

Circuit Descriptions  
ENERNET Corporation  
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The RF transceiver in ENERNET products is based on RF Monolithics P/N TR1000, which contains an amplitude modulated, SAW-based, fixed frequency transmitter, and a “sequenced” TRF receiver (see their documentation for circuit details). Support component selection was based on RFM reference designs and application note, *ASH Transceiver Designer’s Guide*. A single resistor controls power level; the remaining support components control baseband parameters like receive threshold levels, bandwidth and AGC.

RF transceiver circuitry in ENERNET products is virtually identical (see figs. 1-3). Thermostat 10200 contains a power switch, Q2, to reduce quiescent battery consumption. This switch, controlled by microcontroller U3, turns communications processor U6 and RF transceiver U1 on and off. Conversely, Remote Control Node (RCN) products, 10300, 10500, 12200 are continuously powered from a line-based supply.

Thermostat and RCNs both contain a communications processor, which formats data into a balanced differential Manchester-coded, 9.766 kb/s stream applied to the transceiver TXMOD pin through level adjust resistor. Receive data is translated to 5 volt logic levels for all products except the 12200, which operates entirely on 3.3 volts. The communications processor keys the transceiver chip with a PTT signal. In the 10200 Thermostat, data processing and user interface is performed by a dedicated microcontroller U3, which contains crystal controlled oscillators on 5.0 MHz and 32 kHz. It supplies 5 MHz clock signal to communications processor U6 through clock switch Q3. In all of the RCN products, the communications processor itself runs data processing and user interface algorithms, and has its own 5.0 MHz crystal oscillator.

Differences between the RCN products is power supply type and application I/O capacity. The 10300 Plug Load RCN is a self-contained, single channel line voltage switch with a NEMA standard power plug and receptacle. The 10500 Line Voltage J\_BOX RCN is a single channel, 110-240 volt product with 0.5 A pilot duty solid state switch output. The 12200 PTAC/FC-24 RCN is a 6 channel, 24 VAC control.