2020

Faro CAN Bus Module

Tony

[FARO CAN SDK REFERENCE MANUAL (LINUX)]

Version 5.0.6

Table of Contents

Revision History

Version	Date	Editor	Descriptions
V5.0.0	2020/02/26	Tony Lee	Created
V5.0.1	2020/03/18	Tony Lee	Add OBD2
V5.0.2	2020/06/05	Tony Lee	Modify OBD2 Decode
V5.0.3	2020/07/07	Vincent Cheng	Add check the amount of data function.
V5.0.4	2020/08/06	Vincent Cheng	Modify some wrong commands.
V5.0.6	2020/08/20	Vincent Cheng	Add baud rate of the COM port in the parameters of the AZ_VC_Init function.
V5.0.8	2021/09/13	Vincent Cheng	Add new initial function, AZ_VC_Init_PB

WARNING

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1. Introduction

The Faro CAN SDK (Software Development Kit) is a software library that can be used to build the user application.
It contains many topics such as Controller Area Network (CAN), J1939, OBD-II, etc.
The Faro SDK and firmware version must be v1.01.06.20.06 (Raw CAN)/ v3.09.F4 (J1939)/v3.01.04.20.05 (J1939)/v4.01.06.20.06 (Raw CAN + OBDII + J1939 + J1708) or later.

The SDK is available as a plain „C-style SO" and can be accessed from C programming language.

2. System Requirements and Preparation

2.1 Supported Hardware:

Faro CAN bus F4 module full and half size type.

2.2 Supported OS:

Ubuntu 16.04 (kernel 4.15.0) and later.

2.3 System Prepare (Driver Installation):

Follow CP210x Linux driver “CP210x_VCP_Linux_3.13.x_Release_Notes.txt” to build and install CP210x USB-to-UART adapter driver.
Ubuntu 14.04 and later, Debian 8.9.0 has already built-in CP210x driver that means we can also use the OS default driver.

2.4 Install Necessary Building Libraries (Ubuntu):

1. Make sure your developed desktop PC or laptop connect to internet.
2. Launch terminal and enter root authority.
3. Type “sudo apt-get install build-essential cmake” to install necessary libraries and waiting for installation successfully.

2.4.1 Install Necessary Building Libraries (Debian):

1. Make sure your developed desktop PC or laptop connect to internet.
2. Launch terminal and enter root authority.
3. Type “apt-get update” to update apt latest packages.
4. Type “apt-get install build-essential cmake” to install necessary libraries and waiting for installation successfully.

2.5 Files Requirement:

Folder bin, CMakeFiles, conf, include, lib, src and files cmake_install.cmake, CMakeCache.txt, CMakeLists.txt, and Makefile.

2.6 How to build sample source code:

1. Extract “v5.0.0.tgz” (Ubuntu)(file folder name should be faro_can_sdk).
2. Switch working directory to “faro_can_sdk”.
3. Type “cmake .” on terminal window.
4. Type “make” on terminal window to build faro_can_sdk_demo.exe , faro_can_sdk_demo_j1708.exe, faro_can_sdk_demo_sensor.exe,

faro_can_sdk_receive_sample.exe sample program.

2.7 How to run sample program:

1. Type “sudo ./bin/faro_can_sdk_demo -h” on terminal window to get supporting functions list. The follow the supporting functions list description to run the function what you need.
2. The supporting functions list.

-h, --help

-s, --scan, scan available serial port

-p, --port

#1-port, ex "/dev/ttyUSB0"

-d, --deinit

#1-deinit after x seconds, -1 endless until ctrl-c

-g, --get_fw_ver, get CAN firmware version

-c, --can_config, can config

#1-port: 1 byte

#2-speed: 1 byte, 0: 1M, 1: 800K, 2: 500K, 3: 250K, 4: 200K, 5: 125K

-b, --reset_module

-m, --mode_active

#1-port: 0 or 1

#2-mode active: 0:RAW CAN, 1:OBD2, 2:J1939, 3:J1708_27byte, 4:CAN2ADR_OBD2, 5:CAN2ADR_J1939, 8:J1708_21, 9: J1708_21_OFF

-a, --set_request_time

#1-port: 0 or 1

#2-request time: 1~100ms

-f, --filter_config

-w, --filter_config_raw

#1-type: 0: ID+Mask, 1: ID List, 2: Remove, 3: Reset All

#2-port: 0, 1

#3-bank: 0 - 13

#4-mode: 0: 16 bits, 1: 32 bits

#5-filterId: 16/32 bits value in hex, ex: 0x0011/0x00112233

#6-filterId/filterMask: 16bits/32 bits in hex, ex: 0x1234/0x00112233

#7-filterMask: 16 bits in hex, ex: 0x0011

#8-filterMask: 16 bits in hex, ex: 0x0011

-x, --get_filter_config

#1 port: 0, 1

#2 bank: 0 - 13

-r, --read_write_raw

-j, --j1939_test

0 - read data

1 - write/read test

#1-port: 1 byte

#2-pgn: 4 bytes, ex: 0x18FEF100

#3-dlc: 1 byte

#4-4/8 J1939 data(0~3): 4 byte, ex: 0x01020304

#5-4/8 J1939 data(4~7): 4 byte, ex: 0x05060708

-t, --test_cnt, set counter for testing loop

-u, --get_uart_canspeed, get UART baudrate and can speed

-U, --set_uart, set UART baudrate\n"

uart baud rate - 0: 115200, 1: 230400, 2: 460800, 3: 512000, 4: 921600

-S --store_config

1: Store system configuration, 2: Factory Reset

-7, --demo_j1708

0 - read J1708 21 bytes pkt

1 - write J1708 21 bytes pkt

#1-mid: 1 byte, ex: 0x00

#2-priority: 1 byte, ex: 0x01

#3-dlc: 1 byte, ex: 0x08

#4-4/13 data: 4 byte, ex: 0x01020304

#5-4/13 data: 4 byte, ex: 0x05060708

#6-4/13 data: 4 byte, ex: 0x090A0B0C

#7-4/13 data: 4 byte, ex: 0x0D0E0F10

#8-4/13 data: 4 byte, ex: 0x11121314

--> data will be combined as 0x01020304 0x05060708 0x090A0B0C 0x0D0E0F10 0x11121314

-e, --ecompass

0 - set Accelerator Full Scale

-scale: 0: ±2, 1: ±4, 2: ±8, 3: ±16

1 - Get Accelerator Full Scale

-A, --Algorithm

0 - Clear sensor algorithm

1 - Set Fordward/Backward Algorithm Enable/Disable

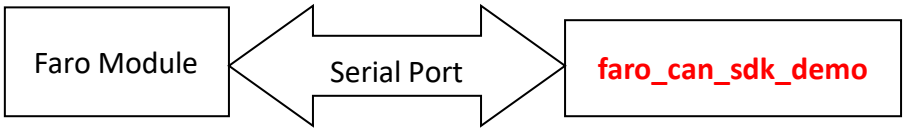
-switch: 0: Disable, 1: Enable

-k, --read_sku

-v, --version

-q, --quiet mode, set 1 to quiet mode

2.8 Faro Linux SDK File Architecture



2.9 How to receive raw CAN data:

1. Type “sudo ./bin/faro_can_sdk_receive_sample -p /dev/ttyUSB0 -r -d -1” on terminal windows and press “Enter” key to launch serial receiving thread.

