DESIGN OF AN REAL TIME PORTABLE ECG ANALYSIS SYSTEM WITH REDUCED MOTION ARTIFACTS THROUGH WAVELET ANALYSIS

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Abstract—— **This paper present a new integrated, portable device to provide a convenient solution for remote monitoring heart rate at the fingertip and body temperature using Ethernet technology and widely spreading internet. Now a day, heart related disease is rising. Most of the times in these cases , patients may not realize their actual conditions and even it is a common fact that there are no doctors by their side, especially in rural areas, but nowadays most of the diseases are curable if detected in time. We have tried to make a system which may give information about one's physical condition and help him\her to detect these deadly but curable diseases. The system gives information of heart rate and body temperature simultaneously acquired on the portable side in realtime and transmits results to web. In this system, the condition of heart and body temperature can be monitored from remote places. Eventually, this device provides a low-cost, easily accessible human health monitor solution bridging the gaps between patients and doctors.**

Index Terms—**Biomedical signal processing,Electrocardiography, Heart rate extraction, Microcontrollers, Mobile healthcare, Wearable sensors**

INTRODUCTION

The global elderly population is fastgrowing and willoutnumber of children in near future. The aging society is bringing its impact on many developingcountries and presents a stark contrast with the low Fertility rate of these countries. The changes brought about by the aging society include an increasing demand for caretaking; thus, patient monitoring systems are gaining their importance in reducing the need for human resources. Caretaking homes and hospitals have been planning on the use of biological sensorsto effectively minister to their patients. Vital signs, suchas body temperature, blood pressure, and sugar level, can be regularly and remotely monitored by medical professionals,achieving a comprehensive caretaking system.

The transmission of vital signs in nursing homes and hospitalsis usually carried out wirelessly. The vital signs can becategorized into emergency messages and regularly collectedinformation. While the regularly collected information can bestored and transmitted in a given time period, the emergencymessages must be transmitted immediately. The transmissionpath of vital signs can be divided into outdoor and indoor. Thetechnology of wireless wide area networks (WWANs) is usedfor outdoor transmission, and that of wireless mesh network(WMN) is responsible for indoor transmission.

Daily-life monitoring is especially important in preventing lifestylediseases, which have rapidly increased the number of patientsand elderly people requiring nursing care. Our goal is themonitoring and

Display of vital signals and physical activity indaily life to improve users' quality of life and realize a smartsociety.We propose an Instantaneous Heart Rate (IHR) monitoringand electrocardiograph (ECG) processor for use in a wearablehealthcare system. The IHR is an important bio-signal used forheart disease detection, heart rate variation analysis, and

This research was partially supported by the Ministry of Economy, Tradeand Industry (METI) and the New Energy an Industrial Technology Development Organization (NEDO) and a grant from Tanesha Science and exercise intensity estimation.**C**HRONIC HEART failure (CHF) represents one of themost relevant chronic disease in all industrialized countries,affecting approximately 15 million people in Europe andmore than 5 million in the U.S., with a prevalence ranging from1% to 2% and an incidence of 3.6million new cases each year inEurope and 550 000 cases in U.S. [1]–[3]. It is the leading causeof hospital admission particularly for older adults reachingTechnology Foundation.The current healthcare model is mostly in-hospital basedand consists of periodic visits. Previous studies pointed outthat in patients with a discharge diagnosis of heart failure, theprobability of a readmission in the following 30 days is about0.25, with the readmission rate that approaches 45% within6 months [7]. It is acknowledged that changes in vital signsoften precede symptom worsening and clinical destabilization:indeed, a daily monitoring of some biological parameters wouldensure an early recognition of heart failure de-compensationsigns, allowing appropriate and timely interventions, likelyleading to a reduction in the number of re-hospitalizations.

Due to lack of resources at medical facilities to support this kind of follow-up, the use of Information and Communication Technologies (ICT) has been identified by physicians and administrator as a possible valid support to overcome this limit.

TYPES OF COMPONENTS

POWER SUPPLY:

A power supply converts main AC to low voltage regulated DC power for the internal components of a computer .Mordern personal computers universally use a switched mode power supply .some power supplies have a manual selector for input voltage , while automatically adapt to some supply voltage.

Every circuit needs a source to give energy to that circuit. The Source wills a particular voltage and load current ratings. The following is a circuit diagram of a power supply. We need a constant low voltage regulated power supply of +5V, providing input voltages to the microcontroller RS232, LM311 and LCD display which requires 5 volts supply.

