

uCAN View

# User Manual



## Revision History

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## 1. uCAN View

### 1.1. Introduction

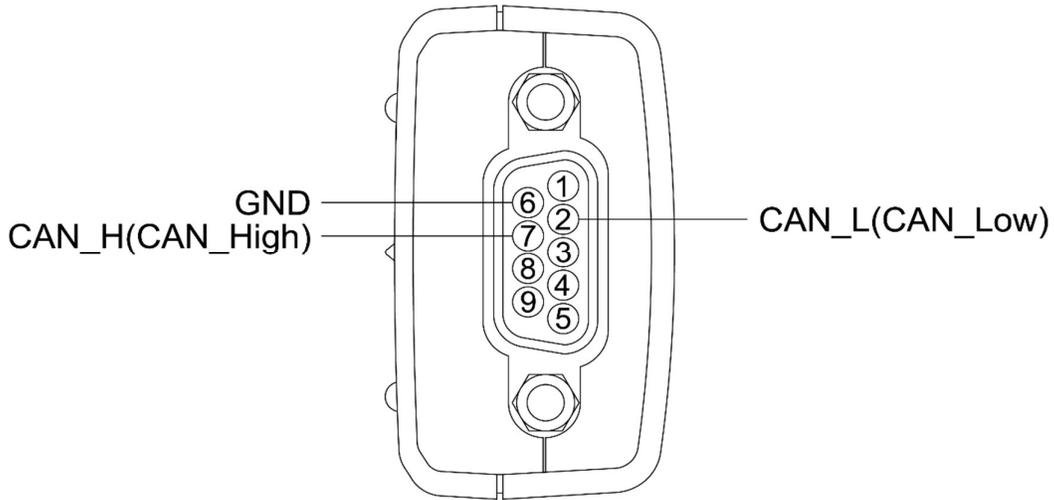
The uCAN View is an Microsoft Windows based analyzer for uCAN device to probe all transmitted data in the CAN bus.

- It does not require a separate driver to operate.
- The users can see all the CAN data from the provided utility.
- The CAN data can be saved into DCU (Data CAN Unit) file and read from it.
- With the timestamp feature, the users can check the time when the CAN data was received.
- Provides 'Exerciser' function that creates CAN frame and sends to other CAN device.
- Provides 'Error Status' to detect errors in CAN bus.
- Provides 'Advanced Function' for setting numbers of widely used baud rate.
- Supports ABOR (Automatic Bus-Off Recovery) and ART (Automatic Retransmission) modes

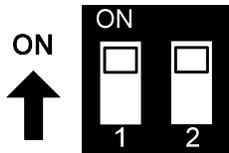
### 1.2. uCAN

uCAN is a device which connects to the USB port on the IBM compatible computer and CAN bus by D-sub 9 pin port. It has a USB type A and DE-09P (male) for the CAN interface. The image and the pin out of the product are as follows.





Terminal Resistor switch on the bottom of uCAN device.



Switch 1	Switch 2	Description
ON	ON	Enable Terminal Resistor
OFF	OFF	Disable Terminal Resistor (Default)
ON	OFF	Not used
OFF	ON	Not used

### 1.3. Device Recognition

This device will be recognized by Windows as 'HID-compliant device' or 'USB Input Device'.

- Human Interface Devices
  - HID-compliant consumer control device
  - HID-compliant consumer control device
  - HID-compliant device**
  - HID-compliant system controller
  - HID-compliant system controller
  - HID-compliant vendor-defined device
  - USB Input Device**
  - USB Input Device
  - USB Input Device
  - USB Input Device

## 1.4. System Requirement

- **Minimum System Requirement**
  - CPU : Intel Pentium 1GHz (32bit)
  - RAM : 512MB
  - OS : Windows XP SP2
  - Disk Space : 10MB additional space for the utility to function
  - Supports HID (Human Interface Device)
  - 1360 x 768 Display (Monitor) required.
  
- **Recommended System Requirement**
  - CPU : Intel Dual Core 1GHz or greater.
  - RAM : 1GB or greater
  - OS : Windows XP SP3 or greater
  - Disk Space : 10MB additional space for the utility to function
  - Supports HID (Human Interface Device)
  - 1360 x 768 Display (Monitor) required.

