POWERTIP TECH. CORP.

DISPLAY DEVICES FOR BETTER ELECTRONIC DESIGN

Application Note

Module name:

PPT-9999-A003-05-Q (2.2”)

PPT-9999-A003-06-Q (2.4”)

PPT-9999-A003-08-Q (2.8”)

Issue date: 2007/10/19

Version: 0.1

Note:

1. The information contained herein may be change without prior notice. It is therefore advisable to contact POWERTIP TECH. COPR. before designed your product based on this specification.

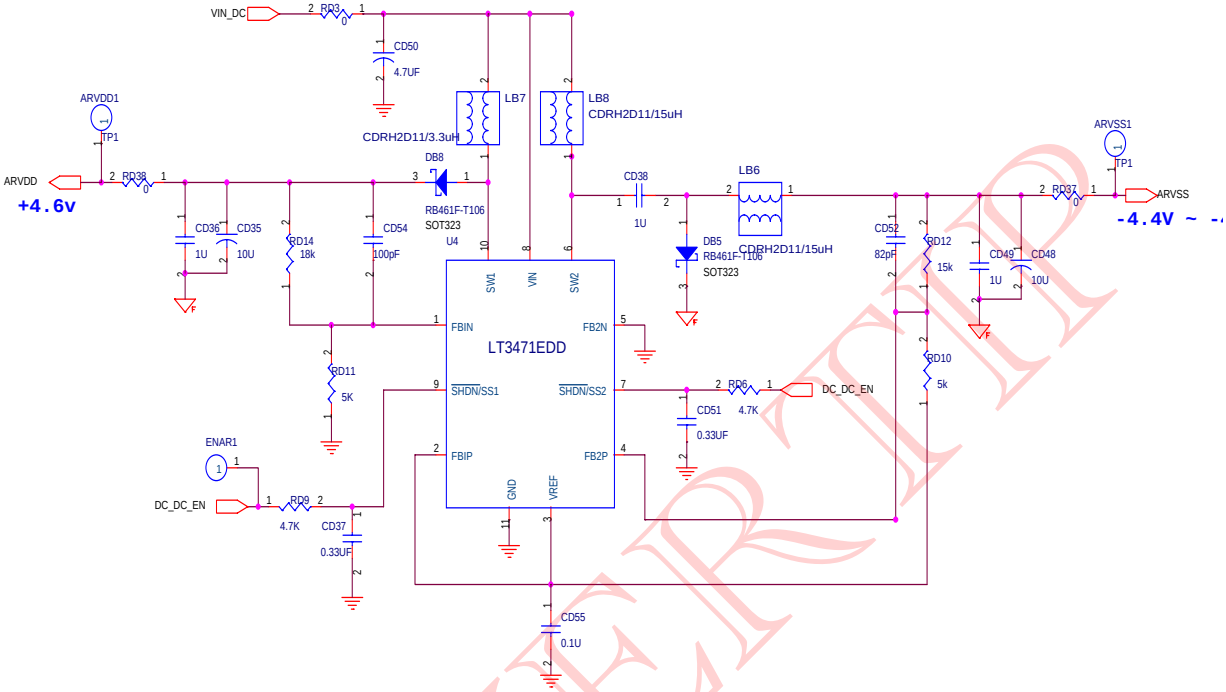
Reversion History

Version	Date	Page	Description
Ver.0.0	2007,08,10	All	Application note was first issued
Ver.0.1	2007.10.19	All	Modify Application, add brightness control, power supply sequence, gamma setting

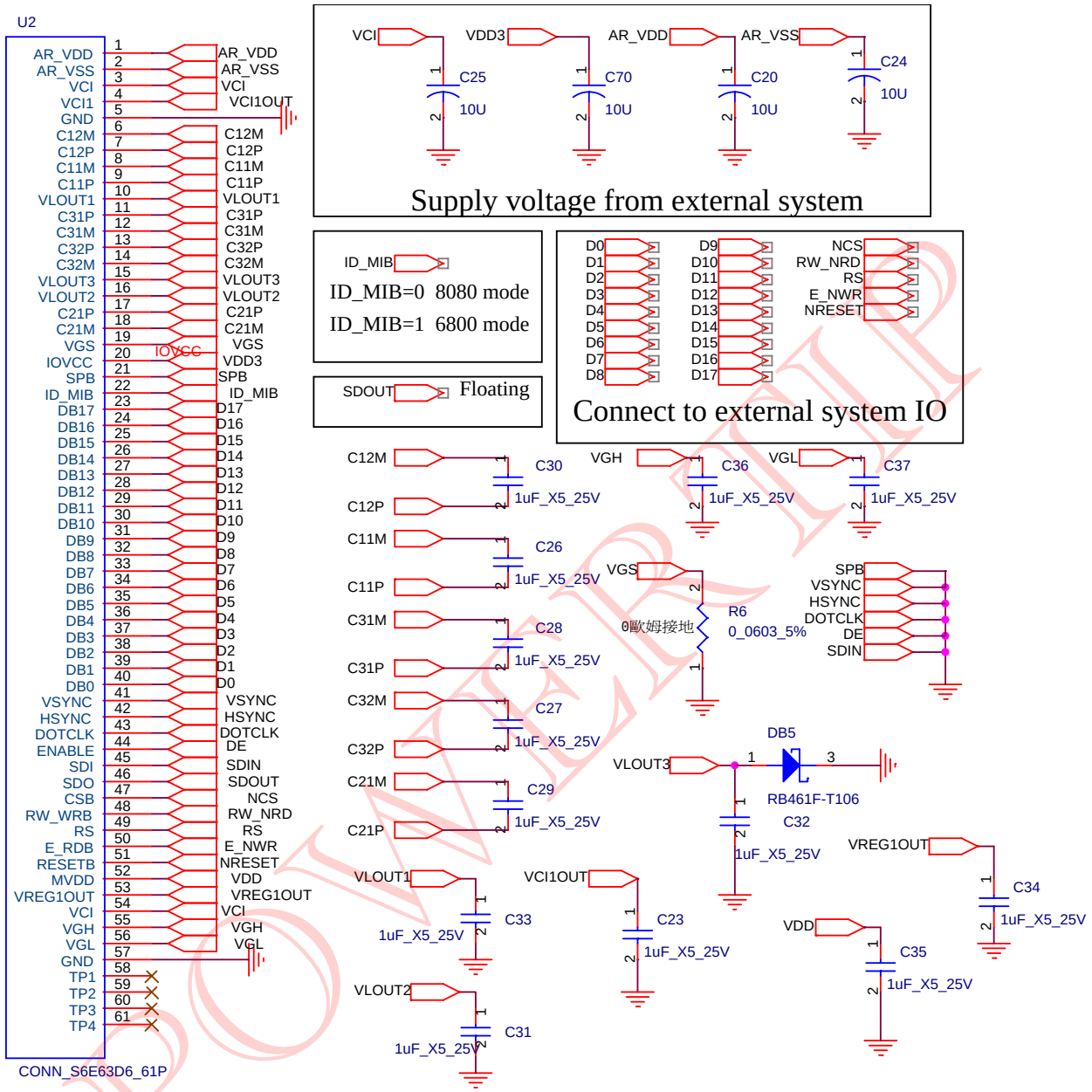
1. Application Circuit

1.1 Below two application DC/DC circuit is an example for the input 3v to generate ARVDD,ARVSS

1.1.A Application circuit 1 (LT3471)



1.2 Drive IC CPU interface definition

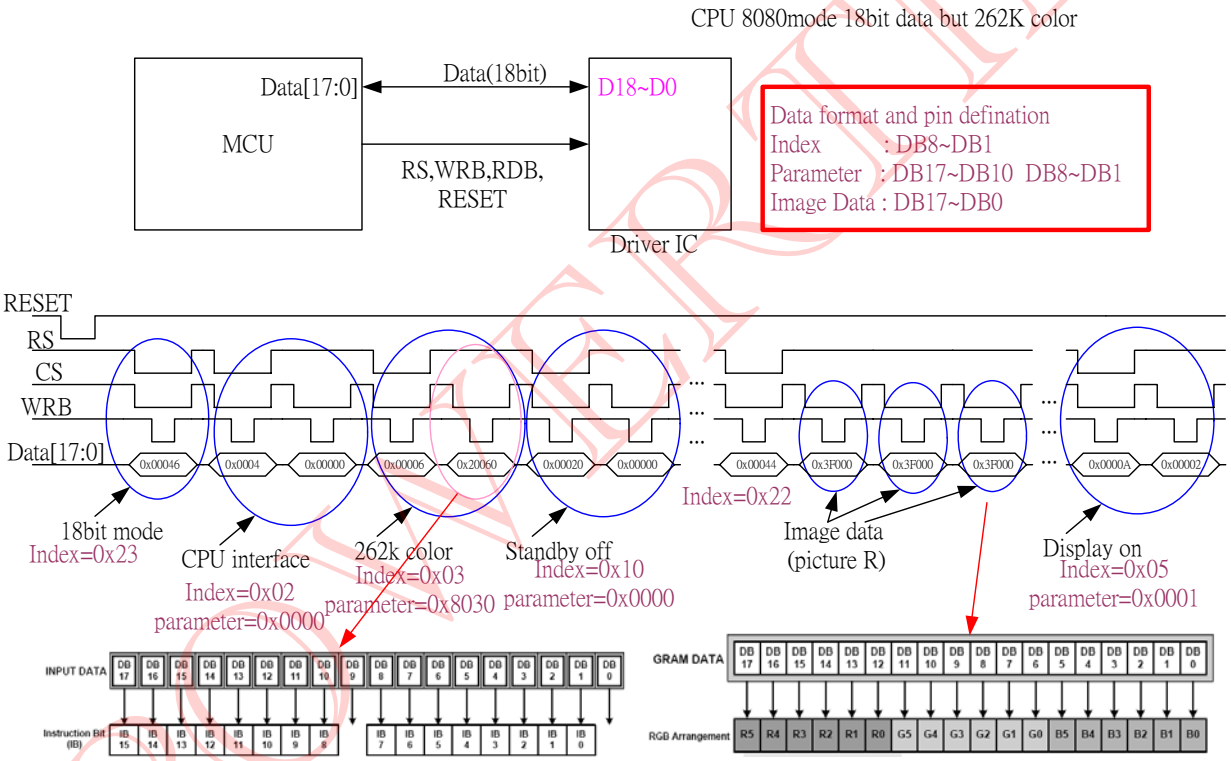


1.3. Drive IC interface spec – BUS spec.

Bus width	Pin selection	note
18-bit interface	DB17-0	
16-bit interface	DB17-10, DB8-1	
9-bit interface	DB8-0	
8-bit interface	DB8-1	

