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❖ I/O and FPGA RT DAS Solutions

1. Index

I. **Core and Enhanced DAS (PXI/CPCIs/VPX) Solutions**.

- Strain/Pressure Modules
- Voltage Modules
- Thermocouple Modules
- RTD (2-wire, 3 wire, 4 wire) Modules
- IEPE Vibration Module
- LVDT Module

II. System and Enclosures

- 2 U/4U/6U/9U PXI/CPCI/VPX Enclosure
- Portable Enclosures
- Rugged Enclosures

III. Software

- DAS system Software
- Customized application Development

IV. Accessories

- IO Cable
- IO connector
- Systems
- Connector panels
- Rack

I. Core and Enhanced DAS Module features

SN	Main Features	Strain /Pressure	IEPE	Thermocouple/RTD	Voltage
1	No Of channels 8/16	✓	✓	✓	✓
2	Amplifier Gain 0-5000 Programable	✓	✓	✓	✓
3	Per channel 24 Bit ADC	✓	✓	✓	✓
4	Voltage Excitation (0-12V Programable)	✓	Excitation voltage 23V (Minimum)	-	-
5	Type of bridge	½, ¼ & Full Bridge Programable	-	J, K, E, T, N, B, R, S, C type Thermocouple, PT-100, PT-500, PT-1000	Differential/Single ended
6	Sampling rate Up to 250 KSPS	✓	✓	✓	✓
7	Filter Software selectable Digital Low pass Filter 1Hz to 30KHz	User selectable	User selectable	User selectable	User selectable
8	Isolation Input/output/Power	Available in Enhanced IO Module	Available in Enhanced IO Module	Available in Enhanced IO Module	Available in Enhanced IO Module
9	Common Mode voltage >300V	Available in Enhanced IO Module	Available in Enhanced IO Module	Available in Enhanced IO Module	Available in Enhanced IO Module
10	Analog Dual output	Available in Enhanced IO Module	Available in Enhanced IO Module	Available in Enhanced IO Module	Available in Enhanced IO Module
11	Size	3U/6U	3U/6U	3U/6U	3U/6U
12	Form factor	PXI/PXIe/CPCI/VPX	PXI/PXIe/CPCI/VPX	PXI/PXIe/CPCI/VPX	PXI/PXIe/CPCI/VPX

All the modules are pluggable mezzanine modules that can be hosted by any carrier modules to suite various buses - PXI/PXIe/CPCI/VPXetc and a wide range of application demands.

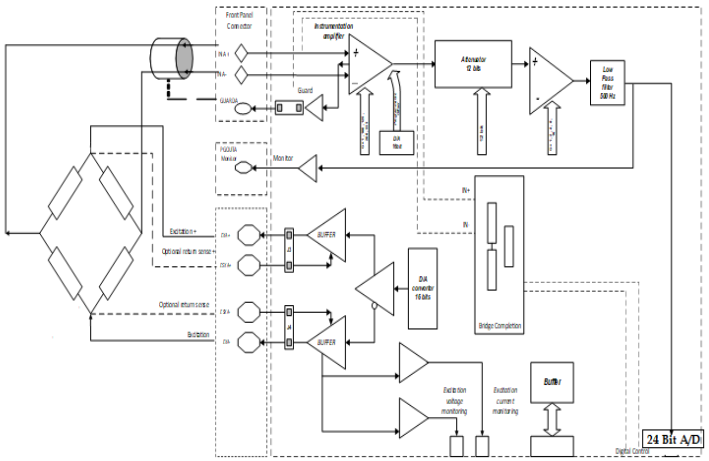
1.1 Strain/Pressure Modules

Overview

The PXI/CPCIs-Stra16-A0 module offers a complete solution for High Performance data Acquisition applications.Both the A/D and D/A offers 5us converters. The input instrumentation amplifiers provide differential inputs, buffering and gain. A/D operations can be triggered internally or externally through the front panel.Each D/A offers 2 output simultaneously for monitoring and control.A PXI/CPCIs bus connector provides the interface to the host computer with x1 Lane PCI express.

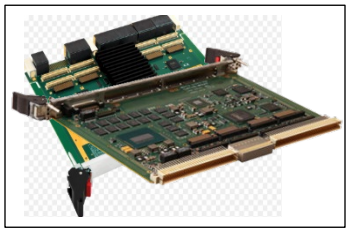
Main features

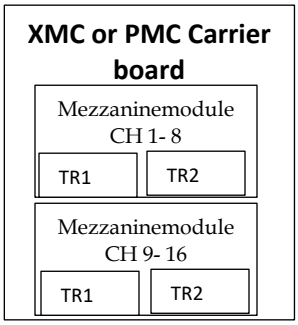
- 16 Channels per board
- 24 Bits Delta Sigma A/D
- Sampling rate: 5 SPS to 250 kSPS
- Overvoltage protected up to ±30 V
- Input range: ±2mV to 10V
- Programmable Gain up to 1,10,100,1000,2000,5000 with 0.05% accuracy and Linearity 0.02%
- Low pass FIR Filter with programmable up to 5kHz cut off (-3dB)
- TEDS support
- Types of Strain Input bridges: Quarter, Half and Full bridges
- Strain Gauge Bridge resistances: 350 Ω and 120 Ω
- **Isolation (Input/output/Power) ****
- **300V or better Common Mode voltage ****
- **Dual analog Outputs ****
- Dual +/- 10V AO outputs **
- Short circuit protection on Analog Outputs
- Output Current: 40 mA



Software Drivers

- C library DLL's
- Linux drivers
- Window drivers
- Lab View
- VxWorks drive
-





Datasheet

All the modules are pluggable mezzanine modules that can be hosted by any carrier modules to suite various buses - PXI/PXIe/CPCI/VPX etc and a wide range of application demands.

