

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

**Artisan Technology Group**
(217) 352-9330 | sales@artisantg.com | artisantg.com

**Full-service, independent repair center**
with experienced engineers and technicians on staff.

**We buy your excess, underutilized, and idle equipment**
along with credit for buybacks and trade-ins.

**Custom engineering**
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

**Expert team | Trust guarantee | 100% satisfaction**

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

**Visit our website - *Click HERE***

# Altera Programming Hardware

January 1998, ver. 4 Data Sheet

## General Description

Altera offers a variety of hardware to program and configure Altera devices. For conventional device programming, in-system programming, and in-circuit reconfiguration, designers can choose from the hardware options shown in Table 1; these options are described in more detail in subsequent sections.

*Table 1. Available Hardware Options for Altera Device Programming & Configuration*

| | External Programming Hardware, *Note (1)* | BitBlaster™ Serial Download Cable | ByteBlaster™ Parallel Download Cable |
|---|---|---|---|
| Conventional device programming | ✓ | | |
| In-system programming | | ✓ | ✓ |
| In-circuit reconfiguration | | ✓ | ✓ |

*Note:*
(1) External programming hardware includes the Logic Programmer card and Master Programming Unit (MPU).



Altera devices are also supported by a variety of third-party programmers. Refer to *Programming Hardware Manufacturers* in this data book for more information.

## External Programming Hardware

Altera provides the following external programming hardware:

- Altera Stand-Alone Programmer
- Logic Programmer card
- Master Programming Unit
- Programming adapters

## Altera Stand-Alone Programmer

The Altera Stand-Alone Programmer (PL-ASAP2), together with the appropriate programming adapters, provides the hardware and software needed for programming EPROM- and EEPROM-based devices, and for configuring SRAM-based devices. PL-ASAP2 includes an LP6 Logic Programmer card, an MPU, MAX+PLUS® II Programmer software (which requires Microsoft Windows 3.*x*, Windows 95, or Windows NT), and complete documentation. The MAX+PLUS II Programmer supports device configuration for FLEX® 10K, FLEX 8000, and FLEX 6000 devices, and device programming for MAX® 9000, MAX 7000, MAX 5000, Classic™, and Configuration EPROM devices.

*Ordering Code:* *PL-ASAP2*

## Logic Programmer Card

The LP6 Logic Programmer card generates programming waveforms and voltages for the MPU. The software-controlled card can be installed into any full-length computer expansion slot in an IBM PC or compatible computer. The LP6 card is available as part of PL-ASAP2 or individually.

*Ordering Code:* *PLP6*

## Master Programming Unit

The MPU is a hardware module that is used together with an appropriate adapter to program Altera devices. The MPU connects to a Logic Programmer card via a 25-pin ribbon cable. The MPU receives power from the Logic Programmer card and does not require an external power supply. Programming and functional test information is transmitted from the Logic Programmer card through the ribbon cable to the MPU. A programming status light on the MPU lights up when the unit is active.

When used with the appropriate adapter, the MPU automatically tests for continuity between the device leads and the programming socket before programming. It can also apply test vectors to functionally test and verify programmed Altera devices. Test vectors can be created in waveform or text format in the MAX+PLUS II Waveform Editor or Text Editor and applied to the device; results can be viewed in waveform or text format. The MPU is available as part of the PL-ASAP2 or individually.

*Ordering Code:* *PL-MPU*

## Programming Adapters

Altera provides three types of programming adapters for Altera devices: PLM-prefix adapters, PLE-prefix adapters, and the PLAD3-12 compatibility adapter. Each adapter contains one of the following sockets: a zero-insertion-force dual in-line package (DIP), plastic or ceramic J-lead (PLCC / JLCC), pin-grid array (PGA), small-outline integrated circuit (SOIC), or quad flat pack (QFP). Most adapters for QFP devices with 100 or more pins support Altera's QFP carriers. Adapters with an "NC" suffix program QFP devices that are not in a QFP carrier. Table 2 on page 680 lists the adapters required for each Altera device and package option.



See the *QFP Carrier & Development Socket Data Sheet* in this data book for more information.

