Document Title: Procedure to Install BU-69092S1 AceXtreme C SDK in Linux with kernel 4.x & 5.x

**Document No**: AN0005

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**Introduction** : This document explains the steps for installing the AceXtreme C SDK (BU-69092S1) on Linux. The steps, in general apply to all distributions of Linux like Fedora, RHEL, Ubuntu etc. with kernel 4.x and 5.x.

## Procedure

1. Pre-requisites for installation:

- Download the BU-69092S1 AceXtreme SDK for Linux from the website of Data Device
   Corporation (<a href="www.ddc-web.com">www.ddc-web.com</a>). Please note that the SDK versions to be used as different for
   specific kernel versions of Linux. Ensure to download the correct version of the SDK to match
   your kernel version. Generally, Linux with kernel 4.x and 5.x require SDK version 4.9.x or
   higher.
- Build tools (also called build-essentials) are needed for the installation procedure to complete successfully. You may check if build tools are installed by running the "gcc" command on a terminal Window. If not installed, you will encounter a "command not found" error. Build tools may be installed as below:
  - Ubuntu: Run the following command as root or user with *sudo* privileges:
    - \$ sudo apt update
    - \$ sudo apt install build-essential
  - RHEL/CentOS
    - \$ sudo yum group install "Development Tools"
      OR
    - # yum groupinstall 'Development Tools'
- 2. Create a folder on Desktop named *DDC* and copy *BU-69092S1\_x\_y\_z.zip* (downloaded from DDC's website) into it.
- 3. Open a Terminal & change to "root" mode by typing command "su". On Ubuntu, since the root user is usually disabled, you may run the command "sudo -i".
- 4. Change directory (cd) to *DDC* folder on the Desktop and extract *BU-69092S1\_x\_y\_z.zip* file into it. (x\_y\_z here indicates the version number of the SDK). This creates a folder named *BU-69092S1\_x\_y\_z*.
- 5. Change permissions on folder BU-69092S1\_x\_y\_z and its sub-folders and files to Read and Write.
- 6. Change directory to *BU-69092S1\_x\_y\_z* and enable "execute" permission on file *acexInstall* (you may use "sudo chmod +x acexInstall" command).
- 7. Run the script file acexInstall by using below command
  - \$ ./acexInstall
- 8. Once installation begins type "y" and press Enter key.

