EGAWONDER™

OPERATION MANUAL

OEM VERSION

EGA Wonder Operation Manual

Edition 2.3 January 1988

The contents of this manual are subject to change without notice and shall not be regarded as warranty.

Any questions or addenda regarding the contents of this document should be referred to the Product Department of ATI Technologies Inc.

PREFACE

The EGA Wonder you have purchased represents a compatibility breakthrough in Computer Graphics Hardware. Most Video boards are limited and designed to run one specific software standard on one or possibly two types of monitors. Advanced adapters such as the ATI Graphics Solution can run several software standards on several types of monitors. The ATI EGA Wonder will display most popular graphics modes on IBM compatible monitors. The EGA Wonder eliminates having to use specific monitors for specific programs. Although most software is supported, there will always be an odd program or two which will not run on the card. If you are having problems with a specific application first check that the card is properly installed in accordance with this manual and as a last resort call the ATI Technical Support Group.

The EGA Wonder represents a new concept in EGA. EGA Wonder allows upgrade to EGA, adds 132 column capability and maintains downward compatibility to older CGA, MDA and Hercules software on most popular monitors — MultiSync™, EGA, RGB, 25 kHz, Composite, TTL Monochrome, IBM PC Portable and Compaq PC Portable.

On MultiSync monitors the EGA Wonder runs the digital VGA compatible modes, which are modes 11 & 12. 800 x 560, 752 x 410 & 640 x 480. These are high resolution modes which are specifically designed to improve the resolution on the windowing loon-type software such as Window, Gem, Ventura Publisher, Autocad, 1-2-3, Pagemaker etc. You will find that we have included special drivers with this card to support these high resolutions.

The EGA Wonder improves the monitor's display quality and produces high resolution 8 x 14 text when running CGA software on an EGA, MultiSync or 25 kHz monitors. EGA Wonder is simple to use because it incorporates SoftSense Automatic Mode Switching into its design. Compatible at the hardware level to the IBM Color/Graphics Adapter, the Hercules Graphics Card, the IBM Monochrome Adapter and the IBM Enhanced Graphics Adapter, EGA Wonder is tomorrow's EGA today.

The secret of the EGA Wonder is its use of proprietary state-of-the-art CMOS VLSI gate array technology — ATI's specialty. We know that you will be very happy with your new EGA Wonder because it is built with high quality components and workmanship. The card has been fully burned-in and tested at the factory and we back up its reliability with a two year warranty that includes both parts and labor.

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1.0 INTRODUCTION

The EGA Wonder is designed to be compatible, flexible and easy to use. It is compatible at the hardware level to the IBM Enhanced Graphics Adapter (EGA), the IBM Color/Graphics Adapter (CGA), the Hercules Graphics Card (HGC) and the IBM Monochrome Adapter (MDA). The power of the EGA Wonder however is that it goes far beyond normal hardware compatibility. It offers wide flexibility in that it is able to display all of the major software standards – EGA, MDA, CGA and Hercules – on any of the major monitor types – Enhanced Graphics, Multi Sync, RGB Color, 25 kHz, TTL Monochrome and Composite. An overview of some of the EGA Wonder features are as follows:

FEATURES

1) **Total IBM Enhanced Graphics Adapter (EGA) Compatibility**
   - all EGA attributes and display modes
   - 640 x 350 16 color graphics from a palette of 64 colors
   - 640 x 350 4 color monochrome graphics
   - 640 x 200 16 color graphics
   - 320 x 200 16 color graphics
   - RAM-based, loadable character generator capable of up to 512 character codes and multiple character fonts
   - Smooth scrolling and pixel panning

2) **Runs High Resolution Color/Graphics Modes on a Multi-Sync™ Monitor.**
   - VGA mode 11 (640 x 480 2 colors) and VGA mode 12 (640 x 480 16 colors) on Multi-Sync or compatible monitors.
   - 640 x 480, 752 x 410, and 800 x 560 16 color/graphics from a palette of 64 colors on Multi-Sync or compatible monitors.
   - High resolution Multi-Sync drivers included for popular software such as Microsoft Windows, Lotus 1-2-3 (2.0), Symphony (1.1), Autodesk Autocad and Digital Research GEM.

3) **True Hardware Compatibility with IBM Color/Graphics Adapter, Hercules Graphics Adapter, and IBM Monochrome Adapter.**
   - All CGA attributes and display modes
   - All Hercules attributes and display modes
   - All MDA attributes and display modes

4) **Runs EGA, CGA, MDA, Hercules and 132 Column Software on Enhanced Graphics and Multi Sync Monitors.**
   - Provides wide software compatibility on the Enhanced Monitor
   - When running CGA software, text is converted to an 8 x 14 high resolution character and graphics are double scanned for a high quality display.

5) **Runs EGA, CGA, MDA, Hercules and 132 Column Software on a TTL Monochrome Monitor.**
   - Provides wide software compatibility on the TTL monochrome display.
   - The colors of EGA and CGA software are converted into shades.
   - Full screen graphics.
   - No pre-boot drivers required.

6) **Runs EGA, CGA, MDA, Hercules and 132 Column Software on an RGB Color Monitor**
   - Provides wide software compatibility on the RGB color monitor.
   - ATI's proprietary technique maintains a palette of 64 colors for EGA software.
   - 640 x 350 EGA and 720 x 348 Hercules software are interlaced* to produce high resolution text and high resolution graphics.

7) **Runs EGA, CGA, MDA, Hercules and 752 x 410 High Resolution Color/Graphics on a 25 kHz 400 line Monitor.**
   - Provides wide software compatibility on 25 kHz monitors.
   - All EGA, CGA, and Hercules graphics displayed in non-interlaced mode.
   - Displays high resolution EGA 8 x 14 character set.
   - When running CGA software, text is converted to an 8 x 14 high resolution character and graphics are double scanned for a high quality display.

8) **Runs EGA, CGA, MDA, Hercules and 132 Column Software on a Composite Monitor or the Internal Monitor of an IBM PC Portable.**
   - Provides wide software compatibility on the composite monitor.

*See Section 2.10

- EGA's palette of 64 colors converted into 64 shades.
- The EGA Wonder NTSC output can be converted into Colors by use of an external device. For more information on this mode call ATI Technical Support Group.

9) **Runs EGA, CGA, MDA, and Hercules Software on the Internal Monitor of a Compaq PC Portable.** (via optional expansion module)
   - Provides wide software compatibility on the high resolution Compaq internal display.
   - The colors of EGA and CGA software are converted into shades.
   - Full screen graphics.
   - No pre-boot drivers required.

10) **Automatic Mode Switching**
   - Able to sense and automatically switch between color modes or between monochrome modes. No pre-boot drivers are required before running game programs or before running Hercules software.

11) **Monitor Optimization** – The EGA Wonder maximizes the monitor's display quality.

Enhanced, Multi Sync and 25 kHz Monitors
- The text of CGA software is improved from the low resolution 8 x 8 character to a high resolution 8 x 14 character.
- Graphics for CGA software are double scanned.

TTL Monochrome Monitor
- The colors of both EGA and CGA software are converted into shades.
- A high resolution 8 x 14 character is displayed for CGA and EGA software.
- Graphics of CGA and EGA software are full screen.
- No pre-boot drivers are required.

RGB Color Monitor
- A palette of 64 colors is available when running EGA software.
- Interlacing* produces high resolution text and high resolution graphics for both EGA and Hercules software.