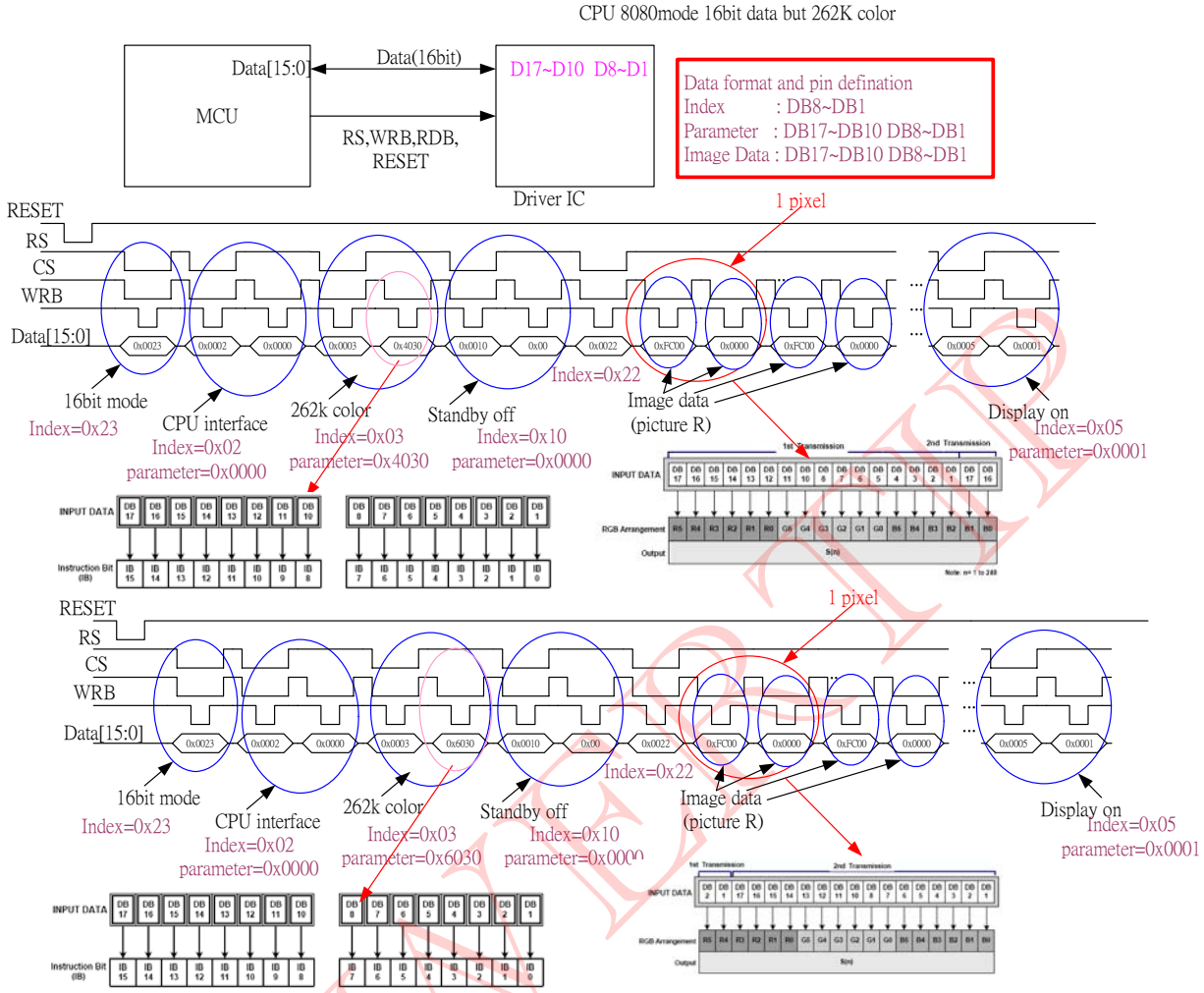
ID_MIB= high 6800 mode

ID_MIB=low 8080 mode



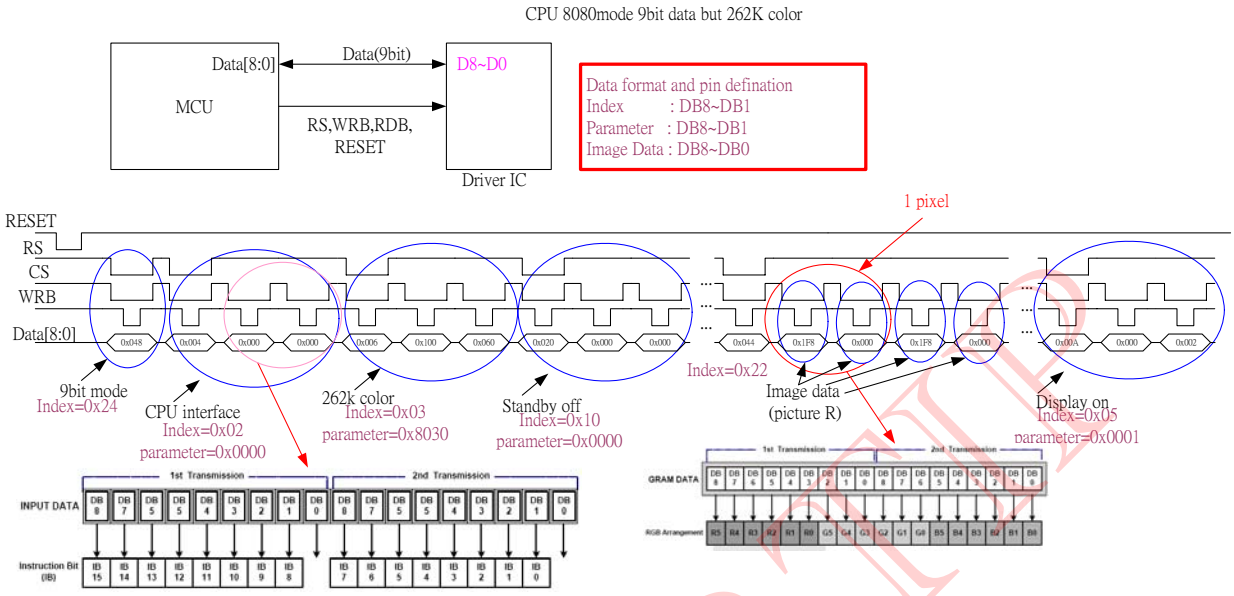
Initial code:

```
Index_out(0x23);
Index_out(0x02);
Parameter_out(0x0000);
Index_out(0x03);
Parameter_out(0x8030);
Index_out(0x10);
Parameter_out(0x0000);
Index_out(0x05);        // display on
Parameter_out(0x0001);
Index_out(0x22);
```



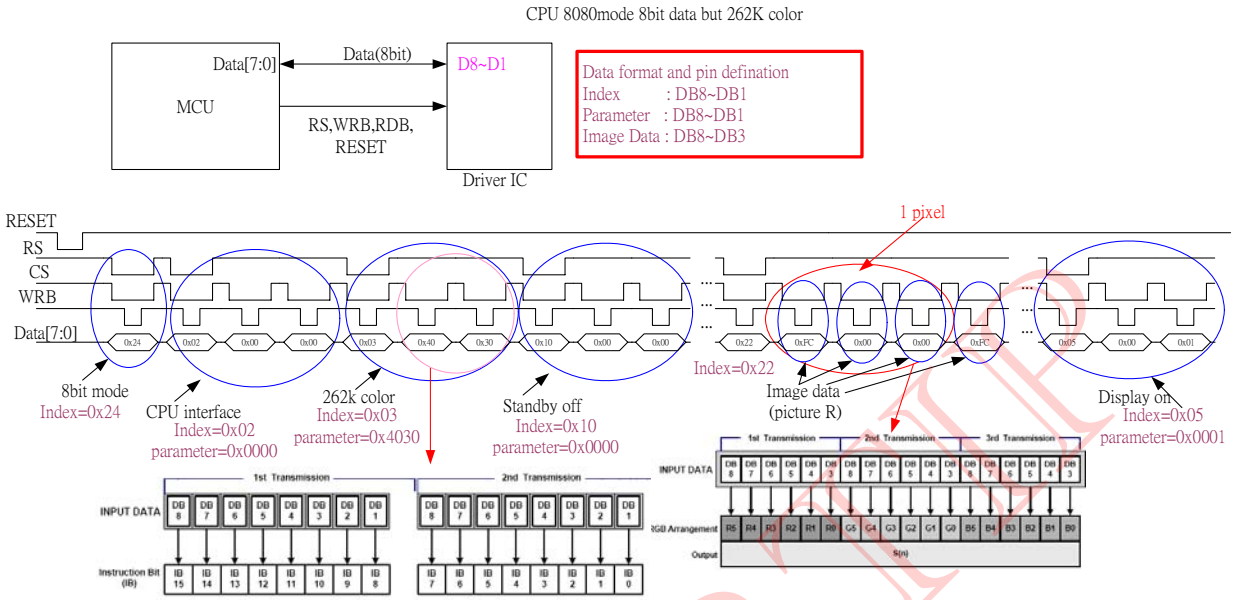
Initial code:

Index_out(0x23);
Index_out(0x02);
Parameter_out(0x0000);
Index_out(0x03);
Parameter_out(0x4030); or Parameter_out(0x6030);
Index_out(0x10);
Parameter_out(0x0000);
Index_out(0x05); // display on
Parameter_out(0x0001);
Index_out(0x22);



