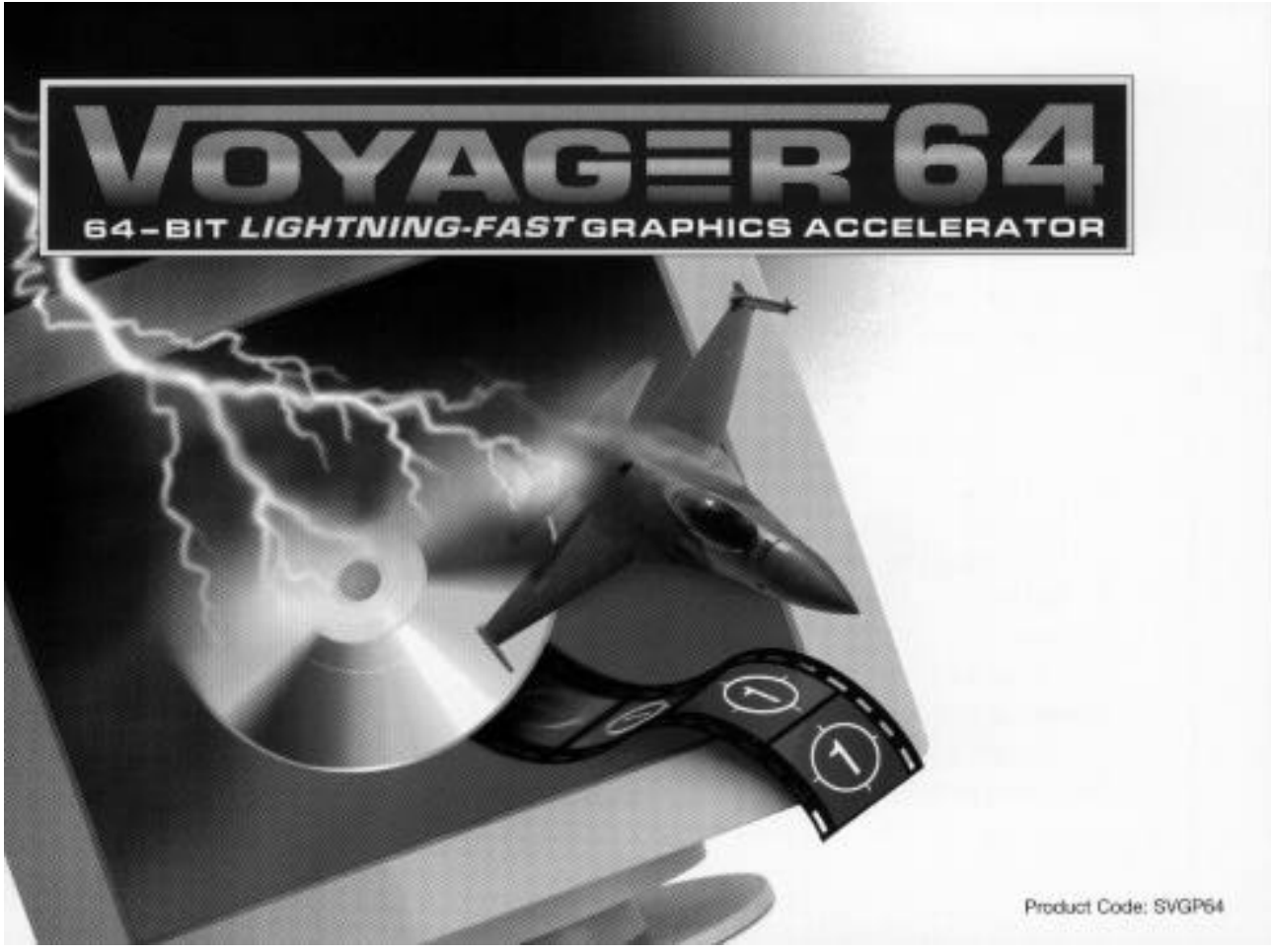
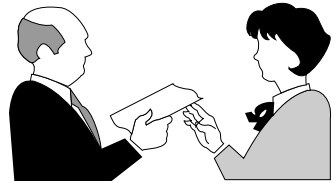

VOYAGER 64
64-BIT LIGHTNING-FAST GRAPHICS ACCELERATOR
Product Code: SVGP64

Before You Begin your Installation

The product you have purchased is designed to be easily installed into most IBM PC or compatible systems. Many products have large, easy-to-read legends to allow for the easy configuring of the product. This installation manual contains detailed instructions. Most included software has automatic installation programs to place the software correctly onto your computer. However, as all computers are configured differently, you may be required to perform some basic DOS or Windows tasks. If you are not familiar with basic DOS commands such as DIR, CD, or EDIT, you should check your DOS manual, or seek assistance from you local computer dealer to install the product.

How to get Technical Assistance



The dealer that you purchased this product or your computer from is the FIRST place you should go for technical assistance. The dealer is usually the most qualified source of help, and

is most familiar with your system and how this product should be installed. Many dealers have customer service and technical support programs, with varying levels of support offered, depending on your needs and computer knowledge. ***Please contact the dealer first whenever a problem occurs.***

If your Dealer Can't Assist you

If you can't get assistance from your dealer, the manufacturer provides varying levels of technical assistance. The following support number is for quick answers to specific inquiries on product features and technical questions. Call **407-241-8088**; M-F, 8 am to 6:30 pm EST.

Direct access to technical support representatives is provided on a limited basis. If you require immediate attention or in-depth help with the installation of the product, please call our 900-priority support number for service. This number gives you immediate access to senior-level technicians. The number is **900-555-4900**. You will be charged $2.00 per minute. The charges will appear on your next phone bill.

