Application Note 30201

In-System Programming of ST Flash PSDs

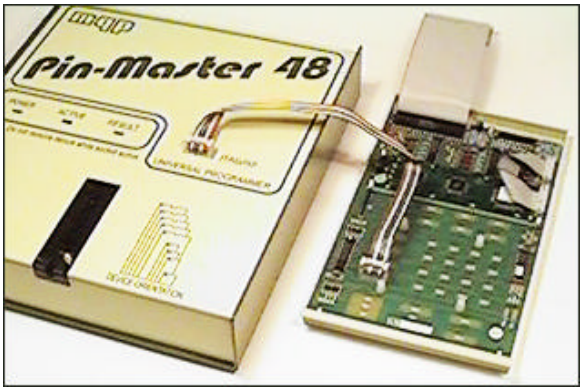
This application note describes how ST Flash PSDs may be programmed in-circuit using the dedicated JTAG/ISP connector on the Pin-Master 48 universal programmer. The programming cable, the design of the target board, and programming procedures are described.

INTRODUCTION

ST Flash PSDs are configurable memory systems on a chip, available in various packages. They can be programmed while mounted on the end-users target system using a JTAG interface.

In system programming reduces the number of times the parts have to be handled during the manufacturing process and allows the latest or custom software to be loaded just prior to shipping.

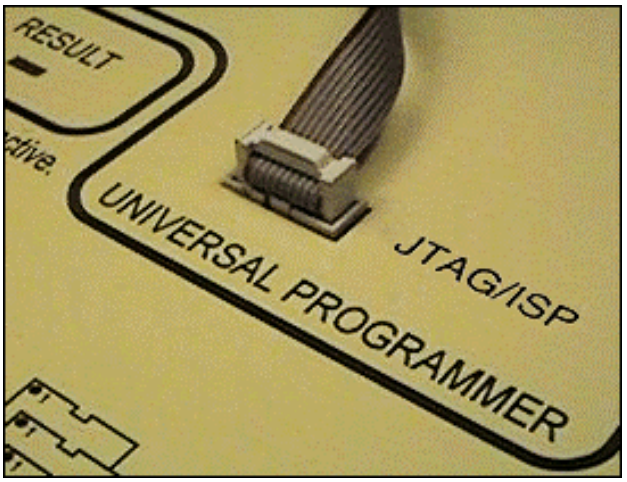
The interface between the programmer and target board is made up of 5 standard signals, plus ground.



Production Programming using Pin-Master 48

The Pin-Master 48 universal programmer has a dedicated JTAG/ISP connector fitted to the top of the unit. A cable made up to the users own requirements connects the socket to the target board.

The requirements of in-system programming affects the circuit design of the target board. Aspects of the design which must be considered are explained later in this application note.



JTAG/ISP SOCKET

The socket is a standard 10 way 0.1″ header. A diagram of the socket is shown below:

Viewed from top, front of programmer

2 GND	4 GND	6 GND	8 GND	10 GND
1 TCK	3 TMS	5 TDI	7 TDO	9 TRST*

* May be Enable, Vpp, or No Connect

1	TCK	Test Clock	Device input
2	GND	Ground	
3	TMS	Test Mode Select	Device input
4	GND	Ground	
5	TDI	Test Data Input	Device input
6	GND	Ground	
7	TDO	Test Data Output	Device output
8	GND	Ground	
9	TRST*	Test Reset	Device input
10	GND	Ground	

* TRST is an optional signal on a JTAG interface. On some devices it is used for an ENABLE or Vpp high voltage signal. It is not used when programming ST Flash PSDs with a Pin-Master 48.

A ribbon cable with alternate wires connected to ground is used between the Pin-Master 48 and the target board. The cable should be kept as short as possible (maximum length 1m).

TARGET BOARD

CONNECTOR

The target board should be equipped with a suitable connector. This could be most simply achieved with a similar connector and pin layout to that used at the programmer end of the cable. If using a different arrangement, care should be taken not to run signals adjacent to any signal other than ground in a ribbon cable.

- ***RESET***

This pin should be left unconnected.

JAM STAPL FILES

These devices may be programmed or verified using a JAM file. A JAM file does not generally allow other functions such as reading a device. JAM programming is generally used to perform in-circuit programming using the JTAG connection. However in some cases it can also be used with a particular adapter in the Pin-Master 48 ZIF socket. In this case the file format displayed will be 'JAM' and the adapter number will be shown in the selection menu.

Preparing a JAM STAPL file

JAM format files for PSDxxx devices can be generated using the ST software '**PSDsoft'**, by the following procedure (based on PSDsoft Express version 7.80):

- Create your project .OBJ file using the ST design tools in PSDsoft.
- In the 'Design Flow' window select **'STMicroelectronics JTAG/ISP'**
- If asked specify the number of devices in the chain. The following assumes that you specifed just one.
- In the **JTAG-ISP Operations - Single Device** window locate the .OBJ programming file for your project.
- Specify the correct device type.
- Specify operation **Program/Verify**
- Specify the region **All**
- Specify **4 pins**
- Click the button **ATE Files**
- Select **Generate JAM STAPL** file
- Do **not** select **Assert Reset**
- Check **Blank Check** and **Erase**
- Click **OK**
- Choose a location to save your JAM file
- The JAM file will be generated.

To program or verify your device, simply open the JAM file and click on the PLAY button. Then choose the action required (e.g. PROGRAM or VERIFY).

To use a JAM file in Script Mode - check the script mode documentation for the **PLAY_JAM** command.

PROGRAMMING PROCEDURE

As no power is provided by the programmer, the target board must be independently powered. To avoid earth potential differences the programmer and target board should be connected to a common mains supply.

- Connect the cable to the target board and the programmer.
- Power up the target board, and proceed with programming in the normal way.
- If there are any other devices to be programmed on the board move the cable and repeat the procedure. This could be simplified by using a 'Script File' which would automatically change the device type and instruct the operator where to plug in the cable.

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