The following table lists the valid jumper settings for the computer
and explains the significance of each setting. Default settings are
indicated with an asterisk.

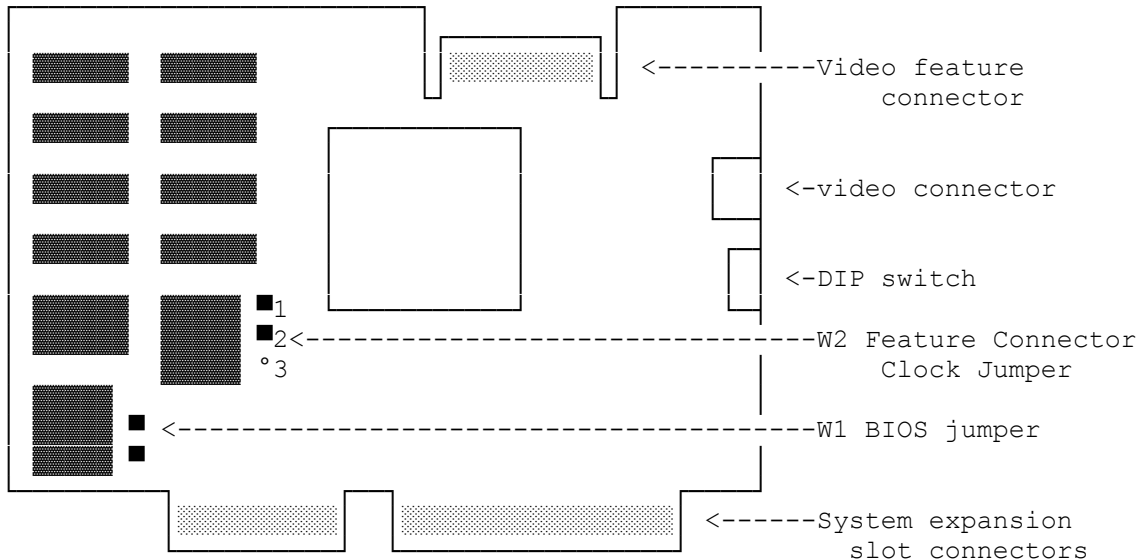| FEATURE	DESCRIPTION	JUMPER SETTING
Monitor type	Software selection by Setup*	E11 and E12 installed
	Color	E10 and E11 installed
	Monochrome	E10, E11 , E12 no connection

VGA ADAPTER

The VGA video expansion adapter features:

* Full IBM Personal System/2 VGA Display adapter compatibility.
* Support of 132-column text modes.
* A color palette of more than 262,000 possible colors
* Compatibility with Tandy's VGM-100, VGM-200, and VGM-300 monitors,
   as well as equivalent monitors.

NOTE: The 132 column modes might require special software. Check to see
whether your application software supports these modes.
VGA Board Layout

     * VIDEO CONNECTOR. Connect your VGA-compatible monitor to this
           15-pin socket. The VGA adapter supports monochrome VGA and
           RGB VGA analog monitors.

     * DIP SWITCH. The switches on this four-section DIP switch define

the video configuration of your computer.

     * VIDEO FEATURE CONNECTOR. This connector is provided to maintain
          complete compatibility with the IBM VGA standard. Normally,
          there will be no need to use this connector. It is reserved
          to support future enhancements.

     * FEATURE CONNECTOR CLOCK JUMPER (W2). This jumper activates and
          deactivates Video Feature Connector. The default jumper
          setting (pins 1 and 2 connected) enables 132-column text
          modes and disables the video feature connector. Changing
          the jumper setting so that pins 2 and 3 are connected
          disables the 132-column text modes and enables the Video
          Feature Connector. NOTE: Leave the this jumper in the
          default setting for normal system use.

     * SYSTEM EXPANSION SLOT CONNECTORS. These connectors plug into the
          expansion slots inside your computer.

MONITOR AND SOFTWARE COMPATIBILITY

The VGA adapter is compatible with software written for the following
video standards on color or monochrome VGA analog monitors:

* VGA (Video Graphics Array)
* MCGA (Multi-Color Graphics Array)
* EGA (IBM Enhanced Graphics Adapter)
* CGA (IBM Color Graphics Adapter)
* MDA (IBM Monochrome Display Adapter)
* Hercules graphics (Hercules Graphics Card)

To emulate one of these standards, use the VGA.EXE utility found on
the Utilities Diskette. This utility is discussed in SETUP.