Every power supply has the following parts**,**

- Transformer
- Rectifier
- Capacitor (filter)
- Regulator
- resistors

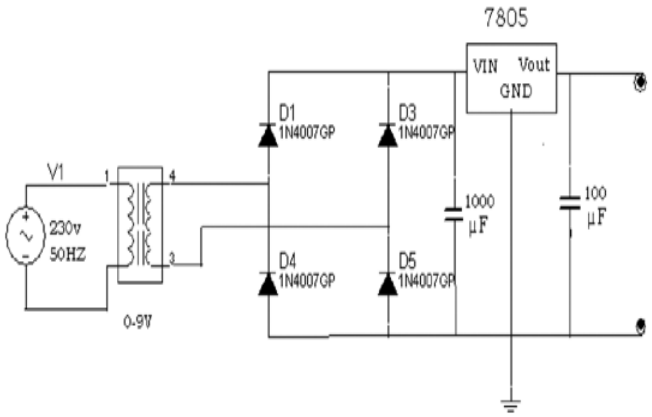


FIG 1:TRANSFORMER

WORKING PRINCIPLE OF TRANSFORMER:

The transformer works on the principle of faradays law of electromagnetic inductions. Transformer in its simplest form.The core is built up of thin laminations insulated from each other in order to reduce eddy current loss in the more. The winding are unguarded from each other and also from the care. The winding connected to the load is called the secondary winding for samplings they are shown on the opposite side of core but in practice they are distributed owner both sides of the cores. The high voltage winding encloses the low voltage.

Let us say that transformer has N1 turns in its primary winding and N2 turns in its secondary winding. The primary winding is connected to a sinusoidal voltage of magnitude V1 at a frequency FH2. A working flux is set up in magnetic core. The working flux is alternating and sinusoidal as the applied voltage is alternating and sinusoidal. When these flux link the primary and the secondary winding emf are induced in them. The emf induced in this is called the self-induced emf and that induced in the secondary is the mutually induced emf. These voltages will have sinusoidal waveform and the same frequency as that of the applied voltage. The currents, which flow in the close primary and secondary circuits, are respectively I1 and I2.

In our electrical and electronic circuit we use two important components namely.

1. Resister
2. Capacitor

RESISTOR:

A resistor is an electric component. It has a known value of resistance. It is especially designed to introduce a desired amount of resistance in a circuit. A resistor is used either to control the flow of current or to produce a voltage drop. It is the most commonly used component in electrical and electronic circuits.

TYPES OF RESISTOR

1. Carbon resistor
2. Metal oxide resistor
3. Metal film resistor
4. Wire wound resistor
5. Variable resistor-carbon resistor

CAPACITOR:

Capacitor is an electrical device used for storing electrical energy. The stored electrical energy is the form of a current in to the circuits which the capacitor form a part. Capacitor is one of the important components used in Radio, TV and other electronic circuits.

Filter circuits, which is usually capacitor acting as a surge arrester always follow the rectifier unit. This capacitor is also called as a decoupling capacitor or a bypassing capacitor, is used not only to 'short' the ripple with frequency of 120Hz to ground but also to leave the frequency of the DC to appear at the output.

TYPES OF CAPACITOR:

1. Paper Capacitor
2. Mica Capacitor
3. Ceramic Capacitor
4. Electrolytic Capacitor
5. Variable Capacitor

VOLTAGE REGULATOR:

A voltage regulator is an electronic circuit that provides a stable DC voltage independent of the load current, temperature and AC line voltage variations. Although Voltage regulators can be designed using op-amps it is quicker and easier to use IC voltage regulator. The IC voltage regulators are inscribe and inexpensive and are available with features such as programmable, output, current voltage, boosting and floating operation for high voltage application.

7805 VOLTAGE REGULATOR:

78XX series are three terminal positive fixed voltage regulators. There are seven output voltage options available such as 5, 6, 8,12,15,18 and 24V in 78XX the two numbers (XX) indicate the output voltage.

The connection of a 7805-voltage regulator is show infix. The AC line voltage is stepped down a cross each half of the center tapped transformers. If full wane rectifier and capacitors filter then provides an unregulated DC voltage with AC ripple of a few volts as a input to the voltage regulator. The 7805 of IC provides an output of +5 Volts D.C.

BRIDGE RECTIFIER

OPERATION BRIDGE RECTIFIER:

During positive half cycle of input signal, anode of diode 1 becomes positive and at the sometime due anode of diode D2 becomes negative. Hence D1 conducts and D2 does not conduct. The load currier flow through D1 and the voltage drop across RL will be equal to the input voltage. During the negative half cycle of the input the anode of D1 becomes negative and the anode of D2 becomes positive. Hence D1 does not conduct and D2 conducts. The load current flow through D2 and the voltage drop across RC will be equal to the input voltage. The maximum efficiency of a full wane rectifier is 81.2% and ripple factor is 0.48 peak inverses voltage for full ware rectifies is 2VM because the entire secondary voltage appears across the non-conducting diode.

