



**LabVIEW**  
**hacker**  
**.com**

android  
phone  
arduino  
iphone  
irobot  
kinect  
neato/lidar  
wii remote

-----  
suggest...

## android

technical specifications will familiarize you with the concepts of bluetooth communication.

hacking with labview how to hack with labview instructions

download the labview library download the labview library

## technical specifications

the sensors available on an android platform -

> <http://developer.android.com/reference/android/hardware/sensor.html>

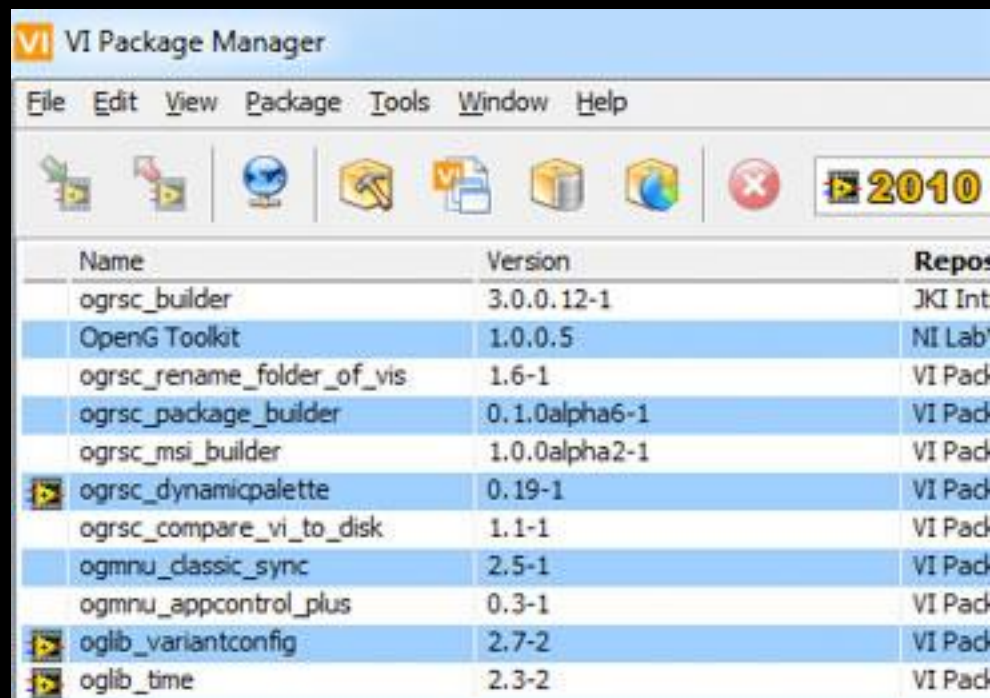
int type\_accelerometer a constant describing an accelerometer sensor type.

int type\_all a constant describing all sensor types.

int type\_gravity a constant describing a gravity sensor type.

## download the labview library

1. install jki's vi package manager -> [jki's vi package manager](#)
2. download the android package -> [labviewhacker\\_jib\\_android\\_bluetooth\\_library-1.0.0.8.vip](#)
3. install the 'labviewhacker\_jib\_android\_bluetooth\_library-1.0.0.8.vip' using jki's package manager



<http://jki.net/vipm>

# Wii-mote

# Tech Specs

- 3 axis accelerometer for static and dynamic acceleration
- Broadcom Bluetooth chip
- 4 LED's and 12 buttons
- Infrared optical sensor
- Up to 3.3V operating voltage

