MSP430® Graphics Library

USER'S GUIDE

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Revision Information

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1 Circle API

1.1 Introduction

The Circle API provides simple functions to draw a circle on the display. There are two different functions used to draw a circle; one which draws the outline, and the other which draws a filled-in circle. The clipping of the circle is performed within the routine; the display driver's circle fill routine is used to permore the actual circle fill.

The code for this API is contained in `grlib/circle.c`, with `grlib/circle.h` containing the API definitions for use by applications.

1.2 API Functions

The Circle API is broken into two separate functions both of which write to the display.

The function which draws a circle is handled by

- GrCircleDraw()

The function which draws a filled-in circle is handled by

- GrCircleFill()

1.3 Programming Example

```
tContext sContext;

//
// Initialize the graphics context
//
GrContextInit(&sContext, &g_sharp400x240LCD);
GrContextForegroundSet(&sContext, ClrBlack);
GrContextBackgroundSet(&sContext, ClrWhite);

GrClearDisplay(&sContext);

GrCircleDraw(&sContext, 275, 100, 30);
GrCircleFill(&sContext, 50, 100, 30);

GrFlush(&sContext);
__no_operation();
```

2 Context API

2.1 Introduction

The Context API provides simple functions to initialize a drawing context, preparing it for use on the display. The display driver will be used for all subsequent graphics operations.

The code for this API is contained in `grlib/context.c`, with `grlib/context.h` containing the API definitions for use by applications.

2.2 API Functions

The Context API is broken into two separate functions both of which initialize the context for the display, but differ in the way they set the clipping regions of the screen. The clipping region is not allowed to exceed the extents of the screen, but may be a portion of the screen. The supplied coordinates are inclusive for the clipping region. As a consequence, the clipping region must contain at least one row and one column.

The function which initializes the context and who's clipping region is set to the extent of the entire screen is handled by

- GrContextInit()

The function which initializes the context and also sets a clipping region is handled by

- GrContextClipRegionSet()

2.3 Programming Example

```
tContext sContext;

  //
  // Initialize the graphics context
  //
  GrContextInit(&sContext, &g_sharp400x240LCD);
  GrContextForegroundSet(&sContext, ClrBlack);
  GrContextBackgroundSet(&sContext, ClrWhite);

  GrClearDisplay(&sContext);

  GrContextFontSet(&sContext, &g_sFontCm26);
  GrStringDraw(&sContext, "Welcome to ", -1, 20, 8, 0);

  GrContextFontSet(&sContext, &g_sFontCm30);
  GrStringDraw(&sContext, "Dallas TX", -1, 20, 180, 0);
```

```
GrFlush(&sContext);
__no_operation();
```

3 Image API

3.1 Introduction

The Image API provides simple functions to draw images on the screen. There are two different functions used to draw a image; one which converts the palette of a bitmap image and the other which renders the bitmap image onto the screen.

The code for this API is contained in `grlib/image.c`, with `grlib/image.h` containing the API definitions for use by applications.

3.2 API Functions

The Image API is broken into two separate functions, one to converte the palette and the other to render to the display. Calling the GrImageDraw() function also invokes GrPaletteConversion() as well so the user only needs to be concerned with the GrImageDraw() function.

The image may be either 1-, 4-, or 8-bits per pixel by using a palette supplied in the image data. The image palette is in 24-bit RGB form and by calling GrPaletteConversion(), the palette can then be sent to the LCD usign DpyColorTranslate function. The converted palette is contained in a global buffer while the original image remains the same. The palette can be uncompressed data or it can be compressed using several different compresion types. Compression options are either 4- or 8-bit run length encoding, or a custom run lenth endocing variation written for complex 8-bit per pixel images.

