LR 2000 R

Theory of operation

The UWB Location Receiver (LR2000R) is a component of the AeroScout suite of enterprise-level visibility solutions. This product provides accurate, robust and sophisticated real time detection and location of tags using Wi-Fi and Ultra Wide Band (UWB) communication.
The LR is used to complement the AeroScout Wi-Fi based solution by accurately triangulating Tags in areas where sub-meter accuracy is required.
The LR support both PoE and external power connection as a power up.
The system is used to locate tags using UWB or WiFi

The system can locate tags by using UWB impulse transmission. Every tag transmit its own ID through WiFi every 5 minutes. The signal received by at least 4 LRs and the one that has the strongest signal (actually LOS) begins an UWB signaling (short impulse) between tag and LR to measure the distance between them. The resulted distance is transferred to the center through WiFi (tag).

LR2000R can be supplied either by PoE or an external 48VDC. The Ethernet cable carry data that come from the central control (engine).

LR2000R consist of 5 main blocks: Power, Ethernet switch, uProcessor, UWB chip and WiFi module

Data is transferred to/from LR2000R through an Ethernet connector to a switch (Micrel) which is used as a switch between outside world and the uProcessor (Kinetis). Once LR2000R detects a WiFi signal from a tag, it begins a UWB signaling to measure the distance between tag and LR2000R. In normal operation mode, every tag transmit its own ID through WiFi every 5 minutes. The signal received by at least 4 LRs and the one that has the strongest signal (actually LOS) begins an UWB signaling (short impulse) between tag and LR to measure the distance between them. The resulted distance is transferred to the center through WiFi (tag).

Power

LR2000R can be supplied either by PoE or an external dedicated 48VDC power supply.

The main 48VDC down-loaded to 12v, 3.3v (for uP, Ethernet switch, UWB, WiFi), 1.8v (UWB, WiFi)

UWB transceiver

UWB IC (DECA1000, Deca Wave) is served as a transceiver that can operates in one of two UWB channels: Ch2 (3994.6MHz) or ch5 (6489.6MHz), both are 500MHz BW. It operates in impulse mode to measure distance. A 38.4MHz TCXO served as a reference clock. Data is transferred to and from a Kinetis micro Processor through SPI protocol. The RF signal goes to/from the external antenna through a balun.

WiFi receiver

A WiFi module (Qualcomm: AR4100P-BM2D) is served as a WiFi receiver in 802.11b/g (1 or 6 MBPS). Frequency bands: 2412-2472MHz. It has an internal 38.4MHz clock, and its RF is connected directly to an external WiFi antenna.