CHARACTER STORAGE AND DISPLAY

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1 Introduction

This lab required us to construct a system of memory modules, multiplexers, and decoders to create a character storage and display system that also includes a rotate feature. This was accomplished by creating individual parts and using them to construct a larger system. The system was all functional in the end, with the exception of parts of the rotation feature.

2 Design

2.1 Memory

The lowest level components are the d-type flip flops. These are used to store character codes that can be chosen by the user. For the final product, there are generated in a group of 4 in order to store 4 of the 3-bit character codes. Their values are referenced by a 12-bit long signal vector that is fed into the multiple multiplexers.

2.2 Character Decoder

The character code chosen by the 5-by-1 multiplexer of the respective display unit is fed into a 7-segment decoder. This feeds a signal representative of a specific character into the 7-segment display. The characters are hard-coded into the hardware and cannot be changed by the user. The default character set is 't', 'i', 'g', 'e', 'r', ' ', but the source code contains another character set in order to display the word "HELLO".

3 Results

Overall, the lab was a success. The shifting functionality has a bug where left-trailing characters do not properly update, and become stuck to the character value of the first memory module. This is most likely due to a generate statement for the multiple multiplexers having undesired logic.

References

[1] J. Y. Gil. LATEX 2$_\varepsilon$ for graduate students. manuscript, Haifa, Israel, 2002.

4 Appendix