**********Draft**********

learning Circle Bare Metal
Testing on RPi Zero
05/06/22

**********Draft**********

To run as circle bare metal

cd ../addon/pico/sample/

```
make clean
  GEN   firmware.h
  CLEAN  /home/devel/circle/addon/pico/sample

make
  GEN   firmware.h
  CPP   main.o
  CPP   kernel.o
  LD    kernel.elf
  DUMP  kernel.lst
  COPY  kernel.img
  WC    kernel.img => 72512
```

Testing the libpico.a from circle for a RPi Zero.

```
cd addon/pico/
make clean
  CLEAN  /home/devel/circle/addon/pico
make
  CPP   swdloader.o
  AR    libpico.a
```

cp libpico.a ../../my-doc/

arm-none-eabi-objdump -d libpico.a > libpico.a.txt

Following the posting on the Ultibo project

https://ultibo.org/forum/viewtopic.php?f=9&t=1640

1.0 Ultibo could provide the same fuctions as RPi4B running OpenOCD with Single Wire Debugger SWD to program a Pico using 3 GPIO pins.
This would require compiling the openocd C for use for linking with Ultibo.
I recently tested an updated version of openocd on 05/03/22

https://github.com/develone/Ultibo_Proj ... -build.pdf

this updated version worked as previous version.

2.0 Using a Pico running picoprobe and Ultibo provide the functions of OpenOCD.

https://www.youtube.com/watch?v=jnC5LrTx470&t=147s

https://www.digikey.com/en/maker/projec ... 6f67f184c0

https://github.com/raspberrypi/picoprob ... master/src

https://github.com/develone/picoprobe

3.0 Running OpenOCD in Linux Raspberry Pi O/S an using MicroDos by pik33

Ultibo posted

It might be much simpler than compiling OpenOCD, we noticed recently that our friends at the Circle project added SWD loader support for the Pico.

This uses just the GPIO pins and looks like it would be fairly minor to implement in Ultibo as well.

Initial tests following forking the https://github.com/rsta2/circle

https://github.com/rsta2/circle/tree/master/addon/pico

```
README

This sample loads and starts a program into the Raspberry Pi Pico, which has to
be connected as follows (SoC numbers):

Raspberry Pi    Raspberry Pi
Pico            1-4 or Zero

SWCLK   <---    GPIO17
SWDIO   <--->   GPIO27
RUN     <---    GPIO24
GND     <--->   GND

This is the default setting. If you want to different GPIO pins, you have to
update the configuration in the file kernel.cpp.

The program loads the file firmware.bin to the Raspberry Pi Pico, which does
simply blink the LED. If you want to load your own program, you have to replace
this file. Be sure to copy the .bin file from the built Pico SDK project and
rename it to firmware.bin in this directory. Your Pico project must be
configured for operation from RAM using this option in CMakeLists.txt, where
PROJECT is the project name:

pico_set_binary_type (PROJECT no_flash)

You should install the file dummy_flash.uf2 in the flash of your Raspberry Pi
Pico before running the program.
```

git clone git@github.com:develone/circle.git

cd circle

./makeall
  TOOL converttool

```
CPP   actled.o
CPP   alloc.o
CPP   assert.o
CPP   bcmframebuffer.o
CPP   bcmmailbox.o
CPP   bcmpropertytags.o
CPP   bcmwatchdog.o
CPP   chargenerator.o
CPP   classallocator.o
CPP   cputhrottle.o
CPP   debug.o
AS    delayloop.o
CPP   device.o
CPP   devicenameservice.o
CPP   dmachannel.o
CPP   dmasoundbuffers.o
CPP   gpioclock.o
CPP   gpiomanager.o
CPP   gpiopin.o
CPP   gpiopinfiq.o
CPP   i2cmaster.o
CPP   i2cslave.o
CPP   hdmisoundbasedevice.o
CPP   i2ssoundbasedevice.o
CPP   koptions.o
CPP   logger.o
CPP   machineinfo.o
CPP   multicore.o
CPP   nulldevice.o
CPP   ptrarray.o
CPP   ptrlist.o
CPP   pwmoutput.o
CPP   pwmsoundbasedevice.o
CPP   pwmsounddevice.o
CPP   qemu.o
CPP   screen.o
CPP   serial.o
CPP   soundbasedevice.o
CPP   spimaster.o
CPP   spimasteraux.o
CPP   spimasterdma.o
CPP   spinlock.o
CPP   string.o
CPP   sysinit.o
CPP   time.o
CPP   timer.o
CPP   tracer.o
CPP   usertimer.o
CPP   util.o
AS    util_fast.o
CPP   virtualgpiopin.o
CPP   chainboot.o
```