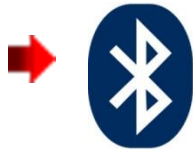


# Interface to LabVIEW

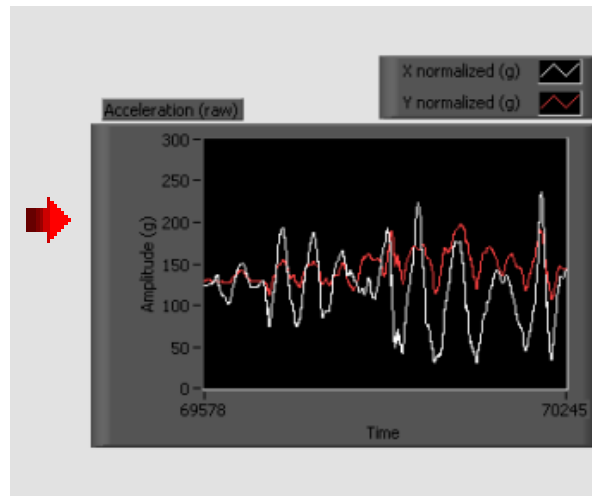
Wiimote



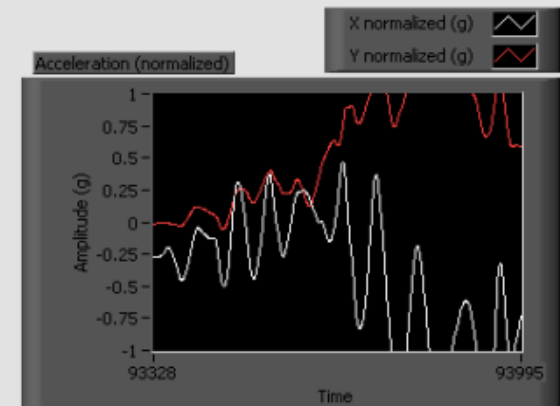
Bluetooth



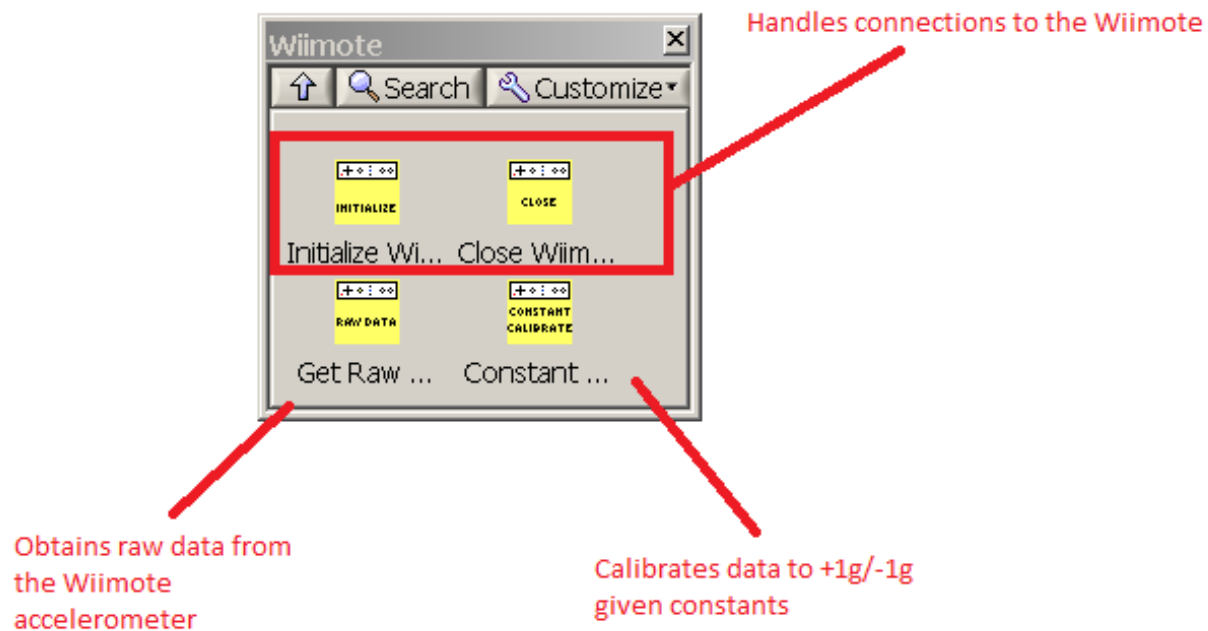
Raw Data



Calibrated Data

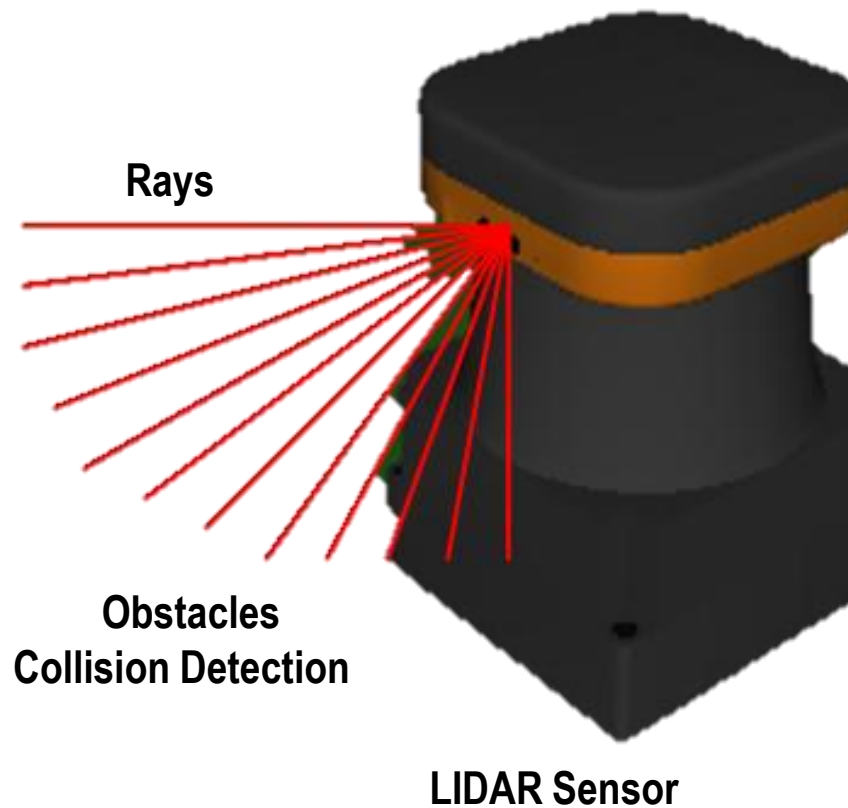


# LabVIEW Package



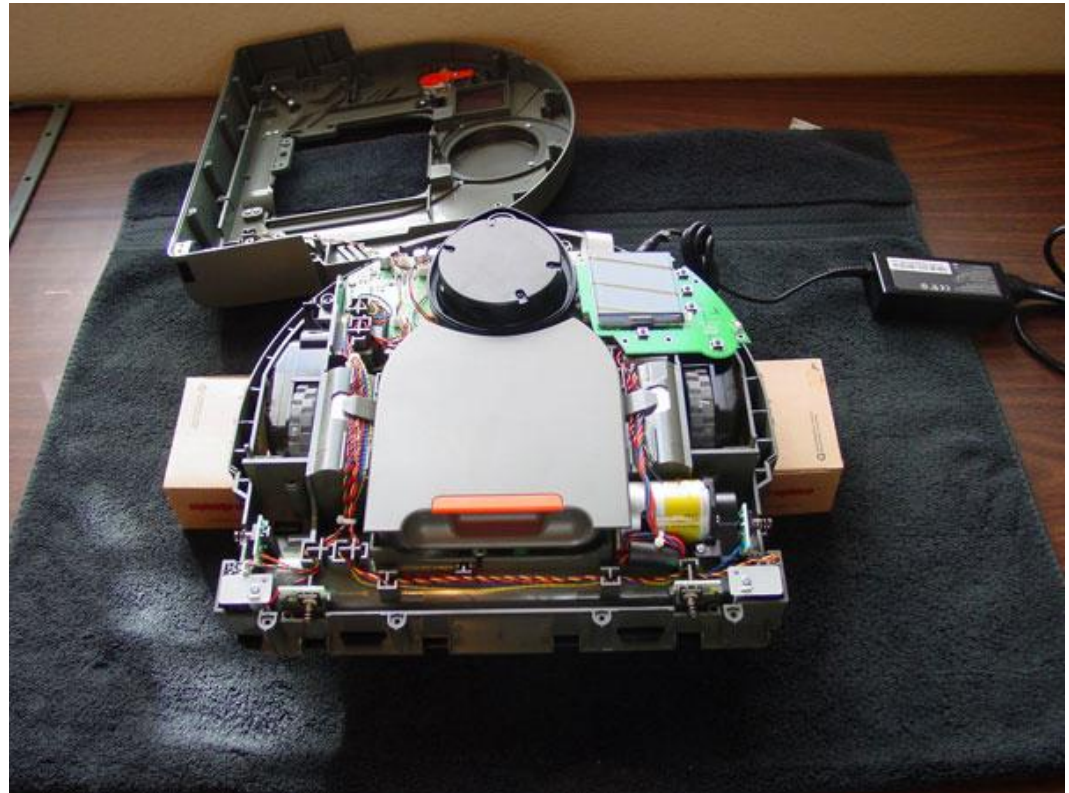
# Neato Lidar

# Tech Specs



# Tech Specs

- Neato XV-11 Vacuum for \$400
- 360 degree lidar with 1 degree resolution
- Maximum distance of 6 meters
- 115.2 kHz baud rate with 3.3V logic



# Interface to LabVIEW

Lidar



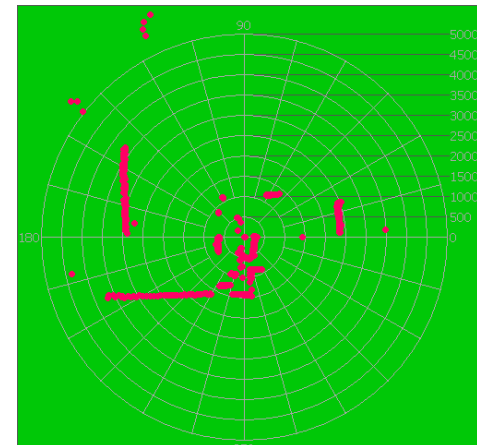
Parsed Data

```
D1 6A 4A 78 04 07 00 7F 04 0A 00 89 04 06 00 89 04 0F 00 A3 5D
D2 6A 4A 35 80 00 00 35 80 00 00 35 80 00 00 35 80 00 00 BD 05
D3 6A 4A 35 80 00 00 A0 04 0E 00 35 80 00 00 CE 02 19 00 2B 19
D4 6A 4A CC 02 5D 00 C3 02 BE 00 BD 02 C4 00 B9 02 D0 00 A6 62
D5 6A 4A B7 02 E2 00 B7 02 C8 00 B8 02 DD 00 CF 02 AD 00 CF 78
D6 6A 4A 73 03 06 00 35 80 00 00 35 80 00 00 05 05 25 00 93 2F
D7 8D 4A E0 04 34 00 C2 04 2E 00 A8 04 38 00 8E 04 37 00 8E 4C
D8 8D 4A 74 04 3B 00 5D 04 41 00 47 04 40 00 32 04 46 00 51 09
D9 8D 4A 20 04 4E 00 0B 04 48 00 F7 03 52 00 E7 03 4F 00 7F 57
DA 8D 4A D5 03 65 00 C5 03 5E 00 B6 03 6E 00 A8 03 74 00 72 2E
```

