HP 13255

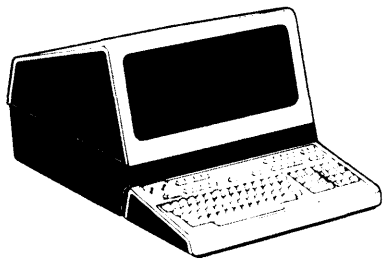
SIMPLIFIED KEYBOARD MODULE

Manual Part No. 13255-91069

PRINTED

AUG-01-76

DATA TERMINAL
TECHNICAL INFORMATION



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1.0 INTRODUCTION.

The Simplified Keyboard Module substitutes the Simplified Keyboard Assembly (02640-60068) and the Simplified Keyboard PCA (02640-60069) for the General Purpose Keyboard Assembly (02640-60030) and the Keyboard PCA (02640-60018). Parts lists and detailed description for the Keyboard Interface PCA (02640-60019) and the cable assemblies are contained in module section 13255-91018.

2.0 OPERATING PARAMETERS.

A summary of operating parameters for the Simplified Keyboard Module is contained in tables 1.0 through 5.3.

Table 1.0 Physical Parameters

Part Number	Nomenclature	Size (L x W x D) +/-0.100 Inches	Weight (Pounds)
02640-60019	Keyboard Interface PCA	12.9 x 4.0 x 0.5	0.38
02640-60041	Speaker Cable Assembly	N/A	N/A
02640-60068	Simplified Keyboard Assembly	N/A	N/A
02640-60069	Simplified Keyboard PCA	16.8 x 7.1 x 2.1	2.75
02640-60081	Keyboard Cable Assembly	N/A	N/A
Number of Backplane Slots Required: 1			

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NOTE: This document is part of the 264XX DATA TERMINAL product series Technical Information Package (HP 13255).

1.0 INTRODUCTION.

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02640-60081	Keyboard Cable Assembly	N/A	N/A
Number of Backplane Slots Required: 1			

Table 2.0 Reliability and Environmental Information

Environmental: (X) HP Class B ( ) Other:
Restrictions: Type tested at product level
Failure Rate: 1.542 (percent per 1000 hours)

Table 3.0 Power Supply and Clock Requirements - Measured
(At +/-5% Unless Otherwise Specified)

+5 Volt Supply	+12 Volt Supply	-12 Volt Supply	-42 Volt Supply
@ 400 mA	@ 100 mA	@ 80 mA	@ mA
			NOT APPLICABLE

115 volts ac	220 volts ac
@ A	@ A
NOT APPLICABLE	NOT APPLICABLE

Clock Frequency: MHz
NOT APPLICABLE

Table 4.0 Connector Information

Connector and Pin No.	Signal Name	Signal Description
J3, Pin 1	GND	Ground
- 2	GND	
- 3	BADDR3	Positive True, Column Address Bit 3
- 4	$\overline{\text{BBUS4}}$	Negative True, Buffered Data Bus Bit 4
- 5	$\overline{\text{BBUS5}}$	Negative True, Buffered Data Bus Bit 5
- 6	$\overline{\text{BBUS7}}$	Negative True, Buffered Data Bus Bit 7
- 7	$\overline{\text{BBUS6}}$	Negative True, Buffered Data Bus Bit 6
- 8	$\overline{\text{READ . COL15}}$	Negative True, Enables Reading the Column 0-13. Not asserted for Columns 14 & 15
- 9		Not Used
-10	LED EN	Strobes Data into LED Latches
-11	BEEP	Triggers Beeper Circuit
-12	+12V	+12 Volt Power Supply
-13	+5V	+5 Volt Power Supply
-14	-12V	-12 Volt Power Supply
-15	CHASSIS GND	Grounds the Switchplate

Table 4.1 Connector Information

Connector and Pin No.	Signal Name	Signal Description
J4, Pin 1	PON	Resets the Terminal
- 2	+5V	+5 Volt Power Supply
- 3	COL OUT EN	Strobes Data into Column's Previous State in Input Register
- 4	$\overline{\text{BBUS3}}$	Negative True, Buffered Data Bus Bit 3
- 5	$\overline{\text{BBUS0}}$	Negative True, Buffered Data Bus Bit 0
- 6	$\overline{\text{BBUS2}}$	Negative True, Buffered Data Bus Bit 2
- 7	$\overline{\text{BBUS1}}$	Negative True, Buffered Data Bus Bit 1
- 8	BADDR2	Positive True, Column Address Bit 2
- 9	BADDR1	Positive True, Column Address Bit 1
-10	BADDR0	Positive True, Column Address Bit 0

Table 5.0 Module Bus Pin Assignments

Function Performed: Output a column's previous state into Simplified Keyboard PCA's input register

Poll Bit: Not Applicable

Module Address: (ADDR 11,10,9,4) = (0011)

Function Specifier: ADDR 5 = 1

Data Bus Bit Interpretation: Each data bit is associated with a switch in a column. If the bit is set to 1, it indicates that the switch was previously depressed. The column to which the value is applied is specified by a subsequent switch read as indicated in table 5.1.

Value	Bus Signal
X	ADDR 15
X	ADDR 14
X	ADDR 13
X	ADDR 12
0	ADDR 11
0	ADDR 10
1	ADDR 9
X	ADDR 8
0	ADDR 7
X	ADDR 6
1	ADDR 5
1	ADDR 4
X	ADDR 3
X	ADDR 2
X	ADDR 1
X	ADDR 0
B7	BUS 7
B6	BUS 6
B5	BUS 5
B4	BUS 4
B3	BUS 3
B2	BUS 2
B1	BUS 1
B0	BUS 0

1=Logical 1=Bus Low
0=Logical 0=Bus High
X=Don't Care

Table 5.1 Module Bus Pin Assignments

Function Performed: Read switches in column "n" as determined by A3, A2, A1, and A0

Poll Bit: Not Applicable

Module Address: (ADDR 11,10,9,4) = (0011)

Function Specifier: ADDR 0,1,2,3, are used to specify which keyboard column is to be read. The column number specified must be less than 14 (decimal)

Data Bus Bit Interpretation: Each data bit is associated with a switch in a column. If the switch is depressed, the data bit is 1. (Refer to figure 1 for a cross-reference of key numbers to the physical switches on the keyboard.)

Value	Bus Signal
X	ADDR 15
X	ADDR 14
X	ADDR 13
X	ADDR 12
0	ADDR 11
0	ADDR 10
1	ADDR 9
X	ADDR 8
0	ADDR 7
X	ADDR 6
X	ADDR 5
1	ADDR 4
A3	ADDR 3
A2	ADDR 2
A1	ADDR 1
A0	ADDR 0
B7	BUS 7
B6	BUS 6
B5	BUS 5
B4	BUS 4
B3	BUS 3
B2	BUS 2
B1	BUS 1
B0	BUS 0

1=Logical 1=Bus Low
0=Logical 0=Bus High
X=Don't Care

Column Address				DATA BUS BIT							
A3	A2	A1	A0	B7	B6	B5	B4	B3	B2	B1	B0
0	0	0	0	007	006	005	004	003	002	001	000
0	0	0	1	017	016	015	014	013	012	011	010
0	0	1	0	027	026	025	024	023	022	021	020
0	0	1	1	037	036	-	034	033	032	031	030
0	1	0	0	047	046	-	044	043	042	041	040
0	1	0	1	057	-	-	054	053	052	051	050
0	1	1	0	-	-	-	064	063	062	061	-
0	1	1	1	-	-	075	074	073	072	071	070
1	0	0	0	-	-	105	104	103	102	101	100
1	0	0	1	-	116	115	114	113	112	111	110
1	0	1	0	127	126	125	124	123	122	121	120
1	0	1	1	137	136	-	134	133	132	131	130
1	1	0	0	147	-	-	144	-	142	141	140
1	1	0	1	157	-	-	154	-	152	151	150

Table 5.2 Module Bus Pin Assignments

Function Performed: Read data comm switches on Simplified Keyboard PCA. (Refer to figure 1 for physical location of data comm switches and their positions.)

Poll Bit: Not Applicable

Module Address: (ADDR 11,10,9,4) = (0011)

Function Specifier: ADDR 0,1,2,3 = (1111)

Data Bus Bit Interpretation:

Switch 1

Position	0	1
B7	1	0

B6 Not assigned, always 0

Switch 2

Position	0	1	2
B5	0	0	1
B4	0	1	0

Switch 3

Position	0	1	2	3	4	5	6	7
B3	0	0	0	0	1	1	1	1
B2	0	0	1	1	0	0	1	1
B1	0	1	0	1	0	1	0	1

B0 Not assigned, always 0

Value	Bus Signal
X	ADDR 15
X	ADDR 14
X	ADDR 13
X	ADDR 12
0	ADDR 11
0	ADDR 10
1	ADDR 9
X	ADDR 8
0	ADDR 7
X	ADDR 6
X	ADDR 5
1	ADDR 4
1	ADDR 3
1	ADDR 2
1	ADDR 1
1	ADDR 0
B7	BUS 7
B6	BUS 6
B5	BUS 5
B4	BUS 4
B3	BUS 3
B2	BUS 2
B1	BUS 1
B0	BUS 0

1=Logical 1=Bus Low
0=Logical 0=Bus High
X=Don't Care

Table 5.3 Module Bus Pin Assignments

Function Performed: Write LED latch and trigger alarm generator (Beep)

Poll Bit: Not Applicable

Module Address: (ADDR 11,10,9,4) = (0011)

Function Specifier: ADDR 5 = 0

Data Bus Bit Interpretation:

B7
when Set, Beeper is triggered

B6
when Set, LED #7 is turned on

B5
when Set, LED #6 is turned on

B4
when Set, LED #5 is turned on

B3
when Set, LED #4 is turned on

B2
when Set, LED #3 is turned on

B1
Not Used

B0
when Set, LED #1 is turned on

Value	Bus Signal
X	ADDR 15
X	ADDR 14
X	ADDR 13
X	ADDR 12
0	ADDR 11
0	ADDR 10
1	ADDR 9
X	ADDR 8
0	ADDR 7
X	ADDR 6
0	ADDR 5
1	ADDR 4
X	ADDR 3
X	ADDR 2
X	ADDR 1
X	ADDR 0
B7	BUS 7
B6	BUS 6
B5	BUS 5
B4	BUS 4
B3	BUS 3
B2	BUS 2
B1	BUS 1
B0	BUS 0

1=Logical 1=Bus Low
0=Logical 0=Bus High
X=Don't Care

3.0 FUNCTIONAL DESCRIPTION. Refer to the switch location diagram (figure 1), block diagram (figure 2), schematic diagram (figure 3), timing diagram (figure 4), component location diagram (figure 5), and parts lists (02640-60068 and 02640-60069) located in the appendix.

The Simplified Keyboard PCA consists of a column decoder, an 8 by 14 key matrix, ramp generator, differential comparator circuits, an output register (data taken by processor), an input register (receives previous state of the key switches from processor), data comm logic, and a LED register.

3.1 COLUMN DECODER. The column decoder selects one column in the key matrix when binary address $\overline{\text{ADDR0}}$ through $\overline{\text{ADDR3}}$ is applied.

3.2 KEY MATRIX.

3.2.1 The key switches are arranged in a matrix of 8 rows and 14 columns. The matrix is scanned column by column, so that eight switches at a time are read.

3.2.2 The key switch used is a LICON type consisting of a ferrite core, a drive wire, a sense wire, and two magnets. When the switch is in the undepressed state, the two magnets are in close proximity to the core, thus saturating the core and inhibiting the coupling of a signal from the drive wire to the sense wire. When the switch is depressed, two magnets are moved away from the core and a signal is coupled from the drive wire to the sense wire. All switches in one column are connected serially by drive lines and switches in one row are connected serially by sense lines. One side of the drive lines is connected to the column decoder (U5 and U7), and the other side to the ramp generator (to collector of Q2). Eight sense lines are connected to differential comparators on one side and are grounded on the other end. After the column decoder selects a column and the ramp generator is enabled, then drive current (80 milliamperes) flows through the selected column. Depressed keys in the selected column couple the drive signal to the sense line which is then applied to the differential comparator.

3.3 RAMP GENERATOR.

3.3.1 When a RD . $\overline{\text{COL15}}$ signal is applied to the ramp generator, the current is enabled into the selected column. The current rises linearly from 0 to 80 milliamperes in 80 nanoseconds.

3.3.2 The ramp generator is a combination of a Miller integrator (transistor Q1, resistor R35, and capacitor C5) and a current mirror (transistors Q3 and Q2). When the RD . $\overline{\text{COL15}}$ signal is applied to the input, the collector of transistor Q1 falls to ground according to the transit time determined by R35 and C5. The collector current of Q1 rises linearly and is determined by resistors R39 and R36. Since the same base emitter voltage is applied to Q2 and Q3, the emitter current of Q2 "reflects" the current of Q3. This current flows through the selected column of the matrix. Nominally, the current rises from 0 to 80 milliamperes in 80 nanoseconds. The function of R37 (10 kilohms) is to bias the drive lines to ground when Q2 is off and no column is selected.

3.4 DIFFERENTIAL COMPARATORS.

3.4.1 The eight sense lines out of the key matrix are fed into the eight differential comparators. Each depressed switch generates a pulse on the corresponding row when its column is scanned. Differential comparators translate this pulse into the required TTL level.

3.4.2 Differential comparators are MC1414 or equivalent. Sense lines are fed into the minus input and are terminated by a 200-ohm resistor. Threshold is determined by resistor network (47K, 47K, 1.2K) and the previous state held in the input register. When the previous state is "0", the threshold is set to 200 millivolts and when "1", it is 100 millivolts. The differential comparator timing is shown in figure 4. When the processor wants to read one column, it puts the binary address of the column on the terminal data bus and the column decoder selects the corresponding drive line for the column. Approximately 200 nanoseconds

after the column has been selected, the RD . $\overline{\text{COL15}}$ signal comes true and turns on the ramp generator. This current is transformed into sense lines only on those switches that are depressed. The sense pulse is approximately 400 millivolts in amplitude and 80 nanoseconds wide at the base. Differential comparators set the corresponding bits in the output register.

3.5 OUTPUT REGISTER. Outputs of the differential comparators set the corresponding bits in an 8-bit output register. Signals RD . $\overline{\text{COL15}}$ and DATA OUT EN (on the Keyboard Interface PCA) enable the result of the selected column on the terminal data bus.

3.6 INPUT REGISTER. Before a column is read, the previous state of that column is sent from the processor to the input register. Outputs of this register determine the threshold of the differential comparators. If the previous state of a switch was "0", the threshold is 200 millivolts; if it was "1", then the threshold is 100 millivolts. This causes hysteresis in the key travel since the sense pulse amplitude is proportional to the key depression.

3.7 DATA COMM LOGIC. The data communications logic contains a baud rate encoder and the keyboard data communications switches. Eight positions of the rotary BAUD RATE switch (Switch 3) are encoded into three binary bits. The 3-position PARITY switch (Switch 2), is encoded into two bits. The 2-position DUPLEX switch (Switch 1) uses one bit for detection. When column 15 is addressed, the RD. COL15 (U8, Pin 10) signal is decoded and the data comm byte is released to the terminal data bus. (Refer to table 5.2 for more details.)

3.8 LED REGISTER. The LED register is loaded with six data bits when a LED EN signal is decoded. Outputs of this latch drive six LED indicators.

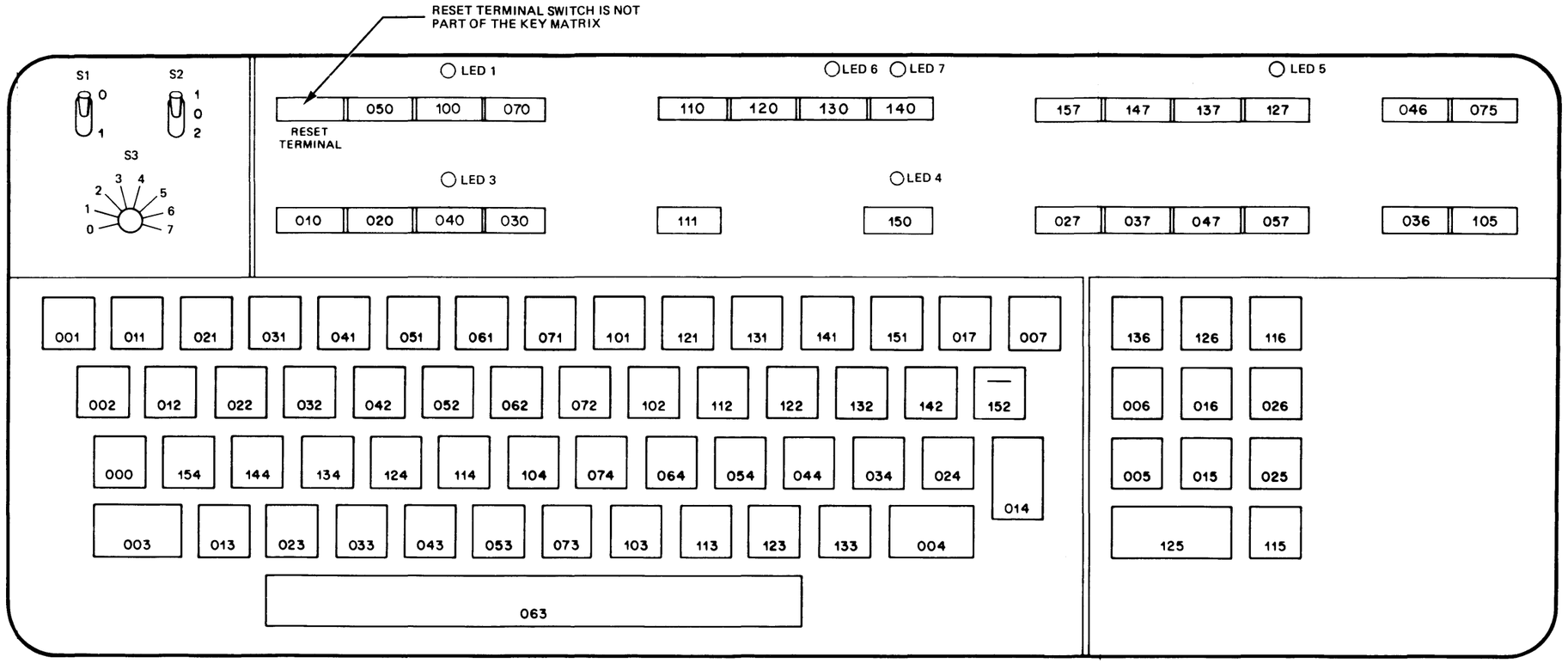

Figure 1
Simplified Keyboard Switch Location Diagram
AUG-01-76 13255-91069

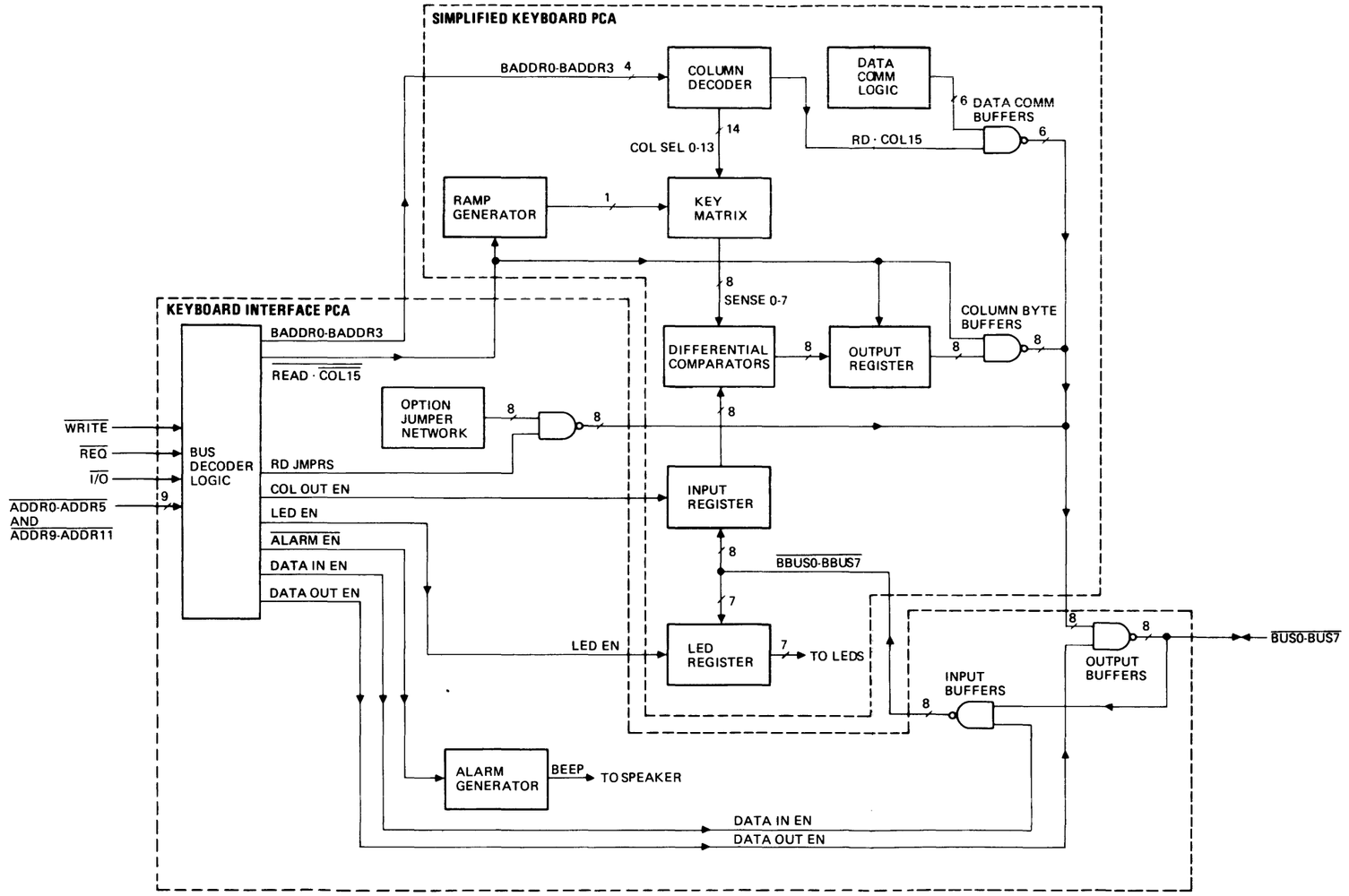

Figure 2
Simplified Keyboard Block Diagram
AUG-01-76 13255-91069

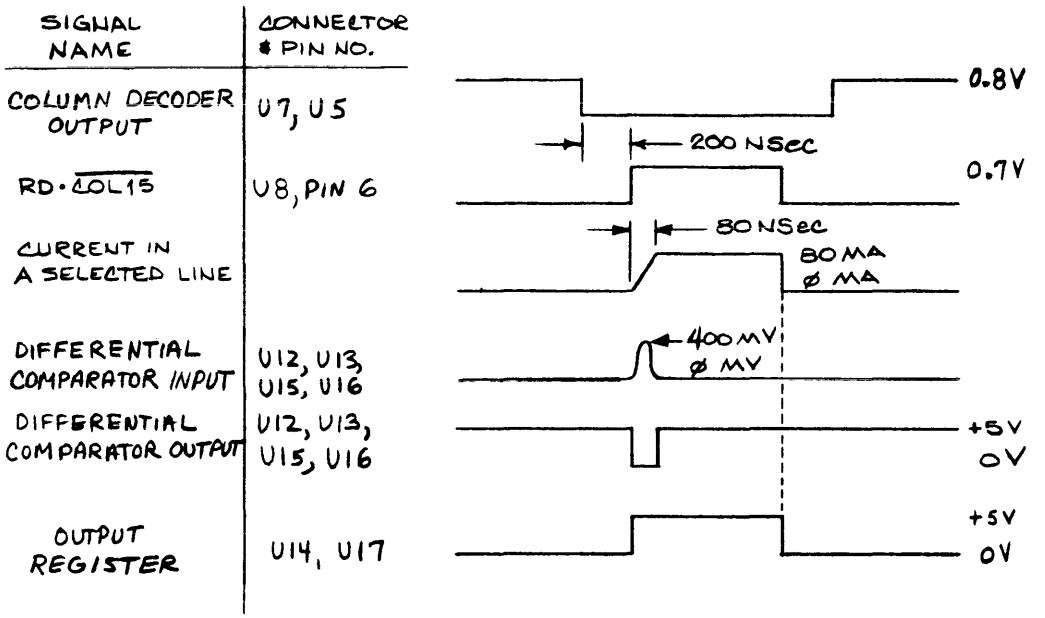

Figure 3
Simplified Keyboard PCA Schematic Diagram
AUG-01-76 13255-91069

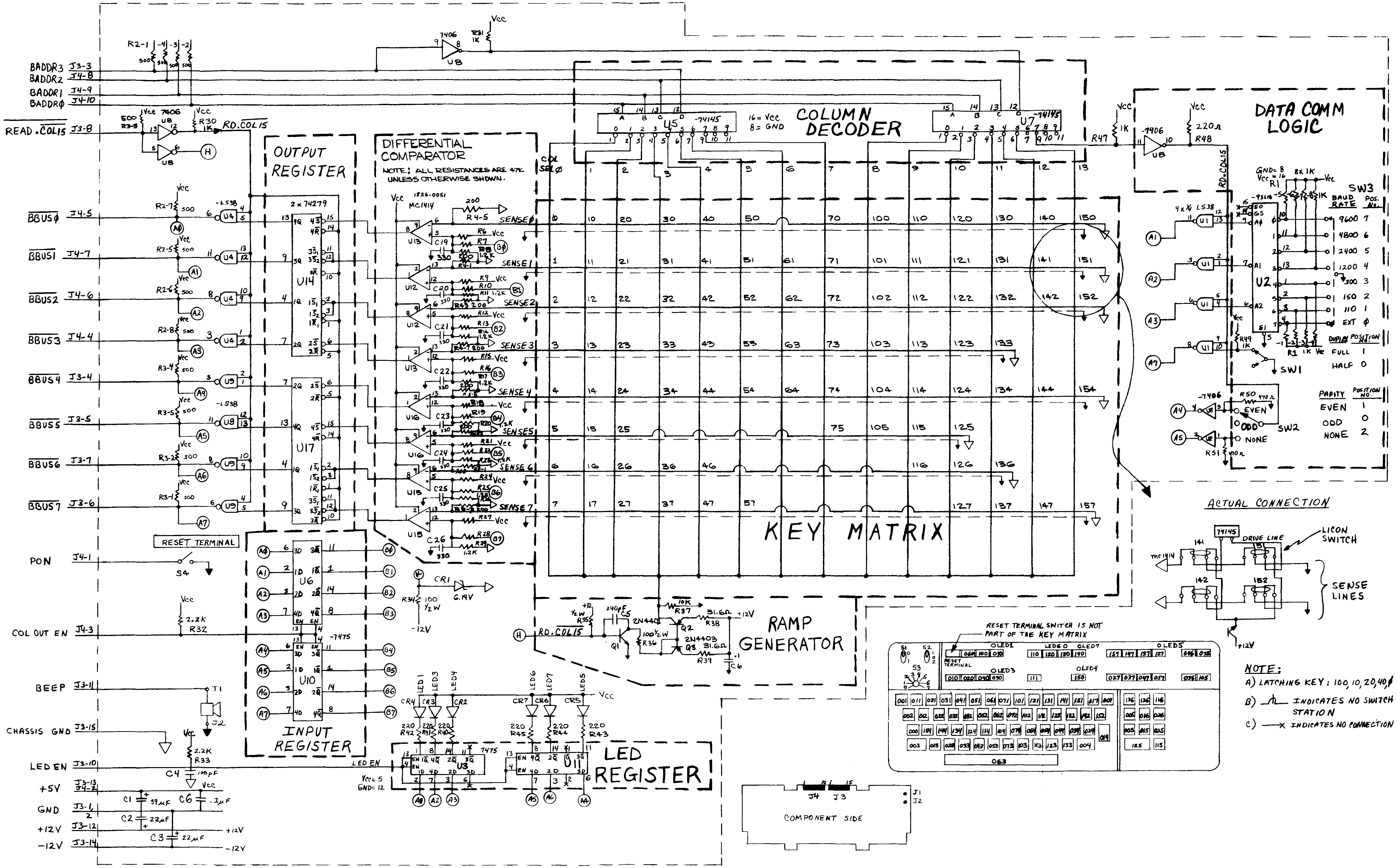

Figure 4
Differential Comparator Timing Diagram
AUG-01-76 13255-91069

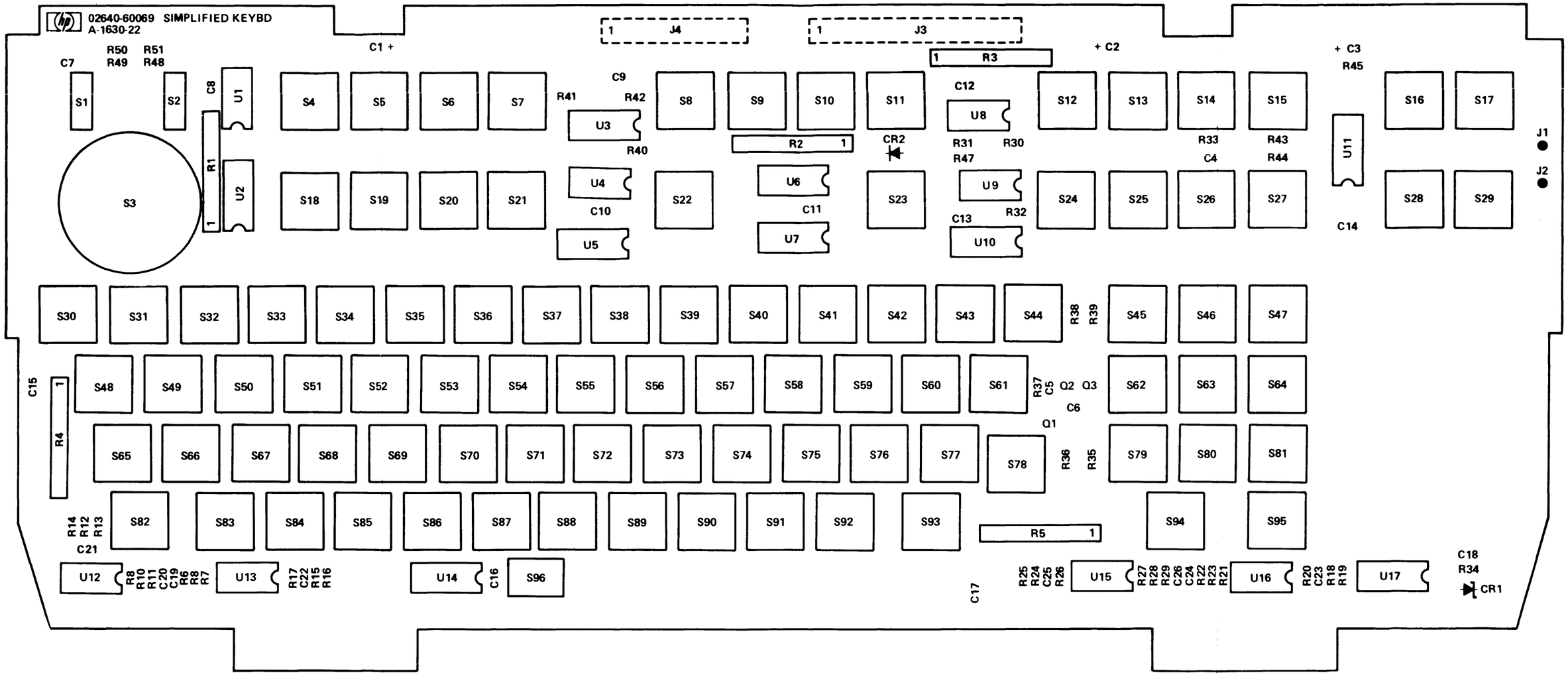

Figure 5
Simplified Keyboard PCA Component Location Diagram
AUG-01-76 13255-91069

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A1	02640-60068	1	SIMPLIFIED KEYBOARD ASSEMBLY REVISION DATE: 03-26-76	28480	02640-60068
	0403-0243	2	BUMPER, FOOT, WHITE RUBBER .38" W	00000	OBD
	0403-0324	4	BUMPER FOOT, GRAY PLASTIC 0.560" W	76381	SJ-5025-GRAY
