

SERVICE MANUAL CHANGES

MANUAL IDENTIFICATION

Model Number: 64161A/2A/3A

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This supplement contains important information for correcting manual errors and for adapting the manual to instruments containing improvements made after the printing of the manual.

To use this supplement:

Make all ERRATA corrections.

Make all appropriate serial number related changes indicated in the tables below.

Serial Prefix or Number	Make Manual Changes	Serial Prefix or Number	Make Manual Changes
ALL	1		

▲ NEW ITEM

▲ CHANGE 1

NOTE

The Models 64161A/2A/3A Emulation Memory Cards are now supported under the Hewlett-Packard bluestripe exchange program. The program provides factory repaired and tested assemblies for repairs of defective units. Repairs of the 64300A should be done by swapping the board assembly; component level repair of the assembly will not be supported in the future.

The supplied pages in this change sheet reflect these differences in level of support.

NOTE

Manual change supplements are revised as often as necessary to keep manuals as current and accurate as possible. Hewlett-Packard recommends that you periodically request the latest edition of this supplement. When requesting copies quote the manual identification information from your supplement, or the model number and print date from the title page of the manual.

Table of Contents, pages i and ii,

Replace: with pages i and ii provided in this change sheet.

Section I, pages 1-1 and 1-2,

Replace: with pages 1-1 and 1-2 provided in this change sheet.

Section IV, pages 4-1 and 4-2,

Replace: with pages 4-1 and 4-2 provided in this change sheet.

Section VI, pages 6-1 through 6-4,

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SECTION I

GENERAL INFORMATION

1-1. INTRODUCTION.

1-2. This Service Manual contains information required to install, test and service the Hewlett-Packard Model 64161A/162A/163A Emulator Memory.

Service information contained in this manual allows the user to isolate functional problems to the board level. This or to the component level. Board level troubleshooting is in support of the Hewlett-Packard Bluestripe board exchange program.

1-3. Shown on the title page is a microfiche part number. This number can be used to order a 4 X 6-inch microfilm transparency of the manual. Each microfiche contains up to 96 photoduplicates of the manual pages.

1-4. INSTRUMENTS COVERED BY THIS MANUAL.

1-5. Attached to the instrument or printed on the printed circuit board is the repair number. The repair number is in the form: 0000A0000. It is in two parts; the first four digits and the letter are the repair prefix, and the last five are the suffix. The prefix is the same for all identical instruments. The suffix, however, is assigned sequentially and is different for each instrument. The contents of this manual apply to instruments with the repair number prefix(es) listed under REPAIR NUMBERS on the title page.

1-6. An instrument manufactured after the printing of this manual may have a repair number prefix that is not listed on the title page. This unlisted repair number prefix indicates that the instrument is different from those described in this manual. The manual for this newer instrument is accompanied by a Manual Changes Supplement. The supplement contains "change information" that explains how to adapt the manual for the newer instrument.

1-7. In addition to change information, the supplement contains information for correcting errors in the manual. To keep this manual as current as possible, Hewlett-Packard recommends that you periodically request the latest Manual Changes Supplement. The supplement for this manual is identified with the manual print date and part number, both of which appear on the manual title page. Complimentary copies of the supplement are available from Hewlett-Packard.

1-8. For information concerning a repair number prefix that is not listed on the title page or in the Manual Changes Supplement, call your nearest Hewlett-Packard office.

1-9. DESCRIPTION.

1-10. The 64000 microprocessor emulation systems, illustrated in Figure 1-2, allow software designers to develop and debug software modules for specific microprocessors. The emulation plug replaces the microprocessor physically in the target system permitting hardware in the emulation system to simulate the functions of the target microprocessor while driving target system hardware with the software being developed.

1-11. The emulation memory can be used to duplicate the target system memory. Address space can be allocated to target system RAM, target system ROM, emulation RAM, and emulation ROM, and illegal address space.

1-12. Models 64161A, 64162A, and 64163A Emulation Memory provide the possibility of up to 128K bytes of memory on one card. The three models differ from each other in the number of memory chips loaded on each board. The Model 64163A, 32k byte memory, has one 16-chip row of 16K x 1 static RAM chips loaded; Model 64162A, 64k byte memory, has two rows of chips loaded and the Model 64161A, 128k byte memory has four rows of chips.

1-13. The 64161A, 64162A and 64163A feature fast access time, low-power standby and operation modes, and the ability to access bytes as well as 16-bit words.

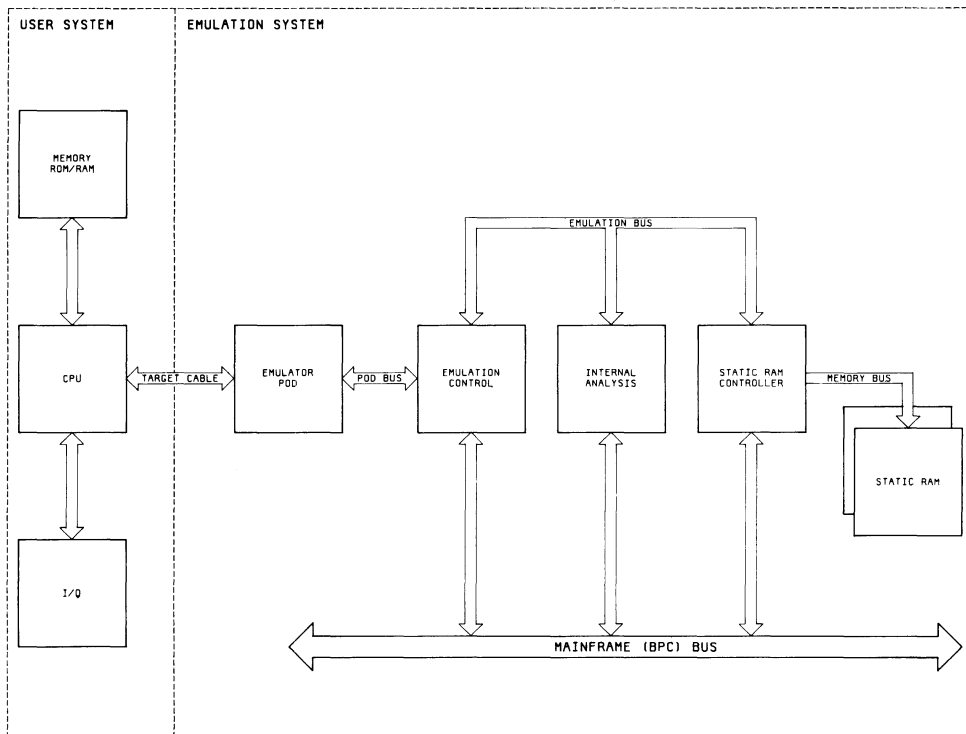


Figure 1-2. Emulation Subsystem

SECTION IV

PERFORMANCE VERIFICATION AND TROUBLESHOOTING

4-1. INTRODUCTION.

4-2. This section describes the Performance Verification for the Models 64161A/64162A/64163A Emulation Memory Boards.

4-3. This section is divided into two subsections: How to Run Performance Verification, and How to Interpret Performance Verification. Although the first subsection provides instructions on running several tests, only two tests will be described in the interpretation.

4-4. Use the following instructions to find the paragraphs which describe the Performance Verification of your system.

a. Be certain that your Memory subsystem is installed according to the directions in Section II.

b. For a system that is configured with a 64151A Memory Control Board.

4-9. How to Run Performance Verification

4-15. How to Interpret Performance Verification

c. For a system that is configured with a 64155 Memory Control

4-12. How to Run Performance Verification with a mixture of 6416X and 6415X Memory Boards.

4-12. How to Run Performance Verification with only 6416X memory boards.

4-20. How to Interpret Performance Verification.

4-5. PERFORMANCE VERIFICATION.

4-6. The Performance Verification for the Models 64161A/64162A/64163A Emulation Memory is a subset of the 64000 system `opt_test` Performance Verification. The `opt_test` Performance Verification tests all possible option modules that can be configured within the expansion slots of the 64000 mainframe. Table 4-1 defines the softkey options available.

4-7. The scope of the Performance Verification procedures in this section is to provide the minimum amount of information necessary to completely verify the operation of the Emulation Memory Boards. Procedures for complete verification of the Emulation Memory subsystem are treated in the Service Manuals for the Emulation Memory Controllers and are not repeated here (although the user may be referred to these manuals while using the Performance Verification procedures).

Troubleshooting of the analyzer may be carried out to the component level, as described in this section, or to the module level. Although not specifically described in this section, module level repair simply involves replacement of the analyzer board if any of the performance verification tests fail. Module level repair is supported by the Hewlett-Packard Bluestripe exchange program.