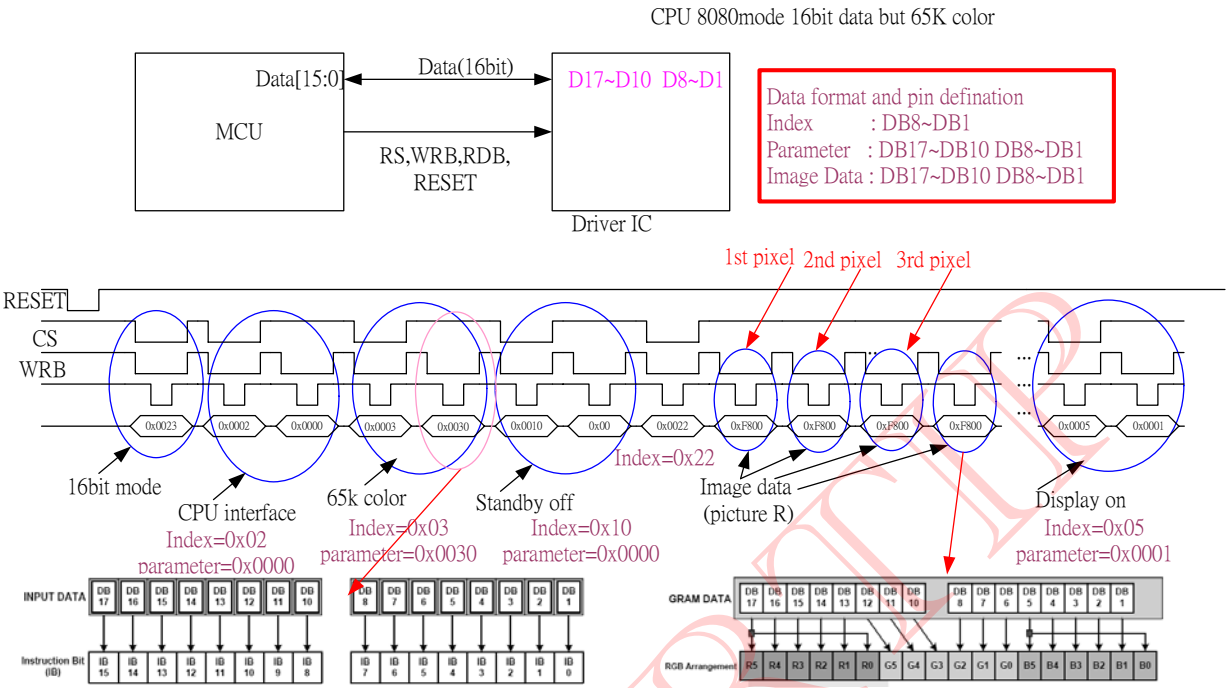
Initial code:

```
Index_out(0x24);
Index_out(0x02);
Parameter_out(0x0000);
Index_out(0x03);
Parameter_out(0x8030);
Index_out(0x10);
Parameter_out(0x0000);
Index_out(0x05);        // display on
Parameter_out(0x0001);
Index_out(0x22);
```



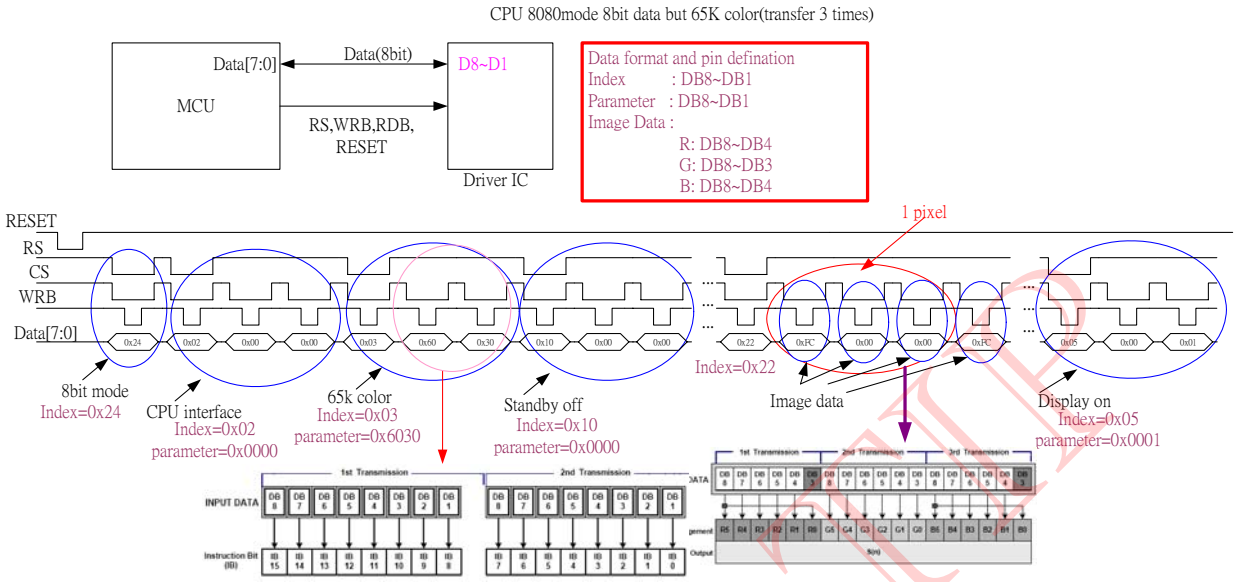
Initial code:

```
Index_out(0x24);
Index_out(0x02);
Parameter_out(0x0000);
Index_out(0x03);
Parameter_out(0x4030);
Index_out(0x10);
Parameter_out(0x0000);
Index_out(0x05);        // display on
Parameter_out(0x0001);
Index_out(0x22);
```



Initial code:

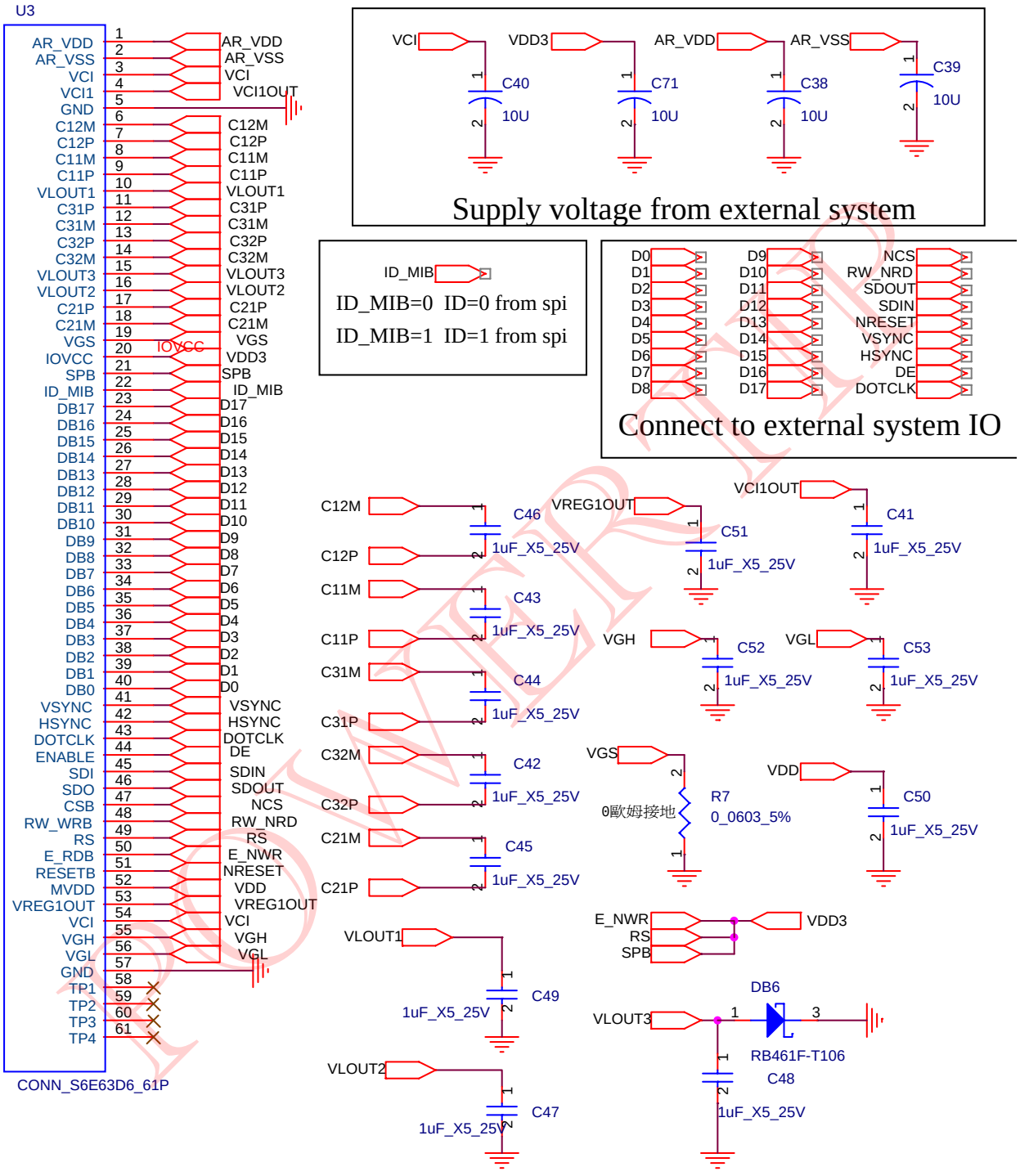
```
Index_out(0x23);
Index_out(0x02);
Parameter_out(0x0000);
Index_out(0x03);
Parameter_out(0x0030);
Index_out(0x10);
Parameter_out(0x0000);
Index_out(0x05);        // display on
Parameter_out(0x0001);
Index_out(0x22);
```



