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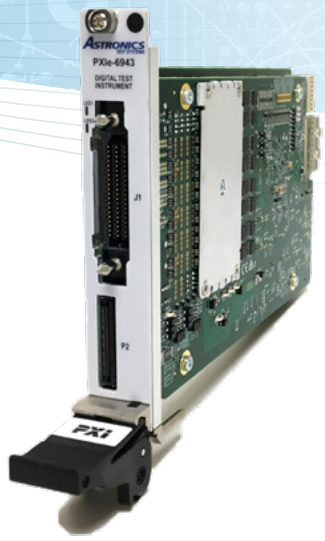
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Find the *Astronics / EADS / Racal PXIe-6943* at our website: ***Click HERE***

ASTRONICS TEST SYSTEMS

PXIe-6943

50 MHz Digital Test Instrument



The PXIe-6943 Digital Test Instrument (DTI) provides 32 high-performance digital I/O channels in a space-saving, single-wide PXI Express compatible module. The PXIe-6943 DTI operates at data rates up to 50 MHz with 1 ns edge placement, variable slew rates, and <3 ns channel-to-channel skew.

Product Information

The PXIe-6943 DTI for PXI Express provides the basis for a complete state-of-the-art digital solution at the subsystem level. The PXIe-6943 is the solution for both legacy digital replacement and new digital test stations for applications including aircraft/avionics, weapons systems, spacecraft, semiconductors and medical devices.

Applications for a Digital Subsystem

The PXIe-6943 DTI forms the backbone of a digital subsystem that may include switching, analog instrumentation, and even an RF subsystem.

The proven PXI instrumentation platform is a time-tested approach for facilitating the integration of these different technologies at the device level by allowing the free mixing of PXIe-6943 modules with other PXI modules for added functionality. In addition, the PXIe-6943 modules can be pre-integrated at the subsystem level suited to a specific application.

Astronics Test Systems offers custom design and integration services to create subsystems or fully integrated systems for functional testing on a variety of complex Devices Under Test (DUTs), including satellites, weapons systems, aircraft LRUs/SRUs, and certain classes of semi-conductor devices.

From devices to turnkey systems, Astronics Test Systems can deliver all hardware and software solutions, including the Test Program Set (TPS) itself.

Designed for High Reliability

The PXIe-6943 DTI employs comprehensive thermal design to ensure reliability with excellent cooling, monitoring, and protection.

The pin electronics devices on the PXIe-6943 employ a large heat sink, and there is also on-board temperature monitoring that protects the pin electronics from overheating and provides over-temperature shutdown.

KEY BENEFITS

- 50 MHz digital stimulus and response with 1 ns edge placement resolution
- Engineered for reliability with an advanced thermal design, temperature monitoring, and over-temperature shutdown
- Innovative software tools to speed test development
- Scalable design supports synchronized digital test systems from 32 to 224 channels
- High-speed data sequencer provides control of stimulus/response patterns
- Optional software tools simplify legacy replacement and preserve TPS investment

Product Information (continued)

Advanced Features for Modern Digital Test Development

The PXIe-6943 DTI's innovative design is suitable for today's challenging digital test system applications. The flexible FPGA design enables the PXIe-6943 to meet special user and legacy requirements.

The high-speed data sequencer provides control over test patterns, timing, and format.

Robust Protection Circuitry

All channels can source and sink current as well as dissipate heat providing loading and high slew rates. To ensure that all channels are operating in a safe area, protection circuitry is provided for automatic fault condition detection. Figure 1 below summarizes the built-in protection features including overcurrent, overvoltage, and over-temperature monitoring (system cooling features are diagrammed). The digital bias power supply is also monitored for voltage faults.

Scalable Design

Built-in scalability and modular design enable configurations from 32 to 416 single-ended channels in 32 channel increments. Multiple PXIe-6943 DTIs can operate both as independent, 32-bit digital instruments or as a digital subsystem with up to 416 channels.

