486-VAC-V

MAIN BOARD
USER'S MANUAL

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Chapter 1
Overview

The **486-VAC-V** is a high-performance All-in-One motherboard offering outstanding features and performance for building advanced personal computers or workstations. Based on ISA/VESA BUS architecture, this multi-function board includes built-in IDE and FDC interfaces. The on-board Cirrus Logic VGA controller is directly linked to the Local BUS, providing enhanced video performance and Windows acceleration functions.

Specifications

The **486-VAC-V** motherboard comes with the following features:

- Intel **80486SX/DX/DX2™** and Intel **80487SX™** CPU in PQFP and PGA packages.

- **VIA VT82C481™ and VT82C495™** PC/AT **Chipset.**

- Supports **0/64/128/256K** direct-mapped write-back cache memory.

- Supports 1 to 64MB DRAM memory; page mode DRAM operation.

- Shadow RAM.

- **1MB** BIOS.

- One **16-bit** ISA expansion slot.

- One VESA expansion slot.

- Real time clock/calendar.

- Built-in **SMC651™** for IDE HDD and FDD interface.

- Built-in PDC20230™ **local IDE** interface.

- **Two** serial ports and one parallel port.

- PS/2 mouse and keyboard connector.

- Built-in Cirrus GD5426™ or GD5428™ VGA with 1 or 2MB Video RAM on board.

- LPM-size board.

Motherboard Layout
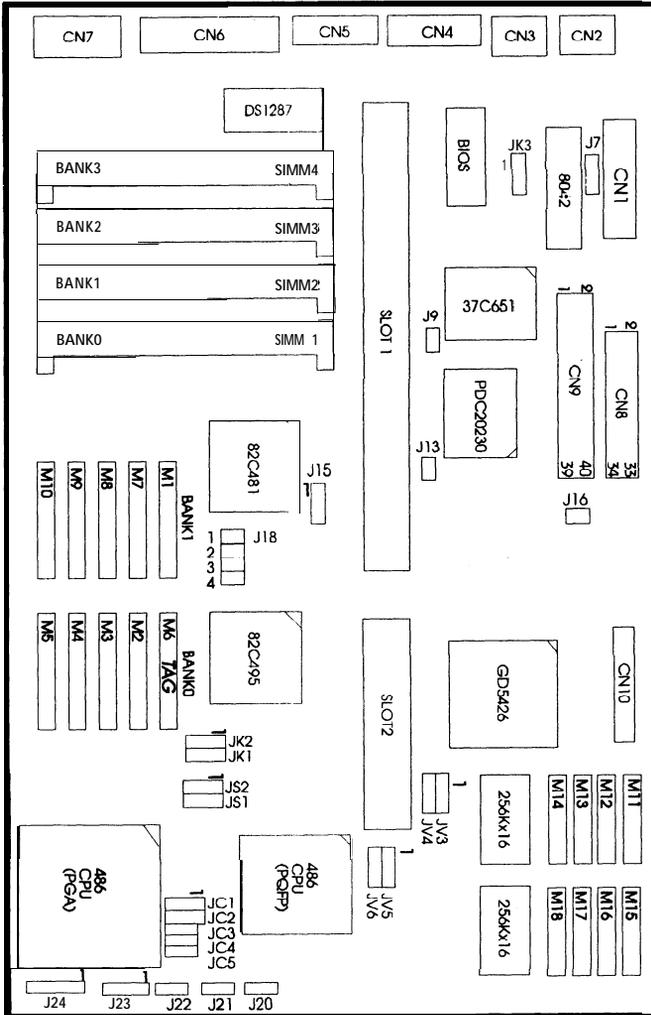
Figure 1-1. Motherboard Layout

System Block Diagram
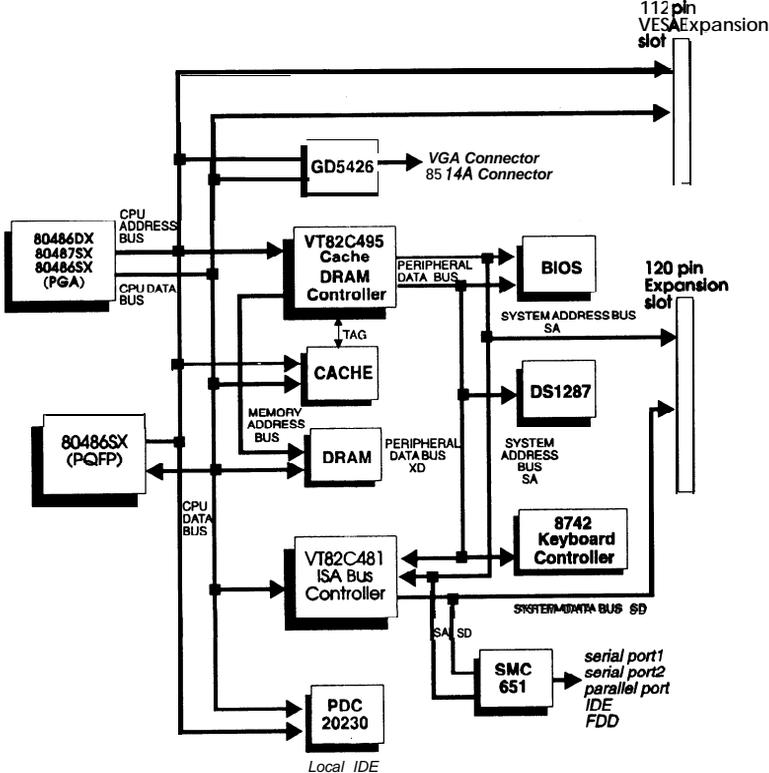
Figure *1-2*. System Block Diagram

Chapter 2
Motherboard Settings

Connector	Pin Out	Signal Name
CN1 - Power connector	1 2 3 4 5-8 9 10-12	Power go **+5V** **+12V** -12v Ground -5v **+5V**
CN2 - **PS/2** Keyboard	1 2 3 4 5 6	Keyboard data NC Ground v c c Keyboard clock NC
CN3 - **PS/2** Mouse	1 2 3 4 5 6	Mouse data NC Ground v c c Mouse clock Ground
CN4 - Serial Port1	1 2 3 4 5 6 7 8 9	Data carrier detect Receive data Transmit data Data transmit ready Ground Ready to receive data Request to send data Clear to send Ring indicator
CN5 - Serial Port 2	1 2 3 4 5 6 7 8 9	Data carrier detect Receive data Transmit data Data transmit ready Ground Ready to receive data Request to send data Clear to send Ring indicator

Table 2-1. Connector Description

Connector	Pin Out	Signal Name
CN6 - Parallel port	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18-25	LPT strobe. LPT DO LPT D1 LPT D2 LPT D3 LPT D4 LPT D5 LPT D6 LPT D7 LPT acknowledge LPT busy Paper end Selected status Auto line feed LPT error Initiate printer Select printer Ground
CN7 - VGA Connector	1 2 3 4 5-8 9 10 1 I-12 13 14 15	Red Green Blue NC Ground NC Ground NC Horizontal sync Vertical sync NC
CN8 - FDD Connector	2 4 6 8 10 1 2 14 16 18 20 22 24 26 28 30 32 34 1,3,5,7,9,11, 13,15,17,19, 21,23,25,27, 29,31,33	Density selection NC NC Index detection Select motor A Select drive B Select drive A Select motor B Direction control Step pulse Write data Write enable Track 0 Write protect Read data Head select Disk change Ground

Table 2- I. Connector Description (Continued)

Connector	Pin Out	Signal Name
CN9 -	1	Reset hard disk
IDE Connector	2	Ground
	3	HDD7
	4	HDD8
	5	HDD6
	6	HDD9
	7	HDD5
	8	HDD10
	9	HDD4
	10	HDD11
	11	HDD3
	12	HDD12
	13	HDD2
	14	HDD13
	15	HDD1
	16	HDD14
	17	HDD6
	18	HDD15
	19	Ground
	20-21	NC
	22	Ground
	23	HD I/O write
	24	Ground
	25	HD I/O read
	26	Ground
	27	IOCHRDY
	28	HD address latch
	29	NC
	30	Ground
	31	IRQ14
	32	IOCS16
	33	HD AI
	34	NC
	35	HD A0
	36	HDA2
	37	HD chip select 0
	38	HD chip select 1
	39	HD active
	40	Ground

Table 2-1. Connector Description (Continued)

Connector	Pin Out	Signal Name
CN10 - 8514A Connector	1 2,4,6,16,18, 20,22,25 3 5 7 8 9 10 11 12 13 14 15 17 19 21 23 24 26	VP0 Ground VP1 VP2 VP3 Enable video data VP4 Enable sync signal VP5 Enable video dot clock VP6 NC VP7 Video dot clock Banking Horizontal sync Vertical sync NC NC
J13 HDD LED	1 2	HDD Signal Ground
J20 Turbo LED	1 2	LED - LED +
J21 Turbo Switch	1 2	Ground Turbo signal
J22 Reset Switch	1 2	Ground Reset signal
J23 Speaker Connector	1 2 3 4	Speaker signal NC Ground **VCC**
J24 Power LED **&** **Key lock**	**1, 2** 3 4 5	Power LED Ground Keyboard clock Ground

