

# COMPUTER INDEPENDENT DATA TRANSFER DEVICE

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**Abstract**— In today's continuously evolving digital era, where the user wants everything accessible very easily, the use of a laptop or PC just for the sake of data transfer is not efficient. This paper discusses an innovative approach to avoid the use of computer for data transfer among distinct USB storage devices. The proposed system "Computer Independent Data Transfer Device" is a compact, portable device that can be carried anywhere and allows data to be transferred from one USB storage device to another USB storage device. It also allows data to be transferred in a wireless manner i.e. using Bluetooth/Wi-Fi technology. For ease of use, this device has a TFT LCD screen for graphical user interface (GUI) that allows the user to select files to be transferred and display options like cut-paste, copy-paste, share via. Various options like delete file, rename file, cancel operation are also provided.

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**Keywords**— Data transfer, Portable, USB, Bluetooth, Wi-Fi.

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## I. INTRODUCTION

Nowadays USB storage devices have become the most common choice for storage purpose. The computer users need fast, reliable, secure, high capacity and easily accessible system for data storage and transfer. The disadvantage of USB storage device is that being a peripheral device, it requires a host, usually a PC or a laptop to carry out data transfer between two USB storage devices.

To overcome this problem, the "Computer Independent Data Transfer Device" allows data to be transferred among USB storage devices without the need of a computer or a laptop. It also allows data to be transferred in a wireless manner using Bluetooth/Wi-Fi. It is compact, portable, cost effective and consumes less power as compared to laptop or PC.

## II. LITERATURE SURVEY

To avoid the use of PC or laptop for data transfer, various systems have been developed similar to proposed system. The system proposed in [1] by Sukhada M. Deshmukh and R. C. Mahajan is one such system where USB host controller (VNC1L) is used along with microcontroller ARMLPC 2138. The system developed in [2] has a limitation that it can only be used for the USB devices up to 2GB capacity. In both the above mentioned systems, wireless data transfer is not possible.

Wireless data transfer can be achieved through Bluetooth. Bluetooth is a short range wireless interconnection of mobile phones, computers, and other electronic devices.

Wireless data transfer through Bluetooth is achieved in the system developed by Prof. Parmar, Prof. Dwivedi and Prof. Wandra [3]. A matrix keyboard is used in the system developed by Gawali and Kale which is not that easy to use as compared to a touchscreen display [4]. A system has been proposed by Tushar Sawant and Sanjay Deshmukh to

transfer data among storage devices without relying on a PC. For ease of use, control options like explore, copy etc have been provided [5]. Mobile devices used nowadays, such as mobile phones and PDAs, when run out of local memory, require backing up their files in an external storage device which could restrict the user mobility. The Adaptive File Transfer Middleware (AFTM) [10] for mobile applications makes the transfer of files between a mobile device and external storage server easier by using wireless connections like Wi-Fi, GPRS/UMTS. It also uses the Multimedia Message Service (MMS) as another option for transferring the files. Thus, the main objective of the proposed system is to develop a system where data transfer can take place in a wired and wireless manner. The proposed system makes use of ARM processor.

## III. PROPOSED SYSTEM

The proposed system "Computer Independent Data Transfer Device" allows data to be transferred in a wired or wireless manner. Ex. data transfer between two pen drives connected to the host controller or data transfer between pen drive and a smartphone where the smartphone is connected to the host controller through Bluetooth/Wi-Fi.

The system uses Raspberry Pi as a development board. Raspberry Pi comes with a Broadcom BCM2835 system on chip (SOC) which includes ARM processor. It also has 4 USB ports which is very important for the system as it gives the user options to add new modules to the device. The USB controller provides high speed serial communication ports at a baud rate of 12 Mbits/sec.

To provide the Graphical User Interface, the system uses a TFT (Thin Film Transistor) screen. All the contents of USB storage devices are displayed on this screen. This feature helps the user to select the required files that need to be transferred. Various other options like cut, copy, paste, delete, rename and cancel are displayed on this TFT screen.

The most important and distinguishing feature of the proposed system is portability i.e the ability to take the device anywhere without any compromise. This can be achieved by using a portable power bank(5Volts and 3000mA or more) to power up the device adequately. Hence, the user will be able to transfer data among different storage devices anywhere.