## 2. Installation and Execution

### 2.1. Installation

2.1.1 Insert included CD into your computer.

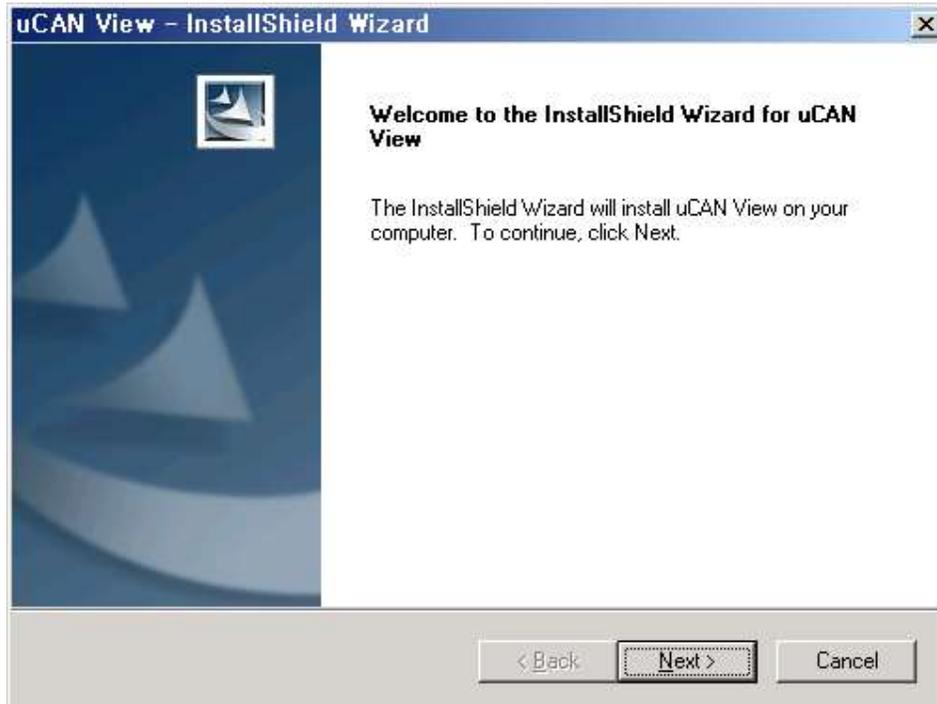
2.1.2 Go to [CD Drive]\uCAN View and run “uCAN View setup.exe” file.

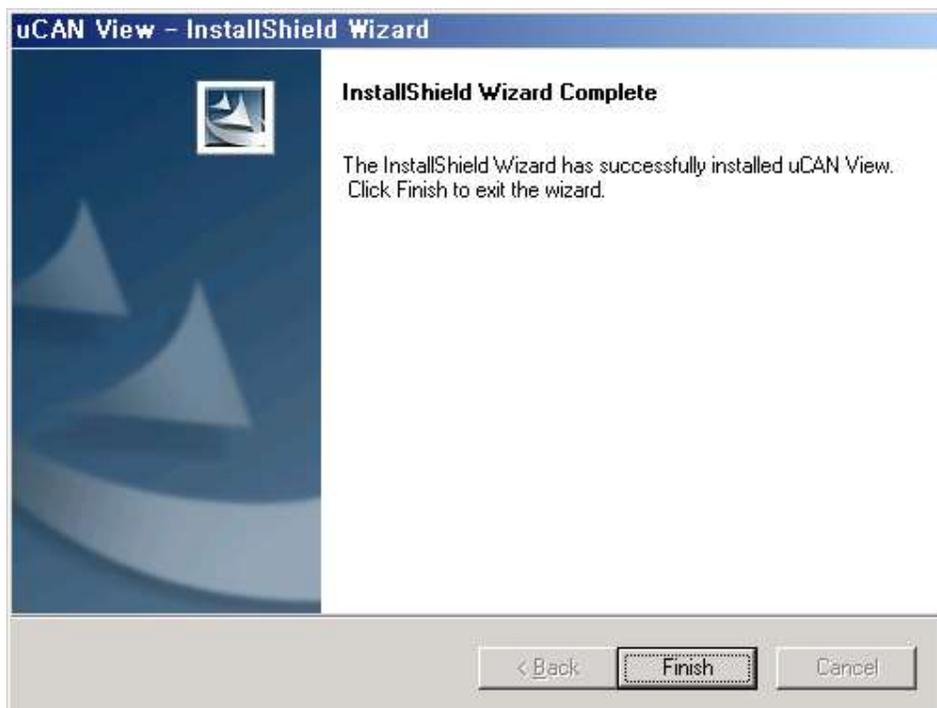
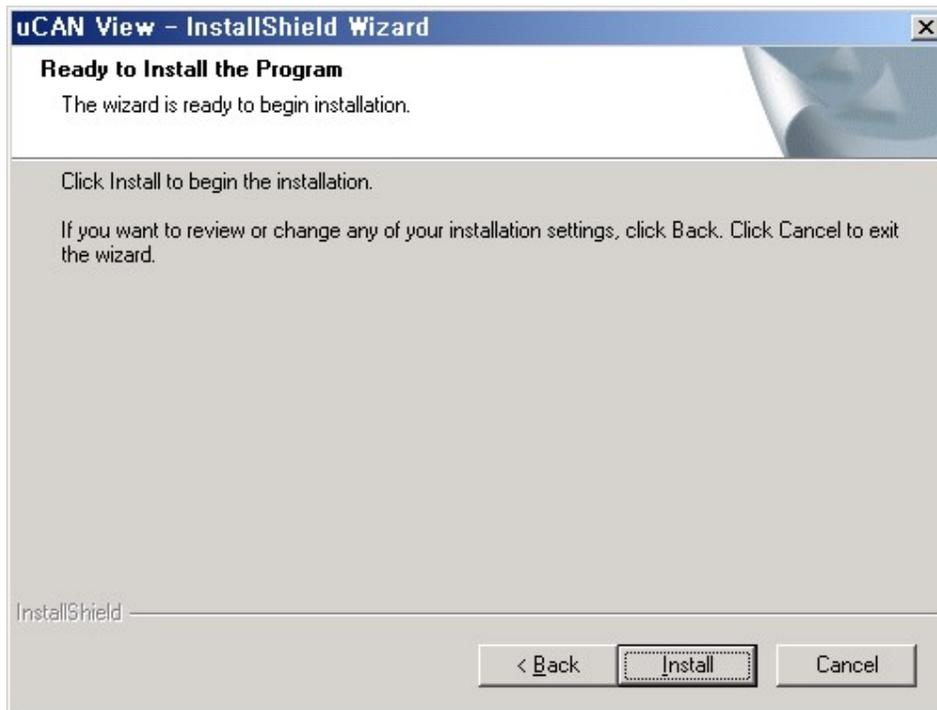
 uCAN View setup.exe