2.10 How to receive J1939 data:

1. Change path to “bin” folder.
2. Type “sudo ./bin/faro_can_sdk_receive_sample -p /dev/ttyUSB0 -j -d -1” on terminal windows and press “Enter” key to launch serial receiving thread.

2.11 How to receive J1708 data (27byte):

1. Type “sudo ./bin/faro_can_sdk_demo_j1708 -p /dev/ttyUSB0 -j 0 -d -1” on terminal windows and press “Enter” key to launch serial receiving thread.

2.12 How to receive Sensor interrupt data:

1. Configure sensor interrupt (refer to
2. Type sudo ./bin/faro_can_sdk_demo_sensor -p /dev/ttyUSB0 -x 0 -d -1
3. Press combination key “ctrl+c” to exit receiving thread and it will display similar message as below.

```
Testing port = /dev/ttyUSB0, baudrate = B500000
waiting packet timeout
Testing port = /dev/ttyUSB0, baudrate = B115200
***** Adopting port = /dev/ttyUSB0, baudrate = B115200
waiting packet timeout
checking module status...
module reset complete
Calling AZ_VC_ACCCalibration successful
Calling AZ_VC_Sensor_Write, cmd = 0x53, successful
```

```
Calling AZ_VC_ConfigACCINT successful
Read packet cnt = 1
cmd = 0x93, dlc = 0x04 -->
INT_SRC = 0x01, STATUS = 0xFF, INT1_SRC = 0x60, INT2_SRC = 0x00
Read packet cnt = 2
cmd = 0x93, dlc = 0x04 -->
INT_SRC = 0x01, STATUS = 0xFF, INT1_SRC = 0x60, INT2_SRC = 0x00
Read packet cnt = 3
cmd = 0x93, dlc = 0x04 -->
INT_SRC = 0x01, STATUS = 0xFF, INT1_SRC = 0x60, INT2_SRC = 0x00
Read packet cnt = 4
cmd = 0x93, dlc = 0x04 -->
INT_SRC = 0x01, STATUS = 0xFF, INT1_SRC = 0x60, INT2_SRC = 0x00
Read packet cnt = 5
cmd = 0x93, dlc = 0x04 -->
INT_SRC = 0x01, STATUS = 0xFF, INT1_SRC = 0x60, INT2_SRC = 0x00
Read packet cnt = 6
cmd = 0x93, dlc = 0x04 -->
INT_SRC = 0x01, STATUS = 0xFF, INT1_SRC = 0x60, INT2_SRC = 0x00
Read packet cnt = 7
cmd = 0x93, dlc = 0x04 -->
INT_SRC = 0x01, STATUS = 0xFF, INT1_SRC = 0x60, INT2_SRC = 0x00
waiting packet timeout
^Ccatch SIGINT
waiting packet timeout
threads are stopped
```

3 SDK Programming API

3.1 int AZ_VC_GetCommPort(char *lpszCommPort, int *portCnt)

Include file: #include "faro_can_sdk.h"

Descriptions:

Get CAN bus module serial port name and amount

Parameters:

char * lpszCommPort – all of serial port name string and separated character is '\n', e.g. "COM3\nCOM4\n…"

int *portCnt – amount of serial port

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function "do_scan_port" of sample program faro_can_sdk_demo.c.

3.2 int AZ_VC_Init(char *lpszDevice, char BaudRate)

Include file: #include "faro_can_sdk.h"

Descriptions:

Serial port open, initialization & configuration

Parameters:

char *lpszDevice – serial port name string

char BaudRate – Baud rate of COM port.(0 - 115200, 1 - 230400, 2 - 460800, 3 - 921600, 4 - 921600)

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function "do_get_can_fw_ver" of sample program faro_can_sdk_demo.c.

3.3 int AZ_VC_Init_PB(char *lpszDevice, char BaudRate, , int bufsize)

Include file: #include "faro_can_sdk.h"

Descriptions:

Serial port open, initialization & configuration, increase ring buffer size

Parameters:

char *lpszDevice – serial port name string

char BaudRate – Baud rate of COM port.(0 - 115200, 1 - 230400, 2 - 460800, 3 - 921600, 4 - 921600)

int *bufsize – A multiple of element ring buffer size.(bufsize >= 1)

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_get_can_fw_ver” of sample program faro_can_sdk_demo.c.

3.4 int AZ_VC_DeInit(void)

Include file: #include "faro_can_sdk.h"

Descriptions:

Serial port close & de-initialization

Parameters:

None

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “deinit_wait” of sample program faro_can_sdk_demo.c.

3.5 int AZ_VC_GetFWVer(struct can_fw_ver_t *canfwver)

Include file: #include "faro_can_sdk.h"

Descriptions:

Get Faro CAN bus module firmware version

Parameters:

```
struct can_fw_ver_t
{
    uint8_t main;
    uint8_t minor;
    uint8_t type;
    uint8_t year;
    uint8_t week;
};
```

*canfwver – 3 bytes, 1st byte is major version, 2nd byte is minor version,
3rd byte is bata version, 4th byte is release year,
5th byte is release week. e.g. 1.0.f4

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_get_can_fw_ver” of sample program faro_can_sdk_demo.c.

3.6 int AZ_VC_CAN_Config(struct can_config_t *canCFG)

Include file: #include "faro_can_sdk.h"

Descriptions:

Set CAN bus configurations

Parameters:

```
enum can_speed
{
    CAN_SPEED_1M = 0,
    CAN_SPEED_800K = 1,
    CAN_SPEED_500K = 2,
    CAN_SPEED_250K = 3,
    CAN_SPEED_200K = 4,
    CAN_SPEED_125K = 5
};
struct can_config_t
{
    uint8_t port;
    enum can_speed speed;
};
```

canCFG.port = 0 or 1

canCFG.speed = 0 ~ 5

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_can_config” of sample program faro_can_sdk_demo.c.

3.7 int AZ_VC_CAN_Read_Amount (void)

Include file: #include "faro_can_sdk.h"

Descriptions:

Check the amount of CAN bus data received.

Parameters:

None

Return value:

The amount of CAN bus data received.

Usages:

Refer to function “do_read_write_raw” of sample program

faro_can_sdk_demo.c.

3.8 int AZ_VC_CAN_Read(struct can_message_t *candata, uint32_t *dwread)

Include file: #include "faro_can_sdk.h"

Descriptions:

The SDK support message queue method to read CAN bus data.

