

**MINDSET®**

Video Production  
System  
Operation Guide

Personal  
Computer  
System

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## Section 1

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### Introduction

The Mindset Video Production System enables you to overlay, or genlock, video images from any standard NTSC (E.I.A. RS-170A) video source--video cassettes and tapes (1/2, 3/4, and 1-inch), laser disks, video cameras, television broadcasts, and other Mindset Personal Computers--with text and graphics generated with a Mindset Personal Computer. Figure 1-1 shows the Video Production System with the optional Mindset Expansion Unit.

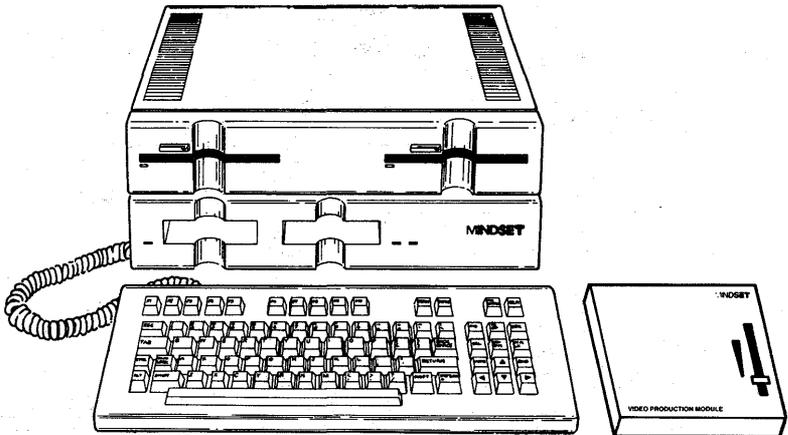


Figure 1-1: The Mindset Video Production System

The Video Production System allows you to genlock in two ways. Overlaid images can be displayed either as composite images or as digital RGB images over a composite video source.

The composite image approach allows you to use a standard composite monitor for display, and to record the resulting mixture of source and overlaid images on video cassette or tape. With this approach, also, you can control the opaqueness of overlaid images--from completely opaque to virtually transparent--either manually or under software control.

The RGB image approach requires a combined composite/RGB monitor for display (the Zenith ZVM-131 or ZVM-135 is recommended). You cannot record the resulting mixture of source and overlaid images, nor can you control the opaqueness of overlaid images with this approach. However, it produces graphics and text images of greater clarity than you can achieve with the composite image approach.

To generate the text and graphics images to be overlaid, you can use such Mindset graphics software as Lumena, Designer, and 4-Point Graphics Plus (provided that your system includes a Mindset Expansion Unit with disk drives). For basic video editing, you can use Mindset Video Producer software. It enables you to sequence up to five full-screen overlays and manipulate them with a variety of scrolling, fading, and "pop-up" techniques.

Experienced programmers and video technicians also have the option of creating original software for generating and genlocking computer graphics overlays.

## Minimum System Requirements

The basic Mindset Video Production System consists of the following components:

- o Mindset Video Production System Unit
- o Video Production Module
- o AC power adapter for Module
- o Four standard phono jack cables
- o One flat-wire cable with nine-pin connectors

In addition, you will of course need an external video source such as a video cassette recorder or camera and a monitor for display.

If you plan to use a dual-mode composite/RGB monitor, you'll need a custom cable to connect the monitor to your system. Appendix B gives specifications for the cable needed to connect a Zenith ZVM-131 or ZVM-135.

If you want to record your mixture of source video and overlaid images, you'll also need a video recording device.

If you plan to use Mindset software to generate your computer graphics images, you'll also need a Mindset Expansion Unit; Mindset MS-DOS, version 1.01 or a later version; the software you want; and the required input device (such as a Mindset Mouse or Graphics Tablet) for working with the software. See Section 3, "Software for the Video Production System."

Chances are that you purchased the components you need as a package; if not, contact your Mindset dealer for any components missing from your system.

## How to Use This Guide

In addition to this "Introduction," this guide consists of three sections and three appendices:

- o Section 2, "Setting Up and Using the Video Production System," provides step-by-step instructions for connecting the various components of your system, powering up, and verifying proper operation. This section also explains what you have to do to bypass the Video Production Module when you want to use your Mindset as a personal computer.

NOTE: This guide describes two ways to verify proper operation of your system, both requiring the use of a disk drive. It's assumed that if your system does not include a Mindset Expansion Unit with disk drives, you have the technical expertise not only to generate overlay images by an alternative method but also to verify proper operation of your system; see Appendix A.

- o Section 3, "Software for the Video Production System," outlines how to use currently available Mindset text and graphics software with your system.
- o Section 4, "Solving Problems," describes troubleshooting techniques for identifying and solving problems that may arise with your Video Production System.
- o Appendix A, "The Software Interface to the Video Production System," is a technical guide for experienced programmers and video technicians who want to create original software for use with the

Video Production System.

- o Appendix B, "Cable Specifications for Connecting a Zenith Dual-Mode Composite/RGB Monitor," describes the custom cable you'll need to connect a Zenith ZVM-131 or ZVM-135 to your Video Production System.
- o Appendix C, "Specifications," lists technical specifications for the Mindset Video Production System.

For convenience, place this guide under the Options tab in your Mindset Personal Computer System Operator Guide.



## Section 2

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### Setting Up and Using the Video Production System

Along with step-by-step instructions, this section contains drawings that illustrate schematically the two configuration options that can be used with the Mindset Video Production System. Figure 2-2 shows how the system is set up for overlaying composite images; Figure 2-3 shows how it is set up for overlaying RGB images. The differences between these options are discussed in Section 1.

