SECTION I
GENERAL INFORMATION

1-1. INTRODUCTION.

1-2. This section contains general information concerning the -hp- Model 3437A System DVM. Included is an instrument description, specifications, information concerning instrument and accessory information, and safety considerations.

1-3. DESCRIPTION.

1-4. The Model 3437A is a Microprocessor controlled 3½ digit, successive approximation system voltmeter, capable of sampling voltages at rates up to 5700 samples per second.

1-5. Chassis isolated input terminals, a wideband input amplifier, auto-zero, auto-polarity, sample and hold, and 100% overrange on each of the input voltage ranges (.1 volt, 1 volt, and 10 volts) provide floating measurement capability (± 20 V) over the frequency range of DC through 1.0 MHz.

1-6. Hewlett-Packard Interface Bus is standard. All front panel functions are programmable. The output data format is selectable between an ASCII (8 byte) and Packed (2 byte) format. The packed data format allows the controller additional data storage as well as allowing the input voltage to be sampled at rates up to 5700 samples per second.

1-7. The 3437A digital delay logic is capable of delaying an external trigger from 0 to 1 second (100 ns steps), and of generating up to 9999 triggers (for each trigger received) at rates of 1 Hz through 5700 Hz. The internally generated triggers provide a burst sampling capability (up to 9999 samples) at a maximum rate of 5700 sampled per second. Figures 1-1 and 1-2 illustrate the delayed measurement and burst sampling capabilites of the 3437A.

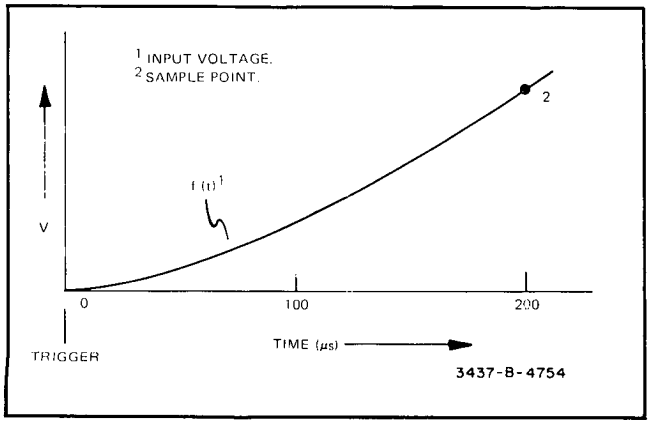

Figure 1-1. NRDGS = 1 DELAY = 200 μs.

1-8. (Figure 1-1) 200 μs after being triggered, the 3437A will sample and (after conversion) display the instantaneous value of the input voltage. If the 3437A is addressed to talk, the sampled input voltage will be output onto the HP-IB.

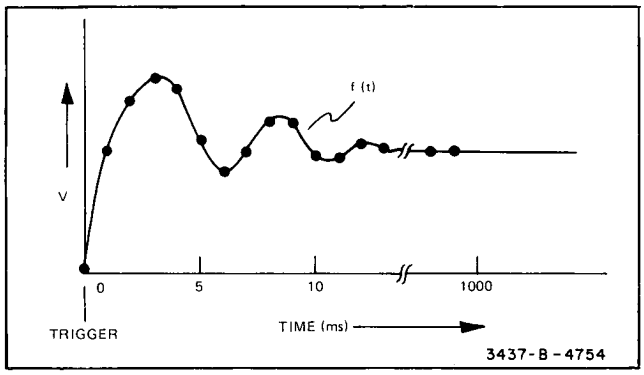

Figure 1-2. NRDGS = 1000 DELAY = 1 ms.

1-9. (Figure 1-2) When triggered, the 3437A will sample the input voltage 1000 times at 1 ms intervals. Between samples, the instantaneous value of the sampled input voltage is converted and output onto the HP-IB.

1-10. The Binary Program mode provides a means of programming the 3437A using an abreviated program code. When interrogated in the Binary Program mode. The 3437A responds by writing 7 bytes (completely describing the programmed state of the instrument) onto the HP-IB. The controller can use these 7 bytes as an abreviated program code to reprogram the 3437A to its previous configuration.

1-11. Model 3437A applications include:

a. Fast multipoint data-acquisition.

b. Repetitive-waveform analysis.

c. Low frequency transient characterization.

d. Low frequency True RMS measurements.

1-12. SPECIFICATIONS.

1-13. Instrument specifications are listed in Table 1-1. These specifications are the performance standards or limits against which the instrument is tested. Any change in the specifications due to manufacturing, design, or traceability to the U.S. National Bureau of Standards will be covered by revised pages, a change sheet, or both, to this manual. Addi-

Table 1-1. Specifications.

VOLTAGE MEASUREMENT CHARACTERISTICS.

Range	Bandwidth (3dB)		Display*
10 Volt	1.0 MHz	± 19.98 (max)	± 99.99 (ovrld)
1 Volt	1.1 MHz	± 1.998	± 9.999
.1 Volt	40 kHz	± .1998	± .9999

Static Accuracy (90 days, 23°C ± 5°C)

10 Volt Range	± 0.05% of Reading	± 1.6 Digits
1 Volt Range	± 0.03% of Reading	± 1.6 Digits
.1 Volt Range	± 0.06% of Reading	± 1.8 Digits

Static Accuracy (1 year, 23°C ± 5°C)

10 Volt Range	± 0.05% of Reading	± 2.0 Digits
1 Volt Range	± 0.03% of Reading	± 2.0 Digits
.1 Volt Range	± 0.06% of Reading	± 2.2 Digits

Static Accuracy Temperature Coefficient (0°C to 50°C)
± 0.002% reading/°C ± 0.05 digits/°C

Dynamic Accuracy

Range	Step Input	mV within Final Value	Time
10 Volt	10 V	± 200 mV	700 ns
10 Volt	10 V	± 30 mV	7.5 μs
1 Volt	1 V	± 20 mV	700 ns
1 Volt	1 V	± 3 mV	1.5 μs
.1 Volt	.1 V	± 200 μV	25 μs

DELAY CHARACTERISTICS.

Delay
For NRDGS equal to 0 or 1
0 to .9999999 sec in 100 ns steps

For NRDGS > 1

Data Format	Delay between readings
ASCII	277.8 μs to .9999999 sec
Packed	175.4 μs to .9999999 sec

Offset (actual delay with 0 delay programmed)
100 ns ± 25 ns

Accuracy
± 0.008% Delay + Delay offset

Repeatability (Jitter)
For NRDGS equal to 0 or 1

Delay	Jitter
0 or 100 ns	2 ns
200 ns to 50 ms	10 ns + .002% of Delay
> 50 ms	110 ns

NUMBER OF READINGS. (For each trigger received.)

From 0 to 9999

INPUT CHARACTERISTICS.

Input Impedance

Range	Impedance	
10 Volt	1 MΩ (± 20%)	< 75 pF
1 Volt	> 10^8 Ω	< 75 pF
.1 Volt	> 10^8 Ω	< 75 pF

Maximum Input Voltage (All ranges)

HI to LO	< ± 30 V Peak
LO to CHASSIS	< ± 42 V Peak

PROGRAMMABILITY.

(In accordance with IEEE - 488-1975)

AH1	Acceptor	PPØ	Parallel Poll
CØ	Controller	RL1	Remote/Local
DC1	Device Clear	SR1	Service Request
DT1	Device Trigger	SH1	Source
L4	Listener	T5	Talker

COMMON MODE REJECTION RATIO.

⩾ 75 dB (1 kΩ unbalance in low input lead at 60 Hz)

*Display will indicate overload if input is unterminated (.1 volt range).

Table 1-2. Supplemental Characteristics.

MAXIMUM READING RATE.[1]

ASCII	3600 Readings per second
Packed	5700 Readings per second

[1]Actual reading rate is given by:

ASCII $\dfrac{3600 \times 7 \text{ Byte Listen Rate}}{3600 + 7 \text{ Byte Listen Rate}}$

Packed $\dfrac{5700 \times 2 \text{ Byte Listen Rate}}{5700 + 2 \text{ Byte Listen Rate}}$

Where Listen Rate = Data acceptance rate of listener

GENERAL.

Power Requirements

100 V, 120 V, 220 V, 240 V (+ 5% –10%, 48–440 Hz)
⩽ 42 VA

Operating Temperature

0°C to 50°C

Storage Temperature

–40°C to 75°C

Humidity Range

< 95% RH (0°C to 40°C)

Dimensions

212.7 mm wide x 88.9 mm high x 527.1 mm deep

Weight

Net 5.6 kg
Shipping 7.6 kg

Model Number and Name

3437A System Voltmeter

tional information describing the operating characteristics (Table 1-2) are not specifications but are supplemental information for the user.

1-14. OPTIONS.

1-15. The following options are available for the -hp- Model 3437A System Voltmeter:

Option	-hp- Part Number	Description
907	5061-0088	Front Handle Kit
908	5061-0072	Cabinet Assembly
909	5061-0075	Cabinet Assembly

1-16. ACCESSORIES.

1-17. The following accessories are available and can be ordered from your nearest -hp- Sales and Service Office:

1. DSA Test ROM -hp- 34115A
2. Performance Test Source Interface -hp- 34114A
3. Performance Test Trigger Interface -hp- 34113A

1-18. SAFETY CONSIDERATIONS.

1-19. If, to preserve the apparatus from damage, it is necessary for the user to refer to the instruction manual, the apparatus will be marked with the symbol ⚠.

1-20. INSTRUMENT IDENTIFICATION.

1-21. A three-section serial number (XXXXAXXXXX) is used to identify the Model 3437A. Figure 1-3 illustrates the meaning of the three parts of the number.

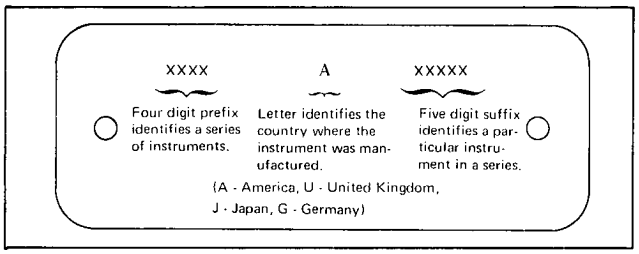

Figure 1-3. Instrument Serial Number.

Table 1-3. Message Transfer Rates (Listen).

Listen	Handshake (μs/Byte)[A]
Commands (ATN True)	
Addressed to Listen (ATL)	58
Addressed to Talk (ATT)	38
Group Execute Trigger (GET)	160
Local Lockout (LLO)	37
Selected Device Clear (SDC)	124
Serial Poll Enable (SPE)	35
Serial Poll Disable (SPD)	36
Unlisten (UNL)	36
Untalk (UNT)	36
Program Code (ATN False)	
Delay	100
"."	92
0	64
1	69
2	74
3	79
4	84
5	89
6	94
Store	176
NRDGS	112
1	94
2	68
3	68
4	68
Store	112
Enab RQS	108
7	59
Store	90

Listen	Handshake (μs/Byte)[A]
Program Code (ATN False) Cont'd	
Range 1	56 88
Range 2	56 89
Range 3	56 90
Trigger 1	56 97
Trigger 2	56 98
Trigger 3[B]	56 90
Trigger 3[C]	56 74
Format 1	56 98
Format 2	56 99
Binary Prgm	83
1st Byte	95
2nd Byte	78
3rd Byte	66
4th Byte	75
5th Byte	42
6th Byte	42
7th Byte	140

[A] Typical

[B] Initial

[C] Subsequent—maximum rate (due to conversion time)≅240 μs.

Table 1-4. Message Transfer Rates (Talk).

Talk	Handshake (μs/Byte)[A]
Data Formats (ATN False)	
ASCII	22 μs
Packed	20 μs