

SPI110LV Optically Isolated Adapter for JTAG Emulators

***Technical
Reference***

***SPI110LV Optically
Isolated Adapter
For JTAG Emulators
Technical Reference***

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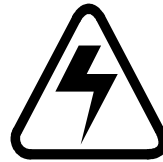
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Chapter 1

Installing the SPI110LV Optically Isolated Adapter

This chapter helps you install the SPI110LV Optically Isolated Adapter with your JTAG emulator, target board, and Code Composer.

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WARNING!

Before touching the JTAG connector make sure the target high voltage is off. Verify with a meter.

1.1 What You'll Need

The following checklists detail items that are shipped with the SPI110LV and additional items you'll need to use these tools.

Hardware checklist

- ___ **host** An IBM PC/AT or 100% compatible PC or laptop with a hard-disk system and a CD-ROM drive
- ___ **memory** Minimum of 64MB
- ___ **display** Color VGA or LCD
- ___ **parallel port** One centronics printer port, with EPP, ECP, or bidirectional mode
- ___ **emulator module** XDS510PP PLUS JTAG Emulator or compatible
- ___ **target system** A board with a TI DSP (e.g. Spectrum Digital EVM320F240, EVM320F243, EVM320LF2407)
- ___ **connector to target system** 14-pin connector (two rows of seven pins) --- see Chapter 2 for more information about this connector
- ___ **isolation pod** SPI110LV Optically Isolated Adapter with JTAG Interface and power supply

Software checklist

- ___ **operating system** Win 98ME, Win NT 4.0, Win 2000, Win XP
- ___ **software tools** Code Composer/Studio for TI DSPs and Microcontrollers
- ___ **required file** ^t *SDConfig.exe* on CD-ROM for configuring the parallel port
- ___ **drivers** ^t Spectrum Digital emulator drivers Code Composer/Studio.

^t Included as part of the debugger package

1.2 Installing the SPI110LV Optically Isolated Adapter

This section contains the hardware installation information for the SPI110LV Optically Isolated Adapter.

The SPI110LV requires two (2) power sources, one for the **HOT** side (target), and one for the emulator interface. The power supply included will power the emulator interface section. The **HOT** side is powered via the PD pin (#5) on the JTAG connector. The PD pin must be able to supply 200 Ma. at +3.3 to +5 volts.

The SPI110LV has a switching regulator internally which converts the PD input voltage to the necessary internal operating voltage.

WARNING

Be very careful with the target cable connectors. connect them gently; don't force them into position, or you may damage the connectors.

Do **not** connect or disconnect the 25-pin D connector while the PC is powered up.

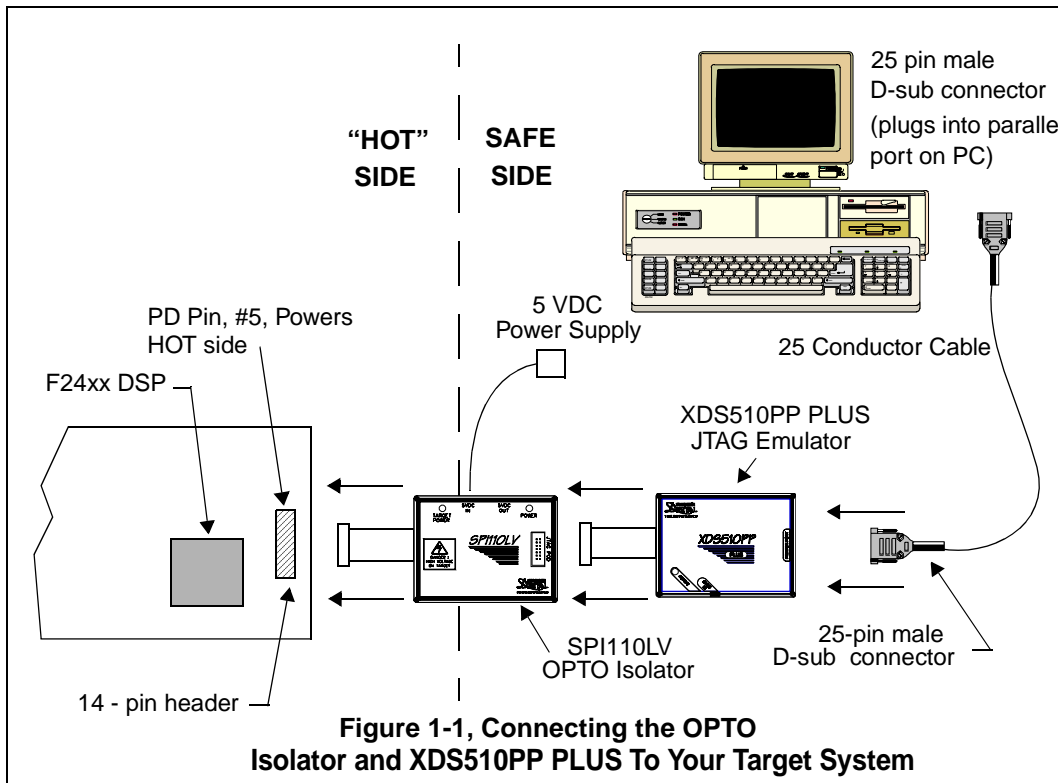
Do **not** connect or disconnect the 14-pin cable while the target system is powered up.

