

OLED DISPLAY MODULE

Application Notes

PRODUCT NUMBER	DD-12864WE-1A with EVK board
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TABLE OF CONTENTS

1	EVK SCHEMATIC.....	4
2	SYMBOL DEFINITION	5
3	TIMING CHARACTERISTICS	6
4	CONNECTION BETWEEN OLED AND EVK	7
5	HOW TO USE THE DD-12864WE-1A.....	9
5.1	RECOMMENDED INITIAL CODE	10

Product No.	DD-12864WE-1A	REV. A

Page	2 / 11
------	--------

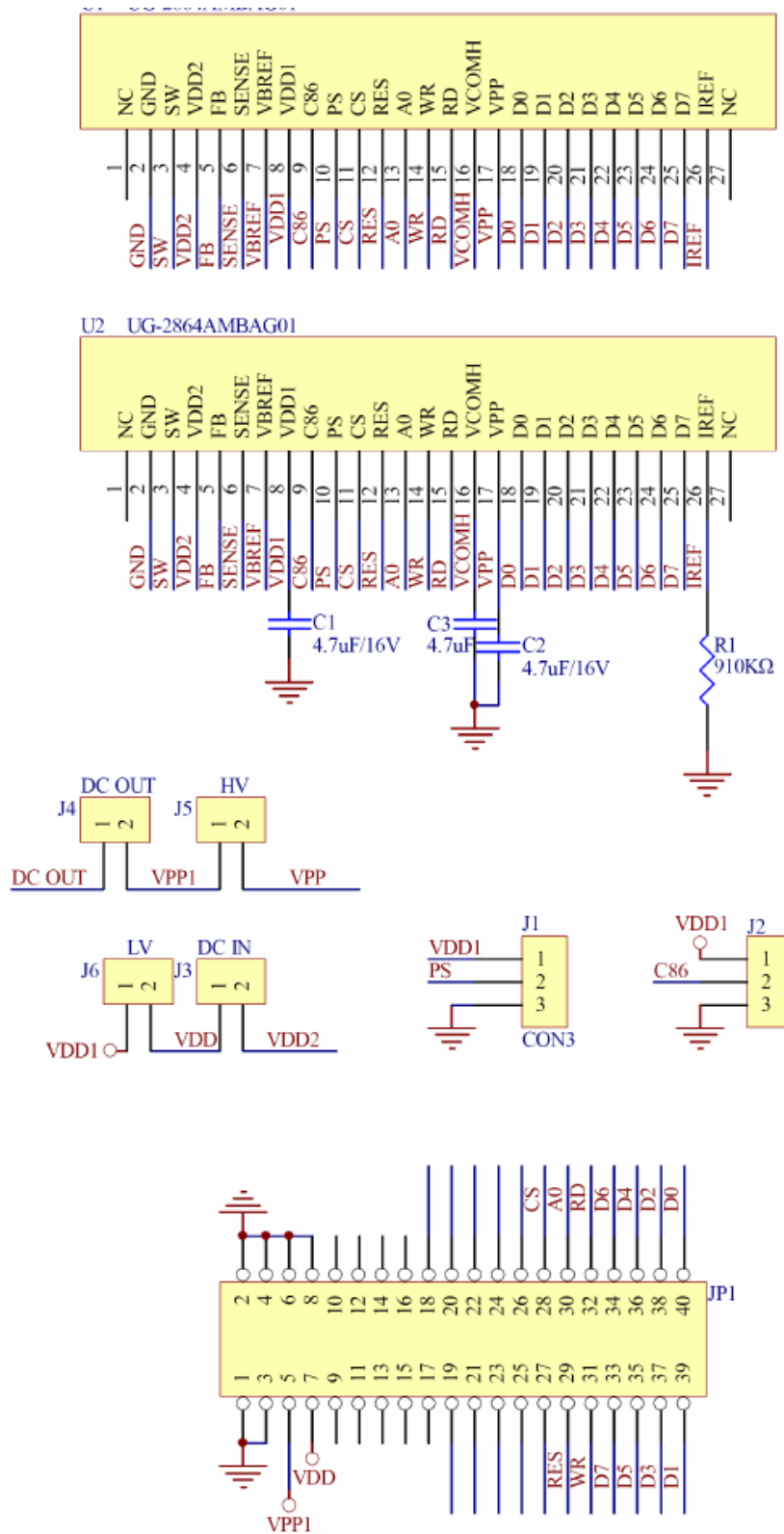
REVISION RECORD

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Product No.	DD-12864WE-1A	REV. A

Page	3 / 11
------	--------

1 EVK Schematic



Product No.	DD-12864WE-1A	REV. A

Page	4 / 11
------	--------

2 Symbol Definition

D0-D7 : These pins are 8-bit bi-directional data bus to be connected to the MCU's data bus.

