Por que não Intel?

RubeM Paulo Torri Saldanha
Gerente de Educação


SANGUE
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TCC

Intel Corporation

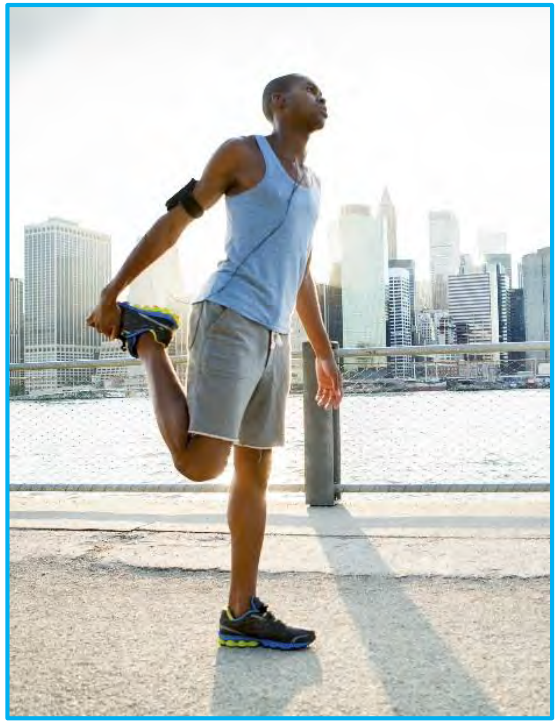
The World's Largest Semiconductor Manufacturer

- Leading Manufacturer of Computer, Networking & Communications Products
- Founded by Gordon Moore and Robert Noyce in 1968
- Headquartered in Santa Clara, California
- $56B in Annual Revenues - 28+ Consecutive Years of Positive Net Income
- 170 Sites in 66 Countries
- Over 107,000 Employees – 84,600 technical roles, 10,200 Masters in Science, 5,400 PhDs, 4,000 MBAs
- Named one of the Top Ten Most Valuable Brands in the World by Interbrand
- Ranked #42 on Fortune's World's Most Admired Companies
- Largest Voluntary Purchaser of Green Power in the United States for 6 years in a row
- Invests $100 Million Each Year in Education Across More than 100 Countries
- 4 Million Hours of Volunteer Service toward improving education over the past decade

Intel's Vision







This decade we will create and extend computing technology to connect and enrich the lives of every person on earth.



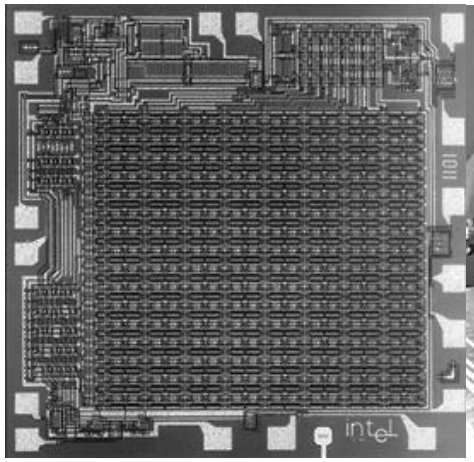
Intel's Strategy

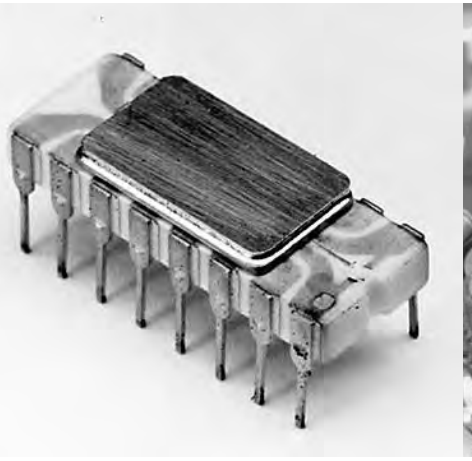
If it computes, it does it best with Intel

History of Intel

Back in 1968, two scientists, Robert Noyce and Gordon Moore, founded Intel with a vision for semiconductor memory products.

By 1971, they had introduced the world's first microprocessor. Since then, Intel has established a heritage of innovation that continues to expand the reach and promise of computing while advancing the ways people work and live worldwide.