Table 2-1. Connector Description (Continued)

Jumper	Function	Open	Close
J9	IOCHRDY (for Hard Disk)	No IOCHRDY #	IOCHRDY
J16	BALE (for Hard Disk)	No BALE #	BALE

Jumper	Function	1-2	2-3
J7	Software RTC Clear	Clear (For AWARD)	Clear (For AMI)
J15	A20 Gate	Fast A20 #	KB A20
JK3	Address Decode (for WEITEK)	Normal #	WEITEK Interface

TABLE NOTE: # *Default*

Table 2-2. System Setting

Jumper	Function	1-2	2-3
JV3	VGA On/Off	ON #	OFF
JV4	IRQ9	ON	OFF #
JV5	VESA BUS setting wait state	0 Wait #	1 Wait
JV6	VESA BUS setting CPU speed	<=33MHz #	>33MHz

TABLE NOTE: # *Default*

Table 2-3. Video Setting

NOTE: To upgrade display memory to 2MB, install 8 pieces of DIP 44256-70 DRAM at Ml 1 to M18.

J18				IMI 425 Clock (MHz)
1-2	3-4	5-6	7-8	
0 (short)	0	0	0	24
1 (open)	0	0	0	32
0	1	0	0	40
1	1	0	0	50
0	0	1	0	80
1	0	1	0	66. 6
0	1	1	0	66. 6
1	1	1	0	Test
0	0	0	1	12
1	0	0	1	16
0	1	0		20
1	1	0	1	25
0	0	1	1	40
1	0	1	1	50
0	1	1	1	33.3 (Default)
1	1	1	1	PW_DN

Table 2-4. Clock Setting

CPU	JK1	JK2	JC1	JC2	JC3	JC4	OSC1 (MHz)
804860X-33 **(Default)**	2-3	2-3	I-2	1-2	ON	ON	33.33
80486DX-25	1-2	1-2	I-2	I-2	**ON**	**ON**	**50.00**
80486DX-20	**1-2**	1-2	1-2	1-2	ON	ON	40.00
80486DX2-66	2-3	2-3	I-2	I-2	ON	ON	33.33
80486DX2-50	I-2	1-2	1-2	1-2	ON	ON	50.00
80487SX-25	1-2	1-2	I-2	1-2	OFF	OFF	50.00
80487SX-20	**1-2**	1-2	I-2	I-2	OFF	**OFF**	**40.00**
804868X-33	2-3	2-3	2-3	2-3	OFF	OFF	33.33
80486SX-25	1-2	1-2	2-3	2-3	OFF	OFF	50.00
80486SX-20	1-2	1-2	2-3	2-3	OFF	**OFF**	**40.00**

JC5	ON	OFF
(CPU **Package)**	**PGA** (default)	PQFP

Table 2-5. CPU Type Selection

Jumper	64K	128K	256K
JS1	**1-2**	**2-3**	**2-3**
JS2	**1-2**	**1-2**	**2-3**

Table 2-6. Cache Selection

ISA/VESA Expansion Slot Connector

The motherboard provides one ISA/VESA expansion slot connector. The following list gives a detailed arrangment and pin outs of this slot. 'Side A" of the connector are the component pin outs on the board. "Side B" of the connector are the solder pin outs on the board.

Connector	Side A - pins and pin outs		Side B - pins and pin outs	
SLOT1	01	+12V	01	+12V
	02	Ground	02	+5V
	03	Ground	03	Ground
	04	IOCHCK#	04	Ground
	05	SD7	05	RES_DRV
	06	SD6	06	+5V
	07	SD5	07	IRQ9
	08	SD4	08	- 5V
	09	SD3	09	DREQ2
	10	SD2	10	- 12V
	11	SD1	11	0WS#
	12	SD0	12	+12V
	13	IOCHRDY	13	Ground
	14	AEN	14	SMEMW#
	15	LA19	15	SMEMR#
	16	LA18	16	IOW#
	17	LA77	17	IOR#
	18	LA76	18	DACK3#
	19	SA15	19	DREQ3
	20	SA14	20	DACK1#
	21	SA13	21	DREQ1
	22	SA12	22	REFRESH#
	23	SA7 7	23	SYS_CLK
	24	SA10	24	IRQ7
	25	SA9	25	IRQ6
	26	SA8	26	IRQ5
	27	SA7	27	IRQ4
	28	SA6	28	IRQ3
	29	SA5	29	DACK2#
	30	SA4	30	TC
	31	SA3	31	BALE
	32	SA2	32	+5V
	33	SA1	33	OSC
	34	SAO	34	Ground
	35	Ground	35	Ground
	36	Ground	36	+5V
	37	+5V	37	+5V
	38	SBHE#	38	MEMCS16#
	39	LA23	39	IOCS16#
	40	LA22	40	IRQ10
	41	LA21	41	IRQ11
	42	LA20	42	IRQ12
	43	LA19	43	IRQ15
	44	LA18	44	IRQ14
	45	LA17	45	DACK0#
	46	MEMR#	46	DREQ0
	47	MEMW#	47	DACK5#
	48	SD8	48	DREQ5
	49	SD9	49	DACK6#
	50	SD10	50	DREQ6
	51	SD11	51	DACK7#
	52	SD12	52	DREQ7
	53	SD13	53	+5V
	54	SD14	54	MASTER#
	55	SD15	55	Ground
	56	Ground	56	Ground
	57	Ground	57	Ground
	58	Ground	58	+5V
	59	*LDEV1#	59	*LREQ1#
	60	*GNT1#	60	NC

Table 2-7. ISA/VESA Slot Connector

Connector	Side A - pins and pinouts		Side B - pins and pinouts	
				DAT00
SLOT2	02	DAT03	02	DAT02
		Ground		DAT04
	03	DAT05	03	DAT06
	05	DAT07	05	DAT08
		DAT09		Ground
	06	DAT11	06	DAT10
	08	DAT13	08	DAT12
	09	DAT15	09	vcc
		Ground		DAT14
	10	DAT17	10	DAT16
				DAT18
	12	DAT19	13	DAT20
	13	DAT23	14	Ground
	15	DAT25	15	DAT22
	16		16	DAT24
	17	Ground	17	DAT26
	18	DAT27	18	DAT28
	19	DAT29	19	DAT30
	20	ADR30	20	vcc
	21	ADR28	21	ADR31
	22		22	Ground
	23	ADR26	23	ADR29
	24	ADR24	24	ADR27
	25	ADR22	25	ADR25
	26		26	ADR23
	27	vcc	27	ADR21
	28	ADR18	29	ADR19
	29	ADR16	30	Ground
		ADR14		ADR17
	30	ADR12	31	ADR15
	32		32	vcc
	33	ADR10	33	ADR13
	34	ADR08	34	ADR11
	35	ADR06	35	ADR09
	36	ADR04	36	ADR07
	37	WBACK#	37	ADR05
	38	BE0#	38	Ground
				ADR03
	39	BE1#	39	ARD02
	41	BE2#	41	NC
		Ground		RESET#
	43	BE3#	43	D/C#
	44		44	M/IO#
	45	ADS#	45	W/R#
	48	LRDY#	48	RDYRTN#
	49	LDEVO#	49	Ground
	50	LREQ0#	50	IRQ9
	51	Ground	51	BRDY#
	52	LGNT0#	52	BLAST#
	53	VCC	53	ID0
	54	ID2	54	ID1
	55	ID3	55	Ground
	56	ID4	56	LCLK
	57	LKEN#	57	vcc
	58	LEADS#	58	LBS16#

NOTE: The 120-pin slot connector pinout has been modified. If it is used with a standard 120-pin slot card, it may not work properly.

Table 2-7. ISA/VESA Slot Connector (Continued)

Chapter 3
System Memory

Total Memory	Bank 0	Bank 1	Bank 2	Bank 3
1MB	1MB			
2MB	1MB	1MB		
3MB	1MB	1MB	1MB	
4MB	1MB	1MB	1MB	1MB
4MB	4MB			
5MB	4MB	1MB		
6MB	4MB	1MB	1MB	
7MB	4MB	1MB	1MB	1MB
8MB	4MB	4MB		
12MB	4MB	4MB	4MB	
16MB	4MB	4MB	4MB	4MB
16MB	16MB			
17MB	16MB	1MB		
18MB	16MB	1MB	1MB	
19MB	16MB	1MB	1MB	1MB
20MB	16MB	4MB		
21MB	16MB	4MB	1MB	
22MB	16MB	4MB	1MB	1MB
24MB	16MB	4MB	4MB	
28MB	16MB	4MB	4MB	4MB
32MB	16MB	16MB		
33MB	16MB	16MB	1MB	
34MB	16MB	16MB	1MB	1MB
36MB	16MB	16MB	4MB	
40MB	16MB	16MB	4MB	4MB
48MB	16MB	16MB	16MB	
64MB	16MB	16MB	16MB	16MB

Table 3-1. Memory Configuration

NOTE: All memory banks use the 72-pin memory modules.

