

ZX and TurboZX Graphics Accelerator

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This chapter describes how to change the ZX and TurboZX Graphics Accelerator screen resolution to work properly with different monitors. Since the following discussions are identical for the ZX and the TurboZX, the product name in this chapter is shortened to ZX to simplify the discussion.

You can change the ZX screen resolution through the use of the `leoconfig` program. See the `leoconfig(8)` man page for more information on this program than is described here.

There are two elements to `leoconfig`: the `leoconfig` program and the `leoconfig` script. The `leoconfig` program initializes the ZX Graphics Accelerator and downloads microcode from the host CPU. The `leoconfig` program is normally run as a part of the `/etc/init.d/leoconfig` script to download the ZX microcode file and to complete ZX installation.

The `leoconfig` program is also useful to change the default screen configuration to some other resolution, including stereo. The default screen resolution for the ZX Graphics Accelerator is defined by the monitor ID code, read from the monitor. If the monitor returns an unknown ID code, the ZX Graphics Accelerator defaults to a screen resolution of 1152×900 at 66 Hz. While this resolution works with all of the monitors available for the workstations supplied by Sun, some monitors are able to take advantage of other resolutions available on the ZX Graphics Accelerator.

There are two ways to implement the change in screen resolution:

- Temporarily, by running the `leoconfig` program

- So that it will always boot up in the new resolution, by modifying the `leoconfig` script file

ZX Supported Monitors

Table 3-1 lists the monitors supported by the ZX Graphics Accelerator.

Table 3-1 Monitors Supported by ZX

Model	Sun Part Number	Type and Size	Monitor ID Sense Code	Supported Resolution and Refresh Rate
X248A	365-1068-01	Color 21"	2	1280 × 1024 at 76 Hz
GDM-20D10	365-1167-01	Color 20"	4	1280 × 1024 at 67 Hz 1280 × 1024 at 76 Hz 1152 × 900 at 76 Hz 1152 × 900 at 66 Hz 960 × 680 at 112 Hz (stereo)
GDM-1955A15	365-1081-01	Color 19"	3	1152 × 900 at 66 Hz
GDM-1962	365-1095-01	Color 19"	4	1280 × 1024 at 67 Hz 1152 × 900 at 76 Hz 1152 × 900 at 66 Hz
GDM-1962B	365-1160-01	Color 19"	4	1280 × 1024 at 67 Hz 1152 × 900 at 76 Hz 1152 × 900 at 66 Hz
GDM-1604A15	365-1079-01	Color 16"	3	1152 × 900 at 66 Hz
GDM-1662B	365-1159-01	Color 16"	6	1152 × 900 at 76 Hz 1152 × 900 at 66 Hz 1280 × 1024 at 67 Hz
CPD-1790	365-1151-01	Color 16"	3	1152 × 900 at 66 Hz 1024 × 768 at 76 Hz
X449A	365-1286-01	Color 15"	0	1024 × 768 at 76 Hz
GDM-20S5	365-1168-01	Grayscale 20"	2 or 4*	1280 × 1024 at 76 Hz or 1280 × 1024 at 67 Hz 1152 × 900 at 76 Hz
17SMM4 A	365-1100-01	Grayscale 17"	6	1152 × 900 at 76 Hz
Non-Sun	--	Unknown	7	1152 × 900 at 66 Hz

Table 3-1 Monitors Supported by ZX (Continued)

Model	Sun Part Number	Type and Size	Monitor ID Sense Code	Supported Resolution and Refresh Rate
Resolutions in bold type are the default resolution at power-on initialization.				
* Monitor ID sense code is user-selectable by switch on rear.				
Monitors not supported:				
M20P110	365-1099-01	Grayscale 19"	4	N/A

Default Screen Resolutions

Table 3-2 lists the default screen resolutions by monitor ID sense code.

Table 3-2 ZX Frame Buffer Monitor Sense Codes

Code	Screen Resolution
7	1152 × 900 at 66 Hz
6	1152 × 900 at 76 Hz
5	1152 × 900 at 66 Hz
4	1280 × 1024 at 67 Hz
3	1152 × 900 at 66 Hz
2	1280 × 1024 at 76 Hz
1	1152 × 900 at 66 Hz
0	1024 × 768 at 76 Hz

Supported Screen Resolutions

Table 3-3 lists the screen resolutions the ZX Graphics Accelerator supports.

Table 3-3 ZX Supported Screen Resolutions

Screen Resolution	Vertical Refresh Rate	Description
1280 × 1024	67 Hz	Non-interlaced
1280 × 1024	76 Hz	Non-interlaced
1152 × 900	76 Hz	Non-interlaced
1152 × 900	66 Hz	Non-interlaced
1024 × 768	76 Hz	Non-interlaced
1024 × 768	60 Hz	Non-interlaced
960 × 680	108 Hz	Stereo, non-interlaced, 54 Hz field rate per eye
960 × 680	112 Hz	Stereo, non-interlaced, 56 Hz field rate per eye
770 × 575	50 Hz	Interlaced – PAL
640 × 480	59.94 Hz	Interlaced – NTSC

Changing the Screen Resolution Temporarily

To change the screen resolution temporarily:

1. Exit from the window system.

If you are in a windowing environment, exit from it and wait for the system prompt to appear.

2. As superuser (root), type the following command:

```
example# /etc/opt/SUNWleo/bin/leoconfig -M monitor_type
```

where *monitor_type* is one of the values listed in Table 3-4. See also Table 3-3 on page 16.

