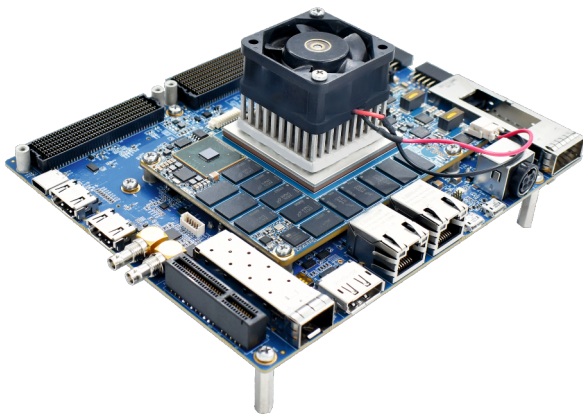# Kintex UltraScale+ FPGA SOM Development Platform

iW-RainboW-G47D
Quick Start Guide

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Certification

iWave Systems Technologies Pvt. Ltd. is an ISO 9001:2015 Certified Company.

Introduction

Quick Start Guide (QSG)

This Quick Start Guide (QSG) is designed for users to quickly understand the iW-RainboW-G47D-Kintex UltraScale+ FPGA SOM Development Platform and start the evaluation. It provides the instructions for setting-up the Development Platform from the packed box.

Development Platform Description

The iW-RainboW-G47D Kintex UltraScale+ FPGA SOM Development platform incorporates with iWave's Kintex UltraScale+ FPGA based SOM and Ultra High Performance carrier board with all necessary interface connectors for developing an embedded application based on Xilinx Kintex UltraScale+ FPGA.

Some Key Features of the Board Include:

- Kintex US+ FPGA SoC upto 1842K Logic Cells
- Layerscape (LS1021A) CPU with dual-core Cortex-A7
- Dual 4GB PL DDR4 for FPGA
- 128MB QSPI Flash (FPGA)
- 2GB DDR4 for CPU
- 256MB NOR Flash (CPU)
- USB 3.0 Type-C Port
- PCIe x1 Port
- Gigabit Ethernet RJ45 Magjack
- USB 2.0 OTG Port
- 12 Pin PMOD Connectors
- QSFP+ Connector
- Firefly Connector
- FMC+ and FMC HPC Connectors

Safety

Environmental Compliance

iW-RainboW-G47D-Kintex UltraScale+ FPGA SOM Development Platform is designed by using RoHS and REACH compliant components and manufactured on lead free production process.

ESD Protection

This development platform is ESD sensitive. Handle the product only in accordance with the installation instructions given in the manual. Therefore ESD precautions should be taken care during transport and handling.

Must use a ESD ground strap or other grounded source before unpacking or handling the hardware.

Product Disposal

Check the local regulations for disposal of electronic products before disposing.

Quick Start Steps

![iWave Embedding Intelligence logo]

Step 1 - Unpacking

Remove the Development platform from anti-static cover and place it above the ESD free area. Use anti-static pad/mat with proper grounding to place the Development Platform. Don't touch inside surface of the circuit board.
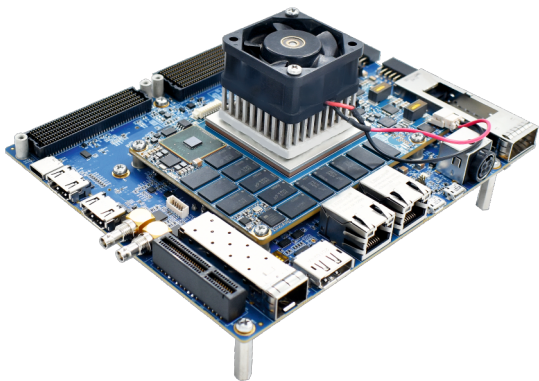
Avoid using board in extreme dust, humidity and temperature conditions. Also this development platform is not water proof. Keep away from wet surface.

