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CONTROLLING APPLIANCES USING EMBEDDED SYSTEMS

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ABSTRACT

The Interaction between a caller and a system via telephone is provided by using an IVRS(INTERACTIVE VOICE RESPONSE SYSTEM) technology. By forcing numbers on a telephone keypad or by oral commands to respond the computer voice prompt, callers can communicate with the IVRS system. This is an efficient way to exchange information without any staff members, so it will reduce the labour costs. The existing IVRS system is so expensive for a hardware and software components and it is too difficult for maintaining and development. The IVRS system is mainly used for all type of mobile transfers like mobile and telephone banking (to recharge), mobile purchases (especially for app purchasing,caller tone,logo design or emblem), caller ID and system security, order placement and money transfer (credit card, debit card, paytm, google pay), airlines(ticket booking, flight arrivals, departure and checking), weather forecasting and it is also used to access the home appliances at anytime.

Keywords: Interactive Voice Response System, HAS, DTMF

I. INTRODUCTION

These days Home appliances are automated by using wireless technology. This computerised system was very useful to operate the network appliances and gadgets in the home environment. Home automation system has created immense change in the environment and there are also some conflicts arise in the Home Automation System. Since this system is easily adaptable, so that any appliance can easily be integrated into it and provides a easy accessible system interface on the network host region. The gadgets have a group of links, observed and prohibited. A price optimizing system would succeed it for mass acceptance. Interfacing system was tested[1]. Nowadays, mobile phones are not only used for voice calls, it can also be used for transmitting a message and the concept behind this proposed system is to design a system that can get the message and transmit it to various home appliances and gadgets linked to the control system with ATMEGA8 as a microcontroller [2]. Then telephone and Peripheral Interface Controller based remote control system was considered[3]. The wireless technology is very useful for connecting any basic structure to intelligent appliances. It could be useful for home automation in a profitable manner. 2.4 GHz is a universal frequency of operating the gadgets over unlicensed. The gadgets can be connected within the range of 10 m, it can also expanded to 100 m at the speed of 1Mbps.The 7 devices in the piconet can be connected by bluetooth master device[4,5]. but in this paper we can represent the point to point Piconet topology design in a customized approach that improves the scalability to a greater extent. The main goal of our project is to use GSM

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technology and Atmega8 to done a home automation system using wireless technology. For examples the gadgets like light, CFLfans etc are controlled by microcontroller in which the control is made by connecting the relay in series.

