GL Studio HMI Application by DiSTI

Getting Started Guide

Revision	Date	Description
0.1	6th Dec 2021	Initial Version

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Pre-requisites

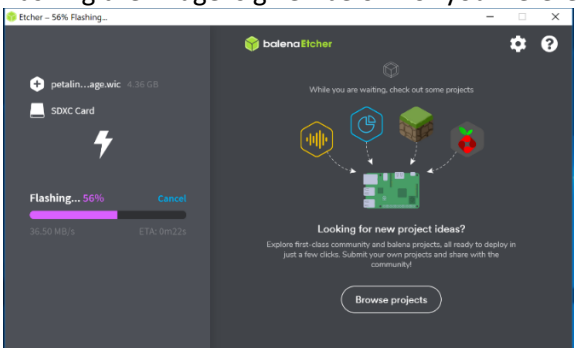
1. Kria KV260 Vision AI starter Kit board (target)
2. Windows machine (host)
3. 16GB microSD card
4. USB-A to micro-B cable
5. RJ45 Ethernet cable
6. 1080p Touchscreen monitor with HDMI port
   Preferred monitor : GeChic On-Lap 1503i 1080p touchscreen monitor (Link)
7. USB mouse (optional, required only when user does not have touchscreen monitor and uses normal monitor for testing the GL Studio HMI application)
8. Install Tera Term Application (https://osdn.net/projects/ttssh2/releases) on your Windows host machine.

Environment setup

Follow the steps below to setup Kria KV260 Vision AI starter Kit board environment.

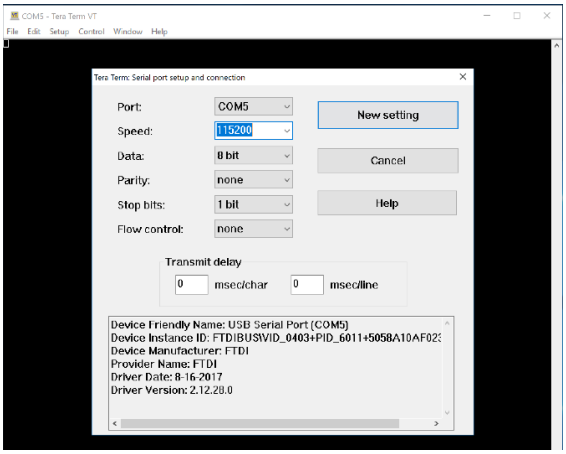
1. Download the *Xilinx SOM Starter Linux image*(petalinux-sdimage-2021.1-update1.wic.xz) onto your windows host machine from the URL Kria™ KV260 Vision AI Starter Kit Image

2. Place 16GB microSD card in your host machine SD card slot and write the *Xilinx SOM Starter Linux image* onto it using balenaEtcher or Win32DiskImager tool. Snapshot of balenaEtcher tool, while flashing the image is given below for your reference.



3. Upon successful write of the Xilinx SOM Starter Linux image, safely eject the microSD card from host windows machine SD card slot and place it in Vision AI Starter Kit SD card slot(J11).

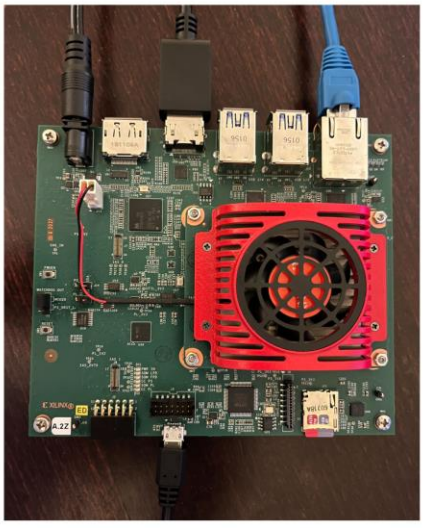
4. Setup USB-based UART connection using USB-A to micro-B cable. Plug micro-B end of the cable to J4 slot on Vision AI starter kit and USB-A end of the cable to your Windows host machine. Open Tera term, setup serial port with options - 115200, 8, none, 1 bit, none



5. Setup network for kV260 target as follows. Connect one end of ethernet cable to kV260 board J10 RJ45 slot and another end to a router which you use as source of internet connection(with DHCP enabled) at your premises. Your windows host machine should be using WIFI internet connection from the same router that was used to provide internet connection to kV260 board.

6. Connect GeChic On-Lap 1503i 1080p touchscreen monitor to KV260 target using HDMI cable and provide required power to your touchscreen monitor. **Note**: If user does not have touchscreen monitor and has normal monitor, user may connect normal monitor and USB mouse to KV260 target. This enables user to interact with GL Studio HMI application via USB mouse, but it will be hard to zoom-in/zoom-out and interact with application.

