Superuser Memory Area

Setting The Superuser memory area

The superuser memory area can be set to start at a specific location and at the same time the size of the area is also selected. The location and size of the superuser memory area (protected memory area) must be set before synthesis of the core by editing the file **configuration_pkg.vhd**.

In the file **configuration_pgk.vhd** the superuser memory area is defined by the following constants.

mask_def : Zeros at the least significant end of this binary number indicate the length of the superuser memory area. The length of the superuser memory area is 2^X , where X is the number of zeros. All other bits in this binary number must be ones. In other words, this bit vector defines which bits are checked, when considering whether an address is in the superuser area or not. Bits which are not checked are masked.

bits_def : This binary number declares the most significant bits of the superuser memory area. In other words it indicates the highest address of the superuser memory area. The corresponding bits at the least significant end, which are zeros in the **mask_def** constant, are *don't care* bits in this number.

The vectors **bits_def** and **mask_def** enable a fast detection of address validity without requiring any subtraction to be done. They also provide flexibility when setting the position and size of the superuser memory area.

The examples below clarify the declaration of the size and position of superuser memory area.

Example 1

The superuser memory area is set between 00000000 Hex ... 00000FFF Hex.
In this case the **bits_def** constant is 00000xxx Hex, where x indicates a *don't care* bit.
The **mask_def** constant is then FFFFF000 Hex.

Example 2

The superuser memory area is set between 00101000 Hex ... 00101FFF Hex.
The **bits_def** constant is set to be 00101xxx Hex, where x indicates a *don't care* bit.
The **mask_def** constant is set to FFFFF000 Hex.

The table below lists the choices when setting the superuser memory area.

checked bits	super user address space size	Number of possible start addresses	Space between blocks (start addresses)
1	2G	2	2G
2	1G	4	1G
3	512M	8	512M
4	256M	16	256M
5	128M	32	128M
6	64M	64	64M
7	32M	128	32M
8	16M	256	16M
9	8M	512	8M
10	4M	1K	4M
11	2M	2K	2M
12	1M	4 K	1M
13	512K	8 K	512K
14	256K	16 K	256K
15	128K	32 K	128K
16	64K	64 K	64K
17	32K	128 K	32K
18	16K	256 K	16K
19	8K	512 K	8K
20	4K	1M	4K
21	2K	2 M	2K
22	1K	4 M	1K
23	512	8 M	512
24	256	16 M	256
25	128	32 M	128
26	64	64 M	64
27	32	128 M	32
28	16	256 M	16
29	8	512 M	8
30	4	1G	4
31	2	2G	2
32	1	4G	1

For example a 64K operating system block can be placed at 65536 different addresses. Example from real life: Real time operating system QP (Softman oy ,Helsinki) needs less than 5KB ROM and about the same amount of RAM. RAM usage depends on the number of tasks.