GM03-16bit Library and Sample Code User's Manual

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3F, No. 8, Dusing Rd., Hsinchu Science Park, Hsinchu City 30078, Taiwan, R.O.C

Tel: 886-3-6662118 Fax: 886-3-6662117 Web: www.generalplus.com

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Generalplus Documentation

The following documents are available from Generalplus. These documents provide useful information regarding the software programming and application designing.

- *xxx Instruction set user's manual* -This document explains the xxx instruction sets.
- *xxx confirmation sheet - A* check list for releasing code.

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Revision History

Revision	Date	By	Remark
2.0	2009/05/05	Wilson Wu	1. Add Mono animation GM03 Decode function
1.0	2009/02/25	Wilson Wu	First edition.

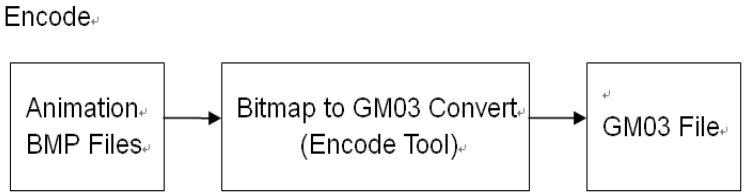
1 Introduction

1.1 General Description

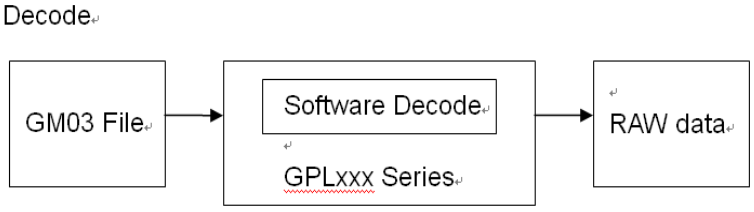
GM03 is a decoding algorithm for 4-Gray and Mono Image. We offer users the easy-to-use API and library to develop applications. Only the header file (GC03.h) and LIB need to be added and GM03_User.asm can be modified to meet various system requirements.

1.2 Structure Diagram

Structure diagram for encode



Structure diagram for decode



2 Resource Allocation

2.1 Resource ROM/RAM Size

The resources taken by GM03 Decoder are as follows:

RAM: 13 + Decode-Out buffer Size (for 4-gray GM03 decode only) words

ROM: 358 words

In GPL16 series, the LCD controller only supports 1bpp and 4 bpp formats. Thus, users should reserve one decode buffer to store 4-gray GM03 decode-out data and convert decode-out data type form 4-gray (2bpp) to 16-gray (4bpp). For Mono GM03 decode, this buffer can be assigned to LCD buffer.

2.2 Example

The decoding time of the corresponding frame size is as follows:

4-Gray animation:

Size: 32*64 Rate: 32.11%

Decode Time (Frame/second): AUTO mode: 2.5 ms (max)@48MHz SYSCLK

*MANUAL mode: 2.86 ms (max) @48MHz SYSCLK

Mono animation:

Size: 32*64 Rate: 32.11%

Decode Time (Frame/second): AUTO mode: 1.16 ms (max)@48MHz SYSCLK

*MANUAL mode: 1.4 ms (max) @48MHz SYSCLK

*Manual mode does not include the time accessing external memory (SPI Flash).

3 API Functions Description

3.1 API Function List of Library

Index	syntax
1	F_GM03_Initial
2	F_GM03_SetMode
3	F_GM03_Decode_Start
4	F_GM03_Get_RemainFrame_Num
5	F_GM03_Decode_ServiceLoop

3.2 API Function Description

Void F_GM03_Initial(int isGrayorMono);

Description
Desc: This function is to set decode format to Gray or Mon
Input: isGrayorMono: 0: is Mono, 1: is Gray
Output: Null

void F_GM03_SetMode(int Mode);

Description
Desc: This function is to set decode format to Auto mod or Manual mode
Input: Mode: 0: Auto mode, -1: Manual mode
Output: Null

void GM03_Decode_Start(int Index);

Description
Desc: If Auto mode is selected, users should assign GM03 resource index. After this function is completed, first frame will be decoded.
Input: Index: The GM03 resource index of GM03_Resource_Table
Output: Null

int GM03_Decode_ServiceLoop(void);

