

Circuited Mouse with File Transfer Facility using Embedded and Network Technology

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ABSTRACT

The purpose of our project is to enable storage and file transfer for the users, making it possible with the use of single USB connected mouse with the help of an integrated chip. This Integrated Chip(IC) is (GL850G) that acts as a splitter. This splitter splits the USB connector to connect the receiver and a storage medium, so that the users can make use of this mouse as storage device also. So the user can transfer the files or data to another unknown computer via this mouse with an inbuilt storage facility instead of using an additional storage device. File transfers are made easier between two unknown computers.

Keywords: GL850G, mounting storage chip, storage 2 GB, java program to copy paste

INTRODUCTION

Our concept (Mouse with File Transfer) where, one can effectively use the mouse to transfer as well as have the ability to store data, that can be used to transfer files to another computer. People who carry both the pen drive and their wireless mouse everywhere find it difficult to keep track of them.

This is effective, where we need not carry a separate storage device in order to transfer files to another computer. From various surveys we came to know that working people who carry these seem to misplace their transmitter part and often try to replace with another transmitter which doesn't belong to their original receiver and should also deal with the battery issues and misplacing of pen drives or additional storage devices and their receiver part. This will help many users who find it hard to carry two separate devices, a mouse and a memory drive.

We, mount the memory chip onto the integrated chip itself. We use an integrated chip (IC) to split the USB

connection into two flows; one which is to connect to the receiver and the other to the storage device for storage purposes.

The Integrated Chip that we use is GL850G. We can therefore transfer files to unknown pcs or laptops with the use of a single mouse. Storing is done within a secured (virus attacks) connection. Using a wired feature instead of wireless, overcomes the connectivity issues.

Where the connection would not get lost easily and is fixed to the USB port of the laptop. This mouse also overcomes the storage issue as; a storage chip will be mounted onto the integrated chip as well. Thus, to serve two purposes to act as a mouse as well as an additional storage device. The Transmitter is not detached unlike the wireless mouse hence we cannot lose the USB transmitter. There is a Stable connection and it is more responsive because we need not wait for the pc/laptop to settle the connection. The domains used are embedded for hardware/software components. An embedded system

consists of real time computing constraints and is of electrical system. This system is embedded or associated with different hardware and mechanical parts. Embedded systems are the ones that are used till date because of their working.

Whereas, networking for the software part is used. The optical mouse that is being in use today is integrated into an ASIC. The reason for this is that it has a camera that takes pictures at a time and then these pictures are used to be compared with each other newer pictures taken. This is done in order to find out the movements that have happened on the surface.

Every modern mouse makes use of an embedded system. Without an embedded system, nothing can exist. However a network mouse is used to allow us to connect with various computers in a single network. This network can be your local network such as the Local Area Network (LAN) that is wireless or any standard Ethernet. By this network mouse, we can connect to any keyboard computer like as though as using a remote to control the computer. Moreover network mouse is cost-effective to use in our day to day lives.

The network and mouse are two different things which are very much different from each other and their differences are seen as: The mouse does not transmit any contents using the internet connection or any network connect but rather through a connection through the wire.

BRIEF HISTORY

The first computer mouse was invented in the 1960s by Douglas Engel Bart along with a Director of Augmentation Research Centre (ARC) at Stanford Research Institute (SRI), in Menlo Park,

California.

The mouse itself did not start off as small concept but rather a piece of a large project in the early 1962s. The mouse was aimed to increase their capabilities to assist the humans even more.

Douglas Engel Bart, was keen to explore further and further about the mouse and how all the possible ways can exist while inventing a computer mouse. He wanted to increase the capabilities of the mouse in order to solve complex problems faced by the humans. He kept on working on this concept for twelve years. Another colleague of Engel Bart, worked out ways to achieve this structure of a computer mouse.

The main goal of a computer mouse was to be able to interact with the information that is displayed on the screen and how and all. There were other types of mice invented like the joystick, the remote that acts as a cursor on screen, or the light pens, etc. NASA was then sought by these two and with a bunch of volunteers, did some tasks with different devices.

It was very clear that the mouse was the best kind to perform the tasks that we require and to solve our problems. Unlike the joysticks and light pen, they took too much time to process the speed of the cursor, establish connection and difficult to establish connection with the screen.