CS# : This pin is the chip select input. The chip is enabled for MCU communication only when CS is pulled low.

C86, PS: These input pins are used to configure the MCU interface selection by appropriate logic setting, which is described in the following table. **But in this EVK, which was fixed as 80-parallel interface.**

	6800 Parallel Interface	8080 Parallel Interface	Serial Interface
C86	0	1	0
PS	1	1	0

RD: NOTE: The EVK board has been hard wired to 80xx-parallel interface

When connecting to an 8080 microprocessor, this pin receives the Read (RD) signal. Data read operation is initiated when this pin is pulled low and the chip is selected. When serial interface is selected, this pin E(RD) must be connected to VSS or VDD. **The EVK has fixed as 80 series interface, so this pin just only for 80 series interface read function.**

WR:

When 8080 interface mode is selected, this pin will be the Write (WR) input. Data write operation is initiated when this pin is pulled low and the chip is selected. When serial interface is selected, this pin R/W must be connected to VSS or VDD. **The EVK has fixed as 80 series interface, so this pin just only for 80 series interface write function.**

A0: This pin is Data/Command control pin. When the pin is pulled high, the data at D0-D7 is treated as display data. When the pin is pulled low, the data at D0-D7 will be transferred to the command register. For detail relationship to MCU interface signals, please refer to the timing characteristics diagrams at the following pages and datasheet.

RES: This pin is reset signal input. When the pin is low, initialization of the chip is executed.

HV: This is the most positive voltage supply pin of the chip.

LV: Power supply pin for logic operation of the driver

GND: Power supply ground

DC IN: This is an internal DC-DC voltage converter of low voltage supply input VDD2

DC-OUT: This is an internal DC-DC voltage converter can generate a high voltage supply HV from a low voltage supply input (VDD2)

