



EVBAVR User Guide

V-1.4

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Document History Information

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Ver. 1.3	September 9, 2005	Modified ISP PIN spec. (6X1 → 3X2)
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Table of contents

1.	Before you begin	1
1.1.	Component	1
1.2.	Software CD	2
1.2.1.	Document	2
1.2.2.	HW	2
1.2.3.	Software	2
2.	Quick Start	3
2.1.	Hardware Installation	3
2.2.	Setup value	3
3.	Tool Install	7
3.1.	WinAVR	7
3.2.	AVR Studio	7
3.3.	AX1	7
4.	Loopback	10
4.1.	TCP Server Mode	11
4.1.1.	Flow chart	11
4.1.2.	Make a TEST	11
4.2.	TCP Client Mode	14
4.2.1.	Flow chart	14
4.2.2.	Make a TEST	15
4.3.	UDP Mode.....	16
4.3.1.	Flow chart	16
4.3.2.	Make a TEST	16
5.	DHCP(Dynamic Host Configuration Protocol).....	18
5.1.	Flow Chart	19
5.2.	Make a TEST	21
6.	HTTPD	23
6.1.	Flow Chart	24
6.2.	Make a TEST	26
7.	FTP	28
7.1.	FTP Server.....	28
7.1.1.	Flow Chart	29
7.1.2.	Make a TEST	31
7.2.	FTP Client	34

7.2.1. Flow Chart	35
7.2.2. Make a TEST	36
8. TelnetD	37
8.1. Make a TEST	38

Table of Figures

Figure 1-1. Contents of EVBAVR	1
Figure 5-1. DHCP Processing.....	18

1. Before you begin

1.1. Component

The EVBAVR package is displayed:



Figure 1-1. Contents of EVBAVR

The EVBAVR, also called EVBIIM7300, contains the items described in the table below.

No.	Item	Quantity
1	EVBAVR (Plugged IIM7300)	1
2	12V Power Adaptor	1
3	Software CD	1
4	UTP Cable	1
5	Serial Cable	1
6	AVR ISP Tool	Option
7	ISP GENER	Option

1.2. Software CD

The EVBAVR is supplied with a Software CD that contains various development tools including Documents, Schematics, Partlists, Firmware and PC Utilities etc.

1.2.1. Document

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

1.2.2. HW

Contains the Schematics, Partlists, PAL Source Code & JEDEC file. The PAL subdirectory contains the PAL Source that is necessary for interfacing the MCU, AVR and the W3100A.

1.2.3. Software

Software is provided for the firmware and PC Utilities. The software for the firmware contains the W3100A API Driver for the MCU, AVR and sample source codes. The software for PC Utilities contains compiler and Loopback test program.

2. Quick Start

2.1. Hardware Installation

For testing functions of the EVB and developing applications, the system environment should be configured as follow.

- 1) Connect the power adapter to EVB.
- 2) Connect EVB's female DB9 and your PC's COM1 port (or COM2 port) by using supplied serial cable.
- 3) Connect EVB's MAC jack and your PC's Lan Port by using supplied crossed UTP cable.
(Caution! When you use non-crossed UTP cable, you must make the cable connected not to PC's Lan Port but to HUB or Switch that is connected to LAN)

2.2. Setup value

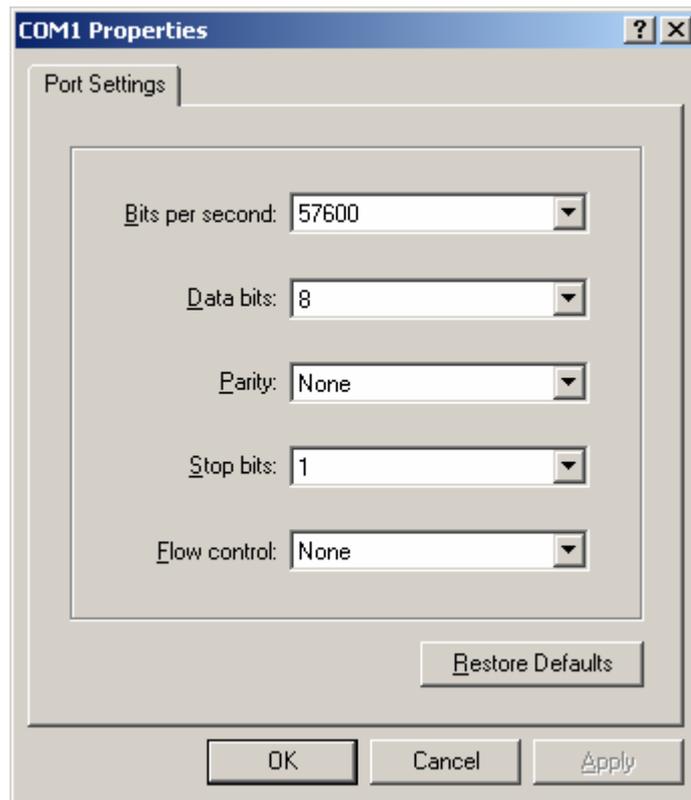
- 1) Set up your PC's Network environment.
 - A. To communicate your PC with EVB, they must be in the same subnet.
 - B. Set the PC as bellow.

IP Address	192.168.0.3
Subnet	255.255.255.0
Gateway	192.168.0.1

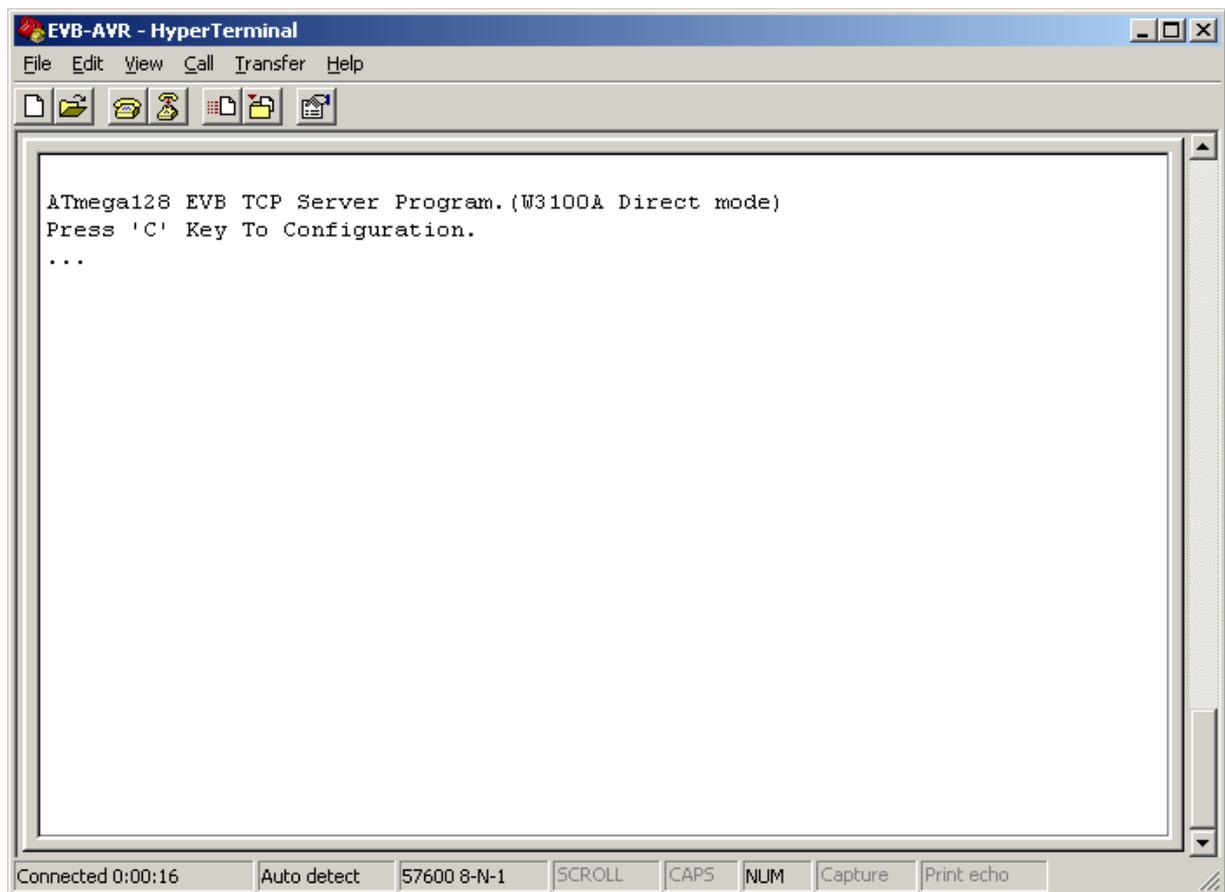
- 2) Set up EVB's network environment.
 - a. To set the EVBAVR's setup, run "Hyperterminal.exe".



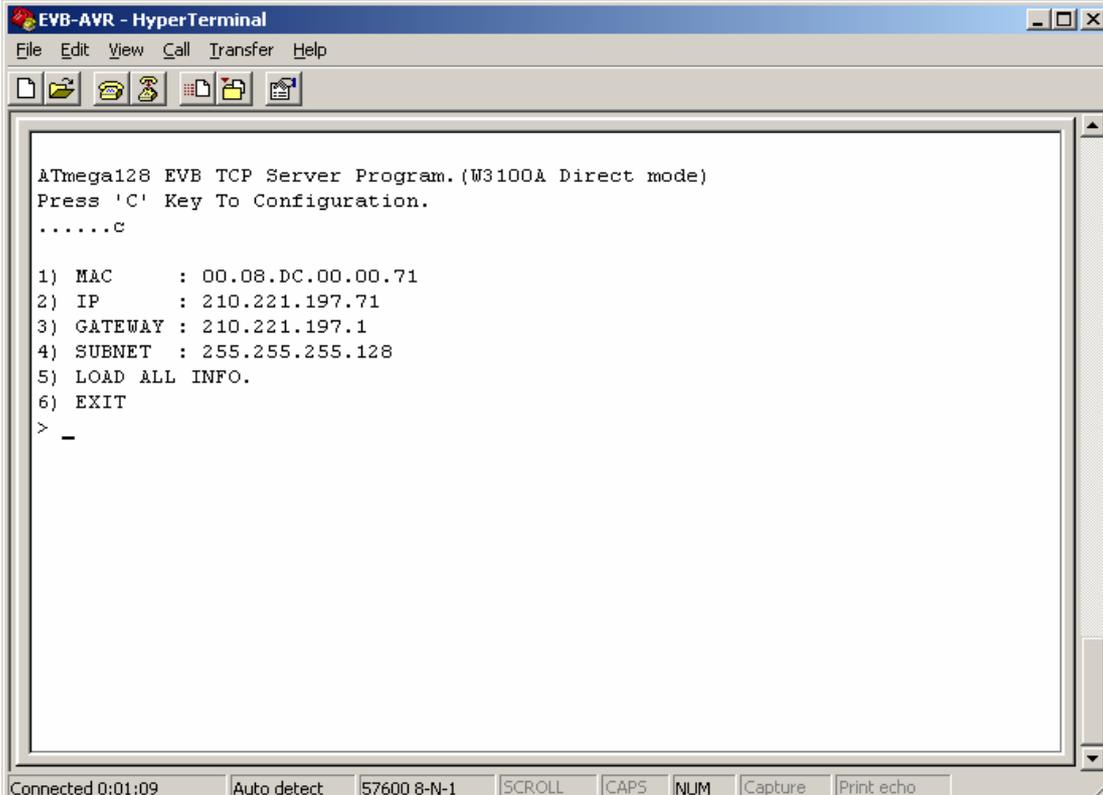
- b. To communicate your PC with EVBAVR, they must be the following setting values.



c. Reset EVB, and the following window is shown.



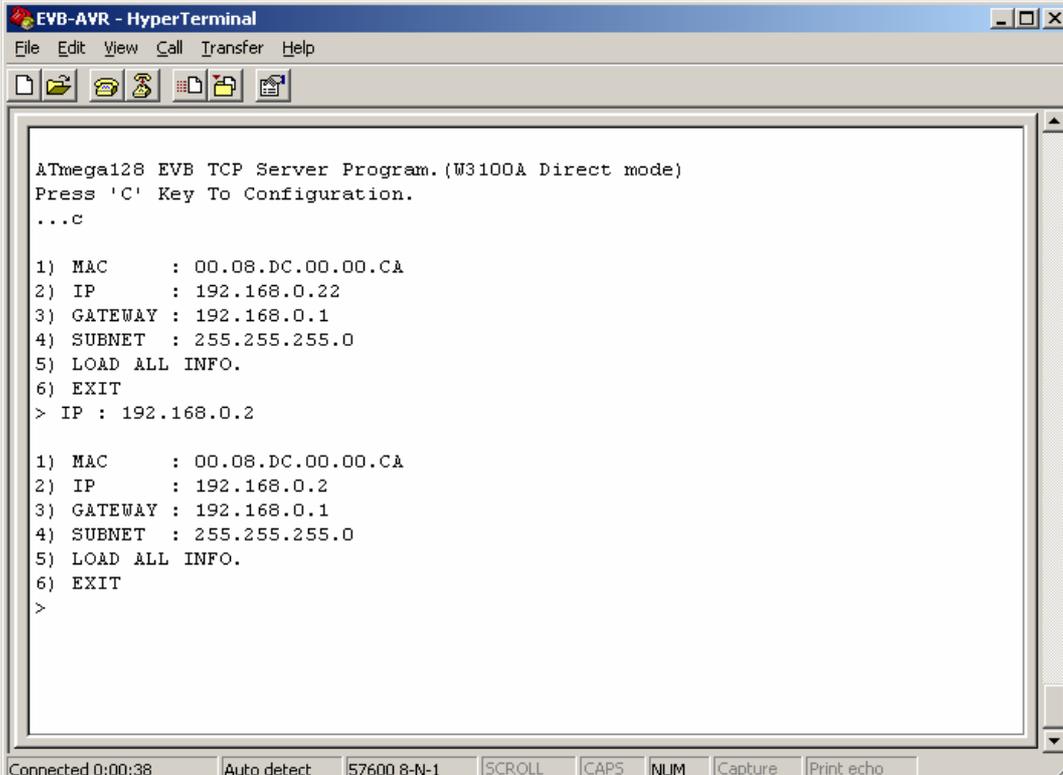
d. When you press 'C' within 5 seconds, you can see the following menu.



```
ATmega128 EVB TCP Server Program.(W3100A Direct mode)
Press 'C' Key To Configuration.
.....C
1) MAC      : 00.08.DC.00.00.71
2) IP       : 210.221.197.71
3) GATEWAY  : 210.221.197.1
4) SUBNET   : 255.255.255.128
5) LOAD ALL INFO.
6) EXIT
> -
```

Connected 0:01:09 Auto detect 57600 8-N-1 SCROLL CAPS NUM Capture Print echo

e. Set the network information of EVB as the below. (IP, Gateway, Subnet)

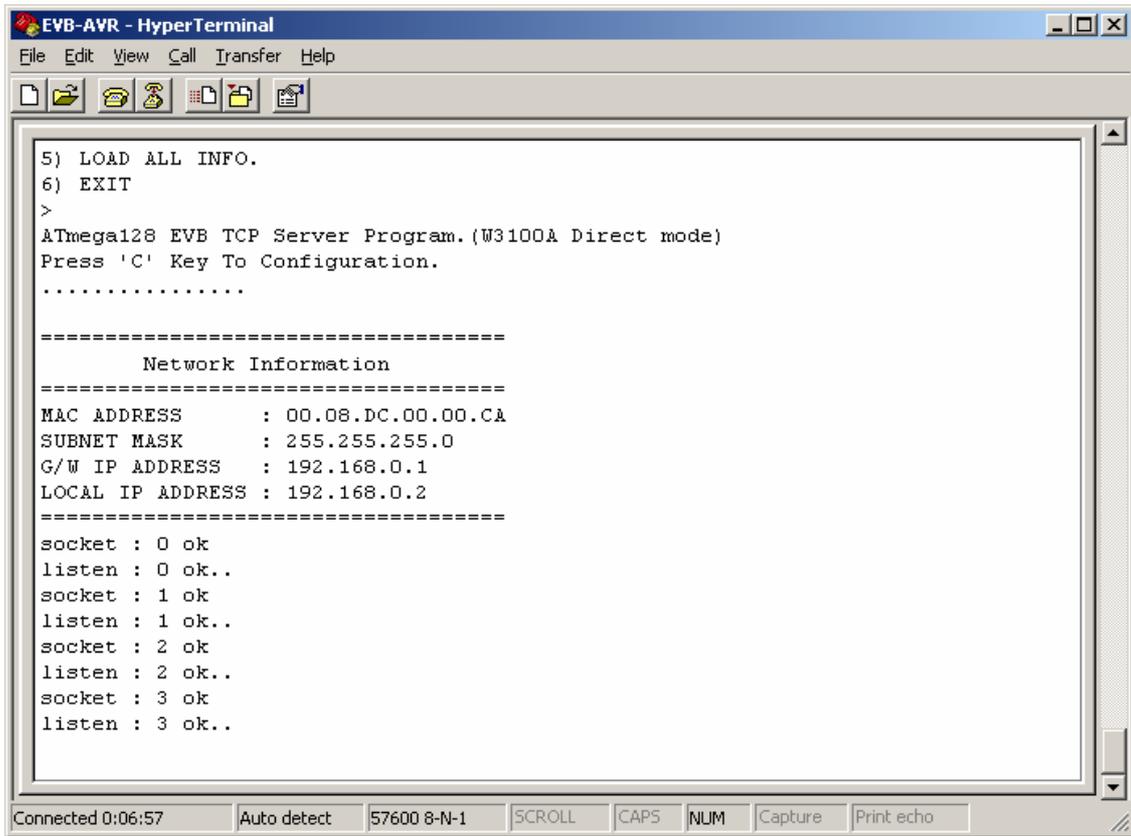


```
ATmega128 EVB TCP Server Program.(W3100A Direct mode)
Press 'C' Key To Configuration.
...C
1) MAC      : 00.08.DC.00.00.CA
2) IP       : 192.168.0.22
3) GATEWAY  : 192.168.0.1
4) SUBNET   : 255.255.255.0
5) LOAD ALL INFO.
6) EXIT
> IP : 192.168.0.2

1) MAC      : 00.08.DC.00.00.CA
2) IP       : 192.168.0.2
3) GATEWAY  : 192.168.0.1
4) SUBNET   : 255.255.255.0
5) LOAD ALL INFO.
6) EXIT
>
```