	1400-0440	1	CABLE TIE .062-1.75-DIA .184-WD NYL	59730	TY 35M
	2190-0918	8	WASHER-LK HLCL NO.-6 .141-IN-ID	28480	2190-0918
	2360-0193	2	SCREW-MACH 6-32 .25-IN-LG PAN-HD-POZI	28480	2360-0193
	2360-0201	1	SCREW-MACH 6-32 .5-IN-LG PAN-HD-POZI	28480	2360-0201
	2360-0203	5	SCREW-MACH 6-32 .625-IN-LG PAN-HD-POZI	28480	2360-0203
	3050-0066	6	WASHER-FL MTLC NO.-6 .147-IN-ID	28480	3050-0066
	7120-1927	1	BLANK LABEL .625-IN-WD 1.5-IN-LG AL	28480	7120-1927
	7120-4403	1	INFORMATION LABEL 1.98-IN-WD 2.187-IN-LG	28480	7120-4403
	9160-0233	1	LOUDSPEAKER	28480	9160-0233
	02640-00022	1	OVERLAY, FULL KEYBOARD	28480	02640-00022
	02640-40007	1	BASE, KEYBOARD	28480	02640-40007
	02640-40021	1	KEYBOARD, TOP	28480	02640-40021
	02640-60041	1	ASSY, SPEAKER CABLE	28480	02640-60041
	02640-60069	1	ASSY, SIMPLIFIED KEYBOARD	28480	02640-60069
	02640-60081	1	ASSY, CABLE KEYBOARD	28480	02640-60081

