



» APPLICATION NOTE (DOC No. HX8347-D(T)-AN)

» **HX8347-D(T)**

240RGB x 320 dot, 262k color,
with internal GRAM,
TFT Mobile Single Chip Driver
Preliminary version 01 September, 2008

>> **HX8347-D(T)**

240RGB x 320 dot, 262k color, with Internal GRAM, TFT Mobile Single Chip Driver



Himax Technologies, Inc.
<http://www.himax.com.tw>

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➤ **HX8347-D(T)**

240RGB x 320 dot, 262k color, with Internal GRAM, TFT Mobile Single Chip Driver



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➤ **HX8347-D(T)**

240RGB x 220 dot, 262k color, with Internal GRAM, TFT Mobile Single Chip Driver



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HX8347-D(T)

240RGB x 320 dot, 262k color, with Internal GRAM, TFT Mobile Single Chip Driver



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Preliminary Version 01

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1. MPU mode Reference FPC Circuit and Initial Code

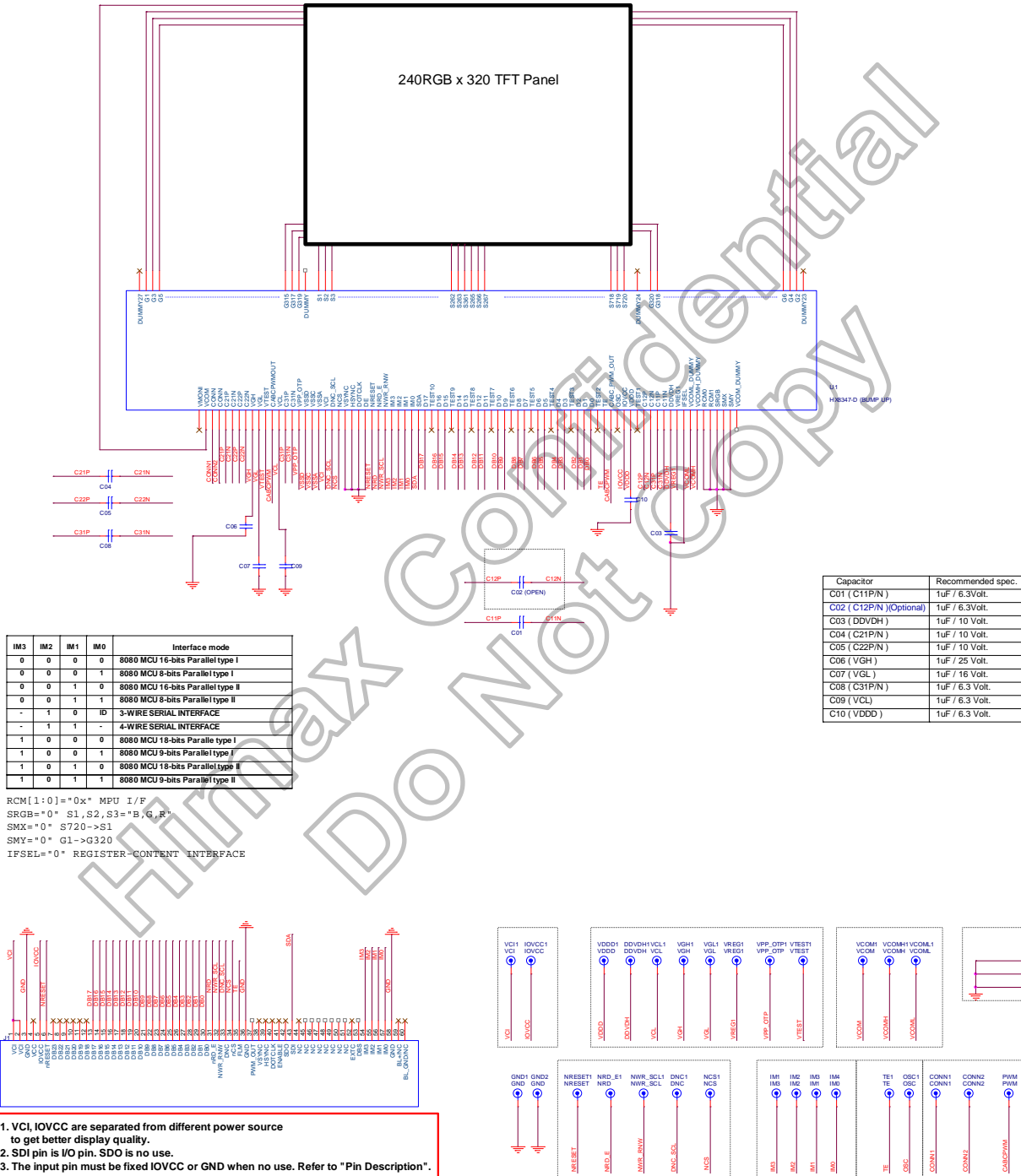
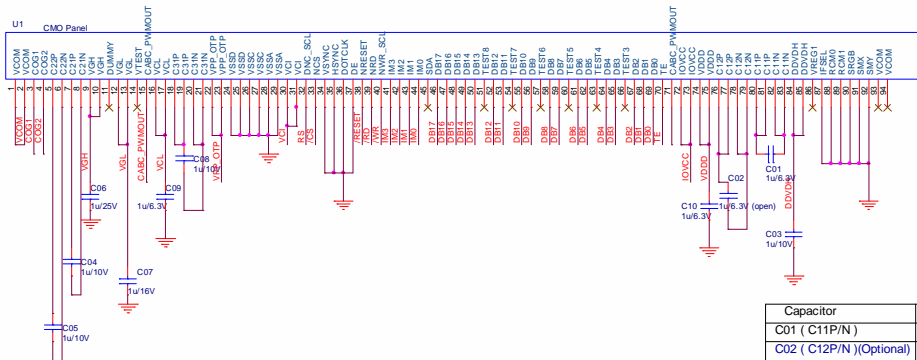


Figure 1. The HX8347-D MPU Application Reference Circuit

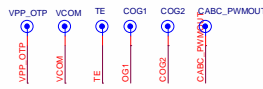
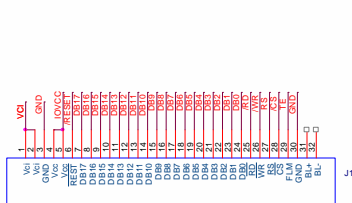
1.1 CMO

1.1-1CMO 2.6" Reference FPC Circuit

NOTES 1 : Set IOVCC=2.8V(1.65~3.3V); VCI=2.8V(2.5~3.3V)
 NOTES 2 : Set IFSEL="0"; Register-content interface mode.
 NOTES 3 : Set IM3-IM0="1000": 80 system 18bit type I interface.



Capacitor	Recommended spec.
C01 (C11P/N)	1uF / 6.3Volt.
C02 (C12P/N)(Optional)	1uF / 6.3Volt.
C03 (DDVDH)	1uF / 10 Volt.
C04 (C21P/N)	1uF / 10 Volt.
C05 (C22P/N)	1uF / 10 Volt.
C06 (VGH)	1uF / 25 Volt.
C07 (VGL)	1uF / 16 Volt.
C08 (C31P/N)	1uF / 6.3 Volt.
C09 (VCL)	1uF / 6.3 Volt.
C10 (VDDD)	1uF / 6.3 Volt.



IM3	IM2	IM1	IM0	Interface	Valid Data Bus
0	0	0	0	8080 MCU 18-bits Parallel type I	DB15-0
0	0	0	1	8080 MCU 8-bits Parallel type I	DB7-0
0	0	1	0	8080 MCU 18-bits Parallel type II	DB15-10, DB8-1
0	0	1	1	8080 MCU 8-bits Parallel type II	DB7-10
1	1	1	0	3-WIRE SERIAL INTERFACE	SDA, SCL
1	1	1	1	4-WIRE SERIAL INTERFACE	SDA, SCL, RES
1	0	0	0	8080 MCU 18-bits Parallel type I	DB15-0
1	0	0	1	8080 MCU 8-bits Parallel type I	DB7-0
1	0	0	0	8080 MCU 18-bits Parallel type II	DB15-0
1	0	1	1	8080 MCU 8-bits Parallel type II	DB7-9

