

APPLICATION NOTES
FOR THE
MINDSET GRAPHICS COMPUTER
IN THE
VIDEO ENVIRONMENT

Introduction:

The Mindset Video Production System (M1000V) and the Mindset Professional Video Graphics System (M1000VS) when used in conjunction with the Mindset Video Production Module (M1011) can "genlock" to an external video source. The genlocking function allows computer generated images to be overlaid on background video from a variety of NTSC video sources (including VCRs, cameras, and video disk players) in post production applications. This application note will discuss a variety of issues that you may encounter when using the Mindset Computer Systems in the video environment.

If you have just purchased your Mindset Computer System and the Mindset Video Production Module, set this document aside till you have become familiar with the operation of the Mindset Computer System and the Mindset Video Production Module.

In the following description the term Mindset Computer refers to both the Mindset Video Production System and the Mindset Professional Video Graphics System. Where a distinction between the two models is necessary, the complete model names are spelled out.

1. Interlaced and noninterlaced modes.

The NTSC Video Signal is an interlaced signal which can produce annoying flicker. In the computer industry, it is common to design noninterlaced systems in order to minimize the 30 Hz flicker.

The Mindset Computer can be set in either interlaced or non-interlaced mode depending on the application required by the user. In video applications where the NTSC signal is required, the Mindset computer should be set in the interlaced mode by using the software packages designed for video applications. Examples of such video applications are time base correction, production switchers, video processing and video recording.

At this time, there are three Mindset software titles designed for video applications: Lumena, Video Producer and Designer Video. In Lumena, the Mindset computer is automatically placed in the interlaced mode whenever "GENLOCK" is on. Note that from the Lumena VIDEO Menu you must first select GENLOCK and then hit "OK" in the Status Box to enable Genlock. In Video Producer, the "G" key on the keyboard sets the computer in the interlaced mode and in Designer Video, it is ALT G keys.

2. RS170 and RS170A NTSC signals.

When the Mindset computer is placed in the interlaced mode it generates an RS170 NTSC signal from the composite video output connector. However, when the Mindset computer is used in genlocking applications with the Mindset Video Production Module, the output tracks the format of the incoming external video signal. If the incoming external video is RS170A, the output from the Video Production Module is RS170A. Since there is no control for the SC/H phase (subcarrier to horizontal sync phase) within the Video Production Module, the external video source should have a SC/H phase control to compensate for the possible delays in the video chain.

3. Border and the Sync.

In genlocking applications the border area in the Mindset computer display can be set to either transparent or opaque. If the border is transparent then the composite sync and the color burst of the external video is keyed in to the output video. If the border is opaque then the composite sync and the color burst of the computer video is keyed in to the output video signal. Mindset Lumena software allows the setting of the border type by selecting the border color. Mindset Video Producer software always sets the border transparent whenever the G key is struck. Mindset Designer software sets the border color to the currently active paint color.

4. Using Composite Video.

Since most of the genlocking applications require the use of the composite video signal rather than RGB, it is important to understand that there will be a degradation of the quality of the video signal due to the bandwidth limitations of the NTSC format and interference between chroma and luma channels.

The use of dithered colors on a composite monitor IS NOT RECOMMENDED. Dithered colors will cause severe interference in the chroma channel which will be seen as a flicker on the screen in the areas where the dithered colors were used. A similar situation will occur when a single pixel is being displayed. It is also good practice to stay away from the fully saturated colors when using a composite monitor. When using Lumena, the color menu can be designed by using 512 available colors in the palette. To avoid excessive chroma crawl (an apparent motion of the pixels on the boundary between two color transitions.), the color transitions should be designed very carefully. The chroma crawl can be minimized by using less saturated colors and proper hue selection for the color transitions.

5. "Chaining" two Mindsets.

In genlocking applications it is possible to chain together the video of two Mindset computers where the composite video output of one is being used as an external video source for the Video Production Module connected to the second Mindset computer. It is very important that the Mindset computer being used as a video source be set in the interlaced mode. Otherwise, vertical locking will not occur. All external video sources for the Video Production Module must be interlaced.