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
	02640-60069	1	SIMPLIFIED KEYBOARD ASSEMBLY DATE CODE: A-1630-22 REVISION DATE: 08-25-76	28480	02640-60069
C1	0180-0393	1	CAPACITOR-FXD 39UF+-10% 10VDC TA	56289	150D396X901082
C2	0180-0228	2	CAPACITOR-FXD 22UF+-10% 15VDC TA	56289	150D226X901582
C3	0180-0228		CAPACITOR-FXD 22UF+-10% 15VDC TA	56289	150D226X901582
C4	0160-2204	1	CAPACITOR-FXD 100PF +-5% 300WVDC MICA	28480	0160-2204
C5	0140-0199	1	CAPACITOR-FXD 240PF +-5% 300WVDC MICA	72136	DM15F241J0300WV1CR
C6	0150-0121	1	CAPACITOR-FXD .1UF +80-20% 50WVDC CER	28480	0150-0121
C7	0160-2055	12	CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C8	0160-2055		CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C9	0160-2055		CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C10	0160-2055		CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C11	0160-2055		CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C12	0160-2055		CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C13	0160-2055		CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C14	0160-2055		CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C15	0160-2055		CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C16	0160-2055		CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C17	0160-2055		CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C18	0160-2055		CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C19	0160-3572	8	CAPACITOR-FXD 330PF +-10% 500WVDC CER	28480	0160-3572
C20	0160-3572		CAPACITOR-FXD 330PF +-10% 500WVDC CER	28480	0160-3572
C21	0160-3572		CAPACITOR-FXD 330PF +-10% 500WVDC CER	28480	0160-3572
C22	0160-3572		CAPACITOR-FXD 330PF +-10% 500WVDC CER	28480	0160-3572
C23	0160-3572		CAPACITOR-FXD 330PF +-10% 500WVDC CER	28480	0160-3572
C24	0160-3572		CAPACITOR-FXD 330PF +-10% 500WVDC CER	28480	0160-3572
C25	0160-3572		CAPACITOR-FXD 330PF +-10% 500WVDC CER	28480	0160-3572
C26	0160-3572		CAPACITOR-FXD 330PF +-10% 500WVDC CER	28480	0160-3572
CR1	1902-0049	1	DIODE-ZNR 6.19V 5% DO-7 PD=.4W TC=+.022%	28480	1902-0049
CR2	1990-0486	1	LED-VISIBLE LUM-INT=1MCD IF=20MA-MAX	28480	1990-0486
E1	0360-0124	5	TERMINAL-STUD SGL-PIN PRESS-MTG	28480	0360-0124
E2	0360-0124		TERMINAL-STUD SGL-PIN PRESS-MTG	28480	0360-0124
E3	0360-0124		TERMINAL-STUD SGL-PIN PRESS-MTG	28480	0360-0124
E4	0360-0124		TERMINAL-STUD SGL-PIN PRESS-MTG	28480	0360-0124
E5	0360-0124		TERMINAL-STUD SGL-PIN PRESS-MTG	28480	0360-0124
J3	1251-3198	1	CONNECTOR 15-PIN M POST TYPE	27264	09-60-1151(2403-15A)
J4	1251-3475	1	CONNECTOR 10-PIN M POST TYPE	27264	09-60-1101
Q1	1854-0467	1	TRANSISTOR NPN 2N4401 SI TO-92 PD=310MW	04713	2N4401
Q2	1853-0271	2	TRANSISTOR PNP 2N4403 SI TO-92 PD=310MW	04713	2N4403
Q3	1853-0271		TRANSISTOR PNP 2N4403 SI TO-92 PD=310MW	04713	2N4403
R1	1810-0121	1	NETWORK-RES 9-PIN-SIP .15-PIN-SPCG	28480	1810-0121
R2	1810-0132	2	NETWORK-RES 9-PIN-SIP .15-PIN-SPCG	28480	1810-0132
R3	1810-0132		NETWORK-RES 9-PIN-SIP .15-PIN-SPCG	28480	1810-0132
R4	1810-0163	2	NETWORK-RES 9-PIN-SIP .15-PIN-SPCG	28480	1810-0163
R5	1810-0163		NETWORK-RES 9-PIN-SIP .15-PIN-SPCG	28480	1810-0163
R6	0683-4735	16	RESISTOR 47K 5% .25W FC TC=-400/+800	01121	CB4735
R7	0683-4735		RESISTOR 47K 5% .25W FC TC=-400/+800	01121	CB4735
R8	0683-1225	8	RESISTOR 1.2K 5% .25W FC TC=-400/+700	01121	CB1225
R9	0683-4735		RESISTOR 47K 5% .25W FC TC=-400/+800	01121	CB4735
R10	0683-4735		RESISTOR 47K 5% .25W FC TC=-400/+800	01121	CB4735
R11	0683-1225		RESISTOR 1.2K 5% .25W FC TC=-400/+700	01121	CB1225
R12	0683-4735		RESISTOR 47K 5% .25W FC TC=-400/+800	01121	CB4735
R13	0683-4735		RESISTOR 47K 5% .25W FC TC=-400/+800	01121	CB4735
R14	0683-1225		RESISTOR 1.2K 5% .25W FC TC=-400/+700	01121	CB1225
R15	0683-4735		RESISTOR 47K 5% .25W FC TC=-400/+800	01121	CB4735
R16	0683-4735		RESISTOR 47K 5% .25W FC TC=-400/+800	01121	CB4735
R17	0683-1225		RESISTOR 1.2K 5% .25W FC TC=-400/+700	01121	CB1225
R18	0683-4735		RESISTOR 47K 5% .25W FC TC=-400/+800	01121	CB4735
R19	0683-4735		RESISTOR 47K 5% .25W FC TC=-400/+800	01121	CB4735
R20	0683-1225		RESISTOR 1.2K 5% .25W FC TC=-400/+700	01121	CB1225
R21	0683-4735		RESISTOR 47K 5% .25W FC TC=-400/+800	01121	CB4735
R22	0683-4735		RESISTOR 47K 5% .25W FC TC=-400/+800	01121	CB4735
R23	0683-1225		RESISTOR 1.2K 5% .25W FC TC=-400/+700	01121	CB1225
R24	0683-4735		RESISTOR 47K 5% .25W FC TC=-400/+800	01121	CB4735
R25	0683-4735		RESISTOR 47K 5% .25W FC TC=-400/+800	01121	CB4735
R26	0683-1225		RESISTOR 1.2K 5% .25W FC TC=-400/+700	01121	CB1225
R27	0683-4735		RESISTOR 47K 5% .25W FC TC=-400/+800	01121	CB4735
R28	0683-4735		RESISTOR 47K 5% .25W FC TC=-400/+800	01121	CB4735
R29	0683-1225		RESISTOR 1.2K 5% .25W FC TC=-400/+700	01121	CB1225
R30	0683-1025	4	RESISTOR 1K 5% .25W FC TC=-400/+600	01121	CB1025

