



Operations Guide

TAVA CORPORATION

SECTION 1/ INTRODUCTION

Contents

Introduction.....3

NOTES:

INTRODUCTION

Congratulations on selecting the TAVA personal computer to meet your computing needs. Your TAVA PC offers several options that will allow you to upgrade your system. These options will also enable you to configure your system to satisfy your particular computing requirements.

The "heart" of the TAVA Personal Computer system is the Processing Unit. This small but powerful cabinet contains five expansion slots for expanding the capabilities of the TAVA PC. Included in the standard system are 128K of RAM memory, two serial ports and one parallel port.

The Central Unit contains room for 2 standard size 5 1/4 inch Floppy Disk drives. It can be enhanced with a hard disk drive or slimline floppy disk drives. The system can support a variety of monochrome or color monitors to suit your specific application.

The TAVA PC is operated by an 83-key keyboard. For ease of use, it also includes a numeric keypad and 10 functions keys. The keyboard has a six-foot coil cable that permits a comfortable position to be attained while using the computer.

A variety of printer adapters are available for connecting many different types of printers to the TAVA PC.

This manual is designed to help you begin using your Personal Computer immediately, even though you may not have a great deal of computer experience. This manual can be consulted easily to answer any question that may arise while using your PC.

SECTION 2/ INSTALLATION

Contents

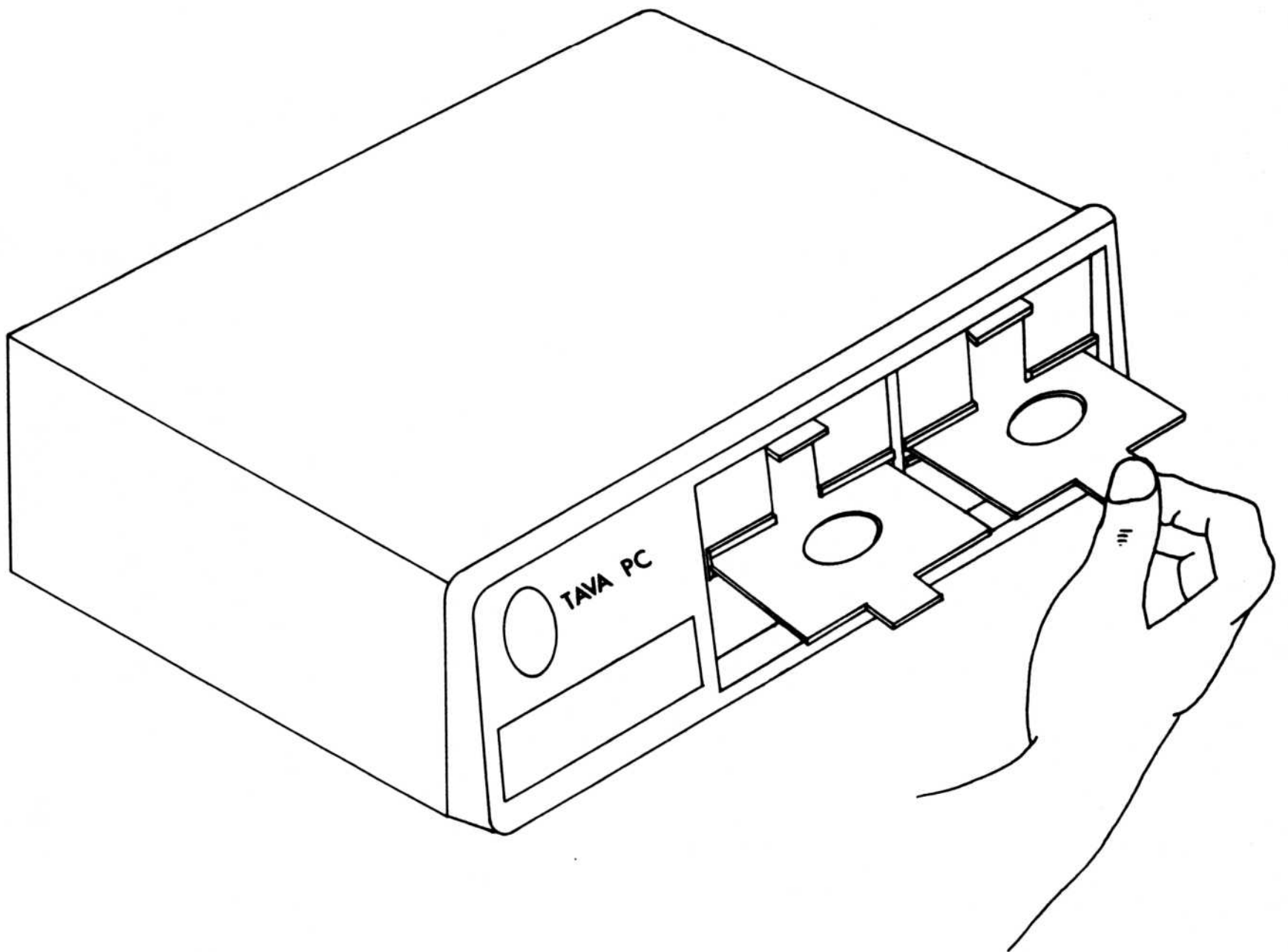
Installation	6
Power-On Selftest	8
Rear Panel Reference	9
System Test	10
System Quick Check	12
Technical Data	14
Block Diagram	15
RAM Memory Switch Settings	16
EPR0M Memory	17
Processor	18
DMA	20
Timer	20
Interrupts	20
PIO	20
Keyboard Port	21
Parallel Port	22
Reset Port	23
Serial Channels	23
BIOS Switches for Disk Drives and Monitors	25
Expansion Slots	26
Expansion Slots Signals	27
I/O Address Map	28
Power	29
Environmental Data	30
BIOS Diagnostics	30

NOTES:

INSTALLATION

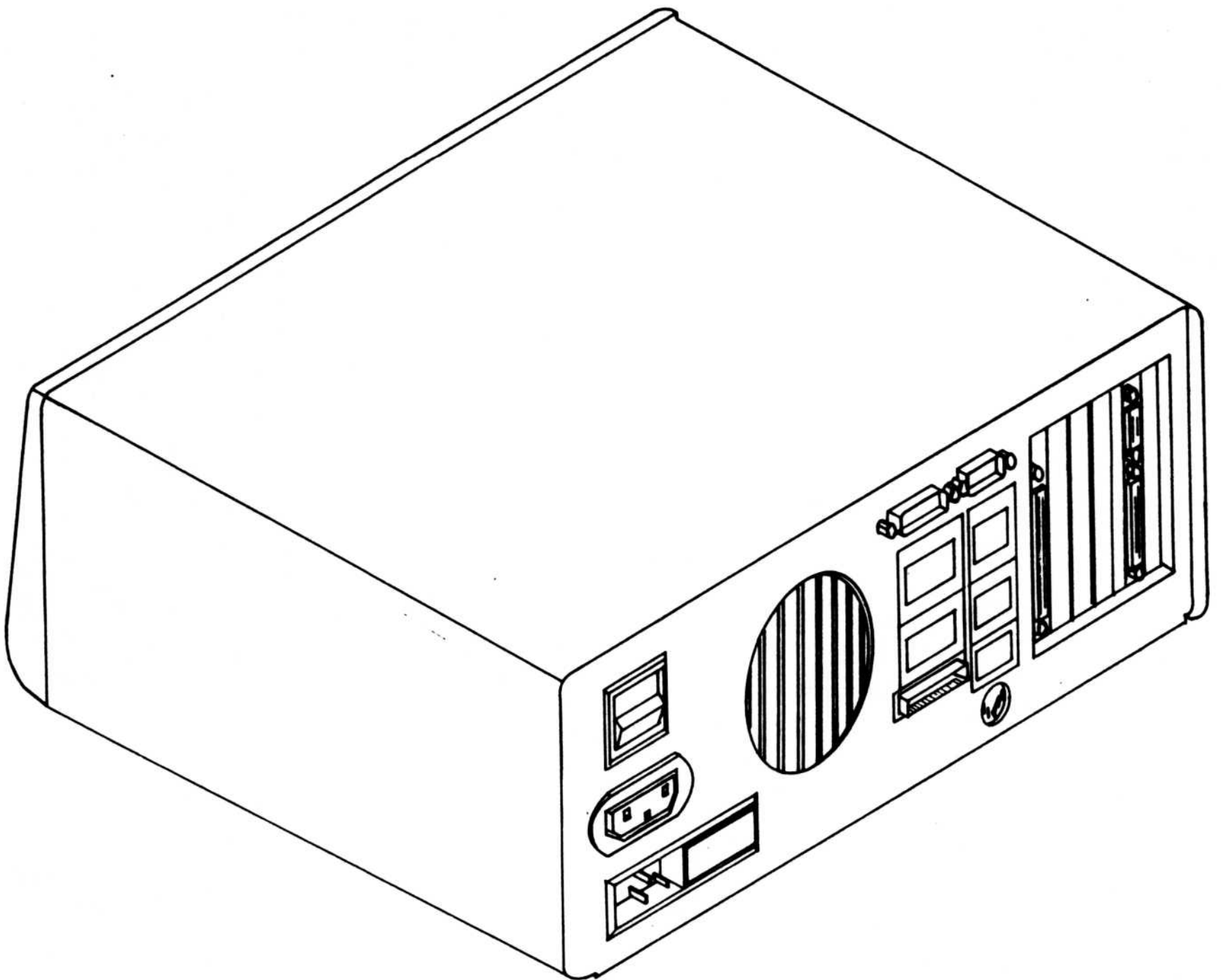
1. If your TAVA Personal Computer came with a diskette drive installed, remove the shipping cardboard from the drive(s). See Figure 2-1.

Figure 2-1. Disk drive preparation for setup.



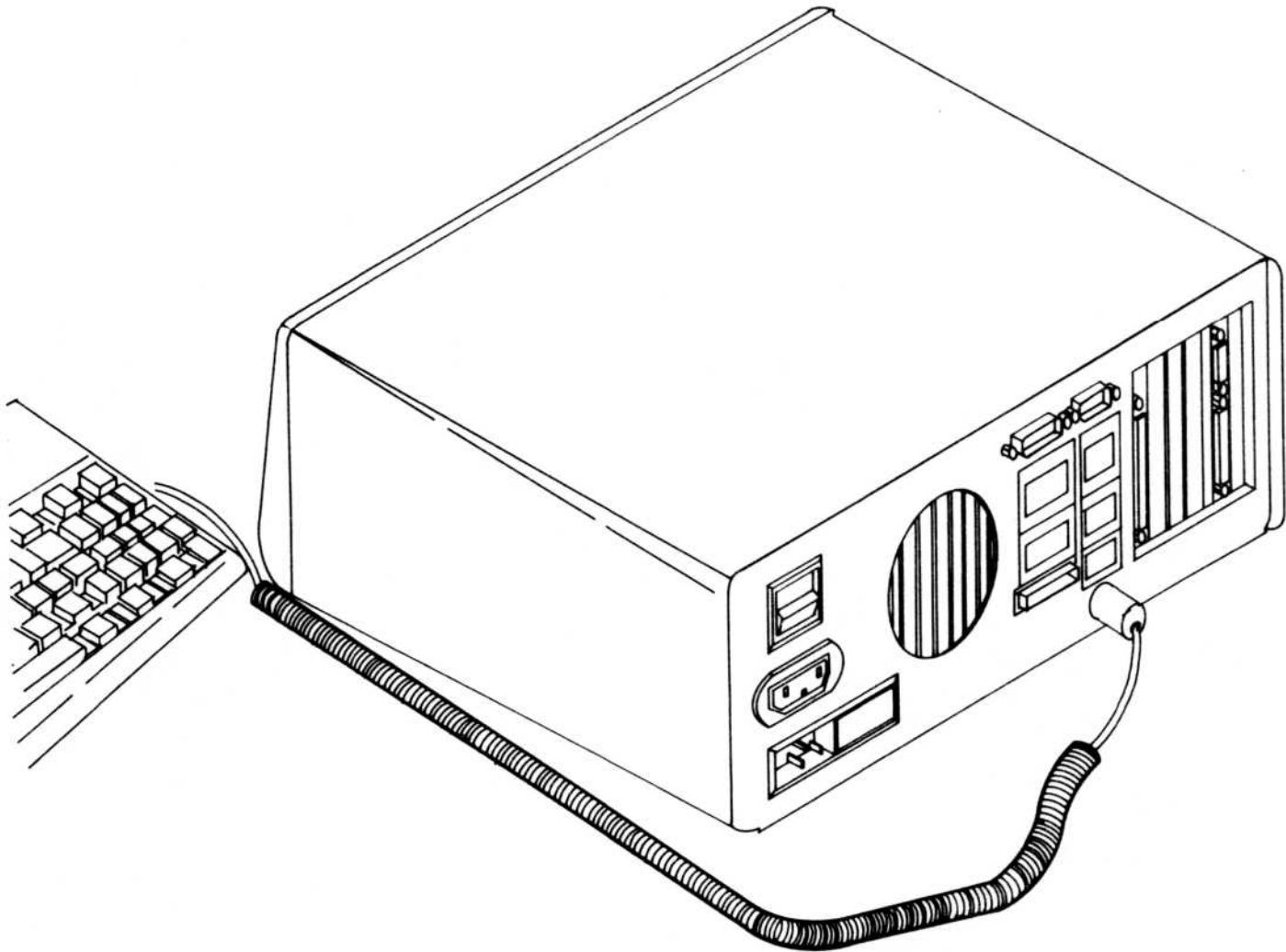
2. Place the Processing Unit on a level area as shown in Figure 2-2.