6. Absence of external video.

In genlocking applications, it is necessary, at all times, to have an active external video source or black burst in order to maintain proper operation. Without external video, there will be loss of color. When the Mindset computer is not being used for video production, it is recommended to unplug the sync cable from the base unit and connect the Mindset composite video output directly to the composite monitor. (Refer to the Mindset Video Production System Operation Guide).

7. RGB overlay.

In some applications, such as training and interactive video, it is convenient to use RGB overlays on top of the composite video image. However for this application a special monitor is required. Sony and Zenith have suitable models. The Mindset Video Production Module does the necessary synchronization and provides the "key" signal to do the RGB keying. The required polarity of the "key" signal may vary on different monitor models. Contact the monitor manufacturer for more information on their products.

The "key" signal is available on the RGB video connector and it is the same pin as vertical sync. Due to this fact it is not possible to use vertical sync to synchronize the RGB monitor when the "key" signal is set ON. If an RGB monitor that uses the vertical sync is connected when the key signal is set ON, the monitor will go out of synchronization. Note that this DOES NOT damage the monitor in any way. Most TTL RGB monitors use the vertical sync signal; most Analog RGB monitors do not use the vertical sync signal. Thus you will most likely encounter this problem only if you are using the Mindset Video Production System (M1000V). You should not encounter this problem with a Mindset Professional Video Graphics System (M1000VS).

Note that in the RGB overlay applications the monitor should be set so that the sync signals are extracted from the composite video input to the monitor.

8. Video pinouts.

The EXTERNAL SYNC connector and RGB VIDEO connector pin-outs are listed below.

EXT SYNC CONNECTOR

- 1 - Key Bit Out
- 2 - 3.58 MHz clock out
- 3 - Subcarrier reset
- 4 - Subcarrier "lead"
- 5 - GND
- 6 - Computer composite sync
- 7 - Frame reset
- 8 - Subcarrier "lag"
- 9 - VCO control voltage

RGB VIDEO CONNECTOR PIN OUT (Mindset Video Production System M1000V).

- 1 - GND
- 2 - GND
- 3 - Red *
- 4 - Green *
- 5 - Blue *
- 6 - Intensity *
- 7 - Vert Drive (negative polarity)/Key Signal (positive polarity)
- 8 - Horizontal Drive *
- 9 - Vert Drive (positive polarity)/ Key Signal (negative polarity)

RGB VIDEO CONNECTOR PIN OUT (Mindset Professional Video Graphics System M1000VS)

- 1 - GND
- 2 - GND
- 3 - Red **
- 4 - Green **
- 5 - Blue **
- 6 - Not Connected
- 7 - Key Signal (positive)
- 8 - Composite Sync ***
- 9 - Key Signal (negative)

Notes:

Vert Drive and Key signals are TTL level.

* TTL Level positive polarity

** 1 Volt peak-peak when terminated in 75 ohms.

*** TTL level negative polarity

Key signal is useful only if RGB overlay over composite video is desired. This requires a special monitor (See section 8 above). Such a monitor will either require a positive polarity key signal or a negative polarity key signal. Connect only the appropriate one.

9. Previewing your Mindset Graphics Before Overlaying it on Source Video:

This section will describe how the Mindset Video Production System and Mindset Professional Video Graphics System may be configured to preview the graphics generated on the Mindset before overlaying it on source video in a video tape creation application. This section assumes that the reader is familiar with the features of the Mindset Computer System, Mindset Video Production Module and the Mindset Lumena Software.

The preview function is important because in several applications involving overlaying of the Mindset Lumena generated graphics on the video tape the appearance of the Lumena menu on overlaid graphics is undesirable. The preview mode allows the user to get around this undesirable effect.

The following description is written in a format that will allow the user to set-up and operate the Mindset Computer System with the preview feature. It is recommended that the user first familiarize himself with the operations of the Mindset Computer System and Mindset Video Production Module and experiment with the basic operation described in this section before using the preview mode for production.

