



RasterFlex-32 and RasterFlex-HR

Frequently Asked Questions - last official update was mid-2000

Placed at the Sun Shack by [Craig Dewick](#) for the benefit of all

Introduction

This FAQ document covers the RasterFlex-32 and RasterFlex-HR boards manufactured, supplied and shipped by AP&D of San Diego, California. Unless explicitly stated, it does NOT cover any other products.

The following links will take you to what are currently the most frequently asked questions:

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Your first questions

faq001: What are the main features of the RasterFlex board?

- 32 bit frame buffers
 - 24 bit main frame buffer PLUS overlay and control planes
 - Display true color (16.7 million colors) AND an overlay if you want
 - Allows other applications which use Pseudo color to run in other windows
- Two color Lookup Tables
 - reduces color table flashing if you run multiple windows which require a large number of Pseudo colors
- Utilise standard X Windows
 - X Windows applications are "plug and play" (although they do need to support True or Direct color to make full use of the 24 bit frame buffer)
- Support for Solaris 2.6, 2.5.1, 2.5, 2.4 and 2.3 (for 2.7, see [faq052](#))
 - Also for Solaris 1.1.2 (=SunOS 4.1.4)
- Accelerated Graphics
 - On-board features relieve the cpu of the tedium of many pixel based features
- Standard S-bus slots
 - Can be used on almost ANY Sun Sparc system (not just particular models). Each board takes just one slot.
- Multiple screen support
 - If you want several screens, that's fine (Competitive offerings can usually only be one per workstation)
- Multiple resolution support
 - Resolution up to 1280 x 1024 supported on RasterFlex-HR

faq002: How does the RasterFlex board connect into my workstation?

Most Sun workstations have "SBus" slots for the installation of additional boards. Each new RasterFlex Frame Buffer takes just a single slot.

Newer Sun "Ultra" workstations may have SBus slots, PCI slots, or both. The current version of RasterFlex is ONLY SBus.

(The original RasterFlex-HR boards made prior to mid-1994 occupied TWO adjacent SBus slots.)

faq003: Do I need to install any special software to use RasterFlex?

RasterFlex cards are integrated at the X Windows driver level, rather than being compatible at a hardware level with any Sun frame buffers. With each card, we supply a CD including DDX drivers, as well as ALTERNATIVE servers for "pure X11" and also X11/NeWS.

On machines running Solaris, unless you have special requirements it's simplest to use the DDX drivers which integrate best with Sun's own Xsun server, and OpenWindows and CDE environments.

APPLICATIONS WILL RUN UNMODIFIED. This is because all of the servers listed above use the X Windows standard, with information passed in X protocol between the Application and the X Server ... the application does not care which screen server it's using.

Very rarely indeed, applications are written to address the hardware of the display directly or to use a specially extended X Server. This might apply for high performance 3D graphic simulation applications, for example ... where in any case you would be using a special Frame Buffer to get the exceptional performance.

faq004: What applications does RasterFlex support?

RasterFlex cards support any applications - commercial or noncommercial - which use the X Windows system.

Windowing applications on Sun (and Sun clone) workstations use the X Windows System ... if your workstation is running X Windows, or any flavour or superset such as Open Windows, Common Desktop Environment, Motif, IXI Panorama, etc, then the RasterFlex board will be supported. Only if applications stray from the X standard (that's rare) will they not run correctly.

faq005: What models are there, and what are the differences?

There are two current products available - the RasterFlex 32, which supports screen resolutions up to 1152 x 900, and the RasterFlex HR which additionally supports the 1280 x 1024 resolution.

faq006: Which Sun models support the RasterFlex Board?

The RasterFlex board may be installed in any Sun or Sun Compatible workstation with at least one available SBus slot. Almost every Sun system includes such a slot, but clearly you must check that you have a slot free for each RasterFlex board you intend to install.

Some Sun Ultra models have PCI and SBus slots, while some have only PCI slots. The RasterFlex will work in Ultra models with SBus slots. A version of the RasterFlex is under development to work in the new Sun Ultra series which has PCI slots only.

We have received recent (1998) reports from customers who are successfully running RasterFlexes on Sun Ultra 1, Ultra 2, and Enterprise 3000 and 4000 models.

Amongst the few older models which do NOT have s-bus slots (and so cannot be used with the RasterFlex) are the following models (all no longer being manufactured): ELC, SLC, 4/110, 4/260, 4/3xx, 4/4xx and 4/6xx.

(Note: Exceptionally, some 200MHz Ultra 2s with motherboard levels lower than Rev. level 13 give a problem. If you come across this, ask Sun to upgrade your machine to Rev level 13. This problem does NOT seem to apply to the 167MHz nor the 300MHz models.)

faq007: Does it run on Sun machines with multiple processors?

Yes, it does ... but you MUST use RasterFlex drivers release 4.6 or later.

Upgrades to releases 4.6 and 4.7 can be downloaded from the internet (at no charge, of course!). See faq023 "Where do I get release xxxx of the RasterFlex Drivers?"

faq008: What releases of Solaris are supported?

The short answer:

...is SunOS 4.1.4 (a.k.a. Solaris 1.1.2), and Solaris 2.3, 2.4, 2.5, 2.5.1 and 2.6.

If you need to run your RasterFlex boards on older versions of SunOS, we might be able to help. Call our technical support line for assistance.

The longer answer:

In general, the last software release (v. 5.0) contains software that will run on most SunOS versions from 4.1.4 to "5.6" (Solaris 2.6).

If you are using Solaris 1 / SunOS 4, the latest release is RasterFlex release 4.5 of May 1996. This release is also good for Solaris 2 systems up to Solaris 2.4

Although release 4.5 does support Solaris 2.5, we suggest that you run release 4.6 instead, as this release included patches for workstations introduced after Solaris 2.5 was released. You MUST use at least release 4.6 if you are running Solaris 2.5.1

Users of Solaris 2.6 MUST use release 4.7.

