



# VERSATILE WRITER-PORTABLE PRINTER

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**Abstract**— with the vast technological advancement, it's a necessity to reduce the size of the huge printers now available in the market. As the technology is moving to a Nano range, the advancement should be done to printers too. So, a pocket printer is developed which is a versatile writer with a Bluetooth module attached to it, it can be called as a robot with a DC motor attached to it with wheels which can move to and fro between a thermo chromic paper. The printer head is embedded with a thermal printing technology.

**Keywords**—Bluetooth Module, DC Motor, Thermo Chromic Paper

## I. INTRODUCTION

In Computing, Printer is a peripheral which makes a persistent human readable representation of graphics or text on paper or similar physical media. The two most common printer mechanisms are black and white laser printers used for common documents, and color inkjet printers which can produce high quality photograph output.

### A. Printing Technology –

The world's first computer printer was a 19th century mechanically driven apparatus invented by Charles Babbage for his difference engine. The system used a series of metal rods with characters printed on them and stuck a roll of paper against the rods to print the characters. The first commercial printers generally used mechanisms from electric typewriters and teletype machines, which operated in a similar fashion. The demand for higher speed led to the development of new systems specifically for computer use. Among the systems widely used through the 1980s were daisy wheel systems similar to typewriters, line printers that produced similar output but at much higher speed, and dot matrix systems that could mix text and graphics but produced relatively low quality output. The plotter was used for those requiring high quality line art like blue prints.

The introduction of the low cost laser printer in 1984 with the first HP LaserJet, and the addition of PostScript in next year's Apple LaserWriter, set off a revolution in printing known as desktop publishing. Laser printers using PostScript mixed text and graphics, like dot matrix printers, but at a quality levels formerly available only from commercial typesetting systems. By 1990, most simple printing tasks like fliers and brochures were now created on personal computers

and then laser printed; expensive offset printing systems were being dumped as scrap. The HP Deskjet of 1988 offered the same advantages as laser printer in terms of flexibility, but produced somewhat lower quality output (depending on the paper) from much less expensive mechanisms. Inkjet systems rapidly displaced dot matrix and daisy wheel printers from the market.

The rapid update of internet email through the 1990s and into the 2000s has largely displaced the need for printing as a means of moving documents, and a wide variety of reliable storage systems means that a reliable storage systems means that a physical backup is of little benefit today. Even the desire for printed output for offline reading while on mass transit or aircraft has been displaced by e-book readers and tablet computers .today, traditional printers are being used more for special purposes, like printing photographs ao artwork, and are no longer a must have peripheral.

Starting around 2010,3D printing became an area of intense interest, allowing the creation of physical objects with the same sort of effort as an early laser printer required to produce a brochure.These devices are in their earliest stages of development and have not yet become commonplace.

## II.

## II. EXPERIMENT AND RESULT

Photographic printing is the process of producing a final image on paper for viewing, using chemically sensitized paper. The paper is exposed to a photographic negative, a positive transparency (or slide), or a digital image file projected using an enlarger or digital exposure unit such as a Light Jet printer. Alternatively, the negative or transparency may be placed atop the paper and directly exposed, creating a contact print. Photographs are more commonly printed on plain paper, for example by a color printer, but this is not considered "photographic printing". Following exposure, the paper is processed to reveal and make permanent the latent image.

Kodak Panalure is a panchromatic black-and-white photographic printing paper. Panalure was developed to facilitate the printing of full-tone black-and-white images from color negatives – a difficult task with conventional orthochromatic papers due to the orange tint of the film base. Panalure also finds application as paper negatives in large format cameras. It is generally not suitable for conventional black-and-white printing, since it must be handled and



developed in near-complete darkness. Kodak has announced that it will no longer produce or sell this product. However, as of early 2006, it is still available from various online retailers. Color negatives are printed on RA-4 papers and produce a Type C print. These are essentially the same as color negative films in that they consist of three emulsion layers, each sensitive to red, green and blue light. Upon processing, color couplers produce cyan, magenta and yellow dyes, representing the true colors of the subject. The processing sequence is very similar to the C-41 process. Rollei make a film called 'Digi base 200 Pro' that is like a conventional C-41 film but it has no orange mask, allowing easy prints on black-and-white paper with a grade 2 or 3 variable contrast filter

The extraction algorithm process is the inverse of the embedding process. It is assumed that the watermark as well as the see value is available at the receiver end to the authorized users.

