Getting Started with the Ultrascale+ and Arm DS

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guide

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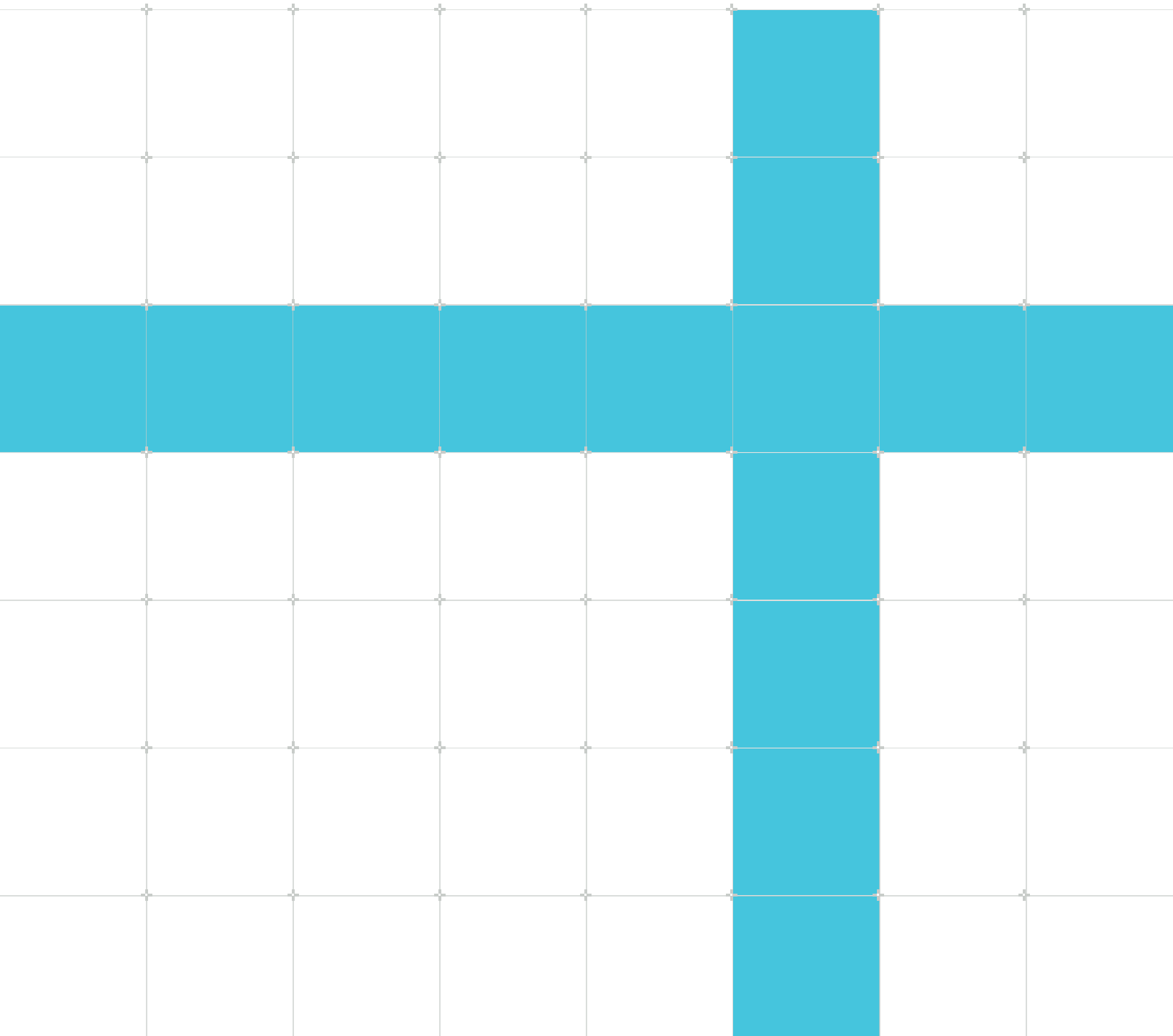

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Release information

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110 Fulbourn Road, Cambridge, England CB1 9NJ.

