

Third-Party Programmers

Third-Party Programming Support

Lattice Semiconductor works with several industry-leading programming manufacturers to ensure that high quality programming support is available for Lattice ISP devices. Table 1 lists of the programming vendors approved to program the ispLSI®, ispGAL® and ispGDS® devices. For ispLSI devices, Lattice works with third-party socket adapter vendors to provide programming support for low-cost programmers, such as 28-pin programmers. These adapters route the necessary programming signals from the programmer to the devices and use a standard 28-pin pinout.

Table 1. Qualified Programmers

Programmer Vendor	Model
Advin Systems	Pilot U-40 Pilot U-84 Pilot GL Pilot GCE
BP Microsystems	PLD 1128 CP-1128 BP-1200
Data I/O	2900 3900 Unisite
Logical Devices	Allpro 40 Allpro 88
SMS Micro Systems	Expert
Stag	Eclipse ZL30A ZL30B System 3000 Quasar 1040 Quasar 1084
System General	Turpro-1 Turpro-1/FX

Device Selection

When programming Lattice's ispLSI devices, there are two types of adapters you can use. First, you can use an adapter supplied by the programming vendor. These adapters make electrical connections to all pins and may be capable of applying test vectors. Or, you can use a 28-pin adapter from one of the manufacturers listed below.

- PROCON Technologies
- EDI Corporation
- Emulation Technology

When using 28-pin adapters, the correct algorithm must be selected and specified with an asterisk (*). These algorithms are listed in Table 2.

Table 2. 28-Pin Adapter Algorithms

pLSI 1016*	ispLSI 1016*
pLSI 1024*	ispLSI 1024*
pLSI 1032*	ispLSI 1032*
pLSI 1048*	ispLSI 1048*
pLSI 2032*	ispLSI 2032*
pLSI 3256*	ispLSI 3256*

Third-Party Adapters

Table 3 lists universal socket adapters by Emulation Technology, EDI Corporation, and PROCON Technologies that may be used to program Lattice's ispLSI devices with 28-pin programmers. These adapters route the necessary programming signals from the programmer to the appropriate pins of the device using a 28-pin, .600 mil socket.

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Table 3. Third-Party Adapters

Device	Package Type	Emulation Part Number	EDI Part Number	PROCON Part Number
ispLSI or pLSI 1016/E, 2032/LV	44-PLCC	AS-44-28-03P-6YAM (Hinged lid)	44PL/28D6-ZL-L1016 (Hinged lid) 44PL/28D6-ZAL-L1016 (Auto eject)	325-044-1221-028L (Auto eject)
	44-TQFP	AS-44-28-01Q-600	Contact Vendor	Contact Vendor
ispLSI or pLSI 1024	68-PLCC	AS-68-28-03P-6YAM (Hinged lid)	68PL/28D6-ZL-L1024 (Hinged lid) 68PL/28D6-ZAL-L1024 (Auto eject)	325-068-1221-028L (Auto eject)
ispLSI or pLSI 1032/E, 2064	84-PLCC	AS-84-28-02P-6YAM (Hinged lid)	84PL/28D6-ZL-L1032 (Hinged lid) 84PL/28D6-ZAL-L1032 (Auto eject)	325-084-1221-028L (Auto eject)
	84-PGA 100-TQFP	AS-84-28-01PG-6 AS-100-28-01Q-3 (300 MIL) AS-100-28-01Q-6 (600 MIL)	Contact Vendor Contact Vendor Contact Vendor	Contact Vendor Contact Vendor Contact Vendor
ispLSI or pLSI 1048	120-PQFP	AS-120-28-01Q-6YAM (Hinged lid)	120QF/28D6-ZL-L1048 (Hinged lid)	325-120-1221-028L (Hinged lid)
ispLSI or pLSI 1048C, 1048E, 2096	128-PQFP 133-PGA	AS-128-28-02Q-6YAM (Hinged lid) AS-133-28-01PG-6	Contact Vendor Contact Vendor	Contact Vendor Contact Vendor
ispLSI or pLSI 3256, 2128	160-MQUAD 176-TQFP	AS-160-28-01Q-6YAM (Hinged lid) AS-176-28-01Q-6YAM (Hinged lid)	Contact Vendor Contact Vendor	Contact Vendor Contact Vendor
ispLSI or pLSI 6192	208-MQUAD	AS-208-28-02MQ-6YAM (Hinged lid)	Contact Vendor	Contact Vendor
ispLSI 3192	240-PQFP	AS-240-28-01Q-6YAM (Hinged lid)	Contact Vendor	Contact Vendor