Package Box

Step 2 - What's Inside The Box ?

Make sure that, below deliverables are received without any physical damage.

Development Platform

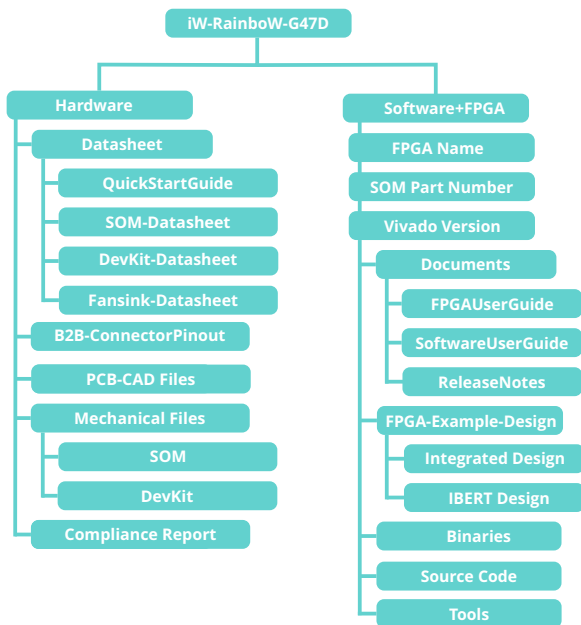
12V, 14A Power Supply

USB OTG Cable

JTAG Cable

Step 3 - Download FTP Contents

All the technical resources of iW-RainboW-G47D Kintex UltraScale+ FPGA SOM Development platform is available in iWave FTP server.

FTP Folder Structure

For FTP Credentials, Contact *: **mktg@iwavesystems.com***

Step 4 - Read Documents

Before moving to next step, one must go through all the documents including Hardware Datasheet and get familiar about iW-RainboW-G47D Kintex UltraScale+ FPGA SOM Development platform.
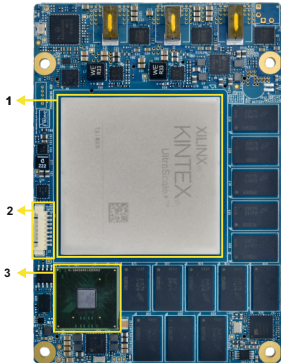
Development Platform Documents:

■ Quick Start Guide (This document)
■ SOM Datasheet
■ DevKit Datasheet
■ Release Notes
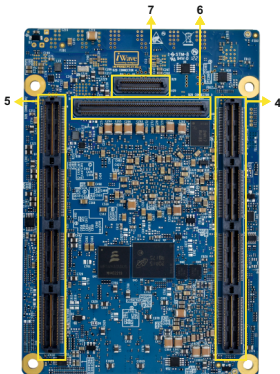■ Software User Guide
■ FPGA User Guide

iW-RainboW-G47D

![iWave - Embedding Intelligence logo]

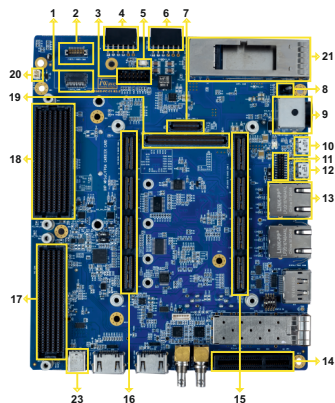# Step 5 - Quick View-SOM

TOP View

1. Kintex UltraScale+ FPGA SoC
2. PMIC Programming Header
3. LS1021A Layerscape CPU
4. Board to Board connector 1
5. Board to Board connector 2
6. Board to Board connector 3
7. Board to Board connector 4