RS 232:

Before Universal Serial Bus (USB) in computers **RS232** was used as a standard port for communication between different devices like printers, mouse, modems and all other type of computer peripherals and the computer. In terms of definition, RS232 can be defined as point to point communication between the Data Terminal Equipment (DTE) and Data Communication Equipment (DCE). On RS 232, 920 Kbps of data speed is achievable and the fact that it is called a serial port is that it transfers data bit by bit. RS232 comes in two different variants of D-style 9 pin and 25 pin the former is called as DB 9

connector and the latter is called as DB 25 connector, however only three pins are required for communication.Scope of the standardThe Electronics Industries Association (EIA) standard RS-232-C[1] as of 1969 defines Electrical signal characteristics such as voltage levels, signaling rate, timing and slew-rate of signals, voltage withstand level; short-circuit behavior, and maximum load capacitance.

Interface mechanical characteristics, pluggable connectors and pin identification.

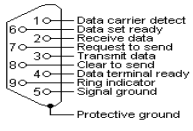
- Functions of each circuit in the interface connector.
- Standard subsets of interface circuits for selected telecom applications.

The standard does not define such elements as

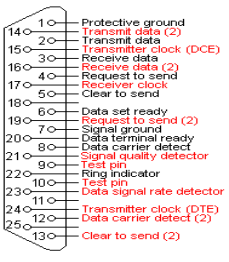
- Character encoding (for example, ASCII, Baudot code or EBCDIC)
- The framing of characters in the data stream (bits per character, start/stop bits, parity)
- Protocols for error detection or algorithms for data compression
- Bit rates for transmission, although the standard says it is intended for bit rates lower than 20,000 bits per second. Many modern devices support speeds of 115,200 bit/s and above
- Power supply to external devices.

Details of character format and transmission bit rate are controlled by the serial port hardware, often a single integrated circuit called a UART that converts data from parallel to asynchronous start-stop serial form. Details of voltage levels, slew rate, and short-circuit behavior are typically controlled by a line-driver that converts from the UART's logic levels to RS-232 compatible signal levels, and a receiver that converts from RS-232 compatible signal levels to the UART's logic levels.

Other pins present in RS 232 port are used depending upon the peripheral support. Devices like Modem utilize all the pins to achieve full handshaking capabilities. For having reliable communication, the length of cable used should be less than 50 ft. set to 9600 baud rate. To have a communication over long distance, other resources like wireless communication can also be used. Before 1997 the RS232 was termed as EIA232F, where EIA stands for "**Electronic Industries Association**" were it was developed but after the renewal of standards its name was replaced with RS232.



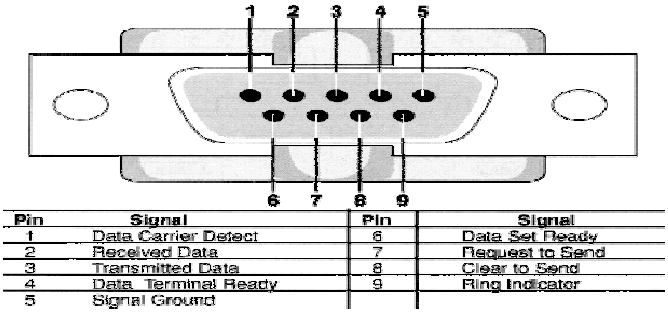
RS 232 9 pin



RS 232 25 pin

FIG 2:RS 232 PIN

Other pins present in RS 232 port are used depending upon the peripheral support. Devices like Modem utilize all the pins to achieve full handshaking capabilities. For having reliable communication, the length of cable used should be less than 50 ft. set to 9600 baud rate. To have a communication over long distance, other resources like wireless communication can also be used. Before 1997 the RS232 was termed as EIA232F, where EIA stands for "**Electronic Industries Association**" were it was developed but after the renewal of standards its name was replaced with RS232.



