APPENDIX A

INSIDE THE BASE UNIT

I WHAT'S INSIDE THE BASE UNIT?

As was stated before, the parts inside the base unit are the "computer". The standard parts inside include: the power supply, a 5-slot expansion unit, one or two floppy disk drives, and a system board (see Figure A-1).

The system board is a single board microcomputer integrating the real time clock and floppy disk controllers to provide a low cost single board system. It has been able to extend IBM's system speed from 4.77MHZ to 10MHZ.

The system uses Intel's 8088-1 as the host CPU. The board supports up to 640K bytes of RAM under DOS access. The system's processing capacity can also be extended by adding the 8087-1 math co-processor into the available socket. Two EPROM sockets are available for either the BIOS ROM our company offers (using one socket) or any user developed code.
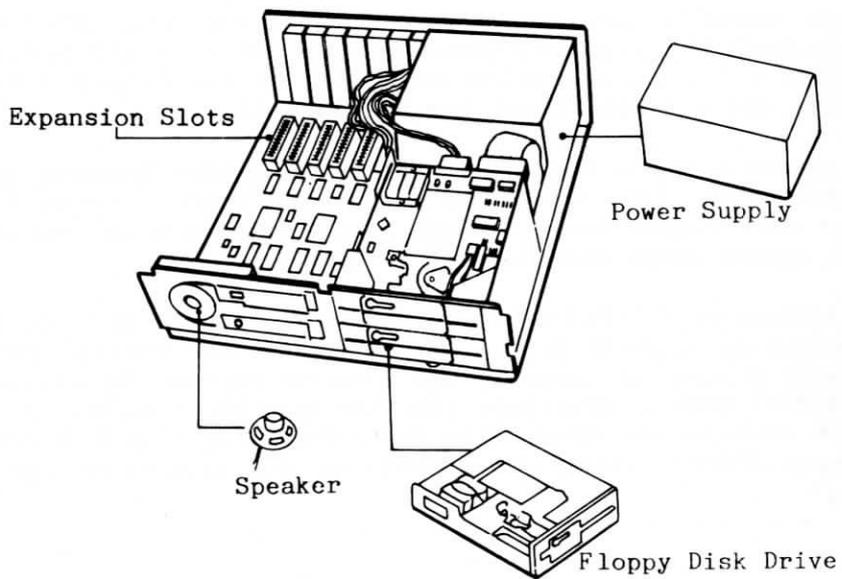
A   INSIDE THE BASE UNIT

Expansion Slots

Power Supply

Speaker

Floppy Disk Drive

Figure A-1
Inside the Base Unit

II THE POWER SUPPLY

The power supply adjusts the line current (120V AC) to that required by the computer components. Computer components require either +12V or +5V DC. The power supply is located inside the cage in the back corner. Do not under any circumstances remove the cover of the power supply. There are no serviceable parts inside and the high voltages could result in severe shock.

III THE PROCESSOR '

The processor section consists of the 8088-1 CPU and its associated support chips. The support chips include the 8253 Programmable Interval Timer, 8237 DMA controller, 8259 Interrupt controller, and the 8255 Programmable Peripheral Interface.

The 8088-1 operatesat a 10/4.77-MHZ clock rate which is keyboard selectable by typing **t5** or **t8**. Two of the 8253 timer channels are available to the user under software control. The timer has a resolution of 1.05 micro-seconds. Also, there are 5-user available interrupts. Finally, of the 4 DMA channels supported by the system two are user-defined. Two DMA channels are used by the system for the floppy disk controller and memory refresh.

IV MEMORY

The system can support up to the maximum 640K bytes of RAM. System memory configuration is shown in Figure A-2.

