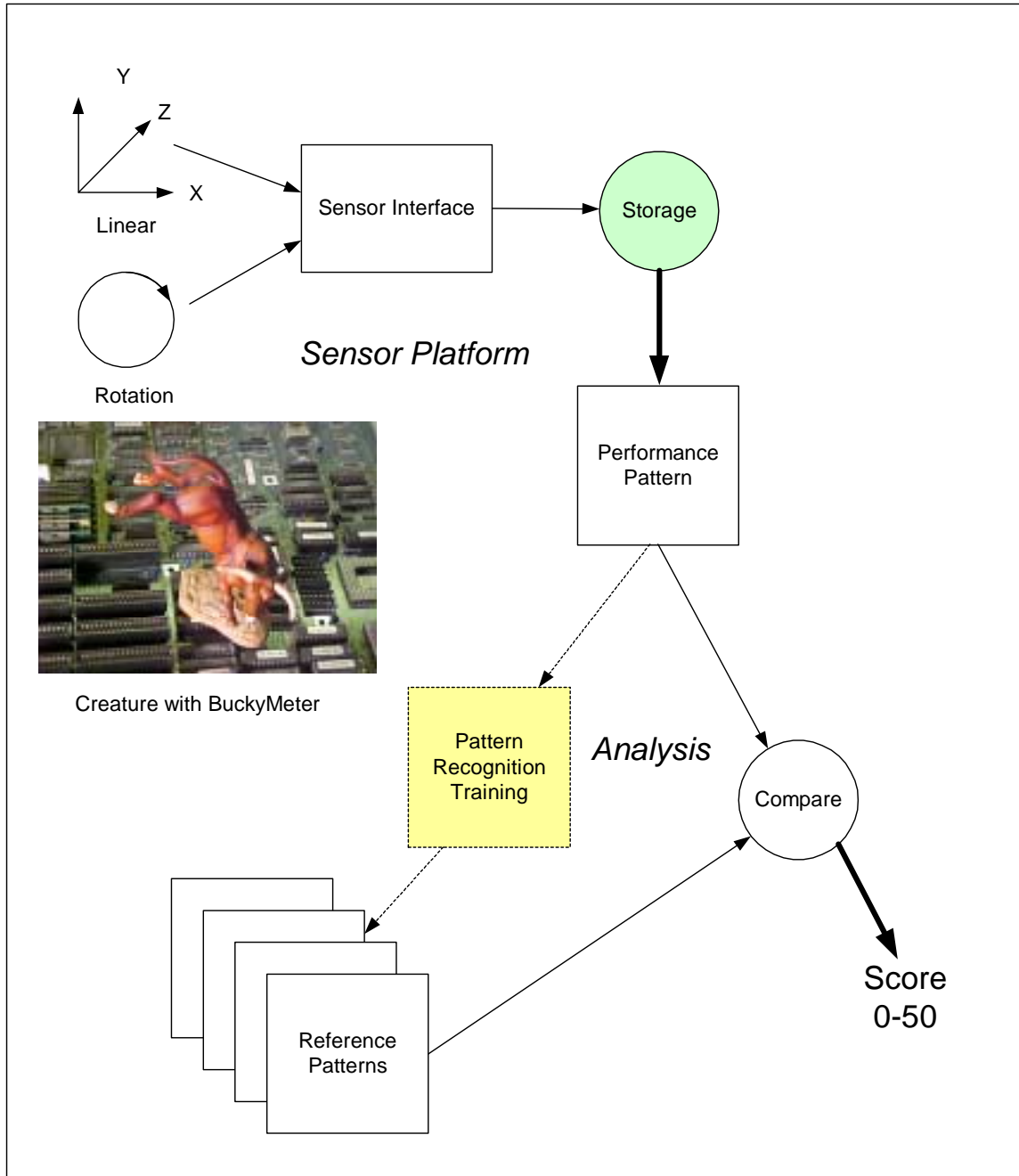


From 20,000 feet: Concepts, Technology, and Techniques for a quantitative approach to the scoring of PBR bulls

The system design shown below illustrates the two key problems that must be solved to electronically score a bull's performance. It is necessary to monitor the bull's motion, and it is necessary to evaluate the motion and assign a score. The bull's motion can be monitored by a sensor platform. A bull's performance can be scored by analyzing the data.



Sensor Platform

In the not so distant past, precision motion sensing was the purview of the military and commercial aviation. Picture the inertial navigation system that leads a pilot to his destination half a world away.

The more recent explosion in sensing technology for automotive applications, such as air bags and stability systems, has led to the development of Micro-Electrical-Mechanical Systems (MEMS) sensors. These silicon sensors provide sensing technology that rivals the old navigation system, in a miniature affordable package.

A collection of these sensors connected to a custom microcontroller can put a motion monitoring system into a package that could be mounted on a bull to record his motion(s). (Obviously a final version would need to be bull tolerant, if not bull proof!)



