I-7532

Two-channel CAN Bus Bridge

User's Manual

Warranty

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1 Introduction

I-7532 is a local CAN bridge used to establish a connection between two CAN bus system in a CAN network. I-7532 stands by itself connecting adjacent wiring segments together as in the case of a CAN repeater (I-7531). Not just like a CAN repeater, I-7532 has the following powerful features :

- (1) Extend CAN bus network distance.
- (2) Connect two CAN bus networks with different baud rate.
- (3) Raise the number of node in CAN bus network.
- (4) Integrate multi the same CAN devices in the CAN network.

The transmission distance limitation of the CAN bus system on each side of I-7532 is independent, which means the total CAN network distance can be extended like Figure 1-1.

Extend The Communication Network Distance



Figure 1-1: Application of I-7532 Extend Distance

The baudrate of two channels on I-7532 can be different for highly flexibility. On the other hand, when the CAN bus system on one side of I-7532 happens some error (e.g. bit error), the system on other side can still work on correctly like Figure 1-2.



Figure1-2: Application of I-7532 Different Baud Connected

I-7532 can enhance the bus load capacity like Figure 1-3 and users can know how to increase driving capability by table 3-2. **Raise the number of node in the bus**



Figure 1-3: Application of I-7532 Raise nodes.

1.1 Features

- Fully compatible with the ISO 11898-2 standard.
- Support both CAN 2.0A and CAN 2.0B
- 82C250 CAN transceiver.
- 2500 Vrms photo-couple isolation on the CAN side.
- 3kV galvanic isolation between the power supply and two CAN channel.
- Selectable 120Ω terminator resistor by jumper
- Watchdog inside.
- Up to 100 CAN nodes on each channel.
- Transmission distance up to 1km on each CAN channel.
- Removable terminal block.
- Mountable on DIN Rail.
- 768 data frames for each CAN channel.
- The baud of each channel can be different for highly flexibility.
- Rotary switch for CAN baud rate from 5Kbps to 1Mbps or programmable user-defined CAN baud rate. (For firmware v1.01 or newer)
- Support CAN bus message acceptance filter configuration. (For firmware v1.01 or newer)
- Provide I-7532 Utility for CAN bus message acceptance filter and user-defined CAN baud rate etc. configuration easily and quickly.
- Support firmware update via CAN1 of I-7532. (For firmware v1.02 or newer)
- CAN messages can be forwarded under another identifier. (For firmware v1.03 or newer)
- Support CAN Bus-Off Auto-Reset function. (For firmware_v1.04 and Utility_v1.03 or newer)
- Support CAN Listen-Only Mode function. (For firmware_v1.04 and Utility_v1.03 or newer)

1.2 Specifications

- Power consumption: 2W max.
- Power Supply: +10 $V_{DC} \sim$ +30 V_{DC} .
- Operating temperature: -25°C ~ +75°C.

- Humidity: 5% ~ 95%.
- Dimensions: 122 mm x 72 mm x 35 mm
- LEDs : <u>PWR LED</u> for power <u>RUN LED</u> for communication <u>ERR LED</u> for error

1.3 Application

- Factory Automation.
- Building Automation.
- Home Automation.
- Vehicle Automation.
- Control system.
- Monitor system.

1.4 Information

For more information about the I-7532, please visit ICP DAS website:

http://www.icpdas.com/products/Remote_IO/can_bus/i-7532.htm

2 Hardware

2.1 Block Diagram

The following block diagram illustrates the functions of I-7532 module. Power supply is with $3000V_{DC}$ galvanic isolated between each CAN port. Furthermore, there is photo-isolation 2500 Vrms between two CAN channels.



Figure 2-1: Block Diagram of I-7532

2.2 Appearance



Figure 2-2: Appearance of I-7532

2.3 LED Indication

Table2-1: LED	Status	Table
---------------	--------	-------

LED Name	I-7532 Status	LED Status	
	Bootloader Mode	Flash per second	
	Configuration Mode	Flash per 100ms	
PWR LED	Communication Mode	Always turned on	
	Power Off	Off	
	Module Configuration via	Always turned on in config	
	this CAN Chnnel	mode	
RX LED	Transmission	Flash in comm. mode	
	Bus Idle	Off in comm. mode	
	Transmission Fail	Flash per 100 ms	
	Buffer Overflow	Flash per second	
	Bus-Off	Always turned on	
	No Error	Off	

[Note]

- 1. When I-7532 is in Comm. mode, the PWR LED will turn on with red light.
- 2. If a CAN message passes through I-7532 from CH1 to CH2, the CH1 Rx LED will flash once with green light.
- 3. The following is the error conditions in comm. mode :

(1) Transmission Fail :

If CAN transmission fails on channel(x), the CH(x) ERR LED will flash continuously and the interval is about 100 ms.

(2) Buffer overflow :

If Tx buffer on CH(x) has been overflowed, the CH(x) ERR LED will flash per second continuously. Users can press the "RST" button once to clear the ERR LED.

(3) <u>Bus Off</u> :

If the bus-off condition happened on channel(x) of I-7532, the CH(x) ERR LED will be always ON until the bus-off condition is solved.

2.4 **Reset & Error Clear Button**

Table 2-2: Resel & EITOI Clear Bullon				
Reset & Error Clear Button				
Click once Clear Error LED				
Press Over 3 sec	Module Reset			

Table 2.2. Deast & Error Clear Button

[Note]

- 1. Users can press this button once to clear the "buffer overflow" Error LED status, but it can not be used to clear the "transmission fail" or bus-off" error LED status.
- 2. If users want to reset I-7532, just press "RST & Error Clear" button over 3 sec, then all LEDs of I-7532 will flash once and reset. After that, the PWR LED will be on and other LEDs will be off.

2.5 CANBaud Rotary Switch

Users can use the "CANBaud Rotary Switch" to change the CAN1 and CAN2 baud of I-7532 and it supports 15 kinds of baud shown on Table 2-3. After changing the rotary switch value, users need to reset I-7532 to take the setting effect. If the "CANBaud Rotary Switch" is set to be '0', then I-7532 will go into module configuration mode and others of "CANBaud Rotary Switch" will go into communication mode.

Switch	0	1	2	3	4	5	6	7
Value								
Baud	Config	<u>5k</u> or	10k	20k	40k	50k	80k	100k
[bps]	Mode	user-defined						
		CAN baud						

Table 2-3: Rotary Switch Value & Baud

Switch Value	8	9	Α	В	С	D	E	F
Baud [bps]	125k	200k	250k	400k	500k	600k	800k	1M

2.5.1 BootLoader Mode

If users set rotary switch of CAN1 and CAN2 to be '0' position simultaneously and reboot I-7532, then I-7532 will go into bootloader mode for "Firmware Update" via CAN bus (Just for **CAN1 of I-7532 with Baud equals 1000Kbps**). The bootloader function is provided for firmware version 1.02 or newer.

In bootloader mode, the PWR LED will flash per second continuously and users can use "FW_Update_CAN" tool like the below figure for firmware update of I-7532. "FW_Update_CAN" tool can be downloaded from the ICP DAS web site :

<u>ftp://ftp.icpdas.com.tw/pub/cd/fieldbus_cd/can/converter/i-7532/soft</u> <u>ware/tool/</u>

FW_Update_CAN_v1.00					
1. CAN Device :					
(1) R\$232 to CAN : • I-7530(A)					
(2) Ethemet to CAN : 🔿 I-7540D					
(3) USB to CAN : C I-7565 C I-7565-H1 C I-7565-H2					
(4) CAN Card: O PISO-CM100(U) O CAN200 O CAN400					
Dev_Port: COM1 CAN_Port: CAN1					
2. Firmware :					
Start Firmware Download 39%					

(Firmware Update Utility of I-7532)

Please follow the steps to accomplish the firmware update function of I-7532.

- (1)Choose the CAN interface device. (Current just ICP DAS CAN devices are supported)
- (2)Click the "Browser..." button to choose the I-7532 firmware file like I7532_v1.03.fw.
- (3)Click "Start Firmware Download" button to start the firmware update process.

2.5.2 Communication Mode

If users set rotary switch of CAN1 and CAN2 to be one of '1' to 'F' and reboot I-7532, then I-7532 will go into communication mode for CAN message transmission with the assigned CAN baud.

In comm. mode, the PWR LED will be always on and other LEDs will be off initially.

[Note]

There are two kinds of CAN baud recorded in '1' position of "CANBaud Rotary switch". If users had set the user-defined CAN baud before, then it will use user-defined CAN baud recorded in I-7532 for communication. If not, then it will use 5Kbps (default value) for communication. Users can get the user-defined CAN baud by using configuration command.