Ordering Information

PXI-Stra16	6U PXI 16 Ch A/D125kSPS
PXI-Stra16-A0*	6U PXI 16 Ch with AO A/D125kSPS
CPCI-Stra16	6U CPCI 16 Ch A/D125kSPS
CPCI-Stra16-A0*	6U CPCI 16 Ch with AO A/D125kSPS

Optional AccessoriesCBL-HDR-50 50-pin IDC cable only

TB-50-HDR 50-pin Header terminals block and 3 feet Flat Ribbon Cable

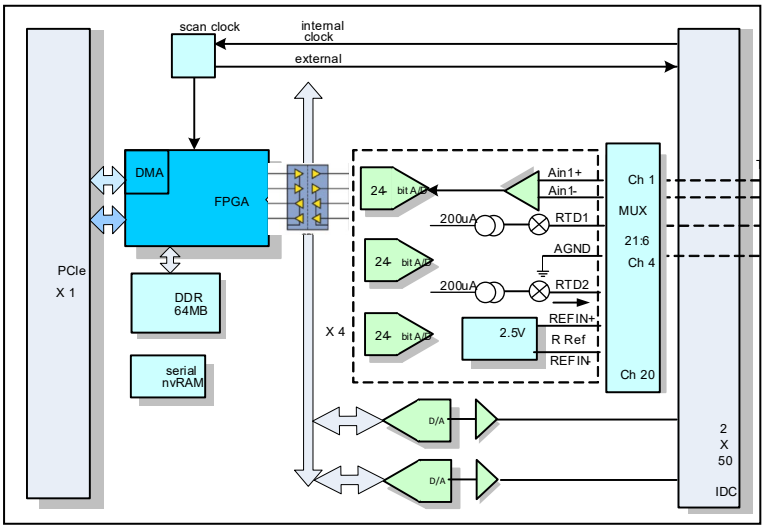
2.2 Thermocouple/RTD Module

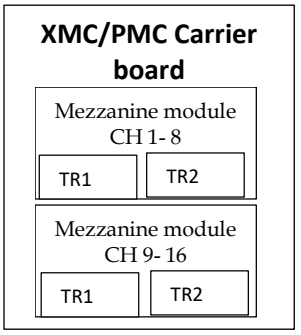
Overview

The PXI/*CPCIs-RTD SC* module offers a complete solution for Thermocouple Solution. It offers 24 bits precision temperature measurement, with fixed and optional programmable current source. Each of the 16-temperature measurement channels has its own A/D converter with two matched 200 µA current sources.The Board also features 16 single-ended high impedance analog inputs. Also, a 16-bit A/D converter with 16 channels multiplexed allows measurement of input voltage in excess of +/- 20 volts**.**

Main features

- 6U high Compact PCIs module
- 16 Channels 4 Wires RTD or 20 Channels 2 or 3 wires RTD
- J, K, E, T, N, B, R, S, C type Thermocouple
- Automatic CJC Cold Junction Compensation
- Built-In Standard and User-Programmable Coefficients for Thermocouples, RTDs and Thermistors
- Negative Thermocouple Voltages support
- Automatic Short-Circuit & Fault Detection
- Support most RTD:PT-10, PT-50, PT-100, PT-200, PT-500, PT-1000, and NI-120
- Input impedance of 1MΩ
- 24 Bits Delta Sigma A/D
- Sampling rateUp to 250 KSPS
- High CMRR: 120 dB
- **Isolation (Input/output/Power) ****
- **300V or better Common Mode voltage ****
- **+/- 10V Dual analog Outputs ****
- Short circuit protectionon Analog Outputs
- 0.1°C accuracy and 0.001°C resolution





Software Drivers

- Linux drivers
- C library DLL's
- Window drivers
- LabView
- VxWorks drive

Datasheet

All the modules are pluggable mezzanine modules that can be hosted by any carrier modules to suite various buses - PXI/PXIe/CPCI/VPX etc and a wide range of application demands.

Ordering Information

PXI-TC16	6U PXI 16 Ch Thermo Couple, Commercial 0 – 70Deg C	**PXI-TC16 with AO***
PXI-RTD16	6U PXI 16 Ch RTD Commercial 0 – 70 Deg C	**PXI-RTD 16 With AO***
CPCI-TC16	6U CPCIs, 16 Ch Thermo Couple Industrial -40 to 85 C	**CPCIs TC 16 With AO***
CPCI-RTD16	6U CPCIs, 16 Ch RTD -40 to 85 C	**CPCIs RTD 16 with AO***

Optional Accessories

CBL-HDR-50	50-pin IDC cable only
TB-50-HDR	50-pin Header terminals block and 3 feet Flat Ribbon Cable

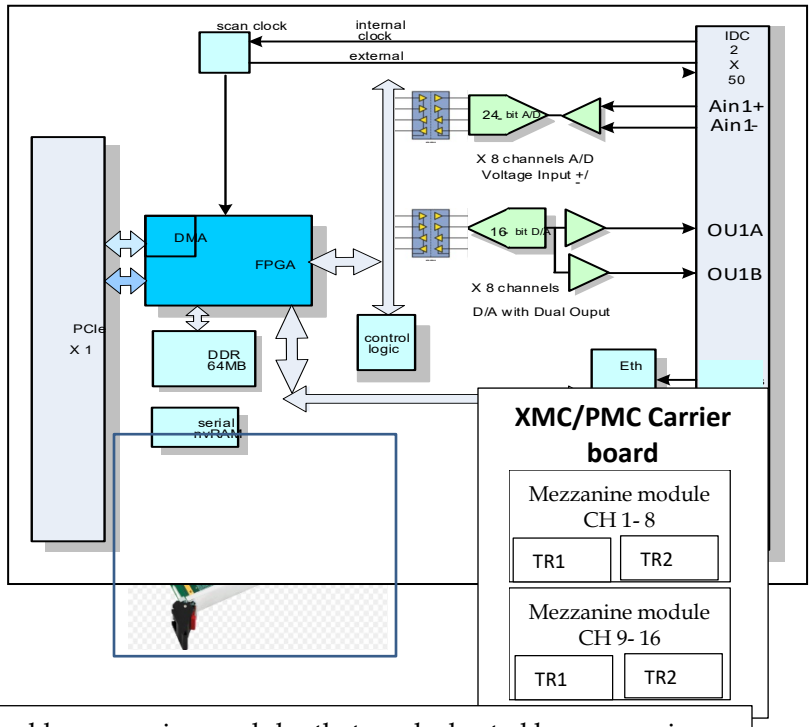
2.3 Voltage Module

Overview

The PXI/***CPCIs-VOLT SC*** module offers a complete solution for High Performance data Acquisition applications. Both the A/D and D/A offers 5 us converters. The input instrumentation amplifiers provide differential input buffering and gain. A/D operations can be triggered internally or externally through the front panel. Each D/A offers 2 output simultaneously for monitoring and control. A CPCI subs connector provides the interface to the host computer with x1 Lane PCI express

Main features

- 6U PXI/CPCI voltage input Module
- 32 SE/16 DIFF x 24-bits Σ-Δ AD
- Input range settable +/-10V
- Per channel configurability—up to sixteen different setups can be defined.
- 24 Bits Delta Sigma A/D
- Sampling rate: 5 SPS to 250 kSPS
- Giga ohm (GΩ) input impedance or better
- Isolation (Input/output/Power) **
- 300V or better Common Mode voltage **
- +/- 10VDual buffer analog Outputs **
- Short circuit protected Analog Outputs
- Output Current: 50 mA min



Software Drivers

- Windows drivers
- C library DLL's
- LabView

Datasheet

All the modules are pluggable mezzanine modules that can be hosted by any carrier modules to suite various buses - PXI/PXIe/CPCI/VPX etc and a wide range of application demands.

