ARDUINO BLUETOOTH WORKSHOP

BY IEEE

AGENDA

- Introduction to Bluetooth
- Using Bluetooth with an Arduino
- Practice Time

WHAT IS BLUETOOTH?

- Famous Short Range Communication / Data Transfer Technology
- Commonly found in mobile phones, computers and other electronic devices
- Many versions:
  - 1.0, 1.1, 1.2 … 3.0, 4.0 (LE), 4.1, 4.2, 5.0

BLUETOOTH CONCEPTS

- Great Intro:
  - https://learn.sparkfun.com/tutorials/bluetooth-basics/all
- Each Bluetooth Device has a unique MAC Address
- Connection Process: Refer to link above!
- Bluetooth Profiles:
  - Serial Port Profile (SPP)
  - Human Interface Device (HID)

APPLICATIONS IN ROBOTICS / ENGINEERING

- Wireless Control in short-range (E.g. Android Bluetooth Controller App)
- Automated Wireless Data Communication between Devices (E.g. Swarm Unit)
- Mesh Network (E.g. Beacons for position tracking)
- Wireless collection of data from sensors

BLUETOOTH WITH ARDUINO

BUILT IN VARIANTS

BLEduino

ATmega328-BT

Arduino Bluno

Arduino Primo

ARDUINO COMPATTIBLE MODULES

HC-05

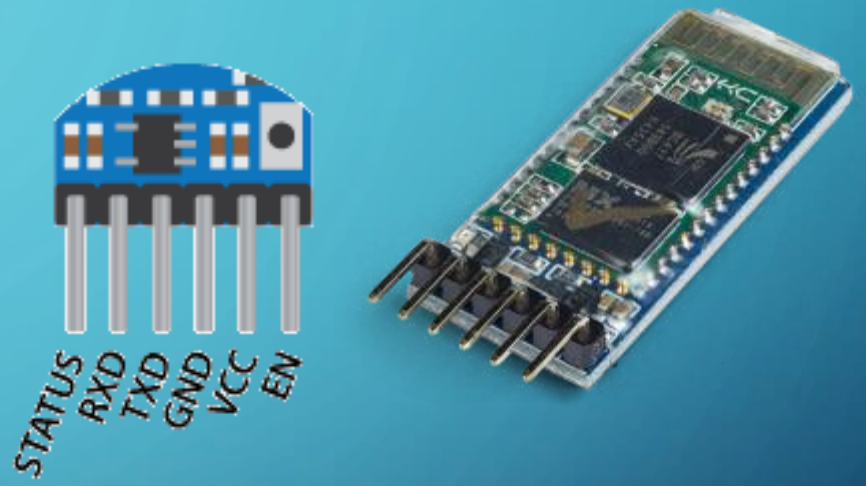
HC-06

THE HC-05 BLUETOOTH MODULE

- Bluetooth 2.0 + EDR (Enhanced Data Rate)
- Implements a SPP (Serial Port Profile)
- Can be both master and slave

