

*****Draft*****

**Code clean up and getting a more reliable Compile
with TinyUSB
01/07/22**

*****Draft*****

Some are using are Window OS for there development work. I for one, are using Raspberry Pi O/S with the following tools (**binutils-arm-none-eabi, gcc-arm-none-eabi, libnewlib-arm-none-eabi, Open On-Chip Debugger 0.10.0+dev-g71510a7-dirty (2021-08-15-17:08), pico-sdk 1.3, git and gitk**) Bullseye on my RPi4B with 8 Gb.

We were having issues with the pico working with Ultibo Bare Metal.

Paul Wrote

Attached is my Ultibo and Pico test files. The compiled uf2 file is included if you can't compile the pico source.

All the Pico program does is to transmit the word "pulsing" every half second which is received by the Ultibo program.

Regards

Paul

CmakeLists.txt

```
cmake_minimum_required(VERSION 3.12)
include($ENV{PICO_SDK_PATH}/external/pico_sdk_import.cmake)
project(test C CXX ASM)
set(CMAKE_C_STANDARD 11)
set(CMAKE_CXX_STANDARD 17)
```

```
pico_sdk_init ()
add_executable(${PROJECT_NAME}
    main.c
)
```

```
pico_add_extra_outputs(${PROJECT_NAME})
```

```
target_link_libraries(${PROJECT_NAME}
    pico_stdlib
)
```

```
pico_enable_stdio_usb(${PROJECT_NAME} 1)
pico_enable_stdio_uart(${PROJECT_NAME} 0)
```

```
main.c
#include <stdio.h>
#include <stdlib.h>
```

```

#include "pico/stdlib.h"
#include <string.h>
#include <ctype.h>

int      flag = 0;
const int led_pin = 25;

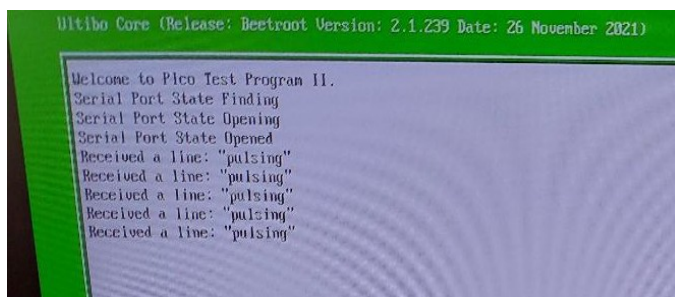
bool timer_callback(struct repeating_timer *t)
{
    printf ("pulsing\r");
    flag = !flag;
    gpio_put (led_pin, flag);
    return true;
}

int main ()
{
    struct    repeating_timer timer;

    gpio_init (led_pin);
    gpio_set_dir (led_pin, GPIO_OUT);
    stdio_init_all();
    add_repeating_timer_ms(500, timer_callback, NULL, &timer);

    while (true)
    {
        sleep_ms (50);
    } // main loop
}

```



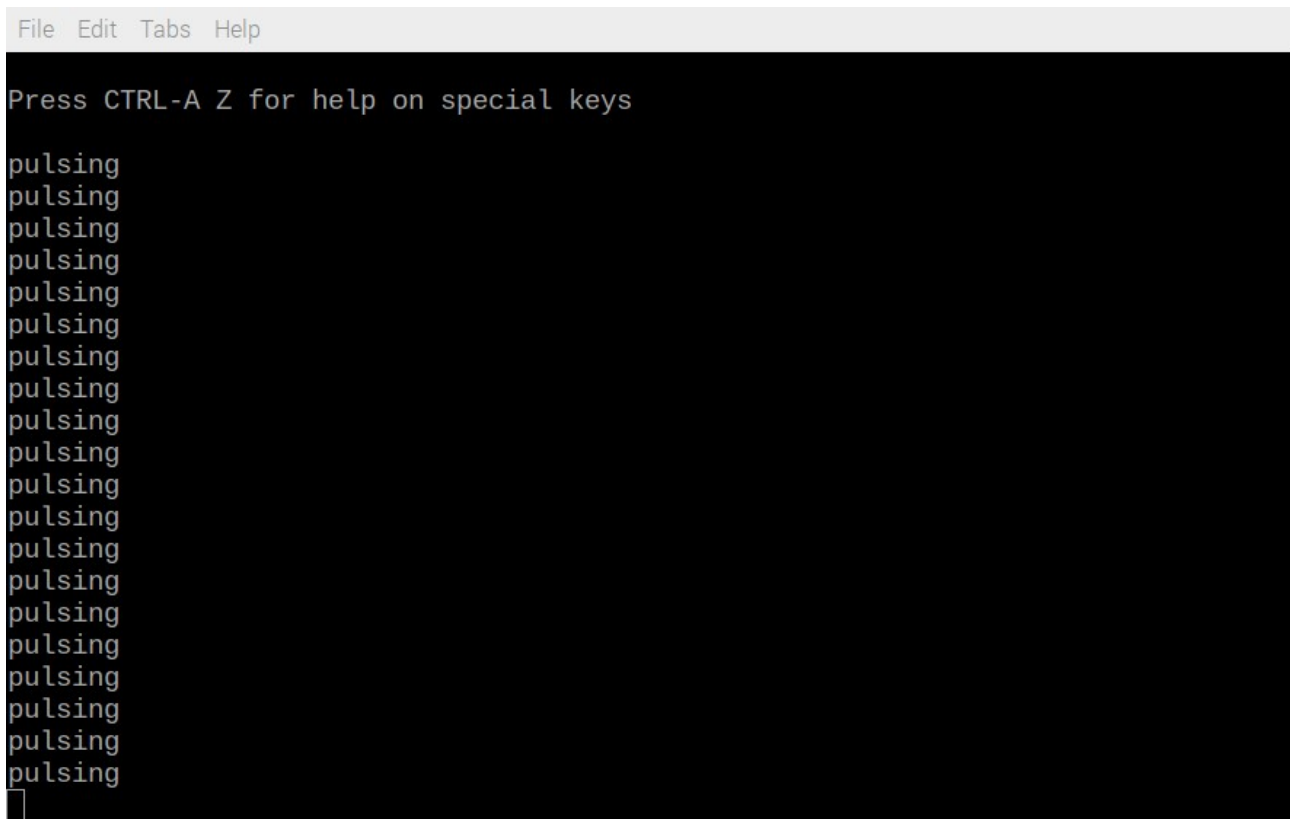
This Ultibo code detects the pico using TinyUSB. This is reliable using Window putty following transfer test.uf2 to the pico. I is also reliable using openocd to program the pico and minicom to test the output.

export PATH=~/local/openocd/bin:\$PATH

cd /opt/pico-examples/build

openocd -f interface/raspberrypi-swd.cfg -f target/rp2040.cfg -c "program pulsing/test.elf verify reset exit"

sudo minicom -s

A screenshot of a terminal window titled 'File Edit Tabs Help'. The terminal displays the text 'Press CTRL-A Z for help on special keys' followed by a list of 18 options: pulsing, pulsing, pulsing, pulsing, pulsing, pulsing, pulsing, pulsing, pulsing, pulsing, pulsing, pulsing, pulsing, pulsing, pulsing, pulsing, pulsing, and pulsing. A cursor is visible at the end of the last 'pulsing' line.

```
File Edit Tabs Help

Press CTRL-A Z for help on special keys

pulsing
pulsing
pulsing
pulsing
pulsing
pulsing
pulsing
pulsing
pulsing
pulsing
pulsing
pulsing
pulsing
pulsing
pulsing
pulsing
pulsing
pulsing
pulsing
```

Paul Wrote,

t took me a number of attempts using various online guides to eventually setup the pico environment on a Windows machine.

