



FARO-FD700 / GADN-FD7L0

USB to Dual CAN FD / & GNSS Module

User Manual

Rev 1.1

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Revision History

Revision	Date	Description
1.0	2023/03/02	Initial Release
1.1	2023/07/14	Add the Switch Instruction

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1. Introduction

We provide basic CAN 2.0B and CAN FD API for application programming in Windows and Linux.

The following table shows the corresponding model to these API which can be used.

Part Number	Basic CAN 2.0B	CAN FD
FARO-FD700	Yes	Yes
GADN-FG7L0	Yes	Yes

Factory Default Setting

Nominal Baud Rate	1M Bit/s
Data Baud Rate	2M Bit/s
Frame Format	Classical CAN CAN FD No Bit Rate CAN FD Bit Rate (Default)
Auto Retransmission	ON
Transmit Pause	ON
Error Update	OFF
ISO Mode	ON
Filter Type	Range(Default) /Dual/Mask
Filter ID	0
Filter ID Type	Standard(Default) /Extend

Supported Operation System

Windows	10(32/64bit)
Linux (cdc-acm driver)	Kernel 4.4 and above, 32/64bit
Linux (SocketCAN driver)	Kernel 4.4 and above, 32/64bit

2. Hardware Installation

2.1. FARO-FD700/GRDN-FD7L0

FARO-FD700/GADN-FD700 CANbus module uses USB 2.0 input interface, there are dual options to install the module.

2.1.1. mPCIe Slot

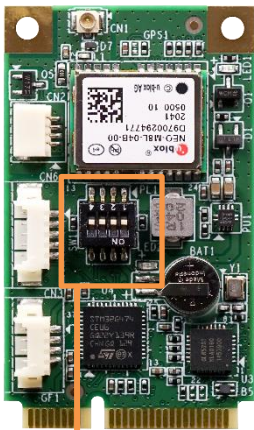
Install the module to mPCIe slot which has USB 2.0 interface.



2.1.2. Check the Switch for Terminal Resistor Function

Before we start, check the CANbus system or connected cable between CAN1/2 whether has terminal resistor or not. To turn on the pin 1 or 4 or even 1 and 4 pin for the terminal resistor function

You can find this setting as below table.



SW1: Switch

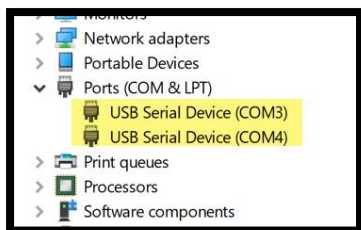
Table 15: Switch SMD 4Poles Switch Setting (SW1)

Pin #	Signal Name
1	CAN Port 1 Terminal Resistor (Default OFF)
2	NC (Default OFF)
3	CAN Port 0 TX On/Off (Default ON)
4	CAN Port 0 Terminal Resistor (Default OFF)

3. Windows OS

3.1. FARO-FD700/GRDN-FD7L0 Driver Installation

Install FARO-FD700/GRDN-FD7L0 into mPCIe slot. Windows 10 inbox driver support module directly, no additional driver needed. USB Serial Device (COM3) is for CAN bus, and USB Serial Device (COM4) is for GNSS.



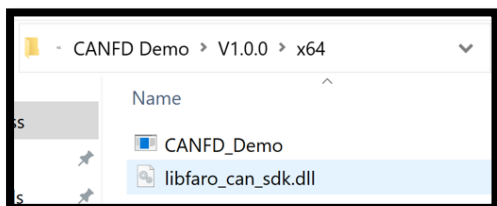
3.2. CANFD DEMO Tool

You can use this GUI utility to test FARO-FD700/GRDN-FD7L0 for sending/receiving basic CAN frames. Here show you the loopback test that CAN port 0 and CAN Port 1 send data to each other.

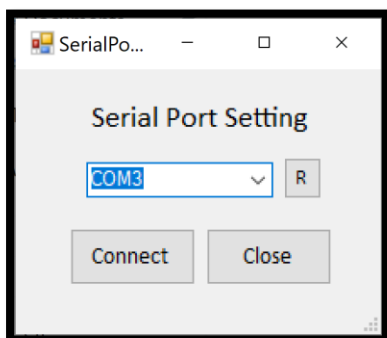
- First connect CAN port 0 and CAN Port 1.