Initial code:

```
Index_out(0x24);
Index_out(0x02);
Parameter_out(0x0000);
Index_out(0x03);
Parameter_out(0x6030);
Index_out(0x10);
Parameter_out(0x0000);
Index_out(0x05);        // display on
Parameter_out(0x0001);
Index_out(0x22);
```

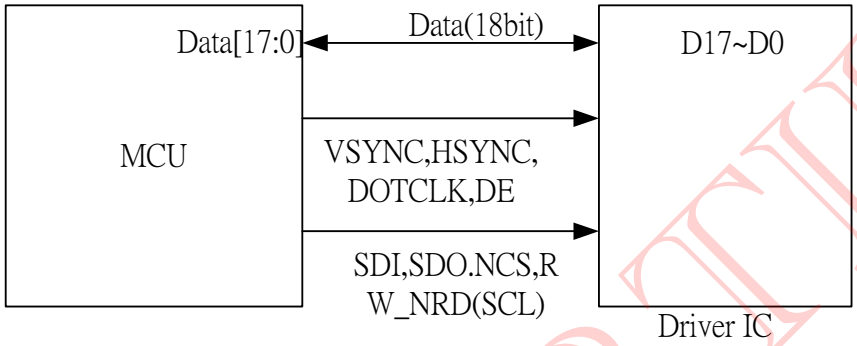
1.4 Drive IC RGB interface definition



Bus width	Pin selection	note
18-bit interface	DB17-0	
16-bit interface	DB17-10, DB8-1	
6-bit interface	DB8-3	

Fix unused pin to vss level

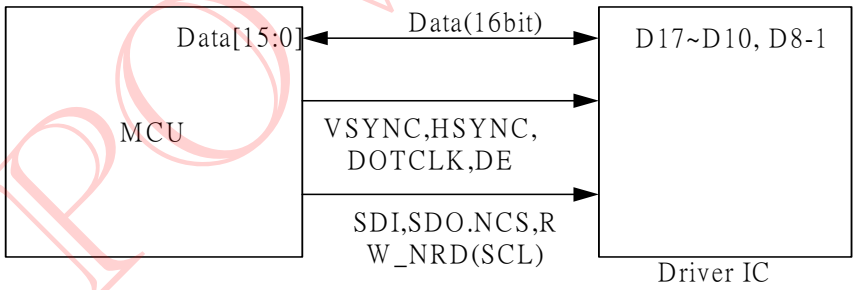
RGB inf18 bit data but 262K color



Initial code:

```
Index_out(0x02);
Parameter_out(0x0182);
Index_out(0x10);
Parameter_out(0x0000);
Index_out(0x05);        // display on
Parameter_out(0x0001);
Index_out(0x22);
```

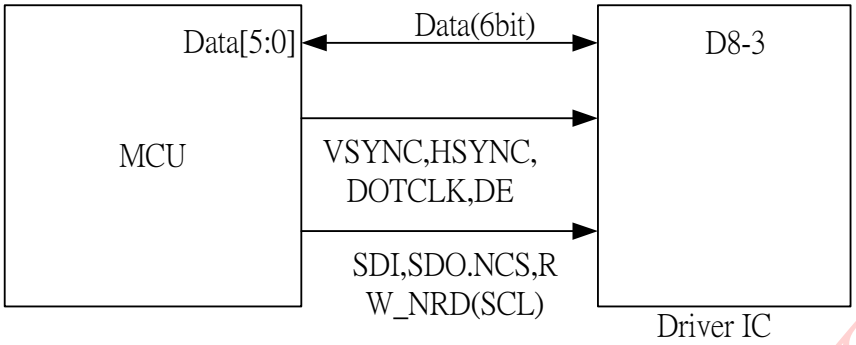
RGB inf16 bit data but 65K color



Initial code:

```
Index_out(0x02);
Parameter_out(0x0192);
Index_out(0x10);
Parameter_out(0x0000);
Index_out(0x05);        // display on
Parameter_out(0x0001);
Index_out(0x22);
```

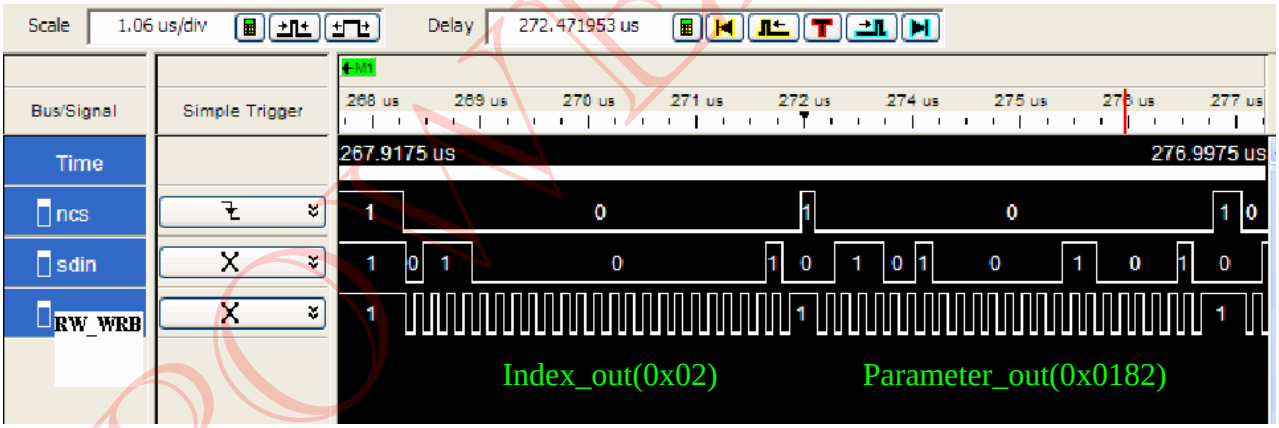
RGB inf 6 bit data but 262K color

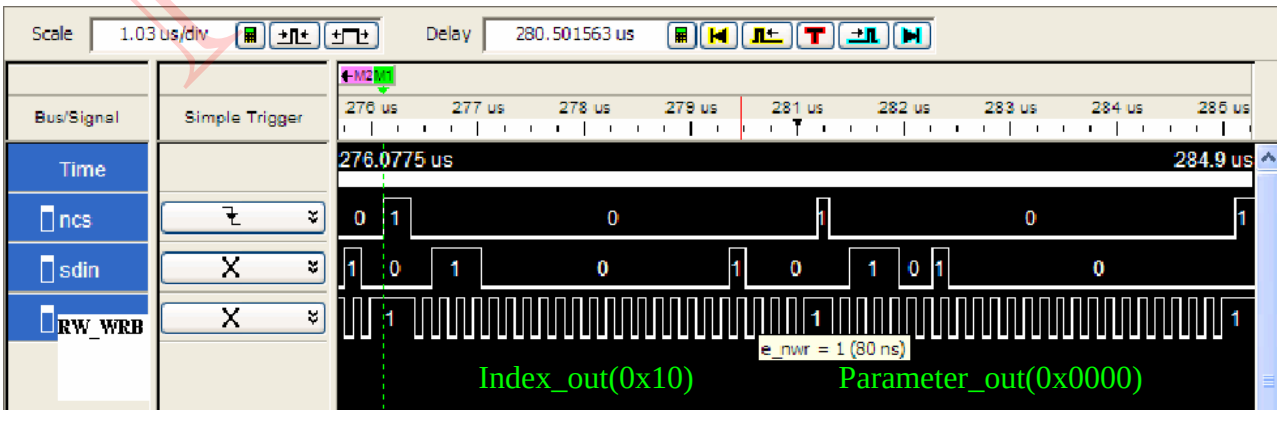


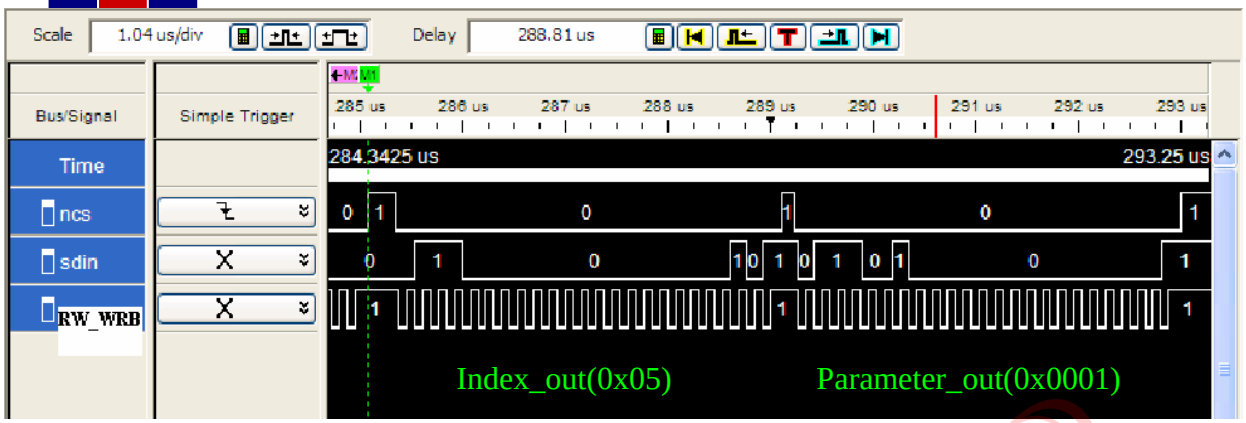
Initial code:

Index_out(0x02);
Parameter_out(0x01A2);
Index_out(0x10);
Parameter_out(0x0000);
Index_out(0x05); // display on
Parameter_out(0x0001);
Index_out(0x22);

