Revision History:

Revision	Date	Comment
1.0	July 7, 2006	Initial Version
1.1	May 9, 2008	Update Header

Table of Contents

1 The W90N745 Boot Loader (WBL)

Once install on the target board, the W90N745 Boot Loader (WBL) is the first program to be executed after power on. It is responsible to initialize the system including memory interface, interrupt vector table, address remapping, peripherals and so on.

After the initialization is completed, a prompt message will be shown on the console to notify user to press the ‘ESC’ or ‘B’ key to enter the WBL debug mode. If no key is pressed within a specified period (3 seconds generally), the WBL will start scanning the FLASH ROM. The WBL will load the first active image into DRAM and then pass the CPU control to it. If no active image is found, the WBL will enter debug mode finally.

In the WBL debug mode, a command shell is responsible to get the command string from the serial or network connection. The command shell parses the command, processes the corresponding operations, and then waits the next command The WBL commands are able to support many functions such as image download, FLASH programming, memory editing, program execution and so on.

This document will introduce the WBL on the following sections:

- The W90N745 Boot Loader
- WBL commands
- The FLASH ROM map
- WBL memory map
- Download procedure examples
- Update Bootloader
- FAQ’s

1.1 About the WBL

The W90N745 Boot Loader (WBL) is a ROM-based monitor program. It communicates with the host computer by using a serial or network connection. Generally, the WBL is concomitant with several user programs and saved in the FLASH ROM. Except for the WBL, all the programs are saved as image file format in the FLASH ROM. The image file can be automatically loaded to DRAM for execution after power-on The WBL provides program download and FLASH write functions for user to write the programs into FLASH ROM. Besides, a program can be directly downloaded to DRAM for execution, or downloaded to the FLASH ROM in image format.

1.2 Hardware Connection

To get message or send command to the WBL, user needs to run a terminal emulator program on host PC. The connection between the terminal and the WBL can go through the serial port, or

TCP/IP network..

- Serial Port Connection

  The serial port is the default communication channel with the host computer.
- Network Connection

  The network connection is used by the alternate communication channel and TFTP download function.

1.2.1 Setting up a serial connection

A general terminal emulator program such as Windows HyperTerminal or Linux minicom could be used to communicate with the WBL. Before open the terminal, connect the W90N745 target board and host PC with a serial cable. The interface setting of the terminal should be configured as below.

Baud rate	115200
Data bits	8
Parity	None
Stop bits	1
Flow control	None

1.2.2 Setting up a TCP/IP connection

When choosing the TCP/IP connection, a terminal emulator program having network connection support is necessary. A usual example is the Windows HyperTerminal with WinSock support. Make sure the target board and host PC are in the same network domain. Besides, the WBL's 'debug port' must be changed to network. The network interface setting of the terminal emulator must be as the following.

Host address	xxx.xxx.xxx.xxx (The IP address of WBL on the target, such as 192.168.1.100)
Port number	65500

1.3 The WBL commands

WBL provides a set of commands to do the system configuration, image download, update flash image, and others. The summary of the command's function is listed below.

- Download images through the serial connection into system memory or FLASH ROM.
- Download images into system memory or FLASH ROM through network.
- Read and write data in memory.
- Configure platform system information.
- Enable or disable cache.
- Decompress images to the system memory.
- Support network communication channel with host computer.

2 The command set of the boot loader

The command interpreter accepts user's commands to do the specified operations. The following table lists the legal command set. Commands can be accepted in uppercase or lowercase.

Command	Comment
H	Display the available commands
B	Set Baud Rate
D	Display memory. D -? for help
E	Edit memory. E -? for help
G	Go to address
I	Information
MX	Xmodem download
MT	TFTP download/ USB download(According to the bootloader)
FT	Program the flash by TFTP. T -? for help
FX	Program the flash by Xmodem. P -? for help
CP	Memory copy
LS	List the images in the flash
SET	Setting boot loader configuration. SET -? for help
CHK	Check the flash
RUN	Execute image
DEL	DEL the image or flash block
MSET	Fill memory
TERM	Change the terminal output port
BOOT	Reboot the system
USB	USB setting
CACHE	Cache setting
UNZIP	Unzip image
ATTRIB	Change the image attribution

2.1 H, Show the command list

SYNOPSIS

H

DESCRIPTION

This command is used to list all valid commands provided by the WBL.

EXAMPLE

```
bootloader > h
```

All commands will be shown on the terminal emulator with brief descriptions.

2.2 B, Set baud rate

SYNOPSIS

B [1200] [2400] [4800] [9600] [14400] [19200] [28800] [38400] [57600] [115200] [230400] [460800]

DESCRIPTION

This command is used to set the baud rate of the serial line used by the WBL

EXAMPLE

```
bootloader > b 115200
```

The baud rate changes immediately after the target system baud rate was set. The baud rate setting of the terminal emulator needs to reconfigure to new baud rate setting..

The flow control and stop bits cannot be configured.

2.3 D, Display the memory contents

SYNOPSIS

D -[w,h,b,s] [taddr]
-w, -W Word alignment
-h, -H Half-word alignment
-b, -B Byte alignment
-s, -S Swap target
[taddr] Target memory address.

DESCRIPTION

This command displays 256 bytes of system memory by the specified address. The data format shown on the terminal emulator could be 32, 16 or 8 bits. That could be specified by command options such as ‘w’, ‘h’, or ‘b’. The ‘w’ option lets the command show the system memory in words (4 Bytes). The ‘h’ option lets the command show the system memory in half-words (2 Bytes). The ‘b’ option lets the command show the system memory in bytes. If the data format option is not given, the data is default to show in 32 bits format. If the address is not given, the address following the previous shown address will be the default address. An example of this command is shown as follows:

```
bootloader > d -w 0x8000

Displaying memory at 0x8000
[00008000] FFFFE9FB FEEFF9FD - FFFF7ABD FFFFFF9E .........z......
[00008010] 5ECB8FFF F5ABE579 - CFFFFBF6 FFBDFFEF ...^y...........
[00008020] EFEFBFFE B4FFFFB7 - 7DFCFFEE BF9FDFFD ...........}....
[00008030] CEF7EAF9 FFE3FB7D - FFFCEFF7 FFEBFFFB ....}...........
[00008040] E76E9EFF ABDEF78E - 3DF7FFF5 FBD9EDF3 ..n........=....
[00008050] EFDEBEFF F25B5FD9 - FF7F6F5F E9F6F2AF ....._[._o_.....
[00008060] BFED7EFF F3F7D79A - FCF3DEFF 999B3BFB .~...........;..
[00008070] FFFBF5DF F7FFF7EE - 7EFFFFDB FDB95BEF ...........~.[..
[00008080] FDFFFFB7 D8BFDF6D - BDFEFDFD F77FED77 ....m.......w._.
[00008090] DF7FBFFD DF7FEFFF - 7FDFCEF7 DFEFF77F .._..._....__...
[000080A0] 95FBF77F 6BBFF7F7 - 5FF5D776 FEFFD9F7 _......kv.._....
[000080B0] FFFFFFB7 BFBFFFF7 - FBFFFEBD BFF7BE7F ............_...
[000080C0] F6CDBBD4 7FDD3DFF - FF5FFD7F 53FDE77F .....=.__._._..S
[000080D0] DD56F7DE 4EEFF33F - FBEEFFBB F7B7F7DF ..V.?..N........
[000080E0] FBE7F7F7 FFFDEDF3 - 6EBFFEFF AFB2FFDE ...........n....
[000080F0] 7FFFFFFF 7CFF77BB - DDE5FBF7 FF7BFEFF ..._.w.|......{.
```

2.4 E, Edit the system memory

SYNOPSIS

E -[w,h,b,s] [taddr]
-w, -W Word alignment
-h, -H Half-word alignment
-b, -B Byte alignment
-s, -S Swap target
[taddr] Target memory address.

DESCRIPTION

This command edits the data on the target address, both the data and address are represented by hex decimal format. The data width edited could be 32, 16 or 8 bits. They are specified by command options 'w', 'h' and 'b'. The 'w' option specifies the word access (4 Bytes). The 'h' specifies the half-word access (2 Bytes). The 'b' specifies the byte access. If the data format option is not given, the data width is default to be 32 bits format.

EXAMPLE

```
bootloader > e -b 0x8000 [8000] 90 -> 90 [8001] 80 -> 80 [8002] 8F
```

The original data at the specified address will be shown in hex before you change it. You can use backspace key to erase the original hex number while changing it. The actual contents of the specified memory won't change until you press 'Enter'. The WBL will step to next memory to edit once the 'Enter' key was pressed. Press the 'ESC' to exit if all modifications have been done.

2.5 G, Go to address

SYNOPSIS

G [address]

DESCRIPTION

This command transfers control to the specified address. Use hex format of the address. If the address is not given, the default address 0x8000 is used.

EXAMPLE

```
bootloader > g 0x8000
```

WBL will transfer control to the given address.

2.6 I, Show WBL information

SYNOPSIS

I

DESCRIPTION

This command is used to show the WBL information. The information includes the version number, board information and processor name.

EXAMPLE

```
bootloader > i
```

The WBL relevant information would be shown on the terminal.

2.7 MX, Download to system memory by Xmodem

SYNOPSIS

MX [download address]

DESCRIPTION

Use this command to download an image into DRAM on the specified address. The WBL uses the XMODEM protocol to communicate with the host computer through the serial connection. After the XMODE download procedure starts, the WBL will continue to prompt 'C' character on the console. At the same time, user should select a image from the host PC to be downloaded. If the user wants to cancel the downloading procedure, press Ctrl-x to stop it.

To download a file into address 0x8000:

1. Type mx 0x8000 at the prompt. (Or simply type mx, and WBL will prompt for the download destination address, simply type ENTER key to use default address 0x8000)
2. Use the Transmit File command of your terminal emulator to send the file. If the emulator has more transfer options, use the XMODEM protocol.

EXAMPLE

```
bootloader > mx 0x8000
Press Ctrl-x to cancel ... CCCCCCCCCC
Download successed!
```

2.8 MT, Download to system memory by TFTP /XUSB

SYNOPSIS

MT [download address]

DESCRIPTION

Use this command to download an image into DRAM to the specified address. The WBL will start a TFTP/XUSB server to receive the image. Note that the transfer mode must be 'binary'. The IP address of the TFTP/XUSB server could be ether fixed or obtained by using DHCP protocol. The actual method is according to the setting of the boot information block.

To download a file into 0x8000:

1. Type mt 0x8000 at the prompt. (Or simply type mt, and WBL will prompt for the download destination address, simply type ENTER key to use default address 0x8000)
2. Use the tftp/usb client in the host computer to send the file(It depends on which version of

bootloader is in FLASH). A tool, Magic Terminal, helps to make send the file more confortable. Refer to the part 7 of this ducoment for detail information.

- Using TFTP: The tftp client must be set to binary mode to transfer the file. (such as, 'tftp -i 10.3.29.41 put hello.exe', '-i' is used to set to binary transfer mode)

```
bootloader > mt 0x8000
Wait for auto-negotiation complete...OK
100MB - Full Duplex
DHCP DISCOVER...
DHCP REQUEST... DHCP
ACKed...
IP Address. . . . . . . . . . . . : 10.3.29.41
Subnet Mask . . . . . . . . . . . : 255.255.0.0
Default Gateway . . . . . . . . . : 10.3.1.254
```

- Use the xusb client in the host computer to send the file (such as, 'xusb linux.bin'). bootloader > mt

```
Please enter destination address (0x8000):
Image load address default to 0x00008000
Waiting for usb download …
```

or

```
Bootloader > mt 0x80000
Waiting for usb download …
```

Then type xusb <file> in Windows/Linux's command prompt.

2.9 FX, Load an image into flash by Xmodem

SYNOPSIS

FX [ImageNo.] [ImageName] [base address] [exec address] -[a,c,x,f,z]

-a Active image
-c Image needs to be copy to RAM
-x Executable image
-f File system image
-z Compressed image

DESCRIPTION

This command downloads an image into memory by XMODEM and then programs it into FLASH. As part of the programming process, the WBL will build FLASH image footer according to the image characteristic. In order to build the correct footer information, the relative information of the image must be specified. The information is:

- Image number:
  A unique number for the image.
- Image name:
  The name of the image, up to 16 characters.
- Image base address:
  The actual start address of the image on FLASH.
- Image load address:
  The final address when the image executing, it maybe the RAM or FLASH address. If the final image is executed on FLASH, the 'Image base address' and 'Image load address; should set to the same address.
- Image attribution:
  The attributes of the image. The WBL will use these attributes to decide how to process the image on loading it. Such as coping it to memory, executing it, or decompressing it to system memory.

To load an image into flash:

1. Decide the image number, image name, image base, image load address, and image attributes. Ex: 1, demo_image, 0x7f020000, 0x8000, -acx
2. Type fx 1 demo_image 0x7f020000 0x8000 –acx at prompt
3. Use the **Send File** command of your terminal emulator to send the file. If the emulator has more transfer options, use the **Xmodem protocol.**

```
bootloader > fx 1 demo_image 0x7f020000 0x8000 -acx
Press Ctrl-x to cancel ... CCCCCCCCCCCCCCCCC
Flash programming ...
```

2.10 FT, Load an image into flash by TFTP/XUSB

SYNOPSIS

FT [ImageNo.] [ImageName] [base address] [exec address] -[a,c,x,f,z]
-a Active image
-c Image needs to be copy to RAM
-x Executable image
-f File system image
-z Compressed image

DESCRIPTION

This command downloads an image into memory by TFTP/XUSB and then programs it into FLASH. As part of the programming process, the WBL will build a appropriate FLASH image footer. In order to build the footer information, the relative information of the downloaded image must be specified. The information is:

- Image number
  A unique number for the image
- Image name:
  The name of the image
- Image base address
  The actual address of the image on flash.
- Image load address
  The final address when the image executing, it maybe the RAM or FLASH address. If the final image is executed on FLASH, the 'Image base address' and 'Image load address; should set to the same address.
- Image attribution
  The attributes of the image. The WBL will use these attributes to decide how to process this image on loading. Such as copying it to memory, executing it, and decompressing it into system memory.

