EG-CN-7200 User Guide

Ver. 1.2

WIZnet,Inc

Woolim e-Biz Center 1414, 170-5, Guro-dong, Guro-gu, Seoul, 152-847, Korea

Phone: 82-2-2108-2640

Fax: 82-2-2108-2648

Marketing & Sales: sales@wiznet.co.kr

Technical Support: support@wiznet.co.kr

Table of contents

Table of Figures

1. Before you begin

1.1. Component

The EG-CN-7200 package is displayed:

Figure 1-1. The contents of EG-CN-7200

The EG-CN-7200 contains the items described in the table below.

No.	Item	Quantity
1	EG-CN-7200 module	1
2	MB-EG-CN-7200 board	1
3	5V Power Adaptor & Power Plug	1
4	Software CD	1
5	UTP Cross cable cat 5E	1
6	Serial Cross Cable	1

1.2. Software CD

The EG-CN-7200 is supplied with a Software CD that contains various development tools including Documents, Schematics, Source Codes, and PC Softwares.

1.2.1. Document

Contains the data sheets of essential parts, including the W3100A. User manual is also included.

1.2.2. Schematic

Contains the circuit diagram of the EG-CN-7200 module and MB-EG-CN-7200 board.

1.2.3. PC program

Contains the configuration tool and socket utility.

1.2.4. Development

Contains the firmware source code and ATMEL FLIP software.

2. Introduction

2.1. Overview

The EG-CN-7200 allows simple, flexible access to a CAN-system via Ethernet. By supporting the TCP/IP protocol, the EG-CN-7200 can be accessed via the Internet.

In order to do so, the EG-CN-7200 is running a server or client. The picture below shows the configuration for the EG-CN-7200 used as gateway to a CAN system.

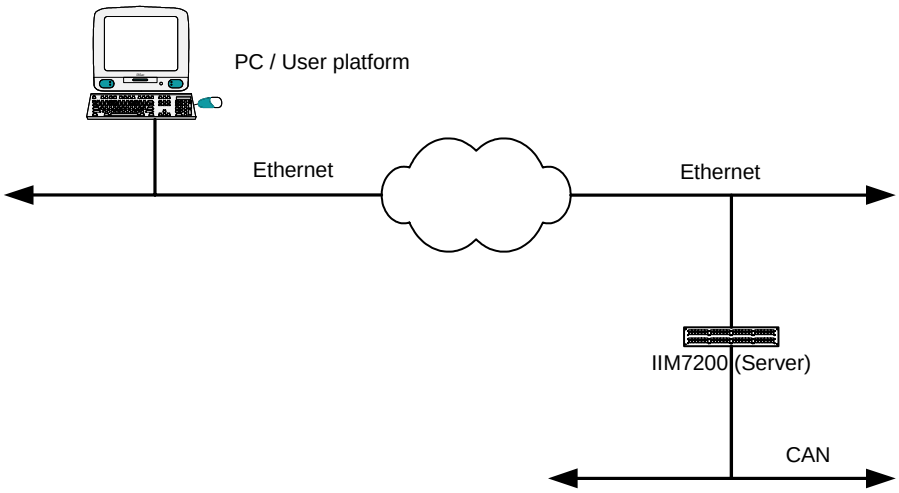


Figure 2-1. EG-CN-7200 used as gateway

The picture below shows the bridge setup for the EG-CN-7200. This setup allows to connect two CAN systems over an Ethernet network. For this setup one of the EG-CN-7200 takes over the role of the client and the other is server configuration.

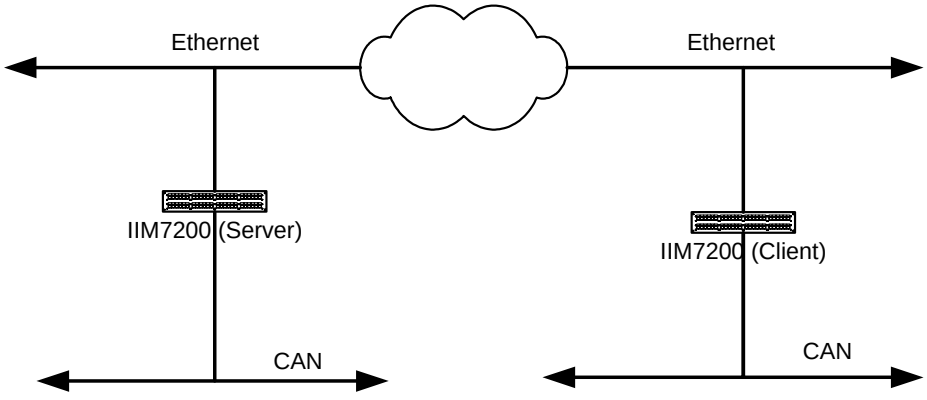


Figure 2-2. EG-CN-7200 used as bridge

2.2. Features

- Connection of CAN systems to Ethernet networks
- Monitoring and control of remote CAN-networks via the Ethernet
- Fully complaint with CAN Rev2.0A and 2.0B
- Support 10/100 Base-T Ethernet
- LED interface for the network status
- Additional serial interface for the configuration of the device
- In System Programming by FLIP software on UART

2.3. Block diagram

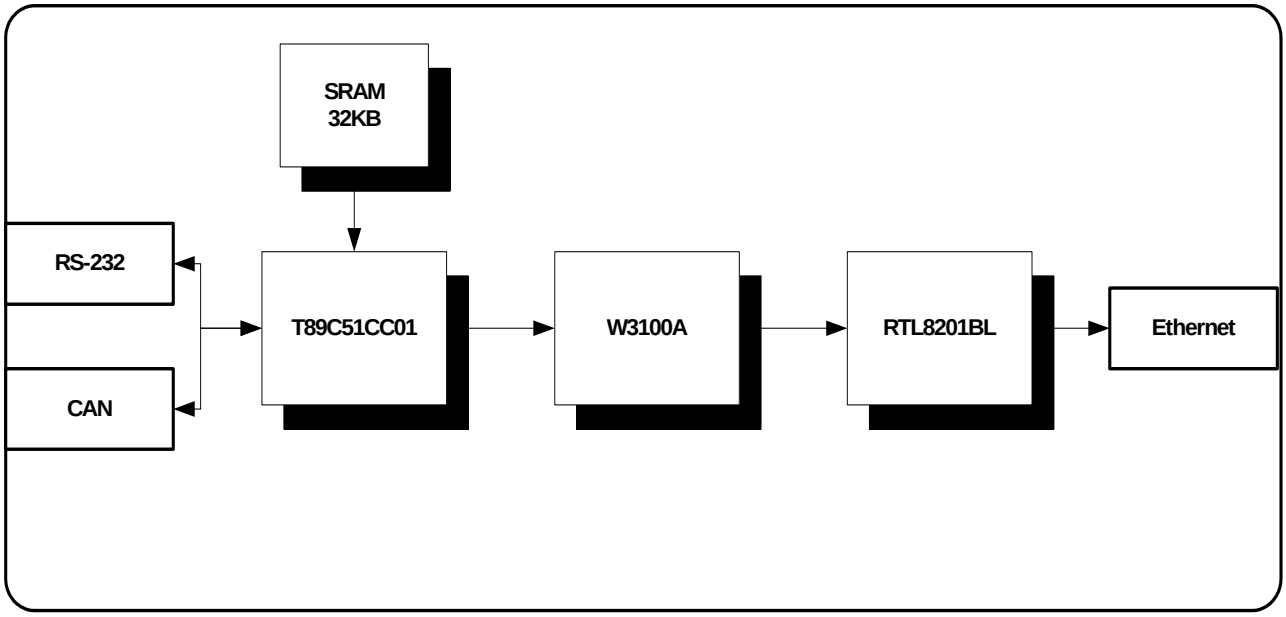


Figure 2-3. Block diagram

3. Stat-up

3.1. Connections

The following picture shows the connection of EG-CN-7200.

