

# Log book

04/02/2026

**Problem-** uC STM32 target not found upon trying to program it using st-link

1. Trying to see if the uC pins are soldered properly- using multimeter probing and camera-  
[swd - Cannot Program a Custom STM32 Board - Electrical Engineering Stack Exchange](#)

I found this error after following this instruction: "Use a multimeter and test all of the connections for shorts or lack of connection. Remember to touch the pins/pads/whatever really gently, because if you press the probe hard, you may "fix" the connection temporarily (for example you push the pin of IC to the trace on PCB and the test is OK, but as soon as you let go the pin bends up again)."

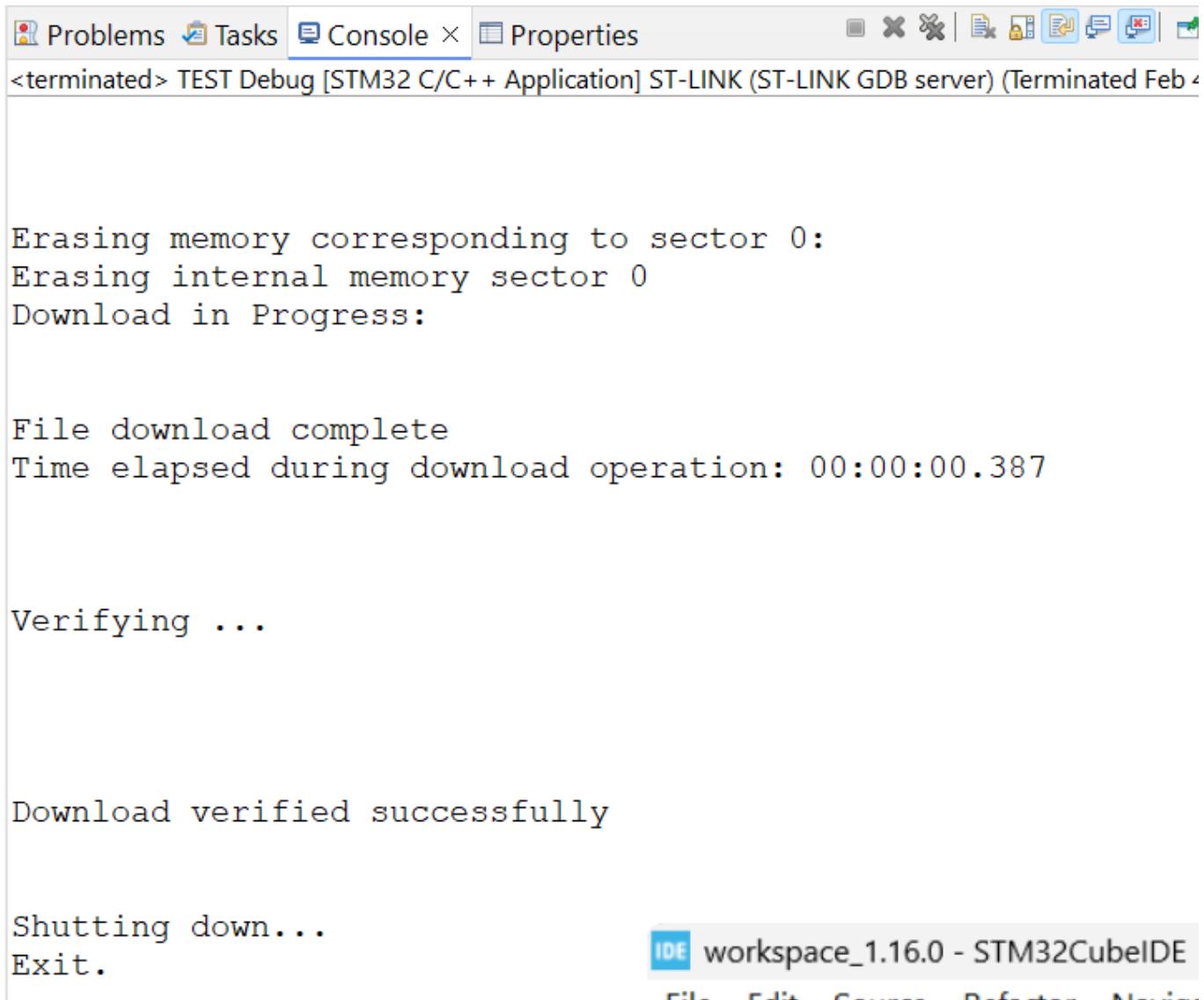
some pins of the microcontroller are very shaky, upon applying some pressure sideways than the other, maybe they are not soldered properly

 20260204-145733-324.wmv

7:33 p.m.

programmed successfully, turns out the SWCLK pin was hovering over the pad and not actually soldered- as you can see in the above video, fixed that by soldering each of the pin

still left to check and solder rest of the shaking pins



Problems Tasks Console Properties

<terminated> TEST Debug [STM32 C/C++ Application] ST-LINK (ST-LINK GDB server) (Terminated Feb 4, 2024, 1:40:38 PM)

```
Erasing memory corresponding to sector 0:  
Erasing internal memory sector 0  
Download in Progress:  
  
File download complete  
Time elapsed during download operation: 00:00:00.387  
  
Verifying ...  
  
Download verified successfully  
  
Shutting down...  
Exit.
```

task:

1. Solder MPU6050 and clock crystal
2. Get output from MPU6050, take files from MPU6050 library, implement the changed code, apply whatever filter required, to stabilize the output- get quick working model, if possible use visual python or see the output in a form of a graph
3. Test the IR led circuit