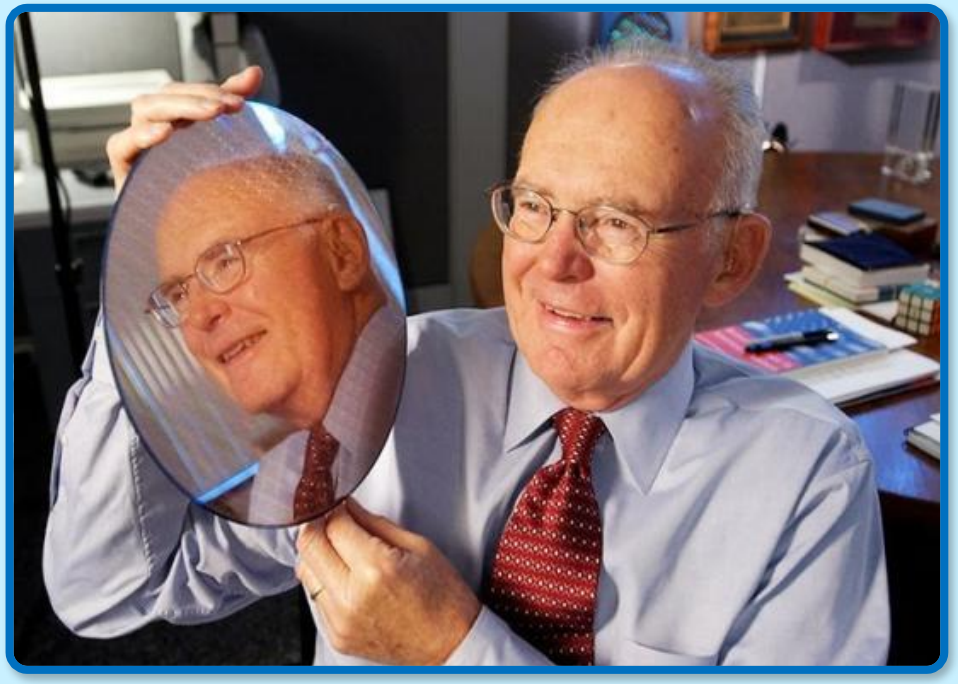


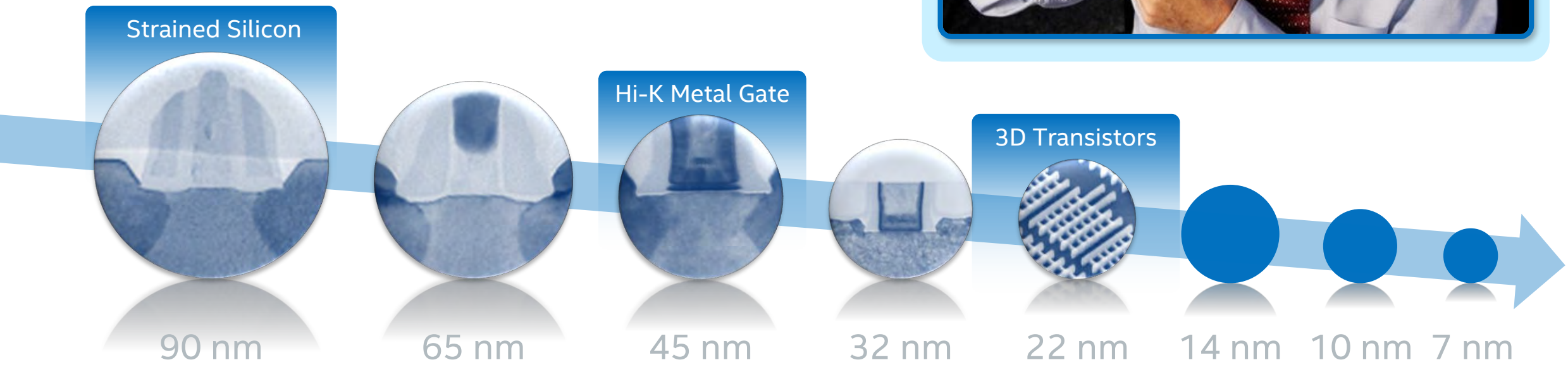



Predictable Silicon Track Record

Executing to Moore's Law

Enabling new devices with higher functionality and complexity while controlling power, cost, and size





Cramming more components onto integrated circuits

With unit cost falling as the number of components per circuit rises, by 1975 economics may dictate squeezing as many as 65,000 components on a single silicon chip

By Gordon E. Moore

Director, Research and Development Laboratories, Fairchild Semiconductor division of Fairchild Camera and Instrument Corp.

The future of integrated electronics is the future of electronics itself. The advantages of integration will bring about a proliferation of electronics, pushing this science into many new areas.

Integrated circuits will lead to such wonders as home computers—or at least terminals connected to a central computer—automatic controls for automobiles, and personal portable communications equipment. The electronic wristwatch needs only a display to be feasible today.

But the biggest potential lies in the production of large systems. In telephone communications, integrated circuits in digital filters will separate channels on multiplex equipment. Integrated circuits will also switch telephone circuits and perform data processing.

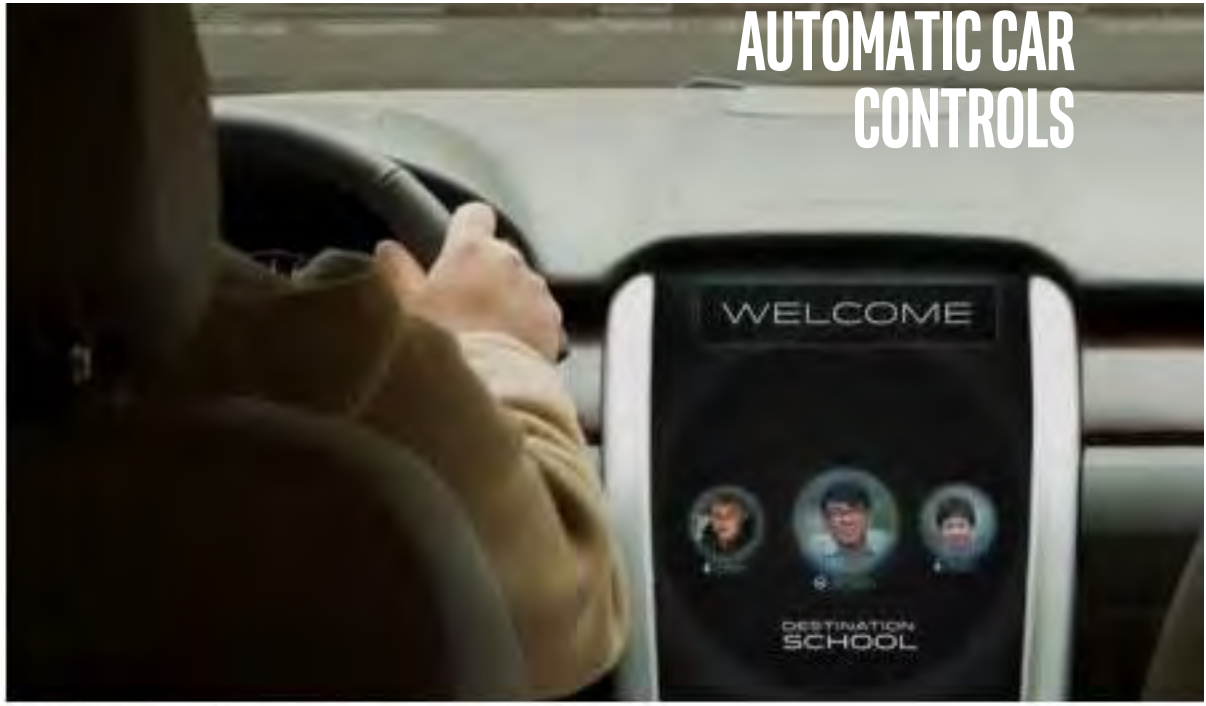
machine instead of being concentrated in a central unit. In addition, the improved reliability made possible by integrated circuits will allow the construction of larger processing units. Machines similar to those in existence today will be built at lower costs and with faster turn-around.

