

# PIC32 and Raspberry Pi Interface

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## Combine real time PIC32 & powerful Raspberry Pi

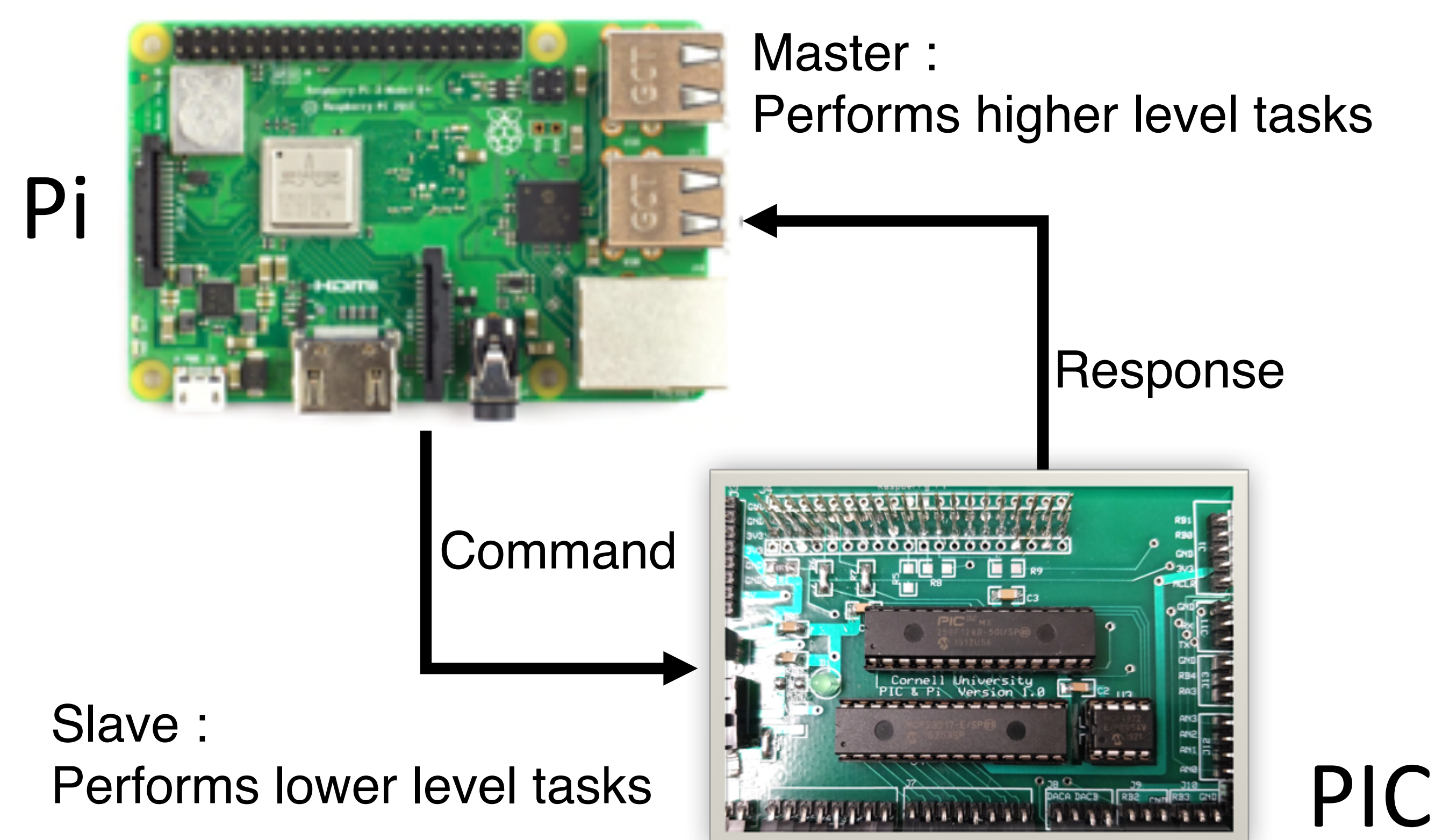
- Develop a cross platform system capable of performing real time tasks
- Use Embedded Operating System to Enable development of software decoupled from the hardware
- Implement a final application to demonstrate the system.