 uCAN\_Manual\_Eng.pdf

 uCAN\_Manual\_Kor.pdf

2.1.3 Install the uCAN View utility.





2.1.4 After above process is completed, the short cut will be created under “SystemBase” in the Program group under Start menu and at the desktop screen.

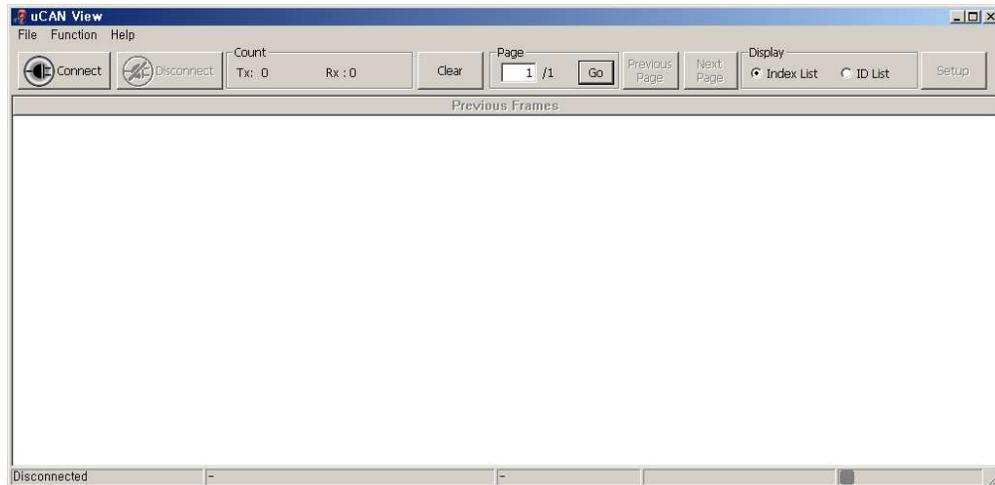
\* Windows 8/Server 2012 or greater versions may not show the icons under the folder.



## 2.2. Execution

2.2.1. Depending on the icon location or the operating system, click or double click the “uCAN View” icon to run the utility.

2.2.2. The uCAN View main window will appear as shown below.



### 3. Main Window

There are five parts in the main window.

Name	Description
Title	Name of the utility is displayed.
Menu	Various functions and features can be accessed from here.
Control bar	Connection status of uCAN device, short cut icons of functions, and numbers of CAN frames are displayed.
Client View	Displays received/transmitted CAN messages.
Status	Displays connection status and status of errors.

## 4. Menu

File Function Help

There are three main menus shown here.

Name	Description
File	Open/Save DCU file.
Function	Sort or filter CAN frames in client view windows. Run 'exerciser' function.
Help	Displays the version of the utility.

### 4.1. File

When 'File' menu is clicked, following sub-menus will appear.



- **Open Log:** Open DCU file to read CAN frame data.
- **Save As:** Save CAN frame data into a DCU file.
- **Exit:** Exits uCAN utility.

### 4.2. Function

When 'Function' menu is clicked, following sub-menus will appear.

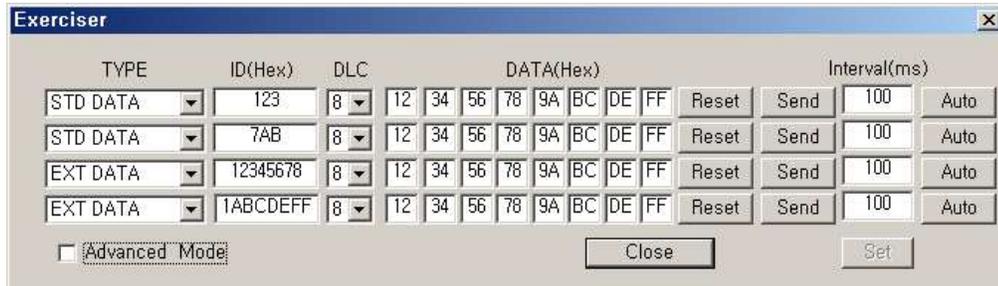


- **Exerciser:** Sends CAN frame.
- **Sort:** Sort frames by the number or ID in ascending or descending order.
- **Filter:** Display frames with given range only.