Connected 0:00:38 Auto detect 57600 8-N-1 SCROLL CAPS NUM Capture Print echo

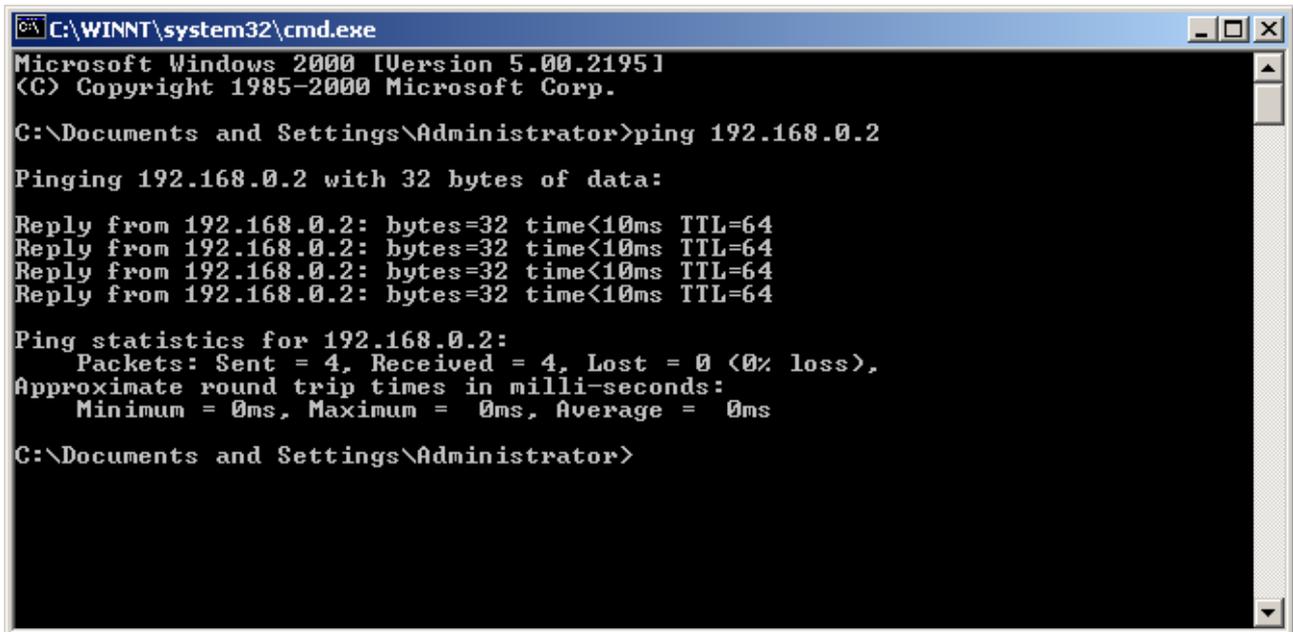
f. Reset EVB.



```
EVB-AVR - HyperTerminal
File Edit View Call Transfer Help
[Icons]
5) LOAD ALL INFO.
6) EXIT
>
ATmega128 EVB TCP Server Program. (W3100A Direct mode)
Press 'C' Key To Configuration.
.....
=====
Network Information
=====
MAC ADDRESS      : 00.08.DC.00.00.CA
SUBNET MASK      : 255.255.255.0
G/W IP ADDRESS   : 192.168.0.1
LOCAL IP ADDRESS : 192.168.0.2
=====
socket : 0 ok
listen : 0 ok..
socket : 1 ok
listen : 1 ok..
socket : 2 ok
listen : 2 ok..
socket : 3 ok
listen : 3 ok..
Connected 0:06:57  Auto detect  57600 8-N-1  SCROLL  CAPS  NUM  Capture  Print echo
```

3) Let's start ping test. Run "start>run>cmd.exe".

4) Run "Ping 192.168.0.2".



```
C:\WINNT\system32\cmd.exe
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-2000 Microsoft Corp.

C:\Documents and Settings\Administrator>ping 192.168.0.2

Pinging 192.168.0.2 with 32 bytes of data:

Reply from 192.168.0.2: bytes=32 time<10ms TTL=64

Ping statistics for 192.168.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Documents and Settings\Administrator>
```

3. Tool Install

For detail, refer to "AVR Tool Guide Vx.x.pdf" about installation and usage of AVR tools.

3.1. WinAVR

WinAVR is a suite of executable, open source software development tools for the Atmel AVR series of RISC microprocessors hosted on the Windows platform. It includes the GNU GCC compiler.

The latest version of WinAVR is available from <http://winavr.sourceforge.net> .

- 1) Run "WinAVR-20050214-install.exe" from CD.
- 2) You can probably leave most of the settings to their default values.

3.2. AVR Studio

AVR Studio is free development environment tool having simulation, emulation, flash programming function. In addition to, it supports flash programming using AVR JTAG/ISP Tool. Usage of AVR Tools refer to "AVR Tool Guide

The latest version of AVR Studio is available from <http://www.atmel.com> .

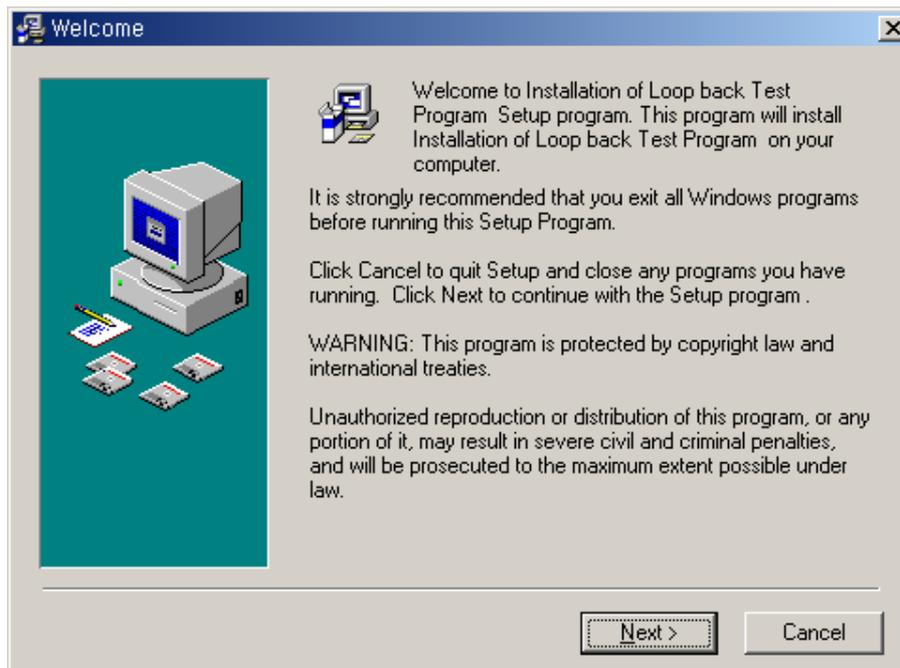
- 1) The self-extracting archive, "ASTUDIO3.EXE" from CD, unpacks to the folder of your choice.
- 2) Open this folder after decompression is finished, and run "install.exe". Follow the instructions on-screen.
- 3) You can probably leave most of the settings to their default values.
- 4) Run this program, start>program>Atmel AVR Tool>AVR Studio.

3.3. AX1

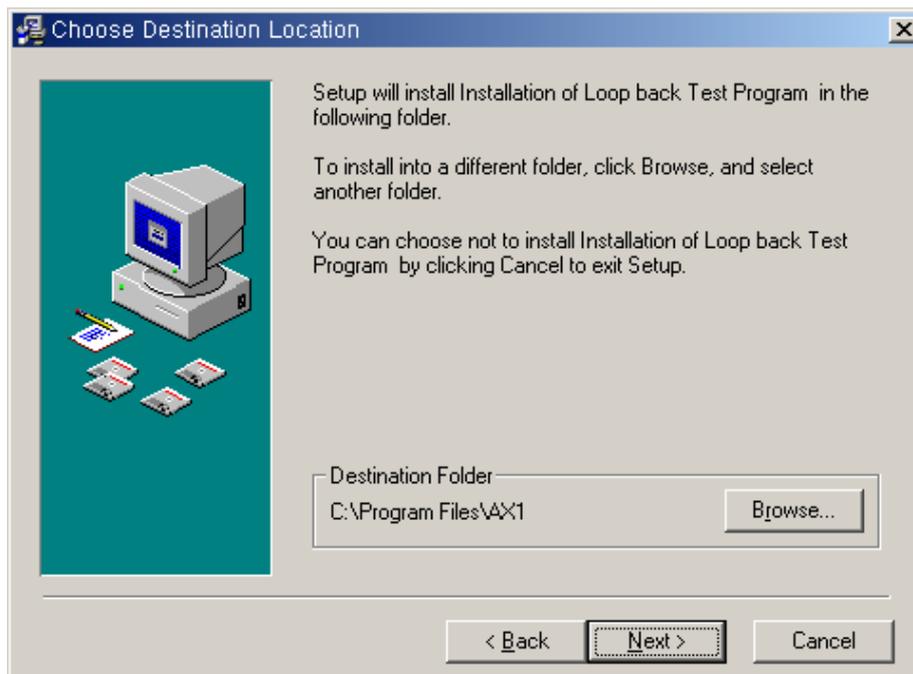
This program is used for loopback test.

New release version is located in <http://www.iinchip.com> .

- 1) Run "AXInstallVx.x.exe" from CD.
- 2) You can probably leave most of the settings to their default values.
 - A. On the Welcome window dialog box, click Next.

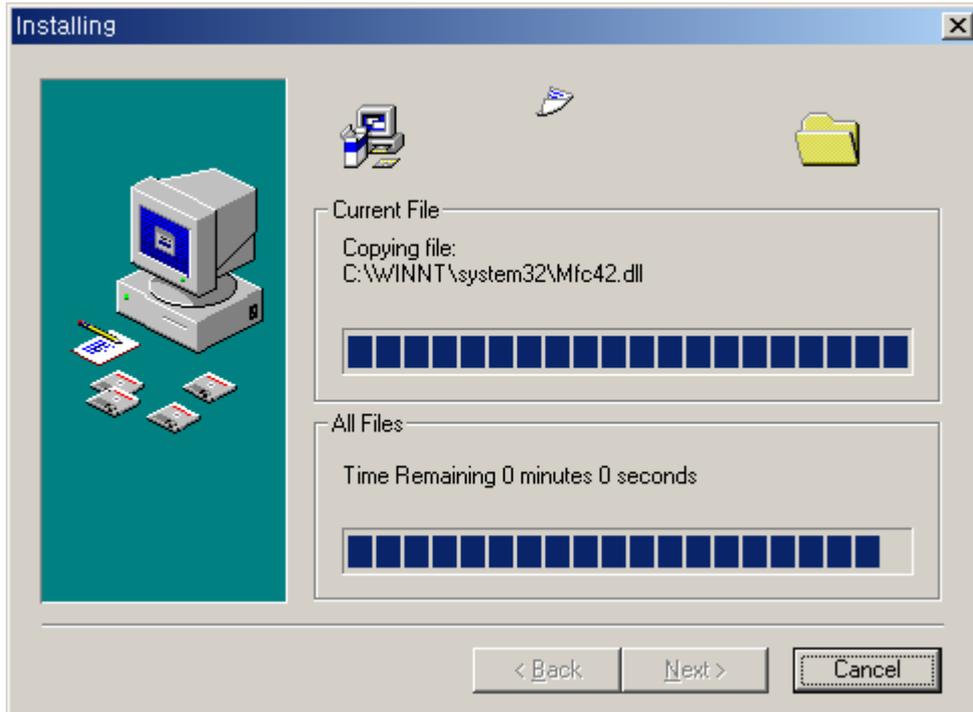


B. On the Choose Destination Directory dialog box.

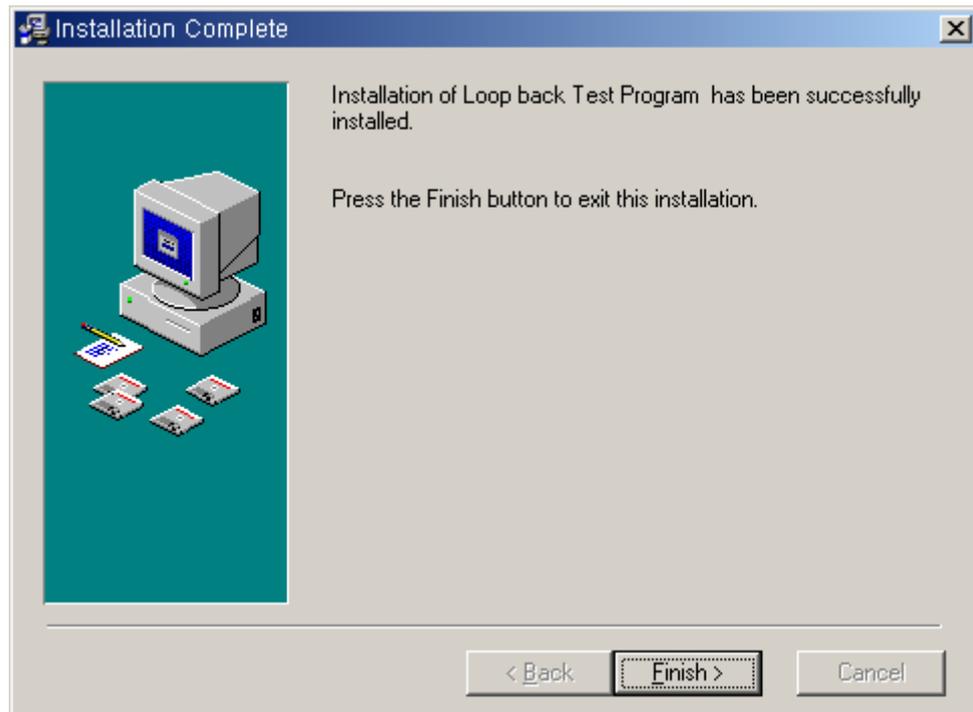


C. Click Next two step, and start installation.

Refer to "AX1 Manual Vx.x.pdf" for detail.



D. On the Installation Complete dialog box, click Finish.



3) Complete Installation. Run start>program>AX1>AX1.exe.

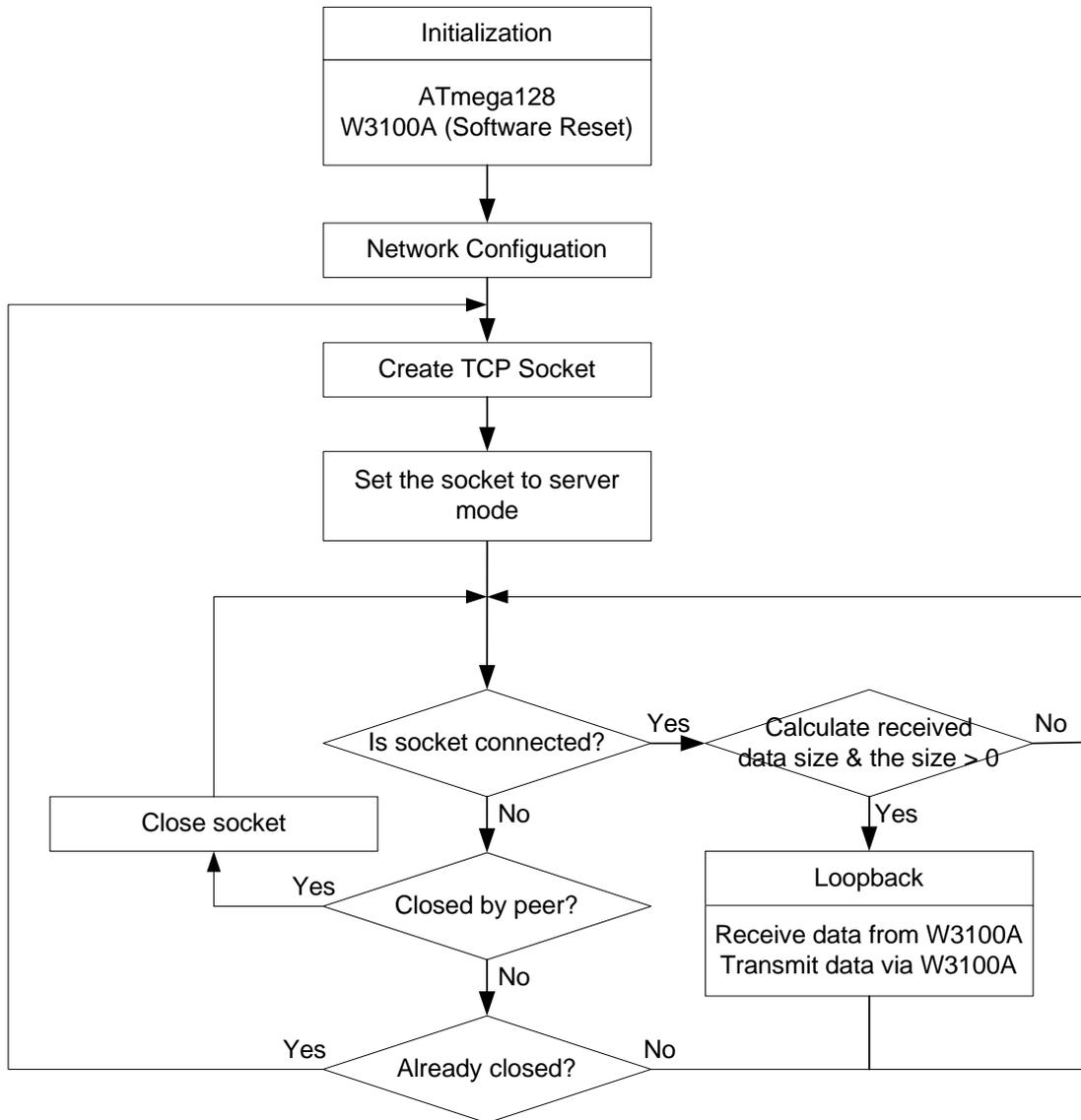
4. Loopback

The Loopback is the operational mode for measuring the transmission performance of the iinChip W3100A on the EVB. It is used for measuring data transfer speed when the EVB receives data from the PC and sends it back to the PC.

