DMA Driver for STM32F103

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Data Structure Documentation

3.1 DMA_Channel Struct Reference

Data Fields

- uint_32t **CCR**
- uint_32t **CNDTR**
- uint_32t **CPAR**
- uint_32t **CMAR**
- uint_32t **Reserved**

The documentation for this struct was generated from the following file:

- DMA/DMA.c

3.2 DMA_Config Struct Reference

Data Fields

- uint_32t **Mem2Mem**
- uint_32t **PL**
- uint_32t **MSIZE**
- uint_32t **PSIZE**
- uint_32t **MINC**
- uint_32t **PINC**
- uint_32t **CIRC**
- uint_32t **DIR**
- uint_32t **TEIE**
- uint_32t **HTIE**
- uint_32t **TCIE**
- uint_8t **ChannelNumber**

The documentation for this struct was generated from the following file:

- DMA/DMA_Cfg.h

3.3 DMA_t Struct Reference

Data Fields

- uint_32t **ISR**
- uint_32t **IFCR**
- DMA_Channel **Channel** [7]

The documentation for this struct was generated from the following file:

- DMA/DMA.c

3.4 Notify_t Struct Reference

Data Fields

- TC_Notification **TC**
- HTC_Notification **HTC**
- TE_Notification **TE**

The documentation for this struct was generated from the following file:

- DMA/DMA.h

Chapter 4

File Documentation

4.1 DMA/DMA.c File Reference

This file is Implementation for DMA Driver for STM32F103.

```
#include "STD_TYPES.h"
#include "DNVIC.h"
#include "DMA.h"
#include "DMA_Cfg.h"
```

Data Structures

- struct DMA_Channel
- struct DMA_t

Macros

- #define ENABLE_DMA 1

  Enabe DMA

- #define CHANNELS_MAX_NUMBER 7

  Maximum Channels Number

- #define COUNTER_MAX_NUMBER 65535

  Maximum Number to transfer in one time

- #define DMA_1_NVIC 11

  Offest of DMA Channels in Vector table offest.

- #define DMA ((volatile DMA_t∗)0x40020000)

  Base Address of DMA.

Functions

- uint_8t D_DMA_Init (void)

    Function to initialize DMA.
- uint_8t D_DMA_Start (uint_32t MemoryAddress, uint_32t PeripheralAddress, uint_32t Counter, uint_↩ 8t ChannelNumber)

    Function to Make DMA Start Transfering Data according to it's Parameters.
- uint_8t D_DMA_SetNotifyCbf (Notify_t ∗Notification, uint_8t Channel_Number)

    Function to Set DMA Call Back Function.
- void **DMA1_Channel1_IRQHandler** (void)
- void **DMA1_Channel2_IRQHandler** (void)
- void **DMA1_Channel3_IRQHandler** (void)
- void **DMA1_Channel4_IRQHandler** (void)
- void **DMA1_Channel5_IRQHandler** (void)
- void **DMA1_Channel6_IRQHandler** (void)
- void **DMA1_Channel7_IRQHandler** (void)

Variables

- Notify_t NotificationArray [7]

    Aray of struct from type Notify_t.
- DMA_Config DMA_Configure [MAX_NUMBER_OF_CHANNELS]

4.1.1 Detailed Description

This file is Implementation for DMA Driver for STM32F103.

Author

Marcelle (marcelle.samir.s@gmail.com)

Version

0.1

Date

2020-06-05

Copyright

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4.1.2 Macro Definition Documentation

4.1.2.1 COUNTER_MAX_NUMBER

```
#define COUNTER_MAX_NUMBER 65535
```

Maximum Number to transfer in one time

4.1.2.2 ENABLE_DMA

```
#define ENABLE_DMA 1
```

Enabe DMA

4.1.3 Function Documentation

4.1.3.1 D_DMA_Init()

```
uint_8t D_DMA_Init (
            void )
```

Function to initialize DMA.

Parameters

NA	

Returns

uint_8t : OK | NOK

4.1.3.2 D_DMA_SetNotifyCbf()

```
uint_8t D_DMA_SetNotifyCbf (
            Notify_t * Notification,
            uint_8t Channel_Number )
```

Function to Set DMA Call Back Function.

