DYNA PC/XT

PERSONAL COMPUTER

(IBM PC/XT COMPATIBLE)

INSTRUCTION MANUAL

DYNA SYSTEMS

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I. Introduction to DYNA PC/XT personal computer

DYNA PC/XT personal computer is the very best, most compatible one of IBM PC/XT compatible personal computers in the market. It was designed and manufactured by DYNA SYSTEMS, Santa Clara, Calif. USA. It runs PC-DOS, MS-DOS, CPM/86 operating systems and the most popular softwares such as LOTUS 1-2-3, SYMPHONEY, FLIGHT SIMULATOR, DBASE II and all others. It offers users a low-cost, high-quality, very reliable, most compatible personal computer at saving 40 % and up compared to IBM PC/XT computer.

The DYNA PC/XT has several extra features and improvements over original IBM PC/XT, such as:

i. 84 key keyboard with standard typewriter layout for word processing.
ii. The standard 130W switching power supply with 4 power lines and connectors for 4 disk drives(floppy or hard disks).
iii. Eight 64K EPROM layout with sockets(1 for DYNA BIOS, 4 for BASIC ROM and 3 for custom firmware).
iv. Computer case with flip-up top cover(easy to remove or add on expandsion boards) and cut-out for an extra cooling fan(option).
v. External audio port.
vi. External reset port(option).

Depending on the particular configuration of your system, the DYNA PC/XT may include up to 4 half height disk drives(floppy or hard disks), floppy disk controller, hard disk controller, the DYNA six-FUNPAK board(AST 6-PAK compatible), a color graphic board or a monochrome graphic board(Hercules compatible) and a monitor.

II. System Unit

The general set-up of a ready to run personal computer system includes the system unit, the keyboard, the monitor and a printer.

The system unit consists of three parts: the system board, the power supply and the enclosure. Usually there are two floppy drives mounted in the front section of the enclosure. A floppy drive controller plugged in one of the 8 expansion slots controls these two drives. Other essential elements might include 6-FUNPAK board, a video board, one or two hard disks and the hard disk controller.

i. DYNA PC/XT system board

The system board is a single, double-sided printed circuit board measuring 8.875 by 13 inches. System power enters the board via a twelve pin connector. Other connectors provides a means to connect the DYNA PC/XT keyboard and speaker. Eight 62 pin expansion connectors are provided for system expansion boards.

The system board consists of FIVE functional sections: 1.the 8088 micro-processor and the supporting chips(a DMA controller 8237, a timer 8253, 8 levels of interrupts 8259, a parallel input-output chip 8255),2.the system operating firmware(DYNA BIOS),3.up to 256K bytes of ramdon access memory,4. on-board I/O,5.an expansion I/O bus.

The heart of the DYNA PC/XT is the INTEL 8088 micro-processor. The 8088 is an 8-bit external data bus version of the INTEL 16-bit 8086 processor, and is fully software compatible with the 8086. The processor has a 20 bit wide address bus that allows it to support up to 1 Megabyte of memory. The processor also supports an optional high speed math co-processor, the INTEL 8087.

The micro processor has an operating clock frequency of 4.77 MHZ. The signal is one third the frequency of the master system clock(14.31818).

The DYNA PC/XT system board supports up to 256K bytes of user RAM(randon access memory), and up to 64K bytes of EPROM(erasable ,programmable read only memory). One 8K bytes EPROM contains DYNA BIOS(basic input-output structure). Parity checking is provided for the system RAM.

The access time of the EPROM is equal to or faster than 250 ns, with a cycle time of 350 ns. The system RAM uses 4164 DYNAMIC memory chips with an access time of 250 ns or faster. The average cycle time for the 4164 is 410 ns.

The DYNA PC/XT system board contains two 8 position DIP(dual-in-line) switches that are set according to the amount of memory that is installed and the type and number of I/O channel expansion adaptors installed. (details see section:System parameter set-up) These two DIP switches are located at the rear-right corner of the system board, marked as SW1 and SW2 individually.

The DYNA PC/XT 62 pin, eight slot I/O expansion bus is a buffered extension of the 8088 processor bus with additional interrupts and DMA channels. Power supplied to the I/O channels is as follows: 1) +5 volts, 2) +12 volts, 3) -12 volts, and 4) -5 volts. The I/O bus is powered by DYNA PC/XT switching power supply.

It should be noted that the DYNA PC/XT expansion bus is fully IBM (TM) compatible. This allows the use of all DYNA expansion adaptors as well as all IBM (TM) adaptors.

ii. Switching Power Supply

The DYNA PC/XT power supply is a 130 watt switching type regulated power supply. The power supply provides the following voltages: 5V/13A, 12V/4.5A, -5V/.5A, -12V/.5A.

This power supply has a self contained fan for system cooling. It also provides two 110 volt AC power outlets for other system devices, such as a monitor and a printer.