Damaged or Missing Items

We use many world-class quality assurance programs to ensure the product you purchased is of the highest caliber. Sometimes, however, a component may be

missing from the box, or is damaged or corrupt in some way. If this happens, immediately return the entire package to your place of purchase so you may exchange it for a new one. Your dealer should be able to provide you with an exchange far more quickly than by contacting us directly. If for some reason you are unable to return the product directly to its place of purchase, refer to "Servicing Your Product" and "Warranty" in this manual's Appendix for instructions.

Boca BBS
407-241-1601

CompuServe
GO BOCA

QuickFax
Fax Retrieval
407-995-9456

Standard Free
Technical Support
407-241-8088

Priority Service
900-555-4900
($2 per minute)

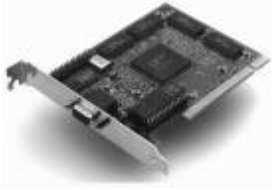
Contents

INTRODUCTION

Congratulations on the purchase of your Voyager 64 Accelerator VGA board from Boca Research, a leader in high-tech computer enhancement products. The Voyager 64 is IBM VGA compatible and is designed to work in all standard PCI 2.0 Local Bus and compatible computers. The EXPRESS Install provided on page 9 is intended for experienced and knowledgeable users. For more details, see pages 10-11.

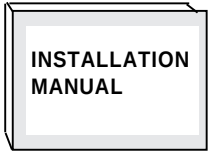
The balance of the manual contains a product overview (including compatibility and system requirements), instructions for installing Windows and DOS drivers and utilities, troubleshooting, and technical specifications.

Make sure you have received the following items:



THE VOYAGER 64 ACCELERATOR

DRIVER DISKETTE

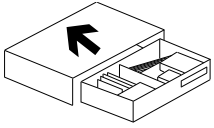


If any items are missing, or appear damaged, contact your dealer for assistance.

Express Installation

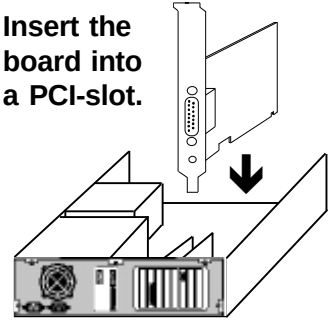
START HERE!

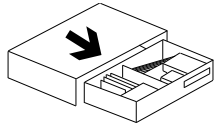
Turn OFF your computer.



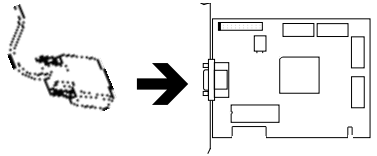
Remove your system cover and any existing video card.

Insert the board into a PCI-slot.





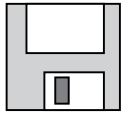
Replace your system cover.



Attach the monitor cable.

Turn ON your computer.

Install drivers.
Go to page 18.

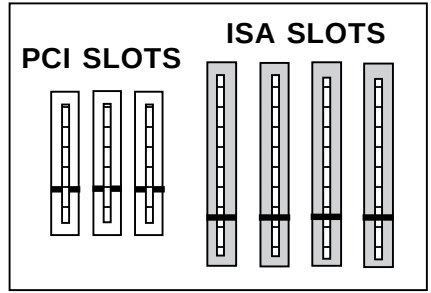


Installing the Voyager 64

1. Turn the power switch to the OFF position. Remove the power cord from the back of the computer and unplug the keyboard cable from the computer. Then use a small screwdriver to remove the screws that attach the computer's cover to the rear panel. Carefully slide the cover forward, away from the rear panel.

The Voyager 64 board must be installed in a PCI-bus compatible slot. PCI expansion slots are shorter than standard ISA slots. The Voyager 64 board will NOT function if it is plugged into a standard ISA slot.

Normally, plugging in the PCI-based Voyager 64 will disable any built-in video adapter. If this does not disable your built-in video adapter, your computer documentation should provide the necessary instructions.



2. Select any available PCI-Bus expansion slot.

3. Remove the screw and the metal plate that covers the external access to the slot you have selected.

Remove any existing VGA/EGA card before installing the Voyager 64.

4. Insert the Voyager 64 in the slot that you have selected, so that the edge connector on the bottom of the board mates with the socket on the motherboard. Press firmly on the board and ensure that it seats properly into the slot. Secure the board with the screw you removed in step 3.

5. Slide the computer cover back over the chassis, taking care not to let it catch on the disk drive or power cables. Once the cover is in place, replace all the screws that you removed earlier.

6. Re-attach all cables and power cords to their original positions.

7. Attach the appropriate monitor cable to the Voyager 64.

8. Power up your system.

Physical installation is complete.

If you wish to enhance your display, turn to the Display Driver section on page 18.

NOTE: Drivers are not required if the board is used under DOS and Windows in standard VGA modes. Drivers are required to run high-resolution applications under DOS and Windows.

Product Overview

The Voyager 64 is a high performance PCI graphics accelerator. The Voyager 64 provides accelerated performance in all display modes. Its 2MB of display memory allows the Voyager 64 to display 16M colors at 800 x 600 resolution. The Voyager's high performance is realized by the use of a 64 Bit Hardware BitBLT engine. Other functions such as, two point line draw, trapezoidal and polygon fills, and clipping are also accelerated by the hardware. The Voyager 64 conforms to the PCI Local Bus 2.0 specification. This allows maximum system graphics performance under heavy system load conditions.

