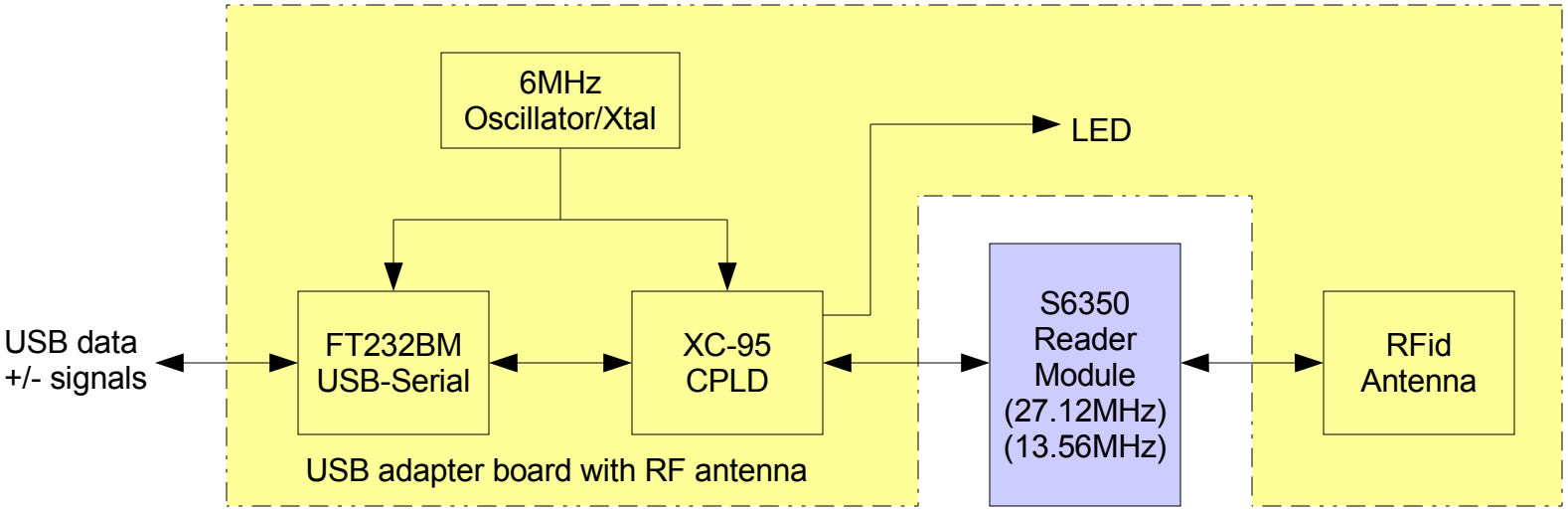
Core System – Operational/Technical Description

Hardware – The system consists of a 3rd party reader module (TI S6350) and a USB to serial adapter board with an attached antenna tuned to resonate at 13.56MHz. The reader module uses a 27.12MHz oscillator to operate the controller chip and generates a 13.56MHz signal derived from the 27.12MHz oscillator. The USB adapter board uses a 6MHz oscillator that provides the reference clock for the USB to serial conversion chip (FT232BM) and the programmable logic device (XC95XX). The antenna is attached to the reader module and is capacitively tuned to resonate at 13.56MHz with a Q of about 20. A common-mode choke is used to suppress common-mode noise picked up by the attached loop antenna. The outer case is made of aluminum and is connected to the common ground plane to help reduce EMI. All of the circuits share a common ground provided through the USB connector. All circuits share the same +5 volt source, powered by the USB connector. However, the power is locally filtered with a ferrite bead (100Ohm @100MHz), 10uF, and 0.1uF capacitors at the power connection to the USB adapter board and the reader module.

Intended Use – The intended use for the system is to track remote controlled toy cars around a fixed track. Each car is equipped with an Rfid transponder. When the car passes over the loop antenna, a counter on a computer will incremented showing that the car has completed a lap around the race track. The product is marketed towards professional hobby shop stores that host R/C racing events. The software for tracking the progress of the cars is also provided to the user.