Parameters:

```
struct can_message_t
{
    uint8_t port;
    uint32_t id;
    uint8_t mode;    // CAN 2.0A/B (STD/Extended)
    uint8_t rtr;     // Remote request
    uint8_t dlc;
    uint8_t data[8];
};
```

*canData – total 16 bytes, 1st byte is CAN bus port 0 or 1, 2nd byte is raw CAN data ID, 3rd byte is CAN 2.0A (=0, standard) or B (=1, extended) mode, 4th byte is RTR (Remote Request) mode (=1 RTR, =0 None), 5th byte is raw CAN data length DLC, the last 8 bytes are raw CAN data.

uint32_t *dwread – actual reading bytes

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_read_write_raw” of sample program faro_can_sdk_demo.c.

3.9 int AZ_VC_CAN_Write(struct can_message_t candata)

Include file: #include "faro_can_sdk.h"

Descriptions:

Write raw CAN data to CAN bus controller

Parameters:

```
struct can_message_t
{
    uint8_t port;
    uint32_t id;
    uint8_t mode;    // CAN 2.0A/B (STD/Extended)
    uint8_t rtr;     // Remote request
    uint8_t dlc;
    uint8_t data[8];
};
```

candata.port = 0 or 1

candata.id = 0xXXXXXXXX

candata.mode = 0 or 1

candata.rtr = 0 or 1

candata.dlc = 1 ~ 8

candata.data[0 ~ 7] = the raw CAN data would be transmitted

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_read_write_raw” of sample program faro_can_sdk_demo.c.

3.10 int AZ_VC_CAN_Filter_Config(struct can_filter_config_t canFilterCFG)

Include file: #include "faro_can_sdk.h"

Descriptions:

Set CAN bus controller filters configuration

Parameters:

```
struct can_filter_config_t
{
    uint8_t type;    // 0 - ID+Mask, 1 - ID List, 2 - Remove, 3 - Reset All
    uint8_t port;
    uint8_t bank;
    uint8_t mode;
    uint32_t filterId;
    uint32_t filterMask;
};
```

canFilterCFG.type = 0 ~ 3

canFilterCFG.port = 0 or 1

canFilterCFG.bank = 0 ~ 14 (F1), 0 ~ 27 (F4)

canFilterCFG.mode = 0 (CAN 2.0A) or 1 (CAN 2.0B)

canFilterCFG.filterId = CAN bus controller ID filter configuration value

canFilterCFG.filterMask = CAN bus controller ID filter mask configuration value

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_filter_config” of sample program faro_can_sdk_demo.c.

3.11 int AZ_VC_ModeActive(uint8_t mode, uint8_t mode)

Include file: #include "faro_can_sdk.h"

Descriptions:

Active and retrieve J1939, J1708, ADR_OBD2, ADR_J1939, J1708_21byte or J1708 supporting status.

Parameters:

uint8_t port – 0 or 1

uint8_t mode – 0x01: OBDII mode, 0x02: J1939 mode, 0x03: J1708 mode,
0x04: ADR_OBD2 mode, 0x05: ADR_J1939 mode
0x08: J1708_21 byte mode, 0x09: Close J1708_21 byte mode.

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_mode_active” of sample program faro_can_sdk_demo.c.

3.12 int AZ_VC_Set_Request (uint8_t set_request_time_port, uint8_t set_request_time_time)

Include file: #include "faro_can_sdk.h"

Descriptions:

Active and retrieve J1939, J1708, ADR_OBD2, ADR_J1939, J1708_21byte or J1708 supporting status.

Parameters:

uint8_t set_request_time_port – 0 or 1

uint8_t set_request_time_time – 1 ~ 100ms
.

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_set_request_time” of sample program faro_can_sdk_demo.c.

3.13 int AZ_VC_CAN_Filter_Get(struct can_filter_config_t *canFilterCFG)

Include file: #include "faro_can_sdk.h"

Descriptions:

Get CAN bus controller filters configuration

Parameters:

```
struct can_filter_config_t
{
    uint8_t type;    // 0 - ID+Mask, 1 - ID List, 2 - Remove, 3 - Reset All
    uint8_t port;
    uint8_t bank;
    uint8_t mode;
    uint32_t filterId;
    uint32_t filterMask;
};
```

canFilterCFG.type = 0 ~ 3

canFilterCFG.port = 0 or 1

canFilterCFG.bank = 0 ~ 14 (F1), 0 ~ 27 (F4)

canFilterCFG.mode = 0 (CAN 2.0A) or 1 (CAN 2.0B)

canFilterCFG.filterId = CAN bus controller ID filter configuration value

canFilterCFG.filterMask = CAN bus controller ID filter mask configuration value

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_get_filter_config” of sample program faro_can_sdk_demo.c.

3.14 int AZ_VC_GetUART_CanBaudRate (struct uart_canbaudrate_t *uart_canbaudrate)

Include file: #include "faro_can_sdk.h"

Descriptions:

Get CAN uart and can speed.

Parameters:

```
struct uart_canbaudrate_t
{
    uint8_t UART; //0-115200bps,1-230400bps, 2-460800bps, 3-512000bps, 4-921600bps
```

```
    uint8_t CANPort0;
    uint8_t CANPort1;
};
```

uart_canbaudrate.UART = 0 ~ 4

uart_canbaudrate.CANPort0 = 0 ~ 5

uart_canbaudrate.CANPort1 = 0 ~ 5

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_get_uart_canbaudrate” of sample program faro_can_sdk_demo.c.

3.15 int AZ_VC_UART_Config(uint8_t mode);

Include file: #include "faro_can_sdk.h"

Descriptions:

Set UART baud rate.

Parameters:

uint8_t mode – 0: 115200, 1: 230400, 2: 460800, 3: 512000, 4: 921600.

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_set_uart_baudrate” of sample program faro_can_sdk_demo.c.

3.16 int AZ_VC_Save_Config (uint8_t mode);

Include file: #include "faro_can_sdk.h"

Descriptions:

Set UART baud rate.

Parameters:

uint8_t mode – 1: Store system configuration, 2: Factory Reset.

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_set_store_config” of sample program faro_can_sdk_demo.c.

3.17 int AZ_VC_read_sku(struct module_sku_format_t module_sku);

Include file: #include "faro_can_sdk.h"

Descriptions:

Read Module SKU number.

Parameters:

uint8_t mode – 1: Store system configuration, 2: Factory Reset.

```
struct module_sku_format_t {
        uint8_t sku1;
        uint8_t sku2;
        uint8_t sku3;
        uint8_t sku4;
        uint8_t sku5;
        uint8_t sku6;
        uint8_t sku7;
        uint8_t sku8;
};
```

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_read_sku” of sample program faro_can_sdk_demo.c

3.18 int AZ_VC_Reset_Module (void)

Include file: #include "faro_can_sdk.h"

Descriptions:

Reset Module.