Description
Desc: GM03 library will decode next frame when this function is called.
Input: Null
Output: return = 1: GM03 decode is completed. return = 0: GM03 decode is not completed.

int F_GM03_Get_RemainFrame_Num(void);

Description
Desc: GM03 library will return the remaining frame number when this function is called.
Input: Null
Output: Remaining frame number

4 Variables Description

4.1 Variable List of Library

Index	syntax
1	R_Frame_Data_Size
2	R_GM03_Frame_Width
3	R_GrayorMono_Flag
4	R_Dec_In_Length
5	R_GM03_DEC_Out_Buffer
6	R_GM03_DEC_In_Buffer

4.2 Variable Description

R_Frame_Data_Size

This variable is public from GM03 Library. It will show the byte number of GM03 Decode out raw data size.

R_GM03_Frame_Width

This variable is public from GM03 Library. It will show the pixel number of frame width.

R_GrayorMono_Flag

This variable is public from GM03 Library. It will show the decoding GM03 type is Gray or Mono.

R_Dec_In_Length

This variable is public from GM03 Library. Users should write decode in buffer length to this variable when selecting Manual mode.

R_GM03_DEC_Out_Buffer

This variable is public from GM03_User.asm. Users should designate one decode out buffer for GM03 library to store decode out data.

R_GM03_DEC_In_Buffer

This variable is public from GM03_User.asm. Users should designate one decode in buffer for GM03 library to read Decode in data. This variable is necessary when selecting manual mode.

5 GM03 User's Function Description

5.1 Function List of GM03_User.asm

Index	syntax
1	F_GM03_User_Initial
2	F_GM03_SetBufferAddr_User
3	F_GM03_User_Get_Data
4	F_GM03_User_Process

5.2 User's Function Description

F_GM03_User_Initial

Description
Desc: sets decode in length or initializes LCD settings in this function.
Input: R_Frame_Data_Size

F_GM03_SetBufferAddr_User

Description
Desc: sets manual mode decode in buffer address in this function.
Input: Decode in buffer address

F_GM03_User_Get_Data

Description
Desc: GM03 library will call this function to read decode in data.
Input: R1: Write GM03 decode-in buffer start point R2: Write GM03 decode-in buffer data size

F_GM03_User_Process

Description
Desc: For GPL16, LCD controller only supports 4bpp and 1bpp format; it allows to process data format from 2bpp to 4bpp in this function. Users can also refer to R_GrayorMono_Flag to identify Decode out data format at 1bpp or 2bpp.
Input: R_GrayorMono_Flag

6 GM03 User's Function Description

6.1 Examples

Manual mode example code:

```
Int ret;
System_Initial();
TimeBase_Flag = 0;
FrameCnt = 0;
LCD_Enable ();
EnableTimeBase();
while(1)
{
    F_GM03_Initial(C_Mono);                          //Set decode format is Mono
    F_GM03_SetMode(C_Manual_Mode);                   //Set decode mode is manual mode
    F_GM03_SetBufferAddr_User(DecodeInBuffer);       //Set decode in buffer address
    F_GM03_Decode_Start(0);                          //Start decode
    FrameCnt = F_GM03_Get_RemainFrame_Num();         //Get remain Frame number
    while(ret != 1)                                  //Decode GM03 until return value = 1
    {
        if(TimeBase_Flag == 1)
        {
            ret = F_GM03_Decode_ServiceLoop();
            TimeBase_Flag = 0;
        }
    }
        ret = 0;
}
```

Auto mode example code:

```
Int ret;
System_Initial();
TimeBase_Flag = 0;
FrameCnt = 0;
LCD_Enable ();
EnableTimeBase();
while(1)
```

```
{
        F_GM03_Initial(C_Gray);                          //Set decode format is Gray
        F_GM03_SetMode(C_Auto_Mode);                     //Set decode mode is Auto mode
        F_GM03_Decode_Start(0);                          //Set GM03 decode the index 0 of
                                                         //GM03_Resource_Table. Start Decode
        FrameCnt = F_GM03_Get_RemainFrame_Num();         //Get remain Frame number
        while(ret != 1)                                  //Decode GM03 until return value = 1
        {
                if(TimeBase_Flag == 1)
                {
                        ret = F_GM03_Decode_ServiceLoop();
                        TimeBase_Flag = 0;
                }
        }
                ret = 0;
}
```