



APPLICATION NOTE:

Setting up the FTDI JTAG debugger
for SX-ULPGN-EVK on Linux

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REVISION HISTORY

Rev. No.	Date	Revision by	Comments
0.01	2016.04.12	B. Hegardt	Initial version
0.02	2016.04.12	L. Aydelotte	Added QDN dependencies description
0.03	2016.07.28	B. Hegardt	Removed dependencies to other documents, Added missing brown wire. Removed 32-bit only warning

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First Steps

Before reading this document, you should have downloaded the QCA4010 Software SDK from <https://developer.qualcomm.com/hardware/qca4010/tools>, along with the associated documentation.

Development System Requirements

Silex recommends using the Ubuntu 14.04 Linux distribution which we have tested and support. If you choose to try a different version of Linux, you may encounter problems that are not easily resolved.

Connecting the FTDI Chip C232HM-DDHSL-0 JTAG cable

The SX-ULPGN-EVK board provides an OnCE 14 pin JTAG connector at JP12. Pin 1 is closest to the edge of the board.

- Connect the yellow wire to pin 1
- Connect the green wire to pin 3
- Connect the orange wire to pin 5
- Connect the black wire to pin 6
- Connect the purple wire to pin 9
- Connect the brown wire to pin 10
- Move the jumper from JP11 pins 1&2 to JP11 pins 2&3

The red, white, blue, and grey wires from the JTAG cable are not required.

NOTE: while using the JTAG debugger, the board can be powered by a USB cable connected to J3, the USB to serial adapter with the red wire connected to J4 pin 1, or the red wire on the JTAG cable connected to JP12 pin 11. Powering the EVK via the JTAG cable is not suitable for power measurements.

Installing the FTDI drivers for Linux

Download the x86 (32-bit or 64-bit as appropriate for your machine) D2XX driver for Linux from FTDI Chip. As of 2016.07.28, version 1.3.6 of the driver is available from this page <http://www.ftdichip.com/Drivers/D2XX.htm>

Install the driver to /usr/local/lib using the instructions in the tarball

Source the script you created when installing the Xtensa tools to define the XTENSA_ environment variables and then run the Xtensa OCD Daemon Setup Wizard:

```
cd $XTENSA_INST/XtDevTools/downloads/RE-2013.3/tools
sudo ./xt-ocd-10.0.3-linux-installer --mode xwindow
```

Do not edit the default installation directory of: /opt/tensilica/xocd-10.0.3

On 'Select Components' screen, make sure the FTDI FT2232 Libraries and Files entry is checked and uncheck all the other choices

Follow instructions for the remaining steps and let the installer complete.

Connect your JTAG probe and the USB to serial cables to the USB ports on your computer.

At the shell prompt, use

```
dmesg | grep FTXQ
```

to find the unique serial number string for your JTAG probe.

You will need to modify /opt/tensilica/xocd-10.0.3/topology.xml so that it includes the line:

```
<controller id='Controller0' module='ft2232' usbser='FTXQ????' probe='flyswatter2' speed='15MHz' />
```

Substitute the complete serial number you obtained from dmesg for FTXQ?????. Also be sure the line is not commented out.

Then execute these commands from a root shell:

```
# cd /opt/tensilica/xocd-10.0.3
# mv FTDI original-FTDI
# mkdir FTDI
# cp /usr/local/lib/libftd2xx.so.1.3.6 FTDI/libftd2xx.so.0
```

Test the installation from a root shell:

If necessary, source the script you created when installing the toolchain to define the various XTENSA environment variables.

```
# cd /opt/tensilica/xocd-10.0.3
# ./xt-ocd
```

If you get an “Error opening probe” message, issue the command

```
rmmod ftdi_sio usbserial
```

and try again. Note this may be necessary each time the probe is attached or computer restarted.

You should see messages similar to these:

```
XOCD 10.0.3
(c) 1999-2016 Tensilica Inc. All rights reserved.
[Debug Log 2016-07-28 16:37:28]

Loading module "gdbstub" v2.0.0.11
Loading module "ft2232" v2.0.0.1
Loading module "jtag" v2.0.0.20
Loading module "xtensa" v2.0.0.40
Loading module "traxapp" v2.0.0.8
Loading module "trax" v2.0.1.22
Total IR bits : 5
TAP[0] irwidth = 5
Total DR bypass bits : 1
Starting thread 'GDBStub'
Starting thread 'TraxApp'
0: Warning: Target doesn't support individual core reset. Will issue System
wide reset !
```

Later when running xt-gdb, you may see warnings

```
warning: Current core configuration doesn't match the target:Core ID =
0xC280C9FE0DC39DBD, Target ID = 0xC280C9FE0DC4FB9A
```

```
warning: Spill location has not been specified, TIE register will be
unavailable.
```

These warnings are normal.

Note that for some reason, the gdb breakpoint does not work on the first run. Once you have interrupted the system (Ctrl-C) and continue, then breakpoints work.

Open another shell, source your script to define the XTENSA_ environment variables, and launch xt-gdb. Execute the commands below to connect to the xt-ocd instance and run two gdb commands to verify the setup.

```
xt-gdb
GNU gdb (GDB) 7.1 Xtensa Tools 10.0.3
Copyright (C) 2010 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law. Type "show copying"
and "show warranty" for details.
This GDB was configured as "--host=x86_64-unknown-linux-gnu --target=xtensa-elf".
(xt-gdb) target remote localhost:20000
(xt-gdb) x/i $pc
(xt-gdb) reset
```

Exit from xt-gdb and optionally close xt-ocd

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