I finally used the following

**<https://www.youtube.com/watch?v=B5rQSoOmR5w>
<https://www.digikey.com/en/maker/projects/0f39ae8422>**

and after numerous trials, managed to get it going.

It uses WinGW instead of NMake which means you don't have to start MS Visual Studio Code from the command prompt.

Also use CMake 3.19 as .20 and .21 have bugs. Another gotcha is that you need to restart VCS each time you make a change to the extensions or settings.

The inside of the CMakeList.txt was shown in these pages and now all I do is copy the file across, change the program name and add any additional libraries (such as hardware).

Regards

Paul

After testing his code I decided to try his methods on my code.

The initial code was developed using `/opt/pico-examples/helloworld/usb/hello_usb.c`

To clean the code

```
cmake --version
```

```
cmake version 3.18.4
```

CMake suite maintained and supported by Kitware (kitware.com/cmake).

Add openocd to your PATH env.

```
export PATH=~/.local/openocd/bin:$PATH
```

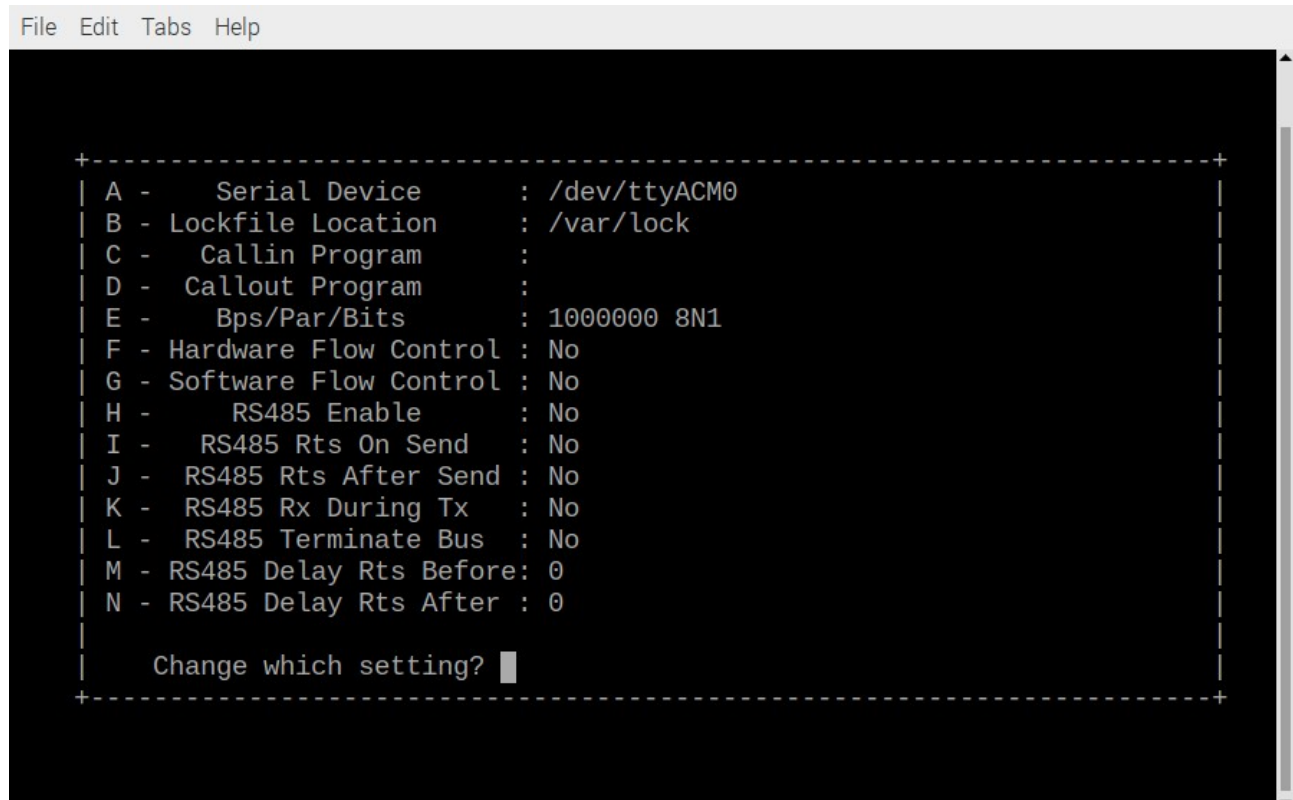
```
cd /opt/pico-examples/build
```

Now openocd can be used with Single Wire Debugger SWD to load programs onto the pico.

```
/opt/pico-examples/build $ openocd -f interface/raspberrypi-swd.cfg -f target/rp2040.cfg -c  
"program hello_world/usb/hello_usb.elf verify reset exit"
```

```
/opt/pico-examples/build $ openocd -f interface/raspberrypi-swd.cfg -f target/rp2040.cfg -c  
"program lifting/test1.elf verify reset exit"
```

```
sudo minicom -s
```

A screenshot of a terminal window with a menu interface. The window has a title bar with 'File Edit Tabs Help'. The menu is enclosed in a dashed box and lists various settings for a serial device. The settings include Serial Device, Lockfile Location, Callin Program, Callout Program, Bps/Par/Bits, Hardware Flow Control, Software Flow Control, RS485 Enable, RS485 Rts On Send, RS485 Rts After Send, RS485 Rx During Tx, RS485 Terminate Bus, RS485 Delay Rts Before, and RS485 Delay Rts After. The prompt 'Change which setting?' is at the bottom of the menu.

```
+-----+  
| A -   Serial Device       : /dev/ttyACM0  
| B - Lockfile Location    : /var/lock  
| C -   Callin Program      :  
| D -   Callout Program     :  
| E -   Bps/Par/Bits        : 1000000 8N1  
| F - Hardware Flow Control : No  
| G - Software Flow Control : No  
| H -   RS485 Enable        : No  
| I -   RS485 Rts On Send   : No  
| J -   RS485 Rts After Send : No  
| K -   RS485 Rx During Tx  : No  
| L -   RS485 Terminate Bus : No  
| M - RS485 Delay Rts Before: 0  
| N - RS485 Delay Rts After : 0  
|  
|   Change which setting? █  
+-----+
```

```
/opt/pico-examples/build $ openocd -f interface/raspberrypi-swd.cfg -f target/rp2040.cfg -c  
"program hello_world/usb/hello_usb.elf verify reset exit"
```

or

```
/opt/pico-examples/build $ openocd -f interface/raspberrypi-swd.cfg -f target/rp2040.cfg -c  
"program lifting/test1.elf verify reset exit"
```