PINOUT OF ADNS-2610 OPTICAL

PIN NUMBER	PIN	DESCRIPTION
1	OSC_IN	Oscillator input
2	OSC_OUT	Oscillator output
3	SDIO	Serial data
4	SCK	Serial port clock
5	LED_CNTL	Digital Shutter signal out
6	GND	System ground
7	VDD	5V DC Input

WORKING OF A MOUSE

With a normal ball mouse, when the mouse is moved across the surface of the mouse, the ball moves as well along with the movement. Two balls associated in this and one of them detects a x-axis side to side movement and the other for the y-axis, up or down.

With this x and y axis movements we can detect how far the mouse has moved across the surface and perform the related actions. The ball present in the mouse helps in telling us how much the ball

blocks the beam of light emitted from the mouse and path is traced.

Thus, the x and y axis play a major role in discovering the positions which the mouse moved. The light beam emitted is used for the uncovering the amount of light blocked, by the wheels.

Now, optical mice are used due to the durability of the old mechanical mice. Thus they were replaced soon after optical laser mice were invented.

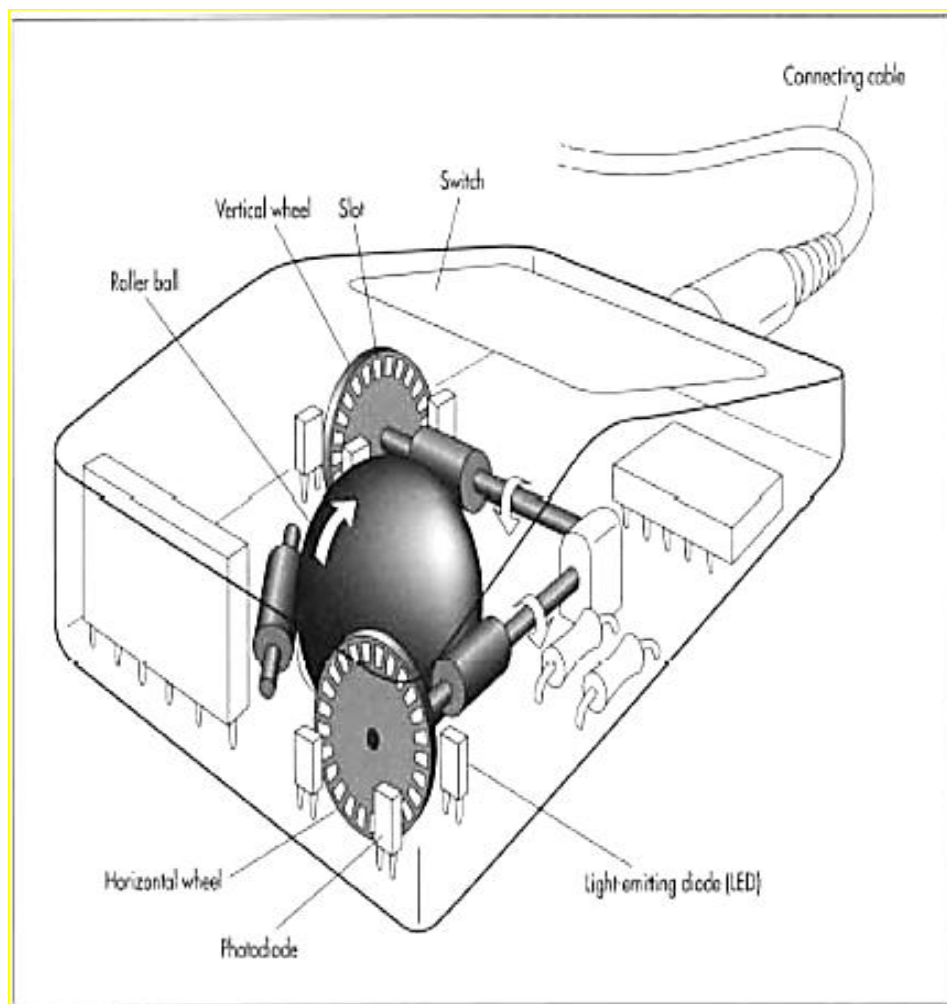


Fig.1:-Mouse Sensor

MOUSE SENSOR

Optical mice has one of the main components; the optical mice sensor. This is relatively called as ADNS-2610. Along

with this component exists the controller or the interface chip and three micro switches with a quadrature encoder and LED for the illumination of surface beneath it.