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1.1-2 Initial Code for CMO 2.6”

```
#####.
M51_WR_REG(U05_LCD_POWER_ON,          0x0F); //VCI & IOVCC ON
DelayX1ms(10);
//RESET
M51_WR_REG(U05_LCD_RST,                0x01); // LCD HW RST Enable
DelayX1ms(5);
M51_WR_REG(U05_LCD_RST,                0x00); // LCD HW RST Disable.
DelayX1ms(10);

//Driving ability Setting
Set_LCD_8B_REG(0xEA,0x00); //PTBA[15:8]
Set_LCD_8B_REG(0xEB,0x20); //PTBA[7:0]
Set_LCD_8B_REG(0xEC,0x0C); //STBA[15:8]
Set_LCD_8B_REG(0xED,0xC4); //STBA[7:0]
Set_LCD_8B_REG(0xE8,0x40); //OPON[7:0]
Set_LCD_8B_REG(0xE9,0x38); //OPON1[7:0]
Set_LCD_8B_REG(0xF1,0x01); //OTPS1B
Set_LCD_8B_REG(0xF2,0x10); //GEN
Set_LCD_8B_REG(0x27,0xA3); //

//Gamma 2.2 Setting
Set_LCD_8B_REG(0x40,0x01); //
Set_LCD_8B_REG(0x41,0x00); //
Set_LCD_8B_REG(0x42,0x00); //
Set_LCD_8B_REG(0x43,0x10); //
Set_LCD_8B_REG(0x44,0x0E); //
Set_LCD_8B_REG(0x45,0x24); //
Set_LCD_8B_REG(0x46,0x04); //
Set_LCD_8B_REG(0x47,0x50); //
Set_LCD_8B_REG(0x48,0x02); //
Set_LCD_8B_REG(0x49,0x13); //
Set_LCD_8B_REG(0x4A,0x19); //
Set_LCD_8B_REG(0x4B,0x19); //
Set_LCD_8B_REG(0x4C,0x16); //

Set_LCD_8B_REG(0x50,0x1B); //
Set_LCD_8B_REG(0x51,0x31); //
Set_LCD_8B_REG(0x52,0x2F); //
Set_LCD_8B_REG(0x53,0x3F); //
Set_LCD_8B_REG(0x54,0x3F); //
Set_LCD_8B_REG(0x55,0x3E); //
Set_LCD_8B_REG(0x56,0x2F); //
Set_LCD_8B_REG(0x57,0x7B); //
Set_LCD_8B_REG(0x58,0x09); //
Set_LCD_8B_REG(0x59,0x06); //
Set_LCD_8B_REG(0x5A,0x06); //
Set_LCD_8B_REG(0x5B,0x0C); //
Set_LCD_8B_REG(0x5C,0x1D); //
Set_LCD_8B_REG(0x5D,0xCC); //
```

//Power Voltage Setting

```
Set_LCD_8B_REG(0x1B,0x1B); //VRH=4.65V
Set_LCD_8B_REG(0x1A,0x01); //BT (VGH~15V,VGL~-10V,DDVDH~5V)
Set_LCD_8B_REG(0x24,0x2F); //VMH(VCOM High voltage ~3.2V)
Set_LCD_8B_REG(0x25,0x57); //VML(VCOM Low voltage -1.2V)
//****VCOM offset**//
Set_LCD_8B_REG(0x23,0x88); //for Flicker adjust //can reload from OTP
```

//Power on Setting

```
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ, Normal mode 75Hz
Set_LCD_8B_REG(0x19,0x01); //OSC_EN='1', start Osc
Set_LCD_8B_REG(0x01,0x00); //DP_STB='0', out deep sleep
Set_LCD_8B_REG(0x1F,0x88);// GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0x80);// GAS=1, VOMG=00, PON=0, DK=0, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0x90);// GAS=1, VOMG=00, PON=1, DK=0, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0xD0);// GAS=1, VOMG=10, PON=1, DK=0, XDK=0, DDVDH_TRI=0, STB=0
DelayX1ms(5);
```

//262k/65k color selection

```
Set_LCD_8B_REG(0x17,0x06); //default 0x06 262k color // 0x05 65k color
```

//SET PANEL

```
Set_LCD_8B_REG(0x36,0x00); //SS_P, GS_P,REV_P,BGR_P
//Display ON Setting
Set_LCD_8B_REG(0x28,0x38); //GON=1, DTE=1, D=1000
DelayX1ms(40);
Set_LCD_8B_REG(0x28,0x3C); //GON=1, DTE=1, D=1100
```

//Set GRAM Area

```
Set_LCD_8B_REG(0x02,0x00);
Set_LCD_8B_REG(0x03,0x00); //Column Start
Set_LCD_8B_REG(0x04,0x00);
Set_LCD_8B_REG(0x05,0xEF); //Column End
```

```
Set_LCD_8B_REG(0x06,0x00);
Set_LCD_8B_REG(0x07,0x00); //Row Start
Set_LCD_8B_REG(0x08,0x01);
Set_LCD_8B_REG(0x09,0x3F); //Row End
```

```
WR_8B_FORMAT(0x22); //Start GRAM write
```



```

#####
// Power Off Setting
Set_LCD_8B_REG(0x28,0x38); //GON='1' DTE='1' D[1:0]='10'
DelayX1ms(40);
Set_LCD_8B_REG(0x1F,0x89); // GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=1
DelayX1ms(40);
Set_LCD_8B_REG(0x28,0x04); //GON='0' DTE='0' D[1:0]='01'
DelayX1ms(40);
Set_LCD_8B_REG(0x19,0x00); //OSC_EN='0'
DelayX1ms(5);
M51_WR_REG(U05_LCD_POWER_ON, 0x00); //VCI & IOVCC OFF

#####

// ENTER IDLE mode Setting
Set_LCD_8B_REG(0x18,0x34); //I/P_RADJ,N/P_RADJ, IDLE mode 55Hz
Set_LCD_8B_REG(0x2F,0x11); //IDLE mode line inversion
Set_LCD_8B_REG(0x01,0x04); //IDLE='1', enter IDLE mode

// EXIT IDLE mode Setting
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ, Normal mode 75Hz
Set_LCD_8B_REG(0x2F,0x11); //Normal mode line inversion
Set_LCD_8B_REG(0x01,0x00); //IDLE='0', EXIT IDLE mode

#####

// ENTER Partial mode Setting 32line
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ Partial mode 75Hz
Set_LCD_8B_REG(0x2F,0x11); //Partial mode line inversion
Set_LCD_8B_REG(0x01,0x01); //PTL='1', Enter Partial mode
Set_LCD_8B_REG(0x0A,0x00); //PSL[15:8]=0x00
Set_LCD_8B_REG(0x0B,0x20); //PSL[7:0]=0x20
Set_LCD_8B_REG(0x0C,0x00); //PEL[15:8]=0x00
Set_LCD_8B_REG(0x0D,0x47); //PEL[7:0]=0x47
Set_LCD_8B_REG(0x26,0x01); //refresh cycle=5frame

// EXIT Partial mode Setting
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ, Normal mode 75Hz
Set_LCD_8B_REG(0x2F,0x11); //Normal mode, line inversion
Set_LCD_8B_REG(0x01,0x00); //PTL='0', EXIT Partial mode

```

```
#####
```

```
// ENTER Partial + IDLE mode Setting 32line
```

```
Set_LCD_8B_REG(0x18,0x34); //I/P_RADJ,N/P_RADJ, Partial mode 55Hz
Set_LCD_8B_REG(0x2F,0x11); // Partial + IDLE mode line inversion
Set_LCD_8B_REG(0x01,0x09); // PTL='1' IDLE='1', Enter Partial + IDLE mode
Set_LCD_8B_REG(0x0A,0x00); //PSL[15:8]=0x00
Set_LCD_8B_REG(0x0B,0x20); //PSL[7:0]=0x20
Set_LCD_8B_REG(0x0C,0x00); //PEL[15:8]=0x00
Set_LCD_8B_REG(0x0D,0x47); //PEL[7:0]=0x47
Set_LCD_8B_REG(0x26,0x01); //refresh cycle=5frame
```

```
// EXIT Partial + IDLE mode Setting
```

```
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ ,Normal mode 75Hz
Set_LCD_8B_REG(0x2F,0x11); //Normal mode, line inversion
Set_LCD_8B_REG(0x01,0x00); // PTL='0' IDLE='0', EXIT Partial + IDLE mode
```

```
#####
```

```
// Enter Sleep mode Setting
```

```
Set_LCD_8B_REG(0x28,0x38); //GON='1' DTE='1' D[1:0]='10'
DelayX1ms(40);
Set_LCD_8B_REG(0x1F,0x89); // GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=1
DelayX1ms(40);
Set_LCD_8B_REG(0x28,0x04); //GON='0' DTE='0' D[1:0]='01'
DelayX1ms(40);
Set_LCD_8B_REG(0x19,0x00); //OSC_EN='0'
DelayX1ms(5);
```

```
// Exit Sleep mode Setting
```

```
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ, Normal mode 75Hz
Set_LCD_8B_REG(0x19,0x01); //OSC_EN='1', start Osc
Set_LCD_8B_REG(0x1F,0x88);// GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0x80);// GAS=1, VOMG=00, PON=0, DK=0, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0x90);// GAS=1, VOMG=00, PON=1, DK=0, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0xD0);// GAS=1, VOMG=10, PON=1, DK=0, XDK=0, DDVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x28,0x38); //GON=1, DTE=1, D=1000
DelayX1ms(40);
Set_LCD_8B_REG(0x28,0x3F); //GON=1, DTE=1, D=1100
```

```
#####  
// Enter Deep Sleep mode Setting  
Set_LCD_8B_REG(0x28,0x38); //GON='1' DTE='1' D[1:0]='10'  
DelayX1ms(40);  
Set_LCD_8B_REG(0x1F,0x89); // GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=1  
DelayX1ms(40);  
Set_LCD_8B_REG(0x28,0x04); //GON='0' DTE='0' D[1:0]='01'  
DelayX1ms(40);  
Set_LCD_8B_REG(0x19,0x00); //OSC_EN='0'  
DelayX1ms(5);  
Set_LCD_8B_REG(0x01,0xC0); //DP_STB[1:0]='11'  
  
// Exit Deep Sleep mode Setting  
Set_LCD_8B_REG(0x01,0x00); //DP_STB='0', out deep sleep  
DelayX1ms(10);  
Set_LCD_8B_REG(0x19,0x01); //OSC_EN='1', start Osc  
Set_LCD_8B_REG(0x1F,0x88);// GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=0  
DelayX1ms(5);  
Set_LCD_8B_REG(0x1F,0x80);// GAS=1, VOMG=00, PON=0, DK=0, XDK=0, DVDH_TRI=0, STB=0  
DelayX1ms(5);  
Set_LCD_8B_REG(0x1F,0x90);// GAS=1, VOMG=00, PON=1, DK=0, XDK=0, DVDH_TRI=0, STB=0  
DelayX1ms(5);  
Set_LCD_8B_REG(0x1F,0xD0);// GAS=1, VOMG=10, PON=1, DK=0, XDK=0, DDVDH_TRI=0, STB=0  
DelayX1ms(5);  
Set_LCD_8B_REG(0x28,0x38); //GON=1, DTE=1, D=1000  
DelayX1ms(40);  
Set_LCD_8B_REG(0x28,0x3F); //GON=1, DTE=1, D=1100  
WR_8B_FORMAT(0x22); //Start GRAM write
```