### 4.2.1. Exerciser

The users can define CAN frame and send it through uCAN.

(Provides manual or automatic transmission mode)

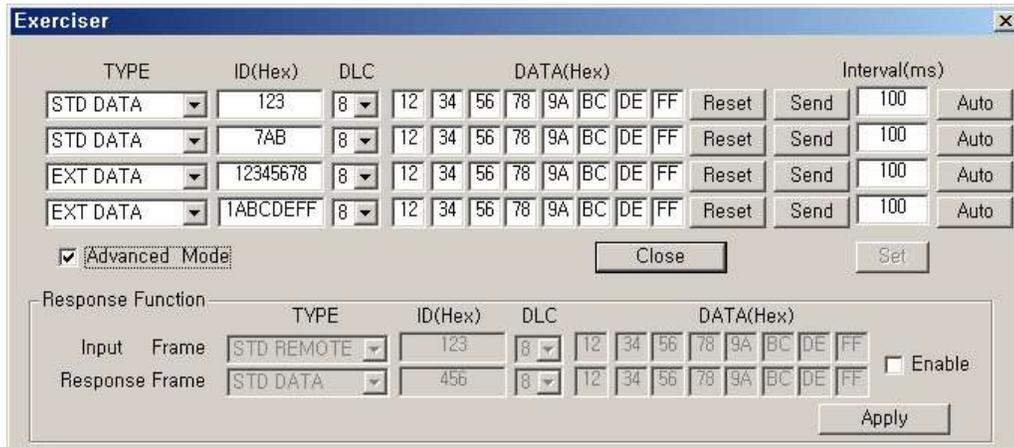


TYPE	ID(Hex)	DLC	DATA(Hex)								Interval(ms)			
STD DATA	123	8	12	34	56	78	9A	BC	DE	FF	Reset	Send	100	Auto
STD DATA	7AB	8	12	34	56	78	9A	BC	DE	FF	Reset	Send	100	Auto
EXT DATA	12345678	8	12	34	56	78	9A	BC	DE	FF	Reset	Send	100	Auto
EXT DATA	1ABCDEF	8	12	34	56	78	9A	BC	DE	FF	Reset	Send	100	Auto

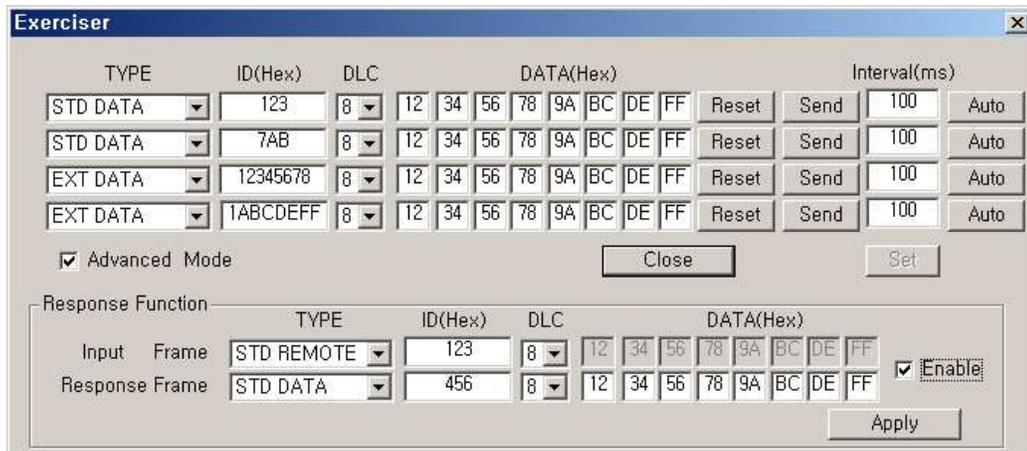
Advanced Mode

Close Set

Name	Description
<b>TYPE</b>	Type of CAN frame. STD DATA: CAN Standard Data Frame STD REMOTE: CAN Standard Remote Frame EXT DATA: CAN Extended Data Frame EXT REMOTE: CAN Extended Remote Frame
<b>ID(Hex)</b>	CAN frame ID (Hex Value) Input Range: Standard = 0 ~ 7FF, Extended = 0 ~ 1FFFFFFF
<b>DLC</b>	DLC (Data Length Code) of a CAN frame Input Range: 0 ~ 8 (Byte)
<b>DATA(Hex)</b>	CAN frame data (Hex Value) Input Range: 0 ~ FF
<b>Reset</b>	Re-initialize configuration of TYPE, ID, DLC, and DATA
<b>Send</b>	Send one CAN frame with pre-configured TYPE, ID, DLC, and DATA.
<b>Interval(ms)</b>	When sending CAN frames automatically, interval can be set with minimal unit value of milliseconds. (Input Range: 10 ~ 1000)
<b>Auto</b>	Sends CAN frame automatically, with pre-configured ID, DLC, and DATA.
<b>Set</b>	Apply changed 'Interval' value. (Button enabled when the 'Interval' value is changed.)
<b>Advanced Mode</b>	Enable additional mode for the Exerciser. (For more information, please refer to the next page.)
<b>Close</b>	Close 'Exerciser' window.



