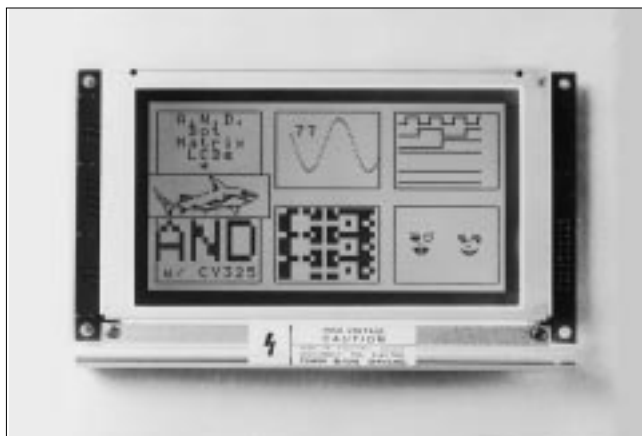




AND1741MST/BST

240 x 128 Dots

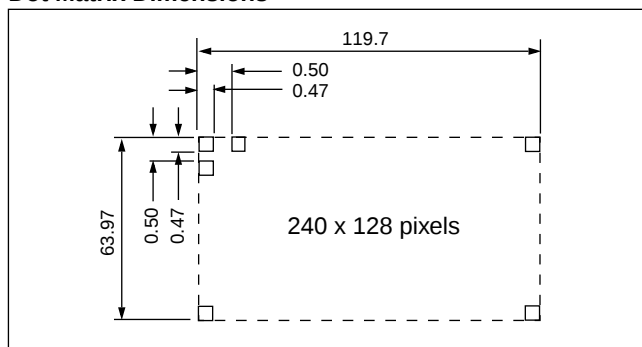
Intelligent Graphics Display

The AND1741 MST/BST devices are compact, full dot matrix, with "white page" appearance, LCD modules that have an on-board LCD controller (T6963C) and display memory (RAM). The AND1741 MST/BST can display TEXT information, numerals, letters and symbols, as well as GRAPHIC patterns. These devices are suitable for medical and measurement equipment, point-of-sale terminals, portable equipment, and marine instrumentation.

Features

- Black and white ST (MST) transmissive mode
- Blue and white (BST) transmissive mode
- Built-in CCFL backlight
- 40 characters x 18 line capability
- 240 x 128 dot graphic display
- Excellent readability and high-contrast ratio
- Built-in LCD controller (T6963C)
- Wide operating temperature range (0° to 50°C)
- User-selectable fonts: 6 x 8 or 8 x 8

Dot Matrix Dimensions



Mechanical Characteristics

Item	Specification	Unit
Outline Dimensions	170.0 (W) x 105.0 (H) x 14.0 Max (D)	mm
Number of Dots	240 x 128 Dots (40 characters x 16 lines)	
# of Characters	40 x 16 (480), 6 x 8 font	
Viewing Area	126.0 (W) x 70.0 (H)	mm
Bezel Opening	132.0 (W) 76.0 (H)	mm
Dot Size	0.47 (W) 0.47 (H)	mm
Dot Pitch	0.50 (W) 0.50 (H)	mm
Weight (approx.)	250	gram

Absolute Maximum Ratings

Item	Absolute Maximum			Unit
	Symbol	Min	Max	
Supply Voltage	V_{DD}	0	7.0	V
	$V_{DD} - V_{EE}$	0	24.0	V
CCFL Input Current	I_{FL}	—	10	mA rms
CCFL Driving Voltage ⁽¹⁾	V_{FL}	—	1500	V_{rms}
CCFL Drive Frequency	f_{EL}	—	80	kHz
Input Voltage	V_{IN}	-0.3	V_{DD}	V
Storage Temperature	T_{stg}	-20	60	°C
Operating Temperature	T_{op}	0	50	°C
Humidity ⁽²⁾	—	10	90	% RH

1. One minute maximum.

2. Wet bulb temperature $\leq 29^{\circ}\text{C}$, no condensation of water.

Electrical Characteristics (TA = 25°C)

Item	Symbol	Cond.	Specifications			Unit
			Min. (BST/ MST)	Typ. (BST/ MST)	Max. (BST/ MST)	
Supply Voltage	V_{DD}		4.75	5.0	5.25	V
	$V_{DD} - V_{EE}$		17.5/ 18.5	18.5/ 19.5	19.5/ 20.5	
High Level In V	V_{IN}	$V_{DD} = 5.0V$	2.8	—	V_{DD}	V
Low Level In V	V_{IH}		0	—	0.8	
FL Driving V	V_{IN}	V_{FL}	—	300	350	V_{rms}
FL Input Current ⁽¹⁾	I_{FL}		4.0	5.0	7.0	mA rms



AND1741MST/BST Intelligent Graphics Display

Electrical Characteristics (TA = 25°C) (Continued)