VCOMH: The voltage output high level for signals

IREF: Current setting

Product No.	DD-12864WE-1A	REV. A

Page	5 / 11
------	--------

3 Timing characteristics

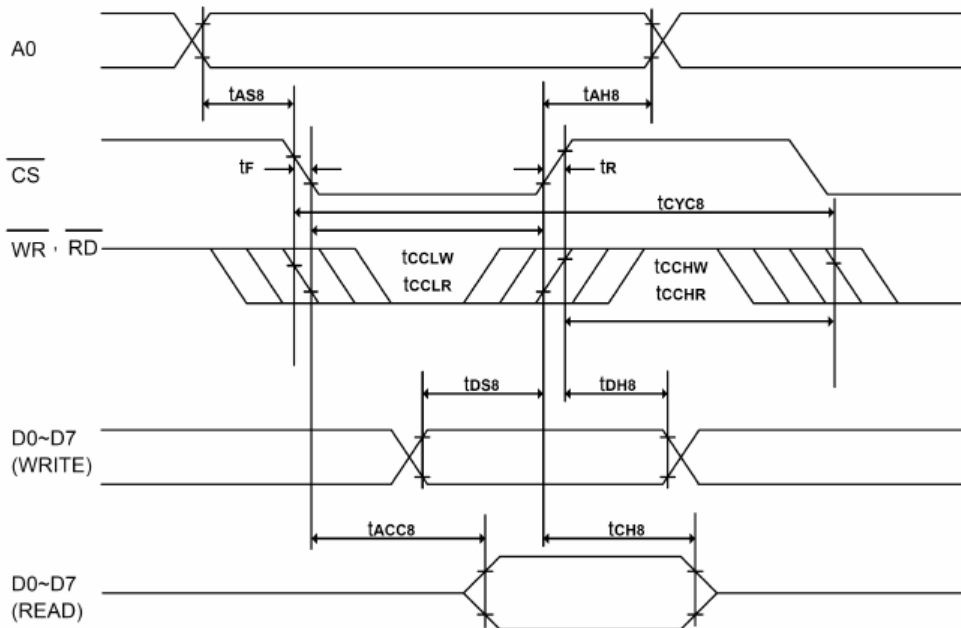


Figure 1: 8080-series MPU parallel interface characteristics

(VDD1 = 2.4 - 3.5V, TA = +25°C)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
tCYC8	System cycle time	300	-	-	ns	
tAS8	Address setup time	0	-	-	ns	
tAH8	Address hold time	0	-	-	ns	
tDS8	Data setup time	40	-	-	ns	
tDH8	Data hold time	15	-	-	ns	
tCH8	Output disable time	10	-	70	ns	CL = 100pF
tACC8	\overline{RD} access time	-	-	140	ns	CL = 100pF
tCCLW	Control L pulse width (WR)	100	-	-	ns	
tCCLR	Control L pulse width (RD)	120	-	-	ns	
tCCHW	Control H pulse width (WR)	100	-	-	ns	
tCCHR	Control H pulse width (RD)	100	-	-	ns	
tR	Rise time	-	-	15	ns	
tF	Fall time	-	-	15	ns	