IMPORTANT NOTICE

1. The SPI110LV **must** be powered by the included power supply.
2. The PD pin **must** be tied directly to the target system's +3.3 to +5 volts. The SPI110LV requires 200ma from the target system to operate the "HOT" side circuitry within the SPI110LV.

1.3 Step 1: Connecting the SPI110LV to Your Target System

Figure 1-1 shows how you connect the SPI110LV when used with the XDS510PP PLUS JTAG Emulator and 25 conductor cable to your target system. In most cases, the target system will be a 'F24x or 'LF24x target board.



When the target power is present the red "Target Power" LED will be illuminated. When the power is present on the Optically Isolated Adapter the green "Power" led will be illuminated.

1.4 Step 2: Installing the Spectrum Digital Code Composer Drivers

This section explains the process of installing the driver software on a hard-disk system.

The Optically Isolated Adapter requires Spectrum Digital's Code Composer/Studio drivers which are shipped with its emulators. The drivers are installed with an install utility. Use the following guidelines to set up the required drivers with Code Composer.

1. Install the required drivers from the CD-ROM which came with the emulator. The installation program will install the drivers and "SDConfig" utility in the appropriate directories.

Note: For "OPTO_POD" scan checking version 1.30 of the "SDConfig" utility must be used. To find the current version go to Help -> About SDConfig.

2. Use the "SDConfig" utility to select the correct parallel port address, emulator type, PC/laptop BIOS port mode, and mark the "Opto-Isolator" box.
3. This information defines the parameters used for the hardware portion of the emulation tool chain. These are reflected in the "sdopts.cfg" file. The "SDConfig" utility is shown in the figure below.

