PART I:

Introduction to HST Data

- Introduction to HST Data

Chapter 1
Getting HST Data

In This Chapter...

This chapter describes how to obtain Hubble Space Telescope (HST) data files. Both Guest Observers (GO) and Archival Researchers can receive data in either of two ways:

- Electronically over the Internet from the Hubble Data Archive, where data are stored immediately after they pass through HST pipeline processing.
- On a data tape generated from the Archive.

To retrieve data electronically you must first register with the Archive. If you wish to retrieve proprietary data associated with a particular proposal you must also request authorization to retrieve data from that proposal. Tapes, if requested, are sent to Principal Investigators automatically. This chapter explains how to search the Archive for datasets of interest, how to retrieve data electronically from the Archive, and how to read a typical GO data tape.

1.1 Archive Overview

STScI maintains an Archive of all HST data and their associated calibration files. The Archive holds all HST observations ever made and provides a database that catalogs and describes these observations. A program called *StarView* acts as an interface to the Archive; it allows you to search the Archive and to retrieve data from it. StarView is the sole electronic source of proprietary data. A World Wide Web interface to the archive currently permits retrieval of public but not proprietary data.

1.1.1 Accessing the Archive

To retrieve data electronically you need to be able to access StarView (or the Archive web site if you are interested only in public data), and you need to be a registered user of the archive. Only *registered* users may retrieve data from the Archive. Proprietary data can be retrieved *only by authorized registered* users.

General Observers and Guaranteed Time Observers (GTO) normally have exclusive rights to their HST data for one year. However, all observations obtained under calibration proposals are immediately public.

Distributed Access

StarView operates most rapidly if you run it on your own machine, and it is available in executable form for several operating systems. To take advantage of the speed of distributed access, download the StarView software from our website:

`http://archive.stsci.edu/starview.html`

The web site contains directions and materials for installing StarView on your own computer. No compilation is necessary. Once StarView is installed, typing `xstarview` starts the program.

By running the `xstarview` client on your own computer, you avoid the overhead of running the software over the network, giving you a considerable speed improvement.

Remote Access

You can run StarView remotely at STScI, if it is not currently available on your local machine. Use `telnet` to connect to `archive.stsci.edu` and log in with the user name `guest` and password `archive`[1]. Once logged in, you can use StarView to peruse the database. Simply type `xstarview` for the X-Windows version or `starview` from the command line for the terminal version. The X-Windows version takes advantage of all of StarView's capabilities, including data previews; however, the terminal version will respond faster under remote access.

1. European archive users should generally use the ST-ECF Archive system via their web site at `http://archive.eso.org/`. Canadian users should request public archival data through the CADC web site; `http://cadc.dao.nrc.ca/`. Proprietary data is available only through STScI.

Web Access

STScI maintains a web site for current news, quick retrieval of special datasets, and retrieval of public data sets through online forms:

`http://archive.stsci.edu/`

Features of this web site include:

- Registration using online forms.
- Archive news.
- Form-based access to the Archive and the Digitized Sky Survey.
- A FITS Keyword Dictionary for interpreting header keywords.
- Archive documentation and policies.

1.1.2 Registering to Retrieve Hubble Data

The simplest way to register is through our World Wide Web form at the following location:

`http://archive.stsci.edu/registration.html`

You can also register by typing the `register` command while logged onto `archive.stsci.edu`.

Your retrieval account will be activated within two working days, and you will receive your password via E-mail.

1.1.3 Authorization to Retrieve Proprietary Data

To be authorized to retrieve proprietary data, you must (a) send email to the archive hotseat (`archive@stsci.edu`) if you are the Principal Investigator (PI) of the proposal, specifying the proposal ID number and your registered username, or (b) request the PI to do so.

Note that PIs are *not* automatically authorized to retrieve their own data.

1.1.4 Archive Documentation and Help

The Archive's web page provides a wealth of useful information, including an online version of the *HST Archive Manual*. Postscript versions of the *HST Archive Primer* and the *HST Archive Manual* are available via anonymous FTP from `archive.stsci.edu`. in the `pub/manuals` directory. If you have any questions, direct them via E-mail to `archive@stsci.edu`, or phone (410) 338-4547.