The operation of channel separation is applied on the watermarked color image to generate its sub images, and then 2-level discrete wavelet transform is applied on the sub images to generate the approximate coefficients and detail coefficients.

### III. THERMAL PRINTING TECHNOLOGY

Thermal printing (or direct thermal printing) is a digital printing process which produces a printed image by selectively heating coated thermo chromic paper, or thermal paper as it is commonly known, when the paper passes over the thermal print head. The coating turns black in the areas where it is heated, producing an image. Two-color direct thermal printers can print both black and an additional color (often red) by applying heat at two different temperatures. Thermal transfer printing is a very different method that uses a heat-sensitive ribbon instead of heat-sensitive paper, but uses similar thermal print heads.

A thermal printer comprises these key components: Thermal head: generates heat; prints on paper Platen: a rubber roller that feeds paper spring: applies pressure to the thermal head, causing it to contact the thermo sensitive paper Controller boards: for controlling the mechanism. In order to print, thermo-sensitive paper is inserted between the thermal head and the platen. The printer sends an electric current to the heating elements of the thermal head, which generate heat. The heat activates the thermo-sensitive coloring layer of the thermo sensitive paper, which changes color where heated. Such a printing mechanism is known as a thermal system or direct system. The heating elements are usually arranged as a matrix of small closely spaced dots—thermal printers are actually dot-matrix printers, though they are not so called.

The paper is impregnated with a solid-state mixture of a dye and a suitable matrix; a combination of a fluoran leuco dye and an octadecylphosphonic acid is an example. When the matrix is heated above its melting point, the dye reacts with the acid, shifts to its colored form, and the changed form is

then conserved in metastable state when the matrix solidifies back quickly enough (a process known as thermochromism). Controller boards are embedded with firmware to manage the thermal printer mechanisms. The firmware can manage multiple bar code types, graphics and logos. They enable the user to choose between different resident fonts (also including Asian fonts) and character sizes. Controller boards can drive various sensors such as paper low, paper out, door open and so on, and they are available with a variety of interfaces, such as RS-232, parallel, USB and wireless. For point of sale application some boards can also control the cash drawer.

Thermal printer used in seafloor exploration. Thermal printers print more quietly and usually faster than impact dot matrix printers. They are also smaller, lighter and consume less power, making them ideal for portable and retail applications. Its efficiency can be utilized in retail sectors. Roll-based printers can be rapidly refilled. Commercial applications of thermal printers include filling station pumps, information kiosks, point of sale systems, voucher printers in slot machines, print on demand labels for shipping and products, and for recording live rhythm strips on hospital cardiac monitors. Many popular microcomputer systems from the late 1970s and early 1980s had first-party and aftermarket thermal printers available for them - such as the Atari 822 printer for the Atari 8-bit systems, the Apple Silent type for the Apple II and the Alphacom 32 for the Sinclair ZX Spectrum and ZX81. They often used unusually-sized supplies (10CM wide rolls for the Alphacom 32 for instance) and were often used for making permanent records of information in the computer (graphics, program listings etc.), rather than for correspondence.

Through the 1990s many fax machines used thermal printing technology. Toward the beginning of the 21st century, however, thermal wax transfer, laser, and inkjet printing technology largely supplanted thermal printing technology in fax machines, allowing printing on plain paper. Thermal Receipt Printer are very efficient and quick. Its efficiency can be utilized in retail sectors. Thermal printers are still commonly used in seafloor exploration and engineering geology due to their portability, speed, and ability to create continuous reels or sheets. Typically, thermal printers found in offshore applications are used to print real-time records of side scan sonar and sub-seafloor seismic imagery. In data processing, thermal printers are sometimes used to quickly create hard copies of continuous seismic or hydrographic records stored in digital SEG Y or XTF form.

The Game Boy Printer, released in 1998, was a small thermal printer used to print out certain elements from some Game Boy games. Early formulations of the thermo-sensitive coating used in thermal paper were sensitive to incidental heat, abrasion, friction (which can cause heat, thus darkening the



paper), light (which can fade printed images), and water. Later thermal coating formulations are far more stable; in practice, thermally printed text should remain legible at least 50 days.

In many hospitals in the United Kingdom, many common ultrasound sonogram devices output the results of the scan onto thermal paper. This can cause problems if the parents wish to preserve the image by laminating it, as the heat of most laminators will darken the entire page—this can be tested for beforehand on an unimportant thermal print. An option is to make and laminate a permanent ink duplicate of the image. An easy way to comply with the conference paper formatting requirements is to use this document as a template and simply type your text into it.