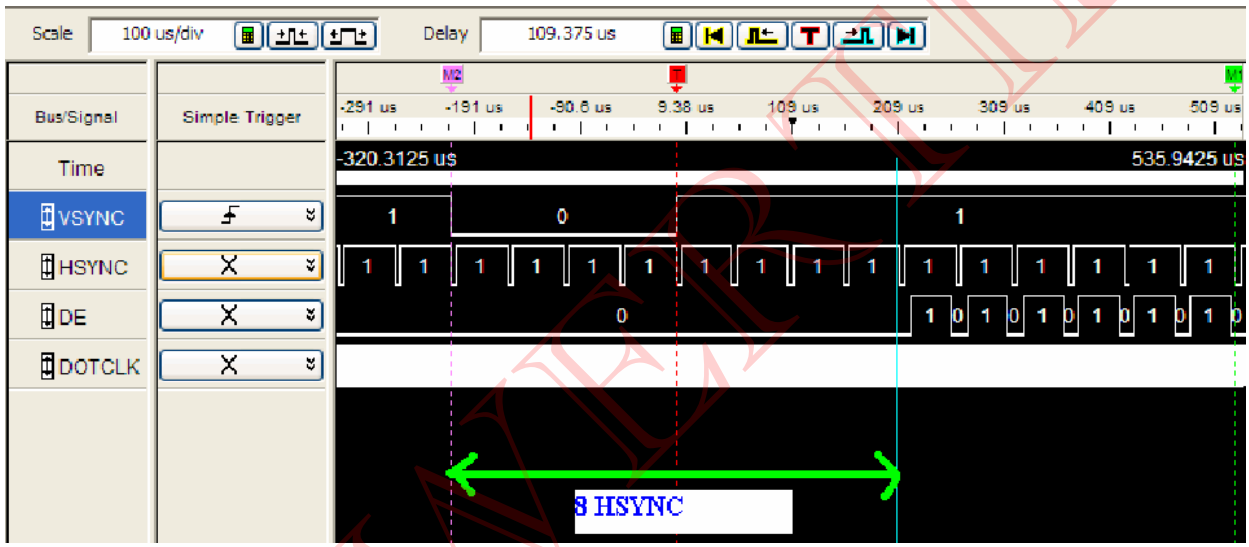
SPI waveform

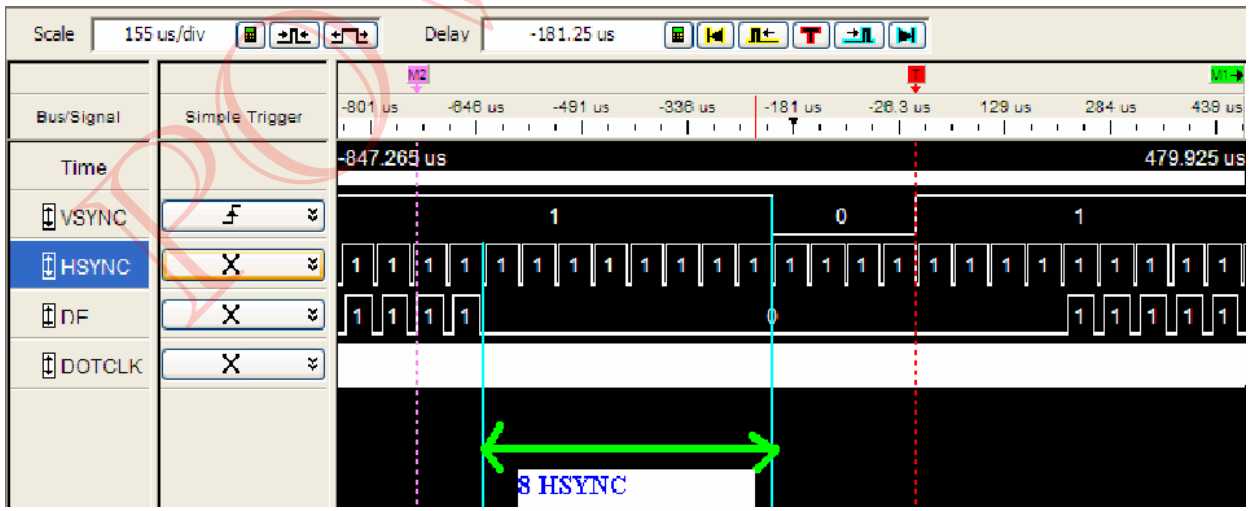


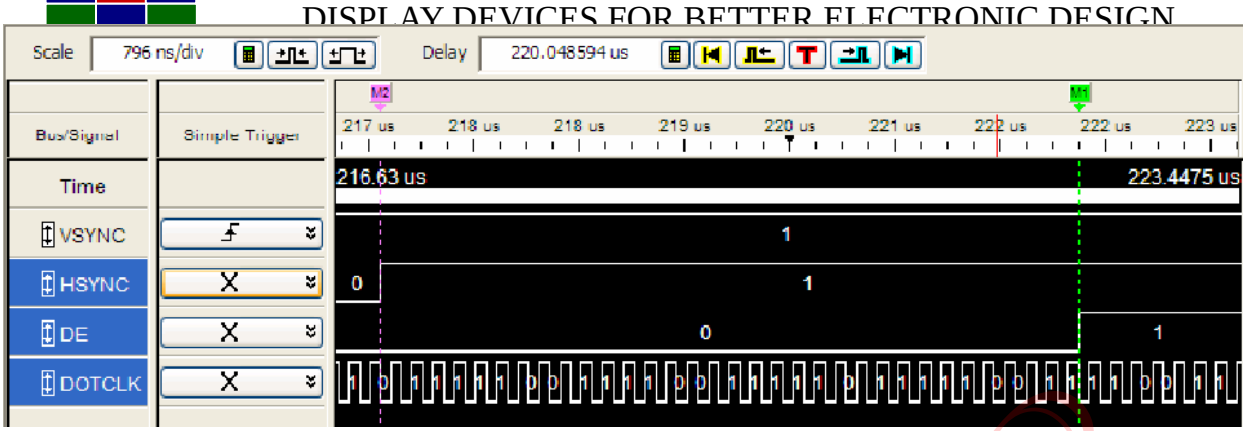


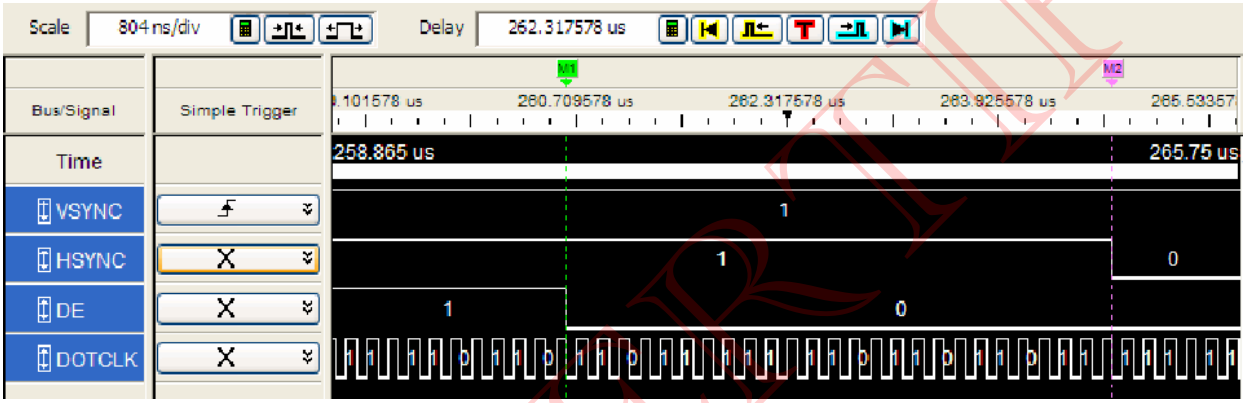


RGB interface waveform

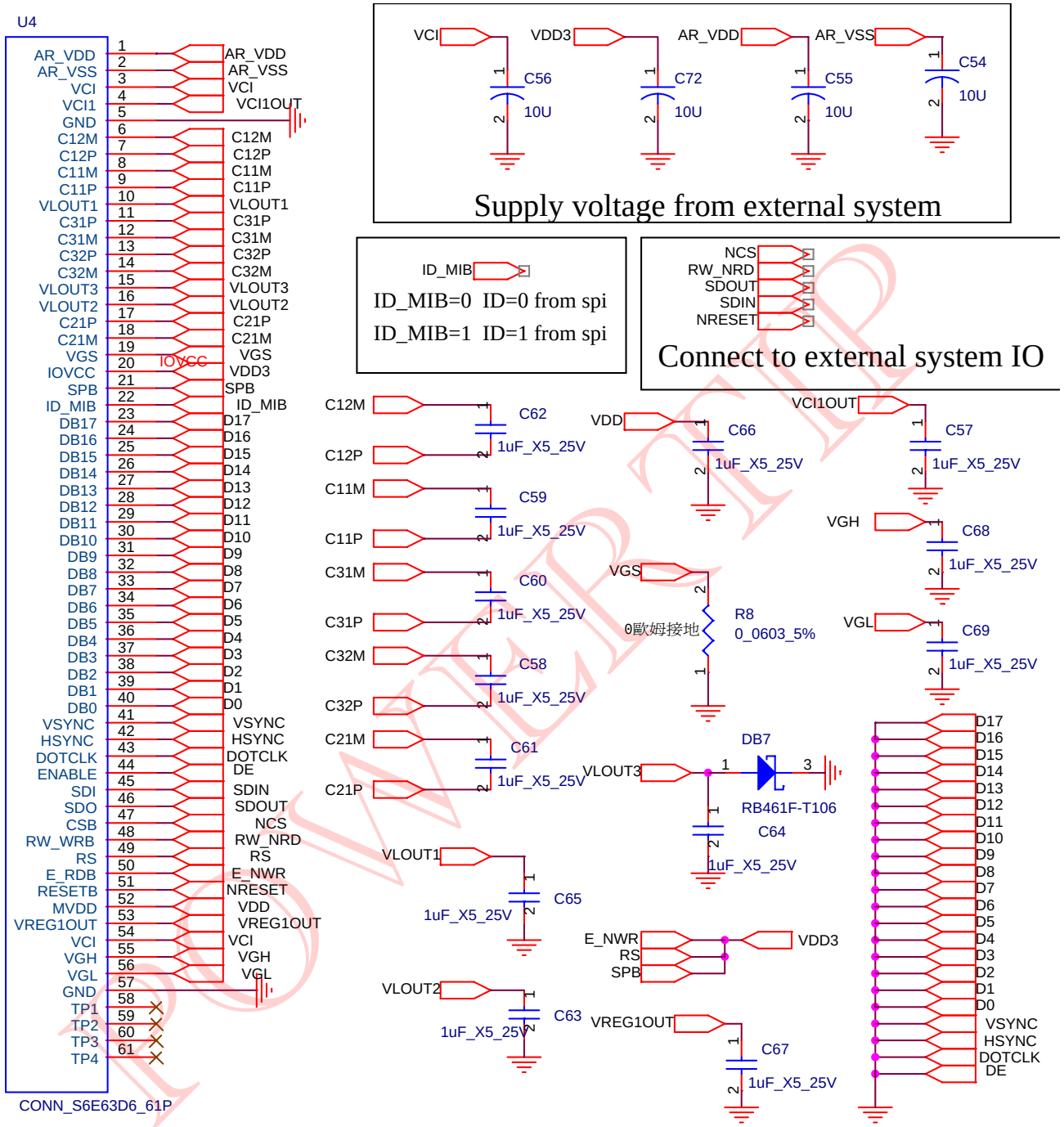


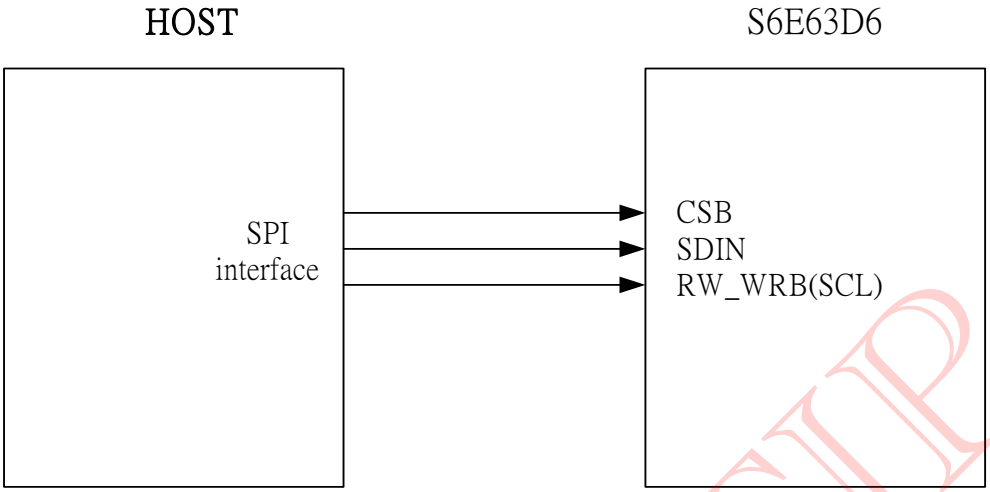



Scale
796 ns/div
Delay
220.048594 us
Bus/Signal
Simple Trigger
Time
VSYNC
HSYNC
DE
DOTCLK
M1
M2
217 us
218 us
218 us
219 us
220 us
221 us
222 us
222 us
223 us
216.63 us
223.4475 us
1
0
1
0
1


Scale
804 ns/div