Parameters

Notification	Pointer to struct , Takes Function to Execute
ChannelNumber	Variable of uint_8t , DMA Channel Number (CHANNEL_ONE , CHANNEL_SEVEN)

Returns

uint_8t : OK | NOK

4.1.3.3 D_DMA_Start()

```
uint_8t D_DMA_Start (
            uint_32t MemoryAddress,
            uint_32t PeripheralAddress,
            uint_32t Counter,
            uint_8t ChannelNumber )
```

Function to Make DMA Start Transfering Data according to it's Parameters.

Parameters

MemoryAddress	Variable of uint_32t , Takes Memory Address
PeripheralAddress	Variable of uint_32t , Takes Peripheral Address
Counter	Variable of uint_8t , Takes Counter of Data Transmission
ChannelNumber	Variable of uint_8t , DMA Channel Number (CHANNEL_ONE , CHANNEL_SEVEN)

Returns

uint_8t : OK | NOK

4.1.4 Variable Documentation

4.1.4.1 DMA_Configure

```
DMA_Config DMA_Configure[MAX_NUMBER_OF_CHANNELS]
```

4.2 DMA/DMA.h File Reference

This file is a user interface for DMA Driver for STM32F103.

Data Structures

- struct Notify_t

Macros

- #define **CHANNEL_ONE** 0
- #define **CHANNEL_TWO** 1
- #define **CHANNEL_THREE** 2
- #define **CHANNEL_FOUR** 3
- #define **CHANNEL_FIVE** 4
- #define **CHANNEL_SIX** 5
- #define **CHANNEL_SEVEN** 6

Typedefs

- typedef void(∗ TC_Notification) (void)

  Pointer to Function
- typedef void(∗ HTC_Notification) (void)

  Pointer to Function
- typedef void(∗ TE_Notification) (void)

  Pointer to Function

Functions

- uint_8t D_DMA_Init (void)

  Function to initialize DMA.
- uint_8t D_DMA_Start (uint_32t MemoryAddress, uint_32t PeripheralAddress, uint_32t Counter, uint_8t ChannelNumber)

  Function to Make DMA Start Transfering Data according to it's Parameters.
- uint_8t D_DMA_SetNotifyCbf (Notify_t ∗Notification, uint_8t Channel_Number)

  Function to Set DMA Call Back Function.

4.2.1 Detailed Description

This file is a user interface for DMA Driver for STM32F103.

This file is Implemtation of DMA Configuration for DMA Driver for STM32F103.

Author

Marcelle (marcelle.samir.s@gmail.com)

Version

0.1

Date

2020-06-05

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4.2.2 Function Documentation

4.2.2.1 D_DMA_Init()

```
uint_8t D_DMA_Init (
             void  )
```

Function to initialize DMA.

Parameters

NA	

Returns

uint_8t : OK | NOK

4.2.2.2 D_DMA_SetNotifyCbf()

```
uint_8t D_DMA_SetNotifyCbf (
             Notify_t * Notification,
             uint_8t Channel_Number )
```

Function to Set DMA Call Back Function.

Parameters

Notification	Pointer to struct , Takes Function to Execute
ChannelNumber	Variable of uint_8t , DMA Channel Number (CHANNEL_ONE , CHANNEL_SEVEN)

Returns

uint_8t : OK | NOK

4.2.2.3 D_DMA_Start()

```
uint_8t D_DMA_Start (
             uint_32t MemoryAddress,
             uint_32t PeripheralAddress,
             uint_32t Counter,
             uint_8t ChannelNumber )
```

Function to Make DMA Start Transfering Data according to it's Parameters.

Parameters

MemoryAddress	Variable of uint_32t , Takes Memory Address
PeripheralAddress	Variable of uint_32t , Takes Peripheral Address
Counter	Variable of uint_8t , Takes Counter of Data Transmission
ChannelNumber	Variable of uint_8t , DMA Channel Number (CHANNEL_ONE , CHANNEL_SEVEN)

Returns

uint_8t : OK | NOK

4.3 DMA/DMA_Cfg.h File Reference

This file is DMA Configuration for DMA Driver for STM32F103.

