9S12XHZ Family
Single chip solution for instrument cluster

Overview

The MC9S12XHZ512 MCU is the industry's first instrumentation cluster MCU featuring an integrated thin-film transistor (TFT) display drive capability.

The S12XHZ family is complemented by the low-end S12HZ family, which is based on Freescale's high volume S12 architecture and boasts 15 members, ranging from the ultra low-cost 32 KB ROM versions to devices with up to 256 KB of flash memory. Featuring the enhanced S12X core, the S12XHZ512 provides a high-performance, backward compatible extension to the established S12HZ.

Application Features

This instrument cluster demonstrator board was designed to present Freescale's complete advanced solution for automotive instrument cluster designs.

It offers high flexibility in support of displays. Add-on boards are available for the demo system.

- OPTREX TFT-LCD module 320 x 96; 4.9 inch driven directly by XGATE coprosessor
- MCU can drive QVGA displays via async. FIFO implemented in low-cost FPGA
- MCU runs 128 Segment LCD display from integrated driver

Application Usage

- Instrument cluster
- Stepper motor gauge applications
- Automotive gateway
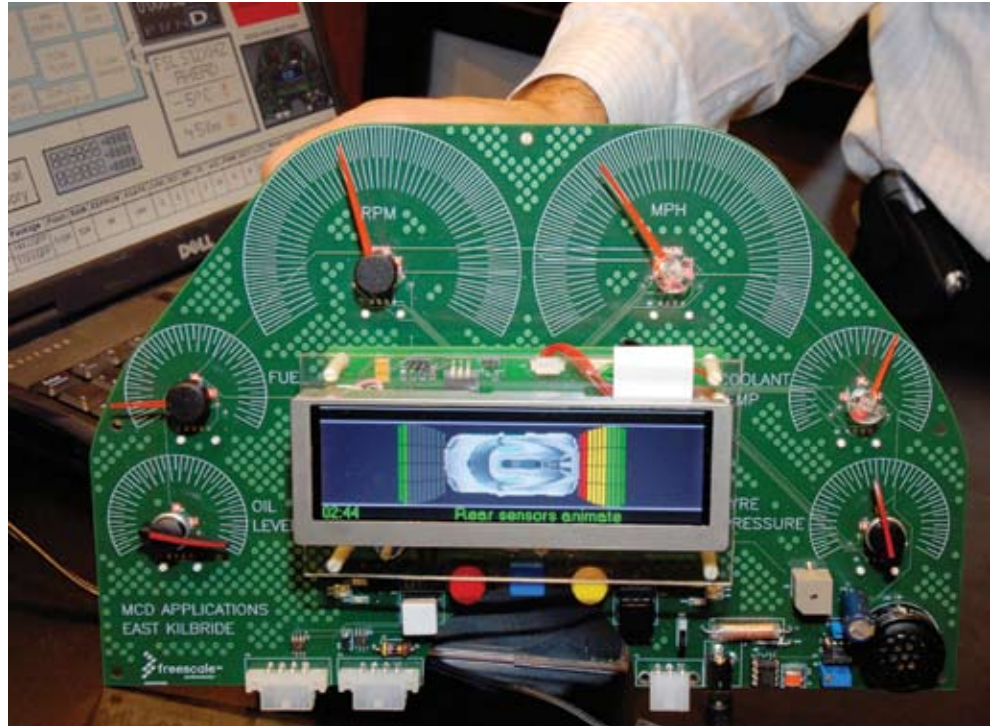
Demo Board Available

With its on-chip TFT driver, the S12XHZ512 device enables instrumentation cluster designers to reduce the complexity of their designs and implement high-quality graphic displays on low-end automotive dashboards in a timely, cost-effective manner. TFT displays are gaining momentum in the mainstream autiomotive market as the technology becomes more cost-effective.

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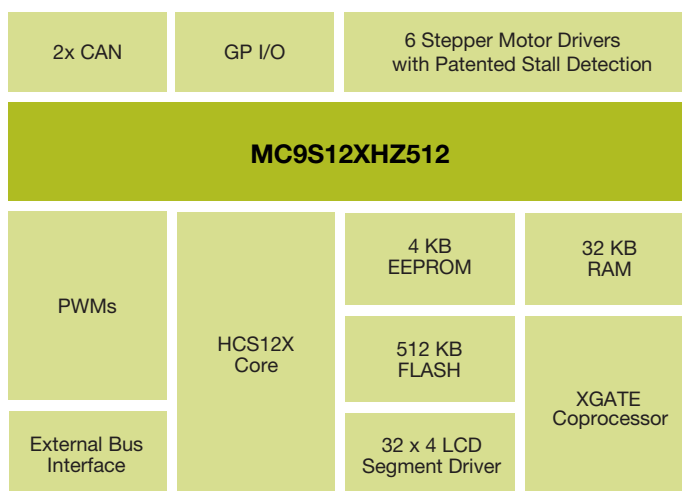
MC9S12XHZ512 Features