HX8347-D(T)

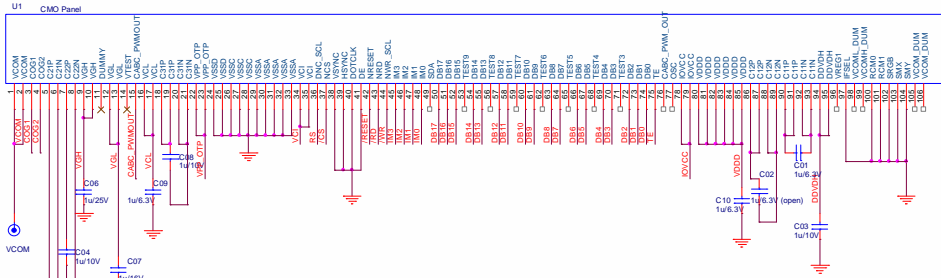
240RGB x 320 dot, 262k color, TFT Mobile Single Chip Driver



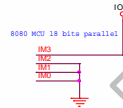
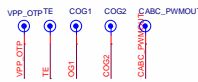
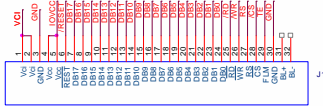
APPLICATION NOTE Preliminary V01

1.1-3 CMO 2.0" 2.2" 2.4" 2.8" Reference FPC Circuit

NOTES 1 : Set IOVCC=2.8V(1.65~3.3V);VCI=2.8V(2.5~3.3V)
 NOTES 2 : Set IFSEL=0* ; Register-content interface mode.
 NOTES 3 : Set IM3-IM0=1000* ; 80 system 18bit type I interface.



Capacitor	Recommended spec.
C01 (C11P/N)	1uF / 6.3Volt.
C02 (C12P/N)(Optional)	1uF / 6.3Volt.
C03 (DDVDH)	1uF / 10 Volt.
C04 (C21P/N)	1uF / 10 Volt.
C05 (C22P/N)	1uF / 10 Volt.
C06 (VGH)	1uF / 25 Volt.
C07 (VGL)	1uF / 16 Volt.
C08 (C31P/N)	1uF / 6.3 Volt.
C09 (VCL)	1uF / 6.3 Volt.
C10 (VDDD)	1uF / 6.3 Volt.



IM3	IM2	IM1	IM0	Interface	Valid Data bus
0	0	0	0	8080 MCU 16-bits Parallel type I	DB15:0
0	0	0	1	8080 MCU 8-bits Parallel type I	DB7:0
0	0	1	0	8080 MCU 16-bits Parallel type II	DB17:10, DB8:1
0	0	1	1	8080 MCU 8-bits Parallel type II	DB7:0
1	0	0	0	3-WIRE SERIAL INTERFACE	S0A, S0B, S0C
1	0	0	1	4-WIRE SERIAL INTERFACE	S0A, S0B, S0C
1	0	1	0	8080 MCU 16-bits Parallel type I	DB15:0
1	0	1	1	8080 MCU 8-bits Parallel type I	DB7:0
1	1	0	0	8080 MCU 16-bits Parallel type II	DB17:0
1	1	0	1	8080 MCU 8-bits Parallel type II	DB7:0

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Size	Document Number			Rev
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1.1-4 Initial Code for CMO 2.0”

```
#####.
M51_WR_REG(U05_LCD_POWER_ON,      0x0F); //VCI & IOVCC ON
DelayX1ms(10);
//RESET
M51_WR_REG(U05_LCD_RST,            0x01); // LCD HW RST Enable
DelayX1ms(5);
M51_WR_REG(U05_LCD_RST,            0x00); // LCD HW RST Disable.
DelayX1ms(10);
```

```
//Driving ability Setting
Set_LCD_8B_REG(0xEA,0x00); //PTBA[15:8]
Set_LCD_8B_REG(0xEB,0x20); //PTBA[7:0]
Set_LCD_8B_REG(0xEC,0x0C); //STBA[15:8]
Set_LCD_8B_REG(0xED,0xC4); //STBA[7:0]
Set_LCD_8B_REG(0xE8,0x40); //OPON[7:0]
Set_LCD_8B_REG(0xE9,0x38); //OPON1[7:0]
Set_LCD_8B_REG(0xF1,0x01); //OTPS1B
Set_LCD_8B_REG(0xF2,0x10); //GEN
Set_LCD_8B_REG(0x27,0xA3); //
```

```
//Gamma 2.2 Setting
Set_LCD_8B_REG(0x40,0x00); //
Set_LCD_8B_REG(0x41,0x00); //
Set_LCD_8B_REG(0x42,0x01); //
Set_LCD_8B_REG(0x43,0x12); //
Set_LCD_8B_REG(0x44,0x10); //
Set_LCD_8B_REG(0x45,0x26); //
Set_LCD_8B_REG(0x46,0x08); //
Set_LCD_8B_REG(0x47,0x54); //
Set_LCD_8B_REG(0x48,0x02); //
Set_LCD_8B_REG(0x49,0x15); //
Set_LCD_8B_REG(0x4A,0x19); //
Set_LCD_8B_REG(0x4B,0x19); //
Set_LCD_8B_REG(0x4C,0x16); //
```

```
Set_LCD_8B_REG(0x50,0x19); //
Set_LCD_8B_REG(0x51,0x2F); //
Set_LCD_8B_REG(0x52,0x2D); //
Set_LCD_8B_REG(0x53,0x3E); //
Set_LCD_8B_REG(0x54,0x3F); //
Set_LCD_8B_REG(0x55,0x3F); //
Set_LCD_8B_REG(0x56,0x2B); //
Set_LCD_8B_REG(0x57,0x77); //
Set_LCD_8B_REG(0x58,0x09); //
Set_LCD_8B_REG(0x59,0x06); //
Set_LCD_8B_REG(0x5A,0x06); //
Set_LCD_8B_REG(0x5B,0x0A); //
Set_LCD_8B_REG(0x5C,0x1D); //
Set_LCD_8B_REG(0x5D,0xCC); //
```

```
//Power Voltage Setting
```

```
Set_LCD_8B_REG(0x1B,0x1B); //VRH=4.65V
Set_LCD_8B_REG(0x1A,0x01); //BT (VGH~15V,VGL~-10V,DDVDH~5V)
Set_LCD_8B_REG(0x24,0x2F); //VMH(VCOM High voltage ~3.2V)
Set_LCD_8B_REG(0x25,0x57); //VML(VCOM Low voltage -1.2V)
//****VCOM offset**//
Set_LCD_8B_REG(0x23,0x79); //for Flicker adjust //can reload from OTP

//Power on Setting
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ, Normal mode 75Hz
Set_LCD_8B_REG(0x19,0x01); //OSC_EN='1', start Osc
Set_LCD_8B_REG(0x01,0x00); //DP_STB='0', out deep sleep
Set_LCD_8B_REG(0x1F,0x88);// GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0x80);// GAS=1, VOMG=00, PON=0, DK=0, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0x90);// GAS=1, VOMG=00, PON=1, DK=0, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0xD0);// GAS=1, VOMG=10, PON=1, DK=0, XDK=0, DDVDH_TRI=0, STB=0
DelayX1ms(5);

//262k/65k color selection
Set_LCD_8B_REG(0x17,0x06); //default 0x06 262k color // 0x05 65k color

//SET PANEL
Set_LCD_8B_REG(0x36,0x00); //SS_P, GS_P,REV_P,BGR_P
//Display ON Setting
Set_LCD_8B_REG(0x28,0x38); //GON=1, DTE=1, D=1000
DelayX1ms(40);
Set_LCD_8B_REG(0x28,0x3C); //GON=1, DTE=1, D=1100

//Set GRAM Area
Set_LCD_8B_REG(0x02,0x00);
Set_LCD_8B_REG(0x03,0x00); //Column Start
Set_LCD_8B_REG(0x04,0x00);
Set_LCD_8B_REG(0x05,0xEF); //Column End

Set_LCD_8B_REG(0x06,0x00);
Set_LCD_8B_REG(0x07,0x00); //Row Start
Set_LCD_8B_REG(0x08,0x01);
Set_LCD_8B_REG(0x09,0x3F); //Row End

WR_8B_FORMAT(0x22); //Start GRAM write
```



```

#####
// Power Off Setting
Set_LCD_8B_REG(0x28,0x38); //GON='1' DTE='1' D[1:0]='10'
DelayX1ms(40);
Set_LCD_8B_REG(0x1F,0x89); // GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=1
DelayX1ms(40);
Set_LCD_8B_REG(0x28,0x04); //GON='0' DTE='0' D[1:0]='01'
DelayX1ms(40);
Set_LCD_8B_REG(0x19,0x00); //OSC_EN='0'
DelayX1ms(5);
M51_WR_REG(U05_LCD_POWER_ON, 0x00); //VCI & IOVCC OFF

#####

// ENTER IDLE mode Setting
Set_LCD_8B_REG(0x18,0x34); //I/P_RADJ,N/P_RADJ, IDLE mode 55Hz
Set_LCD_8B_REG(0x2F,0x11); //IDLE mode line inversion
Set_LCD_8B_REG(0x01,0x04); //IDLE='1', enter IDLE mode

// EXIT IDLE mode Setting
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ, Normal mode 75Hz
Set_LCD_8B_REG(0x2F,0x11); //Normal mode line inversion
Set_LCD_8B_REG(0x01,0x00); //IDLE='0', EXIT IDLE mode

#####

// ENTER Partial mode Setting 32line
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ Partial mode 75Hz
Set_LCD_8B_REG(0x2F,0x11); //Partial mode line inversion
Set_LCD_8B_REG(0x01,0x01); //PTL='1', Enter Partial mode
Set_LCD_8B_REG(0x0A,0x00); //PSL[15:8]=0x00
Set_LCD_8B_REG(0x0B,0x20); //PSL[7:0]=0x20
Set_LCD_8B_REG(0x0C,0x00); //PEL[15:8]=0x00
Set_LCD_8B_REG(0x0D,0x47); //PEL[7:0]=0x47
Set_LCD_8B_REG(0x26,0x01); //refresh cycle=5frame

// EXIT Partial mode Setting
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ, Normal mode 75Hz
Set_LCD_8B_REG(0x2F,0x11); //Normal mode, line inversion
Set_LCD_8B_REG(0x01,0x00); //PTL='0', EXIT Partial mode