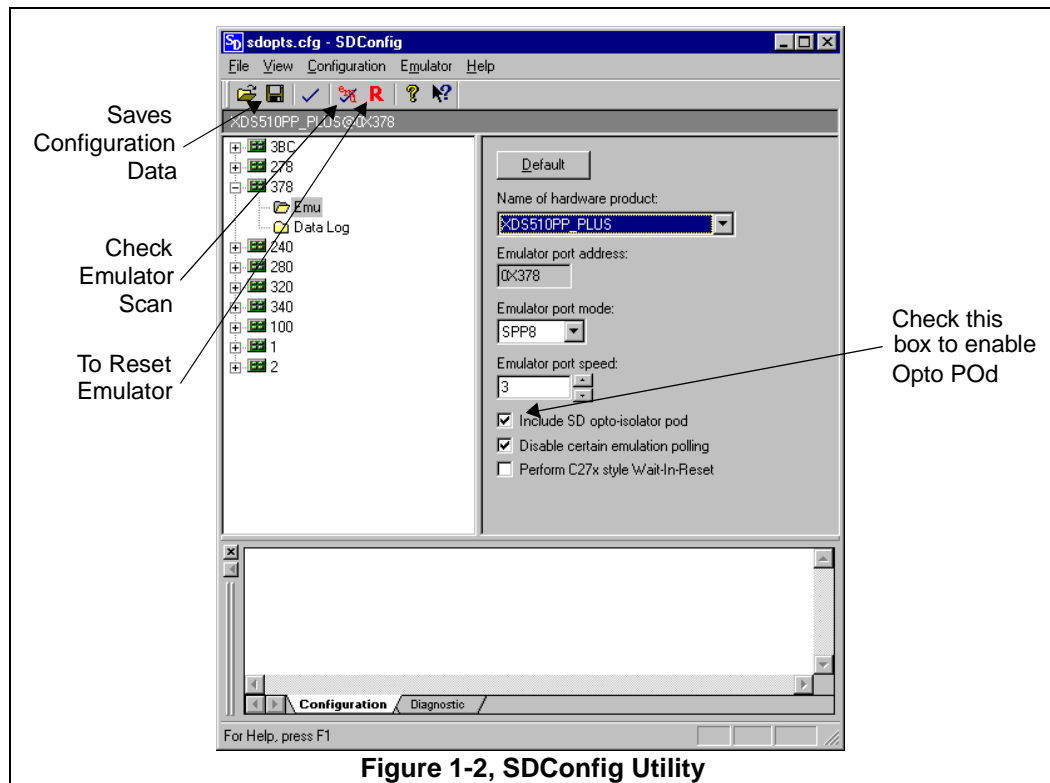


Figure 1-2, SDConfig Utility

1.5 Step 3: Verifying the SPI110LV and XDS510PP PLUS Installation

The “SDConfig” utility can be used to verify the operation of the XDS510PP PLUS emulator and the SPI110LV Optically Isolated Adapter with a target DSP.

To verify the operation of the SPI110LV, XDS510PP PLUS JTAG emulator, and a DSP target use the following steps:

1. Make sure the system is hooked up as shown in Figure 1-1. Insure that power is applied to the target board to power the SPI110LV, and that power is applied to the emulator.
2. Insure the Spectrum Digital emulator drivers have been installed.
3. Launch the “SDConfig” utility. There should be a blue “SD” icon on your desktop.
4. Double click on the port address.
5. Double click on the “emu” box right below the port address.
6. When the right hand window opens up:
 - a. select the type of emulator you are using in the top window,
 - b. select the port mode,
 - c. click the box next to “Include SD opto-isolator pod”,
 - d. click small diskette under “view” to save the configuration
7. To reset the emulator click on the big red “R” on the tool bar. If the emulator resets correctly the message box at the bottom of the window should provide the results of the reset.

If the reset did not work recheck the setup against Figure 1-1.

8. If the reset worked correctly then click on the emu-check. This icon is just to the left of the big red “R”. This test will attempt to communicate with the target DSP through the emulator and SPI110LV. The results of this test will be shown in the message box at the bottom of the window. If the test was successful then Code Composer/Studio can be configured and used.

If the emulator test was unsuccessful verify the following:

- that the target DSP has a clock in
- the DSP is not being help in reset

1.6 Step 4: Configuring Code Composer/Studio

If step 8 above was successful Code Composer/Studio can now be configured. The steps shown below should be followed:

1. Close the "SDConfig" utility
2. Launch the Code Composer Setup by double clicking on the icon.
3. Select the "sdgoxxx" driver which corresponds to your processor type. Typically the "sdgo2xx.dvr" will be selected. This driver supports the TMS320F24x and TMS320LF240x DSPs
4. Change the port address to match the one used successfully in the "SDconfig" utility.
5. Select the number of devices
6. Be sure to do a File -> Save to save the new configuration

Chapter 2

Specifications for Your Target System's Connection to the SPI110LV OPTO Isolator

This chapter contains information about connecting your target system to the SPI110LV OPTO Isolator. Your target system must use a special 14-pin connector for proper communication with the emulator.

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2.1 Designing Your Target System’s Emulator Connector (14-pin Header)

The ‘C24xx devices support emulation through a dedicated emulation port. This port is a superset of the IEEE 1149.1 (JTAG) standard and is accessed by the emulator. To perform emulation with the emulator, your target system must have a 14-pin header (2 rows of 7 pins) with the connections that are shown in Figure 2-1. Table 1 describes the emulation signals.

