

```

1 AREA main, CODE, READONLY ;area is a directive
2 EXPORT __main
3 ENTRY
4 sig dcw 0x0128, 0x004f, 0xff74, 0x0096, 0x01b5, 0x00cf, 0xffe4, 0x00f3, 0x01fd, 0x0100, 0xfffd, 0x00f3, 0x01e4, 0x00cf, 0xffb5, 0x0096, 0x0174, 0x004f, 0x:
5 h dcw 0x0000, 0x0000, 0xffff, 0xffff, 0xffff, 0xffff, 0x0000, 0x0001, 0x0003, 0x0006, 0x0009, 0x000d, 0x0011, 0x0014, 0x0017, 0x0019, 0x001a, 0x0019, 0x00:
6 f equ 8 ;length of fraction part of fixed point
7
8 l equ 1000 ; Input length*2 for 2 byte alignment
9 hl equ 66 ; Filter length*2 for 2 byte alignment
10 ol equ 1064 ; Output length*2 for 2 byte alignment
11
12 ;convlution code
13 ;for(i=0;i<ol;i++){
14 ;y[i]=0;
15 ;for(j=0;j<hl;j++){
16 ;(if(0<i-j<l){
17 ;y[i]=y[i]+x[i-j]*h[j];
18 ;}};
19 ;}};
20 ;}};
21
22 __main
23     ldr r0,=sig ;Address of input signal
24     ldr r1,=h ;Address of filter coefficients
25     mov r2,#0x0000 ;output signal memory lower byte
26     movt r2,#0x2000 ;output signal memory upper byte 0x2000000000
27
28     mov r3,#0 ;i=0
29 __outer_loop ;for(i=0;i<ol;i++)
30     cmp r3,#ol
31     bge __exit_outer_loop ;exit if i>=ol
32     mov r4,#0 ;j=0
33     mov r9,#0 ;accumulator=0
34 __inner_loop ;for(j=0;j<hl;j++)
35     cmp r4,#hl
36     bge __exit_inner_loop ;exit if j>=hl

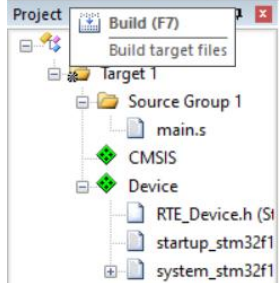
```

```
0x01e4, 0x00cf, 0xffb5, 0x0096, 0x0174, 0x004f, 0x:
x0011, 0x0014, 0x0017, 0x0019, 0x001a, 0x0019, 0x00:
```

OK Cancel Apply



Target 1



```

1  AREA main, CODE, READONLY ;area is a directive
2  EXPORT __main
3  ENTRY
4  sig dcw 0x0128, 0x004f, 0xff74, 0x0096, 0x01b5, 0x00cf, 0xffe4, 0x00f3, 0x01fd, 0x0100, 0xfffd, 0x00f3, 0x01e4, 0x00cf, 0xffb5, 0x0096, 0x0174, 0x004f, 0x:
5  h dcw 0x0000, 0x0000, 0xffff, 0xffff, 0xffff, 0xffff, 0x0000, 0x0001, 0x0003, 0x0006, 0x0009, 0x000d, 0x0011, 0x0014, 0x0017, 0x0019, 0x001a, 0x0019, 0x00:
6  f equ 8 ;length of fraction part of fixed point
7
8  l equ 1000 ; Input length*2 for 2 byte alignment
9  hl equ 66 ; Filter length*2 for 2 byte alignment
10 ol equ 1064 ; Output length*2 for 2 byte alignment
11
12 ;convlution code
13 ;for(i=0;i<ol;i++){
14 ;y[i]=0;
15 ;for(j=0;j<hl;j++){
16 ;(if(0<i-j<l){
17 ;y[i]=y[i]+x[i-j]*h[j];
18 ;}}
19 ;}}
20 ;}}
21
22 __main
23     ldr r0,=sig ;Address of input signal
24     ldr r1,=h ;Address of filter coefficients
25     mov r2,#0x0000 ;output signal memory lower byte
26     movt r2,#0x2000 ;output signal memory upper byte 0x2000000000
27
28     mov r3,#0 ;i=0
29 __outer_loop ;for(i=0;i<ol;i++){
30     cmp r3,#ol
31     bge __exit_outer_loop ;exit if i>=ol
32     mov r4,#0 ;j=0
33     mov r9,#0 ;accumulator=0
34 __inner_loop ;for(j=0;j<hl;j++){
35     cmp r4,#hl
36     bge __exit_inner_loop ;exit if j>=hl

