Table 1-1. Specifications: 1349A (no memory); 1349D (with internal memory)

INTERFACE

General: 16 Bit Binary.

Signal lines:

Pin Name	Description	1349A	1349D
D0-D15	16-Bit TTL Data Bus Pos Logic	X	X
LWR	Low Memory Write	N/A	X
LDAV	Low Data Available	X	N/A
LRD	Low Memory Read	N/A	X
LRFD	Low Ready for Data	X	N/A
LDS	Low Device Select	N/A	X
SYNC	Ext Refresh Synchronization	N/A	X
LXACK	Low Transfer Acknowledge	N/A	X
GND	Logic Ground	X	X
DISCON	Disconnect Sense. Signal connector off activates self test when allowed to float.		

Logic Level: Standard TTL.

1349A		1349D	
Line	Loading	Line	Loading
D0-D4	1-MOS, 1-LSTTL, 1-STTL	D0-D13	1-MOS, 1-LSTTL
D5-D7	1-MOS, 2-LSTTL, 1-STTL	D14,D15	1-MOS, 2-LSTTL
D8-D15	1-MOS, 1-LSTTL, 1-STTL	LRD	1-MOS, 1-LSTTL
LDAV	1-MOS, 1-LSTTL, 1-STTL	LWR	1-MOS, 1-LSTTL
		LDS	1-MOS, 1-LSTTL
		SYNC	1-MOS, 1-LSTTL

Mating connector: 26-pin female transition connector; mating part Ansley 609-2630 (polarized).

CATHODE RAY TUBE

Type: Electrostatic focus and deflection, post accelerated. Aluminized P31 Phosphor.

Screen Size: 204 Square cm (31.6 square in.); approx. 20.8 cm (8.2 in.) diagonal; 12 cm (4.7 in.) vertical by 17 cm (6.7 in.) horizontally.

Resolution: Display is to be adjusted so that all lines of the secondary test pattern are distinguishable.

Display Memory (1349D only): 8K word by 16 bits.

INPUT POWER

+15VDC +-5% Regulated; <=1.3A @<=10 mV p-p ripple (measured at A3TP1).

-15VDC +-5% Regulated; <=0.35A @<=10 mV p-p ripple (measured at A3TP2).

+5VDC +5 -0% Regulated; <2.0A @<=50 mV p-p ripple (measured at A3TP3 1349A only).

Mating Connector: Molex No. 09-50-3061.

SAFETY

X-Ray Emission: CRT emission <=9,5 mR/hr (not measurable above background noise with Vicroreen Model 440RF/C when in normal operating modes).

OPERATING ENVIRONMENT

Temperature: (operating) 0° C to +65° C (+32° F to +149° F).

NOTE

The 65° C (149° F) temperature specification reflects the maximum allowable operating temperature with the 1349A/D enclosed, not the ambient temperature of the system housing. It is recommended that a minimum of 0.84 m^3/min (30 ft^3/min) of air flow is forced around and through the instrument to ensure that the maximum operating temperature of 65° C (149° F) is not exceeded. Refer to Section II, Paragraph 2-13 of this manual for temperature measurement instructions.

Temperature: (non-operating) -40° C to +70°C (-40° F to +167° F).

Table 1-1. Specifications (Cont'd)

Humidity: to 95% relative humidity up to +50° C.
Altitude: (operating) to 4600 m, (15,000 ft); (non-operating) to 15,300 m, (50,000 ft).
Shock:
Shock Intensity 60g.
Shock Pulse Duration 11 ms.
Shock tests are performed with the equipment non-operating and any auxiliary circuits not powered.
Vibration:
Vibration Frequency: 5-55-5 Hz.
Vibration Sweep: Cover the vibration frequency in 15 minutes.
Vibration Pulse Shape: Full sine wave.
Vibration peak-to-peak amplitude:
5-10 Hz, 6.34 mm (0.250 in.)
10-25 Hz, 3.05 mm (0.120 in.)
25-55 Hz, 0.76 mm (0.030 in.)
Dwell for 10 minutes at the four highest resonances found on each axis. If no major resonance can be detected, dwell at 55 Hz for 10 minute duration at 0.76 mm (0.030 in.).

CAUTION

The 1349A/D Displays have been tested at shock and vibration levels listed above. These are absolute maximum levels and apply to the 1349A/D only not to the host structure in which they are installed.

In general, the host structure will act to amplify shock and vibration applied to it when transmitting that energy to the 1349A/D.

Care must be taken that specified levels of shock and vibration are not applied to the 1349A/D.

Size: See outline drawing figure 1-2.
Weight: Net 6.0 kg (13.2 lbs).
Shipping Weight: 8.64 kg (19.0 lbs).

