Edison Overview

**Information Contained in this Presentation is Subject to Change without Notice**
The Intel® Edison development platform is designed to lower the barriers to entry for a range of Inventors, Entrepreneurs and consumer product designers to rapidly prototype and produce IoT and wearable computing products.
The Intel® Edison Offering

Hardware
- Edison Module + Derivatives
- Expansion Boards

Software
- Yocto + Various Runtimes, IDE & Developer Tools

Cloud
- Developer cloud solution and partner-based solutions for scale

Support
- Managed on-line community, trouble ticketing, drawings, schematics, datasheets, code libraries, webinars, etc.

Ecosystem
- ISVs, Incubators, Crowd Source funders & SIs

- Maker
- Pro-Maker & Entrepreneur
- Consumer IoT
- Light Ind. IoT

No extended temp or life

Cloud
Developer cloud solution and partner-based solutions for scale
Retail Configurations*

<table>
<thead>
<tr>
<th>Maker</th>
<th>Pro-Maker &amp; Entrepreneur</th>
<th>Consumer IoT</th>
<th>Light Ind. IoT</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Intel® Edison Kit for Arduino*" /></td>
<td><img src="image2" alt="Intel® Edison Breakout Board Kit" /></td>
<td><img src="image3" alt="Intel® Edison Module" /></td>
<td><img src="image4" alt="Light Ind. IoT" /></td>
</tr>
<tr>
<td>$85 RCP</td>
<td>$60 RCP</td>
<td>$50 RCP</td>
<td>No extended temp or life</td>
</tr>
</tbody>
</table>

*The Recommended Channel Prices stated here are suggested prices only. Distributors are not obligated to charge these prices. Each Distributor is entitled to determine independently the prices at which products may be sold to its customers.
Intel® Edison
Compute Module
What will you make?
Intel® Edison Mechanical Layout

- Processor and DDR POP Memory
- PMIC
- eMMC 4Gbyte
- 70 PIN I/O Connector
- WiFi/BT 4.0 module
- Embedded 2.4/5 GHz Antenna
- Antenna COAX
- USB ULPI Transceiver

Top Side

Bottom Side

Dimensions:
- Width: 25mm
- Height: 35.5mm
### Physical

<table>
<thead>
<tr>
<th>Property</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form Factor</td>
<td>Board with 70-pin connector</td>
</tr>
<tr>
<td>Dimensions</td>
<td>35.5 x 25.0 x 3.9 mm max</td>
</tr>
<tr>
<td>C/M/F</td>
<td>Blue PCB with Shields / No enclosure</td>
</tr>
<tr>
<td>Connector</td>
<td>Hirose DF40 Series (1.5mm, 2.0mm, or 3.0mm stack height)</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>0 – 40 degC</td>
</tr>
</tbody>
</table>

### External Interfaces

Total of 40 GPIOs which can be configured as:

- **SD Card**: 1 Interface
- **UART**: 2 Controllers (1 full flow control, 1 RX/TX)
- **I2C**: 2 Controllers
- **SPI**: 1 Controller with 2 chip selects
- **I2S**: 1 Controller
- **GPIO**: Additional 12 (with 4 capable of PWM)
- **USB 2.0**: 1 OTG Controller
- **Clock Output**: 32 KHz, 19.2 MHz

### Power

- **Input**: 3.3V – 4.5V
- **Output**: 100mA @3.3V and 100mA @ 1.8V
- **Standby (No radios)**: 13mW
- **Standby (BT 4.0)**: 21.5mW (BTLE in Q4’14)
- **Standby (WiFi)**: 35 mW

### Firmware + Software

- **CPU OS**: Yocto Linux® v1.6
- **Development Environments**:
  - Arduino® IDE
  - Eclipse supporting: C, C++, & Python
  - Intel XDK supporting: Node.JS & HTML5
- **MCU OS**: RTOS
- **Development Environments**:
  - MCU SDK and IDE

### Major Edison Components

- **SoC**: 22-nm Intel® SoC that includes a dual-core, dual-threaded Intel® Atom™ CPU at 500Mhz and a 32-bit Intel® Quark™ microcontroller at 100 MHz
- **RAM**: 1 GB LPDDR3 POP memory (2 channel 32bits @ 800MT/sec)
- **Flash Storage**: 4 GB eMMC (v4.51 spec)
- **WiFi**: Broadcom® 43340 802.11 a/b/g/n; Dual-band (2.4 and 5 GHz) On board antenna or external antenna SKU configurations
- **Bluetooth**: BT 4.0

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Intel® Edison
Expansion Boards
Intel® Edison Family: *Supporting the long tail via Expansion Boards*

Intel Expansion Boards

Partner Expansion Boards

Built to Order Expansion Boards
Intel® Edison Board for Arduino*

**Market position:** Similar to Arduino Yun (Arduino Sketch, Linux, WiFi & BT)

**Board I/O:** Compatible with Arduino Uno (except only 4 PWM instead of 6 PWM)

- 20 digital input/output pins including 4 pins as PWM outputs
- 6 analog inputs
- 1 UART (RX/TX)
- 1 I2C
- 1 ICSP 6-pin header (SPI)
- Micro USB device connector OR (via mechanical switch) dedicated standard size USB host Type-A connector
- Micro USB device (connected to UART)
- SD Card connector
- DC power jack (7V – 15V DC input)
Intel® Edison Breakout Board

**Market position:** The Edison Breakout board is for non-Arduino users. This breakout board has a minimalistic set of features and is slightly larger than the Edison module.

