The HP-41 SYNTHETIC Quick Reference Guide

Compiled by
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HP-41C QUICK REFERENCE CARD FOR SYNTHETIC PROGRAMMING

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	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
	CAT	@c(GTO..)	DEL	COPY	CLP	R/S	SIZE	BST	SST	ON	PACK	←(PRGM)	USR/P/A	2 __	SHIFT	ASN	
0	NULL 00 ¯ 0 ◆	LBL 00 01 ⌅ 1 ×	LBL 01 02 ■ 2 ⌅	LBL 02 03 ■ 3 ←	LBL 03 04 ⌅ 4 α	LBL 04 05 ⌅ 5 β	LBL 05 06 ⌅ 6 Γ	LBL 06 07 ■ 7 ↓	LBL 07 08 ■ 8 Δ	LBL 08 09 ■ 9 σ	LBL 09 10 ■ 10 ◆	LBL 10 11 ■ 11 ⌅	LBL 11 12 ⌅ 12 μ	LBL 12 13 ⌅ 13 ∠	LBL 13 14 ⌅ 14 ⌅	LBL 14 15 ■ 15 ⌅	0
1	0 16 ■ 16 θ	1 17 ■ 17 Ω	2 18 ■ 18 δ	3 19 ■ 19 ä	4 20 ■ 20 à	5 21 ■ 21 ä	6 22 ■ 22 ä	7 23 ■ 23 ö	8 24 ■ 24 ö	9 25 ■ 25 ü	. 26 ■ 26 ü	EEX 27 ■ 27 Æ	NEG 28 ■ 28 æ	GTO ▼ 29 ■ 29 ≠	XEQ ▼ 30 ■ 30 £	W ▼ 31 ■ 31 ⌅	1
2	RCL 00 32 32	RCL 01 33 : 33 !	RCL 02 34 " 34 "	RCL 03 35 # 35 #	RCL 04 36 $ 36 $	RCL 05 37 % 37 %	RCL 06 38 & 38 &	RCL 07 39 ' 39 '	RCL 08 40 (40 (	RCL 09 41) 41)	RCL 10 42 * 42 *	RCL 11 43 + 43 +	RCL 12 44 , 44 ,	RCL 13 45 - 45 -	RCL 14 46 . 46 .	RCL 15 47 / 47 /	2
3	STO 00 48 0 48 0	STO 01 49 1 49 1	STO 02 50 2 50 2	STO 03 51 3 51 3	STO 04 52 4 52 4	STO 05 53 5 53 5	STO 06 54 6 54 6	STO 07 55 7 55 7	STO 08 56 8 56 8	STO 09 57 9 57 9	STO 10 58 : 58 :	STO 11 59 ; 59 ;	STO 12 60 < 60 <	STO 13 61 = 61 =	STO 14 62 > 62 >	STO 15 63 ? 63 ?	3
4	+ 64 P 64 @	− 65 A 65 A	✱ 66 B 66 B	/ 67 C 67 C	X<Y? 68 D 68 D	X>Y? 69 E 69 E	X≤Y? 70 F 70 F	Σ+ 71 G 71 G	Σ− 72 H 72 H	HMS+ 73 I 73 I	HMS− 74 J 74 J	MOD 75 K 75 K	% 76 L 76 L	%CH 77 M 77 M	P→R 78 N 78 N	R→P 79 O 79 O	4
5	LN 80 P 80 P	X↑2 81 Q 81 Q	SQRT 82 R 82 R	Y↑X 83 S 83 S	CHS 84 T 84 T	E↑X 85 U 85 U	LOG 86 V 86 V	10↑X 87 W 87 W	E↑X-1 88 X 88 X	SIN 89 Y 89 Y	COS 90 Z 90 Z	TAN 91 [91 [	ASIN 92 \ 92 \	ACOS 93] 93]	ATAN 94 ^ 94 ↑	→DEC 95 _ 95 _	5
6	1/X 96 ˋ 96 ˋ	ABS 97 a 97 a	FACT 98 b 98 b	X≠0? 99 c 99 c	X>0? 100 d 100 d	LN1+X 101 e 101 e	X<0? A ■ 102 f	X=0? B ■ 103 g	INT C ■ 104 h	FRC D ■ 105 i	D→R E ■ 106 j	R→D F ■ 107 k	→HMS G ■ 108 l	→HR H ■ 109 m	RND I ■ 110 n	→OCT J ■ 111 o	6
7	CLΣ T ■ 112 p	X<>Y Z ■ 113 q	PI Y ■ 114 r	CLST X ■ 115 s	R↑ L ■ 116 t	RDN M ■ 117 u	LASTX N ■ 118 v	CLX O ■ 119 w	X=Y? P ■ 120 x	X≠Y? Q ■ 121 y	SIGN ⊢ ▼ ■ 122 z	X≤0? a ■ 123 {	MEAN b ■ 124 |	SDEV c ■ 125 →	AVIEW d ■ 126 Σ	CLD e ■ 127 ⊢	7
	0 0000	1 0001	2 0010	3 0011	4 0100	5 0101	6 0110	7 0111	8 1000	9 1001	A 1010	B 1011	C 1100	D 1101	E 1110	F 1111	

00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

HP-41C QUICK REFERENCE CARD FOR SYNTHETIC PROGRAMMING

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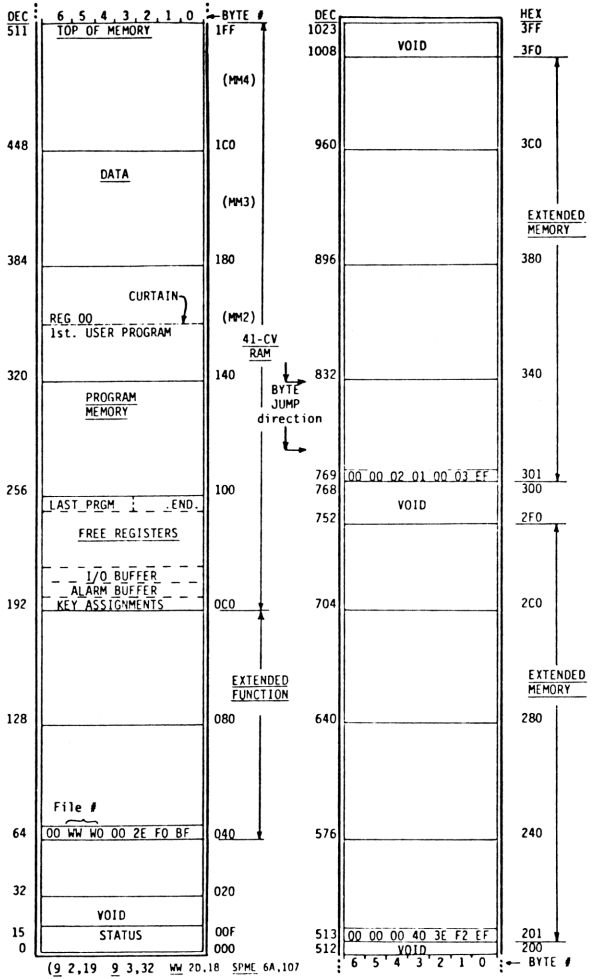
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
8	DEG IND 00 128 ◆	RAD IND 01 129 ×	GRAD IND 02 130 ⌧	ENTER↑ IND 03 131 ←	STOP IND 04 132 α	RTN IND 05 133 β	BEEP IND 06 134 Γ	CLA IND 07 135 ↓	ASHF IND 08 136 Δ	PSE IND 09 137 σ	CLRG IND 10 138 ◆	AOFF IND 11 139 ↘	AON IND 12 140 μ	OFF IND 13 141 ∠	PROMPT IND 14 142 π	ADV IND 15 143 ⇕	8
9	RCL IND 16 144 θ	STO IND 17 145 Ω	ST+ IND 18 146 δ	ST− IND 19 147 ä	ST ✱ IND 20 148 à	ST/ IND 21 149 ä	ISG IND 22 150 ä	DSE IND 23 151 ö	VIEW IND 24 152 ö	Σ REG IND 25 153 ü	ASTO IND 26 154 ü	ARCL IND 27 155 ß	FIX IND 28 156 ⊕	SCI IND 29 157 ≠	ENG IND 30 158 £	TONE IND 31 159 ✱	9
A	XR 0-3 IND 32 160	XR 4-7 IND 33 161 !	XR8-11 IND 34 162 "	X12-15 IND 35 163 #	X16-19 IND 36 164 $	X20-23 IND 37 165 %	X24-27 IND 38 166 &	X28-31 IND 39 167 '	SF IND 40 168 (	CF IND 41 169)	FS?C IND 42 170 *	FC?C IND 43 171 +	FS? IND 44 172 ,	FC? IND 45 173 −	GTO XEQ IND IND 46 174 .	SPARE IND 47 175 /	A
B	SPARE IND 48 176 0	GTO 00 IND 49 177 1	GTO 01 IND 50 178 2	GTO 02 IND 51 179 3	GTO 03 IND 52 180 4	GTO 04 IND 53 181 5	GTO 05 IND 54 182 6	GTO 06 IND 55 183 7	GTO 07 IND 56 184 8	GTO 08 IND 57 185 9	GTO 09 IND 58 186 :	GTO 10 IND 59 187 ;	GTO 11 IND 60 188 <	GTO 12 IND 61 189 =	GTO 13 IND 62 190 >	GTO 14 IND 63 191 ?	B
C	GLOBAL IND 64 192 @	GLOBAL IND 65 193 A	GLOBAL IND 66 194 B	GLOBAL IND 67 195 C	GLOBAL IND 68 196 D	GLOBAL IND 69 197 E	GLOBAL IND 70 198 F	GLOBAL IND 71 199 G	GLOBAL IND 72 200 H	GLOBAL IND 73 201 I	GLOBAL IND 74 202 J	GLOBAL IND 75 203 K	GLOBAL IND 76 204 L	GLOBAL IND 77 205 M	X<>-- IND 78 206 N	LBL -- IND 79 207 O	C
D	GTO -- IND 80 208 P	GTO -- IND 81 209 Q	GTO -- IND 82 210 R	GTO -- IND 83 211 S	GTO -- IND 84 212 T	GTO -- IND 85 213 U	GTO -- IND 86 214 V	GTO -- IND 87 215 W	GTO -- IND 88 216 X	GTO -- IND 89 217 Y	GTO -- IND 90 218 Z	GTO -- IND 91 219 [	GTO -- IND 92 220 \	GTO -- IND 93 221]	GTO -- IND 94 222 ↑	GTO -- IND 95 223 _	D
E	XEQ -- IND 96 224 `	XEQ -- IND 97 225 a	XEQ -- IND 98 226 b	XEQ -- IND 99 227 c	XEQ -- IND100 228 d	XEQ -- IND101 229 e	XEQ -- IND102 230 f	XEQ -- IND103 231 g	XEQ -- IND104 232 h	XEQ -- IND105 233 i	XEQ -- IND106 234 j	XEQ -- IND107 235 k	XEQ -- IND108 236 l	XEQ -- IND109 237 m	XEQ -- IND110 238 n	XEQ -- IND111 239 o	E
F	TEXT 0 IND T 240 p	TEXT 1 IND Z 241 q	TEXT 2 IND Y 242 r	TEXT 3 IND X 243 s	TEXT 4 IND L 244 t	TEXT 5 IND M [245 u	TEXT 6 IND N \ 246 v	TEXT 7 IND O] 247 w	TEXT 8 IND P↑ 248 x	TEXT 9 IND Q_ 249 y	TEXT10 IND ⊢ᵀ 250 z	TEXT11 IND a 251 ⊤	TEXT12 IND b 252 |	TEXT13 IND c 253 →	TEXT14 IND d 254 Σ	TEXT15 IND e 255 ⊢	F
	0 0000	1 0001	2 0010	3 0011	4 0100	5 0101	6 0110	7 0111	8 1000	9 1001	A 1010	B 1011	C 1100	D 1101	E 1110	F 1111	

For price information and a list of dealers in your area, send a self-addressed stamped envelope to: SYNTHETIX, 1540 Mathews Ave., Manhattan Beach, CA 90266, USA

MEMORY CONFIGURATION



UNUSED PROGRAM MEMORY

Top of I/O Buffer ID

	M	O	N	I	T	R	
	10	4D	4F	4E	49	54	52	0D5
each byte	48	49	20	53	57	45	45	0D4
	54	59	20	50	49	00	00	0D3
	00	00	00	00	00	00	00	0D2
	BB	05	0 0 B	0 00	0	1	00	0D1

ID I/O buffer; # REGS; PT= (see note); MIPT=0 AIPT=1

Top of ALARM ID

	F0 00 00 00 00 00 00							0D0
ALM # 4	Message							0CF
	Message							0CE
	DATE/TIME				0	0	2	0CD
ALM # 3	DATE/TIME				0	F	0	0CC
ALM # 2	Message (if any)							0CB
	00 REPEAT (if any) 0 0				0	0	0	0CA
	DATE/TIME				1	F	1	0C9
ALM # 1	MESSAGE up to 24 bytes (3½ registers)							0C8
	00 Repeat interval secs. 0 0				0	0	0	0C7
	DATE/TIME secs. from 1-1-1900				1	F	1	0C6

last 3 nybbles of DATE/TIME register

non-repeat =0
repeat alarm =1
Future alarm =0
unacknowledged alarm =F

no message =0
1-7 characters =1
8-14 characters =2
15-21 characters =3
21-24 characters =4

