Microcontrollers in Flow Meters

Texas Instruments

Gas, water, and heat meters measure the volume of gas or liquid that passes through the meter.

Automatic meter reading (AMR) and advanced metering infrastructure (AMI) technologies add an additional layer of intelligence to traditional mechanical meters. These technologies improve meter-reading efficiency and provide more accurate and timely billing.

AMR enables automatic data collection, storage, and one-way communication from the meter to a meter-reading or data-collection device. Such a technology can offer customers and utility companies greater insight into consumption and flow information.

AMI enables two-way communication, bringing even more flexibility to metering systems and networks. The increased communication and control allows for additional features such as remote system upgrades and remote valve control.

Why partner with TI Smart Grid Solutions?

Choose from the broadest selection of low-power solutions that optimize your gas, water and heat meter systems. TI Smart Grid Solutions deliver:

- Innovation, expertise and support covering all the major functions of the flow meter
- Comprehensive hardware and software portfolios to meet specific system requirements
- Solutions that are compliant with standards such as IEC, ANSI, WMBus and ZigBee®

Microcontrollers for your gas, water and heat meter

With TI's MSP430™ ultra-low-power microcontrollers, designers are given several design options to differentiate and to drive innovation with their meter designs. In addition to sensing, data-logging, processing and communications support, the MSP430 family enables rapid development for next-generation gas, water and heat meter systems.

	LCD	RF	MCU family of devices	Examples of key flow meter devices	Active mode	Standby mode
Flow meter MCUs with low-power scan interface unit	•		MSP430FW4xx	MSP430FW429	200 µA/MHz	0.7 µA
MCUs with embedded FRAM			MSP430FR57xx MSP430FR59xx	MSP430FR5739 MSP430FR5969	80 µA/MHz 100 µA/MHz	1.5 µA 0.5 µA
General MCUs	•		MSP430F2xx MSP430F4xx	MSP430F2272 MSP430F4481	270 µA/MHz 280 µA/MHz	0.7 µA 1.1 µA
High-performance MCUs	•		MSP430F5xx MSP430F6xx	MSP430F5438A MSP430F6721	230 µA/MHz 256 µA/MHz	1.7 µA 1.7 µA
MCU + RF SoC	• •	• •	CC430F51xx CC430F61xx	CC430F5137 CC430F6147	160 µA/MHz 160 µA/MHz	2.0 µA 1.0 µA

For tools, software, and support options for your MSP430 microcontroller, visit www.ti.com/msp430.

