M480-10 / M480-20

CHARACTERISTICS

Microprocessor	i486SX for M480-10, i486 for M480-20
Clock	20 MHz for M480-10, 33 MHz for M480-20
Architecture	XT/AT with 32-bit addressing
Memory	From 4 to 36 MB on the motherboard Bank 0 Eight 514402 chips soldered for a total of 4 MB Bank 1 Four SIMM sockets : 1 MB x 9 **EXM 486-04** (for 4 MB) or four 4 MB x 9 SIMMs **EXM 486-16** (for 16 MB) Bank 2 On an expansion board connected to the motherboard through a connector. This bank is identical to bank 1
Memory access	60 ns static column
Coprocessor	WEITEK WTL 4167 at 25 MHz M480-10 i487SX at 25 MHz M480-10 WEITEK WTL 4167 at 33 MHz M480-20
Floppy Disk	1.2 MB 5.25" Panasonic JU 475-3 C20R 1.2 MB 5.25" Panasonic JU 475-4/5 C20R 1.44 MB 3.5" Panasonic JU-257 A - 293 / 294 1.44 MB 3.5" Sony MP-F17 - 86 1.44 MB 3.5" Y-E DATA YD-702B - 6039 B
Hard Disk	120 MB CONNER CP30126 AT 120 MB W.D. AC2120 AT 210 MB CONNER CP3206 / CP30256 AT 210 MB QUANTUM LPS240 AT 240 MB CONNER CP30254 340 MB CONNER CP3304 AT 510 MB CONNER CP3504 AT 510 MB CONNER CP3544 AT 510 MB CONNER CP30544 AT 210 MB CONNER CP3200F SCSI 210 MB CONNER CP30200 SCSI 510 MB CONNER CP3500 SCSI 510 MB CONNER CP3540 SCSI 525 MB CONNER CP30540 SCSI
Streaming Tape	120 MB STU 38-120 with floppy interface 150 MB WANGTEK with SCSI Interface 320 MB WANGTEK with SCSI Interface
Slots	Six 16-bit connectors
Video adapter	VGA-compatible 82C453 integrated on the motherboard
Integrated FDU controller AT HDU controller	Floppy disk controller: National 87310 Hard disk interface: MSI buffers and logic gates
SCSI HDU controller	Board to be installed on ASC-1 BUS
Mouse	PS/2- and AT-compatible
Keyboard	101/102-key ANK 26-101, ANK 26-102

MOTHERBOARD

Earlier models:
M480-10: 486 SX 4 MB
M480-20: 486 SX 4 MB

New models:
M480-10: BA372
M480-20: BA371

BIOS

Earlier models:
1.03 for M480-10
1.06 for M480-20

New models:
2.07 for M480-10
2.08 for M480-20

EXPANSION BUS

POWER SUPPLY

OS - 020
Earlier models

OS - 020A
New models

These personal computers are available in two versions:

1 - With AT IDE hard disk interface

2 - With SCSI hard disk interface

The following table shows the main differences between the different versions and models of the M480-10 and M480-20 Personal Computers.

PERSONAL COMPUTER	VERSION	MODEL	CHARACTERISTICS
M480-10	IDE AT	PREVIOUS MODEL Can be recognized as it uses BIOS rel. 1.XX	Processor 20 MHz i486 SX Coprocessor WEITEK and i487 SX Built in setup Available Security feature Not available BIOS Rev. 1.XX System Test M300-04, M290-25, M480-10/20 HDU controller On system board Possibility of installing two 1.44 MB floppy disk drives
		NEW MODEL Can be recognized as it uses BIOS rel. 2.XX and has an ID plate on its rear panel	Processor i486 SX Clock 20 MHz Coprocessore WEITEK and i487 SX Built in setup Not available Security feature Available BIOS Rev. 2.XX System Test M480-10, M480-20 Rel.3.XX HDU controller On system board Two 1.44 MB floppy disk drives cannot be installed
	SCSI	-	Processor 20 MHz i486 SX Coprocessor WEITEK and i487 SX Built in setup Not available Security feature Available BIOS Rev. 2.XX System Test M480-10, M480-20 Rel 3.XX HDU controller ASC-1/A board Two 1.44 MB floppy disk drives cannot be installed
M480-20	IDE AT	PREVIOUS MODEL Can be recognized as it uses BIOS rel. 1.XX	Processor 33 MHz i486 Coprocessor WEITEK Built in setup Available Security feature Not available BIOS Rev. 1.XX System Test M300-04, M290-25, M480-10/20 HDU controller On system board Possibility of installing two 1.44 MB floppy disk drives
		NEW MODEL Can be recognized as it uses BIOS rel. 2.XX and has an ID plate on its rear panel	Processor 33 MHz i486 SX Coprocessor WEITEK Built in setup Not available Security feature Available BIOS Rev. 2.XX System Test M480-10, M480-20 Rel.3.XX HDU controller On system board Two 1.44 MB floppy disk drives cannot be installed
	SCSI	-	Processor 33 MHz i486 SX Coprocessor WEITEK Built in setup Not available Security feature Available BIOS Rev. 2.XX System Test M480-10, M480-20 Rel 3.XX HDU controller ASC-1/A board Two 1.44 MB floppy disk drives cannot be installed