To load an image into flash:

1. Decide the image number, image name, image base, image load address, and image attributions. Ex: 1, demo image, 0x7f020000, 0x8000, -acx
2. Type ft 1 demo_image 0x7f020000 0x8000 –acx at prompt
3. Use the tftp/xusb client in the host computer to send the file.
   - Using TFTP: The tftp client must be set to binary mode to transfer the file. (Such as, 'tftp -i 10.3.29.41 put hello.exe', '-i' is used to set to binary transfer mode)

```
   bootloader > ft 1 demo_image 0x7f020000 0x8000 -acx
Waiting for usb download ...
```

```
Wait for auto-negotiation complete...OK
100MB - Full Duplex
DHCP DISCOVER...
DHCP REQUEST...
DHCP ACKed...
IP Address. . . . . . . . . . . . : 10.3.29.41
Subnet Mask . . . . . . . . . . . : 255.255.0.0
Default Gateway . . . . . . . . . : 10.3.1.254
```

- Use the xusb client in the host computer to send the file.

```
bootloader > ft 1 demo_image 0x7f020000 0x8000 -acx
Waiting for usb download ...
```

Then type xusb <file> in Windows/Linux’s command prompt.

2.11 CP, Copy memory

SYNOPSIS

CP [saddr] [taddr] [length]

[saddr] source address to be copied from

[taddr] target address to be copied to

[length] The length of memory block to be moved

DESCRIPTION

This command is used to copy a block of memory. The destination must be in RAM.

EXAMPLE

```
bootloader > cp 0x7f020000 0x8000 0x100000
```

This command will copy the data from 0x7f020000 to 0x8000 with the size 0x100000.

2.12 LS, List the images in the FLASH

SYNOPSIS

LS

DESCRIPTION

This command is used to list the images on the FLASH. The information of image including image number, image name, image base address, image size, execution address and image attributes. This command can be used to check images position, size and the free space of the FLASH.

EXAMPLE

```
bootloader > ls
Image: 0 name:BOOT INFO base:0x7F010000 size:0x0000FFCC exec:0x7F010000 -f
Image: 1 name:romfs base:0x7F020000 size:0x0009D400 exec:0x00700000 -ac
Image: 2 name:linux base:0x7F0C0000 size:0x000E8250 exec:0x00008000 –acx
```

2.13 SET, Set the boot information block

SYNOPSIS

SET [-mac0 [addr]] [-ip0 [addr]] [- dhcp [0,1]] [-cache [on, off]] [-buffer [base] [size]] [-baudrate [UART baudtate]] [-sn [serial number]]

DESCRIPTION

The boot information block is used to store the basic configuration of the bootLoader. It includes the Ethernet port used by TFTP server(or USB configuration for bootloader supports USB upload), the MAC PHY chip, the Ethernet MAC address, the IP address, cache ON/OFF, and boot loader buffer address. The system must be rebooted to make the new setting be valid.

2.13.1 MAC Address

This is the network address for the MAC

EXAMPLE

```
bootloader > set –mac0 00:11:22:33:44:55
```

or

```
bootloader > set –mac0 001122334455
```

2.13.2 IP Address

This is the fixed IP address

EXAMPLE

```
bootloader > set –ip0 192.168.1.1
```

2.13.3 DHCP Client

If this option is enabled, the IP address used by the WBL will be obtained from the DHCP server. If it is disabled, WBL will use fixed IP address.

For example (Disable DHCP client):

```
bootloader > set -dhcp 0
```

2.13.4 Cache

User can user this option to configure cache status before processing images in FLASH ROM
For example (Disable Cache):

```
bootloader > set –cache off
```

2.13.5 BL buffer base

When using TFTP server, network console, SET command or decompression function, the WBL needs additional memory space to do it. The address of the ‘buffer base’ used by the WBL must ensure that it would not make conflict on doing the TFTP server downloading, network console, or decompression function. This option indicates the base address of the free space for the WBL. The buffer base must be set with buffer size.

2.13.6 BL buffer size

This option indicates the size of the free space reserved for the WBL. The buffer size is recommended to be 0x100000.

For example (base=0x300000, size=0x100000):

```
bootloader > set -buffer 0x300000 0x100000
```

2.13.7 Default Baud rate

WBL supports various default baud rate settings. Generally, the default baud rate is 115200 bps. If the default baud rate needs to change to other speed, the user can use SET command with -baudrate option to set it.

For example (Set default baud rate to 38400)

```
bootloader > set -baudrate 38400
```

The WBL needs to be restarted to enable the new setting. The set baud rate command is different to B command, which change the baud rate immediately. All WBL supported baud rate can be used to be default baud rate. Please refer to B command to the supported baud rate.

2.13.8 Serial number

This is the serial number of the bootloader

EXAMPLE

```
bootloader > set –sn 0x01
```

2.13.9 USB

This configuration disable or enable USB interface.

EXAMPLE

```
bootloader > set –usb 0
```

2.15 CHK, Check the FLASH space

SYNOPSIS

CHK

DESCRIPTION

This command is used to check the image checksum. If the image data were corrupted, a checksum error message would be shown on the terminal.

EXAMPLE

```
bootloader > chk
```

Image check finished. 0 checksum error found.

2.16 RUN, Execute image

SYNOPSIS

RUN [image number]

DESCRIPTION

This command is used to execute an image. The command will process the image according to the attributes of the image.

For example(Execute image 1):

```
bootloader > run 1
```

2.17 Del, Delete the image or FLASH block

SYNOPSIS

DEL [ImageNo.] [block] [-all]
[ImageNo.] Delete the image
[block] Delete the block
[-all] Delete all blocks

DESCRIPTION

This command is used to delete the image from the FLASH. If the image number is given, this command will delete the specified image. If the block number is given, this command will only erase that block. You also can use this command to erase all blocks in the FLASH except block 0 and 1 with the option -all. The size of each block is 64KB. If the FLASH size is 2MB, there would be 32 blocks in the FLASH. These blocks are numbered form block 0 to 31.

EXAMPLE

```
bootloader > del 1  Delete the image 1
bootloader > del b1  Delete the block 1 of the FLASH
bootloader > del -all  Erase all blocks in the FLASH except block 0 and 1
```

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2.18 MSET, Fill memory

SYNOPSIS

MSET -[w,W,H,h,B,b] [saddr] [size] [value].

-w, -W Word alignment

-h, -H Half-word alignment

-b, -B Byte alignment

[saddr] Start address to be filled from.

[size] Size of the memory to be filled.

[value] The vaule to be filled into memory.

DESCRIPTION

The MSET command fills a block size of memory with the specified value. This value could be word, half-word, or byte. There options are -w, -h, -b. The default is word.

EXAMPLE

```
bootloader > mset 0x8000 0x400000 0x12345678
```

Fill 0x12345678 to address 0x8000 by word(4 bytes) with the length 0x40. The memory contents should become:

```
Displaying memory at 0x8000
[00008000] 12345678 12345678 - 12345678 12345678 xV4.xV4.xV4.xV4.
[00008010] 12345678 12345678 - 12345678 12345678 xV4.xV4.xV4.xV4.
[00008020] 12345678 12345678 - 12345678 12345678 xV4.xV4.xV4.xV4.
[00008030] 12345678 12345678 - 12345678 12345678 xV4.xV4.xV4.xV4.
```

```
bootloader > mset -b 0x8000 0x40 0x1234
```

Fill 0x1234 to address 0x8000 by byte with the length 0x40. The memory contents should become:

```
Displaying memory at 0x8000
[00008000] 1234 1234 1234 1234 - 1234 1234 1234 1234 4.4.4.4.4.4.4.4.
[00008010] 1234 1234 1234 1234 - 1234 1234 1234 1234 4.4.4.4.4.4.4.4.
[00008020] 1234 1234 1234 1234 - 1234 1234 1234 1234 4.4.4.4.4.4.4.4.
[00008030] 1234 1234 1234 1234 - 1234 1234 1234 1234 4.4.4.4.4.4.4.4.
```

2.19 TERM, Change the debug channel

SYNOPSIS

TERM [0] [1]
[0] for serial port output,   [1] for TCP/IP output

DESCRIPTION

The WBL supports an alternate debug communication channel to host computer. The user can use this command to switch to another debug channel. The option 0 is to switch to serial port and the option 1 is to switch to network connection.

EXAMPLE

```
bootloader > term 0
```

Switch to serial port connection

```
bootloader > term 1
```

Switch to network connection

2.20 BOOT, Reboot the system

SYNOPSIS

BOOT

DESCRIPTION

The BOOT command will make a software reset of the W90N745 to reboot the system immediately.

EXAMPLE

```
bootloader > boot
```

2.21 CACHE, Setting cache

SYNOPSIS

CACHE -[on,off]

-on, -off	Enable/Disable cache
-f	Flush cache

DESCRIPTION

This command is used to enable or disable the cache. The options are: -on Enable the cache -off Disable the cache. Please be noted, this setting is for run-time only, and will not be written into boot information block.

EXAMPLE

```
bootloader > cache –on
```

2.22 UNZIP, Decompress the image

SYNOPSIS

UNZIP [ImageNo.]

DESCRIPTION

The UNZIP command can decompress an image of the given image number into system memory according to the load address recorded on the image footer.

EXAMPLE

```
bootloader > unzip 1
```

2.23 ATTRIB, Change the image attribution

SYNOPSIS

ATTRIB [ImageNo.] -[a,c,x,f,z]

-a Active image
-c Image needs to be copy to RAM
-x Executable image -f File system image
-z Compressed image

DESCRIPTION

The ATTRIB command can be used to change the attribution of an image without re-download it.

EXAMPLE

```
bootloader > ls
Image: 0 name:INFO base:0x7F010000 size:0x0FFCC exec:0x7F010000 -f
Image: 7 name:linux base:0x7F020000 size:0x76F10 exec:0x00008000 -axz
Image: 6 name:romfs base:0x7F100000 size:0xDAD88 exec:0x00700000 -az
bootloader > attrib 6 –f
Image attribution changed successfully
bootloader > ls
Image: 0 name:INFO base:0x7F010000 size:0x0FFCC exec:0x7F010000 -f
Image: 7 name:linux base:0x7F020000 size:0x76F10 exec:0x00008000 -axz
Image: 6 name:romfs base:0x7F100000 size:0xDAD88 exec:0x00700000 -f
```

In this example, the attribution of image 6 was changed from “-az” to “-f” by ATTRIB command. The user may use the “LS” command to check if the image attribution changed successfully.

2.24 USB, Setting USB interface

SYNOPSIS

USB -[on,off]

-on, -off Enable/Disable USB at run-time

DESCRIPTION

This command is used to enable or disable USB interface at run-time. The options are: -on Enable the USB interface, -off disable it. Please be noted, this setting is for run-time only, and will not be written into boot information block.

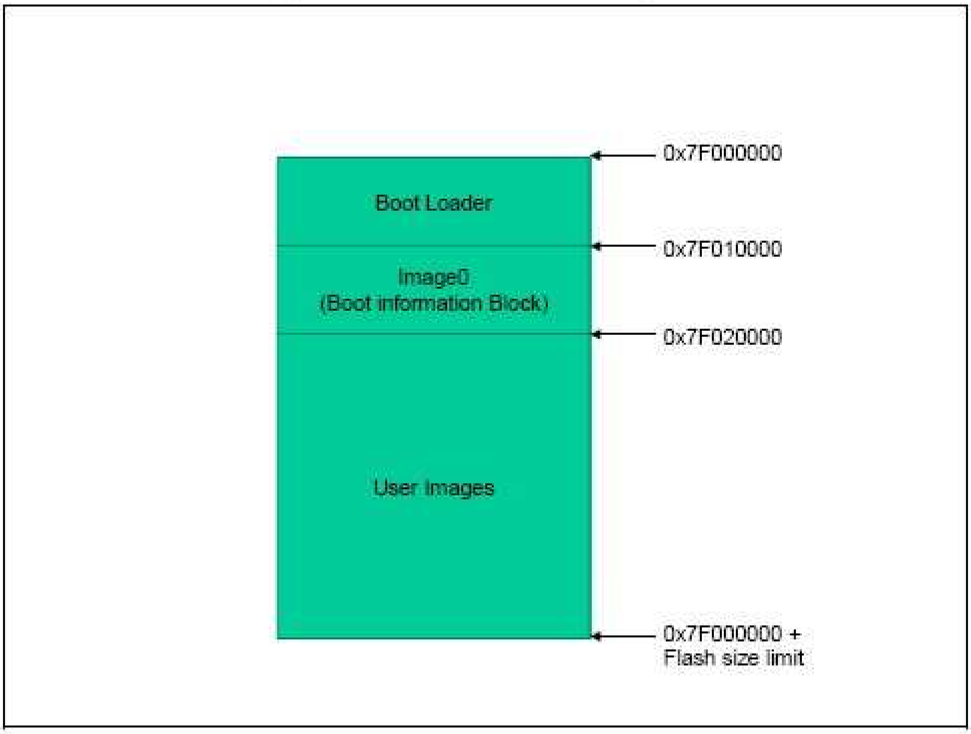
EXAMPLE

```
bootloader > cache –on
```

3 The FLASH ROM map of the WBL

The main function of the WBL is to boot up the system and load the user program to execute it. Therefore, the boot loader must be located in the offset zero of the FLASH. The minimum space requirement of boot loader is 128KB. The first 64KB is the binary code of boot loader, and the following 64KB is reserved for image 0 which is used to store the boot information block. If the FLASH ROM on the system is larger than 128KB, the other space can be used to store the user's images. The FLASH ROM map is shown as follows:

Figure 1 Boot Loader Flash Map



3.1 W90N745 Boot Loader

The W90N745 Boot Loader must be placed on the offset zero of the FLASH. For the W90N745 target platform, the boot ROM is remapped to 0x7F000000. Therefore, the boot loader's starting address is 0x7F000000.

3.2 Image 0

All images in the FLASH ROM have an unique number to identify themselves. The image 0 is a special one, which is used to store the boot information. The boot information including:

Name	Size (byte)	DESCRIPTION
length	4	Indicating the length of the information block
type	4	Identify the information block
mac	6	The network address for MAC
ip	6	The IP address for network interface. The last two bytes are reserved.
reserved	12	
cache	4	Setting the cache when loading images
dhcp	4	Setting if the IP address is given by DHCP or not
reserved	8	
buf_base	4	The base address of the buffer used by boot loader
buf_size	4	The size of the buffer used by boot loader
baudrate	4	The default baud rate of the serial port
reserved	4	
sn	4	The serial number of bootloader
usb	4	USB device setting after bootup

If the image 0 could not be found during power-on initialization, the WBL will create it at the address 0x7F010000. A 64KB FLASH memory size starts at 0x7F010000 should be reserved for image 0.

