TELEPHONIC CONTROL OF ELECTRICAL EQUIPMENT

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ABSTACT:

This is the circuit by which we can control equipment from a very long distance (it may be more than 1000 km). The circuit is connected to a telephone network just like any normal telephone set. On being called, the circuit waits for a predetermined number of ring signals and then answers the call (electrically, it lifts the receiver). Next, it waits for the predetermined system access code, which the caller must transmit with the keypad on his telephone.

The unit is capable of switching up to sixteen loads on and off. By virtue of relays high voltages may be switched, which means that even main loads may be switched On/Off. Reception of the correct system code is acknowledged with a short tone which the caller can hear. Next suppose that the loading the number '1' and '0' switches On a fan. The same load is switched off by dialing 1 and then 9. The control on the other six loads are identical to that of load '1'. i.e. (load) number is dialed first, then 0 or 1 for switching off or on.

SOME APPLICATIONS:

1. This is a wireless control having no limitation of distance we can control from any where in the world.

2. i.e. the channel (We can on or off our A.C or HEATER by phone or mobile when we are coming to home .

3. We can control any equipment by telephone on the site. i.e. if we want to on or off the panel from the anywhere in the site only one man can do this by our instrument.

4. Multiuse of phone.

5. More advantageous then remote because there is no limitation in distance, low cost, no disturbance.

6. We can drive tanks (used in army) by this instrument without men.

MAIN TEXT:

CONTAINS:

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2. BASIC PRINCIPAL OF PROJECT
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FUNCTION OF TELEPHONE

A telephone uses an electric current to convey sound information from your home to that of a friend. When the two of you are talking on the telephone, the telephone company is sending a steady electric current through your telephones. The two telephones, yours and that of your friend, are sharing this steady current. But as you talk into your telephone's microphone, the current that your telephone draws from the telephone company fluctuates up and down. These fluctuations are directly related to the air pressure fluctuations that are the sound of your voice at the microphone.

Because the telephones are sharing the total current, any change in the current through your telephone causes a change in the current through your friend's telephone. Thus as you talk, the current through your friend's telephone fluctuates. A speaker in that telephone responds to these current fluctuations by compressing and rarefying the air. The resulting air pressure fluctuations reproduce the sound of your voice. Although the nature of telephones and the circuits connecting them have changed radically in the past few decades, the telephone system still functions in a manner that at least simulates this behavior.

The current which powers your telephone is generated from the 48V battery in the central office. The 48V voltage is sent to the telephone line through some resistors and indictors (typically there is 2000 to 4000 ohms in series with the 48V power source). The old ordinary offices had about 400 ohm line relay coils in series with the line.

When your telephone is in on-hook state the "TIP" is at about 0v, while "RING" is about -48v with respect to earth ground. When you go off hook, and current is drawn, TIP goes negative and RING goes positive (I mean less negative). A typical off hook condition is TIP at about -20v and ring at about -28v. This means that there is about 8V voltage between the wires going to telephone in normal operation condition. The DC-resistance of typical telephone equipment is in 200-300 ohm range and current flowing through the telephone is in 20-50 mA range. The bass frequency response is limited because of the limitations in telephone system components: transformers and capacitors can be smaller if they don't have to deal with lowest frequencies. Other reason to drop out the lowest frequencies is to keep the possibly strong mains frequency (50 or 60 Hz and it's harmonics) humming away from the audio signal you will hear.

RINGING SIGNALS

When the central office want to make your telephone ring it will send an AC ringing voltage to the line which will ring the bell in your telephone. Most of the world uses frequencies in 20..40 Hz range and voltage in 40..150 volts range.
The ringer is built so that it will no pass any DC current when it is connected to telephone line (traditionally there has been a capacitor in series with the bell coil). So only the AC ring signal can go though the bell and make it ring. The bell circuit is either designed so that it has high impedance in audio frequencies or it is disconnected from line when phone is picked off-hook.