Sending the data for computing the lifting dwt

```
File Edit Tabs Help  
3, 2, -1, 9, -5, -2, 2, -23, 11, 1, -2, 3, 9, 3, -9, 3, 1, -9, 10, 27, -19, 4, 2, 1, 0, 0, -1, -1, 0, -3, 10,,  
1, +-----[Select a file for upload]-----+  
1, |Directory: /root|  
2, | [..]|  
1, | [..cache]|  
2, | [..config]|  
0, | [..dbus]|  
-1| [..ecryptfs]|  
12| [..local]|  
-5| [..vnc]|  
-4| .bash_history|  
-1| .bashrc|  
8, | .profile|  
13| a64.bin|  
-3| minicom.cap|  
8, | minicom.log|  
2, |  
0, |  
-9| ( Escape to exit, Space to tag )|  
86+-----+  
setting pointers  
pt [Goto] [Prev] [Show] [Tag] [Untag] [Okay]  
head 0x2000505c tsil 0x2000505c end 0x200050dc top 0x2000505c
```

Once the data has been sent.

```
File Edit Tabs Help  
  
Welcome to minicom 2.8  
  
OPTIONS: I18n  
Port /dev/ttyACM0, 07:16:19  
  
Press CTRL-A Z for help on special keys  
  
setting pointers  
ptrs.inp_buf = 0x20001030 ptrs.out_buf = 0x20003030  
head 0x2000505c tsil 0x2000505c end 0x200050dc top 0x2000505c  
█
```

```

File Edit Tabs Help
setting pointers
ptrs.inp_buf = 0x20001030 ptrs.out_buf = 0x20003030
head 0x2000505c tsil 0x2000505c end 0x200050dc top 0x2000505c
104 104 103 102 103 103 105 107 106 105 101 96 113 129 115 94
107 93 96 80 88 69 52 62 64 64 62 64 78 71 52 66 94 67 56 59 57 53 51 62 64 67
recCRC 0x0 0x200050d6 0x200050d6 0x200050dc 0x2000505c 0x20001730
0x66
122 119 118 117 118 1159 159 156 155 155 157 158 158 160 161 159
recCRC 0xd 0x2000507e 0x2000507e 0x200050dc 0x2000505c 0x20002eb0
0x7c
145 154 151 143 136 166 196 194 196 204 206 206 208 210 212 214 212 212 201 158
113 94 126 130 102 51 56 58 54 53 52 54 68 93 136 140 154 158 157 156 156 157 1
recCRC 0x19 0x200050be 0x200050be 0x200050dc 0x2000505c 0x20002f30
0x7a
142 141 131 170 191 191 200 208 207 209 210 212 213 212 208 209 198 85 66 89 10
61 94 126 130 102 51 56 58 54 53 52 54 68 93 136 140 154 158 157 156 156 157 15
recCRC 0x46 0x2000507d 0x2000507d 0x200050dc 0x2000505c 0x20002fb0
0x71
142 141 131 170 191 191 200 208 207 209 210 212 213 212 208 209 198 85 66 89 10
61 142 53 51 55 54 50 50 52 48 103 149 146 161 162 157 157 155 153 154 156 156
recCRC 0x31 0x200050bd 0x200050bd 0x200050dc 0x2000505c 0x20003030
errors 0
Command (1 = Send or 0 = Wait):

```

Now the results of the lifting DWT

```
File Edit Tabs Help
0, 1, -1, 1, 5, -5, 1, -1, 4, 4, -3, -4, 8, -5, 7, 3, 13, 8, 17, -4, -10, -29, 2, 22, 23, 2, -1, 0, 17, -2, -,
1, 1, 0, -3, -9, 5, 0, 6, 3, -2, 2, 4, -5, 5, -17, -1, -2, 6, 3, 41, -42, 34, 17, -14, -14, -5, 6, 32, -16, ,
0, 0, 1, 3, 0, -3, 1, 5, -8, 5, 3, -5, 4, 0, 4, 1, -1, -3, -2, -14, 50, -23, -17, -1, 1, -3, 1, -20, -8, 2, 1,
3, 2, -1, 9, -5, -2, 2, -23, 11, 1, -2, 3, 9, 3, -9, 3, 1, -9, 10, 27, -19, 4, 2, 1, 0, 0, -1, -1, 0, -3, 10, ,
1, 3, -5, 19, 1, -2, -2, 24, 1, 1, 8, 5, -27, 0, 16, -15, 2, 23, -7, -19, 5, 3, 0, -5, 1, -3, 1, 1, 6, 6, -17,
1, 2, -7, 22, 2, 8, -8, -7, 4, -3, 11, 0, 9, -7, -18, 5, 20, -16, 4, 1, 0, 1, 4, 3, 4, -2, 2, 5, -5, -4, 6, 0, ,
2, 3, 3, 14, -2, -9, 12, 4, -3, 2, 7, -3, 3, -19, 24, 11, -30, 18, 8, 1, 1, -1, 1, 10, -14, -1, 2, 0, 3, 1, 1,
1, 1, 1, -27, 19, 3, -5, 1, 5, 6, 2, -22, -8, 1, -3, -15, -62, 11, 10, 1, 0, 8, 5, 2, -8, 0, 0, -1, 0, 0, 0, 0,
2, 1, 0, 7, -21, 9, 0, -1, 4, -2, 6, -70, 18, 0, 1, 30, -20, 5, 3, 2, -2, 4, -1, 5, 2, -3, 1, 1, 0, -1, 2, 2, 4,
0, 2, 0, 1, -7, 9, 5, 2, -3, 6, -6, 8, 0, -1, 1, 6, -3, 2, 0, -5, -30, 40, 22, 12, -4, 6, 0, 0, 0, 2, -1, 1, 1, ,
-1, 1, 1, 2, 2, -7, 8, 12, -2, 0, -7, 5, -3, -3, 2, -3, 16, -5, 3, 1, -14, 19, 10, -5, -44, 0, -1, 1, 1, 0, 0,
12, -5, 0, 1, 1, 0, -6, -15, 24, -12, 9, 2, 19, 7, 5, 29, -46, 15, 4, 1, 5, 2, -2, 0, -25, 58, -4, 0, 0, 1, -,
-5, 3, 1, -2, -1, 1, 0, 3, -6, 14, -6, 1, -34, 5, -5, 10, -14, -6, 9, 1, -1, -1, -3, 1, 5, -41, 20, 3, -2, 1,
-4, 3, 1, 1, 5, -6, 1, 10, -15, 6, -1, 48, 18, -4, 1, 0, 3, -1, 0, 1, 1, -1, -1, -1, 3, 9, -2, 5, 2, 2, 5, 0, 6,
-1, 0, 1, 2, 0, 6, -2, -48, 33, -4, 6, -61, 56, -31, 2, 4, -1, 4, -4, -2, 3, 1, 2, 2, -3, 1, -2, 0, 18, -13, ,
8, -2, 3, 0, -1, 1, 7, 25, -2, 10, 7, 37, -31, 6, 2, -2, -1, -1, 3, 0, 1, 1, 1, 3, -15, 7, 1, 0, 7, -32, 6, 5, ,
13, -3, -1, 1, -1, -1, 6, 6, 4, 9, 3, -3, 7, -2, -6, 4, 1, 3, 1, 2, -1, 0, 0, 1, 11, 4, 3, -1, -2, 4, -4, 4, 0, ,
-33, 11, 13, -8, -9, 12, -8, -15, 8, -7, -3, -3, -1, 0, 5, 0, 0, -1, 1, 1, 0, -1, 0, 2, 13, -14, 0, 7, -1, -,
8, -9, -12, 15, 28, -17, 4, 3, 4, -5, 3, 3, 5, 3, -9, 3, 1, 2, -1, 1, -1, 1, 1, -2, 3, -20, -4, 8, 2, 15, -37,
2, 1, 8, 1, -11, 4, 0, -7, -14, 8, 4, 0, 1, 0, -5, 6, 1, 2, -3, -6, 4, 1, 1, 0, 4, 1, 5, -1, 0, -11, 4, -10, 22,
0, 5, 5, -8, 3, 1, -8, 6, 7, -2, 0, 0, 1, 1, 6, -1, 2, -2, 4, 4, 0, 1, -1, 0, 2, -1, -4, 0, -1, 5, -3, 4, -24, 2,
-9, 8, -6, 0, 2, -11, 9, 3, 2, 0, 0, -1, -1, 1, 4, -7, 4, -18, 5, 3, 1, -1, 3, 3, 17, -15, 7, -1, 1, -1, 3, 8, ,
86, -7, 2, -1, -28, 22, 5, -2, 0, 0, 2, 0, 0, 0, -1, 0, 0, 19, -4, -2, -1, 0, 0, 19, -76, 0, 2, 2, 7, -7, 5, -,

