

KIM-1 Quick Reference

For the MOS Technology KIM-1 Microcomputer Module

Jeff Tranter <tranter@pobox.com>

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 decimal 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 decimal 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 2400 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 |
| \$0400-\$16FF | Reserved for RAM expansion |
| \$1700-\$17FF | RAM/ROM/IO/TIMER chips |
| \$1700-\$173F | Application I/O and timer |
| \$1740-\$177F | KIM I/O and timer |
| \$1780-\$17BF | Application RAM |
| \$17C0-\$17E6 | Application RAM |
| \$17E7-\$17FF | KIM RAM |
| \$1800-\$1FFF | ROM (2K) |
| \$2000-\$FFF7 | Reserved for expansion |
| \$FFF8-\$FFFF | Reset, NMI, IRQ, and BRK vectors (in ROM). |

Useful ROM Routines

| Name | Address | Description |
|--------|---------|---|
| AK | \$1EFE | Check for key depressed. A non-zero: no key down. A equal 0, key down. |
| CRLF | \$1E2F | Send CRLF to TTY. |
| GETBYT | \$1F9D | Get two hex characters from TTY and return them packed in A. |
| GETCH | \$1E5A | Get one ASCII character from TTY and return in A. |
| GETKEY | \$1F6A | Return key from keyboard. Value 0-F, 10(AD), 11(DA), 12(+), 13(GO), 14(PC), 15 (no keypress). |
| KEYIN | \$1F40 | Open up keyboard channel. Call before using GETKEY (or call SCANDS). |
| OUTCH | \$1EA0 | Print ASCII character in A on TTY. |
| OUTSP | \$1E9E | Print space on TTY. |
| PRTBYT | \$1E3B | Prints A as two hex characters. |
| PRTPNT | \$1E1E | Prints contents of \$00FB, \$00FA on TTY. |
| SCANDS | \$1F1F | Output six hex characters on display. Stored in \$00F9, \$00FA, \$00FB. |

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 |