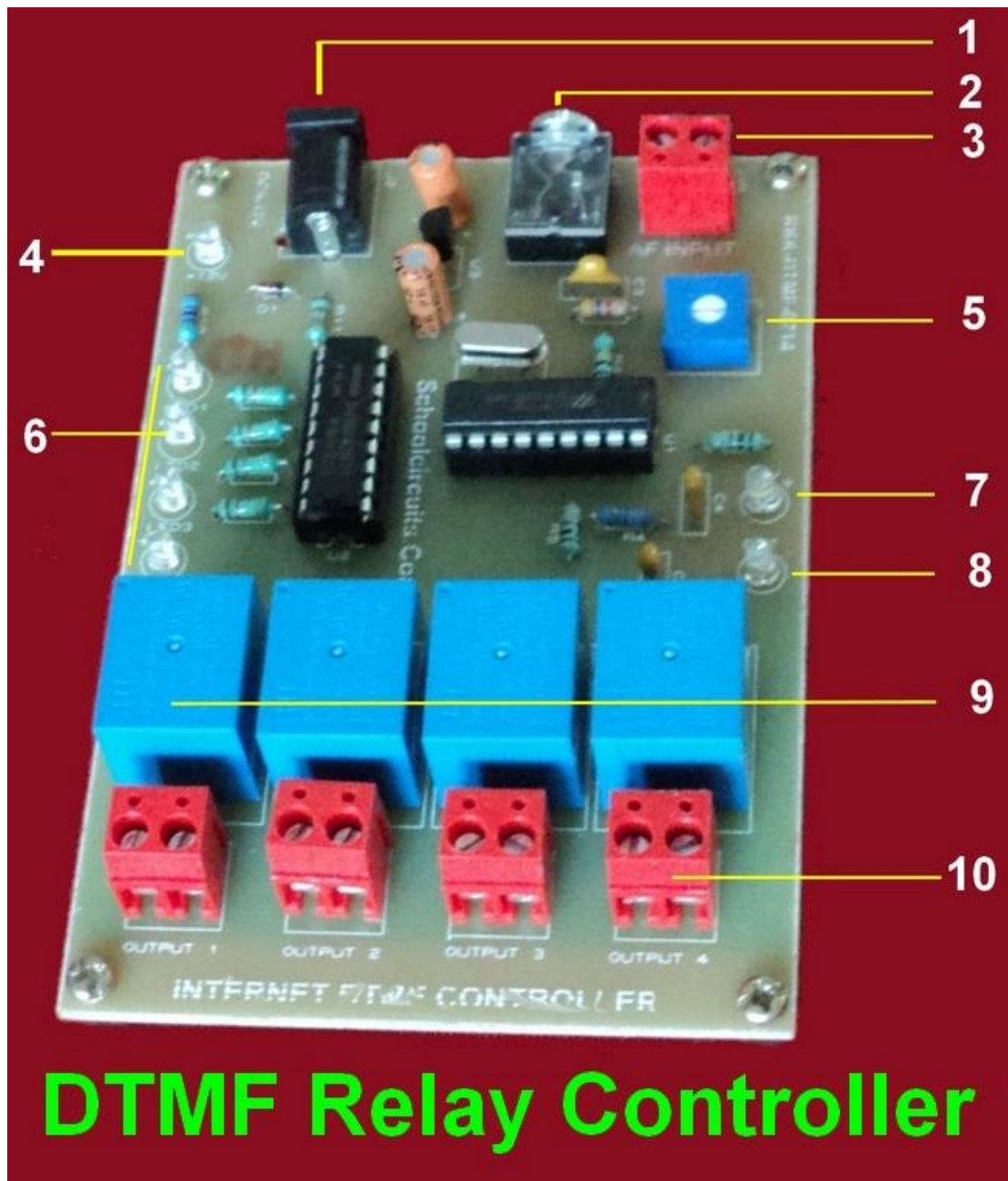




## DTMF Device/ Relay Remote Controller

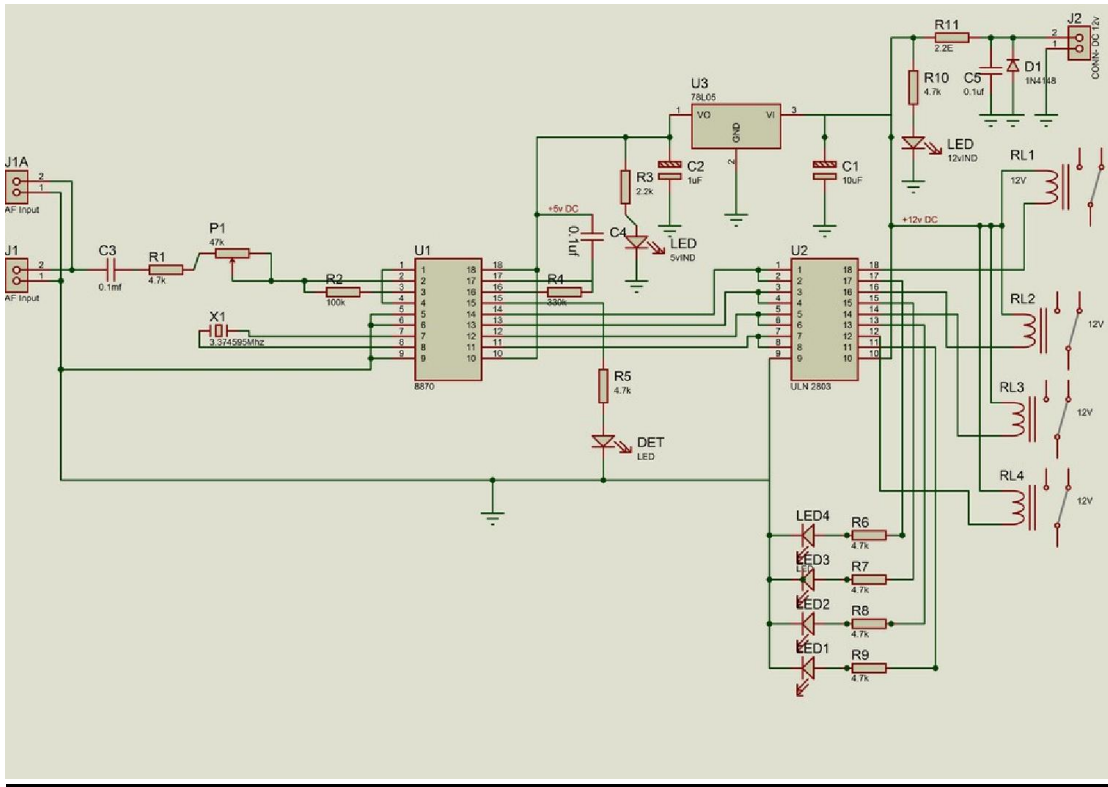


This high quality board is designed to get DTMF input from Internet / Mobile / Wireless receivers/ Computer for operation of 4 relays. AC 250 V AC rated Relays can control 4 devices attached to 4 outputs.

