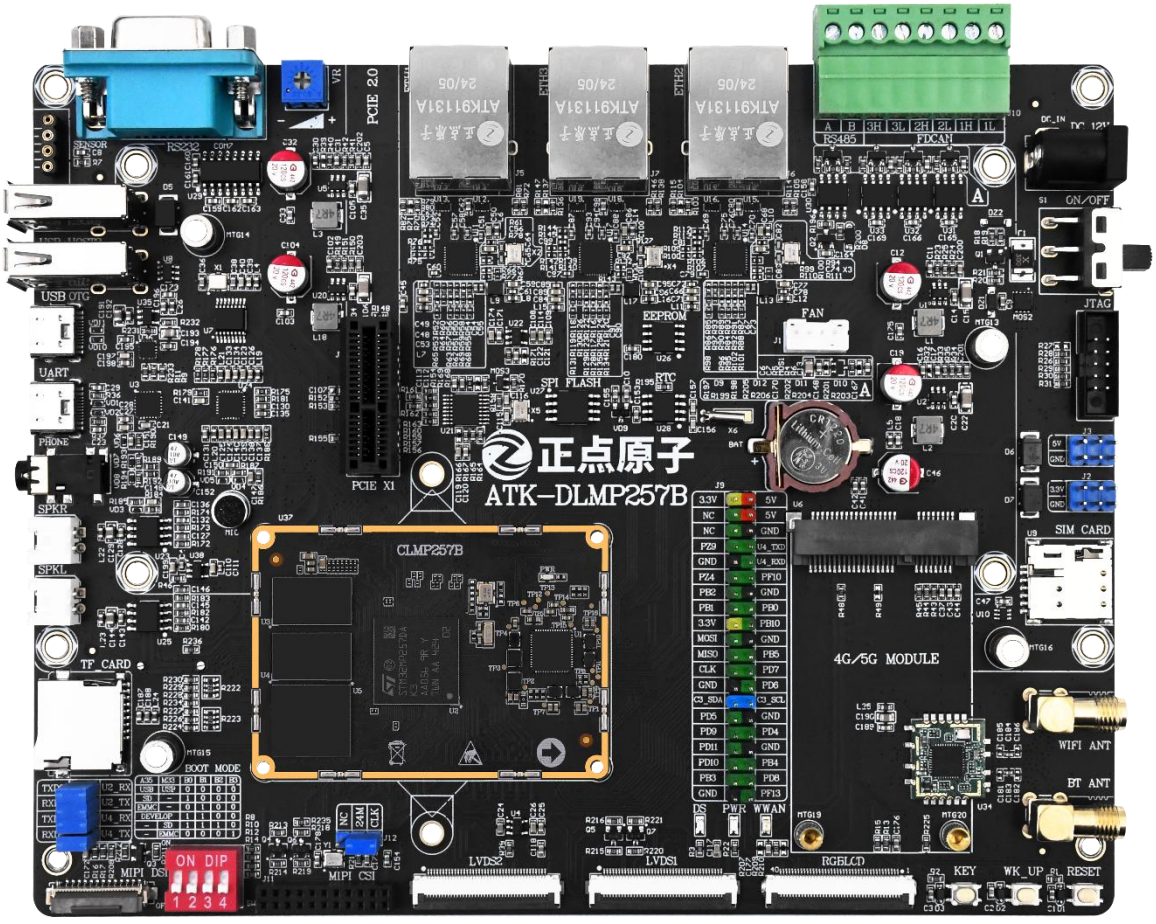
# ATK-DLMP257B

## Factory system TFTP setup manual

## V1.0



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Revision History:

| Version | Version Update Notes | Responsible person | Proofreading | Date |
|---|---|---|---|---|
| V1.0 | release officially | ALIENTEK | ALIENTEK | 2025.04.01 |

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# Introduction

In this chapter, we learned how to set up and configure the Trivial File Transfer Protocol (TFTP) on Ubuntu. TFTP is a lightweight file transfer protocol in TCP/IP protocol family, which is widely used in boot and file transfer of embedded system. Because TFTP protocol is simple and efficient, it is often used to load kernel image (zImage), device tree (dtb) and other necessary configuration files through the network in the process of starting the development board.

This chapter explains in detail how to install and configure a TFTP server on Ubuntu, including installing the xinetd service, setting up the TFTP share directory, and modifying the configuration files. At the same time, it introduces how to obtain shared files through TFTP protocol in the development board to ensure smooth communication between the TFTP server and the development board. Through the study of this chapter, developers can master the basic configuration and test method of TFTP environment, and provide strong support for the fast boot and file transfer of embedded systems.

