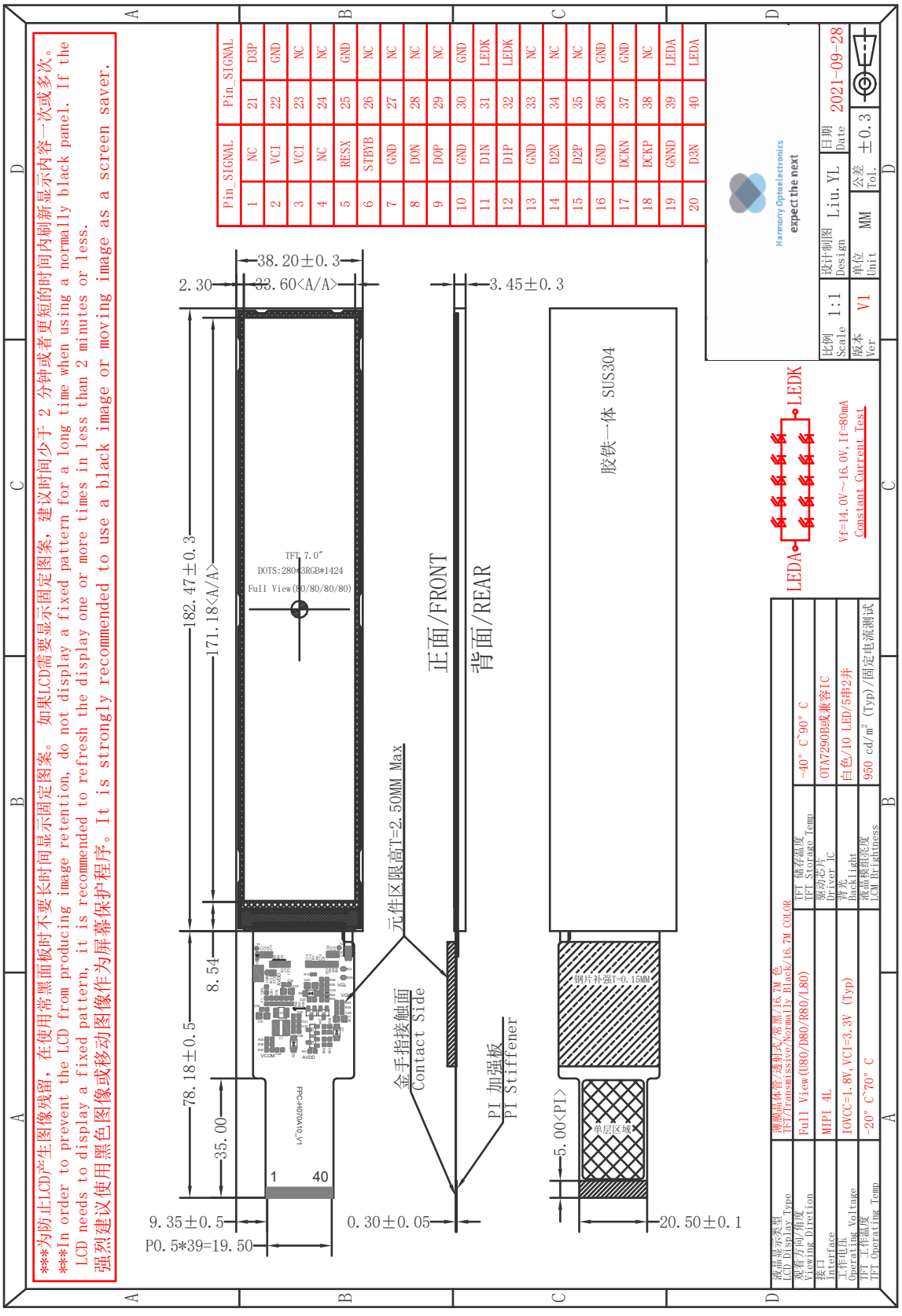
LCM Specification

产品描述 Product Description	TFT LCD Module 280 x 3RGB x 1424 Dots 7.0 ” TFT LCD

一、基本特征 General Feature:

项目 Item	标准值 Standard Value	单位 Unit
显示尺寸 Display Size	7.0	-
分辨率 Number of Pixels	280 (H)x3(RGB)*1424 (V)	-
显示区域 Active Area	33.60(H) * 171.18(V)	mm
外形尺寸 Outline Dimension	38.20(H) * 182.47(V) * 3.45(D) <TFT>	mm
观看方向 Viewing Direction	全视角 Full O'Clock	-
端口 Interface	MIPI 4L	-
驱动芯片 Driver IC	OTA7290B	-
驱动电压 Driver Condition	VCI=2.8V, IOVCC=1.8V	V
背光 Backlight	白色 LED White LED	-
触摸屏 Touch Panel	不带触摸屏 Whitout Touch Panel	-
电容触摸屏驱动芯片 CTP Driver IC	- - -	-
摸屏驱动电压 CTP Driver Condition	- - -	V
TFT 液晶工作温度 Operation Temperature	-20 ～ 70	℃
TFT 液晶储存温度 Storage Temperature	-40 ～ 90	℃