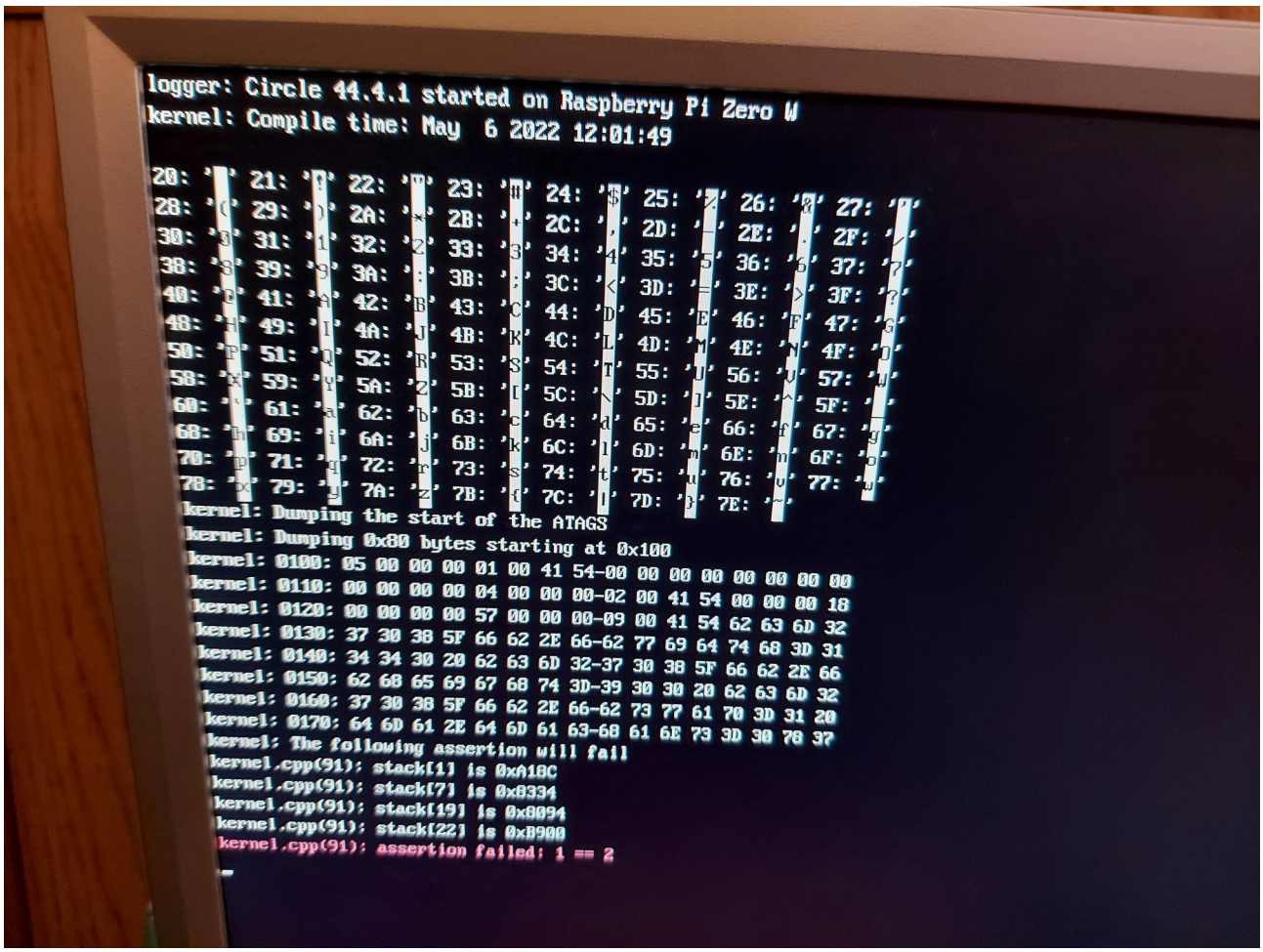
CPP macaddress.o
CPP netdevice.o
CPP new.o
CPP heapallocator.o
CPP pageallocator.o
AS setjmp.o
CPP numberpool.o
CPP latencytester.o
CPP writebuffer.o
CPP 2dgraphics.o
CPP smimaster.o
AS cache-v7.o
CPP exceptionhandler.o
AS exceptionstub.o
CPP memory.o
CPP pagetable.o
AS startup.o
CPP synchronize.o
CPP bcmrandom.o
CPP interrupt.o
CPP purecall.o
CPP cxa_guard.o
AR libcircle.a
CPP lan7800.o
CPP smsc951x.o
CPP usbbluetooth.o
CPP usbcdcethernet.o
CPP usbconfigparser.o
CPP usbdevice.o
CPP usbdevicefactory.o
CPP usbendpoint.o
CPP usbfunction.o
CPP usbgamepad.o
CPP usbgamepadps3.o
CPP usbgamepadps4.o
CPP usbgamepadstandard.o
CPP usbgamepadswitchpro.o
CPP usbgamepadxbox360.o
CPP usbgamepadxboxone.o
CPP usbhiddevice.o
CPP usbhostcontroller.o
CPP usbkeyboard.o
CPP usbmassdevice.o
CPP usbmidi.o
CPP usbmouse.o
CPP usbprinter.o
CPP usbrequest.o
CPP usbstandardhub.o
CPP usbstring.o
CPP usbserial.o
CPP usbserialch341.o
CPP usbserialcp2102.o

```
CPP   usbserialpl2303.o
CPP   usbserialft231x.o
CPP   usbserialcdc.o
CPP   usbtouchscreen.o
CPP   dwhcidevice.o
CPP   dwhciframeschednper.o
CPP   dwhciframeschednsplit.o
CPP   dwhciframeschedper.o
CPP   dwhciregister.o
CPP   dwhcirootport.o
CPP   dwhcixactqueue.o
CPP   dwhcixferstagedata.o
AR    libusb.a
CPP   keyboardbehaviour.o
CPP   keymap.o
CPP   mousebehaviour.o
CPP   mouse.o
CPP   touchscreen.o
CPP   rpitouchscreen.o
CPP   console.o
CPP   keyboardbuffer.o
CPP   linediscipline.o
AR    libinput.a
