

I have found a bunch of unknown data at the end of my hex file, it was located behind my last data.

For example, when i added:

```
const uint16_t defaultSettingByte __attribute__((at(0x0800DC00), used)) = 0x0073;
```

I will found a group of unknown data after the flash address 0x0800DC00:

```
10 DBE0 00 00000000000000000000000000000000 35
10 DBF0 00 00000000000000000000000000000000 25
10 DC00 00 7300000000000000005858582D000000 6C
10 DC10 00 0000FF00000000000000004D43430000 32
10 DC20 00 4D43430000000000006CDC0200000000 D
0C DC30 00 00000000102030406070809 C0
04 0000 05 080000C1 2E
00 0000 01 FF
```

Data record:
0x10 bytes starting at 0x0800DC00

When i change the address to 0x0800FC00:

```
const uint16_t defaultSettingByte __attribute__((at(0x0800FC00), used)) = 0x0073;
```

The same group of data appeared after 0x0800FC00:

```
10 FBB0 00 00000000000000000000000000000000 45
10 FBC0 00 00000000000000000000000000000000 35
10 FBD0 00 00000000000000000000000000000000 25
10 FBE0 00 00000000000000000000000000000000 15
10 FBF0 00 00000000000000000000000000000000 05
10 FC00 00 7300000000000000005858582D000000 4C
10 FC10 00 0000FF00000000000000004D43430000 12
10 FC20 00 4D43430000000000006CDC0200000000 B7
0C FC30 00 00000000102030406070809 A0
04 0000 05 080000C1 2E
00 0000 01 FF
```

Data record:
0x10 bytes starting at 0x0800FC00

When i just remove the variable, the same unknown data just come up at the end of my program:

```
10 31B0 00 444343434342424242414141DC310008 DF
10 31C0 00 00000020380000000401000814320008 4C
10 31D0 00 38000020600600002001000800000000 08
10 31E0 00 005858582D0000000000FF0000000000 AB
10 31F0 00 0000004D434300004D43430000000000 29
10 3200 00 006CDC0200000000000000001020304 62
04 3210 00 08070809 9C
04 0000 05 080000C1 2E
00 0000 01 FF
```

Data record:
0x10 bytes starting at 0x080031D0

This keeps me annoying as when i do page erase on the page that defaultSettingByte located in, it also erased the unknown data (which i expect it does not exists, or it should be located at the end of the execution address of my program), after erased that page, my SysTick doesn't work anymore... So maybe the unknown code were related to SysTick?

I have already tried using --datacompressor=off in linker option with no luck. This is my memory map:

```
Memory Map of the image

Image Entry point : 0x080000c1

Load Region LR_IROM1 (Base: 0x08000000, Size: 0x00003214, Max: 0x00010000, ABSOLUTE)

Execution Region ER_IROM1 (Base: 0x08000000, Size: 0x000031dc, Max: 0x00010000, ABSOLUTE)

Base Addr      Size           Type  Attr   Idx   E Section Name      Object
0x08000000     0x000000c0    Data  RO     309   RESET              startup_stm32f051.o
0x080000c0     0x00000008    Code  RO     354   * !!!main          c_p.l(__main.o)
0x080000c8     0x0000003c    Code  RO     505   !!!scatter         c_p.l(__scatter.o)
```

