

**FAQ0065**

Frequently Asked Questions

Float variable address must be 4-byte aligned after FPU enable

**Questions:**

**Why does the float variable address must be 4-byte aligned after FPU is enabled?**

**Answer:**

When the FPU is enabled, if float variable address is not 4-byte aligned, Hard Fault will be entered. As shown in the figure below, thest1 is not 4-byte aligned, the program enters HardFault\_Handler.

```
test1 = (float*)test_arr;
test1 = (float*)((uint32_t)&test_arr[0]+2);
*test1 = 0.52f;
*test2 = 0.52f;
```

Name	Value	Type
fpu	<cannot evaluate>	uchar
test1	0x20010486	float *
test1 [0]	0	float
test2	0x20000008 &fpu2	float *
test2 [0]	0	float
<Enter expression>		

```
/**
 * @brief this function handles hard fault exception.
 * @param none
 * @retval none
 */
void HardFault_Handler(void)
{
    /* go to infinite loop when hard fault exception occurs */
    while (1)
    {
    }
}
```

By changing the code as follows, the program can return to normal.

```
test1 = test_arr;
test1 = ((&test_arr[0] + 2));
*test1 = 0.52f;
*test2 = 0.52f;
```

Name	Value	Type
fpu	<cannot evaluate>	uchar
test1	0x2001048C	float *
test1 [0]	0.519999981	float
test2	0x20000008 &fpu2	float *
test2 [0]	0.519999981	float
<Enter expression>		

**Type:** Development tool

**Applicable products:** AT32F403, AT32F403A, AT32F413, AT32F407, AT32F435, AT32F437

**Main function:** None

**Minor function:** None

**Document revision history**

<b>Date</b>	<b>Revision</b>	<b>Changes</b>
2022.2.15	2.0.0	Initial release

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