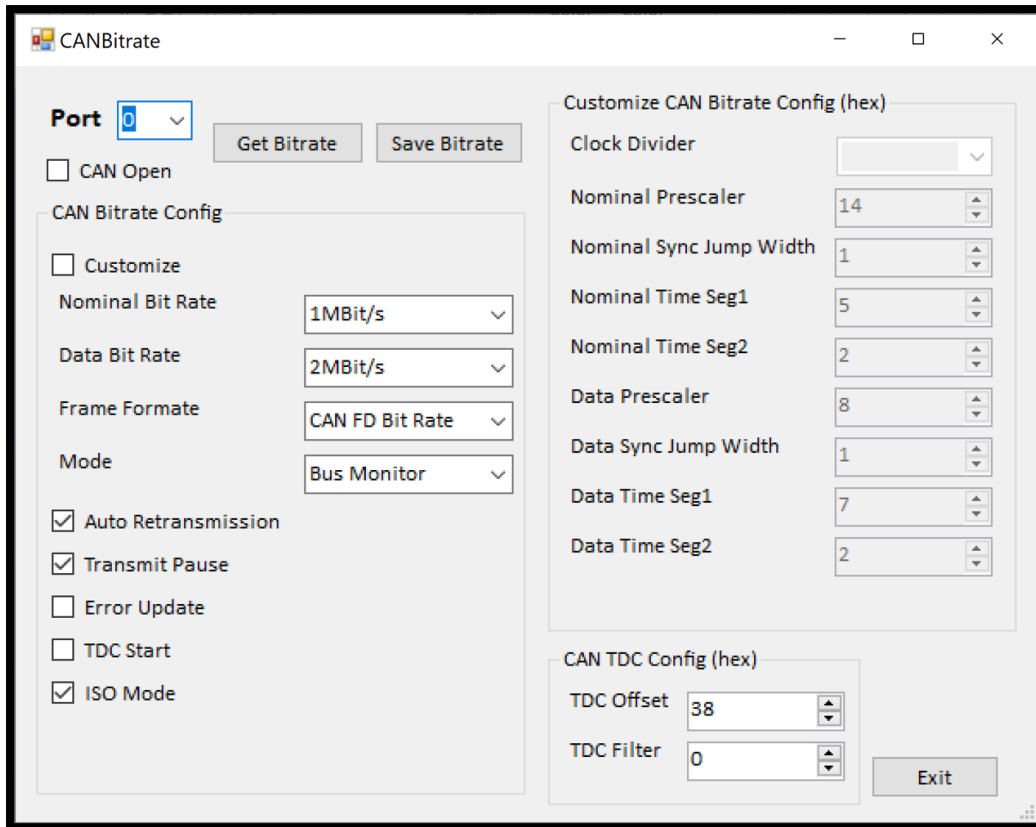
- Execute CANFD_DEMO



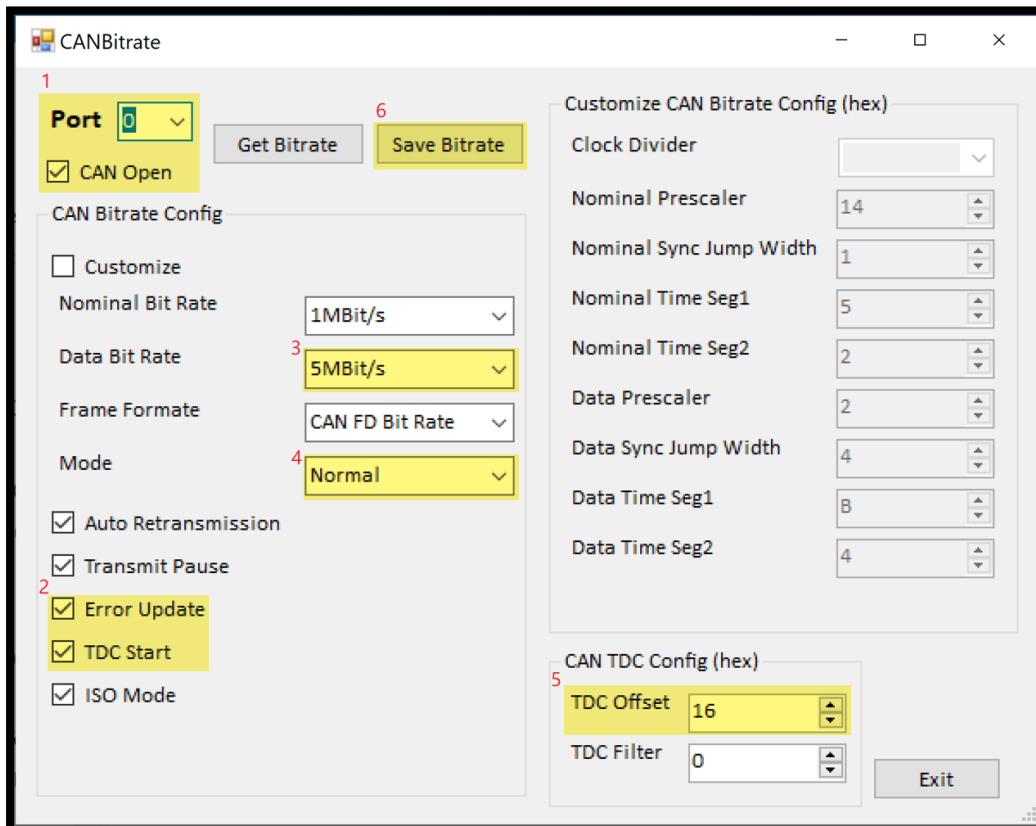
- Select COM3 and Connect



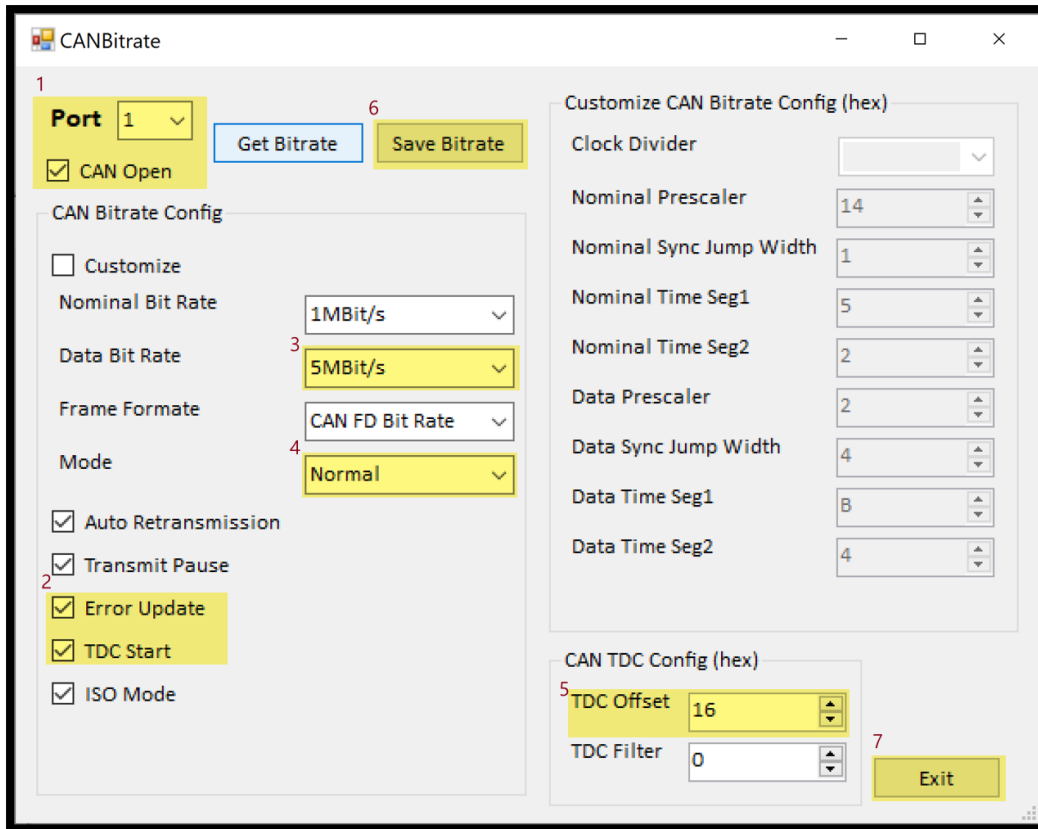
- This is CAN Bitrate setting page.



