PFM-C20N

PC/104 CAN Bus Module

SJA 1000 CAN Chipset

CAN 2.0 Compatible

Isolating Voltage Up to 1600VDC

PFM-C20N Manual Rev.A 1st Ed.
June 2009

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Packing List

Before you begin installing your card, please make sure that the following materials have been shipped:

- Utility CD
- PFM-C20N

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Chapter

1

General Information

1.1 Introduction

AAEON Technology, a leading company in embedded boards manufacturing with a full range of PC/104 CPU Modules, launches a brand new CAN Bus Module-PFM-C20N. Its compact size and rich functionality ensures the most cost effective and compatible module to coincide with your existing system planning devices.

The PFM-C20N features PC/104+ expansion interfaces. It supports Windows XP and Linux operating systems. Moreover, it is CAN 2.0 compatible and up to 1Mbps. The PFM-C20N was designed to enhance benefit for the Subcompact and peripheral boards.

1.2 Features

- SJA 1000 Based CAN Interface Module
- CAN 2.0 Compatible, Up to 1Mbps
- Onboard Switch Selectable CAN Termination
- LEDs Indicate Diagnostics Status
- Supports Window XP And Linux
- PC/104+ Interface
- Isolating Voltage Up To 1600VDC

1.3 Specifications

- Form Factor: PC/104 & PCI-104 (90mm x 96mm)
- CAN Chipset: SJA1000
- Expansion Slot: PC/104 or PCI-104
- Power Requirement: +3.3V and +5V
- Operating Temperature: 32˚F~ 140˚F (0˚C ~ 60˚C)
- Isolation Voltage: 1600V DC

Chapter

2

Quick Installation Guide

Notice:

The Quick Installation Guide is derived from Chapter 2 of user manual. For other chapters and further installation instructions, please refer to the user manual CD-ROM that came with the product.

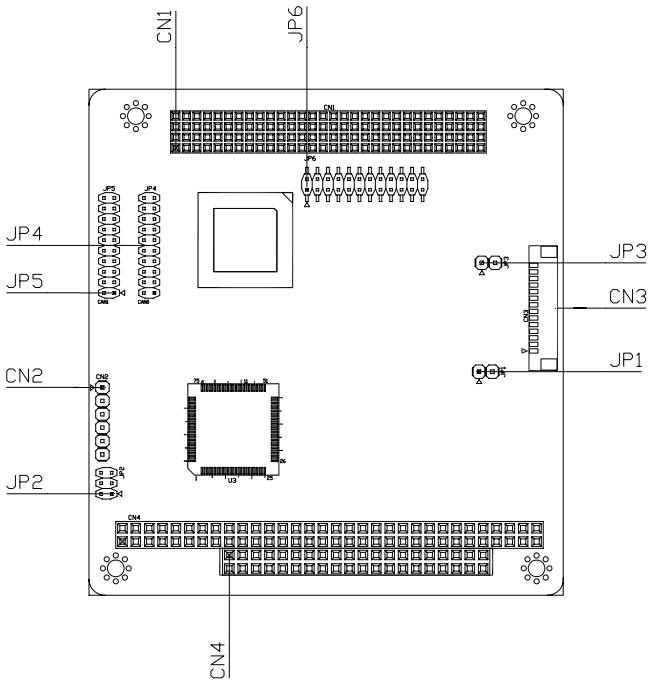
Printed in Taiwan, June 2009

2.1 Safety Precautions

Always completely disconnect the power cord from your board whenever you are working on it. Do not make connections while the power is on, because a sudden rush of power can damage sensitive electronic components.

Always ground yourself to remove any static charge before touching the board. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis

2.2 Location of Connectors and Jumpers



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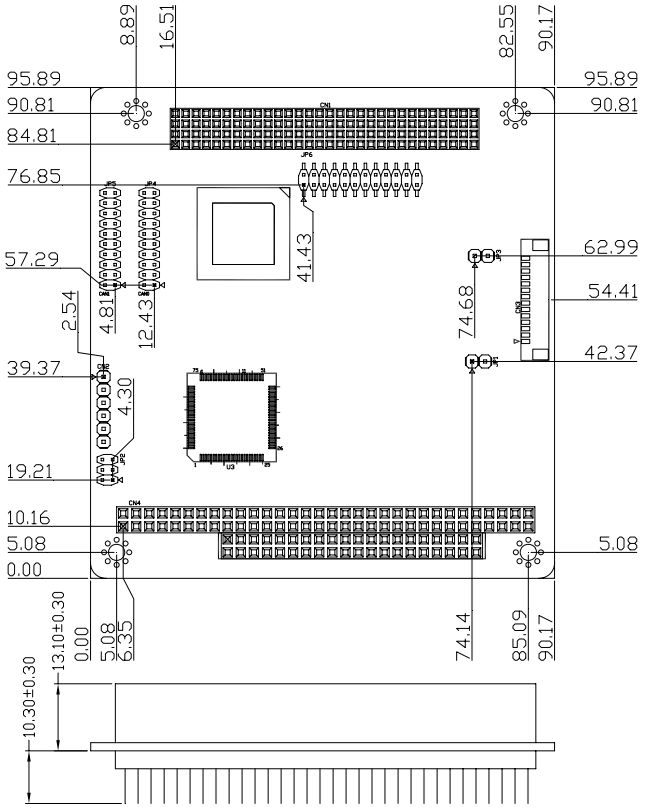
2.3 Mechanical Drawing