Parameters:

None

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “reset module” of sample program faro_can_sdk_demo.c and sample program faro_can_sdk_demo_j1708.c

*** This command is also effective when Faro is in J1708 state.**

4 OBD2 SDK Programming API

4.1 int AZ_VC_OBD2_Write(struct OBD2_send_msg_t obd2data)

Include file: #include "faro_can_sdk.h"

Descriptions:

Write OBD2 data to CAN bus controller.

Parameters:

```
struct OBD2_send_msg_t
{
    uint8_t port;
    uint32_t id;            // ID
    uint8_t PID;            // data PID
    uint8_t can_mode;       // can mode(A or B)
    uint8_t dlc;            // dlc
    uint8_t data[8];        //data
};
```

(Input)

obd2data.port = 0 or 1

obd2data.id = ex:7DF

obd2data.PID = ex:0C

obd2data.can_mode = 0: 2.0A, 1, 2.0B

obd2data.dlc = 1 ~ 8

obd2data.data[0 ~ 7] = the OBD2 data would be transmitted

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_obd2_demo” of sample program faro_can_sdk_demo_obd2.c.

4.2 int AZ_VC_OBD2_Read_Amount (void)

Include file: #include "faro_can_sdk.h"

Descriptions:

Check the amount of OBD2 data received.

Parameters:

None

Return value:

The amount of OBD2 data received.

Usages:

Refer to function “do_obd2_demo” of sample program faro_can_sdk_demo_obd2.c.

4.3 int AZ_VC_OBD2_Read(struct OBD2_message_t *obd2data, uint32_t *dwread)

Include file: #include "faro_can_sdk.h"

Descriptions:

The SDK support message queue method to read OBD2 data from module.

Parameters:

char *lpszDevice – serial port name string

Parameters:

```
struct OBD2_message_t
{
    uint8_t port;
    uint32_t id;            // ID
    uint8_t service;        // service
    uint8_t pid;            // data PID
    uint8_t can_mode;       // can mode(A or B)
    uint8_t dlc;            // dlc
    uint8_t data[8];        //data
};
```

(output)

obd2data.port = 0 or 1

obd2data.id = ex:7DF

obd2data.service = (int value).

obd2data.pid = ex:0C

obd2data.can_mode = 0: 2.0A, 1, 2.0B

obd2data.dlc = 1 ~ 8

obd2data.data[0 ~ 7] = the OBD2 data would be transmitted

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_obd2_demo” of sample program faro_can_sdk_demo_obd2.c.

4.4 int AZ_VC_OBD2_Read_Decode(struct OBD2_Decode_message_t *obd2data, uint8_t pid uint32_t *dwread)

Include file: #include "faro_can_sdk.h"

Descriptions:

The SDK support message queue method to read OBD2 data from module.

Parameters:

char *lpszDevice – serial port name string

Parameters:

```
struct OBD2_message_t
{
    uint8_t pid;            // data PID
    uint32_t data;          // data been decode
    uint32_t data2;         // data2 been decode
    uint8_t data_f;         // float data been decode
    uint8_t data_vi[17];    // vehicle identification number(VI)
};
```

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_obd2_demo” of sample program faro_can_sdk_demo_obd2.c.

5 J1939 SDK Programming API

5.1 int AZ_VC_J1939_Read_Amount (void)

Include file: #include "faro_can_sdk.h"

Descriptions:

Check the amount of J1939 data received from port0(CAN1).

Parameters:

None

Return value:

The amount of J1939 data received from port0(CAN1).

Usages:

Refer to function “do_j1939_test” of sample program faro_can_sdk_demo.c.

5.2 int AZ_VC_J1939_Read(void)

Include file: #include "faro_can_sdk.h"

Descriptions:

The SDK support message queue method to read J1939 data from module can1.

Parameters:

```
struct J1939_message_t
{
    uint32_t id;
    uint8_t p;      // Priority
    uint8_t dp;     // Data Page
    uint8_t pf;     // PDU Format
    uint8_t ps;     // PDU Specific Field
    uint8_t sa;     // Source Address
    uint32_t pgn;   // Parameter Group Number
    uint8_t dlc;
    uint8_t data[8]; // Data
};
```

J1939data (output) – total 22 bytes, 1st ~ 4th byte is J1939 ID, 5th byte is J1939 data priority (0 ~ 7), 6th byte is J1939 data page (0 or 1), 7th byte is PDU format (PDU1 = 0 ~ 239, PDU3 = 240 ~ 255), 8th byte is PDU specific field, 9th byte is source address (unique address), 10th ~ 13th bytes are Parameter group number (total 3 bytes, consist of dp, pf and ps), 14th byte is raw CAN data length DLC, the last 8 bytes are raw CAN data, refer to J1939 standard SAE J1939-21 for more detail information.

UINT32 *dwread (output) – actual reading bytes

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_j1939_test” of sample program faro_can_sdk_demo.c

5.3 int AZ_VC_J1939_Read_CAN2_Amount (void)

Include file: #include "faro_can_sdk.h"

Descriptions:

Check the amount of J1939 data received from port1(CAN2).

Parameters:

None

Return value:

The amount of J1939 data received from port1(CAN2).

Usages:

Refer to function “do_j1939_test” of sample program faro_can_sdk_demo.c.

This Command only support on faro v4.01.07.20.06, v3.01.08.20.08

5.4 int AZ_VC_J1939_Read_CAN2(struct J1939_message_t J1939data, uint32_t* dwread)

Include file: #include "faro_can_sdk.h"

Descriptions:

The SDK support message queue method to read J1939 data from module can2.

Parameters:

```
struct J1939_message_t
{
    uint32_t id;
    uint8_t p;     // Priority
    uint8_t dp;    // Data Page
    uint8_t pf;    // PDU Format
    uint8_t ps;    // PDU Specific Field
    uint8_t sa;    // Source Address
    uint32_t pgn;    // Parameter Group Number
    uint8_t dlc;
    uint8_t data[8]; // Data
};
```

J1939data (output) – total 22 bytes, 1st ~ 4th byte is J1939 ID, 5th byte is J1939 data priority (0 ~ 7), 6th byte is J1939 data page (0 or 1), 7th byte is PDU format (PDU1 = 0 ~ 239, PDU3 = 240 ~ 255), 8th byte is PDU specific field, 9th byte is source address (unique address), 10th ~ 13th bytes are Parameter group number (total 3 bytes, consist of dp, pf and ps), 14th byte is raw CAN data length DLC, the last 8 bytes are raw CAN data, refer to J1939 standard SAE J1939-21 for more detail information.

UINT32 *dwread (output) – actual reading bytes

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_j1939_test” of sample program faro_can_sdk_demo.c.