7. Power on the KV260 Vision AI Starter Kit with 12V, 3A power supply adapter.



Xilinx KV260 target board

GeChic 1080p touchscreen monitor connections

Initial Boot

1. After power-on, the Vision AI starter kit auto boots to Linux. User can observe power LEDs (DS1-DS5) on the carrier card to be ON in green color, heartbeat LED(DS35) on the K26 SOM flashing in green color, and UART response on the Tera Term terminal program interface.

2. On Tera Term terminal, when system boots to Linux and asks for login username, enter default username as "**petalinux**" and set a new user password (required only for first time login).

```
PetaLinux 2021.1 xilinx-k26-starterkit-2021_1 ttyPS1

xilinx-k26-starterkit-2021_1 login: petalinux
You are required to change your password immediately (administrator enforced)
New password:
Retype new password:
xilinx-k26-starterkit-2021_1:~$
```

3. On 1080p touchscreen monitor connected to KV260 target, user will observe below login request. Please ignore it and proceed with Tera term terminal command line interface.

```
PetaLinux 2021.1 xilinx-k26-starterkit-2021_1 tty1
xilinx-k26-starterkit-2021_1 login: _
```

4. Make sure Internet connectivity is working via "ping" or "DNS lookup" commands. Run below command to ping google public DNS IP addresses:

ping 8.8.8.8

```
xilinx-k26-starterkit-2021_1:~$ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=52 time=25.8 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=52 time=27.4 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=52 time=26.4 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=52 time=24.6 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=52 time=26.0 ms
^C
--- 8.8.8.8 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4006ms
rtt min/avg/max/mdev = 24.590/26.036/27.440/0.926 ms
xilinx-k26-starterkit-2021_1:~$
```

Press CTRL+C to exit from ping command. If ping is successful, user can observe packets get transmitted and received with no packet loss. It means, Internet connectivity is working. If ping replies, "Destination host unreachable" then re-check your internet connection.

Install GL Studio HMI application package

Xilinx provides DiSTI's GL Studio HMI application package feeds in runtime package management (rpm) format for the users to dynamically load it on top of running *Xilinx SOM Starter Linux image* using dnf package manager utility command "dnf install". Run below commands to install GL Studio HMI application package :

1. GL Studio HMI application requires root permissions. Run below command to enter root mode. FYI. For Password, use the same petalinux user password that you created during initial boot.

sudo su -l

```
xilinx-k26-starterkit-2021_1:~$
xilinx-k26-starterkit-2021_1:~$ sudo su -l

We trust you have received the usual lecture from the local System
Administrator. It usually boils down to these three things:

    #1) Respect the privacy of others.
    #2) Think before you type.
    #3) With great power comes great responsibility.

Password:
root@xilinx-k26-starterkit-2021_1:~#
```

2. Perform system update.

dnf clean all

FYI. 'dnf clean all' command cleans the cached RPMs and metadata that dnf stores

dnf update

FYI. "dnf update" command pulls the latest Xilinx package feed updates. **Note** : dnf update command might take around 30min to complete. It depends on your network speed.