For your system to operate properly, the video image generated by the Mindset computer must be "keyed" to the external source video signal. This is done by setting the key bit under software control. Unless the key bit is set, the overlaid and source video images may roll or display colors incorrectly on some monitors. Even if your combined images appear to be displaying correctly, operating the system without setting the key bit is not recommended.

The software products discussed in Section 3 are specially designed to set the key bit automatically whenever they're loaded into your computer. Alternatively, you can set the key bit through programming, as discussed in "Verifying System Operation Without Ready-Made Software" near the end of this section and in Appendix A.

## **Before Setting Up Your System**

Before setting up your Video Production System, it's a good idea to set up your Mindset Personal Computer System and monitor without connecting the Video Production Module and verify that the computer system is working properly. See the operation guides that came with your computer for complete instructions. (You need not set the date and time, since you'll be unplugging the computer in order to set up your Video Production System and will therefore have to reset the date and time later.)

Once you've checked the Mindset for proper operation, turn off the computer and unplug it from the wall socket. If you have a composite monitor connected to the COMP VIDEO connector on the back of the Mindset System Unit, disconnect it.

Familiarize yourself with the POWER ON/OFF SWITCH and connectors on the back of the Video Production Module, shown in Figure 2-1; all are clearly labeled on the bottom of the Module.

Make sure that the Module's POWER ON/OFF SWITCH is in the OFF (down) position, and that the fade control lever on the top of the Module is all the way toward the front of the Module.

You're now ready to set up your Video Production System. You'll find step-by-step instructions for both possible system configurations on the pages following Figures 2-2 and 2-3.