Prototype Picture

Analysis

Analysis of the bull's performance requires a data collection system. This is a bit of a "chicken and the egg." We must collect initial sets of data to determine what parameters are important and what the limits of these parameters are. This iterative process will result in an optimized design of the sensor platform.

Analysis of a bull's performance requires comparison of the bull's motion against a known pattern. In order to define "known" patterns, arbitrary performances can be recorded, and a trained observer can assign weights, or scores, to various components. The scoring formula can then be applied to future performances automatically to produce a quantitative value for the bull's performance.

Scores could be calculated in real-time by a slightly more sophisticated sensor platform or calculated after the ride by downloading the sensor data to a personal computer.

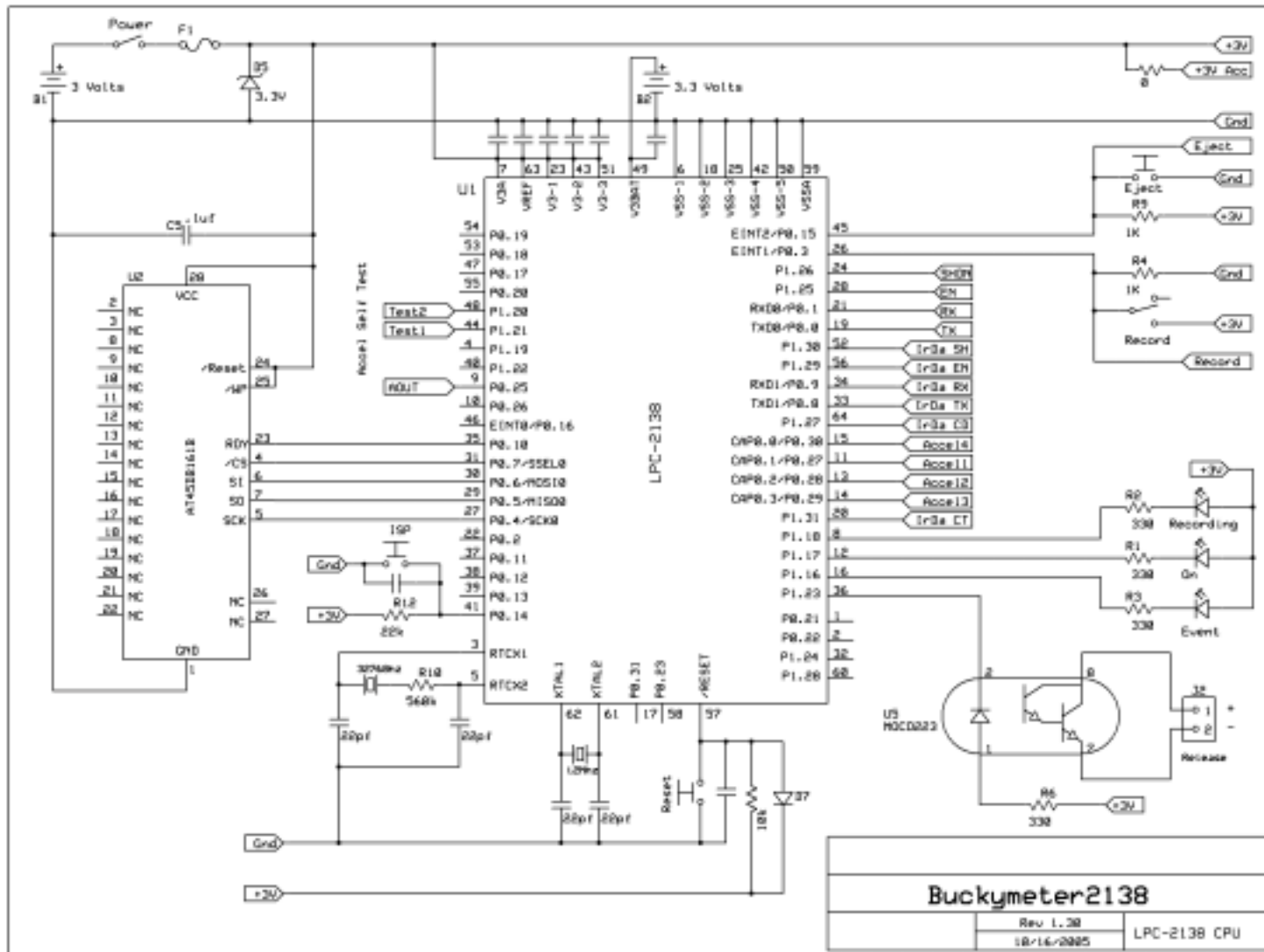
Use of these techniques using existing electronic components and common computing techniques can produce a novel approach to providing objective and repeatable scoring of PBR bulls.

