OPERATION MANUAL

OEM VERSION

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ATI reserves the right to make changes to this manual without prior notice.

ATI Technologies Inc.
3761 Victoria Park Avenue
Scarborough, Ontario
M1W 3S2
Tel: (416) 756-0718
Fax: (416) 756-0720
Telex: 06-966640 (ATI TOR)

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- GEM - Digital Research Inc.
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- Newviews - Q.W. Page Associates, Inc.

SOFTWARE INSTALLATION

A number of changes have been made to the v1.02 disks shipped with the VGAWONDER. The information given here replaces that given in Chapter 7 of the *VGAWONDER USER'S GUIDE*. The major changes are:

README Extensively revised. Please read this file before installation.

VSETUP.COM A choice for NEC VGA has been added to ANALOG MONITOR SELECTION, which specifies a NEC Multisync 2A or equivalent monitor. Also added is a new feature to adjust grey scale on a TTL monochrome monitor. Note that after each menu choice in VSETUP, you must EXIT, then power-off to write the changes to the EEPROM.

VCONFIG.COM A choice for MDA TEXT MODE has been added to allow use of monochrome mode without enabling Hercules graphics, i.e. for Sidekick Plus.

VDRIVER.COM Replaces VINSTALL.COM. This program is used to install ATI high-resolution drivers.

MOUSE.COM and **MOUSE.SYS** Mouse drivers can now be disabled. See README for details.

ATI-INFO.COM This is a new program which displays displays configuration information for diagnostic purposes. If you have occasion to call our Technical Support Department, please run this program and record the information on the Problem Report.

README.WIN A new text file describing Windows and Windows 286 driver installation.

README.LOT A new text file describing Lotus 123 driver installation.

README.ACA A new text file describing AutoCAD driver installation.

README.SHD A new text file describing AutoSHADE driver installation.

README.SKE A new text file describing AutoSKETCH usage.

README.VP A new text file describing Ventura driver installation.

README.GEM A new text file describing GEM driver installation.

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VGAWONDER

INTRODUCTION

The **ATI** VGAWONDER & VGAWONDER256 are high performance IBM PC/XT PC/AT 286/386 compatible VGA video adapters, with capabilities and performance which exceed other video cards of their type.

They are capable of achieving the 1024x768 resolution of the IBM Personal System/2 high resolution modes on Multisync monitors.

The implementation of both a 16 bit datapath and a 1:1 memory interleave scheme provides the user with fast screen updates.

100% IBM hardware and software compatibility guarantee the user that their system will be able to run all software programs written for both the IBM Personal Computer and the IBM PS/2 Model 30.

The VGAWONDER is register-level compatible with the video standards of IBM's MDA: Monochrome Display Adapter, CGA: Color Graphics Adapter, EGA: Enhanced Graphics Adapter, VGA: Video Graphics Array, and even the non IBM standard, the Hercules text and graphics card standards. Additionally the VGAWONDER supports resolutions of 1024x768, 800x600, 640x480, and 600x400.

The VGAWONDER will operate on practically any IBM compatible monitor including TTL monochrome, RGB, EGA, Personal System/2 Analog, IBM 8514, Multisync or Multifrequency monitors. The adapter is specifically designed to support the EGA resolution on any of these monitors and can additionally support the higher resolutions including the 1024x768 on the original Multisync monitors through interlacing.*

Some of the outstanding features of the VGAWONDER include its ease of installation, with the total elimination of dip-switches or jumper settings. A Microsoft bus mouse compatible interface, is included with the adapter, eliminating the user's requirement to provide an extra board or device. The versatility of running in either an 8 or 16 bit data bus allows the optimum use of systems.

The VGAWONDER, covered under a Two Year warranty period, guarantees to give the user the utmost reliability and performance.

ATI maintains a very high level of technical support which is readily available to all purchasers of **ATI** products.

INTERLACING: used by **ATI, has allowed the VGAWONDER to run high resolution and to display the high resolution of 1024x768 on monitors not normally capable of displaying this resolution. The visual effect of interlacing is not noticeable on these monitors.*

FEATURES

The VGAWONDER includes a long list of features:

- *Advanced CMOS VLSI Gate Array Technology*
  The VGAWONDER is built around the exclusive **ATI** VGA chip, a solution which features low power consumption, high speed performance and complete reliability, all at a competitive price.
- *100% Register-Level Hardware Compatibility*
  VGA cards can vary in their levels of BIOS or hardware register compatibility. This may affect their operational capabilities under some software that expect to see the same registers as with IBM's VGA hardware architecture. The VGAWONDER features 100% Register-Level Hardware Compatibility to IBM's VGA. In addition, it includes circuitry that is 100% register-level compatible with CGA, MDA, EGA, and Hercules standards.
- *Includes 512k of Video Memory*
  The VGAWONDER with 512k of video memory supports higher resolutions with more color. The VGAWONDER256, with 256K of video memory, supports all the resolutions of the VGAWONDER with a lower color spectrum and is field upgradeable to 512K.
- *Higher Resolution and Enhanced Color Modes*
  The VGAWONDER supports higher resolutions using special **ATI** video drivers. These include 1024x768 with 16 simultaneous colors or 800x600 and 640x480 with 256 simultaneous colors for CAD/CAM, desktop publishing and presentation graphics applications. High resolution drivers are included for AutoCAD, AutoShade, Windows, GEM, Ventura, and OS/2.
- *Automatic 8/16 bit bus detection*
  The VGAWONDER works in both the 8 bit slots of the IBM PC, PC/XT, and the 16 bit slots of the PC/AT computers. The VGAWONDER will perform twice as fast in a 16 bit slot of an AT. However it will also automatically configure itself in an 8 bit slot in an IBM PC, XT.

- *Up to 800% Faster than IBM's VGA*
  With an advanced design using an internal 16 bit datapath and 1:1 memory access interleave scheme, performance is up to 800% faster than IBM VGA using a 16 bit slot and up to 400% faster using an 8 bit slot.

- *132 Column Support*
  The VGAWONDER supports 132 column text on TTL monochrome, RGB, EGA, and Multisync or Multifrequency monitors. Software presently supported includes Lotus 1-2-3, Symphony, WordStar, WordPerfect, SmarTerm, Vterm, and NewViews.

- *User Friendly*
  Automatic Monitor Detection eliminates setting dip switches and possible damage to your monitor. The VGAWONDER detects the monitor at the time the computer is turned on, and during software re-boot. A software utility (VSETUP) will help you configure the VGAWONDER without having to set dip switches; the onboard EEPROM will store this information after power down.

- *Automatic and Manual Video Mode Switching*
  The VGAWONDER will run all video modes to which your software application is configured. A software utility (VCONFIG) will manually configure the VGAWONDER in VGA, EGA, CGA, MDA, or HGC modes without having to power down the system.

- *Supports Major Video Standards on Any Monitor*
  The VGAWONDER will support all software configured for either:

  VGA (Video Graphics Array)
  EGA (Enhanced Graphics Adapter)
  CGA (Color Graphics Adapter)
  MDA (Monochrome Display Adapter)
  HGC (Hercules Graphics Card)

  The VGAWONDER will also support software which is not normally displayed by some monitors.

The VGAWONDER runs:
EGA, CGA, MDA, HGC, on an EGA monitor.
EGA, CGA, MDA, HGC, on a TTL monochrome monitor.
EGA, CGA, MDA, HGC, on an RGB monitor.
VGA, EGA, CGA, MDA, HGC, and **ATI** enhanced modes on VGA and Multisync monitors.

- *Improved Text Quality and Monitor Optimization*
  The resolution of text is improved by the VGAWONDER. On Multisync, Analog and EGA monitors, the text of CGA software is improved from an 8x8 pixel character to a high resolution 8x16 pixels, and graphics are double scanned.
- *Built-in Mouse*
  The VGAWONDER includes built-in mouse support with the inclusion of a Microsoft bus mouse compatible interface on each board. The configuration of the mouse to various bus mouse ports or interrupt levels is provided for using the VSETUP Software.
- *Flicker Free Operation in All Video Modes*
- *Full Two Year Warranty on Parts and Labour*

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CONTENTS OF THE PACKAGE

Your VGAWONDER package includes the following:

- VGAWONDER Video Adapter or VGAWONDER256 Video Adapter
- Users manual.
- Two software diskettes:
  Disk 1 - VGAWONDER Utility diskette.
  Disk 2 - VGAWONDER Software Driver diskette.
- **ATI** Microsoft bus mouse compatible (optional).

