

Chapter 1. How to build loader image

1. To install toolchain, please refer to “Matrix500 Quick Installation Guide.pdf” on released CD.
2. Extract loaderxxx.tar.bz2(`tar -jxvf loaderxxx.tar.bz2`)
3. Two directories are extracted,
 - a. u-boot-1.1.2 : u-boot-1.1.2 source tree(refer to <http://u-boot.sourceforge.net/>)
 - b. binary : tools for building artila loader file(.alf)
4. `cd u-boot-1.1.2`
5. Build
 - a. `./build_m500.sh` (for Matrix500)
 - b. `./build_m500v2.sh`(for Matrix500v2)
 - c. `./build_m501.sh`(for M501)
 - d. `./build_m400.sh`(for Matrix400)
6. Artila loader image will be generated in `../binary` as `*.alf`

Chapter 2. How to update loader to flash

1. Please plugin serial console cable to P3 and refer to “Serial Console Cable.pdf” on released CD.
2. Open terminal utility with 115200bps , 8N1
3. Power up Matrix and keep keying '@' to enter loader. If fail, please do it again

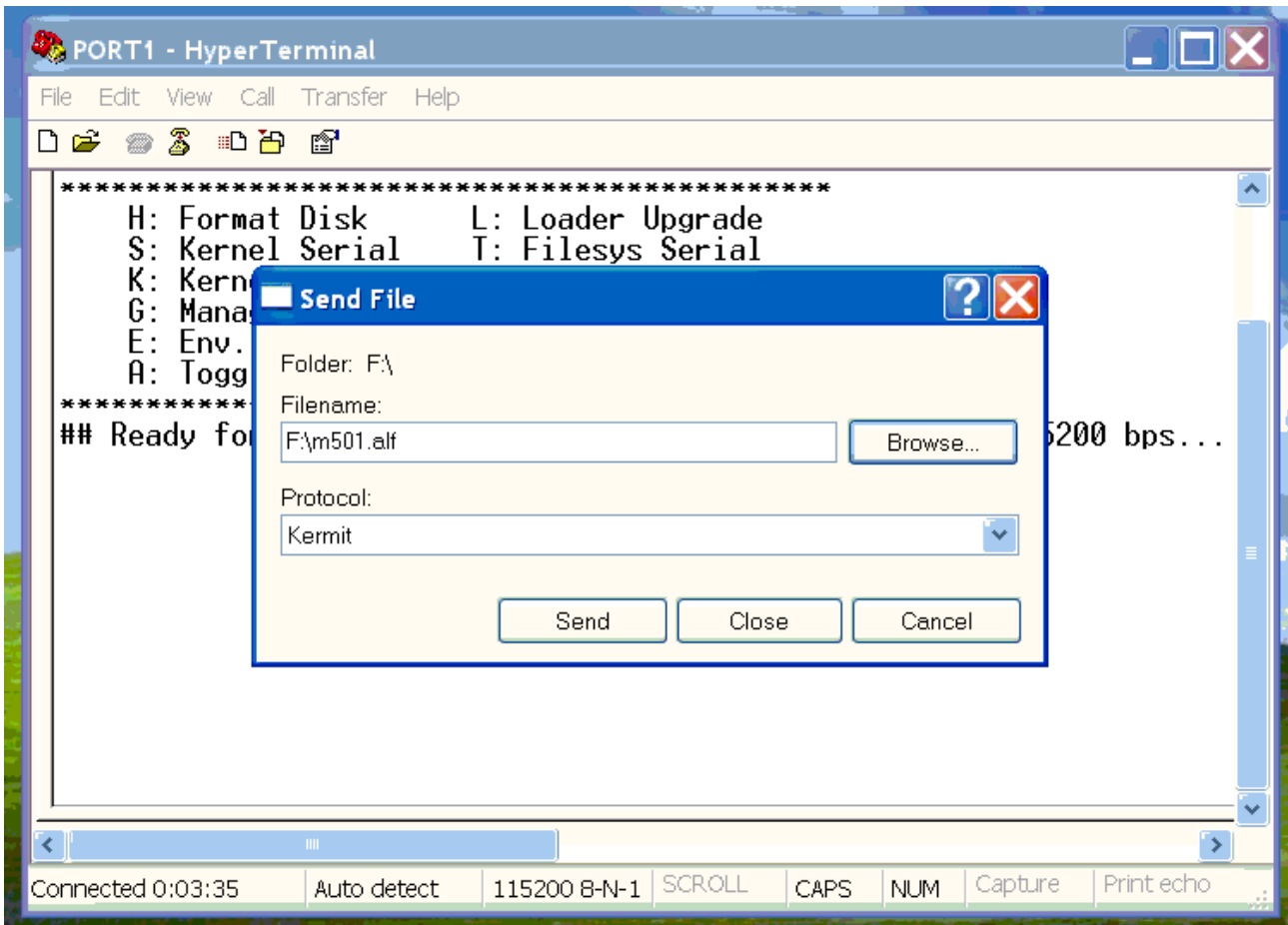
Starting M501.....

```
*****  
Loader Version 1.1.4 (32M)  
*****  
H: Format Disk   L: Loader Upgrade  
S: Kernel Serial T: Filesys Serial  
K: Kernel TFTP  F: Filesys TFTP.  
G: Manager Mode J: Jump to Firmware  
E: Env. Upgrade M: Ethernet Setting  
A: Toggle Console R: Reset  
*****
```

4. Type in “L” to upgrade loader

```
## Ready for binary (kermit) download to 0x21000000 at 115200 bps...
```

5. Transfer loader file(*.alf) via kermit protocol



Total Size = 0x0000fa5e = 64094 Bytes

Start Addr = 0x21000000

Update loader ...