			Specifications			
Item	Symbol	Cond.	Min. (BST/ MST)	Typ. (BST/ MST)	Max. (BST/ MST)	Unit
FL Starting V	V_{FLS}	Ta = 0°C	1300	—	—	V_{0-P}
FL Driving Frequency	$f_{FL}^{(2)}$		25	30	35	kHz
Current Consumption	I_{DD}	Typical Pattern ⁽³⁾	—	9.0	18.0	mA
	I_{EE}		—	2.0	4.0	
	I_{DD}	Max. Pattern ⁽³⁾	—	12.0	24.0	
	I_{EE}		—	2.5	5.0	

1. Life time of backlight will change according to the FL input current.
2. Choose a driving frequency that is not in sync with the frame frequency otherwise, you may experience flickering.
3. Typical pattern is all "on", maximum pattern is checkered.

Optical Characteristics (TA = 25°C, $\phi = 0^\circ$, $\theta = 0$)

		Specifications			
Item	Symbol	Min. (BST/ MST)	Typ. (BST/ MST)	Max. (BST/ MST)	Unit
Viewing Angle	Right to Left	—	80	—	degree
	Up & Down	—	55	—	
Contrast Ratio	K	2.5/8	3.5/12	—	—
Response Time	T_{ON}	—	200	350	ms
	T_{OFF}	—	200	350	
Luminance $I_{FL} = 5.0$ mA rms	L	60	80	—	cd/m ²

Note: Refer to Applications Section for definitions of viewing angle, contrast ratio, response time (on and off) and luminance.

Connector Pin Assignment

Pin No.	Signal	Function
1	FGND	Frame Ground
2	GND	Ground
3	V_{DD}	Power Supply (5V)
4	V_{EE}	Power Supply for LCD Drive
5	$\overline{WR}$	Data Write
6	$\overline{RD}$	Data Read
7	$\overline{CE}$	Chip Enable
8	$C/\overline{D}$	$\overline{WR} = "L", C/\overline{D} = "H"$: Command Write $\overline{WR} = "L", C/\overline{D} = "L"$: Data Write $\overline{RD} = "L", C/\overline{D} = "H"$: Status Read $\overline{RD} = "L", C/\overline{D} = "L"$: Data Read

Connector Pin Assignment

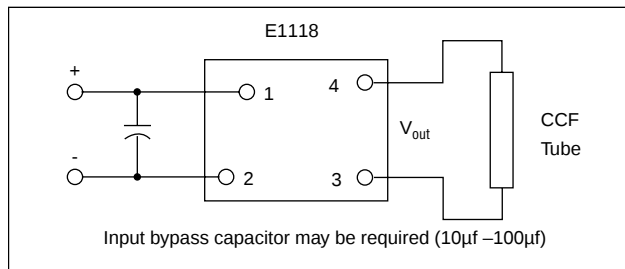
Pin No.	Signal	Function
9	NC	No connection
10	$\overline{RESET}$	Controller Reset
11	D0	Data Input/Output (LSB)
12	D1	Data Input/Output
13	D2	Data Input/Output
14	D3	Data Input/Output
15	D4	Data Input/Output
16	D5	Data Input/Output
17	D6	Data Input/Output
18	D7	Data Input/Output (MSB)
19	FS	Connect to V_{DD} : 6 x 8 font Connect to GND: 8 x 8 font
20	RV	V_{DD} : Positive image GND: Negative image

FL Connector

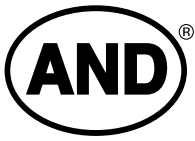
Pin No.	Signal	Function
1	V_{FL}	Power supply for FL backlight
5	V_{FL}	Power supply for FL backlight

Note: Connector: IL-G-55-53C2, Japan Aviation Electronics Industry. Mating Housing: IL-M-5P-S3C2-PM.
Contact: IL-M-C2.

Recommended FL Inverter



Part number E1118 is Endicott Research Group, Inc..
Method of connecting is illustrated.



AND1741MST/BST Intelligent Graphics Display

Power Supply

LCD panel is driven by the voltage $V_{DD}-V_{EE}$, so adjustable V_{EE} is required for contrast control and temperature compensation.