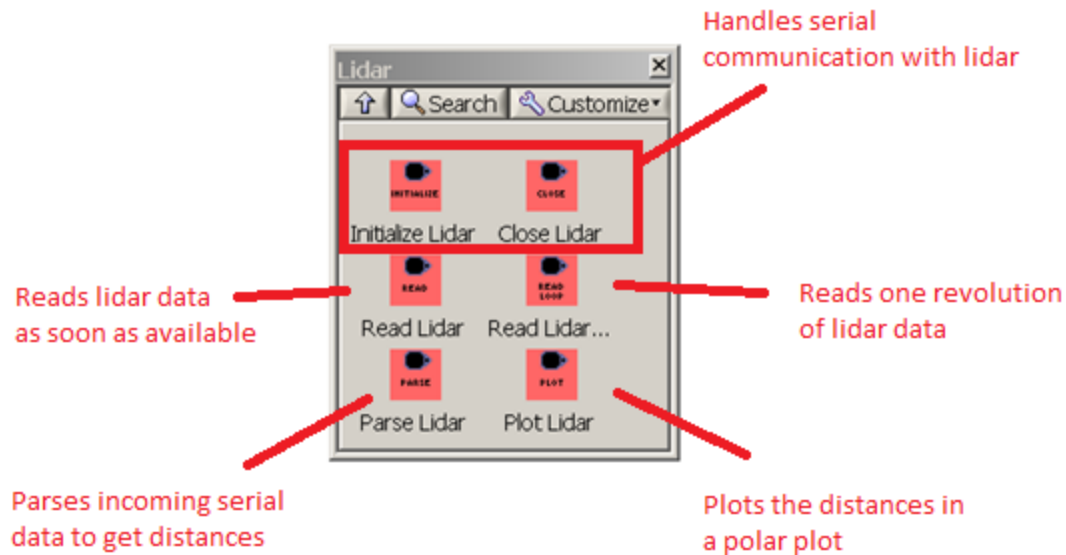
USB/Serial



Polar Plot



# LabVIEW Package

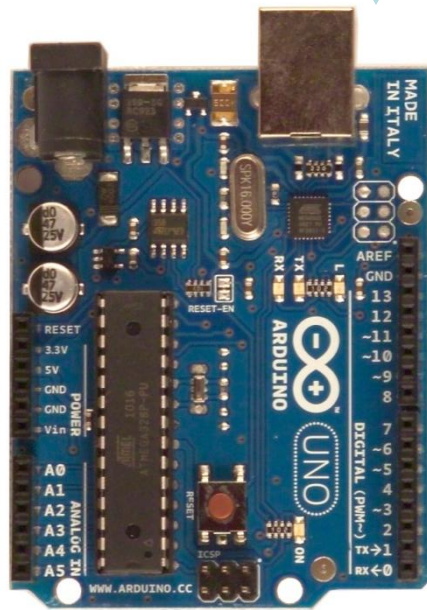


# Arduino

# Tech Specs

External  
Power  
Jack

USB  
for  
Power  
& Data



Power  
Pins

Analog  
Inputs

14 digital I/O lines (6 PWM  
capable, 2 Serial lines)

- Has I/O in a small package to interact with the real world

- Created with artists, designers, and hobbyists in mind

- Costs **\$30**

- Includes super simple C programming environment

# Interface to LabVIEW

## Arduino IO Engine

```
case 0x08: // Read Analog Pin
    retVal = analogRead(command[1]);
    Serial.print( (retVal >> 8), BYTE);
    Serial.print( (retVal & 0xFF), BYTE);
    break;
```

```
void setup()
{
    // Initialize Serial Port With
    Serial.begin(DEFAULTBAUDRATE);
```

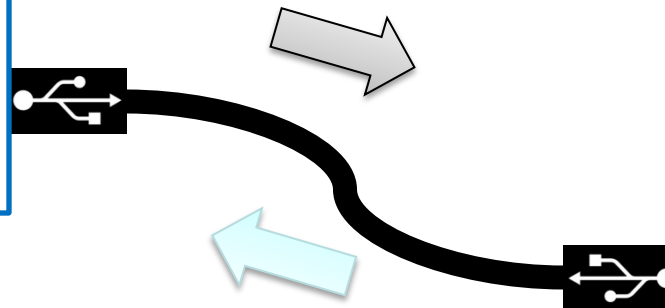
Steps

1

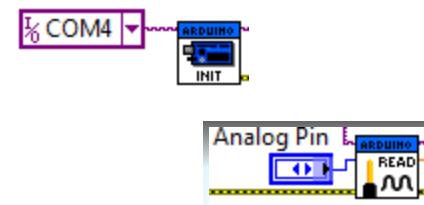
2

3

Initialize    Send    Process &  
Request    Return  
Packet

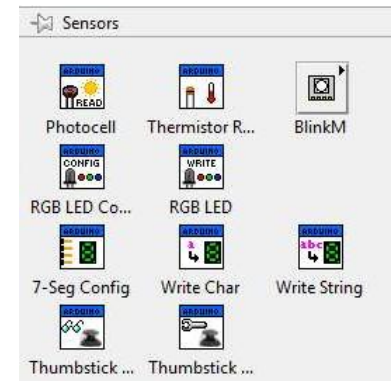
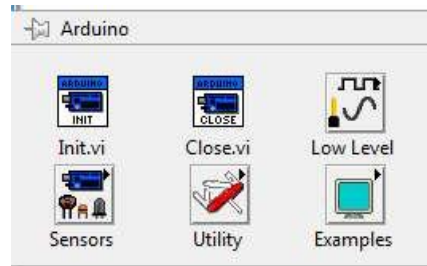
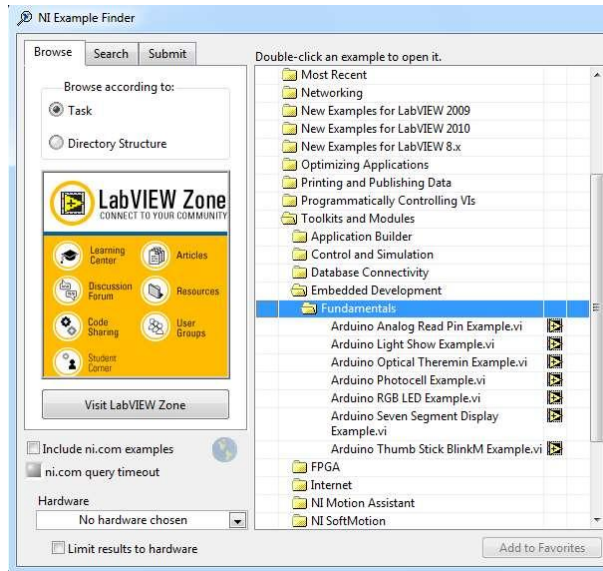