Figure 2-2. System unit on flat surface.



3. Place the keyboard in front of the Processing Unit and connect the coiled cable to the rear of the cabinet as shown in Figure 2-3. The system will not initialize without the keyboard cable plugged in.

Figure 2-3. Connection of keyboard cable.



4. Flip the Power switch located in the rear of the unit to the OFF position.

5. Connect the power cord first to the Processing Unit, and then to a wall outlet.

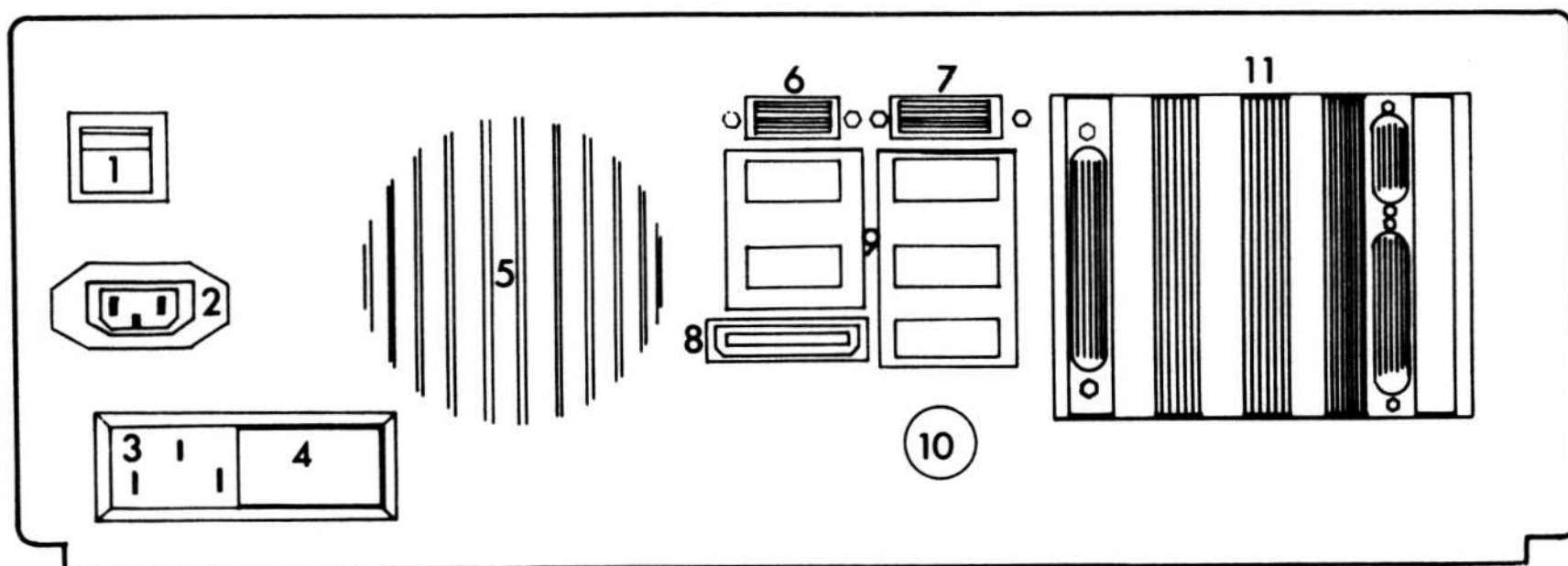
POWER-ON SELFTEST

6. Flip the power switch to the ON position. You should hear one short beep. This short tone indicates that your TAVA PC has completed its selftest. If you hear more than one beep, please proceed to Section 4, TROUBLESHOOTING.

REAR PANEL REFERENCE

Figure 2-4 illustrates the rear panel of the TAVA PC. Please refer to this drawing when installing and connecting all your cables and cords.

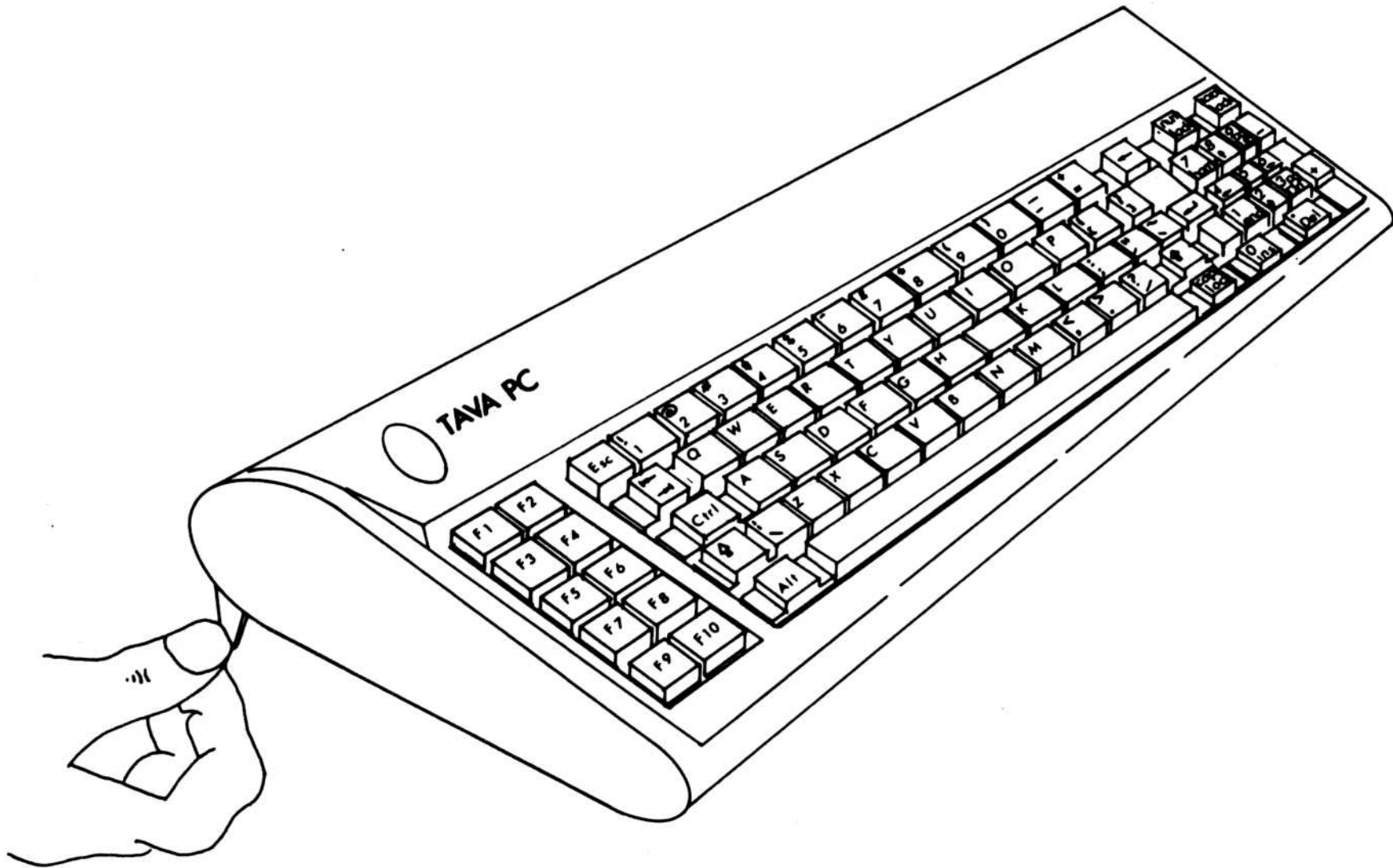
Figure 2-4. TAVA PC rear panel.



- 1 ON-OFF SWITCH
- 2 A/C OUTLET
- 3 A/C INLET&FILTER
- 4 FUSE BOX
- 5 EXHAUST FAN
- 6 SERIAL PORT-COM1
- 7 SERIAL PORT-COM2
- 8 PARALLEL PORT
- 9 FIVE EXPANSION PORTS
- 10 KEYBOARD PLUG
- 11 FIVE EXPANSION SLOTS

7. The TAVA PC keyboard is fitted with adjustable front leg posts for typing comfort. Adjust these legs to the position that provides the greatest typing ease for yourself. See Figure 2-5.

Figure 2-5. Adjusting keyboard leg posts.



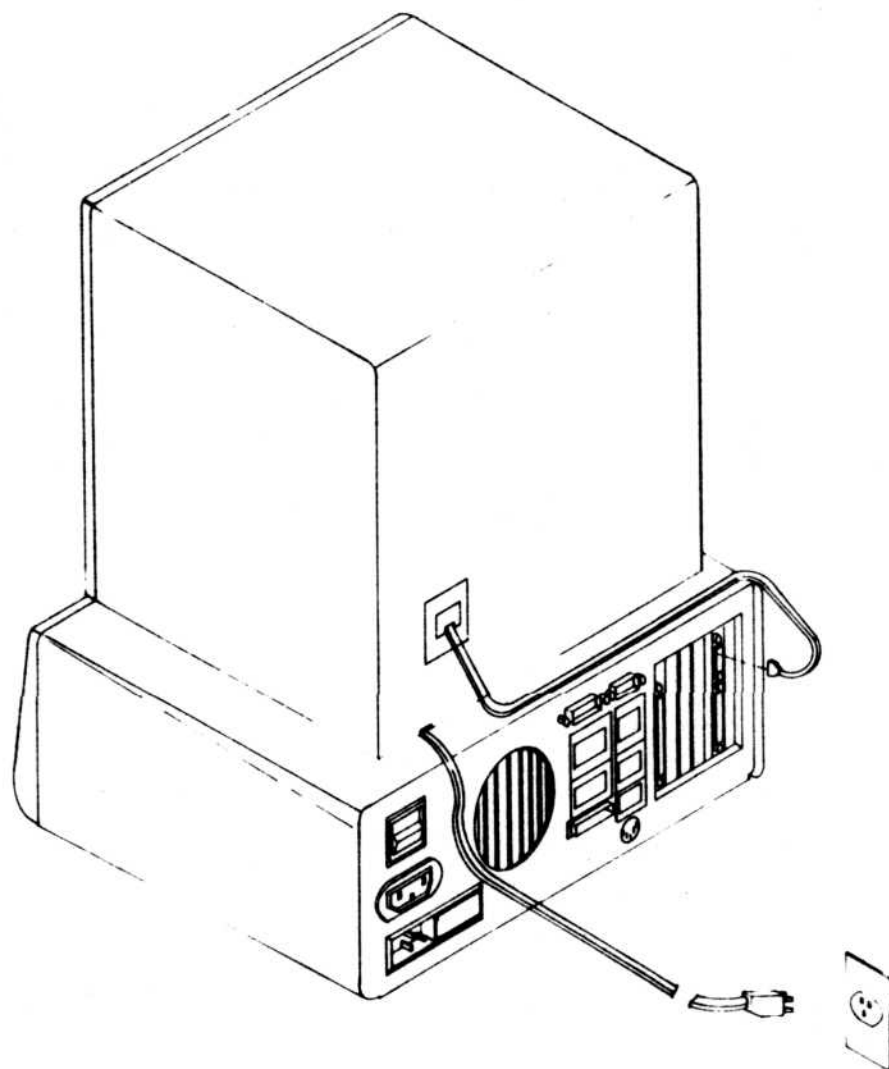
Now the TAVA PC is completely set up and ready for system test.