*See Section 2.10

Composite Monitor

- A palette of 64 shades is available for EGA software.
- Interlacing* produces high resolution text and high resolution graphics for both EGA and Hercules software.

12) **256K Video Memory**

- Comes fully configured and does not require a video memory expansion module.

13) **Advanced CMOS VLSI Gate Array Technology**

- This technology gives the EGA Wonder low power consumption, high speed, high reliability and high compatibility.

14) **User Friendly**

- SuperSwitch software allows users to change between software written for different color and monochrome software standards (ie. EGA, CGA, MDA, Hercules) without changing monitors and without re-setting hardware switches.

15) **Two Year Warranty**

An overview of the various software standards that the EGA Wonder runs on various monitors is outlined in Table 1.

Table 1
Software — Monitor Compatibilities

Monitor	Software Standard
Multi-Sync Monitor	1) 640 x 480 16/64 Color/Graphics (VGA-12) 2) 640 x 480 2/64 Color/Graphics (VGA-11) 3) 752 x 410 16/64 Color/Graphics 4) 800 x 560 16/64 Color/Graphics 5) IBM Enhanced Graphics Adapter (EGA) 6) IBM Color/Graphics Adapter (CGA)[1] 7) IBM Monochrome Adapter (MDA) 8) Hercules Graphics Card 9) EGA Wonder 132 Columns
IBM Enhanced Graphics Display	1) IBM Enhanced Graphics Adapter (EGA) 2) IBM Color/Graphics Adapter (CGA)[1] 3) IBM Monochrome Adapter (MDA) 4) Hercules Graphics Card 5) EGA Wonder 132 Columns
IBM TTL Monochrome Display (Compaq PC Portable)[5]	1) IBM Enhanced Graphics Adapter (EGA)[2] 2) IBM Color/Graphics Adapter (CGA)[2] 3) IBM Monochrome Adapter (MDA) 4) Hercules Graphics Card 5) EGA Wonder 132 Columns
IBM Color/Graphics Display	1) IBM Enhanced Graphics Adapter (EGA)[3 4] 2) IBM Color/Graphics Adapter (CGA) 3) IBM Monochrome Adapter (MDA)[3] 4) Hercules Graphics Card[3] 5) EGA Wonder 132 Columns
25 kHz Monitor	1) 752 x 410 16/64 Color/Graphics 2) IBM Enhanced Graphics Adapter (EGA) 3) IBM Color/Graphics Adapter (CGA)[1] 4) IBM Monochrome Adapter (MDA) 5) Hercules Graphics Adapter
Composite Monitor (IBM PC Portable)	1) IBM Enhanced Graphics Adapter (EGA)[2 3] 2) IBM Color/Graphics Adapter (CGA)[2] 3) IBM Monochrome Adapter (MDA)[3] 4) Hercules Graphics Card[3] 5) EGA Wonder 132 Columns

[1] Text converted to 8 x 14 character, graphics double-scanned for high quality display.
[2] Colors converted to shades, in full screen, no pre-boot drivers required.
[3] Display interlaced* to produce high resolution text and high resolution graphics.
[4] Palette of 64 colors produced using ATI's proprietary technique.
[5] Requires optional Compaq Expansion Module.

* See Section 2.10.

DIAGRAM I
EGA WONDER BLOCK DIAGRAM

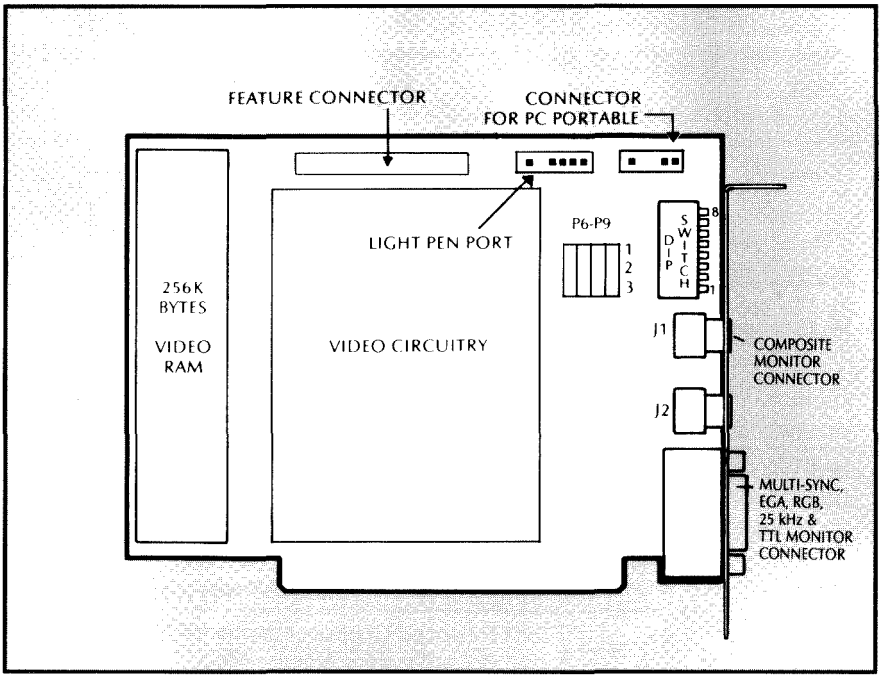


Diagram 1 is a block diagram of the EGA Wonder showing its major features and their approximate locations on the board.

1.1 PACKING LIST

In the EGA Wonder there should be:

1) an EGA Wonder
2) two software diskettes
3) an Operation Manual

1.2 ATI SOFTWARE DISKETTES

The EGA Wonder diskettes contains the following software files:

Diskette 1

ACAD <DIR>
WINDOWS <DIR>
README
SMSBAT
INSTALL.BAT
BIOSDATE.BAT
EGA TEST.BAT
LOADGAME.COM
SMS.COM
ATIGSHA2.DRV

Diskette 2

README.GEM
GEMMOD.BAT
GEMMODH.BAT
GEMSETUP.EXE
GEMSETUP.TXT
GEM51.SYS
GEM52.SYS
GEM53.SYS
README.VP
VPMOD.BAT
VPMODH.BAT
VPSETUP.EXE
VPSETUP.TXT
VP51.SYS
VP52.SYS
VP53.SYS
BACKUP.TXT
WORK.TXT

You may wish to make a Printout of the README files.

The diskette contains a file called README. It contains updates to this manual. To read this information, place the diskette in Drive A and type,

A > TYPE README [enter]

2.0 GETTING STARTED

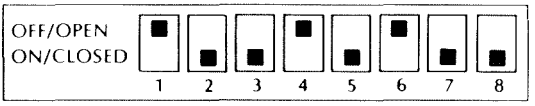
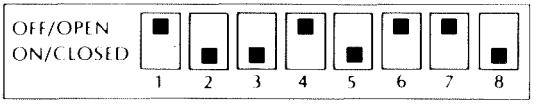
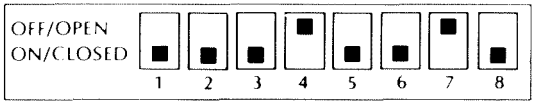
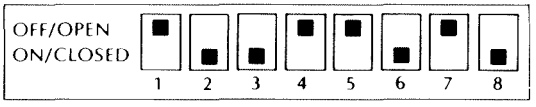
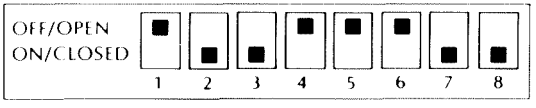
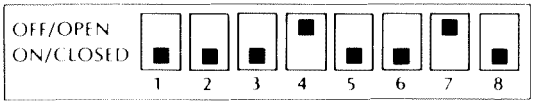
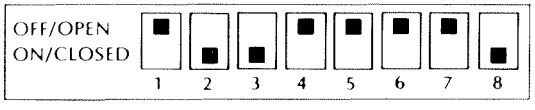
2.1 SYSTEM REQUIREMENTS

The EGA Wonder may be installed in an IBM PC, PC/XT, PC/AT, PC Portable or compatible. Some older models of the IBM PC however may require a new ROM BIOS module. No modifications are required for the IBM PC/XT, PC Portable, PC/AT or IBM PC with either expansion units or Cluster Adapters.

