

The APPLE[®] CARD

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\$3⁹⁸

APPLESOFT II (FLOATING POINT BASIC)

MATH Operators & Functions

= Assigns value to variable
 - Negative
 ^ Exponential
 + Addition
 * Multiplication
 / Division
 SIN (X) Sin of X in Radians
 COS (X) Cosine of X in Radians
 TAN (X) Tangent of X in Radians
 ATN (X) Arctangent of X in Radians
 INT (X) Largest Integer less than or = X
 RND (I) Random numbers from 0 to .999999999
 RND (O) Returns last random number
 Sgn (X) Gives sign value of X
 -1 if less than 0
 0 if = to 0
 +1 if greater than 0

ABS (X) Absolute value
 SQR (X) Square Root of X
 EXP (X) E (2.718289) to power of X
 LOG (X) Natural logarithm of X

MONITOR COMMANDS

CALL-151 Place into Monitor from Basic
 F666g Turn on Mini-Assembler
 FF69g Turn off Mini-Assembler (or Reset)
 (adr) Examine value at the location
 (adr:adr) Examine values between adr 1 & adr 2
 (adr: DATA) Puts Data into memory from location adr
 (adr 3) < (adr 1) . (adr 2) M Moves values from adr 1 thru adr 2 to adr 3
 (adr 3) < (adr 1) . (adr 2) V Compares values in adr 1 thru adr 2 to those starting at adr 3
 (adr)g Starts Mach. Lang. Prog. at adr
 (adr)L Disassembles starting at adr
 I Inverse Video N Normal Video
 Ctrl E Display 6502 Registers
 Ctrl Y Jump to Subroutine at \$3F8
 (Slot #) Ctrl P Output to Slot #
 (Slot #) Ctrl K Accept Input Slot #

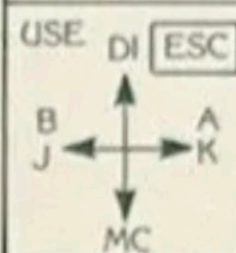
MONITOR SUBROUTINES

\$FDED COUT Output a character
 \$FDF0 COUTI Output to screen
 \$FEB0 SETINV Set Inverse mode
 \$FEB4 SETNORM Set Normal mode
 \$FD8E CROUT Generate a RETURN
 \$FD8B CROUTI RETURN with clear
 \$FD8A PRBYTE Print a hexadecimal byte
 \$FDE3 PRHEX Print a hexadecimal digit
 \$F941 PRNTAX Print A and X in hexadecimal
 \$F871 SCRNI Read the Low-Res screen
 \$FB1E PREAD Read a Game Controller
 \$FF2D PRERR Print "ERR"
 \$FF4A IOSAVE Save all registers
 \$FF3F IOREST Restore all registers
 \$FD6F GETLINI Get an input line, no prompt
 \$FCA8 WAIT Delay
 \$F864 SETCOL Set Low-Res Graphics color
 \$F85F NEXTCOL Increment color by 3
 \$F800 PLOT Plot a block on the Low-Res screen
 \$F819 HLINE Draw a horizontal line of blocks
 \$F828 VLINE Draw a vertical line of blocks
 \$F832 CLRSCR Clear the entire Low-Res screen
 \$F836 CLRTOP Clear the top of the Low-Res screen
 \$F948 PRBLNK Print 3 spaces
 \$F94A PRBL2 Print many blank spaces
 \$FF3A BELL Output a "bell" character
 \$FBDD BELL1 Toggle the speaker
 \$FD0C RDKEY Get an input character
 \$FD35 RDCHAR Get an input character or ESC code
 \$FD1B KEYIN Read the Apple's keyboard
 \$FD6A GETLIN Get an input line with prompt
 \$FD67 GETLINZ Get an input line

