

01616C PROGRAM DESCRIPTION I

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Program Title DOUBLE PRECISION HEXIDECIMAL CONVERSION

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Program Description, Equations, Variables This program converts double precision hexadecimal into double precision decimal and vice-versa. Double precision hex contains up to 12 digits (0-9 and A-F) and corresponds to a decimal value of up to 15 digits (less than approximately 2.81 E15). The only program variables are the hex and decimal input and output. Of these only the decimal input and output need explanation. To obtain extended precision, the variables are each held in two registers: one high order and the other low order.

On input, decimal numbers more than nine digits in length must be divided at some point and the number input in two halves. Any multiple digit number can be so divided; numbers more than nine digits must be. For example, the number 483,975 can be input as 483. E3 for the high order chunk and 975 for the low order piece. On output, assuming that flag 28 is set to obtain American radix notation, decimal digits will be appropriately grouped into 3-digit chunks separated by commas, except for the radix character between 100,000 and 1,000,000. This radix character will be a decimal point. No confusion results because a comma appears further to the right as does another decimal point, and in any case a whole number must be the result. (Radix characters are reversed if flag 28 is clear.)

Because of a logical glitch in the 41C's numeric input (a nine digit number cannot be given an exponent), the high order input for D-H must be 8 digits or less. The low order input should not exceed 9 digits to maintain numerical accuracy in the conversion. If the decimal value to be converted is less than 9 digits, it can be input as either high order or low order with 0. input for the other value.

If a printer is attached, toggle to NORM mode.

Necessary Accessories None

Operating Limits and Warnings Twelve hex digits maximum; 15 decimal digits maximum (less than roughly 2.8147 E15). No more than 8 decimal digits should be assigned to the HO input if an exponent of 10 is needed.

Reference(s) N.A.

This program has been verified only with respect to the numerical example given in Program Description II. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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Sample Problem (Sketch if Desired)

1. Convert 6A13F27BC9E to its decimal equivalent.
2. Convert 239,714,688,307,524 to its hexadecimal equivalent.

SOLUTION:

[illegible]

□ 67 □ 97 □ 41C

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
01	LBL "H-D			51	ABS		
02	SF 29		Control F29	52	-		
03	"HEX:"			53	FIX IND		Control display for zeros below 1.0 E6
04	CLX			54	RCL 01		
05	STO 00		Initialize output registers	55	X>0?		Test for any H0 value
06	STO 01			56	ARCL 01		
07	AOH			57	FIX 0		
08	PROMPT			58	ARCL 00		
09	ASTO 02		Store input	59	AOFF		
10	ASHF			60	AOFF		
11	ASTO 03			61	STOP		
12	LBL 01			62	GTO "H-D		
13	" "		Pick up high order hex digit in Reg 4	63	LBL 04		Divide by 10 ⁶
14	ARCL 02			64	/		
15	ARCL 03			65	INT		
16	ASTO 04			66	ST+ 01		Add digits above 10 ⁶ to H0 register
17	ASHF			67	RCL 00		
18	ASTO 02			68	1 E6		
19	ASHF			69	MOD		Keep digits MOD 10 ⁶ in L0 register
20	ASTO 03			70	STO 00		
21	" "			71	RTN		
22	ASTO X			72	LBL "0 "		Hex digit conver- sion table
23	ARCL 04			73	0		
24	ASHF			74	RTN		
25	"F "			75	LBL "1 "		
26	ASTO 04			76	1		
27	RCL 04			77	RTN		
28	X=Y?		Test for blank-- end of hex number	78	LBL "2 "		
29	GTO 02			79	2		
30	XEQ IND		Get decimal equiv.	80	RTN		
04				81	LBL "3 "		
31	ST+ 00			82	3		
32	RCL 00			83	RTN		
33	1 E6			84	LBL "4 "		
34	X<=Y?		Test for L0 overflo	85	4		
35	XEQ 04			86	RTN		
36	16			87	LBL "5 "		
37	ST* 00			88	5		
38	ST* 01			89	RTN		
39	GTO 01			90	LBL "6 "		
40	LBL 02			91	6		
41	AOFF		Prepare output	92	RTN		
42	16			93	LBL "7 "		
43	ST/ 00		Divide out extra factor of 16	94	7		
44	ST/ 01			95	RTN		
45	"DEC: "			96	LBL "8 "		
46	6			97	8		
47	.2			98	RTN		
48	RCL 00			99	LBL "9 "		
49	+			100	9		
50	LOG						

□ 67 □ 97 ☑ 41C

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
101	RTN			151	RCL 03		
102	LBL "A"			152	+		
103	10			153	X>0?		Test for end of decimal number
104	RTN			154	GTO 03		
105	LBL "B"			155	"HEX: "		
106	11			156	ARCL 01		
107	RTN			157	ARCL 00		
108	LBL "C"			158	AVIEW		
109	12			159	SF 29		
110	RTN			160	STOP		
111	LBL "D"			161	GTO "D-H"		
112	13						
113	RTN			162	LBL 10		Decimal conversion table for 10-15
114	LBL "E"			163	"FA"		
115	14			164	RTN		
116	RTN			165	LBL 11		
117	LBL "F"			166	"FB"		
118	15			167	RTN		
119	RTN			168	LBL 12		
120	LBL "D-H"			169	"FC"		
				170	RTN		
121	SF 29		Control F29	171	LBL 13		
122	FIX 0			172	"FD"		
123	"DEC H0:			173	RTN		
				174	LBL 14		
124	PROMPT			175	"FE"		
125	STO 03		Store H0 input	176	RTN		
126	"DEC L0:			177	LBL 15		
				178	"FF"		
127	PROMPT			179	RTN		
128	STO 02		Store L0 input	180	LBL 09		
129	CLA			181	X>Y?		
130	ASTO 00		Initialize output registers	182	ARCL Y		Append next higher hex digit to developing number
131	ASTO 01			183	ARCL 01		
132	CF 29			184	ARCL 00		
133	LBL 03			185	ASTO 01		
134	RCL 03			186	ASHF		
135	16 E7			187	ASTO 00		
136	MOD		Move one hex equiv chunk at a time from H0 to L0	188	CLA		
137	ST- 03			189	RTN		
138	ST+ 02			190	.END.		
139	RCL 02						
140	16						
141	ST/ 03		Divide H0 and L0 by 16 and pick off low order hex equiv digit				
142	MOD						
143	ST- 02						
144	10						
145	X<=Y?		Get table digit for hex digits above 9				
146	XEQ IND Y		Assemble hex number				
147	XEQ 09						
148	16						
149	ST/ 02						
150	RCL 02						

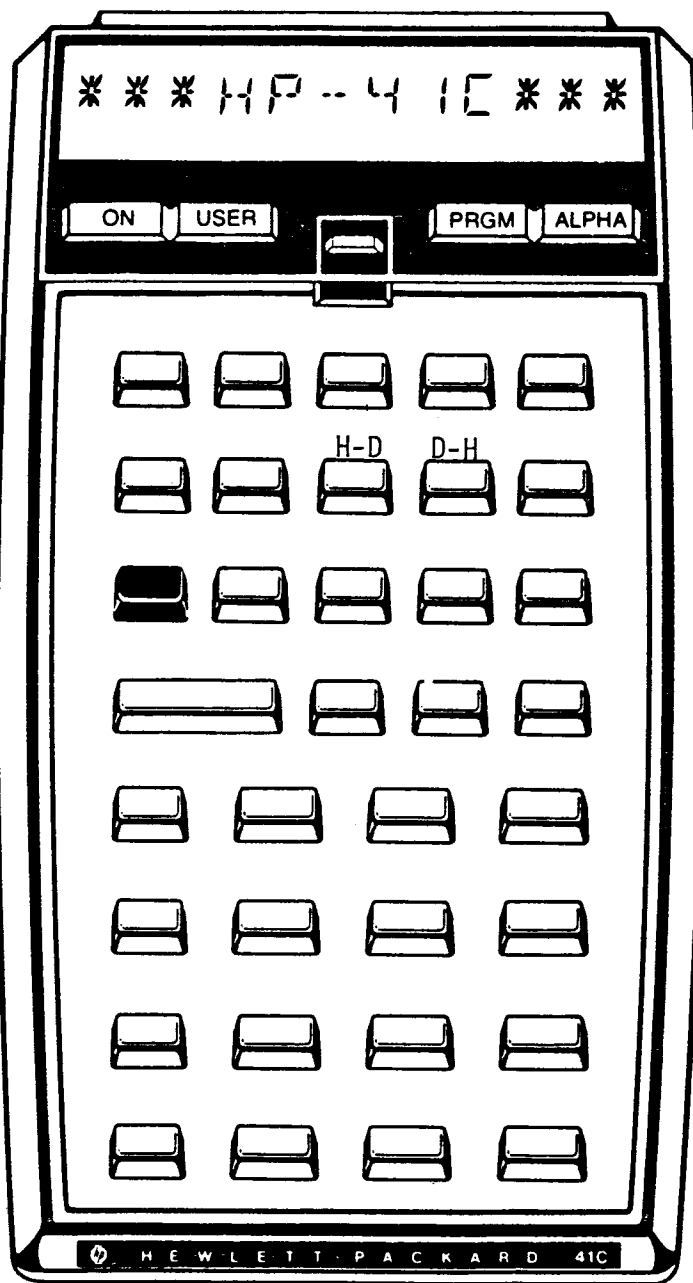
01616C

REGISTERS, STATUS, FLAGS, ASSIGNMENTS

[illegible]

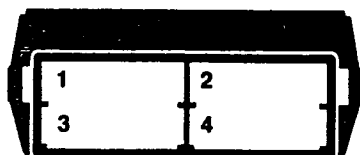
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KEYBOARD CARD LABELING

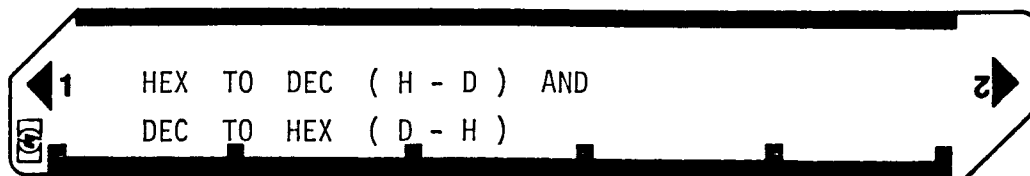


KEYBOARD

SYSTEM
CONFIGURATION



CARD



ROW 1 (1 : 3)



ROW 2 (3 : 13)



ROW 3 (13 : 18)



ROW 4 (18 : 25)



ROW 5 (25 : 33)



ROW 6 (33 : 39)



ROW 7 (39 : 45)



ROW 8 (45 : 53)



ROW 9 (54 : 62)



ROW 10 (62 : 69)



ROW 11 (70 : 75)



ROW 12 (75 : 80)



ROW 13 (81 : 84)



ROW 14 (84 : 90)



ROW 15 (90 : 94)



ROW 16 (95 : 99)



ROW 17 (99 : 104)



ROW 18 (105 : 108)



ROW 19 (108 : 112)



ROW 20 (113 : 117)



ROW 21 (117 : 120)



ROW 22 (121 : 124)



ROW 23 (125 : 130)



ROW 24 (130 : 137)



ROW 25 (137 : 144)



ROW 26 (145 : 152)



ROW 27 (153 : 157)



ROW 28 (158 : 163)



ROW 29 (164 : 172)



ROW 30 (172 : 178)



ROW 31 (179 : 187)



ROW 32 (187 : 190)