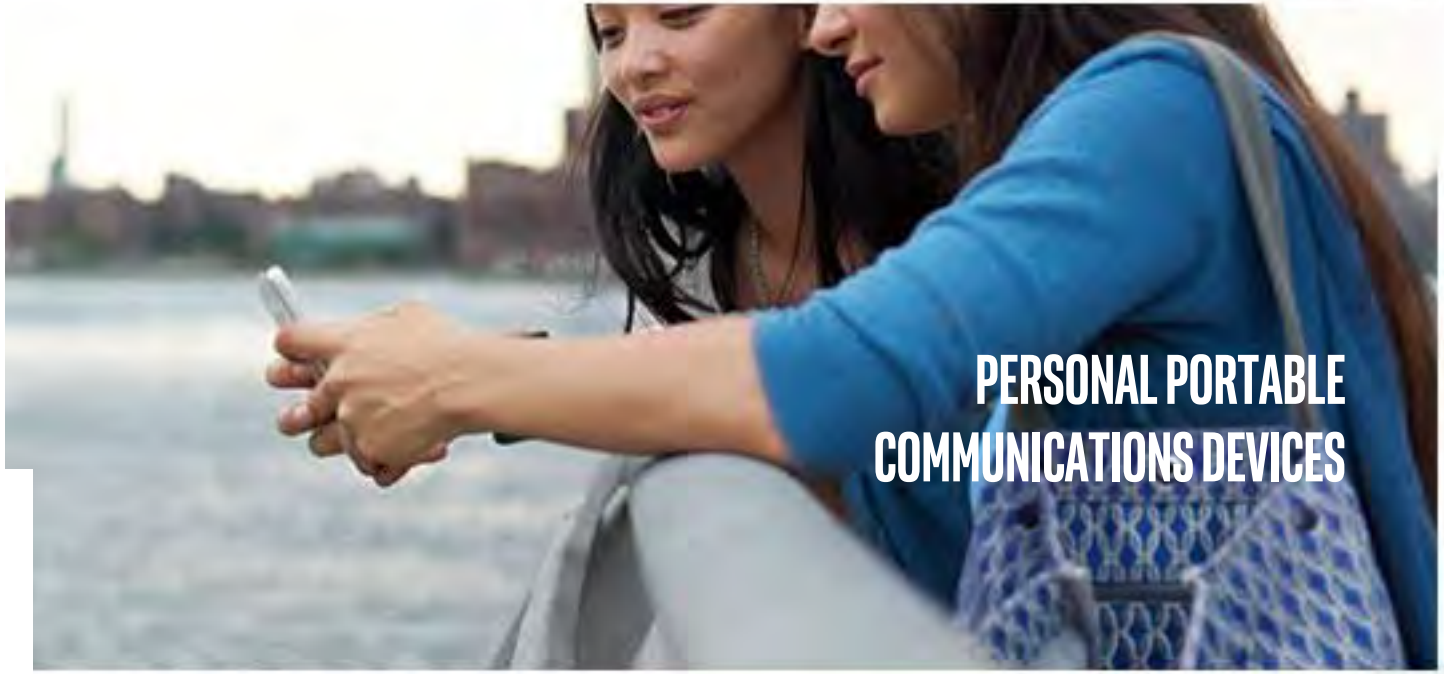
Present and future

By integrated electronics, I mean all the various technologies which are referred to as microelectronics today as well as any additional ones that result in electronics functions supplied to the user as irreducible units. These technologies were first investigated in the late 1950's. The object was to miniaturize electronics equipment to include increasingly complex electronic functions in limited space with

Gordon's Predictions

"Integrated circuits will lead to such wonders as home computers ... automatic controls for automobiles, and personal portable communications equipment. The electronic wristwatch needs only a display to be feasible today."





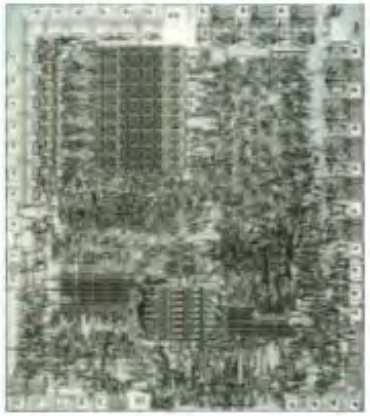
1971

Intel® 4004 processor
Initial clock speed: 108KHz
Transistors: 2,300
Manufacturing technology:
10 micron

1972

Intel® 8008 processor
Initial clock speed: 800KHz
Transistors: 3,500
Manufacturing technology:
10 micron

1974

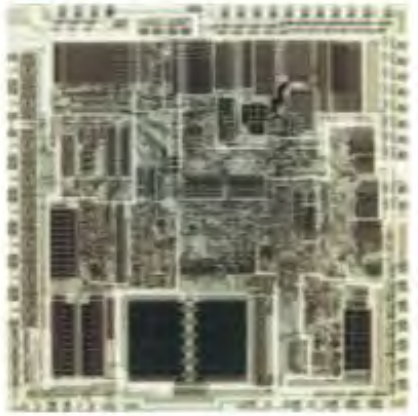


Intel® 8080 processor
Initial clock speed: 2MHz
Transistors: 4,500
Manufacturing technology:
6 micron

1978

Intel® 8086 processor
Initial clock speed: 5MHz
Transistors: 29,000
Manufacturing technology:
3 micron

1982



Intel® 286 processor
Initial clock speed: 6MHz
Transistors: 134,000
Manufacturing technology:
1.5 micron