BOTTOM View

Step 6 - Quick View-Carrier Board

TOP View

01. FireFly Connector
02. FireFly Power Connector
03. JTAG Connector
04. PMOD Connector 2
05. Reset Switch
06. PMOD Connector 1
07. Board to Board Connector 4
08. Power ON/OFF Switch
09. Power Connector
10. Debug UART Connector
11. 20 Pin GPIO Header
12. USB 2.0 OTG Connector
13. Gigabit Ethernet MagJack
14. PCIex1 Connector
15. Board to Board Connector 2
16. Board to Board Connector 1
17. FMC Connector
18. FMC+ Connector
19. Board to Board Connector 3
20. 12V Fan Header
21. QSFP+ Connector
22. RTC Battery Holder
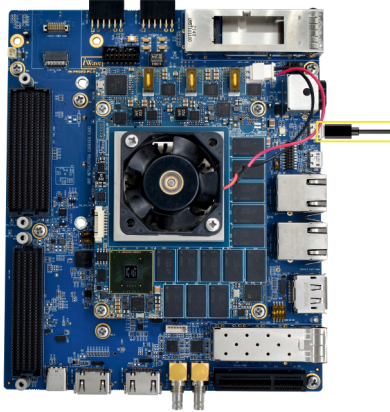23. USB 3.0 Type-C Connector

BOTTOM View
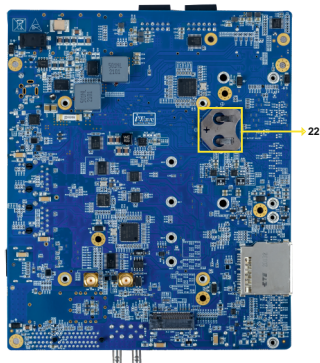
Note : *Connectors which are not highlighted is not supported by the Kintex UltraScale+ FPGA Development Kit*

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08

Step 7 - Debug Port Setting

Connect TypeA end of USB cable to PC and MicroB end of USB cable to Development platform's Debug USB MicroAB Connector (J13) as shown below.

Install the driver for Debug Port in Host PC/Laptop using the below link.

https://ftdichip.com/products/ft232rq/

Setup the Debug Terminal parameters.

Baud Rate : 115200
Data bits : 8
Parity : None
Stop Bits : 1
Flow Control : None

Step 8 - Power-ON the Development Platform

Connect the 12V power supply plug to the power connector (J10) of the Development platform as shown below and switch ON the power supply.

Once power is applied to the Development platform, the power LEDs in Kintex UltraScale+ FPGA SOM and Ultra High Speed Carrier Board will glow as shown in the below image.
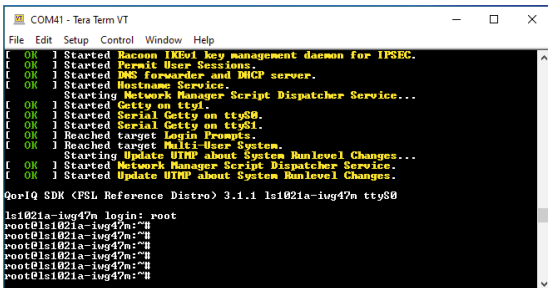

SOM Power LED
Carrier Board Power LED

FPGA Program Done LED
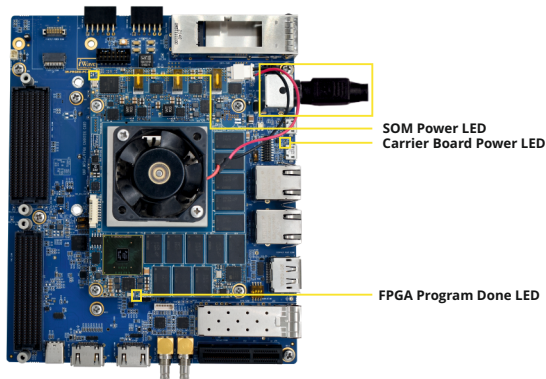
Warning :

1. Do not try to connect any other power supply other than supplied along with the Development platform.

2. Do not plug or remove the Kintex UltraScale+ FPGA SOM from carrier board with live power.

3. Contact iWave if any LEDs are not glowing

iW-RainboW-G47D

Step 9 - Test Environment setup

Once power is applied to the Development Platform as explained in the previous section, boot messages being displayed in the debug terminal of the PC/Laptop which is connected to the Development platform. Press any key in terminal immediately to see the command prompt of the Boot loader or wait until OS boots.

