Host Computer

Any computer running Ubuntu 18.04 with a working internet connection will do as the host computer for the software setup. But if the host computer is also intended for development later on, then a recent desktop computer with an NVIDIA graphics card would be required. We used a desktop computer with: i7 CPU, SSD drive, 32GB RAM and NVIDIA GeForce GTX 1660 GPU.

Ubuntu

Install Ubuntu 18.04 LTS
Firefox: https://releases.ubuntu.com/18.04
> Click 64-bit PC (AMD64) desktop image
> Save File
Downloads/**ubuntu-18.04.5-desktop-amd64.iso**
Insert USB flash drive
Ubuntu: Startup Disk Creator
> Select Source disc image (.iso) Ubuntu 18.04.5 LTS
> Select Disk to use USB
> Click Make Startup Disk
Take out USB flash drive
Put USB flash drive into host computer
Power up
During boot enter BIOS setup (DEL)
> BIOS: Set date/time (Settings / System Status)
> BIOS: Change boot sequence to start with USB flash drive
Ubuntu: Click Install Ubuntu
> Select English
> Select Keyboard layout English US English US
> Select Normal installation
> Select Download updates while installing Ubuntu
> Check Erase disk and install Ubuntu
> Select Select drive: SSD
> Select Where are you?
> Enter Your name
> Enter Your computer's name
> Enter Pick a username
> Enter Choose a password
Ubuntu: reboot
Take out USB flash drive
During boot enter BIOS setup (DEL)
> BIOS: Change boot sequence to start with SSD
$: sudo apt update
$: sudo apt upgrade

OPTIONAL: Software Setup

Hookup

Set up the sensors & processing board without the cover as described in the hardware assembly.

Connect the **SparkFun RedBoard Turbo** Development Board from its USB port with a 90° micro USB to USB cable to a USB port on the Host Computer. Connect the USB cable from the **Intel RealSense D435i** to a USB port on the Host Computer. Connect the USB cable from the **GroupGets Pure Thermal 2** to a USB port on the Host Computer.

Our SensorBox Repository

Clone our SensorBox repository from GitHub
DATA/projects$: git clone **https://github.com/AIWerkstatt/SensorBox.git**
DATA/projects$: cd **SensorBox/4-Setup**

NVIDIA Graphics Card

Install NVIDIA Graphics Card Driver
Ubuntu: Software & Updates
> Select"Additional Drivers"
> Check "NVIDIA Corporation: TU116[GeForce GTX 1660]" "Using NVIDIA driver meta package from **nvidia-driver-450** (proprietary, tested)"
> Click "Apply changes"
Ubuntu: Reboot
$: nvidia-smi

```
+-----------------------------------------------------------------------------+
| NVIDIA-SMI 450.80.02    Driver Version: 450.80.02    CUDA Version: 11.0     |
…
```

Scripts

The scripts specific to the host computer are located in the folder **sw/Host_Computer/Scripts**.

Run all install scripts
sw/Host_Computer/Scripts$: bash **install.sh**
Reboot

Docker

Install Docker
sw/Host_Computer/Docker$: bash **install-Docker.sh**

Install NVIDIA Container Toolkit
sw/Host_Computer/Docker$: bash **install-NVIDIA_Container_Toolkit.sh**

Create a Docker identification.

The Dockerfiles specific to the host computer are located in the folder **sw/Host_Computer/Docker**.

Build a Docker image with all Dockerfiles
sw/Host_Computer/Docker$: bash **build-Docker.sh**

We based the development environment on the NVIDIA's Ubuntu 18.04 LTS with CUDA and OpenGL Image.

Set up udev rules on Docker Host (only once)
sw/Host_Computer/Docker$: bash **install-udev_rules-Host.sh**
Reboot

Run the Docker container
sw/Host_Computer/Docker$: bash **run-Docker.sh**

The Docker container is run as a bash terminal (interactive mode) under the current user (same user id, group id and home folder), using the same network as the host computer and forwarding the display to the X server on the host computer with the proper access to the host computers resources.