MOTHERBOARD

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
486 SX	Nasc.	612543 X	Rev. 1.01	System board of the previous M480-10 model with 4 MB of soldered memory
	Lev. 01		Rev. 1.02	New BIOS so that new hard disks can be added
	Lev. 02		Rev. 1.03	New BIOS to solve the problems with Windows 3.1.
BA372	Nasc.	553101 S	Rev. 2.06	System board of the new M480-10 model with 4 MB of soldered memory. This board is introduced with the new User Diskette and the new System Test Rev. 3.00.
	Lev. 02			Introduction of the new ACER I/O controller 87310 as an alternative to the National Super I/O controller
	Lev. 02		Rev. 2.07	New BIOS to solve the problems with Windows 3.1.
	Lev. 02		Rev. 2.08	New BIOS to correct the problems with the printers. This new BIOS does not change board level.

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
486/33	Nasc.	612544 Y	Rev. 1.01	System board of the previous M480-20 model with 4 MB of soldered memory.
	Lev. 01		Rev. 1.05	New BIOS to solve the parity error that occurs when more than 4 MB of DRAM are installed.
	Lev. 02		Rev. 1.06	New BIOS to solve the problems with Windows 3.1.
BA371	Nasc.	553102 T	Rev. 2.07	System board of the new M480-20 model with 4 MB of soldered memory. This board is introduced with the new User Diskette and the new System Test Rev. 3.01.
	Lev. 02			Introduction of the new ACER I/O controller 87310 as an alternative to the National Super I/O controller
	Lev. 02		Rev. 2.08	New BIOS to solve the problems with Windows 3.1. This new BIOS does not change board level.
	Lev. 03 SI		Rev. 2.08	To correct the loss of synchronism with the DVA 4000 board, the two 2200 pF capacitors at location F26 and F27 have been replaced by two 100 pF EMI filters. **This modification is only valid at field level**, therefore board level changes from 03 to 03SI.
	Lev. 04 SI		Rev. 2.08	Component 74ALS32 at location U14 is replaced by NATIONAL's component 74ALS32. This modification corrects problem with the monitor not working correctly when expansion boards are installed on the bus. This problem only occurred in SCSI configuration systems.
	Lev. 04 SI		Rev. 2.09	New BIOS to correct the problems with the printers. This new BIOS does not change board level.
BA2046	Nasc.	588054 Z	Rev. 2.08	New board replacing board BA371. The board has been re-designed to host fast page mode RAM and SIMMs. The previous board used static column RAM and SIMMs. Boards BA371 and BA2046 are interchangeable as long as memory expansions are made using Fast Page Mode SIMMs.

MOTHRBOARD INTEGRATED CONTROLLERS

MOTHERBOARD	INTEGRATED CONTROLLERS
The boards do not differ significantly as far as the main components are concerned.	- 20 MHz **i486 SX** CPU on the M480-10 33 MHz **i486** CPU on the M480-20 - Socket for the 25 MHz **WEITEK WTL 4167** on the M480-10 Socket for the 33 MHz **WEITEK WTL 4167** on the M480-20 - Clock generators:14.318 MHz - 16 MHz - 50 MHz for the M480-10 Clock generators:14.318 MHz - 16 MHz - 66 MHz for the M480-20 - Keyboard controller and mouse interface **8742 OTP** - VGA video adapter **82C453** - 1 MB video memory - Component **BT476** - Video DAC - Color palette - **ACER 87310** Serial port interface Parallel port interface Floppy disk peripherals controller Interface for intelligent AT hard disks - 128 KB ROM BIOS (2 **27512** chips) - **TOPCAT** chip set consisting of 3 chips and integrating: - VL82C330 System controller - VL82C331 AT BUS controller - VL82C332 Data buffer.

