

Description of e*TAG-Quasar Reader System & its Components

System Overview

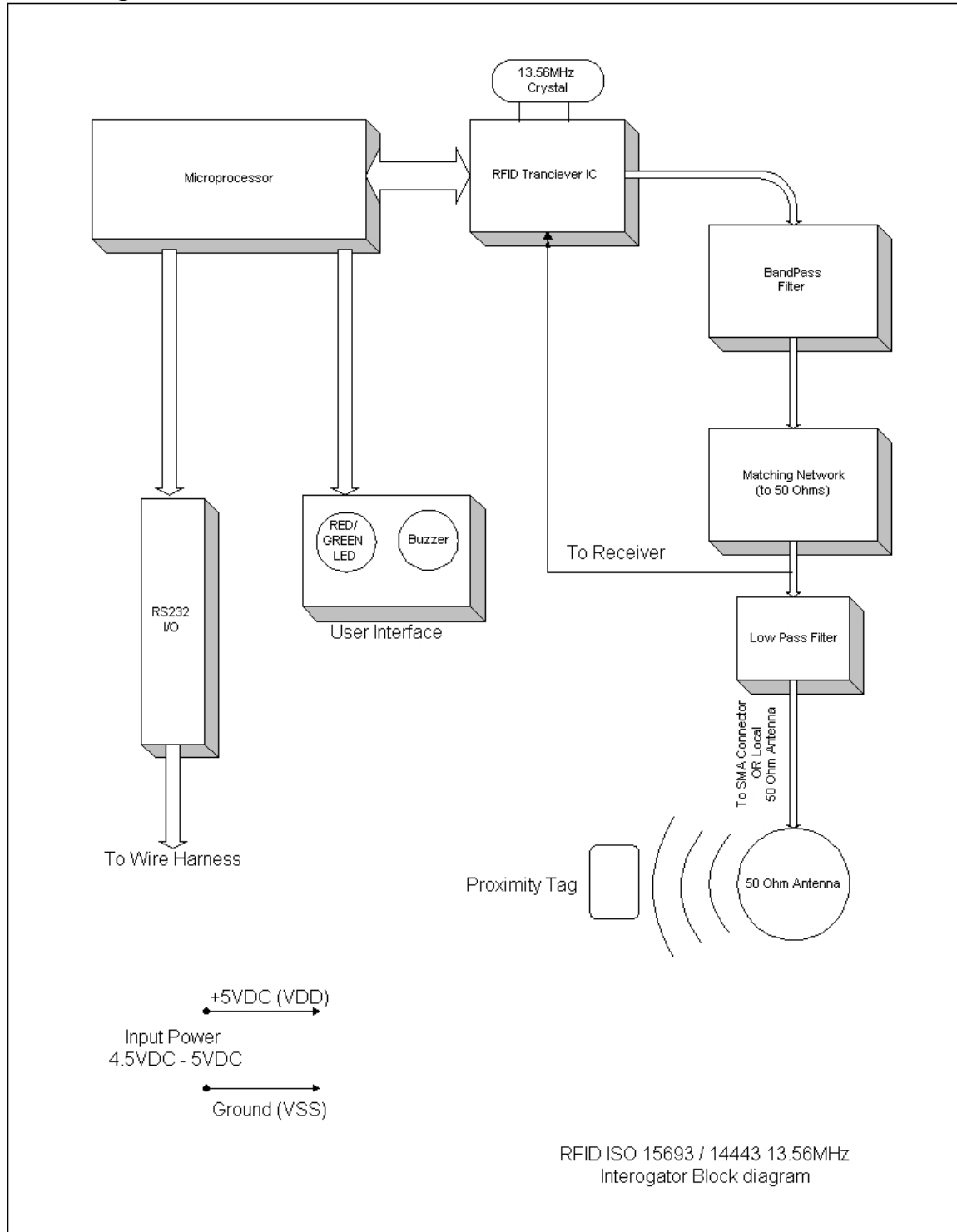
The eTag-Quasar system is comprised of tags and reader assembly. The reader can be host driven such as PC, or some other kind of intelligent device (for example a tag printer or controller) through RS-232 and can operate in self run mode connected to data collection device such as access control controller. RF functionality operates per ISO/IEC 15693 protocols. During a transaction, the tag (transponder) is permanently powered by the signal sent by the reader. This signal also provides the clock frequency to the transponder. It is amplitude modulated to transmit requests from the reader to the transponder. In order to transmit responses to the reader, the transponder (tag) derives the operating energy and the clock from the reader's power signal to generate the sub-carrier frequencies.

ISO 15693 parameters are configurable for: 1) modulation depth (10% or 100%), 2) data coding (1/4 or 1/256), 3) sub-carrier load modulation (ASK or FSK) and 4) anti-collision rate (FAST or Slow). This reader is set for worst-case FCC conditions (100% FSK, 1/4 and Fast anti-collision). Read distance is influenced by the coupling factor between the reader's antenna (size and efficiency) and tag antenna size, and thus by the distance between them. The emissions from transponders (tags) was not measurable and well below the regulated limit. The passive tag is not required to be FCC certified.

ETO-RexRB (e*TAG-Quasar)

A typical reader consists of electronic board, antenna, and wiring harness as shown in Figure 1. Electronics board includes microprocessor (digital), RF ASIC (analog), 13.56 MHz crystal, buzzer, LED, RS-232 communication interface and antenna connection. The reader is powered with 5V_{DC}. Maximum current during tag read is 250mA and gives 3-4" read distance. The data is transmitted through the RS-232 interface connected to its host or controller. It sends energy and commands to, and receives signals from the transponder through the antenna.

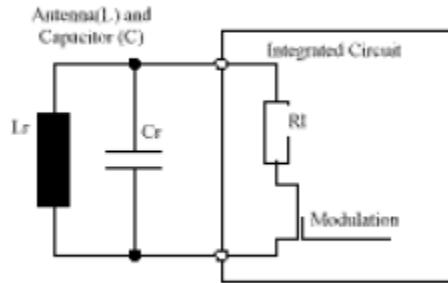
Block Diagram of Reader's Electronics



Transponder (Tag)

A transponder (tag inlay) comprises a flexible foil antenna, a resonance capacitor and an integrated circuit. The tag inlay can be packaged in different formats such as pressure sensitive labels and plastic cards. The transponder's IC is powered by the electromagnetic field generated by the reader's antenna; this is generally described as a passive transponder.

Figure 3: Block Diagram of the Badge



The IC is flip chip mounted onto the antenna. The electrical parameters of the components: the antenna (including its inductance) and the resonance capacitor; and the layout of the antenna loops all have an effect on the transponder's performance. The L_r/C_r resonance circuit is trimmed to the required target frequency to achieve optimal performance. The tag uses one or two sub-carrier AM modulation frequencies for sending its data to the Reader (up-link). The data are encoded in Manchester code by alternating between both sub-carrier frequencies, such generating an ASK or FSK modulation scheme. The emissions from Transponders (tags) was not measurable and well below the regulated limit. The passive tag is not required to be FCC certified.