Embedded Systems

CS 397

TRIMESTER 3, AY 2021/22

Assignments 4
Additional Information

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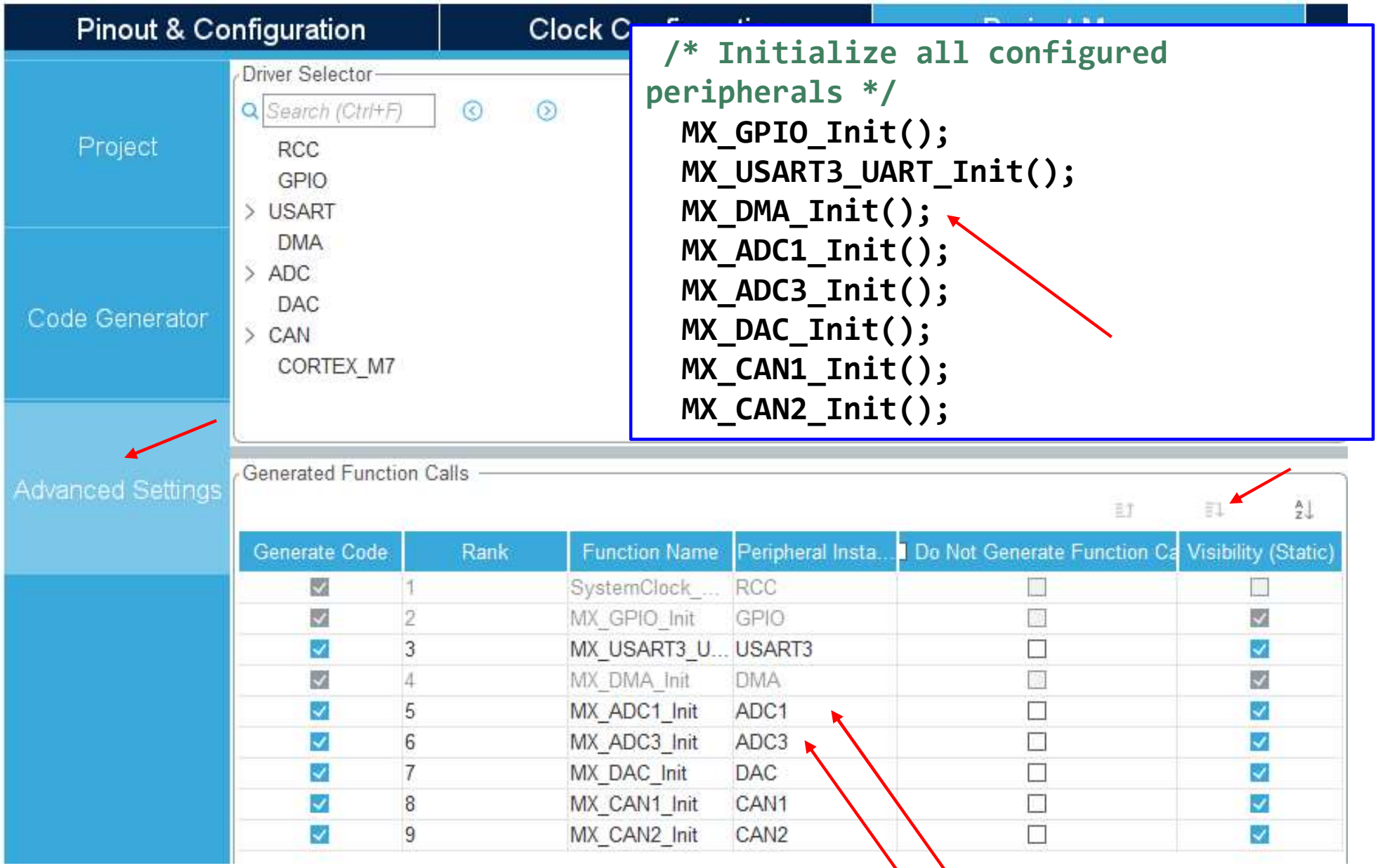
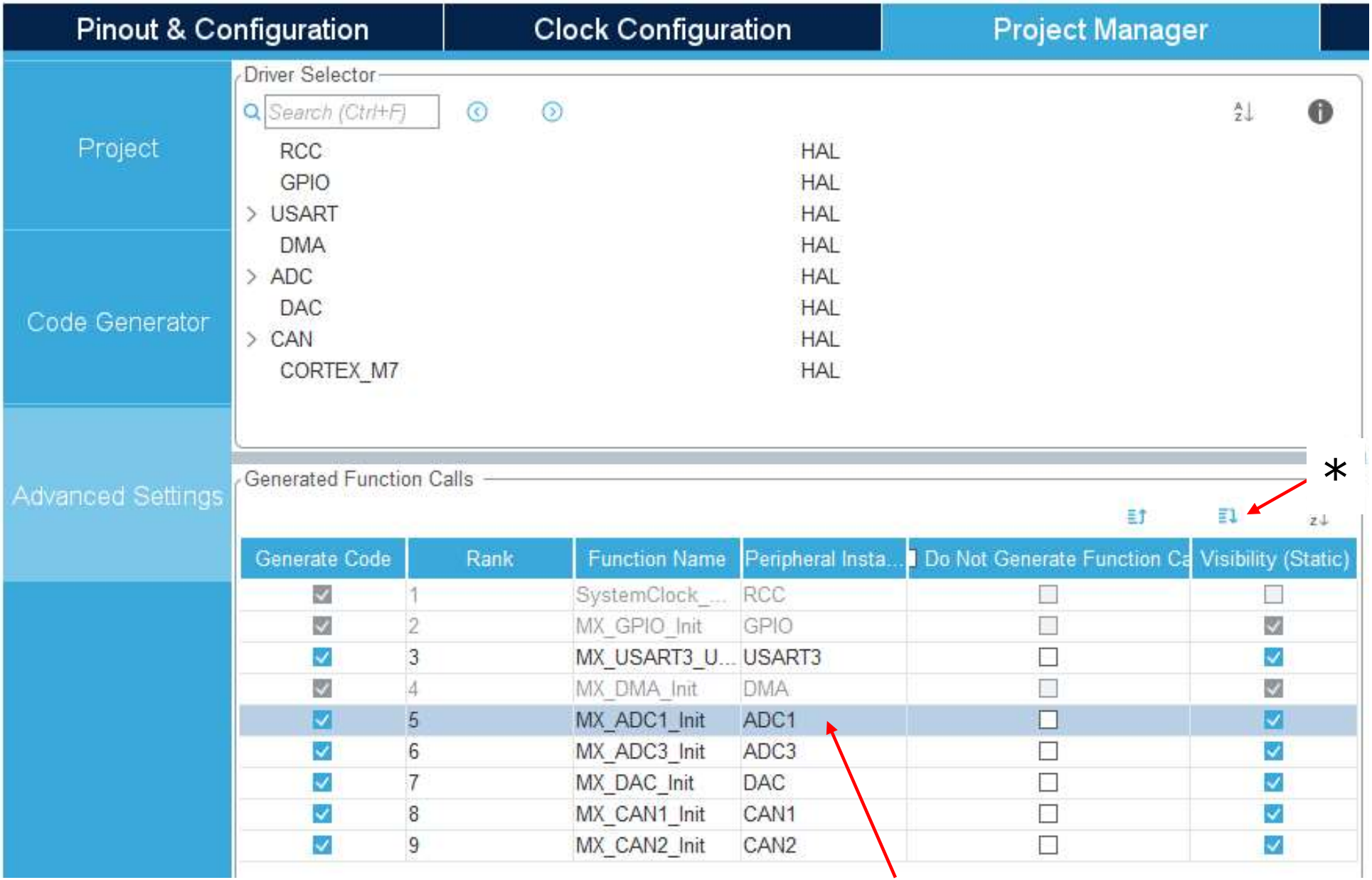
Using DMA for ADC: DMA must be initialized before ADC



