Raspberry Pi Pico RP2040 PIO Emulator

A Useful Development & Debugging Aid

Jürgen Reuter

soundpaint.org

GPN Karlsruhe, 2022/5/20

Overview

1. Pico, RP2040, PIO
2. Developing PIO Programs & RP2040 Emulator
3. Demo
4. Q & A

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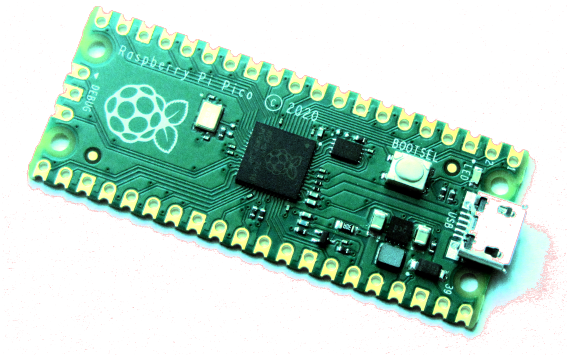

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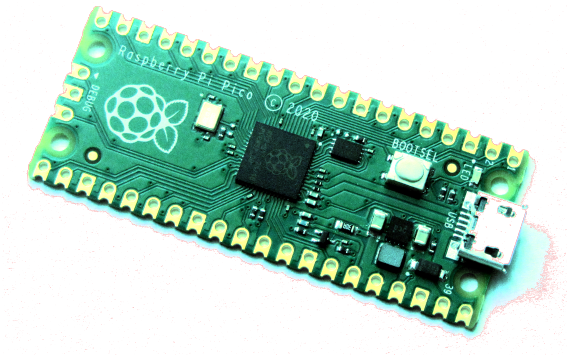

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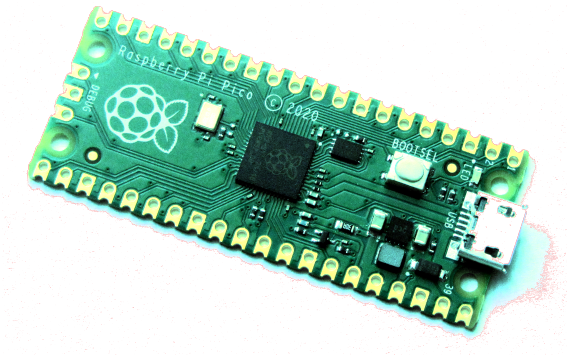

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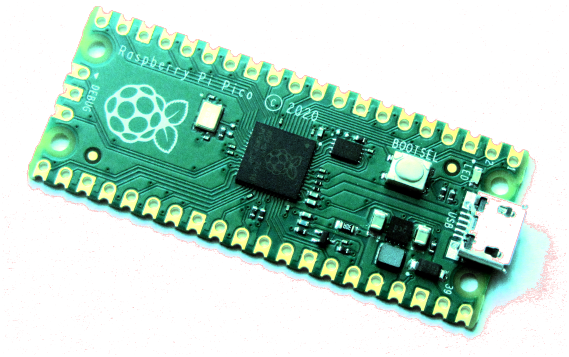

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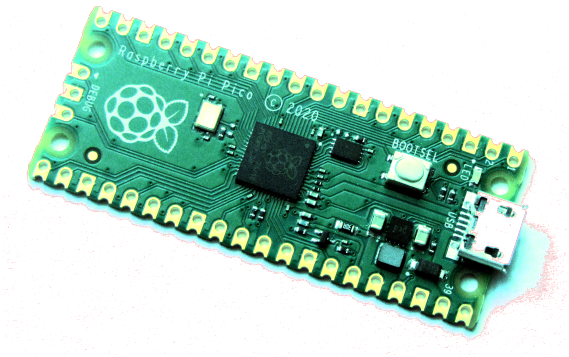