Delay
262.317578 us
Bus/Signal
Simple Trigger
Time
VSYNC
HSYNC
DE
DOTCLK
M1
M2
260.709578 us
262.317578 us
263.925578 us
258.865 us
265.75 us
1
1
0
1
0

1.4 Drive IC SPI interface definition

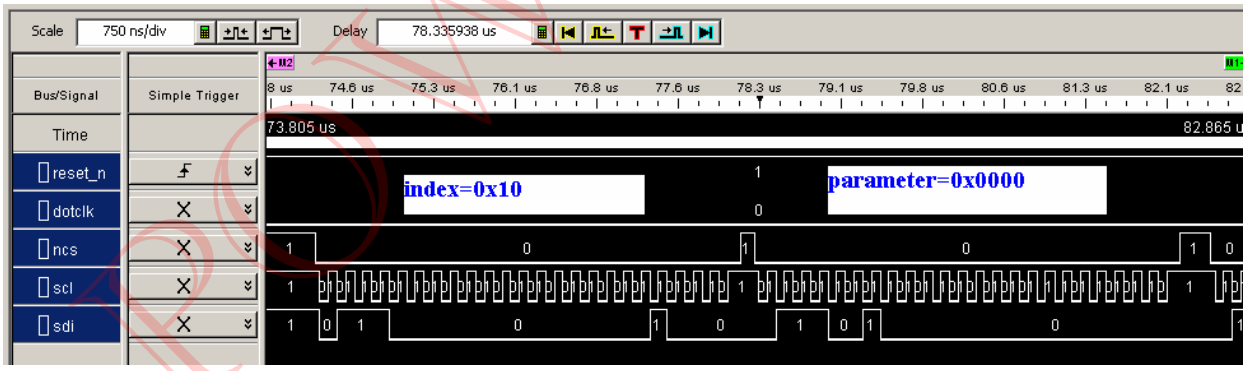


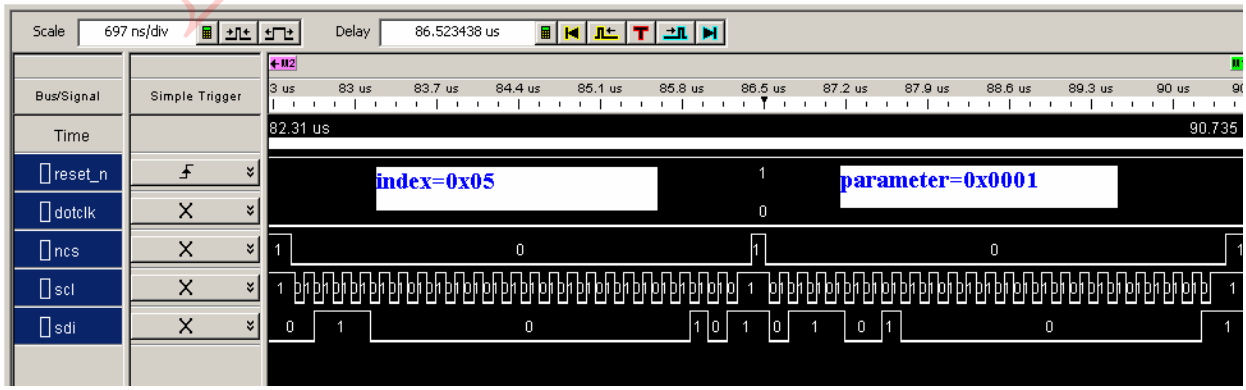


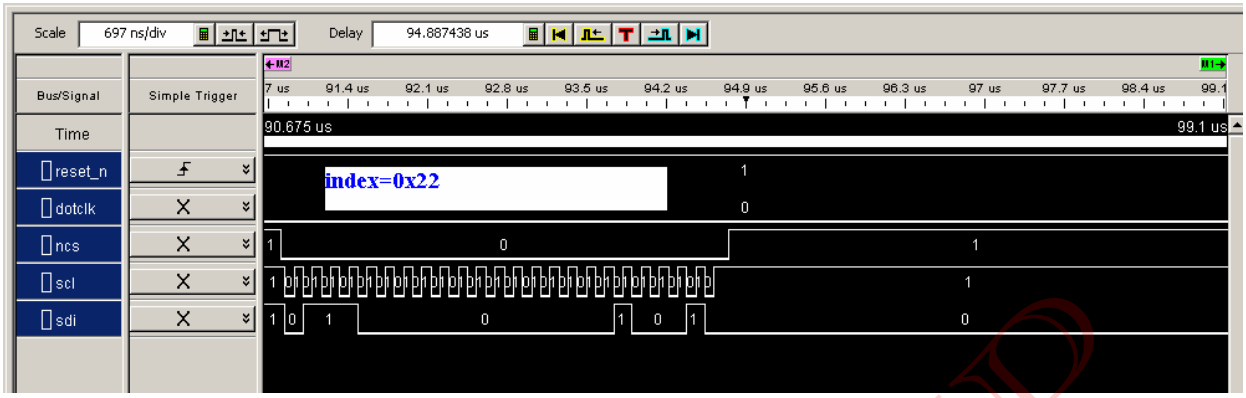
Initial code:

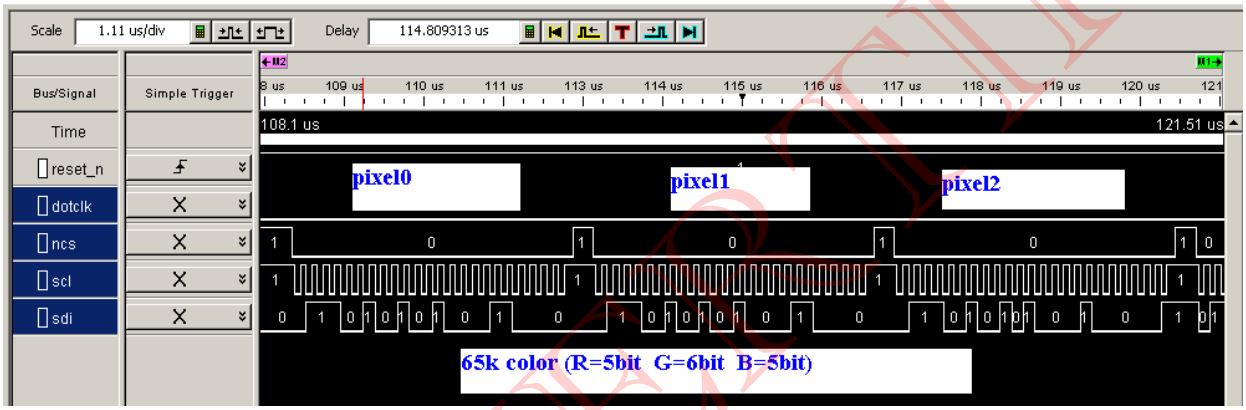
```
Index_out(0x10);
Parameter_out(0x0000);
Index_out(0x05);        // display on
Parameter_out(0x0001);
Index_out(0x22);
```