```

All code is contained in 1 file /opt/pico-examples/lifting/main.c

/opt/pico-examples/build/lifting \$ diffuse ../../lifting/main.c ../../hello_world/usb/hello_usb.c

commit d4309451416d2a60c912130a901841274d115fa8 (HEAD)

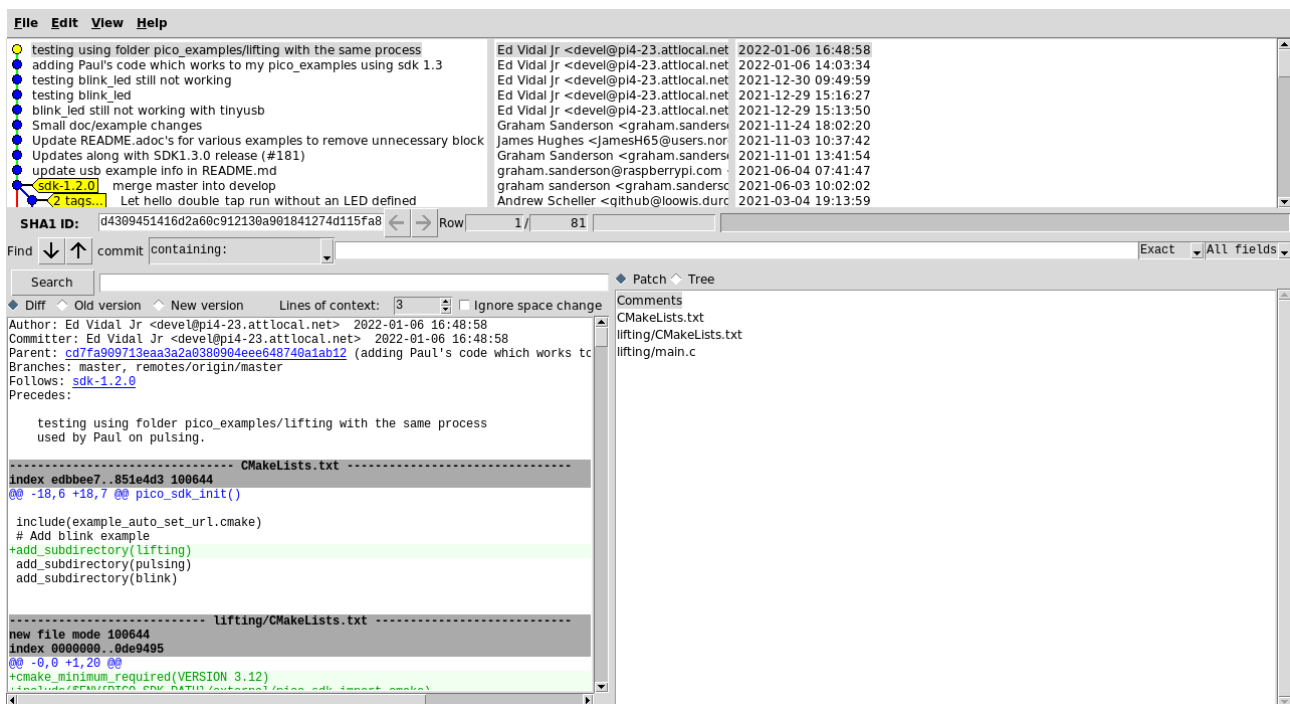
Author: Ed Vidal Jr <devel@pi4-23.attlocal.net>

Date: Thu Jan 6 16:48:58 2022 -0700

testing using folder pico_examples/lifting with the same process
used by Paul on pulsing.

/opt/pico-examples/build \$ git checkout d4309

The image below was gitk &



```
/opt/pico-examples/build $ cmake ..
PICO_SDK_PATH is /opt/pico-sdk
PICO platform is rp2040.
PICO target board is pico.
Using board configuration from /opt/pico-sdk/src/boards/include/boards/pico.h
TinyUSB available at /opt/pico-sdk/lib/tinyusb/src/portable/raspberrypi/rp2040; enabling build
support for USB.
-- Configuring done
-- Generating done
-- Build files have been written to: /opt/pico-examples/build
```

```
/opt/pico-examples/build/lifting $ make clean; make
[ 0%] Creating directories for 'ELF2UF2Build'
[ 0%] No download step for 'ELF2UF2Build'
[ 0%] No update step for 'ELF2UF2Build'
[ 0%] No patch step for 'ELF2UF2Build'
[ 0%] Performing configure step for 'ELF2UF2Build'
-- Configuring done
-- Generating done
-- Build files have been written to: /opt/pico-examples/build/elf2uf2
[ 0%] Performing build step for 'ELF2UF2Build'
[100%] Built target elf2uf2
[ 0%] No install step for 'ELF2UF2Build'
[ 0%] Completed 'ELF2UF2Build'
[ 0%] Built target ELF2UF2Build
[ 0%] Built target bs2_default
[ 0%] Built target bs2_default_padded_checksummed_asm
[ 0%] Building C object lifting/CMakeFiles/test1.dir/main.c.obj
/opt/pico-examples/lifting/main.c: In function 'lifting':
/opt/pico-examples/lifting/main.c:222:11: warning: iteration 3 invokes undefined behavior [-Waggressive-loop-optimizations]
```



```
ov[lvl] = offset + ((lvl)?(ov[lvl-1]):0);
```

```
~~~~~\~~~~~
```

```
/opt/pico-examples/lifting/main.c:194:2: note: within this loop
```

```
for(lvl=0; lvl<LVLS; lvl++) {
```

```
  ^~~
```

```
[ 0%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_stdlib/stdlib.c.obj
```

```
[ 0%] Building C object
```

```
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/hardware_gpio/gpio.c.obj
```

```
[ 0%] Building C object
```

```
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/hardware_claim/claim.c.obj
```