2.5.3 Configuration Mode

If users set rotary switch of CAN1 or CAN2 to be '0' and reboot I-7532, then I-7532 will go into module configuration mode and users can set the "<u>CAN-ID Filter</u>", "<u>user-defined CANBaud</u>" or "<u>get</u> <u>module information</u>" etc. functions.

In config mode, the PWR LED will flash per 100ms continuously.

- (1) If the CH1 Baud rotary switch is set in '0':
 - [1] The CH1 Rx LED will be always on.
 - [2] It means that users will be able to config I-7532 via CAN1 of I-7532 with 250Kbps baudrate.
- (2) If the CH2 Baud rotary switch is set in '0':
 - [1] The CH2 Rx LED will be always on.
 - [2] It means that users will be able to config I-7532 via CAN2 of I-7532 with 250Kbps baudrate.

The configuration command code consists of CAN-ID and the following is the total commands provided in config mode of I-7532.

Function	SendCmd Code (In CAN-ID field)	Response Code (In CAN-ID field)
System Function	0x001 (Get FW_Ver) 0x002 (Reset Module)	0x401 0x402 0x4FF (Cmd Fail)

CAN1	0x101 (Start CAN-ID Filter Setting)	0x501
Function	0x102 (Stop CAN-ID Filter Setting)	0x502
	0x103 (Get CAN-ID Filter Setting)	0x503
	0x104 (Set CAN-ID Filter All Pass)	0x504
	0x105 (Set user-defined CANbaud)	0x505
	0x106 (Get user-defined CANbaud)	0x506
	0x107 (Start CAN-ID Map Setting)	0x507
	0x108 (Stop CAN-ID Map Setting)	0x508
	0x109 (Get CAN-ID Map Setting)	0x509
	0x10A (Set CAN-ID No Map)	0x50A
	0x111 (Set Single 11-bit ID)	0x511
	0x112 (Set Group 11-bit ID)	0x512
	0x113 (Set Single 29-bit ID)	0x513
	0x114 (Set Group 29-bit ID)	0x514
	0x115 (Set Mapping 11-bit ID)	0x515
	0x116 (Set Mapping 29-bit ID)	0x516
		0x5FF (Cmd Fail)
CAN2	0x201 (Start CAN-ID Filter Setting)	0x601
CAN2 Function	0x201 (Start CAN-ID Filter Setting) 0x202 (Stop CAN-ID Filter Setting)	0x601 0x602
CAN2 Function	0x201 (Start CAN-ID Filter Setting) 0x202 (Stop CAN-ID Filter Setting) 0x203 (Get CAN-ID Filter Setting)	0x601 0x602 0x603
CAN2 Function	0x201 (Start CAN-ID Filter Setting) 0x202 (Stop CAN-ID Filter Setting) 0x203 (Get CAN-ID Filter Setting) 0x204 (Set CAN-ID Filter All Pass)	0x601 0x602 0x603 0x604
CAN2 Function	0x201 (Start CAN-ID Filter Setting) 0x202 (Stop CAN-ID Filter Setting) 0x203 (Get CAN-ID Filter Setting) 0x204 (Set CAN-ID Filter All Pass) 0x205 (Set user-defined CANbaud)	0x601 0x602 0x603 0x604 0x605
CAN2 Function	0x201 (Start CAN-ID Filter Setting) 0x202 (Stop CAN-ID Filter Setting) 0x203 (Get CAN-ID Filter Setting) 0x204 (Set CAN-ID Filter All Pass) 0x205 (Set user-defined CANbaud) 0x206 (Get user-defined CANbaud)	0x601 0x602 0x603 0x604 0x605 0x606
CAN2 Function	0x201 (Start CAN-ID Filter Setting) 0x202 (Stop CAN-ID Filter Setting) 0x203 (Get CAN-ID Filter Setting) 0x204 (Set CAN-ID Filter All Pass) 0x205 (Set user-defined CANbaud) 0x206 (Get user-defined CANbaud) 0x207 (Start CAN-ID Map Setting)	0x601 0x602 0x603 0x604 0x605 0x606 0x607
CAN2 Function	0x201 (Start CAN-ID Filter Setting) 0x202 (Stop CAN-ID Filter Setting) 0x203 (Get CAN-ID Filter Setting) 0x204 (Set CAN-ID Filter All Pass) 0x205 (Set user-defined CANbaud) 0x206 (Get user-defined CANbaud) 0x207 (Start CAN-ID Map Setting) 0x208 (Stop CAN-ID Map Setting)	0x601 0x602 0x603 0x604 0x605 0x606 0x607 0x608
CAN2 Function	0x201 (Start CAN-ID Filter Setting) 0x202 (Stop CAN-ID Filter Setting) 0x203 (Get CAN-ID Filter Setting) 0x204 (Set CAN-ID Filter All Pass) 0x205 (Set user-defined CANbaud) 0x206 (Get user-defined CANbaud) 0x207 (Start CAN-ID Map Setting) 0x208 (Stop CAN-ID Map Setting) 0x209 (Get CAN-ID Map Setting)	0x601 0x602 0x603 0x604 0x605 0x606 0x607 0x608 0x609
CAN2 Function	0x201 (Start CAN-ID Filter Setting) 0x202 (Stop CAN-ID Filter Setting) 0x203 (Get CAN-ID Filter Setting) 0x204 (Set CAN-ID Filter All Pass) 0x205 (Set user-defined CANbaud) 0x206 (Get user-defined CANbaud) 0x207 (Start CAN-ID Map Setting) 0x208 (Stop CAN-ID Map Setting) 0x209 (Get CAN-ID Map Setting) 0x20A (Set CAN-ID No Map)	0x601 0x602 0x603 0x604 0x605 0x606 0x607 0x608 0x609 0x609 0x60A
CAN2 Function	0x201 (Start CAN-ID Filter Setting) 0x202 (Stop CAN-ID Filter Setting) 0x203 (Get CAN-ID Filter Setting) 0x204 (Set CAN-ID Filter All Pass) 0x205 (Set user-defined CANbaud) 0x206 (Get user-defined CANbaud) 0x207 (Start CAN-ID Map Setting) 0x208 (Stop CAN-ID Map Setting) 0x209 (Get CAN-ID Map Setting) 0x204 (Set CAN-ID Map Setting) 0x20A (Set CAN-ID No Map)	0x601 0x602 0x603 0x604 0x605 0x606 0x607 0x608 0x609 0x609 0x60A
CAN2 Function	0x201 (Start CAN-ID Filter Setting) 0x202 (Stop CAN-ID Filter Setting) 0x203 (Get CAN-ID Filter Setting) 0x204 (Set CAN-ID Filter All Pass) 0x205 (Set user-defined CANbaud) 0x206 (Get user-defined CANbaud) 0x207 (Start CAN-ID Map Setting) 0x208 (Stop CAN-ID Map Setting) 0x209 (Get CAN-ID Map Setting) 0x204 (Set CAN-ID Map Setting) 0x204 (Set CAN-ID No Map)	0x601 0x602 0x603 0x604 0x605 0x606 0x607 0x608 0x609 0x609 0x60A
CAN2 Function	0x201 (Start CAN-ID Filter Setting) 0x202 (Stop CAN-ID Filter Setting) 0x203 (Get CAN-ID Filter Setting) 0x204 (Set CAN-ID Filter All Pass) 0x205 (Set user-defined CANbaud) 0x206 (Get user-defined CANbaud) 0x206 (Get user-defined CANbaud) 0x207 (Start CAN-ID Map Setting) 0x208 (Stop CAN-ID Map Setting) 0x209 (Get CAN-ID Map Setting) 0x209 (Get CAN-ID Map Setting) 0x204 (Set CAN-ID No Map) 0x211 (Set Single 11-bit ID) 0x212 (Set Group 11-bit ID) 0x213 (Set Single 29-bit ID)	0x601 0x602 0x603 0x604 0x605 0x606 0x607 0x608 0x609 0x609 0x604
CAN2 Function	0x201 (Start CAN-ID Filter Setting) 0x202 (Stop CAN-ID Filter Setting) 0x203 (Get CAN-ID Filter Setting) 0x204 (Set CAN-ID Filter All Pass) 0x205 (Set user-defined CANbaud) 0x206 (Get user-defined CANbaud) 0x207 (Start CAN-ID Map Setting) 0x208 (Stop CAN-ID Map Setting) 0x209 (Get CAN-ID Map Setting) 0x209 (Get CAN-ID Map Setting) 0x204 (Set CAN-ID No Map) 0x211 (Set Single 11-bit ID) 0x212 (Set Group 11-bit ID) 0x213 (Set Single 29-bit ID) 0x214 (Set Group 29-bit ID)	0x601 0x602 0x603 0x604 0x605 0x606 0x607 0x608 0x609 0x609 0x604 0x611 0x612 0x613 0x614
CAN2 Function	0x201 (Start CAN-ID Filter Setting) 0x202 (Stop CAN-ID Filter Setting) 0x203 (Get CAN-ID Filter Setting) 0x204 (Set CAN-ID Filter All Pass) 0x205 (Set user-defined CANbaud) 0x206 (Get user-defined CANbaud) 0x206 (Get user-defined CANbaud) 0x207 (Start CAN-ID Map Setting) 0x208 (Stop CAN-ID Map Setting) 0x209 (Get CAN-ID Map Setting) 0x209 (Get CAN-ID Map Setting) 0x204 (Set CAN-ID No Map) 0x211 (Set Single 11-bit ID) 0x212 (Set Group 11-bit ID) 0x213 (Set Single 29-bit ID) 0x214 (Set Group 29-bit ID) 0x115 (Set Mapping 11-bit ID)	0x601 0x602 0x603 0x604 0x605 0x606 0x607 0x608 0x609 0x609 0x609 0x604 0x611 0x612 0x613 0x614 0x615
CAN2 Function	0x201 (Start CAN-ID Filter Setting) 0x202 (Stop CAN-ID Filter Setting) 0x203 (Get CAN-ID Filter Setting) 0x204 (Set CAN-ID Filter All Pass) 0x205 (Set user-defined CANbaud) 0x206 (Get user-defined CANbaud) 0x207 (Start CAN-ID Map Setting) 0x208 (Stop CAN-ID Map Setting) 0x209 (Get CAN-ID Map Setting) 0x209 (Get CAN-ID Map Setting) 0x204 (Set CAN-ID No Map) 0x211 (Set Single 11-bit ID) 0x212 (Set Group 11-bit ID) 0x213 (Set Single 29-bit ID) 0x214 (Set Group 29-bit ID) 0x115 (Set Mapping 11-bit ID) 0x116 (Set Mapping 29-bit ID)	0x601 0x602 0x603 0x604 0x605 0x606 0x607 0x608 0x609 0x609 0x609 0x60A 0x611 0x612 0x613 0x614 0x615 0x616