[When disabled by unchecking 'Enable' check box.]



[When enabled by checking 'Enable' check box.]

Name	Description
<b>Input Frame</b>	Define CAN frame that Response function will respond by. (Receive)
<b>Response Frame</b>	Define CAN frame that Response function will respond with. (Transmission)
<b>Enable</b>	Enable 'Response' functino.
<b>Apply</b>	Apply configuration set for 'Response' function. (This button must be clicked in order to apply configuration in 'Advance mode'.)

#### 4.2.2. Sort

Click "Disconnect" button to use this function.



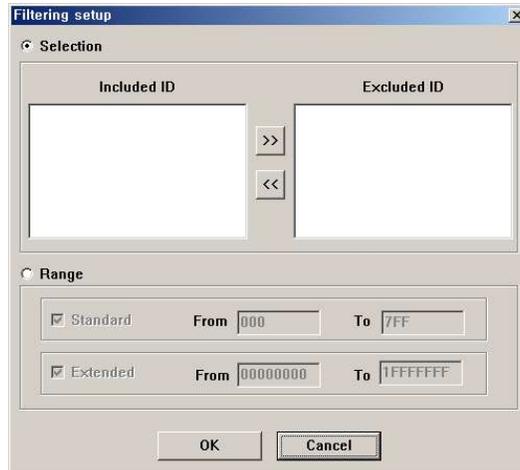
- CAN frame can be sorted with number of the CAN frame or ID by ascending or descending order.

### 4.2.3. Filter

Click "Disconnect" button to use this function.

- This function displays filtered transmitted/received ID on the 'View' area. There are two methods of filtering, filter by selection and filter by range.

\* When data is saved while filter function is enabled, all data is saved instead of just filtered data.



**Selection:** CAN ID transmitted/received from uCAN View can be selected to be displayed.

- **Included:** Display frames related to these CAN IDs.
- **Excluded:** Do not display frames related to these CAN IDs.
- **>>:** Move CAN ID from 'Included' to 'Excluded'.
- **<<:** Move CAN ID from 'Excluded' to 'Included'.

**Range:** The range of CAN IDs entered are exclude from the 'View' area.

- **Standard:** Excludes standard CAN frame within given range.
- **Extended:** Excludes extended CAN frame within given range.
- **From:** Enter the starting ID that will be included.
- **To:** Enter the ending ID that will be included.
- \* If "To" value is smaller than "From" value, an error will occur.  
When two values are the same, only the corresponding ID will be excluded
- \* The values of "From" and "To" must be entered.

## 4.3. Help

When 'Help' menu is clicked, following sub-menu will appear.



- **About uCAN View:** The current version of the utility is displayed.



## 5. Control Bar

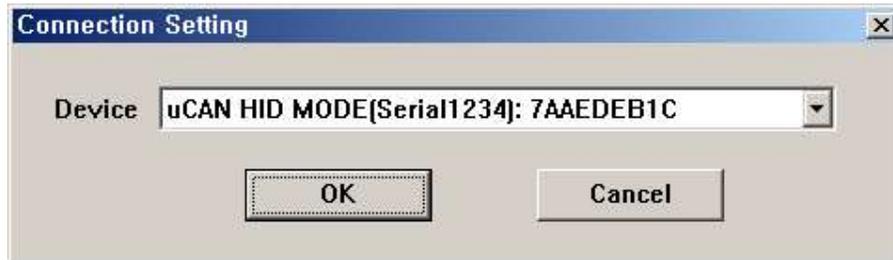


Name	Description
Connect / Disconnect	Connect or disconnect uCAN device.
Count	Numbers of transmitted/received CAN frames.
Clear	Empty all CAN frame in the buffer.
Page	Move to entered page.
Display	Change display type.
Setup	Configure CAN or USB serial related settings.

### 5.1. Connect / Disconnect Button



When 'Connect' button is clicked, recognized devices are shown in the list box from the 'Connection Setting' window. While uCAN View utility is running, when uCAN device is connected to the computer, 'Connecting Setting' window will pop-up.



Name	Description
Device	uCAN device can be selected. (The name of the device and port instance are displayed.)

After 'OK' button is clicked, Connect / Disconnect icons will be disabled and enabled as shown below.



## 5.2. Count

Shows the number of transmitted/received CAN frames by uCAN device.



Count  
Tx: 0      Rx: 0

Name	Description
Tx	Displays the number of CAN frames transmitted by the uCAN device
Rx	Displays the number of CAN frames received by the uCAN device

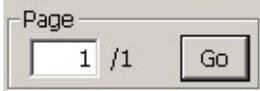
## 5.3. Clear



Clear

Reset the count of Tx/Rx to zero.