This power supply provides 6 connectors, two 6-pin connectors to power the system board and its I/O channel, and four to power the system disk drives.

FEATURES:

- high efficiency
- low output noise
- short protection
- over current protection
- universal AC input
- with AC or DC fan
- low cost
- peak load power
- over voltage protection
- built-in EMI filter
- meet UL/CSA/FCC standard

SPECIFICATION:

- line input: 90-135VAC or 180-270VAC 47-63HZ
- line regulation: 0.3 % full load
- load regulation: ±5V, ±3 % at 10%-100% load
  ±12V, ±5 % at 20%-100% load
- cross regulation: +5V, ±1%, other output ±5%.
- ripple and noise: less than 1% at any output
- efficiency: 70%
- output adjustment range: +5V, ±10%
- protection: short, over voltage and over current protection
- temperature: coefficient 0.02% per °C
  operation 0°C to 70°C
  storage -20°C to 85°C
- isolation: meet UL, CSA
- size: 8.1 x 5.2 x 4.7 inches (L x W x H)

iii. System Enclosure:

The system enclosure is a steel-made cabinet coated with scratch-proof paint.

FEATURES:

. dimension: 16.5 x 19.5 x 6.0 inches (L x W x H)
. store two full height disk drives or four half height disk drives
. front ventilation grooves
. eight slot grill for expansion boards
. three cut-out slots for I/O connectors
. four cut-out holes for power supply(1 for power switch, 1 for input power cord, 2 for monitor and printer power plugs)
. one cut-out slot for keyboard connector and the external audio connector
. one cut-out hole on bottom plate for the optional cooling fan
. flip-up top cover(easy to remove or add on expansion boards)
. full height and half height face plates for disk drive and all mounting hardware are included

III. Keyboard

The DYNA PC/XT keyboard is detached from the system unit. It is provided with a coiled cable which attaches it to the DYNA system unit. The cable plugs into the system unit via a 5 pin (DIN) connector. This cable provides the power to the keyboard and also transmits to the system board serial encoded data from any key being depressed. The total number of keys on this keyboard is 84 keys, laid out in a standard typewriter format. The entire keyboard can be tilted to 15 degree angle for easy typing. Both the Caps Lock key and the Num Lock key have visual indicators.

The keyboard is divided into three general sections:

i. 10-function keys, from F1 to F10, are located at the left section of the keyboard

ii. The "typewriter" section is located at the central section of the keyboard.

iii. For accounting and data entry a 10-key section with mathmatical operations and Enter key is provided. This section is located at the right section of the keyboard

The followings is a detailed description of each key's function and their combined functions.

"FUNCTION KEYS"

The function keys can be used in two different ways.

(1) As "soft keys" This means you can set each key to automatically type any sequence of characters or frequently used commands. These commands can be modified as you wish referring to "KEY statement" under BASIC mode. There are some commands have already been assigned to these keys. Assignments under DOS are different from those under BASIC.

(2) As program interrupts in advanced BASIC, through the use of the "ON KEY statement".

See the followings for DOS and BASIC assignments of function keys.

Assignment of function keys under DOS:

KEY	DESCRIPTION
F1	Redisplays a character at a time of previous entering
F2	Strike "F2" and then followed by a character, the previously entered line will be redisplayed up to the enter character.
F3	Redisplays the complete line entered previously
F4	Strike "F4" and then followed by a character, the previously entered line will be redisplayed from the entered character.
F5	Saves the currently displayed line for future use.

Assignment of function keys under BASIC:

Key	DESCRIPTION
F1	"LIST" displays the listing of the program currently loaded
F2	"RUN" starts excution of the program currently loaded
F3	"LOAD" reads program from auxiliary storage(such as drives) and stores it into main memory
F4	"SAVE" transfer program currently loaded in main memory into auxiliary storage
F5	"CONT" continues to execute where you "BREAK" the program
F6	"LPT1" stands for line printer #1 and is used in transfering data from screen to printer
F7	"TRON" stands for "trace on" and indexes the lines in execution output
F8	"TROFF" stands for "trace off"
F9	"KEY" is used to change the contents of function keys

F10 "SCREEN" turns color and graphics off and returns the the program to text mode

"Caps Lock" Key

This key gives you upper case letters, but won't give you the upper shift characters on the numeric or other special character keys. You will continue getting upper case letters until you press it again.

"Back Space" Key

This key backs spaces and erases what you have typed at that space

"Alt" Key

This key enables easy entry of BASIC command with a single keystroke. The BASIC command is typed when the "Alt" key is held down while one of the alphabetic keys A-Z is pressed. Commands associated with each alphabetic key are summarized as below. Letters which are not associated with any command are noted by "not available".

