



# MiDAS Family

Application Note #021

(AN021-V1.0)

# ZZA

## [Midas 2.1] How to drive Segment LCD without driver

with EW1027TP

V1.0

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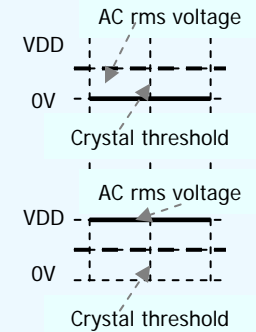
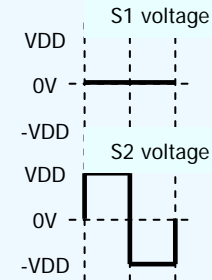
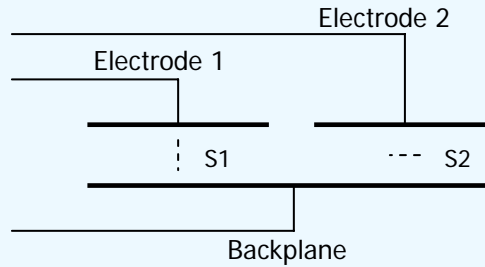
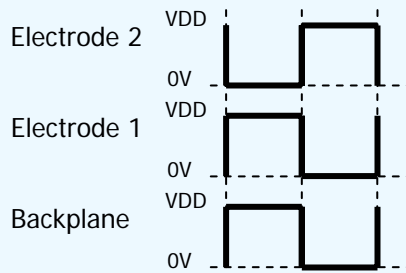
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# 1. Introduction

- ◆ This application note intends to explain how to make use of segment LCD without dedicated LCD driver.
- ◆ This document is an example of direct-drive-LCD with Midas2.1.

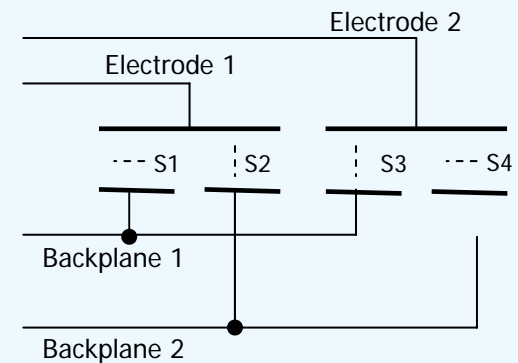
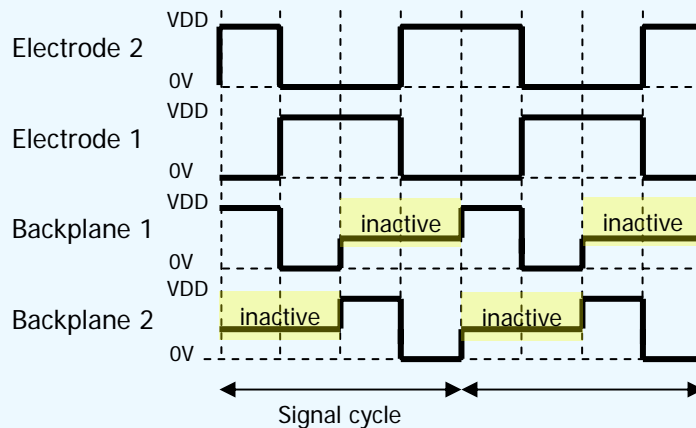
## 2. Segment LCD basics

### LCD DIRECT DRIVE

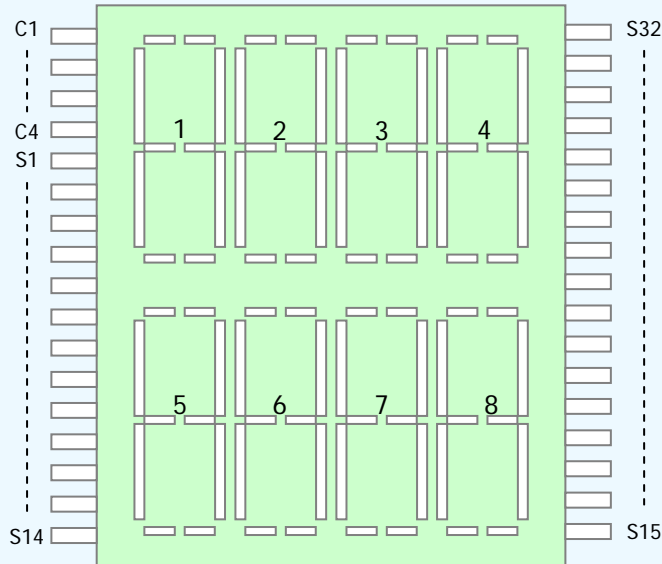


The signal is in phase on segment S1 and in counter-phase on segment S2, therefore the resulting voltage is 0 on segment S1 and +/- VDD on segment S2.

