



USB to USB Data Transfer using Raspberry Pi

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ABSTRACT: The purpose of the proposed system is to describe the efficient data transfer between pen drives without the support of PC. Now day's portability is most important. Utilizing the system one can not only transfer the data but also transfer the particular file which is to be sent by using LCD display. Currently to transfer data between two USB device we use PC or laptop, but it is not always possible to carry such a large device only for the data transfer. So to overcome the problem a system is designed, which is more compact. In the proposed system, transfer of data between two USB devices is done without using any computers or laptops. As shown in the block, whenever two pen drives are inserted into the USB port of Raspberry Pi, as done by giving the command to the processor, the processor indicates that the pen drive is inserted successfully till the user can not send any command to processor, the operation will not be initiated. After sending the particular command to processor, the processor will start fetching the data from source pen drive into buffer and the ARM processor wait for the signal from destination pen drive. When the processors receives the signal from destination pen drive, the data transfer operation will start. Only the ARM processor should get the external hard key input signal from the user. Once the user press the hard key the ARM processor get the information to transfer the data between two pen drive. While transferring the data the LED blinking rate will be increased when data transfer is completed then LED will stop blinking. The total operation is performed on the Raspberry Pi board by using a "Raspbian" operating system.

KEYWORDS: USB to USB, Without PC, Raspbian OS.

I. INTRODUCTION

Today the need for the portable devices is well known to us. One can easily find the USB and its applications everywhere around us. The applications of the USB are computer peripherals such as keyboard, pointing devices, digital cameras, printers, portable media players, disk drives and network adapter, both to communicate and to supply electric power. It has become common place on other devices, such as smart phones, PDAs and video game consoles. USB has effectively replaced a variety of earlier interfaces, such as serial and parallel ports, as well as separate power chargers for portable devices. But the main disadvantage of USB devices is that it requires the use of PC for their operation. Carrying a PC just for the sake of data transfer is not affordable these days in the age when people want all devices to be handy. Moreover, transferring data via a computer involves a lot of power to be wasted. Also, the threat of viruses and malware has made the life of computer users more complicated. These viruses get activated as soon as the device is plugged into the system and get copied along with other data from one device into another. So a solution is provided by means of implementation of a small device that carries out the required task. The small footprint and ease of portability makes it a choice for the data transfer. This device will help the user to select a particular data file from the mass storage device connected to one of the ports and transfers it to the other mass storage device using some controls like list, copy provided on the front panel.

The main objective is to design and implement a cost friendly device to effectively transfer data without using pc, from one pen drive to another pen drive. It is a portable device which ensures data transfer securely. Aims at evaluating feasibility and performance. The system is designed in such a way that it assures no loss of data, is simple and easy to adapt.

Problem Statement- Nowadays the transfer of data between two PC's can be done with either net access or LAN network, but transfer of data between PC's is not secured. For transferring data between pen drives in general we require PC's. Disadvantage of an existing system – we can transfer the data from one place to another place by using net access, but if we transfer the data between PC's the data is not secured and also it requires two PC's to communicate. Moreover, transferring data via a computer involves a lot of power to be wasted, since the computer has to be entirely before it can transfer data. Also, the threat of virus and malware has made the life of computer users more



complicated. These viruses get activated as soon as the device is plugged into system and get copied along with other data from one ash device into another.

Proposed System- this project here can provide a valuable solution to all the problems faced by a person in the existing system. The aim of the project is to build a small and handy device to transfer data from one USB device to another.

This system pen drive to pen drive data transfer without PC is done by using raspberry pi. The pen drives are connected to USB module through USB hub, the communication between two pen drives is done by using raspberry pi.

The purpose of this paper is to describe the efficient data transfer between pen drives without the support of PC. The probability of the device is achieved using a small credit-card sized, yet a powerful computer, Raspberry Pi. Raspberry Pi is responsible for the execution of the main software and display of the render images on the screen. This paper includes literature review and commentary on this topic that has been addressed by professionals, researchers and practitioners. Effective data transfer between the drives without PC achieved with a good speed estimate is valuable. The value in addressing this topic is to examine the notion of efficient transfer of data without PC and its suggested uses in various fields to ensure accurate performance, portability and usability.