2.2 RECOMMENDED EGA WONDER SWITCH SETTINGS

The following recommended switch settings are designed to allow maximum flexibility on each monitor type. The EGA Wonder switches automatically between color modes or between monochrome modes. Users who need to change between different color and monochrome standards can do so using SuperSwitch. SuperSwitch makes it possible to change between different color and monochrome software standards without changing monitors and without re-setting switches.

Table 2 — Recommended EGA Wonder Switch Settings

Monitor Type	Recommended Switch Settings
Multi-Sync	
Enhanced Graphics	
IBM RGB Color	
TTL Monochrome	
25 kHz Color*	
Composite (PC Portable)	
Compaq Internal Monitor (with optional Compaq Module)	

*Jumper P8 must be over pins 2 & 3 for use on a 25 kHz monitor.

Warning

Levers 5, 6 and 7 must be set according to the type of monitor being used. Incorrect switch settings may result in damage to the monitor and/or EGA Wonder which is not covered by our warranty.

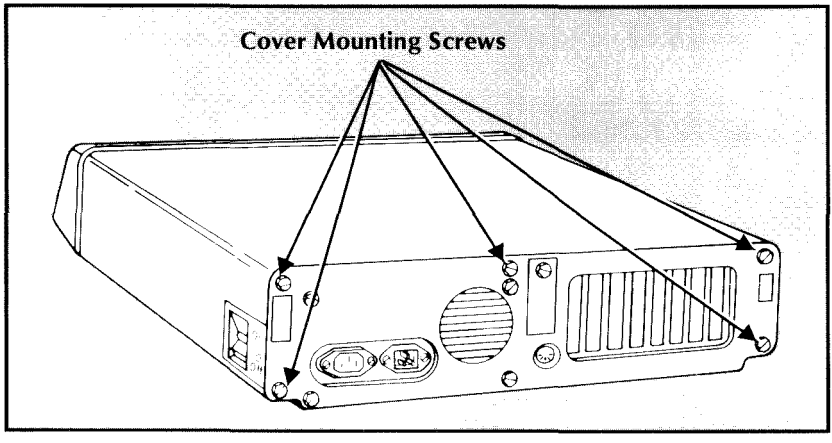
On some EGA Wonder's, the switches may be marked OPEN and CLOSED vs ON and OFF. OPEN means the same as OFF and CLOSED the same as ON.

The EGA Wonder's switches can be configured differently from what we have recommended and detailed setting breakdowns are located in Appendix A.

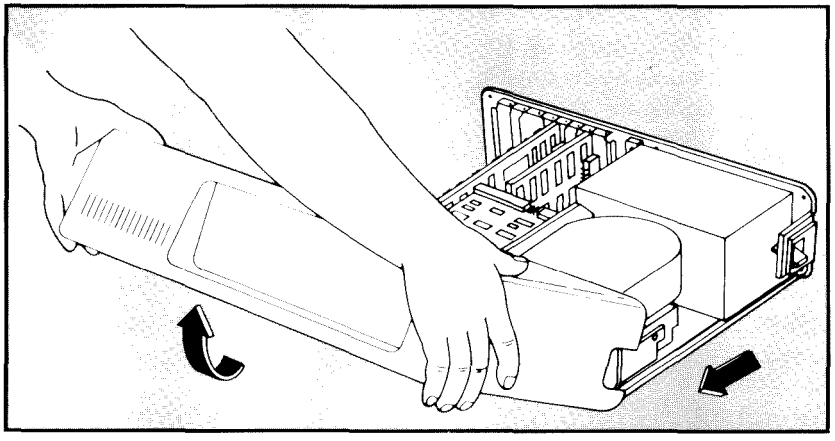
Switch settings for dual monitor system configurations are outlined in Appendix B.

2.3 INSTALLATION INSTRUCTIONS

1. Turn off the computer and unplug its power cord. Otherwise, the installation process could result in damage to both the EGA Wonder and computer that is not covered by our warranty.
2. Set the 8 position dip switch on the EGA Wonder to the recommended switch settings as described in Section 2.2.
3. Remove the 5 cover mounting screws from the rear of the PC. On an IBM PC/AT unlock the key lock.



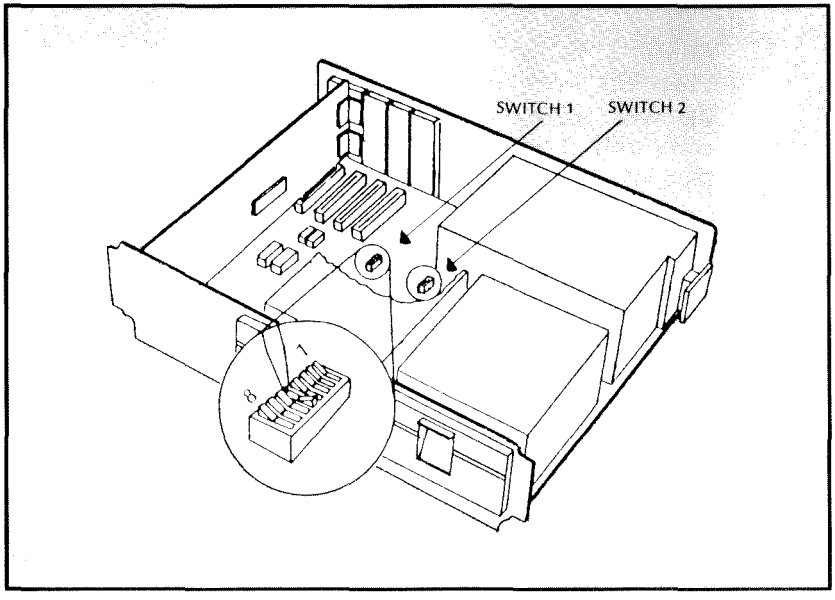
4. Carefully slide the system unit cover forward. When the cover will go no further, tilt it up and away from the system unit.



5. **IBM PC and PC/XT**

When installing an EGA Wonder in an IBM PC or PC/XT, set switches 5 and 6 on SW1 of the PC ON. Do not change any other switches. The PC/XT has only one switch block on its motherboard and thus it is easy to find. The switch locations for an IBM PC are shown in Diagram 2 below.

Diagram 2 — IBM PC Switch Locations



IBM PC/AT

When installing the EGA Wonder in an IBM PC/AT, it is necessary to run the IBM Diagnostics "Setup" program and configure the PC/AT for the Enhanced Graphics Adapter. (Refer to the PC/AT Guide to Operations for more details).

