

ESIRF BRIDGE Theory of Operation

The ESIRF BRIDGE acts as a translator between a bidirectional, wireless RF network protocol (hereafter referred to as ESIRF); and a bidirectional, wired bus network protocol. The ESIRF BRIDGE connects via RS-232 level signals at standard bitrates from 9600 to 115200 to a computerized home automation system. The automation system sends a proprietary, wired bus protocol operating at about 9600 bps, to the ESIRF BRIDGE to control motorized window coverings in the ESIRF wireless network. The ESIRF BRIDGE translates the wired protocol commands to ESIRF commands which it transmits via the ESIRF wireless network. Likewise, the ESIRF BRIDGE receives information from the ESIRF wireless network, then translates and sends that information to the computerized home automation system via the wired bus protocol.

The ESIRF BRIDGE uses an Atmel AT91SAM3S4C microprocessor operating at 48MHz and a crystal oscillator operating at 18.432MHz. The ESIRF Bridge has a mini-USB connector for power only. No data is transmitted using mini-USB.

The Atmel AT86RF231 RF (hereafter referred to as the RF231) transceiver handles bidirectional RF communication on the ESIRF wireless network. ESIRF operates on the 2.4GHz ISM radio band. ESIRF adheres to, and is built on top of, the specifications for 2.450MHz PHY in the IEEE 802.15.4 Standard, which specifies an “offset quadrature phase-shift keying (O-QPSK)” modulation scheme. The RF231 transmits and receives on one of 14 software-selectable channels, evenly spaced at 5MHz intervals, from 2405MHz to 2480MHz, excluding 2420MHz.