

Matrox Imaging Application Note: **MATROX PULSAR**

Dual-screen and Multiple-head Modes - Driving Two or More Monitors with the Matrox Pulsar

INTRODUCTION

This document describes how to use the Matrox Pulsar with multiple monitors. This allow a user to display an overlay over live video on one monitor while displaying the desktop or man machine interface (MMI) on another monitor (dual-screen mode) and how to create a virtual desktop, that will be displayed over multiple monitors (multiple-head mode).

Topics covered below are:

- ✓ using the non-destructive overlay;
- ✓ dual-screen mode and code example;
- ✓ choosing the display mode and resolution;
- ✓ multiple-head mode;
- ✓ display conditions, and configuration steps.

USING THE NON-DESTRUCTIVE OVERLAY

Support for non-destructive overlay is possible with the Matrox Pulsar¹. The display section, available on the Matrox Pulsar, is equipped with two frame buffers. One is a 2 MB image frame buffer and the other is a separate 2 MB overlay frame buffer. The overlay frame buffer allows non-destructive overlay (see figure 1) of desktop and/or separate text and graphics onto the contents of the image buffer.

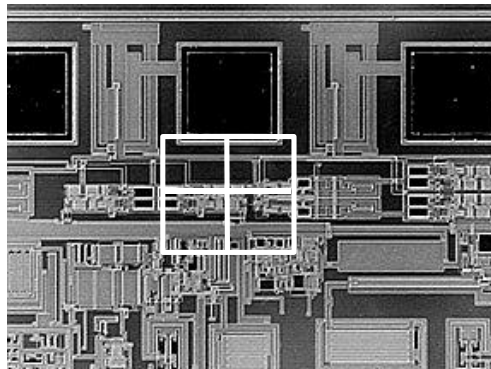


Figure 1: Non-destructive overlay over an image in the image buffer

The overlay frame buffer allows different system configurations like single-screen or dual-screen mode. A windowed display with overlay, which provides viewing of live video with overlay along with MMI display all on a single monitor is only possible in single-screen mode. In some applications, the view presented of the image and overlay will not be large enough for a complete view of the subject. A user may prefer to have the image and overlay presented completely on a single monitor, while desktop or MMI information is displayed on a separate monitor. A dual-screen mode will provide a display of live video and overlay on one monitor, however the display will be non-windowed.

¹ except for the LC version, since an integrated display section is unavailable on this version of the board

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DUAL-SCREEN MODE

The dual-screen mode is a configuration where the Matrox Pulsar can capture and display live video with overlay on one monitor while an additional VGA (or additional Matrox Pulsar) displays the MMI on a second monitor (see figure 2). The Matrox Pulsar's display resolution is controlled using MIL or MIL-Lite. In dual-screen mode the buffer will not be displayed from within a window on the display, as in the case with single-screen operation under the DOS environment.

In order to use the overlay frame buffer in dual-screen mode, allocation of a second display object **MdispAlloc()** with the **M_OVR** attribute given as the **InitFlag** is necessary. Any buffer selected into this display will appear in the overlay frame buffer, on top of any other buffer selected in the image frame buffer. Note that the current keying color **MdispOverlayKey()** should be used in the buffer selected in the overlay display object to determine which portion of the image should be made visible (for example, if the buffer selected in the overlay display object is filled with the keying color, then the entire underlay buffer will be visible, whereas if the buffer selected in the overlay display object is filled with a different value from the keying color, then only the overlay buffer will be visible). All modifications applied to the buffer selected on the overlay display object will automatically update the display accordingly.

Code Example:

```
/* Allocate the overlay display object */
MdispAlloc(MilSystem, M_DEV0, "M_DEFAULT", M_OVR, &MilOvrDisplay);

/* Allocate the overlay image buffer */
MbufAlloc2d(MilSystem,800,600,8,M_IMAGE+M_DISP+M_PROC+M_OVR,MilOvrImage);

/* Display the image buffer. */
MdispSelect(MilOvrDisplay, MilOvrImage);

/* Print a string in the image buffer. */
MgraText(M_DEFAULT, MilOvrImage, 0, 0, " - MIL Overlay Text - ");
```