The Voyager 64 is based on a highly integrated S3tm Trio64tm architecture. The Trio64 contains an integrated RAMDAC and Dual Clock Generator. The Trio64 has a 64 Bit memory interface which provides 228 MB/second bandwidth to support resolutions up to 1600 x 1200, color depths up to 16M colors, and refresh rates up to 75Hz non-interlaced.

Users of high performance CAD, Animation, and 3D Modeling applications, will benefit from the high system level performance offered by the Voyager 64. Drivers are provided for support of major GUI applications such as AutoCAD and Windows.

Support for the EPA "Energy Star" requirements is provided via VESA DPMS support in the BIOS. The Voyager 64 can place a DPMS compliant monitor into power savings mode, thus reducing the overall power consumption of the display monitor. Monitor Plug-n-Play is supported by the VESA DDC (Display Data Channel) support in the hardware and BIOS. The VESA DDC support allows the video subsystem to sense the modes supported by the DDC compliant monitor, and only allows the Voyager 64 to be placed in those modes.

Hardware Features

Maximum Resolutions/Color Depths Supported (Non-Interlaced):

- 1280 x 1024 X 256 Colors
- 1024 x 768 x 64K Colors
- 800 x 600 x 16M Colors

Maximum Resolution/Color Depth Supported (interlaced).

- 1600 x 1200 x 256 Colors

Maximum Clock Frequencies

- Dot Clock 135 Mhz
- Memory Clock 57Mhz

Memory

- 64 Bit wide memory interface.
- 2MB of display memory

Hardware GUI Accelerator Functions

- BitBLT
- Solid Line Draw
- Textured Line Draw
- Rectangle Fill
- Short Stroke Vector line draw
- Polyline (two Point Line Draw)
- Polygon Fill Solid
- Polygon Fill Pattern
- 4-Point Trapezoid Fill Solid
- 4-Point Trapezoid Fill Pattern
- Programmable Hardware Cursor

VESA Support

- DDC Monitor Communications Support
- Standard VESA Feature Connector
- VESA 1.2 BIOS with DPMS (Display Power Management Signaling) monitor support.

Software Features

Drivers Provided for the following GUIs and applications:

- AutoCAD V11 (DOS)
- AutoCAD V12 (DOS)
- MicroStation 4.0
- MicroStation 5.0
- Windows 3.1/3.11

Windows NT 3.5 and Windows 95 come with built-in support for the S3 Trio64 on which the Voyager 64 is based.

Additional drivers not provided on the installation diskette may be available on our BBS.

Utilities

- VREFRESH Display refresh setting utility for DOS

- Fcon Feature connector enable/disable utility for DOS

- Power Manager screen saver for Windows

Monitor Compatibility

The Voyager 64 board is compatible with VGA Color and monochrome analog monitors. TTL monochrome monitors with 9-pin connectors are NOT compatible with the Voyager 64. It is also compatible with Multiple Frequency Monitors, provided the proper 15-pin cable adapter is used with the monitor and the monitor is set to analog.

Check your monitor manual and the video mode table in Appendix C to determine the modes supported by your monitor.

IMPORTANT: The Voyager 64 uses the same 15-pin (DB15) cable available from monitor manufacturers to interface with IBM computers. Using an incorrect cable may result in damage to the monitor and/or adapter. Contact the monitor manufacturer for proper cabling and pin-outs if you have questions.

System Compatibility

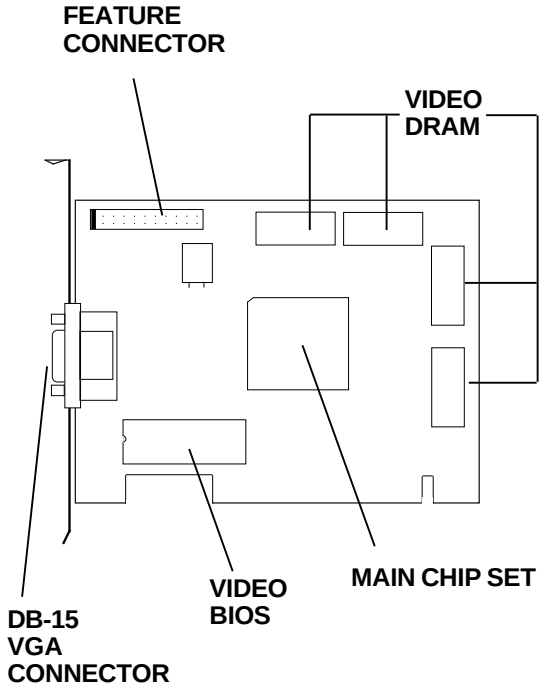
Most systems with PCI Local Bus slots are compatible with the Voyager 64. If you are uncertain, refer to your system's guide to operation or check with the dealer or manufacturer of your computer. The Voyager 64 board is compatible with the IBM Video Graphics Array (VGA) and Enhanced Graphics Adapter (EGA) standards.

System Requirements

- 486- or Pentium-based PC with PCI 2.0 slot
- DOS 5.0 or later
- 640KB minimum of system RAM (4MB RAM recommended for Windows and 4-6MB for Autodesk applications in addition to memory required by other applications.
- Video monitor capable of the desired resolution (check the manual which came with your monitor)

The Voyager 64 must be installed in a PCI-bus compatible slot. PCI expansion slots are shorter than standard ISA slots.

For a comprehensive list of video modes supported, refer to Appendix C.



Display Drivers

This section describes the installation and operation of the display driver programs for Microsoft Windows and various utilities to further enhance your video display.

Information on drivers for other popular graphics applications is provided in a README.TXT file on the diskette. This file may also contain information on new drivers which became available after the printing of this manual. The drivers allow you to use the extended features of the Voyager 64 board.