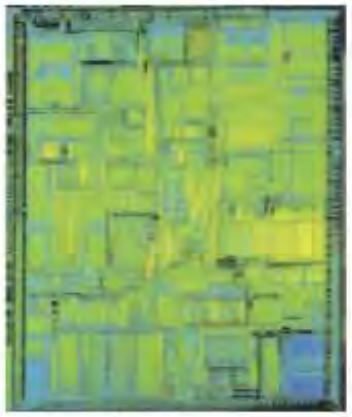
1997

Intel® Pentium® II processor

1998

Intel® Celeron® processor

1999



Intel® Pentium® III processor

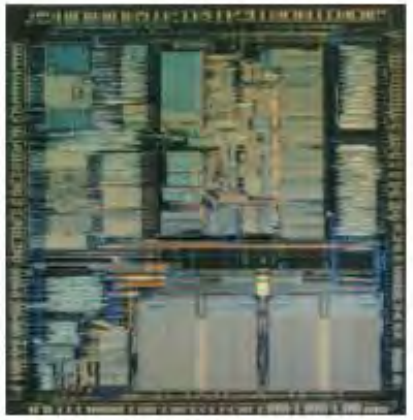
2000

Intel® Pentium® 4 processor

2001

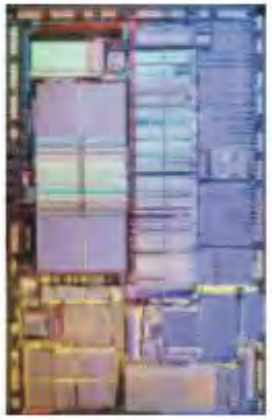
Intel® Xeon® processor

1985



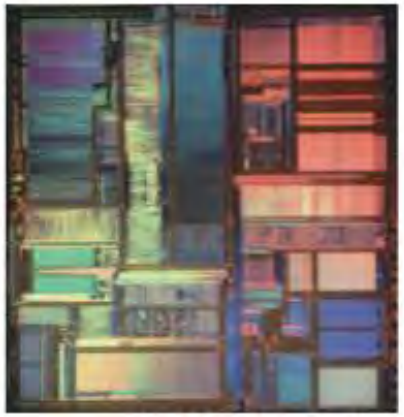
Intel386™ processor
Initial clock speed: 16MHz
Transistors: 275,000
Manufacturing technology:
1.5 micron

1989



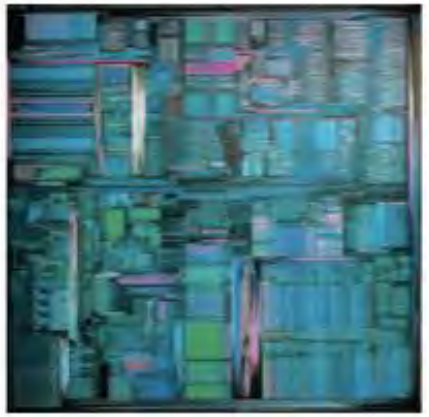
Intel486™ processor
Initial clock speed: 25MHz
Transistors: 1.2 million
Manufacturing technology:
1 micron

1993



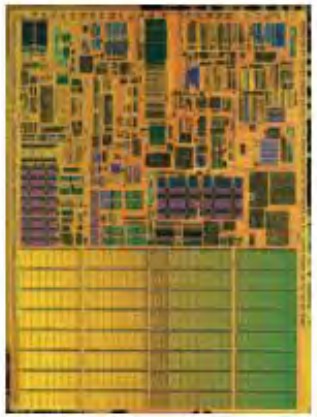
Intel® Pentium® processor
Initial clock speed: 66MHz
Transistors: 3.1 million
Manufacturing technology:
0.8 micron

1995



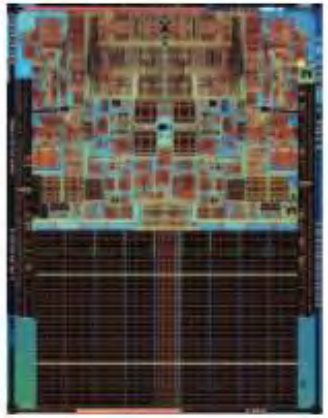
Intel® Pentium® Pro processor
Initial clock speed: 200MHz
Transistors: 5.5 million
Manufacturing technology:
0.35 micron