II.PROBLEM STATEMENT

Nowadays the transfer of data between two PC's can be done with either net access or LAN network, but transfer of data between PC's is not secured. For transferring data between pen drives in general we require PC's .Disadvantage of an existing system – we can transfer the data from one place to another place by using net access, but if we transfer the data between PC's the data is not secured and also it requires two PC's to communicate. Moreover, transferring data via a computer involves a lot of power to be wasted, since the computer has to be entirely before it can transfer data. Also, the threat of virus and malware has made the life of computer users more complicated. These viruses get activated as soon as the device is plugged into system and get copied along with other data from one ash device into another.

III.PROPOSED SYSTEM

This project here can provide a valuable solution to all the problems faced by a person in the existing system. The aim of the project is to build a small and handy device to transfer data from one USB device to another. This system pen drive to pen drive data transfer without PC is done by using raspberry pi.The pen drives are connected to USB module through USB hub, the communication between two pen drives is done by using raspberry pi.

IV.METHODOLOGY

Transfer of data through USB in today's scenario is the very easy task. But the problem is that to transfer the data to a personal computer or laptop is not easy if you don't have one or the only intention is transfer data.

So to overcome this problem we implement device using the following :-

1. Initial Setup:

In this system, the user inputs two pen drive i.e., source pen drive and destination pen drive. Selects the desired file or folder to be transferred, which will be displayed on the screen. The progress of the data transfer destination pen drive. Selects the desired file or folder to be transferred, which will be displayed on the screen. The progress of the data transfer will be displayed on the screen so that the user might take further actions based on it.

2. Detection of Pendrive:

The Raspberry pi has the two USB port and it has the central host controller. The host controller manages attachment and removal of USB devices Manage data flow between host and devices Provide and manage power to attached devices monitor activity on the bus. The 2.0 USB connector are connected to the ARM processor this two USB port are used to connect the other device such as keyboard, mouse, and external hubs. For communication it's most important to connect the two pen drives into the USB ports of controller. When it connects to the system first it does the job of initialization and then we provide the option such as copy, paste, cut etc. by using switches for dealing with the data.

3. Display of Data:

The touch screen is used which is of 10" tablet with high quality IPS screen, a great 1280×800 resolution, capacitive multi-point touch screen and uses Raspberry Pi as a heart. The contents of the mass storage device are displayed on the touch screen. This helps the user to view and select the files or folders of interest from the USB device. Also the options like select, copy for data transfer are put on to the touch screen. It displays the start and finish of the data transfer.

4. User Interface:

This module obtains the user input and displays the user requested information through a touch screen. It has three major blocks, the touch screen Controller, Navigation and Screen Display Formatter. The touch screen is used to select



the file and displays the path or Long File Name (LFN) format of a file or directory. The inputs from the touch panel are used to execute the operation to be performed. All the content on touch panel are displays the information of the USB drive.

5. Data Transfer:

Universal Serial Bus (USB) is a master- slave device which is made up of many slaves and a single master. The slaves are called the peripherals and the master is the host. Only the host has the ability to begin data transfer. The slaves cannot initiate data transfer. They only respond to the master’s instructions. A USB device can have 32 connections- two of which are reserved for giving Ack. So a total of 30 are present for normal use for the data transfer in bidirectional manner.

V.SYSTEM ARCHITECTURE

A good system design is to organize the program modules in such a way that are easy to develop and change. Structured design techniques help developers to deal with the size and complexity of programs. Analysts create instructions for the developers about how code should be written and how pieces of code should fit together to form a program.

Several structural design considerations should be taken into account for economical and efficient welding. Many of these apply to other joining methods, and all apply to both subassemblies and the complete structure. The architectural design of a system emphasizes the design of the system architecture that describes the structure, behaviour and more views of that system and analysis.

The architecture of a system describes its major components, their relationships (structures), and how they interact with each other. Software architecture and design includes several contributory factors such as Business strategy, quality attributes, human dynamics, design, and IT environment. We can segregate Software Architecture and Design into two distinct phases: Software Architecture and Software Design. In Architecture, non-functional decisions are cast and separated by the functional requirements. In Design, functional requirements are accomplished.

