Introduction:

Normally in our day to day life we lead towards automating things. Using different types of sensors we can easily count any parameters and keep a data log for analysis. Likewise somehow we require automation to operate our home appliances without any physical efforts e.g. to turn on fan with wireless remote. With this inspiration I made this project to automate electrical home appliances with wireless remote.

As we know RF based wireless remotes are generally used in toys. Here this system controls output load connected to it consisting RF transmitter and RF receiver pair. As name suggest RF transmitter uses radio frequency of 434 MHz band to communicate with maintaining specific baud rate. This RF module available readymade in market which makes this circuit reliable to make. Following are the steps to build it easily.

Step 1: What material is required for this project?

434 MHz RF-Module - 01 Pair

Resistors:

10k – 04
1k  - 01
32k - 01
740k - 01

Capacitors:

470micro-farad - 01
0.01micro-farad- 02
Diode:
IN4007 - 07
LED - 01

Transistor:
BC547 - 04

Regulator:
LM7805 - 01
LM7812 - 01

Relay:
12 V DC - 04
HT 12D RX IC - 01
HT12E TX IC - 01
18 pin IC holder - 02
On/Off Switch - 04
Slide switch - 01
9v Battery and Snap - 01
Connectors for RF module
Transformer-15v /0.5 Amp - 01

**Step 2: Circuit Diagram and working**

**RF Transmitter:**

RF transmitter circuit basically have RF transmitter 434MHz module which works on frequency 433.92MHz which will cover area under 400 m. Also it consisting with Encoder IC HT12E which will encodes a signal and gives it to the RF module when switch get turned ON .Its operated on 5V DC power supply ,to regulate 9V supply we used hare Voltage regulator LM 7805. RF module transmits this signal through ASK pattern.
RF Module:

Fig: RF Transmitter Module

Circuit diagram:

Fig: Circuit diagram for RF Transmitter Remote
PCB Layout:

Fig: PCB Layout and actual remote

Print this board and place components on it as per circuit diagram.

**RF Receiver:**

RF Receiver works exactly opposite to RF transmitter. As it decodes signal encoded by encoder IC HT12 E, which comes in ASK (Amplitude shift Keying) pattern. RF receiver receives On Off keyed (OOK) modulation signal and demodulates it in digital signal and gives it to decoder IC HT12D to decode. HT12D gives high output when any of button press from transmitter. Transistor BC547 operate as a switch to turn On /OFF respective relays. Technically, this is an Amplitude Shift Keying (ASK) receiver module based on a single-conversion, super-heterodyne receiver architecture and incorporates an entire Phase Locked Loop (PLL) for precise local oscillator (LO) generation. It can use in OOK/ HCS / PWM modulation signal and demodulate to digital signal.
RF Receiver Module:

![RF Receiver Module Image]

**Fig: RF receiver Module**

RF receiver Circuit Diagram:

![RF Receiver Circuit Diagram Image]

**Fig: Circuit diagram for RF receiver circuit**
PCB Layout:

Fig: PCB Layout for RF Receiver

Print this board and mount components as per circuit diagram.

Fig: RF Receiver Unit
Step 3: Connections

Do the connections as per shown above diagram. Main supply to the load will have to connect through relay switch. Also give 230V Ac power supply to receiver unit with 15V/0.5amp transformer. We can connect four home appliances at the same time to the circuit.
Application:

We can use this circuit to operate electrical home appliances, Electrical bell in schools, In robots or any machine which is operated on 230V ac supply voltage.

References:

www.alldatasheet.com


en.wikipedia.org