Introduction

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 "Internet of Things" (IoT) and wearable computing products.

Intel® Edison Board for Arduino*

Supports Arduino Sketch, Linux, Wi-Fi, and Bluetooth.

Board I/O: Compatible with Arduino Uno (except 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 (7 to 15 VDC input).

Intel® Edison Breakout Board

Slightly larger than the Intel® Edison module, the Intel® Edison Breakout Board has a minimal set of features:

- Exposes native 1.8 V I/O of the Edison module.
- 0.1 inch 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 (7 to 15 VDC input).

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 noncommercial use.
## PHYSICAL

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form factor</td>
<td>Board with 70-pin connector</td>
</tr>
<tr>
<td>Dimensions</td>
<td>35.5 × 25.0 × 3.9 mm (1.4 × 1.0 × 0.15 inches) 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 (1.5, 2.0, or 3.0 mm stack height)</td>
</tr>
<tr>
<td>Operating temp</td>
<td>32 to 104°F (0 to 40°C)</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

## MAJOR EDISON COMPONENTS

- **SoC**: 22 nm Intel® SoC that includes a dual-core, dual-threaded Intel® Atom™ CPU at 500 MHz 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)
  - Onboard antenna or external antenna (SKU configurations)
- **Bluetooth**: Bluetooth 4.0

## POWER

- **Input**: 3.3 to 4.5 V
- **Output**: 100 ma @3.3 V and 100 ma @ 1.8 V
- **Power**:
  - Standby (No radios): 13 mW
  - Standby (Bluetooth 4.0): 21.5 mW (BTLE in Q4-14)
  - Standby (Wi-Fi): 35 mW

## FIRMWARE + SOFTWARE

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

**Maker**
- Intel® Edison Kit for Arduino*
  - $85 RCP

**Pro-Maker & Entrepreneur**
- Intel® Edison Breakout Board Kit
  - $60 RCP

**Consumer IoT**
- Intel® Edison Module
  - $50 RCP

**Light Ind. IoT**
- No extended temp or life

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*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
Intel® Edison Mechanical Layout

Top Side
- eMMC 4Gbyte
- WiFi/BT 4.0 module
- Embedded 2.4/5 GHz Antenna
- Antenna COAX
- USB ULPI Transceiver

Bottom Side
- Processor and DDR POP Memory
- PMIC
- 70 PIN I/O Connector

Dimensions:
- 25mm across
- 35.5mm vertically
### Physical

<table>
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- **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
- **Power**: Standby (No radios): 13mW, Standby (BT 4.0): 21.5mW (BTLE in Q4’14), Standby (WiFi): 35mW

### Firmware + Software

- **CPU OS**: Yocto Linux* v1.6
- **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
**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)
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* Developer

IDE
Arduino* IDE
Win* / Mac*

Programming Language
Arduino* Sketch
C++

Tools/Libraries
Arduino* Libraries

OS/Boot Image
Yocto Linux* 1.6

Arduino* Libraries
Intel XDK
Win*/ Mac*/ Linux*

Intel XDK
Win*/ Mac*/ Linux*

Javascript (Node JS)

C/ C++/Python

ISS

Wyliodrin*
Web

Wyliodrin*

Win*/ Mac* / Linux*

C/C++

MCU Developer

Visual Programming
Eclipse
Win*/ Mac* / Linux*

Visual Javascript

Win*/ Mac* / Linux*

MCU SDK

RTOS

Coming mid 4Q (subject to change)

Coming late Sept.

* 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

Software License Types
- GPL License
- MIT License
- Branded or Licensed Binary
- PaaS
- On Die Silicon based ROM

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
  - Connman
- IO LibC

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
- BlueZ
- Wi-Fi STA
- 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
# 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
**Intel® Edison R2 Software Support - December 2014**

*(subject to change)*

<table>
<thead>
<tr>
<th>Firmware</th>
<th>WLAN/BT Connectivity (BCM43340)</th>
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<tbody>
<tr>
<td>Intel IFWI (Integrated Firmware Image) in binary</td>
<td>Firmware in Binary: WiFi STA and BT+LE</td>
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<tr>
<td><strong>OS Loader</strong></td>
<td>Drivers in source: BRCM kernel drivers, WiFi Supplicant and BlueZ</td>
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<td>• Bluetooth Support</td>
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<td></td>
<td>• JavaScript &amp; Python Bindings, Additional Sensors</td>
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<td>• Standard compiler support (GCC 4.8.2), GLIB 2.38.2</td>
<td><strong>Device Portal Registration; Device Data Upload/Visualization</strong></td>
</tr>
<tr>
<td>• Standard debugger support GDB 7.6.2</td>
<td><strong>Portal Enhancements &amp; Back-end Integration</strong></td>
</tr>
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<td><strong>Custom Tools: Flash tools (DFU-Util; XFSTK for stitching &amp; flashing)</strong></td>
<td><strong>RESTful Device Data Access</strong></td>
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<td><strong>Device Messaging &amp; Notification with Third-Party Service Integration</strong></td>
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<td><strong>OTA Software Installation &amp; Update</strong></td>
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<td><strong>Logging Features</strong></td>
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<tr>
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<td><strong>Hosted IDE for Cloud-based Services</strong></td>
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<td></td>
<td><strong>Online Forums</strong></td>
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| **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)** | |

*Release 2 Deltas from Release 1 in blue*
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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Rev. 4/15/14