

display-dma2d

User Manual



MICROEJ[®]

Reference:	TLT-XXX-MAN-display-dma2d-display-dma2d
Version:	3.0.2
Revision:	XXX

Confidentiality & Intellectual Property

All rights reserved. Information, technical data and tutorials contained in this document are confidential and proprietary under copyright Law of Industrial Smart Software Technology (IS2T S.A.) operating under the brand name MicroEJ®. Without written permission from IS2T S.A., *copying or sending parts of the document or the entire document by any means to third parties is not permitted*. Granted authorizations for using parts of the document or the entire document do not mean IS2T S.A. gives public full access rights.

The information contained herein is not warranted to be error-free. IS2T® and MicroEJ® and all relative logos are trademarks or registered trademarks of IS2T S.A. in France and other Countries.

Java™ is Sun Microsystems' trademark for a technology for developing application software and deploying it in cross-platform, networked environments. When it is used in this documentation without adding the ™ symbol, it includes implementations of the technology by companies other than Sun.

Java™, all Java-based marks and all related logos are trademarks or registered trademarks of Sun Microsystems Inc, in the United States and other Countries.

Other trademarks are proprietary of their authors.

Table of Contents

1. Data Structure Documentation	1
1.1. DRAWING_DMA2D_blending_t struct Reference	1
1.1.1. Data Fields	1
1.1.2. Field Documentation	1
1.2. DRAWING_DMA2D_memcpy struct Reference	1
1.2.1. Data Fields	1
1.2.2. Field Documentation	2
2. File Documentation	3
2.1. drawing_dma2d.h File Reference	3
2.1.1. Data Structures	3
2.1.2. Functions	3
2.2. drawing_dma2d.c File Reference	4
2.2.1. Data Structures	4
2.2.2. Typedefs	4
2.2.3. Variables	4
2.2.4. Functions	4

Chapter 1. Data Structure Documentation

1.1. DRAWING_DMA2D_blending_t struct Reference

1.1.1. Data Fields

- uint8_t * src_address
- uint8_t * dest_address
- uint32_t src_stride
- uint32_t dest_stride
- jchar dest_width
- jchar dest_height
- jint x_src
- jint y_src
- jint width
- jint height
- jint x_dest
- jint y_dest
- jint alpha
- uint32_t src_dma2d_format
- uint32_t src_bpp

1.1.2. Field Documentation

1.2. DRAWING_DMA2D_memcpy struct Reference

1.2.1. Data Fields

- uint8_t * src_address
- uint8_t * dest_address
- uint16_t width

- uint16_t height

1.2.2. Field Documentation

Chapter 2. File Documentation

2.1. drawing_dma2d.h File Reference

```
#include <stdint.h>
```

```
#include "LLUI_DISPLAY_IMPL.h"
```

```
#include "sni.h"
```

2.1.1. Data Structures

- struct DRAWING_DMA2D_memcpy

2.1.2. Functions

- void DRAWING_DMA2D_initialize (void * binary_semaphore_handle)
- void DRAWING_DMA2D_IRQHandler (void)
- void DRAWING_DMA2D_configure_memcpy (uint8_t * srcAddr, uint8_t * destAddr, uint32_t xmin, uint32_t ymin, uint32_t xmax, uint32_t ymax, uint32_t stride, DRAWING_DMA2D_memcpy * memcpy_data)
- void DRAWING_DMA2D_start_memcpy (DRAWING_DMA2D_memcpy * memcyp_data)

Detailed Description

Use STM32 DMA2D (ChromART) for MicroEJ ui_drawing.h implementation.

This library provides the implementation of ui_drawing.h "UI_DRAWING_fillRectangle()" and "UI_DRAWING_drawImage()" functions. The third feature "memcpy" is useful when a copy from frame buffer to back buffer is required after the call to "LLUI_DISPLAY_IMPL_flush()".