1.1.5 Getting Your Data Quickly

The fastest way to retrieve your proprietary data is to:

- Start StarView.
- Go to either the <General Search> or <Quick Search> screen.
- Enter your PI name or proposal ID in the appropriate field.
- Click on **[Begin Search]**.
- Click on the **[Scan Forward]** button in the <Results> screen to complete your search.
- Select all of your observations for retrieval by clicking on **[Mark All]**, then click **[Retrieve Marked Data]**. This action will spawn another screen listing all of your marked datasets.
- Click on **[Submit Request]**, which spawns the <File Options> screen. To make sure you get all of your data, select both calibrated and uncalibrated data. (This step is particularly important for NICMOS observers who want to retrieve individual exposures as well as their pipeline data products.)
- Click on **[Submit Request]**, bringing up a screen in which you enter your archive username and password and specify the means and delivery location for your data. StarView users can receive data directly to their home computer (NET) or on tape. Users interested in non-proprietary data can transfer datasets to a public site on `archive.stsci.edu` for subsequent downloading to their own machines via FTP (HOST).
- Click on **[Submit Request]** once more, and your data are on their way.

Users will receive an E-mail message when the retrieval request has been queued, and another when it has been completed. If you need more guidance, see the StarView tutorial below or the Archive documentation (*HST Archive Primer* or *HST Archive Manual*.)

1.2 Getting Data with StarView

StarView is available in an X-Windows based version and a terminal version for basic terminals, such as a VT100. This section leads you through a simple example of an X-Windows StarView session, providing additional information about how to run the terminal version where the two versions differ. The terminal version is only available remotely and is mainly useful if your electronic connection to STScI is slow. If you need to access StarView remotely, consult “Running StarView via Remote Access” on page 1-18 before proceeding.

Start the X-Windows version of StarView by typing:

```
% xstarview
```

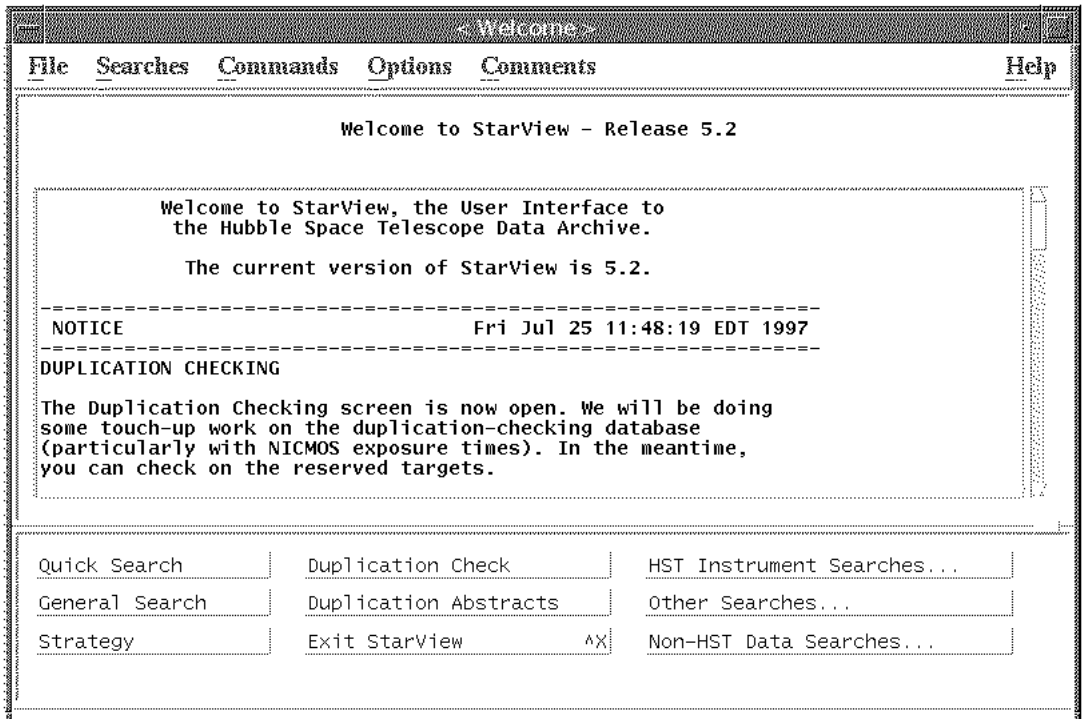
Some introductory messages will then appear on your screen. To see more of the text, press Space. To quit, press Q.

The StarView session then begins, displaying messages telling you what is happening (e.g., data dictionaries being loaded). The startup process may take a minute or two to complete.

1.2.1 Welcome Screen

The StarView <Welcome> screen (Figure 1.1) appears first. If there is any urgent news (e.g., a message about possible system downtime), it will appear at the top of the welcome text.