THE ASCII CHARACTER SET

Decimal:	Hex:	128	144	160	176	192	208	224	240
		B0	90	A0	B0	C0	D0	E0	F0
0	0	nul	dc1	!	1	A	Q	a	p
1	1	soh	dc2	"	2	B	R	b	q
2	2	stx	dc3	#	3	C	S	c	r
3	3	etx	dc4	\$	4	D	T	d	s
4	4	eot	nak	%	5	E	V	e	t
5	5	ack	syn	&	6	F	W	f	u
6	6	bel	etb	'	7	G	X	g	v
7	7	bs	can	(	8	H	Y	h	w
8	8	ht	em	)	9	I	Z	i	x
9	9	if	sub	+	:	J	[	j	y
10	A	vt	esc	,	<	K	]	k	z
11	B	ff	fs	-	=	L	^	l	{
12	C	cr	gs	.	>	M	_	m	|
13	D	so	rs	/	?	N	`	n	~
14	E	si	us			O		o	rub
15	F								

CURSOR



MOVE

ROM TO RAM APPLESOFT

Load Program
 Call 54514
 Save Program

RAM TO ROM APPLESOFT

Load Program
 Call 3314
 Save Program

SCREEN PAGES & MEMORY LOCATION

Screen	Page	Hex	Dec.
Text/Lores	1	400 to 7FF	1024 to 2047
Text/Lores	2	800 to BFF	2048 to 3071
Hires	1	2000 to 3FFF	8192 to 16383
Hires	2	4000 to 5FFF	16384 to 24575
I/O ADR.		C000 to CFFF	
APPLESOFT Rom		D000 to F7FF	

DECIMAL TOKENS WITH KEYWORDS

Hex	Decimal	Keyword	Hex	Decimal	Keyword	Hex	Decimal	Keyword
80	128	END	A7	167	RECALL	CD	205	AND
81	129	FOR	A8	168	STORE	CE	206	OR
82	130	NEXT	A9	169	SPEED=	CF	207	>
83	131	DATA	AA	170	LET	D0	208	=
84	132	INPUT	AB	171	GOTO	D1	209	<
85	133	DEL	AC	172	RUN	D2	210	SGN
86	134	DIM	AD	173	IF	D3	211	INT
87	135	READ	AE	174	RESTORE	D4	212	ABS
88	136	GR	AF	175	E	D5	213	USR
89	137	TEXT	B0	176	GOSUB	D6	214	FRE
8A	138	PR#	B1	177	RETURN	D7	215	SCRNI
8B	139	IN#	B2	178	REM	D8	216	PDL
8C	140	CALL	B3	179	STOP	D9	217	POS
8D	141	PLOT	B4	180	ON	DA	218	SQR
8E	142	HLIN	B5	181	WAIT	DB	219	RND
8F	143	VLIN	B6	182	LOAD	DC	220	LOG
90	144	HGR 2	B7	183	SAVE	DD	221	EXP
91	145	HGR	B8	184	DEF	DE	222	COS
92	146	HCOLOR=	B9	185	POKE	DF	223	SIN
93	147	HPLLOT	BA	186	PRINT	E0	224	TAN
94	148	DRAW	BB	187	CONT	E1	225	ATN
96	150	HTAB	BC	188	LIST	E2	226	PEEK
97	151	HOME	BD	189	CLEAR	E3	227	LEN
98	152	ROT=	BE	190	GET	E4	228	STR\$
99	153	SCALE=	BF	191	NEW	E5	229	VAL
9A	154	SHLOAD	C0	192	TAB(	E6	230	ASC
9B	155	TRACE	C1	193	TO	E7	231	CHR\$
9C	156	NOTRACE	C2	194	FN	E8	232	LEFT\$
9D	157	NORMAL	C3	195	SPC(	E9	233	RIGHT\$
9E	158	INVERSE	C4	196	THEN	EA	234	MID\$
9F	159	FLASH	C5	197	AT			
A0	160	COLOR=	C6	198	NOT			
A1	161	POP	C7	199	STEP			
A2	162	VTAB	C8	200	+	Hex	Dec.	Keyboard
A3	163	HIMEN:	C9	201	-	C000	49152	DATA
A4	164	LOMEN:	CA	202	*		16384	
A5	165	ONERR	CB	203	/		49168	CLEAR
A6	166	RESUME				C010	16368	STROBE