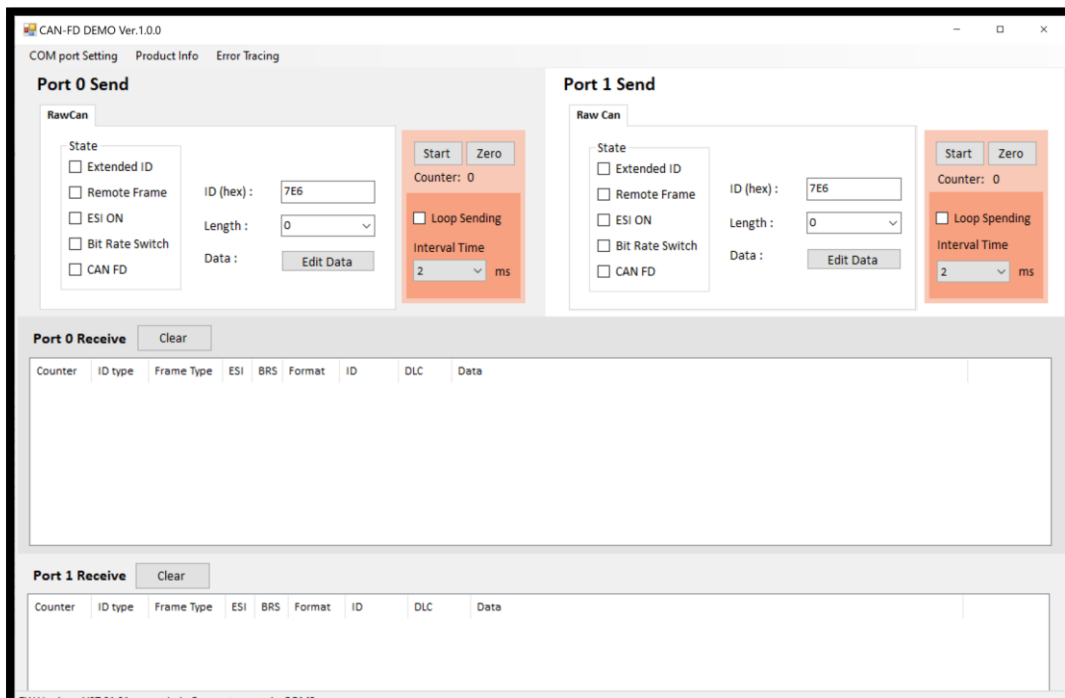
- Follow below settings step by step for CAN Port 0



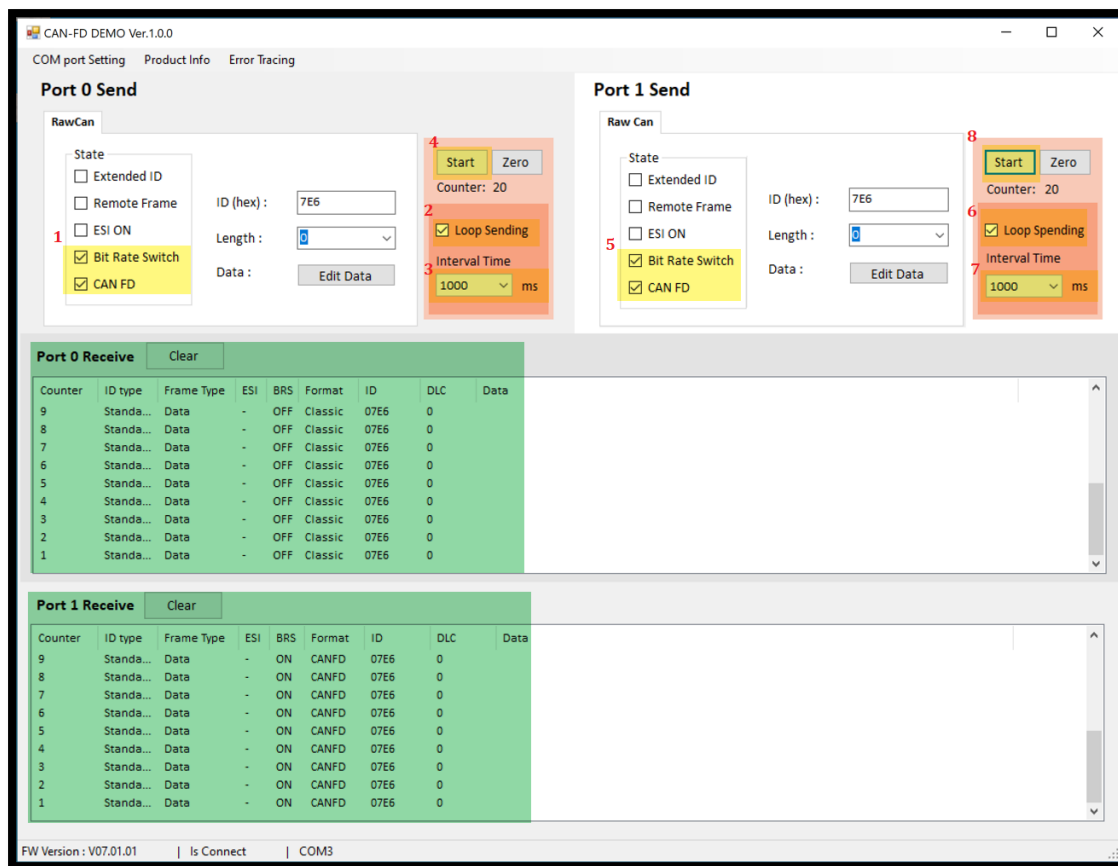
- Follow below settings step by step for CAN Port 1



- CAN-FD DEMO Tool Popup



- Follow below settings step by step, CAN port 0 and CAN Port 1 send data to each other, and you can find the test result in green area.



4. Linux OS

The following sections use Ubuntu 22.04.

4.1. Driver Installation

The device will be recognized as `ttyACM%` (`%=0, 1...`) by using CDC-ACM kernel driver.

Note: Linux kernel 2.6 and above have native CDC-ACM kernel driver. Some Linux OS may need to add CDC-ACM configuration manually in building process. In different Linux OS may have different `tty` name.

Type command `lsusb` to see messages below.

There are U-blox AG, STMicroelectronics VCOM, and Genesys Logic 4-port hub.

Type command `sudo dmesg | grep acm` to see messages below.