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
			SIMPLIFIED KEYBOARD ASSEMBLY, CONT'D.		
R31	0683-1025		RESISTOR 1K 5% .25W FC TC=-400/+600	01121	CB1025
R32	0683-2225	2	RESISTOR 2.2K 5% .25W FC TC=-400/+700	01121	CB2225
R33	0683-2225		RESISTOR 2.2K 5% .25W FC TC=-400/+700	01121	CB2225
R34	0686-1015	1	RESISTOR 100 5% .5W CC TC=0+529	01121	EB1015
R35	0698-3402	1	RESISTOR 316 1% .5W F TC=0+-100	91637	MFF-1/2-10
R36	0757-0198	1	RESISTOR 100 1% .5W F TC=0+-100	19701	MF7C1/2-T0-101-F
R37	0683-1035	1	RESISTOR 10K 5% .25W FC TC=-400/+700	01121	CB1035
R38	0757-0180	2	RESISTOR 31.6 1% .125W F TC=0+-100	24546	C4, T-0
R39	0757-0180		RESISTOR 31.6 1% .125W F TC=0+-100	24546	C4, T-0
R40	0683-2215	7	RESISTOR 220 5% .25W FC TC=-400/+600	01121	CB2215
R41	0683-2215		RESISTOR 220 5% .25W FC TC=-400/+600	01121	CB2215
R42	0683-2215		RESISTOR 220 5% .25W FC TC=-400/+600	01121	CB2215
R43	0683-2215		RESISTOR 220 5% .25W FC TC=-400/+600	01121	CB2215
R44	0683-2215		RESISTOR 220 5% .25W FC TC=-400/+600	01121	CB2215
R45	0683-2215		RESISTOR 220 5% .25W FC TC=-400/+600	01121	CB2215
R47	0683-1025		RESISTOR 1K 5% .25W FC TC=-400/+600	01121	CB1025
R48	0683-2215		RESISTOR 220 5% .25W FC TC=-400/+600	01121	CB2215
R49	0683-1025		RESISTOR 1K 5% .25W FC TC=-400/+600	01121	CB1025
R50	0683-4715	2	RESISTOR 470 5% .25W FC TC=-400/+600	01121	CB4715
R51	0683-4715		RESISTOR 470 5% .25W FC TC=-400/+600	01121	CB4715
SW1	3101-1858	1	SWITCH-TGL SUBMIN SPDT NS .02A 20VAC/DC	09353	7101-L2YCBE
SW2	3101-1859	1	SWITCH-TGL SUBMIN SPDT NS .02A 20VAC/DC	09353	7103-L2YCBE
SW3	3100-3313	1	SWITCH-RTRY .812 IN CTR SPCG IDX-ANG=36	28480	3100-3313
SW4	3101-1745	1	SWITCH-PB SPST-NO MOM .12A 28VAC	28480	3101-1745
SW5	3101-1899	87	SWITCH-PB SPST-NO MOM .08A	28480	3101-1899
SW6	3101-1900	5	SWITCH-PB SPST-NO ALTNG .08A	28480	3101-1900
SW7	3101-1899		SWITCH-PB SPST-NO MOM .08A	28480	3101-1899
SW8	3101-1899		SWITCH-PB SPST-NO MOM .08A	28480	3101-1899
SW9	3101-1899		SWITCH-PB SPST-NO MOM .08A	28480	3101-1899
SW10	3101-1899		SWITCH-PB SPST-NO MOM .08A	28480	3101-1899
SW11	3101-1899		SWITCH-PB SPST-NO MOM .08A	28480	3101-1899
SW12	3101-1899		SWITCH-PB SPST-NO MOM .08A	28480	3101-1899
SW13	3101-1899		SWITCH-PB SPST-NO MOM .08A	28480	3101-1899
SW14	3101-1899		SWITCH-PB SPST-NO MOM .08A	28480	3101-1899
SW15	3101-1899		SWITCH-PB SPST-NO MOM .08A	28480	3101-1899
SW16	3101-1899		SWITCH-PB SPST-NO MOM .08A	28480	3101-1899
SW17	3101-1899		SWITCH-PB SPST-NO MOM .08A	28480	3101-1899
SW18	3101-1900		SWITCH-PB SPST-NO ALTNG .08A	28480	3101-1900
SW19	3101-1900		SWITCH-PB SPST-NO ALTNG .08A	28480	3101-1900
SW20	3101-1900		SWITCH-PB SPST-NO ALTNG .08A	28480	3101-1900
SW21-SW64	3101-1899		SWITCH-PB SPST-NO MOM .08A	28480	3101-1899
SW65	3101-1900		SWITCH-PB SPST-NO ALTNG .08A	28480	3101-1900
SW66-SW95	3101-1899		SWITCH-PB SPST-NO MOM .08A	28480	3101-1899
U1	1820-1209	3	IC-DIGITAL SN74LS38N TTL LS QUAD 2 NAND	01295	SN74LS38N
U2	1820-0987	1	IC-DIGITAL 93L18PC TTL L 8	07263	93L18PC
U3	1820-0301	4	IC-DIGITAL SN7475N TTL D-TYPE	01295	SN7475N
U4	1820-1209		IC-DIGITAL SN74LS38N TTL LS QUAD 2 NAND	01295	SN74LS38N
U5	1820-0491	2	IC-DIGITAL SN74145N TTL 4 BCD-TO-DEC	01295	SN74145N
U6	1820-0301		IC-DIGITAL SN7475N TTL D-TYPE	01295	SN7475N
U7	1820-0491		IC-DIGITAL SN74145N TTL 4 BCD-TO-DEC	01295	SN74145N
U8	1820-0471	1	IC-DIGITAL SN7406N TTL HEX 1	01295	SN7406N
U9	1820-1209		IC-DIGITAL SN74LS38N TTL LS QUAD 2 NAND	01295	SN74LS38N
U10	1820-0301		IC-DIGITAL SN7475N TTL D-TYPE	01295	SN7475N
U11	1820-0301		IC-DIGITAL SN7475N TTL D-TYPE	01295	SN7475N
U12	1826-0051	4	IC MC 1414 COMPARATOR	04713	MC1414P
U13	1826-0051		IC MC 1414 COMPARATOR	04713	MC1414P
U14	1820-1089	2	IC-DIGITAL SN74279N TTL QUAD	01295	SN74279N
U15	1826-0051		IC MC 1414 COMPARATOR	04713	MC1414P
U16	1826-0051		IC MC 1414 COMPARATOR	04713	MC1414P
U17	1820-1089		IC-DIGITAL SN74279N TTL QUAD	01295	SN74279N
			MISCELLANEOUS		
	0360-0040	3	TERMINAL-SLDR LUG LK-MTG FOR-#1/4-SCR	73734	1958
	0360-0268	1	TERMINAL-SLDR LUG LK-MTG FOR-#6-SCR	78189	2103-06-00
	0370-0620	1	KEYCAP, DBLO	28480	0370-0620
	0370-1129	1	KNOB	28480	0370-1129
	0370-2260	1	KEYCAP, 1	28480	0370-2260
	0370-2261	1	KEYCAP, 2"	28480	0370-2261
	0370-2262	1	KEYCAP, 3#	28480	0370-2262
	0370-2263	1	KEYCAP, 4$	28480	0370-2263
	0370-2264	1	KEYCAP, 5%	28480	0370-2264
	0370-2265	1	KEYCAP, 6&	28480	0370-2265