1. TCP Server Mode : EVB is TCP Server, PC is TCP Client
2. TCP Client Mode : EVB is TCP Client, PC is TCP Server.
3. UDP Mode : EVB is UDP mode, PC is UDP mode.

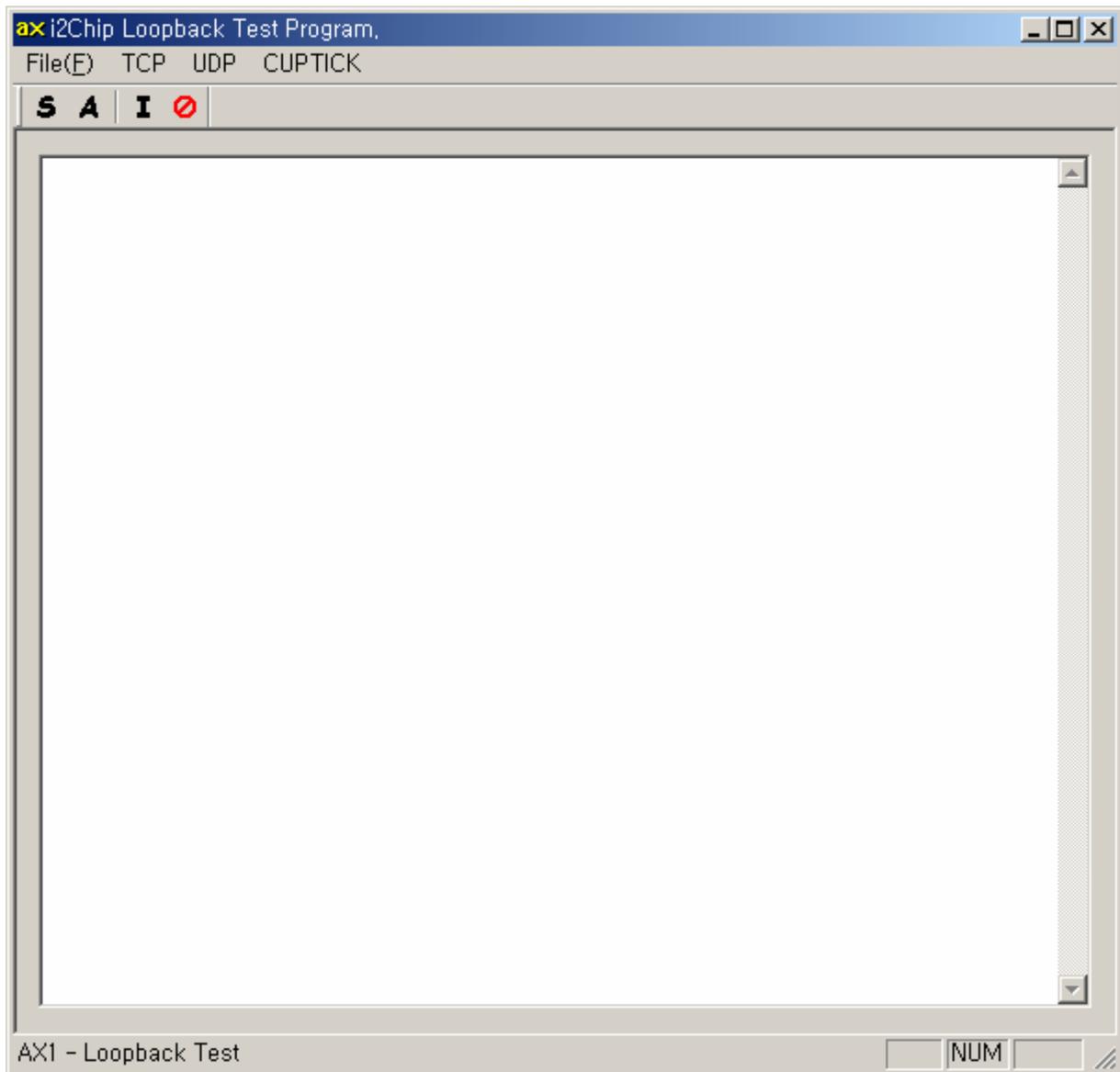
4.1. TCP Server Mode

4.1.1. Flow chart

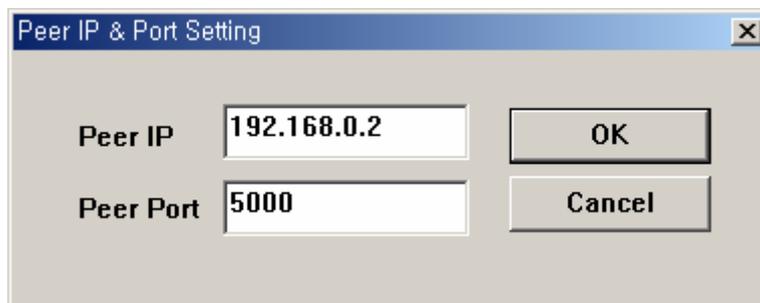


4.1.2. Make a TEST

- 1) Download "Software/Firmware/lb_tcp_server/lb_tcps.hex", Reset EVB
- 2) Run "AX1.exe" at PC's side, and Click Menu>TCP>Connect.



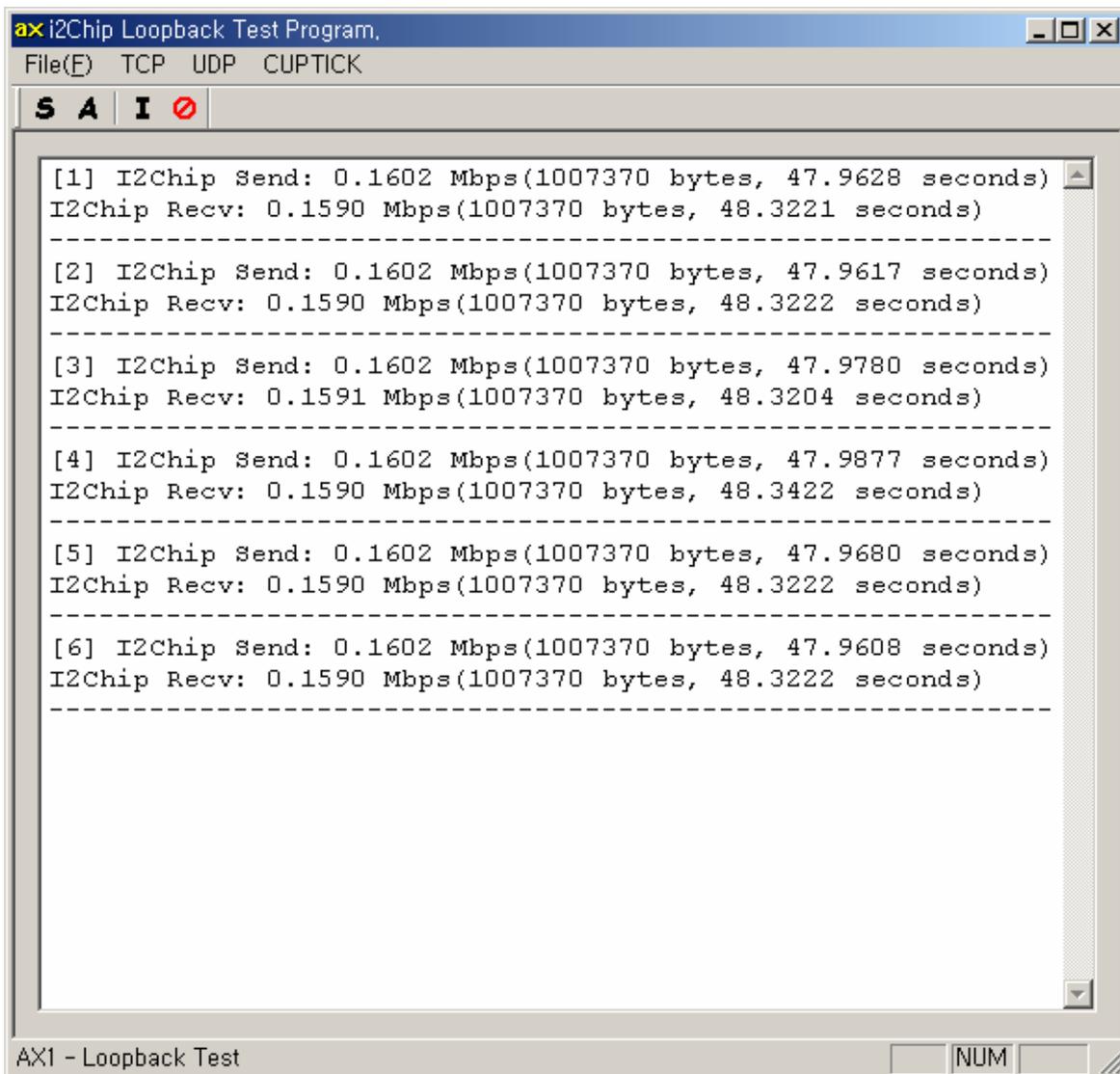
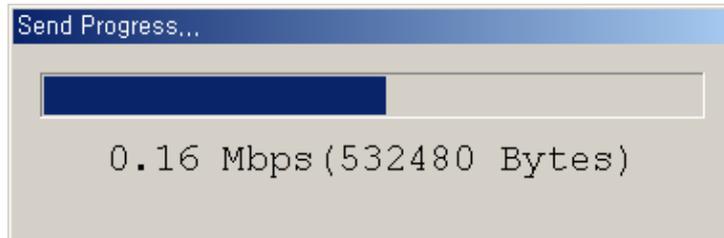
3) Input board's IP and Port Address.



4) Once a connection is established between the EVB and the PC, and The "Connected" Message box is displayed : (if not, check the environment.)

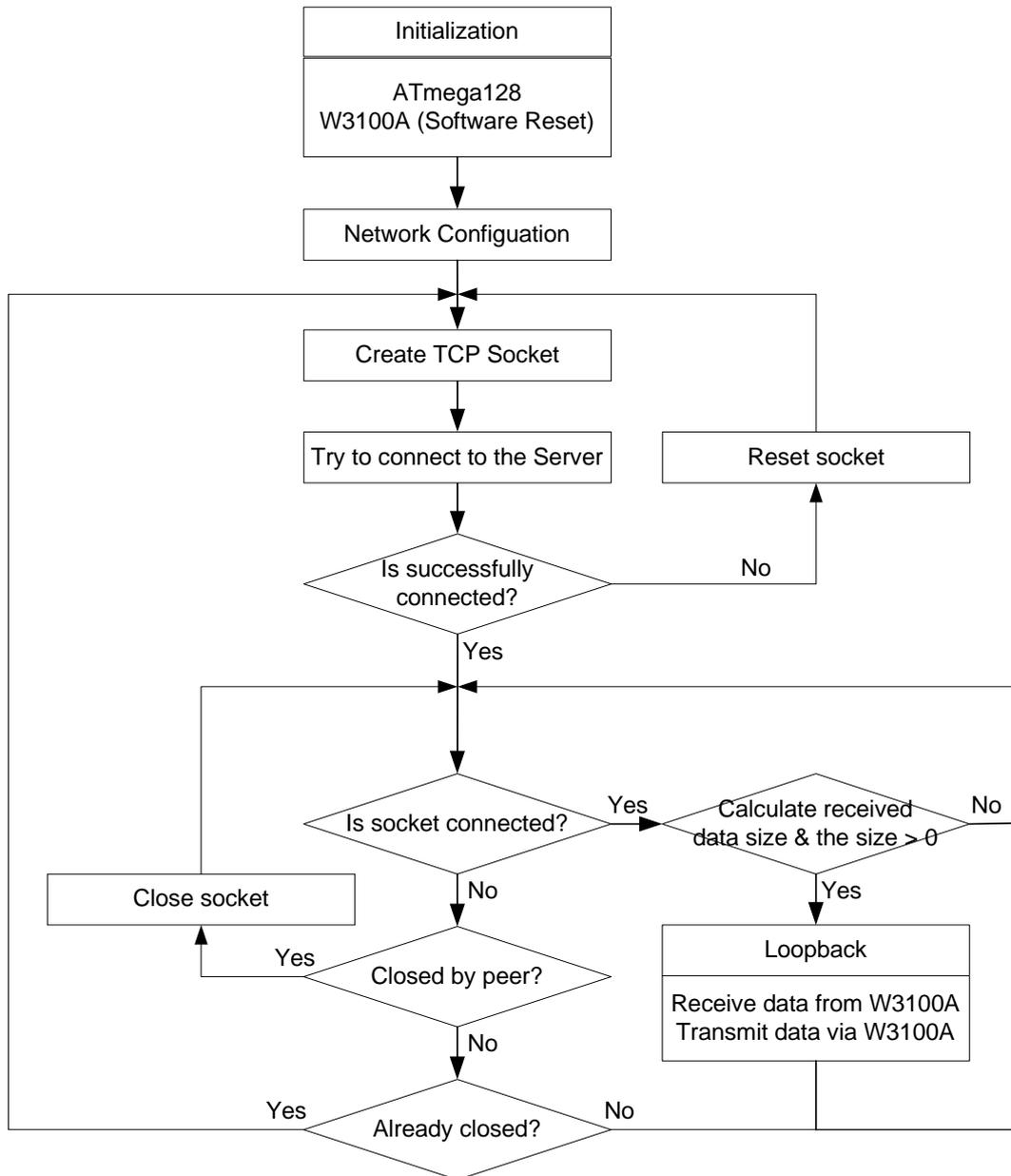


5) Click Menu>TCP>Send. And Select file, and click "OK".