```

Build Output

Build target files

ST-Link Debugger

L:31 C:5

CAP NUM SCRL OVR R/W


```
1 AREA main, CODE, READONLY ;area is a directive
2 EXPORT __main
3 ENTRY
4 sig dcw 0x0128, 0x004f, 0xff74, 0x0096, 0x01b5, 0x00cf, 0xfe4, 0x00f3, 0x0lfd, 0x0100, 0xffffd, 0x00f3, 0x0le4, 0x00cf, 0xffb5, 0x0096, 0x0174, 0x004f, 0x0128; length of fraction part of fixed point
5 h dcw 0x0000, 0x0000, 0xffff, 0xffff, 0xffff, 0xffff, 0x0000, 0x0001, 0x0003, 0x0006, 0x0009, 0x000d, 0x0011, 0x0014, 0x0017, 0x0019, 0x001a, 0x0019, 0x001c, 0x001e, 0x001f, 0x0020; filter coefficients
6 f equ 8 ;length of fraction part of fixed point
7
8 l equ 1000 ; Input length*2 for 2 byte alignment
9 hl equ 66 ; Filter length*2 for 2 byte alignment
10 ol equ 1064 ; Output length*2 for 2 byte alignment
11
12 ;convolution code
13 ;for(i=0;i<ol;i++){
14 ;y[i]=0;
15 ;for(j=0;j<hl;j++){
16 ;(if(0<i-j<l){
17 ;y[i]=y[i]+x[i-j]*h[j];
18 ;}}
19 ;}
20 ;}
21
22 __main
23     ldr r0, =sig ;Address of input signal
24     ldr r1, =h ;Address of filter coefficients
25     mov r2, #0x0000 ;output signal memory lower byte
26     movt r2, #0x2000 ;output signal memory upper byte 0x2000000000
27
28     mov r3, #0 ;i=0
29 __outer_loop :for(i=0;i<ol;i++)
30     cmp r3, #ol
31     bge __exit_outer_loop ;exit if i>=ol
32     mov r4, #0 ;j=0
33     mov r9, #0 ;accumulator=0
34 __inner_loop :for(j=0;j<hl;j++)
35     cmp r4, #hl
36     bge __exit_inner_loop ;exit if j>=hl
```



Registers

| Register | Value |
|-----------------|------------|
| Core | |
| R0 | 0x00000000 |
| R1 | 0x00000000 |
| R2 | 0x00000000 |
| R3 | 0x00000000 |
| R4 | 0x00000000 |
| R5 | 0x00000000 |
| R6 | 0x00000000 |
| R7 | 0x00000000 |
| R8 | 0x00000000 |
| R9 | 0x00000000 |
| R10 | 0x00000000 |
| R11 | 0x00000000 |
| R12 | 0x00000000 |
| R13 (SP) | 0x20000600 |
| R14 (LR) | 0xFFFFFFFF |
| R15 (PC) | 0x080000EC |
| xPSR | 0x01000000 |
| Banked | |
| System | |
| Internal | |
| Mode | Thread |
| Privilege | Privileged |
| Stack | MSP |
| States | 0 |
| Sec | 0.00000000 |

Disassembly

| | | |
|-----------------|-----|---------------------------|
| 133: | LDR | R0, =SystemInit |
| 0x080000EC 4809 | LDR | r0,[pc,#36] ; @0x08000114 |
| 134: | BLX | R0 |
| 0x080000EE 4780 | BLX | r0 |

main.s

startup_stm32f10x_md.s

system_stm32f10x.c

```
126         AREA |.text|, CODE, READONLY
127
128 ; Reset handler
129 Reset_Handler PROC
130     EXPORT Reset_Handler                [WEAK]
131
132     IMPORT __main
133     IMPORT SystemInit
134
135     LDR R0, =SystemInit
136     BLX R0
137     ENDP
138
139 ; Dummy Exception Handlers (infinite loops which can be modified)
140
141 NMI_Handler PROC
142     EXPORT NMI_Handler                [WEAK]
143     B .
144     ENDP
145 HardFault_Handler\
146     PROC
147     EXPORT HardFault_Handler          [WEAK]
148     B .
149     ENDP
```