**Board I/O:**
- Exposes native 1.8V I/O of the Edison module
- .1” grid I/O array of through-hole solder points
- USB OTG with USB Micro Type-AB connector
- USB OTG power switch
- Battery Charger
- USB to device UART bridge with USB Micro Type-B connector
- DC power supply jack (7V – 15V DC input)
Intel® Edison
Software
Edison Developer Options

Cloud
- Arduino* IDE
  - Win */ Mac*
- Arduino* Sketch
  - C++
- Arduino* Libraries

IDE
- Intel XDK
  - Win*/ Mac*/ Linux*
- Javascript (Node JS)

Programming Language
- C/ C++/Python

Tools/ Libraries
- Intel XDK
- ISS
- Wyliodrin*
- MCU SDK

OS / Boot Image
- Yocto Linux* 1.6
- RTOS

RTOS

* Windows is a registered trademark of Microsoft Corporation in the United States and other countries. Other names and brands may be claimed by the property of others by all third party name and the notation.
Edison Release 1 Software Stack

**Tools / Support Software**
- Native SDK
- Flash Tools
- Debug
- GDB
- Yocto Build System

**Edison Cloud**
- Cloud Services Portal
  - Device Registration
  - User Profile

**Middleware**
- Messaging
- D2D / D2C Connectivity
- mDNS
- MQTT
- 0MQ
- IO LibC
- Connman

**Arduino (Hosted Software)**
- Arduino IDE
- Core Libraries
- Download Client
- Cross-Compilers

**Poky-Linux v3.10 Platform BSP**
- Tangier Support in Kernel
- USB Gadget
- USB Storage
- SD Master
- USB OTG
- Supplicant
- Wi-Fi STA
- BlueZ
- BT + LE
- GPIO
- I2C Master
- PWM
- SPI Master
- UART
- RTC
- Thermal
- Watchdog

**OS Loader**
- U-boot

**Firmware**
- IFWI
- Wi-Fi
- BT

**Trusted Boot**
- Trusted Boot ROM

**Software License Types**
- GPL License
- MIT License
- PaaS
- Branded or Licensed Binary
- On Die Silicon based ROM
# Intel® Edison R1 Software Support

## Firmware
- Intel IFWI (Integrated FirmWare Image) in binary

## OS Loader
- U-Boot version (2nd stage bootloader in source)

## Kernel/BSP
- Yocto Linux 1.6
- Linux kernel v3.10.17

## Tools
- Native SDK
  - Standard compiler support (GCC 4.8.2), GLIB 2.38.2
  - Standard debugger support GDB 7.6.2
- Custom Tools: Flash tools (DFU-Util ; XFSTK for stitching & flashing)

## Additional Developer Tools & Environments
- Arduino IDE for Mac, Windows and Linux OS
  - Cross compilers for each of the host
  - Core Arduino Libraries
- Node.js (Supported by Intel® XDK)
- Python (This package is part of BSP)

## WLAN/BT Connectivity (BCM43340)
- Firmware in Binary: WiFi STA and BT+LE
- Drivers in source: BRCM kernel drivers, WiFi Supplicant and BlueZ

## Middleware
- Connectivity framework for simplified D2D and D2C
  - Networking, Messaging, privacy/security

## Cloud
- Web Portal, Identity Management, User Profile
- Device Registration; Device Data Upload/Visualization
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<td><strong>Kernel/BSP</strong></td>
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<td>Linux kernel v3.10.17</td>
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<tr>
<td><strong>Tools</strong></td>
<td>Connectivity Framework Enhancements</td>
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<tr>
<td>Native SDK</td>
<td>- Bluetooth Support</td>
</tr>
<tr>
<td>- Standard compiler support (GCC 4.8.2), GLIB 2.38.2</td>
<td>Expanded I/O Library Support</td>
</tr>
<tr>
<td>- Standard debugger support GDB 7.6.2</td>
<td>- JavaScript &amp; Python Bindings, Additional Sensors</td>
</tr>
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<tr>
<td>- Cross compilers for each of the host</td>
<td>Portal Enhancements &amp; Back-end Integration</td>
</tr>
<tr>
<td>- Core Arduino Libraries</td>
<td>RESTful Device Data Access</td>
</tr>
<tr>
<td>Node.js (Supported by Intel® XDK)</td>
<td>Device Messaging &amp; Notification with Third-Party Service Integration</td>
</tr>
<tr>
<td>Python (This package is part of BSP)</td>
<td>OTA Software Installation &amp; Update</td>
</tr>
<tr>
<td><strong>Release 2 Deltas from Release 1 in blue</strong></td>
<td>Logging Features</td>
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<tr>
<td></td>
<td>Hosted IDE for Cloud-based Services</td>
</tr>
<tr>
<td></td>
<td>Online Forums</td>
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</table>
Intel® IoT Analytics Platform

- Provides seamless Device to Device and Device to Cloud communication
- Ability to run rules on your data stream that trigger alerts based on advanced analytics
- Foundational tools for collecting, storing, and processing data in the cloud
- Free for limited and non-commercial use
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