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BOARDS

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
486 SX	Motherboard of previous M480-10 model	413271 X	4 MB of soldered memory
BA372	System board of new M480-10 model		4 MB of soldered memory
486/33	Motherboard of previous M480-20 model	413266 S	4 MB of soldered memory
BA371	System board of new M480-20 model		4 MB of soldered memory
OS-020	220 V power supply	413178 S	The power supply has a jumper with which to change the operating voltage
OS-020	110 V power supply	413178 S	
OS-020A	220 V power supply		
OS-020A	110 V power supply		
Bus adapter board		030072 S	
Memory expansion board		030069 F	
SCSI HDU controller	ASC-1/A		For the version with SCSI system hard disks.

ASC-1 SCSI HARD DISK CONTROLLER

LEVEL	NOTES
Nasc.	–

USER DISKETTE

LEVEL	COMPATIBILITY
Rev. 3.0	-
Rev. 3.01	Disables memory between 512 KB and 640 KB. Handles Security features.

SYSTEM TEST

LEVEL	COMPATIBILITY
Rev. 2.06	-
Rev. 3.0	For the new personal computers with BIOS rel. 2.XX
Rev. 3.01	Disables memory between 512 KB and 640 KB. Handles Security features.

POWER SUPPLY UNIT

POWER SUPPLY	LEVEL	DESCRIPTION
OS - 020 110 V OS - 020 220 V	Nasc.	The power supply has a jumper used to change the operating voltage.
OS - 020A 110 V OS - 020A 220 V	Nasc.	Replaces power supply OS - 020 that had the following problems: - Excessive distribution of radio interference upon load variation - Does not comply with Danish norms.

COMPATIBILITY NOTES

BOARD/DEVICE	COMPATIBILITY
Customer Test diskette provided in the Streaming Tape kit STS 26-150/321	The Customer Test diskettes provided in Streaming Tape kit STS 26-150/321 Lev. 01, were formatted with MS-DOS 4.01 and cannot bootstrap on systems with more than two hard disks since MS-DOS 4.01 does not support these configurations. The diskettes provided with starter kit Lev. 02 were formatted with MS-DOS 5.0 thus solving this problem.
1.2 MB, 5.25" Panasonic JU-475-4 floppy disk drive	Modifications were made to the mechanics of this drive. The new drives have the letter "R" printed on their external label while the earlier drives have the letter "K".

SOFTWARE DRIVERS

DRIVER	NOTES
LIM/EMS 4.0 EVD driver rev. 2.01 EVD driver rev. 2.02 SCSI hard disk driver Rev. 1.0	Management of extended and expanded memory.

BIOS OF THE EARLIER M480-10 MODELS

LEVEL	NOTES
Lev. 1.01	–
Lev. 1.02	Solves the problem regarding the management of some monitors Addition of some AT hard disk parameters
Lev. 1.03	Solves the problems with Windows 3.1.

BIOS OF THE EARLIER M480-20 MODELS

LEVEL	NOTES
Lev. 1.01	–
Lev. 1.02	Solves the problem regarding the management of some monitors Addition of some AT hard disk parameters
Lev. 1.05	Solves the parity error that occurs when more than 4 MB of DRAM are installed
Lev. 1.06	Solves the problems with Windows 3.1.

BIOS OF THE NEW M480-10 MODELS

LEVEL	NOTES
Rev. 2.06	This new BIOS revision controls the features offered by the new models: - The Built-in Setup has been removed so the system is configured via User Disk - The Shadow is addressed at 0C000. - Three drives with floppy disk interface are no longer handled. - The 1.44 MB diskette drive can no longer be installed. - No longer possible to assign drive identifier A or B to any one of the two diskette drives. - The Olivetti standard fonts have been added, the Office fonts removed. - Only the Olivetti high resolution monitors can be used. - The Security utilities are handled. This requires User Disk or System Test version 3.01.
Rev. 2.07	Solves the problems with Windows 3.1.

