Anritsu

Data Transfer for Linux
Version 1.0

User's Guide

Document Version History

Version	Date	Notes
1.0	2017/09/29	USB3.0 only support
	2017/10/31	PCIe support

Chapter – 1 : Introduction

This document introduces how to install software. It consists of an API library and a demo application.

There are two documents available for Data Transfer for Linux:
1. This guide, also known as the Data Transfer for Linux User's Guide, and
2. The Data Transfer for Linux Programmer's Guide,which describes the API library for Linux and how to use the API library.

This version of the Data Transfer for Linux has been developed and tested on the following environment:
1. CentOS 7, 64-bit

Notes:
1. When the USB3.0 data transfer will operate for a long time, one cable of 3 meters or less is recommended without going through the switch hub or repeater cable.
2. This API version cannot be used with more than one instrument (MS2850A) at the same time.

Chapter – 2 : Installing the software

The software Data Transfer for Linux is available as a compressed tarball as follows:
DataTransfer_Linux_v1.0.tar.gz
where the 1.0 refers to the version number of the software.

Once the archive is extracted, the following directory structure is created:
1. The **bin** directory contains the demo executable program called *datatransfer_demo*. Before building and installing the software, this directory is an empty folder.
2. The **demo_src** directory contains the demo main program source file as below:
    * *main.cpp* → The sample code shows how to use the API library.
3. The **docs** directory contains the documentation in PDF format (requires Adobe Acrobat Reader or equivalent).
4. The **driver64** directory contains two subdirectories and two shared object files as below:
    * *config* subdirectory → Contains setting information of the USB3.0.
    * *img* subdirectory → Contains the firmware image file for the USB3.0.
    * *module* subdirectory → Contains the module file for the PCIe.
    * *libcyusb.so.1* → The shared object of the USB3.0 access.
    * *libnsauwb.so.1* → The shared object of the USB3.0 control.
    * *libnsawb.so.1* → The shared object of the PCIe control.
5. The **include** directory contains the head file of API library of Data Transfer for Linux as below:
    * *iqdata.h* → The header file defines the user interface functions of Data Transfer for Linux.
6. The **lib64** directory contains the two shared objects as below:
    * *libiqdata.so* → The API library of Data Transfer for Linux.

Buiding and installing the software
Refer to the README file for prerequisites required for the installation and functioning of this software. Ensure that all of the prerequisite software modules are installed before starting to compile and install the Data Transfer for Linux.

Once the files are extracted in the local directory, open the terminal and point to the directory where files were extracted. Type the following commands to build and install the executable.

For example: if the files are in /home/Anritsu:
[root@desktop /home/Anritsu]$ ./install.sh (Requires super-user privileges)

This will install the **datatransfer_demo** application, which can then be launched from the terminal. This application is executed with super-user privileges.

Chapter – 3 : Using the demo application

Open a terminal and launch the application by typing "datatransfer_demo".

Example: [root@desktop /home]$ datatransfer_demo

**if installation completed successfully, the following interpreter message will be shown.
The interpreter message is as below when the demo application was launched successfully.

```
|-------------------------------------------------------------|
|This is a demo program of Data Transfer for Linux.  |
|It shows how to read the IQ data of the instrument   |
|from the external PC and evaluate the speed of       |
|data transfer.                                       |
|-------------------------------------------------------------|
Open start...
Open is OK
Before reading the data, it is necessary to capture the instrument at least once.
If you are ready to read, enter 'y' or 'Y',or enter another key to quit.
Is it OK? ['y' or 'Y'/others]: y  ←Enter
Please intput datasize of IQ data to read[Unit:MB]: 100  ←Enter
If you want to save read IQ data, enter 'y' or 'Y', or enter another key to read only.
Is it OK? ['y' or 'Y'/others]: y  ←Enter
Read start...
Read is OK.
Speed of data transfer: 330.000 MB/s.
Elapsed time of data transfer: 303.030 ms.

Do you want to continue? ['y' or 'Y'/others to quit]: q←Enter
Quitting demo.
Close start...
Close is OK.
```

In the interpreter message, the user has 4 inputs. First, it is necessary to capture the instrument manually when the "Open is OK" message is shown before entering user first input. After capturing, enter "y" or "Y" to proceed to next step. Input the reading data size. It should be an integer greater than zero and the unit is in megabytes (MB). The third input is whether to save read IQ data or not. In the example, "y" is to save data. Lastly, the user is asked whether or not to run the demonstration again. In the example, "q" is to quit demo application while "y" or "Y" is to continue.

Chapter – 4: Notes

4.1 About plugging and unplugging USB cable
If USB3.0 data transfer is used, it is necessary to connect the instrument with the USB cable before the demo application starts or 'iqdata_open' function of API is called. If USB cable is removed one time after the demo application started or 'iqdata_open' function was called, it is necessary to restart the demo application or recall the function 'iqdata_open' to reopen the external interface.

4.2 About span change of the instrument
When changing the span, it is necessary to capture at least once. In the case of switching between wideband span, if there is at least one capture after changing the span, you can read the data correctly. If you change the span from wideband to narrowband, you cannot read the narrowband data even if you perform one or more captures. In that case, you will read the capture data of the wideband span before it was changed to narrowband. The reason is that the external interface is valid when the instrument is in wideband mode only.
(Narrowband: Span <= 31.25MHz ; Wideband: Span >= 50 MHz)

Chapter – 5: Error Messages

*Error message definitions from API (exception message excluded)

No.	Error Message	Comment
01	*Failed to open.* *Check if PCIe or USB3.0 is connected.*	When API cannot be opened.
02	*Option 'MS2850A-054' is not available.*	When 'iqdata_open' function of API is called but Option 'MS2850A-054' is not installed on the instrument.
03	*Option 'MS2850A-053 is not available.*	When 'iqdata_open' function of API is called but Option 'MS2850A-053' is not installed on the instrument.
04	*No data to read.*	When the return value of 'iqdata_get_data_size' function of API is 0 or less.
05	*[User setting error]: Pointer of memory buffer is 'null'.*	When the memory buffer pointer argument of the 'iqdata_read' or 'iqdata_readplus' function of API is NULL.
06	*[User setting error]: Offset of reading is not a multiple of '8'.*	When the read offset argument of the 'iqdata_read' or 'iqdata_readplus' function of API is not a multiple of 8.
07	*[User setting error]: Size of data < 64 bytes.*	When the data size argument of the 'iqdata_read' or 'iqdata_readplus' function of API is less than 64 bytes.
08	*[User setting error]: Size of data is not a multiple of '64'.*	When the data size argument of the 'iqdata_read' or 'iqdata_readplus' function of API is not a multiple of 64.