

# display-dma2d

## *User Manual*



**MICROEJ<sup>®</sup>**

Reference:	TLT-XXX-MAN-display-dma2d-display-dma2d
Version:	2.1.0
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# 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

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# 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).

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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)
- static void \_drawing\_dma2d ( DRAWING\_DMA2D\_blending\_t \* dma2d\_blending\_data)
- static bool \_is\_useless\_drawing ( MICROUI\_Image \* dest, MICROUI\_Image \* source, jint x\_src, jint y\_src, jint x\_dest, jint y\_dest, jint alpha)
- 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)

## Detailed Description

Use STM32 DMA2D (ChromART) for MicroEJ ui\_drawing.h implementation.

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Definition in file C:/Jenkins/workspace/master77851a12/bsp-lldisplay\_dma2d/target~/ccomponent-Working/bsp/ui/src/drawing\_dma2d.c