IMPORTANT

This document is dated at the time of the first 5150 motherboard, the 16KB-64KB one, and is applicable to only that motherboard when it has either the first or second revision BIOS fitted.

The BIOS revision can be determined by examination of the seven digit number on chip U33.

First revision: 5700051
Second revision: 5700671
Third revision: 1501476

For those who want to know why

The first and second revision BIOS only inspect the first four switches on SW2.
That is shown on page B-2 and in Appendix A.
Switches 5 to 8 are normally switched to OFF, since IBM instructs that.

The third revision BIOS also inspects switch 5 on SW2.

An example of differences in switch settings:

First and second revision BIOS: SW2 setting for 128KB = on, off, on, on, off
Third revision BIOS: SW2 setting for 128KB = on, off, on, on, on

IBM PC Memory Expansion Cards Documentation

DAVONG SYSTEMS, INC.

Davong IBM PC Memory Expansion Cards
Documentation Package

30 September 82

DSI P/N 03-2000010

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OVERVIEW

DAVONG SYSTEMS, Inc. makes a variety of memory expansion cards for the IBM (r) Personal Computer. Each of these cards is completely compatible with all IBM Personal Computer software and hardware, and runs at the same speed as IBM memory products.

All DAVONG Memory Expansion cards require that the IBM system have a full 64K bytes on the system board before adding memory expansion cards. Since the addressing of these boards begins on 64K byte boundries, having less than 64K bytes on the system board would leave an address range between the system memory board and the DAVONG expansion card which would have no memory. In most cases this is not acceptable to the operating system.

The DSI Memory cards come in sizes from 64K bytes to 256K bytes (1K = 1024) of parity checked memory. Two boards, the DSI-EX64K card and the DSI-ASYNC + RAM card, can be configured initially for 64K bytes and expanded up to 256K bytes in 64K byte increments. The DSI-ASYNC + RAM card is fully documented in the DSI-ASYNC + RAM/DSI-ASYNC Documentation Package, DSI P/N 03-200006.

The switch settings on the various DSI Memory cards may vary due to the differing sizes and user choosen start addresses of the cards. All of the cards are based on the same printed circuit board and have identical switch operation. The user need only determine the desired starting address for the card and calculate the ending address (card memory size added to the start address) and set the switches accordingly. In most cases the default switch settings which start the memory at the 64K byte boundry and enable the full expansion RAM will be correct.

The switch settings for the IBM Personal Computer system board are set to different settings dependent upon the total amount of memory in the system. A complete description of these switch settings for all legal memory configurations is given in Appendix A.

It is recommended that the user read the sections on the IBM SYSTEM CARD SWITCH SETTINGS and the HARDWARE INSTALLATION BEFORE doing the installation.

HARDWARE INSTALLATION

IMPORTANT: TURN OFF THE IBM PC POWER BEFORE INSTALLING

Step 1. Remove the IBM PC Cover

The IBM PC chassis cover is a one piece design that slides towards the front of the unit. It is held in place by two screws on the back panel of the main chassis. Remove the screws in the lower left and right corners, and slide the chassis cover off the chassis base. Refer to the IBM Guide to Operations manual, Options Section on the Diskette Drive Installation for details of the operation.

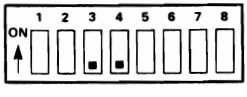
Step 2. Check the IBM System Board Switch Settings.

Appendix A gives a full description of the possible IBM PC switch settings for memory options. SW1 must always be set for 64K on the system card. The setting for SW2 will depend on the amount of contiguous memory the system will have after installation of the new memory expansion card.

To determine the switch settings for the IBM SW2 switch block, you must add the total amount of memory currently in the system to the amount to be added by the new memory expansion card.

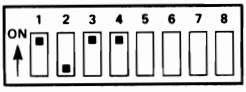
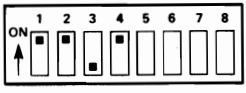
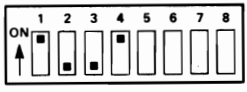
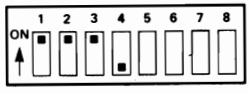
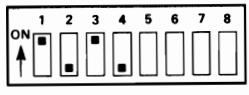
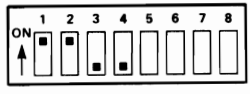
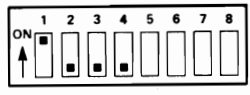
If a 64K byte expansion card is being added to a system with only 64K, then the total memory for the system would be 128K and IBM SW2 would be set to a total memory size of 128K (1–on, 2–off, 3–on, 4–on).

IBM System switch SW1



(64K bytes on the main system board)

IBM System switch SW2 --- Switches 1 thru 4 must be set to indicate the TOTAL contiguous memory on the system including the 64K bytes on the main board and any expansion memory boards. A listing of the common switch settings is given below (also see Appendix A for a complete list).