Table 1-2. 1349A/D Functions

GRAPHIC FUNCTIONS

Character Generator:
Stroke Characters: 32 by 20 point resolution; modified full ASCII set. Character Strokes are stored in ROM. Average character writing time is 16 μs.
4 Programmable Character Sizes:
1.0× = 68 Characters per line, 31 horizontal lines possible.
1.5× = 45 Characters per line, 21 horizontal lines possible.
2.0× = 34 Characters per line, 15 horizontal lines possible.
2.5× = 27 Characters per line, 12 horizontal lines possible.

NOTE

1× Character approximately 2mm high.

4 Programmable Character Orientations: 0, 90, 180, 270° (CCW) relative to horizontal.

VECTORS

Random Vector Plotting: Addressable resolution 2048 by 2048 points.
Line Types: Solid Line
Solid line with intensified end points
Short dashed line
Long dashed line
Dots

Velocity:
4 Programmable Writing Speeds: approximately 1.9, 3.4, 5.2 and 6.9 mm per μs.
Vector Drawing time: μs per vector + (length of vector/writing speed).
3 Programmable Intensities: Dim, medium brightness, full brightness (plus Blank or off).

PLOTTING
Plotting Modes: Plot absolute and Graph.
Beam Control: The beam may be turned on or off while plotting.

GRAPH GENERATION
Tick Marks: X- and Y-axis tick marks of four selectable lengths.
Graph Mode: Allows generation of graphs which have a constant X-incrememt between points by storing the X-increment once, requiring only new values for succeeding points.

SELF TEST

Self Test is invoked by disconnecting the I/O connector with power applied. The Test Pattern verifies that the 1349A/D is operational and provides necessary stimulus for routine calibration. An internal connector is provided for activation of an alternate test pattern. When the connector is shorted, the alternate pattern may be used to verify CRT resolution and allow calibration of focus and astigmatism adjustments. When memory is installed (1349D), the self test feature also performs a memory test.

Table 1-3. Supplemental Characteristics

ANALOG OUTPUTS

General: The 1349A/D Displays have internal connectors for output of X, Y, and Z analog signals to drive a slave CRT display.

Amplitudes: Approximate amplitude range is 0V to 1V.

Output Impedance: X, Y — 340 ohms nominal.
Z — 250 ohms nominal.

Polarity: X — Positive-going voltage corresponds to right beam movement.
Y — Positive-going voltage corresponds to upward beam movement.
Z — Positive-going voltage corresponds to increasing luminance.

Recommended Bandwidth of slave display: X, Y — Axis: >=3 MHz
Z — Axis: >=10 MHz

Recommended Mating Connectors: Molex 22-01-1023. (3 required, 1 each for X, Y and Z Axis).

CATHODE RAY TUBE

Brightness: Shipped from the factory at approximately 140 Cd/sq. m at 1.9 mm/μs writing speed, full brightness at 60 Hz refresh rate, 7 by 7 cm, 50 line raster, 50% duty cycle.

1-13. DESCRIPTION.

1-14. The Hewlett-Packard Models 1349A and 1349D are 20.8 cm (approx. 9 in.) Display Components. Both produce vector graphics on their display screens in response to digital commands from a user processor. The 1349D contains an 8K word refresh memory which enables the display to refresh the picture without support from the user processor. The 1349A must be refreshed by the user.

The 1349A/D have an addressable resolution of 2048 by 2048 points which allows display of very high quality images, composed of straight or curved lines. Curved lines are formed by a series of short straight vectors joined end to end. The unit has programmable writing speeds and programmable intensities. Vectors, regardless of length can be drawn at constant speed so that the intensity does not vary from vector to vector.

For on screen labeling and identification, the 1349A/D have a built-in set of ASCII characters. The 1349A/D receive just one word from the user processor and all the vectors necessary to form one character are automatically produced from ROM.

1-15. ACCESSORIES SUPPLIED.

1-16. The following accessories are supplied with the 1349A/D:
One Operating and Service Manual.

1-17. RECOMMENDED TEST EQUIPMENT.

1-18. Equipment required to test and maintain the 1349A/D Displays is listed in table 1-4. Other equipment may be substituted if it meets or exceeds the critical specifications listed in the table.

Table 1-4. Recommended Test Equipment

Instrument Type	Recommended Model	Required Characteristics	Required For
Monitor Oscilloscope	HP Model 1740A	**Bandwidth:** 100 MHz **Input Z:** 50 ohms AND 1 Mohm shunted by approx. 20 pf.	A
Digital Voltmeter	HP Model 3466A	**Voltage Rating:** -15V to 250V **Accuracy:** 0.1 % **Input Resistance:** 10 Mohm	A
1000:1 Divider	HP Model 34111A	**Voltage Rating:** 12 kV	A
10:1 Divider Probe (Qty 2)	HP Model 10041A (supplied with model 1740A)	**Input Resistance:** 1 Mohm shunted by approx. 12 pf.	A
Power Supply	HP Model 63315E	**Output Voltage:** 5V at 2.0A **Output Voltage:** +15V at 0.5A -15V at 1.1A	P,A P,A
Signature Analyzer	HP Model 5005A		T

P = Performance test A = Adjustment T = Troubleshooting