```
[ 0%] Building C object
```

```
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_platform/platform.c.obj
```

```
[ 0%] Building C object
```

```
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/hardware_sync/sync.c.obj
```

```
[ 0%] Building C object
```

```
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/hardware_uart/uart.c.obj
```

```
[ 0%] Building ASM object
```

```
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/hardware_divider/divider.S.obj
```

```
[ 0%] Building C object
```

```
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/common/pico_time/time.c.obj
```

```
[ 0%] Building C object
```

```
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/common/pico_time/timeout_helper.c.obj
```

```
[ 0%] Building C object
```

```
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/hardware_timer/timer.c.obj
```

```
[ 0%] Building C object
```

```
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/common/pico_sync/sem.c.obj
```

```
[ 0%] Building C object
```

```
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/common/pico_sync/lock_core.c.obj
```

```
[ 0%] Building C object
```

```
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/common/pico_sync/mutex.c.obj
```

```
[ 0%] Building C object
```

```
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/common/pico_sync/critical_section.c.obj
```

```
[ 0%] Building C object
```

```
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/common/pico_util/datetime.c.obj
```

```
[ 0%] Building C object
```

```
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/common/pico_util/pheap.c.obj
```

```
[ 0%] Building C object
```

```
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/common/pico_util/queue.c.obj
```

```
[ 0%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_runtime/runtime.c.obj
```

```
[ 0%] Building C object
```

```
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/hardware_clocks/clocks.c.obj
```

```
[ 0%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/hardware_irq/irq.c.obj
```

```
[ 0%] Building ASM object
```

```
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/hardware_irq/irq_handler_chain.S.obj
```

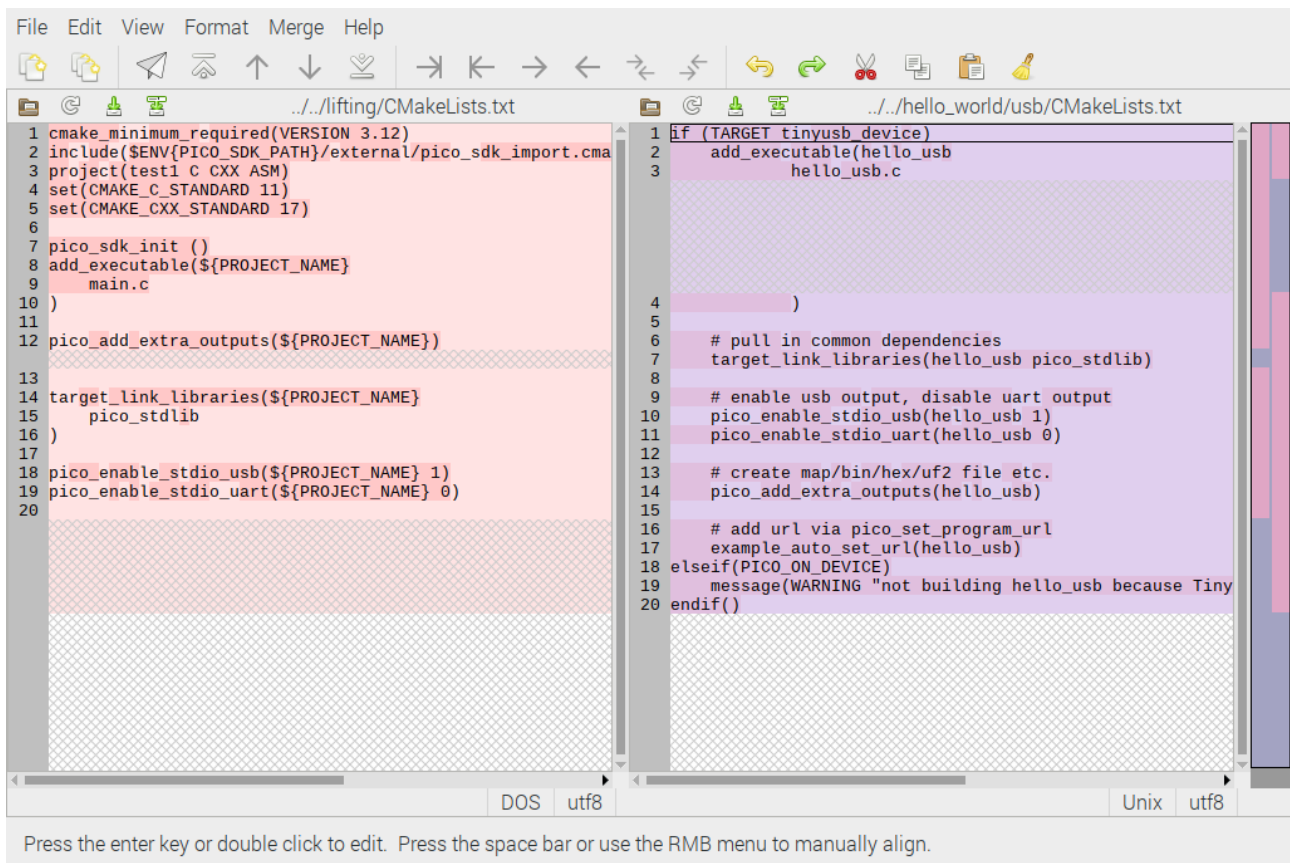
```
[ 0%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/hardware_pll/pll.c.obj
```