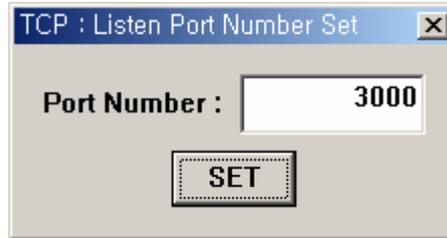
4.2. TCP Client Mode

4.2.1. Flow chart

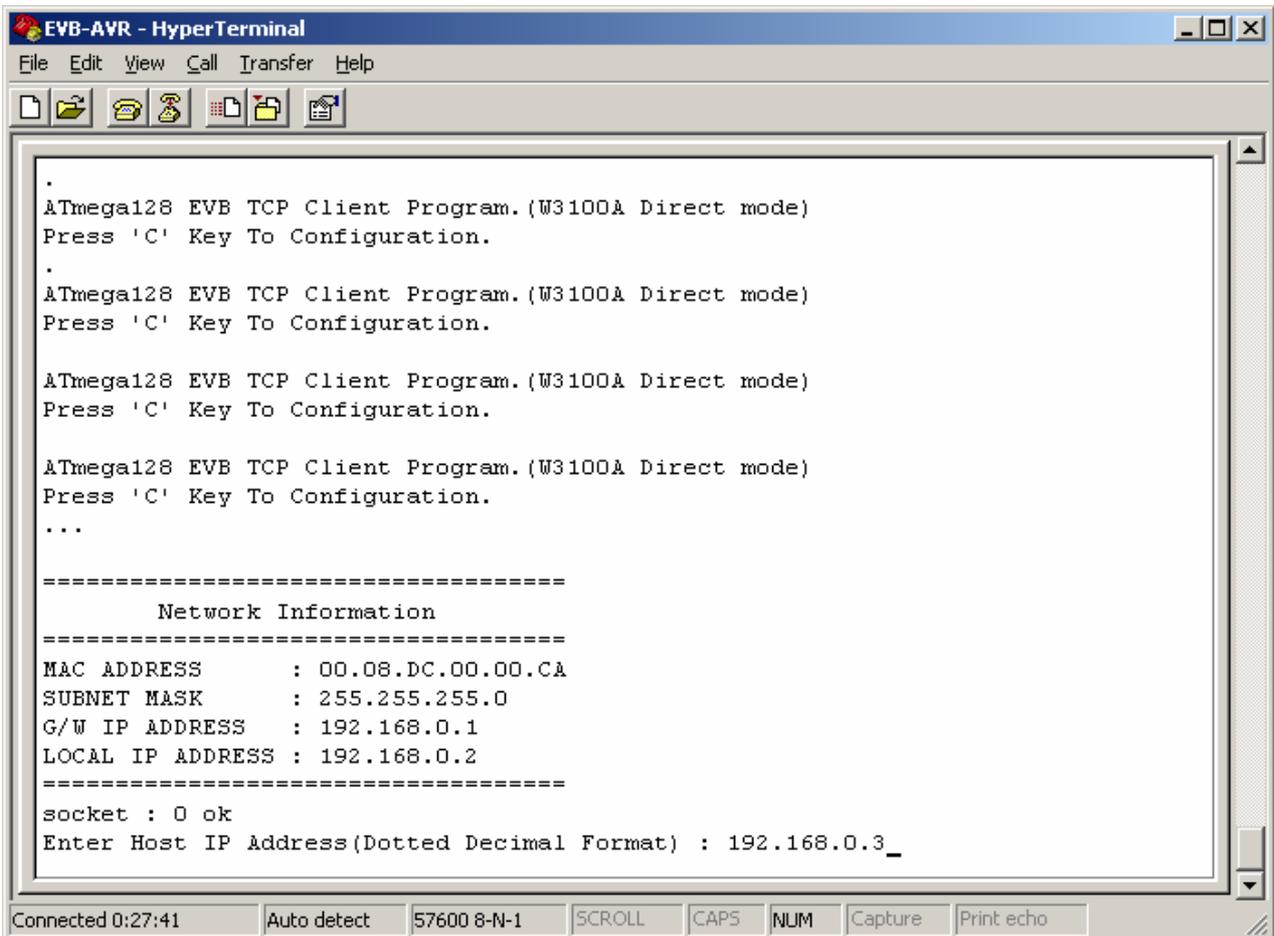


4.2.2. Make a TEST

- 1) Run "AX1.exe" at PC's side, and Click Menu>TCP>Listen.
- 2) Input board's Port Address.



- 3) Download "Software/Firmware/lb_tcp_client/lb_tcpc.hex", reset EVB.



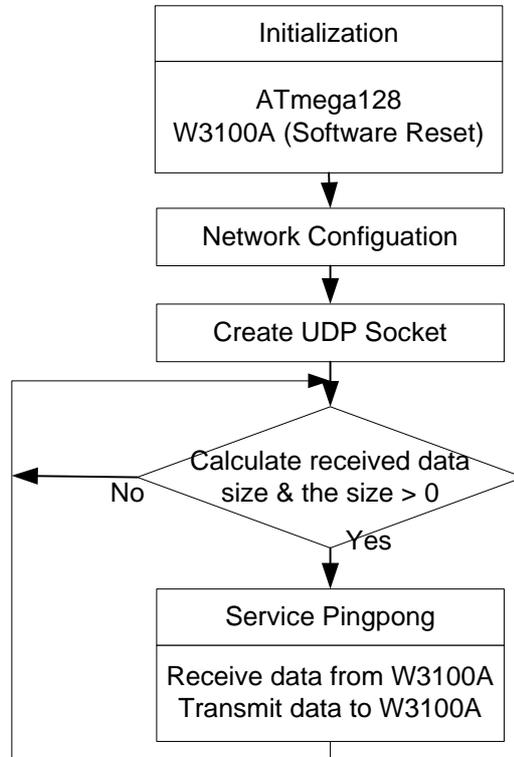
- 4) Enter PC's IP Address. The "Connected" message box is displayed :



- 5) Click Menu>TCP>Send. And Select file, and click "OK".

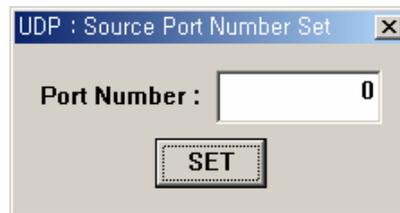
4.3. UDP Mode

4.3.1. Flow chart

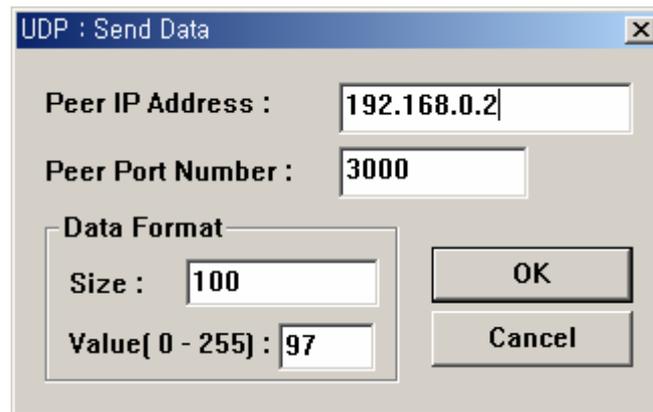


4.3.2. Make a TEST

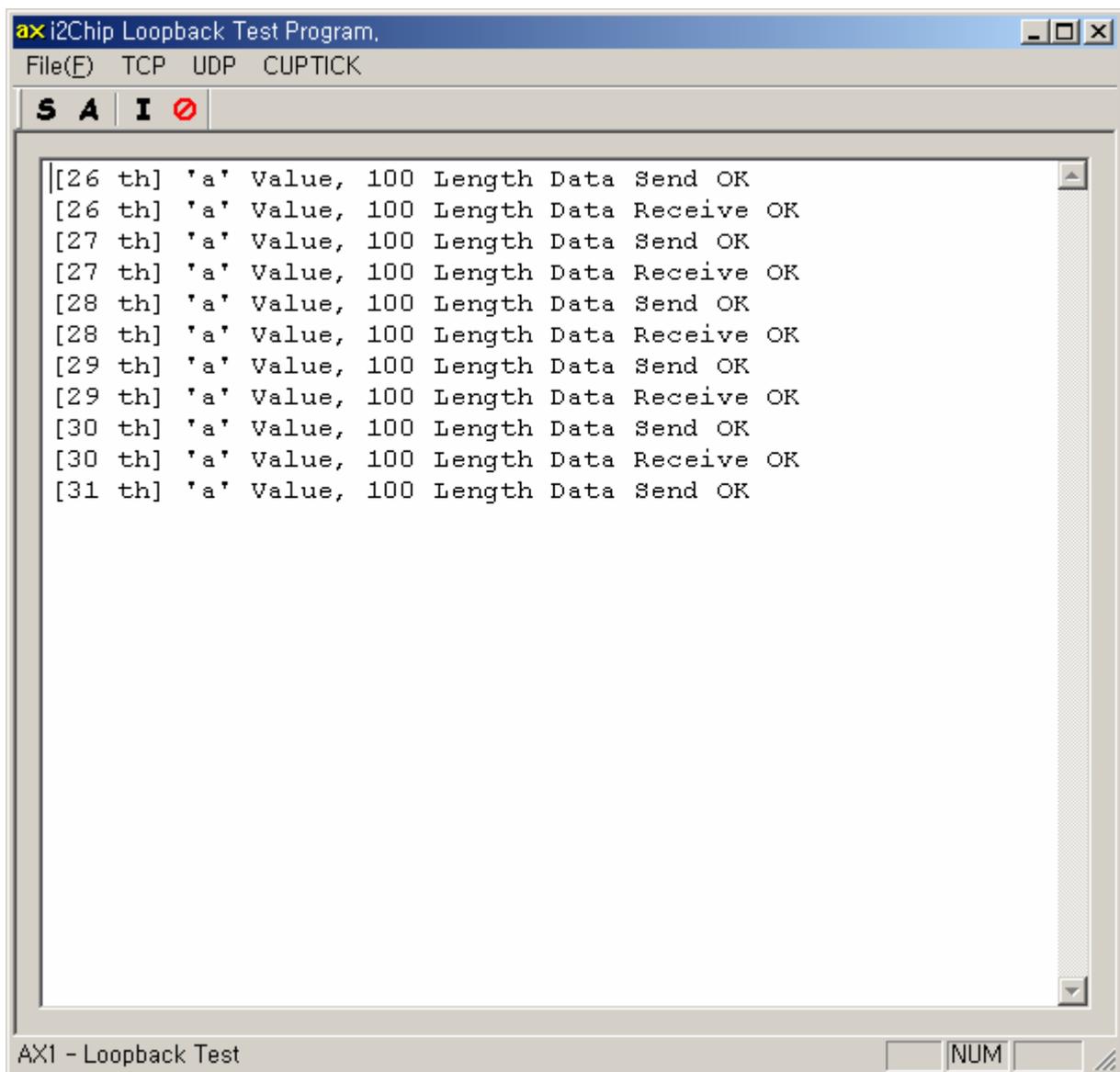
- 1) Download "Software/Firmware/lb_udp/lb_udp.hex", and reset EVB.
- 2) Run "AX1.exe" at PC's side, and Click Menu>UDP>Open.
- 3) Input board's Port Address. And click "set"



- 4) Click Menu>UDP>Send, and Enter Peer IP Address, port number, data size and value for UDP loopback test of EVB.



5) Click "OK"



5. DHCP(Dynamic Host Configuration Protocol)

This sample is DHCP Client.

Figure 5-1 illustrates DHCP processing for allocation IP address.

- 1) DHCP client requests IP address.(DHCP Discover)
- 2) DHCP server offers address.(DHCP Offer)
- 3) DHCP client receives offer message, and requests offer address. (DHCP Request)
- 4) DHCP server allocates offered address. (DHCP Acknowledge).

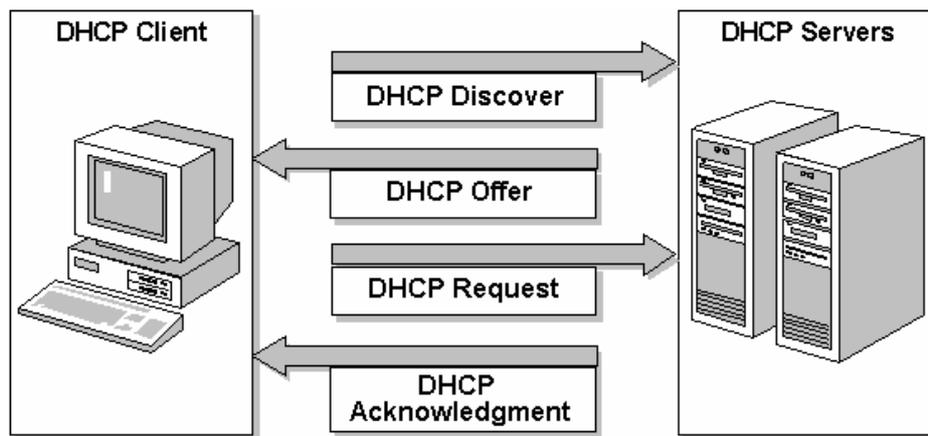
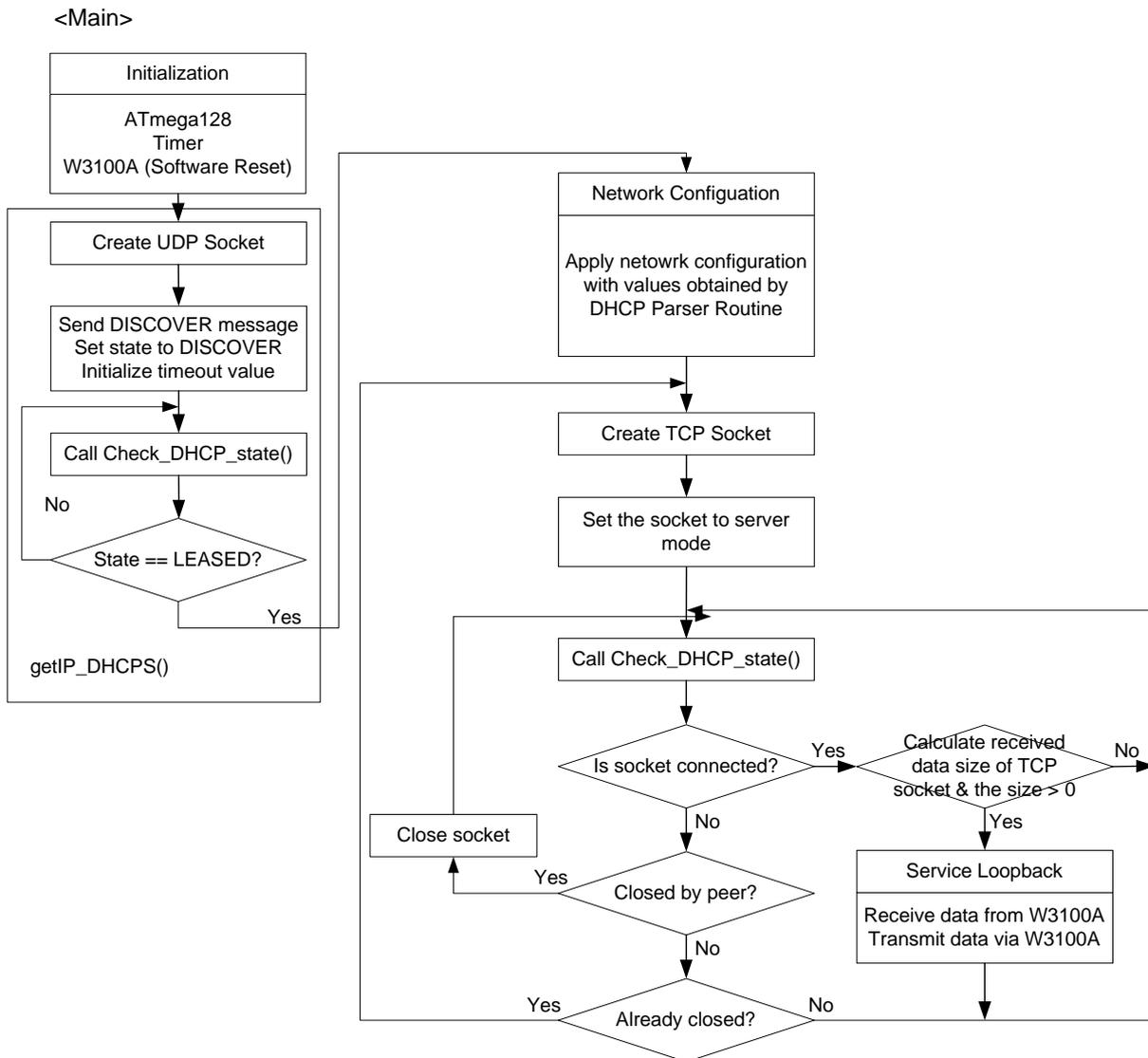


Figure 5-1. DHCP Processing

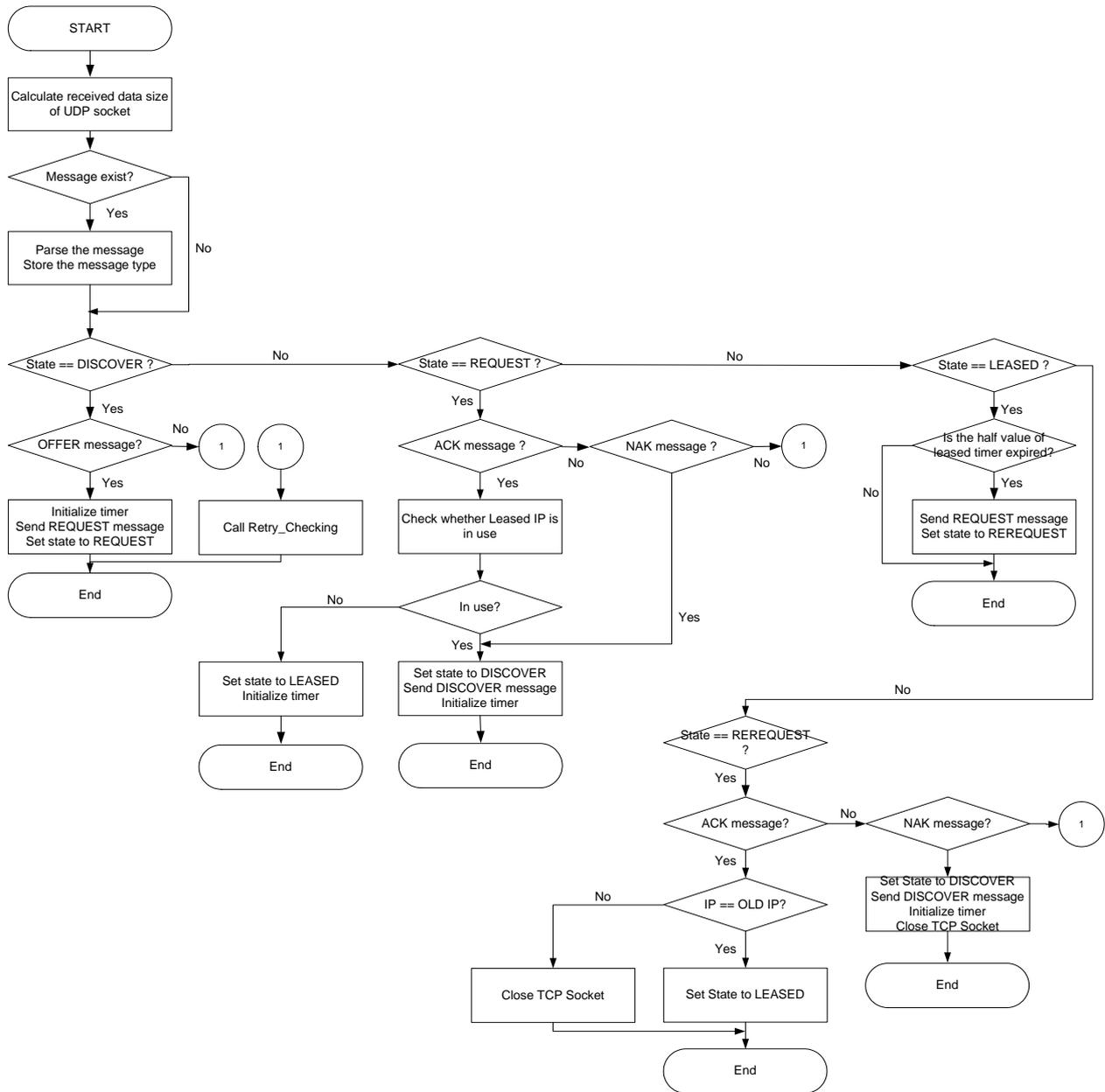
DHCP client functions are implemented in "dhcp.c", and timer related to DHCP functions is implemented in "timer.c".

