M290

CHARACTERISTICS

Microprocessor	80286
Clock	12 MHz
RAM access time	100 ns
Wait states	1
Minimum/maximum capacity	512 KB - 2 SIMM 256 KB modules 1 MB - 2 SIMM 512 KB modules 2 MB - 2 SIMM 1 MB modules
ROM memory	64 KB (1 CHIP 27512)

BOARDS

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
CPU System board	UC081	412061 P	
CPU System board	UC090	412495 G	
Console controller	GE012		
Bus Adapter	IN108	412062 Q	
Power supply 220V	ESAN/HANTAREX	412065 K	W = 150
RAM expansion	RA081/A		MEM 25-292
PGC monitor adapter	GO423	411688 Y	Positive monitor
OVC monitor adapter	GO481	412444 L	VGA compatible 16-bit
OEC monitor adapter	GO491	411860 Y	EGA compatible
HD/FD adapter	GO727	412063 R	ST506/MFM 1:1
HD/MFD adapter	GO731	412508 V	ST506/MFM 1:1
Multifunction board	GO477	412543 P	Floppy-int. HD controller
Serial Interface controller	IF613	411714 R	

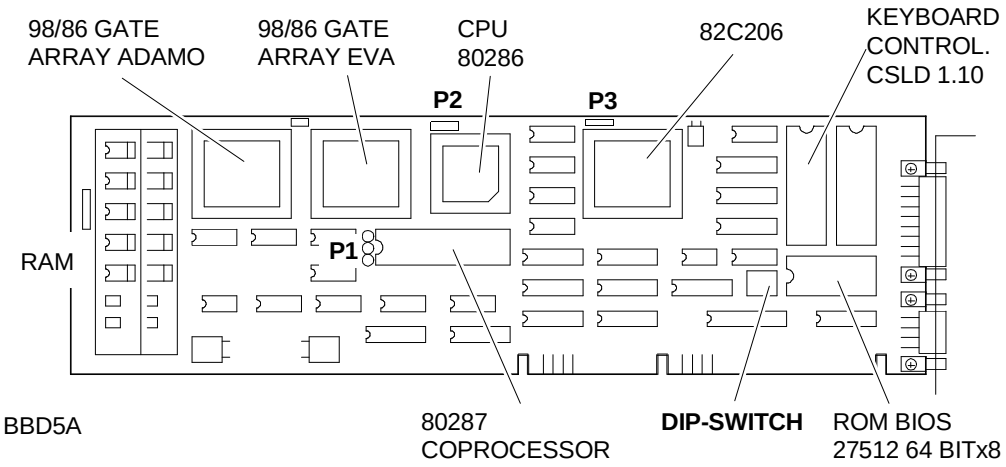
ROM BIOS/PAL/EPROM LEVEL

FUNCTION	EVOLUTION									
BIOS ROM (2/512) Keyboard controller	1.08 1.10	1.10	1.11	1.12	1.17	1.24	1.25	1.28 PEP4	1.29 PEP5	1.34 field only

COMPATIBILITY NOTES

PAL PLVW	- Solves incompatibility problems with PGC monitor adapter (positive video) in M290
ROM BIOS 1.12	- Solves RAM acknowledge problems, after pressing the reset button
ROM BIOS 1.17	- SHADOW RAM management
ROM BIOS 1.24	- 100 MB hard disk management
GA86 and GA87	- 128 KB SHADOW RAM management
ROM BIOS 1.25 PEP3/BIT 11	- Correct management of memory expansion board - Solves problems of "NOVELL"/"A" "@" - Solves parity error
ROM BIOS 1.26	- Solves problems of CONNER hard disk and 33 clock
New ADAMO 2 gate (FCO511)	- New "ADAMO" Gate Array GA099B-V2

SYSTEM BOARD COMPONENTS AND SETTINGS



DIP-SWITCHES

AREA	1	2	3	4	FUNCTION
RAM memory capacity	ON	ON			512 KB
	ON	OFF			1 MB
	OFF	ON			2 MB
	OFF	OFF			2 MB + 256 KB
Monitor adapter type			ON		OEC/OVC adapter
			OFF		PGC/other adapter
Production control				ON	BURN-IN
				OFF	Normal

