



Data Concentrator System Solutions



Advanced Metering Infrastructure (AMI) networks are the foundation for Smart Grid deployments around the world. AMI provides the two-way communications necessary for utilities to automate billing, remote connect/disconnect of individual meters, and implement demand response programs. AMI networks also provide the ability for real-time monitoring of grid operations and immediate notification of outages to speed utilities' ability to respond and restore power to energy consumers quickly and efficiently.

Data concentrators play a key role in AMI networks as they are the point of interaction between the utility's central operations network and individual end points. The data concentrator nodes securely aggregate data from a network of meters and sends it to utility servers.

TI's AMI data concentrator solution provides a secure, high performance reference that maximizes the number of end points serviced and therefore reduces the utility's overall cost of deployment. The data concentrator solution supports both wired AMI networks such as PLC and wireless AMI networks using low-power RF mesh or star topologies.

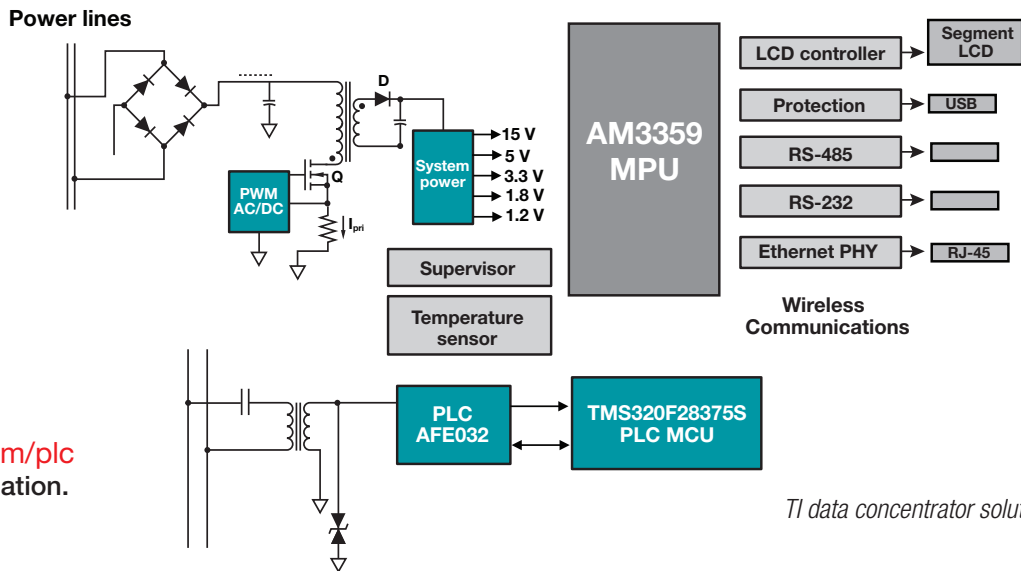
For PLC networks using the PRIME or G3-PLC standards, TI offers certified software solutions.



TI's PLC data concentrator software architectures separates the real-time functions into the TMS320F28375S MCU while keeping the upper levels of the stack on the AM3359 host MPU running Linux. This allows developers to write applications in a familiar environment quickly and easily.

TI's data concentrator solution also provides support for all narrowband PLC frequency bands in use around the world. OEMs can develop a single hardware platform with the AM3359, F28375S, and AFE032 analog front end and reuse that platform globally, saving development time and reducing total cost of ownership.

