

**UC1698u B/W**  
**Application note**  
(Only for reference)

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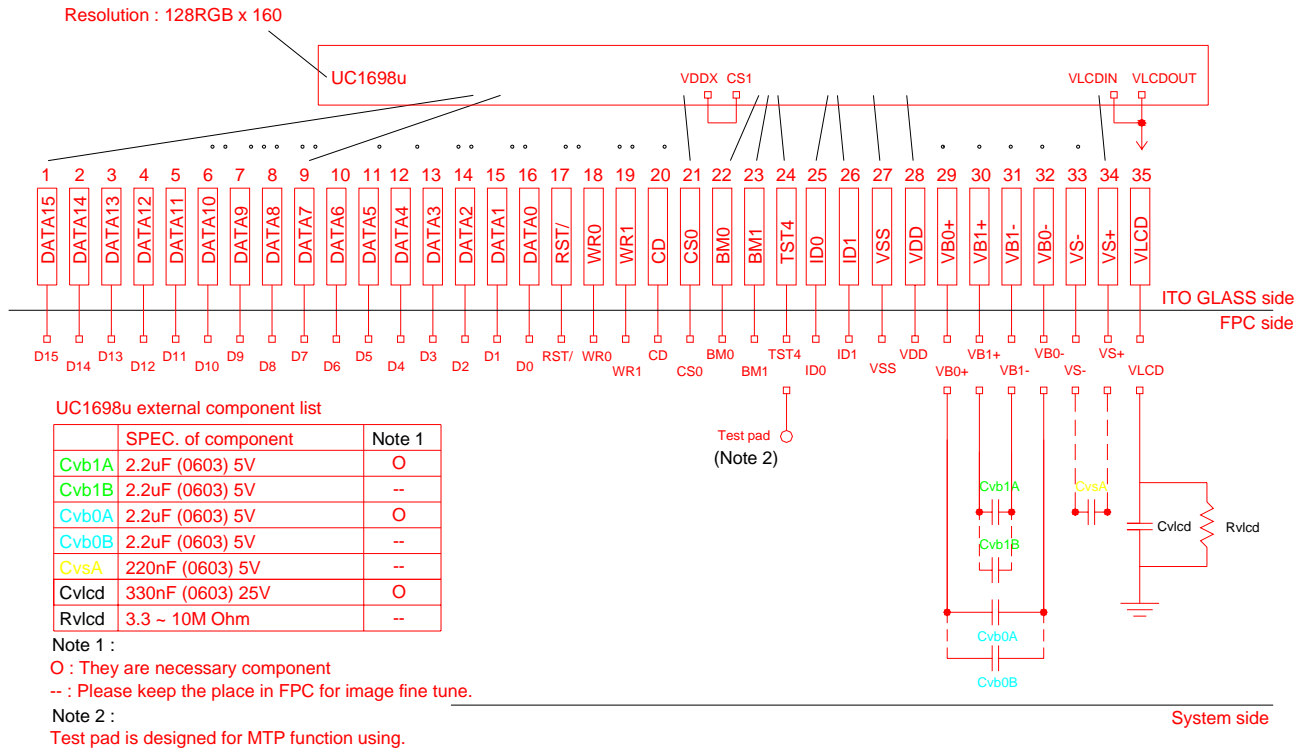
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# ULTRACHIP

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### 一、 External circuit

The external circuit of UC1698u for COG application (Reference design)



### 二、 Initial code

Following code is basic code:

```

{
  RESET=1;
  Delay(5ms);
  RESET=0;
  Delay(5ms);
  RESET=1;
  Delay(150ms);
  LCMCOMM=0x00e2;    // system reset
  Delay(5ms);
  LCMCOMM=0x002b;    //set internal power control
  LCMCOMM=0x0025;    //set TC=-0.01%
  LCMCOMM=0x00a1;    //set line rate
  LCMCOMM=0x00ea;    //set bias
  LCMCOMM=0x00f1;    //set com end
  LCMCOMM=0x009f;    //duty=1/160
  LCMCOMM=0x0081;    //set VLCD value
  LCMCOMM=0x0045;    //VLCD=(CV0+Cpm*pm)*(1+(T-25)*CT%)
  LCMCOMM=0x00c4;    //set LCD mapping control

```

```
LCMCOMM=0x0089;    //set ram address control
LCMCOMM=0x00d1;    //set color pattern=RGB
LCMCOMM=0x00d5;    //set color mode=4k-color
LCMCOMM=0x00ad;    //set ON/OFF display enable
}
```

### 三、Picture display code

UC1698u can support 384\*160 dots max in mono mode.

For example: 320\*160 resolution and 8bit parallel mode.

Code as follow:

```
void display_picture(void)
{
int k=0;
int i,j,n;
unsigned char temp,temp1,temp2,temp3,temp4,temp5,temp6,temp7,temp8;
unsigned char h11,h12,h13,h14,h15,h16,h17,h18,d1,d2,d3,d4;
for(i=0;i<160;i++) // 320*160 B/W picture for example
{
for(j=0;j<40;j++) // 320 dot/ 8 bite=40 byte
{
temp=picture1[k++]; //turns 1byte B/W data to 4k-color data(RRRR-GGGG-BBBB)
temp1=temp&0x80;
temp2=(temp&0x40)>>3;
temp3=(temp&0x20)<<2;
temp4=(temp&0x10)>>1;
temp5=(temp&0x08)<<4;
temp6=(temp&0x04)<<1;
temp7=(temp&0x02)<<6;
temp8=(temp&0x01)<<3;
h11=temp1|temp1>>1|temp1>>2|temp1>>3;
h12=temp2|temp2>>1|temp2>>2|temp2>>3;
h13=temp3|temp3>>1|temp3>>2|temp3>>3;
h14=temp4|temp4>>1|temp4>>2|temp4>>3;
h15=temp5|temp5>>1|temp5>>2|temp5>>3;
h16=temp6|temp6>>1|temp6>>2|temp6>>3;
h17=temp7|temp7>>1|temp7>>2|temp7>>3;
h18=temp8|temp8>>1|temp8>>2|temp8>>3;
d1=h11|h12;
d2=h13|h14;
d3=h15|h16;
d4=h17|h18;
}
```

```
LCMDATA=d1;
LCMDATA=d2;
LCMDATA=d3;
LCMDATA=d4;
    }
    for(n=0;n<32;n++) LCMDATA=0x00;//There are 384-320=64 segment need to write data
    }
}
```