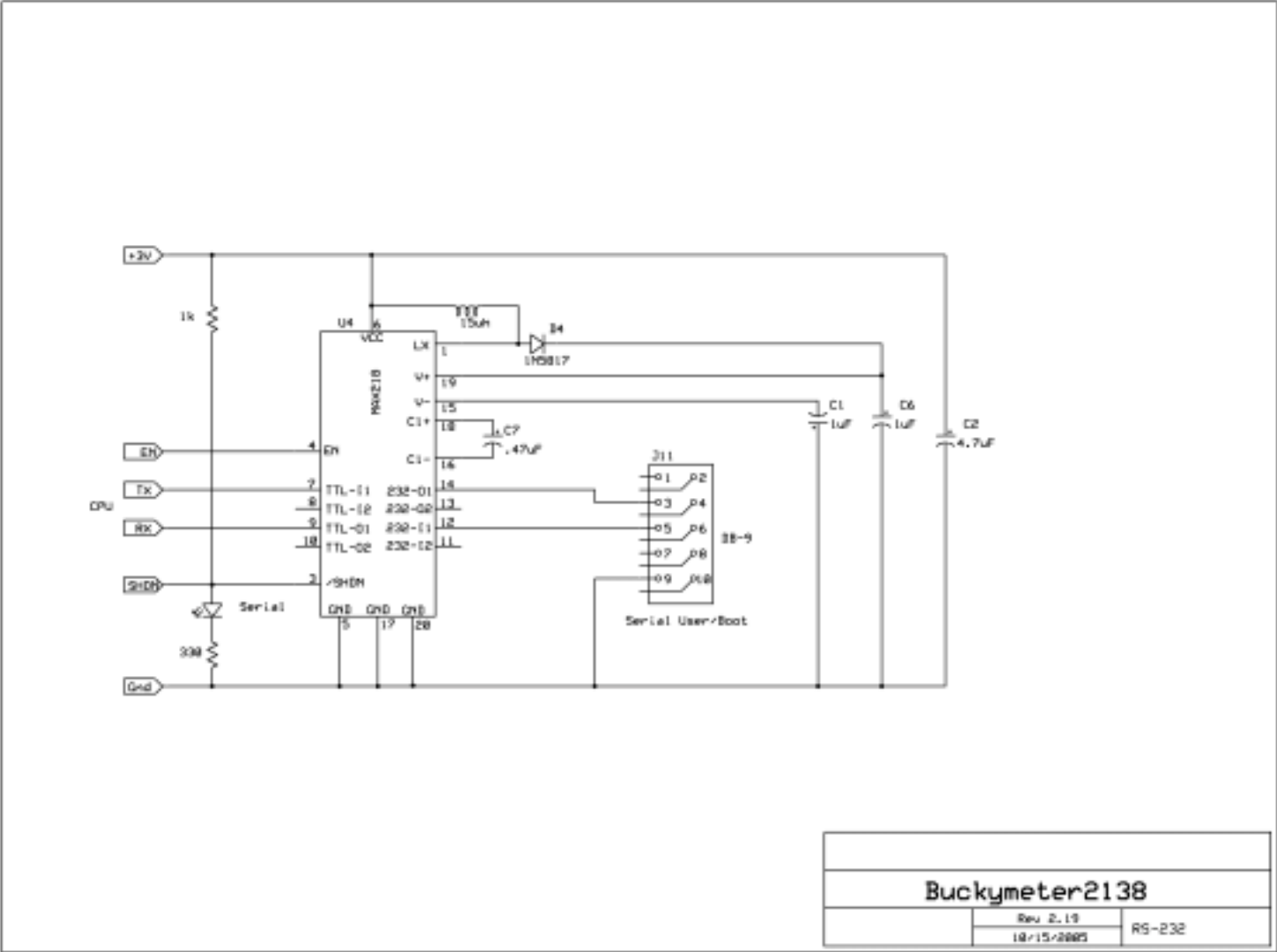
Complete Schematic

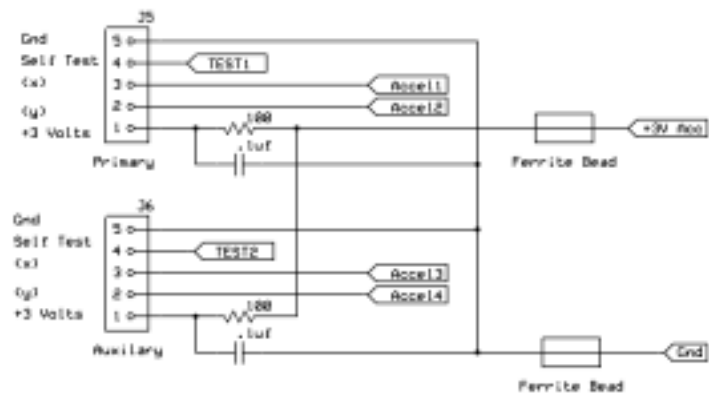
The complete schematic is shown below. The schematic is divided into functional areas with off page markers indicating interconnections between the various sheets of the schematic.

Schematic Pages

CPU	- LPC-2138 CPU Circuitry
RS-232	- Programming and Data Serial Interface
Accelerometers	- Analog Devices Accelerometer Interface
IrDA	- Secondary Communications Interface







Buckmeter2138		
Rev. 3.2		Accelerometers
08-27-2005		