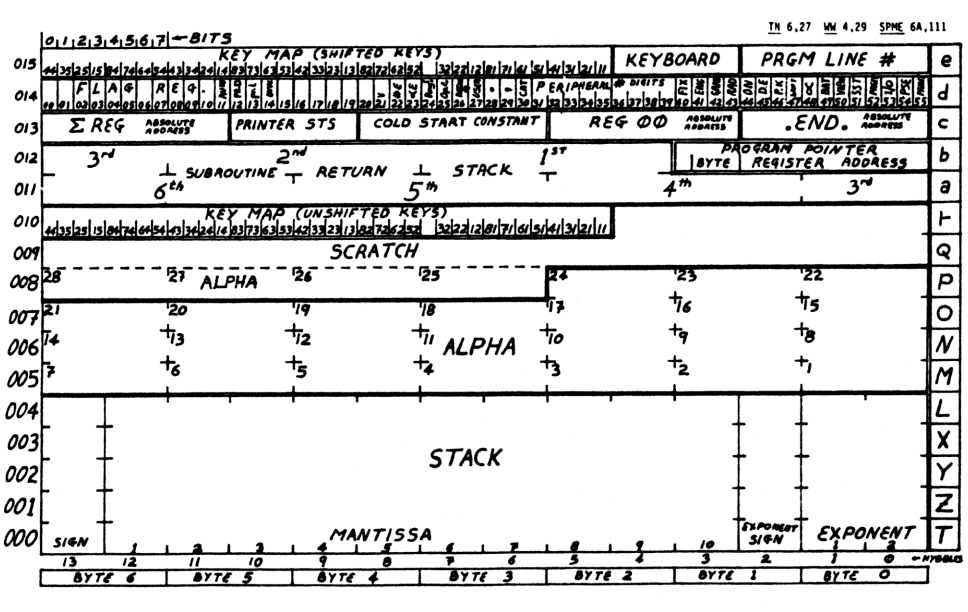
ID byte; # REGS in ALM buffer

	AA	nn	00	00	00	00	00	0C5
KA (KEY-ASSN.)	F0	00	00	00	04	07	42	0C4
	F0	1B	04	0E	9F	35	0B	0C3
	F0	00	A7	49	C7	85	3C	0C2
	F0	F7	3F	09	A2	A8	0C	0C1
	F0	04	68	32	A6	6F	21	0C0
	ID byte	04= filler	INT	key-code	1st byte	2nd byte	key-code	

1 Byte function; 2 Byte function (XTOA)

Note: pointer in I/O buffer counts up from zero, starting at top left byte down to bottom right (as depicted above)

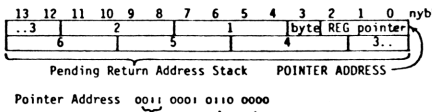
TN 6,27 WM 4,29 SPME 6A,111



REG:d

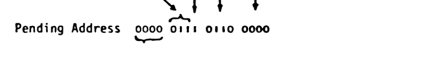
00-10 general purpose
11 auto execute
12 doublewide
13 lower case
14 overwrite
15-16 IL printer
0 0 MAN
0 1 NORM
1 0 TRACE
1 1 TR/STACK
17 record incomplete
18 general use
19 cleared at
20 turn-on
21 prtr enable
22 num. entry
23 alpha entry
24 range ignore
25 error ignore
26 audio enable
27 USER mode
28 dec./comma
29 digit grouping
30 CAT
31 timer DMY/MDY
32 manual IL I/O
33 IL lock
34 not used
35 not used
36-39 number of digits
40-41 display
0 0 SCI
0 1 ENG
1 0 FIX
1 1 FIX/ENG
42-43 trig mode
0 0 DEG
0 1 RAD
1 0 GRAD
1 1 RAD
44 cont. ON
45 system data entry
46 partial key sequence
47 SHIFT
48 ALPHA
49 low BAT
50 message
51 SST
52 PRGM
53 I/O
54 PSE
55 printer existence

ROM 1F,217
SPME 117

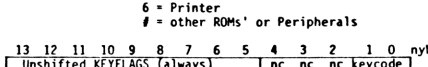


6 8,27
WW 4G,36
SPME 6A,114

0 = RAM address
6 = Printer
# = other ROMs' or Peripherals

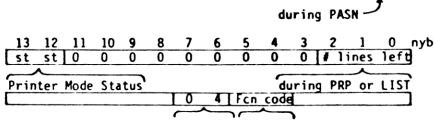


WW 4E,34
SPME 6A,113



9 2,22
WW 4C,33
SPME 6A,112

KA code during PASN 1st byte 2nd byte
Other Q changers: viewing alpha; ALPHA, AVIEW, PROMPT
alpha args.: CLP, LBL, PRP, GTO(IND), XEQ(IND)
fcns: SIN, ASIN, COS, ACOS, P-R, Y^x, SDEV
numeric entry



SPME 6A,112
7 8,27
8 5,14
7 8,27
8 5,13
7 8,27
8 6,23b
6 8,27

BAR CODE STRUCTURE

BYTE	HEADER 1	HEADER 2		HEADER 3	DATA or PROGRAM INSTRUCTIONS 4 - 16		
	CHECKSUM	TYPE					
0						NOT USED	0
1	RUNNING CHECKSUM	0001	sequence # 0-15	# of leading	# of trailing	← up to 13 PROGRAM BYTES → REGULAR PROGRAM	1
2	RUNNING CHECKSUM	0010	row 1=0 row 17=0	byts frm last row	bytes of next row	← up to 13 PROGRAM BYTES → PRIVATE PROGRAM	2
3						NOT USED	3
4	CHECKSUM	0100	0000	← up to 12 INSTRUCTION BYTES →		DIRECT EXECUTION	4
5	mirror image / FUNCTION	← (one BYTE)		CHECKSUM	0-16 / FUNCTION	← (two BYTE)	PAPER KEYBOARD 5
6	CHECKSUM	0110	# 0 1 2 3 4 5 6 7 8 9 . + - EEX ILL CODE 0 1 2 3 4 5 6 7 8 9 A B C D E F			up to 14 BYTES → NUMERIC DATA	6
7	CHECKSUM	0111	# CHR's	← up to 14 ASCII CHARACTERS →		ALPHA REPLACE DATA	7
8	CHECKSUM	1000	# CHR's	← up to 14 ASCII CHARACTERS →		ALPHA APPEND DATA	8
9		1001				NUMERIC SEQUENCED DATA	9
A		1010				ALPHA REPLACE SEQUENCED DATA	10
B		1011				ALPHA APPEND SEQUENCED DATA	11
C						NOT USED	12
D						NOT USED	13
E						NOT USED	14
F						NOT USED	15

(7 5,18-33 7 6,22-28,38 7 7,13,21 7 8,31 7 9,10 7 10,20)

FUNCTION TIMES

STACK OPERATIONS

ENTER	11
R↓	12
RDN	16
X<>Y	10
LASTX	13
Digits(n)	33n+30
0	75
.	65
-(1C)	61
E	51
1E	85

SINGLE ARGUMENT

CHS	12
ABS	13
INT	20
FRC	20
RND	19
SIGN	13
10↑X	100
E↑X	160
E↑X-1	230
LOG	260
LN	220
LN1+X	260
1/X	37
X↑2	41
SQRT	54
OCT	120
DEC	65
HMS	30
HR	40
D-R	110
R-D	90
FACT(n!)	4.2n+20

MICELLANEOUS

BEEP	1368
PI	19
LBL'nChrs	4n+42

NOP	
Nul	6
Text0(F0)	12
LBL 01	10
LBL 88	14
STO X	16
X<>X	19
DEG	19
SF 01	31
GTO 15(B0,B0)	10
XEQ IND 47 (AF,AF)	12

CLEAR

CLX	10
CLA	9
CLD	20
CLST	10
CLRG	2.7n+12
CLΣ	25

TWO ARGUMENT

+	30
-	29
*	37
/	37
MOD	20
Y↑X	107
HMS+	100
HMS-	100

MODE & DISPLAY

DEG	19
RAD	20
GRAD	20
FIX	16
SCI	16
ENG	16
PSE	1300
ON	

STATISTICS

ΣREG	30
CLΣ	25
Σ+	240
Σ-	250
MEAN	130
SDEV	480
%	35
%CH	70

PRINTER

	PR	F21	
ADV	-	S/C	9
	off	S/C	12
	on	C	23
ACA	off	C	26
	on	C	36
	on	S	82

CARD READER

7CLRG	63
7DSP0-7DSP9	33
7DSPI	48
7DSZ	58
7DSZI	71
7ENG	32
7FIX	32
7ISZ	57
7ISZI	71
7P<>S	73
7RCL	46
7SCI	31
7PPREG	42,700
7PRSTK	10,800
7PRTX	4,900

TIME	(FIXn)
ADATE	9.5n+54
ALMNOW	55
ATIME	10n+69
ATIME24	10n+54
CLK12	27
CLK24	27
CLKT	27
CLKTD	27
CORRECT	352
DATE	150
DATE+	290
DDAYS	335
DMY	23
DOW	182
MDY	22
RCLAF	32
RCLSW	58
RUNSW	26
SETAF	34
SETDATE	294
SETIME	164
SETSW	43
STOPSW	25
T+X	127
TIME	67
XYZALM	400+200
-TIME- C	138

REGISTER ACCESS

	DIRECT		INDIRECT	
	DATA	SI	DATA	SI
STO	20	16	34	30
RCL	23	20	37	30
X<>	24	19	36	33
ST+	40	35	53	49
ST-	44	38	56	51
ST*	47	42	61	56
ST/	48	43	61	56
VIEW	130	130	140	140
ASTO	32	31	49	44

LOOPING

ISG	63	38	90	85
DSE	75	42	88	83

TRIGONOMETRY

	DEG	RAD	GRAD
SIN	350	410	360
ASIN	450	400	410
COS	450	400	490
ACOS	450	380	430
TAN	150	250	140
ATAN	310	240	290
P-R	300	230	290
R-P	260	170	230

FLAGS & CONDITIONALS

SF	31
CF	31

	TRUE	FALSE
FS?	22	36
FC?	23	35
FS?C	32	44
FC?C	33	45
X=0?	12	23
X>0?	12	23
X<=0?	12	23
X<0?	12	23
X≠0?	12	23
X=Y?	10	21
X>Y?	28	37
X<=Y?	28	38
X<Y?	24	33
X≠Y?	10	21

LOOPING & BRANCHING

GTO local	32
LBL local	
XEQ local	60
LBL local	
RTN	
LBL'AB	130-410
LBL'ABCDEF	180-470

ALPHA

AON	19
AOFF	19
ASHF	18
ARCL X(FIXn)	9n+61
(X=A)	40
(X=null)	31
n CHR's	15n+10
AVIEW	257
Scrolling/chr	565
Terminated/chr	9

EXTENDED FUNCTIONS

XTOA	45
SIZE?	138
ATOX	145
CLKEYS	85
X>F	103
ANUM	80-260
AROT	50-350
POSA	100-300
PASN: Global	200
fcn	2000
RCLFLAG	31
STOFLAG	28
PSIZE	4.3n+1200
(nREGS)	
ALENG	-4.3n+173

REFERENCES

7 7,9
8 2,19
8 4,5-6
9 4,71
TN 2,2
TN 6,3-5
KJ Appendix A,143
CR 60-63

eGØBEEP

eGOBEEP	XROM#	HEX	DEC
00 -MASS ST 1M	28,00	A7,00	167,0
01 CREATE	28,01	A7,01	167,1
02 DIR	28,02	A7,02	167,2
03 NEWM	28,03	A7,03	167,3
04 PURGE	28,04	A7,04	167,4
05 READA	28,05	A7,05	167,5
06 READK	28,06	A7,06	167,6
07 READP	28,07	A7,07	167,7
08 READR	28,08	A7,08	167,8
09 READRX	28,09	A7,09	167,9
10 READS	28,10	A7,0A	167,10
11 READSUB	28,11	A7,0B	167,11
12 RENAME	28,12	A7,0C	167,12
13 SEC	28,13	A7,0D	167,13
14 SEEKR	28,14	A7,0E	167,14
15 UNSEC	28,15	A7,0F	167,15
16 VERIFY	28,16	A7,10	167,16
17 WRTA	28,17	A7,11	167,17
18 WRTK	28,18	A7,12	167,18
19 WRTP	28,19	A7,13	167,19
20 WRTPV	28,20	A7,14	167,20
21 WRTR	28,21	A7,15	167,21
22 WRTRX	28,22	A7,16	167,22
23 WRTS	28,23	A7,17	167,23
24 ZERO	28,24	A7,18	167,24
25 —	28,25	A7,19	167,25
26 -CTL FNS	28,26	A7,1A	167,26
27 AUTOID	28,27	A7,1B	167,27
28 FINDID	28,28	A7,1C	167,28
29 INA	28,29	A7,1D	167,29
30 IND	28,30	A7,1E	167,30
31 INSTAT	28,31	A7,1F	167,31
32 LISTEN	28,32	A7,20	167,32
33 LOCAL	28,33	A7,21	167,33
34 MANIO	28,34	A7,22	167,34
35 OUTA	28,35	A7,23	167,35
36 PWRDN	28,36	A7,24	167,36
37 PWRUP	28,37	A7,25	167,37
38 REMOTE	28,38	A7,26	167,38
39 SELECT	28,39	A7,27	167,39
40 STOPIO	28,40	A7,28	167,40
41 TRIGGER	28,41	A7,29	167,41
42 @	28,42	A7,2A	167,42
43 XROM 28,43	28,43	A7,2B	167,43
44 XROM 28,44	28,44	A7,2C	167,44
45 XROM 28,45	28,45	A7,2D	167,45
46 XROM 28,46	28,46	A7,2E	167,46
47 XROM 28,47	28,47	A7,2F	167,47
48 XROM 28,48	28,48	A7,30	167,48
49 XROM 28,49	28,49	A7,31	167,49
50 XROM 28,50	28,50	A7,32	167,50

eGØBEEP notes:

The above list is complete for the HP-IL Module
03 executes as NEWM 03 only (& wipes out tapes)
42 displays in a program line as L2D@@ @@@ ▯
& prints as ⅊pL2D@@c@@@c: when printer is 2D

eGØBEEP

		XROM#	HEX	DEC
51	XROM 28,51	28,51	A7,33	167,51
52	XROM 28,52	28,52	A7,34	167,52
53	XROM 28,53	28,53	A7,35	167,53
54	XROM 28,54	28,54	A7,36	167,54
55	XROM 28,55	28,55	A7,37	167,55
56	XROM 28,56	28,56	A7,38	167,56
57	XROM 28,57	28,57	A7,39	167,57
58	XROM 28,58	28,58	A7,3A	167,58
59	XROM 28,59	28,59	A7,3B	167,59
60	XROM 28,60	28,60	A7,3C	167,60
61	XROM 28,61	28,61	A7,3D	167,61
62	XROM 28,62	28,62	A7,3E	167,62
63	XROM 28,63	28,63	A7,3F	167,63
64	-PRINTER 2E	29,00	A7,40	167,64
65	ACA	29,01	A7,41	167,65
66	ACCHR	29,02	A7,42	167,66
67	ACCOL	29,03	A7,43	167,67
68	ACSPEC	29,04	A7,44	167,68
69	ACX	29,05	A7,45	167,69
70	BLDSPEC	29,06	A7,46	167,70
71	LIST	29,07	A7,47	167,71
72	PRA	29,08	A7,48	167,72
73	XROM "PRAXIS"	29,09	A7,49	167,73
74	PRBUF	29,10	A7,4A	167,74
75	PRFLAGS	29,11	A7,4B	167,75
76	PRKEYS	29,12	A7,4C	167,76
77	PRP	29,13	A7,4D	167,77
78	XROM "PRPLOT"	29,14	A7,4E	167,78
79	XROM "PRPLOTP"	29,15	A7,4F	167,79
80	PRREG	29,16	A7,50	167,80
81	PRREGX	29,17	A7,51	167,81
82	PRΣ	29,18	A7,52	167,82
83	PRSTK	29,19	A7,53	167,83
84	PRX	29,20	A7,54	167,84
85	REGPLOT	29,21	A7,55	167,85
86	SKPCHR	29,22	A7,56	167,86
87	SKPCOL	29,23	A7,57	167,87
88	STKPLOT	29,24	A7,58	167,88
89	FMT	29,25	A7,59	167,89
90	—	29,26	A7,5A	167,90
91	⊢TM1C@x	29,27	A7,5B	167,91
92	FINDID	29,28	A7,5C	167,92
93	XROM 29,29	29,29	A7,5D	167,93
94	71SZI	29,30	A7,5E	167,94
95	XROM 29,31	29,31	A7,5F	167,95
96	XROM 29,32	29,32	A7,60	167,96
97	XROM 29,33	29,33	A7,61	167,97
98	XROM 29,34	29,34	A7,62	167,98
99	XROM 29,35	29,35	A7,63	167,99

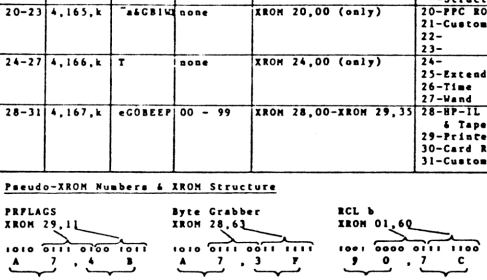
71 executes LIST 71 only
91 exists only with TIME module in (else crash)
94 executes only when Card Reader plugged in
64-89 cover HP-82143 Printer (89 causes a crash)

7 3,15 CR 75 SPME 4A,76

XROM NUMBERS

XROM	MK INPUT	DISPLAY	POSTFIX	RESULT	XROM assignments
0-3	4,160,k	λ_ _	00 - 99 IND 00-99	XROM 00,00-XROM 01,35 XROM 02,00-XROM 03,35	0-Not Useable 1-Math Pac 2-Statistics 3-Surveying Pac
0-4	4,161,k	μ_ _	00 - 99 IND 00-99	XROM 04,00-XROM 05,35 XROM 06,00-XROM 07,35	4-Financial Pac 5-Standard Pac 6-Cicuit Anal. 7-Structural
8-11	4,162,k	OBEEP	ALPHA(any)	XROM 08,00 (only)	8-Stress Anal. 9-Home Manage. 10-Games,PPC ROM 11-Real Estate
12-15	4,163,k	∠=0?	none	XROM 12,00 (only)	12-Machine Des. 13-Thermal & Tr. 14-Navigation 15-Petroleum
16-19	4,164,k	S_	ALPHA(any)	XROM 16,00 (only)	16-Petroleum 17- 18- 19-Aviation -Clinical Lab. -Securities -Structural
20-23	4,165,k	¯a&GB1¯	none	XROM 20,00 (only)	20-PPC ROM 21-Custom 8k 22- 23-
24-27	4,166,k	T	none	XROM 24,00 (only)	24- 25-Extended Fcn. 26-Time 27-Wand
28-31	4,167,k	eGOBEEP	00 - 99	XROM 28,00-XROM 29,35	28-HP-IL Control & Tape Drive 29-Printer 30-Card Reader 31-Custom 448k

Pseudo-XROM Numbers & XROM Structure



XROM i,j = 160+j/4, 64(i mod 4)+j (decimal value)

Using byte table for XROM numbers

Consider the byte table in four blocks - row 0-3, 4-7, 8-11, 12-15, and use last row of byte table on page 2 to determine i.

Decoding XROM i,j (eg XROM 41,60)

1 Find i in bottom row, page 2 on byte table.

2 Prefix is in this column. i will be in position 1,2,3 or 4. (eg. 41 is column A, 2nd position. Therefore prefix is column A which includes prefixes ASTO, FSTC, [GTO, XEQ])

3 Find j decimal value in byte table, then move to equivalent position in block 1,2,3 or4 - corresponding to i's position in 3 above.

4 This is postfix byte from which complete instruction may be deduced. (41 is in 2nd position. Therefore go to 2nd block where corresponding decimal # to 60, 4 rows or next block down, is 124, which is b. Therefore instruction may be ASTO b or FSTC b).

Determining an XROM # given instruction (eg. ASTO b)

1 Find block & column of postfix in byte table (eg. b is 2nd block column C, 124 dec.)

2 Decimal value of corresponding position in 1st block is j (60 in 1st block corresponds to 124, or b, 2nd block).

3 Find column containing prefix (ASTO is in column A)

4 From block # found in 1 above find equivalently positioned # in that column. This is i for XROM i,j (b was in 2nd block. Therefore find 2nd # in column A - 41. Hence ASTO b is XROM 41,60)

SPME 4C,81

MATHEMATICS

	IROM#	HEX	DEC
MATH 1B	01,00	A0,40	160,64
*MATRIX	01,01	A0,41	160,65
*SIMEQ	01,02	A0,42	160,66
*VCOL	01,03	A0,43	160,67
*VMAT	01,04	A0,44	160,68
*PVT	01,05	A0,45	160,69
*DET	01,06	A0,46	160,70
*INV	01,07	A0,47	160,71
*EDIT	01,08	A0,48	160,72
*SOLVE	01,09	A0,49	160,73
*SOL	01,10	A0,4A	160,74
*POLY	01,11	A0,4B	160,75
*ROOTS	01,12	A0,4C	160,76
*INTG	01,13	A0,4D	160,77
*DIFEQ	01,14	A0,4E	160,78
*FOUR	01,15	A0,4F	160,79
*C+	01,16	A0,50	160,80
*C-	01,17	A0,51	160,81
C	01,18	A0,52	160,82
*C/	01,19	A0,53	160,83
*MAGZ	01,20	A0,54	160,84
*CINV	01,21	A0,55	160,85
*Z↑N	01,22	A0,56	160,86
*Z↑1/N	01,23	A0,57	160,87
*e↑Z	01,24	A0,58	160,88
*LNZ	01,25	A0,59	160,89
*10↑Z	01,26	A0,5A	160,90
*LOGZ	01,27	A0,5B	160,91
*Z↑N	01,28	A0,5C	160,92
*Z↑1/N	01,29	A0,5D	160,93
*SINZ	01,30	A0,5E	160,94
*COSZ	01,31	A0,5F	160,95
*TANZ	01,32	A0,60	160,96
*SINH	01,33	A0,61	160,97
*COSH	01,34	A0,62	160,98
*TANH	01,35	A0,63	160,99
*ASINH	01,36	A0,64	160,100
*ACOSH	01,37	A0,65	160,101
*ATANH	01,38	A0,66	160,102
*SSS	01,39	A0,67	160,103
*ASA	01,40	A0,68	160,104
*SAA	01,41	A0,69	160,105
*SAS	01,42	A0,6A	160,106
*SSA	01,43	A0,6B	160,107
*TRANS	01,44	A0,6C	160,108
*#FN	01,45	A0,6D	160,109

STATISTICS

	IROM#	HEX	DEC
STAT 1B	02,00	A0,80	160,128
*ΣBSTAT	02,01	A0,81	160,129
*ΣBSTG	02,02	A0,82	160,130
*#BE	02,03	A0,83	160,131
*ΣMMTUG	02,04	A0,84	160,132
*ΣMMTGD	02,05	A0,85	160,133
*#MT	02,06	A0,86	160,134
*#MD	02,07	A0,87	160,135
*ΣAOVONE	02,08	A0,88	160,136
*ΣAOVTWO	02,09	A0,89	160,137
*ΣANOCOV	02,10	A0,8A	160,138
*ΣLIN	02,11	A0,8B	160,139
*ΣEXP	02,12	A0,8C	160,140
*ΣLOG	02,13	A0,8D	160,141
*ΣPOW	02,14	A0,8E	160,142
*ΣPOLYP	02,15	A0,8F	160,143
*ΣPOLYC	02,16	A0,90	160,144
*ΣMLRXY	02,17	A0,91	160,145
*ΣMLRXYZ	02,18	A0,92	160,146
*ΣPTST	02,19	A0,93	160,147
*ΣTSTAT	02,20	A0,94	160,148
*ΣXSQEV	02,21	A0,95	160,149
*ΣEEFXSQ	02,22	A0,96	160,150
*ΣCTKK	02,23	A0,97	160,151
*ΣCTKKK	02,24	A0,98	160,152
*ΣSPEAR	02,25	A0,99	160,153
*ΣNORMD	02,26	A0,9A	160,154
*ΣCHISQD	02,27	A0,9B	160,155
*#a	02,28	A0,9C	160,156
*#b	02,29	A0,9D	160,157

SURVEYING

	IROM#	HEX	DEC
SURVEY 1B	03,00	A0,C0	160,192
*TRAV	03,01	A0,C1	160,193
*COMP	03,02	A0,C2	160,194
*TRANSIT	03,03	A0,C3	160,195
*ADJUST	03,04	A0,C4	160,196
*INTER	03,05	A0,C5	160,197
*CURVE	03,06	A0,C6	160,198
*HORIZ	03,07	A0,C7	160,199
*VERT	03,08	A0,C8	160,200
*RESECT	03,09	A0,C9	160,201
*PREAREA	03,10	A0,CA	160,202
*ENDVOL	03,11	A0,CB	160,203
*PIT	03,12	A0,CC	160,204
*COORD	03,13	A0,CD	160,205
*ACRES	03,14	A0,CE	160,206
*AZ	03,15	A0,CF	160,207
*BRG	03,16	A0,D0	160,208
*CIR	03,17	A0,D1	160,209
*INVERSE	03,18	A0,D2	160,210
*NE	03,19	A0,D3	160,211
*TS	03,20	A0,D4	160,212
*#AO	03,21	A0,D5	160,213
*#∠	03,22	A0,D6	160,214
*#BR	03,23	A0,D7	160,215
*#DL	03,24	A0,D8	160,216
*#DS	03,25	A0,D9	160,217
*#EL	03,26	A0,DA	160,218
*#H	03,27	A0,DB	160,219
*#S	03,28	A0,DC	160,220
*#A1	03,29	A0,DD	160,221
*#B1	03,30	A0,DE	160,222
*#IN	03,31	A0,DF	160,223
*#YN	03,32	A0,E0	160,224

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FINANCIAL DECISIONS

	FROM	HEX	DEC
FINANCE 1	C04,00	A1,00	161,0
*MONEY	04,01	A1,01	161,1
*IRR	04,02	A1,02	161,2
*MIRR	04,03	A1,03	161,3
*NPV	04,04	A1,04	161,4
*AMORT	04,05	A1,05	161,5
*SL	04,06	A1,06	161,6
*DB	04,07	A1,07	161,7
*SOYD	04,08	A1,08	161,8
*BOND	04,09	A1,09	161,9
*DAYS	04,10	A1,0A	161,10
*=N	04,11	A1,0B	161,11
*=I	04,12	A1,0C	161,12
*=PV	04,13	A1,0D	161,13
*=PMT	04,14	A1,0E	161,14
*=FV	04,15	A1,0F	161,15
*=IRR	04,16	A1,10	161,16
*=MIRR	04,17	A1,11	161,17
*=NPV	04,18	A1,12	161,18
*=AMORT	04,19	A1,13	161,19
*=SL	04,20	A1,14	161,20
*=DB	04,21	A1,15	161,21
*=SOYD	04,22	A1,16	161,22
*=PRC	04,23	A1,17	161,23
*=YLD	04,24	A1,18	161,24
*=DAYS	04,25	A1,19	161,25
*=BGN	04,26	A1,1A	161,26
*=SIZE	04,27	A1,1B	161,27
*=DATA	04,28	A1,1C	161,28
*=DATA1	04,29	A1,1D	161,29
*=OUT	04,30	A1,1E	161,30
*=TGL	04,31	A1,1F	161,31
*=TGL1	04,32	A1,20	161,32
*=Y/N	04,33	A1,21	161,33
*$ENG	04,34	A1,22	161,34

STANDARD PAC

	FROM	HEX	DEC
STRD 1A	05,00	A1,40	161,64
*CLSTK	05,01	A1,41	161,65
*1	05,02	A1,42	161,66
*2	05,03	A1,43	161,67
*3	05,04	A1,44	161,68
*4	05,05	A1,45	161,69
*5	05,06	A1,46	161,70
*6	05,07	A1,47	161,71
*7	05,08	A1,48	161,72
*8	05,09	A1,49	161,73
*9	05,10	A1,4A	161,74
*0	05,11	A1,4B	161,75
*STACK	05,12	A1,4C	161,76
*Ef	05,13	A1,4D	161,77
*RDWN	05,14	A1,4E	161,78
*SWAP	05,15	A1,4F	161,79
*RUP	05,16	A1,50	161,80
*PL	05,17	A1,51	161,81
*MI	05,18	A1,52	161,82
*MU	05,19	A1,53	161,83
*DI	05,20	A1,54	161,84
*CLR	05,21	A1,55	161,85
*CHSN	05,22	A1,56	161,86
*ST	05,23	A1,57	161,87
*RC	05,24	A1,58	161,88
*LSTX	05,25	A1,59	161,89
*CLNDR	05,26	A1,5A	161,90
*WORDS	05,27	A1,5B	161,91
*LTTR	05,28	A1,5C	161,92
*DESPEL	05,29	A1,5D	161,93
*TEACH	05,30	A1,5E	161,94
*AGN	05,31	A1,5F	161,95
*TRY	05,32	A1,60	161,96
*YES	05,33	A1,61	161,97
*+	05,34	A1,62	161,98
*-	05,35	A1,63	161,99
*x	05,36	A1,64	161,100
*/	05,37	A1,65	161,101
*RNDM	05,38	A1,66	161,102
*FF	05,39	A1,67	161,103
*HEX	05,40	A1,68	161,104
*FIN	05,41	A1,69	161,105
*ROOT	05,42	A1,6A	161,106
*LIN	05,43	A1,6B	161,107
*EXP	05,44	A1,6C	161,108
*LOG	05,45	A1,6D	161,109
*POW	05,46	A1,6E	161,110
*INIT	05,47	A1,6F	161,111
*CSUB	05,48	A1,70	161,112
*CADD	05,49	A1,71	161,113
*CDIV	05,50	A1,72	161,114
*CMULT	05,51	A1,73	161,115
*UV	05,52	A1,74	161,116
*CRD	05,53	A1,75	161,117
*D	05,54	A1,76	161,118
*10	05,55	A1,77	161,119
*SH	05,56	A1,78	161,120
*DL	05,57	A1,79	161,121
*S	05,58	A1,7A	161,122
*HT	05,59	A1,7B	161,123
*DB	05,60	A1,7C	161,124
*PH	05,61	A1,7D	161,125
*DH	05,62	A1,7E	161,126
*P	05,63	A1,7F	161,127

CIRCUIT ANALYSIS

		XROM#	HEX	DEC
CIR ANL	1A	06,00	A1,80	161,128
*GNAP		06,01	A1,81	161,129
*=J		06,02	A1,82	161,130
*PHASE		06,03	A1,83	161,131
*H<F>dB		06,04	A1,84	161,132
*H<F>		06,05	A1,85	161,133
*GM=		06,06	A1,86	161,134
*R=		06,07	A1,87	161,135
*L=		06,08	A1,88	161,136
*C=		06,09	A1,89	161,137
*LNAP		06,10	A1,8A	161,138
*RS		06,11	A1,8B	161,139
*RP		06,12	A1,8C	161,140
*CS		06,13	A1,8D	161,141
*CP		06,14	A1,8E	161,142
*LS		06,15	A1,8F	161,143
*LP		06,16	A1,90	161,144
*TF		06,17	A1,91	161,145
*GY		06,18	A1,92	161,146
*LCS		06,19	A1,93	161,147
*LCP		06,20	A1,94	161,148
*LINE		06,21	A1,95	161,149
*STUBO		06,22	A1,96	161,150
*STUBS		06,23	A1,97	161,151
*ICIS		06,24	A1,98	161,152
*VCIS		06,25	A1,99	161,153
*RS=		06,26	A1,9A	161,154
*LS=		06,27	A1,9B	161,155
*CS=		06,28	A1,9C	161,156
*LCS=		06,29	A1,9D	161,157
*LINE=		06,30	A1,9E	161,158
*ICIS=		06,31	A1,9F	161,159
*VCIS=		06,32	A1,A0	161,160
*TF=		06,33	A1,A1	161,161
*GY=		06,34	A1,A2	161,162
*RP=		06,35	A1,A3	161,163
*LP=		06,36	A1,A4	161,164
*CP=		06,37	A1,A5	161,165
*LCP=		06,38	A1,A6	161,166
*STUBO=		06,39	A1,A7	161,167
*STUBS=		06,40	A1,A8	161,168
*PV		06,41	A1,A9	161,169
*P∠V		06,42	A1,AA	161,170
*PVdB		06,43	A1,AB	161,171
*∠V2/V1		06,44	A1,AC	161,172
*V2/1dB		06,45	A1,AD	161,173
*V2/V1		06,46	A1,AE	161,174
*PI		06,47	A1,AF	161,175
*P∠I		06,48	A1,B0	161,176
*PIdB		06,49	A1,B1	161,177
*∠I2/I1		06,50	A1,B2	161,178
*I2/1dB		06,51	A1,B3	161,179
*I2/I1		06,52	A1,B4	161,180
*PZIN		06,53	A1,B5	161,181
*P∠ZIN		06,54	A1,B6	161,182
*ZIN		06,55	A1,B7	161,183
*∠ZIN		06,56	A1,B8	161,184
*PP2/P1		06,57	A1,B9	161,185
*P2/P1		06,58	A1,BA	161,186
*ALL		06,59	A1,BB	161,187
*=AN		06,60	A1,BC	161,188
=MAT		06,61	A1,BD	161,189
=C		06,62	A1,BE	161,190
*=C+		06,63	A1,BF	161,191

STRUCTURAL ANALYSIS

		XROM#	HEX	DEC
STRCTA	1B	07,00	A1,C0	161,192
*SECTION		07,01	A1,C1	161,193
*SIMPLE		07,02	A1,C2	161,194
*CANT		07,03	A1,C3	161,195
*FIXED		07,04	A1,C4	161,196
*PROPPED		07,05	A1,C5	161,197
*SPAN		07,06	A1,C6	161,198
*NSPAN		07,07	A1,C7	161,199
*FIXL		07,08	A1,C8	161,200
*FIXR		07,09	A1,C9	161,201
*MOMENTS		07,10	A1,CA	161,202
*SETTLE		07,11	A1,CB	161,203
*CFRAME		07,12	A1,CC	161,204
*VECTOR		07,13	A1,CD	161,205
*SIZE?		07,14	A1,CE	161,206
*SZ?		07,15	A1,CF	161,207
*ATANY/X		07,16	A1,D0	161,208
*BEAM		07,17	A1,D1	161,209
*=B		07,18	A1,D2	161,210
*=AI		07,19	A1,D3	161,211
*=L1		07,20	A1,D4	161,212
*=P1		07,21	A1,D5	161,213
*=M1		07,22	A1,D6	161,214
*=W1		07,23	A1,D7	161,215
*=P		07,24	A1,D8	161,216
*=M		07,25	A1,D9	161,217
*=L		07,26	A1,DA	161,218
*=W		07,27	A1,DB	161,219

STRUCTURAL ANALYSIS (B)

		XROM#	HEX	DEC
STRCTB	1A	19,00	A4,C0	164,192
*COLE		19,01	A4,C1	164,193
*TBEAM		19,02	A4,C2	164,194
*RBEAM		19,03	A4,C3	164,195
*CONCOL		19,04	A4,C4	164,196
*ITCON		19,05	A4,C5	164,197
*IRCON		19,06	A4,C6	164,198

STRESS ANALYSIS

		XROM#	HEX	DEC
STRESS	1B	08,00	A2,00	162,0
*SIMPLE		08,01	A2,01	162,1
*CANT		08,02	A2,02	162,2
*FIXED		08,03	A2,03	162,3
*PROPPED		08,04	A2,04	162,4
*SPAN		08,05	A2,05	162,5
*NSPAN		08,06	A2,06	162,6
*FIXL		08,07	A2,07	162,7
*FIXR		08,08	A2,08	162,8
*MOMENTS		08,09	A2,09	162,9
*COLUMN		08,10	A2,0A	162,10
*SECTION		08,11	A2,0B	162,11
*MOHR		08,12	A2,0C	162,12
*DELTA		08,13	A2,0D	162,13
*REC		08,14	A2,0E	162,14
*SODER		08,15	A2,0F	162,15
*VECTOR		08,16	A2,10	162,16
*SIZE?		08,17	A2,11	162,17
*ATANY/X		08,18	A2,12	162,18
*BEAM		08,19	A2,13	162,19
*=B		08,20	A2,14	162,20
*=AI		08,21	A2,15	162,21
*=L1		08,22	A2,16	162,22
*=L		08,23	A2,17	162,23
*=P1		08,24	A2,18	162,24
*=P		08,25	A2,19	162,25
*=M1		08,26	A2,1A	162,26
*=M		08,27	A2,1B	162,27
*=W1		08,28	A2,1C	162,28
*=W		08,29	A2,1D	162,29
*=ROS		08,30	A2,1E	162,30
*=MO		08,31	A2,1F	162,31
*=COL		08,32	A2,20	162,32

HOME MANAGEMENT

		XROM#	HEX	DEC
HOME MN	1A	09,00	A2,40	162,64
"BUDGET		09,01	A2,41	162,65
"TRAVEL		09,02	A2,42	162,66
"STOCKS		09,03	A2,43	162,67
"FINANCE		09,04	A2,44	162,68
"BAL		09,05	A2,45	162,69
"IRA		09,06	A2,46	162,70
"INS		09,07	A2,47	162,71
"CHECK		09,08	A2,48	162,72
"HOME		09,09	A2,49	162,73
"BUY?		09,10	A2,4A	162,74
"STORE		09,11	A2,4B	162,75
"RELOAD		09,12	A2,4C	162,76
"CL		09,13	A2,4D	162,77
"∘		09,14	A2,4E	162,78
"∘0		09,15	A2,4F	162,79
"∘∘		09,16	A2,50	162,80
"N		09,17	A2,51	162,81
"∘I		09,18	A2,52	162,82
"PV		09,19	A2,53	162,83
"PMT		09,20	A2,54	162,84
"FV		09,21	A2,55	162,85
"∘J		09,22	A2,56	162,86
"∘H		09,23	A2,57	162,87

GAMES

		XROM#	HEX	DEC
GAMES	1A	10,00	A2,80	162,128
"BAGELS		10,01	A2,81	162,129
"BIOR		10,02	A2,82	162,130
"BIOF		10,03	A2,83	162,131
"CRAPS		10,04	A2,84	162,132
"HANG		10,05	A2,85	162,133
"PINBALL		10,06	A2,86	162,134
"SWAR		10,07	A2,87	162,135
"SUBHUNT		10,08	A2,88	162,136
"BOOM		10,09	A2,89	162,137
"INI		10,10	A2,8A	162,138
"P		10,11	A2,8B	162,139
"SIZE?		10,12	A2,8C	162,140
"RNDM		10,13	A2,8D	162,141
"RNDMW		10,14	A2,8E	162,142

REAL ESTATE

		XROM#	HEX	DEC
REAL EST	1B	11,00	A2,C0	162,192
"$		11,01	A2,C1	162,193
"N		11,02	A2,C2	162,194
"∘I		11,03	A2,C3	162,195
"PV		11,04	A2,C4	162,196
"PMT		11,05	A2,C5	162,197
"FV		11,06	A2,C6	162,198
"12∘		11,07	A2,C7	162,199
"12/		11,08	A2,C8	162,200
"BEG/END		11,09	A2,C9	162,201
"LIST		11,10	A2,CA	162,202
"CLFIN		11,11	A2,CB	162,203
"AMORT		11,12	A2,CC	162,204
"NPV		11,13	A2,CD	162,205
"IRR		11,14	A2,CE	162,206
"MIRR		11,15	A2,CF	162,207
"DEPR		11,16	A2,D0	162,208
"IPA		11,17	A2,D1	162,209
"GPMT		11,18	A2,D2	162,210
"WRAP		11,19	A2,D3	162,211
"SUMMARY		11,20	A2,D4	162,212
"EQ		11,21	A2,D5	162,213
"RENT		11,22	A2,D6	162,214
"∘N		11,23	A2,D7	162,215
"I∘		11,24	A2,D8	162,216
"∘PV		11,25	A2,D9	162,217
"∘PMT		11,26	A2,DA	162,218
"∘FV		11,27	A2,DB	162,219
"∘AMORT		11,28	A2,DC	162,220
"∘AMT		11,29	A2,DD	162,221
"∘SL		11,30	A2,DE	162,222
"∘SOYD		11,31	A2,DF	162,223
"∘DB		11,32	A2,E0	162,224
"∘NPV		11,33	A2,E1	162,225
"∘IRR		11,34	A2,E2	162,226
"∘MIRR		11,35	A2,E3	162,227
"CALC		11,36	A2,E4	162,228
"SALE		11,37	A2,E5	162,229
"Y		11,38	A2,E6	162,230
"R		11,39	A2,E7	162,231
"CH		11,40	A2,E8	162,232
"∘EQ		11,41	A2,E9	162,233
"∘RT		11,42	A2,EA	162,234
"OUT		11,43	A2,EB	162,235
"SIZE?		11,44	A2,EC	162,236
START		11,45	A2,ED	162,237
CLK		11,46	A2,EE	162,238

MACHINE DESIGN

	XROM#	HEX	DEC
MACHINE 1A	12,00	A3,00	163,0
'CAM	12,01	A3,01	163,1
'HAR	12,02	A3,02	163,2
'CYC	12,03	A3,03	163,3
'PAR	12,04	A3,04	163,4
'DWELL	12,05	A3,05	163,5
'GEN4BAR	12,06	A3,06	163,6
'4BAR	12,07	A3,07	163,7
'CRANK	12,08	A3,08	163,8
'GEAR	12,09	A3,09	163,9
'SPUR	12,10	A3,0A	163,10
'INV	12,11	A3,0B	163,11
'SPRING	12,12	A3,0C	163,12
'MOTION	12,13	A3,0D	163,13
'COORD	12,14	A3,0E	163,14
'POINTS	12,15	A3,0F	163,15
'3POINTS	12,16	A3,10	163,16
FCON	12,17	A3,11	163,17
BCON	12,18	A3,12	163,18
'INI	12,19	A3,13	163,19
'#?	12,20	A3,14	163,20
'#IN	12,21	A3,15	163,21
'÷360	12,22	A3,16	163,22
'#OUT	12,23	A3,17	163,23
'KEY	12,24	A3,18	163,24

THERMAL &TRANSPORT SCIENCE

	XROM#	HEX	DEC
THRML 1A	13,00	A3,40	163,64
'KWONG	13,01	A3,41	163,65
'IDEAL	13,02	A3,42	163,66
'POLYTRP	13,03	A3,43	163,67
'ISNFLOW	13,04	A3,44	163,68
'FLOW	13,05	A3,45	163,69
'FLOW2	13,06	A3,46	163,70
'H2O	13,07	A3,47	163,71
'Re	13,08	A3,48	163,72
'ENERGY	13,09	A3,49	163,73
'HEATEX	13,10	A3,4A	163,74
'A0	13,11	A3,4B	163,75
'E0	13,12	A3,4C	163,76
'ACNT	13,13	A3,4D	163,77
'ECNT	13,14	A3,4E	163,78
'APAR	13,15	A3,4F	163,79
'EPAR	13,16	A3,50	163,80
'APRC	13,17	A3,51	163,81
'EPRC	13,18	A3,52	163,82
'ACRS	13,19	A3,53	163,83
'ECRS	13,20	A3,54	163,84
'BLKBODY	13,21	A3,55	163,85
'EbL	13,22	A3,56	163,86
'UNIT?	13,23	A3,57	163,87
'SZ?	13,24	A3,58	163,88
'INPUT	13,25	A3,59	163,89
'OUTPUT	13,26	A3,5A	163,90
'KEY	13,27	A3,5B	163,91
-SI	13,28	A3,5C	163,92
SI-	13,29	A3,5D	163,93

NAVIGATION

	XROM#	HEX	DEC
NAVIG 1A	14,00	A3,80	163,128
'*NA	14,01	A3,81	163,129
'*=NA	14,02	A3,82	163,130
'*STAR	14,03	A3,83	163,131
'*=STAR	14,04	A3,84	163,132
'*SUN	14,05	A3,85	163,133
'*=SUN	14,06	A3,86	163,134
'*SUNL	14,07	A3,87	163,135
'*=SUNU	14,08	A3,88	163,136
'*MOON	14,09	A3,89	163,137
'*=MOON	14,10	A3,8A	163,138
'*=MOONU	14,11	A3,8B	163,139
'*=MOONL	14,12	A3,8C	163,140
'*VENUS	14,13	A3,8D	163,141
'*=VENUS	14,14	A3,8E	163,142
'*P	14,15	A3,8F	163,143
'*MARS	14,16	A3,90	163,144
'*=MARS	14,17	A3,91	163,145
'*JUPITER	14,18	A3,92	163,146
'*=JUPIT	14,19	A3,93	163,147
'*SATURN	14,20	A3,94	163,148
'*=SATUR	14,21	A3,95	163,149
'*SRT	14,22	A3,96	163,150
'*=SRT	14,23	A3,97	163,151
'*JD	14,24	A3,98	163,152
'*D+T	14,25	A3,99	163,153
'*LBRYZX	14,26	A3,9A	163,154
'*ZYXdHA	14,27	A3,9B	163,155
'*DSPHAd	14,28	A3,9C	163,156
'*=IN	14,29	A3,9D	163,157
'*=IN1	14,30	A3,9E	163,158
'*=DMT	14,31	A3,9F	163,159
'*=DMS	14,32	A3,A0	163,160
'*=HR	14,33	A3,A1	163,161
'*=T	14,34	A3,A2	163,162
'*FA	14,35	A3,A3	163,163
'*GST	14,36	A3,A4	163,164
'*BODY	14,37	A3,A5	163,165
'*=BODY	14,38	A3,A6	163,166
'*SIGHT	14,39	A3,A7	163,167
'*RM	14,40	A3,A8	163,168
'*DR	14,41	A3,A9	163,169
'*=DR	14,42	A3,AA	163,170
'*GCPOS	14,43	A3,AB	163,171
'*=GCPOS	14,44	A3,AC	163,172
'*GC	14,45	A3,AD	163,173
'*=GC	14,46	A3,AE	163,174
'*GCPLAN	14,47	A3,AF	163,175
'*=GCPLAN	14,48	A3,B0	163,176
'*GCPLOT	14,49	A3,B1	163,177
'*=GCPLOT	14,50	A3,B2	163,178
'*DSPP2	14,51	A3,B3	163,179
'*LOTOL	14,52	A3,B4	163,180
'*=LOTOL	14,53	A3,B5	163,181
'*DSPL	14,54	A3,B6	163,182
'*DSPLO	14,55	A3,B7	163,183
'*RLPOS	14,56	A3,B8	163,184
'*=RLPOS	14,57	A3,B9	163,185
'*RL	14,58	A3,BA	163,186
'*=RL	14,59	A3,BB	163,187
'*=M/a	14,60	A3,BC	163,188

PETROLEUM (A)

		ZROM#	HEX	DEC
PETROL	1B	15,00	A3,C0	163,192
*Z		15,01	A3,C1	163,193
*CG		15,02	A3,C2	163,194
*CCG		15,03	A3,C3	163,195
*BG		15,04	A3,C4	163,196
*CBG		15,05	A3,C5	163,197
*UG		15,06	A3,C6	163,198
*CUG		15,07	A3,C7	163,199
*TcPc		15,08	A3,C8	163,200
*CTcPc		15,09	A3,C9	163,201
*CCWA		15,10	A3,CA	163,202
*PROP		15,11	A3,CB	163,203
*W8		15,12	A3,CC	163,204
*COMP		15,13	A3,CD	163,205
*SOUR		15,14	A3,CE	163,206
*IN		15,15	A3,CF	163,207
*CGASG		15,16	A3,D0	163,208
*CTPC		15,17	A3,D1	163,209
*W1		15,18	A3,D2	163,210
*CHV		15,19	A3,D3	163,211
*CCK		15,20	A3,D4	163,212
*W2		15,21	A3,D5	163,213
*W3		15,22	A3,D6	163,214
*CO		15,23	A3,D7	163,215
*CCOb		15,24	A3,D8	163,216
*CCO		15,25	A3,D9	163,217
*CGS		15,26	A3,DA	163,218
*W4		15,27	A3,DB	163,219
*W5		15,28	A3,DC	163,220
*BO		15,29	A3,DD	163,221
*CBOb		15,30	A3,DE	163,222
*CBO		15,31	A3,DF	163,223
*CBT		15,32	A3,E0	163,224
*UO		15,33	A3,E1	163,225
*CUOd		15,34	A3,E2	163,226
*CUOb		15,35	A3,E3	163,227
*CUO		15,36	A3,E4	163,228
*CW		15,37	A3,E5	163,229
*CCW		15,38	A3,E6	163,230
*BW		15,39	A3,E7	163,231
*CBW		15,40	A3,E8	163,232
*UW		15,41	A3,E9	163,233
*CUW		15,42	A3,EA	163,234
*CPSAT		15,43	A3,EB	163,235
*CFR		15,44	A3,EC	163,236
*CCFR		15,45	A3,ED	163,237
*RS		15,46	A3,EE	163,238

PETROLEUM (B)

		ZROM#	HEX	DEC
PETROL	1B	16,00	A4,00	164,0
*CRSb		16,01	A4,01	164,1
*CPBP		16,02	A4,02	164,2
*BT		16,03	A4,03	164,3
*CBTb		16,04	A4,04	164,4
*RSW		16,05	A4,05	164,5
*CRSW		16,06	A4,06	164,6
*CT		16,07	A4,07	164,7
*CCT		16,08	A4,08	164,8
*CCTb		16,09	A4,09	164,9
*TITLE		16,10	A4,0A	164,10
*W6		16,11	A4,0B	164,11
*Y/N?		16,12	A4,0C	164,12
*ITcPc		16,13	A4,0D	164,13
*STDTP		16,14	A4,0E	164,14
*SEPTP		16,15	A4,0F	164,15
*T		16,16	A4,10	164,16
*P		16,17	A4,11	164,17
*GASG		16,18	A4,12	164,18
*OILG		16,19	A4,13	164,19
*IRS		16,20	A4,14	164,20
*RSI		16,21	A4,15	164,21
*%NACL		16,22	A4,16	164,22
*%POR		16,23	A4,17	164,23
*W7		16,24	A4,18	164,24
*W8		16,25	A4,19	164,25
*W9		16,26	A4,1A	164,26
*X0		16,27	A4,1B	164,27
*X1		16,28	A4,1C	164,28
*X2		16,29	A4,1D	164,29
*X3		16,30	A4,1E	164,30
*X4		16,31	A4,1F	164,31
*X5		16,32	A4,20	164,32
*X6		16,33	A4,21	164,33
*X7		16,34	A4,22	164,34
*X8		16,35	A4,23	164,35
*OUTK		16,36	A4,24	164,36
*OUTU		16,37	A4,25	164,37
*OUT		16,38	A4,26	164,38
*INK		16,39	A4,27	164,39
*INU		16,40	A4,28	164,40
CZ		16,41	A4,29	164,41
CCR		16,42	A4,2A	164,42
CON		16,43	A4,2B	164,43
INCON		16,44	A4,2C	164,44

SECURITIES

	IROMB	HEX	DEC
SECUR 1A	19,00	A4,C0	164,192
*BONDS	19,01	A4,C1	164,193
*STOCK	19,02	A4,C2	164,194
*CALL	19,03	A4,C3	164,195
*OPTION	19,04	A4,C4	164,196
*HEDGING	19,05	A4,C5	164,197
*BFLY	19,06	A4,C6	164,198
*BULL	19,07	A4,C7	164,199
*CSEC	19,08	A4,C8	164,200
*CBOND	19,09	A4,C9	164,201
*SPEC	19,10	A4,CA	164,202
*PRC	19,11	A4,CB	164,203
*YLD	19,12	A4,CC	164,204
*ATY	19,13	A4,CD	164,205
*ATP	19,14	A4,CE	164,206
JDAY	19,15	A4,CF	164,207
*BEP	19,16	A4,D0	164,208
*=BFLY	19,17	A4,D1	164,209
*DBEP	19,18	A4,D2	164,210
*UBEP	19,19	A4,D3	164,211
*CONV	19,20	A4,D4	164,212

AVIATION

	IROMB	HEX	DEC
AVIATIN 1A	19,00	A4,C0	164,192
*FM	19,01	A4,C1	164,193
*WB	19,02	A4,C2	164,194
*C6	19,03	A4,C3	164,195
*CLWB	19,04	A4,C4	164,196
*PLAN	19,05	A4,C5	164,197
*DP	19,06	A4,C6	164,198
*WA	19,07	A4,C7	164,199
*PERF	19,08	A4,C8	164,200
*FLY	19,09	A4,C9	164,201
*CLIMB	19,10	A4,CA	164,202
*CRUISE	19,11	A4,CB	164,203
*360+	19,12	A4,CC	164,204
*WALT	19,13	A4,CD	164,205
*DISP	19,14	A4,CE	164,206
*IFW	19,15	A4,CF	164,207
*HCW	19,16	A4,D0	164,208
*1VOR	19,17	A4,D1	164,209
*R2	19,18	A4,D2	164,210
*2VOR	19,19	A4,D3	164,211
*TAS	19,20	A4,D4	164,212
*$T	19,21	A4,D5	164,213