Highlights include:

- 1600 x 1200 resolution in 256 colors (interlaced)
- 1024 x 768 resolution in 65,536 colors
- 800 x 600 resolution in 16.7 million colors
- 640 x 480 resolution in 16.7 million colors

If you intend to use your Voyager 64 in standard VGA modes, you DO NOT need to install any of these drivers.

Your display drivers support the following software applications and environments. For documentation:

In this Manual	On README

• Windows 3.1/3.11
• Windows 95
• Windows NT (3.5+)
• SVGP64 Utilities
  • Vrefresh
  • FCON
	• AutoCAD
	• AutoShade
	• 3D Studio
	• OS/2
	• Power Manager
	  Screen Saver
	•Microstation PC

NOTE: To use the 800 x 600 or higher graphics display drivers, you must have a multiple frequency monitor capable of displaying that resolution. Standard VGA monitors may not have this capability.

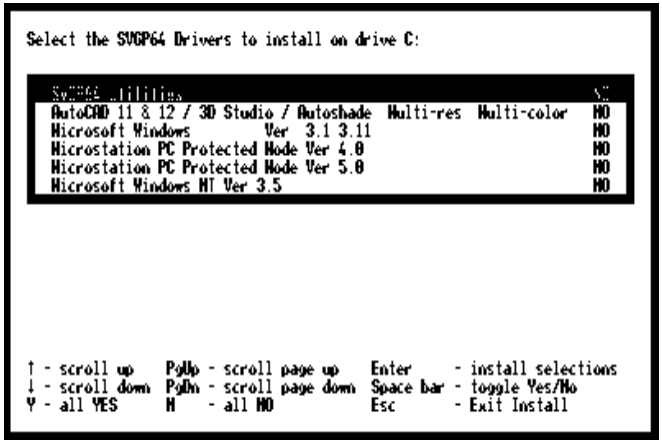
Installing the Display Drivers

For DOS-only Users

For Windows users, turn to the next page.

- Make sure the Voyager 64 is present (physically installed) BEFORE installing any drivers.
- Insert the Voyager driver diskette into your system drive A: (or B:).
- Type A:\INSTALL (or B:\INSTALL) at a DOS prompt and follow all on-screen instructions.

NOTE: Additional drivers may appear on this screen as more applications are supported. You may also download newly released drivers from our BBS (407-241-1601).



Windows 3.1/3.11

The Voyager driver diskette contains drivers for both DOS and Windows. Make sure Windows is already installed on your system. The Windows install can also install drivers for DOS applications.

1. Put the disk labeled "Voyager Driver Diskette" into your A: or B: drive.

2. Start Windows

3. From the Program Manager screen, select **File**, then **Run**.

4. In the Command Line box, type **A:SETUP** or **B:SETUP**, then select OK.

5. An introductory Voyager screen appears. Select Continue.

6. Next, you are presented with a Drivers/ Utilities selection box. Make your selection (choose at least SVGP64 utilities and Windows 3.1/3.11) and select OK.

7. For each selection, you will have to select a destination directory or accept the default (e.g., C:\SVGP64 for SVGP64 utilities; C:\WINDOWS for Windows). The drivers selected will now be installed.

8. If you chose “Windows 3.1/3.11 Drivers”, you are asked if you want to use the Power Management screen saver. If so, refer to the README.TXT file in the C:\SVGP64 subdirectory. **Installation is complete**.

Windows 95

Do the following to get started when installing the Voyager 64 with the Windows 95 operating system:

Windows 95 should detect the new video adapter and reconfigure your operating system automatically. If the Voyager 64 is not auto-configured by Windows 95, select the Display icon from the Control Panel, then Settings, then Change Display Type.

Select S3 as the manufacturer and S3 Trio 32/64 PCI for the card type (The Boca Voyager is based on the S3 chipset). If you require additional assistance, consult your Windows 95 documentation.

Windows NT (3.5+)

Do the following to get started when installing the Voyager 64 with the Windows NT operating system:

Select the Display icon from the Control Panel, then Settings, then Change Display Type. Select S3 as the compatible driver type.

If you require additional assistance, consult your Windows NT documentation.

The Vrefresh Utility

This is a DOS-based utility which allows you to change the refresh rate of the display. Vrefresh is installed when you select “SVGP64 Utilities” from the install or setup program.

Using Vrefresh with a Mouse Driver

A menu is displayed when Vrefresh is loaded.

The refresh rates are shown on the left side and the corresponding resolutions are displayed on top of the table. Click on the desired boxes. The “X” mark means that the selection is **NOT** valid. Selected refresh rates are defined by the check marks. Click on the Exit button to set the new refresh rate. You will be asked if you wish to save the changes to your AUTOEXEC.BAT. Choose YES if you want to use the new refresh rate every time you turn on your system.

NOTE: The refresh rate set with Vrefresh has no effect when using Windows.

Using Vrefresh without a Mouse

You will need to use command-line parameters with the following options:

VREFRESH X Y

where X = 640, 800, 1024, 1280 and
Y = 0 (56Hz),
1(60Hz),
2 (70Hz),
3 (72Hz),
4 (75Hz),
5 (interlaced).

Note that 1600 x 1200 and 1152 x 864 each have a single refresh rate so this utility is not needed.

Using the FCON Utility

This DOS-based utility allows you to enable or disable the board's feature connector. In order to maintain VESA compatibility when using the feature connector, only 1MB video modes are supported.

Instructions for FCON are provided on-screen.

Appendix A: Troubleshooting

This section lists common problems that may be encountered and their possible solutions.

SYMPTOM

System does not power up and the screen is blank.

POSSIBLE SOLUTION

- Ensure the Voyager 64 is properly inserted in its slot.

- Ensure you do not have another video card in the system. If you do, you need to remove it from your system and try re-booting. Remember: the Voyager 64 must be the only video adapter.

- Verify that switch settings and/or jumpers are properly set on your motherboard. Refer to compatibility requirements.

- Confirm that your computer and monitor are plugged in. Check all power cables.

PROBLEM

The computer seems to boot, but there is no display.

POSSIBLE SOLUTION

- Check all cable and power cable connections and verify that the monitor is powered on.

- Adjust brightness and contrast controls correctly.

- Verify that your monitor cable is the proper type for the Voyager 64.

- Ensure you do not have another video card in the system; if you do, remove it from your system and try re-booting. Remember: the Voyager 64 must be the only VGA video adapter.

- Verify motherboard switch and jumper settings.

- If your multi-frequency monitor has an Analog/Digital switch, make sure it is set to the Analog position.

- Examine your monitor display cable for broken or bent pins.

- Make sure your Voyager 64 is properly installed in a PCI slot.

PROBLEM

Your monitor's display appears somewhat distorted when running a graphics application

POSSIBLE SOLUTION

- Set the vertical hold properly on your monitor.

- Ensure that your current graphics application software has been properly installed.

- Ensure that your monitor is capable of displaying the graphics mode you are using. Refer to your monitor specifications and Appendix C.

- Ensure you are using the correct vertical refresh rate for your monitor.

- If your monitor has vertical/ horizontal position and size adjustment controls, try these controls to adjust the display.

- Use Windows Setup to select another display resolution for the Voyager 64.

PROBLEM

You are unable to get the Voyager 64 to work in your computer, but have found that it works well in another.

POSSIBLE SOLUTION

- Refer to the preceding suggested remedies. If the Voyager 64 functions properly in another system, it is likely the problem lies elsewhere.

- Ensure that your computer is compatible with the PCI 2.0 Local Bus specifications.

- Ensure that your computer is completely compatible with IBM standards. Some machines do not support IBM-standard video BIOS requirements.

PROBLEM

You are experiencing difficulty installing the Voyager 64 on a network.

POSSIBLE SOLUTION

- Generally speaking, when configuring a network system avoid the following areas the Voyager 64 occupies: Memory addresses

A000h -C7FFh, I/O addresses 03B0h - 03Dfh and in some instances 02E0h -02EFh. The Voyager 64 does not require an interrupt (IRQ).

- Some network cards do not fully decode a 16-bit I/O address; these cards deal only with 10-bits of a 16-bit I/O address.

- The Voyager 64 has a global set up register at an I/O base address of 46E8h. A network card that improperly decodes I/O addresses will see 46E8h in a 10-bit format as 02E8h.

- 02E8h may conflict with a network card in the 02E0h-02EFh range. The symptoms of this conflict manifest in the inability to access the Server. To alleviate this problem choose an alternative base I/O address for your network card and regenerate the shell; refer to your network documentation or network software vendor if you require additional assistance in this area.

PROBLEM

You want to adjust your display resolution with Windows Setup.

REMEDY

Go to the Main Program Group and select the Windows Setup icon. Next, select Options, then Change System Settings. Click on the Down Arrow next to the Display bar. Here you may select an alternate display resolution (for SVGP64). Once you choose an alternate setting, you will be instructed to re-start Windows. Follow all on-screen instructions.

Appendix B: Technical Specifications

Connector Information

The following table shows the pin-out assignments for the DB15 video cable connectors.

IMPORTANT:

The Voyager 64 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. Note: some monitor manufacturers use slightly different naming conventions for the signal while retaining the same pin functionality. Do not be concerned. All that is required is PS/2 functionality.

Signal	Pin
Red	1
Green	2
Blue	3
Not used	4
Ground	5
Red Return	6
Green Return	7
Blue Return	8
Not used	9
Ground	10
Not used	11
DDC Data	12
Horizontal Sync	13
Vertical Sync	14
Not used	15

Pin-Out Assignments for the DB15 Video Cable Connector

Technical Specifications

- 2MB DRAM of on-board memory
- Supports up to 24-bit per pixel color
- Compatible with VGA color and monochrome analog monitors, and multiple frequency monitors
- 15-pin analog connector
- Power: 1A @ 5V
- Dimensions: 4.72" x 3.55"

VESA Standard VGA Pass Through Connector Specification

A 26-pin header stake connector (J1) is provided which maintains pin to pin compatibility with IBM's feature connector as shown in the table which follows.

Signal	Feature Connector Pin
Pixel Data 0	2
Pixel Data 1	4
Pixel Data 2	6
Pixel Data 3	8
Pixel Data 4	10
Pixel Data 5	12
Pixel Data 6	14
Pixel Data 7	16
Pixel clock	18
Blanking	20
Horz. Sync	22
Vert. Sync	26
ground	1
ground	3
ground	5

Signal	Feature Connector Pin
Enable External Pixel Data[1]	7
Enable External Sync[2]	9
Enable External Pixel Clock [3]	11
not used	13
ground	15
ground	17
ground	19
ground	21
not used	22
not used	25

[1]A low enables feature connector pixel data input to the RAMDAC.

[2]A low enables feature connector sync and blanking inputs.

[3]A low enables feature connector pixel clock input.

For additional information see the Auxiliary Video Connector description in the IBM PS/2 Hardware Technical Reference Manual.

Appendix C: Video Modes

The Voyager 64 supports the graphic modes listed on the following page. (I) indicates that the display is interlaced (i.e., only every other line is repainted each refresh cycle). The refresh rate is the number of times per second the screen is repainted. Generally, the higher the refresh rate, the better the display.