Ordering Information

CPCIs-VOLT SC6U CPCIs, 8/16 Ch A/D250kSPS Commercial 0 – 70Deg C	
CPCIs-VOLT SC with AO * 6U CPCIs, 8/16 Ch A/D250kSPS, 8/16 Ch D/A 5us, with AO *	
PXI-VOLT SC	6U CPCIs, 8/16 Ch A/D 250 kSPS Commercial 0 – 70 Deg C
PXI-VOLT SC-with AO	6U CPCIs, 8/16 Ch A/D 250 kSPS, 8/16 Ch D/A 5 us, with AO *

Optional Accessories

CBL-HDR-50	50-pin IDC cable only
TB-50-HDR	50-pin Header terminals block and 3 feet Flat Ribbon Cable

2.4 Vibration (IEPE) Module

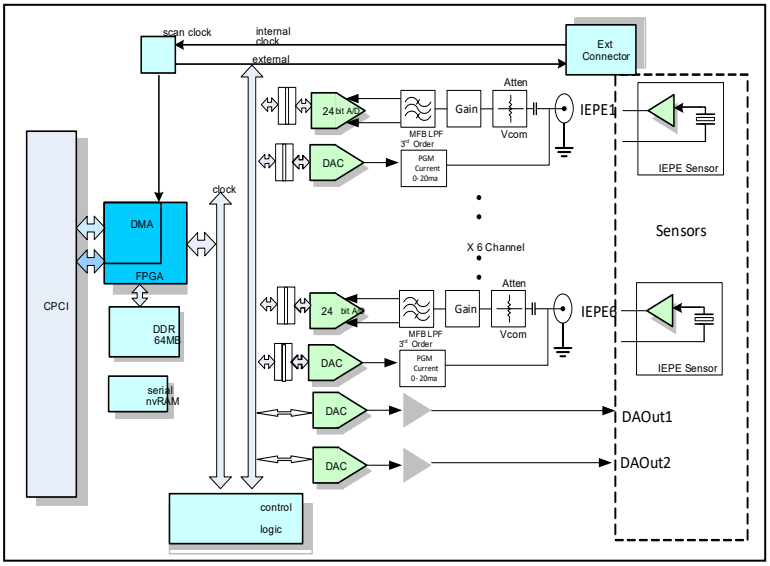
Overview

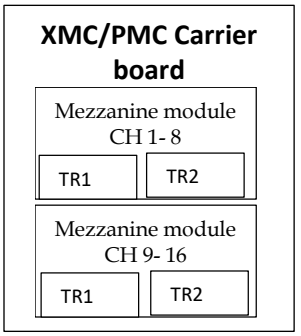
The PXI-IEPE-6U module offers a complete single board IEPE sensor Analog Input.This design is intended for use with a high-end single-channel IEPE sensor interface. A 24-bit conversion at maximum sampling speeds reaching up to 256 KSPS establishes this design at the leading edge of the existing product range. The design targets an input bandwidth of 20 kHZ and a programmable gain between –12 dB to 18 dB. A programmable excitation current of 2 mA to 20 mA as well as a programmable sampling speed down to 32 kSPS means that this design can accommodate different sensor cable distances and different back-end DAQ capabilities. Wire-break and short-circuit detection ensure safe and reliable operation of the sensor interface

Main features

- 6U high PXI/CPCI-6U module
- 16 x Channels IEPE Sensor Analog Input
- Programmable Data Rate: up to 256 kSPS,
- SNR 100dB
- Programmable Excitation Current: 2 mA to 20 mA (8 bits of resolution)
- Excitation voltage 23V (Minimum)
- ±10-V AC Input, 250-kΩ Input Impedance
- Diagnostics: Wire-Break, Short-Circuit Detection, and Short-Circuit Protection
- 24 Bits Delta Sigma A/D
- High Pass Filter/low pass filter
- Giga ohm (GΩ) input impedance
- **Isolation (Input/output/Power) ****
- **300V or better Common Mode voltage ****
- **+/- 10V Dual analog Outputs ****

Datasheet





Available Software Drivers and Software Tools:

- C library DLL's Linux drivers
- Window drivers
- LabView
- VxWorks drivers
-

All the modules are pluggable mezzanine modules that can be hosted by any carrier modules to suite various buses - PXI/PXIe/CPCI/VPX etc and a wide range of application demands.

Ordering Information

PXI-IEPE-6U	6U PXI 16 Ch IEPE Sensor Input	Commercial 0 – 70Deg C
PXI-IEPE—6U-with AO*	6U PXI 16 Ch IEPE Sensor Input	Industrial -40 to 85 C
CPCIs-IEPE-6U	6U CPCI, 16 Ch IEPE Sensor Input	Commercial 0 – 70Deg C
CPCIs-IEPE—6U-with AO	6U CPCI, 16 Ch IEPE Sensor Input	Industrial -40 to 85 C

Optional Accessories

SMC-BNC- XXX	SMB Plug to BNC RG233 Coax cable only
XXX	Desired length: 36, 48, 60, 72

3 Systems and Enclosure

Rack Mount 2U/4U/6U/9U 4/6/9/20 Slot Chassis

4 slot Chassis WITH PSW

- Advanced EMC shielded 19"chassis, powder-coated black (RAL 9005)
- Applicable for Compact PCI, PICMG 2.16, VME bus and VME64x backplanes
- Horizontal backplane, 4 slots
- System platform for horizontal boards (6 U)
- Card cage front: 160 mm
- Card cage rear I/O: 80 mm
- ON/OFF switch: rear
- Fan speed controlled by Fan Con in order to min. noise
- Ambient temperature: 0 °C to +50 °C operation; –40 °C to +80 °C storage
- Humidity: 30 % – 80 %, non-condensing
- Form factor PXI/CPCI/VPX

