



Freescale

At a Glance

We are Freescale

Freescale Semiconductor is a global leader in the design and manufacture of embedded semiconductors for the automotive, consumer, industrial and networking markets. During Freescale's 50+ years as part of Motorola, we developed our extensive technology portfolio, embedded expertise and innovative system-level solutions.

We are developing the enabling technologies for applications that will deliver value for our customers and shape our industry for years to come.

- We are committed to innovation—our intellectual property portfolio includes more than 6,200 patent families.
- We are committed to the future—we invest more than \$1 billion USD annually in research and development.
- We are committed to global corporate responsibility—we employ more than 20,000 people in more than 20 countries around the world, promoting creativity, diversity and environmental leadership.

- We are committed to open standards—we enable true convergence by embracing and creating common platforms.

Transforming the world around us

Freescale is an established leader in the semiconductor industry. With our technology expertise, our strong portfolio of products and intellectual property, partnerships and alliances, we can address complex customer and market challenges with comprehensive solutions.

Our leadership includes a broad portfolio of over 14,000 products. We have more than 10,000 customers, including many of the top original equipment manufacturers. With these assets, an innovative spirit and a commitment to ethics, we are dedicated to our mission of making Freescale the embedded processing leader for a smarter, more connected world.

Freescale's integrated solutions span the application spectrum—from next-generation networking equipment to engine control systems to factory automation. Billions of our products are powering and connecting lives.

- We put more silicon in automobiles than anyone else—we are the No. 1 supplier of semiconductors to the automotive industry.
- We are the global market share leader for embedded processors.
- We connect billions of people to the Internet—we are the No. 1 supplier of communication processors handling your Internet data.
- We have shipped more than 18 billion embedded devices.

Every day, we build on our heritage of innovation and customer collaboration.





Freescale—leading the markets we serve

Our 2008 revenues were \$5.2 billion USD.

We are the No. 1 supplier of:

- Automotive integrated circuits
- Integrated communications processors
- Radio frequency (RF) power transistors for 2.5G and 3G wireless infrastructure applications
- Digital signal processors (DSPs) based on StarCore® technology
- Independent automotive micro-electromechanical systems

We hold leading positions in:

- 8-, 16- and 32-bit microcontrollers
- Programmable DSPs
- 32-bit embedded products built on Power Architecture® technology
- Inertial and pressure sensors

Freescale delivers

Automotive—we are the leading supplier of semiconductors for the global automotive industry, and we are at the forefront in the development of the technologies and standards that will be critical for making cars safer, more fuel efficient and environmentally friendly.

Consumer—we deliver solutions to meet the needs of the consumer electronics industry. Our technology is helping to improve battery life in portable devices, innovate home entertainment to enable a more connected and efficient world for consumers. Freescale is a technology leader in a number of key consumer markets, including LED backlit screens, smart RF remote controls, sensors and accelerometers.