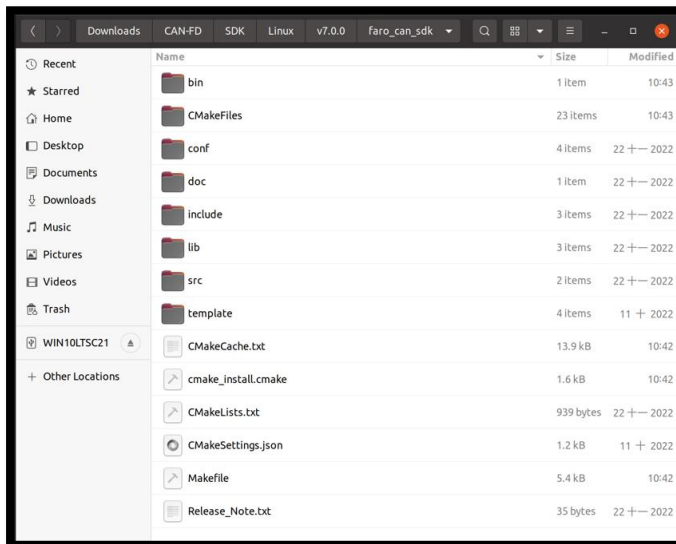
Generally the name would be `ttyACM0` or `ttyACM1` in Linux.

```

ageserver@ageserver-NUC11PAHi5: ~
ageserver@ageserver-NUC11PAHi5:~$ lsusb
Bus 004 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 003 Device 006: ID 1546:01a8 U-Blox AG [u-blox 8]
Bus 003 Device 005: ID 0483:5740 STMicroelectronics Virtual COM Port
Bus 003 Device 003: ID 05e3:0610 Genesys Logic, Inc. 4-port hub
Bus 003 Device 004: ID 8087:0026 Intel Corp.
Bus 003 Device 002: ID 046d:c534 Logitech, Inc. Unifying Receiver
Bus 003 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
ageserver@ageserver-NUC11PAHi5:~$ sudo dmesg | grep acm
[ 4.823035] cdc_acm 3-3.1:1.0: ttyACM0: USB ACM device
[ 4.829171] cdc_acm 3-3.2:1.0: ttyACM1: USB ACM device
[ 4.830066] usbcore: registered new interface driver cdc_acm
[ 4.830068] cdc_acm: USB Abstract Control Model driver for USB modems and ISDN adapters
ageserver@ageserver-NUC11PAHi5:~$
    
```

4.2. CAN-FD SDK

- Enter in faro_can_sdk folder



- Open terminal and install build-essential and cmake
 Command:
 #sudo apt-get update
 #sudo apt-get install build-essential and cmake

```

ageserver@ageserver-NUC11PAH15: ~
[sudo] password for ageserver:
Sorry, try again.
[sudo] password for ageserver:
Hit:1 https://deb.nodesource.com/node_14.x focal InRelease
Hit:2 https://download.docker.com/linux/ubuntu focal InRelease
Hit:3 http://tw.archive.ubuntu.com/ubuntu focal InRelease
Get:4 http://tw.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:5 http://tw.archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:6 http://tw.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [2403 kB]
Get:7 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:8 http://tw.archive.ubuntu.com/ubuntu focal-updates/main i386 Packages [788 kB]
Get:9 http://tw.archive.ubuntu.com/ubuntu focal-updates/main amd64 DEP-11 Metadata [274 kB]
Get:10 http://tw.archive.ubuntu.com/ubuntu focal-updates/universe i386 Packages [711 kB]
Get:11 http://tw.archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [1026 kB]
Get:12 http://tw.archive.ubuntu.com/ubuntu focal-updates/universe amd64 DEP-11 Metadata [408 kB]
Get:13 http://tw.archive.ubuntu.com/ubuntu focal-updates/universe amd64 c-n-f Metadata [23.6 kB]
Get:14 http://tw.archive.ubuntu.com/ubuntu focal-updates/multiverse amd64 DEP-11 Metadata [944 B]
Get:15 http://tw.archive.ubuntu.com/ubuntu focal-backports/main amd64 DEP-11 Metadata [8012 B]
Get:16 http://tw.archive.ubuntu.com/ubuntu focal-backports/universe amd64 DEP-11 Metadata [30.4 kB]
Get:17 http://security.ubuntu.com/ubuntu focal-security/main amd64 DEP-11 Metadata [60.0 kB]
Get:18 http://security.ubuntu.com/ubuntu focal-security/universe amd64 DEP-11 Metadata [94.1 kB]
Get:19 http://security.ubuntu.com/ubuntu focal-security/universe amd64 c-n-f Metadata [17.0 kB]
Get:20 http://security.ubuntu.com/ubuntu focal-security/multiverse amd64 DEP-11 Metadata [940 B]
Fetched 6181 kB in 3s (2381 kB/s)
Reading package lists... Done
ageserver@ageserver-NUC11PAH15:~$ sudo apt-get install build-essential cmake
Reading package lists... Done
Building dependency tree
Reading state information... Done
build-essential is already the newest version (12.8ubuntu1.1).
build-essential set to manually installed.
The following packages were automatically installed and are no longer required:
 gyp javascript-common libc-ares2 libjs-inherits libjs-is-typedarray libjs-psl
 libjs-typedarray-to-buffer libpython2-stdlib libpython2.7-minimal libpython2.7-stdlib libssl-dev
 libuv1-dev node-abbrev node-ajv node-ansi node-ansi-align node-ansi-regex node-ansi-styles
 node-ansistyles node-aproba node-archy node-are-we-there-yet node-asap node-asn1 node-assert-plus
 node-asynckit node-aws-sign2 node-aws4 node-balanced-match node-bcrypt-pbkdf node-bl
 node-bluebird node-boxen node-brace-expansion node-builtin-modules node-builtins node-cacache
 node-call-limit node-camelcase node-caseless node-chalk node-chownr node-ci-info node-cli-boxes
 node-clui node-clone node-co node-color-convert node-color-name node-colors node-columnify
 node-combined-stream node-concat-map node-concat-stream node-config-chain node-configstore
 node-console-control-strings node-copy-concurrently node-core-util-is node-cross-spawn
 node-crypto-random-string node-cyclist node-dashdash node-debug node-decamelize
 node-decompress-response node-deep-extend node-defaults node-define-properties
 node-delayed-stream node-delegates node-detect-indent node-detect-newline node-dot-prop
 node-duplexer3 node-duplexify node-ecc-jsbn node-editor node-encoding node-end-of-stream
 node-err-code node-errno node-es6-promise node-escape-string-regexp node-execa node-extend
 node-extsprintf node-fast-deep-equal node-find-up node-flush-write-stream node-forever-agent
 node-form-data node-from2 node-fs-vacuum node-fs-write-stream-atomic node-fs.realpath
 node-function-bind node-gauge node-genfun node-get-caller-file node-get-stream node-getpass
 node-glob node-got node-graceful-fs node-har-schema node-har-validator node-has-flag
 node-has-symbol-support-x node-has-to-string-tag-x node-has-unicode node-hosted-git-info
 node-http-signature node-iconv-lite node-iferr node-import-lazy node-imurmurhash node-inflight
 node-inherits node-ini node-invert-kv node-ip node-ip-regex node-is-npm node-is-obj
 node-is-object node-is-path-inside node-is-plain-obj node-is-retrv-allowed node-is-stream
    
```