```

```
#####
```

```
// ENTER Partial + IDLE mode Setting 32line
```

```
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ, Partial mode 55Hz
Set_LCD_8B_REG(0x2F,0x11); // Partial + IDLE mode line inversion
Set_LCD_8B_REG(0x01,0x09); // PTL='1' IDLE='1', Enter Partial + IDLE mode
Set_LCD_8B_REG(0x0A,0x00); //PSL[15:8]=0x00
Set_LCD_8B_REG(0x0B,0x20); //PSL[7:0]=0x20
Set_LCD_8B_REG(0x0C,0x00); //PEL[15:8]=0x00
Set_LCD_8B_REG(0x0D,0x47); //PEL[7:0]=0x47
Set_LCD_8B_REG(0x26,0x01); //refresh cycle=5frame
```

```
// EXIT Partial + IDLE mode Setting
```

```
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ ,Normal mode 75Hz
Set_LCD_8B_REG(0x2F,0x11); //Normal mode, line inversion
Set_LCD_8B_REG(0x01,0x00); // PTL='0' IDLE='0', EXIT Partial + IDLE mode
```

```
#####
```

```
// Enter Sleep mode Setting
```

```
Set_LCD_8B_REG(0x28,0xB8); //GON='1' DTE='1' D[1:0]='10'
DelayX1ms(40);
Set_LCD_8B_REG(0x1F,0x89); // GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=1
DelayX1ms(40);
Set_LCD_8B_REG(0x28,0x04); //GON='0' DTE='0' D[1:0]='01'
DelayX1ms(40);
Set_LCD_8B_REG(0x19,0x00); //OSC_EN='0'
DelayX1ms(5);
```

```
// Exit Sleep mode Setting
```

```
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ, Normal mode 75Hz
Set_LCD_8B_REG(0x19,0x01); //OSC_EN='1', start Osc
Set_LCD_8B_REG(0x1F,0x88);// GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0x80);// GAS=1, VOMG=00, PON=0, DK=0, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0x90);// GAS=1, VOMG=00, PON=1, DK=0, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0xD0);// GAS=1, VOMG=10, PON=1, DK=0, XDK=0, DDVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x28,0x38); //GON=1, DTE=1, D=1000
DelayX1ms(40);
Set_LCD_8B_REG(0x28,0x3F); //GON=1, DTE=1, D=1100
```



```
#####  
// Enter Deep Sleep mode Setting  
Set_LCD_8B_REG(0x28,0xB8); //GON='1' DTE='1' D[1:0]='10'  
DelayX1ms(40);  
Set_LCD_8B_REG(0x1F,0x89); // GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=1  
DelayX1ms(40);  
Set_LCD_8B_REG(0x28,0x04); //GON='0' DTE='0' D[1:0]='01'  
DelayX1ms(40);  
Set_LCD_8B_REG(0x19,0x00); //OSC_EN='0'  
DelayX1ms(5);  
Set_LCD_8B_REG(0x01,0xC0); //DP_STB[1:0]='11'  
  
// Exit Deep Sleep mode Setting  
Set_LCD_8B_REG(0x01,0x00); //DP_STB='0', out deep sleep  
DelayX1ms(10);  
Set_LCD_8B_REG(0x19,0x01); //OSC_EN='1', start Osc  
Set_LCD_8B_REG(0x1F,0x88);// GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=0  
DelayX1ms(5);  
Set_LCD_8B_REG(0x1F,0x80);// GAS=1, VOMG=00, PON=0, DK=0, XDK=0, DVDH_TRI=0, STB=0  
DelayX1ms(5);  
Set_LCD_8B_REG(0x1F,0x90);// GAS=1, VOMG=00, PON=1, DK=0, XDK=0, DVDH_TRI=0, STB=0  
DelayX1ms(5);  
Set_LCD_8B_REG(0x1F,0xD0);// GAS=1, VOMG=10, PON=1, DK=0, XDK=0, DDVDH_TRI=0, STB=0  
DelayX1ms(5);  
Set_LCD_8B_REG(0x28,0x38); //GON=1, DTE=1, D=1000  
DelayX1ms(40);  
Set_LCD_8B_REG(0x28,0x3F); //GON=1, DTE=1, D=1100  
WR_8B_FORMAT(0x22); //Start GRAM write
```

