W90N745 BSP Quick Start Guide

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1. Introduction of This Document

This document is intent to give a description of BSP installation procedure step by step, and give a brief description of the building procedure of each software project. There are other documents in BSP CD which give further information on each topic.

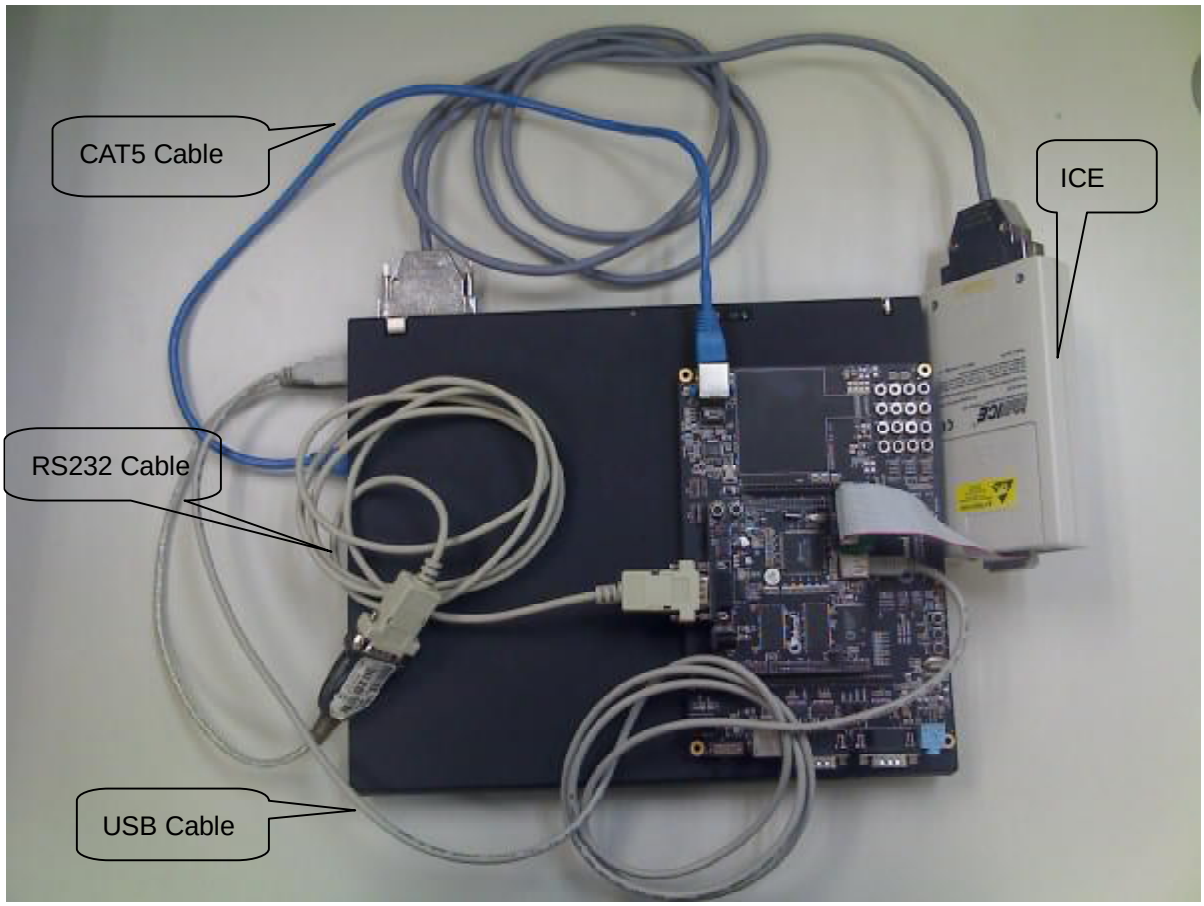
2. System Requirement

To build uClinux kernel and application, Linux environment with a RedHat 6.x or higher version of Linux installed host computer with at least 800 MB free disk space is required. Sometimes environment variable and ownership of installed files/directories needs to be changed manually if using other Linux distribution.

To build the bootloader or Non-OS demo code, Windows NT/XP with ADS 1.2 installed host computer with at least 300 MB free disk space is required.

3. Hardware Connection

To set up the test environment, UART0 on target board must connect with a COM port on a computer via RS232 cable. This is the basic communication channel between bootloader and host computer. It can be used to read/write SDRAM on board and read/write register of W90N745, load data to NOR flash or SDRAM, and it can also be used by user application to dump debug message to host computer.
Upload image to target board via RS232 will take minutes if the code size grows bigger. Upload data to target board via USB or Ethernet will be much desirable in this case. USB cable should connect between host computer's USB host port and target board's USB device port. CAT5 cable should connect between the RJ45 jacks of host computer and target board.
If a debugger is used during debugging, an ICE should connect between target board and host computer. Following picture shows an evaluation board connecting to a laptop computer with RS232 cable, CAT5 cable, USB cable and ICE.



4. uClinux BSP Installation Procedure

The BSP CD contains two directories. Hardware directory contains the datasheets and schematics. And the other directory, software, contains a tar ball of bootloader and uClinux source code and relevant documents. The naming of this tar ball is defined as followed: <IC name>BSP<Release date>_<Platform>.tar.gz, where IC name is W90N745, release date is in mmddyyyy format, and platform could be ether EVB for evaluation board or POS for POS-TAX demo board. The content of this tar ball is listed below.

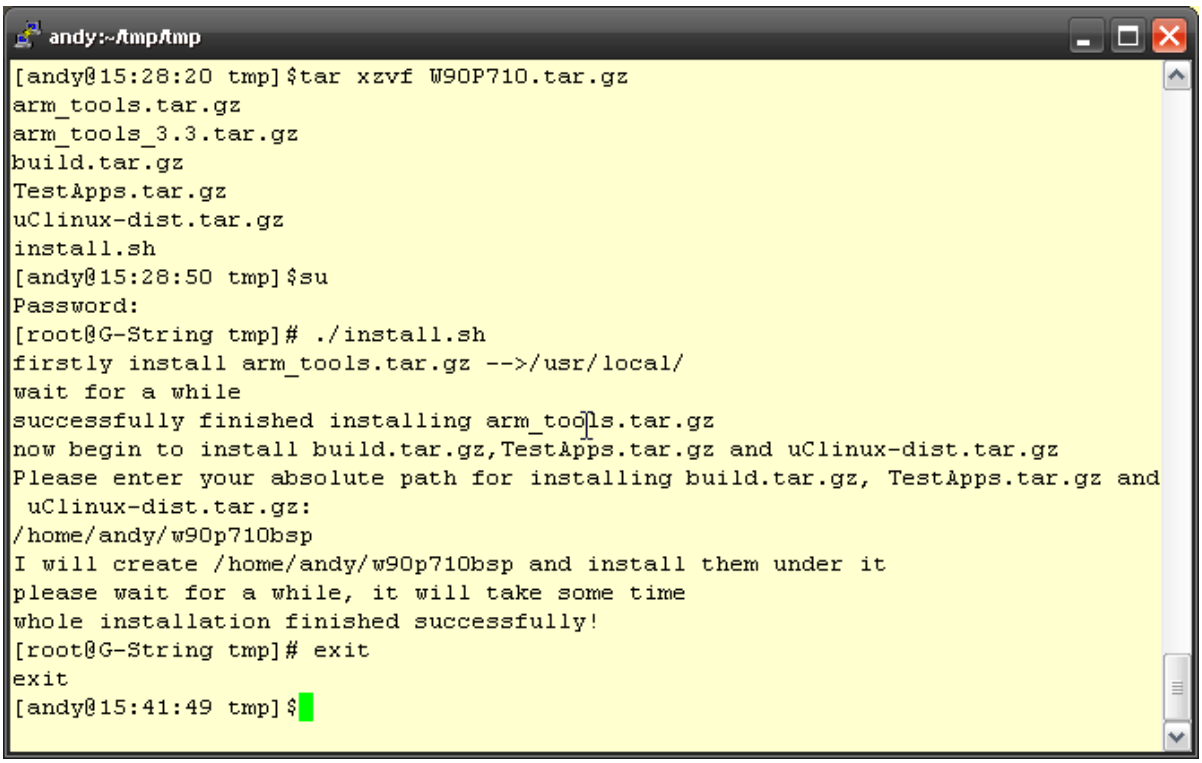
File name	Description
/	
Release note.pdf	W90N745 BSP Release Note
/BSP	
W90N745.tar.gz	uClinux kernel source code and demo applications
/bootloader	
usb_driver/setup_pro	Magic terminal and xusb

1.0.exe	
usb_driver/setup_usb.exe	USB device driver for Windows
updater_usb.bin	Binary code for update bootloader with USB support.
updater_usb.axf	Same as above but in axf format. Needs to be loaded and executed with ICE and AxD
updater_mac.bin	Binary code for update bootloader with MAC support
updater_mac.axf	Same as above but in axf format. Needs to be loaded and executed with ICE and AxD
init.axf	System initialization code. AxD could lode and execute this file to initialize a target board without effective bootloader in flash.
bootloader.zip	Bootloader source code
/Doc	
W90N745PGV1-0,pdf	W90N745 programming guide
W90N745 uClinux BSP Users Manual.pdf	uClinux BSP user's manual
W90N745 Bootloader Users Manual	Bootlaoder user's manual
Make a Production ROM.pdf	User's manual of mkrom, which is a tool could be used to generate firmware upgrade image or production iamge
Bootloader Source Code Modification Guide.pdf	A document describes how to modify and build bootloader.
W90N745 BSP Quick Start Guide.pdf	This document. Describe the contents of BSP, step by step introduction of BSP installation and building projects in BSP.
/Tools	
mkrom/mkrom.exe	Windows version of mkrom to make production ROM image
mkrom/mkrom.ini	Information file for mkrom.exe
/Self Test*	
pos_self_test.zip	Non-OS POS-TAX self test code

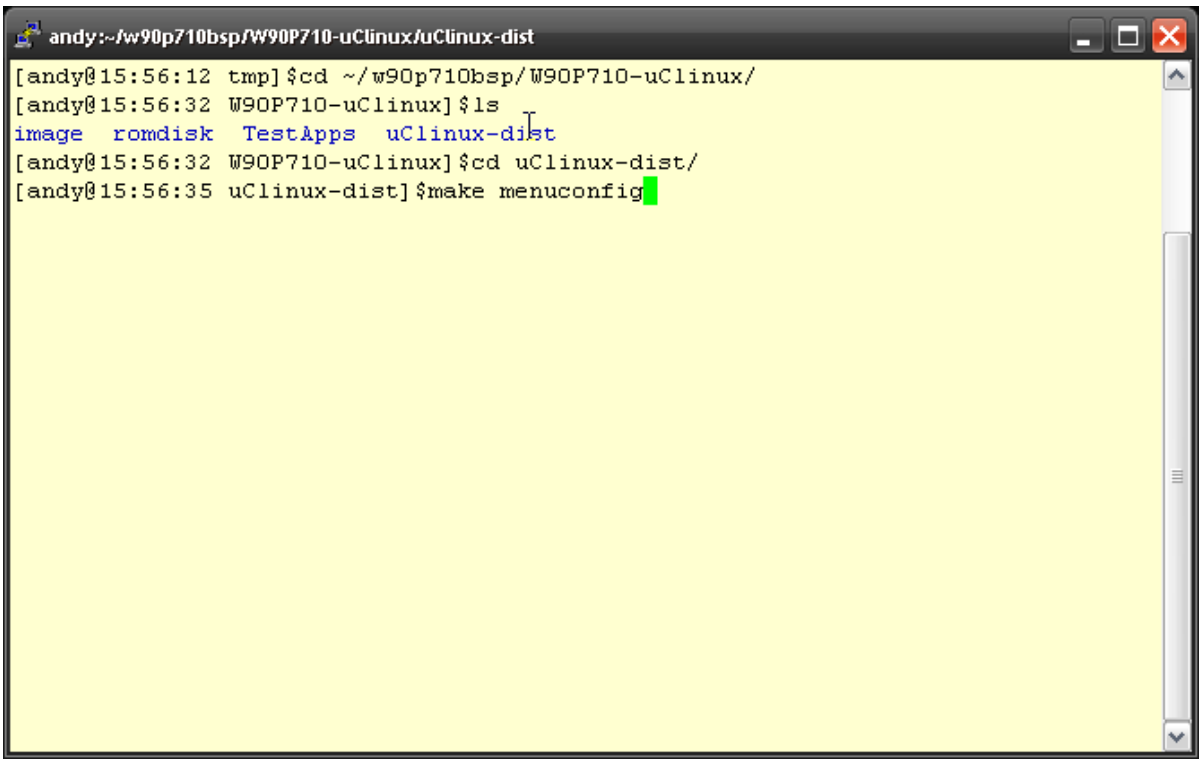
*: Only in POS-TAX BSP

To install the uClinux kernel and demo application, first use "tar xzvf W90N745.tar.gz" command to untar the source code tar ball. Use "su" command to switch to root account, Type "./install.sh" to install the source code and tool chain. During the

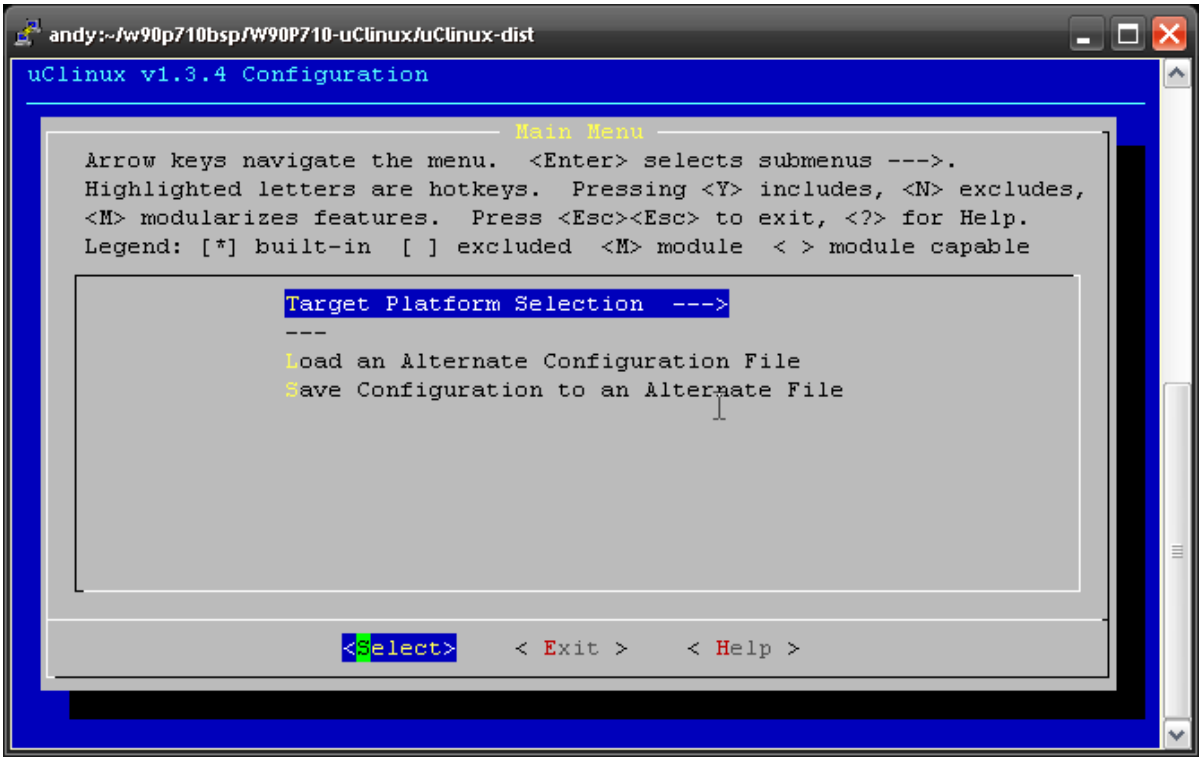
installation, the absolute path to install the source code needs to be assigned. And use “exit” command to exit root account. Following picture illustrate these steps.



