

# AZ DISPLAYS, INC.

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*COMPLETE LCD SOLUTIONS*

## SPECIFICATIONS FOR LIQUID CRYSTAL DISPLAY

PART NUMBER:

AGM1216B Series

REVISED:

MAY 14, 2003

# General Specifications

Item	<input checked="" type="checkbox"/> Standard Value	Unit
Display Pattern	<input checked="" type="checkbox"/> Graphic <input type="checkbox"/> Character <input type="checkbox"/> Segment <input type="checkbox"/> _____ <input type="checkbox"/> with ICON	
Color	<input type="checkbox"/> Mono. <input type="checkbox"/> Grayscale <input checked="" type="checkbox"/> _65K_____	
Module Dimension (W x H x T)	33.54 (W) x 44.9 (H) x1.46 (T)	mm
Viewing Area (W x H)	30.54(W)X36.04(H)	mm
Active Area (W x H)	28.02(W)X35.028(H)	mm
Character Size (W x H)	\	mm
Character Pitch (W x H)	\	mm
DOT Size (W x H)	0.061(W)X0.207(H)	mm
DOT Pitch (W x H)	0.073(W)X0.219(H)	mm
LCD Type	<input type="checkbox"/> TN, Positive <input type="checkbox"/> TN, Negative <input type="checkbox"/> HTN, Positive <input type="checkbox"/> HTN, Negative	
	<input type="checkbox"/> STN, Yellow-Green <input type="checkbox"/> STN, Gray <input type="checkbox"/> STN, Blue <input type="checkbox"/> FSTN, Positive <input type="checkbox"/> FSTN, Negative	
	<input type="checkbox"/> _____ <input type="checkbox"/> FM LCD <input checked="" type="checkbox"/> Color STN	
Polarizer Type	<input type="checkbox"/> Transflective <input checked="" type="checkbox"/> Transmissive <input type="checkbox"/> Reflective <input type="checkbox"/> Anti-Glare	
View Direction	<input checked="" type="checkbox"/> 6H <input type="checkbox"/> 12H <input type="checkbox"/> _____	
LCD Controller & Driver	S6B33B2 (or Equivalent)	
LCD Driving Method	1/162duty, 1/5bias	
Interface Type	Serial <input type="checkbox"/> I <sup>2</sup> C <input type="checkbox"/> 4-line SPI <input type="checkbox"/> 3-line SPI <input type="checkbox"/> _____	
	Parallel <input checked="" type="checkbox"/> 6800 <input checked="" type="checkbox"/> 8080 <input type="checkbox"/> 4-bit <input type="checkbox"/> _____	
Backlight Type	<input checked="" type="checkbox"/> LED <input type="checkbox"/> Bottom <input checked="" type="checkbox"/> Single Side <input type="checkbox"/> Dual Side	
	<input type="checkbox"/> _____ <input type="checkbox"/> EL <input type="checkbox"/> CCFL	
Backlight Color	<input type="checkbox"/> Yellow-Green <input checked="" type="checkbox"/> White <input type="checkbox"/> Amber <input type="checkbox"/> Blue <input type="checkbox"/> Red <input type="checkbox"/> _____	
EL/CCFL Driver type	<input type="checkbox"/> Build-in <input type="checkbox"/> External	
DC-DC Converter	<input checked="" type="checkbox"/> Build-in <input type="checkbox"/> External	
Operation Temperature	T <sub>OPL</sub> = -0 T <sub>OPH</sub> = 50	°C
Storage Temperature	T <sub>STL</sub> = -10 T <sub>STH</sub> = 60	°C

Note:

T<sub>OPL</sub>: Lowest Operation Temperature.

T<sub>OPH</sub>: Highest Operation Temperature.

T<sub>STL</sub>: Lowest Storage Temperature.

T<sub>STH</sub>: Highest Storage Temperature.

# Electro-optical Specifications

## 1 Absolute Maximum Ratings

No	Item	Symbol	Min.	Max.	Unit
1	Supply Voltage For Logic	$V_{DD} - V_{SS}$	-0.3	4.0	V
2	Supply Voltage For LCD Driver	$V_{LCD}$	-0.3	22.0	V
3	Input Voltage	$V_I$	$V_{SS} - 0.3$	$V_{DD} + 0.3$	V

Note: Operating Temperature and Storage Temperature can be found in 1. General Specifications.

