

"Software product that requires user guide will not sell" - Amir

Register File Generator

The goal is to make simplest to write/use/maintain register file generator.

"Less is more".

The input format is text file, editable by vim or emacs. Dont allow complex directives. Use minimal number of directives. Most registers defined in one line. While register can have fields, don't define just one field. It is almost stupid.

Registers and Fields appear on the header under their names. Unique fields keep their names. If You must use same field names in several registers, Register name will be prefixed. Unless suffix/prefix is defined from that register.

chip line

First line in any register definition file is chip line.

- **chip** Regfilename **apb wid=32 addrwid=20 reset=async empty=0xdeadbeaf**
wid= is data bus width
addrwid= defines address bus width
reset= can be async or sync
empty= defines data returned on read from not used location.

register line

- **reg** Regname **wid=32 access=rw reset=0x232 desc=Descr ready=true prefix=aa suffix=aa fields=external**

REG parameters

width (or wid) is register width. It can be any number, including big numbers like 500. In case there are fields, wid parameter is not required.

access can be rw (or wr) , ro , rw_pulse, ro_pulse,

description Has either no spaces, or enclosed in "...".

reset is relevant to writable registers.

ready=true is relevant to ro_pulse registers. specific ready signal to this reg will stall the APB.

prefix or **suffix** is relevant to fields of this register, if the field can be double used.

fields=external causes the fields split to be written in separate file. It makes easier to pass wide busses through hierarchies.

FIELDS

field lines follow their register line.

Fields dont have access. The access (read/write/...) is determined by the register.

Fields should have width parameter and may have description.

field Name **wid**=8 **align**=16 **desc**=DESC

align is misnomer. It is the number of bits the field will be allocated in register. Active bits are defined by wid (or synonym width).

TEMPLATE ans INSTANCE

1. **template** Tname

reg ...

reg ...

reg

endtemplate

Template works like macro.

2. **instance** Tname Iname

instance will expand the template, where all registers and fields will be prefixed with Iname.

GAP

gap align=1024 **abs**=0x1000

defined jump in address. Only one: align or abs is allowed.

EXTERNAL

ram Name **wid**=32 **depth**=1024 **desc**=Description

Ram adds interface to external ram module. it adds read/write/addr/rdata/wdata ports. Width of ram cannot be wider than apb bus.

reg Name **access**=external **wid**=23

similar interface to ram, just without depth.

Files generated

Verilog RTL file is generated. Additional several formats are generated - include files and documentation.

look for examples in examples/ directory.

Here is one example:

```
chip ready_rgf apb reset=async wid=32 addrwid=16 empty=0xdeadbeaf
# this is comment
reg ronly access=ro_pulse wid=32 ready=true
reg ronly2 access=ro_pulse wid=16 ready=true
reg rega wid=32 access=rw reset=0x123456 desc="first register to work"
// this is also comment
reg control0 wid=32 access=rw reset=0xcc00 desc=control.register
reg statusa wid=24 access=ro
field dma0 wid=2 align=8
field cpul wid=8
```

```
field spi0 wid=3 desc=spi.status

reg regb wid=24 access=rw_pulse reset=0x0
field odma wid=2 align=8
field ocpu wid=8
field ospi wid=3 desc=spi.status

end
```

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