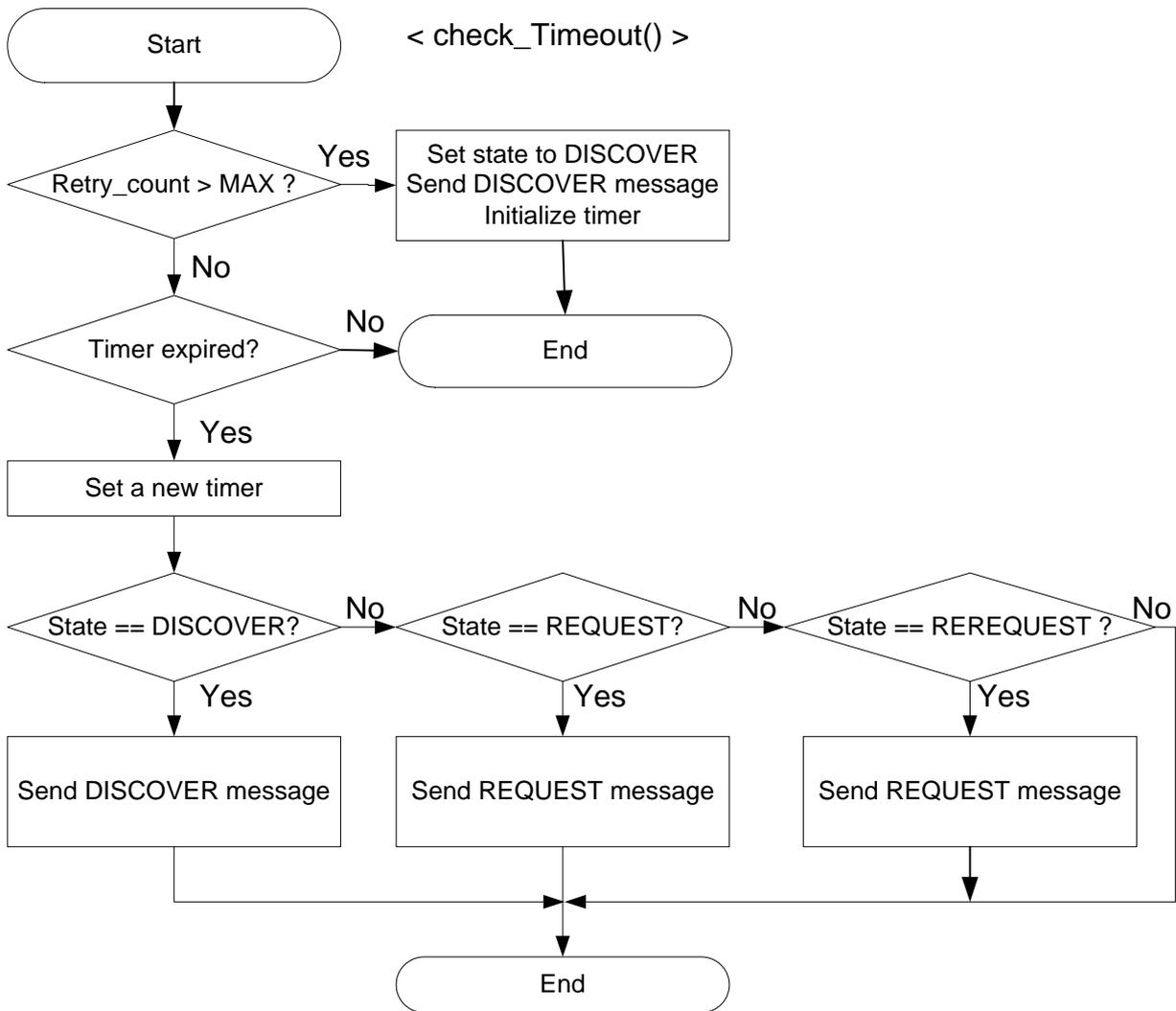
Function	Description
send_DHCP_DISCOVER()	The routine to send DISCOVER message to DHCP server.
send_DHCP_REQUEST()	The routine to send REQUEST message to DHCP server.
send_DHCP_RELEASE()	The routine to send RELEASE message to DHCP server.
getIP_DHCP()	The main routine to lease IP from DHCP Server.
check_DHCP_state()	The routine to check the state of DHCP client and process a reply message from server, send reply message.
set_network()	The routine to set W3100A with the network configuration from DHCP server.
check_Timeout()	The routine to check timer and resend the message.
check_leasedIP()	The routine to check the leased IP from DHCP server.

5.1. Flow Chart



< check_DHCP_state() >

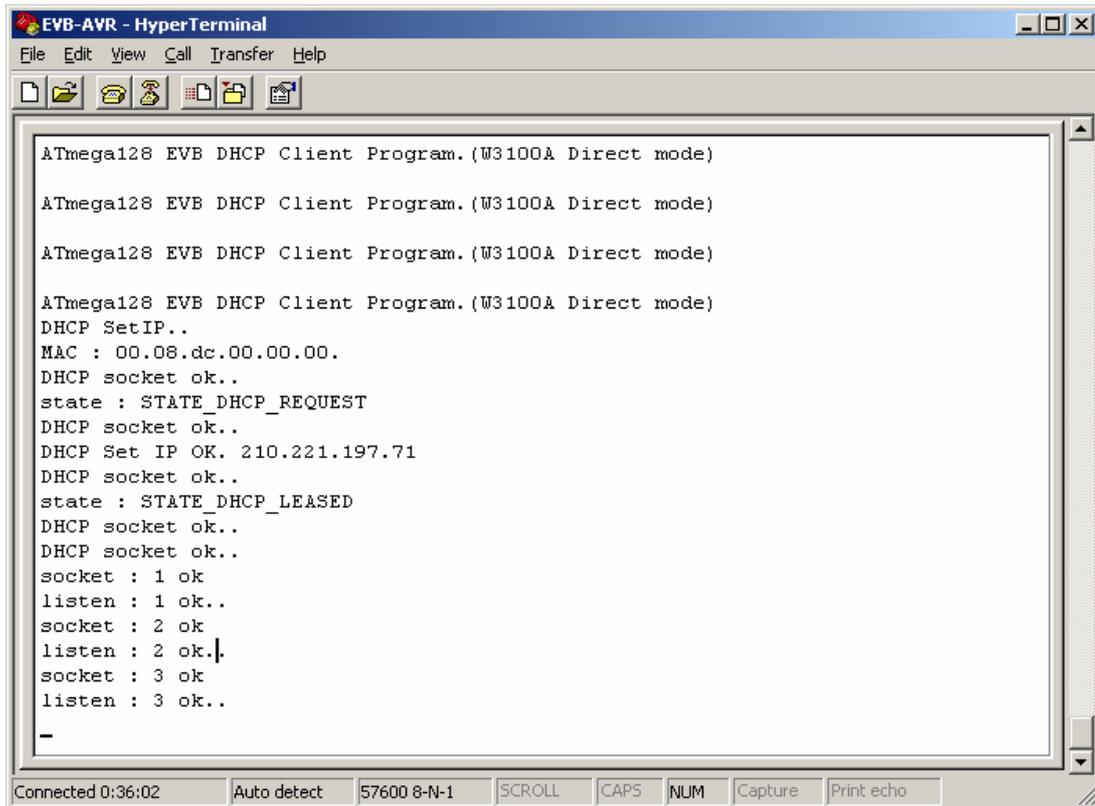




5.2. Make a TEST

- 1) Run DHCP server at your PC or Server.
- 2) Download "Software/Firmware/dhcp/dhcp.hex", and reset EVB.

- 3) If DHCP server is running, EVB receive IP address from DHCP server as follows.



```
ATmega128 EVB DHCP Client Program.(W3100A Direct mode)

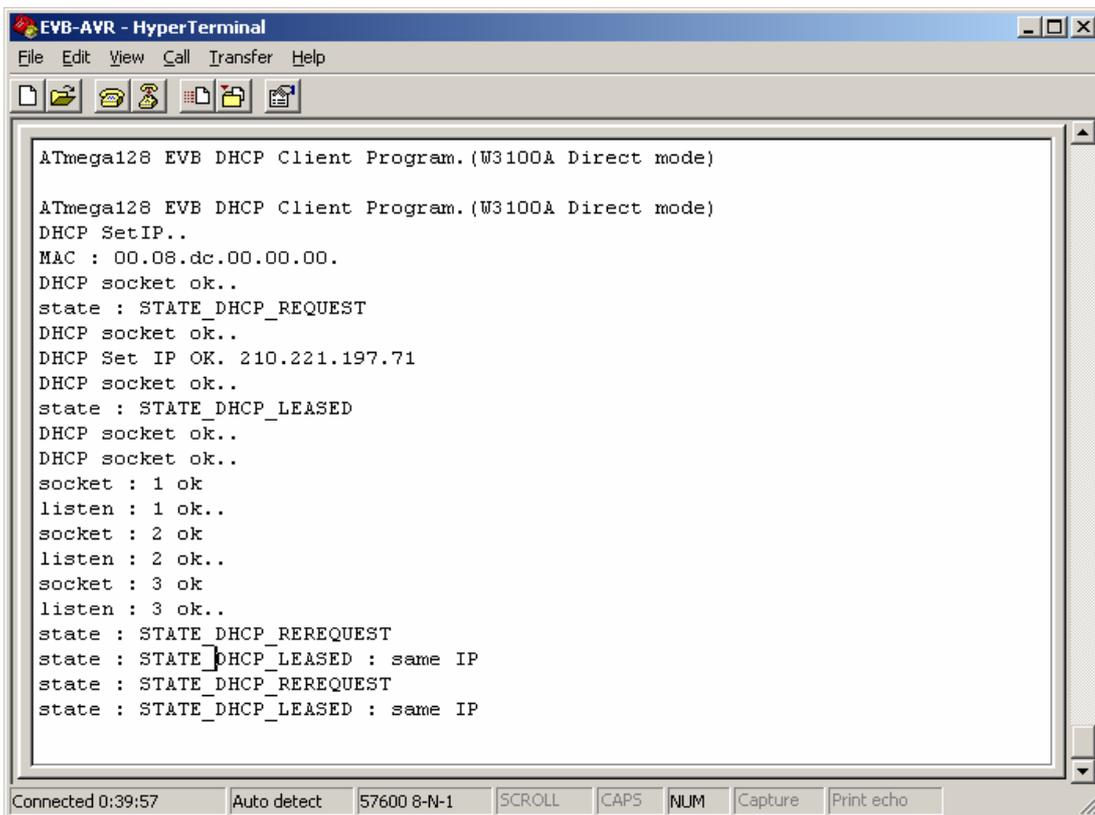
ATmega128 EVB DHCP Client Program.(W3100A Direct mode)

ATmega128 EVB DHCP Client Program.(W3100A Direct mode)

ATmega128 EVB DHCP Client Program.(W3100A Direct mode)
DHCP SetIP..
MAC : 00.08.dc.00.00.00.
DHCP socket ok..
state : STATE_DHCP_REQUEST
DHCP socket ok..
DHCP Set IP OK. 210.221.197.71
DHCP socket ok..
state : STATE_DHCP_LEASED
DHCP socket ok..
DHCP socket ok..
socket : 1 ok
listen : 1 ok..
socket : 2 ok
listen : 2 ok..
socket : 3 ok
listen : 3 ok..
-
```

Connected 0:36:02 Auto detect 57600 8-N-1 SCROLL CAPS NUM Capture Print echo

- 4) After leased time, EVB re-requests IP address to DHCP server.



```
ATmega128 EVB DHCP Client Program.(W3100A Direct mode)

ATmega128 EVB DHCP Client Program.(W3100A Direct mode)
DHCP SetIP..
MAC : 00.08.dc.00.00.00.
DHCP socket ok..
state : STATE_DHCP_REQUEST
DHCP socket ok..
DHCP Set IP OK. 210.221.197.71
DHCP socket ok..
state : STATE_DHCP_LEASED
DHCP socket ok..
DHCP socket ok..
socket : 1 ok
listen : 1 ok..
socket : 2 ok
listen : 2 ok..
socket : 3 ok
listen : 3 ok..
state : STATE_DHCP_REREQUEST
state : STATE_DHCP_LEASED : same IP
state : STATE_DHCP_REREQUEST
state : STATE_DHCP_LEASED : same IP
```

Connected 0:39:57 Auto detect 57600 8-N-1 SCROLL CAPS NUM Capture Print echo

6. HTTPD

This sample program is web server program having ROM File System for HTML Page.

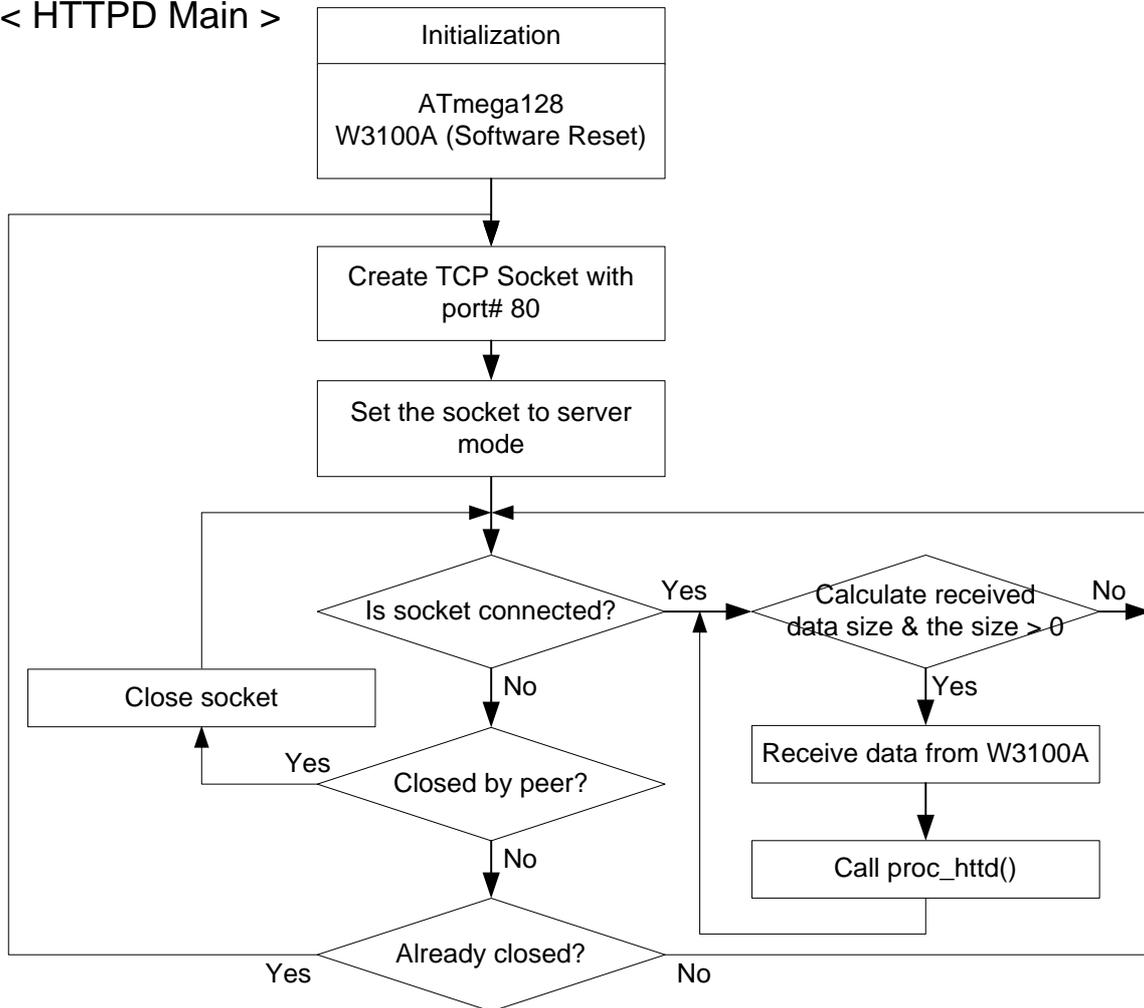
HTML pages are located in httpd_fs directory.