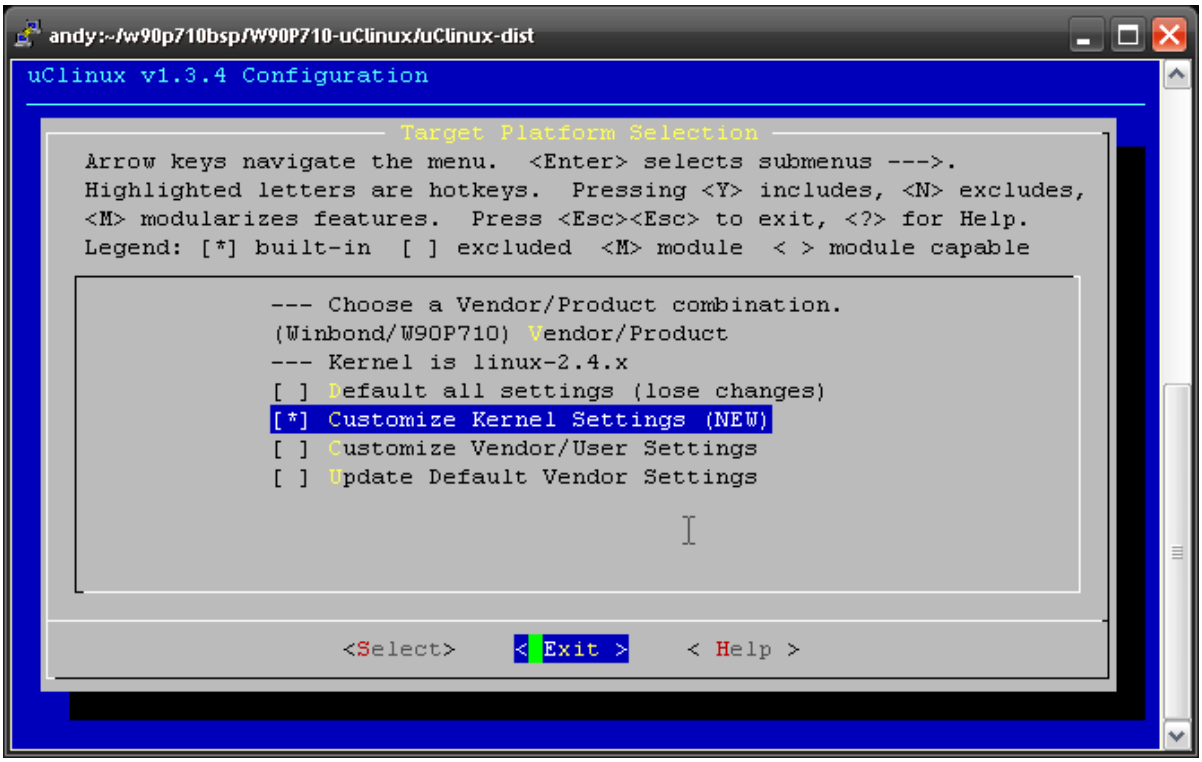
Switch to the uClinux-dist directory in previous assigned path during installation, type “make menuconfig” to launch the UI for configuring kernel



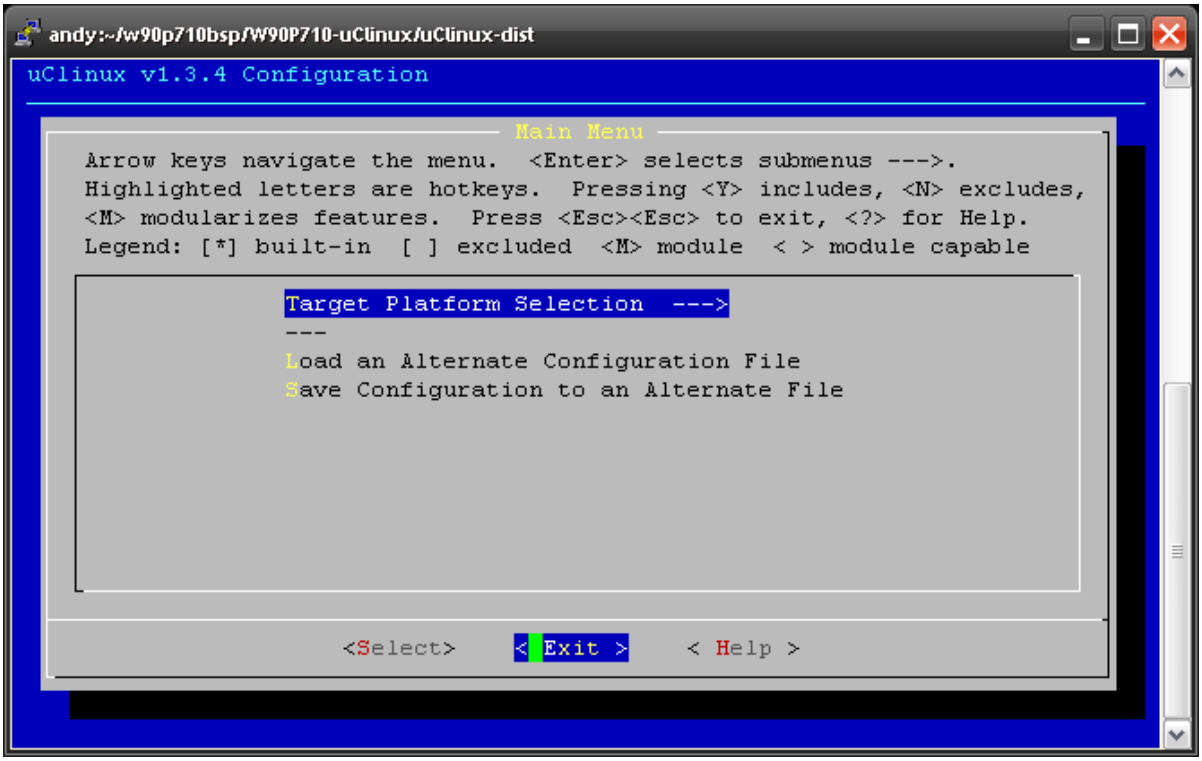
Hit enter key.



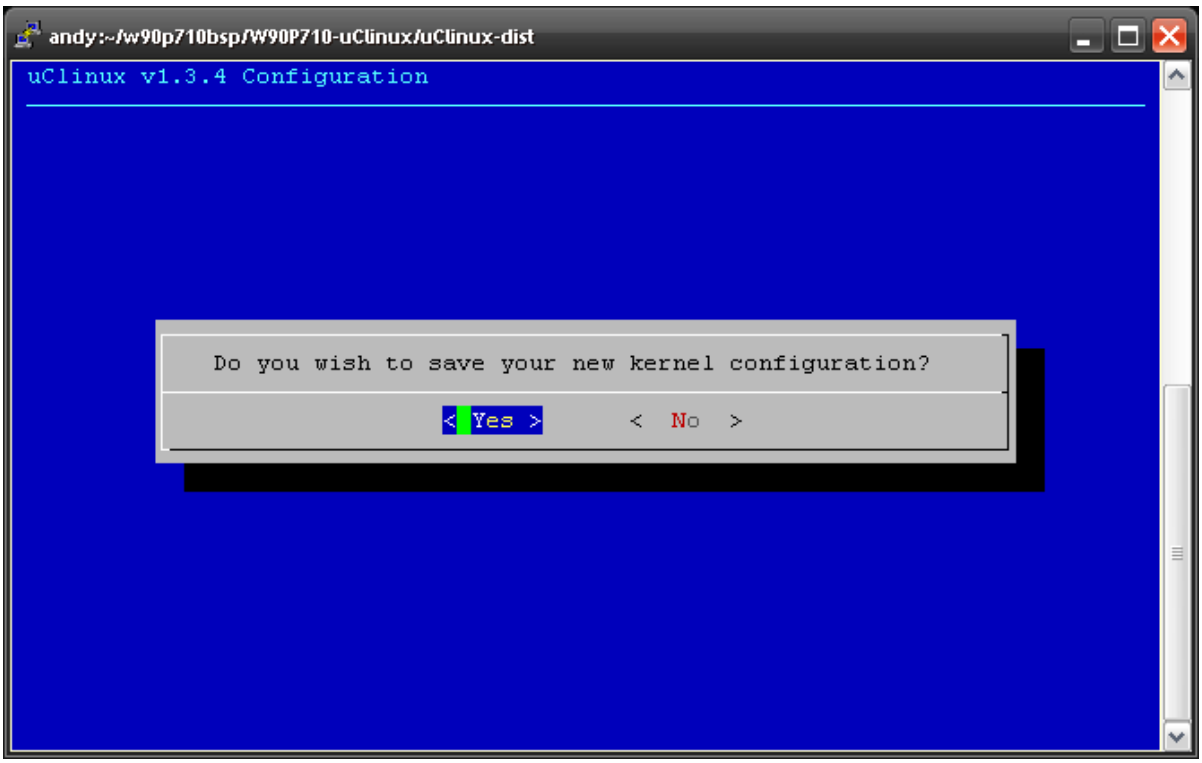
Use down arrow key to highlight “Custom Kernel Settings”, and hit space key to select it. An asterisk should show up between the square brackets. Use right arrow key to highlight <Exit>, and then press Enter.



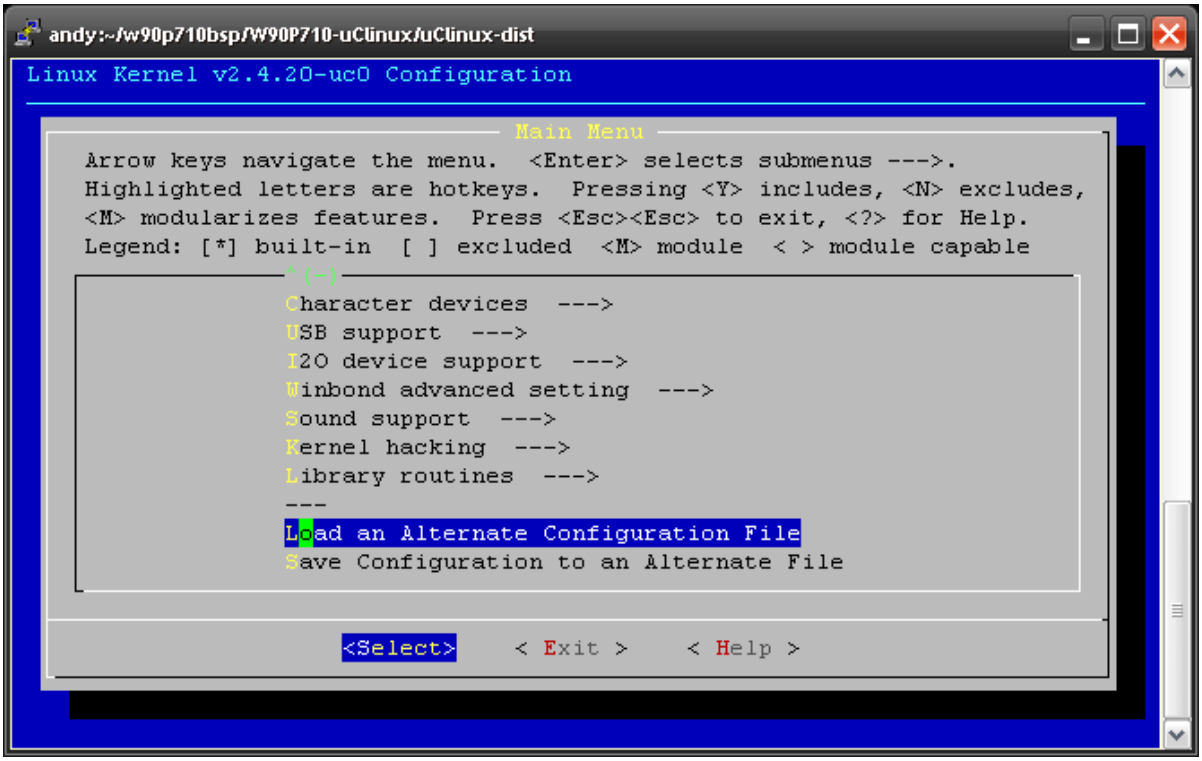
Highlight <Exit>, then press enter.



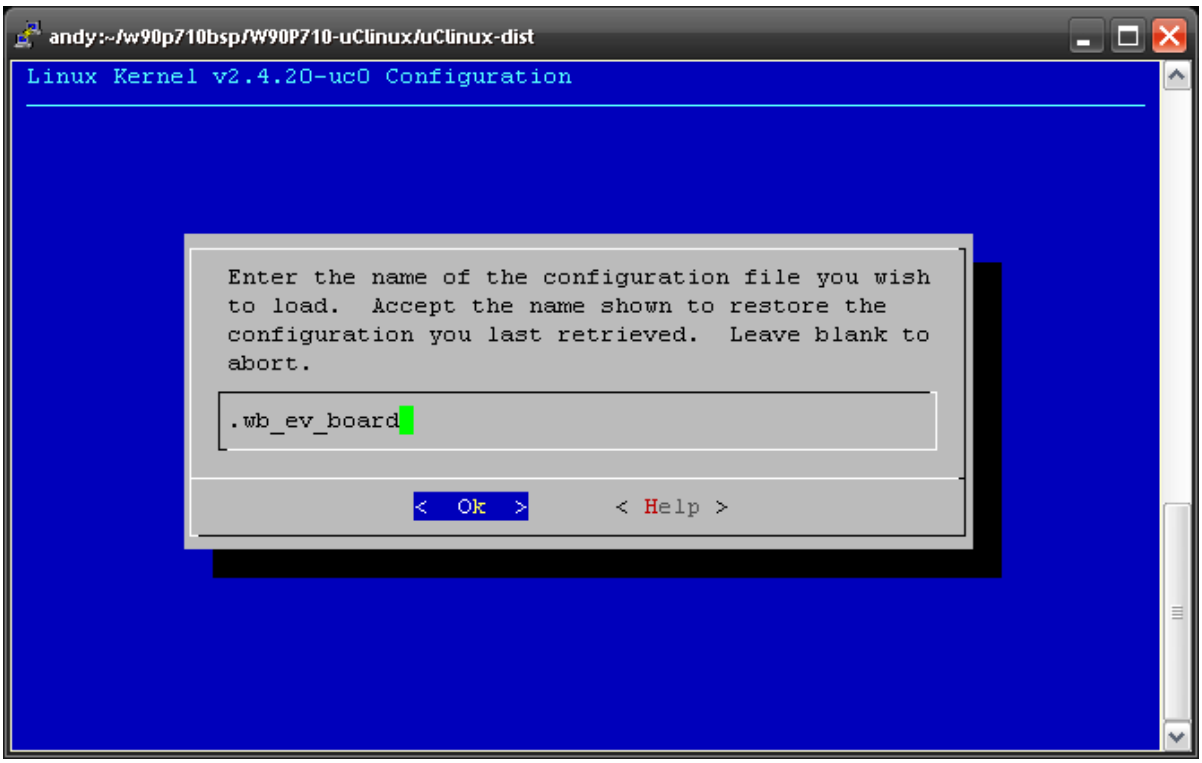
Select <Yes>, press enter.