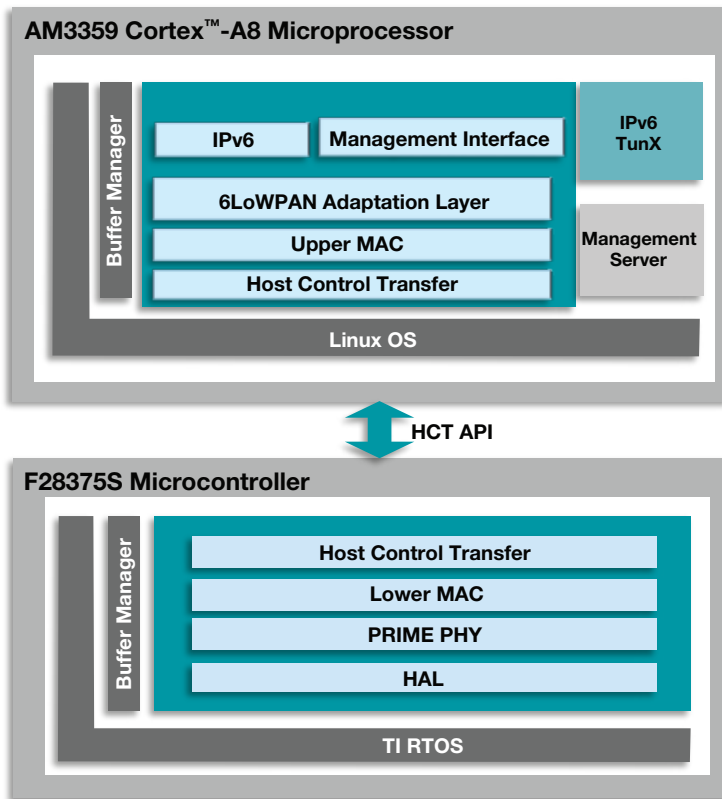
Complete information about TI's solution for Power Line Communications, including software downloads can be found at www.ti.com/plc.



Visit www.ti.com/plc for more information.

TI data concentrator solutions block diagram

G3-PLC Data Concentrator Software Stack



AM3359 Host MPU

- DLMS/COSEM IPv6 application interface
- Management interface
- Linux OS simplifies application development
- EAP/PSK Security EAP/PSK
- Topology supports 1000 end nodes

F28375S Microcontroller

- Real-time MCU supports G3-PLC CENELEC, ARIB, and FCC frequency bands
- Optimized architecture for PLC
- 1MB integrated flash provides memory for field updates and feature enhancements

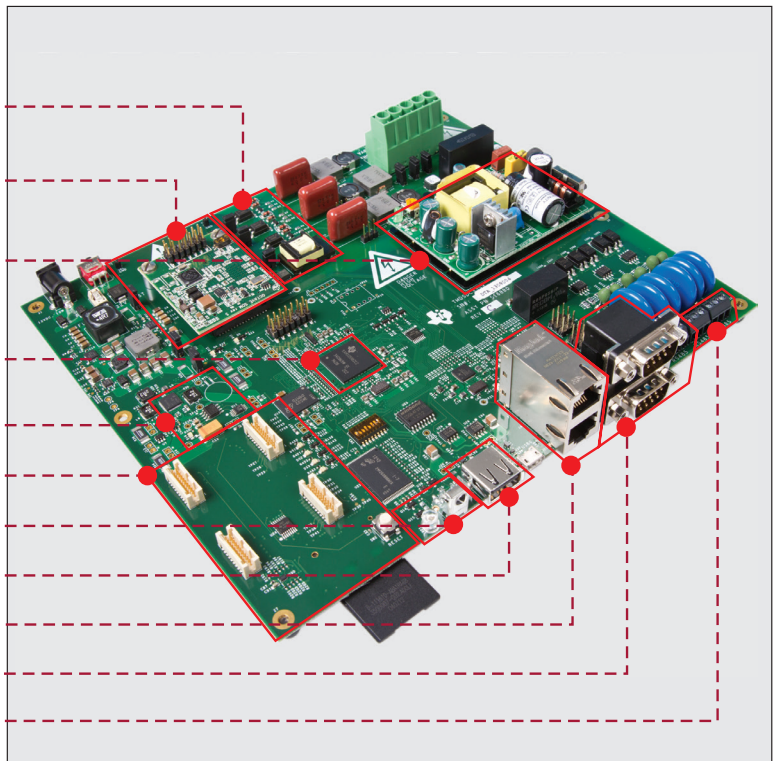
Evaluate TI's solutions for data concentrator based on ARM® technology. Support up to 2000 nodes G3-PLC standard, PRIME standard, IEEE-1901.2 standard

Supports control and data communications:
2x Ethernet, 3-phase PLC interface, sub-1-GHz and 2.4-GHz RF, 2x RS-232, 3x RS-485

Designed to best practices for high-speed systems: Good reference for design passing ESD system tests; BOM and schematics available