Before starting the configuration of I-7532, there are some rules must be followed.

- (1) The **CAN baud** must be set in **250Kbps** in users' CAN tool.
- (2) The **data length** of SendCmd must be **8**. If users just want to set one CAN-ID filter, then just fill "0xFFFFFFFF" in another DW field.
- (3) The "Mode" bit of SendCmd is no limit.
- (4) The "RTR" bit of SendCmd must be 0.
- (5) In group CAN-ID filter setting, the low CAN-ID needs to place in low-DW field and the high CAN-ID needs to place in Hi-DW field. Or it will return error code 2.
- (6) The CAN-ID value of ResCmd equals the one of SendCmd plus 0x400. The result of SendCmd will be placed in a return code and shown as below :

ResCmd RetCode	Meaning		
0x00	No Error		
0x01	Process Error		
0x02	Parameter Format Error		
0x03	CAN-ID Filter Record Error		
0x04	Command No. Error		
0x05 CAN No. Error			
0x06	Command Length Error		
0x07	RTR Error		

There are two methods for configuration of I-7532 and described as chapter 2.5.4 and 2.5.5.

2.5.4 Configuration via I-7532 Utility

The "I-7532 Utility" is provided by ICP DAS to configure I-7532 module easily and quickly and can be downloaded from the ICP

DAS web site :

<u>ftp://ftp.icpdas.com.tw/pub/cd/fieldbus_cd/can/converter/i-7532/soft</u> <u>ware/utility/</u>. The following is operation description of I-7532 utility.

[Step 1 – Setting before I-7532 Configuration]

- 1. Setting via "I-7530" module:
 - [1] Set the following parameters by using I-7530 utility.
 - (1) Set COM_Baud=115200; DataBit=8; StopBit=1; Parity=None; CheckSum=No.; Error Response=No
 - (2) Set CAN Spec.=2.0B; CAN Baud=250Kbps
 - (3) Set CAN Acceptance Code and Mask= 00000000
 - (4) Disable "Pair Connection" function.

🎏 I-7530 Utility 📃 🗖 🔀							
<u>File A</u> ctions <u>H</u> elp	<u>File Actions H</u> elp						
Connect Disconr	Connect Disconnect Exit About						
Settings Test							
1 RS-232 Paramete	rs		2-CAN Parameters				
RS-232 Baudrate	115200 🖃	bit/sec	CAN Specification 2.0B				
Data Bit	8 💌	Ыt	CAN bus Baudrate 1000K 🗨 bit/sec				
Stop Bit	1 🔹	Ьit	Acceptance Code 00000000 (Hex)				
Parity	None 💌	Ыt	Acceptance Mask 00000000 (Hex)				
Add Checksum	No 💌		4 Pair Connection				
Error Response	No 💌)	End of RS-232 Command				
			Fixed Tx CAN ID 00000001 (Hex)				
			Response with CAN ID				
	Defaults						
Connected to COM1	Configuratio	on Mode	Ver: 2.01 Copyright(c) 2004 ICP DAS Co., LTD.				

(I-7530 Utility)

- 2. Setting via "I-7540D" module:
 - [1] Installl "VxComm_Driver" and run "VxComm Utility" :
 - (1) Click "Search Servers" button
 - (2) Click "Add Server(s)" button

(3) Set "Port 3" of I-7540D to be a Virtual COM. (like COM20)
(4) Execute "Restart Driver"

🥩 ¥xComm Utility [v2.10.0	00, Mar.24, 2	010]							
<u>File Server Port</u> <u>Tools</u>		_							
System In Restart D	formation river	>	Configu	ire Server				C	onfigure Port
driver & utility	V×Com	m Serve	rs			Port	Virtual CO	DM I	Baudrate
Where remote serial devices become part of your PC	7186	6E3 (192	.168.1.50) 🔔			Port I/O Port 1	Reserved UnMap	1 I 1	N/A Dvnamic
2					3	Port 2	UnMap		Dynamic
Add Server(s)						Port 3	COM20		Dynamic
🔀 Remove Server									
Web									
Search Servers									
Configuration (UDP)									
Exit									
	λ								
	Name	Alias	IP Address	Sub-net M	Gateway	MAC Addre	ss I	DHCP	
Contract (1)	7186E3	N/A	192.168.1.50	255.255.0.0	192.168.1.1	00:0d:e0:d	0:7c:2e	OFF	

(VxComm Utility)

[2] Set the following parameter by using I-7540D Utility.

- (1) Set CAN Spec.=2.0B; CAN Baud=250Kbps
- (2) Set Acceptance Code=00000000; Mask= FFFFFFF
- (3) Set Error Resp.= No; TimeStamp Resp.= No
- (4) Disable "Pair Connection" function.

🎏 i-7540D Utility	
<u>F</u> ile <u>A</u> ctions <u>H</u> elp	
Connect Disconnect Exit) tt
Settings Test	
1. CAN Parameters	Network Status
CAN Specification 2.0B	Gateway: 192.168.1.1 Set
CAN Bus Baud rate 1000K 🔍 bits/sec	Mask : 255.255.0.0 Set
	MAC : 00:0d:e0:d0:7c:2e
BTR0 00 (Hex) BTR1 00 (Hex)	Web ID : 7540D Set
Acceptance Code 00 00 00 00 (Hex)	Web Passwd : jcpdas7540D Set
Acceptance Mask FF FF FF FF (Hex)	🔲 Reset System
3	Modify IP
Error Resp. No 💌 TimeStamp Resp. No 💌	CAN Bus Pair Connection Status
Setting Defaults	CAN Bus Pair Connection Set
COM Status COM1: 9600,8,N,1 Set	C TCP C UDP C Server C Client
COM2: 9600,8,N,1Set	Connect to 192.168.0.51 Set
Connected Configuration Mode v1.1.4[10/29/2009] Copyright(c) 2005 ICP DAS Co., LTD.
·	

(I-7540D Utility)

Setting via "I-7565" module:

[1] Set the following parameter by using I-7565 utility.

- (1) Set CheckSum=No.; Error Response=No
- (2) Set CAN Spec.=2.0B; Baud=250Kbps.
- (3) Set CAN Acceptance Code and Mask= 00000000.

🎏 I-7565 Utility	
<u>File A</u> ctions <u>H</u> elp	
Connect Disconnect Exit	? About
Settings Test	
USB Parameters Add Checksum No I Error Response No I	2 - CAN Parameters CAN Specification 2.0B CAN bus Baudrate 1000K Acceptance Code 00000000 (Hex) Acceptance Mask 00000000 (Hex)
📕 Defaults	😭 Setting
Connected to COM5 Configuration 1	4ode Ver: 1.00 Copyright(c) 2007 ICP DAS Co., LTD.