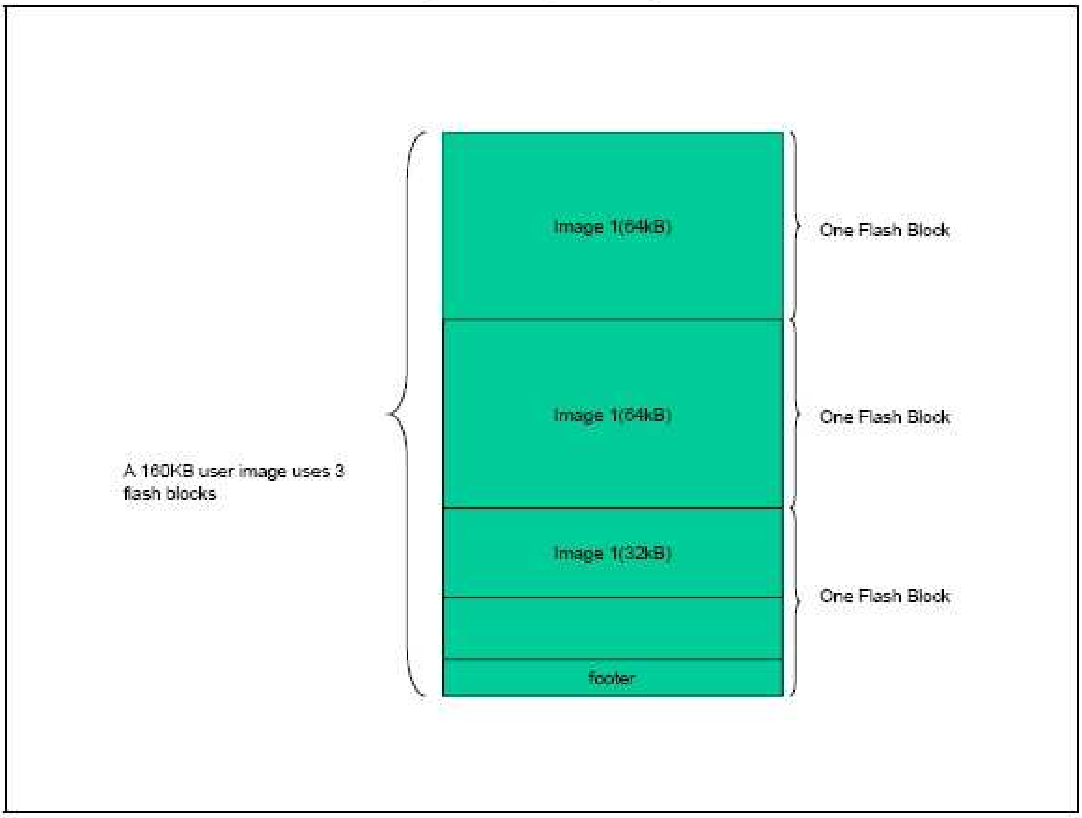
3.3 User images

At the boot time, the WBL searches images form number 1 to 7. If an image is found, the boot loader will process it according to its attributes.

3.4 Image

An image is a binary code or a general data file, which has footer information. When downloading the user program into FLASH, the WBL automatically writes the footer for it. The footer is always located at the end of the last FLASH block of the image. Note that, if there is no enough free space at the last FLASH block containing the user program, the footer will be written to the end of the next free block. An example is shown as follows:

Figure 2 Image Example



All FLASH space is divided into blocks by the size of 64KB. The user image is stored in these blocks. For an image of size 160KB, it needs at least three blocks to store the image. The footer will be written to the end of the last block.

3.4.1 Footer

The footer is a data structure to store all the information relative to the image. The information in the footer includes:

Name		
num	4	The image number

base	4	The base address of the image
length	4	The image size
load_address	4	The load address of the image.
exec_address	4	The execution address of the image.
name	16	The image name
image_checksum	4	The checksum of the image
signature	4	A signature word to identify a footer
type	4	The attribution of the image
checksum	4	The checksum of the footer

3.4.2 Image attribution

The image attributes are stored in the footer. The WBL will process the image according to the attributes. The attributes and its effect are listed as follows:

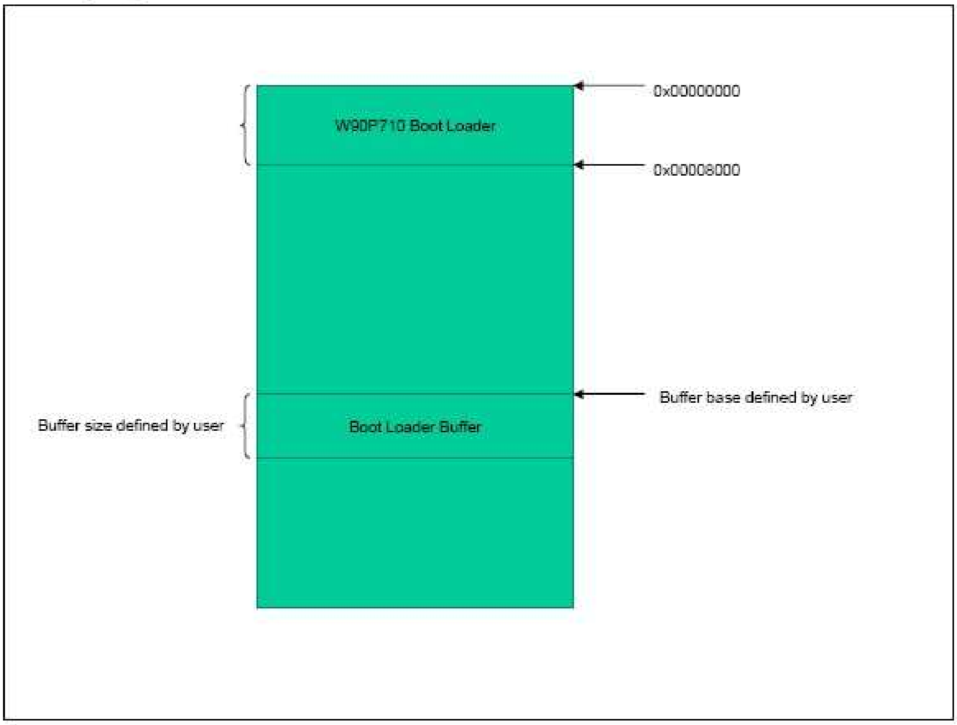
- IMAGE_ACTIVE (0x1) (-a)
  This attribute indicates that it must be processed at booting time. If the image is not active, the WBL will skip it.
- IMAGE_COPY2RAM (0x2) (-c)
  This attribution indicates that it must be copied from FLASH into system memory. The WBL will copy the image from base address to the load address if the image is active and the IMAGE_COPY2RAM attribution is set.
- IMAGE_EXEC (0x4) (-x)
  If the IMAGE_EXEC attribute is set, the WBL will pass the control to the image. If the user image is a semihosted application, the WBL can continue to process the next image after the semihosted application terminated. This attribute is usually used with IMAGE_COPY2RAM to execute the image in system memory.
- IMAGE_FILE (0x8) (-f)
  The IMAGE_FILE attribute is used to indicate this image is a file system image. The WBL doesn't do anything for this image.
- IMAGE_COMPRESSED (0x10) (-z)
  The IMAGE_COMPRESSED attribution is used to indicate the image was compressed. The WBL will decompress it to its load address. At present, the WBL only supports the ZIP format files.

Some of the above attributes could be used together. For example: IMAGE_ACTIVE and IMAGE_COMPRESSED and IMAGE_EXEC will cause the WBL to decompress the image into system memory and then execute it. Therefore several attributes can be set to be active according to the requirement.

4 The WBL memory map

The WBL requires two memory buffers to execute. The first one is a 32KB memory blockstarting from address 0x0. The other one is a buffer area defined by the user. The runtime memory map of the WBL is illustrated as follows:

Figure 3 WBL Memory Map



4.1 32KB memory

The WBL requires the 32KB memory at low address from 0x0 to 0x7FFF. The memory is used to be as stack, heap and code section of bootloader. The user program can't use this area if it wants to return to the WBL after termination.

4.2 Boot loader memory management

The WBL defines a buffer for special usage. This buffer provides a larger memory space for the WBL to accomplish some special functions. The detailed description is as follows:

4.2.1 Backup image 0

When setting the boot information, the free space in image 0 can be used to store application data. The WBL must backup the whole image 0 to prevent data from lost when it programs the boot information into FLASH. The buffer required to backup the image 0 data is 64KB.

4.2.2 Buffer used by network connection

The network connection needs about 64KB memory space to be as the net buffer. Once the WBL uses the network functions, such as TFTP server or network console, this buffer must be provided.

4.2.3 Buffer used by decompression

The decompression function in the WBL requires about 50KB memory space to accomplish the function.

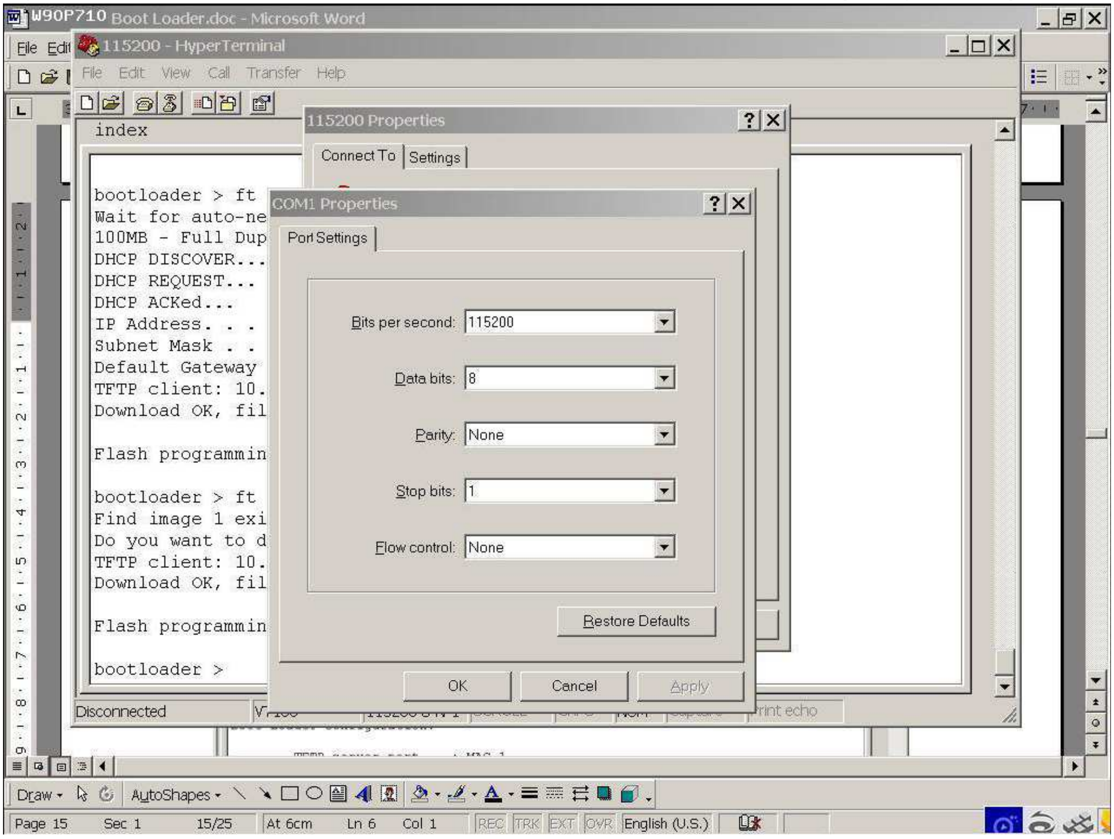
4.2.4 Stack and heap space for semihosted program

A 128KB stack and a 128KB heap are required for the semihosted program to be executed.

5 Download procedure examples

5.1 Case 0: How to enter debug mode?

To communicate with the host computer, you need to set the terminal emulator to the proper serial port setting. In Windows' HyperTerminal, the serial port setting illustrated as the following figure. It should be set to baud rate 115200, 8 data bits, no parity, 1 stop bit, no flow control.



```
index

bootloader > ft
Wait for auto-ne
100MB - Full Dup
DHCP DISCOVER...
DHCP REQUEST...
DHCP ACKed...
IP Address. . .
Subnet Mask . .
Default Gateway
TFTP client: 10.
Download OK, fil

Flash programmin

bootloader > ft
Find image 1 exi
Do you want to d
TFTP client: 10.
Download OK, fil

Flash programmin

bootloader >
```