Dialing

There are two types of dials in use around the world: pulse dialing and tone

dialing. Those are pulse dialing and tone dialing. The most common one is Tone dialing is more modern dialing method is usually called with names Touch-tone, Dual Tone Multi-Frequency (DTMF) or Multi-Frequency (MF) in Europe. Touch tone is fast and less prone to error than pulse dialing. Bell Labs developed DTMF in order to have a dialing system that could travel across microwave links and work rapidly with computer controlled exchanges. Touch-tone can therefore send signals around the world via the telephone lines, and can be used to control phone answering machines and computers (this is used in many automatic telephone services which you operate using your telephone keypad). Each transmitted digit consists of two separate audio tones that are mixed together (the four vertical columns on the keypad are known as the high group and the four horizontal rows as the low group).

Standard DTMF dials will produce a tone as long as a key is depressed. No matter how long you press, the tone will be decoded as the appropriate digit. The shortest duration in which a digit can be sent and decoded is about 100 milliseconds (ms).

BASIC PRINCIPAL OF PROJECT

Main principal of my project is to transmit the signal by telephone.
I have used voice as a media of transmitting the signal. In the telephone every no. Has his own ton with particular dual ton frequency. I have used this frequency for particular coding. The biggest benefit of this dual ton frequency is that over voice frequency or any kind of voice disturbance can not affect our function.

REQUIRE WORK FOR FULFILL OUR MAIN AIM

To implement our idea first we have to make the ckt that can detect telephone ring automatically. And then receive it itself.

After receiving the ting ckt should be ready to receive the codes by which we are sending the signal for the no. of equipment and for on/off .

After getting the code we have to convert this analog signal in to digital. For our making the work easy. After getting the digital signal it should be decide that which no. of equipment is should be on or off. Then it should be put off the receiver, which is automatically lift for normal operation of telephone.

COMPONANT FOR PARTICULAR FUNCTION

OPTOCOUPLER WITH RING DETACTOR:

The ringing signals detector is relatively simple. A bridge rectifier connected to the telephone lines turns the ringing single into a pulsating direct voltage, which is smoothed by a capacitor and limiting to 15v with the aid of zener diode. The direct voltage across zener diode supplies the LED optocoupler IC, with the resistor acting as a current limiter. During the ringing signal, the collector of the phototransistor in the optocoupler is at ground position. To suppress the error pulses, the low level at the optocoupler output is also used to trigger the monostable multivibrator (MMV) IC. The ringing signal detector responds to alternating

voltage only. Any direct voltage levels that may exist between input terminals are ignored. This is used for the isolate the ringing circuit with telephone line. This is for the prevention of the damage due to the variation in telephone line.

MULTIVIBRATOR:

The getable astable multivibrator with logic techniques ncorporated to permit positive or negative edge-triggered monostable multivibrator action with retriggering and external counting options. This is use for the detection of the telephone ring. By the setting of the rc network we can abject the no. of ring for the receiving.

DTMF RECEIVER;

With the help of this we can convert the analog signal frequency to the digital codes.Its filter section uses switched capacitor technology for both the high and low group filters and for dial tone rejection. . Thus each tone is a combination of two frequencies one from lower band and the other is from the upper band. For example: if digit 9 is pressed then it will transmit 852hz and 1477hz. The rectangular matrix keyboard is shown in figure.

	1209 Hz	1336 Hz	1447 Hz	
679 Hz	1	2	3	
770 Hz	4	5	6	
852 Hz	7	8	9	
941 Hz	*	0	#	

Its operating functions include a bandsplit filter that separates the high and low tones of the received pair, and a digital decoder that verifies both the frequency and Duration of the received tones before passing the resulting 4-bit code to the output bus.

Filter

The low and high group tones are separated by applying the dual-tone signal to the inputs of two 6th order switched capacitor band pass filters with bandwidths that correspond to the bands enclosing the low and High group tones. The filter also incorporates notches at 350 and 440 Hz, providing excellent dial tone rejection. A single-order switched capacitor section that smooths the signals prior to limiting follows each filter output. High-gain comparators provided with hysteresis to prevent detection of unwanted low-level signals and noise performs signal limiting. The comparator outputs provide full-rail logic swings at the frequencies of the incoming tones.

Decoder

The decoder uses a digital counting technique to determine the frequencies of the limited tones and to verify that they correspond to standard DTMF frequencies. A complex averaging

algorithm is used to protect against tone simulation by extraneous signals (such as voice) while tolerating small frequency variations. The algorithm ensures an optimum combination of immunity to talk off and tolerance to interfering signals (third tones) and noise. When the detector recognizes the simultaneous presence of two valid tones (known as signal condition), it gives digital output.

