

# AND1741MST/BST

## 240 x 128 Dots

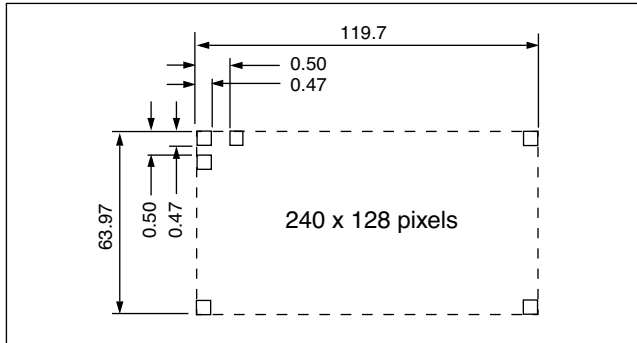
### Intelligent Graphics Display

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 <sup>(1)</sup>	$V_{FL}$	-	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 <sup>(2)</sup>	-	10	90	% RH

1. One minute maximum.
2. Wet bulb temperature  $\leq 29^{\circ}C$ , 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 <sup>(1)</sup>	$I_{FL}$		4.0	5.0	7.0	mA rms

Product specifications contained herein may be changed without prior notice.

It is therefore advisable to contact Purdy Electronics before proceeding with the design of equipment incorporating this product.



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

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

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

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

Item	Symbol	Specifications			Unit
		Min. (BST/MST)	Typ. (BST/MST)	Max. (BST/MST)	
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 <sup>2</sup>

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/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

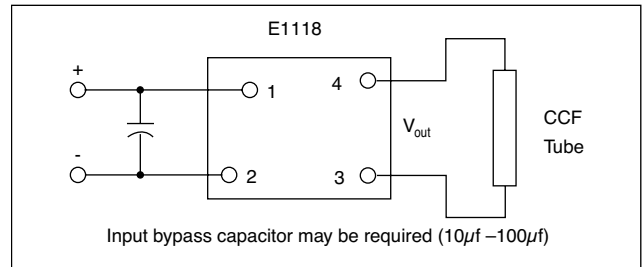
Pin No.	Signal	Function
9	NC	No connection
10	$\overline{RESET}$	Controller Reset
11	D0	Data Input/Output (LSB)
12	D1	Data Input/Output
13	D2	Data Input/Output
14	D3	Data Input/Output
15	D4	Data Input/Output
16	D5	Data Input/Output
17	D6	Data Input/Output
18	D7	Data Input/Output (MSB)
19	FS	Connect to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



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## 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

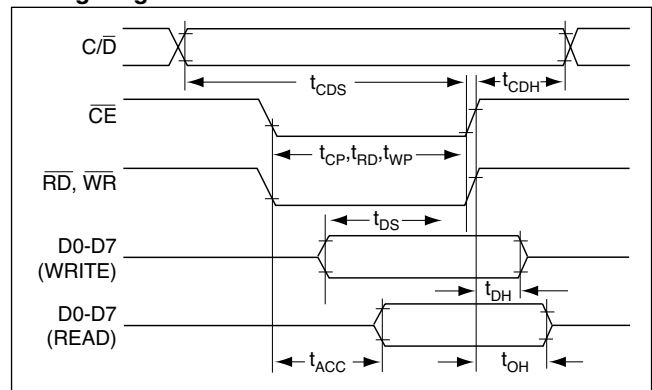
Temperature	$V_{DD}-V_{EE}$ (MST)	$V_{DD}-V_{EE}$ (BST)
0°C	21.0	20.0
+25°C	19.5	18.5
+50°C	17.6	16.6

## Timing Relationships and Diagram

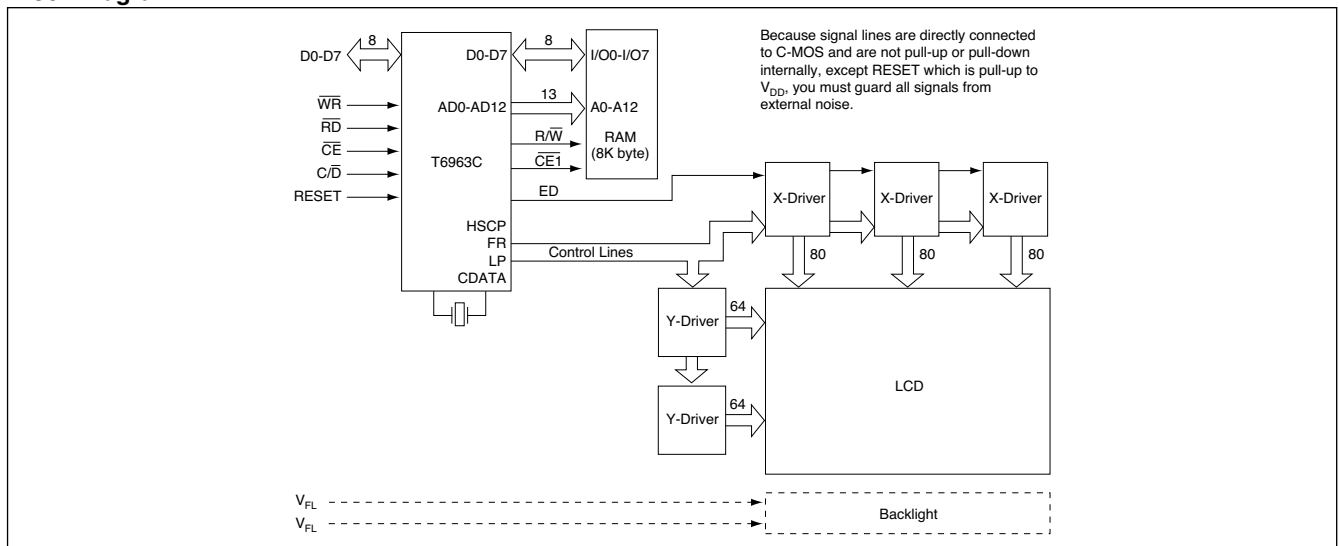
### Signal Timing Relationships

Item	Symbol	Min.	Max.	Unit
C/D Set Up Time	$t_{CDS}$	100	-	ns
C/D Hold Time	$t_{CDH}$	10	-	
CE, RD, 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





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## Dimensional Outline