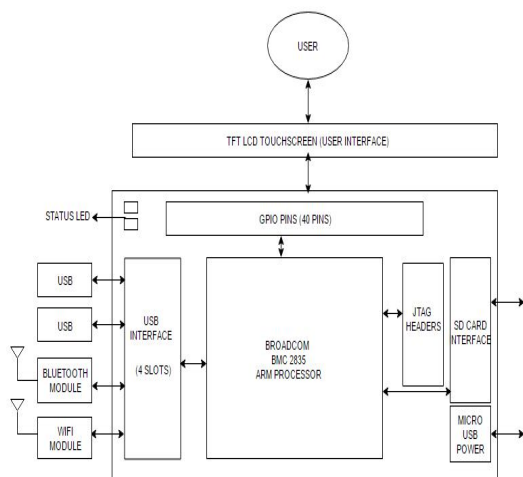


Fig 1: System Architecture

#### A. USB Sticks

A USB stick, also variously known as a USB drive, USB flash drive, thumb drive, pen drive, flash-disk, or USB memory, is a data storage device that includes flash memory with an integrated USB interface. USB sticks are typically removable and rewritable, and physically much smaller than an optical disc[11].

USB sticks have four pins and each pin has a specific function which is given below [1].

| Pin No. | Pin Name | Function          |
|---------|----------|-------------------|
| 1       | +V       | +5V               |
| 2       | D+       | Data reception    |
| 3       | D-       | Data transmission |
| 4       | GND      | Ground            |

There are two separate pins for data reception and data transmission. Data transfer is done serially [1]. Remaining two pins are used for power supply. The speeds offered by USB are low speed(1.5Mbits/sec), full speed (12Mbits/sec) and high speed(480Mbits/sec).

#### B. ARM processor

It is the heart of the system. Advanced RISC Machine(ARM), is a family of reduced instruction set computing (RISC) architectures for computer processors, configured for various environments[11]. ARM processor has a USB host with USB drivers installed in it which will be used for data transfer. Some of the features of an ARM processor are:

- It can perform Millions of instructions per second (MIPS).
- Load and Store architecture.
- Power saving design

Raspberry Pi has a Broadcom BCM2835 SOC which includes ARMv7 processor[12]. Because it has an ARMv7 processor, it can run the full range of ARM GNU/Linux distributions, including Snappy Ubuntu Core, as well as Microsoft Windows 10.

#### C. TFT LCD screen

A thin-film-transistor liquid-crystal display (TFT LCD) is a variant from LCD that uses thin-film-transistor technology to improve image qualities. A TFT LCD is an active-matrix LCD. The contents of USB storage devices and various operations are displayed on this screen. This helps the user to select files and perform required operations.

#### D. Bluetooth Technology

Bluetooth is a wireless technology standard for exchanging data over short distances (using short-wavelength UHF radio waves in the ISM band from 2.4 to 2.485 GHz) from fixed and mobile devices, and building personal area networks (PANs). Bluetooth has a physical range of typically less than 10m. Bluetooth module is incorporated into the proposed system for wireless data transfer between devices with Bluetooth compatibility but no Wi-Fi compatibility.

#### E. Wi-Fi Direct Technology

Wi-Fi Direct, initially called Wi-Fi P2P, is a Wi-Fi standard enabling devices to easily connect with each other without requiring a wireless access point. It is useful for everything from internet browsing to file transfer and to communicate with one or more devices simultaneously at typical Wi-Fi speeds. One advantage of Wi-Fi Direct is the ability to connect devices even if they are from different manufacturers. Only one of the Wi-Fi devices needs to be compliant with Wi-Fi Direct to establish a peer-to-peer connection that transfers data directly between them with greatly reduced setup[15]. The proposed device will be incorporated with a Wi-Fi module which will allow it to create its own WLAN(Wireless Local Area Network) and connect to other WLANs for data transfer. Data transfer using Wi-Fi direct has several advantages as compared to Bluetooth. Data transfer using Wi-Fi direct is faster than data transfer using Bluetooth. Physical range of Wi-Fi direct is upto 100 metres which is more than Bluetooth.

#### F. ADVANTAGES

- PORTABLE  
The whole system is battery operated and compact, therefore can be carried anywhere, anytime without any compromise.

- **POWER OPTIMIZATION**  
Both the processor and USB 2.0 are designed to consume low power. Hence, power requirement is not an issue.
- **SECURITY**  
Since the operating system used in the proposed system is Linux based, there is complete assurance of secure data transfer.
- **EASE OF USE**  
There are a lot of options given to the user for transferring data among distinct storage devices i.e from USB flash drives to mobile phones.

## CONCLUSION

We have studied an innovative approach for eliminating the use PC or Laptop just for the sake of data transfer. Through theoretical analysis it has been found that various systems developed to overcome this problem work as good as PC. The ease of use and portability of the system makes it powerful and unique tool for data transfer in both wired and wireless manner. The proposed system makes use of both Bluetooth and Wi-Fi direct technology for wireless data transfer.

But the sole drawback is that we can transfer the files but cannot read or open them. This drawback can be removed in the research of the proposed system in future.

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