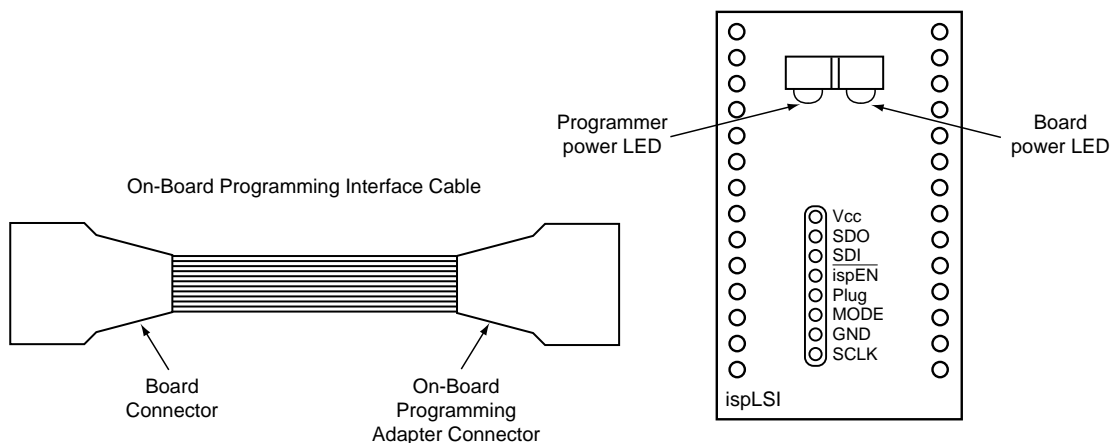
On-board Programming Adapters

An alternative to programmer-based programming is "on-board programming," which is performed with an on-board programming adapter. Using an interface board and ribbon cable, the on-board programming adapter routes the programming signals from a programmer to the PC board (Figure 1). An interface header must be

included on the board to route the programming signals to the device. The following adapters are currently available from PROCON Technology:

- ispLSI (Supports: ispLSI 1048C/1048/1032/1024/1016)
- ispGDS (Supports: ispGDS14/18/22)
- ispGAL22V10

Figure 1. The PROCON ispLSI On-board Programming Adapter Routes the Programming Signals From a 28-Pin Programmer to a Header on the PC board.



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Design Requirements

In order to program a device on-board, the board must be designed with the following considerations:

- An eight-pin header must be included on the board to connect the eight-pin ribbon cable.
- The normal programming signals, along with VCC and GND, must be routed to an eight-pin header interface. The signal definitions are provided below:

VCC (VCC Supply)
SDO (Serial Data Out)
SDI (Serial Data In)
 $\overline{\text{ispEN}}$ (ISP pin for ispLSI devices)
Plug (Plug-Alignment)
Mode (Mode control pin)
GND (GROUND Supply)
SCLK (Clock Driver)

Programming

To program a device on-board, insert the interface board into the programmer and select the device. Connect the ribbon cable from the programmer to the interface board. The LED labeled “Board Power” will illuminate to show that power is applied to the board and the cable is properly connected. Download the JEDEC file to the

programmer and program the device. The LED labeled “Programmer Power” will illuminate when the programmer applies power to the socket. A design example is shown in Figure 2.