A	AUTO	N	NEXT
B	BSAVE	O	OPEN
C	COLOR	P	PRINT
D	DELETE	Q	N/A
E	ELSE	R	RUN
F	FOR	S	SCREEN
G	GOTO	T	THEN
H	HEX$	U	USING
I	INPUT	V	VAL
J	N/A	W	WIDTH
K	KEY.	X	XOR
L	LOCATE	Y	N/A
M	MOTOR	Z	N/A

The "Alt" key is also used with the numeric keys to enter characters not found on the keyboard. This is done by holding down the "Alt" key and typing the three digit ASCII code of that specified character.

"PrtSc * " Key

"PrtSc" stands for "Print Screen". In upper shift, hitting this key causes the printer to print a copy of what is currently on the screen.

In lower shift, pressing this key causes an asterisk "*" to be typed.

"Ctrl" Key

This key is used to enter certain codes and characters not available from the keyboard. Such as, "Ctrl G" is "Bell" command. You press and hold the "Ctrl" key and press the "G" key at the same time, the speaker will beeps. You can also use this key together with other keys when you edit programs with the program editor.

"Ctrl + Alt + Del" = RESET

Restart the system by reloading the diskette (Holding down all three keys at the same time)

"Tab" Key

Moves the cursor to the next tab stop. Tab stops occur every eight character positions

"Scroll Lock" Key

This key by itself is an inactive key. It is usually used in combination with other keys.

"NUMERIC KEYS"

Numeric keys are generally used in data entry. Some mathematical operation keys and a "Enter" key is provided for the user's convenience.

"Num Lock" Key

This key stands for "Number Lock". With the indicator light "ON", you get those special functions marked on the numeric keys when they are depressed. If the light is "OFF" , those functions won't show up.

"Ctrl + Scroll Lock" = BREAK

This operation stops the running program and gives you the line number where it stopped. Type "CONT" and hit "Return" to continue execution.

"Ctrl + Num Lock" = PAUSE

This operation haults the running program. Press any key to continue execution.

"HOME" Key

Moves the cursor to the Top-Left corner of the screen.

"PgUp" Key

Shows the previous page content on the screen.

"PgDn" key

Shows the following page content on the screen.

"Ctrl + Home"

Clears all the screen and positions the cursor in the Top-Left corner of the screen.

"↑" Key

Hitting this key moves the cursor up one character position.

"↓" Key

Hitting this key moves the cursor down one character position.

"←" Key

Hitting this key moves the cursor one character position to the left.

"→" Key

Hitting this key moves the cursor one character position to the right.

"Ctrl →"

Moves the cursor right to the next word. A word is defined as a character or group of characters which begins with a letter or number. Words are seperated by blanks or special characters. So the next word will be the next letter or number to the right of the cursor which follows a blank or a special character.

"Ctrl ← "

Moves the cursor left to the previous word. The previous word will be the letter or number to the left of the cursor which is preceded by a blank or a special character.

"End" Key

Moves the cursor to the end of the logical line. Characters typed from this position are added to the end of the line.

"Ctrl End" Key

Erase all characters from the current cursor position to the end of logical line. All physical screen lines are erased until a terminating Enter is found.

"Ins" Key

Sets insert mode. The insert mode is off and on by hitting this key repeatedly. In insert mode, the cursor covers the lower half of the character position.

"Del" Key

Deletes the character at the current cursor position. All characters to the right of the deleted character moves one position to the left to fill in the position for the deleted character.

"Esc" Key

Hitting this key erases the entire logical line where the cursor is located.

"Shift + PrtSc"

This operation causes a copy of what is on the screen to be printed on the printer.

"Ctrl + Shift + PrtSc"

This operation allows you to "ECHO" (print whatever you are typing) the input and output. To turn off this printing mode simply repeat the "Ctrl + Shift + PrcSc" operation.

"Enter" Key

This key is located beside the numeric keys to enter the numeric data into the computer. It functions just like the "Return" key.

IV. System Parameter Set-Up

The DYNA PC/XT system parameter set-up includes installation setting of the disk drives, the display, the memory and Co-processor 8087. These installation settings are carried out in two DIP(dual-in-line) switch blocks, switch block 1 (SW1) and switch block (SW2). These two switch blocks are located at the rear-right corner of DYNA PC/XT system board. Each switch block has eight (labeled as 1 to 8) switches.

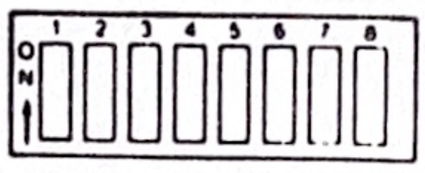
The following charts describe the switch function of each switch block and the detailed description of installation setting of system disk drives, the display, memory and the co-processor.