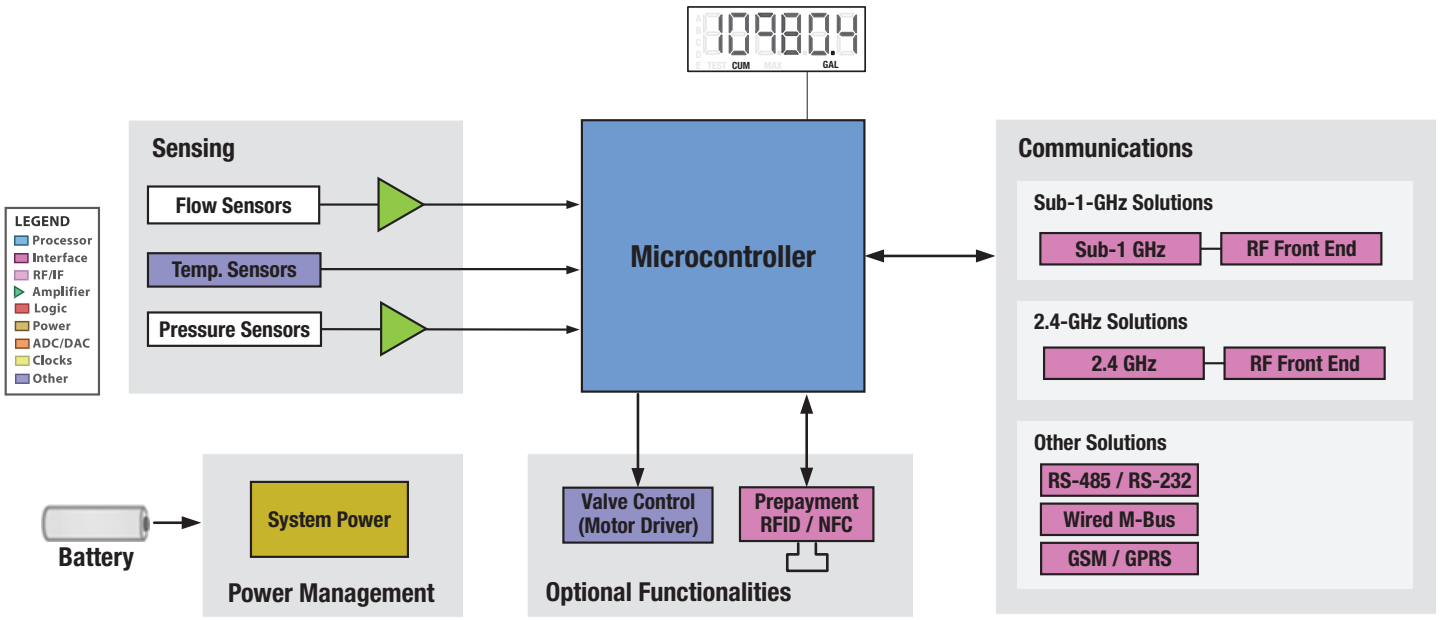
Getting Started

Solution highlights

- TI flow meter landing page: **www.ti.com/flowmeter**
- Smart grid landing page: **www.ti.com/smartgrid**
- Smart grid solutions brochure: **www.ti.com/lit/slym071**
- TI end-equipment folders:
  - Gas meters: **www.ti.com/solution/gas_meter**
  - Water meters: **www.ti.com/solution/water_meter**
  - Heat meters: **www.ti.com/solution/heat_meter**

Use on-demand support

- Introducing TI's Complete WMBus Solution (**www.ti.com/lit/slyt433**)
- An Electronic Water Meter Design Using MSP430F41x (**www.ti.com/lit/slaa138a**)
- Rotation Detection with the MSP430 Scan Interface (**www.ti.com/lit/slaa222**)
- Rotary/Linear Motion Detection Using the MSP430 Scan Interface and Optical Sensors (**www.ti.com/lit/slaa289**)
- Using GMR Sensors with the MSP430 Scan Interface (**www.ti.com/lit/slaa358**)



Key Flow Metering Solutions

Complement your microcontroller with other key flow metering solutions.

RF communications

Integrate AMR/AMI abilities with RF ICs and protocols for the sub-1 GHz and 2.4 GHz frequency bands.

- Sub-1 GHz (CC11x1, CC112x, CC119x)
- 2.4 GHz (CC25xx, CC259x)
- wMBus Software (**WMBus protocol stack**)

Power management

Optimize power consumption with solutions designed for battery-powered applications.

- DC/DC converters
  - Boost converters (TPS61xxx)
  - Buck converters (TPS62xxx)
  - Buck-boost converters (TPS63xxx)
- Power management ICs
  - Flow metering PMIC (TPS65290)

Optional functionalities

Address additional design requirements for smart meters.

- Prepayment
  - RFID (TRF796xA)
  - RFID or NFC (TRF7970A)
- Low-voltage motor drivers for valve control
  - Brushed motors (DRV883x)
  - Stepper motors (DRV883x except DRV8830)

Explore more options for your meter design

Wireless connectivity solutions: **www.ti.com/lprf**
WMBus solutions: **www.ti.com/wmbus**
Power management solutions: **www.ti.com/power**
RFID solutions: **www.ti.com/rfid**
NFC solutions: **www.ti.com/nfc**
Motor driver solutions: **www.ti.com/motor**
Analog solutions: **www.ti.com/analog**

The platform bar, E2E and MSP430 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 which meet ISO/TS16949 requirements, mainly for automotive use. Components which have not been so designated are neither designed nor intended for automotive use; and TI will not be responsible for any failure of such components to meet such requirements.

Products		**Applications**	
Audio	www.ti.com/audio	Automotive and Transportation	www.ti.com/automotive
Amplifiers	amplifier.ti.com	Communications and Telecom	www.ti.com/communications
Data Converters	dataconverter.ti.com	Computers and Peripherals	www.ti.com/computers
DLP® Products	www.dlp.com	Consumer Electronics	www.ti.com/consumer-apps
DSP	dsp.ti.com	Energy and Lighting	www.ti.com/energy
Clocks and Timers	www.ti.com/clocks	Industrial	www.ti.com/industrial
Interface	interface.ti.com	Medical	www.ti.com/medical
Logic	logic.ti.com	Security	www.ti.com/security
Power Mgmt	power.ti.com	Space, Avionics and Defense	www.ti.com/space-avionics-defense
Microcontrollers	microcontroller.ti.com	Video and Imaging	www.ti.com/video
RFID	www.ti-rfid.com		
OMAP Applications Processors	www.ti.com/omap	**TI E2E Community**	e2e.ti.com
Wireless Connectivity	www.ti.com/wirelessconnectivity		

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2012, Texas Instruments Incorporated