Triggering and Synchronization

The PXIe-6943 DTI features extensive control over digital testing to synchronize it with other test instruments and to control digital test sequencing.

The PXIe-6943 accepts triggers from the PXI TTL Trigger Buses, Front Panel Auxiliary Inputs, or from any channel and provides two sync outputs per module.

Triggers can be used (1) to synchronize the PXIe-6943 with other instruments; and (2) as a test input for test sequence control. Sync outputs can be offset to the start of a test sequence or step.

High-Speed Data Sequencer

The high-speed data sequencer provides control over digital test patterns. Each DTI has a sequencer that controls 32 channels and can operate either independently or synchronously with other DTI modules.

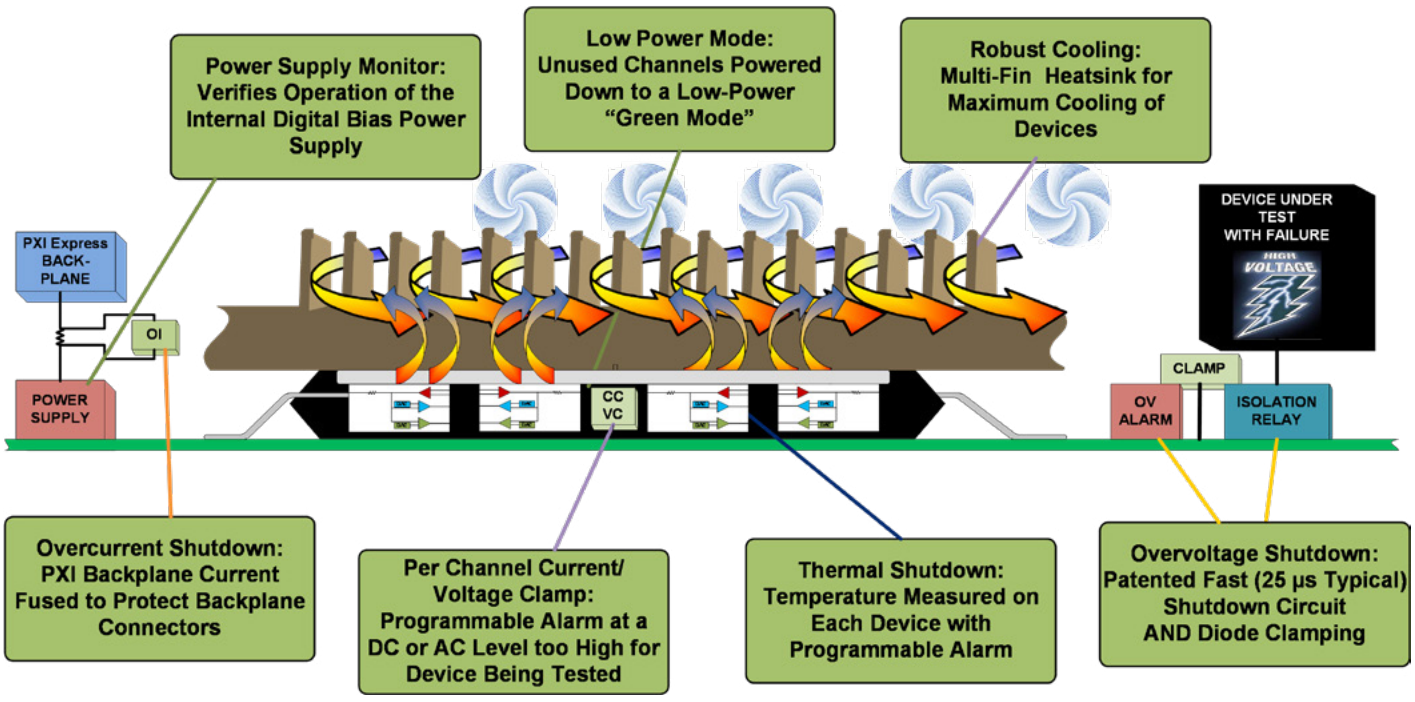


Figure 1: Built-in Protection

Product Information (continued)

Sequencer logic supports full Unit Under Test (UUT) handshaking and controls timing, format, pattern data, looping, and conditional testing. The sequencer includes definable standby and idle sequences.

