

SpeedSTAR VGA™

User Manual



DIAMOND COMPUTER SYSTEMS, INC.

Version 1.00

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FCC NOTICE

This equipment generates and uses radio frequency energy and if not installed and used properly, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient the receiving antenna
- Relocate the computer with respect to the receiver
- Move the computer away from the receiver
- Plug the computer into a different outlet so that computer and receiver are on different branch circuits

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: *How to Identify and Resolve Radio/TV Interference Problems*.

This booklet is available from the U.S. Government Printing Office, Washington DC 20402, Stock No. 004-000-00345-4.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: (1) this

device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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INTRODUCTION

Congratulations on purchasing the *SpeedSTAR* VGA™ board!

You are now the owner of a state-of-the-art graphics adapter offering features and functionality exceeding any other in the VGA class. The *SpeedSTAR VGA™* adapter features include:

- Register- and BIOS-level compatibility with the IBM VGA adapter.
- Extended graphics resolution modes providing 640x480, 800x600, and 1024x768 High Resolution when used with multi-frequency analog monitors*, and similar maximum resolutions with fixed-frequency analog monitors such as the IBM 85XX series.
- Extended text modes providing 132x25, 132x28, 132x44, 100x40, and 80x60 resolutions allowing your microcomputer, using popular emulator and micro/mainframe link products, display emulation of widely used terminals such as the DEC VT100 line and the IBM 3278 MOD 5.
- Extended text mode drivers in Lotus 1-2-3 and Symphony, WordStar, and WordPerfect; and extended graphics mode drivers for Autodesk

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AutoCAD, Digital Research GEM, Microsoft Windows and Ventura Publisher.

- Design and use custom character sets with the font editor and loader software. Scientific and foreign language applications will find this ideal.

* Analog multi-frequency monitors include the Mitsubishi Diamond Scan, NEC MultiSync, Sony Multiscan, and others. The 1024x768 mode is supported by the IBM 8514 and compatible monitors and requires at least 512Kb video RAM on the **SpeedSTAR VGA™** board.

CHAPTER

2**INSTALLATION**

We want you to get started using the *SpeedSTAR* VGA™ board as quickly as possible.

This User Manual is designed to answer questions concerning the installation and use of the *SpeedSTAR* VGA™ board. Please take a few moments to read through this manual before installing the *SpeedSTAR* VGA™. Chances are the answers to your questions are on these pages.

NOTE:

The *SpeedSTAR* VGA™ board uses the same 15-pin (DB15) cable available from monitor manufacturers to interface with the IBM PS/2 computers. Using an incorrect cable may result in damage to the monitor and/or adapter.

SYSTEM COMPATIBILITY**■ IBM Personal Computers**

IBM Personal Computers manufactured prior to April, 1983, must have a new ROM module installed on the system board before installing the *SpeedSTAR* VGA™ board. If you are uncertain which ROM module is installed on your system board, run the following BASIC program.

Enter the program exactly as shown. It will display the date code of the ROM module installed on your system board. If the date displayed is earlier than 10/27/82, a new ROM module is required. The ROM is contained in the BIOS Upgrade Kit available from your IBM dealer. The IBM part number is 1501005.

```

10 DEF SEG=&HF000
20 FOR A=&HFFF5 TO &HFFF
30 PRINT CHR$(PEEK(A));
40 NEXT
RUN
    
```

Additional information on BASIC programs is available in your BASIC manual.

■ IBM PC/XT, XT-286, AT; PS/2 Mod. 25/30, & 30-286

The *SpeedSTAR VGA*™ board is compatible for use in these systems.

■ Compatible Personal Computers

Check with the dealer or manufacturer of your computer. The *SpeedSTAR VGA*™ board is compatible with the IBM Video Graphics Array and Enhanced Graphics Adapter. Most compatible systems support the IBM VGA or EGA standard. If your computer supports the IBM Enhanced Graphics Adapter, then the *SpeedSTAR VGA*™ will operate in your system.

INVENTORY CHECKLIST

Your *SpeedSTAR VGA*™ carton should contain:

- One VGA board

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- One Utilities & Drivers diskette
- One User Manual

TOOLS REQUIRED FOR INSTALLATION

A medium-size, flat-blade screwdriver is needed to install the **SpeedSTAR VGA™**. A medium screwdriver, 3/16-inch nutdriver, and 1/4-inch nutdriver also may be useful.

JUMPER AND SWITCH SETTINGS

Jumper JP3 Settings

- JP3...ON - IRQ2 Enabled (default setting)
- JP3...OFF - IRQ2 Disabled

DIP Switch SW1 Settings

Switch	Configuration	Setting
1	Reserved	ON*
2	Turbo display memory access	ON*
3	Normal display memory access	OFF
	Normal 16-bit BIOS access	ON*
	Alternate 8-bit BIOS access	OFF
4	Turbo mode BIOS access	ON*
	Normal mode BIOS access	OFF

* Default settings

NOTE:

- 1) Some network environments may require that jumper JP3 be set OFF.
 - 2) Systems with a fast I/O bus (over 10MHz) may require that DIP switch 4 be set OFF.
 - 3) Some systems may require that DIP switch 4 be set OFF, when installed on an 8-bit bus.
-
-

DISPLAY MONITORS

The following chart lists examples of the display monitors that may be attached to the **SpeedSTAR VGA™** board and their maximum pixel resolutions and simultaneous colors.

Extended Graphics Modes

<u>Pixels</u>	<u>Colors</u>	<u>Display</u>	<u>Monitor Timing</u>
1024x768*	16/256	HVF,VF,AD	31.5KHz/38.5Hz
1024x768*	16/256	HVF,VF	35.5KHz/43.6Hz
1024x768**	16/256	HVF	49.0KHz/60.0Hz
800x600*	16/256	HVF,VF,AD	31.5KHz/38.5Hz
800x600	16/256	HVF,VF	37.8KHz/60.0Hz
640x480	256	HVF,VF,AD	31.5KHz/60.0Hz
640x400	256	HVF,VF,AD	31.5KHz/70.0Hz
640x350	256	HVF,VF,AD	31.5KHz/70.0Hz

* Interlaced; ** Noninterlaced (See page 14)

HVF = High Resolution Variable Frequency Monitor (NEC 4D, 5D)

VF = Variable Frequency Analog Monitor (Multiscan, MultiSync, including 3D)

AD = Fixed Frequency Analog Monitor (IBM 8513, Zenith ZCM-1490)

Extended Text Modes

<u>Col x Row</u>	<u>Colors</u>	<u>Char Cell</u>	<u>Monitor Timing</u>
132x44	16	8x8	30.9KHz/70.0Hz
132x28	16	8x13	30.9KHz/70.0Hz
132x25	16	8x14	30.9KHz/70.0Hz
100x40*	16	8x15	37.8KHz/60.0Hz
80x60	16	8x8	31.5KHz/60.0Hz

* Requires VF monitor

Monitors compatible with the above displays may be used with the **SpeedSTAR VGA™** board. Check with your dealer to

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ensure the compatibility of any particular display. The 1024x 768 mode with 256 simultaneous colors requires 1MB of video memory.

INSTALLATION INSTRUCTIONS

Seven easy steps:

- Power OFF the computer and any devices (printer, display, modem, etc.) attached to it.

NOTE:

To remember which cables go in which connectors, label the cables and connectors before disconnecting them.

- Remove the computer cover .
- The *SpeedSTAR VGA™* board will fit in any unused slot on the motherboard (installation in a 16-bit slot will result in maximum performance) Unscrew the screw holding the slot cover, and remove the cover.
- Place the gold-fingered, edge connector of the *SpeedSTAR VGA™* board directly above the slot on the motherboard. Gently push down until it snaps into place, making certain the board is fully seated in the slot.
- Insert the screw removed from the expansion slot rear panel cover, and tighten it firmly.

If the *SpeedSTAR VGA™* adapter is being installed in an original IBM PC, observe the following instructions. If installing the adapter in an XT, AT, PS/2, or compatible

devices, skip this next step.

- Using the tip of a ballpoint pen or similar object, set levers 5 and 6 on switch block 1 on the motherboard (switch block 1 is the set closest to the expansion slots; it is marked as SW 1) to the ON position. The ON and OFF positions are usually marked along the side of the switch.
- Carefully slide the cover back over the computer. Install the mounting screws that hold the cover to the computer.

NOTE:

Refer to the user's guide included with your computer system for additional instructions concerning the installation of options. Switch and/or jumper settings vary from system to system. Make sure your computer system is configured properly for the *SpeedSTAR VGA™* board.

THE SOFTWARE DISKETTE

A program diskette is included with the *SpeedSTAR VGA™* board. It is the *SpeedSTAR VGA™* Utilities & Drivers diskette. It includes several routines similar to those on your DOS diskette. Following are descriptions of these *SpeedSTAR VGA™* utilities and other files.

VDIAG.EXE - a diagnostic file that tests *SpeedSTAR VGA™* video modes and details the system configuration. Use this test to check/align the display monitor screen.

VMODE.COM - used to switch the *SpeedSTAR VGA™* display modes. The *SpeedSTAR VGA™* mode displayed depends on the parameter used. VMODE may be accesses

INSTALLATION

from the VMODE menu or directly from the command line.

FASTBIOS.SYS - speeds up video BIOS operations when used in 80286- and 80386-based systems ONLY. Must be installed as the FIRST device in the CONFIG.SYS file. (See Installing the FASTBIOS.SYS Device Driver)

EANSI.SYS - replaces the ANSI.SYS device driver supplied on your DOS system disk. EANSI.SYS is compatible with the standard ANSI.SYS, and additionally supports the extended screen modes provided by the *SpeedSTAR VGA™* board.

