

# MPSoC-MPI WIKI

## Definition

A Message Passing Interface (MPI) uses an object model to distinguish the general function from the specific implementations. The invoking program sends a message and relies on the object to select and execute the appropriate code. Using an intermediate layer essentially falls into two categories: encapsulation and distribution. Objects should be able to invoke services on other objects without knowing or caring about how those services are implemented.

## 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

Port	Size	Direction	Description
IHBURST	3	Output	Instruction Transfer Burst Size
IHPROT	4	Output	Instruction Transfer Protection Level
IHTRANS	2	Output	Instruction Transfer Type
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

Port	Size	Direction	Description
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