14/21 Slot Chassis

Rugged Chassis

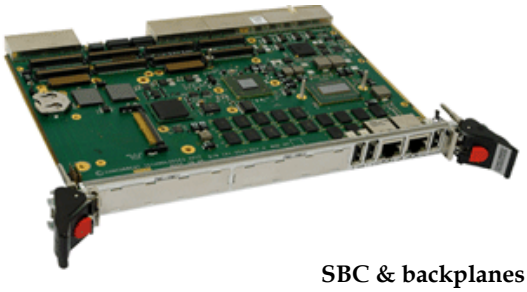
Rugged Chassis

- Modular, Rugged COTs design
- VPX, PXI, PXIe,cPCI and MicroTCA compatible
- 19" rack mount per IEC60297 (slide mounting optional)
- 8U H x standard depths: 22" and 25"
- 12-21 card slots, front access
- Optional shock isolated cards cage and device mounting
- Front to rear evacuative cooling (350 LFM @ .1" H20)
- Custom rear I/O patch panel (rear I/O cards optional)
- MIL grade components
- 500 to 1200-watt PSU options
- Input options: 90-264VAC Fixed PSU, 47-500 Hz, 28/48VDC
- Designed to meet: MIL-STD-5400, MIL-STD-810F, MIL-STD-46IE, MIL-STD-704E, MIL-STD-1275A, MIL-STD-167, MIL-STD-901

Portable Chassis

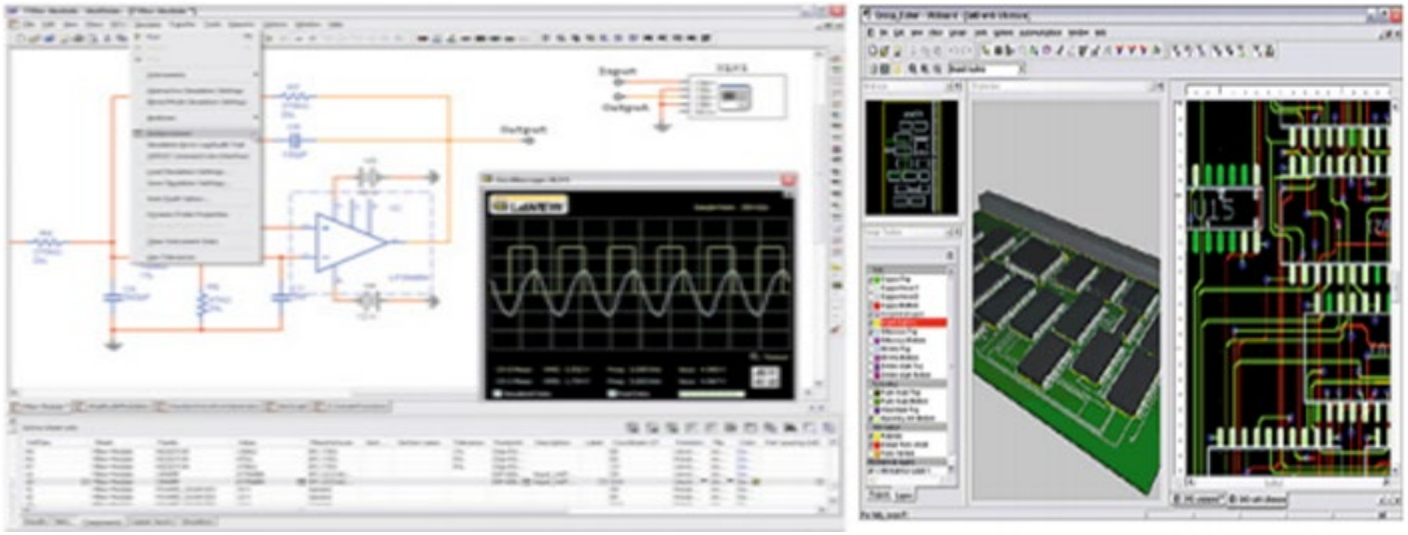
PortableChassis

- 4U Portable tower fully compliant to IEEE 1101.10/.11
- 3, 4, or 6 slot, 6U x 160mm boards
- PICMG: 2.0, 2.16, 2.17, 2.20 backplanes (H.110 optional)
- Cooling front to rear (1 x 90 CFM), plug removable
- Advanced EMC shielding to meet CE and FCC
- Wide range of PSU inputs (90 - 264 VAC, 48VDC)
- Wide range of PSU options: fix mount, plug in, N+1
- Ready to run - turnkey solution



SBC & backplanes

4 Application development environmental platform:



- We shall provide Lab view Runtime platform on Lab view development environment for developing the real tome software and real time simulation
- We shall provide BSP, library, API & test applications for the I/O models to test and clear the ATP of installation

The **Lab view Run-Time Platform** from Lab VIEW-built applications relates to the concept of component-based software development and distribution. The world of software today is a component-based world. No longer do we develop and deploy monolithic applications. Rather, we develop software that reuses common components as often as possible. When we deploy this software, more than a single file is almost always required. Applications that use the same components are then able to use the same common files, resulting in smaller disk usage than if each application included all required components. Perhaps even more importantly, developing component-based software allows us to update individual components separately from the software that uses those components.