After OS boots, Login prompt being displayed in the debug terminal.

Debug Terminal

![iWave Embedding Intelligence logo]

Heat Sink

Heat Sink Integration

iW-RainboW-G47D Kintex UltraScale+ FPGA SOM Development platform comes with Heat Sink + Fan mounted on SOM. Makesure to power up the platform only with Heatsink+Fan attached.

Below is the Heatsink+Fan integration procedure for reference.

Heatsink + Fan

Peel off Thermal pad sticker
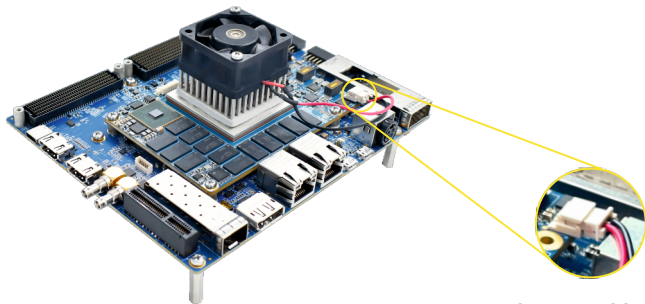
Fix the heatsink in to SOM

Connect the Fan cable to SOM Fan Header

JTAG

JTAG Connection

iW-RainboW-G47D Kintex UltraScale+ FPGA SOM Development platform Support JTAG interface in Carrier Board for FPGA and CPU Programming.

In the carrier board Config Switch (SW6.2) is provided for selecting the JTAG device between FPGA and CPU.

FPGA as JTAG Device   **CPU as JTAG Device**

FPGA JTAG Connection to Carrier Board :

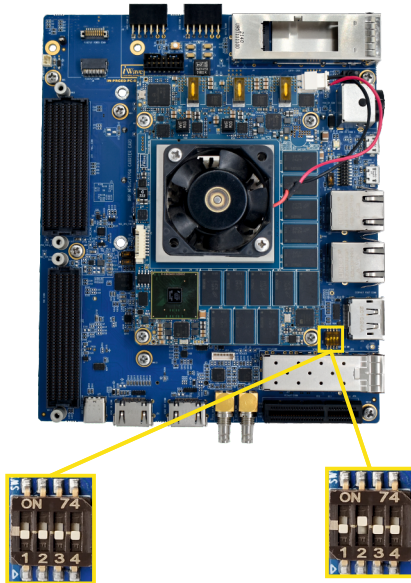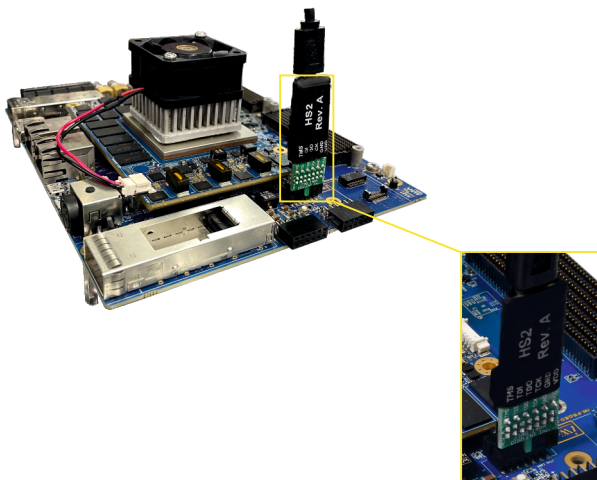After changing Config switch and selecting the JTAG device as FPGA, Power on the board connect the JTAG cable to the carrier board as shown below.

