

Operational Description Of KIC Base Station

The KIC Base Station is a companion device to the KE thermal profiler which transmits temperature data. The Base Station is a PC peripheral which interfaces via USB port. KIC has created custom application software to analyze and present the temperature data sent from the KE to the Base Station. Since both devices (i.e. KE and Base Station) are transceivers the Base Station does send configurations setting information and packet acknowledgements as part of the packet protocol to the KE.

Brief circuit description:

The KE circuit can be broken into 3 sub-sections which are A) power supply circuitry B) mixed signal integrated micro controller and C) RF communication circuitry which consists of a micro controller running the link layer protocol and RFM TR1000 transceiver which is the physical layer RF device. The part B MCU communicates via UART to the link layer protocol. The link layer protocol MCU is under interrupt control from the data out of the RF chip data slicer while the RF transmit is a bit bashing pin on the link layer MCU. A more complete link layer description is provided below.

RF description:

The design is based around RFM's TR1000 transceiver (see datasheet for complete description) chip which is highly integrated and contains all critical RF functions operating at 916.5 MHz. The transmitter uses On/Off keying (OOK) modulation and employs SAW filtering to suppress output harmonics. The KIC Base Station is designed to be compliant to FCC 15.249.

Output power is fixed via an external resistor. The current through this resistor is proportional to the devices output power and is hard wired in (see schematic R16 4K7 resistor).

The Base Station PCB has a RPSMA edge mount connector for mating a custom KIC $\frac{1}{4}$ wave whip antenna which is provided with the product packaging. There is no substitute or alternative antenna. This antenna mounts at the rear of the KE device and extends out the back horizontally.