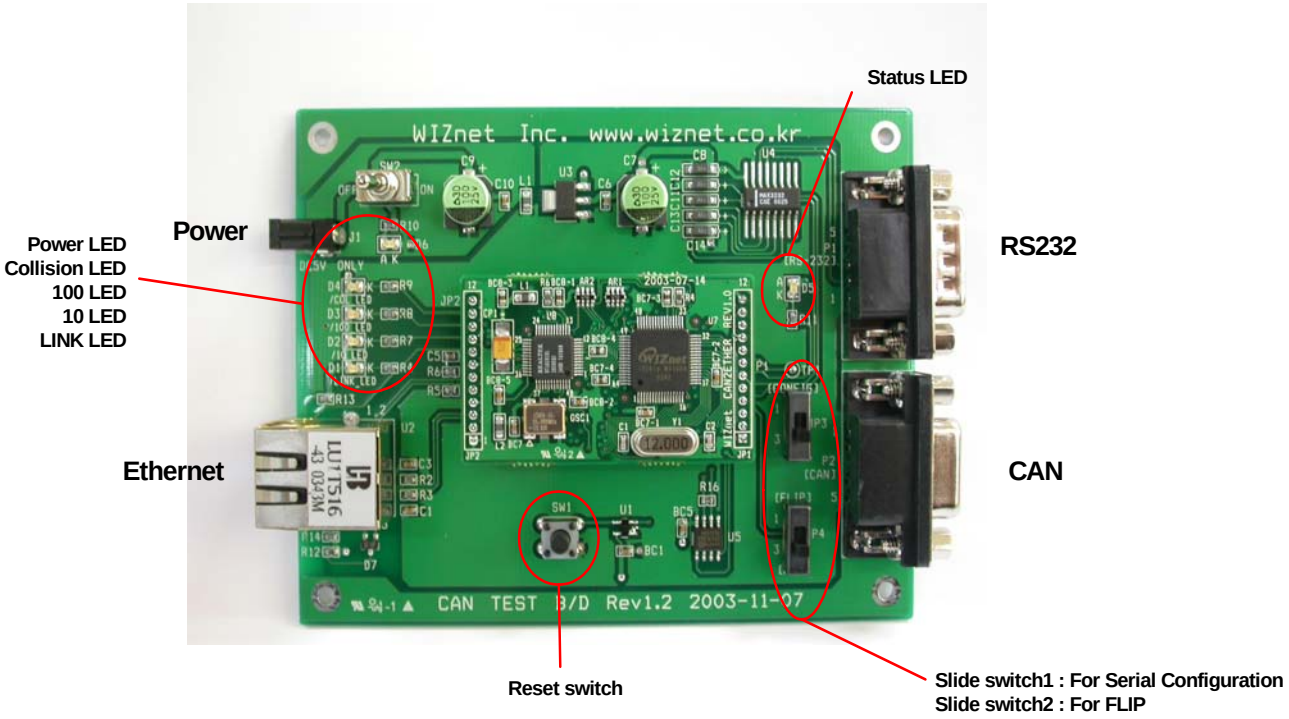


Figure 3-1. EVBEG-CN-7200

3.1.1. Power supply

For the operation of the EG-CN-7200, regulated 3.3Volt is required.

A 5V power adapter is provided to power the EG-CN-7200 board in 5V so that the voltage regulator will supply the board.

3.1.2. RS232

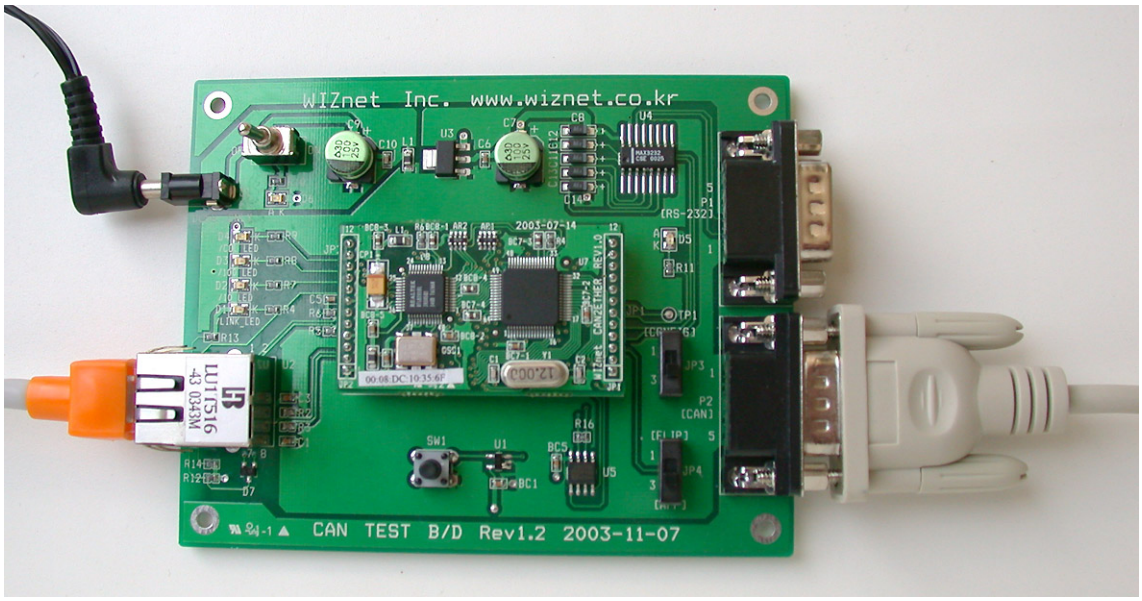
The serial interface is used for debugging message or serial configuration.

Pin no.	Signal name
2	RxD
3	TxD
4	GND

3.1.3. CAN

The CAN connection on the EG-CN-7200 test board is DB9 and the pin assignment is below.

Pin no.	Signal name
1	N.C.
2	CAN_L
3	GND
4	N.C.
5	N.C.
6	GND
7	CAN_H
8	N.C.
9	N.C.



3.1.4. Network

Important : If you use non-crossed UTP cable, you must connect HUB or Switch conneted to your network.

The EG-CN-7200 support 10/100Mbit network. When directly connect to the PC, using the supplied crossed UTP cable.

3.1.5. Display element & switch

- Power LED : Indicates power on
- Network status LED : Indicates network status (e.g. network speed, link and collision)
- Status LED : Indicates serial configuration mode and connection status.
- Slide switch1 : Used for serial configuration
- Slide switch2 : Used for firmware download using the FLIP software.

3.2. Software Installation

For device configuration, supplied configuration tool software must be installed.

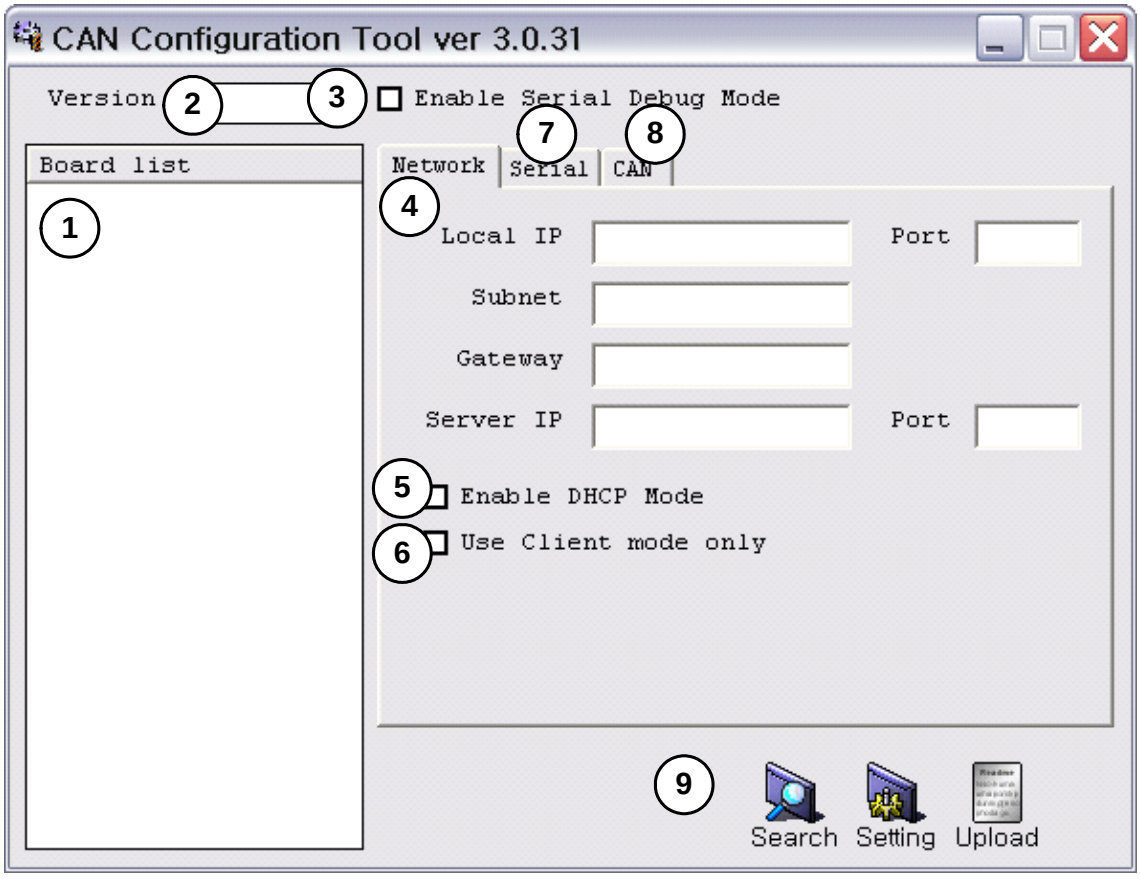


Figure 3-2. Configuration tool

① Board list

Displays all EG-CN-7200 in the subnet as MAC address after clicking the “Search” button.

② Version

Represents Firmware version of the EG-CN-7200.

③ Enable Serial Debug Mode

If this mode is checked, you can monitor the status and debug message through the terminal.

④ Network Setting

Network information of the selected EG-CN-7200 is displayed, and can be inserted and revised here.

⑤ DHCP

Set this option to use DHCP mode.