How to use this library:

- Set the define DRAWING_DMA2D_BPP to 16, 24 or 32
- Set the define STM32F4XX or STM32F7XX
- Call "DRAWING_DMA2D_initialize()" during "LLUI_DISPLAY_IMPL_initialize()"
- Redirect the STM32 DMA2D interrupt routine to "DRAWING_DMA2D_IRQHandler()"

- Call "DRAWING_DMA2D_configure_memcpy()" in "LLUI_DISPLAY_IMPL_flush()" before enabling LCD interrupt (optional).
- Call "DRAWING_DMA2D_start_memcpy()" in LCD interrupt (optional).

Author: . MicroEJ Developer Team

Version: . 3.0.2

Date: . 2 February 2023

Definition in file C:/Jenkins/workspace/master77851a12/bsp-lldisplay_dma2d/target~/ccomponent-Working/bsp/ui/inc/drawing_dma2d.h

2.2. drawing_dma2d.c File Reference

```
#include "drawing_dma2d.h"
```

```
#include "ui_drawing.h"
```

```
#include "ui_drawing_soft.h"
```

```
#include "bsp_util.h"
```

2.2.1. Data Structures

- struct DRAWING_DMA2D_blending_t

2.2.2. Typedefs

- typedef void(* t_drawing_notification

2.2.3. Variables

- static DMA2D_HandleTypeDef g_hdma2d
- static t_drawing_notification g_callback_notification
- static bool g_dma2d_running
- static void * g_dma2d_semaphore

2.2.4. Functions

- static void _drawing_dma2d_wait (void)

- static void _drawing_dma2d_done (void)
- static uint8_t * _drawing_dma2d_adjust_address (uint8_t * address, uint32_t x, uint32_t y, uint32_t stride, uint32_t bpp)
- static void _drawing_dma2d_configure_alpha_image_data (MICROUI_GraphicsContext * gc, jint * alphaAndColor)
- static void _cleanDCache (void)
- static bool _drawing_dma2d_is_image_compatible_with_dma2d (MICROUI_GraphicsContext * gc, MICROUI_Image * image, jint x_src, jint y_src, jint width, jint height, jint x_dest, jint y_dest, jint alpha, DRAWING_DMA2D_blending_t * dma2d_blending_data)
- static void _drawing_dma2d_blending_configure (DRAWING_DMA2D_blending_t * dma2d_blending_data)
- static void _drawing_dma2d_blending_start (DRAWING_DMA2D_blending_t * dma2d_blending_data)
- static void _drawing_dma2d_overlap_horizontal (DRAWING_DMA2D_blending_t * dma2d_blending_data)
- static void _drawing_dma2d_overlap_vertical (DRAWING_DMA2D_blending_t * dma2d_blending_data)
- void DRAWING_DMA2D_IRQHandler (void)
- void DRAWING_DMA2D_initialize (void * binary_semaphore_handle)
- void DRAWING_DMA2D_configure_memcpy (uint8_t * srcAddr, uint8_t * destAddr, uint32_t xmin, uint32_t ymin, uint32_t xmax, uint32_t ymax, uint32_t stride, DRAWING_DMA2D_memcpy * memcpy_data)
- void DRAWING_DMA2D_start_memcpy (DRAWING_DMA2D_memcpy * memcpy_data)
- DRAWING_Status UI_DRAWING_fillRectangle (MICROUI_GraphicsContext * gc, jint x1, jint y1, jint x2, jint y2)
- DRAWING_Status UI_DRAWING_drawImage (MICROUI_GraphicsContext * gc, MICROUI_Image * image, jint x_src, jint y_src, jint width, jint height, jint x_dest, jint y_dest, jint alpha)
- DRAWING_Status UI_DRAWING_drawRegion (MICROUI_GraphicsContext * gc, jint x_src, jint y_src, jint width, jint height, jint x_dest, jint y_dest, jint alpha)

Detailed Description

Use STM32 DMA2D (ChromART) for MicroEJ ui_drawing.h implementation.

Author: . MicroEJ Developer Team

Version: . 3.0.2

Date: . 2 February 2023

Definition in file C:/Jenkins/workspace/master77851a12/bsp-lldisplay_dma2d/target~/ccomponent-Working/bsp/ui/src/drawing_dma2d.c