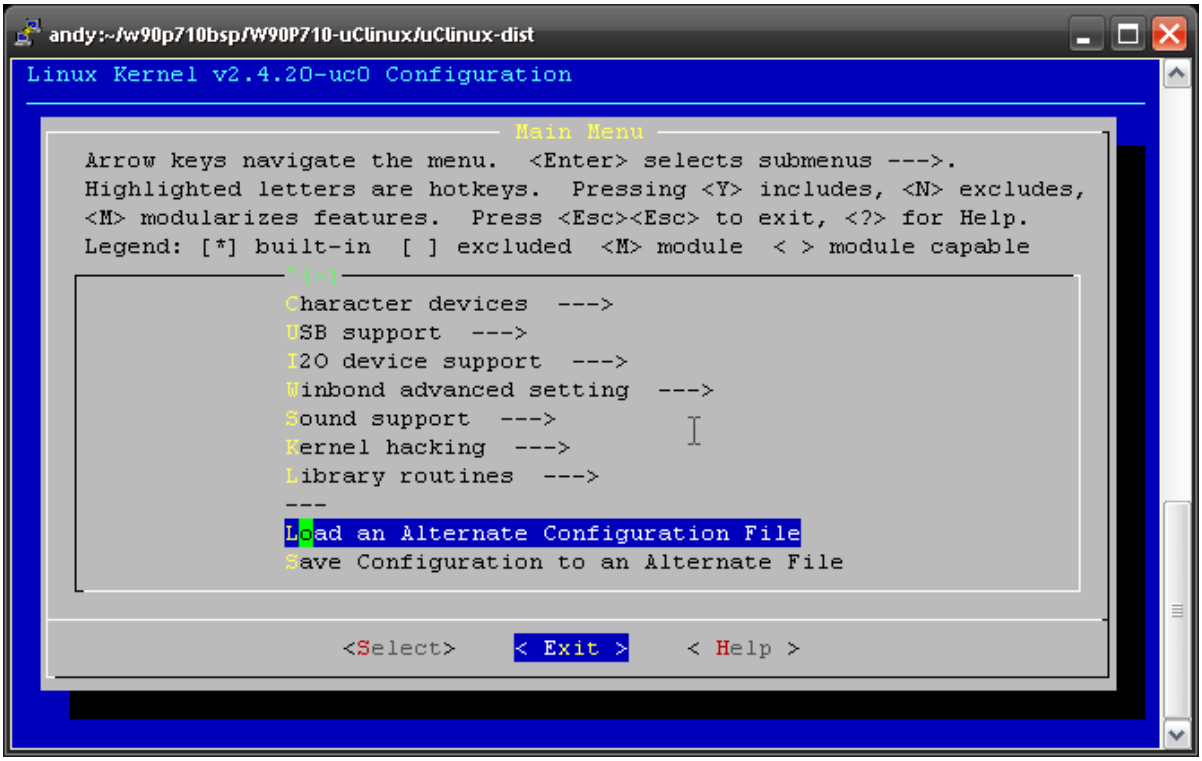
Use arrow key to scroll the menu to bottom, select “Load an Alternate Configuration File”



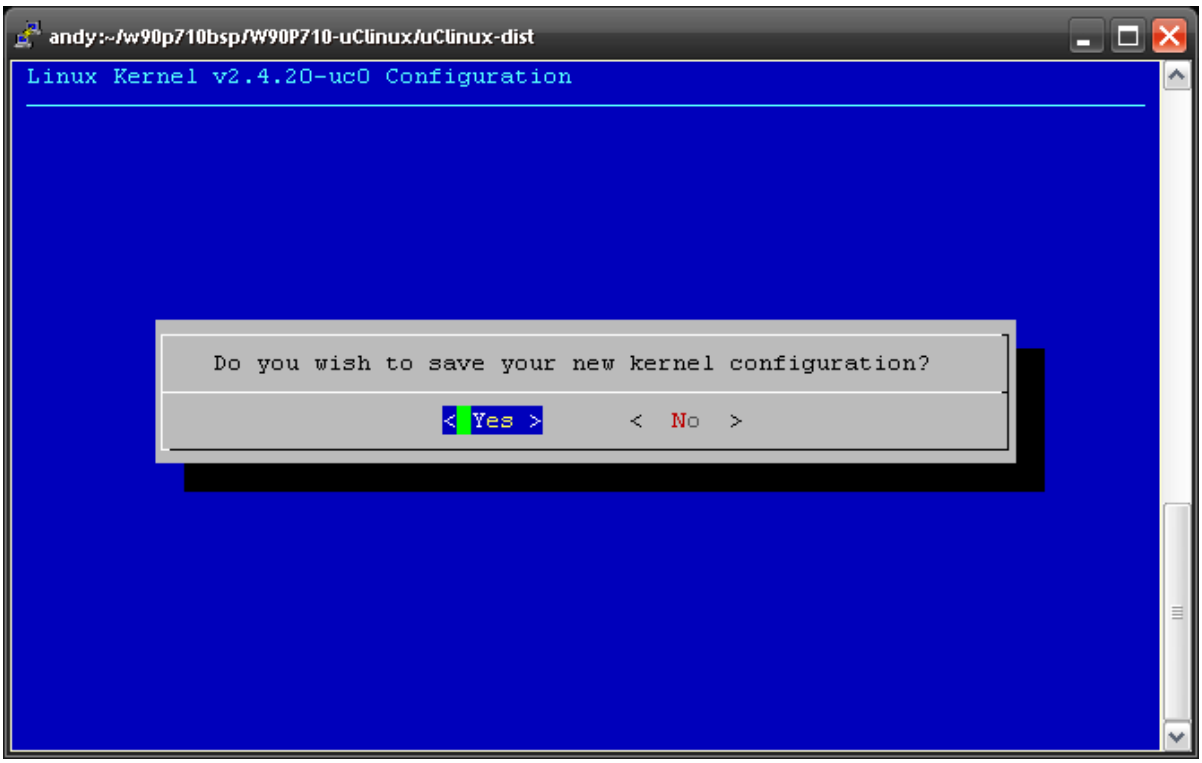
Input .wb_ev_board for evaluation board, and .wb_pos_board for POS-TAX demo board, and then press enter.



Hit right arrow key to select <Exit>, then press enter

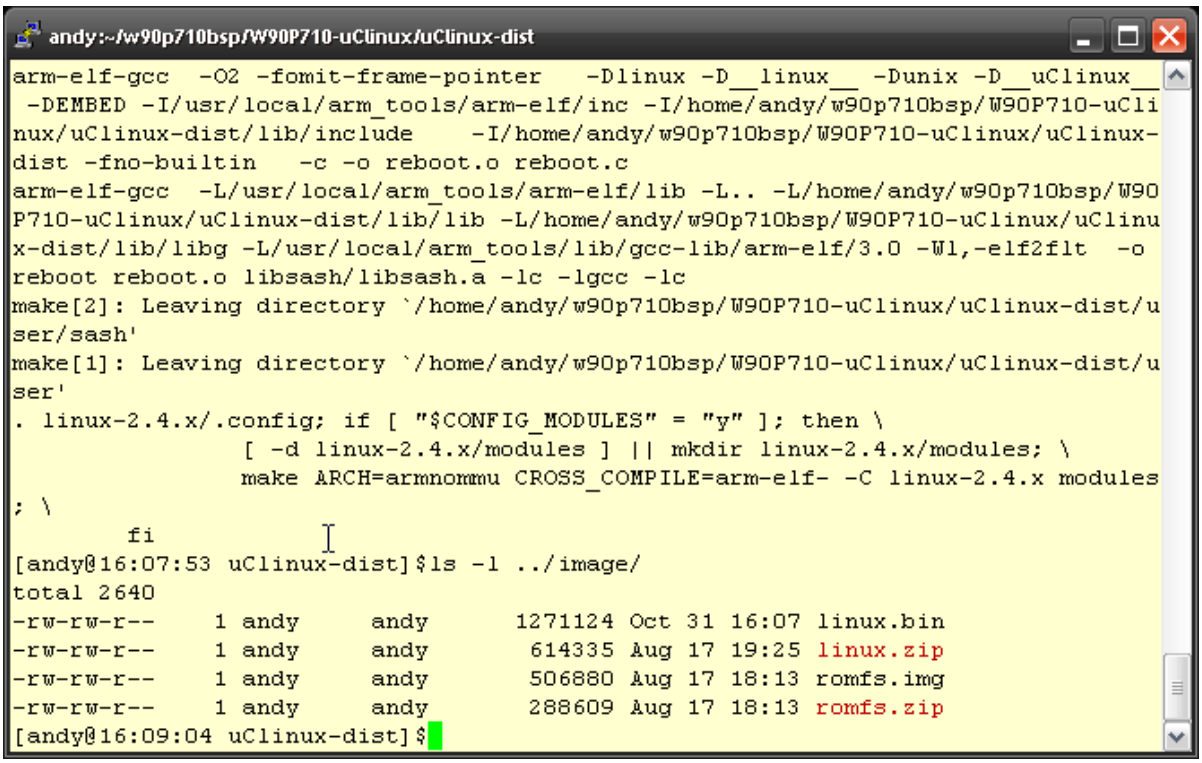


Press enter

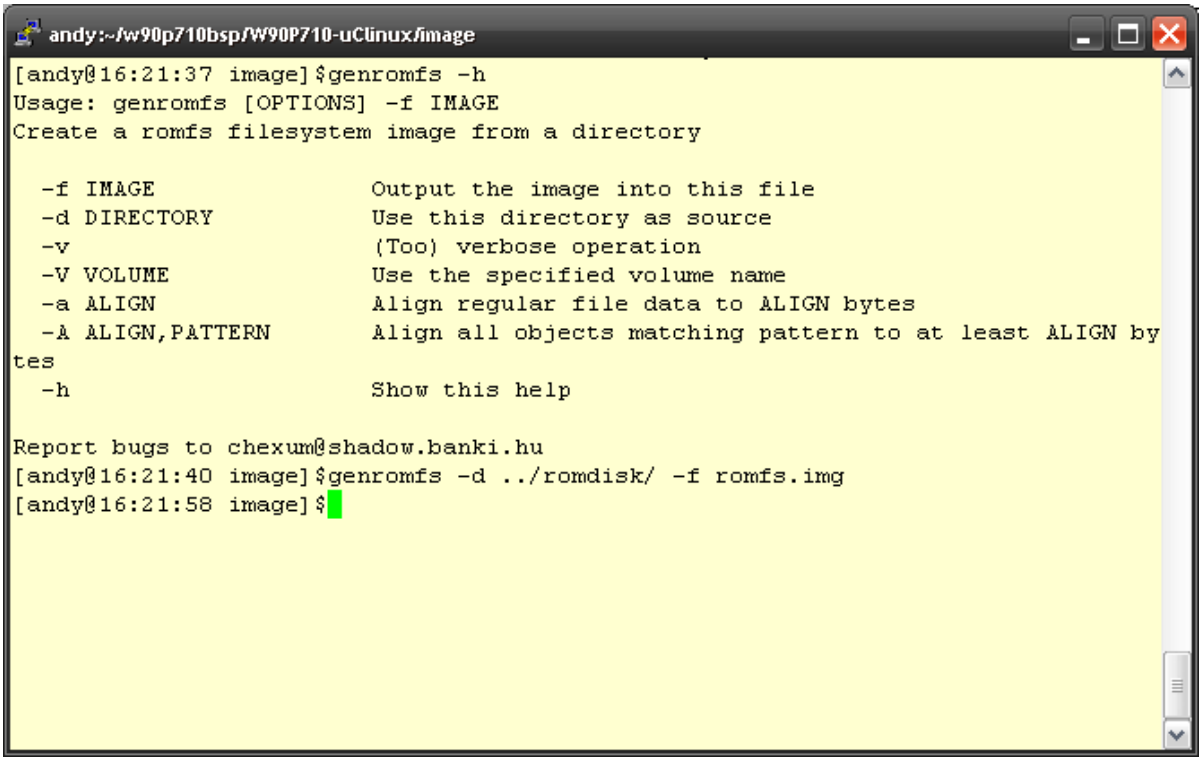


Type “make clean;make dep;make” in command shell to build the kernel

The new kernel image will be copied into image directory

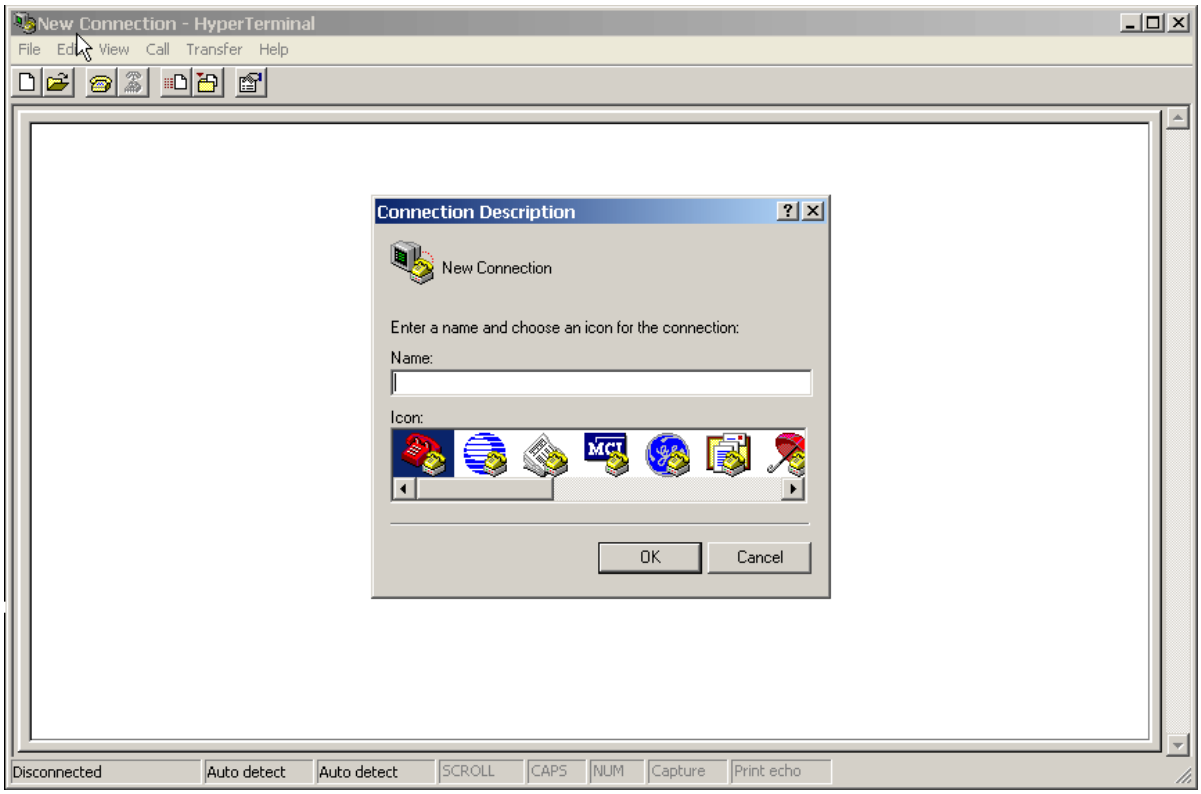


User can use genromfs command to generate a romfs image as root file system. The syntax is genromfs –d <source directory> -f <output image file>

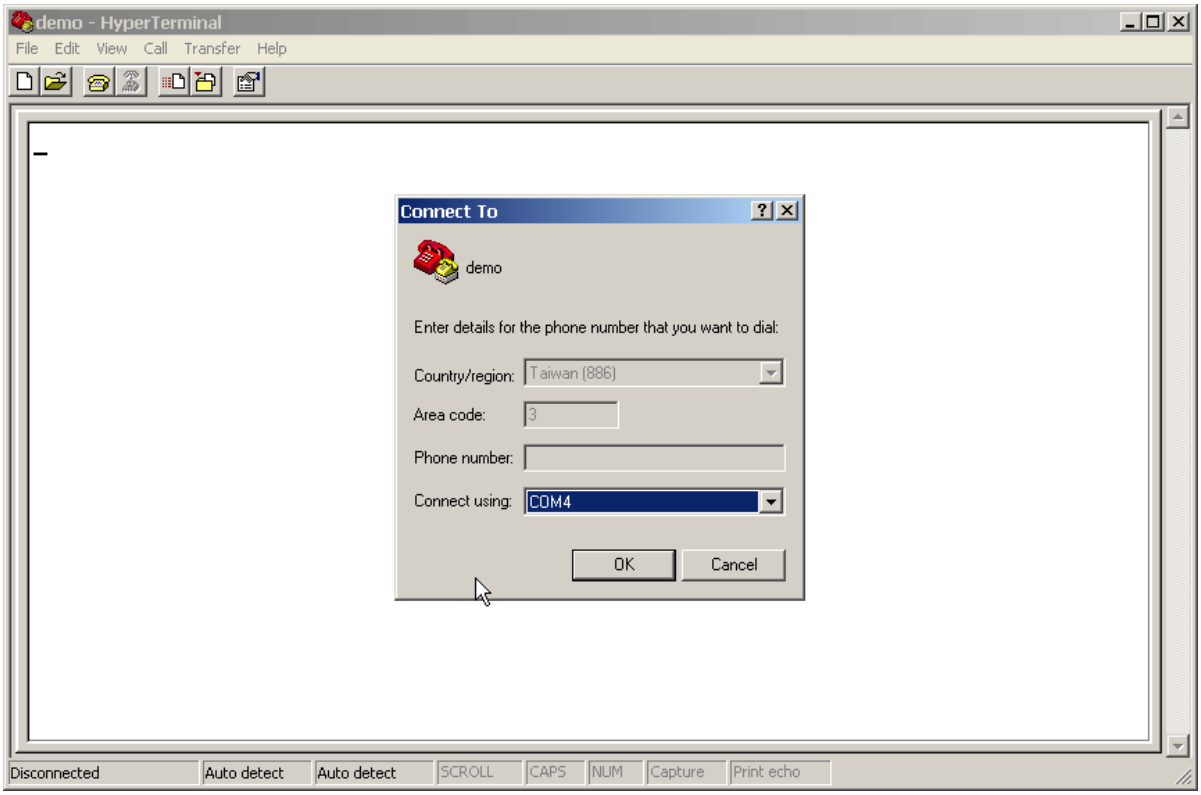


Now both kernel and rootfs has been generated, and can be uploaded to target board for testing via Xmodem, USB or Ethernet. Below shows how to upload the images to target board via Xmodem and execute it in Hyper Terminal in Windows. There are similar applications in Linux system such as minicom, but this document will not cover the usage of these applications. Please refer to Bootloader User's Manual for the commands to load image via USB and Ethernet. These two methods give better data transfer rate comparing to Xmodem.