2003



Intel® Pentium® M processor

2006



Intel® Core™2 Duo processor

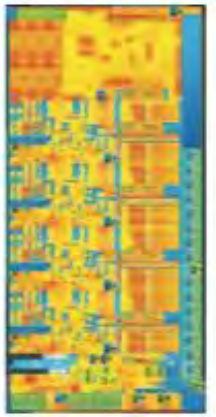
2008

Intel® Core™2 Duo processor

2008

Intel® Atom™ processor

2010



2nd generation

2012

3rd generation

Then and Now

Moore's Law transistor change

3500x Performance

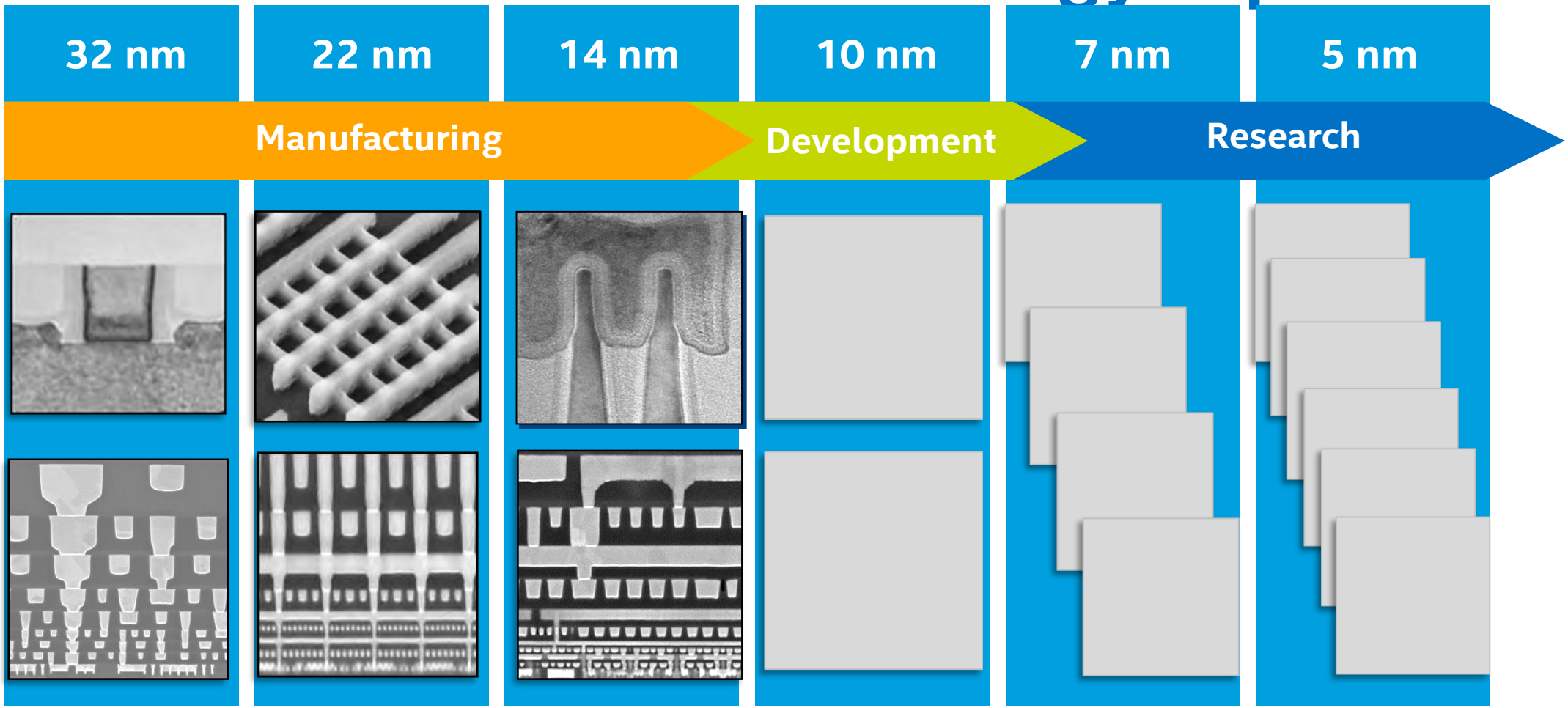
90000x Efficiency

$ 60,000x Lower cost

Intel® 4004
1971

Intel® Core i5 processor
2015

Innovation Enabled Technology Pipeline



Many novel device and process options are being researched to ensure Moore's Law continues


IF AN INTEL-BASED ANDROID** PHONE
WERE BUILT USING 1971 TECHNOLOGY,
THE PHONE'S MICROPROCESSOR ALONE
WOULD BE THE SIZE OF A PARKING SPACE.

Intel Transistor Leadership

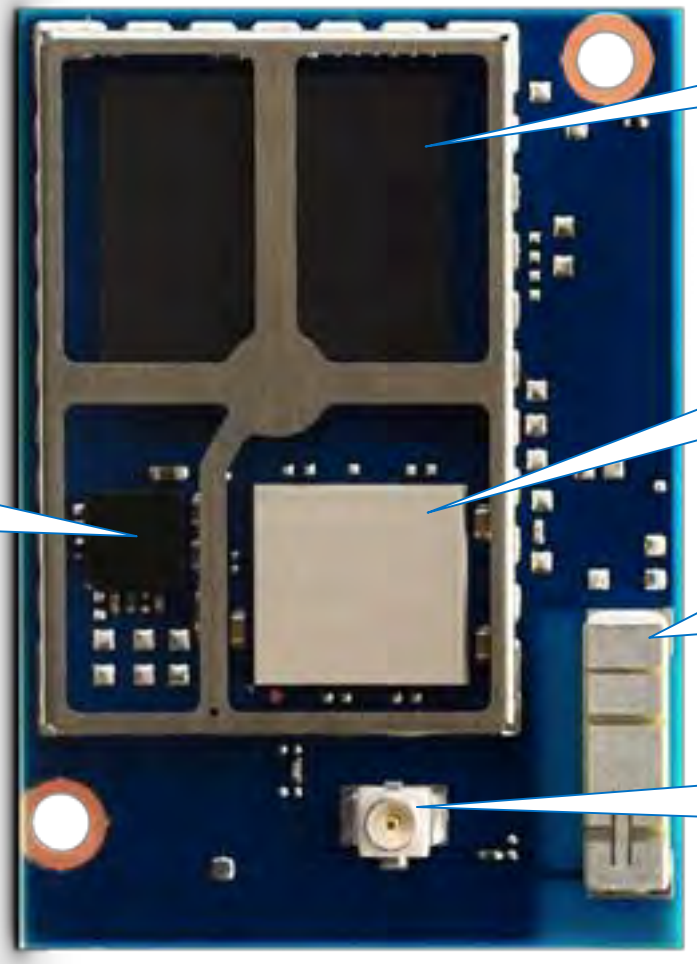
*Other names and brands may be claimed as the property of others.
Source: Dates are based on start of high volume production. Projected dates are based on other company public statements.

intel Edison

VALUE PROPOSITION

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.