## PIC + RPi = Real-time + Cool Linux stuff

- PIC32: Real-time input reading, analog interface and output generation
- Raspberry Pi: Linux operating system, fast decision making, higher level software, user-interface and connectivity

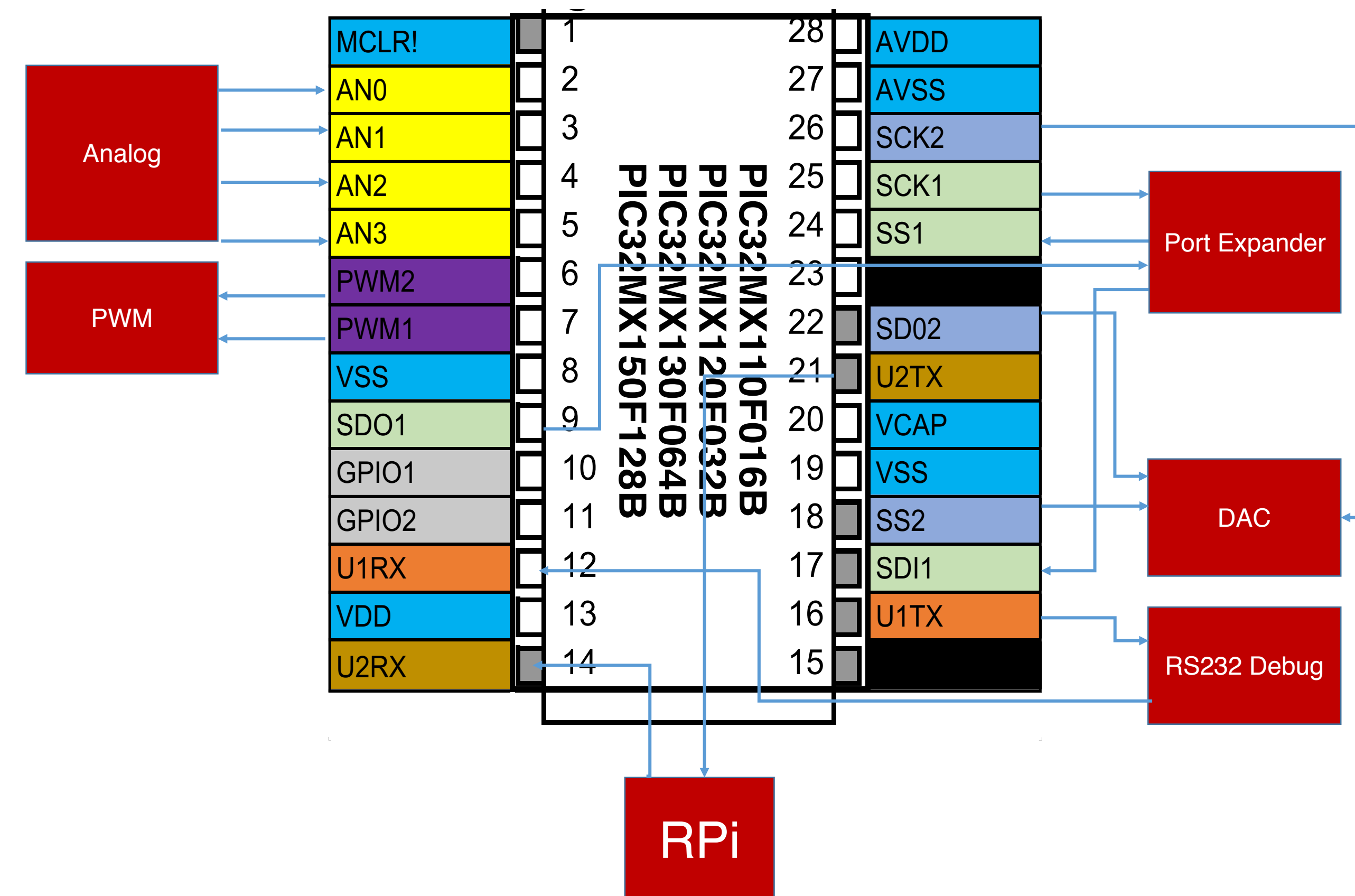
## RPi ← high speed → PIC32

- Raspberry Pi works as “master”, making decisions and controls PIC32, performs higher level tasks such as image processing
- Pic32 works as “slave”, receiving command from Raspberry Pi and performs lower level tasks such as PWM generation



