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PXI-100 HARDWARE KIT — A PXI/CompactPCI BOUNDARY-SCAN CONTROLLER

Product Overview

The PXI-100 Boundary-Scan Controller enables boundary-scan test and programming in conjunction with other PXI/CompactPCI instruments for functional testing during board debug and manufacturing. The PXI-100 conforms to the popular 3U PXI form factor, adding a powerful new test tool in a small package to the extensive selection of test instrumentation that's already available for PXI\CompactPCI test systems.

The PXI-100 IEEE 1149.1 boundary-scan controller provides a sustained data throughput at high-test clock (TCK) frequencies, allowing for the fast application of test and in-system programming operations. The PXI-100 supports one Test Access Port (TAP) interface to the board and two TAP control modes. By supporting two different TAP



control modes, the PXI-100 can support non-compliant, boundary-scan devices and special board test operations. It uses the industry-proven Texas Instruments SN74LVT8980 embedded Test Bus Controller (eTBC) for dependable scan operations. The PXI-100 supports a controller-to-board distance of four feet without the use of an optional interface pod. A pod extends that distance to nine feet. At lower TCK frequencies, custom-built cables can extend the maximum distance to over 20 feet. The optional pod also expands the supported voltages from 3.3V (5V tolerant) to a range of 1.8V to 5.0V. The PXI-100 supports 16 individually controllable discrete I/O signals for controlling and monitoring non-boundary-scan signals.

PXI-100 Controller

The base PXI-100 controller includes:

- One controller card
- One PCI card-to-board TAP cable (four feet)
- One PCI card-to-board TAP cable (eight inches)

An optional 10-ft. discrete I/O cable for connecting the PXI-100 card to the board being tested is available (no connector at board end). The optional interface pod adds:

- One pod
- One five-ft. PCI card-to-pod cable

The card-to-board cable provided with the controller card is compatible with the pod-to-board connector, eliminating the need for another cable.

ScanWorks® supports up to eight PXI-100 controller cards installed in one PC.

PXI-100 Programmable Clock

The TCK signal provided by the PXI-100 controller card is programmable in eight increments from 130 kHz to 16.6 MHz. This allows you to select the maximum TCK frequency your board will support, enabling the shortest possible test and programming times. The TCK frequency is controllable from the ScanWorks® hardware setup menu or from FREQUENCY statements in SVF and STAPL files.

PXI-100 Flexible TAP Support

The PXI-100 supports two modes of controlling the TAP signals:

- Gated TCK (default mode)
- Free running TCK

In the gated TCK mode, the TAP controller will not enter the PAUSE-IR or PAUSE-DR state during a data shift operation. If the data buffer needs to be reloaded, the TCK signal is inhibited until it is again ready for data transfers. This will support in-system configuration of FPGAs and some non-compliant devices, as well as multi-drop

backplanes configured with the Texas Instruments Addressable Scan Port (ASP). The PXI-100 is capable of shifting data at a continuous 16.6 Mbits per second without gating the TCK during scan operations.
The free running TCK mode applies a continuous TCK signal to the board, using the PAUSE-IR and PAUSE-DR states to reload shift buffers if necessary. This mode supports designs and devices that require a continuous TCK signal.

PXI-100 Discrete IO Signals

The PXI-100 controller card supports 16 non-boundary-scan signals that can control inputs to the board or observe outputs from the board. The state of these signals can be controlled and observed with the ScanWorks macro language or with one of ScanWorks' interactive applications such as the debugger. These signals are all bidirectional and controlled individually. These signals are open-collector outputs with LVTH level (3.3V, 5.0V tolerant) input monitoring. Eight signals are terminated for high drive and eight are terminated for low load characteristics. See the PXI-100 documentation for specifications.

PXI-100 Board Voltages

The PXI-100 controller card supports 3.3V (5.0V tolerant) input/output signals. With the provided cables and properly terminated and driven signals, the controller card supports a TCK frequency of 16.6 MHz at a distance of four feet to the board or system under test. Lower frequencies have been verified to operate up to eight feet from the controller card.
Support for board voltages from 1.8V to full 5.0V is provided with the optional pod. Support for 1.8V, 2.5V, 3.3V, and 5.0V is either automatically or manually selected. If a reference voltage from the board is provided, the pod automatically selects the proper interface. Alternatively, the interface can be selected with switches provided on the pod. LEDs on the pod indicate the selected voltage. See the PXI-100 documentation for specifications.

PXI-100 Differential TAP Signal Support

The PXI-100 controller card provides differential output signals at the maximum TCK frequency of 16.6 MHz.so the pod or a test fixture can be located more than 16 feet from the host PC. Differential signal specifications are provided so that the interface can be designed into a test fixture. This eliminates the need for the pod.

PXI-100 TAP Monitor Port

The optional pod provides external signals to monitor the current TAP state, the TCK and TMS signals, and the DR and IR shift signals. These signals are especially useful to monitor software control of the TMS signal when verifying a new TAP controller design in a custom device.

PXI-100 Physical Features

The PXI-100 and optional interface pod are built to commercial environmental standards for the U.S. and Europe. The pod is EMI shielded to eliminate electrical noise in a laboratory or manufacturing environment. See the PXI-100 documentation for complete specifications.

Full Life-Cycle Support

During the design/debug or the field service stage of your product's life cycle, the PXI-100 controller card provides you with a robust and flexible interface from your host test platform to your board. It is fast enough to provide maximum scan throughput to all but the most highly optimized scan paths, yet inexpensive enough for high volume production. By using the same controller in design/debug test development and manufacturing, you can eliminate any question of compatibility. Also, if you have an embedded application for field support that uses the TI SN74LVT8980, you can be sure of test compatibility.

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