- Press Y and enter

```

ageserver@ageserver-NUC11PAH15: ~
node-prr node-pseudomap node-psl node-pump node-pumpify node-punycode node-qs node-qw node-rc
node-read node-read-package-json node-readable-stream node-registry-auth-token node-registry-url
node-request node-require-directory node-require-main-filename node-resolve node-resolve-from
node-retry node-rimraf node-run-queue node-safe-buffer node-semver node-semver-diff
node-set-blocking node-sha node-shebang-command node-shebang-regex node-signal-exit node-slash
node-slide node-sorted-object node-spdx-correct node-spdx-exceptions node-spdx-expression-parse
node-spdx-license-ids node-sshpk node-ssri node-stream-each node-stream-iterate node-stream-shift
node-strict-uri-encode node-string-decoder node-string-width node-strip-ansi node-strip-eof
node-strip-json-comments node-supports-color node-tar node-term-size node-text-table node-through
node-through2 node-timed-out node-tough-cookie node-tunnel-agent node-tweetnacl node-typedarray
node-typedarray-to-buffer node-uid-number node-unique-filename node-unique-string node-unpipe
node-uri-js node-url-parse-lax node-url-to-options node-util-deprecate node-uuid
node-validate-npm-package-license node-validate-npm-package-name node-verror node-wcwidth.js
node-which node-which-module node-wide-align node-widest-line node-wrap-ansi node-wrapappy
node-xdg-basedir node-xdg-basedir node-xtend node-y18n node-yallist node-yargs
node-yargs-parser python-pkg-resources python2 python2-minimal python2.7 python2.7-minimal
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  cmake-data libjsoncpp1 librhash0
Suggested packages:
  cmake-doc ninja-build
The following NEW packages will be installed:
  cmake cmake-data libjsoncpp1 librhash0
0 upgraded, 4 newly installed, 0 to remove and 193 not upgraded.
Need to get 5470 kB of archives.
After this operation, 28.3 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://tw.archive.ubuntu.com/ubuntu focal-updates/main amd64 cmake-data all 3.16.3-1ubuntu1.20.04.1 [1613 kB]
Get:2 http://tw.archive.ubuntu.com/ubuntu focal/main amd64 libjsoncpp1 amd64 1.7.4-3.1ubuntu2 [75.6 kB]
Get:3 http://tw.archive.ubuntu.com/ubuntu focal/main amd64 librhash0 amd64 1.3.9-1 [113 kB]
Get:4 http://tw.archive.ubuntu.com/ubuntu focal-updates/main amd64 cmake amd64 3.16.3-1ubuntu1.20.04.1 [3668 kB]
Fetched 5470 kB in 1s (7791 kB/s)
Selecting previously unselected package cmake-data.
(Reading database ... 197006 files and directories currently installed.)
Preparing to unpack .../cmake-data_3.16.3-1ubuntu1.20.04.1_all.deb ...
Unpacking cmake-data (3.16.3-1ubuntu1.20.04.1) ...
Selecting previously unselected package libjsoncpp1:amd64.
Preparing to unpack .../libjsoncpp1_1.7.4-3.1ubuntu2_amd64.deb ...
Unpacking libjsoncpp1:amd64 (1.7.4-3.1ubuntu2) ...
Selecting previously unselected package librhash0:amd64.
Preparing to unpack .../librhash0_1.3.9-1_amd64.deb ...
Unpacking librhash0:amd64 (1.3.9-1) ...
Selecting previously unselected package cmake.
Preparing to unpack .../cmake_3.16.3-1ubuntu1.20.04.1_amd64.deb ...
Unpacking cmake (3.16.3-1ubuntu1.20.04.1) ...
Setting up librhash0:amd64 (1.3.9-1) ...
Setting up cmake-data (3.16.3-1ubuntu1.20.04.1) ...
Setting up libjsoncpp1:amd64 (1.7.4-3.1ubuntu2) ...
Setting up cmake (3.16.3-1ubuntu1.20.04.1) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for libc-bin (2.31-0ubuntu9.9) ...
ageserver@ageserver-NUC11PAH15:~$
    
```

- Use cmake to generate makefile

Command:

#cmake .

```

ageserver@ageserver-NUC11PAH15:~/Downloads/CAN-FD/SDK/Linux/v7.0.0/faro_can_sdk$ cmake .
-- The C compiler identification is GNU 9.4.0
-- The CXX compiler identification is GNU 9.4.0
-- Check for working C compiler: /usr/bin/cc
-- Check for working C compiler: /usr/bin/cc -- works
-- Detecting C compiler ABI info
-- Detecting C compiler ABI info - done
-- Detecting C compile features
-- Detecting C compile features - done
-- Check for working CXX compiler: /usr/bin/c++
-- Check for working CXX compiler: /usr/bin/c++ -- works
-- Detecting CXX compiler ABI info
-- Detecting CXX compiler ABI info - done
-- Detecting CXX compile features
-- Detecting CXX compile features - done
-- Configuring done
-- Generating done
-- Build files have been written to: /home/ageserver/Downloads/CAN-FD/SDK/Linux/v7.0.0/faro_can_sdk
ageserver@ageserver-NUC11PAH15:~/Downloads/CAN-FD/SDK/Linux/v7.0.0/faro_can_sdk$
    
```

- Use make to build antzer_faro_can_fd

Command:

#make

```
ageserver@ageserver-NUC11PAH15:~/Downloads/CAN-FD/SDK/Linux/v7.0.0/faro_can_sdk$ make
Scanning dependencies of target antzer_faro_can_fd
[ 50%] Building C object CMakeFiles/antzer_faro_can_fd.dir/src/antzer_faro_can_fd.c.o
[100%] Linking C executable bin/antzer_faro_can_fd
[100%] Built target antzer_faro_can_fd
ageserver@ageserver-NUC11PAH15:~/Downloads/CAN-FD/SDK/Linux/v7.0.0/faro_can_sdk$
```