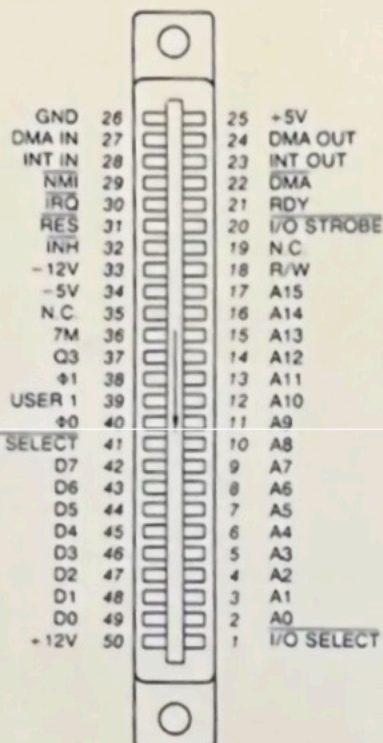
KEY BOARD LOCATIONS

Hex	Dec.	Keyboard
C000	49152	DATA
	16384	
	49168	CLEAR
C010	16368	STROBE

CALLS, PEEKS, POKES

Call-936	Clear Screen	Call-167	Return to Monitor in Text Mode
Call-922	Line Feed		Set Graphics Mode
Call-912	Scroll Screen	Poke-16304.0	Set Text Mode
Call-1944	Clear upper 20 lines to #	Poke-16303.0	Set Hires Mode
	Sign	Poke-16297.0	Clear Keyboard Strobe
Call-62450	Clear Hires Screen	Poke-16368.0	Toggle Speaker
Call-958	Clear from Cursor to Page	Poke-16336.0	Set Left Scroll Window
	End	Poke 32, L1	Set Window Width
Call-868	Clear from Cursor to Line	Poke 33, W1	Set Top of Scroll Window
	End	Poke 34, T1	Set Bottom of Scroll Window
Call-384	Inverse	Poke 35, B1	Normal Screen
Call-380	Normal	Poke 50, 255	FLASH
Call-198	Sound Bell	Poke 50, 127	Reverse
Call-1998	Clear or Screen	Poke 50, 63	Toggle Speaker
Call-1233	Reset Text	X= PEEK(-16336)	Read PDL (O) Switch
Call-1036	Advance Cursor	X= PEEK(-16287)	Read PDL (I) Switch
Call-1008	Backspace	X= PEEK(-16286)	Read Keyboard
Call-756	Wait for Key Press	X= PEEK(-16384)	

APPLE BUS PINOUT



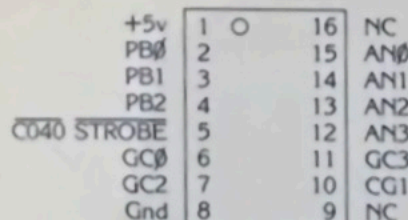
INTEGER & APPLESOFT

*C080 - Initialize Applesoft Rom
*C081 - Initialize Integer

GRAPHICS & GAME CONTROLS

Lores
GR Set Lores graphics
Color = Y Set color (0 to 15)
Plot X, Y Place dot at screen position X, Y
HLIN X, X1 at Y Draws horizontal line
VLIN Y, Y1 at X Draws vertical line
SCRN (X,Y) Returns color at X, Y

Hires
HGR Sets hires graphics Page 1
HGR2 Sets hires graphics Page 2
HCOLOR = X Sets color (0 to 7)
HPLOT X, Y Place dot at screen position X, Y
HPLOT X, Y to X1 Y1 Draws line
SHLOAD Loads tape shape table
DRAW 2 at X, Y Draws shape 2 at X, Y
XDRAW 2 at X, Y Undraw Shape 2 at X, Y
ROT = X Rotate shape
SCALE = X Sets scale (1 to 255)
PDL (X) Returns number of paddle (X) where it is set (0 to 255)



GAME I/O CONNECTOR PINOUTS

AN0-AN3 Annunciator outputs. These are standard 74LS series TTL outputs and must be buffered if used to drive other inputs.