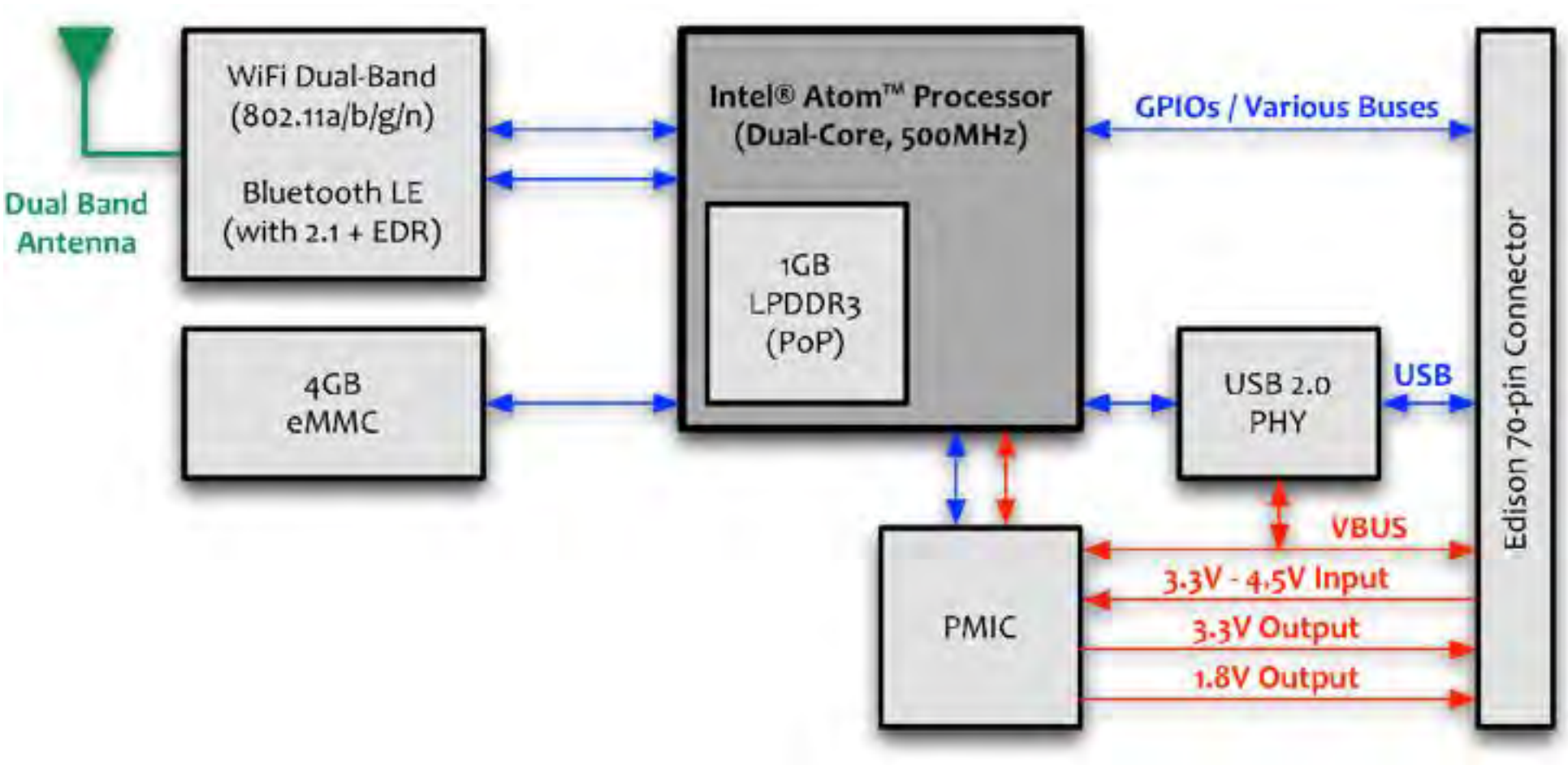
Intel® Edison Mechanical Layout



Top Side

Bottom Side

Intel® Edison Block Diagram



intel Edison

Physical	
Form Factor	Board with 70-pin connector
Dimensions	35.5 x 25.0 x 3.9 mm max
C/M/F	Blue PCB with Shields / No enclosure
Connector	Hirose DF40 Series (1.5mm, 2.0mm, or 3.0mm stack height)
Operating Temperature	0 – 40 degC

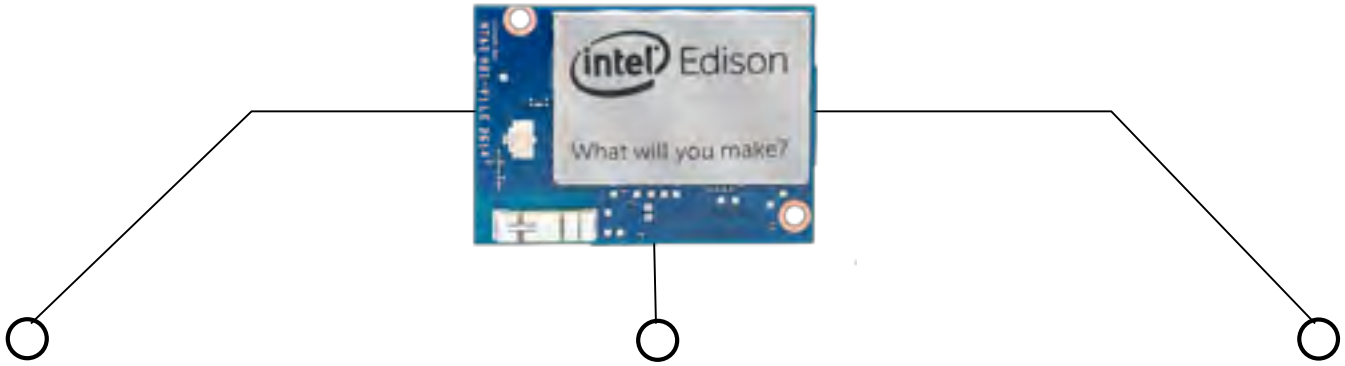
External Interfaces	
Total of 40 GPIOs which can be configured as:	
SD Card	1 Interface
UART	2 Controllers (1 full flow control, 1 RX/TX)
I2C	2 Controllers
SPI	1 Controller with 2 chip selects
I2S	1 Controller
GPIO	Additional 12 (with 4 capable of PWM)
USB 2.0	1 OTG Controller
Clock Output	32 KHz, 19.2 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) On board antenna or external antenna SKU configurations
Bluetooth	BT 4.0 + 2.1 EDR

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): 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

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*

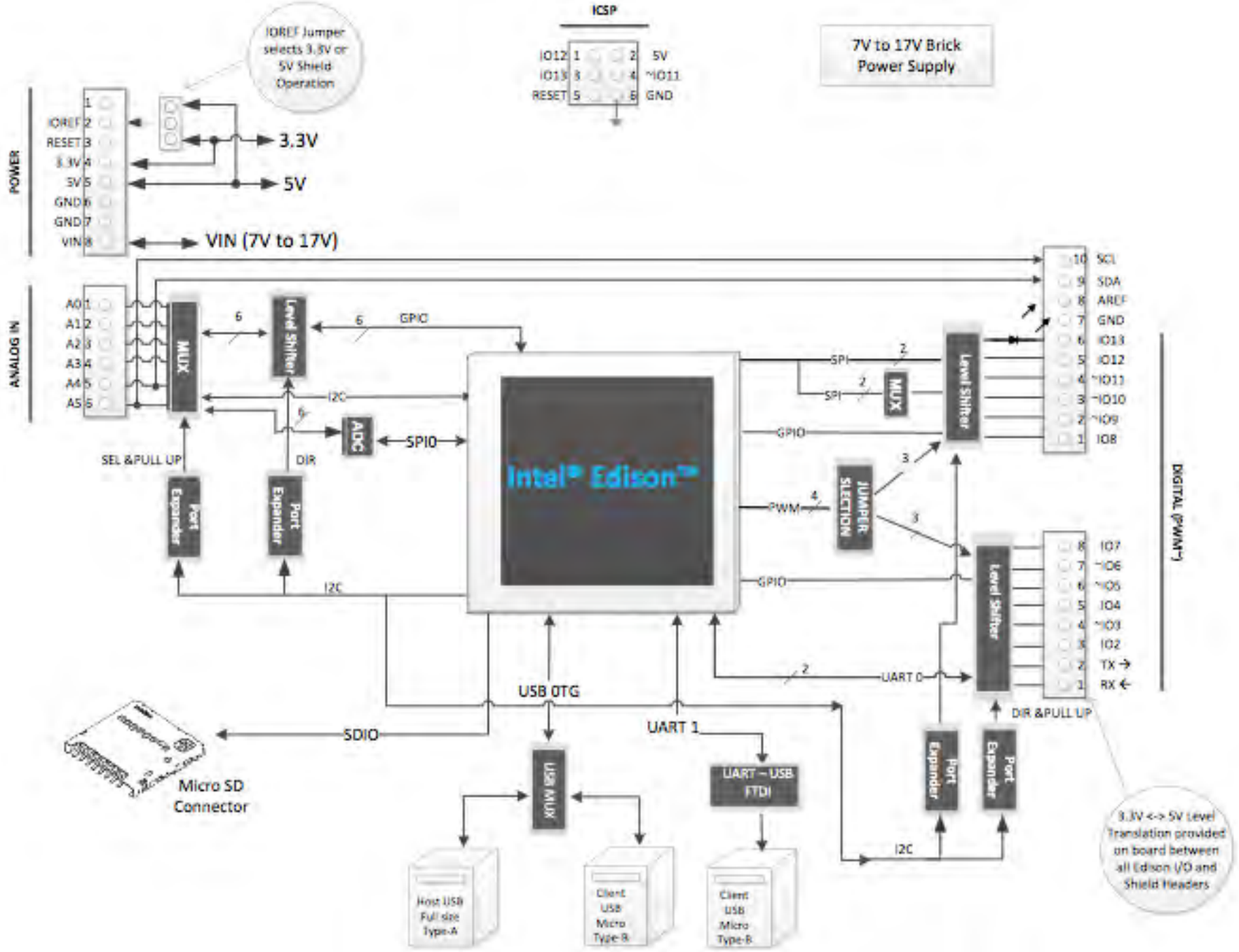
Similar to Arduino Yun (Arduino Sketch, Linux, WiFi & BT)

