PLC I/O Module Front-End Controller Using a Tiva C Series ARM Cortex-M4 MCU

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Fully assembled board (shown above) developed for testing and performance validation only, not available for sale.

Key Document

- TIDA-00123 Reference Guide (PDF 3724 KB)
  30 Jan 2014 635 views
- View All Technical Documents (6)

Description

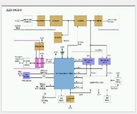
This TI Design implements the Tiva™ C Series MCU as a front-end controller for TI's suite of Programmable Logic Controller (PLC) analog and digital I/O module reference design boards. The design includes sockets for interfacing and simultaneously controlling two TI Designs I/O reference design boards. It allows maximum versatility whereby the I/O boards can be any combination of analog or digital input or output modules. The controller system automatically identifies and configures each I/O board appropriately, setting any required compensation of the analog circuitry. On-board power supplies are included to power the controller board as well as providing isolated power to both I/O boards, eliminating the need for multiple external power supplies. Additional circuitry is provided that optimizes the I/O signal acquisition and data throughput, enabling full 1-MSPS data acquisition and 20-MHz SPI bus performance. This design also performs as an evaluation platform for each of the I/O boards, analyzing the performance of several key parameters and relaying the results to a PC via an onboard USB 2.0 connector. Included in the design is an easy-to-use Graphical User Interface that runs a LabView™-based analysis program facilitating comprehensive evaluation of the I/O reference designs. The GUI provides many options for configuration of the test parameters as well as filtering and set up options that allow for comprehensive analysis of the individual I/O module boards. Full documentation and design files of the platform are provided.

Features

- 32-bit, 80MHz Tiva™ C Series ARM® Cortex™-M4 MCU
- Modular plug-in design: two identical interface sockets for simultaneously controlling and analyzing TI's suite of PLC I/O module reference design boards
- Circuitry for enhanced throughput enabling full 1-MSPS data acquisition and 20-MHz SPI performance
- EMC-compliant Isolated RS485 interface for fieldbus connectivity and EMC-compliant USB 2.0 interface for PC connectivity
- High-efficiency, isolated power supply for both I/O boards using LM5017 Flyback™ topology
- Power supply protection circtry for safeguarding against reverse polarity, transient/surge, and in-rush current
- LabView™-based GUI for functional testing and performance analysis

Schematic/Block Diagram

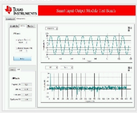
Quickly understand overall system functionality.



Download Schematic

Test Data

Get results faster with test and simulation data that's been verified.



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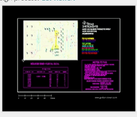
Design Files

Download ready-to-use system files to speed your design process. Get Viewer.



Download Design Files

Bill of Materials (BOM)

Find the complete list of components in this reference design.

Download BOM

TI Devices (8)

Order samples, get tools and find more information on the TI products in this reference design.

Part Number	Name	Product Family	Sample & Buy	Design Kits & Evaluation Modules
ISO3082	Isolated 5-V Full-Duplex RS-485 Transceivers	Isolator	Sample & Buy	View Design Kits & Evaluation Modules
LM5017	7.5-100V Wide Vin, 650mA Constant On-Time Synchronous Buck	Converter (Integrated Switch)	Sample & Buy	View Design Kits & Evaluation

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CAD/CAE symbols

Part	Package | Pins	CAD File [.bxl]	STEP Model [.step]
ISO3082	SOIC (DW) | 16	Download	Download
LM5017	HSOP (DDA) | 8	Download	Download
	WSON (NGU) | 8	Download	Download
LM5069	VSSOP (DGS) | 10	Download	Download
REF3230	SOT (DBV) | 6	Download	Download
TPS3897	USON (DRY) | 6	Download	-
TPS55010	WQFN (RTE) | 16	Download	-

Texas Instruments and Accelerated Designs Inc. have collaborated together to provide TI customers with schematic symbols and PCB layout footprints for TI products.

Step 1: Download and Install the Ultra Librarian software ZIP: 62MB

Step 2: Download the Symbol and Footprint .bxl file.

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Technical Documents

User Guides (1)

Title	Abstract	Type	Size [KB]	Date	Views	TI Recommends
TIDA-00123 Reference Guide		PDF	3724	30 Jan 2014	635	✓

Selection Guides (2)

Title	Abstract	Type	Size [KB]	Date	Views
USB Solutions Guide		PDF	4753	25 Jun 2014	450
Wide VIN Power Solutions for Industrial Automation Brochure		PDF	3059	05 Jun 2014	629

Design Files (2)

Title	Abstract	Type	Size [KB]	Date	Views
TIDA-00123 Schematic		PDF	1920	30 Jan 2014	698
TIDA-00123 Bill of Materials (BOM)		PDF	222	30 Jan 2014	181

More Literature (1)

Title	Abstract	Type	Size [KB]	Date	Views
Pick the right turns ratio for a Fly-Buck converter		PDF	783	21 Aug 2014	54

Related Tools & Software

Software (3)

- TIDA-00123 Reference Design - PC Based GUI Software
  (ZIP, 7936 KB) 148 views, 30 Jan 2014
- TIDA-00123 Reference Design - IO Controller Software
  (ZIP, 278 KB) 153 views, 30 Jan 2014
- TIDA-00123 Design Files
  (ZIP, 1021 KB) 194 views, 30 Jan 2014

Applications

- PLC/DCS I/O Module: Analog Input
- PLC/DCS I/O Module: Analog Output
- PLC/DCS I/O Module: Digital Input
- Programmable Logic Controller

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- LM3431-REF
- TSW3070EVM
- PMP1182

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