Table 4-1. Option Test Softkey Definitions

<end>	Causes the test currently executing to abort and returns to the overview menu.
<cycle>	Causes the performance verification software to test each block of memory in turn, stepping to the next block as the testing of each block is completed.
<next_test>	Causes the inverse video bar to move highlighting the address range of the next block of emulation memory to be tested.
<start>	Causes the performance verification software to begin testing emulation memory in the address range currently highlighted by the inverse video bar.
<print>	Causes the performance verification test results (the area above the status line on the display) to be copied to the system printer, if one is connected.
<prev_test>	Causes the inverse video bar to highlight the address range immediately prior to the one currently highlighted. Used to select a desired block of memory for testing.
<img_test>	Causes image testing to be commenced on the block of memory whose address range is highlighted by the inverse video bar on the display. Used to check for address line problems.
<retn_test>	Causes the Performance Verification software to initiate the retention testing sequence, which is used to verify that the static RAM will hold a "0" or "1" for a certain amount of time.
<print>	Causes the test results above the status line to be copied to the system printer if one is connected.

SECTION VI

REPLACEABLE PARTS

6-1. INTRODUCTION.

6-2. This section contains information for ordering parts. Table 6-1 lists abbreviations used in the parts list and throughout the manual. Table 6-2 lists all replaceable parts in reference designator order. Table 6-3 contains names and addresses that correspond to the manufacturers' code numbers.

6-3. ABBREVIATIONS.

6-4. Table 6-1 lists abbreviations used in the parts list, the schematics and throughout the manual. In some cases, two forms of the abbreviations are used, one all in capital letters, and one partial or no capitals. This occurs because the abbreviations in the parts list are always all capitals. However, in the schematics and other parts of the manual, other abbreviation forms are used with both lower case and upper case letters.

6-5. REPLACEABLE PARTS LIST.

6-6. Table 6-2 is the list of replaceable parts and is organized as follows:

- a. Electrical assemblies and their components in alphanumerical order by reference designation.
- b. Chassis-mounted parts in alphanumerical order by reference designation.
- c. Miscellaneous parts.
- d. Illustrated parts breakdowns, if appropriate.

The information given for each part consists of the following:

- a. The Hewlett-Packard part number.
- b. The total quantity (Qty) in the instrument.
- c. The description of the part.
- d. A typical manufacturer of the part in a five-digit code.
- e. The manufacturer's number for the part.

The total quantity for each part is given only once--at the first appearance of the part number in the list.

6-7. ORDERING INFORMATION.

6-8. To order a part listed in the replaceable parts table, quote the Hewlett-Packard part number, indicate the quantity required, and address the order to the nearest Hewlett-Packard office.

6-9. To order a part that is not listed in the replaceable parts table, include the instrument model number, instrument serial number, the description and function of the part, and the number of parts required. Address the order to the nearest Hewlett-Packard Office.

6-10. SPARE PARTS KIT.

6-11. At this time no Spare Parts Kit is available for this instrument

6-12. DIRECT MAIL ORDER SYSTEM.

6-13. Within the USA, Hewlett-Packard can supply parts through a direct mail order system. Advantages of using the system are as follows:

a. Direct ordering and shipment from the HP Parts Center in Mountain View, California.

b. No maximum or minimum on any mail order (there is a minimum order amount for parts ordered through a local HP office when orders require billing and invoicing).

c. Prepaid transportation (there is a small handling charge for each order).

d. No invoices--to provide these advantages, a check or money order must accompany each order.

6-14. Mail order forms and specific ordering information is available through your local HP office. Addresses and phone numbers are located at the back of this manual.

6-15. EXCHANGE ASSEMBLIES

6-16. Exchange assemblies are available from the HP Corporate Parts center on a trade in bases. These exchange assemblies, are listed in Table 6-2.