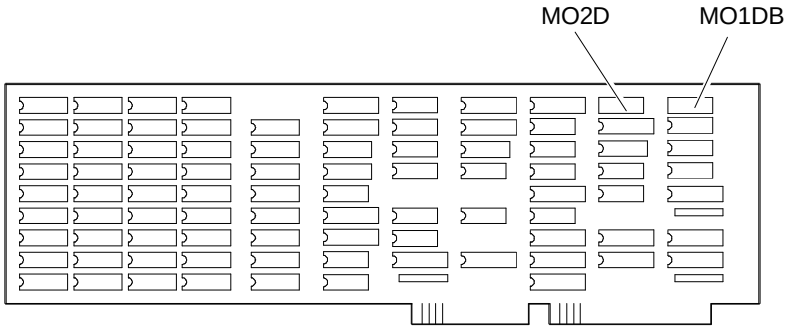
JUMPER P1

POSITION	FUNCTION
1-2	256-512 KB RAM Module
2-3	1 MB RAM Module

JUMPERS P2 and P3
ON OF NORMAL OPERATION

COMPONENT	FUNCTIONS
GATE ARRAY 98/86 EVA	- Memory and I/O select logic control - System configuration register - Memory refresh and interrupt logic - Memory paging logic and DMA operations
GATE ARRAY 99/87 ADAMO	- BUS control and memory timing - Clock generator - BUS arbiter logic - Parity check management - Shut-down logic and reset generation - Coprocessor management logic
IPC 82C206	- 7-channel DMA controller - 13-channel interrupt controller - 3-channel timer management

MEM 25-292 MEMORY BOARD SETTINGS



BBD6A

MO2D DIP-SWITCH BLOCK FOR RAM ADDRESS SELECTION

		1st BOARD	2nd BOARD	3rd BOARD
M290 with 1 MB	1 BOARD	MEM 2/4 MB		
	2 BOARDS	MEM 4 MB	MEM 2/4 MB 4-8 OFF	
	3 BOARDS	MEM 4 MB	MEM 4 MB 4-8 OFF	MEM 2/4 MB 5 OFF
M290 with 2 MB	1 BOARD	MEM 2/4 MB 2-3 OFF		
	2 BOARDS	MEM 4 MB 2-3 OFF	MEM 2/4 MB 2-3-4-8 OFF,	
	3 BOARDS	MEM 4 MB 2-3 OFF	MEM 4 MB 2-3-4-8 OFF	MEM 2/4 MB 2-3-5 OFF

NOTE: The previous table shows only the DIP-Switches that should be set to **OFF**. The rest should be set to **ON**. (See the following table).

BOARD	DIP-SWITCH								SYSTEM BOARD RAM
	1	2	3	4	5	6	7	8	
1	ON	ON	ON	ON	ON	ON	ON	ON	1 MB
	ON	OFF	OFF	ON	ON	ON	ON	ON	2 MB
2	ON	ON	ON	OFF	ON	ON	ON	OFF	1 MB
	ON	OFF	OFF	OFF	ON	ON	ON	OFF	2 MB
3	ON	ON	ON	ON	OFF	ON	ON	ON	1 MB
	ON	OFF	OFF	ON	OFF	ON	ON	ON	2 MB

MO1DB DIP-SWITCH BLOCK FOR I/O ADDRESS SELECTION

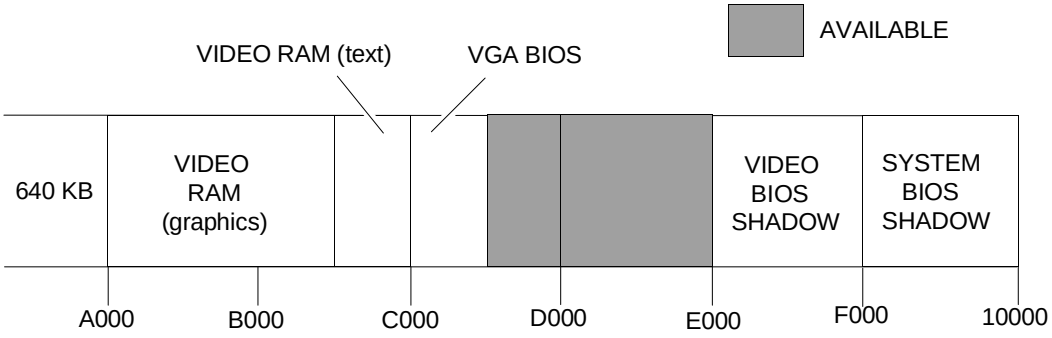
DIGIT No.	SWITCH No.				VALUE
3	6		7		
	ON		ON		000H
	OFF		ON		100H
	ON		OFF		200H
	OFF		OFF		300H
2	2	3	4	5	
	ON	ON	ON	ON	000H
	OFF	ON	ON	ON	010H
	ON	OFF	ON	ON	020H
	OFF	OFF	ON	ON	030H
	ON	ON	OFF	ON	040H
	OFF	ON	OFF	ON	050H
	ON	OFF	OFF	ON	060H
	OFF	OFF	OFF	ON	070H
	ON	ON	ON	OFF	080H
	OFF	ON	ON	OFF	090H
	ON	OFF	ON	OFF	0A0H
	OFF	OFF	ON	OFF	0B0H
	ON	ON	OFF	OFF	0C0H
	OFF	ON	OFF	OFF	0D0H
	ON	OFF	OFF	OFF	0E0H
	OFF	OFF	OFF	OFF	0F0H
1	1				
	ON				000H
	OFF				008H