BIOS OF THE NEW M480-20 MODELS

LEVEL	NOTES
Rev. 2.07	This new BIOS revision controls the features offered by the new models: - The Built-in Setup has been removed so the system is configured via User Disk - The Shadow is addressed at 0C000. - Three drives with floppy disk interface are no longer handled. - The 1.44 MB diskette drive can no longer be installed. - No longer possible to assign drive identifier A or B to any one of the two diskette drives. - The Olivetti standard fonts have been added, the Office fonts removed. - Only the Olivetti high resolution monitors can be used. - The Security utilities are handled. This requires User Disk or System Test version 3.01.
Rev. 2.08	Solves the problems with Windows 3.1.

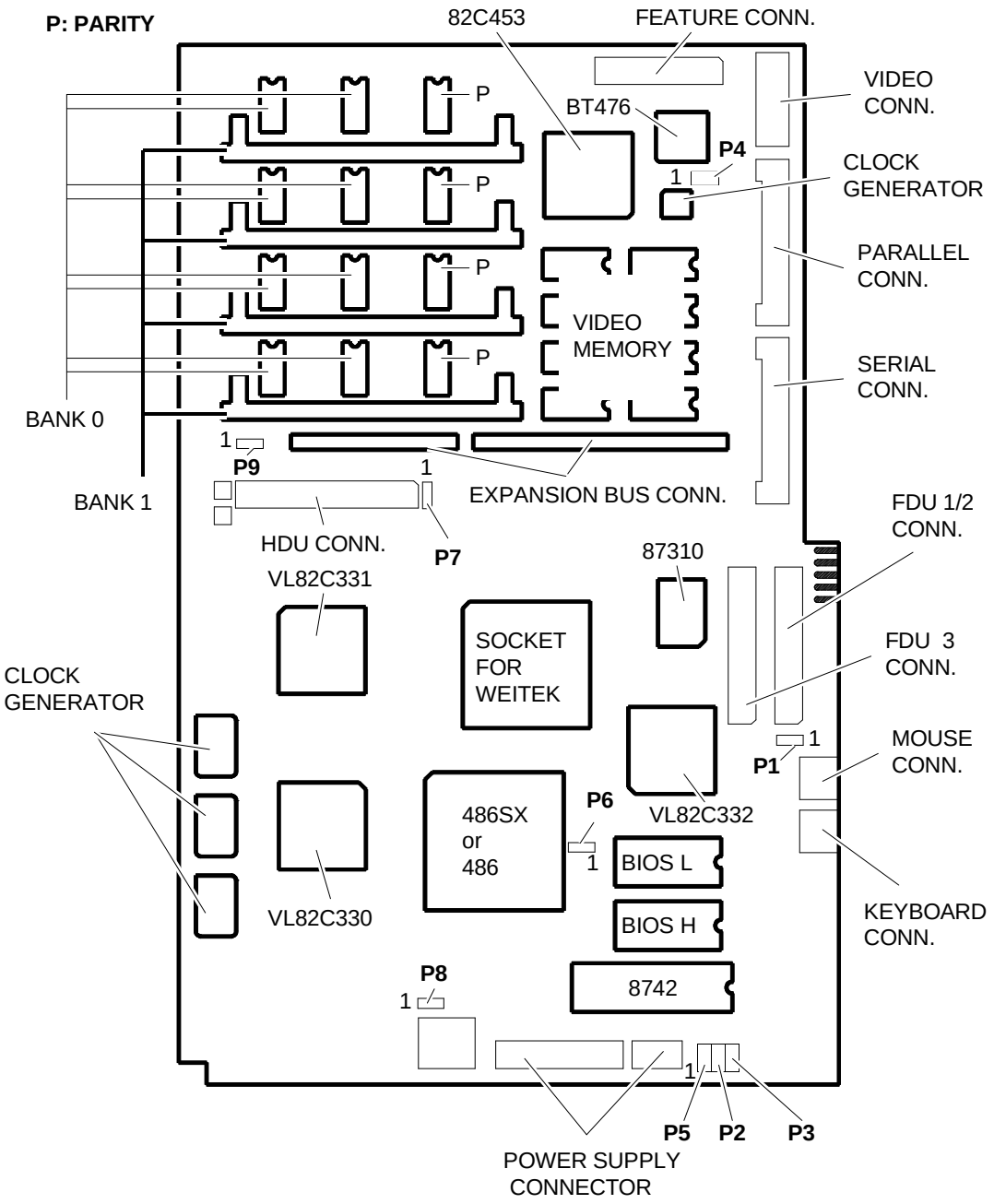
SOFTWARE COMPATIBILITY

OPERATING SYSTEMS	NOTES
IBM DISK Operating System, Ver. 3.30	
MS-DOS (Compaq)	
IBM DISK Operating System, Ver. 4.01	A formatted DSDD diskette is required during installation on hard disk
MS-DOS Ver. 5.0	
IBM Operating System/2, Ver. 1.10 and 1.20	The PS/2 mouse is not acknowledged
IBM Operating System/2 Extended Edition, Ver. 1.10 and 1.20	The PS/2 mouse is not acknowledged
INTERACTIVE 386/ix, Ver. 2.02	
SCO UNIX System V/386, Rev. 3.2	
SCO XENIX 386, Rev. 2.3	
WINDOWS	
GEM/3 Desktop, IBM-PC Ver. 3.02	MS-WINDOWS /386 Ver. 2.11
MS-WINDOWS /286 Ver. 2.11	MS-WINDOWS 3 Ver. 3.0

HARDWARE COMPATIBILITY

MODEMS	**I/O INTERFACE PRODUCTS**
Hayes Smart modem 2400B FAXY PC MAXTER FURY 2400 PC MODEM AT&T 2224 CEO MODEM FURY 2400 MAXTER MODEM FURY 2400 TI/MNP Hayes Smart modem 1200 B	IBM PRINTER ADAPTER (1505200) STB 4-ON THE FLOOR
MULTIPORT	**MOUSE**
