Machine Access System

Reed Henderson
ETEC 471
Project Proposal
Introduction
The machine access system is a device that monitors and controls the ability for people to use machinery. It has the ability to read ID cards and determine based on its database whether or not to activate the machine. It also has a key pad that will allow administrators to enter and remove users and change user access privileges. Its secondary function is to keep a log of who has been using the machine and for how many hours. This functionality is critical in an environment where many people are using the machine in order to make sure that the machine receives maintenance at proper intervals.

Project Description
The machine access system has four main parts; microcontroller unit, user interface, card reader and machine activation. The microcontroller will take inputs from the card reader and the keypad. The microcontroller unit will output to the LCD display and a relay controlling power to the machine.

User Interface
The user interface consists of a keypad and an LCD display. The machine access system will have a menu system. The main menu will consists of settings and the machine log. The main menu will only be available when the machine is not activated. If settings is selected it will prompt for an access code. The settings would allow for the log to be cleared and for users to be added or deleted. The machine log allows users to view a log of who has been using the machine and how many hours of use the machine has had since the log was last cleared. Once the machine is activated, the keypad will allow the user to deactivate the machine.
Card Reader
The card reader will allow users to scan their ID cards in order to access the machine. This means that the users' existing ID cards can be used without having to make any changes. The machine will be activated if the user has privileges to access the machine. An administrator will have to enter users into the system to give them access privileges.

Machine Activation
The machine activation will consist of a relay that will turn power on to the machine when the relay is activated. This will make for a very simple and reliable way to disable the machine for unauthorized users.

Background and Benefits
Technology is becoming more and more integral to every facet of our lives. Now that machines are becoming more and more technical to use, it is important to make sure that users are educated about how to use the machines. Most machines require some amount of training or at least have a set of instructions. As a result, safety is a big concern. The machine access system will keep people who have not been trained on the machinery from using it and potentially injuring themselves. The cost of machines has increased as a result of the machines being more technical and thus the consequences of misusing a machine or not maintaining it properly can not only be dangerous but costly too. This is why it is important to be able to keep track of who has been using machines and how many hours of use the machine has had since it last received maintenance. In machine shops that have many machines it can be difficult for a shop manager to keep track of when machines need maintenance. This problem is easily resolved by checking the machine access system’s log to see how many hours of use the machine has had since it received maintenance. This system makes using the machine very simple because all that is required is a simple swipe of your ID card.

Societal and Global Impacts
A system for monitoring the use of machinery can reduce the cost of owning machinery by allowing the shop to perform preventative maintenance on machines before problems that are more serious arise. Controlling access to machinery also makes for a safer environment. If untrained people are operating machinery without supervision, they could be endangering not only themselves, but also those around them. Insurance can be expensive for machine shops because there is a high risk of injury when working with machinery. Insurance companies can be reassured that only trained personnel are able to use machinery.

Competing and Similar Products
There are several competing products on the market that have similar function. Some products are meant to be hooked to an alarm system and thus would not be ideal for a machinery application. Most access systems are meant for use with proximity cards but in most cases have the ability to connect to a magnetic strip card reader as an additional input. This feature is critical in order to be compatible with magnetic trip ID card systems.
**Kadtronix OP6600 Programmable Terminal**

One competing product whose function is very similar to that of the machine access system is the Kadtronix OP6600 Programmable Terminal. This device is marketed for use in plants and shops. The retail price for this unit is $219.00 without firmware. It has a 12 button keypad, a self contained LCD display, 8 general purpose I/O’s, a battery- backed database, and a real-time clock. It also has the ability to interface with a computer. It measures 7” x 6” x 2”.

**Keri PXL-500 Tiger Card Access Controller**

The Keri PXL-500 Tiger Card Access Controller is another one of the competitors, although not as ideal in a machinery application. The retail price for this unit is $695.00. This unit boasts a locking metal enclosure, 65K bytes of RAM, and increased EEPROM.

**Development and Demonstration**

Most of the development of this project will occur in the electronics engineering lab (ET340) in the Ross Engineering Technology Building. Everything that I will need for developing the software for the machine access system should be available in the lab. Any hardware that is not available in the lab I should be able to get from either Mouser or Digi-Key. I will be able to build and test most of its functionality within the lab. I will need to hook it up to the machine to ensure that the relay is functioning properly. I will be able to demonstrate everything in the lab using a jigsaw. The method for disabling the jigsaw will be the same as with larger equipment, using a relay. I will be able to show that I can enable and disable the jigsaw by swiping my ID card.