modified slightly as follows:

- If a project is locked then once the PASS / FAIL message has been displayed, the programmer will now always go back to the screen 'Press YES to program Target System'.
- At the end of a project, only the <YES> key will now cause the project to be executed again.

## ***xii. AT89S8253 – 'Hardware SPI' Mode now implemented***

- Programmers supported: Epsilon5, FS2003, PPM3-MK2
- If firmware 3.07 is installed in the programmer, it is now possible to use the 'Hardware SPI' mode to program the AT89S8253 device. This results in faster and more reliable programming of this device.

## ***xiii. AT89S51 / AT89S52 – 'Hardware SPI' mode now implemented***

- Programmers supported: Epsilon5, FS2003, PPM3-MK2
- If firmware 3.07 is installed in the programmer, it is now possible to use the 'Hardware SPI' mode to program the AT89S51 and AT89S52 devices. This results in faster and more reliable programming of these devices.

#### ***xiv. RESET\_PPM command amendment***

- Programmers supported: Epsilon5, FS2003, PPM3-MK2
- The RESET\_PPM command now does not wait after the command has been issued. This ensures that ConsoleEDS can always reset the programmer properly.

#### ***xv. Atmel 24Cxxx I2C Serial EEPROMs support***

- Programmers supported: Epsilon5, FS2003, PPM3-MK2
- In-System Programming support for the Atmel 24Cxxx I2C Serial EEPROM family has been introduced in firmware 3.07. This allows these memory devices to be programmed at up to 400kHz via the I2C bus