二、外形尺寸 Outline Dimensions

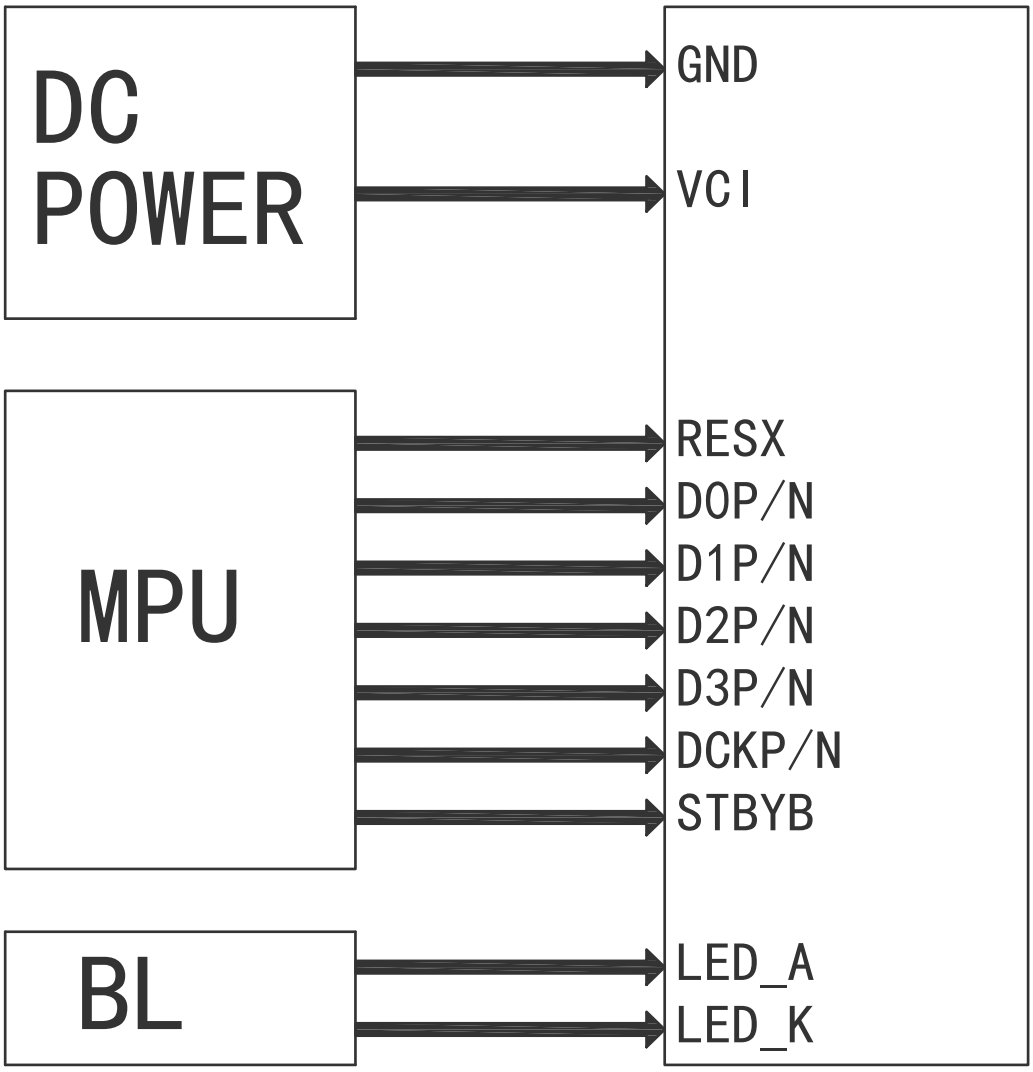


三、引脚说明 Pin Description

3.1 模组引脚说明 TFT Pin Description

引脚编号 Pin NO.	标号 Symbol	详细描述 Description
1	NC	Open Pin
2,3	VCI	Analog Power(2.6 ~ 3.3 V,2.8V Type)
4	NC	Open Pin
5	RESX	Global reset pin. Active low to enter reset state.
6	STBYB	Standby mode,Normally operation pull high.
7	GND	Ground
8	D0N	MIPI data input pins
9	D0P	MIPI data input pins
10	GND	Ground
11	D1N	MIPI data input pins
12	D1P	MIPI data input pins
13	GND	Ground
14	D2N	MIPI data input pins
15	D2P	MIPI data input pins
16	GND	Ground
17	DCKN	MIPI clock input pins.
18	DCKP	MIPI clock input pins.
19	GND	Ground
20	D3N	MIPI data input pins
21	D3P	MIPI data input pins
22	GND	Ground
23,24	NC	Open Pin
25	GND	Ground
26 ～ 29	NC	Open Pin
30	GND	Ground
31,32	LEDK	Backlight cathode
33 ～ 35	NC	Open Pin
36,37	GND	Ground
38	NC	Open Pin
39,40	LEDA	Backlight anode
---END---		

3.2 接线说明 Wiring instructions



四、电气特性 Electrical Characteristics

4-1 TFT 模组工作条件 TFT LCD Module Operating Conditions

项目 Item	标号 Symbol	条件 Condition	最小值 Min	典型值 Type	最大值 Max	单位 Uint
数字电源 Digital Power	VCI	-	2.8	3.3	3.6	V
模拟电源 Analog Power	AVDD	-	11.20	11.40	11.60	V
TFT 栅极导通电压 TFT Gate on voltage	VGH	-	17.5	18.0	18.50	V
TFT 栅极关断电压 TFT Gate off voltage	VGL	-	-9.5	-10.0	-10.5	V
TFT 共模电压 TFT Common Voltage	VCOM	-	4.5	4.6	4.7	V

4-2 背光工作条件 LED back light specification

项目 Item	标号 Symbol	条件 Condition	最小值 Min	典型值 Type	最大值 Max	单位 Uint
工作电压 Forward voltage	Vt	If=40mA /1-chip	14.0	15.0	16.0	V
工作电流 Forward current	Ipn		-	80	-	mA
亮度（带 LCD) Luminance(With LCD)	Lv	If=80mA	-	950	-	cd/㎡
颜色 Luminous color	白色 White					

4-3 电容触摸屏工作条件 CTP Operating Conditions

项目 Item	标号 Symbol	条件 Condition	最小值 Min	典型值 Type	最大值 Max	单位 Uint
数字电源 Digital Power	VDD	-	2.8	3.30	3.60	V
I/O 电源 I/O Power	IOVDD	-	2.8	3.30	3.60	V
工作温度 Operation Temperature	-	-	-	-	-	℃
储存温度 Storage Temperature	-	-	-	-	-	℃

五、液晶光学规格 TFT OPTICAL SPECIFICATION

5.1 概述 Overview

光学规格的测试应在暗室（环境亮度 1lux，温度=25 2℃）中使用亮度计系统（测角仪系统和TOPCON BM-5)设备进行测量,测试单元应位于大约 在 θ 和 Φ 等于 0 的视角下,距 LCD 表面 50cm 的距离。 显示面上测量点的中心应保持固定。 测量前背光应工作 30 分钟。

The test of Optical specifications shall be measured in a dark room (ambient luminance 1lux and temperature = 25 2℃) with the equipment of Luminance meter system (Goniometer system and TOPCON BM-5) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0 . The center of the measuring spot on the Display surface shall stay fixed. The backlight should be operating for 30 minutes prior to measurement.

