LEGO® Education SPIKE™ Prime Technical Specifications

Technic™ Large Hub

Hardware name	Technic™ Large Hub
Description	The Hub is a programmable control unit that LEGO® sensors and motors can be attached to. The Hub has an intuitive light and button interface and can work autonomously or in streaming mode.
Key features	• 5x5 LED matrix white display • Six input/output ports • Six-axis Gyro Sensor (three-axis accelerometer and three-axis gyroscope) • Three-button navigation, including light interface • Speaker • Connectivity to devices using USB and Bluetooth • MicroPython operating system • The Hub has a Technic build geometry that allows for versatile building and easy integration into models
Connector type	LEGO Power Functions 2.0 (LPF2) for connection to LEGO sensors and motors

Hub capabilities	5x5 LED matrix white display:
	• 25 white LEDs
	• Each LED is programmable
	• Each LED can be dimmed in 10-step increments
	
	Input/output ports:
	• 6x LPF2 input/output ports (ports A, B, C, D, E , and F)
	• 115 kB port speed (ports E and F are prepared for “high-speed”)
	• Autodetection of sensors and motors
	• Ports can be chosen freely when pairing motors
	
	Six-axis Gyro Sensor:
	• Three-axis accelerometer
	• Three-axis gyroscope
	• Able to report:
	  • Gyroscope mode (three-axis)
	  • Accelerometer/tilt mode (three-axis)
	  • Gestures as *tap*, *free fall*, and *shake*
	
	Three-button interface:
	• Center Button:
	  • Turns the Hub on/off
	  • Executes selected programs
	  • RGB light LEDs inside the button that communicate system status and are programmable
	• Left/Right Button:
	  • Navigates programs on the Hub
	
	Speaker:
	• Used for interface sounds
	• Maximum sound quality is 12 bit 16 KHz (mono)

The LEGO® Education SPIKE™ app may not support all hardware features and functionalities.

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Wireless connectivity:
- Enables users to connect wirelessly to smart devices (phones, tablets, laptops, etc.) and LEGO® LPF2 remotes and wireless components using Bluetooth
  - Bluetooth Classic 4.2 (BTC)
  - Bluetooth Low Energy 4.2 (BLE)
- Connectivity to smart devices (laptops, tablets, etc.) is only supported with BTC
- Programs, sounds, and firmware can be updated wirelessly (BTC only)
- Minimum range: 10 meters (line-of-sight, without obstructions, indoors)
- The Hub can have a maximum of four BLE and one Bluetooth connections to compatible wireless components
- Connection interface button on the Hub enables users to turn wireless functionality on/off
  - RGB light LED indicates connectivity status ("Bluetooth on/off," “connected,” “out of range”)

Power supply:
- Specially designed rechargeable battery is required
  - Charges inside the Hub via micro USB cable
  - Can be removed from the Hub without the use of tools
- RGB color LED indicates power/charging status

Size and weight:
- Hub Weight 63 g (without battery)
- Hub Dimensions: L88.0 x W56.0 x H32.0 mm.

System:
- The Hub is powered by a 100MHz M4 320 KB RAM 1M FLASH processor
- 32 MB of memory for programs, sound, and content
- Embedded MicroPython operating system
  - Provides an open platform for advanced users and third-parties

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