INTERACTIVE VOICE RESPONSE SYSTEM FOR PHYSICALLY CHALLENGED

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ABSTRACT:

Household applications like light, fan, lamp etc can be easily operated by ordinary people. But, when it comes to blind or physically challenged people this is not the case, they must be always accompanied by someone for this purpose. The basic motto is to make blind people or physically challenged people operate house hold appliances. This paper uses a voice IC in which commands will be prerecorded and a transmitter which acts as a remote transmits the signal of the respective appliances which the person has selected. Each appliance button when operated utters the name of the appliances that the user wants to switch ON/OFF .The PIC microcontroller has analog and digits in it. So this is most suitable for this type of application where sensor interfacing is required. In this work RF module is used which can transmit over a wide range of distance when compared to IR.IVRS which uses RF module is economical and efficient, it also requires very low maintenance and up gradation.

INTRODUCTION:

Home automation gives an individual the ability to remotely or automatically control things in the home. Automation lowers the human judgment to the lowest degree possible but does not completely eliminate it .The recent developments in technology which permit the use of radio frequency technology such as Bluetooth, have enabled different devices to have capabilities of communicating each other. The radio frequency used (2.4 GHz) is so high that the range of transmission will be small that it can be used in apartments without much interference to neighbor.

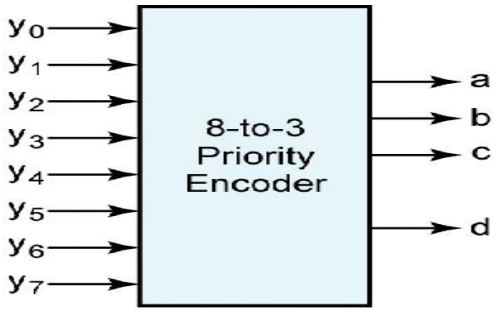
DESIGN OBJECTIVE:

The main objective of the paper is to help physically challenged people in performing certain tasks by themselves using RF and voice based technology. The main aim is to provide a user-friendly interaction with the physically challenged people. Depending upon the basic requirement of the person some commands are prerecorded into microcontroller and can be altered at any time it is highly sensible for the blind people and easy to operate.

RF TRANSMITTER:

ENCODER:

An encoder performs the inverse function of a decoder. If input *yi* is 1 and the other inputs are 0, then *abc* outputs represent a binary number equal to *i*. For example, if *y3* = 1, then *abc* = 011. If more than one input is 1, the highest numbered input determines the output. An extra output, *d*, is 1 if any input is 1, otherwise *d* is 0. This signal is needed to distinguish the case of all 0 inputs from the case where only *y0* is 1.



FEATURES:

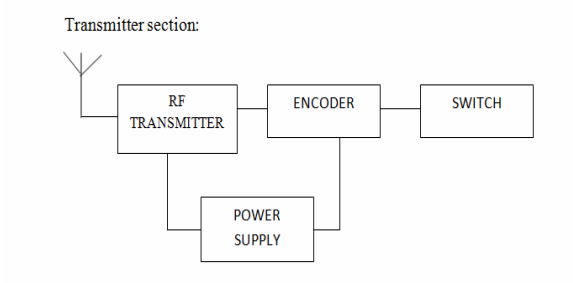
- High performance single chip transmitter.
- Very low phase noise: -111 dBc/Hz at 10 kHz offset.
- High spectral efficiency (9.6 kbps in 12.5 kHz channel in compliance with FCC narrow banding mandate).
- Programmable output power up to +16 dBm with 0.4 dB step size.
- Power Supply
- Wide supply voltage range (2.0 V - 3.6 V).
- Low current consumption:- TX: 45 mA at +14 dBm.
- Power down: 0.3 ma Automatic output power ramping.
- Configurable data rates: 0 to 200 kbps.

The CC1175 transmitter is based on direct synthesis of the RF frequency (in-loop modulation). To achieve effective spectrum usage, CC1175 has extensive data filtering and shaping in TX to support high throughput data communication in narrowband channels. The modulator also controls power ramping to remove issues such as spectral splattering when driving external high power RF amplifiers. The modulator also controls the PA power level to support on/off keying (OOK) and amplitude shift keying (ASK).

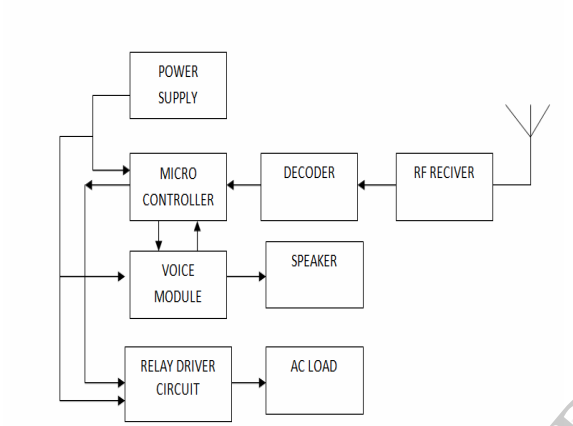
LOW POWER / HIGH PERFORMANCE MODE:

The CC1175 is highly configurable, enabling trade-offs between power and performance to be made based on the needs of the application. This data sheet describes two modes - low power mode and high performance mode - which represent configurations where the device is optimized for either power or performance.