CPP   partition.o
CPP   partitionmanager.o
AR    libfs.a
CPP   fatfs.o
CPP   fatcache.o
CPP   fatinfo.o
CPP   fat.o
CPP   fatdir.o
AR    libfatfs.a
CPP   task.o
CPP   scheduler.o
AS    taskswitch.o
CPP   synchronizationevent.o
CPP   mutex.o
CPP   semaphore.o
AR    libsched.a
CPP   netsubsystem.o
CPP   nettask.o
CPP   netsocket.o
CPP   socket.o
CPP   transportlayer.o
CPP   networklayer.o
CPP   linklayer.o
CPP   netdevlayer.o
CPP   phytask.o
CPP   arphandler.o
CPP   icmphandler.o
CPP   routecache.o
CPP   netconnection.o
```

```
  CPP   udpconnection.o
  CPP   tcpconnection.o
  CPP   retransmissionqueue.o
  CPP   retranstimeoutcalc.o
  CPP   tcprejector.o
  CPP   netconfig.o
  CPP   ipaddress.o
  CPP   netqueue.o
  CPP   checksumcalculator.o
  CPP   dnsclient.o
  CPP   ntpclient.o
  CPP   mqttclient.o
  CPP   mqttsendpacket.o
  CPP   mqttreceivepacket.o
  CPP   dhcpclient.o
  CPP   ntpdaemon.o
  CPP   httpdaemon.o
  CPP   httpclient.o
  CPP   tftpdaemon.o
  CPP   syslogdaemon.o
  AR    libnet.a
  CPP   main.o
  CPP   kernel.o
  LD    kernel.elf
  DUMP  kernel.lst
  COPY  kernel.img
  WC    kernel.img => 85088

cd ../

cd sample/03-screentext/
```



make

```
  CPP   main.o
  CPP   kernel.o
  LD    kernel.elf
  DUMP  kernel.lst
  COPY  kernel.img
  WC    kernel.img => 61028
```

cd ../17-fractal/

make

```
  CPP   main.o
  CPP   kernel.o
  CPP   mandelbrot.o
  LD    kernel.elf
  DUMP  kernel.lst
  COPY  kernel.img
  WC    kernel.img => 61252
```

update


AL1916
acer