If this option is checked, then EG-CN-7200 will acquire IP address, Subnet mask and Gateway from DHCP server.

⑥ Client Mode Setting

A. If the “Use Client mode only” is not checked:

It sets the EG-CN-7200 to operate in the server mode, listens in the specified “Local Port” and waits for the client connection.

B. If the “Use Client mode only” is checked

It sets the EG-CN-7200 to operate in the client mode and attempts to connect to the specified “Server IP” and “port”.

⑦ Serial

Baud-rate of selected EG-CN-7200 is displayed, and can be revised here.

⑧ CAN

Baud-rate, CAN ID and filter of selected EG-CN-7200 is displayed, and can be revised here.

⑨ Functions

A. Search

Searches for operating EG-CN-7200 currently connected to the network, and results are displayed as MAC address on the board list.

B. Setting

Changes the configuration of the selected EG-CN-7200. After clicking this button, EG-CN-7200 re-initializes with changed values.

C. Upload

Updates the firmware of the selected EG-CN-7200 through Ethernet.

4. Device configuration

In order to operate the EG-CN-7200 in your network, you must configure the EG-CN-7200. These parameters are altered via network or serial.

4.1. Using configuration tool

1. Run CAN Configuration Tool program.
2. Click the “Search” button.
   A. MAC address of the EG-CN-7200 will be displayed
   B. If one of the MAC addresses, displayed on the “Board List”, is selected then the current setup values of the selected EG-CN-7200 will be displayed.

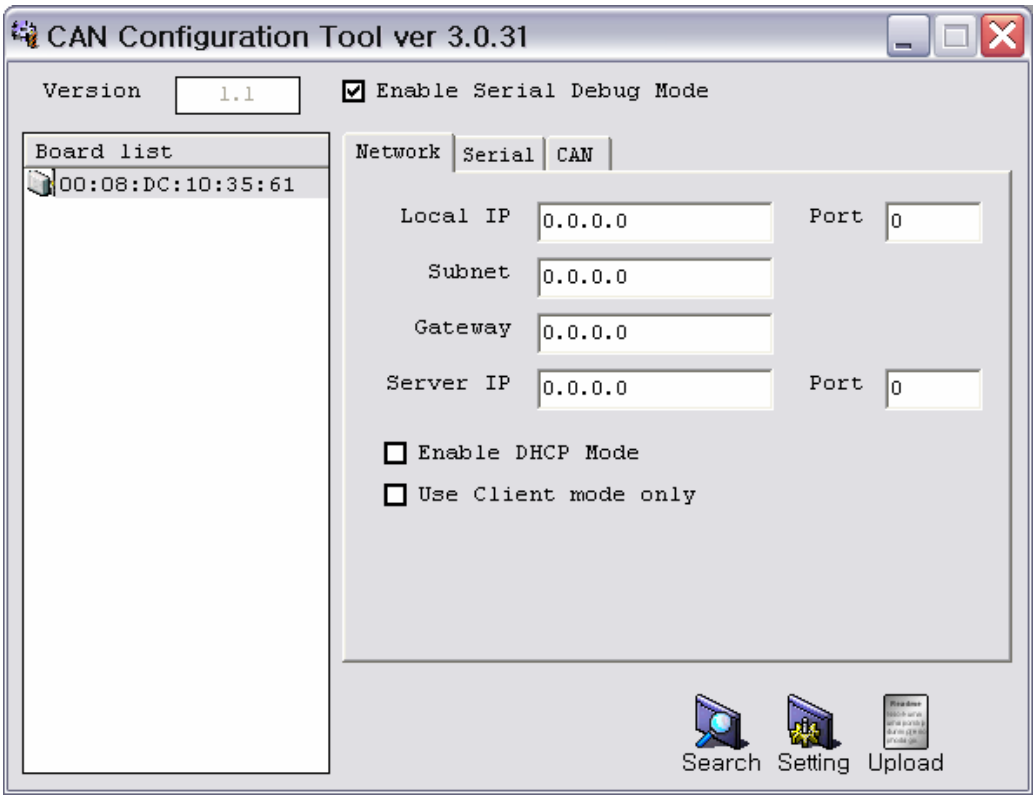


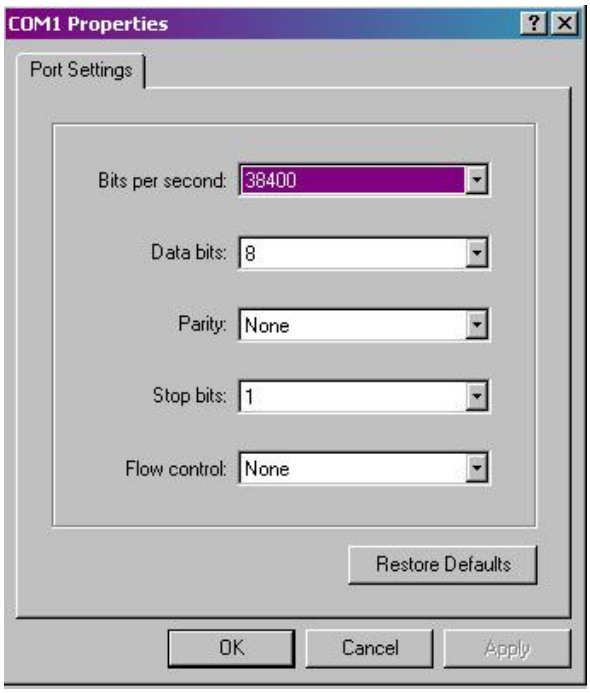
Figure 4-1. Board Results List after Running “Search”

3. Set the selected EG-CN-7200.
   A. To modify the setup values, press the “Setting” button after designating the IP address, Subnet, Serial speed, etc., then the inserted values will be setup at the selected EG-CN-7200 and message box “Complete setting” will be displayed.

4.2. Serial configuration

For Serial configuration you require a PC with terminal program. (e.g. Windows-HyperTerminal)

1. Connect EG-CN-7200 serial port via the serial cable with the PC COM port.
2. Set the mode of EG-CN-7200 to serial configuration mode by switching on [CONFIG] of slide switch1.
3. Run “Hyperterminal” program and switch on the EG-CN-7200 power.



In X1 mode, the speed in bits per second must be the same as what you put in the EEPROM. In X2 mode, the speed in bits per second must be twice faster as what you put in the EEPROM. (The default baudrate is 38400. If you change the setting of the baudrate for the EG-CN-7200, Hyperterminal’s baudrate must be changed as well)

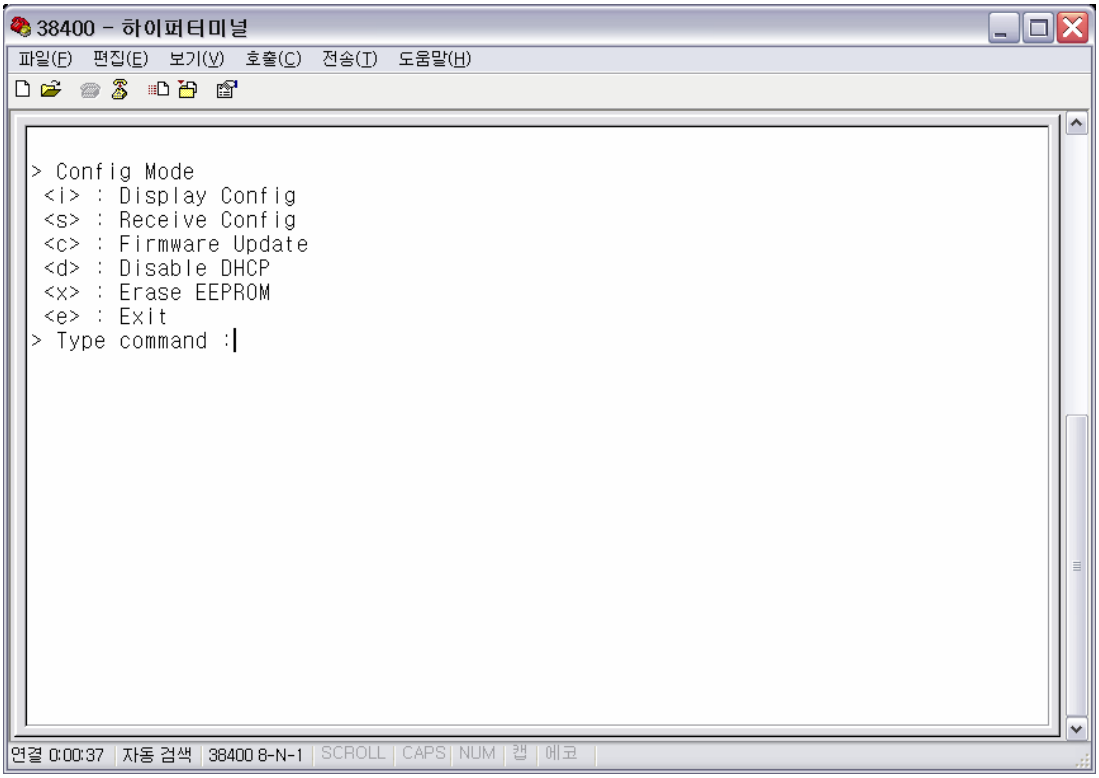


Figure 4-2. Serial configuration

4. Press ‘s’ then send configuration file then the configuration of the EG-CN-7200 will be changed.

4.2.1. Configuration File format

The contents of configuration file have following meanings and saved in EEPROM.