## 05/02/2026

1:40 p.m. upon soldering the HSE ceramic oscillator and configruign RCC to hig speed external, we are getting an error

```

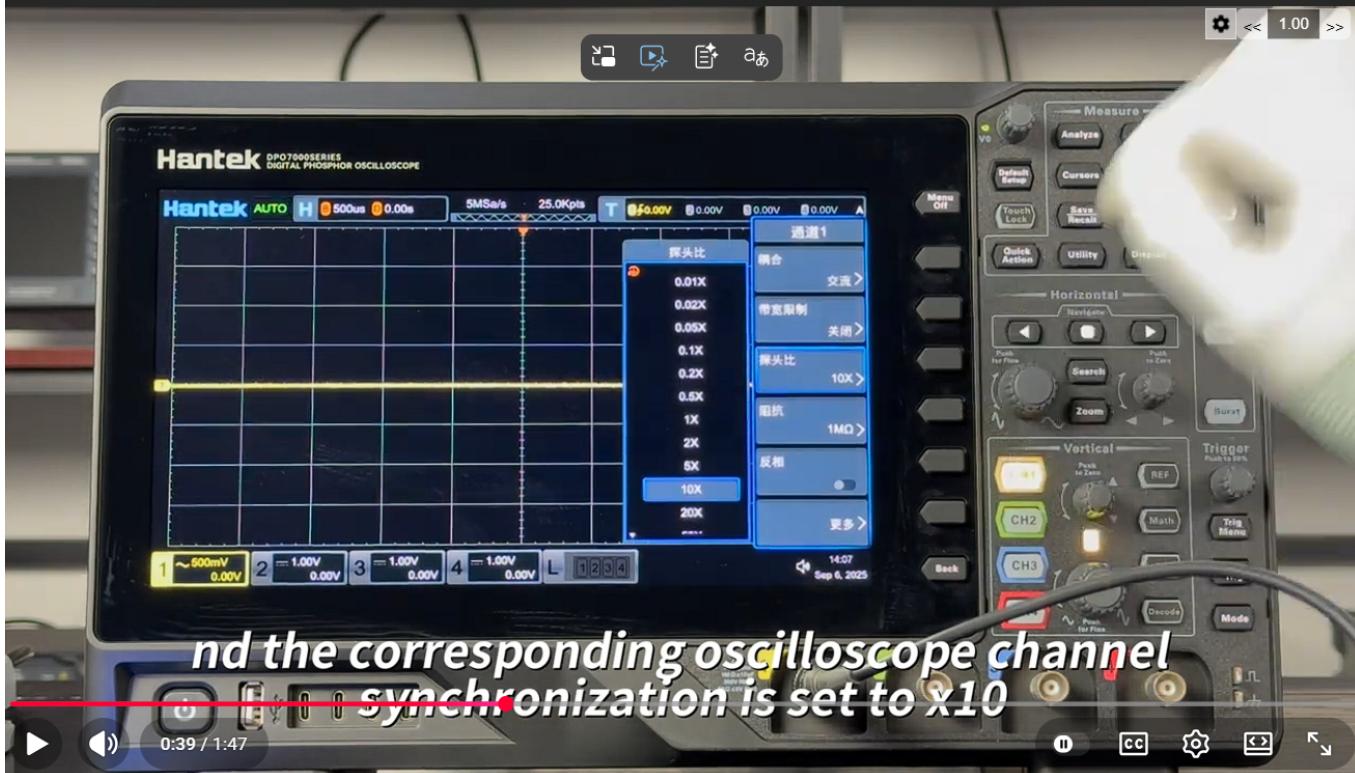
Break at address "0xf000b580" with no debug information available, or outside of program code.
View Disassembly...
Configure when this editor is shown Preferences...
f000b575: ldrb r1, [r5, #2]
f000b577: strb r4, [r0, #40] @ 0x28
f000b579: b.n 0xf000af26
f000b57b: add r1, sp, #892 @ 0x37c
f000b57d: strh r4, [r3, #24]
f000b57f: ldr r2, [r1, r7]
f000b581: ldr r7, [pc, #684] @ (0xf000b830)
f000b583: ldr r7, [r5, #36] @ 0x24
f000b585: subs r7, r4, r1
f000b587: ldr r2, [r0, r5]
f000b589: umaal r2, r1, r3, r6
f000b58d: add r4, pc, #452 @ (adr r4, 0xf000b754)
f000b58f: strh r5, [r7, #8]
f000b591: add r3, pc, #504 @ (adr r3, 0xf000b78c)
f000b593: lsls r7, r0, #12
f000b595: asrs r6, r0, #24
f000b597: ldr r2, [r0, #32]
f000b599: subs r7, r4, r3
f000b59b: add r3, sp, #372 @ 0x174
f000b59d: add r0, r8
f000b59f: lrsr r0, r2, #25
f000b5a1: @ <UNDEFINED> instruction: 0xee67489d
f000b5a5: b.n 0xf000ba82
f000b5a7: add r4, pc, #136 @ (adr r4, 0xf000b630)
f000b5a9: ldrb r6, [r0, #7]
f000b5ab: ldr r2, [sp, #772] @ 0x304
f000b5ad: asrs r3, r3, #16
f000b5af: asrs r5, r4, #24
f000b5b1: vpmmax.ul6 <illegal reg q13.5>, q14, q8
f000b5b5: mov r8, r0
f000b5e7: ldr r7, [r5, #41]

```

yet to test the output with AD2 scope, because we should use a low capacitance probe preferably scope with 10x impedance to measure the signal

## measuring the output of oscillator

the attenuation of the measuring probe must be set to 10x to reduce attenuation and reduce load effects, also the ground probe of the measuring probe must be as short as possible. The bandwidth of the oscilloscope must be 5 times the measuring device



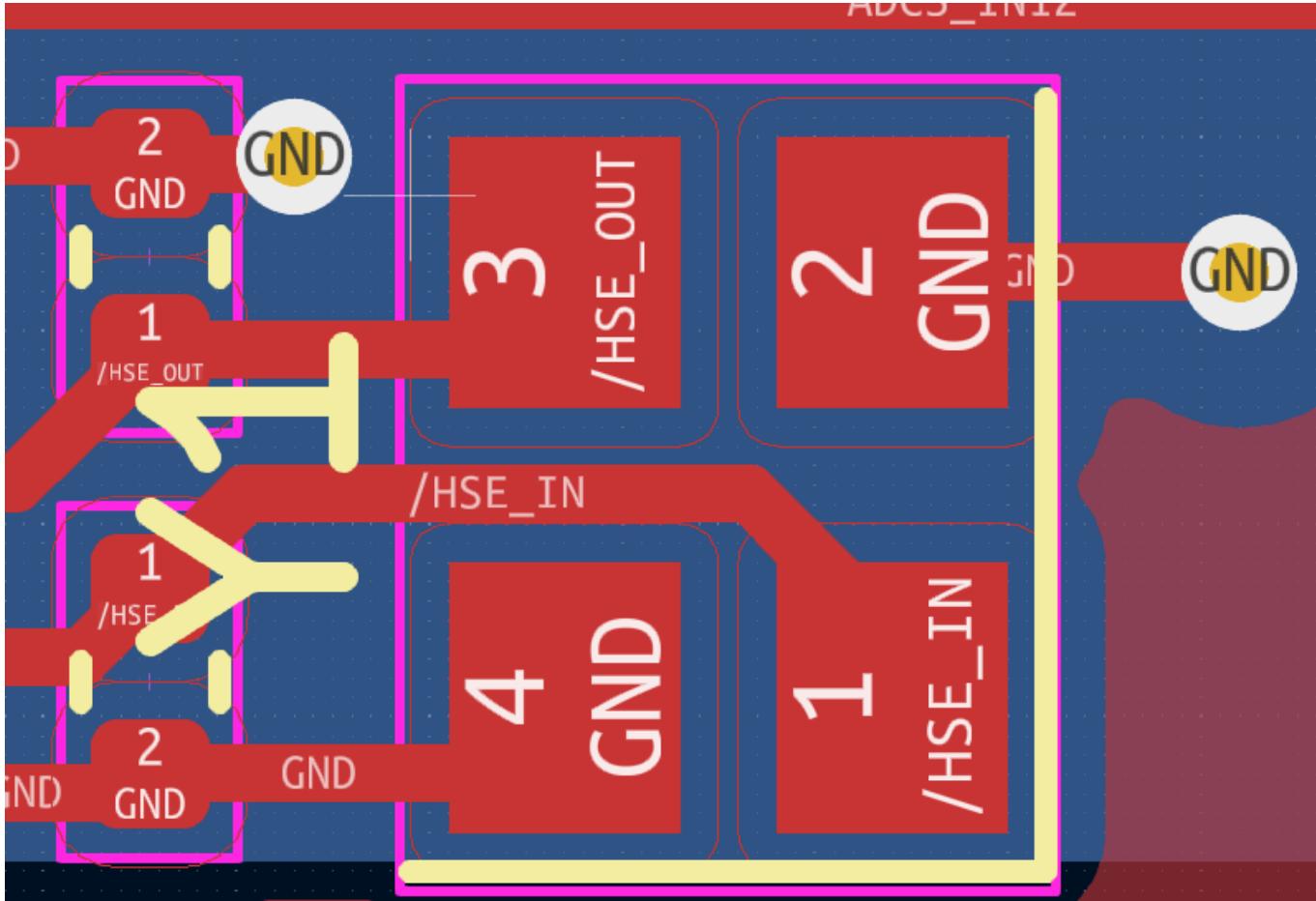
4:12 am- tried measuring the output of the oscillator using AD2, it was not that good, one probe at the ground leg and the other probe at the HSE\_OUT, was getting some random waveform

Not sure if the way I measured was right,

## [How To Test A Crystal Oscillator Using An AWG and a 'Scope](#)

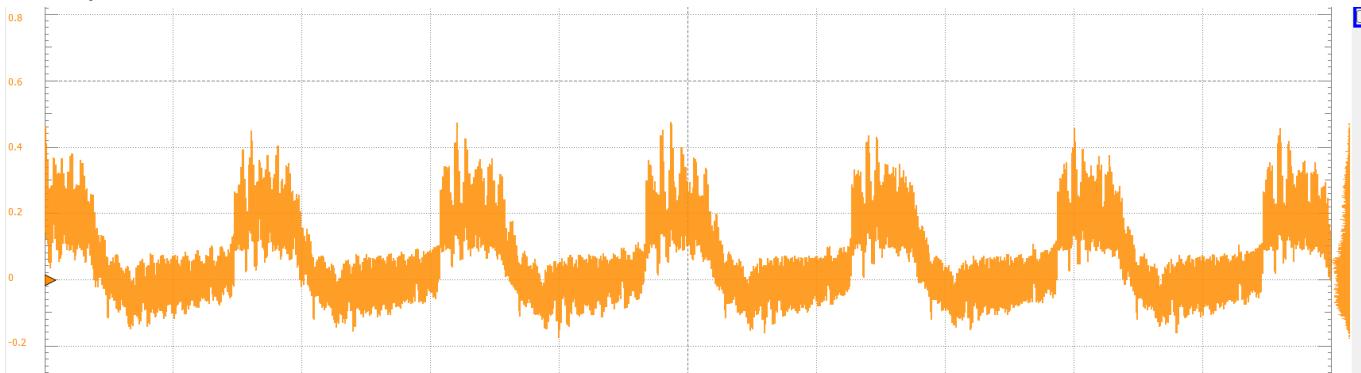
The above video uses a wavegenerator and the scope , ties the ground of the wavegen and the scope, connects the wavegen to one leg of the crystal oscillator and the other to the oscilloscope, basically sending a sine wave through the crystal and measuring the response at the "output"

