**FRIENDS Serial Communication**

**Requirements:**

* Install VCP (Virtual Com Port) Driver.
* Install FRIENDS Serial Monitor.

**Installation Process of VCP Driver:**

* Download VCP driver from this link: (<https://ftdichip.com/drivers/vcp-drivers/> ).The downloaded zipped file may be named as CDM212364\_Setup
* Unzip the downloaded file and open CDM212364\_Setup
* Step 1:

A screenshot of a computer

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* Step 2:

A screenshot of a software wizard

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* Step 3:

A screenshot of a software update

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* Step 4:

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* When FRIENDS is connected to the computer by USB, a serial port appears after installing the VCP driver.

A computer screen shot of a computer

Description automatically generated with low confidence

**Installation process of FRIENDS serial monitor:**

* Open Friends Serial Monitor.exe
* A screenshot of a computer

  Description automatically generatedChoose the installation path by pressing browse and select install.
* A screenshot of a computer

  Description automatically generated with medium confidenceThe installation process will start and then press close button after the installation is complete.
* Go to the installation directory and open main\_gui to run the FRIENDS Serial Monitor.

A screenshot of a computer

Description automatically generated with medium confidence

**The FRIENDS Serial Communication GUI:**

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**Status Bar:** It shows the connectivity status between the computer and the FRIENDS device. It turns into “green” and shows “connected” when the connection between the two devices have been established after selecting the appropriate COM port and baud rate (115200).

**COM:** Appropriate COM port should have been selected for establishing the connection for a particular FRIENDS device.

**Baudrate:** For the FRIENDS device, the baud rate will be 115200.

**Reload:** If the appropriate com port for the device doesn’t show up in the options, reload button should be pressed to get the appropriate com port.

**Connect:** After setting the com port and baud rate, connect button should be pressed to establish the connection between the computer and the FRIENDS device

**Disconnect:** To turn off the connection, disconnect button should be pressed.

**Minimum puffing duration:** By setting the threshold (minimum puffing duration) , user can separate the puffing events in the plots based on this threshold. By default, the value of this entry is 0.0.

There are two options to show the puffing events in the plot based on the threshold.

1. Display all puffing events
2. Display puffs that exceed the threshold

1st option will show all the puffing events in the plots.

Example: For minimum puffing duration 0.1s:

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Description automatically generated

2nd option will show the puffing events that only exceed the specified minimum puffing duration,

Example: For minimum puffing duration 0.1s

A graph with numbers and lines

Description automatically generated

**Plot types:** Three types of plot (Line, Stem, and Step) are available for user selection to generate the plots.

**Read Time:** This button returns the device’s actual time in POSIX format. It shows the timestamps in the Rx monitor of the GUI. Besides, it also saves the timestamps and generate the plots.

**Set Time:** This button set the local time in POSIX format to the device.

**Erase flash:** This button will erase the device’s flash memory. It requires a confirmation (YES) and “Yes” button will be enabled after pressing “Erase” button. At the beginning, the erase button will be disabled. After saving the data and generating the plots by “Read Data” button, the erase button will be enabled.

**Start Data Collection**: This button should be pressed before start collecting the data. It will set the local time in POSIX format to the device and erase the flash memory of the device and make it ready to start the data collection. At the beginning, the “Start Data Collection” button will be disabled as this button erases the flash memory without requiring any confirmation. So, after saving the data and generating the plots by “Read Data” button, the “Start Data Collection” button will be enabled.

**Read Data:** This button has multiple tasks. It reads the flash memory, saves the data in a text file, and also generate the plots from the data.

* The text file contains the local time in human readable format (e.g., Local Time: 2023-06-05 13:06:47.836938), device’s internal timestamp (e.g., Internal timestamp: 647E2437 E3EB), and event’s timestamps in **POSIX** format.

After pressing the “Read Data” button, a file dialog will be popped up and it will require a path and a filename to save the text file. The system will generate the plots from the data. The number of plots depends on the number of days in the data (one plot for one day). Time from 00:00 to 24:00 represents the horizontal x-axis.

**Conversion and generate plots:** This button converts the original timestamps to human-readable time and generates the plots. It creates two text files.

* File 1: It contains the local time in human readable format (e.g., Local Time: 2023-06-05 13:06:47.836938), and event’s timestamps in **human readable format** in flash memory.
* File 2: It contains a data table with four columns (Event, Date, Range, Duration\_in\_seconds). One can find each complete event’s occurring date, time range and duration from this table. Example:

A picture containing text, screenshot, font, information

Description automatically generated

After pressing the “Conversion and generate plots” button, a file dialog will be popped up to get the input file (The file generated from “Read Data” button), then it converts the timestamps. Afterwards, another file dialog will be popped up to save the files with converted timestamps. The second file dialog will require a path to save the converted files, and it takes the filename from the input file and add postfixes to save the converted text files. File 1 will be saved as “input file name”\_converted and file 2 will be saved as “input file name”\_duration.

**Clear:** This button will clear all the text in RX monitor

**Data Status Bar**: It shows the status while performing the functionality of “Read Data” and “Conversion and generate plots” button.

**Save the plot:** For saving the plot, press the marked icon by red circle below.

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Description automatically generated with low confidence