

ADLINK Technical Document

Abstract	How to install Linux drivers for the DSA-DASK/X		
OS	Linux		
Keyword	Linux, DSA-DASK/X		
Related Products	PCI-9527, PCI-9527L, PXI-9527, PCIe-9529, PXIe-9529		
Date	2021-09-10	No.	202110009

- Issue Details:

To build a Linux software application to operate an ADLINK DAQ card (e.g., PCI-9527L), download the Linux drivers and install them. The steps for downloading and installing the Linux drivers are detailed in this document.

- More information:

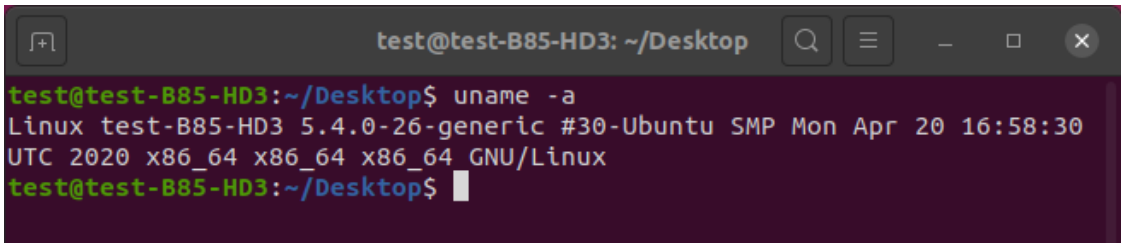
ADLINK provides pre-built driver binaries for Ubuntu LTS Linux kernels. These binaries are regularly updated and officially supported to work with specific Linux kernels indicated in this document and on the ADLINK website. If you want to use another Linux OS or Linux Kernel, you need to sign the NDA to get the driver source code and build the Linux driver by yourself.

- Solution:

Step 1:

Find out the system kernel version. Go to the terminal and type “uname -a”

NOTE: ADLINK only supports Linux Kernel version 4.15.0-20-generic, 5.4.0-26-generic, and 5.4.0-47-generic.



```
test@test-B85-HD3: ~/Desktop
test@test-B85-HD3:~/Desktop$ uname -a
Linux test-B85-HD3 5.4.0-26-generic #30-Ubuntu SMP Mon Apr 20 16:58:30
UTC 2020 x86_64 x86_64 x86_64 GNU/Linux
test@test-B85-HD3:~/Desktop$
```

Step 2:

Go to the official ADLINK website, search for “DSA-DASK/X”, and download the driver corresponding to your OS and kernel version.

Software Download :

PCI-9527L Driver

Linux Ubuntu



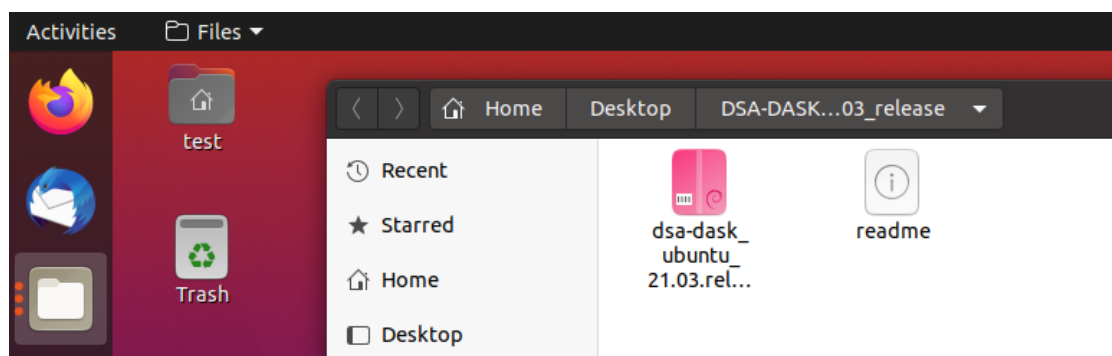
DSA-DASK/X, v21.03 for Ubuntu 18.04 &
20.04 (4.15.0-20-generic 5.4.0-26-generic
5.4.0-47-generic)

(0.17MB)

