User's Guide

TPLD-PROGRAM User's Guide

ABSTRACT

This user's guide contains support documentation for the TPLD-PROGRAM programming unit. Included is a description of how to set up and configure the board, instructions on installing InterConnect Studio, and instructions on using the TPLD-PROGRAM to configure TPLD devices.

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1 Introduction

The TPLD-PROGRAM is an EVM developed to support programming TI Programmable Logic Devices (TPLD). The board is designed to be compatible with all TPLD EVMs and can program all TPLD devices. The board communicates with a computer running TI's InterConnect Studio using a USB to Micro-USB cable, and connects to all of TI's TPLD EVMs using a 14-pin female to female connector. Note that this tool is meant to interface with TPLD EVMs and does not come with TPLD samples.

1.1 Kit Contents

Table 1-1. TPLD-PROGRAM Kit Contents

Item	Description	Quantity	DigiKey Part Number
TPLD-PROGRAM	PCB	1	
USB to Micro USB Cable	USB 2.0 Cable A Male to Micro B Male 3.00' (914.4mm) Shielded	1	3025010-03
14-Position Programmer to EVM Cable	14 Position Cable Assembly Rectangular Socket to Socket 0.500' (152.40mm, 6.00")	1	H3CCS-1406G
TPLD-PROGRAM Enclosure	Plastic enclosure for the programming board, 3 Pieces	1	

TI does not recommend using any cables other than the ones provided in the kit.

1.2 Features

The TPLD-PROGRAM has the following features:

- Interfaces with a computer running InterConnect Studio using a USB-to-Micro-USB Cable
- Interfaces with TPLD EVMs using a 14-position cable
- Compatible with all TPLD EVMs
- Easy-to-use for programming and evaluation
- Kit includes: Programmer board, USB cable, ribbon cable, board case, and a quick start guide

Quick Troubleshooting

The following table shows some common issues while configuring TPLD with the TPLD-PROGRAM, as well as how to diagnose and fix these issues. If you are having an issue using the TPLD-PROGRAM to configure a TPLD and are not able to fix the issue using this list, TI recommends posting on E2E.TI.com for help from our engineering team.

Indication	Issue	Solution
No blue LEDs light up when TPLD-PROGRAM is plugged into a computer	Poor connection between the TPLD-PROGRAM and the computer	Unplug USB connection between the TPLD and the computer. Check both plugs for obstructions before plugging in the cable again.
InterConnect Studio does not recognize the TPLD-PROGRAM attached to the computer	Poor connection between the TPLD-PROGRAM and the computer	Unplug the 14-position ribbon cable between the TPLD and the computer. Check both headers for obstructions before plugging in the cable again.
InterConnect Studio does not recognize the TPLD connected to the output of the TPLD-PROGRAM	Poor connection between the TPLD-PROGRAM and the TPLD EVM	Unplug the 14-position ribbon cable between the TPLD and the computer. Check both headers for obstructions before plugging in the cable again.

2 Hardware

2.1 PCB Overview

Installing Software

The TPLD development software InterConnect Studio is available free of charge at interconnect_studio.itg.ti.com.

Using InterConnect Studio Software

For more information on using the InterConnect Studio software, see the *InterConnect Studio User's Guide*.

Uninstalling Software

The software can be uninstalled in the way that is typical for your operating system.

Using the TPLD-PROGRAM

This section describes the steps to take when using the TPLD-PROGRAM to program a TPLD device on a TPLD EVM.

1. Download and install InterConnect Studio using the steps described in Installing Software.
2. Using InterConnect Studio, choose a preset configuration or design your own circuit.
3. Using the 14-position cable, connect a TPLD EVM with an unprogrammed TPLD device on the board to the TPLD-PROGRAM. Connect the TPLD-PROGRAM to your computer using the USB-to-micro-USB cable. When connecting cables to the Programmer, ensure that the cables are facing the correct direction. Turn the key on the 14-pin cable up for both boards. All cables should slide in without difficulty or needing excessive force.
4. Temporarily load settings to TPLD by clicking the Configure TPLD button.
5. To permanently write to the TPLD, open the Configure TPLD Settings menu by selecting the three dots next to the Configure TPLD button in the top left, then check Permanently program this device and click OK.

For more details, see the user's guides for the chosen TPLD EVM and for InterConnect Studio.