16-bit S12X MCU family

- MC9S12X core features
  - CPU12X Enhanced S12 16-bit CPU
  - EBI 16-bit non-multiplexed external bus interface
  - INT—Provides 7 levels of interrupt; routes interrupts to CPU12X or XGate
  - DBG—Debug module with trigger/ trace capability
  - BDM—Single-wire background debug
- XGate
  - Independent, programmable 16-bit RISC CPU Processor
  - Accelerates data transfer between peripherals, flash and RAM independent of CPU12X
- PIT-Periodic Interrupt Timer
  - Four independent timers with selectable timeout periods
  - Independent of main timer module
- CRG
  - Low-noise/low-power Pierce oscillator
  - PLL
  - COP watchdog
  - Real-time interrupt
  - Clock monitor
  - Fast wake-up from STOP mode
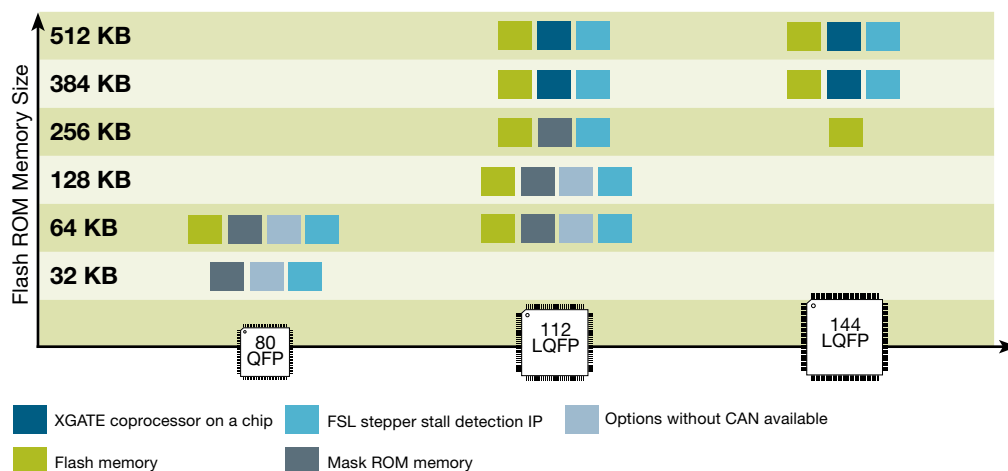 - Low power RC wake-up function

Tools Documentation and Support

- Device documentation
  - MC9S12XHZ512 product brief
  - MC9S12XHZ512 datasheet
- Modular system development and demostation solution. Contact your Freescale Sales Office for information.
- Application support available from experts at Freescale Semiconductor.

MC9S12XHZ512 Block Diagram

2x CAN	GP I/O	6 Stepper Motor Drivers with Patented Stall Detection

MC9S12XHZ512

PWMs	HCS12X Core	4 KB EEPROM	32 KB RAM
		512 KB FLASH	XGATE Coprocessor
External Bus Interface		32 x 4 LCD Segment Driver	

S12(X)HZ Family

Flash ROM Memory Size: 512 KB, 384 KB, 256 KB, 128 KB, 64 KB, 32 KB — plotted against 80 QFP, 112 LQFP, 144 LQFP

- XGATE coprocessor on a chip
- FSL stepper stall detection IP
- Options without CAN available
- Flash memory
- Mask ROM memory

This example design is used by Freescale as proof of concept and may contain advanced information on unreleased devices. For further details contact your Freescale sales representative.
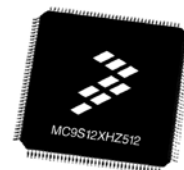
Device	Package	Flash	RAM	EEPROM	XGate	CAN	SCI	SPI	IIC	A/D	PWM	ECT	LCD	PWM	Motor	SSD	KWU	EBI	I/O
9S12XHZ512	144 LQFP	512 KB	32 KB	4 KB	yes	2	2	1	2	16	8	8	32x4	8	24/6	6	8	yes	117
	112 LQFP										6			6	16/4	4		no	85
9S12XHZ384	144 LQFP	384 KB	28 KB	4 KB	yes	2	2	1	2	16	8	8	32x4	8	24/6	6	8	yes	117
	112 LQFP										6			6	16/4	4		no	85
9S12XHZ256	144 LQFP	256 KB	16 KB	4 KB	yes	2	2	1	2	16	8	8	32x4	8	24/6	6	8	yes	117
	112 LQFP										6			6	16/4	4		no	85

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