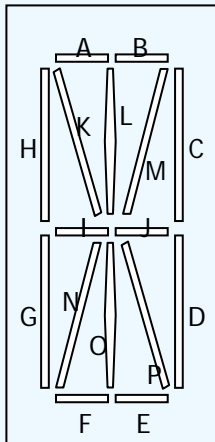
### LCD MULTIPLEX DRIVE



# 3. Pin table of EW10227TP



C : common  
S : signal



EW10227TP segment layout

Pin Table (EW10227TP)

2nd	S1	S2	S3	S4
C1	N	H	I	G
C2	O	A	K	F
C3	P	B	C	E
C4	J	C	M	D

1st	S2	S3	S4	S5
C1	J	C	M	D
C2	P	B	L	E
C3	O	A	K	F
C4	N	H	I	G

8th	S6	S7	S8	S9
C1	N	H	I	G
C2	O	A	K	F
C3	P	B	C	E
C4	J	C	M	D

7th	S10	S11	S12	S13
C1	M	D	J	C
C2	L	E	P	B
C3	K	F	O	A
C4	I	G	N	H

6th	S14	S15	S16	S17
C1	I	G	N	H
C2	K	F	O	A
C3	L	E	P	B
C4	M	D	J	C

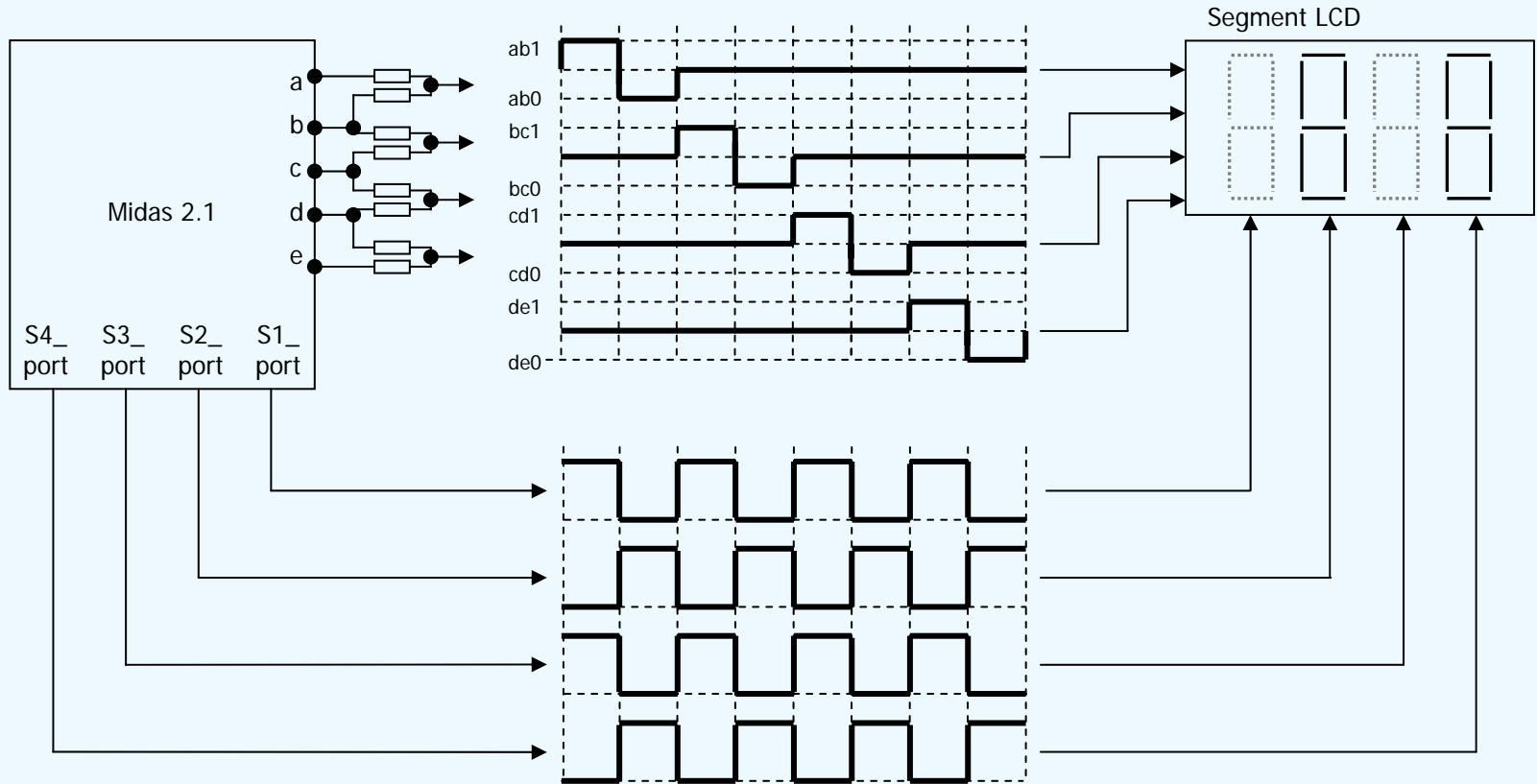
5th	S18	S19	S20	S21
C1	M	D	J	C
C2	L	E	P	B
C3	K	F	O	A
C4	I	G	N	H