5.2 光学规格 Optical Specifications

参数 Parameter		标号 Symbol	条件 Condition	最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit	备注 Remark
视角范围 Viewing Angle Range	水平 Horizontal	Θ左/L	CR>10	-	80	-	Deg.	Note 1
		Θ右/R		-	80	-	Deg.	
	垂直 Vertical	Θ上/U		-	80	-	Deg.	
		Θ下/D		-	80	-	Deg.	
对比度 Contrast ratio		CR	Θ = 0°	-	1000	-	-	Note2
色域 Color Gamut		CG		-	60	-	%	
白色色度 White Chromaticity		Wx	Θ = 0°	-0.03	0.319	+0.03	-	
		Wy			0.343		-	
色彩还原 Reproduction of color	红 Red	Rx			0.644		-	Note4 (Based on C Light)
		Ry			0.332		-	
	绿 Green	Gx			0.324		-	
		Gy			0.566		-	
	蓝 Blue	Bx			0.137		-	
		By			0.125		-	
响应时间（上升 + 下降） Response Time (Rising + Falling)		Tr＋Tf	Θ = 0° Ta= 25℃	-	30	40	ms	Note5

注释 Note:

1. 视角是对比度大于10的角度。视角确定为相对于光轴的水平或3、9点钟方向和垂直或6、12点钟方向 垂直于 LCD 表面（见图 1）。

Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o’clock direction and the vertical or 6, 12 o’clock direction with respect to the optical axis which is normal to the LCD surface (see FIGURE 1).

2. 对比度测量应在 θ = 0 的视角和 LCD 表面的中心进行。 亮度测量时，视场中的所有像素首先设置为白色，然后设置为暗（黑色）状态。 （参见图 1）亮度对比度 (CR) 是通过数学定义的。

Contrast measurements shall be made at viewing angle of Θ= 0 and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state . (see FIGUR 1) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR= \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. 透射率是没有 APF 和没有 CG 的值。

Transmittance is the Value without APF and without CG.

4. 上表中规定的色度坐标应由所有像素首先测量的光谱数据计算为红色、绿色、蓝色和白色。 测量应在面板的中心进行。

The color chromaticity coordinates specified in the above table shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

5. 电光响应时间测量应如图 2 所示，通过打开和关闭“数据”输入信号来进行。 亮度从10%变化到90%所需的时间是Tr，90%到10%是Tf。

The electro-optical response time measurements shall be made as FIGURE 2 by switching the “data” input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Tr, and 90% to 10% is Tf.