Two 28-pin EPROM sockets are available on the board . The system is designed to accomodate either the 128K, or 256K EPROMs.
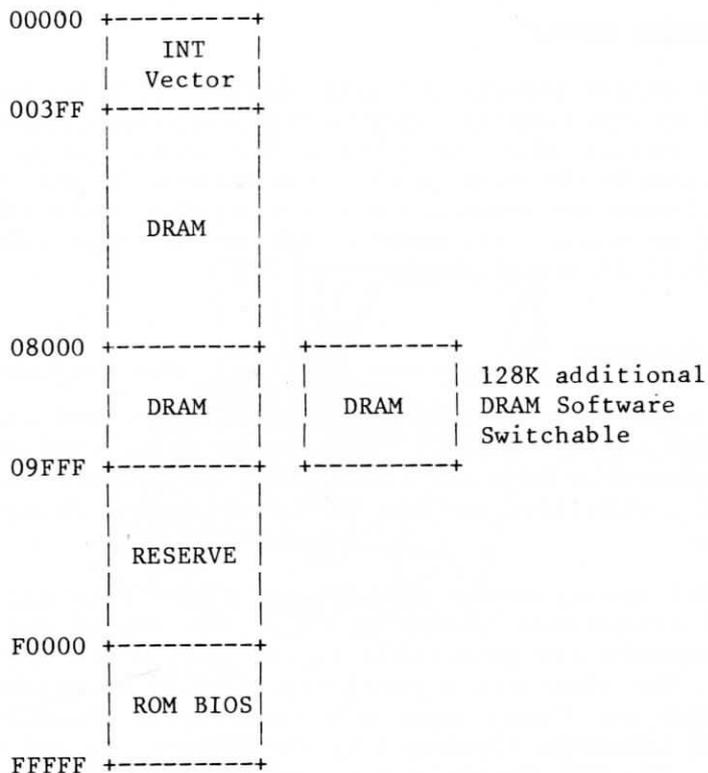
A   INSIDE THE BASE UNIT

```
00000 +---------+
      |   INT   |
      | Vector  |
003FF +---------+
      |         |
      |         |
      |         |
      |  DRAM   |
      |         |
      |         |
      |         |
08000 +---------+    +---------+
      |         |    |         |    128K additional
      |  DRAM   |    |  DRAM   |    DRAM Software
      |         |    |         |    Switchable
09FFF +---------+    +---------+
      |         |
      |         |
      | RESERVE |
      |         |
      |         |
F0000 +---------+
      |         |
      | ROM BIOS|
      |         |
FFFFF +---------+
```

Figure A-2   System Memory Configuration

A - 4

V   THE FLOPPY DISK CONTROLLER

The controller supports two double-sided, double-density, 5-1/4 inch floppy disk drives. A simple 34-conductor flat ribbon cable is used to connect the system board at J17 to the floppy disk drive.

VI   THE FLOPPY DISK DRIVE

The floppy disk drive writes data sent by the controller onto a floppy disk. The use of floppy disks for data storage has several advantages:

1) The memory in the computer is erased when the computer is shut off. Storing programs and data on a floppy disk provides permanent storage because the disks are not erased when the computer is shut off.

2) Each floppy disk can hold 360K of programs or data.

3) Floppy disks can easily be transported from computer to computer. One or two floppy disk drives are mounted in the front right of the base unit. Two additional floppy disk drives can be mounted in the front center.

VII   I/O EXPANSION BUS

The system supports 5 IBM PC-compatible I/O expansion slots as shown in Figure A-1. The expansion slots are available for use with any of the available IBM PC-compatible peripheral boards. Since some peripheral controllers have been implemented on the system, care must be taken when using certain peripheral boards. In general, when boards with functions similiar to those already on the system are used, alternate addresses must be used. Those functions include the floppy disk and real- time clock.

A INSIDE THE BASE UNIT

VIII   COLOR/GRAPHICS DISPLAY ADAPTER CARD

Since the display card has already been implemented on the
mother board, the users don't need to install any add-on
cards for installing a monitor. The color/graphics adapter
card can display 40*25 characters in alphanumeric low
resolution mode and 80*25 characters in high resolution
mode. In all-points-addressable graphics mode, 160*100
pixels are displayed in low resolution mode, 320*200 pixels
displayed in medium resolution mode and 640*200 pixels
displayed on high resolution mode. Sixteen colors are
provided for low resolution mode, four colors for medium
resolution mode and one color for high resolution mode.

IX   I/O INTERFACES

The system also supports standard interfaces for the IBM PC
compatible keyboard, speaker port, and a reset port.

Both a speaker and reset outputs are provided on the board
at connectors J13 and J15, respectively. The reset logic
performs a system-wide reset similar to a power-on reset.
This is accomplished by a direct connection to the on-board
power-on reset logic. The reset is performed by making a
connection between the two terminals of J15. Note that all
filtering is performed by the on-board power-on reset logic.

X   THE HARD DISK CONTROLLER CARD (OPTIONAL)

The hard disk controller card controls data transfer to and
from the hard disk. The controller card can manage up to 2
hard disk drives at once. It resides in one of the expansion
slots.