Upload: 2021-03-24

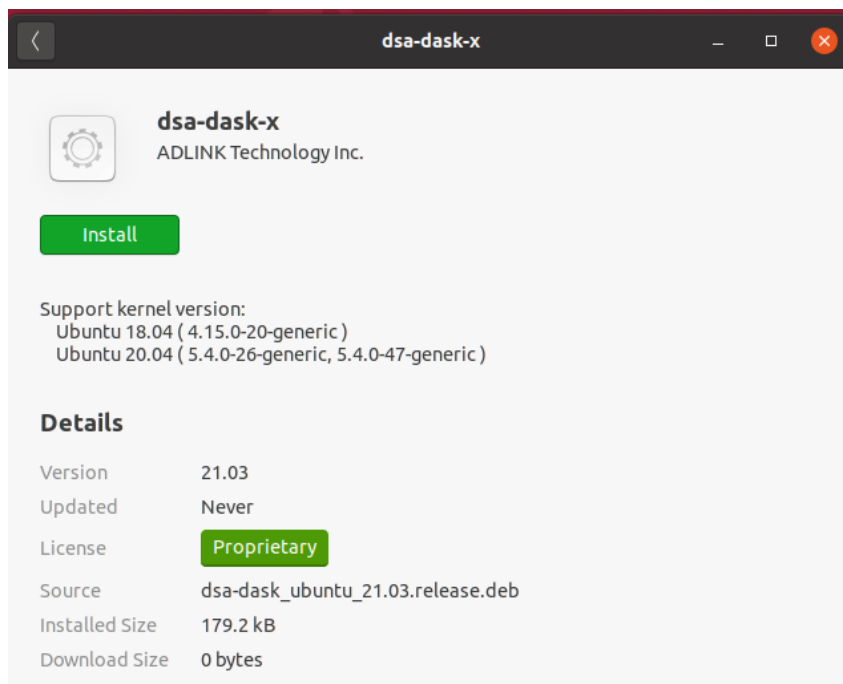
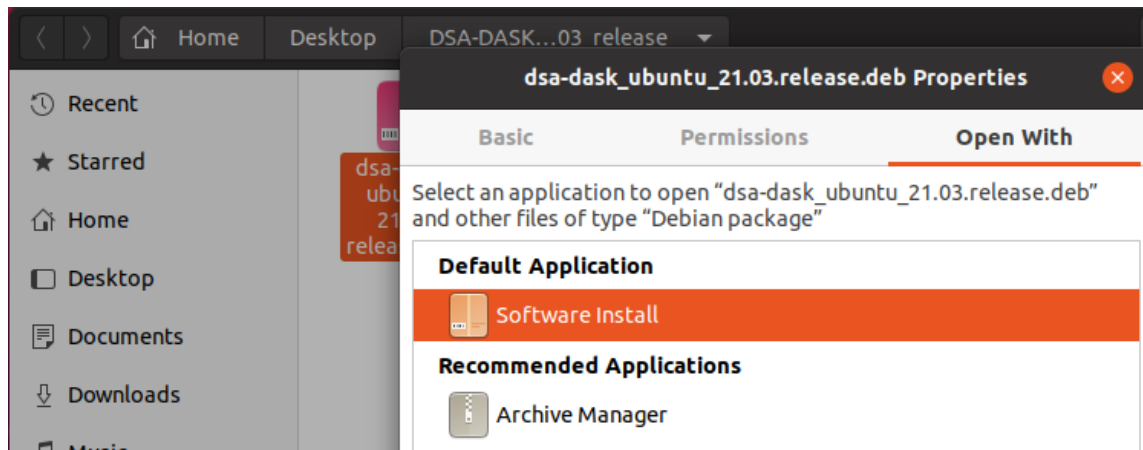
Step 3:

Unpack the .gz file downloaded in the step above. There are two files in the target folder.



Step 4:

Double-click the .deb file in the graphical user interface. If prompted to select an application, select “Software Install”. Follow the prompts until installation is complete. Reboot when done.