Figure1 Measurement Set Up

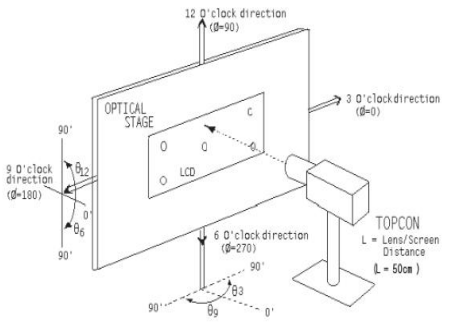


图 1

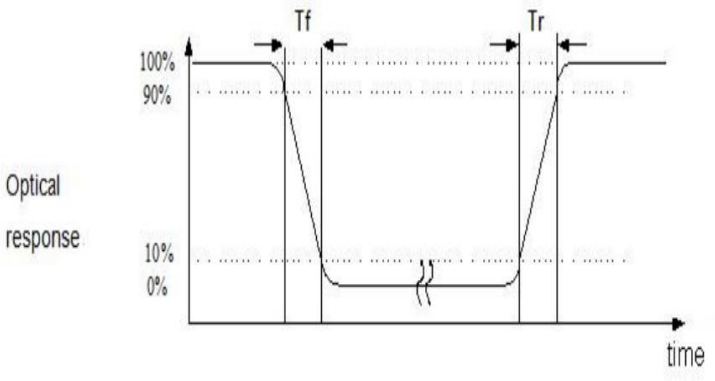


图 2

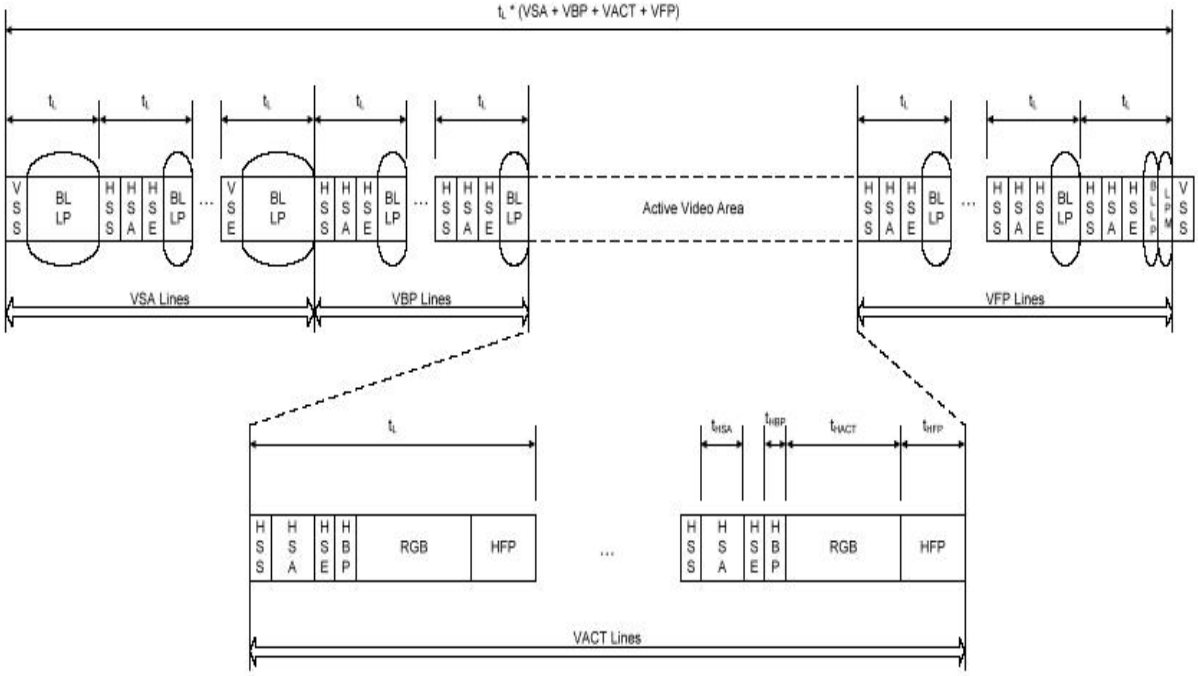
六、时序特性 Timing Characteristics

6-1 DSI 接口时序特性 / DSI Interface Timing Characteristics

A. 带同步脉冲的非突发模式 Non-Burst Mode with Sync Pulse

使用这种格式，目标是通过 DSI 串行链路准确传送 DPI 类型的时序。这包括匹配 DPI 像素传输速率和同步脉冲等定时事件的宽度。

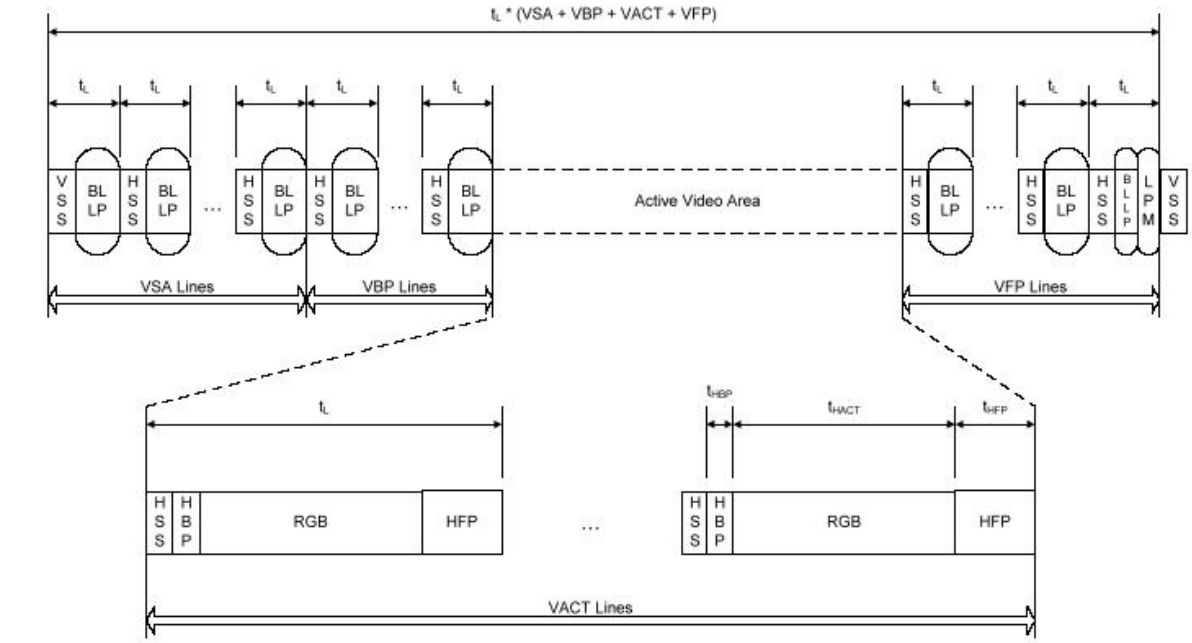
With this format, the goal is to accurately convey DPI-type timing over the DSI serial Link. This includes matching DPI pixel transmission rates, and width of timing events like sync pulse.



B. 具有同步事件的非突发模式 Non-Burst Mode with Sync Event

此模式是具有同步脉冲的非突发模式的简化。 仅传输每个同步脉冲的开始。 外设可以根据需要从接收到的每个同步事件数据包中重新生成同步。

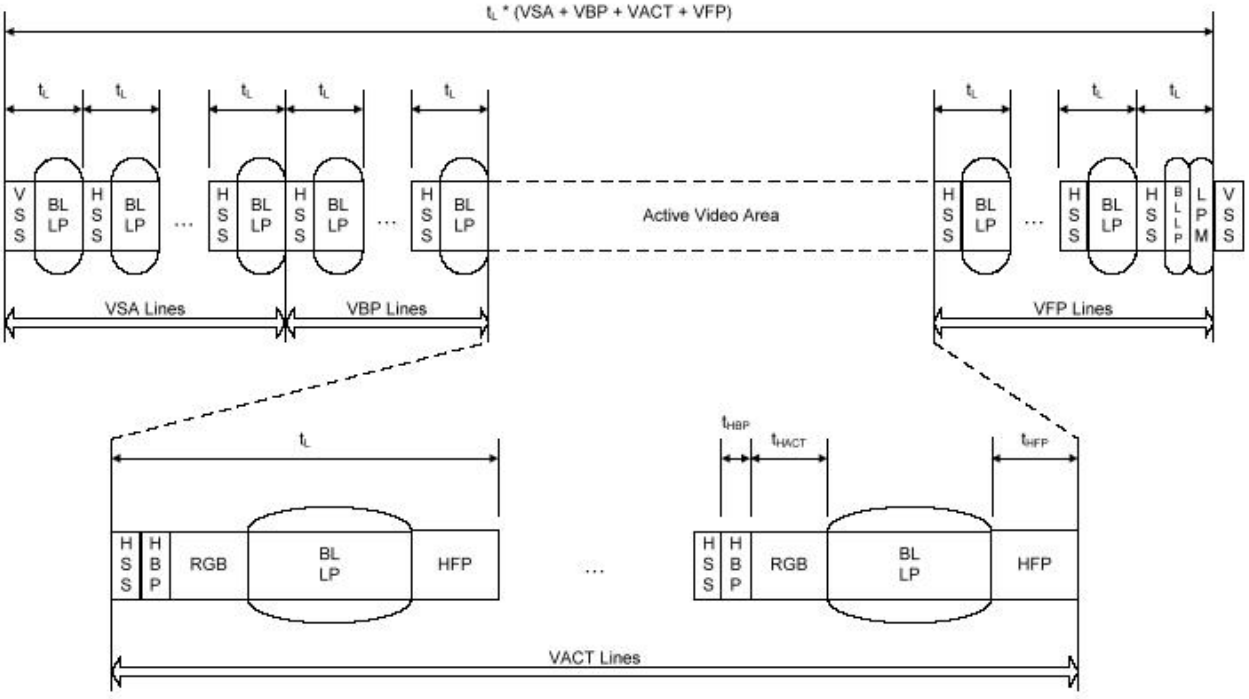
This mode is a simplification of Non-Burst Mode with Sync Pulse. Only the start of each synchronization pulse is transmitted. The peripheral may regenerated Sync as needed from each Sync Event packet received.