2.4 List of Jumpers

The board has a number of jumpers that allow you to configure your system to suit your application. The table below shows the function of each of the board's jumpers:

Label	Function
JP1	CAN BUS Port 1 Termination Resistor Setup
JP2	Address Condition
JP3	CAN BUS Port 2 Termination Resistor Setup
JP4	CAN BUS Port 1 IRQ Setup
JP5	CAN BUS Port 2 IRQ Setup
JP6	PCICLOCK & Arbitration Pins Setup

2.5 List of Connectors

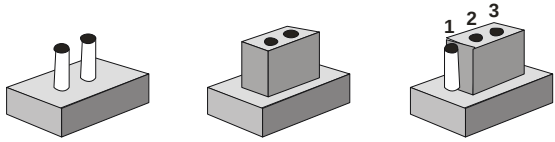
The board has a number of connectors that allow you to configure your system to suit your application. The table below shows the function of each board's connectors:

Label	Function
CN1	PCI-104 Connector
CN2	CPLD JTAG
CN3	CAN Connector
CN4	PC/104 Connector (optional)

2.6 Setting Jumpers

You configure your card to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To “close” a jumper you connect the pins with the clip.

To “open” a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2 or 2 and 3.



OFF **ON** **ON 2-3**

A pair of needle-nose pliers may be helpful when working with jumpers. If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any change. Generally, you simply need a standard cable to make most connections.

2.7 CAN BUS Port 1 Termination Resistor Setup (JP1)

JP1	Function
1-2	Termination Resistor Setup

2.8 Address Condition (JP2)

JP2	Function
1-3,2-4	DC00
1-3,4-6	DB00
3-5,2-4	DA00 (Default)
3-5,4-6	CC00

2.9 CAN BUS Port 2 Termination Resistor Setup (JP3)

JP3	Function
1-2	Termination Resistor Setup

2.10 CAN BUS Port 1 IRQ Setup (JP4)

JP4	Function
1-2	IRQ3
3-4	IRQ4
5-6	IRQ5 (Default)
7-8	IRQ6

.

9-10	IRQ7
11-12	IRQ9
13-14	IRQ10
15-16	IRQ11
17-18	IRQ12
19-20	IRQ15

2.11 CAN BUS Port 2 IRQ Setup (JP5)

JP5	Function
1-2	IRQ3
3-4	IRQ4
5-6	IRQ5
7-8	IRQ6
9-10	IRQ7 (Default)
11-12	IRQ9
13-14	IRQ10
15-16	IRQ11
17-18	IRQ12
19-20	IRQ15

2.12 PCICLOCK & Arbitration Pins Setup (JP6)

JP6	Function
1-2	PCI_CLK0 (Default)
3-4	PCI_CLK1
5-6	PCI_CLK2
7-8	PCI_CLK3
9-10	GNT#0 (Default)
11-12	GNT#1
13-14	GNT#2
15-16	GNT#3
17-18	REQ#0 (Default)
19-20	REQ#1
21-22	REQ#2
23-24	REQ#3

2.13 PCI-104 Connector (CN1)

Pin	Signal	Pin	Signal
A1	GND	B1	SERIRQ
A2	N.C.	B2	AD2
A3	AD5	B3	GND
A4	C/BE0#	B4	AD7
A5	GND	B5	AD9
A6	AD11	B6	N.C.

A7	AD14	B7	AD13
A8	+3.3V	B8	C/BE1#
A9	SERR#	B9	GND
A10	GND	B10	PERR#
A11	STOP#	B11	+3.3V
A12	+3.3V	B12	TRDY#
A13	FRAME#	B13	GND
A14	GND	B14	AD16
A15	AD18	B15	+3.3V
A16	AD21	B16	AD20
A17	+3.3V	B17	AD23
A18	IDSEL	B18	GND
A19	AD24	B19	C/BE3#
A20	GND	B20	AD26
A21	AD29	B21	+5V
A22	+5V	B22	AD30
A23	REQ#0	B23	GND
A24	GND	B24	REQ#2
A25	GNT#1	B25	N.C.
A26	+5V	B26	PCI_CLK0
A27	PCI_CLK2	B27	+5V
A28	GND	B28	N.C.
A29	N.C.	B29	INTA#
A30	N.C.	B30	REQ#3

C1	+5V	D1	AD0
C2	AD1	D2	+5V
C3	AD4	D3	AD3
C4	GND	D4	AD6
C5	AD8	D5	GND
C6	AD10	D6	N.C.
C7	GND	D7	AD12
C8	AD15	D8	+3.3V
C9	N.C.	D9	PAR
C10	+3.3V	D10	N.C.
C11	LOCK#	D11	GND
C12	GND	D12	DEVSEL#
C13	IRDY#	D13	+3.3V
C14	+3.3V	D14	C/BE2#
C15	AD17	D15	GND
C16	GND	D16	AD19
C17	AD22	D17	+3.3V
C18	N.C.	D18	N.C.
C19	N.C.	D19	N.C.
C20	AD25	D20	GND
C21	AD28	D21	AD27
C22	GND	D22	AD31
C23	REQ#1	D23	N.C.
C24	+5V	D24	GNT#0

.

C25	GNT#2	D25	GND
C26	GND	D26	PCI_CLK1
C27	PCI_CLK3	D27	GND
C28	+5V	D28	RST#
C29	INTB#	D29	N.C.
C30	GNT#3	D30	GND

Note: If PCI-104 Connector B1 is not SERIRQ signal, this card can not support IRQ mode.