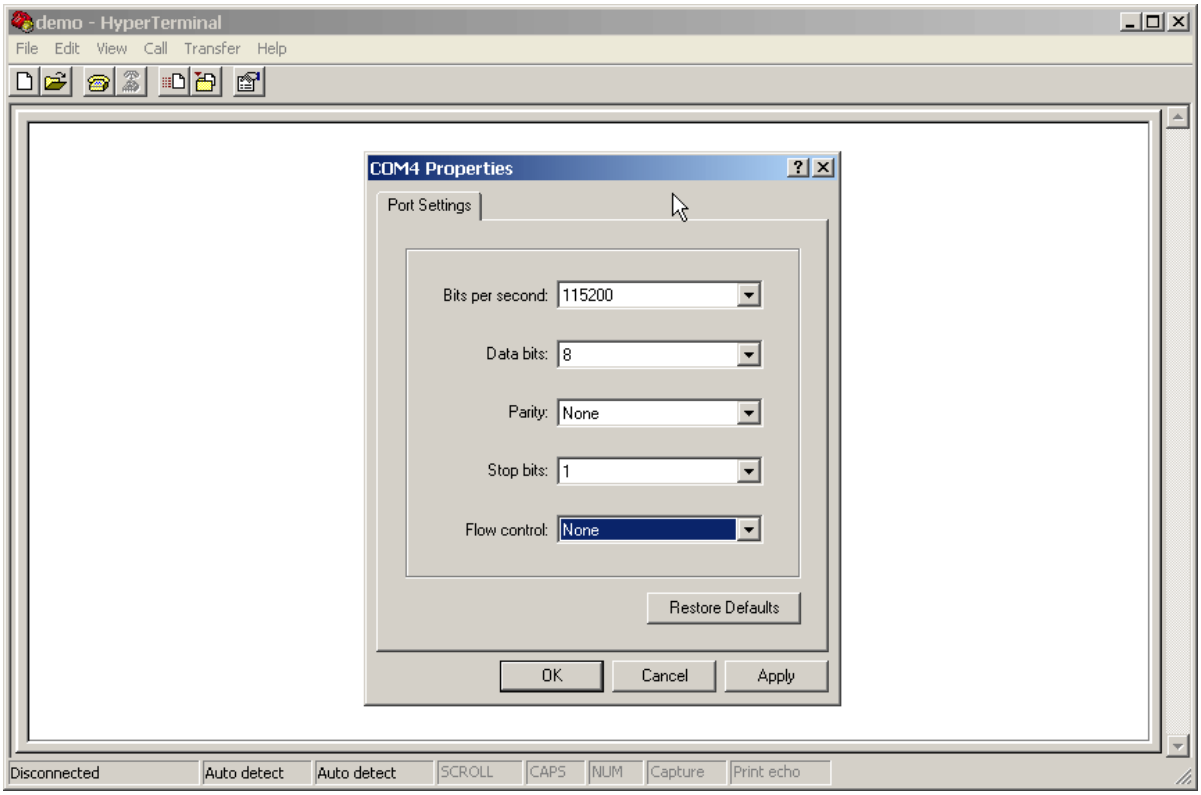
First open Start->Programs->Accessories->Communications->Hyper Terminal, give a name for this connection, and press OK.



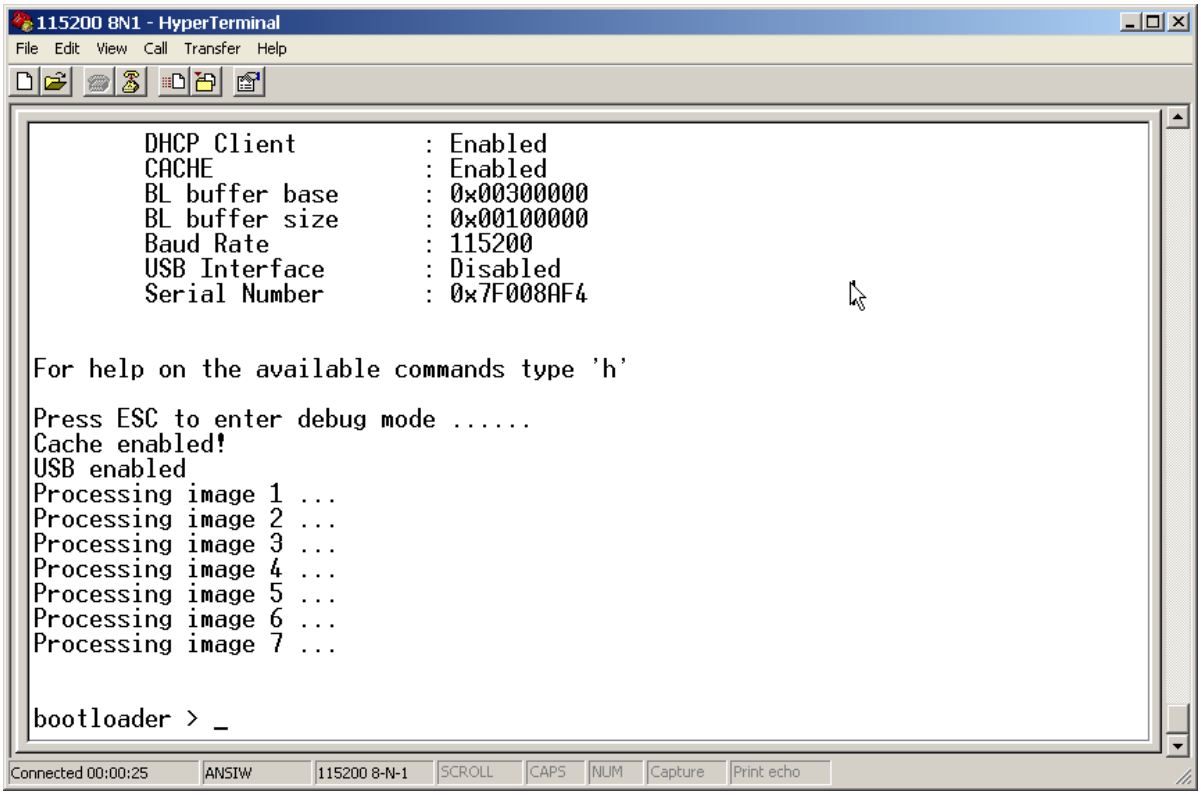
Select the COM port connecting with target board



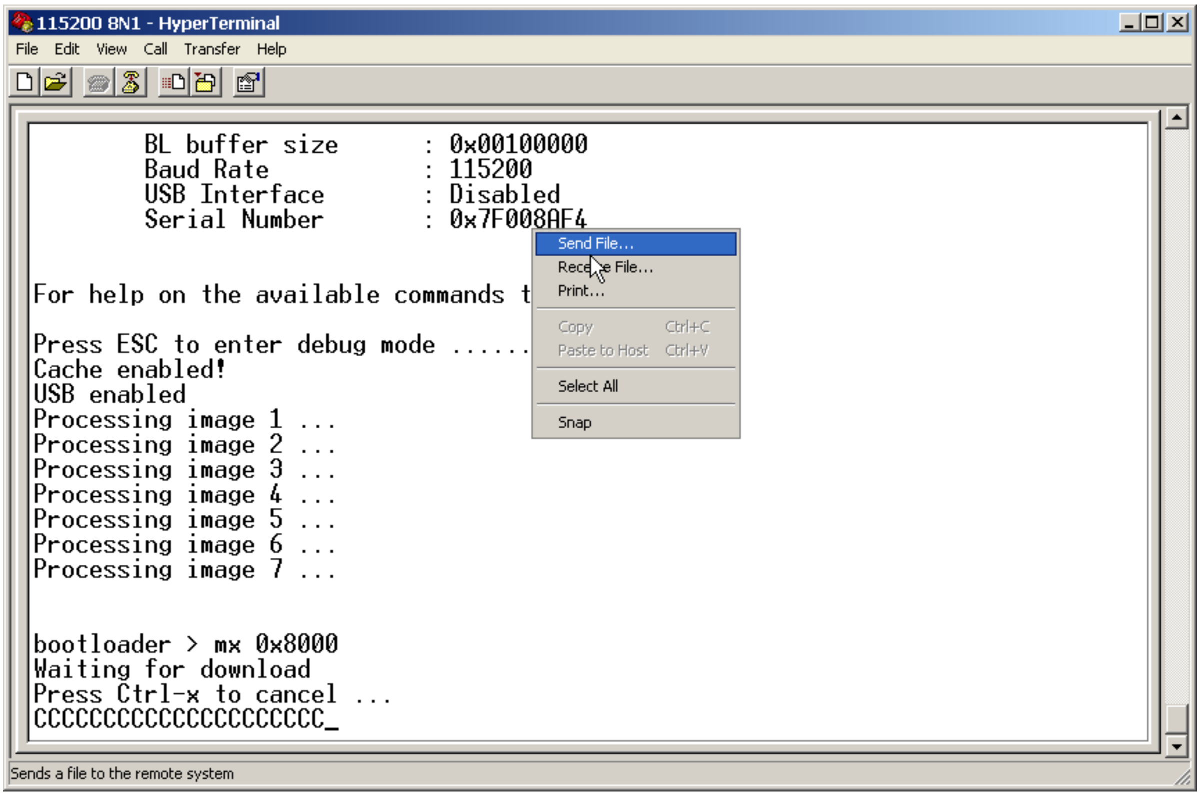
Set the attribute of this connection, the default UART configuration of bootloader is 115200 8-N-1, as displayed in following image.



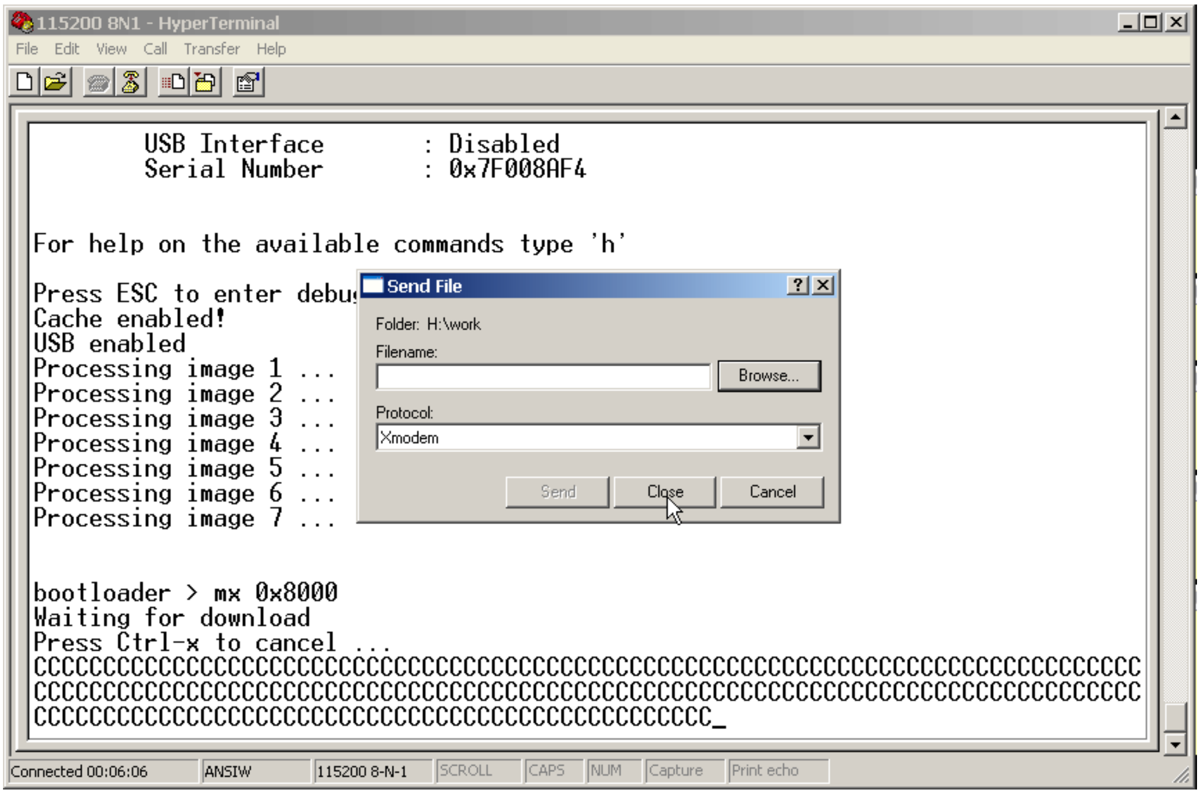
You should be able to see the output in Hyper Terminal now.

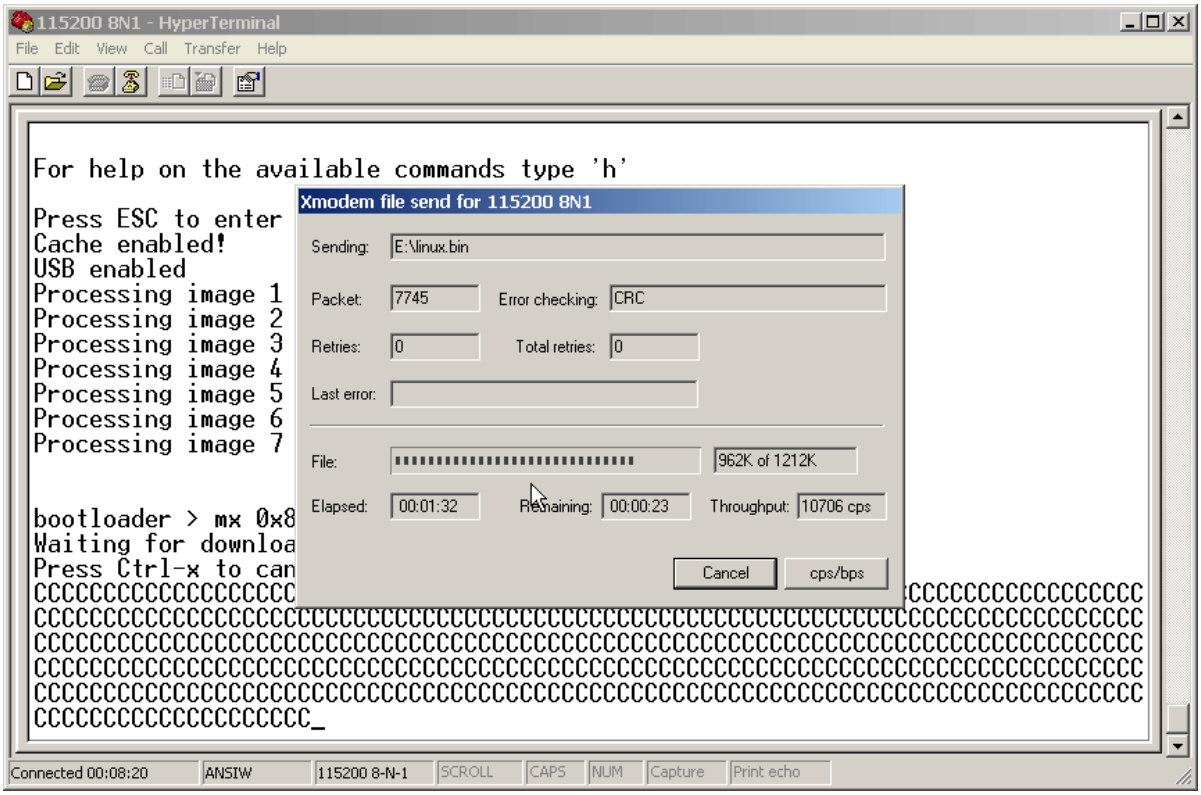


Type command “mx 0x8000”, and press mouse right button, select “Send File…”

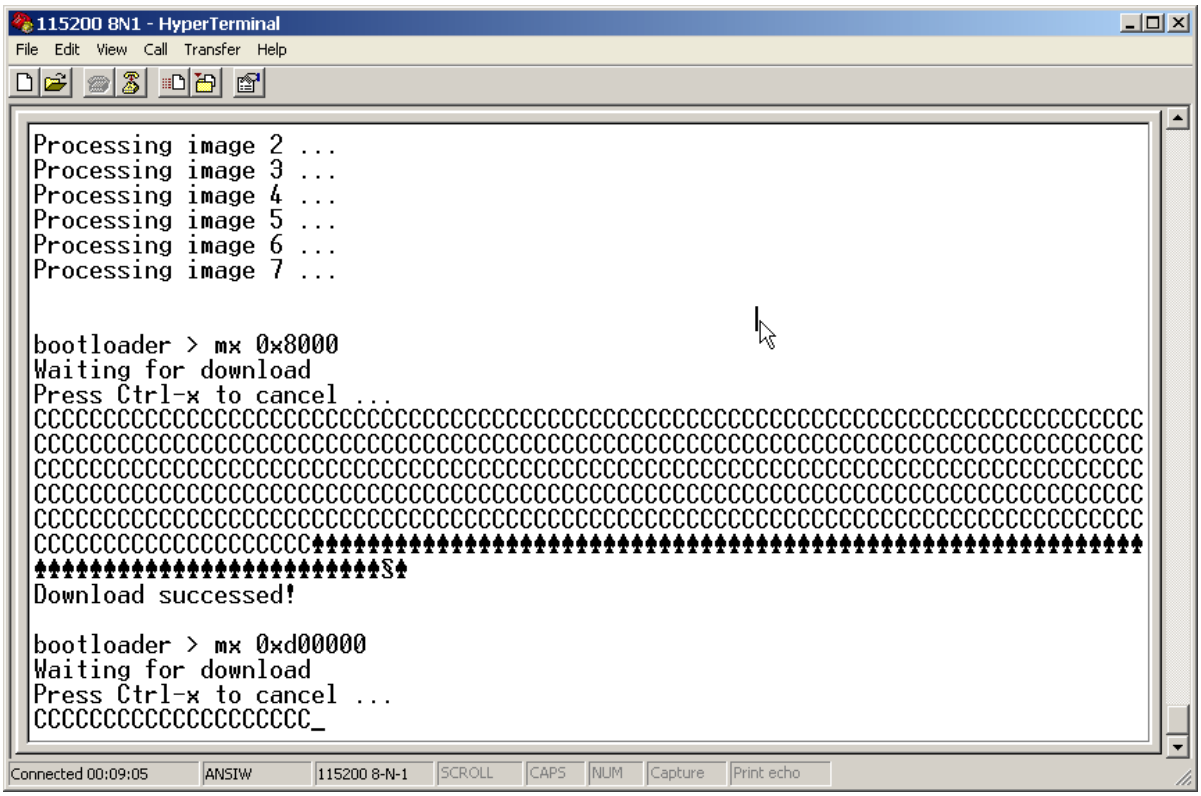


Select linux.bin as upload file, and change protocol to Xmodem.

