

JTAGulator Demonstration

Raspberry Pi Zero W w/ Raspbian GNU/Linux 10 (buster)
Broadcom BCM2835

Enable alternative peripheral function of GPIO pins (ALT4)
Add "enable_jtag_gpio=1" to /boot/config.txt

Enable mini UART for primary UART output (115200, 8N1)
Add "enable_uart=1" to /boot/config.txt

Remove 'quiet' from /boot/cmdline.txt to allow display of boot activity on the UART interface

Pin #	Function	RPi Header
GPIO18	PWM0	12
GPIO14	TXD	8
GPIO15	RXD	10
GPIO22	ARM_TRST	15
GPIO23	ARM_RTCK	16
GPIO24	ARM_TDO	18
GPIO25	ARM_TCK	22
GPIO26	ARM_TDI	37
GPIO27	ARM_TMS	13
N/A	GND	6, 9, 14, 20, 25, 30, 34, 39

UART:

- UART Scan TXD (T) to find TXD during boot
- UART Scan (U) to find RXD (250mS delay, RPi changes baud rates during scan, will detect correct pins, but not show proper baud rate)
- UART Passthrough (P) to login, run PWM

Logic Analyzer:

- Run 'python PWM.py' from RPi shell to output variable duty cycle signal on PWM0
- sigrok/PulseView: 1.024k samples @ 5 kHz

JTAG / OpenOCD:

- OpenOCD Mode (0), then from command line:
openocd -f interface/buspirate.cfg -c "transport select jtag; buspirate_port /dev/ttyUSB0" -f pi-zero.cfg
- OpenOCD interactive shell: telnet localhost 4444, then:
halt
reg
step
reg
mdw 0x0 100
dump_image dump.bin 0x0 0x1000 (~16 sec.)
resume
- xxd dump.bin