



Operation Manual

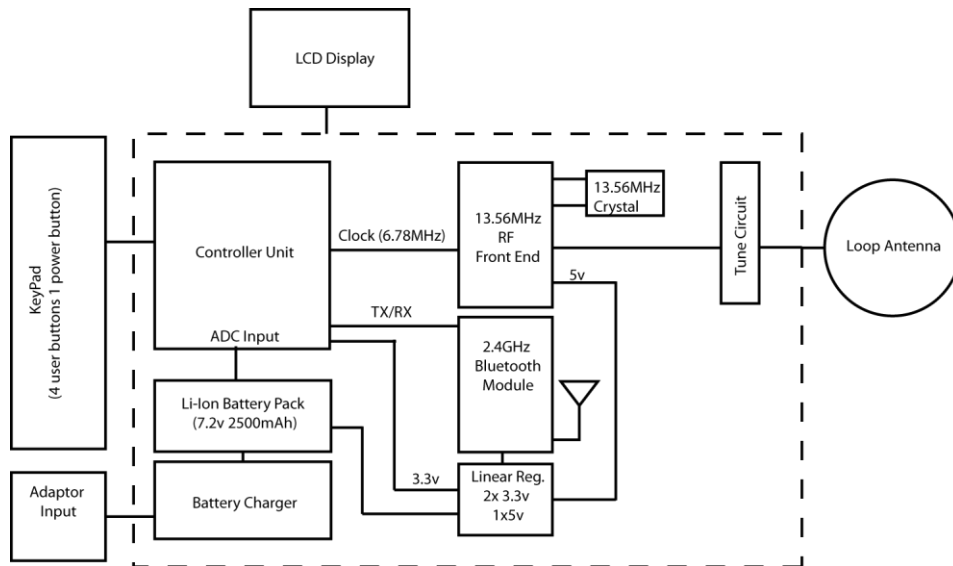
Product Name: Blade Reader (Scanner)

Model Number: BR10

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Product description

Blade Reader is a Bluetooth RFID reader. Following diagram shows how Blade Reader is being used to in conjunction with a Bluetooth device (e.g. tablet pc) to read RFID tags.



13.56MHz RF front end

Receiver

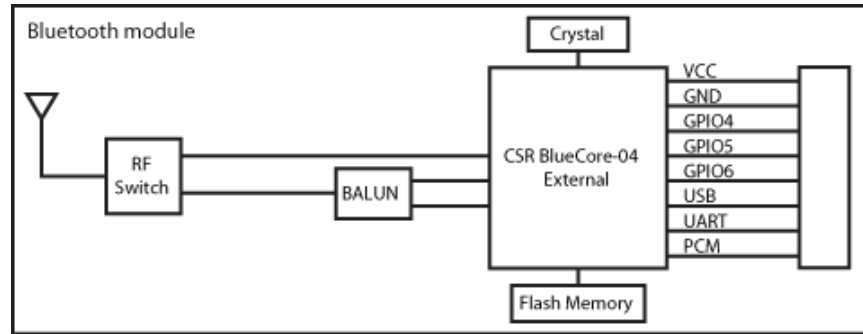
The main receiver is composed of RF envelope detection stage, first gain and band-pass filtering stage, second gain and filtering stage with AGC and digitizing stage which output is connected to the digital processing block. The main receiver also comprises a RSSI measuring stage with measures the demodulated signal after first gain and filtering stage. The auxiliary receiver is basically used only to measure the RSSI of the modulation signal on the input not connected to main input

Transmitter

The transmitter part composes of 13.56MHz oscillator, protocol processing digital part and RF output stage. The 13.56MHz quartz oscillator directly generates the RF frequency for RF output stage. It also generates clock signal for digital part which is used by main controller. The frequency on SYS_CLK in normal operation is 6.78MHz, set at 'Modulator and SYS_CLK control' register. The RF output stage is a non-overlapping driver with output resistance set at 4Ω.

Bluetooth Module

Blade reader uses a Bluetooth module (Roving Networks Bluetooth module RN-42) for communicating with external Bluetooth devices. The Bluetooth module is connected through a serial connection (TTL level) to main controller. Following is the block diagram of this module based on the manufacturer datasheet.



User interface

Blade Reader is equipped with a LCD display. Information such as version of the firmware and charge status plus Bluetooth connection status is displayed at the most upper lines of the display. The rest of display area is addressable by user by issuing write display command thorough a Bluetooth connection.

Blade Reader is equipped with four user keypad. User is able to issue a command through a Bluetooth connection to read the last status of buttons.

Power up and power down operation

Power up and power down operations can be started with pressing power button (toggle button) on Blade Reader by a user. Power up operation consists of following operations:

- Sets RF protocol registers for proper clock and protocol.
- Sets the clock frequency for controller unit from internal clock to external clock (6.78MHz).
- Clearing display unit and setting the proper scan rate.
- Checking and displaying battery status and Bluetooth connection on the user display.
- Enters command mode (i.e. accepting commands from external Bluetooth device).

Command Mode operation

In this mode Blade Reader accepts commands over air (i.e. Bluetooth SPP connection). As soon as Blade Reader receives a command from inquiring device it executes the command and sends back a full or partial respond. It is up to inquiring device to recognize the end of response based on command/reply protocol. Command mode can be used to read RFID tag data. A Bluetooth device needs to turn the RF on and set the protocol before issuing any RFID command. Issuing an inventory command returns all unique identifiers of tags (UID) in the proximity of the Blade Reader antenna. Bluetooth device further can issue read command using the UIDs received from inventory command to read data block of each tag. Bluetooth device also can issue commands to send visual and audible feedback to user (Display command or Beep command).

Power up Mode 1

User is able retrieve Bluetooth MAC address of the Blade Reader by holding button 1 on power up. Power up mode 1 consists of following operations:

1. Sets the baud rate for Bluetooth module to 115200bps.

2. Sets the Bluetooth to be discoverable.
3. Set the name for Bluetooth module to “Blade-Reader xxxx” (xxxx is last 4 characters of MAC address).
4. Displays the MAC address for Blade Reader.

Power up Mode 2

Blade Reader enters this mode if button 2 is pressed on power up. Device enters a self read mode and executes inventory command. If a RFID tag detected, it beeps.