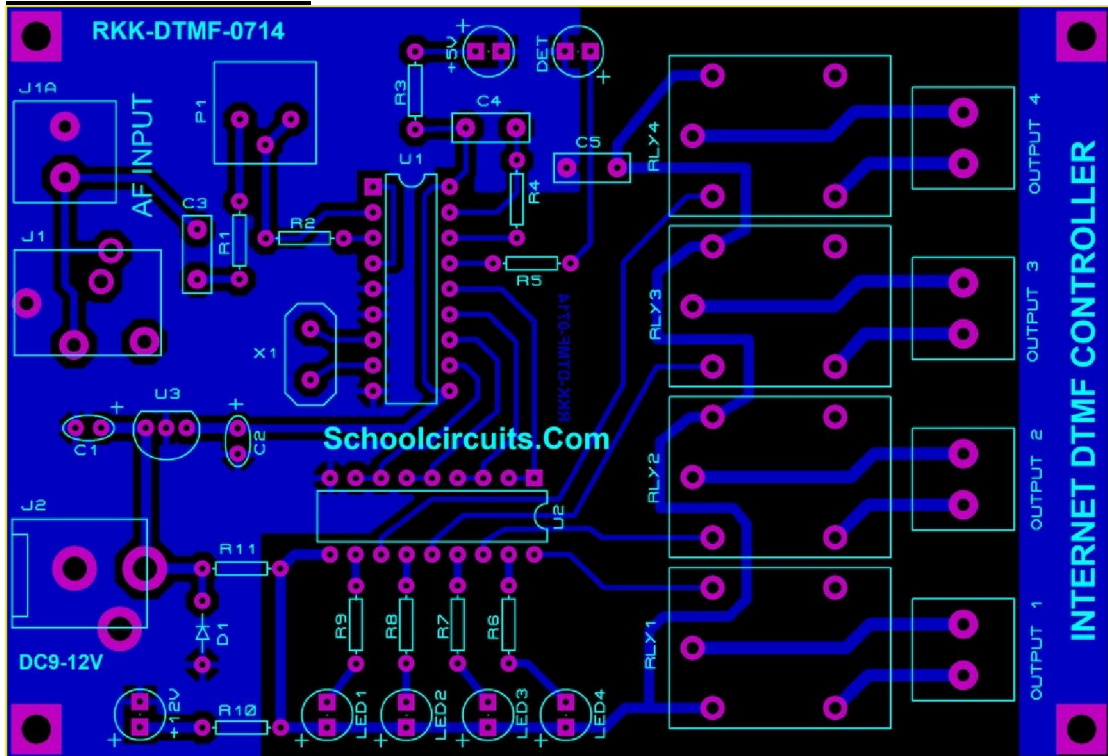
Device functioning:

- (1) Power socket shown at (1) above should be powered by 12v regulated DC
- (2) DTMF audio input given through MX-15 audio jack through standard audio pin
- (3) DTMF audio input can be alternatively given through 2 pin connector - for both DTMF audio input above, you can control the board by obtaining DTMF tones from
  - a. Internet site (refer to separate section for internet control),
  - b. mobile phone output for headphones, (refer mobile control section)
  - c. wireless receiver/repeater device which get DTMF signals from remote location, or
  - d. audio output of a computer system
- (4) 12v Power indicator: Turns on when 12v supply to device is on
- (5) Audio gain control for amplifying weak audio input. Adjust this until DTMF tone is detected properly by the device
- (6) LEDs indicating which of 4 relays (9) are turned on.
- (7) 5v Power indicator – some components operate on 5v, this LED indicates power on status for 5v line
- (8) DTMF tone detect indicator – flashes momentarily whenever a DTMF tone is detected by the device
- (9) 4 Relays which are connected N/O status, when turned on, respective outputs at (10) are on
- (10) 4 outputs (2 pin connectors) where you can attach upto 4 AC/DC devices. Use the connector as a switch and connect device upto 250v AC/DC. Do not connect device with inductive load.

