Project Proposal: FPGA Powered Barcode Scanner
Embedded Systems, Professor Edwards

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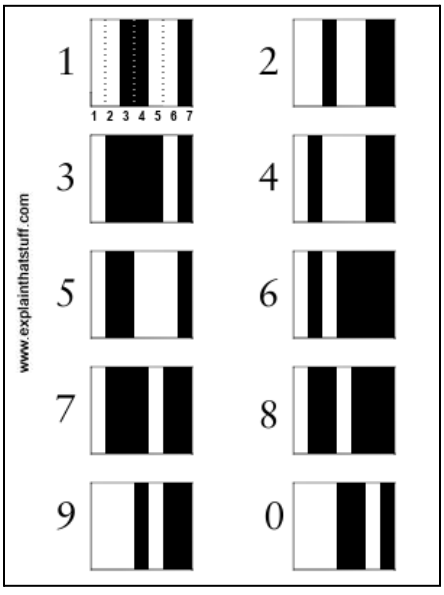
Introduction

For this project, we plan to implement a barcode and/or QRcode scanner. The project will involve using a handheld laser to extract information from a barcode. Although we won't be designing our own laser, we will be designing the hardware connected to the laser which executes the data extraction. Barcodes are used on retail products to represent UPC codes and on books to represent ISBN codes.

System Overview

The barcode either reflects or does not reflect light depending on if it is a white or black portion of the code, respectively. A photodetector sensor will collect the reflected signal and convert the detected light, or lack thereof, into high/low digits. The digits will then map to usable information using a decoder. The typical mapping of barcode to digits is on the right.



Once we've converted the waveform into binary code, we can use it to tell about different products attached to that barcode. Everytime the laser scans correctly, we will update a monitor screen to provide information about the product being scanned. This means we will have a scanner reading the barcode which is also integrated with a display monitor that is updated every time the scanner scans.

Software

SystemVerilog, C

Hardware

Handheld Barcode Scanner (Laser / Photodetector)
FPGA
VGA Monitor
Cords

Possible Additions

If able, we can implement a QR Code Scanner

We could also use the Ethernet connection to look up product data from a database and display it on the screen.