4:16 a.m. , going to send the sinewave at the HSE\_Input and see the output, oscilloscope ground and the negative terminal of AD2 are both connected together,  
I will not connect the ground of the crystal oscillator and the

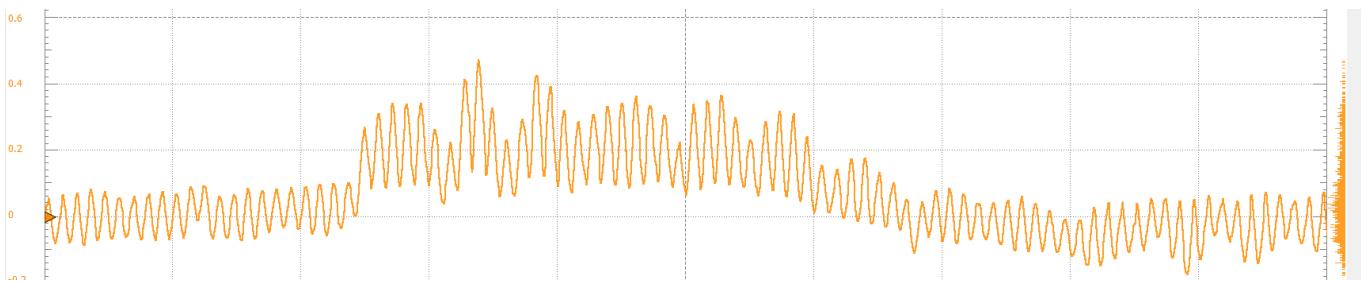


Upon giving a 5Khz sinewave at HSE IN

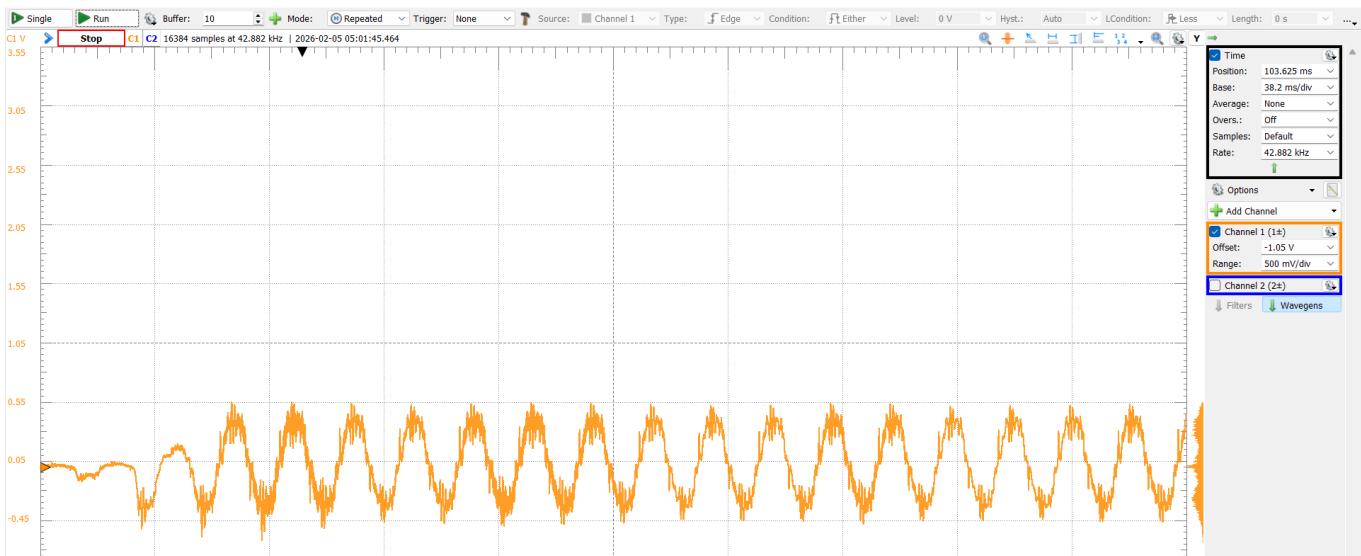
the reponse is



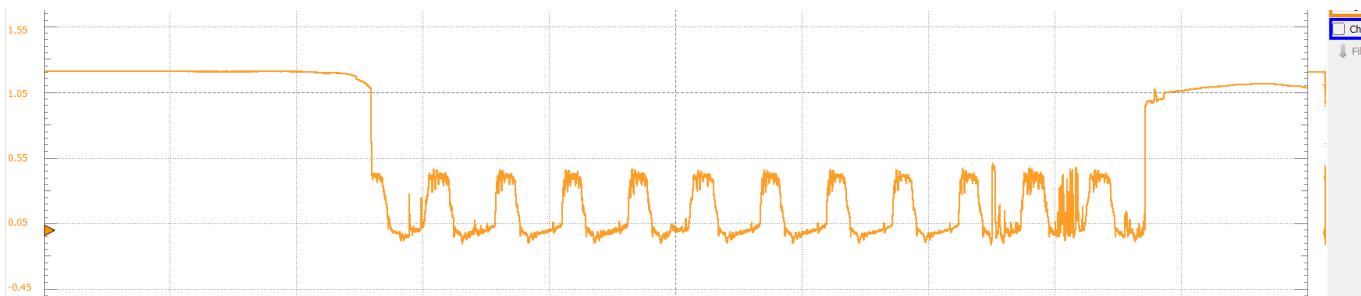
"zoomed in version"



Increasing the input to 2Mhz sinewave at HSE IN



Increasing the input to 9Mhz



5:12 a.m. -There maybe is not a problem with how I have soldered the HSE since we are getting good-ish responses, so gotta figure out what else is the problem

12:17 p.m. -

MPU6050 not responding, address itself not getting detected, yet to check the I2C trace

Few possible problems

1. MPU6050 may not be soldered properly, alignment wrong
2. MPU6050 IC may have got screwed, because of applying 370 deg hot air
3. VLOGIC, VDD across the MPU6050 is 3.18V
4. something wrong in the code itself