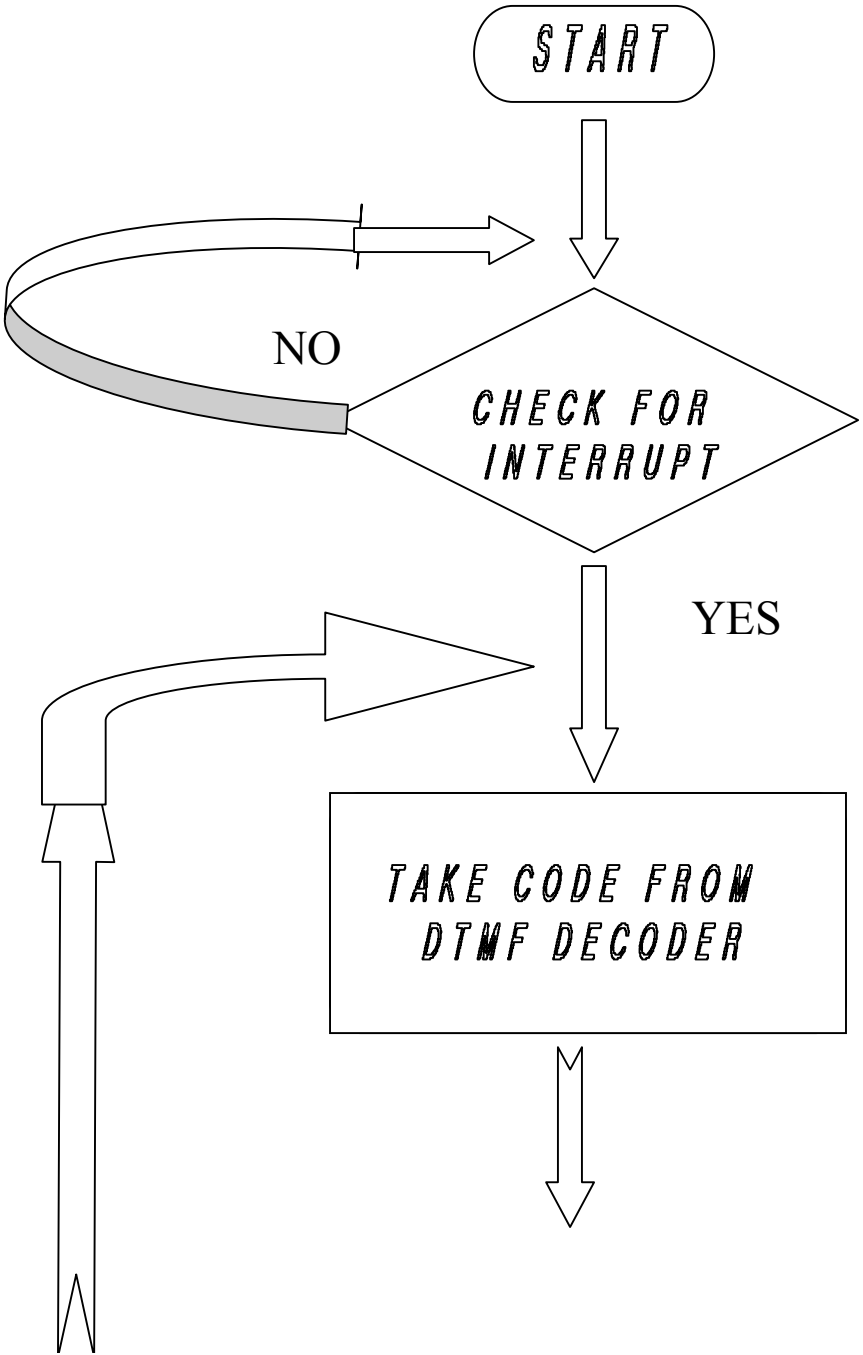
Its decoder uses digital counting techniques to detect and decode all 16 DTMF tone pairs into a 4-bit code. External component count is minimized by provision of an on-chip differential input amplifier, clock generator, and latched tri-state inter-face bus.