FEDIT.COM - the font editor, used to create new fonts and/or modify existing fonts. It uses font files (.FNT) which are included on your *SpeedSTAR VGA™* Utilities & Drivers diskette in the UTIL subdirectory.

FLOAD.COM - the font loader, used to load a selected font into video memory from disk.

INSTALLING THE UTILITIES

To install the *SpeedSTAR VGA™* utility software, simply copy all the files contained in the UTIL subdirectory of the Utilities & Drivers diskette onto your PC- or MS-DOS operating system diskette or fixed disk drive. Please remember to create a duplicate the *SpeedSTAR VGA™* Utilities & Drivers diskette before using it.

NOTE: Refer to the DOS Manual if necessary while installing the *SpeedSTAR VGA™* software.

- Boot the system.
- Insert the *SpeedSTAR VGA™* Utility Diskette into drive A.

INSTALLATION

- At the DOS prompt type A:, then press<Enter>.

To install the **SpeedSTAR VGA™** utilities on the "B:" drive, insert a bootable PC DOS diskette (created with the FORMAT /S command) into drive "B:" then type:

```
COPY \UTIL\*.* B: <Enter>
```

To install the **SpeedSTAR VGA™** utilities on the "C:" drive under the directory \UTIL type:

```
COPY \UTIL\*.* C:\UTIL <Enter>
```

CHAPTER

3

USING THE UTILITIES

Following are instructions for using the utilities.

NOTE:

Your DOS Manual contains explanations of common terms and instructions on how to perform common operations, such as checking your disk directory. Refer to your DOS manual if necessary while performing the steps outlined in this section.

THE EXTENDED-COLUMN MODES

SpeedSTAR VGA™ provides extended column mode capability with text applications. This means that your *SpeedSTAR VGA™* board, when interfaced with appropriate color displays, can produce 132x44, 132x28, 132x25, 100x40, and 80x60 modes in addition to the standard 80x25 and 40x25 modes. With the appropriate software, the 132-column display capability allows emulation of terminals that require 132 columns of text.

With the *SpeedSTAR VGA™* board, you can switch back and forth between the 80-column display modes and the various extended-column display modes. To use VMODE, follow these steps:

- First, be sure the VMODE.COM utility is present on the disk.
- To switch to a different mode, type the mode to use and press <Enter>.

Type:

- VMODE 132X25 ...to switch to 132x25 mode
 - VMODE 132X28 ...to switch to 132x28 mode
 - VMODE 132X44 ...to switch to 132x44 mode
 - VMODE 40X25 ...to switch to 40x25 mode
 - VMODE 80X60 ...to switch to 80x60 mode*
 - VMODE 80X25 ...to switch to 80x25 mode
 - VMODE 100X40 ...to switch to 100x40 mode*
- * See note

NOTE:

Not all modes are supported by all monitors. Attempting to use modes which your monitor does not support will produce unsatisfactory results.

Three additional modes are provided to change the scan line resolution. This accommodates some software that specifically looks for a particular number of scan lines. The 400 scan line mode provides the most pleasing text resolution.

Type:

- VMODE 200 ...to provide 200 scan lines in 40- or 80x25 text modes.

USING THE UTILITIES

VMODE 350 ...to provide 350 scan lines in 40- or 80x25 text modes.

VMODE 400 ...to provide 400 scan lines in 40- or 80x25 text modes.

THE COMPATIBILITY MODES

Some programs are written for specific modes or are written according to particular video standards. For example, some programs require a monochrome adapter or are written exclusively for a Color Graphics Adapter. When these kinds of programs are used, it becomes necessary to make your **SpeedSTAR VGA™** board appear as the program requires. This is easily accomplished.

To select a mode that will change the "appearance" of the video adapter to the software, select the appropriate **VMODE** parameter. When another mode is needed or desired, select the mode using a **VMODE** parameter. To return to the default **VGA** mode, type **VMODE VGA** or power down (the **VGA** mode will be in effect upon power-up the computer). A list of modes and their uses follows. The parameter desired may be set by the **VMODE** program, directly from the command line, or by using hexadecimal equivalents of the modes.

Type:

VMODE CGA ...to set the adapter for compatibility with the Color Graphics Adapter.

VMODE MDA ...to set the adapter for compatibility with the Monochrome Display Adapter.

VMODE HERCULES ...to set the adapter for compatibility with the Hercules card.

USING THE UTILITIES

VMODE EGA ...to set the adapter for compatibility with the Enhanced Graphics Adapter.

VMODE VGA ...to set the adapter for compatibility with the Video Graphics Array.

VMODE NI ...to set the adaptor for compatibility with non-interlaced, high-resolution, variable-frequency analog monitors.

VMODE IX ...to set the adaptor for compatibility with interlaced, variable-frequency analog monitors

VMODE I ...to set the adaptor for compatibility with fixed-frequency analog monitors

A typical use might be game software that requires CGA resolution. **VMODE CGA** will put the **SpeedSTAR VGA™** board in CGA mode. If the software must be re-booted in order to work, type **VMODE CGA**, and warm-boot <Ctrl><Alt> the computer with the game diskette in drive A:.

Modes are switched in this manner as often as needed.

Entering **VMODE** with no parameter will display a menu screen from which to choose a text, graphics, or display mode.

THE GRAPHICS MODES

Mode	Type	Colors/ Shades	Alpha Format	Buffer Start	Box Size	Max. Page	Display Size
0	A/N	16/256K	40x25	B8000	8x8	8	320x200
0*	A/N	16/256K	40x25	B8000	8x14	8	320x350
0+	A/N	16/256K	40x25	B8000	9x16	8	360x400
1	A/N	16/256K	40x25	B8000	8x8	8	320x200
1*	A/N	16/256K	40x25	B8000	8x14	8	320x350
1+	A/N	16/256K	40x25	B8000	9x16	8	360x400
2	A/N	16/256K	80x25	B8000	8x8	8	640x200
2*	A/N	16/256K	80x25	B8000	8x14	8	640x350
2+	A/N	16/256K	80x25	B8000	9x16	8	720x400
3	A/N	16/256K	80x25	B8000	8x8	8	640x200
3*	A/N	16/256K	80x25	B8000	8x14	8	640x350
3+	A/N	16/256K	80x25	B8000	9x16	8	720x400
4	APA	4/256K	40x25	B8000	8x8	1	320x200
5	APA	4/256K	40x25	B8000	8x8	1	320x200
6	APA	2/256K	80x25	B8000	8x8	1	640x200
7	A/N	4	80x25	B0000	9x14	8	720x350
7+	A/N	4	80x25	B0000	9x16	8	720x400
D	APA	16/256K	40x25	A0000	8x8	8	320x200
E	APA	16/256K	80x25	A0000	8x8	4	640x200
F	APA	4	80x25	A0000	8x14	2	640x350
10	APA	16/256K	80x25	A0000	8x14	2	640x350
11	APA	2/256K	80x30	A0000	8x16	1	640x480
12	APA	16/256K	80x30	A0000	8x16	1	640x480
13	APA	256/256K	40x25	A0000	8x8	1	320x200
22	A/N	16/256K	132x44	B8000	8x8	2	1056x352
23	A/N	16/256K	132x25	B8000	8x14	4	1056x350
24	A/N	16/256K	132x28	B8000	8x13	4	1056x364
25	APA	16/256K	80x60	A0000	8x8	1	640x480
26	A/N	16/256K	80x60	B8000	8x8	3	640x480
29	APA	16/256K	100x37	A0000	8x16	1	800x600
2A	A/N	16/256K	100x40	B8000	8x15	4	800x600
2D	APA	256/256K	80x25	A0000	8x14	1	640x350
2E	APA	256/256K	80x30	A0000	8x16	1	640x480
2F	APA	256/256K	80x25	A0000	8x16	1	640x400
30	APA	256/256K	100x37	A0000	8x16	1	800x600
37	APA	16/256K	128x48	A0000	8x16	1	1024x768
38	APA	256/256K	128x48	A0000	8x16	1	1024x768

* Extended Graphics Adapter text modes with 350 scan lines

+ 9x16 character cell enhanced text modes with 400 scan lines

Type: A/N = Alphanumeric (text); APA = All Points Addressable (graphics)

THE FASTBIOS.SYS DEVICE DRIVER

The FASTBIOS.SYS device driver is located on the **SpeedSTAR VGA™** Utilities & Drivers diskette in the UTIL subdirectory. It transfers the contents of the video ROM BIOS to PC system RAM. This utility enhances video BIOS operation speed considerably when used in 80286- and 80386-based systems only. FASTBIOS.SYS is installed by typing the line

```
DEVICE=FASTBIOS . SYS
```

in the CONFIG.SYS file. It must be the first such device driver listed in the CONFIG.SYS file. If this is not done, the following message may result upon loading:

```
FASTBIOS NOT INSTALLED
```

...another (earlier installed) device driver has taken over the video interrupt; make sure the line,

```
DEVICE=FASTBIOS . SYS,
```

occurs first in your CONFIG.SYS file.

Should an attempt be made to install FASTBIOS.SYS in anything other than an 80286- or 80386-based system, the following message will result:

```
FASTBIOS requires an 80286 or  
80386 machine
```

When FASTBIOS.SYS is successfully installed the following message appears:

```
FASTBIOS Installed
```

FASTBIOS.SYS may only be installed during system boot-up. Remember to re-boot the system after adding FASTBIOS to

USING THE UTILITIES

the CONFIG.SYS file, and make sure FASTBIOS.SYS resides in the same directory as CONFIG.SYS.