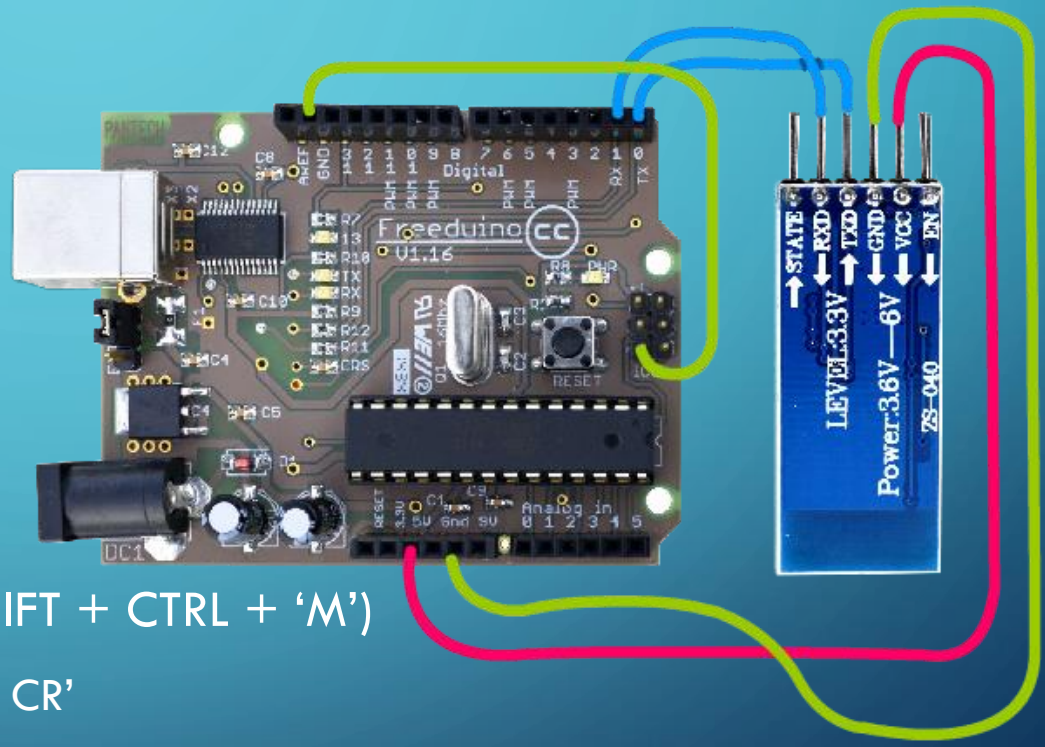
THE HC-05 BLUETOOTH MODULE

- VCC : Standard Power (3.3v)
- GND : Ground
- RX : Receive
- TX : Transmit
- EN : Key
- STATE: LED



THE HC-05 BLUETOOTH MODULE

- How to configure?
  - Connect as shown
    - RX to RX; TX to TX !
  - Enter AT-Mode by setting EN Pin to HIGH (5V)
  - Use Serial Monitor on Arduino IDE (SHIFT + CTRL + ‘M’)
    - Baud Rate: 38400; Use ‘Both NL and CR’
  - LED on HC-05 should blink 1 / 2s

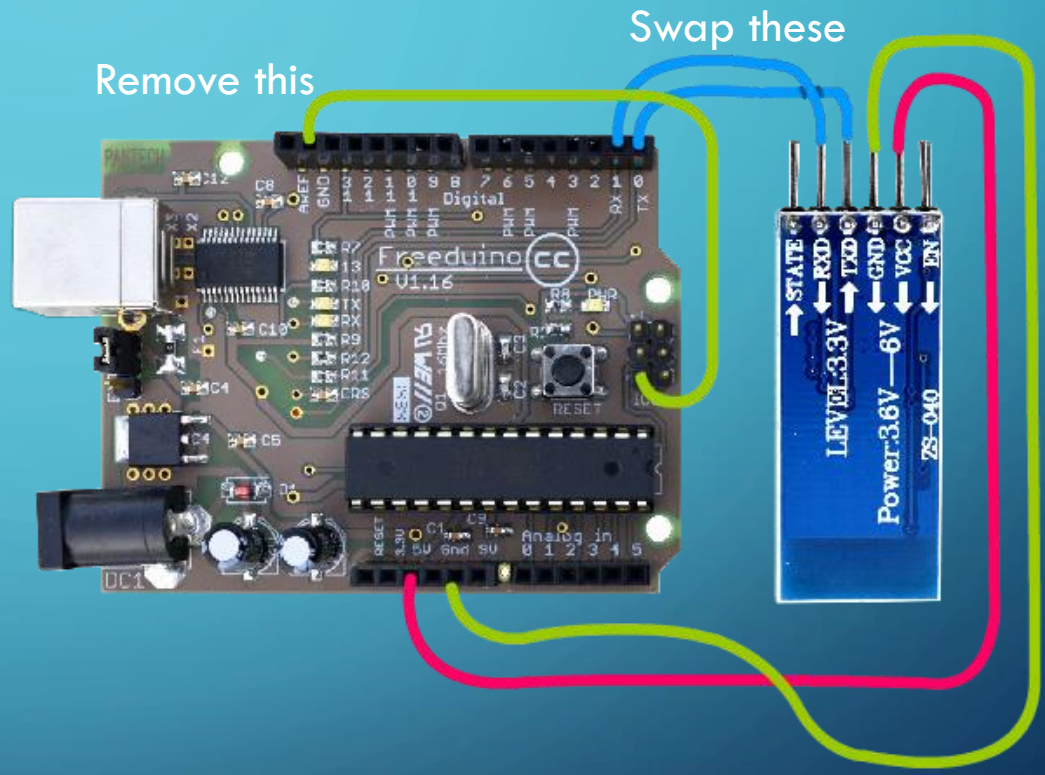


AT-MODE FOR HC-05 (BASIC COMMANDS)

Command	Response	Parameter
AT	OK	NONE
AT+NAME=<PARAM>	OK	Param: Bluetooth device name Default: “HC-05”
AT+NAME?	1. +NAME: <PARAM> OK----success 2. FAIL----failure	
AT+PSWD=<PARAM>	OK	Param: Pin Code Default: “1234”
AT+ PSWD	+ PSWD : <Param> OK	