4th	S22	S23	S24	S25
C1	N	H	I	G
C2	O	A	K	F
C3	P	B	C	E
C4	J	C	M	D

3rd	S26	S27	S28	S29
C1	J	C	M	D
C2	P	B	L	E
C3	O	A	K	F
C4	N	H	I	G

# 4. Schematic

## 1) Circuit diagram with M2.1 I/O port

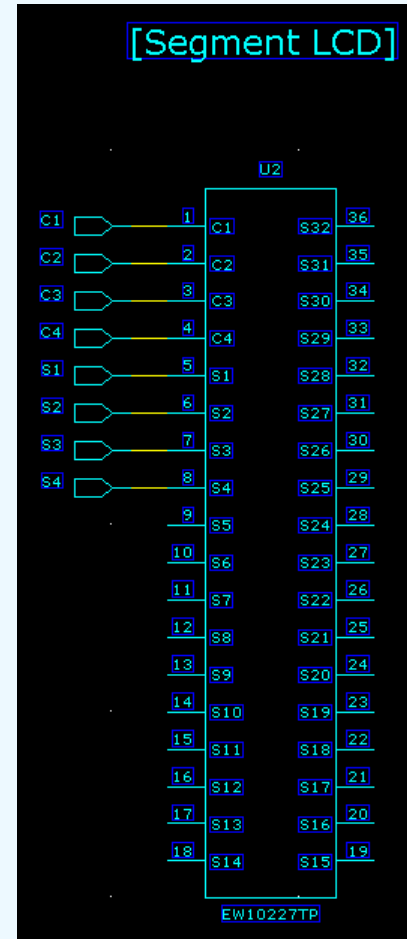
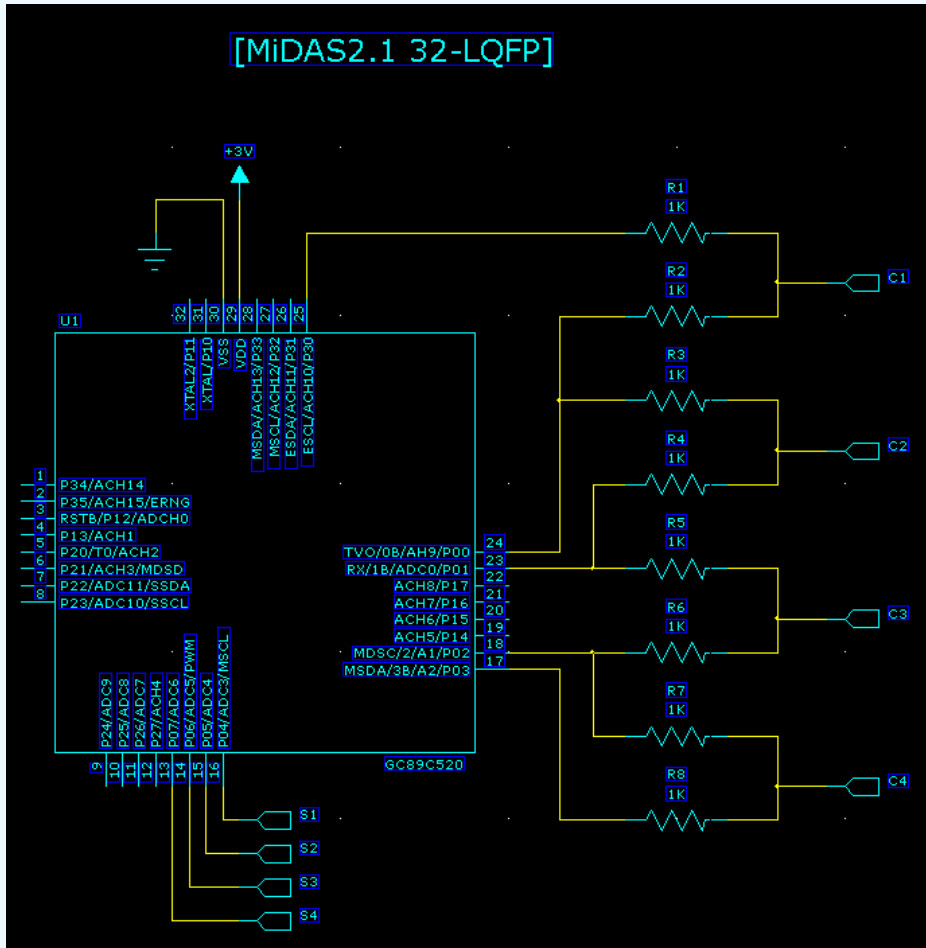