REPLACING THE ANSI.SYS DEVICE DRIVER

The command

```
DEVICE=EANSI . SYS
```

must appear in the configuration file (CONFIG.SYS). Install EANSI.SYS exactly as the ANSI.SYS device driver on the DOS diskette. EANSI.SYS is compatible with the standard ANSI.SYS, and additionally supports the extended screen modes provided by the **SpeedSTAR VGA™** board. Once installed using the above command, EANSI.SYS provides all the screen control and keyboard re-mapping features of ANSI.SYS (see your DOS Technical Reference manual). EANSI.SYS is a replacement for ANSI.SYS, and the two should not be used at the same time.

EANSI.SYS may be used to select the extended **SpeedSTAR VGA™** screen modes. This is accomplished by issuing an escape sequence with the "set mode" command, just as any standard mode would be selected with the normal ANSI.SYS. For example, screen mode 22 hex would be selected by sending the escape sequence:

```
(Esc) [=34h
```

to the screen. (Note that 34 is the decimal equivalent of 22 hexadecimal.) To select other modes, simply replace 34 with the number of the mode desired. The available extended screen modes using an enhanced color display are as follows:

USING THE UTILITIES

<u>Modes</u>	<u>Cols</u>	<u>Rows</u>
34 dec (22 hex)	132	44
35 dec (23 hex)	132	25
36 dec (24 hex)	132	28
42 dec 2A hex)	100	40
38 dec (26 hex)	80	60
02 dec (02 hex)	80	80

For example, to generate 132-column by 44-row mode, place the command

```
DEVICE=EANSI.SYS
```

in the CONFIG.SYS file on a bootable disk, and place EANSI.SYS and BASICA.COM on that same disk. Boot the system, and type

```
BASICA <Enter>
```

Type the following BASIC commands:

```
OPEN "O", 1, "TEMP.DAT"  
PRINT #1, CHR$(27); "[=34h";  
CLOSE  
SYSTEM
```

This creates the file TEMP.DAT, containing the escape sequence to select mode 22 hex, 132-column mode. At the DOS prompt, type

```
TYPE TEMP.DAT <Enter>
```

This command sends the escape sequence to the screen. The screen is immediately set to 132-column mode. Note that the escape sequence is not displayed; it is interpreted as a command rather than displayable text.

THE CUSTOM FONT LOADER/EDITOR

The Custom Font Loader and Font Editor included on the **SpeedSTAR VGA™** Utilities & Drivers diskette, in the UTIL subdirectory, allows instant changes to the character set (character font) displayed on the screen. For example, the letter "A" could be displayed as @ or !, or could even be changed to a different character entirely. This is very useful for scientific and foreign language applications, as well as customizing the look of your screen.

Normally, fonts must be changed from within a program. The Font Loader changes the displayed font with a single DOS command. One of the several ready-made fonts provided on the **SpeedSTAR VGA™** Utilities & Drivers diskette may be loaded, or use the font editor to customize your own fonts. The Font Editor and Loader programs are included on the diskette, in the the UTIL subdirectory. Below are descriptions of the files and their functions.

NOTE:

Fonts may be loaded in text mode only. When a font is selected to be displayed, every character on the screen is immediately displayed in that new font.

FEDIT.COM - the font editor, used to create new fonts and/or modify existing fonts. Start the Font Editor by typing the command "FEDIT" at the DOS prompt. Select the Help option in FEDIT's main menu for more information.

FLOAD.COM - the font loader, used to load a selected font into video memory from disk. Up to four fonts may be stored in video memory at once, with any one of the fonts selected for display. Type the command FLOAD, with no parameters, for more information on program use.

FEDIT.HLP - the help file used by FEDIT.

Assorted fonts - fonts packaged on the **SpeedSTAR VGA™** Utilities & Drivers diskette, in the UTIL subdirectory, are listed here. Any file with the .FNT extension contains a font.

- 6X8.FNT** ...a 6 by 8 font used with the 132-column by 44-line mode.
- 6X14.FNT** ...a 6 by 14 font used with the 132-column by 25 or 28-line modes.
- 8X8.FNT** ...a 8 by 8 font used with the 80-column by 60-line mode.
- 8X8 THIN.FNT** ...a 8 by 8 font used with the 80-column by 60-line mode.
- 8X14.FNT** ...a 8 by 14 font used with the 80-column by 25-line mode.
- 8X14 APL.FNT** ...a 8 by 14 font, includes APL symbols used with the 80-column by 25-line mode.
- 8X14 THIN.FNT** ...a 8 by 14 font used with the 80-column by 25-line mode.

THE DRIVERS

Extended video mode drivers for popular commercial programs are included with the **SpeedSTAR VGA™** board. These drivers permit the use of the high resolution modes when properly configured. See Appendix D for instructions for loading these drivers.

APPENDIX A - CONNECTORS

The *SpeedSTAR VGA™* board uses the same 15-pin (DB15) cable available from monitor manufacturers to interface with IBM PS/2 computers. Using an incorrect cable may result in damage to the monitor and/or adapter.

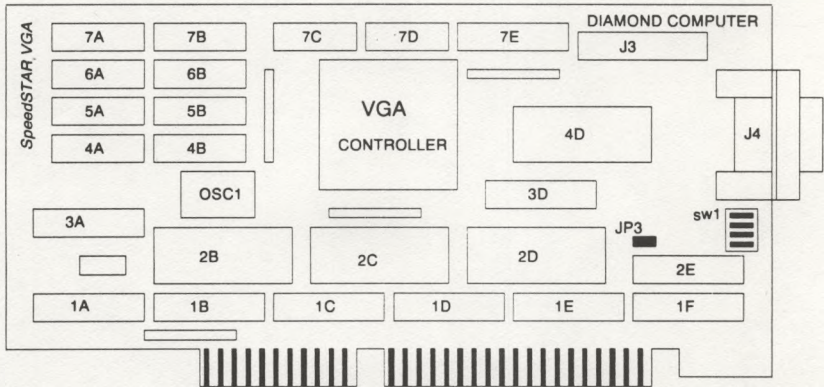
VIDEO DISPLAY CONNECTOR (DB15-S)

J4	SIGNAL DESCRIPTION	PIN
	Red	1
	Green	2
	Blue	3
	Monitor ID bit 2	4
	Not Used	5
	Ground	6
	Ground	7
	Ground	8
	Not Used	9
	Ground	10
	Monitor ID bit 0	11
	Monitor ID bit 1	12
	Horizontal Sync	13
	Vertical Sync	14
	Not Used	15

VESA STANDARD FEATURE CONNECTOR

J3	SIGNAL DESCRIPTION	PIN
	PB	1
	PG	2
	PR	3
	PI	4
	SB	5
	SG	6
	SR	7
	SI	8
	Dot Clock	9
	Blank	10
	HSync	11
	VSynC	12
	Ground	13
	Ground	14
	Ground	15
	Ground	16
	Ext Video Selection	17
	Ext Sync Selection	18
	Ext Dot Clock Selection	19
	No Connection	20
	Ground	21
	Ground	22
	Ground	23
	Ground	24
	No Connection	25
	No Connection	26

CONNECTOR AND JUMPER LOCATOR



Locator Key

- J3 - VESA Standard Feature Connector
- J4 - Video Display Connector
- SW1 - DIP Switch Bank 1
- JP3 - IRQ2 Jumper Block
- 4A, 4B, 6A, 6B - Standard 512K Memory
- 5A, 5B, 7A, 7B - Optional 512K Memory

CONSTRUCTION AND REPAIR WORK

1. [Faint text]

2. [Faint text]

3. [Faint text]

4. [Faint text]

5. [Faint text]

6. [Faint text]

7. [Faint text]

8. [Faint text]

9. [Faint text]

10. [Faint text]

11. [Faint text]

12. [Faint text]

13. [Faint text]

14. [Faint text]

15. [Faint text]

16. [Faint text]

17. [Faint text]

18. [Faint text]

19. [Faint text]

20. [Faint text]

APPENDIX B - DIAGNOSTIC TEST

Included on the **SpeedSTAR VGA™** Utilities & Drivers diskette, in the UTIL subdirectory, is a test program called VDIAG.EXE which can assist in verifying that the **SpeedSTAR VGA™** board and attached display monitor are working properly.

1. First, be sure the VDIAG.EXE utility is present on the disk.
2. At the DOS prompt, type VDIAG then press ENTER.
3. The test will start and prompt you with further instructions.

APPENDIX C - ADVANCED USERS

COLOR OR MONOCHROME TEXT MODES

The **SpeedSTAR VGA™** board BIOS supports the following text modes. These modes are not used by the IBM VGA. The numbers are in decimal except as noted.

Mode	Col	Row	Length of Memory Map
22 hex	132	44	132x44x2=11616=2D60 hex
23 hex	132	25	132x25x2=6600=19C8 hex
24 hex	132	28	132x28x2=7392=1CE0 hex
2A hex	100	40	100x40x2=8000=1F40 hex
26 hex	80	60	80x60x2=9600=2580 hex

The 132-column modes are selected exactly as the standard modes 0-7 and D-13 are selected:

- Place a 0 in register AH to indicate "select mode" function
- Place the mode number in register AL
- Execute an INT 10h instruction, generating software interrupt 10 hex, which invokes the **SpeedSTAR VGA™** BIOS to set the mode

The above sequence is commonly used to access the BIOS from assembly language or from a machine-language driver, and is the standard BIOS interface for video mode select.

COLOR TEXT MEMORY MAP

Like other test modes, the 132-, 100-, and 80-column color text memory map begins at B800:0000 (monochrome at B000:0000). Memory is organized with even bytes as character codes and odd bytes as attributes, again just like normal text. The row offset register (CRTC register 13 hex) is normally set to 66 (42 hex) to compensate for the greater width of the screen, and so the start of each row is 264 bytes after the start of the row above it, as opposed to the 80-column row offset register of 40 (28 hex) and 160 bytes from the start of one row to the start of the next.

As indicated in the table above, the lengths of the 132-, 100-, and 80-column memory maps are longer than the normal 80x25 length of 4000 bytes.