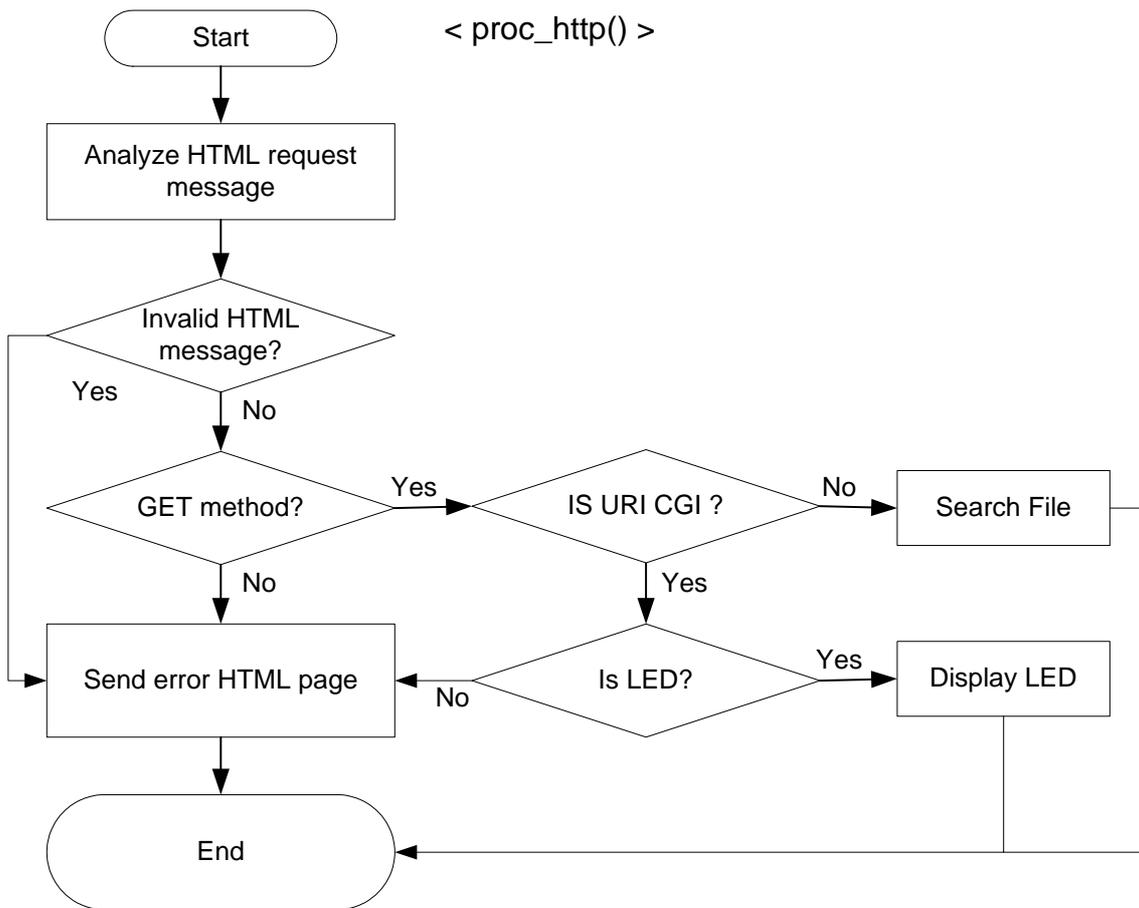
HTTP Server functions are implemented in "httpd.c", and "romfs.h" created by "HTMLMaker.exe" is ROM file system.

Function	Description
Proc_http()	The main routine to parse the request message from Browser
make_head()	The routine to make HTTP header.
parse_request()	The routine to parse the HTTP header from Browser.
find_type()	The routine to process the type of URI.
search_file()	The routine to search the requested file in Rom File System

6.1. Flow Chart

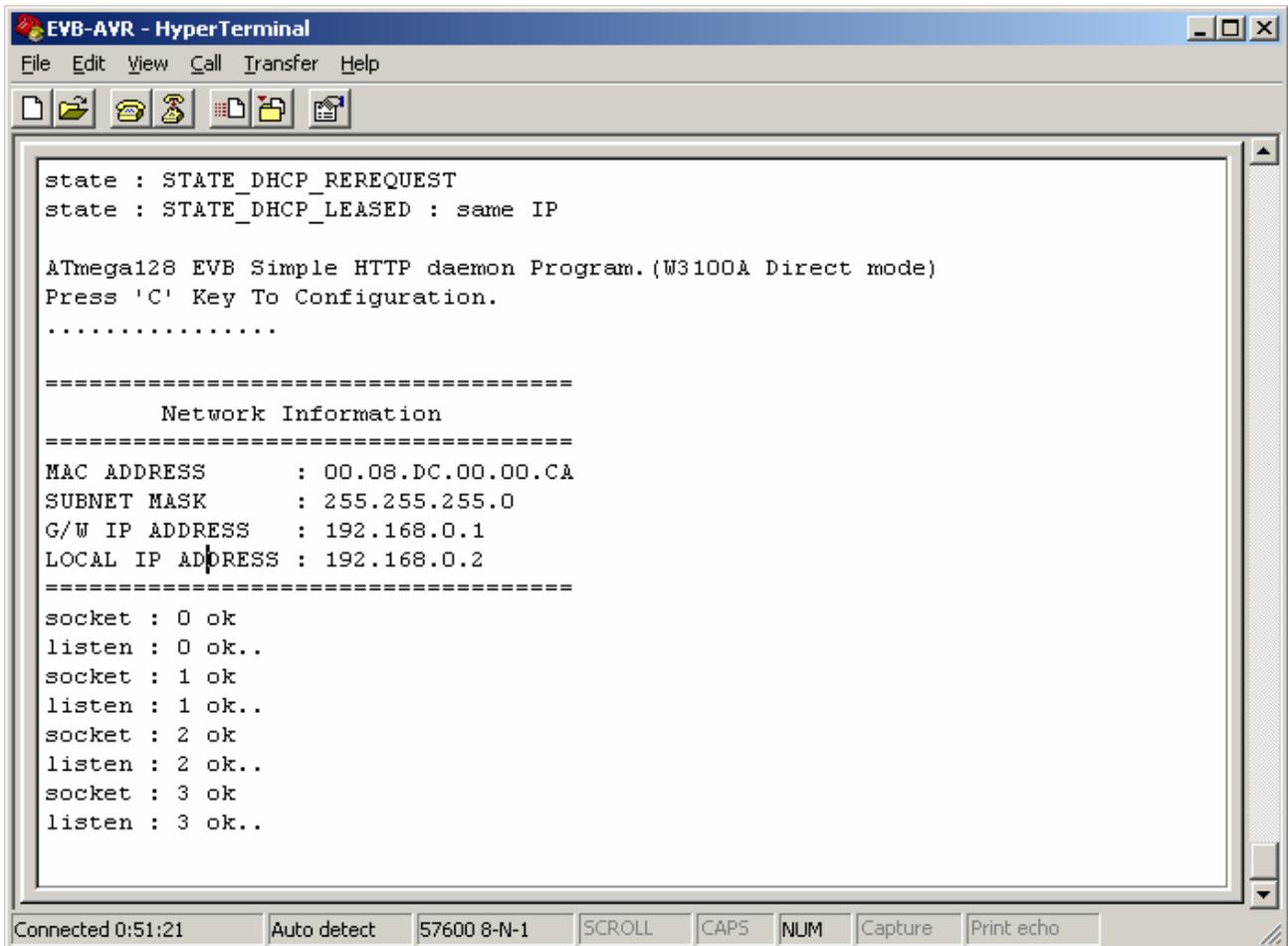
< HTTPD Main >





6.2. Make a TEST

- 1) Download "Software/Firmware/httpd_fs/httpd.hex", and reset EVB.



```
EVB-AVR - HyperTerminal
File Edit View Call Transfer Help
state : STATE_DHCP_REREQUEST
state : STATE_DHCP_LEASED : same IP

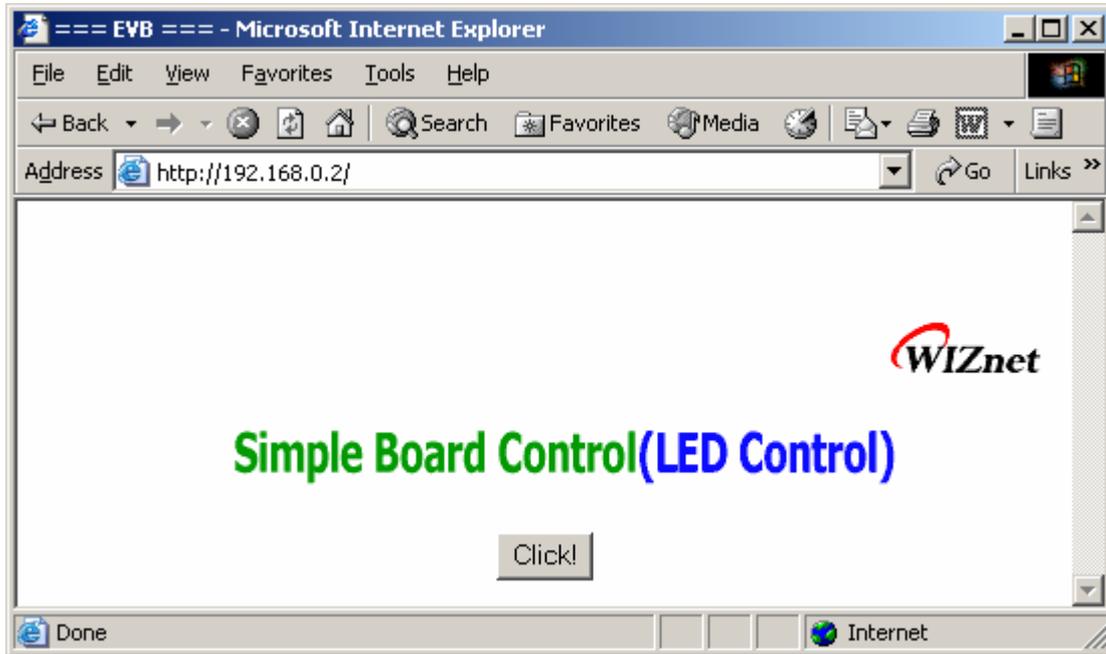
ATmega128 EVB Simple HTTP daemon Program.(W3100A Direct mode)
Press 'C' Key To Configuration.
.....

=====
Network Information
=====
MAC ADDRESS      : 00.08.DC.00.00.CA
SUBNET MASK      : 255.255.255.0
G/W IP ADDRESS   : 192.168.0.1
LOCAL IP ADDRESS : 192.168.0.2
=====

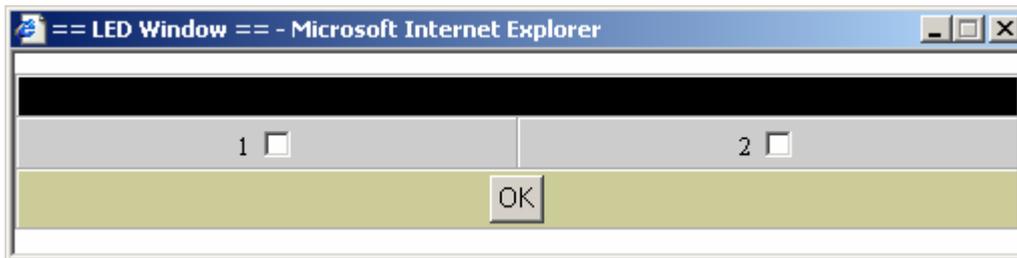
socket : 0 ok
listen : 0 ok..
socket : 1 ok
listen : 1 ok..
socket : 2 ok
listen : 2 ok..
socket : 3 ok
listen : 3 ok..

Connected 0:51:21  Auto detect  57600 8-N-1  SCROLL  CAPS  NUM  Capture  Print echo
```

- 2) Run "Internet explore.exe", and enter "192.168.0.2"



- 3) Click "Click!" button. And new window is displayed :



- 4) Check "1", "2" or both, and Click "OK". The message is displayed :



- 5) EVB's LED turns on/off as you selected.

7. FTP

FTP is file transfer protocol via Internet. We supply two mode, one is ftp server and the other is ftp client.

7.1. FTP Server

This sample is FTP server that receives connection request from ftp client and send/receive file. It has no file system, received file send through serial interface.

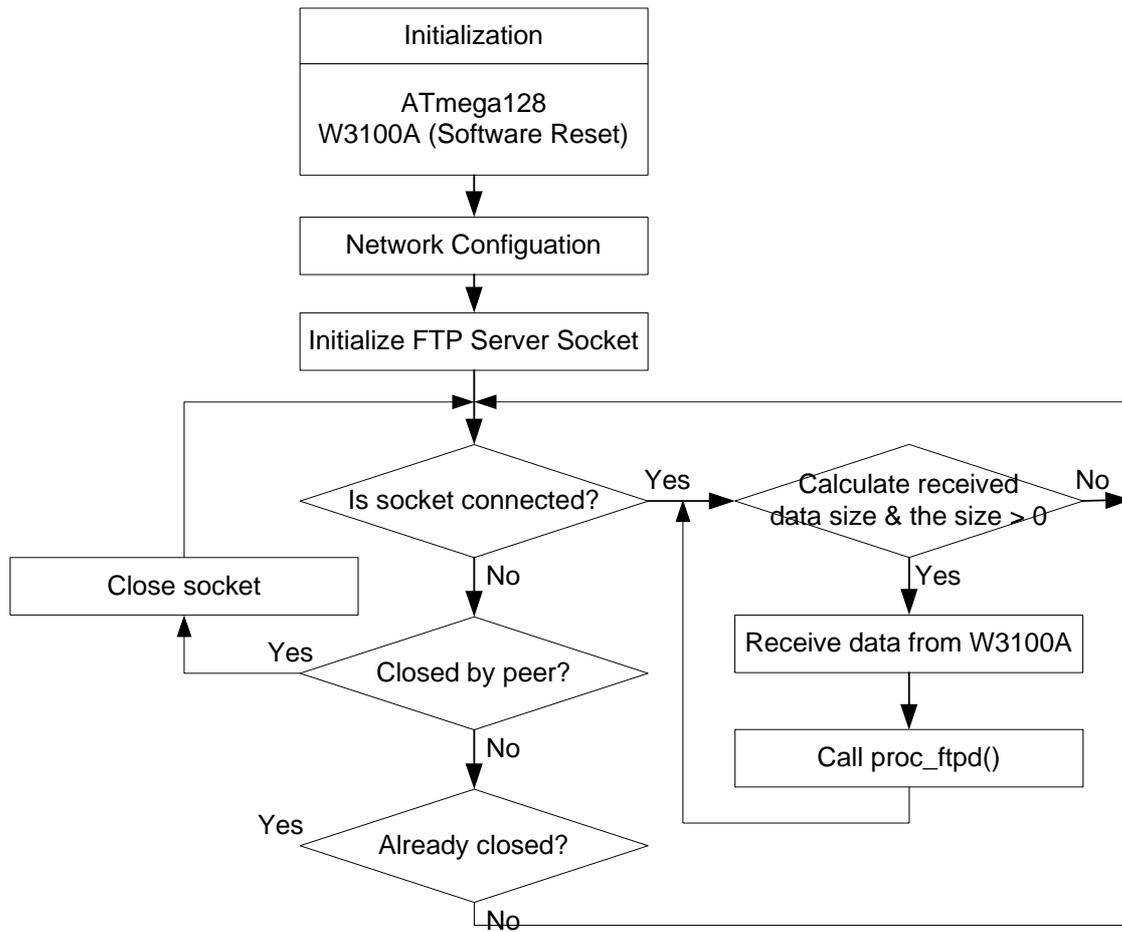
FTP Server functions are implemented in "ftpd.c".