## Computer

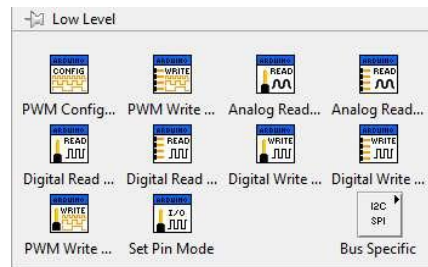
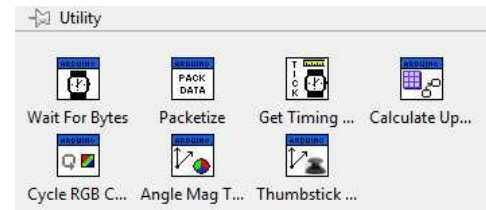


# LabVIEW Package

## Shipping Examples



## Palettes



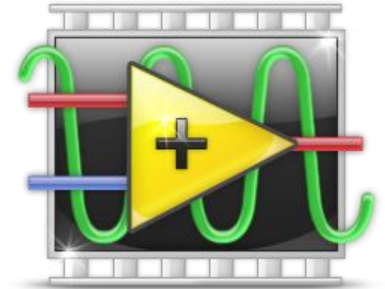
# Kinect

# Tech Specs

- 640x480 RGB Camera
- 640x480 Depth Map
- Field of View 60° x 30°
- Color Resolution 16-bit
- Kinect v1
- Color Resolution 16-bit
- Error Rate 0.1%
- Version 1.0



# Interface to LabVIEW



Kinect SDK Beta



LabVIEW .NET Invoke Nodes



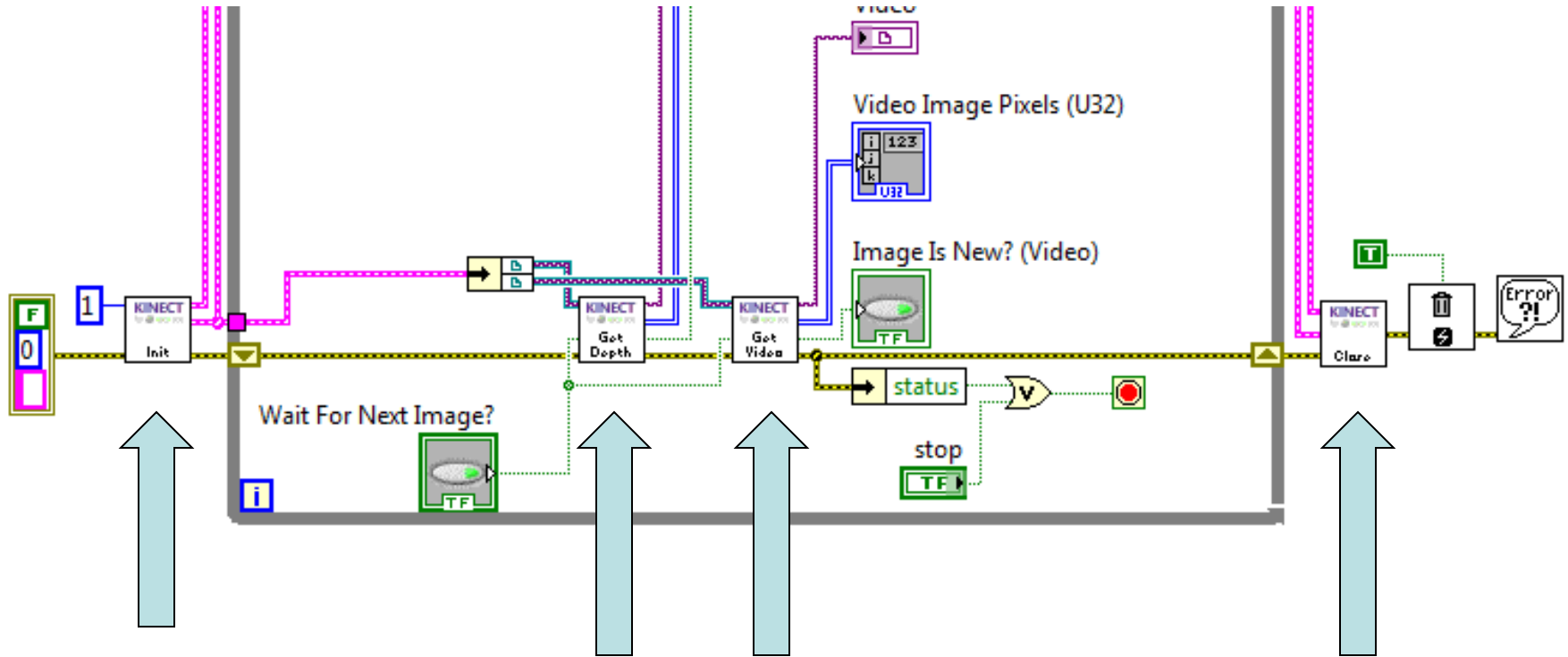
Registered Event Callbacks



Enqueued Data Streams



# LabVIEW Package



Initialize Kinect,  
Open Handles

Acquire Frames

Terminate Kinect,  
Close Handles

# Android

# Tech Specs

- Android library to access sensors
- 3 axis accelerometer
- Light, pressure, temperature
- Bluetooth communication