APPENDIX D - SOFTWARE DRIVERS

***SpeedCAD DLD™* DISPLAY LIST DRIVER FOR AUTOCAD RELEASE 10, AUTOCAD 386, AUTOSHADE, AUTOSHADE 386, AND AUTOSKETCH**

Quick Start

These pages sum up the basics of installing and using *SpeedCAD DLD™*. Please see the rest of the manual for details.

Thanks for the memory. You may wish to purchase and install additional RAM before installing *SpeedCAD DLD™*. At least 1 Mbyte should be available for the driver. Use expanded (LIM EMS) memory or an EMS emulator program for top performance. Rerun the install program, DLDSETUP, if you change the amount of memory in your system.

To install *SpeedCAD DLD™*.

- Create a new directory, DLDVGA, on your hard disk and copy to it all files in the DLDVGA directory on the *SpeedSTAR VGA™* Utilities & Drivers diskette.
- Go to the new directory and run DLDSETUP, following the instructions on-screen.
 - If you are using AutoCAD 386, pre-allocate the memory.
 - If possible, set aside at least 1 Mbyte for the driver.

- Choose the Remove option for file maintenance for both lists.
 - Select the desired display resolution and the number of simultaneous colors from the list.
 - Press <F10> when done.
- Reconfigure AutoCAD to use the ADI 4.0 display device; see page 23 of the AutoCAD Release 10 "Installation and Performance Guide" for details.

What's it do? *SpeedCAD DLD™* does two things to speed AutoCAD:

- Creates and maintains a Display List—a fast displaying vector list of the current drawing—dramatically increasing performance on pans and zooms.
- Creates and maintains a prescaled Fast Redraw List, allowing redraws to display an average of eight times faster than without the driver.

What's the Catch? The only resource used by *SpeedCAD DLD™* is memory. The driver itself takes up about 43 Kbytes of RAM from below the DOS 640 Kbyte limit. The Display List can average about twice the size of the current drawing file; the size of the Fast Redraw List varies. We recommend at least 1 Mbyte be set aside for *SpeedCAD DLD™*.

SpeedCAD DLD™ uses the memory you set aside for it, plus any memory not in use by other programs. If the Fast Redraw List runs out of memory, it's abandoned until you pan or zoom. If the Display List also runs out of memory, it's abandoned, and the message: DISPLAY LIST OVERFLOW appears. If this occurs frequently, you may need to increase the amount of memory allocated to the driver and/or add memory to your system to get the full benefit of using

SpeedCAD DLD™. You can also allow the display list to overflow to disk, which prevents your system from slowing back down to normal AutoCAD speed, but which also does not give you the same performance as running out of memory would.

Installing SpeedCAD DLD™

Before starting, please make a backup copy of the **SpeedSTAR VGA™** Utilities & Drivers diskette and put it in a safe place. If you have additional memory at hand, and a driver which will make extended memory act as expanded (LIM/EMS) memory, install and configure it before running the install program.

The description below is exact, and describes what's happening at each step. For a brief how-to, see the Quick Start section at the beginning of Appendix D.

1. Create a new directory, i.e. \DLDVGA, for the display driver files.
2. Go to the new directory, then copy to it the files contained in the DLDVGA directory on the **SpeedSTAR VGA™** Utilities & Drivers diskette.
3. Type: DLDSETUP to start the install program.
4. The installation program will ask if you wish to Install or Reconfigure. Choose Install.

The Install option will generate the FASTACAD.BAT file, then copy it and the DLDVGA.EXE driver file to the directory you specify in the next step.

5. The program will ask you to enter the driver destination directory. This should generally be the directory in which AutoCAD is stored. Enter: C:\ACAD10 (the default) or enter the name of your AutoCAD directory.

Two new files will be added to the directory; no other files will be modified.

NOTE:

What Happens At Installation/Reconfiguration

When you install **SpeedCAD DLD™**, a batch file, FASTACAD.BAT, is created. Run FASTACAD to start the driver. It sets the memory parameters you entered during installation, then starts the memory-resident program DLDVGA.EXE, with the command-line switches set to reflect the choices you make when installing or reconfiguring. About 43 Kbytes of RAM are used by the driver, and the Display List and Fast Redraw List use memory area(s) which you set aside during installation. Note: If you do not allocate any Expanded memory for the driver to use, the driver will require another 32K of normal memory for itself, bringing the total DOS memory required by the driver to 75K

To reconfigure, follow the same steps as for installation. If **SpeedCAD DLD™** is already loaded when you reconfigure, you will need to uninstall it and then reload the new configuration. Refer to the section entitled "Advanced Features" for more information.

6. A prompt requesting the drive for display list overflow will appear. With **SpeedCAD DLD™**, you have the option to allow the display list and the fast-redraw list to overflow to disk. At the prompt, enter the drive letter of the overflow disk. Note that you can run **SpeedCAD DLD™** entirely off of the disk using this feature. You can also have this point to a RAM disk, although with the extended memory support provided by the driver, this would be redundant.

7. The Memory Configuration Menu will appear. A display of your available system resources will appear, listing the amount of Extended and Expanded (LIM/EMS) memory available. Check that the amounts listed are correct. If you have Extended memory on a 386 machine, or on a 286 using the ALL Chargecard, you may wish to use or purchase a driver which allows the extended memory to be used as expanded (LIM/EMS) memory, which is faster. Also, using only Extended memory will increase the base amount of memory used by the driver. Install and configure the additional memory before completing the setup program.

8. The first option on the Memory Configuration Menu is whether or not you want to Pre-Allocate EMS/Extended Memory. If you are planning on running AutoCAD 386, AutoShade 386, or Extended AutoLisp, you must set this option to Yes. For regular AutoCAD Release 10 or AutoShade operation, either setting will be fine. Note that if you do pre-allocate the memory, the only way you'll be able to free it up is by unloading the driver (see the "Advanced Features" section) or by rebooting.

9. Enter the amount of Expanded (LIM/EMS) memory you wish to use for the driver, or use the default amount displayed. The minimum amount of Expanded memory you can enter is 64 Kbytes. Use Expanded memory, which is faster to access, rather than Extended memory where possible. The driver will use expanded memory until it runs out, then will use any available extended memory.

NOTE:

Memory Sizes Rounded Up

Remember that the number you enter for memory size will be rounded up to the next multiple of 16 as soon as you go to the next field. If you specify more memory than is actually available, an error message will appear when you try to accept the entries you have made for installation.

10. Enter the amount of Expanded (LIM/EMS) memory you wish to use for AutoCAD, or use the default amount displayed. The sum of the expanded memory used for *SpeedCAD DLD™* and for AutoCAD must be less than or equal to the total amount of expanded memory available. Any expanded memory not in use by AutoCAD is available for use by other programs, including the driver.

11. Enter the amount of Extended memory you wish to use for the driver, or use the default amount displayed.

12. Enter the amount of Extended memory you wish to use for AutoCAD and AutoLisp, or use the default amounts displayed. The sum of the extended memory used for *SpeedCAD DLD™*, AutoCAD, and for AutoLisp must be less than or equal to the total amount of extended memory available. Any extended memory not in use by AutoCAD and AutoLisp is available for use by other programs, including the driver.

13. To progress to the next menu, the Driver Configuration Menu, you must hit <F10>.

14. The first option, Background Color, will be highlighted. Choose Black for a normal AutoCAD display or Write if you want a dark AutoCAD display on a light background. Press <Enter> or <down arrow> to highlight the next option.

15. The Single vs Dual Screen option is used to tell the driver if you want to operate on only one screen (the one attached to the **SpeedSTAR VGA™** board) or two (in case you also have a Monochrome Display Adapter in the same system as the VGA). If you choose Automatic, the driver will run single screen if AutoCAD is started on **SpeedSTAR VGA™**, and dual screen if you start AutoCAD from the monochrome display. Selecting Always Dual will cause the driver to always run in dual screen mode - don't select this mode if you don't have a monochrome board in your system.

16. The next item on this menu is the Interrupt Vector to use for communicating with AutoCAD.

The default is 7A (hexidecimal). Don't change this number unless you have a serious need to do so, and if you do change it, make sure to reconfigure AutoCAD to use the new vector number.

17. Select the type of Color Palette you would like to use: Normal VGA or Emulated 256 Colors. The normal VGA palette consists of 8 bright colors and their 8 dim counterparts, with all other colors being a dull gray. The 256 color emulated palette defines colors for the entire range of colors that AutoCAD can access.

18. The Flip Screen Method is a fail-safe feature. In virtually all cases the Instant selection will suffice, but in some rare cases artifacts may appear on the display when doing a flip screen back to the graphics display. If this occurs on your system, use the Force Redraw option to eliminate this artifacting.

19. Enter the method for updating the Display List: Remove/Overwrite/Disable. For trouble-free operation, we suggest that you initially choose Remove.

When an object is erased or moved, the Remove option causes its vectors to be removed from the Display List. The Overwrite option causes new "erase"vectors to be added to the Display List so the object will be drawn, then rubbed out on screen updates. This option avoids the minor one-time list update delay associated with the Remove option, but increases redraw time and makes the Display List larger. Disable disables the Display List — the Fast Redraw List is still maintained unless you specifically disable it as well. See the section, "The Remove/Overwrite Option," for complete information.

20. Enter the method for updating the Fast Redraw List: Remove/Overwrite/Disable. For trouble-free operation, we suggest that you choose Remove initially.

When an object is erased or moved, the Remove option causes its vectors to be removed from the Fast Redraw List. The Overwrite option causes new "erase" vectors to be added to the Fast Redraw List so the object will be drawn, then rubbed out on screen redraws. This option avoids the minor one-time list update delay associated with the Remove option, but increases redraw time and makes the Fast Redraw List larger. Disable disables the Fast Redraw List, slowing redraws to pan/zoom speed.