0x08000104	0x0000001a	Code	RO	506	!!handler_copy
c_p.l(__scatter_copy.o)					
0x0800011e	0x00000002	PAD			
0x08000120	0x0000001c	Code	RO	507	!!handler_zi c_p.l(__scatter_zi.o)
0x0800013c	0x00000002	Code	RO	350	.ARM.Collect\$\$_printf_percent\$\$00000000
c_p.l(_printf_percent.o)					
0x0800013e	0x0000000a	Code	RO	349	.ARM.Collect\$\$_printf_percent\$\$00000009
c_p.l(_printf_d.o)					
0x08000148	0x0000000a	Code	RO	348	.ARM.Collect\$\$_printf_percent\$\$0000000C
c_p.l(_printf_x.o)					
0x08000152	0x00000004	Code	RO	370	.ARM.Collect\$\$_printf_percent\$\$00000017
c_p.l(_printf_percent_end.o)					
0x08000156	0x00000002	Code	RO	401	.ARM.Collect\$\$libinit\$\$00000000
c_p.l(libinit.o)					
0x08000158	0x00000000	Code	RO	412	.ARM.Collect\$\$libinit\$\$00000002
c_p.l(libinit2.o)					
0x08000158	0x00000000	Code	RO	414	.ARM.Collect\$\$libinit\$\$00000004
c_p.l(libinit2.o)					
0x08000158	0x00000000	Code	RO	417	.ARM.Collect\$\$libinit\$\$0000000A
c_p.l(libinit2.o)					
0x08000158	0x00000000	Code	RO	419	.ARM.Collect\$\$libinit\$\$0000000C
c_p.l(libinit2.o)					
0x08000158	0x00000000	Code	RO	421	.ARM.Collect\$\$libinit\$\$0000000E
c_p.l(libinit2.o)					
0x08000158	0x00000000	Code	RO	424	.ARM.Collect\$\$libinit\$\$00000011
c_p.l(libinit2.o)					
0x08000158	0x00000000	Code	RO	426	.ARM.Collect\$\$libinit\$\$00000013
c_p.l(libinit2.o)					
0x08000158	0x00000000	Code	RO	428	.ARM.Collect\$\$libinit\$\$00000015
c_p.l(libinit2.o)					
0x08000158	0x00000000	Code	RO	430	.ARM.Collect\$\$libinit\$\$00000017
c_p.l(libinit2.o)					
0x08000158	0x00000000	Code	RO	432	.ARM.Collect\$\$libinit\$\$00000019
c_p.l(libinit2.o)					
0x08000158	0x00000000	Code	RO	434	.ARM.Collect\$\$libinit\$\$0000001B
c_p.l(libinit2.o)					
0x08000158	0x00000000	Code	RO	436	.ARM.Collect\$\$libinit\$\$0000001D
c_p.l(libinit2.o)					
0x08000158	0x00000000	Code	RO	438	.ARM.Collect\$\$libinit\$\$0000001F
c_p.l(libinit2.o)					
0x08000158	0x00000000	Code	RO	440	.ARM.Collect\$\$libinit\$\$00000021
c_p.l(libinit2.o)					
0x08000158	0x00000000	Code	RO	442	.ARM.Collect\$\$libinit\$\$00000023
c_p.l(libinit2.o)					
0x08000158	0x00000000	Code	RO	444	.ARM.Collect\$\$libinit\$\$00000025
c_p.l(libinit2.o)					
0x08000158	0x00000000	Code	RO	448	.ARM.Collect\$\$libinit\$\$0000002C
c_p.l(libinit2.o)					
0x08000158	0x00000000	Code	RO	450	.ARM.Collect\$\$libinit\$\$0000002E
c_p.l(libinit2.o)					
0x08000158	0x00000000	Code	RO	452	.ARM.Collect\$\$libinit\$\$00000030
c_p.l(libinit2.o)					
0x08000158	0x00000000	Code	RO	454	.ARM.Collect\$\$libinit\$\$00000032
c_p.l(libinit2.o)					
0x08000158	0x00000002	Code	RO	455	.ARM.Collect\$\$libinit\$\$00000033
c_p.l(libinit2.o)					
0x0800015a	0x00000002	Code	RO	475	.ARM.Collect\$\$libshutdown\$\$00000000
c_p.l(libshutdown.o)					
0x0800015c	0x00000000	Code	RO	490	.ARM.Collect\$\$libshutdown\$\$00000003
c_p.l(libshutdown2.o)					
0x0800015c	0x00000000	Code	RO	493	.ARM.Collect\$\$libshutdown\$\$00000006
c_p.l(libshutdown2.o)					
0x0800015c	0x00000000	Code	RO	496	.ARM.Collect\$\$libshutdown\$\$00000009
c_p.l(libshutdown2.o)					
0x0800015c	0x00000000	Code	RO	498	.ARM.Collect\$\$libshutdown\$\$0000000B
c_p.l(libshutdown2.o)					
0x0800015c	0x00000000	Code	RO	501	.ARM.Collect\$\$libshutdown\$\$0000000E
c_p.l(libshutdown2.o)					

