FXLC95000CL Xtrinsic Intelligent Motion-Sensing Platform

Typical Applications

- Mobile phones e-readers/tablets
  - Sensor hub capability
  - GPS navigation backup
  - Portrait/landscape
  - Shock/Flick detection
  - Tilt control
  - User interface
  - Gesture control
  - Pedometer
- Gaming and toys
  - Motion control
  - Auto wake/sleep
- Medical applications
  - Activity monitoring
  - Sports injury monitoring systems
- Security
  - Shock detection
  - Tilt
- Fleet monitoring, tracking
  - Shock recording for warranty reporting
  - Anti theft
- Power tools and small appliances
 - Tilt control
  - Safety shutoff

## Programmable Intelligence in Motion

With an open architecture that is demanded for next generation e-readers, tablets, portable navigation devices, and multiple applications requiring multiple sensor technologies, the FXLC95000CL Xtrinsic intelligent motion-sensing platform extends the Freescale family with more flash memory, integration of an MEMS accelerometer, a 32-bit embedded ColdFire MCU and a dedicated architecture to manage other sensors.

The FXLC95000CL Xtrinsic intelligent motion-sensing platform is comparable in size (3 x 5 x 1 mm) and power consumption to standard state-machine-based accelerometers. The sensor hub device can process sensor data locally, reducing communications required with the host 14-bit processor. Fewer computations done on the host and active power management of the host by the FXLC95000CL device can reduce system power by up to 90 percent compared to systems in which "dumb sensors" are directly managed by the applications processor.

The FXLC95000CL Xtrinsic intelligent motion-sensing platform can be programmed independent of the host operating system to create applications and services based on sensors. The device provides real-time sensor processing, more efficient data processing and re-use of IP software for shorter development time. In addition, sensor data aggregation can be achieved from third-party sensors, easing sensor implementation.

FXLC95000CL Xtrinsic Intelligent Motion-Sensing Platform Block Diagram
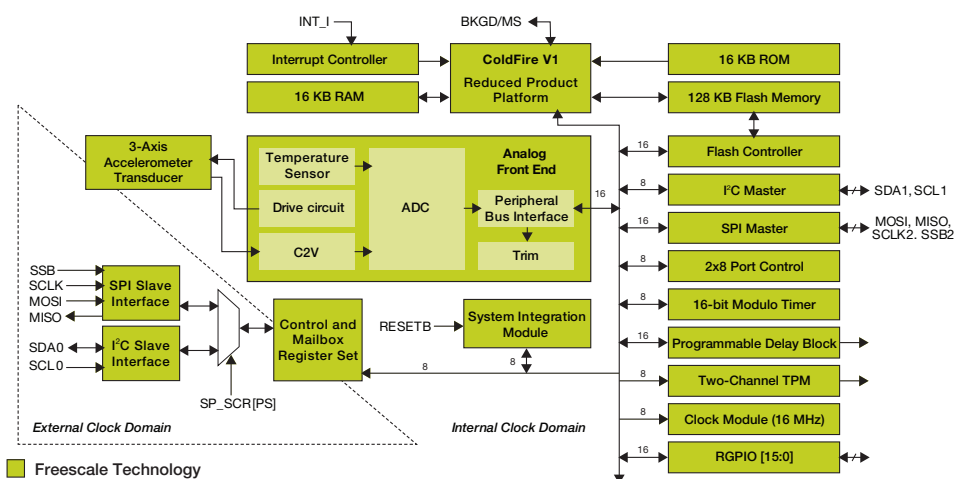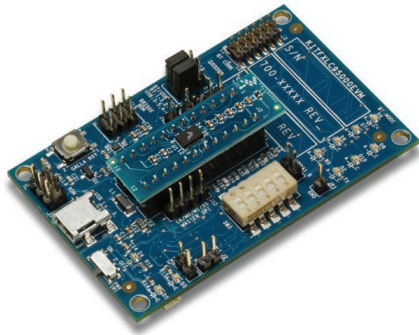
With internal flash memory, the FXLC95000CL can be re-programmed on the fly. New sensors for new applications are now possible based on programming the FXLC95000CL sensor hub with full customization for the end user and mobile device-level through software.

