

# AND1741MST

## 240 x 128 Dots

### Intelligent Graphics Display

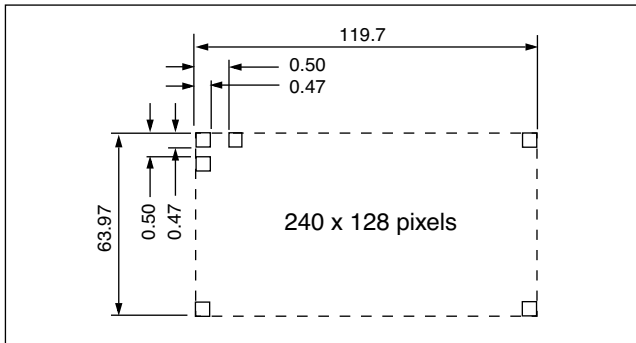
The AND1741 MST devices are compact, full dot matrix, with “white page” appearance, LCD modules that have an on-board LCD controller (T6963C) and display memory (RAM). The AND1741 MST can display TEXT information, numerals, letters and symbols, as well as GRAPHIC patterns. These devices are suitable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

#### Features

• RoHS Compliant

- Black and white ST (MST) 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

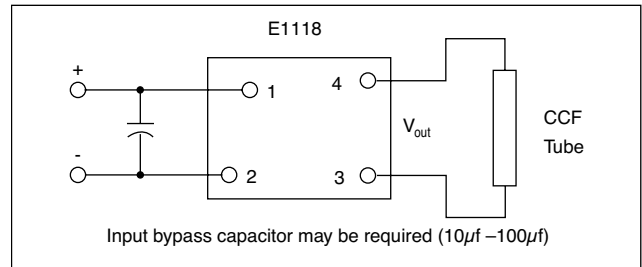
Pin No.	Signal	Function
9	NC	No connection
10	$\overline{RESET}$	Controller Reset
11	D0	Data Input/Output (LSB)
12	D1	Data Input/Output
13	D2	Data Input/Output
14	D3	Data Input/Output
15	D4	Data Input/Output
16	D5	Data Input/Output
17	D6	Data Input/Output
18	D7	Data Input/Output (MSB)
19	FS	Connect to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



## 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

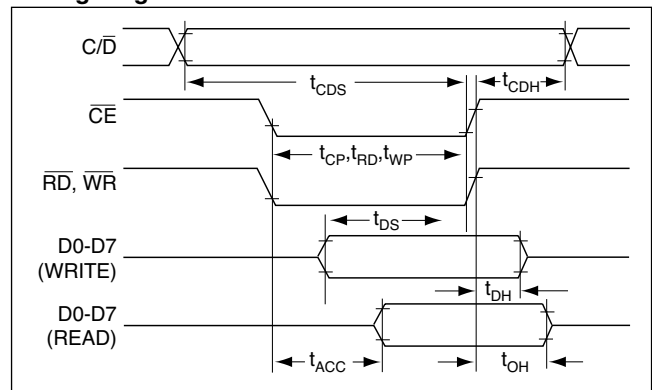
Temperature	$V_{DD}-V_{EE}$ (MST)	$V_{DD}-V_{EE}$ (BST)
0°C	21.0	20.0
+25°C	19.5	18.5
+50°C	17.6	16.6

## Timing Relationships and Diagram

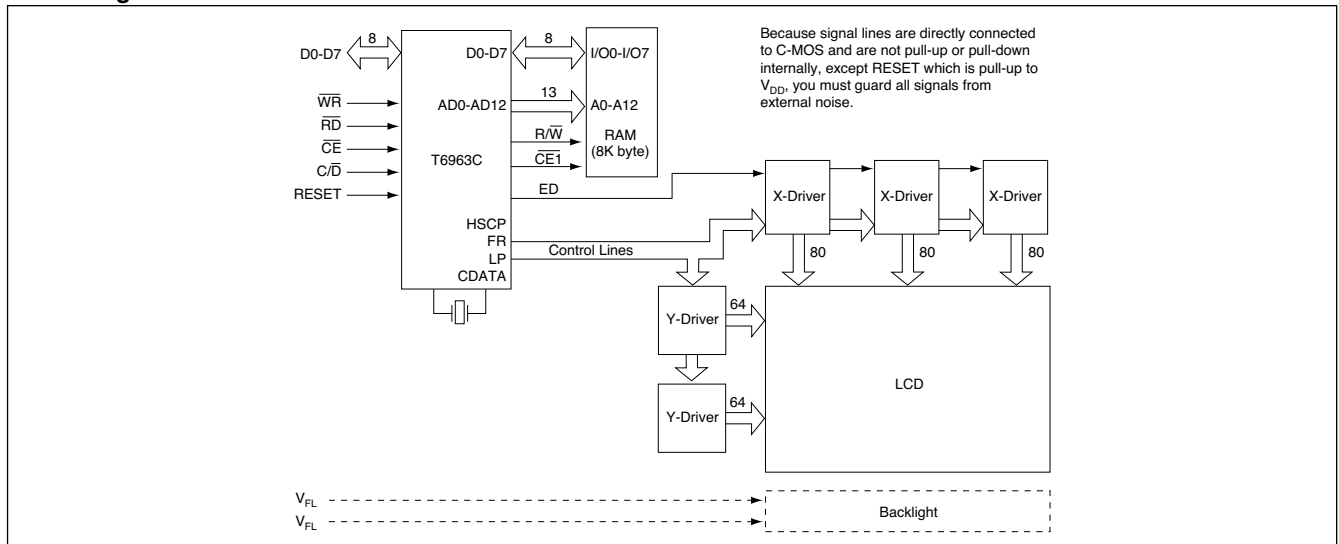
### Signal Timing Relationships

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