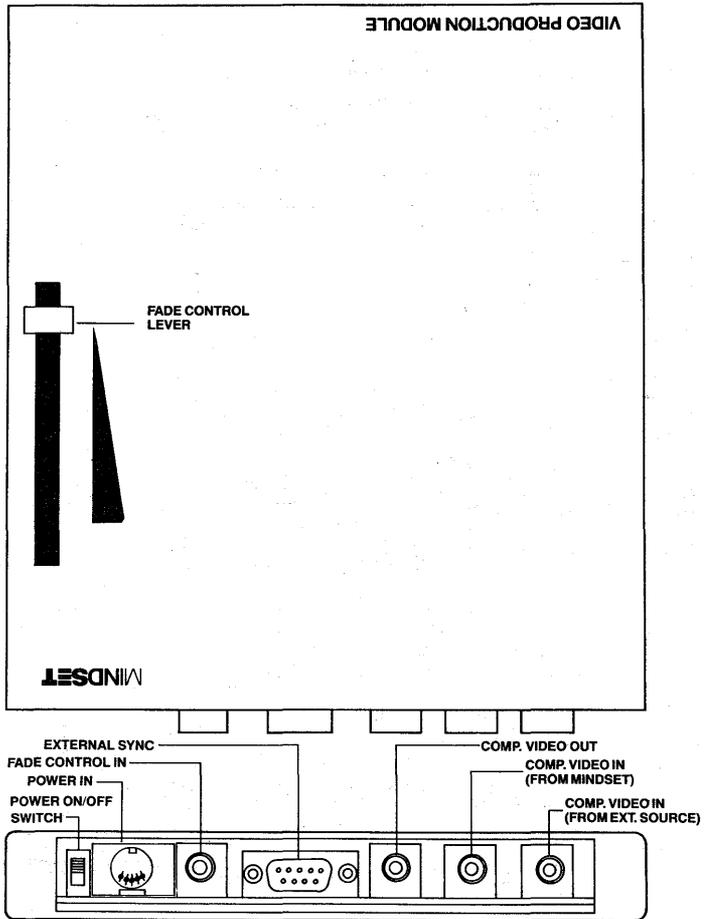


Figure 2-1: The Video Production Module

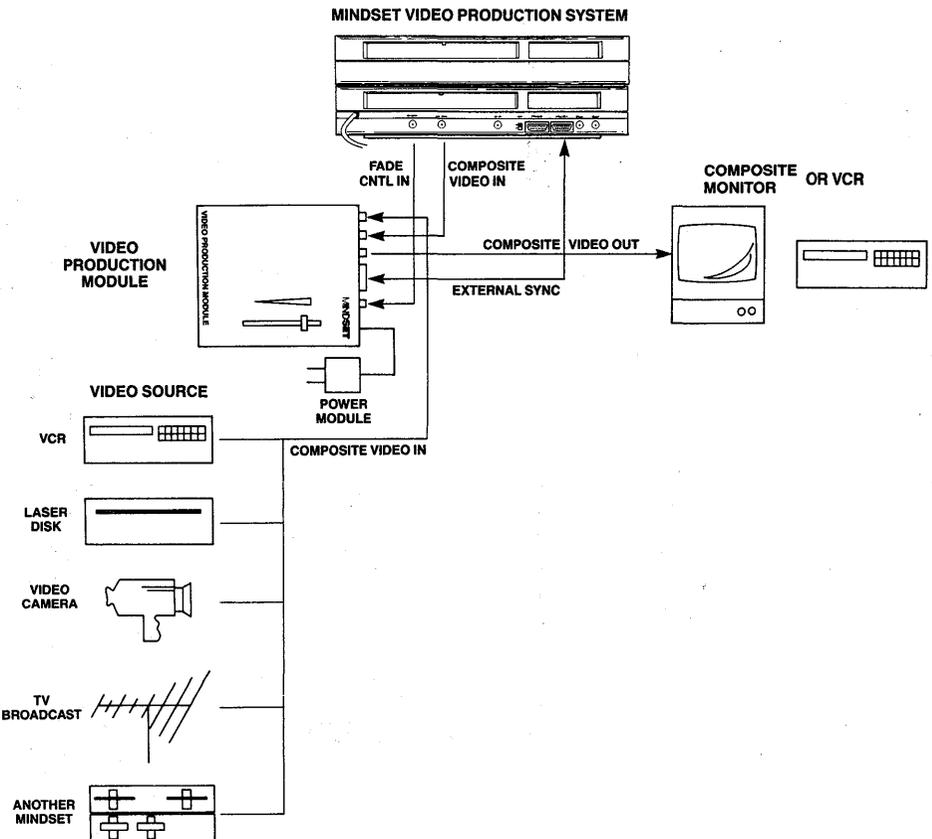


Figure 2-2: System configuration for composite image overlay

## **Setting Up the System for Composite Image Overlay**

Follow these steps to connect the various components of your system:

1. Using one of the four standard phono jack cables included with your Module, connect your video source (video cassette recorder, camera, laser disk, or other source) to the COMP. VIDEO IN (FROM EXT. SOURCE) connector on the Video Production Module.
2. Use a second phono jack cable to connect the COMP. VIDEO connector on the back of the Mindset System Unit to the COMP. VIDEO IN (FROM MINDSET) connector on the Video Production Module.

(If you have an RGB monitor connected directly to your Mindset System Unit through the RGB connector, you need not disconnect it while configuring your Video Production System for composite image overlay. However, the image on this monitor may not be stable during operation of the Video Production System.)

3. Use a third phono jack cable to connect the COMP. VIDEO OUT connector on the Video Production Module to your composite monitor.

If you like, you can connect another video cassette recorder or other video recording device in a "daisy chain" with your monitor, to record your combined source video and overlaid images.

4. Using the flat-wire cable with nine-pin connectors included with your Module, connect th

EXTERNAL SYNC connector on the Video Production Module to the EXT SYNC connector on the back of the Mindset System Unit.

5. Use the fourth phono jack cable to connect the AUDIO LEFT connector on the back of the Mindset System Unit to the FADE CONTROL IN connector on the Video Production Module.
6. Plug the AC plug of the power adapter included with your Module into a wall socket and insert the small round plug from the adapter in the POWER IN connector on the Video Production Module.

Before going on, recheck steps 1 through 6 to see that your system is properly connected. Make sure that the fade control lever on the Video Production Module is all the way toward the front of the Module.

Now follow these steps to power up your system and verify that it's operating properly:

7. Reconnect your Mindset System Unit to a wall socket. Turn on your monitor and external video source, then slide the POWER ON/OFF SWITCH on the back of the Video Production Module to the ON (up) position.
8. Insert your Mindset MS-DOS diskette in drive A (the left-hand drive) of your computer system, then turn on your computer. Remember: you must use version 1.01 or a later version of Mindset MS-DOS. (If you have one of the software products discussed in Section 3, and you've added MS-DOS system files to your working copy, you can load the software directly at this stage.)

9. After MS-DOS has loaded, set the date and time (or simply press RETURN twice), then load one of the software products listed in Section 3 of this guide or skip to "Verifying System Operation Without Ready-Made Software" near the end of this section.

When the software has loaded, enable genlocking by pressing the proper key or combination of keys, as described in Section 3 of this guide. The external video signal appears on your monitor, overlaid by the software title or start-up screen.

To increase the opaqueness of the overlaid image, slide the fade control lever forward; pull the lever back to decrease the opaqueness of the overlaid image.

