RACE CONDITION FREE SPACEWIRE DECODER FOR FPGA

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Short Paper

Masaharu Nomachi

Laboratory of Nuclear Studies, Graduate School of Science, Osaka University

1-1 Machikaneyama, Toyonaka, Osaka 560-0043, JAPAN

Shigeru Ishii, Yoshikatsu Kuroda, Kazunori Masukawa

Nagoya Guidance & Propulsion Systems Works, Mitsubishi Heavy Industries LTD

1200, O-aza Higashi Tanaka, Komaki, Aichi, 485-8561, Japan

*E-mail: nomachi@lns.sci.osaka-u.ac.jp, shigeru_ishii@mhi.co.jp,
yoshikatsu_kuroda@mhi.co.jp, kazunori_masukawa@mhi.co.jp*

ABSTRACT

Data-Strobe encoding is a simple encoding system. A clock signal is simply recovered by the XOR of Data line and Strobe line. The recovered clock signal may be used to strobe the Data line. This logic is easy to be implemented with small amount of logic. However, this simple decoding way causes a race condition. When Data line changes the state, the recovered clock also changes the state. Therefore, the strobe signal, which is the recovered clock, and the Data are in the race condition. The result depends on propagation delay and set-up/hold time of the device. One has to carefully route the signal in the device. Thus, the race condition obstructs portability of the decoder logic in FPGA.

Simple solution to avoid the race condition is to synchronize the input signals. It is safe and simple way. However, the sampling interval must be shorter than the bit interval. Therefore, this kind of decoder can not extract maximum performance of the logic devices compare to the simple logic using the recovered clock. In this paper, we will present new idea to avoid the race condition. The new decoder logic works up to the maximum speed of devices.