	64K	128K	256K
ALTER RAM	8K x 8	8K x 8	32Kx 8
TAG RAM	8K x 8	8K x 8	32Kx 8
DATA RAM	8K x 8	32Kx 8	32Kx 8

Table 3-2. Cache Configuration Size
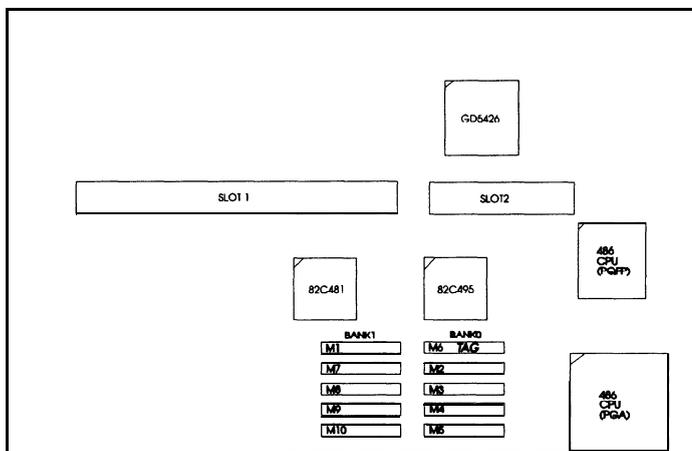
Figure 3-1. Cache Bank Location on the Motherboard

64K Direct Mapped Cache

M1	[==== ====] *	M6	8Kx8
M7	8Kx8	M2	8Kx8
M8	8Kx8	M3	8Kx8
M9	8Kx8	M4	8Kx8
M10	8Kx8	M5	8Kx8
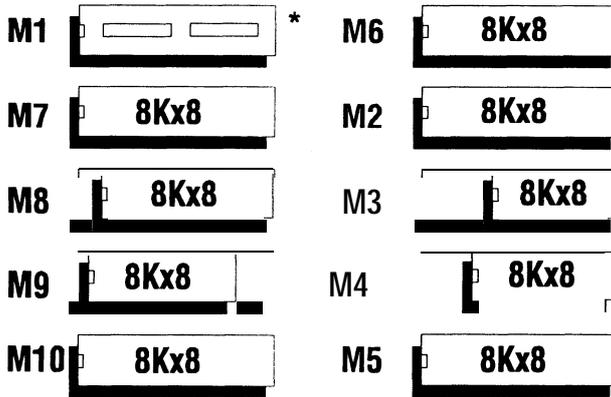
Figure 3-2. 64K Direct Mapped Cache

NOTE: **64K** Direct Mapped Cache option is achieved by installing eight 8Kx8 SRAM (DATA RAM) DIPs at M2 to M5 and M7 to M10, and one 8Kx8 SRAM (TAG RAM 28 pin) at M6.

128K Direct Mapped Cache

M I `[  ⬜ ⬜  ]` *	M6 `[  8Kx8  ]`
M7 `[  ⬜ ⬜  ]`	M2 `[  32Kx8  ]`
M8 `[  ⬜ ⬜  ]`	M3 `[  32Kx8  ]`
M9 `[  ⬜ ⬜  ]`	M4 `[  32Kx8  ]`
M10 `[  ⬜ ⬜  ]`	M5 `[  32Kx8  ]`
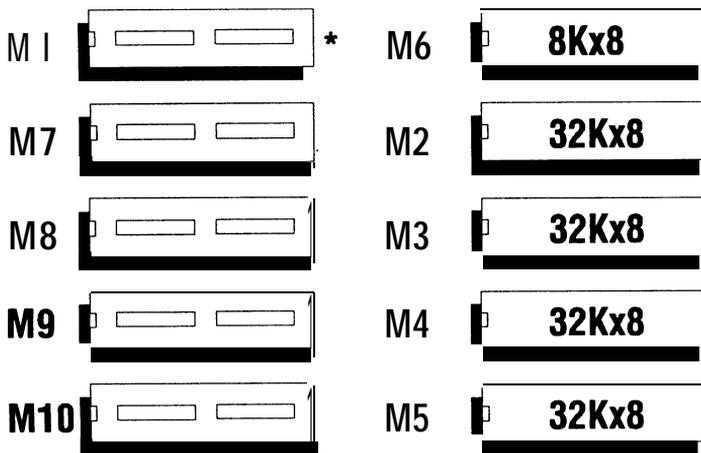
Figure 3-3. 128K Direct Mapped Cache

NOTE: 128K Direct Mapped Cache option is achieved by installing four 32Kx8 SRAM (DATA RAM) DIPs at M2 to M5 and one 8Kx8 SRAM (TAG RAM 28 pin at M6.

256K Direct Mapped Cache
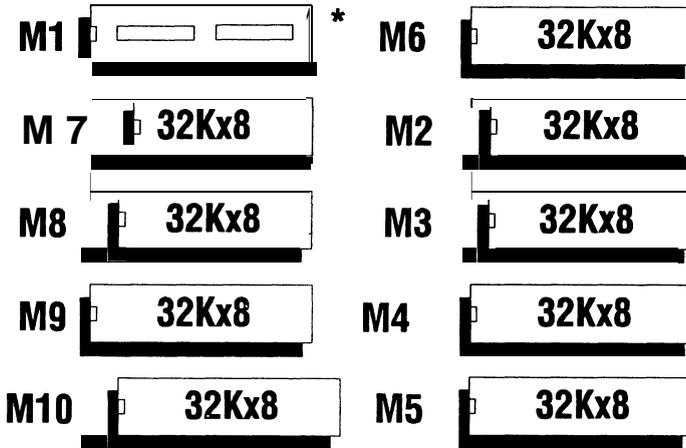
Figure 3-4. 256K *Direct Mapped Cache*

NOTE: 256K Direct Mapped Cache option is achieved by installing eight **32Kx8** SRAM (DATA RAM) **DIPs** at M2 to **M5** and M7 to **M10**, and one **32Kx8** SRAM (TAG RAM 28 pin) at M6.

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Chapter 4
Award BIOS Setup

System Setup

A SETUP program, builtinto the system BIOS, is stored in the CMOS RAM that allows the configuration settings to be changed. This program is executed when:

- User changes system configuration.

- User changes system backup battery.

- System detects a configuration error and asks the user to run the SETUP program.

After power-on RAM testing, the message below appears:

"TO ENTER **SETUP** BEFORE BOOT, PRESS CTRL-ALT-ESC" or **<DEL>** key.

Press "CTRL+ALT+ESC"or **<DEL>** to run SETUP. The screen below appears:

```
                    ROM ISA BIOS (VIAOOOOO)
                     CMOS  SETUP  UTILITY
                    AWARD  SOFTWARE,  INC

  STANDARD CMOS SETUP              PASSWORD SETTING

  BIOS  FEATURES  SETUP            IDE  HDD  AUTO   DETECTION

  CHIPSET FEATURES SETUP           HDD LOW LEVEL FORMAT

  LOAD BIOS DEFAULTS               SAVE & EXIT SETUP

  LOAD SETUP DEFAULTS              EXIT WITHOUT SAVE


  ESC : Quit               ↑↓→ ← :Select Item
  F10 : Save & Exit          (Shift) F2 : Color


           Time, Date, Hard Disk Type
```

Use ↑ or ↓or → or ← key to select and press "ENTER" to run your selection.

Standard CMOS Setup

The Standard CMOS SETUP has 10 items for setting. Each item may have one or more option settings. Move cursor to the desired item for setting. Use the "PgUp",or "PgDn" keys to see the options available for the highlighted item.

```
                        ROM ISA BIOS (VIA00000)
                        STANDARD CMOS SETUP
                        AWARD  SOFTWARE,  INC.

  Date (mm: dd: yy)        Sat, May 15 1993
  Time (hh: mm: ss)        12 : 37 : 05
  DAYLIGHT  SAVING         Disabled
                               CYLS.  HEADS  PRECOMP LANDZONE SECTORS
  Drive C: User (81mb)         611     16      0        0        17
  Drive D: None ( 0mb)          0      0       0        0         0
  Drive A: 1.2M, 5.25 in
  Drive B: 1.44M, 3.5 in                 ┌──────────────────────────┐
                                         │ Base Memory    : 640K    │
  Vi&o  :  EGA/VGA                       │ Extended Memory : 7168K  │
                                         │ Expanded Memory : 0K     │
  Halt on :  All Errors                  │ Other Memory   : 384K    │
                                         ├──────────────────────────┤
                                         │ Total Memory    : 8192K  │
                                         └──────────────────────────┘

  ESC : Quit            ↑↓→← : Select Item    PgUp/PgDn/+/ :Modify
  F1: Help              (Shift)F2 : Change Color F3 :Toggle  Calendar
```

The Standard CMOS SETUP screen is displayed above. System BIOS automatically detects memory size, thus no changes are necessary. Press "F3" to show the calendar.

