# AND1742MST2

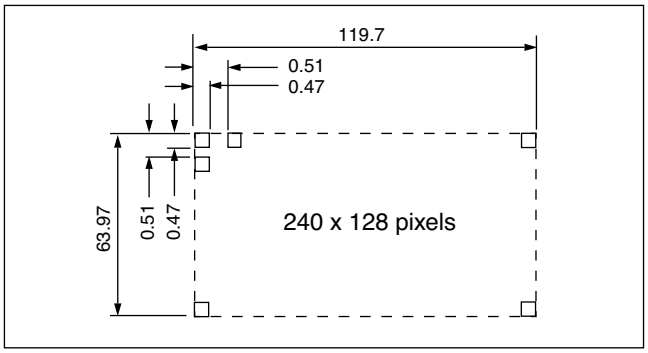
## 240 x 128 Dots
## Intelligent Graphics Display

The AND1742MST2 devices are compact, full dot matrix, with “white page” appearance, LCD modules that have an on-board LCD controller (RA8835) and display memory (RAM). The AND1742MST2 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

- FSTN positive black & white LCD type
- Built-in CCFL backlight
- White backlight color, black frame
- 240 x 128 dot graphic display
- Excellent readability and high-contrast ratio
- Built-in LCD controller (RA8835/RAiO)
- Wide operating temperature range (0° to 50°C)
- 12 O’clock viewing direction
- ISO9001 certified

### Dot Matrix Dimensions




### Mechanical Characteristics

| Item | Specification | Unit |
|---|---|---|
| Outline Dimensions | 180.0 (W) x 110.0 (H) x 15.0 Max (D) | mm |
| Viewing Area | 132.0 (W) x 76.0 (H) | mm |
| Dot Size | 0.47 (W) x 0.47 (H) | mm |
| Dot Pitch | 0.51 (W) x 0.51 (H) | mm |
| Resolution | 240 (W) x 128 (H) Dots Matrix | – |
| Duty Ratio | 1/128 Duty | – |
| Controller | RA8835 / RAiO | – |
| DC/DC Converter | Without | – |

### Absolute Maximum Ratings

| Item | Absolute Maximum | | | Unit |
|---|---|---|---|---|
| | Symbol | Min | Max | |
| Power Supply for Logic | $V_{DD}$ - $V_{SS}$ | -0.3 | 7.0 | V |
| Power Supply for LCD | $V_{DD}$ - $V_{EE}$ | 0 | 24.0 | V |
| Input Voltage | V1 | -0.3 | $V_{DD}$ | V |
| CCFL Driving Voltage | $V_{FL}$ | 0 | 500 | $V_{rms}$ |
| CCFL Input Current | $I_{FL}$ | – | 7.0 | mA |

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

| Item | Symbol | Cond. | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Power Supply for Logic | $V_{DD}$ - $V_{SS}$ | – | 4.5 | 5.0 | 5.5 | V |
| Input Voltage | $V_{IL}$ | L Level | 0 | – | 0.6 | V |
| | $V_{IH}$ | H Level | 2.2 | – | $V_{DD}$ | |
| | $V_{DD}$ - $V_O$ Bias = 1/12 | Ta = 0°C | – | – | – | |
| | | Ta = 25°C | 16.7 | 17.8 | 18.5 | |
| | | Ta = 50°C | – | – | – | |
| Power Supply Current for LCM | $I_{DD}$ | $V_{DD}$= 5.0V $V_{DD}$ - $V_{EE}$ = 17.8V | – | 15.6 | 18 | mA |
| | $I_{EE}$ | | – | 2.4 | – | |
| CCFL Starting Voltage | $V_{FLS}$ | - | – | 750 | – | Vrms |
| CCFL Driving Voltage | $V_{FLD}$ | – | – | 360 | – | Vrms |

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.

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

| Item | Symbol | Cond. | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| CCFL Driving Current | $I_{FLD}$ | $V_{FLD}$= 450Vrms $f_{FL}$ = 30kHz | – | 5.0 | – | mA |
| CCFL Driving Frequency | $f_{FL}$ | $V_{FLD}$= 450Vrms $f_{FL}$ = 30kHz | 15 | 30 | 85 | kHz |
| CCFL Saturation Time | $t_{SAT}$ | Ta = 25ºC | – | 1 | – | minut |

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

| Item | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Viewing Angle Range (when Cr ≥ 2) | $\phi$ f(12 o'clock) | – | 34 | – | degree |
| | $\phi$ b(6 o'clock) | – | 41 | – | |
| | $\phi$ l(9 o'clock) | – | 35 | – | |
| | $\phi$ r(3 o'clock) | – | 30 | – | |
| Rise Time * | Tr | – | 140 | – | mS |
| Fall Time * | Tf | – | 240 | – | |
| Frame Frequency * | Frm | – | 64 | – | Hz |
| Contrast * | Cr | – | 5.2 | – | – |

* Condition: $V_{DD}$ - $V_{EE}$ = 17.8V, Ta = 25ºC

### Connector Pin Assignment

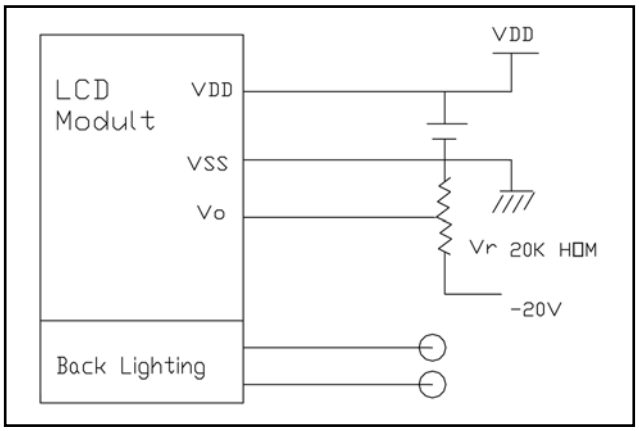
| Pin No. | Signal | Function |
|---|---|---|
| 1 | $\overline{RESET}$ | Controller Reset |
| 2 | $\overline{RD}$ | Data Read |
| 3 | $\overline{WR}$ | Data Write |
| 4 | SEL2 | MPU Select |
| 5 | $\overline{SEL1}$ | MPU Select |
| 6 | $\overline{CS}$ | Chip Select |
| 7 | AO | Command Mode Set |
| 8 | D0 | Data Input/Output (LSB) |
| 9 | D1 | Data Input/Output |
| 10 | D2 | Data Input/Output |
| 11 | D3 | Data Input/Output |
| 12 | D4 | Data Input/Output |
| 13 | D5 | Data Input/Output |
| 14 | D6 | Data Input/Output |
| 15 | D7 | Data Input/Output (MSB) |
| 16 | $V_{DD}$ | Power Supply (5V) |
| 17 | GND | Ground |
| 18 | $V_O$ | Contrast Adjustment Voltage |
| 19 | $V_{EE}$ | Power Supply for LCD Drive |
| 20 | FGND | Frame Ground |

### Environmental Absolute Maximum Ratings

| Item | Normal Temperature | | | | Wide Temperature | | | |
|---|---|---|---|---|---|---|---|---|
| | Operating | | Storage | | Operating | | Storage | |
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. |
| Ambient Temperature | 0ºC | +50ºC | -20ºC | +70ºC | -20ºC | +70ºC | -30ºC | +80ºC |
| Humidity (without condensation) | Note 2,4 | | Note 3, 5 | | Note 4,5 | | Note 4,6 | |

Note 2: Ta ≤ 50ºC: 80% RH max. Ta > 50ºC: Absolute humidity must be lower than the humidity of 85% RH at 50ºC.
Note 3: Ta at -20ºC will be < 48 hrs at 70ºC will be < 120 hrs when humidity is higher than 75%.
Note 4: Background color changes slightly depending on ambient temperature. This phenomenon is reversible.
Note 5: Ta ≤ 70ºC: 75% RH max. Ta > 70ºC: absolute humidity must be lower than the humidity of 75% RH at 70ºC.
Note 6: Ta at -30ºC will be < 48 hrs, at 80ºC will be <120 hrs when humidity is higher than 75%.

## Power Supply




### Reliability Test

| No. | Item | Conditions | |
|---|---|---|---|
| 1 | High Temp. Operation | 70ºC | 120 HR |
| 2 | High Temp. Storage | 80ºC | 120 HR |
| 3 | Low Temp. Operation | -20ºC | 120 HR |
| 4 | Low Temp. Storage | -30ºC | 120 HR |
| 5 | High Temp./Humid Storage | 60ºC 90%RH | 120 HR |
| 6 | Thermal Shock | -20ºC, 30 min.<br>+60ºC, 30 min. | 10 cycle |

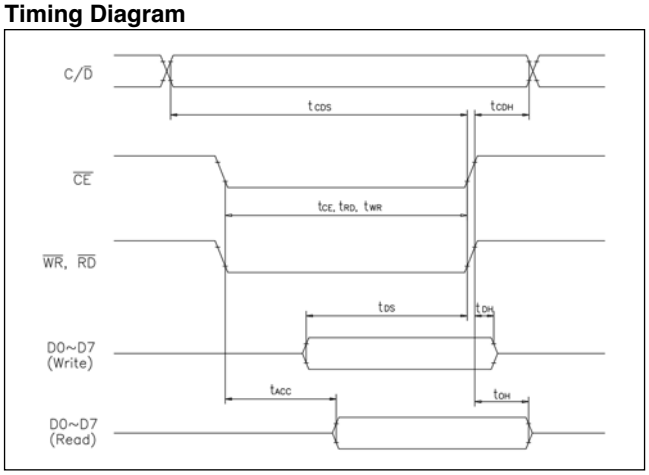
**Controller: RA8835**

## Timing Relationships and Diagram

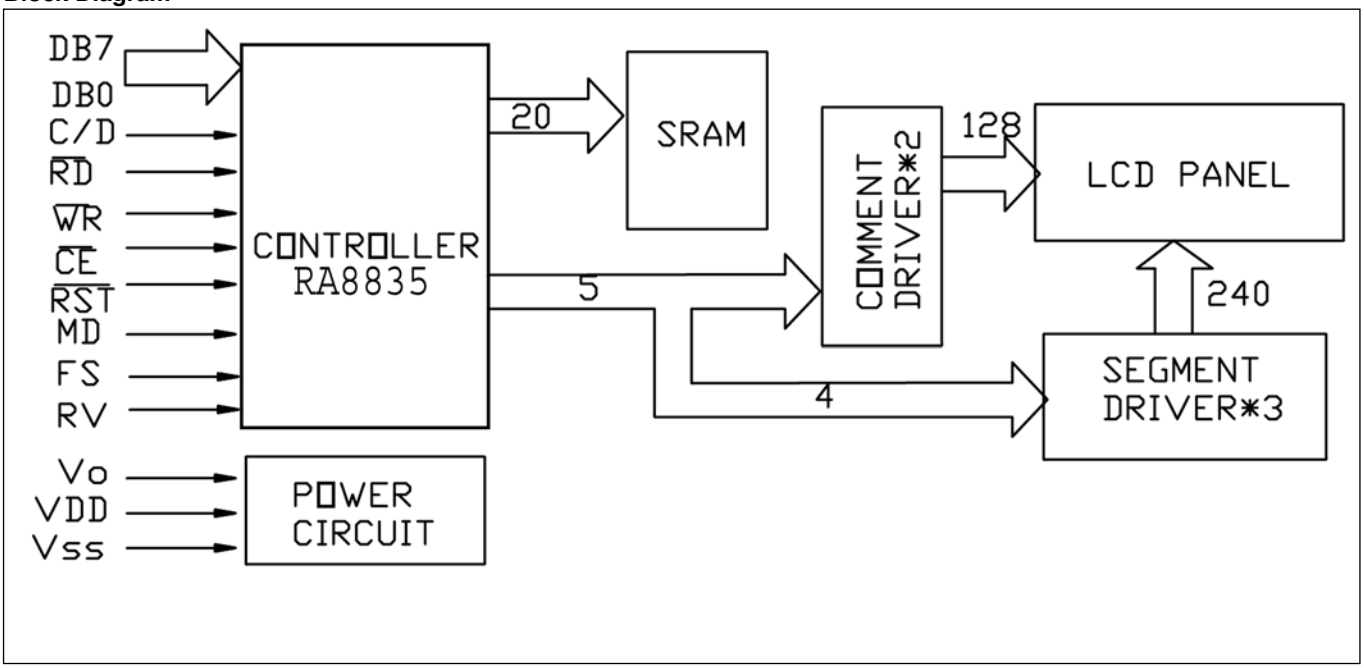
### Signal Timing Relationships

| 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 | $t_{CDS}$, $t_{CDS}$, $t_{CDS}$ | 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**