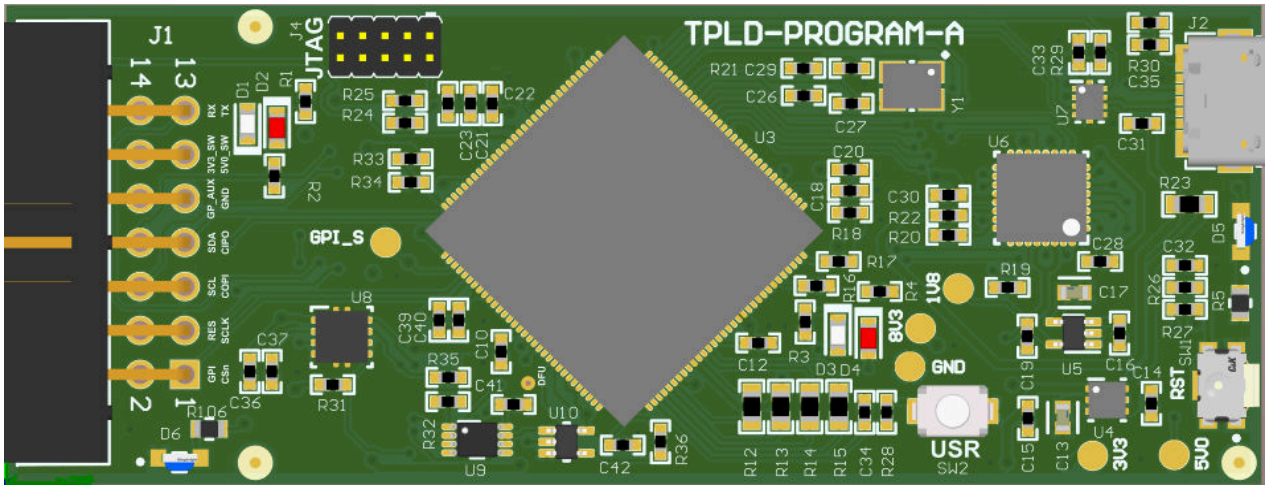

Figure 2-1. TPLD-PROGRAM PCB Front

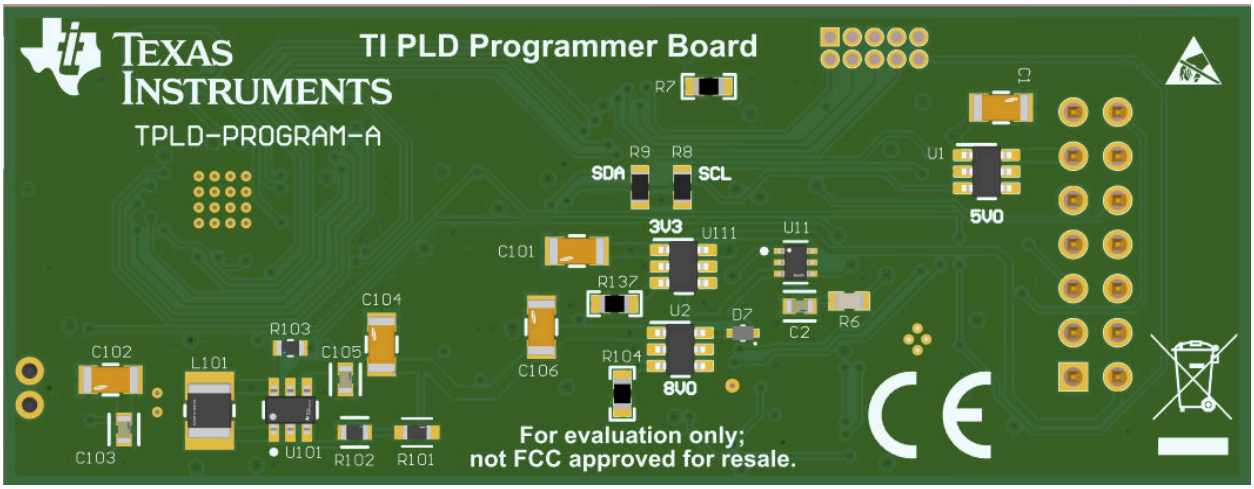

Figure 2-2. TPLD-PROGRAM PCB Back

The TPLD-PROGRAM PCB is designed to be easy to use and to be compatible with all TPLD EVMs. LEDs on the board allow for users to diagnose the boards functionality. The LEDs activate based on the conditions described below.