**06/12/2026**

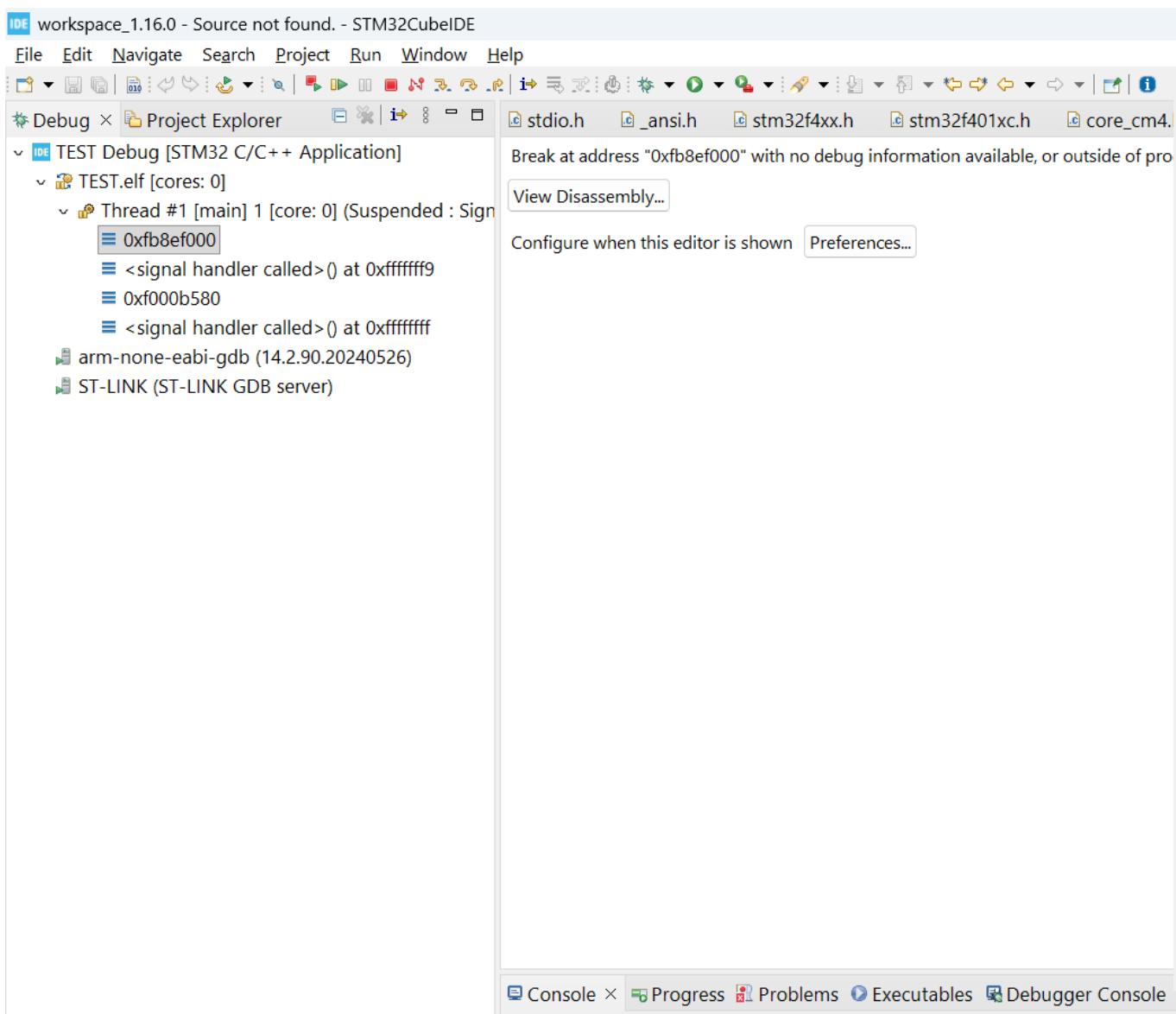
2:13 a.m. - after soldering the MPU6050, VCC and ground are both connected , continuity check was beeping

after desoldering and resoldering continuity check between VCC and ground multimeter did not give sound, as it should be

3:19 a.m.

```
Break at address "0xfb8ef000" with no debug information available, or outside of program code
Configure when this editor is shown Preferences...
fb8eefee: lsr r3, r6, #28
fb8eef0: ldr r2, [r2, #20]
fb8eef2: ittee lt
fb8eef4: cmplt r1, r8
fb8eef6: lsllt r3, r4, #5
fb8eef8: @ <UNDEFINED> instruction: 0xb6dc
fb8eefaa: ldrge r3, [r4, #88] @ 0x58
fb8eefcc: bhi.n 0xfb8ef018
fb8eefee: b.n 0xfb8ef192
fb8ef000: cbnz r0, 0xfb8ef076
fb8ef002: lsrs r3, r2, #15
fb8ef004: stmia r2!, {r3, r6}
fb8ef006: str r6, [r5, #56] @ 0x38
fb8ef008: ldmia r6, {r1, r3, r5, r6, r7}
fb8ef00a: @ <UNDEFINED> instruction: 0xf2696230
fb8ef00e: push {r1, r4, r6}
fb8ef010: ldr r3, [sp, #192] @ 0xc0
fb8ef012: vld1.32 @ <UNDEFINED> instruction: 0xf9ec9840
fb8ef016: bne.r 0xfb8ef0c4
fb8ef018: subs r1, r7, r6
fb8ef01a: movs r7, #208 @ 0xd0
fb8ef01c: cmp r7, #33 @ 0x21
fb8ef01e: ldrb r4, [r3, r5]
fb8ef020: ldr r3, [r1, #116] @ 0x74
fb8ef022: ldr r3, [r6, #100] @ 0x64
fb8ef024: ldmia r5, {r2, r3, r5}
fb8ef026: ldmia r3!, {r1, r2, r4, r5}
fb8ef028: ldr r7, [r6, #92] @ 0x5c
fb8ef02a: movs r5, #231 @ 0xe7
fb8ef02c: ldr r2, [sp, #524] @ 0x20c
fb8ef02e: ... r3, r4, r5, r6, r7
```

10:59 a.m. - Similar error - searched google- got this link- [Debug randomly causes "Signal Thread #1 \(Suspend...](#) - STMicroelectronics Community



Accd to the link, vectactive = 3

subtract 16, you get -13

```
* @brief STM32H7XX Interrupt Number Definition, according to the selected
device
*           in @ref Library_configuration_section
*/
typedef enum
{
/***** Cortex-M Processor Exceptions Numbers
*****
NonMaskableInt_IRQn      = -14,     /*!< 2 Non Maskable Interrupt
*/
HardFault_IRQn            = -13,     /*!< 4 Cortex-M Memory Management
Interrupt
MemoryManagement_IRQn     = -12,     /*!< 4 Cortex-M Memory Management
Interrupt
*/
```

```

BusFault_IRQn           = -11,      /*!< 5 Cortex-M Bus Fault Interrupt
*/
UsageFault_IRQn         = -10,      /*!< 6 Cortex-M Usage Fault Interrupt
*/
SVCall_IRQn             = -5,       /*!< 11 Cortex-M SV Call Interrupt
*/
DebugMonitor_IRQn       = -4,       /*!< 12 Cortex-M Debug Monitor
*/
Interrupt
PendSV_IRQn             = -2,       /*!< 14 Cortex-M Pend SV Interrupt
*/
SysTick_IRQn             = -1,       /*!< 15 Cortex-M System Tick Interrupt
*/
*/
***** STM32 specific Interrupt Numbers
*****
WWDG_IRQn               = 0,        /*!< Window WatchDog Interrupt (
wwdg1_it, wwdg2_it)
*/
PVD_AVD_IRQn             = 1,        /*!< PVD/AVD through EXTI Line
detection Interrupt
*/
TAMP_STAMP_IRQn          = 2,        /*!< Tamper andTimeStamp interrupts
through the EXTI line
*/
RTC_WKUP_IRQn             = 3,        /*!< RTC Wakeup interrupt through the
EXTI line
*/

```

-13 corresponds to HardFault\_IRQn, so the processor is in the hard fault interrupt.

Because the processor is going to 0xfffffec0 for this interrupt and not to somewhere in your program, it suggests your vector table is missing or corrupted or something else.

## 12/02/2026

1:09 p.m.

same error as the previous screenshot, when trying to debug the program  
changed the main.c code

```

/* Initialize all configured peripherals */
MX_GPIO_Init();
MX_I2C3_Init();
/* USER CODE BEGIN 2 */
HAL_StatusTypeDef ret= HAL_I2C_IsDeviceReady(&hi2c3, 0b1101000<<1 + 0, 1,
1000);
if(ret == HAL_OK){

```

```

        flag==1;
    }
else{
    flag==0;
}

/* USER CODE END 2 */

/* Infinite loop */
/* USER CODE BEGIN WHILE */
while (1)
{
    /* USER CODE END WHILE */

    /* USER CODE BEGIN 3 */

}
/* USER CODE END 3 */
}

```

What could be the possible reason for a hardfault interrupt?

because somewhere in the code it is trying to jump to an invalid address

Source: [Debug randomly causes "Signal Thread #1 \(Suspend... - STMicroelectronics Community](#)

Some issue related to vector table getting corrupted and apparently it happened in stm32f407 mCU for someone

[Solved: Corrupted Flash in Vector Table area - sector 0 - STMicroelectronics Community](#)

I had immediately went to the above link because someone said that since your code is jumping to invalid memory location, it suggests that the vector table is missing or corrupted or something else

OP who posted the question/issue regarding corrupted bytes in the flash memory, also answered the question- they said setting the BOR(brownout reset) level to 3 fixed the issue

They also said its a issue specific to STM32F407, at least for them

**The Flash memory can be corrupted in Sector 0 (default vector table) when the BOR level is off, and reset of MCU become at low voltage. To solve the issue, BOR level should set at level 3**

Someone else answered-

Writing blocks of zeros, whilst leaving original content elsewhere is very odd.