Switch Setting Charts

i. System Board Switches

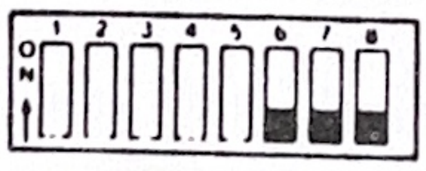
WARNING: Before you change any switch settings, make a note of how the switches are presently set.

Switch Block 1



Switch	Function
1 7 8	Number of 5 1/4 inch diskette drives installed
2	Coprocessor
3,4	System board memory switches
5,6	Type(s) of display(s) connected

Switch Block 2



Switch	Function
1,2,3,4,5	Amount of memory options installed
6,7,8	Always in the Off position

ii. Number of 5-1/4 Inch Diskette Drives Installed

	Switch Block 1	Switch Block 2
0 - Drives		
1 - Drive		
2 - Drives		

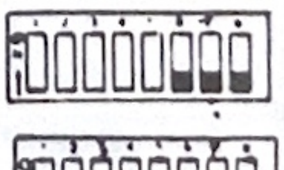
iii. Type(s) of Display(s) Connected

WARNING: If an IBM Monochrome Display is connected to your system, Switch Block 1, switches 5 and 6 must always be Off. Damage to your display can result with any other switch settings.

	Switch Block 1	Switch Block 2	
IBM Monochrome Display (or IBM Monochrome Display plus another display)			
Color Display (Do not use if an IBM Monochrome Monitor is connected)			40x25 Mode
			80x25 Mode

Note: The 40x25 mode means there will be 40 characters across the screen and 25 lines down the screen. The 40x25 is normally used with a home television. The 80x25 mode means there will be 80 characters across the screen and 25 lines down the screen. The 80x25 mode, when used with home televisions and various displays, can cause loss of character quality.

iv. Math Coprocessor

	Switch Block 1	Switch Block 2
Without Math Coprocessor		
With Math Coprocessor		

V. Memory Switch Settings
(64KB-256KB CPU) System Board

64K Total Memory

System Board Switches	Switch Block 1	Switch Block 2

128K Total Memory

System Board Switches	Switch Block 1	Switch Block 2

192K Total Memory

System Board Switches	Switch Block 1	Switch Block 2

256K Total Memory

System Board Switches	Switch Block 1	Switch Block 2

288K Total Memory
32K + (256K on System Board)

System Board Switches	Switch Block 1	Switch Block 2

320K Total Memory
64K + (256K on System Board)

System Board Switches	Switch Block 1	Switch Block 2

352K Total Memory
96K + (256K on System Board)

System Board Switches	Switch Block 1	Switch Block 2

384K Total Memory
128K + (256K on System Board)

System Board Switches	Switch Block 1	Switch Block 2

416K Total Memory
160K + (256K on System Board)

System Board Switches	Switch Block 1	Switch Block 2

448K Total Memory
192K + (256K on System Board)

System Board Switches	Switch Block 1	Switch Block 2

480K Total Memory
224K + (256K on System Board)

System Board Switches	Switch Block 1	Switch Block 2

512K Total Memory
256K + (256K on System Board)

System Board Switches	Switch Block 1	Switch Block 2

544K Total Memory
288K + (256K on System Board)

System Board Switches	Switch Block 1	Switch Block 2

576K Total Memory
320K + (256K on System Board)

System Board Switches	Switch Block 1	Switch Block 2

608K Total Memory
352K + (256K on System Board)

System Board Switches	Switch Block 1	Switch Block 2

640K Total Memory
384K + (256K on System Board)

System Board Switches	Switch Block 1	Switch Block 2

V. INSTALLATION GUIDE

All user accessable switches and plugs are located on the rear panel of the system unit. (See REAR PANEL LAYOUT on the following page)

CAUTION: THE SYSTEM POWER SHOULD BE OFF DURING INSTALLATION !
(otherwise serious damage to your system could occur)

CAUTION: THE POWER ON ALL EQUIPMENT HOOKED UP TO THE SYSTEM UNIT SHOULD ALSO BE OFF ! (such as monitor, printer, modem and ...)

(1) Set up the system unit on a spacious level surface.

(2) Flip up the top cover of the system unit, check for any loose connection among the expansion slots. If no problem, flip down the top cover.

(3) Connect monitor to the video card through the rear panel.

(4) Connect the keyboard cable to the keyboard port through the rear panel.

(5)Connect the system power cord to the system unit, then to the wall outlet.

(6) Connect monitor power cord to one of the two auxiliary 110V plugs located on the rear panel.

(7) Insert a DOS diskette in the drive "A" (in general, the top-left one)

(8) Turn on the system power and monitor power. Wait for approximately 10-20 seconds (depending on how many memory chips installed in the system) and there should be one short beep. At this time your computer has completed its self-test and prompts the new date and the new time.

REAR PANEL LAYOUT