Micro Reader description

1. General

1.1. Reference documents
  1.1.1. Schematics, document number 47C10050
1.2. Page numbers referenced in the following description, are referred to the schematics.

2. General Description

2.1. Micro Reader and DataSeal-125 comprise a system. The DataSeal-125 is used to electronically seal assets during storage or shipment. The Micro Reader is used to inspect DataSeal-125 status. An inspector presses a button, the Micro Reader wakes up, interrogates the DataSeal-125 and lights a LED according to the seal status. RED means the seal is tampered; GREEN means the seal is OK.

2.2. The Micro Reader is a stand-alone unit. It has a replaceable battery, RF receiver, transmitter and microprocessor (μP), which controls the Micro Reader operation.

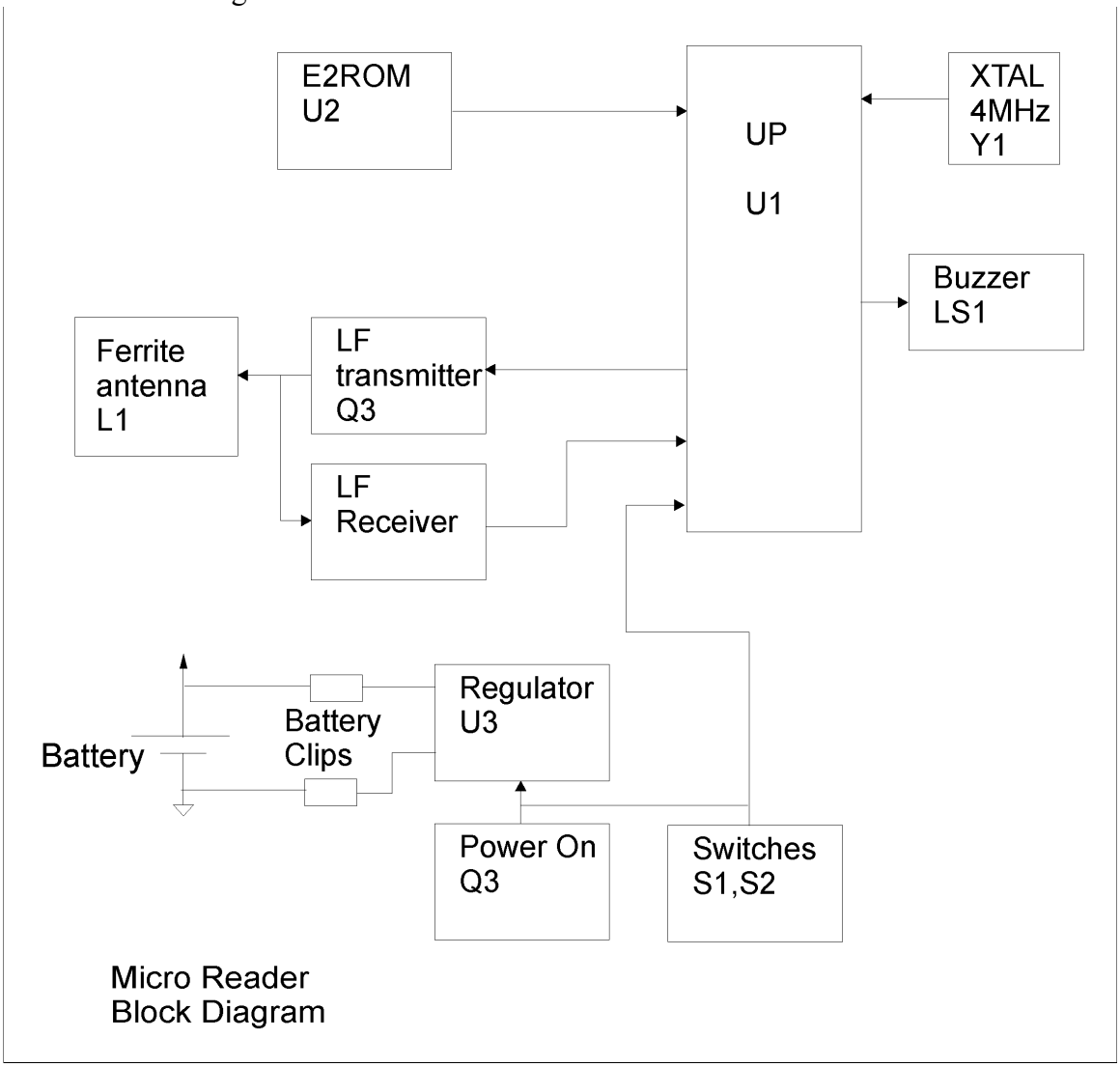
2.3. The Micro Reader RF channel is 125KHz carrier with OOK modulated data.

3. Hardware Description

3.1. A PCB is mounted in a pocket size enclosure; a replaceable 12V battery supplies power to the Micro Reader. The circuit includes micro controller, 4MHz crystal, E2ROM, power supply regulator, 125KHz transmitter and receiver.

4. Circuit description.

4.1. Block Diagram



4.2. **µP** (U1 Pg.2): PIC16F876 µP is timed by a 4MHz ceramic resonator (Y1).

4.3. **Buzzer** (LS1 Pg.2): generates audible signal to indicate interrogation result.

4.4. **E2ROM** (U2 Pg.2): Serial E2ROM stores unit parameters and data.

4.5. **Power management:** (Pg.2): 12V A23 type battery powers the circuit. D2 is used for reverse polarity protection. U3 regulates the voltage to the whole circuit. In stand by mode, U3 is OFF and the circuit is not powered. When one of the switches (S1, S2) is pressed, U3 is enabled thus powering the circuit. The micro controller wakes up and holds the power by Q1, until cycle is finished.

4.6. **LF Transmitter** (Q2, Pg.3): OOK modulated data comes from the μP to the driver transistor Q2, which drives a ferrite antenna (L1).

4.7. **LF Receiver** (C8 to U4 Pg.3): Data is received in the ferrite antenna (L1); D7, D8, D9 and Q3 are used to limit signal amplitude. D6 is used for envelope detection of the signal and data is digitized by U4.