VI.BLOCK DIAGRAM AND ITS COMPONENTS

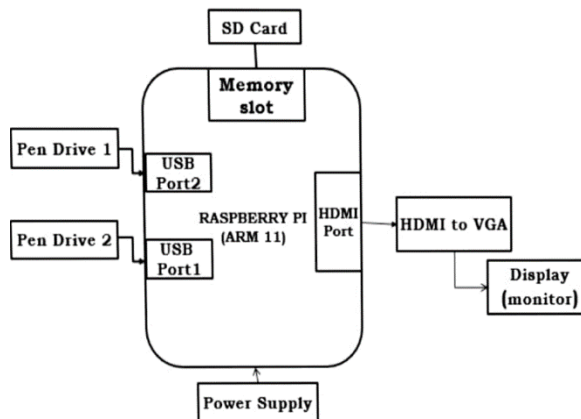


Fig. 1 Block diagram

A block diagram is a graphical representation of a system – it provides a functional view of a system. Block diagrams give us a better understanding of a system’s functions and help create interconnections within it. Block diagrams derive their name from the rectangular elements found in this type of diagram. They are used to describe hardware and software systems as well as to represent processes. Block diagrams are described and defined according to their function and structure as well as their relationship with other blocks.

Block diagram can represent Source, destination, storage and flow of data using the following set of components:-

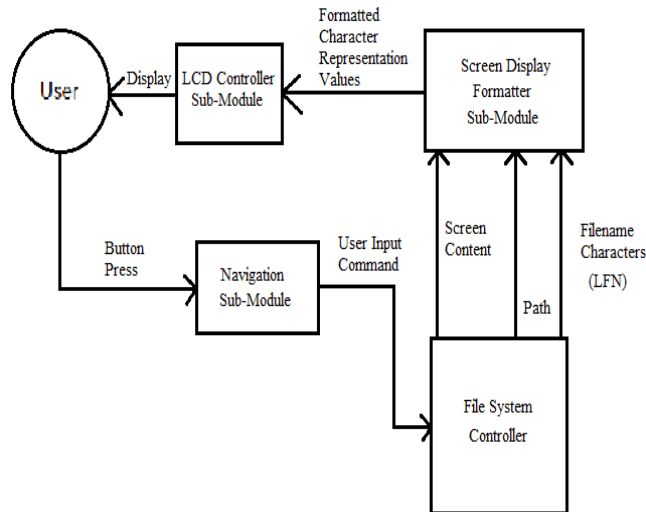


Fig. 2 User Interface Controller Module Block Diagram

1. User Interface Controller Module: This module obtains the user input and displays the user requested information through a touch screen. It consists of three sub modules namely the touch screen Controller, Navigation and Screen Display Formatter. The touch screen is used to select the file and displays the path or Long File Name (LFN) format of a file or directory. The inputs from the touch screen are converted to their corresponding command codes and are forwarded to the File System Controller module for execution. All information to be displayed is received from the File System Controller module.

A. Touch screen Controller: The touch screen controller is used to interface the touch screen to the main hardware system. It has two USB ports and ARM7 controller which consists of driver files for the touch screen.

B. Navigation: The Navigation sub module is the input handling hardware of the system. It sends corresponding signal for each touch pressed to the microcontroller that controls the touch screen so that it could update the screen and/or send commands to the File System Controller module for processing.

C. Screen Display formatter: The Screen Display formatter is the software part of the User Interface module. It arranges and orders the contents of the touch screen. It formats the screen to display the appropriate option menus, folder contents, path names, content type (folder or file).It receives the names of the files and folders to be displayed from the File System.

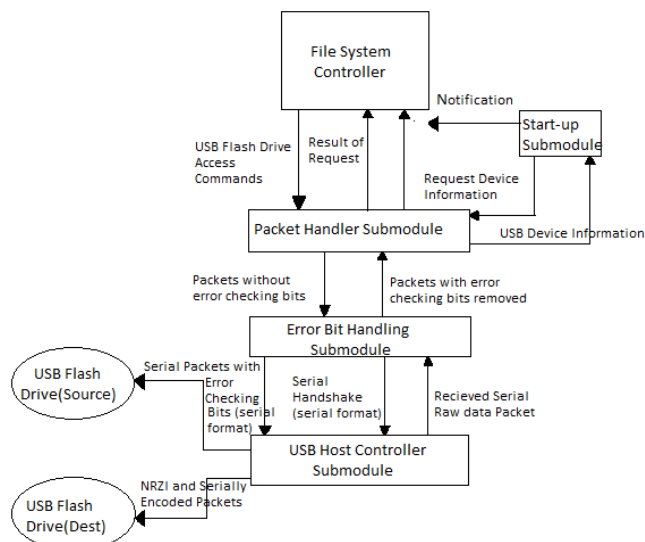


Fig. 3 USB Host Controller Module Block Diagram

2. USB Host Controller Module: The USB Host Controller sub module is the main hardware used by both the USB Controller Module and the File System Controller Module. It interfaces the USB flash drives and converts raw data and