If your package does not include the above items, contact your dealer immediately.

If you are installing the VGAWONDER on a system which requires 3.5" diskettes, please call **ATI** with the serial

number of your card and we will be pleased to send the appropriate disks, or contact your dealer to have the software downloaded to your diskette standard.

Be sure to make working copies of the original diskettes to prevent accidental erasure of important files.

Completion of your warranty card, which is contained at the back of this manual, is important in order to maintain your warranty and receive Technical Support services from **ATI Technologies Inc.**

You have purchased a video card of the highest quality. Engineered by **ATI Technologies,** this card will maintain its quality for many years.

NOTE: *The VGAWONDER256 has been engineered with provisions for upgrade to 512K video memory. Information required to upgrade the VGAWONDER256 to 512K of video memory is contained in Appendix "C".*

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SYSTEM REQUIREMENTS

The VGAWONDER is designed for use in any open system expansion slot in an IBM or compatible/AT system which uses a 16 bit datapath slot on its motherboard, however the user may also find it quite suitable for use with an IBM or compatible 8 bit bus slot motherboard, or the IBM System/2 Model 30. If you are installing the VGAWONDER in an 8 bit slot, care should be taken to ensure that the *"gold fingers"* do not hit any components which are in its path, when the board is being installed. A suitable slot can normally be found.

***NOTE**: If you are uncertain of a suitable slot, we recommend that you have an experienced technician install the card. **ATI** does not cover under, its warranty, any damage caused either to the card or the system by the incorrect installation of this card.*

Under no circumstances should the card be installed while the system is switched on.

The monitors supported by the VGAWONDER will be covered in Chapter 5 "**Monitor Selection**". Users should be familiar with the capabilities of their monitor before installation. **ATI** recommends the use of a Multifrequency monitor in order to obtain the optimum results of the VGAWONDER, however the VGAWONDER has more capabilities with other monitors than other VGA cards and therefore the user is not specifically restricted to any particular monitor in order to achieve better than average results.

The IBM Personal Computer and Personal System/2 do not permit two similar display adapters to reside in the system operating in the same mode. The VGAWONDER has multiple emulation capabilities, which are controlled by a user software program supplied with the VGAWONDER.

***NOTE**: It is recommended that other video adapters which are either presently installed in the system, or which may be present as a standard provision on the motherboard, be either removed or disabled before installing the VGAWONDER in your system.*

***NOTE:** More explanation on the installation of dual monitors is covered in Chapter 10 "**Dual Monitor Selection**" of this manual.*

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SETTING UP YOUR COMPUTER

In order to install the VGAWONDER It may be necessary to make some minor changes to the switch settings on the computer system. If you do not feel comfortable in making these changes you should consult a qualified Computer Technician. Installing the VGAWONDER is very simple and can be achieved in 15 minutes or less.

Read the following instructions before you start.

***NOTE**: Static electricity can seriously damage the components in your computer. You must ensure that you have discharged any static electricity by grounding yourself to the chassis of the pc before you begin.*

IBM/PC

Ensure that the System is switched off and the power cord removed before installation. **Damage to the System and the VGAWONDER may result if the power is left on.**

Remove the 5 cover mounting screws from the rear of the PC.

On the IBM/AT you must unlock the keylock before you can remove the cover.

Some compatible PC's have a hinged top for convenience. If your system appears to be different, consult your System Users Manual for instructions on board installations.

On the IBM Personal System/2 Model 30 remove the 4 cover mounting screws, 2 of them are located on each side of the system.

Carefully slide the cover forward, until it will go no further, then tilt the cover away from the system unit and withdraw it from the system.

On the Personal System/2 Model 30, slide the cover backwards and remove by lifting straight up.

Put the screws in a safe place, you will need them later for re-installation.

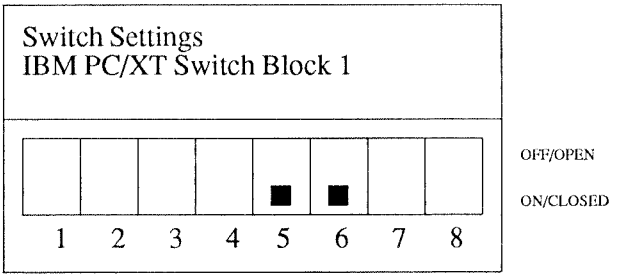
There are no switches or jumpers to set on the VGAWONDER, the card will automatically configure itself to your system upon installation.

It is however necessary to configure your system for the card.

The correct configuration of your system is the same as for that of an EGA card.

See diagram on the following page.

IBM PC/XT



When installing the VGAWONDER in an IBM PC, PC/XT, set switches 5 & 6 as outlined in the above table. **Do not change any other switches as these will affect the memory and configuration of your system.**

***NOTE**: Do not use a pencil to set the switches, as the graphite residue can damage your computer.*

The PC/XT has only one switch block on its motherboard; which should be easy to find. Compatibles may have different switch locations or set-ups in order to isolate their video interface. Consult your Systems User Manual for these locations.

IBM PC/AT

When installing the VGAWONDER in the IBM PC/AT it is necessary to set the video display switch (Color/Mono switch) on the AT motherboard to Color and run the **IBM Advanced Diagnostics Program** which will automatically configure the System for an EGA (Enhanced Graphics Adapter) Card, which is the category for the VGA WONDER.

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MONITOR SELECTION

AUTOMATIC MONITOR DETECTION

It is manditory that the monitor is connected to the VGAWONDER before power-up in order for the automatic detection to function correctly. Failure to do this will result in an incorrect monitor being detected.

The VGAWONDER will support the following IBM compatible video monitors in text & graphics resolution as follows:

TTL MONOCHROME (18.43KHz)

These monitors are designed to be used with Hercules or MDA cards. With the VGAWONDER, the following software standards can be displayed:

- Monochrome text mode
- Hercules text and graphics modes 720x348

- RGB text and graphics mode 320x200 - in shades
- EGA text and graphics mode - 640x350 in shades
- 132 Columns x 44 rows text for software which either supports this mode or by drivers which are provided by **ATI** on the disks supplied with the card.

RGB COLOR (15.75KHz)

These monitors are designed to work with CGA cards. With the VGAWONDER, the same standards as with the TTL monochrome are displayed with the following differences:

- CGA and EGA are displayed in colors instead of shades;
- 132 Columns x 25 rows text for software which either supports this mode or by drivers which are provided by **ATI** on the disks supplied with the card.

It should be noted that in order to display the EGA or Hercules resolution on RGB monitors an interlacing technique is used. This will result in some "flickering" of the image on the screen on this particular monitor. Flicker can be reduced by the use of an anti-glare filter or by decreasing the contrast and brightness controls. This monitor is not recommended as being suitable for prolonged use in these resolutions.

EGA (15.75 - 21.85 KHz)(Enhanced Graphics Monitors)

Enhanced Graphics monitors are designed to work with CGA or EGA cards. Using the VGAWONDER, EGA monitors can display:

- Hercules text and graphics modes 720x348
- RGB graphics mode - 320x200 - 16/64 colors.
- EGA text and graphics modes - 640x350 - 16/64 colors.

- 132 Columns x 44 rows text on software which either supports this mode or by drivers which are provided by **ATI** on the disks supplied with the card.

VGA/ANALOG MONITORS (31.5KHz) *(sometimes referred to as PS/2 color or monochrome display)*

The Analog monitor has an advantage in displaying an infinite array of colors. In VGA it is possible to display up to 262,144 colors.

In addition to displaying the same modes as with an EGA monitor, the VGA/Analog monitor will allow the following modes:

- All I7 of the IBM VGA/Analog modes, displaying color spectrums of 256 colors from a palette of 262,144 where the modes are defined to support this choice.
- Additionally supporting Hercules, CGA, EGA, and the higher resolution **ATI** modes of 640x480 in 256/262,144 colors on software supported by the drivers which are included by **ATI** with the VGAWONDER or by the software manufacturer to support this resolution.