Bits per second: 115200

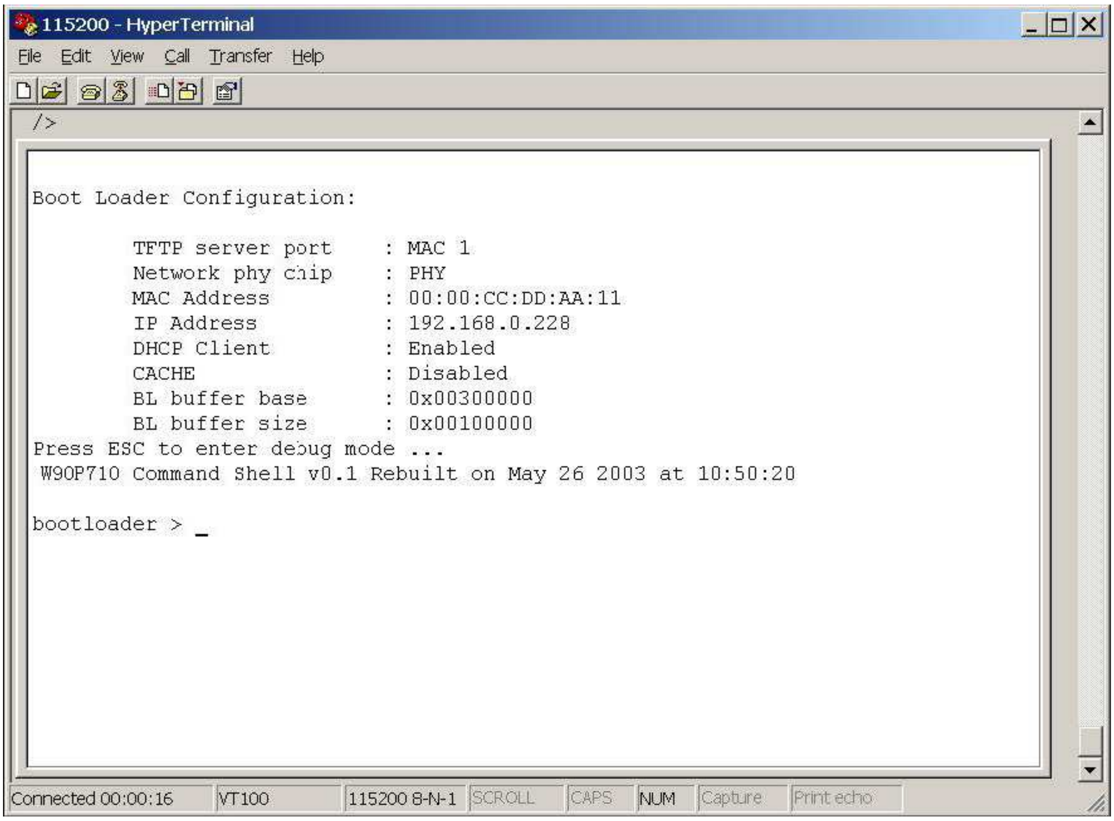
Data bits: 8

Parity: None

Stop bits: 1

Flow control: None

If the WBL is connected correctly to the host computer, there are some messages shown on the terminal emulator when system startup. The WBL will wait for 3 seconds before loading images. Press "ESC" key or 'B' to enter bootloader mode before it time out. The boot screen of WBL is shown as the followed figure.



```
/>

Boot Loader Configuration:

        TFTP server port     : MAC 1
        Network phy chip     : PHY
        MAC Address          : 00:00:CC:DD:AA:11
        IP Address           : 192.168.0.228
        DHCP Client          : Enabled
        CACHE                : Disabled
        BL buffer base       : 0x00300000
        BL buffer size       : 0x00100000
Press ESC to enter debug mode ...
 W90P710 Command Shell v0.1 Rebuilt on May 26 2003 at 10:50:20

bootloader > _
```

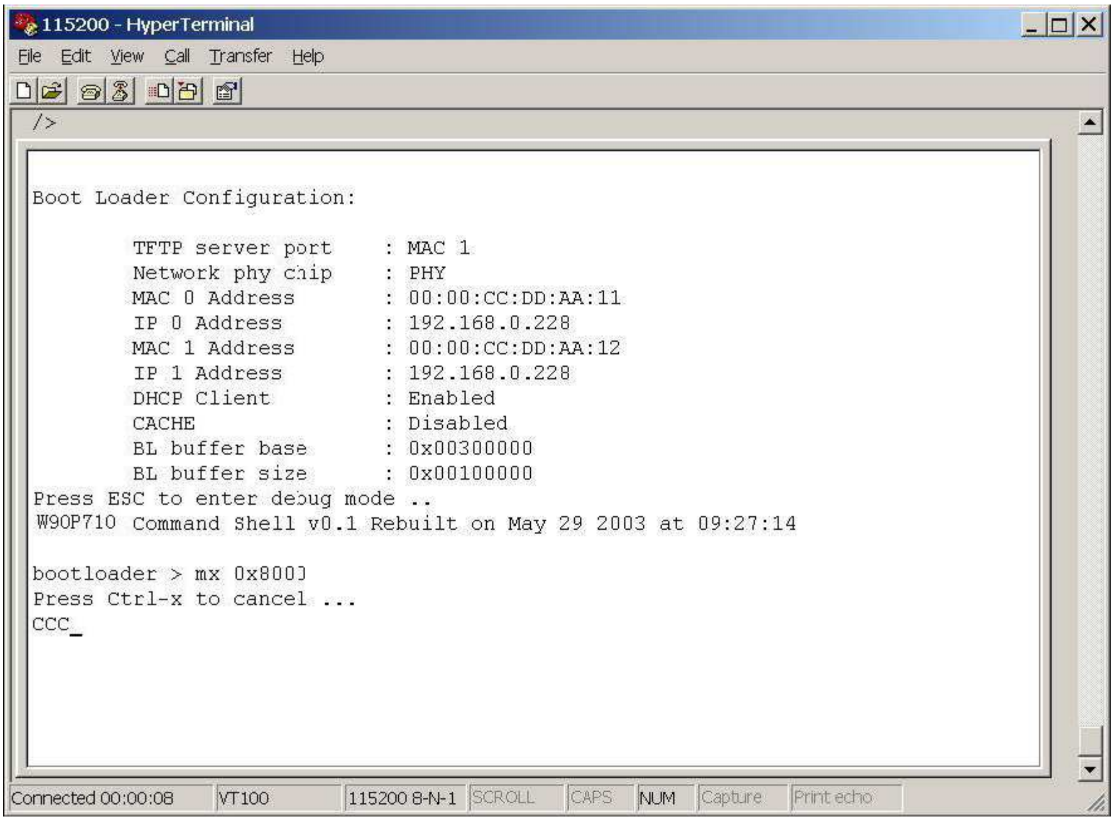
Please press "h" for command reference.

5.2 Case 1: Download an image to memory by Xmodem

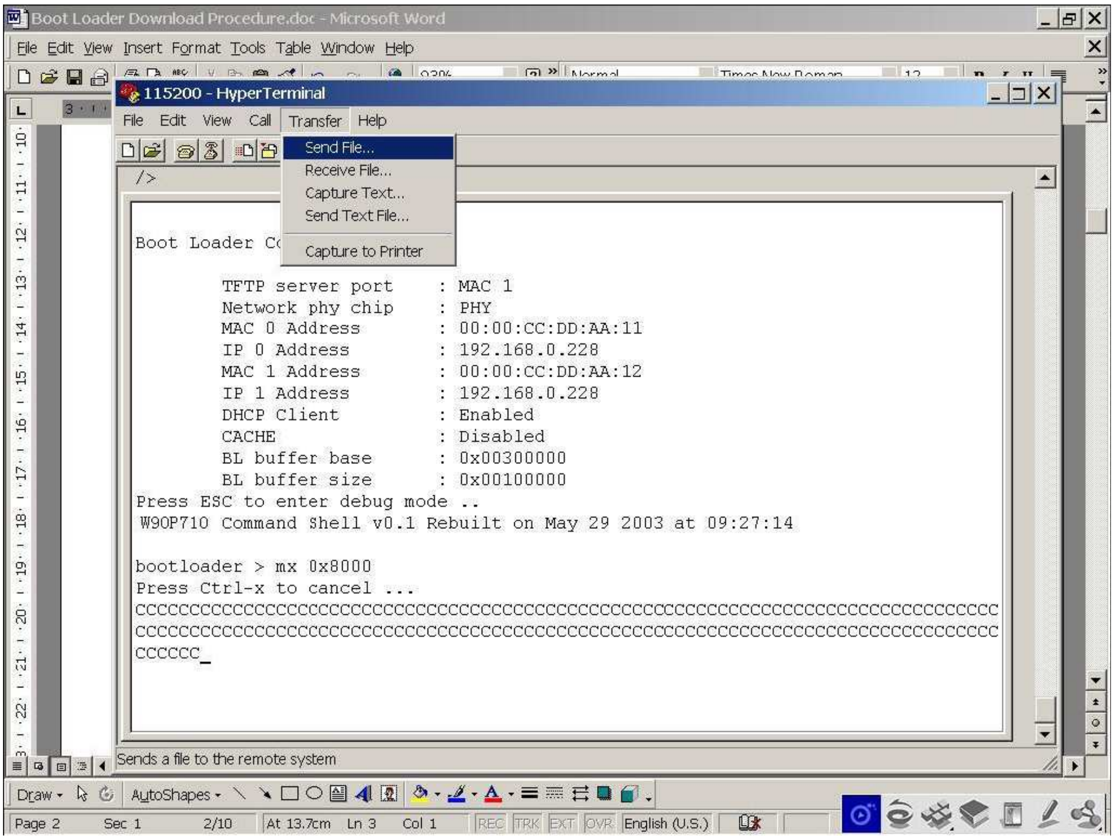
DESCRIPTION - Download "demo.bin" to memory 0x8000

Command - mx 0x8000

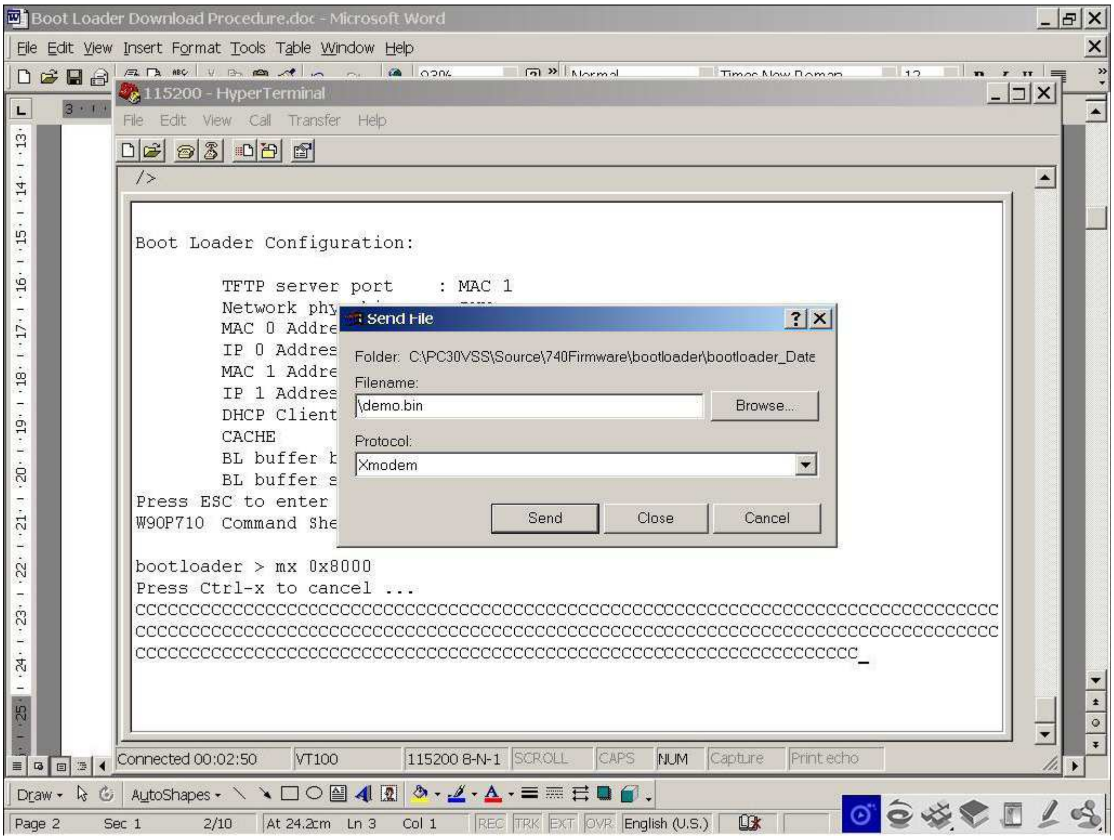
Screen shot -



```
/>

Boot Loader Configuration:

        TFTP server port     : MAC 1
        Network phy chip     : PHY
        MAC 0 Address        : 00:00:CC:DD:AA:11
        IP 0 Address         : 192.168.0.228
        MAC 1 Address        : 00:00:CC:DD:AA:12
        IP 1 Address         : 192.168.0.228
        DHCP Client          : Enabled
        CACHE                : Disabled
        BL buffer base       : 0x00300000
        BL buffer size       : 0x00100000
Press ESC to enter debug mode ..
W90P710 Command Shell v0.1 Rebuilt on May 29 2003 at 09:27:14

bootloader > mx 0x8000
Press Ctrl-x to cancel ...
CCC_
```


Boot Loader Download Procedure.doc - Microsoft Word
File Edit View Insert Format Tools Table Window Help
115200 - HyperTerminal
File Edit View Call Transfer Help
Send File...
Receive File...
Capture Text...
Send Text File...
Capture to Printer
Sends a file to the remote system
Page 2 Sec 1 2/10 At 13.7cm Ln 3 Col 1 REC TRK EXT OVR English (U.S.)

```
/>

Boot Loader Co

        TFTP server port     : MAC 1
        Network phy chip     : PHY
        MAC 0 Address        : 00:00:CC:DD:AA:11
        IP 0 Address         : 192.168.0.228
        MAC 1 Address        : 00:00:CC:DD:AA:12
        IP 1 Address         : 192.168.0.228
        DHCP Client          : Enabled
        CACHE                : Disabled
        BL buffer base       : 0x00300000
        BL buffer size       : 0x00100000
Press ESC to enter debug mode ..
 W90P710 Command Shell v0.1 Rebuilt on May 29 2003 at 09:27:14

bootloader > mx 0x8000
Press Ctrl-x to cancel ...
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCC_
```