SYSTEM TEST

1. Place the monitor on top of the Processing Unit and connect the monitor cable to the rear of the cabinet as shown in Figure 2-6. Connect the monitor power cord to the monitor and then to a wall outlet.

2. Turn the video controls of your monitor completely clockwise.

Figure 2-6. Connecting monitor to system unit.



3. When the TAVA PC is powered on it performs a selftest that takes between 3 to 30 seconds depending upon how much memory the system has.

Flip the Power switch to the ON position. These occurrences should be noted:

1. Cursor will appear on the monitor screen.
2. One short tone will sound after the memory test.

If the TAVA PC has selftested successfully, these responses will indicate that. If other information is present on the screen, please call your TAVA dealer.

If the correct responses occurred, please continue to step 4.

4. If the information displayed on the screen is shifted to the left of the screen, please refer to the "MODE" command explanation in your DOS manual.

5. Now adjust the brightness and contrast controls of the monitor for greatest visual comfort.

Your TAVA Personal Computer is now ready to be used. The basics of system operation are given in Section 3, Operations.

SYSTEM QUICK CHECK

Listed below is a method for ensuring that your system is operational after it has not been in use for a while. This check is not intended to be diagnostic in nature, but rather to quickly determine the system's ability to function.

1. Insert DOS diskette in Drive A.
2. Type 'chkdsk' and hit ENTER.
3. The monitor screen should display the following.

```
179712 bytes total disk space
 22016 in 2 hidden files
126464 bytes in 23 user files
 31232 bytes available on disk
```

```
262144 bytes total memory
237344 bytes free
```

These numbers may vary depending on the density of the drives you are using and the amount of memory your TAVA PC possesses. The number of bytes available should equal the difference of the number of bytes used in files and the size of the diskette (bytes total disk space). If they do not, enter 'chkdsk' again with a different DOS diskette (you should have a copy) and try again.

4. Now type 'format' and hit ENTER.
5. The screen will display the following:

Insert new diskette for Drive A
and strike any key when ready

6. Insert a new diskette in Drive A and hit any key when ready. The screen will display the following:

formatting...

7. When the system has completed formatting the diskette, it will display the following on the screen:

format
formatting...format complete
FORMAT ANOTHER (Y/N)

The light on the diskette drive should be on while the diskette is being formatted.

8. Type 'N' and hit ENTER.
9. This completes the Quick Check of the system. If any errors were encountered they would have been reported. If all steps were error free, the Processing Unit, Keyboard, Monitor, Diskette drives, and memory are all functioning properly and ready for use.

You also have a formatted diskette ready for use. This would be a good time to make a copy of your DOS diskette. See Section 3, Operations.

TAVA PERSONAL COMPUTER TECHNICAL DATA

The following section provides technical data about your TAVA PC Processing Unit computer board.

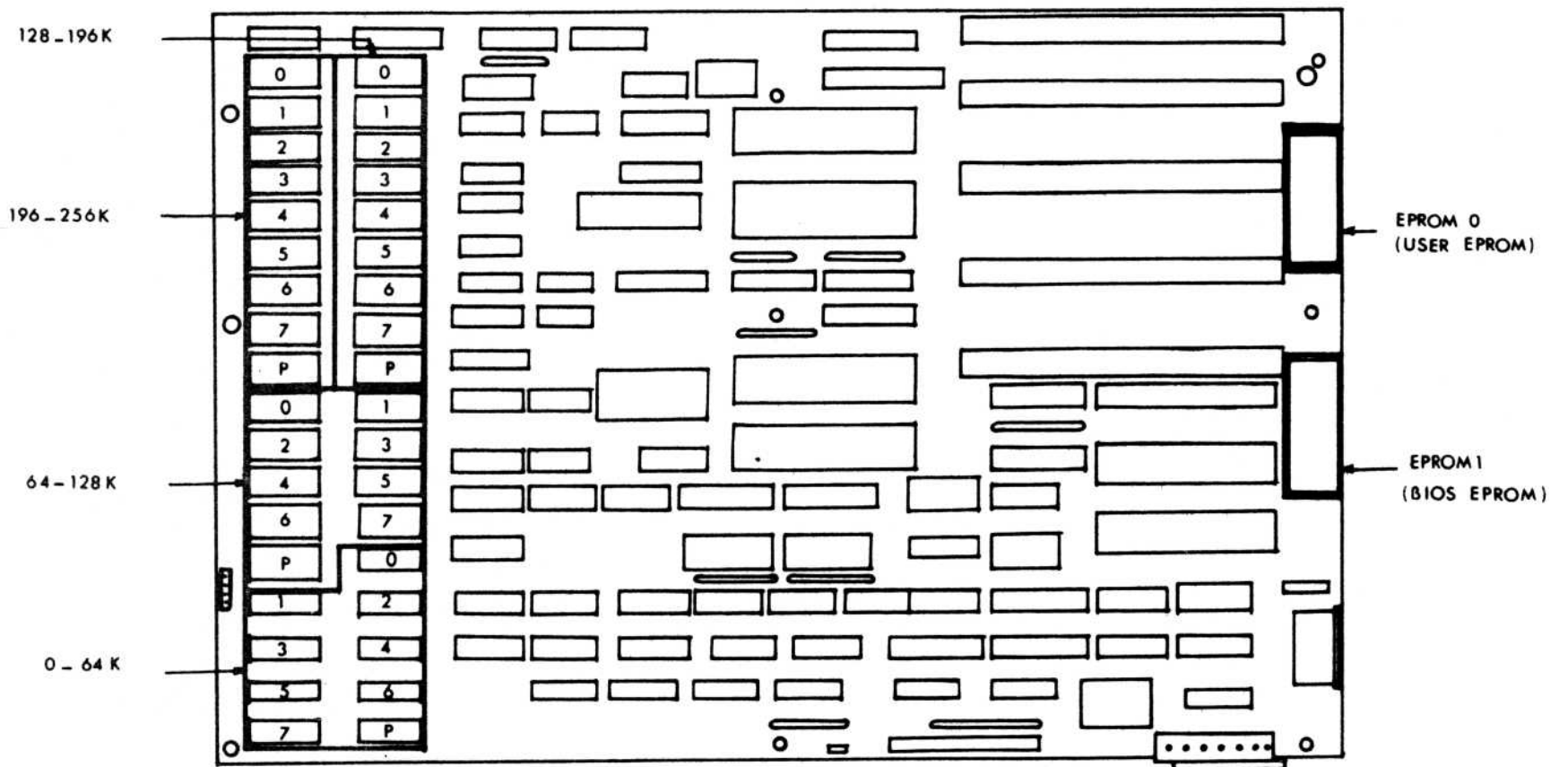
The TAVA PC is a single board computer that features up to 256K of RAM memory, up to 32K of EPROM memory, two serial ports, one parallel printer port, a keyboard port, an 8088 processor, an optional 8087 math co-processor, a DMA controller, a timer, 8 levels of interrupts, an 8255 parallel Input/Output (PIO) chip, a speaker port, a reset port, and up to 9 expansion slots*. The board is 8.5" by 12" and is physically hardware and software compatible with the IBM PC.

*** (5) Operational and (4) Optional**

BLOCK DIAGRAM

Figure 2-7 is a block diagram of the TAVA PC computer board.

Figure 2-7. TAVA system motherboard.



RAM MEMORY

The computer board may contain from 64K (minimum) to 256K (maximum) of RAM memory (see figure 2-7). An expansion is provided for up to another 256K of RAM. The RAMs are dynamic and are refreshed by one of the DMA and timer channels. The memory cycle is 840 nanoseconds with an access time of 250 nanoseconds. The RAM is parity checked and a parity error generates an interrupt

The following switch settings are required for the Basic Input/Output System (BIOS) EPROM to address available memory.

SWITCH 1 (see Figure 2-8)				MEMORY SIZE
4	3	2	1	
ON	ON	ON	ON	64K
ON	ON	ON	OFF	96K
ON	ON	OFF	ON	128K
ON	ON	OFF	OFF	160K
ON	OFF	ON	ON	192K
ON	OFF	ON	OFF	224K
ON	OFF	OFF	ON	256K
ON	OFF	OFF	OFF	288K
OFF	ON	ON	ON	320K
OFF	ON	ON	OFF	352K
OFF	ON	OFF	ON	384K
OFF	ON	OFF	OFF	416K
OFF	OFF	ON	ON	448K
OFF	OFF	ON	OFF	480K
OFF	OFF	OFF	ON	512K

BASE MEMORY JUMPERS (J17) (see figure 2-8)				MAXIMUM BASE MEMORY SIZE
9	10	11	12	
IN	OUT	IN	OUT	64K
OUT	IN	IN	OUT	128K
OUT	IN	OUT	IN	(standard) 256K

EPROM MEMORY

The computer board has from 2K to 32K of EPROM memory and supports 2716, 2732, 2764, and 27128 EPROM chips. The top 32K of memory (address F8000 to FFFFF) is reserved for the EPROM memory. The BIOS EPROM is installed in EPROM 1. The memory cycle and access times are the same as for RAM memory.

