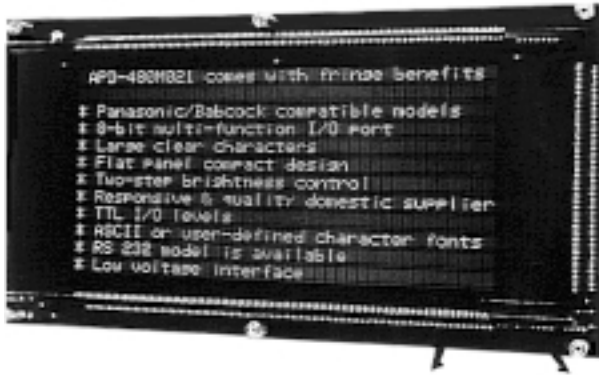# APD-480M021/-2

Vishay Dale

VISHAY

Plasma Panel Display Modules
480 Character Display with Drive Electronics, Controller and Parallel Interface

The APD-480M021 display module displays up to 480 alphanumeric 5 x 7 dot matrix characters arranged in 12 lines of 40 characters each.

The module includes drive electronics, a controller consisting of refresh memory, character generator and control logic with ASCII input to enable the module to serve as a direct readout device for many applications including POS terminals, industrial controls, computer peripherals, measurement instruments, and office machines. (A serial interface version is available APD-480M021-1.)

FEATURES
• 480 (12 x 40) alphanumeric characters
  (5 x 7 dot matrix)
• Only + 5 and + 12 VDC required (- 2 option)
• ASCII character set
  (optional character sets available)
• Efficient Parallel Interface
• Two Step Brightness Control
• Wide viewing angle (150°)
• Rugged design/slim profile
• Flicker free refresh
• Editing functions
• Panasonic/NEC/Babcock Compatible

ENVIRONMENTAL SPECIFICATIONS
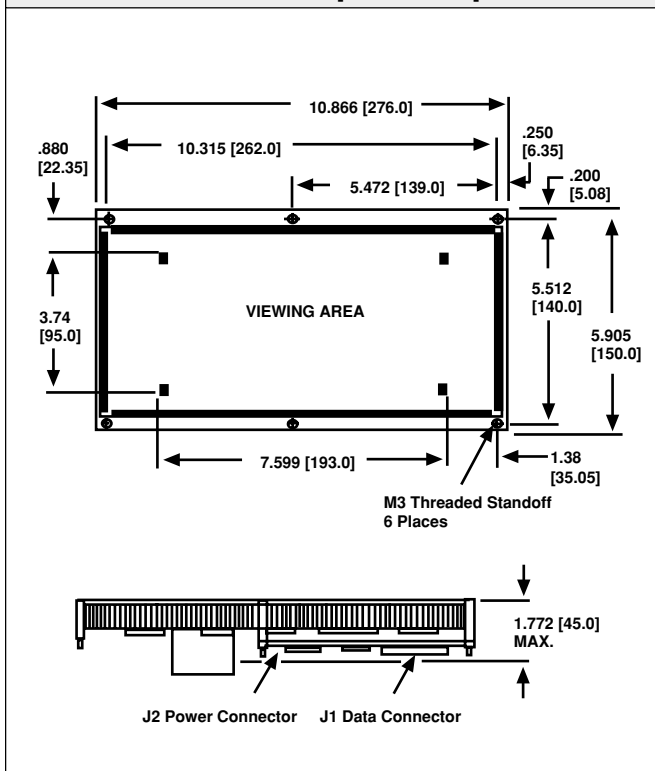
Operating Temperature: 0°C to + 55°C.

Storage Temperature: - 55°C to + 85°C.

Relative Humidity: 10 - 90% non-condensing.

Mechanical Shock: 50G 1/2 sine wave, 11 msec duration. 5 shocks in each of six directions.

Vibration: 0.018" [0.46] displacement amplitude from 10 to 50 Hz acceleration from 50 to 2000 Hz logarthmic sweep rate, along each side of the 3 major axes.

OPTICAL SPECIFICATIONS

Viewing Area: 7.56" [192.02] W x 3.74" [95.0] H.

Number of Characters: 480.

Character Size: 0.146" [3.708] W x 0.209" [5.309] H.

Luminance: 60 foot lamberts.

Color: Neon orange.

Viewing Angle: 150° cone.

