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DC CHARACTERISTICS

	16 BIT		8 BIT	
RANGE	RESOLUTION	ACCURACY* ±(%rdg + offset) (1 Yr., 18°-28°C)	RESOLUTION	ACCURACY* ±(%rdg + offset) (1 Yr., 18°-28°C)
320 mV	10 µV	0.030% + 200 µV	2.56 mV	0.42% + 2.56 mV
3.2 V	100 µV	0.025% + 2 mV	25.6 mV	0.42% + 25.6 mV
32 V	1 mV	0.035% + 20 mV	256 mV	0.42% + 256 mV
200 V	10 mV	0.035% + 200 mV	2.56 V	0.42% + 2.56 V

*After pushbutton or bus zeroing, and using average function (10,000 samples, 10µs sample rate).

INPUT IMPEDANCE: 1.1MΩ (1.0MΩ on 200V range) shunted by <70pF.

MAXIMUM ALLOWABLE INPUT: 250V peak, 10^8V•Hz.

MAXIMUM COMMON MODE VOLTAGE: 30V rms, 42V peak, 5×10^5 V•Hz.

COMMON MODE REJECTION RATIO: >60dB at dc to 1kHz, 1kΩ unbalance.

DIFFERENTIAL NONLINEARITY: 16-Bit: ≤2 LSB. 8 Bit: ≤0.5 LSB.

TEMPERATURE COEFFICIENT (0°-18°C & 28°-50°C): < ±(0.1 × applicable accuracy specification)/°C.

DYNAMIC CHARACTERISTICS

SAMPLE TRIGGER: Initiates each A/D conversion.

EXTERNAL SAMPLE TRIGGER INPUT: Rising edge, TTL compatible. DB-25 connector.

	INTERNAL SAMPLE TRIGGER		EXTERNAL SAMPLE TRIGGER	
	16 BIT	8 BIT	16 BIT	8 BIT
SAMPLE RATE				
Maximum	100 kHz	1 MHz	100 kHz	1 MHz
SAMPLE INTERVAL				
Minimum	10 µs	1 µs	10 µs	1 µs
Maximum	1 s	1 s	No limit	
Resolution	100 ns	100 ns	—	—
Jitter (typical)	±0.4 ns	±2 ns	±2 ns	±2 ns
TIMEBASE ACCURACY	±0.02%	±0.02%	±0.02%	±0.02%
NUMBER OF SAMPLES				
Minimum	1	1	1	1
Maximum	32k	64k	32k	64k

SIGNAL/NOISE RATIO (sinewave curve fit): 50dB for full range 100kHz sine input; 72dB typical at 10kHz.

SLEW RATE: 13V/µs minimum.

SETTLING TIME: 1 µs to 1% of final value.

CHANNEL CROSSTALK: <60dB at 500kHz.

INPUT COUPLING: Ac, dc, ground.

FREQUENCY RESPONSE (Filter Off):

0.2 dB	1 dB	3 dB
dc (15 Hz) - 20 kHz	dc (5 Hz) - 200 kHz	dc (2 Hz) - 750 kHz

( ) Indicates ac coupled performance.

LOW PASS FILTER: 50kHz, 500kHz, single pole.

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MEASUREMENT TRIGGER

MEASUREMENT TRIGGER: Initiates acquisition of a set of samples.

DELAY:

Pre-Trigger: $-32k < n < -1$, 16-bit mode; $-64k < n < -1$, 8-bit mode. $|n|$ samples are stored prior to measurement trigger.

Post-Trigger: $1 < n < 1 \times 10^9$. Storage begins "n" samples after measurement trigger.

SOURCE:	Description
Input Signal	Slope: + or − Level: Selectable over input voltage range and resolution.
External:	Negative TTL edge, rear panel BNC.
Front Panel:	Manual pushbutton.
IEEE-488 Interface:	16 programmable trigger modes.
Other Channel:	Internally generated.

CHANNEL 2 (Option 1944A)

Permits synchronous or asynchronous sampling of data. Specifications are identical to those of Channel 1. All Channel 2 measurement parameters are independently selectable.

MATH FUNCTIONS

AVERAGE: $\frac{\sum_{i=0}^{n-1} V_i}{n} = V_{avg}$

PEAK TO PEAK: Difference between maximum and minimum values of samples.

PLUS PEAK: Maximum value of samples.

MINUS PEAK: Minimum value of samples.

