

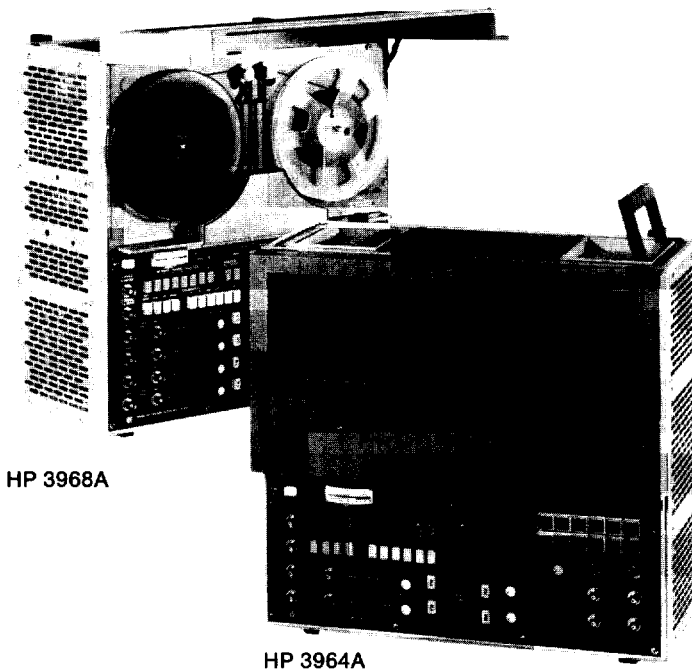


PLOTTERS & RECORDERS

Instrumentation Tape Recorders and Degausser

Models 3964A, 3968A, and 13064A Degausser

- Continuing savings by recording on 1/4-inch tape
- Choice of 4 or 8-channel recorders
- Selection of FM or direct electronics
- Six tape speeds, including 15/32 ips
- Remote control (TTL or optional HP-IB)
- Switch selection of tach or tape servo



HP 3968A

HP 3964A

HP 3964A and 3968A ITRs, HP 13064A Degausser

The 4-channel HP 3964A and 8-channel HP 3968A are quality instrumentation tape recorders (ITRs) that provide cost-saving operation by using 1/4-inch tape for a wide variety of recordings. Medical versions of the HP 3964A and 3968A (Options 009 and 010) are available. These versions include a UL 544 medical listing making them useful in hospitals, medical offices, and research facilities.

The HP 13064A bulk tape degausser erases a complete roll of tape cleanly in seconds. A thoroughly clean tape is necessary to obtain maximum signal-to-noise ratio.

Both the HP 3964A and the HP 3968A are precision-built ITRs with features that cut costs, enhance the usefulness of the units, and simplify recording tasks in laboratory, medical, production, and field use.

HP 3964A, 3968A Features

Cost-saving 1/4-inch tape: provides continuing savings for the life of the recorder. By using 1/4-inch tape, rather than 1/2-inch tape, users can save over 50 percent on tape costs.

AC/DC calibrator: provides an internal voltage source that simplifies the set up of input and output levels for each data channel. Six voltages, ac or \pm dc, can be pushbutton selected, applied, and monitored to check out each channel. In addition, there is an external connector to allow the use of scopes or other monitoring devices.

Tach or tape servo control: tach-servo and tape-servo systems are switch selectable.

Flutter compensation: improves the signal-to-noise ratio in FM by up to 12 dB in a vibrating environment. When switched on, flutter-generated noise introduced during record and reproduce is subtracted from all FM data channels during reproduce to improve performance. One FM channel is used for flutter compensation; this same channel can also be used for tape servo control, saving a data channel for recording when both flutter compensation and tape servo are required.

Voice capability: provides voice annotation capability on the fourth channel of the HP 3964A or the eighth channel of the HP 3968A, using the press-to-talk microphone. The voice channel accepts data only, voice only, or data with a voice interrupt. Microphone, speaker, and headphone jack are provided with both recorders.

FM electronics-to-electronics (e-e) mode: transfers the input signal automatically to output, bypassing the record/reproduce heads. This occurs when tape is below record/reproduce speed or in Fast Forward, Rewind, or Stop mode. E-E allows the unit to be set and calibrated without using tape.

Instrumentation Tape Recorder Notes

These technical application notes are available, at no charge, from your Hewlett-Packard sales office:

Topic	Application Note No.	HP Part Number
Dropouts	213-1	5952-2841
Crosstalk	213-2	5952-2844
Interchannel Time Displacement Error	213-3	5952-2848
Magnetic Tape Recording Handbook	89	5952-2820

HP 3964A, 3968A Transport Specifications

Tape width: 1/4 inch (6.3 mm)

Reel size: standard 7-inch (18 cm) plastic reel, totally enclosed by reel cover

Heads

HP 3964A: One 4-track record and one 4-track reproduce

HP 3968A: One 8-track record and one 8-track reproduce

Tape Speed* (ips)	15	7 1/2	3 3/4	1 7/8	1 5/16	1 5/32
Flutter (% p-p)	0.35	0.35	0.40	0.50	0.70	1.5
Time base error (μ s)*	± 4	± 5	± 7.5	± 15	± 25	± 50
Start time (s) (typical)	3	1.5	0.9	0.5	0.5	0.5
Tape speed accuracy (s)	0.2	0.2	0.2	0.2	0.2	0.2

*Tape servo operation

Tape motion controls: pushbutton selectable Forward Record, Reverse Record, Forward Play, Reverse Play, Fast Forward, Fast Rewind, and Stop

EOT sensing: tape drive stops automatically at the end of tape (EOT)

Reel revolution counter: 4-digit counter with pushbutton reset

FM Record/Reproduce Specifications¹

Tape Speed (ips)	Passband ² (Hz)	Signal-to-noise ³ Ratio	
		HP 3964A	HP 3968A
15	dc-5000	48	46
7 1/2	dc-2500	48	46
3 3/4	dc-1250	48	46
1 7/8	dc-625	46	46
1 5/16	dc-312	44	44
1 5/32	dc-156	40	40

- Based on use of Ampex 797 tape or equivalent
- Frequency response over passband is ± 1.0 dB referenced to 10% of upper band edge frequency
- Signal measured with carrier deviation ±40% of upper passband without flutter compensation. Output filters of reproduce amplifiers selected for constant amplitude response. May also be selected for linear phase (transient) response

Flutter compensation: can improve signal-to-noise by up to 4 dB under static conditions and as much as 12 dB under conditions of vibration. Selected by rear panel switch.

Distortion: total harmonic distortion <1.2% @ 15 to 1 7/8 ips, < 2% @ 1 5/16 to 1 5/32 ips.

Linearity: ±1.0% of peak-to-peak output for best straight line through zero at ±40% deviation

DC drift: ±0.1% (max) of full scale output per °C

Input level: 1 V to 30 V (peak-to-peak); continuously adjustable

Input impedance: 100 kΩ nominal, shunted by <100 pF single-ended

Output level: 1 to 5 V (peak-to-peak); continuously adjustable

Load impedance: minimum load impedance 660 Ω

Direct Record/Reproduce Specifications¹

Tape Speed (ips)	Passband (±3 dB) ²		S/N Ratio (dB) ³	
	HP 3964A	HP 3968A	HP 3964A	HP 3968A
15	70-64000 Hz	500-64000 Hz	38	36
7 1/2	50-32000 Hz	250-32000 Hz	38	36
3 3/4	50-16000 Hz	100-16000 Hz	38	36
1 7/8	50-8000 Hz	100-8000 Hz	38	36
1 5/16	50-4000 Hz	100-4000 Hz	38	35
1 5/32	50-2010 Hz	100-2000 Hz	37	35

- Based on the use of Ampex 797 tape or equivalent
- Reference to 10% of upper band edge
- Referenced to a 500 Hz sine wave with a maximum of 1% third harmonic distortion when reproduced at 3 3/4 ips