MOUSE SENSOR MOUSE CIRCUIT DIAGRAM

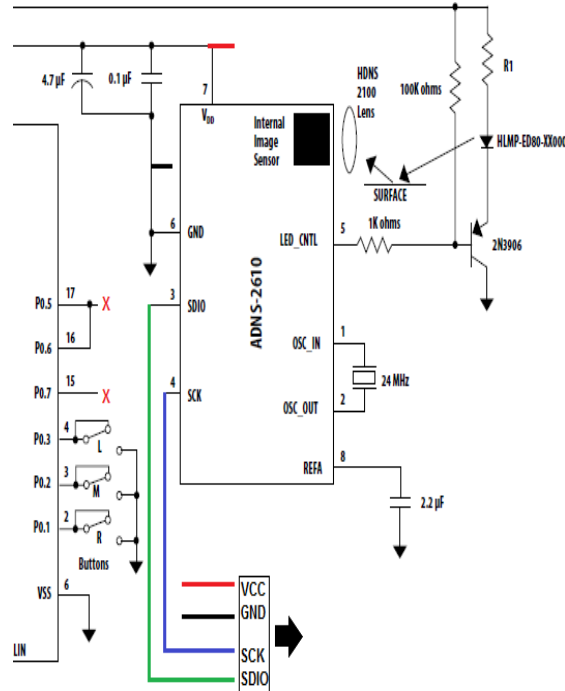


Fig.2:-Mouse Circuit Diagram

AUTHENTICATION

Authentication is the main feature present in the mouse with file transfer as not anyone can access the files stored. For that a behavioral biometric approach is used. The properties of curves are focused which are generated by the constant mouse positions during the mouse movements that occur.

Curves have enough information that aid us in detecting the movements or the gestures that occur on the mouse surface. Using this information, the validation is experimented using some users and detecting their behaviors which are common.

Back propagation of the neural networks is essential for the usage of classifier. The behavior of each individual is very imperative in making an apt mouse. The information asset protection is also practiced simultaneously. The modeling of the mouse is done very sound provides the authentication to the users like us who wants to use the mouse as well as the storage feature.

NOTIFICATION

As soon as your files are stored in to that storage chip you get notified that your files have been transferred.

STORAGE

This contains a storage limit like example 2GB space to store files

GL850G IC

GL850G is used to simplify the board design and make it as small and minimal as possible. It has voltage being emitted at 5V-3.3V and 3.3V- 1.8V. There will be a voltage drop in the regulator of the chip, thus, any external LDO is not at all required. This GL850G chip can handle the low and high enable that takes place in the power of the chip, with the flexibility of components that are to be selected.

GL850G is embedded onto an 8-bit RISC processor to manipulate the controls of a registers. Side by side to respond to the requests approaching the host. With EEPROM, the PID and VID are both configured. The latest firmware of this

GL850G splitter will be able to manipulate the general purposes of the input and output in order to access EEPROM.

GL850G is intended for customers who want more flexibility in using a device. The default settings are done in ROM. Various other settings like the PID, VID, and other downstream ports settings are easily changes by using the external

EEPROM and re programming it.

A two color (green/amber) LEDs are used to indicate the status of the GL850G normal or abnormal or not.

A total of 4 modes are supported by the GL850G individually for the management of power.

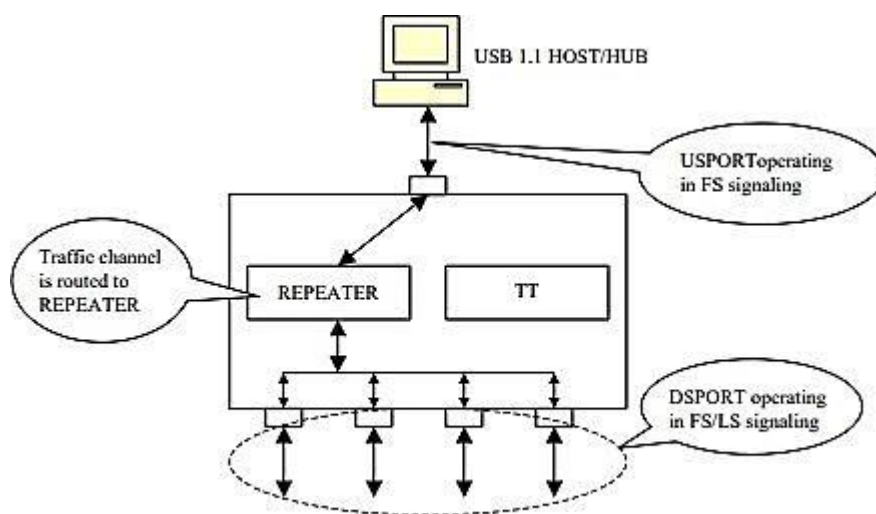


Fig.3:-Operating in USB1.1 Scheme

The power management which can be present as in the form of an individual or gang form, is supported by the GL850G full function solution. The number of ports downstream can be configured by the inputs and outputs with the absence of EEPROM as well.

