SUNIX | AI Accelerator Card
Quick Installation Guide (Universal) Ver.1

Please visit https://www.sunix.com with product model for detail and full User Manual

System Requirements

Hardware:
Host system CPU Architecture
▶ x86 or ARM
▶ 16+ GB RAM (32+ GB recommended)

Software:
Pre-requisite
▶ Access to Hailo Developer Zone
▶ Ubuntu 20.04/22.04, 64 bit

1. Hardware Installation

The hardware installation of PCI Express AI accelerator card is easy to carry out. Before inserting the card into the PCIe bus, please follow the detailed steps given below to install the board in your computer.

> ⚠️ **SAFETY FIRST**
> To avoid damages, please make sure to remove any power connection before card installation, and follow the detailed steps given below before inserting the card into your computer.

Step 1: Turn your PC's power off, and shut off the power to any peripheral.
**Step 2:** Remove the power plug from the plug socket.
Step 3: Remove the cover from the computer case.
Step 4: If fitted. Remove the metal cover plate on the rear of a free PCIe slot.
Step 5: Insert PCI Express Industrial I/O Control Board into the free PCIe slot and screw it firmly on the bracket side.
Step 6: Place the cover back onto the computer.
Step 7: Insert the plug into the plug socket.
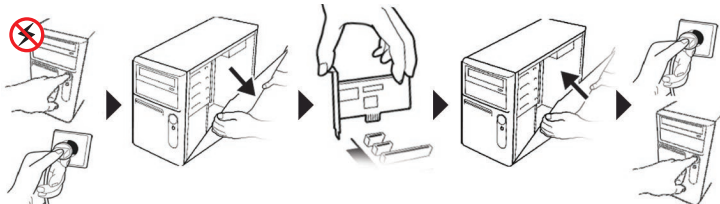
2. Driver Installation

Step 1: HailoRT, PCIe Driver Linux Packages Download

SW Downloads	Documentation	Tutorials	Model Explorer	
Product	Hailo Software Suite	Dataflow Compiler	**HailoRT**	Model Zoo	TAPPAS	Plugins
Architecture	**x86**	ARM64	ARMEL	ARMHF
OS	**Linux**		Windows	
Python	3.8	3.9	3.10	

✕ Clear all

Package name ⇅	Version number ⇅	Changelog ⇅	Installation ⇅	Modified date ⇅
⬇ HailoRT – Docker	4.14.0	🔗 changelog	🔗 installation guide	July 1, 2023
⬇ HailoRT – Ubuntu package (deb) for amd64	4.14.0	🔗 changelog	🔗 installation guide	July 1, 2023
⬇ HailoRT – PCIe driver Ubuntu package (deb)	4.14.0	🔗 changelog	🔗 installation guide	July 1, 2023
⬇ HailoRT – Log Collector tool (bash)	1.0.3			January 10, 2023

Step 2: HailoRT, PCI Driver Linux Installation

```
# install required system packages
sudo apt update
sudo apt install build-essential make cmake dpkg dkms
sudo apt install linux-headers-$(uname -r)
sudo apt install linux-image-$(uname -r)

# install driver - issuing below commands in Terminal
sudo dpkg --install hailort_pcie_driver_x.x.x_all.deb
# install HailoRT x86 64 (AMD 64 ) version
sudo dpkg --install hailort_x.x.x_amd64.deb
# reboot to apply driver installation
sudo reboot
```

3. Installation Verification

After successfully installing SUNIX AI Board into the network appliance, please follow the steps below to complete SUNIX PCIe enumeration verification process.
Step 1: Power ON the host system and log on to Linux.
Step 2: Verify that the SUNIX AI board processor is detected on the PCIe bus. From a Linux terminal, type-in:

> **Commands**
> (1) Check that your board is recognized by the host by running:
> **lspci | grep Co-processor**
>
> (2) Find Hailo virtual environment:
> **source hailo_platform_venv/bin/activate**
>
> (3) Verify (while in Hailo environment):
> **hailo fw-control identify**

4. Hailo software suite overview

Getting Started Guide

Hailo SW products are set of frameworks and tools that enable you to compile, run and evaluate neural networks on Hailo devices:
1. **Dataflow Compiler** (Model conversion and compilation to Hailo binary format)
2. **HailoRT** (Runtime environment and driver for running networks and interacting with Hailo devices)
3. **Model Zoo** (Pre-trained models to run and evaluate on Hailo devices)
4. **TAPPAS** (Deployment framework, examples and multi-network pipelines)

Although you can install each product separately, Hailo releases a quarterly software suite in which all the product versions are aligned. Therefore, using Hailo SW Suites ensures the best compatibility.

