IMPLEMENTATION OF A DIGITAL CELL PHONE

THIS PROJECT REPORT IS SUBMITTED TO THE DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING (EEE) IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF "BACHELOR OF SCIENCE IN ELECTRICAL & ELECTRONICS ENGINEERING".



SUPERVISED BY

MD. MAHMUDUR RAHMAN SENIOR LECTURER

SUBMITTED BY

MD. SHAHIDULLAH KOUSER CHOWDHURY ID: 102-33-244

MOHAMMAD MONOWAR HOSSAIN FAKIR ID: 102-33-232

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING FACULTY OF ENGINEERING DAFFODIL INTERNATIONAL UNIVERSITY

> 102, Shukrabad, Dhanmondi, Dhaka-1207, Bangladesh March 2014

DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Md**. **Mahmudur Rahman, Senior Lecturer, Department of EEE**, Daffodil International University. We also declare that neither this project nor any part of this project has submitted elsewhere for award of any degree or diploma.

Supervised by:

Md. Mahmudur Rahman Senior Lecturer Department of EEE Daffodil International University

Submitted by

Md. Shahidullah Kouser Chowdhury ID: 102-33-244 Department of EEE Daffodil International University Mohammad Monowar Hossain Fakir ID: 102-33-232 Department of EEE Daffodil International University

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ABSTRACT

Cell Phones have became an essential in our lives and made their own single stand. Once regarded as luxury is now the thing nearest to our hearts. The mobiles even replaced the wrist watches which people find it now easier to see time in their cell phones. Mobile phones became the personal dairies for many today.

This will see that you won't obtain annoyed at an unspecified point of time. Internet accessing became obligatory in many professions. The Cell Phone popularized the service of "sending short messages" which also made it easy for people to send through messages and almost eliminated the traditional system of lettering. The Cell Phones are also known for camera features. With camera Cell Phones Point-and-shoot imaging has been discovered. Today Cell Phones are more comfortable with their extensible memory features. This allowed users with the facility to store multiple files and even multi-media content in their phones. Some Cell Phones even have hard disk in them and this increased the capabilities of memory of the phone enormously.

As a result, The Digital Cell Phones are the best know for their goal of communication, as they enable calling anytime from anywhere and the transnational going facilities allowed the raise in communication among people. The call phone rates also helping this technology to reach the rural places likely to get higher communication.

In this project a basic Cell phone system has been designed.

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Introduction

1.1 Objectives of this work

The objectives of this project are proposed to implementation of a Digital cell phone. This circuit is available in market but those are expensive where as our designed Digital cell phone is the cheapest one.

1.2 Preface

A mobile phone (also known as a cellular phone, cell phone, and a hand phone) is a device that can make and receive telephone calls over a radio link while moving around a wide geographic area. It does so by connecting to a cellular network provided by a mobile phone operator, allowing access to the public telephone network. By contrast, a cordless telephone is used only within the short range of a single, private base station.

In addition to telephony, modern mobile phones also support a wide variety of other services such as text messaging, MMS, email, Internet access, short-range wireless communications (infrared, Bluetooth), business applications, gaming and photography. Mobile phones that offer these and more general computing capabilities are referred to as Smartphone.

The first hand-held cell phone was demonstrated by John F. Mitchell and Dr Martin Cooper of Motorola in 1973, using a handset weighing around 2.2 pounds (1 kg). In 1983, the Dynastic 8000x was the first to be commercially available. From 1990 to 2011, worldwide mobile phone subscriptions grew from 12.4 million to over 6 billion, penetrating about 87% of the global population and reaching the bottom of the economic pyramid.

1.3 History

1843 Micheal Faraday a talented chemist begins researching the possibility that space can conduct electricity. His research starts the wheels turning for many other 19th century scientists. At the time, many of them were referred to as "crackpots".

1865 A Virginia Dentist/Scientist, Dr. Mahlon Loomis, develops a method of communicating through the earth's atmosphere by using an electrical conductor. He does this by flying two kites, that are rigged with copper screens and wires, which are connected to the ground on two separate mountains about 18 miles apart.

He later received a grant from the U.S. Congress for \$50,000. (A fairly large chunk of change for 1865)

1866 The first trans-Atlantic telegraph is built (not much to do with cell phones, but a major advancement in communication nonetheless)

1921 The Police Department in Detroit, Mich. begins installing mobile radios, operating around 2 MHz, in their squad cars. They encounter many problems such as overcrowding on the channels and terrible interference.

1934 The U.S. Congress creates the Federal Communications Commission. They decide who gets to use certain radio frequencies. Most channels are reserved for emergency use and for the government. Radio is still a baby.

1940'sBy now, the mobile radios are able to operate at 30 to 40 MHz and become much more common between police departments, and the wealthy. Several private companies and organizations begin using these same radios for personal gain.

1945 The first mobile-radio-telephone service is established in St. Louis, Miss. The system is comprised of six channels that add up to 150 MHz The project is approved by the FCC, but due to massive interference, the equipment barely works.

1947 AT&T comes out with the first radio-car-phones that can be used only on the highway between New York and Boston; they are known as push-to-talk phones. The system operates at frequencies of about 35 to 44 MHz, but once again there is a massive amount of interference in the system. AT&T declares the project a failure.

1949 The FCC authorizes the widespread use of many separate radio channels to other carriers. They are known as Radio Common Carriers (RCC) and are the first link between mobile phones and the telephone, rather than just radio to radio. The RCC's are the first step toward the cellular phone industry, which is were designed more for profit than for the general public.

1956 The first real car phones, not car radios, come into play across the United States. Although, the system is still using push-to-talk phones, it is an improved version that actually works. However, the units are big and bulky, and require a personal radio operator to switch the calls. A similar system appeared in Sweden a few years earlier.

1964 A new operating system is developed that operates on a single channel at 150 MHz In essence; this removes the need for push-to-talk operators. Now customers can dial phone numbers directly from their cars. RCC's are finally taken seriously by the FCC as legitimate competitors to the land-line phone companies. 1969 The self-dialing capability is now upgraded to 450 MHz and becomes standard in the United States. This new service is known as (IMTS) Improved mobile telephone service.

1970 Cell phone lobbyists finally win with the FCC and get a window of 75 MHz in the 800 MHz region, which allocated specifically for cell phones. The FCC realizes the potential of the industry and can't ignore it any longer.

1971 AT&T is the first company to propose a modern-day mobile-phone system to the FCC. It involves dividing cities into "cells". It is the first company to do so.

1973 Dr. Martin Cooper invents the first personal handset while working for Motorola. He takes his new invention, the Motorola Dyna-Tac., to New York City and shows it to the public. His is credited with being the first person to make a call on a portable mobile-phone.

1974 The FCC actually starts to encourage cell phone companies to push forward the "cellular idea". But unfortunately a law suit arises with Western Electric, who is the closest company to succeeding at the time, and it rules that they are not allowed to manufacture terminal and network phone systems under the same roof. This is an effort to prevent a monopoly. But it also prevents progress.

1975 AT&T adapts its own cellular plan for the city of Chicago, but the FCC is still uneasy about putting the plan into action. They have concerns about its success.

1977 Finally cell phone testing is permitted by the FCC in Chicago. The Bell Telephone Company gets the license; they are in a partnership with AT&T which is a general effort to battle the stubborn FCC.

1981 The FCC makes firm rules about the growing cell phone industry in dealing with manufactures. It finally rules that Western Electric can manufacture products for both cellular and terminal use. (Basically they admit that they put the phone companies about 7 years behind)

1988 One of the most important years in cell phone evolution. The Cellular Technology Industry Association is created and helps to make the industry into an empire. One of its biggest contributions is when it helped create TDMA phone technology, the most evolved cell phone yet. It becomes available to the public in 1991.

