

#### **APPLICATION NOTE**

## **Programming of Atmel Programmable Logic Devices**

**Atmel SPLD/CPLD** 

#### Introduction

Atmel® Programmable Logic Devices (PLDs) are Electrically Erasable and Programmable Read-Only Memory (EEPROM) based devices which contains the configuration information for the configurable logic blocks, interconnects, and device options. Therefore, the EEPROM in the PLD needs to be properly programmed with a JEDEC fusemap file (.JED) in order for the PLD to operate as intended. For the Atmel ATF15xx CPLDs with the programmable JTAG feature, In-System Programming (ISP) is possible; therefore, they can be programmed using stand-alone programmers before they are mounted on the PCB or in-system programming is not supported and must be programmed using stand-alone programmers before they are mounted on the PCB.

#### **Features**

- Atmel Programming Tools
- Third-party Programming Tools
- Third-party Programming Services
- In-circuit Testing

### 1 Atmel Development Programming Tools

For the ATF15xx CPLDs with JTAG ISP support, Atmel offers the ATF15xx-DK3-U Development/Programmer Kit, the ATDH1150USB USB-based ISP Download Cable (included in ATF15xx-DK3-U), and the ATDH1150VPC LPT-based ISP Download Cable to users for programming of these CPLDs using a Windows based host PC running the Atmel ATMISP ATF15xx ISP programming software. These programming tools are mainly designed for development environments, and they are less suitable for production programming than the commercial grade production programmers available from third-party device programming tool vendors as described in Section 2 below.

ATF15xx-DK3-U: http://www.atmel.com/tools/ATF15XX-DK3-U.aspx ATDH1150USB: http://www.atmel.com/tools/ATDH1150USB.aspx http://www.atmel.com/tools/ATDH1150VPC.aspx

ATMISP: http://www.atmel.com/tools/ATMISP.aspx

# **2 Third-party Programming Tools**

Many programming tool vendors offer stand-alone and in-system programmers that can be used to program Atmel PLDs in the production and development environments. For production programming of Atmel PLDs, the use of commercial grade production programmers from third-party device programming tool vendors is recommended. Multi-site (or "gang") programmers are also available from various vendors to allow users to program multiple devices at the same time to increase the programming throughput for high volume production programming. The below table lists some of the third-party device programming tool vendors that offer programming tools for Atmel PLDs and the types of device programming tools offered (please check with vendors to confirm offering).

Table 2-1. Third-party Device Programming Tool Vendors

Company Name	Stand-alone (Single-site)	Stand-alone (Multi-site)	In-system	Website
Advantech Equipment	✓			www.aec.com.tw
Advin Systems	✓	✓		www.advin.com
BPM Microsystems <sup>(1)</sup>	✓	✓	✓	www.bpmmicro.com
Data I/O <sup>(1)</sup>	✓	✓		www.dataio.com
Dataman	✓	✓	✓	www.dataman.com
EE Tools	✓	✓		www.eetools.com
ELNEC	✓	✓	✓	www.elnec.com
HI-LO Systems <sup>(1)</sup>	✓	✓		www.hilosystems.com
Kanda <sup>(1)</sup>	✓		✓	www.kanda.com
Leap Electronic	✓	✓		www.leap.com.tw
Logical Devices <sup>(1)</sup>	✓	✓	✓	www.logicaldevices.com
Minato	✓	✓		www.minato.co.jp
Needham's Electronics <sup>(1)</sup>	✓		✓	www.needhams.com
Phyton	✓	✓		www.phyton.com
System General <sup>(1)</sup>	✓	✓		www.sg.com.tw
Tribal Microsystems <sup>(1)</sup>	✓	✓		www.tribalmicro.com
Xeltek	✓	✓	✓	www.xeltek.com

Note: 1. The PLD programming supports from this vendor had been qualified by the Atmel PLD Applications group.



### 3 Third-party Programming Services

Some of the Atmel distributors (i.e. Arrow, Avnet, Digi-Key) and third-party device programming tool vendors (i.e. HI-LO Systems, Dataman, Xeltek) also offer programming services for Atmel PLDs and other programmable devices. There are also many device programming service providers (i.e. A&J Programming, Action Circuits, ProEx, Reel Service) available worldwide that offer programming services for various types of programmable devices including PLDs.

### 4 In-circuit Testing

For the ATF15xx CPLDs with JTAG ISP support, it is possible to program these devices after they are mounted on the PCB using in-circuit testers during board level production test flow. Typically, the test program development software for the in-circuit tester obtains all the necessary programming information for the ATF15xx CPLD from the Serial Vector Format (SVF) file which is generated by the ATMISP software.

## 5 Revision History

Doc Rev.	Date	Comments
Α	08/2015	Initial document release.













**Atmel Corporation** 

1600 Technology Drive, San Jose, CA 95110 USA

T: (+1)(408) 441.0311

F: (+1)(408) 436.4200

www.atmel.com

© 2015 Atmel Corporation. / Rev.:Atmel-8979A-PLD-Programming-ApplicationNote\_082015.

Atmel®, Atmel logo and combinations thereof, Enabling Unlimited Possibilities®, and others are registered trademarks or trademarks of Atmel Corporation in U.S. and other countries. Other terms and product names may be trademarks of others.

DISCLAIMER: The information in this document is provided in connection with Atmel products. No license, express or implied, by estoppel or otherwise, to any intellectual property right is granted by this document or in connection with the sale of Atmel products. EXCEPT AS SET FORTH IN THE ATMEL TERMS AND CONDITIONS OF SALES LOCATED ON THE ATMEL WEBSITE, ATMEL ASSUMES NO LIABILITY WHATSOEVER AND DISCLAIMS ANY EXPRESS, IMPLIED OR STATUTORY WARRANTY RELATING TO ITS PRODUCTS INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT. IN NO EVENT SHALL ATMEL BE LIABLE FOR ANY DIRECT, INDIRECT, CONSEQUENTIAL, PUNITIVE, SPECIAL OR INCIDENTAL DAMAGES (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS AND PROFITS, BUSINESS INTERRUPTION, OR LOSS OF INFORMATION) ARISING OUT OF THE USE OR INABILITY TO USE THIS DOCUMENT, EVEN IF ATMEL HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. Atmel makes no representations or warranties with respect to the accuracy or completeness of the contents of this document and reserves the right to make changes to specifications and products descriptions at any time without notice. Atmel does not make any commitment to update the information contained herein. Unless specifically provided otherwise, Atmel products are not suitable for, and shall not be used in, automotive applications. Atmel products are not intended, authorized, or warranted for use as components in applications intended to support or sustain life.

SAFETY-CRITICAL, MILITARY, AND AUTOMOTIVE APPLICATIONS DISCLAIMER: Atmel products are not designed for and will not be used in connection with any applications where the failure of such products would reasonably be expected to result in significant personal injury or death ("Safety-Critical Applications") without an Atmel officer's specific written consent. Safety-Critical Applications include, without limitation, life support devices and systems, equipment or systems for the operation of nuclear facilities and weapons systems. Atmel products are not designed nor intended for use in military or aerospace applications or environments unless specifically designated by Atmel as military-grade. Atmel products are not designed nor intended for use in automotive applications unless specifically designated by Atmel as automotive-grade.