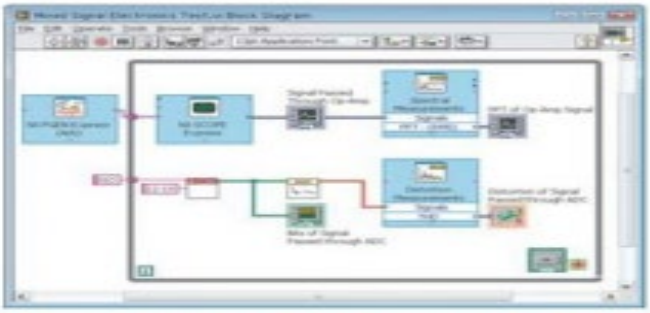
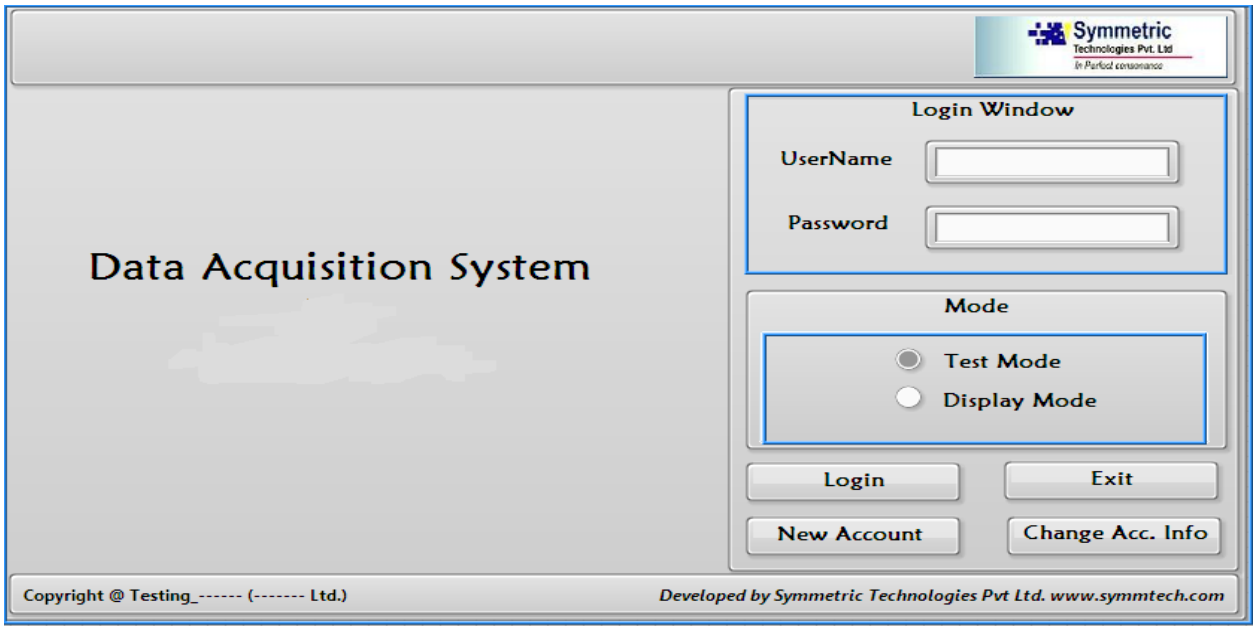


Figure 5. Rapidly and cost-effectively program in LabVIEW.

The principal complaints about LabVIEW applications were their large size. A contributing factor to the size of LabVIEW applications was that the Application Builder includes a copy of the LabVIEW Run-Time Engine in every application. Using the principles of component-based software, one way to solve this problem was to separate out the common component, the LabVIEW Run-Time Engine, so that all LabVIEW-built applications on a system could use the component.

Many of the technologies that we use in LabVIEW today are available only as components. Examples include Data Socket, NI-Reports, and the Mesa graphics library for displaying three-dimensional controls and indicators.


Symmetric
Technologies Pvt. Ltd
In Perfect consonance
Data Acquisition System
Login Window
UserName
Password
Mode
Test Mode
Display Mode
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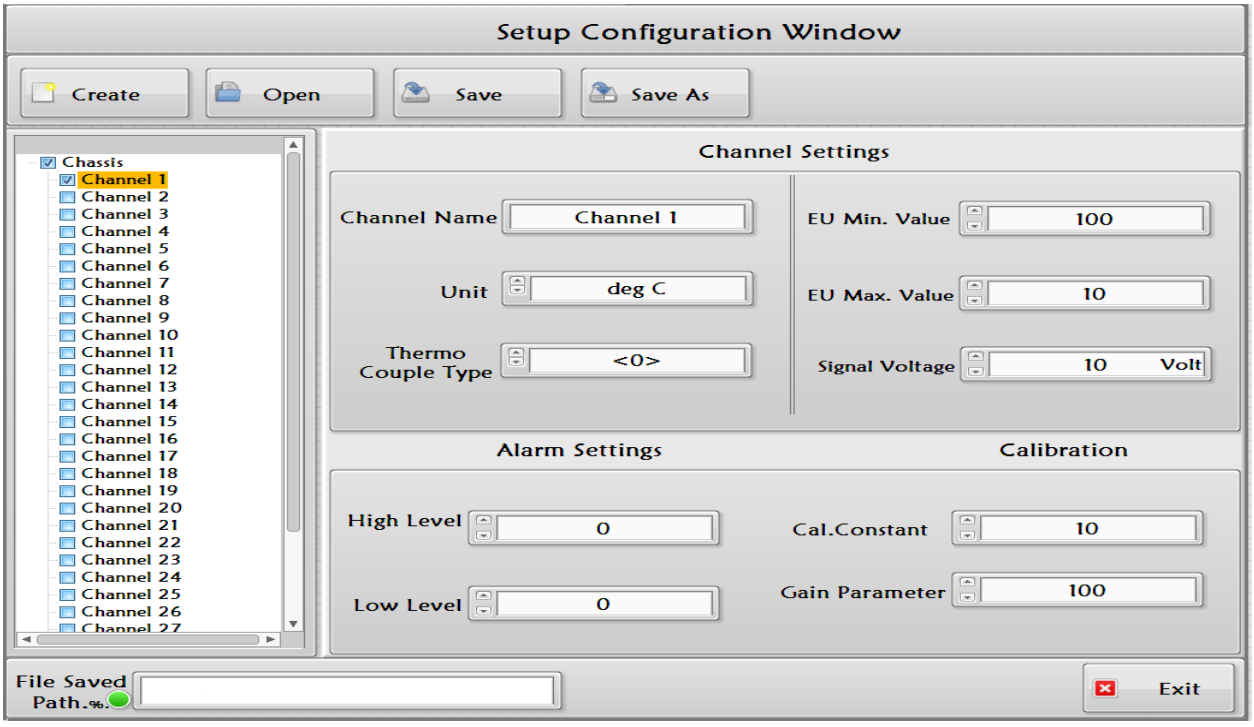
Exit
New Account
Change Acc. Info
Copyright @ Testing_------ (------- Ltd.)
Developed by Symmetric Technologies Pvt Ltd. www.symmtech.com