1.1-5 Initial Code for CMO 2.2”

```
#####.
M51_WR_REG(U05_LCD_POWER_ON,          0x0F); //VCI & IOVCC ON
DelayX1ms(10);
//RESET
M51_WR_REG(U05_LCD_RST,                0x01); // LCD HW RST Enable
DelayX1ms(5);
M51_WR_REG(U05_LCD_RST,                0x00); // LCD HW RST Disable.
DelayX1ms(10);

//Driving ability Setting
Set_LCD_8B_REG(0xEA,0x00); //PTBA[15:8]
Set_LCD_8B_REG(0xEB,0x20); //PTBA[7:0]
Set_LCD_8B_REG(0xEC,0x0C); //STBA[15:8]
Set_LCD_8B_REG(0xED,0xC4); //STBA[7:0]
Set_LCD_8B_REG(0xE8,0x40); //OPON[7:0]
Set_LCD_8B_REG(0xE9,0x38); //OPON1[7:0]
Set_LCD_8B_REG(0xF1,0x01); //OTPS1B
Set_LCD_8B_REG(0xF2,0x10); //GEN
Set_LCD_8B_REG(0x27,0xA3); //

//Gamma 2.2 Setting
Set_LCD_8B_REG(0x40,0x00); //
Set_LCD_8B_REG(0x41,0x00); //
Set_LCD_8B_REG(0x42,0x01); //
Set_LCD_8B_REG(0x43,0x12); //
Set_LCD_8B_REG(0x44,0x10); //
Set_LCD_8B_REG(0x45,0x26); //
Set_LCD_8B_REG(0x46,0x08); //
Set_LCD_8B_REG(0x47,0x53); //
Set_LCD_8B_REG(0x48,0x02); //
Set_LCD_8B_REG(0x49,0x15); //
Set_LCD_8B_REG(0x4A,0x19); //
Set_LCD_8B_REG(0x4B,0x19); //
Set_LCD_8B_REG(0x4C,0x16); //

Set_LCD_8B_REG(0x50,0x19); //
Set_LCD_8B_REG(0x51,0x2F); //
Set_LCD_8B_REG(0x52,0x2D); //
Set_LCD_8B_REG(0x53,0x3E); //
Set_LCD_8B_REG(0x54,0x3F); //
Set_LCD_8B_REG(0x55,0x3F); //
Set_LCD_8B_REG(0x56,0x2C); //
Set_LCD_8B_REG(0x57,0x77); //
Set_LCD_8B_REG(0x58,0x09); //
Set_LCD_8B_REG(0x59,0x06); //
Set_LCD_8B_REG(0x5A,0x06); //
Set_LCD_8B_REG(0x5B,0x0A); //
Set_LCD_8B_REG(0x5C,0x1D); //
Set_LCD_8B_REG(0x5D,0xCC); //

//Power Voltage Setting
```

```
Set_LCD_8B_REG(0x1B,0x1B); //VRH=4.65V
Set_LCD_8B_REG(0x1A,0x01); //BT (VGH~15V,VGL~-10V,DDVDH~5V)
Set_LCD_8B_REG(0x24,0x2F); //VMH(VCOM High voltage ~3.2V)
Set_LCD_8B_REG(0x25,0x57); //VML(VCOM Low voltage -1.2V)
//****VCOM offset**//
Set_LCD_8B_REG(0x23,0x97); //for Flicker adjust //can reload from OTP

//Power on Setting
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ, Normal mode 75Hz
Set_LCD_8B_REG(0x19,0x01); //OSC_EN='1', start Osc
Set_LCD_8B_REG(0x01,0x00); //DP_STB='0', out deep sleep
Set_LCD_8B_REG(0x1F,0x88);// GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0x80);// GAS=1, VOMG=00, PON=0, DK=0, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0x90);// GAS=1, VOMG=00, PON=1, DK=0, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0xD0);// GAS=1, VOMG=10, PON=1, DK=0, XDK=0, DDVDH_TRI=0, STB=0
DelayX1ms(5);

//262k/65k color selection
Set_LCD_8B_REG(0x17,0x06); //default 0x06 262k color // 0x05 65k color

//SET PANEL
Set_LCD_8B_REG(0x36,0x00); //SS_P, GS_P,REV_P,BGR_P
//Display ON Setting
Set_LCD_8B_REG(0x28,0x38); //GON=1, DTE=1, D=1000
DelayX1ms(40);
Set_LCD_8B_REG(0x28,0x3C); //GON=1, DTE=1, D=1100

//Set GRAM Area
Set_LCD_8B_REG(0x02,0x00);
Set_LCD_8B_REG(0x03,0x00); //Column Start
Set_LCD_8B_REG(0x04,0x00);
Set_LCD_8B_REG(0x05,0xEF); //Column End

Set_LCD_8B_REG(0x06,0x00);
Set_LCD_8B_REG(0x07,0x00); //Row Start
Set_LCD_8B_REG(0x08,0x01);
Set_LCD_8B_REG(0x09,0x3F); //Row End

WR_8B_FORMAT(0x22); //Start GRAM write
```

```

#####
// Power Off Setting
Set_LCD_8B_REG(0x28,0x38); //GON='1' DTE='1' D[1:0]='10'
DelayX1ms(40);
Set_LCD_8B_REG(0x1F,0x89); // GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=1
DelayX1ms(40);
Set_LCD_8B_REG(0x28,0x04); //GON='0' DTE='0' D[1:0]='01'
DelayX1ms(40);
Set_LCD_8B_REG(0x19,0x00); //OSC_EN='0'
DelayX1ms(5);
M51_WR_REG(U05_LCD_POWER_ON, 0x00); //VCI & IOVCC OFF

#####

// ENTER IDLE mode Setting
Set_LCD_8B_REG(0x18,0x34); //I/P_RADJ,N/P_RADJ, IDLE mode 55Hz
Set_LCD_8B_REG(0x2F,0x11); //IDLE mode line inversion
Set_LCD_8B_REG(0x01,0x04); //IDLE='1', enter IDLE mode

// EXIT IDLE mode Setting
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ, Normal mode 75Hz
Set_LCD_8B_REG(0x2F,0x11); //Normal mode line inversion
Set_LCD_8B_REG(0x01,0x00); //IDLE='0', EXIT IDLE mode

#####

// ENTER Partial mode Setting 32line
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ Partial mode 75Hz
Set_LCD_8B_REG(0x2F,0x11); //Partial mode line inversion
Set_LCD_8B_REG(0x01,0x01); //PTL='1', Enter Partial mode
Set_LCD_8B_REG(0x0A,0x00); //PSL[15:8]=0x00
Set_LCD_8B_REG(0x0B,0x20); //PSL[7:0]=0x20
Set_LCD_8B_REG(0x0C,0x00); //PEL[15:8]=0x00
Set_LCD_8B_REG(0x0D,0x47); //PEL[7:0]=0x47
Set_LCD_8B_REG(0x26,0x01); //refresh cycle=5frame

// EXIT Partial mode Setting
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ, Normal mode 75Hz
Set_LCD_8B_REG(0x2F,0x11); //Normal mode, line inversion
Set_LCD_8B_REG(0x01,0x00); //PTL='0', EXIT Partial mode

```

```
#####
```

```
// ENTER Partial + IDLE mode Setting 32line
```

```
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ, Partial mode 55Hz
Set_LCD_8B_REG(0x2F,0x11); // Partial + IDLE mode line inversion
Set_LCD_8B_REG(0x01,0x09); // PTL='1' IDLE='1', Enter Partial + IDLE mode
Set_LCD_8B_REG(0x0A,0x00); //PSL[15:8]=0x00
Set_LCD_8B_REG(0x0B,0x20); //PSL[7:0]=0x20
Set_LCD_8B_REG(0x0C,0x00); //PEL[15:8]=0x00
Set_LCD_8B_REG(0x0D,0x47); //PEL[7:0]=0x47
Set_LCD_8B_REG(0x26,0x01); //refresh cycle=5frame
```

```
// EXIT Partial + IDLE mode Setting
```

```
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ ,Normal mode 75Hz
Set_LCD_8B_REG(0x2F,0x11); //Normal mode, line inversion
Set_LCD_8B_REG(0x01,0x00); // PTL='0' IDLE='0', EXIT Partial + IDLE mode
```

```
#####
```

```
// Enter Sleep mode Setting
```

```
Set_LCD_8B_REG(0x28,0xB8); //GON='1' DTE='1' D[1:0]='10'
DelayX1ms(40);
Set_LCD_8B_REG(0x1F,0x89); // GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=1
DelayX1ms(40);
Set_LCD_8B_REG(0x28,0x04); //GON='0' DTE='0' D[1:0]='01'
DelayX1ms(40);
Set_LCD_8B_REG(0x19,0x00); //OSC_EN='0'
DelayX1ms(5);
```

```
// Exit Sleep mode Setting
```

```
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ, Normal mode 75Hz
Set_LCD_8B_REG(0x19,0x01); //OSC_EN='1', start Osc
Set_LCD_8B_REG(0x1F,0x88);// GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0x80);// GAS=1, VOMG=00, PON=0, DK=0, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0x90);// GAS=1, VOMG=00, PON=1, DK=0, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0xD0);// GAS=1, VOMG=10, PON=1, DK=0, XDK=0, DDVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x28,0x38); //GON=1, DTE=1, D=1000
DelayX1ms(40);
Set_LCD_8B_REG(0x28,0x3F); //GON=1, DTE=1, D=1100
```

```

#####
// Enter Deep Sleep mode Setting
Set_LCD_8B_REG(0x28,0xB8); //GON='1' DTE='1' D[1:0]='10'
DelayX1ms(40);
Set_LCD_8B_REG(0x1F,0x89); // GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=1
DelayX1ms(40);
Set_LCD_8B_REG(0x28,0x04); //GON='0' DTE='0' D[1:0]='01'
DelayX1ms(40);
Set_LCD_8B_REG(0x19,0x00); //OSC_EN='0'
DelayX1ms(5);
Set_LCD_8B_REG(0x01,0xC0); //DP_STB[1:0]='11'

// Exit Deep Sleep mode Setting
Set_LCD_8B_REG(0x01,0x00); //DP_STB='0', out deep sleep
DelayX1ms(10);
Set_LCD_8B_REG(0x19,0x01); //OSC_EN='1', start Osc
Set_LCD_8B_REG(0x1F,0x88);// GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0x80);// GAS=1, VOMG=00, PON=0, DK=0, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0x90);// GAS=1, VOMG=00, PON=1, DK=0, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0xD0);// GAS=1, VOMG=10, PON=1, DK=0, XDK=0, DDVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x28,0x38); //GON=1, DTE=1, D=1000
DelayX1ms(40);
Set_LCD_8B_REG(0x28,0x3F); //GON=1, DTE=1, D=1100
WR_8B_FORMAT(0x22); //Start GRAM write