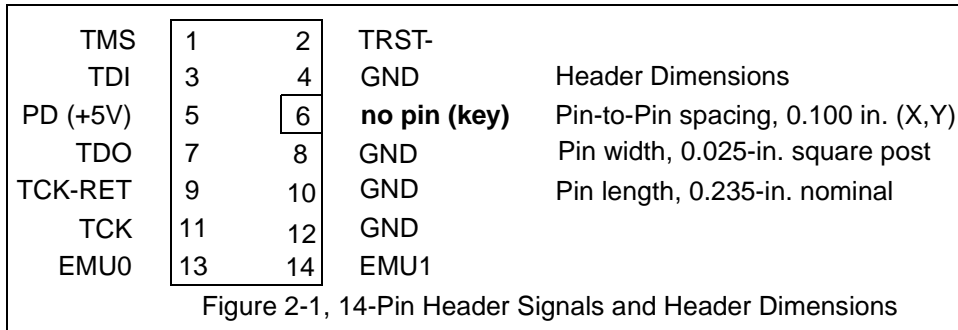


Table 1: 14-Pin Header Signal Description

Signal	Description	Emulator State	Target State
TMS	JTAG test mode select.	Output	Input
TDI	JTAG test data input.	Output	Input
TDO	JTAG test data output.	Input	Output
TCK	JTAG test clock. TCK is a 5-MHz clock source from the emulation pod. This signal can be used to drive the system test clock.	Output	Input
TRST-	JTAG test reset.	Output	Input
EMU0	Emulation pin 0.	Input	I/O
EMU1	Emulation pin 1.	Input	I/O
PD	Presence detect. Indicates that the emulation cable is connected and that the target is powered up. PD should be tied directly to +5 volts in the target system. The SPI110LV uses this pin to power the front end “HOT” circuitry.	Input	Output
TCK_RET	JTAG test clock return. Test clock input to the emulator. May be a buffered or unbuffered version of TCK.	Input	Output

Although you can use other headers, recommended parts include:

straight header, unshrouded	DuPont Connector Systems part # 67996-114
right-angle header, unshrouded	DuPont Connector Systems part # 68405-114

2.2 OPTO Isolation

The SPI110LV provides up to 2500 volts RMS isolation between the target side and the emulator side of the pod.

Two benefits of this are safer operation on “HOT” designs and the reduction of common mode noise problems which can cause scan errors on non-isolated emulators.

2.3 Mechanical Dimensions for the SPI110LV OPTO Isolator

The SPI110LV interfaces between the **XDS510PP PLUS** JTAG Emulator, and the target system. The overall length (pod and enclosure) is approximately 10 inches. Figure 2-2 and Figure 2-3 show the mechanical dimensions for the **SPI110LV** OPTO Isolator and short cable. Note that the pin-to-pin spacing on the connector is 0.100 inches in both the X and Y planes.