II.PROPOSED SYSTEM

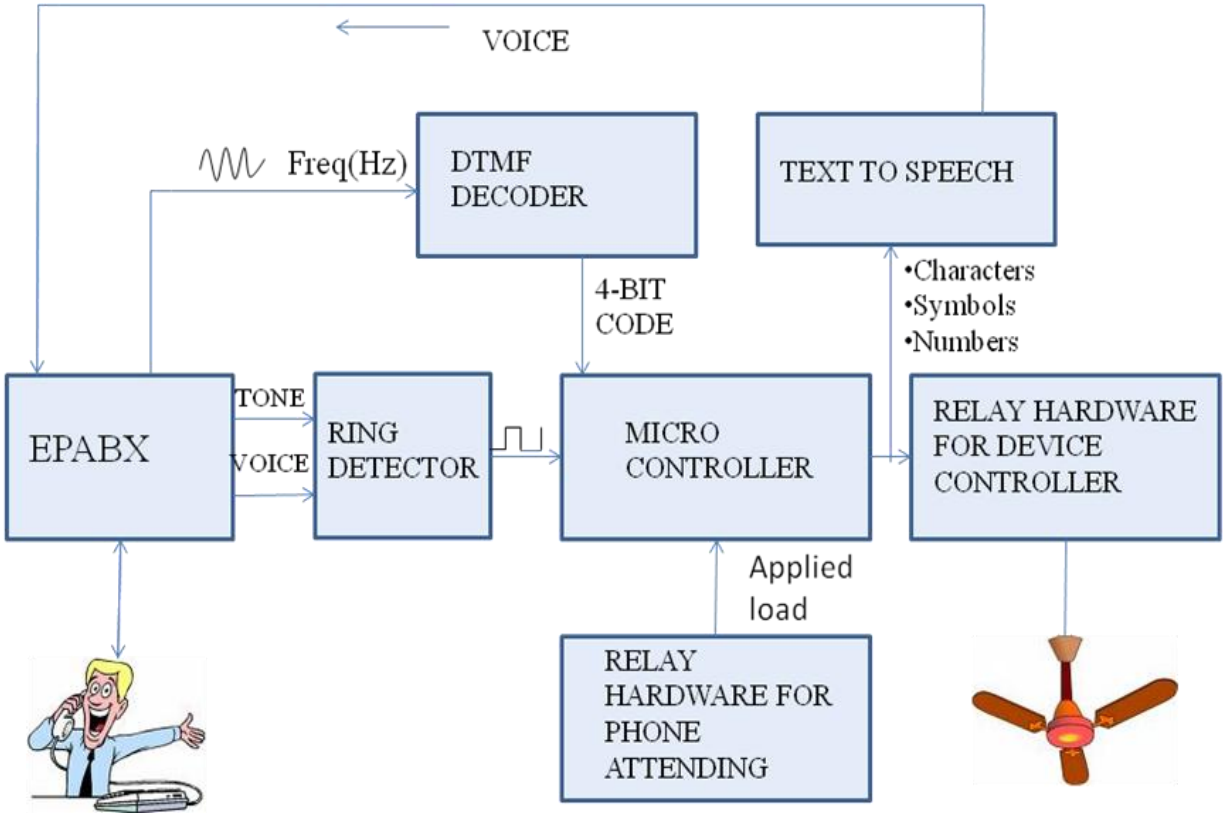

Fig.2.1 Block Diagram

The existing IVRS system is so expensive for a hardware and software components and it is too difficult for maintaining and development. It also support cost. Angle.com's offering is the newer breed of hosted IVRS solution that ignore these barriers to enter by using IVRS solution that does not need any upfront investment, and also it can be deployed in hours other than months. So IVRS solution does not need maintenance or support cost. Angle.com is the best provider of IVRS solution that can provide service to more than 1600 company in over 20 businesses and hosts more than 10,000 IVRS solution. We should learn more about IVRS customers so that we can understand the benefits of an IVRS solution. The IVRS system is mainly used for all type of mobile transfers like mobile and telephone banking, mobile purchases, caller identification and system security, order placement and money transfer, airlines for ticket booking, weather forecasting and it is also used to access the home appliances at anytime. It also used for gadget control. When user generate a call, it reaches EPABX box and ring was identified by the ring detector. It starts to count the number of pulses. Since we have programmed the microcontroller so that the phone should be attended within that 'n' number of pulses. A hardware component called Relay is used to phone attending automatically. In a ordinary telephone when the

receiver is taken, a 180 ohm resistance is applied to take the call. Whereas the circuit would be open loop. When the 'n' number of pulses reaches the microcontroller then 180 ohm resistance is applied and the circuit is closed.

Text to speech is mainly used to change the characters, symbols and numbers into voice. In our circuit once we attended the call, it will greet the user by "WELCOME TO IVRS GADGETS CONTROL AND MONITORING". Then it will inform us to press the wanted number to perform the corresponding action.

As soon as the user presses the desired number, it reaches the DTMF decoder as a frequency. Every pressed number has both high and low frequency. Then DTMF identifies the pressed number and the corresponding action is carry out. This decoder changes the frequency to 4 bit hexadecimal code. An another relay hardware is used to control the gadgets. If user needs the gadget to be switched on, this hardware relay provides the voltage to the gadget, and then gadget becomes switched on. It happens vice versa. Text to speech informs the user about the condition of the gadget. When user pressed the exit number, the call is automatically disconnected.