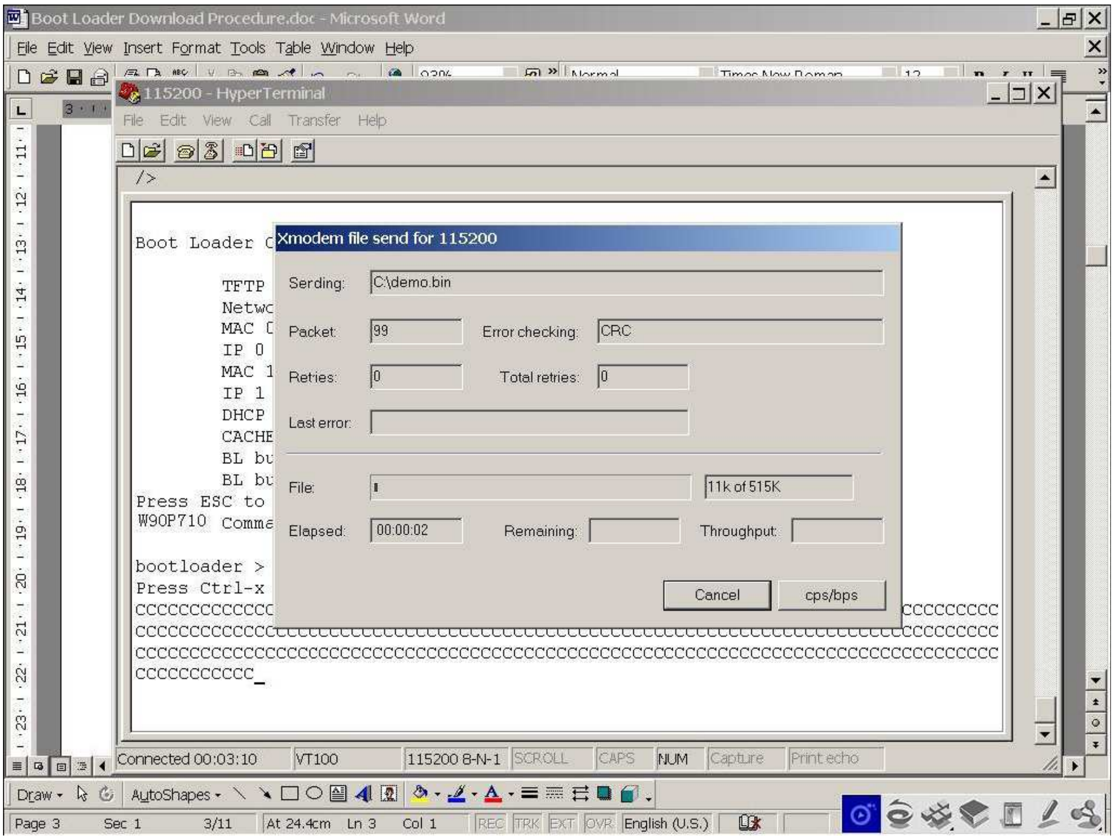

Boot Loader Download Procedure.doc - Microsoft Word
File Edit View Insert Format Tools Table Window Help
115200 - HyperTerminal
File Edit View Call Transfer Help
Send File
Browse...
Send
Close
Cancel
Connected 00:02:50 VT100 115200 8-N-1 SCROLL CAPS NUM Capture Print echo
Page 2 Sec 1 2/10 At 24.2cm Ln 3 Col 1 REC TRK EXT OVR English (U.S.)

Folder: C:\PC30VSS\Source\740Firmware\bootloader\bootloader_Date

Filename: \demo.bin

Protocol: Xmodem

```
/>

Boot Loader Configuration:

        TFTP server port     : MAC 1
        Network phy
        MAC 0 Addre
        IP 0 Addres
        MAC 1 Addre
        IP 1 Addres
        DHCP Client
        CACHE
        BL buffer b
        BL buffer s
Press ESC to enter
W90P710 Command She

bootloader > mx 0x8000
Press Ctrl-x to cancel ...
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC_
```



```
/>

Boot Loader C

        TFTP
        Netwo
        MAC C
        IP 0
        MAC 1
        IP 1
        DHCP
        CACHE
        BL bu
        BL bu
Press ESC to
W90P710  Comma

bootloader >
Press Ctrl-x
CCCCCCCCCCCCC                                                          CCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCC_
```

Xmodem file send for 115200

Serding: C:\demo.bin

Packet: 99 Error checking: CRC

Retries: 0 Total retries: 0

Last error:

File: 11k of 515K

Elapsed: 00:00:02 Remaining: Throughput:

Connected 00:03:10 VT100 115200 8-N-1

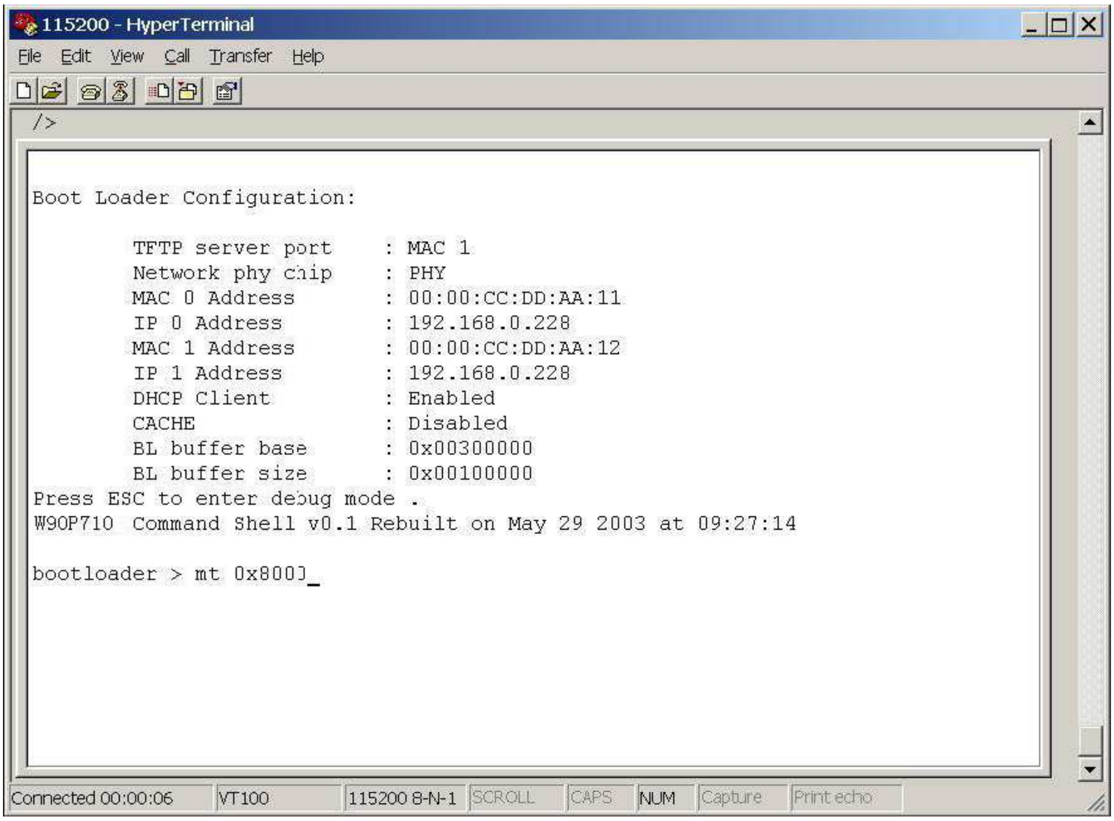
Boot Loader Download Procedure.doc - Microsoft Word
File Edit View Insert Format Tools Table Window Help
115200 - HyperTerminal
File Edit View Call Transfer Help
Cancel
cps/bps
SCROLL CAPS NUM Capture Print echo
Draw AutoShapes
Page 3 Sec 1 3/11 At 24.4cm Ln 3 Col 1 REC TRK EXT OVR English (U.S.)

5.3 Case 2: Download image to memory by TFTP

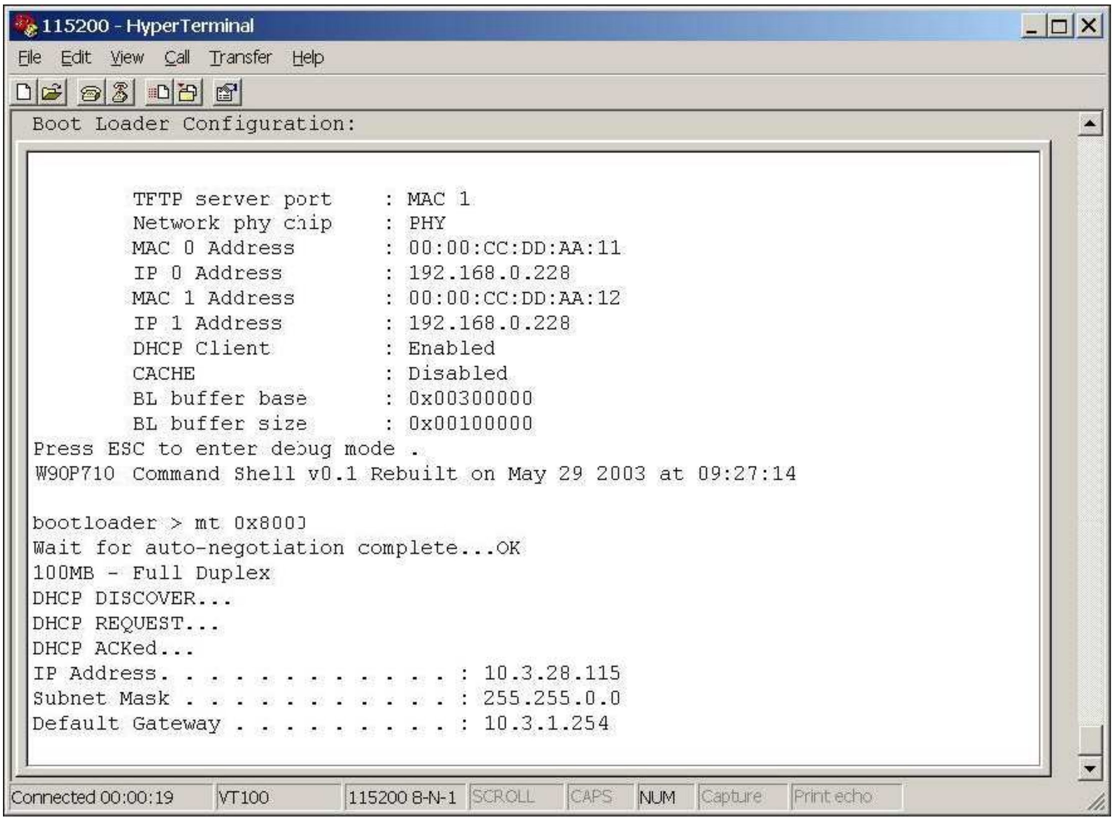
DESCRIPTION - Download “demo.bin” to memory 0x8000

Command - mt 0x8000

Screen shot -

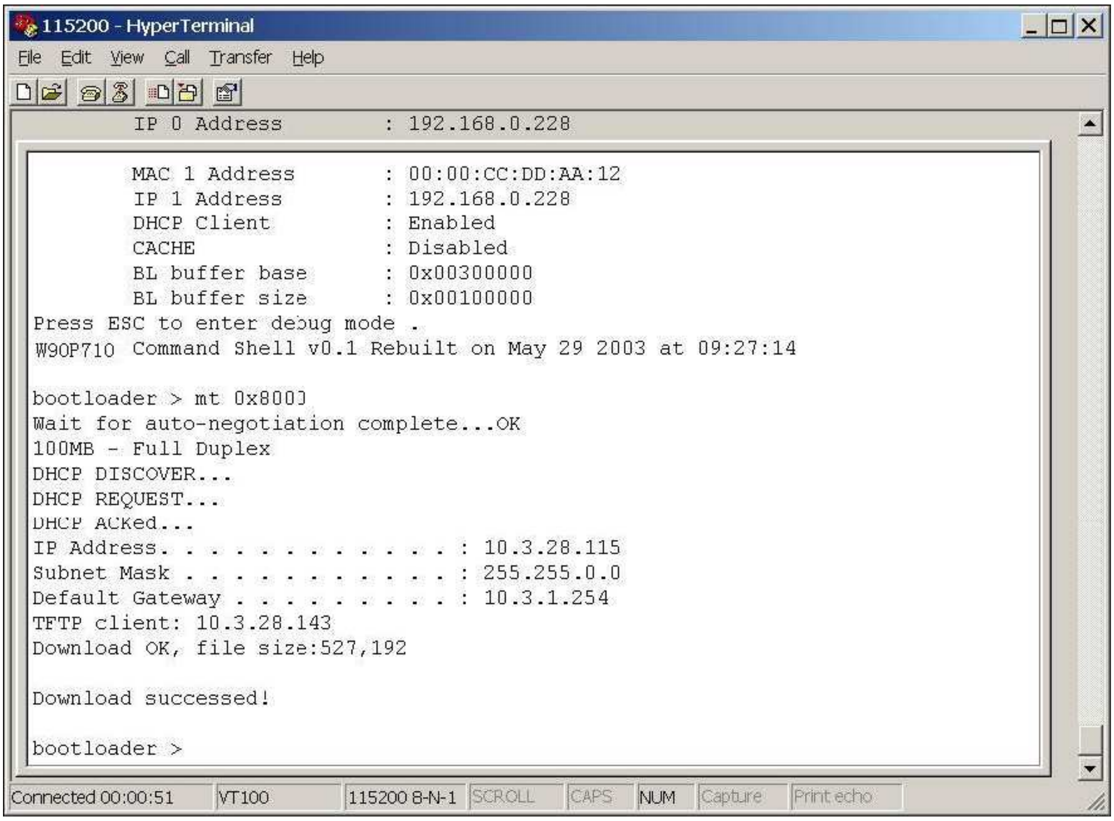


```
/>

Boot Loader Configuration:

        TFTP server port     : MAC 1
        Network phy chip     : PHY
        MAC 0 Address        : 00:00:CC:DD:AA:11
        IP 0 Address         : 192.168.0.228
        MAC 1 Address        : 00:00:CC:DD:AA:12
        IP 1 Address         : 192.168.0.228
        DHCP Client          : Enabled
        CACHE                : Disabled
        BL buffer base       : 0x00300000
        BL buffer size       : 0x00100000
Press ESC to enter debug mode .
W90P710 Command Shell v0.1 Rebuilt on May 29 2003 at 09:27:14

bootloader > mt 0x8000_
```



```
Boot Loader Configuration:

        TFTP server port     : MAC 1
        Network phy chip     : PHY
        MAC 0 Address        : 00:00:CC:DD:AA:11
        IP 0 Address         : 192.168.0.228
        MAC 1 Address        : 00:00:CC:DD:AA:12
        IP 1 Address         : 192.168.0.228
        DHCP Client          : Enabled
        CACHE                : Disabled
        BL buffer base       : 0x00300000
        BL buffer size       : 0x00100000
Press ESC to enter debug mode .
W90P710  Command Shell v0.1 Rebuilt on May 29 2003 at 09:27:14

bootloader > mt 0x8000
Wait for auto-negotiation complete...OK
100MB - Full Duplex
DHCP DISCOVER...
DHCP REQUEST...
DHCP ACKed...
IP Address. . . . . . . . . . . . . : 10.3.28.115
Subnet Mask . . . . . . . . . . . . : 255.255.0.0
Default Gateway . . . . . . . . . . : 10.3.1.254
```

```
[Enter in Windows command prompt]
C:\>tftp -i 10.3.28.115 put demo.bin
Transfer successful: 527192 bytes in 1 second, 527192 bytes/s
[Or enter in Linux command prompt]
[wschang0@Linux images]$ tftp 10.3.28.115
tftp> bin
tftp> put demo.bin
Sent 527192 bytes in 1 seconds
tftp>
```