Figure 1.1: Welcome Screen



You can scroll through the text and read any additional information below the display area using the scroll bar on the X-Windows version of StarView. On the terminal version (for VT100 or other basic terminals), use the arrow keys or page up by pressing Control – V and page down by pressing Control – P.

1.2.2 Command Usage and Screen Interaction

In the *X-windows version* of StarView:

- Use the mouse to select all functions.
- Choose options by positioning the mouse pointer over the command button or menu and pressing the left mouse button.

In the *terminal version*:

- Press Control-T to cycle through the three screen areas (*menu*, *work area*, and *command box*).
- Use the arrow keys to move around within any one portion of the screen.
- Whenever an option is highlighted, press Return to invoke the highlighted function.

You can also use the *command accelerators* to invoke functions (i.e., run commands). Some command buttons show accelerators such as "^N", which means you can invoke the function or command by pressing down on the Control key while simultaneously pressing the N key. Other commands show accelerators such as "E+n", which means that you would press the Esc (escape) key followed by N.

1.2.3 Searching the Catalog

To search the catalog:

1. Choose a search screen.
2. Specify your search criteria, such as a range of sky coordinates (and a release date before today's date if you want public data.).
3. Click on the **[Begin Search]** button to start the search.
4. Click on the **[Scan Forward]** button to complete the search.

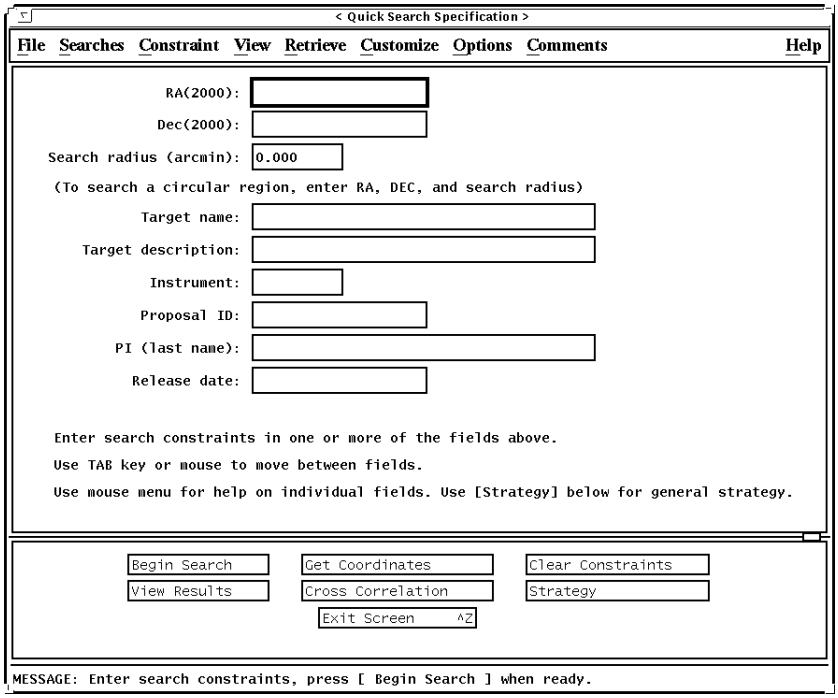
In this example we use the <Quick Search> screen to search the HST catalog.

The <Quick Search> screen is useful for most basic searches of the HST catalog. An extensive set of more detailed search screens is also available. To choose one of these, click on **[Other Searches]** or pull down the **| Searches |** menu. Consult the *HST Archive Manual* for more details.

The <Quick Search> Screen

Choose the <Quick Search> screen by clicking the **[Quick Search]** button. The <Quick Search> screen is shown in Figure 1.2. We will use this screen to request all of the public WFPC2 data for the galaxy M87.

Figure 1.2: Quick Search Screen



Specifying Search Criteria

There are various ways to search for observations of a particular target in the catalog. The easiest way is to enter the name (e.g., “M87”) in the target field. Because observers do not necessarily use the same convention to name sources, this strategy might not return all observations of a given source. The best way to ensure that you retrieve *all* observations of a given stationary target is to search for observations within a given (radial) distance of your source’s position by entering constraints in the “RA”, “Dec”, and “Search radius” fields on the <Quick Search> screen.

If you do not know the RA and Dec of your target, you can run either the SIMBAD or NED target name resolver from within StarView. Each resolver automatically determines the target’s position using a network connection to either the SIMBAD database in Europe or the NASA Extragalactic Database (NED) in California. It then populates the RA and Dec fields on the search screen with this information. Click on the **[Get Coordinates]** button to use the SIMBAD resolver; to use NED, pull down the **|Options|** menu, select User Defaults, and change the “Coordinates lookup server” field to NED.