Input level: 1 V to 30 V (p-p); continuously adjustable

Input impedance: 100 kΩ nominal, single-ended

Output level: 0.5 to 5 V (p-p); continuously adjustable

Load impedance: minimum load impedance 600 Ω

Calibrator: internal signal source, peak ac and ±dc levels of 0, 1.0, 1.414, 2.5, 5.0, and 10.0 volts ±2%

Meter modes: peak ac or dc, input or output

HP 3964A, 3968A General Specifications

Size

HP 3964A: 400 H x 427 W x 256 mm D (15.7" x 16.8" x 10.1")

HP 3968A: 445 H x 427 W x 256 mm D (17.5" x 16.8" x 10.1")

Weight: HP 3964A, 29.5 kg (65 lb); HP 3968A, 31.3 kg (69 lb)

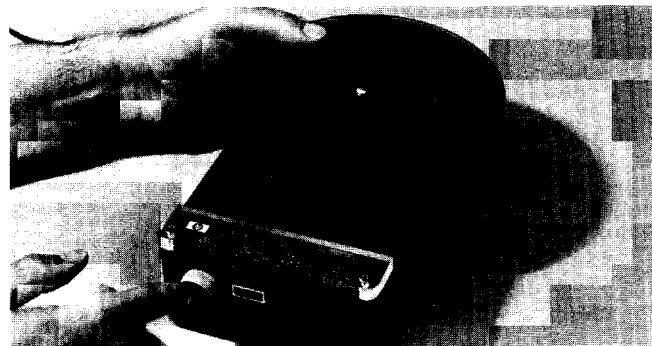
Power requirements: 100, 120, 220, or 240 V, +5%, -10%, 48-66 Hz; 110 W average

Temperature: storage, -40°C to 75°C; operating, 0°C to 55°C; tape limit, 10°C to 40°C

Altitude: storage, 15240 m (50000 ft); operating, 4500 m (15000 ft)

Humidity: the system, excluding tape limitations, will operate from 10% to 95% RH (25°C to 40°C), non-condensing

Shock: 30 g maximum (11 ms) non-operating
Mounting: rack mounting kit for equipment racks, 19-inch



HP 13064A

HP 13064A Tape Degausser Specifications

Tape size: 1/4-inch (6.33 mm) tape on reels up to 10 1/2 inch (266 mm) in diameter

Erase: 60 dB minimum

Duty cycle: one minute ON, three minutes OFF

Size: 67 H x 133 W x 171 mm D (2.6" x 5.25" x 6.75")

Weight: approximately 4.3 kg (9.5 lb)

Power requirements: 115 V ac ±10%, 50-60 Hz (Opt 001); 230 V ac ±10%, 50-60 Hz (Opt 002)

HP 3964A, 3968A Options

Price

Record/Reproduce Channel Data Card Options

Option provides one data card. Specify one option for each channel, up to 4 for HP 3964A, up to 8 for HP 3968A.

001 FM data card, standard \$480

030 FM data card, medical (must order Opt 009 or 010) \$480

002 Direct data card, standard \$450

031 Direct data card, medical (must order Opt 009 or 010) \$450

Medical ITR Options

009 Medical version with white paint \$500

010 Medical version with standard paint \$430

Other Options

Specify no more than one of each option per mainframe

003 Rear panel with BNC input/output connectors for each channel.

HP 3964A \$95

HP 3968A \$125

004 Locking knob set (screwdriver adjustable) \$50

005 Metric speed annotation on pushbuttons N/C

007 HP-IB remote control of speeds and mode \$470

024 Loop adapter (accommodates 5 to 30-ft loop) \$975

026 Slides for 19 in. racks \$135

027 Slides for HP cabinets \$195

041 IRIG servo reference frequency \$225

070 Overlap. For two units. Provides automatic play/record commands for second recorder when first unit tape is low \$380

Ordering Information

Price

HP 3964A 4-channel instrumentation tape recorder \$8065

HP 3968A 8-channel instrumentation tape recorder \$10,370

HP 13064A Tape degausser (specify Option 001 for 115 V ac or 002 for 230 Vac, N/C for options) \$155

HP 13107A Transit case for HP 3964A \$480

HP 13106A Transit case for HP 3968A \$480