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Contents

1. Overview

This guide contains all the steps you need to connect to, and get code running on the Xilinx UltraScale+, and 96 Boards Ultra96 targets using Arm Development Studio (Arm DS). However, before you start it would be useful to have familiarity with creating and building projects in Arm DS. See the Arm DS User guide, and Arm DS Getting started guide for more information.

2. Prerequisites

To complete this guide you will need:

- A Xilinx UltraScale+, or 96 Boards Ultra96 development board.
- Arm DS.
- One of the DSTREAM family, ULINKpro, or ULINKpro D debug probes.

This guide was tested on the UltraScale+ ZCU102 revision 1.1 development board, and the Ultra96 development board using Arm DS 2019.0 and a DSTREAM probe.

For more information on the target boards, see the Xilinx manual for the UltraScale+ ZCU102, or the 96 Boards manual for the Ultra96 board.

3. Set up the ZCU102

Peform the following steps to set up the ZCU102:

1. Connect the DSTREAM or ULINK to J6, the Arm 20 pin JTAG connector.
2. Connect a micro USB to the USB UART port J83, this will show up as 4 COM ports on the host PC. The serial config options are 115K 8N1.
3. Jumper links should be left in their default positions, ensure J14 is closed (see jumper section in the Xilinx manual).
4. Connect the 12V Power Supply.

It is possible to boot the target in different modes, boot from an SD card, JTAG boot mode or QSPI32. If you have a linux kernel image you would like to use, you can load that on a SD card and boot from it. If you would like to flash your own image into RAM you can boot in JTAG mode.

4. Set up the Ultra96

You must connect the DSTREAM or ULINK to J2. You will need to modify an Arm 20 pin JTAG connector, with the following information:

Ultra96 (J2)	Arm JTAG 20
pin 1 Vcc	pin 1 VTREF
pin 2 GND	pins 4,6,8,10,12 GND
pin 3 TCK	pin 9 TCK
pin 4 TMS	pin 7 TMS
pin 5 TDI	pin 5 TDI
pin 6 PS_SRT_B	NC
pin 7 TDO	pin 13 TDO

All grounds need to be connected together. Pin 1 is nearest the power connector.

To finish setting up the Ultra96, perform the following steps:

1. Depending on the board version, connect a micro USB or a USB 3.0-A to the USB UART port J8. The serial config options are 115K 8N1.
2. Connect 12V Power Supply.

It is possible to boot the target in different modes, boot from an SD card, JTAG boot mode or USB. If you have a linux kernel image you would like to use, you can load that on a SD card and boot from it. If you would like to flash your own image into RAM you can boot in JTAG mode.

Please note the V2 version of the board has 8 pins. The 8th pin doesn't need to be connected.

5. Running Code

This section describes how to create a simple program image in Arm Development Studio (Arm DS) and run it on the Xilinx UltraScale+, or Ultra96 target.

More detailed information on building a simple project in Arm Development Studio can be found in the Hello World tutorial of the Arm Development Studio Getting Started Guide.