Since we want all observations of M87 (even when the target name is something else), we will use “Get Coordinates” to fill in the RA and Dec. Click on the **[Get Coordinates]** button, enter “M87” as the name, and the RA and Dec fields will be automatically filled.

In this case, we want WFPC2 observations, so move to the “Instrument” field. The valid HST instruments are:

- Faint Object Camera (FOC).
- Faint Object Spectrograph (FOS).
- Fine Guidance Sensors (FGS).
- Goddard High Resolution Spectrograph (HRS).
- High Speed Photometer (HSP).
- Near Infrared Camera and Multiobject Spectrograph (NICMOS).
- Space Telescope Imaging Spectrograph (STIS).
- Wide Field Planetary Camera (WFPC).
- Wide Field Planetary Camera 2 (WFPC2).

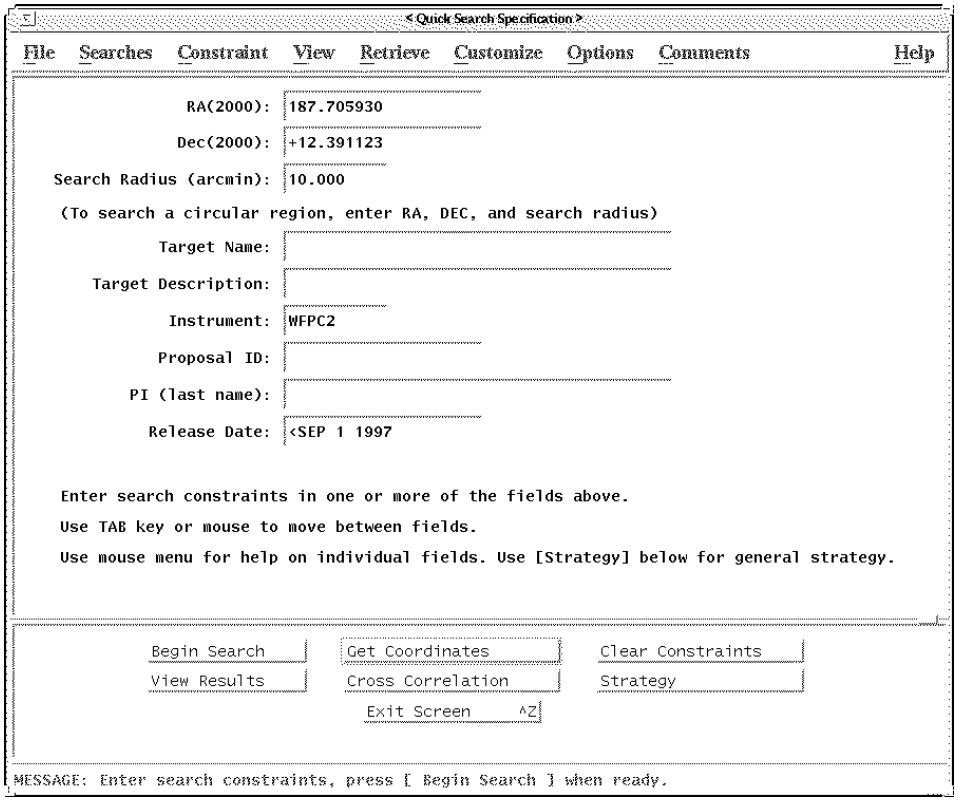
To get help on the valid ranges for any field, use the *field help*. In `xstarview`, move the cursor to the field and press the right mouse button (or press the Help button, often located in the bottom left corner of your keyboard).

Enter `WFPC2` in the instrument field. (To find observations from more than one instrument, use a comma-separated list; e.g., `WFPC2,WFPC,FOC`.)

We want public data, so now specify that we want data released prior to today’s date. For example, move to the “Release date” field and enter `<Sep 1 1997` for any datasets that were released before September 1, 1997. Figure 1.3 shows how the <Quick Search> screen looks at this point.

Don’t use commas in a date field. StarView will interpret the comma as a list operator.