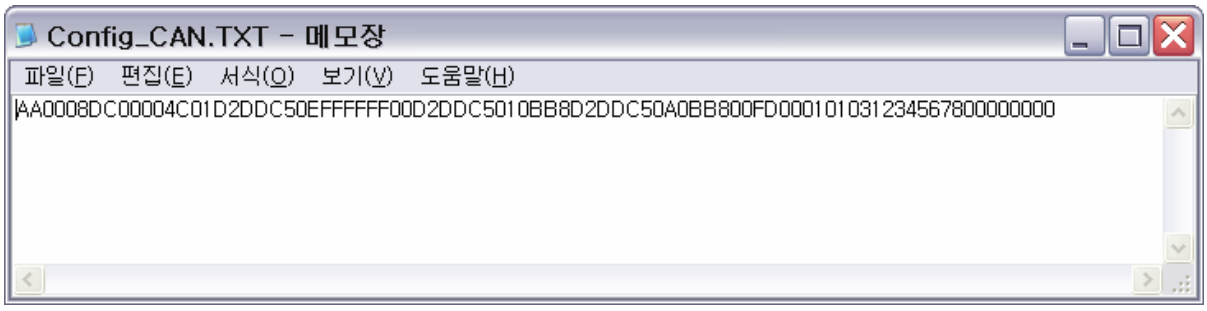
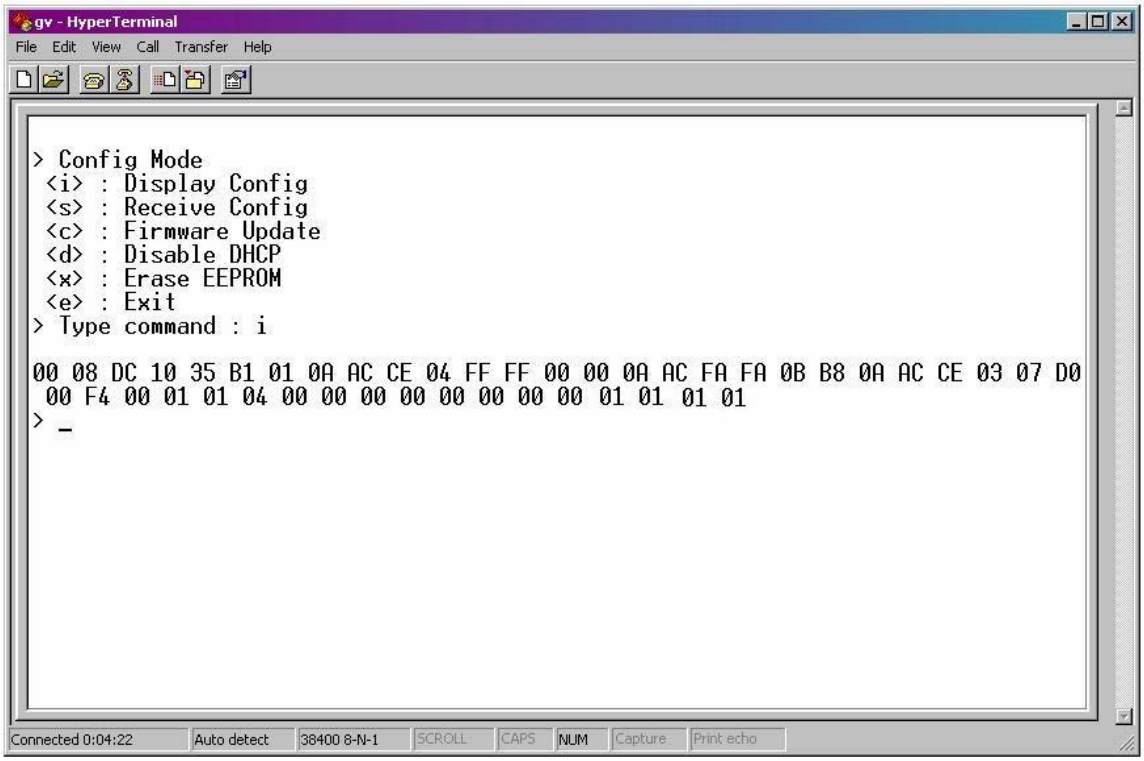


Figure 4-3. Example of configuration file



This is an HEX file format you can read it by two ways :

With FLIP software by select EEPROM in the software and then read it.

By sliding the serial config switch up and and push then '"i" touch.

AA : Reserved

0008DC1035B1 : MAC address in HEX format. **XX-XX-XX-XX-XX-XX**.

01 : Mode (Server mode : **01**, Client mode : **00**).

0AACCE04 : IP address in HEX format. It can be converted in DEC format **XXX.XXX.XXX.XXX**.

FFFF0000 : Subnet mask in HEX format. It can be converted in DEC format **XXX.XXX.XXX.XXX**.

0AACFAFA : Gateway address in HEX format. It can be converted in DEC format **XXX.XXX.XXX.XXX**.

0BB8 : Port number (Client) in HEX format. It can be converted in DEC format **XXXX**.

0AACCE03 : Server IP address in HEX format. It can be converted in DEC format **XXX.XXX.XXX.XXX.**

07D0 : Port number (Server) in HEX format. It can be converted in DEC format **XXXX**.

F4 : Serial speed (bps) (**FD**:38400, **FA**:19200, **F4**:9600, **E8**:4800, **D0**:2400, **A0**:1200). These speeds are available only in X1 mode. Speeds are double in X2 mode

00 : Serial debug code (**00**: ON), (**01**: OFF).

01 : Software major version.

01 : Software minor version.

03 : Baud rate of the CAN (**01** : 33k, **02** : 83k, **03** : 100k, **04**: 500k, **05**:1000k).

00000000 : CAN ID.

00000000 : CAN filter.

01 : Acceptance filter of CAN 2.0 part A.

01 : Acceptance filter of CAN 2.0 part B.

01 : Acceptance filter of DATA

01 : Acceptance filter of RTR.

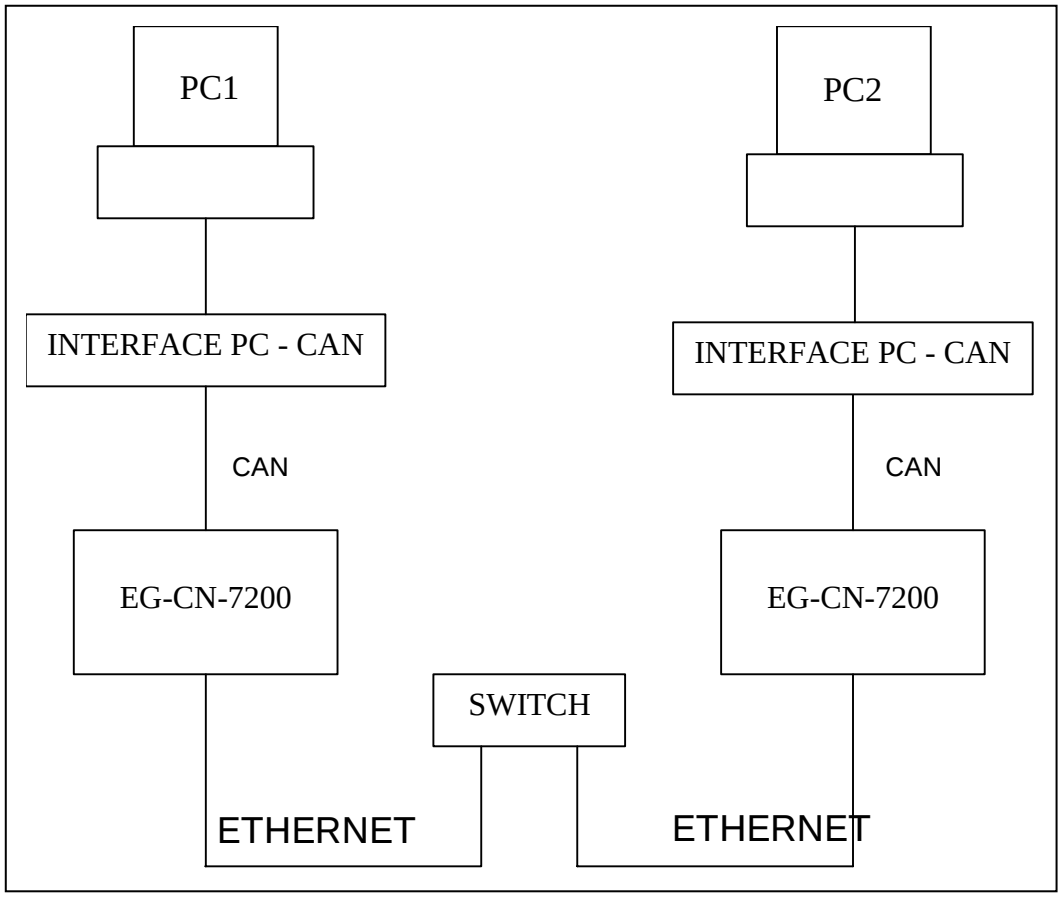
5. APPLICATION

The gateway is now ready to interconnect parts of a CAN network, it do not need more manipulations. If two gateways setup in peer to peer like above are plugged to CAN network they will be able to exchange message fully transparently.