Example JTAG Cable which is tested with this Platform is mentioned below.

JTAG-HS2 Programming Cable
Part Number: 410-249 from Digilent

CPU JTAG Connection to Carrier Board :

After changing Config switch and selecting the JTAG device as CPU, connect the CodeWarrior® TAP to carrier board via custom made JTAG cable provided from iWave.

Connect the CodeWarrior® TAP to the PC through USB and Power on the board.

For further details regarding CodeWarrior® TAP, visit the below link:

https://www.nxp.com/design/software/development-software/codewarrior-development-tools/run-control-devices/codewarrior-tap:CW_TAP

Pin No. 1

Pin No. 1
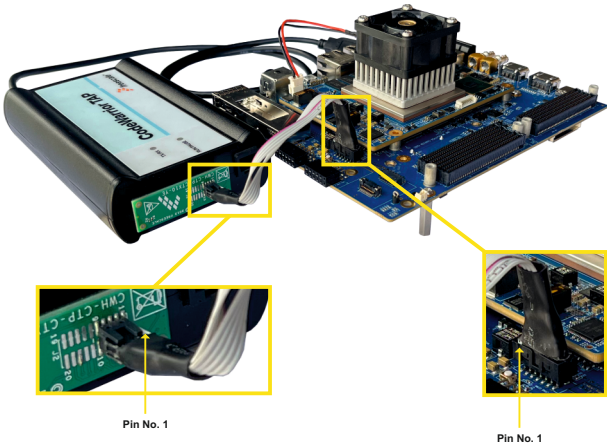
iWave's Other Products

Product Name: Zynq UltraScale+ MPSoC (ZU5/ZU4/ZU3/ZU2) SBC
Processor: Xilinx's Zynq US+ MPSoC (2/3/4/5-EV/EG/CG)
RAM: 8GB PS DDR4* & 4GB PL DDR4*
Application: AI/ML, Industrial IoT, Human Machine Interface, Advanced Driver Assistance Systems.
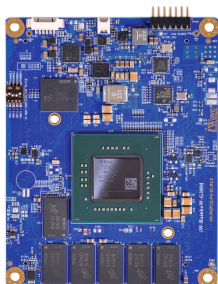

Product Name: Zynq US+ MPSoC (4/5/7-EV/EG/CG) SOM
Processor: Xilinx's Zynq US+ MPSoC (4/5/7-EV/EG/CG)
RAM: 4GB PS DDR4*
1GB PL DDR4*
Application: Industrial Motor Control & IoT, Sensor Fusion, ADAS/Embedded Vision, Data Center, Medical Endoscopy
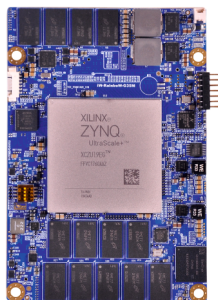
Product Name: Zynq US+ MPSoC (11/17/19-EG) SOM
Processor: Xilinx's Zynq US+ MPSoC (11/17/19-EG)
RAM: 4GB PS DDR4*
4GB Dual PL DDR4*
Application: Video Surveillance, Cloud Computing, Artificial Intelligence/Machine Learning, 5G Wireless, High Precision Test Instrument.

* RAM size is expandable. Contact iWave team for further details

iW-RainboW-G47D

Need More Help ?

iWave Systems Provides Technical Support to all Customers Worldwide.

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■Live Chat

We provide Live Chat technical support to our customers. Contact iWave to enable Live Chat support.

■Phone

Call us on : +91-80-26683700, 26781643, 26786245

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Warranty support for Hardware: 1 Year from iWave or iWave's EMS partner.

For Warranty terms & Registration, scan the QR code or go to :
https://www.iwavesystems.com/support/warranty/

For Return Merchandise Authorization (RMA),scan the QR code or go to :
https://www.iwavesystems.com/support/rma/

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