IBM 8514 (43.5KHz) *(or compatible)*

The IBM 8514 monitor is a high resolution color Analog monitor that is VGA compatible and also operates in interlaced mode. The 8514 will allow the use of an additional mode, in addition to, the modes functional on VGA/Analog monitors:

- Supporting the higher resolution of 1024x768 in 16 colors from a palette of 262,144.
- Additionally supporting IBM VGA, Hercules, CGA and EGA modes.

MULTISYNC OR MULTIFREQUENCY MONITORS

Some introduction is required in defining these monitors. These monitors have a range of operating frequencies and will adjust to the output frequency of the graphics adapter. Some models of the Multisync or Multifrequency monitors may not have the capability to display 1024x768 because of their lower operating frequency range.

ATI recommends that the Multisync or Multifrequency monitor is used in the Analog mode for optimum results with the VGAWONDER. This is achieved by using a 15 pin VGA/Analog connecting cable from the monitor to the VGAWONDER and switching your monitor to ANALOG.

NOTE: *Refer to the Operating Manual of the Monitor for more details or call your dealer to obtain the necessary cables and adapters if required.*

Multifrequency monitors support the following resolutions using the VGAWONDER:

- Hercules text & graphics modes 720x348
- RGB graphics mode - 320x200 - 16/64 colors.
- EGA text & graphics modes - 640x350 - 16/64 colors.
- 132 columns to a maximum of 60 rows text on software which either supports this mode or by drivers which are included by **ATI,** on the disks supplied with the VGAWONDER card.
- All the IBM 17 VGA/Analog modes, displaying a color spectrum of up to 256 colors from a palette of 262,144.

The VGAWONDER also supports higher resolution ATI modes:

- 640x400 in 256 from 262,144 colors.
- 640x480 in 256 from 262,144 colors.
- 800x600 in 256 from 262,144 colors.
- 1024x768 in 16 from 262,144 colors.

with software supported by the drivers which are included by **ATI** with the VGAWONDER or by the software manufacturer to support this resolution.

***NOTE**: If you have a Multisync monitor without a 15 pin VGA/Analog cable etc., contact the Monitor manufacturer or their representative for details on adapter cables.*

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INSTALLING THE VGAWONDER

The VGAWONDER is a 16 bit databus/datapath card, that is to say that it has been designed to take full advantage of the wider datapath of systems using the 80186, 80286 or 80386 microprocessor which is found in the IBM/AT systems or compatibles. This gives the advantage of much faster speeds and optimizes the system. The card will however run in an 8 bit databus slot found in the IBM PC or XT and compatibles. The user should be aware that when installing the card in the shorter or 8 bit slot a portion of the *"gold fingers"* connector on the VGAWONDER will not be connected into any part of the expansion slot.

Care should be taken to ensure that this portion of the connector, which is not connected to your expansion slot, does NOT touch any components on your mother board.

NOTE: ***ATI Technologies*** *will not be responsible in any way for damage which is caused to either the system or the card because of incorrect installation.*

For IBM/AT users the VGAWONDER should be installed in a 16 bit slot.

For IBM/XT users the VGAWONDER should be installed in a slot where the extending *"gold fingers"* are clear of components on the mother board.

Remove the slot cover at the rear of the system and grasping the card by the top edge, firmly locate it into the expansion slot.

Insert the screw from the expansion slot cover in the hole at the top of the VGAWONDER's retaining bracket and tighten it.

Replace the System Unit's cover and fasten the screws.

You should now connect a monitor to the card with the use of a properly shielded cable. There is provision on the VGAWONDER for both a 9 pin and a 15 pin connector. The 9 pin connector is for use with TTL monitors, and the 15 pin connector is for use with VGA, Multifrequency or Multisync monitors.

The monitor must be connected to the VGAWONDER before you switch on your system in order to be properly identified by the ATI Monitor detect program.

Warning: *Only one monitor can be attached to the VGAWONDER card at any time, otherwise damage to one of your monitors might result.*

NOTE: *If you do not have the appropriate 15 pin VGA cable for your Multisync or Multifrequency monitor, it should be available through your local Computer Dealer.*

If you have correctly installed the VGAWONDER your system is now ready to run, however you are advised to read Chapter 9 "Software Installation" before proceeding.

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REASSEMBLING THE PC

Replace the cover on the PC and replace the screws at the rear.

Using the properly shielded cable attach the monitor to the VGAWONDER adapter.

The System is now ready to run.

In order to test the full operational functionality of the VGAWONDER, a Utility program named VGATEST is provided by **ATI** on the diskette supplied with the card.

Follow the menu driven instructions; and a series of screens will be displayed. If these screens are displayed correctly, the VGAWONDER has been properly installed and is in good working order.

For more information on **VGATEST**, see Appendix A.

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QUICK START (FOR EXPERIENCED USERS)

This Chapter can be used as a guide to Quick Set-Up for the experienced user. It should not be used unless you have a full understanding of how to install a card.

Unplug computer and remove the cover.

Remove any video cards and install the VGAWONDER into any available slot (8 bit or 16 bit slot). Seat the VGAWONDER and secure with a mounting screw.

For IBM PC and PC/XT users, set switches 5 and 6 on switch block 1 to the "ON/CLOSED" position.
For IBM AT and compatible users, if applicable, set the video selection switch or jumper to the "COLOR" position.

Reinstall cover of computer and connect power cord.

Connect monitor to video connector on the back of the VGAWONDER. Multisync or PS/2 monitors should use the analog port (DB-15). EGA, RGB, or TTL monochrome monitor should use the digital port (DB-9).

Turn on the computer. IBM PC/AT or compatible owners should run the "setup" program on the PC/AT Diagnostics Disk to ensure that the system has selected a color card as the primary card.

NOTE: Do not change monitors after you have powered up. Serious damage could result.

Using the VGAWONDER Utility diskette, run VINSTALL to install the **ATI** software utilities and high resolution drivers onto your hard disk.

You are now ready to enjoy a new world of high performance, high resolution video.

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SOFTWARE INSTALLATION

The VGAWONDER is shipped with software utilities to change the default settings and a variety of high resolution drivers enhancing the operation of graphics programs such as GEM, Windows, and AutoCAD. Although the VGAWONDER will work without any further input, it is recommended that you go through the software installation process to get peak performance from your video board.

The VGAWONDER Diskette #1 contains the following utilities:

ATIVIDEO.SY		- RAM version of video BIOS
DATE.COM		- utility that checks date of BIOS
CLR.COM		- clear screen utility for 132 column mode
L43.COM		- 43 line mode utility
README		- addendum and driver installation instruction
VCONFIG.COM		- mode switching software
VGATEST.COM		- diagnostic software for VGAWONDER
VINSTALL.EXE		- run this program to install **ATI**'s software utility on your hard disk
VSETUP.COM		- setup and configuration utility
GAMES	<DIR>	- subdirectory with instructions to run some special game programs
MOUSE.COM		- the **ATI** standard mouse driver compatible with Microsoft mouse.com
MOUSE.SYS		- the alternative driver conforming to DOS installable drivers

VGAWONDER Diskette #2 contains the following drivers:

ACAD	<DIR>	- subdirectory with AutoCAD drivers
GEM	<DIR>	- subdirectory with GEM version 2 & 3 drivers
LOTUS	<DIR>	- subdirectory with Lotus drivers
VENTURA	<DIR>	- subdirectory with Ventura drivers
WINDOWS	<DIR>	- subdirectory with Windows driver

VINSTALL

To start the installation process for the VGAWONDER Utilities, insert the VGAWONDER Utility diskette into drive A and type:

A> VINSTALL <enter>

The following menu will appear on your screen:

*** VGAWONDER Software Installation Menu (ver xxx) ***
1. Utilities for VGAWONDER
2. AutoCAD ver 2.52/ ver 2.62/ rel 9
3. AutoShade ver 1.0
4. AutoSketch ver 1.04
5. GEM ver 2.1/ ver 2.2/ ver 3.0
6. Lotus 1-2-3 ver 2.0
7. Symphony ver 1.1
8. Ventura ver 1.0/ ver 1.1
9. Windows ver 1.03/ ver 1.04/ ver 2.03
Use <↑↓> or < letter > and < ret > to select option, < esc > to abort.

