

HOMWORK

ASSIGNMENT #4

Due Date: Tuesday, March 31, 1997

Include your name and student ID on homework.

- Create a **synthesizable** Morse Code decoder that accepts a stream of high and low pulses (known as a *dit-dah* pattern) and outputs a stream of ASCII characters that corresponds to a translation of the input data stream.
 - Create a stimulus module that reads a text file consisting of a stream of '.' (dot), '-' (dash) and ' ' (space) *characters* and converts them into a string of *std_logic* '0's and '1's with the correct timing to feed your morse code generator, along with a 92.3 msec clock.
 - Create a testbench entity/architecture pair that instantiates your decoder module along with your stimulus module.
- ◊ Turn in your **code** for the Testbench module, the Stimulus module, and your Morse Code reader module. (HARDCOPY AND E-MAIL)
- ◊ Turn in the **synthesis report** file for your decoder module (target a C3751 device). (E-MAIL ONLY)
- ◊ Turn in a **simulation waveform** (HARDCOPY)

Design Details

Morse Code is a dot-dash pattern for ASCII characters (see accompanying Table.)

The timing of the various *dit-dah* pulses is:

- A dot '.' is a 92.3 millisecond high pulse (1 "count").
 - A dash '-' is a 276.9 millisecond high pulse (3 "counts").
 - A 92.3 millisecond low gap separates each dot and/or dash within an alphabetic character (*intra-character spacing* -- 1 "count").
 - A 276.9 millisecond low gap separates each alphabetic character (*inter-character spacing* -- 3 "counts").
 - A 646.1 millisecond low gap separates each word (*inter-word spacing* -- 7 "counts").
- A *std_logic* 92.3 msec clock, *clkIn*
 - A *std_logic* dit-dah stream, *dataIn*
 - A 8-bit *std_logic_vector* output, *charOut* where the *charOut* is the 8-bit ASCII code for the decoded letter (decimal 65 = 'A' thru decimal 90 = 'Z')
 - A *std_logic* output flag, *validOut*, which is true for one "count" for each *charOut*

What Is Provided

A sample data file with an input *dit-dah* pattern. (Create your own for testing, also.)

File: /home/clark/class/morse.dat

Morse Code Dit-Dah Patterns

| Char | Pattern | Char | Pattern | Char | Pattern |
|------|---------|------|---------|------|---------|
| A | .- | J | .--- | S | ... |
| B | -... | K | -.- | T | - |
| C | -.-. | L | ..-. | U | ..- |
| D | -.. | M | -- | V | ...- |
| E | . | N | -. | W | ..-- |
| F | ..-. | O | --- | X | -.-. |
| G | --- | P | ..--. | Y | -.-. |
| H | | Q | ---.- | Z | ---.. |
| I | .. | R | .-. | | |

