

Programming Lattice Devices

Lattice offers three programming solutions for customers: Lattice-approved third-party programmers for customers to program devices themselves, direct factory programming or programming by Lattice's distributors.

Contact information for hardware, software and adapter manufacturers is listed at the end of this document.

Lattice-Approved Third-Party Programmers

For a complete list of third-party programmers and the approved software versions for programming Lattice devices, see the *Third-Party Programmer Support for ispGAL[®], ispPAC[®], isp/pLSI and ispGDX[®] Devices* and *Third-Party Programmer Support for MACH[®] and PAL[®] Devices* documents on the Lattice CD-ROM or the Lattice web site at www.latticesemi.com.

Socket Adapters

For a complete list of socket adapters for Lattice devices, see the *GAL, ispGAL, ispGDX, ispLSI, ispPAC, MACH and ispMACH Socket Adapters* document on the Lattice CD-ROM or the Lattice web site at the address listed above.

Factory Programming

Factory programming includes programming, verification, security options and custom top-side marking. This service requires a minimum order quantity and monthly run rate. Contact your local Lattice sales representative for details.

Distributor Programming

Avnet and Arrow Electronics provide customer programming. Contact your Lattice sales representative for details on local distributors which offer this service.

Simulation

When processing devices yourself, there are two environments in which devices are programmed: the engineering lab or the production floor. In the engineering lab, devices are programmed to verify functionality and to validate the device functions on the board. Test vectors and register preload are typically used in the design simulation process.

Production

Production programming requires additional cables, hardware and contactors to program devices. The extra equipment may affect the programming signals generated by the programmer. Lattice's programming algorithms are written and implemented to minimize the effects of the additional hardware required for production programming.

Lattice recommends the following equipment for production programming:

Data I/O Autosite and Autosite-E

Handlers: Quality Automation 7000
Quality Automation 3000
Exatron Model 4000
Exatron Model 3000
Exatron Model 2800

Data I/O Unisite/3900/2900

Handlers: Quality Automation 7000
Quality Automation 3000
Exatron Model 4000
Exatron Model 3000
Exatron Model 2800

System General Turpro-1/FX

Handlers: Exatron Model 4000
Exatron Model 3000
Exatron Model 2800

Production programming equipment is under constant evaluation by Lattice to insure it is production-ready. Every device released by Lattice undergoes a programming yield analysis to ensure 100% programming yields with production equipment. Lattice also verifies that both the continuity test and the reverse device test are functional with every device released. This ensures the highest possible programming yields in a manufacturing environment.

Programming Recommendations

To insure the highest possible programming yields, Lattice recommends that customers purchase an annual update contract from programming vendors that offer this service. This provides several benefits:

- The cost is usually less than purchasing three or four updates a year.

Lattice Third-Party Programming Tools Guide

- It ensures that users have the latest programming algorithm which will produce the highest possible programming yields.
- It allows users access to new algorithms as soon as they are available. Most programming vendors support a web site for downloading the latest algorithms.
- Programming equipment should be calibrated on a regular basis. Typically this service is included in the annual update service. For the highest possible programming yields, Lattice recommends that programming equipment be calibrated four times annually.

Handler Equipment and Maintenance

All of Lattice's programming algorithms include a continuity and reverse device test to insure that the handler has correctly placed the device into the contactor. This test is performed first, before any high voltages are applied to the device, to prevent any damage from occurring.

Under normal operation, an increase in continuity failures will occur as the contactor reaches the end of its life expectancy. Carefully review the manufacturer's specification for the number of insertions for which the contactor is guaranteed, and schedule a regular maintenance plan for replacement as required. Some manufacturers require that other parts associated with the contactor be released as well.

A sudden drastic increase in continuity failures is often the result of a poor set-up or misaligned contactors.

100% Programming Yields

Lattice guarantees 100% programming yields when programming with approved equipment. The programmer must be operating with an approved version of software or firmware.

Device Selection and Electronic Signature

Most Lattice devices include a hidden Electronic ID Code (separate from the User Electronic Signature or UES), which is read by the programmer at the beginning of the programming algorithm. If the programmer does not recognize the Electronic ID Code read from the device, an Electronic Signature Error is generated. This error indicates that the user has either selected an incorrect algorithm or the software version used does not support the particular device. In either case, the device is not damaged. The user should check that the correct device has been selected and that the correct software/firmware version is being used.