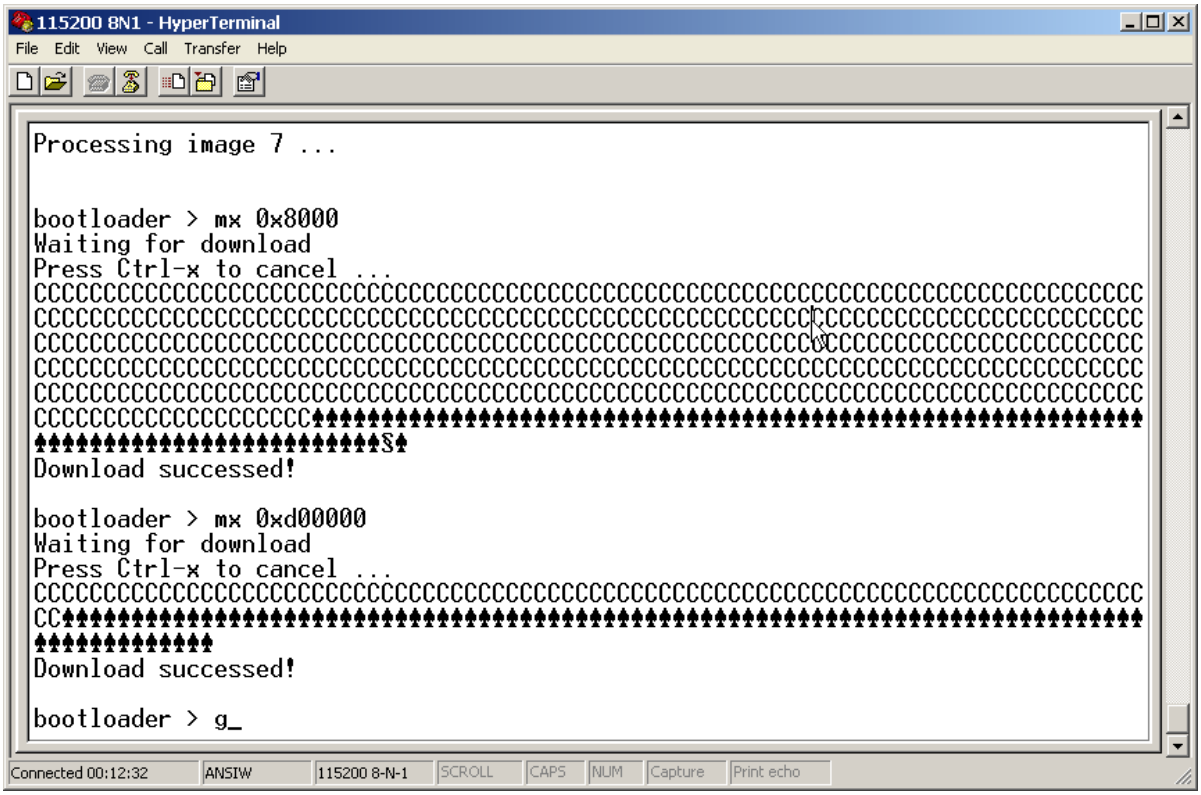




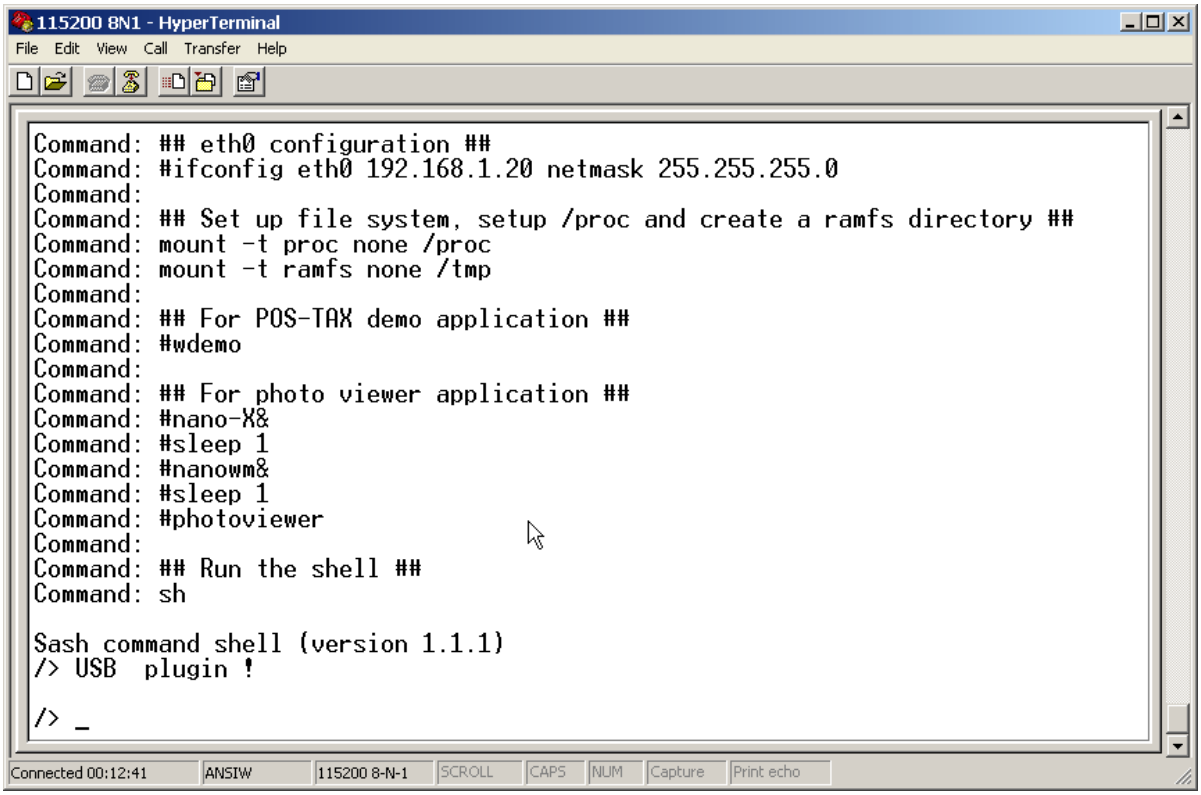
After previous transfer complete, input command “mx 0xd00000”, and load romfs.img using Xmodem protocol



Input command “g” in bootloader command shell.



Then the uClinux kernel will boot up and enter shell.



Now you would be able to test the applications in root file system.

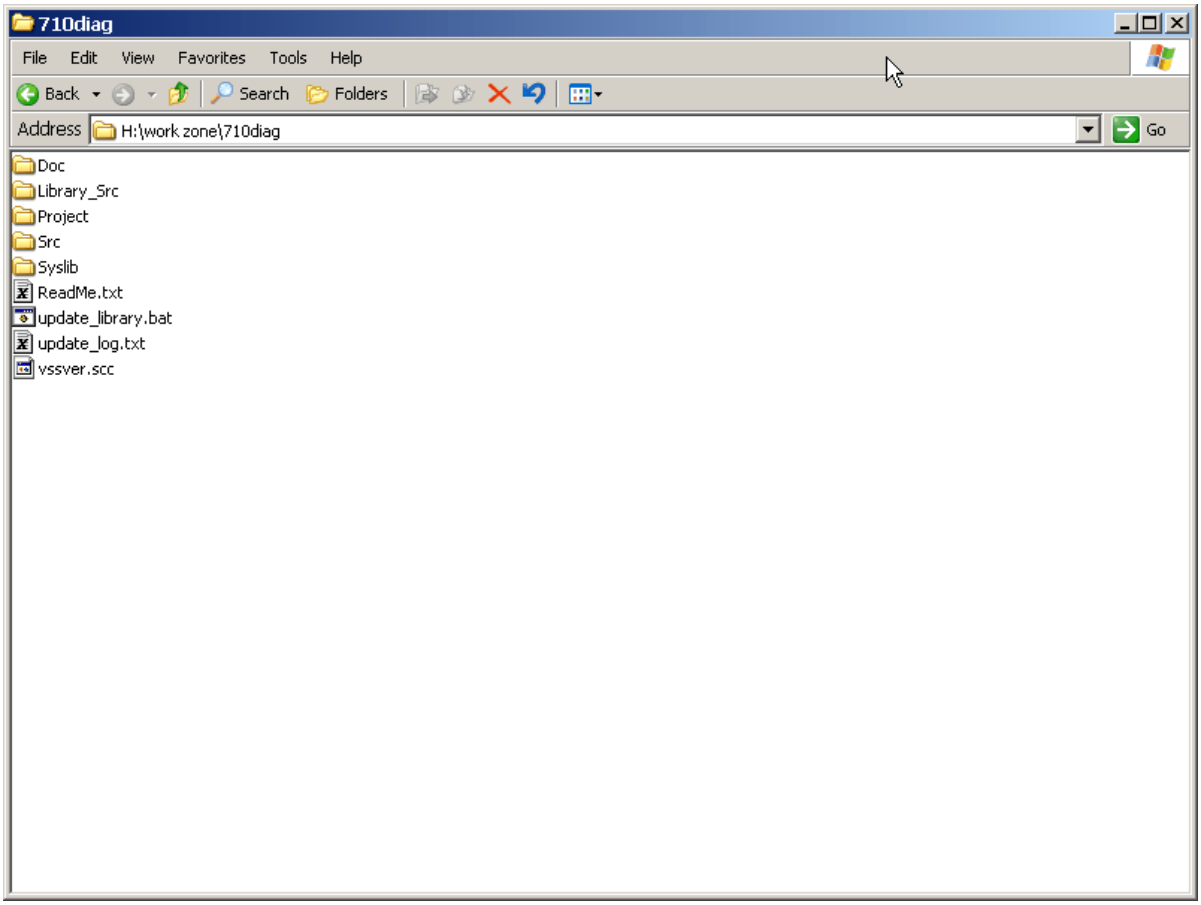
5. Non-OS BSP Installation Procedure

The BSP CD contains two directories. Hardware directory contains the datasheets and schematics. And the other directory, software, contains the source code of bootloader and diagnostic code and relevant documents. Detail description of the files in software directory is listed below.

File name	Description
/	
Release note.pdf	W90N745 BSP Release Note
/Diagnostic Code	
W90N745.zip	Diagnostic code source code
/bootloader	
usb_driver/setup_pro 1.0.exe	Magic terminal and xusb
usb_driver/setup_usb.exe	USB device driver for Windows
updater_usb.bin	Binary code for update bootloader with USB support.
updater_usb.axf	Same as above but in axf format. Needs to be loaded and executed with ICE and AxD
updater_mac.bin	Binary code for update bootloader with MAC support
updater_mac.axf	Same as above but in axf format. Needs to be loaded and executed with ICE and AxD
init.axf	System initialization code. AxD could lode and execute this file to initialize a target board without effective bootloader in flash.
bootloader.zip	Bootloader source code
/Doc	
W90N745PGV1-0,pdf	W90N745 programming guide
W90N745 Bootloader Users Manual	Bootlaoder user's manual
Make a Production ROM.pdf	User's manual of mkrom, which is a tool could be used to generate firmware upgrade image or production iamge
Bootloader Source Code Modification Guide.pdf	A document describes how to modify and build bootloader.
W90N745 BSP Quick Start Guide.pdf	This document. Describe the contents of BSP, step by step introduction of BSP installation and building projects

	in BSP.
/Tools	
mkrom/mkrom.exe	Windows version of mkrom to make production ROM image
mkrom/mkrom.ini	Information file for mkrom.exe

The directory structure looks like the image below after decompress the W90N745.zip, to a working directory



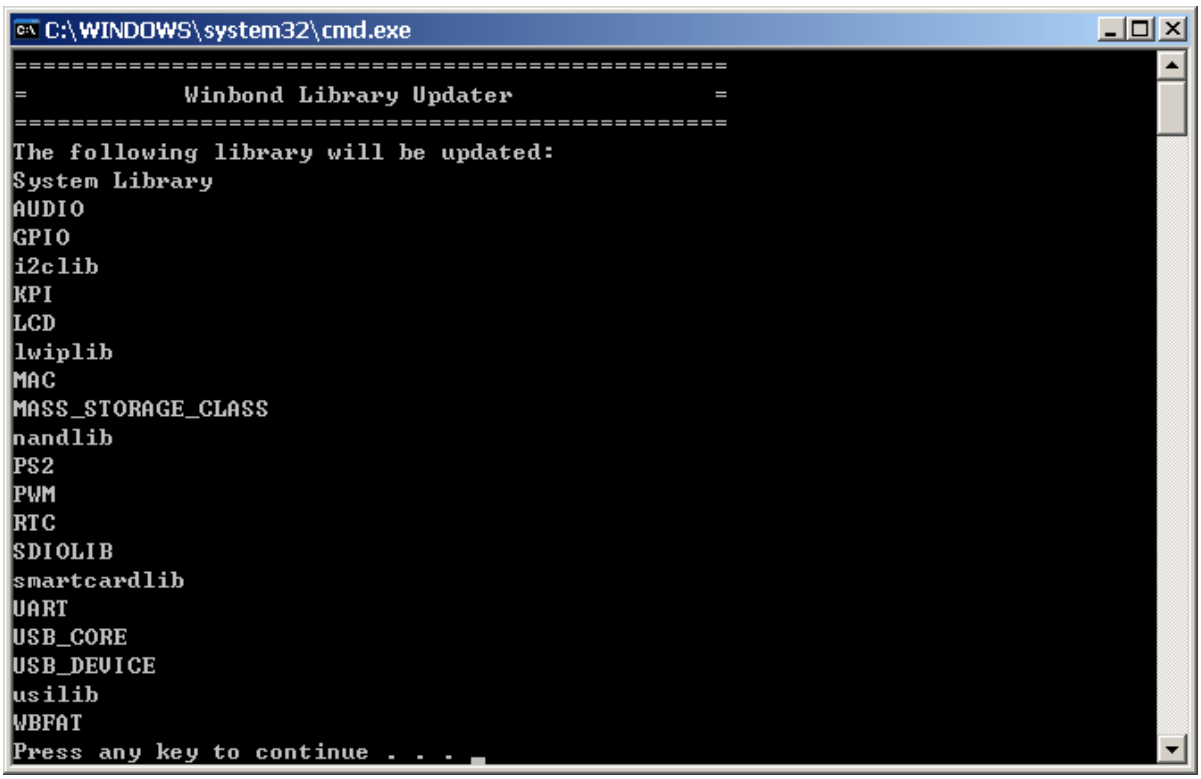
The description of each directory are listed in following table

File name	Description
update_library.bat	This is a script file you should execute every time after a library is rebuild. It will copy the updated libraries and header files to proper directory where the application could find and link them during compilation.
Doc\W90N745 <Platform*> Diagnostic Code User's Manua.pdf	This document is the user's manual of diagnostic code.
Doc\W90N745 Non-OS	This document describe the APIs and their usage of