Daylight Saving

When enabled, this field allows user to set the clock one hour in advance. When disabled, it subtracts one hour from standard time. After the changes are made, 'press "ESC" to return to main menu.

BIOS and Chipset Features Setup

```
                    ROM ISA BIOS (VIAOOOOO)
                     BIOS  FEATURES  SETUP
                    AWARD  SOFTWARE,  INC..

Virus Warning              :   Enabled      System BIOS Shadow          :    Enabled
CPU Internal Cache         :   Enabled      Video BIOS Shadow           :    Enabled
External Cache             :   Enabled      C8000-CBFFF Shadow          :    Disabled
Quick Power On Self Test   :   Disabled     CC000-CFFFF Shadow          :  Disabled
Boot Sequence              :   A:, C:       D000-D3FFF  Shadow          :  Disabled
Boot Up Floppy Seek        :   Enabled      D4000-D7FFF  Shadow         :  Disabled
Boot Up Numlock Status     :   On           D8000-DBFFF  Shadow         :  Disabled
Boot Up System Speed       :   High         DCOOO-DFFFF  Shadow         :  Disabled
IDE HDD Block Mode         :   Disabled     E0000-E3FFF  Shadow         :  Disabled
Gate A20 Option            :   Fast         E4000-E7FFF  Shadow         :  Disabled
Typem atic Rate Setting    :  Disabled      E8000-EBFFF  Shadow         :  Disabled
Typematic Rate (Chars/Sec) :  6            ECOOO-EFFFF  Shadow          :  Disabled
Typematic Delay (Msec)     :  250
Security Option            :  Setup
                                           Esc : Quit          ↑↓→←  : Select  Item
                                           F1 : Help      PgUp/PgDn/+/-  :Modify
                                           F5 : Old Values       (Shift) F2 : Color
                                           F6 : Load BIOS Defaults
                                           F7 : Load Setup Defaults
```

```
                    ROM ISA BIOS (VIAOOOOO)
                     BIOS  FEATURES  SETUP
                    AWARD  SOFTWARE,  INC..

ISA  Command  Delay      :  Nbrmal      On-board FDC Controller     :    Enabled
ISA  Wait  State         :  Normal      On-board IDE Controller     :    Enabled
I/O  Recovery  Time      :  Disabled    On-board Serial Port 1      :    COM1
Extended  ALE            :  Dirabled    On-board Serial Port 2      :    COM2
Decoupled  Refresh       :  Enabled     On-board Parallel Port      :    378H
Relocate  256/384K       :  Disabled    Local IDE Select            :    Disabled
Video  BIOS  Cacheable   :  Enabled
System  BIOS  Cacheable  :  Enabled

DRAM  Timing  Control    :   Fast
Cache  Timing  Control   :   Turbo
                                        Esc : Quit          ↑↓→ ← : Select Item
                                        Fl : Help      PgUp/PgDn/+/-  : Modify
                                        F5 : Old Valuer       (Shift) F2 : Color
                                        F6 : Load BIOS Defaults
                                        F7 : Load Setup Defaults
```

NOTE : Users are not encouraged to run the BIOS and Chipset Features Setup items. Your system should have been fine-tuned before shipping. Improper Setup may cause system to fail. Consult dealer before making any changes. Default values of the various Setup items on this chapter may not necessarily be the same ones shown on your screen.

Load Setup Default

Selecting this field loads the factory defaults for BIOS and CHIPSET FEATURE which the system automatically detects.

Load BIOS Default

BIOS defaults contain the most appropriate values of the system parameter that allows minimum system performance. The OEM manufacturer may change the defaults through MODBIN before the binary image burns into the ROM.

Password Setting

Seiect this function to create a password. Type your password up to eight characters and press **"Enter". You** will be asked to confirm the password. Type the password again and press **"Enter". You** may also press **"Esc"** to abort the selection and not enter a password. To disable your password, press **"Enter"** when you are prompted to enter password. A message appears, confirming the password has been disabled. When the password is disabled, the system boots and you can enter SETUP freely.

Security Option

If you select **System** under this field, you will be prompted for the password every time system is rebooted or any time you try to enter SETUP. If you select **Setup, you** will be prompted only when you try to enter SETUP.

Standard CMOS SETUP

```
         AMI BIOS  SETUP  PROGRAM - STANDARD  CMOS  SETUP
            0 1992 American Megatrends Inc., All Rights Reserved

  Date (mn/date/year)    :  Fri, Jun 11 1993        Base  memory  :  640 KB
  Time (hour/min/sec)    :  11 : 32 : 03             Ext. memory  :  3072 KB
                                            Cyln Head WPcom LZone Sect Size
  Hard Disk C: Type      :  17               977   5    300   977   17   41 MB
  Hard Disk D: Type         : Not Installed
  Floppy Drive A: : 1.2MB,5 1/4"
  Floppy Drive B: : Not Installed
  Primary Display : VGA/PGA/EGA                  Sun Mon Tue Wed Thu Fri Sat
  Keyboard        : Installed                     26   27   28   29   30   31   1
      Month   :   Jan, Feb, . . . Dec              2    3    4    5    6    7    8
      Date    :   01, 02, 03, . . . 31             9   10   11   12   13   14   15
      Year    :   1901, 1902, . . . 2099          16   17   18   19   20   21   22
                                                  23   24   25   26   27   28   29
                                                  30    1    2    3    4    5    6

       ESC : Exit    ↓→↑ : Select    F2/F3 : Color PgUp/PgDn : Modify
```

The standard CMOS SETUP screen is shown above. System
BIOS automatically detects memory size, thus no changes
are necessary. After the changes are made, press **"Esc"** to
exit. The SETUP program is completely menu driven. Use the
arrow keys to select an entry; **"PgUp/PgDn"** keys to change
an entry; and **"Esc"** key to exit. Help messages are displayed
in a window on the screen when Alt-Fl is pressed.

Chapter 5
AMI BIOS Setup

System Setup

A SETUP program, built into the system BIOS, is stored in the CMOS RAM that allows the configuration settings to be changed. This program is executed when:

- User changes system configuration.

- User changes system backup battery.

- System detects a configuration error and asks the user to run the SETUP program.

After power-on RAM testing, the message below appears:

"Press **<DEL>** **if you want to run** SETUP."

Press "DEL" to run setup or do nothing to bypass. If the "DEL" key is pressed, the following screen is displayed:

```
AM1 BIOS SETUP PROGRAM - BIOS SETUP UTILITIES
© 1992 American Megatreads Inc., All Rights Reserved

              STANDARD CMOS SETUP
              ADVANCED CMOS SETUP
        AUTO CONFIGURATION WITH BIOS DEFAULTS
      AUTO CONFIGURATION WITH POWER-ON DEFAULTS
               CHANGE PASSWORD
             AUTO DETECT HARD DISK
               HARD DISK UTILITY
            WRITE TO CMOS AND EXIT
          DO NOT WRITE TO CMOS AND EXIT

Load BIOS Setup Default Values for Advanced CMOS and Advanced CHIPSET Setup

  ESC : Exit ↓→↑ Sel  F2/F3 : Color F10 : Save & Exit
```

Use ↓ and ↑ keys to select and press **"Enter"** to run your selection.

Standard CMOS SETUP

```
                AM1 BIOS SETUP PROGRAM ▪ STANDARD CMOS SETUP
                  © 1992 American Megatrends Inc., All Rights Reserved

   Date (mn/date/year)     : Fri, Jun 11 1993        Base  memory : 640 KB
   Time (hour/min/sec)     : 11 : 32 : 03            Ext. memory : 3072 KB
                                            Cyln Head WPcom LZone Sect Size
   Hard Disk C: Type       : 17              977  5    300    977  17   41 MB
   Hard Disk D: Type       : Not Installed
   Floppy Drive A: : 1.2MB, 5¹/₄"
   Floppy Drive B: : Not Installed           ┌─────────────────────────────┐
   Primary Display : VGA/PGA/EGA             │ Sun Mon Tue Wed Thu Fri Sat │
   Keyboard        : Installed               │ 26  27  28  29  30  31  1   │
       ┌────────────────────────────┐        │ 2   3   4   5               │
       │ Month  :  Jan, Feb, . . . Dec│       │ 9   10  11  12  6 13 7 14 8 15│
       │ Date   :  01, 02, 03, . . . 31│      │ 16  17  18  19  20  21  22  │
       │ Year   :  1901, 1902, . . . 2099│    │ 23  24  25  26  27 4 28  29 │
       └────────────────────────────┘        │ 30  1   2   3       5   6   │
                                             └─────────────────────────────┘

          ESC : Exit    ↓→↑ : Select    F2/F3 : Color   PgUp/PgDn : Modify
```

The standard CMOS SETUP screen is shown above. System
BIOS automatically detects memory size, thus no changes
are necessary. After the changes are made, press **"Esc"** to
exit. The SETUP program is completely menu driven. Use the
arrow keys to select an entry; **"PgUp/PgDn"** keys to change
an entry; and **"Esc"** key to exit. Help messages are displayed
in a window on the screen when Alt-Fl is pressed.

Advanced **CMOS SETUP**

Typematic Rate Programming	: Disabled	Adaptor ROM Shadow D000, 32K :	Disabled
Typematic Rate Delay (msec)	: 500	Adaptor ROM Shadow D800, 32K :	Disabled
Typematic Rate (Chars/Sec)	: 15	Adaptor ROM Shadow E000, 64K :	Disabled
Mouse Support Option	Enabled	Boot Sector Virus Protection :	Enabled
Above 1 MB Memory Test	Disabled	BIOS Cacheable Option	Enabled
Memory Test Tick Sound	Enabled	Video Cacheable Option	Enabled
Hit <DEL> Message Display	: Enabled	256K Relocate Option	Disabled
Hard Disk Type 47 RAM Area	: 0:300	ISA Bus Command Delay	Disabled
Wait For <F1> If Any Error	: Enabled	ISA Slave Wait States	4 W/S
System Boot Up Num Lock	. On	I/O Recovery Time	Disabled
Floppy Drive Seek At Boot	: Enabled	Extended ALE	Disabled
System Boot Up Sequence	A:, C:	Decouple Refresh	Enabled
System Boot Up CPU Speed	: High	FAST A20 PORT 92H	Enabled
External Cache Memory	Enabled	COM 1 Select	Enabled
Internal Cache Memory	Enabled	COM2 Select	Enabled
Password Checking Option	: Setup	Parallel port address	0378H
Video ROM Shadow COOO, 32K	: Enabled	IDE Select	Enabled
Adaptor ROM Shadow COOO, 32K	: Disabled	FDC Select	Enabled
		Local IDE Drive Select	Disabled

Esc : Exit   ↓→↑ : Sel (Ctrl) PgUp/PgDn : Modify F1 : Help F2/F3 : Color
F5 : Old Values   F6 : BIOS Setup Defaults   F7 : Power-on Defaults

Moving around the Advanced CMOS Setup program shown above is similar to moving around Standard CMOS Setup. Users are not encouraged to run Advanced CMOS Setup program. Your system should have been fine-tuned before shipping. Improper setup may cause the system to fail, consult your dealer before making any changes.

> **NOTE : Default values of the various Setup items on this chapter may not necessarily be the same ones shown on your screen.**

Write to CMOS and Exit

```
┌─────────────────────────────────────────────────────────────┐
│         AMI BIOS SETUP PROGRAM - BIOS SETUP UTILITIES        │
│        © 1992 American Megatrends Inc., All Rights Reserved  │
│                                                              │
│                                                              │
│                   STANDARD CMOS SETUP                        │
│                   ADVANCED CMOS SETUP                        │
│           AUTO CONFIGURATION WITH BIOS DEFAULTS              │
│          AUTO CONFIGURATION WITH POWER-ON DEFAULTS           │
│                   CHANGE PASSWORD                            │
│            ┌──────────────────────────────────┐             │
│            │   Write to CMOS and Exit (Y/N) ? Y│             │
│            └──────────────────────────────────┘             │
│                                                              │
├─────────────────────────────────────────────────────────────┤
│                                                              │
│               Write settings to CMOS and Exit               │
│                                                              │
├─────────────────────────────────────────────────────────────┤
│                                                              │
│    ESC : Exit  ↓→↑ : Sel  F2/F3 : Color  F10 : Save & Exit   │
│                                                              │
└─────────────────────────────────────────────────────────────┘
```

After making the necessary changes under SETUP, press
"**Esc**" to return to the main menu. Move cursor to "**Write to
CMOS and Exit**", and press "**y**" to change the CMOS SETUP.
If no changes were made, press "**Esc**" again and press "**y**" to
retain the CMOS settings.

Chapter 6
UTILITY and DRIVERS

The instructions in this chapter assume that you understand elementary concepts of MS-DOS. Before you attempt to install any drivers, you should know how to format a diskette, copy and delete files, and understand MS-DOS directory structure.

You should have made backup copies of the **original** diskettes and should be using the **backu**p ones.

The **486-VAC-V** supplies drivers for DOS and Windows-based programs. These drivers will help you utilize and enhance your system's video subsystem. Each drivers diskette contains a **README** file giving information on the diskette. Read the file first by using any word processor in the non-document or ASCII mode.

The installation utility is provided to facilitate the smooth installation of the display drivers. The installation program is menu-driven and allows you to select and install only those display drivers for software and application currently in use.

It is important to note that some display drivers need to have **the** associated vendor's **application** program already installed on the system prior to loading the VGA display drivers. In other cases, the loading of the display driver may be an integral part of the vendor's product installation process. Please review the driver product section below for specific instructions prior to running the installation program.

The VGA card is supplied with software drivers for the following application programs:

. 3D Studio 1 **.x/2.0**

. **AutoCAD 9/10/11/1** 2

• **AutoShade 1.x/2.0**

• **AutoSketch** 3.x

• Framework **2/3**

- GEM 3.0

- Lotus I-2-3 2.x/3.0/3.1

- MS Windows 3.0/3.1

- **MS** Word 5.0

- OS/2 R. 2.0

- Ventura Publisher 2.x/3.0

- WordPerfect 5.0/5.1

- WordStar 5.5/7.0

- WordStar 2000 V. 3.5

The installation utility is located on the diskette labeled Disk 1. To install the desired display drivers and utility, insert the diskette into the A: drive and type

   A : [Enter]
   INSTALL : [Enter]

Follow the instructions on screen to install the listed display drivers. At any time you may press [Esc] to abort the installation process and go back to DOS. Selected drivers are simply copied to the specified disk and directory.

Clmode

The Clmode utility allows the user to define the type of monitor attached and set the video modes supported by the VGA.

Using Clmode's Menu-driven Interface

At the DOS prompt type: CLMODE **[Enter]**

The main **popup** window consists of a number of buttons. Each button represents a different option or menu. The underlined letter of a button name specifies the hot key combination for that item. For example, press the [Alt] and the underlined letter keys simultaneously or just the underlined letter key to select an option.

NOTE: If you intend to use a mouse with Clmode, then a mouse driver should first be installed prior to running the Clmode utility.

Available Video Modes

Select the Video Mode button. The **Video Mode Preview** window displays all the modes supported according to the monitor type attached, and the amount of video memory present. This list of video modes tells you which are available in your current configuration for use with extended resolution drivers. To see what different video modes look like on your monitor, select the **Preview** button. After each test screen is displayed, press [Enter] or the left mouse button to see the next video mode. if you do not want to see any more video modes press [Esc] or the right mouse button will return you to the **Video Modes Preview** window.

The information in the main window displays the VGA controller type, the BIOS version number and the amount of video memory present.

Getting Help

Clmode provides Help for the following items: Monitor Type, Video Mode Preview, Mouse, Keyboard and About Clmode. The Monitor Type help window explains the different capabilities of each monitor type. The Video Mode help window defines the information given in the Video Mode window. The Keyboard and Mouse help windows explain how to use the keyboard and the **mouse to make selections. The About window displays** the **copyright message and the Clmode version number.**

Exiting the Clmode

To exit Clmode at any time, choose any of the following:

- Press [Alt] and [F4] keys simultaneously.

- Click the left mouse button on the system button of the main window (i.e., The top left corner button of the window which is shown as a dot).

- Select the Exit button.

When the Clmode utility exits, the current video mode, monitor type, and VGA refresh rate will be displayed.

Using Clmode's Command Line Options

When command line options for CLMODE.EXE are given at the DOS prompt, the menu-driven windows will not be displayed. Instead, monitor type, video mode and refresh rate will be set at the DOS prompt. The command line options for CLMODE.EXE are:

CLMODE [[modenum][+*-]] [m[montype] I t6=x t8=x t1 =x t2=x]
[modenum] mode number
[+*-] + selects 400 lines (default)

    * selects **350** lines
    - selects 200 lines
[montype] monitor type
t6=x(Hz) 640x480 **@** (0 **=60, 1 =72)**
t8=x(Hz) 800x600 **@** (0 **=56, 1=60, 2 =72)**
tl=x(Hz) 1024x768 **@ (0 =87i, 1 =60, 2 =70, 3 =72)**
t2=x(Hz) 1280x1024 **@ (0 =87i, 1 =Not available)**

For example, to select mode 3 for a Super VGA monitor (montype **2),** type the following command at the DOS prompt:
CLMODE 3+ m2 [Enter]

To select custom monitor timings with 640x480 at **60Hz** and 800x600 at 72Hz refresh type:
CLMODE t6=0 t8=2 [Enter]

Typing an invalid option will display the command line help text. Typing [S] as a command line option will display the current Clmode settings.

Software Drivers

Windows 3.0/3.1

1. Exit Windows.

2. From the DOS Prompt (e.g., **C:\>)** change the directory to the Windows directory (e.g., CD \WINDOWS).

3. Type "setup" at the MS-DOS prompt.

4. After setup has executed you will be presented with a screen which shows the current Windows configuration. Move the highlighted selection bar to the Display entry. Press [ENTER].

5. A screen which lists the available display adapters which you may select for use with Windows will be presented. Move the highlight bar down to the entry marked "other (Requires disk provided by a hardware manufacturer)". Type in the source drive of the Windows 3.0/3.1 Drivers diskette.

6. Select the desired screen resolution and press Enter. Setup will copy files from the diskette into your Windows directories. You may be prompted for the "Driver Disk (\files subdirectory)." When this happens, enter A:\ if this diskette is in the A: drive.

If you see the message "Problem with disk drive A:" and the installation disk is in drive B, press ESC twice, and re-enter "B:" in the space provided.

7. When Setup is complete, you are returned to the MS-DOS prompt. Type **win** to start Windows.

AutoCAD 9/10/11/12

1. Insert the Display drivers diskette into Drive A: (or B:).

2. Run the installation program (INSTALL.EXE), and choose the option for the Autodesk / AutoCAD drivers and specify the drive and directory where you want them copied to (such as C:\ACAD\DRV).
Since the start-up is a little bit different for AutoCAD Release 12 than it is for older versions, please follow the instructions for the version of AutoCAD you will be using TurboDLD *Classic* with.

To configure AutoCAD 12:

1. Begin AutoCAD with the reconfigure switch by typing **ACAD -R [Enter].**

2. Choose option 3, **Configure Video Display** from the AutoCAD configuration menu.

3. Type Y at the **Do you want to select...** message to display the available video options for AutoCAD.

4. Select **TurboDLD Classic by Panacea Inc.** from the list of display options.

NOTE: If you chose to install TurboDLD *Classic* into a sub-directory other than ACAD\DRV, be sure to modify the ACADDRV environment variable to include that sub-directory. Otherwise, the TurboDLD *Classic* selection will not appear in the list of available drivers.

To configure AutoCAD 11/386:

1. Run the FASTACAD.BAT that was copied to the TurboDLD *Classic* sub-directory by typing:
   C:\TURBODLD\FASTACAD   [Enter].
   The above example shows that TurboDLD *Classic* was installed on drive C: in the TURBODLD sub-directory.

2. Start AutoCAD and reconfigure it to use TurboDLD *Classic* by selecting option 5, **Configure AutoCAD** from the AutoCAD main menu. From the next menu, select option 3, **Configure Video Display.** Choose Item 1, P386 **ADI 4.0/4.1** (R11) as your display device. (For more information, see your AutoCAD 'Installation and Performance Guide.')

GEM 3.0

To install the GEM drivers the first step is to create a diskette file known as the GEM driver pak.

1. Using the standard DOS FORMAT utility, format a blank diskette by inserting it in drive A and typing the following:
   FORMAT A: N **[Enter]**
   The DOS format utility will then prompt for the volume label by displaying:
   Volume Label? (11 characters max) Press Enter for none. .
   At this prompt, type the following volume-label name in upper case:
   GEM DRIVRPK [Enter].

2. Using the DOS COPY utility, copy the following files from the GEM/3 system master diskette (comes with **GEM/3)** to the newly formatted GEM DRIVRPK diskette. Type the following sample commands assuming that the GEM/3 system master diskette is in drive A: and the GEM DRIVRPK diskette is in drive B:
   COPY A:GEMVDI.EXE B: [Enter]
   COPY A:MDGEM?.SYS B: [Enter].

3. Insert the drivers diskette into Drive A:. Run the installation program (INSTALL.EXE), and choose the option for the GEM/3 drivers and specify the drive and directory where you want them copied to (such as B:\). GEM/3 requires that the drivers be installed from the root directory of a floppy disk in drive A:. Be sure to install the drivers to the root of drive A: or drive B: and then place the diskette in drive A: before proceeding.

4. Install GEM/3 (following the instructionsprovided in the product's manual), selecting the standard IBM VGA Color (IBM **PS/2)** driver.

5. After successfully completing installation, insert the GEM/3 System Master Disk in drive A.

6. Move to drive A by typing **A: [Enter].** Please note that you must install from the A: drive.

7. Then type **GEMSETUP [Enter].**
   Follow the GEM/3 installation instructions up to the **CHANGE EXISTING CONFIGURATION** stage. When prompted for a screen driver choice, highlight:
   OTHER (DRIVER PACK).

8. When prompted to insert a screen driver into drive A, insert the newly created GEM DRIVRPK diskette.

9. Select one of the following:
   Cirrus Logic VGA 16 Color 800x600
   Cirrus Logic VGA 16 Color 1024x768.

10.Continue with the remainder of the installation.

Lotus l-2-3 2.x

1. Run the installation program (INSTALL.EXE), and choose the option for the Lotus l-Z-3 and specify the drive and directory where you want them copied to (such as C:\LOTUS).

2. From within the Lotus sub-directory type:
   INSTALL [Enter]

3. From the next menu, select **Advanced Options** for Lotus 1-2-3 V2.2 or **Change Selected Equipment** for Lotus 1-2-3 V2.3.

4 For V2.2, select **Add New Drivers to Library** and go to step 3. For V2.3, select **Modify Current Driver Set** and go to step 6.

5. From the next menu, select **Modify Current Driver Set.**

6. From the next menu, se lect one of the display and resolution configurations.

7. From the next menu, select **Return To Menu.**

8. From the next menu, select **Save Changes.**

9. Enter the name you have selected for the driver set. We recommend that the driver set name reflect or include the driver's resolution (e.g., 132x43)

NOTE: The default driver set name assigned by the program is 123.SET.

You may create multiple driver sets with different display resolutions. To run Lotus l-2-3 with a specific driver set, type:
   123 **SETNAME [Enter]**
where **SETNAME** is the name of the desired driver set.

Lotus l-2-3 3.0/3.1

1. It is assumed that Lotus *3.0 or 3.1* is already installed on your hard disk, using the standard Lotus installation utility. To install this driver, make the directory containing l-2-3 V. 3.0 the current directory. For example, if l-2-3 is in the directory named **123R3**, then type the following command:
     CD **\123R3** [Enter].

2. Look for file INSTALL.DDF, a text file used by the l-2-3 installation utility, containing information on each of the drivers and modes of operation. If you have been using a driver supplied with another graphics adapter, you may want to make a backup copy of the INSTALL.DDF file currently in your l-2-3 directory.
     COPY **INSTALL.DDF** INSTALL.BAK **[Enter]**

3. Run the installation program (INSTALL.EXE), and choose the option for the version of Lotus 1-2-3 that you are using and specify the drive and directory where you want them copied to (such as **C:\123R3**). If the INSTALL.DDF has been copied to a backup file (see step 2 above), answer YES to the prompt to confirm overwriting the file.

4. Run the Lotus installation utility by typing:
     INSTALL [Enter].

5. Select Change selected equipment from the list.

NOTE: If you are currently using another driver supplied with a graphics board, it may be necessary to choose First-time installation.

---

6. Select Modify Current DCF, or Choose another DCF to modify, according to your preference. The following procedure is valid for either selection.

7. Select Change Video Display. This will present you with a list of all the display types provided with the l-2-3 distribution, with two additional choices. **GD542x100** Column Display (800x600 resolution) supports **100x31,** 100x42, and **100x75** 16 color modes. **GD542x128** Column Display (1024x768 resolution) supports **128x40,** 128x54, and 128x96 16 color modes. Select a-resolution that best meets your requirements.

8. After your selection is made, choose the Save Changes option from the menu.

NOTE: When some high-resolution modes are selected, a message may appear asking for the drive letter of the floppy disk. Before entering the drive letter, insert the disk that is requested in the floppy drive. After inserting the disk, you may enter the drive letter containing that diskette.

MS Word 5.0

The high resolution Microsoft Word 5.0 display driver supplied with your VGA supports both high resolution text and graphics. When using a Microsoft Mouse with the driver, please ensure that your mouse driver version level is 7.0 or above.

1. If you have not already done so, install Microsoft Word onto your computer system. **Follow** the instructions supplied with Word. When asked for a screen display type, choose IBM Video Graphics Array (VGA).

2. Run the installation program (INSTALL.EXE), and choose the option for the Microsoft Word drivers and specify the drive and directory where you want them copied to (such as C:\WORD5).

NOTE: To use the new drivers they must be copied to the same directory as Word. Otherwise, they must be copied to the Word directory before they can be used.