For Solaris {2.}7, see [faq052](#).

See [faq023](#) "Where do I get release xxxx of the RasterFlex Drivers?" for details of where to get the drivers.

RasterFLEX 3.3 supports:	
	SunOS 4.1.x xnews-rfx, Xrfx
	Solaris 2.1, 2.2 xnews-rfx, Xrfx
	Solaris 2.3 Xrfx only (and runs much slower than RasterFLEX 4.0 version)
RasterFLEX 4.0 (Mar 1994) supports:	
	SunOS 4.1.x xnews-rfx, Xrfx
	Solaris 2.1, 2.2 xnews-rfx, Xrfx
	Solaris 2.3 Xrfx, Xsun
RasterFLEX 4.2 supports:	
	SunOS 4.1.3.x xnews-rfx, Xrfx
	Solaris 2.3, Xrfx, Xsun

(RasterFLEX 4.2 should also function under SunOS 4.1.1, Solaris 2.1 and 2.2 BUT has not been fully tested.	
RasterFLEX 4.3 (Jan 1995) supports:	
	SunOS 4.1.3, 4.1.4 xnews-rfx Xrfx
	Solaris 2.3, 2.4 Xrfx, Xsun
RasterFLEX 4.4 (Mar 1995) DOES NOT SUPPORT RASTERFLEX 32 or HR.	
RasterFLEX 4.5 (May 1996) supports:	
	SunOS 4.1.3, 4.1.4 xnews-rfx Xrfx
	Solaris 2.3, 2.4, 2.5, Xrfx, Xsun
RasterFLEX 4.6 (Partial Release - December 96) supports:	Solaris 2.3, 2.4, 2.5, 2.5.1 Xsun
RasterFLEX 4.7 (Partial Release - October 97) supports:	Solaris 2.6 XSun
RasterFLEX 5.0 (Full Release of July 1998 supports all of the above versions.	

faq009: What screen resolutions are supported?

The RasterFlex 32 supports:

1152 x 900, 66 Hz
 1152 x 900, 76 Hz
 1024 x 768, 76 Hz (SVGA)

The RasterFlex HR supports:

1280 x 1024, 60 Hz
 1280 x 1024, 67 Hz
 1280 x 1024, 76 Hz
 1152 x 900, 66 Hz
 1152 x 900, 76 Hz
 1024 x 768, 76 Hz (SVGA)

Further details (pixel clock frequency, blanking, porches, etc) are documented in Appendix B of the User manual.

faq010: What are the physical characteristics of the RasterFlex Board?

Operational	
Dimensions	Single Slot S Bus 3.3" x 5.776"
Power	1.9A at 5V (RasterFlex 32)
	2.0A at 5V (RasterFlex HR)
Operating temperature	0 to 40 deg C
Relative Humidity	5 - 80% non condensing
MTBF	65000 hours (RasterFlex HR)
Non Operational	
Storage temp	-20 to 85 deg C
Relative Humidity	0 to 90% non condensing
Shipping size	360 x 240 x 70 mm box
Shipping Weight	600 grams (20 oz) approx (inc. manual and CD)
Warranty	3 years parts and labour
Qualifications	FCC Part 15, Subpart B, Class A

faq011: What is the board's performance?

The performance is dependent on many factors but the specifications (on a Sparc Classic) are quoted as:

	8 bit	24 bit
Rectangle fill	165 Megapixels	58 Megapixels/sec
BitBlt	14.3 Megapixels	4.8 Megapixels/sec
Frame Buffer Writes	18.6 Megapixels	4.6 Megapixels/sec
Text (6 x 13 pixel font)	104 K Chars	85.3 K Chars/sec

faq012: What about support for VX Works and Trusted Solaris?

I'm afraid that there is not. Until now VX Works (and other operating systems

away from Standard Solaris) have only been requested on a very few occasions. Clearly such systems COULD be supported if there were a good commercial sense in doing so but until now it has not been possible to justify.

faq013: What about support for OpenGL?

OpenGL is the name of a standard rather than a particular product. Rather than being a 2 dimensional standard like X Windows, it includes a many higher level 3D primitives and was really written to support specialist Graphics Systems such as Silicon Graphics. And OpenGL is a standard at the C library level rather than the device communication level - which means that for Frame Buffer manufacturers a different solution might be required for EACH implementation of Open GL - some may be supported and some not!

Sun's version 1.0 of Open GL does NOT use pure X windows and ONLY operates on their Creator 3D Frame Buffer.

Sun's OpenGL 1.1 is stated to work only with their graphic frame buffers. They have a list of those supported on their web site. It is based on X Windows system, but it appears that ADDITIONS have been made beyond the X Windows standard, so that the it ONLY works on a limited range of boards they have chosen to support. On Rasterflex, firing up an OpenGL application (in this case a test program) gives:

```
unix% /usr/openwin/demo/GL/ogl_install_check

X Error of failed request:
  BadAlloc (insufficient resources for operation)
  Major opcode of failed request:  141 (GLX)
  Minor opcode of failed request:  3 (X_GLXCreateContext)
  Serial number of failed request:  19
  Current serial number in output stream:  23
```

[Template Graphics Software](#) have an OpenGL product, referenced from Sunsite, which they state to be useable through a standard X Windows interface. In that case, it should work just like any other X Windows application.

Some things to remember if you choose to use such an OpenGL package:

1. Unless you are using it to link your own applications, you will need to ensure that the copy supplied by your software vendor DOES use this particular library

3. As it's a 3D library, the software emulation needed may mean that it runs slowly on a board such as the RasterFlex which is designed for true color and image handling rather than 3D graphics.