Up to sixteen sensor inputs are easily consolidated by the FXLC95000CL motion-sensing platform which operates with a unique slave port that is configurable as either I^2C or SPI allowing calibration, compensation and sensor functions to be offloaded from the system application processor.

The FXLC95000CL can be programmed and configured with the CodeWarrior Development Studio, which enables customers to quickly and easily shape next-generation applications that go beyond basic algorithms to exactly what they need.

Freescale offers the Xtrinsic intelligent sensing framework (ISF) for the FXLC95000CL device. ISF is a comprehensive and robust runtime framework providing open sensor hub capability for running on Xtrinsic intelligent sensing platforms' low-power processors. For sensor data processing, ISF allows development and execution for custom sensor algorithms directly on Xtrinsic intelligent sensors or using several Freescale-provided pre-built firmware images.

ISF's extensibility and open sensor hub functionality enable adding additional external sensors to the system. By simply including the corresponding sensor driver libraries, the system can easily start subscribing to the new sensor data. Driver libraries can either be downloaded from **freescale.com/ISF** or

Features and Benefits of the FXLC95000CL Xtrinsic Platform

Features	Function	Benefits
Sensor controller	• Slave I^2C bus initiates control and manages the sensor data from multiple external sensor inputs such as pressure, touch, gyroscope and magnetics	• Modularize the basic sensor configuration and control functions • Manages sensor data acquisition depending on function
Sensor function controller	• Pre-processing sensor inputs, considering sources of error known per respective sensor technology and incorporating sensor data fusion to make decisions based on multiple sensor inputs	• The FXLC95000CL provides a complete solution back to the systems application processor rather than simply raw data • The FXLC95000CL can modularize complex sensor algorithms that require multiple sensor inputs
Advanced processing (logic)	• Embedded in the FXLC95000CL accelerometer is the 32-bit ColdFire V1 processor (alongside the sensor) which can make decisions within the context of its environment	• Enables a variety of use cases and higher levels of abstraction. • Provides interpreted sensing information and control over a number of sensing decisions so developers can focus on higher levels of innovation
Software	• Software libraries available for customers to configure • User programmable • CodeWarrior Development Studio V10.3 can be used to program the FXLC95000CL	• Provides added features and complete resources to help you develop for your application quickly and easily • CodeWarrior provides a simple interface to help speed your development process
Power management	• Auto-wake monitors change in activity/position • Auto-sleep powers down sensor and sensor subsystem when there is no activity • Embedded dynamic FIFO for data processing while applications processor is asleep • Low voltage operation: 1.62 V to 3.6 V I/O supply	• Configurable power saving modes and auto-wake/sleep capability allows the FXLC95000CL to become a part of the power management decision to achieve optimal current consumption
Connectivity	• Communication protocols: I^2C/SPI • Communication between master and slave ports	• Flexible configuration options for easy design with minimal limitations for up to 16 sensor inputs

Development Tools

| Part Number	Description
KITFXLC95000EVM	The KITFXLC95000EVM contains two PCBs: FXLC95000CL accelerometer daughter card and the sensor interface board

Documentation

Document Number	Title
FXLC95000CL	FXLC95000CL Intelligent, Motion-Sensing Platform Data Sheet
FXLC95000CLSWRM	FXLC95000CL Software Reference Manual
FXLC95000CLHWRM	FXLC95000CL Hardware reference manual

quickly developed as your own drivers using the provided CodeWarrior project templates.

Freescale: A Leader in Sensing Solutions

Expanding on more than 30 years of sensor innovation, Freescale Xtrinsic sensing solutions are designed with the right combination of high-performance sensing capability, processing capacity and customizable software to help deliver smart, differentiated sensing applications. With Xtrinsic sensing solutions, our vision is

to offer a diverse and differentiated product portfolio to meet the expanding needs of the automotive, consumer and industrial segments. Xtrinsic solutions offer ideal blends of functionality and intelligence designed to help our customers differentiate and win in highly competitive markets.
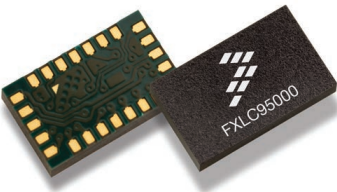
For more information, visit freescale.com/sensingplatform

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