Hardware Features

- Isolation to prevent damage from high-voltage currents
- Three-phase PLC module support
- On-board 120-/240-V power supply
- AM335x processor:
 - Sitara™ processor for upper-level data concentrator stack and communications
 - Full Linux BSP supported by TI
- Temperature sensor
- Sub-1-GHz and 2.4-GHz RF
- Infrared receiver and transmitter
- 2x USB
- 2x Ethernet
- 2x RS-232
- 3x RS-485



TMDSDC3359 – data concentrator evaluation module

Data Concentrator System Solutions

Data concentrator reference designs

| Device | Reference design | Price |
|-----------------|---|------------|
| TIDEP-0006 | Data concentrator | \$699 |
| TIDM-SOMPLC-FCC | System on module for PLC in FCC band | Contact TI |
| TIDA-00192 | PLC AC mains line coupling | |
| PMP9185.2 | AC/DC power supply for data concentrators | |

Embedded processors and front ends

| Device | Description | Benefits |
|---------------|--------------------------|---|
| AM3359 | Sitara ARM-Cortex A8 MPU | Up to 1 GHz performance, extensive peripheral set with 2 x G-bit ethernet, USB, Linux SDK |
| TMS320F28375S | C2000™ real-time MCU | PLC processor supports PRIME, G3-PLC, IEEE-1901.2 across FCC, ARIB, and CENELEC frequency bands |
| AFE032 | Analog front end for PLC | Supports FCC, ARIB, and CENELEC frequency bands |

Power management

| Device | Description | Benefits |
|----------|-------------------------|--|
| UCC28710 | AC/DC | Constant voltage, constant current controller with primary-side regulation |
| TPS82085 | Step-down Regulator | Industry's smallest 3 A buck converter module with integrated inductor |
| TLV62084 | Step-down Regulator | 2.7 V-5.5 V input, 2 A converter in 2x2 mm package |
| TPS63025 | Buck-Boost Regulator | HotRod QFN package: 2-A, low I_Q , low noise, 95% |
| TPS61230 | Step-up/boost regulator | High-efficiency boost converter for backup power supply |
| TPS61236 | Step-up/boost regulator | High-efficiency, small size boost with adjustable current limit |

Linear regulators

| Device | Description | Benefits |
|----------------------|-------------|---|
| TLV71310/11/12/15/18 | LDO | Capacitor-free, 150-mA, LDO with 15% regulation over temp. This next-generation LDO was designed to be stable without an o/p cap |
| LP38691 | LDO | 500 mA, low dropout CMOS linear regulator with tight output tolerance, and excellent AC performance with ultra-low ESR ceramic caps |
| TLV70710/11/12/15 | LDO | 200 mA LDO with low I_Q tight output regulation (2% typ). Offers line and load transient performance |

PMICs

| Device | Description | Benefits |
|-----------|-------------|--|
| TPS650250 | PMU | Low-cost PMU for AM335x processor |
| TPS65250 | PMU | Power management IC with “last gasp” storage and release circuit |

Voltage supervisor and reset

| Device | Description | Benefits |
|-----------|--------------------|---|
| TPS3831/9 | Voltage supervisor | Ultra-low power 150 nA, ultra-small voltage supervisor |
| TPS3700 | Voltage supervisor | UV, OV voltage monitor, wide input voltage |
| TPS3808 | Voltage supervisor | Highly accurate (0.5% typ) supervisor with low I_Q and adjustable reset delay |

Isolation

| Device | Description | Benefits |
|-------------|-------------------|---|
| ISO7840/41 | Digital isolation | High-immunity, 5.7 KV RMS reinforced isolator |
| ISO7340/41C | Digital isolation | Low power, robust EMC, fail-safe high |

RS-485 (Isolated and non-isolated)

| Device | Description | Benefits |
|-------------------|---------------------------|---|
| SN65HVD3082/85/88 | RS-485 Interface | 200 Kbps/1 Mbps/20 Mbps capable half-duplex transceivers, operate with very low supply current |
| SN65HVD3080/83/86 | RS-485 Interface | 200 Kbps to 20 Mbps capable full-duplex transceivers, operate with very low supply current |
| ISO3080/82/86/88 | Isolated RS-485 Interface | Isolated 5 V full and half-duplex RS-485 transceivers, provide 2500 V _{RMS} of isolation for 60s |

