Hummingbird Arduino API Description

The Hummingbird can be used with Arduino in two modes:

1. Use the Hummingbird Arduino library API to write programs that control the regular Hummingbird inputs and outputs (top-side ports). As the top-side ports use nearly all Arduino pins, it may be a challenge to use shields in addition to the Hummingbird library. Refer to the pin-mapping guide at the end of this document to see how Hummingbird I/O maps to the Arduino Pin mapping.
2. Use Hummingbird as an Arduino Leonardo with an integrated SPI-based Motor/Servo shield; all other inputs/outputs will need to be manually initialized by other libraries or the program.

Initialization

void init()

Fully initializes the Hummingbird. By default it will set as outputs all LED and Vibration motor pins (Arduino pins 2 to 12), it will also enable intensity control for LEDs (using Timer 3) and for vibration motors (using Timer 1).

void initOnlyMotorsAndServos()

Initializes just the SPI communication with Hummingbird's integrated motor/servo controller. All regular Arduino pins except for digital I/O pin 8 are left alone. Pin 8 is the slave select line for SPI communication with the motor/servo controller.

void init(boolean turnOnLEDFading, boolean turnOnVibrationSpeed, boolean turnOnLEDandVibrationOutputs)

Provides user control over specific initialization steps.

Parameters

turnOnLEDFading: Initializes software interrupt on Timer 3 that provides intensity control of the LEDs. If this is not initialized, the LED functions only turn LEDs on or off and Timer 3 is free for user control.

turnOnVibrationSpeed: Initialized speed control over the vibration motors, using Timer 1. If this is not initialized, the vibration motors can only be turned on or off and Timer 1 is free for user control.

tunrOnLEDandVibrationOutputs: Sets Arduino pins 2-7 and 9-13 as outputs.

LEDs

void setLED(byte port, byte intensity)

Sets the intensity of the LED on port 1, 2, 3, or 4.

Parameters
port: The LED's port: 1, 2, 3, or 4

intensity: The intensity of light from the LED, 0 is off, 255 is fully on. If LED fading is turned off, all non-zero values will result in the LED being fully on.

void setStatusLED(byte intensity)

Sets the intensity of the green status LED (also tied to 'L' LED on the Arduino side).

Parameters
intensity: The intensity of light from the LED, 0 is off, 255 is fully on. If LED fading is turned off, all non-zero values will result in the LED being fully on.

void setTriColorLED(byte port, byte red, byte green, byte blue)

Sets the color and brightness of the tri-color LED on port 1 or 2

Parameters
port: The LED's port: 1 or 2

red: The intensity of red light from the LED, 0 is off, 255 is fully on. If LED fading is turned off, all non-zero values will result in the red LED being fully on.

green: The intensity of green light from the LED, 0 is off, 255 is fully on. If LED fading is turned off, all non-zero values will result in the green LED being fully on.

blue: The intensity of blue light from the LED, 0 is off, 255 is fully on. If LED fading is turned off, all non-zero values will result in the blue LED being fully on.

void turnOnLEDFade() and void turnOffLEDFade()

Turns on or off fading for LEDs

Motors and Servos

void setMotor(byte port, int velocity)

Sets the velocity of the gear motor on port 1 or2.

Parameters
port: The gear motor's port: 1 or 2

velocity: The power sent to the motor, the range is -255 to 255: 0 is off, 255 is full speed in one direction, -255 is full speed in the other direction. The motor has a dead zone where it will not spin for values between approximately -30 to 30.

void setServo(byte port, byte degrees)

Sets the angle of the servo on ports 1, 2, 3 or 4.

Parameters
port: The servo's port: 1, 2, 3, or 4

degrees: The servo angle, specified in degrees, with a range of 0 to 180.

void setVibration(byte port, byte intensity)

Sets the intensity of the vibration motor on port 1 or 2.

Parameters
port: The vibration motor's port: 1 or 2

intensity: The speed of the vibration motor, 0 is off, 255 is fully on. If vibration motor speed control is turned off, all non-zero values will result in full speed for the motor.

void turnOnVibrationMotorSpeed() and void turnOffVibrationMotorSpeed()

Turns speed control on or off for vibration motors.

Sensors

float readInputVoltage()

Returns a reading in volts of the voltage of VIN. Voltages higher than 10V will read as 10V.

int readSensorValue(byte port)

Reads the analog value at the port specified. Values can range from 0 to 1023, with 0 corresponding to 0V and 1023 corresponding to 5V.

Parameters
port: The sensor's port: 1, 2, 3, or 4

Pin-mapping: Hummingbird Duo to Arduino Leonardo

Digital I/O

Arduino Pin	Hummingbird Use
0	Not used
1	Not used
2	Controls LED port 2
3	Controls LED port 1
4	Controls RGB port 1, green element
5	Controls RGB port 2, red element
6	Controls RGB port 2, green element
7	Controls RGB port 1, red element
8	Controls SPI slave select for motor/servo controller.
9	Controls Vibration motor 1
10	Controls Vibration motor 2
11	Controls RGB port 2, blue element
12	Controls RGB port 1, blue element
13	Controls Status LED on top side, ‘L’ LED on bottom
SDA	Controls LED port 2
SCL	Controls LED port 1

Analog In

Arduino Pin	Hummingbird Use
0	Controls LED port 4
1	Sensor 1 input
2	Sensor 2 input
3	Sensor 3 input
4	Sensor 4 input
5	Battery voltage monitor

SPI

Arduino Pin	Hummingbird Use
MOSI	MOSI to motor/servo controller, can be used for additional modules
MISO	Not used
SCK	SCK to motor/servo controller, can be used for additional modules