Handling of Input Ready and Data Ready Signals

Each MTCxx produces an Input Ready signal when each non-masked receiver on the board is receiving data and a Data Ready signal when the MTCxx has data that is ready to be transmitted. The MTCxxs have open collector outputs that are pulled up by a resistor for each signal on the MTCM board. This has created a small problem in that the RC time constant to pull high was larger than expected and the signals had a rise time greater than the period of the clock, this paper describes how these 2 signals are handled at the MTCM.

The Input Ready signal is used only for error checking and to create a front panel signal, because of this no special precautions have been taken on Input Ready.

The Data Ready signal is used to create a Send Data signal to the MTCxx boards so it’s timing is critical and we have done several things to make sure that the system acts reliably. The Data Ready signal from the backplane is sent through a shift register that serves as meta-stability protection, the length of the shift register can be adjusted from 1 to 15 by setting the register at 0x10400082. We have defined 3 possible modes of operation, classic, absolute and conditional, that we can select at register 0x10400080, to control how the Data Ready input signal is transformed into the Send Data signal. When in Classic Mode the Send Data signal goes active on the start of the stabilized Data Ready signal and goes inactive after the correct number of pulses in the rotation minus the sync gap (nominally this is 142 but can be adjusted). Absolute and Conditional Modes both determine the location of Send Data from the first occurrence of Data Ready after an Init signal but uses an internal counter to create Send Data for subsequent rotations. There are registers to determine what to preset the internal bunch crossing counter to for the first Data Ready after an Init and another register to set what bunch crossing corresponds to the first crossing with data, which will be when Send Data will be sent. The Send Data signal in Absolute and Conditional Modes also goes inactive after the correct number of pulses in the rotation minus the sync gap (the same as in Classic Mode).