The function which converts the palette of the bitmap is handled by

- GrPaletteConversion()

The function which draws a bitmap image is handled by

- GrImageDraw()

3.3 Programming Example

```
tContext sContext;

  //
  // Initialize the graphics context
  //
  GrContextInit(&sContext, &g_sharp400x240LCD);
  GrContextForegroundSet(&sContext, ClrBlack);
  GrContextBackgroundSet(&sContext, ClrWhite);

  GrClearDisplay(&sContext);
```

```
GrImageDraw(&sContext, &infoHugePig, 200, 70);

GrFlush(&sContext);
__no_operation();
```

4 Line API

4.1 Introduction

The Line API provides simple functions to draw lines on the display. There are five different functions used to draw a line; two optimized functions for horizontal and vertical drawing, one generic line drawing function, two functions for clipping. The user needs only to be concerned with the generic line drawing function, GrLineDraw(), as it incorporates the use of all the other functions automatically.

The code for this API is contained in `grlib/line.c`, with `grlib/line.h` containing the API definitions for use by applications.

4.2 API Functions

The Line API is broken into two separate functions; one for drawing and the other for clipping (internal functions).

The functions that draw a line are handled by

- GrLineDrawH()
- GrLineDrawL()
- GrLineDraw()

The user needs only to be concerned with the generic line drawing function, GrLineDraw(), as it incorporates the use of all the other functions automatically.

4.3 Programming Example

```
tContext sContext;

  //
  // Initialize the graphics context
  //
  GrContextInit(&sContext, &g_sharp400x240LCD);
  GrContextForegroundSet(&sContext, ClrBlack);
  GrContextBackgroundSet(&sContext, ClrWhite);

  GrClearDisplay(&sContext);

  GrLineDraw(&sContext, 130, 30, 275, 200 );
  GrLineDrawH(&sContext, 20, 180, 220);
  GrLineDrawV(&sContext, 30, 50, 160);

  GrFlush(&sContext);
```

```
__no_operation();
```

5 Rectangle API

5.1 Introduction

The Rectangle API provides simple functions to draw a rectangle on the display. There are two different functions used to draw a rectangle; one which draws the outline, and the other which draws a filled-in rectangle. The clipping of the rectangle is performed within the routine; the display driver's rectangle fill routine is used to permore the actual rectangle fill.

The code for this API is contained in `grlib/rectangle.c`, with `grlib/rectangle.h` containing the API definitions for use by applications.

5.2 API Functions

The Rectangle API is broken into two groups; one that draws to the screen and the other which perform checks(internal functions).

The functions which draw rectangles are handled by

- GrRectDraw()
- GrRectFill()

5.3 Programming Example

```
tContext sContext;
tRectangle myRectangle1 = { 60, 60, 120, 120};
tRectangle myRectangle2 = { 160, 60, 220, 120};

//
// Initialize the graphics context
//
GrContextInit(&sContext, &g_sharp400x240LCD);
GrContextForegroundSet(&sContext, ClrBlack);
GrContextBackgroundSet(&sContext, ClrWhite);

GrClearDisplay(&sContext);

GrRectDraw(&sContext, &myRectangle1 );
GrRectFill(&sContext, &myRectangle2);

GrFlush(&sContext);
__no_operation();
```

6 String API

6.1 Introduction

The String API provides simple functions to draw strings on the screen. There are several different functions used to draw a string; one which counts the number of leading zeroes, one for obtaining the display width of the string, one for drawing the string to the display, one for setting the location of the current string table, one to set the current language, and the last one for grabbing the string from the current string table. The user should not directly call NumLeadingZeroes() as it is used internally.

The code for this API is contained in `grlib/string.c`, with `grlib/string.h` containing the API definitions for use by applications.

6.2 API Functions

The String API available are classified as below.

The functions which calculate and set up parameters are handled by

- GrStringWidthGet()

The function which draws a string to the display is handled by

- GrStringDraw()

6.3 Programming Example

```
tContext sContext;

//
// Initialize the graphics context
//
GrContextInit(&sContext, &g_sharp400x240LCD);
GrContextForegroundSet(&sContext, ClrBlack);
GrContextBackgroundSet(&sContext, ClrWhite);

GrClearDisplay(&sContext);

GrContextFontSet(&sContext, &g_sFontCm26);
GrStringDraw(&sContext, "Welcome to ", -1, 20, 8, 0);

GrContextFontSet(&sContext, &g_sFontCm30);
GrStringDraw(&sContext, "Dallas TX", -1, 20, 180, 0);

GrFlush(&sContext);
```

```
__no_operation();
```

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