- Execute antzer_faro_can_fd to do loopback test for CAN Port 1 & CAN Port 2

Command:

#sudo ./bin/ antzer_faro_can_fd

Press Ctrl + C to stop the loopback test and show the test result.

```
ageserver@ageserver-NUC11PAH15:~/Downloads/CAN-FD/SDK/Linux/v7.0.0/faro_can_sdk$ sudo ./bin/antzer_faro_can_fd
[sudo] password for ageserver:
Testing port = /dev/ttyACM0
**** Adopting port = /dev/ttyACM0, baudrate = B115200
Get firmware version : v07.01.01
send CAN Port0 cnt: 1, CAN ID:18FEC100
send CAN Port1 cnt: 1, CAN ID:CF00400
rec CAN port1 Frame Cnt:1, ID:18FEC100, Port:1, FD:8, BRS:10
Data: 00 01 02 03 04 05 06 07 08 09 0a 0b 0c 0d 0e 0f 10 11 12 13 14 15 16 17 18 19 1a 1b 1c 1d 1e 1f
20 21 22 23 24 25 26 27 28 29 2a 2b 2c 2d 2e 2f 30 31 32 33 34 35 36 37 38 39 3a 3b 3c 3d 3e 3f
rec CAN port0 Frame Cnt:1, ID:CF00400, Port:0, FD:8, BRS:10
Data: 00 03 06 09 0c 0f 12 15 18 1b 1e 21 24 27 2a 2d 30 33 36 39 3c 3f 42 45 48 4b 4e 51 54 57 5a 5d
60 63 66 69 6c 6f 72 75 78 7b 7e 81 84 87 8a 8d 90 93 96 99 9c 9f a2 a5 a8 ab ae b1 b4 b7 ba bd
send CAN Port0 cnt: 2, CAN ID:18FEC100
send CAN Port1 cnt: 2, CAN ID:CF00400
rec CAN port1 Frame Cnt:2, ID:18FEC100, Port:1, FD:8, BRS:10
Data: 00 01 02 03 04 05 06 07 08 09 0a 0b 0c 0d 0e 0f 10 11 12 13 14 15 16 17 18 19 1a 1b 1c 1d 1e 1f
20 21 22 23 24 25 26 27 28 29 2a 2b 2c 2d 2e 2f 30 31 32 33 34 35 36 37 38 39 3a 3b 3c 3d 3e 3f
rec CAN port0 Frame Cnt:2, ID:CF00400, Port:0, FD:8, BRS:10
Data: 00 03 06 09 0c 0f 12 15 18 1b 1e 21 24 27 2a 2d 30 33 36 39 3c 3f 42 45 48 4b 4e 51 54 57 5a 5d
60 63 66 69 6c 6f 72 75 78 7b 7e 81 84 87 8a 8d 90 93 96 99 9c 9f a2 a5 a8 ab ae b1 b4 b7 ba bd
send CAN Port0 cnt: 3, CAN ID:18FEC100
send CAN Port1 cnt: 3, CAN ID:CF00400
rec CAN port1 Frame Cnt:3, ID:18FEC100, Port:1, FD:8, BRS:10
Data: 00 01 02 03 04 05 06 07 08 09 0a 0b 0c 0d 0e 0f 10 11 12 13 14 15 16 17 18 19 1a 1b 1c 1d 1e 1f
20 21 22 23 24 25 26 27 28 29 2a 2b 2c 2d 2e 2f 30 31 32 33 34 35 36 37 38 39 3a 3b 3c 3d 3e 3f
rec CAN port0 Frame Cnt:3, ID:CF00400, Port:0, FD:8, BRS:10
Data: 00 03 06 09 0c 0f 12 15 18 1b 1e 21 24 27 2a 2d 30 33 36 39 3c 3f 42 45 48 4b 4e 51 54 57 5a 5d
60 63 66 69 6c 6f 72 75 78 7b 7e 81 84 87 8a 8d 90 93 96 99 9c 9f a2 a5 a8 ab ae b1 b4 b7 ba bd
send CAN Port0 cnt: 4, CAN ID:18FEC100
send CAN Port1 cnt: 4, CAN ID:CF00400
rec CAN port1 Frame Cnt:4, ID:18FEC100, Port:1, FD:8, BRS:10
Data: 00 01 02 03 04 05 06 07 08 09 0a 0b 0c 0d 0e 0f 10 11 12 13 14 15 16 17 18 19 1a 1b 1c 1d 1e 1f
20 21 22 23 24 25 26 27 28 29 2a 2b 2c 2d 2e 2f 30 31 32 33 34 35 36 37 38 39 3a 3b 3c 3d 3e 3f
rec CAN port0 Frame Cnt:4, ID:CF00400, Port:0, FD:8, BRS:10
Data: 00 03 06 09 0c 0f 12 15 18 1b 1e 21 24 27 2a 2d 30 33 36 39 3c 3f 42 45 48 4b 4e 51 54 57 5a 5d
60 63 66 69 6c 6f 72 75 78 7b 7e 81 84 87 8a 8d 90 93 96 99 9c 9f a2 a5 a8 ab ae b1 b4 b7 ba bd
send CAN Port0 cnt: 5, CAN ID:18FEC100
send CAN Port1 cnt: 5, CAN ID:CF00400
rec CAN port1 Frame Cnt:5, ID:18FEC100, Port:1, FD:8, BRS:10
Data: 00 01 02 03 04 05 06 07 08 09 0a 0b 0c 0d 0e 0f 10 11 12 13 14 15 16 17 18 19 1a 1b 1c 1d 1e 1f
20 21 22 23 24 25 26 27 28 29 2a 2b 2c 2d 2e 2f 30 31 32 33 34 35 36 37 38 39 3a 3b 3c 3d 3e 3f
rec CAN port0 Frame Cnt:5, ID:CF00400, Port:0, FD:8, BRS:10
Data: 00 03 06 09 0c 0f 12 15 18 1b 1e 21 24 27 2a 2d 30 33 36 39 3c 3f 42 45 48 4b 4e 51 54 57 5a 5d
60 63 66 69 6c 6f 72 75 78 7b 7e 81 84 87 8a 8d 90 93 96 99 9c 9f a2 a5 a8 ab ae b1 b4 b7 ba bd
^Ccatch SIGINT
CAN port0 send: 5, rec: 5
CAN port1 send: 5, rec: 5
ageserver@ageserver-NUC11PAH15:~/Downloads/CAN-FD/SDK/Linux/v7.0.0/faro_can_sdk$
```

5. Software API

Faro-FD SDK is based on a dynamic library (DLL) in Windows and shared library (.so) in Linux to control Faro-FD.