2.14 CPLD JTAG (CN2)

Pin	Signal
1	CPLD_TMS
2	CPLD_TDI
3	CPLD_TDO
4	CPLD_TCK
5	GND
6	+5V

2.15 CAN Connector (CN3)

Pin	Signal
1	+5V
2	CAN0H

3	CAN0L
4	N.C.
5	GND
6	CAN1H
7	CAN1L
8	N.C.
9	GND
10	LED_TX0
11	LED_RX0
12	LED_TX1
13	LED_RX1
14	SERIRQ

2.16 PC/104 Connector (CN4) (Optional)

Pin	Signal	Pin	Signal
A1	N.C.	B1	GND
A2	SD7	B2	RSTDRV
A3	SD6	B3	+5V
A4	SD5	B4	IRQ9
A5	SD4	B5	N.C
A6	SD3	B6	N.C
A7	SD2	B7	N.C

A8	SD1	B8	N.C
A9	SD0	B9	N.C
A10	N.C.	B10	GND
A11	AEN	B11	SMEMW#
A12	SA19	B12	SMEMR#
A13	SA18	B13	IOW#
A14	SA17	B14	IOR#
A15	SA16	B15	N.C.
A16	SA15	B16	N.C.
A17	SA14	B17	N.C.
A18	SA13	B18	N.C.
A19	SA12	B19	N.C.
A20	SA11	B20	N.C.
A21	SA10	B21	IRQ7
A22	SA9	B22	IRQ6
A23	SA8	B23	IRQ5
A24	SA7	B24	IRQ4
A25	SA6	B25	IRQ3
A26	SA5	B26	N.C.
A27	SA4	B27	N.C.
A28	SA3	B28	BALE
A29	SA2	B29	+5V
A30	SA1	B30	N.C.
A31	SA0	B31	GND

A32	GND	B32	GND
C0	GND	D0	GND
C1	N.C.	D1	N.C.
C2	N.C.	D2	N.C.
C3	N.C.	D3	IRQ10
C4	N.C.	D4	IRQ11
C5	N.C.	D5	IRQ12
C6	SA19	D6	IRQ15
C7	SA18	D7	N.C.
C8	SA17	D8	N.C.
C9	N.C.	D9	N.C.
C10	N.C.	D10	N.C.
C11	N.C.	D11	N.C.
C12	N.C.	D12	N.C.
C13	N.C.	D13	N.C.
C14	N.C.	D14	N.C.
C15	N.C.	D15	N.C.
C16	N.C.	D16	+5V
C17	N.C.	D17	N.C.
C18	N.C.	D18	GND
C19	GND	D19	GND

Below Table for China RoHS Requirements
产品中有毒有害物质或元素名称及含量

AAEON Main Board/ Daughter Board/ Backplane

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板及其电子组件	×	○	○	○	○	○
外部信号连接器及线材	×	○	○	○	○	○

O：表示该有毒有害物质在该部件所有均质材料中的含量均在 **SJ/T 11363-2006** 标准规定的限量要求以下。

X：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 **SJ/T 11363-2006** 标准规定的限量要求。

