



# TELECOMMUNICATIONS TEST EQUIPMENT

Microwave Radio Noise and Interference Test Set and Measurement System;  
Digital Radio Constellation Display

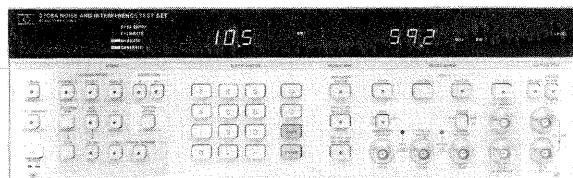
Models 3708A, 3708S, 3709A

## HP 3708A

- Highly accurate wideband noise source covers all common microwave link IFs
- Tracking mode maintains constant C/N ratio under carrier fading conditions
- Broadband interference facility, with or without noise injection, stresses the radio deterministically

## HP 3708S

- Extensive graphics capability facilitates operation and measurement interpretation
- Complete range of Hewlett-Packard HP-IB compatible bit-error-ratio test sets supported



HP 3708A



## HP 3708A Noise and Interference Test Set

The HP 3708A offers an accurate, yet simple, method of simulating flat-fade conditions on a digital or FM microwave radio. Designed for connection at the IF section, the HP 3708A adds calibrated levels of white noise and/or interference signals to the radio IF carrier. A built-in power meter and microprocessor control enable the radio IF carrier power to be sampled by the HP 3708A at the point of noise injection and the noise density (or interference level) to be adjusted automatically to maintain a constant carrier-to-noise (or interference) ratio even in the presence of receiver carrier level variations.

### Additional capabilities within the instrument include:

- True RMS IF power meter
- High stability 0 dBm reference tone (can be used as interferer)
- Direct noise bandwidth measurement
- Entry is units of  $C/N_0$ ,  $E_b/N_0$  or  $C/N$  ( $C/N$  in user-defined bandwidth)

### Options

**Std:** Signal connectors impedance, 75 ohm nominal unbalanced to GND. Reference tone oscillator frequency is 70/140 MHz.

**001:** Signal connectors impedance, 50 ohm nominal unbalanced to GND.

**Special options:** Reference tone oscillator frequencies, other than the standard values, are available on a special order basis.

**HP 3708A Noise and Interference Test Set \$14,450.00**

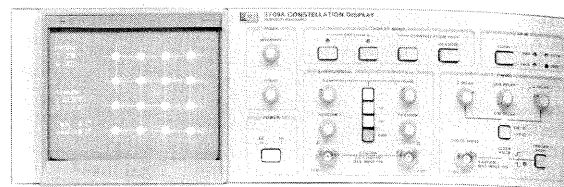
## HP 3708S Noise and Interference Measurement System

Using the HP 3708S system, automatic measurement of radio performance under flat-fade (and/or interference) conditions can be made with the HP 3708A, and a pattern generator and error detector to provide and monitor a known test pattern. The following measurements are supported:  $C/N$  vs BER (tracking/non-tracking, with/without interference) and  $C/I$  vs BER.

Versions of the HP 3708S system software (HP 37080) exist to support all current HP bit-error-ratio test sets with HP-IB capability.

## HP 3709A

- Informative constellation measurements
- Simplified oscilloscope controls
- Partial HP-IB control allows data transfer



HP 3709A



## HP 3709A Constellation Display

Designed primarily for service and maintenance in digital microwave radios, the HP 3709A is a dedicated display for characterizing radio performance and condition by analysis of constellation patterns. Since impairments on a digital radio produce distinctive constellation patterns, the HP 3709A can provide a fast, straightforward method of diagnosing impairments on both in-service and out-of-service systems.

The HP 3709A is capable of monitoring radio eye and constellation patterns, and measuring key constellation parameters such as closure, lock-angle error and quad-angle error. In addition, the HP 3709A can dump a formatted report of the constellation and constellation measurements to a ThinkJet printer.

The HP 3709A can be used for trouble-shooting, in-service performance assessment, radio adjustments and to obtain data for written reports.

### Supported Radio Parameters

Modulation schemes: The HP 3709A has graticules and measurement routines to cover QPSK, 9PRS (3LPR), 16QAM, 49PRS (7LPR) and 64QAM radios (25PRS, 81PRS, 256QAM are available as special options).

### Monitor points:

(1) I and Q signals: Any of the above schemes with signal levels in the range 100mv to 1V p-p across the constellation. (dc offsets must be no more than 0.5 x signal amplitude p-p)

(2) Clock: 1MHz to 80MHz (100mV to 1V p-p).

Symbol Clock Rate	Bit Rate (Mbit/s)		
	QPSK/ 9PRS	16QAM/ 49PRS	64QAM
Min 1 MHz	2	4	6
Max 80 MHz	160	320	480

Impedance level: All HP 3709A inputs are 75 ohm terminated.

**Options:** Versions of the HP 3709A offering higher sensitivity and 50 ohm terminations are available.

### Accessories:

Transit case: HP Part No. 9211-2661 contains custom-moulded inserts which fit snugly around the instrument for maximum protection during transit.

**HP 3709A Constellation Display**