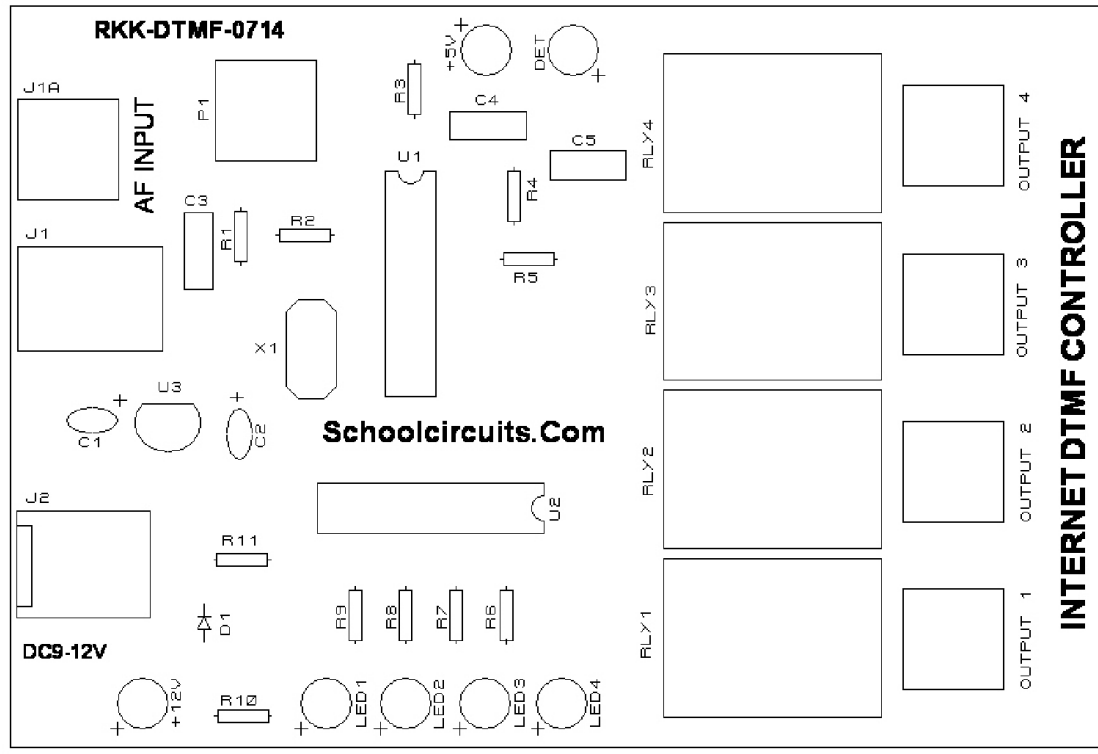
**Circuit Diagram:**



**DTMF PCB with Silk:**



### Silk only for Component Placement:



### Processing :

DTMF Audio tones are fed to the device through audio input jack/pins.

Audio gain is controlled through gain control preset. Normally not required to make any changes there.

Popular MT8870 (or equivalent) IC detects any of the standard DTMF tones and its 4 binary outputs turn on/off as per truth table shown in this document.

Those binary outputs are connected to relay driver IC which handles 12v relays to be turned on or off.

### Mobile Control of device:

Connect an audio jack to the mobile's headphone output. Use standard audio pin to feed the output to the device through audio jack (2) above or pair of two wires (3) shown in the photograph.

Put your mobile phone in the auto-answer mode to answer after few rings and when the call is established, you can press digits of phone you are using to call the mobile connected to the device. As per DTMF truth table (as per image below), respective relay will turn on/off. For example, pressing 6 will turn on relay No.2 and 3 as they represent values 2 and 4 i.e.  $2+4=6$

**DTMF Truth Table:**

KEY	TOW	Q <sub>4</sub>	Q <sub>3</sub>	Q <sub>2</sub>	Q <sub>1</sub>
1	H	0	0	0	1
2	H	0	0	1	0
3	H	0	0	1	1
4	H	0	1	0	0
5	H	0	1	0	1
6	H	0	1	1	0
7	H	0	1	1	1
8	H	1	0	0	0
9	H	1	0	0	1
0	H	1	0	1	0
.	H	1	0	1	1
#	H	1	1	0	0
A	H	1	1	0	1
B	H	1	1	1	0
C	H	1	1	1	1
D	H	0	0	0	0
ANY	L	Z	Z	Z	Z

**Wireless control:**

Connect audio output of a wireless repeater /receiver to the audio input of the device. Any DTMF tone sent by remote transmitter will make the relays to respond accordingly according to truth table.

**Computer PC control:**

Connect sound card/ audio output of computer system to the board through audio input jack/pins. You can download various DTMF tones from our site. When any tone is played through any media player program, the board will respond to that command and operate relays.

In short, you have a board which will control relays efficiently through DTMF tones you fed it through audio input. You can be in front of the device or control it from other end of the world by using various easy methods described above.

The device is supplied as a **kit of PCB and components**. Careful soldering will give you a versatile device useful for your remote control needs.

Address your further queries to [schoolcircuits@gmail.com](mailto:schoolcircuits@gmail.com)