Suite Components
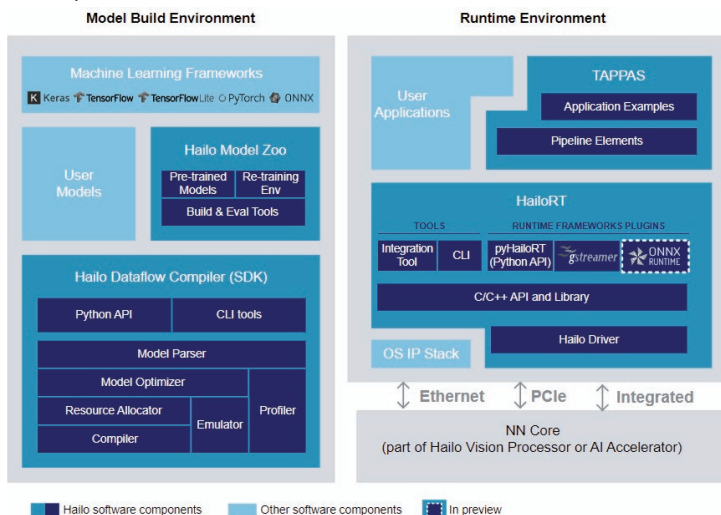
Detailed block diagram of Hailo software packages

Hailo SW components are used in this manner:
▶ **On the Model build environment:**
  ▪ Hailo Dataflow Compiler is used to compile a trained model to run on Hailo devices.
  ▪ Hailo Model Zoo contains a large database of pre-trained models that are validated to work with best performance on Hailo devices. It also contains a retraining environment.

▶ **On the Runtime environment:**
  ▪ HailoRT is used to load the compiled model to Hailo device and interact with it (using the PCIe driver).
  ▪ TAPPAS includes complete examples and demos of using HailoRT to create full pipelines on top of Hailo devices.

Dataflow Compiler

The Dataflow Compiler API is used for compiling models to Hailo binaries. The input of the Dataflow Compiler is a trained Deep Learning model. The output is a binary file which is loaded to the Hailo device.

HailoRT

The HailoRT API is used for deploying the built model on the target device. This library is used by the runtime applications.
It implements a userspace C/C++ API that is called from the user's applications. It allows both to control the Hailo device and to send and receive data from it. It supports both the PCIe interface.
The HailoRT Python package wraps the C/C++ API and exposes a Python interface that allows to load models to the device and send and receive data from it.
It also includes a PCIe driver is required when working via the PCIe interface. It links the HailoRT library and the device. It also loads the device's firmware when working through this interface.

Finally, Hailo's Yocto layer allows the user to integrate Hailo's software into an existing Yocto environment. It includes recipes for the HailoRT library, Python package and the PCIe driver.

Hailo Model Zoo

Hailo Model Zoo provides pre-trained models for high-performance deep learning applications.
Using the Hailo Model Zoo you can measure the full precision accuracy of each model, the optimized accuracy using the Hailo Emulator and measure the accuracy on the Hailo-8 device.
Finally, you will be able to generate the Hailo Executable Format (HEF) binary file to speed-up development and generate high quality applications accelerated with Hailo-8.
The models are optimized for high accuracy on public datasets and can be used to benchmark the Hailo model optimization scheme.

TAPPAS

TAPPAS is Hailo's set of full application examples, implementing pipeline elements and pre-trained AI tasks. Demonstrating Hailo's system integration scenario of specific use cases on predefined systems (software and Hardware platforms). It can be used for evaluations, reference code and demos:

▪ Accelerating time to market by reducing development time and deployment effort
▪ Simplifying integration with Hailo's runtime SW stack
▪ Providing a starting point for customers to fine-tune their applications

For the most updated versions, please visit Hailo developer site for the latest installation manuals and software installation packages.
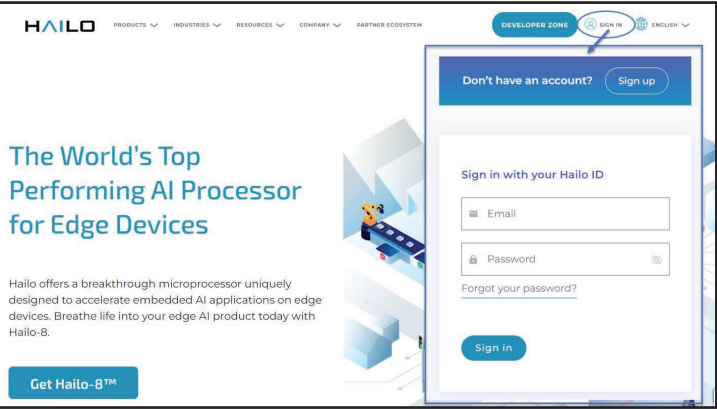
For the most updated versions, please visit Hailo developer site (https://developer.hailo.ai/developer-zone/) for the latest installation manuals and software installation packages.

5. Hailo Developer Zone Sign Up

Visit hailo web site： https://hailo.ai

Hailo Developer Zone - Sign up

Hailo Developer Zone - Choose access

Hailo Developer Zone - Fill info & Submit

Hailo Developer Zone - Waiting for Approval

E-mail for technical support: info@sunix.com
Website for product information: www.sunix.com
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