2001 BellSouth announces that it is leaving the pay phone business because there is too much competition from cell phones.

Early predecessors of cellular phones included analog radio communications from ships and trains. The race to create truly portable telephone devices began after World War II, with developments taking place in many countries. The advances in mobile telephony have been traced in successive generations from the early "OG" (zeroth generation) services like the Bell System's Mobile Telephone Service and its successor, Improved Mobile Telephone Service. These "OG" systems were not cellular, supported few simultaneous calls, and were very expensive.

The first handheld mobile cell phone was demonstrated by Motorola in 1973. The first commercial automated cellular network was launched in Japan by NTT in 1979. In 1981, this was followed by the simultaneous launch of the Nordic Mobile Telephone (NMT) system in Denmark, Finland, Norway and Sweden. Several other countries then followed in the early to mid-1980s. These first generation ("1G") systems could support far more simultaneous calls, but still used analog technology.

In 1991, the second generation (2G) digital cellular technology was launched in Finland by Radiolinja on the GSM standard, which sparked competition in the sector, as the new operators challenged the incumbent 1G network operators.

Ten years later, in 2001, the third generation (3G) was launched in Japan by NTT DoCoMo on the WCDMA standard. This was followed by 3.5G, 3G+ or turbo 3G enhancements based on the high-speed packet access (HSPA) family, allowing UMTS networks to have higher data transfer speeds and capacity.

By 2009, it had become clear that, at some point, 3G networks would be overwhelmed by the growth of bandwidth-intensive applications like streaming media. Consequently, the industry began looking to data-optimized 4th-generation technologies, with the promise of speed improvements up to 10-fold over existing 3G technologies. The first two commercially available technologies billed as 4G were the WiMAX standard (offered in the U.S. by Sprint) and the LTE standard, first offered in Scandinavia by TeliaSonera.

1.4 Work status

We implemented the parts of a cell phone in PCB board. At first clean the Charging connector, Ear phone connector, Keypad cover, Microphone, Power key, PCB board, Shielding, SIM& memory box, Speaker & Speaker cover, integrated circuit & Volume key then we set the equipment in the PCB board. Now we are complete the work of PCB board and then we add the display system to complete the project.

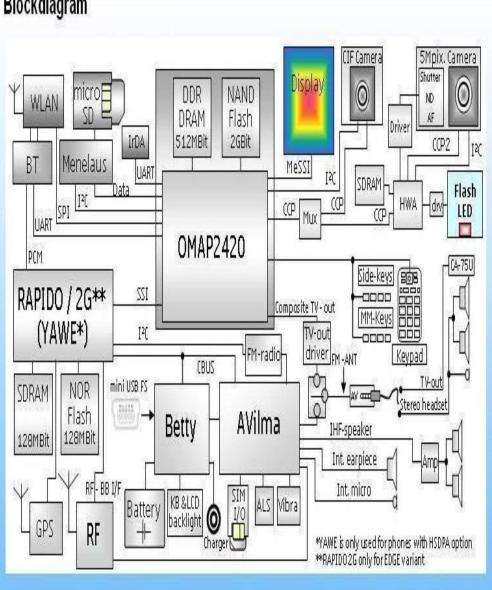
1.5 Organization of the project

This project report has eight chapter in total .The first chapter describes a brief idea about Preface, History, Objectives of This Work and work status .The second chapter contains Circuit Diagram and Description. In third chapter describe theParts of a Digital Cell Phone. Fourth and Five chapters explain the Integrated circuit (IC) and Cellular network; six chapters areAdvantage and Disadvantage of a Cell Phone. Seven and Eight chapters explain Cost analysis andresult and suggestions for the future work.

Block Diagram and Description

Introduction: This chapter belongs to block diagram, *Outdoor block diagram of* Digital Cell Phone, Circuit Description & Features of a Cell Phone, Concept and Prototyping, Parts and Software, Construction and Fabrication etc.

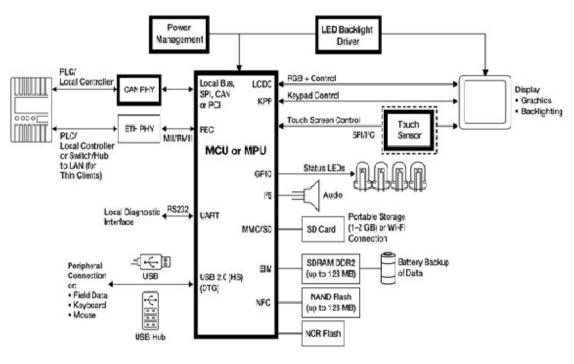
2.1 Block Diagram of Digital Cell Phone:



Blockdiagram

Fig 2.1 BlockDiagram of Digital Cell Phone.

2.2 Outdoor Blok Diagram of Digital Cell Phone:



Freescale Technology [] Optional

Fig 2.2 Outdoor block diagram of Digital Cell Phone.

2.3 Circuit Description & Features of a Cell Phone:

All mobile phones have a number of features in common, but manufacturers also try to differentiate their own products by implementing additional functions to make them more attractive to consumers. This has led to great innovation in mobile phone development over the past 20 years.

The common components found on all phones are:

- A battery, providing the power source for the phone functions.
- An input mechanism to allow the user to interact with the phone. The most common input mechanism is a keypad, but touch screens are also found in some high-end smart phones.

- A screen which echoes the user's typing, displays text messages, contacts and more.
- Basic mobile phone services to allow users to make calls and send text messages.
- All GSM phones use a SIM card to allow an account to be swapped among devices. Some CDMA devices also have a similar card called aR-UIM.
- Individual GSM, WCDMA, iDEN and some satellite phone devices are uniquely identified by an International Mobile Equipment Identity (IMEI) number.

Low-end mobile phones are often referred to as feature phones, and offer basic telephony. Handsets with more advanced computing ability through the use of native software applications became known as smartphones.

Several phone series have been introduced to address a given market segment, such as the RIM BlackBerry focusing on enterprise/corporate customer email needs; the Sony-Ericsson 'Walkman' series of music/phones and 'Cyber shot' series of camera/phones; the Nokia Nseries of multimedia phones, the Palm Pre the HTC Dream and the Apple iPhone.

2.4 Concept and Prototyping

All cell phone manufacturers' start the process in the conceptual phase. Several sketches and wireframes are created using different designs, features, and interface options, such as keypad only and touchscreen. These sketches also determine the phone's weight, scale, size and portability. Because the goal of most phones is to be compact and portable, this phase is the most intensive. During this process, a team decides what designs will become prototypes. Once a list is determined, several prototypes are created. These models are usually non-functional and only for visual purposes. Prototypes are constructed from plastic, Styrofoam and other re-usable materials. Once a final design is created, the concept is pushed to engineers, who decide what electronics are necessary.

2.5 Parts and Software

The key part of every cell phone is its electronics. The electronics control everything from the way the phone displays information, places calls, sends location information and more. Depending on the features determined during the conceptual phase, different electronics can be used. For most cell phones, there are three key components: a printed circuit that controls the keypad and signal reception, abattery, and screen. In addition to the hardware, software is also required for the phone to operate. Almost all cell phone manufacturers 'use proprietary software for their phones. The software is designed by a series of programmers that develop the design of the interface, the phone's basic/advanced operations, and other features. By default, most modern cell phones are programmed with basic features like text messaging, calendar and clock. After these components and software are determined, the phone moves on to final construction.