Project

Registers

Text Editor

Configuration Wizard

Command

```
BS 0x080006D4, 1
BS \\fir_filter\main.s\1
^
*** error 35: undefined line number
BS 0x080006D4
<
>
ASSIGN BreakDisable BreakEnable BreakKill BreakList BreakSet BreakAccess COVERAGE COVTOFILE
```

Call Stack + Locals

| Name | Location/Value | Type |
|---------------|----------------|----------|
| Reset_Handler | 0x00000000 | void f() |

Call Stack + Locals

Trace Exceptions

Event Counters

Memory 1

ST-Link Debugger t1: 0.00000000 sec L:133 C:1 CAP NUM SCRL OVR R/W



Registers

| Register | Value |
|-----------------|------------|
| Core | |
| R0 | 0x08000254 |
| R1 | 0x0800063C |
| R2 | 0x20000000 |
| R3 | 0x00000428 |
| R4 | 0x00000042 |
| R5 | 0x000003E6 |
| R6 | 0x0800063A |
| R7 | 0x0800067C |
| R8 | 0x20000426 |
| R9 | 0x00000000 |
| R10 | 0x00000000 |
| R11 | 0x00000000 |
| R12 | 0x00000000 |
| R13 (SP) | 0x20000600 |
| R14 (LR) | 0x080006B4 |
| R15 (PC) | 0x080006D4 |
| xPSR | 0x61000000 |
| Banked | |
| System | |
| Internal | |
| Mode | Thread |
| Privilege | Privileged |
| Stack | MSP |
| States | 1202055 |
| Sec | 0.12020550 |

Disassembly

```
0x080006D4 E7FE B 0x080006D4
0x080006D6 FB0BFA0C MUL r10,r11,r12
0x080006DA EA4F2A2A ASR r10,r10,#8
0x080006DE F1BA0F00 CMP r10,#0x00
-----
```

main.s startup_stm32f10x_md.s system_stm32f10x.c

```
126 AREA |.text|, CODE, READONLY
127
128 ; Reset handler
129 Reset_Handler PROC
130 EXPORT Reset_Handler [WEAK]
131
132 IMPORT __main
133 IMPORT SystemInit
134
135 LDR R0, =SystemInit
136 BLX R0
137
138 LDR R0, =__main
139 BX R0
140 ENDP
141
142 ; Dummy Exception Handlers (infinite loops which can be modified)
143
144 NMI_Handler PROC
145 EXPORT NMI_Handler [WEAK]
146 B .
147 ENDP
148
149 HardFault_Handler\
150 PROC
151 EXPORT HardFault_Handler [WEAK]
152 B .
153 ENDP
```

Project Registers

Command

```
BS 0x080006D4, 1
BS \\fir_filter\main.s\1
*** error 35: undefined line number
BS 0x080006D4
```

ASSIGN BreakDisable BreakEnable BreakKill BreakList BreakSet BreakAccess COVERAGE COVTOFILE

Call Stack + Locals

| Name | Location/Value | Type |
|---------------|----------------|----------|
| Reset_Handler | 0x00000000 | void f() |