The write functions as a write-once, so unlike more classic FLASH chips you can't keep knocking down ONE bits.

Double check your VCAP capacitors.

Remove your flashing code and see if you can replicate.

How does VCAP capacitors make any difference?

Ways of resolving

1. Check Boot0 pin
2. write something in the hardfault, such that we are able to see what caused the error
3. Seeing from the very beginning like, just after the boot mode what happens setting a breakpoint in the HAL\_Init function
4. Could be an error inconfiguring of ioc file

13/02/2026- 3:06 A.M.

this is a hardfault error

upon checking the HFSR register

Register	Address	Value
▼ Cortex_M4		
▼ Control		
▼ HFSR	0xe000e...	0x40000000
▼ DEBUGEVT	[31:1]	0x0
▼ FORCED	[30:1]	0x1
▼ VECTTBL	[1:1]	0x0

CFSR REGISTER-

All registers

CFSR

Register	Address	Value
▼  Control		
▼  CFSR	0xe000e...	0x1
DIVBYZERO [25:1]	0x0	
UNALIGNED [24:1]	0x0	
NOCP [19:1]	0x0	
INVPC [18:1]	0x0	
INVSTATE [17:1]	0x0	
UNDEFINSTR [16:1]	0x0	
BFARVALID [15:1]	0x0	
LSPERR [13:1]	0x0	
STKERR [12:1]	0x0	
UNSTKERR [11:1]	0x0	
IMPRECISER [10:1]	0x0	
PRECISERR [9:1]	0x0	
IBUSERR [8:1]	0x0	
MMARVALID [7:1]	0x0	
MLSPERR [5:1]	0x0	
MSTKERR [4:1]	0x0	
MUNSTKERR [3:1]	0x0	
DACCVIOL [1:1]	0x0	
IACCVIOL [0:1]	0x1	

**Table 7.9** Memory Management Fault Status Register (0xE000ED28)

Bits	Name	Type	Reset Value	Description
7	MMARVALID	—	0	Indicates the MMAR is valid
6:5	—	—	—	—
4	<b>MSTKERR</b>	R/Wc	0	Stacking error
3	<b>MUNSTKERR</b>	R/Wc	0	Unstacking error
2	—	—	—	—
1	DACCVIOL	R/Wc	0	Data access violation
0	IACCVIOL	R/Wc	0	Instruction access violation

the forced bit is set

which indicates "The hard fault handler can be caused by usage faults, bus faults, and memory management faults if their handler cannot be executed"

So it has to be either one of the three faults, because a hardfault is triggered when the handler for each of them is not there or not enabled

since in teh CFSR register only IACCVIOL bit is set which is of memory management fault type, we conclude it is a memory management fault

## How to debug a HardFault on an ARM Cortex-M MCU | Interrupt

5:19 a.m.

```
TEST Debug [STM32 C/C++ Application] arm-none-eabi-gdb (14.2.90.20240526)
GNU gdb (GNU Tools For STM32 13.3.rell.20240926-1715) 14.2.90.20240526-git
Copyright (C) 2023 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.
Type "show copying" and "show warranty" for details.
This GDB was configured as "--host=x86_64-w64-mingw32 --target=arm-none-eabi".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<https://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
<http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".
Type "apropos word" to search for commands related to "word".

Note: automatically using hardware breakpoints for read-only addresses.
No source file named C:\\Users\\Tushar\\STM32CubeIDE\\workspace_1.16.0\\I2C_GYRO\\Core\\Src\\main.c.
No source file named C:\\Users\\Tushar\\STM32CubeIDE\\workspace_1.16.0\\I2C_GYRO\\Core\\Src\\main.c.
No source file named C:\\Users\\Tushar\\STM32CubeIDE\\workspace_1.16.0\\I2C_GYRO\\Drivers\\STM32F4xx_HAL_Driver\\Src\\st
set *(int *)0xE000EDFC=*(int *)0xE000EDFC|0x7F0

Program received signal SIGTRAP, Trace/breakpoint trap.
0xfb8ef000 in ?? ()
```

signal handler called at 0xffffffff

**16/02/2026**

```
Command Prompt      x  Ubuntu      x  Ubuntu      x  Windows PowerShell      x  +  -  □  ×
Register group: general
r0      0x0          0          r1      0x0          0
r2      0x0          0          r3      0x0          0
r4      0x0          0          r5      0x0          0
r6      0x0          0          r7      0x0          0
r8      0x0          0          r9      0x0          0
r10     0x0          0          r11     0x0          0
r12     0x0          0          sp      0x8000f8b0    0x8000f8b0

.../Core/Src/main.c
71 }
72 /* USER CODE END 0 */
73
74 /**
75  * @brief  The application entry point.
76  * @retval int
77 */
78 int main(void)

extended-r Remote target (regs) In:                                     L??   PC: 0xd0f74546
(gdb) where
#0 0xd0f74546 in ?? ()
#1 <signal handler called>
#2 0x00000000 in ?? ()
Backtrace stopped: previous frame identical to this frame (corrupt stack?)
(gdb) list
(gdb) info line
Line 74 of ".../Core/Src/main.c" is at address 0x800057c <main> but contains no code.
(gdb)
```

```
(gdb) x/8x $sp
0x8000f8b0: 0x00000000 0x00000000 0x00000000 0x00000000
0x8000f8c0: 0x00000000 0x00000000 0x00000000 0x00000000
(gdb) █
```