To fully meet the cost/performance, a single TT hub solution for the cost requirement is practiced. The LEDs can be of green or amber color requirement, GL850G is a single TT hub solution for the cost requirement.

With reference, the Genesis Logic, provides multiple TT hub solutions to target the systems requiring high and fast performance rates in a full/low speed devices in embedded systems.

FEATURES

Upstream ports by input output pins support both high speed and low speed traffic, Downstream ports also support both the high and low speed traffic. There exists a 1 control pipe and 1 interrupt pipe, Backward compatible to the USB specification ports. Complaint to USB specification support with 4/3/2 downstream ports.

An 8 bit on chip micro-processor is used like the RISC Architecture, RAM with 64 byte and a 2k byte ROM mask, USB optimized instruction set is used with a performance of 6MIPS@12MHz, Customized EEPROM is supported with PID and VID with the performance mentioned.

The Transaction Translator (TT) shares the

same Transaction controls as though of the Single Transaction Translator (STT) to allow to control of all port devices.

This is a cost effective solution used for the transaction translator. Various TT provides individual controls for the downstream port only.

Essential and aids the new USB 2.0 hub where the performance is better overall and can be used for the version 2.0 instead of the version 1.0. It minimizes the usage of several components by using just this one integrated chip and by understanding the transceiver.

GL850G IC



Fig.4:-GL850G

Pull-up downstream of 15K ohm is built in upstream at 1.5K ohm. Serial resistor is embedded for the USB signals by conforming to the bus power. The requirements of power are automatic in switching between self-powered and bus-powered modes.

Oscillator (crystal) clock input is built in 5V to 3.3V regulator. Also supporting the compound-device, not removable in downstream port using an input/out pin. Built in PLL supports the external 12 MHz

crystal oscillator.

This is of, lower power consumption. To improve output drivers with slew-rate control for the reduction of EMI.

The detection of internal power-fail for the ESD recovery is carried out. The ESD protection is upto 4KV OF hbm BY mil-std-883h(standard for all USB pins and ports). Two color status indicator is supported along with the automatic and manual modes compliant to the USB 2.0

which is not available to the SSOP 28 package.

Both individual and gand modes of power management is supported with the over-current detection for the downstream ports.

Downstream port can be configured by GPIO without any external EEPROM. Low speed and high speed enabled power are both assisted for power switches. Likewise does not help when it comes to SSOP 28 package. Downstream ports are configured by GPIO.

The available package types include the following; a 48 pin LQFP, 28 pin QFN and 28 pin SSOP which is fully Function able only available in 48 pin. One of the many applications include; a Stand-alone USB hub, a PC motherboard USB hub, docking of notebook and a Gaming console

RELATED WORK

A Study of Computer Mice- Woodford, Chris(3rd September, 2019) Bachelor's Degree in Natural Sciences- Cambridge University, The Old Schools, Trinity Ln, Cambridge CB2 1TN, United Kingdom. A normal computer mouse, is used to point objects on the screen and to makes commands do the work. A mouse, in order for the commands to work, figures out how much you are moving the mouse in which direction. Olden days mouse use a ball-type mouse which detects the movements that are being made. Now, an optical computer mouse is being used to detect the movements of our action.

Degree in Electrical Engineering- Master's Degree in Computer Science from North Carolina State University (NCSU), Raleigh, United States. Optical mouse has a light emitting diode (LED) that bounces right off from a surface with every movement we make. This light is bounced onto a complementary metal Oxide Semi-Conductor (CMOS)

Sensor. This then is forwarded to the digital signal processor (DSP) for analysis. This DSP then determines how far the mouse has moved and then computer displays the mouse movements on the screen.

Wireless Mice(How do optical mice work)- Marshall David Brain (8 May 2001)- Bachelor's Degree in Electrical Engineering- Master's Degree in Computer Science from North Carolina State University (NCSU), Raleigh, United States. Wireless mice make use of Radio Frequency (RF) technology in other to communicate with the computer. In a wireless mouse there are two main components and they are, the transmitter and the receiver. The transmitter, in built onto the mouse sends electromagnetic waves about the mouse's movements (actions). The receiver on the other hand receives these waves and decodes it and sent to the computer's OS and mouse driver's Software.