For further detailed information on the submenus contained within the VINSTALL menu, consult the README file.

VCONFIG

VCONFIG is a menu driven, user friendly utility that is used to:

1. Change the current video mode to a different mode;

2. Automatically turn your screen display off during long periods of inactivity;

VCONFIG is automatically copied onto your hard disk drive or your boot disk during the installation process.

To start VCONFIG, type at the DOS prompt:

C> VCONFIG <enter>

The following menu will be displayed:

ATI TECHNOLOGIES INC ATI TECHNOLOGIES INC A
TI TECHNOLOGIES INC ATI TECHNOLOGIES INC AT
I TECHNOLOGIES INC ATI TECHNOLOGIES INC ATI
© COPYRIGHT 1988

VGAWONDER ADVANCE CONFIGURATION PROGRAM
SETUP VERSION XXX

SELECTION		KEYWORDS
[A]	VGA	VGA
[B]	EGA	EGA
[C]	CGA	CGA
[D]	MDA MONO GRAPHICS 720x340	H720
[E]	MDA MONO GRAPHICS 640X400	H640
[F]	132x25	25
[G]	132x44	44
[H]	132x60	60
[I]	SCREEN SAVE	SAVE
[J]	8/16-BIT SELECT	
[L]	EXIT	

Current configuration Monitor detected
VGA in cv80 EGA
Use <↑↓> or < letter > and < ret > to select option,
< esc > to abort.

MODE SELECTION

COLOR
MONO

Each of the options in VCONFIG can be selected by typing in the letter to the left of the selection and then depressing the <enter> key. As you get familiar with the operation of VCONFIG, you can bypass the menu completely by typing:

C> VCONFIG [KEYWORD] <enter>

The keywords are indicated on the right hand side of the screen: VGA, EGA, CGA, H720, H640, 25, 44, 60, or SAVE.

A description of each of the options under VCONFIG follows:

[A] VGA
This option selects the VGA mode and is functional only with VGA, 8514 and Multisync monitors. Software configured for VGA mode will run under this mode.

[B] EGA
This option selects the EGA mode and is functional on all monitors. Software configured for EGA mode will run under this mode.

[C] CGA
This option selects the CGA mode. ATI enhances this mode by improving the graphics and text to a double scanned image on all monitors except for RGB monitors.

[D] MDA MONO GRAPHICS 720x348
Selection of this option will put the VGAWONDER into Hercules Graphics mode. If you are using a color monitor, you will have a choice of text colors from white, amber or green. All Hercules graphics programs use this resolution.

[E] MDA MONO GRAPHICS 640x400
This option will put VGAWONDER into special Hercules Graphics mode. Only a small number of programs use this resolution. If you have a problem with this option, try option [D].

[F] 132x25
The option 132 column x 25 row text mode works on all monitors except VGA monitors.

[G] 132x44
The 132 column x 44 row text mode will work on all monitors except for RGB monitors and VGA monitors.

[H] 132x60
This option will only work on Multisync monitors.

NOTE: *132 Column modes can only be used by software which is written to support 132 columns on the screen. Check your users manual or call your dealer to confirm that the application will run in this mode.*

[I] SCREEN SAVE
The Screen Save option will activate a utility which will turn off the screen display after a predetermined time interval in order to prevent accidental phosper etching on your monitor. At your option, Screen Save is automatically installed during the utility installation process.

NOTE: *Screen Save is not compatible with graphics programs that run under the GEM or Windows environments. Type "VCONFIG SAVE OFF" before you start these programs, and type "VCONFIG SAVE ON" after you leave these programs. You can also incorporate these commands into a batch file to have the command automatically executed.*

[J] 8/16-BIT SELECT
8 or 16 bit BIOS operation. In an IBM XT, 8 bit is selected automatically. In some AT systems the VGAWONDER may not operate correctly in the 16 bit mode. This will be obvious if the system is NOT responding to keyboard control. **ATI** recommends that the user select the 8 bit mode if this condition persists.

[K] EXIT
Selection of this option will execute the last mode chosen that is supported by the monitor you are using. If you do not use EXIT to leave the menu, all options you choose will be ignored.

VSETUP

VSETUP is used to configure the onboard EEPROM. The setup information is retained even after the power is turned off. It is also used to change or store the default information used by the VGAWONDER. It is only necessary to use VSETUP in the following situations:

1. To change the default setup video mode.
2. To specify default monitor selection on power-up.
3. To setup the mouse interface.

To start VSETUP, type at the DOS prompt:

C> VSETUP <enter>

The following menu will be displayed:

```
ATI TECHNOLOGIES INC ATI TECHNOLOGIES INC A
TI TECHNOLOGIES INC ATI TECHNOLOGIES INC AT
I TECHNOLOGIES INC ATI TECHNOLOGIES INC ATI
              © COPYRIGHT 1988

        VGAWONDER ADVANCE SETUP PROGRAM
        VSETUP                  VERSION x.xx

              POWER UP MODE SELECTION

[A]   ANALOG MONITOR SELECTION
[C]   EGA
[D]   CGA
[E]   MDA MONO GRAPHICS 720X348
[F]   MDA MONO GRAPHICS 640X400
[G]   8/16 BIT SELECT
[H]   MOUSE OPTION SELECT
[I]   EXIT AND SAVE CONFIGURATION

Monitor detected
EGA
Use < ↑↓ > or < letter > and < ret > to select option, < esc >
to abort.
```

The following is a description of the VSETUP menu:

[A] ANALOG MONITOR SELECTION
The VGAWONDER monitor detection circuitry cannot differentiate between Multisync, Multisync Plus, or Multisync XL monitor. You must specify which type of multisync monitor is attached. This selection allows you to override the automatic analog monitor detection function of the VGAWONDER.

[B] VGA
Selection of this item will start the VGAWONDER in VGA mode, and is operational only with Analog and Multisync monitors. Similar to the VCONFIG menus, you will be given the option of choosing either the COLOR or MONO option; if you have a color monitor, and you choose the MONO option, another menu will appear, asking for the choice of foreground color (either white, amber or green).

[C] EGA (and Dual Monitor Configurations)
Selection of this item will start the VGAWONDER in EGA mode.

You will be given the option of choosing either the EGA(C80), EGA (CE80), EGA (M80) or DUAL option. If you have a color monitor and you choose the EGA (M80) option, another menu will appear, asking for the choice of foreground color (either white, amber or green).

Dual Monitor
If you select the DUAL option, you must determine which video card you wish to be the primary card at the time the computer powers up.

Primary Card - VGAWONDER

If you elect to have the VGAWONDER be the primary video card you can choose from the first three options:

1. With an MDA or Hercules card as the secondary adapter, you have the option of the VGAWONDER powering up as:

a) CGA card - choose EGA (C80)/MDA
b) EGA card - choose EGA (CE80)/MDA

2. With a CGA card as the secondary adapter, choose EGA (M80)/CGA (VGAWONDER powers up as a Hercules or MDA card); you will also have to specify your selection of a foreground color if you are using a color monitor on the VGAWONDER.

Secondary Card - VGAWONDER

If you elect to have the VGAWONDER be the secondary video card, you can choose from the last three options:

1. With an MDA or Hercules card as the primary adapter, you have the option of the VGAWONDER as:

   a) CGA card - choose MDA/EGA (C80)
   b) EGA card - choose MDA/EGA (CE80)

2. With a CGA card as the primary adapter choose CGA/EGA (M80); you will also have to specify your selection of a foreground color if you are using a color monitor on the VGAWONDER.

[D] CGA
Selection of this item will start the VGAWONDER in CGA mode with double scanned text. Because this mode has the lowest resolution available on the VGAWONDER, **ATI** recommends using this mode as a default only if the majority of your software is CGA selfbooting software.