PALtoGAL Conversion Utility Software

A software utility from Lattice called PALtoGAL can be used to convert a PAL JEDEC file to a GAL JEDEC file. This software is also capable of changing the User Electronic Signature (UES) without changing the functional fuse data. A copy of the PALtoGAL conversion software can be downloaded from the Lattice web site at www.latticesemi.com. The file name is PALTOGAL.EXE.

Lattice Third-Party Programming Tools Guide

Hardware, Software and Adapter Manufacturers

Advin Systems

1050-L Duane Ave.
Sunnyvale, CA 94086
Tel: (408) 243-7000 or
(800) 627-2456 (toll free)
Fax: (408) 736-2503
BBS: (408) 737-9200
e-mail: sales@advin.com
Web site: www.advin.com

BP-Microsystems

1000 N Post Oak Rd, Suite 225
Houston, TX 77055-7237
Tel: (713) 688-4600 or
(800) 225-2102 (toll free)
Fax: (713) 688-0920
BBS: (713) 688-9283
e-mail: sales@bpmicro.com
Web site: www.bpmicro.com

California Integration Coordinators, Inc.*

630 Main Street
Placerville, CA 95667
Tel: (530) 626-6168 or
(866) 626-6168 (toll free)
Fax: (530) 626-7740
e-mail: cic@cic-inc.com
Web site: www.cic-inc.com

Data I/O Corporation

10525 Willows Road N.E.
P.O. Box 97046
Redmond, WA 98073-9746
Tel: (800) 426-1045 (toll free)
(800) 247-5700 (toll free)
Fax: (206) 882-1043
BBS: (206) 882-3211
Email: telsales@data-io.com
Web site: www.data-io.com

In Europe contact:

Data I/O Corporation
Tel: 31 (0) 20-662-2866

In Japan contact:

Data I/O Corporation
Tel: (03) 432-6991

Emulation Technology

2344 Walsh Ave., Bldg. F
Santa Clara, CA 95051
Tel: (408) 982-0660
Fax: (408) 982-0664
Web site: www.emulation.com

HI-LO System Research Co., Ltd.*

4F, No. 18, Ln. 76
Rui Guang Road
Nei Hu
Taipei, Taiwan, ROC
Tel: (886) 2-8792-3301
Fax: (886) 2-8792-3285
e-mail: hilosale@hilosystems.com.tw
Web site: www.hilosystems.com.tw

In the U.S. contact:

Tribal Microsystems, Inc.
44388 S. Grimmer Blvd.
Fremont, CA 94538-6385
Tel: (510) 623-8859
Fax: (510) 623-9925
e-mail: sales@tribalmicro.com
Web site: www.tribalmicro.com

Logical Devices

Contact Kanda Systems for more
information.
Tel: (800) 331-7766
Web site: www.kanda-systems.com

SMS MicroComputer

Contact Data I/O for more
information.

Stag Programmers, Ltd.

Silver Court
Watchmead
Welwyn Garden City
Herts, AL7 1LT
United Kingdom
Tel: 011-44-1707-332-148
Fax: 011-44-1707-371-503
Email: sales@stag.co.uk
Web site: www.stag.co.uk

In the U.S. contact:

Stag Programmers, Inc.
7451 Topanga Canyon Blvd.
Canoga Park, CA 91303
Tel: (818) 537-3434 or
(888) 700-7824 (toll free)
Fax: (818) 537-3433

System General Corporation

3F., No. 1, Alley 8, Lane 45
Bao Shing Road
Shin Dian
Taipei, Taiwan R.O.C.
Tel: 88-62-9173005
Fax: 88-62-9111283
Email: sga@inreach.com

In the U.S. contact:

System General Corporation
1623 South Main Street
Milpitas, CA 95035
Tel: (408) 263-6667 or
(800) 967-4776 (toll free)
Fax: (408) 262-9220
Web site: www.systemgeneral.com

*For MACH and PALCE devices only.