XI   THE WINCHESTER DISK DRIVE

A hard disk drive stores data in a manner similar to the

floppy disk drive except that the disks are permanently
mounted inside the unit. Permanent mounting allows the data
to be written on the disk more tightly and increases the
reliability. The hard disk will hold either 10 or 20 Mbytes
(megabytes) depending on the model you buy. This is
equivalent to about 30 or 60 floppy disks, respectively.

XII   THE REAL-TIME CLOCK

The real-time clock supports the date and time with a
battery back-up feature, it can keep the correct date and
time even with the power off.
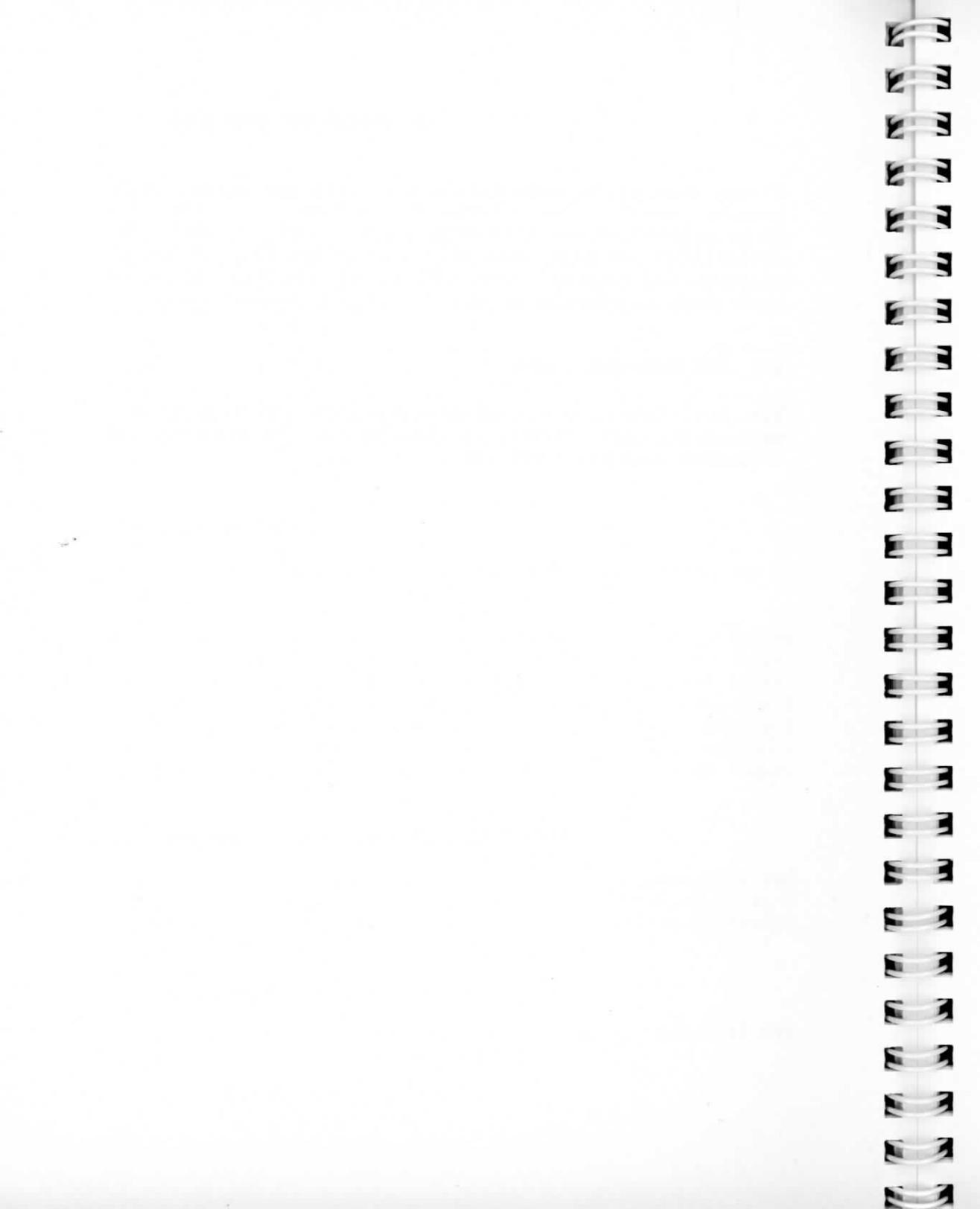
APPENDIX B