## 5.4. Page



Page  
1 / 1      Go

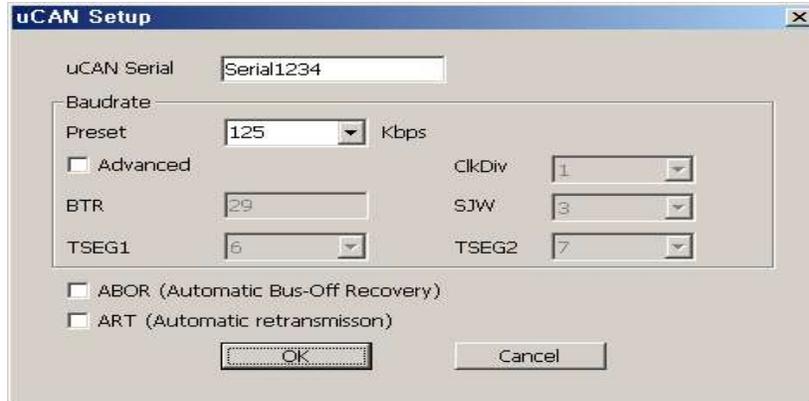
Name	Description
Text Box	Enter the page number that you wish to move to.
/1	Shows the maximum page number. ("/1" means there are total 1 page that can be displayed.)
Go Button	When clicked, 'View' area will display the entered page from the text box.

## 5.5. Setup



Click 'Setup' to open 'uCAN Setup' window.

(For more information regarding baudrate, please refer to chapter 10.1 Baudrate.)



Name	Description
uCAN Serial	The name of current device can be changed. (Default: Serial1234) 영문이나 숫자로 최대 10자로 제한됩니다.
Preset	CAN baud rate can be selected. (Default: 125Kbps)
Advanced	Advanced options for baud rate settings (Default: Disable)
ClkDiv	CAN baud rate - Clock Divider Register (Default: 1)
BTR	CAN baud rate - Bit Timing Register (Default: 29)
SJW	CAN baud rate - Synconization Jump Width (Default: 3)
TSEG1	CAN baud rate - TSEG1 is used to correct Phase Edge Error. May be lengthened temporarily by synchronization. (Default: 6)
TSEG2	CAN baud rate - TSEG2 is used to correct Phase Edge Error. May be shorten temporarily by synchronization (Default: 7)
ABOR	Enables ABOR (Automatic Bus-Off Recovery). (Default: Disable) When error mode enters bus-off mode, ABOR function resets uCAN device to restore the error count function. When reset, data loss may occur.
ART	Enable ART (Automatic Retransmission) function. (Default: Disable) While ART function is enabled, when CAN frame fail to transmit due to ID priority conflicts or when error occurs, re-transmit will not happen.

## 6. View

'No.' means numbers of each frame. In one page there are maximum 25 frames displayed. Arrows pointing up or down can be clicked to scroll the screen.

No. 55	I/O →	FORMAT STD DATA	ID 0123	DLC 8	DATA 12 34 56 78 9A BC DE FF	
No. 56	I/O ←	FORMAT STD DATA	ID 0123	DLC 8	DATA 12 34 56 78 9A BC DE FF	TIMESTAMP 01:37 721.654
No. 57	I/O →	FORMAT STD DATA	ID 0123	DLC 8	DATA 12 34 56 78 9A BC DE FF	
No. 58	I/O ←	FORMAT STD DATA	ID 0123	DLC 8	DATA 12 34 56 78 9A BC DE FF	TIMESTAMP 01:37 831.022
No. 59	I/O →	FORMAT STD DATA	ID 0123	DLC 8	DATA 12 34 56 78 9A BC DE FF	
No. 60	I/O ←	FORMAT STD DATA	ID 0123	DLC 8	DATA 12 34 56 78 9A BC DE FF	TIMESTAMP 01:37 940.398
No. 61	I/O →	FORMAT STD DATA	ID 0123	DLC 8	DATA 12 34 56 78 9A BC DE FF	

Next Frames

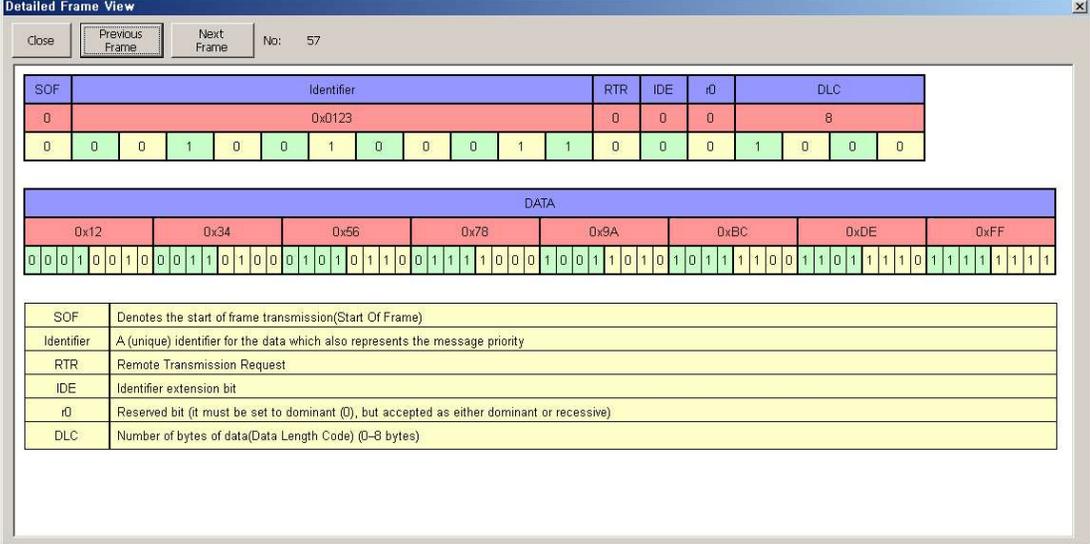
### 6.1. Frame

Each blocks of line represents one CAN Frame.