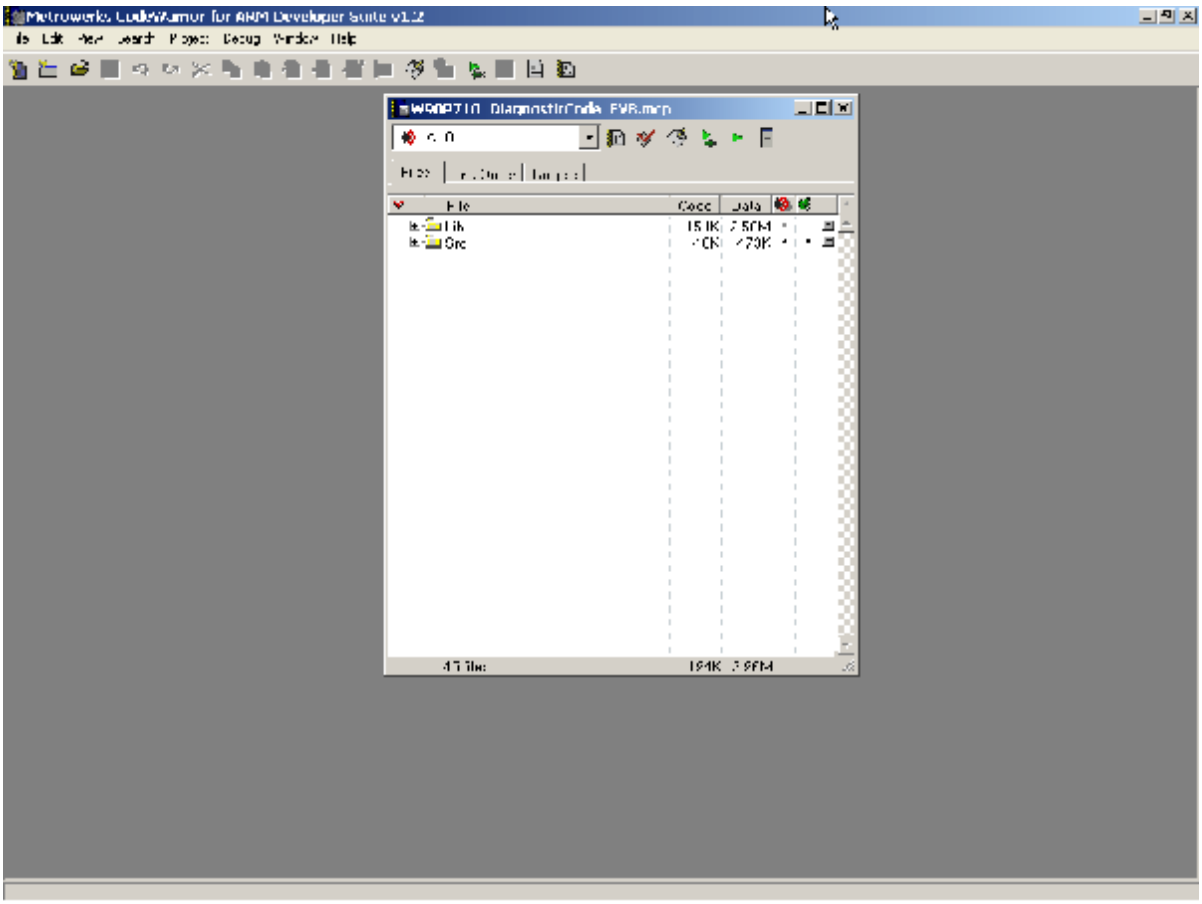
Library User's Manual.pdf	the libraries in Library_Src directory
Library_Src\	This directory contains the source code of Non-OS libraries
Project\W90N745_DiagnosticCode_<Platform*>.mcp	The project file of diagnostic code
Src\	Source code of diagnostic application
Syslib\	Source code of system library. The document of system library also located in this directory.

*: The <Platform> could be ether EVB or POS

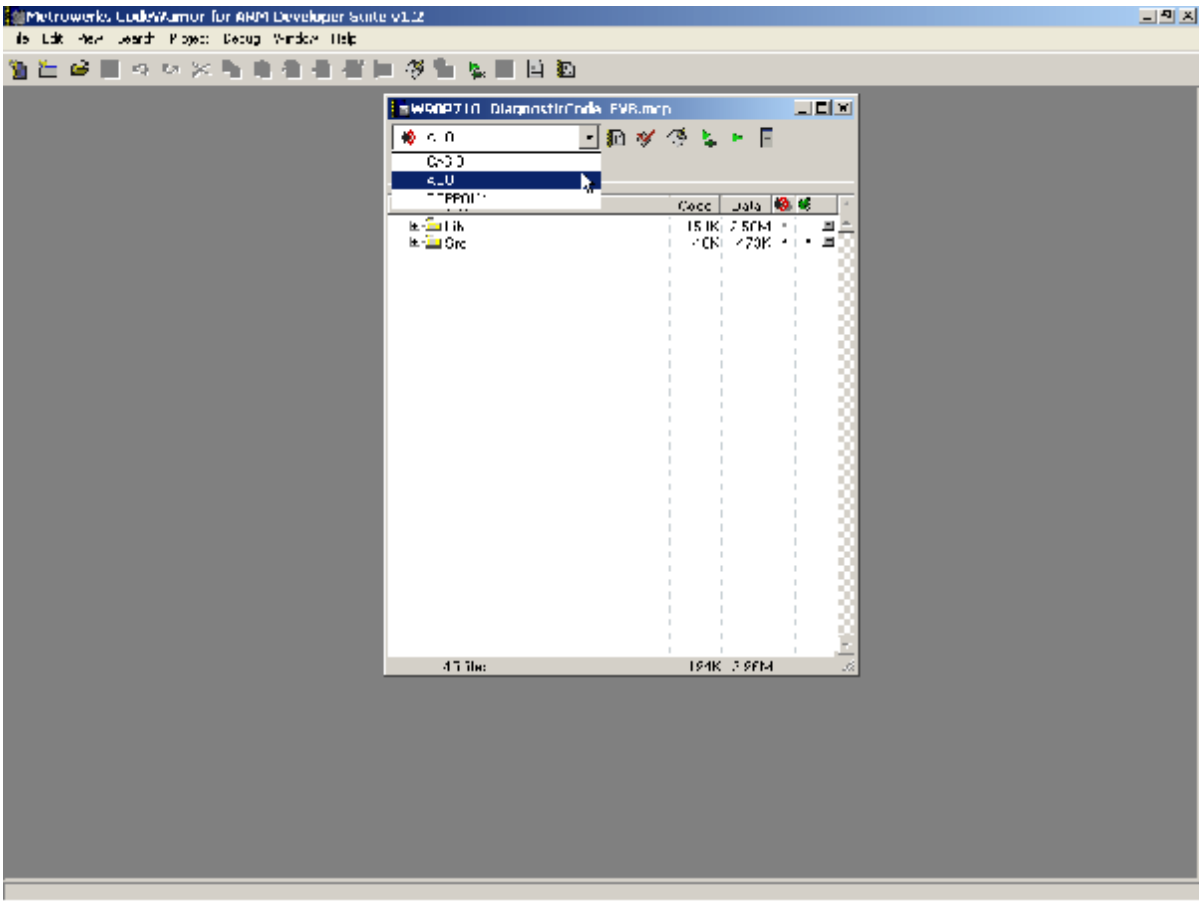
To build the diagnostic code application, first double click update_library.bat and press any key twice to copy updated header files and library to correct location if necessary.



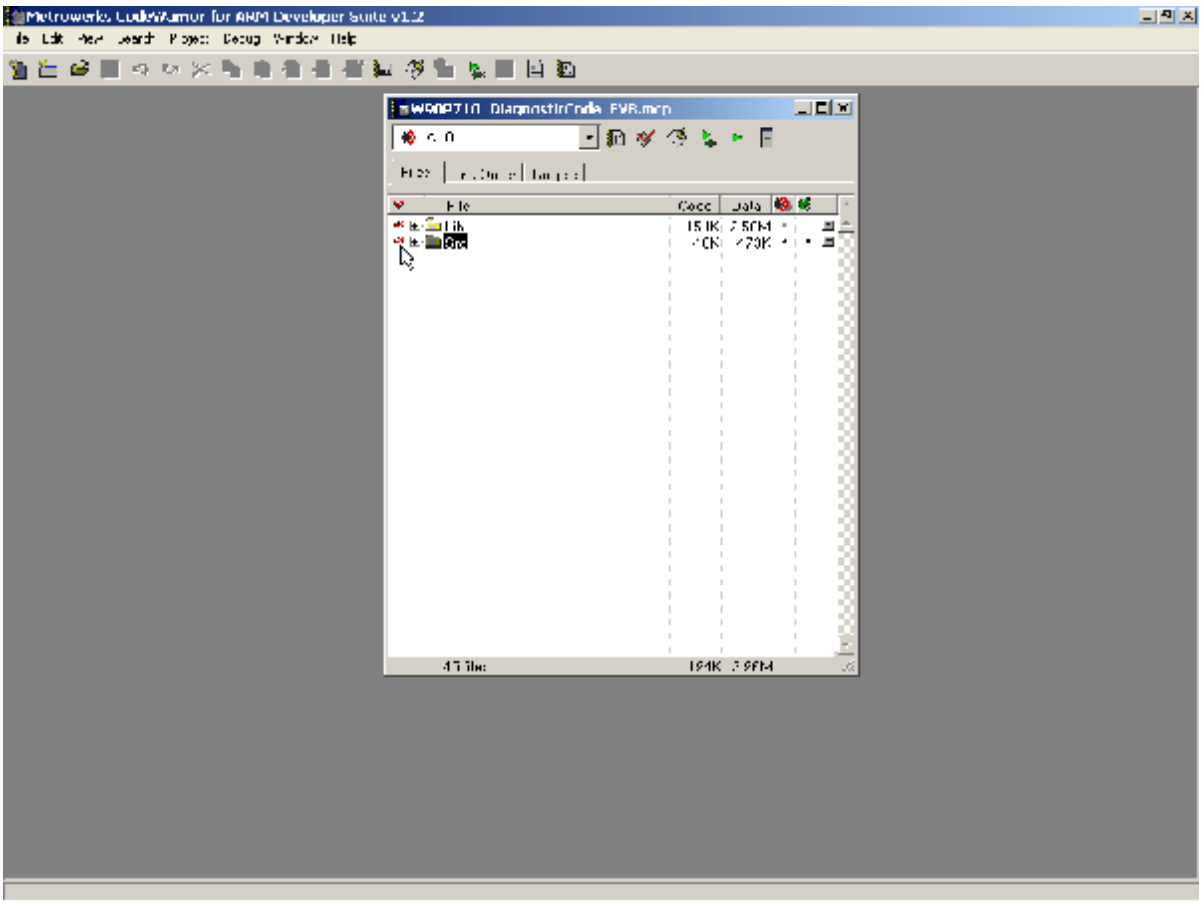
Double click the project file of diagnostic code, and following CodeWarrior windows should be displayed on monitor.



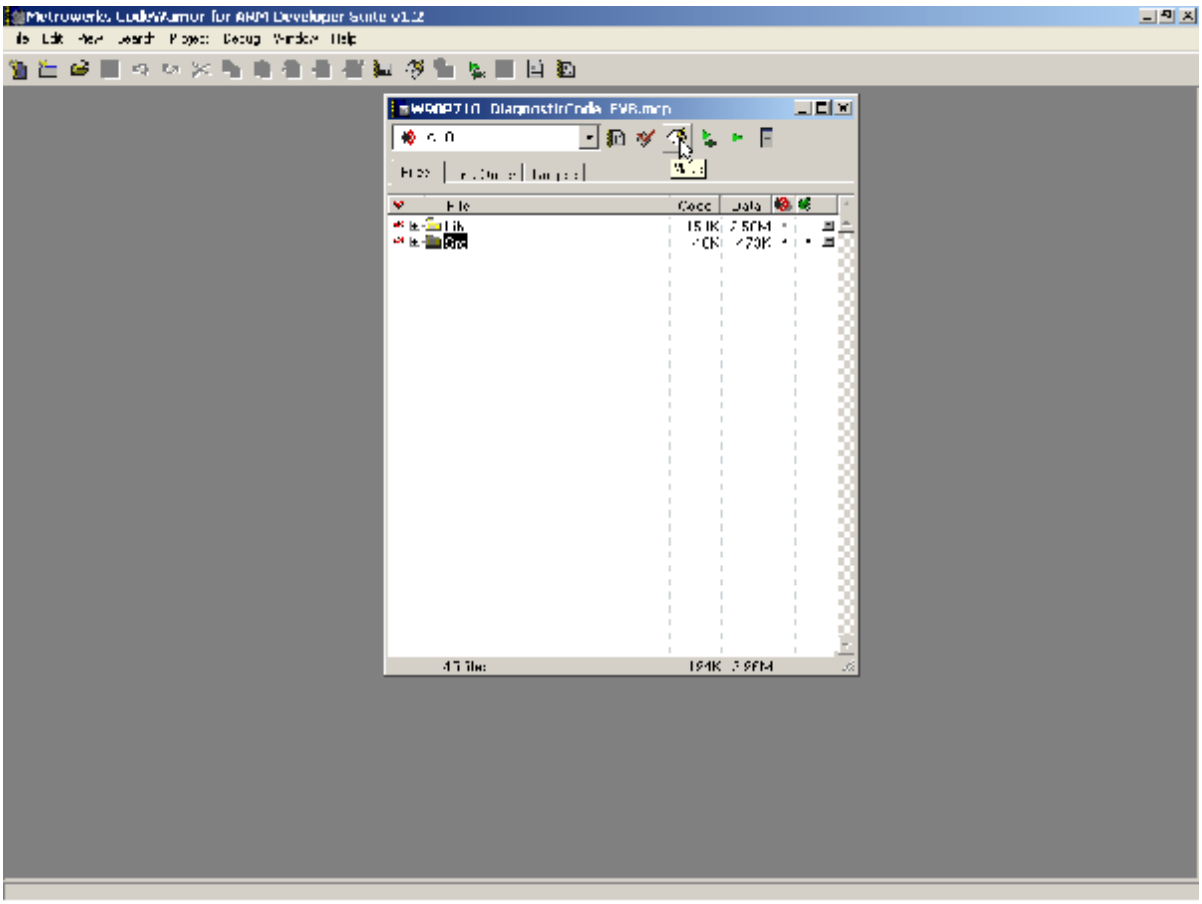
Select the correct target according to the LCD panel on board.



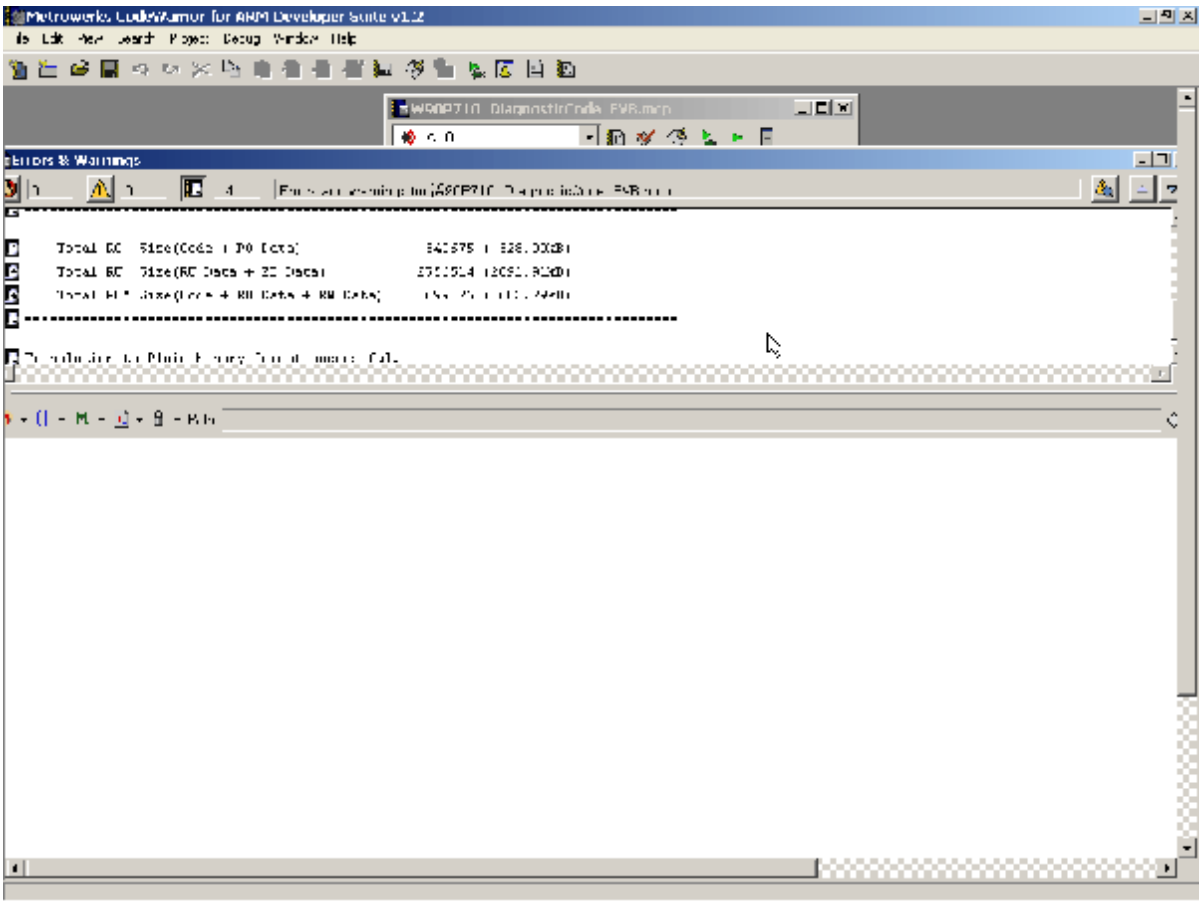
Touch all files in Lib and Src group by click the touch column on the left side of each group name.