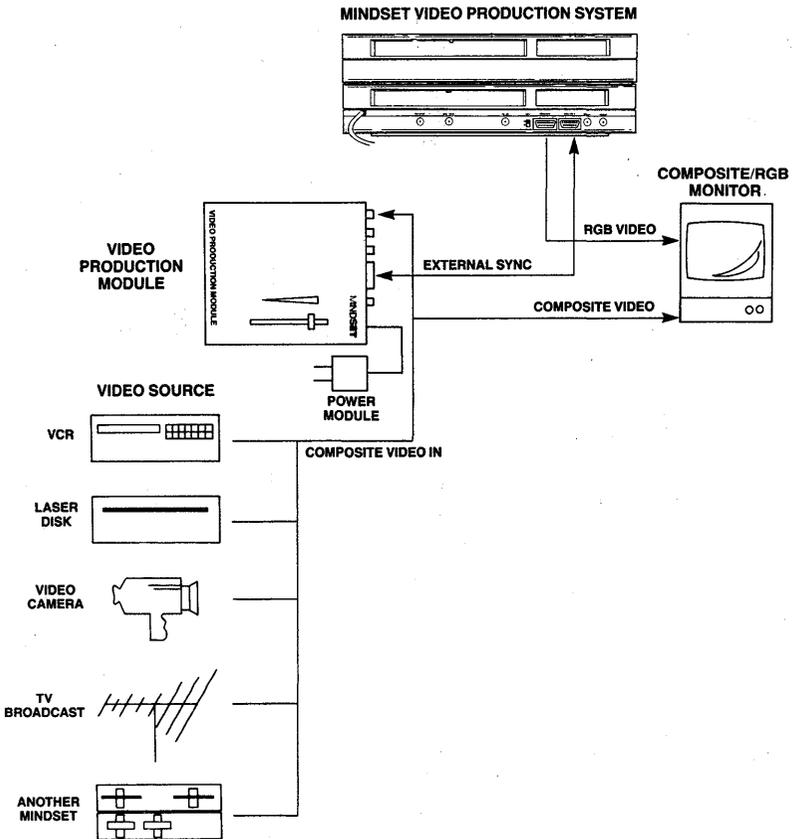


Figure 2-3: System configuration for RGB image overlay

### **Setting Up the System for RGB Image Overlay**

To overlay RGB computer graphics images on a composite source video signal, you must have a dual-mode composite/RGB monitor such as the Zenith ZVM-131 or ZVM-135. This configuration of your Video Production System also requires a custom cable for connecting the Mindset System Unit to the dual-mode monitor. Appendix B gives specifications for the cable needed to connect a Zenith ZVM-131 or ZVM-135.

Make sure that your monitor is set for composite video input--see the owner's guide that came with your monitor. Then follow these steps to connect the various components of your system:

1. Using one of the four standard phono jack cables included with your Module, connect your video source (video cassette recorder, camera, laser disk, or other source) to the composite video input connector on your monitor.
2. Using a second phono jack cable, connect the video out connector on the monitor to the COMP. VIDEO IN (FROM EXT. SOURCE) connector on the Video Production Module. (If your monitor has no video out connector, you must connect your video source both to your monitor and directly to the COMP. VIDEO IN (FROM EXT. SOURCE) connector on your Video Production Module.)
3. Using the flat-wire cable with nine-pin connectors included with your Module, connect the EXTERNAL SYNC connector on the Video Production Module to the EXT SYNC connector on the back of the Mindset System Unit.

4. Using a cable made to the specifications given in Appendix B, connect the RGB VIDEO connector on the back of the Mindset System Unit to the RGB video input connector on your monitor.
5. Plug the AC plug of the power adapter included with your Module into a wall socket and insert the small round plug from the adapter in the POWER IN connector on the Video Production Module.

Before going on, recheck steps 1 through 5 to see that your system is properly connected. Make sure that the fade control lever on the Video Production Module is all the way toward the front of the Module.

Now follow these steps to power up your system and verify that it's operating properly:

6. Reconnect your Mindset System Unit to a wall socket. Turn on your monitor and external video source, then slide the POWER ON/OFF SWITCH on the back of the Video Production Module to the ON (up) position.
7. Turn on your computer. When the message System Diagnostics in Progress disappears, press ALT and SYS CONFIG at the same time. Select Monitor on the System Configuration Screen.
8. Insert your Mindset MS-DOS diskette in drive A (the left-hand drive) of your computer system, then press ALT and RESET at the same time.  
Remember: you must use version 1.01 or a later version of Mindset MS-DOS. (If you have one of the software products discussed in Section 3, and you've added MS-DOS system files to your working copy, you can load the software directly at this

stage.)

9. After MS-DOS has loaded, set the date and time (or simply press RETURN twice), then load one of the software products listed in Section 3 of this guide or skip to "Verifying System Operation Without Ready-Made Software" at the end of this section.

After the software has loaded, enable genlocking by pressing the proper key or combination of keys as described in Section 3 of this guide. The external video signal appears on your monitor, overlaid by the software title or start-up screen.

When you're overlaying RGB images on a composite video signal, use of the fade control lever on the Video Production Module has no effect on the opaqueness of the overlaid RGB images.

---

### **Verifying System Operation Without Ready-Made Software**

If you have no ready-made software designed for use with your Video Production System (see Section 3), you can still test the operation of your system. The short program listed here, used with the DEBUG utility of Mindset MS-DOS (version 1.01 or a later version), sets the key bit in your Video Production System and enables you to verify that the system is working properly.

Set up your system, power up all components, and load MS-DOS into your computer. Set the date and time (or simply press RETURN twice). Then, with the A> prompt

on your screen, type

**debug**

and press RETURN. After the MS-DOS DEBUG utility loads, a minus sign (-) appears on your screen. Type in the following short test program from your Mindset keyboard. Be careful to distinguish between the number 1 and the letter l (shown here only as the uppercase L and only in the entries cL and aL), and between the number 0 and the letter o (shown here only as the lowercase o). Press RETURN at the end of each line.

```
A100
mov ax,cs
mov ds,ax
mov es,ax
mov ah,l
int ef
and bh,bf
not bh
mov cL,6
ror bh,cL
mov aL,bh
mov ah,2
int ee
mov ax,607
int ee
mov ax,b00
mov bx,200
mov cx,10
xor dx,dx
int ef
and byte ptr [bx+1],fd
or byte ptr [bx+3],2
mov ah,a
int ef
mov ah,4c
int 21
```

Now, to execute the program, type

g=100

and press RETURN twice. As the program executes, the external video signal appears on your monitor, overlaid by the program listing you've typed in. If you're overlaying composite images onto a composite external video source, use the fade control lever on the Video Production Module to increase and decrease the opaqueness of the overlaid image.

---

### Using the Mindset as a Personal Computer

The Mindset System Unit (and optional Expansion Unit) at the heart of your Video Production System is a fully capable personal computer that you can use for a wide variety of applications: word processing, spreadsheets, data management, and more. However, you may first have to change a few of the connections in your system before using your Mindset for normal computer operations. The reconnections required depend on the kind of monitor you want to use for display during these operations.