III. FUNCTIONAL BLOCK DIAGRAM

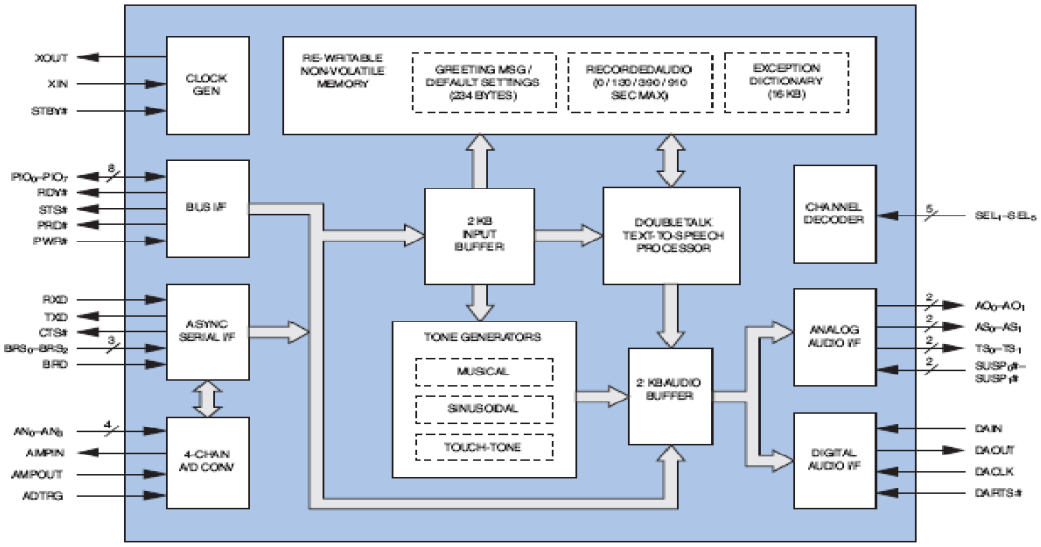

Fig.3.1 Functional Block diagram

APPLICATIONS

- Handheld barcode readers
- Electronic test and measurement
- Security systems
- Aids for the orally or visually disabled and Meeting federal ADA requirements

3.1 FUNCTION OF P89V51RD2 MICROCONTROLLER

The P89V51RD2 is an 80C51 microcontroller with 64 kB Flash and 1024 bytes of data RAM. A key feature of the P89V51RD2 is in X2 mode option. The design engineer can select to run the application with the conventional 80C51 clock rate (12 clocks per machine cycle) or select the X2 mode (6 clocks per machine cycle) to achieve twice the throughput at the same clock frequency. Another way to benefit from this feature is

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to keep the same performance by reducing the clock frequency by half, thus dramatically reducing the EMI. The Flash program memory supports both serial In-System Programming(ISP) and in parallel programming . A device can be reprogrammed in the end product under software control by ISP. Parallel programming mode gives gang-programming at high speed, it also reduces programming costs and time to market. The capability to update the application firmware makes a wide range of applications possible.

The P89V51RD2 is also In-Application Programmable (IAP), allowing the Flash program memory to be reconfigured even while the application is running.

- 80C51 Central Processing Unit,5 V Operating voltage from 0 to 40 MHz
- 64 kB of on-chip Flash program memory with ISP (In-System Programming) and
- IAP (In-Application Programming)
- Supports 12-clock (default) or 6-clock mode selection via software or ISP
- SPI (Serial Peripheral Interface) and enhanced UART
- PCA (Programmable Counter Array) with PWM and Capture/Compare functions
- Four 8-bit I/O ports with three high-current Port 1 pins (16 mA each)
- Three 16-bit timers/counters, Programmable Watchdog timer (WDT)
- Eight interrupt sources with four priority levels, Second DPTR register
- Low EMI mode (ALE inhibit), TTL- and CMOS-compatible logic levels
- Brown-out detection and Low power modes
- Power-down mode with external interrupt wake-up and Idle mode
- PDIP40, PLCC44 and TQFP44 packages