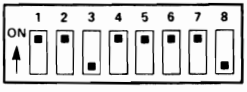
Total Memory on System	IBM SW2 Switches:
128K Bytes	
192K Bytes	
256K Bytes	
320K Bytes	
384K Bytes	
448K Bytes	
512K Bytes	

Step 3. Check DSI Memory Expansion Card Switch Settings

Default Switch Settings

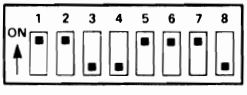
The default switch setting for each memory size of the DSI Memory Expansion cards is given below. Check that the switches on your card match those for that memory size. If a setting other than the default is to be used, the non-standard switch settings may be used. These are documented following the default settings.

64K bytes of memory, the switches are set to indicate a start address of 64K and a stop address of 128K.



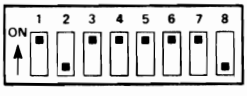
(stop address of 128K) (start address of 64K)

128K bytes of memory, the switches are set to indicate a start address of 64K and a stop address of 192K.



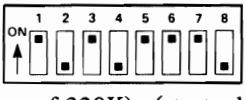
(stop address of 192K) (start address of 64K)

192K bytes of memory, the switches are set to indicate a start address of 64K and a stop address of 256K.



(stop address of 256K) (start address of 64K)

256K bytes of memory, the switches are set to indicate a start address of 64K and a stop address of 320K.



(stop address of 320K) (start address of 64K)

Non-Standard Switch Settings

For start and stop addresses other than the default, the switches must be set to match the user requirements. The switch functions and the table of the addresses verses switch settings should be used to determine the correct settings.

Switches 1 thru 4 set the stop address.
Switches 5 thru 8 set the start address.

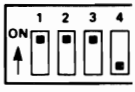
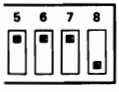
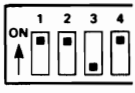
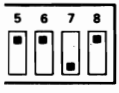
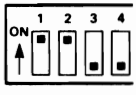
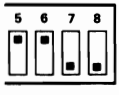
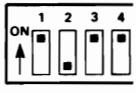
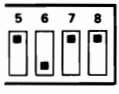
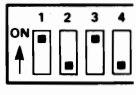
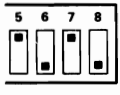
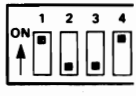
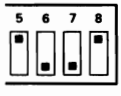
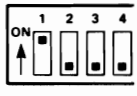
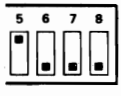
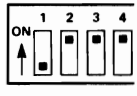
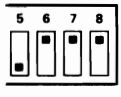
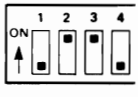
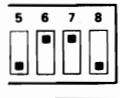
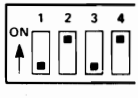
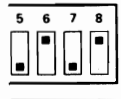
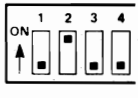
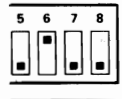
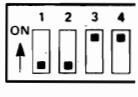
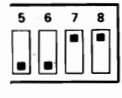
If there are additional memory boards on the system, then the start address and end address would have to be modified to place this board address above the existing memory.

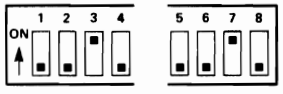
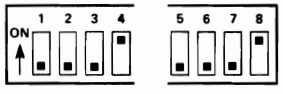
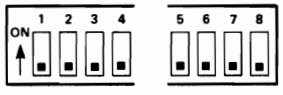
Switch		Address Bit
1	Stop	19
2	Stop	18
3	Stop	17
4	Stop	16
5	Start	19
6	Start	18
7	Start	17
8	Start	16

The "on" position corresponds to a logical "0" for that address line. During system operation, the memory card is selected by a memory read or write when the high four I/O channel address lines are within the range set by the start and stop address switches.

DSI memory cards come in sizes starting at 64K bytes and reaching 256K bytes in 64K byte increments (expandable DSI cards may be expanded with the DSI memory expansion kit, DSI-K64). The banks on the printed circuit card are filled sequentially from bank 1 through bank 3.

On the user expandable cards, the banks must also be filled in sequentially from bank 1 through bank 3. All nine sockets in each bank being used MUST have a memory chip in it to operate correctly. As the memory chips are added, the Stop address switches on the board must be modified to correspond to the new ending memory address and the IBM switch settings must be changed to reflect the new total memory size.

Address	DAVONG Memory Expansion Card Switch Settings	
	STOP	START
64K Bytes		
128K Bytes		
192K Bytes		
256K Bytes		
320K Bytes		
384K Bytes		
448K Bytes		
512K Bytes		
576K Bytes		
640K Bytes		
704K Bytes		
768K Bytes		

Address	DAVONG Memory Expansion Card Switch Settings
832K Bytes	
896K Bytes	
960K Bytes	

Step 4. Install the DSI Memory Expansion Card

The DSI card may be installed in any free I/O slot. Remove the edge bracket from the selected slot and **loosen the screws on all other printed circuit board brackets.**

Insert the DSI card gently but firmly.

Retighten all of the edge bracket screws.

Step 5. Replace the Chassis Cover

Slide the cover back on and fasten the two screws at the back of the unit.

