Performance Level Digital Signal Controllers

MC56F83xxx DSC Family

The MC56F83xxx DSC family is NXP's performance level digital signal controllers product, with peripheral enhancements ideal for high performance digital power conversion and advanced motor control applications
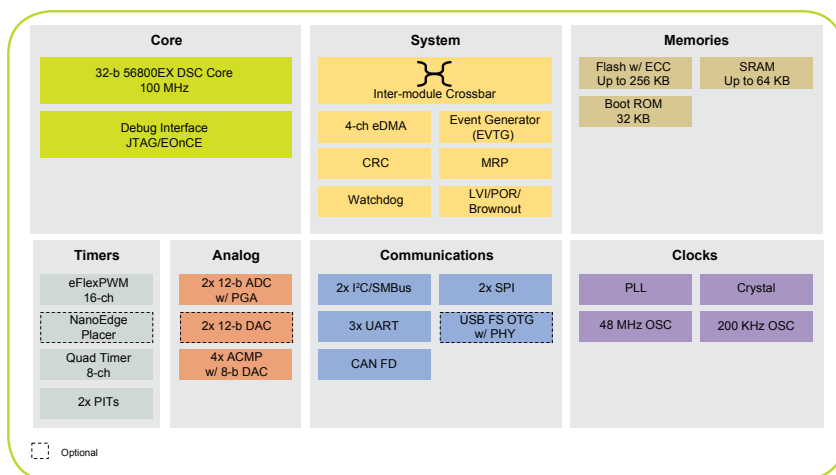
KEY FEATURES

The MC56F83xxx family is NXP's performance level digital signal controllers. This family is based on the 32-b 56800EX DSP core, with both core and BUS frequency up to 100 MHz. The MC56F83xxx family also extends the DSC products' feature integration to now include support for dual partition Flash, Flash ECC, USB FS OTG, CAN FD and boot ROM. In addition, the MC56F83xxx family offers enhanced DMA function (eDMA), inter-module crossbar (XBAR) with more flexible event generator (EVTG), low-power high-speed ADC, extended RAM size and up to 16-channel high resolution PWM, making it ideal for high performance digital power conversion and advanced motor control applications.

TARGET APPLICATIONS

▸ Switched mode power-supply

▸ Uninterruptable power supply

▸ Power distribution systems

▸ Photovoltaic systems

▸ Wireless charging

▸ Advanced lighting

▸ Advanced motor control

▸ Smart appliances

▸ Industrial motor

MC56F83xxx DSC FAMILY BLOCK DIAGRAM

Core		System		Memories	
32-b 56800EX DSC Core 100 MHz		Inter-module Crossbar		Flash w/ ECC Up to 256 KB	SRAM Up to 64 KB
Debug Interface JTAG/EOnCE		4-ch eDMA	Event Generator (EVTG)	Boot ROM 32 KB	
		CRC	MRP		
		Watchdog	LVI/POR/ Brownout		

| Timers	Analog	Communications		Clocks	
eFlexPWM 16-ch	2x 12-b ADC w/ PGA	2x I²C/SMBus	2x SPI	PLL	Crystal
NanoEdge Placer	2x 12-b DAC	3x UART	USB FS OTG w/ PHY	48 MHz OSC	200 KHz OSC
Quad Timer 8-ch	4x ACMP w/ 8-b DAC	CAN FD			
2x PITs					

Optional

FEATURE AND BENEFITS

▸ 100 MHz 32-bit core provides math capabilities needed for advanced power conversion and motor control applications

▸ Single-cycle math computations, fractional arithmetic support and parallel moves improve performance, driving tighter and faster control loops

▸ Up to 16-channel high-resolution PWM with 312 picosecond resolution enables higher switching frequencies, reducing cost and increasing efficiency

▸ Two 12-bit high-speed low-power ADCs each with up to 3MSPS sampling rate improve system accuracy by reducing jitter on input values

▸ 128 KB to 256 KB flash memory provides scalability needed for performance level digital power and motor control applications

▸ 64 KB SRAM allows more code to execute from SRAM for faster speed

▸ 32 KB boot ROM support code update through I2C, UART and CAN, no need to use the flash memory to store the bootloader; more flash can be used for program and data

▸ Pin-to-pin compatible with the MC56F84xxx and MC56F82xxx DSC families for performance and peripheral scalability

▸ 5V-tolerant I/O provides design flexibility and system cost reduction

▸ Enhanced direct memory access (eDMA) controller provides more flexible two-level loop control, further reducing core interruption and increasing performance

▸ Four analog comparators with integrated 8-bit DACs speed system event identification and emergency shutdown of PWM outputs

▸ Memory protection capability increases system safety by restricting user code from accessing key memory locations and peripherals reserved for supervisor access

▸ One USB FS/LS 2.0 OTG controller supporting crystal-less operation helps to save on BOM cost

▸ One FlexCAN module supporting Flexible Data Rate (CAN FD) and CAN 2.0 B protocol, enabling real-time and cost-effective field communication

DEVELOPMENT TOOLS

MC56F83000-EVK Development Board
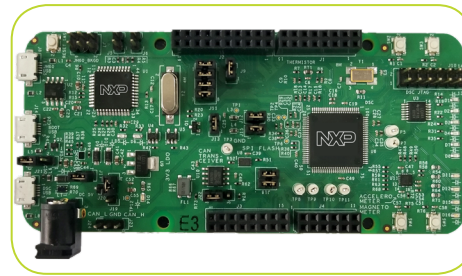
The MC56F83000-EVK is an ultra-low-cost development platform for the MC56F83xxx DSC family allowing rapid prototyping and application development.

MC56F83XXX DSC FAMILY OPTIONS

Part Number	CPU Freq (MHz)	Flash	SRAM	Flash Swap	High Resolution PWM	12-b 3MSPS ADC	12-b DAC	CAN-FD	USB FS	Package
MC56F83789VLL	100 MHz	256 KB	64 KB	Yes	Yes	Yes	Yes	Yes	Yes	LQFP100
MC56F83769VLL	100 MHz	128 KB	48 KB	Yes	Yes	Yes	Yes	Yes	Yes	LQFP100
MC56F83786VLK	100 MHz	256 KB	64 KB	Yes	Yes	Yes	Yes	Yes	No	LQFP80
MC56F83766VLK	100 MHz	128 KB	48 KB	Yes	Yes	Yes	Yes	Yes	No	LQFP80
MC56F83783VLH	100 MHz	256 KB	64 KB	Yes	Yes	Yes	Yes	Yes	No	LQFP64
MC56F83763VLH	100 MHz	128 KB	48 KB	Yes	Yes	Yes	Yes	Yes	No	LQFP64
MC56F83689VLL	100 MHz	256 KB	64 KB	No	No	Yes	No	Yes	Yes	LQFP100
MC56F83686VLK	100 MHz	256 KB	64 KB	No	No	Yes	No	Yes	No	LQFP80
MC56F83683VLH	100 MHz	256 KB	64 KB	No	No	Yes	No	Yes	No	LQFP64

CodeWarrior Development Studio for Microcontrollers V11

Complimentary Special Edition Eclipse-based CodeWarrior Development Studio for Microcontrollers V11 is a complete integrated development environment that provides a highly visual and automated framework to accelerate the development of the most complex embedded applications.

FreeMASTER

Complimentary, user-friendly, real-time debug monitor and data visualization tool for application development and information management. Supporting non-intrusive variable monitoring on a running system, FreeMASTER allows the data from multiple variables to be viewed in an evolving oscilloscope-like display or in a common text format.

For more information on DSC development tools, visit: www.nxp.com/dsc/developer.