Pin	Signal	Pin	Signal
1	Data Carrier Detect	6	Data Set Ready
2	Received Data	7	Request to Send
3	Transmitted Data	8	Clear to Send
4	Data Terminal Ready	9	Ring Indicator
5	Signal Ground		

FIG 3 :CROSS SECTION

PIN CONFIGURATION:

The pin configuration and signaling taking place in RS232 is tabulated below:

TAB 1

DB 9	DB 25	Acronym	Full name	Direction
Pin 3	Pin 2	TXD	Transmit Data	Out
Pin 2	Pin 3	RXD	Receive Data	In
Pin 7	Pin 4	RTS	Ready to send	Out
Pin 8	Pin 5	CTS	Clear to send	In
Pin 6	Pin 6	DSR	Data set Ready	In
Pin 4	Pin 20	DTR	Data terminal Ready	Out
Pin 1	Pin 8	DCD	Data Carrier Detect	In
Pin 9	Pin 22	RI	Ring Indicator	In
Pin 5	Pin 7	SG	Signal Ground	-

The pin 3, pin 2 and pin 5 are set by hardware to transmit, receive and ground while all other pins are software controlled and can be changed. The pins described here are set according to the standards by EIA. The pin description given below is in the order of their priorities in which they are used in DB9 Connector.

1). Pin 3: TXD- This pin is used to serially transmit the bits to the device connected to it. They are permanently set by the hardware

2). Pin 2: RXD- The data is received by the computer in serial order by the receive pin. It is also permanently set by the hardware.

3). Pin 7/Pin 8: RTS/CTS- The ready to send and clear to send pins are for hardware control flow. Hardware flow control is very useful when there is mismatching between the transmitter and receiver in terms of rate of speed.

4). Pin 6: DSR: Data Set Ready pin is generally utilized in devices like modem to tell computer that it is ready to take data.

5) Pin 4: DTR: The DTR is a control signal set to high-low. It tells the device to disconnect from computer.

6) Pin 1: DCD: This Data Carrier Detect is another type of pin configured by software for control signaling purpose. It is used to by computer to detect whether the device has been disconnected from it.

7) Pin 9: RI- As its name suggests, ring indicator indicates the computer that modem is ringing. It is a one way type of communication taking place from modem to computer.

8) Pin 5: SG- The signal ground provides ground to the overall connections. It also acts as reference point from where signals can be measured.

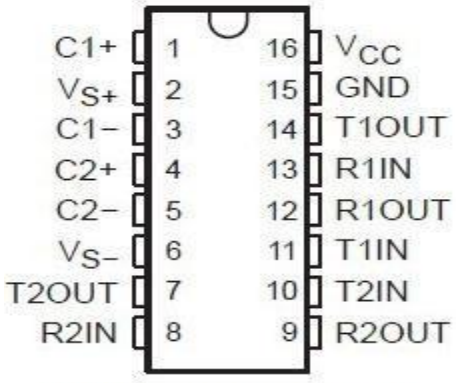
Step by Step Working of RS232:
After having a brief reference of the pins and signaling let us see the working of RS232 by an example. Let us we have a modem that utilizes RS232 to communicate with computer. The processes taking place are briefly described below:

1). As the modem is connected to the computer, It (modem) sends a software based Ring Indicator (RI) signal to computer.
2). The computer gives response to the modem by sending DTR signal i.e. Data Terminal Ready. It tells modem that computer is ready to undergo communication with modem and ready to receive data.
3). Next is modem's turn to responds to the DTR signal. This is done by sending a DSR signal (Data Set Ready) to the computer indicating that it is now ready to exchange further signaling with the computer's DTE (Data Terminal Equipment).
4). after these necessary steps, transmission and reception of data and signals is set up on the TXD and RXD pins. In full duplex communication, both CTS and RTS pins are raised high while in half duplex mode they are utilized for handshaking necessary to control the direction.
5). When data transfer is completed, the computer incapacitate DTR signal and restrains the DCD and DSR signals. Hence the communication ends up.

RS232 in Real World:

In modern computer world, RS232 has been replaced with the USB port. However there are certain devices that uses RS232 port for the communication with computer like dot matrix printers, modem etc. Most of the devices build today are not able to communicate with the RS232 world due to voltage differences between them. Thus to have serial communication it is necessary to have level conversion. This level conversion is done by using specifically designed integrated circuits (IC).

The RS232 IC converts the signals from rs232 port into the signals which are compatible to TTL based digital logic. It consists of amplifiers called as line drivers which improve signal strength and set the voltage levels according to receiver unit so that it does not get damaged. In this IC's, 0 indicates high and 1 indicates low. Therefore whenever they receive signal, it is inverted from its initial state. These IC does also have an inbuilt UART (Universal Asynchronous Transmitter Receiver) which performs an overhead process transmitting and receiving the serial data.



RS232 IC pin diagram

FIG4:PIN DIAGRAM

The asynchronous signal consists of start/stop bits as well as error detecting bits. The UART generates start/stop bits and can also detect the error in the transmission. It also acts as an intermediate between serial and parallel communication i.e. bit-wide communication and byte-wide communication. It converts byte of data into a single stream when transmitting and converts the bit of data i.e. serial data into parallel when receiving.