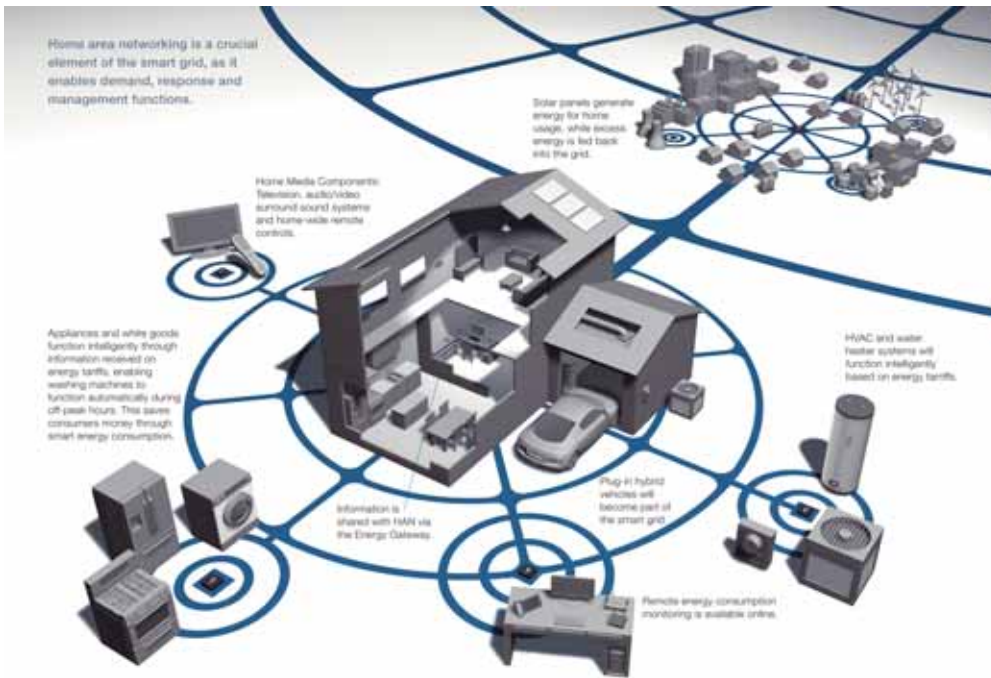
Industrial—we deliver solutions for connectivity, control, sensing and power management in the industrial market. Our products address the performance spectrum with 8-, 16- and 32-bit solutions and sensors for building control, HVAC, factory automation, energy-efficient motor control, medical and point-of-sale applications.

Networking—our technologies are enabling a new era of networking where every connection matters—helping to build more reliable, protected and content-rich networks. Our PowerQUICC® processors, StarCore DSPs, RF solutions and QorIQ™ platforms offer a smarter approach to multicore for manufacturers of wireless and wireline infrastructure, enterprise, SOHO networking, and pervasive computing products.



Learn More:

For current information about Freescale products and documentation, please visit www.freescale.com.



At the heart of smart Meters being rolled out worldwide and Smart Grid network infrastructure being constructed lies the goal of achieving energy efficiency at

both end-customer and Utilities side thereby reducing the carbon footprint left on the environment.