Step 5:

After reboot, go to the terminal and type “lspci -vxxx” to check if the system detected and allocated resources for ADLINK devices. (Note: PCI-9527L used as an example from here on)

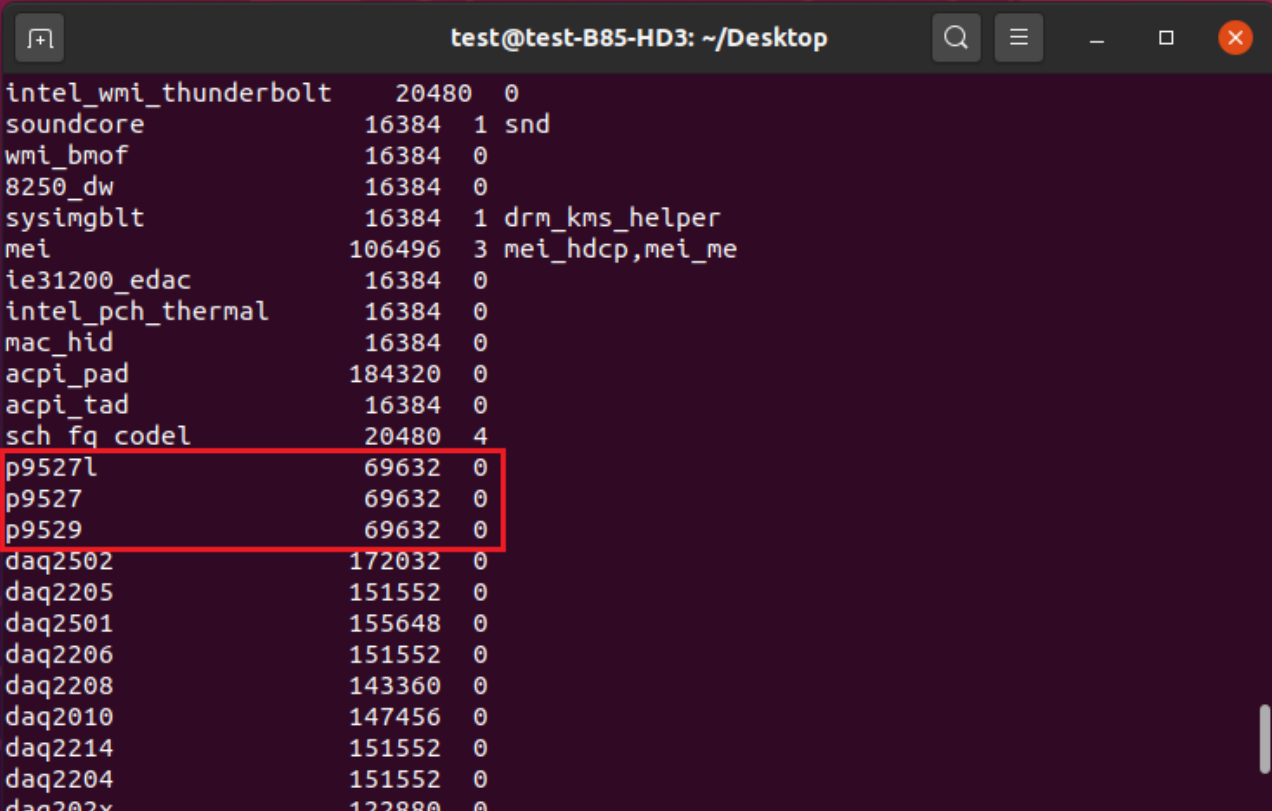
```
test@test-B85-HD3: ~/Desktop
03:00.0 PCI bridge: Integrated Technology Express, Inc. IT8652L PCI to PCI bridge (rev 41) (prog-if 01 [Subtractive decode])
    Flags: bus master, fast devsel, latency 0, IRQ 18
    Bus: primary=03, secondary=04, subordinate=04, sec-latency=32
    I/O behind bridge: 00004000-00004fff [size=4K]
    Memory behind bridge: a1200000-a12fffff [size=1M]
    Prefetchable memory behind bridge: [disabled]
    Capabilities: <access denied>
00: 83 12 93 88 07 00 10 00 41 01 04 06 10 00 01 00
10: 00 00 00 00 00 00 00 00 03 04 04 20 41 41 20 22
20: 20 a1 20 a1 f1 ff 01 00 00 00 00 00 00 00 00 00
30: 00 00 00 00 90 00 00 00 00 00 00 00 00 ff 01 12 02

04:01.0 Signal processing controller: Adlink Technology Device 9527 (rev 02)
    Subsystem: Adlink Technology Device 1000
    Flags: bus master, slow devsel, latency 32, IRQ 17
    Memory at a1200000 (32-bit, non-prefetchable) [size=2K]
    I/O ports at 4000 [size=256]
    Kernel driver in use: PCI-9527L Driver
    Kernel modules: p9527l
00: 4a 14 27 95 07 00 00 04 02 00 80 11 00 20 00 00
10: 00 00 20 a1 01 40 00 00 00 00 00 00 00 00 00 00
20: 00 00 00 00 00 00 00 00 00 00 00 00 00 4a 14 00 10
30: 00 00 00 00 00 00 00 00 00 00 00 00 00 ff 01 00 00
```