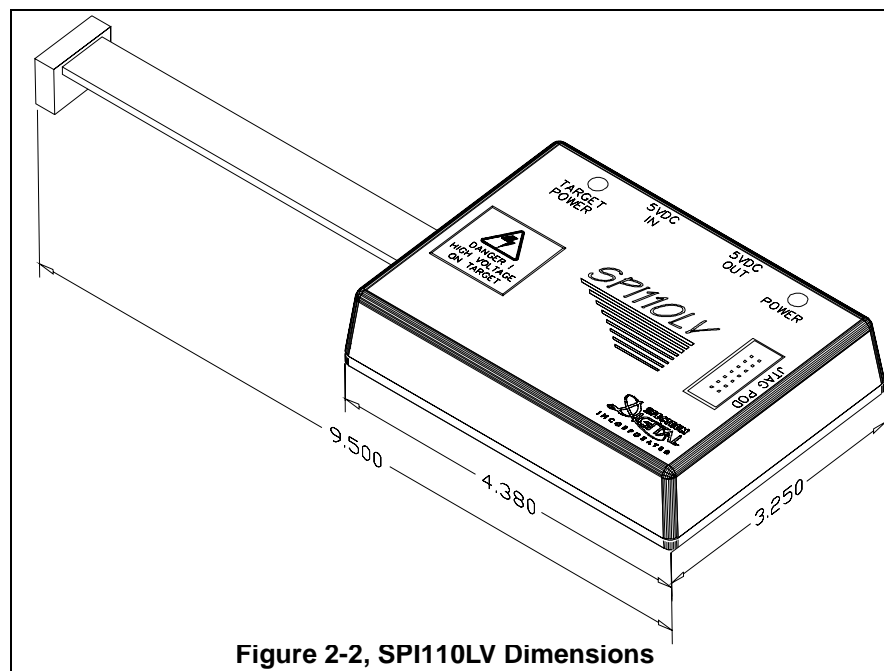
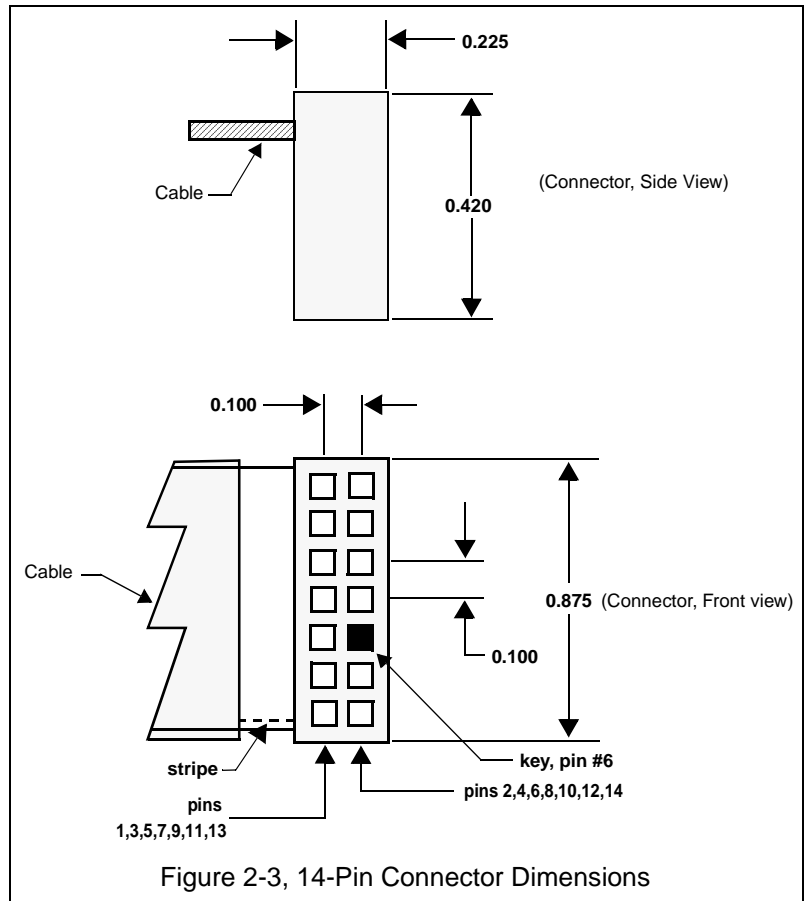


Figure 2-2, SPI110LV Dimensions

Note: All dimensions are in inches and are nominal dimensions, unless otherwise specified.

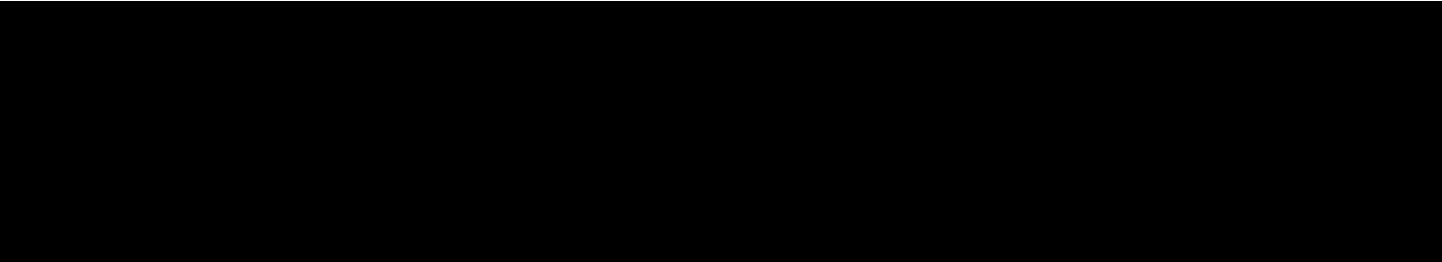


Note: All dimensions are in inches and are nominal dimensions, unless otherwise specified.

2.4 Power Connectors

The SPI110LV OPTO Isolator has 2 male power connectors. One connector is an input to power the OPTO Isolator. The other is an output which can be pig tailed to allow powering of another 5 volt device.

WARNING !
Never power the target system with the 5 volt output. This is for **safe** side operation only.



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