5.1. Basic Function Description

This chapter describes basic Faro-FD SDK functions and parameters.

Header file (faro_can_sdk.h) includes declaration and data structure requested for programming.

5.1.1. int AZ_VC_Init (void)

Description: Initialize and setup SDK.

Member:

None.

Return Status Code:

Value	Description
0	Success
!= 0	Error

5.1.2. int AZ_VC_Init_SetBuf (int bufsize)

Description: Initialize and setup SDK.

Member:

bufsize: [input] Internal buffer multiply by a multiple of parameter. The parameter must >= 1.

Return Status Code:

Value	Description
0	Success
!= 0	Error

5.1.3. int AZ_VC_DeInit (void)

Description: De-Initialize SDK.

Member:

None.

Return Status Code:

Value	Description
0	Success
!= 0	Error

5.1.4. int AZ_VC_Open_Port (char *lpszDevice)

Description: Serial port open.

Member:

lpszDevice: [input] serial port name.

Example:

Windows – COM1

Linux – /dev/ttyACM0

Return Status Code:

Value	Description
0	Success
!= 0	Error

5.1.5. int AZ_VC_Close_Port (void)

Description: Serial port close.

Member:

None.

Return Status Code:

Value	Description
0	Success
!= 0	Error

5.1.6. int AZ_VC_GetFWVer (struct can_fw_ver_t *canfwver)

Description: Get FaroFD CAN FD module firmware version.

Member:

canfwver: [output] struct can_fw_ver_t.

```

struct can_fw_ver_t {
    uint8_t main;    // major version

```



```

uint8_t minor;    // minor verion
uint8_t type;     // build version
uint8_t year;     // release year
uint8_t week;    // release week
};
    
```

Return Status Code:

Value	Description
0	Success
!= 0	Error

5.1.7. int AZ_VC_GetSDKVer(struct can_sdk_ver_t* cansdkver)

Description: Get FaroFD CAN FD module SDK version.

Member:

cansdkver: [output] struct can_sdk_ver_t.

```

struct can_fw_ver_t {
    uint8_t main;    // major version
    uint8_t minor;  // minor version
    uint8_t patch;  // build version
};
    
```

Return Status Code:

Value	Description
0	Success
!= 0	Error

5.1.8. int AZ_VC_CAN_Baudrate_Set(struct can_config_t canCFG)

Description: Set CAN FD baudrate.

Member:

canCFG: [input] struct can_config_t.

```

struct can_config_t {
    enum can_port_no Port;    // 0 or 1
    enum can_flag_switch CustomizeSetFlag; // open customize bit rate or not
    enum can_speed NominalBR; // can_speed from 125kHz to 1MHz
    enum can_speed DataBR;    // can_speed from 2MHz to 5MHz
    enum can_frame_type FrameFormat;
    enum can_mode_type Mode;
};
    
```

```

enum can_flag_switch AutoRetransmission;
enum can_flag_switch TransmitPause;
enum can_br_div ClockDivider;
uint16_t NominalPrescaler;
uint8_t NominalSyncJumpWidth;
uint16_t NominalTimeSeg1;
uint8_t NominalTimeSeg2;
uint8_t DataPrescaler;
uint8_t DataSyncJumpWidth;
uint8_t DataTimeSeg1;
uint8_t DataTimeSeg2;
enum can_flag_switch ErrorUpdateEn;
enum can_flag_switch TdcStart;
uint16_t TdcOffset;
uint16_t TdcFilter;
enum can_flag_switch IsoModeEn;
enum can_flag_switch CANEn; // have to enable it before transmit
};

enum can_port_no {
    CAN_CAN1 = 0, // port 0
    CAN_CAN2, // port 1
    CAN_CAN_MAX
};

enum can_flag_switch {
    CAN_FLAG_DISABLE = 0,
    CAN_FLAG_ENABLE,
    CAN_FLAG_MAX
};

enum can_speed {
    CAN_SPEED_125KHZ = 0,
    CAN_SPEED_250KHZ,
    CAN_SPEED_500KHZ,
    CAN_SPEED_800KHZ,
    CAN_SPEED_1MHZ,
    CAN_SPEED_2MHZ,

```

```

        CAN_SPEED_4MHZ,
        CAN_SPEED_5MHZ,
        CAN_SPEED_BPS_MAX
    };

    enum can_frame_type {
        CAN_FRAME_CLASSIC = 0, // Classic CAN frame
        CAN_FRAME_FD_NO_BRS, // CAN FD frame, Bit Rate Switch Off
        CAN_FRAME_FD_BRS, // CAN FD frame, Bit Rate Switch On
        CAN_FRAME_MAX
    };

    enum can_mode_type {
        CAN_MODE_NORMAL = 0,
        CAN_MODE_BUS_MONITOR = 2, // Listening mode
        CAN_MODE_EXTERNAL_LOOPBACK = 4,
        CAN_MODE_MAX
    };

    enum can_br_div {
        CAN_CLOCK_DIV1 = 1, // 160 / 1 = 160
        CAN_CLOCK_DIV2 = 2, // 160 / 2 = 80
        CAN_CLOCK_DIV4 = 4, // 160 / 4 = 40
        CAN_CLOCK_MAX
    };
    
```

Return Status Code:

Value	Description
0	Success
!= 0	Error

5.1.9. int AZ_VC_CAN_Baudrate_Get(uint8_t port, struct can_config_t* canCFG)

Description: Get CAN FD baudrate.

Member:

port: [input] 0 = CAN1, 1 = CAN2.

canCFG: [output] struct can_config_t. (description see [6.1.8](#))

Return Status Code:

Value	Description
0	Success
!= 0	Error

5.1.10. int AZ_VC_CAN_Error_Amount(void)

Description: Check the amount of CAN FD error received.

Member:

None.

Return Status Code:

Value	Description
0	No error occurs.
> 0	The number that error occurs.

5.1.11. int AZ_VC_CAN_Error(struct error_data_t* errordata)

Description: Get CAN FD received error state.