5.1. Test

5.1.1. CANmonitor

With a CAN monitor, it is possible to view CAN message go from one side of CAN network to the other side through the Ethernet network. It allows to assume the gateway is doing well is job.



The “PC to CAN interface” can be an USB or RS232 dongle from ATMEL, PEAK, VECTOR, IXXAT or others… Or it can be any other device which allows to connect CAN network to a PC.

Now, by using a CAN monitor software, it is possible to view the CAN message send on CAN network from the other side of the Ethernet network by the CAN monitor software. Refer to user guide given with CAN monitor software to see how generate CAN message.

Important : Generate CAN message on a network can be very dangerous if devices are connected on your network. Be sure to connect only a PC to the CAN network for this test.

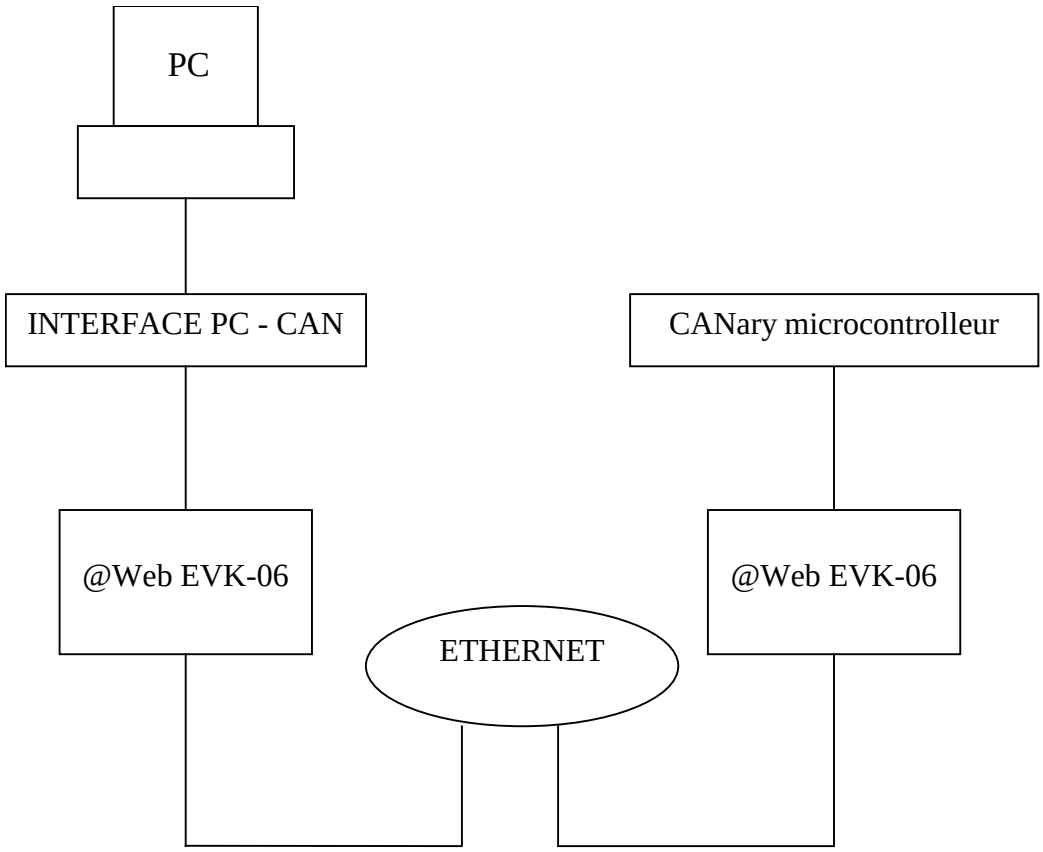
5.1.2. RS232

If Debug mode is enable it is possible to see parameters of CAN messages convert by the gateways. Go to the concerned chapter to see how to use debug mode. Then just see on Hyperterminal parameters of CAN messages convert. It says if it is CAN 2.0 part A or part B, DATA or Remote Request, length of DATA…
It is also possible to see what conversion is , CAN to Ethernet or Ethernet to CAN, it then can be quickly and simply monitor without heavy tools, just a PC with a light Hyperterminal software.

5.2. Second application :

Remote flashing a microcontroller of CANary famly from ATMEL on a CAN network by ISP on the CAN.

All microcontroller from CANary family are flashable from CAN by the In System Programming software FLIP. It can be used on this gateway to get microcontrollers remote flashable on your CAN network. Be sure devices on CAN network are programmed with a CAN bootloader. The last letters of part number must be “CA” for CAN bootloader.



There is a condition to be able to remote flashing a device. It must be first setup on local with a PC on a local CAN network. It needs to do it one time, after the device can be remote flashing whenever. This setup must be done by FLIP software, on local CAN network. Refers to FLIP help files if you have problems with the ISP on CAN.

When FLIP see the device, click on “CAN” button. Then set the bit timing value according to your CAN network speed. If you do not know good values, refer to T89C51CC01 datasheet, in CAN controller part, chapter “bit timings and baud rate”, page 84.

Now device is remote flashable by FLIP on CAN using two EG-CN-7200.

The reprogramming of the device is done by selecting the CAN speed (same as value sets in device and CAN network) and the procedure is the same as usual , fully transparent, the same as when device is on local CAN.

6. DEBUG MODE

Important : *If DEBUG mode is enabled, Performance of the gateway will decrease, if your CAN network have too high load charge the gateway will not be able to perform all CAN messages.*

If you enable DEBUG Mode, the board will send message by the UART. Values of some CAN controller registers of T89C51CC01 are shown and quick analysis of CAN or Ethernet messages are shown. Refers to T89C51CC01 datasheet to know more about CAN controller register.

Means of messages on hyperterminal in DEBUG mode :

CAN 2.0 A : The CAN message is part A.
CAN 2.0 B : The CAN message is part B.
DATA XX : The CAN message is a DATA type and his DLC field value is XX.
RTR XX : The CAN message is a RTR type and his DLC field value is XX.
CAN2ETH : The message is from CAN to Ethernet.
ETH2CAN : The message is from Ethernet to CAN.

7. EG-CN-7200 Module

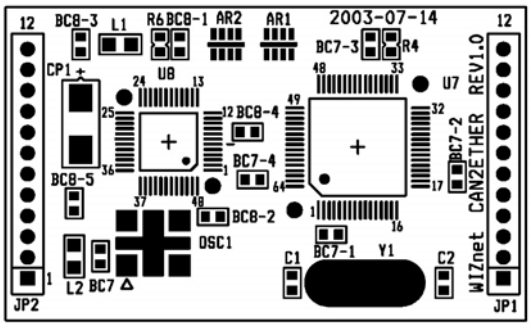
7.1. Specification

Category	Specification
Protocol	TCP, UDP, IP, ARP, ICMP, Ethernet MAC
Network interface	10/100 Base-T Ethernet (Auto detection)
Serial port	1 RS-232 port (3.3V LVTTL)
CAN	Fully Compliant with CAN Rev2.0A and 2.0B
CPU	Atmel T89C51CC01 with 12Mhz
Memory	32K Flash (inside MCU), 32K SRAM
Temperature	10'C ~ 80'C (Operating), -40~85'C (Storage)
Humidity	10~90%
Power	3.3V, 150mA
Connector type	2x12 2mm Pin header array
Size	50mm x 30mm x 8.85mm

7.2. Pin assignment

The followings are the pin assignments of EG-CN-7200.

- EG-CN-7200 has 2 connectors, which names are JP1, JP2.
- All signal level is 3.3V LVTTL
- A high on RESET pin about minimum 1.2 usec must be applied for proper operation



JP1		JP2	
1	3.3VCC	1	GND
2	RESET	2	TPRX+
3	/PSEN	3	TPRX-

4	TXD	4	GND
5	RXD	5	TPTX-
6	STATUS	6	TPTX+
7	Reserved_1	7	GND
8	Reserved_2	8	/LINK_LED
9	GND	9	/10_LED
10	CAN_L	10	/100_LED
11	CAL_H	11	/COL_LED
12	GND	12	3.3VCC

7.3. Functional description

This chapter explains the main functions of the EG-CN-7200

① Power

The complete logic of the EG-CN-7200 is driven by a single 3.3V regulated power supply.

② Ethernet Interface

A. Ethernet interface has four signals, TPTX+. TPTX-, TPRX+ and TPRX-.

These signals are connected to RJ-45 connector via transformer.

