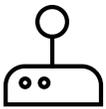# AMIEC
Embedded Controller

AMI Embedded Controller (EC)
AMI Embedded Controller (EC) Firmware Solution

Not your father's keyboard controller

EC firmware has steadily evolved from the keyboard controller of the last millennia to what it is today. Along the way, it's kept many of its legacy components, which include old-fashioned communication methods such as communicating through the low pin count (LPC) bus. At the same time, it's picked up added features such as LED status indicators and added button controls. AMI's EC firmware is a highly compatible Embedded Controller solution that can be used across many different EC chipsets and developed using AMI's Visual eBIOS (VeB) development environment. As a total EC and BIOS solution, the AMI EC solution allows customers to shift from basic keyboard controllers to full-featured EC products.

Latest Technology Support

The latest EC silicon features higher processing power and complex features, requiring a more robust firmware solution. AMI EC has integrated support for the latest technologies including full eSPI functionality (Flash Channel, OOB Channel, Virtual Wire Channel, Peripheral Channel) and USB Type-C Power Delivery.

Features:

ACPI Compliant Keyboard Controller

- 8042 software compatible
- Port 92 support

RTOS Multitask

- Dedicate task for individual service
- High performance scheduling

Smart Battery

- Smart Battery Data 1.1 Compatible
- Retrievable battery-related data

Broad EC Support for Chips and CRBS

AMI EC extends support for a broad range of EC chip vendors, giving customers the ability to port the EC firmware to many different chipsets. Chipsets supported by AMI EC include:

- ITE™: IT8516E, IT8500, IT8518E, IT8519, IT8380, IT8528, IT8991, IT8390, IT8587, IT8987

- Renesas™: H8S2117, H8S2117-R, Cohiba, Cohiba 2C, Cohiba HR, H8S2113

- Microchip®: MEC1609, MEC1308, MEC161x, MEC1632, MEC1418, MEC1322, MEC1703

- Nuvoton™: NPCE775, NPCE776, NPCE781, NPCE783, NPCE79x, NPCE88x, NPCE98x, NPCE28x

- USB PD: TI TPS65982 and TPS65988, Realtek® RTS5450

- FreeRTOS™- eSPI: Microchip MEC1703 and MEC1418, ITE IT8390

For those working on Intel® customer reference boards (CRB), the AMI EC solution has been validated on the following CRBs:

- Intel® Skylake: ITE IT8528, Microchip MEC1703

- Intel® Kaby Lake: Microchip MEC1703
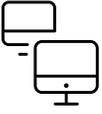
Features:

Keyboard Matrix

- 18*8 and 16*8 matrix support

- Numeric keypad

USB Type-C Power Delivery Support

- Power Role detection (DRP, Sink, Source)

- Data Role detection (DRD, DFP, UFP)

Common Tools between BIOS and EC

There are various AMI toolsets that have been tried and tested to work in conjunction with the AMI EC solution for greater development capabilities. The following toolsets include:

- VeB Development Tool for tailor-made EC development and integrated source control/project management

- AMI Firmware Update (AFU) for EC firmware updates

- Debug Tool for debug view in real-time and current status information for battery, thermal and fan

- Test Tool for auto reboot tests, auto EC flash updates and fan/thermal and backlight simulation tests

Advanced Functionality

Keyboard Controller Functionality: AT and PS/2 8042 compatibility with support for matrix keyboard scan controllers, device hotswap, hot-plug and OEM hot-key implementations

- Advanced Configuration and Power Interface (ACPI) Embedded Controller

- Full compatibility with ACPI EC requirements

- Designed to extend beyond the specification

- Use ASL to control EC functionality

- Customize notifications and external events

- Smart Battery Management: SMBus interface for smart or control method batteries

- OEM Customization: Utilize EC advanced functionality to create unique platform functionality. Including General Purpose I/O (GPIO), Analog-to-Digital Converter (ADC), Pulse-Width Modulator (PWM) and Watch Dog Timer (WDT) functionality With these value-adds and extended debugging features, AMI Hardware Debugger is a powerful hardware debugger solution that provides superior debugging capabilities.

Features:

FN Hot Key Support

- GPIO control

- Generate SCI, SMI and SWI

- Scan code

EC eSPI Support Feature

- Windows® 10 (and above) support
- Internal and External PS/2 Compatible Auxiliary Device
- Dual Internal Auxiliary Device
- Internal Matrix (keyboard)
- Smart Battery
- Power Management

EC RTOS Support Feature

- RTOS Multitask
- Power Management Support
- Keyboard Controller
- ACPI Embedded Controller Interface
- Smart Battery SMBus
- Internal Matrix (keyboard)
- Hot Key Support
- PS/2 Compatible Auxiliary Device
- USB type-c multiple PD support
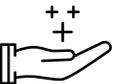
Flexible Development Options

- Full source code available for development
- Firmware development in C or assembly language (depends on part selection)
- Supports ShareBIOS and Internal Flash implementations (depends on part selection)
- AMI offers EC firmware ported to many popular chipset reference board (CRB) designs

There are more parts available and more that are under development. Please contact AMI for details.

Note: Specific feature support depends on capabilities of embedded controller hardware and platform design.

Features:

- C-source level window
- Callstack window
- Debug/Trace message and checkpoints
- Local/Global Variable Window
- CPU registers
- Memory window
- Status window
- Disassembly window
- Traceview

For more information please visit the request form at ami.com/contact

AMI EC