To my knowledge, there is no technical reason why drivers could not be written to support the RasterFlex 32 and HR under Sun OpenGL 1.1, but it would require considerable resource and a strong commercial case would need to be made.

faq014: What about support for Sun Clones?

RasterFlex boards work fine in Sun clones.

With laptop or portable machines (e.g., RDI, Tadpole, Rugged Portable), you DO need to be careful to ensure they have an Sbus slot, and if the screen is hardwired into the existing frame buffer you might only be able to use the RasterFlex board as a second screen (i.e. it would NOT be possible to use the RasterFlex board to drive the built in flat screen. You would also need to check the internal screen resolution in such a case - RasterFlex does NOT support 640x480, nor 600x800).

faq015: Where can I buy RasterFlex boards?

You can contact us at AP&D's world headquarters:

AP&D
ATTN: RasterFlex Sales
10052 Mesa Ridge Court
San Diego, California 92121
USA

Telephone: 858/527-6100 or 800/621-8474
Fax: 858/597-7094

faq016: Will RasterFlex boards work in Sbus expansion boxes?

Rasterflex cards are "Master" cards and will not work in slave-only expansion boxes such as the Aurora ... but they WILL work in full expansion boxes. Customers have not reported any problems with Sun's expansion box (which I think is made by Artecon) or Artecon's expansion boxes.

The board takes up 16Mb of address space. Note also that if the full address

space is not PREsented to the board, it won't work. Some expansion boxes map the memory differently which could also cause the problem.

Note that the rasterFlex ASIC does act as a bus master, but does not perform DVMA cycles.

faq017: Can I use a PC monitor onto a RasterFlex board?

1. The monitor specs are in Appendix (B) of the RasterFlex manual, and many monitors should work. However - some of the resolutions are NOT seen on PCs (e.g. 1152 x 900) and if that is the resolution you use, you will need to choose especially carefully.
2. Sun monitors signal back to the Sun (or Rasterflex) frame buffers "sense" information which allows the correct video resolution to be selected automatically by the frame buffer. A PC monitor does NOT do this. You will need to change jumpers on the board in order to force the board to work at an appropriate resolution.
3. Sun monitors usually have a 13W3 connect on them, whereas PC monitors connect via a 15 pin, 3 line DIN type connector. You may need an adaptor.

faq018: Can I drive several monitors with one card?

One RasterFlex board drives one Monitor. In dual screen configurations, you might use two RasterFlex boards - OR you might wish to use another frame buffer - such as one that was already in the workstation when you bought it. Clearly, if you choose to do the latter you will only get the "regular" facilities on the monitor attached to the original frame buffer.

RasterFlex boards use the X Windows System and are inherently 2D in their operation. 3D capabilities can be provided by third party software, and that may include stereo vision packages. Do note that even with one stereo pair of screens, you would still need two Frame Buffer Boards.

faq019: Can I use the board for grey scale work?

The RasterFlex HR is a color card, capable of displaying up to 16.7 million different colors - each of the red, green and blue electrons guns has 256 setting levels (0 to 255). In order to achieve a grey, you would simply specify the same setting for each of red, green and blue - so it can display a maximum of 256 grey scales.

Now - some people may have an image that is 12 bit grey scale (i.e. monochrome, with 4096 levels), and may find all that detail useful within a specialist piece of analysis software, the human eye cannot normally tell the difference between a grey scale image that uses 8 bits (256 levels) and one that uses more. That's actually one of the reasons manufacturers such as ourselves do not produce "deeper" frame buffers.

[Side note - on a screen which is deliberately shaded from black at one corner to mid-grey at the diagonally opposite corner some people can make out lines as the level changes by "1" - but this really has to be 'set up' and is not a typical case!]

If the circumstances of the application allow, I would suggest that for display purposes you use only the eight most significant bits of your data, and simply do not display the other four. If you wanted to display the other four (for example use color to get higher resolution into the image - false color to see features that could NOT normally be seen by the naked eye), the RasterFlex board would be the ideal product for you to use!

faq020: How many RasterFlex boards can I install in one system?

The Xsun server (the most common server used) will support up to four framebuffers. It has been tested with 4 RasterFLEX-32 boards installed in a SPARC 10 and 4 RasterFLEX-HRs in a SPARC 20.

The Xrfx X server will support three framebuffers,

When running multiple head, the Xrfx and Xsun servers support all the same options, -dd 24 -cc TrueColor for Xrfx and defdepth 24 for Xsun.

faq021: How reliable are your boards?

They are exceptionally reliable, with an MTBF (Mean Time Between Failure) rating of 65,000 hours (RasterFlex HR).

Questions as you install the boards (and Later)

faq022: Which Release of RasterFlex Drivers do I require?

Release 5.0 contains software for all versions of Solaris from 1.1.1 (also known as SunOS 4.1.3) to 2.6.

Users of Solaris 2.6 MUST use at least release 4.7.

Users of Solaris 2.5.1 MUST use at least release 4.6 (or 4.7)

Users of Solaris 2.5 should also use release 4.6 (or 4.7) Although release 4.5 does support Solaris 2.5, we suggest that you run release 4.6 instead, as this release included patches for workstations introduced after Solaris 2.5 was released.

Users of Solaris 2.3 and 2.4 should use release 4.5 or later

Users of Solaris 1.x / SunOS 4.1.x should use release 4.5; releases 4.6 and 4.7 are partial release that only support Solaris 2.

faq023: Where do I get release xxxx of the RasterFlex Drivers?

For Solaris 1 and 2 releases up to and including 2.4:

Releases 5.0 of the RasterFlex drivers is shipped on a CD with newly purchased boards, and can also be purchased through our normal sales channels (there are details elsewhere in this FAQ).

For Solaris releases 2.5 and 2.5.1:

Release 4.6 can be downloaded from:

<http://www.wellho.com/download> or <ftp://ftp.vigra.com/pub/rasterflex>

It comes in the form of a complete installable XSun driver, and it is NOT necessary to have any prior release installed on your system. There is also a "Readme" file which can be downloaded from the same location. The total download size is approx 430k.

For Solaris release 2.6:

Release 4.7 can also be downloaded from: <http://www.wellho.com/download> or <ftp://ftp.vigra.com/pub/rasterflex>

It comes in the form of a patch file to replace the existing file ddxVITrxf.so.1 from either the 4.5 or 4.6 release (this was the only file to change between those releases). There is a "Readme" file of instructions also available for download. The download size is 170k (if you have the gzip utility available) or 930k otherwise.

(Note that these the contents of these download areas as well as the file

locations are subject to change.)

faq024: What color models does the RasterFlex board support?

PseudoColor, StaticColor, StaticGray and GrayScale (all in 8 bit) DirectColor and TrueColor (both in 24 bit)

Default operation is Pseudocolor. For individual applications, this can be overridden using the vset utility supplied with the drivers. To override for all windows (i.e. to change the default), modify the line which starts the server.

Examples:

```
... -dev /dev/rfx0 defdepth 24 defclass DirectColor
... -dev /dev/rfx0 defclass StaticGray
```

For more information on Vset, refer to the User manual supplied with the RasterFlex board. For more information on the color models, refer to a standard X Windows text (ther are brief notes in the User Manual)

faq025: Is my RasterFlex board installed correctly?

Firstly - did you remember (On Solaris 2) to reboot using the -r option when you installed the board, and before you ran the installation software? If so ... the RasterFlex board(s) should be visible as the system boots up (you can run the dmesg command to replay the messages) and it should report on each RasterFlex board found.

If you want to CHECK the dmesg output, and that all the device files are correct, the Perl script at the end of this answer will provide the confirmation.

Second - even if the system can see the screen correctly, it might be that the X Windows system is NOT looking at the board See faq026 "SunOS detects the board, but Open Windows doesn't".

```
#!/usr/local/bin/perl
#
# Identify screens and print a count ....
#
# Written by Graham Ellis as a demonstration, August 1997
# No responsibility for any errors taken. No warranty. Demo only.
#
```

```

@screen_lines = <DATA>;
chomp @screen_lines;
@dmesg = `dmesg`;

foreach $screen (@screen_lines)
{
    @scr_hits = grep (/ $screen/,@dmesg);
    foreach $scr_found (@scr_hits)
    {
        $screen_table{$scr_found} ++;
    }
}

# collect ALL the devices!

open (DEVS,"ls -lR /dev|");
while (<DEVS>) {
    @line = split (/ \s+/);
    if ($#line == 0)
        { $nowdir = substr ($line[0],0,length($line[0])-1)}
    else{
        push @dv,"$nowdir/" . $line[$#line-2] . " $line[$#line]\n";
    }
}

foreach $screen(sort keys %screen_table)
{
# list found screen sbus (etc) addresses
print "\nscreen found: $screen";
@scdets = split(/ \s+/, $screen);
# find the matching name in /devices
$second_line = "$scdets[0]\\ \s+is";
@device = grep (/ $second_line/,@dmesg);
@d_els = split (/ \s+/, $device[0]);
$dfile = "/devices$d_els[$#d_els]";
print "That is $dfile\n";
# hunt for links to it
print "it is known as ";
@found = grep (/ $dfile/,@dv);
foreach $name (@found) {
    @fls = split(/ /, $name);
    print "    ",$fls[0];
}
print ("\n");
$nscreen++;
}

print "\nsystem appears to have $nscreen screen(s)\n\n";

__END__
^VITec.*sbus.*slot
^bwtwo.*sbus.*slot
^cgthree.*sbus.*slot
^cgsix.*sbus.*slot

```

^SUNW,ffb.*UPA

faq026: SunOS sees the boards, but OpenWindows doesn't!

The X Windows system is very configurable, so we can give no easy one-liner as an answer. But here's a scheme for checking under OpenWindows on a dual-headed system ...

1. Create a clean new user account WITHOUT ANY .cshrc or .login files.
2. Log in to the new account and run

```
/usr/openwin/bin/openwin -dev /dev/rfx0 -dev /dev/cgsix0
```

(or whatever your frame buffer devices are called)

[Open Windows started. Both screens cleared. Default windows appeared on the first screen ... Console, File Manager and Help Viewer]

3. When open windows has started, use the pulldown menus to start a command tool or shell tool (by default, that's in the "programs" menu.
4. Click into the command-or-shell tool and type:

```
xterm -display :0.1
```

[A window should appear on the second screen; you can drag the cursor over to it, click in it, use it]

SHOULD THINGS NOT WORK IN THIS WAY FOR YOU, then chances are that system wide configuration files have been changed. Files that I would look at in that case include (in /usr/openwin/lib):

```
openwin-init
  openwin-menu
  openwin-menu-programs
  Xdefaults
  Xinitrc
```

and the app-defaults directory.

Xinitrc is a "good" one as it refers on to lots more files as well!!

ONCE YOU HAVE GOT THE BASIC WINDOWS WORKING, then you'll want to tailor your pull-down menus to be able to select applications to start on either screen. Use files such as ".openwin-menu" in your home directory if you want that done on a user by user basis, or files such as "/usr/openwin/lib/openwin-menu" if you want the changes to apply to ANYONE who logs in and does not have a personal "dot" file.

Also do remember that you need to have a monitor plugged into the active frame buffer ... it's all too easy to install a new board, switch the screen across but not switch the software. What LOOKS like a dead machine is not ...

faq027: How do I get the RasterFlex to work with CDE?

After completing the installation procedure, you need to edit the file /etc/dt/config/Xservers or /usr/dt/config/Xservers to reflect the frame buffers that you will be supporting ...

The last active line of the file should be changed. Examples:

```
:0 Local local_uid@console root /usr/openwin/bin/Xsun -nobanner
  -dev /dev/rfx0 defdepth 24 -dev /dev/fb0
```

(All on one line.)

This sample line sets up the RasterFlex as the main frame buffer (hostname:0.0) and the other frame buffer in the system as the second (hostname:0.1)

```
:0 Local local_uid@console root /usr/openwin/bin/Xsun -nobanner -dev
/dev/rfx1
```

(This sample sets up the SECOND RasterFlex board as the main frame buffer and makes no use of any other Frame Buffers fitted to the system!)

faq028: How do I set the screen resolution?

The board itself selects the resolution it is to use; it is NOT a software configuration.

RasterFlex HR hnd 32 have three jumpers on the board. In the factory set condition, the board senses (from a Sun monitor) the maximum resolution of the screen, and operates up to that resolution. Thus - plug in a Sun 1280x1024

monitor to a RasterFlex HR, switch on, and you get that resolution!

If your monitors are not standard Sun ones that provide the information on their resolution, different jumper settings control the operational resolution (you may also need to do this for Sun monitors manufactured prior to Summer 1994)

For the following section, hold the board with the Screen (video) connector at the top. You will see 3 jumpers (J2, J3 and J4) at the top left of the board. Setting options are as follows:

The following apply to RasterFlex 32 and RasterFlex HR:

Automatic configure (As shipped)	J2 - RIGHT J3 - RIGHT J4 - RIGHT
1024 x 768, 76 Hz (SVGA)	J2 - LEFT J3 - LEFT J4 - LEFT
1152 x 900, 66 Hz	J2 - LEFT J3 - jumper REMOVED J4 - jumper REMOVED

The following is for the RasterFlex 32 ONLY:

1152 x 900, 76 Hz	J2 - jumper REMOVED J3 - LEFT J4 - LEFT
-------------------	---

The following apply to RasterFlex HR ONLY:

1152 x 900, 76 Hz	J2 - LEFT J3 - LEFT J4 - jumper REMOVED
1280 x 1024, 60Hz	J2 - jumper REMOVED J3 - LEFT J4 - jumper REMOVED
1280 x 1024, 67 Hz	J2 - Jumper REMOVED J3 - LEFT J4 - LEFT
1280 x 1024, 76Hz	J2 - LEFT J3 - jumper REMOVED J4 - LEFT

Other screen resolutions are NOT possible.**faq029: Why are there several X Servers? Which are supported?**

The part of the X Windows system which sits between the Applications (be they your purchased-in software or things like command tools) and the physical device is called the "X Server". The applications talk to it in a standard X protocol and that's where the "Standard" comes in ... in theory, anyone can write a server, anyone can write applications, and provided they adhere to the standard they should inter-operate.

AP&D supply three different servers, or components for them:

1. xnews-rfx. For Solaris 1. An X Server which supports AP&D and Sun Frame buffers, and ALSO supports "NeWS" protocol - which was a big "thing" with Sun at the time. (Mainly because it was their proprietary answer to X11, which was to be an open standard. For trivial fans, NeWS stands for "Network Extensible Windowing System."
2. Xrfx. For Solaris 1 and Solaris 2. A Port of the "X11R5" Standard X Server (supplied with X itself), once again supporting AP&D and common Sun frame buffers
3. XSun. For Solaris 2. Sun supplies Xsun itself. It is a general X Server into which "ddx" modules can be plugged to support whatever frame buffers you like, using the "ddl" interface. AP&D supplies a ddx driver; you clearly have that, and have it installed correctly, or you would NOT be able to get windows on the screen which the RasterFlex card is driving.

XSun / ddx has a huge advantage in its modularity and has (to all intents and purposes) replaced the other two servers under Solaris 2.

faq030: Where do I get technical support on my RasterFlex Boards?

1. This FAQ
2. The User Manual contains the answer to most of the questions you'll be asking
3. Technical support is also available from directly from AP&D. Here is the contact information:

Address: AP&D, 10052 Mesa Ridge Court, San Diego CA 92121

Time Zone: US-Pacific (GMT-8 most of the year)

Phone Numbers: (USA 1+) 858 457 2111
AP&D Corporate 800 621 8474
FAX 858 597 7094

Email: rasterflex_support@visicom.com

faq031: How do I set up and run multiple screens?

For the Common Desktop Environment, edit the last line of the file `/usr/dt/config/Xservers` (or `/etc/dt/config/Xservers`) to read something like:

```
:0 Local local_uid@console root /usr/openwin/bin/Xsun -dev /dev/rfx0  
-dev /dev/fbs/ffb0
```

(All on one line)

this example means only root can start the Xserver Xsun on the local display, and Xsun will manage two devices `/dev/rfx0` and `/dev/fbs/ffb0`. As long as we know that these two device nodes are valid, which can verify by doing a "ls -l" and seeing if the links point to the right place or by running openwindows:

```
% openwin -dev /dev/rfx0 -dev /dev/fbs/ffb0
```

For open windows, simply use the last line of the example above (or one varied to reflect differing frame buffer device names). You may like to place an alias for openwin in your `.cshrc` or `.login` file, or in a file that calls, so that the options are selected automatically.

Under both CDE and Open Windows, further parameters may be given to set the relationship of one screen to the other ... how the mouse moves off one screen to appear on the second. For further details of this and of other facilities provided by the X Window system to dual headed workstation users, please refer to a standard X Windows text.

faq033: How do I choose which of my two screens is the console?

You can change this by changing the `sbus-probe-list` in the eeprom.

The `sbus-probe-list` determines which device is the console boot device. The

boot prom will go through the list sequentially until it finds a hardware device installed in that Sbus slot.

[This answer is for a system with a built in GX board ... it DOES vary from model to model]

0 is always first.

0312 will cause the system to display console text on the builtin GX at boot.

0123 will cause the system to display console text on what ever is installed in slots 1 or 2 at boot time.

Use 0123 if you're running single head, if you're running dual head you can use 0123 or 0312.

Remember this has nothing to do with the way X windows comes up.

faq034: How do I add the RasterFlex Drivers manually?

Note: Some of the locations of these ftp files are "in flux"... contact AP&D Customer Support for assistance if necessary.)

(Applies from Solaris 2.3 up)

1) Install the RasterFLEX framebuffer and connect the monitor.

2) Power on the CPU

```
ok boot -r
```

3) Download the version 4.6 driver and Readme from:

```
http://www.wellho.com/download
```

This archive has three files, the driver "rfx", the DDX module "ddxVITrfx.so.1", and a readme. Move the files to /tmp

4) As root:

```
cp /etc/driver_aliases /etc/driver_aliases.old
```

If add_drv fails it wipes out driver_aliases and the system won't boot!

5) cp /tmp/ddxVITrfx.so.1 /usr/openwin/server/modules/ddxVITrfx.so.1

```
chmod 644 /usr/openwin/server/modules/ddxVITrfx.so.1  
chown root /usr/openwin/server/modules/ddxVITrfx.so.1
```

6) `cp /tmp/rfx /kernel/drv/rfx`

```
chmod 644 /kernel/drv/rfx
chown root /kernel/drv/rfx
```

7) Choose either RF-32 or RF-HR

```
8) /usr/sbin/add_drv -m '* 0666 root sys' -i "VITec,RasterFLEX-32" rfx
    "VITec,RasterFLEX-HR(67Hz)" rfx
```

```
9) echo "type=ddi_display;minor=rfx  rfx\N0" >> /etc/devlink.tab
      ^
      |
      tab
```

this will create the device node

10) if RF-HR add "" to /etc/driver_aliases

```
rfx "VITec,RasterFLEX-HR(67Hz)"
```

11) /usr/sbin/devlinks, this what a boot -r does

```
check for ls -l /dev/rfx0
```

```
try bringing up X windows
```

```
% openwin -dev /dev/rfx0 defdepth 24
```

12) List of files modified in /etc

```
% grep rfx /etc/*
devlink.tab:type=ddi_display;minor=rfx  rfx\N0
driver_aliases:rfx VITec,RasterFLEX-32
driver_aliases:rfx "VITec,RasterFLEX-HR(67Hz)"
minor_perm:rfx:* 0666 root sys
name_to_major:rfx 56
path_to_inst: "/iommu@f,e0000000/sbus@f,e0001000/VITec, RasterFLEX-32@1,0" 0 "rfx"
```

13) IF YOU ARE RUNNING SOLARIS 2.6 ONLY

You need to patch the release by replacing the file `ddxVITrfx.so.1` with a the release 4.7 version. This driver is also available from the address given in step 2 of these instructions.

faq035: What's a good way to test my installation / boards?

The Rasterflex boards run standard X Windows applications, and the best tests are to run such standard applications. The examples in the manual are

tiny demonstrations to show you how to program certain extra features of the board and are only relevant to a small number of customers.

To test the board in 24 bit mode, I would use an application such as "xv" which is freely available on the net, and use it to view a 24 bit image of (say) a face with all the gradual color changes involved. Drag the window around, resize it, pull up multiple windows, run other apps at the same time that will be a much more thorough test of the board.

faq036: What's all this about 8 and 24 bit modes? What is color Flashing?

A Brief Tutorial...

Computer Graphics is (are?) displayed as a large number of colored dots or pixels - on the RasterFlex HR there is a grid of up to 1280 x 1024 of them.

In order for the Frame Buffer to remember which color to display at which point, it has a large block of computer memory fitted which holds the information and plays it out very fast (at up to 76 times a second for the whole screen). Naturally, being such fast memory this is also expensive memory.

Most frame buffers have 8 bits of memory per pixel - giving up to 2 to the power 8 (i.e. 256) possible different colors for display. As different customers require different sets of colors, though, each dot is put through a color look up table (or CLT) to work out what the actual display color is to be (for example) for "color No. 17".

For imaging applications, 256 colors is NOT enough, and so the RasterFlex Frame buffers provide not 8 bits but 24 bits per pixel, giving 2 to the power 24 (i.e. 16777216) different colors. Of course, there is then no need for a color lookup table (indeed it would be impractical to have one that's so large).

The X Windows system supports two "color models" that use 24 bit color - TrueColor and DirectColor - and the RasterFlex boards can support BOTH.

It turns out though that the CLT models have certain advantages - by changing a single entry in the CLT, for example, an application can make the screen blink or can highlight a color coded feature. Furthermore, it's much quicker for an application to write 8 bits rather than 24. So the RasterFlex boards ALSO support the four X Windows 8 bit color models - PseudoColor, StaticColor, StaticGray and GrayScale.

Different color Models may be used in different windows - you select the default mode you want for the window manager and other windows that do

not choose explicitly, then the default can be overridden either directly by an application or by the AP&D supplied "vset" utility. The X Server keeps track of the color model in use for each pixel by using some extra bits (there are actually 32 bits per pixel on the RasterFlex 32 and RasterFlex HR cards).

You might like to note that the RasterFlex 24 board (which is NOT a AP&D-supported product) does NOT have the extra bits and so has to work only in a single color Model. This also applies to the RasterFlex 32 and RasterFlex HR boards if they are configured to run in "8 bit overlay mode".

color FLASHING is something users of X Windows systems experience from time to time ... as the cursor is moved from one window to another some (or all) of the colors change. Why?