### *PLM-Prefix Adapters*

The PLM-prefix adapters plug directly into the MPU. Each adapter provides programming support for a specific device package. Additionally, PLM-prefix adapters (except the PLMJ1213 and PLMT1064) support functional testing of programmed Altera devices. The PLMJ1213 and PLMT1064 adapters can program the Configuration EPROMs used to configure FLEX 10K, FLEX 8000, and FLEX 6000 devices.

### *PLE-Prefix Adapters*

The PLE-prefix adapters plug into the PLAD3-12 compatibility adapter, which in turn plugs into the MPU. Each PLE-prefix adapter provides programming support for a specific Classic device.

### *PLAD3-12 Compatibility Adapter*

The PLAD3-12 compatibility adapter plugs directly into the MPU. This adapter allows PLE-prefix adapters to be used with the MPU. See Table 2.

*Table 2. Programming Adapters & Hardware Support (Part 1 of 3)* *Note (1)*

| Device | Package | Adapter | BitBlaster & ByteBlaster Support |
|---|---|---|---|
| FLEX 10K | All packages | *Note (2)* | ✓ |
| FLEX 8000 | All packages | *Note (2)* | ✓ |
| FLEX 6000 | All packages | *Note (2)* | ✓ |
| EPC1 | DIP<br>J-Lead | PLMJ1213<br>PLMJ1213 | – |
| EPC1441 | DIP<br>J-lead<br>TQFP | PLMJ1213<br>PLMJ1213<br>PLMT1064 | – |
| EPC1213 | DIP<br>J-lead | PLMJ1213<br>PLMJ1213 | – |
| EPC1064<br>EPC1064V | DIP<br>J-lead<br>TQFP | PLMJ1213<br>PLMJ1213<br>PLMT1064 | – |
| EPM9320<br>EPM9320A | J-lead (84-pin)<br>RQFP (208-pin)<br><br>RQFP (240-pin) | PLMJ9320-84<br>PLMR9000-208<br>PLMR9000-208NC<br>PLMR9000-280 | ✓ |
| EPM9400<br>EPM9400A | J-lead (84-pin)<br>RQFP (208-pin)<br><br>RQFP (240-pin) | PLMJ9400-84<br>PLMR9000-208<br>PLMR9000-208NC<br>PLMR9000-240<br>PLMR9000-240NC | ✓ |
| EPM9480<br>EPM9480A | RQFP (208-pin)<br><br>RQFP (240-pin) | PLMR9000-208<br>PLMR9000-208NC<br>PLMR9000-240<br>PLMR9000-240NC | ✓ |
| EPM9560<br>EPM9560A | RQFP (208-pin)<br><br>RQFP (240-pin)<br><br>PGA (280-pin)<br>RQFP (304-pin)<br>BGA (356-pin) | PLMR9000-208<br>PLMR9000-208NC<br>PLMR9000-240<br>PLMR9000-240NC<br>PLMG9000-280<br>PLMR9000-304<br>*Note (3)* | ✓ |
| EPM7032<br>EPM7032V<br>EPM7032S<br>EPM7032A | J-lead<br>PQFP<br>TQFP | PLMJ7000-44<br>PLMQ7000-44<br>PLMT7000-44 | ✓ *(4)* |

