Robosapien V1 - Hardware Mod Version 1.0

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Overview:
This document is about modification of Robosapien V1 robot manufactured by Wowee, to make it controllable[programmable] via a PC with linux OS. [Later minor changes will be made to allow control via other devices and operating systems]

Required Components:

1. Robosapien V1 (x1)
2. Arduino Pro Mini 5v AtMega 328 (x1)
3. Sonar HC-SR04 (x1)
4. 5v RC-Servos for pan-til t(x2)
5. USB 5v portable power unit (portable mobile charger) (x1)
6. IMU GY-80 (x1)
7. Bluetooth HFP module (mobile stereo hands free) (x1)
8. Audio Amplifier LM368N module (x1)
9. HC05 or HC06 bluetooth serial module (x1)
10. 5.8ghz wireless fm av camera and receiver (x1)
11. component video(av) capture card(linux compatible) (x1)
12. Bluetooth dongle in absence of built in bluetooth (with spp and hfp, linux compatible) (x1)
13. SPDT or DPDT toggle switch (x2)
14. CP2102 usb-ttl (for programming and testing arduino mini pro)

Important links:

- http://selfbuilt.net/shop/gy-80-inertial-management-unit

Barometer + Thermometer	http://bildr.org/2011/06/bmp085-arduino/
Magnetometer	http://bildr.org/2012/02/hmc5883l_arduino/
Accelerometer	http://bildr.org/2011/03/adxl345-arduino/
Gyro	http://bildr.org/2011/06/l3g4200d-arduino/

- http://www.instructables.com/id/Arduino-AND-Bluetooth-HC-05-Connecting-easily/
- http://embeddedprogrammer.blogspot.in/2012/06/ubuntu-hacking-hc-06-bluetooth-module.html
- http://www.aibohack.com/robosap/ir_codes.htm
- https://makehackvoid.com/projects/robosapien-w-bluetooth-remote/
- https://www.youtube.com/watch?v=Vawhrr4COjI [We use the last new version of usb-ttl … CP2102 v3 with breakout]
- http://www.instructables.com/id/Simple-Arduino-and-HC-SR04-Example/

- Links to code and circuit diagrams on github

Wiring: [Please follow after looking at circuit diagrams]

First: we program arduino pro mini

1. solder the angled pins with arduino pro mini on it (GRN,TX,RX,VCC,GND,BLK)
2. connect CP2102 ver 3 angled pins to arduino pro mini using the connection wires like such :
   [connections … CP2102->Arduino]
   [5V->VCC,GND->GND,TX->RX,RX->TX,DTR/RST->GRN]
3. connect CP2102 to linux pc and upload compiled code[RS1mod1.pde] using arduino ide.

Disconnect arduino from CP2102 and Modify Robosapien [Also refer to circuit diagram]:

1. Open the Robosapien and locate the head connector.
2. Remove the head connector and carefully and split(cut) the white wire in two between connector that attaches to board and the wire coming from head(this wire comes down from the IR sensor and we need to feed the signals from arduino instead of IR directly). We need both ends of this wire to connect or disconnect direct IR or arduino control.
3. connect the common of SPDT switch to white wire still attached on head connector that attaches to board.
4. connect L1 of SPDT to the white wire on the head wire bundle side
5. connect L2 of SPDT to Pin D5 on arduino
6. Also strip and tap(do not disconnect) the black wire on the head connector(this is the ground from the battery)
7. connect GND on arduino to the tapped black wire on head connector and also connect the same to ground wire that will connect to external 5v USB power source. Connect GND of all devices like sonar, servo's, imu,camera to the GND line.
8. connect 5v wire to be connected to USB power to 5V VCC of sonar, IMU, servo's, arduino, camera 5v
9. connect sonar to arduino [trig pin-> D13, echo pin -> D2]
10. connect IMU->arduino [SDA->A4,SCL->A5]
11. connect servos to arduino [pan servo signal->D9, tilt servo signal->D10]

(we attach the HC06 bluetooth serial last)

1. connect 5v Vcc to 5v external power source line and GND to common ground line
2. connect HC06-> arduino [TX->RX,RX->TX]