## RPi callable set of PIC32 peripheral control functions

1. Read input
2. Write output
3. Set Value for CHA
4. Set Value for CHB
5. Check Buffer Status
6. Set Sample Frequency
8. Start ADC
9. Set Period
10. Generate PWM 1
11. Generate PWM 2
12. Read Buffer
13. Write Buffer

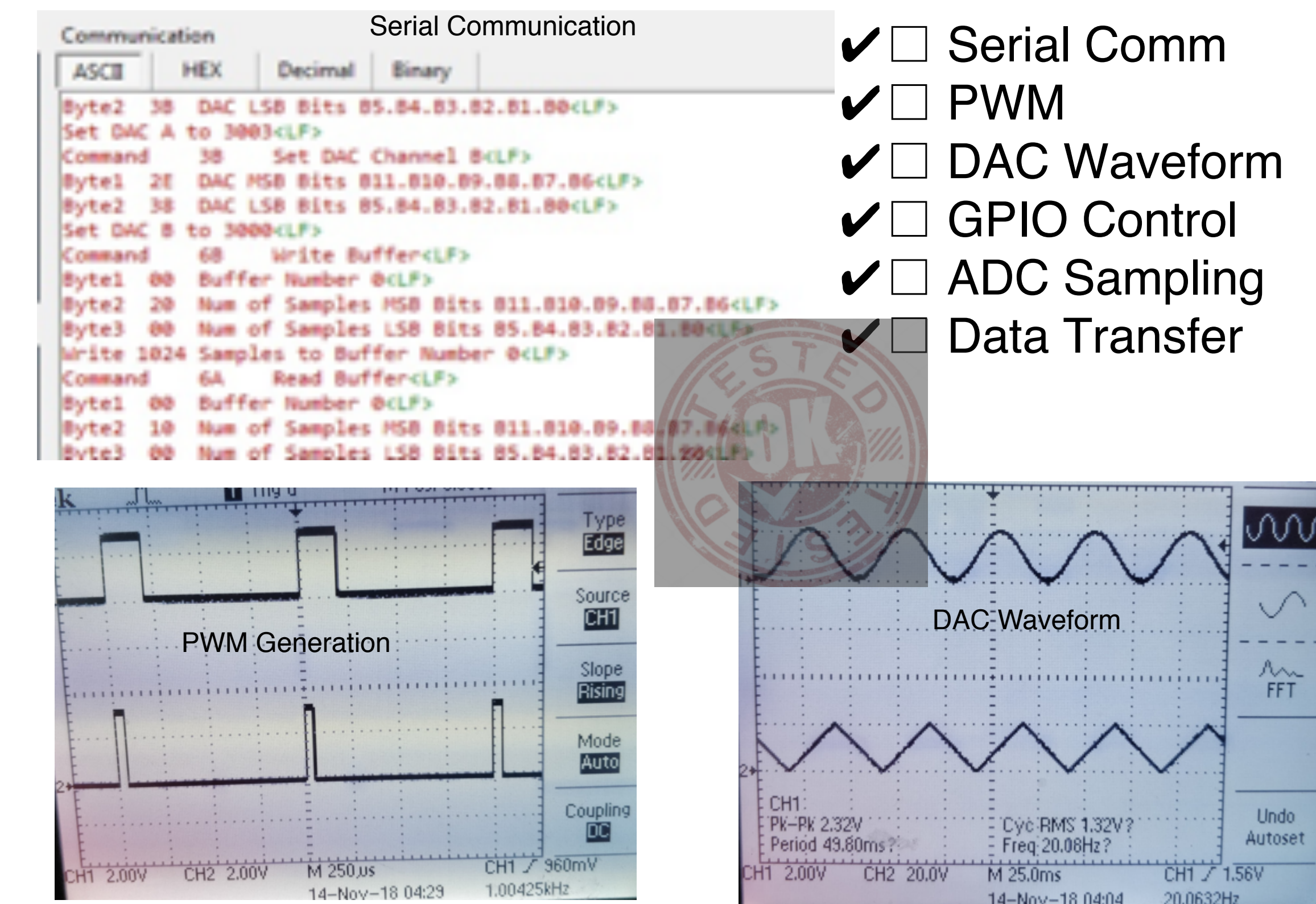


## PIC32 PCB mates with RPi



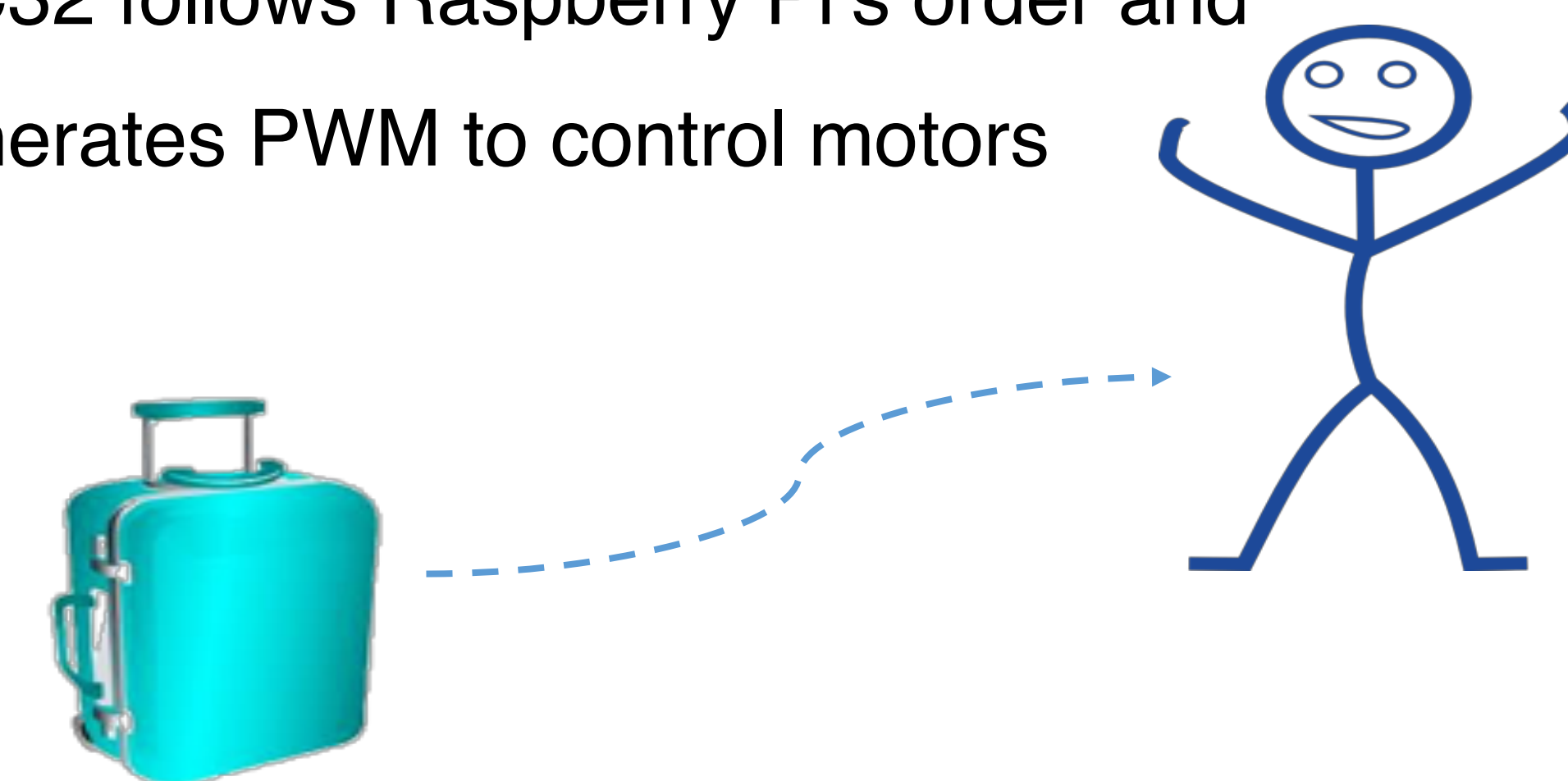
Thanks to Dr. Bruce Land & Dr. Joseph Skovira!

## Tested OK ✓



## Proof of concept: Autonomous suitcase

- Built a people following robot with the system
- Raspberry Pi processes vision information and controls where to go
- PIC32 follows Raspberry Pi's order and generates PWM to control motors



## Best of both worlds!

- The combination of PIC32 and Raspberry Pi makes it possible for building a system with blazing fast low level functionality and a full fledged operating system
- The communication protocol is universal and flexible, one can build anything with this protocol
- The cost of the system is low