

802.15.4 Transceiver Description of Circuitry

The 802.15.4 Transceiver is an IEEE 802.15.4 compliant gateway between an organization's existing wired IEEE 802.3 Ethernet network and Privaris' hand-held, wireless biometric security transmitter (BPID). A typical application would be to grant a user access to a gated facility from within their moving vehicle. In this scenario, a user would transmit the encrypted authentication data from their personal BPID device to the Transceiver module in order to have the request forwarded over the organization's network infrastructure for validation.

The role of the Transceiver module is merely to serve as a media gateway between the 2.4GHz IEEE 802.15.4 wireless protocol and the 10MHz or 100MHz IEEE 802.3 wired Ethernet protocols. The processing of all incoming and outgoing radio signals is handled by the Chipcon 2240 device which interfaces to both the antenna and AT91 CPU. The AT91 has a logic level interface with the Lantronix Xport/AR Embedded Ethernet module which connects directly to the network infrastructure. Power to the Transceiver module can be provided through the associated switch, hub, or router that supports the Power over Ethernet feature (IEEE 802.3af), or through an external DC power supply.

The 2240 includes a digital direct sequence spread spectrum baseband modem providing a spreading gain of 9 db and an effective data rate of 250Kbps. It is designed for applications operating within the 2.4GHz unlicensed ISM frequency band and provides support in hardware for packet handling, data buffering and encryption, and all overhead associated with channel assessments and transmission timing. It complies with European regulations ETSI EN 300 328 and EN 300 440 class 2, American FCC CFR47 Part 15, and Japanese ARIB STD-T66.

The single-chip Atmel AT91 ARM Microcontroller used in the Transceiver handles the data communications between the 2240 radio and the Xport Ethernet module. It is a highly integrated processor contained in a 121-ball BGA package. Its operation is driven by the ECS 3953M 66.66MHz external clock generator.

The Xport/AR is a direct connect embedded Ethernet module containing the standard RJ-45 connector, 802.3 Ethernet magnetics, and the DSTni EX microcontroller for all packet processing and input and output with the attached AT91 processor. The Xport/AR utilizes an integral 25MHz clock for driving the processor.

The information processed through the Transceiver module consists of an encrypted packet of biometrically enabled identification information assembled and transmitted by the user's BPID.

Firmware is loaded into the Transceiver module through a JTAG interface. The integral RS232 and Wiegand interfaces can be used in lieu of the Xport/AR for special applications in which Ethernet is not available. In these instances, hard-wired connections will be made directly to the appropriate termination points on the board.