Step 6:

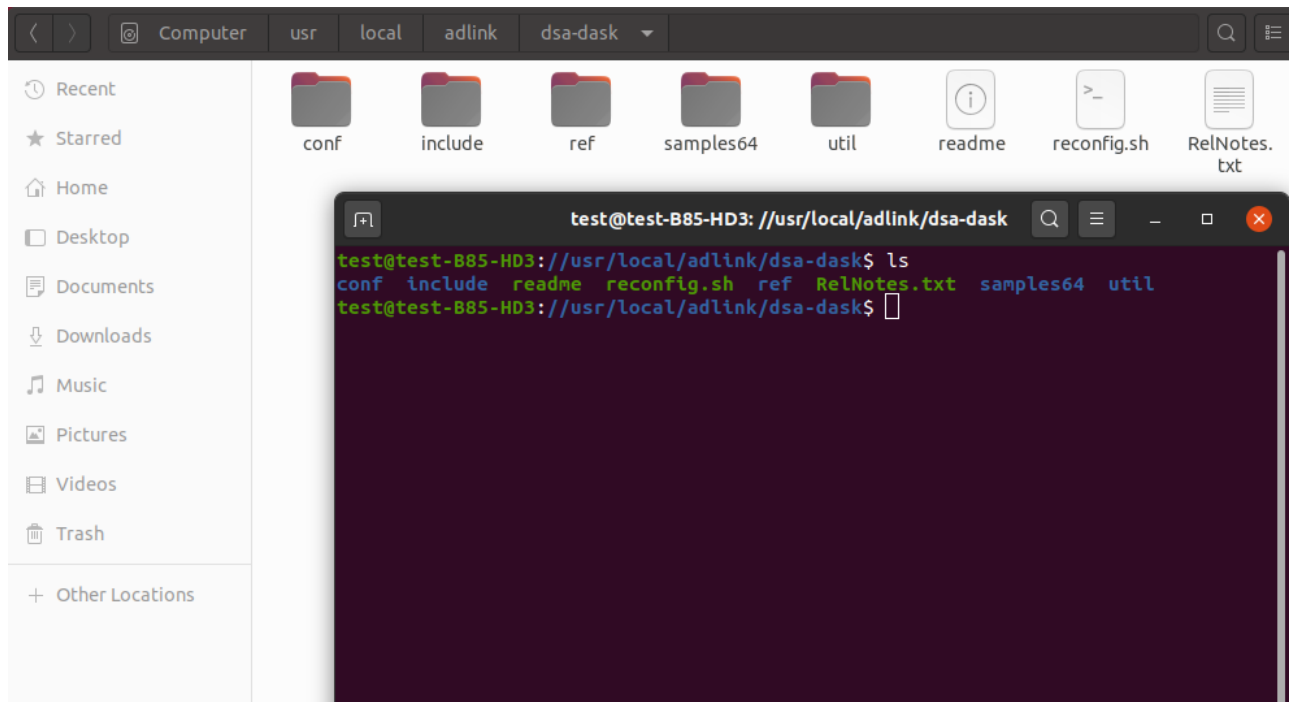
Go to the terminal and type “lsmod” to check the driver service is activated and running in the Linux kernel.



```
test@test-B85-HD3: ~/Desktop
intel_wmi_thunderbolt    20480  0
soundcore                16384  1 snd
wmi_bmf                  16384  0
8250_dw                  16384  0
sysimgblt                16384  1 drm_kms_helper
mei                      106496  3 mei_hdcp,mei_me
ie31200_edac             16384  0
intel_pch_thermal        16384  0
mac_hid                  16384  0
acpi_pad                 184320  0
acpi_tad                 16384  0
sch_fq_codel             20480  4
p9527l                   69632  0
p9527                    69632  0
p9529                    69632  0
daq2502                  172032  0
daq2205                  151552  0
daq2501                  155648  0
daq2206                  151552  0
daq2208                  143360  0
daq2010                  147456  0
daq2214                  151552  0
daq2204                  151552  0
daq202x                  122880  0
```