# Interface to LabVIEW

Android



Bluetooth



Parse

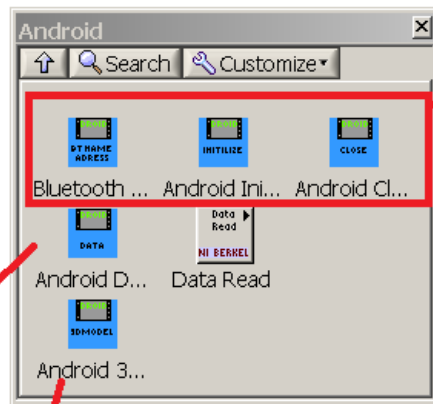
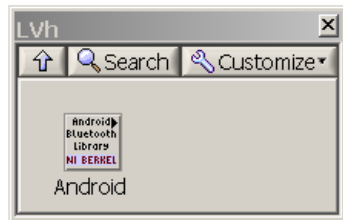
Data String

data out

```
-3.0000000000a3.0000000000b2  
83.0000000000c9.95647400000d-  
0.5720546000e-0.5039528600f-  
26.187500000g13.812500000h4  
9.875000000j225.0000k27.0000
```

ort_X	3
ort_Y	-3
ort_Z	283
accel_X	-0.572055
accel_Y	9.95647
accel_Z	-0.503953
magnet_X	13.8125
magnet_Y	-26.1875
magnet_Z	49.875
Light	225
Temperature	27