Setup Configuration Window
Create
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Save
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Channel 1
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Channel 3
Channel 4
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Channel 6
Channel 7
Channel 8
Channel 9
Channel 10
Channel 11
Channel 12
Channel 13
Channel 14
Channel 15
Channel 16
Channel 17
Channel 18
Channel 19
Channel 20
Channel 21
Channel 22
Channel 23
Channel 24
Channel 25
Channel 26
Channel 27
Channel Settings
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100
EU Max. Value
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Signal Voltage
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Volt
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Low Level
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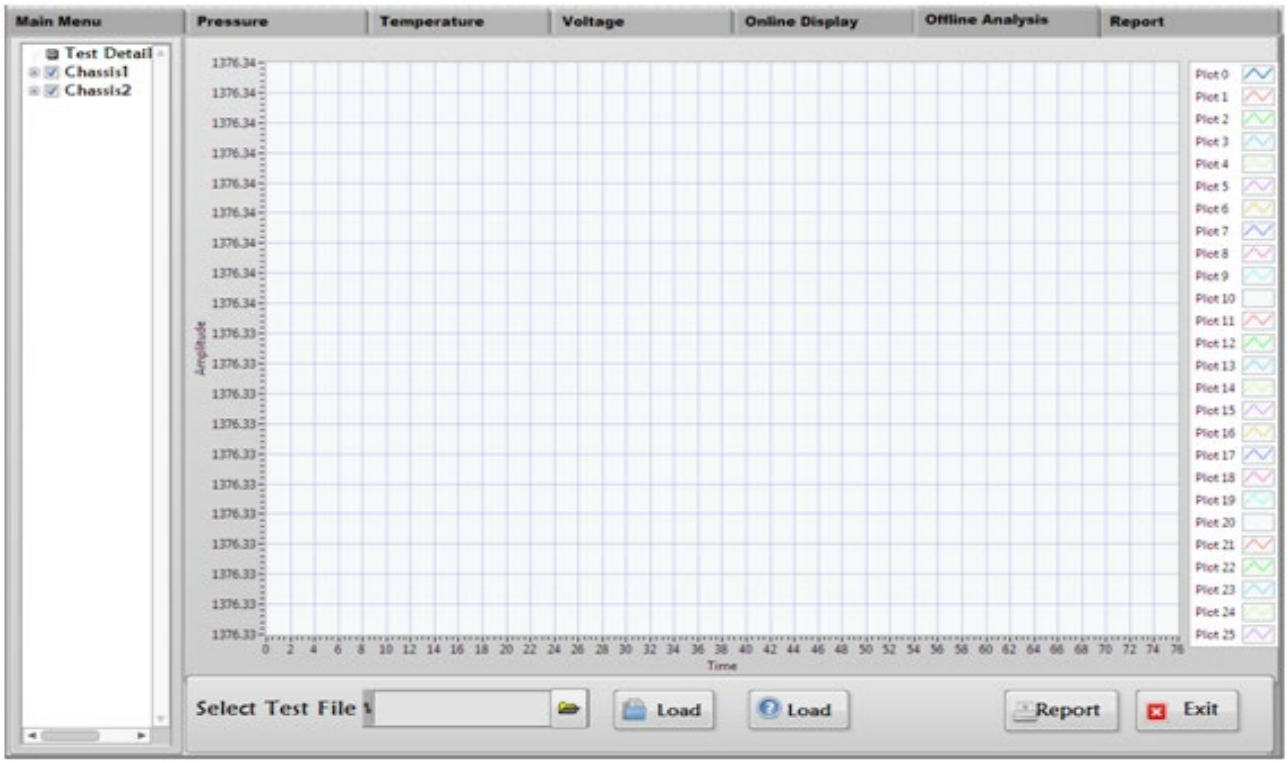
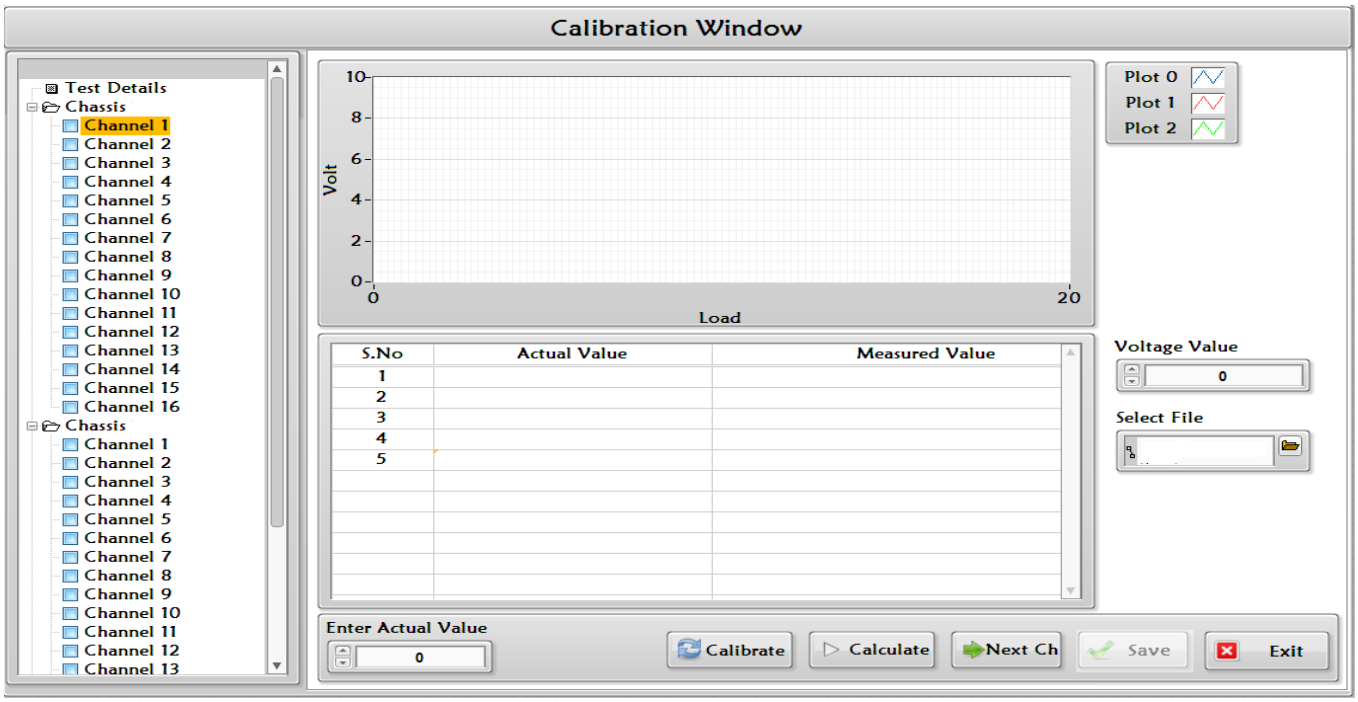
Exit


Main Menu
Pressure
Temperature
Voltage
Online Display
Offline Analysis
Report
Test Detail
Chassis1
Chassis2
Amplitude
Time
Select Test File
Load
Load
Report
Exit