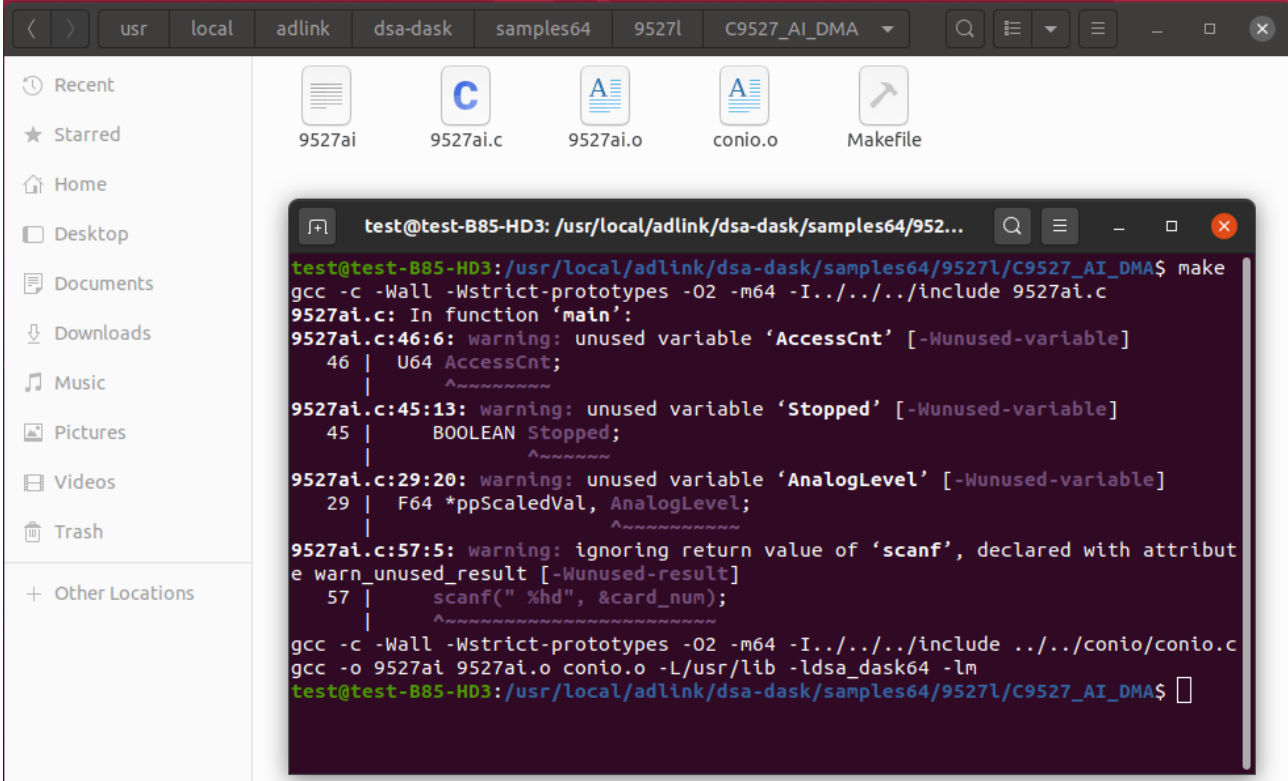
Step 7:

The ADLINK software package deploys files such as documents, utilities, and samples to the following folder: `///usr/local/adlink/dsa-dask/`



Step 8:

Choose a sample program (e.g., `usr/local/adlink/dsa-dask/samples64/9527L/C9527_AI_DMA`). Users can modify the sample program as needed and type “make” to build the executable.