[E] MDA MONO GRAPHICS 720x348
Selection of this item will start the VGAWONDER in Hercules mode. **ATI** recommends using this mode as a default only if the majority of your software is monochrome. If you are using a color monitor, when you select this option, you will be required to choose a color (either white, amber or green). Almost all Hercules Graphics programs use this resolution.

[F] MDA MONO GRAPHICS 640x400
This selection will also start the VGAWONDER in a special Hercules mode. However, only a small number of Hercules graphics programs use this resolution. If there is a problem with this option, try option [E].

[G] 8/16 BIT SELECT
Select 8 or 16 bit BIOS operation.

[H] MOUSE OPTION SELECT
The Mouse option select allows the user to:

- Select or deselect the mouse
- Select the interrupt level
- Select Primary or Secondary mouse port

The default setting for the ATI Mouse is deselected.

[I] EXIT AND SAVE CONFIGURATION
This option records the last configuration sequence into the EEPROM. If you do not use this option to leave VSETUP, the configuration information is not saved.

10

DUAL MONITOR INSTALLATION

The VGAWONDER will co-exist with 3 types of video adapters: either MDA, Hercules Graphics or CGA card. Other video adapters will not work with the VGAWONDER.

You must select which card will be the primary or start-up video adapter. **ATI** recommends that you use the VGAWONDER as the primary adapter because of its superior performance and flexibility.

Make the following switch selections:

For IBM PC, and PC/XT, set switch 5 and 6 on switch block 1, both to the ON position.

For IBM PC/AT If equipped with display switch, consult owner's manual for more information, set the display switch to the COLOR position.

IBM PC/AT owners must run the IBM Diagnostics "SETUP" provided with the computer. (Consult your owner's manual for more details). Select the NO DISPLAY or EGA option.

Now run ATI VSETUP, as described in Chapter 9.

To change between the primary and secondary adapters, use the MODE command found on your DOS diskette. At the DOS prompt, type:

A> MODE [KEYWORD] <enter>

where the keyword is CO80 or MONO.

***NOTE**: In dual monitor configurations, you can use VCONFIG to change the current mode. However, the VGAWONDER cannot emulate MDA or Hercules if an MDA or Hercules card is installed in the system. Similarly, the VGAWONDER cannot emulate a CGA, EGA or VGA if a CGA is installed in the system. **ATI** does not recommend the use of a color card with the VGAWONDER Since many of the color modes on the VGAWONDER would be defeated.*

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THE MOUSE INTERFACE

The Mouse Interface is compatible with the Microsoft bus mouse interface.

The configuration of the mouse interface is programmed via the VSETUP and VCONFIG utilities. VSETUP determines the default power-up configuration and VCONFIG is used to change the configuration after the system is power on.

The mouse configuration parameters are the interrupt level and the port address of the mouse interface.

An Interrupt Request (IRQ) is generated when a hardware device (such as the mouse interface) needs service from the pc system. You should set your mouse interface so that it uses an IRQ level not used by any other device in your pc system.

The following table lists the IRQ levels which are used by the IBM PC, PC/XT and the PC AT.

	IRQ Level
IBM AT	2
IBM PC with a fixed disk	5
IBM PC/XT	5
Asynchronous Communications Adapter (1st serial port COM1):)	4
Binary Synchronous Communications Adapter (1st serial port COM1:)	4 or 3
Synchronous Data Link Control Communications Adapter	4 or 3
Asynchronous Communications Adapter (2nd serial port COM2:)	3
IBM Enhanced Graphics Adapter	2
IBM Network Adapter	2

APPENDIX A

DIAGNOSTICS AND TROUBLESHOOTING

The **VGATEST** diagnostics program should be used when the VGAWONDER produces a display, but does not work properly. For example:

- does not display graphics,
- has missing characters,
- has no color,
- does not display in all modes.

Follow the menu driven instructions and a series of screens will be displayed. If these screens are displayed properly, the functions of the VGAWONDER are in good working order.

If problems are still encountered after the VGAWONDER passes **VGATEST**, they are most likely installation, compatibility or operation related.

Compatibility related problems can be isolated by trying the VGAWONDER on another monitor and/or another computer as appropriate.

INSTALLATION RELATED PROBLEMS

NO DISPLAY PROBLEMS

- **Problem:**
  Cannot seat VGAWONDER into slot.

  Diagnosis:
  Components in computer may interfere.

  Action:
  Try a different slot.

- **Problem:**
  No display, No fan noise.

  Diagnosis:
  No power to computer.

  Action:
  Check that computer is plugged in and turned on. If the power indicator light does not come on when power is switched on, the power supply may be defective.

- **Problem:**
  No display, fan noise, computer beeps (1 long and 2 short tones)

  Diagnosis:
  Video card not recognized.

  Action:
  Check switch settings: switches 5 & 6 on switch block 1 on your motherboard should be "ON". Check that the VGAWONDER is properly seated in the slot.
  Check ROM BIOS date (IBM PC only). Get new BIOS if earlier than 10/16/82.

- **Problem:**
  No display, computer beeps once, floppy drive light flashes on and goes off.

  Diagnosis:
  Computer works, signal not reaching monitor, possible defective monitor.

  Action:
  Check monitor; is it switched on and monitor cable connnected properly.
  Turn up monitor brightness and contrast controls.
  Turn monitor off and on, then reboot system.
  Try monitor on another system.

- **Problem:**
  No display, dual monitor configuration.

  Diagnosis:
  Incorrect installation

  Action:
  Check installation, run VSETUP.
  If problem not solved, remove other video card and install VGAWONDER as single monitor setup to confirm operation before attempting dual monitor configuration.

ERROR MESSAGES

- **Problem**:
  Error message - 'Invalid configuration press F1 to continue.' (IBM PC/AT only).

  Diagnosis:
  Incorrect configuration file, or dead AT battery.

Action:
Run AT diagnostics software, installing for EGA or No Display; reboot; problem should disappear; power down, if problem appears on power up again, battery is dead.

- **Problem:**
  Error message - Failed VGATEST

  Diagnosis:
  Certain modes may not operate on certain monitors.

  Action:
  Check section on monitor selection. If the mode is supposed to run, and colors or patterns are missing, card may be defective.

OPERATIONAL PROBLEMS

- **Problem:**
  Screen goes blank in Windows, GEM or games

  Diagnosis:
  Program incompatible with SCREEN SAVE.

  Action:
  Disable SCREEN SAVE, by typing, 'VCONFIG SAVE OFF' at DOS prompt before using program.

- **Problem**:
  Software does not work or garbage appears on screen and system hangs.

  Diagnosis:
  Software mode incorrect or not supported by monitor.

  Action:
  Use VCONFIG to change mode to match what software is installed for. Check that mode is supported by your monitor.

Diagnosis:
Possible device driver or memory resident program conflict.

Action:
Disable programs by unloading them from memory or by renaming the AUTOEXEC.BAT file to *.BAK and CONFIG.SYS to *.BAK and reboot. If the problem disappears, there is a conflict with one of your programs.

Diagnosis:
Monitor may not switch modes without resetting.

Action:
Reset monitor by turning it off and on.

- **Problem:**
Memory resident programs (ie. SideKick) work when initially loaded, but not later when needed.

Diagnosis:
Current video mode different from installation of TSR program.

Action:
Use VCONFIG to switch mode to whatever the TSR program (ie. SideKick) is installed for.

- **Problem**:
Programs vary in screen size.

Diagnosis:
Programs may be using different video modes.

Action:
Adjust the horizontal and vertical height controls on your monitor.

- **Problem:**
Screen flickers on RGB monitor.

Diagnosis:
Interlacing of image.

Action:
Use a screen filter or install software for lower resolution.

If none of the above have helped to solve the problem, contact the dealer who sold you the computer or VGAWONDER. If they are unable to solve the problem, fill out the ATI Problem Report form, located on the following pages, and call our Technical Support Department.

- **The Technical Support Departement is open between the hours of 9:00 am and 5:30 pm Eastern time at (416) 756-0718.**

ATI Problem Report

Before calling ATI Technical Support please fill out this form and have it available when talking to one of our representatives. This form must be filled out before placing the call to ATI. If you write, please complete both pages of this report and mail to the address given on the back of this manual or fax to 416-756-0720.

