

Terminology

TIMING AND MEASUREMENTS: Signal Measurement with Timing and Counter Control	
TCC: Timer/Counters for Control	Selected SAM products have TCCs for applications like Switch Mode Power Supplies (SMPS), lighting and motor control. The TCCs support up to 96 MHz and 24-bit resolution.
QEI: Quadrature Encoder Interface QDEC: Quadrature Decoder	QEI to increment encoders for obtaining mechanical position data typical for automation or motor control applications. QDEC performs the input lines filtering, decoding of quadrature signals and connects to the timers/counters in order to read the position and speed of the motor through the user interface.
SAFETY AND MONITORING: Hardware Monitoring and Fault Detection	
DMT: Dead Man Timer	The primary function of the DMT is to reset the processor in the event of a software malfunction. A DMT is typically used in mission-critical and safety-critical applications, where any single failure of a software functionality and sequencing must be detected.
COMMUNICATIONS: General, Industrial, Lighting and Automotive	
SERCOM: Serial Communication Module	The SERCOM is software that is configurable to operate as I ² C, SPI or USART, giving you extended flexibility to mix serial interfaces and greater freedom in PCB layout. Each SERCOM instance can be assigned to different I/O pins through I/O multiplexing, further increasing versatility.
FS: Inter-IC Sound Controller	The Inter-IC Sound Controller provides a bidirectional, synchronous digital audio link with external audio devices.
PMP: Parallel Master Port EBI: External Bus Interface	An embedded peripheral touch controller makes it easy to add capacitive touch sensing to your project with buttons, sliders, wheels and proximity. By offering superb sensitivity and noise tolerance as well as self-calibration, the PTC eliminates the need for external components and minimizes CPU overhead. The PTC supports up to 256 channels on 64-pin devices, 120 channels on 48-pin devices and 60 channels on 32-pin devices. PTC with Driven Shield + can achieve better noise immunity and moisture tolerance.

Development Tools

MIPS-Based PIC32 Products

Tool	Description
MPLAB® X IDE	MPLAB X Integrated Development Environment (IDE) is for developing and debugging MIPS-based PIC32 MCU applications, in addition to Microchip's 8- and 16-bit PIC® microcontrollers. It is based on the open-source NetBeans IDE from Oracle and runs under Windows®, Mac OS® and Linux®, and connects seamlessly to a range of debuggers, programmers and development kits.
MPLAB Harmony Configurator	The MPLAB Harmony Configurator (MHC) is a time-saving hardware configuration utility for MPLAB Harmony, Microchip's award winning software framework. You can use MHC to get visual understanding and control of the configuration of your target device and application. MHC is a fully integrated tool within MPLAB X IDE.
MPLAB Harmony Software Framework	MPLAB Harmony is a flexible, abstracted, fully integrated firmware development platform for PIC32 microcontrollers. It takes key elements of modular and object-oriented design, and provides the option of adding in the flexibility of a Real-Time Operating System (RTOS). MPLAB Harmony provides a framework of software modules that are easy to use, configurable for your specific needs and in a format that allows for maximum reuse and reduces your time to market.
MPLAB Harmony Graphics Composer	MPLAB Harmony Graphics Composer (MHGC) is Microchip's industry-leading Graphical User Interface (GUI) design tool for PIC32 microcontrollers. Providing a fully integrated easy-to-use WYSIWYG editor, graphics asset management and code generator within the MPLAB Harmony framework, the MHGC allows you to go from concept to glass in minutes without writing a single line of code. Additionally the integrated Display Manager plug-in enables quick support for new and unsupported displays in MPLAB Harmony.
Touch Interface	Capacitive and resistive touch screen support is an integrated part of the MPLAB Harmony Graphics Composer (MHGC). With automatic generation and configuration of event handlers for touch events, the MHGC allows quick development of touch enabled graphics solutions.

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USER INTERFACE: Capacitive Touch Sensing and LCD Control	
PTC: Peripheral Touch Controller	An embedded peripheral touch controller makes it easy to add capacitive touch sensing to your project with buttons, sliders, wheels and proximity. By offering superb sensitivity and noise tolerance as well as self-calibration, the PTC eliminates the need for external components and minimizes CPU overhead. The PTC supports up to 256 channels on 64-pin devices, 120 channels on 48-pin devices and 60 channels on 32-pin devices. PTC with Driven Shield+ can achieve better noise immunity and moisture tolerance.
SYSTEM FLEXIBILITY: System Peripherals and Interconnects	
CLC/CCL: Configurable Custom Logic	The CCL is a programmable logic peripheral which can be connected to the device pins, events or to other internal peripherals. This allows you to eliminate logic gates for simple glue logic function on the PCB.
EVSYS: Event System	The Event System allows autonomous, low-latency and configurable communication between peripherals. Several peripherals can be configured to generate and/or respond to signals known as events. Communication is made without CPU intervention and without consuming system resources such as Bus or RAM bandwidth. This reduces the load on the CPU and other system resources, compared to a traditional interrupt-based system.
Dual Panel/Bank Flash	Dual Bank Flash allows live field firmware/program update on one bank while CPU can continue executing code from another Flash bank.
SECURITY: Chip-Level Security, Crypto Acceleration, Secure Key Provisioning & Storage and Tamper Detection	
TrustZone	TrustZone® for ARMv8-M provides hardware-enforced security isolation between trusted and the untrusted resources on a Cortex™-M23 based device, while maintaining the efficient exception handling.
TrustRAM	TrustRAM provides secure key storage and can resist microprobing and side channel attacks. It also prevents data remanence and facilitates rapid erase on tamper event.
DataFlash	DataFlash provides secure key storage and can resist side channel attacks. It also allows data scrambling and facilitates rapid erase on tamper event.
Secure Boot	Secure Boot authenticates the Flash content at startup and ensures the desired code is executed.

Arm® Cortex®-M Based SAM Products

Tool	Description
Atmel Studio 7	Atmel Studio 7 is the Integrated Development Platform (IDP) for developing and debugging AVR® and Arm®-based SAM MCU applications. Atmel Studio 7 provides you with a seamless easy-to-use environment to develop and debug applications written in C/C++ or assembly code. It connects seamlessly to a range of debuggers, programmers and development kits.
Atmel START	Atmel START is an innovative online tool for intuitive, graphical configuration and deployment of embedded software. It lets you select and configure software components, drivers and middleware, as well as deploy complete example projects tailored to the needs of your application. It is completely platform independent, and able to generate project files for a number of IDEs. The configuration engine lets you review dependencies between software components and available hardware resources in the selected MCU, and automatically suggests solutions to any conflicts that in your chosen setup.
ASF Software Framework for SAM	ASF provides software drivers and libraries to build applications for AVR and SAM devices. It is architected for readability and performance, and contains a number of advanced middleware components for 32-bit SAM devices such as USB device, TCP/IP, Wi-Fi®, RTOS kernel (FreeRTOS), Bluetooth®, file system and more.
Data Visualizer	Track and profile your applications run-time behavior using the powerful Data Visualizer. It provides an oscilloscope view of signals such as GPIO, SPI, UART, etc. The Data Visualizer also provides live power measurements when used together with a supported probe or board, such as the power debugger. Profiling your applications power usage has never been easier.
QTouch® Composer	The QTouch Composer allows you to seamlessly develop capacitive touch functionality for your application. This simplifies the design process by tying together the tools required to edit the code in Atmel Studio 7 and tune the touch design in QTouch Composer.