USB – How it Works- D. Mohan Kumar M.Sc., M.Phil AIM, Alagappa University, Karaikudi, Tamil Nadu, Trichy, India. In order to connect the computer peripherals, we use an Universal Serial Bus. This USB is a plug in between various devices. It is a standard port where the two important aspects are capability and the total bandwidth. It can support up to 127 devices and has a bandwidth of 12Mbit. Makes use of a, A type Receptacle on one end and a series B Connector on the other end. This B connector is used to plug into the B type receptacle. USB has 4 wires to connect the A type connector. The USB hub is used to connect many devices to the PC.

How a Pen drive works- Electrovees(3rd May, 2013)-Blog- Wordpress and integrated USB interface is present inside the Pen drive itself which consists of the connector, crystal oscillator, memory chips

and a controller to interact with the PC. Usually the storage capacity varies from pendrive to pen drive. A printed circuit board is used to carry all these elements and perform the work. NAND/EEPROM is present which can be interfaced by the controller IC. NAND is used for read, write and erase cycles. EEPROM consists of source, gate and drain. Oscillator produces clock signal for correct operation of the device.

Memory Types- Alex Yoon (15th February, 2018)- BS degree in chemistry and materials science from UCLA.-Ph.D in chemistry- UC Berkeley, United States. Two types in which memory can be classified as, Volatile and Non- Volatile Memory. This can be accessed in a random or sequential way and the primary memory (main memory) is the one that works on data and as well as a secondary storage which provides storage for a long period.

However, speed plays an essential role in the memory types such as, not able to make the next move in a game on a computer, due to the slow processing of data on your computer memory. DRAM is a volatile memory, simply said as to be refreshed periodically to retain data.

EEPROM- David Meador (3rd September, 2018)-Computer Science-MCA in Operating Systems-Tutorialspoint. Operation of EEPROM is where it consists of a transistor, containing a channel which is insulated with a layer of oxide. Now data can be extracted from EEPROM by decoding the address at the address pins itself. This is not a reversible process however; ultraviolet light is used for the ionization within the oxide. This allows the deletion process of the EEPROM.

Working of a Splitter (GL850G)- Genysis Logic, Inc.- New Taipei City, Taiwan. The splitter, GL850G simplifies the board level design to achieve the lowest level of BOM

(Bill Of Material). This IC embeds an 8-bit RISC processor to employ the control/status registers to respond to the USB host as well as to respond to the requests from USB host. GL850G has a firmware that will control its general purpose I/O (GPIO). This is done to access the external EEPROM and then respond to the host the customized PID and VID configured in the external EEPROM. This GL850G supports two colors, Red and Green; where green indicates normal and red for abnormal status of the chip.

Bluetooth Computer Mouse- How Computer Mice Work-Marshall Brain & Carmen Carmack (24th April, 2000)- Bachelor's Degree in Electrical Engineering- Master's Degree in Computer Science from North Carolina State University (NCSU), Raleigh, United States. Bluetooth mouse is a technology that is used via a Bluetooth connection. Bluetooth connectivity involves wireless connecting of the devices at one time. Bluetooth is known as a personal area network (PAN) with a small range frequency of 2.4GHZ within a 10meters range, avoiding interference among peripherals using a spread-spectrum frequency hopping.

ShareMouse- Gunnar Bartels –GM of BartelsMedia-Trier, Germany uses a software KVM, to drag and drop files from on computer to another. It provides a windows and Mac cross-platform solution where sharemouse allows one to control a Mac from a PC. Clipboard sharing is also made possible between multiple computers. Such as being able to copy and paste files between Mac and MAC or Mac to Window or Windows to Windows and vice versa. The network KVM present is used to transmit the mouse movements and clicks through the local LAN and is password protected and AES encrypted.

CONCLUSION

The overview of this project is all about one can effectively use the mouse to

transfer as well as have the ability to store data that can be used to transfer to another computer. This is effective, where we need not carry a separate storage device in order to transfer files to another computer. This will help many users who find it hard to carry two separate devices, a mouse and a memory drive. Only a single mouse plays a vital role in both sharing and transferring files. Single wired mouse acts as a storage mechanism and a normal receiver mouse can connect any computer without scanning or connectivity problems that occur in wireless mouse. File transfers are made easier between two unknown computers or laptops.

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