Table 3-4 Monitor Types

monitor_type	Screen Resolution
1280_76	1280 × 1024 at 76 Hz, non-interlaced
1280_67	1280 × 1024 at 67 Hz, non-interlaced
1152_76	1152 × 900 at 76 Hz, non-interlaced
1152_66	1152 × 900 at 66 Hz, non-interlaced
1024_76	1024 × 768 at 76 Hz, non-interlaced
1024_60	1024 × 768 at 60 Hz, non-interlaced
stereo_108	960 × 680 at 108 Hz non-interlaced stereo, 54 Hz field rate per eye
stereo_114	960 × 680 at 112 Hz, non-interlaced stereo, 56 Hz field rate per eye
pal	770 × 575 at 50 Hz, interlaced (PAL)
ntsc	640 × 480 at 60 Hz, interlaced (NTSC)
default	The default resolution, defined by the monitor sense pins

For example, to change screen resolution to stereo at a 108 Hz vertical refresh rate, enter:

```
example# /etc/opt/SUNWleo/bin/leoconfig -M stereo_108
```

3. Restart the window system.

Modifying the `leoconfig` Initialization File

Before performing the following steps, read “Restrictions to Changing the Default Screen Resolution” on page 20. To change the `leoconfig` script so that the system boots up in the new screen resolution, edit the `leoconfig` script in the `/etc/init.d/leoconfig` file, as follows:

1. As superuser (root), open the leoconfig file with the editor.

For example, to use the vi editor:

```
example# vi /etc/init.d/leoconfig
```

2. Search for the “MONTYPE=” string in the file.

This string is usually one of the first lines in the file. You should see the lines shown below.

There is one MONTYPE= line for each available screen configuration. By default, all but one of the lines are commented out (with the # character).

```
MONTYPE="-m default"  
# MONTYPE="-m 1280_76"  
# MONTYPE="-m 1280_67"  
# MONTYPE="-m 1152_76"  
# MONTYPE="-m 1152_66"  
# MONTYPE="-m 1024_76"  
# MONTYPE="-m 1024_60"  
# MONTYPE="-m stereo_108"  
# MONTYPE="-m stereo_114"  
# MONTYPE="-m pal"  
# MONTYPE="-m ntsc"
```

3. Comment out the line that specifies the current screen configuration.

In the above example, you would comment out the “-m default” line, as follows:

```
# MONTYPE="-m default"
```

4. Delete the comment out character (#) from the line that supports your monitor.

The supported monitor types are listed in Table 3-3 on page 16. See also Table 3-1 on page 14.

For example, to change the screen resolution from the default to the higher resolution of 1280 × 1024 at 76 Hz, delete the comment (the # character) from the `MONTYPE="-m 1280_76"` line. The file should now look like this:

```
# MONTYPE="-m default"  
MONTYPE="-m 1280_76"  
# MONTYPE="-m 1280_67"  
# MONTYPE="-m 1152_76"  
# MONTYPE="-m 1152_66"  
# MONTYPE="-m 1024_76"  
# MONTYPE="-m 1024_60"  
# MONTYPE="-m stereo_108"  
# MONTYPE="-m stereo_114"  
# MONTYPE="-m pal"  
# MONTYPE="-m ntsc"
```

5. Save the file and exit the editor.

In vi, press Esc and type:

```
:wq
```

6. Save all your work.

Refer to Chapter 6, “Working with Documents,” in the *Sun System User’s Guide* for more information about ending a work session and saving your files. If you do not save your work, you can lose it when you reboot the system.

7. Exit from the window system.

If you are in a windowing environment, exit from it and wait for the system prompt to appear.

8. As superuser (root) again, execute the `leoconfig` program:

```
example# /etc/init.d/leoconfig
```

9. Exit superuser and restart the window system.

The system should now be in the new screen resolution.

ZX Graphics Accelerator Restrictions

The ZX Graphics Accelerator has some limitations on its ability to support alternate screen resolutions. If you are using a Sun monitor and not changing the default screen resolution by way of the `leoconfig` program, you can disregard the following restrictions.

Using a Non-Sun Monitor as Console

If you use a non-Sun monitor as the workstation console, the monitor you use must meet both of the following requirements:

1. The monitor must support a screen resolution of 1152×900 at 66 Hz (the default screen resolution for a non-Sun monitor, as shown in Table 3-1 on page 14).
2. The monitor must not drive the monitor ID sense lines, or must conform to the sense codes and resolutions listed in Table 3-1 on page 14.

Restrictions to Changing the Default Screen Resolution

There are restrictions to changing the default screen resolution with the `leoconfig` program.

When you modify the `leoconfig` initialization program to change from the default screen resolution to a resolution of 1024×900 or less, excluding stereo, you will be unable to see the bottom portion of the display area during boot up before the window system starts. This means that you may not be able to see all of the start-up messages or to see what you are typing when you log in. Specifically, to avoid this problem you must not set the monitor type to any one of the following:

```
1024_76
1024_60
pal
ntsc
```

For those applications that require the lower resolutions, such as `pal` and `ntsc`, use a two-headed system. With a two-headed system where the ZX monitor is not used as the boot console, you may operate the ZX monitor in any of the supported screen resolutions. For more information, see Chapter 8, “Multiple Monitors on a System.”