Example: In order to select address I/O 3C8H, MO1DB DIP-Switch should be set as follows:

DIGIT	VALUE	SWITCH							
		1	2	3	4	5	6	7	8
3	300H						OFF	OFF	X
2	0C0H		ON	ON	OFF	OFF			X
1	008H	OFF							X
TOTAL	3C8H	OFF	ON	ON	OFF	OFF	OFF	OFF	X

X = NOT SIGNIFICANT

SYSTEM MEMORY MAP



Addresses C800 to DFFF are available if shadow memory is active.
If shadow memory of both video BIOS and system BIOS is disabled, segment E000 is available.
If only shadow memory of video BIOS is disabled memory segments are not available because system can not reallocate less than 128 KB.

I/O ADDRESS MAP

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000-01F	DMA controller 1	0C0-0DF	DMA controller 2
020-03F	Interrupt controller 1	0C0-0FF	80287
040-05F	Timer	278-27F	Parallel port 2
060-064	Keyboard controller	378-37F	Parallel port 1
061-065	GA98 registers	1F0-1F8	Hard disk controller
067	RAM page registers	2F8-2FF	Serial interface
069	RAM enable registers	380-3AF	Reserved
070-07F	RTC and NMI registers	3D0-3DF	OEC or PGC board
080-09F	DMA page register	3F0-3F7	Floppy disk controller
0A0-ABF	Interrupt controller 2	3F8-3FF	Serial interface

INTERRUPT LEVELS

LEVEL	FUNCTION
IRQ0	Timer
IRQ1	Keyboard controller
IRQ2	Interrupt from interrupt controller 2
IRQ3	Available
IRQ4	Serial port 1
IRQ5	Available
IRQ6	Floppy disk controller
IRQ7	Parallel port 1
IRQ8	RTC
IRQ9	Available
IRQ10	Available
IRQ11	Available
IRQ12	Available
IRQ13	80287
IRQ14	Hard disk controller
IRQ15	Available