CHASE AT8 COMPUTONE AT 8 COMPUTONE AT 16 INTEL Bell ICC.6 SPECIALIX SI / 8	IBM PS/2 Mouse (6450350) IBM PS/2 Mouse Serial Logitech Bus Mouse (PF-3F) Logitech 3 button mouse MS-BUS mouse MS-MOUSE serial
GRAPHICS PRODUCTS	**NETWORKING & LAN PRODUCTS**
AST VGA plus FASTWRITE 1024i FASTWRITE VGA HERCULES GRAPHICS CARD IBM VGA Adapter MATROX PG - 1281 MAXON MVGA-16 Adapter ORCHID PRODESIGNER VGA PLUS HERCULES INCOLOR CARD (GB222) PARADISE VGA PRO CARD	10 NET INTERFACE BOARD 200 series 3COM Etherlink adapter 3C501 3COM Etherlink II adapter 3C503 3COM Etherlink plus adapter 3C505 3COM Etherlink plus adapter 3C505 DECNET PCSA adapter IBM PC NETWORK adapter II IBM TOKEN RING 16/4 adapter IBM TOKEN RING adapter II MADGE AT RING NODE adapter MICOM NP1000 adapter NOVELL NE1000 adapter NOVELL NE2000 adapter
DISPLAY UNITS	
IBM enhanced graphics monitor 5151 IBM color graphics monitor 5153 IBM PS/2 Monochrome display 8503 IBM PS/2 color display 8512 IBM PS/2 color display 8513 IBM PS/2 color display 8514 NEC MULTISYNC II	NEC MULTISYNC 2A NEC MULTISYNC 3D NEC MULTISYNC 4D NEC MULTISYNC 5D PHILIPS 7BM749 PHILIPS 9CM082

MOTHERBOARD COMPONENTS



ATE2A

Jumper P1 - Third floppy disk interface peripheral

Position 1 - 2 Third floppy disk interface peripheral enabled (default)

Position 2 - 3 Third floppy disk interface peripheral disabled.

Jumper P2 - Password

Position 1 - 2 Password disabled

Position 2 - 3 Password enabled (default).

Jumper P3 - Parallel port

Position 1 - 2 Parallel port disabled during inputs (default)

Position 2 - 3 Bidirectional parallel port.

Jumper P4 - Interlaced video

Position 1 - 2 Disabled

Position 2 - 3 Enabled (default).

Jumper P5 - Board current control

Position 1 - 2 Maximum current (default)

Position 2 - 3 Minimum current.