Calibration Window
Test Details
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Channel 12
Channel 13
Channel 14
Channel 15
Channel 16
Chassis
Channel 1
Channel 2
Channel 3
Channel 4
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Channel 6
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Channel 8
Channel 9
Channel 10
Channel 11
Channel 12
Channel 13
Volt
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Plot 0
Plot 1
Plot 2
S.No
Actual Value
Measured Value
Voltage Value
Select File
Enter Actual Value
Calibrate
Calculate
Next Ch
Save
Exit

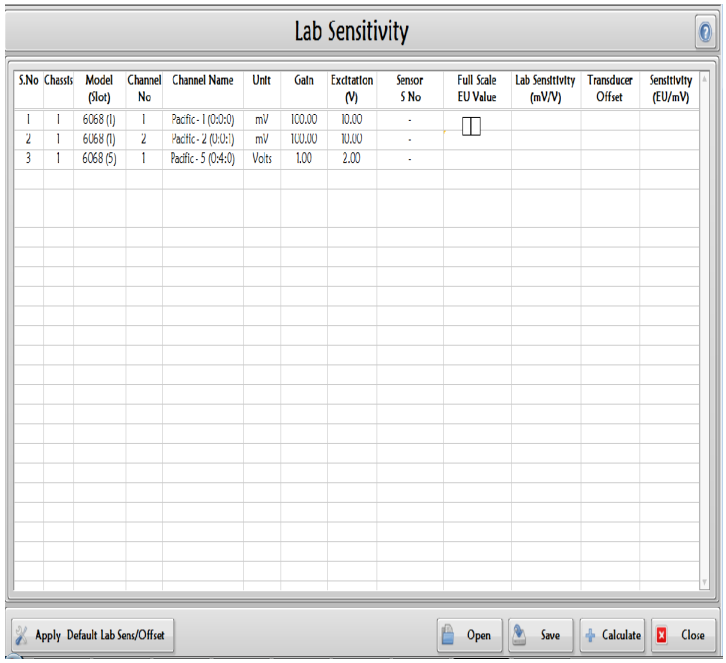
Lab view development environment With the Lab VIEW Embedded Model for Blackfin Processors, domain experts can develop their applications from algorithm design and prototyping to deployment and test – all using one platform. The graphical software includes more than 140 Blackfin-specific, hand-optimized math, analysis, and signal processing functions

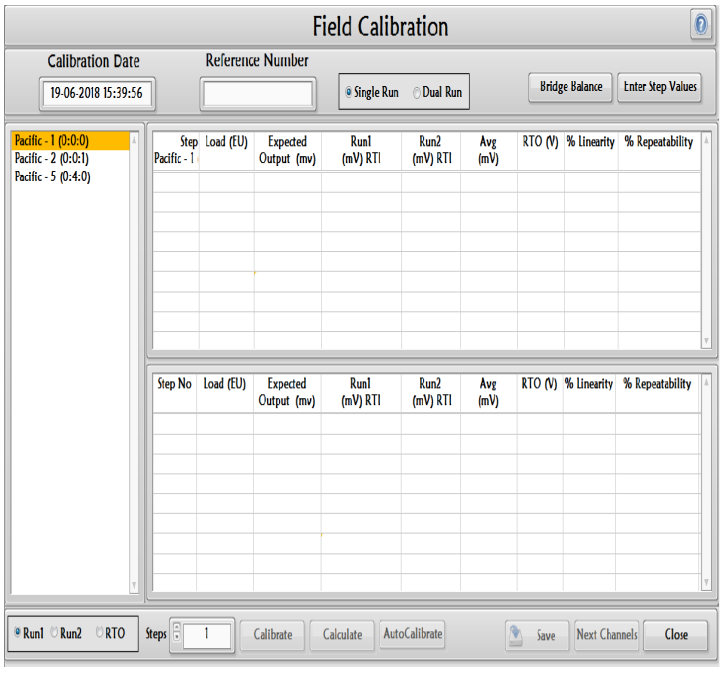
- High-performance execution with compiled code optimized for the execution target
- Rapid prototyping and development with graphical programming
- Integrated debugging and system analysis tools
- Add-on models to deploy code to real-time and FPGA targets

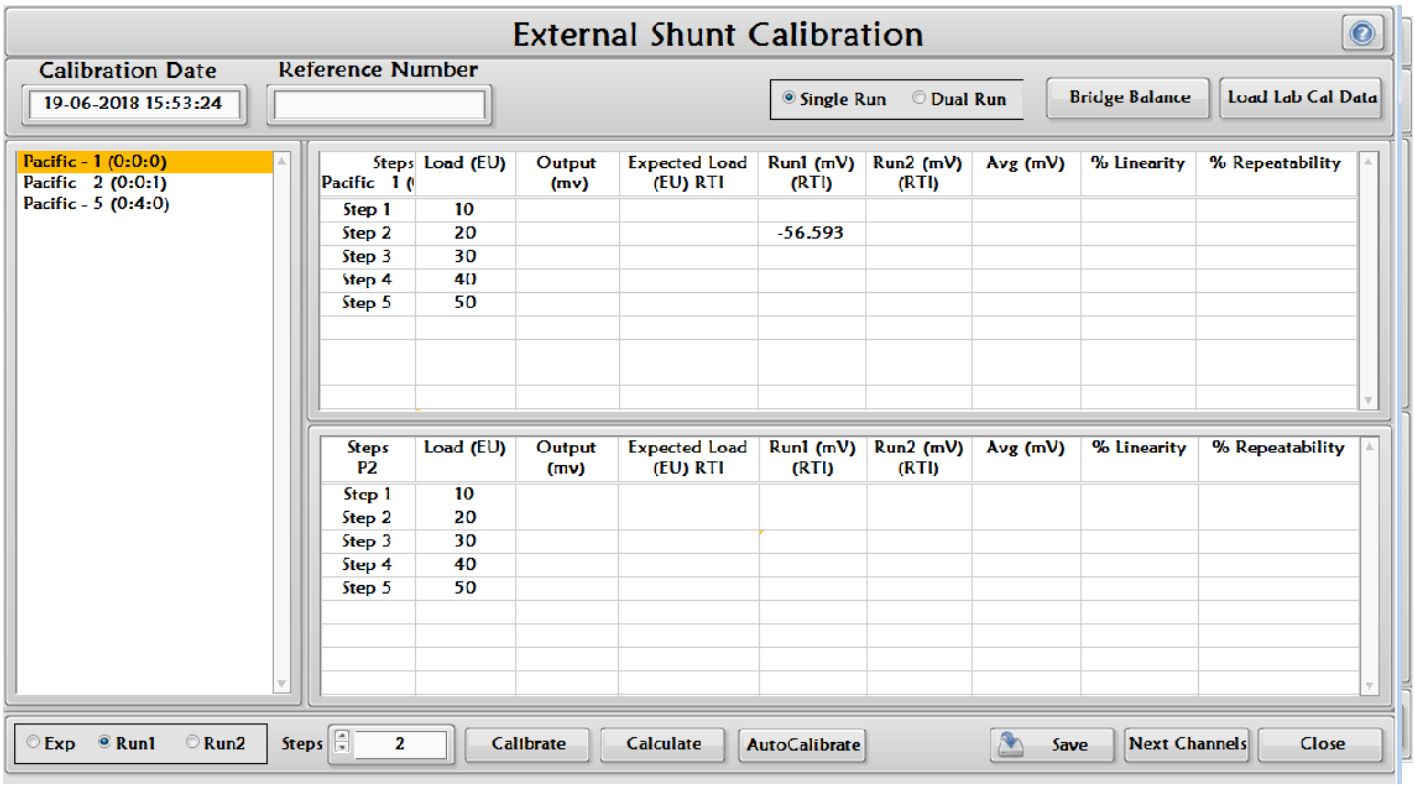
Integrated I/O such as audio and video DACs, ADCs and CODECs; and on-chip debugging, as well as easy graphical interconnection via Ethernet. The LabVIEW Embedded Model for Black fin Processors includes the fully featured and accessible ADI VisualDSP++ C development and debugging environment for low-level access and real-time, interactive debugging and deployment directly to Black fin. Engineers and scientists can debug code graphically in LabVIEW or simultaneously debug both the graphical code and generated C source code. The new model is shipped with examples for applications including audio, control, power monitoring, and communications. It also provides easy connectivity to the extensive range of NI test and measurement hardware for deploying external simulation and test methodologies early in the development process