**5:49 p.m.**

The order in which we get the interrupt

the order in which program is executed in the flash memory g\_pfnVectors -> udivmoddi4+48 -> ITM\_SendChar -> \_write \* -> main -> SystemClockConfig -> GPIOInit -> Error handler -> MSPInit -> ..bunch of other functions -> SystemInit -> reset handler

```
Ubuntu x Ubuntu x Windows PowerShell x + ▾
0x80008c6 <Reset_Handler+38>    str   r3, [r2, #0]
0x80008c8 <Reset_Handler+40>    adds  r2, #4
0x80008ca <Reset_Handler+42>    cmp   r2, r4
0x80008cc <Reset_Handler+44>    bcc.n 0x80008c6 <Reset_Handler+38>
0x80008ce <Reset_Handler+46>    bl    0x80018cc <_libc_init_array>
0x80008d2 <Reset_Handler+50>    bl    0x800057c <main>
0x80008d6 <Reset_Handler+54>    bx    lr
0x80008d8 <Reset_Handler+56>    movs  r0, r0
0x80008da <LoopFillZeroBSS+16> movs  r0, #2
0x80008dc <LoopFillZeroBSS+18> movs  r0, r0
0x80008de <LoopFillZeroBSS+20> movs  r0, #0
0x80008e0 <LoopFillZeroBSS+22> lsls  r0, r5, #1
0x80008e2 <LoopFillZeroBSS+24> movs  r0, #0
0x80008e4 <LoopFillZeroBSS+26> adds  r4, r2, #7
0x80008e6 <LoopFillZeroBSS+28> lsrs  r0, r0, #32
0x80008e8 <LoopFillZeroBSS+30> lsls  r0, r5, #1
0x80008ea <LoopFillZeroBSS+32> movs  r0, #0
0x80008ec <LoopFillZeroBSS+34> lsls  r0, r3, #7
0x80008ee <LoopFillZeroBSS+36> movs  r0, #0
0x80008f0 <WWDG_IRQHandler>    b.n   0x80008f0 <WWDG_IRQHandler>
0x80008f2                         movs  r0, r0
0x80008f4 <HAL_Init>           push  {r7, lr}
0x80008f6 <HAL_Init+2>         add   r7, sp, #0
0x80008f8 <HAL_Init+4>         ldr   r3, [pc, #56] @ (0x8000934 <HAL_Init+64>)
0x80008fa <HAL_Init+6>         ldr   r3, [r3, #0]
remote Remote target (asm) In: HAL_GetTick
```

```
Ubuntu x Ubuntu x Windows PowerShell x + ▾
0x80008e2 <LoopFillZeroBSS+24> movs  r0, #0
0x80008e4 <LoopFillZeroBSS+26> adds  r4, r2, #7
0x80008e6 <LoopFillZeroBSS+28> lsrs  r0, r0, #32
0x80008e8 <LoopFillZeroBSS+30> lsls  r0, r5, #1
0x80008ea <LoopFillZeroBSS+32> movs  r0, #0
0x80008ec <LoopFillZeroBSS+34> lsls  r0, r3, #7
0x80008ee <LoopFillZeroBSS+36> movs  r0, #0
0x80008f0 <WWDG_IRQHandler>    b.n   0x80008f0 <WWDG_IRQHandler>
0x80008f2                         movs  r0, r0
0x80008f4 <HAL_Init>           push  {r7, lr}
0x80008f6 <HAL_Init+2>         add   r7, sp, #0
0x80008f8 <HAL_Init+4>         ldr   r3, [pc, #56] @ (0x8000934 <HAL_Init+64>)
0x80008fa <HAL_Init+6>         ldr   r3, [r3, #0]
0x80008fc <HAL_Init+8>         ldr   r2, [pc, #52] @ (0x8000934 <HAL_Init+64>)
0x80008fe <HAL_Init+10>        orr.w r3, r3, #512 @ 0x200
0x8000902 <HAL_Init+14>        str   r3, [r2, #0]
0x8000904 <HAL_Init+16>        ldr   r3, [pc, #44] @ (0x8000934 <HAL_Init+64>)
0x8000906 <HAL_Init+18>        ldr   r3, [r3, #0]
0x8000908 <HAL_Init+20>        ldr   r2, [pc, #40] @ (0x8000934 <HAL_Init+64>)
0x800090a <HAL_Init+22>        orr.w r3, r3, #1024 @ 0x400
0x800090e <HAL_Init+26>        str   r3, [r2, #0]
0x8000910 <HAL_Init+28>        ldr   r3, [pc, #32] @ (0x8000934 <HAL_Init+64>)
0x8000912 <HAL_Init+30>        ldr   r3, [r3, #0]
0x8000914 <HAL_Init+32>        ldr   r2, [pc, #28] @ (0x8000934 <HAL_Init+64>)
0x8000916 <HAL_Init+34>        orr.w r3, r3, #256 @ 0x100
remote Remote target (asm) In: HAL_GetTick
```

```
Ubuntu x Ubuntu x Windows PowerShell x + v
0x8000916 <HAL_Init+34>    orr.w   r3, r3, #256      @ 0x100
0x800091a <HAL_Init+38>    str     r3, [r2, #0]
0x800091c <HAL_Init+40>    movs    r0, #3
0x800091e <HAL_Init+42>    bl      0x8000b84 <HAL_NVIC_SetPriorityGrouping>
0x8000922 <HAL_Init+46>    movs    r0, #15
0x8000924 <HAL_Init+48>    bl      0x8000938 <HAL_InitTick>
0x8000928 <HAL_Init+52>    bl      0x80006c0 <HAL_MspInit>
0x800092c <HAL_Init+56>    movs    r3, #0
0x800092e <HAL_Init+58>    mov     r0, r3
0x8000930 <HAL_Init+60>    pop    {r7, pc}
0x8000932 <HAL_Init+62>    nop
0x8000934 <HAL_Init+64>    subs    r4, #0
0x8000936 <HAL_Init+66>    ands    r2, r0
0x8000938 <HAL_InitTick>  push    {r7, lr}
0x800093a <HAL_InitTick+2> sub     sp, #8
0x800093c <HAL_InitTick+4> add     r7, sp, #0
0x800093e <HAL_InitTick+6> str     r0, [r7, #4]
0x8000940 <HAL_InitTick+8> ldr     r3, [pc, #72]  @ (0x800098c <HAL_InitTick+84>)
0x8000942 <HAL_InitTick+10> ldr     r2, [r3, #0]
0x8000944 <HAL_InitTick+12> ldr     r3, [pc, #72]  @ (0x8000990 <HAL_InitTick+88>)
0x8000946 <HAL_InitTick+14> ldrb    r3, [r3, #0]
0x8000948 <HAL_InitTick+16> mov     r1, r3
0x800094a <HAL_InitTick+18> mov.w   r3, #1000      @ 0x3e8
0x800094e <HAL_InitTick+22> udiv    r3, r3, r1
0x8000952 <HAL_InitTick+26> udiv    r3, r2, r3
```

remote Remote target (asm) In: HAL\_GetTick

```
Ubuntu x Ubuntu x Windows PowerShell x + v
0x8000952 <HAL_InitTick+26> udiv    r3, r2, r3
0x8000956 <HAL_InitTick+30> mov     r0, r3
0x8000958 <HAL_InitTick+32> bl      0x8000bd2 <HAL_SYSTICK_Config>
0x800095c <HAL_InitTick+36> mov     r3, r0
0x800095e <HAL_InitTick+38> cmp     r3, #0
0x8000960 <HAL_InitTick+40> beq.n  r3, #1
0x8000962 <HAL_InitTick+42> movs   r3, #1
0x8000964 <HAL_InitTick+44> b.n    0x8000984 <HAL_InitTick+76>
0x8000966 <HAL_InitTick+46> ldr     r3, [r7, #4]
0x8000968 <HAL_InitTick+48> cmp     r3, #15
0x800096a <HAL_InitTick+50> bhi.n  0x8000982 <HAL_InitTick+74>
0x800096c <HAL_InitTick+52> movs   r2, #0
0x800096e <HAL_InitTick+54> ldr     r1, [r7, #4]
0x8000970 <HAL_InitTick+56> mov.w   r0, #4294967295 @ 0xffffffff
0x8000974 <HAL_InitTick+60> bl      0x8000b9a <HAL_NVIC_SetPriority>
0x8000978 <HAL_InitTick+64> ldr     r2, [pc, #24]  @ (0x8000994 <HAL_InitTick+92>)
0x800097a <HAL_InitTick+66> ldr     r3, [r7, #4]
0x800097c <HAL_InitTick+68> str     r3, [r2, #0]
0x800097e <HAL_InitTick+70> movs   r3, #0
0x8000980 <HAL_InitTick+72> b.n    0x8000984 <HAL_InitTick+76>
0x8000982 <HAL_InitTick+74> movs   r3, #1
0x8000984 <HAL_InitTick+76> mov     r0, r3
0x8000986 <HAL_InitTick+78> adds   r7, #8
0x8000988 <HAL_InitTick+80> mov     sp, r7
0x800098a <HAL_InitTick+82> pop    {r7, pc}
```

