

Maximum Likelihood Symbols Synchronization

Features

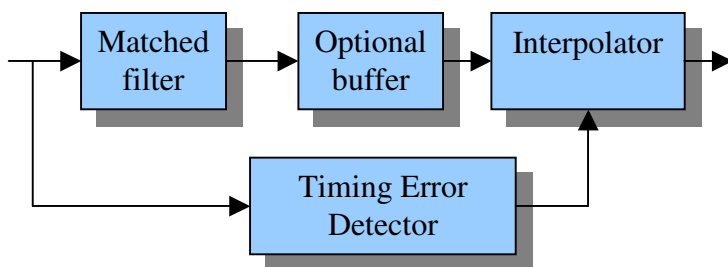
- High speed Symbols Synchronisation core
- Available for all vendors
- Fully pipelined
- Configurable data input size
- Maximum likelihood and Non Data Aided Algorithm

Application

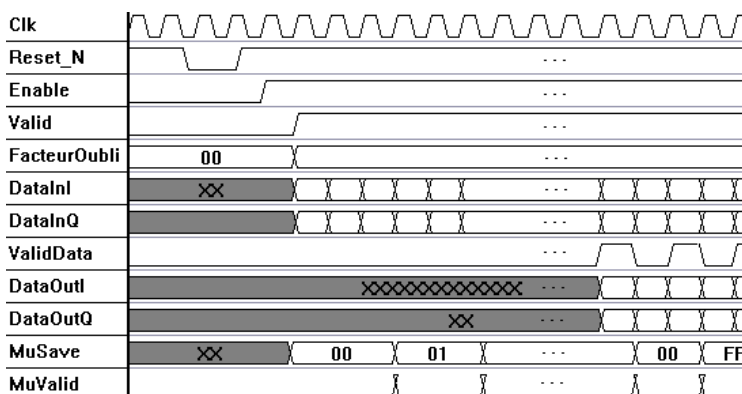
The Maximum Likelihood Symbols Synchronization systems can be used in communication systems.

Functional description

Symbols synchronization is performed with the Maximum Likelihood algorithm. Input Data are oversampled by about 2 and output data are exactly at the symbol rate when strobe is on. The Matched filter is based on a squared root raised cosine with configurable roll-off and can easily be modified (length, type ...). Input and output data size are easily configurable.



Timing



I/O

Signal	Direction	Width	Function
SizeInputTED	Generic integer	12	Input data size
SizeOutputTED	Generic integer	12	Coefficient size in interpolator
SizeInterpollator	Generic integer	12	Output data size (and data in interpolator)
SizeChoixAlpha	Generic integer	2	Number of Roll-off for Matched Filter
Clk	IN	1 bit	Input clock
Reset_n	IN	1 bit	Reset (active Low)
Enable	IN	1 bit	Enable
Valid	IN	1 bit	Input validation
DataInI	IN	SizeInputTED	Real input data
DataInQ	IN	SizeInputTED	Imaginary input data
ChoixAlpha	IN	SizeChoixAlpha	Roll-off selection
ForgettingFactor	IN	5 bits	IIR filter parameter
DataOutI	OUT	SizeInterpollator	Real output data
DataOutQ	OUT	SizeInterpollator	Imaginary output data
ValidData	OUT	1 bit	Strobe of
MuSave	OUT	SizeInterpollator	Debug signal
muValid	OUT	1 bit	Debug signal

Performance characteristics

Speed and area for this core depend on word size and matched filter length.

For example, with 12 bits input words, 11 bits output words, and 11 bits words in interpolator, 3 roll-off selection for the matched filter with 35 taps, the core takes 9300 slices and run at 130MHz on a Xilinx Virtex 4 SX35.