2.6 Construction and Fabrication

Each piece of the cell phone is created separately. First, the casing for the phone is made. Most cell phones use a simple plastic that is created using a process known as injection molding. Once the casing is created, the printed circuit board is made and loaded with the necessary software/operating system. The circuit board is then placed in the casing, using a series of eyeglass screws. Next, the other components of the phone are added: screen, keypad, antenna, microphone and speaker. After the phone is constructed, it is moved on to testing. During the testing phase, the battery for the phone is added and a worker checks the phone for power, button functionality and reception. Finally, the necessary documentation for the phone is produced and sent to be packaged with the phone. Once all of these components are verified, the phone is packaged and shipped to retail outlets.

Component of a Digital Cell Phone:

Introduction: This chapter of Component of a Digital Cell Phone belongs to printed circuit board (PCB), History, touch screen or touch panel, LCD or Liquid Crystal Display, camera, microphone, Battery, Battery charger & Used tools for the project etc.

3.1 printed circuit board (PCB):



Fig 3.1 PCB Board.

A printed circuit board (PCB) mechanically supports and electrically connects electronic components using conductive tracks, pads and other features etched from copper sheets laminated onto a non-conductive substrate. PCB's can be single sided (one copper layer), double sided (two copper layers) or multi-layer. Conductors on different layers are connected with plated-through holes called vias. Advanced PCB's may contain components - capacitors, resistors or active devices - embedded in the substrate. A printed circuit board (PCB) mechanically supports and electrically connects electronic components using conductive tracks, pads and other features etched from copper sheets laminated onto a non-conductive substrate. PCB's can be single sided (one copper layer), double sided (two copper layers) or multi-layer. Conductors on different layers are connected with plated-through holes called vias. Advanced PCB's may contain components - capacitors, resistors or active devices embedded in the substrate. Printed circuit boards are used in all but the simplest electronic products. Alternatives to PCBs include wire wrap and point-to-point construction. PCBs are more costly to design but allow automated manufacturing and assembly. Products are then faster and cheaper to manufacture, and potentially more reliable. Much of the electronics industry's PCB design, assembly, and quality control follow standards published by the IPC organization. When the board has only copper connections and no embedded components it is more correctly called a printed wiring board (PWB) or etched wiring board. Although more accurate, the term printed wiring board has fallen into disuse. A PCB populated with electronic components is called a printed circuit assembly (PCA), printed circuit board assembly or PCB assembly (PCBA). The IPC preferred term for assembled boards is circuit card assembly (CCA), for assembled backplanes it is backplane assemblies. The term PCB is used informally both for bare and assembled boards.

3.2 History of PCB:

Development of the methods used in modern printed circuit boards started early in the 20th century. In 1903, a German inventor, Albert Hanson, described flat foil conductors laminated to an insulating board, in multiple layers. Thomas Edison experimented with chemical methods of plating conductors onto linen paper in 1904. Arthur Berry in 1913 patented a print-and-etch method in Britain, and in the United States Max School obtained a patentto flame-spray metal onto a board through a patterned mask. Charles Durcase in 1927 patented a method of electroplating circuit patterns.

The Austrian engineer Paul Eisler invented the printed circuit while working in England around 1936 as part of a radio set. Around 1943 the USA began to use the technology on a large scale to make proximity fuses for use in World War II.After the war, in 1948, the USA released the invention for commercial use. Printed circuits did not become commonplace in consumer electronics until the mid-1950s, after the Auto-Sembly process was developed by the United States Army.

A PCB as a design on a computer (left) and realized as a board assembly populated with components (right). The board is double sided, with through-hole plating, green solder resist and a white legend. Both surface mount and through-hole components have been used. Before printed circuits (and for a while after their invention), pointto-point construction was used. For prototypes, or small production runs, wire wrap or turret board can be more efficient. Predating the printed circuit invention, and similar in spirit, was John Sargrove's 1936–1947 Electronic Circuit Making Equipment (ECME) which sprayed metal onto a Bakelite plastic board. The ECME could produce 3 radios per minute.

During World War II, the development of the anti-aircraft proximity fuse required an electronic circuit that could withstand being fired from a gun, and could be produced in quantity. The Centralab Division of Globe Union submitted a proposal which met the requirements: a ceramic plate would be screen printed with metallic paint for conductors and carbon material for resistors, with ceramic disc capacitors and subminiature vacuum tubes soldered in place. The technique proved viable, and the resulting patent on the process, which was classified by the U.S. Army, was assigned to Globe Union. It was not until 1984 that the Institute of Electrical and Electronics Engineers (IEEE) awarded Mr. Harry W. Rubinstein, the former head of Globe Union's Centralab Division, its coveted CledoBrunetti Award for early key contributions to the development of printed components and conductors on a common insulating substrate. As well, Mr. Rubinstein was honored in 1984 by his alma mater, the University of Wisconsin-Madison, for his innovations in the technology of printed electronic circuits and the fabrication of capacitors.

3.3 Touch Panel:



Fig 3.3 Touch Panel

A touch screen or touch panel is an electronic visual display that the user can control through simple or multi-touch gestures by touching the screen with a special stylus/pen and-or one or more fingers. Some touch screens an ordinary or specially coated gloves work too while others only a special stylus/pen will work. The user can use the touch screen to react to what is displayed and to control how it is displayed (for example by zooming the text size).

The touch screen enables the user to interact directly with what is displayed, rather than using a mouse, touchpad, or any other intermediate device (other than a stylus, which is optional for most modern touch screens). Touch screens are common in devices such as game consoles, all-in-one computers, tablet computers, and smart phones. They can also be attached to computers or, as terminals, to networks. They also play a prominent role in the design of digital appliances such as personal digital assistants (PDAs), satellite navigation devices, mobile phones, and video games and some books (Electronic books). The popularity of smart phones, tablets, and many types of information appliances is driving the demand and acceptance of common touch screens for portable and functional electronics. Touch screens are found in the medical field and in heavy industry, as well as for automated teller machines (ATMs), and kiosks such as museum displays or room automation, where keyboard and mouse systems do not allow a suitably intuitive, rapid, or accurate interaction by the user with the display's content.

Historically, the touch screen sensor and its accompanying controller-based firmware have been made available by a wide array of after-market system integrators, and not by display, chip, or motherboard manufacturers. Display manufacturers and chip manufacturers worldwide have acknowledged the trend toward acceptance of touch screens as a highly desirable user interface component and have begun to integrate touch screens into the fundamental design of their products.

3.4 Liquid Crystal Display (LCD):



Fig 3.4 Liquid Crystal Display (LCD)

An LCD or Liquid Crystal Display, is a type of screen that is used in many computers, TVs, and cell phones. LCDs are very thin, but are actually composed of several layers. Those layers include two polarized panels, with a liquid crystal solution between them. Light is projected through the layer of liquid crystals and is colorized, which produces the visible image.

The liquid crystals do no emit light themselves, so LCDs require a backlight. That means that an LCD requires more power, and could potentially be more taxing on your phone's battery. LCDs are thin and light, though, and generally inexpensive to produce.

3.5 Camera:



Fig 3.5 Camera of mobile phone.

Most current phones also have a built-in digital camera (see camera phone), that can have resolutions as high as 38M pixels. This gives rise to some concern about privacy, in view of possible voyeurism, for example in swimming pools. South Korea has ordered manufacturers to ensure that all new handsets emit a beep whenever a picture is taken.

Sound recording and video recording is often also possible. Most people do not walk around with a video camera, but do carry a phone. The arrival of video camera phones is transforming the availability of video to consumers, and helps fuel citizen journalism.

3.6 Microphone:



Fig 3.6 Microphone of cell phone.