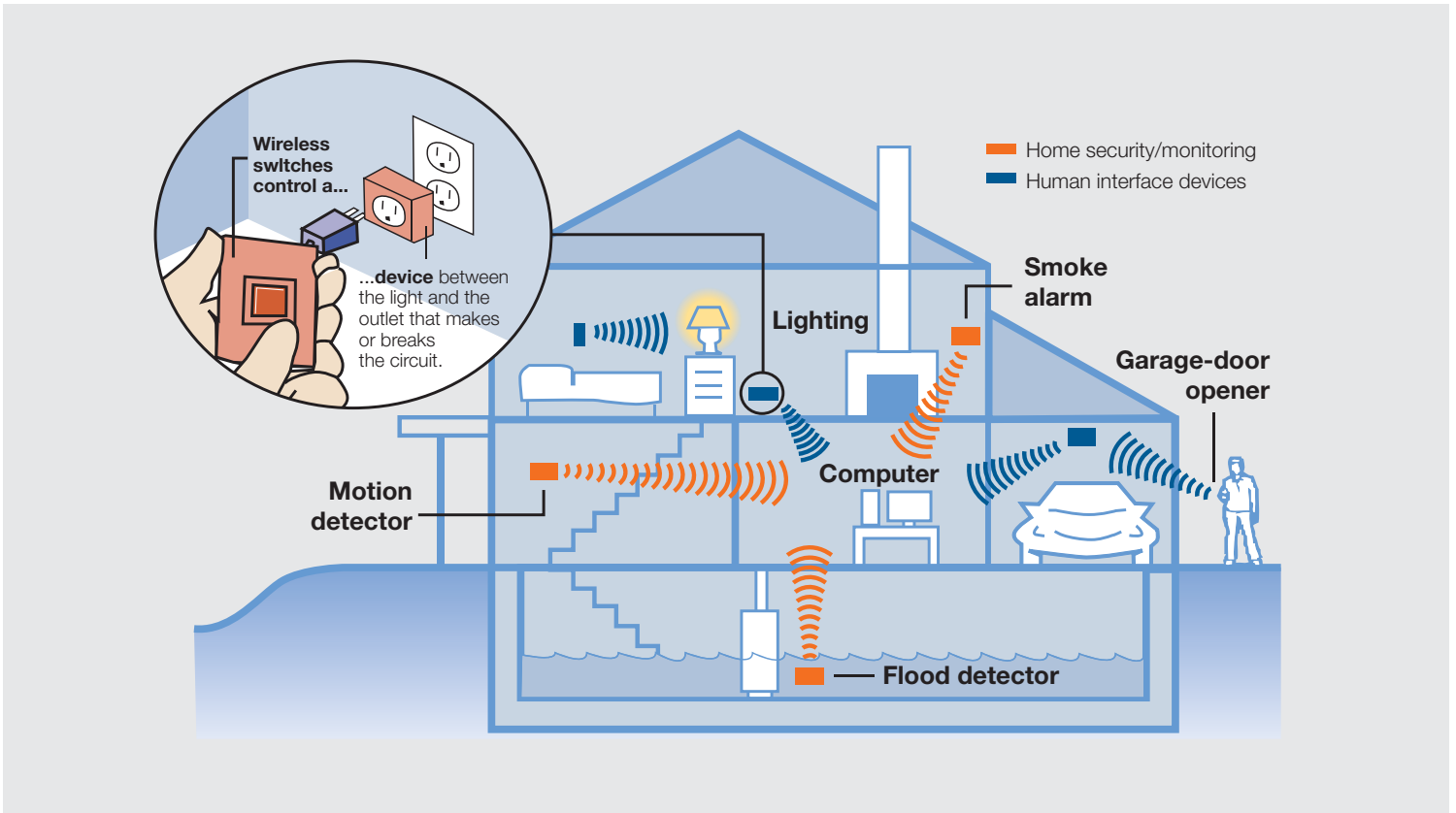
Freescale Solutions

Metrology: Freescale offers energy efficient 8- and 32-bit microcontroller solutions to implement smart utility metering systems for electricity, gas, water and heat meters. The MZ series are customized for meters with China smart grid new standard. The MZ series integrate ADC, timers, up to 69 GPIO and multiple communication interfaces to improve system accuracy and reduce BOM cost. Smart meter products such as the MCF51EM256 have on chip high accuracy ADC as well as a range of support functionality to provide security and accuracy for the product with a minimum of external components. Extremely low

power products such as the MC9S08LL16 are ideal for the flow meter applications as they consume very little power ensuring extremely long (over 15 years) battery lifetime.

Last Mile Communications: Freescale provides FSK Power Line Communications solutions based on digital signal controllers, MC56F802x. Freescale is collaborating with a partner on OFDM power line communications to provide higher speed, robust communications for "last mile" meter communications.

Data Concentrators: The Power Architecture based QorIQ family has the processing power and connectivity options required to implement a data concentrator or aggregator application. The P2020 offers dual core to allow application and communications to co-exist whilst providing a platform for a fully featured operation system and hypervisor support. Windows support for such applications is provided by i.MX family of products.



Home Area Network

Home Area Networking: The smart meter may require an energy gateway to provide the connectivity with other smart home appliances and services. The i.MX25, i.MX28 and MPC8308 products are ideal for such broad based connectivity solutions. With single and dual Ethernet options, LCD controller for colour graphic display needs and many different serial communications protocols supported including SPI for ZigBee® and EEPROM, these products offer the flexibility and cost points for this intelligent solution for modern connected buildings. The ZigBee protocol and Smart Energy profile (provided ZigBee stack) provides an easy to implement, low cost mesh network that brings together appliances, meters and medical equipment with a common solution. The MC13224 is a complete ZigBee solution in a package, with fast communications at low power.