```


1.1-6 Initial Code for CMO 2.8”

```
#####.
M51_WR_REG(U05_LCD_POWER_ON,          0x0F); //VCI & IOVCC ON
DelayX1ms(10);
//RESET
M51_WR_REG(U05_LCD_RST,                0x01); // LCD HW RST Enable
DelayX1ms(5);
M51_WR_REG(U05_LCD_RST,                0x00); // LCD HW RST Disable.
DelayX1ms(10);

//Driving ability Setting
Set_LCD_8B_REG(0xEA,0x00); //PTBA[15:8]
Set_LCD_8B_REG(0xEB,0x20); //PTBA[7:0]
Set_LCD_8B_REG(0xEC,0x0C); //STBA[15:8]
Set_LCD_8B_REG(0xED,0xC4); //STBA[7:0]
Set_LCD_8B_REG(0xE8,0x40); //OPON[7:0]
Set_LCD_8B_REG(0xE9,0x38); //OPON1[7:0]
Set_LCD_8B_REG(0xF1,0x01); //OTPS1B
Set_LCD_8B_REG(0xF2,0x10); //GEN
Set_LCD_8B_REG(0x27,0xA3); //

//Gamma 2.2 Setting
Set_LCD_8B_REG(0x40,0x00); //
Set_LCD_8B_REG(0x41,0x00); //
Set_LCD_8B_REG(0x42,0x01); //
Set_LCD_8B_REG(0x43,0x13); //
Set_LCD_8B_REG(0x44,0x10); //
Set_LCD_8B_REG(0x45,0x26); //
Set_LCD_8B_REG(0x46,0x08); //
Set_LCD_8B_REG(0x47,0x51); //
Set_LCD_8B_REG(0x48,0x02); //
Set_LCD_8B_REG(0x49,0x12); //
Set_LCD_8B_REG(0x4A,0x18); //
Set_LCD_8B_REG(0x4B,0x19); //
Set_LCD_8B_REG(0x4C,0x14); //

Set_LCD_8B_REG(0x50,0x19); //
Set_LCD_8B_REG(0x51,0x2F); //
Set_LCD_8B_REG(0x52,0x2C); //
Set_LCD_8B_REG(0x53,0x3E); //
Set_LCD_8B_REG(0x54,0x3F); //
Set_LCD_8B_REG(0x55,0x3F); //
Set_LCD_8B_REG(0x56,0x2E); //
Set_LCD_8B_REG(0x57,0x77); //
Set_LCD_8B_REG(0x58,0x0B); //
Set_LCD_8B_REG(0x59,0x06); //
Set_LCD_8B_REG(0x5A,0x07); //
Set_LCD_8B_REG(0x5B,0x0D); //
Set_LCD_8B_REG(0x5C,0x1D); //
Set_LCD_8B_REG(0x5D,0xCC); //

//Power Voltage Setting
```

```
Set_LCD_8B_REG(0x1B,0x1B); //VRH=4.65V
Set_LCD_8B_REG(0x1A,0x01); //BT (VGH~15V,VGL~-10V,DDVDH~5V)
Set_LCD_8B_REG(0x24,0x2F); //VMH(VCOM High voltage ~3.2V)
Set_LCD_8B_REG(0x25,0x57); //VML(VCOM Low voltage -1.2V)
//****VCOM offset**//
Set_LCD_8B_REG(0x23,0x86); //for Flicker adjust //can reload from OTP

//Power on Setting
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ, Normal mode 75Hz
Set_LCD_8B_REG(0x19,0x01); //OSC_EN='1', start Osc
Set_LCD_8B_REG(0x01,0x00); //DP_STB='0', out deep sleep
Set_LCD_8B_REG(0x1F,0x88);// GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0x80);// GAS=1, VOMG=00, PON=0, DK=0, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0x90);// GAS=1, VOMG=00, PON=1, DK=0, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0xD0);// GAS=1, VOMG=10, PON=1, DK=0, XDK=0, DDVDH_TRI=0, STB=0
DelayX1ms(5);

//262k/65k color selection
Set_LCD_8B_REG(0x17,0x06); //default 0x06 262k color // 0x05 65k color

//SET PANEL
Set_LCD_8B_REG(0x36,0x00); //SS_P, GS_P,REV_P,BGR_P
//Display ON Setting
Set_LCD_8B_REG(0x28,0x38); //GON=1, DTE=1, D=1000
DelayX1ms(40);
Set_LCD_8B_REG(0x28,0x3C); //GON=1, DTE=1, D=1100

//Set GRAM Area
Set_LCD_8B_REG(0x02,0x00);
Set_LCD_8B_REG(0x03,0x00); //Column Start
Set_LCD_8B_REG(0x04,0x00);
Set_LCD_8B_REG(0x05,0xEF); //Column End

Set_LCD_8B_REG(0x06,0x00);
Set_LCD_8B_REG(0x07,0x00); //Row Start
Set_LCD_8B_REG(0x08,0x01);
Set_LCD_8B_REG(0x09,0x3F); //Row End

WR_8B_FORMAT(0x22); //Start GRAM write
```



```

#####
// Power Off Setting
Set_LCD_8B_REG(0x28,0x38); //GON='1' DTE='1' D[1:0]='10'
DelayX1ms(40);
Set_LCD_8B_REG(0x1F,0x89); // GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=1
DelayX1ms(40);
Set_LCD_8B_REG(0x28,0x04); //GON='0' DTE='0' D[1:0]='01'
DelayX1ms(40);
Set_LCD_8B_REG(0x19,0x00); //OSC_EN='0'
DelayX1ms(5);
M51_WR_REG(U05_LCD_POWER_ON, 0x00); //VCI & IOVCC OFF

#####

// ENTER IDLE mode Setting
Set_LCD_8B_REG(0x18,0x34); //I/P_RADJ,N/P_RADJ, IDLE mode 55Hz
Set_LCD_8B_REG(0x2F,0x11); //IDLE mode line inversion
Set_LCD_8B_REG(0x01,0x04); //IDLE='1', enter IDLE mode

// EXIT IDLE mode Setting
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ, Normal mode 75Hz
Set_LCD_8B_REG(0x2F,0x11); //Normal mode line inversion
Set_LCD_8B_REG(0x01,0x00); //IDLE='0', EXIT IDLE mode

#####

// ENTER Partial mode Setting 32line
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ Partial mode 75Hz
Set_LCD_8B_REG(0x2F,0x11); //Partial mode line inversion
Set_LCD_8B_REG(0x01,0x01); //PTL='1', Enter Partial mode
Set_LCD_8B_REG(0x0A,0x00); //PSL[15:8]=0x00
Set_LCD_8B_REG(0x0B,0x20); //PSL[7:0]=0x20
Set_LCD_8B_REG(0x0C,0x00); //PEL[15:8]=0x00
Set_LCD_8B_REG(0x0D,0x47); //PEL[7:0]=0x47
Set_LCD_8B_REG(0x26,0x01); //refresh cycle=5frame

// EXIT Partial mode Setting
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ, Normal mode 75Hz
Set_LCD_8B_REG(0x2F,0x11); //Normal mode, line inversion
Set_LCD_8B_REG(0x01,0x00); //PTL='0', EXIT Partial mode