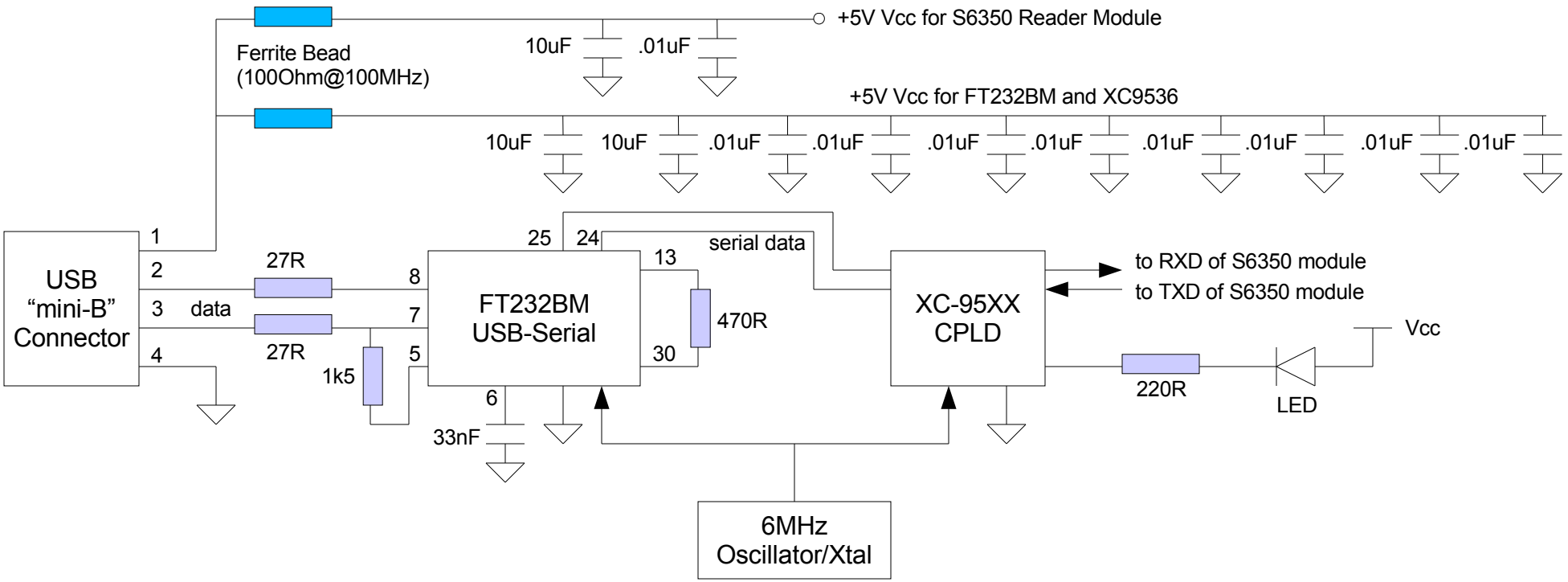
Core System – Block Diagram

Description: This is a block diagram of the Core System that uses the TI S6350 reader module.
The purpose of the adapter board is to convert the serial RS-232 interface of the S6350 module to a USB PC interface. The adapter board uses a standard USB to Serial conversion chip (FT232BM) from FTDI. The board also has a programmable logic device (XC-95) from Xilinx to add some miscellaneous functions such as LED control. The antenna is also connected to the adapter board.



* Ground is common between all devices and the antenna
* There is one +5V source supplied through USB or external power connector.

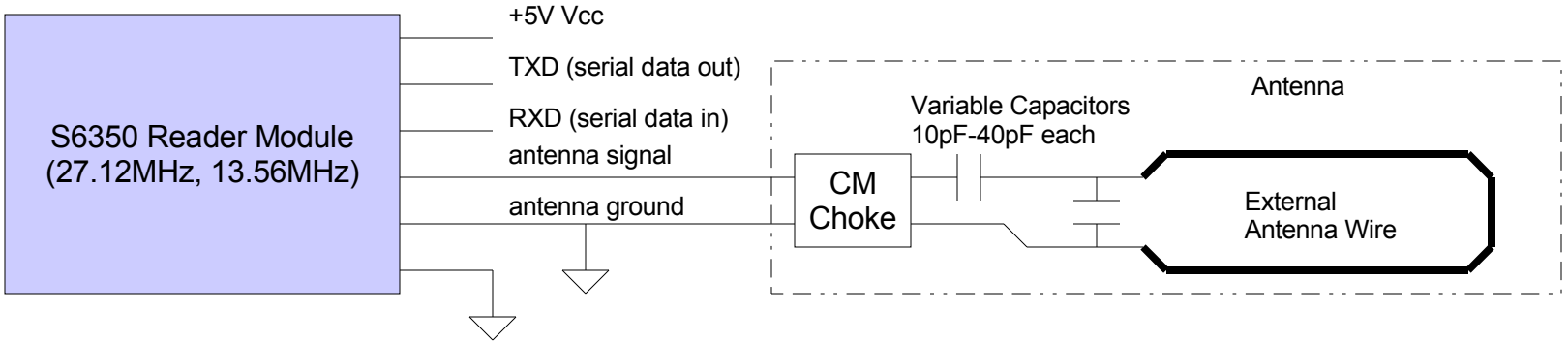
Core System – Schematic Diagram



* Refer to document ds232b14.pdf (section 4) for all ground and Vcc pins of FT232BM chip.
  All GND and Vcc are tied together to the board ground and +5V Vcc, respectively

* Refer to document XC9572.pdf (page 7) for all ground and Vcc pins of XC-95XX CPLD.
  All GND and Vcc are tied together to the board ground and +5V Vcc, respectively.

* Schematics for the S6350 reader module are submitted separately by TI. The module has a header with pins to connect
  Vcc, GND, TXD(serial transmit), RXD (serial receive), ANT(antenna signal), AGND (antenna ground)



Core System – Label (sample drawing)