Move ADC below DMA



For example, select the line by click on "ADC1", then apply the change *

```
/* main.c */
/* Private define */
/* USER CODE BEGIN PD */
#define LBYTE( x ) (uint8_t)  ( x )
#define HBYTE( x ) (uint8_t) (( x ) >> 8)
/* USER CODE END PD */


/* USER CODE BEGIN PV */

// 3.3 * 2050/4096 = 1.6516
// 2050 -> 1.65V

uint32_t dac[2] = {0, 2050};
uint32_t adc[4] = {0}, buffer[3];

uint8_t   TxData1[8] = {0};
uint32_t  TxMailbox1;

/* USER CODE END PV */
```

```
/* USER CODE BEGIN WHILE */

.
.
.
TxHeader1.DLC = 8;
TxData1[0] = LBYTE( dac[0] );
TxData1[1] = HBYTE( dac[0] );
TxData1[2] = LBYTE( adc[0] );
TxData1[3] = HBYTE( adc[0] );
.
.
.

/* USER CODE END WHILE */
```

stm32f7xx_hal_can.h (Partial)

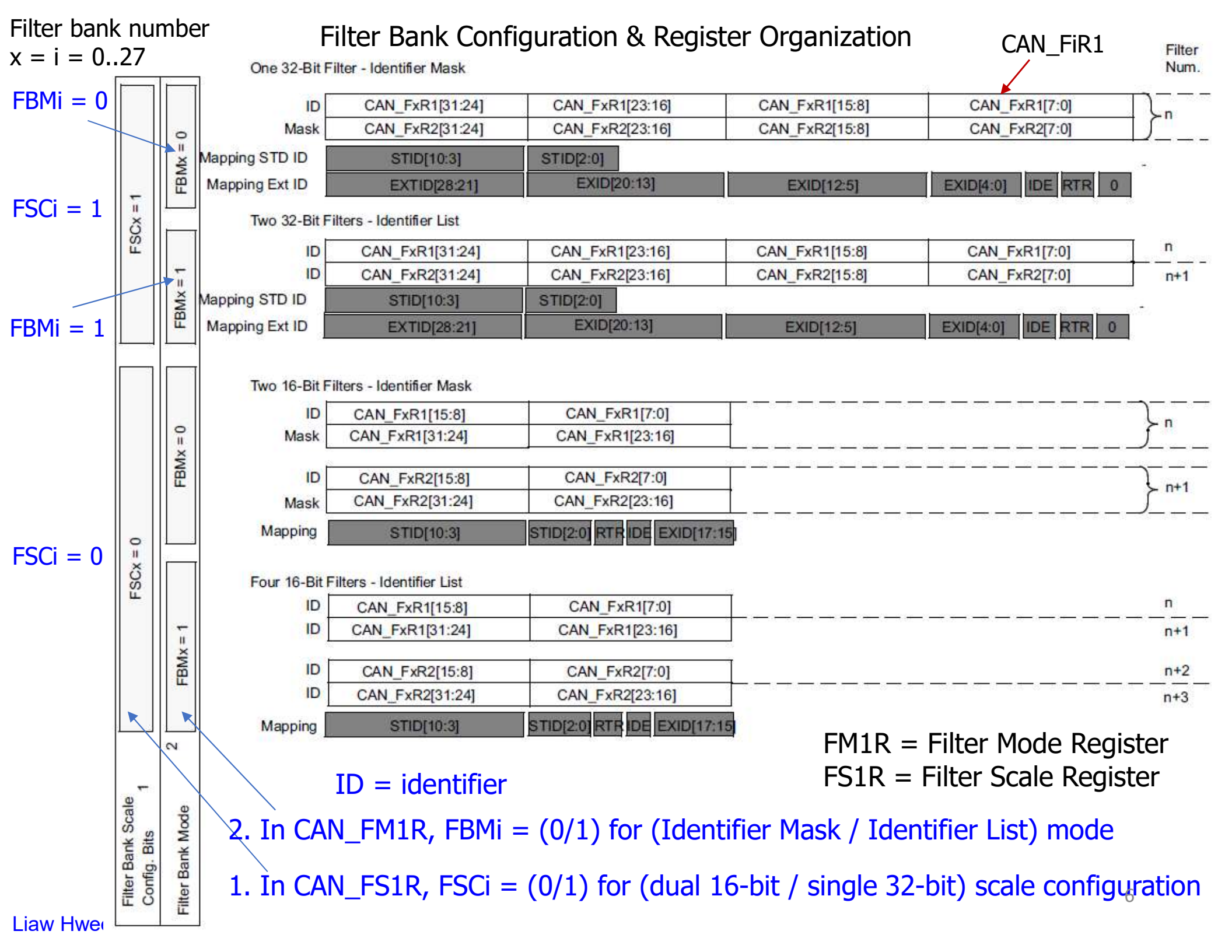
```
/** @defgroup CAN_identifier_type CAN Identifier Type
      * @{   */
#define CAN_ID_STD                  (0x00000000U)  /*!< Standard Id */
#define CAN_ID_EXT                  (0x00000004U)  /*!< Extended Id */
/**   * @}   */

/** @defgroup CAN_remote_transmission_request CAN Remote Transmission Request
     * @{    */
#define CAN_RTR_DATA                (0x00000000U)  /*!< Data frame   */
#define CAN_RTR_REMOTE              (0x00000002U)  /*!< Remote frame */
/**  * @}    */

/** @defgroup CAN_receive_FIFO_number CAN Receive FIFO Number
     * @{    */
#define CAN_RX_FIFO0                (0x00000000U)  /*!< CAN receive FIFO 0 */
#define CAN_RX_FIFO1                (0x00000001U)  /*!< CAN receive FIFO 1 */
/**  * @}    */

/** @defgroup CAN_Tx_Mailboxes CAN Tx Mailboxes
     * @{    */
#define CAN_TX_MAILBOX0             (0x00000001U)  /*!< Tx Mailbox 0  */
#define CAN_TX_MAILBOX1             (0x00000002U)  /*!< Tx Mailbox 1  */
#define CAN_TX_MAILBOX2             (0x00000004U)  /*!< Tx Mailbox 2  */
/**  * @}    */
```