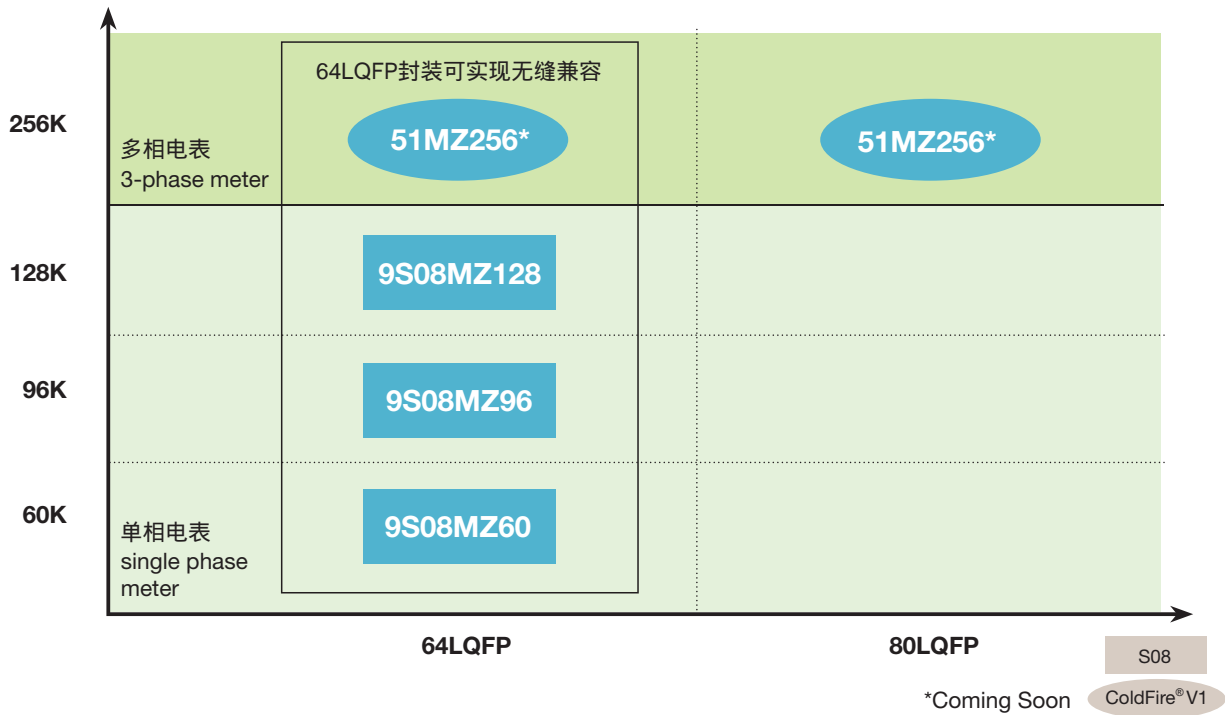
With motor control for heating and air conditioning systems easily handled by the broad portfolio of the Flexis S08 and ColdFire® V1 controllers, many with a wide range of connectivity options, every part of the smart home can be connected and controlled from a central point.

Displaying all this information in the home will see major strides of innovation as the low cost graphical displays are combined with touch sensing solutions. Freescale has a range of options such as the MPR121 touch sensor product with 12 touch pads for menu selection with ultra low power consumption allowing hand held and battery operated products to incorporate this feature. The scope for creativity through connectivity has never before been better.

