Laser Shoot - Out Game
Data Sheet

Proposed Demo

The demonstration of each Senior Project must show the operation of our project in all its modes of operation. It should show that each component and subsystem operates correctly, and that the system overall does what it is designed to do. Therefore, in the demonstration of the Laser Shootout Game, one should be able to power up the system, step through a sample game or two, and power down the system with no major glitches.

In the sample game, all subsystems could be "turned on" as they would be if the laser game was in an actual arcade setting. Then, after the system is ready, two people could go through the process of starting and completing a game: powering up their weapons, firing shots, and noting whether the game records hits, misses, and ammunition counts appropriately. When the game is over, they could verify that the correct win/loss messages are displayed. They could also continue playing games to make sure the system works for all the possible outcomes: win, loss, or tie due to both players running out of ammo.

Additional tests may be performed to demonstrate that not only does the game work, but also that each subsystem is operating as expected, within predefined specifications. Scope readings could be taken to verify that the lasers are transmitting and being received properly, and that the RF link is processing the correct signals. Test subroutines could also be used to display microprocessor memory contents, to verify that the processors are keeping track of game data correctly. Distances and times could be measured to find the maximum ranges for the lasers and RF link, and the typical response times from the laser system and processors. These tests would be especially useful if the overall game does not work properly, both as verification that the subsystems are working, and as a diagnostic tool to find where the problem is.

Detailed Description of User Interface

The main user interfaces are the display boards and the weapons.
Display Boards
The displays are small scoreboards located near each player. They communicate with the weapons and the central controller, and display game information (See table 1). The user interface consists of several LED's and LCD's that display game information. The LED is on if the system is ready and the LCD displays the ammo count and a countdown to begin the game. The LCD also displays the result of the game when it is over. The speaker simulates the report of a firearm when the gun is fired. There are also several buttons in the user interface for power and reset. When the system is set up, the Display ID may also be set to match its associated Weapon ID, so the wireless communication may be synchronized.
Weapons
The weapon is a portable, wireless unit. The user interface has several LED's that represent battery power, low power, and an out of ammo condition. The user interface on the weapon also has buttons for the hammer, trigger, and weapon reset.

Numerical Specifications

Table 1 –Inputs and Outputs

Signal Name	Input/Output	Specification
Central Processor		
Power	Input	+5V
Reset Central Processor	Input	TTL levels
Displays		
Power	Input	+5V
Begin Game	Output	LED
Speaker	Output	A large dB level above ambient room noise
Ammo Count	Output	Display
Win/Lose	Output	Display
Weapon Ready	Output	LED
Weapons		
Battery Power	Input	+5V
Reset	Input	TTL levels
Hammer	Input	TTL levels
Trigger	Input	TTL levels
Laser Receiver	Input	Unknown
Laser Transmitter	Output	Unknown
Low Power	Output	LED
Power Light	Output	LED
Out of Ammo	Output	LED

Table 2 – Coaxial Cable Signal Description

Signal Name	Direction	Specification
Game Reset	From CPU to Displays	A communication standard to be chosen at a later time.
Game Start	From CPU to Displays	
Game Winner	From CPU to Displays	
System Ready	From Displays to CPU	
Target Hit	From Display to CPU	
Weapon Out of Ammo	From Display to CPU	

Table 3 – RF Link Signal Description

Signal Name	Direction	Specification
Weapon Reset	From Weapon to Display	A communication standard to be chosen at a later time.
Weapon Fire	From Weapon to Display	
Target Hit	From Weapon to Display	
Weapon Out of Ammo	From Weapon to Display	