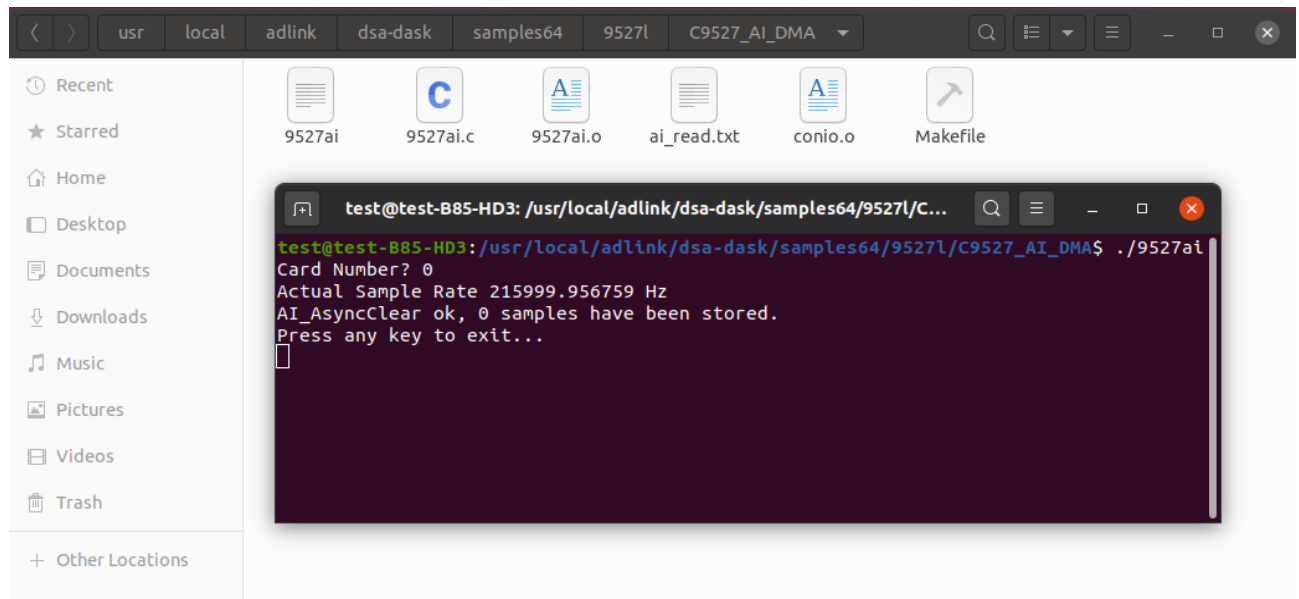


The screenshot shows a file manager window with the path `usr/local/adlink/dsa-dask/samples64/9527L/C9527_AI_DMA`. The files listed are `9527ai`, `9527ai.c`, `9527ai.o`, `conio.o`, and `Makefile`. A terminal window is open, showing the execution of the `make` command. The terminal output includes several warnings from the compiler:

```
test@test-B85-HD3: /usr/local/adlink/dsa-dask/samples64/952...
test@test-B85-HD3:/usr/local/adlink/dsa-dask/samples64/9527L/C9527_AI_DMA$ make
gcc -c -Wall -Wstrict-prototypes -O2 -m64 -I../../../../include 9527ai.c
9527ai.c: In function 'main':
9527ai.c:46:6: warning: unused variable 'AccessCnt' [-Wunused-variable]
   46 |     U64 AccessCnt;
      |
9527ai.c:45:13: warning: unused variable 'Stopped' [-Wunused-variable]
   45 |     BOOLEAN Stopped;
      |
9527ai.c:29:20: warning: unused variable 'AnalogLevel' [-Wunused-variable]
   29 |     F64 *ppScaledVal, AnalogLevel;
      |
9527ai.c:57:5: warning: ignoring return value of 'scanf', declared with attribute warn_unused_result [-Wunused-result]
   57 |     scanf("%hd", &card_num);
      |     ~~~~~
gcc -c -Wall -Wstrict-prototypes -O2 -m64 -I../../../../include ../../conio/conio.c
gcc -o 9527ai 9527ai.o conio.o -L/usr/lib -ldsa_dask64 -lm
test@test-B85-HD3:/usr/local/adlink/dsa-dask/samples64/9527L/C9527_AI_DMA$
```

