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Dear HPUX/IRAF Installer,

This is a supplement to the *BSD-UNIX/IRAF Installation Guide* (IG) and the accompanying *UNIX/IRAF Site Manager's Guide* (SMG). We do not have a System V installation guide, but there are few if any differences (primarily the tape device specification). You will be using those other documents both for installation and maintenance, but there are some minor differences for the HP systems covered here. **Please read these notes first.**

1. History and Acknowledgments

The initial HPUX/IRAF port was done in 1988 by NOAO at HP headquarters in Cupertino, CA, on an HP9000/800. The system was subsequently enhanced and maintained at CFHT by Rick McGonegal and others, who also ported the system from the HPPA RISC architecture to the HP9000/300 series Motorola architecture.

The current port (IRAF v2.9.1) was performed at NOAO using an HP9000/370 workstation belonging to the Advanced Optical Telescope Technology Group at NOAO. Thanks go to Larry Stepp and others in his group for making this workstation available. Some of the CFHT work was very helpful in this new port.

Mike Somers of Hewlett-Packard in Tucson arranged the usage of an HP9000/800 series computer in Phoenix for the mini-port to HP's HPPA RISC architecture. Steve Brooks in Phoenix was helpful in facilitating access to this computer and in obtaining some hard to locate information about HPPA internals.

2. HPUX Operating System and Environment

Both the HPUX v7.0 operating system and compilers were a vast improvement over previous versions. All three sets of IRAF binaries were produced with full compiler optimization, with fewer than a dozen files triggering host level compiler bugs (compared to what would have been hundreds in earlier OS versions).

HPUX/IRAF v2.9.1 should run on any HP9000/300 or HP9000/800 series workstation running HPUX v7.0 and presumably later HPUX releases. It is not known whether this version of HPUX/IRAF will run on the HP9000/400 series workstations, but presumably if they are supposed to be binary compatible with the 300 series code, it should run. HP9000/300 series workstations with floating point accelerators are supported.

3. Loading IRAF Distribution; Multiple Architectures

3.1. Installation

HPUX/IRAF is configured for multiple architecture support within the 9000/300 (Motorola) and 9000/800 (HPPA RISC) series. That is, there is one copy of the IRAF directory tree, source and help files, etc., and three copies of the executables both for the core system and the NOAO packages (in the 300 series there is the standard, or 68881 floating point architecture, plus the optional floating point accelerator version).

The IRAF executables will be contained in "`bin`" subdirectories for each supported architecture upon installation. The mapping between the distribution archive component and the names of the bin directories is as follows.

Archive	Directory
IB.HPUX.688	`$iraf/bin.hp68`
IB.HPUX.FPA	`$iraf/bin.hpfpa`
IB.HPUX.HPP	`$iraf/bin.hppa`
NB.HPUX.688	`$iraf/noao/bin.hp68`
NB.HPUX.FPA	`$iraf/noao/bin.hpfpa`
NB.HPUX.HPP	`$iraf/noao/bin.hppa`

We do not have a tape drive on NOAO's HP system. The HPUX documentation indicates that it may be necessary for the HPUX installer optionally to have set up Berkeley style minor device entries to enable the use of the utility `mt`, which we normally use to position a tape to read the appropriate `tar` file, and there are a couple of other unresolved questions about HP tape drives. Consequently, we will not provide an example of reading this IRAF distribution directly from tape on the local HP machine, but instead assume a 6250 bpi, 9 track distribution tape is mounted on a raw, no rewind character tape device on another workstation named *other* running some flavor of BSD UNIX (e.g. SunOS).

If this is a first time installation, refer to §2.1.2 of the IG and create an `iraf` account and root directory. If instead it is an update to an existing installation, refer to §2.1.1 and save the files mentioned then delete the old system. So now we have a clean `iraf` root directory somewhere, to which we shall refer as `$iraf` as a cshell environment variable. (For example, if we placed the iraf root at `/usr1/iraf`, we would set the environment variable using `% setenv iraf /usr1/iraf/`).