132-COLUMN TEXT

The VGA adapter supports text modes that are 132 columns wide. These
modes provide screen formats of 132 characters by 25 or 43 lines.
(Standard text format is 80 characters by 25 lines.)

Check to see whether your application software supports these modes.

DEFAULT CONFIGURATIONS

The VGA adapter defaults to monochrome text mode for a monochrome monitor
(or equivalent) or to 80 column color text mode for a color monitor. The
VGA.EXE utility enables you to switch between color and monochrome modes.

DIP Switch	Default Position	Note
1	OFF	ON is for special multi-frequency displays.
2	ON	ON=all VGA modes. OFF=limited VGA modes

3	OFF	Not used.
4	ON	ON=16-=bit operation with AutoSense enabled. OFF=8-bit operation with AutoSense disabled.

The primary video adapter configuration is set to color. If you
replace the VGA adapter with a monochrome or CGA video display
adapter, you need to run the Setup Utility to switch the configuration
to monochrome. If you replace the VGA adapter with an EGA adapter,
it is not necessary to run the Setup utility.

OPERATION

Most application software that is designed for VGA or EGA video support
will run automatically on your computer system with VGA. Just turn on
the computer, and install the application package as instructed by the
software manufacturer.

CONFIGURING THE SOFTWARE

Many application software packages include a setup, installation, or
configuration program to prepare the application with the particular
hardware that you are using. Most newer software will be able to run
in the default VGA configuration for the VGA adapter.

Because some software packages are written specifically for certain
non-EGA, non-VGA video hardware, you might need to configure the VGA
adapter to emulate the video adapter need by the software.

STANDARD VIDEO MODES

Mode (text or graphic)	Resolution (columns by rows)	Simultaneous (colors [1]/ mapping[2])
VGA, EGA, and MCGA modes (startup defaults) Monochrome Text	80 x 25	-/monochrome
Color Text	80 x 25 40 x 25	16/color 16/color
132-Column Text [4]	132 x 25 132 x 43 132 x 25 132 x 43	16/color 16/color -/monochrome -/monochrome
Graphics	320 x 200 [3] 640 x 200 [3] 320 x 200 [3] 640 x 200 [3] 640 x 350 640 x 350	4/color 2/color 16/color 16/color 16/color -/monochrome

	320 x 200 [3]	256/color
	640 x 480	2/color
	640 x 480	16/color

CGA mode		
Color Text	80 x 25	16/color
	40 x 25	16/color
Color Graphics	320 x 200 [3]	4/color
	640 x 200 [3]	2/color

Hercules Graphics mode and MDA mode		
Monochrome Text	80 x 25	-/monochrome
Monochrome Graphics	720 x 348	-/monochrome

[1] Simultaneous colors refers to the number of colors or
    shades that can be displayed at one time.
[2] Simultaneous mapping refers to the type of old-style
    display for which the mode was originally designed.
[3] 200-line vertical resolution modes are double-scanned
    to display 400 lines on the screen.
[4] You might need application-specific drivers to operate
    in these modes.

SOFTWARE TIPS

   * The best-looking display can usually be achieved by selecting
      the highest resolution mode available when you install your
      application software packages.

   * Some applications automatically detect the type of video adapter
      and monitor combination installed and configure themselves to take
      best advantage of the available hardware.

   * If your software specifies that it is VGA, PS/2 video, or EGA,
      install the software for the appropriate adapter. This enables
      your software to run on your VGA adapter in the adapter's startup
      configuration.

   * If your software does not specify a VGA, PS/2 video, or EGA option
      and you are using an RGB color analog monitor, try installing
      the software for color, if available. This usually works with
      your VGA adapter's default color mode on color monitors.

   * To enable the VGA adapter to run software that will not run on VGA
      hardware, you must configure the VGA adapter to operate in another
      mode (such as CGA or Hercules), using the VGA.EXE utility.

   * Hercules-compatible software and CGA-compatible games require
      using the VGA.EXE utility to set the VGA adapter to the
      appropriate video standard.