备注：此产品所标示之环保使用期限，系指在一般正常使用状况下。

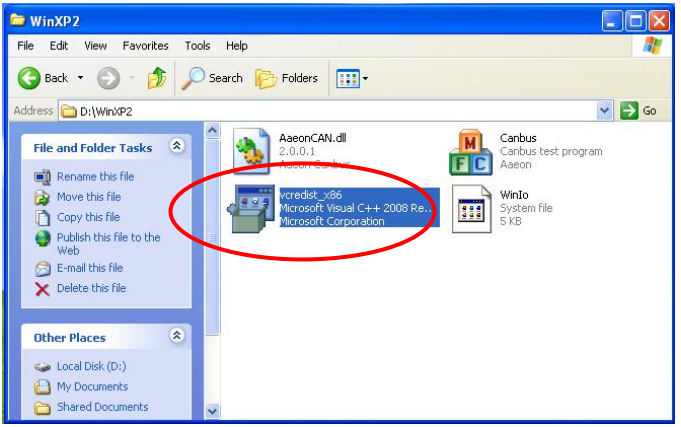
Chapter

3

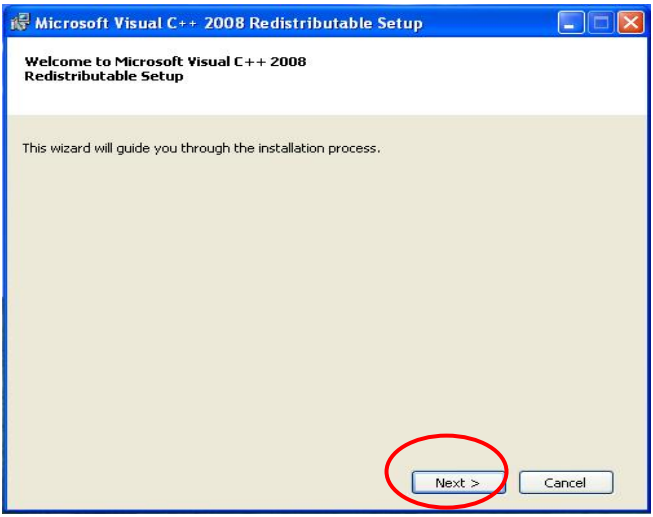
Driver Installation

3.1 Testing with Windows XP

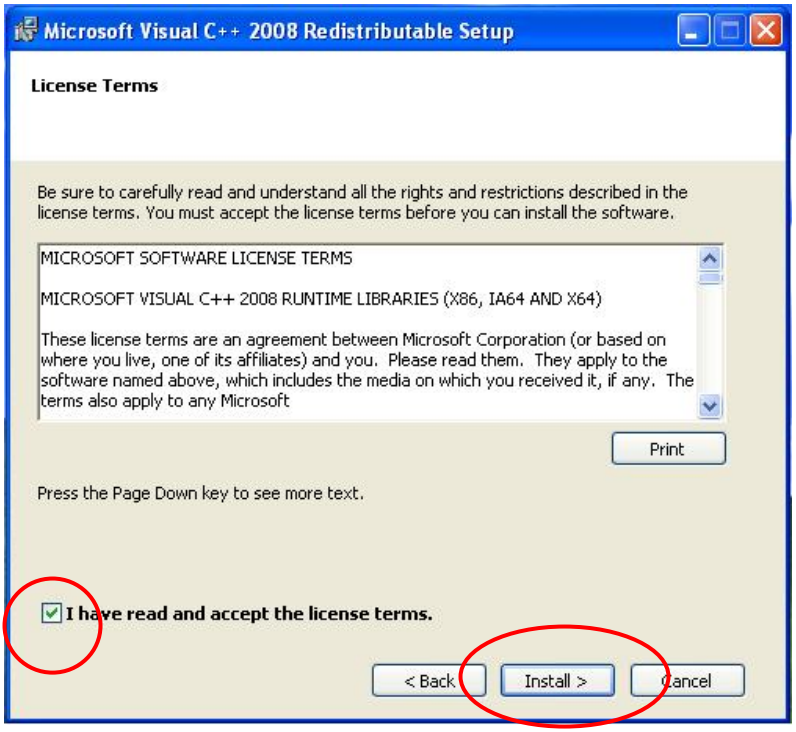
Step1: Open the “WinXP2” folder and click on “vcredist_x86.exe” to start installing VC2008 Redistributable.



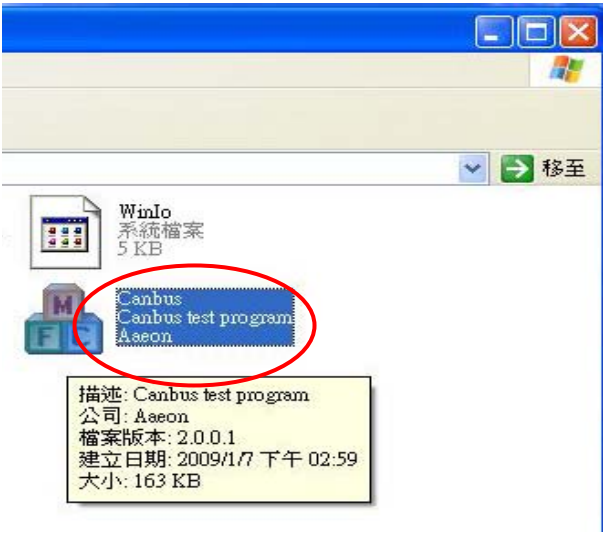
Click ”Next “ to continue.



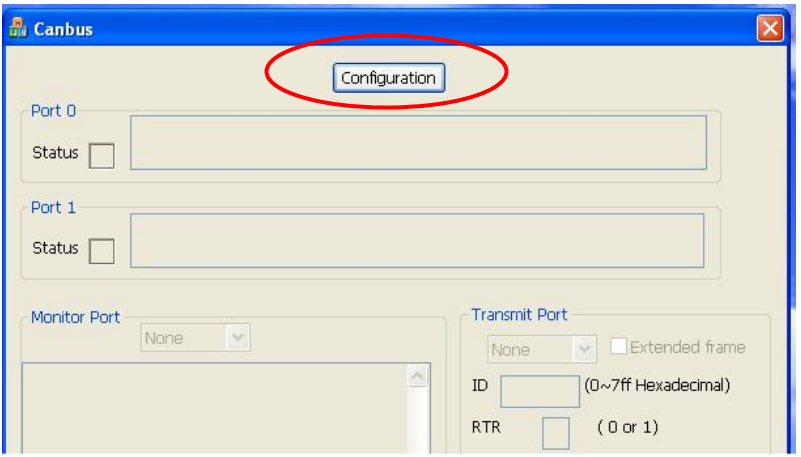
Check the check box and click on “Install” to follow the instruction until the computer shows to “Finish”