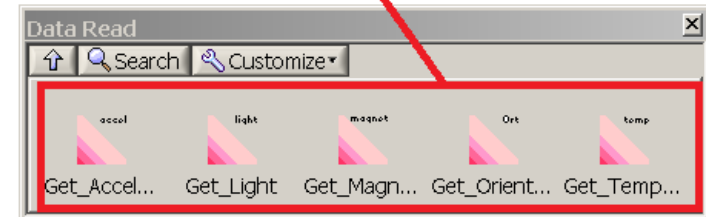
# LabVIEW Package



Handles Bluetooth connections to the Android

Obtains data in string format

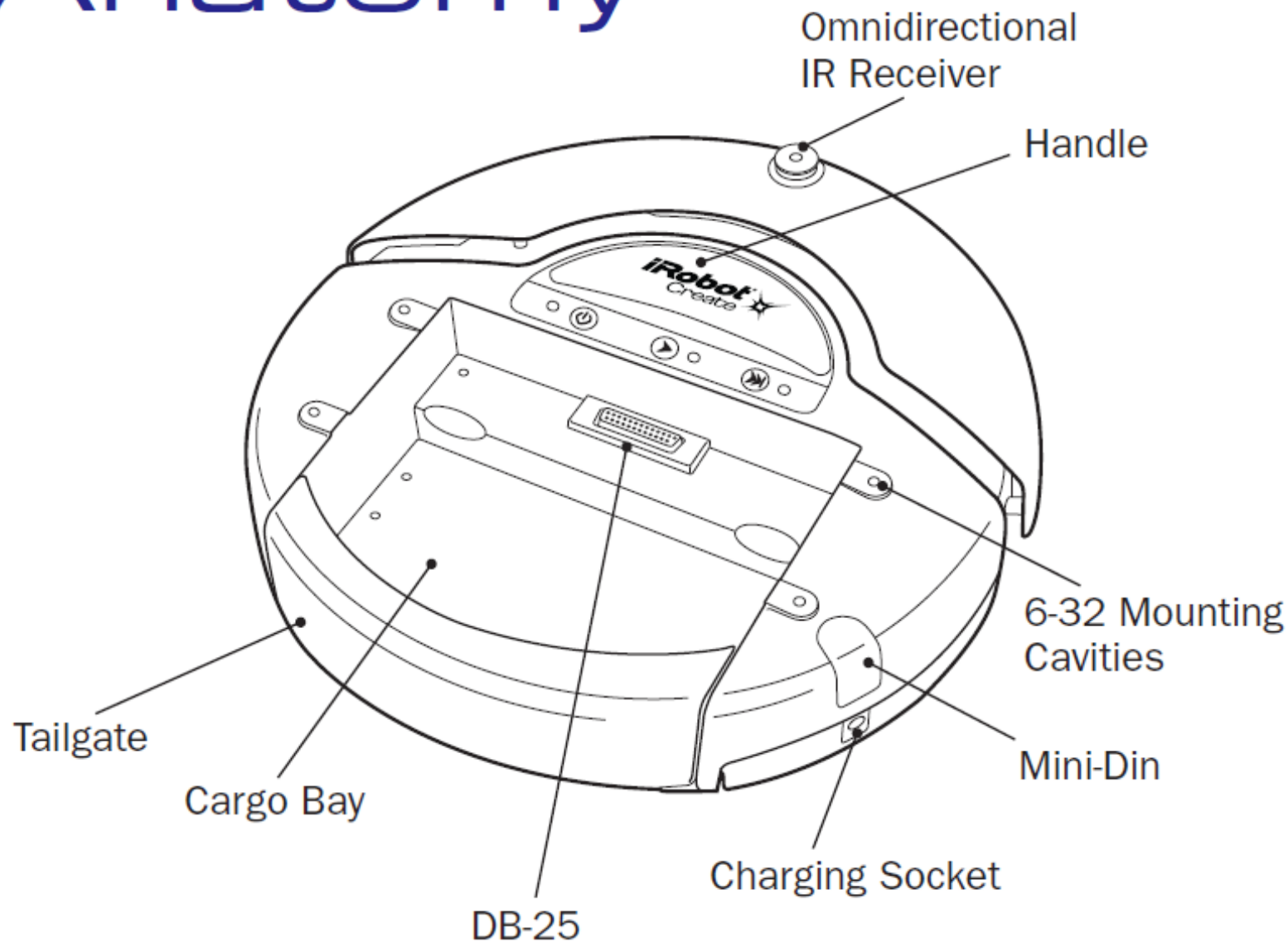
Represents 3D orientation



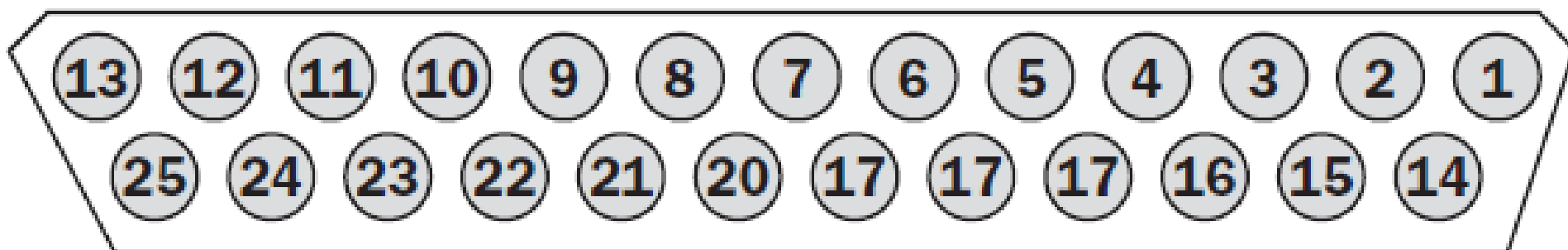
Parses string data into number values

# iRobot

# Anatomy



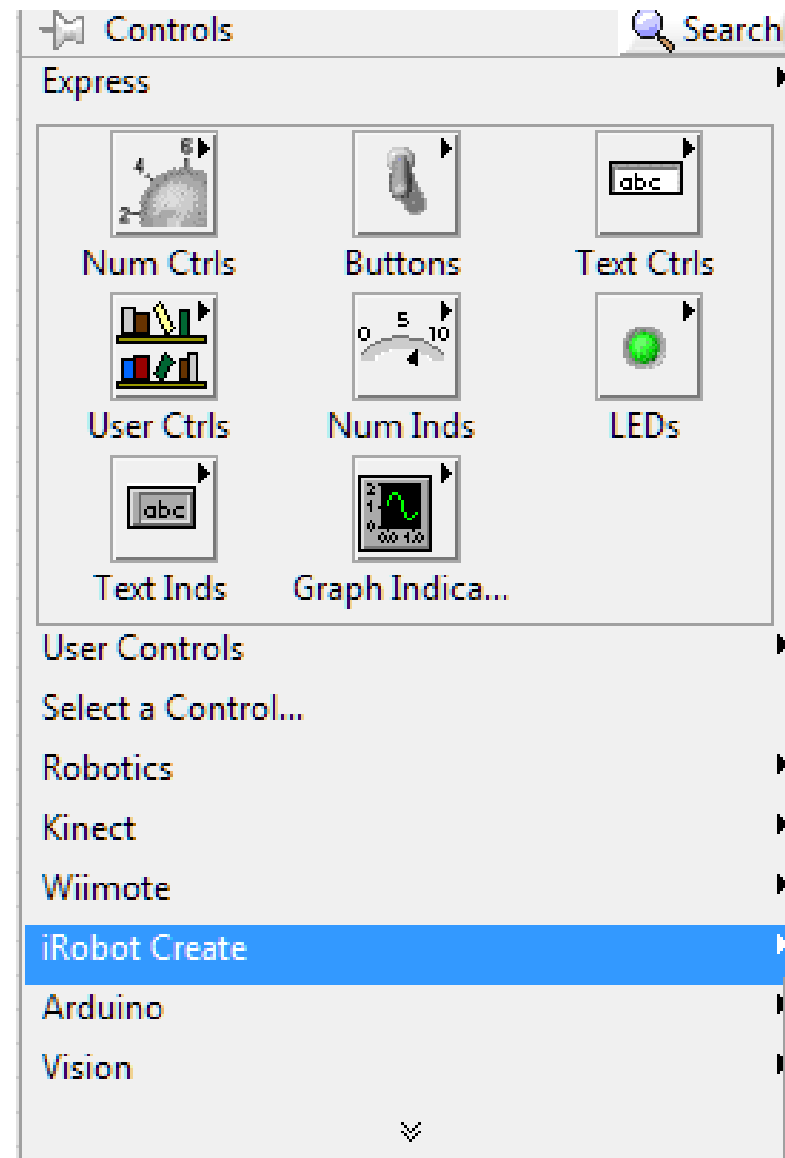
# Connecting to iRobot

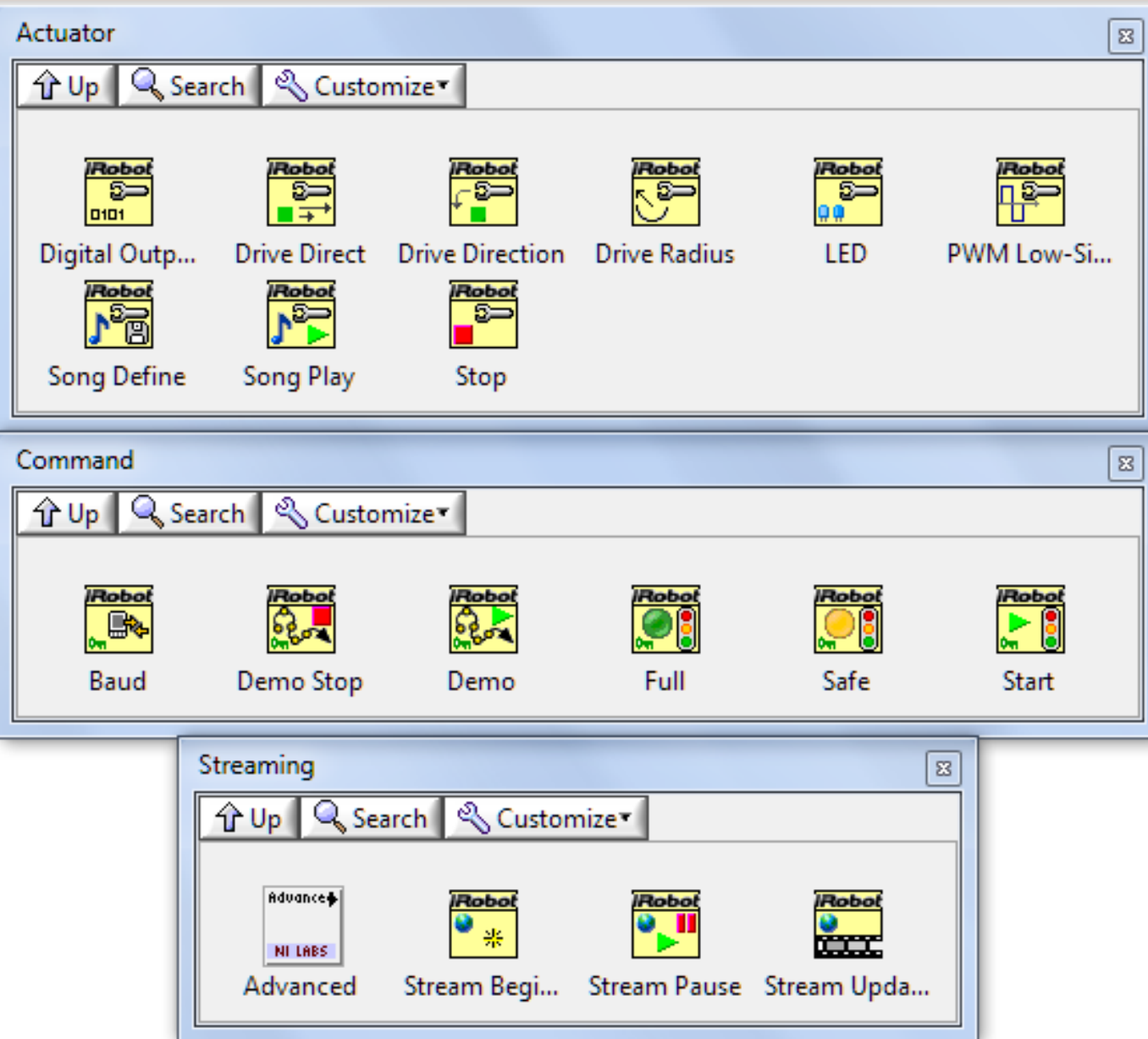


Pin	Name	Description
1	RXD	0 – 5V Serial input to Create
2	TXD	0 – 5V Serial output from Create