*Table 2. Programming Adapters & Hardware Support (Part 2 of 3)* *Note (1)*

| Device | Package | Adapter | BitBlaster & ByteBlaster Support |
|---|---|---|---|
| EPM7064<br>EPM7064S<br>EPM7064A | J-lead (44-pin)<br>TQFP (44-pin)<br>J-lead (68-pin)<br>J-lead (84-pin)<br>PQFP (100-pin)<br><br>TQFP (100-pin) | PLMJ7000-44<br>PLMT7000-44<br>PLMJ7000-68<br>PLMJ7000-84<br>PLMQ7000-100<br>PLMQ7000-100NC<br>PLMT7000-100NC | ✓ *(4)* |
| EPM7096 | J-lead (68-pin)<br>J-lead (84-pin)<br>PQFP (100-pin) | PLMJ7000-68<br>PLMJ7000-84<br>PLMQ7000-100 | – |
| EPM7128E<br>EPM7128S<br>EPM7128A | J-lead (84-pin)<br>PQFP (100-pin)<br><br>PQFP (160-pin)<br><br>TQFP (144-pin) | PLMJ7000-84<br>PLMQ7000-100<br>PLMQ7000-100NC<br>PLMQ7128/7160-160<br>PLMQ7128/160-160NC<br>*Note (3)* | ✓ *(4)* |
| EPM7160E<br>EPM7160S | J-lead (84-pin)<br>TQFP (100-pin)<br>PQFP (100-pin)<br>PQFP (160-pin) | PLMJ7000-84<br>PLMT7000-100NC<br>PLMQ7000-100<br>PLMQ7128/7160-160<br>PLMQ7128/160-160NC<br>PLMT7000-100NC | ✓ *(4)* |
| EPM7192E<br>EPM7192S | PGA (160-pin)<br>PQFP (160-pin) | PLMG7192-160<br>PLMQ7192/7256-160<br>PLMQ7192/256-160NC | ✓ *(4)* |
| EPM7256E<br>EPM7256S<br>EPM7256A | PGA (192-pin)<br>PQFP (160-pin)<br><br>RQFP (208-pin)<br>PQFP (208-pin)<br>TQFP (144-pin) | PLMG7256-192<br>PLMQ7192/7256-160<br>PLMQ7192/256-160NC<br>PLMR7256-208<br>PLMR7256-208NC<br>*Note (3)* | ✓ *(4)* |
| EPM7384A | TQFP (144-pin)<br>PQFP (208-pin)<br>BGA (256-pin) | *Note (3)* | ✓ |
| EPM7512A | TQFP (144-pin)<br>PQFP (208-pin)<br>BGA (256-pin) | *Note (3)* | ✓ |
| EPM71024A | PQFP (208-pin)<br>BGA (256-pin) | *Note (3)* | ✓ |

*Table 2. Programming Adapters & Hardware Support (Part 3 of 3)* *Note (1)*

| Device | Package | Adapter | BitBlaster & ByteBlaster Support |
|---|---|---|---|
| EPM5032 | DIP<br>J-lead | PLMD5032A<br>PLMJ5032A | – |
| EPM5064 | J-lead | PLMJ5064A | – |
| EPM5128<br>EPM5128A | J-lead<br>PGA | PLMJ5128A<br>PLMG5128A | – |
| EPM5130 | J-lead<br>PGA<br>PQFP | PLMJ5130A<br>PLMG5130A<br>PLMQ5130A | – |
| EPM5192 | J-lead<br>PGA | PLMJ5192A<br>PLMG5192A | – |
| EP600<br>EP610 | DIP<br>J-lead<br>SOIC | PLED610<br>PLEJ610<br>PLES610 | – |
| EP900<br>EP910 | DIP<br>J-lead | PLED910<br>PLEJ910 | – |
| EP1810 | J-lead<br>PGA | PLMJ1810<br>PLEG1810 | – |

***Notes:***

(1) Adapters with an NC suffix program QFP devices that are not in QFP carriers.
(2) Configuration of FLEX 10K, FLEX 8000, or FLEX 6000 devices is supported by Configuration EPROMs (EPC1064, EPC1064V, EPC1213, EPC1441, and EPC1), and the BitBlaster or ByteBlaster download cable.
(3) A BitBlaster or ByteBlaster download cable is used to program this device via in-system programming.
(4) The BitBlaster and ByteBlaster download cables support in-system programming of MAX 7000S and MAX 7000A devices.

*Ordering Codes:* *PLExxxx, PLMxxxx, PLAD3-12*

## BitBlaster Serial Download Cable

The BitBlaster serial download cable is a hardware interface to a standard PC or UNIX workstation RS-232 port (known as a "COM port" on a PC and a "ttya port" or "ttyb port" on a UNIX workstation) that provides configuration data to FLEX 10K, FLEX 8000, and FLEX 6000 devices and programming data to MAX 9000, MAX 7000S, and MAX 7000A devices.

Copyright © 1995, 1996, 1997, 1998 Altera Corporation, 101 Innovation Drive, San Jose, CA 95134, USA, all rights reserved.

By accessing this information, you agree to be bound by the terms of Altera's Legal Notice.

**Artisan Technology Group** is an independent supplier of quality pre-owned equipment

## Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

## We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

## Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP