AND1781MST/BST

240 x 64 Dots
Intelligent Graphics Display

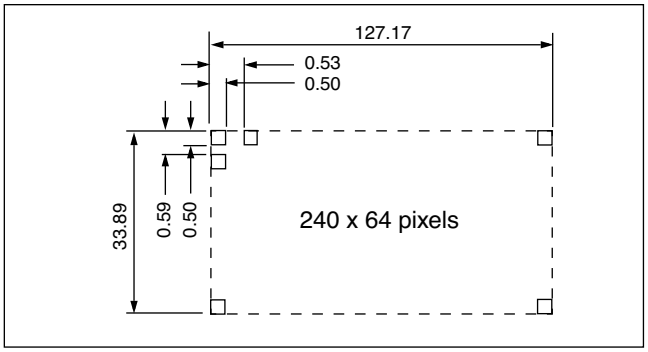
The AND1781MST/BST devices are compact, full dot matrix, with “white page” appearance, LCD modules that have an on-board LCD controller (T6963C) and display memory (RAM). The AND1781 can display TEXT information, numerals, letters and symbols, as well as GRAPHIC patterns. These devices are suitable for medical and measurement equipment, point-of-sale terminals, portable equipment, and marine instrumentation.

Features

• RoHS Compliant

- Black and white ST (MST) transmissive mode
- Blue and white (BST) transmissive mode
- Built-in CCFL backlight
- 40 characters x 8 line capability
- 240 x 64 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	180.0 (W) x 70.0 (H) x 14.0 Max (D)	mm
Number of Dots	240 x 64 Dots	
# of Characters	40 x 8 (480), 6 x 8 font	
Viewing Area	127.17 (W) x 33.89 (H)	mm
Bezel Opening	137.0 (W) 44.0 (H)	mm
Dot Size	0.50 (W) 0.50 (H)	mm
Dot Pitch	0.53 (W) 0.53 (H)	mm
Weight (approx.)	170	gram

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.

Absolute Maximum Ratings

	Absolute Maximum			
Item	Symbol	Min	Max	Unit
Supply Voltage	V_{DD}	0	7.0	V
	V_{DD} - V_{EE}	0	28.0	V
CCFL Input Current	I_{FL}	–	10	mA rms
CCFL Driving Voltage(1)	V_{FL}	–	1500	V_{rms}
CCFL Drive Frequency	f_{FL}	–	35	kHz
Input Voltage	V_{IN}	-0.03	0.3	V
Storage Temperature	T_{stg}	-20	60	°C
Operating Temperature	T_{OP}	0	50	°C
Humidity(2)	–	10	90	°/° RH

1. 1 minute maximum.
2. Wet bulb temperature ≤29° C, no condensation of water.

Electrical Characteristics (TA = 25°C)

			Specifications			
Item	Symbol	Cond.	Min. (BST/ MST)	Typ. (BST/ MST)	Max. (BST/ MST)	Unit
Supply Voltage	V_{DD}		4.75	5.0	5.25	V
	V_{DD}- V_{EE}		11.2/ 12.0	12.2/ 13.0	13.2/ 14.0	
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

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

Item	Symbol	Cond.	Specifications Min. (BST/ MST)	Typ. (BST/ MST)	Max. (BST/ MST)	Unit
FL Starting V	V_{FLS}	Ta = 0°C	1300	—	—	V_{O-P}
FL Driving Frequency	I_{FL} (2)		25	30	35	kHz
Current Consumption	I_{DD}	Typical Pattern(3)	—	7.0	14.0	mA
	I_{EE}		—	1.0	2.0	
	I_{DD}	Max. Pattern(3)	—	8.0	16.0	
	I_{EE}		—	1.5	3.0	

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, ϕ = 0°, θ = 0)

Item	Symbol	Specifications 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	3.5/20	—	—
Response Time	T_{ON}	—	200	350	ms
	T_{OFF}	—	200	350	
Luminance I_{FL} = 5.0 mA rms	L	50	80	—	cd/m²

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
9	NC	No connection

Connector Pin Assignment (Continued)