A microphone (colloquially called a mic or mike; both pronounced) is an acoustic-toelectric transducer or sensor that converts sound into an electrical signal. Microphones are used in many applications such as telephones, tape recorders, karaoke systems, hearing aids, motion picture production, live and recorded audio engineering, FRS radios, megaphones, in radio and television broadcasting and in computers for recording voice, speech recognition, VoIP, and for non-acoustic purposes such as ultrasonic checking or knock sensors.

Most microphones today use electromagnetic induction (dynamic microphone), capacitance change (condenser microphone), piezoelectric generation, or light modulation to produce an electrical voltage signal from mechanical vibration.

3.7 Speaker:

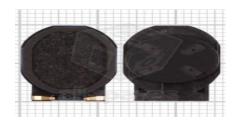


Fig 3.7 Speaker of cell phone.

In most modern mobile cell phones, in which there is a separate ear speaker, it is directly to the CPU. It receives sound via signals directly from the CPU of from the audio section inbuilt within the CPU. In some mobile phones, these sound signals are received via coil / resistance. Some mobile phones have audio IC in the audio section. Some mobile phones have audio amplifier.

3.8 Battery (Lithium-ion battery):



Fig 3.8 Battery (Lithium-ion battery) of cell phone.

A lithium-ion battery (sometimes Li-ion battery or LIB) is a member of a family of rechargeable battery types in which lithium ions move from the negative electrode to the positive electrode during discharge and back when charging. Li-ion batteries use an intercalated lithium compound as the electrode material, compared to the metallic lithium used in non-rechargeablelithium battery.Lithium-ion batteries are common in consumer electronics. They are one of the most popular types of rechargeable battery for portable electronics, with one of the best energy densities, no memory effect (note, however, that new studies have shown signs of memory effect in lithium-ion batteries), and only a slow loss of charge when not in use. Beyond consumer electronics, LIBs are also growing in popularity for military, electric vehicle and aerospace applications. For example, Lithium-ion batteries are becoming a common replacement for the lead acid batteries that have been used historically for golf carts and utility vehicles. Instead of heavy lead plates and acid electrolyte, the trend is to use a lightweight lithium/carbon negative electrodes and lithium iron phosphate

positive electrodes. Lithium-ion batteries can provide the same voltage as lead-acid batteries, so no modification to the vehicle's drive system is required. Chemistry, performance, cost and safety characteristics vary across LIB types. Handheld electronics mostly use LIBs based on lithium cobalt oxide (LiCoO 2), which offers high energy density, but presents safety risks, especially when damaged. Lithium iron phosphate (LFP), lithium manganese oxide (LMO) and lithium nickel manganese cobalt oxide (NMC) offer lower energy density, but longer lives and inherent safety. Such batteries are widely used for electric tools, medical equipment and other roles. NMC in particular is a leading contender for automotive applications. Lithium nickel cobalt aluminum oxide (NCA) and lithium titan ate (LTO) are specialty designs aimed at particular niche roles.

Lithium-ion batteries can be dangerous under some conditions and can pose a safety hazard since they contain, unlike other rechargeable batteries, a flammable electrolyte and are also kept pressurized. Because of this the testing standards for these batteries are more stringent than those for acid-electrolyte batteries, requiring both a broader range of test conditions and additional battery-specific tests. This is in response to reported accidents and failures, and there have been battery-related recalls by some companies.

3.9 Headphones:



Fig 3.9 Headphones of cell phone.

Headphones (or "head-phones" in the early days of telephony and radio) are a pair of small loudspeakers that are designed to be held in place close to a user's ears. They are also known as ear speakers, earphones or, colloquially, cans. The alternate in-ear versions are known as ear buds or earphones. In the context of telecommunication, a headset is a combination of headphone and microphone. Headphones either have wires for connection to a signal source such as an audio amplifier, radio, CD player, portable media player, mobile phone, electronic musical instrument, or have a wireless device, which is used to pick up signal without using a cable.

3.10 Battery charger:

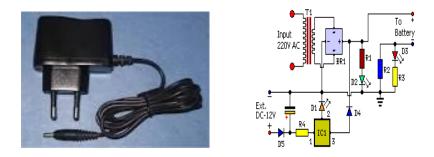


Fig 3.10 Battery charger of cell phone.

A battery charger is a device used to put energy into a secondary cell or rechargeablebattery by forcing an electric current through it. The charging protocol depends on the size and type of the battery being charged. Some battery types have high tolerance for overcharging and can be recharged by connection to a constant voltage source or a constant current source; simple chargers of this type require manual disconnection at the end of the charge cycle, or may have a timer to cut off charging current at a fixed time. Other battery types cannot withstand long high-rate over-charging; the charger may have temperature or voltage sensing circuits and a microprocessor controller to adjust the charging current, and cut off at the end of charge. A trickle charger provides a relatively small amount of current, only enough to counteract self-discharge of a battery that is idle for a long time. Slow battery chargers may take several hours to complete a charge; high-rate chargers may restore most capacity within minutes or less than an hour, but generally require monitoring of the battery to protect it from overcharge. Electric vehicles need highrate chargers for public access; installation of such chargers and the distribution support for them is an issue in the proposed adoption of electric cars.

3.11 Used tools for the project:

Soldering Station:



Fig 3.11 Soldering station.

A soldering station has 2 units those are a station and iron. It has option to control temperature depending on the heat requirement of the soldering job being done. The

soldering iron is attached with the soldering station. It is better and more convenient than traditional soldering iron. It makes soldering work much easier and faster. When buying a soldering station for mobile phone repairing one must always select an ESD-Safe (Antistatic) model. Hakko and Weller are two world renowned brands who manufacture, sell and export world class soldering irons and other soldering tools and equipment.

Hot Air Blower:



Fig 3.12 Hot Air Blower.

The Hot Air Blower is also called SMD (Surface Mount Device) rework system and SMD repair system. It has control to regulate or manage temperature and flow or hot air. Always buy a good quality ESD-Safe hot air blower.

DC Power Supply:



Fig 3.13 DC Power Supply.

Regulated DC (Direct Current) power supply is used to supply DC current to a mobile phone. Most repair person used DC power supply to switch ON a mobile phone without battery.

Thinner or PCB Cleaner:



Fig 3.14 Thinner or PCB Cleaner.

Thinner or PCB cleaner is used to clean the PCB of a mobile phone. The most common PCB cleaner used in mobile phone repairing is IPA or Isopropyl Alcohol. It is important to buy only good quality PCB cleaner as poor quality PCB cleaners can damage the board.

Screwdriver Kit & Tweezers:



Fig 3.15 Screwdriver Kit & Tweezers.

Screwdriver Kit has several screwdrivers of different shapes and sizes to dissemble and assemble a mobile phone. Even tools are a world renowned manufacturer, exporter and supplier of all kinds of tools and tool kits.

These are needed to hold electronic components, ICs, jumper wire etc. while soldering and DE soldering.

Integrated circuit(IC)

4.1 Introduction of Integrated circuit:

An integrated circuit or monolithic integrated circuit (also referred to as an IC, a chip, or a microchip) is a set of electronic circuits on one small plate ("chip") of semiconductor material, normally silicon. This can be made much smaller than a discrete circuit made from independent components. Integrated circuits are used in virtually all electronic equipment today and have revolutionized the world of electronics. Computers, mobile phones, and other digital home appliances are now inextricable parts of the structure of modern societies, made possible by the low cost of producing integrated circuits. ICs can be made very compact, having up to several billion transistors and other electronic components in an area the size of a fingernail. The width of each conducting line in a circuit can be made smaller and smaller as the technology advances; in 2008 it dropped below 100 nanometers and in 2013 it is expected to be in the tens of nanometers.

