

June 14, 2005

OPERATIONAL DESCRIPTION

SOMFY X10 TO RTS CONVERTER

Introduction

This module receives power line carrier signals in a standard format known as X10 and upon receipt of certain such commands sends predetermined commands through a radio transmitter operating at 433.42 MHz to devices manufactured by Somfy. The module derives its power supply from the normal 120 Volt AC power line through a step down transformer. The X10 signals are capacitively coupled from the power line. A rotary switch on the module allows the user to have the module respond to one of 16 codes. Push buttons on the module allow manually sending radio commands to the target device.

Technical Specifications

Transmitter frequency-	433.42 MHz
Transmitter stabilization-	SAW (tolerance +/- 200 kHz including temperature effects)
Modulation-	ASK (on-off)
Data rate-	Approximately 1200 baud
Transmission time	approximately 0.13 seconds
Microcomputer clock rate-	4.00 MHz (this is the only clock)
Microcomputer clock reference-	Quartz crystal
Power source-	120 VAC power line. Draws approximately 50 mA. There is a 3V regulator for all circuits

Circuit Description

Power for the system is provided by a small UL approved step down transformer to about 5 Volts AC with a rectifier to provide about 6VDC. A linear voltage regulator reduces the voltage to a stabilized 3.0 volts for all of the circuits including the microcontroller and the transmitter.

The transmitter oscillator is a standard Colpitts configuration using a SAW resonator to set the transmitter frequency. The ASK (on-off) modulation is carried out by turning the transmitter and amplifier one and off following the bit pattern. The control of the transmitter is directly from a port pin on the microcontroller. The oscillator operates at a nominal frequency of 433.42 MHz. The output of the oscillator is coupled to an amplifier stage that increases the power to the needed level and isolates the oscillator from antenna loading effects. The output of the amplifier goes to the antenna through a PI filter to reduce spurious signals.

The microcomputer operates from a 4.00 MHz crystal. The microcomputer instruction rate is about 1 MHz (1/4 of the clock rate). The microcomputer runs at this clock rate all of the time. The detection of the X10 signals is synchronized to the 60 Hz power line. All other timings are based on software timing from the instruction sequences. There are no other timing elements. The microcomputer controls the transmit functions and the data conversion. An EEPROM memory stores the unique serial number for each module. The transmitter is activated based on receipt of the designated X10 power line carrier commands or based on manual activation of the push button switches on the module