#### IV. VERSATILE WRITER

Electronic Communication Systems deployed in Pocket Size Printer has been witnessing a tremendous growth based on Research and Development in the context of Mobile Thermal Printer with Bluetooth Technology. The Bluetooth standard provides interfaces for a wide range of communications including audio. The explosion of portable information devices and the increasing use of wireless technology have prompted more and more companies – both Private and Public, to connect their field workers to complete transactions at the point-of-sale or point-of-service itself.

Electronic payment refers to cash and associated transactions implemented by linking to remote servers in the cloud. Electronic payment system involves the use of computer networks, hand held devices/mobile phones and Mobile Thermal Printer with Bluetooth technology. This paper may suit the environment of the whole or a majority of citizens as power consumers in each district of a state.

Basically, the system for billing and payment involves two sides namely server and client side. The technology involved in developing the server side starts with the creation of a well-articulated, full-fledged database of consumers or customers in a Relational Database Management system (RDBMS) require the back end and front end software support. A roaming staff may handle the issue of the bill for the product or service marketed. The client may get the comfort of paying on the spot either at home or at the company and get the receipt when internet enabled, handheld device and mobile thermal printer with Bluetooth technology are deployed.

Bluetooth is short-range wireless data communications that allow devices to communicate with each other using secure radio waves. Bluetooth evolved as a BASIC cable replacement technology. Bluetooth operates in the 2.4 GHz Industrial, Scientific and Medical (ISM) band which is open, unlicensed and available for use everywhere. Bluetooth has been designed with a potential to operate in noisy environments. It nominally operates within a 10-meter range. Since it is a radio link,

Bluetooth is not limited to line-of-sight and can pass through walls.

By providing Wi-Fi module we can remove this range limit, and provide a network connection to the device. By connecting it to the network one can send the information or data over the network to the device to print that certain data. For the versatile printer, it consist of Thermal printer circuitry, Bluetooth module, DC motors, and thermo chromic Paper, and Power transfer Circuitry, wheels.

The DC motor (Direct Current Motor) and the Wheels drives the whole system around the thermo chromic paper, as per the amount of information one applies the Thermal printer circuitry. The signals to the motors are given by the thermal circuit, the motors drive accordingly by the signal. The thermal printer head moves around the thermo chromic paper heating the papers to produce the hard copy of the information given to the printer circuit. The figure below shows the working of the DC motor.

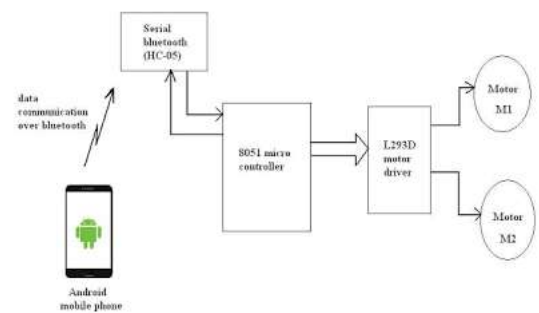


Fig. 1. Working Of DC Motor During Printing

The data or information given to the thermal printer circuit is first converted to binary codes and then given it serial to the printer head. These binary codes are then converted to signals and are given to a heating coil resides in the printer head. When the coil heats the thermo chromic paper heats along with it producing the hard copy of the information given. In the Software section, an android device is used to send the data or information through a software module which is in the .apk format and is installed on to the android device. Its can convert data or information to pdf format and send over to the portable printer. Java is used to program the Software section of the portable device.

#### V. CONCLUSION

Mobile Thermal Printers with Bluetooth interface are already found to be more useful for comfortable market ticketing sector as well as many others too. It can receive communication originating from the remote Database servers through Internet enabled handheld devices through a Wi-Fi or Bluetooth module attached to the device. The electronic communication from the handheld device is a one way traffic



to the Mobile Thermal Printer with Bluetooth interface, may it be a specific application oriented hand held device or even mobile phones. The service design shall benefit both the State EB and the consumers having Power connection facilitating on the spot proxy payment ensuring a prompt receipting process authenticated by the State EB from its remote server. One can send an information to the device (which is placed in the workstation) over the network to print some important document via online. This proposed design with electronic device components is a Server-Internet enabled Handheld Device Mobile Thermal Printer with Bluetooth interface. The test run with a Android Device as a server was conducted and obtained fruitful results.

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