# Chapter 1. TFTP environment installation

## 1.1 Introduction to TFTP

TFTP (Trivial File Transfer Protocol) is a protocol of TCP/IP protocol family used for simple file transfer between client and server, which provides uncomplicated and inexpensive file transfer service. We can use TFTP to load the kernel zImage, device tree, and other smaller files to the development board DDR to achieve network mount.

## 1.2 Setting up TFTP

### 1.2.1 Installing and configuring xinetd

Install xinetd by running the following command

```
sudo apt-get install xinetd
```

```
alientek@ubuntu:~$ sudo apt-get install xinetd
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  xinetd
0 upgraded, 1 newly installed, 0 to remove and 60 not upgraded.
Need to get 108 kB of archives.
After this operation, 310 kB of additional disk space will be used.
Get:1 http://us.archive.ubuntu.com/ubuntu focal/universe amd64 xinetd amd64 1:2.3.15.3-
1 [108 kB]
Fetched 108 kB in 1s (88.6 kB/s)
Selecting previously unselected package xinetd.
(Reading database ... 160491 files and directories currently installed.)
Preparing to unpack .../xinetd_1%3a2.3.15.3-1_amd64.deb ...
Unpacking xinetd (1:2.3.15.3-1) ...
Setting up xinetd (1:2.3.15.3-1) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for systemd (245.4-4ubuntu3.20) ...
alientek@ubuntu:~$
```

Figure 1 Installing xinetd

Find out if a xinetd.conf file exists in /etc/and create one if it doesn't.

```
ls /etc/xinetd.conf
```

```
alientek@ubuntu:~$ ls /etc/xinetd.conf
/etc/xinetd.conf
alientek@ubuntu:~$
```

Figure 2 Querying the xinetd.conf file

A xinetd.conf file has been found.If not, create a xinetd.conf file using the following command:

```
sudo vi /etc/xinetd.conf
```

It should be an empty file.Modify xinetd.conf as follows:

```
# Simple configuration file for xinetd
#
# Some defaults, and include /etc/xinetd.d/
defaults
{
# Please note that you need a log_type line to be able to use log_on_success
```

```
# and log_on_failure. The default is the following :
# log_type = SYSLOG daemon info
}
includedir /etc/xinetd.d.
```

```
# Simple configuration file for xinetd
#
# Some defaults, and include /etc/xinetd.d/

defaults
{

# Please note that you need a log_type line to be able to use log_on_success
# and log_on_failure. The default is the following :
# log_type = SYSLOG daemon info

}

includedir /etc/xinetd.d
```

Figure 3 Modifying the contents of xinetd.conf

### 1.2.2 TFTP directory

Create a new TFTP directory under /home/alientek/linux with the name tftp. Give the tftp directory read, write and execute permissions.

```
mkdir -p /home/alientek/linux/tftpboot
chmod 777 /home/alientek/linux/tftpboot/
cd /home/alientek/linux/
ls
```

```
alientek@ubuntu:~$ mkdir -p /home/alientek/linux/tftpboot
alientek@ubuntu:~$ chmod 777 /home/alientek/linux/tftpboot/
alientek@ubuntu:~$ cd /home/alientek/linux/
alientek@ubuntu:~/linux$ ls
tftpboot
```

Figure 4 Creating a new tftp directory

### 1.2.3 tftp-hpa and tftpd-hpa service programs

Execute the following procedure to install the tftp-hpa and tftpd-hpa service programs

```
sudo apt-get install tftp-hpa tftpd-hpa
```

```
alientek@ubuntu:~/linux$ sudo apt-get install tftp-hpa tftpd-hpa
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  pxelinux
The following NEW packages will be installed:
  tftp-hpa tftpd-hpa
0 upgraded, 2 newly installed, 0 to remove and 60 not upgraded.
Need to get 57.8 kB of archives.
After this operation, 187 kB of additional disk space will be used.
Get:1 http://us.archive.ubuntu.com/ubuntu focal/main amd64 tftp-hpa amd64 5.2+20150808-
1ubuntu4 [19.0 kB]
Get:2 http://us.archive.ubuntu.com/ubuntu focal/main amd64 tftpd-hpa amd64 5.2+20150808
-1ubuntu4 [38.7 kB]
Fetched 57.8 kB in 1s (50.4 kB/s)
Preconfiguring packages ...
Selecting previously unselected package tftp-hpa.
(Reading database ... 160529 files and directories currently installed.)
Preparing to unpack .../tftp-hpa_5.2+20150808-1ubuntu4_amd64.deb ...
Unpacking tftp-hpa (5.2+20150808-1ubuntu4) ...
Selecting previously unselected package tftpd-hpa.
Preparing to unpack .../tftpd-hpa_5.2+20150808-1ubuntu4_amd64.deb ...
Unpacking tftpd-hpa (5.2+20150808-1ubuntu4) ...
Setting up tftpd-hpa (5.2+20150808-1ubuntu4) ...
Setting up tftp-hpa (5.2+20150808-1ubuntu4) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for systemd (245.4-4ubuntu3.20) ...
```