Table 6-1. Reference Designators and Abbreviations

REFERENCE DESIGNATORS			
A	= assembly	F	= fuse
B	= motor	FL	= filter
BT	= battery	IC	= integrated circuit
C	= capacitor	J	= jack
CP	= coupler	K	= relay
CR	= diode	L	= inductor
DL	= delay line	LS	= loud speaker
DS	= device signaling (lamp)	M	= meter
E	= misc electronic part	MK	= microphone
MP	= mechanical part	U	= integrated circuit
P	= plug	V	= vacuum, tube, neon bulb, photocell, etc
Q	= transistor	VR	= voltage regulator
R	= resistor	W	= cable
RT	= thermistor	X	= socket
S	= switch	Y	= crystal
T	= transformer	Z	= tuned cavity network
TB	= terminal board		
TP	= test point		
ABBREVIATIONS			
A	= amperes	H	= henries
AFC	= automatic frequency control	HDW	= hardware
AMPL	= amplifier	HEX	= hexagonal
BFO	= beat frequency oscillator	HG	= mercury
BE CU	= beryllium copper	HR	= hour(s)
BH	= binder head	HZ	= hertz
BP	= bandpass		
BRS	= brass	IF	= intermediate freq
BWO	= backward wave oscillator	IMPG	= impregnated
		INCD	= incandescent
CCW	= counter-clockwise	INCL	= include(s)
CER	= ceramic	INS	= insulation(ed)
CMO	= cabinet mount only	INT	= internal
COEF	= coefficient		
COM	= common	K	= kilo=1000
COMP	= composition		
COMPL	= complete	LH	= left hand
CONN	= connector	LIN	= linear taper
CP	= cadmium plate	LK WASH	= lock washer
CRT	= cathode-ray tube	LOG	= logarithmic taper
CW	= clockwise	LPF	= low pass filter
DEPC	= deposited carbon	M	= milli=10 ⁻³
DR	= drive	MEG	= meg=10 ⁶
ELECT	= electrolytic	MET FLM	= metal film
ENCAP	= encapsulated	MET OX	= metallic oxide
EXT	= external	MFR	= manufacturer
		MHZ	= mega hertz
F	= farads	MINAT	= miniature
FH	= flat head	MOM	= momentary
FIL H	= fillister head	MOS	= metal oxide substrate
FXD	= fixed	MTG	= mounting
		MY	= "mylar"
G	= giga (10 ⁹)	N	= nano (10 ⁻⁹)
GE	= germanium	N/C	= normally closed
GL	= glass	NE	= neon
GRD	= ground(ed)	NI PL	= nickel plate
N/O	= normally open	NPN	= negative-positive-negative
NOM	= nominal	NRFR	= not recommended for field replacement
NPO	= negative positive zero (zero temperature coefficient)	NSR	= not separately replaceable
		OBD	= order by description
NPN	= negative-positive-negative	OH	= oval head
NRFR	= not recommended for field replacement	OX	= oxide
NSR	= not separately replaceable		
		P	= peak
OB	= order by description	PC	= printed circuit
OH	= oval head	PF	= picofarads= 10 ⁻¹² farads
OX	= oxide	PH BRZ	= phosphor bronze
		PHL	= phillips
P	= peak	PIV	= peak inverse voltage
PC	= printed circuit	PNP	= positive-negative-positive
PF	= picofarads= 10 ⁻¹² farads		
PH BRZ	= phosphor bronze	P/O	= part of
PHL	= phillips	POLY	= polystyrene
PIV	= peak inverse voltage	PORC	= porcelain
PNP	= positive-negative-positive	POS	= position(s)
		POT	= potentiometer
P/O	= part of	PP	= peak-to-peak
POLY	= polystyrene	PT	= point
PORC	= porcelain	PWV	= peak working voltage
POS	= position(s)		
POT	= potentiometer	RECT	= rectifier
PP	= peak-to-peak	RF	= radio frequency
PT	= point	RH	= round head or right hand
PWV	= peak working voltage		
		RMO	= rack mount only
RECT	= rectifier	RMS	= root-mean square
RF	= radio frequency		
RH	= round head or right hand	RWV	= reverse working voltage
		S-B	= slow-blow
RMO	= rack mount only	SCR	= screw
RMS	= root-mean square	SE	= selenium
		SECT	= section(s)
RWV	= reverse working voltage	SEMICON	= semiconductor
		SI	= silicon
S-B	= slow-blow	SIL	= silver
SCR	= screw	SL	= slide
SE	= selenium	SPG	= spring
SECT	= section(s)	SPL	= special
SEMICON	= semiconductor	SST	= stainless steel
SI	= silicon	SR	= split ring
SIL	= silver	STL	= steel
SL	= slide		
SPG	= spring	TA	= tantalum
SPL	= special	TD	= time delay
SST	= stainless steel	TGL	= toggle
SR	= split ring	THD	= thread
STL	= steel	TI	= titanium
		TOL	= tolerance
TA	= tantalum	TRIM	= trimmer
TD	= time delay	TWT	= traveling wave tube
TGL	= toggle		
THD	= thread	U	= micro=10 ⁻⁶
TI	= titanium		
TOL	= tolerance	VAR	= variable
TRIM	= trimmer	VDCW	= dc working volts
TWT	= traveling wave tube		
		W/	= with
U	= micro=10 ⁻⁶	W	= watts
		WIV	= working inverse voltage
VAR	= variable	WW	= wirewound
VDCW	= dc working volts	W/O	= without
W/	= with		
W	= watts		
WIV	= working inverse voltage		
WW	= wirewound		
W/O	= without		