21. Choose the display resolution and the number of simultaneous colors from the list which appears when you press <F1>.

This will tell the installation program how to set up **SpeedSTAR VGA™** for resolutions beyond 640x480 and simultaneous colors up to 256.

When you have selected the resolution and number of colors at which you want to run AutoCAD and AutoShade, press the <F10> key.

22. Once all changes are made, press the <F10> key to save the Installation information.

The batch file, FASTACAD.BAT, and the program DLDVGA.EXE will be copied to the AutoCAD directory you specified.

23. Change the AutoCAD display device to ADI display 4.0.

Start AutoCAD. From the main menu select option 5, Configure AutoCAD. From there, select option 3, Configure Video Display. Choose the ADI display v 4.0 as your display device. For more details, please refer to the page 23 of the AutoCAD Release 10 "Installation and Performance Guide", paragraph 3.2.2.

24. If you want the driver to be installed automatically at startup, edit your AUTOEXEC.BAT file and add a line to run FASTACAD to the end of it; i.e., "FASTACAD". This assumes that the directory in which FASTACAD.BAT resides is in your PATH.

If you have DOS 3.2 or previous, the command needs to be at the end of your batch file because DOS can't return to the AUTOEXEC.BAT file after running the FASTACAD batch file. If you have DOS 3.3 or subsequent versions of DOS, use the command "CALL FASTACAD" instead, anywhere in the AUTOEXEC.BAT file. If you don't wish to put the command in your AUTOEXEC.BAT file, you may put it in a batch file which also starts AutoCAD, or simply remember to run FASTACAD before starting AutoCAD.

The FASTACAD batch file contains several SET commands which set memory options for AutoCAD and *SpeedCAD DLD™* driver, as you specified during installation. Then the file runs the DLDVGA.EXE file which installs *SpeedCAD DLD™* in memory. The driver examines the SET commands to determine how to use available memory. Command line options for DLDVGA.EXE reflect other choices you made during installation. For a complete listing of what the options are, type: DLDVGA -?. However, these options and the SET statements for memory work closely together, and a mistake could cause problems in using AutoCAD; please use the DLDSETUP utility to create the batch file for running the driver, or be careful if you use the DLDVGA command directly.

25. Run the FASTACAD program, or restart your system (if you've modified the AUTOEXEC.BAT file) to start the driver.

The *SpeedCAD DLD*™ Display List Driver for AutoCAD Release 10

The *SpeedCAD DLD*™ Display List Driver for AutoCAD Release 10 has only one purpose: to speed up AutoCAD redraws, pans, and zooms. The driver is memory-resident and inserts itself between AutoCAD and the *SpeedSTAR VGA*™ card. It has no other effect on AutoCAD's operation besides speeding the program up; it runs with AutoShade and AutoSketch, but does not affect the speed of these programs, since they do not support display lists. Installing the driver does not change any of the AutoCAD program files or alter any of the drawing files stored on disk. There is no change to the user's interface with AutoCAD, AutoShade, or AutoSketch.

How does the *SpeedCAD DLD*™ Display List Driver make AutoCAD run faster? There are two things the driver does to speed operation:

- AutoCAD usually stores drawings in a hierarchical structure, with simple elements intermixed with complex ones. Every time the screen is updated, AutoCAD must decode this structure. *SpeedCAD DLD*™ works differently. While you are working, it translates the normal hierarchical structure into a Display List, a series of vectors. (The ability to support display lists was specifically added to AutoCAD with Release 10.) When you pan or zoom, the driver scales the Display List, then writes the resulting vectors to the VGA hardware. Since the hierarchical structure does not have to be decoded, drawing proceeds very quickly.
- In addition to the Display List, *SpeedCAD DLD*™ also maintains a Fast Redraw List. This is an already- scaled version of the Display List and allows for even faster redrawing. The Fast Redraw

List is cleared on pans and zooms (which cause a change in scale), so it only helps on redraws. (Pans and zooms still run much faster than with the standard AutoCAD driver because of the Display List.) AutoCAD users often have a screen cluttered with leftover pieces (blips) from editing operations. The Fast Redraw List allows for quick removal of these screen artifacts.

How much does *SpeedCAD DLD™* speed things? Pans and zooms, aided by the Display List, run from two to eight times faster with the new driver. And the Fast Redraw List further speeds things up to the point that redraws can be up to ten times faster with *SpeedCAD DLD™*, compared to the VGA driver shipped by AutoDesk.

Advanced Features

Among the additional features not accessible through the installation program are a memory meter and the ability to unload or "uninstall" *SpeedCAD DLD™*.

Memory Meter

While in AutoCAD, you can check to see how much memory the display list and fast-redraw list are occupying at any time. The way to do this is by typing DLDUSAGE at the "Command:" prompt. DLDUSAGE will return information about how much EMS and Extended memory is still available, and how much memory each viewport is occupying. Since AutoCAD can support up to four viewports, it is possible to have up to four display lists. But multiple viewports don't necessarily have to use multiple display lists, even though each viewport will have its own fast-redraw list, because of an AutoCAD feature known as slave viewports. If a viewport is a slave of another viewport (known as the master viewport), then the slave and the master share the same display list. This

is the case when with multiple viewports only one shows any display list memory used when using DLDUSAGE.

Uninstall

Once you are done with running AutoCAD and want to run some other application, it really doesn't make sense to have the driver loaded anymore. Therefore, we have implemented the capability to uninstall *SpeedCAD DLD™*. To unload the driver from memory, just type `DLDVGA -U` in the directory that `DLDVGA.EXE` resides in, and unless you have loaded some other memory resident programs after loading *SpeedCAD DLD™*, the memory occupied by the driver will be returned to the pool of free memory used by DOS.

NOTE:

If you have changed the interrupt vector that *SpeedCAD DLD™* uses to communicate with AutoCAD, you will have to add `-VXX` to the uninstall command line, where `XX` is the vector number you used when loading the driver initially. (The last line of the `FASTACAD.BAT` file should list the proper command line options to use when uninstalling the driver.)

Memory Usage and Lists

SpeedCAD DLD™ speeds up AutoCAD operations by creating a Display List in extended or expanded memory, and sending that list to the VGA for pans and zooms. Redraws are run from the Fast Redraw List, which is even faster. But both of these lists take up memory.

How much memory? For production use, we recommend that at least 1 megabyte be set aside for *SpeedCAD DLD™*. The driver will also take advantage of memory not specifically assigned to AutoCAD or AutoLisp and not otherwise in use. The Display List for a simple drawing like the shuttle Columbia might only require 20 Kbytes for the Display List.

Complex drawings may require several megabytes. We have seen Display Lists for a drawing anywhere from one-fifth the size of the drawing file to five times the size; in general, the Display List averages about double the file size. Complex objects such as circles and text "expand" when translated into display list format, so a drawing with a lot of complex objects and text will have a larger display list than a simpler drawing.

Keeping the Display List Small

NOTE:

Text takes up a disproportionate amount of space in the Display List. To keep the list small, put text in its own layer of the drawing. Then don't display the text layer when editing the rest of the figure. This will keep memory consumption down and speed execution.

In most cases, the memory you set aside for the display list driver will not affect the underlying performance of AutoCAD significantly. AutoCAD uses paging to support drawings larger than the amount of available memory, taking advantage of up to 4 Mbytes of memory. Setting AutoCAD memory too low will make the program swap pages more often, which will lead to a visible increase in disk activity. This activity will generally only occur during a REGEN, which recreates the Display List and causes the drawing file to be accessed directly.

Read the Fine AutoCAD Manuals

NOTE:

The AutoCAD manuals have an excellent section on performance, concentrating on memory usage. To get the most performance out of the program, read the appropriate sections of those manuals as well as this one.

NOTE: Buy Memory to Improve Performance

If you are occasionally running out of memory for the Display List, you are probably running out of memory more often for the Fast Redraw List, slowing performance. If so, buying one or two megabytes of RAM will greatly improve your productivity under AutoCAD. We recommend that you purchase expanded memory, or extended memory and an EMS emulator program like those described above.

What happens when the lists grow beyond the amount of memory you set aside? If you have enabled an overflow drive for the display list, the list will simply expand out to disk. Otherwise, when the driver first runs out of memory, it abandons the Fast Redraw List, slowing redraws to the speed of the fast zooms. But if the Display List continues to grow until it, too, runs out of memory, it is also abandoned, slowing all screen updates. Drawing speed reverts to AutoCAD standard speed.

Given the different ways people use AutoCAD, the only way to determine the amount of memory you need for *SpeedCAD DLD™* is by trial and error. Once you are using the driver, if it runs out of room for the Display List, it stops using the list, at which point zooms, pans, and redraws will occur at normal AutoCAD speed. The following message will appear in the AutoCAD scroll area to notify you that the Display List has run out of memory:

Display List Overflow

If you see this message frequently, you need to increase the amount of memory set aside for the driver or enable disk overflow. There is no separate message for the Fast Redraw

List, but losing it does not have as drastic an effect on performance as losing the Display List.

You may want to use the DLDUSAGE command described in the previous section to keep tabs on your display list usage as time goes on.

Also, your system may not have enough memory to manage large drawings without excessive paging and simultaneously support the Display List and the Fast Redraw List. This may happen because *SpeedCAD DLD™* makes AutoCAD run so much faster that you start to work with larger drawings! After a certain amount of time spent adjusting memory parameters, the only way to do your work at top speed is to buy more memory. We recommend that this be in the form of expanded memory, which runs as much as 20-30% faster for our purposes than extended memory.