EPROM Type Jumpers (J17) (see figure 2-8)

EPROM 0					EPROM 1			EPROM TYPE
1	2	3	4	5	6	7	8	
IN	OUT	IN	OUT	IN	OUT	IN	OUT	2716 (2K by 8)
OUT	IN	IN	OUT	OUT	IN	IN	OUT	2732 (4K by 8)
OUT	IN	OUT	IN	OUT	IN	OUT	IN	2764 (8K by 8)
								or
								27128 (16K by 8)
								(standard)

EPROM ADDRESSING	EPROM	TYPE
FB800-FBFFF	0	2716 (2K by 8)
FF800-FFFFF	1	2716 (2K by 8)
FB000-FBFFF	0	2732 (4K by 8)
FF000-FFFFF	1	2732 (4K by 8)
FA000-FBFFF	0	2764 (8K by 8)
FE000-FFFFF	1	2764 (8K by 8)
F8000-FBFFF	0	27128 (16K by 8)
FC000-FFFFF	1	27128 (16K by 8)

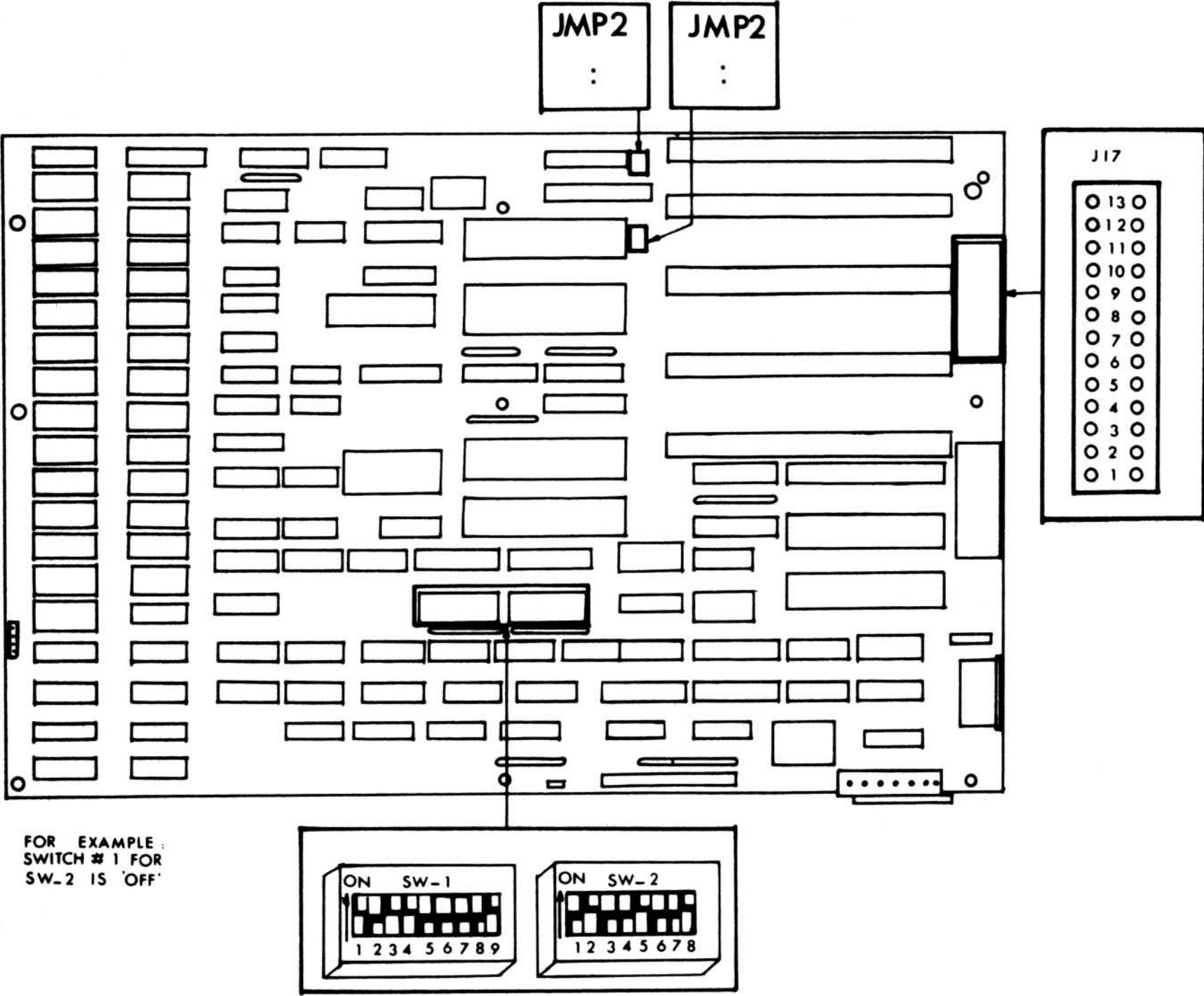
PROCESSOR

The microprocessor is an 8088 running at 4.77 megahertz. An optional 8087 math co-processor is available.

Jumpers (J17) (see Figure 2-8)	SWITCH 2 (see Figure 2-8)	CO-PROCESSOR
13	2	
OUT (standard)	OFF	Installed
IN*	ON	Not Installed

*not required by DOS or CP/M

Figure 2-8. TAVA system motherboard.



DMA (Direct Memory Access) (8237)

The computer board has four DMA channels. Channel 0 is tied to interrupt 1, channels 1 through 3 are for use by the expansion slots. A DMA transfer must take place within a 64K block. Page registers are used to determine which 64K block is used.

TIMER (8253)

Three timer channels are available. Channel 0 is tied to interrupt 1, channel 1 is used for memory refresh, and channel 2 is used by the speaker port. The timer resolution is 1.05 microseconds.

INTERRUPTS (8259)

The computer board has 8 levels of interrupts.

INTERRUPT	USE
0	Timer
1	Keyboard
2-3*	---
4*	Serial
5-6*	---
7*	Parallel

*Available for use by expansion slots.

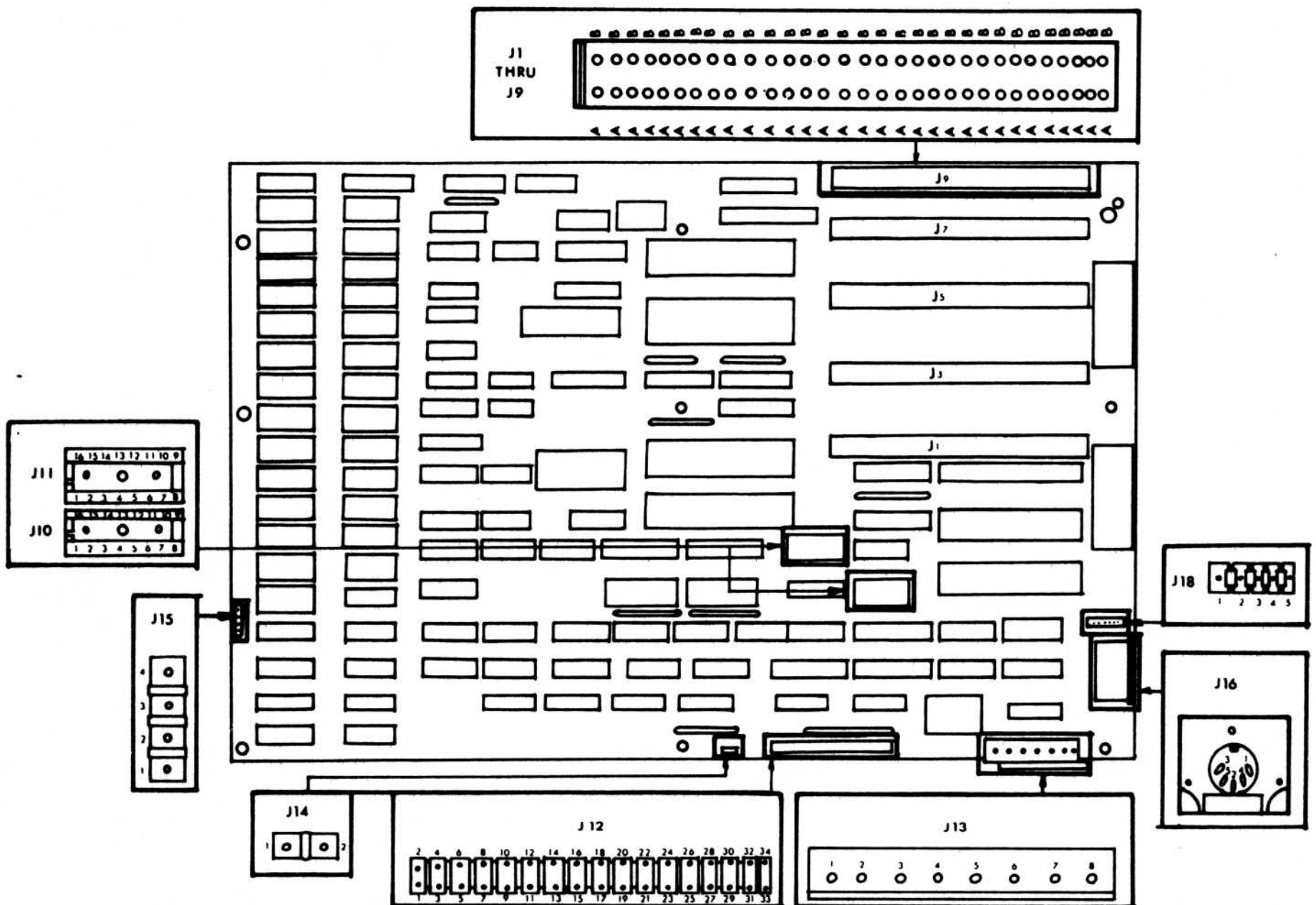
PIO (8255)

The PIO chip is used to read the keyboard port, the configuration switches, enable and read parity checks, and control the speaker port.

KEYBOARD PORT

The computer board contains a port for a keyboard. The connector is a 5-pin DIN female type (J16), and a 5-pin header (J18)

Pin (J16 and J18) (see figure 2-9)	SIGNAL
1	+CLOCK
2	+DATA
3	-RESET
4	GROUND
5	+5v



PARALLEL PORT

The board contains a Parallel port that may be used as a printer port or as a general I/O port. The connector is a 34-pin ribbon cable connector (J12).

SIGNAL	RIBBON cable pin (J12) see figure 2-9)	CENTRONIX PRINTER CABLE PIN
-STROBE	1	1
+DATA 0	3	2
+DATA 1	5	3
+DATA 2	7	4
+DATA 3	9	5
+DATA 4	11	6
+DATA 5	13	7
+DATA 6	15	8
+DATA 7	17	9
-ACK	19	10
+BUSY	21	11
+PE	23	12
+SELECT	25	13
GROUND	27	14
GROUND	31	16
CHASSIS GROUND	33	17
GROUND	2-24 (even pins)	18-29
+RESET	26	30
-ERROR	28	31
GROUND	30	32
-AUTO FDXT	32	33
-SCLINT	34	34

RESET PORT

The computer board contains a port (J14) that allows the system to be re-booted externally. The connector is a 2-pin header on .1" centers. The board resets when power is applied, so that an external reset may not be necessary. If the external reset is not used, it may be left open.

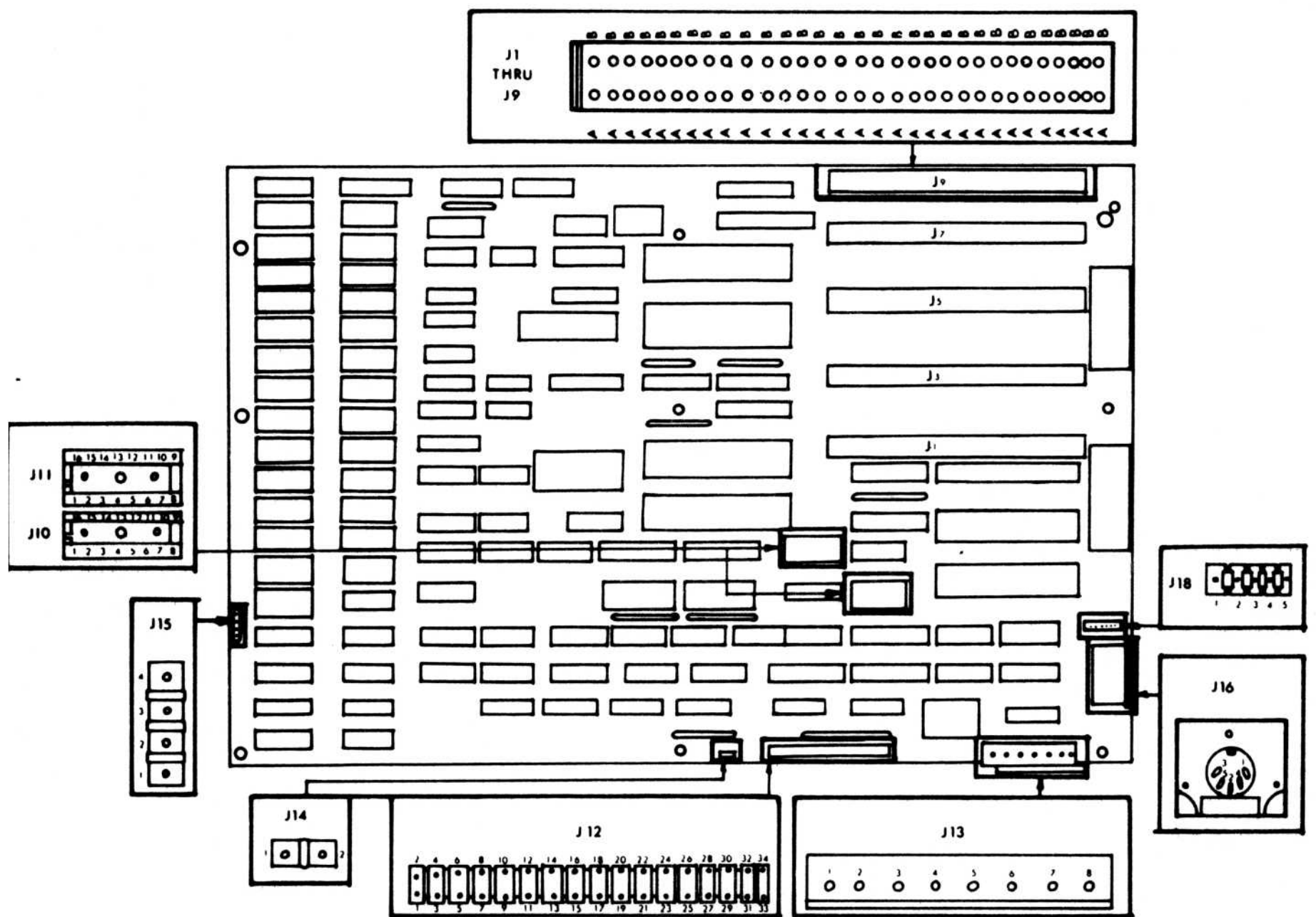
SIGNAL	PIN (J14) (see figure 2-9)
-RESET	1
GROUND	2

SERIAL CHANNELS

The computer board has two RS232 serial channels. The connectors are 16-pin DIP sockets (J10, J11). The UARTS are 8250s.

SIGNAL	J10 (CHANNEL 0) J11 (CHANNEL 1) (see figure 2-9)	RS232 CONNECTOR	BAUD RATES	
RxD	1	3	50	2000
CTS	2	5	75	2400
SG	3	7	110	3600
DTR	4	20	134.5	4800
RI	12	22	150	7200
DCD	13	8	300	9600
DSR	14	6	600	19200
RTS	15	4	1200	38400
TXD	16	2	1800	56000

Figure 2-9. TAVA system motherboard.



BIOS SWITCHES

The following chart gives switch settings for various configurations of the TAVA PC, i.e. the number of floppy disk drives and type of monitor.

SWITCH 2 (See Figure 2-8)			# OF FLOPPY DRIVES
1	7	8	
ON	ON	ON	0
OFF	ON	ON	1
OFF	OFF	ON	2
OFF	ON	OFF	3
OFF	OFF	OFF	4

SWITCH 2 (See Figure 2-8)		MONITOR TYPE
5	6	
ON	ON	none
OFF	ON	Graphics (40x25)
ON	OFF	Graphics (80x25)
OFF	OFF	Monochrome (80x25) or Graphics and monochrome

SWITCH 1 (See Figure 2-8)					SWITCH 2 (See Figure 2-8)	
5	6	7	8	9	3	4
OFF	OFF	OFF	OFF	ON	OFF	OFF

EXPANSION SLOTS

There are five expansion slots on 1" centers. These expansion slots are shown in figure 2-9 (J1-J9). Each expansion slot is a 62-pin connector. All processor memory cycles are 840 nanoseconds and all processor I/O cycles are 1.05 microseconds. Refresh cycles occur approximately every 15 microseconds.

SIGNAL NAME	EXPANSION SLOT (Component side)	SIGNAL NAME
GROUND	B1	A1
+RESET	B2	A2
+5v	B3	A3
+IRQ2	B4	A4
-5v	B5	A5
+DRQ2	B6	A6
-12v	B7	A7
-HRQ I/O	B8	A8
+12v	B9	A9
GROUND	B10	A10
-MEMW	B11	A11
-MEMR	B12	A12
-IOW	B13	A13
-IOR	B14	A14
-DACK3	B15	A15
+DRQ3	B16	A16
-DACK1	B17	A17
+DRQ1	B18	A18
+DACK	B19	A19
+CLOCK	B20	A20
+IRQ7	B21	A21
+IRQ6	B22	A22
+IRQ5	B23	A23
+IRQ4	B24	A24
+IRQ3	B25	A25
-DACK2	B26	A26
+T/C	B27	A27
+ALE	B28	A28
+5v	B29	A29
+OSC	B30	A30
GROUND	B31	A31

EXPANSION SLOT SIGNALS

+RESET	OUT	This signal resets the system.
+IRQ2 - +IRQ7	IN	These signals are the interrupt request lines. Interrupt 2 has the highest priority and interrupt 7 the lowest. The signal is held high until acknowledged by the interrupt service routine.
+DRQ1 - +DRQ3	IN	These signals are the DMA request lines. +DRQ1 has the highest priority and +DRQ3 the lowest. The line is held high until the corresponding DACK is received.
-DACK0 - -DACK3	OUT	These signals are the DMA acknowledge lines. -DACK0 is reserved for refresh, and a refresh cycle is indicated by -DACK0 and -MEMR.
+T/C	OUT	This signal indicates that a DMA channel has reached its terminal count.
-MEMW	OUT	This signal indicates a memory write.
-MEMR	OUT	This signal indicates a memory read.
-IOW	OUT	This signal indicates an I/O write.
-IOR	OUT	This signal indicates an I/O read.

+I/O READY	IN	When this line is low, the current memory or I/O cycle will be extended in multiples of 210 nanoseconds. The cycle is never extended beyond 2.1 microseconds.
+CLOCK	OUT	This is the 14.31838 Mhz clock with 50% duty cycle.
+OSC	OUT	This is the 4.77 Mhz system clock with 30% duty cycle.
+AEN	OUT	When high, the DMA chip has control of the bus.
-I/O CHECK	IN	Indicates an error on a device in an expansion slot. CPU receives an NMI.
+ALE	OUT	Indicates the address bus is valid. Processor addresses are latched on the trailing edge of +ALE.
+D0 - +D7	IN/OUT	This is the data bus.
+A0 - +A17	OUT	These signals are the address bus. For I/O operations, only +A0 - +A9 are used.

I/O ADDRESS MAP

ADDRESS	DEVICE (on the base board)
000-00F	DMA (8237)
020-021	INTERRUPTS (8259)
040-043	TIMER (8253)
060-063	PIO (8255)
080-083	DMA page registers
0A0	NMI enable register

ADDRESS	DEVICE
2F8-2FF	Serial Port 0
378-37F	Parallel Port
3F8-3FF	Serial Port 1
ADDRESS	Device (in expansion slot)
200-20F	GAME I/O ADAPTER
3B0-3BF	MONOCHROME DISPLAY
	PARALLEL PRINTER ADAPTER
3D0-3DF	GRAPHICS ADAPTER
3F0-3F7	5.25" FLOPPY DISK ADAPTER

POWER

Power is provided to the computer board through J13. The board does not use -5v, but it is bused to the expansion slots. The -5v may be provided by J13 or optionally it may be generated from the -12v by an on board regulator. This regulator delivers up to 100 ma.

J13 (see figure 2-9)	
1	+5v
2	GROUND
3	+12v
4	-12v
5	-5v
6	GROUND
7	+5v
8	GROUND

POWER REQUIREMENTS

+5v +/- 5%	3.0 Amps
-5v	0.0 Amps--required only by some expansion cards
+12v +/- 10%	50 ma
-12v +/- 10%	50 ma

ENVIRONMENTAL DATA

Operating temperature	0 to 55 degrees C
Storage temperature	-40 to 80 degrees C
Relative humidity	0% to 90% with no condensation

BIOS DIAGNOSTICS

The TAVA PC contains a built-in diagnostic in the BIOS EPROM that will loop continuously. These steps explain its use:

1. Add a turn around connector to J12 (printer port). See Figure 2-9.
1-25
32-23
26-19
34-21-28
2. Add loopback connectors to J10 and J11 (serial ports). See Figure 2-9.
3. Set Switch 1: 1,2,3,4 for memory size. See Figure 2-8.
4. Turn all other switches on. See Figure 2-9.
5. Connect speaker to J15. See Figure 2-9.
6. Disconnect keyboard.
7. Power up the TAVA PC.

The diagnostic should loop and beep the speaker twice for each pass. If a failure occurs, the diagnostic will halt. By checking the halt address and looking at the BIOS listing, the failure can be determined. Please note that the halt address will be several locations beyond the halt due to the fetch ahead feature of the 8088. If refresh is running, the halt address is more difficult to see, but by ignoring the faint refresh address on an oscilloscope, the halt address can be determined.

SECTION 3/ OPERATIONS

Contents

Introduction	33
Preparing the TAVA PC for Use	33
Keyboard Usage	35
Keyboard Usage with DOS	43
Using DOS with the TAVA PC	47
Fundamental DOS Commands	47
Making a Copy of Your DOS Diskette	48
Using the TAVA PC with a Printer	50
Parallel Printer Port Considerations	50
Printing Commands for LPT1	50
Expanding RAM memory	51

NOTES:

INTRODUCTION

This section provides the operating instructions required to begin using your TAVA personal computer. An explanation of the System confidence mini-test is provided to ensure your PC is functioning properly. A layout of the keyboard and an explanation of key functions is also provided.

The TAVA Personal Computer needs an operating system in order to run. You need a diskette that has an operating system before you can start using your TAVA PC.

The TAVA PC will operate with MS-DOS versions 1.1 and 2.0, CP/M-86, and the p-System. It runs all the popular IBM PC software applications.

PREPARING THE TAVA PC FOR USE

1. Turn the brightness and contrast dials of the monitor you are using fully clockwise.
2. When the system power switch is flipped on, the system performs a confidence test to ensure the machine is functioning properly for use. The time required for this test is from a few seconds to a minute and a half, depending on how much memory the machine has.

Flip the power switch to ON. You should observe:

1. The cursor will appear on the screen.
2. A short tone will sound indicating the memory is working properly.

These occurrences indicate that the confidence test has been passed and the system is functioning correctly.

If any of these things did not happen:

1. Flip the power switch to OFF. Unplug the power cord and check all cabling for accuracy.
2. Check the wall outlet for power with a lamp.
3. Plug power cord into the wall outlet and flip the power switch to ON again.