INTERNAL SWITCH SETTINGS
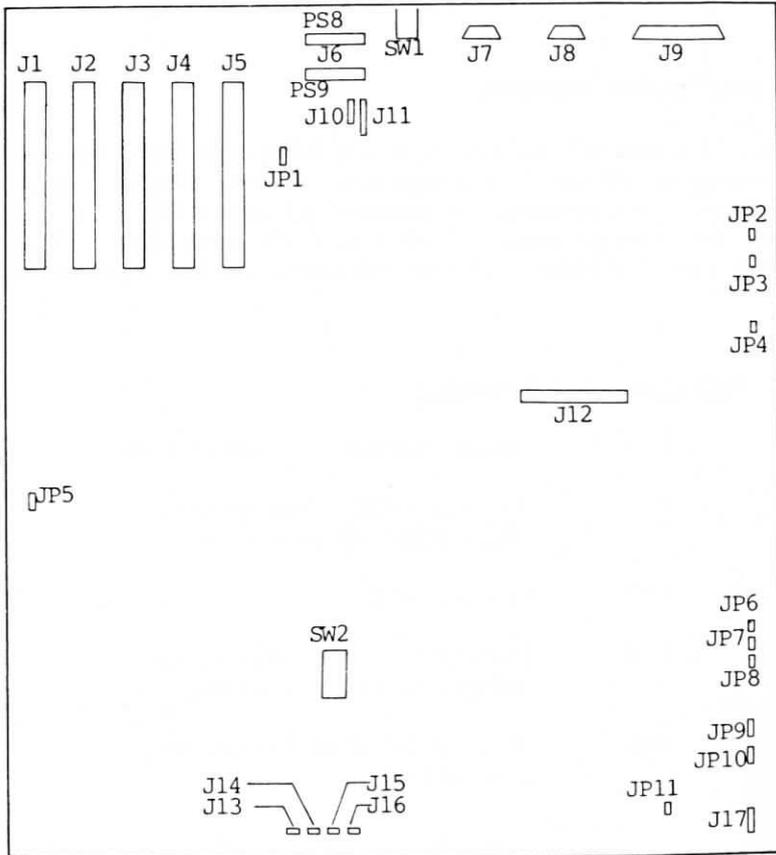

I CPU SWITCH SETTINGS

One DIP switch on the system board is used to set option
parameters within the computer. If you install a different
monitor, more memory, or another floppy disk drive, you will
need to change some of the switch settings. Figure B-1
shows the locations of the switches on the system board.

Position	Function
1	Under Normal Operation OFF
2	On = no 8087 coprocessor Off= 8087 coprocessor
3-4	Always off
5-6	Type(s) of display adapters you are using
7-8	Number of diskette drives installed

B   INTERNAL SWITCH SETTINGS

Figure B-1
Jumper Layout of the System Board

A   SWITCH SETTINGS FOR FLOPPY DISK DRIVES

The SW1 switch controls the display mode (monochrome or color) and the SW2 switch positions 7 and 8 are used to indicate the number of floppy disk drives that the system is to recognize.

```
                         System card
                            SW2
                    ------------------
                    ON o o o o o o x x
   1 disk drive        o o o o o o o o
                       1 2 3 4 5 6 7 8
                    ------------------


                    ------------------
                    ON o o o o o o o x
   2 disk drives       o o o o o o x o
                       1 2 3 4 5 6 7 8
                    ------------------
```

NOTE

```
o
o    unrelated to this function


o
x    means switch OFF


x
o    means switch ON
```

B   INTERNAL SWITCH SETTINGS

B   SWITCH SETTINGS FOR MONITOR TYPE

The SW2 switch positions 5 and 6 are used to indicate the
type of monitor that you have attached to the computer. You
can operate your color/graphics monitor in either of two
modes. One mode displays 80 columns horizontally and 25 rows
vertically. The other mode displays 40 columns horizontally
by 25 rows vertically. The 80x25 mode is preferred by most
people but, if you are using a television or one of the less
expensive color/graphics monitors, you may not be able to
read text in the 80x25 mode because of loss of character
resolution and you will have to use the 40x25 mode.