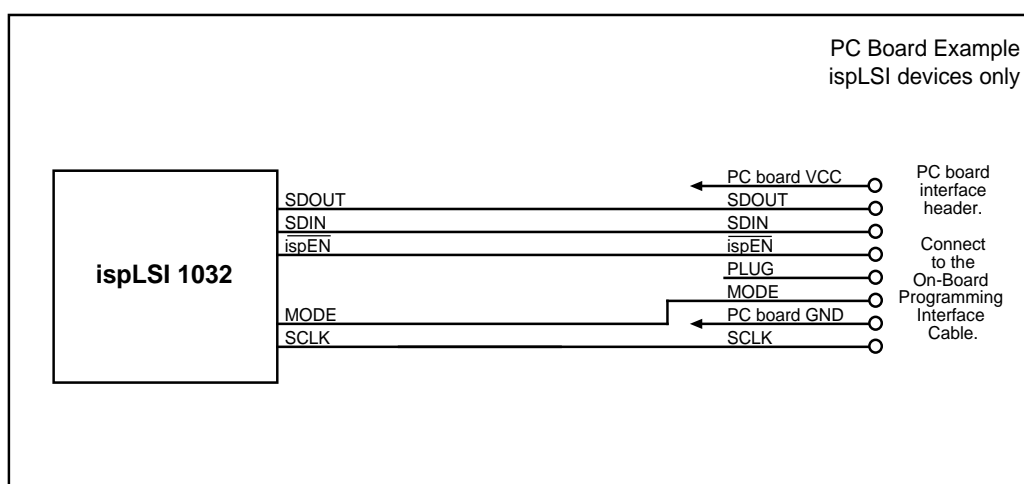
Device	PROCON Part Numbers
ispLSI	325-isp-1221-028L
ispGDS	325-GDS-1221-028L
ispGAL22V10	325-GAL-1221-028L

Programming Multiple ISP Devices

To program multiple devices on-board using the On-board Programming scheme, two design approaches may be used:

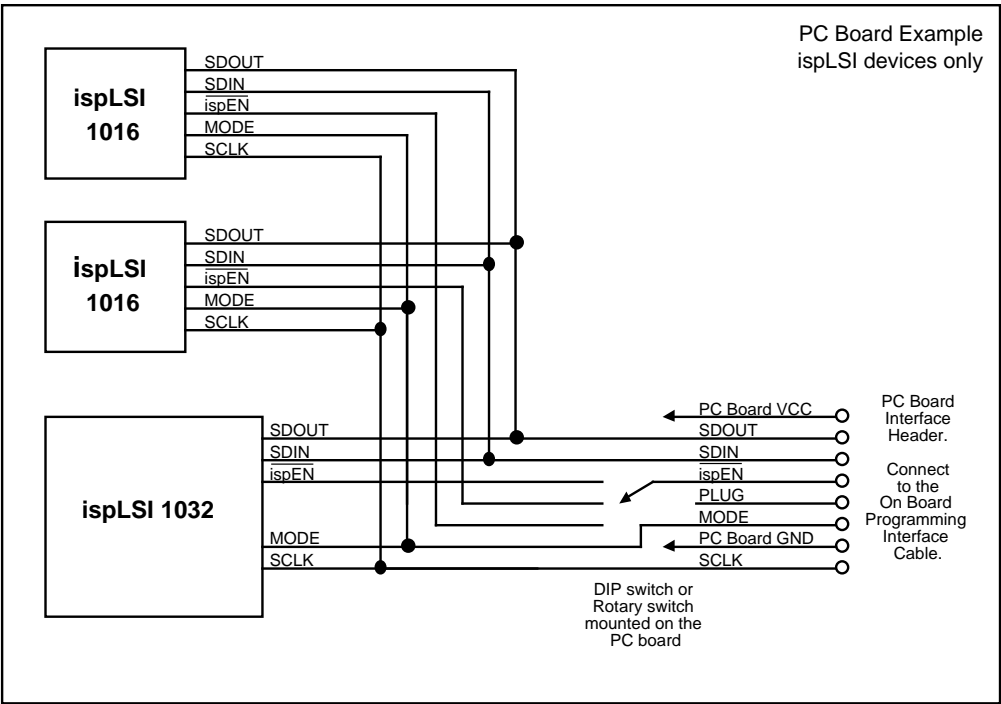
1. Include Multiple interface headers to program each individual device.
2. Include a rotary switch or DIP switch on the board to select the device to program. If all of the devices are ispLSI devices, then the $\overline{\text{ispEN}}$ control signal will serve to select which device is programmed. The number of devices that are programmed determines the number of rotary/DIP switches required. A design example is shown in Figure 3.