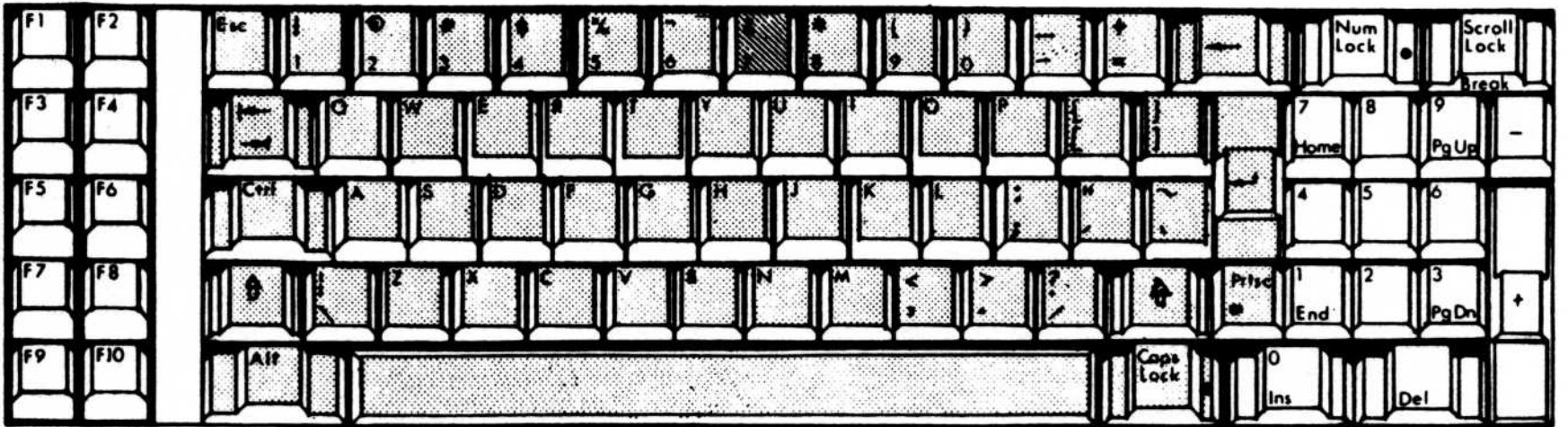
If the system still fails the confidence test, turn to Section 5, TROUBLESHOOTING. If your system still fails to operate properly, please call your TAVA representative or return your TAVA PC to place of purchase.

3. If your system passed the confidence test, adjust the monitor brightness and contrast controls for visual comfort.

Your TAVA PC is ready for use.

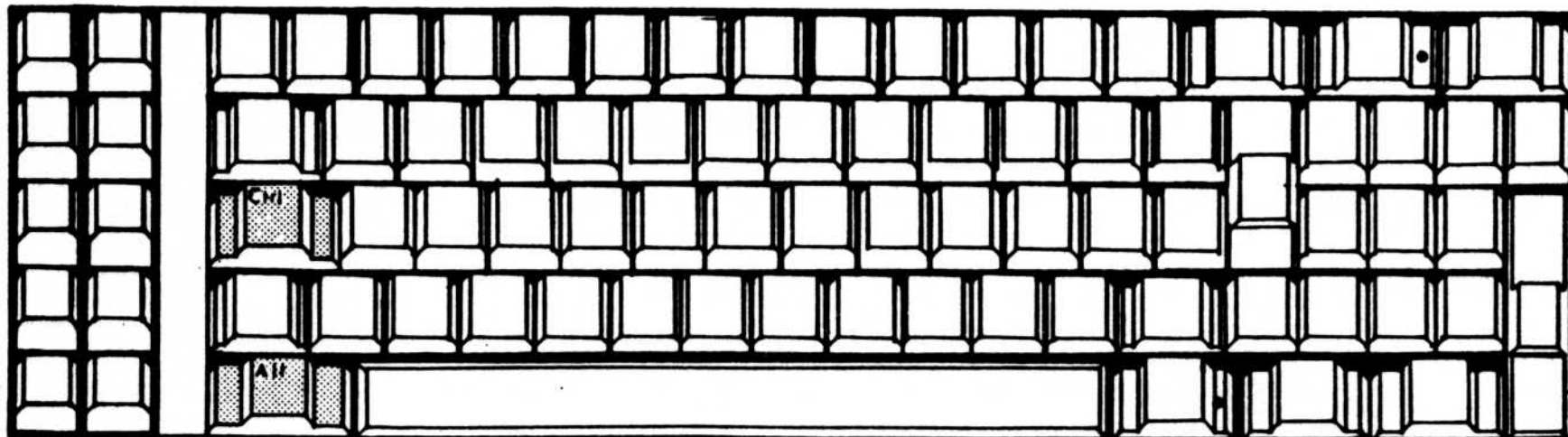
KEYBOARD USAGE

Figure 3-1. TAVA PC keyboard.



The keys outlined in the picture are used in the same way as they are on a typewriter.

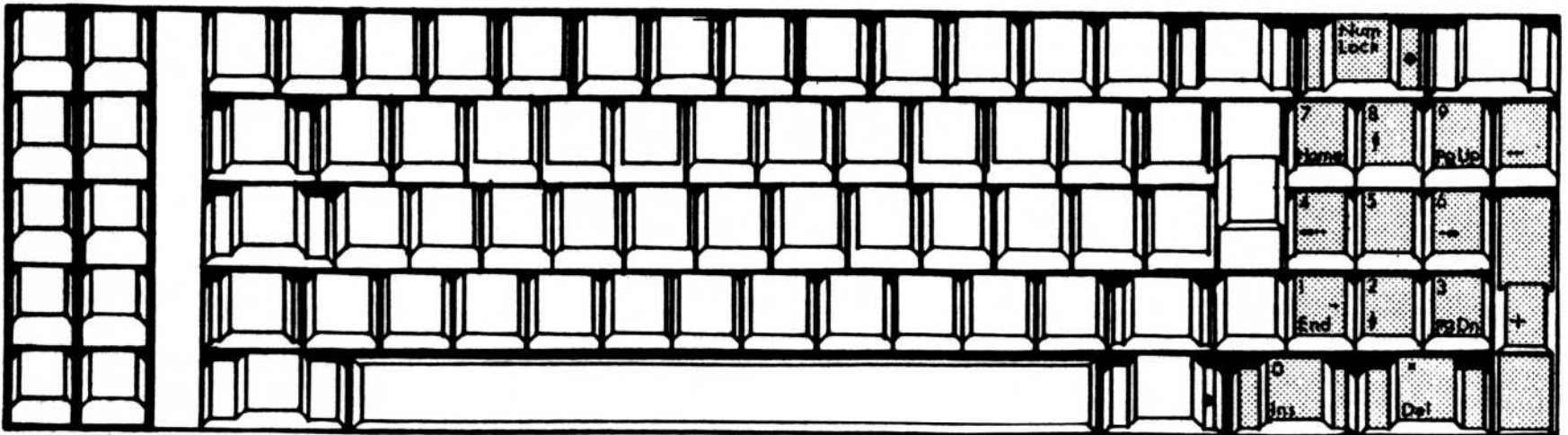
Figure 3-2. TAVA PC keyboard.



The outlined keys are to be used in the writing, updating, and execution of programs.

<u>Key</u>	<u>Description</u>
	TAB function. Set every 8 characters.
CTRL	CONTROL key is used with another key to perform a command or function.
	SHIFT used for upper case.
ALT	ALTERNATE is used with another key to perform a command or function.
	BACKSPACE moves cursor one column to the left and deletes character on left.
	ENTER or RTRN ends the line and moves the cursor down to the first column of the next line.

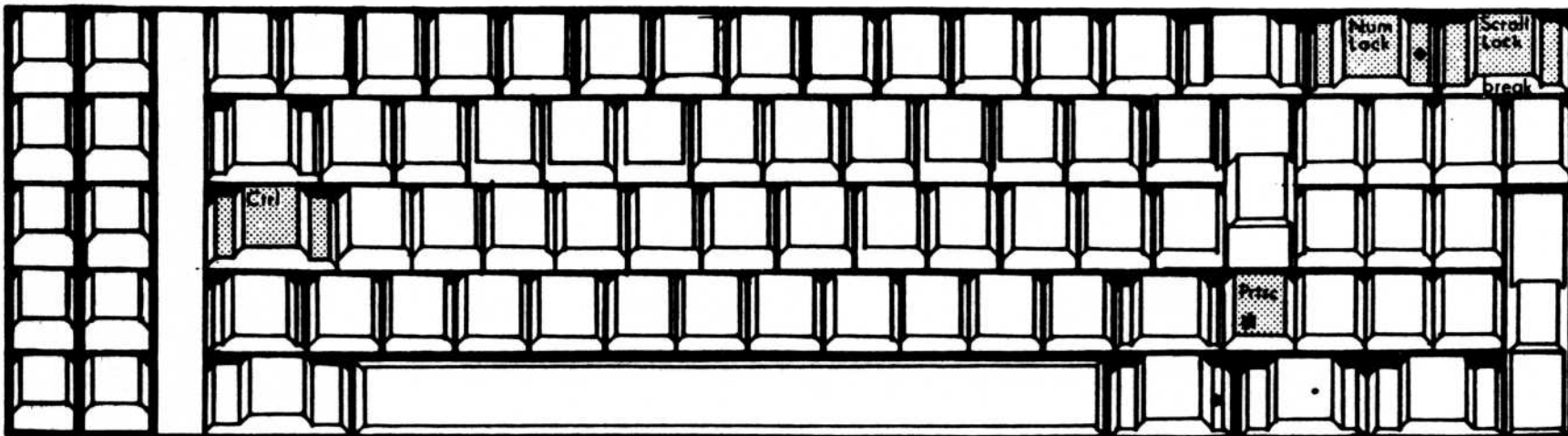
Figure 3-3. TAVA PC with NUM LOCK ON.



The NUM LOCK key turns the numeric keypad ON and OFF. The NUM LOCK key ON:

<u>Key</u>	<u>Description</u>
1-9	The number keys function when NUM LOCK is ON.
.	DECIMAL POINT used with the numeric keypad.
0	ZERO digit used with numeric keypad.
Ins	
-	MINUS sign used with the numeric keypad.
+	PLUS sign used with the numeric keypad.

Figure 3-4. TAVA PC keyboard with NUM LOCK OFF.



The keys described below function when NUM LOCK is OFF. They are used in the writing, updating, and execution of programs.

<u>Key</u>	<u>Description</u>
7 HOME	HOME moves the cursor to the first column of the first line of the screen.
8	Moves the cursor up one line.

Key

Description

4 Moves the cursor one column to the left.

6 Moves the cursor one column to the right.

Key

Description

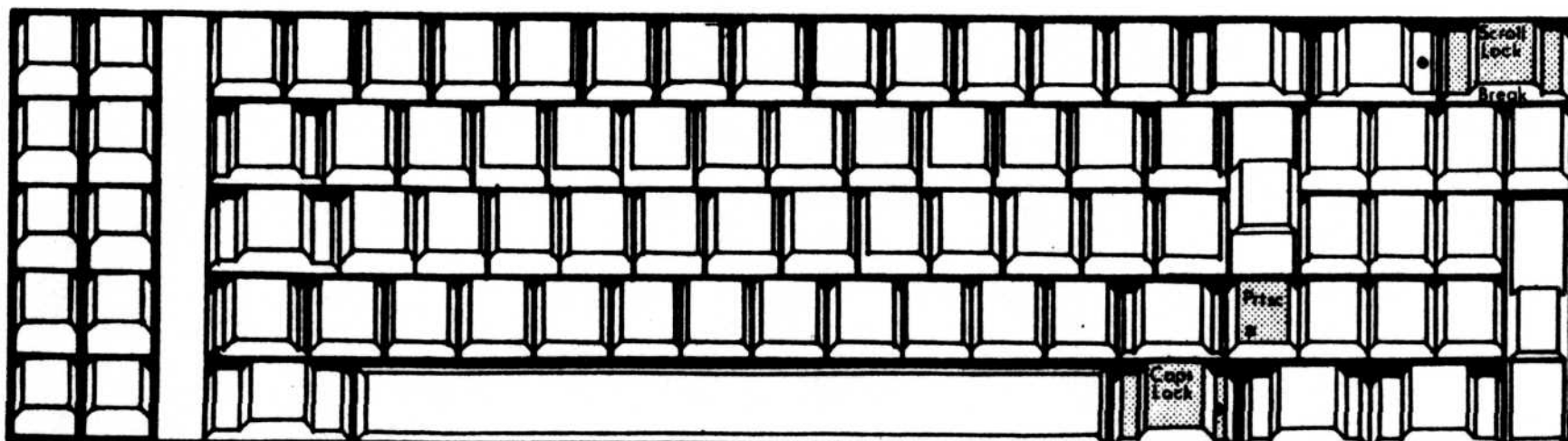
2 Moves the cursor down one line.

