THE ERX15 A/B
OPERATIONAL DESCRIPTION

GENERAL:

This device is used to turn a self-contained electric fireplace unit on and off. It consists of a 120VAC plug-in receiver module and a hand held control transmitter. The transmitter provides two push buttons to operate the fireplace. The top one is for turning the fireplace "on" and the bottom one for turning it "off". An internal nine-volt alkaline battery provides power for the transmitter.

The receiver has one three-pronged, 120VAC receptacle for connecting the fireplace and a built-in 120VAC three-pronged plug to connect to a standard household outlet. The receiver obtains its power from the 120VAC source through an internal DC power supply. The receiver also has a manual override button for "on/off" operation.

Both units contain an internal four-section switch to set a personal code in case of interference from other devices including other ERX15 sets.

OPERATION:

Transmitter

The hand-held remote is a 315Mhz. transmitter with an output power of less than 10mW. The carrier is pulse modulated at 38kHz with a 25% duty cycle and contains status code and function data (12 bits/byte). When the "on" or "off" button is depressed, the transmitter emits the code/data signal, which repeats every 1.2mS until the button is released. The purpose of the data is to send commands to the receiver to operate a line power relay for "open" and "closed" conditions.

The signal modulator (HT12E), with an internal clock of 10MHz, produces the 12 bit modulation data (8 status + 4 function). This chip, in turn, drives an RF power transistor (R315) loaded with a tuned antenna tank circuit. The antenna is etched onto the PC board.

The transmitter set can be personalized by way of a 4-bit status code input to the modulator, which can be manually set using the 4 segment DIP switch mounted on the PC board. A red LED is connected to the modulator to indicate the transmitter is enabled.

A single 9-volt battery supplies the power source, for the transmitter. The circuit is protected from accidental reversed installation of the battery using a 1N4007 blocking diode. The average current consumption of the unit in the transmit mode is 9.1mA.

Receiver

The receiver is a self-contained module consisting of two PC boards, a 28VDC relay, a 120VAC North American standard receptacle and a 120VAC North American standard plug. The two PC boards are the receiver circuit assembly and the control / motherboard assembly. An internal AC to DC power supply mounted on the motherboard powers these circuits. The low power circuits are protected from the line voltage by way of a 0.5A slow-blow fuse.

The receiver board assembly is a two-stage, 315 MHz, transistor receiver with tuned LRC circuits. A dual OP amp (LM358) amplifies the signal. The antenna is a stiff, 6.5cm wire connected to the PC board at the first transistor stage. The board is connected to the motherboard with 4 wire pins.

The signal demodulator (HT12D) executes all functions when prompted by data received. The receiver can be personalized by way of a 4-bit status code input to the demodulator, which can be manually set using the 4 segment DIP switch mounted on the PC motherboard.

The demodulator sets the Q state of the (4013) flip-flop, which in turn, activates/deactivates the switching transistors (S8050 and S9014). The second transistor (S8050) switches the 28VDC, to the relay (HG4115) on/off and the Normally Open contacts close/ open respectively, to complete the 120VAC circuit to the AC receptacle. The relay is rated at 240VAC@ 30A. A red LED is connected to the 120VAC receptacle to indicate power is "on".

There is a momentary manual override button connected to the Clock of the 4013 flip-flop, which applies 5VDC when pressed. This changes the Q state of the flip-flop from high to low or vice-versa, turning the relay off/on.

A voltage-dropping resistor (220K ohms) and a 27volt Zener diode (1N4750A) from the 120VAC source lowers the voltage to the filtered half wave rectifier (1N4007 diode, 470uF capacitor) to produce 28VDC. The voltage regulator (MC78L05), connected to the 28VDC, supplies the 5VDC to the logic circuit and the receiver board assembly. The current drain of the receiver assembly is 46mA DC.