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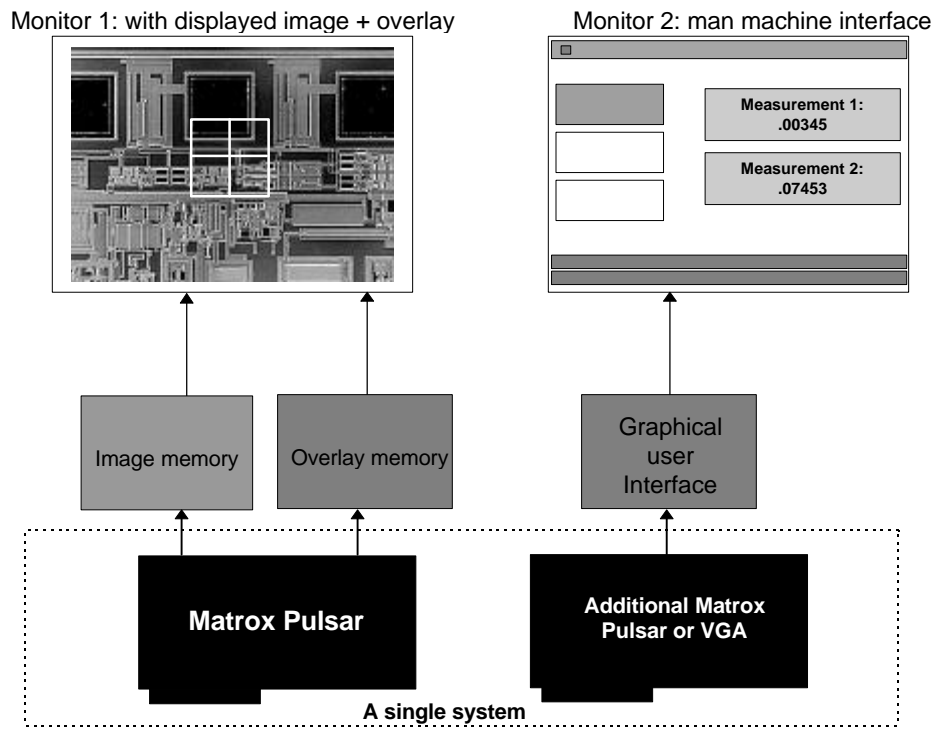


Figure 2: Overlay on a live-grab using dual-screen mode

Note that the MIL software always assumes that the output display LUT (effectively being 256 x 24-bit LUT) integrated in the RAMDAC is associated with the overlay only, not with the image. This can allow the user to assign a pseudo-color to the text or graphics used in the overlay, for example, having a blue or red cross-hairs rather than a white or black cross-hair overlay a grayscale image. In the event that live video display in pseudo-color is required, the incoming video must be captured in the overlay buffer.

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DISPLAY RESOLUTIONS

In dual-screen mode, the user can set the display resolution of the PULSAR screen (image and overlay) by setting the **DispFormat** parameter (found in the **MdispAlloc()** function) to one of the display format files listed in table below. The files are available for display formats with both 60 and 72 Hz refresh rates. To control the resolution, specify the required Video Configuration File (VCF) at display allocation time-**MdispAlloc()**. VCF files can be found in the \PULSDAR\VCF directory.

| Filename | Display Format |
|--------------|----------------------|
| VM101_60.VCF | 640 x 480 at 60 Hz |
| VM101_72.VCF | 640 x 480 at 72 Hz |
| VM103_60.VCF | 800 x 600 at 60 Hz |
| VM103_72.VCF | 800 x 600 at 72 Hz |
| VM105_60.VCF | 1024 x 768 at 60 Hz |
| VM105_72.VCF | 1024 x 768 at 72 Hz |
| CM001_60.VCF | 1152 x 882 at 60 Hz |
| CM001_72.VCF | 1152 x 882 at 72 Hz |
| VM107_60.VCF | 1280 x 1024 at 60 Hz |
| VM107_72.VCF | 1280 x 1024 at 72 Hz |
| VM11C_60.VCF | 1600 x 1200 at 60 Hz |

Table 1: Display format filenames

The user can also use the predefined display resolutions by setting the **DispFormat** in the function **MdispAlloc()** to the required display resolution for the PULSAR screen (image and overlay). Possible settings are:

| Display Format |
|-------------------|
| 320 x 200 x 8PP |
| 640 x 400 x 8PP |
| 640 x 480 x 8PP |
| 800 x 600 x 8PP |
| 1024 x 768 x 8PP |
| 1280 x 1024 x 8PP |
| 1600 x 1200 x 8PP |

Table 2: Predefined display resolution settings

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CHOOSING THE DISPLAY MODE

If two Matrox Pulsars or a Pulsar and a MGA Millennium are in a single system, and one is to be used as a main display controller (the additional Pulsar or the MGA Millennium) and the other as a separate display, the DIP switch 2 of one board (the one with the displayed image and overlay) should be set to the ON position while the other board's (the one with MMI) DIP switch 2 should be set to the OFF position (see figure 3).