```

```
#####
```

```
// ENTER Partial + IDLE mode Setting 32line
```

```
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ, Partial mode 55Hz
Set_LCD_8B_REG(0x2F,0x11); // Partial + IDLE mode line inversion
Set_LCD_8B_REG(0x01,0x09); // PTL='1' IDLE='1', Enter Partial + IDLE mode
Set_LCD_8B_REG(0x0A,0x00); //PSL[15:8]=0x00
Set_LCD_8B_REG(0x0B,0x20); //PSL[7:0]=0x20
Set_LCD_8B_REG(0x0C,0x00); //PEL[15:8]=0x00
Set_LCD_8B_REG(0x0D,0x47); //PEL[7:0]=0x47
Set_LCD_8B_REG(0x26,0x01); //refresh cycle=5frame
```

```
// EXIT Partial + IDLE mode Setting
```

```
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ ,Normal mode 75Hz
Set_LCD_8B_REG(0x2F,0x11); //Normal mode, line inversion
Set_LCD_8B_REG(0x01,0x00); // PTL='0' IDLE='0', EXIT Partial + IDLE mode
```

```
#####
```

```
// Enter Sleep mode Setting
```

```
Set_LCD_8B_REG(0x28,0xB8); //GON='1' DTE='1' D[1:0]='10'
DelayX1ms(40);
Set_LCD_8B_REG(0x1F,0x89); // GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=1
DelayX1ms(40);
Set_LCD_8B_REG(0x28,0x04); //GON='0' DTE='0' D[1:0]='01'
DelayX1ms(40);
Set_LCD_8B_REG(0x19,0x00); //OSC_EN='0'
DelayX1ms(5);
```

```
// Exit Sleep mode Setting
```

```
Set_LCD_8B_REG(0x18,0x36); //I/P_RADJ,N/P_RADJ, Normal mode 75Hz
Set_LCD_8B_REG(0x19,0x01); //OSC_EN='1', start Osc
Set_LCD_8B_REG(0x1F,0x88);// GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0x80);// GAS=1, VOMG=00, PON=0, DK=0, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0x90);// GAS=1, VOMG=00, PON=1, DK=0, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0xD0);// GAS=1, VOMG=10, PON=1, DK=0, XDK=0, DDVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x28,0x38); //GON=1, DTE=1, D=1000
DelayX1ms(40);
Set_LCD_8B_REG(0x28,0x3F); //GON=1, DTE=1, D=1100
```

```

#####
// Enter Deep Sleep mode Setting
Set_LCD_8B_REG(0x28,0xB8); //GON='1' DTE='1' D[1:0]='10'
DelayX1ms(40);
Set_LCD_8B_REG(0x1F,0x89); // GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=1
DelayX1ms(40);
Set_LCD_8B_REG(0x28,0x04); //GON='0' DTE='0' D[1:0]='01'
DelayX1ms(40);
Set_LCD_8B_REG(0x19,0x00); //OSC_EN='0'
DelayX1ms(5);
Set_LCD_8B_REG(0x01,0xC0); //DP_STB[1:0]='11'

// Exit Deep Sleep mode Setting
Set_LCD_8B_REG(0x01,0x00); //DP_STB='0', out deep sleep
DelayX1ms(10);
Set_LCD_8B_REG(0x19,0x01); //OSC_EN='1', start Osc
Set_LCD_8B_REG(0x1F,0x88);// GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0x80);// GAS=1, VOMG=00, PON=0, DK=0, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0x90);// GAS=1, VOMG=00, PON=1, DK=0, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x1F,0xD0);// GAS=1, VOMG=10, PON=1, DK=0, XDK=0, DDVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_8B_REG(0x28,0x38); //GON=1, DTE=1, D=1000
DelayX1ms(40);
Set_LCD_8B_REG(0x28,0x3F); //GON=1, DTE=1, D=1100
WR_8B_FORMAT(0x22); //Start GRAM write