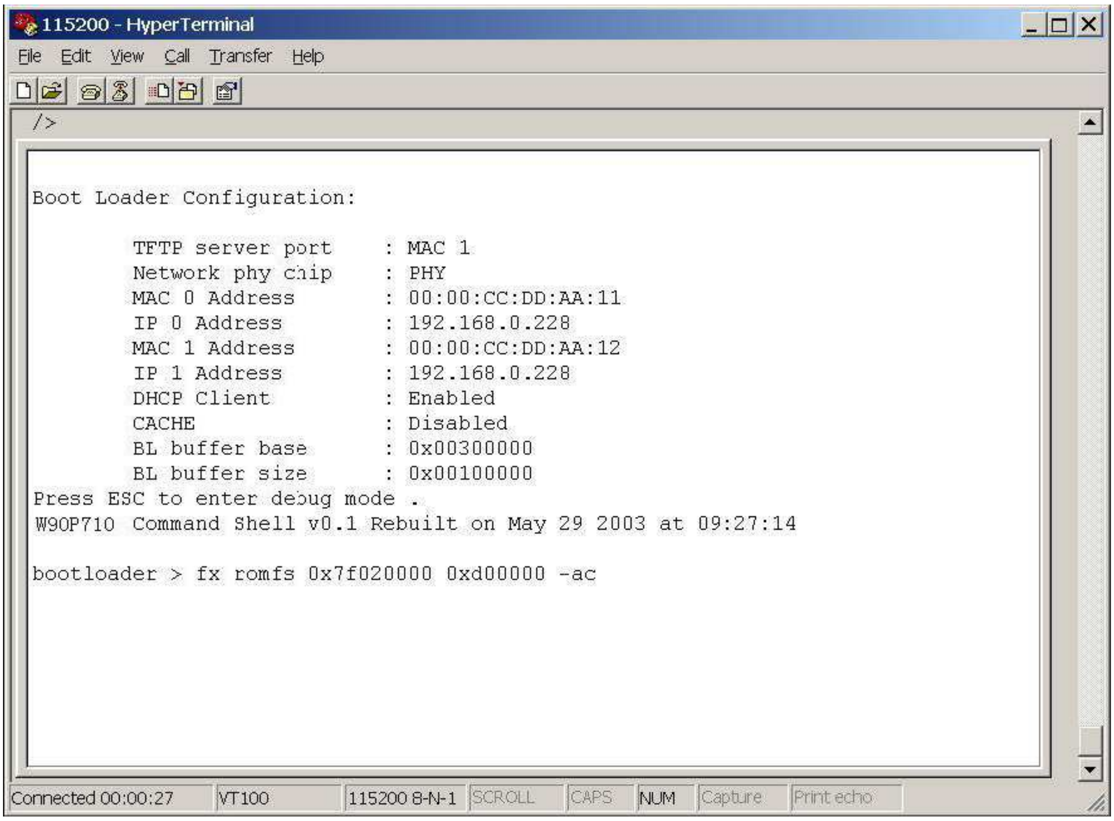
```
        IP 0 Address         : 192.168.0.228

        MAC 1 Address        : 00:00:CC:DD:AA:12
        IP 1 Address         : 192.168.0.228
        DHCP Client          : Enabled
        CACHE                : Disabled
        BL buffer base       : 0x00300000
        BL buffer size       : 0x00100000
Press ESC to enter debug mode .
W90P710 Command Shell v0.1 Rebuilt on May 29 2003 at 09:27:14

bootloader > mt 0x8000
Wait for auto-negotiation complete...OK
100MB - Full Duplex
DHCP DISCOVER...
DHCP REQUEST...
DHCP ACKed...
IP Address. . . . . . . . . . . . . : 10.3.28.115
Subnet Mask . . . . . . . . . . . . : 255.255.0.0
Default Gateway . . . . . . . . . . : 10.3.1.254
TFTP client: 10.3.28.143
Download OK, file size:527,192

Download successed!

bootloader >
```

5.4 Case 3: Program image into FLASH by Xmodem

DESCRIPTION - Download "rimfs.img" to FLASH 0x7F020000 as image 1

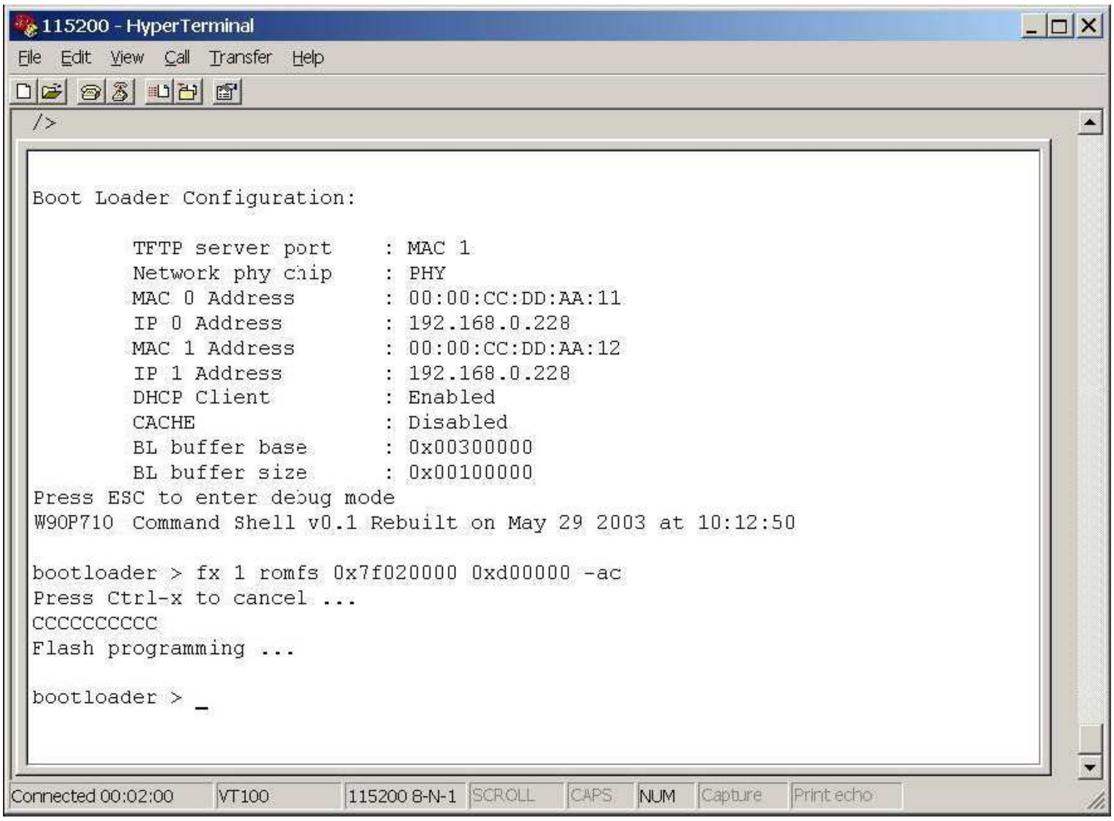
Command - fx 1 romfs 0x7f020000 0xd00000 –ac

Screen shot -



```
/>

Boot Loader Configuration:

        TFTP server port     : MAC 1
        Network phy chip     : PHY
        MAC 0 Address        : 00:00:CC:DD:AA:11
        IP 0 Address         : 192.168.0.228
        MAC 1 Address        : 00:00:CC:DD:AA:12
        IP 1 Address         : 192.168.0.228
        DHCP Client          : Enabled
        CACHE                : Disabled
        BL buffer base       : 0x00300000
        BL buffer size       : 0x00100000
Press ESC to enter debug mode .
W90P710 Command Shell v0.1 Rebuilt on May 29 2003 at 09:27:14

bootloader > fx romfs 0x7f020000 0xd00000 -ac
```

(Please refer to Case 1 for the detail of Xmodem download procedure)



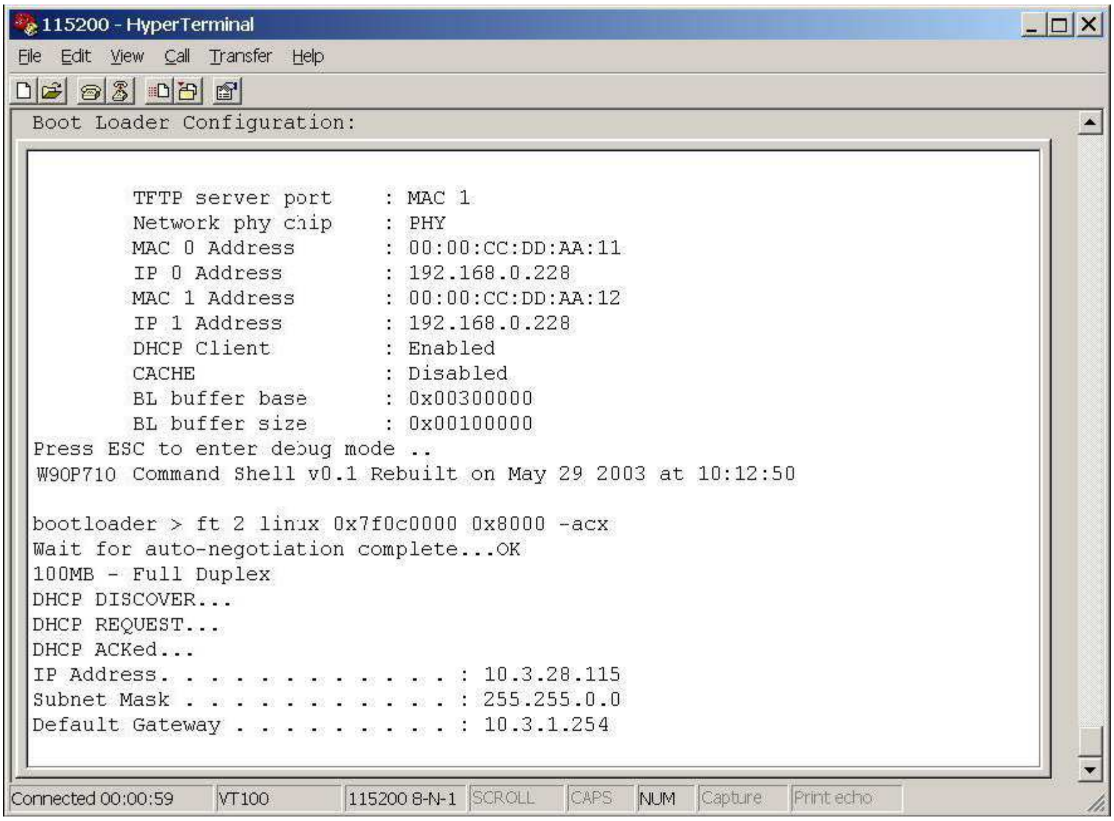
```
 />

Boot Loader Configuration:

        TFTP server port     : MAC 1
        Network phy chip     : PHY
        MAC 0 Address        : 00:00:CC:DD:AA:11
        IP 0 Address         : 192.168.0.228
        MAC 1 Address        : 00:00:CC:DD:AA:12
        IP 1 Address         : 192.168.0.228
        DHCP Client          : Enabled
        CACHE                : Disabled
        BL buffer base       : 0x00300000
        BL buffer size       : 0x00100000
Press ESC to enter debug mode
W90P710 Command Shell v0.1 Rebuilt on May 29 2003 at 10:12:50

bootloader > fx 1 romfs 0x7f020000 0xd00000 -ac
Press Ctrl-x to cancel ...
CCCCCCCCCC
Flash programming ...

bootloader > _
```

5.5 Case 4: Program image into FLASH by TFTP

DESCRIPTION - Download “linux.bin” to FLASH 0x7F0C0000 as image 2

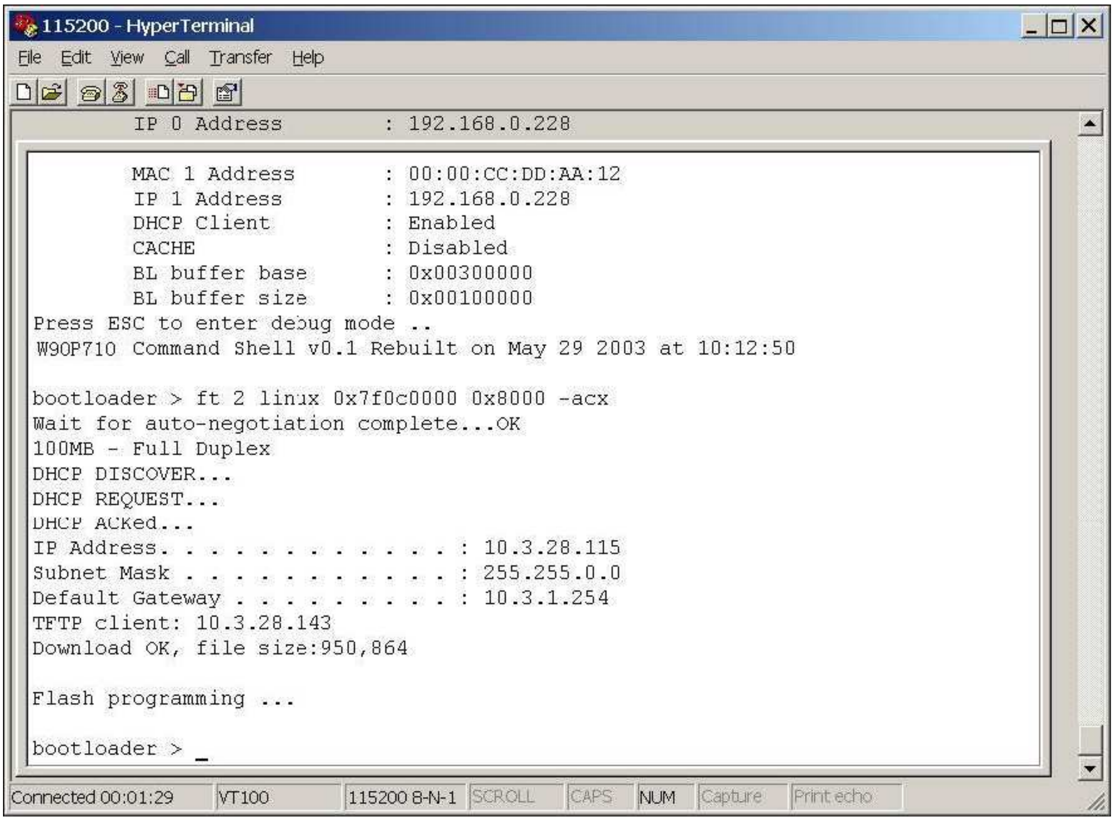
Command - ft 2 linux 0x7f0c0000 0x8000 -acx