SENSORS

Sensors are sophisticated devices that are frequently used to detect and respond to electrical or optical signals. A **Sensor** converts the physical parameter (for example: temperature, blood pressure, humidity, speed, etc.) into a signal which can be measured electrically. Let's explain the example of temperature. The mercury in the glass thermometer expands and contracts the liquid to convert the measured temperature which can be read by a viewer on the calibrated glass tube.

CRITERIA TO CHOOSE A SENSOR

There are certain features which have to be considered when we choose a sensor. They are as given below:

1. Accuracy
2. Environmental condition - usually has limits for temperature/ humidity
3. Range - Measurement limit of sensor
4. Calibration - Essential for most of the measuring devices as the readings changes with time
5. Resolution - Smallest increment detected by the sensor
6. Cost
7. Repeatability - The reading that varies is repeatedly measured under the same environment

CLASSIFICATION OF SENSORS
The sensors are classified into the following criteria:

1. Primary Input quantity (Measurand)
2. Transduction principles (Using physical and chemical effects)
3. Material and Technology
4. Property
5. Application

Transduction principle is the fundamental criteria which are followed for an efficient approach. Usually, material and technology criteria are chosen by the development engineering group.

Classification based on property is as given below:

- Temperature - Thermistors, thermocouples, RTD's, IC and many more.
- Pressure- Fibre optic, vacuum, elastic liquid based manometers, LVDT, electronic.
- Flow - Electromagnetic, differential pressure, positional displacement, thermal mass, etc.
- Level Sensors - Differential pressure, ultrasonic radio frequency, radar, thermal displacement, etc.
- Proximity and displacement - LVDT, photoelectric, capacitive, magnetic, ultrasonic.
- Biosensors - Resonant mirror, electrochemical, surface Plasmon resonance, Light addressable potentiometric.
- Image - Charge coupled devices, CMOS
- Gas and chemical - Semiconductor, Infrared, Conductance, Electrochemical.
- Acceleration - Gyroscopes, Accelerometers.

- Others - Moisture, humidity sensor, Speed sensor, mass, Tilt sensor, force, viscosity.

Surface Plasmon resonance and Light addressable potentiometric from the Bio-sensors group are the new optical technology based sensors. Christo Ananth et al. [5] discussed about an eye blinking sensor. Nowadays heart attack patients are increasing day by day."Though it is tough to save the heart attack patients, we can increase the statistics of saving the life of patients & the life of others whom they are responsible for. The main design of this project is to track the heart attack of patients who are suffering from any attacks during driving and send them a medical need & thereby to stop the vehicle to ensure that the persons along them are safe from accident. Here, an eye blinking sensor is used to sense the blinking of the eye. spO2 sensor checks the pulse rate of the patient. Both are connected to micro controller.If eye blinking gets stopped then the signal is sent to the controller to make an alarm through the buffer. If spO2 sensor senses a variation in pulse or low oxygen content in blood, it may results in heart failure and therefore the controller stops the motor of the vehicle. Then Tarang F4 transmitter is used to send the vehicle number & the mobile number of the patient to a nearest medical station within 25 km for medical aid. The pulse rate monitored via LCD .The Tarang F4 receiver receives the signal and passes through controller and the number gets displayed in the LCD screen and an alarm is produced through a buzzer as soon the signal is received.

Classification based on Application is as given below:

- Industrial process control, measurement and automation
- Non-industrial use – Aircraft, Medical products, Automobiles, Consumer electronics, other type of sensors.

Sensors can be classified based on power or energy supply requirement of the sensors:

- Active Sensor - Sensors that require power supply are called as Active Sensors. Example: LiDAR (Light detection and ranging), photoconductive cell.
- Passive Sensor - Sensors that do not require power supply are called as Passive Sensors. Example: Radiometers, film photography.

In the current and future applications, sensors can be classified into groups as follows:

- Accelerometers - These are based on the Micro Electro Mechanical sensor technology. They are used for patient monitoring which includes pace makers and vehicle dynamic systems.
- Biosensors - These are based on the electrochemical technology. They are used for food testing, medical care device, water testing, and biological warfare agent detection.
- Image Sensors - These are based on the CMOS technology. They are used in consumer electronics, biometrics, traffic and security surveillance and PC imaging.
- Motion Detectors - These are based on the Infra Red, Ultrasonic, and Microwave / radar technology. They are used in videogames and simulations, light activation and security detection.