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)

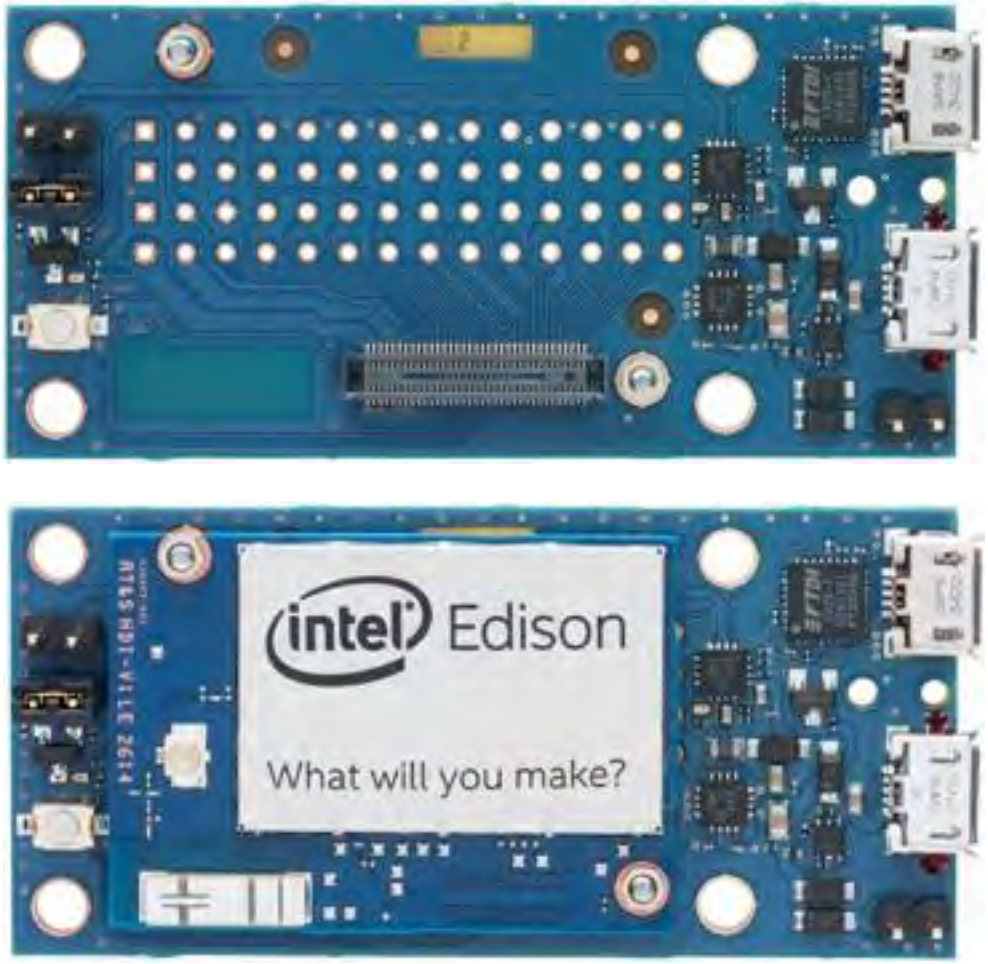
Intel® Edison

Arduino Expansion Board Block Diagram



Intel® Edison Breakout Board

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.