If you have a 386 PC with extended memory beyond the DOS 640 Kbyte limit, we recommend that you get 386-to-the-Max, Quarterdeck's QEMM, or some other program which allows 386 extended memory to be accessed as expanded memory. If you have a 286 PC, the ALL Chargecard will do the same thing. These programs may also allow you to put the 43 Kbytes or so required by the driver itself into high memory, preserving space below the DOS 640 Kbyte line.

Do-It-Yourself Benchmarking

NOTE:

It's impossible to predict how performance for your drawings, on your specific hardware setup, will be affected by a given set of **SpeedCAD DLD™** configuration parameters. We suggest that if you are running in a low-memory situation you run a few tests to help determine the best way to configure AutoCAD with **SpeedCAD DLD™**. Use one of the larger drawing files you regularly work with and bring it up without **SpeedCAD DLD™**, then redraw, pan, and zoom, and time how long each step takes. Then try the same test with varying amounts of memory set aside for AutoCAD and the driver. This will give you solid information to use in determining how best to configure **SpeedCAD DLD™** for use on your system, with your drawings.

The Remove/Overwrite Option

During installation, you are asked if you wish to maintain the Display List and the Fast Redraw List by *removing* or *overwriting* erased vectors. (You also have the option of disabling either or both lists, though this option is not needed for normal operations). The Remove and Overwrite options come into play when you erase or move an object (moving is the same as erasing and then redrawing somewhere else). When you erase or move an object, the Display List and Fast Redraw List must be updated to get rid of the "gone" object. There are two ways to do this:

- Remove option — search the list for the offending vectors and remove them. This is the elegant solution, but the search takes a small amount of time. For small drawings, the extra time will not be noticeable, but for large drawings it may be. If

AutoCAD "moves" and "erases" seem to be taking longer than they should, use the Overwrite option documented below.

- Overwrite option — add more vectors to the list to overwrite the offending vectors with new vectors in the background color. This avoids the time loss to find and remove the vectors, but causes a strange effect: when the screen is updated, the erased object is drawn, then disappears as it's overwritten by the new vectors in the background color! This slows each redraw, and the extra "overwrite" vectors add to the length of the list.

We recommend that you use Remove mode for both lists for most drawings or if you have a relatively small amount of memory for the lists. For very large drawings, you may want to go to Overwrite mode for the Fast Redraw List, so that redraws will be speeded, but the Display List will still be updated correctly. This will minimize the strange "draw then undraw" effect for erased objects. For the largest drawings, where searching and updating a list takes a lot of time, you may want to go to Overwrite mode for both lists. If you start to get error messages saying that the Display List has been abandoned due to lack of memory, go back to Remove Mode for at least the Display List, or for both lists.

DRIVERS FOR GEM VERSION 2.2

The following instructions are applicable to users of GEM Version 2.2.

The GEM driver files require a new GEMSETUP.TXT file to be installed in place of the one on the GEM Device Driver Diskette #1. The drivers make full use of the extended graphics modes of the **SpeedSTAR VGA™** graphics adapter. The

APPENDIX D - SOFTWARE DRIVERS

VGA monitor must be capable of displaying these resolutions in order to utilize this driver.

NOTE:

Be sure the VGA monitor can display 800x600 and/or 1024x768-pixel resolution. Choosing a higher resolution than the monitor is capable of displaying will bring about unsatisfactory results.

Before installing GEM, perform the following steps:

1) Make a DISKCOPY of GEM Device Driver Disk #1. This copy will be used in place of the original during installation.

Example:

```
C:DISKCOPY A: B: ...or
```

```
C:DISKCOPY A: A:
```

2) Delete unnecessary screen drivers from the newly diskcopied diskette. Copy the file GEMSETUP.V22 and the screen drivers from the GEM subdirectory of the **SpeedSTAR VGA™ Utilities & Drivers** diskette to the newly diskcopied diskette. Example:

```
DEL B: SD*.*
```

```
COPY A:\GEM\GEMSETUP.V22
```

```
B:GEMSETUP.TXT
```

```
COPY A:\GEM\SD*.SYS B:
```

NOTE:

You are copying from the **SpeedSTAR VGA™ Utilities & Drivers** diskette to your new GEM Device Driver Disk #1 the extended mode drivers and the GEMSETUP.TXT file, while simultaneously renaming it.

Now refer to GEM's manual to proceed with the normal installation.

The program will prompt to insert GEM's Device Driver Disk #1. Insert, instead, the newly diskcopied diskette and the installation will continue. Complete the installation as instructed, selecting

K. SpeedSTAR VGA Adapter
(800x600) 16-Color Mode;VGA
800, or

L. SpeedSTAR VGA Adapter
(1024x768) 16-Color Mode;VGA
1024

as your video adapter, whichever is appropriate for your hardware configuration.

You may now begin using GEM.

DRIVERS FOR GEM/3 VERSIONS 3.0-3.1

The following instructions are applicable to users of GEM/3 Versions 3.0 and 3.1.

The GEM/3 driver files require a new GEMSETUP.TXT file to be installed in place of the one on the GEM/3 System Mater Disk (Ver. 3.0), or the GEM/3 Master Disk (Ver. 3.1). The drivers make full use of the extended graphics modes of the **SpeedSTAR VGA™** graphics adapter. Your VGA monitor must be capable of displaying these resolutions in order to utilize this driver.

NOTE:

Be sure that your VGA monitor can display 800x600 and/or 1024x768-pixel resolution. Choosing a higher resolution than your monitor is capable of displaying will bring about unsatisfactory results.

Before installing GEM/3, perform the following steps:

1) Make a DISKCOPY of the System Master Disk (Ver. 3.0), or the Master Disk (Ver. 3.1). This copy will be used in place of the original during installation.

Example:

```
C:DISKCOPY A: B: ...or
```

```
C:DISKCOPY A: A:
```

2) Copy the following file from the GEM subdirectory of the **SpeedSTAR VGA™** Utilities & Drivers diskette to the newly diskcopied diskette. The following commands assume the Utilities and Drivers diskette is on drive A: and the newly diskcopied diskette is on drive B:

For Version 3.0,

```
COPY A:\GEM\GEMSETUP.V30  
B:GEMSETUP.TXT
```

For Version 3.1,

```
COPY A:\GEM\GEMSETUP.V31  
B:GEMSETUP.TXT
```

3) Insert a blank diskette in drive A: Then using the standard DOS Format utility, format the blank diskette by typing the following command:

```
C:FORMAT A: /V
```

4) The /V option tells DOS to ask for a diskette volume label. Format prompts for the label by displaying:

```
Volume label? (11 characters,  
ENTER for none.
```

At the prompt, type the following label in upper case letters:

```
GEM SCREEN2
```

5) Copy the following files from GEM/3 Screen Disk #2 (both Ver. 3.0 and 3.1) to the newly formatted diskette. The following sample commands assume the GEM/3 disk is on drive A: and the newly formatted diskette is on drive B:

```
COPY A:GEMVDI.EXE B:
```

```
COPY A:MDGEM?.SYS B:
```

6) Copy the following files from the GEM subdirectory of the **SpeedSTAR VGA™** Utilities & Drivers diskette to the newly formatted diskette. The following commands assume the Utilities and Drivers diskette is on drive A: and the newly formatted diskette is on drive B:

```
COPY A:\GEM\SD*.VGA B:
```

Now the installation of VGA extended mode drivers is a 2-step process.

First, install GEM as instructed in the GEM manual, selecting...

```
IBM 16-Color VGA for PS/2  
(640x480) or Compatible
```

as the video driver. Complete the GEM installation normally. After completing installation, it is a good idea to start GEM to ensure that it operates properly before performing the next step.

APPENDIX D - SOFTWARE DRIVERS

Assuming GEM worked properly with the IBM VGA driver loaded, reinsert the System Master Disk and run GEMPREP again. This time, choose to change the existing configuration. Change the video adapter part of the configuration in order to load the **SpeedSTAR VGA™** graphics adapter.

Select from the following:

SpeedSTAR VGA Adapter
(800x600) 16-Color Mode

SpeedSTAR VGA Adapter
(1024x768) 16-Color Mode

The program will prompt to insert Screen Disk #2. Instead of GEM Screen Disk #2, insert the newly formatted diskette with drivers copied from the **SpeedSTAR VGA™** Utilities & Drivers diskette. The driver will load and the program will conclude.

You may now begin using GEM.

LOTUS 1-2-3 RELEASE 2.01 AND 2.2 AND LOTUS SYMPHONY RELEASE 2.0

Introduction

The drivers in the LOTUS subdirectory of the **SpeedSTAR VGA™** Utilities & Drivers diskette are text drivers for Lotus 1-2-3 Release 2 and 2.01 and Symphony Release 1.1.

These drivers support all the text modes of the **SpeedSTAR VGA™**:

- 80x25
- 80x60
- 132x25
- 132x28
- 132x44

One driver is dedicated to each of these five modes; each of these drivers, when selected as the active text display for a Lotus product, will automatically cause individual Lotus programs and utilities (1-2-3, Translate, Symphony, Printgraph, etc.) to display in the selected format.

For example, if the 132x28 driver has been selected in the installation procedure, as described below, then the spreadsheet will display 132 columns by 28 rows of text when 1-2-3 is run.

In addition the **SpeedSTAR VGA™** drivers include an "All Color Text Modes" driver which supports all five text display modes of the **SpeedSTAR VGA™**.

When this driver is selected you are offered the choice of any of the five display modes. This allows switching between 80-column and 132-column displays without reconfiguring your Lotus program.

Because the **SpeedSTAR VGA™** board is EGA-compatible, the Enhanced Graphic Adapter drivers should be installed as the text display.

When initially installing the EGA drivers, it is important that the drivers (called IBM Enhanced Graphics in 1-2-3 and Separate in Symphony) be installed.