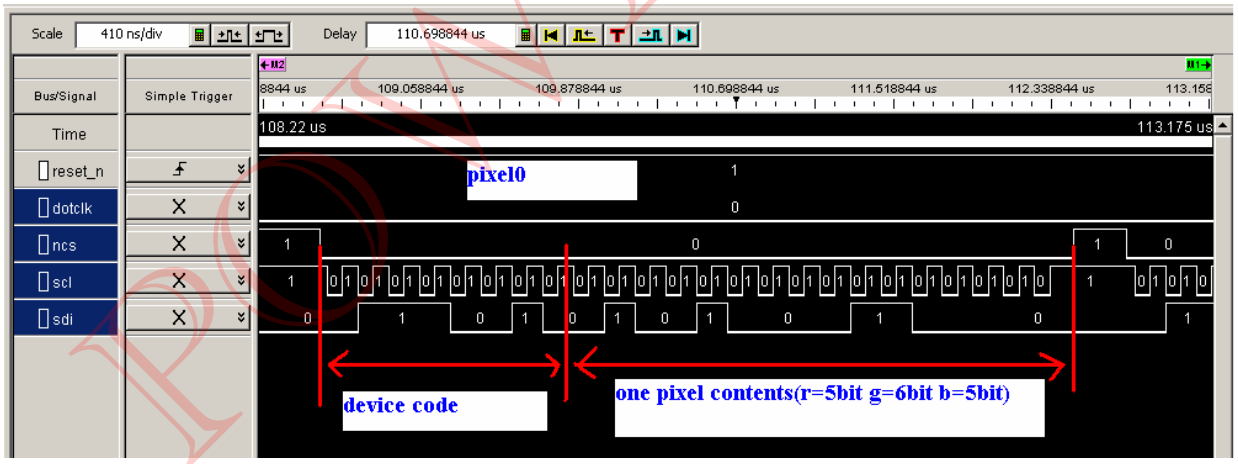
SPI waveform





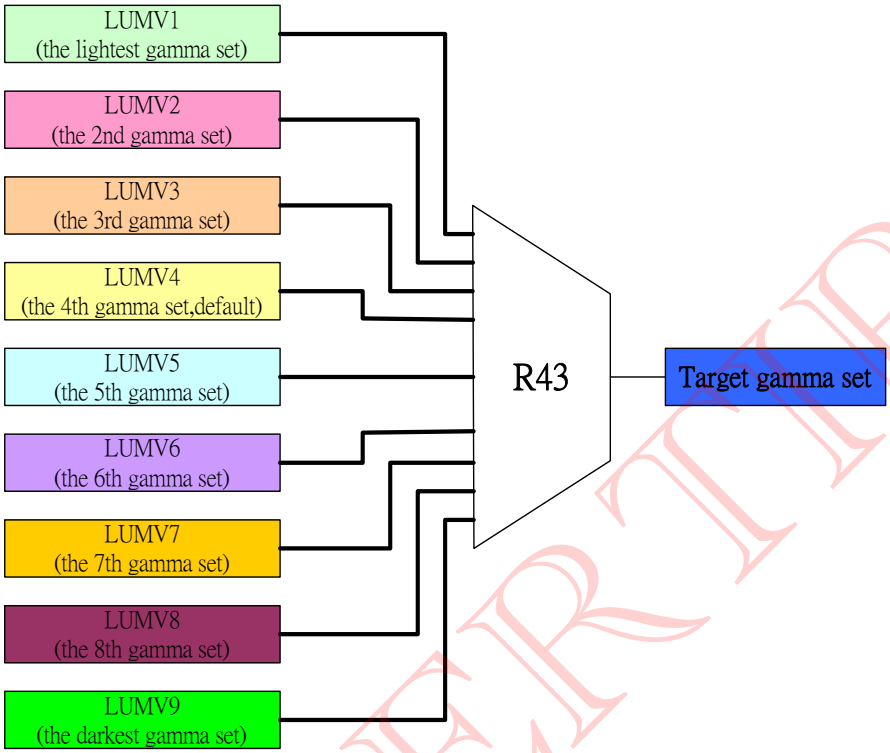

Scale
697 ns/div
Delay
94.887438 us
Bus/Signal
Simple Trigger
Time
reset_n
dotclk
ncs
scl
sdi
90.675 us
99.1 us
index=0x22


Scale
1.11 us/div
Delay
114.809313 us
Bus/Signal
Simple Trigger
Time
reset_n
dotclk
ncs
scl
sdi
108.1 us
121.51 us
pixel0
pixel1
pixel2
65k color (R=5bit G=6bit B=5bit)


Scale
410 ns/div
Delay
110.698844 us
Bus/Signal
Simple Trigger
Time
reset_n
dotclk
ncs
scl
sdi
108.22 us
113.175 us
pixel0
device code
one pixel contents(r=5bit g=6bit b=5bit)

2. Brightness control

3.1



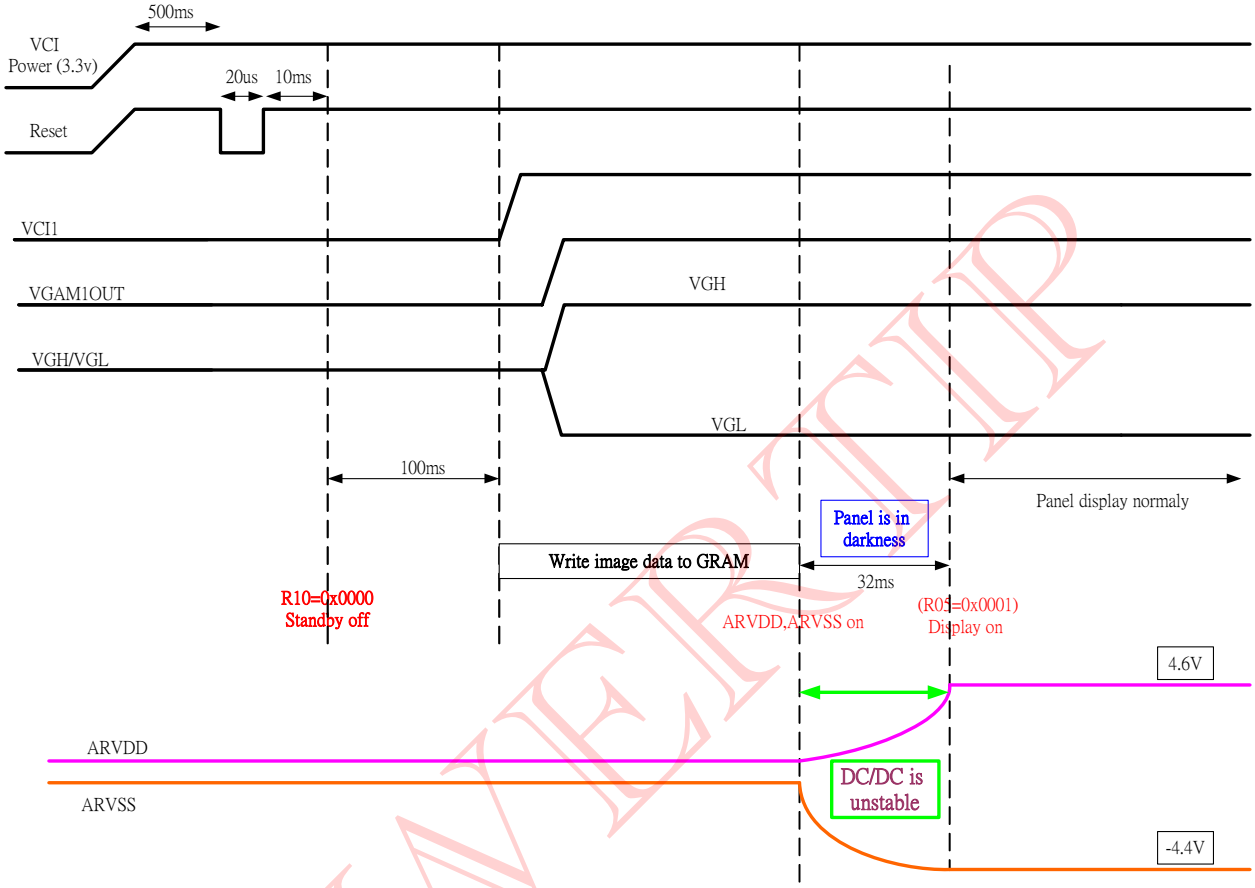

```
Switch(R43)          //////          (IC behavior)
{
   case 0x00:    Target gamma set = LUMV1;
   case 0x01:    Target gamma set = LUMV2;
   case 0x02:    Target gamma set = LUMV3;
   case 0x03:    Target gamma set = LUMV4;
   case 0x04:    Target gamma set = LUMV5;
   case 0x05:    Target gamma set = LUMV6;
   case 0x06:    Target gamma set = LUMV7;
   case 0x07:    Target gamma set = LUMV8;
   case 0x08:    Target gamma set = LUMV9;
}
```

