Comparison between blank project with DFSDM, DMA & DAC configured vs. WiFi Project

stm32l4xx_hal_conf.h

This file is present in both projects. It seems like the file which is used to enable appropriate header files for used components like DMA, DAC, etc., for each STM32Cube project.

Actions taken in Wi-Fi project:

Uncommented HAL_DAC_MODULE_ENABLED and HAL_DFSDM_MODULE_ENABLED

```
#define HAL_DAC_MODULE_ENABLED
/* #define HAL_DCMI_MODULE_ENABLED */
#define HAL_DFSDM_MODULE_ENABLED
#define HAL_DMA_MODULE_ENABLED
```

Result after compilation: No error

stm32l4xx_hal_msp.c

This file is not present in the Wi-Fi project. It seems like it is used to configure the DMA and DFSDM.

Actions taken in Wi-Fi project:

Copied file into the “User” folder

Result after compilation: No error, 1 extra warning:

```
../Application/User/stm32l4xx_hal_msp.c: In function 'HAL_DAC_MspInit':
../Application/User/stm32l4xx_hal_msp.c:123:7: warning: implicit declaration of
function 'Error_Handler' [-Wimplicit-function-declaration]
  123 |       Error_Handler();
```

Result after flashing board & running: Working as intended, no error.

system_stm32l4xx.c

This file is present in both projects. There are some slight differences between the two but I do not think they relate to the DFSDM & DMA so no action taken for now.

system32l4xx_it.c

This file is present in both projects. It seems to be implementations of some interrupt handlers that are used in the projects.

Actions taken in Wi-Fi project:

Added all this code:

```c
/**
  * @brief This function handles DMA1 channel1 global interrupt.
  */
void DMA1_Channel1_IRQHandler(void)
{
  /* USER CODE BEGIN DMA1_Channel1_IRQn 0 */

  /* USER CODE END DMA1_Channel1_IRQn 0 */
  HAL_DMA_IRQHandler(&hdma_dac1_ch1);
  /* USER CODE BEGIN DMA1_Channel1_IRQn 1 */

  /* USER CODE END DMA1_Channel1_IRQn 1 */
}

/**
  * @brief This function handles DMA1 channel2 global interrupt.
  */
void DMA1_Channel2_IRQHandler(void)
{
  /* USER CODE BEGIN DMA1_Channel2_IRQn 0 */

  /* USER CODE END DMA1_Channel2_IRQn 0 */
  HAL_DMA_IRQHandler(&hdma_dfsdm1_flt0);
  /* USER CODE BEGIN DMA1_Channel2_IRQn 1 */

  /* USER CODE END DMA1_Channel2_IRQn 1 */
}

/**
  * @brief This function handles TIM2 global interrupt.
  */
void TIM2_IRQHandler(void)
{
  /* USER CODE BEGIN TIM2_IRQn 0 */

  /* USER CODE END TIM2_IRQn 0 */
  HAL_TIM_IRQHandler(&htim2);
  /* USER CODE BEGIN TIM2_IRQn 1 */

  /* USER CODE END TIM2_IRQn 1 */
}
```

Into the same place in the wifi project. Also added these external variables

```
1  /* Includes ------------------------------------------------------------------*/
2  #include "main.h"
3  #include "stm32l4xx_it.h"
4
5  /* Private typedef -----------------------------------------------------------*/
6  /* Private define ------------------------------------------------------------*/
7  /* Private macro -------------------------------------------------------------*/
8  /* Private variables ---------------------------------------------------------*/
9  /* Private function prototypes -----------------------------------------------*/
0  /* Private functions ---------------------------------------------------------*/
1  /* External variables --------------------------------------------------------*/
2  extern DMA_HandleTypeDef hdma_dac1_ch1;
3  extern DMA_HandleTypeDef hdma_dfsdm1_flt0;
4  extern TIM_HandleTypeDef htim2;
```