3.2 PIN DIAGRAM

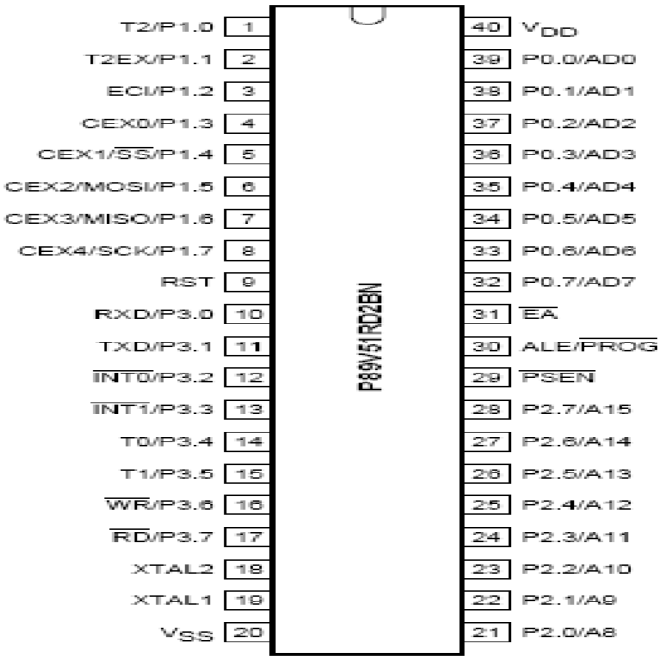

Fig.3.2 Pin diagram of P89V51RD2

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3.3 FUNCTIONAL DESCRIPTION

The MT8870D/MT8870D-1 is a DTMF receiver combining both the Digital decoder functions and band split filter. The Digital decoder functions are used to identify and decode all 16 DTMF pairs into a 4 bit hexadecimal code by digital counting techniques. The switched capacitor techniques are used for high and low group filters in band split filter. External component count is reduced by on chip provision of clock oscillator, a differential input amplifier and latched three state bus interfaces. The MT8870D/MT8870D-1 is a monolithic DTMF receiver provides high performance, low power consumption and small size. DTMF receiver is constructed by two sections one is band split filter section which isolate the high and low group filters. Another one is digital decoder section. it uses digital counting techniques that checks the frequency and time of received pulses before passing the 4bit code to the output bus.

3.4 FILTER SECTION

DTMF signal is given as a input to the sixth-order switched capacitor bandpass filters for attaining the separation of the lower-group and upper-group tones, the bandwidth of that equals to the lower group and upper group frequencies. For exceptional dial tone rejection, notches at 350 and 440Hz integrated by the filter section. A single order switched capacitor filter section follows each filter output that flattens the signals proceeding to limiting. High-gain comparator is used here for executing the limiting operation that provided with hysteresis to block the detection of undesirable low-level signals. The comparator output that produces full rail logic swings at the frequencies of the incoming DTMF signals.

3.5 DECODER SECTION

Decoder employing digital counting technique are used to find whether the frequencies of the incoming signal tally with the standard DTMF frequencies . To safeguard against tone simulation by irrelevant signals such as audio signal (voice) while providing acceptance to small frequency difference and variation, complex averaging algorithm is used. This averaging algorithm has been expanded to make sure an optimum combination of immunity to talk-off and acceptance to the presence of interfering frequencies (third tones) and noise. The “Early Steering” (ESt) output will go to an active state, when the detector finds the existence of two valid tones (this is referred to as the “signal condition” in some industry description. Any upcoming loss of signal condition will cause ESt to imagine an inactive state.

3.6 STEERING CIRCUIT

The recipient detects for a valid signal duration (mentioned to as character identification condition) before recording the decoded tone pair. An external RC time constant driven by EStperform this detection. ESt causes Vc to rise, when it is in logic high. Provided signal condition is preserved(ESt remains high) for the confirmation period (tGTP), Vc reaches the threshold (VTSt) of the steering logic to register the tone pair,

latching its corresponding 4-bit code into the output latch. At this point the GT output is triggered and forces Vc to VDD. As long as ESt remains high, GT pursues to force high. Finally, the output latch is granted to settle after a small delay, whenever the delayed steering output flag (StD) goes high, it indicates that a received tone pair has been recorded. By raising the three state control input (TOE) to logic high, the contents of the output latch are obtained on the 4-bit output.

The steering circuit works in reverse to accept the inter digit pause between signals. Thus, as well as declined signals too small to be considered valid, signal interventions (drop out)will be tolerated by the recipient is too small to be considered a valid pause. Along with this facility, it also has the potential of choosing the steering time constants superficially, permits the designer to tailor performance to reach a extensive change of system demands. Telephone ringer detector electronic kit K8086 tied up with your telephone line. When the telephone rings, a powerful LED shines to produce a optical notification. Attaching a 12VDC power adapter (not included) to permit the built in output relay. Telephone ring detector K8086 with output relay is an electronic kit. User assembly is needed.

IV. CONCLUSION

Various gadgets are supervised using phone and the level of the gadgets is transferred to the user. To attain this, P89V51RD2 controller is used. The number pressed is identified by DTMF decoder. Relay is used to handle the phone calls and then to switch ON/OFF the gadget. Due to the current flowing through their coil, relays are consuming more power. Relays needs more current than many ICs can supply, so a low power transistor may be required to switch the current for the relay's coil. In future, this hardware can be extended further to use as a Real Time Application Model. This will upgrade the efficiency of the Telephone Exchange to a large size. This can also be applied in many industries to increase their automation, safety and security with low expenses and high efficiency.

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