Below screenshot is the snippet of above commands for your reference.

```
root@xilinx-k26-starterkit-2021_1:~#
root@xilinx-k26-starterkit-2021_1:~# dnf clean all
0 files removed
root@xilinx-k26-starterkit-2021_1:~#
root@xilinx-k26-starterkit-2021_1:~# dnf update
accelize 2021_1 all
accelize 2021_1 any
accelize 2021_1 noarch
accelize 2021_1 aarch64
accelize 2021_1 armv8a
accelize 2021_1 armv8a_crc
accelize 2021_1 cortexa72_cortexa53
accelize 2021_1 zynqmp
accelize 2021_1 zynqmp_ev
accelize 2021_1 k26
accelize 2021_1 k26_kv
accelize 2021_1 zynqmp_generic
OE Remote Repo: sswreleases rel-v2021.1 generic rpm all
OE Remote Repo: sswreleases rel-v2021.1 generic rpm any
OE Remote Repo: sswreleases rel-v2021.1 generic rpm noarch
OE Remote Repo: sswreleases rel-v2021.1 generic rpm aarch64
OE Remote Repo: sswreleases rel-v2021.1 generic rpm armv8a
OE Remote Repo: sswreleases rel-v2021.1 generic rpm armv8a_crc
OE Remote Repo: sswreleases rel-v2021.1 generic rpm cortexa72_cortexa53
OE Remote Repo: sswreleases rel-v2021.1 generic rpm zynqmp
OE Remote Repo: sswreleases rel-v2021.1 generic rpm zynqmp_ev
OE Remote Repo: sswreleases rel-v2021.1 generic rpm k26
OE Remote Repo: sswreleases rel-v2021.1 generic rpm zynqmp_generic
OE Remote Repo: sswreleases rel-v2021.1 generic rpm k26_kv
OE Remote Repo: sswreleases rel-v2021.1 generic-updates rpm all
OE Remote Repo: sswreleases rel-v2021.1 generic-updates rpm any
OE Remote Repo: sswreleases rel-v2021.1 generic-updates rpm noarch
OE Remote Repo: sswreleases rel-v2021.1 generic-updates rpm aarch64
OE Remote Repo: sswreleases rel-v2021.1 generic-updates rpm armv8a
OE Remote Repo: sswreleases rel-v2021.1 generic-updates rpm armv8a_crc
OE Remote Repo: sswreleases rel-v2021.1 generic-updates rpm cortexa72_cortexa53
OE Remote Repo: sswreleases rel-v2021.1 generic-updates rpm zynqmp
OE Remote Repo: sswreleases rel-v2021.1 generic-updates rpm zynqmp_ev
OE Remote Repo: sswreleases rel-v2021.1 generic-updates rpm k26
OE Remote Repo: sswreleases rel-v2021.1 generic-updates rpm zynqmp_generic
OE Remote Repo: sswreleases rel-v2021.1 generic-updates rpm k26_kv
Dependencies resolved.
================================================================================
 Package                                 Architecture          Version
================================================================================
Upgrading:
 accelize-repo                           cortexa72_cortexa53    1.0-r0.1
 accelize-repo-lic                       cortexa72_cortexa53    1.0-r0.1
 archconfig                              cortexa72_cortexa53    1.0-r0.1
 archconfig-lic                          cortexa72_cortexa53    1.0-r0.1
 axi-qos                                 cortexa72_cortexa53    1.0-r0.1
 axi-qos-lic                             cortexa72_cortexa53    1.0-r0.1
 ddr-qos                                 cortexa72_cortexa53    1.0-r0.1
 ddr-qos-lic                             cortexa72_cortexa53    1.0-r0.1
 dfx-mgr                                 cortexa72_cortexa53    1.0-r0.1
 dfx-mgr-lic                             cortexa72_cortexa53    1.0-r0.1
 image-update                            zynqmp                 1.0-r0.1
 image-update-lic                        zynqmp                 1.0-r0.1
 kernel-5.10.0-xilinx-v2021.1            zynqmp_generic         5.10+git1+09a4215f61-r0.0
 kernel-module-a8233-5.10.0-xilinx-v2021.1 zynqmp_generic       5.10+git1+09a4215f61-r0.0
```

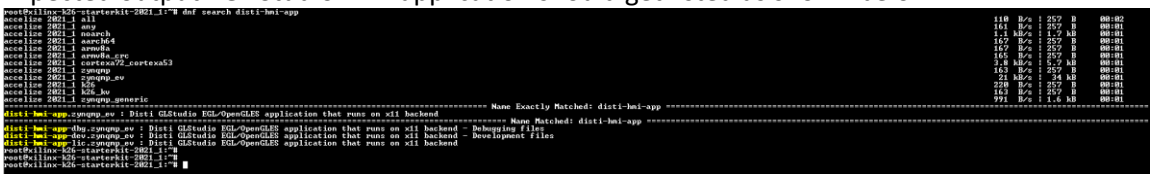
Expected output : User can observe "Complete!" print message at the end of dnf update command console logs as given below.

```
  kernel-module-zl10353-5.10.0-xilinx-v2021.1-5.10+git1+09a4215f61-r0.0.zynqmp_generic
  kernel-modules-5.10+git1+09a4215f61-r0.0.zynqmp_generic
  packagegroup-petalinux-tpm-1.0-r0.1.noarch
  platformstats-1.0-r0.1.cortexa72_cortexa53
  som-pwrctl-1.0-r0.1.cortexa72_cortexa53
  xmutil-1.0-r0.1.cortexa72_cortexa53

Installed:
  kernel-image-5.10.0-xilinx-v2021.1-5.10+git1+09a4215f61-r0.0.zynqmp_generic

Complete!
root@xilinx-k26-starterkit-2021_1:~#
```

3. Search for GL Studio HMI application from Accelize repo.

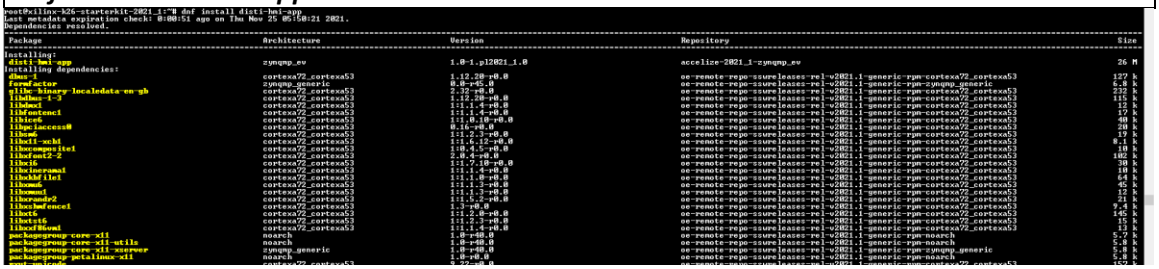
dnf search disti-hmi-app

Expected output : GL Studio HMI application should get listed as shown below



4. Dynamically install GL Studio HMI app from Accelize repo.

dnf install disti-hmi-app



Expected output : GL Studio HMI application should get installed. Observe “Complete!” message at the end of logs.