CLINICAL LAB & NUCLEAR MEDICINE

	IROMB	HEX	DEC
CLINLAB 1A	19,00	A4,C0	164,192
*REEPS	19,01	A4,C1	164,193
*BSA	19,02	A4,C2	164,194
*CPEAT	19,03	A4,C3	164,195
*BLOOD	19,04	A4,C4	164,196
*O2SAT	19,05	A4,C5	164,197
*RCI	19,06	A4,C6	164,198
*TBV	19,07	A4,C7	164,199
*THY	19,08	A4,C8	164,200
*RADCORR	19,09	A4,C9	164,201
*RIA	19,10	A4,CA	164,202
*BSTAT	19,11	A4,CB	164,203
*CHI	19,12	A4,CC	164,204
*TSTAT	19,13	A4,CD	164,205
*TDIST	19,14	A4,CE	164,206
*=	19,15	A4,CF	164,207
*=0	19,16	A4,D0	164,208
*=1	19,17	A4,D1	164,209
*=2	19,18	A4,D2	164,210
*=3	19,19	A4,D3	164,211
*=4	19,20	A4,D4	164,212
*=5	19,21	A4,D5	164,213
*=6	19,22	A4,D6	164,214
*=7	19,23	A4,D7	164,215
*=8	19,24	A4,D8	164,216
*=9	19,25	A4,D9	164,217
*=A	19,26	A4,DA	164,218
*=C	19,27	A4,DB	164,219
*=CO	19,28	A4,DC	164,220
*=CR	19,29	A4,DD	164,221
*=CS	19,30	A4,DE	164,222
*=F	19,31	A4,DF	164,223
*=H	19,32	A4,E0	164,224
*=HG	19,33	A4,E1	164,225
*=IN	19,34	A4,E2	164,226
*=I125	19,35	A4,E3	164,227
*=I131	19,36	A4,E4	164,228
*=P	19,37	A4,E5	164,229
*=P=	19,38	A4,E6	164,230
*=PR	19,39	A4,E7	164,231
*=R	19,40	A4,E8	164,232
*=SE	19,41	A4,E9	164,233
*=SR	19,42	A4,EA	164,234
*=TC	19,43	A4,EB	164,235
*=X	19,44	A4,EC	164,236
*=XE	19,45	A4,ED	164,237
*=YN	19,46	A4,EE	164,238

PPC ROM

	IROM#	HEX	DEC
C PPC 1981	10,00	A2,80	162,128
'MK	10,01	A2,81	162,129
'IK	10,02	A2,82	162,130
'+K	10,03	A2,83	162,131
'F?	10,04	A2,84	162,132
'LF	10,05	A2,85	162,133
'CK	10,06	A2,86	162,134
'VA	10,07	A2,87	162,135
'UD	10,08	A2,88	162,136
'PK	10,09	A2,89	162,137
'A?	10,10	A2,8A	162,138
'DC	10,11	A2,8B	162,139
'ML	10,12	A2,8C	162,140
'RF	10,13	A2,8D	162,141
'I?	10,14	A2,8E	162,142
'S?	10,15	A2,8F	162,143
'C?	10,16	A2,90	162,144
'DT	10,17	A2,91	162,145
'AD	10,18	A2,92	162,146
'XE	10,19	A2,93	162,147
'HD	10,20	A2,94	162,148
'IC	10,21	A2,95	162,149
'LB	10,22	A2,96	162,150
'L-	10,23	A2,97	162,151
'-B	10,24	A2,98	162,152
'XD	10,25	A2,99	162,153
'VM	10,26	A2,9A	162,154
'EX	10,27	A2,9B	162,155
'MT	10,28	A2,9C	162,156
'DS	10,29	A2,9D	162,157
'VS	10,30	A2,9E	162,158
'EP	10,31	A2,9F	162,159
'TN	10,32	A2,A0	162,160
'CX	10,33	A2,A1	162,161
'CU	10,34	A2,A2	162,162
'CD	10,35	A2,A3	162,163
'VK	10,36	A2,A4	162,164
'AL	10,37	A2,A5	162,165
'NC	10,38	A2,A6	162,166
'SU	10,39	A2,A7	162,167
'NH	10,40	A2,A8	162,168
'HN	10,41	A2,A9	162,169
'BL	10,42	A2,AA	162,170
'FL	10,43	A2,AB	162,171
'BI	10,44	A2,AC	162,172
'IP	10,45	A2,AD	162,173
'PS	10,46	A2,AE	162,174
'TI	10,47	A2,AF	162,175
'MS	10,48	A2,B0	162,176
'IF	10,49	A2,B1	162,177
'CB	10,50	A2,B2	162,178
'RT	10,51	A2,B3	162,179
'PD	10,52	A2,B4	162,180
'DP	10,53	A2,B5	162,181
'DR	10,54	A2,B6	162,182
'2D	10,55	A2,B7	162,183
'SX	10,56	A2,B8	162,184
'RX	10,57	A2,B9	162,185
'OM	10,58	A2,BA	162,186
'PA	10,59	A2,BB	162,187
'BE	10,60	A2,BC	162,188
'A b	10,61	A2,BD	162,189
'E?	10,62	A2,BE	162,190
'FI	10,63	A2,BF	162,191

PPC ROM

	IROM#	HEX	DEC
'SR	20,00	A5,00	165,0
'S b	20,01	A5,01	165,1
'LR	20,02	A5,02	165,2
'SD	20,03	A5,03	165,3
'SK	20,04	A5,04	165,4
'RD	20,05	A5,05	165,5
'RK	20,06	A5,06	165,6
'BV	20,07	A5,07	165,7
'CV	20,08	A5,08	165,8
'IB	20,09	A5,09	165,9
'SV	20,10	A5,0A	165,10
'FD	20,11	A5,0B	165,11
'FR	20,12	A5,0C	165,12
'DF	20,13	A5,0D	165,13
'NP	20,14	A5,0E	165,14
'GN	20,15	A5,0F	165,15
'RN	20,16	A5,10	165,16
'BD	20,17	A5,11	165,17
'TB	20,18	A5,12	165,18
'PM	20,19	A5,13	165,19
'CM	20,20	A5,14	165,20
'CJ	20,21	A5,15	165,21
'JC	20,22	A5,16	165,22
'CA	20,23	A5,17	165,23
'LS	20,24	A5,18	165,24
'HA	20,25	A5,19	165,25
'HS	20,26	A5,1A	165,26
'CP	20,27	A5,1B	165,27
'MP	20,28	A5,1C	165,28
'HP	20,29	A5,1D	165,29
'BA	20,30	A5,1E	165,30
'M2	20,31	A5,1F	165,31
'M3	20,32	A5,20	165,32
'M1	20,33	A5,21	165,33
'BE	20,34	A5,22	165,34
'M4	20,35	A5,23	165,35
'M5	20,36	A5,24	165,36
'IR	20,37	A5,25	165,37
'DR	20,38	A5,26	165,38
'BM	20,39	A5,27	165,39
'BR	20,40	A5,28	165,40
'BX	20,41	A5,29	165,41
'B	20,42	A5,2A	165,42
'BC	20,43	A5,2B	165,43
'UR	20,44	A5,2C	165,44
'PR	20,45	A5,2D	165,45
'S1	20,46	A5,2E	165,46
'S3	20,47	A5,2F	165,47
'S2	20,48	A5,30	165,48
'NS	20,49	A5,31	165,49
'NR	20,50	A5,32	165,50
'PO	20,51	A5,33	165,51
'R b	20,52	A5,34	165,52
'AM	20,53	A5,35	165,53
'MA	20,54	A5,36	165,54
'SM	20,55	A5,37	165,55
'SE	20,56	A5,38	165,56
'XL	20,57	A5,39	165,57
'VF	20,58	A5,3A	165,58

EXTENDED FUNCTIONS

	IROM#	HEX	DEC
-EXT FCN 1F	25,00	A6,40	166,64
ALENG	25,01	A6,41	166,65
ANUM	25,02	A6,42	166,66
APPCHR	25,03	A6,43	166,67
APPREC	25,04	A6,44	166,68
ARCLREC	25,05	A6,45	166,69
AROT	25,06	A6,46	166,70
ATOI	25,07	A6,47	166,71
CLFL	25,08	A6,48	166,72
CLKEYS	25,09	A6,49	166,73
CRFLAS	25,10	A6,4A	166,74
CRFLD	25,11	A6,4B	166,75
DELCHR	25,12	A6,4C	166,76
DELREC	25,13	A6,4D	166,77
EMDIR	25,14	A6,4E	166,78
FLSIZE	25,15	A6,4F	166,79
GETAS	25,16	A6,50	166,80
GETKEY	25,17	A6,51	166,81
GETP	25,18	A6,52	166,82
GETR	25,19	A6,53	166,83
GETREC	25,20	A6,54	166,84
GETRX	25,21	A6,55	166,85
GETSUB	25,22	A6,56	166,86
GETX	25,23	A6,57	166,87
INSCHR	25,24	A6,58	166,88
INSREC	25,25	A6,59	166,89
PASN	25,26	A6,5A	166,90
PCLPB	25,27	A6,5B	166,91
POSA	25,28	A6,5C	166,92
POSFL	25,29	A6,5D	166,93
PSIZE	25,30	A6,5E	166,94
PURFL	25,31	A6,5F	166,95
RCLFLAG	25,32	A6,60	166,96
RCLPT	25,33	A6,61	166,97
RCLPTA	25,34	A6,62	166,98
REGMOVE	25,35	A6,63	166,99
REGSWAP	25,36	A6,64	166,100
SAVEAS	25,37	A6,65	166,101
SAVEP	25,38	A6,66	166,102
SAVER	25,39	A6,67	166,103
SAVERX	25,40	A6,68	166,104
SAVEX	25,41	A6,69	166,105
SEEKPT	25,42	A6,6A	166,106
SEEKPTA	25,43	A6,6B	166,107
SIZE?	25,44	A6,6C	166,108
STOFLAG	25,45	A6,6D	166,109
X<>F	25,46	A6,6E	166,110
XTOA	25,47	A6,6F	166,111

TIME

	IROM#	HEX	DEC
-TIME- C	26,00	A6,80	166,128
ADATE	26,01	A6,81	166,129
ALMCAT	26,02	A6,82	166,130
ALMNOW	26,03	A6,83	166,131
ATIME	26,04	A6,84	166,132
ATIME24	26,05	A6,85	166,133
CLK12	26,06	A6,86	166,134
CLK24	26,07	A6,87	166,135
CLKT	26,08	A6,88	166,136
CLKTD	26,09	A6,89	166,137
CLOCK	26,10	A6,8A	166,138
CORRECT	26,11	A6,8B	166,139
DATE	26,12	A6,8C	166,140
DATE+	26,13	A6,8D	166,141
DDAYS	26,14	A6,8E	166,142
DMY	26,15	A6,8F	166,143
DOW	26,16	A6,90	166,144
MDY	26,17	A6,91	166,145
RCLAP	26,18	A6,92	166,146
RCLSW	26,19	A6,93	166,147
RUNSW	26,20	A6,94	166,148
SETAF	26,21	A6,95	166,149
SETDATE	26,22	A6,96	166,150
SETIME	26,23	A6,97	166,151
SETSW	26,24	A6,98	166,152
STOPSW	26,25	A6,99	166,153
SW	26,26	A6,9A	166,154
T+X	26,27	A6,9B	166,155
TIME	26,28	A6,9C	166,156
XYZALM	26,29	A6,9D	166,157

WAND

	IROM#	HEX	DEC
- WAND 1F	-27,00	A6,C0	166,192
WNDDTA	27,01	A6,C1	166,193
WNDDTX	27,02	A6,C2	166,194
WNDLNK	27,03	A6,C3	166,195
WNDSUB	27,04	A6,C4	166,196
WNDSCN	27,05	A6,C5	166,197
*WNDTST	27,06	A6,C6	166,198

HEADER STRUCTURE for EXTENDED MEMORY FILES

PROGRAM file name (up to seven ASCII characters)								
1	0	0	0	0	0	0	0	# of BYTES	# of REGS.

DATA file name							
2	THIS ADDRESS	0	0	0	0	REC. POINTER	# of REGS.

ASCII file name							
3	THIS ADDRESS	0	0	CHR.PNTR	REC.POINTER	# of REGS.