Parameter	Transmit End	Receive End
Turn Ratio	1 : 1 CT	1 : 1
Inductance (MIN)	350 uH @ 8mA	
Leakage Inductance	0.05 ~ 0.15 uH	
Capacitance (MAX)	15 pF	
DC Resistance (MAX)	0.4 ohm	

Table 7-1. Transformer Specification

B. Any Magnetic with Tx/Rx turn ration of 1:1CT/1:1 are suitable for RTL8201BL, such as Pulse PE68515/H1012, Valor ST6118, YCL 20PMT04, DELTA LF8221, BH16ST8515, TAIMIC HSIP-002.

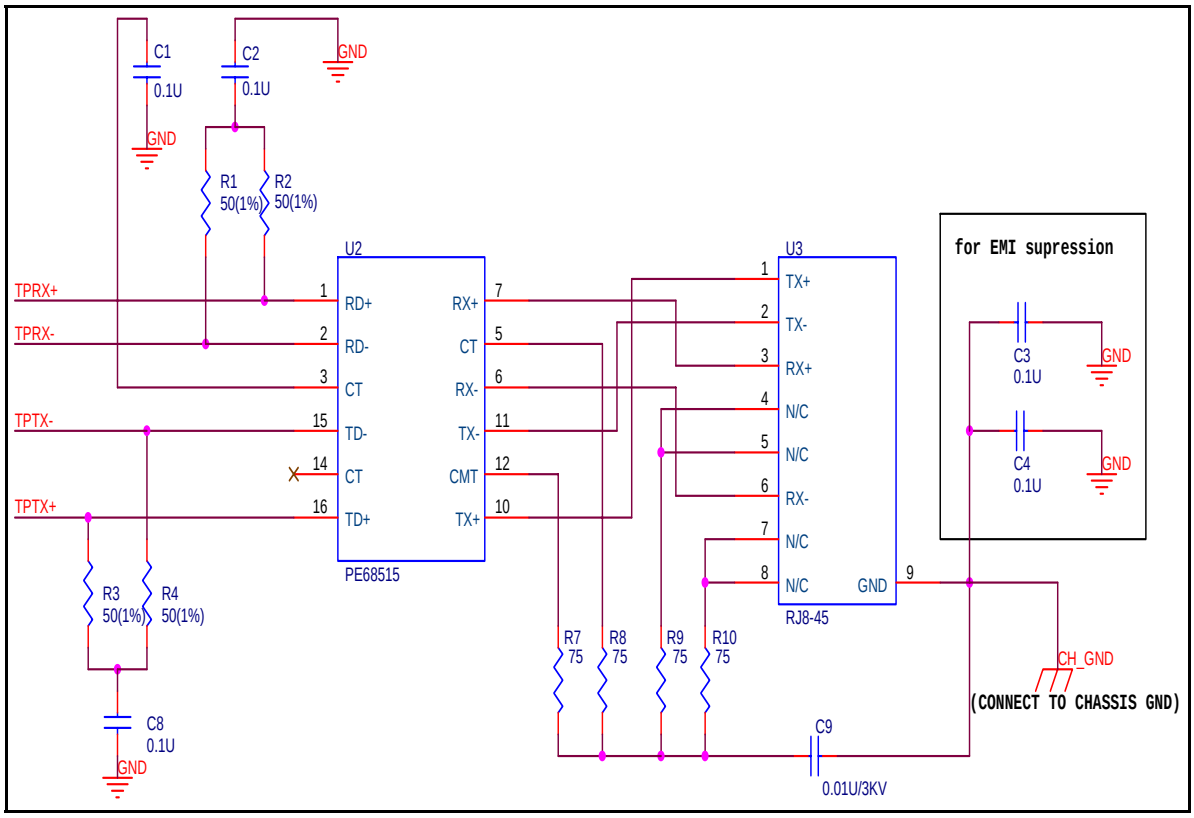


Figure 7-1. Schematic of Ethernet interface

C. While layout the PCB, pay more attention to these signals trace.

i. Avoid signal loss on these traces.

ii. TPTX+, TPTX- make the length equal as possible.

iii. TPRX+, TPRX- make the length equal as possible.

iv. The distance between TPTX± and TPRX±

v. TPRX± had better not use via.

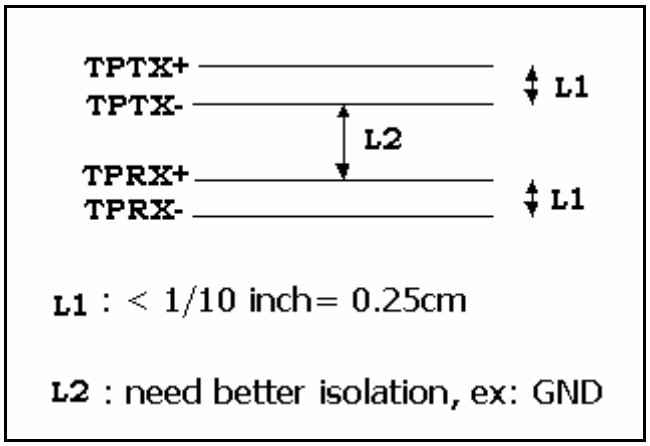


Figure 7-2. Signal trace

For more detail information, refer to “RTL8201BL PCB Layout Guide” document.

③ Serial Interface

Serial Interface has two signals, TxD and RxD.

TxD, RxD signals are connected to the T89C51CC01 UART. These signals are LVTTL-level, RS-232 transceiver chip that converts voltage levels from 3.3V.

④ LED Interface

LED interface has four signals, /LINK_LED, /10_LED, /100_LED and /COL_LED.

This signals indicates Ethernet status, link, speed and collision.

For instance, if collision occurs, the /COL_LED goes low state.

⑤ Status

A. This pin indicates Ethernet connection state as bellow:

i. High : There is no Ethernet connection. (If EG-CN-7200 is in server mode, it listens. If EG-CN-7200 is in client mode, it attempts to connect remote server)

ii. Low : Ethernet connection established.

B. This pin also used for serial firmware downloading.

i. While boot-up time, EG-CN-7200 checks this pin’s state.
If pin’s state is low, EG-CN-7200 enters serial download mode.

⑥ Reset

High-active reset must be applied to EG-CN-7200 for proper operation. The reset signal applies to the CPU, W3100A and inverted reset signal applies to PHY.

Caution : To prevent system malfunction such as Flash corruption, external “Brown-outs” circuit is needed. For more detail information, refer to Atmel web site (http://www.atmel.com/dyn/resources/prod_documents/doc4183.pdf)

7.4. Layout

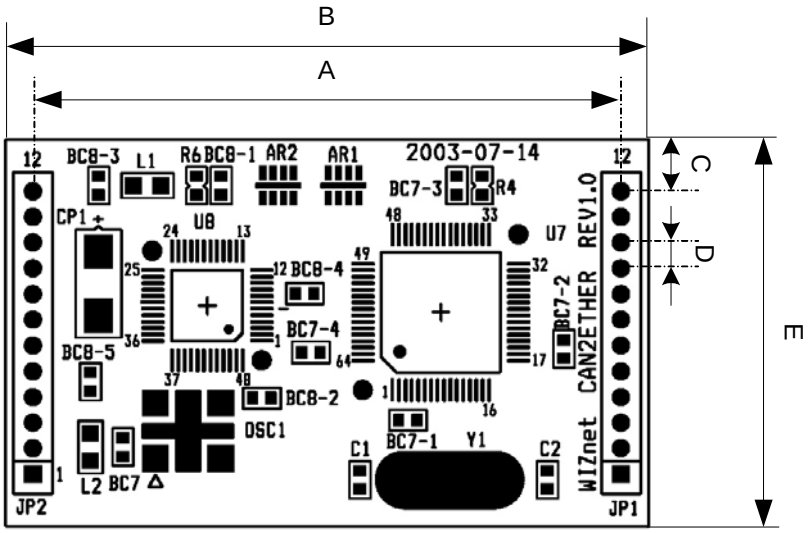


Figure 7-3. Board Layout

Symbol	Dimension (mm)
A	45.7
B	50.0
C	4.0
D	2.0
E	30.0

8. How to reprogram your 32K Flash or 2K EEPROM?

What is required before begining :