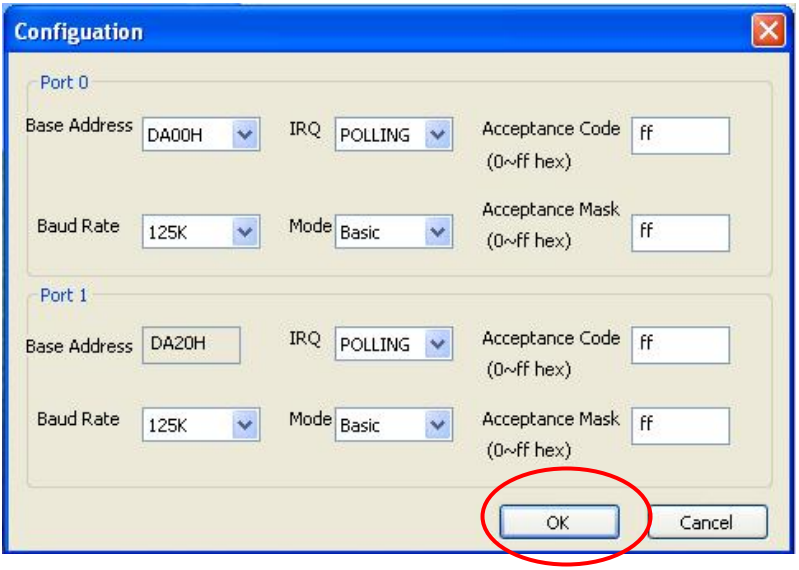


Step 2: Double click on the “Canbus.exe” file



Step 3: Click on “Configuration ”, to setup setting.





The setting of **Base Address** has to be the same as Jumper setting.

IRQ only support POLLING.

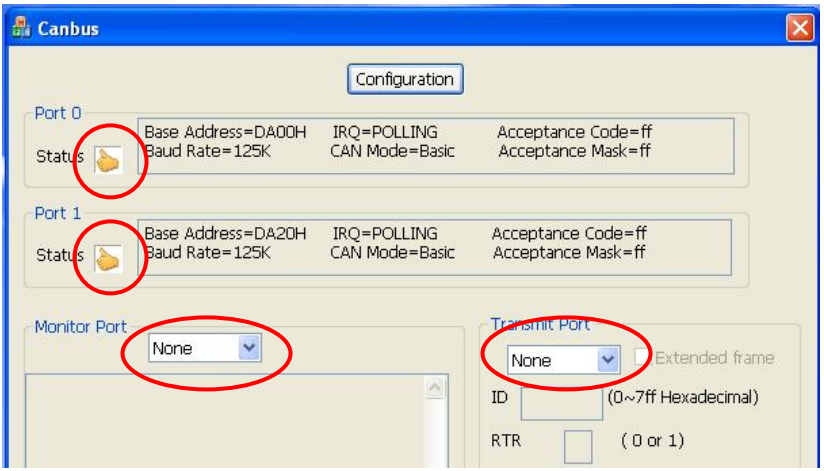
The **Baud Rates** of Transmit Port and Monitor Port have to be the same.

For **Mode**, you may choose “Basic” or “Peli” (only Peli can transmit “Extended frame”). The default setting of “Mode” is “Basic.”

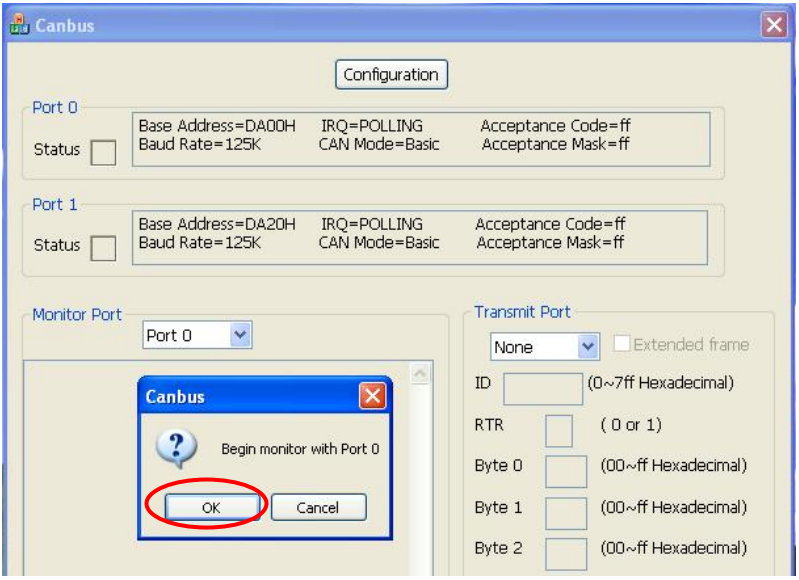
The **Acceptance Code** and **Mask** will be varied by the “Mode” you set. For example, “Basic” is 8 bits, Peli is 32 bits. You may choose the default setting if the application has no specific request.

You may click on “OK” after finish setting these values.

Step 4: The system will show the configuration information on “Port 0” and “Port 1” windows and detect the hardware status automatically. If the status is OK, it will show . The Monitor Port and Transmit Port will be selectable. If the status is Fail, the situation will be contrary.



Step 5: Setup the “Monitor Port”: Please select “Port 0” or “Port 1” as the Monitor Port. After setting, the pop out will ask you if the setting is correct or not. Select “OK” to start monitoring CANBUS. If you want to stop monitoring just click on “Stop” button.



Step 6: Setup the “Transmit Port.”:When you setup the “Transmit Port,” please select the different port from the “Monitor Port.” If the “Monitor Port” is “Port 0,” and the “Transmit Port” should be “Port 1.” Otherwise, it will cause error messages.

Step 7: Data translation: Please fill out the boxes of ID, RTR and Data in order. All the setting numbers are hexadecimal.