Screen shot -



```
 Boot Loader Configuration:

        TFTP server port     : MAC 1
        Network phy chip     : PHY
        MAC 0 Address        : 00:00:CC:DD:AA:11
        IP 0 Address         : 192.168.0.228
        MAC 1 Address        : 00:00:CC:DD:AA:12
        IP 1 Address         : 192.168.0.228
        DHCP Client          : Enabled
        CACHE                : Disabled
        BL buffer base       : 0x00300000
        BL buffer size       : 0x00100000
Press ESC to enter debug mode ..
W90P710 Command Shell v0.1 Rebuilt on May 29 2003 at 10:12:50

bootloader > ft 2 linux 0x7f0c0000 0x8000 -acx
Wait for auto-negotiation complete...OK
100MB - Full Duplex
DHCP DISCOVER...
DHCP REQUEST...
DHCP ACKed...
IP Address. . . . . . . . . . . . . : 10.3.28.115
Subnet Mask . . . . . . . . . . . . : 255.255.0.0
Default Gateway . . . . . . . . . . : 10.3.1.254
```

[Enter in Windows command prompt]
C:\LanCam>tftp -i 10.3.28.115 put linux.bin
Transfer successful: 950864 bytes in 2 seconds, 475432 bytes/s
[Or enter in Linux command prompt]
[wschang0@Linux images]$ tftp 10.3.28.115
tftp> bin
tftp> put linux.bin
Sent 950864 bytes in 2 seconds
tftp>



```
        IP 0 Address          : 192.168.0.228

        MAC 1 Address         : 00:00:CC:DD:AA:12
        IP 1 Address          : 192.168.0.228
        DHCP Client           : Enabled
        CACHE                 : Disabled
        BL buffer base        : 0x00300000
        BL buffer size        : 0x00100000
Press ESC to enter debug mode ..
 W90P710 Command Shell v0.1 Rebuilt on May 29 2003 at 10:12:50

bootloader > ft 2 linux 0x7f0c0000 0x8000 -acx
Wait for auto-negotiation complete...OK
100MB - Full Duplex
DHCP DISCOVER...
DHCP REQUEST...
DHCP ACKed...
IP Address. . . . . . . . . . . . . : 10.3.28.115
Subnet Mask . . . . . . . . . . . . : 255.255.0.0
Default Gateway . . . . . . . . . . : 10.3.1.254
TFTP client: 10.3.28.143
Download OK, file size:950,864

Flash programming ...

bootloader > _
```

6. Update Bootloader

There are three methods to update bootloader, we describe them in the following sections:

6.1 Method 1 – Update by updater.bin via xmodem or TFTP

1. Press ‘Esc’ on booting to enter bootloader mode

```
Press ESC to enter debug mode …[Press ‘ESC’]
bootloader >
```

2. Download the ‘updater.bin’ to 0x8000 by ‘mt’ or ‘mx’ (For more detail, please reference to *Winbond Boot Loader User’s Manual*).

```
bootloader > mx 0x8000
Waiting for download
Press Ctrl-x to cancel ...
CCCCCCCCCCCCCCC-
Download successed!
```

3. Execute the image by ‘g 0x8000’ command.

```
bootloader > g 0x8000
```

4. The following messages would be shown on terminal screen. Please confirm the information shown and press any key to continue if it is ok.

```
                                   Aug 30 2005
******************************************************

W90N745 Updater Version 1.0 $Revision: 6 $

Copyright (c) 2006 Windond Electronics Corp
******************************************************

The ROM code version in this update image :
       W90N745 Boot Loader - Version 1.1

W90N745 board is Found
```

```
WARNING: W90N745 Boot Loader will be updated!

 -- Press any key to continue --
```

5. The following messages would be shown on the terminal screen when the updater start to update the WBL. Please don't power-off the system before the programming finished.

```
Flash Detecting ...
Flash type is: AM29LV320DB
Flash programming ........ OK!
Verifing  OK!
Programming finished!!
ROM code update successed!
 -- Press any key to reboot --
```

6. After programming finished, please press any key to reboot the system. If the system doesn't reboot, please use hardware reset to reboot it.

6.2 Method 2 – Upgrate with xmodem.bin

1. Press 'Esc' on booting to enter bootloader mode
2. Download the 'xmodem.bin' to 0x8000 by 'mt' or 'mx'
3. There are 'CCC..' string displayed on the Terminal Emulator.
4. Use the 'Tranfer->Send file..' to send the new bootloader.bin by XMODEM protocol.
5. Transfe complete.
6. Enter the flash programming address to 0x7F000000.
7. Waiting for the flash programming complete.
8. Reboot.

6.3 Method 3 - Update by updater.bin via JTAG

1. Connect the JTAG-ICE to W90N745
2. Load the init.axf into the W90N745 to execute

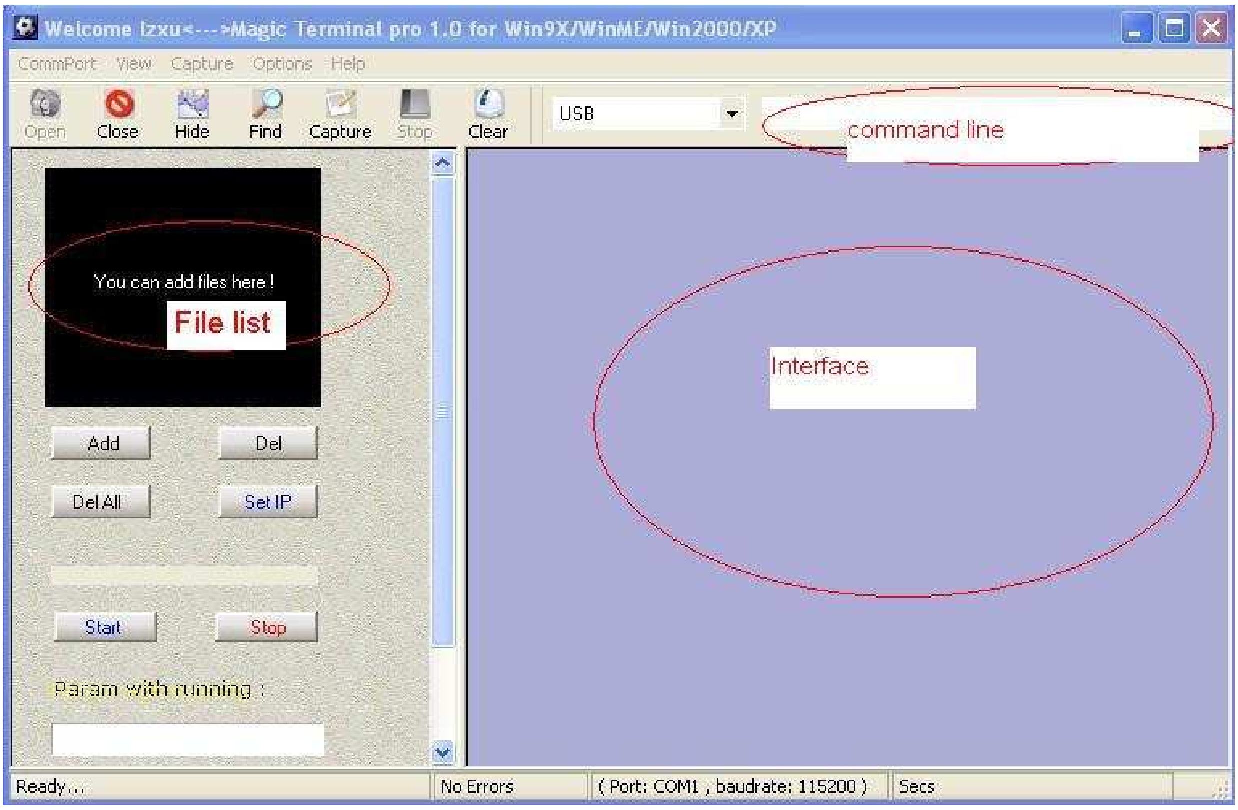
3. Load the updater.axf into the W90N745 to execute
4. When the updater.axf executed, the updater information would be shown on the terminal screen through the serial port. If it doesn't show anything on the terminal screen, please check if the init.axf is executed correctly and the hardware environment.
5. If the updater.axf is executed correctly, please reference the step 4 ~ 6 of Method 1 to update the bootloader.

7 Hot to Use Magic Terminal

Setup:

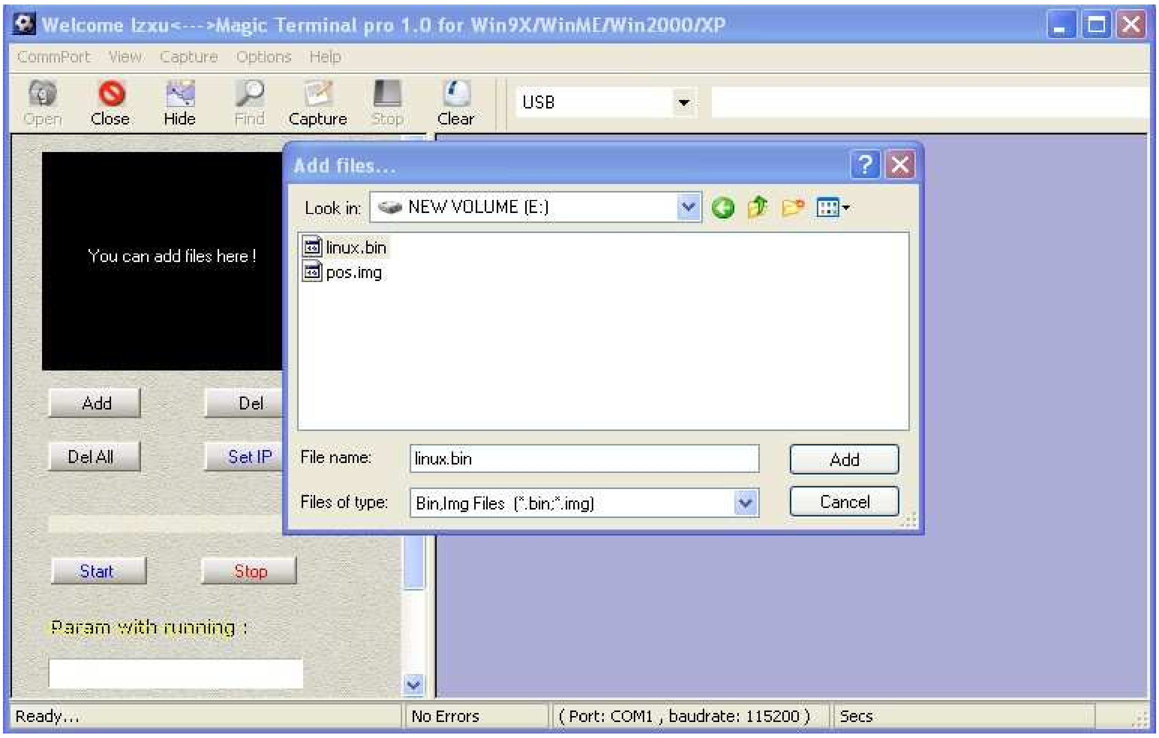
Install both XUSB driver and Magic Terminal before plugging target board to PC.

Usage:

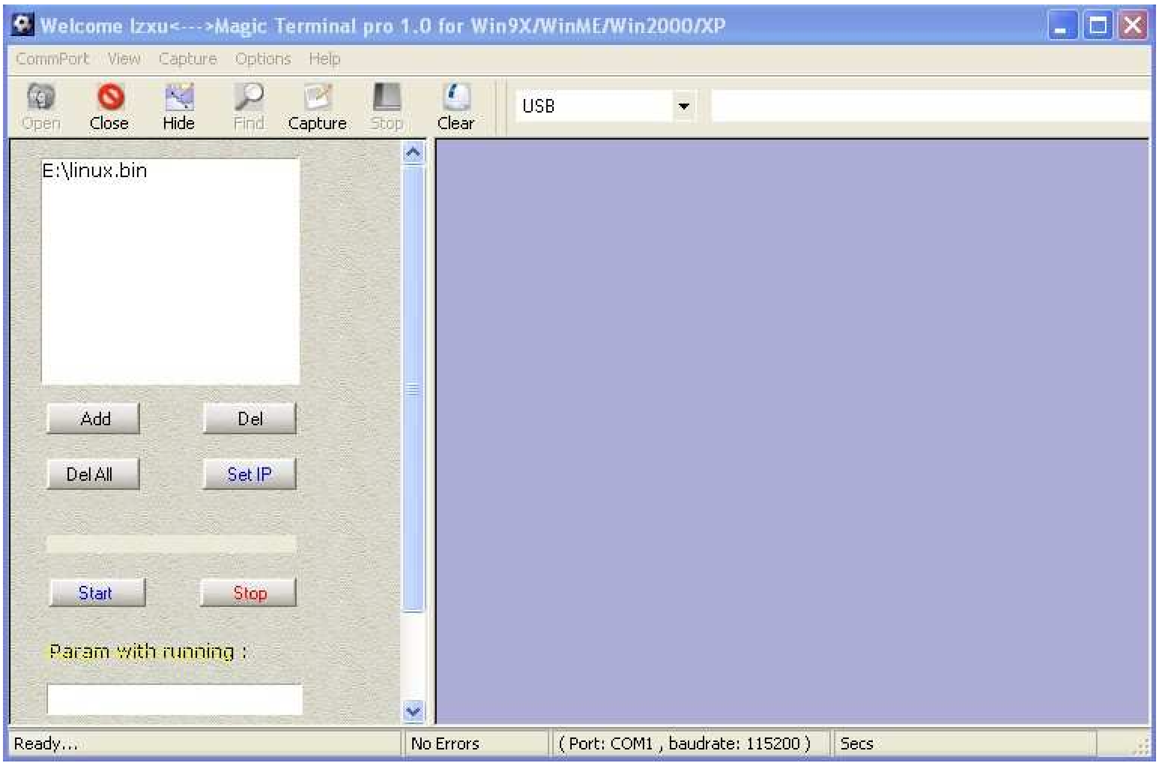

Welcome lzxu<--->Magic Terminal pro 1.0 for Win9X/WinME/Win2000/XP
CommPort View Capture Options Help
Open Close Hide Find Capture Stop Clear
USB
command line
You can add files here !
File list
Interface
Add Del
Del All Set IP
Start Stop
Param with running :
Ready...
No Errors
(Port: COM1 , baudrate: 115200)
Secs

Add:

Add the file to the list.