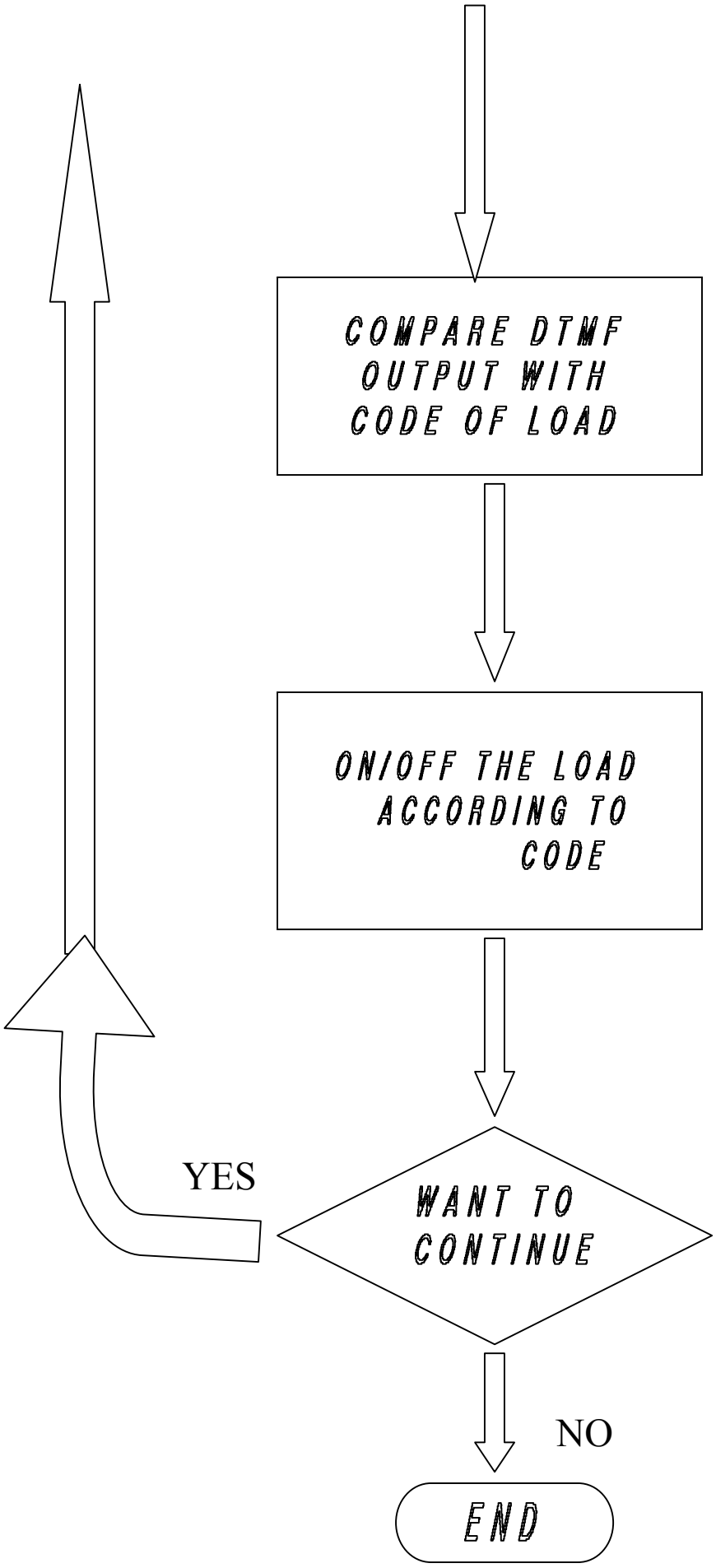
MICRO CONTROLLER:

We should program the control for automatic receiving the signal, asepting the digital codes and for disiding to which no of equipment should be on or off. Care must be taken that during the on or off the particular equipment status of other equipment should not be change.