(I-7565 Utility)

[Step 2 – I-7532 Utility Configuration]

[1] CAN Device :

The below ICP DAS CAN products are supported by I-7532 utility for configuration.

- (1) RS232 to CAN : <u>I-7530</u>
- (2) Ethernet to CAN: I-7540D
- (3) USB to CAN : <u>I-7565</u>, <u>I-7565-H1</u>, <u>I-7565-H2</u>
- (4) CAN Card

: <u>PISO-CM100(U)</u>, <u>PISO-/PCM-/PEX-CAN200</u> / <u>CAN400</u>

*6	I-7532 Utility v1.00	
	1. CAN Device :	
	(1) RS232 to CAN :	○ I-7530(A)
	(1) (2) Ethernet to CAN :	○ I-7540D
	(3) USB to CAN :	⊙ I-7565 ⊙ I-7565-Н1 ⊙ I-7565-Н2
	(4) CAN Card:	C PISO-CM100(U) C CAN200 C CAN400
	(2)Dev_Port: CC	DM1 🗨 (3)CAN_Port: CAN1 💌



Before configuration of I-7532, users need to set the below parameters.

- (1) CAN hardware interface
- (2) Dev_Port / Board_ID
- (3) CAN_Port" number

[2] CAN-ID Filter / Mapping Setting :



CAN-ID Filter Setting

(0) "CAN-ID Filter / Mapping Function" : It is used to choose CAN-ID Filter or CAN-ID Mapping configuration function of I-7532.

(1) "CAN Controller" :

It is used to choose which CAN port (CAN1 or CAN2) of I-7532 for CAN-ID filter setting.

(2) "Add" button :

[1] "CAN-ID Filter" Option:

It is used to add <u>"11-bit Single-ID</u>", "<u>29-bit Single-ID</u>", "<u>11-bit Group-ID</u>", "<u>29-bit Group-ID</u>" to CAN-ID filter table.

[2] "CAN-ID Mapping" Option:

<1> It is used to add <u>11-bit Mapping-ID</u>", "<u>29-bit</u> <u>Mapping-ID</u>" to CAN-ID mapping table.

<2> The below CAN-ID mapping function has already supported in FW_v1.04 and Utility_v1.03.

	11-bit	29-bit				
	(Transfer CAN-ID)	(Transfer CAN-ID)				
11-bit (Recv CAN-ID)	OK	OK				
29-bit (Recv CAN-ID)	OK	OK				



(3) "Set CAN Accepted / Mapping IDs" button :

It is used to set CAN-ID filter / mapping data in CAN-ID filter / mapping table to I-7532 and users need to choose "CAN Controller" number first. After clicking the button, it will show the total percentage in the progress bar. If the table is blank,

then it will set all CAN-IDs without filter or mapping function.

74%

Total Percentage of CAN-ID Filter Setting

(4) "Get CAN Accepted / Mapping IDs" button :

It is used to get CAN-ID filter / mapping data from I-7532 and users need to choose "CAN Controller" number first. Then CAN-ID filter / mapping data will be shown in CAN-ID filter / mapping table. If the result in the table is blank, it means that the CAN-ID filter or mapping function is not used in the CAN port.

(5) "Save File" button :

It is used to save CAN-ID filter / mapping data in CAN-ID filter / mapping table to file. There are two file format for file saving.

[1] "<u>*.dat</u>" format :

It is used to save CAN-ID filter / mapping data to file (.dat) in binary format. The file format is compatible with configuration file of I-7565-H1 and I-7565-H2.

[2] "<u>*.xls</u>" format :

It is used to save CAN-ID filter / mapping data to file (.xls) in CAN message format and useful for CAN hardware interface of other companies to configure CAN-ID filter / mapping function of I-7532.



(6) "Load File" button :

It is used to load CAN-ID filter / mapping data from file (*.dat) to CAN-ID filter / mapping table.

Load CAN Filter-Il	D File		? 🛛
搜尋位置 ([): 🔂 I	7565H_Record	+	🗈 💣 🎟 •
a.dat a.dat a.dat abc.dat abc.dat acan1.dat arr GID11.dat GID11_110.dat	GID29_55.dat GID29_60.dat GID29_70.dat GID29_90.dat GID29_110.dat GID29_140.dat	577 SID11.dat 577 SID11_100.dat 577 SID11_150.dat 577 SID11_200.dat 577 SID11_220.dat 577 SID11_220.dat 577 SID11_250.dat	51011_260.dat 51011_320.dat 51011_320.dat 51011_400.dat 51011_420.dat 51011_440.dat 51011_440.dat 51029.dat
<)	>
檔案名稱(M): GID1	1.dat		開啓〇
檔案類型(I): CAN	Filter-ID File (*.dat)	•	取消
لا ا	唯讀方式開啓(图)		

"Load File" Function

(7) "Delete Row" button :

It is used to delete one row chosen in CAN-ID filter / mapping table.

(8) "Clear Table" button :

It is used to clear all data in CAN-ID filter / mapping table.

[3] Config / Info Option : (For I-7532 Utility v1.02)

Config / Info Option	
🕥 Get ModInfo	
🔿 Reset Module	Send
Set Module Data 83.333	User-Defined CANBaud (Khrs)
🔘 Get Module Data	

(1) "Get ModInfo" :

It is used to get module information of I-7532, for example: firmware version.





Get CAN Bus-Off Auto-Reset Time

- => If the value of the "CAN Bus-Off Auto-Reset Time" is zero, it means that the function is disabled. If not, I-7532 will be reset automatically when CAN Bus-Off happened with continuous 10 seconds for the above example.
- (7) "Set CAN Listen-Only Mode" :

It is used to set CAN1 or CAN2 channel in I-7532 to be Listen-Only mode. In this mode, the CAN channel in I-7532 will not ack the CAN message.

[1] Set "1" => Enable Listen-Only Mode.

[2] Set "0" => Disable Listen-Only Mode.

-Single ID (HEX) 11-bit 29-bit	7FF	Add	CAN CAN	Controller
Group ID (HEX) Il-bit Solution Solution Gold States Gold States Go	. 000) To	7FF (Add
No CAN-ID Type		Accepted IDs		Save File
				Load File
			— (Delete Row
Get CAN Accepted	IDs Set	CAN Accepted I)s (Clear Table
Config / Info Option				
C Get ModInfo				Send
Set Module Data Get Module Data	1	CAN Listen-Onl	y Mode	
Ger Mou die Dala				

Set CAN Listen-Only Mode

(8) "Get CAN Listen-Only Mode" :

It is used to get the Listen-Only mode state of CAN1 or CAN2 in I-7532.

-Config / Info Option C Get ModInfo Reset Module Set Module Data I C Get Module Data	Send CAN Listen-Only Mode
I-7532_Utility CAN1 Listen-Only Mode Enabled	I-7532_Utility CAN2 Listen-Only Mode Disabled

Get CAN Listen-Only Mode

If the "**Config Command Timeout**" error message shows up when configure I-7532, please check the following status.

- (1) Check "CAN bus hardware connection".
- (2) Check "Communication Parameter of CAN device".
- (3) Check I-7532 module if it is in "Configuration" mode.

2.5.5 Configuration via Sending Config Command

If users don't have ICP DAS CAN hardware supported in I-7532 Utility, then users need to send CAN message by following the configuration command format of I-7532. The following is the detailed description and demo for configuration functions of I-7532 and I-7565-H2 module (USB2CAN) is applied for the following demo.

[1] System Functions : (1) <u>0x001</u> (Get FW_Ver) :

Send	dMsg	Configura	tion-											,	_
Mo	ode –	ID (Ĥex)	I	RTR	D	LC	D1	D2	D	3 D	D4	D5	D6 D7	D8 Timer(ms)
11-bit	ID 👻	001	N	o 🔻	8	-	00	00		Π	00	00	00 00	00 0	
-		,			<u> </u>		<u> </u>	1	1				· · · · ·	· · · ·	
No.	MODE	ID(hex)	RTR	DLC	D1	D2	D3	D4	D5	D6	D7	D8	Timer	Status	
1	0		0	(8)	00	00	00	00	00	00	00	00	0		
				\sim											

SendCmd

- 0	CAN2 BerryMsg															
Ŭ		NEC VIVI	isy											🔽 Scrollin	nq	
	No	MODE	ID <u>(h</u> ex)	RTR	DLC	<u>D1</u>	D2	D3	D4	D5	D6	D7	D8	TimeStamp(sec)	•	
	1	0	(401)	0	2	(01)	(01)	.	High Duto					5225.3961		
			Low	Byte	_	<u> </u>	<u> </u>	~	ing	пр	e					

ResCmd

[1] SendCmd :

Type "**001**" in ID field and "**8**" in DLC field and then send it out.