LED	Color	Indication
D5	Blue	Good USB connection and functional 3V3 supply
D6	Blue	Functional 8V0 supply

If a firmware update is required by the programmer, the user is prompted by InterConnect Studio when attempting to program a device through the programmer. The update uses the USB connection between the user's computer and the TPLD-PROGRAM.

2.2 Hardware Setup

Programmer Hardware Connections

The TPLD-PROGRAM was designed to interface with a computer using a USB-to-Micro USB cable and to a TPLD EVM using a 14-position cable. Both cables are included in the kit for the TPLD-PROGRAM. If either of the cables is lost or damaged, TI recommends ordering new cables using the Digi-Key part number included on the kit list provided. Using other connectors could damage the boards or other connected equipment.

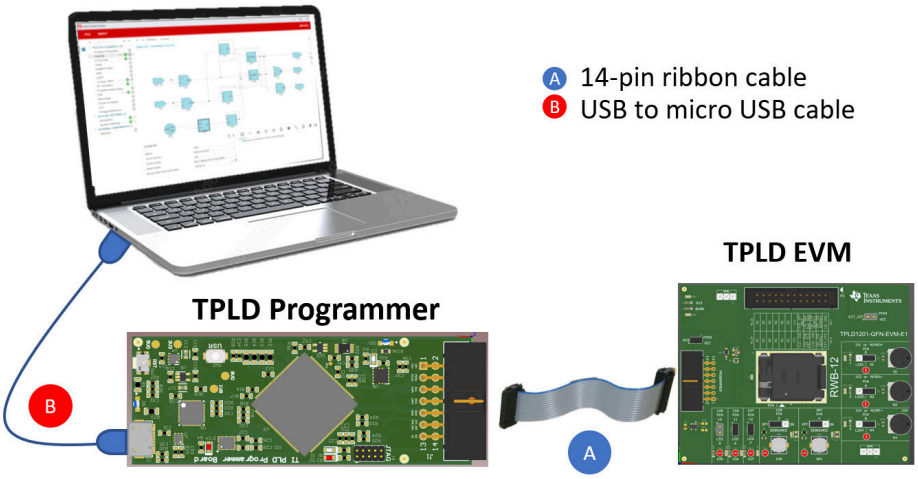

Figure 2-3. TPLD-PROGRAM Hardware Connections

Programmer Case Construction

The cases for the TPLD-PROGRAM are designed to easily snap together. To reconstruct a programmer case that has been disassembled, follow these steps.

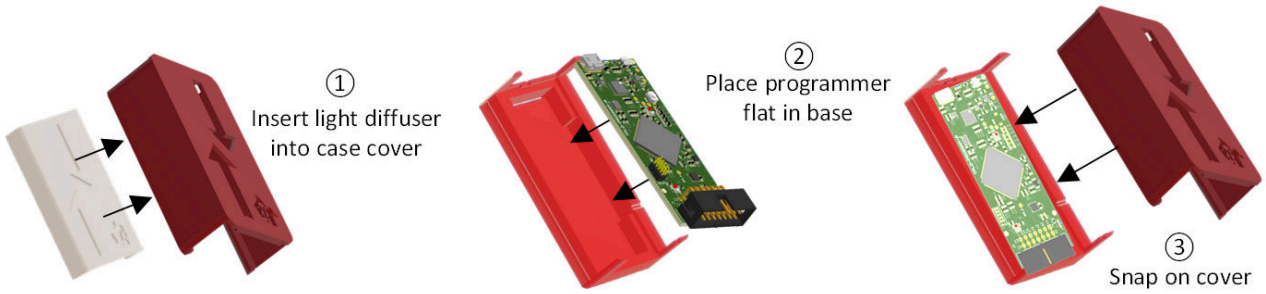

Figure 2-4. TPLD-PROGRAM Case Assembly

1. Insert the light diffuser into the case cover, lining up arrow and LED cutouts.
2. Place the programmer flat in the base, using LED cutouts to align the TPLD-PROGRAM and the case.
3. Snap the cover onto the base, aligning 14-Pin header with the cutout in the case.

3 Bill of Materials

This section provides information on the components that can be used with the TPLD-PROGRAM.