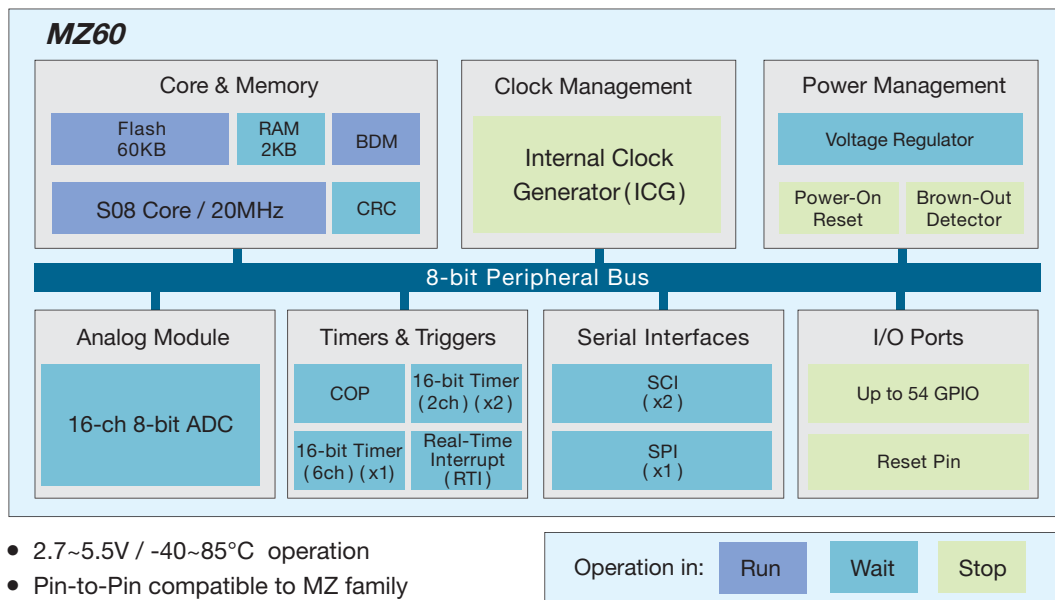
Freescale solutions supports measurement and communication functionality for Microgrid application such as rooftop solar panels. Plug-in Hybrid Electric Vehicle (PHEV) solutions through power line communication is also supported. Smart Grid Back-Bone Networking infrastructure: Freescale, a leader in the Networking space has robust Power Architecture and Multi-core processors like QorIQ to provide solutions in building smart and secure grid backbone infrastructure by providing processing power, security and communication options.

Freescale's focus is on providing connective, integrated solutions for these applications which leads to a better quality of life on a greener earth.

5V MZ Family Dedicated for State Grid Standard






9S08MZ60



64 LQFP

Please visit www.freescale.com.cn/metering for the MZ60 single phase power meter turn-key solution

Smart Meters Made Easy

Poly-phase (1ph or 3ph) Reference Design	MCF51EM Silicon	Software & Hardware
 <ul style="list-style-type: none">• Includes schematics, BOM, software and documentation• Designed to meet international metering standards for both 110V and 230V systems	 <ul style="list-style-type: none">• ColdFire® V1 32-bit core and 4X16-bit ADCs for calculation speed• Tamper detection• Update firmware without turning off the meter• Low Power and flexible LCD controller	 <ul style="list-style-type: none">• Complimentary MQX RTOS• CodeWarrior™ and Processor Expert makes development environment easy to use• DEMOEM board simulates an energy meter
Easy turnkey solution	Optimized solution for smart meters	Easy-to-use tools