Compatibles

When installing on an IBM "compatible" please refer to its Operation's Manual for the proper system board switch settings. It must be configured for an EGA display.

6. Locate any unused expansion slot and remove the slot cover.
7. Hold the EGA Wonder by its top corners and slide it into the system unit.
8. Firmly press the card's gold finger into the system unit's expansion slot.
9. Insert the screw removed from the expansion slot cover earlier into the hole at the top of the EGA Wonder's retaining bracket and tighten it.
10. Stop here and re-check the installation. Are the switches on both the EGA Wonder and the PC set properly? Is the card fully seated in its socket?
11. Replace the system unit cover and fasten the screws.
12. Attach a properly shielded monitor cable to the EGA Wonder's 9 pin connector, and reconnect all of the cables that were previously attached to the rear of the computer. A composite monitor is attached by plugging its RCA phono plug into the top RCA phono jack (labelled J1) mounted on the EGA Wonder's retaining bracket. (For location see Diagram 1.)
13. The system is now ready to run.
14. To test the operation of the EGA Wonder, place the EGA Wonder Diskette in Drive A and type

    A > EGATEST

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

The system is now ready to run application software.

If further assistance regarding installation is required please refer to the troubleshooting section in Appendix D.

2.4 INSTALLATION IN THE PC PORTABLE

The same steps outlined in Section 2.3 are used to install the EGA Wonder in the PC Portable except that,

1) SW1 on the PC Portable system board must be set to 5-ON, 6-ON.

2) The EGA Wonder's recommended switch settings are: 1-ON, 2-ON, 3-ON, 4-OFF, 5-ON, 6-ON, 7-OFF, 8-ON.

3) The PC Portable's internal display is connected to the 4 pin BERG located at the upper right hand corner of the EGA Wonder. (For location see Diagram 1.)

4) To connect an external display, set the EGA Wonder's switch according to the monitor type as outlined in Appendix A, and connect the external monitor to the 9 pin connector located on the card's bracket. With the internal monitor also connected, it is possible to switch between the internal and external monitor by re-setting the EGA Wonder dip switch according to which monitor is to be active. This is done by changing the monitor type settings as outlined in Appendix A, Table A-2.

2.5 RUNNING SUPERSWITCH MODE SWITCHING SOFTWARE

SuperSwitch is a software utility which allows switching between video modes while operating the computer and without opening the computer chassis to reset switches.

Designed to be user friendly, SuperSwitch is completely menu driven. Instructions about operating the program will be shown on a menu after placing the EGA Wonder Diskette in Drive A and typing,

A > SMS [enter]

The computer will then display the following screen:

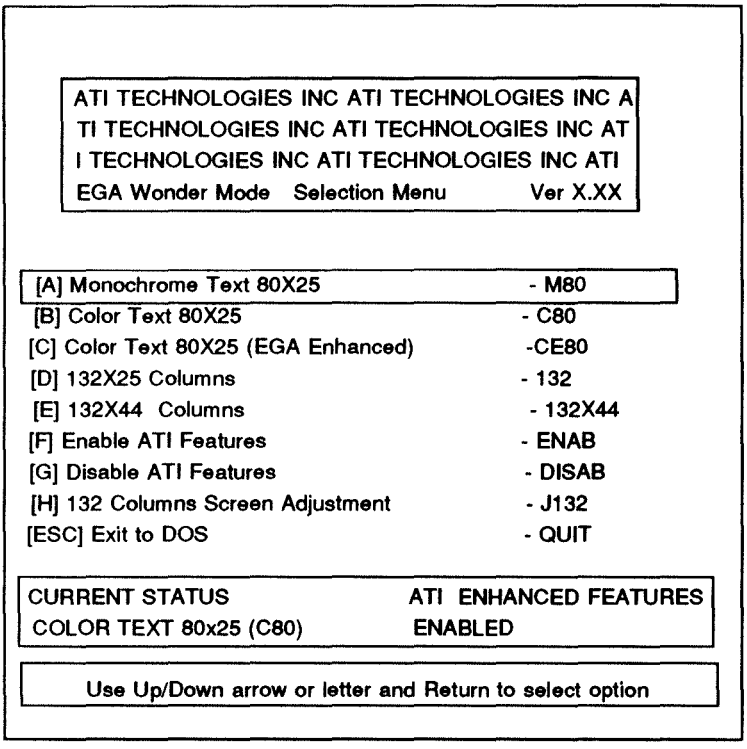


Diagram 3 - SuperSwitch Menu

Select a video mode by entering a letter (A-H) for the mode desired.

The power of SuperSwitch is that it allows the user to run any of the modes, on either an EGA, Multi-Sync, RGB ,25KHz, Composite or TTL Monochrome monitors. For example it is possible to run EGA or CGA on a TTL or RGB Monochrome monitor. EGA runs with interlacing on RGB monitors and is not recommeded for prolonged use because of screen refresh flicker.

CE80 selects the high resolution EGA Character set on RGB or composite monitors. C80 selects the standard CGA character set. The SoftSense ability of the EGA WONDER automatically selects between various CGA and EGA color graphics modes. When used on a Multi-sunc monitor, SoftSense automatically swithces between Multi-Sync, VGA, EGA, and CGA Color Graphics. The high resolution 640X480, 752X410 and 800X560 Multi-Sync modes run only on Multi-Sync type monitors.

After becoming familiar with the mode switching program, it is possible to skip the menu. To do this enter

A > SMS [keyword] (enter)

Possible keywords can be selected from the Menu located in Diagram 3.

The syntax of SuperSwitch is,

SMS [keyword]

where keyword is either M80, 132, C80, CE80, ENAB, or DISAB.

There are some software on the market where a configuration or installation process must be run before the software can be used. Examples are Lotus 1-2-3, Sidekick, Superkey etc. Remember that if SuperSwitch is used to change modes, application software must be configured to the corresponding new mode selected in order to run.

To preserve the monitor's phosphors, SuperSwitch includes a screen saver feature which will blank the display when the keyboard is left unattended. This feature is activated by typing

```
A > SMS   SAVE   x      :where x is the number of minutes.
                         Default is 5. e.g. SMS SAVE 10 will
                         blank after 10 minutes of non-use.
A > SMS   SAVE   OFF    :disables the screen saver
```

2.6 CONFIGURING APPLICATION SOFTWARE

This section is designed to aid in the configuration of application software (such as Lotus 123).

The EGA Wonder can run EGA, CGA, MDA or Hercules software on either an EGA, Multi-Sync, RGB, 25 kHz, Composite or TTL monochrome monitor. The video mode can be setup either by the EGA Wonder's switch settings or by the ATI SuperSwitch software supplied.

Most application software come with a selection of different video drivers. The best display is usually achieved via the highest resolution mode that the software supports. You must decide which mode you would like to run your software in and install the appropriate driver. Before you run the software, remember to configure your EGA Wonder to the corresponding video mode you have installed on your software. For example, if you have configured Lotus 123 with the Hercules driver, your EGA Wonder must be in the M80 mode.

In the Monochrome mode (M80), it is possible to run all software written for the IBM Monochrome/Printer Adapter, monochrome grapphics software written for the IBM EGA and monochrome graphics software written for the Hercules Graphics Card. If only one video board is present in the system then Hercules software is automatically allocated 2 pages of graphics memory. This is equivalent to the FULL utility of Hercules. If two video boards are in the system then in order to allow co-existance, the EGA Wonder allocates one page of memory to monochrome graphics. This is equivalent to the HALF utility of Hercules. Note: Software written for the Hercules monochrome graphics standard is not compatible with the IBM EGA monochrome graphics standard.

The Color modes C80 and CE80 make it possible to run all Color/ Graphics and Enhanced Color/Graphics software.

The 132 column mode (132) is a special EGA Wonder mode. Only software written to run on EGA Wonder in 132 columns will run with this mode.

2.7 MULTI-SYNC DRIVERS

The EGA Wonder is shipped with special drivers supporting high resolution 800 x 560, 640 x 480 and 752 x 410 color modes for popular programs on Multi-Sync type monitors. These drivers and their appropriate installation instructions are located on the EGA Wonder diskette. Check the README files for more information.

2.8 132 COLUMN DRIVERS

EGA Wonder comes with drivers to allow Lotus spreadsheets to be displayed in 132 x 44 monochrome or 132 x 25 color mode. Compatible with 1-2-3 and Symphony 1.1 or later, they are contained with installation instructions on the EGA Wonder diskette.

Instructions are included on the EGA Wonder's README file explaining how to modify Wordstar and WordPerfect for 132 columns.

Persoft's SmartTerm and Coefficient's VTerm are two terminal emulation programs which support the EGA Wonder's 132 capability.

From time to time other drivers will become available from various application software publishers supporting the ATI 132 column modes. Check the README file on the diskette for details of driver updates.

2.9 COMPAQ PC PORTABLE

ATI manufactures an optional Compaq Expansion Module which allows the EGA Wonder to display EGA, CGA, MDA, and Hercules software on the internal monitor of a Compaq PC Portable. This optional add-on module does not occupy an additional slot and can be purchased from any dealer selling the EGA Wonder.

Note: The Plasma display of the Compaq III is not supported by the EGA Wonder.

2.10 NOTE ON EGA WONDER'S USE OF INTERLACING

RGB and Composite monitors are designed to display 200 lines of information 60 times per second. This appears to the human eye as a continuous image. To display the 350 lines of EGA and Hercules resolution on the 200 line monitor, EGA Wonder uses a technique called interlacing. EGA Wonder scans the 200 line screen twice in succession, creating the effect of a 400 line monitor. The result of scanning the screen twice in succession is that the total EGA image is displayed only 30 times per second. This lower refresh cycle may appear to the eye as a flicker. To appear continuous, the image must be retained on either the computer screen or the retina of the eye longer. Therefore the following is recommended.

1) Use a long persistance monitor, or,
2) Use an anti-glare or polarized screen filter.

Either recommendation can eliminate the interlace condition between 70-100% depending on the conditions present.

Interlacing is only used to display EGA, MDA and Hercules modes on RGB and Composite monitors. All other modes and monitors are non-interlaced.

APPENDIX A
EGA WONDER SWITCH SETTINGS

Default Mode

The default mode tells the EGA Wonder which video mode to automatically power-up to upon system start-up.

Table A-1 outlines video default mode switch settings.

Table A-1
Video Default Settings

Default Mode	1	2	3	4
MDA	OFF	OFF	ON	OFF
CGA (40 x 25)	ON	OFF	OFF	ON
CGA (80 x 25)	OFF	OFF	OFF	ON
EGA (Normal)	ON	ON	ON	OFF
EGA (Enhanced)	OFF	ON	ON	OFF

MDA — Selects for monochrome text mode, (MDA), EGA monochrome graphics mode and Hercules monochrome graphics mode.

CGA (40 x 25), CGA (80 x 25) — Selects for IBM color/graphics modes.

EGA (Normal) — Selects for EGA color/graphics modes and a normal 8 x 8 character on power up.

EGA (Enhanced) — Selects the EGA color/graphics modes and the enhanced 8 x 14 character on power up.

Type of Display

Switches 5, 6 and 7 tell the EGA Wonder which type of monitor is attached to it.

Table A-2
Monitor Switch Settings

Monitor Type	5	6	7
MultiSync	ON	OFF	ON
Enhanced Graphics	ON	OFF	OFF
RGB Color	ON	ON	OFF
TTL Monochrome	OFF	ON	OFF
25 kHz Color*	OFF	OFF	ON
Composite (PC Portable)	ON	ON	OFF
Compaq Internal Monitor**	OFF	OFF	OFF

*Jumper P8 must be over pins 2 & 3
**via optional Compaq Module

Warning

Levers 5, 6 and 7 must be set according to the type of monitor being used. Incorrect switch settings may result in damage to the monitor and/or EGA Wonder which is not covered by our warranty.

Switch settings for dual monitor system configurations are outlined in Appendix B.

EGA Wonder Enhanced Features

Switch 8 enables or disables EGA Wonder enhanced features.

Table A-3
Enhanced Features Switch Settings

ATI Enhanced Features	8
Enabled	ON
Disabled	OFF

With SW8 ON, the following features are enabled:

1) EGA Wonder becomes compatible at the hardware level with the IBM Color/Graphics Adapter, the IBM Monochrome Adapter and the Hercules Graphics Card.

2) All major software standards – EGA, Color/Graphics, Hercules and MDA – can be displayed on any popular monitor type – MultiSync, EGA, RGB, 25 kHz, Composite and TTL monochrome.

3) High resolution 800 x 560, 752 x 410 and VGA 640 x 480 color/graphics modes are available on Multi-Sync monitors, and 132 columns are available on Multi-Sync, EGA, RGB, TTL Monochrome and Composite monitors.

4) EGA Wonder maximizes the monitor's display quality.
   - On an Enhanced, Multi Sync or 25 kHz low resolution 8 x 8 text of CGA software is converted into high resolution 8 x 14 text and graphics are double scanned.
   - On a TTL Monochrome monitor or the internal monitor of a Compaq PC Portable, the colors of EGA and CGA software are converted into shades and a high resolution 8 x 14 text is displayed. EGA and CGA graphics fill the full screen and no pre-boot drivers are required before running software.
   - On an RGB display, the entire 64 color palette of EGA is available and interlacing produces a high resolution text and high resolution graphics display.
   - On a Composite monitor, the 64 color palette of EGA is converted into shades and interlacing produces a high resolution text and high resolution graphics display.

5) SoftSense — Automatic Mode Switching is enabled. On all monitors, the EGA Wonder is able to sense and automatically switch between EGA and CGA color modes or between MDA, Hercules and EGA monochrome modes. On Multi-Sync monitors, EGA Wonder automatically switches between Multi-Sync, VGA, EGA and CGA color modes or between MDA, Hercules and EGA monochrome modes. No pre-boot software is needed before running games and no special software is required.

SW8 OFF will make the EGA Wonder identical to the IBM EGA in features, capabilities and limitations. All EGA Wonder's enhanced features listed above are disabled. The EGA Wonder has an automatic SafetySwitch which prevents accidental damage to the monitor when SW8 is OFF. When SW8 is OFF, SafetySwitch will automatically power the EGA Wonder up to the Monochrome mode when a monochrome monitor is selected, to Color mode when an RGB monitor is selected and EGA mode when an EGA monitor is selected regardless of the actual mode selected on Switches 1-4.

APPENDIX B
DUAL DISPLAY ADAPTER CONFIGURATIONS

For systems configured with two display adapters, it is necessary to specify which display adapter is the "Primary" card, and which is the "secondary" card. On power up, video output will be directed to the adapter specified as primary. The secondary display adapter will be idle. The DOS MODE command may be used to change the active display adapter.