. done Erased 1 sectors writing ... done.

Press 'q' to return...

6. Finished. New loader will be effected at next reset.

Chapter 3. How to operate loader

Starting M501.....

```
*****
Loader Version 1.1.4 (32M)
*****
H: Format Disk    L: Loader Upgrade
S: Kernel Serial  T: Filesys Serial
K: Kernel TFTP   F: Filesys TFTP.
G: Manager Mode  J: Jump to Firmware
E: Env. Upgrade  M: Ethernet Setting
A: Toggle Console R: Reset
*****
```

H: Format user disk.

Note: The free space of flash except system used is used as user disk for storing user's applications, library, web page, /home, /etc...and so on. For M501, it's about 12MB capacity with jffs2 format. The linux first time booting will stop at "Init System.....Please Wait....." about 3 minutes after formatting the user disk.

Note: 'update --FORMAT' can also format user disk in Linux.

L: Upgrade loader image.

Note: 'update xxxx.alf' can do it in Linux.

S: Update Linux kernel image via serial console.

Note: Kernel image usually names xxxxK. For example, M501K.

Note: It also can be done by 'update xxxxK' on Linux .

T: Update Linux filesystem image

Note: It usually names xxxxR. For example, M501R *Note:* It also can be done by 'update xxxxR' on Linux .

K: Update Linux kernel image via Ethernet

Note: TFTP server must be installed and started before using this option. The default TFTP server IP is 192.168.2.150 and loader's IP is 192.168.2.196. 'M' option can get Ethernet settings.

Starting M501.....

Loader Version 1.1.4 (32M)

H: Format Disk L: Loader Upgrade
S: Kernel Serial T: Filesys Serial
K: Kernel TFTP F: Filesys TFTP.
G: Manager Mode J: Jump to Firmware
E: Env. Upgrade M: Ethernet Setting
A: Toggle Console R: Reset

TFTP from server 192.168.2.150; our IP address is 192.168.2.196

Filename 'M501K'.

Load address: 0x21000000

Loading: *#####

#####

done

Bytes transferred = 1270272 (136200 hex)

..... done

Erased 11 sectors

Copy to Flash... done

Press 'q' to return...

F: Update Linux filesystem via Ethernet

G: Manage/Operation loader via Artila Windows UI utility.

Note: Not released yet.

J: Boot Linux from loader mode.

E: Update loader environment parameters.

M: Current Ethernet settings

A: Toggle Linux serial console.

Note: Disable serial console

```
*****
Loader Version 1.1.4 (32M)
*****
H: Format Disk   L: Loader Upgrade
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G: Manager Mode  J: Jump to Firmware
E: Env. Upgrade  M: Ethernet Setting
A: Toggle Console R: Reset
```

```
*****
Saving Environment to Flash...
Erasing Flash...
. done
Erased 1 sectors
Writing to Flash... done
```

Console (NULL)

Press 'q' to return...

Note: Enable serial console

```
*****
Loader Version 1.1.4 (32M)
*****
H: Format Disk   L: Loader Upgrade
S: Kernel Serial T: Filesys Serial
K: Kernel TFTP   F: Filesys TFTP.
G: Manager Mode  J: Jump to Firmware
E: Env. Upgrade  M: Ethernet Setting
A: Toggle Console R: Reset
```

```
*****
Saving Environment to Flash...
Erasing Flash...
. done
Erased 1 sectors
Writing to Flash... done
```

Console (ttyS0)

Press 'q' to return...

Note: Default is disable since P3 is intended to be used as serial data port.

R: Reset system.

Chapter 4. How to change Ethernet setting

1. Press '&' when the loader menu appears.

Starting M501.....

Loader Version 1.1.4 (32M)

H: Format Disk L: Loader Upgrade
S: Kernel Serial T: Filesys Serial
K: Kernel TFTP F: Filesys TFTP.
G: Manager Mode J: Jump to Firmware
E: Env. Upgrade M: Ethernet Setting
A: Toggle Console R: Reset

Artila>

2. 'set ipaddr xxx.xxx.xxx.xxx' to set loader's IP
3. 'set serverip xxx.xxx.xxx.xxx' to set TFTP server's IP
4. 'set netmask xxx.xxx.xxx.xxx' to set netmask
5. 'set gateway xxx.xxx.xxx.xxx' to set gateway's IP

Note: Ethernet address(or MAC address) is unique. Please ***DON'T*** modify it.

Note: For more commands, please refer to <http://u-boot.sourceforge.net/>

Chapter 5. How to recovery loader

1. Demonstration by M501

- a. Prepare the serial console cable and connect to Port 3
- b. set jumper JP1 to position 1-2
- c. Power on M-501
- d. You will read "CCCCC" from serial console port
- e. upload "loader.bin" to M-501 with X modem protocol
- f. once completed upload "arloader501" to M-501 with X modem protocol
- g. once complete upload "m501env.txt" to M-501 with Kermit protocol(not must)
- h. once complete upload "m501.alf" to M-501 with Kermit protocol
- i. once complete, power off and switch JP1 to position 2-3
- j. Power on and keep keying @ to enter loader screen. If fail do it again

*Note: **MUST** modify manually device Ethernet address in environment file if environment has to update.*