```
[ 0%] Building C object
```

```
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/hardware_vreg/vreg.c.obj
```

[0%] Building C object
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/hardware_watchdog/watchdog.c.obj
[0%] Building C object
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/hardware_xosc/xosc.c.obj
[0%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_printf/
printf.c.obj
[0%] Building ASM object
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_bit_ops/bit_ops_aeabi.S.obj
[0%] Building C object
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_bootrom/bootrom.c.obj
[0%] Building ASM object
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_divider/divider.S.obj
[0%] Building ASM object
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_double/double_aeabi.S.obj
[0%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_double/
double_init_rom.c.obj
[0%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_double/
double_math.c.obj
[0%] Building ASM object
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_double/double_v1_rom_shim.S.obj
[0%] Building ASM object
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_int64_ops/
pico_int64_ops_aeabi.S.obj
[0%] Building ASM object lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_float/
float_aeabi.S.obj
[0%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_float/
float_init_rom.c.obj
[0%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_float/
float_math.c.obj
[0%] Building ASM object lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_float/
float_v1_rom_shim.S.obj
[0%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_malloc/
pico_malloc.c.obj
[0%] Building ASM object
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_mem_ops/mem_ops_aeabi.S.obj
[0%] Building ASM object
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_standard_link/crt0.S.obj
[0%] Building CXX object
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_standard_link/new_delete.cpp.obj
[0%] Building C object
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_standard_link/binary_info.c.obj
[0%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_stdio/
stdio.c.obj
[0%] Building C object
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_stdio_usb/reset_interface.c.obj
[0%] Building C object
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_stdio_usb/stdio_usb.c.obj
[0%] Building C object
lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_stdio_usb/
stdio_usb_descriptors.c.obj
[0%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/lib/tinyusb/src/portable/
raspberrypi/rp2040/dcd_rp2040.c.obj

[0%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/lib/tinyusb/src/portable/raspberrypi/rp2040/rp2040_usb.c.obj
[0%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/lib/tinyusb/src/device/usbd.c.obj
[0%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/lib/tinyusb/src/device/usbd_control.c.obj
[0%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/lib/tinyusb/src/class/audio/audio_device.c.obj
[0%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/lib/tinyusb/src/class/cdc/cdc_device.c.obj
[0%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/lib/tinyusb/src/class/dfu/dfu_device.c.obj
[0%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/lib/tinyusb/src/class/dfu/dfu_rt_device.c.obj
[0%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/lib/tinyusb/src/class/hid/hid_device.c.obj
[0%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/lib/tinyusb/src/class/midi/midi_device.c.obj
[0%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/lib/tinyusb/src/class/msc/msc_device.c.obj
[100%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/lib/tinyusb/src/class/net/ecm_rndis_device.c.obj
[100%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/lib/tinyusb/src/class/net/ncm_device.c.obj
[100%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/lib/tinyusb/src/class/usbtmc/usbtmc_device.c.obj
[100%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/lib/tinyusb/src/class/vendor/vendor_device.c.obj
[100%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/lib/tinyusb/src/class/video/video_device.c.obj
[100%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/lib/tinyusb/src/tusb.c.obj
[100%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/lib/tinyusb/src/common/tusb_fifo.c.obj
[100%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_fix/rp2040_usb_device_enumeration/rp2040_usb_device_enumeration.c.obj
[100%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/pico_unique_id/unique_id.c.obj
[100%] Building C object lifting/CMakeFiles/test1.dir/opt/pico-sdk/src/rp2_common/hardware_flash/flash.c.obj
[100%] Linking CXX executable test1.elf
[100%] Built target test1



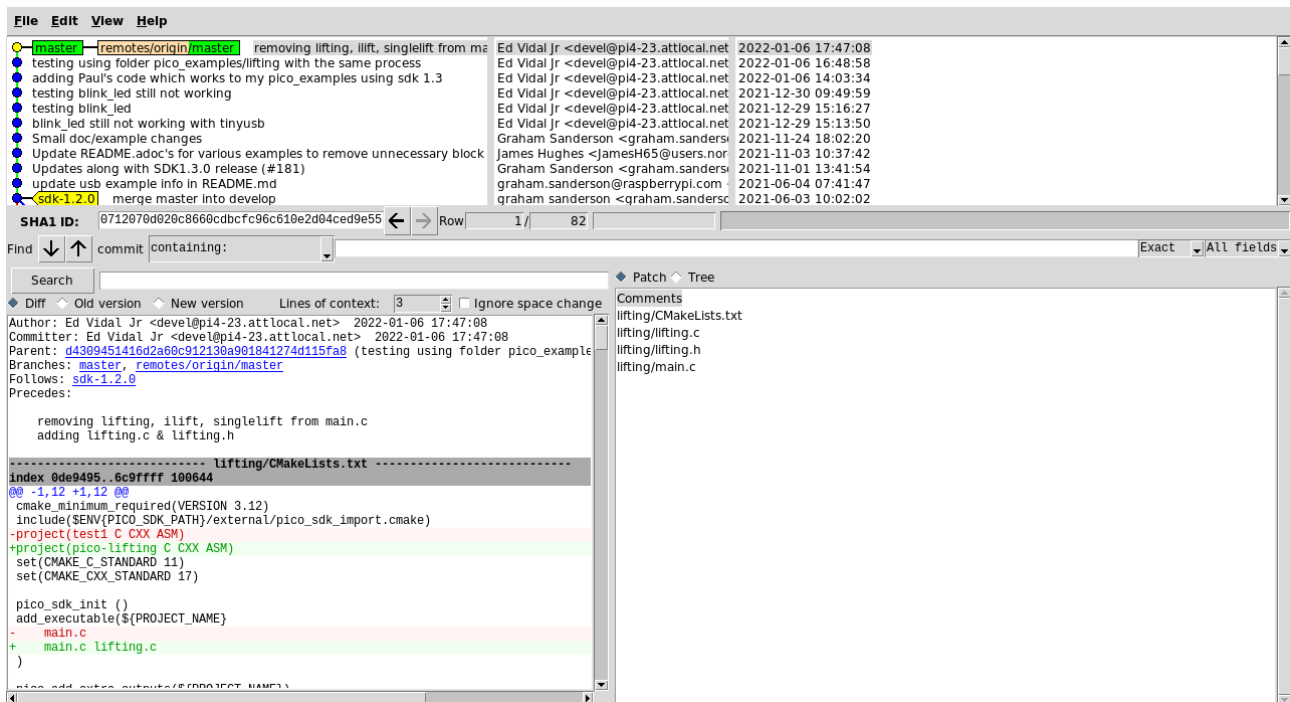
This is now taking out several of methods from main.c

```

extern void singlelift(int rb, int w, int * const ibuf, int * const obuf);
extern void lift(int rb, int w, int * const ibuf, int * const obuf);
extern void lifting(int w, int *ibuf, int *tmpbuf, int *fwd);
to the files lifting.c & lifting.h

```

/opt/pico-examples \$ git checkout 0712070



This is the new CmakeLists.txt

```
cmake_minimum_required(VERSION 3.12)
include($ENV{PICO_SDK_PATH}/external/pico_sdk_import.cmake)
project(pico-lifting C CXX ASM)
set(CMAKE_C_STANDARD 11)
set(CMAKE_CXX_STANDARD 17)
```

```
pico_sdk_init ()
add_executable(${PROJECT_NAME}
    main.c lifting.c
)
```

```
pico_add_extra_outputs(${PROJECT_NAME})
```

```
target_link_libraries(${PROJECT_NAME}
    pico_stdlib
)
```

```
pico_enable_stdio_usb(${PROJECT_NAME} 1)
pico_enable_stdio_uart(${PROJECT_NAME} 0)
```

```
/opt/pico-examples/build $ cmake ..
```

PICO_SDK_PATH is /opt/pico-sdk

PICO platform is rp2040.

PICO target board is pico.

Using board configuration from /opt/pico-sdk/src/boards/include/boards/pico.h

TinyUSB available at /opt/pico-sdk/lib/tinyusb/src/portable/raspberrypi/rp2040; enabling build support for USB.

-- Configuring done

-- Generating done

-- Build files have been written to: /opt/pico-examples/build

Now instead of compiling a single file main.c. Now main.c. & lifting.c need to be compiled resulting I pico-lifting.