---

3. INSTALL.EXE will copy two screen drivers:
   SCREEN8.VID for 800x600 graphics resolution
   SCREEN.VID for 1024x768 graphics resolution.
   The driver to be used must be named SCREEN.VID. When a file is renamed this, it will overwrite the existing display driver. If you wish to preserve the original, it should be renamed or copied prior to installation of the new drivers.

4. The new driver is now installed, and to use it, run Word as you normally would. To view and change the screen resolutions, select **Options,** move the cursor to display mode, and press **[F1]**. Choose the desired screen resolution from the list presented.

5. A sub-menu appears, listing all the choices of resolutions supported by the text driver. Select the desired resolution.

OS/2 R. 2.0

16 **Color Drivers**

This installation guide assumes the user to be familiar with the mouse interface of the **OS/2 2.0** Desktop Shell environment.

1. Save a copy of the DISPLAY.DLL in **\OS2\DLL**. If you are currently running OS/2 **2.0,** open a DOS session by double clicking on a DOS Full Screen icon from the OS/2 Command Prompts folder. The Command Prompts icon is in the **OS/2** System folder. Move to the **\OS2\DLL** directory by typing at the DOS prompt **CD \OS2\DLL [Enter].**
Type **COPY DISPLAY.DLL IBMVGA.DLL /B [Enter]** at the DOS prompt to make a backup copy of the DISPLAY.DLL If you are currently running MS-DOS, follow the above steps for a DOS session to make a backup copy of the DISPLAY.DLL.
Return to the root directory by typing **CD\ [Enter]** and create a subdirectory in your OS/2 drive.
If you intend to install the 16 color drivers:
At the DOS prompt type **md CL16DRV [Enter].**
Type **C:\OS/2\BOOT OS/2 [Enter]** to boot **OS/2 to** continue with the installation.

2. Invoke **OS/2's** Device Driver Install utility from **System Setup** in the **System Folder.** This copies the device drivers from the Driver and Utilities for OS/2 diskette to the hard disk.
Insert the Drivers and Utilities for OS/2 diskette into drive A:.
Double click on the Device Driver Install icon in the System Setup folder. System Setup is in the OS/2 System folder.

Click on the Install button from the OS/2 2.0 Device Driver Installation pop up window. The Select Device Drivers pop up window displays a list of device drivers.

To assist in determining what capabilities your monitor has, refer to the section on Clmode. Select the device driver to be installed from the list and click on the OK button. Device drivers are copied to their corresponding directories.
Click on the Exit button, then the Yes button. If the current DISPLAY.DLL is in use, a dialog box will pop up to notify the user that changes will be in effect on the next reboot. Click the OK button to exit the installation utility.

3. Modify the CONFIG.SYS file in the root directory so that OS/2 will install the correct device driver on the next reboot.
Click on the OS/2 System Editor icon from the Productivity folder which resides in the OS/2 System folder.
Once in the OS/2 System Editor, click on **File Open** and select CONFIG.SYS in the **File** box. If CONFIG.SYS is not displayed, type in the correct path and file name in the **Filename** box (i.e., C:\CONFIG.SYS). Click on **OK.**

Search for the command line which contains the library path and add the following subdirectory to the beginning of the path statement.
For example, `LIBPATH=C:\CL16DRV;.;.......`

Select **Open** from the **File** menu. Open CONFIG.SYS from the root directory.
Search for the command line which contains vvga.sys. For example, `DEVICE=C:\OS2\MDOS\VVGA.SYS`. Select **Find** from the **Edit** menu.
Type VVGA.SYS in the **Find: edit** box.
Uncheck the **Case Sensitive** option if it is checked.
Click on the **Wrap** option so that a tick mark appears in the check box.
Click on the **Find** button.
Once the command line is located, select the **Cancel** button.
Highlight the command line with the mouse, then select **Copy** from the **Edit** menu.
Click at the end of the command line, press the [Enter] key to insert a new line below the current command line. Select **Paste** from the **Edit** menu to make a copy of the command line.

Type REM at the beginning of the original command line. Change **VVGA.SYS** in the pasted command line to **CLVSVGA.SYS.** Select **Save** from the **File** menu and save the changes. Double click on the **SYSTEM** icon to exit the editor. Shutdown the system and reboot for the changes to take effect.

32 Bit 256 Color Drivers

This installation guide assumes the user has installed the Corrective Service Pack provided by IBM. Also, this installation assumes the user is familiar with the mouse interface of the OS/2 2.0 Desktop Shell environment.

1. Save a copy of the DISPLAY.DLL in **\OS2\DLL.** If you are currently running OS/2 2.0, open a DOS session by double clicking on a DOS Full Screen icon from the OS/2 Command Prompts folder. The command Prompts icon is in the OS/2 System folder. Move to the **\OS2\DLL** directory by typing at the DOS prompt **CD \OS2\DLL [Enter].** Type **COPY DISPLAY.DLL IBMVGA.DLL /B [Enter]** at the DOS prompt to make a backup copy of DISPLAY.DLL. If you are currently running MS-DOS, follow the above steps for a DOS session to make a backup copy of the DISPLAY.DLL. Return to the root directory by typing. **CD\ [Enter]** and create a subdirectory in your OS/2 drive. If you intend to install the 256 color drivers: Type at DOS prompt> **md CL32DRV [Enter].** Boot **OS/2** to continue with the installation.

2. Invoke **OS/2's** Device Driver Install utility to copy device drivers from the Driver and Utilities for OS/2 diskette to the hard disk.

insert the Drivers and Utilities for OS/2 diskette in drive A:. Double **click on** the Device Driver Install icon in the System Setup folder. The System Setup icon is in the OS/2 System folder. Click on the Install button from the OS/2 2.0 Device Driver Installation pop up window. The Select Device Drivers opo up window will display a list of device drivers.

To assist in determining what capabilities your monitor has, refer to the **Clmode** section. Select the device driver to be installed from the list and click on the **OK** button. Device drivers are copied to their corresponding directories.

Click on the **Exit** button, then the Yes button. If the current DISPLAY.DLL is in use, a dialog box will pop up to notify the **user that changes will** be in effect on the next reboot. Click the **OK** button to exit the installation utility.

3. Modify the CONFIG.SYS file in the root directory so that OS/2 will install the correct device driver on the next reboot.

Click on the OS/2 System Editor icon from the Productivity folder which resides in the OS/2 System folder.
Select **Open** from the **File** menu. Open CONFIG.SYS from the root directory.
Search for the command line which contains the library path and add the following subdirectory at the beginning of the path statement: For example, LIBPATH=C:\CL32DRV; . ; .... Search for the command line which contains vvga.sys.
For example, DEVICE=C:\OS2\MDOS\VVGA.SYS. Select **Find** from the **Edit** menu.
Type VVGA.SYS in the **Find: edit** box.
Uncheck the **Case Sensitive** option if it is checked. Click on the **Wrap** option so that a tick mark appears in the check box.
Click on the **Find** button.
Once the command line is located, select the **Cancel** button.

Highlight the command line with the mouse, then select **Copy** from the **Edit** menu.
Click at the end of the command line, press the [Enter] key to insert a new line below the current command line. Select **Paste** from the **Edit** menu to make a copy of the command line.
Type REM at the beginning of the original command line. Change VVGA.SYS in the pasted command line to CLVSVGA.SYS.
Select **Save** from the **File** menu and save the changes. Double click on the SYSTEM icon to exit the editor. Shutdown the system and reboot for the changes to take effect.

Windows 3.0 drivers for OS/2 2.0

This section assumes that the WIN-OS/2 Support has been installed. If that option has not been selected at the initial OS/2 installation, please use the Selective Install utility that is in the System Setup folder to first install WIN-OS/2 Support.

1. If you do not currently have a WIN-OS/2 session running, start one.
   Open a WIN-OS/2 session by double clicking on a WIN-OS/2 icon from the OS/2 Command Prompts folder. The Command Prompts icon is in the OS/2 System folder.

2. Run the Install program to copy the WIN-OS/2 Drivers and SetRES Utility to the hard disk.
   In the Program Manager, choose File Run. Specify the diskette drive where the Drivers and Utilities for OS/2 Diskette is inserted, and run the install program.
       A:\INSTALL [Enter]

3. When prompted, specify to copy the files to the **\OS2\MDOS\WINOS2** directory.

4. The resolution may now be selected by running the SetRES Utility. Execute SetRES by double clicking on the SetRES icon. Use the SetRES utility to select either 16 or 256 **colors and the desired resolution** for future Win-OS/2 sessions.

For help on the SetRES utility, select **Help** from the program menu.

Ventura Publisher 2.x/3.0

1. Install Ventura Publisher **V.2.0** as instructed in the product's manual, specifying the Hercules driver.

2. Insert the drivers diskette into Drive B:. Run the installation program (INSTALL.EXE), and choose the option for the Ventura Publisher drivers and specify the drive and directory where you want them copied to (such as A:\). Ventura Publisher requires that the drivers be installed from the root directory of a floppy disk in drive A; or drive B: and then place the diskette in drive A: before proceeding.