DIMENSIONS in inches [millimeters]

10.866 [276.0]
.880 [22.35]
10.315 [262.0]
.250 [6.35]
5.472 [139.0]
.200 [5.08]
VIEWING AREA
3.74 [95.0]
5.512 [140.0]
5.905 [150.0]
7.599 [193.0]
1.38 [35.05]
M3 Threaded Standoff 6 Places
1.772 [45.0] MAX.
J2 Power Connector   J1 Data Connector

STANDARD ELECTRICAL SPECIFICATIONS

DESCRIPTION	MIN.	TYP.	MAX.	UNITS
Logic Supply Voltage	4.75	5.0	5.25	V
Logic Supply Current	—	800	—	mA
Panel Supply Voltage	180.0	185.0	190.0	V
Panel Supply Current	—	—	105.0	mA
Logic One Voltage	2.2	—	5.0	V
Logic Zero Voltage	—	—	0.8	V
Logic Zero Input Current	—	—	- 0.4	mA
(APD-480M021-2)				
Panel Supply Voltage	11.4	12.0	12.6	V
Panel Supply Current	—	0.7	2.5	A

GENERAL DESCRIPTION

The APD-480M021 consists of a DC plasma panel display, drive circuitry, and controller. The interface is a basic 8 bit parallel ASCII interface with handshaking and some dedicated control lines.
Vishay Dale's® patented open construction display technology assures a stable, flicker free screen.

The controller maintains all the refresh memory, character generation and control logic. It supports back space, horizontal tab, line feed, vertical tab, clear, carriage return and escape through software instructions. Control commands available include reading cursor position and data, horizontal tab after reading data at cursor position, character insert, character delete, line insert, line delete and screen clear. Operating modes are "normal" (wrap-around) or vertical scroll. The cursor may be turned on, or off, or on with a 4 Hz blink rate.

The EPROM based character generator is programmed with an ASCII character set, but is easily configured for any character set.

The logic input is one 74LS type input with 4.75 kilohm to + 5 VDC.
All input lines also have a 1000 μF capacitor to ground.

INTERFACE SIGNAL DESCRIPTION

DB0-DB7 (Data Bus) - Tri-state bi-directional data bus to exchange data between display and host processor.

CHK (Check Command) - If CHK is low, any character written will fill all positions on the screen. After CHK is low, momentarily pulling CLR low will start a self-test where all the characters in the character set are scrolled from right to left.

WR (Write) - Enter data while WR is low.

RD (Read) - Read data while RD is low.

A0 (Address Bus) - Selects character control codes or control command. A0 = low enables writing data.

US (Unit Select) - Read and Write commands will only influence display while US is low

B/D (Brightness/Dim) - Brightness is reduced 50% when B/D is low.

BL (Blank Screen) - Screen blanked when BL is low, but the data and cursor are maintained.

CLR (Clear Display) - Display memory is cleared and the cursor goes
to the HOME position when CLR is low.

BUSY (Busy Signal) - I/O is inhibited while BUSY is high. This output is driven from a 74LS06 open collector output and is not pulled up.

PIN DESCRIPTION

PIN	DESCRIPTION
J1 DATA CONNECTOR	
1	DATA BIT 0
3	DATA BIT 1
5	DATA BIT 2
7	DATA BIT 3
9	DATA BIT 4
11	DATA BIT 5
13	DATA BIT 6
15	DATA BIT 7
17	WR
19	US
21	RD
23	CLR
2, 26	GND
4	B/D
6	A0
12	CHK
24	BUSY
25	BL
8, 10, 14, 16, 18, 20, 22	Unused
J2 POWER CONNECTOR	
1	+ 185 V (+ 12 with - 2 option)
2	GND (Power)
3	GND (Logic)
4	+ 5 V

WARNING: Wrong connections or reversal of the connector may cause permanent damage to the display and host interface.

FUNCTION SUMMARY

CONTROL CODES	HEX
Back Space	08
Horizontal Tab	09
Line Feed	0A
Vertical Tab	0B
Clear	0C
Carriage Return	0D
Read Cursor Position	F0
Read Data at Cursor Position	F1
Read Cursor Position Data, then Perform Horizontal Tab	F2
Character Insert	F3
Character Delete	F4
Line Insert	F5
Line Delete	F6
Screen Clear	FF
ESCAPE CONTROL CODES	
Alter Cursor Position	1B
Row Position	##
Column Position	##

ORDERING INFORMATION

DESCRIPTION	PART NUMBER
Display, Driver Electronics and Controller	APD-480M021
Display, Driver Electronics, Controller with Built-in DC/DC Converter	APD-480M021-2
Parallel Data Connector Kit	280105-01
Power Connector Kit	280108-05
Non-Glare Filter (amber circular polarized) - other filters available, contact factory	280109-11