

*****Draft*****
openocd build & install
08/17/21
*****Draft*****

*****tests 05/03/22*****

```
git clone https://github.com/raspberrypi/openocd.git --recursive --branch rp2040 --depth=1
cd openocd/
git log
commit 610f137d2b91b794dc9a8999b1e6631a99fcddc7 (grafted, HEAD -> rp2040, origin/rp2040,
origin/HEAD)
Author: Rene Kita <git@rkta.de>
Date: Fri Mar 12 18:38:02 2021 +0100
```

build: remove warnings with gcc 11

This removes some warnings which prevent a successful build with -Werror which is enabled by default. I'm using gcc 11, so maybe others are not getting this warnings yet.

In src/flash/nor/numicro.c the debug messages were misleadingly indented.
In src/target/arm920t.c the array size where smaller than expected from the receiving function.

Change-Id: I66f5c6a63beb9f9416e73b726299297476c884d8
Signed-off-by: Rene Kita <git@rkta.de>
Reviewed-on: <http://openocd.zylin.com/6104>
Reviewed-by: Jonathan McDowell <noodles-openocd@earth.li>
Tested-by: jenkins
Reviewed-by: Tomas Vanek <vanekt@fbl.cz>
Reviewed-by: Antonio Borneo <borneo.antonio@gmail.com>

```
ls -la
./bootstrap
ls ../
ls ../installed-openocd
mkdir ../installed-openocd
./configure --enable-sysfsgpio --enable-bcm2835gpio --prefix=/home/devel/installed-openocd/
make -j4
make install
```

sudo mksquashfs openocd openocd050322-610f137.img

sudo mksquashfs installed-openocd installed-openocd050322-610f137.img

openocd -v
Open On-Chip Debugger 0.11.0-g610f137-dirty (2022-05-03-08:59)
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For bug reports, read
<http://openocd.org/doc/doxygen/bugs.html>

*****tests 05/03/22*****

The information for this document was found at “<https://www.electronicshub.org/programming-raspberry-pi-pico-with-swd/>”

Testing a new installation method using a prefix in the configure and creating a squashfs img that can install bin & share in “**/home/devel/local/openocd**”. Using this method it can be installed on my other RPi4 without having to rebuild from source. A 2nd “**openocd081421-71510a.img**” is the source compiled to be installed at “**/home/devel/local/openocd**”

“export PATH=/home/devel/local/openocd/bin:\$PATH”

The build was done on PI400 and the with the “**installed-openocd081421-71510a.img**” it was installed on a RPi4B 4Gb.

```
sudo apt install gdb-multiarch
```

```
dpkg -l | grep gdb-multiarch
gdb-multiarch            8.2.1-2                armhf      GNU Debugger (with
support for multiple architectures)
```

```
git clone https://github.com/raspberrypi/openocd.git --recursive --branch rp2040 --depth=1
```

```
commit 71510a77a61c6eb2b1266e00010f8f258785a54b (grafted, HEAD -> rp2040, origin/rp2040,
origin/HEAD)
```

```
Author: Peter Lawrence <12226419+majbthrd@users.noreply.github.com>
```

```
Date: Thu Jun 3 14:06:09 2021 -0500
```

```
tcl/boards: add pico-debug.cfg
```

```
cd openocd/
```

```
./bootstrap
+ aclocal --warnings=all
+ libtoolize --automake --copy
+ autoconf --warnings=all
+ autoheader --warnings=all
+ automake --warnings=all --gnu --add-missing --copy
configure.ac:26: installing './compile'
configure.ac:37: installing './config.guess'
configure.ac:37: installing './config.sub'
configure.ac:16: installing './install-sh'
configure.ac:16: installing './missing'
Makefile.am:46: warning: wildcard $(srcdir: non-POSIX variable name
Makefile.am:46: (probably a GNU make extension)
Makefile.am: installing './INSTALL'
Makefile.am: installing './depcomp'
Makefile.am:23: installing './mdate-sh'
Makefile.am:23: installing './texinfo.tex'
Setting up submodules
Generating build system...
```

```

libtoolize: putting auxiliary files in AC_CONFIG_AUX_DIR, 'build-aux'.
libtoolize: copying file 'build-aux/config.guess'
libtoolize: copying file 'build-aux/config.sub'
libtoolize: copying file 'build-aux/install-sh'
libtoolize: copying file 'build-aux/ltmain.sh'
libtoolize: putting macros in AC_CONFIG_MACRO_DIRS, 'm4'.
libtoolize: copying file 'm4/libtool.m4'
libtoolize: copying file 'm4/ltoptions.m4'
libtoolize: copying file 'm4/ltugar.m4'
libtoolize: copying file 'm4/ltversion.m4'
libtoolize: copying file 'm4/lt~obsolete.m4'
configure.ac:43: installing 'build-aux/ar-lib'
configure.ac:37: installing 'build-aux/compile'
configure.ac:30: installing 'build-aux/missing'
libjaylink/Makefile.am: installing 'build-aux/depcomp'
Bootstrap complete. Quick build instructions:

```

Use the `--help` to see what the options provide.

./configure --help

```

--enable-sysfsgpio    Enable building support for programming driven via
                      sysfs gpios.
--enable-bcm2835gpio  Enable building support for bitbanging on BCM2835

```

The folder where

```
sudo mkdir /media/devel/03ba8473-3445-4a49-8e7b-1876b5d543d2/installed-openocd
```

```
./configure --enable-sysfsgpio --enable-bcm2835gpio --prefix=/media/devel/03ba8473-3445-4a49-8e7b-1876b5d543d2/installed-openocd
```

```
make -j4
```

```
sudo make install
```

```

top
swclk          grd          swdio
x              x              x

```

```

GPIO24    pin 18    swdio
GRD       pin 20    GRD
GPIO25    pin 22    swclk

```

Pin#	NAME		NAME	Pin#
01	3.3v DC Power		DC Power 5v	02
03	GPIO02 (SDA1 , PC)		DC Power 5v	04
05	GPIO03 (SCL1 , PC)		Ground	06
07	GPIO04 (GPIO_GCLK)		(TXD0) GPIO14	08
09	Ground		(RXD0) GPIO15	10
11	GPIO17 (GPIO_GEN0)		(GPIO_GEN1) GPIO18	12
13	GPIO27 (GPIO_GEN2)		Ground	14
15	GPIO22 (GPIO_GEN3)		(GPIO_GEN4) GPIO23	16
17	3.3v DC Power		(GPIO_GEN5) GPIO24	18
19	GPIO10 (SPI_MOSI)		Ground	20
21	GPIO09 (SPI_MISO)		(GPIO_GEN6) GPIO25	22
23	GPIO11 (SPI_CLK)		(SPI_CE0_N) GPIO08	24
25	Ground		(SPI_CE1_N) GPIO07	26
27	ID_SD (PC ID EEPROM)		(PC ID EEPROM) ID_SC	28
29	GPIO05		Ground	30
31	GPIO06		GPIO12	32
33	GPIO13		Ground	34
35	GPIO19		GPIO16	36
37	GPIO26		GPIO20	38
39	Ground		GPIO21	40

Rev 1
2807/2014

http://www.element14.com

```
~/local/openocd/bin/openocd --version
```

```
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
```

```
local/openocd/bin/openocd: invalid option -- 'e'
```

```
local/openocd/bin/openocd --help
```

```
Open On-Chip Debugger 0.10.0+dev-g71510a7-dirty (2021-08-15-17:08)
```

```
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```
For bug reports, read
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```
http://openocd.org/doc/doxygen/bugs.html
```

```
Open On-Chip Debugger
```

```
Licensed under GNU GPL v2
```

```
--help      | -h  display this help
```

```
--version   | -v  display OpenOCD version
```

```
--file      | -f  use configuration file <name>
```

```
--search    | -s  dir to search for config files and scripts
```

```
--debug     | -d  set debug level to 3
```

```
      | -d<n>      set debug level to <level>
```

```
--log_output | -l      redirect log output to file <name>
```

```
--command   | -c      run <command>
```

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

```
sudo ~/local/openocd/bin/openocd -f interface/raspberrypi-swd.cfg -f target/rp2040.cfg -c "program blink/blink.elf verify reset exit"
```

```
[sudo] password for devel:
```

Open On-Chip Debugger 0.10.0+dev-g71510a7-dirty (2021-08-15-17:08)