Call Stack + Locals

Trace Exceptions

Event Counters

Memory 1

ST-Link Debugger

t1: 0.12020550 sec

L:133 C:1

CAP NUM SCRL OVR R/W

STM32CubeProgrammer

Memory & File edition

Device memory Open file +

Address 0x08000254 Size 0x400 Data width 32-bit Find Data 0x Read

| Address | 0 | 4 | 8 | C | ASCII |
|------------|----------|----------|----------|----------|-------------------|
| 0x08000254 | 004F0128 | 0096FF74 | 00CF01B5 | 00F3FFE4 | (.0.tÿ.µ.İ.ăŷó. |
| 0x08000264 | 010001FD | 00F3FFFD | 00CF01E4 | 0096FFB5 | ý...ŷŷó.ă.İ.µŷ.. |
| 0x08000274 | 004F0174 | 0000FF28 | FFB100D8 | FF6AFE8C | t.O.(ÿ..ø.±ÿ.þĴ |
| 0x08000284 | FF31004B | FF0DFE1C | FF000003 | FF0DFE03 | K.1ÿ.þ.ŷ...ŷ.þ.ŷ |
| 0x08000294 | FF31001C | FF6AFE4B | FFB1008C | 0000FED8 | ..1ÿkþĴŷ...±ÿøþ.. |
| 0x080002A4 | 004F0128 | 0096FF74 | 00CF01B5 | 00F3FFE4 | (.0.tÿ.µ.İ.ăŷó. |
| 0x080002B4 | 010001FD | 00F3FFFD | 00CF01E4 | 0096FFB5 | ý...ŷŷó.ă.İ.µŷ.. |
| 0x080002C4 | 004F0174 | 0000FF28 | FFB100D8 | FF6AFE8C | t.O.(ÿ..ø.±ÿ.þĴ |
| 0x080002D4 | FF31004B | FF0DFE1C | FF000003 | FF0DFE03 | K.1ÿ.þ.ŷ...ŷ.þ.ŷ |
| 0x080002E4 | FF31001C | FF6AFE4B | FFB1008C | 0000FED8 | ..1ÿkþĴŷ...±ÿøþ.. |
| 0x080002F4 | 004F0128 | 0096FF74 | 00CF01B5 | 00F3FFE4 | (.0.tÿ.µ.İ.ăŷó. |
| 0x08000304 | 010001FD | 00F3FFFD | 00CF01E4 | 0096FFB5 | ŷ...ŷŷó.ă.İ.uŷ.. |

Log

Live Update Verbosity level 1 2 3

17:02:22 : Data read successfully
17:02:22 : Time elapsed during the read operation is: 00:00:00.007
17:02:30 : UPLOADING ...
17:02:30 : Size : 1024 Bytes
17:02:30 : Address : 0x08000254
17:02:30 : Read progress:
17:02:30 : Data read successfully
17:02:30 : Time elapsed during the read operation is: 00:00:00.007

100%

ST-LINK Disconnect

ST-LINK configuration

Serial number 492107...
Port SWD
Frequency (kHz) 4000
Mode Normal
Access port 0
Reset mode Software reset
Shared Disabled
Debug in Low Power mode ☒
External loader
Target voltage 3.17 V
Firmware version V2J31S7
Firmware upgrade

Target information

Board --
Device STM32F101/F102/F103 Medi...
Type MCU
Device ID 0x410
Revision ID Rev X
Flash size 64 KB
CPU Cortex-M3
Bootloader Version --

Memory & File edition

Connected

Device memory

Open file

+

Address 0x08000254 Size 0x400 Data width 32-bit Find Data 0x

| Address | 0 | 4 | 8 | C | ASCII |
|------------|----------|----------|----------|----------|------------------|
| 0x08000254 | 004F0128 | 0096FF74 | 00CF01B5 | 00F3FFE4 | (.O.tÿ..µ.İ.äÿó. |
| 0x08000264 | 010001FD | 00F3FFFD | 00CF01E4 | 0096FFB5 | ý...ÿÿó.ä.İ.µÿ.. |
| 0x08000274 | 004F0174 | 0000FF28 | FFB100D8 | FF6AFE8C | t.O.(ÿ..ø.±ÿ.þÿÿ |
| 0x08000284 | FF31004B | FF0DFE1C | FF000003 | FF0DFE03 | K.1ÿ.þ.ÿ...ÿ.þ.ÿ |
| 0x08000294 | FF31001C | FF6AFE4B | FFB1008C | 0000FED8 | ..1ÿkþÿÿ..±ÿøþ.. |
| 0x080002A4 | 004F0128 | 0096FF74 | 00CF01B5 | 00F3FFE4 | (.O.tÿ..µ.İ.äÿó. |
| 0x080002B4 | 010001FD | 00F3FFFD | 00CF01E4 | 0096FFB5 | ý...ÿÿó.ä.İ.µÿ.. |
| 0x080002C4 | 004F0174 | 0000FF28 | FFB100D8 | FF6AFE8C | t.O.(ÿ..ø.±ÿ.þÿÿ |
| 0x080002D4 | FF31004B | FF0DFE1C | FF000003 | FF0DFE03 | K.1ÿ.þ.ÿ...ÿ.þ.ÿ |
| 0x080002E4 | FF31001C | FF6AFE4B | FFB1008C | 0000FED8 | ..1ÿkþÿÿ..±ÿøþ.. |
| 0x080002F4 | 004F0128 | 0096FF74 | 00CF01B5 | 00F3FFE4 | (.O.tÿ..µ.İ.äÿó. |
| 0x08000304 | 010001FD | 00F3FFFD | 00CF01E4 | 0096FFB5 | ý...ÿÿó.ä.İ.µÿ.. |
| 0x08000314 | 004F0174 | 0000FF28 | FFB100D8 | FF6AFE8C | t.O.(ÿ..ø.±ÿ.þÿÿ |
| 0x08000324 | FF31004B | FF0DFE1C | FF000003 | FF0DFE03 | K.1ÿ.þ.ÿ...ÿ.þ.ÿ |

