



## Kord

Status: Commercial Beta

The Kord is a general purpose IO board that is used to connect all of the other Brainpack components to the "brain," which is a KoreBot II Linux-based single board computer (shown below). The Kord is designed to work well with the Brainpack, however, it is also a very appealing add-on to existing KoreBot II users as well for a large range of applications, not just Brainpack. Its key features include:

- On-board power supply and power management
- Power distribution system
- Power switch
- 3-Port USB hub for cameras and other accessories
- 6x - I2C ports to connect hands, feet, and other sensors
- RS-232 serial console port
- 2x - RS-232 device ports
- IR remote receiver
- Tri-axis high-resolution accelerometer
- 12x - Configurable LEDs to display system status or acceleration data
- Programming port for easy firmware upgrades



## Brackets

Status: Commercial Beta

In order to allow the Brainpack to work on a wide variety of humanoid platforms we developed several different bracket sets. These are made from waterjet cut aluminum and act as mounts for the KoreBot II, camera, feet, and hands. If a humanoid platform is changed or a new platform is released we can simply design a new bracket set which allows us to quickly add Brainpack hardware support. Currently we have bracket sets for the following platforms:

- Robotis Bioloid Series
- Hitec RoboNova
- Kondo KHR Series
- Kyosho Manoi



## Bellum DM

Status: Prototyping

While we can interface with most off-the-self humanoid platforms, the interface between our controller and the motors can sometimes be slower than we want it. The Bellum is an optional high-speed servo motor controller replacement that eliminates this slow link. The Bellum DM is specifically designed to replace the standard controller on the Robotis Bioloid line of humanoids but other Bellum boards can be designed for other humanoid platforms to improve their performance as well.

## Hand

Status: Commercial Beta

The Brainpack Hand is a smart I2C device that contains a strain gauge sensor that allows a robot to "feel" objects. It is usually used for simple grasping but can also be used as a tactile sensor, much like how a blindfolded person would use their hands when they were wandering around a cluttered room. The hand also provides several LEDs to display status information.



## Foot

Status: Commercial Beta/Redesign Development

The Brainpack Foot is a smart I2C device that contains eight force sensors to allow a humanoid robot to balance and adapt to various terrain changes. Six of the force sensors are in the sole of the foot and two are in the toe to provide tactile feedback when an object is kicked. If an object such as a ball is kicked the feedback from the toe sensors can also provide an estimated trajectory angle from which the ball left the foot. LEDs in the foot can display force data or a variety of patterns. Our second generation Foot which is currently in development will replace our current force sensors with strain gauges to give the Foot better reliability and accuracy. It will also be slightly smaller to meet RoboCup Soccer rule requirements opening up this new market to the Brainpack.

## Camera

Status: Off-the-Shelf Commercial Product

The USB camera is mounted on the head of a humanoid and can support vision algorithms such as object tracking or facial recognition



## KoreBot II

Status: Off-the-Shelf Commercial Product

The KoreBot II is a 600MHz Linux-based single board computer and is the "brain" of the SkewZone Brainpack. The KB-250 interface bus allows us to plug in accessory modules such as the Kord.



## Wi-Fi Card

Status: Off-the-Shelf Commercial Product

The 802.11 b/g Wi-Fi card plugs into the KoreBot II and adds wireless capabilities to the system. This means that a robot could be controlled remotely or the vision system could be streamed to a remote user.