Refer to Figure 1. To use the preview mode you will need a composite monitor with video loop-through. Connect your system up as shown in Figure 1. If you are using Mindset Professional Video/ Graphics System (Model M1000VS), you may preview on an Analog RGB monitor. This configuration is shown in Figure 2. You may also preview by connecting a TV set to the TV/RF output of the Mindset Computer. To use this configuration, set up as shown in Figure 2, except replace the Analog RGB Monitor with a TV set connected to the TV/RF output of the Mindset Computer System. The quality of the image on the TV may be degraded due to RF modulation

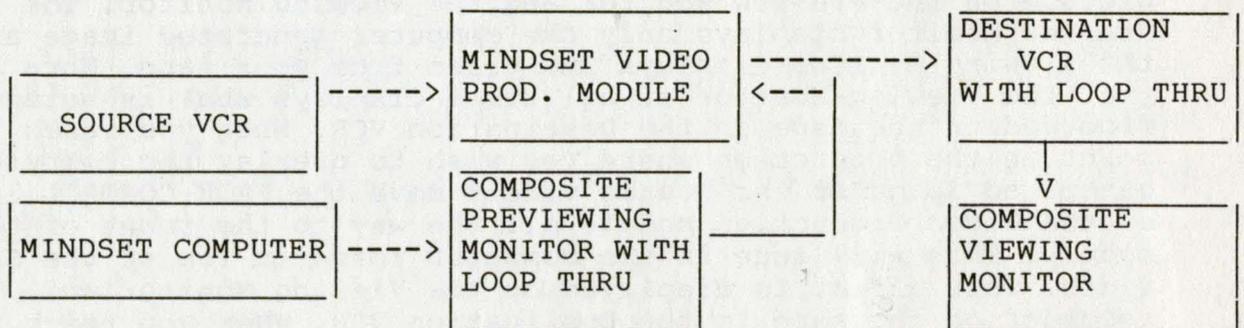


FIGURE 1. PREVIEWING MINDSET GRAPHICS USING A LOOP THROUGH COMPOSITE MONITOR

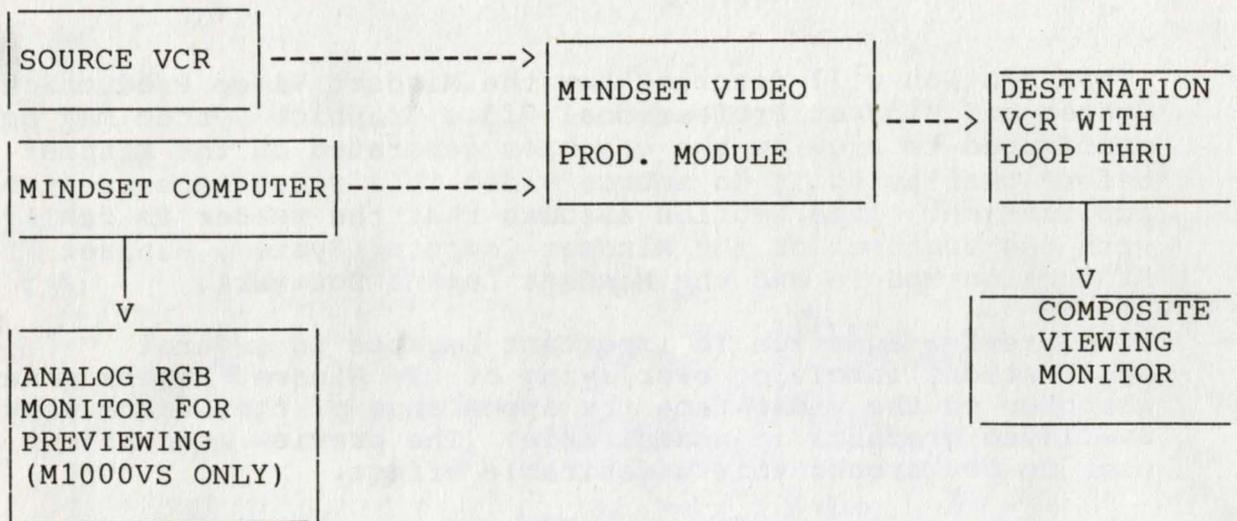


FIGURE 2. PREVIEWING MINDSET GENERATED GRAPHICS USING AN ANALOG RGB MONITOR.