Figure 2. Programming a Single ispLSI Device On-Board Using a PROCON Adapter. The Programming Signals are Routed to a Header Connector on the PC Board Which is Then Connected to the Interface Cable of the Adapter.



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Figure 3. Programming ispLSI Devices On-Board Using a PROCON Adapter. The PROCON Adapter Routes the Programming Signals From a Universal Programmer to the PC Board.



Programming Mixed ISP Devices

When programming multiple devices on-board using the on-board programming adapter, two switches are required to select the device to program. In Figure 4, all of the SDOUT pins are connected together, which stipulates that only one device may be enabled at a time. If ispLSI devices are mixed with either the ispGAL22V10 or ispGDS devices then both $\overline{\text{ispEN}}$ and MODE must be

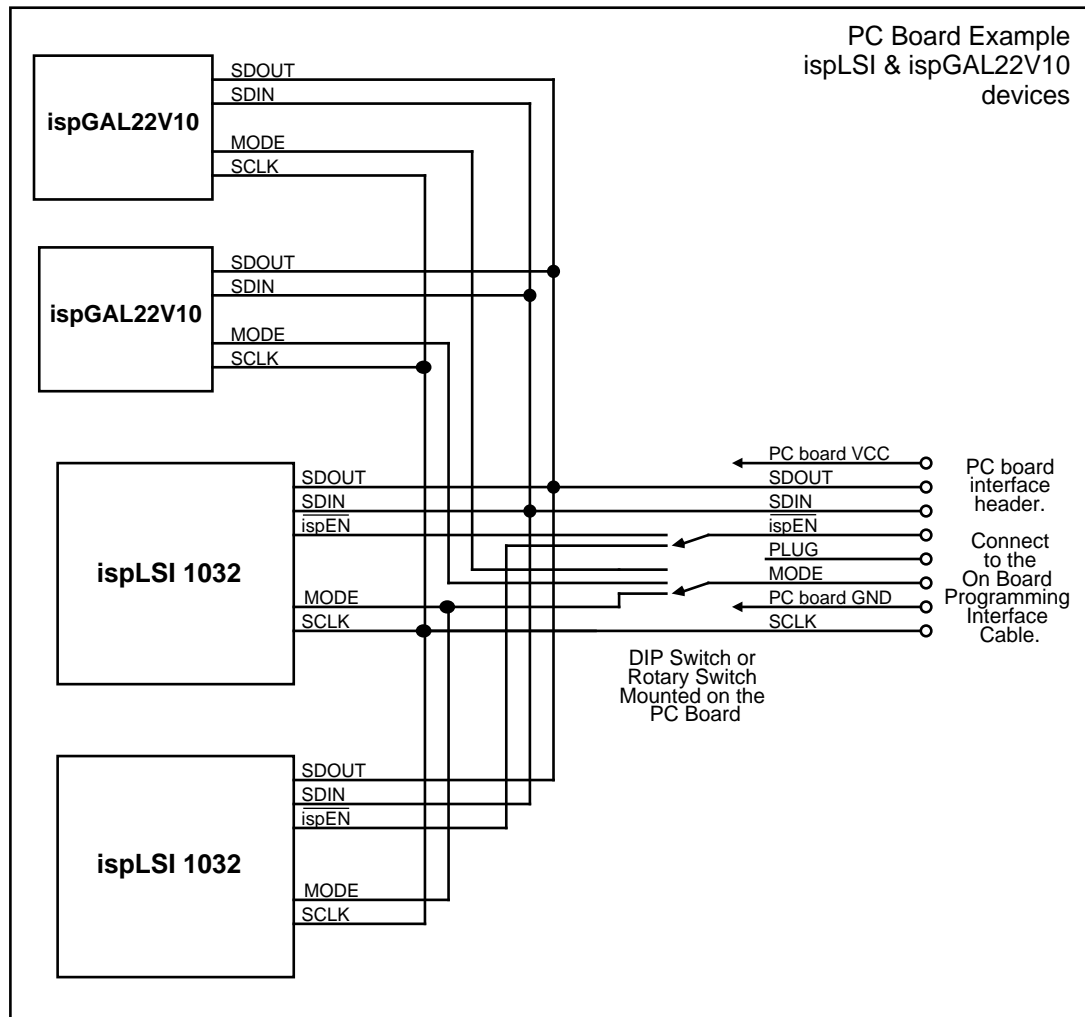
used as control signals to select each device to program. $\overline{\text{ispEN}}$ will enable and select the appropriate ispLSI device, and MODE will enable and select the desired ispGAL22V10 or ispGDS device. Table 4 reviews the switches required for common on-board programming.