```



2. RGB mode Reference FPC Circuit

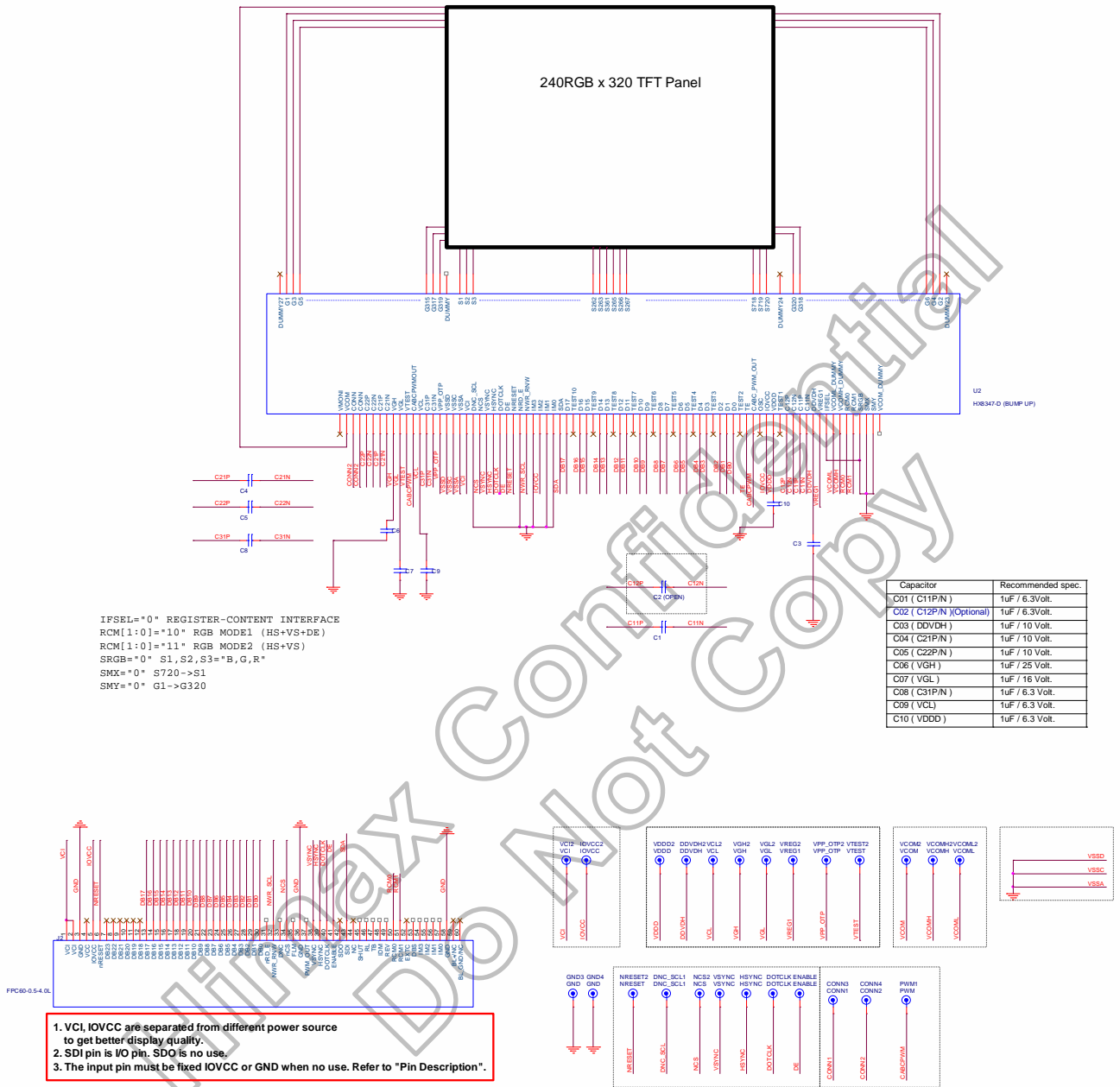


Figure 2. 1 The HX8347-D SPI+RGB Application Reference Circuit

2.1. Initial Code for Reference

```

//for CMO 2.6"
#####
M51_WR_REG(U13_RGB_IF_ENABLE,          0x13); // RGB IF TIMING ENABLE.
DelayX1ms(5);
//RESET
M51_WR_REG(U05_LCD_RST,                 0x01); // LCD HW RST Enable
DelayX1ms(5);
M51_WR_REG(U05_LCD_RST,                 0x00); // LCD HW RST Disable.
DelayX1ms(10);

//Driving ability Setting
Set_LCD_SPI_REG_8b(0xEA,0x00); //PTBA[15:8]
Set_LCD_SPI_REG_8b(0xEB,0x20); //PTBA[7:0]
Set_LCD_SPI_REG_8b(0xEC,0x0C); //STBA[15:8]
Set_LCD_SPI_REG_8b(0xED,0xC4); //STBA[7:0]
Set_LCD_SPI_REG_8b(0xE8,0x38); //OPON[7:0]
Set_LCD_SPI_REG_8b(0xE9,0x10); //OPON1[7:0]
Set_LCD_SPI_REG_8b(0xF1,0x01); //OTPS1B
Set_LCD_SPI_REG_8b(0xF2,0x10); //GEN

//Gamma 2.2 Setting
Set_LCD_SPI_REG_8b(0x40,0x01); //
Set_LCD_SPI_REG_8b(0x41,0x00); //
Set_LCD_SPI_REG_8b(0x42,0x00); //
Set_LCD_SPI_REG_8b(0x43,0x10); //
Set_LCD_SPI_REG_8b(0x44,0x0E); //
Set_LCD_SPI_REG_8b(0x45,0x24); //
Set_LCD_SPI_REG_8b(0x46,0x04); //
Set_LCD_SPI_REG_8b(0x47,0x50); //
Set_LCD_SPI_REG_8b(0x48,0x02); //
Set_LCD_SPI_REG_8b(0x49,0x13); //
Set_LCD_SPI_REG_8b(0x4A,0x19); //
Set_LCD_SPI_REG_8b(0x4B,0x19); //
Set_LCD_SPI_REG_8b(0x4C,0x16); //

Set_LCD_SPI_REG_8b(0x50,0x1B); //
Set_LCD_SPI_REG_8b(0x51,0x31); //
Set_LCD_SPI_REG_8b(0x52,0x2F); //
Set_LCD_SPI_REG_8b(0x53,0x3F); //
Set_LCD_SPI_REG_8b(0x54,0x3F); //
Set_LCD_SPI_REG_8b(0x55,0x3E); //
Set_LCD_SPI_REG_8b(0x56,0x2F); //
Set_LCD_SPI_REG_8b(0x57,0x7B); //
Set_LCD_SPI_REG_8b(0x58,0x09); //
Set_LCD_SPI_REG_8b(0x59,0x06); //
Set_LCD_SPI_REG_8b(0x5A,0x06); //
Set_LCD_SPI_REG_8b(0x5B,0x0C); //
Set_LCD_SPI_REG_8b(0x5C,0x1D); //
Set_LCD_SPI_REG_8b(0x5D,0xCC); //

//Power Voltage Setting
Set_LCD_SPI_REG_8b(0x1B,0x1B); //VRH=4.65V
Set_LCD_SPI_REG_8b(0x1A,0x01); //BT (VGH~15V,VGL~-10V,DDVDH~5V)
    
```

```

Set_LCD_SPI_REG_8b(0x24,0x2F); //VMH(VCOM High voltage ~3.2V)
Set_LCD_SPI_REG_8b(0x25,0x57); //VML(VCOM Low voltage -1.2V)
//****VCOM offset**//
Set_LCD_SPI_REG_8b(0x23,0x88); //for Flicker adjust //can reload from OTP

//Power on Setting
Set_LCD_SPI_REG_8b(0x19,0x01); //OSC_EN='1', start Osc
Set_LCD_SPI_REG_8b(0x01,0x00); //DP_STB='0', out deep sleep
Set_LCD_SPI_REG_8b(0x1F,0x88);// GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_SPI_REG_8b(0x1F,0x80);// GAS=1, VOMG=00, PON=0, DK=0, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_SPI_REG_8b(0x1F,0x90);// GAS=1, VOMG=00, PON=1, DK=0, XDK=0, DVDH_TRI=0, STB=0
DelayX1ms(5);
Set_LCD_SPI_REG_8b(0x1F,0xD0);// GAS=1, VOMG=10, PON=1, DK=0, XDK=0, DDVDH_TRI=0, STB=0
DelayX1ms(5);

//262k/65k color selection
Set_LCD_SPI_REG_8b(0x17,0x60); //default 0x60 262k color // 0x50 65k color

//Display ON Setting
Set_LCD_SPI_REG_8b(0x28,0x38); //GON=1, DTE=1, D=1000
DelayX1ms(40);
Set_LCD_SPI_REG_8b(0x28,0x3F); //GON=1, DTE=1, D=1100

//Set Window Area
Set_LCD_SPI_REG_8b(0x02,0x00);
Set_LCD_SPI_REG_8b(0x03,0x00); //Column Start
Set_LCD_SPI_REG_8b(0x04,0x00);
Set_LCD_SPI_REG_8b(0x05,0xEF); //Column End

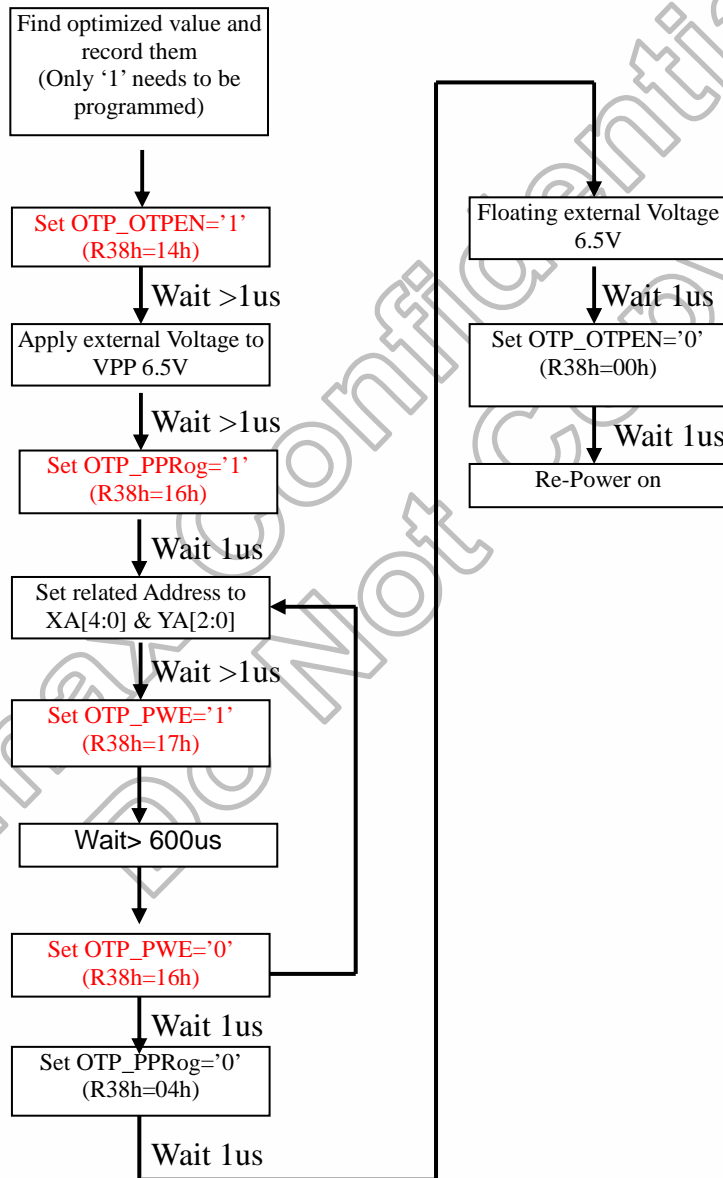
Set_LCD_SPI_REG_8b(0x06,0x00);
Set_LCD_SPI_REG_8b(0x07,0x00); //Row Start
Set_LCD_SPI_REG_8b(0x08,0x01);
Set_LCD_SPI_REG_8b(0x09,0x3F); //Row End

#####
// Power Off Setting
Set_LCD_SPI_REG_8b(0x28,0x38); //GON='1' DTE='1' D[1:0]='10'
DelayX1ms(40);
Set_LCD_SPI_REG_8b(0x1F,0x89); // GAS=1, VOMG=00, PON=0, DK=1, XDK=0, DVDH_TRI=0, STB=1
DelayX1ms(40);
Set_LCD_SPI_REG_8b(0x28,0x04); //GON='0' DTE='0' D[1:0]='01'
DelayX1ms(40);
Set_LCD_SPI_REG_8b(0x19,0x00); //OSC_EN='0'
DelayX1ms(5);
M51_WR_REG(U05_LCD_POWER_ON, 0x00); //VCI & IOVCC OFF
    
```


3. OTP Programming

	YA[2:0]=11 1	YA[2:0]=11 0	YA[2:0]=1 01	YA[2:0]=1 00	YA[2:0]=0 11	YA[2:0]=0 10	YA[2:0]=0 01	YA[2:0]=0 00	Non-Program
XA[4:0]=00011	VMF17	VMF16	VMF15	VMF14	VMF13	VMF12	VMF11	VMF10	00h
XA[4:0]=00100	VMF17	VMF16	VMF15	VMF14	VMF13	VMF12	VMF11	VMF10	00h
XA[4:0]=00101	VMF17	VMF16	VMF15	VMF14	VMF13	VMF12	VMF11	VMF10	00h
XA[4:0]=00110	VMH6	VMH6	VMH5	VMH4	VMH3	VMH2	VMH1	VMH0	00h
XA[4:0]=00111	VML6	VML6	VML5	VML4	VML3	VML2	VML1	VML0	00h
XA[4:0]=01000				Valid_VM L	Valid_VM H	Valid_VMF 3	Valid_VMF 2	Valid_VMF 1	00h
XA[4:0]=01001	Valid_panel		DDVDH_T RI		SS_Panel	GS_Panel	REV_Panel	BGR_Panel	00h

Table 3. 1 OTP ADDRESS MAPPING



Note: Valid bit must program if user want use this OTP function

4. Revision History

Version	Date	Description of changes
01	2008/08/11	New setup
	2008/08/20	P7 and P13 modify VCOM setting
	2008/09/15	Modify P11 SPI+RGB reference FPC circuit Modify normal mode at 70Hz Modify P14 OTP Programming
	2008/10/13	Add CMO 2.0" application
	2008/10/17	1. Modify P8 P9 P10 CMO2.6" Power Off Setting, Enter Sleep mode Setting, and Enter Deep Sleep mode Setting 2. Modify P14 P15 P16 CMO2.0" Power Off Setting, Enter Sleep mode Setting, and Enter Deep Sleep mode Setting
	2008/11/12	Modify CMO 2.0" application circuit
	2008/11/14	Add CMO 2.2" and 2.8" initial code

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