Table 1: 8080-Series MPU Parallel Interface Timing Characteristics

Product No.	DD-12864WE-1A	REV. A

Page	6 / 11
------	--------

4 Connection Between OLED and EVK

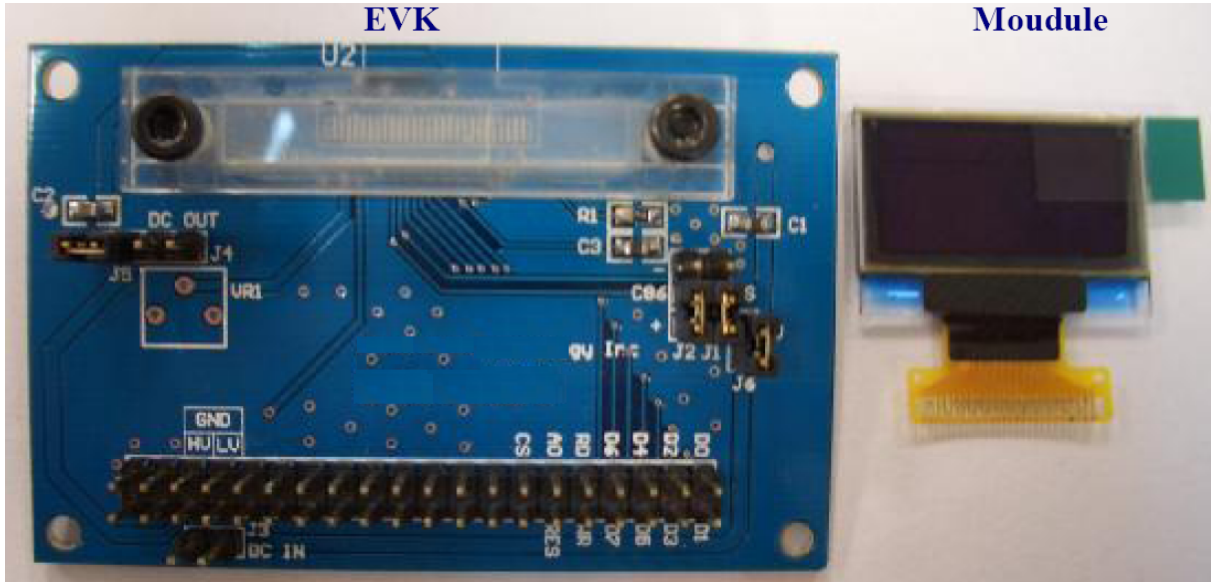


Figure 2 EVK PCB and DD-12864WE-1A Module

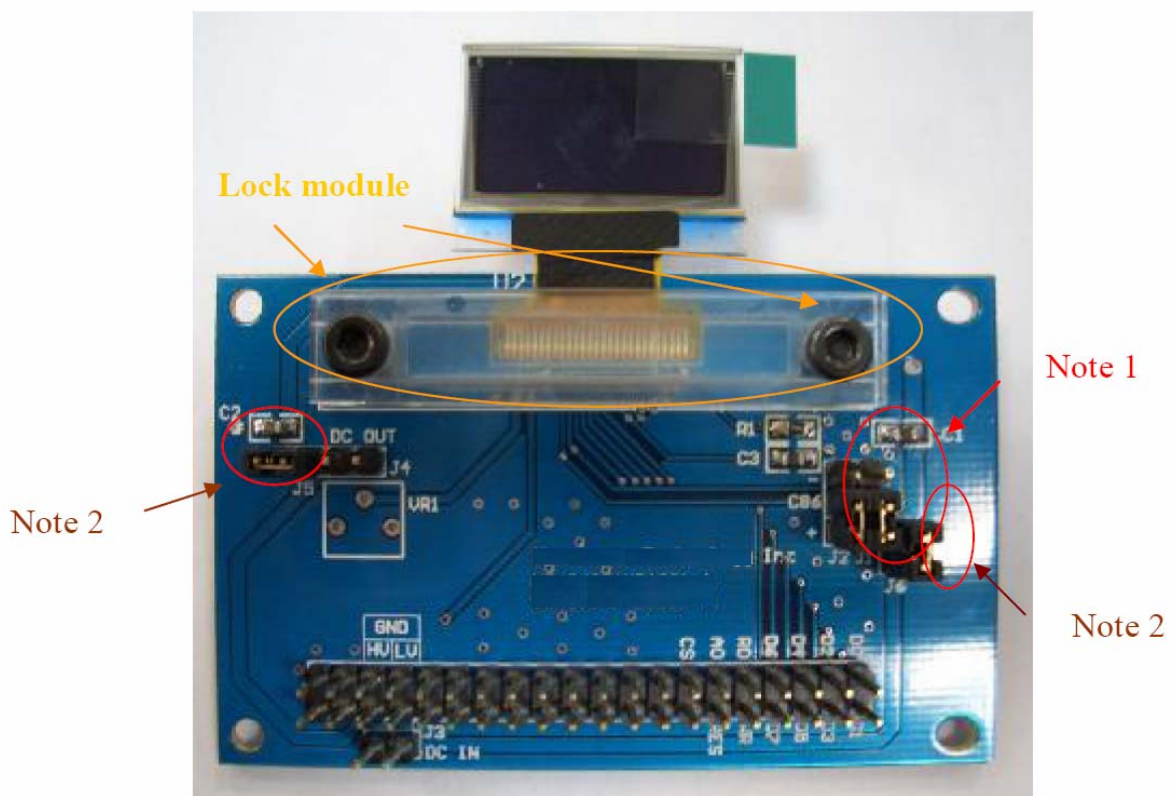


Figure 3 the DD-12864WE-1A and EVK assembled (Top view)

Product No.	DD-12864WE-1A	REV. A

Page	7 / 11
------	--------

The DD-12864WE-1A is COG type, please refer to Fig 2, Fig3. User can use leading wire to connect EVK with customers system. The example shows as Fig 4.

Note1: Refer to **Symbol define**

Note 2: J5, J6 must be connected by Jump.

