Single Track Automated Level Crossing using z64 processor

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1 Project

1.1 Requirements

A z64 processor manages a single track automated level crossing, composed of a `BAR` device and two `BOA` devices. Trains pass on the track in both directions.

The `BOA` device informs the processor of the approach of a train from one of the two directions in an *asynchronous* manner. When the processor is alerted, it programs the `BAR` device *synchronously* to lower.

When the train has passed, the second `BOA` device informs the z64 that the train has reached a distance of sufficient confidence to raise the bar. The processor will then program (always *synchronously*) the device `BAR` to stand up.

In case a train passes in the opposite direction, the z64 processor will be informed by the two `BOA` devices in order reverse. However, the functioning of the `BAR` must be the same (first it lowers, then it raises).

To design:

- The interfaces of the `BOA` and `BAR` devices
- All the code necessary for the functioning of the level crossing.

1.2 Implementation

1.2.1 Hardware

The `BOA` peripheral is represented as a classic *asynchronous daisy chain* device:

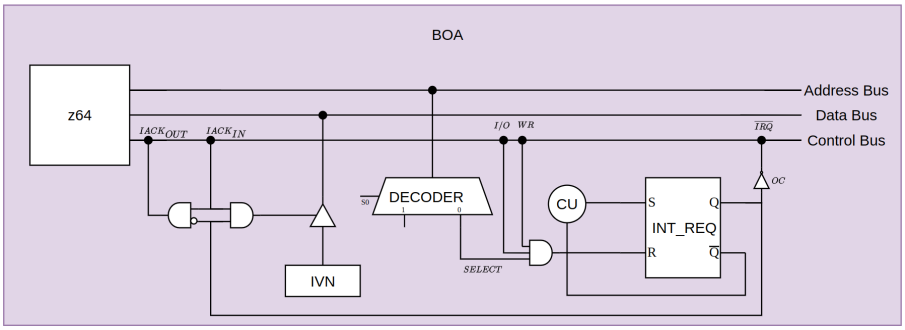

Figure 1. The `BOA` peripheral

The `BAR` peripheral is represented as a *synchronous* device that is used at the firmware level by implementing *busy waiting*:

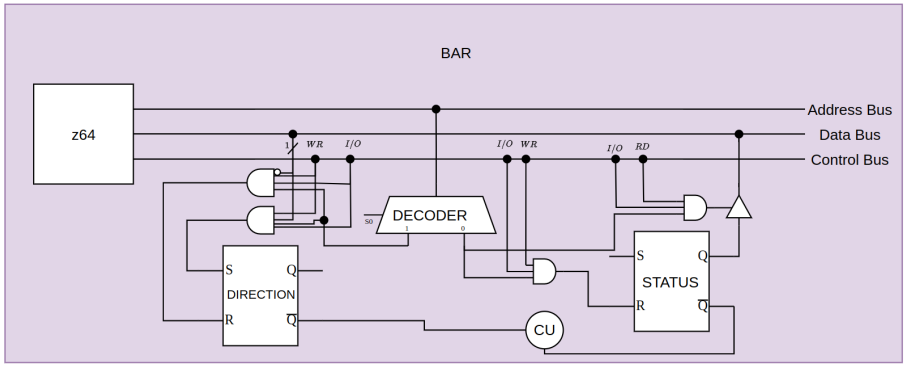

Figure 2. The `BAR` peripheral

1.2.2 Firmware

So, a possible *firmware implementation* can be found here.