DC Power Line Communication (PLC) Reference Design

(ACTIVE) 24VDCPLCEVM

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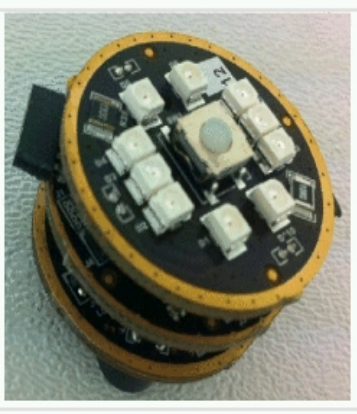

Description

The DC (24 V, nominal) Power-Line Communication (PLC) reference design is intended as an evaluation module that customers can use to develop end-products for industrial applications leveraging the capability to deliver both power and communications overs the same DC power line. The reference design provides a complete design guide for the hardware and firmware design of a master (PLC) node, slave (PLC) node in an extremely small (approximately 1-inch diameter) industrial form factor.

The application layer handles the addressing of the slave (PLC) nodes as well as the communication from the host processor (PC or Sitara Arm MPU from Texas Instruments). The host processor communicates only to the mater (PLC) node via a USB-UART interface and then master node communicates to the rest of the slave nodes over the Power Line Communication. The easy-to-use GUI is also included that can run on the host processor and provides address management as well as slave node(s) status monitoring and control to the user.

At the heart of this reference design are the AFE from TI, AFE031, to interface with power lines as well as the TMS320F28035 Piccolo™ Microcontroller that runs the PLC-Lite protocol from TI. The AFE's monolithic integrated circuit provides high reliability in demanding power-line communications applications. The F2803x Piccolo family of microcontrollers (C2000™) provides the power of the C28x core and Control Law Accelerator (CLA) coupled with highly integrated control peripherals in low pin-count devices. Based on TI's powerful, C2000 microcontroller architecture and the AFE031, developers can select the correct blend of processing capacity and peripherals to either add power-line communications to an existing design or implement a complete application with PLC communications.

Target Applications

- *Lighting applications*
- *Smoke and fire detection systems*
- *Building automation systems*
- *Elevator systems*

Features

- *Robust protection against power-up surges with two-stage AC-coupling design with TVS protection*
- *Power design implements low-pass filtering to filter PLC communication from switching regulator operation*
- *Hardware and software supports multiple nodes*
- *DC-input voltage 18-V to 35-V operation*
- *Long cable support, (40-m) cable passed with no bit errors even at the lowest Transmitter Power Level*
- *Configurable hardware that supports different PLC standards*
- *Complete PHY, MAC, and applications layer*

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Technical Documents

User Guides (2)

Title	Abstract	Type	Size (KB)	Date	Views
DC PLC Reference Design Test Results		PDF	1081	16 Oct 2013	287
DC PLC Reference Design		PDF	2213	16 Oct 2013	862

Design Files (5)

Title	Abstract	Type	Size (KB)	Date	Views
DC PLC Reference Design Schematic		ZIP	732	15 Oct 2013	389
DC PLC Reference Design Layer Plots		ZIP	1626	15 Oct 2013	103
DC PLC Reference Design Gerber		ZIP	9104	15 Oct 2013	122
DC PLC Reference Design BOM		ZIP	1090	15 Oct 2013	112
DC PLC Reference Design Altium		ZIP	3841	15 Oct 2013	176

Related Products

Software (1)

DC PLC Reference Design Software Demo (Rev. A)
(ZIP, 971 KB) 180 views, 29 Jan 2014

TI Devices (4)

Part Number	Name	Product Family
AFE031	Powerline Communications Analog Front End	Operational Amplifier (Op Amp)
LM34910	8-36V, 1.25A Constant On-Time Non-Synchronous Buck Regulator	Converter (Integrated Switch)
TMS320F28035	Piccolo Microcontroller	Real-time Control

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Name	Type	Available During
Georgia Tech MOOC: Control of Mobile Robots Learn how to make mobile robots move in effective, safe, predictable, and collaborative ways using modern control theory.	On-Line Training	On Demand

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