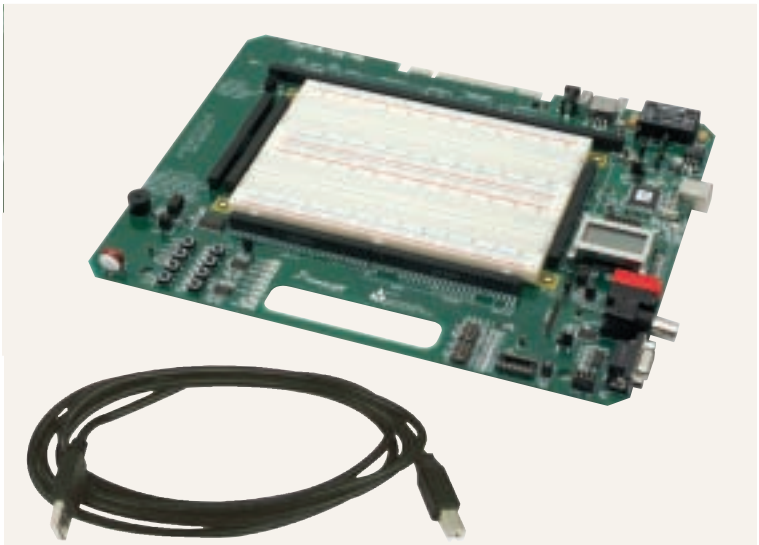
Freescale's Microcontroller Student Learning Kits

Overview

Freescale's Microcontroller Student Learning Kits (MCUSLK) now give you the flexibility to choose!

The MCUSLKs now come with a feature-rich project board and your choice of an Application Module Student Learning Kit (APSLK). Best of all, the application modules are specifically designed to plug directly into the project board to enrich development.



Project Board Student Learning Kit *(PBMCUSLK)*

Application Module Student Learning Kit *(AP5211SLK Shown)*

The **PBMCUSLK** can be used standalone for introductory circuit design or used in conjunction with the application modules. The PBMCUSLK allows you to easily migrate from one application module to another, providing great flexibility in using a range of 8-, 16- and 32-bit microcontrollers.

Features:

> Integrated HCS12/HCS12X/HCS08 USB BDM pod

> USB or wall transformer powered (+3.3, +5 or ±15V*)

> Replaceable, solderless breadboard

> Eight LED's, push buttons, DIP switches

> 2-line, 8-character LCD display

> Integrated buzzer and potentiometer

> COM port (RS-232/MONO8 capable)

> Configurable direct connect feature

*15V not available when powered from USB BDM

The **APSLK** can be used standalone for small projects or plugged into the project board. The APSLK contains an application module (microcontroller board), CodeWarrior® programming development tools, as well as documentation, power and communications cables to provide you with a comprehensive learning environment.

Application Modules:

> ***8-bit HCS08***
- APS08QG8SLK

> ***16-bit HCS12/HCS12X/DSP***
- APS12DT256SLK
- APS12C32SLK
- APS12XDT512SLK
- AP56F801SLK

> ***32-bit ColdFire® Processor***
- AP5211SLK
- AP5223SLK (on-chip Ethernet)

> ***RF transceiver*****
- AP13192USLK

**Freescale's newest SLK keeps you up to date with the latest innovations. Now, wireless development is simple by providing ZigBee™ specification-ready RF transceivers, SMAC software and support documentation.

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Application Modules

Application Modules can be used as stand-alone platforms or interfaced through the on-board MCU connector on the project board or other compatible expansion platforms. This range of applications modules provides flexibility in the modules' use, ranging from introductory embedded systems to more advanced courses. Also, due to the small size, the modules are outstanding tools for incorporating into senior- or graduate-level projects, such as robotics or controls.