This Command only support on faro v4.01.07.20.06, v3.01.08.20.08

5.5 int AZ_VC_J1939_Write(struct J1939_send_msg_t J1939data)

Include file: #include "faro_can_sdk.h"

Descriptions:

Write J1939 data to CAN bus controller

Parameters:

```
struct J1939_send_msg_t
{
    uint8_t port;
    uint8_t p;          // Priority
    uint8_t sa;         // Source Address
    uint32_t pgn;    // Parameter Group Number
    uint8_t dlc;
    uint8_t data[8];    // Data
};
```

(Input)

J1939data.port = 0 or 1

J1939data.p = 0 ~ 7

J1939data.sa = 0 ~ 255

J1939data.pgn = 0 ~ 131071

J1939data.dlc = 1 ~ 8

J1939data.data[0 ~ 7] = the J1939 data would be transmitted

Return value:

Success – ERROR_SUCCESS (=0), Failure – ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_j1939_test” of sample program faro_can_sdk_demo.c.

6 J1708_21 bytes SDK Programming API

It need do AZ_VC_ModeActive(8) before calling J1708_21 bytes API (refer to 3.9 for AZ_VC_ModeActive function description).

6.1 int AZ_VC_J1708_21_Read_Amount (void)

Include file: #include "faro_can_sdk.h"

Descriptions:

Check the amount of J1708 data received on 21 bytes command.

Parameters:

None

Return value:

The amount of J1708 data received on 21 byte command.

Usages:

Refer to function “do_j1708_demo” of sample program faro_can_sdk_demo.c.

6.2 int AZ_VC_J1708_21_Read (struct J1708_21_message_t *data, uint32_t *dwread)

Include file: #include "faro_can_sdk.h"

Descriptions:

The SDK support message queue method to read J1708 data on 21 bytes command.

Parameters:

```
struct J1708_21_message_t {
    uint8_t pkt_no;      // 0 or 1
    uint8_t mid;         // 0 - 255
    uint8_t p;           // priority
    uint8_t dlc;         // 0-12
    uint8_t data[13];
};
```

data –maximum total 19 bytes,

pkt_no = 0 or 1,

mid = 0 ~ 255,

priority = 1 ~ 8,

dlc = 0 ~ 19, must match with real data[] length, data[] = buffer to write.

pkt_no is fallow by data dlc, if data dlc is bigger then 13, Then will receive 2 package data(pkt_no = 0 and 1).

UINT32 *dwread (output) – actual reading bytes

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_j1708_demo” of sample program faro_can_sdk_demo.c.

6.3 int AZ_VC_J1708_21_Write (struct J1708_21_message_t data)

Include file: #include "faro_can_sdk.h"

Descriptions:

Write J1708 data to J1708 controller on 21 bytes command .

Parameters:

```
struct J1708_21_message_t {
    uint8_t pkt_no;      // 0 or 1
    uint8_t mid;         // 0 - 255
    uint8_t p;           // priority
    uint8_t dlc;         // 0-12
    uint8_t data[13];
};
```

data –maximum total 19 bytes,

pkt_no = 0 or 1,

mid = 0 ~ 255,

priority = 1 ~ 8,

dlc = 0 ~ 19, must match with real data[] length, data[] = buffer to write.

pkt_no is fallow by data dlc, if data dlc is bigger then 13, Then need to send 2 package for send all data(send pkt_no = 0 and 1).

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_j1708_demo” of sample program faro_can_sdk_demo.c.

6.4 int AZ_VC_J1708_21byte_FilterConfig (uint8_t type, uint8_t mid)

Include file: #include "faro_can_sdk.h"

Descriptions:

Configure J1708 filters on 21 byte command.

Parameters:

uint8_t type = 0x01 (add filter), 0xFF (Reset all filters)

uint8_t mid = J1708 mid number for filter configuration, refer to J1708 standard for more detail information.

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_j1708_demo” of sample program faro_can_sdk_demo.c.

6.5 int AZ_VC_J1708_21byte_GetFilterCount(uint16_t *count)

Include file: #include "faro_can_sdk.h"

Descriptions:

Get J1708 filter current total counts.

Parameters:

uint16_t count = J1708 current filter amount

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_j1708_demo” of sample program faro_can_sdk_demo.c.

6.6 int AZ_VC_J1708_21byte_FilterGet(uint32_t *filter)

Include file: #include "faro_can_sdk.h"

Descriptions:

Get J1708 filter mid number. It must call "AZ_VC_J1708_21byte_GetFilterCount" API to get total counts first before implementing this API.

Parameters:

uint32_t filter = malloc(sizeof(uint32_t) * count); // count – filter total counts

uint32_t filter[0 ~ (count –1)] = J1708 filter mid number.

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_j1708_demo” of sample program faro_can_sdk_demo.c.

7 J1708 SDK Programming API

It need do AZ_VC_ModeActive(3) before calling J1708 API (refer to 3.9 for AZ_VC_ModeActive function description).

7.1 int AZ_VC_J1708_Read_Amount (void)

Include file: #include "faro_can_sdk.h"

Descriptions:

Check the amount of J1708 data received.

Parameters:

None

Return value:

The amount of J1708 data received.

Usages:

Refer to function “do_j1708_test” of sample program faro_can_sdk_demo_j1708.c.

7.2 int AZ_VC_J1708_Read(struct J1708_message_t *data, uint32_t *dwread)

Include file: #include "faro_can_sdk.h"

Descriptions:

The SDK support message queue method to read J1708 data.

Parameters:

```
struct J1708_message_t {
  uint8_t mid;          // 0-255
  uint8_t p;            // priority (1-8)
  uint8_t dlc;          // 0-18
  uint8_t data[19];
};
```

*data –maximum total 22 bytes, mid = 0 ~ 255, priority = 1 ~ 8, dlc = 0 ~ 18, must match with real data[] length, data[] buffer to read.

*dwread –actual reading bytes.

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_j1708_test” of sample program faro_can_sdk_demo_j1708.c.

7.3 int AZ_VC_J1708_Write(struct J1708_message_t data)

Include file: #include "faro_can_sdk.h"

Descriptions:

Write J1708 data to J1708 controller.

Parameters:

```
struct J1708_message_t {
   uint8_t mid; // 0-255
   uint8_t p; // priority (1-8)
   uint8_t dlc; // 0-18
   uint8_t data[19];
};
```

*data –maximum total 22 bytes, mid = 0 ~ 255, priority = 1 ~ 8, dlc = 0 ~ 18, must match with real data[] length, data[] = buffer to write.

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_j1708_test” of sample program faro_can_sdk_demo_j1708.c.

7.4 int AZ_VC_J1708_FilterConfig(uint8_t type, uint8_t mid)

Include file: #include "faro_can_sdk.h"

Descriptions:

Configure J1708 filters.

Parameters:

type = 0 (add filter), 3 (Reset all filters)

mid = J1708 mid number for filter configuration, refer to J1708 standard for more detail information.

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_j1708_test” of sample program faro_can_sdk_demo_j1708.c.

7.5 int AZ_VC_J1708_GetFilterCount(uint16_t *count)

Include file: #include "faro_can_sdk.h"

Descriptions:

Get J1708 filter current total counts.