- Read
- Save As
- Fill memory
- Blank check
- Compare memory with file
- Compare two files

Log

☐ Live Update

Verbosity level

1

2

3

17:02:30 : Size : 1024 Bytes
17:02:30 : Address : 0x8000254
17:02:30 : Read progress:
17:02:30 : Data read successfully
17:02:30 : Time elapsed during the read operation is: 00:00:00.007
17:03:13 : UPLOADING ...
17:03:13 : Size : 1024 Bytes
17:03:13 : Address : 0x8000254
17:03:13 : Read progress:
17:03:13 : Data read successfully
17:03:13 : Time elapsed during the read operation is: 00:00:00.008

ST-LINK

Disconnect

ST-LINK configuration

Serial number

492107...

SWD

(Hz)

4000

Normal

0

Reset mode

Software reset

Shared

Disabled

Debug in Low Power mode

External loader

Target voltage 3.17 V

Firmware version V2J31S7

Firmware upgrade

Target information

Board

Device STM32F101/F102/F103 Medi...

Type

MCU

Device ID

0x410

Revision ID

Rev X

Flash size

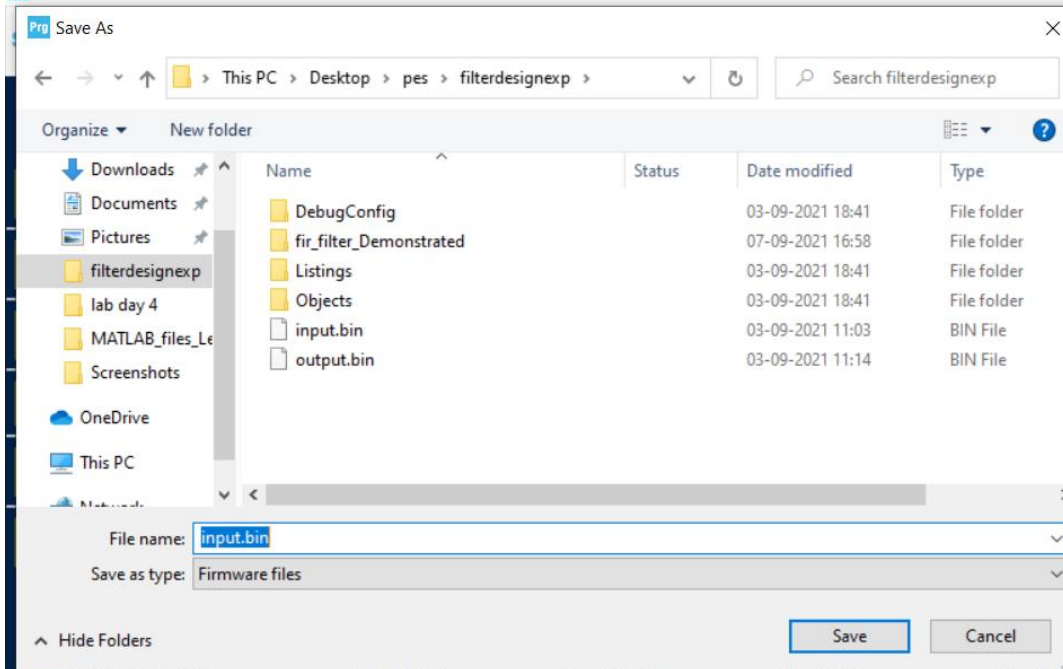
64 KB

CPU

Cortex-M3

Bootloader Version

100%



Log

17:03:13 : Size : 1024 Bytes

17:03:13 : Address : 0x8000254

17:03:13 : Read progress:

17:03:13 : Data read successfully

17:03:13 : Time elapsed during the read operation is: 00:00:00.008

17:03:23 : UPLOADING ...

17:03:23 : Size : 1024 Bytes

17:03:23 : Address : 0x8000254

17:03:23 : Read progress:

17:03:23 : Data read successfully

17:03:23 : Time elapsed during the read operation is: 00:00:00.008

ST-LINK configuration

Serial number: 492107...

Port: SWD

Frequency (kHz): 4000

Mode: Normal

Access port: 0

Reset mode: Software reset

Shared: Disabled

Debug in Low Power mode: ☒

External loader: ☐

Target voltage: 3.17 V

Firmware version: V2J31S7

Firmware upgrade

Target information

Board: --

Device: STM32F101/F102/F103 Medi...

Type: MCU

Device ID: 0x410

Revision ID: Rev X

Flash size: 64 KB

CPU: Cortex-M3

Bootloader Version: --

Memory & File edition

Connected



Device memory

Open file



OB

CPU

SWV

REG

BETA

Address 0x02000000 Size 0x400 Data width 32-bit Find Data 0x

| Address | 0 | 4 | 8 | C | ASCII |
|------------|----------|----------|----------|----------|-------|
| 0x02000000 | 000D0009 | 000D0009 | 000D0009 | 000D0009 | ..... |
| 0x02000010 | 000D0009 | 000D0009 | 000D0009 | 000D0009 | ..... |
| 0x02000020 | 000D0009 | 000D0009 | 000D0009 | 000D0009 | ..... |
| 0x02000030 | 000D0009 | 000D0009 | 000D0009 | 000D0009 | ..... |
| 0x02000040 | 000D0009 | 000D0009 | 000D0009 | 000D0009 | ..... |
| 0x02000050 | 000D0009 | 000D0009 | 000D0009 | 000D0009 | ..... |
| 0x02000060 | 000D0009 | 000D0009 | 000D0009 | 000D0009 | ..... |
| 0x02000070 | 000D0009 | 000D0009 | 000D0009 | 000D0009 | ..... |
| 0x02000080 | 000D0009 | 000D0009 | 000D0009 | 000D0009 | ..... |
| 0x02000090 | 000D0009 | 000D0009 | 000D0009 | 000D0009 | ..... |
| 0x020000A0 | 000D0009 | 000D0009 | 000D0009 | 000D0009 | ..... |
| 0x020000B0 | 000D0009 | 000D0009 | 000D0009 | 000D0009 | ..... |
| 0x020000C0 | 000D0009 | 000D0009 | 000D0009 | 000D0009 | ..... |
| 0x020000D0 | 000D0009 | 000D0009 | 000D0009 | 000D0009 | ..... |

Read

Save As

Fill memory

Blank check

Compare memory with file

Compare two files

Log

☐ Live Update

Verbosity level

1

2

3

17:03:23 : Size : 1024 Bytes
17:03:23 : Address : 0x8000254
17:03:23 : Read progress:
17:03:23 : Data read successfully
17:03:23 : Time elapsed during the read operation is: 00:00:00.008
17:04:10 : UPLOADING ...
17:04:10 : Size : 1024 Bytes
17:04:10 : Address : 0x2000000
17:04:10 : Read progress:
17:04:10 : Data read successfully
17:04:10 : Time elapsed during the read operation is: 00:00:00.006

100%



ST-LINK

Disconnect

ST-LINK configuration

Serial number

492107...

SWD

(Hz)

4000

Normal

0

Reset mode

Software reset

Shared

Disabled

Debug in Low Power mode

External loader

Target voltage 3.17 V

Firmware version V2J31S7

Firmware upgrade

Target information

Board

Device STM32F101/F102/F103 Medi...