```
/opt/pico-examples/build/lifting $ make clean; make
[ 0%] Creating directories for 'ELF2UF2Build'
[ 0%] No download step for 'ELF2UF2Build'
[ 0%] No update step for 'ELF2UF2Build'
[ 0%] No patch step for 'ELF2UF2Build'
[ 0%] Performing configure step for 'ELF2UF2Build'
-- Configuring done
-- Generating done
-- Build files have been written to: /opt/pico-examples/build/elf2uf2
[ 0%] Performing build step for 'ELF2UF2Build'
[100%] Built target elf2uf2
[ 0%] No install step for 'ELF2UF2Build'
[ 0%] Completed 'ELF2UF2Build'
[ 0%] Built target ELF2UF2Build
[ 0%] Built target bs2_default
[ 0%] Built target bs2_default_padded_checksummed_asm
Scanning dependencies of target pico-lifting
[ 0%] Building C object lifting/CMakeFiles/pico-lifting.dir/main.c.obj
/opt/pico-examples/lifting/main.c: In function 'main':
/opt/pico-examples/lifting/main.c:488:23: warning: passing argument 2 of 'lifting' from
incompatible pointer type [-Wincompatible-pointer-types]
    lifting(ptrs.w,ptrs.inp_buf,ptrs.out_buf,ptrs.fwd_inv);
          ~~~~~^~~~~~

In file included from /opt/pico-examples/lifting/main.c:9:
/opt/pico-examples/lifting/lifting.h:46:33: note: expected 'int *' but argument is of type 'short int *'
extern void lifting(int w, int *ibuf, int *tmpbuf, int *fwd);
          ~~~~~^~~~~~

/opt/pico-examples/lifting/main.c:488:36: warning: passing argument 3 of 'lifting' from
incompatible pointer type [-Wincompatible-pointer-types]
    lifting(ptrs.w,ptrs.inp_buf,ptrs.out_buf,ptrs.fwd_inv);
          ~~~~~^~~~~~

In file included from /opt/pico-examples/lifting/main.c:9:
/opt/pico-examples/lifting/lifting.h:46:44: note: expected 'int *' but argument is of type 'short int *'
extern void lifting(int w, int *ibuf, int *tmpbuf, int *fwd);
          ~~~~~^~~~~~

/opt/pico-examples/lifting/main.c:488:49: warning: passing argument 4 of 'lifting' from
incompatible pointer type [-Wincompatible-pointer-types]
    lifting(ptrs.w,ptrs.inp_buf,ptrs.out_buf,ptrs.fwd_inv);
          ~~~~~^~~~~~

In file included from /opt/pico-examples/lifting/main.c:9:
/opt/pico-examples/lifting/lifting.h:46:57: note: expected 'int *' but argument is of type 'short int *'
extern void lifting(int w, int *ibuf, int *tmpbuf, int *fwd);
          ~~~~~^~~~~~

/opt/pico-examples/lifting/main.c:588:23: warning: passing argument 2 of 'lifting' from
incompatible pointer type [-Wincompatible-pointer-types]
    lifting(ptrs.w,ptrs.inp_buf,ptrs.out_buf,ptrs.fwd_inv);
          ~~~~~^~~~~~

In file included from /opt/pico-examples/lifting/main.c:9:
/opt/pico-examples/lifting/lifting.h:46:33: note: expected 'int *' but argument is of type 'short int *'
```

```
extern void lifting(int w, int *ibuf, int *tmpbuf, int *fwd);
```

```
~~~~~\~~~~
```

```
/opt/pico-examples/lifting/main.c:588:36: warning: passing argument 3 of 'lifting' from  
incompatible pointer type [-Wincompatible-pointer-types]
```

```
lifting(ptrs.w,ptrs.inp_buf,ptrs.out_buf,ptrs.fwd_inv);
```

```
~~~~~\~~~~~
```

```
In file included from /opt/pico-examples/lifting/main.c:9:
```

```
/opt/pico-examples/lifting/lifting.h:46:44: note: expected 'int *' but argument is of type 'short int *'
```

```
extern void lifting(int w, int *ibuf, int *tmpbuf, int *fwd);
```

```
~~~~~\~~~~~
```

```
/opt/pico-examples/lifting/main.c:588:49: warning: passing argument 4 of 'lifting' from  
incompatible pointer type [-Wincompatible-pointer-types]
```

```
lifting(ptrs.w,ptrs.inp_buf,ptrs.out_buf,ptrs.fwd_inv);
```

```
~~~~~\~~~~~
```

```
In file included from /opt/pico-examples/lifting/main.c:9:
```

```
/opt/pico-examples/lifting/lifting.h:46:57: note: expected 'int *' but argument is of type 'short int *'
```

```
extern void lifting(int w, int *ibuf, int *tmpbuf, int *fwd);
```

```
~~~~~\~~~~
```

```
[ 0%] Building C object lifting/CMakeFiles/pico-lifting.dir/lifting.c.obj
```

```
/opt/pico-examples/lifting/lifting.c: In function 'lifting':
```

```
/opt/pico-examples/lifting/lifting.c:229:11: warning: iteration 3 invokes undefined behavior [-  
Waggressive-loop-optimizations]
```

```
ov[lvl] = offset + ((lvl)?(ov[lvl-1]):0);
```

```
~~~~~\~~~~~
```

```
/opt/pico-examples/lifting/lifting.c:201:2: note: within this loop
```

```
for(lvl=0; lvl<LVLS; lvl++) {
```

```
^~~
```

```
[ 0%] Building C object
```

```
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_stdlib/stdlib.c.obj
```

```
[ 0%] Building C object
```

```
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/hardware_gpio/gpio.c.obj
```

```
[ 0%] Building C object
```

```
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/hardware_claim/claim.c.obj
```

```
[ 50%] Building C object
```

```
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_platform/platform.c.obj
```

```
[ 50%] Building C object
```

```
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/hardware_sync/sync.c.obj
```

```
[ 50%] Building C object
```

```
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/hardware_uart/uart.c.obj
```

```
[ 50%] Building ASM object
```

```
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/hardware_divider/divider.S.obj
```

```
[ 50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/common/pico_time/  
time.c.obj
```

```
[ 50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/common/pico_time/  
timeout_helper.c.obj
```

```
[ 50%] Building C object
```

```
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/hardware_timer/timer.c.obj
```

```
[ 50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/common/pico_sync/  
sem.c.obj
```

```
[ 50%] Building C object lifting/CmakeFiles/pico-lifting.dir/opt/pico-sdk/src/common/pico_sync/  
lock_core.c.obj
```


[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/common/pico_sync/mutex.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/common/pico_sync/critical_section.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/common/pico_util/datetime.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/common/pico_util/pheap.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/common/pico_util/queue.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_runtime/runtime.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/hardware_clocks/clocks.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/hardware_irq/irq.c.obj
[50%] Building ASM object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/hardware_irq/irq_handler_chain.S.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/hardware_pll/pll.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/hardware_vreg/vreg.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/hardware_watchdog/watchdog.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/hardware_xosc/xosc.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_printf/printf.c.obj
[50%] Building ASM object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_bit_ops/bit_ops_aeabi.S.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_bootrom/bootrom.c.obj
[50%] Building ASM object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_divider/divider.S.obj
[50%] Building ASM object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_double/double_aeabi.S.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_double/double_init_rom.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_double/double_math.c.obj
[50%] Building ASM object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_double/double_v1_rom_shim.S.obj
[50%] Building ASM object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_int64_ops/pico_int64_ops_aeabi.S.obj
[50%] Building ASM object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_float/float_aeabi.S.obj

[50%] Building C object
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_float/float_init_rom.c.obj
[50%] Building C object
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_float/float_math.c.obj
[50%] Building ASM object
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_float/
float_v1_rom_shim.S.obj
[50%] Building C object
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_malloc/pico_malloc.c.obj
[50%] Building ASM object
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_mem_ops/
mem_ops_aeabi.S.obj
[50%] Building ASM object
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_standard_link/crt0.S.obj
[50%] Building CXX object
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_standard_link/
new_delete.cpp.obj
[50%] Building C object
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_standard_link/
binary_info.c.obj
[50%] Building C object
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_stdio/stdio.c.obj
[50%] Building C object
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_stdio_usb/
reset_interface.c.obj
[50%] Building C object
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_stdio_usb/stdio_usb.c.obj
[50%] Building C object
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_stdio_usb/
stdio_usb_descriptors.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/lib/tinyusb/src/portable/
raspberrypi/rp2040/dcd_rp2040.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/lib/tinyusb/src/portable/
raspberrypi/rp2040/rp2040_usb.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/lib/tinyusb/src/device/
usbd.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/lib/tinyusb/src/device/
usbd_control.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/lib/tinyusb/src/class/
audio/audio_device.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/lib/tinyusb/src/class/cdc/
cdc_device.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/lib/tinyusb/src/class/dfu/
dfu_device.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/lib/tinyusb/src/class/dfu/
dfu_rt_device.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/lib/tinyusb/src/class/hid/
hid_device.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/lib/tinyusb/src/class/
midi/midi_device.c.obj
[50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/lib/tinyusb/src/class/
msc/msc_device.c.obj