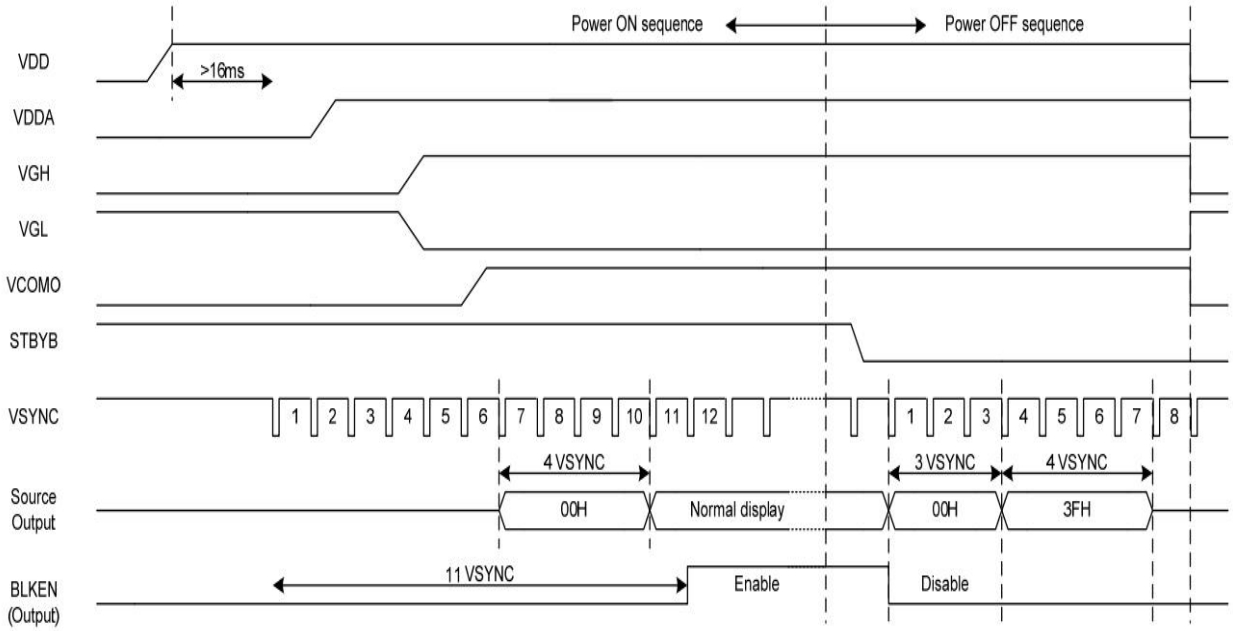
C. 突发模式 Burst Mode

在这种模式下，可以使用时间压缩突发格式在更短的时间内传输像素数据块。

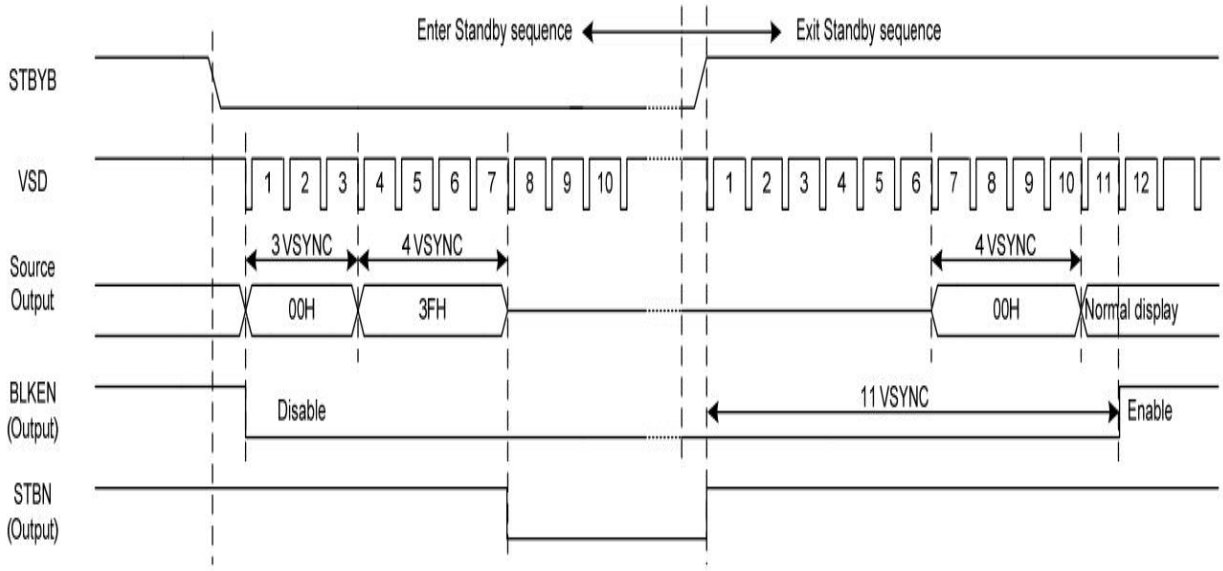
In this mode, blocks of pixel data can be transferred in a shorter time using a time-compressed burst format.