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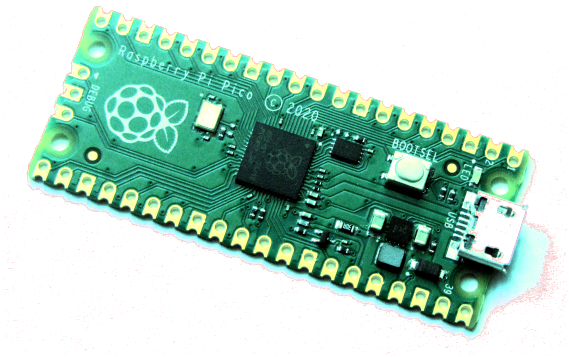

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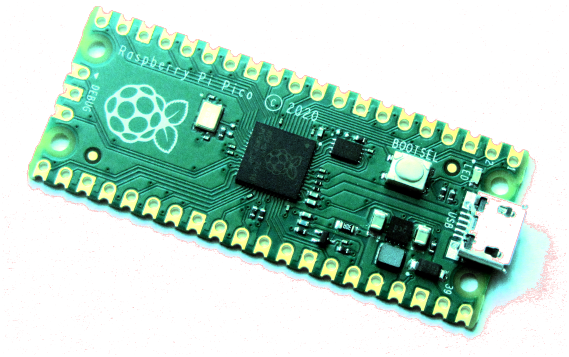

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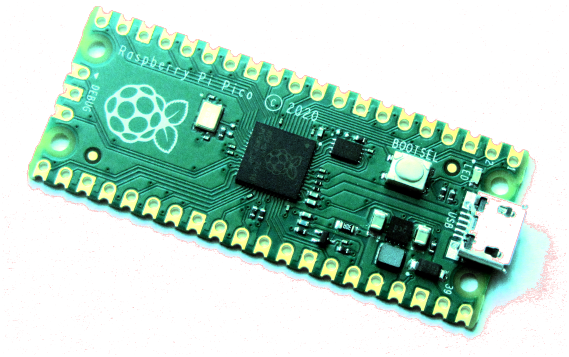

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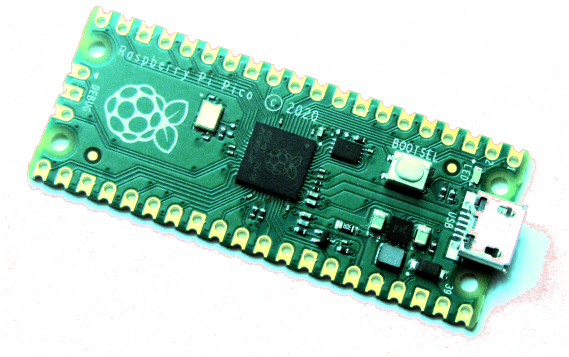

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PIO Processor Instruction Set (2)

Mnemonic	Short Description
JMP	Set program counter to specified address if specified condition is true. Otherwise, no operation.
WAIT	Stall until some condition is met.
IN	Shift specified number of bits from specified source into the Input Shift Register.
OUT	Shift specified amount of bits out of the Output Shift Register and write those bits to specified destination.
PUSH	Push the contents of the Input Shift Register into the RX FIFO as a single 32-bit word. Clear Input Shift Register to all-zeroes.
PULL	Load a 32-bit word from the TX FIFO into the Output Shift Register.
MOV	Copy data from the specified source to the specified destination.
IRQ	Set or clear the IRQ flag selected by the specified index argument.
SET	Write specified immediate value to specified destination.

Example Program

```
.program squarewave
        set pindirs, 1      ; Set pin to output
again:
        set pins, 1 [1]     ; Drive pin high, then delay for one cycle
        set pins, 0         ; Drive pin low
        jmp again           ; Set PC to label 'again'
```

(Source: RP2040 datasheet)

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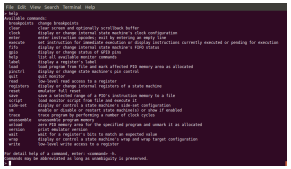

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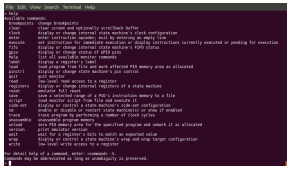