SOFTDAQ Software Includes following Modules

- Setup Configuration Module
- Online Display Module
- Calibration Module
- Lab sensitivity
- Field Calibration
- Internal shunt Calibration
- External shunt Calibration
- Offline Analysis






External Shunt Calibration
Calibration Date
19-06-2018 15:53:24
Reference Number
Single Run
Dual Run
Bridge Balance
Load Lab Cal Data
Pacific - 1 (0:0:0)
Pacific 2 (0:0:1)
Pacific - 5 (0:4:0)
Steps Pacific 1 (
Load (EU)
Output (mv)
Expected Load (EU) RTI
Run1 (mV) (RTI)
Run2 (mV) (RTI)
Avg (mV)
% Linearity
% Repeatability
Step 1
Step 2
Step 3
Step 4
Step 5
10
20
30
40
50
-56.593
Steps P2
Exp
Run1
Run2
Steps
2
Calibrate
Calculate
AutoCalibrate
Save
Next Channels
Close

VI. Accessories

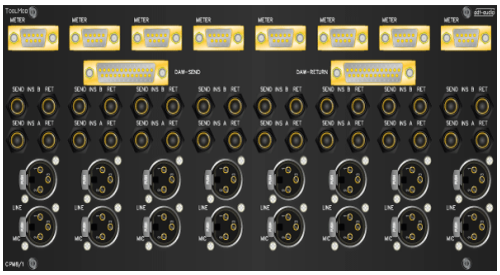
1. Instrumentation Rack, Cables, Connectors panels

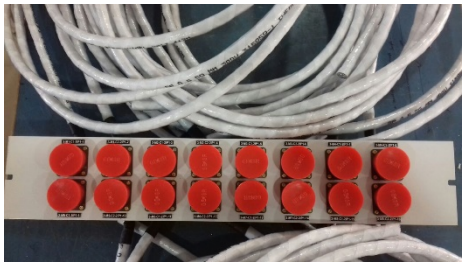
- 42U Smart Rack enclosure with doors and side panels
- Adjustable mounting rails with easy-view depth index and toolless mounting slots for PDUs and vertical cable managers. Locking, removable, reversible front and rear doors
- EMC/EMI Standards

D Sub Connectors

MIL- Connectors

BNC Connectors





Customized Connector panel

Dual Buffer & Isolator

V. Configuration List

Description	Model No.	Remarks
Strain	PXI-Stra16 6U PXI 16 Ch A/D125kSPS PXI-Stra16 with AO* 6U PXI 16 Ch with AO A/D125kSPS CPCI-Stra16 6U CPCI 16 Ch A/D125kSPS CPCI-Stra16-A0* 6U CPCI 16 Ch with AO A/D125kSPS	
Thermocouple	PXI-TC16 6U PXI 16 Ch Thermo Couple, Commercial 0 – 70 Deg C PXI-TC16 with AO* CPCI-TC1 6U CPCIs, 16 Ch Thermo Couple Industrial -40 to 85 C CPCIs TC 16 With AO*	
RTD	PXI-RTD16 6U PXI 16 Ch RTD Commercial 0 – 70 Deg C PXI-RTD 16 With AO* CPCI-RTD16 6U CPCIs, 16 Ch RTD -40 to 85 C CPCIs RTD 16 with AO*	
IEPE	PXI-IEPE-6U 6U PXI 16 Ch IEPE Sensor Input Commercial 0 – 70 Deg C PXI-IEPE—6U-with A 6U PXI 16 Ch IEPE Sensor Input CPCIs-IEPE- 6U CPCI, 16 Ch IEPE Sensor Input Commercial 0 – 70 Deg C CPCIs-IEPE—6U-with AO 6U CPCI, 16 Ch IEPE Sensor Input	
Voltage	CPCIs-VOLT SC 6U CPCIs, 8/16 Ch A/D 250 kSPS Commercial 0 – 70 Deg C CPCIs-VOLT SC with AO * 6U CPCIs, 8/16 Ch A/D 250 kSPS, 8/16 Ch D/A 5 us, with AO * PXI-VOLT 6U CPCIs, 8/16 Ch A/D 250 kSPS Commercial 0 – 70 Deg C PXI-VOLT SC-with AO 6U CPCIs, 8/16 Ch A/D 250 kSPS, 8/16 Ch D/A 5 us, with AO *	
LVDT	VDSP31-SC-LVDT LVDT INPUT MODULE	
Software	**Application development Kit**	
	accessories	
	Optional Transition Modules	