Member:

errordata: [output] struct error_data_t.

```

struct error_data_t {
    enum can_error_data_type port0_error; // port 0 error state
    enum can_error_data_type port1_error; // port 1 error state
    enum can_error_ITtype port0_ITerror; // port 0 error IT state
    enum can_error_ITtype port1_ITerror; // port 1 error IT state
};

enum can_error_data_type {
    CAN_ERROR_NO_ERROR = 0x00000000,
    CAN_ERROR_TIMEOUT_ERROR = 0x00000001,
    CAN_ERROR_PERIPHERAL_NOT_INITIALIZED = 0x00000002,
    CAN_ERROR_PERIPHERAL_NOT_READY = 0x00000004,
    CAN_ERROR_PERIPHERAL_NOT_STARTED = 0x00000008,
    CAN_ERROR_MODE_NOT_SUPPORTED = 0x00000010,
    CAN_ERROR_PARAMETER_ERROR = 0x00000020,
    CAN_ERROR_PENDING_OPERATION = 0x00000040,
    CAN_ERROR_MESSAGE_RAM_ACCESS_FAILURE = 0x00000080,
    CAN_ERROR_PUT_ELEMENT_IN_FULL_FIFO = 0x00000100,

```

```

CAN_ERROR_GET_ELEMENT_FROM_EMPTY_FIFO = 0x00000200,
CAN_ERROR_OVERFLOW_OF_CAN_ERROR_LOGGING_COUNTER = 0x00010000,
CAN_ERROR_MESSAGE_RAM_WATCHDOG_EVENT_OCCURRED = 0x00100000,
CAN_ERROR_PROTOCOL_ERROR_IN_ARBITRATION_PHASE = 0x00200000,
CAN_ERROR_PROTOCOL_ERROR_IN_DATA_PHASE      = 0x00400000,
CAN_ERROR_ACCESS_TO_RESERVED_ADDRESS = 0x00800000,
};

enum can_error_ITtype {
    CAN_IT_ERROR_NO_ERROR      = 0x00000000,
    CAN_IT_ERROR_PASSIVE       = 0x00020000,
    CAN_IT_ERROR_WARNING       = 0x00040000,
    CAN_IT_ERROR_BUS_OFF       = 0x00080000,
};
    
```

Return Status Code:

Value	Description
0	Success
!= 0	Error

5.1.12. int AZ_VC_CAN_Read_Amount(void)

Description: Check the amount of CAN FD data received.

Member:

None.

Return Code:

Value	Description
0	No data occur.
> 0	The number that data occurs.

5.1.13. int AZ_VC_CAN_Read(struct can_message_t *candata, uint32_t *dwread)

Description: The SDK support message queue method to read CAN FD data.

Member:

candata: [output] struct can_message_t.

dwread: [output] Actual reading bytes.

```

struct can_message_t {
    
```

```

uint8_t TxRxState;
// bit 7 : IdType - 0 is standard ID, 1 is extended ID
// bit 6 : FrameType - 0 is data frame, 1 is remote frame
// bit 5 : ErrorStateIndicator - 0 is active, 1 is passive
// bit 4 : BitRateSwitch - 0 is OFF, 1 is ON
// bit 3 : FDFormat - 0 is Classic CAN, 1 is FA CAN
// bit 2 : reserved 0
// bit 1 : reserved 0
// bit 0 : Port - 0 is port 0, 1 is port 1
uint32_t Id; // 11-bit if IdType is standard, 29-bit if IdType is extended
uint8_t Length; // 64, 48, 32, 24, 20, 16, 12, 8, 7, 6, 5, 4, 3, 2, 1, 0
uint8_t data[64];
};
    
```

Return Code:

Value	Description
0	Success
!= 0	Error

5.1.14. int AZ_VC_CAN_Write(struct can_message_t candata)

Description: Write raw CAN FD data to CAN FD controller.

Member:

candata: [input] struct can_message_t. (description see [6.1.13](#))

Return Code:

Value	Description
0	Success
!= 0	Error

5.1.15. int AZ_VC_CAN_Filter_Set(struct can_filter_config_t canFilterCFG)

Description: Set CAN FD controller filters configuration.

Member:

canFilterCFG: [input] struct can_filter_config_t.

```

struct can_filter_config_t {
    enum can_port_no Port; // (description see 6.1.8)
    uint8_t Index; //std:0~13, ext:0~7
    enum can_filter_type FilterType;
    
```

```

enum can_id_type IdType;
enum can_filter_cfg FilterConfig;
uint32_t Id1;
uint32_t Id2;
};

enum can_filter_type {
    CAN_FILTER_RANGE = 0, //Range filter from FilterID1 to FilterID2
    CAN_FILTER_DUAL = 1, // Dual ID filter for FilterID1 or FilterID2
    CAN_FILTER_MASK = 2, // Classic filter: FilterID1 = filter, FilterID2 = mask CAN_FILTER_TYPE_MAX
};

enum can_id_type {
    CAN_ID_STD = 0, // standard ID
    CAN_ID_EXT, // extended ID
    CAN_ID_TYPE_MAX
};

enum can_filter_cfg {
    CAN_FILTER_CFG_DISABLE = 0,
    CAN_FILTER_CFG_ENABLE,
    CAN_FILTER_CFG_MAX
};
    
```

Return Status Code:

Value	Description
0	Success
!= 0	Error

5.1.16. int AZ_VC_CAN_Filter_Get(struct can_filter_config_t *canFilterCFG)

Description: Get CAN FD controller filters configuration.

Member:

canFilterCFG: [input / output] struct can_filter_config_t. (description see [6.1.15](#))

```

struct can_filter_config_t {
    enum can_port_no Port; // input
    uint8_t Index; // input
    enum can_filter_type FilterType; //output
    enum can_id_type IdType; // input
    
```

```
enum can_filter_cfg FilterConfig; //output
uint32_t Id1; // output
uint32_t Id2; // output
};
```

Return Status Code:

Value	Description
0	Success
!= 0	Error

5.1.17. int AZ_VC_CAN_Product_Info_Read(struct product_information* canProductInfo)

Description: Get Product Information.

Member:

canProductInfo: [output] struct product_information.

```
struct product_information {
    uint8_t BomName[30];
    uint8_t PnNumber[20];
    uint8_t SnNmuber[17];
};
```

Return Status Code:

Value	Description
0	Success
!= 0	Error

5.1.18. int AZ_VC_Save_All_Config(uint8_t mode)

Description: Save or reset all config (baudrate & filter).

Member:

mode: [input] 1 - Store system configuration, 2 – Factory reset.

Return Status Code:

Value	Description
0	Success
!= 0	Error

5.1.19.int AZ_VC_Reboot_Module(void)

Description: Reboot module.

Member:

None.

Return Status Code:

Value	Description
0	Success
!= 0	Error

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