ECE 373 Assignment #8 (6+2) - OPTIONAL
Spring 2022

Descriptors, and bits, and bits, and bits

Assignment 6 saw the first taste of interrupts, descriptors, and DMA. However, when we receive the packets coming off the wire, we haven't been looking at what's in the descriptors at all. This assignment builds on top of Assignment 6, and adds a bit more logic to actually look at the incoming descriptors, and will inspect some bits, and print those values out.

This assignment will be worth a full homework assignment as extra credit. It's not required to do. If you do this, then an additional 100/100 points will be added to your homework grade.

The driver side

First, you should have all of the Assignment 6 set of details working. Once that is completed, let's add a few pieces of inspection to the workqueue task that runs after the interrupt is fired.

Look at the Rx legacy descriptor format in the datasheet. The two fields we want to inspect in this assignment are the Length field, and the Status field.

In your workqueue task, process all the descriptors currently waiting to be processed (i.e. more than one descriptor may have shown up since the interrupt). This should be the delta between HEAD and TAIL. What this entails:

1. For each descriptor between HEAD and TAIL, read in the descriptor from the ring.

2. Read the Status and Length fields from the descriptor you are currently inspecting, and printk() them to the kernel buffer (NOTE: print them as unsigned hex values).

3. Repeat this until you're finished with all pending descriptors.

The e1000e and e1000 code has good examples of how to easily retrieve descriptors from a ring. Refer to the E1000_GET_DESC macro is a useful piece of code to look at for this.

How to finish

Turn in these materials along with Assignment 6 before or at the start of class (the final exam) on **Monday**, **6-June-2022:** (note the same time as assignments #6 and #7)

1. Source code to your user program and Makefile.

2. Note that you will need to unload the current network driver!

3. A typescript of the user program running at least three times.

4. Output out dmesg or /var/log/messages|syslog showing the print output from your driver.