c_p.l(libshutdown2.o)	0x0800015c	0x00000002	Code	RO	502	.ARM.Collect\$\$libshutdown\$\$0000000F	
c_p.l(__rtentry.o)	0x0800015e	0x00000000	Code	RO	364	.ARM.Collect\$\$rtentry\$\$00000000	
c_p.l(__rtentry2.o)	0x0800015e	0x00000000	Code	RO	375	.ARM.Collect\$\$rtentry\$\$00000002	
c_p.l(__rtentry4.o)	0x0800015e	0x00000006	Code	RO	387	.ARM.Collect\$\$rtentry\$\$00000004	
c_p.l(__rtentry2.o)	0x08000164	0x00000000	Code	RO	377	.ARM.Collect\$\$rtentry\$\$00000009	
c_p.l(__rtentry2.o)	0x08000164	0x00000004	Code	RO	378	.ARM.Collect\$\$rtentry\$\$0000000A	
c_p.l(__rtentry2.o)	0x08000168	0x00000000	Code	RO	380	.ARM.Collect\$\$rtentry\$\$0000000C	
c_p.l(__rtentry2.o)	0x08000168	0x00000008	Code	RO	381	.ARM.Collect\$\$rtentry\$\$0000000D	
c_p.l(rtexit.o)	0x08000170	0x00000002	Code	RO	406	.ARM.Collect\$\$rtexit\$\$00000000	
c_p.l(rtexit2.o)	0x08000172	0x00000000	Code	RO	458	.ARM.Collect\$\$rtexit\$\$00000002	
c_p.l(rtexit2.o)	0x08000172	0x00000004	Code	RO	459	.ARM.Collect\$\$rtexit\$\$00000003	
c_p.l(rtexit2.o)	0x08000176	0x00000006	Code	RO	460	.ARM.Collect\$\$rtexit\$\$00000004	
c_p.l(rtexit2.o)	0x0800017c	0x00000074	Code	RO	310	.text	startup_stm32f051.o
c_p.l(__printf_hex_int.o)	0x080001f0	0x0000002c	Code	RO	317	.text	c_p.l(__2sprintf.o)
	0x0800021c	0x0000006c	Code	RO	319	.text	c_p.l(__printf.o)
	0x08000288	0x0000006c	Code	RO	320	.text	c_p.l(_printf_dec.o)
	0x080002f4	0x00000058	Code	RO	323	.text	
	0x0800034c	0x0000015a	Code	RO	351	.text	c_p.l(aeabi_sdiv.o)
	0x080004a6	0x00000006	Code	RO	353	.text	c_p.l(heapauxi.o)
	0x080004ac	0x0000007c	Code	RO	355	.text	fz_ps.l(d2f.o)
	0x08000528	0x00000358	Code	RO	356	.text	fz_ps.l(daddsub.o)
	0x08000880	0x00000448	Code	RO	357	.text	fz_ps.l(ddiv.o)
	0x08000cc8	0x00000058	Code	RO	359	.text	fz_ps.l(dflti.o)
	0x08000d20	0x00000248	Code	RO	360	.text	fz_ps.l(dmul.o)
	0x08000f68	0x00000030	Code	RO	361	.text	fz_ps.l(ffixui.o)
	0x08000f98	0x000000b0	Code	RO	367	.text	
c_p.l(_printf_intcommon.o)	0x08001048	0x00000030	Code	RO	368	.text	
c_p.l(_printf_char_common.o)	0x08001078	0x0000000a	Code	RO	369	.text	c_p.l(_putc.o)
	0x08001082	0x00000028	Code	RO	371	.text	c_p.l(rtudiv10.o)
	0x080010aa	0x00000002	PAD				
	0x080010ac	0x00000064	Code	RO	372	.text	fz_ps.l(fcmpin.o)
	0x08001110	0x00000030	Code	RO	391	.text	fz_ps.l(cmpret.o)
	0x08001140	0x00000010	Code	RO	392	.text	fz_ps.l(fnan2.o)
	0x08001150	0x0000003e	Code	RO	393	.text	
c_p.l(sys_stackheap_outer.o)	0x0800118e	0x0000000c	Code	RO	395	.text	c_p.l(exit.o)
	0x0800119a	0x0000005e	Code	RO	402	.text	fz_ps.l(retnan.o)
	0x080011f8	0x00000008	Code	RO	403	.text	c_p.l(libspace.o)
	0x08001200	0x0000000c	Code	RO	456	.text	c_p.l(sys_exit.o)
	0x0800120c	0x00000002	Code	RO	469	.text	c_p.l(use_no_semi.o)
	0x0800120e	0x00000000	Code	RO	470	.text	
c_p.l(indicate_semi.o)	0x0800120e	0x00000018	Code	RO	58	i.ADC_ChannelConfig	stm32f0xx_adc.o
	0x08001226	0x00000018	Code	RO	62	i.ADC_Cmd	stm32f0xx_adc.o
	0x0800123e	0x00000002	PAD				
	0x08001240	0x00000020	Code	RO	66	i.ADC_DeInit	stm32f0xx_adc.o
	0x08001260	0x0000003c	Code	RO	68	i.ADC_GetCalibrationFactor	
stm32f0xx_adc.o	0x0800129c	0x00000008	Code	RO	69	i.ADC_GetConversionValue	stm32f0xx_adc.o
	0x080012a4	0x00000030	Code	RO	70	i.ADC_GetFlagStatus	stm32f0xx_adc.o
	0x080012d4	0x0000002c	Code	RO	73	i.ADC_Init	stm32f0xx_adc.o
	0x08001300	0x0000000a	Code	RO	76	i.ADC_StartOfConversion	stm32f0xx_adc.o
	0x0800130a	0x00000002	PAD				
	0x0800130c	0x00000028	Code	RO	87	i.DAC_Cmd	stm32f0xx_dac.o

