



# ACCELERATION STACK ON THE ARRIA 10 QUICKSTART GUIDE

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## Contents

Contents .....	2
1 Introduction .....	3
2 Assumptions .....	3
3 Requirements.....	3
3.1 Hardware Requirements .....	3
3.2 Software Requirements .....	3
4 Walkthrough .....	3
4.1 Initial Setup .....	3
4.2 Running the Program .....	4
5 Table of Figures.....	5
6 Document Revision History .....	5

## 1 Introduction

This lab is a QuickStart reference on using the acceleration stack with the Arria 10 on the Intel Devcloud. The Devcloud is equipped with multiple acceleration cards, that users can use by logging into the Devcloud and running the commands inside this QuickStart guide.

## 2 Assumptions

This lab assumes the following:

- Prior FPGA knowledge
- Prior terminal command knowledge
- Intel Devcloud registration and SSH key set up
- MobaXterm installed and set up

If any of the above assumptions are incorrect, please refer to the relevant set up guides.

## 3 Requirements

### 3.1 Hardware Requirements

When logged in to the head node, you must log into the correct compute node to use the Arria 10 Acceleration cards. The nodes that allow Arria 10 usage thus far are nodes 137, 138, and 139. Please assure you are in the correct node if you encounter any issues.

There is only a certain amount of acceleration cards per compute node, so if one node is full, please use another node, or wait for the current job on the node to be completed.

### 3.2 Software Requirements

Please make sure you have all relevant software set up including MobaXterm and have successfully been able to login to a compute node. This QuickStart guide is terminal command heavy, so if you do not understand what a terminal command does, please refer to a prior guide, or look at the “man” page for that specific terminal

## 4 Walkthrough

### 4.1 Initial Setup

The first step is locating the environment setup script, and the folder containing the demo of the acceleration card in use. We will be running the script, and copying the folder containing the demo to a more workable directory.

- ☐ Open MobaXterm, and login to the appropriate compute node. In this case, **137**, **138**, or **139**.

- ☐ To run the environment setup script, we are going to source the file.
- ☐ Type into the terminal:
  - `source /opt/a10/intelrtestack/init_env_nosudo.sh`
- ☐ This will set up the environment variables we need.
- ☐ Next, we will look for the folder containing the demo. Type into the terminal:
  - `cd /opt/a10/intelrtestack/a10_gx_pac_ias_1_2_pv/hw/samples`
- ☐ This folder contains multiple examples. In this case we will be using the example **hello\_intr\_afu**.
- ☐ We will make a directory in our root folder called DEMO. To do this type this into the terminal:
  - `mkdir ~/DEMO`
- ☐ We will then copy the example folder into this DEMO folder. Type this into the terminal:
  - `cp -r hello_intr_afu ~/DEMO`
- ☐ We will then move into that folder and begin working inside the bin folder located there. To do this type this into the terminal:
  - `cd ~/DEMO/hello_intr_afu/bin`

## 4.2 Running the Program

The example folder has been copied into the DEMO folder, allowing us a more workable directory. Inside this folder, we will be looking for an available acceleration card, programming it, and running the software program to display into the terminal.

- ☐ To see what pci accelerator cards are available we type the following into the terminal:
  - `lspci | grep accel`
- ☐ We will then run the code onto the acceleration card, in this case we are running it on acceleration card **0x3b** using the following command:
  - `fpgaconf -B 0x3b hello_intr_afu.gbs`
- ☐ We then need to run the code to display onto the terminal screen our final design. To do this we need to first switch directories into the software folder. Do this by typing into the terminal:
  - `cd ../sw`
- ☐ We then make clean, to remove old files and start fresh. And make the code to build the program.
  - `make clean`
  - `make`
- ☐ To run the final program, we just run the script.
  - `./hello_intr_afu`

If successful you should get an output like below. It should show **success**.

```
u30329@001-n138:~/DEMO/hello_intr_afu/sw$ make
gcc -fstack-protector -fPIE -fPIC -O2 -D_FORTIFY_SOURCE=2 -Wformat -Wformat-se
gcc -fstack-protector -fPIE -fPIC -O2 -D_FORTIFY_SOURCE=2 -Wformat -Wformat-se
-luuid -lpthread -ljson-c -lopae-c
u30329@001-n138:~/DEMO/hello_intr_afu/sw$ ./hello_intr_afu
Running Test
Setting user interrupt id register (Byte Offset=000000c0) = 00000000
Setting Interrupt register (Byte Offset=000000a0) = 00000001
Poll success. Return = 1
Setting user interrupt id register (Byte Offset=000000c0) = 00000001
Setting Interrupt register (Byte Offset=000000a0) = 00000001
Poll success. Return = 1
Setting user interrupt id register (Byte Offset=000000c0) = 00000002
Setting Interrupt register (Byte Offset=000000a0) = 00000001
Poll success. Return = 1
Setting user interrupt id register (Byte Offset=000000c0) = 00000003
Setting Interrupt register (Byte Offset=000000a0) = 00000001
Poll success. Return = 1
Done Running Test
```

Figure 1: Successful Acceleration Card Programming

5 Table of Figures

Figure 1: Successful Acceleration Card Programming .....5

6 Document Revision History

List the revision history for the application note.

Name	Date	Changes
Rony Schutz	11/4/2019	Initial Release of Acceleration Card QuickStart Guide