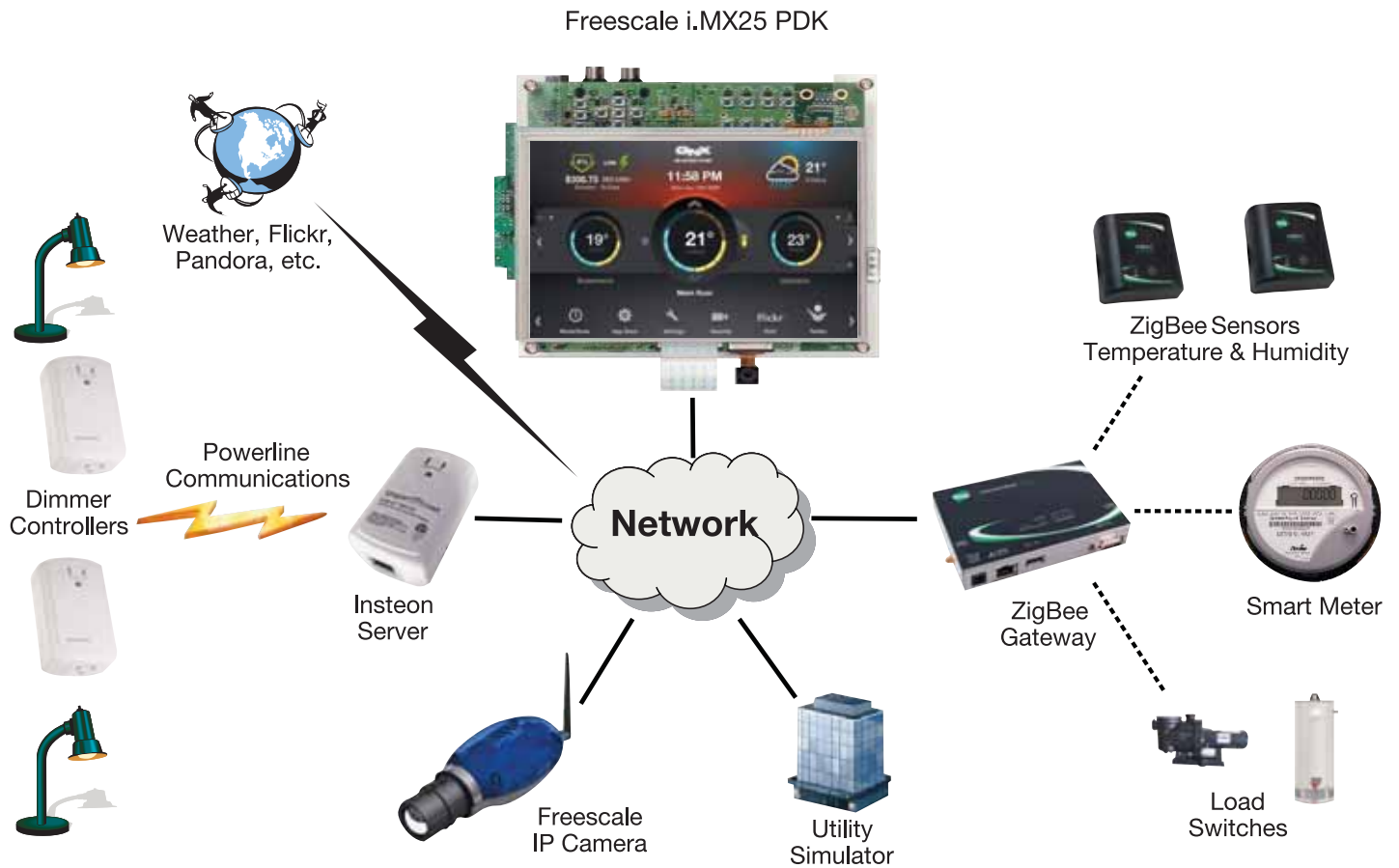
Poly-phase Reference Design Based on MCF51EM

- Demonstrates complete metering solution and helps you design a smart meter with the MCF51EM MCU
- Allows customer to develop a production meter design quickly
- Includes all design documentation and software
- Full working reference design is available for loan and evaluation. Contact your Freescale sales representative for more information.
- Designed and tested against:
 - **IEC 62053-22** International Energy Metering Specification, class 0.5 (or better) for active energy
 - **IEC 62053-23** International Energy Metering Specification, class 2 for reactive energy
 - **IEC 62056-21** International Energy Metering data exchange Specification
 - **IEC 62053-22, IEC 62053-23, IEC 62052-11** Electro Static Discharge (ESD), tested per **IEC 61000-4**