ATI WILL BE UNABLE TO PROCESS YOUR CALL WITHOUT THIS INFORMATION.

Serial Number: _____

VGAWONDER ☐ VGAWONDER256 ☐

VGA BIOS Version*: _____ DOS Version: _____

VCONFIG version: _____ VSETUP version: _____

Type & Model of Computer: _____

Type & Model of Monitor: _____

Other Add-on Boards Installed and Version: _____

_____

Memory Board: _____

Mouse (Make): _____ Driver Version: _____

Network (Make/Model): _____

Software & Version: _____

_____

_____

Memory-Resident Programs/Device Drivers Loaded (Versions): _____

_____

* BIOS Version is displayed on the screen upon power up or by running BIOSDATE on Disk #1.

Contents of Autoexec.bat

Contents of Config.sys

Problem Description

Problem:

Steps to Re-Create the Problem:

ATI TECHNICAL SUPPORT DEPARTMENT: (416) 756-0718
HOURS: 9:00am to 5:30pm Est.

APPENDIX B

PROGRAMMING INFORMATION FOR ADVANCED USERS

The ATI VGAWONDER is a high-speed, high-resolution video card for the IBM PC, XT and AT series personal computer market. It offers the utmost in compatibility being the only product on the market that is 100% register and BIOS compatible with VGA, EGA, CGA, MDA and Hercules. It supports every mode of these 5 video standards on compatible monitors. In many cases, the VGAWONDER will support video modes not normally supported on some monitors. For instance, EGA hi-res and Hercules modes on an RGB monitor or EGA and CGA on a monochrome TTL monitor. In addition, the VGAWONDER will support a number of ATI exclusive video modes. This document details information that software developers will require to program the card in these ATI modes. Developers who require programming information about standard IBM or Hercules video modes should refer to the Reference, located on page 75.

The VGAWONDER incorporates a number of video display modes on one board, care should be taken when programming to avoid video memory conflict and/or programming to the wrong display mode. Damage to the monitor may result if wrong mode parameters are programmed. Read through this section and the example program before attempting to program for the VGAWONDER.

AH = 0 ;set video mode

AL =	MODE/ TYPE	RESOLUTION	DIM/ COLOR	START ADDRESS
0h	color/alpha	640x200	40x25/ BW	b800:0h
1h	color/alpha	640x200	40x25/ 16	b800:0h
2h	color/alpha	640x200	80x25/ BW	b800:0h
3h	color/alpha	640x200	40x25/ 16	b800:0h
0*	color/alpha	640x350	40x25/ BW	b800:0h
1*	color/alpha	640x350	40x25/ 16	b800:0h
2*	color/alpha	640x350	80x25/ BW	b800:0h
3*	color/alpha	640x350	80x25/ 16	b800:0h
0+	color/alpha	720x400	40x25/ BW	b800:0h
1+	color/alpha	720x400	40x25/ 16	b800:0h
2+	color/alpha	720x400	80x25/ BW	b800:0h
3+	color/alpha	720x400	80x25/ BW	b800:0h
4h	color/graphics	320x200	40x25/ 4	b800:0h
5h	color/graphics	320x200	40x25/ BW	b800:0h
6h	color/graphics	320x200	80x25/ BW	b800:0h
7h	mono/alpha	720x350	80x25/ BW	b000:0h
0dh	color/graphics	320x200	40x25/ 16	a000:0h
0eh	color/graphics	640x200	80x25/ 16	a000:0h
0fh	mono/graphics	640x350	80x25/ BW	a000:0h
10h	color/graphics	640x350	80x25/ 16	a000:0h
11h	color/graphics	640x480	80x30/ BW	a000:0h
12h	color/graphics	640x480	80x30/ 16	a000:0h
13h	color/graphics	320x200	80x25/256	a000:0h
ATI Enhanced Modes				
23h	color/alpha	*1056x350	132x25/ 16	b800:0h
27h	mono/alpha	*1056x350	132x25/ BW	b800:0h
33h	color/alpha	1056x350	132x44/ 16	b800:0h
37h	mono/alpha	1056x350	132x44/ BW	b800:0h
54h	color/graphics	800x600	16	a000:0h
61h	color/graphics	640x400	256	a000:0h
62h	color/graphics	640x480	256	a000:0h
63h	color/graphics	800x600	256	a000:0h
65h	color/graphics	1024x768	16	a000:0h
67h	color/graphics	1024x768	4	a000:0h

The **ATI** enhanced mode 61H, 62H, 63H, 65H, and 67H are supported by the set mode (ah = 0) function only, the other BIOS functions will not support these modes. It is up to the application programs or drivers to implements those functions.

* *On RGB monitors, a resolution of 1056x200 is available.*

ATI ENHANCED GRAPHICS MODES

The video modes described in this document are listed below by the BIOS video mode number. We highly recommend that programmers select the video mode through BIOS whenever possible.

Mode# (hex)	Resolution	Colors/ Palette	Memory Required	Monitors Supported
54	800x600	16/256K	256K	3
61	640x400	256/256K	512K	1, 2, 3
62	640x480	256/256K	512K	1, 2, 3
63	800x600	256/256K	512K	3
65	1024x768	16/256K	512K	2, 3
67	1024x768	4/256k	256k	2, 3

Monitor Chart 1) VGA, 2) IBM 8514, 3) Multisync

STATUS DETECTION

The VGAWONDER is provided with some features which will allow software to autodetect the presence of the VGAWONDER, the amount of memory installed, and the type of monitor for which it is configured.

Identify VGAWONDER

c000:31 = '761295520' - ATI product signature found in all ATI products equipped with a BIOS

c000:40 = '31' - Identifies product as VGAWONDER or compatible

c000:4c = xxh - major BIOS revision number

c000:4d = yyh - minor BIOS revision number

Memory Configuration

The following assembler code segment can be used to determine the amount of memory available on the card.

```
                cli
                mov         dx,ATI_REG
                mov         al,DATA_I
                out         ax,al
                inc         dx
                in          al,dx
                sti
                and         al,020h

returns         al=0        ; 256K display memory
                              installed
                al=20h      ; 512k display memory
                              installed

where           ATI_REG     location is stored in
                            c000:10h
                DATA_I      is stored in 0bbh
```

Monitor Configuration

The following assembler code segment can be used to determine for which monitor the VGAWONDER is currently configured.

```
                cli
                mov         dx,ATI_REG
                mov         dl,DATA_I
                out         dx,al
                inc         dx
                in          al,dx
                sti
                and         al,0fh

returns  al = 0             EGA monitor
               1            PS/2 monochrome monitor
               2            TTL monochrome monitor
               3            PS/2 color monitor
               4            RGB color monitor
```

5	multiswitch monitor
7	PS/2 8514 monitor
d	NEC multisync XL

PROGRAMMING STANDARD EGA/VGA MODES WITHOUT BIOS

ATI strongly recommends setting the video mode through BIOS whenever possible. When this is not possible, such as when writing drivers for non-DOS operating systems, direct manipulation of the CRT controller parameters is necessary. ATI has provided a mechanism for accessing the parameter tables contained in the VGAWONDER BIOS. The following assembler code segment will locate the start address of the parameter table for the desired mode.

```
push    bp
mov     bp,sp
push    es
mov     al,args
mov     ah,12h
mov     bx,5506h
int     10h
mov     ax,bp
pop     es
pop     bp
ret
```

where args = mode desired in hex

If this routine returns BP = 0ffffh, that mode is not supported in the current configuration.

The parameter table size and structure is identical to the IBM EGA/VGA. The function of each register is also identical to IBM. Since the VGAWONDER uses hardware emulation, the standard parameters are used regardless of the type of monitor installed. However, ATI cautions that use of non-standard parameters may not produce the results that you expect especially if the card is in emulation.