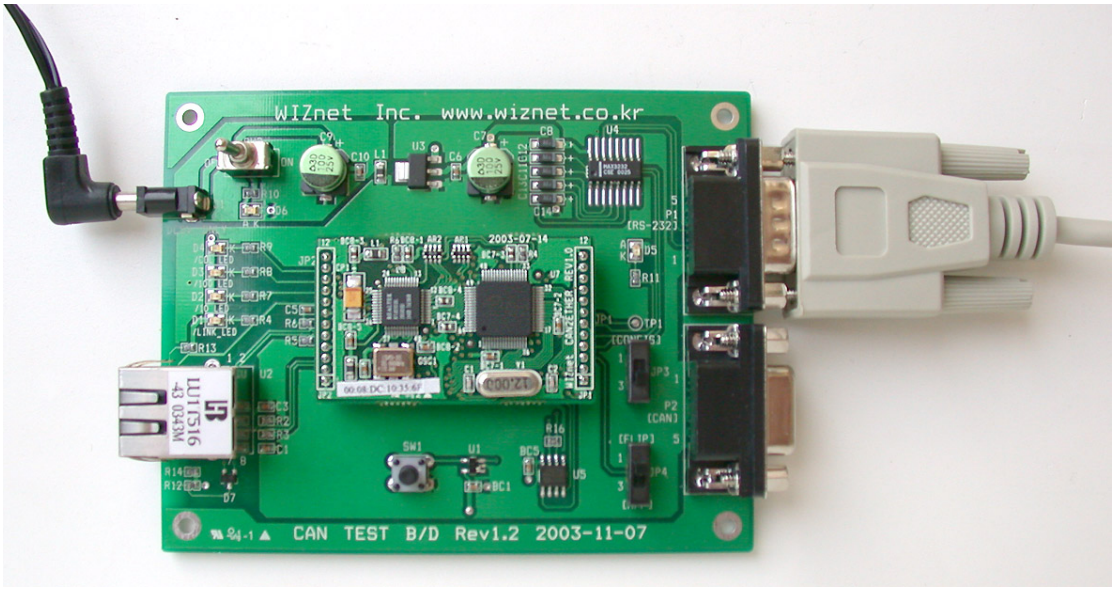
- EG-CN-7200-EVB
- UART cross cable
- Program file in HEX file format
- FLIP 2.2.4 installed on your PC

You must have on your PC a file in HEX format to program the 32K of flash memory of T89C51CC01 device. For this example this file is named “cegok.hex”.

Step 1

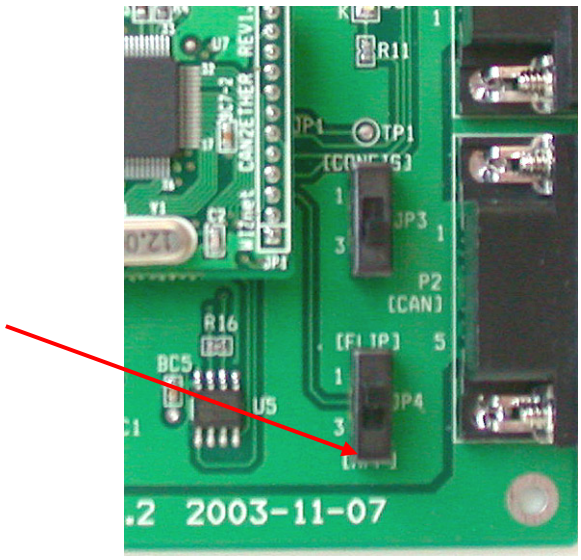
Connect your EG-CN-7200-EVB to your PC with the UART cable supplied.

Important : *If you have any program running on your PC and which use a COM port, like “Hyperterminal”, be sure to connect the cable on an unused COM port or free your COM port used.*



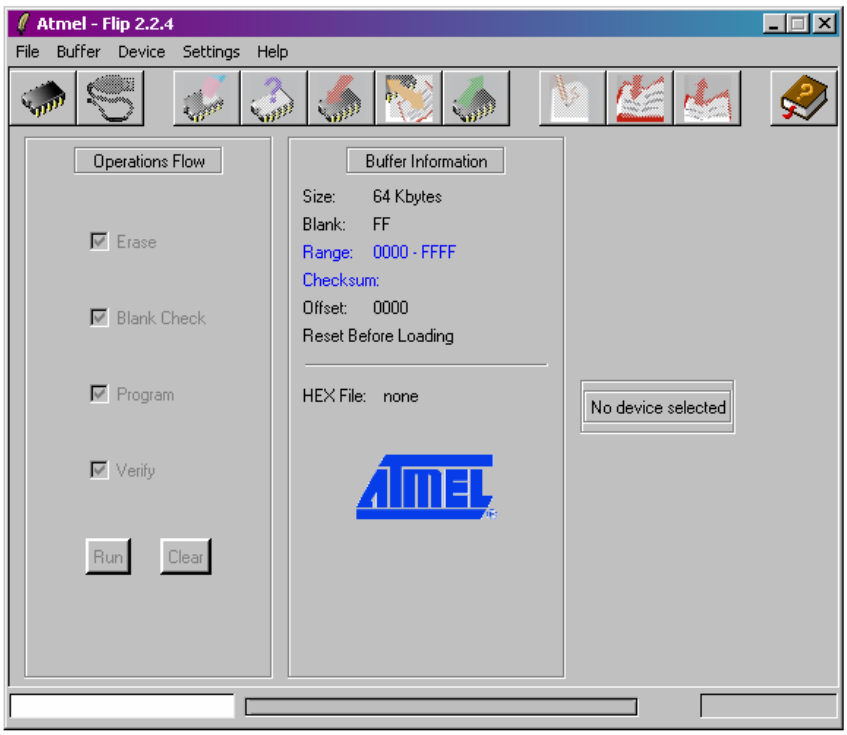
Step 2

Slide up the FLIP switch onto “FLIP”. Then if it is not already done, power on the board.



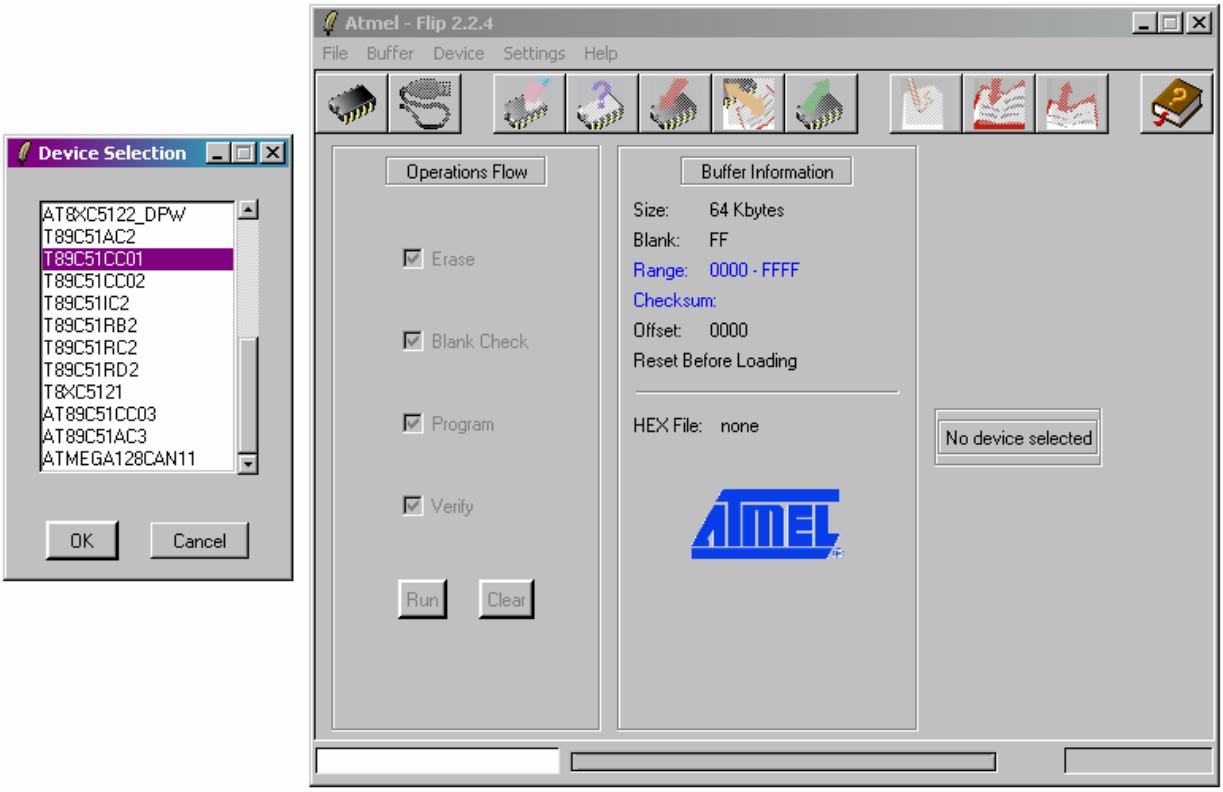
Step 3

You must run the ISP software named FLIP 2.2.4 by ATMEL.



