ISP Programming Methods & Ordering Codes

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Altera® MAX® 9000 and MAX 7000S devices can be programmed in-system with the Master Programming Unit (MPU), third-party programming hardware, the ByteBlaster™ Parallel Port Download Cable, the BitBlaster™ Serial Download Cable, embedded processors, or automated test equipment (ATE). This technical brief describes and provides the device ordering codes for each programming method.

Table 1 summarizes the programming methods using in-system programmability (ISP).

Table 1. Programming Methods Using ISP

Programming Method	Usage		
	Prototyping	Production	In-Field Upgrades
MPU or Third-Party Programmers	✓	✓	
ByteBlaster or BitBlaster	✓	✓	
Embedded Processor	✓	✓	✓
ATE		✓	

Master Programming Unit or Third-Party Programmer

The MPU and third-party programmer methods offer low-cost programming solutions and provide the flexibility to program MAX 9000 and MAX 7000S devices. The MPU is a hardware module that is used with programming adapters to program Altera devices. The MPU receives programming and functional test information, and applies test vectors to functionally test and verify programmed devices. Third-party programmers, including programmers from Data I/O and BP Microsystems, offer programming hardware support for Altera devices. Altera recommends contacting manufacturers directly for up-to-date details (see *Programming Hardware Manufacturers* in the ***1996 Data Book*** for contact information).

For in-system programming using an MPU or third-party programmer, MAX 9000 or MAX 7000S devices in quad flat pack (QFP) packages should be ordered with carriers. Although ISP-capable devices do not need carriers, these devices require special handling when programmed by the MPU or third-party programmer. The carriers also protect the QFP device leads during non-ISP programming. Devices that are shipped with carriers have a "C" suffix after the speed grade in the ordering code (e.g., EPM9560RC208-15C).

ByteBlaster or BitBlaster Download Cables

The ByteBlaster download cable is a hardware interface to a standard parallel port that can be used to channel programming data to Altera ISP-capable devices (i.e., MAX 9000 or MAX 7000S devices). The ByteBlaster downloads design changes directly to the device. Similarly, the BitBlaster download cable can program ISP-capable devices by serving as a hardware interface to a standard RS-232 port. Both the ByteBlaster and BitBlaster download cables use the Joint Action Test Group (JTAG) interface, which makes in-system programming easier during prototyping and production. For in-system programming via a ByteBlaster or BitBlaster download cable, MAX 9000 or MAX 7000S devices in QFP packages should be ordered without carriers (e.g., use the EPM9560RC208-15 ordering code instead of EPM9560RC208-15C).

Embedded Processor

An embedded processor stores programming information, e.g., a Jam File (**.jam**). For in-system programming, an embedded processor enables the designer to program ISP-capable devices during development and production, and allows in-field upgrades. For in-system programming using an embedded processor, MAX 9000 or MAX 7000S devices in QFP packages should be ordered without carriers.

Automated Test Equipment

ISP-capable devices can be programmed during the final printed circuit board (PCB) testing stage using ATE. This programming method offers the ability to combine device programming with board-level test methods. To program a device using ATE, designers must create a Jam File or Serial Vector Format (**.svf**) File using the Altera MAX+PLUS® II software and download the programming file from the ATE to MAX 9000 or MAX 7000S devices. After the programming file is downloaded, the ATE can quickly program the devices during production.

Altera ISP-capable devices that support ATE programming and testing using a Jam File or SVF File devices in QFP packages should be ordered without carriers. ISP-capable devices that support ATE programming and testing using an SVF File however, should have an "F" suffix after the speed grade in the ordering code (e.g., EPM9560RC208-15F).

☞ Designers should not program a mixture of "F" and non-"F" devices at the same time. "F" devices adhere to a specified and fixed programming algorithm and provide a seamless programming flow for the ATE.

Altera is currently shipping "F" devices. For available "F" device ordering codes, contact Altera Applications at (800) 800-EPLD or your local sales representative.

The documents listed below provide more detailed information. Part numbers are in parentheses.

- ***In-System Programmability Handbook*** *(M-HB-ISP-01)*
- *BitBlaster Serial Download Cable Data Sheet (A-DS-BITBL-03)*
- *ByteBlaster Parallel Port Download Cable Data Sheet (A-DS-BYTE-01)*
- *MAX 9000 Programmable Logic Device Family Data Sheet (A-DS-M9000-04)*
- *MAX 7000 Programmable Logic Device Family Data Sheet (A-DS-M7000-04)*
- *AN 88: Using the Jam Language for ISP via an Embedded Processor (A-AN-088-01)*
- *Programming Hardware Manufacturers (A-GN-PRHW-03)*

You can request documents from:

- Altera Literature Services at (888) 3-ALTERA
- World-wide web at **http://www.altera.com**
- Your local Altera sales representative