Monochrome monitors are often used by businesses which do a
lot of text processing because the text resolution is very
good. Below is a listing of the DIP switch settings for the
SW2 switch for different monitor types.

```
                        System card
                            SW2
                        ------------------
                    ON  o o o o x x o o
    no monitor          o o o o o o o o
                        1 2 3 4 5 6 7 8
                        ------------------


                        ------------------
                    ON  o o o o o x o o
    40x25 color         o o o o x o o o
                        1 2 3 4 5 6 7 8
                        ------------------


                        ------------------
                    ON  o o o o x o o o
    80x25 color         o o o o o x o o
                        1 2 3 4 5 6 7 8
                        ------------------
```

B - 4

```
                    --------------------
Monochrome    ON o o o o o o o o
                 o o o o x x o o
                 1 2 3 4 5 6 7 8
                    --------------------
```

Position 5 is parallel with SW1.

II   INSTALLING A SECOND FLOPPY DISK DRIVE

A second floppy disk drive can be installed in the system if
your system only has one floppy disk drive. You need to
purchase one Tandon TM-100-2 compatible half-height floppy
disk drive, and two number 8 by 11/16 inch machine screws.
The floppy disk drive will sit on top of the one already
installed. Installation instructions will be included with
the disk drive.

III   MOTHER BOARD JUMPER AND SWITCH SETTINGS

J1-J5   :   EXPANSION SLOT

J6 (PS8 PS9):   POWER INPUT CONNECTOR

J7   :   D TYPE VIDEO OUTPUT

J8   :   PRIMARY S.I.O PORT (3F8-3FF H)

J9   :   PRIMARY P.I.O PORT (3BC-3BE H)

J10   :   COMPOSITE VIDEO OUTPUT
                            (RESERVED)

J11   :   LIGHT PEN INPUT
                            (RESERVED)

B   INTERNAL SWITCH SETTINGS

J12	:		F.D.C. CONNECTOR
J13	:		SPEAKER OUTPUT
J14	:		POWER ON LED
J15	:		RESET SWITCH CONNECTOR
J16	:		TURBO MODE LED
J17	:		KEY BOARD CONNECTOR
JP1	:	1-2	POWER GOOD SIGNAL RESET
		*2-3	HARDWARE RESET
JP2	:	*1-2	ENABLE ON BOARD S.I.O
JP3	:	*1-2	ENABLE ON BOARD P.I.O
JP4	:	*1-2	ENABLE ON BOARD MDA/CGA/PCGA VIDEO
JP5	:	*1-2	27128X1
		2-3	27256X1 OR 27256X2
JP6,JP7:		*1-2	ENABLE ON BOARD F.D.C
JP8	:	*1-2	ENABLE ON BOARD R.T.C
JP9	:	1-2	4.77MHZ FOR SYSTEM CLOCK
		*2-3	8/10MHZ FOR SYSTEM CLOCK
JP10	:	1-2	SIMULATOR IBM MONO/C.G.A./HERCULES/PLANTRONICS COLORPLUS
		*2-3	STANDARD IBM MONO/C.G.A. AND HERCULES
JP11	:	*1-2	ZERO WAIT STATE ON BOARD MEMORY/I/O
		(OPEN)	ONE WAIT STATE ON BOARD MEMORY/I/O

SW1 :   MONO/COLOR CRT SELECT

SW2 :   SYSTEM CONFIGURATION DIP (8 PINS)

An * indicates the default setting.

4.77/10 MHz CLOCK SWITCH

HARDWARE SWITCH: SET JP9 BEFORE POWER ON
                    JP9 1-2 SHORT --> POWER ON 4.77 MHz
                    JP9 2-3 SHORT --> POWER ON 10 MHz

SOFTWARE SWITCH: AFTER LOADING MS-DOS

* RUN T8.COM TO CHANGE THE SYSTEM CLOCK TO 10MHz
  (TURBO MODE LED ON)

* RUN T5.COM TO CHANGE THE SYSTEM CLOCK TO 4.77MHz
  (TURBO MODE LED OFF)

8K ADDITIONAL MEMORY BANK SWITCH

The system has 768KB total memory. This is 128KB more than
the maximum memory of the IBM PC/XT. The additional 128KB
memory share the same address space of the top 128KB of the
system address (512K to 640K, or 80000 to 9FFFF). The bank
switch is controlled by port 'CO'H bit 6.

PORT CO BIT 6 ON(1): Power on default active bank.

B   INTERNAL SWITCH SETTINGS

PORT CO BIT 6 OFF(0): User selectable, user has to clear memory before use this bank at first time. (Parity check will occur if memory does not clear).

NOTE
If you want to use the additional memory reserved, you must design the software yourself.