#### 四、Window program

**4.2):** When column address(WPC) increase by one,three pixel will be displayed .

So,segment must be 3 integral multiples in window program.

For example: 33\*32 B/W picture and 8bit parallel mode.

Code as follow:

```
void window_display(void)
{int k=0;
  int i,j;
  int m=0;
  unsigned char temp,temp1,temp2,temp3,temp4,temp5,temp6,temp7,temp8;
  unsigned char h11,h12,h13,h14,h15,h16,h17,h18,d1,d2,d3,d4;
  LCMCOMM=0x0070; //set row msb address
  LCMCOMM=0x0060; //set row lsb address
  LCMCOMM=0x0010; //set column msb address
  LCMCOMM=0x0000; //set column lsb address
  LCMCOMM=0x00f4; //set column start address
  LCMCOMM=0x0000; //column start address=00
  LCMCOMM=0x00f6; //set column end address
  LCMCOMM=0x000a; //column end address=11*3RGB=33 segment
  LCMCOMM=0x00f5; //set row start address
  LCMCOMM=0x0000; // row start address=00
  LCMCOMM=0x00f7; //set row end address
  LCMCOMM=0x001f; // row end address=32
  LCMCOMM=0x00f8; // inside mode
  for(i=0;i<32;i++) // 33*32 B/W picture for example
  {
    for(j=0;j<4;j++)
    {
temp=map2[k++]; // turns 1byte B/W data to 4k-color data(RRRR-GGGG-BBBB)
temp1=temp&0x80;
temp2=(temp&0x40)>>3;
temp3=(temp&0x20)<<2;
```

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```
temp4=(temp&0x10)>>1;
temp5=(temp&0x08)<<4;
temp6=(temp&0x04)<<1;
temp7=(temp&0x02)<<6;
temp8=(temp&0x01)<<3;
h11=temp1|temp1>>1|temp1>>2|temp1>>3;
h12=temp2|temp2>>1|temp2>>2|temp2>>3;
h13=temp3|temp3>>1|temp3>>2|temp3>>3;
h14=temp4|temp4>>1|temp4>>2|temp4>>3;
h15=temp5|temp5>>1|temp5>>2|temp5>>3;
h16=temp6|temp6>>1|temp6>>2|temp6>>3;
h17=temp7|temp7>>1|temp7>>2|temp7>>3;
h18=temp8|temp8>>1|temp8>>2|temp8>>3;
d1=h11|h12;
d2=h13|h14;
d3=h15|h16;
d4=h17|h18;
LCMDATA=d1;
LCMDATA=d2;
LCMDATA=d3;
LCMDATA=d4;
}
LCMDATA=picture2[k++];
m=m+1; //must be set row address increase
LCMCOMM=0x0070|((m&0xf0)>>4); //set row msb address
LCMCOMM=0x0060|(m&0x0f); //set row lsb address
}
}
unsigned char picture2[]={
/*-- 调入了一幅图像： C:\Documents and Settings\willis.wen\桌面\33.bmp --*/
/*-- 宽度 x 高度=33x32 --*/
/*-- 宽度不是 8 的倍数，现调整为：宽度 x 高度=40x32 --*/
0xFF,0xFF,0xFF,0xFF,0x80,0x80,0x00,0x00,0x00,0x00,0x80,0x00,0x00,0x00,0x00,0x9F,
0xFF,0xFF,0xF8,0x00,0x90,0x00,0x00,0x08,0x00,0x90,0x00,0x00,0x08,0x00,0x90,0x00,
0x00,0x08,0x00,0x90,0x00,0x00,0x08,0x00,0x90,0x20,0x20,0x08,0x00,0x90,0x60,0xE0,
0x08,0x00,0x90,0xA0,0x20,0x08,0x00,0x91,0x20,0x20,0x08,0x00,0x91,0x20,0x20,0x08,
0x00,0x92,0x20,0x20,0x08,0x00,0x92,0x20,0x20,0x08,0x00,0x94,0x20,0x20,0x08,0x00,
0x97,0xF8,0x20,0x08,0x00,0x90,0x20,0x20,0x08,0x00,0x90,0x20,0x20,0x08,0x00,0x90,
0x20,0x20,0x08,0x00,0x90,0xF8,0xF8,0x08,0x00,0x90,0x00,0x00,0x08,0x00,0x90,0x00,
0x00,0x08,0x00,0x90,0x00,0x00,0x08,0x00,0x90,0x00,0x00,0x08,0x00,0x90,0x00,0x00,
```

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```
0x08,0x00,0x90,0x00,0x00,0x08,0x00,0x9F,0xFF,0xFF,0xF8,0x00,0x80,0x00,0x00,0x00,  
0x00,0x80,0x00,0x00,0x00,0x00,0x80,0x00,0x00,0x00,0x00,0xFF,0xFF,0xFF,0xFF,0x80  
};
```

```
//-----end-----
```