APPENDIX - I

PAL IMPLEMENTATION FOR SIGNAL RETIMING IN HUB

The PAL equations for Signal Retiming in HUB are:

\[ \text{LEFIFO} = ! \left( (PD1 \# PD2 \# PD3) \& \neg \text{EDD} \& \text{THRESH} \right) \]

Whenever there is an edge, the first received bit threshold is High and the pulse width is longer than "1" the fifo is loaded.

\[ \text{LSIN} = ! \left( \neg (PD3 \# (PD2 \# PDO) \# (PD2 \& PD1)) \right) \]

Every pulse longer than 6 is considered to be a long pulse.
\( \overline{\text{CNTPE}} = \overline{! ( ( \text{CNTEN} \& \overline{\text{CNTEND}}) \# \text{CNTTC} )} \)

The reconstruction counter is loaded whenever CNTEN comes active. Meaning the fifo threshold of seven was exceeded and whenever a new pulse is going to be reconstructed.

\( \overline{\text{ODAT}} = \overline{! \text{RESET}} \# ( \overline{\text{CNTPE}} \& \overline{\text{OUTDAT}} ) \# ( \overline{\overline{\text{CNTPE}}} \& \overline{\overline{\text{OUTDAT}}} ) \# ( \overline{\overline{\overline{\text{CNTPE}}}} \& \overline{\overline{\overline{\text{OR}}}} ) \)

The RESET causes the output to go High on initialisation. Whenever CNTPE is Low the ODAT will toggle. The output of the flip-flop will go inactive High when the fifo is empty.