4.2 Integrated circuit

ICs were made possible by experimental discoveries showing that semiconductor devices could perform the functions of vacuum tubes and by mid-20th-century technology advancements in semiconductor device fabrication. The integration of large numbers of tiny transistors into a small chip was an enormous improvement over the manual assembly of circuits using discrete electronic components. The integrated circuit's mass production capability, reliability, and building-block approach to circuit design ensured the rapid adoption of standardized integrated circuits in place of designs using discrete transistors.

There are two main advantages of ICs over discrete circuits: cost and performance. Cost is low because the chips, with all their components, are printed as a unit by photolithography rather than being constructed one transistor at a time. Furthermore, much less material is used to construct a packaged IC die than to construct a discrete circuit. Performance is high because the components switch quickly and consume little power (compared to their discrete counterparts) as a result of the small size and close proximity of the components. As of 2012, typical chip areas range from a few square millimeters to around 450 mm2, with up to 9 million transistors per mm2.

4.3 Terminology

An integrated circuit is defined as A circuit in which all or some of the circuit elements are inseparably associated and electrically interconnected so that it is considered to be indivisible for the purposes of construction and commerce.

Circuits meeting this definition can be constructed using many different technologies. for example thin-film transistor, thick film technology, or hybrid integrated circuit. However, in general usage integrated circuit has since come to refer to the singlepiece circuit construction originally known as a monolithic integrated circuit.

4.4 Invention of Integrated circuit

Early developments of the integrated circuit go back to 1949, when the German engineer Werner Jacobi (Siemens AG) filed a patent for an integrated-circuit-like semiconductor amplifying device showing five transistors on a common substrate in a 3-stage amplifier arrangement. Jacobi disclosed small and cheap hearing aids as typical industrial applications of his patent. An immediate commercial use of his patent has not been reported. The idea of the integrated circuit was conceived by a radar scientist working for the Royal Radar Establishment of the British Ministry of Defence, Geoffrey W.A. Dummer (1909–2002). Dummer presented the idea to the public at the Symposium on Progress in Quality Electronic Components in Washington, D.C. on 7 May 1952. He gave many symposia publicly to propagate his ideas, and unsuccessfully attempted to build such a circuit in 1956. A precursor idea to the IC was to create small ceramic squares (wafers), each one containing a single miniaturized component. Components could then be integrated and wired into a bidimensional or tridimensional compact grid. This idea, which looked very promising in 1957, was proposed to the US Army by Jack Kilby, and led to the shortlived Micromodule Program (similar to 1951's Project Tinkertoy). However, as the project was gaining momentum, Kilby came up with a new, revolutionary design: the IC.



Fig 4.4 Jack Kilby's original integrated circuit.

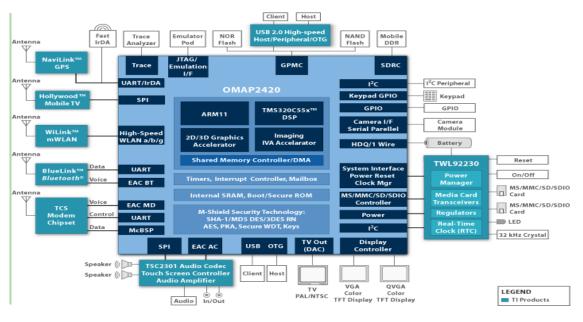
Newly employed by Texas Instruments, Kilby recorded his initial ideas concerning the integrated circuit in July 1958, successfully demonstrating the first working integrated example on 12 September 1958. In his patent application of 6 February 1959, Kilby described his new device as "a body of semiconductor material. Whereinall the components of the electronic circuits are completely integrated. "The first customer for the new invention was the US Air Force. Kilby won the 2000 Nobel Prize in Physics for his part of the invention of the integrated circuit. Kilby's work was named an IEEE Milestone in 2009. Noyce also came up with his own idea of an integrated circuit half a year later than Kilby. His chip solved many practical problems that Kilby's had not. Produced at Fairchild Semiconductor, it was made of silicon, whereas Kilby's chip was made of germanium. Robert Noyce credited Kurt Lehovec of Sprague Electric for the principle of p-n junction isolation caused by the action of a biased p-n junction (the diode) as a key concept behind the IC. Fairchild Semiconductor was also home of the first silicon gate IC technology with self-aligned gates, which stands as the basis of all modern CMOS computer chips. The technology was developed by Italian physicist Federico Faggin in 1968, who later joined Intel in order to develop the very first Central Processing Unit (CPU) on one chip (Intel 4004), for which he received the National Medal of Technology and Innovation in 2010.

4.5 Classification

Integrated circuits can be classified into analog, digital and mixed signal (both analog and digital on the same chip). Digital integrated circuits can contain anywhere from one to millions of logic gates, flip-flops, multiplexers, and other circuits in a few square millimeters. The small size of these circuits allows high speed, low power dissipation, and reduced manufacturing cost compared with board-level integration. These digital ICs, typically microprocessors, DSPs, and micro controllers, work using binary mathematics to process "one" and "zero" signals. Analog ICs, such as sensors, power management circuits, and operational amplifiers, work by processing continuous signals. They perform functions like amplification, active filtering, demodulation, and mixing. Analog ICs ease the burden on circuit designers by having expertly designed analog circuits available instead of designing a difficult analog circuit from scratch. ICs can also combine analog and digital circuits on a single chip to create functions such as A/D converters and D/A converters. Such mixed-signal circuits offer smaller size and lower cost, but must carefully account for signal interference.

Modern electronic component distributors often further sub-categorize the huge variety of integrated circuits now available:

- Digital ICs are further sub-categorized as logic ICs, memory chips, interface ICs (level shifters, serializer/deserializer, etc.), Power Management ICs, and programmable devices.
- Analog ICs are further sub-categorized as linear ICs and RF ICs.
- Mixed-signal integrated circuits are further sub-categorized as data acquisition ICs (including A/D converters, D/A converter, digital potentiometers) and clock/timing ICs.



4.6 OMAP2420 Processor:

Fig 4.6 OMAP2420 Processor

The OMAP2420 processor is a single-chip applications processor that supports all cellular standards, and complements any modem or chipset and any air interface. It is intended for high-volume wireless handset manufacturers and is not available through distributors. The OMAP2420 includes the benefits of the OMAP 2 architecture's parallel processing, giving users the ability to instantly run applications and operate multiple functions simultaneously without quality of service compromises. The OMAP2420 includes an integrated ARM1136 processor (330 MHz), a TI TMS320C55xTMDSP (220 MHz), 2D/3D graphics accelerator, imaging and video accelerator, high-performance system interconnects and industry-standard peripherals Graphics.

Multimedia enhancements made in the OMAP2420 include an added imaging and video accelerator for higher-resolution still capture applications, multi-megapixel cameras and full-motion video encode and decode with VGA resolution of 30 frames per second. An added TV video output supports connections to television displays for displaying images and video captured from the handset. 5-Mb internal SRAM also boost streaming media performance. Access to the OMAP Developer Network also provides an extensive range of programs and media components that manufacturers can use for differentiating and delivering products to market fast.

Cellular network

Introduction: In a cellular radio system, a land area to be supplied with radio service is divided into regular shaped cells, which can be hexagonal, square, circular or some other regular shapes, although hexagonal cells are conventional. Each of these cells is assigned multiple frequencies (f1 - f6) which have corresponding radio base stations. The group of frequencies can be reused in other cells, provided that the same frequencies are not reused in adjacent neighboring cells as that would cause co-channel interference.

