Development of a Simple Train Controller CS 4397.001

Mahmoud, Youssef
yam160130@utdallas.edu

Harris, Collin
chh150030@utdallas.edu

Park, Daniel
dxp123230@utdallas.edu

Foster, Joseph
jpf150030@utdallas.edu

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1 Objective

To develop a program for controlling the train in Lab ECSS 3.217. The control system should implement a simple user interface that allows the user to **ring** the bell, **start** the train, **accelerate** the train, **move** the train, **decelerate** the train, and **stop** the train.

2 Procedure

One of the main features that is unique with our program is the use of macros. This is due our choice of using C as our programming language, which places restrictions on how constants can be used. The program was worked on while we met up in the lab several times, where we experimented a bit with the train hardware and remote control themselves. After we had learned how the train actually operated in practice, we were able to properly debug and develop a program that could interface with the train. There were minor road blocks along the way, such as certain parts of the train not registering the correct input. With C, this was a trivial issue to detect and correct.

The program works by taking user input, then sending messages over UART to the train system. The program allows communication between the user and the train. It first takes a command from the user, and then sends the corresponding UART message to the train. The main difference between this program and general purpose programs is that our program controls hardware directly. That makes this an embedded systems program that's suited for the very specific use of this train system. The hardware itself had to be taken into account since this program was specifically designed to control various moving parts of the train hardware.