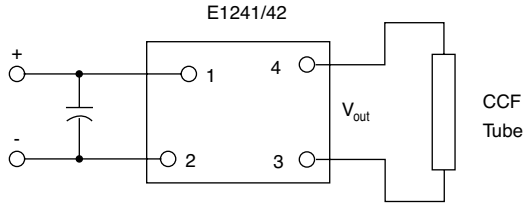
Pin No.	Signal	Function
10	$\overline{RESET}$	Controller Reset
11	D0	Data Input/Output (LSB)
12	D1	Data Input/Output
13	D2	Data Input/Output
14	D3	Data Input/Output
15	D4	Data Input/Output
16	D5	Data Input/Output
17	D6	Data Input/Output
18	D7	Data Input/Output (MSB)
19	FS	Connect to V_{DD}: 6 x 8 font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



Input bypass capacitor may be required (10μf –47μf)

Part number E1241/42 (part number E1241 is +5v, number E1242 is +12V). This part is manufactured by 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

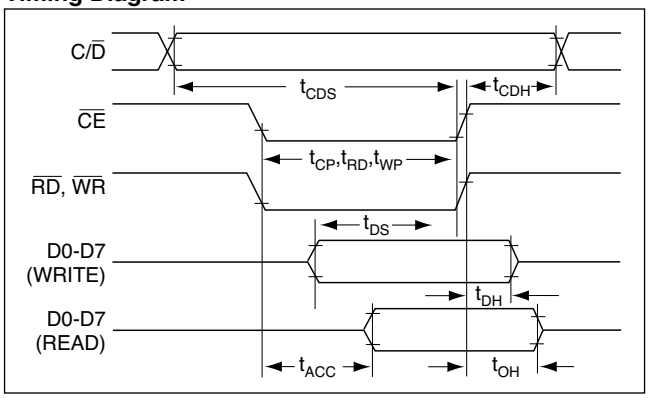
Temperature	V_{DD}–V_{EE} (MST)	V_{DD}–V_{EE} (BST)
0°C	13.5	14.3
+25°C	12.2	13.0
+50°C	11.0	11.8

Timing Relationships and Diagram

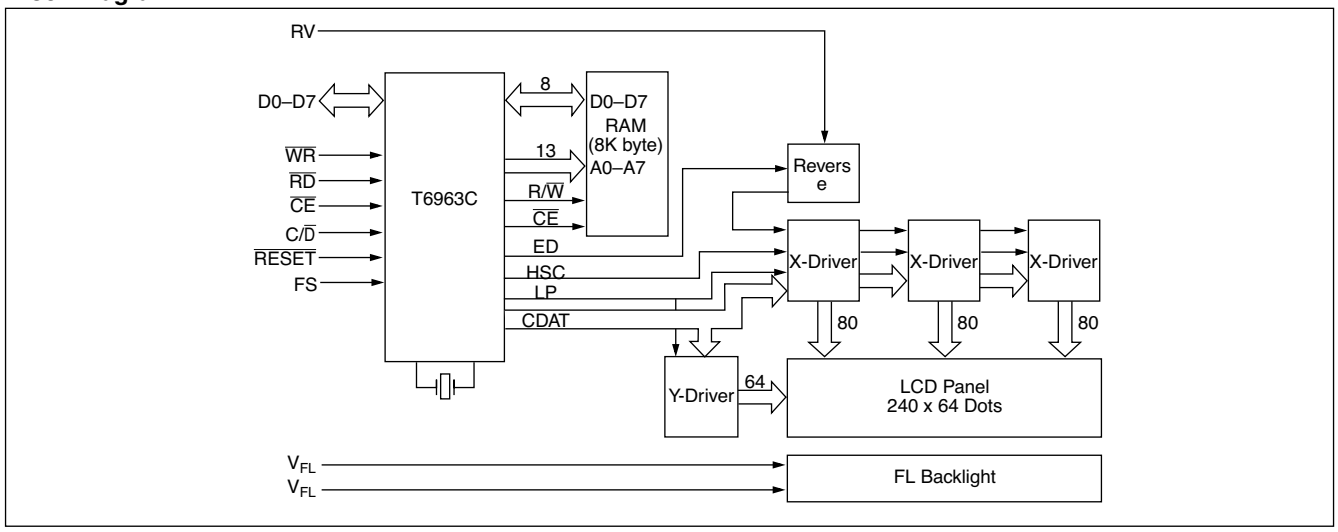
Signal Timing Relationships

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



Dimensional Outline