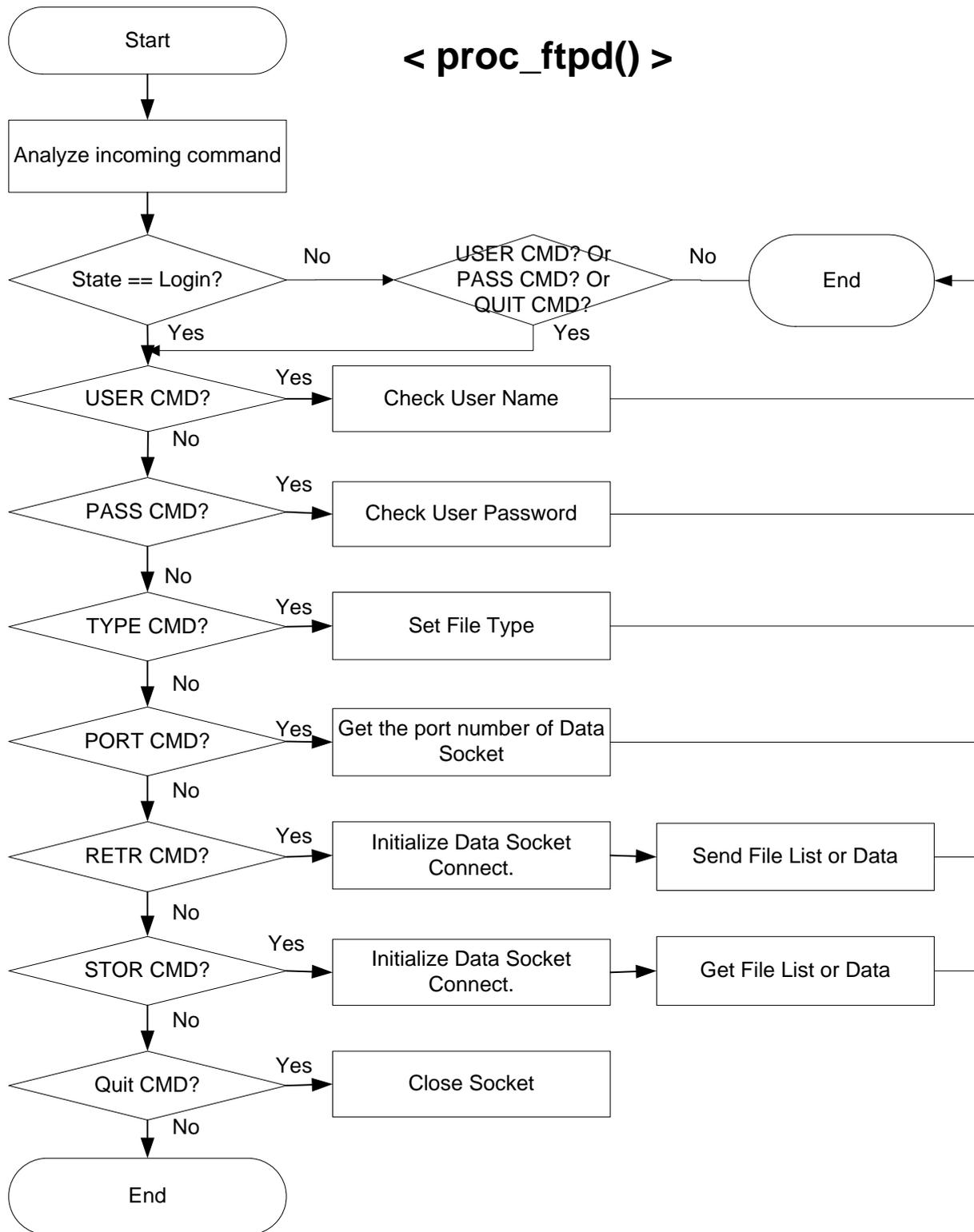
Function	Description
proc_ftpd()	The main routine to process the command and data from client.
ftplgin()	The routine to process the FTP login.
pport()	The routine to process the PORT command.
sendit()	The routine to send data to client.
recvit()	The routine to receive data from client.
sendfile()	The routine to send file.
Recvfile()	The routine to receive file.

Supported command as follow.

Command	Description
User	The command to login using User's ID and password..
Get	The command to get files from user's system.
Mget	The command to get files from user's system.
Put	The command to put files to user's system.
Mput	The command to put files to user's system.
Ascii	The command to set ASCII mode.
Binary	The command to set BINARY mode.
Quit	The command to quit.

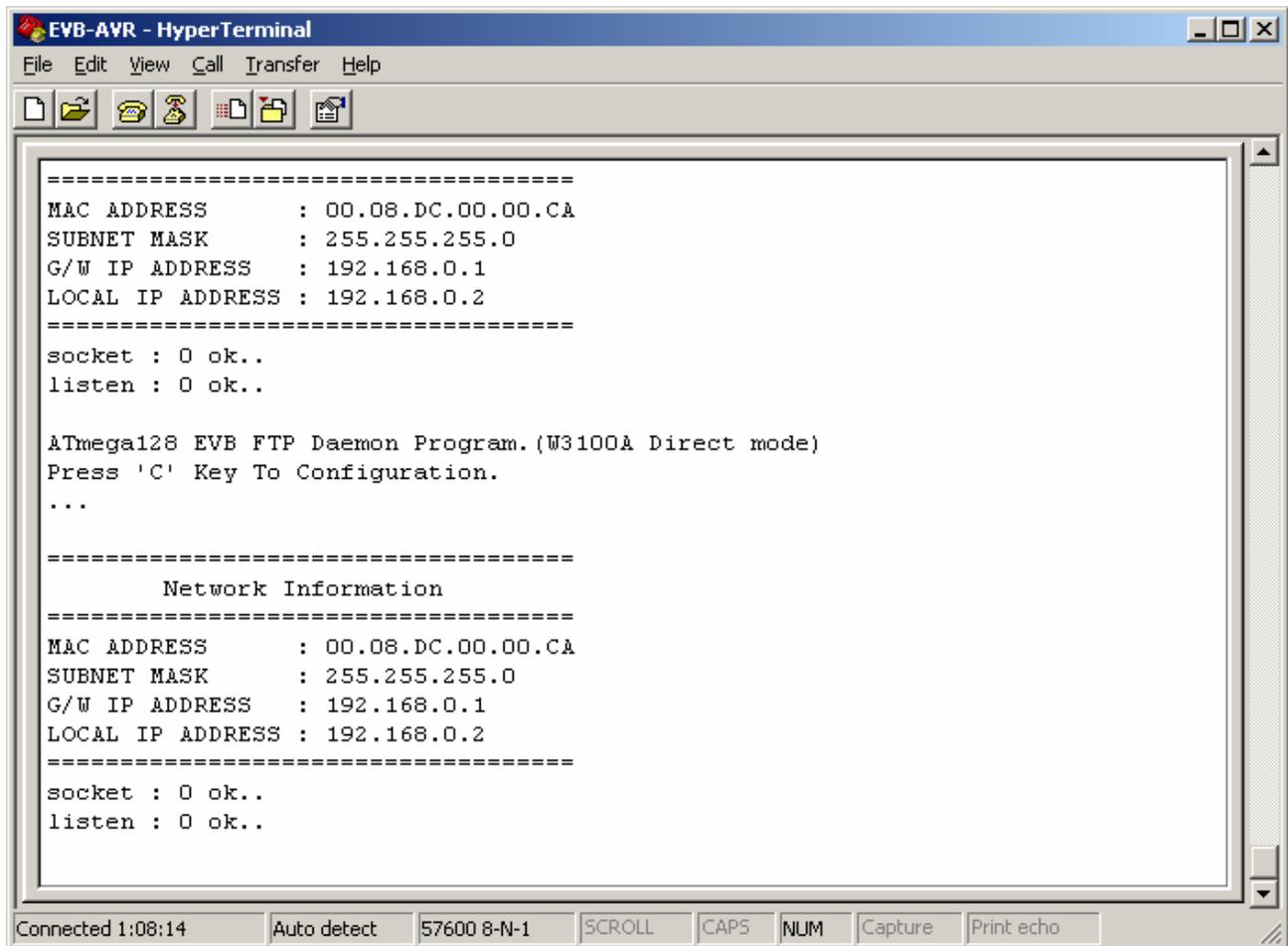
7.1.1. Flow Chart





7.1.2. Make a TEST

- 1) Download "Software/Firmware/ftpd/ftpd.hex", and reset EVB.



The screenshot shows a HyperTerminal window titled "EVB-AVR - HyperTerminal". The window contains the following text:

```
=====
MAC ADDRESS      : 00.08.DC.00.00.CA
SUBNET MASK      : 255.255.255.0
G/W IP ADDRESS   : 192.168.0.1
LOCAL IP ADDRESS : 192.168.0.2
=====
socket : 0 ok..
listen : 0 ok..

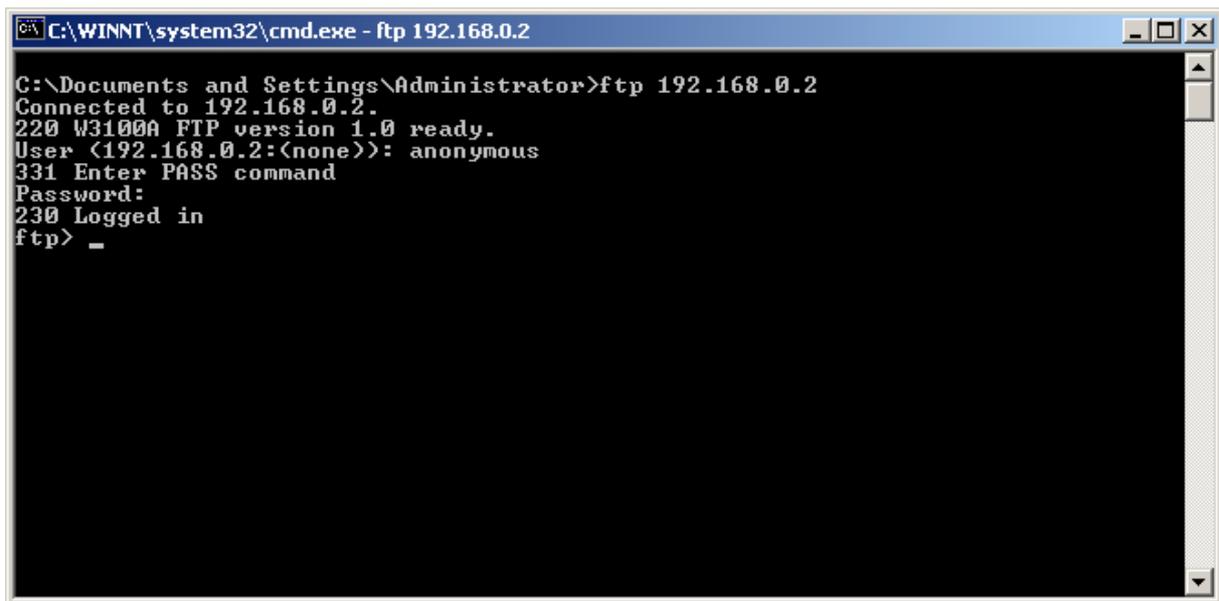
ATmega128 EVB FTP Daemon Program. (W3100A Direct mode)
Press 'C' Key To Configuration.
...

=====
Network Information
=====
MAC ADDRESS      : 00.08.DC.00.00.CA
SUBNET MASK      : 255.255.255.0
G/W IP ADDRESS   : 192.168.0.1
LOCAL IP ADDRESS : 192.168.0.2
=====
socket : 0 ok..
listen : 0 ok..
```

At the bottom of the window, there is a status bar with the following information: Connected 1:08:14, Auto detect, 57600 8-N-1, SCROLL, CAPS, NUM, Capture, Print echo.

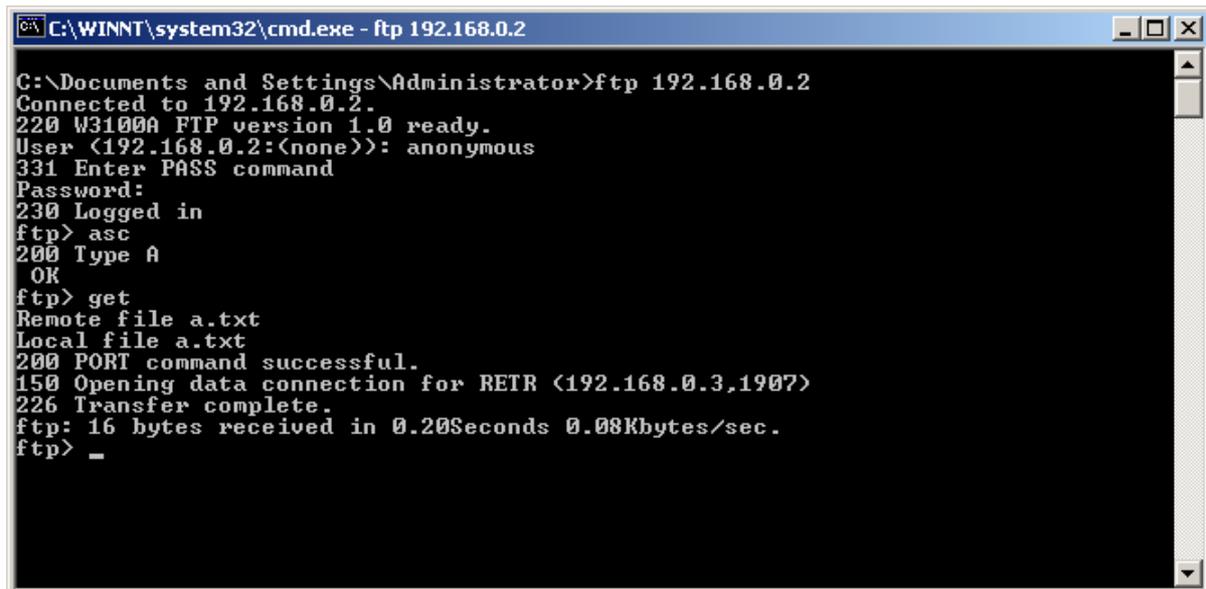
- 2) Run "Start>Run>cmd.exe", and enter "ftp 192.168.0.2".

(This sample has no authentication, so any User ID/Password is accepted.)



```
C:\WINNT\system32\cmd.exe - ftp 192.168.0.2
C:\Documents and Settings\Administrator>ftp 192.168.0.2
Connected to 192.168.0.2.
220 W3100A FTP version 1.0 ready.
User (192.168.0.2:(none)): anonymous
331 Enter PASS command
Password:
230 Logged in
ftp> _
```

- 3) Download "a.txt" to EVB. First run "asc" to change ascii mode.
- 4) Run "get" to download, and enter "a.txt" to Remote file and Local file.



```
C:\WINNT\system32\cmd.exe - ftp 192.168.0.2
C:\Documents and Settings\Administrator>ftp 192.168.0.2
Connected to 192.168.0.2.
220 W3100A FTP version 1.0 ready.
User (192.168.0.2:(none)): anonymous
331 Enter PASS command
Password:
230 Logged in
ftp> asc
200 Type A
OK
ftp> get
Remote file a.txt
Local file a.txt
200 PORT command successful.
150 Opening data connection for RETR (192.168.0.3,1907)
226 Transfer complete.
ftp: 16 bytes received in 0.20Seconds 0.08Kbytes/sec.
ftp> _
```

```
ATmega128 EVB FTP Daemon Program.(W3100A Direct mode)
Press 'C' Key To Configuration.
...
=====
                Network Information
=====
MAC ADDRESS      : 00.08.DC.00.00.CA
SUBNET MASK      : 255.255.255.0
G/W IP ADDRESS   : 192.168.0.1
LOCAL IP ADDRESS : 192.168.0.2
=====
socket : 0 ok..
listen : 0 ok..
connected : 0
USER_CMD : anonymous
anonymous
  logged in
PORT_CMD |
ip : 192.168.0.3, port : 1907
RETR_CMD
socket : 1 ok..
this is a test
-

```

Connected 1:09:52 Auto detect 57600 8-N-1 SCROLL CAPS NUM Capture Print echo

5) Complete download "a.txt". Check your PC.

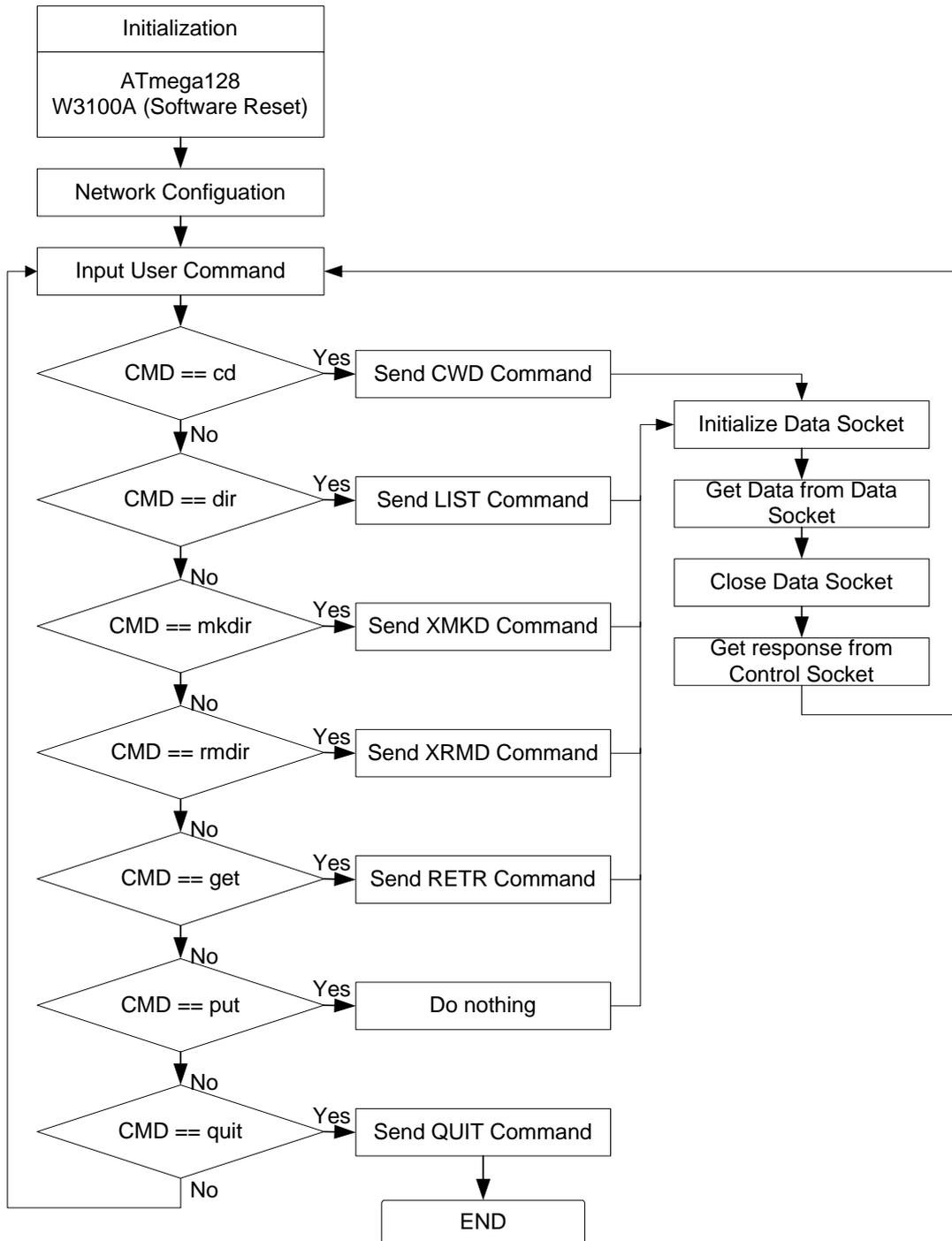
7.2. FTP Client

This sample is connected to FTP server, and receives or sends file.