- [2] ResCmd :
 - (1) "401" in ID field is the response CAN-ID for SendCmd 0x001 (0x001+0x400 = 0x401).
 - (2) "02" in DLC field means response data length.
 - (3) "01" in D2 (High Byte Integer part of FW_Ver)
 "01" in D1 (Low Byte Decimal part of FW_Ve)
 => the version of firmware is v1.01.

(2) <u>0x002</u> (Reset Module) :

- Seno Mo 11-bit	dMsg ode ID 💌	Configura ID (Hex) 002	tion- f	RTR	D 8	LC •	D1 00	D2 00	D	3 C 0 1	04 00	D5 00	D6 00	D7 00	, D8 00	Timer (n	ns)
No.	MODE	ID(hex)	RTR	DLC	D1	D2	D3	D4	D5	D6	D7	D8	Ti	mer	S	tatus	
1	0	(002)	0	8	00	00	00	00	00	00	00	00		0			
2																	

SendCmd

-C	AN2 I	RecvM	lsg											🔽 Scrolli	ing
	No	MODE	ID <u>(he</u> x)	RTR	DLC	D1	D2	D3	D4	D5	D6	D7	D8	TimeStamp(sec)	
	1	0	402	0	1	\odot								4248.9700	
							×.	Retu	rn C	ode					

ResCmd

[1] ResCmd :

If there is no any data to return, then it will just return the result of SendCmd with the return code.

(3) <u>0x003</u> (Set CAN Bus-Off Auto-Reset Time) :

	.,																
Mo	ode	ID (Hex)	F	RTR	D	LC	D1	D2	: D	3 C	04	D5	D6	D7	D8	Timer (m	ns)
11-bit	ID 🔻	003	N	o 🔽	8	-	0A	00		Γ	00	00	00	00	00	0	
No.	MODE	I <u>D(hex</u>)	RTR	DLC	D1	D2	D3	D4	D5	D6	D7	D8	Т	imer	S	tatus	
1	0	003	0	8	(OA	00	00	00	00	00	00	00		0			
2					_												

SendCmd

ANI D	ocyMe													
	CUVINI	°Y		🖲 Sc	roll l	Mode	_0	🔽 Scrolling	Scrolling					
No	MODE	ID(hex)	RTR	DLC	D1	D2	D3	D4	D5	D6	D7	D8	TimeStamp(sec)	•
1	0	(403)	0	1	(0)	-							214025.2887	
							Ret	um (Code					_

ResCmd

[1] SendCmd :

Type "003" in ID field and "8" in DLC field.

"00" in D2 (High Byte of Auto Reset Time)

"0A" in D1 (Low Byte of Auto Reset Time)

=> It means that the auto reset time is 10 seconds.

- Then send it out.
- [2] ResCmd :
 - (1) "403" in ID field is the response CAN-ID.
 - (2) "01" in DLC field means response data length.
 - (3) "**00**" in D1 is the return code for SendCmd.

(4) <u>0x004</u> (Get CAN Bus-Off Auto-Reset Time) :

Mo	ode	ID (Hex)	l I	RTR	D	LC	D1	D2	D	3 D	04	D5	D6 D7	D8	Timer (m	is)
11-bit	ID 👻	004	N	o 🔽	8	•	00	00		σ	00	00	00 00	00	0	
No.	IMODEI	ID(hex)	BTR	DLC	D1	D2	D3	D4	D5	D6	D7	D8	Timer	S	tatus	
<u>No.</u>	MODE 0	ID(hex) 004	RTR 0	DLC 8	D1 00	D2 00	D3 00	D4 00	D5 00	D6 00	D7 00	D8 00	Timer 0	SI	tatus	-

SendCmd

CAN1 RecvMsg														
Cratter 1		'9 		🖲 Sc	roll l	Mode	_0	🔽 Scrollin	Scrolling					
No	MODE	ID(hex)	RTR	DLC	D1	D2	D3	D4	D5	D6	D7	D8	TimeStamp(sec)	
1	1 0 (404) 0					(00)							214025.2887	
		Lo	w Byt	e 🦯				- Hig	рh By	te				_

ResCmd

[1] SendCmd :

Type "**004**" in ID field and "**8**" in DLC field and then send it out.

- [2] ResCmd :
 - (1) "404" in ID field is the response CAN-ID.
 - (2) "**02**" in DLC field means response data length.
 - (3) "**00**" in D2 (High Byte of Auto Reset Time)

"**0A**" in D1 (Low Byte of Auto Reset Time)

=> the auto reset time is 10 seconds.

[2] CAN1 Functions :

[CAN-ID Filter]

(1) <u>0x101</u>

(Start CAN-ID Filter Setting) : (2) 0x111 / 0x112 / 0x113 / 0x114 (Set CAN-ID Filter data) : (3) <u>0x102</u> (Stop CAN-ID Filter Setting) :

For example :

There are four CAN-ID types in I-7532.

(1) Single 11-bit CAN-ID: 0x001, 0x010

(2) Group 11-bit CAN-ID: 0x100 ~ 0x706

(3) Single 29-bit CAN-ID: 0x1F000201

(4) <u>Group 29-bit CAN-ID</u>: 0x01000000 ~ 0x1F000000

If users just want to receive the above CAN-IDs (White List), please refer to the below demo.

SendMsg Configuration																
Mo	de	10	D (Hex)	F	RTR	D	LC	D1	D2	D	3 C	04	D5	D6 D7	D8 Timer (n	ns)
11-bit	ID 🔻	101		N) 🔻	8	-	00	00		Γ	00	00	00 00	00 0	_
Ľ.		_				<u> </u>		_	_	_		_	_			_
No.	MODE	[D(hex)	RTR	DLC	D1	D2	D3	D4	D5	D6	D7	D8	Timer	Status	
1	0	1. ζ	101	0	8	00	00	00	00	00	00	00	00	0		
2	0	з. С	102	0	8	00	00	00	00	00	00	00	00	0		
3	0	1	111	0	8	01	00	00	00	10	00	00	00	0		1
4	0	2.	112	0	8	00	01	00	00	06	07	00	00	0,7	No Use	1
5	0		113	0	8	01	02	00	1F	ŒF	FF	FF	FF	0		<u> </u>
6	0		114	0	8	00	00	00	01	00	00	00	1F	0		-
							10-	DW			Hi_D	W	_		•	

SendCmd

[1] SendCmd:

(1) Send ID – "0x101" to start CAN-ID filter setting.

(2) Send ID – "0x111" ~ "0x114" for CAN-ID filter data.

(3) Send ID – "0x102" to stop CAN-ID filter setting.

[Note]

- Lo-DW value and Hi-DW value are two CAN-ID filter data.
- (2) DW value "0xFFFFFFF" means the DW value is no use.
- (3) When setting group CAN-ID filter function, the Lo-DW value must be smaller than the Hi-DW value.

			-											Scrollir
No	MODE		I <u>D(h</u> ex)	BTR	DLC	D1	D2	D3	D4	D5	D6	D7	D8	TimeStamp(sec)
1	0	1.3	501	0	1	00								7685.4951
2	0		511	0	8	01	00	00	00	10	00	00	00	7687.0552
3	0	2.	512	0	8	00	01	00	00	-06	07	00	00	7688.0552
4	0		513	0	- 4	01	02	00	1F					7689.5112
5	0		514	0	8	00	00	00	01	00	00	00	1F	7692.5593
6	0	3. (502	0	1	00								7696.0994

ResCmd

[2] ResCmd:

When sending CAN-ID filter data, it will return the result of the received CAN-ID filter data.

[Note]

The total capacity for CAN-ID filter function of each CAN port in I-7532 is 500 WORD. Table 2-5 describes the size of every different type CAN Filter-ID.

	Size (Unit: WORD)
11-bit Single ID	1
11-bit Group ID	2
29-bit Single ID	2
29-bit Group ID	4

Table 2-5: Size of Every Different Type CAN Filter-ID

According to Table 2-5, Table 2-6 describes the supported CAN Filter-ID number of each CAN port in I-7532.

	I-7532 (Each CAN Port)
11-bit Single ID	500/1 = 500
11-bit Group ID	500/2 = 250
29-bit Single ID	500/2 = 250
29-bit Group ID	500/4 = 125

Table 2-6: Number of every different type CAN ID

[CAN-ID Mapping]

(1.1) <u>0x107</u> (Start CAN-ID Mapping Setting) :

(2.1) <u>0x115</u> (Set 11-bit CAN-ID Mapping data) :

<u>0x116</u> (Set 29-bit CAN-ID Mapping data) :

(3.1) 0x108 (Stop CAN-ID Mapping Setting) :

CAN-ID Mapping number of each CAN port in I-7532.