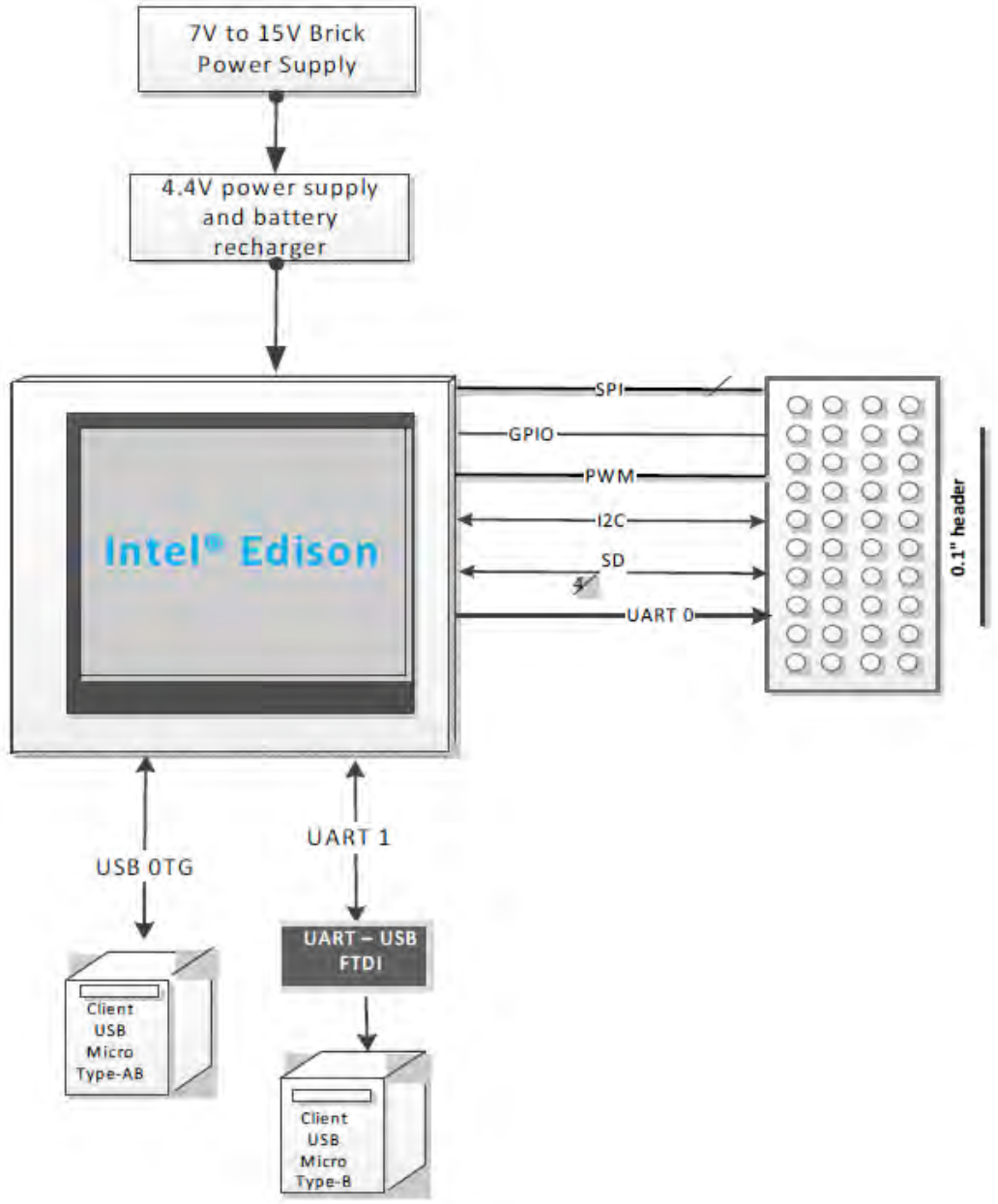


Board I/O:

- 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

Mini Break-out board



Intel® Curie™ module: reimagining wearable technology solutions

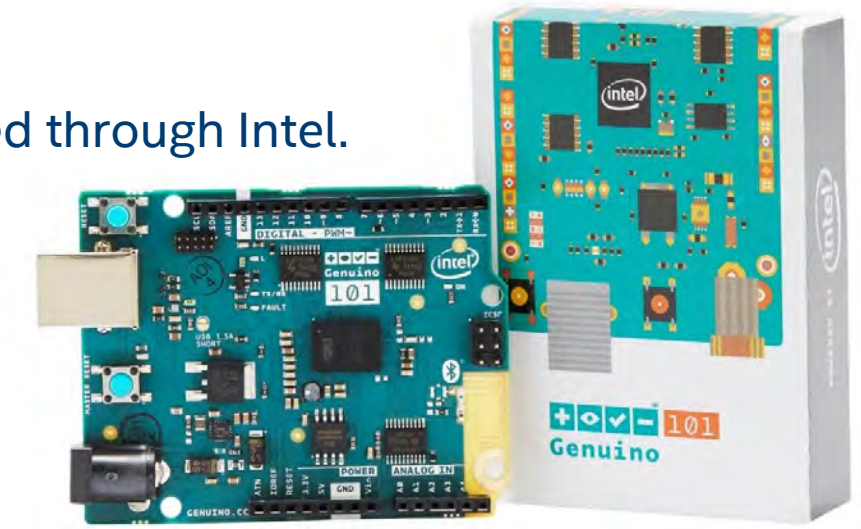
The Intel® Curie™ module is a highly integrated hardware module that can power a solution the size of a button.

The Intel Curie Module includes:

- Low-power, 32-bit Intel® QuarkTM microcontroller
- 384kB flash memory, 80kB SRAM
- Low-power, integrated DSP sensor hub and pattern matching technology
- Bluetooth Low Energy
- 6-axis combo sensor with accelerometer and gyroscope
- Battery charging circuitry (PMIC)

Arduino 101* & Genuino 101* | Powered by Intel

A low-cost, entry-level learning and development board for makers & students to learn about electronics, and for IOT developers to prototype rapidly.



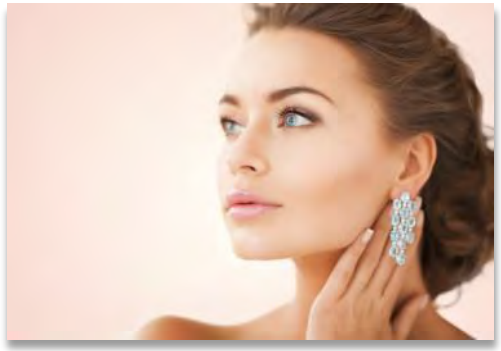
- Co-designed/branded with Arduino, LLC. Manufactured, distributed through Intel.
- Easy-to-use developer tools; extensive ecosystem of third-party platform extensions; established P2P online support community; programmable with open source development environment using a Windows*, Mac OS* or Linux* client computer.
- Same form factor and peripheral list of Arduino UNO* with addition of onboard Bluetooth LE and 6-axis accelerometer/gyro to enable creative technology projects in the connected world.
- Certified to be made available in more than 160 countries as Arduino 101* in US and Genuino 101* outside the US.

More info:
https://www.arduino.cc/en/Main/ArduinoBoard101 and
http://www.intel.com/content/www/us/en/do-it-yourself/arduino-101.html

- First widely-available development board to provide access to the Intel® Curie™ Module.

New Devices Group

Deliver groundbreaking new device technologies and platforms that inspire and create the best human interaction to our virtual and physical worlds

Smart Devices

Platforms for Creators

intel Edison