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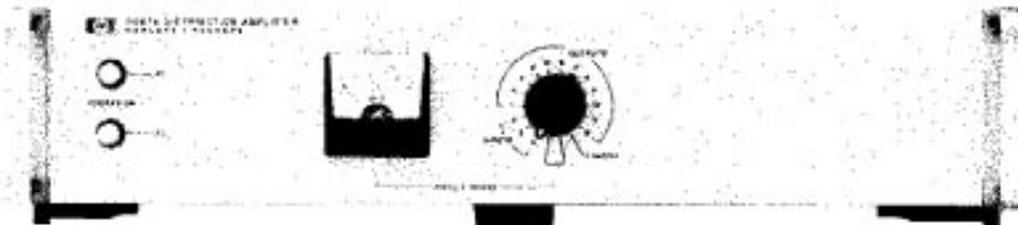


## DISTRIBUTION AMPLIFIER

Model  
5087A

TECHNICAL DATA APR 80

**3 INPUT CHANNELS      LOW NOISE      12 OUTPUT CHANNELS**  
**EXCELLENT ISOLATION      HIGH STABILITY      VERSATILE**



Hewlett-Packard Model 5087A Distribution Amplifier provides the isolation and flexibility required for distribution of the output of high quality frequency standards. Low distortion and excellent isolation make it ideal for providing multiple outputs from atomic or crystal frequency standards. The 3 input channels will accept 10 MHz, 5 MHz, 1 MHz, or 100 kHz in any combination with the number of outputs for each channel selectable up to a total of 12 outputs. The output levels are individually adjustable from 0 to 3 Vrms. All input and output levels are monitored on a front panel meter.

This Distribution Amplifier features plug-in modular construction, short-circuit isolation, exceptional phase stability, low noise and crosstalk, and uninterrupted switchover to standby DC in event of AC power failure.

The instrument design provides maximum versatility to meet a wide variety of special requirements. The standard configuration of input and output amplifiers, identified as Option 031, is shown in Figure 1. This accepts the normal frequency standard signals of 5 MHz, 1 MHz, and 100 kHz and provides four outputs at each of these frequencies.

### DESCRIPTION:

The 5087A consists of a power supply, mother board with plug-in connectors for the input and output amplifiers, front panel switch and meter for monitoring, and rear panel input and output connections.

A 115/230 volt power supply provides well regulated DC to operate the amplifiers. Line voltage fluctuations have no measurable effect on the amplitude or phase of the outputs. Provision for external 22-30 VDC connections insures uninterrupted operation in the event of AC failure.

Shielding around each input and output plug-in amplifier assures minimum noise and crosstalk. The tuned output amplifiers provide clean signals and high channel-to-channel isolation. Individual output level adjustments are easily made.

The selector switch and meter permit monitoring individual channel input or output levels and DC voltage. The mother board provides proper interconnection for the many module

combinations and eliminates wiring—increasing the instrument's reliability.

A metal decal listing the input and output connections and frequencies is supplied with each instrument.

Each of up to three input amplifier/divider/multiplier modules receive signals directly from one of the input connectors. These supply signals to the output amplifiers through the three buses (A, B or C). Alternate configurations similar to that of Option 034 may be made to supply additional output frequencies. To accomplish this, a multiplier/divider module in position B or C derives its input signal from the Channel A

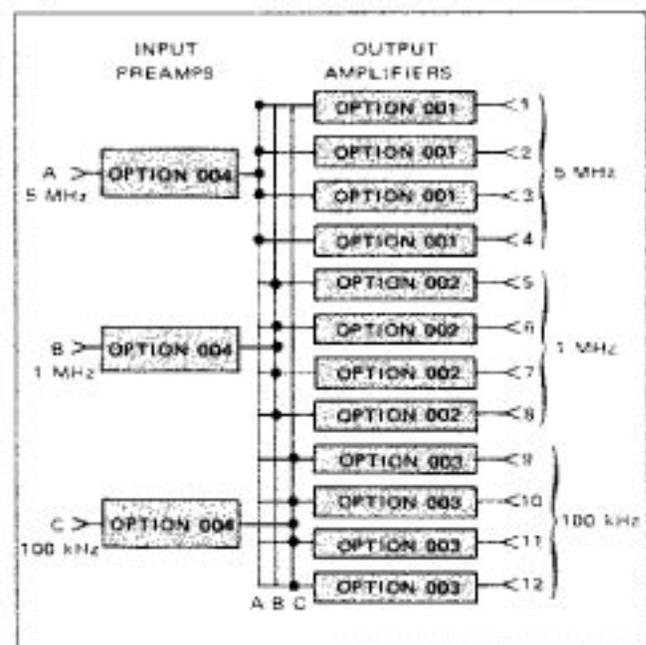


Figure 1. 5087A Distribution Amplifier with Opt. 031, Standard Configuration of input and output amplifiers. Connections to the Channel A, B and C distribution buses are indicated.

bus. Also, the Channel B bus may be used for the input to a Channel C multiplier or divider.

For ease of ordering, the input and output amplifiers required for the standard configuration are identified as Option 031. Several other commonly used configurations are also assigned option numbers. Special combinations of the various input and output modules may be ordered individually to meet a wide variety of requirements.

## SPECIFICATIONS

### INPUTS (Rear panel BNC)

**Frequencies:** 10 MHz, 5 MHz, 1 MHz, or 100 kHz.  
**Channels:** Up to 3.  
**Level:** 0.3 to 3.0 V rms.  
**Input Impedance:** 50 ohms (1000 ohms on special order).

### OUTPUTS (Rear panel BNC)

**Frequencies:** 10 MHz, 5 MHz, 1 MHz, or 100 kHz.  
**Channels:** Up to 12.  
**Level:** 0 to 3 V rms into a 50 ohm load (screwdriver level adjustment inside cover).  
**Harmonic Distortion:**\* Down more than 40 dB below rated output.  
**Spurious Phase Modulation, Discrete Sidebands, 10 Hz to 50 kHz:**\* Down more than 80 dB below rated output.  
**Crosstalk:** (Channel-to-Channel): -60 dB.

### ISOLATION

**Load** (open or short on any other channel):

**Amplitude Change:** <0.1 percent  
**Phase Change:** <0.1 ns at 5 or 10 MHz  
<0.5 ns at 1 MHz  
<5.0 ns at 100 kHz

**Injected Signal:** 1V signal up to 50 MHz applied to any output except 10 MHz, will be down more than 60 dB in all other outputs; 10 MHz output channel will be down more than 50 dB.

**SSB Phase Noise** (5 MHz):\* More than 145 dB below signal in 1 Hz BW for frequencies greater than 1 kHz from carrier.

**Short Term Stability Degradation** (5 MHz):\*  $<1 \times 10^{-12}$  in 10 kHz band. (1 s average).

### ENVIRONMENTAL

**Temperature:** (MIL-E-16400, Class 4)

**Operating:** 0°—50°C

**Non-operating:** -62° to +75°C

**Stability:**

**Amplitude:**  $\pm 0.5$  dB, 0° to 50°C  
**Phase:** <0.1 ns/°C, 5 and 10 MHz  
<0.5 ns/°C, 1 MHz  
<5 ns/°C, 100 kHz

**EMC:** MIL-STD-461A

**Humidity:** 95% at 40°C

**Altitude:** Up to 30,000 ft.

**Shock:** MIL-T-21200, Class 1 and MIL-E-5400 (30G's)

**Vibration:** MIL-STD-167.

### POWER

**AC Input:** 115 or 230 Vac  $\pm 10\%$ , 48 to 440 Hz, 20 V Amps, max.

**DC Input:** 22—30 Vdc, 600 mA, max.

\*Input signal must be at least as good as 5087A specifications for this performance.

Input and output amplifiers can be added or the configuration easily changed at any time. It is only necessary to position a short input jumper wire connecting the amplifier to signal bus A, B, or C and plug the board into the desired position.

On special order, a 10 MHz crystal oscillator is available on one input channel. With the high stability, ovenized oscillator, two input channels, and any of the output distribution options, the 5087A can function as a bench oscillator and distribution amplifier.

### DIMENSIONS

88 mm x 425 mm x 286 mm (3-15/32" high, 16-3/4" wide, 11-1/4" deep).

### WEIGHT:

Typical, Option 031—net, 7 kg (15 lb), shipping, 10 kg (22 lb).

### ACCESSORIES FURNISHED:

Power cord 180 cm (6 ft.), detachable mating connector 1251-0126 for EXT DC input, extender board, metal decal listing input and output frequencies.

### 5087A DISTRIBUTION AMPLIFIER MAINFRAME

#### NORMAL CONFIGURATIONS (necessary input and output amplifier options included):

Option 031 5, 1, and 0.1 MHz inputs and 4 outputs at each frequency  
Option 032 Single 5 MHz input and 12 outputs  
Option 033 Single 10 MHz input and 12 outputs  
Option 034 Single 5 MHz input, 4 each outputs at 5, 1, and 0.1 MHz

#### SPECIAL CONFIGURATIONS (specify individual options and quantity):

##### Input Preamplifiers (up to 3 total):

Option 004 Input Preamplifier (0.1 to 10 MHz)  
Option 005 5 to 1 MHz Input Divider  
Option 006 1 to 0.1 MHz Input Divider  
Option 011 5 to 10 MHz Input Doubler  
Option 013 10 to 5 MHz Input Divider  
Option 014 10 to 1 MHz Input Divider

##### Output Amplifiers (up to 12 total):

Option 001 5 MHz Output Amplifier  
Option 002 1 MHz Output Amplifier  
Option 003 0.1 MHz Output Amplifier  
Option 012 10 MHz Output Amplifier

### ACCESSORY AVAILABLE

Option 908 Rack Mounting Kit  
Option 910 Extra Manual

### ORDERING INFORMATION:

When ordering, specify the 5087A mainframe and either one of the normal configurations of Preamplifiers and Output Amplifiers (Options 031 to 034) or a special configuration. For a special configuration specify the desired quantity (up to 3) of input and (up to 12) output amplifiers. The mainframe will be assembled with the input and output options specified, the required interconnections to buses A, B, and C made, and the unit tested prior to delivery. Order should indicate number and frequency(s) of inputs and outputs.

For more information, call your local HP Sales Office or nearest Regional Office: Eastern (201) 265-5000; Midwestern (312) 255-9800; Southern (404) 955-1500; Western (214) 970-7500; Canadian (416) 678-9430. Ask the operator for instrument sales. Or write Hewlett-Packard, 1501 Page Mill Road, Palo Alto, CA 94304. In Europe: Hewlett-Packard S.A., 7, rue du Bois-du-Lan, P.O. Box, CH 1217 Meyrin 2, Geneva, Switzerland. In Japan: Yokogawa-Hewlett-Packard Ltd., 29-21, Takaido-Higashi 3-chome, Sugiyama-ku, Tokyo 160-2595-7575

DATA SUBJECT TO CHANGE.

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