Hardware: La Fortuna

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COMP2215: Computer Systems II
Embedded Computing

Microcontrollers (left), System-on-Chip (middle), Embedded Computers (right)
Microcontroller

- Low power requirements (a few mA)
- Flash Memory for programs: 4–128 kB
- RAM: typically from 0–32 kB
- Easy to program in C or C++
- Cross-compiler setup relatively simple
- In-system-programmers are cheap
- In quantity they can be very cheap
- Very low sleep power
- Can be extremely small and low capability
  (e.g., 4-bit CPU, no RAM only registers)
System on Chip

- Typically ARM Core CPUs
- Flash and RAM in MB range
- Cross-compiler setup is complex
- often used with cloud-based cross-compiler

Micro Python on SoC

- SoC now powerful enough to run scripting languages:
  - https://micropython.org/
- Fills the gap between low-level C-programming and full embedded computer.
System on Chip

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Embedded Computer

- Convenient development with login console
- Sufficient computing capability for image processing
- Current consumption several 100 mA
- System boot time makes frequent sleeping not efficient
- Complex Interrupt architecture makes precise timing of I/O difficult
- Often combined with uC for better control of I/O
**LaFortuna**

**Microcontroller (µC)**
- Computer on single Chip
- Low Power compared to SoC
- Easy low level use
- Programmable over USB

![Microcontroller Image]
LaFortuna Assembly
Development Kit

LaFortuna boards will be ready tomorrow.

All material is for you to keep and to continue on with your own embedded projects after the end of the module.

You will get:

- LaFortuna
- SD Card
- USB Cable
- A box for it
What is the LaFortuna?

Microcontroller Board with:

- 8-bit AVR controller
- Colour Display
- Rotary encoder
- 5 Buttons
- Micro SD card
- Audio & USB connector
- Digital I/O, Analogue I
- Serial port, JTAG

AT90USB1286

- 8 MHz, $V_{CC}=3.3$ V
- 8 KB RAM
- 128 KB Flash
- 4 KB EEPROM
- 4 Timer
- 8 ch. 10 bit ADC
- $320 \times 240$ TFT
- 18 bit Colour
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AVR Micro controller

- Complete computer on a single chip
- Very popular series of microcontroller
- Available in many sizes and configurations

Search for "arduino projects" or "AVR projects" on Google.