The X Windows models are based on one color Lookup Table per window - so that each application can use up to 256 colors. Hardware vendors, however, have provided just one color lookup table per frame buffer. This means that the X Windows system has to struggle for colors, and most Window Managers will (when necessary) maintain separate color tables for each window and switch the tables as the "focus" changes from one window to another. Of course, color 19 on one window is likely to be very different to color 19 on another window.

Some piecemeal corrections are possible - modern window managers attempt to allocate color as requested and to share CLTs between windows. Sometimes that results in fewer colors than you would wish being available, perhaps to the extent that something will be drawn in totally the wrong color (if the window manager says "look - I have no yellow - have orange instead" for example!)

With the features of the RasterFlex 32 and RasterFlex HR, color flashing is much lessened.

1. The boards (uniquely in my knowledge) have two CLTs each rather than one. The User manual describes how they are allocated.
2. CLTs are not used in 24 bit modes, so if you have any windows which are drawn in those modes they will NOT use up precious CLT entries.

One of the most common uses of RasterFlex is to eliminate color flashing; customers use 24 bit mode for windows that soak up a lot of colors, but which don't require the fastest of display, and then use 8 bit modes for the applications which are dynamic. Examples of applications which hog color table entries are the various browsers, Applix, and image handling software.

faq051: Crash while attempting to install on a Solaris 2.5 system

This might be due to a Solaris bug in the ckitem function which is used in the installation scripts. To determine this, see the material below. If it is indeed the problem, it is fixed in patch 106255-01.

This script will determine whether the bug exists:

```
% cat gjetes
ABC=`ckitem -n -p " select what you want: " " one two " " three four "`
echo Status: $?
echo Result: $ABC
^D
```

This script returned a status code of 139 (the manual describes codes of 0 through 4 only) when a correct entry was made. ckitem was handling incorrect entries correctly.

It also core dumped, producing the message:

```
1070 Segmentation fault (Core Dumped)
```

(also saw 1039 in place of 1070 ...)

Later Questions and Troubleshooting

faq037: "Out of date" library error messages when starting the X Server

Sometimes these messages are just informative and the windowing system will start up OK. However sometimes the server will time out and not start up.

In Solaris 1, if you do NOT have SunView installed, you should start OpenWindows using the -nosunview argument to the script

```
/usr/openwin/bin/openwin
```

(A quick way to determine if SunView is loaded is to see if there is a file /usr/lib/.sunview. If there is, then you probably do have SunView loaded)

The other thing to do is to verify your LD_LIBRARY_PATH. If you have a directory such as /opt/VITrflex/lib, it should be at the BEGINNING of the path, e.b.

```
setenv LD_LIBRARY_PATH /optVITrflex/lib:$LD_LIBRARY_PATH
```

The rfxconfig.sh script will take care of this for you.

faq038: I am about to upgrade to Solaris 2.5.1. What should I know?

The RasterFlex 32 and HR boards work fine on Solaris 2.5.1, but you must have (at least) software release 4.6.

See "Where do I get release xxxx of the RasterFlex Drivers?" within this FAQ document.

faq039: I am about to upgrade to Solaris 2.6. What should I know?

The RasterFlex-32 and -HR boards work fine on Solaris 2.6, but you must have (at least) software release 4.7. (This is part of the 5.0 release.)

See "Where do I get release xxxx of the RasterFlex Drivers?" within this FAQ document.

faq052: I am about to upgrade to Solaris {2.}7. What should I know?

Officially, the last supported version of Solaris we support RasterFlex on is 2.6. However, the latest (5.0) version of the software is known to support an -HR on a SPARCstation 5 running Solaris 7 and CDE 1.3. RasterFlex-32 does NOT appear to work, nor do we have any information about compatibility with SBus Ultra machines.

See "Where do I get release xxxx of the RasterFlex Drivers?" within this FAQ document.

faq049: When attempting to start OpenWindows I just get a listing of all the options to xinit and the message "server error". What's wrong??

If you used the rfxconfig.sh script, that may be the reason.

rfxconfig.sh was intended to create some shell commands that would simplify operation of OpenWindows. Unfortunately there are some incompatibilities.

If you used rfxconfig to create a .cshrc.flex file and added the line

```
source .cshrc.flex
```

It creates startup files for various shells but unfortunately they don't all work properly.

The simple explanation is this: depending on the options you give to `rfxconfig.sh`, a line of the form

```
alias xinit "xinit -- /usr/openwin/bin/Xsun defdepth 24 defclass TrueColor"
```

In some versions of Solaris this is legal, and the device will default to `/dev/fb`, the primary frame buffer. However, in later versions of Solaris it is ILLEGAL, and an EXPLICIT frame buffer needs to be specified:

```
alias xinit "xinit --  
    /usr/openwin/bin/Xsun -dev /dev/xfx0 defdepth 24 defclass  
TrueColor"
```

(This will be remedied in the next release of the RasterFlex software.)

If you need assistance in creating the commands, options, `xdm` or CDE files for your system, call or email AP&D technical support apd.boardsupport@titan.com for assistance.

faq032: I cannot get the RasterFlex to be console on a system with a Creator card

Background: If you open a new ULTRA 2 that has a Creator 3D installed, then install a RasterFlex, then power up, you get no video. The problem is that the software thinks the RasterFlex is the default screen, but the Creator 3D interferes.

Solution: The solution that we have found is to follow these steps:

1. Remove the Rasterflex. Install all software (O/S, RasterFlex Drivers etc.) using the Creator 3D as the frame buffer,
2. Reinstall the RasterFlex hardware, reboot using the `-r` option.

This resolves the conflict.

faq040: Which RasterFlex board do I have?

You might actually get confused between the RasterFlex-24 (a product withdrawn from sale a number of years ago) as well as the RasterFlex 32 and HR.