5.1 Cellular network



Fig 5.1 Top of a cellular radio tower

A cellular network or mobile network is a wireless network distributed over land areas called cells, each served by at least one fixed-location transceiver, known as a cell site or base station. In a cellular network, each cell uses a different set of frequencies from neighboring cells, to avoid interference and provide guaranteed bandwidth within each cell. When joined together these cells provide radio coverage over a wide geographic area. This enables a large number of portable transceivers (e.g., mobile phones, pagers, etc.) to communicate with each other and with fixed transceivers and telephones anywhere in the network, via base stations, even if some of the transceivers are moving through more than one cell during transmission. Cellular networks offer a number of desirable features:

- More capacity than a single large transmitter, since the same frequency can be used for multiple links as long as they are in different cells
- Mobile devices use less power than with a single transmitter or satellite since the cell towers are closer
- Larger coverage area than a single terrestrial transmitter, since additional cell towers can be added indefinitely and are not limited by the horizon

Major telecommunications providers have deployed voice and data cellular networks over most of the inhabited land area of the Earth. This allows mobile phones and mobile computing devices to be connected to the public switched telephone network and public Internet. Private cellular networks can be used for researchor for large organizations and fleets, such as dispatch for local public safety agencies or a taxicab company.

5.2 Concept

The increased capacity in a cellular network, compared with a network with a single transmitter, comes from the mobile communication switching system developed by Amos Joel of Bell Labs that permitted multiple callers in the same area to use the same frequency by switching calls made using the same frequency to the nearest available cellular tower having that frequency available and from the fact that the same radio frequency can be reused in a different area for a completely different transmission. If there is a single plain transmitter, only one transmission can be used on any given frequency. Unfortunately, there is inevitably some level of interference from the signal from the other cells which use the same frequency. This means that, in a standard FDMA system, there must be at least a one cell gap between cells which reuse the same frequency.

In the simple case of the taxi company, each radio had a manually operated channel selector knob to tune to different frequencies. As the drivers moved around, they would change from channel to channel. The drivers knew which frequency covered approximately what area. When they did not receive a signal from the transmitter, they would try other channels until they found one that worked. The taxi drivers would only speak one at a time, when invited by the base station operator (this is, in a sense, time division multiple access (TDMA)).

5.3 Cell signal encoding

To distinguish signals from several different transmitters, frequency division multiple access (FDMA) and code division multiple access (CDMA) were developed. With FDMA, the transmitting and receiving frequencies used in each cell are different from the frequencies used in each neighboring cell. In a simple taxi system, the taxi driver manually tuned to a frequency of a chosen cell to obtain a strong signal and to avoid interference from signals from other cells. The principle of CDMA is more complex, but achieves the same result; the distributed transceivers can select one cell and listen to it. Other available methods of multiple access (TDMA) cannot be used to separate signals from one cell to the next since the effects of both vary with position and this would make signal separation practically impossible. Time division multiple access, however, is used in combination with either FDMA or CDMA in a number of systems to give multiple channels within the coverage area of a single cell.

5.4 Frequency reuse

The key characteristic of a cellular network is the ability to re-use frequencies to increase both coverage and capacity. As described above, adjacent cells must use different frequencies; however there is no problem with two cells sufficiently far apart operating on the same frequency. The elements that determine frequency reuse are the reuse distance and the reuse factor.

The reuse distance, D is calculated as

$$D = R\sqrt{3N},$$

Where R is the cell radius and N is the number of cells per cluster. Cells may vary in radius in the ranges (1 km to 30 km). The boundaries of the cells can also overlap between adjacent cells and large cells can be divided into smaller cells. The frequency reuse factor is the rate at which the same frequency can be used in the network. It is 1/K (or K according to some books) where K is the number of cells which cannot use the same frequencies for transmission. Common values for the frequency reuse factor are 1/3, 1/4, 1/7, 1/9 and 1/12 (or 3, 4, 7, 9 and 12 depending on notation).

In case of N sector antennas on the same base station site, each with different direction, the base station site can serve N different sectors. N is typically 3. A reuse pattern of N/K denotes a further division in frequency among N sector antennas per site. Some current and historical reuse patterns are 3/7 (North American AMPS), 6/4 (Motorola NAMPS), and 3/4 (GSM). If the total available bandwidth is B, each cell can only use a number of frequency channels corresponding to a bandwidth of B/K, and each sector can use a bandwidth of B/NK.

Code division multiple access-based systems use a wider frequency band to achieve the same rate of transmission as FDMA, but this is compensated for by the ability to use a frequency reuse factor of 1, for example using a reuse pattern of 1/1. In other words, adjacent base station sites use the same frequencies, and the different base stations and users are separated by codes rather than frequencies. While N is shown as 1 in this example that does not mean the CDMA cell has only one sector, but rather that the entire cell bandwidth is also available to each sector individually.

Depending on the size of the city, a taxi system may not have any frequency-reuse in its own city, but certainly in other nearby cities, the same frequency can be used. In a large city, on the other hand, frequency-reuse could certainly be in use. Recently also orthogonal frequency-division multiple access based systems such as LTE are being deployed with a frequency reuse of 1. Since such systems do not spread the signal across the frequency band, inter-cell radio resource management is important to coordinate resource allocation between different cell sites and to limit the inter-cell interference. There are various means of Inter-Cell Interference Coordination (ICIC) already defined in the standard. Coordinated scheduling, multi-site MIMO or multisite beams forming are other examples for inter-cell radio resource management that might be standardized in the future.

5.5 Directional antennas

Cell towers frequently use a directional signal to improve Reception in higher traffic areas. In the United States, the FCC limits omni-directional cell tower signals to 100 watts of power. If the tower has directional antennas, the FCC allows the cell operator to broadcast up to 500 watts of effective radiated power (ERP).

Cell phone companies use this directional signal to improve reception along highways and inside buildings like stadiums and arenas. As a result, a cell phone user may be standing in sight of a cell tower, but still have trouble getting a good signal because the directional antennas point a different direction.

Although the original cell towers created an even, omni-directional signal, were at the centers of the cells and were omni-directional, a cellular map can be redrawn with the cellular telephone towers located at the corners of the hexagons where three cells converge. Each tower has three sets of directional antennas aimed in three different directions with 120 degrees for each cell (totaling 360 degrees) and receiving/transmitting into three different cells at different frequencies. This provides a minimum of three channels, and three towers for each cell and greatly increases the chances of receiving a usable signal from at least one direction. The numbers in the illustration are channel numbers, which repeat every 3 cells. Large cells can be subdivided into smaller cells for high volume areas.

5.6 Mobile phone network

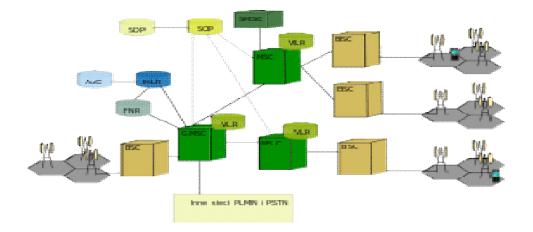


Fig 5.6 Mobile phone network

The most common example of a cellular network is a mobile phone (cell phone) network. A mobile phone is a portable telephone which receives or makes calls through a cell site (base station), or transmitting tower. Radio waves are used to transfer signals to and from the cell phone.

Modern mobile phone networks use cells because radio frequencies are a limited, shared resource. Cell-sites and handsets change frequency under computer control and use low power transmitters so that the usually limited number of radio frequencies can be simultaneously used by many callers with less interference.