a, b, c, d, e are make common signal.

S1, S2, S3, S4 are signal ports. Each signal port use a number of four I/O port.

# 4. Schematic (cont'd)

## 2) Driving segment LCD using M2.1



## 5. Source code (1 of 3)

### File : Main.c

```
/*
*****
**          File : Main.c          **
*****

#include <gc89c520_tq32i.h>
/*
*****
**          Midas 2.1 32-LQFP declaration          **
*****
#include "DPdata.h"

void delay();
void delay2();

void Num(char i);
    // Function of display int

void main()
{
    unsigned char i,j;
    // Variable for Display Data

    POSEL = 0xFF;
    PODIR = 0x00;
    P3DIR = 0x00;

    while(1){
```

```
        for(i=0;i<10;i++){
            for(j=0;j<20;j++){
                Num(i);
                // Display Dgit i
                delay2();
            }
        }
    }
```



## 5. Source code (2 of 3)

```
void delay()
{
    unsigned int i;
    for(i=0;i<900;i++);
}

void delay2()
{
    unsigned int i;
    for(i=0;i<150;i++);
}

void Num(char i)
{
    unsigned char dat, j;

    for(j=0;j<8;j++){

        dat = DigSeg[i*8 + j] * 0x10;
        // Move data high bit of P0
        dat += (comm[j] & 0x0F);

        P0 = dat;
        if(comm[j] > 0x0F) P3_0 = 1;
        // Common base pin0
        else P3_0 = 0;

        delay();
        delay();
    }
}
```

## 5. Source code (3 of 3)

File : dpdata.h

```
/*
*****
**          File : DPdata.h          **
*****
**          Based 2nd Segment pin data    **
*****/

//DGIT DATA
unsigned char DigSeg[80] = {0x5,0xA,0x5,0xA,0x5,0xA,0x5,0xA    // Display Dgit 0
                          ,0xF,0x0,0xF,0x0,0xF,0x0,0x5,0xA    // Display Dgit 1
                          ,0x3,0xC,0x5,0xA,0x5,0xA,0xC,0x3    // Display Dgit 2
                          ,0xB,0x4,0x5,0xA,0x5,0xA,0x4,0xB    // Display Dgit 3
                          ,0x9,0x6,0xF,0x0,0xF,0x0,0x4,0xB    // Display Dgit 4
                          ,0x9,0x6,0x5,0xA,0x5,0xA,0x6,0x9    // Display Dgit 5
                          ,0x1,0x2,0x5,0xA,0x5,0xA,0x6,0x9    // Display Dgit 6
                          ,0xD,0x2,0xD,0x2,0xD,0x2,0x5,0xA    // Display Dgit 7
                          ,0x1,0xE,0x5,0xA,0x5,0xA,0x4,0xB    // Display Dgit 8
                          ,0x9,0x6,0x5,0xA,0x5,0xA,0x4,0xB};   // Display Dgit 9

//COMM
unsigned char comm[8] = {0x15,0x0A,0x0B,0x14,0x16,0x0B,0x0D,0x12};
```