If the board is TWO SBus slots with it is a very old (1994 vintage) RasterFLEX. It will probably work, but this model is no longer supported.

Under Solaris 2, to check the version of an installed board, you can use the command

```
prtconf
```

which will report the connected hardware. The version of the RasterFlex will also be shown.

Under Solaris 1 (SunOS 4), if your machine is UP and RUNNING with the board installed, then the dmesg command will report on hardware found at the most recent boot up ... and that will clearly say " 24 ", " 32 " or " hr ".

Examples:

```
VITec,RasterFLEX-323 at sbus0: SBus slot 3 0x0 SBus level 5 sparcl ipl 9  
VITec,RasterFLEX-HR1 at sbus0: SBus slot 2 0x0 SBus level 5 sparcl ipl 9
```

If your machine is NOT running, look at the board (video connector uppermost). There will be 2 large chips on the left, and either 1 or 2 columns or smaller chips to the right.

```
If there is 1 row of chips, it's a RasterFLEX 24 or 32  
If there are 2 rows of chips, it's a RasterFLEX HR
```

The RasterFlex 24 and 32 boards look remarkably similar. The RasterFlex 24 is a cut down version of the 32. If there are a number of empty chip positions, it's a 24.

faq041: Does my RasterFlex board need a Firmware upgrade?

The ONLY case this is necessary is when transferring an older RasterFlex HR board into an Ultra2 - an upgraded boot Prom is needed. The chip at position U2 on the board needs to be labelled #30PD0584-2; if it is NOT, contact AP&D for their current returns / upgrade policy.

faq042: How do I remove the RasterFlex drivers from a machine?

Our software is loaded using Sun's " pkg " system, and to remove all of the Conectware / RasterFlex drivers you should (as root) use pkgrm to remove all the packages with names starting VIT.

For example:

pkgm VITrdvr VITrfdx VITrxfont VITrxman VITrxserv VITrxsupt

As part of the install process, you might also have modified your .cshrc or .profile files, and in order to revert you would also need to back out any such changes you made.

faq043: Are the RasterFlex drivers year 2000 compliant?

Yes. There is no time dependent code within our RasterFlex drivers.

faq044: I'm having trouble with Netscape 4.03 under Solaris 2.6

Netscape 4.03 Beta when running under Solaris 2.6 shows some coloration errors - in particular some web sites display with text foreground and background in the same color. THIS PROBLEM ALSO OCCURS ON STANDARD SUN FRAME BUFFERS, and so is an error in Netscape and / or X Windows. One of our engineers has in fact followed this further, and seen the X Windows system passing incorrect "glyphs" to the drivers. Should you see this problem, we would suggest that you confirm it on a non-RasterFlex frame buffer, then report the fault through Sun or Netscape.

faq045: What if I re-slot my RasterFlex card?

If running Solaris 2, you will need to reboot your workstation '-r' so that it knows about the new location of the board.

You will need to REMOVE and RE-INSTALL your driver software. (Under Solaris 2, use pkgm to remove the old release - and use pkginfo to find out the names of the packages loaded).

faq050: How do I add another RasterFlex to my Solaris system?

For the purposes of this discussion, I'm assuming you have successfully installed a single RasterFlex board sometime in the past, and are just now adding another one. In order to do this you need to add new device entries. This can be done manually and is explained elsewhere in the FAQ, but here's an easier way.

A brief overview on how to do this is as follows.

1. Boot up with the -r option on the boot command.
2. Log in as the root user.

5. REMOVE the RasterFlex driver by using the postremove script in the Solaris2 package VITrdvr

```
...Solaris2/FLEX/VITrdvr/install/postremove
```

6. ADD all RasterFlex drivers by running postinstall in the same directory. This will create additional /dev entries such as rfx1, rfx2, etc. that you can start OpenWindows or X11 sessions on.

If you would have had both RasterFlex boards installed at the time you installed the VITrdvr package, this step would not have been necessary.

faq046: AP&D / Connectware / Vitec?

The RasterFlex-32 and RasterFlex-HR products are totally owned and supported by AP&D, to whom all queries should be addressed.

The products were acquired from Connectware, who had in turn acquired them from Vitec (of Plano, Texas) when they bought that company. You may see references within the documentation still to these other companies, but all support and sales enquiries should now be made of AP&D.

As well as acquiring the products, AP&D has taken over the goodwill of the existing customer base and whether you purchased your board from us, or from Connectware, or from Vitec, we will be delighted to offer you ongoing support.

faq047: RasterVideo, RasterMedia, RasterFlex-24, RasterOps, RasterFlex-TV?

There are a number of products around with similar sounding names, some of which were historically linked with the RasterFlex 32 and RasterFlex HR. NONE of the products listed above is (or has ever been) supplied or supported by AP&D. To the best of our knowledge, the current company that looks after most of these products is ATM Systems, a subsidiary of AMP.

(Please note that even though you may be able to run a RasterFlex-24 on a Solaris 2.5 system, it will definitely fail if you attempt to run it under 2.6 or 2.7, even with the newer RasterFlex software.)

A 24-bit-only graphics card (the "SPARC TC") was acquired by Connectware from RasterOps and briefly marketed by Connectware. This has been long discontinued. It had the option of having a video card piggyback on it ("PIP" option).

faq048: What version of the FAQ is this?

This is version 3.0 of the AP&D / RasterFlex Frequently Asked Questions document, current as of 10 Dec 1999. It is subject to change without notice (hopefully to include newer and better information). We welcome any suggestions for improvement or reports of error.

(Obligatory Legal Disclaimer:) Whilst every effort has been made to ensure the accuracy of this document, neither the author, nor AP&D can be held responsible for any errors contained herein nor for the consequences of any such errors.

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