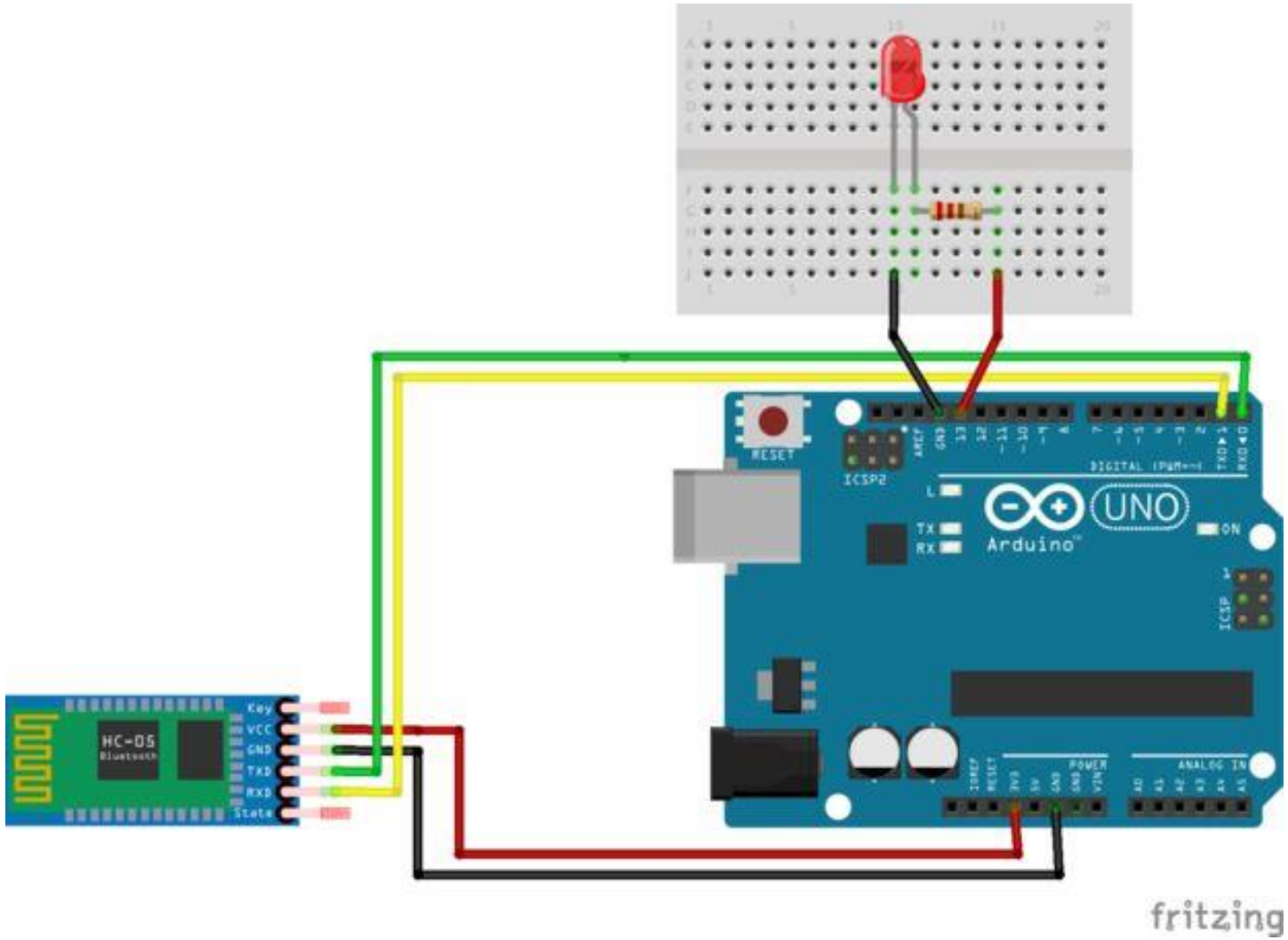
HOW TO USE AFTER CONFIGURING?

- The Bluetooth module will simply act as a serial connection to the device its connected to.
- Swap RX and TX wires
- Remove wire from GND to Reset
- Baud Rate: 9600
- Use Serial.read() / Serial.write()
- Refer to '*Bluetooth_Switch.ino*'



SCHEMATIC TO CONTROL AN LED

- Connect as shown



HOW TO CONNECT TO THE HC-05

- Through phone
  - Download ‘Arduino Bluetooth Control’
  - https://play.google.com/store/apps/details?id=com.app.control&hl=en
- Through PC
  - http://www.collideabq.com/2016/04/28/bluetooth-serial-connection-with-windows-10/
  - Use pyserial to communicate to Arduino via Python
  - Please refer to this in your free time

HC-05 THROUGH PHONE

- Connect to HC-05
- Use Buttons Mode
- Send data!

TRY IT YOURSELF (30 MIN)

- Play around with the different modes of sending data to the HC-05
- Try and make a simple game to play between your phone and Arduino
  - Eg. A memory game?

USEFUL LINKS

- Master and Slave: http://www.instructables.com/id/How-to-Configure-HC-05-Bluetooth-Module-As-Master-/
- Bluetooth Controlled Projects: http://www.instructables.com/id/Bluetooth-Controlled-Projects/

THANK YOU ☺

SUTD IEEE STUDENT BRANCH