SELECTING MEMORY PLANES

Certain ATI enhanced resolution graphics modes employ a multiple plane memory organization. When one of these modes is invoked, the video memoryis organized into 64K planes at a0000h to affffh. VGAWONDERS with 256K memory have 4 planes and those with 512K have 8 planes available. The following assembler code segment can be used to select the required plane.

```
        cli
        mov     dx, ATI_REG
        mov     al,PLANE_SELECT
        out     dx,al
        inc     dl
        in      al,dx
        mov     ah,al
        and     ah,PLANE_MASK
        shl     ch,1
        or      ah,ch
        mov     al,PLANE_SELECT
        dec     dl
        out     dx,ax
        sti
```

where ch = required plane value
PLANE_SELECT = 0b2h
PLANE_MASK = 0e1h

BIOS COMPATIBILITY

As mentioned earlier, the VGAWONDER is 100% BIOS compatible in all standard MDA, CGA, EGA and VGA modes. The ATI enhanced resolution graphics modes (modes 54, 61, 62, 63, 65 and 67) do not support many of the BIOS functions.

The BIOS functions that are not supported are as follows:

Function	Description	Remark
AH = 1	Set cursor type	; no cursor
AH = 2	Set cursor position	

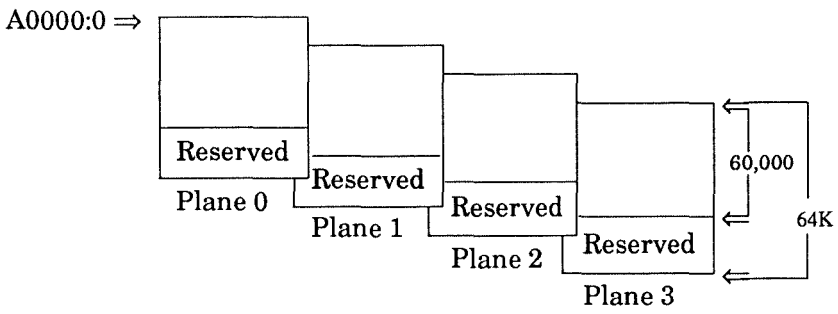
Function	Description	Remark
AH = 3	Read cursor position	
AH = 4	Read light pen position	; no light pen port
AH = 5	Set active display page	; only one page available
AH = 6	Scroll page up	
AH = 7	Scroll page down	
AH = 8	Read character	; no text mode
AH = 9	Write character	
AH = A	Write character at specified page	
AH = B	Set CGA color palette	
AH = C	Write dot	; use direct I/O to video memory
AH = D	Read dot	
AH = E	Write TTY to active page	
AH = 11	Character generator routines	
AH = 13	Write string to specified page	

All other BIOS routines should be supported including the mode switching calls and the palette changing calls.

800x600 - 16 COLORS (Mode 54h)

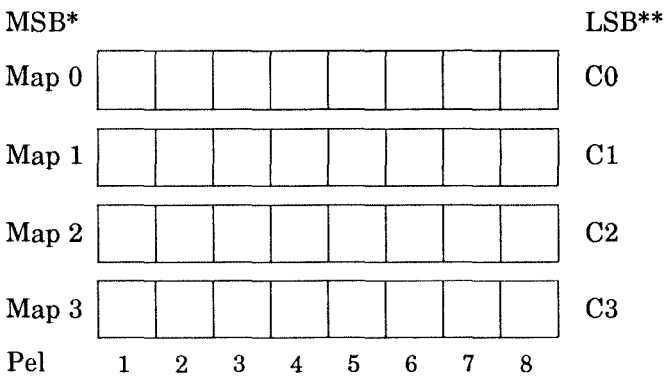
Video Memory Organization

The memory organization is identical to 16 color EGA and VGA modes and consists of 256K organized into 4 maps of 64K. One bit from each of the 4 maps is used to compose each pel. The IBM EGA/VGA Map Mask register is used to select any or all the maps to be updated.



Video Data Format

The video data format is identical to 16 color EGA/VGA modes. Each pel is represented by a 4 bit word. One bit from each of the 4 maps are used to compose a pixel. Thus, each byte of address space contains 8 pels.

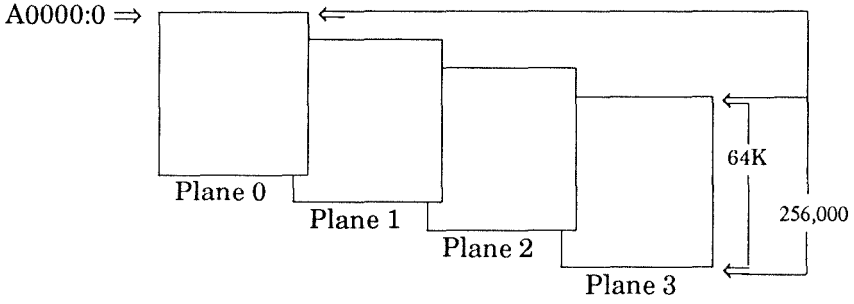


* *Most Significant Bit*
** *Least Significant Bit*

640x400 - 256 COLORS (Mode 61h)

Video Memory Configuration

This ATI enhanced resolution mode uses a plane memory system unique to ATI. The memory is organized into contiguous 64K blocks located at A0000H to AFFFFH. VGAWONDER must be equipped with 512K of RAM to operate in this mode. Mode 61 uses 4 pages. The video data in this mode should only be updated during monitor retrace periods.



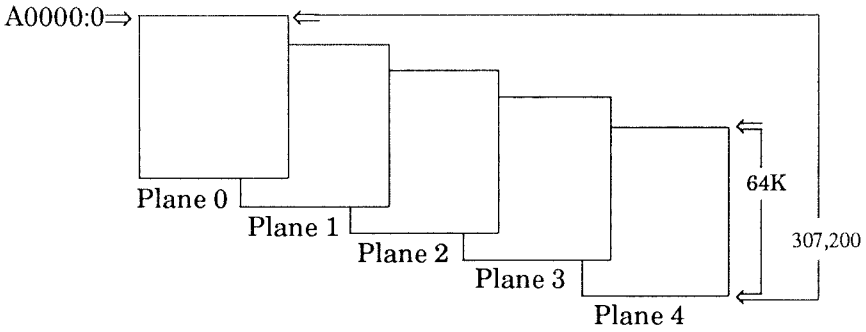
Video Data Format

The video data format is identical to VGA mode 13h (320x200, 256 color). Each pel is represented by 1 byte. Color selection and palette set up is identical to VGA mode 13h.

640x480 - 256 COLORS (Mode 62h)

Video Memory Organization

This ATI enhanced resolution modes uses a plane memory system unique to ATI. The memory is organized into contiguous 64K blocks located at A0000H to AFFFFH. VGAWONDER must be equipped with 512K of RAM to operate in this mode. Mode 62 uses 5 pages.



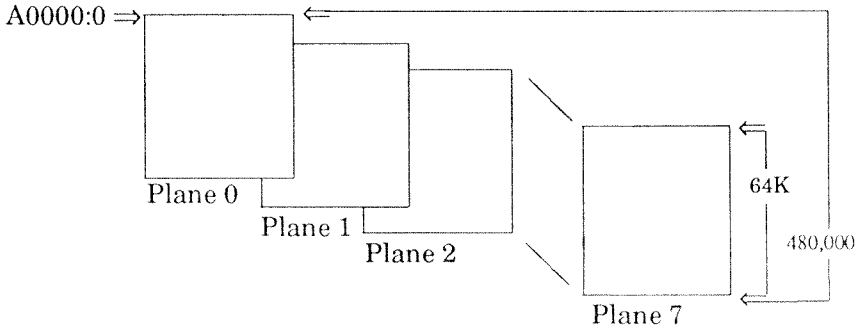
Video Data Format

The video data format is identical to VGA mode 13h (320x200, 256 color). Each pel is represented by 1 byte. Color selection and palette set up is identical to VGA mode 13h.

800x600 - 256 COLORS (Mode 63h)

Video Memory Organization

This ATI inhanced resolution mode uses a plane memory system unique to ATI. The memory is organized into contiguous 64K blocks located at A0000H to AFFFFH. VGAWONDER must be equipped with 512K of RAM to operate in this mode. Mode 63 uses 8 pages.