EGA Wonder With MDA Co-Resident

Table B-1
EGA-MDA Dual Display Switch Settings

Primary Adapter: EGA Wonder
Secondary Adapter: MDA

EGA Wonder Configured as	ATI Switch			
	1	2	3	4
CGA (40 x 25)	ON	OFF	OFF	ON
CGA (80 x 25)	OFF	OFF	OFF	ON
EGA (Normal)	ON	ON	ON	OFF
EGA (Enhanced)	OFF	ON	ON	OFF

Table B-2
MDA-EGA Dual Display Switch Settings

Primary Adapter: MDA
Secondary Adapter: EGA Wonder

EGA Wonder Configured as	ATI Switch			
	1	2	3	4
CGA (40 x 25)	ON	ON	ON	ON
CGA (80 x 25)	OFF	ON	ON	ON
EGA (Normal)	ON	OFF	ON	ON
EGA (Enhanced)	OFF	OFF	ON	ON

EGA Wonder With CGA Co-Resident

Table B-3
MDA-CGA Dual Display Switch Settings

Primary Adapter: EGA Wonder configured as MDA
Secondary Adapter: CGA

CGA Mode	ATI Switch			
	1	2	3	4
40 x 25	ON	OFF	ON	OFF
80 x 25	OFF	OFF	ON	OFF

Table B-4
CGA-MDA Dual Display Switch Settings

Primary Adapter: CGA
Secondary Adapter: EGA Wonder configured as MDA

CGA Mode	ATI Switch			
	1	2	3	4
40 x 25	ON	ON	OFF	ON
80 x 25	OFF	ON	OFF	ON

Switches 5-7 must be set according to monitor type used and switch 8 must be set according to whether or not EGA Wonder enhanced features are desired. Settings for switches 5-8 are located in Appendix A.

APPENDIX C
EGA WONDER JUMPER SETTINGS

Table C-1 — Jumper P6 Settings

Jumper P6	
Pins	Comments
1 & 2	Set port addresses to 2XX.
2 & 3	Set port addresses to 3XX.

Jumper P6 is factory pre-set to 3XX.

Table C-2 — Jumper P7 Settings

Jumper P7	
Pins	Comments
1 & 2	Video clock connected to on board 25.175 mHz oscillator.
2 & 3	Video clock connected to EXTOSC from feature connector.

Jumper P7 is shipped factory pre-set to pins 1 & 2. EXTOSC option used for expansion options which supply a video clock to the EGA Wonder via the feature connector.

Table C-3 — Jumper P8 Settings

Jumper P8	
Pins	Comments
1 & 2	Pin 8 on DB9 connector connected to Horizontal sync.
2 & 3	Pin 8 on DB9 connector connected to Composite sync. (Used with Taxan 650 type 25 kHz monitor.)

Jumper P8 is factory pre-set to pins 1 & 2. Jumper P8 must be set over pins 2 & 3 when the EGA Wonder is used with a Taxan 650 type 25 kHz monitor.

Table C-4 — Jumper P9 Settings

Jumper P9	
Pins	Comments
1 & 2	Disables composite signal to J1. J1 is connected to the feature connector.
2 & 3	Enables composite signal to J1.

To allow attachment of a composite monitor, Jumper P9 is factory pre-set to pins 2 & 3. To use J1 with the feature connector, jumper P9 must be over pins 1 & 2. Refer to Diagram 1 in Section 1.0 for jumper locations.

APPENDIX D
DIAGNOSTICS AND TROUBLESHOOTING

Use the EGATEST diagnostics program when the EGA Wonder 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 etc.

EGATEST is completely menu driven and is started by typing,

A > EGATEST

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

If the EGA Wonder passes EGATEST and problems are still encountered during normal operation, then these problems are most likely related to either installation, compatibility or operation. In this case, please review the troubleshooting steps listed below.

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

Installation Related Problems

Using the following steps, check the installation of the EGA Wonder.

- Check the EGA Wonder switch settings as outlined in Section 2.2.
- Check the PC's motherboard switch settings as outlined in Section 2.3.
- Check that the IBM PC has an up-to-date ROM BIOS Module as outlined in Section 2.1.
- Allow the computer 30 seconds or so to boot-up.
- Check that all data and power cables are properly connected.
- Check that the EGA Wonder is fully seated in the PC's expansion bus.

- Turn the video display's intensity and contrast controls up enough to produce an image.
- Properly adjust the video display's vertical and horizontal hold controls. With some types of monochrome monitors, it is sometimes required to adjust the H-HOLD and V-HOLD of the monitor when the display mode is changed.
- After switching modes, on some types of monitors it may be necessary to turn the monitor off and then on again.

Operation Related Problems

(For example — no graphics display for Lotus 123)

- Make sure the EGA Wonder is configured for the corresponding video mode that the application software in use is configured to. For example, if Lotus 1-2-3 is installed with a Hercules driver, make sure the EGA Wonder is configured to the M80 mode.
- If characters are distorted while operating in 132 column mode, a 132 column screen adjustment must be carried out using SuperSwitch — see Section 2.5.

Compatibility Related Problems

1) Computer

- The EGA Wonder is designed for use in the IBM PC, XT, AT and PC Portable. Compatibles which have video circuitry built into their motherboards may not necessarily run all modes. Modes which will not work depend on the type of video circuitry built into the compatible.
- Some compatible PCs will not power up and/or re-boot properly when the EGA Wonder's Enhanced Features are enabled (SW8=ON). In this case it is necessary to power up with SW8 OFF. The EGA Wonder may display an error message. Ignore this message and once the system is up, the EGA Wonder's Enhanced Features can be enabled by choosing Option 5 -ENAB on the SuperSwitch Mode Selection Menu (see Diagram 3). To install SMS ENAB on the AUTOEXEC.BAT file, from the default drive type,

```
INSTALL   x          ;where x is the boot-up drive where
                      AUTOEXEC.BAT is located
```

- ATI has provided a utility called LOADGAME.COM to facilitate the direct booting of games on compatible PCs which will not boot properly with SW8=ON. With LOADGAME in the default drive, type,

  LOADGAME [enter]

  Place the game in Drive A and it will automatically boot.

2) Monitor

- The EGA Wonder is designed to display on an IBM Enhanced Graphics Display, an IBM Monochrome Display, an IBM Color/Graphics Display, a MultiSync Monitor, a 25 kHz monitor or a Composite Monitor. All modes may not work on some compatible monitors. Also on some compatible monitors a vertical and/or horizontal hold adjustment may be required.
- When the EGA Wonder's enhanced features are enabled on RGB or Composite monitors, interlace flicker can be reduced by adjusting the brightness and contrast controls. Also interlace flicker can be reduced through the purchase of a polarized or anti-glare screen filter (see Section 2.10).

3) Other

- If a Microsoft Bus Mouse or a battery-backed real-time clock is installed in the system, it must be configured for any interrupt level other than 2. The EGA Wonder will not co-exist with another device that uses interrupt level 2.

If none of the above solve the problem then seek assistance from the dealer who sold you the computer or EGA Wonder before contacting ATI.

If it is necessary to contact us regarding installation, try to isolate the problem using the diagnostics suggestions above and have the following information ready.

1) The brand and model of the PC.
2) The brand and model of the monitor.
3) All other adapter cards installed.
4) Current EGA Wonder and PC motherboard switch settings.
5) DOS version and names of resident software in use.
6) A description of the image displayed on the monitor.
7) EGA Wonder BIOS Version.

To contact us, call our Service Department between the hours of 9:00 a.m. and 5:30 p.m. (Eastern Time) at (416) 756-0711.

APPENDIX E
PROGRAMMING INFORMATION FOR ADVANCED USERS

This section provides BIOS calls for the EGA Wonder (INT 10H). Since the EGA Wonder incorporates a number of video display modes on one board, care should be taken when programming to avoid video memory conflict.

AH = 0;Set video mode

AL	Mode/Type	Resolution	Dim/Color	Start Address
0	color/alpha	640 x 200	40 x 25/BW	b800:0
1	color/alpha	640 x 200	40 x 25/16	b800:0
2	color/alpha	640 x 200	80 x 25/BW	b800:0
3	color/alpha	640 x 200	80 x 25/16	b800:0
4	color/graphics	320 x 200	40 x 25/4	b800:0
5	color/graphics	320 x 200	40 x 25/BW	b800:0
6	color/graphics	320 x 200	80 x 25/BW	b800:0
7	mono/alpha	720 x 350	80 x 25/BW	b000:0
d	color/graphics	320 x 200	40 x 25/16	a000:0
e	color/graphics	640 x 200	80 x 25/16	a000:0
f	mono/graphics	640 x 350	80 x 25/BW	a000:0
10	color/graphics	640 x 350	80 x 25/16	a000:0
**11	color/graphics	640 x 480	80 x 30/2 of 64	a000:0
**12	color/graphics	640 x 480	80 x 30/16 of 64	a000:0
*23	color/alpha	1056 x 200	132 x 25/16	b800:0
*27	mono/alpha	1056 x 200	132 x 25/BW	b000:0
*33	color/alpha	1056 x 352	132 x 44/16	b800:0
*37	mono/alpha	1056 x 352	132 x 44/BW	b000:0
**51	color/graphics	640 x 480	80 x 34/16	a000:0
**52	color/graphics	752 x 410	94 x 29/16	a000:0
**53	color/graphics	800 x 560	100 x 40/16	a000:0
**54	color/graphics	800 x 600	100 x 42/16	a000:0
**58	color/alpha	640 x 462	80 x 33/16	b800:0

*will not run on a 25 kHz monitor

**these modes run on MultiSync type monitors only

```
AH = 1 ;Set cursor type
        CH = start line of cursor
        CL  = end line of cursor

AH = 2 ;Set current cursor position
        BH = Page number of the desired page
        DH, DL = row and column of cursor

AH = 3 ;Read current cursor position at the specified page
        BH = Page number of the desired page
        on exit:
        CH, CL = cursor type
        DH, DL = row and column of cursor at the specified page

AH = 4 ;Read current light pen position
        on exit:
        AH = 0  ;light pen not triggered
        AH = 1  ;light pen triggered
                ;DH, DL = row and column of light pen when
                 triggered
                ;CH = raster line for mode 1-6
                ;CX = raster line for mode d-10h
                ;BX = pixel column

AH = 5 ;Select active display page
        AL = page number to be active

AH = 6 ;Scroll active page up
        AL = number of lines to be scrolled
        AL = 0  ;to blank the whole window
        BH = attribute of blanked line
        CH, CL = row and col of upper left hand corner of scrolling
                 window
        DH, DL = row and col of lower right hand corner of
                 scrolling window

AH = 7 ;Scroll active page down
        AL = number of lines to be scrolled
        AL = 0  ;to blank the whole window
        BH = attribute of blanked line
        CH, CL = row and col of upper left hand corner of scrolling
                 window
        DH, DL = row and col of lower right hand corner of
                 scrolling window
```

```
AH = 8 ;Read character/attribute at the active cursor position
        BH = page number of desired page
        on exit:
        AL = character read
        AH = attribute of character (for text mode only)

AH = 9 ;Write character/attribute at current cursor position of a
        specified page

        AL = character to be written
        BL = attribute of character
        BH = page number
        CX = count of character to write

AH = A ;Write character at current cursor position of a specified page

        AL = character to be written
        BH = page number
        CX = count of character to write

AH = B ;Set color palette, valid for mode 4 and 5 only

        BH = 0  ;selects the background color
                 BL = color value used with that color id
        BH = 1  ;selects the palette to be used
                 BL = 0  ; palette value is GREEN (1)/RED (2)/
                           BROWN (3)
                 BL = 1  ; palette value is CYAN (1)/MAGENTA (2)/
                           WHITE (3)

AH = C ;Write dot (graphics mode)

        BH = page number
        DX, CX = row and column of dot position
        AL = color value of dot; if bit 7 of al is on, the color value will be
             exclusive or'd with the current value of the dot

AH = D ;Read dot (graphics mode)

        BH = page number
        DX, CX = row and column of dot position
        on exit
        AL = color value of dot

AH = E ;Write teletype to active page

        AL = character to write
        BL = foreground color in graphics mode
```

```
AH = F ;Return the current video setting

        on exit:
        AL = current video mode
        AH = number of column (in characters) on screen
        BH = current active display page

AH = 10 ;Set palette registers

        AL = 0  ;Set individual palette register
                 BL = palette register
                 BH = palette value
        AL = 1  ;Set overscan register
                 BH = palette value
        AL = 2  ;Set all palette and overscan register
                 ES:DX = pointer to palette value table
                 (17 bytes long),
                 byte 0-15 are palette values for 16 palette registers,
                 byte 16 is palette value for the overscan register
        AL = 3  ;Toggle between intensity/blinking bit
                 BL = 0  ;Set intensity on
                 BL = 1  ;Set blinking on

AH = 11 ;Character generator routines

        AL = 00  ;load user specified character set
                  ES:BP = pointer to character table
                  CX    = number of character to be stored
                  DX    = character of offset into current table
                  BL    = block to load
                  BH    = bytes per character
        AL = 01  ;load 8 x 14 character set
                  BL = block to load
        AL = 02  ;load 8 x 8 character set
                  BL = block to load
        AL = 03  ;set block specifier
                  BL = character generator block specifier
```