Some monitors may not be able to support all the modes and refresh rates. If the screen does not display properly under Windows, or another application, your monitor may not support this refresh rate for the chosen resolution.

In this case, you must either lower the resolution to one that can be supported, or lower the refresh rate. Refer to your monitor owner's manual.

VESA Mode #	Screen Resolution	Colors	Refresh Rate (Hz) (Vertical)	Refresh Rate (Hz) (Horizontal)
10A	132 x 43 characters	16	70	31.5
109	132 x 25 characters	16	70	31.5
100	640 x 400	256	70	31.5
101	640 x 480	256	60	31.5
101	640 x 480	256	72	37.9
101	640 x 480	256	75	37.5
102	800 x 600	16	56	35.1
102	800 x 600	16	60	37.9
102	800 x 600	16	72	48.1
102	800 x 600	16	75	47.5
103	800 x 600	256	56	35.1
103	800 x 600	256	60	37.9
103	800 x 600	256	72	48.1
103	800 x 600	256	75	46.8
104	1024 x 768	16	43 (I)	35.5
104	1024 x 768	16	60	48.4
104	1024 x 768	16	70	56.5
104	1024 x 768	16	75	60.2
105	1024 x 768	256	43 (I)	35.5
105	1024 x 768	256	60	48.4

VESA Mode #	Screen Resolution	Colors	Refresh Rate (Hz) (Vertical)	Refresh Rate (Hz) (Horizontal)
105	1024 x 768	256	70	56.5
105	1024 x 768	256	75	60.2
106	1280 x 1024	16	45 (I)	47.7
107	1280 x 1024	256	45 (I)	47.7
107	1280 x 1024	256	60	63.7
107	1280 x 1024	256	72	77.7
107	1280 x 1024	256	75	79.5
110	640 x 480	32,768	60	31.5
110	640 x 480	32,768	72	37.5
110	640 x 480	32,768	75	37.5
111	640 x 480	65,536	60	31.5
111	640 x 480	65,536	72	37.5
111	640 x 480	65,536	75	37.5
112	640 x 480	16.7M	60	31.5
112	640 x 480	16.7M	72	37.9
112	640 x 480	16.7M	75	37.5
113	800 x 600	32,768	60	37.9
113	800 x 600	32,768	72	48.1
113	800 x 600	32,768	75	46.8
114	800 x 600	65,536	60	37.9
114	800 x 600	65,536	72	48.1

VESA Mode #	Screen Resolution	Colors	Refresh Rate (Hz) (Vertical)	Refresh Rate (Hz) (Horizontal)
114	800 x 600	65,536	75	46.8
115	800 x 600	16.7M	60	37.9
115	800 x 600	16.7M	72	48.1
115	800 x 600	16.7M	75	46.8
116	1024 x 768	32,768	43 (I)	35.0
116	1024 x 768	32,768	60	48.9
116	1024 x 768	32,768	70	56.5
116	1024 x 768	32,768	75	60.4
117	1024 x 768	65,536	43 (I)	35.0
117	1024 x 768	65,536	60	48.9
117	1024 x 768	65,536	70	56.5
117	1024 x 768	65,536	75	60.4
120	1600 x 1200	256	48.5 (I)	62.0
201	640 x 480	256	60	31.5
201	640 x 480	256	72	37.9
201	640 x 480	256	75	37.5
202	800 x 600	16	56	35.1
202	800 x 600	16	60	37.9
202	800 x 600	16	72	48.1
202	800 x 600	16	75	46.9

VESA Mode #	Screen Resolution	Colors	Refresh Rate (Hz) (Vertical)	Refresh Rate (Hz) (Horizontal)
203	800 x 600	256	56	35.1
203	800 x 600	256	60	37.9
203	800 x 600	256	72	48.1
203	800 x 600	256	75	46.8
204	1024 x 768	16	43 (I)	35.5
204	1024 x 768	16	60	48.4
204	1024 x 768	16	70	56.5
204	1024 x 768	16	75	60.3
205	1024 x 768	256	43 (I)	35.5
205	1024 x 768	256	60	48.4
205	1024 x 768	256	70	56.5
205	1024 x 768	256	75	60.2
207	1152 x 864	256	60	55.3
208	1280 x 1024	16	43 (I)	47.7
208	1280 x 1024	16	60	63.7
208	1280 x 1024	16	72	77.7
208	1280 x 1024	16	75	79.8

Appendix D: FCC Compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference.

(2) This device must accept any interference received, including interference that may cause undesired operation.

Shielded cables are required between the computer and the monitor with the shield properly grounded. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio or television reception. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful 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 or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CHANGES OR MODIFICATIONS TO THIS EQUIPMENT NOT EXPRESSLY APPROVED BY THE MANUFACTURER COULD VOID YOUR AUTHORITY TO OPERATE THE EQUIPMENT.

Appendix E: Servicing Your Boca Product

If your Voyager 64 board requires service, first contact the authorized Voyager 64 dealer from whom you purchased the board. If the dealer is unable to assist you, and you must contact Boca Research, Inc., please follow the instructions below.

Our electronic BBS is available 24 hours a day at (407) 241-1601 and will support data transmission speeds up to 14.4Kbps with settings of N, 8, 1. If you have a modem, the BBS may be helpful (especially during off hours) if you have a question about product settings or compatibility, or if you wish to download driver software or utilities.

NOTE: CALLING TECHNICAL SUPPORT WITHOUT COMPLETE AND ACCURATE INFORMATION CONCERNING YOUR PROBLEM MAY BE BOTH TIME-CONSUMING AND FRUSTRATING FOR YOU.