0x08001334	0x00000038	Code	RO	95	i.DAC_Init	stm32f0xx_dac.o
0x0800136c	0x00000020	Code	RO	96	i.DAC_SetChannel1Data	stm32f0xx_dac.o
0x0800138c	0x000002b4	Code	RO	3	i.EXTI4_15_IRQHandler	main.o
0x08001640	0x0000000c	Code	RO	267	i.EXTI_ClearITPendingBit	
stm32f0xx_exti.o						
0x0800164c	0x0000001c	Code	RO	271	i.EXTI_GetITStatus	stm32f0xx_exti.o
0x08001668	0x00000088	Code	RO	272	i.EXTI_Init	stm32f0xx_exti.o
0x080016f0	0x0000000c	Code	RO	276	i.FLASH_ClearFlag	stm32f0xx_flash.o
0x080016fc	0x0000004c	Code	RO	278	i.FLASH_ErasePage	stm32f0xx_flash.o
0x08001748	0x0000003c	Code	RO	281	i.FLASH_GetStatus	stm32f0xx_flash.o
0x08001784	0x0000001c	Code	RO	304	i.FLASH_SetLatency	stm32f0xx_flash.o
0x080017a0	0x00000024	Code	RO	305	i.FLASH_Unlock	stm32f0xx_flash.o
0x080017c4	0x00000028	Code	RO	306	i.FLASH_WaitForLastOperation	
stm32f0xx_flash.o						
0x080017ec	0x00000090	Code	RO	105	i.GPIO_Init	stm32f0xx_gpio.o
0x0800187c	0x00000014	Code	RO	109	i.GPIO_ReadInputDataBit	stm32f0xx_gpio.o
0x08001890	0x00000004	Code	RO	112	i.GPIO_ResetBits	stm32f0xx_gpio.o
0x08001894	0x00000004	Code	RO	113	i.GPIO_SetBits	stm32f0xx_gpio.o
0x08001898	0x00000084	Code	RO	4	i.LCDWriteCmd	main.o
0x0800191c	0x00000084	Code	RO	5	i.LCDWriteDat	main.o
0x080019a0	0x00000070	Code	RO	261	i.NVIC_Init	stm32f0xx_misc.o
0x08001a10	0x00000078	Code	RO	6	i.NVIC_SetPriority	main.o
0x08001a88	0x00000038	Code	RO	119	i.RCC_ADCCLKConfig	stm32f0xx_rcc.o
0x08001ac0	0x00000020	Code	RO	120	i.RCC_AHBPeriphClockCmd	stm32f0xx_rcc.o
0x08001ae0	0x00000020	Code	RO	122	i.RCC_APB1PeriphClockCmd	stm32f0xx_rcc.o
0x08001b00	0x00000020	Code	RO	124	i.RCC_APB2PeriphClockCmd	stm32f0xx_rcc.o
0x08001b20	0x00000020	Code	RO	125	i.RCC_APB2PeriphResetCmd	stm32f0xx_rcc.o
0x08001b40	0x00000078	Code	RO	133	i.RCC_DeInit	stm32f0xx_rcc.o
0x08001bb8	0x00000048	Code	RO	135	i.RCC_GetFlagStatus	stm32f0xx_rcc.o
0x08001c00	0x00000020	Code	RO	138	i.RCC_HCLKConfig	stm32f0xx_rcc.o
0x08001c20	0x00000024	Code	RO	150	i.RCC_PCLKConfig	stm32f0xx_rcc.o
0x08001c44	0x00000028	Code	RO	151	i.RCC_PLLCmd	stm32f0xx_rcc.o