Figure 1.3: Quick Search Screen With Constraints Entered



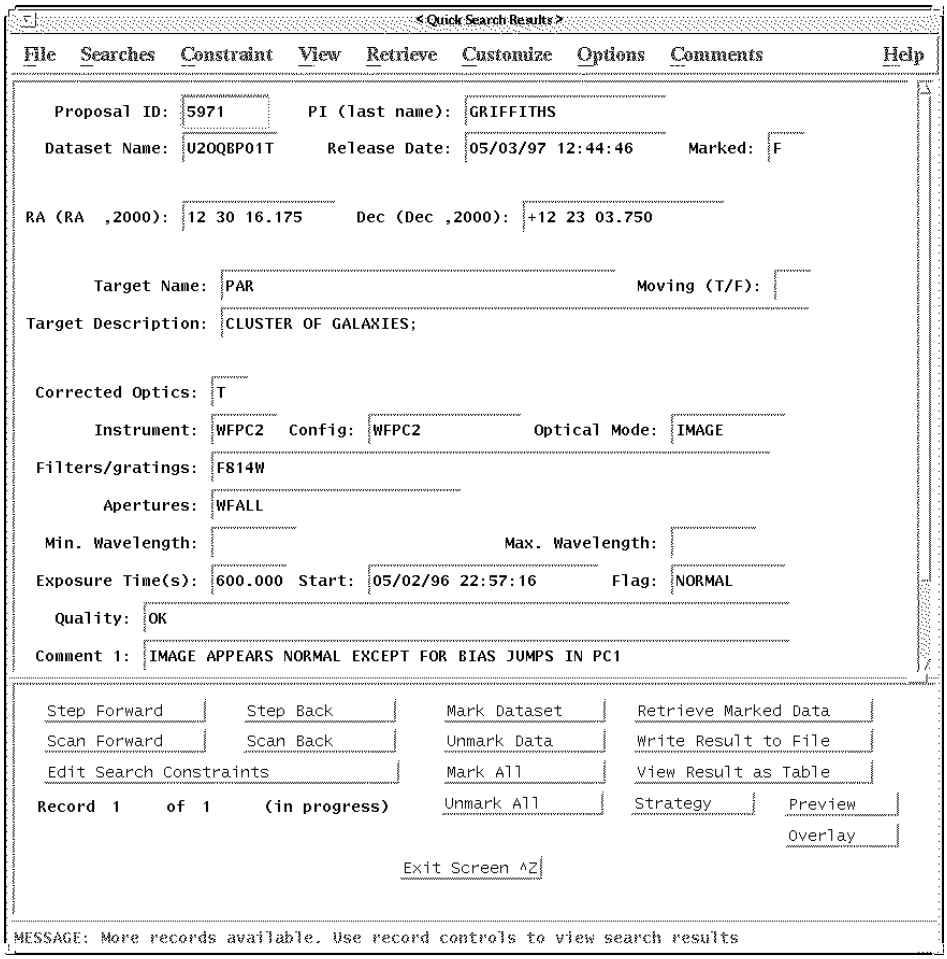
Use the **[Strategy]** button to get help using any StarView screen, or the pull down |**Help**| in the menu bar to see all the available StarView help.

Starting the Search

Click on the **[Begin Search]** button to search the catalog for the observations satisfying your search criteria. If none are found, a message will appear at the bottom of the screen, and you will need to enter different search constraints. If at least one observation is found, the screen will change to the <Quick Search Results> screen.

The <Quick Search Results> screen (Figure 1.4) shows the results of your catalog search. The first record that matches your search criteria will be displayed.