Filter Bank Configuration & Register Organization



FM1R = Filter Mode Register
FS1R = Filter Scale Register

ID = identifier

2. In CAN_FM1R, FBMi = (0/1) for (Identifier Mask / Identifier List) mode

1. In CAN_FS1R, FSCi = (0/1) for (dual 16-bit / single 32-bit) scale configuration

```
void CAN2_Config(void)
{
CAN_FilterTypeDef  sFilterConfig2;

  /*##-1- Configure the CAN Filter ##*/
  sFilterConfig2.FilterBank = 14;
  .
  .
  .

   sFilterConfig2.FilterBank = 15;
   sFilterConfig2.FilterMode = CAN_FILTERMODE_IDLIST;
   sFilterConfig2.FilterScale = CAN_FILTERSCALE_32BIT;
   // sn = FF, 16-bit high
   sFilterConfig2.FilterIdHigh = ((0x00397FF5<<3) & 0xFFFF0000)>>16;
   // 16-bit low
   sFilterConfig2.FilterIdLow  = ((0x00397FF5<<3)|CAN_ID_EXT|CAN_RTR_DATA) & 0xFFFF;
   sFilterConfig2.FilterMaskIdHigh = ((0x00397FFA<<3) & 0xFFFF0000)>>16;
   sFilterConfig2.FilterMaskIdLow  = ((0x00397FFA<<3)|CAN_ID_EXT|CAN_RTR_DATA) & 0xFFFF;
   sFilterConfig2.FilterFIFOAssignment = CAN_RX_FIFO1;
   sFilterConfig2.FilterActivation = ENABLE;
   // sFilterConfig2.SlaveStartFilterBank = 14;
   if (HAL_CAN_ConfigFilter(&hcan2, &sFilterConfig2) != HAL_OK)
   {
     /* Filter configuration Error */
     Error_Handler();
   }
```