Table 6-2. Replaceable Parts List

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1	64161-66501	8	1	BOARD ASSEMBLY-MEMORY 128K-NEW	28480	64161-66501
A1	64161-66501			128KB EMUL. RAM PCA-EXCHANGE	28480	64161-69501
A1	64161-66501			64KB EMUL. RAM PCA-EXCHANGE	28480	64161-69501
A1	64161-66501			32KB EMUL. RAM PCA-EXCHANGE	28480	64161-69501
C1-C2	0160-5246	6	80	CAPACITOR-FXD .1 UF +80-20% 50 VDC CER	28480	0160-5246
C3-C4	0180-0229	4	4	CAPACITOR-FXD 22 UF +-10% 15 VDC TA	28480	0180-0229
C5-C62	0160-5246	6		CAPACITOR-FXD .1 UF +80-20% 50 VDC CER	28480	0160-5246
TP1-TP3	0360-0535	0	3	TERM TEST POINT	28480	0360-0535
R1-R2	0757-0280	3	6	RESISTOR 1K 1% .125W F TC=0+-100	28480	0757-0280
R3-R4	0698-3432	7	2	RESISTOR 26.1 1% .125W F TC=0+-100	28480	0698-3432
R5	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	28480	0757-0280
R6-R9	0757-0399	5	4	RESISTOR 82.5 1% .125W F TC=0+-100	28480	0757-0399
R10-R12	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	28480	0757-0280
XE1-XE5	1200-0607	0	5	SOCKET-IC 16-CONT DIP DIP-SLDR	28480	1200-0607
E1-E2	1251-4398	1	2	SHUNT DIP 4 POSITION; DUAL INLINE PKG	28480	1251-4398
RP1	1810-0275	1	1	NETWORK-RES 10-SIP 1.0K OHM X 9	28480	1810-0175
UR30-UR3F	1810-0600	6	4	NETWORK-RES 16-DIP 40.0 OHM X 8	28480	1810-0600
U2C	1820-1633	8		IC BFR TTL S INV OCTL 1-INP	01295	SN74S240N
U2D	1820-1633	8		IC BFR TTL S INV OCTL 1-INP	01295	SN74S240N
U2E	1820-1633	8		IC BFR TTL S INV OCTL 1-INP	01295	SN74S240N
U2F	1820-1633	8		IC BFR TTL S INV OCTL 1-INP	01295	SN74S240N
U2G	1820-2861	5	4	IC DCDR TTL F 3-TO-8 LINE 3-INP	07263	74F138PC
U2H	1820-2861	5		IC DCDR TTL F 3-TO-8 LINE 3-INP	07263	74F138PC
U2I	1820-2861	5		IC DCDR TTL F 3-TO-8 LINE 3-INP	07263	74F138PC
U2J	1820-2861	5		IC DCDR TTL F 3-TO-8 LINE 3-INP	07263	74F138PC
U2K	1820-2690	9	1	IC GATE TTL F OR QUAD 2-INP	07263	74F32
U2L	1820-1198	0	2	IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS03N
U2M	1820-1198	0		IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS03N
U3G	1820-1204	9	1	IC GATE TTL LS NAND DUAL 4-INP	01295	SN74LS20
U3J	1820-2684	1	1	IC GATE TTL F NAND QUAD 2-INP	07263	74F00
U3K	1820-1633	8	8	IC BFR TTL S INV OCTL 1-INP	01295	SN74S240N
U3L	1820-1633	8		IC BFR TTL S INV OCTL 1-INP	01295	SN74S240N
U3M	1820-1633	8		IC BFR TTL S INV OCTL 1-INP	01295	SN74S240N
U3N	1820-1633	8		IC BFR TTL S INV OCTL 1-INP	01295	SN74S240N
U4A-U4P	1818-1969	8	64	IC CMOS F16384 (16K) STAT RAM 70NS	S4013	HM6167P
U5A-U5P	1818-1969	8		IC CMOS F16384 (16K) STAT RAM 70NS	S4013	HM6167P
U6A-U6P	1818-1969	8		IC CMOS F16384 (16K) STAT RAM 70NS	S4013	HM6167P
U7A-U7P	1818-1969	8		IC CMOS F16384 (16K) STAT RAM 70NS	S4013	HM6167P
E3.4	1258-0182	7	2	CONNRP IM PLUG	28480	1258-0182

See introduction to this section for ordering information