

DFPDIV

Floating Point Pipelined Divider Unit

v. 2.21

OVERVIEW

The DFPDIV uses the **pipelined** mathematics algorithm to divide two arguments. The input numbers format is compliant with IEEE-754 standard. DFPDIV supports single precision real number. Divide operation was pipelined up to 21 levels. Input data are fed every clock cycle. The first result appears after 21 clock periods latency and next results are available **each clock** cycle. Full IEEE-754 precision and accuracy are included.

APPLICATION

- Math coprocessors
- DSP algorithms
- Embedded arithmetic coprocessor
- Data processing & control

KEY FEATURES

- Full IEEE-754 compliance
- Single precision real format support
- Simple interface
- No programming required
- 21 levels pipeline
- Full accuracy and precision
- Results available at every clock
- Overflow, underflow and invalid operation flags
- Fully configurable
- Fully synthesizable, static synchronous design with no internal tri-states

DELIVERABLES

- ◆ Source code:
 - VHDL Source Code or/and
 - VERILOG Source Code or/and
 - FPGA netlist
- ◆ VHDL & VERILOG test bench environment
 - Active-HDL automatic simulation macros
 - NCSim automatic simulation macros
 - ModelSim automatic simulation macros
 - Tests with reference responses
- ◆ Technical documentation
 - Installation notes
 - HDL core specification
 - Datasheet
- ◆ Synthesis scripts
- ◆ Example application
- ◆ Technical support
 - IP Core implementation support
 - 3 months maintenance
 - Delivery the IP Core updates, minor and major versions changes
 - Delivery the documentation updates
 - Phone & email support

LICENSING

Comprehensible and clearly defined licensing methods, without royalty-per-chip fees, make using of IP Core easy and simple.

Single Site license option – it is dedicated for small and middle sized companies, running their business at one location.

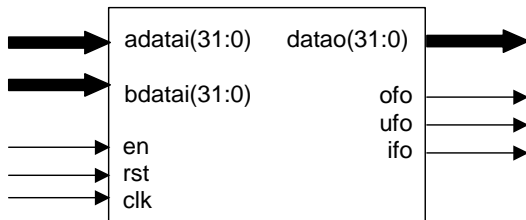
Multi Sites license option – it is dedicated for corporate customers, running their business at several places. Licensed product can be used in selected company branches. In all cases, number

of IP Core instantiation within a project and number of manufactured chips are unlimited. The license is royalty-per-chip free. There is no restrictions regarding the time of use.

There are two formats of delivered IP Core

- VHDL, Verilog RTL synthesizable source code called HDL Source
- FPGA EDIF/NGO/NGD/QXP/VQM called Netlist

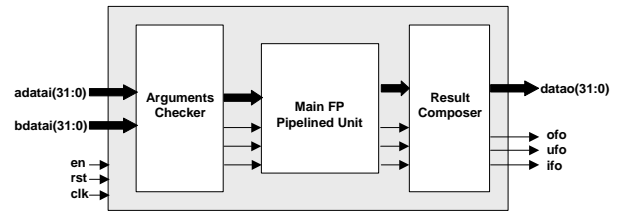
SYMBOL



PINS DESCRIPTION

PIN	TYPE	DESCRIPTION
clk	Input	Global system clock
rst	Input	Global system reset
en	Input	Enable computing
adatai[31:0]	Input	A data bus input
bdatai[31:0]	Input	B data bus input
datao[31:0]	Output	Data bus output
ofo	Output	Overflow flag
ufo	Output	Underflow flag
ifo	Output	Invalid result flag

BLOCK DIAGRAM



Arguments Checker - performs input data analysis against IEEE-754 number standard compliance. The appropriate numbers and information about the input data classes are given as the results to Main FP Pipelined Unit.

Main FP Pipelined Unit - performs floating point divide function. Gives the complex information about the results and makes final flags settings.

Result Composer - performs result rounding function, data alignment to IEEE-754 standard and the final flags setting.

PERFORMANCE

The following table gives a survey about the Core area and performance in the ASIC devices :

Device	Optimization	Gates	F _{max}
0.25u typical	area	15500	40 MHz
	speed	20900	100 MHz
0.18u typical	area	14000	70 MHz
	speed	19400	150 MHz

Core performance in ASIC devices



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