Installing The Drivers

Before installing the **SpeedSTAR VGA™** text drivers, read **GETTING STARTED** in the Lotus 1-2-3 or the Lotus Symphony documentation.

The Lotus Install program permits new drivers to be added to the driver library via the Add New Drivers to Library option of the Advanced Options Menu. Once the **SpeedSTAR VGA™** text drivers are added to the library, select them via the Modify Current Driver Set option of the Advanced Options Menu.

After copying the files from the Lotus diskettes to the hard disk as instructed in the Lotus documentation, copy the drivers contained in the LOTUS subdirectory of the **SpeedSTAR VGA™** Utilities & Drivers diskette to the subdirectory which contains the Lotus 1-2-3 or Lotus Symphony files.

To copy the drivers to the Lotus 1-2-3 or Lotus Symphony subdirectory, complete the following steps.

NOTE:

If you do not have a hard disk drive, you will need a blank formatted diskette to hold any driver sets you make.

1. At the DOS C: prompt change to the subdirectory which contains your Lotus files. Select the correct command depending on the Lotus software you have.
2. Insert the **SpeedSTAR VGA™** Utilities & Drivers diskette into drive "A".
3. Type **COPY A: \LOTUS* .DRV** and press <Enter>

This copies the drivers from the **SpeedSTAR VGA™** Utilities & Drivers diskette to your Lotus subdirectory.

4. Perform the First-Time Installation of your Lotus product. The Install program will guide you through the procedure of selecting the drivers you want. Remember that **SpeedSTAR VGA™** supports the IBM Enhanced Graphics format, so select the EGA Adapter for the initial text and graphics screen display device.

5. When driver selection is completed, press the F10 function key to display the current driver selections.

After completing your selections, the Install program saves the selected drivers in a file, or driver set, called 123.SET for Lotus 1-2-3 or LOTUS.SET for Lotus Symphony.

6. At this point the Main Menu's Install program should appear on the screen. Select Advanced Options and press <Enter>.

7. The Advanced Options Menu will appear on the screen. Select Add New Drivers to Library and press <Enter>.

8. The Install program will ask you to press <Enter>. This step creates a file named SINGLE.LBR which contains the **SpeedSTAR VGA™** drivers.

9. The Advanced Options Menu will appear on the screen. Select Modify Current Driver Set and press <Enter>.

10. The current drivers selected will appear on the screen. Select Text Display and press <Enter>.

11. The text display drivers will appear on the screen. Select the VGA driver to use and press <Enter>. The available drivers for VGA are:

- VGA Adapter (All Color Text Modes)
- VGA Adapter (80x25 Color Text Only)
- VGA Adapter (80x60 Color Text Only)

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- VGA Adapter (132x25 Color Text Only)
- VGA Adapter (132x28 Color Text Only)
- VGA Adapter (132x44 Color Text Only)

12. The currently selected drivers will appear. Verify that the VGA driver selected appears in the Text Display field. Select Return to Menu and press <Enter>.

13. The Advanced Options Menu will appear on the screen. Select Save Changes and press <Enter>.

14. At this time the Install program prompts for the name of the driver set. To name the driver set, type a name and press <Enter>. For example, if the VGA 132x28 Display was selected, the driver might be named VGA28. If no name is entered, Lotus 1-2-3 names the driver 123, while Symphony names the driver LOTUS. Unless you explicitly specify another driver set, the default driver sets will be used when running the programs.

15. The Install program informs you that the driver set has been saved. Press <Enter>, and the Exit Menu will appear on the screen.

Create additional driver sets at any time by selecting the Advanced Options Menu, Modify Current Driver Set, and Save Changes options of the Install program menu (steps 9 through 14 above).

To create additional driver sets, press <Enter> to return to the Main Menu. Be sure to use a different name for each driver saved.

16. Refer to the Starting and Ending chapter of the Lotus GETTING STARTED documentation for information about starting Lotus 1-2-3, or Symphony. Some examples of how to select different driver sets follow.

Simply type LOTUS (Lotus 1-2-3), or ACCESS (Symphony), to run the programs using the default driver sets named 123, or LOTUS.

If a driver named VGA28 was saved, type LOTUS VGA28, or ACCESS VGA28, to set the display to 132x28 mode.

The most convenient way to switch modes is to install the All Color Text Modes driver (SIMB0FLY.DRV) and then employ the pop-up VGA mode selection menu provided in both Lotus 1-2-3 and Symphony. To activate this menu press the <Ctrl> and <A> keys simultaneously. Select the desired mode by moving the cursor until the mode is highlighted, and press <Enter>. The system beeps indicating the choice has been accepted. Exit to DOS, restart the program, and the new display mode will be in effect.

DRIVERS FOR VENTURA PUBLISHER VERSIONS 1.1-2.0

The following instructions are applicable to users of Ventura Publisher Versions 1.1-2.0. The Ventura 800x600 and 1024x768 driver files contained in the VENTURA subdirectory of the Utilities & Drivers diskette are installed AFTER Ventura Publisher has been installed on your system. The drivers make full use of the 800x600 or 1024x768 graphics modes of the **SpeedSTAR VGA™** graphics adapter. The VGA monitor must be capable of displaying this resolution to utilize this driver.

NOTE: Be sure that the VGA monitor can display 800x600- and/or 1024x768-pixel resolution. Choosing a higher resolution than the monitor is capable will bring about unsatisfactory results.

APPENDIX D - SOFTWARE DRIVERS

To install the VGA driver, perform the following steps:

1) Follow the Ventura installation instructions.

2) When asked to select a video adapter, choose

E - IBM Personal System/2 (640x480)
two colors. (Version 1.1)

E - IBM VGA or Compatible (640x480)
2 colors. (Version 2.0)

3) Complete Ventura Publisher installation and verify proper operation using the installed IBM driver.

4) Exit Ventura Publisher and insert the **SpeedSTAR VGA™** Utilities & Drivers diskette in the A: drive.

5) Log on to the A: drive and type

VPDRV2_0 <Enter>

6) The program will ask some questions about the Ventura configuration. Answer them appropriately.

7) When the program asks for the display device and resolution desired, make a selection,

VGA Adapter (800x600) 16 colors or
greys.

VGA Adapter (1024x768) 16 colors or
greys.

whichever is appropriate or desirable for the hardware configuration.

8) The program will ask for the type of mouse installed. Use the same response as the initial installation.

9) Finally, the program displays the choices made and provides the opportunity to change any selections. If no

change is necessary, press <Enter> or "Y" (the default response is "Y") and the driver will be installed.

10) If a change is desired press "N" <Enter> and make the changes. The updated driver will then be installed.

DRIVERS FOR MICROSOFT WINDOWS 2.XX

The following instructions are applicable to users of Microsoft Windows 286/386 Version 2.XX and the **SpeedSTAR VGA™** graphics adapter. A variable frequency analog color display capable of 1024x768 resolution is required to use the 1024x768 or 800x600 modes.

The **SpeedSTAR VGA™** Windows Drivers diskette contains a new driver programs replacing the driver files on the Windows Displays diskettes. The drivers supplied make full use of the **SpeedSTAR VGA™** 1024x768 and 800x600 graphics modes.

Instructions:

1. Run the Windows SETUP program. Select the "Other Display Driver Supplied by Manufacturer" option from the display adaptor menu.

2. When prompted by Windows, insert **SpeedSTAR VGA™** Windows Drivers diskette into drive "A:". Windows will locate the supplied driver. Select either

VGA 800x600 16 color mode. or

VGA 1024x768 16 color mode.

3. When prompted by Windows, select "VGA Fonts".

4. Continue with the rest of the Windows setup process.

Windows may be used after completing the above steps.

DRIVERS FOR MICROSOFT WINDOWS 3.0

The **SpeedSTAR VGA™** Windows Drivers diskette contains drivers that support 800x600 and 1024x768 resolutions with 16, or 256 colors. It also contains a file called SETUP.INF which replaces the file of the same name on the Microsoft Windows 3.0 Setup *Disk 1* diskette. Follow the instructions listed below to install the drivers.

To use 800x600 and 1024x768 modes, an analog color display capable of these high resolutions is required.

Instructions:

1. Make a DISKCOPY of the Setup *Disk 1* diskette. Example (for systems with a single floppy and hard drive):

```
C : DISKCOPY A : A :
```

The system will use drive A: for both the original and the copy as the source and target diskettes are inserted alternately for the copy.

2. After the copy is made, return the original to its jacket and store in a safe place.

3. Copy the file SETUP.INF from the **SpeedSTAR VGA™** Windows Driver diskette to the newly diskcopied Setup *Disk 1* diskette.

Example (for systems with one floppy and a hard drive):

```
C : COPY A : SETUP . INF B :
```

The system will use drive A: as drive B: also. After the copy is finished, type A:

4. Type SETUP to begin installation of Windows 3.0

5. Review the configuration list when it appears. If you wish to change Display type, move the cursor (highlighted line) to the "Display:" option and press select from the available list.

6. The program will ask you to insert the **SpeedSTAR VGA™** Windows Drivers diskette. After this is done, the installation program will continue normally.

After you complete the above steps you can begin using Windows 3.0.

Note: If you wish to change the display type after completing the installation, click on the Windows Setup icon found in the Maindesktop window.

WORDPERFECT 5.0–5.1 DRIVERS FOR 800x600 AND 1024x768 RESOLUTION

The following instructions are applicable to users of WordPerfect 5.0 and 5.1 at 800x600 or 1024x768 resolution.