remote Remote target (asm) In: HAL\_GetTick

```
Ubuntu      x  Ubuntu      x  Windows PowerShell x + ▾
0x800098a <HAL_InitTick+82>    pop   {r7, pc}
0x800098c <HAL_InitTick+84>    movs  r0, r0
0x800098e <HAL_InitTick+86>    movs  r0, #0
0x8000990 <HAL_InitTick+88>    movs  r0, r1
0x8000992 <HAL_InitTick+90>    movs  r0, #0
0x8000994 <HAL_InitTick+92>    movs  r4, r0
0x8000996 <HAL_InitTick+94>    movs  r0, #0
0x8000998 <HAL_IncTick>       push  {r7}
0x800099a <HAL_IncTick+2>     add   r7, sp, #0
0x800099c <HAL_IncTick+4>     ldr   r3, [pc, #24]  @ (0x80009b8 <HAL_IncTick+32>)
0x800099e <HAL_IncTick+6>     ldrb  r3, [r3, #0]
0x80009a0 <HAL_IncTick+8>     mov   r2, r3
0x80009a2 <HAL_IncTick+10>    ldr   r3, [pc, #24] @ (0x80009bc <HAL_IncTick+36>)
0x80009a4 <HAL_IncTick+12>    ldr   r3, [r3, #0]
0x80009a6 <HAL_IncTick+14>    add   r3, r2
0x80009a8 <HAL_IncTick+16>    ldr   r2, [pc, #16] @ (0x80009bc <HAL_IncTick+36>)
0x80009aa <HAL_IncTick+18>    str   r3, [r2, #0]
0x80009ac <HAL_IncTick+20>    nop
0x80009ae <HAL_IncTick+22>    mov   sp, r7
0x80009b0 <HAL_IncTick+24>    ldr.w r7, [sp], #4
0x80009b4 <HAL_IncTick+28>    bx   lr
0x80009b6 <HAL_IncTick+30>    nop
0x80009b8 <HAL_IncTick+32>    movs r0, r1
0x80009ba <HAL_IncTick+34>    movs r0, #0
0x80009bc <HAL_IncTick+36>    lsls r0, r1, #2
0x80009be <HAL_IncTick+38>    movs r0, #0
0x80009c0 <HAL_GetTick>      push  {r7}
0x80009c2 <HAL_GetTick+2>    add   r7, sp, #0
0x80009c4 <HAL_GetTick+4>    ldr   r3, [pc, #12] @ (0x80009d4 <HAL_GetTick+20>)
0x80009c6 <HAL_GetTick+6>    ldr   r3, [r3, #0]
0x80009c8 <HAL_GetTick+8>    mov   r0, r3
0x80009ca <HAL_GetTick+10>   mov   sp, r7
0x80009cc <HAL_GetTick+12>   ldr.w r7, [sp], #4
0x80009d0 <HAL_GetTick+16>   bx   lr
0x80009d2 <HAL_GetTick+18>   nop
0x80009d4 <HAL_GetTick+20>   lsls r0, r1, #2
0x80009d6 <HAL_GetTick+22>   movs r0, #0
0x80009d8 <HAL_Delay>       push  {r7, lr}
0x80009da <HAL_Delay+2>     sub   sp, #16
0x80009dc <HAL_Delay+4>     add   r7, sp, #0
0x80009de <HAL_Delay+6>     str   r0, [r7, #4]
0x80009e0 <HAL_Delay+8>     bl   0x80009c0 <HAL_GetTick>
0x80009e4 <HAL_Delay+12>    str   r0, [r7, #8]
0x80009e6 <HAL_Delay+14>    ldr   r3, [r7, #4]
0x80009e8 <HAL_Delay+16>    str   r3, [r7, #12]
0x80009ea <HAL_Delay+18>    ldr   r3, [r7, #12]
```

remote Remote target (asm) In: HAL\_GetTick

```
Ubuntu      x  Ubuntu      x  Windows PowerShell x + ▾
0x80009b6 <HAL_IncTick+30>    nop
0x80009b8 <HAL_IncTick+32>    movs r0, r1
0x80009ba <HAL_IncTick+34>    movs r0, #0
0x80009bc <HAL_IncTick+36>    lsls r0, r1, #2
0x80009be <HAL_IncTick+38>    movs r0, #0
0x80009c0 <HAL_GetTick>      push  {r7}
0x80009c2 <HAL_GetTick+2>    add   r7, sp, #0
0x80009c4 <HAL_GetTick+4>    ldr   r3, [pc, #12] @ (0x80009d4 <HAL_GetTick+20>)
0x80009c6 <HAL_GetTick+6>    ldr   r3, [r3, #0]
0x80009c8 <HAL_GetTick+8>    mov   r0, r3
0x80009ca <HAL_GetTick+10>   mov   sp, r7
0x80009cc <HAL_GetTick+12>   ldr.w r7, [sp], #4
0x80009d0 <HAL_GetTick+16>   bx   lr
0x80009d2 <HAL_GetTick+18>   nop
0x80009d4 <HAL_GetTick+20>   lsls r0, r1, #2
0x80009d6 <HAL_GetTick+22>   movs r0, #0
0x80009d8 <HAL_Delay>       push  {r7, lr}
0x80009da <HAL_Delay+2>     sub   sp, #16
0x80009dc <HAL_Delay+4>     add   r7, sp, #0
0x80009de <HAL_Delay+6>     str   r0, [r7, #4]
0x80009e0 <HAL_Delay+8>     bl   0x80009c0 <HAL_GetTick>
0x80009e4 <HAL_Delay+12>    str   r0, [r7, #8]
0x80009e6 <HAL_Delay+14>    ldr   r3, [r7, #4]
0x80009e8 <HAL_Delay+16>    str   r3, [r7, #12]
0x80009ea <HAL_Delay+18>    ldr   r3, [r7, #12]
```

remote Remote target (asm) In: HAL\_GetTick

```
Ubuntu x Ubuntu x Windows PowerShell x + v
./Drivers/STM32F4xx_HAL_Driver/Src/stm32f4xx_hal.c
321 * @retval tick value
322 */
323 __weak uint32_t HAL_GetTick(void)
324 {
325     return uwTick;
326 }
327
328 /**
329 * @brief This function returns a tick priority.
330 * @retval tick priority
331 */
332 uint32_t HAL_GetTickPrio(void)

0x80009c4 <HAL_GetTick+4>    ldr    r3, [pc, #12]  @ (0x80009d4 <HAL_GetTick+20>)
0x80009c6 <HAL_GetTick+6>    ldr    r3, [r3, #0]
0x80009c8 <HAL_GetTick+8>    mov    r0, r3
0x80009ca <HAL_GetTick+10>   mov    sp, r7
0x80009cc <HAL_GetTick+12>   ldr.w r7, [sp], #4
>0x80009d0 <HAL_GetTick+16>  bx    lr
0x80009d2 <HAL_GetTick+18>  nop
0x80009d4 <HAL_GetTick+20>  lsls  r0, r1, #2
0x80009d6 <HAL_GetTick+22>  movs  r0, #0
0x80009d8 <HAL_Delay>      push   {r7, lr}
0x80009da <HAL_Delay+2>    sub    sp, #16
0x80009dc <HAL_Delay+4>    add    r7, sp, #0

remote Remote target (asm) In: HAL_GetTick
```

setting the interrupt priority of sysTick timer as 0, previously it was set to 15(god knows why)

IDE workspace\_1.16.0 - Device Configuration Tool - STM32CubeIDE

File Edit Source Refactor Navigate Search Project Run Window Help

STM32F407VGTX\_FLASH.id main.c startup\_stm32f407vgtx.s system\_stm32f4xx.c \*TEST.ioc

### TEST.ioc - Pinout & Configuration

Pinout & Configuration      Clock Configuration      Project

Categories A-Z

System Core

- DMA
- GPIO
- IWDG
- NVIC**
- RCC
- SYS
- WWDG

Analog

Timers

- RTC
- TIM1
- TIM2
- TIM3
- TIM4
- TIM5
- TIM6
- TIM7
- TIM8
- TIM9
- TIM10
- TIM11
- TIM12
- TIM13
- TIM14

NVIC Mode and Configuration

Mode

Configuration

**NVIC** **Code generation**

Priority Group 4 bits for pre-emption priority  Sort by Preemption Priority and Sub Priority  Sort by interrupts names

Search  Show  available interrupts  Force DMA channels Interrupts

NVIC Interrupt Table	Enabled	Preemption Priority	Sub Priority
Non maskable interrupt	<input checked="" type="checkbox"/>	0	0
Hard fault interrupt	<input checked="" type="checkbox"/>	0	0
Memory management fault	<input checked="" type="checkbox"/>	0	0
Pre-fetch fault, memory access fault	<input checked="" type="checkbox"/>	0	0
Undefined instruction or illegal state	<input checked="" type="checkbox"/>	0	0
System service call via SWI instruction	<input checked="" type="checkbox"/>	0	0
Debug monitor	<input checked="" type="checkbox"/>	0	0
Pendable request for system service	<input checked="" type="checkbox"/>	0	0
Time base: System tick timer	<input checked="" type="checkbox"/>	0	0
PVD interrupt through EXTI line 16	<input type="checkbox"/>	0	0
Flash global interrupt	<input type="checkbox"/>	0	0
RCC global interrupt	<input checked="" type="checkbox"/>	0	0
FPU global interrupt	<input type="checkbox"/>	0	0