Variable Voltage Driver/Receiver

The PXIe-6943 provides 32 single-ended channels in a single plug-in module. Each channel has the following attributes:

- Driver/receiver levels from -2 V to +7 V with an output swing of up to > 7 V
- Full drive current on all channels simultaneously (within backplane current limits)
- PMU functions including FV MI, FI MV, current and voltage clamping
- Programmable active current load with dual commutating voltages
- Program slew rates selectable per channel (0.1 V/ns to 1.3 V/ns, typical)
- Real-time over-voltage detection and protection on each channel
- Robust protection circuitry for the entire module as shown in the diagram

PXIe-6943 Soft Front Panel (SFP)

The SFP provides interactive control of the PXIe-6943 digital subsystem. The easy-to-use graphical interface enables setup and configuration, calibration, and sequencer control. Channels may be set up either individually or in user-defined groups. Using the SFP, users are able to define and debug digital tests. The SFP also has the ability save digital tests for later use by the SFP or programmatically within test sets.

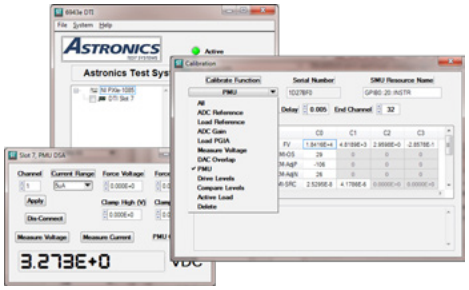


Figure 2: Soft Front Panel

Digital Functional Language (DFL)

The optional DFL provides a high-level programming interface to the PXIe-6943, providing seamless use of the PXIe-6943 with legacy test programs. This interface enables the PXIe-6943 to emulate the legacy system characteristics without changing the underlying C program that executes the digital test.

Application Resource Interface (ARI)

The optional ARI also provides an interface to legacy systems from the PXIe-6943, enabling continued use of legacy test programs. The ARI provides a higher level of control of the advanced features within the PXIe-6943 compared with those in DFL which is primarily used to emulate the legacy digital subsystem.

Innovative Software Tools Speed Test Development

The VXI*plug&play* driver and digital resource suite application interface layer support third-party test development tools to ease development and integration into popular test environments.

The optional Microsoft® Windows® CIIL Emulation Module (WCEM) for TYX PAWS® Run Time System (RTS), one of the most popular independent implementations of the ATLAS language, provides an interface to the PXIe-6943 from the IEEE standard ATLAS test language for modern test development. This interface provides support for both legacy and modern system implementations that take advantage of the higher order, signal-oriented features of IEEE ATLAS.

The optional TestCue runtime package also provides a digital test development and debug environment that is designed to be used with National Instruments TestStand. The Digital Programming support enables developers to access the PXIe-6943 digital features directly within TestStand without having to use other IDE environments for programming.

Subsystem Configurations

Subsystems are configured contiguously across the PXI Express backplane slots in a right-to-left sequence with the master module located in the rightmost slot and with slave modules linking together with the master in a leftward direction using an external attachment.

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Parametric Measurement on Each Channel

Each PXIe-6943 channel is fitted with a Parametric Measurement Unit (PMU) capable of forcing a voltage or current and measuring the resultant current or voltage. Each PMU channel is equipped with a programmable current and voltage clamp for use in force voltage or force current mode, respectively.

Specifications

Note: The Astronics Test Systems policy is one of continuous development and improvement. Consequently, the equipment may vary in detail from the description and specifications in this publication.