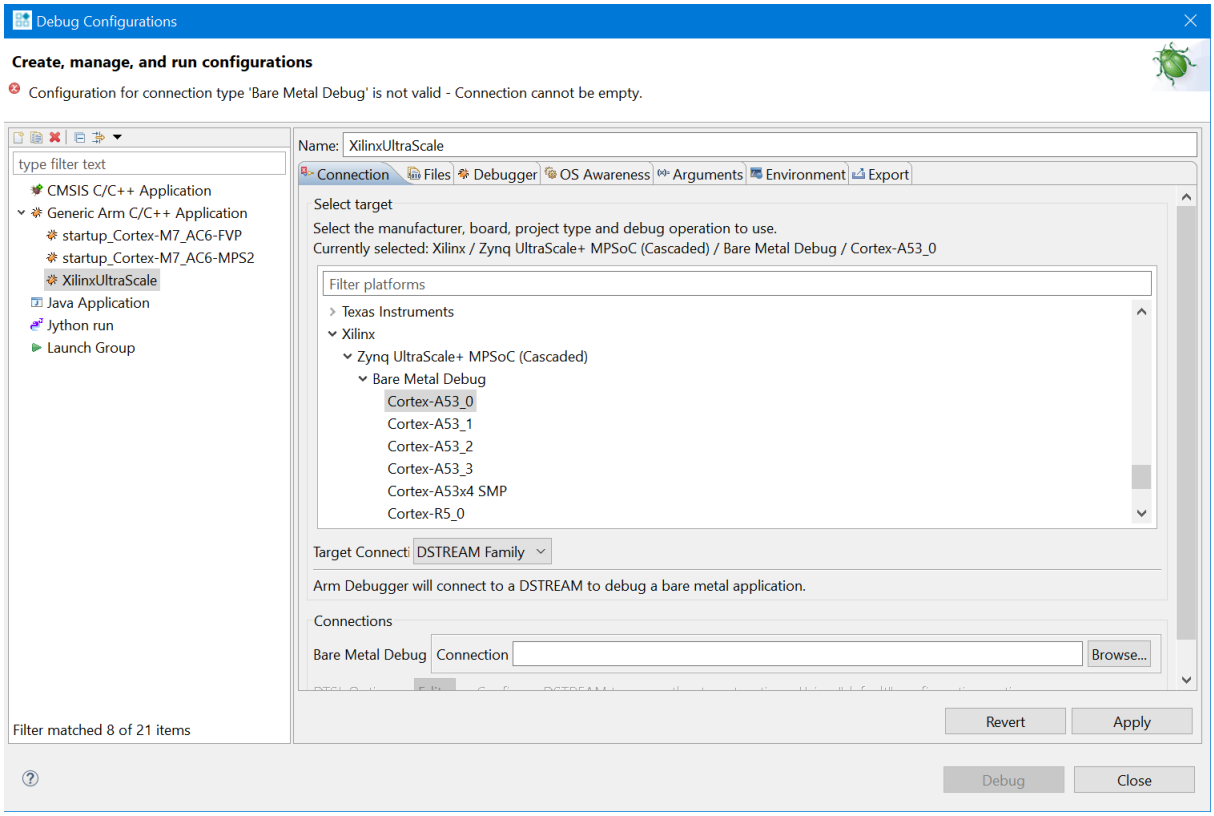
Note: To run code on the target, it first needs to be prevented from autobooting to any OS image that may be installed on the SD card. To prevent the target autobooting, watch the COM port windows described in the previous sections of this guide, and follow the instructions.

1. In Arm DS, create a new empty C project using Arm Compiler 6, and create a new source file named main.c with this code:

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


int main(void) {

    puts("!!!Hello World!!!"); /* prints !!!Hello World!!! */

    return EXIT_SUCCESS;
}
```

2. Build the project.
3. Create a new bare metal debug configuration using the Debug Configuration for Xilinx > Zynq UltraScale+ MPSoC (Cascaded) > Bare Metal Debug > Cortex-A53_0.

Figure 5-1: Xiliinx UltraScale Debug Configuration



4. Specify the .axf file from your project (usually located within the Debug folder in the project directory) in the Application on host to download field of the Files tab.
5. Under the Debugger tab set Run Control to Debug from symbol, and enter `main` in the text field.
6. Finally, select your debugger probe under the connections tab and press the Debug button. Arm Development Studio will now connect to the target and stop at the beginning of the `main()` function.
7. Hit Run to run the program, and in the App Console window the following message will be output:

```
!!!Hello World!!!
```

You have now successfully run the code on your target.

6. Next steps

Once the basic hello world program is running, the target is set up correctly. Getting more complex projects running on the target should now be a simple process of building them in Arm Development Studio, and running them as described in this tutorial.