TRANSMITTER SECTION:



RECIEVER SECTION:



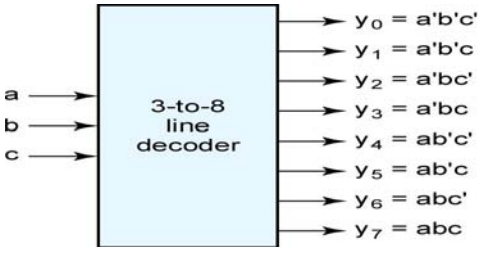
RF RECEIVER

Features

- Complete FM Receiver and Decoder.
- Small Form Factor
- Range up to 200 Metres
- Easy Learn Transmitter Feature.
- Learns 40 transmitter Switches
- 4 Digital and 1 Serial Data outputs
- Outputs, Momentary or Latching.
- Minimal external components
- Direct Led Drive Shows Data Reception
- Secure Data Protocol
- 5V Supply

The RDF1 is a complete FM receiver and decoder module in one, providing a complete radio system with up to four digital outputs and single serial data output when used with an RF Solutions. Dependant on the transmitter, a system using the RDF1 can achieve up to 200m range.

DECODER:



A	B	C	Y 0	Y 1	Y 2	Y 3	Y 4	Y 5	Y 6	Y 7
0	0	0	1	0	0	0	0	0	0	0
0	0	1	0	1	0	0	0	0	0	0
0	1	0	0	0	1	0	0	0	0	0
0	1	1	0	0	0	1	0	0	0	0
1	0	0	0	0	0	0	1	0	0	0
1	0	1	0	0	0	0	0	1	0	0
1	1	0	0	0	0	0	0	0	1	0
1	1	1	0	0	0	0	0	0	0	1

PIC MICRO CONTROLLER:

• High performance RISC CPU
• Only 35 single word instructions to learn
• All single cycle instructions except for program branches which are two-cycle
• Operating speed: DC - 20 MHz clock input
DC - 200 ns instruction cycle
• Up to 8K x 14 words of FLASH Program Memory, Up to 368 x 8 bytes of Data Memory (RAM)
• Interrupt capability (up to 12 sources)
• Eight level deep hardware stack
• Direct, Indirect and Relative Addressing modes
• Processor read access to program memory.

SPECIAL MICROCONTROLLER FEATURES:

• Power-on Reset (POR)
• Power-up Timer (PWRT) and Oscillator Start-up Timer (OST)
• Watchdog Timer (WDT) with its own on-chip RC oscillator for reliable operation
• Programmable code protection
• Power saving SLEEP mode.
• Selectable oscillator options.
• In-Circuit Serial Programming (ICSP) via two pins.

PERIPHERAL FEATURES:

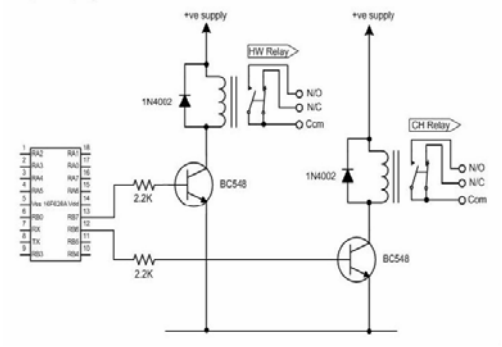
•Timer0: 8-bit timer/counter with 8-bit prescaler
•Timer1: 16-bit timer/counter with prescaler, can be incremented during SLEEP via external crystal/clock
•Timer2: 8-bit timer/counter with 8-bit period register, prescaler and postscaler

VOICE MODULE:

FEATURES

-Single-chip, high-quality voice recording & playback solution
- No external ICs required
- Minimum external components
- Non-volatile Flash memory technology
- No battery backup required
-User-Selectable messaging options Random access of multiple fixed-duration messages- Sequential access of multiple variable-duration messages
- User-friendly, easy-to-use operation
- Programming & development systems not required
- Level-activated recording & edge-activated play back switches
- Low power consumption
- Operating current: 25 mA typical
•Standby current: 1 uA typical
•Compare is 16-bit, max resolution is 200 ns
• PWM max resolution is 10-bit
•Capture is 16-bit, max resolution is 12.5 ns
• Two Capture, Compare, PWM modules
•8-bit, up to 8-channel Analog-to-Digital converter

RELAY DRIVER CIRCUIT:



WORKING OF THE CIRCUIT:

The circuit mainly consists of two divisions they are transmitter and the reciver circuit. The transmitter circuit is made up of RF transmitter, encoder, and the power supply. The reciver circuit is made up of micro controller, decoder, voice module, speaker, relay driver circuit and RF reciver.

When the switch is turned on the encoder encodes the signal and sends to the transmitter. The transmitter converts the digital signal to analog signal. The reciver receives the analog signal and converted to the digital signal. The converted digital signal is decoded and sends the digital signal to the microcontroller. The power supply is used to give the power for the microcontroller, relay driver circuit, and voice module. The digital signal is send to the microcontroller. The voice module receives the voice command and the microcontroller compares the decoded signal and voice signal. Then the microcontroller processes the signal and identifies the respective program to run and the playback the voice command for our reorganization. The microcontroller sends the pulsating signal to the relay driver circuit so that it helps the load (fan, light, etc) to turn on.

CONCLUSION:

The work presented can be extended using high voice circuit, which comes with the option of recording more messages and also the recording system can be extended from basic house hold appliances. This paper will be more useful for blind persons and this device helps physically challenged people to address their requirement it is highly sensitive, reliable, and easy to communicate and operate.

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