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
			SIMPLIFIED KEYBOARD ASSEMBLY, CONT'D.		
	0370-2266	1	KEYCAP, 7*	28480	0370-2266
	0370-2267	1	KEYCAP, 8(	28480	0370-2267
	0370-2268	1	KEYCAP, 9)	28480	0370-2268
	0370-2270	1	KEYCAP, A	28480	0370-2270
	0370-2271	1	KEYCAP, B	28480	0370-2271
	0370-2272	1	KEYCAP, C	28480	0370-2272
	0370-2273	1	KEYCAP, D	28480	0370-2273
	0370-2274	1	KEYCAP, E	28480	0370-2274
	0370-2275	1	KEYCAP, F	28480	0370-2275
	0370-2276	1	KEYCAP, G	28480	0370-2276
	0370-2277	1	KEYCAP, H	28480	0370-2277
	0370-2278	1	KEYCAP, I	28480	0370-2278
	0370-2279	1	KEYCAP, J	28480	0370-2279
	0370-2280	1	KEYCAP, K	28480	0370-2280
	0370-2281	1	KEYCAP, L	28480	0370-2281
	0370-2282	1	KEYCAP, M	28480	0370-2282
	0370-2283	1	KEYCAP, N	28480	0370-2283
	0370-2284	1	KEYCAP, O	28480	0370-2284
	0370-2285	1	KEYCAP, P	28480	0370-2285
	0370-2286	1	KEYCAP, Q	28480	0370-2286
	0370-2287	1	KEYCAP, R	28480	0370-2287
	0370-2288	1	KEYCAP, S	28480	0370-2288
	0370-2289	1	KEYCAP, T	28480	0370-2289
	0370-2290	1	KEYCAP, U	28480	0370-2290
	0370-2291	1	KEYCAP, V	28480	0370-2291
	0370-2292	1	KEYCAP, W	28480	0370-2292
	0370-2293	1	KEYCAP, X	28480	0370-2293
	0370-2294	1	KEYCAP, Y	28480	0370-2294
	0370-2295	1	KEYCAP, Z	28480	0370-2295
	0370-2296	1	KEYCAP, <	28480	0370-2296
	0370-2297	1	KEYCAP, >	28480	0370-2297
	0370-2298	1	KEYCAP, ?/	28480	0370-2298
	0370-2312	1	KEYCAP, 1	28480	0370-2312
	0370-2313	1	KEYCAP, 2	28480	0370-2313
	0370-2314	1	KEYCAP, 3	28480	0370-2314
	0370-2315	1	KEYCAP, 4	28480	0370-2315
	0370-2316	1	KEYCAP, 5	28480	0370-2316
	0370-2317	1	KEYCAP, 6	28480	0370-2317
	0370-2318	1	KEYCAP, 7	28480	0370-2318
	0370-2319	1	KEYCAP, 8	28480	0370-2319
	0370-2320	1	KEYCAP, 9	28480	0370-2320
	0370-2322	1	KEYCAP, .	28480	0370-2322
	0370-2324	1	KEYCAP, +;	28480	0370-2324
	0370-2325	1	KEYCAP, COLON	28480	0370-2325
	0370-2635	1	KEYCAP, RETURN	28480	0370-2635
	0370-2636	2	KEYCAP, SHIFT	28480	0370-2636
	0370-2637	1	KEYCAP, CNTL	28480	0370-2637
	0370-2641	1	KEYCAP, O	28480	0370-2641
	0370-2644	9	KEYCAP, FUNCTION	28480	0370-2644
	0370-2646	1	KEYCAP, ESC	28480	0370-2646
	0370-2647	1	KEYCAP, LOCK	28480	0370-2647
	0370-2648	1	KEYCAP, =-	28480	0370-2648
	0370-2649	1	KEYCAP, LINE FEED	28480	0370-2649
	0370-2650	1	KEYCAP, DEL-	28480	0370-2650
	0370-2651	1	KEYCAP, SLASH	28480	0370-2651
	0370-2652	1	KEYCAP, BKT LEFT	28480	0370-2652
	0370-2653	1	KEYCAP, BKT RT	28480	0370-2653
	0370-2654	1	KEYCAP, APPROX	28480	0370-2654
	0370-2655	1	KEYCAP, AT	28480	0370-2655
	0380-0371	6	SPACER-RND .375LG .171ID .250D FBR	83330	2131
	0380-0585	4	STANDOFF-RVT-ON .531LG 6-32THD .250D BRS	28480	0380-0585
	0470-0231		COMPOUND8 NUT LOCK	28480	0470-0231
	0890-1134	1	TUBING, UBBER 3/16"	28480	0890-1134
	1450-0528	6	LAMP SOCKET BIPIN-SKT BIPIN-TERM PC	28480	1450-0528
	1460-0691	1	SPRING-TRSN .531-IN-W 4-IN-LG MUW	28480	1460-0691
	1530-1737	2	PLUNGER FOR MTG SPACE BAR MECH;STL NP	04426	80-550767
	1530-1738	2	HOUSING, SPACE BAR, END HOUSING FOR MTG	04426	80-550774
	2190-0047	1	WASHER-LK 82 CTSK EXT T NO.-6 .142-IN-ID	78189	1506-00
	2360-0192	4	SCREW-MACH 6-32 .25-IN-LG 100 DEG	28480	2360-0192
	2360-0197	1	SCREW-MACH 6-32 .375-IN-LG PAN-HD-POZI	28480	2360-0197
	2950-0054	2	NUT-HEX-DBL-CHAM 1/4-40-THD .062-THK	28480	2950-0054
	3050-0099	2	WASHER-FL MTLC NO.-12 .25-IN-ID .5-IN-OD	28480	3050-0099
	8151-0013		WIRE 22AWG 1X22	28480	8151-0014
	02640-00003	1	PLATE, SWITCH MOUNTING	28480	02640-00003
	02640-00019	1	KEY CAP- SPACE	28480	02640-00019
	02640-00041	1	SPRING, CONTACT	28480	02640-00019