3.2 Program different gamma set:

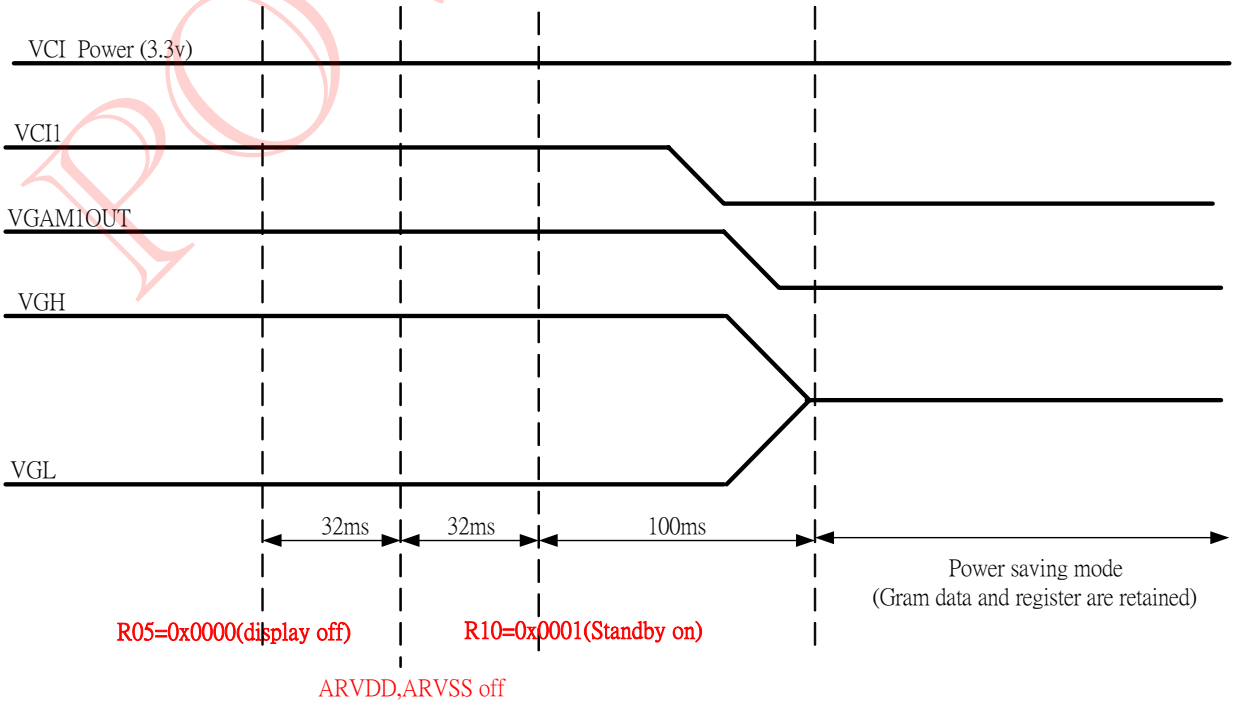
Set R80=01 , then write R70 ~ R78 to register. The data will store in LUMV1 gamma set.
Set R80=02 , then write R70 ~ R78 to register. The data will store in LUMV2 gamma set.
Set R80=03 , then write R70 ~ R78 to register. The data will store in LUMV3 gamma set.
Set R80=04 , then write R70 ~ R78 to register. The data will store in LUMV4 gamma set.
Set R80=05 , then write R70 ~ R78 to register. The data will store in LUMV5 gamma set.
Set R80=06 , then write R70 ~ R78 to register. The data will store in LUMV6 gamma set.
Set R80=07 , then write R70 ~ R78 to register. The data will store in LUMV7 gamma set.
Set R80=08 , then write R70 ~ R78 to register. The data will store in LUMV8 gamma set.
Set R80=09 , then write R70 ~ R78 to register. The data will store in LUMV9 gamma set.

4. Power Sequence

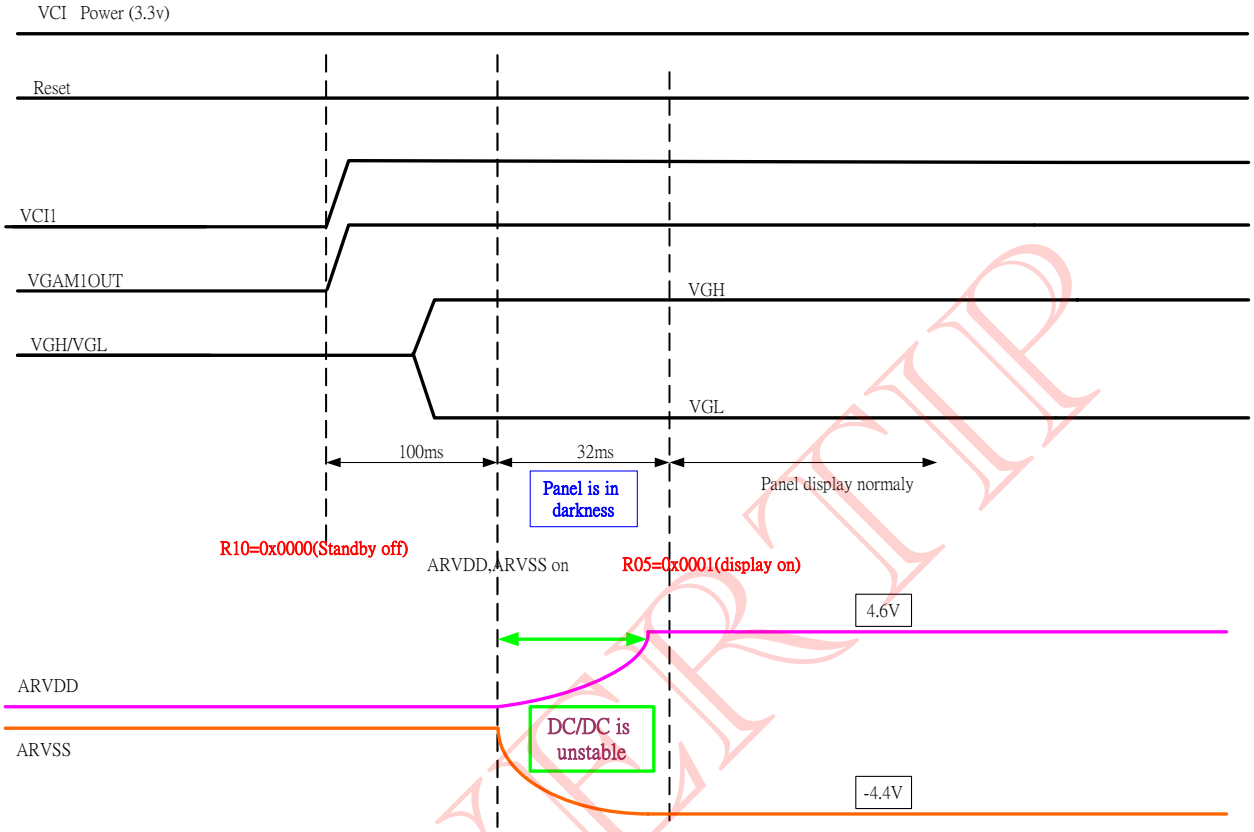
4.1 Power on sequence:



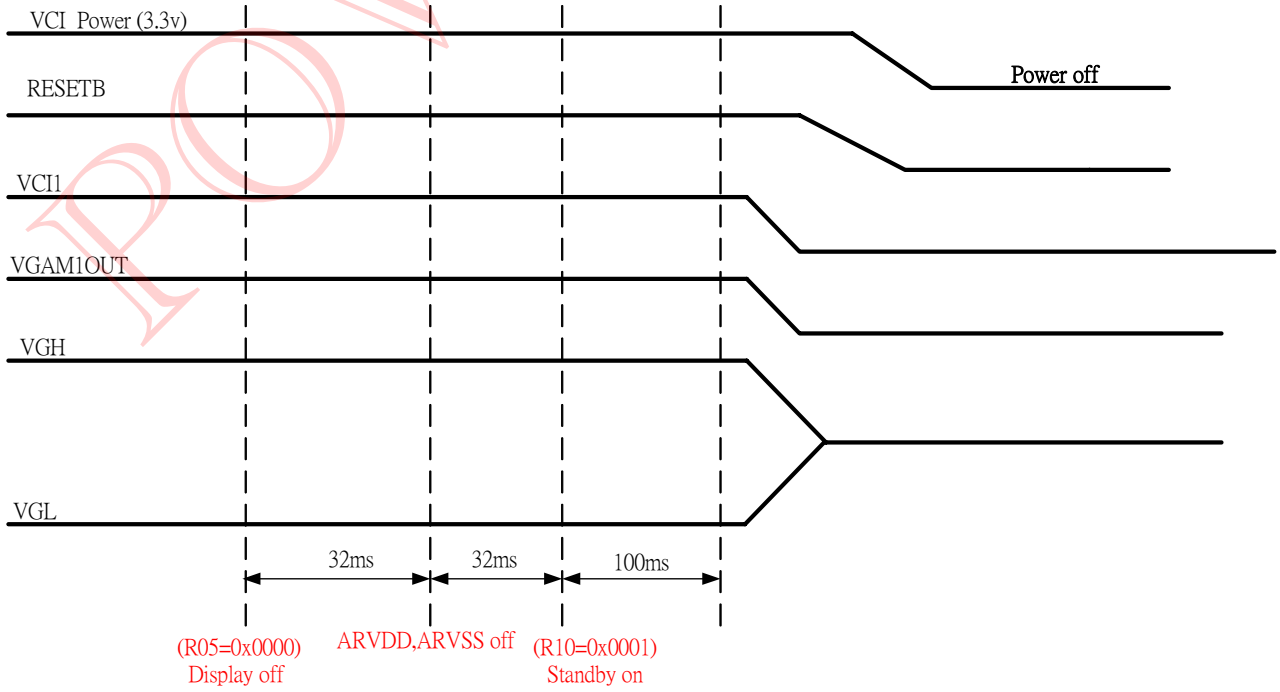
4.2 Standby on sequence:



4.3 Standby off sequence:



4.4 Power off sequence:



5. Gamma Register Setting

PPT-9999-A003-05-Q (2.2")

R70: 0x2C00
R71: 0x3F80
R72: 0x3780
R73: 0x2F24
R74: 0x2117
R75: 0x2F1E
R76: 0x2017
R77: 0x3027
R78: 0x2318

PPT-9999-A003-06-Q (2.4")

R70: 0x2F80
R71: 0x3C00
R72: 0x3F80
R73: 0x271C
R74: 0x2517
R75: 0x2B21
R76: 0x1F18
R77: 0x2923
R78: 0x2919

PPT-9999-A003-08-Q (2.8")

R70: 0x2B80
R71: 0x3600
R72: 0x3E00
R73: 0x1F19
R74: 0x2214
R75: 0x221B
R76: 0x1E16
R77: 0x241E
R78: 0x2617