

MPSoC-DMA WIKI

Definition

A Direct Memory Access (DMA) is a feature of computer systems that allows hardware subsystems to access main system memory (Random Access Memory), independent of the Processing Unit (PU). A PU inside a SoC can transfer data to and from its local memory without occupying its processor time, allowing computation and data transfer to proceed in parallel.

Open Source Tools

Verilator

Hardware Description Language SystemVerilog Simulator

```
git clone http://git.veripool.org/git/verilator
```

```
cd verilator
autoconf
./configure
make
sudo make install

cd sim/verilog/regression/wb/vtor
source SIMULATE-IT

cd sim/verilog/regression/ahb3/vtor
source SIMULATE-IT
```

Icarus Verilog

Hardware Description Language Verilog Simulator

```
git clone https://github.com/steveicarus/iverilog
```

```
cd iverilog
./configure
make
sh autoconf.sh
sudo make install

cd sim/verilog/regression/wb/iverilog
source SIMULATE-IT

cd sim/verilog/regression/ahb3/iverilog
source SIMULATE-IT
```

GHDL

Hardware Description Language GHDL Simulator

```
git clone https://github.com/ghdl/ghdl
```

```
cd ghdl
./configure --prefix=/usr/local
make
sudo make install

cd sim/vhdl/regression/wb/ghdl
source SIMULATE-IT

cd sim/vhdl/regression/ahb3/ghdl
source SIMULATE-IT
```

Yosys-ABC

Hardware Description Language Verilog Synthesizer

```
git clone https://github.com/YosysHQ/yosys
```

```
cd yosys
make
sudo make install

cd synthesis/yosys
source SYNTHESIZE-IT
```

Instruction INPUTS/OUTPUTS AMBA3 AHB-Lite Bus

Port	Size	Direction	Description
HRESETn	1	Input	Asynchronous Active Low Reset
HCLK	1	Input	System Clock Input
IHSEL	1	Output	Instruction Bus Select
IHADDR	PLEN	Output	Instruction Address Bus
IHRDATA	XLEN	Input	Instruction Read Data Bus
IHWDATA	XLEN	Output	Instruction Write Data Bus
IHWRITE	1	Output	Instruction Write Select
IHSIZE	3	Output	Instruction Transfer Size
IHBURST	3	Output	Instruction Transfer Burst Size
IHPROT	4	Output	Instruction Transfer Protection Level
IHTRANS	2	Output	Instruction Transfer Type

Port	Size	Direction	Description
IHMASTLOCK	1	Output	Instruction Transfer Master Lock
IHREADY	1	Input	Instruction Slave Ready Indicator
IHRESP	1	Input	Instruction Transfer Response

Instruction INPUTS/OUTPUTS Wishbone Bus

Port	Size	Direction	Description
rst	1	Input	Synchronous Active High Reset
clk	1	Input	System Clock Input
iadr	AW	Input	Instruction Address Bus
idati	DW	Input	Instruction Input Bus
idato	DW	Output	Instruction Output Bus
isel	DW/8	Input	Byte Select Signals
iwe	1	Input	Write Enable Input
istb	1	Input	Strobe Signal/Core Select Input
icyc	1	Input	Valid Bus Cycle Input
iack	1	Output	Bus Cycle Acknowledge Output
ierr	1	Output	Bus Cycle Error Output
iint	1	Output	Interrupt Signal Output

Data INPUTS/OUTPUTS AMBA3 AHB-Lite Bus

Port	Size	Direction	Description
HRESETn	1	Input	Asynchronous Active Low Reset
HCLK	1	Input	System Clock Input
DHSEL	1	Output	Data Bus Select
DHADDR	PLEN	Output	Data Address Bus
DHRDATA	XLEN	Input	Data Read Data Bus
DHWDATA	XLEN	Output	Data Write Data Bus
DHWRITE	1	Output	Data Write Select
DHSIZE	3	Output	Data Transfer Size
DHBURST	3	Output	Data Transfer Burst Size
DHPROT	4	Output	Data Transfer Protection Level
DHTRANS	2	Output	Data Transfer Type
DHMASTLOCK	1	Output	Data Transfer Master Lock
DHREADY	1	Input	Data Slave Ready Indicator
DHRESP	1	Input	Data Transfer Response

Data INPUTS/OUTPUTS Wishbone Bus

Port	Size	Direction	Description
rst	1	Input	Synchronous Active High Reset
clk	1	Input	System Clock Input
dadr	AW	Input	Data Address Bus
ddati	DW	Input	Data Input Bus
ddato	DW	Output	Data Output Bus
dsel	DW/8	Input	Byte Select Signals
dwe	1	Input	Write Enable Input
dstb	1	Input	Strobe Signal/Core Select Input
dcyc	1	Input	Valid Bus Cycle Input
dack	1	Output	Bus Cycle Acknowledge Output
derr	1	Output	Bus Cycle Error Output
dint	1	Output	Interrupt Signal Output