ZigBee™ Specification-Ready Module
AP13192USLK

The AP13192USLK module is a 2.4 GHz wireless transceiver for applications in the short-range, low-power, industrial, scientific and medical band. When combined with a host applications module or microcontroller, the AP13192U provides a cost-effective solution for short range wireless data links and networks. The module is capable of providing basic point-to-point wireless connection up to the IEEE 802.15.4 wireless standard modem physical layer (PHY) with support for peer-to-peer, star and mesh networks. Interface to the hosting application module is by serial peripheral (SPI) port connection.

68K ColdFire®
AP5223SLK

68K ColdFire
AP5211SLK

HCS12
APS12C32SLK

DSP
AP56F801SLK

HCS12
APS12DT256SLK

HCS08
APS08QG8SLK

HCS12X
APS12XDT512SLK

Project Board

Part Number	Voltage Input	USB Power Limit	VIN Power Limit	Communications I/O	Keypad Port	LCD Display	User I/O	Features
PBMCUSLK	USB BDM or 9V	5V (300 mA), 3.3V (200 mA)	5V and 3.3V (200 mA), 15V (50 mA)	RS-232 or MONO8	Yes	8 Characters X 2 Lines	8 x DIP Switches, 8 x Pushbuttons, 8 x LEDs, Potentiometer, Buzzer, BNC, 2 x Banana	Configurable Direct Connect Features, Replaceable Prototboard, USB BDM for use with HCS12/S12X/S08

Application Modules

Architecture	Part Number	RAM (KB)	Flash (KB)	EEPROM (KB)	Timers (ch,Bits)	I/O Max	PWM (ch,Bits)	ATD (ch,Bits)	Voltage (V)	Bus Freq. (MHz)	Serial	Other	Features
HC908	AP908QG8SLK	0.512	8	–	2/16	11	see timer	8/10	1.8 to 5.0	10	SPI, SCI, I²C	8 x KBI	–
HCS12	AP512C32SLK	2	32	–	8/16	31	3/16 or 5/8	8/10	5	25	SCI, SPI, CAN	–	On-Chip ICE
HCS12	APS12DT256SLK	12	256	4	8/16	56	4/16 or 7/8	8/10	5	25	2 x SCI, 2 x SPI, I²C, 3 x CAN	9 x KBI	Increased IO and Memory
HCS12X	APS12XDT512SLK	20	512	4	8/16	56	4/16 or 7/8	8/10	5	40	2 x SCI, 2 x SPI, I²C, 3 x CAN	9 x KBI	XGATE, LIN, On-Chip ICE, IR
DSP	AP56F801SLK	4	24	–	8/16	11	6/16	8/12	3.3	80	SCI, SPI	–	Multiply Accumulator, JTAG/OnCE™
ColdFire®	APS5211SLK	16	128	–	4ch, 32-bit w/DMA, 4ch, 16-bit	33	4/16 or 8/8	8/12	3.3	66	QSPI, I²C, 3 x UART	3 x INQ	2 x 16-bit PIT
ColdFire	APS5223SLK	32	256	–	4ch, 32-bit w/DMA, 4ch, 16-bit	39	4/16 or 8/8	8/12	3.3	66	QSPI, I²C, 3 x UART	3 x INQ	On-Chip 10/100 Ethernet MAC with PHY, Real-Time Clock
RF Transceiver	AP13192USLK	Voltage: 2.0–3.4V, Frequency Band: 2.4–2.5 GHz, Data Rate: 250 kbps, Serial I/O: SPI											

A Prototyping Environment for Education

Microcontroller Student Learning Kit PLUS CodeWarrior Development Tools and National Instruments' Educational Laboratory Virtual Instrumentation Suite (NI ELVIS)

The MCUSLKs are excellent teaching solutions and can be used in a diverse mix of coursework, such as:

> Electronic Circuit Design I and II

> Introduction to Microcontrollers

> Microcontroller Interfacing and Applications

> Mixed Signals and Circuits

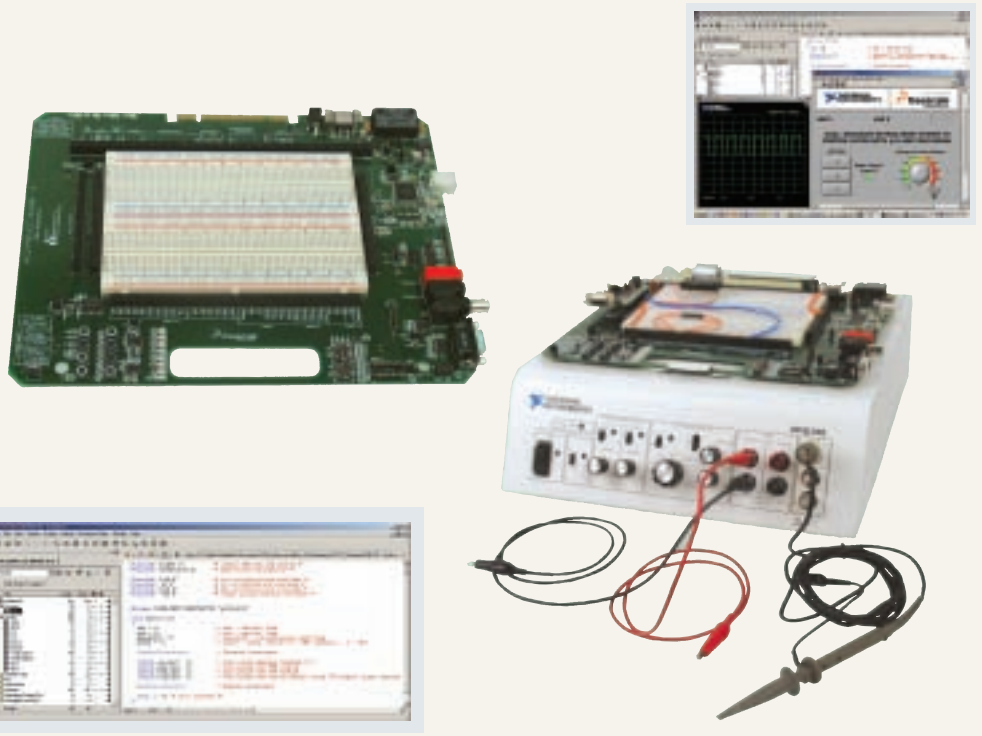
> Real-Time Digital Signal Processing

> Real-Time Embedded Microcontrollers

> Senior Project Design

> Mechatronics

Your students can also benefit from the reasonable price point and versatility of MCUSLKs and are encouraged to purchase their own kit to use throughout their studies.



CodeWarrior Development Studio is a powerful and user-friendly tool suite designed to increase your software development productivity. It shares a common interface across MCU families, making the environment easy to use. With unrivaled features such as the Processor Expert™ application design tool, a highly optimized compiler and the project manager with built-in templates, the tool suite's integrated development environment (IDE) allows the student to focus on the application software. The CodeWarrior environment also features an intuitive graphical source-level debugger with integrated profiling capabilities, data visualization, instruction set simulation and much more.

National Instrument's Educational Laboratory Virtual Instrumentation Suite (NI ELVIS) is a LabVIEW-based, hands-on design and prototyping environment geared for university engineering and science courses. NI ELVIS consists of LabVIEW virtual instruments, a multifunction data acquisition device and a custom-designed bench-top workstation. The combination of NI ELVIS with the MCUSLK is ideal for conducting microcontroller instruction, as they provide a powerful development and debugging platform through the integrated instrument suite of NI ELVIS.

The NI ELVIS integrated instrument suite provides essential functionality for teaching microcontrollers, including:

> Manual and programmable power supply for powering the student project board

> Manual and programmable signal generator and digital/analog outputs to provide stimulus to MCU input signals

> Multiple instruments to acquire, visualize and analyze MCU output signals

> LabVIEW integration to provide flexible design, analysis, testing and reporting

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