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File Edit View Search Terminal Help
 tips@rtips-Desktop:~/DDC/BU69092S1_4_4_1_4$ su
  Thunderbird Mail op:/home/rtips/DDC/BU69092S1_4_4_1_4# ./acexInstall
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                     BU-69092S1 SDK Installation
This will install the BU-69092S1 Software Development Kit. It will install the library, build all of the necessary drivers, load the appropriate driver for the first time, and launch the DDC Card Manager so the user can initialize the logical device number
The user will be prompted twice during installation for the superuser
password to complete installation.
Would you like to begin installation? (y/n)
```

9. Choose path to install the SDK. If you wish to install in a specific path then enter the path name as shown in figure below, else leave it blank and press Enter key.
<u>IMPORTANT</u>: The default path, (~/acextreme) is only accessible in "root" mode. So, if installed to this path, user applications that run in normal user mode (i.e. not root mode) will fail because they will <u>not</u> be able to initialize the 1553 channels. If the 1553 card is expected to be used by applications that run in normal user mode, then an install path must be provided which is accessible for normal (non-root) users.

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rtips@rtips-Desktop:~/DDC/BU69092S1_4_4_1_4$ su
     Thunderbird Mail op:/home/rtips/DDC/BU69092S1_4_4_1_4# ./acexInstall
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   The user will be prompted twice during installation for the superuser
The user with the prospect of 
 Would you like to begin installation? (y/n)
y
Please enter path to install SDK. Ex: /home/user/ddc_path
Or leave blank and press ENTER to install to default (~/acextreme)
/home/rtips/DDC/SDK
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10. Choose "y" when asked if you would like to install ACE library support.

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C. Thunderbird Mail links

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Create symbolic links

Creating link for DDC
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Creating link for remote access

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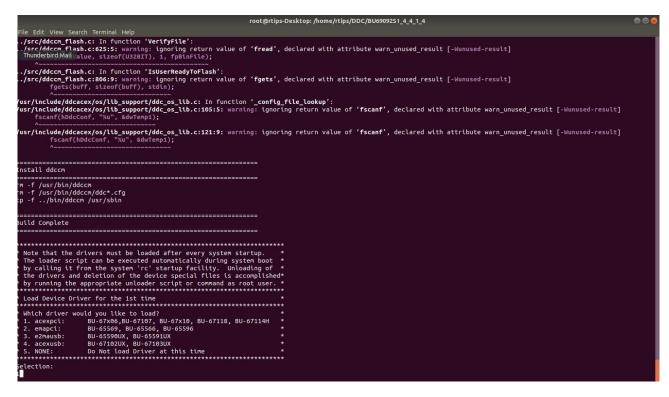
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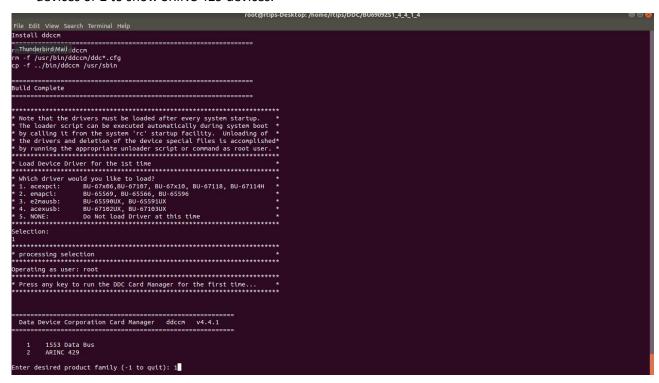
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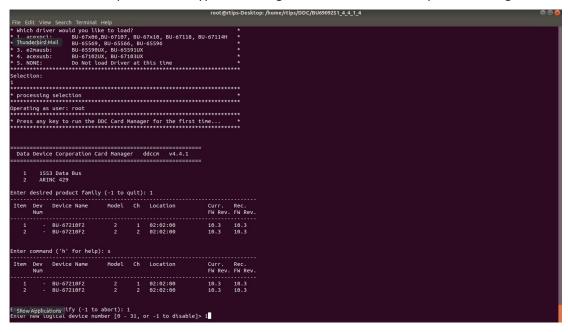
- 11. Select the driver type which you wish to load. Multiple drivers may be installed using the *insmod* command after completion of the setup. E.g.
  - \$ insmod acexpci.ko



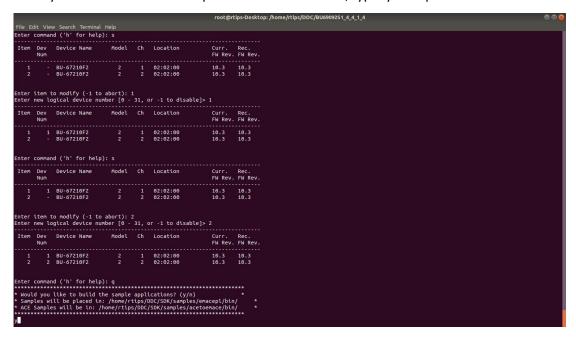
12. The DDC Card Manager (*ddccm*) is automatically run. In the card manager select 1 to show 1553 devices or 2 to show SRINC 429 devices.



13. A Logical Device Number (LDN) is to be assigned to any 1553 channel before it can be used by any application. To assign a LDN type 's' and hit enter. Enter an "Item number" for which to set a new LDN and press Enter. Type a new Logical Device Number and press Enter again.



- 14. Repeat the process to assign LDN to all the channels. Enter 'q' to quit.
- 15. If you wish to build the samples included in the SDK, type 'y' and press Enter.



- 16. After the system restarts, DDC drivers will NOT be automatically loaded by Linux. Therefore, it is necessary to load the drivers manually as below:
  - a) **USB Drivers**: Locate the USB driver file *acexusb.ko* in the folder "<*SDK Install Path*>/drivers/legacy/acexusb/prj/". If the file is not present, create it by running "make" on a terminal in this folder. Then, load the driver file using this command on a terminal in root mode:
    - \$ insmod acexpci.ko

- b) **PCI Drivers:** Run the following script on a terminal in root mode: "<*SDK Install Path*>\drivers\acex\tools\ddc\_acexpci\_load"
  - \$ cd <SDK Install Path>\drivers\acex\tools
  - \$ ./ddc acexpci load
- 17. If you wish to configure Linux to load the driver for the 1553 hardware upon every boot, please refer to Application Note AN0006 on the website of RTips Technologies here Resources for Avionics Databus Products of Data Device Corporation (rtipsonline.com).