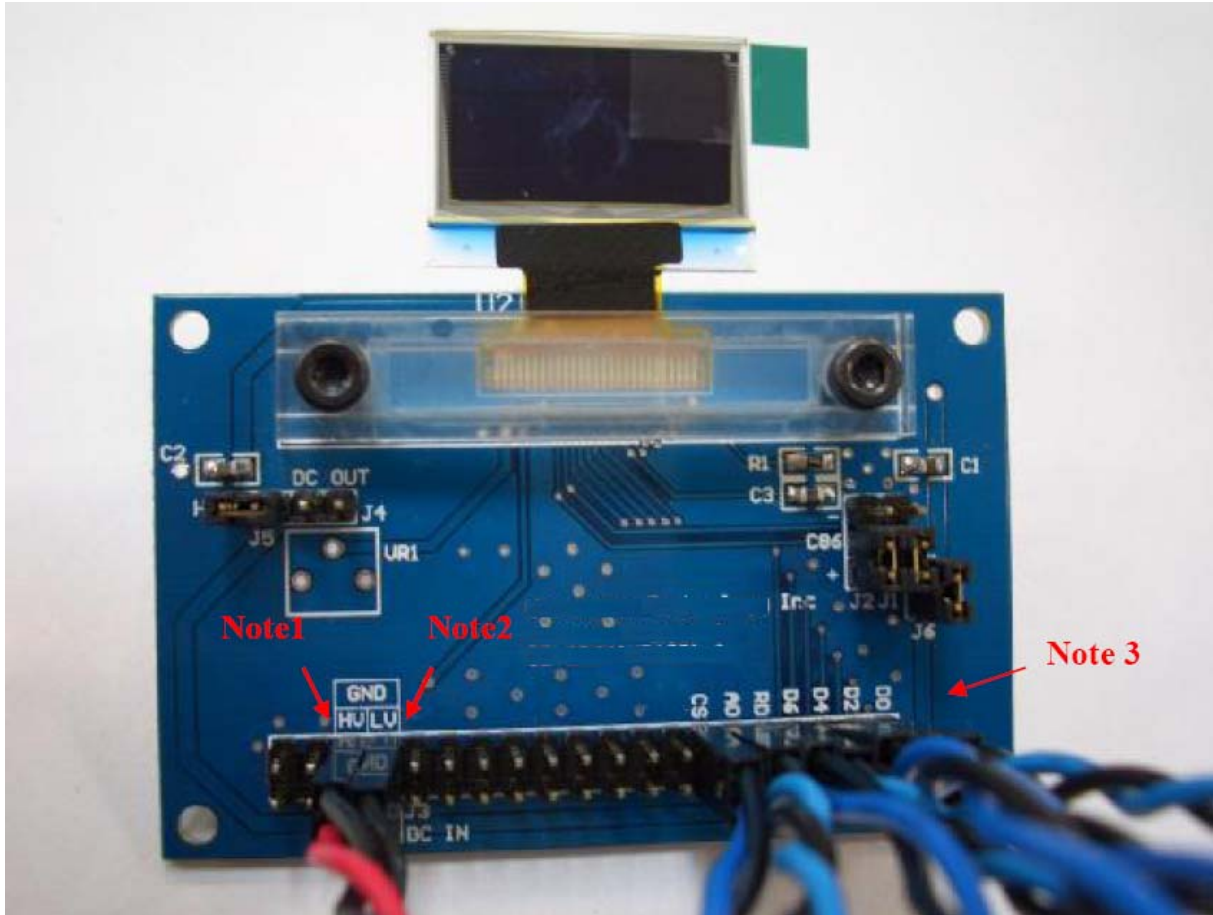


Figure 4 control MCU (not supplied) connected with EVK

Note 1: It is the external most positive voltage supply. In this sample is connected to power supply (HV)

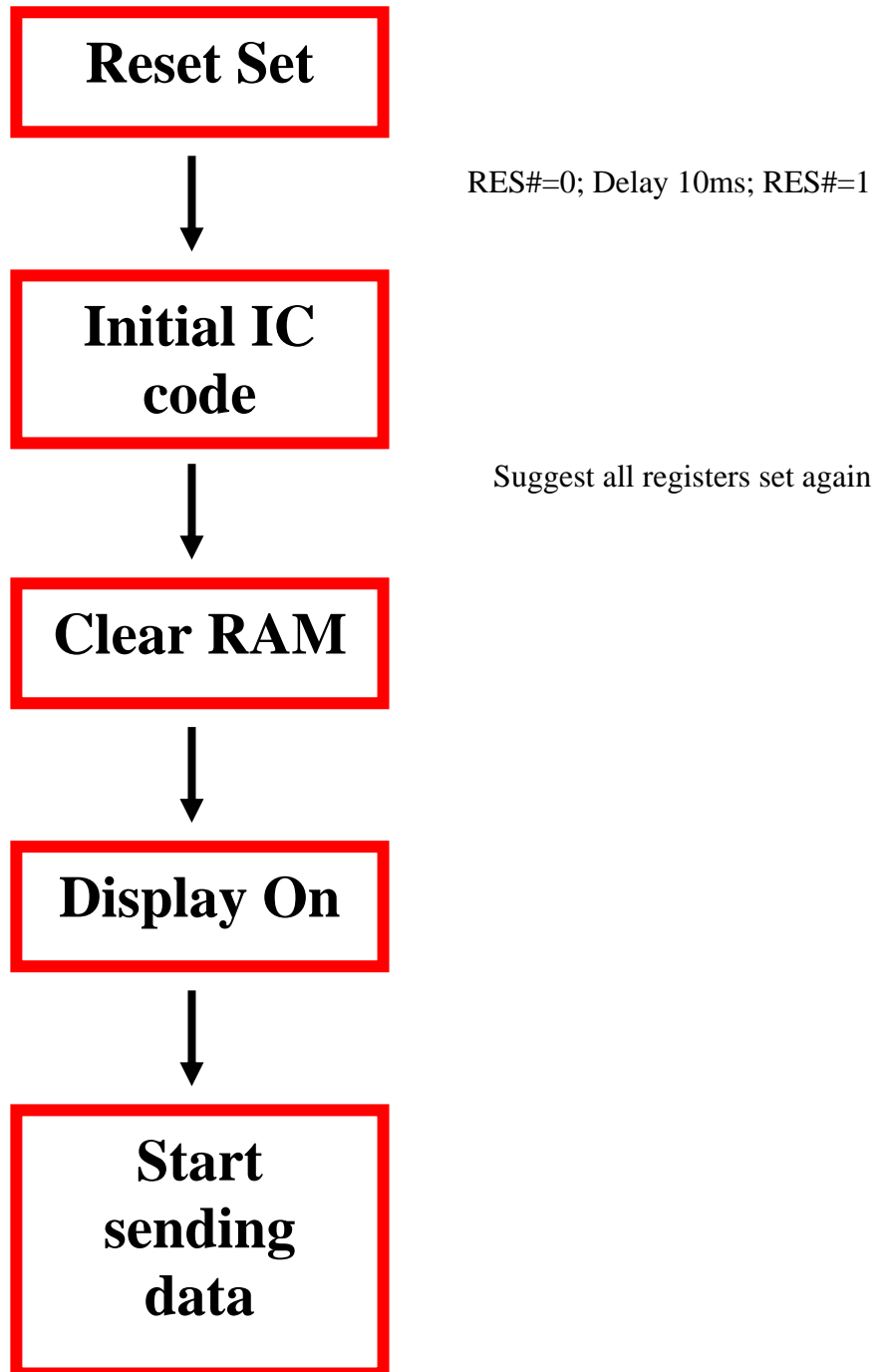
Note 2: It is the power supply pin for logic operation of the driver (LV)