## 2 Optical Characteristics

$T_a = 25^\circ\text{C}$

ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT	DRIVE	
LCD driving voltage	$V_{op}$		0	(9.3)	(9.8)	(10.3)	V	
			25	(9.0)	(9.5)	(10.0)		
			50	(8.6)	(9.1)	(9.6)		
Response time	Rise	$T_r$	$= 0^\circ$	0	-	(530)	ms	
				25	-	(200)		(250)
	Down	$T_d$	$= 0^\circ$	0	-	(200)		(250)
				25	-	(85)		
Contrast ratio	CR	$= 0^\circ$	(20)	(25)	-	%	A *1	
Transmittance	T	-	(3.6)	(6.0)	-	%		
Viewing angle range	$6H$ $= 270^\circ$	CR 2	1	50		deg.		
	$12H$ $= 90^\circ$		2	25				
	$3H$ $= 0^\circ$		3	45				
	$9H$ $= 180^\circ$		4	60				
Chromaticity Coordinates *2	White	X	$= 0^\circ$	(0.20)	(0.25)	(0.30)	-	
		Y		(0.25)	(0.30)	(0.35)		
	Red	X	$= 0^\circ$	(0.34)	(0.39)	(0.44)		
		Y		(0.26)	(0.31)	(0.36)		
	Green	X	$= 0^\circ$	(0.24)	(0.29)	(0.34)		
		Y		(0.46)	(0.51)	(0.56)		
Blue	X	$= 0^\circ$	(0.15)	(0.18)	(0.21)			
	Y		(0.12)	(0.15)	(0.18)			
Color gamut (NTSC)	S		-	(18)	-	%	B*1	

Note:

\*1 Driving A - Duty driving by DMS505 (fFRM = 100Hz, 1/132 duty, 1/6 bias)

Driving B - Duty driving by Actual driver IC

\*2 Backlight coordinates ( x , y ) = ( 0.31 , 0.32 )

### 4.3 Electrical Characteristics

No	Item	Symbol	Condition	Min.	Typ.	Max.	Unit
1	Supply Voltage for Logic	$V_{DD}-V_{SS}$	-	2.8	3.0	3.3	V
2	Supply Voltage for LCD Driver	$V_{LCD}$	$T_a=23\pm 3^{\circ}C$		9.4		V
3	Supply Current for Logic	$I_{DD}$	-....			3.0	mA

5	Input High Voltage	$V_{IH}$	-	0.8xVDD	-	VDD	V
6	Input Low Voltage	$V_{IL}$	-	VSS	-	0.2xVDD	V
7	Output High Voltage	$V_{OH}$	$I_{OH}=0.5mA$	0.8xVDD	-	VDD	V
8	Output Low Voltage	$V_{OL}$	$I_{OL}=0.5mA$	VSS	-	0.2xVDD	V

9	Supply Current for LED Backlight	$I_{LED}$	$V_{LED} = \text{Typ.}$ $T_a=23\pm 3^{\circ}C$	-	15	-	mA
10	Supply Voltage for LED Backlight	$V_{LED}$	$I_{LED} = \text{Typ.}$ $T_a=23\pm 3^{\circ}C$	-	9.6	10.0	V
11	Luminance	Lv	$I_{LED} = \text{Typ.}$ $T_a=23\pm 3^{\circ}C$	3000	3300	-	cd/m <sup>2</sup>

### Timing Characteristics

See Data sheet of LCD Driver for detail.

### Programming

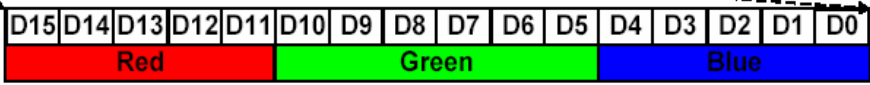
### Instruction Table

See Data sheet of LCD Driver for detail.

# Display Data RAM

Relationship between display pattern and Display Data RAM show as below:

XA Address	YA Address																
	00H	01H	02H	03H	04H	05H	06H	07H	08H	-----	7DH	7EH	7FH	80H	81H	82H	83H
00H										-----							
01H										-----							
02H										-----							
03H										-----							
04H										-----							
05H										-----							
06H										-----							
07H										-----							
08H										-----							
09H										-----							
0AH										-----							
0BH										-----							
0CH										-----							
0DH										-----							
0EH										-----							
0FH										-----							
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B2H										-----							
B3H										-----							
B4H										-----							
B5H										-----							
B6H										-----							
B7H										-----							
B8H										-----							
B9H										-----							
BAH										-----							
BBH										-----							
BCH										-----							
BDH										-----							
BEH										-----							
BFH										-----							
A0H										-----							
A1H										-----							



See Data sheet of LCD Driver for detail.

