

ARM Based USB Flash Drives for Data Communication Without using USB Cables and USB Ports

¹Swathi Nallapati, ²A S N Chakravarthy

¹Research Scholar, K L University, India

²Professor, K L University, India

Email: swathi.nallapati@gmail.com , asnchakravarthy@kluniversity.com

Abstract – Now a day's USB flash drives are widely used for storing the data. Data transmission and reception in USB flash drives are possible through USB cables and USB ports of PC. Data communication cannot be possible in USB flash drives without USB cables and USB ports of PC. So to overcome this problem, this paper proposes a proto type device which is used to transfer as well as to receive the data from one USB Flash Drive to other USB Devices without using the USB cables and USB ports of PC. The device is same as that of the USB flash drive but some extra functional properties and components are attached to it for supporting wireless data transmission and reception.

Keywords – USB Flash Drives; ARM Processor; Wireless Communications; Bluetooth.

1. Introduction

USB flash drives are meant for storing data. Storing data into these devices is done through USB cables and USB ports of PC. USB cables and USB ports are having its own limitations and drawbacks so in this paper we moved to wireless technology for data communication.

2. Problems of USB cable extension

USB is one of the most common ways of connecting peripherals to computers. USB extension cables can increase the distance between a computer and a peripheral. In cases where the USB extension cable isn't working, looking at a few factors should help isolate the problem.

2.1 Cable Length: There are two types of USB extender cables. The most common extender cable is a passive cable. Passive cables do not require a power adapter and don't have a repeater to boost the USB signal. The maximum length of a passive USB cable or series of cables chained together is 16 feet. Cables with repeaters can be as long as 80 feet. When troubleshooting a USB extension cable, the first thing to look at is the length. If the total length of your passive USB extension cable is over 16 feet, the signal may be degrading too much and causing your problems.

2.2 Broken Cable: To see if a USB extension cable is defective, try plugging the device directly in to the computer. If the computer recognizes the device, it could be that the cable is too long. If the cable is less than 16 feet and the computer recognizes the device when connected directly, but fails to recognize the device when an extension cable is used, it is likely that your extension cable is bad. Try using a different extension cable. If the device works with the new extension cable, the original cable probably has a fault.

3. Components of ARM based USB flash drive

Components present in this device are same as that of the normal USB flash drive but some extra features are added. Controller unit plays major role in this device. Additional components that should be attached are as follows:

Display unit:

The main purpose of display unit is to display the contents/data presented in the flash drive and how much data is transmitting as well as receiving in USB flash drive.

Joystick/keys:

These are used for selecting the contents present in USB flash drive.

Control unit:

Here ARM processor is used for driving all the units and also to support the wireless communication. Here Bluetooth or zigbee or wireless LAN protocol is used for wireless communication.

Power supply / Battery backup unit:

Power supply/ Battery backup unit should be interfaced in such a way that whenever the USB flash drive plugged to laptops they should charge their batteries.

Bluetooth ON/OFF switch:

The main purpose of this switch is to activate and deactivate the device. Whenever the switch is ON then only the data transmission and reception is possible in the device.

4. Working of ARM based USB flash drive

Initially the Bluetooth switch of the device will be in OFF position. Whenever we want to send data to another USB

flash drive, make sure that Bluetooth switch of both the devices should be ON position. Make pairing of both devices. Select the contents / data present in the source USB flash drive using the joystick/keys. The amount of data receiving will be displayed in display unit of receiver. ARM processor drives all these operations.

4.1 Steps to follow for data transferring using Bluetooth [2]:

1. Make sure the flash device is equipped with Bluetooth technology (either integrated into the machine or a USB dongle) and active.
2. Turn on Bluetooth on mobile device. This option can often be found in the Settings or Connectivity menu of phone.
3. Pair flash device with mobile device by making both devices discoverable (also known as visible or unhidden) in the Bluetooth options. Once both are visible, search for Bluetooth devices on mobile phone.
4. Locate the name of your computer in the results list and select it.
5. Enter a 4 to 8 digit pass code of your own choosing and press continue. If you are pairing with a Bluetooth headset or other screen less device, the pass code will be either 0000, or provided in the device's manual.
6. Once your devices are paired, you can send and receive files.
7. Method for sending a file to mobile device. Now right-click on the desired file and select Send To --> Bluetooth Device --> (mobile phone's name). Some phones (notably Verizon phones) do not support the necessary 'profile' to allow file transfers, and instead only offer support for Bluetooth headsets.
8. While the file is being transferred, you should see a progress bar on flash device and/or phone. Once the file is finished transferring, a message stating such should show up on your device's screen.
9. Find the transferred file on mobile phone by using the phone's built-in file explorer
10. Turn off the Bluetooth switch of both the flash device and mobile device.

5. OUTLOOK OF ARM BASED USB FLASH DRIVE



(a) Bluetooth ON position



(b) Bluetooth OFF position

Figure 1. Outer look of ARM based USB flash drive

6. LIMITATIONS OF ARM BASED USB FLASH DRIVE

1. More chip area is required for ARM processors.
2. Frequent battery power is needed.

7. FUTURE DEVELOPMENTS

1. Increasing storage capacity or memory size.
2. Interfacing mp3 player to this device.

8. CONCLUSION

The ARM based USB flash drives can be used for transferring as well as receiving the data without using the USB cables and USB ports of PC. The devices which don't have USB ports like cellular phones can directly transmit the data to this type of USB flash drives.

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