* Software that requires a certain video mapping may require you to use the VGA.EXE utility to set the VGA adapter to color or monochrome text as needed. For example, if the VGA adapter was set for color VGA text mode and you want to run software that requires monochrome text, you can use the VGA.EXE utility to switch modes.

* The VGA adapter default mapping depends on the type of monitor being used. If you are using the color monitor, the default mapping will be color. If you are using the monochrome monitor, the default mapping will be monochrome.

SYSTEMS USING TWO MONITORS

The VGA adapter may be used with a second video adapter and monitor combination. The second video adapter/ monitor pair must be either a monochrome display/ adapter and a monochrome monitor, or a color/graphics adapter and an RGB color monitor. These are the only multiple monitor and video adapter installations that will work with the VGA adapter.

NOTES:

* When you install the VGA adapter with another video adapter, you are restricted to modes that do not conflict with those of the complementary video adapter. IBM-compatible computer systems allow only one video adapter to be mapped as a monochrome adapter and one to be mapped as a color adapter.

* If you use the VGA adapter with a monochrome display adapter, the VGA adapter is limited to color-mapped modes. The monochrome VGA modes, Hercules graphics, and MDA modes will not be available on the VGA adapter.

* If you use the VGA adapter with a color/graphics adapter, the VGA adapter will be limited to monochrome operation. Color modes will not be available on the VGA adapter.

* The VGA adapter is always the primary video display adapter. Whenever you start or reset your computer, the VGA adapter is always the default display.

* Use the MS-DOS MODE.EXE command to switch between the two video adapters.

* Whether you are installing one or two video adapters in a computer, always run the Setup utility as if you are installing an EGA adapter or a VGA adapter.

* Do not use two VGA or EGA adapters together. If one adapter in a two-monitor system is VGA or EGA, the other adapter must be something other then VGA or EGA.

TROUBLESHOOTING

Symptom	Solution

1 long beep and 2 short beeps when you turn on the system.	* The VGA adapter is not properly seated in the expansion slot is dirty. Reseat the VGA adapter, or clean the connectors with a clean pencil eraser.
No display	* The monitor and/or power cable is not properly plugged in. * The monitor is not turned on. * The brightness and/or contrast control on the monitor is not turned up far enough.
F1 SETUP error when you start up the system.	* The Setup utility was not run.
Distorted images or a blank screen when you run your software.	* The software is not configured or compatible with the VGA graphics adapter's current video configuration. Run VGA.EXE.

VIDEO POST CONNECTOR PINOUTS

Pin	Function	
1	Red Video	
2	Green Video	
3	Blue Video	
4	Monitor ID Bit 2 (not used)	
5	Ground	
6	Red Return (ground)	
7	Green Return (ground)	
8	Blue Return (ground)	
9	Key (no pin)	
10	Sync return (ground)	
11	Monitor ID Bit 0 (Not Used)	
12	Monitor ID Bit 1 (Not Used)	
13	Horizontal Sync	
14	Vertical Sync	
15	Not Used	

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     |       \
     |  6   \
     |     11 |
   1 |        |
   7 |        |
     |     12 |
   2 |        |
   8 |        |
     |     13 |
   3 |        |
     |        |
     |     14 |
   4 |        |
    10|        |
     |     15 |
   5 |      /
     |_____/
```

Monochrome-type monitors use Green Video for all video input and ignore Red Video and BLue Video.

Monitor ID Bits are not Used. The monitor type is determined when your system is turned on.

Video Feature Edge Connector Pinout	
Front	Back

Pin	Function	Pin	Function
Y1	C0 color bit 0	Z1	GROUND
Y2	C1 color bit 1	Z2	GROUND
Y3	C2 color bit 2	Z3	GROUND
Y4	C3 color bit 3	Z4	SELECT INTERNAL VIDEO
Y5	C4 color bit 4	Z5	SELECT INTERNAL SYNCS
Y6	C5 color bit 5	Z6	SELECT INTERNAL DAC
Y7	C6 color bit 6	Z7	NOT USED
Y8	C7 color bit 7	Z8	GROUND
Y9	DAC CLOCK	Z9	GROUND
Y10	DAC BLANKING	Z10	GROUND
Y11	EXT HORZ SYNC	Z11	GROUND
Y12	EXT VERT SYNC	Z12	NOT USED
Y13	GROUND	Z13	NOT USED