SIGNAL CONDITIONING UNIT

LM324

The LM124 series consists of four independent, high gains internally frequency compensated operational amplifiers which were designed specifically to operate from a single power supply over a wide range of voltages. Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage.

Application areas include transducer amplifiers, DC gain blocks and all the conventional op amp circuits which now can be more easily implemented in single power supply systems. For example, the LM124 series can be directly operated off of the standard +5V power supply voltage which is used in digital systems and will easily provide the required interface electronics without requiring the additional ±15V power supplies.

It is often necessary to be able to detect a certain voltage and switch a circuit according to the voltage that has been detected. For example a temperature sensing circuit will produce a given voltage and it may be necessary to switch heating on when the temperature falls below a given point. For these and many other uses, a circuit known as a comparator can be used. As the name comparator implies these circuits are used to compare two voltages. When one is higher than the other the comparator circuit output is in one state, and when the input conditions are reversed, then the comparator output switches to the other state. Here we use LM324 as comparator. This consists of 4 op-amps inbuilt on to it. We can connect sensors with inverting inputs and potentiometers connected on the Non-inverting inputs. The output pins are interfaced to the Micro controller.

Unique Characteristics

In the linear mode the input common-mode voltage range includes ground and the output voltage can also swing to ground, even though operated from only a single power supply voltage in the unity gain cross frequency is temperature compensated n The input bias current is also temperature compensated

Advantages

- Eliminates need for dual supplies
- Four internally compensated op amps in a single package
- Allows directly sensing near GND and VOUT also goes to GND
- Compatible with all forms of logic
- Power drain suitable for battery operation

Features

- Internally frequency compensated for unity gain
- Large DC voltage gain 100 dB
- Wide bandwidth (unity gain) 1 MHz (temperature compensated)
- Wide power supply range: Single supply 3V to 32V or dual supplies ±1.5V to ±16V
- Very low supply current drain (700 μA) essentially independent of supply voltage
- Low input biasing current 45 Na (temperature compensated)
- Low input offset voltage 2 mV and offset current: 5 nA
- Input common-mode voltage range includes ground
- Differential input voltage range equal to the power supply voltage
- Large output voltage swing 0V to V+ – 1.5V

Connection Diagram

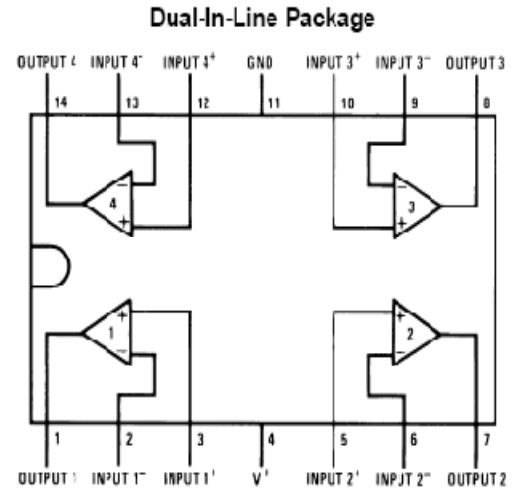


FIG 5: DUAL IN LINE PACKAGE

Schematic Diagram (Each Amplifier)

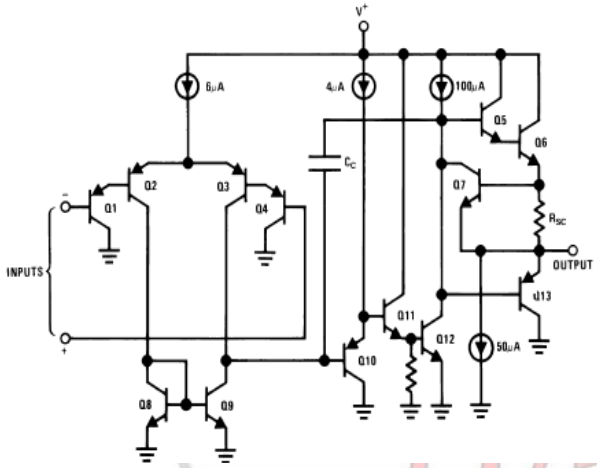


FIG 6:AMPLIFIER CIRCUIT

Application Hints

The LM124 series are op amps which operate with only a single power supply voltage, have true-differential inputs, and remain in the linear mode with an input common-mode voltage of 0 VDC. These amplifiers operate over a wide range of power supply voltage with little change in performance characteristics. At 25°C amplifier operation is possible down to a minimum supply voltage of 2.3 VDC.