Temperature Variations

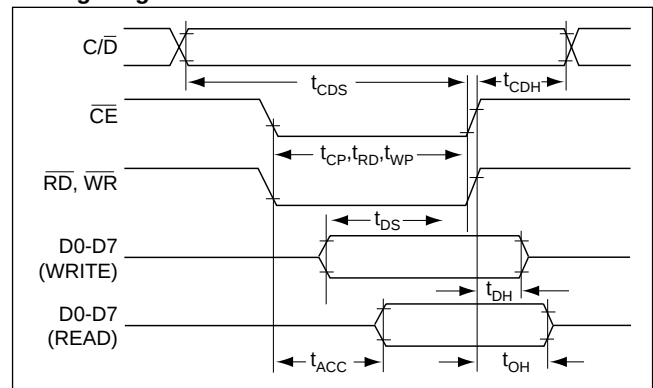
Temperature	$V_{DD}-V_{EE}$ (MST)	$V_{DD}-V_{EE}$ (BST)
0°C	21.0	20.0
+25°C	19.5	18.5
+50°C	17.6	16.6

Timing Relationships and Diagram

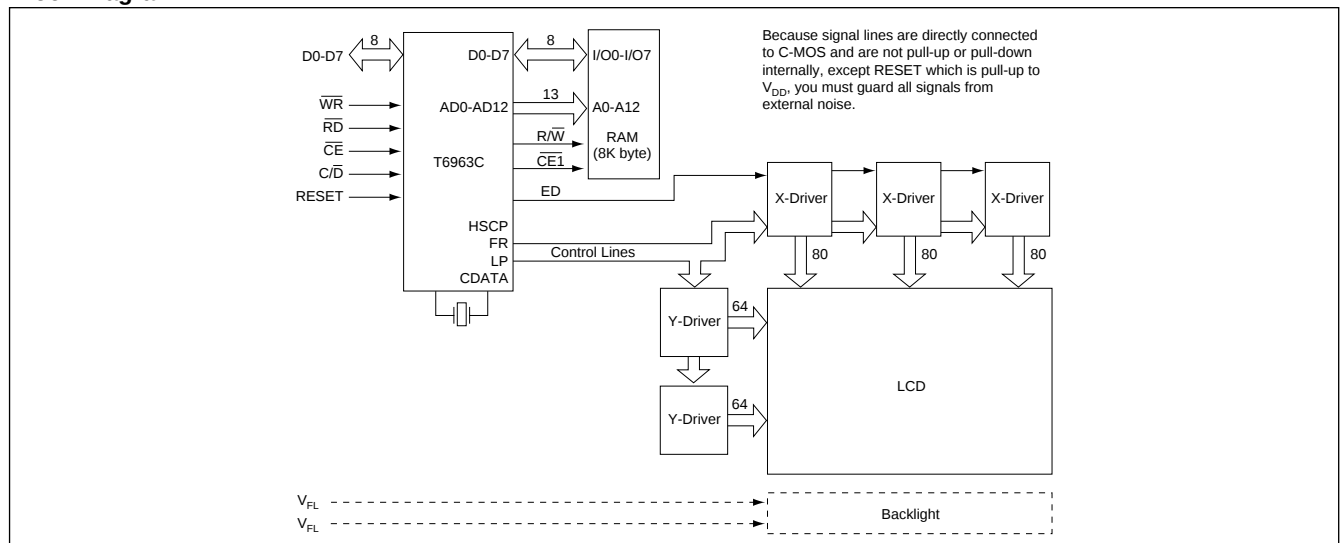
Signal Timing Relationships

Item	Symbol	Min.	Max.	Unit
C/D Set Up Time	t_{CDS}	100	—	ns
C/D Hold Time	t_{CDH}	10	—	
$\overline{CE}$, $\overline{RD}$, $\overline{WR}$ Pulse Width	t_{CE}, t_{RD}, t_{WR}	80	—	
Data Set Up Time	t_{DS}	80	—	
Data Hold Time	t_{DH}	40	—	
Access Time	t_{ACC}	—	150	
Output Hold Time	t_{OH}	10	50	

Timing Diagram



Block Diagram





Technical drawing of the LCD module showing front and side views with dimensions in mm.

Front View Dimensions:

- Overall Width: 170
- Overall Height: 105
- Active Area: 119.97
- Viewing Area: 126 ± 0.3
- Bezel Opening: 132 ± 0.3
- Bezel Thickness: 152
- Mounting Hole Spacing: 162 ± 0.3
- Mounting Hole Diameter: $4 \times \phi 3.5$
- Mounting Hole Position: 21.015
- Mounting Hole Diameter: $20 - \phi 1.0$
- Mounting Hole Position: 2.54 ± 0.3
- Mounting Hole Position: 22.86 ± 0.3
- Mounting Hole Position: 2.54 ± 0.3
- Mounting Hole Position: 4.5
- Mounting Hole Position: 47
- Mounting Hole Position: 76 ± 0.3 (B.O.)
- Mounting Hole Position: 70 ± 0.3 (V.A.)
- Mounting Hole Position: 63.97 (A.A.)
- Mounting Hole Position: 5
- Mounting Hole Position: 2
- Mounting Hole Position: 5
- Mounting Hole Position: 8

Side View Dimensions:

- Overall Thickness: 14 MAX.
- Mounting Hole Position: 7.5
- Mounting Hole Position: 1.6 ± 0.3
- Mounting Hole Position: 130 ± 10
- Connector