3. Change to drive A: by typing A: **[Enter].**
   After the A: prompt appears, run the **VPDRV2_0.EXE**
   program by typing **VPDRV2_0 [Enter].**

NOTE: **VPDRV2_O.EXE** can only be executed from the A: drive.
Follow the step-by-step installation procedure as it
appears on the screen and select one of the following
drivers when prompted:
**Cirrus Logic VGA 800x600 16 of 256K colors or
greys.**
**Cirrus Logic VGA 1024x768 16 of 256K colors or
greys.**

Ventura Publisher V. 2.0 is now configured for the selected
screen resolution and **16** color graphics.

WordPerfect 5.0/5.1/6.0

To use high resolution modes with WordPerfect **6.0,** install the
VESA driver that comes with WordPerfect and configure the
program to use one of the VESA high resolution graphics
modes.

The high resolution WordPerfect version 5.1 driver supplied
with your VGA supports both high resolution text and graphics.
WordPerfect allows graphics and text drivers to be set up
separately, so be sure to install both of these drivers.

To install the WordPerfect high resolution text driver supplied
with your VGA, follow these instructions:

1. If you have not already done so, install WordPerfect onto
   your computer system. Follow the instructions supplied
   with WordPerfect.

2. Run the installation program (INSTALL.EXE), and choose
   the option for the WordPerfect drivers and specify the drive
   and directory where you want them copied to (such as
   C:\WP51).

3. Start WordPerfect, and go into **SETUP** by typing **[Shift-Fl].**

4. Choose Display **[2],** then text screen type by pressing **[3]**.

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5. Move the cursor to where GD542X appears on the list, and choose SELECT.

6. A sub-menu will appear, listing all the choices of resolutions supported by the text- driver. Select the desired resolution.

To install the WordPerfect high resolution graphics driver supplied with your VGA, follow these instructions:

1. If you have not already done so, install WordPerfect onto your computer system. Follow the instructions supplied with WordPerfect.

2. Run the installation program (INSTALL.EXE), and choose the option for the WordPerfect drivers and specify the drive and directory where you want them copied to (such as C:\WP51).

3. Start WordPerfect, and go into SETUP by typing **[Shift-Fl].**

4. Choose Display **[2]**, then graphics screen type by pressing **[2]**.

5. Move the cursor to where VGA appears on the list, and choose **SELECT.**

6. A sub-menu will appear, listing all the choices of resolutions supported by the graphics driver. Select the desired resolution.

WordStar **5.5/7.0** 2000 V. 3.5

1. If you have not already done so, install WordStar onto your computer system. Follow the instructions supplied with WordStar.

2. Run the installation program (INSTALL.EXE), and choose the option for the WordStar drivers and specify the drive and directory where you want them copied to (such as C:\WS).

3. Using a text editor enter the file FONTID.CTL in the WordStar directory and change the CRT_TYPE line to read:
   CRT_TYPE=CL800.WGD

4. When WordStar is executed, the display driver will be used for page preview mode.

Mode No.	No. of Colors	Char.x Row	Char. Cell	Screen Format	Display Mode	Pixel Frequency (MHz)	Horizontal Frequency (KHz)
0,1	16/256K	40x25	9x16	360x400	Text	14	31.5
2,3	16/256K	80x25	9x16	720x400	Text	28	31.5
4,5	4/256K	40x25	8x8	320x200	Graphic	12.5	31.5
6	2/256K	80x25	8x8	640x200	Graphic	25	31.5
7	Mono	80x25	9x16	720x400	Text	28	31.5
D	16/256K	40x25	8x8	320x200	Graphic	12.5	31.5
E	16/256K	80x25	8x14	640x200	Graphic	25	31.5
F	Mono	80x25	8x14	640x350	Graphic	25	31.5
10	16/256K	80x25	8x14	640x350	Graphic	25	31.5
11	2/256K	80x30	8x16	640x480	Graphic	25	31.5
12	16/256K	30x30	8x16	640x480	Graphic	25	31.5
12+	16/256K	30x30	8x16	640x480	Graphic	31.5	37.9
13	256/256K	40x25	8x8	320x200	Graphic	12.5	31.5

Table 6-1. Standard Video Modes

NOTE: Vertical Frequency =70Hz

Mode No.	VESA No.	No. of Colors	Char. x Row	Char. Cell	Screen Format	Pixel Freq. (MHz)	Horizontal Frequency (KHz)	Vertical Frequenzy (Hz)
14	—	16/256)<	132x25	8x16	1056x400	41.5	31.5	70
54	10A	16/256K	132x43	8x8	1056x350	41.5	31.5	70
55	109	16/256K	132x25	8x14	1056x350	41.5	31.5	70
58,6A	102	16/256K	100x37	8x16	800x600	36	35.2	56
58,6A	102	16/256K	100x37	8x16	800x600	40	37.8	60
58,6A	102	16/256K	100x37	8x16	800x600	50	48.1	72
5C	103	256/256K	100x37	8/16	800x600	36	35.2	56
5c	103	256/256K	100x37	8x16	800x600	40	37.9	60
5C	103	256/256K	100x37	8x16	800x600	50	48.1	72
5D+	104	16/256K	128x48	8x16	1024x768	44.9	35.5	87+
5D	104	16/256K	128x48	8x16	1024x768	65	48.3	60
5D	104	16/256K	128x48	8x16	1024x768	75	56	70
5D	104	16/256K	128x48	8x16	1024x768	77	58	72
5F	101	256/256K	80x30	8x16	640x480	25	31.5	60
5F	101	256/256K	80x30	8x16	640x480	31.5	37.9	72
60+	105	256/256K	128x48	8x16	1024x768	44.9	35.5	87+
60	105	256/256K	128x48	8x16	1024x768	65	48.3	60
60	105	256/256K	128x48	8x16	1024x768	75	56	70
60	105	256/256K	128x48	8x16	1024x768	77	58	72
64	111	64K	—	—	640x480	50	31.5	60
64	111	64K	—	—	640x480	63	37.9	72
65	114	64K	—	—	800x600	72	35.2	56
65	114	64K	—	—	800x600	80	37.8	60
66	110	32k*	—	—	640x480	50	31.5	60
66	110	32K*	—	—	640x480	63	37.9	72
67	113	32K*	—	—	800x600	72	31.5	56
6C+	106	16/256K	160x64	8x16	1280x1024	75	48	87+
6D+	—	256/256K	160x64	8x16	1280x1024	75	48	87+
6F	10E	40x25	8x8	8x8	320x200	25	31.5	70
70	10F	16M	40x25	8x8	320x200	38	31.5	70
71	112	16M	80x30	8x16	640x480	75	31.5	60
74+	—	64K	—	—	1024x768	44.9	35.5	87+

Table 6-2. Extended Video Modes

NOTE:	**1.** Only Mode No. 14, 54, 55 are in Text Display Mode.
	2. Some modes are not supported by all monitors. The fastest vertical refresh rate for monitor type selected will be automatically used.
	3. "*****" character stands for 32K Direct-Color / 256-color Mixed Mode.
	4. "**+**" character stands for Interlaced Mode.

Appendix A
Hard Disk Specifications

CONNER

MODEL	CAPACITY	CYLINDER	HEAD	SECTOR
CP-30084	85MB	526	a	39
CP-30084E	85MB	526	8	39
CP-30104	120MB	726	8	39
CP-30104H	120MB	726	a	39
CP-30174	170MB	903	8	46
CP-30174E	170MB	903	a	46
CP-30204	200MB	683	16	38
CP-30204F	200MB	683	16	38
CP-30254	251 MB	895	10	55
CP-3364	360MB	702	16	63
CP-3544	544MB	1024	16	63

MAXTOR

MODEL	CAPACITY	CYLINDER	HEAD	SECTOR
7120A	120MB	1023	14	17
7170A	170MB	964	10	34
7213A	213MB	683	16	38
7245A	245MB	967	16	31
7345A	345MB	790	15	57

QUANTUM

MODEL	CAPACITY	CYLINDER	HEAD	SECTOR
LPS80AT	80MB	611	16	17
LPS105AT	105MB	755	16	17
LPS120AT	120MB	901	5	53
LPS240AT	240MB	723	13	51
ELS85AT	85MB	977	10	17
ELS127AT	127MB	919	16	17
ELS170AT	170MB	1011	15	22

SEAGATE

MODEL	CAPACITY	CYLINDER	HEAD	SECTOR
ST3096A	85MB	1024	10	17
ST3120A	102MB	1024	12	17
ST3144A	125MB	1001	15	17
ST3283A	245MB	978	14	35

WESTERN DIGITAL

MODEL	CAPACITY	CYLINDER	HEAD	SECTOR
AC280	85MB	980	10	17
AC2120	125MB	872	8	35
AC2200	200MB	989	12	35
AC2250	255MB	1010	9	55
AC2340	341MB	1010	12	55

Hard Disk Specifications