Jumper P6 - Type of microprocessor on system board

This jumper is not mounted on the M480-20 Personal Computer

Position 1 -2 i487 SX processor

Position 2 - 3 i486 SX processor on the M480-10.

Jumper P7 - Wait states on the hard disk

Position 1 - 2 One additional wait state (default)

Position 2 - 3 No additional wait state.

Jumper P8 - Battery

Position 1 - 2 Battery disconnected

Position 2 - 3 Battery connected (default).

Jumper P9 - Parity check on memory

Position 1 - 2 Parity check enabled (default)

Position 2 - 3 Parity check disabled.

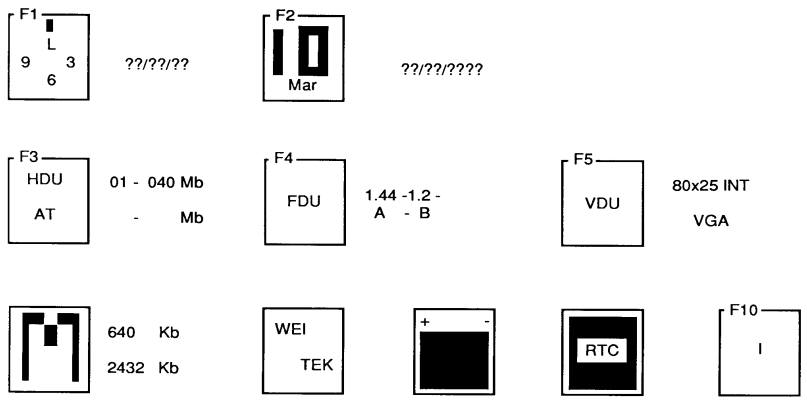
BUILT IN SETUP and EXTENDED SETUP Utilities

The M480-10 and M480-20 personal computers with BIOS release 2.xx no longer use the BUILT IN SETUP utility, and can be configured using the User Diskette or System Test.

BUILT IN SETUP
This program, resident in the ROM BIOS, allows users to change some of the Personal Computer configuration parameters.
There are two possibilities:

First case: If the information in the CMOS RAM is no longer valid or if the power battery is not charging, the screen will display the BUILT IN SETUP. Users can select the national language version they wish to work in from a choice of 6 languages.

Second case: If the system configuration has been modified, only the icon of the device to be added or changed in the CMOS RAM will be displayed. For instance, after installing a second floppy disk the floppy disk icon will be displayed. In both cases, this BUILT IN SETUP screen will be displayed automatically, without any operator action.



F1 To modify the system hour, minutes and seconds.

F2 To modify the system day, month and year.

F3 Press this key to select hard disk type and capacity. Press the space bar until the correct value is displayed. The following table lists the hard disks that can be installed in the system.

TYPE	MODEL	CAPACITY	CYL	T	SECTORS PER TRACK
01	W.D. Caviar 280	85 MB	977	10	17
02	CONNER CP30126 W.D. AC-2120	120 MB 120 MB	762 763	8 8	39 39
CP	CONNER CP3206 CONNER CP3204F	210 MB 210 MB	683 683	16 16	38 38
WD	W.D. AC 4200	210 MB	987	12	35
05	CONNER CP3304	340 MB	726	15	61
06	CONNER CP3504	510 MB	989	26	63

Where: T: No. of disk heads
CYL: No. of disk cylinders

F4 Press this key to select capacity of the floppy disk.Three fields will be displayed beside the icon, according to the number of drives (1, 2 or 3) in the system; enter the capacity of the floppy disk drive installed in the corresponding field.
The line underneath shows the letters A (for one drive only), A - B (for two drives) or A - B - X (for three drives). These are the logic names of the drives.

NOTE: To install a streaming tape drive with floppy interface, the data field corresponding to this unit must not contain any value and the drive must have logic name B associated with it.

F5 Press this key to select the video format when the system is switched on.

Numeric coprocessor This icon is displayed only when the WEITEK coprocessor is installed and is intended to inform the user of this installation.