	I-7532 (Each CAN Port)
11-bit Mapping ID	500
29-bit Mapping ID	250

Table 2-6.1: size of every different type CAN ID

[For Example]

Ex1: Set the below CAN-ID Mapping.

- (1) 11 bit : 0x101 -> 0x201
- (2) 29 bit : 0x1F000101 -> 0x1F000201

single C	11-bit [29-bit]	7FF Add	CAN Controller
Mappi (• (°	ng ID (HEX) 11-bit From 29-bit	000 To 7FF	Add
No	CAN-ID Type	Mapping IDs	Save File
101 102	11-bit MID 29-bit MID	0x101>0x201 0x1F000101>0x1F000201	
			Load File
			Delete Row

Method : (Mode=0, RTR=0, DLC=8 are fixed for the sent CAN msg) (1) Send the CAN msg with **ID=0x107** and D1~D8 are all zero.

=> If succeed, return CAN msg with ID=0x507

- (2) Send the CAN msg with ID=0x115 and D1=0x01, D2=0x01, D3~D4=0x00, D5=0x01, D6=0x02, D7~D8=0x00
 => If succeed, return CAN msg with ID=0x515
- (3) Send the CAN msg with ID=0x116 and <u>D1=0x01, D2=0x01, D3=0x00, D4=0x1F</u>, <u>D5=0x01, D6=0x02, D7=0x00, D8=0x1F</u> => If succeed, return CAN msg with ID=0x516
- (4) Send the CAN msg with ID=0x108 and D1~D8 are all zero.
 => If succeed, return CAN msg with ID=0x508
- => The detailed CAN message, please refer to the below figure.



(4) 0x103 (Read CAN-ID Filter Setting) :

-Senc	neMb	Configura	tion-														
Mo	de	ID (Hex)		RTR	D	LC	D1	D2	2 D	3 C	04	D5	D6	D7	D8	Timer (n	ns)
11-bit	ID 👻	103	N	0 🔻	8	•	00	00		σΓ	00	00	00	00	00	0	
No.	MODE	ID(hex)	BTR	DLC	D1	D2	D3	D4	D5	D6	D7	D8	Ti	mer	S	tatus	
1	0	(103)	0	8	00	00	00	00	00	00	00	00		0			
2																	
3																	

SendCmd

	(CCAIM	эч			_	_	_	_	-			~	🔽 Scrollin
No	MODE	ID(hex)	BTR	DLC	D1	D2	D3	D4	D5	D6	D7	D8	TimeStamp(sec)
1	0	503	0	8	01	00	11	00	01	00	00	00	11001.6253
2	0	503	0	- 8	02	-00	11	-00	10	00	00	-00	11001.6264
3	0	503	0	- 8	01	-00	12	-00	00	01	-00	-00	11001.6275
4	0	503	0	- 8	01	-00	12	00	06	07	00	-00	11001.6286
5	0	503	0	8	01	00	13	00	01	02	-00	1F	11001.6298
6	0	503	0	- 8	01	00	-14	00	00	-00	-00	01	11001.6309
7	0	503	0	8	01	00	14	00	00	00	00	1F	11001.6320
8	0	503	0	1	00								11001.6329

ResCmd

- [1] ResCmd:
 - (1) **D1~D2**:

CAN-ID number of each CAN-ID type. In the demo, it means there are two 11-bit CAN-IDs - 0x001, 0x010, one 11-bit group CAN-ID - 0x100 ~ 0x706, one 29-bit CAN-ID - 0x1F000201, one 29-bit group CAN-ID - 0x01000000 ~ 0x1F000000 passed.

- (2) **D3~D4**:
 - CAN-ID Type :
 - 0x11 => Single 11-bit ID
 - 0x12 => Group 11-bit ID
 - 0x13 => Single 29-bit ID
 - 0x14 => Group 29-bit ID
- (3) **D5~D8**:
 - CAN-ID Filter data.

(4.1) 0x109 (Read CAN-ID Mapping Setting) :

- Seno Mo 11-bit	dMsg ode ID 👻	Cor IC 109) (He	rat X)	tion - F	RTR	D 8		D1 00	D2 00	D	3 [D [1	04 00	D5 00	D6 D7 00 00	D8 00	Timer (m	ns)
No.	MODE	IC)(hex)		RTR	DLC	D1	D2	D3	D4	D5	D6	D7	D8	Timer	S	tatus	
1	0	<	109	2	0	8	00	00	00	00	00	00	00	00	0			
2																		

SendCmd

CA	.N1 R	ecvMs	sg		⊙ So	roll	Mode	0	Over	Write	Mode		_	🔽 Scrollin	g
	No	MODE	ID(hex)	RTR	DLC	D1	D2	D3	D4	D5	D6	D7	D8	TimeStamp(sec)	
	1	0	509	0	8	01	00	15	-00	01	01	00	00	281.2359	
	2	0	509	0	8	01	-00	15	-00	01	02	00	-00	281.2366	_
	3	0	509	0	8	01	00	16	-00	01	01	00	1F	281.2372	
	4	0	509	0	8	01	00	16	00	01	02	00	1F	281.2378	
	5	0	509	0	1	00								281.2382	

ResCmd

[1] ResCmd:

(1) **D1~D2**:

CAN-ID Mapping number of each CAN-ID type. In the demo, it means as below:

[1] one set 11-bit CAN-ID Maping : 0x101 to 0x201

[2] one 29-bit CAN-ID Maping 0x1F000101 to

<u>0x1F000201</u>.

(2) **D3~D4**:

CAN-ID Type :

0x15 => 11-bit Mapping-ID

0x16 => 29-bit Mapping-ID

(3) **D5~D8 :** CAN-ID Mapping data.

(5) 0x104 (Set CAN-ID Filter All Pass) :

- Seno Mo 11-bit	dMsg ode ID -	Configure ID (Hex) 104	tion-	RTR	D	LC T	D1	D2		3 C	04 00 [D5 00	D6 D7	D8	Timer (n	ns)
No.	MODE	ID <u>(hex)</u>		DLC	D1	 D2	D3	, D4	D5	D6	D7	D8	Timer	S	tatus	
1	0		0	8	00	00	00	00	00	00	-00	00	0			
2	0	103	0	8	00	00	00	00	00	00	00	00	0			
3																1

SendCmd

L.	ANZ I	Recvm	sg											🔽 🗹 Scrolling
	No	MODE	ID(hex)	RTR	DLC	D1	D2	D3	D4	D5	D6	D7	D8	Time (sec)
	1	0	504	0	1	00								12480.3322
(2	0	503	0	1	00								12638.1013 📃

ResCmd

After sending the command – 0x104, users can send command – 0x103 to read CAN-ID filter setting again and it will just show command successfully without any filter data.

(5.1) 0x10A (Set CAN-ID without Mapping) :

After sending the command - 0x10A, users can send command - 0x109 to read CAN-ID mapping setting again and it will just show command successfully without any mapping data.

(6) 0x105 (Set user-defined CANbaud) :

For example :

If users want to set user-defined CAN1 baud – **83.333** Kbps, please follow the below steps :

- Get the <u>integer part 83</u> and <u>decimal part 333</u> of CAN1 baud.
- (2) Transfer decimal mode to hex mode : <u>83(decimal) -> 0x53(hex)</u>, <u>333(decimal) -> 0x014D(hex)</u>
- (3) **D1~D2**:

The integer part of user-defined CAN baud.

D3~D4:

The decimal part of user-defined CAN baud.

Therefore, please type $\underline{0x0053 \text{ in } D1 \sim D2}$ and $\underline{0x014D \text{ in}}$ D3~D4.

- Seno Mo 11-bit	dMsg ode ID 👻	Configura ID (Hex) 105	tion - F	RTR	D		D1 53	D2 00	D 40	3 [D	04 01	D5 00	D6 D7 00 00	D8 Timer (ms)
No.	MODE	ID(hex)	RTR	DLC	D1	D2	D3	D4	D5	D6	D7	D8	Timer	Status	
1	0	(105)	0	8	53	00	4D	01	00	00	00	00	0		
2							<u> </u>								

SendCmd

- 0	AN2 0	Rocyk	lea												
Č		ICCAI	isy											🔽 Scrollin	g
	No	MODE	ID(hex)	RTR	DLC	D1	D2	D3	D4	D5	D6	D7	D8	TimeStamp(sec)	•
	1	0	505	0	1	00								13015.4615	
															_

ResCmd

(7) 0x106 (Read user-defined CANbaud) :

- Seno Mo 11-bit	dMsg ode ID 👻	Configura ID (Hex) 106	tion - I	RTR	D 8	LC •	D1 00	D2 00	D	3 [D [(04 00	D5 00	D6 00	D7 00	, D8 00	Timer (n	ns)
No.	MODE	ID(hex)	RTR	DLC	D1	D2	D3	D4	D5	D6	D7	D8	T	mer	S	tatus	
1	0		0	8	00	00	00	00	00	00	00	00		0			
2																	

SendCmd

-0	AN2	Rocyk	lea												
Č		ICCVI	isy											🔽 Scrolli	ng
	No	MODE	.ID(hex)	RTR	DLC	D1	D2	D3	D4	D5	D6	D7	D8	TimeStamp(sec)	
	1	0	506	0	4	53	00	4D	01	_				5323.4740	
				8	3 🦯						333				

ResCmd

[1] ResCmd:

(1) **D1~D2**:

This word value is the <u>integer value</u> of user-defined CAN1 baud with Hex format.