9	Vpwr	Create battery voltage (unregulated), 0.5A

# Controlling iRobot

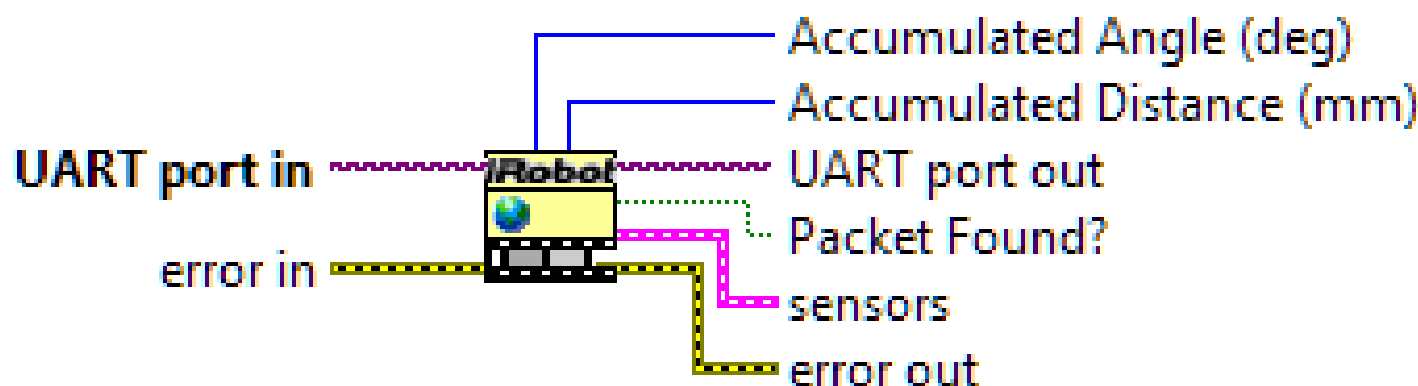
- Available on LabVIEW Hacker (labviewhacker.com)
- Works on Desktop, ARM, and RIO





# Controlling iRobot

## Stream Update All Sensors [Stream Update All Sensors.vi]



Reads data from the UART serial port and updates sensors when packets are available.

This VI assumes that the robot is streaming all sensor data (sensor group 6).

**LabVIEW**  
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