The function AL = Ix is similar in function in AL = Ox except the number of row on screen is recalculated.

```
        AL = 10  ;load user specified character set
                  ES:BP = pointer to character table
                  CX    = number of character to be stored
                  DX    = character of offset into current table
```

```
                BL  = block to load
                BH = bytes per character
        AL = 11 ;load 8 x 14 character set
                BL = block to load
        AL = 12 ;load 8 x 8 character set
                BL = block to load

        AL = 20 ;update alternative character generator pointer
                (int 1f)
                ES:BP = pointer to table
        AL = 21 ;update alternative character generator pointer
                (int 43)
                ES:BP = pointer to table
                CX    = bytes per character
                BL    = row specifier
                BL    = 0 ; DL = rows
                BL    = 1 ; rows = 14
                BL    = 2 ; rows = 25
                BL    = 3 ; rows = 43
        AL = 22 ;update alternative character generator pointer
                (int 43) with the 8 x 14 character generator
                in rom
        AL = 23 ;update alternative character generator pointer
                (int 43) with the 8 x 8 character generator
                in rom

        AL = 30 ;return ega character generator information
                BH = 0  ;return current int if pointer
                BH = 1  ;return current int 43 pointer
                BH = 2  ;return pointer to 8 x 14 character generator
                BH = 3  ;return pointer to 8 x 8 character generator
                BH = 3  ;(lower)
                BH = 4  ;return pointer to 8 x 8 character generator
                BH = 4  ;(upper)
                BH = 5  ;return pointer to alternate 9 x 14 alpha
                on exit:
                ES:BP = pointer to table as requested
                CX    = points (pixel column per char)
                DL    = rows (scan line per char)

AH = 12 ;Return current ega settings/print screen routine selection

        AL = 10 ;return ega information
                on exit:
```

```
                BH = 0  ;color mode in effect
                BH = 1  ;monochrome mode in effect
                BL  = 0  ;64k video memory installed
                BL  = 1  ;128k video memory installed
                BL  = 2  ;192k video memory installed
                BL  = 3  ;256k video memory installed
                BL  = 3  ;(always return 3)
                CH = value of feature bits
                CL  = dip switch setting (SW1 to SW4 only)
        AL = 20  ;select alternate print screen routine for ega
                  graphics mode

AH = 13 ;Write string to specified page

        ES:BP = pointer to string
        CX = length of string
        BH = page number
        DH, DL = starting row and column of cursor in which the
                  string is placed

        AL = 0  ;cursor is not moved
                BL = attribute
                string = (char, char, char, char, . . . . .)
        AL = 1  ;cursor is moved
                BL = attribute
                string = (char, char, char, char, . . . . .)
        AL = 2  ;cursor is not moved
                string = (char, attr, char, attr, . . . . .)
        AL = 3  ;cursor is moved
                string = (char, attr, char, attr, . . . . .)
```

****all numbers used are in hexedecimal****

APPENDIX F
SPECIFICATIONS

Table F-1
Operating Modes

Operating Modes

Alpha/ Graphics	Colors	Char x lines	Char box	Resolution	Mode
Graphics	16/64	—	—	640 x 480	VGA (12)
Graphics	2/64	—	—	640 x 480	VGA (11)
Graphics	16/64	—	—	800 x 600	MultiSync
Graphics	16/64	—	—	800 x 560	MultiSync
Graphics	16/64	—	—	640 x 480	MultiSync
Graphics	16/64	—	—	752 x 410	MultiSync/ 25 kHz
Graphics	4/64	—	—	640 x 350	EGA
Graphics	16/64	—	—	640 x 350	EGA
Graphics	16	—	—	320 x 200	EGA
Graphics	16	—	—	640 x 200	EGA
Graphics	2*	—	—	640 x 350	EGA
Graphics	2	—	—	720 x 350	HGC
Graphics	4	—	—	320 x 200	CGA
Graphics	2	—	—	320 x 200	CGA
Graphics	2	—	—	640 x 200	CGA
Alpha	2	40 x 25	8 x 8	—	CGA
Alpha	16	40 x 25	8 x 8	—	EGA
Alpha	2	80 x 25	8 x 8	—	CGA
Alpha	16	80 x 25	8 x 8	—	EGA
Alpha	16/64	80 x 25	8 x 14	—	EGA
Alpha	16/64	80 x 43	8 x 8	—	EGA
Alpha	2	80 x 43	9 x 8	—	EGA
Alpha	2	80 x 25	9 x 14	—	MDA

*Plus Blink and High Intensity Attributes

Video Display Buffer

256 K bytes of video memory

Sync Signals

Separate horizontal and vertical sync in TTL levels

Horizontal	21.8 kHz	– EGA monitor
	15.75 kHz	– RGB or composite monitor
	18.432 kHz	– TTL monochrome monitor,
		– 25 kHz monitor,
		– MultiSync monitor
Vertical	60 Hz	– EGA monitor
	60 Hz	– RGB or composite monitor
	50 Hz	– TTL monochrome monitor,
		– 25 kHz monitor,
		– MultiSync monitor

Connectors

Direct Drive – 9-pin D shell (Female) IBM standard
Feature Connector – Two RCA Video Jacks connected to the Feature Connector
Light Pen – 6-pin BERG
RF Modulator and PC Portable – 4-pin BERG
Composite – RCA jack labelled J1

Monitor Compatibility

IBM Model 5151 Monochrome Display and compatibles.
IBM Model 5153 Color Display and compatibles.
IBM Model 5154 Enhanced Color Display and compatibles.
Composite monitor.
MultiSync monitor.
25 kHz monitor.

Size

6.6" x 3.9"

Power

+5V @ 0.7A

Environment

Ambient Temperature	– 10° to 60°C (operation)
	0° to 70°C (storage)
Relative Humidity	– 5% to 90% (operation)
(non-condensing)	0% to 95% (storage)

Bus
IBM PC standard

Bus Loading
No more than 2 LS TTL load

System Requirements
IBM PC/XT/AT, PC Portable, Model 30 or compatible.

CONNECTOR SPECIFICATIONS

Table F-2
DB9 Connector Specifications

DB9 Female 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

Table F-3
Light Pen Connector Specifications

Light Pen Connector

Pin no.	Signal
1	+ Light Pen Input
2	Not used
3	+ Light Pen Switch
4	Ground
5	+ 5V
6	+ 12V

Table F-4
RF Modulator Connector Specifications

RF Modulator Connector

Pin no.	Signal
1	+ 12V
2	Not Used
3	Composite Video Signal
4	Ground

FCC COMPLIANCE STATEMENT

This equipment generates and uses radio frequency energy and, if not installed and used properly, 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 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 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 U.S. Government Printing Office, Washington, DC 20402. Stock No. 004-000-00345-4.

FCC ID: EXM5RSEGAI
ATI TECHNOLOGIES INC.
Canada

Certified to comply with Class B Limits, Part 15 of FCC Rules. See Instructions if interference to radio reception is suspected.

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

WARRANTY PROVISIONS

ATI warrants to the original purchaser that this product is in good working condition for a period of two years from date of purchase. Should this product, in ATI's opinion, malfunction within the warranty period, ATI will repair or replace this product without charge as defined by this warranty. Replacement of either the card or parts there-on will be only on an exchange basis. Any replaced parts become the property of ATI. This warranty does not apply to those products which have been damaged due to accident, abuse, improper installation, natural or personal disaster or unauthorized alterations, repairs or modifications.

WARRANTY LIMITATIONS

All warranties for this product, expressed or implied, are limited to two years from the date of purchase and no warranties, expressed or implied, will apply after that period.

If this product does not perform as warranted herein, the owner's sole remedy shall be the repair or replacement as provided for above. In no event will ATI be liable to any purchaser for lost revenue, lost wages, lost savings or any other incidental or consequent damages arising from the purchase, use or inability to use this product, even if ATI has been advised of the possibility of such damages.

This limited warranty applies to hardware products only.

WARRANTY SERVICE

Before returning any product for warranty service be sure to check the troubleshooting and diagnostics section in Appendix D. If a board must be returned for warranty service, the best channel for such a return is via the dealer purchased from. Dealers should return the board via the distributor that they bought from. With the return please itemize the problem and include relevant information such as PC used, monitor used, other display cards installed, etc.

Any boards returned directly to ATI must have a Return Material Authorization Number (RMA) labelled clearly on the external packaging. Boards shipped without an RMA number will not be accepted. The Factory Service Center is located at 2-3761 Victoria Park Ave., Scarborough, Ontario, Canada M1W 3S2. Include with the board proof of purchase (including date of purchase), a note outlining the problem, and the RMA number. The customer agrees to accept all liability for damage or loss to the product, to prepay all shipping charges and to use packing material similar to the original packaging used.

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