(2) **D2~D3**:

This word value is the <u>decimal value</u> of user-defined CAN1 baud with Hex format.

-C	AN2 I	RecvM	lsg			_								🔽 Scrollin	ng
	No	MODE	ID(hex)	RTR	DLC	D1	D2	D3	D4	D5	D6	D7	D8	TimeStamp(sec)	
	1	0	506	0	1	00								16459.2781	
						<u> </u>									_

ResCmd

If it just responses return code – 0x00 and means that no user-defined CAN1 baud data is recorded in I-7532.

[3] CAN2 Functions :

The configuration of CAN2 is the same with CAN1 and the only difference is just the **Command Code** (refer to the Table 2-4).

2.6 Pin Assignment



Figure 2-3: CAN & Power Connector of I-7532

Table 2-7: Pin Description of CAN Connector

Part	Name	Description
	CAN_GND	CAN_Ground, ground voltage level of CAN channel 1
CAN	CAN_L	CAN_Low, signal line of CAN channel 1
CH1	FG1	Frame Ground of CAN channel 1
	CAN_H	CAN_High, signal line of CAN channel 1
	CAN_GND	CAN_Ground, ground voltage level of CAN channel 2
CAN	CAN_L	CAN_Low, signal line of CAN channel 2
CH2	FG2	Frame Ground of CAN channel 2
	CAN_H	CAN_High, signal line of CAN channel 2

 Table 2-8: Pin Description of Power Connector

Part	Name	Description
	(R)VS+	Voltage Source. It could be $+10V_{DC} \sim +30V_{DC}$
Power	(B)GND	Power Ground
	FG3	Frame Ground of Power

Note 1: In some cases, the voltage level of CAN_GND of different CAN device in the same CAN bus system are not equal. At this time, it could cause some problems to derogate system stability of this CAN bus system.

There is one way to relieve this situation; user can connect the CAN_GND between those CAN devices to achieve equal voltage level of CAN_GND.

Wiring of CAN_GND is not necessary; user can modify the configuration of wiring according to actual applications.

Note 2: Electronic circuits are constantly vulnerable to Electro-Static Discharge (ESD), which become worse in a continental climate area. FG(Frame Ground) provides a path for bypassing ESD to earth ground, allowing enhanced static protection (ESD) capability and ensures that the module is more reliable.
If user wants to use FG, the FG1 and FG2 and FG3 should be connecting to earth ground. Within the I-7532, FG1 and FG2 and FG3 are not interconnected.

2.7 Wire Connection



Figure 2-4: Wire Connection of I-7532

2.8 Terminator Resistor Setting

I-7532 includes two built-in 120Ω terminal resistors, users can decide to enable these two terminal resistors or not.

The JP4 of I-7532 is used to adjust terminal resistor on CAN 1, and the JP3 of I-7532 is used to adjust terminal resistor on CAN 2.

Before adjusting JP3 or JP4 of I-7532, users need to open the cover of I-7532 first. The location of JP3 and JP4 is shown as follows:



Figure 2-5: JP3 and JP4 positions

The following connection status presents the condition if the terminal resistor is enabled (default) or disabled.

_			
п			
ш			
ш	-	-	-
-			
1			

 -	-	μ

Disable (Deactivate) Enable (Activate)

Figure 2-6: Adjustment of Terminator Resistor

3 Network deployment

3.1 Definition

The following figure is the relation among segments in CAN bus and CAN network.



Figure 3-1: Segment, CAN Bus and CAN network

3.2 Cable Selection

The CAN bus following ISO 11898-2 is a balanced (differential) 2-wire interface running over either a <u>Shielded Twisted Pair</u> (STP), <u>Un-shielded Twisted Pair</u> (UTP), or Ribbon cable.

The table below shows the recommended DC parameters of CAN bus line.

Table 3-1: Recommended DC parameters for CAN Bus Line

Wire Cross-Section [mm ²]	Resistance [Ω/km]
~0.25 (AWG23)	< 90
~0.5 (AWG20)	< 50
~0.8 (AWG18)	< 33
~1.3 (AWG16)	< 20

The recommended AC parameters of CAN bus line are 120Ω impedance and 5 ns/m specific line delay.

3.3 Driving Capability

Users can use the following table to know the maximum node number in each segment and the maximum segment length when using different type of wire in the CAN network.

Wire Cross-	The maximum segment length [m] under the case of specific node number in this segment									
Section [mm]	16 Nodes 32 Nodes		64 Nodes	100 Nodes						
~0.25 (AWG23)	<220 m	<200 m	<170 m	<150 m						
~0.5 (AWG20)	<390 m	<360 m	<310 m	<270 m						
~0.8 (AWG18)	<590 m	<550 m	<470 m	<410 m						
~1.3 (AWG16)	<980 m	<900 m	<780 m	<670 m						

Table 3-2: Driving Capability

3.4 Baud and Bus Length

The relationship between ideal bus length and baud in the CAN bus system is displayed below.

Baud [bit/sec]	Ideal Bus Length[m]
1M	< 40
800K	< 50
500K	< 100
250K	< 250
125K	< 500
50K	< 1000
20K	< 2500
10K	< 5000

Table 3-3: Baud, Bus Length

When users want to calculate the bus length, the device used to connect CAN segment must be considered, too. Users can check the specification of the device and find the equivalent bus length of the device. For example, the equivalent bus length of CAN repeater (I-7531) is 40m.

3.5 Terminator Resistor

According to the ISO 11898-2 specifications, the bus line of CAN_H and CAN_L must be terminated by a terminal resistor for proper operation. The equivalent resistance between CAN_H and CAN_L should be 60Ω . There are some examples below.





4 FAQ

Q01: Firmware update problem in firmware v1.02

In firmware v1.02 of I-7532, the firmware update function is suppoted. But it exists one bug, so users need to follow the below steps to accomplish the firmware update function of I-7532.

- (1) Open the shell of I-7532.
- (2) Adjust the JP1 position to the left side like Figure 4-1.
- (3) Follow the firmware update standard steps referring to the section 2.5.1 to start the firmware update function.



Figure 4-1: JP1 Left Side Position

(4) After finishing the firmware update process, please adjust the JP1 position back to the right side like Figure 4-2 and reboot I-7532 module.



Figure 4-2: JP1 Right Side Position

In firmware v1.03 or newer of I-7532, the problem has been already solved. Users can update firmware directly without opening the shell.

Q02: How to set the CAN-ID Mapping ? Ans : (2016/06/27)

[Method 1] By using ICP DAS CAN Modules.

Run the I-7532_Utility and follow the below steps.

- [1] Choose "CAN Device".
- [2] Choose "CAN-ID Mapping" option.
- [3] Add the "CAN-ID Mapping" data.
- [4] Choose the CAN channel.
- [5] Click the "Set CAN Mapping IDs" button.

1-7532 Utility v1.03	
1. CAN Device :	_
1. (1) RS232 to CAN : C I-7530(A)	
(2) Ethernet to CAN : 🔿 I-7540D	
(3) USB to CAN : C I-7565 C I-7565-H1 C I-7565-H2	
(4) CAN Card: C PISO-CM100(U) C CAN200 C CAN400	
Dev_Port: COM42 CAN_Port: CAN1	
2. CAN-ID Filter / Mapping Setting	
Z. C CAN-ID Filter CAN-ID Mapping 4.	
Single ID (HEX)	
CAN1	
3 Mapping ID (HEX)	_
C 11-bit 23 To • 11-bit 23 Add	
© 29-bit '	
No CAN-ID Type Mapping IDs Save File)
001 11>11-bit MID 0x123>0x456	'
002 11/25/01 MID 0x/01/201254/07/0 003 29×11-bit MID 0x001A2B3C>0x321 Load File)
004 29>29-bit MID 0x0CC56AB2>0x1AE256AB	' ·
Delete Row)
	,
Clear Table	
Get CAN Mapping IDs Set CAN Mapping IDs	' _

The setting steps of "CAN-ID Mapping"

[Method 2] By using other brand CAN modules.

