A15. RF Transmitter & Receiver Module

We supply three parts: first a 2 button RF transmitter module which will transmit up to 30 meters/yards and is preset at the factory to about 318Mhz. It is all built up with a 12V battery, indicator LED and is ready to use. Second, there is a receiver decoder PCB module which strips the signal from the carrier wave and presents it on an output pin, pin 3. Finally, there is a decoder IC A5885M matched to the encoder IC.

Note that the receiver module & the decoder IC must be built into a circuit by the user. They do nothing as they are supplied here. As an example of how to do this the schematic of our Kit 82 is shown on the next page. This is a 2 channel Remote Control Relay Switch. Pressing each button on the transmitter toggles a relay on/off on the target board. Data sheets for the A5884 (encoder) & A5885M (decoder) IC's are at http://www.kitsrus.com/a58845a_1.gif and a58845a_2.gif

Since the range of the devices is less that 50 yards/meters almost all regulatory authorities do not, in practice, worry about such devices unless you are specifically annoying someone else within that range.

Here is the description of the transmitter & receiver modules we included with Kit 82.

Transmitter Module. When either switch is closed power is applied to the encoder IC, A5884, to the LED and to an oscillator coil. The A5884 has 10 address bits and two data bits. The 12 bits of trinary information are serially transmitted on pin 17 when either data pin is taken low by pressing the switch. The ten address lines can be tied high, low or left floating. As supplied all are left floating. It is easy to tie some or all of A0 to A9 to ground since a ground track has been provided on the transmitter PCB right next to these pins. To allow easy matching of a code we have provided a similar ground next to the decoder IC pins. A trimcap on the tank circuit can vary the output frequency between 300mhz & 375mhz approximately. It is set to 318MHz at the factory.

Receiver. It is based on a complete front-end module which processes the signal via a bandpass filter, amplifier and Schmitt trigger. Its output delivers a digital pulse train to the input of the decoder IC. Normally pin 17 is low. This pulls down the clock inputs to the 4013 to about 0.6V which is the voltage drop across D2 & D3. Pins 12 & 13 are normally high. On the receiver module, pin 1 is the pin closest to the end of the PCB. Pin 3 is the signal out pin. Pins 4 & 5 are connected to ground. (You can see this when you look at the PCB. The track connected to pins 4 & 5 encircles the PCB.)

When the decoder IC receives data with a valid address code, pin 17 goes high, and pin 12 or 13 goes low according to whichever of the corresponding pins on the encoder IC was pressed. Let us assume button II is pressed on the transmitter. Pin 12 on the decoder IC goes low. Pin 13 remains high. But on the other side of the 100K resistor on pin 13 the line is now pulled high via D2 to pin 17. So the clock input pin 3 goes high, and relay 1 is closed. The flip-flops (FF) are connected to toggle each time a positive going pulse appears at the clock input. This is done by connecting the Q/ output to the D input via an RC network. The time constant of this network plus the C5 & C7 capacitors prevent false triggering due to noise. When power is applied, IC2, the 4013, is reset by C8 & R18. Reset is caused by sending the reset inputs of IC2 high. When C8 is charged the voltage across R10 falls to zero. The Q output of each FF connects to a driver transistor via a 3K3 resistor. When Q is high the transistor is turned on and the relay is closed. Protection diodes are connected across each relay coil to limit the back-EMF when the relay is de-energized.

A15 Sample Application Circuit