Parameters:

*count = J1708 current filter amount

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_j1708_test” of sample program faro_can_sdk_demo_j1708.c.

7.6 int AZ_VC_J1708_FilterGet(uint32_t *filter)

Include file: #include "faro_can_sdk.h"

Descriptions:

Get J1708 filter mid number. It must call "AZ_VC_J1708_GetFilterCount" API to get total counts first before implementing this API.

Parameters:

filter = malloc(sizeof(uint32_t) * count); // count – filter total counts

filter[0 ~ (count –1)] = J1708 filter mid number.

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_j1708_test” of sample program faro_can_sdk_demo_j1708.c.

7.7 Exit J1708 mode

It must call AZ_VC_ModeActive(0) to exit J1708 mode, and then could continue using other mode, e.g. Raw CAN, J1939.

8 Sensor SDK Programming API

8.1 int AZ_VC_Sensor_Read_Amount (void)

Include file: #include "faro_can_sdk.h"

Descriptions:

Check the amount of sensor data received.

Parameters:

None

Return value:

The amount of sensor data received.

Usages:

Refer to function “do_sensor_test” of sample program faro_can_sdk_demo_sensor.c.

8.2 int AZ_VC_Sensor_Read(struct sensor_ctrl_format_t *senData,uint32_t*dwread)

Include file: #include "faro_can_sdk.h"

Descriptions:

The SDK support message queue method to read FARO sensor interrupt data.

Parameters:

```
struct sensor_ctrl_format_t
{
    byte cmd;
    byte dlc_cfg; // DLC or Configuration
    byte ctrl1;
    byte ctrl2;
    byte ctrl3;
    byte ctrl4;
    byte ctrl5;
    byte ctrl6;
    byte ctrl7;
    byte reserve[8];
};
```

*senData (output) –total 17 bytes, 1st byte is command, 2nd byte is DLC (sensor data length), 3rd ~ 9th bytes are sensor register data, Latest 8 bytes are reserved bytes (refer to appendix B).

UINT32 *dwread – actual reading bytes

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_sensor_test” of sample program faro_can_sdk_demo_sensor.c.

8.3 int AZ_VC_Sensor_Write(struct sensor_ctrl_format_t senData)

Include file: #include "faro_can_sdk.h"

Descriptions:

Read or write ACC or Gyro sensor register data from Faro module.

Parameters:

```
struct sensor_ctrl_format_t
{
        byte cmd;
        byte dlc_cfg; // DLC or Configuration
        byte ctrl1;
        byte ctrl2;
        byte ctrl3;
        byte ctrl4;
        byte ctrl5;
        byte ctrl6;
        byte ctrl7;
        byte reserve[8];
};
```

sensorCtrl.cmd = 0x47 (Gyro) or 0x56 (ACC)

sensorCtrl.dlc_cfg = Gyro or ACC register address

sensorCtrl.ctrl1 = 0x00 or 0x01 (0 –read, 1 –write)

sensorCtrl.ctrl2 = configure register data (write) or 0x00 (read)

sensorCtrl.ctrl3 = 0x00

sensorCtrl.ctrl4 = 0x00

sensorCtrl.ctrl5 = 0x00

sensorCtrl.ctrl6 = 0x00

sensorCtrl.ctrl7 = 0x00

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_sensor_test” of sample program faro_can_sdk_demo_sensor.c.

8.4 int AZ_VC_GetACCData(void)

Include file: #include "faro_can_sdk.h"

Descriptions:

Get ACC sensor data from Faro module.

Parameters:

None

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_sensor_test” of sample program faro_can_sdk_demo_sensor.c.

8.5 int AZ_VC_GetACCINTData(void)

Include file: #include "faro_can_sdk.h"

Descriptions:

Get ACC sensor interrupt configuration data from Faro module.

Parameters:

None

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_sensor_test” of sample program faro_can_sdk_demo_sensor.c.

8.6 int AZ_VC_SetACCINTData(struct sensor_ctrl_format_t ACCINTData)

Include file: #include "faro_can_sdk.h"

Descriptions:

Set ACC sensor interrupt configuration data to Faro module.

Parameters:

```
struct sensor_ctrl_format_t
{
  byte cmd;
  byte dlc_cfg; // DLC or Configuration
  byte ctrl1;
  byte ctrl2;
  byte ctrl3;
```

```
    byte ctrl4;
    byte ctrl5;
    byte ctrl6;
    byte ctrl7;
    byte reserve[8];
};
```

ACCINTData.cmd = 0x53

ACCINTData.dlc_cfg = 0x01

ACCINTData.ctrl1 = 0x10 (THS1)

ACINTData.ctrl2 = 0x00 (THS2)

ACCINTData.ctrl3 = 0x00 (DUR1)

ACCINTData.ctrl4 = 0x00 (DUR2)

ACCINTData.ctrl5 = 0x00

ACCINTData.ctrl6 = 0x00

ACCINTData.ctrl7 = 0x00

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_sensor_test” of sample program faro_can_sdk_demo_sensor.c.

8.7 int AZ_VC_ACCCalibration(void)

Include file: #include "faro_can_sdk.h"

Descriptions:

Ask Faro module ACC sensor to do calibration.

Parameters:

None

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_sensor_test” of sample program faro_can_sdk_demo_sensor.c.

8.8 int AZ_VC_ConfigACCINT(struct sensor_ctrl_format_t ACCINTCtrl)

Include file: #include "faro_can_sdk.h"

Descriptions:

Configure and enable ACC sensor interrupt.

Parameters:

```
struct sensor_ctrl_format_t
{
  byte cmd;
  byte dlc_cfg; // DLC or Configuration
  byte ctrl1;
  byte ctrl2;
  byte ctrl3;
  byte ctrl4;
  byte ctrl5;
  byte ctrl6;
  byte ctrl7;
  byte reserve[8];
};
```

ACCINTCtrl.cmd = 0x54

ACCINTCtrl.dlc_cfg = 0x05

ACCINTCtrl.ctrl1 = 0x70 (INT1CFG)

ACCINTCtrl.ctrl2 = 0x40 (INT1CTRL)

ACCINTCtrl.ctrl3 = 0x00 (INT2CFG)

ACCINTCtrl.ctrl4 = 0x00 (INT2CTRL)

ACCINTCtrl.ctrl5 = 0x84 (INTMODE)

ACCINTCtrl.ctrl6 = 0x00

ACCINTCtrl.ctrl7 = 0x00

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_sensor_test” of sample program faro_can_sdk_demo_sensor.c.

8.9 int AZ_VC_GetGyroData(void)

Include file: #include "faro_can_sdk.h"

Descriptions:

Get Gyro sensor data from Faro module.

Parameters:

None

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_sensor_test” of sample program faro_can_sdk_demo_sensor.c.

8.10 int AZ_VC_GetGyroTHS(void)

Include file: #include "faro_can_sdk.h"

Descriptions:

Get Gyro sensor threshold settings from Faro module.