1 END moves the cursor to the last
End character on that line.

Del DELETES the character where the cursor
is positioned.

0 INSERT turns insert mode ON and OFF.
Ins Any data to the right of the cursor is
shifted as the cursor moves to the
right.

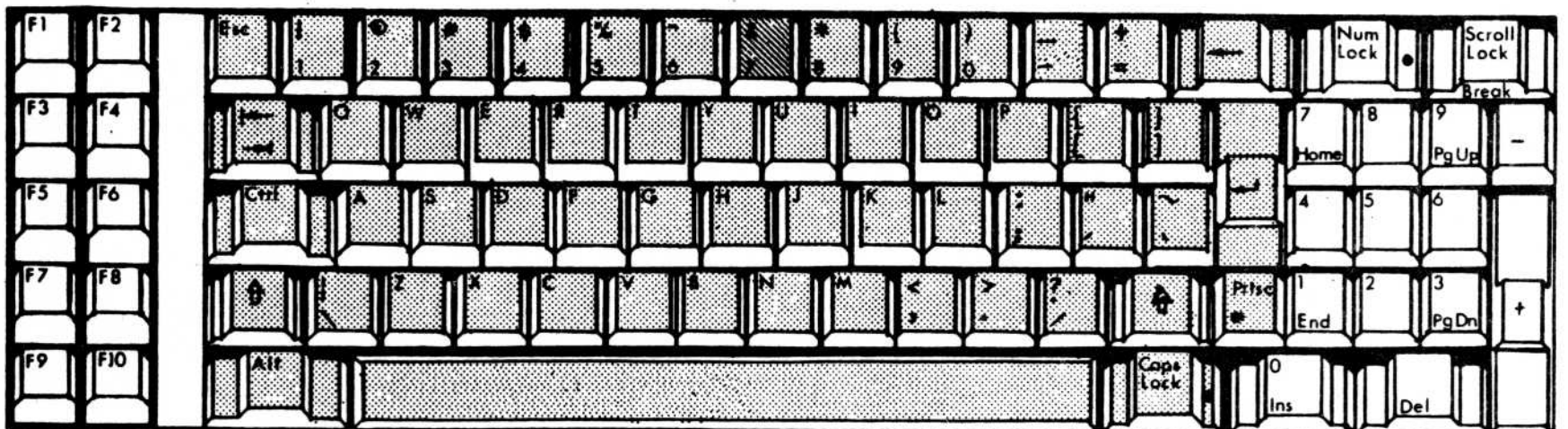
Figure 3-5. TAVA PC keyboard.



The outlined keys perform the functions described below:

<u>Keys</u>	<u>Description</u>
Caps Lock	Turns CAPS LOCK ON and OFF. ON means letters are typed in upper case and OFF means letter are typed in lower case.
PrtSc *	When shifted, this key cause the contents of the screen to be printed.
Scroll Lock	Not Used.

Figure 3-6. TAVA PC keyboard.



These are examples of CONTROL and ALTERNATE combination functions. The keys are used in the writing, updating, and execution of programs.

CTRL + Scroll Lock = BREAK

Stops a program and indicates the line number interrupted.

CTRL + NUM LOCK = PAUSE

Interrupts a program while running. Press any key to continue.

CTRL + = TAB

Moves cursor to next word on line.

CTRL + Shift + = REVERSE TAB

Moves cursor to preceding word on line.

CTRL + Home = CLEAR SCREEN.

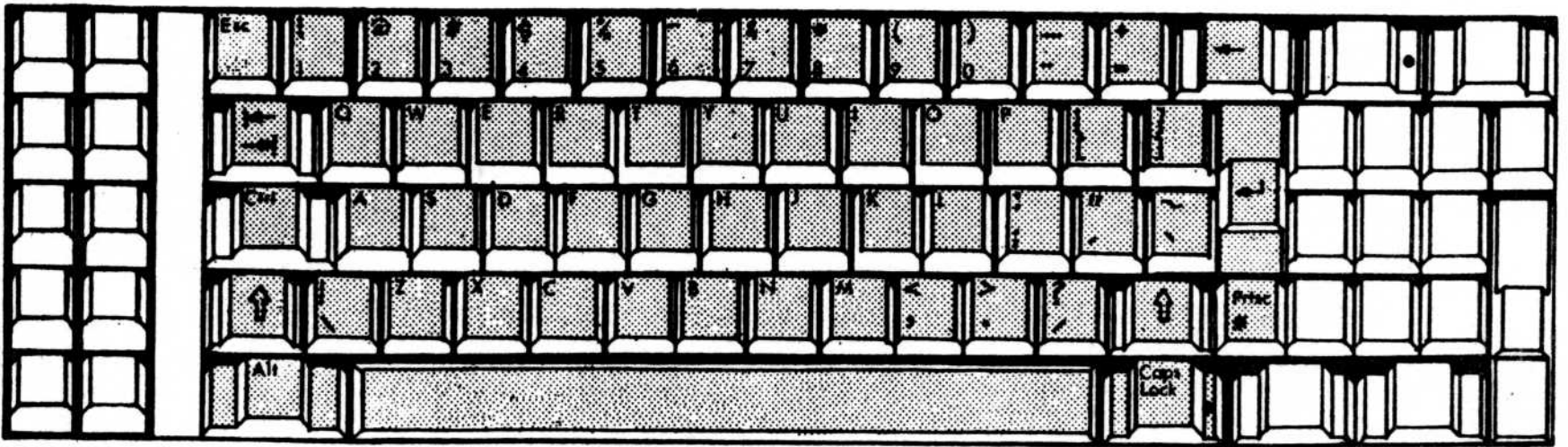
Moves cursor to upper left hand corner and clears screen.

CTRL + ALT + Del = SYSTEM RESET

Reinitializes the system from diskette.

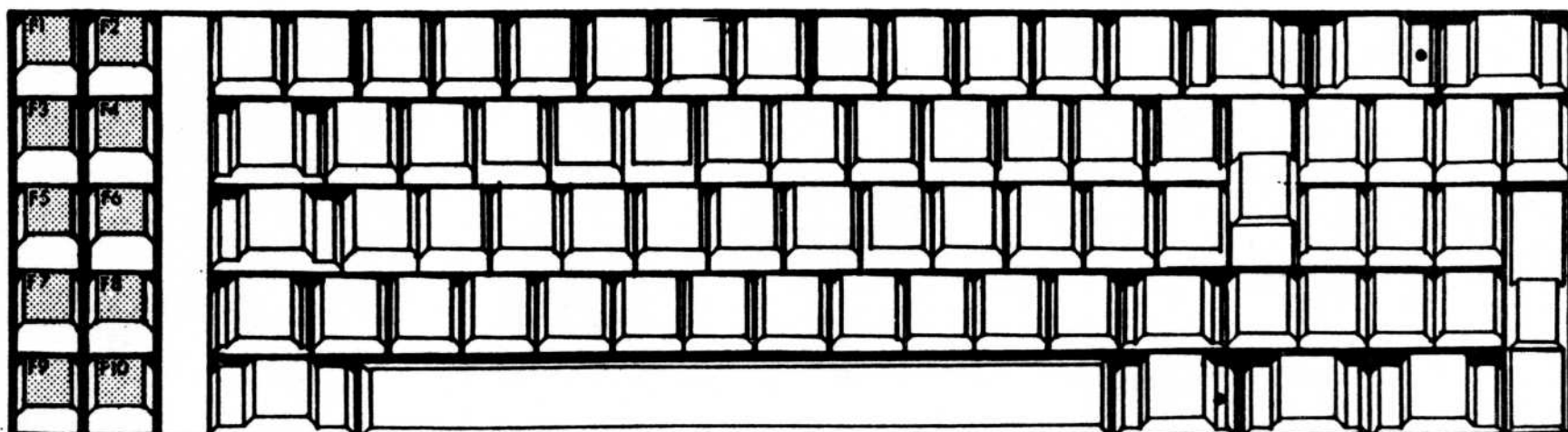
KEYBOARD USAGE WITH DOS

Figure 3-7. TAVA PC keyboard.



The outlined keys are used in the same manner as on a typewriter.

Figure 3-8. TAVA PC keyboard function keys.



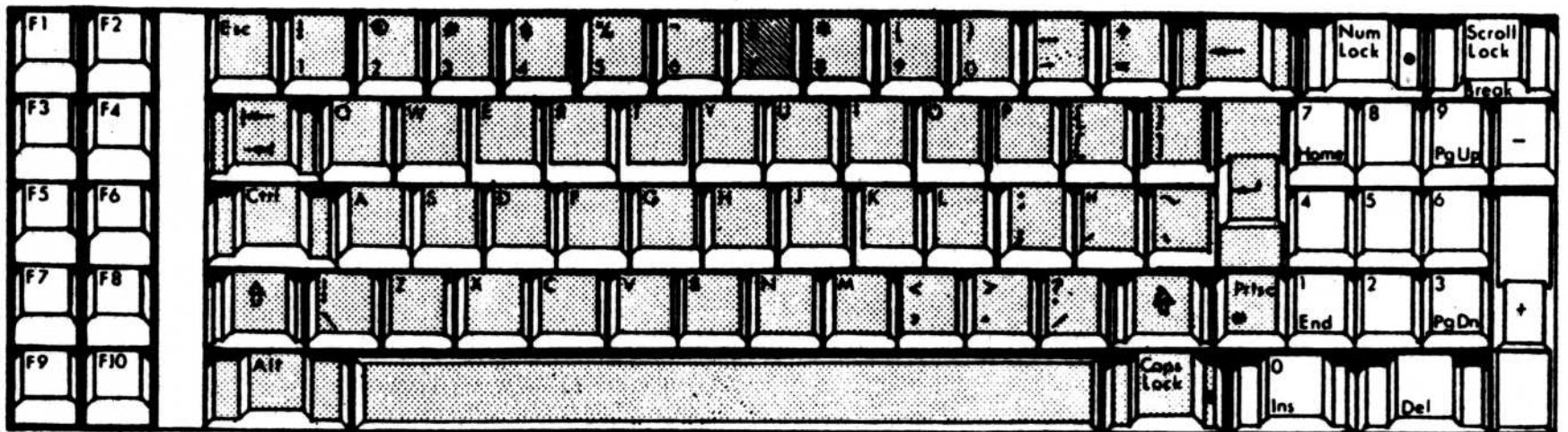
<u>Key</u>	<u>Description</u>
F1	Displays an entered line a character per time pushed.
F2	Displays previously entered line up to character entered after F2.
F3	Displays a line previously entered.

Key**Description**

F4 Displays all characters in a line subsequent to the character entered after F2.

F5 Saves the displayed line.

Figure 3-9. TAVA PC keyboard.



Some sample CONTROL combination commands.

CTRL + NUM LOCK = SUSPEND

Suspends the system so data can be displayed on the screen. Hit any character to continue.

CTRL + PRTSC = ECHO

Echos and prints what is being displayed on the screen. Reset by entering this combination again.

CTRL + SCROLL LOCK = BREAK

Interrupts a running program.

USING DOS WITH THE TAVA PC

The DOS (Disk Operating System) of your TAVA PC allows you to process information on your personal computer. DOS allows the computer to access information from diskettes and write it back again.

Detailed instructions on the use of DOS are provided in the manual accompanying the DOS diskette. Please refer to this manual before attempting to run DOS on your TAVA PC.