GC0-GC3 Game controller inputs. These should each be connected through a 150K Ohm variable resistor to +5v.

PB0-PB2 Pushbutton inputs. These are standard 74LS series inputs.

C040 STROBE A general-purpose strobe. This line, normally high, goes low during a #0 of a read or write cycle to any address from \$C040 through \$C04F.

DOS COMMANDS (UNDERLINED) OPTIONAL

INIT file, Volume, Slot, Drive - Initializes diskette
LOAD file, Slot, Drive, Vol - Load Program
SAVE file, Slot, Drive, Vol - Save Program
DELETE file, Slot, Drive, Vol - Delete Program
RENAME file, file 2, Slot, Drive, Vol - Rename a program
CATALOG Slot, Drive - Lists all files on disk
VERIFY file, Slot, Drive, Vol - Checks Disk Data
FIUN file, Slot, Drive, Vol - Loads & Runs Program
CHAIN file, Slot, Drive, Vol - In Integer runs file without clearing variables

EXEC file, Slot, Drive, Vol - Executes command program
LOCK file, Slot, Drive, Vol - Protects Program from Deletion
MON CIO - Enables Writing Information
NOMON CIO - Disables Writing Information
UNLOCK file, Slot, Drive, Vol - Removes Protection
B SAVE file, Slot, Drive, Vol - Saves Mach. Lang. Program
B LOAD file, Slot, Drive, Vol - Loads Mach. Lang. Program
BRUN file, Slot, Drive, Vol - Runs Mach. Lang. Program
MAXFILES number - Number of active files

FILES

OPEN file, Slot, Drive, Vol - Opens sequential text file
OPEN file, Length, Slot, Drive, Vol - Opens random access text file
CLOSE file - Closes an open file
WRITE file - Subsequent PRINTS enter characters in file
READ file - Subsequent INPUT & GET take characters from file
APPEND file, Slot, Drive, Vol - Similar to OPEN in Seq. files but prepares to WRITE at end
POSITION file, Record # - Subsequent READ or WRITE will proceed from Record # in sequential files

MISC. DOS

CALL 976 Activates DOS if its in memory
3DSIG Goes to Basic with program preserved
3D3G Goes to Basic losing program
INT Goes to Integer Basic
FP Goes to Applesoft Basic

PROGRAMMER'S AID MEMORY TEST

D5BCG Initializes Programmers Aid
440.4 ctrlY - Screen Area Test 4000.40 ctrlY - Second 16K Test
800.8 ctrlY 8000.40 ctrlY - Third 16K Test
1000.10 ctrlY 3000.20 ctrlY - Special Test for 16K
2000.20 ctrlY - First 16K Test 7000.20 ctrlY - Special Test for 32K & 48K

Additional user notes: (use permanent marker to preserve)

LORES COLORS

0	Black	8	Brown
1	Magenta	9	Orange
2	Dk Blue	10	Dk Grey
3	Purple	11	Pink
4	Dk Green	12	Green
5	Grey	13	Yellow
6	Med Blue	14	Aqua
7	Lt Blue	15	White

HIRES COLORS

0	Black
1	Green (Depends on TV)
2	Blue (Depends on TV)
3	White
4	Black 2
5	Orange (Depends on TV)
6	Purple (Depends on TV)
7	White 2

ONERR GOTO Codes

DOS Error Message

1	Language Not Available
2,3	Range Error
4	Write Protect
5	End of Data
6	File Not Found
7	Volume Mismatch
8	I/O Error
9	Disk Full
10	File Locked
11	Syntax Error
12	No Buffers Available
13	File Type Mismatch
14	Program Too Large
15	Not Direct Command