Parameters:

None

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_sensor_test” of sample program faro_can_sdk_demo_sensor.c.

8.11 int AZ_VC_GetGyroDUR(void)

Include file: #include "faro_can_sdk.h"

Descriptions:

Get Gyro sensor duration settings from Faro module.

Parameters:

None

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_sensor_test” of sample program faro_can_sdk_demo_sensor.c.

8.12 int AZ_VC_GyroCalibration(void)

Include file: #include "faro_can_sdk.h"

Descriptions:

Ask Faro module Gyro sensor to do calibration.

Parameters:

None

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_sensor_test” of sample program faro_can_sdk_demo_sensor.c.

8.13 int AZ_VC_SetGyroTHS(struct sensor_Gyro_format_t GyroData)

Include file: #include "faro_can_sdk.h"

Descriptions:

Set Gyro sensor threshold data to Faro module.

Parameters:

```
struct sensor_Gyro_format_t
{
  byte cmd;
  byte dlc_cfg; // DLC or Configuration
  byte dcrm;
  byte xx_H;
  byte xx_L;
  byte yy_H;
  byte yy_L;
  byte zz_H;
  byte zz_L;
  byte reserve[8];
};
```

GyroData.cmd = 0x43

GyroData.dlc_cfg = 0x07

GyroData.dcrm = 0x00 (0 –reset, 1 –decrement)

GyroData.xx_H = 0x34 (interrupt threshold on X axis high byte)

GyroData.xx_L = 0x3E (interrupt threshold on X axis low byte)

GyroData.yy_H = 0x00 (interrupt threshold on Y axis high byte)

GyroData.yy_L = 0x00 (interrupt threshold on Y axis low byte)
GyroData.zz_H = 0x00 (interrupt threshold on Z axis high byte)
GyroData.zz_L = 0x00 (interrupt threshold on Z axis low byte)

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_sensor_test” of sample program faro_can_sdk_demo_sensor.c.

8.14 int AZ_VC_SetGyroDUR(struct sensor_GyroDUR_format_t GyroData)

Include file: #include "faro_can_sdk.h"

Descriptions:

Set Gyro sensor duration data to Faro module.

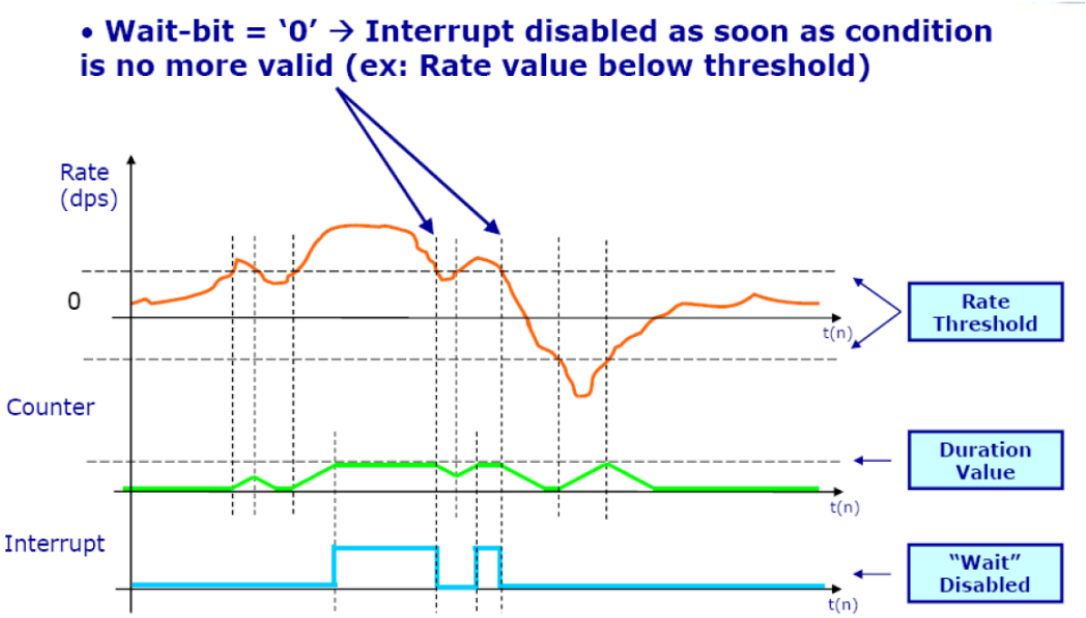
Parameters:

```
struct sensor_GyroDUR_format_t
{
  byte cmd;
  byte dlc_cfg; // DLC or Configuration
  byte wait;
  byte durData;
  byte reserve[13];
};
```

GyroData.cmd = 0x45
GyroData.dlc_cfg = 0x02
GyroData.wait = 0x00 (0 –disable, 1 –enable)
GyroData.durData = 0x7F (duration value, 0x00 ~ 0x7F)

WAIT bit has the following meaning:

Wait =’0’: the interrupt falls immediately if signal crosses the selected threshold
Wait =’1’: if signal crosses the selected threshold, the interrupt falls after a number of samples equal to the duration counter register value.



Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_sensor_test” of sample program faro_can_sdk_demo_sensor.c.

8.15 int AZ_VC_ConfigGyroINT(struct sensor_ctrl_format_t GyroCtrl)

Include file: #include "faro_can_sdk.h"

Descriptions:

Configure and enable Gyro sensor interrupt.

Parameters:

```
struct sensor_ctrl_format_t
{
  byte cmd;
  byte dlc_cfg; // DLC or Configuration
  byte ctrl1;
  byte ctrl2;
  byte ctrl3;
  byte ctrl4;
  byte ctrl5;
  byte ctrl6;
  byte ctrl7;
  byte reserve[8];
};
```

GyroCtrl.cmd = 0x49

GyroCtrl.dlc_cfg = 0x04

GyroCtrl.ctrl1 = 0x02 (INTCFG)

GyroCtrl.ctrl2 = 0x80 (INT1CTRL)

GyroCtrl.ctrl3 = 0x00 (INT2CFG)

GyroCtrl.ctrl4 = 0x00 (INT2CTRL)

GyroCtrl.ctrl5 = 0x00

GyroCtrl.ctrl6 = 0x00

GyroCtrl.ctrl7 = 0x00

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_sensor_test” of sample program faro_can_sdk_demo_sensor.c.

8.16 int AZ_VC_clear_sensor_algorithm(void)

Include file: #include "faro_can_sdk.h"

Descriptions:

Clear Forward/backward sensor algorithm in flash.

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_algorithm_demo” of sample program faro_can_sdk_demo.c.

8.17 int AZ_VC_Set_F_B_Algorithm (uint8_t enable)

Include file: #include "faro_can_sdk.h"

Descriptions:

Set Forward/backward Algorithm Enable/Disable.

Parameters:

uint8_t enable : 0 - Disable, 1 - Enable.