Run GL Studio HMI application

1. Assuming GL Studio HMI application is installed following above steps, please move to the path /opt/disti/bin using below command

cd /opt/disti/bin

2. Run GL Studio HMI application using a script file “target_run.sh”

./target_run.sh

```
root@xilinx-k26-starterkit-2021_1:/opt/disti/bin# ./target_run.sh
target_exe: no process found
Xorg: no process found

X.Org X Server 1.20.9
X Protocol Version 11, Revision 0
Build Operating System: Linux
Current Operating System: Linux xilinx-k26-starterkit-2021_1 5.10.0-xilinx-v2021.1 #1 SMP Tue Aug 24 05:53:21 UTC 2021 aarch64
Kernel command line: earlycon console=ttyPS1,115200 clk_ignore_unused ext4=/dev/mmcblk1p2:/rootfs init_fatal_sh=1 cma=1000M
Build Date: 25 August 2020  03:40:19PM

Current version of pixman: 0.40.0
        Before reporting problems, check http://wiki.x.org
        to make sure that you have the latest version.
Markers: (--) probed, (**) from config file, (==) default setting,
        (++) from command line, (!!) notice, (II) informational,
        (WW) warning, (EE) error, (NI) not implemented, (??) unknown.
(==) Log file: "/var/log/Xorg.0.log", Time: Thu Nov 25 06:04:07 2021
(==) Using config file: "/etc/X11/xorg.conf"
(==) Using system config directory "/usr/share/X11/xorg.conf.d"
```

Note : Ignore the “no process found” messages in the output log

Expected output :

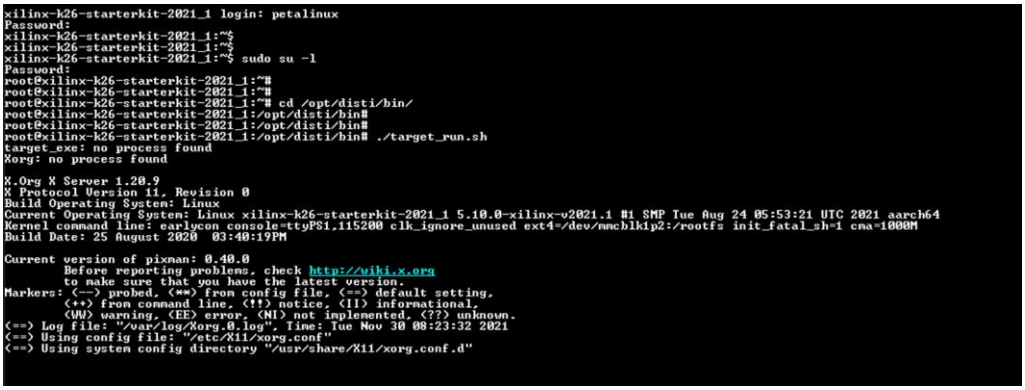
- Four HMI demonstrations(medical patient monitor, industrial operator panel, automotive infotainment app, or automotive cluster) should come up on the touchscreen monitor as shown in below screenshot. **Note** : You will observe blank(white) screen on touchscreen monitor for 10 seconds approximately before the actual GL Studio HMI application comes up. Please ignore this behavior as mentioned in known issues section of this document.
- User should be able to interact with four HMI demonstrations via touchscreen. For more information on the GL Studio HMI application please visit www.disti.com and use sales@disti.com for the contact.

Steps to run the GL Studio HMI application **after reboot**

1. Login as petalinux user
2. Enter root mode
   sudo su -l
3. Move to the path where application is installed
   cd /opt/disti/bin

4. Run the script to run the application
   ./target_run.sh

   Screenshot of above commands is given below for your reference



Known Issues

- When user runs the GL Studio HMI application, the GUI on 1080p GeChic 1503i touchscreen monitor goes blank(white) for 10 sec approximately before the actual application shows up on the monitor. The extended load time is likely unavoidable, as this application is loading four entire demos prior to rendering the first frame.

- If user tests the GL Studio HMI application with normal monitor and USB mouse, USB mouse works, but its curser will not be visible on monitor.