Type

MCU

Device ID

0x410

Revision ID

Rev X

Flash size

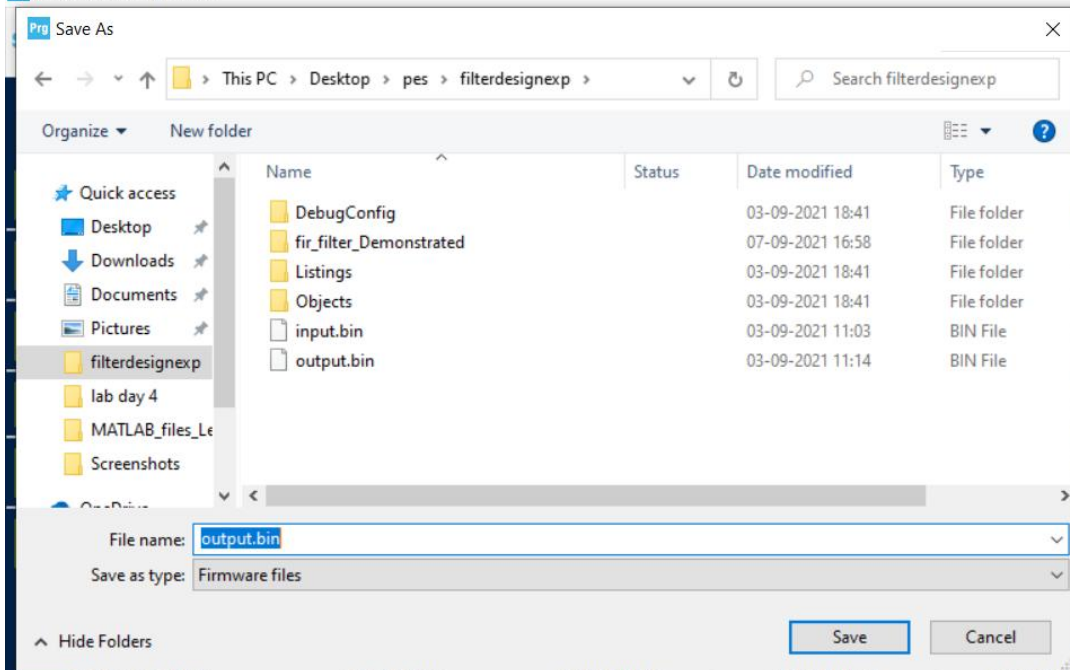
64 KB

CPU

Cortex-M3

Bootloader Version

-



| | | | | |
|------------|----------|----------|----------|----------|
| 0x020000A0 | 000D0009 | 000D0009 | 000D0009 | 000D0009 |
| 0x020000B0 | 000D0009 | 000D0009 | 000D0009 | 000D0009 |
| 0x020000C0 | 000D0009 | 000D0009 | 000D0009 | 000D0009 |
| 0x020000D0 | 000D0009 | 000D0009 | 000D0009 | 000D0009 |

10

Connected

ST-LINK

Disconnect

ST-LINK configuration

Serial number

492107...

Port

SWD

Frequency (kHz)

4000

Mode

Normal

Access port

0

Reset mode

Software reset

Shared

Disabled

Debug in Low Power mode

External loader

Target voltage

3.17 V

Firmware version

V2J31S7

Firmware upgrade

Target information

Board

Device

Type

Device ID

Revision ID

Flash size

CPU

Bootloader Version

STM32F101/F102/F103 Medi...

MCU

0x410

Rev X

64 KB

Cortex-M3

-

Log

17:03:23 : Size : 1024 Bytes

17:03:23 : Address : 0x8000254

17:03:23 : Read progress:

17:03:23 : Data read successfully

17:03:23 : Time elapsed during the read operation is: 00:00:00.008

17:04:10 : UPLOADING ...

17:04:10 : Size : 1024 Bytes

17:04:10 : Address : 0x2000000

17:04:10 : Read progress:

17:04:10 : Data read successfully

17:04:10 : Time elapsed during the read operation is: 00:00:00.006

Live Update

Verbosity level

1

2

3

100%