0x08001c6c	0x00000024	Code	RO	152	i.RCC_PLLConfig	stm32f0xx_rcc.o
0x08001c90	0x0000001c	Code	RO	156	i.RCC_SYSClkConfig	stm32f0xx_rcc.o
0x08001cac	0x00000048	Code	RO	7	i.ReadInputButtonWithDebounce	main.o
0x08001cf4	0x0000001c	Code	RO	33	i.SPIReadData	nrf24l01p.o
0x08001d10	0x00000020	Code	RO	34	i.SPISendData	nrf24l01p.o
0x08001d30	0x00000020	Code	RO	168	i.SPI_CalculateCRC	stm32f0xx_spi.o
0x08001d50	0x0000001c	Code	RO	169	i.SPI_Cmd	stm32f0xx_spi.o
0x08001d6c	0x00000014	Code	RO	178	i.SPI_I2S_GetFlagStatus	stm32f0xx_spi.o
0x08001d80	0x00000058	Code	RO	183	i.SPI_Init	stm32f0xx_spi.o
0x08001dd8	0x00000020	Code	RO	185	i.SPI_NSSInternalSoftwareConfig	
stm32f0xx_spi.o						
0x08001df8	0x0000000c	Code	RO	187	i.SPI_ReceiveData8	stm32f0xx_spi.o
0x08001e04	0x00000014	Code	RO	188	i.SPI_RxFIFOThresholdConfig	
stm32f0xx_spi.o						
0x08001e18	0x0000000a	Code	RO	190	i.SPI_SendData8	stm32f0xx_spi.o
0x08001e22	0x00000002	PAD				
0x08001e24	0x000000d8	Code	RO	313	i.SetSysClock	system_stm32f0xx.o
0x08001efc	0x00000024	Code	RO	263	i.SysTick_CLKSourceConfig	
stm32f0xx_misc.o						
0x08001f20	0x00000148	Code	RO	8	i.SysTick_Handler	main.o
0x08002068	0x000000b0	Code	RO	314	i.SystemCoreClockUpdate	
system_stm32f0xx.o						
0x08002118	0x0000007c	Code	RO	315	i.SystemInit	system_stm32f0xx.o
0x08002194	0x0000002c	Code	RO	9	i.clearLCD	main.o
0x080021c0	0x00000022	Code	RO	50	i.dummyDelay_us	util.o
0x080021e2	0x00000002	PAD				
0x080021e4	0x00000034	Code	RO	10	i.initADC	main.o
0x08002218	0x0000001a	Code	RO	11	i.initDAC	main.o
0x08002232	0x0000002e	Code	RO	12	i.initEXTI	main.o
0x08002260	0x0000010c	Code	RO	13	i.initGPIO	main.o
0x0800236c	0x000000a8	Code	RO	14	i.initLCD	main.o
0x08002414	0x0000005e	Code	RO	15	i.initRCCHSI	main.o
0x08002472	0x00000002	PAD				
0x08002474	0x00000060	Code	RO	16	i.initSPI	main.o
0x080024d4	0x00000070	Code	RO	17	i.initSysTick	main.o
0x08002544	0x00000064	Code	RO	18	i.init_nRF24L01P	main.o
0x080025a8	0x0000007c	Code	RO	19	i.interruptStartupProcess	main.o