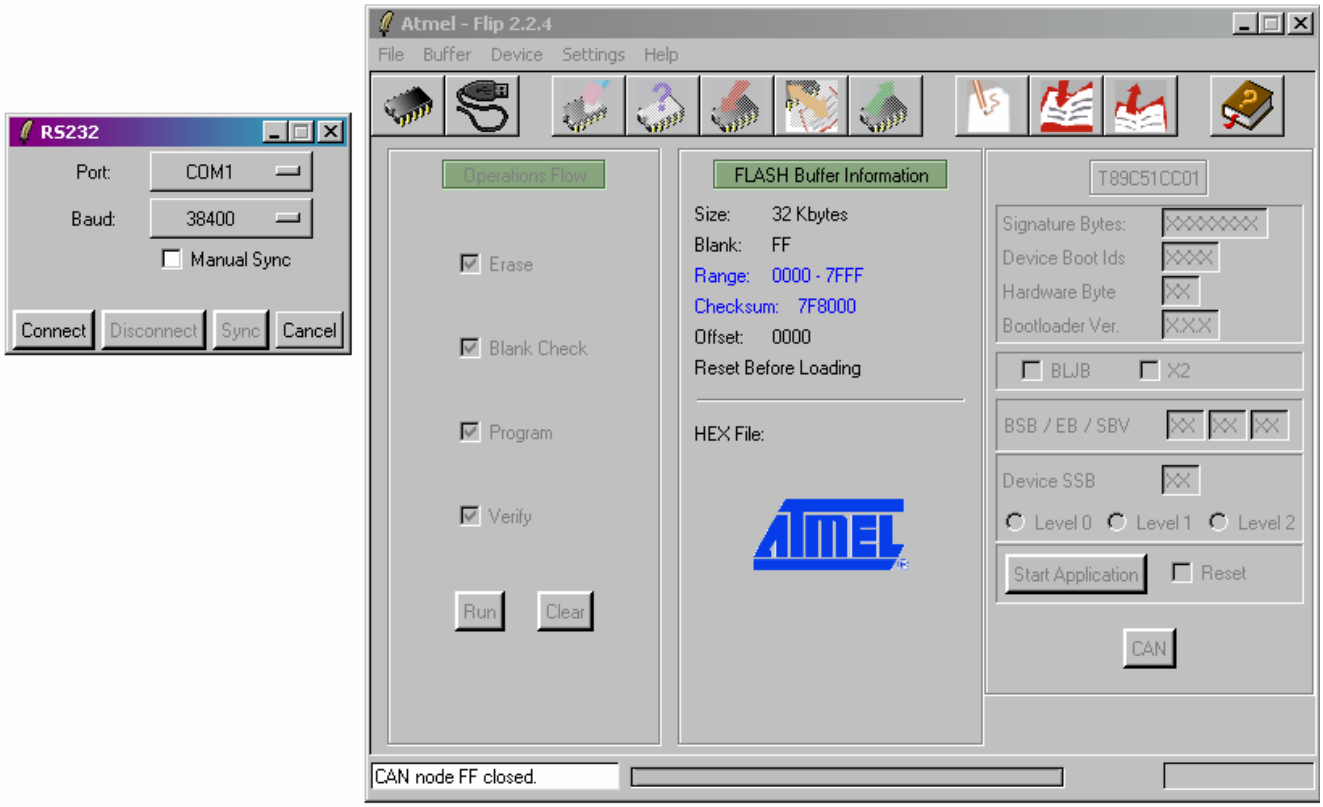
Step 4

Then you must select the good device by pushing F2 button. Here you must choose T89C51CC01.



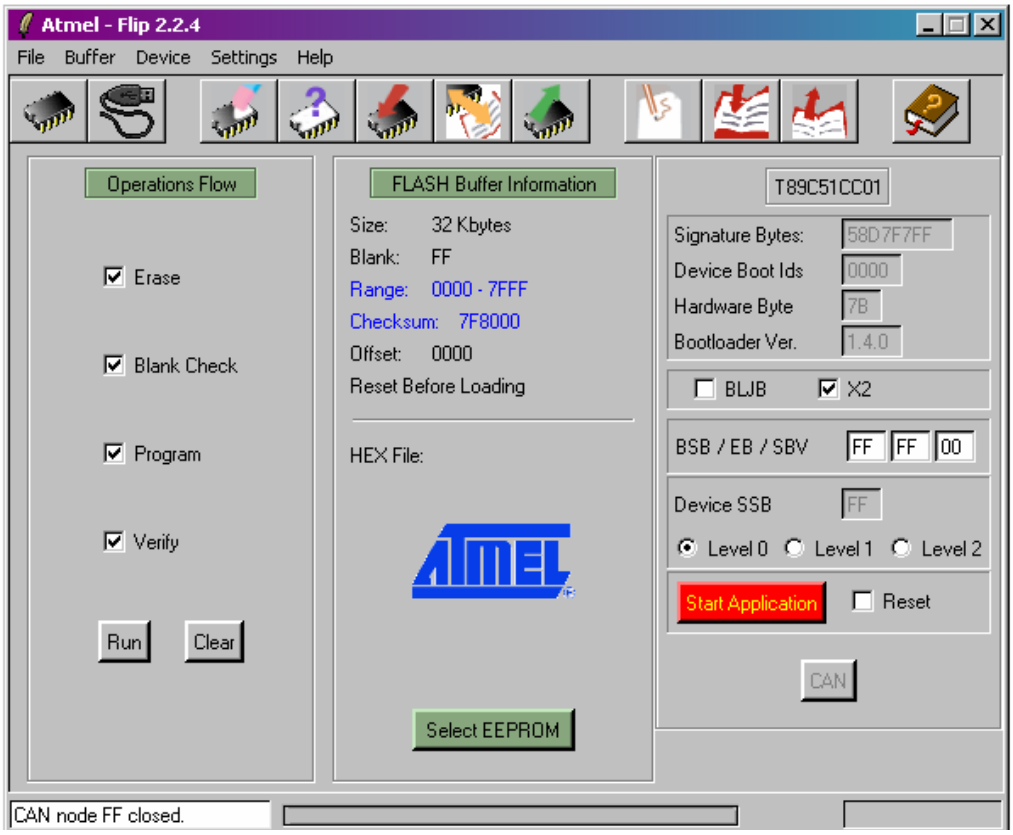
Step 5

You must then setup the communication port by pushing F3 button. Take care to select the same port as the one you have plug in the UART cable of the EG-CN-7200-EVB.The speed is 38600 max. Then click “Connect” button.



Step 6

You will obtain a screen similar at this one.



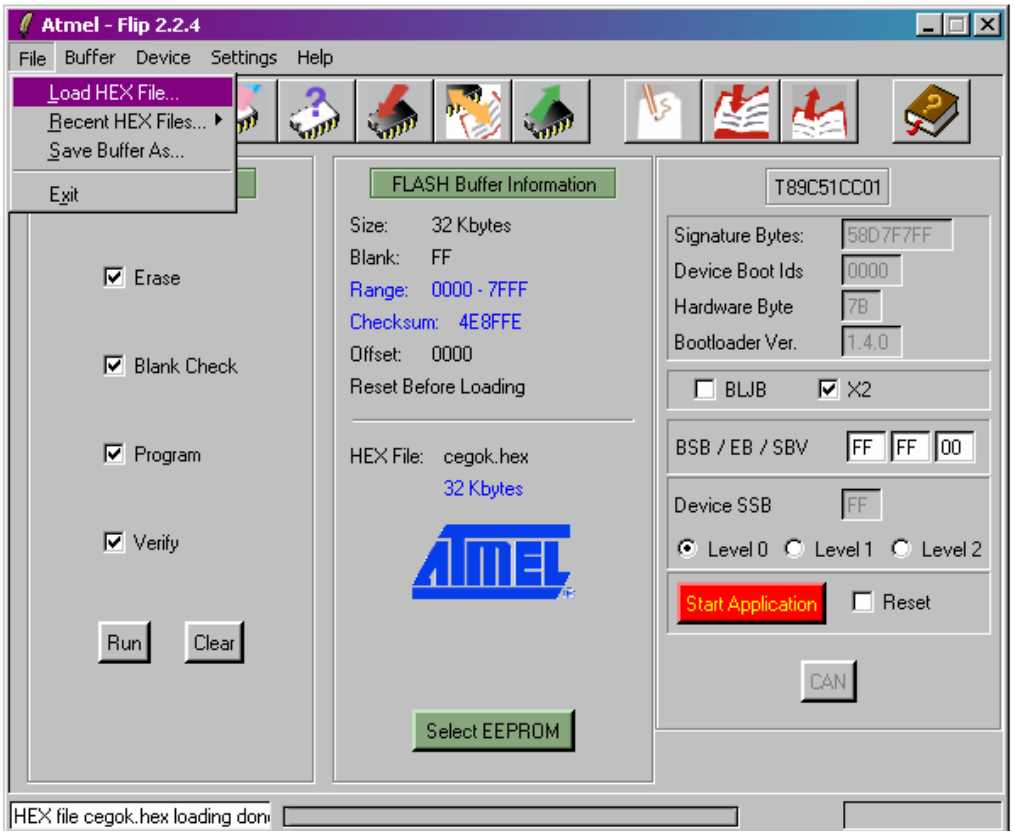
Step 7

You are now connected with the board and you are able to program special bytes on the right, see UART bootloader file on this CD for further information.

Important : These bytes must be well setup for your device starts correctly. If you are not sure take the same config as the screen above to have your device ready to start.

Step 8

Now you will have to browse your PC to load your file in hex format.



Step 9

Then be sure all boxes on the left are checked and click on “Run”. You just have to wait for a moment (about 1minute @38400bauds) and you should have your device program and ready to execute the new program.

Important : *Do not forget to slide down the FLIP switch onto position “APP” after FLIP software is closed.*

Step 10

You maybe want to reprogram the EEPROM so you must repeat this procedure as the same but before step 7 you click on “Select EEPROM”.