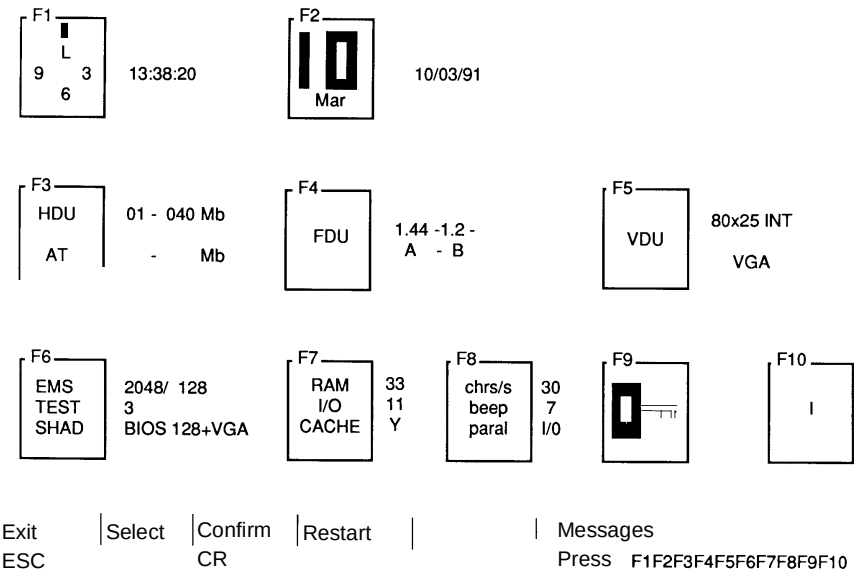
Batteries This icon is displayed only when the system is switched on for the first time or when the system batteries are not charging.

Real time clock This icon blinks when there is a failure of the system's *Real Time Clock* .

Language It is possible to select the language in which to have the messages of the BUILT IN SETUP displayed. One of six languages can be chosen.

EXTENDED SETUP

In addition to the BUILT IN SETUP utility, there is another utility called EXTENDED SETUP with which other parameters of the system can be configured. This utility can be called by the operator by pressing the SHIFT, CTRL, ALT and DEL keys simultaneously.



This menu includes all icons of the BUILT IN SETUP and allows the system to be configured as described previously.
The following other configuration parameters have been added:

F6 EMS Used to modify capacity of the extended memory and memory expansion.

TEST Used to reduce the number of tests made on the system memory during the power-on diagnostics.

SHAD Used to assign a quantity of shadow memory to the BIOS and specific areas of memory.

F7	RAM	Used to modify system speed from the default value of (33 MHz) to 14 MHz,
	I/O	Used to modify the system BUS speed from the default value of 11 MHz to the AT standard speed of 8 MHz.
	CACHE	Used to enable (Y) or disable (N) cache memory.
F8	CHR/S	Used to modify character repeat speed when the associated keys are pressed. This key repeat value is expressed as a number of characters per second.
	BEEP	Used to increase or decrease speaker volume.
	PARAL	Used to change direction of the parallel port.
F9		The system allows the user to enter a **PASSWORD**

HARD DISK SELF-ACKNOWLEGE FEATURE

The hard disk self-acknowledge feature is available on systems with BIOS revision 2.xx .
Using the SETUP utility of the System Test or Customer Test, it is possible to define the type of hard disk installed in the system. After the SETUP utility has been selected, select option hard disk #1 and #2. The following values can be defined in this field:

Not Present:	Where no hard disk is installed.
Standard	In this case, the system automatically acknowledges type and capacity of the hard disk installed. This option can be used for hard disks with the self-acknowledge feature and with a capacity of less than 528 MB.
High Capacity	In this case, the system automatically acknowledges type and capacity of the hard disk installed. This option must be used for hard disks with a capacity of more than 528 MB with the self-acknowledge feature and which have to be used with the Olivetti OS/2, IBM OS/2 and MS-DOS operating systems.
Compatible	This option must be used for hard disks that are compatible with the system but which do not have the self-acknowledge feature, or hard disks that do have the feature but which have been used before hand on systems other than this one. When this option is selected, a list is displayed of the hard disks with preset parameters. Check that the parameters defined match those of the hard disk being installed. The different types are illustrated in the table below:

TYPE	CAPACITY	CYLINDERS	HEADS	SECTORS PER TRACK	WPC	LZ	MODEL
01	10 MB	306	4	17	128	305	STANDARD 10 MB, 8.5 ms
02	40 MB	925	5	17	128	924	WREN II, Full, 35 ms
03	30 MB	697	5	17	128	696	WREN, Full, 35 ms
04	42 MB	981	5	17	-1	980	WREN II Slim
05	53 MB	1024	6	17	-1	1023	Micropolis 1324, Full
06	56 MB	925	7	17	128	924	CDC WREN II, Full
07	71 MB	1024	8	17	-1	1023	Micropolis 1325, Full
08	72 MB	925	9	17	128	924	CDC WREN II, Full
09	44 MB	1024	5	17	-1	1023	Micropolis 1323-A Full
10	42 MB	820	6	17	-1	819	Seagate ST251, Half
11	45 MB	872	6	17	-1	871	RODIME RO3055 40 ms
12	21 MB	612	4	17	128	663	MINISCRIBE M8425 3.5"
13	65 MB	820	6	26	-1	819	SEAGATE ST277R
14	65 MB	820	6	26	128	819	OPE XM5340/60

Not Standard This option allows the service engineer to personally define the parameters of a hard disk without the self-acknowledge feature and which are not in the list of compatible hard disks. The table listing the parameters of the hard disks that are supported by the system BIOS is the same as that of the M400-40 Personal Computer (see page 28-8).

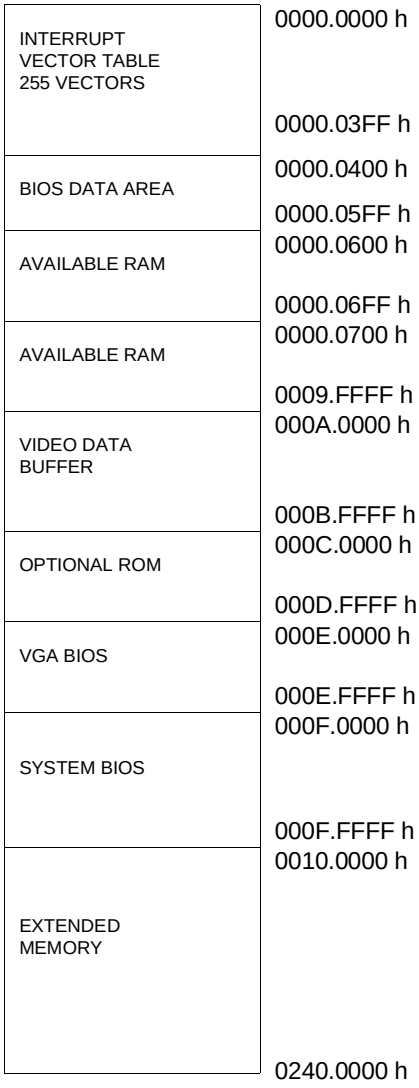
INTERRUPT LEVELS

LEVEL	NAME	CONTROLLER	FUNCTION
1	IRQ0	1	Channel 0 timer OUT
2	IRQ1	1	Keyboard
3 - 10	IRQ2	1	Interrupt to Controller 1 from Controller 2
3	IRQ8	2	Real time clock
4	IRQ9	2	Available
5	IRQ10	2	Available
6	IRQ11	2	Available
7	IRQ12	2	Mouse
8	IRQ13	2	Coprocessor
9	IRQ14	2	Hard Disk controller
10	IRQ15	2	Available
11	IRQ3	1	Serial port 2
12	IRQ4	1	Serial port 1
13	IRQ5	1	Parallel port 2
14	IRQ6	1	Floppy Disk controller
15	IRQ7	1	Parallel port 1

I/O ADDRESS MAP

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000-01F h	DMA controller (channels 0 - 3)	2F8-2FF h	Serial port COM2 (secondary)
020-021F h	Interrupt controller 1	378-37B h	Parallel port 1
040-043 h	Timer	3B4-3B5 h	Video adapter
60 h	Keyboard data controller	3BA h	Video adapter
61 h	System Control Port B	3C0-3CF h	Video adapter
64 h	Keyboard commands controller	3D4-3D5 h	Video adapter
70-71 h	Real time clock, NMI Mask, CMOS RAM	3DA h	Video adapter
081-08F h	DMA page registers	3F0-3F7 h	Floppy disk controller
0A0-0A1 h	Interrupt controller 2	3F8-3FF h	Serial port COM1
0C0-0DF h	DMA channels 4-7	46E8 h	VGA control registers
1F0-1F8 h	Hard disk drive	8000F0-8000FF	Coprocessor
278-27B h	Parallel port 2		

SYSTEM MEMORY MAP



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