- [1] Follow the steps from the first to the fouth of method 1.
- [2] Click the "Save File" button to save CAN-ID mapping data to Excel file.

Save CAN M	apping-ID File as			?	×
儲存於①:	i7532	•	(÷) 💣 🎟 -	
	CANID_Setting			儲存③	
存檔類型(I):	CAN Filter-ID File (*.xls)	•		取消	
	CAN Filter-ID File (* dat) CAN Filter-ID File (* xls)		_		

Save CAN-ID Mapping data to Excel

[3] Open the Excel file of the CAN-ID Mapping file and it will show the CAN messages procedure for setting.

	А	В	С	D	Е	F
1	Mode	ID	RTR	DLC	DataL	DataH
2	0	0x107	0	8	0x00000000	0x00000000
3	0	0x115	0	8	0x123	0x456
4	0	0x115	0	8	0x70F	92345678
5	0	0x116	0	8	0x001A2B3C	80000321
6	0	0x116	0	8	0x0CC56AB2	0x1AE256AB
7	0	0x108	0	8	0x00000000	0x00000000

CAN-ID Mapping data in the Excel

CAN1 F	RecvMs	5 0											
	Scroll Mode O OverWrite Mode											Scrolling	
No	MODE	(Díhex)	BTB	DLC	D1	D2	D3	D4	D5	D6	D7	D8	TimeStamp(sec) 🔺
1	0	107	0	8	00	00	00	00	00	00	00	00	2243.6602
2	0	507	0	1	00								2243.6611
3	0	115	0	8	-23	01	00	00	56	-04	00	00	2243.7809
4	0	515	0	- 8	-23	01	- 00	00	56	- 04	- 00	00	2243.7820
5	0	115	0	8	OF	07	00	00	78	56	34	92	2243.9686
6	0	515	0	8	OF	07	-00	00	78	56	- 34	92	2243.9697
7	0	116	0	8	- 3C	2B	-1A	00	21	03	00	80	2244.2057
8	0	516	0	8	- 3C	2B	-1A	00	21	03	-00	80	2244.2068
9	0	116	0	8	B2	-6A	C5	00	AB	56	E2	-1A	2244.4035
10	0	516	0	- 8	-B2	- 6A	C5	00	AB	56	E2	-1A	2244.4046
11	0	108	0	8	00	00	00	00	00	00	00	00	2244.5937
12	0	508	0	1	00								2244.9990

CAN messages for CAN-ID Mapping setting

Q03: How to set the CAN-ID Filter ? Ans : (2018/06/13)

[Method 1] By using ICP DAS CAN Modules.

Run the I-7532_Utility and follow the below steps.

[1] Choose "CAN Device".

- [2] Choose "CAN-ID Filter" option.
- [3] Add the "CAN-ID Filter" data.
- [4] Choose the CAN channel.
- [5] Click the "Set CAN Accepted IDs" button.

10	[-75	532 U	ltility v	1.03										×
	-1.	CAN	Device :										_	1
	1.	(1) H	RS232 to	CAN :	С	I-7530((Å)							
		(2) H	Ethernet t	OCAN :	C	I-7540I)							
		(3) 1	JSB to C	AN :	C	I-7565	© I-7.	565-H1	• I-7	565-H	1 2			
		(4) (CAN Car	d:	C	PISO-C	M100/U		AN200	C	CAN40	00		
			Dev 1	Dont -	OM	2 -	I c	AN Port	CAN	11				
			Dev_1	on je	0142	<u> </u>	1 0		. јсли		<u> </u>			
	-2.	CAN	ID Filter	/ Mappin	ng Set	ting —								1
				2. 🕞	CAN	-ID Filte	er C	CAN-I	D Mapp	ing				
	Г	Single	ID (HE)	K)					-4.	C	M Contr	oller	1	
		0) 11-bit	Г		7FF	ſ	Add	ן (AN1	.oner		
	L) 29-bit							19			1	
	Γ	Марр	ing ID (F 11-hit I	IEX)			• 11-	hit 📻		_				
3.		œ	29-bit		23	То	0 29-	bit	2	3	Ad	d		
		No	CAN	-ID Tyme	. [Марр	ing IDs		_			ົ	
	Ī	001	11>11	l-bit MII)		0x011	>0x223			Save	: File	J	
		002 003	11>29 29>11	9-bit MII 1-bit MII)	0 0:)x236>0; x000AB;	d000065! 123>0x1	98 AB		Lord	File	1	
	ĺ	004	29>29)-bit MII)	0x000	AABBC	>0x0FE	DCA11		L	СГШС)	
		005	11>1	l-bit MIL)		0x710	>0x001 >0x555			Delete	Row	וו	
		007 008	11>29 29>11	9-bit MII I-bit MII		0)x005>0;)x000001	:0000000 123>0::0	05 23)	
	Ľ	_									Clear	Table		
		G	et CAN .	Accepted	IDs	5.	Set CAN	Accepte	d IDs		_		,	

The setting steps of "CAN-ID Filter"

[Method 2] By using other brand CAN modules.

- [1] Follow the [2] and [3] steps of method 1.
- [2] Click the "Save File" button to save CAN-ID filter data to Excel

file.		
Save CAN M	apping-ID File as	? 🛛
儲存於①:	i7532	
檔案名稱(N):	CANID_Setting	儲存(2)
存檔類型(<u>T</u>):	CAN Filter-ID File (*.xls)	▼ 取消
	CAN Filter-ID File (* dat) CAN Filter-ID File (* xls)	

Save "CAN-ID Filter" data to Excel

[3] Open the Excel file of the "CAN-ID Filter" file and it will show the CAN messages procedure for setting.

	А	В	С	D	Е	F
1	Mode	ID	RTR	DLC	DataL	DataH
2	0	0x107	0	8	0x00000000	0x00000000
3	0	0x115	0	8	0x123	0x456
4	0	0x115	0	8	0x70F	92345678
5	0	0x116	0	8	0x001A2B3C	80000321
6	0	0x116	0	8	0x0CC56AB2	0x1AE256AB
7	0	0x108	0	8	0x00000000	0x00000000

CAN-ID Filter data in the Excel

CAN1 RecvMsg © Scroll Mode © OverWrite Mode											Scrollin	Scrolling		
No	MODE	(D(hex)	BTB	DLC	D1	D2	D3	D4	D5	D6	D7	D8	TimeStamp(sec)	-
1	0	107	0	8	00	00	00	00	00	00	00	00	2243.6602	
2	0	507	0	1	00								2243.6611	_
3	0	115	0	8	23	01	00	00	56	-04	00	00	2243.7809	
4	0	515	0	- 8	- 23	01	- 00	00	56	- 04	- 00	00	2243.7820	
5	0	115	0	8	OF	07	00	00	78	56	34	92	2243.9686	
6	0	515	0	- 8	OF	07	- 00	00	78	56	- 34	92	2243.9697	
7	0	116	0	8	30	2B	-1A	00	21	03	00	80	2244.2057	
8	0	516	0	- 8	30	2B	-1A	00	21	03	- 00	80	2244.2068	
9	0	116	0	8	B2	-6A	C5	00	AB	56	E2	-1A	2244.4035	
10	0	516	0	- 8	B2	- 6A	C5	00	AB	- 56	-E2	-1A	2244.4046	
11	0	108	0	8	00	00	00	00	00	00	00	00	2244.5937	
12	0	508	0	1	00								2244.9990	

CAN messages for "CAN-ID Filter" setting

5 History of Version

Version	Author Date		Description of changes				
1.0	Edward	25-Aug-2008	1. The First Version				
1.1	Edward	21-Apr-2010	1. Add Configuration mode : [1] add CAN-ID filter function [2] add user-defined CAN baud				
1.2	Edward	01-Sep-2010	 Add CAN Bootloader function in firmware v1.02 or newer for firmware update. 				
			2. Provide I-7532 Utility for configuration easily and quickly.				
1.3	Edward	04-Oct-2011	 In Configuration mode, add CAN-IE Mapping function and supported by I-7532 Utility. 				
			2. Solve the firmware update function problem.				
1.4	Edward	2015/10/19	1. Add the CAN-ID mapping example in section 2.5.5.				
1.5	Edward	2016/06/27	 1.FW_v1.04 and Utility_v1.03 already support the below CAN-ID_Mapping. (1) 11bit -> 11bit (2) 11bit -> 29bit (3) 29bit -> 11bit (4) 29bit -> 29bit 2. Add the Q02 of FAQ. 				
1.6	Edward	2018/06/13	1 Add the Q03 of FAQ.				