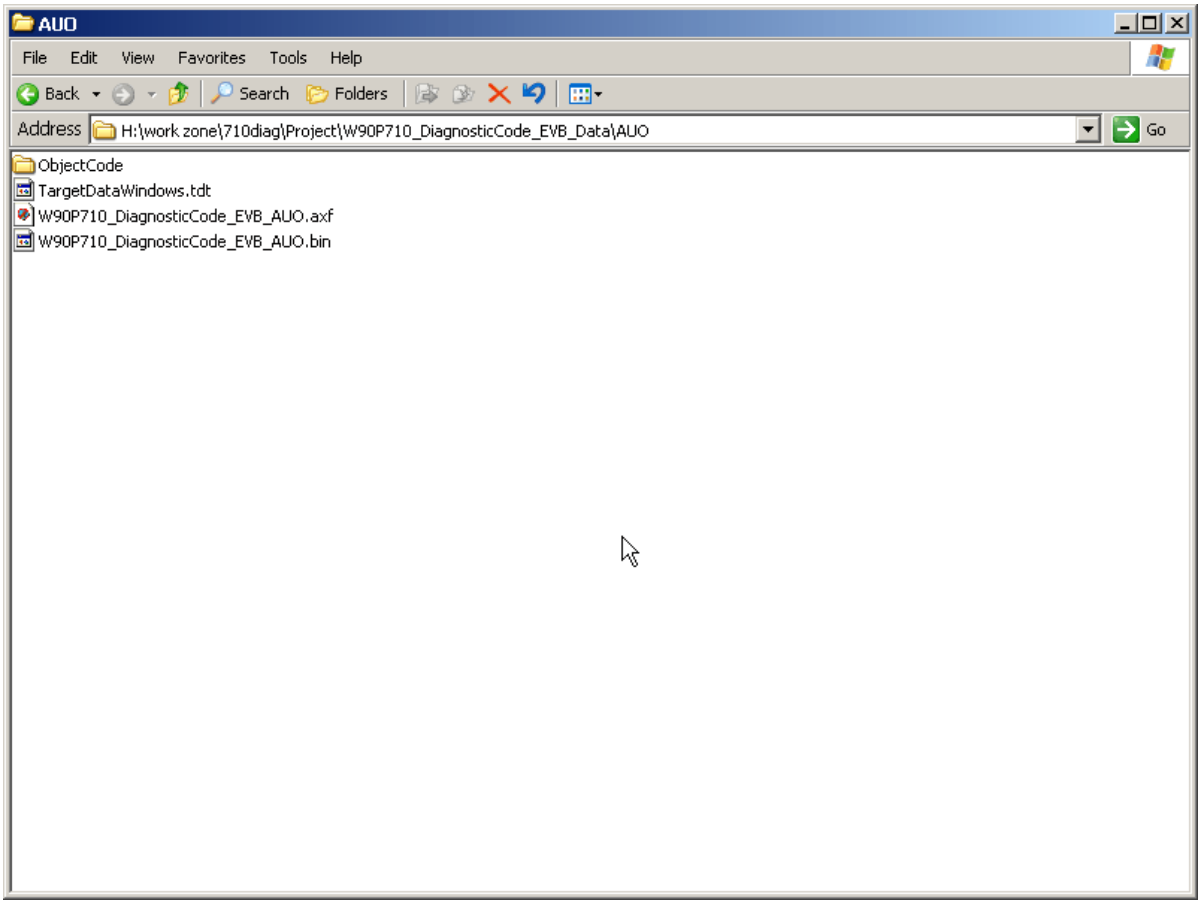
Click the make button.



Wait for the compiling process ends.

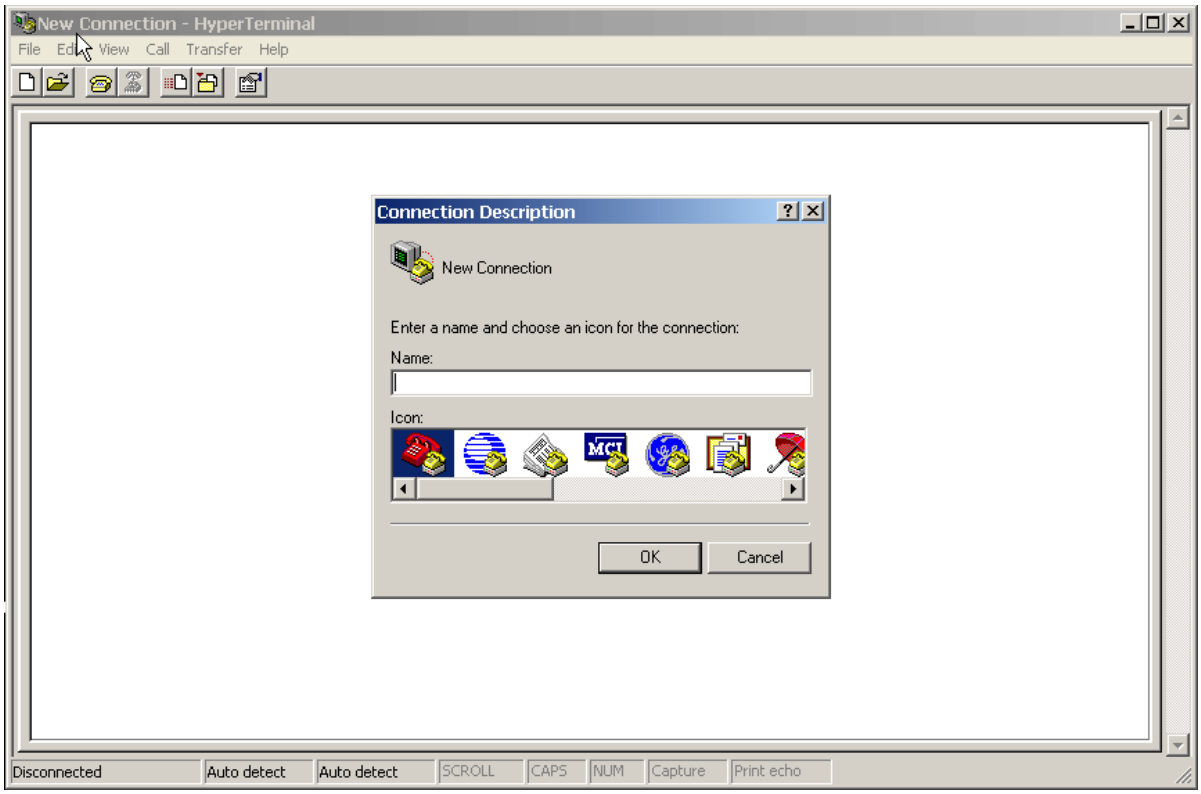


The binary code is located in Project\W90N745_DiagnosticCode_<Platform> _Data\<Target > directory as displayed in following image.

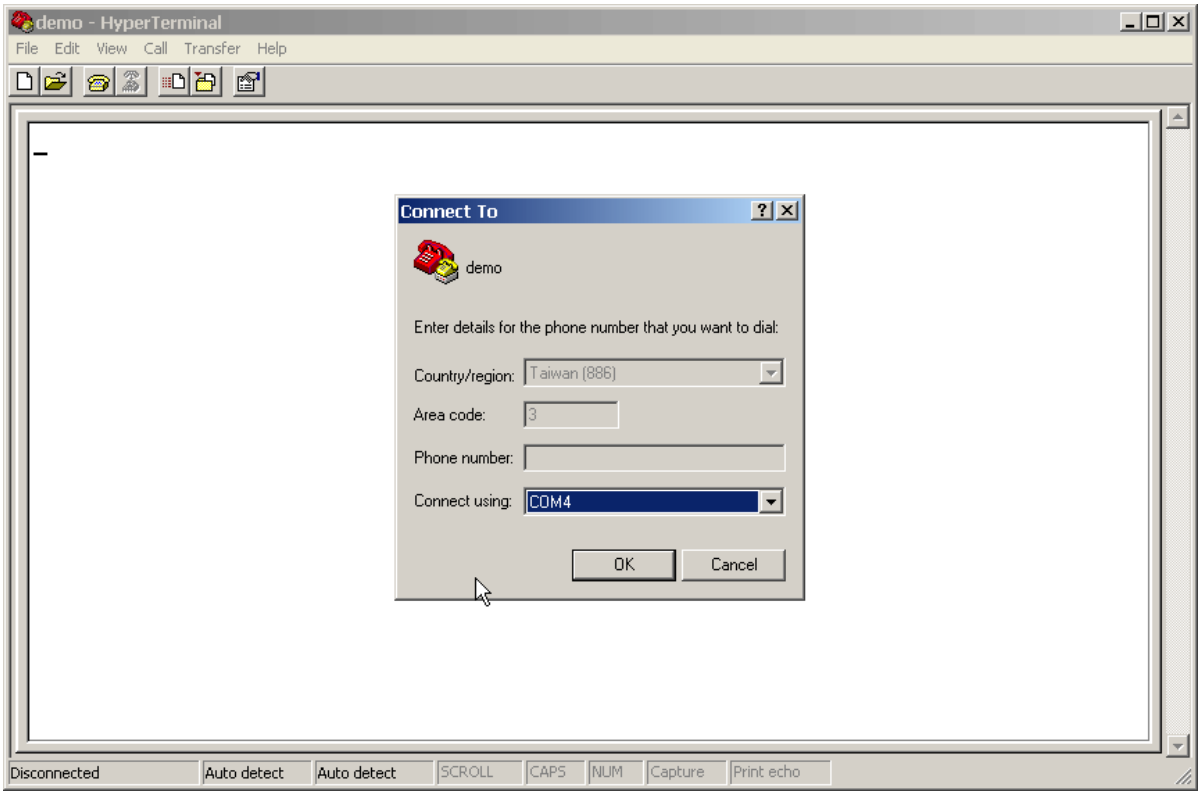


Now the executable image has been generated, and can be uploaded to target board for testing via Xmodem, USB or Ethernet. Below shows how to upload the images to target board via Xmodem and execute it in Hyper Terminal in Windows. Please refer to Bootloader User's Manual for the commands to load image via USB and Ethernet. These two methods give better data transfer rate comparing to Xmodem.

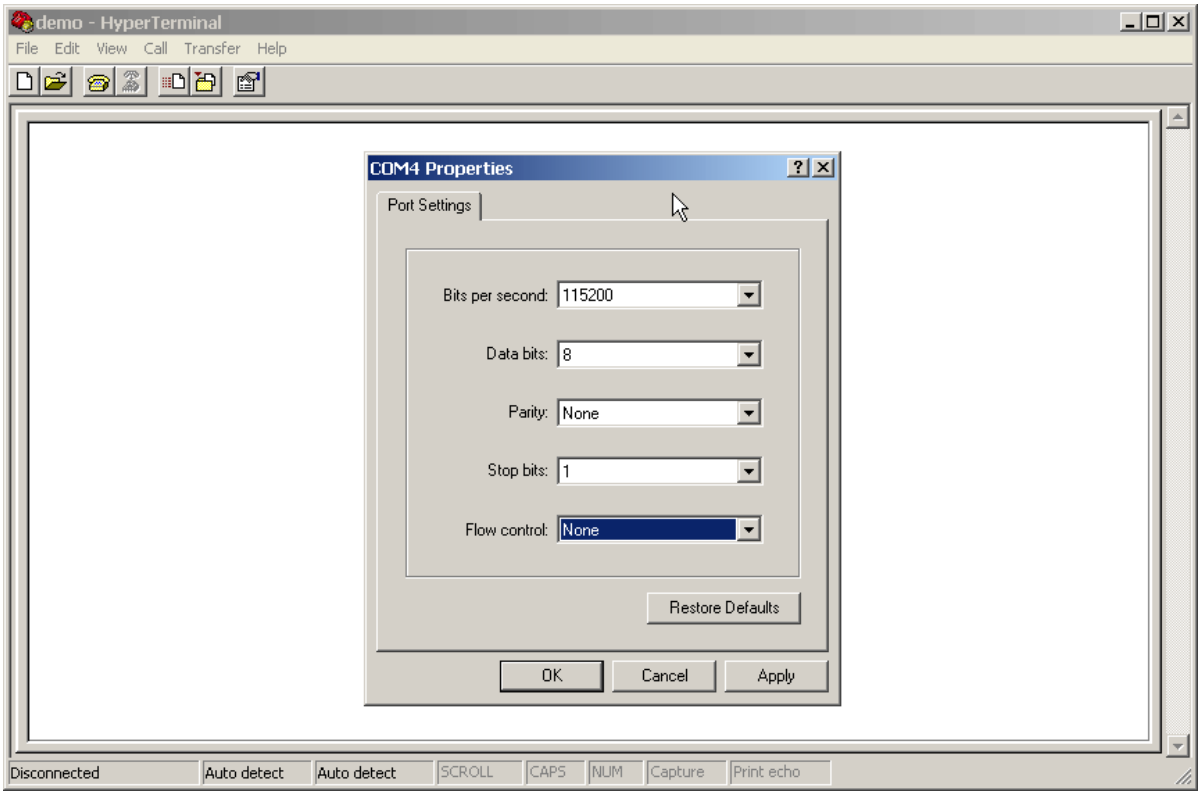
First open Start->Programs->Accessories->Communications->Hyper Terminal, give a name for this connection, and press OK.



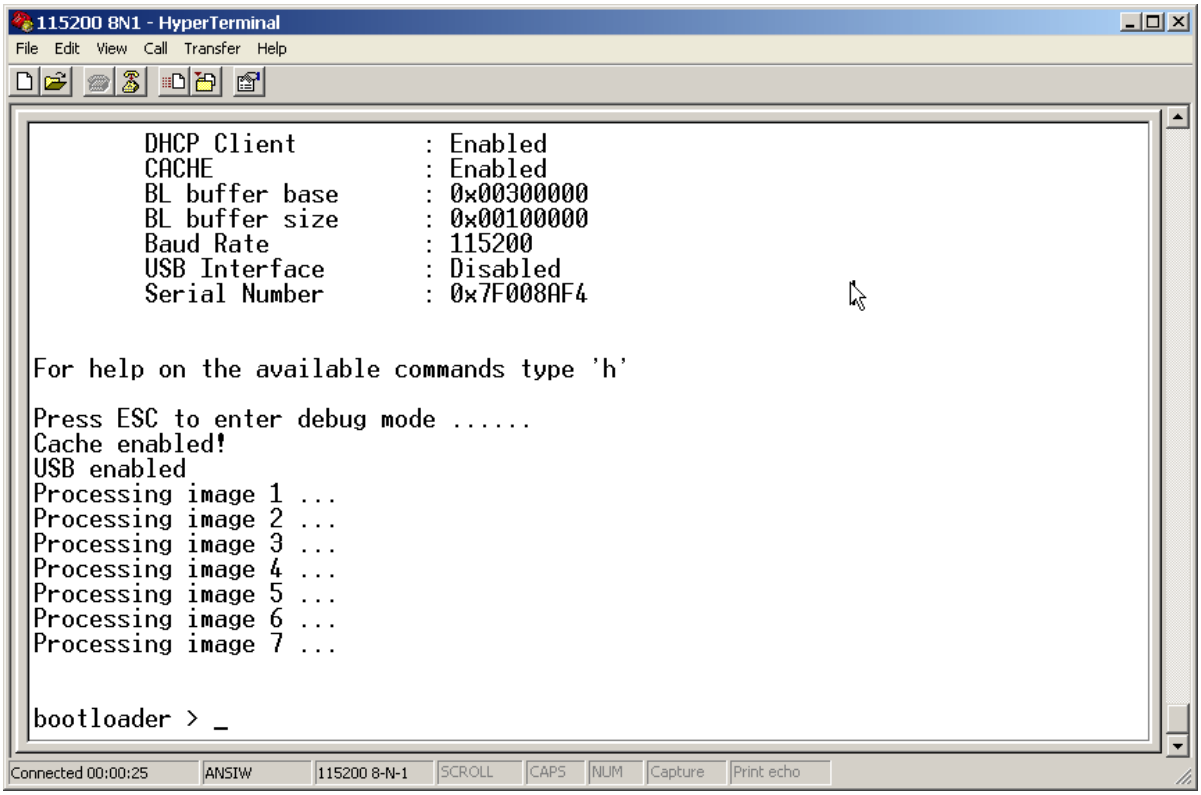
Select the COM port connecting with target board