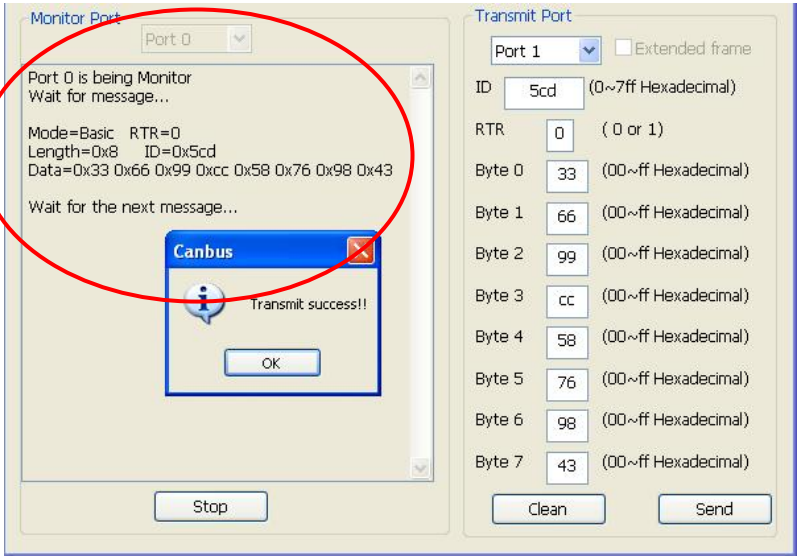
The **ID** of Standard frame (the box of Extended frame not be

checked.) can be keyed in “0~0x7ff.” The **ID** of Extended frame is “0~0x1fffffff.” (The Extended frame can be selectable in “Peli” Mode only.)

For **RTR**, please key in “0” or “1.”

For **Data**, you may key in “0~8 Bytes” and please fill out from the “Byte 0” to “Byte 7” in order.

After filling, please click on “Send.” There is a pop-up to show if it is a successful transmitting or not. Meanwhile, the “Monitor Port” will receive the information you fill and show the related information on “Monitor Port” window. You also can click on “Clean” to erase all data you key in.

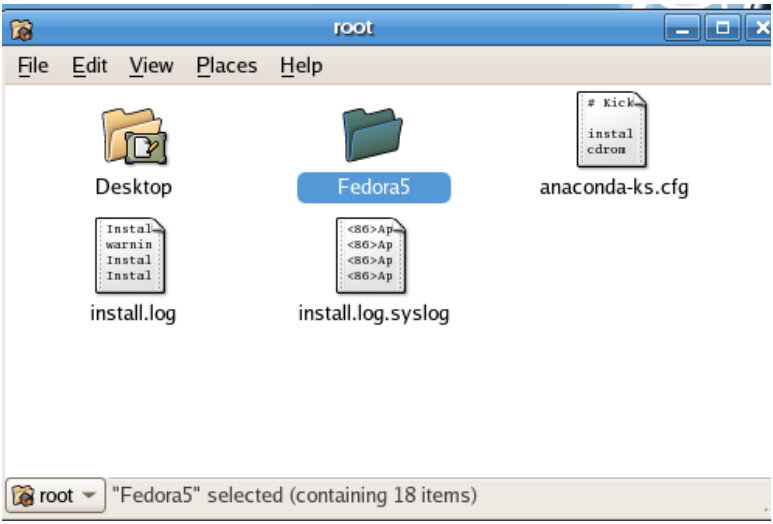


3.2 Testing with Linux

Step 1: Please log in as “root” when you start the computer. (If you log in other identities, you have to command “sudo” to switch the identity, or you cannot insert/remove module.

Below use Fedora5 as example (GENE-5315 + PFM-C20N PC-104)

Step 2: Copy the Fedora5 folder (…/PFM-C20N/Linux/ISA/5315/FedoraCore5/Fedora5) to the root’s home.



Open the Terminal: Applications->Accessories (Fedora4 in System tool ->Terminal) and type command:

uname –n

[root@localhost~]# uname -n

localhost.localdomain

※ If it does not show ”localhost.localdomain,” you have to continue to the following step 2-A. If it shows properly, please go to Step 3.

2-A: If you get the output is “aaeon.5315” for example, please command the following instructions.