Step 6. Check the Installation

Once the installation is complete you may check that the system recognizes the additional memory. From IBM DOS, use the CHKDSK utility to display the current memory size. With CP/M–86(r) the boot message will display the current memory size. Remember that 1K bytes = 1024 bytes when doing the comparison.

If either operating system fails to function, then it is likely that the switch settings on the IBM system board or the DSI memory expansion board are not set correctly.

LIMITED WARRANTY

This is to certify that DAVONG SYSTEMS, INC. (DSI) warrants this Product to be free from all defects in material and workmanship for a period of ninety (90) days from the date of purchase from DSI or an authorized DSI dealer.

Within the period of this warranty DSI shall be obligated to replace or repair this Product should it prove to be defective in material or workmanship. Repair parts and replacement products will be either reconditioned or new and all parts so exchanged or replaced will become the property of DSI.

Warranty service may be obtained by delivering the Product during the warranty period to an authorized DSI dealer or to the DSI service center at the address appearing below. You may contact DSI at the address appearing below for the name of the authorized DSI service center closest to you. If this Product is returned for repair, it must be accompanied by proof of purchase indicating the date of purchase and dealers name from whom it was purchased. All returns must be prepaid and insured by you and must be appropriately packaged for safe shipment since DSI will not accept responsibility for loss or damage in transit.

THIS WARRANTY DOES NOT APPLY TO DEFECTS CAUSED BY NEGLIGENCE, MISUSE, ACCIDENTS OR MODIFICATIONS.

DSI reserves the right to make changes and improvements in our Product without any obligation to similarily alter products previously purchased. DSI neither assumes nor authorizes any representative or other person to assume for us any other liability in connection with the sale of our products.

WARRANTIES FOR THIS PRODUCT INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO A PERIOD OF 90 DAYS FROM THE DATE OF PURCHASE. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU.

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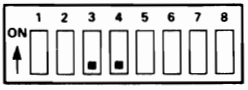
Davong Systems Inc., Limited Warranty
610 Palomar Avenue
Sunnyvale, CA 94086

IBM SYSTEM CARD SWITCH SETTINGS

There are two switch block on the IBM PC system card which must be set to allow full use of the memory expansion cards. Two switches at SW1 must be set to indicate that the system board carries a full 64K bytes of RAM (required before adding an expansion memory card). Switches at SW2 are set to indicate the **TOTAL** amount of contiguous memory available to the operating system. In certain special circumstances these switches may be set to less than the actual amount of memory on the system. This would allow the upper area to be excluded from normal operating system usage, but still available for direct access from special application programs. However, this latter case is not normally recommended except for system programmers and experienced users.

The switches on the IBM PC system board and the DSI MEMORY EXPANSION cards must be set to complementary settings.

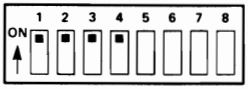
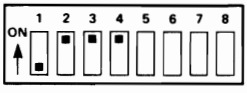
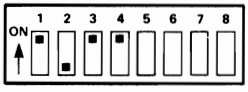
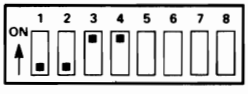
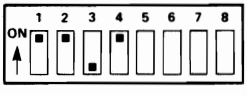
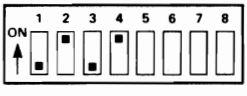
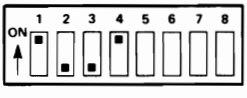
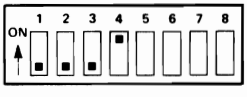
IBM System switch SW1 ---

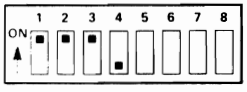
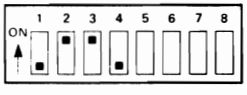
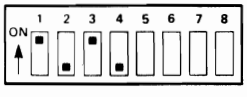
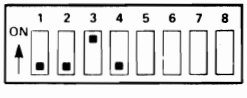
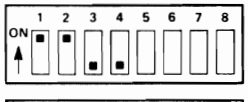
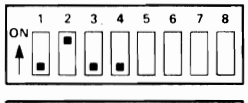
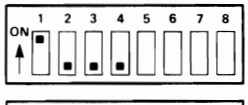
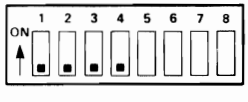


(64K bytes on the main system board)

IBM System switch SW2 --- switches 1 thru 4 must be set to indicate the TOTAL memory on the system including the 64K bytes on the main board and any optional memory boards. A listing of all of the possible settings is given on the following pages.

APPENDIX A

Total Memory on System	IBM SW2 Switches:
64K Bytes	
96K Bytes	
128K Bytes	
160K Bytes	
192K Bytes	
224K Bytes	
256K Bytes	
288K Bytes	

Total Memory on System	IBM SW2 Switches:
320K Bytes	
352K Bytes	
384K Bytes	
416K Bytes	
448K Bytes	
480K Bytes	
512K Bytes	
544K Bytes