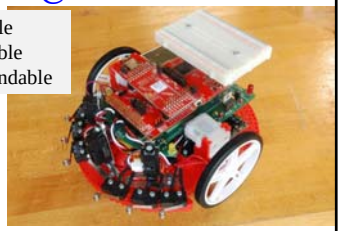
Robot Systems Learning Kit

www.ti.com/rslk

- **Mark Easley, measley@ti.com**
- **Jonathan Valvano, valvano@mail.utexas.edu**
- **Daniel Valvano**
- **Ayesha Mayhugh**
- **Franklin Cooper Jr.**
- **Jason Rubadue**

- Simple
- Flexible
- Expandable



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1

Get workshop materials at **http://users.ece.utexas.edu/~valvano/android**

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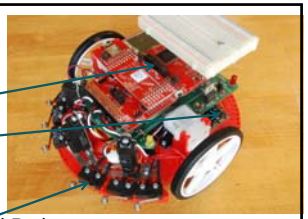
C. Tachometer Hands On Activity



- Place the robot up on blocks (so it doesn't fly off table)
- Make sure 7-bit jumper is in place on LaunchPad
- Connect USB from LaunchPad to PC
- Turn on robot power
- Start TExaSdisplay
  - Execute **Open Next Port** until is connects to LaunchPad
  - Click on logic analyzer toolbar (View->Logic Analyzer)
- Run Lab 17 (press switch 3)
  - Lab 17 is autonomous racing robot solution, proportional controller
  - It attempts to follow constant distance from the closest wall
- Observe PWM outputs and tachometer inputs on logic analyzer

2

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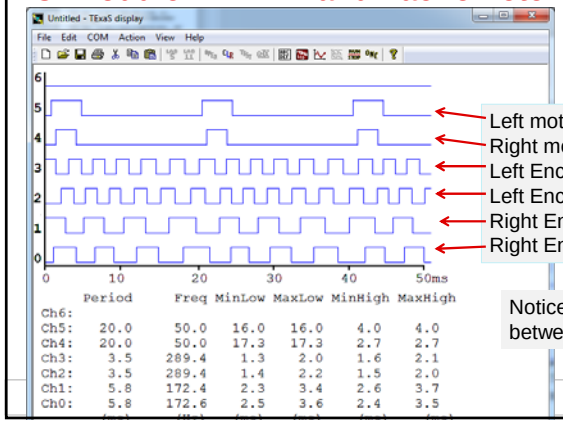
C. Module 17 PWM and Tachometer



	Period	Freq	MinLow	MaxLow	MinHigh	MaxHigh
Ch6:						
Ch5:	20.0	50.0	16.0	16.0	4.0	4.0
Ch4:	20.0	50.0	17.3	17.3	2.7	2.7
Ch3:	3.5	289.4	1.3	2.0	1.6	2.1
Ch2:	3.5	289.4	1.4	2.2	1.5	2.0
Ch1:	5.8	172.4	2.3	3.4	2.6	3.7
Ch0:	5.8	172.6	2.5	3.6	2.4	3.5

Which switch you press
0 – PWMnominal = 2500
1 – PWMnominal = 3000
2 – PWMnominal = 3500
3 – PWMnominal = 4000
4 – PWMnominal = 4500
5 – PWMnominal = 5000

Left motor PWM, P2.7
Right motor PWM, P2.6
Left Encoder A, P8.2
Left Encoder B, P9.2
Right Encoder B, P10.5
Right Encoder A, P10.4

Notice the relationship between power and speed

3

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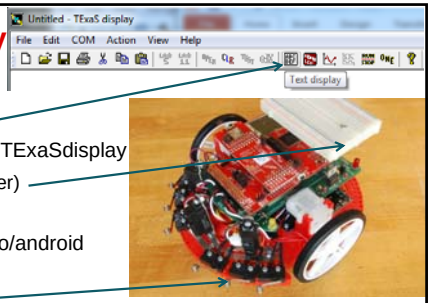
C. BLE Hands On Activity



- Change TExaSdisplay mode to text
  - If you power cycle the robot, restart TExaSdisplay
- Reset the MSP432 (observe robot number)
- Download and install RSLK Android app
  - http://users.ece.utexas.edu/~valvano/android
- Start RSLK Android app
- Run Lab 19 (press switch 4)
  - Connect the RSLK to your robot
  - There are 4 services (RSLK Service is the interesting one)
  - The RSLK service has 4 characteristics (click on Jacki sensors)

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4

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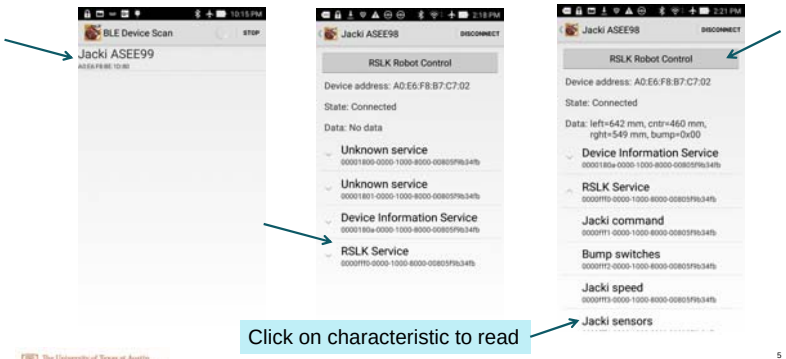
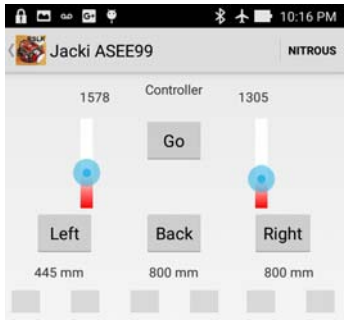
RSLK Service has four characteristics



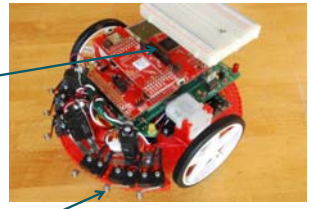
Click on characteristic to read

RSLK Robot controller



- Push the buttons
- Move the sliders
- Observe sensor data
- Observe the BLE packets

Self-discovery



- Turn off power
- Remove 7-pin shorting jumper
- Disconnect USB
- Turn on robot
- Run one of the labs
  - Sw0 Lab 7 FSM line follow (use fluffy black tape)
  - Sw1 Lab 12 Simple motor open loop control
  - Sw2 Lab 16 Tachometer, incremental controller to set speed
  - Sw3 Lab 17 Proportional control, autonomous driving using distance sensor
  - **Sw4 Lab 19 BLE**

- Sign up for robot racing
- 4:30-6pm in TI pavilion
- 3 minute races
- prizes

For more information

Jonathan Valvano valvano@mail.utexas.edu
http://users.ece.utexas.edu/~valvano/
EE319K Introduction
EE445L Interfacing and systems
EE445M Real-time operating systems
https://www.edx.org/course/embedded-systems-shape-world-utaustinx-ut-6-10x
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Mark Easley, Jason Rubadue, Franklin Cooper
www.ti.com/rslk univ@ti.com