Step 9:


Launch the executable and check the output. The image below shows a successful execution of the ADLINK DAQ and the acquired data output to a .dat file.



Step 10:

If necessary, adjust the data acquisition settings (default: 1 MB, 256 pages). To change the settings, go to the terminal and type “./reconfig.sh”. Refer to the following images for further details.

- a. Choose “(1) Change to user settings”.



```
test@test-B85-HD3: /usr/local/adlink/dsa-dask
test@test-B85-HD3:/usr/local/adlink/dsa-dask$ ./reconfig.sh
Reset config setting procedure...

Cards is inserted now:
=====
Card    AI      AO      DI      DO      [unit: KB]
p9527l  1024    1024    0        0
=====

Please choose the flow:
(1) Change to User settings (2) Restore original factory settings
1
```

- b. Select the card type for configuration.

```
test@test-B85-HD3: /usr/local/adlink/dsa-dask

===== Configured Cards =====
Card Type    Cards    Buffer Size [unit: pages(4KB/page)]
              AI      AO      DI      DO
-----
PCI9527       1        256     256      0      0
PCI9529       1        256      0      0      0
PCI9527L      1        256     256      0      0

=====
(1)PCI9527  (2)PCI9529  (3)PCI9527L
Select the card type for configuration, or '0' to exit:3
```



- c. Select “(1) User Config” for configuration.

```
test@test-B85-HD3: /usr/local/adlink/dsa-dask

===== Configured Cards =====
Card Type    Cards    Buffer Size [unit: pages(4KB/page)]
              AI      AO      DI      DO
-----
PCI9527      1        256     256      0      0
PCI9529      1        256      0      0      0
PCI9527L     1        256     256      0      0

=====
(1)PCI9527  (2)PCI9529  (3)PCI9527L
Select the card type for configuration, or '0' to exit:3

=====
(1)User Config  (2)Reset to Default
Select the config type for configuration, or '0' to exit:1
```

- d. Enter memory pages for AI/AO for your device. After that, check if the setting is correct.

```
test@test-B85-HD3: /usr/local/adlink/dsa-dask
*****
*****      DASK LINUX Configuration Utility      *****
*****

Card_Type : PCI9527L

How many PCI9527L adapters in your machine : 1
Memory pages for AI function ( 1 Mem_Page = 4 KB ) : 512

Memory pages for AO function ( 1 Mem_Page = 4 KB ) : 512

Memory pages for DI function ( 1 Mem_Page = 4 KB ) : 0

Memory pages for DO function ( 1 Mem_Page = 4 KB ) : 0

The setting for PCI9527L :
-----
AI: 512 Pages    AO: 512 Pages    DI: 0 Pages    DO: 0 Pages    for 1 PCI9527L C
ards

                                are these correct (Y/N) ? Y
```



- e. Reboot the system.

```
test@test-B85-HD3: /usr/local/adlink/dsa-dask

The memory size you configure for your PCI-DASK adapters is 1792 Mem_Pages,
the minimum reserved memory you needed is 7168 KB.
Please check the setting in /etc/lilo.conf.

The SMP information is got from /proc/sys/kernel/version !

=====
Current Config:
Card  AI    AO    DI    DO    [unit: KB]
p9527 1024   1024    0     0
p9527l 2048   2048    0     0
p9529 1024     0     0     0
=====
Move Config file...
>>>> SYSTEM REBOOT REQUIRED <<<<

Do you want to reboot now? (Y/N)
Y
```

