

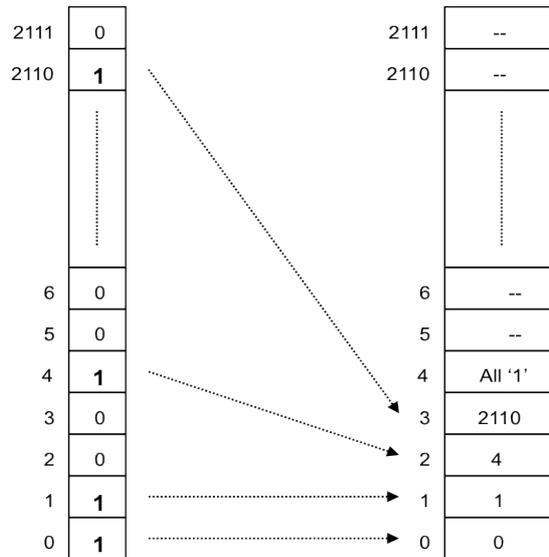
Product table (Part of BN_FORMATTER)

This document contains a description of the product table as it is used as part of the bn_formatter module. The rest of the bn_formatter logic is not described here.

Overview

The total number of products that is calculated by the correlator engine is 2112. A selection of these products, 1 min and 2112 max, must be specified by writing a '1' to the corresponding address location of a product table memory. To indicate that all products of interest have been specified, signal 'mm_wr_ready' must be toggled. The bn_formatter only streams out the data of those products that have been specified. It therefore reads the data from an address store, that contains the addresses of the products inside the correlator engine. If for a specific back node there are no products of interest, then the product table memory should not contain any '1's.

The next figure shows the mapping from the product table to the address store.



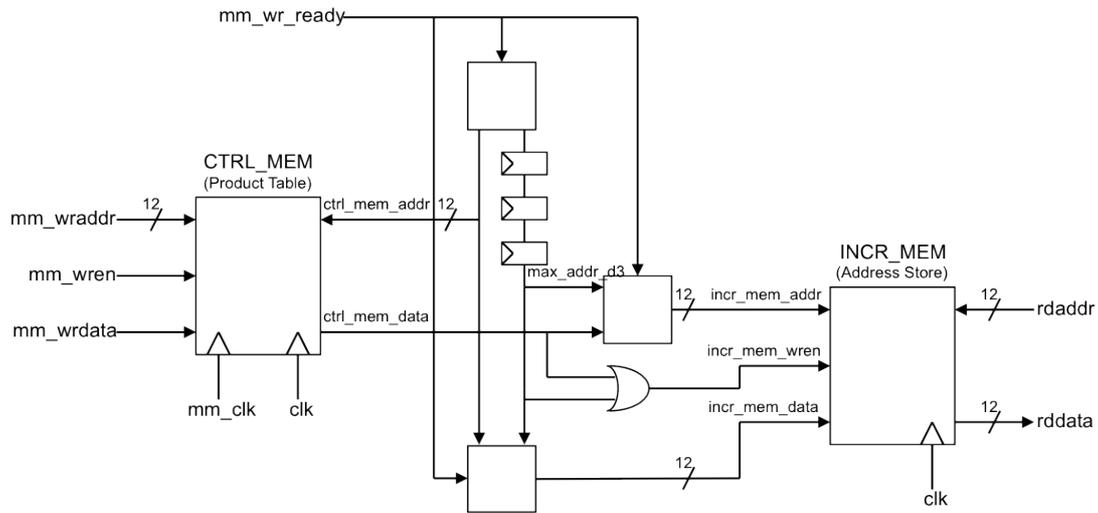
Product table to address store mapping

As an example, the products of interest are: 0, 1, 4 and 2110. The table on the left hand side of the figure is the product table, which is written by the user through the control computer. It contains 2112 address locations. Each location must be written with either '0' or '1'. The 'mm_wr_ready' signal that must be toggled after the last product of interest has been specified starts the process of mapping the product table onto the address store, which is on the right hand side of the figure. The address locations of the product table that contain a '1' are stored in the address store. The addresses are stored adjacent to each other, without gaps.

The location of the address store that follows immediately after the one with the last product of interest is a special one. It contains an all '1' pattern, indicating that the previously read location contained the address of the last product of interest. Based on this all '1' value, reading from the address store is stopped.

Implementation

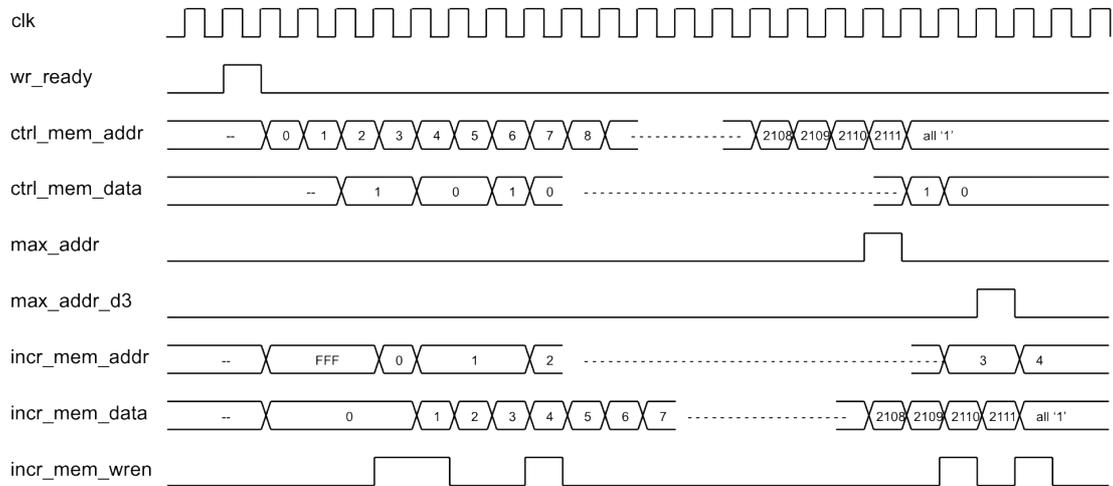
The implementation in hardware is shown in the next figure.



Product table implementation

The size of the product table memory is 4096 locations of 1 bit. The address store contains 4096 locations of 12 bits. The 3 nameless blocks in the figure contain logic which is explained in the VHDL.

The timing diagram is depicted below.



Timing diagram

The data that is written in the address store (INCR_MEM) represents the address pointers where the products of interest are stored in the correlator engine memories. The frame assembler that is part of BN_FORMATTER will read these address pointers from the address store and use them to address the correlator engine memories.