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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 : Read incorrect DLIPDR 00000000 (possibly CTRL/STAT value) when selecting coreid 0

Info : DAP init failed

in procedure 'program'

** OpenOCD init failed **

shutdown command invoked

Info : Read incorrect DLIPDR 00000000 (possibly CTRL/STAT value) when selecting coreid 0

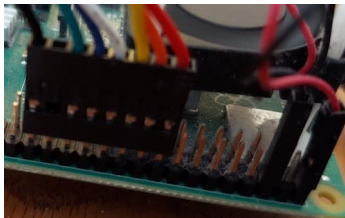
Wiring Raspberry Pi and Raspberry Pi Pico

On RPi4B 4Gb

red GPIO24 pin 18 black jumper black swdio

orange GRD pin 20 orange jumper green GRD

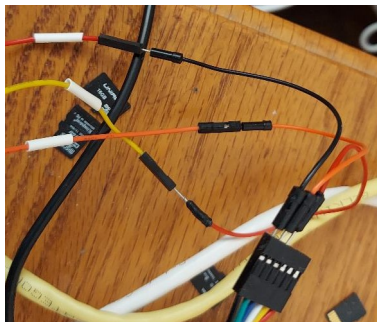
yellow GPIO25 pin 22 red jumper blue swclk



red GPIO24 pin 18 red SWDIO black jumper black

orange GRD pin 20 orange GRD orange jumper green

yellow GPIO25 pin 22 yellow SWCLK red jumper blue





RPi4B 4Gb	Pico Pi
GPI024 pin 18	SWDIO black
GRD pin 20	GRD green
GPI025 pin 22	SWCLK blue



Testing the OpenOCD

```
cd /opt/pico-examples/build
sudo su
[sudo] password for devel:
```

```
export PATH=/home/devel/local/openocd/bin:$PATH
echo $PATH
which openocd
/home/devel/local/openocd/bin/openocd
```

Now the blink program is loaded with the need to remove the usb cable and hold the boot sel button pico.

```
root@mypi3-20:/opt/pico-examples/build# openocd -f interface/raspberrypi-swd.cfg -f
target/rp2040.cfg -c "program blink/blink.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

target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
Info : Writing 12288 bytes starting at 0x0
target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
** Programming Finished **
** Verify Started **
target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
** Verified OK **
** Resetting Target **
shutdown command invoked

Now the hellow_usb is loaded.

openocd -f interface/raspberrypi-swd.cfg -f target/rp2040.cfg -c "program
hello_world/usb/hello_usb.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

target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
Info : Writing 24576 bytes starting at 0x0
target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
** Programming Finished **
** Verify Started **
target halted due to debug-request, current mode: Thread


```
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
target halted due to debug-request, current mode: Thread
xPSR: 0x01000000 pc: 0x00000178 msp: 0x20041f00
** Verified OK **
** Resetting Target **
shutdown command invoked
```

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

```
rm -rf build
```

```
mkdir build
```

```
cd build
```

```
cmake -DCMAKE_BUILD_TYPE=Debug ..
```

```
cd hello_world/serial/
```

```
make -j4
```

```
ls -la
```

```
total 1028
```

```
drwxr-xr-x 3 devel devel  4096 Aug 17 05:47 .
drwxr-xr-x 5 devel devel  4096 Aug 17 05:43 ..
drwxr-xr-x 3 devel devel  4096 Aug 17 05:44 CMakeFiles
-rw-r--r-- 1 devel devel   992 Aug 17 05:43 cmake_install.cmake
-rwxr-xr-x 1 devel devel 21496 Aug 17 05:47 hello_serial.bin
-rw-r--r-- 1 devel devel 348298 Aug 17 05:47 hello_serial.dis
-rwxr-xr-x 1 devel devel 360616 Aug 17 05:47 hello_serial.elf
-rw-r--r-- 1 devel devel 215933 Aug 17 05:47 hello_serial.elf.map
-rw-r--r-- 1 devel devel  60515 Aug 17 05:47 hello_serial.hex
-rw-r--r-- 1 devel devel  43008 Aug 17 05:47 hello_serial.uf2
-rw-r--r-- 1 devel devel  72357 Aug 17 05:43 Makefile
```