Login as `iraf` and `cd` to the root `$iraf` (if you created the account as recommended in §2.1.2, the account login directory is `$iraf/local`, not simply `$iraf`, so be sure to `cd`).

For further information on what we are about to do see §2.2.1. We make sure the distribution tape is rewound then read out the table of contents file:

```
% cd $iraf
% rsh other "mt -f /dev/rmt8 rewind"
% rsh other "cat /dev/nrmt8"
```

0 Table of Contents

1	AS.HPUX.GEN.Z	44.0Mb	IRAF, NOAO packages, HPUX sources and binaries
2	IB.HPUX.688.Z	15.3Mb	Motorola (68881/68882) binaries for IRAF system
3	IB.HPUX.FPA.Z	16.0Mb	Motorola + FPA binaries for IRAF system
4	IB.HPUX.HPP.Z	24.8Mb	HPPA (RISC) binaries for IRAF system
5	NB.HPUX.688.Z	14.9Mb	Motorola (68881/68882) binaries for NOAO packages
6	NB.HPUX.FPA.Z	15.3Mb	Motorola + FPA binaries for NOAO packages
7	NB.HPUX.HPP.Z	22.2Mb	HPPA (RISC) binaries for NOAO packages

The tape is positioned to just before file 1, AS.HPUX.GEN. We are located at the `$iraf` root, so we now read this compressed tar file and unpack it in the current directory:

```
% rsh -n other "dd if=/dev/nrmt8 ibs=20b" | uncompress | tar -xpbf 20 -
```

Suppose we want just the Motorola (series 300) executables, without an FPA. We next remove the old symbolic link `bin.hp68` just emplaced from the AS archive, create a real bin directory, and read/unpack the IB.HPUX.688 archive in it.

```
% rm bin.hp68              # remove old symbolic link
% mkdir bin.hp68              # create real bin directory
% cd bin.hp68
% rsh -n other "dd if=/dev/nrmt8 ibs=20b" | uncompress | tar -xpbf 20  -
```

(Alternatively we could have rewound the tape and done an `fsf 2` to get to tape file 2). Now skip the FPA and HPP tarfiles and read in the NOAO binaries.

```
% cd $iraf/noao
% rm bin.hp68                  # remove old symbolic link
% mkdir bin.hp68           # create real bin directory
% cd bin.hp68
% rsh other "mt -f /dev/nrmt8 fsf 2"
% rsh -n other "dd if=/dev/nrmt8 ibs=20b" | uncompress | tar -xpbf 20 -
```

Note that there are many variations possible here, e.g. reading the tar file actually logged in to the other node and transferring it via `ftp` or `rcp`. Or, you could have read in all three binary architectures to the appropriate bin directory.

4. Runtime Environment

On an HPUX/IRAF system with multiple architectures, the system will automatically select the appropriate binaries for running IRAF. On Motorola machines, the presence of a floating point accelerator is being tested by the simple presence of the file `/dev/fpa`; if the file is present, it is assumed an fpa is resident and the bin.hpfpa binaries will be used. This selection may be overridden by explicitly setting the cshell environment variable, e.g. "`setenv IRAFARCH hp68`" to set to the 68881 or 68882 architecture explicitly before firing up the CL.

5. Software Development

User application software development within IRAF, either in IMFORT or SPP, can be done for any of the supported HP architectures. All the Motorola machines (series 300 and probably 400) support the 68881 or 68882 floating point coprocessor, while some also have an optional floating point accelerator. Software developers on machines containing more than one HPUX architecture should set this environment variable prior to compiling:

HPPA RISC architecture (HP9000/800 series):

```
% setenv MACH hppa
% setenv IRAFARCH hppa
```

Motorola architectures:

```
% setenv MACH hp68           #  68881 / 68882 and
% setenv IRAFARCH hp68       # or

% setenv MACH hpfpa          # FPA and
% setenv IRAFARCH hpfpa
```