The printout of the package have been designed to simplify PC board layouts. Inverting inputs are adjacent to outputs for all of the amplifiers and the outputs have also been placed at the corners of the package (pins 1, 7, 8, and 14). Precautions should be taken to insure that the power supply for the integrated circuit never becomes reversed in polarity or that the unit is not inadvertently installed backwards in a test socket as an unlimited current surge through the resulting forward diode within the IC could cause fusing of the internal conductors and result in a destroyed unit. Large differential input voltages can be easily accommodated and, as input differential voltage protection diodes are not needed, no large input currents result from large differential input voltages. The differential input voltage may be larger than V+ without damaging the device. Protection should be provided to prevent the input voltages from going negative more than –0.3 VDC (at 25°C). An input clamp diode with a resistor to the IC input terminal can be used.

READED WORK ON ECG

Communication Modes

Data transmission can be categorized into four modes, namely, unicast, multicast, broadcast, and any cast. Both multicast and broadcast are one-to-many transmission, but multicast communication must specify the address of the multicast group to identify the potential receivers. Since multicast and broadcast can deliver messages to multiple receivers, they are suitable for the applications demanding stringent data integrity. Nevertheless, their weakness stems from the large number of packets that may impedance the transmission rate. Unicast differs from previous two modes in that it delivers packets only to a single receiver.Unicast transmission has the least traffic overhead; however,when the path to the receiver fails, additional procedure of pathrecovery must be carried out to find another receiver.Anycast is a new network routing approach in which messages from a sender are routed to the topologically nearest receiver in a group of potential receivers. The group is called an anycast group, and the receivers in the same anycast group are identified by the same anycastaddress. Anycast can be treated as a subclass of multicast that finds the nearest receiver. As compared with the previous communication modes, anycast has lower traffic overhead than broadcast and multicast. Anycastalso has better reliability than unicast since it is capable of selecting a new receiver. However, anycast routing increases the complexity of the network devices. The path recovery latency of anycast is also longer than that of multicast/broadcast. A better balance between the implementation complexity and the path recovery efficiency is thus critical to the successful deployment of an anycastbased protocol. Anycast has been used in the following applications.

1) *The nearest or best server selection [7]–[9]:* A client cancommunicate with the nearest server with an anycast address.This application can be used to support emergency calls (e.g., call for an ambulance).

2) *Service identification [10], [11]:* Anycast addresses canbe used to identify unique services, such as domain name system and HTTP proxy in the Internet.

3) *Improving system reliability [12]:* We can assign an anycastaddress to multiple servers scattered. If one of the servers fails, packets will be routed to another nearest server without interrupting service.

4) *Policy routing [13]:* Assume that an anycast address isassigned to the network interfaces of a group of routers. By specifying the anycast address in the hop-by-hop routing option, packets are forced to transmit via one of the routers in the group.

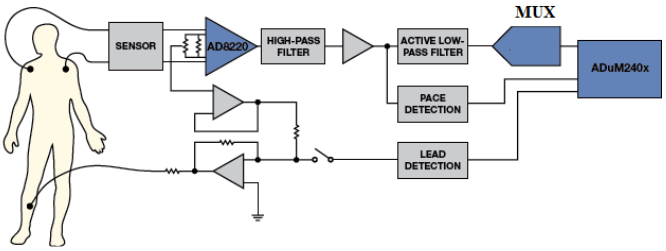
Developing an efficient anycast routing protocol for ad hoc wireless networks is a challenging task [14]. Although many anycast protocols have been deployed in wired networks, these protocols cannot be applied to wireless networks since every node can move arbitrarily. An anycast approach can use message broadcasting to transmit service request messages [15]. The sender then selects the best receiver from the received response messages. Such approach usually produces high traffic overhead. Also, when the number of nodes increases in a wireless network, the possibility of packet collisions increases and the packet delivery ratio decreases [16].

EXPLANATION

Surface Electrode.

The principle of the electrodes is to convert a physical parameter into an electrical output. The function of the transducer is to convert biological information into a quantifiable electrical signal. The transducer interface is provided using an electrode-electrolyte interface.

The most preferable electrode is Ag/AgCl, as it reduces the impedance while using it and the gel is used for the proper contact in between the surface of the skin and electrode



. FIG 7:BLOCK DIAGRAM

Signal Conditioning Circuit.

After receiving raw ECGsignal from the subject through electrode, it has to beprocessed in order to bring the signal in visible form and tolimit the bandwidth of the signal. To do so, the instrumentationamplifier was used to amplify the tiny signal whereaspassive and active components are used to design filter and toamplify it is the constructive circuit diagram ofsignal conditioning.The circuit has been designed and testedin multidisc to get the appropriate output of signal.