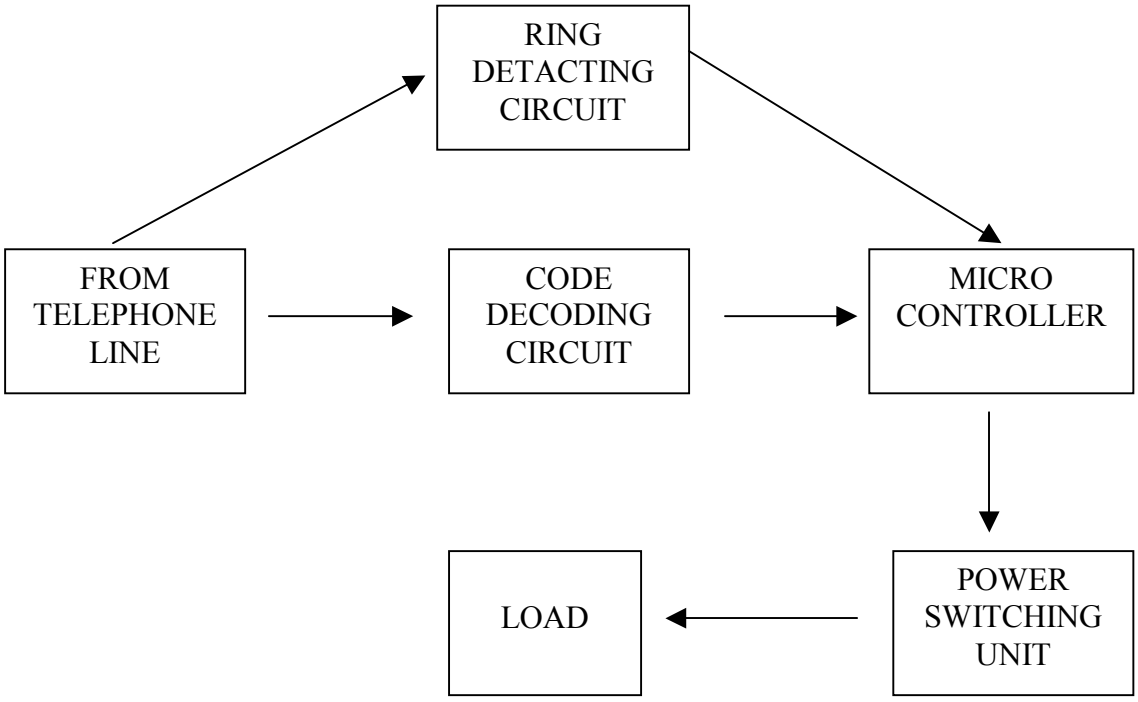
SOFTWARE FOR PROGAMMING THE MICRO CONTROLLER

Here we will see the flowchart for the programming of the our microcontroller. From this I have made the software.




COMPARE DTMF OUTPUT WITH CODE OF LOAD
ON/OFF THE LOAD ACCORDING TO CODE
WANT TO CONTINUE
YES
NO
END

BLOCK OF THE CIRCUITDIAGRAM



POWER SWITCHING UNIT

Output from the port p0.7 to p0.7 of micro controller are given to the transistor Q1 t0 Q8 are used to control relays Re2 to Re8 and leds via driver transistor t4 tot10.

Both the relays and leds are commoned to the 12 v positive supply rail .this enables true logic to be used i.e logic 1 at latch o/p q1 to q7 switches the associated relay on . Flay back diode d13 tod19 protects the switching transistor against back e.m.f surges by relay coils when these are switching off.

The power supply of the telephone controlled switch is conventional and basedon fixed voltage regulators .the 1 v and 15 v supply voltages used for the relay section and the digital section respectively are derived from single mains transformer with the secondary voltage of 15 v.

CONCLUION:

Our main objective of making "TELEPHONIC CONTROL" is to Overcome the limitation of distance faced by normal remote control. This project gave us invaluable practical knowledge of mounting PCB , testing various circuit components , how to find faults etc.. This project helped us put into practice our basic theoretical concepts .

Here due to time constraint we have developed our project for the control of six equipments at a time. But this limitation can be easily overcome . If we get the support (financially) then we can develop a device which is remote it means that then it need not the telephone line . simple example is we can on or off our car from any where. Our project can easily be developed for use in a variety of applications from households to defense.

OUR MISSION:

We are students of electrical engineering. But we have deep interest in electronics specially in the field of microprocessors and microcontrollers . So we have selected a project based on this subject . We even wanted to make a project that has not been made by any engineering student of our college . One motive was also that our project should be such that it could help us in our prospects after graduation.