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_algorithm_demo” of sample program faro_can_sdk_demo.c.

8.18 int AZ_VC_Get_F_B_Algorithm(struct F_B_Algorithm_t *f_b_algorithm)

Include file: #include "faro_can_sdk.h"

Descriptions:

Get Forward/backward Algorithm Enable/Disable.

Parameters:

```
struct F_B_Algorithm_t {
        uint8_t status;
        uint8_t calibration;
};
```

f_b_algorithm.status : 0 - Disable, 1 - Enable.

f_b_algorithm.calibration :

0 – No Calibration

1 - 1 Calibration

2 - 2 Calibration

3 - 3 Calibration

4 - 4 Calibration

5 - 5 Calibration

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_algorithm_demo” of sample program faro_can_sdk_demo.c.

8.19 int AZ_VC_set_accelerator(uint8_t scale)

Include file: #include "faro_can_sdk.h"

Descriptions:

Set Accelerator Full Scale.

Parameters:

uint8_t ecompass_acc_scale : 0 ~ 3.

Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_ecompass_demo” of sample program faro_can_sdk_demo.c.

8.20 int AZ_VC_get_accelerator(struct ecompass_scale *scale)

Include file: #include "faro_can_sdk.h"

Descriptions:

Get Accelerator Full Scale.

Parameters:

```
struct ecompass_scale {
        uint8_t scale;
};
```

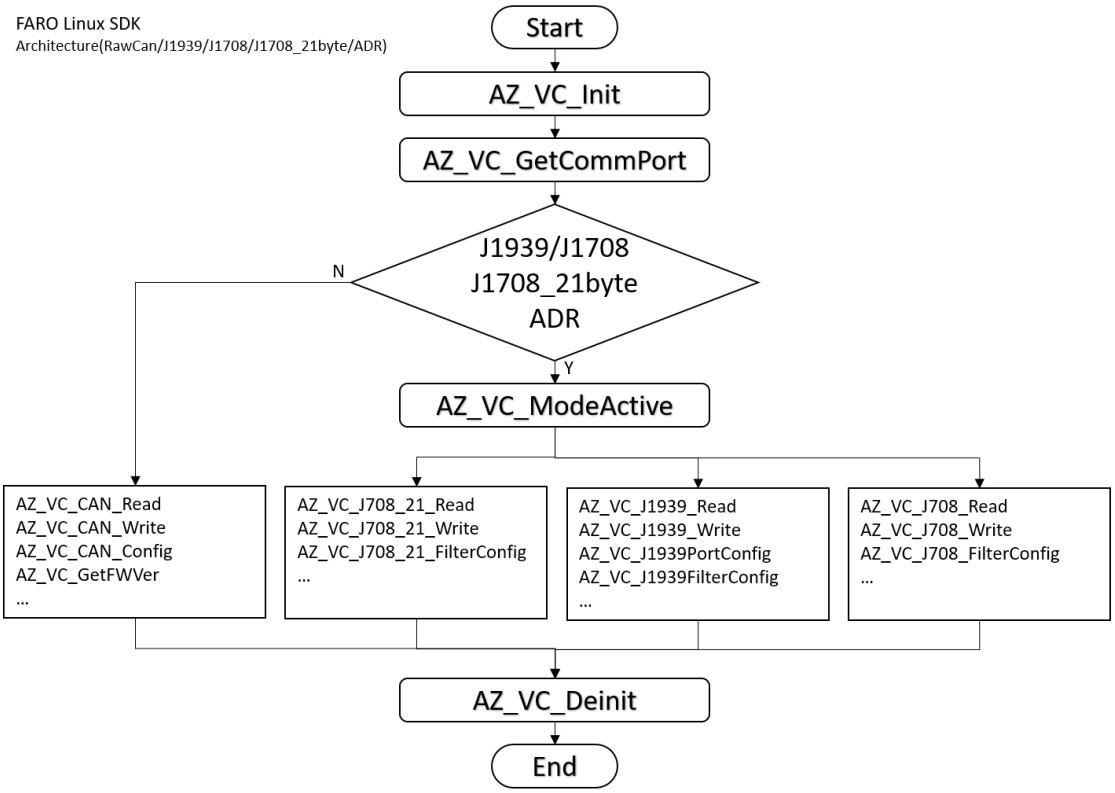
Return value:

Success –ERROR_SUCCESS (=0), Failure –ERROR_ACCESS_DENIED and others (!=0)

Usages:

Refer to function “do_ecompass_demo” of sample program faro_can_sdk_demo.c.

Appendix A : FARO SDK Architecture



Appendix B

```
struct sensor_ctrl_format_t
{
    byte cmd;
    byte dlc_cfg; // DLC or Configuration
    byte ctrl1;
    byte ctrl2;
    byte ctrl3;
    byte ctrl4;
    byte ctrl5;
    byte ctrl6;
    byte ctrl7;
    byte reserve[8];
};
```

- cmd = 0x8A (Gyro Angular Rate Data)
  dlc_cfg = 0x06
  ctrl1 = XX_L, ctrl2 = XX_H, ctrl3 = YY_L, ctrl4 = YY_H, ctrl5 = ZZ_L, ctrl6 = ZZ_H, ctrl7 = 0
- cmd = 0x8B (Gyro Threshold Data)
  dlc_cfg = 0x07
  ctrl1 = DCRM (0 – reset, 1 – decrement)
  ctrl2 = XX_H, ctrl3 = YY_L, ctrl4 = YY_H, ctrl5 = ZZ_L, ctrl6 = ZZ_H, ctrl7 = ZZ_L
- cmd = 0x8C (Gyro Duration Data)
  dlc_cfg = 0x02
  ctrl1 = Wait (0 – disable, 1 – enable)
  ctrl2 = Duration Data, ctrl3 = 0, ctrl4 = 0, ctrl5 = 0, ctrl6 = 0, ctrl7 = 0
- cmd = 0x91 (Acceleration Data, available data length = 12bit, lowest 4bit is unavailable data, negative value represents by 2's complement number)
  dlc_cfg = 0x06
  ctrl1 = XX_L, ctrl2 = XX_H, ctrl3 = YY_L, ctrl4 = YY_H, ctrl5 = ZZ_L, ctrl6 = ZZ_H, ctrl7 = 0
- cmd = 0x92 (Acceleration INT1/2 Threshold & Duration Data)
  dlc_cfg = 0x04
  ctrl1 = THS1, ctrl2 = THS2, ctrl3 = DUR1, ctrl4 = DUR2, ctrl5 = 0, ctrl6 = 0, ctrl7 = 0

- cmd = 0x93 (Response Packet during interrupt trigger)
  dlc_cfg = 0x04
  ctrl1 = Trigger source, ctrl2 = Status, ctrl3 = IG_SRC, ctrl4 = FIFO_SRC, ctrl5 = 0,
  ctrl6 = 0, ctrl7 = 0