THE RFRC10 A/B1/B2
OPERATIONAL DESCRIPTION

GENERAL:
This device is used to turn a self-contained gas fireplace flame and two fireplace accessories on and off. It consists of a 120VAC plug-in receiver module, a battery powered receiver module and a hand held control transmitter. The transmitter provides four push buttons to operate the fireplace and accessories. The top one is for turning the fireplace "on", the second button for turning it "off", the third and fourth buttons are for sound and scent options.
An internal nine-volt alkaline battery provides power for the transmitter.
The accessories receiver has one three-pronged, 120VAC receptacle for connecting to the scent device and a second receptacle for a Christmas tree. It has a built-in 120VAC three-pronged plug to connect to a standard household outlet. The first receiver obtains its power from the 120VAC source through an internal DC power supply. The receiver also has a manual override button for "on/off" operation.
The fireplace receiver has a four terminal connector to attach wires for the gas valve and the sound generator device. 4 AA batteries power it.
All three units contain an internal four-section DIPswitch to set a personal code in case of interference from other devices including other RFRC10 sets.

OPERATION:
Transmitter
The hand-held remote is a 315Mhz. transmitter with an output power of less than 10mW. The carrier is pulse modulated at 38kHz with a 25% duty cycle and contains status code and function data (12 bits/byte). When one of the buttons is depressed, the transmitter emits the code/data signal, which repeats every 1.2mS until the button is released. The purpose of the data is to send commands to the receivers to operate the millivolt gas valve, a sound device and a line power relay for "open" and "closed" conditions. The flip-flop (HEF4013/a), connected to the selector buttons, ensures that the accessories will not function when the fireplace valve is off.
The signal modulator (HT12E), with an internal clock of 10MHz, produces the 12 bit modulation data (8 status + 4 function). This chip, in turn, drives an RF power transistor (R315) loaded with a tuned antenna tank circuit. The antenna is etched onto the PC board.
The transmitter set can be personalized by way of a 4-bit status code input to the modulator, which can be manually set using the 4 segment DIP switch mounted on the PC board. A red LED is connected to the modulator to indicate the transmitter is enabled.
A single 9-volt battery supplies the power source, for the transmitter. The circuit is protected from accidental reversed installation of the battery using a 1N4007 blocking diode. The average current consumption of the unit in the transmit mode is 9.1mA.

Receivers
The B1 receiver is a self-contained module consisting of two PC boards and a 4X1.5VAA battery holder. The two PC boards are the receiver circuit assembly and the control/ motherboard assembly. The four AA batteries power both boards. The receiver circuit has a voltage regulator (HT7136A) to drop the voltage to 3.6VDC. The antenna is an etched line on the motherboard. The 315MHz receiver is a one transistor, tuned LRC circuit. The output is amplified using a quad inverter/buffer (14069U) and coupled to the motherboard logic circuit through a buffer transistor because of different logic levels. The signal demodulator (HT-12D) executes all functions when prompted by data received. The receiver can be personalized by way of a 4-bit status code input to the demodulator, which can be manually set using the 4 segment DIP switch mounted on the PC motherboard.
When "on" or "off" data is sent, the demodulator applies a "1" state to the R/S input of the flip-flop (HEF4013/a) and sets/ resets the Q state of the flip-flop, which in turn, activates/ deactivates the switching MOSFETs (2X IRF24). These transistors are connected in series with the gas valve in the fireplace.
When "sound" data is sent, the demodulator applies a "1" state to the CLK input of the flip-flop (HEF4013/b) and sets the Q state of the flip-flop, which in turn, activates/ deactivates the switching MOSFET (IRF24). This transistor is connected in series with the (4.5VDC) battery powered, optional, sound generator.
There is a "battery low" indicator circuit consisting of two (S9014) transistors and a red LED.

The B2 receiver is a self-contained module consisting of two PC boards, a 28VDC relay, two 120VAC North American standard receptacles and a 120VAC North American standard plug. The two PC boards are the receiver circuit assembly and the control / motherboard assembly. An internal AC to DC power supply mounted on the motherboard powers these circuits. The low power circuits are protected from the line voltage by way of a 0.5A slow-blow fuse.