1. When calling Boca Research Technical Support, have the following information available:

- Exact board name/product code and board part number
- Software/driver revision level
- Computer manufacturer
- Computer model
- Peripherals in the system
- Operating system and version
- Contents of system's CONFIG.SYS

If you suspect a problem with a specific program or software package, make note of the name, version or release number, and manufacturer of the software.

2. Call Boca Research Technical Support Department between the hours of 8:00 a.m. and 6:30 p.m. Eastern time Monday through Friday at (407) 241-8088. A technical support specialist will be available to discuss the problem(s) you are experiencing.

   If it is determined that factory service is required, you will be given a Return Merchandise Authorization (RMA) number. Please place this number on the outside of the package when you return the item(s) for service and reference it on any correspondence included in the package. Boca Research, Inc. will return any product which is not accompanied by an RMA number.

3. Refer to the Warranty Statement if the product is covered under the five-year Boca Research, Inc. Limited Warranty.

4. Certain parts will not be covered under the Boca Research, Inc. Limited Warranty. Dealer installed parts are warranted by the dealer. Parts which you have installed yourself are covered only by the supplier's warranties. In these cases, Boca Research, Inc. can identify which parts are defective, but will not replace such parts until specific written authorization is received from you. The cost of parts and labor involved in making such repairs will be billed to you C.O.D.

5. When sending a board to Boca Research, Inc. for repairs, please be sure to include the Voyager 64 board, your return street address (for UPS purposes), phone number, and the RMA number mentioned above.

Package the product securely in a container equivalent to the original packaging, and insure the package to protect against loss or damage during transit. Shipping charges must be prepaid; C.O.D. shipments will not be accepted. Please use the address below for all correspondence:

Boca Research, Inc.
RMA Department - RMA #_____
1601 Clint Moore Road
Boca Raton, FL 33487-2841

6. If the repairs performed on your board were covered by the warranty, Boca Research, Inc. will return it prepaid via UPS.

Appendix F : Warranty

Limited Warranty

Boca Research, Inc. (BRI) warrants to the original buyer of this BRI product that the hardware is free of defects in materials and workmanship for a period of five (5) years from the date of purchase from BRI or an authorized dealer ("the Warranty Period"). Should the product fail to be in working order at any time during the five-year period, BRI, will at its option, repair or replace this product as described below, provided that in BRI's sole determination the part or product has not been abused, misused, repaired, or modified.

All products will be serviced and returned via ground at no charge to customers DURING the first year of service.

All returns for limited warranty service require a Return Merchandise Authorization (RMA). All customers are required to demonstrate proof of purchase when requesting an RMA. The period of warranty commences on the date of purchase. A dated copy of the sales slip must be included with the returned merchandise.

Products which require Limited Warranty service during the warranty period should be delivered to BRI at the address in the Appendix (Servicing Your Boca Product) with proof of purchase, copy of canceled check (if any), and the Return Merchandise Authorization (RMA) number provided by BRI Technical Support. Refer to the Appendix in this manual. Replacement parts or complete products will be furnished on an exchange basis only. Replaced parts and/or products become the property of BRI.

If the returned product is sent by mail, the purchaser agrees to prepay shipping charges, insure the product or assume the risk of loss or damage which may occur in transit, and to use a shipping container equivalent to the original packaging. BRI does not make any warranties in respect to the product, either expressed or implied, including no implied warranties of merchantability or fitness for a particular purpose, except as expressly provided in this agreement. If any labor, repair, or parts replacement is required because of accident, negligence, misuse, theft, vandalism, fire, water or other peril; or because of conditions outside of specifications, including, but not limited to, electrical power, temperature, humidity or dust; or by moving, repair relocation, or alteration not

performed by BRI, or by any other cause other than normal use, the warranty and maintenance obligations provided herein shall not apply.

BRI SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OR FOR LOSS, DAMAGE, OR EXPENSE DIRECTLY OR INDIRECTLY ARISING FROM CUSTOMER'S USE OF OR INABILITY TO USE THE EQUIPMENT EITHER SEPARATELY OR IN COMBINATION WITH OTHER EQUIPMENT, OR FOR PERSONAL INJURY OR LOSS OR DESTRUCTION OF OTHER PROPERTY, OR FROM ANY OTHER CAUSE.

This warranty shall not be applicable to the extent that any provision of this warranty is prohibited by any Federal, state, or municipal law which cannot be preempted. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Software License Agreement for the Boca Research Voyager 64

Boca Research, Inc. (BRI) grants the owner permission to use Voyager 64 software upon adherence to the terms and conditions of this agreement.

1. The use of Voyager 64 software will be limited to computers that contain the Voyager 64 board.

2. Any reproductions of the Voyager 64 software are also subject to this agreement.

3. Voyager 64 software is not to be modified in any way; it should be used in its original form.

4. Should a change in ownership occur, these three conditions MUST be met:

* the Voyager 64 board must also be transferred to the new owner.

* any copies of the Voyager 64 software which are not being transferred must be destroyed.

* the new owner must abide by the terms presented in this agreement.

5. BRI remains the copyrighted owner of the Voyager 64 software. The ONLY rights given to the licensee are those which have been provided for under this agreement.

6. UNDER NO CIRCUMSTANCES WILL BRI BE HELD LIABLE IN ANY WAY TO ANY PURCHASER FOR DAMAGES, LOST REVENUE, LOST WAGES OR FOR ANY OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND WHETHER COVERED UNDER THIS AGREEMENT OR OTHERWISE. THE Voyager 64 SOFTWARE IS NOT WARRANTED IN ANY WAY AND ITS USE IS THE SOLE RESPONSIBILITY OF THE LICENSEE FREE FROM ANY EXPRESSED OR IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

7. BRI provides a five year warranty for the media on which the Voyager 64 software is furnished. This warranty is limited to defects in materials and workmanship; it does not cover the functions provided by the Voyager 64 software. This license is subject to termination upon breach of this agreement. The Voyager 64 software and any copies must be destroyed or returned to Boca Research, Inc.