HP-IL MASS STORAGE & CONTROL

	IROM#	HEX	DEC
-MASS ST 1H	28,00	A7,00	167,0
CREATE	28,01	A7,01	167,1
DIR	28,02	A7,02	167,2
NEWM	28,03	A7,03	167,3
PURGE	28,04	A7,04	167,4
READA	28,05	A7,05	167,5
READK	28,06	A7,06	167,6
READP	28,07	A7,07	167,7
READR	28,08	A7,08	167,8
READRX	28,09	A7,09	167,9
READS	28,10	A7,0A	167,10
READSUB	28,11	A7,0B	167,11
RENAME	28,12	A7,0C	167,12
SEC	28,13	A7,0D	167,13
SEEKR	28,14	A7,0E	167,14
UNSEC	28,15	A7,0F	167,15
VERIFY	28,16	A7,10	167,16
WRTA	28,17	A7,11	167,17
WRTK	28,18	A7,12	167,18
WRTP	28,19	A7,13	167,19
WRTPV	28,20	A7,14	167,20
WRTR	28,21	A7,15	167,21
WRTRX	28,22	A7,16	167,22
WRTS	28,23	A7,17	167,23
ZERO	28,24	A7,18	167,24
—	28,25	A7,19	167,25
-CTL FNS	28,26	A7,1A	167,26
AUTOID	28,27	A7,1B	167,27
FINDID	28,28	A7,1C	167,28
INA	28,29	A7,1D	167,29
IND	28,30	A7,1E	167,30
INSTAT	28,31	A7,1F	167,31
LISTEN	28,32	A7,20	167,32
LOCAL	28,33	A7,21	167,33
MANID	28,34	A7,22	167,34
OUTA	28,35	A7,23	167,35
PWRDN	28,36	A7,24	167,36
PWRUP	28,37	A7,25	167,37
REMOTE	28,38	A7,26	167,38
SELECT	28,39	A7,27	167,39
STOPID	28,40	A7,28	167,40
TRIGGER	28,41	A7,29	167,41

	IROM#	HEX	DEC
CARD RDR 1E	30,00	A7,80	167,128
MRG	30,01	A7,81	167,129
RDTA	30,02	A7,82	167,130
RDTAX	30,03	A7,83	167,131
RSUB	30,04	A7,84	167,132
VER	30,05	A7,85	167,133
WALL	30,06	A7,86	167,134
WDTA	30,07	A7,87	167,135
WDTAX	30,08	A7,88	167,136
WPRV	30,09	A7,89	167,137
WSTS	30,10	A7,8A	167,138
7CLREG	30,11	A7,8B	167,139
7DSP0	30,12	A7,8C	167,140
7DSP1	30,13	A7,8D	167,141
7DSP2	30,14	A7,8E	167,142
7DSP3	30,15	A7,8F	167,143
7DSP4	30,16	A7,90	167,144
7DSP5	30,17	A7,91	167,145
7DSP6	30,18	A7,92	167,146
7DSP7	30,19	A7,93	167,147
7DSP8	30,20	A7,94	167,148
7DSP9	30,21	A7,95	167,149
7DSPI	30,22	A7,96	167,150
7DSZ	30,23	A7,97	167,151
7DSZI	30,24	A7,98	167,152
7ENB	30,25	A7,99	167,153
7FIX	30,26	A7,9A	167,154
7GSBI	30,27	A7,9B	167,155
7GTOI	30,28	A7,9C	167,156
7ISZ	30,29	A7,9D	167,157
7ISZI	30,30	A7,9E	167,158
7P<>S	30,31	A7,9F	167,159
7PRREG	30,32	A7,A0	167,160
7PRSTK	30,33	A7,A1	167,161
7PRTX	30,34	A7,A2	167,162
7RCL	30,35	A7,A3	167,163
7SCI	30,36	A7,A4	167,164

PRINTER

	IROM#	HEX	DEC
-PRINTER 2E	29,00	A7,40	167,64
ACA	29,01	A7,41	167,65
ACCHR	29,02	A7,42	167,66
ACCOL	29,03	A7,43	167,67
ACSPEC	29,04	A7,44	167,68
ACX	29,05	A7,45	167,69
BLDSPEC	29,06	A7,46	167,70
LIST	29,07	A7,47	167,71
PRA	29,08	A7,48	167,72
'PRAXIS	29,09	A7,49	167,73
PRBUF	29,10	A7,4A	167,74
PRFLAGS	29,11	A7,4B	167,75
PRKEYS	29,12	A7,4C	167,76
PRP	29,13	A7,4D	167,77
'PRPLOT	29,14	A7,4E	167,78
'PRPLOTP	29,15	A7,4F	167,79
PRREG	29,16	A7,50	167,80
PRREGX	29,17	A7,51	167,81
PR	29,18	A7,52	167,82
PRSTK	29,19	A7,53	167,83
PRX	29,20	A7,54	167,84
REGPLOT	29,21	A7,55	167,85
SKPCHR	29,22	A7,56	167,86
SKPCOL	29,23	A7,57	167,87
STKPLOT	29,24	A7,58	167,88
FMT	29,25	A7,59	167,89
--	29,26	A7,5A	167,90

BYTES IN REPEATED SEQUENCE	TIMES CALLED (XEQUETED)													
	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19
3	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
4	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9
5	-3	-1	1	3	5	7	9	11	13	15	17	19	21	23
6	-2	1	4	7	10	13	16	19	22	25	28	31	34	37
7	-1	3	7	11	15	19	23	27	31	35	39	43	47	51
8	0	5	10	15	20	25	30	35	40	45	50	55	60	65
9	1	7	13	19	25	31	37	43	49	55	61	67	73	79
10	2	9	16	23	30	37	44	51	58	65	72	79	86	93
11	3	11	19	27	35	43	51	59	67	75	83	91	99	107
12	4	13	21	31	40	49	58	67	76	85	94	103	112	121
13	5	15	25	35	45	55	65	75	85	95	105	110	115	20
14	6	17	28	39	50	61	72	83	94	105	116	127	138	149
15	7	19	31	43	55	67	79	91	103	115	127	139	151	163

XEQ IND BEST

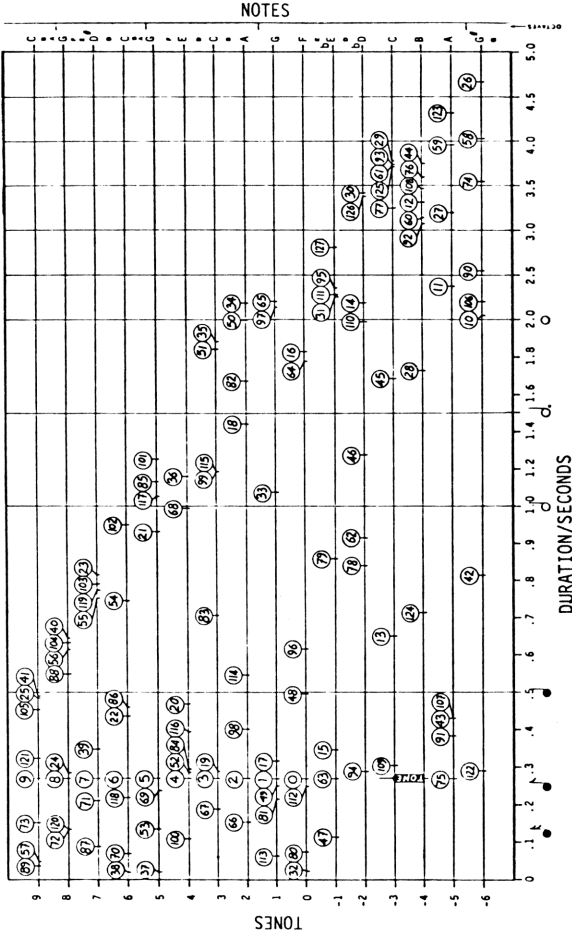
TABLE 1. Bytes saved by executing repeated instruction sequences as subroutines.

BYTES SAVED

BYTES IN REPEATED SEQUENCE	TIMES CALLED (XEQ IND NN)													
	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11
3	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3
4	-9	-7	-5	-3	-1	1	3	5	7	9	11	13	15	17
5	-8	-5	-2	1	4	7	10	13	16	19	22	25	28	31
6	-7	-3	1	5	9	13	17	21	25	29	33	37	41	45
7	-6	-1	4	9	14	19	24	29	34	39	44	49	54	59
8	-5	1	7	13	19	25	31	37	43	49	55	61	67	73
9	-4	3	10	17	24	31	38	45	52	59	66	73	80	87
10	-3	5	13	21	29	37	45	53	61	69	77	85	93	101
11	-2	7	16	25	34	43	52	61	70	79	88	97	106	115
12	-1	9	19	29	39	49	59	69	79	89	99	109	119	129
13	0	11	22	33	44	55	66	77	88	99	110	121	132	143
14	1	13	25	37	49	61	73	85	97	109	121	133	145	157
15	2	15	28	41	54	67	80	93	106	119	132	145	158	171

XEQ BEST

Table 2. Bytes saved by executing repeated instruction sequences as subroutines indirectly.


128 TONES on the HP-41 CV
CR 77 WW 7A,77
NOTES
TONES
DURATION/SECONDS

BINARY	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
HEXADEC.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
FRCT.	0	1	2	3	4	5	6	7	8	9	-6	-5	-4	-3	-2	-1
TONE NO.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
DISP.(P)[1]	TONE 0	TONE 1	TONE 2	TONE 3	TONE 4	TONE 5	TONE 6	TONE 7	TONE 8	TONE 9	TONE 0	TONE 1	TONE 2	TONE 3	TONE 4	TONE 5
XROM	60,00	60,01	60,02	60,03	60,04	60,05	60,06	60,07	60,08	60,09	60,10	60,11	60,12	60,13	60,14	60,15
DURATION	.28	.28	.28	.28	.28	.28	.28	.28	.28	.28	2.20	2.70	3.50	.80	2.3	.35
41C INST.	NULL	LBL 00	LBL 01	LBL 02	LBL 03	LBL 04	LBL 05	LBL 06	LBL 07	LBL 08	LBL 09	LBL 10	LBL 11	LBL 12	LBL 13	LBL 14
0001	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
	TONE 6	TONE 7	TONE 8	TONE 9	TONE 0	TONE 1	TONE 2	TONE 3	TONE 4	TONE 5	TONE 6	TONE 7	TONE 8	TONE 9	TONE 0	TONE 1
1	60,16	60,17	60,18	60,19	60,20	60,21	60,22	60,23	60,24	60,25	60,26	60,27	60,28	60,29	60,30	60,31
	2.00	.34	1.50	.33	.50	1.00	.45	.84	.30	.55	5.00	3.50	2.00	4.10	.30	2.40
	0	1	2	3	4	5	6	7	8	9	-	GTO	CHS	GTO a	XEQ a	SPANE
0010	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
	TONE 2	TONE 3	TONE 4	TONE 5	TONE 6	TONE 7	TONE 8	TONE 9	TONE 0	TONE 1	TONE 2	TONE 3	TONE 4	TONE 5	TONE 6	TONE 7
2	60,32	60,33	60,34	60,35	60,36	60,37	60,38	60,39	60,40	60,41	60,42	60,43	60,44	60,45	60,46	60,47
	.025	1.13	2.35	2.00	1.25	.023	.023	.35	.70	.52	.85	.45	3.20	1.8	1.36	.13
	RCL 00	RCL 01	RCL 02	RCL 03	RCL 04	RCL 05	RCL 06	RCL 07	RCL 08	RCL 09	RCL 10	RCL 11	RCL 12	RCL 13	RCL 14	RCL 15
0011	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
	TONE 8	TONE 9	TONE 0	TONE 1	TONE 2	TONE 3	TONE 4	TONE 5	TONE 6	TONE 7	TONE 8	TONE 9	TONE 0	TONE 1	TONE 2	TONE 3
3	60,48	60,49	60,50	60,51	60,52	60,53	60,54	60,55	60,56	60,57	60,58	60,59	60,60	60,61	60,62	60,63
	.54	.27	2.10	1.95	.28	.15	.80	.77	.65	.058	4.2	.41	3.30	.39	.92	.30
	STO 00	STO 01	STO 02	STO 03	STO 04	STO 05	STO 06	STO 07	STO 08	STO 09	STO 10	STO 11	STO 12	STO 13	STO 14	STO 15
0100	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
	TONE 4	TONE 5	TONE 6	TONE 7	TONE 8	TONE 9	TONE 0	TONE 1	TONE 2	TONE 3	TONE 4	TONE 5	TONE 6	TONE 7	TONE 8	TONE 9
4	61,00	61,01	61,02	61,03	61,04	61,05	61,06	61,07	61,08	61,09	61,10	61,11	61,12	61,13	61,14	61,15
	1.88	2.35	.40	.24	1.05	.29	0.032	.24	.14	.15	3.70	.30	3.76	3.40	.89	.90
	+	-	×	÷	X<Y?	X>Y?	X<=Y?	E+	E-	MMS+	MMS-	MOD	%	%CH	P-R	R-P
0101	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
	TONE 0	TONE 1	TONE 2	TONE 3	TONE 4	TONE 5	TONE 6	TONE 7	TONE 8	TONE 9	TONE 0	TONE 1	TONE 2	TONE 3	TONE 4	TONE 5
5	61,16	61,17	61,18	61,19	61,20	61,21	61,22	61,23	61,24	61,25	61,26	61,27	61,28	61,29	61,30	61,31
	.005	.22	1.75	.74	.28	1.25	.50	.14	.58	.050	2.70	.42	3.21	3.95	.30	2.40
	LN	x^2	$\sqrt{x}$	y^x	CHS	e^x	LOG	10^x	e+x-1	SIN	COS	TAN	ASIN	ACOS	ATAN	DEC
0110	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
	TONE 6	TONE 7	TONE 8	TONE 9	TONE 0	TONE 1	TONE A	TONE B	TONE C	TONE D	TONE E	TONE F	TONE G	TONE H	TONE I	TONE J
6	61,32	61,33	61,34	61,35	61,36	61,37	61,38	61,39	61,40	61,41	61,42	61,43	61,44	61,45	61,46	61,47
	.65	2.22	.43	1.25	.12	1.	.99	.84	.70	.52	.23	.45	3.62	.33	2.10	.35
	1/x	ABS	FACT	X#0?	X=0?	LN1+X	X<0?	X=0?	INT	FRAC	D-R	R-D	HMS	HR	RND	OCT
0111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
	TONE T	TONE Z	TONE Y	TONE X	TONE L	XROM(C)	TONER(%)	TONEO(%)	TONEM(*)	TONEQ(_)	TONE(")	TONE a	TONE b	TONE c	TONE d	TONE e
7	61.48	61.49	61.50	61.51	61.52	61.53	61.54	61.55	61.56	61.57	61.58	61.59	61.60	61.61	61.62	61.63
	1.70	.65	1.45	.52	1.25	1.30	.24	.84	.14	.33	.25	4.6	.76	4.00	3.50	2.90
	CLI	X<>Y	PI	CLST	R↓	RDN	LAST X	CLX	X=Y?	X#Y?	SIGN	X<=0?	MEAN	SDEV	AVIEW	CLD

			66 .15	67 .19			101 1.26	70 .07	87 .09		89 .04	58 4.04	59 3.36			13 .65	30 3.43							
112 .25	113 .06	114 .55	115 1.19	116 .4	117 1.05							106 2.22				61 3.74				111 2.31				