STANDARD DEVIATION: $\sqrt{\frac{\sum_{i=0}^{n-1} (V_i - V_{avg})^2}{n}}$

TRUE ROOT MEAN SQUARE: $\sqrt{\frac{\sum_{i=0}^{n-1} (V_i)^2}{n}}$

INTEGRAL: $(\frac{1}{2}V_0 + \frac{1}{2}V_{n-1} + \sum_{i=1}^{n-2} V_i)\, t_s$

DIFFERENCE: Channel 1 − Channel 2.

RATIO: Channel 1 / Channel 2.

NOTE: V_i: Voltage of sample i. n: Total number of samples. i: Location of individual sample. t_s: Sample interval.

REAL TIME (DMA) OUTPUT

FORMAT: Binary, 16-bit or 8-bit. **RATE:** Same as Sample Rate.

CONTROL LINES: End of Sample, Overrun, High Byte, Low Byte.

ANALOG OUTPUT

MODES	OUTPUTS USED
CRT	x, y, z (blanking)
Oscilloscope	y, z (trigger)
Slow Plot	x, y, z (pen up/down)
Strip Chart	y

X OUTPUT: 0-10V full scale, 2.44mV resolution.

Y OUTPUT: 0-10V full scale, 2.44mV resolution.

Z OUTPUT: 0V, 5V or 15V.

ZOOM MAGNIFICATION: 0.1:1 to 1000:1.

PAN: Across entire memory.

PART NUMBER SPEC.-194A

FRONT PANEL PROGRAMS

0 **IEEE ADDRESS:** Set IEEE-488 address.

1 **SELF TEST:** Performs internal RAM and ROM check.

2 **DIGITAL CALIBRATION:** Executes calibration procedure.

3 **CALIBRATION STORAGE:** Stores calibration constants in NVRAM.

4 **X OUTPUT FULL SCALE:** Sets full scale X output voltage.

5 **Y OUTPUT FULL SCALE:** Sets full scale Y output voltage.

6 **Z OUTPUT BLANKING LEVEL:** Sets high or low blanking level.

IEEE-488 BUS IMPLEMENTATION

MULTILINE COMMANDS: DCL, LLO, SDC, GET, GTL, UNT, UNL, SPE, SPD, MLA, MTA.

UNILINE COMMANDS: IFC, REN, EOI, SRQ, ATN.

INTERFACE FUNCTIONS: SH1, AH1, T6, TE0, L4, LE0, SR1, RL1, PP0, DC1, DT1, C0, E1.

PROGRAMMABLE PARAMETERS: Range, Math Functions, Zero, Delay, Sample Rate, Number of Samples, Trigger, Calibration, Output Format, Self Test, Display, Status, Service Request, Storage, Filter, Terminator, Input Coupling, Buffer Size, Channel, Save and Recall Setups, Front Panel Programs 1-6, Key Sequence, Slope, Analog Outputs, EOI.

BINARY TRANSFER RATE: 90k bytes/second.

GENERAL

DISPLAY: 14-digit alphanumeric LED display; function, bus status also displayed.

RANGING: Manual or autoranging.

WARMUP: One hour to rated accuracy.

OPERATING ENVIRONMENT: 0° to 50°C, 0% to 80% relative humidity up to 35°C.

STORAGE ENVIRONMENT: −25° to 65°C.

POWER: 105-125V or 210-250V (internal switch selectable), 50Hz or 60Hz, 120VA maximum. 90-110V and 180-220V version available.

CONNECTORS: All I/O connectors are BNC except Real Time Output (DB-25) and IEEE-488 connectors.

DIMENSIONS, WEIGHT: 89mm high × 435mm wide × 448mm deep (3½ in. × 17⅛ in. × 17⅝ in.). Net weight 9.1kg (20 lbs.), Dual Channel.

ACCESSORIES AVAILABLE:

Model 1938: Fixed Rack Mounting Kit
Model 1939: Slide Rack Mounting Kit
Model 1942: Sample Cable
Model 1944A: Channel 2
Model 7007-1: Shielded IEEE-488 Cable, 1m (3.2 ft.)
Model 7007-2: Shielded IEEE-488 Cable, 2m (6.5 ft.)
Model 7051-2: BNC Interconnect Cable, 2 ft.
Model 7051-5: BNC Interconnect Cable, 5 ft.
Model 7754-3: BNC to Alligator Cable, 3 ft.
Model 7755: 50Ω Feed-Through Termination
Model 8573A: IEEE-488 Interface for IBM PC, PC-AT

Specifications subject to change without notice.

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