Name	Description
No.	Order of incoming frame
I/O	Direction of frame data ←: Received frame →: Transmitted frame
FORMAT	Type of CAN frames STD DATA : Standard Data Frame STD REMOTE : Standard Remote Frame EXT DATA : Extended Data Frame EXT REMOTE : Extended Remote Frame
ID	ID of CAN frame (Hex Value) Standard Frame Range: 000 ~ 7FF Extended Frame Range: 0 ~ 1FFFFFFF
DLC	Data Length Code Range: 0 ~ 8
DATA	CAN frame data (Hex Value)
TIMESTAMP	Unit of the timestamp is 'ms' (millisecond). It shows when the data was received.

## 6.2. Detailed Frame View

When each data frames are clicked from 'Client View' window, detailed frame information displays as shown below.



SOF	Identifier	RTR	IDE	rD	DLC
0	0x0123	0	0	0	8
0	0 0 0 1 0 0 1 0 0 0 0 1 1	0	0	0	1 0 0 0

DATA							
0x12	0x34	0x56	0x78	0x9A	0xBC	0xDE	0xFF
0 0 0 1 0 0 1 0	0 0 1 1 0 1 0 0	0 1 0 1 0 1 1 0	0 1 1 1 1 0 0 0	1 0 0 1 1 0 1 0	1 0 1 1 1 0 0 0	1 1 0 1 1 1 1 0	1 1 1 1 1 1 1 1

SOF	Denotes the start of frame transmission(Start Of Frame)
Identifier	A (unique) identifier for the data which also represents the message priority
RTR	Remote Transmission Request
IDE	Identifier extension bit
rD	Reserved bit (it must be set to dominant (0), but accepted as either dominant or recessive)
DLC	Number of bytes of data(Data Length Code) (0-8 bytes)

- Previous Frame: Displays previous detailed frame information.
- Next Frame: Displays next detailed frame information.
- SOF: Stands for 'Start of Field' which means the beginning of the frame.
- ID: It is a CAN Identifier used for prioritizing or used for user-defined content..
- RTR: Stands for 'Remote Transmission Request'. When the frame is a 'Remote Frame', it is set to 1.
- IDE: If it is CAN 2.0 A, then it is set to 0. Otherwise if it is CAN 2.0 B then 1.
- rD: Reserved to set to 0.
- DLC: Stands for 'Data Length Code'. Represents the size of the payload.
- DATA: Actual content.

## 7. Status Bar

Displays current connected status

Name	Description
Connection Status	Shows whether uCAN View is connected to the uCAN device.
Connected Device	Shows the ID of the uCAN device and the USB mode
Baud Rate	Shows the CAN baud rate set for the connected uCAN device.
uCAN View Buffer Status	The amount of data stored in the buffer is displayed. (Max. 50,000 frames)
Error Status	Shows error, transmit, receive status. (When double clicked, 'Error Status' window will be displayed.)

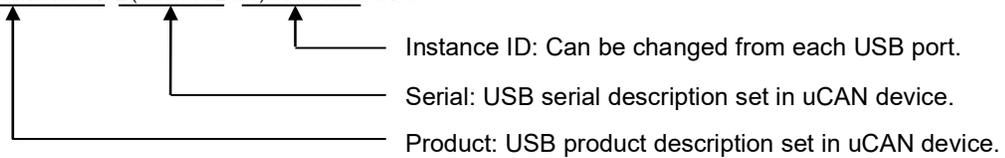


### 7.1. Connection Status

- Connected: Connected with uCAN device
- Disconnected: uCAN device is not connected to the system or unable to communication with it.

### 7.2. Connected Device

uCAN HID MODE(Serial1234): 7A47F53D9

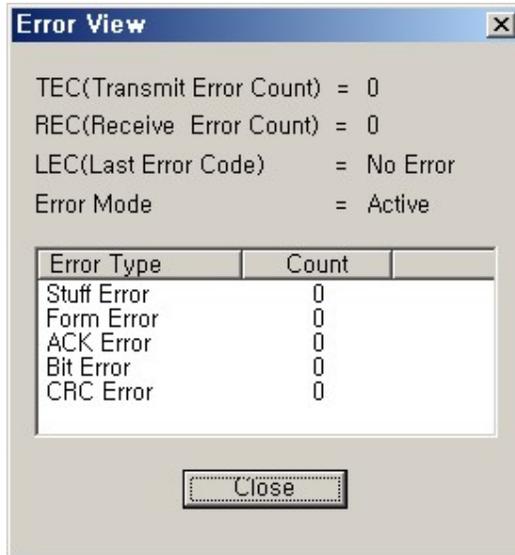


### 7.3. Error Status

Icon	Description
	uCAN View and uCAN device is not connected.
	Connected with uCAN
	CAN frame transmitted from uCAN
	CAN frame received from uCAN
	CAN frame transmitted/received from uCAN
	Error Count of uCAN is greater than 0.
	CAN frame transmitted from uCAN (Error Count of uCAN is greater than 0.)
	CAN frame received from uCAN (Error Count of uCAN is greater than 0.)
	CAN frame transmitted/received from uCAN (Error Count of uCAN is greater than 0.)