FTP client functions are implemented in "ftpc.c", "ftpc.h".

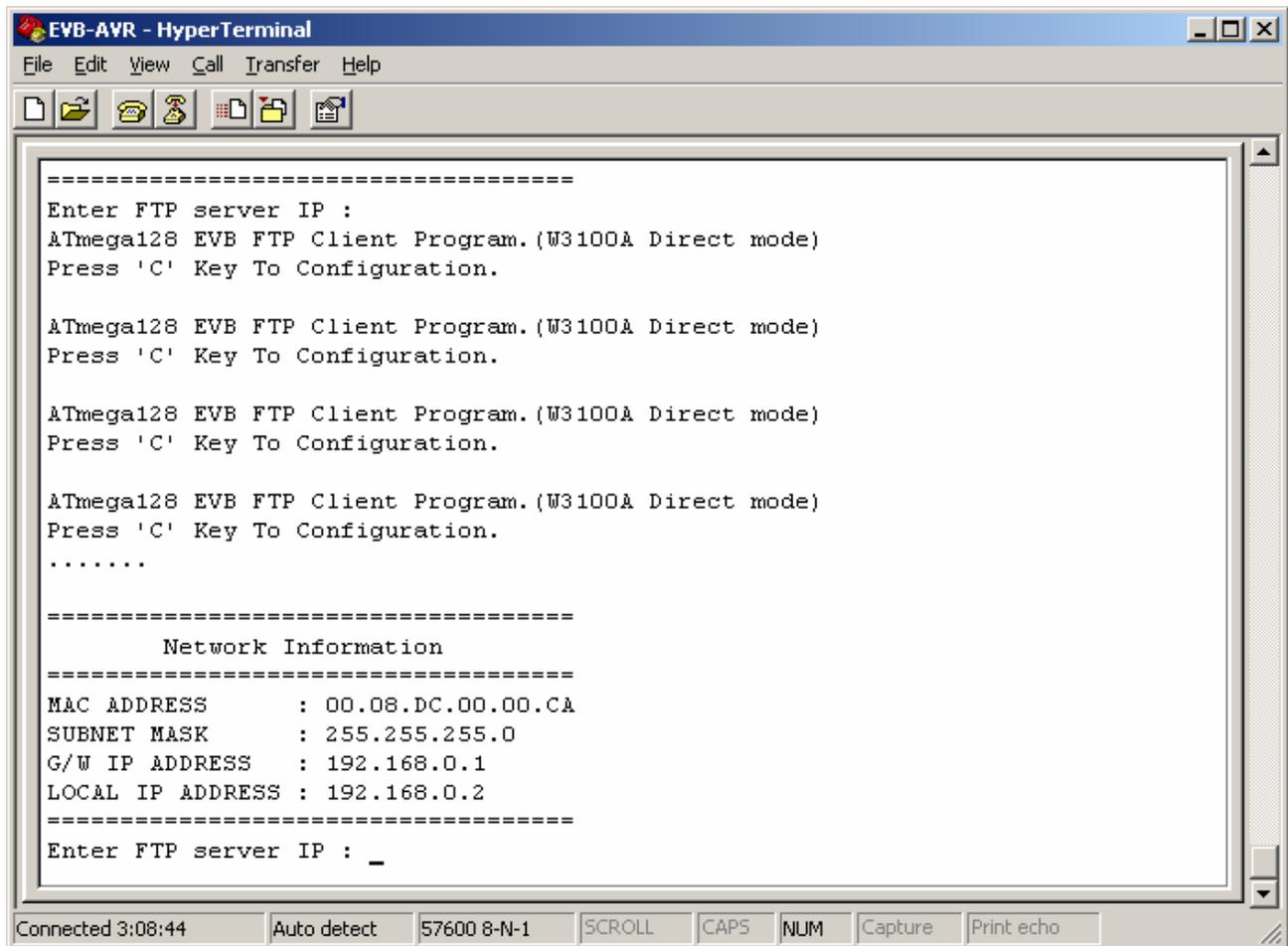
Function	Description
cmdparse()	The routine to parse user's command.
donothing()	The routine to do nothing after parsing.
doascii()	The routine to set ASCII mode.
dobinary()	The routine to set BINARY mode.
doftpcd()	The routine to send the information of current directory.
doget()	The routine to get files from server.
dolist()	The routine to get the file list.
dols()	The routine to get the file list.
domkdir()	The routine to make new directory.
domget()	The routine to get files from server.
doquit()	The routine to quit.
dormdir()	The routine to delete the directory in server.
sendport()	The routine to set the port of data socket.
getsub()	The routine to process the data socket.
makeip()	The routine to make the IP string.
getresp()	The routine to process the reply message from server.
recvfile()	The routine to receive files from server.

7.2.1. Flow Chart



7.2.2. Make a TEST

- 1) Download "Software/Firmware/ftpd/ftpd.hex", and reset EVB.



The screenshot shows a HyperTerminal window titled "EVB-AVR - HyperTerminal". The window contains the following text:

```
=====
Enter FTP server IP :
ATmega128 EVB FTP Client Program.(W3100A Direct mode)
Press 'C' Key To Configuration.

ATmega128 EVB FTP Client Program.(W3100A Direct mode)
Press 'C' Key To Configuration.

ATmega128 EVB FTP Client Program.(W3100A Direct mode)
Press 'C' Key To Configuration.

ATmega128 EVB FTP Client Program.(W3100A Direct mode)
Press 'C' Key To Configuration.
.....
=====
                Network Information
=====
MAC ADDRESS      : 00.08.DC.00.00.CA
SUBNET MASK      : 255.255.255.0
G/W IP ADDRESS   : 192.168.0.1
LOCAL IP ADDRESS : 192.168.0.2
=====
Enter FTP server IP : _
```

At the bottom of the window, there is a status bar with the following information: Connected 3:08:44, Auto detect, 57600 8-N-1, SCROLL, CAPS, NUM, Capture, Print echo.

- 2) Enter server IP, ID, Passwd.
- 3) Refer to "5.1.2 Make a test" for next step.

8. TelnetD

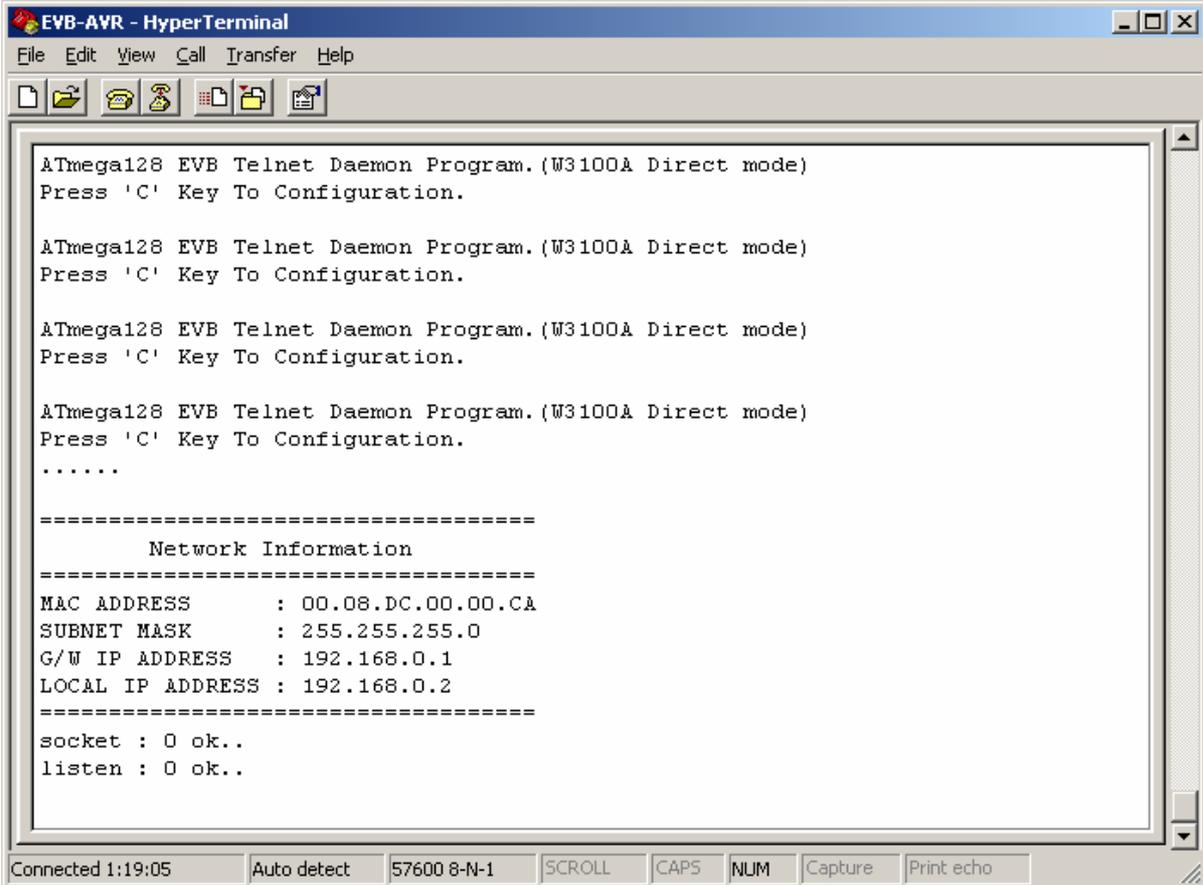
This sample is simple telnet server program.

Telnet functions are implemented in "telnetd.c".

Function	Description
init_telopt()	The routine to initialize telnet option.
tel_input()	The routine to process the request from client
proc_command()	The routine to process the request from user.
willopt()	The routine to process the Will option.
wontopt()	The routine to process Will Not option.
doopt()	The routine to process Do option.
dontopt()	The routine to process Do Not option.
sendIAC()	The routine to process IAC message.

8.1. Make a TEST

- 1) Download "Software/Firmware/telnetd_fs/telnetd.hex", and reset EVB.



```
EVB-AVR - HyperTerminal
File Edit View Call Transfer Help

ATmega128 EVB Telnet Daemon Program. (W3100A Direct mode)
Press 'C' Key To Configuration.

ATmega128 EVB Telnet Daemon Program. (W3100A Direct mode)
Press 'C' Key To Configuration.

ATmega128 EVB Telnet Daemon Program. (W3100A Direct mode)
Press 'C' Key To Configuration.

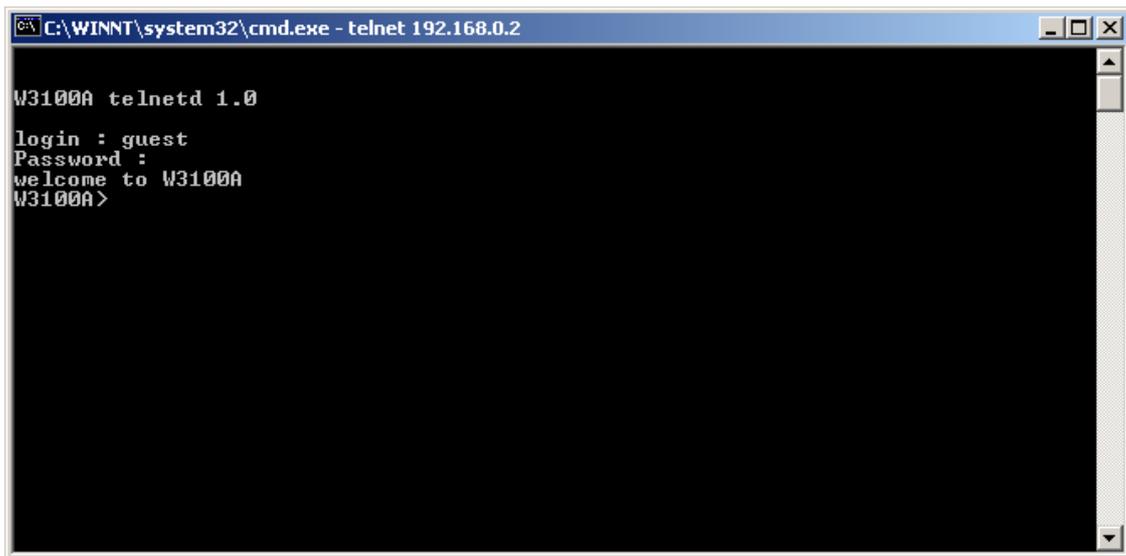
ATmega128 EVB Telnet Daemon Program. (W3100A Direct mode)
Press 'C' Key To Configuration.
.....

=====
Network Information
=====
MAC ADDRESS      : 00.08.DC.00.00.CA
SUBNET MASK      : 255.255.255.0
G/W IP ADDRESS   : 192.168.0.1
LOCAL IP ADDRESS : 192.168.0.2
=====
socket : 0 ok..
listen : 0 ok..

Connected 1:19:05  Auto detect  57600 8-N-1  SCROLL  CAPS  NUM  Capture  Print echo
```

- 2) Run "Start>Run>cmd.exe", and enter "telnet 192.168.0.2".

(This sample has no authentication, so any User ID/Password is accepted.)

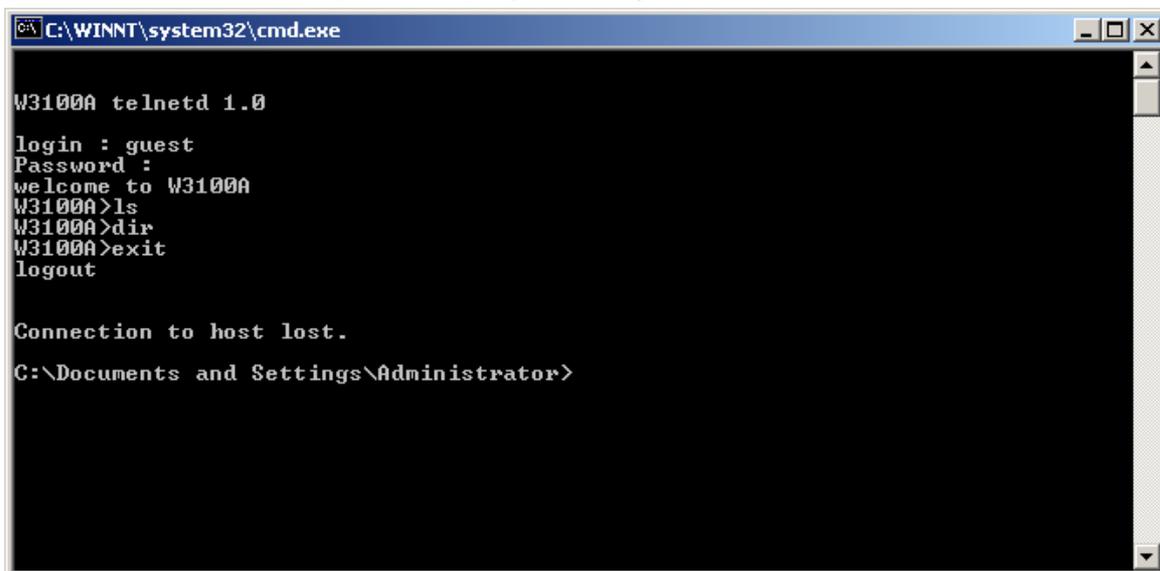


```
C:\WINNT\system32\cmd.exe - telnet 192.168.0.2

W3100A telnetd 1.0

login : guest
Password :
welcome to W3100A
W3100A>
```

3) Run "ls" ,"dir" ,"exit". (This sample just recognize command, but it has no action.)



```
C:\WINNT\system32\cmd.exe

W3100A telnetd 1.0

login : guest
Password :
welcome to W3100A
W3100A>ls
W3100A>dir
W3100A>exit
logout

Connection to host lost.
C:\Documents and Settings\Administrator>
```

```
EV8-AVR - HyperTerminal
File Edit View Call Transfer Help
[Icons]
Network Information
=====
MAC ADDRESS      : 00.08.DC.00.00.CA
SUBNET MASK      : 255.255.255.0
G/W IP ADDRESS   : 192.168.0.1
LOCAL IP ADDRESS : 192.168.0.2
=====
socket : 0 ok..
listen : 0 ok..
connected : 0
sent: will Echo
recv: do Echo
guest

ls
LS_CMD      |
dir
DIR_CMD
exit
EXIT_CMD
SOCK_CLOSED
socket : 0 ok
listen : 0 ok..
-

Connected 1:21:15  Auto detect  57600 8-N-1  SCROLL  CAPS  NUM  Capture  Print echo
```