Figure 5 Installing the tftp-hpa and tftpd-hpa service programs

Execute the following command to open TFTPD - hpa configuration file, set the path/home/alientek/Linux/tftpboot directory working for the TFTP server.

```
sudo vi /etc/default/tftpd-hpa
```

/etc/default/tftpd-hpa

```
# /etc/default/tftpd-hpa

TFTP_USERNAME="tftp"
TFTP_DIRECTORY="/home/alientek/linux/tftpboot"
TFTP_ADDRESS=":69"
TFTP_OPTIONS="-l -c -s"
```

```
# /etc/default/tftpd-hpa

TFTP_USERNAME="tftp"
TFTP_DIRECTORY="/home/alientek/linux/tftpboot"
TFTP_ADDRESS=":69"
TFTP_OPTIONS="-l -c -s"
```

Figure 6 Modification of tftpd-hpa

Execute the following command to create the /etc/xinetd.d/tftp file, configure the /etc/xinetd.d/tftp file, and set the tftp path to your own tftp path. (If you don't have xinetd.d, you can create it yourself.)

```
sudo vi /etc/xinetd.d/tftp -p
```

In/etc/xinetd. D/TFTP add the following content in this file, the path/home/alientek/Linux/tftpboot directory working for the TFTP server.

```
server tftp
{
        socket_type = dgram
```

```
        wait = yes
        disable = no
        user = root
        protocol = udp
        server = /usr/sbin/in.tftpd
        server_args = -s /home/alientek/linux/tftpboot -c
        #log_on_success += PID HOST DURATION
        #log_on_failure += HOST
        per_source = 11
        cps =100 2
        flags =IPv4
}
```

```
server tftp
{
        socket_type = dgram
        wait = yes
        disable = no
        user = root
        protocol = udp
        server = /usr/sbin/in.tftpd
        server_args = -s  /home/alientek/linux/tftpboot -c
        #log_on_success += PID HOST DURATION
        #log_on_failure += HOST
        per_source = 11
        cps =100 2
        flags =IPv4
}
```

Figure 7 Writing /etc/xinetd.d/tftp

Restart tftpd-hpa.

```
sudo service tftpd-hpa restart
```

Restart the xinetd service.

```
sudo service xinetd restart
```

```
alientek@ubuntu:~/linux$ sudo service tftpd-hpa restart
alientek@ubuntu:~/linux$ sudo service xinetd restart
```

Figure 8 Restarting tftpd-hpa and xinetd

## 1.3 Network Environment

Make sure the network is working and Ubuntu, Windows, and the board are ping each other.

Here combined with their own network configuration to verify, the author here for:

Development board IP: 192.168.6.44

Virtual machine IP:192.168.6.153

## 1.4 TFTP test

In the/home/alientek/Linux/tftpboot directory to create a test. The c file, inside directly into the hello alientek!

```
alientek@ubuntu:~$ cd /home/alientek/linux/tftpboot
alientek@ubuntu:~/linux/tftpboot$ vi test.c
alientek@ubuntu:~/linux/tftpboot$ cat test.c
hello alientek!
```

Figure 9 Writing the test.c file

Execute the following instructions in the file system of the development board to set the IP of the development board, and copy the test.c file in the TFTP working directory of the virtual machine (192.168.6.153) to the development board.

```
ifconfig end0 192.168.6.44
tftp -g -r test.c 192.168.6.153
cat test.c
```

```
root@stm32mp2:/# ifconfig end0 192.168.6.44
-g -r test.c 192.168.6.153
cat test.c
root@stm32mp2:/# tftp -g -r test.c 192.168.6.153
root@stm32mp2:/# cat test.c
hello world
```

Figure 10 Testing tftp

You can see that test.c is successfully transferred to the development board, and the TFTP environment is successfully set up.