The drivers contained in the WP subdirectory of the **SpeedSTAR VGA™** Utilities & Drivers diskette, are used to enable WordPerfect 5.0–5.1 to be displayed at 800x600 and 1024x768 resolution, respectively. Simply copy the drivers to the disk directory where WordPerfect resides. Copy drivers WP800.WPD and WP1024.WPD for use with WordPerfect 5.0, or copy driver WP51ET4.VRS for use with WordPerfect 5.1. Upon loading the program the following steps should be taken to choose the resolution desired:

- 1) From the document screen displayed after entering WordPerfect, press SHIFT/F1 to enter the Setup menu.
- 2) From Setup, choose option 3 (V.5.0)-, or 2 (V.5.1)-Display. This brings up the Get Setup: Display menu.

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- 3) From the Get Setup: Display menu, choose option 5 (V.5.0), or 2 (V.5.1)-Graphics Screen Type.
- 4) From the Get Setup: Graphics Screen Type menu, choose either

VGA Adapter 800x600 16 color, or

VGA Adapter 1024x768 16 color, or

the Extended VGA option which lets you choose from

VGA 1024x768 16 color

VGA 1024x768 256 color

VGA 800x600 16 color

VGA 800x600 256 color

VGA 640x480 16 color

VGA 640x480 256 color

- 5) Exit from the menus and begin using WordPerfect.

WORDPERFECT VERSION 5.0 132-COLUMN TEXT MODES

The 132-column modes for WordPerfect Version 5.0 are set by starting the program with a switch appended to the startup filename, WP. This switch, /SS, is used to define ROWS and COLUMNS on startup. The program, however, will only assign the rows and columns according to the screen capacity. Therefore, the screen mode must be set prior to running WordPerfect using the WP/SS file. This is more easily accomplished by using a batch file from DOS to set the mode, start the program, and reset the mode on exit.

1. Use EDLIN or any text editor capable of saving files in ASCII form to create the batch file. Choose a name other than WP as that already belongs to the WordPerfect program. For illustrative purposes, we will use WORDPERF.BAT. You can

also create this file using the DOS command, COPY CON (e.g., WORDPERF.BAT).

2. Your batch file needs only three lines:

```
VMODE 132x25  
WP/25132  
VMODE VGA
```

3. Type WORDPERF at the DOS prompt and the batch file will first change the mode and then load WordPerfect using the rows/columns switch. Note the order in which the switch is written: ROWSCOLUMNS. Use any of the three 132-column modes, 132x25, 132x28, or 132x44, but be sure to type row numbers before column numbers in the WP switch, and be sure to make the WP switch match the mode set on the **SpeedSTAR VGA™** adapter.

WORDSTAR RELEASE 4.0 132-COLUMN TEXT MODES

The 132-column modes for WordStar Release 3.3 are set through the WSCHANGE.EXE file. A 132-column mode also needs to be set on the **SpeedSTAR VGA™** adapter prior to loading a reconfigured WordStar file for 132-column capability. Follow the instructions carefully to ensure that your new version is completed correctly, and that no damage results to the original files.

1. Make a copy of the WS.EXE file, renaming it to indicate that the new copy will be the 132-column version.

Example:

```
C: COPY WS.EXE WS132.EXE
```

This provides separate WordStar files, one for normal 80-column operation, and one for 132-column operation.

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2. Load the WSCHANGE file.
3. Type the filename to install as WS132.
4. Type the filename to save any changes to as WS132.
5. Choose "A Console" from the Main Installation Menu.
6. Choose "A Monitor" from the Console menu.
7. Choose "C Screen sizing" from the Monitor menu.
8. Specify the Height and Width measurements that best suit your needs (i.e., 25 and 132) and exit the menu.
9. Exit through the remainder of the menus and WSCHANGE.

You are now finished making a 132-column version of WordStar. The next step is to put the **SpeedSTAR VGA™** into the proper 132-column mode prior to loading WS132. This is most easily accomplished with a batch file.

1. Use EDLIN or any text editor capable of saving files in ASCII form to create a file. Choose a name other than WS or WS132 since these names already belong to WS.EXE and WS132.EXE. For illustrative purposes, we will use WORDSTAR.BAT. This file may also be created using the DOS command, COPY CON (e.g., WORDSTAR.BAT).

2. Your batch file needs only two lines:

```
VMODE 132x25  
WS132
```

3. Type WORDSTAR at the DOS prompt and the batch file will first change the mode and then load WS132. Upon exiting WS132, the mode will revert to a standard 80x25. These instructions may be used, generally, to provide similar 132-column modes for WordStar Professional.

APPENDIX E - PROBLEMS

If you have problems after installation, check the following to determine the cause.

- Ensure that all cables are properly connected, and that all plugs are firmly seated in their sockets.
- Ensure that the display monitor is properly connected and that its power is turned ON.

Power OFF the computer system and all other connected devices before checking the following:

- Ensure that the switches on the **SpeedSTAR VGA™** board are set properly and that the board is seated in the expansion slot.
- Ensure that the system motherboard switches/jumpers are set properly for use with the **SpeedSTAR VGA™** board.
- Ensure that no other switch settings on the motherboard have been accidentally changed. Refer to the documentation provided with your computer to determine the correct switch settings.

If checking these items does not locate the problem, there may be a malfunction of the computer system, display monitor or the **SpeedSTAR VGA™** board. Consult your computer dealer for assistance in locating the problem.

Diamond Computer Systems, Inc.

Product Support Department

(408) 736-2000 - 8:00 AM - 4:00 PM, Monday through Friday

(408) 730-5750 - FAX 24 hours/day, 7 days/week

APPENDIX E - PROBLEMS

It is the first problem that is solved in this book. The following are the solutions to the problems.

* The first problem is solved in the first chapter. The solution is given in the first chapter.

* The second problem is solved in the second chapter. The solution is given in the second chapter.

Part II of the book is devoted to the solution of the problems. The first part of the book is devoted to the solution of the problems.

* The third problem is solved in the third chapter. The solution is given in the third chapter.

* The fourth problem is solved in the fourth chapter. The solution is given in the fourth chapter.

* The fifth problem is solved in the fifth chapter. The solution is given in the fifth chapter.

It is the first problem that is solved in this book. The following are the solutions to the problems.

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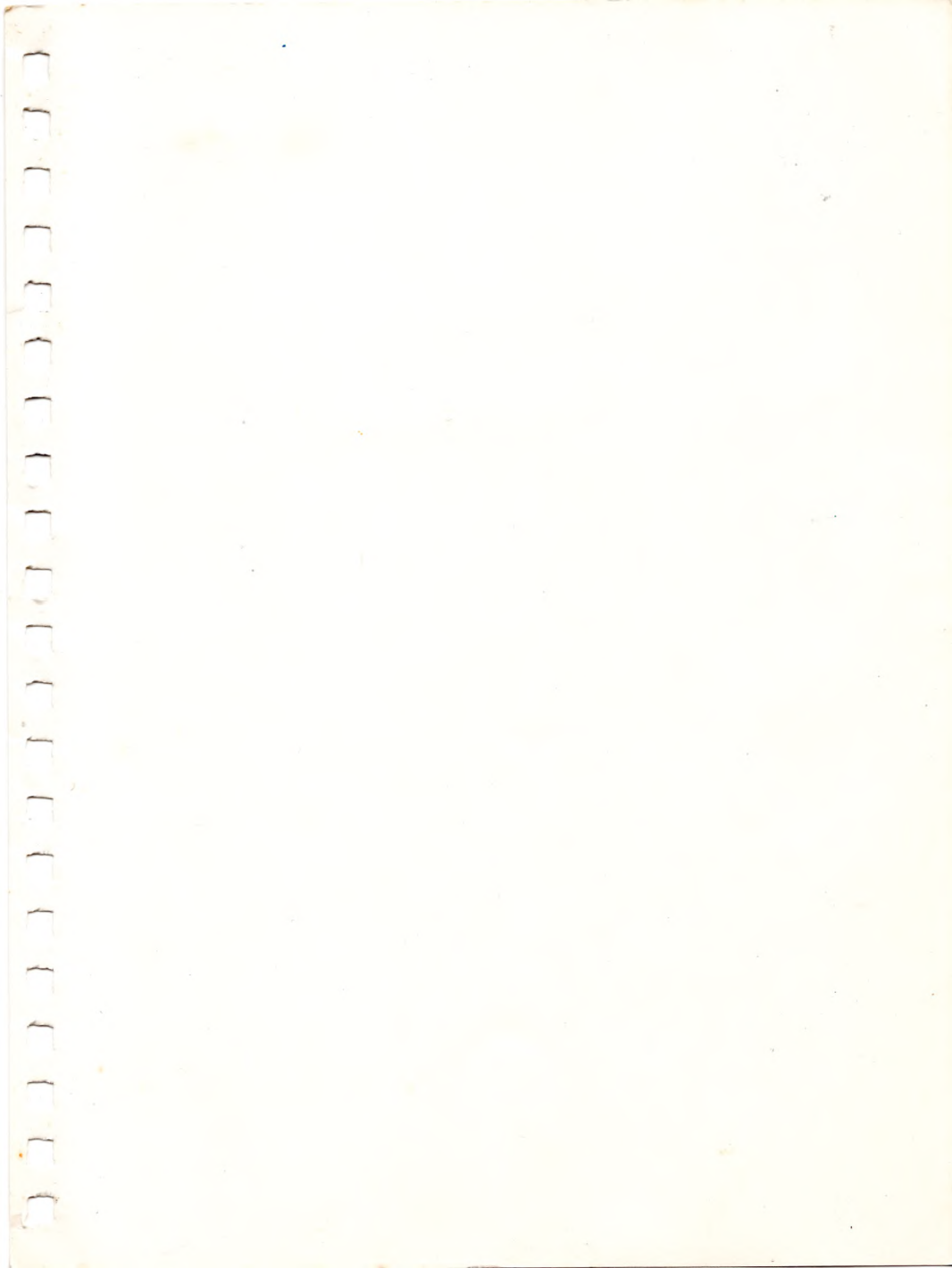
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