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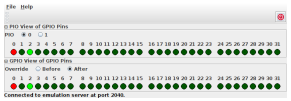

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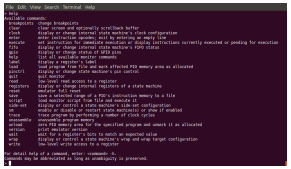

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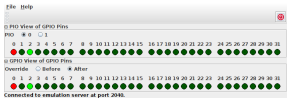

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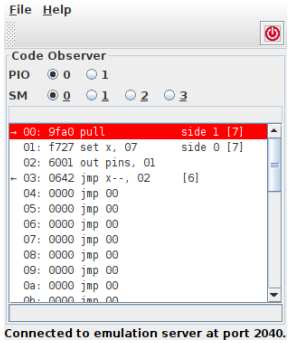

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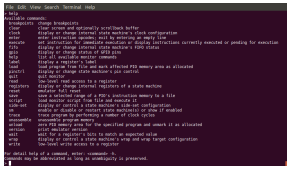

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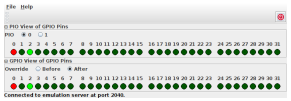

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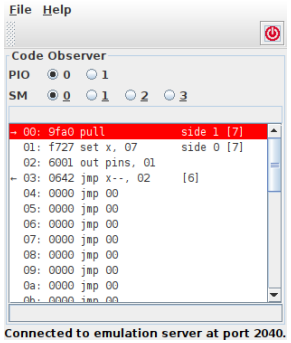

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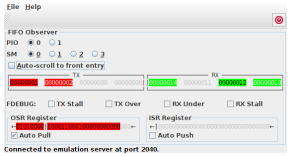

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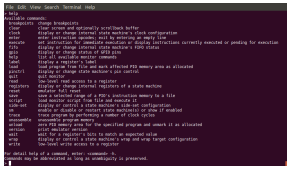

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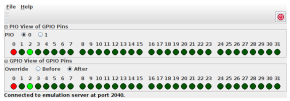

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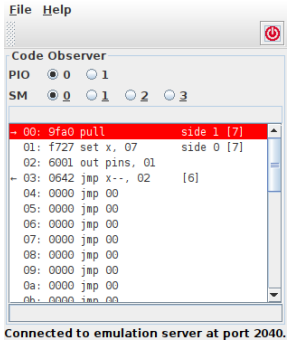

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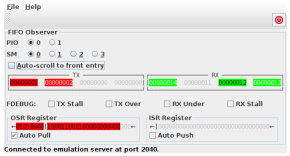

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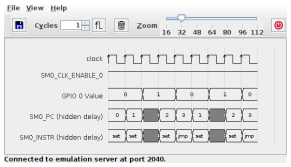

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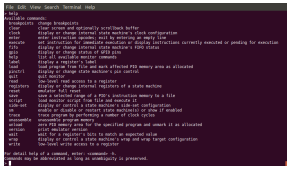

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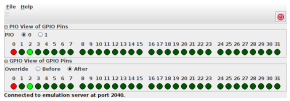

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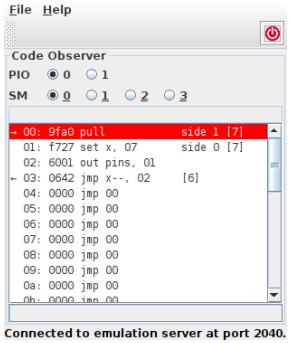
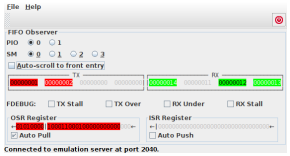
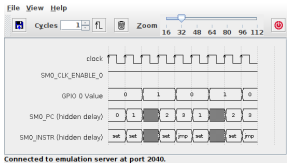


- FIFO observer



- diagram creator



- . . . (maybe more to come)

Overview

1. Pico, RP2040, PIO
2. Developing PIO Programs & RP2040 Emulator
3. Demo
4. Q & A

Live Demo

Overview

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Questions

Questions?

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