Please contact Astronics Test Systems for more information on how to configure a synchronized digital test system and for the expected performance characteristics of specific system configurations.

Timing Characteristics

I/O Data Rate

- Up to 50 MHz

Timing Set Options (3)

- 256 Timing Sets with 4 Phases and 4 Windows and 4 k sequence steps
- 1 k Timing Sets with 4 Phases and 4 Windows and 1 k sequence steps (one for each Seq. Step)
- 4 k Timing Sets with 1 Phase and 1 Window and 4 k sequence steps (one for each Seq. Step)

Phase/Window/Period Timing Resolution

- 1 ns (using the 500 MHz master clock)

Minimum Phase/Window Pulse Width

- 8 ns (using the 500 MHz master clock)

Clocks per Pattern (CPP)

- 1 to 256 (selectable per Seq. Step)

Pause-Resume Feature

- Phases and Windows are frozen when asserted.

Halt-Resume Feature

- All Phases will complete their action for the current Pattern

Stimulus/Capture Characteristics

Testing Modes

- Dynamic, Static

Data Output Formats (per channel)

- Force: Low, High, Tri-State
- Format: NR, RT, R0, R1, RC, Complement Surround. Output the Phase or its complement (used to output Waveforms on channels)

Capture Modes (per channel)

- Mask
- Opening edge of Window
- Closing edge of Window
- Window (input data must match “expect” for the entire duration of the window)

Pattern Memory

- Size: 256 k

Pattern (Stimulus/Expect) Data

- Output: H, L, Tristate
- Expect: Good 1, Good 0, OK , Between or Mask
- Keep last
- Toggle last
- Accumulate a CRC16 or CRC32 (based on a Good 1 only)

Recording Mode

Recording Modes (per sequence step)

- Record errors for programmable inputs that have a Good 1 and Good 0
- Record errors for single-ended inputs that have only a Good 1
- Record raw data based on NOT a Good 0
- Record raw data based on a Good 1

Sequencer Characteristics

General

- Sequencer: 1 per Digital Test Instrument
- Channels: 32 per sequencer
- Linkages: Up to 13 DTI sequencers can be linked
- Modes: Static, Dynamic

Sequence Memory

- Sequence Size: 1024 or 4096 Steps

Master Clock (continued)

Sequence Loop Counters

- Loop Counters: 16, nestable
- Loop Count can be different each time (1 to 64 k) or continuous.
- Loop counters can be optionally re-loaded during a burst.
- Only one can end on a sequence step.

Subroutine Characteristics

- Output one or more Sequence Steps with or without looping. Cannot be nested. Has a designated "Return" Step.

Burst Count Range

- 1 to 1 M or continuous

Jump Types

- Conditional or unconditional
- Jumps at the end of a sequence step
- Vectored (1 of 16 destinations)

Sync Pulse Outputs

- Outputs per Sequencer: 2
- Modes: Start of Sequence, Start of Sequence Step
- Offset Range: 0 to 1 M patterns
- Pulse Width: 1 to 4095 patterns

Sequence Standby Characteristics

- A one word continuous Sequence Step that may be used to output "standby" data on power up or after a sequence reset. The CPU can access pattern data in this state.

Idle Sequence Characteristics

- A continuous Sequence Step that may be used to output data before or after an active sequence. The CPU cannot access pattern data in this state. The Idle Sequence output after the active sequence may be different from the one output before.

