

1. The BrainCard module integrates one or more CM1K brain-inspired chip, a pattern recognition accelerator with neuromorphic learning (that is autonomous and learning by example). Whether your data comes from text streams, biosensors, cameras, mems, BrainCard brings recognition to your Arduino or Raspberry Pi project and their wealth of GPIO interfaces.
2. Given that the BrainCard also has its own A/D converter, microphone and optional CMOS sensor, the data to capture and monitor might also come directly from BrainCard itself.
3. Plug the Intel Edison module directly onto the BrainCard and you have a standalone system ready to perform real-time learning and analytics of data received through DeviceToDevice or DeviceToCloud communications, while still benefiting from the wealth of GPIOs of Arduino Shield boards.

Whichever hardware configuration you assemble, the BrainCard is the core component to teach examples and build knowledge describing what you want to recognize, detect, monitor, track, record or else. You will be able to save this knowledge for use by other BrainCards or for backup until you decide to enrich the knowledge at a later time with new examples.

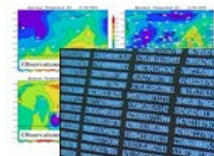
The BrainCard is delivered with a default configuration which can communicate with either one of the proposed controllers (Arduino, Raspberry PI or Edison) through a same communication protocol over their SPI lines. Access to generic pattern learning and recognition functions using the CM1K chip are made through a simple API delivered for the different IDE (Arduino and Eclipse). More specific function libraries will be released shortly after.



Face recognition, Person identification, Smart motion detection, Lock and track target, more...



Audio recognition, Bio-signal sensing, Vibration monitoring, More..



Text analytics, Network intrusion detection, Portable Bioinformatics, More...

SPECIFICATIONS

The left brain

- 1 CM1K with 1024 neurons
- Pattern Matching Accelerator capable of fuzzy logic and adaptive real-time learning
- Learn and recognize between 2.5 and 10 μ seconds depending on the length of the pattern (coded on up to 256 bytes)
- Knowledge base built by the neurons can be saved and restored
- Expansion connector to stack additional pairs of CM1K (totaling up to 9,216 neurons)

The right brain

- Xilinx Spartan 6 FPGA in charge of the on-board house keeping. Configurable by FPGA programmers.
- Footprint for Arduino Shield or CPU board connectors
- Connector for Raspberry Pi board (or GPIO lines)
- Connectors for Intel Edison CPU module and its USB2
- 16 Mbytes SDRAM
- Micro SD card slot
- Power supply: 5V supplied through the Arduino and Raspberry Pi boards; or DC 5v power jack if operating in standalone mode with an Intel Edison

The senses

- 2 6-pins PMOD connectors for Peripheral Modules
- Mini HDMI connector for display
- A/D connector
 - o 6 x 12-bit channels, each with 1 Mega Sample Per Second throughput
- 1 microphone (MEMS)
- Connector for CMOS sensor module
 - o 2592x1944 static
 - o 1080p @30 fps
 - o 720p @60 fps
 - o extension for 2nd sensor for stereoscopy

PROGRAMMING THE BRAINCARD

The factory default configuration of the BrainCard uses a common SPI protocol to interface the Arduino CPU boards, Raspberry Pi boards and the Edison module to (1) the CM1K neural network, (2) the SD card and other components as applicable to the model of the BrainCard such as the vision sensor. API will be supplied to access the functionality of the configuration files under IDE such as Arduino and Eclipse

WITH ARDUINO

<http://arduino.cc/en/Main/Products>

Braincard can be assembled with a Arduino CPU board acting as a controller and also with Arduino Shield boards for multiple GPIO configuration boards.

WITH RASPBERRI PI

<http://www.raspberrypi.org/products/>

Braincard can be assembled with a Raspberry Pi board acting as a controller with various GPIOs in addition to the ones of the BrainCard or Arduino Shield boards.

WITH INTEL EDISON

<HTTP://WWW.INTEL.COM/CONTENT/WWW/US/EN/DO-IT-YOURSELF/EDISON.HTML>

The Intel® Edison is an ultra-small low-power computing platform which can plug into the back of the BrainCard through its 70-pin connector. The resulting assembly is a high speed processor with WiFi and Bluetooth on-board and access to a NeuroMem network for high-speed pattern matching, real-time learning and recognition. Data streams can be received through DeviceToDevice or DeviceToCloud communications. Given that the BrainCard also has its own A/D converter, microphone and optional CMOS sensor, the data to capture and monitor might also come directly from BrainCard itself ready to perform analytics on-board and transmit or record only when something of interest occurs, generate and save meta data and more.

ORDERING

BrainCard 1K

CogniSight BrainCard 1K IS,
NM 2K expansion,

(Arduino connectors supplied, not mounted)

with CMOS sensor and lens mounted
stackable module with 2 CM1K chips