Whatever the configuration of your system, no reconnections are necessary when you want to use Mindset software that's been specially designed for genlocking, such as that listed in Section 3 of this guide.

If you want to use an RGB monitor for display, simply connect the monitor to the RGB VIDEO connector on the back of the Mindset System Unit.

connected to your Video Production System and you want to use it in the RGB mode during normal computer operations, simply turn off your external source video device and switch the monitor to the RGB mode. You need not turn off or unplug your Mindset System Unit.

If you have a composite monitor connected to your Video Production System and you want to use it for display during normal computer operations, whether or not you need to reconnect your system will depend on the particular software you want to use. With software such as presentation graphics and paint programs, which use the color modes of the Mindset Personal Computer, try loading and using the software with your Video Production System fully set up, with all components of the system turned on, and with the fade control lever pulled all the way toward the front of the Video Production Module.

If you have any trouble with the display of color graphics software (such as rolling or unwanted flickering of the image) or if you want to use black-and-white or text-intensive software with a composite monitor, you'll have to reconnect your system as shown in Figure 2-4. Follow these steps:

1. Turn off all components of your system and unplug the Mindset System Unit from its power outlet.
2. Disconnect the flat-wire cable with nine-pin connectors from the EXT SYNC connector on the back of the Mindset System Unit.
3. Disconnect the phono jack cable from the COMP. VIDEO OUT connector on the back of the Video Production Module.
4. Using a phono jack cable, connect your composite

monitor to the COMP VIDEO connector on the back of the Mindset System Unit.

5. Plug the Mindset System Unit back into a working outlet and turn on all components of the system to begin using the Mindset for normal computer operations.

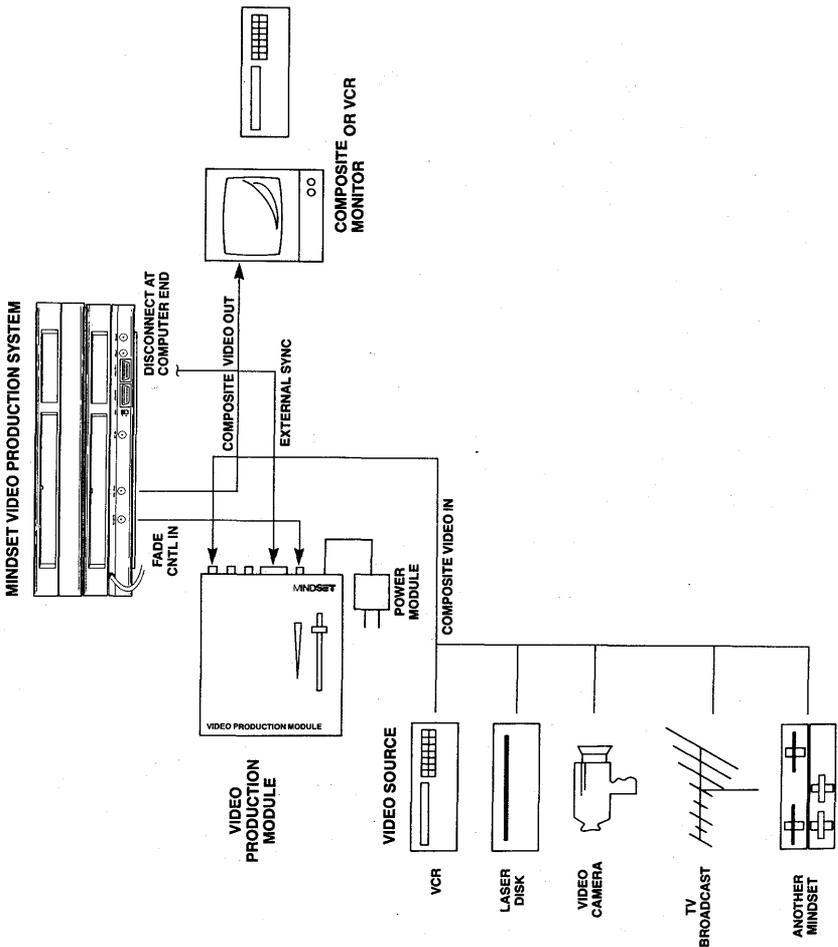


Figure 2-4: System configuration for personal computer operation with a composite monitor



## Section 3

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### Software for the Video Production System

The Mindset software products listed here, either currently available or to be released in the fourth quarter of 1984, are specially designed to set the key bit, and thus enable genlocking, with the Mindset Video Production System. Each one comes with a user's guide that explains its graphics and text creation capabilities.

(Where listed, the version numbers for these products represent the earliest version with genlocking capability; all subsequent--that is, higher-numbered--versions of these products will also have genlocking capability.)

To genlock with any of these products, start by loading the software according to the instructions in Section 2 of this guide and in your software user's guide. Then press the key or combination of keys listed in the right-hand column here.

<u>Software</u>	<u>To enable genlocking,</u> <u>press--</u>
Video Producer, version 1.0	G
Designer, version 1.6	ALT and G
4-Point Graphics Plus, version 1.02	ALT and F1

Lumena, version 1.06  
Lumena Fonts  
Lumena Animation

Lumena products require installation of a separate genlocking program, Lumena Video, available from your Mindset dealer; once this program is installed, select GENLOK from the appropriate menu.

## Section 4

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### Solving Problems

Listed here are a few problems that might arise with your Mindset Video Production System, along with steps you can take to solve them. Should you run into any of these problems, try the troubleshooting procedures described before contacting Mindset or your Mindset dealer for service.