Timer/Counter Characteristics

- Frequency Range: 0.25 Hz to 250 MHz
- Aperture Window Accuracy: ±50 ppm
- Preset Aperture Windows: 1 ms to 10 s in decade steps

Master Clock

Internal Oscillator

- 500 MHz
- Accuracy: 50 ppm

Internal Synthesizer

- 40 kHz to 500 MHz
- Accuracy: 50 ppm

Internal Reference

- LCLK100 or CLK10

External Front Panel Reference

- Range: 5 to 80 MHz

I/O Channel Characteristics

Digital I/O Type

- Variable Voltage

Channels

- 32 SE or 16 DIFF per I/O board
- Per channel relay isolation, PMU

Channel Connectors

- Digital I/O: Samtec SEAF 200
- Sync: Samtec 50 pin

Output Drive Current

- ±50 mA typ (Source/Sink)

Output Impedance

- 50 Ω (adjustable)

Slew Rate (Programmable per Pin)

- 0.1 V/ns to 1.3 V/ns

Input/Output Threshold/Voltage Range

- -2 V to +7 V

Skew (Channel-to-channel)

- <3 ns (drive and compare)

Current Source/Sink

- ±0.4 mA to ±24 mA

Commutating Voltage: Vcom (Dual)

- Range: 0 to +5 V

Ground Reference Input (per I/O board)

- Offset: ±50 mV
- Interrupt Voltage: 390 mV
- Resistive load: 100 kΩ
- Bypass Relay: On or Off

Pin Electronics Monitoring (per channel)

- All programmed levels
- Output and Input levels
- Temperature

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I/O Channel Characteristics (continued)

Auxiliary I/O Channels (per I/O board)

- LVTTL (6): Bi-directional
- LVDS (2): Differential || 100 Ω
- LVTTL (2): 15 kΩ pull-up to 3.3 V and pull-down to GND

Data Rate (max)

- 50 MHz (input and output)

Interface

Front Panel I/O

Digital I/O

- 200 pin SEAF (Samtec)
- 50 pin LBUS (Samtec)

PXI Interface

Backplane Operation

- CLK10 and CLK100: Clock reference
- PXI Trigger Lines: Sequence triggers

Software

Driver Support

- 2 Level: 1 @ card VXIpnp type driver; 1 @ system API type driver

Environmental

Temperature

- Operating: 0° C to 45° C
- Storage: -40° C to 70° C

Humidity (non-condensing)

- 0° C to +10° C: Not controlled
- +10° C to +30° C: 5 to 95 ±5% RH
- +30° C to +40° C: 5 to 75 ±5% RH
- +40° C to +50° C: 5 to 55 ±5% RH

Emissions/Immunity

- EN61326:2006 Class B (pending)

Safety

- EN61010-1:2010-06 (pending)

Mechanical

Dimensions

- Single slot, PXI Express module 3,8" H x 6.5" W x 0.8" D (100 mm x 160 mm x 20 mm)

Ordering Information

PXIe-6943: Astronics Test Systems PXIe-6943 DTI

Digital Test Instrument, Variable Voltage, 7 V, 32 Channels

Software Licenses:

N/A : Driver/Soft Front Panel (included with base Digital Test Instrument)

PXIe-6943-WCEM : Windows® CIIL Emulation Module for TYX PAWS™ ATLAS Runtime System (one license per PXIe-6943 system)

PXIe-6943-ARI : Application Resource Interface (ARI, one license per PXIe-6943 system)

PXIe-6943-TC-DIAG: PXIe-6943 Diagnostic Suite (Guided Probe and Fault Dictionary, one license per PXIe-6943 system)

PXIe-6943-TC-GP: PXIe-6943 Guided Probe (one license per PXIe-6943 system)

PXIe-6943-Fault-Dict-SW: PXIe-6943 Fault Dictionary (one license per PXIe-6943 system)

PXIe-6943-TC-LSR: LASAR to PXIe-6943 High Speed Digital Post Processor (one license per PXIe-6943 system)

PXIe-6943-TC-M9: TerM9 Library including Binary Reader

PXIe-6943-TC-DTB: Binary Reader for DTB and Diagnostic files

PXIe-6943-TC-LSR-GP: LASAR to PXIe-6943 Guided Probe (one license per PXIe-6943 system)

INFO

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PXIe-6943 Digital Test Instrument

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