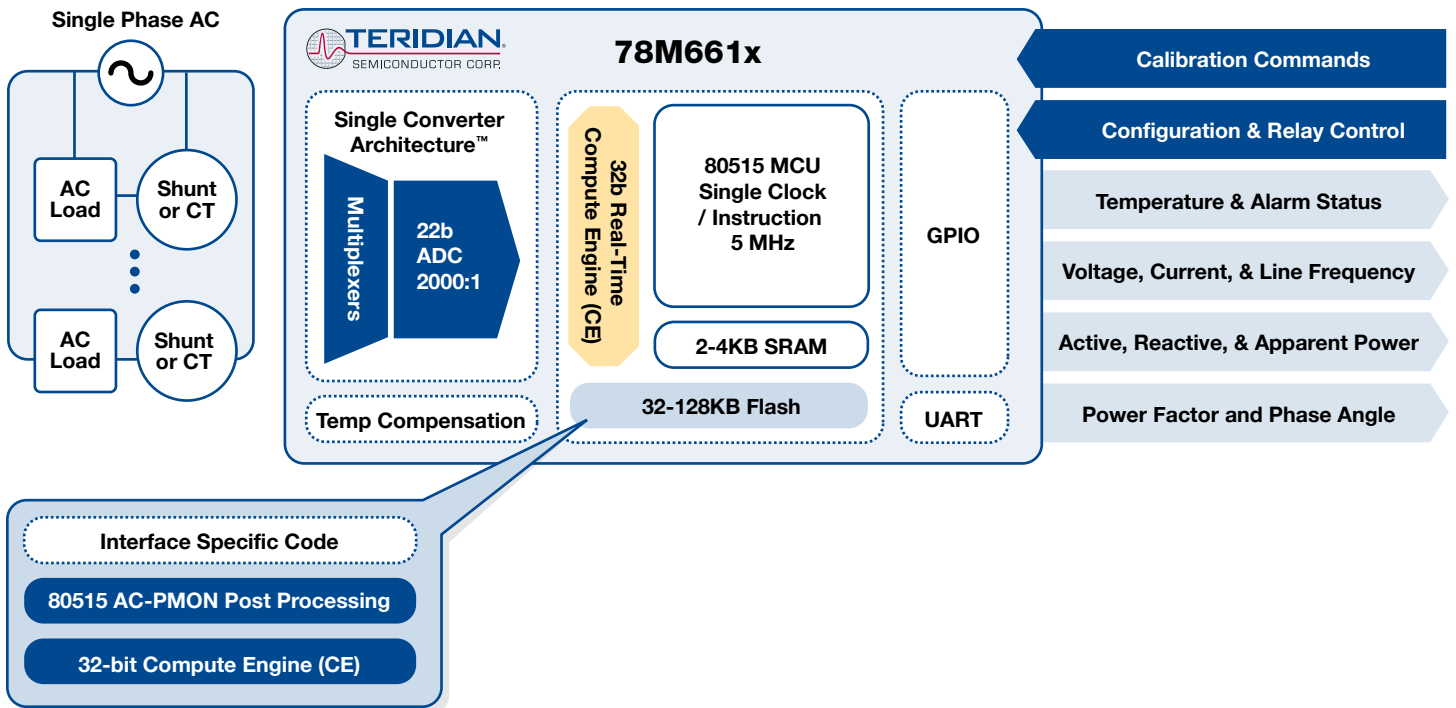## Quantifying Energy

From energy constrained data center equipment to smart appliances communicating with the grid, the need to quantify and control energy demand is increasing. Teridian's new family of 78M661x energy measurement solutions are the ideal choice for embedding high accurate AC power and energy measurement into grid friendly electronic equipment and intelligent power distribution gear.

With Teridian's patented and proven Single Converter Technology® developed for utility meters, the 78M661x products provide system designers precision input power data over a wide 2000:1 dynamic range allowing monitoring of both standby and operating modes. The innovative Single Converter analog front end eliminates channel-to-channel offsets and gain amplifiers minimizing calibration requirements and production costs for implementing accurate power measurement in volume applications. An embedded temperature sensor and 32-bit metrology engine provide the rest of the hardware resources needed to deliver a robust and reliable power measurement solution.

To offload host processing requirements, simplify system integration, and reduce development time; the 78M661x products also include an 8-bit MCU and embedded Flash memory. Complete measurement and application code available from Teridian can be pre-programmed into 78M661x ICs or downloaded for optional code customization. Demonstration platforms and development boards are available for typical applications.

Block Diagram

Single Phase AC

78M661x — TERIDIAN SEMICONDUCTOR CORP.