Enabled Preemption Priority 0 Sub Priority 0

```
Ubuntu          Ubuntu          Windows PowerShell
0x80000858 <HAL_Delay+16>    str   r3, [r7, #12]
0x8000085a <HAL_Delay+18>    ldr   r3, [r7, #12]
0x8000085c <HAL_Delay+20>    cmp.w r3, #4294967295 @ 0xffffffff
0x80000860 <HAL_Delay+24>    beq.n r3, 0x800086e <HAL_Delay+38>
0x80000862 <HAL_Delay+26>    ldr   r3, [pc, #40] @ (0x800088c <HAL_Delay+68>)
0x80000864 <HAL_Delay+28>    ldrb  r3, [r3, #0]
0x80000866 <HAL_Delay+30>    mov   r2, r3
0x80000868 <HAL_Delay+32>    ldr   r3, [r7, #12]
0x8000086a <HAL_Delay+34>    add   r3, r2
0x8000086c <HAL_Delay+36>    str   r3, [r7, #12]
0x8000086e <HAL_Delay+38>    nop
>0x80000870 <HAL_Delay+40> bl    0x80000830 <HAL_GetTick>
B+ 0x80000874 <HAL_Delay+44> mov   r2, r0
0x80000876 <HAL_Delay+46> ldr   r3, [r7, #8]
0x80000878 <HAL_Delay+48> subs  r3, r2, r3
0x8000087a <HAL_Delay+50> ldr   r2, [r7, #12]
0x8000087c <HAL_Delay+52> cmp   r2, r3
0x8000087e <HAL_Delay+54> bhi.n 0x80000870 <HAL_Delay+40>
0x80000880 <HAL_Delay+56> nop
0x80000882 <HAL_Delay+58> nop
0x80000884 <HAL_Delay+60> adds  r7, #16
0x80000886 <HAL_Delay+62> mov   sp, r7
0x80000888 <HAL_Delay+64> pop   {r7, pc}
0x8000088a <HAL_Delay+66> nop
0x8000088c <HAL_Delay+68> movs  r0, r1

remote Remote target (asm) In: HAL_Delay
halted: PC: 0x0800087c
halted: PC: 0x0800087e
halted: PC: 0x08000870
halted: PC: 0x08000830
halted: PC: 0x08000876
halted: PC: 0x08000878
halted: PC: 0x0800087a
halted: PC: 0x0800087c
halted: PC: 0x0800087e
halted: PC: 0x08000870

Program received signal SIGINT, Interrupt.
0x08000870 in HAL_Delay (Delay=500) at ./Drivers/STM32F4xx_HAL_Driver/Src/stm32f4xx_hal.c:401
(gdb)
```

OpenOCD gives this

```
[stm32f4x.cpu] halted due to debug-request, current mode: Thread
xPSR: 0x2100000 pc: 0x08000874 msp: 0x2001ffd8
Info : device id = 0x101f6413
Info : Flash size = 1024 KiB
Info : Flash size = 512 bytes
Warn : Prefer GDB command "target extended-remote :3333" instead of "target remote :3333"
Info : halted: PC: 0x08000834
Info : halted: PC: 0x08000836
Info : halted: PC: 0x08000838
Info : halted: PC: 0x0800083a
Info : halted: PC: 0x0800083c
Info : halted: PC: 0x08000840
Info : halted: PC: 0x08000874
Info : halted: PC: 0x08000876
Info : halted: PC: 0x08000878
Info : halted: PC: 0x0800087a
Info : halted: PC: 0x0800087c
Info : halted: PC: 0x0800087e
Info : halted: PC: 0x08000870
Warn : keep_alive() was not invoked in the 1000 ms timelimit. GDB alive packet not sent! (1410 ms). Workaround: increase "set remotetimeout" in GDB
Info : halted: PC: 0x08000830
Info : halted: PC: 0x08000876
Info : halted: PC: 0x08000878
Info : halted: PC: 0x0800087a
Info : halted: PC: 0x0800087c
Info : halted: PC: 0x0800087e
Info : halted: PC: 0x08000870
Info : halted: PC: 0x08000830
Info : halted: PC: 0x08000876
Info : halted: PC: 0x08000878
Info : halted: PC: 0x0800087a
Info : halted: PC: 0x0800087c
Info : halted: PC: 0x0800087e
Info : halted: PC: 0x08000870
Info : halted: PC: 0x08000830
Info : halted: PC: 0x08000876
Info : halted: PC: 0x08000878
Info : halted: PC: 0x0800087a
Info : halted: PC: 0x0800087c
Info : halted: PC: 0x0800087e
Info : halted: PC: 0x08000870
Info : halted: PC: 0x08000830
```

```
Info : halted: PC: 0x08000878
Info : halted: PC: 0x0800087a
Info : halted: PC: 0x0800087c
Info : halted: PC: 0x0800087e
Info : halted: PC: 0x08000870
Info : halted: PC: 0x08000830
Info : halted: PC: 0x08000876
Info : halted: PC: 0x08000878
Info : halted: PC: 0x0800087a
Info : halted: PC: 0x0800087c
Info : halted: PC: 0x0800087e
Info : The target is not running when halt was requested, stopping GDB.
Info : The target is not running when halt was requested, stopping GDB.
Info : halted: PC: 0x08000870
Info : halted: PC: 0x08000874
Info : halted: PC: 0x08000876
Info : halted: PC: 0x08000878
Info : halted: PC: 0x0800087a
Info : halted: PC: 0x0800087c
Info : halted: PC: 0x0800087e
Info : halted: PC: 0x08000870
Info : halted: PC: 0x08000830
Info : halted: PC: 0x08000876
Info : halted: PC: 0x08000878
Info : halted: PC: 0x0800087a
Info : halted: PC: 0x0800087c
```

```
Info : halted: PC: 0x0800087e
Info : halted: PC: 0x08000870
Info : halted: PC: 0x08000830
Info : halted: PC: 0x08000876
Info : halted: PC: 0x08000878
Info : halted: PC: 0x0800087a
Info : halted: PC: 0x0800087c
Info : halted: PC: 0x0800087e
Info : halted: PC: 0x08000870
Info : halted: PC: 0x08000830
Info : halted: PC: 0x08000876
Info : halted: PC: 0x08000878
Info : halted: PC: 0x0800087a
Info : halted: PC: 0x0800087c
Info : halted: PC: 0x0800087e
```

The above output came from `openOCD` when `next` command was executed via `gdb`  
Still the cause of the error is yet to be determined

**9:29 p.m.**

Changed the delay to 10ms  
now its working kind of but defaults to a

The issue exactly arises when stepping through `HAL_InitTick`, maybe the initialization configuration of our SysTick timer is wrong

```
Windows PowerShell      x  Ubuntu      x  Ubuntu      x  +  -
..../Drivers/STM32F4xx_HAL_Driver/Src/stm32f4xx_hal.c
254 {
255     /* Configure the SysTick to have interrupt in 1ms time basis*/
B+> 256     if (HAL_SYSTICK_Config(SystemCoreClock / (1000U / uwTickFreq)) > 0U)
257     {
258         return HAL_ERROR;
259     }
260

0x800088c <HAL_Delay+68>          movs   r0, r1
0x800088e <HAL_Delay+70>          movs   r0, #0
0x8000890 <_NVIC_SetPriorityGrouping> push   {r7}
0x8000892 <_NVIC_SetPriorityGrouping+2> sub    sp, #20
0x8000894 <_NVIC_SetPriorityGrouping+4> add    r7, sp, #0
0x8000896 <_NVIC_SetPriorityGrouping+6> str    r0, [r7, #4]
b+ 0x8000898 <_NVIC_SetPriorityGrouping+8> ldr    r3, [r7, #4]
0x800089a <_NVIC_SetPriorityGrouping+10> and.w  r3, r3, #7

remote Remote target (asm) In: HAL_InitTick                                L256  PC: 0x80007b0
(gdb) c
Continuing.
halted: PC: 0x080007b2

Breakpoint 4, HAL_InitTick (TickPriority=0) at ..../Drivers/STM32F4xx_HAL_Driver/Src/stm32f4xx_hal.c:256
(gdb) c
Continuing.
halted: PC: 0x080007b2
```