DMA CHANNELS

CHANNEL	FUNCTION
DMA0	8-BIT
DMA1	8-BIT
DMA2	8-BIT
DMA3	8-BIT
DMA4	16-BIT
DMA5	16-BIT
DMA6	16-BIT
DMA7	16-BIT

HARDWARE COMPATIBILITY

MODEM	**MEMORY EXPANSIONS**
HAYES SMARTMODEM (1200B) QUADRAM QUADMODEM II (QM2024) TELENETICS EXPRESSDATA 24i (24i-12i) VEN-TEL PC MODEM HALF-CARD (PCM XT) AT&T 2200 SERIES MODEM (2224-CD0) HAYES SMARTMODEM 1200	AST RAMPAGE/286 (RAMP286) BOCARAM/AT IBM 128 KB/512 KB EXPANSION MEMORY OPTION (6450338) IBM 512 KB/2 MB EXPANSION MEMORY OPTION (6450343) IBM ENHANCED MEMORY EXPANSION ADAPTER (74X8635) INTEL ABOVEBOARD/286 (PCMB4020)
DISPLAY UNITS	**MOUSE**
IBM COLOR GRAPHICS DISPLAY (5153) IBM ENHANCED GRAPHICS MONITOR (5154) IBM MONOCHROME MONITOR (5151) IBM PS/2 COLOR DISPLAY (8512) NEC MULTISYNC MONITOR (APC-H431) PRINCETON RGB DISPLAY (HX-12) ZENITH RGB/COMPOSITE DISPLAY (ZVM-135)	AT&T BUS MOUSE (459420) LOGITECH BUS MOUSE (P7-3F) MICROSOFT BUS MOUSE, REV. C MICROSOFT SERIAL MOUSE MOUSE SYSTEMS PC MOUSE (M1)
NETWORKS & LAN PRODUCTS	**I/O INTERFACE PRODUCTS**
AT&T STARLAN NETWORK IBM PC NETWORK IBM TOKEN RING NETWORK NOVELL NETWORK 3COM NETWORK	APPARAT PARALLEL/SERIAL CARD (7950), REV. 1 IBM ASYNCHRONOUS COMMUNICATIONS CARD (1502074) IBM MONO DISPLAY/PRINTER ADAPTER (1504900) IBM PRINTER ADAPTER (1505200) IBM SERIAL/PARALLEL CARD (6450215)
GRAPHICS PRODUCTS	
AST RESEARCH AST-3G PLUS ATI EGA WONDER GENOA SUPER EGA HIRES HERCULES COLOR CARD (GB200) HERCULES GRAPHICS CARD (GB102) **I**BM ENHANCED GRAPHICS ADAPTER (5154001) IBM VGA ADAPTER PARADISE EGA 480	PARADISE MODULAR GRAPHICS CARD (06-1, Revision 02) PARADISE MULTI-DISPLAY CARD (05-1) QUADRAM QUAD EGA PLUS TECMAR GRAPHICS MASTER BOARD (20037, REV. C) VIDEO-7 VEGA DELUXE 325 INC. ADVANTAGE GRAPHICS INTERFACE (325 SHADOW)

COMPATIBLE HARD DISKS

TYPE	MODEL	CAPACITY	CYL	T	WPC	LZ
1	Standard 85 ms	10 MB	306	4	128	305
2	OPE XM5221 half size	21 MB	615	4	256	700
2	Seagate ST225	21 MB	615	4	256	700
2	NEC D3126	21 MB	615	4	256	700
3	WREN 2 full size	40 MB	925	5	128	924
4	CDC WREN 1	30 MB	697	5	128	696
5	ST4096	80 MB	1024	9	NO	1023
6	OPE XM5340	42 MB	820	6	256	819
7	NEC D5146H	42 MB	615	8	128	614
8	TM755 slim size	42 MB	981	5	NO	980
9	CDC WREN II slim size	42 MB	981	5	128	980
10	Micropolis 1324 full size	53 MB	1024	6	NO	1023
10	RODIME RO413 full size	53 MB	1024	6	NO	1023
11	CDC WREN II full size	55 MB	925	7	128	924
12	Micropolis 1325 full size	71 MB	1024	8	NO	1023
12	RODIME RO414 ful size	71 MB	1024	8	NO	1023
13	CDC WREN II full size	71 MB	925	9	128	924
14	Micropolis 1323-A full size	44 MB	1024	5	NO	1023
15	RESERVED					
16	OPE XM5220 85 ms	20 MB	612	4	128	656
16	NEC D5126	20 MB	612	4	128	656
16	OPE XM3220	20 MB	612	4	128	656
16	Miniscribe M3425	20 MB	612	4	128	656
16	NEC D5126H	20 MB	612	4	128	656
17	TANDON TM 362 85 ms	20 MB	612	4	NO	663
18	Seagate ST251 40 ms	40 MB	820	6	NO	880
19	Rodime RO3055 40 ms	40 MB	872	6	0	871
20	Miniscribe M8425 68 ms	20 MB	612	4	0	663
21	Seagate ST277TR	62 MB	820	6	-1	819
22	OPE XM5340/60	62 MB	820	6	123	819
23	NEC D5147H	62 MB	615	8	384	664
24	NEC D5652	136 MB	820	10	-1	822
25	Micropolis 1355 ESDI	135 MB	1021	8	-1	1023
26	Micropolis 1353 ESDI	67 MB	1021	4	-1	1023
27	NEC D5452	62 MB	823	10	512	824

Where: CYL: No. of disk cylinders
T: No. of disk heads
WPC: Precompensation cylinder number
LZ: Head parking cylinder number

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