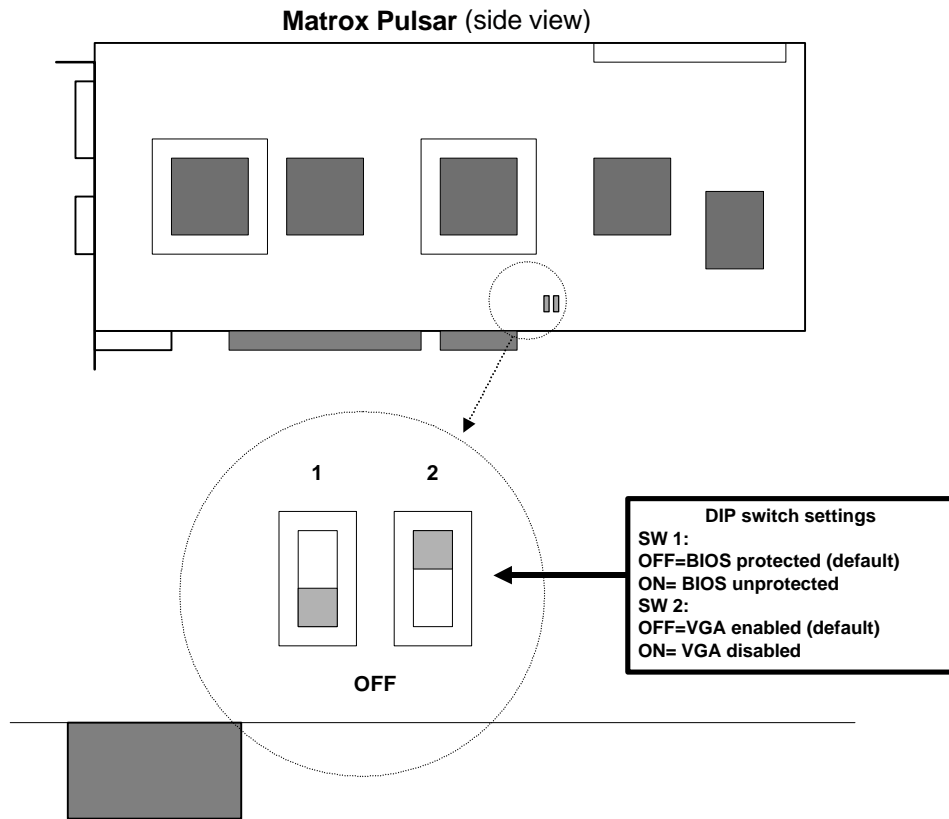


Figure 3: DIP switch settings

MULTIPLE-HEAD MODE

When running Windows NT, a user can also run a Multiple-head display. Multiple-head display is a configuration that uses multiple display boards, with on-board MGA 2064W graphics chip, to create one large desktop across multiple screens. The multi-board configuration can consist of multiple Matrox Pulsars or multiple Pulsars and Matrox MGA Millennium boards.

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DISPLAY CONDITIONS

Multiple-head mode is used to create one large Windows desktop across multiple screens, however depending on whether a user has installed multiple Matrox Pulsars, or multiple Matrox Pulsars and Matrox MGA Millenniums, certain conditions will arise:

- ✓ If two Matrox Pulsars are used in a single system, a live grab with VGA overlay can be moved from one screen to the other. However, when the window displaying the grab intersects two screens, the grab is pseudo-live.
- ✓ If a Matrox Pulsar and a MGA Millennium are used in a single system, a live grab without overlay can be moved from one screen to the other. However, a live grab with overlay will only be possible on the Pulsar screen. On the MGA screen it will switch to pseudo-live. In both cases, when the window displaying the grab intersects both screens, the grab is pseudo-live.

CONFIGURATION STEPS

The following steps must be performed in order to obtain a Multiple-head display:

1. Check the version of your MGA 2064W Windows NT display driver. It should be version 1.10 or later. If this not the case, then install the latest MGA Windows NT display driver.
2. From the **Control Panel**, run the **Display** applet.
3. Adjust the scroll bar for **Desktop_Area**.
4. Chose one of these multiple-size modes. The desktop size will now be larger (twice the size for two boards, three times for three boards, etc.) than what is achieved on only one monitor. By appropriate selection, a user can set-up a different display arrangement as exemplified below.

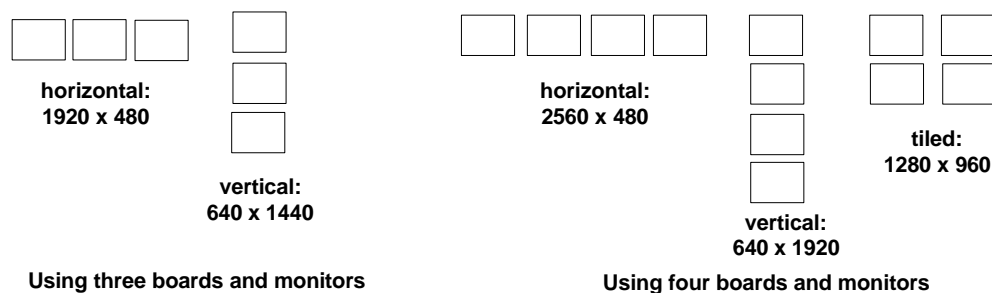


Figure 4: Display arrangements and example resolutions

MONITOR COMPATIBILITY

In Multiple-head display, the *mga.inf* monitor settings affects all monitors. The monitor that you have selected should be compatible with the least-capable monitor in the system.

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