After connecting your system as shown in Figure 1 or Figure 2, check all connections. Power the system and bring up Lumena on the Mindset Computer and create the images that you wish to overlay on your source tape. (You may have previously created these images, in which case just insert the diskette containing the images in drive B of the Mindset Computer).

Load the first image to be overlaid on the screen and put Lumena in Genlock mode. Move the FADE CONTROL LEVER on the Video Production Module to the REAR most position. Insert the video tape to be overlaid in the Source VCR and play it. Observe the picture on the Preview Monitor and the Viewing Monitor. The Preview Monitor displays only the computer generated image and the Viewing Monitor displays the video from your tape. Note also that the Viewing Monitor at all times displays what is being recorded on the tape in the Destination VCR. When you reach the point in the production where you wish to overlay the computer generated image on the Source video, move the FADE CONTROL lever on the Video Production Module all the way to the front of the module. This will fade in the computer image on top of the Source video. This effect is displayed on the Viewing Monitor and recorded on the tape in the Destination VCR. When you reach the point in the production where you wish to fade out the computer image, move the FADE CONTROL LEVER on the Video Production Module

to the rear. Note that the fade in and the fade out of the image may be done at varying speeds. Also notice that the image fades out from the Viewing Monitor but is still displayed on the Previewing Monitor. Thus using the Previewing Monitor as your interactive display, you may now call up the Lumena menu and load the next image on the screen, set it up and fade it in and out at appropriate points in the production. Note that as long as you have the FADE CONTROL LEVER in the rear most position, you will not record the computer image on the tape in the Destination VCR. Conversely, the computer image is overlaid and recorded on the Destination VCR only when the FADE CONTROL LEVER on the Video Production Module is in OTHER THAN the rear most position. In this way you can perform all the Lumena functions (including those that bring up the undesirable menu on the screen) using the Previewing Monitor but record only the desired images on the Destination VCR.

If you have your images created ahead of time and saved on a disk and your production allows adequate time intervals between display of successive computer images to permit disk retrievals of these images, you may not have to stop (or pause) the Destination or Source VCRs in course of the production. If the time intervals between desired display of successive images is short, use of the Mindset Video Producer software package is recommended.

For animation effects created in the Lumena EVENT menu, it is a good idea to start the event with a PAUSE. Pauses of 8 different durations may be created from the PAUSE command in the CHAIN menu and may be subsequently inserted in the EVENT list. The insertion of pause at the beginning of the event list will allow you time to move the FADE CONTROL LEVER forward before the useful part of the event begins thus allowing the complete event to be overlaid properly. For the same reason, it is a good idea to have a PAUSE as the last element of the event list to allow time to move the FADE CONTROL LEVER back to the rear before the Lumena menu pops-up.

10. TAPING MINDSET GENERATED GRAPHICS

All MINDSET Computer Systems support composite output. The signal from this output can be directly taped on a NTSC compatible video tape recorder. The following is recommended for taping composite output from the MINDSET:

1. For the MINDSET composite output to be RS 170 compatible, the MINDSET systems should be placed in interlaced mode. If "Lumena" is being used, interlaced mode may be set by selecting "Genlock" in the "Video" menu (under "Animation"). Note: Lumena Video must be installed to access this feature. If Designer Video is being used, interlaced mode may be set by hitting the ALT-G keys. If Video Producer is being used, interlaced mode may be set by hitting the G key.

2. Genlockable MINDSET systems when configured with MINDSET Video Production Module allow over-lay (keying) of computer graphics on background video before taping (in post-production applications). See specifications of MINDSET Professional Vide/Graphics System (M1000VS) and MINDSET Video Production System (M1000V) for details of this operation.