D. 开机/关机时序 Power-On/Off Timing Sequence



E. 进入和退出待机模式序列 Enter and Exit Standby Mode Sequence



LCD display initialization code

```
Void Panel_Initial_code(void)
{
  //Resolution: 280 x 1424
  //Interface: MIPI 4L
  #define Width 280
  #define Height 1424

  #define VFP 35
  #define VBP 25
  #define VSA 1

  #define HFP 80
  #define HBP 60
  #define HSA 1
  //================上电复位操作===============//
  LCD_RESET=1;
  Delayms(1);          //Delay 1ms
  LCD_RESET=0;
  Delayms(10);          //Delay 10ms
  LCD_RESET=1;
  Delayms(120);         //Delay 120ms
  //============================================//
  SPI_3W_SET_PAR(0xB0); SPI_3W_SET_PAR(0x5A);
  SPI_3W_SET_PAR(0xB1); SPI_3W_SET_PAR(0x00);
  SPI_3W_SET_PAR(0x89); SPI_3W_SET_PAR(0x01);
  SPI_3W_SET_PAR(0x91); SPI_3W_SET_PAR(0x17);
  SPI_3W_SET_PAR(0xB1); SPI_3W_SET_PAR(0x03);
  SPI_3W_SET_PAR(0x2C); SPI_3W_SET_PAR(0x28);
  SPI_3W_SET_PAR(0x0);  SPI_3W_SET_PAR(0x34);
  SPI_3W_SET_PAR(0x1);  SPI_3W_SET_PAR(0x1A);
  SPI_3W_SET_PAR(0x2);  SPI_3W_SET_PAR(0x00);
  SPI_3W_SET_PAR(0x3);  SPI_3W_SET_PAR(0x00);
  SPI_3W_SET_PAR(0x4);  SPI_3W_SET_PAR(0x00);
  SPI_3W_SET_PAR(0x5);  SPI_3W_SET_PAR(0x00);
  SPI_3W_SET_PAR(0x6);  SPI_3W_SET_PAR(0x00);
  SPI_3W_SET_PAR(0x7);  SPI_3W_SET_PAR(0x00);
  SPI_3W_SET_PAR(0x8);  SPI_3W_SET_PAR(0x00);
  SPI_3W_SET_PAR(0x9);  SPI_3W_SET_PAR(0x00);
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```
SPI_3W_SET_PAR(0xA);  SPI_3W_SET_PAR(0x01);
SPI_3W_SET_PAR(0xB);  SPI_3W_SET_PAR(0x3C);
SPI_3W_SET_PAR(0xC);  SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0xD);  SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0xE);  SPI_3W_SET_PAR(0x24);
SPI_3W_SET_PAR(0xF);  SPI_3W_SET_PAR(0x1C);
SPI_3W_SET_PAR(0x10); SPI_3W_SET_PAR(0xC9);
SPI_3W_SET_PAR(0x11); SPI_3W_SET_PAR(0x60);
SPI_3W_SET_PAR(0x12); SPI_3W_SET_PAR(0x70);
SPI_3W_SET_PAR(0x13); SPI_3W_SET_PAR(0x01);
SPI_3W_SET_PAR(0x14); SPI_3W_SET_PAR(0xE3);
SPI_3W_SET_PAR(0x15); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x16); SPI_3W_SET_PAR(0x3D);
SPI_3W_SET_PAR(0x17); SPI_3W_SET_PAR(0x0E);
SPI_3W_SET_PAR(0x18); SPI_3W_SET_PAR(0x01);
SPI_3W_SET_PAR(0x19); SPI_3W_SET_PAR(0x00);
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SPI_3W_SET_PAR(0x1B); SPI_3W_SET_PAR(0xFC);
SPI_3W_SET_PAR(0x1C); SPI_3W_SET_PAR(0x0B);
SPI_3W_SET_PAR(0x1D); SPI_3W_SET_PAR(0xA0);
SPI_3W_SET_PAR(0x1E); SPI_3W_SET_PAR(0x03);
SPI_3W_SET_PAR(0x1F); SPI_3W_SET_PAR(0x04);
SPI_3W_SET_PAR(0x20); SPI_3W_SET_PAR(0x0C);
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SPI_3W_SET_PAR(0x22); SPI_3W_SET_PAR(0x04);
SPI_3W_SET_PAR(0x23); SPI_3W_SET_PAR(0x81);
SPI_3W_SET_PAR(0x24); SPI_3W_SET_PAR(0x1F);
SPI_3W_SET_PAR(0x25); SPI_3W_SET_PAR(0x10);
SPI_3W_SET_PAR(0x26); SPI_3W_SET_PAR(0x9B);
SPI_3W_SET_PAR(0x2D); SPI_3W_SET_PAR(0x01);
SPI_3W_SET_PAR(0x2E); SPI_3W_SET_PAR(0x84);
SPI_3W_SET_PAR(0x2F); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x30); SPI_3W_SET_PAR(0x02);
SPI_3W_SET_PAR(0x31); SPI_3W_SET_PAR(0x08);
SPI_3W_SET_PAR(0x32); SPI_3W_SET_PAR(0x01);
SPI_3W_SET_PAR(0x33); SPI_3W_SET_PAR(0x1C);
SPI_3W_SET_PAR(0x34); SPI_3W_SET_PAR(0x70);
SPI_3W_SET_PAR(0x35); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x36); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x37); SPI_3W_SET_PAR(0xFF);
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```
SPI_3W_SET_PAR(0x38); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x39); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x3A); SPI_3W_SET_PAR(0x05);
SPI_3W_SET_PAR(0x3B); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x3C); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x3D); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x3E); SPI_3W_SET_PAR(0x0F);
SPI_3W_SET_PAR(0x3F); SPI_3W_SET_PAR(0x8E);
SPI_3W_SET_PAR(0x40); SPI_3W_SET_PAR(0x2A);
SPI_3W_SET_PAR(0x41); SPI_3W_SET_PAR(0xFC);
SPI_3W_SET_PAR(0x42); SPI_3W_SET_PAR(0x01);
SPI_3W_SET_PAR(0x43); SPI_3W_SET_PAR(0x40);
SPI_3W_SET_PAR(0x44); SPI_3W_SET_PAR(0x05);
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SPI_3W_SET_PAR(0x4B); SPI_3W_SET_PAR(0x05);
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SPI_3W_SET_PAR(0x4D); SPI_3W_SET_PAR(0xD0);