information to their proper NRZI encoding as specified by the USB technical specifications. Furthermore, the sub module is capable of encoding or decoding the incoming NRZI data from the USB flash drives and forwards it to their respective sub modules for further processing. The system uses the Raspberry pi, a programmable microcontroller and USB multi-role embedded host /peripheral controller, which has its own Basic Input/output system and framework program. Most of the software sub modules make use of the available framework where the functions are already abstracted and simply need to be enabled and customized depending on the application.

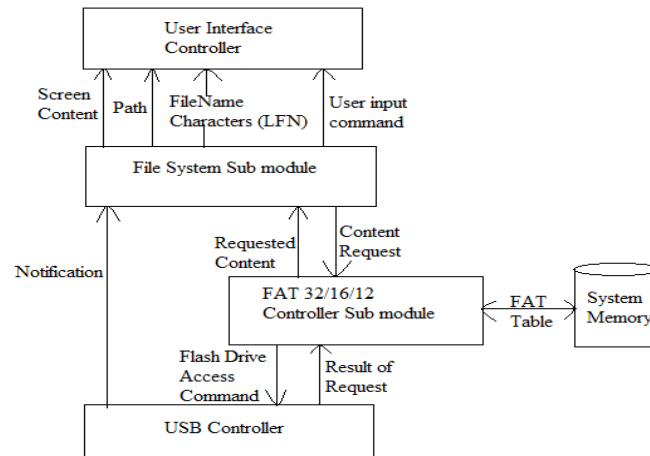


Fig. 4 File System Controller Module Block Diagram

3. File System Controller Module: The File System Controller is responsible for all file management processes and FAT file system access for the system. It mediates between the display/user interface and USB communications module. A large percentage of the systems software is found in this module, contains most of the systems core functions. The major commands handled by the sub module include the navigation touch screen and the different functions like copy, delete, browsing through files/folders and the back command.

VII.IMPEMENTATION

The data transfer is having four types:

- a) **Interrupt transfers:** For the devices needing quick but guaranteed response. For the files up to 20 KB this type of data transfer will take place (e.g. small text file).
- b) **Isochronous transfers:** For some fixed data rate but data loss may take place. For the files between 20 KB and 1024 KB this type of data transfer will take place
- c) **Control transfers:** used for simple status check.
- d) **Bulk transfers:** uses available bandwidth with no fixed data rate. For the files more than 1024 KB this type of data transfer will take place (e.g. file transfer).

6. Implementation Algorithm:

The Implementation Algorithm is as follows

- 1) Select the suitable development board.
- 2) Check whether the OS is ported or not
- 3) Connect the USB device to check functionality
- 4) Inter face the touch screen and keypad as a User interfaces.
- 5) Check the communication between the USB device and the board.
- 6) Explore the device content son touch screen.
- 7) Select a particular file, and by using the option COPY, copy that file to destination device Move Button on touch screen.
- 8) The selected file is then copied into destination USB device that is connected in one of the two USB ports.
- 9) If another copy operation is to be performed, then go to step 7.
- 10) Terminate the process.

VIII.RESULT

The project undertaken satisfies the needs of the current generation that requires portable means of carrying data transfers. The important thing is data transfer is done without the involvement of PC. It also provides much security as



Linux is a much secured Operating System. It has been developed by integrating features of all the hardware component & software used, using advanced raspberry pi board & with the help of growing technology the project has been successfully implemented. The advantage of this device is that it is battery operated, so there is no need of connecting power supply & data transfer can be take place at any time.

IX.CONCLUSION AND FUTURE WORK

Transferring the data through USB in today's scenario is the most common task. But the problem is that for transferring the data to a personal computer or laptop is difficult if you don't have any of them. Therefore, we came up with an easy and affordable device which can transfer the data between two USB data drives without the help of PC or laptops. For future work Keypad and graphical LCD could be replaced by touch screens which could make human work easier by drag and drop method. And it can It can be implemented with photocopier machine.

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