## 8. Error Status

Error Status window shows error status of uCAN device.



Name	Description
TEC	Internal TEC (Transmit Error Count) in uCAN device.
REC	Internal TEC (Receive Error Count) in uCAN device.
LEC	Last error count from uCAN device
Error Mode	Current error mode in uCAN device. (Active, Passive, Bus-Off Mode)
Stuff Error	Number of stuff errors.
Form Error	Number of form errors
ACK Error	Number of ACK errors.
Bit Error	Number of bit errors.
CRC Error	Number of CRC errors.

## 9. Troubleshoot

Below is a listing of frequently asked questions and answers.

### 9.1.1. CAN data cannot be received from uCAN.

Solution:

- (A) Please check the USB cable connected to the computer.
- (B) Check the CAN bus baud rate and match the speed when connecting uCAN device.
- (C) If uCAN device is in bus-off mode, it does not transmit or receive any data. Check the error status from 'Error Status' window to see if uCAN device is in bus-off mode.
- (D) Check if the buffer is full. For stability issue, maximum 50,000 frames are set to be the limit. Clear the buffer to receive any data.

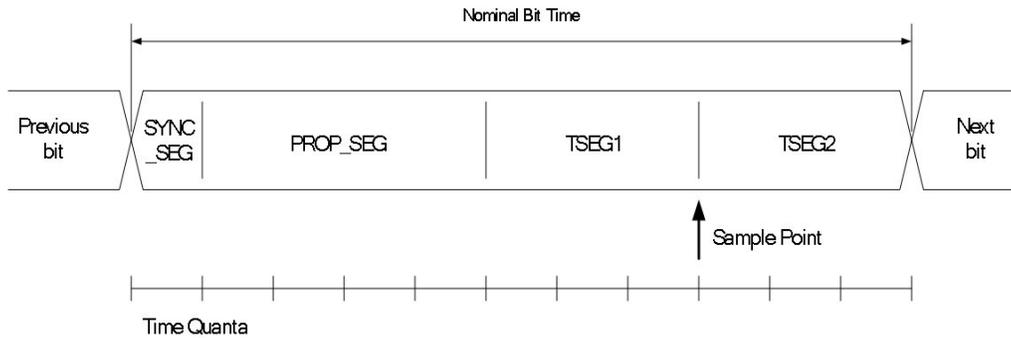
### 9.1.2. The uCAN device cannot be found by the uCAN View utility.

Solution:

- (A) Please disconnect the uCAN USB cable then reconnect to the computer.
- (B) If laptop computer is being used, try connecting the power cord to supply the power to the laptop computer instead of just using the battery power.

## 10. Appendix

### 10.1. Baud rate



Parameter	Range	Function
BRP	1~32	Set size of $1T_q$
SYNC_SEG	$1T_q$	Used in CAN Bus to synchronize various nodes. Size is fixed to $1T_q$ .
PROP_SEG	$(1\sim 8) \times T_q$	Compensates for physical delay times. (Physical bus and internal CAN node transmission delay)
TSEG1	$(1\sim 8) \times T_q$	Used to correct Phase Edge Error. May be lengthened temporarily by synchronization.
TSEG2	$(2\sim 8) \times T_q$	Used to correct Phase Edge Error. May be shortened temporarily by synchronization.
SJW	$(1\sim 4) \times T_q$	Set $T_q$ that TSEG1 may be lengthened or TSEG2 may be shortened. Should not be greater than TSEG1.

$$\text{PROP\_SEG} + \text{TSEG1} + 1 \geq \text{TSEG2}$$

#### Calculation

$$\text{CAN\_CLK} = 60000000 / (\text{DIV}+1)$$

$$\text{CAN Baud rate} = \text{CAN\_CLK} / ((\text{BRP}+1) \times (\text{TSEG1}+2+\text{TSEG2}+1))$$

$$\text{Sample Point} = (\text{TSEG1}+2) / (\text{TSEG1}+2+\text{TSEG2}+1) \times 100$$

Setting 50~70% for Sample Point is recommended

(However, for CANOpen, set it to 80%~90%)

Example)

Baud rate	Sample Point	ClkDiv	BTR	SJW	TSEG1	TSEG2
50	50 %	2	24	3	6	7
100	53.33 %	1	19	3	6	6
125	50 %	0	29	3	6	7
250	50 %	0	14	3	6	7
500	53.33 %	0	7	3	6	6
1000	53.33 %	0	3	3	6	6



If you have any inconvenience while using the product, please contact us.

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