STMicroelectronics: Open Development Environment (ODE) un sistema di sviluppo per applicazioni IoT


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Who we are

- A global semiconductor leader
- 2014 revenues of $7.40B

Listed on New York Stock Exchange, Euronext Paris and Borsa Italiana, Milano

- Approximately 43,600 employees worldwide
- Approximately 8,700 people working in R&D
- 11 manufacturing sites

As of December 31, 2014
Flexible and Independent Manufacturing

Advanced research and development centers around the globe
~15,000 patents; ~9,000 patent families; 500 new filings (in 2014)
~ 8,700 people working in R&D and product design
Product Segments

Sense & Power and Automotive Products (SP&A)
- Analog, MEMS & Sensors (AMS)
- Automotive Product Group (APG)
- Industrial & Power Discrete Group (IPD)

Embedded Processing Solutions (EPS)
- Digital Product Group (DPG)*
- Microcontroller, Memory & Secure MCU (MMS)

* Includes legacy ST-Ericsson products
Where you find us

Our MEMS & Sensors are augmenting the consumer experience.

Our automotive products are making driving safer, greener and more entertaining.

Our smart power products are allowing our mobile products to operate longer and making more of our energy resources.

Our digital consumer products are powering the augmented digital lifestyle.

Our Microcontrollers are everywhere making everything smarter and more secure.
New Things to Augment Life

**Smart City**
- Reduce traffic congestion
- Better use of resources
- Improve security

**Smart Car**
- Reduce emissions
- Increase safety
- Save fuel

**Smart Home**
- Make entertainment more interactive and immersive
- Increase comfort
- Save energy

**Smart Me Healthcare**
- Empower patients
- Help physicians monitor and diagnose remotely

**Smart Me Fitness & Wellness**
- Help to lead healthier lives
- Optimize sports performance
- Early warning of illness
ST’s vision and strategy

OUR VISION
Everywhere microelectronics make a positive contribution to people’s lives, ST is there

OUR STRATEGY
Leadership in Sense & Power, Automotive Products and Embedded Processing Solutions

OUR 5 GROWTH DRIVERS
- Smart Power
- MEMS and Sensors
- Automotive
- Digital Consumer & ASICs
- Microcontrollers
People are our Foundation…

Present in over 35 countries

- Asia
- France
- Italy
- Mediterranean
- Americas
- Rest of Europe

Manufacturing ~ 64%
Research & Development ~ 20%
Marketing & Sales, Divisional Functions, Administration & General services ~ 16%

…working everyday to increase the quality and experience of life for all

As of December 31, 2014
Total ST census in Italy in 2015: 9767
Job functions at ST (1/3)

- **Design Architecture**
  - System specification
  - System modeling and simulation
  - Definition of system architecture
  - Performance study

- **Design H/W**
  - Digital design
  - Analog design
  - Testing
  - Documentation

Example: Wi-Fi PHY BaseBand IP Model

Example: Wi-Fi Transceiver SoC Architecture
Job functions at ST (2/3)

• **Layout**
  - Physical realization of project layout guaranteeing quality standards, time to market and costs

• **Product and Test Engineering**
  - Ensuring new device industrialization and achieving the highest possible production standard

Example: SPWF01SA Wi-Fi Module

Ex.: SoC Layout
Job functions at ST (3/3)

- **Design S/W**
  - Study of requirements
  - Embedded software development
  - Software testing

- **Application Development**
  - Application reference software development
  - Demo tools and lab solutions

```c
#include <stdio.h>
#include <stdlib.h>
#include <sys/types.h>
#include <arpa/inet.h>

void severul(portServ ports)
{
  int sockServ1, sockServ2, sockClient;
  struct sockaddr_in monAddr, addrClient, addrServ2;
  socklen_t lenAddrClient;
  
  if ((sockServ1 = socket(AF_INET, SOCK_STREAM, 0)) == -1) {
    perror("Erreur socket")
    exit(1);
  }
  if ((sockServ2 = socket(AF_INET, SOCK_STREAM, 0)) == -1) {
    perror("Erreur socket")
    exit(1);
  }
  bzero(&monAddr, sizeof(monAddr));
  monAddr.sin_family = AF_INET;
  monAddr.sin_port = htons(ports.port1);
  monAddr.sin_addr.s_addr = INADDR_ANY;
  bzero(&addrServ2, sizeof(addrServ2));
```
The Internet of Things

“Things that leverage the internet to make them smarter…”
The Building Blocks of the IoT

- **Sensors & Actuators**
  - Motion MEMS
  - Environmental Sensors
  - MEMS microphones
  - Touch Sensor
  - Micro-actuators
  - Proximity sensor
  - Image sensors

- **Brain**
  - Low-power brain
  - Sensor fusion

- **Communication**
  - Ultra-low power connectivity

- **Interfaces**
  - Analog
ST Offering for Wearable

- Sensors
- ULP Microcontrollers & Memories
  - Ultra-low power connectivity
  - Analog and mixed signal components
- Power and energy management

- Motion & environmental sensors
  - Proximity Sensors
- Switches
- MEMS microphones

- Digital sensors
- Microcontroller
- User interface
- Connectivity

- Analog front-end
- Power management
- Protections

- Analog sensors
- Power management ICs
- Battery management & monitoring ICs

- Current sensing
- Smart reset

- ESD Protections, EMI Filters & RF-IPD
- Display Power Supplies and LED Drivers
- Audio amplifiers
- BlueNRG
- Sub 1 GHz
- Wi-Fi Modules
- NFC & RFID
Lowering the Barriers for Developers

Fast, flexible, affordable and based on commercial components
STM32 Open Development Environment

STM32 Nucleo development boards

STM32 Nucleo expansion boards

STM32 Open Development Environment

STM32Cube software

STM32Cube expansion software

Developer community and support
Compatibility with free & commercial Development Environments

Sensors
ULP Memories and Tags
Ultra-low power connectivity
Analog and mixed signal components
Power and energy management

www.st.com/stm32ode
STM32 Nucleo Development Boards

- Flexible power supply through USB or external source
- Integrated debugging and programming ST-LINK probe
- STM32 microcontroller
  - Complete product range from ultra-low power to high-performance
- Morpho and Arduino expansion headers
STM32 Nucleo Expansion Boards

Sense
- Bluetooth Low Energy Expansion Board based on BlueNRG
- Dynamic NFC tag Expansion Board based on M24SR

Connect
- Stepper motor driver expansion board based on easySPIN™ L6474

Power
- Sub-1GHz expansion board based on SPGRF-868/-915

Move
- Audio In Expansion Board based on MP34DT01

Interact
- Motion MEMS and Environmental Sensor expansion board
An example of IoT End-to-End scenario
From Wi-Fi sensor to Cloud

STM32 Nucleo board +
Sensors + Wi-Fi
expansion boards

Cloud Platform
(e.g. Microsoft Azure)

Sensors data
 telemetry and
alerts

Analytics and
 mobile
push/notification

HTTPS
MQTT

STM32 Nucleo board +
Sensors + Wi-Fi
expansion boards
Thank you!

ST stands for life.augmented