Please visit www.freescale.com/metering for more information

System Configuration

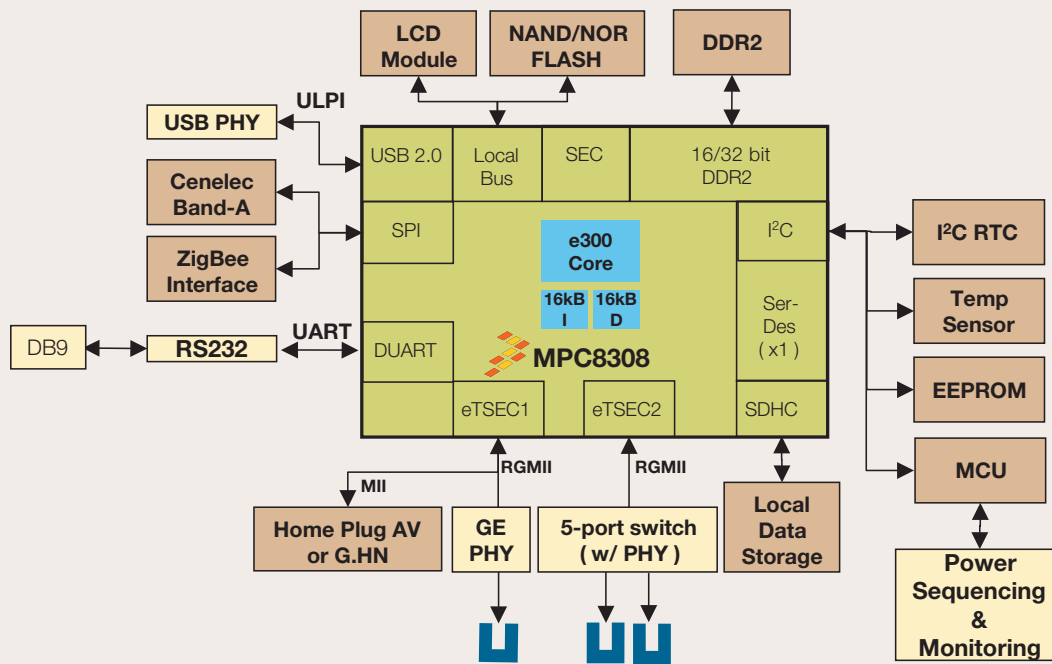


QNX Aviage HMI Suite on the i.MX25 Processor


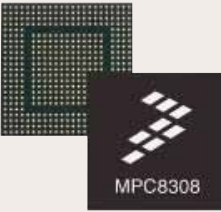

- The i.MX25 family provides performance, low power, integration and connectivity
- Building automation systems with sophisticated UI
- Optimized Adobe Flash Lite 3
- Prototype, develop and deploy Flash HMIs in embedded systems

Please visit www.freescale.com/imx25 for more information

Energy Gateway System Block Diagram (MPC8308 Based)



MPC8308 Smart metering energy gateway solution

Reference Design, Application Stacks	MPC8308	Software & Hardware Enablement
 <ul style="list-style-type: none"> • Partner: GDA Technologies • Energy gateway reference design includes ZigBee chip on board and interfaces to support WiFi, Powerline com, PLM, M-Bus, GPRS etc. • Running DLMS/COSEM Client Stack from Kalki Technologies (IEC 62056) <p>Easy turnkey solution</p>	 <ul style="list-style-type: none"> • E300 based microprocessor running up to 400 MHz • Various WAN/LAN interfaces like Gigabit Ethernet, PCI Express, eSDHC, USB, UART, SPI • Extremely low-cost and a small footprint <p>Optimized solution for energy gateway / concentrator</p>	 <ul style="list-style-type: none"> • Complimentary MQX RTOS • Codewarrior 8.8 development tools available • MPC8308-RDB (\$299) running gateway applications <p>Easy-to-use tools</p>

For more information, please visit :

http://gdatech.com/ref_MPC8308_SmartEnergyGateway.shtml