Problem: The screen is blank when the system is fully installed and powered up.

Solution: Make sure that your monitor and Video Production Module are plugged in to working outlets and are turned on. Also check to see that your external video source device is plugged in, turned on, and operational. Check and secure the cable connections between the external source and the Video Production Module and between the monitor and the Module.

Problem: No computer video image appears on the screen when the system is fully installed and turned on.

Solution: Make sure that your computer is plugged in to a working outlet and is turned on. Check and secure all cable connections, especially at the COMP VIDEO connector on the back of the Mindset System Unit

and the COMP. VIDEO IN (FROM MINDSET) connector on the back of the Video Production Module, and at the EXT SYNC connector on the Mindset and the EXTERNAL SYNC connector on the Video Production Module. Slide the fade control lever on the Video Production Module all the way toward the front of the Module.

Problem: No external video image appears on the screen.

Solution: Check to see that your external video source device is plugged in to a working outlet, turned on, and fully operational. Make sure that the cable from the external video source is securely connected to the COMP. VIDEO IN (FROM EXT. SOURCE) connector on the back of the Video Production Module. Move the fade control lever on the top of the Module toward the back of the Module.

Problem: The computer video image appears distorted.

Solution: Check and secure the cable connections between the EXTERNAL SYNC connector on the Video Production Module and the EXT SYNC connector on the Mindset System Unit.

Problem: The computer video image or the combined source and computer video image "rolls" on the screen; the computer video image does not display in color or appears to be faded.

Solution: You must set the key bit, or genlock the system, either by loading some ready-made software with genlocking capability (listed in Section 3); by means of the DEBUG utility in MS-DOS (see Section 2); or with custom software of your own (see Appendix A). If the problem persists after you've followed the

appropriate procedure, it may be that your external source video signal is too weak. Check the strength of the external source video signal on a separate monitor, bypassing the Video Production System; the image should be free of "snow" and distortion.



## **Appendix A**

---

### **The Software Interface to the Video Production System**

This appendix contains two source code listings, with comments, for controlling the Mindset software interface to the Video Production System. The first program, GENLOCK TEST, enables genlocking with the Video Production System (and thus allows you to verify proper operation of the system). The second program, GENLOCK FADE CONTROL, is a step-by-step guide to controlling the opacity of overlaid computer graphics images through software (fade control is possible only when you're overlaying composite images on a composite source video signal).

Though both programs are presented in the format of the Microsoft Macro Assembler, only GENLOCK FADE CONTROL has been assembled.

For complete details on the Mindset BIOS functions covered in these programs, see the Software Developer's Guide in the Mindset Programmer's Development Library.

## GENLOCK TEST

Designed to verify the proper operation of the Mindset Video Production System, this program results in the overlaying of an external source video signal by the standard Mindset MS-DOS display. In outline, it consists of the following steps:

1. Set the system to a color mode. With the Mindset Personal Computer, it's possible to disable the color sub-carrier from the composite video output signal. For the Video Production Module to operate properly, the color sub-carrier must be enabled. The GET SCREEN MODE call is made to retrieve the TV/MONITOR status of the system. The SET DISPLAY DEVICE call is then made to enable the color sub-carrier, preserving the current TV/MONITOR status.
2. Set the display sync features. The SET DISPLAY SYNC FEATURES call is made to enable genlock, interlaced sync, and external sync. All of these features must be enabled for the Video Production Module to operate properly.
3. Set up the color palette for background transparency. In this step the background color is set to transparent and the foreground color to opaque. This allows characters displayed in the foreground color to be overlaid on an external source video signal. First, the GET PALETTE call is made to retrieve the current palette information. The key bit (bit 9) is then set to 0 for the background color, making it transparent, and to 1 for the foreground color, making it opaque. The SET PALETTE call is then made to set up the new palette.
4. Exit back to DOS.

```

first    segment
         assume cs:first,ds:first,es:first
gentest  proc far

         mov ax,cs    ; fix es for palette access
         mov ds,ax
         mov es,ax

; Get monitor type by using the GET SCREEN MODE interrupt (int efn ah=01)
;
; Registers in:  ah=01 (function number of GET SCREEN MODE)
;
; Registers out: al=screen mode (see SET SCREEN MODE for definitions)
;                bx=flag set (see GET SCREEN MODE for flag definitions)
;
; Of interest:  bit number 14 is set to 1 if a TV is the display device
;                --this call is issued to get this bit because the next call
;                sets the TV/MONITOR status.

         mov ah,01h
         int 0efh

; Now to get the monitor/tv bit

         and bh,03fh
         not bh
         mov cl,6