Note 3: The leading wire has 3 pins totally in this case. (D0-D7, RD, WR, A0, RES, CS)

Product No.	DD-12864WE-1A	REV. A

Page	8 / 11
------	--------

5 How to use the DD-12864WE-1A



Product No.	DD-12864WE-1A	REV. A

Page	9 / 11
------	--------

5.1 Recommended Initial code

RD recommend Initial Code:

```

void init(void)
{ unsigned char i,j;
write_c(0xa0);           //segment remap
write_c(0xda);          //common pads hardware: alternative
write_c(0x12);
write_c(0xc0);          //common output scan direction:com0~com127
write_c(0xa8);          //multiplex ration mode:63
write_c(0x3f);
write_c(0xd5);          //display divide ratio/osc. freq. mode
write_c(0x50);          //Osc. Freq:5,DivideRation:0
write_c(0xdb);          //VCOM deselect level mode:64
write_c(0x40);
write_c(0x81);          //contrast control mode:64
write_c(0x40);
write_c(0xad);          //DCDC control mode:off
write_c(0x8a);
//=====clear internal RAM to "00H"=====//
for(i=0;i<=7;i++)
{
write_c (0xb0+ i );
write_c (0x02);
write_c (0x10);
for(j=0;j<=131;j++)
write_data(0);
}
//=====//
write_c(0xaf); //display on
Delay_1ms(10);
write_c(0x40);          //display start line:0
write_c(0xa4);          //0xa4:normal display , 0xa5:entire display
write_c(0xa6);          //0xa6:normal display , 0xa7:reverse display
write_c(0xd3);          //display offset mode:0
write_c(0x00);
write_c(0xd9);          //discharge / precharge period mode
write_c(0x1f);          //discharge:1,precharge:0x15
for(i=0;i<=7;i++)
{
write_c (0xb0+ i );      //set page address
write_c (0x02);          //column low bits
write_c (0x10);          //column high bits
for(j=0;j<=127;j++)
write_d (0xff);
}
}

```

Product No.	DD-12864WE-1A	REV. A

Page	10 / 11
------	---------

```

void write_c (unsigned char comm)
{
data_bus=comm;
A0=0;
CS=0;
RD=1;
WR=0;
WR=1;
CS=1;
}
void write_d (unsigned char data1)
{
data_bus=data1;
A0=1;
CS=0;
RD=1;
WR=0;
WR=1;
CS=1;
A0=1;
}
void Delay_1ms(int Cycle)
{
unsigned int i,k;
for (i=0;i<Cycle;i++)
for(k=0;k<0x5fff;k++);
}
write_c= Write Command
write_d= Write Parameter

```

Product No.	DD-12864WE-1A	REV. A

Page	11 / 11
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