

KIM-1 Quick Reference

For the MOS Technology KIM-1 Microcomputer Module

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NMI Initialization for Single Step and Stop:

17FA 00
17FB 1C

IRQ Initialization for BRK:

17FE 00
17FF 1C

Machine Context (saved/restored by ST/GO):

00EF PC low
00F0 PC high
00F1 Status Register (flags)
00F2 Stack Pointer
00F3 A
00F4 Y
00F5 X

Cassette Load and Save

Successful save or load indicated on display with **0000 XX**, bad load with **FFFF XX**.
12volt power source is required when reading tapes.

To save:

1. Store \$00 in \$00F1 (to ensure CPU is in binary mode).
2. Save start address (low/high) in \$17F5, \$17F6.
3. Save end address+1 (low/high) in \$17F7, \$17F8.
4. Write tape ID (\$01-\$FE) in \$17F9.
5. Start tape in record mode.
6. Run address \$1800 (DUMPT) to save.

To load:

1. Store \$00 in \$00F1 (to ensure CPU is in binary mode).
2. Write tape ID (\$01-\$FE, \$00 loads any ID, \$FF loads using start address values) to \$17F9.
3. Run address \$1873 (LOADT) to load.

Teleprinter Commands

Serial port settings 9600 bps (or less) 8N2. Press <Rubout> or <Delete> after Reset to initialize serial bit rate.

<hex address> <space>	Show data at address
<hex data> .	Write to current address
<Return>	Advance to next address
<Line Feed>	Move to previous address
<Rubout>	Terminate memory edit
L	Load program from paper tape
Q	Save memory to paper tape (saves from current address to \$17F7, \$17F8)
G	Go from current address

Memory Map

Range	Comments
\$0000 - \$00FF	RAM - page zero (\$00EF - \$00FF are reserved)
\$0100 - \$01FF	RAM - stack
\$0200 - \$03FF	RAM - user programs
\$1700 / \$1740	I/O Register A
\$1701 / \$1741	Direction Register A
\$1702 / \$1742	I/O Register B
\$1703 / \$1743	Direction Register B
\$1704 / \$1744	Write: Timer, 1 usec, no interrupt
\$1705 / \$1745	Write: Timer, 8 usec, no interrupt
\$1706 / \$1746	Write: Timer, 64 usec, no interrupt. Read: timer count, disable interrupt.
\$1707 / \$1747	Write: Timer, 1024 usec, no interrupt. Read: timer status, Bit 7 = 1 on timeout.
\$170C / \$174C	Write: Timer, 1 usec, interrupt
\$170D / \$174D	Write: Timer, 8 usec, interrupt
\$170E / \$174E	Write: Timer, 64 usec, interrupt. Read: timer count, enable interrupt.
\$170F / \$174F	Write: Timer, 1024 usec, interrupt
\$1780 - \$17E6	Application RAM
\$17E7 - \$17FF	KIM RAM
\$1800 - \$1FFF	KIM ROM (2K)
\$FFF8 - \$FFFF	Reset, NMI, IRQ, and BRK vectors (in ROM).

Useful ROM Routines

Name	Address	Description
DUMPT	\$1800	Write (Dump) to audio tape.
LOADT	\$1873	Read (Load) from audio tape.
ONE	\$199E	Send 3700 Hz tone to tape.
ZRO	\$19C4	Send 200 Hz tone to tape.
PLLCAL	\$1A6B	Send 300 Hz PLL reference tone to tape.
AK	\$1EFE	Check for key depressed. A non-zero: no key down. A equal 0, key down.
SCAND	\$1F19	Display address and contents.
SCANDS	\$1F1F	Output six hex characters on display. Stored in \$00F9, \$00FA, \$00FB.
KEYIN	\$1F40	Open up keyboard channel. Call before using GETKEY (or call SCANDS).
INCPT	\$1F63	Increment display address.
GETKEY	\$1F6A	Return key from keyboard. Value 0-F, 10(AD), 11(DA), 12(+), 13(GO), 14(PC), 15 (no keypress).
TABLE	\$1FE7	Table of 7-segment patterns.
	\$1C2A	Set TTY baud rate.
PRTPNP	\$1E1E	Prints contents of \$00FB, \$00FA on TTY.
CRLF	\$1E2F	Send CRLF to TTY.
PRTBYT	\$1E3B	Prints A as two hex characters on TTY.
GETCH	\$1E5A	Get one ASCII character from TTY and return in A.
OUTSP	\$1E9E	Print space on TTY.
OUTCH	\$1EA0	Print ASCII character in A on TTY.
GETBYT	\$1F9D	Get two hex characters from TTY and return them packed in A.
SAVE	\$1C00	Normal interrupt entry point.
RST	\$1C22	Reset return to monitor.
START	\$1C4F	Return to monitor entry.

Connector Pinouts

Connector B (upper) Expansion Connector. Pins 1-22 on top, A-Z on bottom.			
Pin	Signal	Pin	Signal
1	SYNC	A	AB0
2	RDY	B	AB2
3	Ø1	C	AB2
4	IRQ	D	AB3
5	RO	E	AB4
6	NMI	F	AB5
7	RST	H	AB6
8	DB7	J	AB7
9	DB6	K	AB8
10	DB5	L	AB9
11	DB4	M	AB10
12	DB3	N	AB11
13	DB2	P	AB12
14	DB1	R	AB13
15	DB0	S	AB14
16	K6	T	AB15
17	SST OUT	U	Ø2
18		V	R/W
19		W	$\overline{R/W}$
20		X	PLL TEST
21	VCC +5V	Y	$\overline{Ø2}$
22	VSS GND	Z	RAM/R/W

Connector A (lower) Application Connector. Pins 1-22 on top, A-Z on bottom.			
Pin	Signal	Pin	Signal
1	VSS GND	A	VCC +5V
2	PA3	B	K0
3	PA2	C	K1
4	PA1	D	K2
5	PA4	E	K3
6	PA5	F	K4
7	PA6	H	K5
8	PA7	J	K7
9	PB0	K	DECODE ENAB
10	PB1	L	AUDIO IN
11	PB2	M	AUDIO OUT LO
12	PB3	N	+12V
13	PB4	P	AUDIO OUT HI
14	PA0	R	TTY KYBD RTRN(+)
15	PB7	S	TTY PTR RTRN(+)
16	PB5	T	TTY KYBD
17	KB Row 0	U	TTY PTR
18	KB Col F	V	KB Row 3
19	KB Col B	W	KB Col G
20	KB Col E	X	KB Row 2
21	KB Col A	Y	KNB Col C
22	KB Col D	Z	KB Row 1