FUNDAMENTAL DOS COMMANDS

Below are some DOS commands that are used most often.

<u>Command</u>	<u>Description</u>
CHKDSK	CHECK DiSK displays and checks the directory of the specified diskette. Also gives a report about the space remaining on the diskette and in memory.
COMP	COMPares two files and lists the differences.
COPY	Copies specified file(s) to the same or different diskette.
DATE	Enters the date into the system.
DIR	Displays the contents of the diskette.
DISKCOPY	Copies an entire diskette to another diskette.
DISKCOMP	Compares the entire contents of two diskettes. Indicates a mismatch.
ERASE	Deletes the specified file(s).

<u>Command</u>	<u>Description</u>
FORMAT	Prepares a diskette for use on the TAVA PC. Must be performed on all NEW diskettes. Destroys any data on the diskette.
MODE	Command used to alter the functions of the machine. Amount of data displayed on the monitor screen, printed on the printer; sets ASYNC Communications Adapter options; route printer output to ASYNC Communications Adapter. Shifts screen contents left or right.
RENAME	Changes the name of a file.
SYS	Transfers DOS system files to another diskette.
TIME	Sets the computer clock.
TYPE	Displays the contents of a file on the screen.

MAKING A COPY OF YOUR DOS DISKETTE

If you are copying your DOS diskette to a new diskette use the following procedure:

1. Ensure that DOS is running on the TAVA PC and the prompt A> is displayed.
2. Insert the original DOS diskette in drive A.
3. If you only have one drive and:

Your drive is double-sided, Type "format a:/s" and hit ENTER.

Your drive is single-sided, Type "format a:/s/1" and hit ENTER.

If you have two drives then:

Insert the new diskette into drive B.

If your drives are double-sided, Type "format b:/s" and hit ENTER.

If your drives are single-sided, Type "format b:/s/1" and hit ENTER.

4. This message should appear:

```
Formatting...
```

5. After a period of time, this message will appear:

```
Formatting...Format Complete  
System transferred
```

```
nnnnnn bytes total disk space  
13824 bytes used  
nnnnnn bytes available on disk
```

```
Format another (Y/N)?
```

nnnnnn is dependent on the size of your diskette drives.

6. Hit "Y" to repeat or "N" to quit.
(See diskcopy command for additional ways to copy diskettes)

USING THE TAVA PC WITH A PRINTER

The TAVA Personal Computer in the basic configuration provides you with one parallel Input/Output (I/O) port and two serial I/O ports.

DOS assigns an I/O port to a printer. This printer is then selected as the device on which data is printed when you enter printing commands. The selected printer I/O port is given the name LPT1. In the case of the TAVA PC, the parallel I/O port installed on the motherboard in the Central Processing Unit is LPT1. If you are using an IBM Monochrome monitor adapter, there is a parallel I/O port installed on that board and it will be LPT1. The parallel port on the motherboard then becomes LPT2. We recommend that if you are using an IBM monochrome adapter, then use the parallel port on that board.

PARALLEL PRINTER PORT CONSIDERATIONS.

The printer port provided by TAVA is a Centronics 34 pin parallel female connector. Please note, you will need a Centronics 34 pin male connector cable to interface to this port.

PRINTING COMMANDS FOR LPT1

Shift + PrtSc	Prints exactly what is on the screen.
CTRL + Shift + PrtSc	Toggles the printer ON and OFF.
PRINT <filename.ext>	Prints the selected file

EXPANDING RAM MEMORY

Your TAVA PC can be expanded to 256K of RAM memory on the motherboard. See Figure 2-7. If you are adding the memory chips yourself, before you install them, be sure to test your system as it was delivered by turning it on and making sure that it boots properly. See Section 2 INSTALLATION, System Test. Then remove the processing unit cover and add the extra chips as shown in Figure 2-7. Be sure to change the settings on Switch 1 as shown in Section 2, INSTALLATION, RAM Memory. Boot your system. Should you experience any problems, recheck your switch settings and make sure that your memory chips are seated properly. If your switch settings are correct and your system still does not operate properly, you have one or more defective memory chips.

SECTION 4/ TROUBLESHOOTING TECHNIQUES

Contents

Introduction	54
System Power-On Selftest	55
Computer Board Troubleshooting Flow	57
About Diskettes	58

NOTES:

INTRODUCTION

WHAT IS TROUBLESHOOTING?

Troubleshooting is just what it sounds like, identifying a problem and solving it. Actually, it is a logical progression through a set of routines to solve a problem with your system. This section will guide you through a series of questions, most of which can be answered YES or NO. The questions will take you through a series of steps requiring simple observations. By following these carefully laid-out steps you will be able to determine if the machine requires professional service or if you can take corrective action yourself.

SYSTEM POWER-ON SELFTEST

1. Flip the system power switch to the On position.
2. Two things should happen here:
 1. Cursor appears on the monitor screen within 5 seconds.
 2. A short tone sounds after memory test completes.
3. Did something else happen? Make a note of what you observed and go to Step 4. If not, go to Step 5.

CAUTION

Make sure that the system power switch is flipped to the OFF position before removing any components from your personal computer system.

4. Flip power switch OFF. Unplug the system power cord from the wall. Use a lamp that you know works properly and check the wall outlet. Remove and reseal all cables. Be sure to check your Switch 1 and Switch 2 on the motherboard for correct settings for memory and configuration. See Section 2, INSTALLATION, RAM Memory/BIOS Switches. Make sure that any expansion cards are seated properly. Go to Step 5.
5. Flip system power switch to ON. Do the responses in Step 2 occur? If NO go to Step 6. If YES then system has passed the selftest.
6. If two beeps were heard, the fault is in the keyboard. Your keyboard connection to the processing unit might be loose. Check to make sure that it is secure. If anything other than two beeps occurred, the probable fault is in the Processing Unit.

7. If the one short tone is heard but the monitor screen is displaying incorrect or random characters, check to see if your monitor card is seated properly. It is possible that the monitor card itself is defective. To check this, turn your computer off, remove the card, and then turn the computer on. If you hear one beep, then the processing unit is not at fault. Your monitor card is defective.

If you are using a color monitor and you hear the one short tone, but the monitor screen has no color or the color cannot be adjusted to its proper state, then follow the procedure in the preceding paragraph.

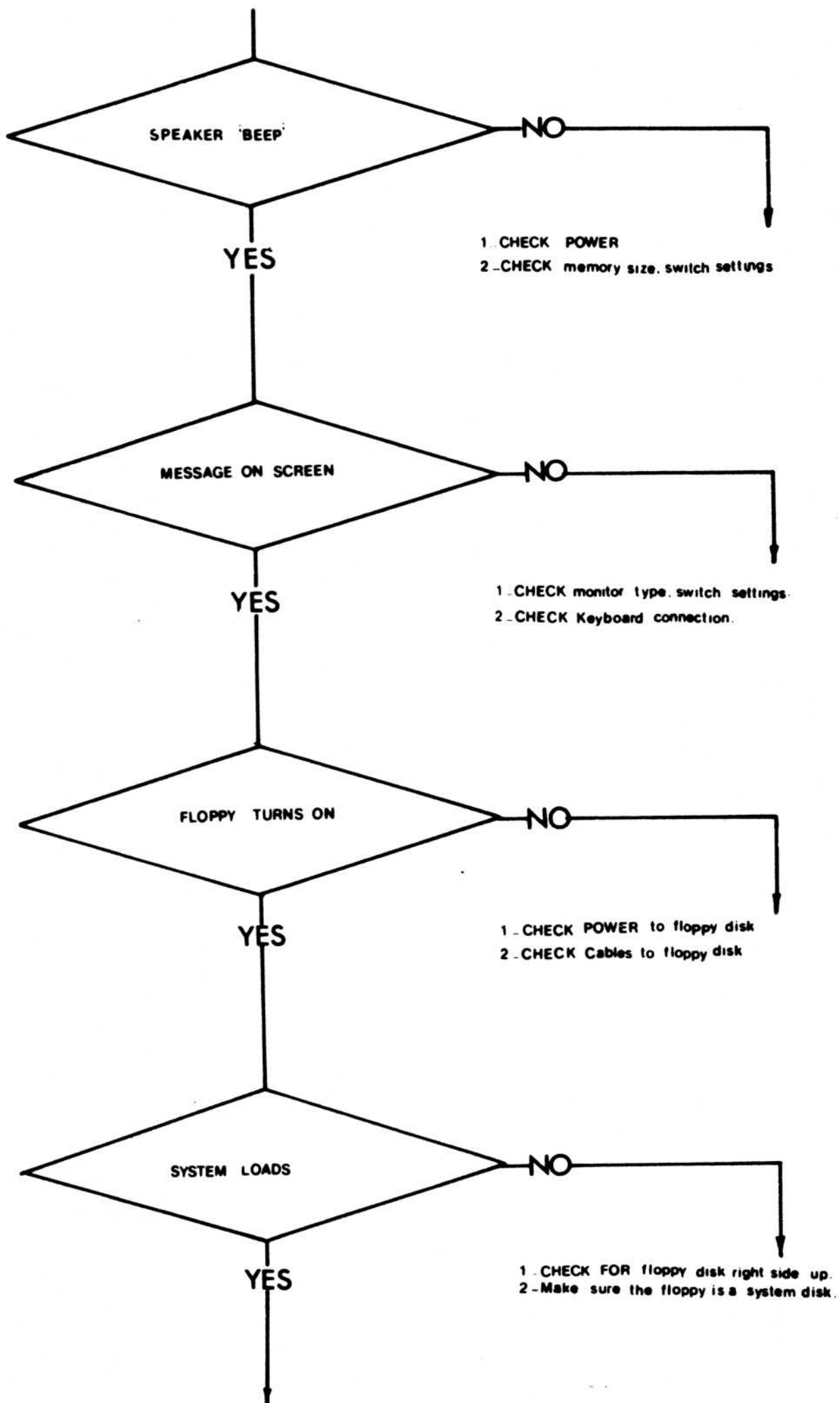
In either of the above cases, if you hear no beep, the processing unit is likely to be at fault.

8. If the one short tone is heard, but the screen is rolling uncontrollably, has shadows, or other similar problems, then the monitor is the likely cause of this trouble. Check for the vertical and horizontal control knobs on the back of the monitor. Adjust these. One other source of the problem could be the monitor card or cable connectors. Make sure the monitor card is seated and that the cable is attached securely. If problems still exist, have your monitor serviced. If problems persist even after servicing, have the processing unit serviced.

9. If your system has not been made operational by these actions then return your TAVA PC to the place of purchase.

COMPUTER BOARD TROUBLESHOOTING FLOW

Figure 4-1. Troubleshooting guide.



ABOUT DISKETTES

When handling any diskette keep these simple rules in mind.

1. Write on the diskette with a felt tip pen only.
2. Handle the diskette by the corners only.
3. Always keep the diskette in its storage leaf when not in use.
4. Never bend the diskette.
5. Do not touch the magnetic disk.
6. Keep the diskette out of direct sunlight.
7. Keep the diskette away from any magnetic source. Electric motors are magnetic sources.
8. Never use cleaning fluid on the diskette.
9. Never expose the diskette to high temperatures.

If you follow these simple rules, you will ensure the greatest lifespan for the diskette.

NOTE

Always keep backup copies of your diskettes.

SECTION 5/ OPTIONS

Contents

Introduction	61
TAVA High Resolution Monitor.....	
Color Graphics Card	
Monochrome Graphics Card	
Floppy Diskette Controller	
Hard Disk (Winchester) Subsystem	
Multifunction Memory Board	

NOTES:

INTRODUCTION

This section is provided for the instructions and documentation you may receive with any options you choose to install. Just place the pages provided with the options into the manual binder in the space indicated in the table of contents.