0x08002624	0x00000478	Code	RO	20	i.main	main.o
0x08002a9c	0x00000014	Code	RO	35	i.nRF24L01PCEHigh	nrf24l01p.o
0x08002ab0	0x00000018	Code	RO	36	i.nRF24L01PCELow	nrf24l01p.o
0x08002ac8	0x00000028	Code	RO	37	i.nRF24L01PDisableChip	nrf24l01p.o
0x08002af0	0x00000012	Code	RO	38	i.nRF24L01PEnableChip	nrf24l01p.o
0x08002b02	0x0000003a	Code	RO	39	i.nRF24L01PExecuteCommand	nrf24l01p.o
0x08002b3c	0x0000003a	Code	RO	40	i.nRF24L01PReadRegister	nrf24l01p.o
0x08002b76	0x00000002	PAD				
0x08002b78	0x00000054	Code	RO	41	i.nRF24L01PRxMode	nrf24l01p.o
0x08002bcc	0x00000070	Code	RO	42	i.nRF24L01PTest	nrf24l01p.o
0x08002c3c	0x00000062	Code	RO	43	i.nRF24L01PTx	nrf24l01p.o
0x08002c9e	0x00000002	PAD				
0x08002ca0	0x00000024	Code	RO	44	i.nRF24L01PTxMode	nrf24l01p.o
0x08002cc4	0x0000003c	Code	RO	45	i.nRF24L01PWriteArrayToRegister	
nrf24l01p.o						
0x08002d00	0x0000002c	Code	RO	46	i.nRF24L01PWriteRegister	nrf24l01p.o
0x08002d2c	0x00000080	Code	RO	21	i.radioSendData	main.o
0x08002dac	0x00000040	Code	RO	22	i.readADC1	main.o
0x08002dec	0x00000020	Code	RO	23	i.sendHeartbeat	main.o
0x08002e0c	0x00000104	Code	RO	24	i.updateBatteryPercentage	main.o
0x08002f10	0x00000060	Code	RO	25	i.updatePersonStatus	main.o
0x08002f70	0x00000088	Code	RO	26	i.updatePersonTalking	main.o
0x08002ff8	0x00000048	Code	RO	27	i.writeCharToLCD	main.o
0x08003040	0x00000020	Code	RO	28	i.writeStrToLCD	main.o
0x08003060	0x00000054	Code	RO	362	x\$fpl\$fleqf	fz_ps.l(flef.o)
0x080030b4	0x00000058	Code	RO	363	x\$fpl\$frleqf	fz_ps.l(frlef.o)
0x0800310c	0x00000000	Code	RO	373	x\$fpl\$usenofp	fz_ps.l(usenofp.o)
0x0800310c	0x00000008	Data	RO	29	.constdata	main.o
0x08003114	0x00000028	Data	RO	324	.constdata	
c_p.l(_printf_hex_int.o)						
0x0800313c	0x00000080	Data	RO	358	.constdata	fz_ps.l(ddiv.o)
0x080031bc	0x00000020	Data	RO	503	Region\$\$Table	anon\$\$obj.o

Execution Region RW_IRAM1 (Base: 0x20000000, Size: 0x00000698, Max: 0x00002000, ABSOLUTE)

Base Addr	Size	Type	Attr	Idx	E Section Name	Object
0x20000000	0x00000017	Data	RW	30	.data	main.o
0x20000017	0x0000000a	Data	RW	47	.data	nrf24l01p.o
0x20000021	0x00000003	PAD				
0x20000024	0x00000014	Data	RW	316	.data	system_stm32f0xx.o
0x20000038	0x00000060	Zero	RW	404	.bss	c_p.l(libspace.o)
0x20000098	0x00000200	Zero	RW	308	HEAP	startup_stm32f051.o
0x20000298	0x00000400	Zero	RW	307	STACK	startup_stm32f051.o

I am using STM32F051C8T6, with Keil MDK 5.15.0 as IDE and default compiler.

Any ideas on what's going on?