Table 4. Switches Required for Common On-Board Programming

Configuration	Switches
ispLSI 1016 & ispGDS14	<ol style="list-style-type: none"> 1. Switch $\overline{\text{ispEN}}$ to enable the ispLSI devices. 2. Switch MODE to enable or disable the ispGDS14.
ispLSI 1016, ispLSI 1032, & ispGAL22V10	<ol style="list-style-type: none"> 1. Switch $\overline{\text{ispEN}}$ to select one of the ispLSI devices or to open the ispGAL22V10. 2. Switch MODE to enable or disable the ispGAL22V10.
ispLSI 1016, ispLSI 1032, ispGDS22, & ispGAL22V10	<ol style="list-style-type: none"> 1. Switch $\overline{\text{ispEN}}$ to select one of the ispGAL22V10 and the ispLSI devices. 2. Switch MODE to enable and select either the ispGAL22V10 or the ispGDS22.

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Figure 4. In-System Programming with Either an ispGAL22V10 or ispGDS Device On-Board Using a PROCON Adapter to Route the Programming Signals From a Universal Programmer to the PC Board.



Third-Party Programmers

Programming and Adapter Vendors

Advin Systems

1050-L East Duane Ave
Sunnyvale, CA 94086
Tel: (408) 243-7000
FAX: (408) 736-2503

BP Microsystems

1000 N Post Oak Road
Houston, TX 77055-7237
Tel: (713) 688-4600
1-800-225-2102
FAX: (713) 688-0902
BBS: (713) 688-9283

Data I/O Corp.

10525 Willows Road
P.O. Box 97046
Redmond, WA 98073-9746
Tel: 1-800-426-1045
1-800-247-5700
FAX: (206) 882-1043
Data I/O Corp.
Tel: 31 (0) 20-6622866
In Japan contact:
Data I/O Corp.
Tel: (03) 432-6991

EDI Corporation

P.O. Box 366
Patterson, CA 95363
Tel: (209) 892-3270
Fax: (209) 892-3610

Emulation Technology

2344 Walsh Ave, Bldg F
Santa Clara, CA 95051
Tel: (408) 982-0660
Fax: (408) 982-0664

PROCON Technology, Inc

1333 Lawrence Expwy, Suite 207
Santa Clara, CA 95051
Tel: (408) 246-4456
Fax: (408) 246-4435

Logical Devices, Inc.

692 South Military Trail
Deerfield Beach, FL 33442
Tel: (305) 428-6868
FAX: (305) 428-1811

SMS Microcomputer

Im Grund 15
D-88239 Wangen
Germany
Tel: (49) 7522-9728-21
FAX: (49) 7522-9728-50
In the U.S. contact:
SMS North America, Inc.
17411 NE Union Hill Road, Suite 100
N.E. Redmond, WA 98052
Tel: (206) 883-8447
FAX: (206) 883-8601

Stag Programmers, Ltd.

In Europe contact:
Silver Court, Watchmead
Welwyn Garden City
Herts, England AL7 1LT
United Kingdom
Tel: 011-44-707-332148
FAX: 011-44-707-371503
In the U.S. contact:
Stag Microsystems
1600 Wyatt Dr., Suite 3
Santa Clara, CA 95054
Tel: 1-800-227-8836
Tel: (408) 988-1118
FAX: (408) 988-1232

System General Corp.

3F, No. 1, Alley 8, Lane 45
Bao Shing Road
Shin Dian
Taipei, Taiwan R.O.C.
Tel: 886-2- 9173005
FAX: 886-2- 9111283
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1603A South Main Street
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FAX: (408) 262-9220



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