

Rexx/WPi

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Rexx/WPi

- Enables a Rexx program to interface with the Raspberry Pi's GPIO digital signal pins
- Uses the Wiring Pi library based on the equivalent Arduino library
- Limited success with other SBCs like Odroid C1



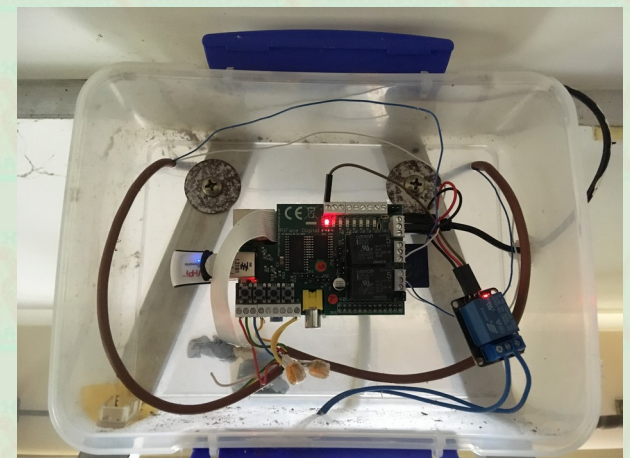
Raspberry Pi

- Single-Board Computer (SBC) designed and built in the UK
- Costs approx US\$25-US\$35



Raspberry Pi

- I use a lot of them!



GPIO Pins

- Three, yes 3 pin numbering schemes!
- Physical, BCM and WiringPi
- GPIO pins can be input or output; user selectable
- Digital signal can be read or written

GPIO#	NAME		NAME	GPIO#
	3.3 VDC Power	1	2	5.0 VDC Power
8	GPIO 8 SDA1 (I2C)	3	4	5.0 VDC Power
9	GPIO 9 SCL1 (I2C)	5	6	Ground
7	GPIO 7 GPCLK0	7	8	GPIO 15 TxD (UART) 15
	Ground	9	10	GPIO 16 RxD (UART) 16
0	GPIO 0	11	12	GPIO 1 PCM_CLK/PWM0 1
2	GPIO 2	13	14	Ground
3	GPIO 3	15	16	GPIO 4 4
	3.3 VDC Power	17	18	GPIO 5 5
12	GPIO 12 MOSI (SPI)	19	20	Ground
13	GPIO 13 MISO (SPI)	21	22	GPIO 6 6
14	GPIO 14 SCLK (SPI)	23	24	GPIO 10 CE0 (SPI) 10
	Ground	25	26	GPIO 11 CE1 (SPI) 11
30	SDA0 (I2C ID EEPROM)	27	28	SCL0 (I2C ID EEPROM) 31
21	GPIO 21 GPCLK1	29	30	Ground
22	GPIO 22 GPCLK2	31	32	GPIO 26 PWM0 26
23	GPIO 23 PWM1	33	34	Ground
24	GPIO 24 PCM_FS/PWM1	35	36	GPIO 27 27
25	GPIO 25	37	38	GPIO 28 PCM_DIN 28
	Ground	39	40	GPIO 29 PCM_DOUT 29

Attention! The GPIO pin numbering used in this diagram is intended for use with WiringPi / Pi4J. This pin numbering is not the raw Broadcom GPIO pin numbers.

<http://www.pi4j.com>

Rexx/WPi - Initialisation

- Call one of the initialisation based on which pin numbering scheme to be used:
 - WPiWiringPiSetup() - WiringPi numbers ¹
 - WPiWiringPiSetupGpio() - BCM numbers ¹
 - WPiWiringPiSetupPhys() - Physical numbers ¹
 - WPiWiringPiSetupSys() - BCM Numbers ²

¹ requires program to be run as root

² can run as non-root user but is limited



Rexx/WPi - Pin Modes

- WpiPinMode(pin, mode)
 - !REXXWPI.!INPUT - available to read
 - !REXXWPI.!OUTPUT - available to write
 - !REXXWPI.!PWM_OUTPUT - available for Pulse Width Modulation (PWM) output
 - !REXXWPI.!GPIO_CLOCK - available for Clock functions

```
rcode = WpiPinMode( 1, !REXXWPI.!INPUT )
```



Rexx/WPi - Read and Write

- WpiDigitalRead(pin)

```
rcode = WpiDigitalRead( 1 ) /* read value of pin 1*/
```

```
/* rcode will be 0 (low or off) or 1(high or on) */
```

- WpiDigitalWrite(pin, state)

```
Call WpiDigitalWrite 1, !REXXWPI.!LOW /* set state of pin 1 to low(0) */
```



Rexx/WPi - PWM

- Pulse Width Modulation

- A technique used to encode a message into a pulsing signal. Its main use is to allow the control of the power supplied to electrical devices, especially to inertial loads such as motors

- WpiPwmWrite(pin, step)

```
Do i = 100 To 50 By -1
    Call WpiPwmWrite 13, I
    Call WpiDelay 20
End
```

- *PWM functions have no effect when initialised with WPiwiringPiSetupSys()*
- *To understand more about the PWM system, you'll need to read the Broadcom ARM peripherals manual.*



Rexx/WPi - PWM Setup

- WpiPwmSetMode(mode)

Call WPiDigitalRead !REXXWPI.!PWM_MODE_BAL

/ mode - one of !REXXWPI.!PWM_MODE_BAL, !REXXWPI.!PWM_MODE_MS */*

- WpiPwmSetClock(divisor)

Call WpiPwmSetClock 192

- WpiPwmSetRange(range)

Call WPiPwmSetClock 2000



Rexx/WPi - Miscellaneous

- WpiPiBoard()

Call WpiPiBoard

/ sets a number of Rexx compound variables for various details about the board */*

- WpiDelay(milli)

Call WpiDelay 1000 */* sleep for 1 second */*

- WpiDelayMicroseconds(micro)

Call WpiDelayMicroseconds 1000000 */* sleep for 1 second */*



Rexx/WPi - Code

- victim.rexx
- bandit.rexx



Questions

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