```

[ 50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/lib/tinyusb/src/class/net/
ecm_rndis_device.c.obj
[ 50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/lib/tinyusb/src/class/net/
ncm_device.c.obj
[ 50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/lib/tinyusb/src/class/
usbtmc/usbtmc_device.c.obj
[ 50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/lib/tinyusb/src/class/
vendor/vendor_device.c.obj
[ 50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/lib/tinyusb/src/class/
video/video_device.c.obj
[ 50%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/lib/tinyusb/src/tusb.c.obj
[100%] Building C object lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/lib/tinyusb/src/common/
tusb_fifo.c.obj
[100%] Building C object
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_fix/
rp2040_usb_device_enumeration/rp2040_usb_device_enumeration.c.obj
[100%] Building C object
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/pico_unique_id/unique_id.c.obj
[100%] Building C object
lifting/CMakeFiles/pico-lifting.dir/opt/pico-sdk/src/rp2_common/hardware_flash/flash.c.obj
[100%] Linking CXX executable pico-lifting.elf
[100%] Built target pico-lifting

```

Using openocd to program the pico.

```

/opt/pico-examples/build $ openocd -f interface/raspberrypi-swd.cfg -f target/rp2040.cfg -c
"program lifting/pico-lifting.elf verify reset exit"
Open On-Chip Debugger 0.10.0+dev-g71510a7-dirty (2021-08-15-17:08)
Licensed under GNU GPL v2
For bug reports, read
    http://openocd.org/doc/doxygen/bugs.html
adapter speed: 1000 kHz

```

```

Info : Hardware thread awareness created
Info : Hardware thread awareness created
Info : RP2040 Flash Bank Command
Info : BCM2835 GPIO JTAG/SWD bitbang driver
Info : clock speed 1001 kHz
Info : SWD DPIDR 0x0bc12477
Info : SWD DLPIDR 0x00000001
Info : SWD DPIDR 0x0bc12477
Info : SWD DLPIDR 0x10000001
Info : rp2040.core0: hardware has 4 breakpoints, 2 watchpoints
Info : rp2040.core1: hardware has 4 breakpoints, 2 watchpoints
Info : starting gdb server for rp2040.core0 on 3333
Info : Listening on port 3333 for gdb connections
target halted due to debug-request, current mode: Thread
xPSR: 0xf1000000 pc: 0x000000ee msp: 0x20041f00
target halted due to debug-request, current mode: Thread
xPSR: 0xf1000000 pc: 0x000000ee msp: 0x20041f00
** Programming Started **
Info : RP2040 B0 Flash Probe: 2097152 bytes @10000000, in 512 sectors

```



```
File Edit Tabs Help

+-----+
| A - Serial Device      : /dev/ttyACM0
| B - Lockfile Location  : /var/lock
| C - Callin Program     :
| D - Callout Program    :
| E - Bps/Par/Bits       : 1000000 8N1
| F - Hardware Flow Control : No
| G - Software Flow Control : No
| H - RS485 Enable       : No
| I - RS485 Rts On Send  : No
| J - RS485 Rts After Send : No
| K - RS485 Rx During Tx : No
| L - RS485 Terminate Bus : No
| M - RS485 Delay Rts Before: 0
| N - RS485 Delay Rts After : 0
|
| Change which setting? █
+-----+
```

XXX

```
File Edit Tabs Help
3,2,-1,9,-5,-2,2,-23,11,1,-2,3,9,3,-9,3,1,-9,10,27,-19,4,2,1,0,0,-1,-1,0,-3,10,,
1,+-----[Select a file for upload]-----+
1,|Directory: /root
2,| [..]
1,| [.cache]
2,| [.config]
0,| [.dbus]
-1| [.ecryptfs]
12| [.local]
-5| [.vnc]
-4| .bash_history
-1| .bashrc
8,| .profile
13| a64.bin
-3| minicom.cap
8,| minicom.log
2,|
0,|
-9| ( Escape to exit, Space to tag )
86+-----+
setting pointers
pt [Goto] [Prev] [Show] [Tag] [Untag] [Okay]
head 0x2000505c tsil 0x2000505c end 0x200050dc top 0x2000505c
```

Once the data has been sent.

```

File Edit Tabs Help
setting pointers
ptrs.inp_buf = 0x20001030 ptrs.out_buf = 0x20003030
head 0x2000505c tsil 0x2000505c end 0x200050dc top 0x2000505c
104 104 103 102 103 103 105 107 106 105 101 96 113 129 115 94
107 93 96 80 88 69 52 62 64 64 62 64 78 71 52 66 94 67 56 59 57 53 51 62 64 67
recCRC 0x0 0x200050d6 0x200050d6 0x200050dc 0x2000505c 0x20001730
0x66
122 119 118 117 118 1159 159 156 155 155 157 158 158 160 161 159
recCRC 0xd 0x2000507e 0x2000507e 0x200050dc 0x2000505c 0x20002eb0
0x7c
145 154 151 143 136 166 196 194 196 204 206 206 208 210 212 214 212 212 201 158
113 94 126 130 102 51 56 58 54 53 52 54 68 93 136 140 154 158 157 156 156 157 1
recCRC 0x19 0x200050be 0x200050be 0x200050dc 0x2000505c 0x20002f30
0x7a
142 141 131 170 191 191 200 208 207 209 210 212 213 212 208 209 198 85 66 89 10
61 94 126 130 102 51 56 58 54 53 52 54 68 93 136 140 154 158 157 156 156 157 15
recCRC 0x46 0x2000507d 0x2000507d 0x200050dc 0x2000505c 0x20002fb0
0x71
142 141 131 170 191 191 200 208 207 209 210 212 213 212 208 209 198 85 66 89 10
61 142 53 51 55 54 50 50 52 48 103 149 146 161 162 157 157 155 153 154 156 156
recCRC 0x31 0x200050bd 0x200050bd 0x200050dc 0x2000505c 0x20003030
errors 0
Command (1 = Send or 0 = Wait):

```

This is where the program is failing. You can not depress I to proceed with the lifting step DWT.