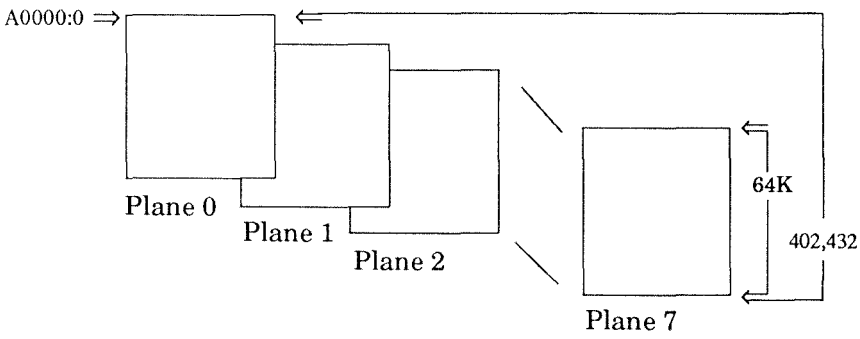
Video Data Format

The video data format is identical to VGA mode 13h (320x200, 256 color). Each pel is representecd by 1 byte. Color selection and palette set up is identical to VGA mode 13h.

1024x768 - 16 COLORS (Mode 65h)

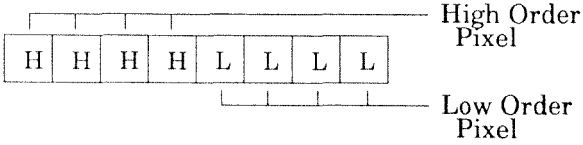
Video Memory Organization

This ATI enhanced resolution modes uses a plane memory system unique to ATI. The memory is organized into contiguous 64K blocks located at A0000H to AFFFFH. VGAWONDER256K must be equipped with 512K of RAM to operate in this mode. Mode 65 uses 8 pages.



Video Data Format

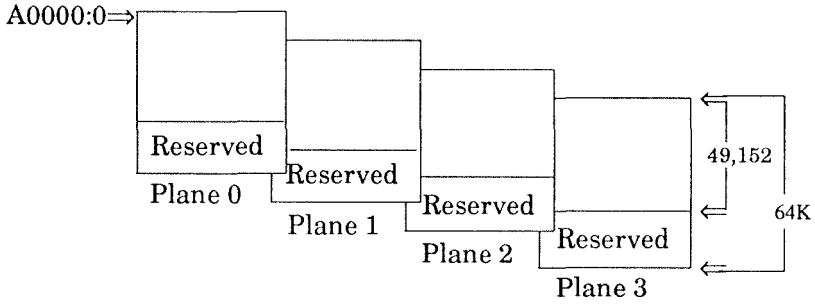
The video data format is unique to this mode. Each pel is represented by 4 bits with 2 pels per byte.



1024x768 - 4 COLORS (Mode 67h)

Video Memory Organization

The memory organization is identical to 16 color EGA and VGA modes and consists of 256K organized into 4maps of 64K. One bit from 2 of the 4 maps is used to compose each pel. The IBM EGA/VGA Map Mask register is used to select any or all the maps to be updated.



Video Data Format

This mode uses a unique data format where 2 bits are required per pel. Plane 0 and 1 contain the data for odd numbered pels and Plane 2 and 3 containing the data of the even numbered pels.

This mode supports 1 of 4 colors sets. Selection of the color set is done through bits 4 & 5 of the internal palette register (3c0h).

3c0 Bits	Color Values (C0, C1)			
4 5	00	01	10	11
0 0	black	white	grey	bright white
0 1	black	green	red	yellow
1 0	black	cyan	red	white
1 1	black	cyan	magenta	white

APPENDIX C

MEMORY UPGRADE

Should you require to upgrade your VGAWONDER to support 512K of video memory, purchase 8 pieces of part # 4464-12, (64Kx4) DRAM chips with an access time of 120 nano seconds or faster from your dealer.

Install the DRAM chips in the empty sockets on the left hand side of the VGAWONDER board. Care should be taken to ensure that the key on the chip indicated by a notch at one end is installed in the same direction as other chips. After installation, inspect each chip carefully for bent pins or reverse insertion.

ATI recommend that the installation of these memory chips be done by a qualified technician.

***Warning**: DRAM chips are static sensitive devices. The user must ensure that they have discharged any static electricity by grounding themselves to the chassis of the PC before handling the chips.*

Specifications

VIDEO FEATURE CONNECTOR
13x2 edge connector located at the top of the card, IBM standard.

VIDEO DISPLAY BUFFER OF VIDEO MEMORY
256K bytes
(512K bytes optional)

SYNC SIGNALS
Seperate horizontals and vertical sync in TTL levels

Horizontal
31.469kHz - Analog monitor
21.8kHz - EGA monitor
15.75kHz - RGB monitor
18.432kHz - TTL Monochrome monitor

Vertical
70 Hz - Analog monitor
60 Hz - EGA monitor
60 Hz - RGB monitor
50 Hz - TTL Monochrome monitor

CONNECTORS

Digital Video- 9-pin D shell (Female) IBM standard
Analog Video- 15-pin D shell (Female) IBM standard
Mouse connector- Hosiden 9-pin circular connector
Microsoft mouse compatible

MONITOR COMPATIBLITY

IBM PS/2 Model 8503 Analog Monochrome Display
IBM PS/2 Model 8512 Analog Color Display
IBM PS/2 Model 8513 Analog Color Display
IBM PS/2 Model 8514 Analog Color Display
IBM Model 5151 Monochrome Display
IBM Model 5153 Color Display
IBM 5154 Enhanced Color Display
Multisync monitor

SIZE
8.5" x 4.2"

POWER
+5V +/- 5%, @ 1.3 AMP

ENVIRONMENT
Ambient Temperature - 10° to 50° degrees C (operation)
0° to 70° degrees C (storage)

Relative Humidity - 5% to 90% (operation) (non-condensing) 0% to 95% (storage)

BUS
IBM PC or AT standard

BUS LOADING
No more than 2 LS TTL load

SYSTEM REQUIREMENTS
IBM PC/XT/AT, PS/2 Model 30 or compatible system.

CONNECTOR SPECIFICATIONS

DB9 Connector

Pin No.	Signal
1	Ground
2	Secondary Red/Ground
3	Primary Red
4	Primary Green
5	Primary Blue
6	Secondary Green/Intensity
7	Secondary Blue/Mono Video
8	Horizontal Retrace
9	Vertical Retrace

DB15 Connector

Pin No.	Signal
1	Red
2	Green
3	Blue
5	Self Test
6	Red Rtn
7	Green Rtn
8	Blue Rtn
10	Digital Gnd
11	Digital Gnd
13	Hsync
14	Vsync

Mouse Connector

Pin No.	Signal
1	+5V
2	XA
3	XB
4	YA
5	YB
6	SW1
7	SW2
8	SW3
9	Ground
E	Chasis Ground

VIDEO FEATURE CONNECTOR

2x13 edge connector located at the top of the VGAWonder.

MOUSE PORT

Mouse interrupt rate - 30hz
Mouse port address - 23Ch - 23Fh or 238h - 23Bh software selectable
Interrupt level - 2-5 software selectable

FCC Compliance Statement

This equipment generates and uses radio frequency energy and, if not properly installed and used correctly, that is, 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. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference with 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 the receiving antenna
- Relocate the computer with respect to the receiver.
- Move 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 US Government Printing Office, Washington, DC 20402. Stock No. 004-000-00345-4.

VGAWonder FCC ID: EXM5RSVGA1

Certified to comply with the limits for a Class B computing device pursuant to Subpart J of Part 15 of FCC rules. See instructions if interference to radio reception is suspected.

This user's monitor requires the use of shielded cables for connection to a computing device. Required to assure compliance with FCC regulations.

Reference

Title: EGA/VGA A Programmer's Reference Guide
Author: Bradley Dyck Kliewer
Publisher: McGraw Hill
Date: 1988

Title: Programmer Guide to IBM PC and PS/2 Video Systems
Author: Richard Wilton
Publisher: Microsoft Press
Date: 1987

Title: Personal System/2 and Personal Computer BIOS Interface Technical Reference
Author: None
Publisher: IBM
Date: April, 1988

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