SPI_3W_SET_PAR(0x4E); SPI_3W_SET_PAR(0x13);
SPI_3W_SET_PAR(0x4F); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x50); SPI_3W_SET_PAR(0x0A);
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SPI_3W_SET_PAR(0x54); SPI_3W_SET_PAR(0x09);
SPI_3W_SET_PAR(0x55); SPI_3W_SET_PAR(0x22);
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SPI_3W_SET_PAR(0x57); SPI_3W_SET_PAR(0x1C);
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SPI_3W_SET_PAR(0x5A); SPI_3W_SET_PAR(0x28);
SPI_3W_SET_PAR(0x5B); SPI_3W_SET_PAR(0x01);
SPI_3W_SET_PAR(0x5C); SPI_3W_SET_PAR(0xCC);
SPI_3W_SET_PAR(0x5D); SPI_3W_SET_PAR(0x21);
SPI_3W_SET_PAR(0x5E); SPI_3W_SET_PAR(0x84);
SPI_3W_SET_PAR(0x5F); SPI_3W_SET_PAR(0x10);
```

```
SPI_3W_SET_PAR(0x60); SPI_3W_SET_PAR(0x42);
SPI_3W_SET_PAR(0x61); SPI_3W_SET_PAR(0x08);
SPI_3W_SET_PAR(0x62); SPI_3W_SET_PAR(0x20);
SPI_3W_SET_PAR(0x63); SPI_3W_SET_PAR(0xE8);
SPI_3W_SET_PAR(0x64); SPI_3W_SET_PAR(0xBD);
SPI_3W_SET_PAR(0x65); SPI_3W_SET_PAR(0xDA);
SPI_3W_SET_PAR(0x66); SPI_3W_SET_PAR(0x8B);
SPI_3W_SET_PAR(0x67); SPI_3W_SET_PAR(0xE3);
SPI_3W_SET_PAR(0x68); SPI_3W_SET_PAR(0x84);
SPI_3W_SET_PAR(0x69); SPI_3W_SET_PAR(0x10);
SPI_3W_SET_PAR(0x6A); SPI_3W_SET_PAR(0x42);
SPI_3W_SET_PAR(0x6B); SPI_3W_SET_PAR(0x08);
SPI_3W_SET_PAR(0x6C); SPI_3W_SET_PAR(0x21);
SPI_3W_SET_PAR(0x6D); SPI_3W_SET_PAR(0x84);
SPI_3W_SET_PAR(0x6E); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x6F); SPI_3W_SET_PAR(0x82);
SPI_3W_SET_PAR(0x70); SPI_3W_SET_PAR(0xDE);
SPI_3W_SET_PAR(0x71); SPI_3W_SET_PAR(0x8A);
SPI_3W_SET_PAR(0x72); SPI_3W_SET_PAR(0x39);
SPI_3W_SET_PAR(0x73); SPI_3W_SET_PAR(0x28);
SPI_3W_SET_PAR(0x74); SPI_3W_SET_PAR(0x4C);
SPI_3W_SET_PAR(0x75); SPI_3W_SET_PAR(0x08);
SPI_3W_SET_PAR(0x76); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x77); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x78); SPI_3W_SET_PAR(0x0F);
SPI_3W_SET_PAR(0x79); SPI_3W_SET_PAR(0xE0);
SPI_3W_SET_PAR(0x7A); SPI_3W_SET_PAR(0x01);
SPI_3W_SET_PAR(0x7B); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x7C); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x7D); SPI_3W_SET_PAR(0x0C);
SPI_3W_SET_PAR(0x7E); SPI_3W_SET_PAR(0x41);
SPI_3W_SET_PAR(0x7F); SPI_3W_SET_PAR(0xFE);
SPI_3W_SET_PAR(0xB1); SPI_3W_SET_PAR(0x02);
SPI_3W_SET_PAR(0x0);  SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x1);  SPI_3W_SET_PAR(0x05);
SPI_3W_SET_PAR(0x2);  SPI_3W_SET_PAR(0x8C);
SPI_3W_SET_PAR(0x3);  SPI_3W_SET_PAR(0x40);
SPI_3W_SET_PAR(0x4);  SPI_3W_SET_PAR(0x36);
SPI_3W_SET_PAR(0x5);  SPI_3W_SET_PAR(0x4E);
SPI_3W_SET_PAR(0x6);  SPI_3W_SET_PAR(0x90);
```

```
SPI_3W_SET_PAR(0x7);  SPI_3W_SET_PAR(0x10);
SPI_3W_SET_PAR(0x8);  SPI_3W_SET_PAR(0xC0);
SPI_3W_SET_PAR(0x9);  SPI_3W_SET_PAR(0x01);
SPI_3W_SET_PAR(0xA);  SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0xB);  SPI_3W_SET_PAR(0x14);
SPI_3W_SET_PAR(0xC);  SPI_3W_SET_PAR(0xE6);
SPI_3W_SET_PAR(0xD);  SPI_3W_SET_PAR(0x0D);
SPI_3W_SET_PAR(0xF);  SPI_3W_SET_PAR(0x08);
SPI_3W_SET_PAR(0x10); SPI_3W_SET_PAR(0x20);
SPI_3W_SET_PAR(0x11); SPI_3W_SET_PAR(0xF2);
SPI_3W_SET_PAR(0x12); SPI_3W_SET_PAR(0xE1);
SPI_3W_SET_PAR(0x13); SPI_3W_SET_PAR(0xBA);
SPI_3W_SET_PAR(0x14); SPI_3W_SET_PAR(0x59);
SPI_3W_SET_PAR(0x15); SPI_3W_SET_PAR(0x10);
SPI_3W_SET_PAR(0x16); SPI_3W_SET_PAR(0x64);
SPI_3W_SET_PAR(0x17); SPI_3W_SET_PAR(0xDD);
SPI_3W_SET_PAR(0x18); SPI_3W_SET_PAR(0xB8);
SPI_3W_SET_PAR(0x19); SPI_3W_SET_PAR(0x3E);
SPI_3W_SET_PAR(0x1A); SPI_3W_SET_PAR(0x08);
SPI_3W_SET_PAR(0x1B); SPI_3W_SET_PAR(0x08);
SPI_3W_SET_PAR(0x1C); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x1D); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x1E); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x1F); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x20); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x21); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x22); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x23); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x24); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x25); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x26); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x27); SPI_3W_SET_PAR(0x1F);