Single Converter Architecture™

- Multiplexers
- 22b ADC 2000:1
- Temp Compensation

32b Real-Time Compute Engine (CE)

- 80515 MCU Single Clock / Instruction 5 MHz
- 2-4KB SRAM
- 32-128KB Flash

- GPIO
- UART

Calibration Commands

Configuration & Relay Control

Temperature & Alarm Status

Voltage, Current, & Line Frequency

Active, Reactive, & Apparent Power

Power Factor and Phase Angle

Interface Specific Code

80515 AC-PMON Post Processing

32-bit Compute Engine (CE)

Energy Measurement IC Product Portfolio

	78M6618	78M6612	78M6613	78M6611
Package(s)	68-QFN	68-QFN, 64-LQFP	32-QFN	24-TSSOP
Total sensor inputs	10	4	4	2
Application(s)	Power Distribution Units & Panels, Control & Automation	Power Supply Units, Smart Appliances, Control & Automation	Power Supply Units, Smart Appliances, Control & Automation	Power Supply Units
Flash Size (KB)	128	32	32	32
RAM Size (KB)	4	2	2	2
MCU MIPS (80515 Core)	10	5	5	5
Max Number of DIOs	19	18	10	6
Slave Host Interface(s)	UART, SPI	UART	UART	UART

## Outlet Monitoring Unit (OMU) Demonstration Kits

Teridian's Outlet Measurement Unit (OMU) is a compact demonstration kit employing the 78M6612 SOC. The 78M6612 monitors the AC line voltages, frequency, and load current. The embedded firmware calculates items such as RMS line voltage and RMS load current, watts, VA, VAR and power factor. The real time data is transmitted via the serial interface to a PC for display in a Windows® based Graphical User Interface.

The standard kit uses a USB interface for OMU power and the serial communications link while the wireless (RF) kit includes a small power supply and necessary connectors for customers looking to integrate their own wireless COM solutions into the OMU demonstration kit.

ORDERING NUMBERS: 78M6612-DB/OMU-RF | 78M6612-DB/OMU-USB

The Windows® GUI provides the following controls and information:

> Power, current, voltage and power factor indicator dials
> Adjustable display scales
> Minimum and peak parameter tracking
> Selectable strip chart display format
> Narrow-band vs Wide-band measurement
> Selectable sample size averaging
> Line Frequency measurement
> Alarm Status Indicators
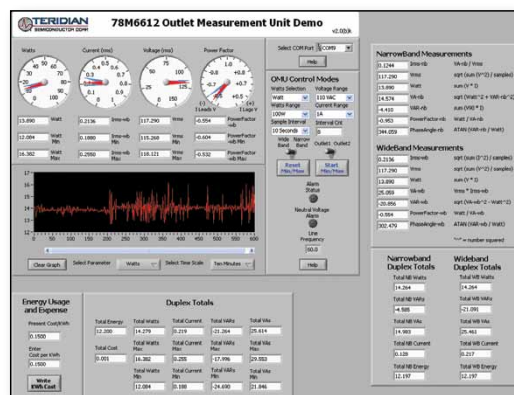
AC-PMON Evaluation Board
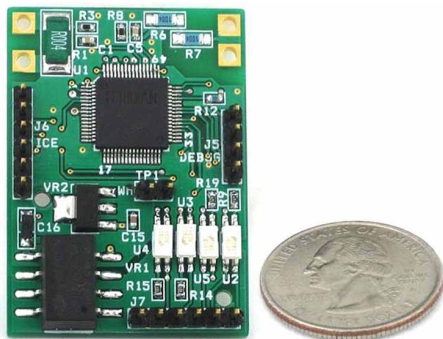
The 78M6612 AC-PMON evaluation board is the quickest way to integrate energy measurement or power monitoring into any application. These boards are reduced in size and include all the necessary isolation components for the 5V supply and communications interface. Multiple firmware or interface options are available.

ORDERING NUMBER: 78M6612-EVM-1

PDU Evaluation Board

The 78M6618 evaluation board is a design example of a switched 8-outlet power distribution unit with per outlet metering. The board includes one 78M6618 IC, an AC-DC power supply, one AC input, eight switched outputs (relays), and connectors to the serial interfaces and DIO pins.

ORDERING NUMBER: 78M6618-PDU-1

Programming Tools:

1. TFP2 Flash Programmer:

> For in-system programming
> Can be used with simple socket module board to pre-program individual ICs (refer to Programming Application note for examples of socket board schematics)

5 VDC Supply

Socket Board

Flash Programmer
Model TFP2

Target Socket

2. ADM51-ICE (In-Circuit Emulator):

> Signum Systems ADM51 is compatible with the Keil symbolic output format.
> Performs code emulation with breakpoints, watch windows, etc., with support of source code symbols.
> Can be used to program small engineering and prototype build requirements

3. Firmware Development Tools

> Keil   www.keil.com

Notes:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Register For More Information

For detailed product information register for a "**My Teridian**" login.

www.teridian.com/myteridian/

Provides access to: datasheets, application notes, user manuals, and SW/FW updates.

For more information about Teridian products and the name of a local representative or distributor, visit **www.teridian.com** or call +1 714-508-8800