Instrumentation Amplifier The voltage gain of the instrumentation amplifier is calculated using the following equation: An instrumentation amplifer is a differential amplifier that has been outfitted with input buffer amplifier, which eliminate the need for input impedence matching and thus make the amplifier particularly suitable for use in measurements and test equipments . Additional characteristics include very low DC offset ,low drift, low noise ,very high open loop gain ,very high common mode rejuction ratio, and very high input impedence . Instrumentation amplifiers are used where great accuracy and stability of the circuit both the short band long term are required.

Operational Amplifier. The voltage gain of the operational amplifier is estimated using given formula as the usedone is noninvertingamplifier:The operational amplifier is arguably the most useful single device in analog electronic circuitary . With only a handful of external components , it can be made to perform a wide variety of analog signal processing task . it is also quite affordable , most general purpose amplifiers selling for under a dollar piece . Mordern designs have been engineered with durability as well . Several OpAmp are manufractured that can sustain direct short circuits on their outputs without damage .

PROPOSED SYSTEM

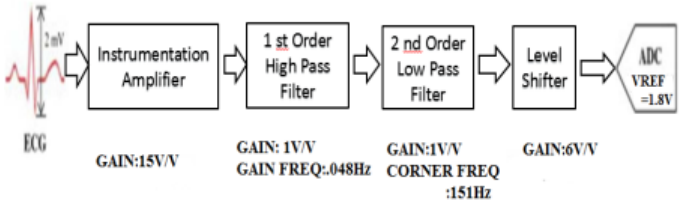


FIG 8:BLOCK DIAGRAM

Instrumentation Amplifier:

An instrumentation amplifer is a differential amplifier that has been outfitted with input buffer amplifier, which eliminate the need for input impedence matching and thus make the amplifier particularly suitable for use in measurements and test equipments . Additional characteristics include very low DC offset ,low drift, low noise ,very high open loop gain ,very high common mode rejuction ratio, and very high input impedence . Instrumentation amplifiers are used where great accuracy and stability of the circuit both the short band long term are required.

Ordered filter:

The key characteristics of the first order filter blocks are :

- Input accept a vectored input of N signals, thus implementing N filters. This features are particularly useful for designing controllers in three-phase system
- The initialize filter states for specificities DC and AC inputs
- It enables to compute and plot filter response

In this filter session we have looked at both passive and active filter design and have seen that first order filter have been easily converted to second order filtersimply by adding RC network within the input feedback path . Then we can define second order filter as simply .It is generally named after the scientist Butterworth ,Chebyshev, Bessel , Sallen –Key . Second order active filters weather low pass or high pass are important in electronics because we can use them to design much higher order filters with very steep roll off .

Level shifter:

Voltage translator or level shifter are device that resolve mixed voltage incompatibility between different parts of the system that operates in a multiple voltage domains that are co:mmon in todays complex system , especially interfering with legacy device . Tl offers the broadest portfolio of standard , general- purpose level-shifters spanning wide range of voltages,frequencies,bit width and IO types(open-drain or push-pull)along withperformance optimizedapplication specific level shifters for standard interface

ADC:

An analog – to – digital coverter is a device that converts a continuous physical quantity to a digital number that represents the quqlities amplitude.

The convertion involves quantization of the input , so it necessarily introduces a small amount of error . furthermore , instead of continuously performing the convertion an ADC does ratio.theconvertion periodically , sampling the input . The result is a sequence of digital values that have been convertyed from a continuous time and continuous amplitude analog signal to a discrete time and discrete – amplitude digital signal .An ADC is defined by its bandwidth and the signal to noice

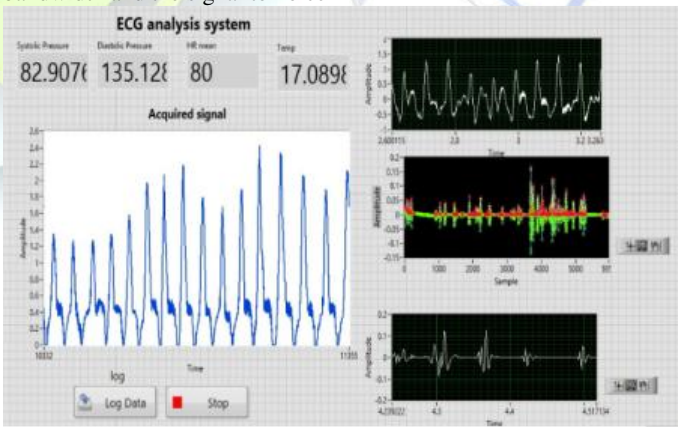


FIG 9:Output of the proposed system

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