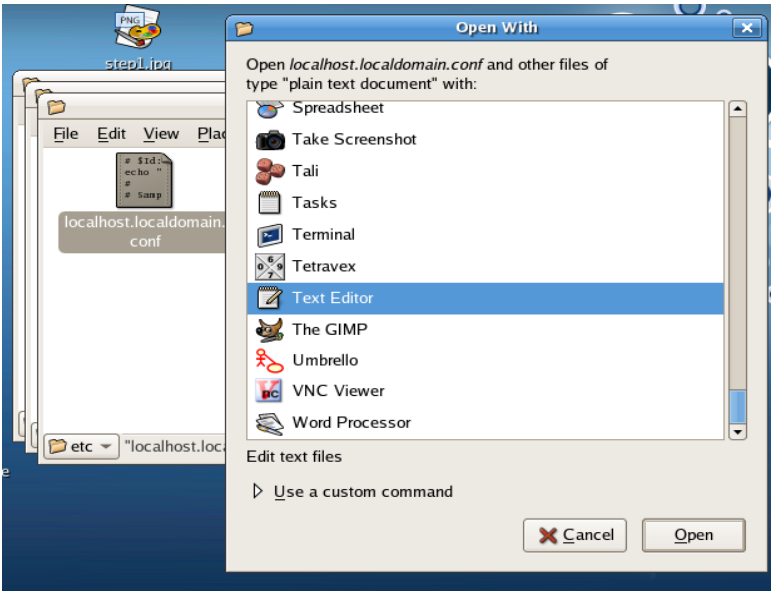
[root@localhost~]# cd Fedora5/etc

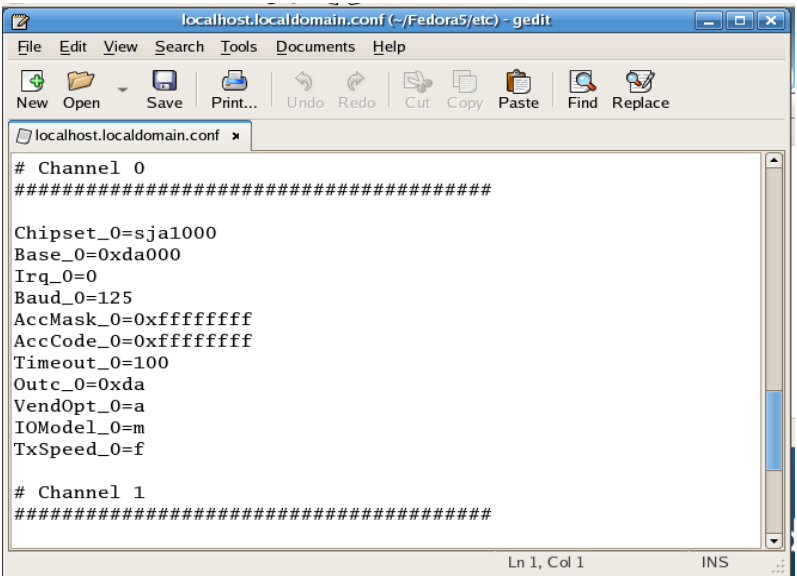
[root@localhost etc]#cp localhost.localdomain.conf aaeon.5315.conf

[root@localhost etc]# cd ~

Step 3: Chang the setting file.

Please open the file of “Fedora5/etc/$(uname –n).conf” by Text Editor, where the “$(uname –n)” is the output value that you got in step 2. For example, the output value you got in Step 2 is ”localhost.localdomain,” and the file you have to open is “localhost.localdomain.conf.”


step1.jpg
File Edit View Plac
localhost.localdomain.
conf
etc
"localhost.loc
Open With
Open localhost.localdomain.conf and other files of type "plain text document" with:
Spreadsheet
Take Screenshot
Tali
Tasks
Terminal
Tetravex
Text Editor
The GIMP
Umbrello
VNC Viewer
Word Processor
Edit text files
Use a custom command
Cancel
Open


localhost.localdomain.conf (~/Fedora5/etc) - gedit
File Edit View Search Tools Documents Help
New Open Save Print... Undo Redo Cut Copy Paste Find Replace
localhost.localdomain.conf
Channel 0
##
Chipset_0=sja1000
Base_0=0xda000
Irq_0=0
Baud_0=125
AccMask_0=0xffffffff
AccCode_0=0xffffffff
Timeout_0=100
Outc_0=0xda
VendOpt_0=a
IOModel_0=m
TxSpeed_0=f
# Channel 1
##
Ln 1, Col 1
INS

The values under Channel 0 are the default setting value of Port 0, and the values under Channel 1 are the default setting value of Port1.

Below use Channel 0 as example, and the same as the Channel 1.

Chipset_0: Default value is “sja1000,” please do not change it since the IC is sja1000.

Base_0: It is a complete memory address (segment + offset), please adjust it based on the jumper of the board. (PFM-C20N=>JP2)

	2-4	4-6
1-3	DC00	DB00
3-5	DA00	CC00

If it is DA00, you have to set “0xda000.” If it is DB00, you have to set “0xdb000.”

irq_0: Setup interrupt, you may set “0” as polling mode.

For choosing IRQ of PFM-C20N, please use the same settings of JP4 (PORT1) and JP5 (PORT2). If you set “0,” please get rid of the jumper.

The following IRQ is useful for the boards co-work with PFM-C20N.

GENE-5315: IRQ 3.4.5.7.10

EPIC-8526: IRQ 4.5

PFM-541I: IRQ 3.4.5.7.11

You may command “cat” in the Terminal to check the occupied IRQ and avoid using the same IRQ.

[root@localhost ~]# cat /proc/interrupts

Baud_0: can set with 125,250,500,800 and 1000

AccMask_0: Default=0xffffffff (no need to change)

AccCode_0: Default=0xffffffff (no need to change)

Timeout_0: Default=10 (no need to change)

Outc_0: Default=0xda (no need to change)

VendOpt_0: Default=a (no need to change)

IOModel_0: Default=m (no need to change)

TxSpeed_0: Default=f (no need to change)