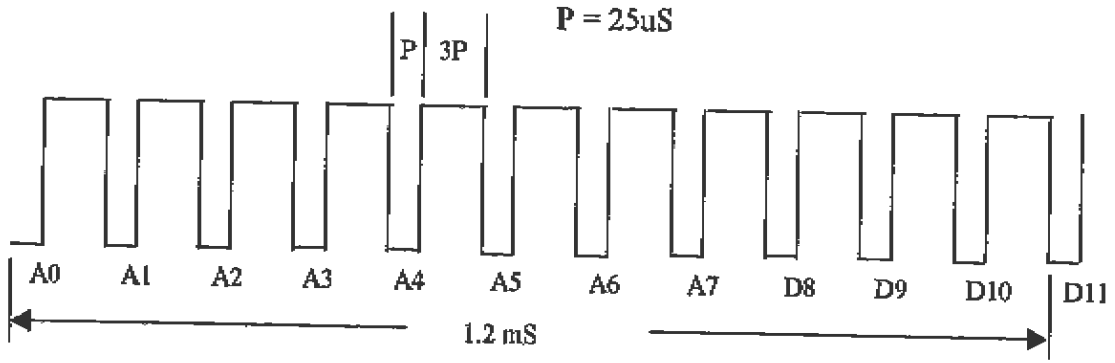
The receiver board assembly is a two-stage, 315 MHz, transistor receiver with tuned LRC circuits. A dual OP amp (LM358) amplifies the signal. The antenna is a stiff, 6.5cm wire connected to the PC board at the first transistor stage. The board is connected to the motherboard with 4 wire pins.

The signal demodulator (HT12D) executes all functions when prompted by data received. The receiver can be personalized by way of a 4-bit status code input to the demodulator, which can be manually set using the 4 segment DIP switch mounted on the PC motherboard.

When "scent" data is sent, the demodulator sets the Q state of the (HEF4013) flip-flop, which in turn, activates/deactivates the switching transistors (S8050 and S9014). The second transistor (S8050) switches the 28VDC, to the relay (HG4115) on/off and the Normally Open contacts close/ open respectively, to complete the 120VAC circuit to the AC receptacles. The relay is rated at 240VAC@ 30A. A red LED is connected to the 120VAC receptacles to indicate power is "on".

There is a momentary manual override button connected to the Clock of the 4013 flip-flop, which applies 5VDC when pressed. This changes the Q state of the flip-flop from high to low or vice-versa, turning the relay off/on.

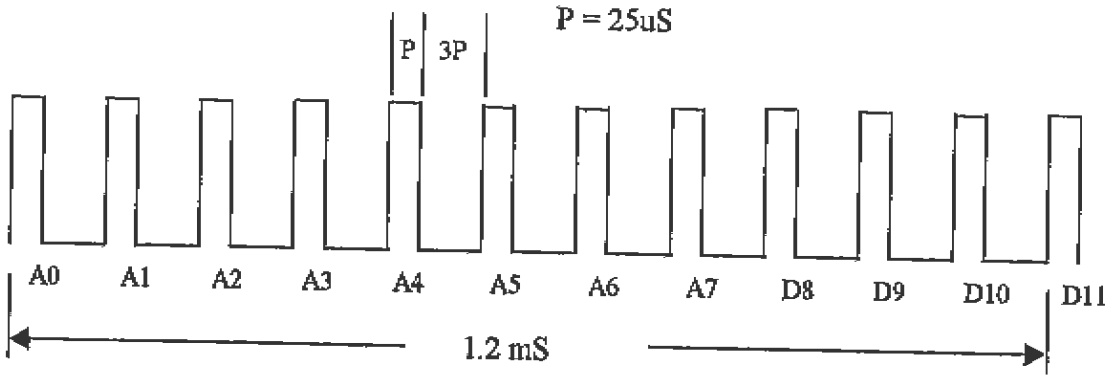
A voltage-dropping resistor (220K ohms) and a 27volt Zener diode (1N4750A) from the 120VAC source lowers the voltage to the filtered half wave rectifier (1N4007 diode, 470uF capacitor) to produce 28VDC. The voltage regulator (MC78L05), connected to the 28VDC, supplies the 5VDC to the logic circuit and the receiver board assembly. The current drain of the receiver assembly is 46mA DC.



A0 - A7 = 0 D8 - D11 = 0

OPERATION
D8=1 D9=0 ON
D8=0 D9=1 OFF

12 BIT PULSE WAVEFORM



A0 - A7 = 1 D8 - D11 = 1