```

```
ror bh,cl
mov al,bh
```

```
; Use SET DISPLAY DEVICE to set the display device to color (default is BW)
; GENLOCK only syncs correctly if this color bit is set
```

```
;
; Registers in: ah=02 (SET DISPLAY DEVICE function number)
;               al bit 0 = 0 for television, 1 for monitor
;               al bit 1 = 0 for color mode, 1 for BW
;
```

```
; Registers out: none
```

```
mov ah,02h
int 0eah
```

```
; SET DISPLAY SYNC FEATURES
```

```
;
; Registers in: ah=06 (SET DISPLAY SYNC FEATURES function number)
;               al bit 0 = 1 to enable GENLOCK (required for GENLOCK)
;               al bit 1 = 1 to enable external sync (required for GENLOCK)
;               al bit 2 = 1 to enable interlaced sync (required for GENLOCK)
;               al bit 3 = 1 to enable fixed phase (here set to zero)
;
```

```
; Registers out: none
```

```
mov ax,0607h ; set key bit, interlace, and external sync
int 0eah
```

```

; GET PALETTE
;
; Registers in: ah=0bh (GET PALETTE)
;               es:bx points to where the palette will be copied to
;               cx the number of words to be read out of the palette
;               dx the offset of the first word to read
;
; Registers out: ah undefined
;               al color index of the border color

    mov ax,0b00h
    mov bx,0200h
    mov cx,0010h
    xor dx,dx
    int 0efh

; Edit the palette colors, making the background transparent and the
; foreground opaque
; Every color in the palette is a word--bit number 9 (bit 1 of
; the second byte in the word) is the key bit
; If the key bit is set to zero, the color is transparent in GENLOCK
; mode, otherwise it is opaque

    and [bx+1],byte ptr 0fdh    ; set background transparent
    or  [bx+3],byte ptr 02h    ; set foreground opaque

```

```

; SET PALETTE
;
; Registers in: ah=0ah (SET PALETTE)
;               al color index of the border color
;               es:bx points to where the palette will be copied to
;               cx the number of words to be read out of the palette
;               dx the offset of the first word to read
;
; Registers out: ah undefined
;               al color index of the border color

        mov ah,0ah    ; write palette using almost all of the old registers
        int 0efh

;TERMINATE PROCESS (INT 21H function)
;
; Registers in: ah=4ch (TERMINATE PROCESS)
;               al return code (unused here)
;
; Registers out: none

        mov ah,4ch
        int 21h

gentest endp
first   ends
        end gentest

```

## GENLOCK FADE CONTROL

This program is a step-by-step guide to genlock fade control through the sound processor in the Mindset Personal Computer. The opacity of the overlaid computer graphics image is controlled by varying the frequency at the output of the sound processor between 700 and 1500Hz, with the image faded out completely at 1500Hz. The program listing provided here will fade the overlaid image from fully opaque to transparent and back again in approximately 2 seconds. In outline, GENLOCK FADE CONTROL consists of the following steps:

1. Set the sound mode to Mode 1, using function 24H of interrupt OEEH.
2. Set the volume register for voice 2 to 255 (the maximum volume), using function 25H of interrupt OEEH. Voice 2 is used for control because it provides the highest amplitude of the four voices available.
3. Again using function 25H of interrupt OEEH, set the frequency registers for voice 2 according to the "mixing" of source and overlaid images desired. The following formula may be used to determine the value of the frequency registers required to obtain a given output frequency:

$$\text{frequency register value} = \text{pitch} \times 6.5536$$

The frequency register value is 4587 for 700Hz, and 9830 for 1500Hz. Values between 4587 and 9830 may be specified to achieve various degrees of opacity in the overlaid image.

```

; Constant declarations
" 0024 MS_SET_SOUND_MODE EQU 24H ; Function code for set sound mode
" 0025 MS_SET_SOUND_REGISTERS EQU 25H ; Function code for set sound registers
" 00EE MS_FUNCT_INT EQU 0EEH ; Mindset-unique function interrupt

" 0000 GET_KEY EQU 00H ; Keyboard buffer get key
" 0001 KEY_STATUS EQU 01H ; Keyboard status function
" 0016 KEYBOARD_INT EQU 16H ; Keyboard I/O function interrupt

" 11EB FREQUENCY_700 EQU 4587 ; Frequency value for 700hz
" 0666 FREQUENCY_1500 EQU 9830 ; Frequency value for 1500hz
" 0069 FREQUENCY_INCREMENT EQU 105 ; Value to increment frequency by 16hz

" 004C DOS_EXIT EQU 4CH ; DOS exit function
" 0021 DOS_INT EQU 21H ; DOS function interrupt

0000 STACK SEGMENT STACK
0000 0100 DB 256 DUP (?)

```

??

1

```

0100          STACK          ENDS

0000          CODE          SEGMENT PUBLIC
                          ASSUME CS:CODE, DS:CODE, ES:CODE, SS:STACK

0000          BENLOCK_EXAMPLE PROC FAR

                          ; Set all segments to CODE
0000  8C 08          MOV     AX,CS
0002  8E 08          MOV     DS,AX
0004  8E 00          MOV     ES,AX

                          ; Set sound mode to mode 1
0006  B4 24          MOV     AH,MS_SET_SOUND_MODE
0008  B0 01          MOV     AL,1           ; Select on-board processor
000A  8A 08          MOV     BL,AL         ; Select mode 1
000C  CD 0E          INT     MS_FUNCT_INT

                          ; Set the volume to maximum (255)
000E  B4 25          MOV     AH,MS_SET_SOUND_REGISTERS
0010  B0 01          MOV     AL,01         ; Select on-board processor
0012  BE 0071 R     MOV     SI,OFFSET SOUND_TABLE; Set pointer to sound table
0015  BB 0000       MOV     BX,000000010000000B; Select voice & volume only
0018  CD 0E          INT     MS_FUNCT_INT

```

```

; Fade in to out (700hz to 1500hz)
001A C7 05 0075 R 11EB FADE_LOOP: MOV VOICE_2_FREQ, FREQUENCY_700
0020 B9 0032 MOV CX, 50 ; Fade in 50 increments
0023 BB 0000 MOV BX, 0000000000001000B; Select voice 2 frequency only