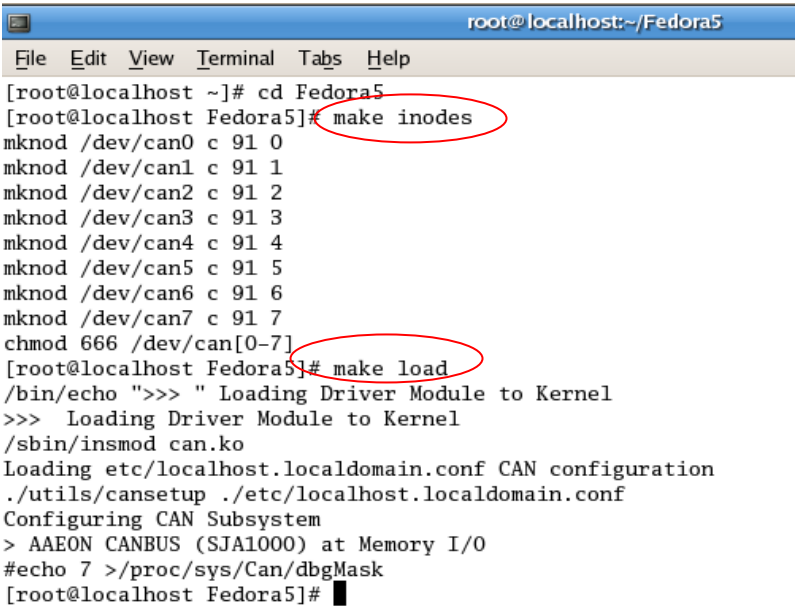
Step 4: Setup inode: please open the terminal again

[root@localhost ~]# cd Fedora5

[root@localhost Fedora5]# make inodes

Step 5: install the driver:

[root@localhost Fedora5]# make load



Command “grep” to check if the driver setting is the same or not. (you may skip this step)

[root@localhost Fedora5]# grep . /proc/sys/Can/*

Step 6: Start testing the transmission, you have to create a new terminal (File→Open Terminal) on the existing terminal. And then, command “receive” in one of the terminals to monitor CANBUS and receive data.

[root@localhost Fedora5]# ./receive

The default Monitor Port is “can0”. You may use the following instruction to assign the Monitor Port to be “can1.”

[root@localhost Fedora5]# ./receive can1

And then, use the other Terminal to transmit message.

[root@localhost Fedora5]# ./can_send 567 0x11 0x22 0x33 0x44 0x55 0x66

The following three digits of “can_send” is ID. (You can key in 000-999, decimal. The example is “567.”)

And then, you may key in 0~8 messages (0x00~0xff, hexadecimal. The example is 0x11…)

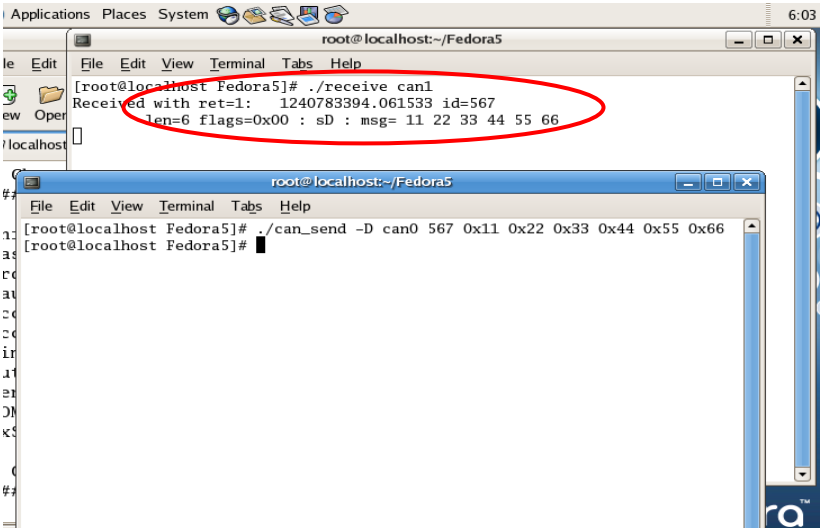
The default Transmit Port is “can1.” You also can use the following instruction to assign the Transmit Port.

[root@localhost Fedora5]# ./can_send –D can0 567 0x11 0x22 0x33 0x44 0x55 0x66

Adding up “-D can0” to command the Transmit Port as “can0” after “can_send.”

If “can0” has been set to be the Monitor Port and it starts to monitor data bus, you cannot assign “can0” as the Transmit Port.

If it is a successful transmission, the Terminal which receives data will have shown the following message on Terminal window.



If you want to stop the Monitor Port to monitor data bus, just let the Terminal on focus and press ctrl+c to stop. If you did not stop receiving data via the Monitor Port, the resource of the port will be occupied.

Step 7: Cross check

Set can0 (Monitor Port), can1 (Transmit Port) ←→ can1 (Monitor Port), can0 (Transmit Port) in terms of the Step 6. To make sure the transmitting and receiving is working OK on can0 and can1.

Step 8: Testing by using different platforms

Using the two boards to test the transmitting and receiving. For example, the can0 of GENE-5315 is the Monitor Port, and the can0 of EPIC-8526 will be the Transmit Port. Or the can1 of EPIC-8526 is the Monitor Port, and the can0 of GENE-5315 is the Transmit Port. In addition, you may use different systems. One is DOS system and the other one is Windows system, or one is DOS system and the other one is Linux system to test the transmitting and receiving (make sure the Baud Rate setting is the same).

Step 9: Change the setting to test.

After testing, you may want to change the IRQ or Baud Rate for a further testing. Please follow the steps below to activate.

9-1 Uninstall the driver

[root@localhost Fedora5]# /sbin/rmmod can.ko

9-2 Modify the setting based as the Step 3

9-3 Install the driver again

[root@localhost Fedora5]# make load

Appendix

A

Mating Connecotor

A.1 List of Mating Connectors and Cables

The table notes mating connectors and available cables.

Connector Label	Function	Mating Connector		Available Cable	AAEON Cable P/N
		Vendor	Model no		
CN3	CAN Connector	CATCH	A003-678	CAN Cable	1703140150