Developers in HPUX/IRAF must also watch carefully their XC command line arguments. It is best to use the arguments defined in `hlib$mkpkg.inc` for the appropriate architecture. If you compile and link exclusively using MKPKG you do not need to worry as long as `IRAFARCH` is set correctly. It is not recommended to make code changes to the core system or NOAO package, and the system as distributed is configured *generic*. But if it becomes necessary, one could reconfigure the system libraries and bin links as follows, in this example to reset the binary architecture from, say, generic to hpfpa:

```
% cd $iraf
% mkpkg showfloat       # assume it is not fpa, e.g. generic
% mkpkg hpfpa
% cd noao
% mkpkg showfloat
% mkpkg hpfpa
```

6. Display Interfaces

IRAF does not support any HPUX native window or display systems at all, rather it relies on the X Window System. At this time XTERM is the preferred terminal and vector graphics emulator (xterm comes with HPUX). In IRAF you can issue the command `cl> stty xterm`, or if your current incarnation of XTERM has a different number of screen lines, say 54, `cl> stty xterm nlines=54`. You may prefer the alternate form, `xtermjh`, with the graphics status line interaction in the text window instead of overwriting the graphics window as in `xterm`.

6.1. SAOimage Installation

The image display is **SAOimage** from the Center for Astrophysics at Harvard. HPUX/IRAF comes with executable versions of SAOimage for Motorola / 68881 or HPPA architectures. SAOimage communicates with the IRAF TV.DISPLAY task via fifo pipes, which should be installed for you automatically when you run the `hlib$install` script as described in the Installation Guide.

Should it be desired to recompile SAOimage for some reason, e.g. a local source modification, use one of the following from its root directory `$iraf/unix/x11/saoimage`:

```
(remember, this is not necessary in a normal installation)
% make hp >& spool &              # (series 300 or 800) or
% make hpfpa >& spool &           # (s300 + fpa)
```

The `hlib$install` script will attempt to install the SAOimage manpages for you. If this is not possible (e.g. there is no `/usr/man/manl` directory) the script should inform you.

6.2. Tips on running SAOimage

The SAOimage manpage is just a brief introduction to running it. Much more extensive documentation is available in `.txt` files in the directory `$iraf/unix/x11/saoimage/doc`, which you will definitely want to examine.

Always fire up SAOimage before attempting to display an image; usually one does this from an X startup file or `.login`.

```
% saoimage -imtool &
```

In IRAF you should have the environment variable `stdimage` set to, yes, `imtool` or one of its cronies (e.g. `imt800, imt1024`):

```
cl> set stdimage = imtool
```

You will probably want to do this in your `login.cl` file with your other customizations. At this point all you need to do is display an image:

```
cl> images
im> tv
tv> display dev$pix 1
```

The default size of an saoimage window is 512*512. Although you can fire it up with any size window up to some limit (probably 2048*2048 maximum) on the command line, only certain sizes will work with IRAF tasks. To see what these sizes are, page the imtoolrc file:

```
% more $iraf/unix/x11/saoimage/imtoolrc
```

To use the 800 square window, you would first fire up saoimage with the right size, then from IRAF reset stdimage to the corresponding size.

```
% saoimage -imtool -g 800x800 &
cl> reset stdimage = imt800
cl> display ...
```

To change frame sizes in an existing saoimage session, the "new" button lets you enter any command line option. Always remember to reset stdimage accordingly.

Good luck on your installation. Please let us hear from you if you have any problems or suggestions as you use the system.

Sincerely,

Steve Rooke

IRAF HOTLINE

internet	`iraf@noao.edu`	
span/hepnet	`noao::iraf`	(noao = 5355)
uucp	`{arizona,decvax,ncar}!noao!iraf` or	
uucp	`uunet!noao.edu!iraf`	
bitnet	`iraf@noao.edu` (through a gateway)	
telephone	`(602) 323-4160`	
FAX	`(602) 325-9360`	