Welcome lzxu<--->Magic Terminal pro 1.0 for Win9X/WinME/Win2000/XP
CommPort View Capture Options Help
Open Close Hide Find Capture Stop Clear
USB
You can add files here !
Add Del
Del All Set IP
Start Stop
Param with running :
Add files...
Look in: NEW VOLUME (E:)
linux.bin
pos.img
File name: linux.bin
Files of type: Bin,Img Files (*.bin;*.img)
Add
Cancel
Ready...
No Errors
(Port: COM1 , baudrate: 115200)
Secs

Add successful.


Welcome lzxu<--->Magic Terminal pro 1.0 for Win9X/WinME/Win2000/XP
CommPort View Capture Options Help
Open Close Hide Find Capture Stop Clear
USB
E:\linux.bin
Add Del
Del All Set IP
Start Stop
Param with running :
Ready...
No Errors
(Port: COM1 , baudrate: 115200)
Secs

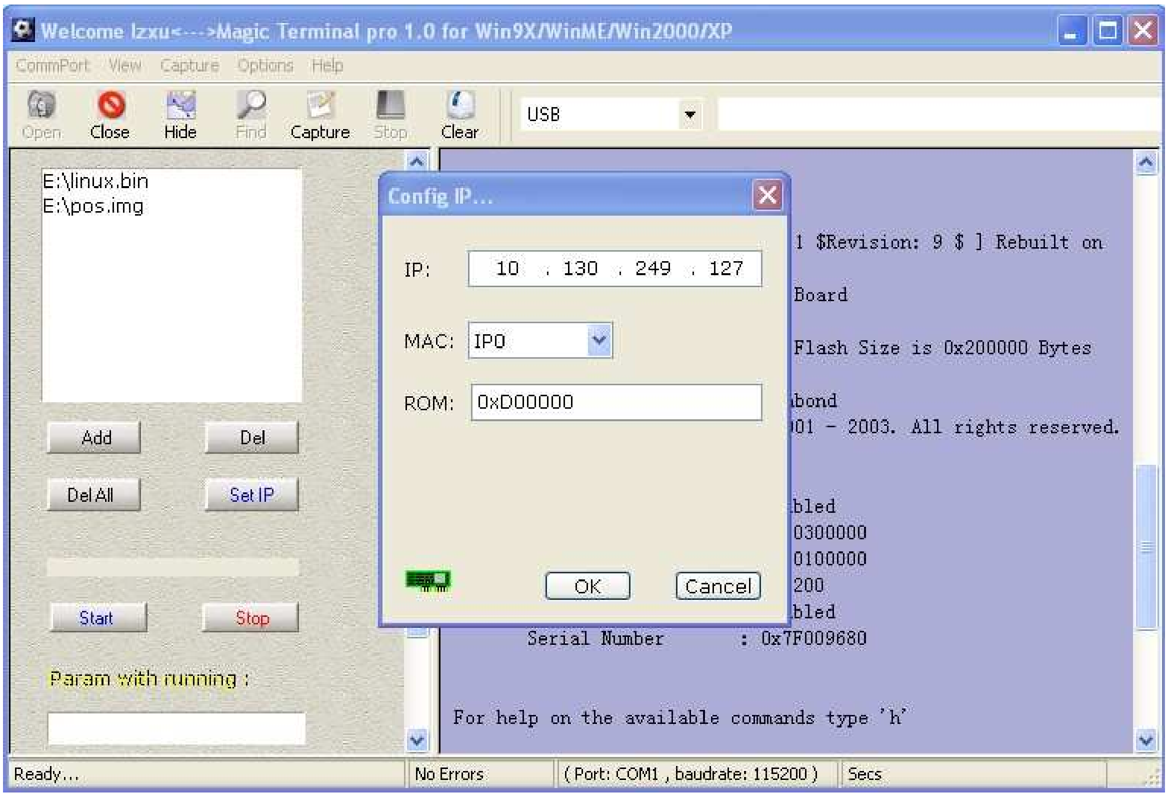
Del:

Delete the file from the list.

Del All:

Delete all the file from the list.

Set IP:


Welcome lzxu<--->Magic Terminal pro 1.0 for Win9X/WinME/Win2000/XP
CommPort View Capture Options Help
Open Close Hide Find Capture Stop Clear
USB
E:\linux.bin
E:\pos.img
Add Del
Del All Set IP
Start Stop
Param with running :
Config IP...
OK Cancel
Ready...
No Errors
(Port: COM1 , baudrate: 115200)
Secs

IP: 10 . 130 . 249 . 127

MAC: IP0

ROM: 0xD00000

```
1 $Revision: 9 $ ] Rebuilt on
Board
Flash Size is 0x200000 Bytes
bond
01 - 2003. All rights reserved.
bled
0300000
0100000
200
bled
    Serial Number      : 0x7F009680

For help on the available commands type 'h'
```

Start:

Start to send file.

Stop:

Make sure to stop the magic terminal and reset the chip first before any file's resent.

Capture:

To record everything showed on the interface.

HOTKEY:

F2:

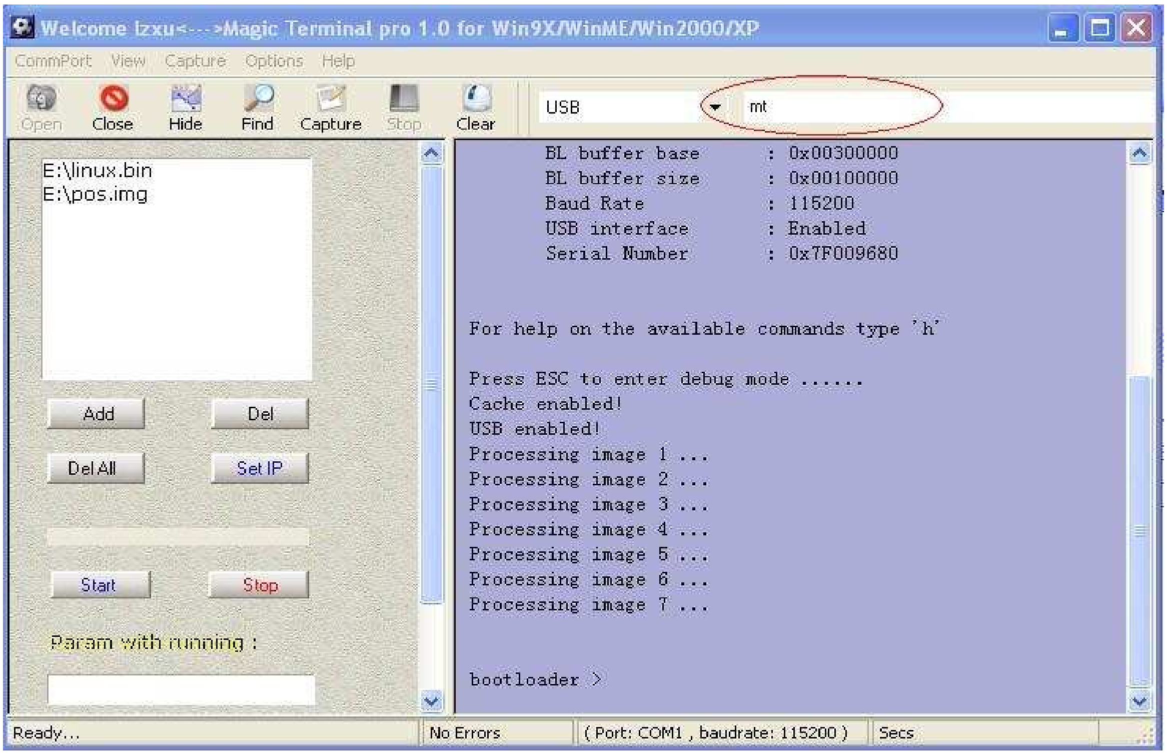
When the cursor is in the interface and the chip has be reset, is the same effect as stop+start to sent the file.

F4:

The same effect as Ctrl+c

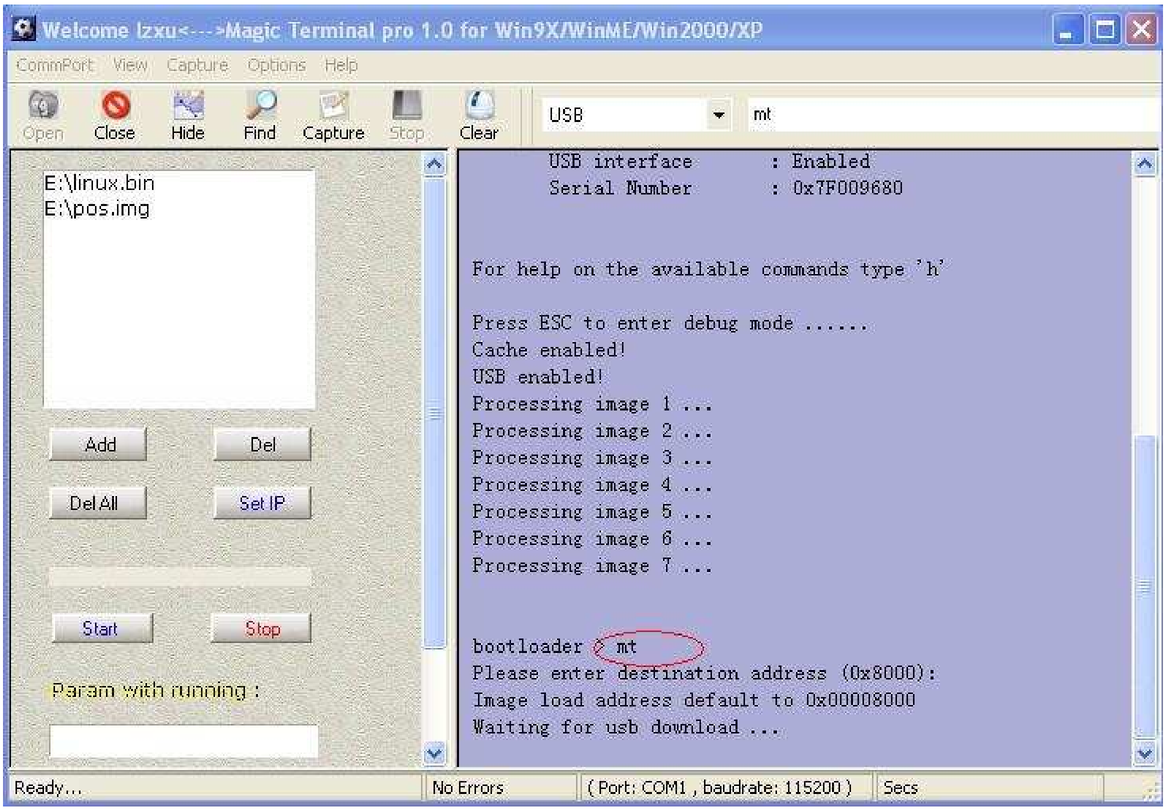
Ctrl+F3:

Input the command in the command line.


Welcome lzxu<--->Magic Terminal pro 1.0 for Win9X/WinME/Win2000/XP
CommPort View Capture Options Help
Open Close Hide Find Capture Stop Clear
USB
mt
E:\linux.bin
E:\pos.img
Add Del
Del All Set IP
Start Stop
Param with running :
Ready... No Errors (Port: COM1 , baudrate: 115200) Secs

```
        BL buffer base       : 0x00300000
        BL buffer size       : 0x00100000
        Baud Rate            : 115200
        USB interface        : Enabled
        Serial Number        : 0x7F009680


For help on the available commands type 'h'

Press ESC to enter debug mode ......
Cache enabled!
USB enabled!
Processing image 1 ...
Processing image 2 ...
Processing image 3 ...
Processing image 4 ...
Processing image 5 ...
Processing image 6 ...
Processing image 7 ...


bootloader >
```

Press Ctrl+F3


Welcome lzxu<--->Magic Terminal pro 1.0 for Win9X/WinME/Win2000/XP
CommPort View Capture Options Help
Open Close Hide Find Capture Stop Clear
USB
mt
E:\linux.bin
E:\pos.img
Add Del
Del All Set IP
Start Stop
Param with running :
Ready... No Errors (Port: COM1 , baudrate: 115200) Secs

```
        USB interface        : Enabled
        Serial Number        : 0x7F009680


For help on the available commands type 'h'

Press ESC to enter debug mode ......
Cache enabled!
USB enabled!
Processing image 1 ...
Processing image 2 ...
Processing image 3 ...
Processing image 4 ...
Processing image 5 ...
Processing image 6 ...
Processing image 7 ...


bootloader > mt
Please enter destination address (0x8000):
Image load address default to 0x00008000
Waiting for usb download ...
```

Ctrl+F2:

Delete the command in the command line.

8 FAQ’s

Q: Why does the boot loader hold on FLASH programming and stop to response my command when I download an image into FLASH?
A: If the FLASH has unknown data, it may cause the FLASH programming failed. You can use the “del -all “command to erase all FLASH blocks if you find any FLASH programming failed condition.

Q: Why does my image not work after download into the platform by TFTP? I am sure the image is ok!
A: Please make sure that the TFTP client is in binary mode. In windows, you must use –i option to switch to binary mode. In linux, you must use bin command of TFTP client to switch to binary mode.