8. BRI reserves the right to make modifications to the software without any prior notice.

9. This license is governed by the laws of the state of Florida.

Glossary

24-bit. The number of bits which represent each pixel, or point on the screen. An 8-bit per pixel card can generate 256 colors; 24 bits per pixel yields 16.8 million colors.

8514. An IBM color monitor capable of resolutions of 720x400 non-interlaced with a refresh rate of 70MHz; 640x480 non-interlaced at 60MHz; or 1024x768 interlaced at 43.58 MHz. All of these resolutions are in 256 colors.

Analog Monitor. A monitor which uses an analog signal. Analog monitors can display an infinite number of shades for each primary color.

Autoswitch. The ability of a display adapter to automatically determine the display standard required by your software and to take action accordingly.

BIOS. Basic Input Output System. Provides fundamental services required for the operation of a computer. Permanently present in the machine, these routines are generally stored in ROM (Read Only Memory). The system board contains a ROM BIOS to support all of its standard functions. The Voyager 64 also has a BIOS for display features.

Bit Block Transfer. A method of holding a block of graphics, such as Windows dialogue box, in memory so that it can be moved and redrawn quickly by memory-to-memory operations.

CGA. Color Graphics Adapter. Medium resolution IBM graphics standard capable of displaying 640 x 200 pixels in 2 colors, or 320 x 200 pixels in 4 colors.

Color Monitor. Any CGA, EGA, VGA color, or multiple frequency monitor.

Digital Monitor. Monitor which receives discrete binary signals. Digital monitors do not have as wide a range of color choices as analog types; digital EGA monitors can display just 64 colors.

DRAM. Dynamic RAM. RAM is random access memory.

ECD. Enhanced Color Display. An EGA specification. TTL monitor capable of displaying video signals with horizontal scan frequencies of 15.750KHz (CGA) or 21.850KHz (EGA) only.

EGA. Enhanced Graphics Adapter. High resolution IBM graphics standard capable of displaying 640 x 350 pixels in 16 colors out of a palette of 64 colors.

EGA Monitor. Any monitor capable of displaying both EGA and CGA standard modes. This includes ECD and multiple frequency monitors.

Extended EGA. Offered by proprietary chip sets on non-IBM adapter cards with 640 x 480 resolution or better.

Feature Connector. Used by graphics adapters to give compatibility with VGA text and graphics codes for use with multi-media applications.

GUI. Graphical User Interface.

Flicker. The wavering or unsteady image on some monitors. A major cause can be a low refresh rate.

Hardware Graphics Cursor. Provides a faster method of displaying/moving a cursor (GUI arrow) on the screen. The video adapter's main chipset controls this function which resides in system memory, as opposed to slower handling by the application software.

HGC. Hercules Graphics Card. Compatible with MDA, but also capable of displaying 720 x 348 pixels in a 4-bank graphics mode.

Hi-res. Short for High Resolution, this term should be only applied to a minimum of 640 x 350 resolution and above.

Horizontal Scan Rate. The frequency in KHz (kilohertz) at which the monitor is scanned in a horizontal direction; high horizontal scan rates produce higher resolution. The EGA horizontal scan rate is 21.8 KHz, while the extended EGA horizontal scan rate is 30.1 KHz.

Interlaced. A method of scanning a screen which results in alternate lines being drawn with each full pass of the electron beam. The resulting display is less stable than a flicker-free non-interlaced display.

MDA. Monochrome Display Adapter. Early IBM Video display board designed for use with IBM monochrome text standard.

Monochrome Monitor. A TTL monitor which can display only 2 colors (generally green/black or amber/black).

Multiple Frequency Monitor. Monitor capable of displaying video signals over a wide range of horizontal scan frequencies. This may include a horizontal capture range from 5.5KHz to 35KHz or wider. Examples of monitors in this class are the NEC MultiSync and the Sony Multiscan. The Multiscan has a wide horizontal scan capture range which enables it to display monochrome signals.

Palette. The range of colors from which you can select the actual colors that the video adapter will display simultaneously. Pixel. A single dot on the CRT display. This word is derived from the words ‘picture’ and ‘element’.

RAMDAC. RAM Digital to Analog Converter.

Refresh Rate. Also called Vertical Scan Rate, the speed at which the screen is repainted. Typically, color displays must be refreshed at 60 times per second. Usually, the faster the refresh rate, the less flicker a monitor has (normally defined in Hz).

Register Level Compatibility. Complete compatibility to the hardware level.

RGB Monitor. Red/Green/Blue. A CGA compatible monitor limited to a 15.750KHz horizontal scan rate.

Scan rate. The frequency in Hertz (Hz) at which the monitor is scanned horizontally. Generally, the higher the scan rate, the higher the resolution.

TSR. Terminate and Stay Resident. A program that remains in memory after it has been loaded.

TTL. Transistor-Transistor Logic; a fast, reasonable-cost type of integrated circuit used in some monitors.

TTL Monitor. Video and synchronization signals (all digital) are on separate lines and have TTL compatible voltage levels.

VESA. Video Electronics Standards Association.

VGA. (Video Graphics Array) Analog graphics standard introduced with the IBM PS/2 series. Backwards compatible with EGA at the BIOS level, but provides higher resolutions. Supports a maximum resolution of 640 x 480 pixels in 16 colors out of a palette of 262,144 colors.

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