Getting Started

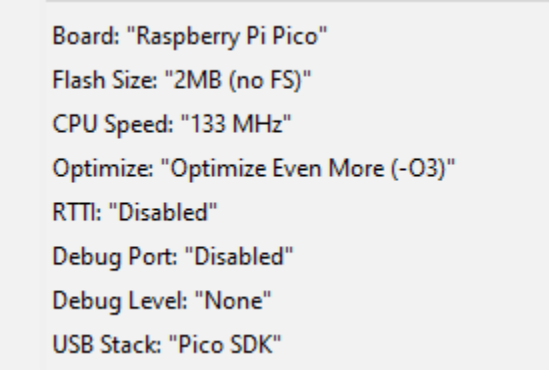
Simple-Circuit 2022

Installing sim680b.ino into your Pico board:

The Pico board requires that you install the Arduino IDE and Earle Philhower's Ardino-Pico port. Follow the instructions for "Installing via Arduino Boards Manager". These are found at:

https://github.com/earlephilhower/arduino-pico

Use the following settings:



PICOBUG Commands:

Monitor Prompt: >
Hex data byte: hh
Enter new hex data byte: **hh**
Hex address: hhhh
Enter new hex address: **hhhh**
<CR> Carriage Return

>M **hhhh** hh <CR> Examine Memory with no change
>M **hhhh** hh **hh** Examine Memory and change
hhhh+1 hh Continues to next address, enter new hex data value or <CR> to end

>N hhhh hh <CR> Examine Next Memory with no change
>N hhhh hh **hh** <CR> Examine Next Memory and change

>J **hhhh** Jump to address hhhh and start running code
>J **1000** Start FIG Forth

>D **hhhh hhhh** Hex dump of data address hhhh to hhhh

>L Load S-record

>P **hhhh hhhh** Punch S-record address hhhh to hhhh

>X **hhhh hhhh** Generate comma delimited 0xhh data dump
Useful for converting memory data to C array data

>B **hhhh** Insert SWI break (0x3F) at address hhhh
B saves the instruction at hhhh
Prints all processor registers when the SWI is executed

>R Restore instruction from B command and do a return from interrupt
Note: Do not use multiple B commands prior to R

Hooks: If you have software that works with the MITS ROM Monitor, address jump hooks have been placed for calling to the original ROM functions. The original ROM monitor source and MITS Basic S-record (paper tape contents) is available at:

https://deramp.com/swtpc.com/Altair/Altair_Basic.htm

The PICOBUG L command will load the Basic S-record into memory. Use the monitor command J 0000 to start Basic.

FIG Forth:

The Forth Interest Group source was transferred by hand from a PDF file. Some content such as comments may be omitted in parts. Also, the serial data code was modified to allow function with the Pico board. The Free License is presented in both the Arduino source and the assembly source file. Due to possible type errors, malfunction is possible.

Forth is preloaded on power up but it is not updated upon a reset. The PICOBUG ROM area is updated upon a reset. PICOBUG will always work after a reset but the RAM area for Forth could be corrupted prior to the reset.

If you send a program file from simpleCRT.exe to Forth, check the LF filter to remove line feeds. Else, the text from the file will generate errors when defining the new dictionary values.

Hardware I/O:

Serial data is transmitted through the USB interface at 9600 baud. You will need a serial terminal program to communicate with the Pico. A Windows Serial Terminal program written in Lazarus, simpleCRT.exe, is included in the file folder. It has a buffer of 256 lines and can plot space delimited decimal data. Set the Baud to 9600 from the drop down menu. Next, select your Pico Com number. Click on Open to start communication.

An 8-bit input port is present at address 0xf011. The output port is at address 0xf010. Check the sim680b.ino listing for details of which instructions access ports. I/O was limited to a few op codes.

The ADC is read by writing the input pin number 1, 2 or 3 to address 0xf020. The high byte is read at 0xf020 and the low byte at 0xf021. Data is 12-bits.