SPI_3W_SET_PAR(0x28); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x29); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x2A); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x2B); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x2C); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x2D); SPI_3W_SET_PAR(0x07);
SPI_3W_SET_PAR(0x33); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x35); SPI_3W_SET_PAR(0x7E);
```

```
SPI_3W_SET_PAR(0x36); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x38); SPI_3W_SET_PAR(0x7E);
SPI_3W_SET_PAR(0x3A); SPI_3W_SET_PAR(0x80);
SPI_3W_SET_PAR(0x3B); SPI_3W_SET_PAR(0x01);
SPI_3W_SET_PAR(0x3C); SPI_3W_SET_PAR(0xC0);
SPI_3W_SET_PAR(0x3D); SPI_3W_SET_PAR(0x28);
SPI_3W_SET_PAR(0x3E); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x3F); SPI_3W_SET_PAR(0x18);
SPI_3W_SET_PAR(0x40); SPI_3W_SET_PAR(0x05);
SPI_3W_SET_PAR(0x41); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x42); SPI_3W_SET_PAR(0xA3);
SPI_3W_SET_PAR(0x43); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x44); SPI_3W_SET_PAR(0x60);
SPI_3W_SET_PAR(0x45); SPI_3W_SET_PAR(0x04);
SPI_3W_SET_PAR(0x46); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x47); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x48); SPI_3W_SET_PAR(0x9B);
SPI_3W_SET_PAR(0x49); SPI_3W_SET_PAR(0xD2);
SPI_3W_SET_PAR(0x4A); SPI_3W_SET_PAR(0x31);
SPI_3W_SET_PAR(0x4B); SPI_3W_SET_PAR(0x62);
SPI_3W_SET_PAR(0x4C); SPI_3W_SET_PAR(0x14);
SPI_3W_SET_PAR(0x4D); SPI_3W_SET_PAR(0xC0);
SPI_3W_SET_PAR(0x4E); SPI_3W_SET_PAR(0x0F);
SPI_3W_SET_PAR(0x4F); SPI_3W_SET_PAR(0x61);
SPI_3W_SET_PAR(0x50); SPI_3W_SET_PAR(0x78);
SPI_3W_SET_PAR(0x51); SPI_3W_SET_PAR(0x5A);
SPI_3W_SET_PAR(0x52); SPI_3W_SET_PAR(0x34);
SPI_3W_SET_PAR(0x53); SPI_3W_SET_PAR(0x59);
SPI_3W_SET_PAR(0x54); SPI_3W_SET_PAR(0xA2);
SPI_3W_SET_PAR(0x55); SPI_3W_SET_PAR(0x02);
SPI_3W_SET_PAR(0x56); SPI_3W_SET_PAR(0x24);
SPI_3W_SET_PAR(0x57); SPI_3W_SET_PAR(0xD8);
SPI_3W_SET_PAR(0x58); SPI_3W_SET_PAR(0xFC);
SPI_3W_SET_PAR(0x59); SPI_3W_SET_PAR(0xF4);
SPI_3W_SET_PAR(0x5A); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x5B); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x5C); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x5D); SPI_3W_SET_PAR(0xB2);
SPI_3W_SET_PAR(0x5E); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x5F); SPI_3W_SET_PAR(0xFF);
```

```
SPI_3W_SET_PAR(0x60); SPI_3W_SET_PAR(0x8F);
SPI_3W_SET_PAR(0x61); SPI_3W_SET_PAR(0x62);
SPI_3W_SET_PAR(0x62); SPI_3W_SET_PAR(0xB5);
SPI_3W_SET_PAR(0x63); SPI_3W_SET_PAR(0xB2);
SPI_3W_SET_PAR(0x64); SPI_3W_SET_PAR(0x5A);
SPI_3W_SET_PAR(0x65); SPI_3W_SET_PAR(0xAD);
SPI_3W_SET_PAR(0x66); SPI_3W_SET_PAR(0x56);
SPI_3W_SET_PAR(0x67); SPI_3W_SET_PAR(0x2B);
SPI_3W_SET_PAR(0x68); SPI_3W_SET_PAR(0x0C);
SPI_3W_SET_PAR(0x69); SPI_3W_SET_PAR(0x81);
SPI_3W_SET_PAR(0x6A); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x6B); SPI_3W_SET_PAR(0xFC);
SPI_3W_SET_PAR(0x6C); SPI_3W_SET_PAR(0xFD);
SPI_3W_SET_PAR(0x6D); SPI_3W_SET_PAR(0xFD);
SPI_3W_SET_PAR(0x6E); SPI_3W_SET_PAR(0xFD);
SPI_3W_SET_PAR(0x6F); SPI_3W_SET_PAR(0xFD);
SPI_3W_SET_PAR(0x70); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x71); SPI_3W_SET_PAR(0xFF);
SPI_3W_SET_PAR(0x72); SPI_3W_SET_PAR(0x3F);
SPI_3W_SET_PAR(0x73); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x74); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x75); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x76); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x77); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x78); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x79); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x7A); SPI_3W_SET_PAR(0xD0);
SPI_3W_SET_PAR(0x7B); SPI_3W_SET_PAR(0xD0);
SPI_3W_SET_PAR(0x7C); SPI_3W_SET_PAR(0xD0);
SPI_3W_SET_PAR(0x7D); SPI_3W_SET_PAR(0xD0);
SPI_3W_SET_PAR(0x7E); SPI_3W_SET_PAR(0xD0);
SPI_3W_SET_PAR(0x7F); SPI_3W_SET_PAR(0x68);
SPI_3W_SET_PAR(0x0B); SPI_3W_SET_PAR(0x04);
SPI_3W_SET_PAR(0xB1); SPI_3W_SET_PAR(0x03);
SPI_3W_SET_PAR(0x2C); SPI_3W_SET_PAR(0x2C);
SPI_3W_SET_PAR(0xB1); SPI_3W_SET_PAR(0x00);
SPI_3W_SET_PAR(0x89); SPI_3W_SET_PAR(0x03);
  }
```

--END--