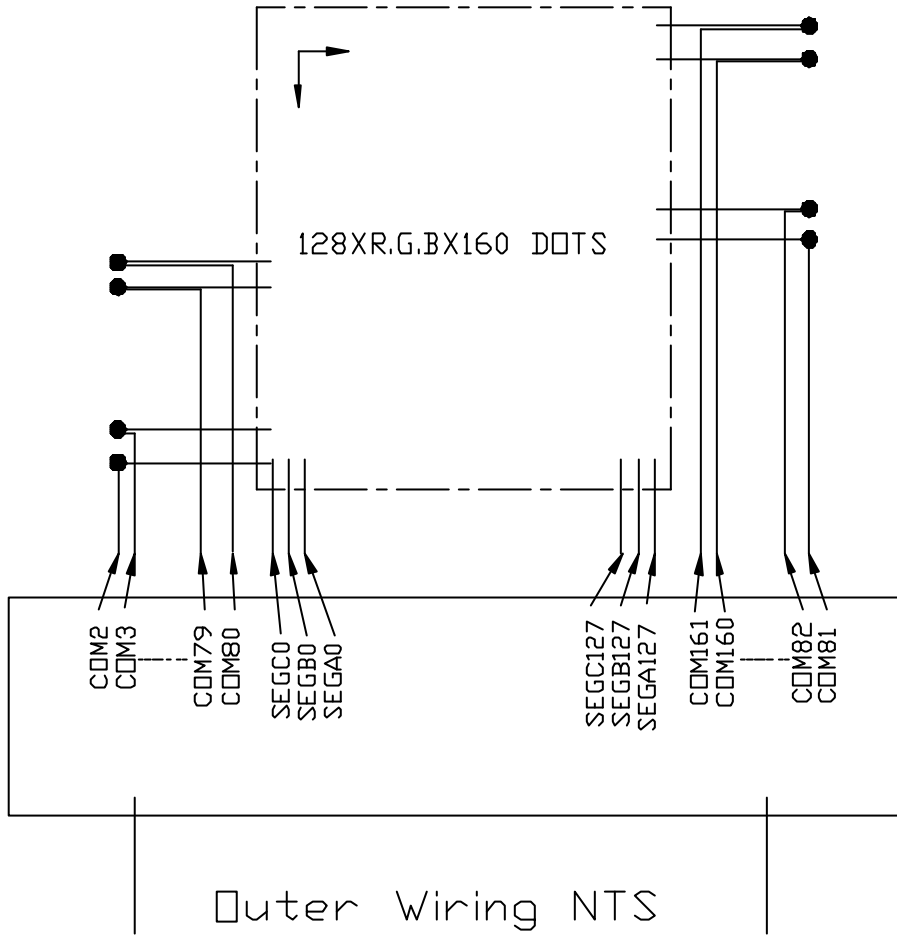
# I/O Terminal

## 1 Pin Description(See Datasheet of LCD Driver for detail)

Pin NO.	Symbol	Function Description																												
1	OTPD	Drain Voltage for OTP programming.																												
2	OTPG	Gate Voltage for OTP programming.																												
3	PS																													
4~5	MPU1~MPU0	MPU interface select pin																												
		<table border="1"> <thead> <tr> <th>PS</th> <th>MPU[1]</th> <th>MPU[0]</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>H</td> <td>L</td> <td>L</td> <td>8080-series 8bit interface</td> </tr> <tr> <td>H</td> <td>L</td> <td>H</td> <td>8080-series 16bit interface</td> </tr> <tr> <td>H</td> <td>H</td> <td>L</td> <td>6800-series 8bit interface</td> </tr> <tr> <td>H</td> <td>H</td> <td>H</td> <td>6800-series 16bit interface</td> </tr> <tr> <td>L</td> <td>L</td> <td>X</td> <td>3 pin SPI(Write only)</td> </tr> <tr> <td>L</td> <td>H</td> <td>X</td> <td>4 pin SPI(Write only)</td> </tr> </tbody> </table>	PS	MPU[1]	MPU[0]	Description	H	L	L	8080-series 8bit interface	H	L	H	8080-series 16bit interface	H	H	L	6800-series 8bit interface	H	H	H	6800-series 16bit interface	L	L	X	3 pin SPI(Write only)	L	H	X	4 pin SPI(Write only)
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6	CSB	Chip select input pins Data / instruction I/O is enabled only when CSB is " L ". When chip select is non-active, DB0 to DB15 may be high impedance.																												
7	RESETB	Reset input pin. When RESETB is " L ", initialization is executed.																												
8	RS	Data / Instruction select input pin . RS = " H " : DB0 to DB15 are display data . RS = " L " : DB0 to DB7 are instruction data																												
9	WRB	Read / Write execution control pin																												
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11~26	DB0~DB15	DB[0:15]: 16-bit bi-directional data bus.																												
27	GND	GND																												
28	VDD	VDD																												
29	VRN	NC																												
30	VRP	NC																												
31	VIN	NC																												