TI Worldwide Technical Support

Internet

TI Semiconductor Product Information Center Home Page
support.ti.com

TI E2E™ Community Home Page
e2e.ti.com

Product Information Centers

Americas Phone +1(512) 434-1560
Brazil Phone 0800-891-2616
Mexico Phone 0800-670-7544
Fax +1(972) 927-6377
Internet/Email support.ti.com/sc/pic/americas.htm

Europe, Middle East, and Africa

Phone
European Free Call 00800-ASK-TEXAS
(00800 275 83927)
International +49 (0) 8161 80 2121
Russian Support +7 (4) 95 98 10 701

Note: The European Free Call (Toll Free) number is not active in all countries. If you have technical difficulty calling the free call number, please use the international number above.

Fax +(49) (0) 8161 80 2045
Internet www.ti.com/asktexas
Direct Email asktexas@ti.com

Japan

Fax International +81-3-3344-5317
Domestic 0120-81-0036
Internet/Email International support.ti.com/sc/pic/japan.htm
Domestic www.tij.co.jp/pic

Asia

| Phone | Toll-Free Number |
|--|-------------------|
| Note: Toll-free numbers may not support mobile and IP phones. | |
| Australia | 1-800-999-084 |
| China | 800-820-8682 |
| Hong Kong | 800-96-5941 |
| India | 000-800-100-8888 |
| Indonesia | 001-803-8861-1006 |
| Korea | 080-551-2804 |
| Malaysia | 1-800-80-3973 |
| New Zealand | 0800-446-934 |
| Philippines | 1-800-765-7404 |
| Singapore | 800-886-1028 |
| Taiwan | 0800-006800 |
| Thailand | 001-800-886-0010 |

International +86-21-23073444
Fax +86-21-23073686
Email tiasia@ti.com or ti-china@ti.com
Internet support.ti.com/sc/pic/asia.htm

Important Notice: The products and services of Texas Instruments Incorporated and its subsidiaries described herein are sold subject to TI's standard terms and conditions of sale. Customers are advised to obtain the most current and complete information about TI products and services before placing orders. TI assumes no liability for applications assistance, customer's applications or product designs, software performance, or infringement of patents. The publication of information regarding any other company's products or services does not constitute TI's approval, warranty or endorsement thereof.

A021014

The platform bar and E2E are trademarks of Texas Instruments. All other trademarks are the property of their respective owners.

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as "components") are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI's terms and conditions of sale of semiconductor products. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

TI assumes no liability for applications assistance or the design of Buyers' products. Buyers are responsible for their products and applications using TI components. To minimize the risks associated with Buyers' products and applications, Buyers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of significant portions of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI components or services with statements different from or beyond the parameters stated by TI for that component or service voids all express and any implied warranties for the associated TI component or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences, lessen the likelihood of failures that might cause harm and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI's goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

Only those TI components which TI has specifically designated as military grade or "enhanced plastic" are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components which have **not** been so designated is solely at the Buyer's risk, and that Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

Products

| | |
|------------------------------|--|
| Audio | www.ti.com/audio |
| Amplifiers | amplifier.ti.com |
| Data Converters | dataconverter.ti.com |
| DLP® Products | www.dlp.com |
| DSP | dsp.ti.com |
| Clocks and Timers | www.ti.com/clocks |
| Interface | interface.ti.com |
| Logic | logic.ti.com |
| Power Mgmt | power.ti.com |
| Microcontrollers | microcontroller.ti.com |
| RFID | www.ti-rfid.com |
| OMAP Applications Processors | www.ti.com/omap |
| Wireless Connectivity | www.ti.com/wirelessconnectivity |

Applications

| | |
|-------------------------------|--|
| Automotive and Transportation | www.ti.com/automotive |
| Communications and Telecom | www.ti.com/communications |
| Computers and Peripherals | www.ti.com/computers |
| Consumer Electronics | www.ti.com/consumer-apps |
| Energy and Lighting | www.ti.com/energy |
| Industrial | www.ti.com/industrial |
| Medical | www.ti.com/medical |
| Security | www.ti.com/security |
| Space, Avionics and Defense | www.ti.com/space-avionics-defense |
| Video and Imaging | www.ti.com/video |

TI E2E Community

e2e.ti.com