Result after compilation: 3 Errors

```
21:30:14 **** Incremental Build of configuration Debug for project WiFi_HTTP_Server
****
make -j12 all
arm-none-eabi-gcc
"C:/Users/Administrator/STM32Cube/Repository/STM32Cube_FW_L4_V1.18.0/Projects/B-
L4S5I-IOT01A/Applications/WiFi/WiFi_HTTP_Server/Src/stm32l4xx_it.c" -mcpu=cortex-m4 -
std=gnu11 -g3 -DUSE_STM32L4S5I_IOT01 -DUSE_HAL_DRIVER -DSTM32L4S5xx -c -
I../../../../../../../Drivers/BSP/B-L4S5I-IOT01 -I../../../Common/Inc -
I../../../../../../../Drivers/STM32L4xx_HAL_Driver/Inc -I../../Inc -
I../../../../../../../Drivers/CMSIS/Device/ST/STM32L4xx/Include -
I../../../../../../../Drivers/BSP/Components/Common -
I../../../../../../../Drivers/CMSIS/Include -O0 -ffunction-sections -fdata-sections -
Wall -fstack-usage -fcyclomatic-complexity -MMD -MP -
MF"Application/User/stm32l4xx_it.d" -MT"Application/User/stm32l4xx_it.o" --
specs=nano.specs -mfpu=fpv4-sp-d16 -mfloat-abi=hard -mthumb -o
"Application/User/stm32l4xx_it.o"
C:/Users/Administrator/STM32Cube/Repository/STM32Cube_FW_L4_V1.18.0/Projects/B-L4S5I-
IOT01A/Applications/WiFi/WiFi_HTTP_Server/Src/stm32l4xx_it.c: In function
'EXTI15_10_IRQHandler':
C:/Users/Administrator/STM32Cube/Repository/STM32Cube_FW_L4_V1.18.0/Projects/B-L4S5I-
IOT01A/Applications/WiFi/WiFi_HTTP_Server/Src/stm32l4xx_it.c:201:28: error:
'PB_BLUE_Pin' undeclared (first use in this function)
  201 |   HAL_GPIO_EXTI_IRQHandler(PB_BLUE_Pin);
      |                            ^~~~~~~~~~~
C:/Users/Administrator/STM32Cube/Repository/STM32Cube_FW_L4_V1.18.0/Projects/B-L4S5I-
IOT01A/Applications/WiFi/WiFi_HTTP_Server/Src/stm32l4xx_it.c:201:28: note: each
undeclared identifier is reported only once for each function it appears in
C:/Users/Administrator/STM32Cube/Repository/STM32Cube_FW_L4_V1.18.0/Projects/B-L4S5I-
IOT01A/Applications/WiFi/WiFi_HTTP_Server/Src/stm32l4xx_it.c: At top level:
C:/Users/Administrator/STM32Cube/Repository/STM32Cube_FW_L4_V1.18.0/Projects/B-L4S5I-
IOT01A/Applications/WiFi/WiFi_HTTP_Server/Src/stm32l4xx_it.c:221:6: error:
redefinition of 'EXTI15_10_IRQHandler'
  221 | void EXTI15_10_IRQHandler(void)
      |      ^~~~~~~~~~~~~~~~~~~
C:/Users/Administrator/STM32Cube/Repository/STM32Cube_FW_L4_V1.18.0/Projects/B-L4S5I-
IOT01A/Applications/WiFi/WiFi_HTTP_Server/Src/stm32l4xx_it.c:196:6: note: previous
definition of 'EXTI15_10_IRQHandler' with type 'void(void)'
  196 | void EXTI15_10_IRQHandler(void)
```

```
      |       ^~~~~~~~~~~~~~~~~~~
make: *** [Application/User/subdir.mk:44: Application/User/stm32l4xx_it.o] Error 1
"make -j12 all" terminated with exit code 2. Build might be incomplete.
```

Fix Attempt 1:

Remove

```
/**
  * @brief This function handles EXTI line[15:10] interrupts.
  */
void EXTI15_10_IRQHandler(void)
{
  /* USER CODE BEGIN EXTI15_10_IRQn 0 */

  /* USER CODE END EXTI15_10_IRQn 0 */
  HAL_GPIO_EXTI_IRQHandler(PB_BLUE_Pin);
  /* USER CODE BEGIN EXTI15_10_IRQn 1 */

  /* USER CODE END EXTI15_10_IRQn 1 */
}
```

Add

```
DAC_HandleTypeDef hdac1;
DMA_HandleTypeDef hdma_dac1_ch1;

DFSDM_Filter_HandleTypeDef hdfsdm1_filter0;
DFSDM_Channel_HandleTypeDef hdfsdm1_channel2;
DMA_HandleTypeDef hdma_dfsdm1_flt0;

TIM_HandleTypeDef htim2;
```

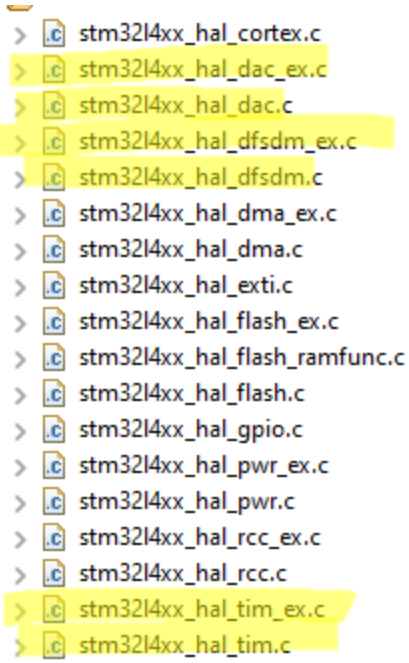
In main.c

Add

```
void DMA1_Channel1_IRQHandler(void);
void DMA1_Channel2_IRQHandler(void);
void TIM2_IRQHandler(void);
```

In stm32l4xx_it.h

Add these files into STM32L4xx_HAL_Driver folder (in Drivers):



Result after compilation: No errors

main.c:

We renamed our main file to “sending_main.c” and “receiving_main.c”.

Actions taken in Wi-Fi project:

Added these prototypes (ALSO MX_DMA_INIT(void))

```
static void MX_DAC1_Init(void);
static void MX_TIM2_Init(void);
static void MX_DFSDM1_Init(void);
```

As well as the implementation of these prototypes:

[see the implementation of these in main.c]

Added this in the main function of receiving_main.c

```
/* Initialize all configured peripherals */
MX_DAC1_Init();
MX_TIM2_Init();
MX_DFSDM1_Init();
```

*NOTE: MAKE SURE MX_DMA_Init() is called BEFORE the other inits

Added this Error_Handler implementation

```c
/**
  * @brief  This function is executed in case of error occurrence.
  * @retval None
  */
void Error_Handler(void)
{
  /* USER CODE BEGIN Error_Handler_Debug */
  /* User can add his own implementation to report the HAL error return state */
  __disable_irq();
  while (1)
  {
  }
  /* USER CODE END Error_Handler_Debug */
}
```

Result after compilation: No errors

Result after running: No errors, runs fine