ROW #	HEX	DEC	Effect		
Row 8:	80-8F	128-143	Print 1-16 BARCODE bytes*		
Row 9:	90-9F	144-159	None		
Row A:	A0-AF	160-175	Skip 0-15 characters		
Row B:	B0-B7	176-183	Skip 16-23 characters		
	B8-BF	184-191	Skip 0-7 columns		
Row C:	C0	192	FMT (format)*		
	C1-CF	193-207	None		
			WIDTH	OUTPUT	CASE
Row D:	D0	208	Single	Char.	Upper
	D1	209	Single	Char.	Lower
	D2	210	Single	Column	Upper
	D3	211	Single	Column	Lower
	D4	212	Double	Char.	Upper
	D5	213	Double	Char.	Lower
	D6	214	Double	Column	Upper
	D7	215	Double	Column	Lower
	D8-DF	216-223	None		
Row E:	E0	224	Print Left Justified		
	E1-E7	225-231	None		
	E8	232	Print Right Justified		
	E9-EF	233-239	None		
Row F:	F0-FB	240-251	None		
	FC-FD	252-253	Escape Mode*		
	FE	254	ADV active*		
	FF	255	ADV ignore*		

* HP-82162 Printer only

NORMALISATION

NORMALISATION of BCD# nybbles →

	a	b	n	n	n	n	n	n	n	n	n	n	c	n	n
	13	12	11	10	9	8	7	6	5	4	3	2	2	1	0
	sign	mantissa											sign	exponent	

n	normalised n
0-9	0-9
A-F	10-15

c	normalised	carry from right
0	0	9
1-8	99	9
9	9	0
A	0	9
B-F	9	9

All n & c > 9 carry a one into the next left digit.

ab	no carry from nn	carry from nn
00	all set to zero	normalized to +BCD#
01-08	normalized to +BCD#	normalized to +BCD#
09	normalized to +BCD#	alpha string (a→1)
0A-0F	alpha string (a→1)	alpha string (a→1)
10-1F	alpha string (nc)	alpha string (nc)
20-88	alpha string (a→1)	alpha string (a→1)
89	alpha string (a→1)	all set to zero
8A	all set to zero	normalized to -BCD# (a→9)
8B-8F	normalized to -BCD# (a→9)	normalized to -BCD# (a→9)
90	all set to zero	normalized to -BCD#
91-98	normalized to -BCD#	normalized to -BCD#
99	normalized to -BCD#	all set to zero
9A	all set to zero	normalized to +BCD# (a→0)
9B-9F	normalized to +BCD# (a→0)	normalized to +BCD# (a→0)
A0	all set to zero	set to +BCD# (a→0)
A1-A8	normalized to +BCD# (a→0)	normalized to +BCD# (a→0)
A9	normalized to +BCD# (a→0)	alpha string (a→1)
AA-FF	alpha string (a→1)	alpha string (a→1)

Carry from nn means that nybble 11 is, or has been normalised to greater than 9, and carries a one over to b (nybble 12).

Unless noted all digits not specified remain unchanged.

NORMALISING FUNCTIONS

Fcn	Register addressed	Comments
RCL	normalized	recalled # normalized
VIEW	normalized	
ARCL	normalized	copies last six bytes of alpha data, or ASCII coded BCD of #, into left of alpha register
X	Contains non-normalized contents of X	recalled # normalized
STO	non-normalized	X is not normalized
ASTO	non-normalized	alpha unchanged

KEY ASSIGNMENT ADDRESSES

Reg. d FLAGS equivalent to KA flags in e & f

35	27	19	11	3
34	26	18	10	2
33	25	17	9	1
32		16	8	0
31	23	15	7	
30	22	14	6	
29	21	13	5	
28	20	12	4	

Key code as it appears in KA registers

LBL 00 / LBL 00	9 / 1	RCL 09 / RCL 01	STO 09 / STO 01	HMS+ / −
LBL 09 / LBL 01	e / 2	RCL 10 / RCL 02	STO 10 / STO 02	HMS− / *
LBL 10 / LBL 02	E / 3	RCL 11 / RCL 03	STO 11 / STO 03	MOD / /
LBL 11 / LBL 03		RCL 12 / RCL 04	STO 12 / STO 04	% / x<>y
LBL 12 / LBL 04	GTO / 5	RCL 13 / RCL 05	STO 13 / STO 05	
LBL 13 / LBL 05	XEQ / 6	RCL 14 / RCL 06	STO 14 / STO 06	
LBL 14 / LBL 06	W / 7	RCL 15 / RCL 07	STO 15 / STO 07	
O / LBL 07	RCL 00 / 8	STO 00 / RCL 08	+ / STO 08	

HEX keycode in a Global label

09 / 01	19 / 11	29 / 21	39 / 31	49 / 41
0A / 02	1A / 12	2A / 22	3A / 32	4A / 42
0B / 03	1B / 13	2B / 23	3B / 33	4B / 43
0C / 04		2C / 24	3C / 34	4C / 44
0D / 05	1D / 15	2D / 25	3D / 35	
0E / 06	1E / 16	2E / 26	3E / 36	
0F / 07	1F / 17	2F / 27	3F / 37	
10 / 08	20 / 18	30 / 28	40 / 38	

WW 2E,26 WW 5E,44 SPME 6A,109

MK inputs for SYNTHETIC FUNCTIONS

FUNCTION	MK INPUTS	XROM	DISPLAY	PRINTER	REFERENCE
Byte Jumper	0,Fn,k (0≤n≤15)				
BJ	0,240,k		W	W	
BJ	241,65,k	05,01		ΣO	WW 3B,25
Reg/byte Jump	4,178,k		⊦-_ _	. nn	9 5,7a
Byte Grabber (Fn) (Also byte jumps in RUN mode)	Fn,p,k (3≤n≤15) (16≤p≤255)				8 5,11 SPME 2,15
BG(7 byte)	247,63,k	28,63		W	
BG(3 byte)	243,240,k	15,48		p	
NOP (Text Ø)	240,240,k	03,48		W	KJ
7	4,160,k		7_ _		
μ	4,161,k		μ_ _		
eGØBEEP	4,167,k		eGØBEEP_ _		
n/p* END	199,133,k	30,05	VER*	⊦a&GB1⊦W>	
n/p† END	247,77,k	29,13	PRP†	W	
Q loader	m,n,k or n,m,k (m≤0-15, n≤16-28)				WW 51,55 SPME 48,77
E, Q loader	27,4,k	44,04		Hb 04	ROM MK,283
GTO Q loader	4,29,k		Ø AHHH	GTO	WW 51,56
XEQ Q loader	4,30,k		ØNQ	XEQ	WW 51,56
W Q loader	4,31,k		2_ _	⊦ae2 nn	
LBL Q loader	205,4,k	52,04		LBL	WW 51,56

MAKING & CLEARING KEY ASSIGNMENTS & Preserving ALARMS & I/O Buffer

	METHOD	NORMAL	SYNTHETIC	ALARMS & I/O	GLOBAL	REFERENCE
MAKING KEY ASSN.	PASN ASN	✓	NO	✓	✓	XFM HP-41
	MK, KA 1K, +K	inefficient	✓	DESTROYED	NO	ROM MK,278 ROM 1K,30
	MKX,ASG	✓	✓	✓	✓	9 4,45 SPME 4,91
STO RCL SUSPEND PACK ASSN.	WSTS KA CARD	✓	✓	✓	✓	CRD.RDR.
	SK WRTK RK READK	suspended ✓ restored ✓	suspended ✓ restored ✓	✓ ✓ ✓ ✓	Suspended ✓ restored ✓	ROM SK,406 TAPE DRIVE ROM RK,378 TAPE DRIVE
	PK	✓	✓	DESTROYED	✓	ROM PK,60
CLEARING ASSN.	CLKEYS	clears	clears	OK	clears	XFM
	1 NUL CRD	clears	clears	OK	clears	CRD. RDR.
	CK	clears	clears	clears	clears	ROM CK,94
VARIOUS ASSN. TESTS	A?,F?,LF VK,CB,S?,C?,E?,OM,Σ? RX			clears OK DESTROYED		ROM LF,248 PPC ROM 9 6,31

BOOTSTRAPPING

BYTE GRABBER 7 byte — SPME 1,7

```
1  MC (Master Clear required)
2  USER
3  ASN + to LN key
4  ASN DEL to LOG key
5  PRGM
6  LBL T ( optional )
7  CAT 1, R/S immediately
8  ALPHA, ←, ALPHA
9  GTO .005
10 DEL 003
11 ALPHA, ?AAAAAA
12 ALPHA, GTO..
13 LN (see XROM 28,63)
```

BUG 9 KA access

BUG 9 KA access

```
1  PRGM
2  LBL T (1st PRGM LBL)
3  CAT 1, R/S immediately
4  ALPHA,← , ALPHA
5  GTO .001
6  SST through KA regs.
```

BYTE JUMPER — WW 3B,25

```
1  CK (optional)
2  ASN X<> to +
3  ASN Σ+ to Σ-
4  Enter KA regs.
5  GTO .002
6  DEL 002
7  ALPHA, A(any chr.)
8  ALPHA
9  GTO.. , PRGM off
10 Σ- (see XROM 05,01)
```

THREE BYTE GTO nn — SPME 4D,84

```
1  STO IND 86
2  ISG nn
3  BST, BST
4  BG(7)
5  ←
6  GTO.. (or PACK)
```

SHORT FORM EXPONENTS

```
1  1 E +n
2  BST
3  BG, BG
4  ← , ←
5  SST (see E +n)
```

(+n optional where n 0)

PRIVATE END

```
1  Backarrow the END
2  RCL IND 66, RCL 77
3  BST, BST
4  BG(7)
5  ←
6  GTO.. (or PACK)
```

PACKED END w/out decompiling

```
1  insert before the END:
   RCL IND 66, FIX 9
2  BST, BST
3  BG(7)
4  ←
5  GTO.. (or PACK)
```

Ref. PPC East Coast Conference Proceedings, page 35
Roger Hill & Clifford Stern

FØ LABEL (for byte viewing) — SPME 5,97

```
1  STO IND 64
2  RCL IND T
3  BST, BST
4  BG(7)
5  ←
6  GTO.. (or PACK)
```

MAIN FRAME ADDRESSING — SPME 6A,115

0000	System ROM 0		
1000	System ROM 1		
2000	System ROM 2		
3000	Not used		
4000	DIAGNOSTIC		
5000	TIME		
6000	PRINTER		
7000	HP-IL		
8000	Lower 4K	PORT 1	
9000	Upper 4K		
A000	Lower 4K	PORT 2	
B000	Upper 4K		
C000	Lower 4K	PORT 3	
D000	Upper 4K		
E000	Lower 4K	PORT 4	
F000	Upper 4K		

INSTRUCTIONS	BYTES	CODE
Two byte		
STO 16	2	91 10 (145,16)
RCL b	2	91 7C (144,124)
X<>M	2	CE 75 (206,117)
TONE 89	2	9F 59 (159,89)
VIEW H (109)	2	98 6D (152,109)
DSE IND 55	2	97 B7 (151,183)
FS?C IND Y	2	AA F2 (170,242)
ST+ IND N	2	92 F6 (146,246)
XROM i,j	2	160+i/4, 64(i mod 4)+j (DEC)
WSTS (XROM 30,10)	2	A7 8A (167,138)
TEXT		
"GOATS	1+n	F5 47 4F 41 54 55
	# chrs	G O A T S
"HAGE	1+n	F4 7F 41 47 45
		H A G E
GTO		d b r
GTO 05	2	B6 0111 1111 (174,dbr)
GTO IND 09	2	AE 09 (174,9)
		b r d #
GTO 99	3	D1110 0011 1111 0110 0011
GTO A	3	D1111 1111 1111 1110 0110
GTO"TEA	2+n	1D F3 54 45 41
	# chrs	T E A
XEQ		b r d #
XEQ 01	3	E1110 0010 0001 0000 0001
XEQ IND X	2	AE F3 (174,243)
XEQ 99	3	E1110 0001 1010 1110 0011
XEQ A	3	E1111 1111 1111 0110 0110
		b r d #
XEQ"PLOT	2+n	1E F4 50 40 4F 54
	# chrs	P L O T
LBL		
LBL 12	1	0A (13)
LBL 49	2	CF 31 (207,49)
LBL A	2	CF 66 (207,102)
LBL"JAR	4+n	Ca bc F4 ef 4A 41 52
	# chrs	J A R
END	Key Assignment	
END	3	Ca bc 0d } {d=9 PACKed
.END.	3	Ca bc 2d } {d=D not PACKed

Abbreviations

d = direction 0 = up, 1 = down
b = bytes 000-111 (0-7 binary)
r = registers 0 0000 0000-1 1111 1111 (0-511 binary)
# = number 0-255 (where 102-111=A-J, 112-127=T-e,
128-239=IND 00 - IND 111, 240-255=IND T - IND e)

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Abbreviations

8 6,14	PPC-CJ Volume 8 No.6 page 14
ROM MK,283	PPC ROM Users Manual, MK Chapter page 283
TN 6,32	Technical Notes(Aus) No.6 page 32
WW 51,55	Synthetic Programming - William Wickes, Section 51, page 55
SPME 6-3,42	Synthetic Programming Made Easy, - Keith Jarret, Section 6-3, page 42
CR 60	HP-IL/HP-41 System Dictionary - Cary Reinstein, page 60

CK	Clear Keys
FCN,fcn	Function
KA	Key Assignments
MC	Master Clear (MEMORY LOST)
nc	No Change
SP	Synthetic Programming