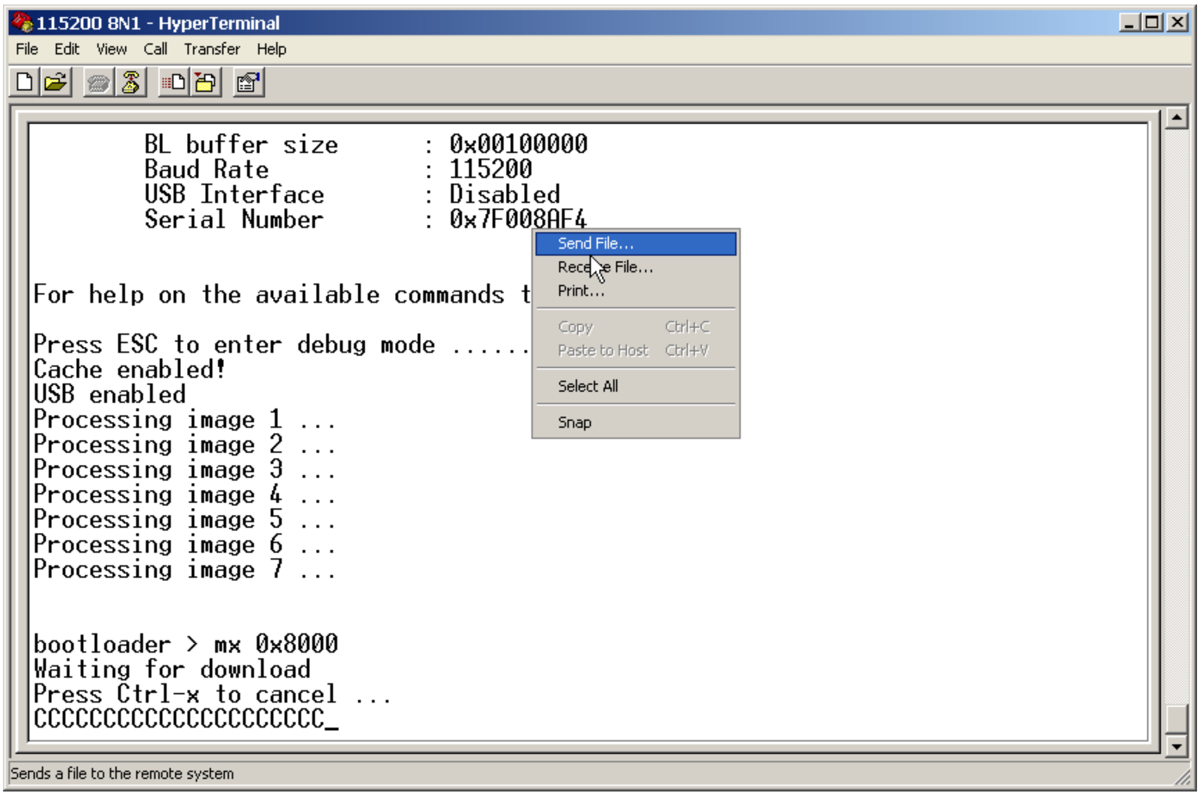
Set the attribute of this connection, the default UART configuration of bootloader is 115200 8-N-1, as displayed in following image.



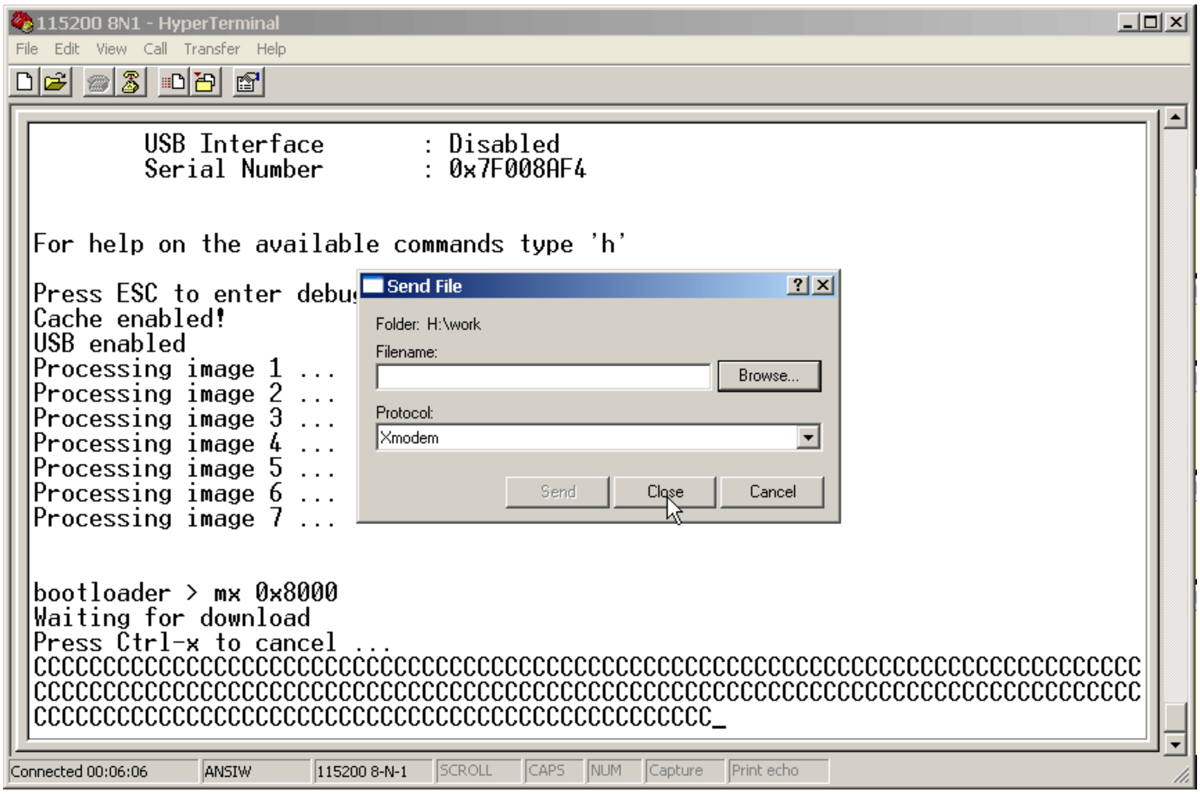
You should be able to see the output in Hyper Terminal now.

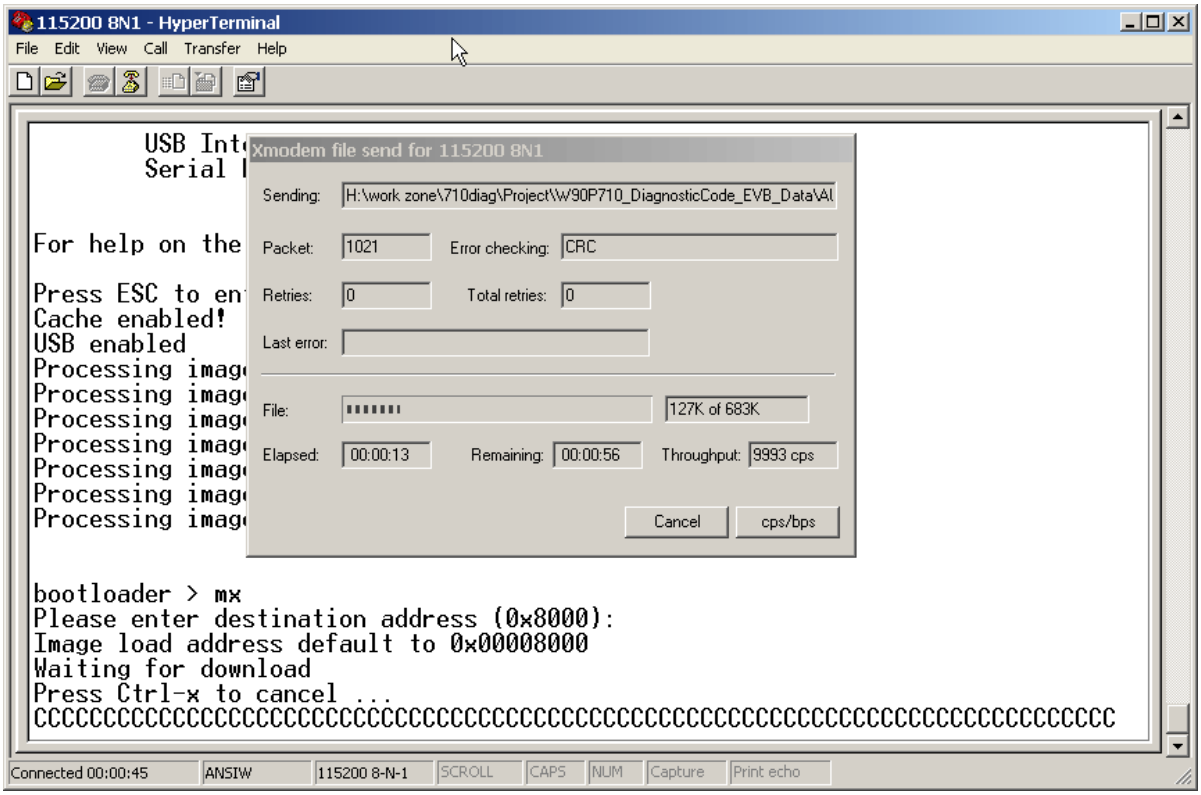


Type command “mx 0x8000”, and press mouse right button, select “Send File…”

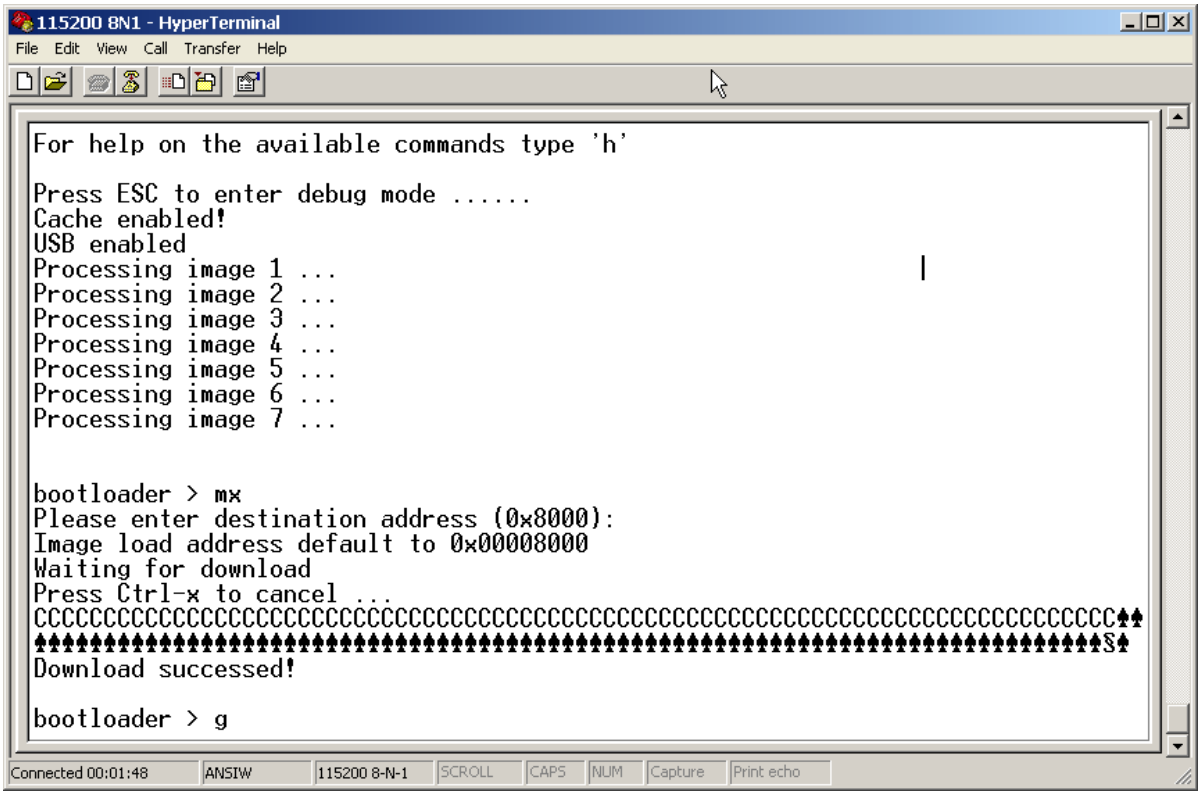


Select the executable image as upload file, and change protocol to Xmodem.

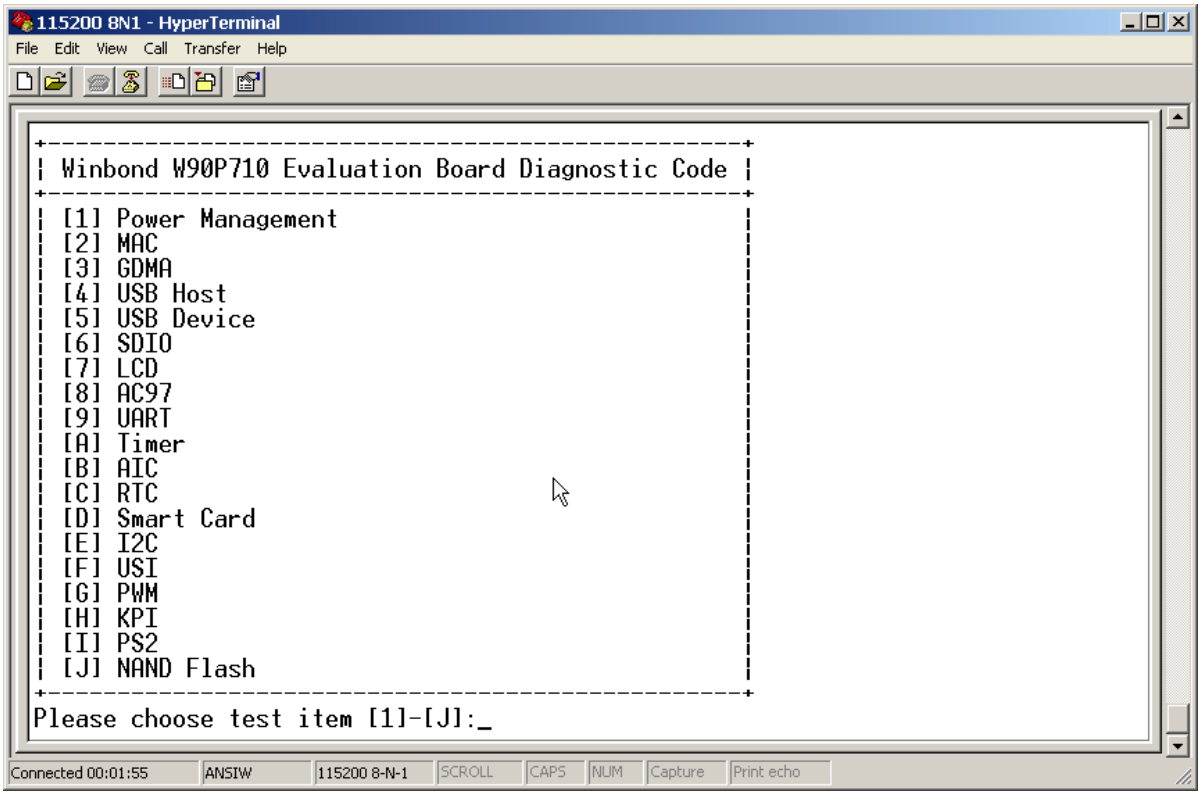




After previous transfer complete, input command “g”, to execute the image



And the main menu of diagnostic code will be shown on Hyper Terminal as the image below. Now you can test each function on board following the instruction on the console.


115200 8N1 - HyperTerminal
File Edit View Call Transfer Help
Winbond W90P710 Evaluation Board Diagnostic Code
[1] Power Management
[2] MAC
[3] GDMA
[4] USB Host
[5] USB Device
[6] SDIO
[7] LCD
[8] AC97
[9] UART
[A] Timer
[B] AIC
[C] RTC
[D] Smart Card
[E] I2C
[F] USI
[G] PWM
[H] KPI
[I] PS2
[J] NAND Flash
Please choose test item [1]-[J]:_
Connected 00:01:55
ANSIW
115200 8-N-1
SCROLL
CAPS
NUM
Capture
Print echo

Revision History

Version	Date	Description
1.0	Nov. 1 ‘07	Initial version