Data Structures

- struct DMA_Config

Macros

- #define **DMA1_GET_INT_GL1** 0x00000001
- #define **DMA1_GET_INT_GL2** 0x00000010
- #define **DMA1_GET_INT_GL3** 0x00000100
- #define **DMA1_GET_INT_GL4** 0x00001000
- #define **DMA1_GET_INT_GL5** 0x00010000
- #define **DMA1_GET_INT_GL6** 0x00100000
- #define **DMA1_GET_INT_GL7** 0x01000000
- #define **DMA1_GET_INT_TC1** 0x00000002
- #define **DMA1_GET_INT_TC2** 0x00000020
- #define **DMA1_GET_INT_TC3** 0x00000200
- #define **DMA1_GET_INT_TC4** 0x00002000
- #define **DMA1_GET_INT_TC5** 0x00020000
- #define **DMA1_GET_INT_TC6** 0x00200000
- #define **DMA1_GET_INT_TC7** 0x02000000
- #define **DMA1_GET_INT_TE1** 0x00000008
- #define **DMA1_GET_INT_TE2** 0x00000080
- #define **DMA1_GET_INT_TE3** 0x00000800
- #define **DMA1_GET_INT_TE4** 0x00008000
- #define **DMA1_GET_INT_TE5** 0x00080000
- #define **DMA1_GET_INT_TE6** 0x00800000
- #define **DMA1_GET_INT_TE7** 0x08000000
- #define **DMA1_GET_INT_HT1** 0x00000004
- #define **DMA1_GET_INT_HT2** 0x00000040
- #define **DMA1_GET_INT_HT3** 0x00000400
- #define **DMA1_GET_INT_HT4** 0x00004000
- #define **DMA1_GET_INT_HT5** 0x00040000
- #define **DMA1_GET_INT_HT6** 0x00400000
- #define **DMA1_GET_INT_HT7** 0x04000000

- #define MEMORY2MEMORY 0x00004000

  used to enable memory to memory transfer

- #define MEMORY2PERIPHERAL 0x00000000

  used to enable Memory to Peripheral transfer

- #define PRIORITY_LOW 0x00000000

  Priority level for channels

- #define **PRIORITY_MEDIUM** 0x00001000
- #define **PRIORITY_HIGH** 0x00002000
- #define **PRIORITY_VERYHIGH** 0x00003000
- #define **MEMORY_SIZE_1_BYTE** 0x00000000
- #define **MEMORY_SIZE_2_BYTE** 0x00000400
- #define **MEMORY_SIZE_4_BYTE** 0x00000800
- #define **PERIPHERAL_SIZE_1_BYTE** 0x00000000
- #define **PERIPHERAL_SIZE_2_BYTE** 0x00000100
- #define **PERIPHERAL_SIZE_4_BYTE** 0x00000200
- #define **MEMORY_INCREMENT_ON** 0x00000080
- #define **MEMORY_INCREMENT_OFF** 0x00000000
- #define **PERIPHERAL_INCREMENT_ON** 0x00000040
- #define **PERIPHERAL_INCREMENT_OFF** 0x00000000
- #define **CIRCULER_INT_ON** 0x00000020
- #define **CIRCULER_INT_OFF** 0x00000000
- #define DIR_PERI_TO_MEMORY 0x00000000

  Direction Peripheral To Memory

- #define DIR_MEMORY_TO_PERI 0x00000010

  Direction Memory to Peripheral

- #define **TRANSFER_ERROR_INT_ON** 0x00000008
- #define **TRANSFER_ERROR_INT_OFF** 0x00000000
- #define **HALF_TRANSFER_INT_ON** 0x00000004
- #define **HALF_TRANSFER_INT_OFF** 0x00000000
- #define **TRANSFER_COMP_INT_ON** 0x00000002
- #define **TRANSFER_COMP_INT_OFF** 0x00000000
- #define MAX_NUMBER_OF_CHANNELS 3

  Number of channels tobe used.

4.3.1 Detailed Description

This file is DMA Configuration for DMA Driver for STM32F103.

Author

Marcelle (marcelle.samir.s@gmail.com)

Version

0.1

Date

2020-06-05

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4.3.2 Macro Definition Documentation

4.3.2.1 DIR_MEMORY_TO_PERI

```
#define DIR_MEMORY_TO_PERI 0x00000010
```

Direction Memory to Peripheral

4.3.2.2 DIR_PERI_TO_MEMORY

```
#define DIR_PERI_TO_MEMORY 0x00000000
```

Direction Peripheral To Memory

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