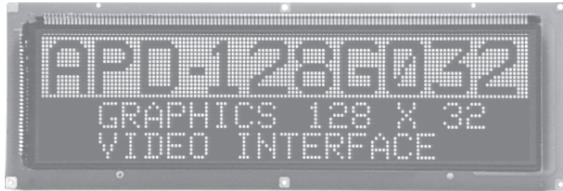


## Plasma Display Modules

### 128 x 32 Graphics Display with Drive Electronics and TTL Level Data Interface



The APD-128G032 has been designed to offer high brightness and superior viewing aesthetics in a package that is very affordable. This display is ideal for low to medium level information content messages and would be ideal for applications such as arcade games, process control, POS terminals, medical equipment, message centers and ATM machines.

The APD-128G032 DC plasma display offers viewing qualities designers seek such as high contrast, viewing angle of 150° minimum and long distance readability. Its bright (50 foot Lambert minimum) with characters and graphics figures presented in a pleasing neon orange color against a black background. Plasma is much more readable and eye-pleasing than liquid crystal or vacuum fluorescent displays and is filterable to red, amber or neutral density.

These plasma display panels are driven in a standard row-column refresh method much like a CRT display. The designer need only supply TTL level signals for SERIAL DATA, DOT CLOCK, COLUMN LATCH, ROW DATA, ROW CLOCK and DISPLAY ENABLE. The SERIAL DATA is entered with the DOT CLOCK up to frequencies as high as 8MHz. After a row of 128 pixels is clocked in, the COLUMN LATCH signal is toggled and the data is latched. At the time the data is latched, the display is briefly disabled using the DISPLAY ENABLE signal, then the row pointer is advanced with the ROW CLOCK signal. Once each frame the ROW DATA must be asserted to synchronize the column serial data with the beginning row. The recommended scanning frequency is approximately 70Hz, but may be as high as 200Hz. The high clock rate on the data clock allows for rapid refresh and maximum access time to the refresh ram.

STANDARD ELECTRICAL SPECIFICATIONS*					
DESCRIPTION	SYMBOL	MIN.	TYP.	MAX.	UNITS
Logic Supply	V <sub>cc</sub>	+ 4.5	+ 5.0	+ 5.5	VDC
Logic Current	I <sub>cc</sub>	—	25	100	mADC
Anode Supply	V <sub>sp</sub>	+ 75	+ 80		VDC
Anode Current (Fully Lit)	I <sub>sp</sub>	—	200	250	mADC
Cathode Supply	V <sub>sn</sub>	—	- 110	- 125	VDC
Cathode Current (Fully Lit)	I <sub>sn</sub>	—	200	250	mADC
Cathode Control**	V <sub>rw</sub>	+ 10.8	+12	+ 15	VDC
Cathode Control Current	I <sub>rw</sub>	—	10	20	mADC
Total V <sub>sp</sub> and V <sub>sn</sub>	V <sub>tot</sub>	170	185	205	VDC
Logic 1 Input	V <sub>ih</sub>	2.0	—	—	VDC
Logic 0 Input	V <sub>il</sub>	—	—	0.8	VDC

\*Recommended operating voltages. All maximums are absolute maximum.

\*\*V<sub>rw</sub> is referenced to V<sub>sn</sub>.

#### FEATURES

- TTL level video interface
- Large characters
- Highly visible for long distance viewing
- > 30:1 contrast ratio
- Bright and pleasant neon orange color
- Slim profile
- Very affordable

#### ELECTRICAL SPECIFICATIONS

**Voltage(s) Required:** + 75VDC, V<sub>sp</sub>. - 110VDC, V<sub>sn</sub>. + 5VDC, V<sub>cc</sub>. + 12VDC (- 98 VDC), V<sub>rw</sub> (12VDC to be referenced to - 110VDC.)

**Power Required:** Typical =12 watts. Maximum = 45 watts

#### OPTICAL SPECIFICATIONS

**Viewing Area:** 12.75" [323.8mm] W x 3.15" [80.01mm] L

**Character Array:** 8 x 8: 16 x 4. 6 x 8: 21 x 4

**Character Size:** 0.65" [16.51mm] H x 0.45" [11.43mm] W

**Pixel Size:** 0.050" [1.27mm]

**Pixel Pitch:** 0.100" [2.54mm]

**Luminance:** 50 foot lamberts

**Color:** Neon Orange

#### ENVIRONMENTAL SPECIFICATIONS

**Operating Temperature:** 0°C to + 70°C

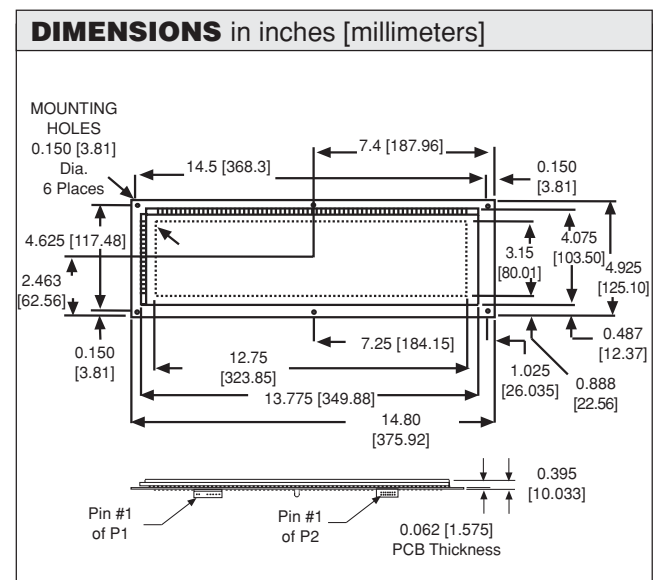
**Storage Temperature:** - 40°C to + 85°C

**Relative Operating Humidity:** To 95% non-condensing

**Mechanical Shock:** 30G

**Vibration:** 3G

**Operating Altitude:** 10,000 feet



PIN DESCRIPTION			
<b>P1 - POWER CONNECTOR</b>			
AMP #640445-8 or equivalent. Mates with AMP 640428-8, MOLEX 09-50-3081 or equivalent.			
PIN	SIGNAL	DESCRIPTION	
1	V <sub>sn</sub>	Cathode supply	
2	V <sub>rw</sub>	Cathode control	
3	KEY	Used to key connector	
4	GND	V <sub>sn</sub> and V <sub>sp</sub>	
5	GND	V <sub>cc</sub>	
6	V <sub>cc</sub>	Logic supply	
7	NOT USED		
8	V <sub>sp</sub>	Anode supply	
<b>P2 - DATA CONNECTOR</b>			
AMP #103309-2 or equivalent. Mates with AMP 746195-2, MOLEX 39-27-1146 or equivalent.			
PIN	DESCRIPTION	PIN	DESCRIPTION
1	DISPLAY ENABLE	2	GROUND
3	ROW DATA	4	GROUND
5	ROW CLOCK	6	GROUND
7	COLUMN LATCH	8	GROUND
9	DOT CLOCK	10	GROUND
11	SERIAL DATA	12	GROUND
13	No connect	14	GROUND

### INTERFACE SIGNAL DESCRIPTION

**DOT CLOCK** - This signal enters the SERIAL DATA on each low to high transition. A total of 128 DOT CLOCK transitions must be present for each line of column/anode data.

**SERIAL DATA** - This signal presents the pixel data in positive logic format. A logic one represents a lit pixel and a logic zero represents an extinguished pixel. Data is entered from right to left. The first pixel data entered will represent the left most pixel in the row.

**COLUMN LATCH** - This signal latches the pixel data into the driver outputs. When the COLUMN LATCH signal goes to logic one the data entered previously will fall through to the driver outputs. When the signal returns to a logic zero the data is latched and the shift register is now ready to accept the next row of data. Must be held low while entering new SERIAL DATA.

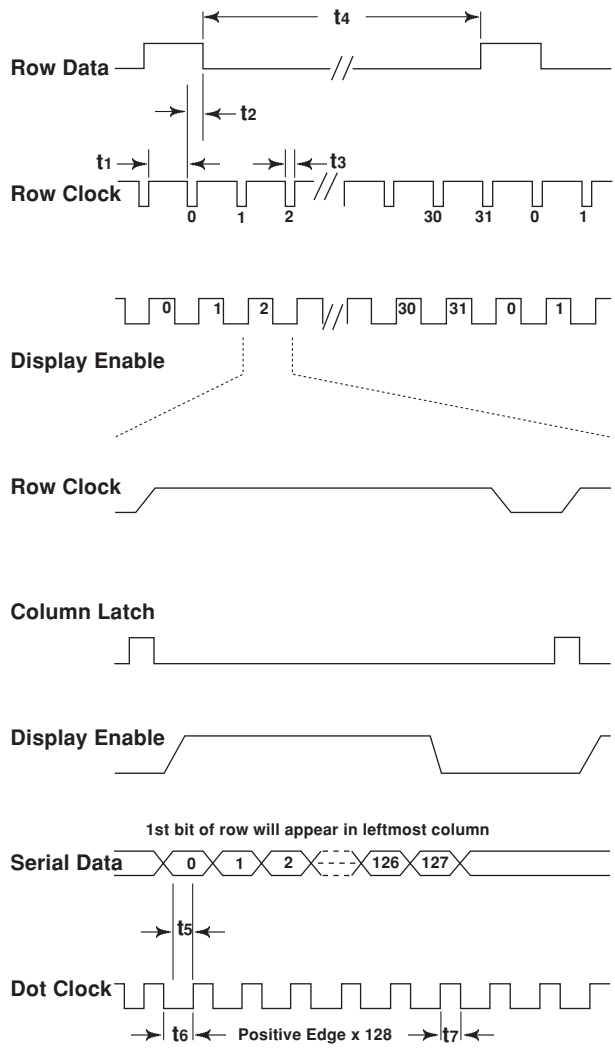
**DISPLAY ENABLE** - This signal enables the output drivers. Using a duty cycle control, this signal may also be used for intensity control. The DISPLAY ENABLE must be at logic zero before the COLUMN LATCH signal transitions. To avoid display blurring, the ROW CLOCK signal should also transition while DISPLAY ENABLE is a logic zero.

**ROW DATA** - This signal is the first line marker for the scan. This input should be held high to correspond to the first row of pixel data.

**ROW CLOCK** - This signal clocks ROW DATA on the falling edge. The ROW CLOCK signal is repetitive and must be present for proper scanning of the display module.

The APD-128G032 has a unique input protection circuit that assures the column drivers stay blanked on power up. The protection circuit unblanks the column drivers when the ROW CLOCK signal begins (i.e the display begins scanning.)

### LOGIC AND DATA TIMING



PARAMETER	MINIMUM	TYPICAL	MAXIMUM	UNITS
t <sub>1</sub>	100	-	-	nS
t <sub>2</sub>	5	-	-	uS
t <sub>3</sub>	1	-	-	uS
t <sub>4</sub>	-	70	200	Hz
t <sub>5</sub>	25	-	-	nS
t <sub>6</sub>	75	-	-	nS
t <sub>7</sub>	75	-	-	nS

### ORDERING INFORMATION

DESCRIPTION	PART NUMBER
Display, Driver Electronics and TTL Interface .....	APD-128G032
Data Connector Kit .....	280105-05
Power Connector Kit .....	280108-12
DC/DC Converter Assembly .....	280961-03



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