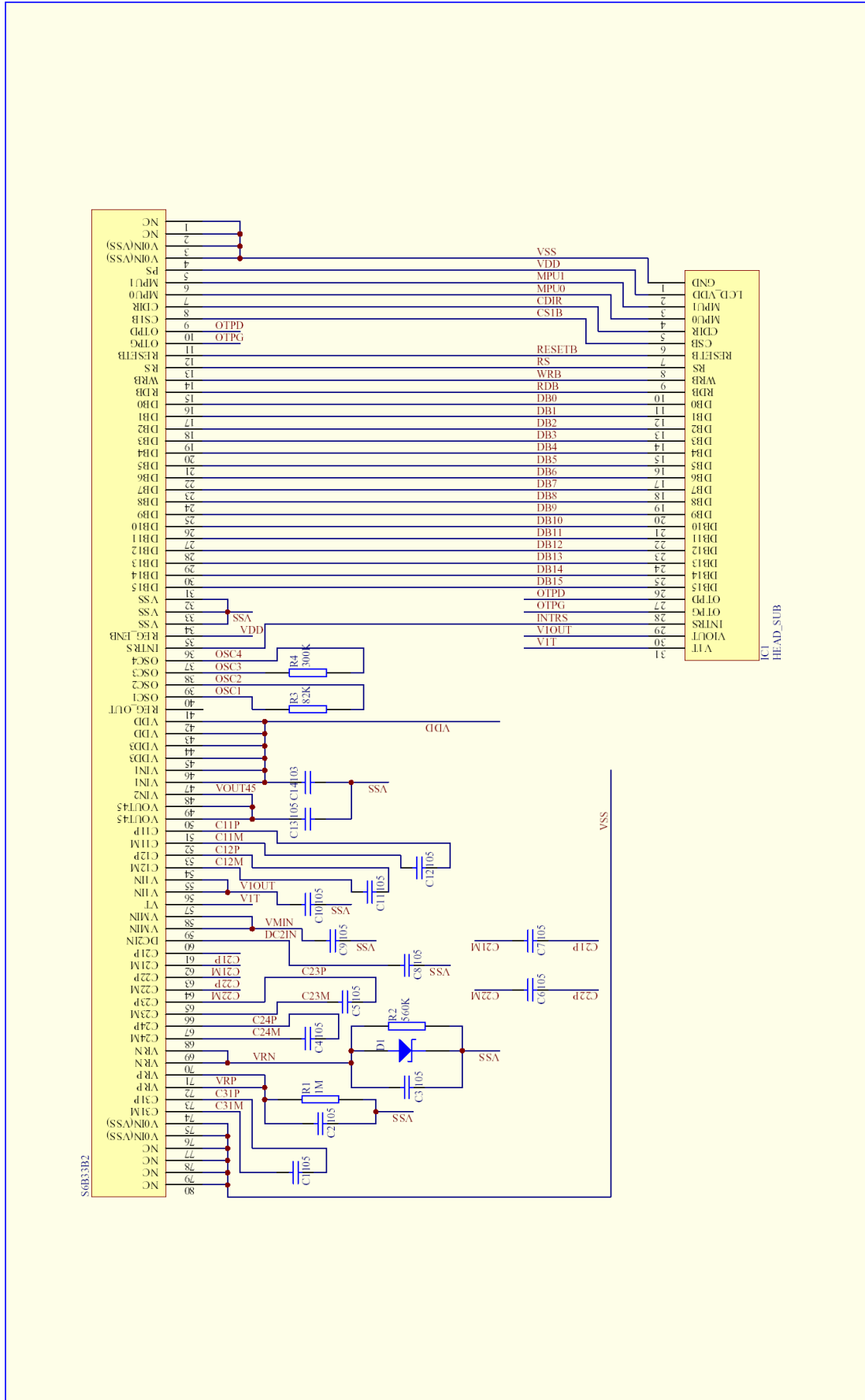
32	VT	NC
33	NC	NC

Block Diagram



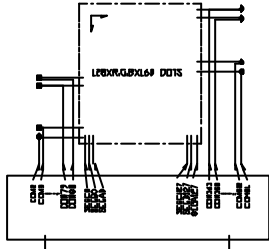
\*View from surface of Terminal

# Application Circuit

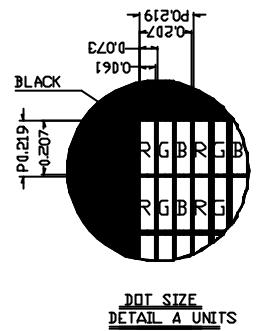
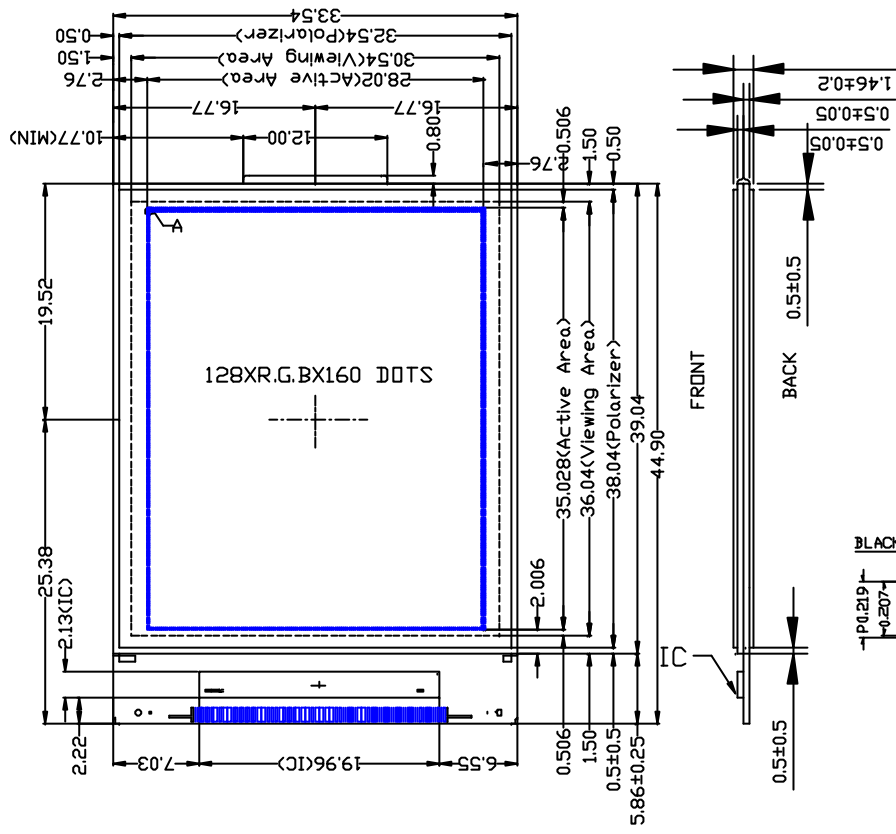








Display Type : CSTN / Transmissive  
 Viewing Direction : 6:00  
 Driver IC : S6B33B2  
 Logic Voltage : 3.0±0.1V  
 LCD Driver Voltage (Vcd) : 9.4  
 Driving Method : 1/162 DUTY 1/3 BIAS  
 Operating Temperature : -20~ +70°C  
 Storage Temperature : -30~ +80°C  
 Interface Connector : FPC  
 All unmarked tolerances : ±0.2mm



CUSTOMER APPROVAL:

AZ Displays, Inc.

AGM1216B  
 DWG NO: ED-4772-LCM/A00

UNITS: mm  
 SHEET 1 OF 3