A cellular network is used by the mobile phone operator to achieve both coverage and capacity for their subscribers. Large geographic areas are split into smaller cells to avoid line-of-sight signal loss and to support a large number of active phones in that area. All of the cell sites are connected to telephone exchanges (or switches), which in turn connect to the public telephone network. In cities, each cell site may have a range of up to approximately ½ mile, while in rural areas, the range could be as much as 5 miles. It is possible that in clear open areas, a user may receive signals from a cell site 25 miles away.

Since almost all mobile phones use cellular technology, including GSM, CDMA, and AMPS (analog), the term "cell phone" is in some regions, notably the US, used interchangeably with "mobile phone". However, satellite phones are mobile phones that do not communicate directly with a ground-based cellular tower, but may do so indirectly by way of a satellite.

There are a number of different digital cellular technologies, including: Global System for Mobile Communications (GSM), General Packet Radio Service (GPRS),

cdmaOne, CDMA2000, Evolution-Data Optimized (EV-DO), Enhanced Data Rates for GSM Evolution (EDGE), Universal Mobile Telecommunications System (UMTS), Digital Enhanced Cordless Telecommunications (DECT), Digital AMPS (IS-136/TDMA), and Integrated Digital Enhanced Network (iDEN).

5.7 Structure of the mobile phone cellular network

A simple view of the cellular mobile-radio network consists of the following:

- A network of radio base stations forming the base station subsystem.
- The core circuit switched network for handling voice calls and text
- A packet switched network for handling mobile data
- The public switched telephone network to connect subscribers to the wider telephony network

This network is the foundation of the GSM system network. There are many functions that are performed by this network in order to make sure customers get the desired service including mobility management, registration, call set up, and handover.

Any phone connects to the network via an RBS (Radio Base Station) at a corner of the corresponding cell which in turn connects to the Mobile switching center (MSC). The MSC provides a connection to the public switched telephone network (PSTN). The link from a phone to the RBS is called an uplink while the other way is termed downlink.

Radio channels effectively use the transmission medium through the use of the following multiplexing and access schemes: frequency division multiple access (FDMA), time division multiple access (TDMA), code division multiple access (CDMA), and space division multiple access (SDMA).

5.8 Cellular handover in mobile phone networks

As the phone user moves from one cell area to another cell while a call is in progress, the mobile station will search for a new channel to attach to in order not to drop the call. Once a new channel is found, the network will command the mobile unit to switch to the new channel and at the same time switch the call onto the new channel.

With CDMA, multiple CDMA handsets share a specific radio channel. The signals are separated by using a pseudo noise code (PN code) specific to each phone. As the user moves from one cell to another, the handset sets up radio links with multiple cell

sites (or sectors of the same site) simultaneously. This is known as "soft handoff" because, unlike with traditional cellular technology, there is no one defined point where the phone switches to the new cell.

In IS-95 inter-frequency handovers and older analog systems such as NMT it will typically be impossible to test the target channel directly while communicating. In this case other techniques have to be used such as pilot beacons in IS-95. This means that there is almost always a brief break in the communication while searching for the new channel followed by the risk of an unexpected return to the old channel.

If there is no ongoing communication or the communication can be interrupted, it is possible for the mobile unit to spontaneously move from one cell to another and then notify the base station with the strongest signal.

5.9 Cellular frequency choice in mobile phone networks

The effect of frequency on cell coverage means that different frequencies serve better for different uses. Low frequencies, such as 450 MHz NMT, serve very well for countryside coverage. GSM 900 (900 MHz) is a suitable solution for light urban coverage. GSM 1800 (1.8 GHz) starts to be limited by structural walls. UMTS, at 2.1 GHz is quite similar in coverage to GSM 1800.

Higher frequencies are a disadvantage when it comes to coverage, but it is a decided advantage when it comes to capacity. Pico cells, covering e.g. one floor of a building, become possible, and the same frequency can be used for cells which are practically neighbors.

Cell service area may also vary due to interference from transmitting systems, both within and around that cell. This is true especially in CDMA based systems. The receiver requires a certain signal-to-noise ratio, and the transmitter should not send with too high transmission power in view to not cause interference with other transmitters. As the receiver moves away from the transmitter, the power received decreases, so the power control algorithm of the transmitter increases the power it transmits to restore the level of received power. As the interference (noise) rises

above the received power from the transmitter, and the power of the transmitter cannot be increased any more, the signal becomes corrupted and eventually unusable. In CDMA-based systems, the effect of interference from other mobile transmitters in the same cell on coverage area is very marked and has a special name, cell breathing. One can see examples of cell coverage by studying some of the coverage maps provided by real operators on their web sites or by looking at independently crowd sourced maps such as Open Signal. In certain cases they may mark the site of the transmitter, in others it can be calculated by working out the point of strongest coverage.

Advantage and Disadvantage of a Cell Phone:

6.1 The Advantages and Disadvantages of Mobile Phone Technology



Mobile phones have altered our way of life to an unbelievable degree. Anytime some old member of a family applies tales regarding prior modes of communication like beepers, postal letters and telegrams, the children of Twenty-first century feel really surprised. It would appear that the people relevant the stories regarding telegrams fit in to a few other planets. So, it's a fact that the cellular phone technology has started a new period on our planet that has uprooted the old fashioned lifestyle entirely.

However, it doesn't mean this technology has no effect on people adversely. Everything on the planet earth has two attributes; advantages and disadvantages. The same will go true for the phone technologies. The technology is effective as well as disadvantageous. In this article, the advantages will be considered towards the disadvantages in order to obtain an accurate understanding of the effects of mobile phones on individual life.

6.2 The Advantages of the Technologies:



- It is said that "phones possess turned the world into a global town." The declaration appears precisely true. Residing in one part of the world, we can talk to our family members residing in an additional corner of the world effortlessly.
- The cell phone technologies have speeded up small and big companies. The business events around the world can communicate with one an additional in a few of mere seconds. They can offer and determine quickly. Consequently, the business world has been enhanced to an astonishing extent due to treatments.
- It's created individuals in contact along with one an additional. In this way, mobile phones possess urged individual conversation.
- To provide a network for communication, lots of individuals are needed to handle the duties. Hence, many jobless people have obtained good work for all of them due to treatments.
- The more you talk, the more you know how to talk and the better your communication skills become. This is applicable if you're a sensible person and keep note of your interacting habits over the phone. It can be a communication tutorial!
- Nothing more than a cell phone comes to great help in emergency. You are driving by the freeway and the vehicle jams and cell phone comes to your rescue. You are stuck in a lone place, again call somebody and ask for directions.
- Parents can be a little less worried about their kids by being in constant touch with them.
- If you're a net-savvy, you can have Internet handy all the time and anywhere the signal of your cell phone provider can reach.
- Trendy and stylish cell phones can be used as a bait to receive attention. It can be part of fashion and styling.
- From the industry and economy point of view, cell phone companies (communication industry) are flourishing with market capital in billions. This is a good thing for the economy to be smooth and healthy.
- Companies find it yet another medium to advertise their products; so another medium to reach the consumers.
- Nowadays, cell phones are not just phone calls; they're about messaging, video, songs, games, alarm clock, notes, calendar, reminder, etc. So one equipment, lots' of uses!
- Although cell phone use can be dangerous while driving but sometimes it can be a time-saver you are driving and simultaneously discussing some urgent matter as well. A sensible and only urgent usage during driving can be a great help at times.