```

```

0026 B4 25 FADE_OUT_LOOP: MOV AH, MS_SET_SOUND_REGISTERS
0028 B0 01 MOV AL, 01 ; Select on-board sound
002A CD EE INT MS_FUNCNT_INT
002C B3 06 0075 R 69 ADD VOICE_2_FREQ, FREQUENCY_INCREMENT
0031 E8 0069 R CALL WAIT_20_MS ; Delay
0034 E2 F0 LOOP FADE_OUT_LOOP

```

```

; Fade out to in (1500hz to 700hz)
0036 C7 06 0075 R 2666 MOV VOICE_2_FREQ, FREQUENCY_1500
003C B9 0032 MOV CX, 50 ; Fade in 50 increments

003F B4 25 FADE_IN_LOOP: MOV AH, MS_SET_SOUND_REGISTERS
0041 B0 01 MOV AL, 01 ; Select on-board sound
0043 CD EE INT MS_FUNCNT_INT
0045 E8 0069 R CALL WAIT_20_MS ; Delay
0048 B3 2E 0075 R 69 SUB VOICE_2_FREQ, FREQUENCY_INCREMENT
004D E2 F0 LOOP FADE_IN_LOOP

```

```

004F 04 01      MOV     AH,KEY_STATUS      ; Quit if key is struck
0051 CD 16      INT     KEYBOARD_INT
0053 74 05      JZ      FADE_LOOP

0055 B4 00      DONE:  MOV     AH,GET_KEY      ; Clear keyboard buffer
0057 CD 16      INT     KEYBOARD_INT

0059 C7 05 0075 R 0000  MOV     VOICE_2_FREQ,0    ; Turn off the sound
005F B4 25      MOV     AH,MS_SET_SOUND_REGISTERS
0061 B0 01      MOV     AL,1
0063 CD EE      INT     MS_FUNCT_INT

0065 B4 4C      MOV     AH,DOS_EXIT      ; Return to DOS
0067 CD 21      INT     DOS_INT

0069          GENLOCK_EXAMPLE ENDP

          ; This procedure waits approximately 20 ms and returns
0069          WAIT_20_MS      PROC      NEAR

0069 51          PUSH   CX
006A B9 1F40     MOV     CX,0000
006D E2 FE      WAIT_LOOP: LOOP    WAIT_LOOP
006F 59          POP    CX
0070 C3          RET

```

```
0070          WAIT_20_MS      ENDP

0071          SOUND_TABLE     LABEL  BYTE
0071 00          DB          0          ; Modulation control reg 1
0072 00          DB          0          ; Modulation control reg 2
0073 0000       DW          0          ; Voice 1 frequency
0075 0000       VOICE_2_FREQ DW          0          ; Voice 2 frequency
0077 0000       DW          0          ; Voice 3 frequency
0079 0000       DW          0          ; Voice 4 frequency
007B 00          DB          0          ; Voice 1 volume
007D 5F         DB          255        ; Voice 2 volume
007E 00          DB          0          ; Voice 3 volume
007F 00          DB          0          ; Voice 4 volume

007F          CODE           ENDS
                                END      GENLOCK_EXAMPLE
```

## Appendix B

---

### Cable Specifications for Connecting a Zenith Dual-Mode Composite/RGB Monitor

These specifications describe the custom cable required to connect a Zenith ZVM-131 or ZVM-135 composite/RGB monitor only to the Mindset Video Production System.

NOTE: The cable should be shielded, and the connector shields at both ends should be connected to the cable shield.

Connectors: Shielded DB-9 (male)--to Mindset System  
Unit  
Shielded DB-25 (male)--to monitor

Pin connections:

<u>DB-9 pin #</u>	<u>Signal</u>	<u>DB-25 pin #</u>
1	GND	19
2	GND	16
3	RED	7
4	GREEN	5
5	BLUE	6
6	INTENSITY	15
7	KEY BIT	3
8	HORIZONTAL SYNC	2
9	VERTICAL SYNC	4



## Appendix C

---

### **Specifications**

#### Video Production System

- o Video input: any NTSC standard signal from:
  - 1/2, 3/4, and 1-inch videotape (consumer and broadcast grade)
  - laser disk
  - TV broadcast
  - video camera
  - other Mindset Personal Computer
- o Video output: E.I.A. RS-170A, 75-ohm impedance
- o Display screen modes:
  - mixing of keyed video (composite with composite)
  - superimposition of keyed video (RGB on composite)
- o Fade control through hardware or software

Mindset Personal Computer System Unit

- o Central processor: 16-bit Intel 80186
- o Custom VLSI graphics and video display coprocessors
- o 32K-byte frame buffer, 32K bytes system RAM
- o Built-in video interfaces: RGB, composite, and TV RF
- o Resolution:
  - 640 by 400 2-color interlaced
  - 320 by 200 16-color non-interlaced
- o Synthesized audio output
- o Dual cartridge ports, each with 128K bytes ROM space
- o 3 I/O expansion ports for RS-232-C and hard disk interface, graphics tablet, modems, and so forth
- o 84-key detached keyboard with connectors for Mindset Mouse and Joystick
- o Input: Keyboard  
Mindset Mouse  
Graphics Tablet  
Mindset Joystick
- o Output: RS-232-C  
Parallel printers  
Modems  
Stereo sound
- o IBM PC-compatible

## Video Production Module

- o Physical characteristics:

Width	6 3/4 inches
Depth	7 3/4 inches
Height	1 3/16 inches
Weight	2 3/4 pounds

- o Genlock lock-in range: + or - 300Hz (minimum)

- o Genlock mode: lock to external video