Transmitter – PE1012 Circuit Description

The transmitter is powered by two AAA size batteries in series yielding 3.0V operating voltage to the transmitter circuit. Employed in this product is the Keeloq™ technology by Microchip, containing a rolling code algorithm. The 8-bit Keeloq™ processor has four (4) function inputs yielding a total of 15 possible switching functions. The output of this processor modulates the oscillatory circuit, which has a surface acoustical wave (SAW) resonator at 433.92 MHz. The resultant signal switches the high-frequency NPN transistor, and subsequently, an inductive trace (the antenna) balanced with inductors and capacitors.

Receiver – PE1013 Circuit Description

A quarter-wave antenna of solid copper wire brings the received signal into the receiver board and immediately into a surface acoustical wave (SAW) filter centered about 433.92MHz and impedance-matched on both ends. The output of the SAW is impedance matched into the input of the canned RF device for demodulation. This particular device, the Micrel MICRF011BM, is programmable for either super heterodyne or super regenerative modes of operation. Since we are utilizing a tight tolerance SAW resonator on the transmitter, we are able to choose to operate this device in the fixed frequency, single-conversion super heterodyne mode of operation and thus recognize possible performance improvements over the super regenerative mode of operation. The MICRF011BM outputs demodulated audio data directly to an 8-bit microcontroller. Along with various logical functions, the microcontroller employs the Keeloq™ decoding algorithm to decode the receive signal and translate the contained information to the four (4) outputs of the microcontroller. The four (4) outputs of the microcontroller mimic the four (4) inputs to the transmitter's Keeloq™ encoder. With more hardware, one can easily recognize up to 15 functions with these four outputs. A non-volatile memory is used on the receiver to store mated transmitter serial numbers along with certain secret manufacturer's codes used as seeds in the decryption algorithm. Lastly, a means by which to program new transmitters to the receiver is supplied through a digital input which must be grounded to activate the learn process and a digital output to display the status via an external LED.