6.3 The Disadvantages of the Technologies



- The finest disadvantage of it is these technologies have impacted the natural method of human interaction badly. Individuals stay hectic using their tissue even when sitting in a team of other people.
- There are many tales about the people who fulfilled accidents because of to keeping focus on their own mobile phone while driving. Therefore, this is one of the greatest disadvantages of these types of devices.
- Mobile phones are used by criminals to inform one another about their filthy ideas. And, their own crime strategies are invented by using these technologies in the majority of cases.
- Mobile phones also have increased up street offences and breach of moral ideals. Lots of immoral, so-called love tales discover their existence through the misuse of this technology.
- A few apparent hearing and brain diseases possess appeared because of to the excessive use of these devices. Furthermore, eyesight problems are also observed among many crazy mobile users.

Therefore, we can see which mobile phones are not only helpful, however they are also dangerous. Nicely, it will not be wrong to say that not one of the technologies is harmful by nature, this will depend on us whether we utilize it favorably or even adversely.

- Some people (especially teens) get so much addicted to cell phones for talking, video, messaging, games, etc that they forget the real purpose of the phone and waste large part of their time in unnecessary interaction over their cell phones.
- Nothing more can be a distraction for a teached in the classroom, when a student's phone rings. Cell phones are increasingly becoming a problem for the schools during classroom hours and are becoming a means of cheating during examinations and other kinds of ability tests. All this is really bad and does hurt the future of the student, who doesn't realize that he/she is him/herself responsible for it.

- Health of those living in the vicinity of cell phone towers is becoming a growing concern. Towers result into an area with concrete development along with destruction of natural features (vegetation etc.) around the place. The towers also emit strong electromagnetic signals, which can be health hazard for those living nearby and who are getting exposed to strong radiations continuously during a good span of their lives.
- While remaining in touch is good thing but sometimes it becomes annoying to have to deal with continuous incoming phone calls. You are on a vacation and your boss calls up, how does that sound!
- Cell phone monthly bills are usually more than a landline bill. Sometimes, we may not require having a cell phone but we still buy one and start paying monthly bills; so it increases our monthly/recurring expenses.
- Use of hands-free (wired/blue-tooth) can at times pass on loud sounds to our ears which can result in weakening of ear-drums. Nowadays, one can download lots of songs, so keeping the hands-free glued inside your ears for long hours can really affect the sensitivity of ears in the long run of life.
- There have been cases of cell phone blasts, due to the excessive heating up of its battery. This can be a fatal issue; although rare.
- No joke, the surface of a cell phone has millions of bacteria and virus on it and that can be a strong reason of immediate skin problem on face or can result into other internal infections wherein the microbes creep inside the body through mouth or other openings.
- Some use the keypad excessively; due to size restrictions the buttons and keypad of the cell phone are not natural for human hands; so excessive and prolonged typing can be an issue for fingers and finger joints.
- The continuous exposure of signal to and from our cell phone can be a cancer concern, although to a meager amount- research is still going on. However, the mobile phone industry has long resisted any suggestion of a link to cancer, though it accepts that mobile phone radiation does affect the electrical activity in the brain.
- The battery parts and other electronic parts of a cell phone can be environmental hazard if not disposed of properly through approved means.
- A cell phone can be helpful while driving and talking in case of urgent matters but increasingly it is becoming cause of accidents because it deviates the attention of a driver; human brain can do only one thing at a time (however small span of time it may be).
- It can be a big time distraction and nuisance in calm and silent places like libraries, cinemas, restaurants, etc. Some cell phone users lose the sense of deciding when and where they can talk on the cell phone and where they can't, without slightest consideration for the fellow beings around.
- The mobile phone advertisements through messages are becoming a pain for the cell phone users.
- Our SIM can be exploited as tracking device and if you're an important person then that can be a big concern for you

6.4 Environmental impacts



Fig 6.4 Cellular antenna disguised to look like a tree

Like all high structures, cellular antenna masts pose a hazard to low flying aircraft. Towers over a certain height or towers that are close to airports or heliports are normally required to have warning lights. There have been reports that warning lights on cellular masts, TV-towers and other high structures can attract and confuse birds. US authorities estimate that millions of birds are killed near communication towers in the country each year.

Some cellular antenna towers have been camouflaged to make them less obvious on the horizon, and make them look more like a tree.

An example of the way mobile phones and mobile networks have sometimes been perceived as a threat is the widely reported and later discredited claim that mobile phone masts are associated with the Colony Collapse Disorder (CCD) which has reduced bee hive numbers by up to 75% in many areas, especially near cities in the US. The Independent newspaper cited a scientific study claiming it provided evidence for the theory that mobile phone masts are a major cause in the collapse of bee populations, with controlled experiments demonstrating a rapid and catastrophic effect on individual hives near masts. Mobile phones were in fact not covered in the study, and the original researchers have since emphatically disavowed any connection between their research, mobile phones, and CCD, specifically indicating that the Independent article had misinterpreted their results and created "a horror story". While the initial claim of damage to bees was widely reported, the corrections to the story were almost non-existent in the media.

There are more than 500 million used mobile phones in the US sitting on shelves or in landfills, and it is estimated that over 125 million will be discarded this year alone. The problem is growing at a rate of more than two million phones per week, putting tons of toxic waste into landfills daily. Several companies offer to buy back and recycle mobile phones from users. In the United States many unwanted but working mobile phones are donated to women's shelters to allow emergency communication.

Chapter 7

Cost analysis

7.1 Cost sheet:

Table

Name	Model / Value	Quantity	Purchase Price TK
Touch Panel	0363	1	350
PCB- 021	Pcb-A	1	950
Camera	0365	1	180
Speaker	0306	1	30
Microphone	0013	1	50
Receiver	0116	1	80
A-Casing	0366	1	130
B- Casing	0367	1	120
Battery case	0368	1	130
Soft Key	0369	1	100
Battery	0370	1	210
Vsb Cable	0329	1	70
Head Phone	0371	1	70
Charger	0331	1	90
Other			140
		Total	2600

7.2 Cost comparison:

The Digital cell phone are available in market are high pricing where as our designed Digital cell phone is the cheapest one. We have experiment in the market before our marketing project. There are many Digital cell phones which are sold till TK.4000-5000.

At first, we select a circuit diagram than we make a chart of electronic device according to that diagram. We use a Touch Panel, PCB, Camera, Speaker, Microphone, Receiver, Casing, Battery, head phone, Charger etc. which value of market is TK.2460, including others cost we have paid TK. 2600 for completing the project. Result

This project is "Digital Cell Phone" that can operate with a dual sim dual standby, 4.0 inches full touch display, 1.3 mega pixels camera, browser: Google, Facebook, twitter, mp3, mp4, fm radio with radio, auto call recording, 3.5 mm audio jack and also have angry birds, fruit ninja, tom cat games, java support games &software Bluetooth, USB connectivity, high performance loud speaker, 1150 mAh li-ion battery.



Fig 8.1 Digital cell phone.

Conclusion:

This Project paper will help seniors, graduate students, and design engineers to understand the modeling and working principle of a Digital Cell Phone.

The Digital Cell Phones are the best known for their goal of communication, as they enable calling anytime from anywhere and the transnational going facilities allowed the raise in communication among people. The Digital Cell Phones also enable to SMS, MMS, Bluetooth, GPRS, EDGE and 3G communication systems in our country. Future mobile phones are being touted as the ultimate multifunctional devices. Some experts predict that the mobiles of the future will become remote controls for our whole lives, whereas others forecast that in the future mobile phones will literally run our lives for us.

One thing is for certain, the technology involved in mobile phones and mobile communications has developed so rapidly over the last few years that the possibilities for the future seem limitless.

As soon as possible will connect 4G communication system in our country.

It is used for worldwide communication. The digital cell phone enable calling anytime from anywhere and the transnational going facilities allowed the raise in communication among people. The digital call phone rates also helping this technology to reach the rural places likely to get higher communication. ©Daffodil International University

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