Welcome to E-XFL.COM

Embedded - Microcontrollers - Application Specific: Tailored Solutions for Precision and Performance

Embedded - Microcontrollers - Application Specific represents a category of microcontrollers designed with unique features and capabilities tailored to specific application needs. Unlike general-purpose microcontrollers, application-specific microcontrollers are optimized for particular tasks, offering enhanced performance, efficiency, and functionality to meet the demands of specialized applications.

What Are Embedded - Microcontrollers - Application Specific?

Application-specific microcontrollers are engineered to

Details	
Product Status	Obsolete
Applications	Energy Measurement
Core Processor	ARM® Cortex®-M0
Program Memory Type	FLASH (32kB)
Controller Series	-
RAM Size	8K x 8
Interface	I²C, IrDA, SPI, UART/USART
Number of I/O	22
Voltage - Supply	2.6V ~ 3.6V
Operating Temperature	-40°C ~ 85°C
Mounting Type	Surface Mount
Package / Case	32-VQFN Exposed Pad
Supplier Device Package	32-HVQFN (7x7)
Purchase URL	https://www.e-xfl.com/product-detail/nxp-semiconductors/em783-mc6e

NXP energy measurement IC EM783

Application processor for energy measurement with metrology engine

Available in a number of variants that support different configurations, this highly integrated yet low-cost application processor uses a powerful ARM Cortex-M0 core and delivers accuracy up to 1%.

KEY FEATURES

▸ Up to 1% accuracy metrology engine
▸ Dynamic range up to 1,000: 1 below the maximum current load
▸ Multiple variants for design flexibility: single- and multi-channel, single- and three-phase
▸ Configurable uptime for period of measurement
▸ Power line frequency detection and tracking of power-line frequency
▸ Built-in temperature sensor with accuracy to within 3 °C.
▸ ARM Cortex-M0 (up to 48 MHz)
▸ 4 kB on-chip EEPROM for calibration parameters and energy consumption log
▸ 32 kB flash memory
▸ 8 kB SRAM memory
▸ Integrated serial peripherals (UART, SPI, I2C, GPIO, counter/ timer, watchdog timer)
▸ Up to 22 GPIOs depending on the number of peripherals used
▸ 33-pin HVQFN package

KEY APPLICATIONS

▸ Smart plugs and plug meters
▸ Single-phase residential meters
▸ DALI/DMX and KNX nodes with metering functionality
▸ Industrial sub-meters
▸ Power monitors for servers
▸ Smart appliances

GENERAL DESCRIPTION

The EM783 is an application processor for energy measurement. It includes a built-in metrology engine with an accuracy of up to 1%, and is available in several variants to support a range configuration requirements. Each variant is built around a low-power, cost-effective, industry-standard ARM Cortex-M0 core that runs at up to 48 MHz and includes 4 kB of EEPROM, 32 kB of flash, 8 kB of SRAM, and a number of serial peripherals. Each variant also includes an on-chip temperature sensor.

The variants are configured for single-channel (SC), single-phase (SP), three-phase (TP), and multi-channel (MC) operation. The SP variant, for example, is an ideal fit for billing-grade, single-phase electricity meters.

With a scalable input source of 120 or 230 V and a power-line frequency of between 45 and 65 Hz, the EM783 delivers an accuracy of 1%. It maintains this accuracy over a dynamic range of 1,000:1 below the maximum current load.

The device performs a number of calculations: power in W, reactive power in VAr, apparent power in VA, power factor, Vrms, Irms, THD, and power-line frequency. It can compensate for temperature variations and can store calibration data in the on-chip EEPROM.

The EM783 runs an open-source application that generates kWh data, and works with an easy-to-use API that lets the designer initialize, start, stop, and read data from the Cortex-M0 CPU.
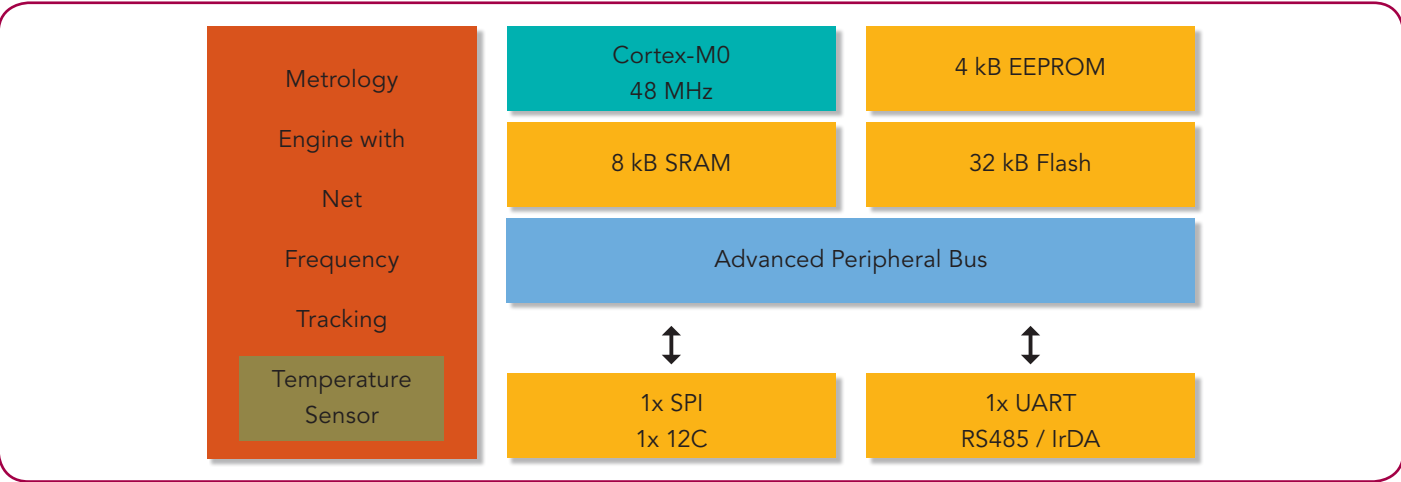
DEVELOPMENT PLATFORM

For fast time-to-market, NXP offers a complete EM783 development platform that supports single- and multi-channel applications.

The development platform includes an evaluation board equipped with an LCD panel and a USB interface. The designer can view metrology data directly on the board's LCD panel or, with the board connected to a PC, can use the platform's PC application to generate graphs for voltage, current, harmonics, and so on.

Portions of the development platform, including the application software, a schematic of the EM783 evaluation board, and the PC application, are available for download, free of charge. Please contact NXP for details.

EM783 block diagram

Metrology Engine with Net Frequency Tracking	Cortex-M0 48 MHz	4 kB EEPROM
Temperature Sensor	8 kB SRAM	32 kB Flash
	Advanced Peripheral Bus	
	1x SPI 1x 12C	1x UART RS485 / IrDA

Selection guide

Product	Type	I/U channels	Accuracy	SRAM	Flash	CPU (minimum)
EM783-SC	Single-channel	1x current, 1x voltage	1%	7.5 KB	28 KB	24 MHz
EM783-SP	Single-phase	2x current, 1x voltage	1%	7.2 KB	26 KB	24 MHz
EM783-MC3	Multi-channel	3x current, 1x voltage	1%	7.2 KB	26 KB	36 MHz
EM783-TP	Three-phase	3x current, 3x voltage	2%	6.5 KB	24 KB	36 MHz
EM783-MC6	Multi-channel	6x current, 1x voltage	2%	6.5 KB	24 KB	36 MHz