Table 3-1. Bill of Materials

Designator	Item	Value	Part Number	Manufacturer
C1, C101, C102, C104, C106	Capacitor	10 µF	CL31B106MOHNNNE	Samsung
C2, C13, C17, C103, C105	Capacitor	1000 pF	C0603C102J5GACAUTO	KEMET
C10, C12, C18, C20, C22, C26, C28, C31, C32, C33, C34, C36, C37, C40, C41, C42	Capacitor	0.1 µF	GRM155R71H104ME14D	Murata
C14, C15, C16, C19, C21, C39	Capacitor	1 µF	GRM155R6YA105KE11D	Murata
C23, C30	Capacitor	2.2 µF	C1005X5R1V225K050BC	TDK
C27, C29	Capacitor	12 pF	CL05C120JB5NNNC	Samsung Electro-Mechanics
C35	Capacitor	3300 pF	GCM155R71H332KA37D	Murata
D1, D3	LED	Green	LTST-C190GKT	Lite-On
D2, D4	LED	RED	QTLP600C7TR	Everlight Electronics Co Ltd
D5, D6	LED	Blue	APA2107LVBC/D	Kingbright
D7	Diode		BAT54XV2T1G	ON Semiconductor
J1	Header	14-Pin	61201421721	Wurth Electronics
J4	Header	JTAG	20021111-00010T4LF	Amphenol ICC / FCI
L101	Inductor	15 µH	LBC3225T150KR	Taiyo Yuden
R1, R2, R3, R4	Resistor	390 Ω	CRCW0402390RJNED	Vishay / Dale
R5, R106	Resistor	10.0 kΩ	TNPW060310K0BEEA	Vishay / Dale
R6	Resistor	470 kΩ	RC0603FR-07470KL	Yageo
R7, R104, R137	Resistor	10 kΩ	CRCW060310K0JNEA	Vishay / Dale
R8, R9	Resistor	4.7 kΩ	ERJ-3EKF4701V	Yageo
R12, R13, R14, R15	Resistor	47 Ω	CRCW060347R0JNEA	Vishay / Dale
R16	Resistor	4.87 kΩ	CRCW04024K87FKED	Vishay / Dale
R17	Resistor	1.0 MΩ	CRCW04021M00JNED	Vishay / Dale
R18	Resistor	51 Ω	RC0402JR-0751RL	Yageo America
R19, R29	Resistor	10 kΩ	ERJ-2RKF1002X	Panasonic Electronic Components
R20	Resistor	8.06 kΩ	CRCW04028K06FKED	Vishay / Dale
R21	Resistor	2 kΩ	CRCW04022K00JNED	Vishay / Dale
R22	Resistor	1 kΩ	ERJ-2RKF1001X	Panasonic Electronic Components
R23	Resistor	0.1 Ω	ERJ-L03KF10CV	Panasonic
R24, R25, R27, R31, R32, R33, R34, R35, R36	Resistor	10 kΩ	CRCW040210K0JNED	Vishay / Dale
R26, R28	Resistor	100 Ω	CRCW0402100RJNED	Yageo
R30	Resistor	1 MΩ	ERJ-2RKF1004X	Panasonic Electronic Components
R101	Resistor	673 kΩ	RT0603BRE07673KL	Yageo
R102	Resistor	71.5 kΩ	CRCW060371K5FKEA	Vishay
R103	Resistor	1 kΩ	CRCW06031K00FKEAC	Vishay
SW1	Switch	Tactile	KMS231GPLFS	C&K

Table 3-1. Bill of Materials (continued)

Designator	Item	Value	Part Number	Manufacturer
SW2	Switch	Tactile	TL1015AF160QG	E-Switch
U1, U2, U111	Load Switch		TPS22810DBVR	Texas Instruments
U3	Micro Controller		TM4C129ENCPDTI3R	Texas Instruments
U4	LDO	3V3	TPS73733DRVR	Texas Instruments
U5	LDO	1V8	TPS71718DCKR	Texas Instruments
U6	USB Transceiver		USB3320C-EZK	Microchip
U7	Multiplexer	1:2	TS3USB221ERSER	Texas Instruments
U8	Voltage Supervisor		TPS3851G18EDRBR	Texas Instruments
U9	NAND Gate		SN74LVC2G132DCUR	Texas Instruments
U10	NAND Gate		SN74LVC1G38DCKT	Texas Instruments
U11	Transistor		UM6K33NTN	Rohm
U101	Boost Converter	8V0	TLV61046ADBVR	Texas Instruments
Y1	Crystal	25 MHz	NX3225GA-25.000M-STD-CRG-2	NDK
J2	Connector	Micro-USB	0473460001	Molex

4 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

DATE	REVISION	NOTES
November 2023	*	Initial Release

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