

The 1104 Tag is a small, active RFID tag that works as part of a PLUS Real Time Location System. The tag consists of a circuit board with integrated antenna, coin cell battery, and plastic enclosure. The enclosure may be opened to enable replacement of the coin cell battery.

The 1104 Tag periodically transmits a short (~100 us) packet that is received by a network of PLUS Readers. The Readers generate time of arrival data for the tag, and then send this data across an Ethernet network to a server running the PLUS Location Software. The PLUS software uses the time of arrival from multiple readers to determine an accurate location for the tag.

Each packet transmitted by the 1104 tag consists of pulses transmitted at a 1 MHz pulse repetition frequency (PRF). Data is transmitted using On-Off Keying (OOK) modulation, in which a pulse present in a given timeslot = data value 1, and a missing pulse in the timeslot = data value 0. The OOK modulation of the 1 MHz pulse train results in a 1 MHz data rate.

Each pulse has an RF center frequency of 6.6 GHz. The pulse is generated from a logic gate edge, filtered by a passive RLC network, and amplified by a transistor drive circuit coupled to the integrated antenna.

The pulse characteristics are determined only by the drive circuit and are not a function of the 1 MHz PRF. This direct signal generation approach does not use an intermediate frequency and up-conversion approach.

The tag signaling only consists of an OOK modulated 1 MHz pulse train and does not use channel coding, frequency hopping, or other channelization techniques. All signal shaping is implemented in the hardware circuit described above.

The tag programming interface is for factory loading of the microcontroller firmware only. The programming pins are internal to the tag (only accessible prior to welding of the plastic enclosure). The programming pins can not be accessed by the user after the tag case has been ultrasonically welded.

It is not possible for the user to change RF signal characteristics, PRF, or transmitted data content. The tag antenna is integrated onto the circuit board inside the plastic enclosure and cannot be accessed, removed, or replaced.