Figure 1.4: Quick Search Results Screen With Record Display



Viewing Subsequent Found Observations

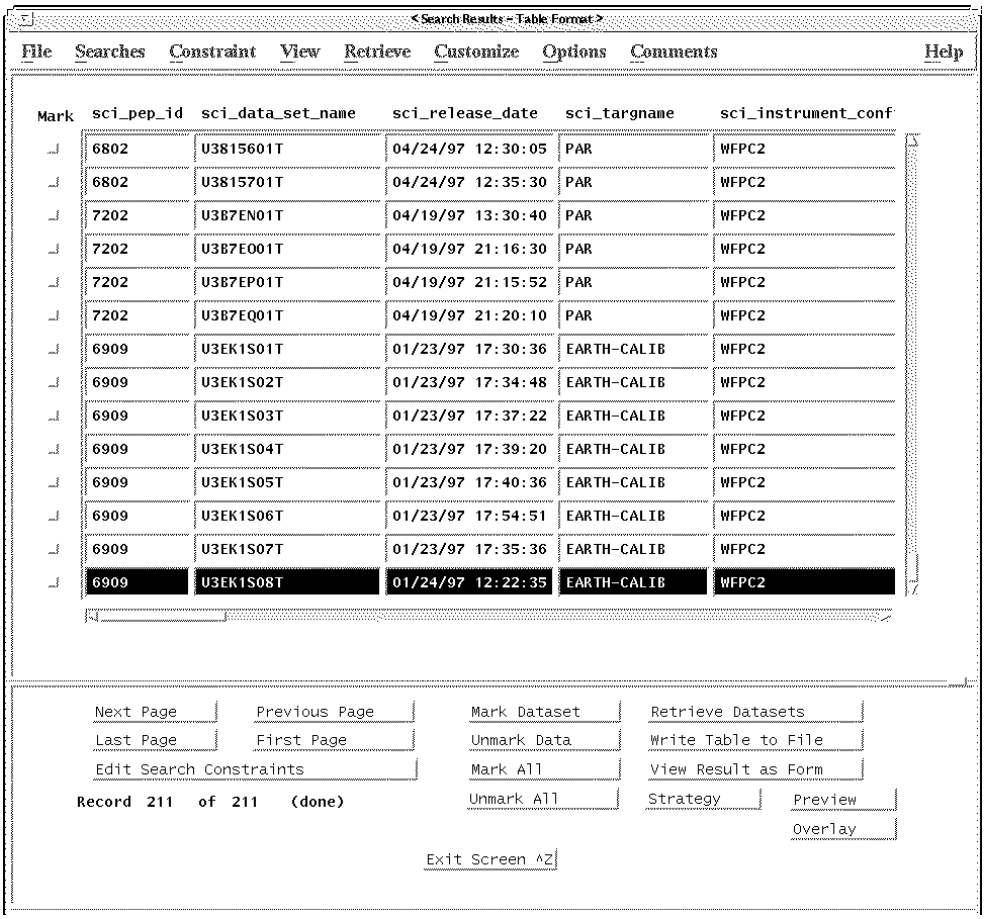
If you want to scan the full list of your search results:

- Click the **[Step Forward]** button to view one record at a time.
- Click **[Scan Forward]** to see all of the found records in rapid succession. Press any key to stop the scan. To complete the query, allow the Scan Forward process run to completion.
- To return to previous records, use **[Step Back]** or **[Scan Back]**.

Notice that many of the fields within 10’ of M87 do not have M87 as a target name. They are randomly-pointed parallel observations, high latitude fields, and so on. You should notice that some of the pointings are not astronomical exposures at all, but rather are random calibration fields such as biases and Earth flats. One way to exclude these datasets from your query is to bring up the General Search screen (which has more search parameters) and enter the constraint `!CAL` (meaning *not* CAL) in the Proposal Type field, as well as your coordinates, instrument, and release date constraints. This Proposal Type constraint excludes all standard (non-servicing mission) calibration proposals from your search. We will continue this example using the results of our <Quick Search> screen query.

Another way to view your search results is to use StarView's <TableFormat> screen. Click on **[View Result as Table]** to see several catalog records at the same time (see Figure 1.5). Click on **[View Result as Form]** to return to the single-record screen format.

Figure 1.5: Quick Search Results Displayed on the Table Format Screen



Use the **[Preview]** button to get a quick look at the data. Previewing can help you decide whether or not to retrieve a dataset. The Preview function displays compressed HST images (not suitable for science analysis), as well as FOS or GHRS spectra. Only public data are available for preview. Previews are not available in the terminal version.

1.2.4 Retrieving Datasets From the Archive

We now want to retrieve some of the data that we have identified in the catalog. The steps in this process are:

1. Mark the observations that you want to retrieve; you can mark them either individually or as a group.
2. Display and review the list of datasets to be retrieved.
3. Specify the file formats and media to be used in the retrieval process.
4. Submit the request.
5. Check the request status, if desired.

Marking Observations for Retrieval

To mark for retrieval the dataset displayed on the screen, click the **[Mark Dataset]** button. A message confirming this action will appear at the bottom of the screen. Also, the "Marked" field, in the upper right corner of the screen, will display "T" (true) indicating that the dataset has been marked for retrieval.

You can mark datasets for retrieval in either the table-row format display screen, in which case the highlighted record is marked, or on the <Quick Search Results> screen with the record displayed.

If you want to mark for retrieval *all* of the records matching your search criteria, click on the **[Mark All]** button. This volume of data could be very large, as it would be for the M87 search request described here. Alternatively, step through your search results records by clicking on the **[Step Forward]** button and click on the **[Mark Dataset]** button for the specific observations you desire. In this example, we mark only a few datasets for retrieval.

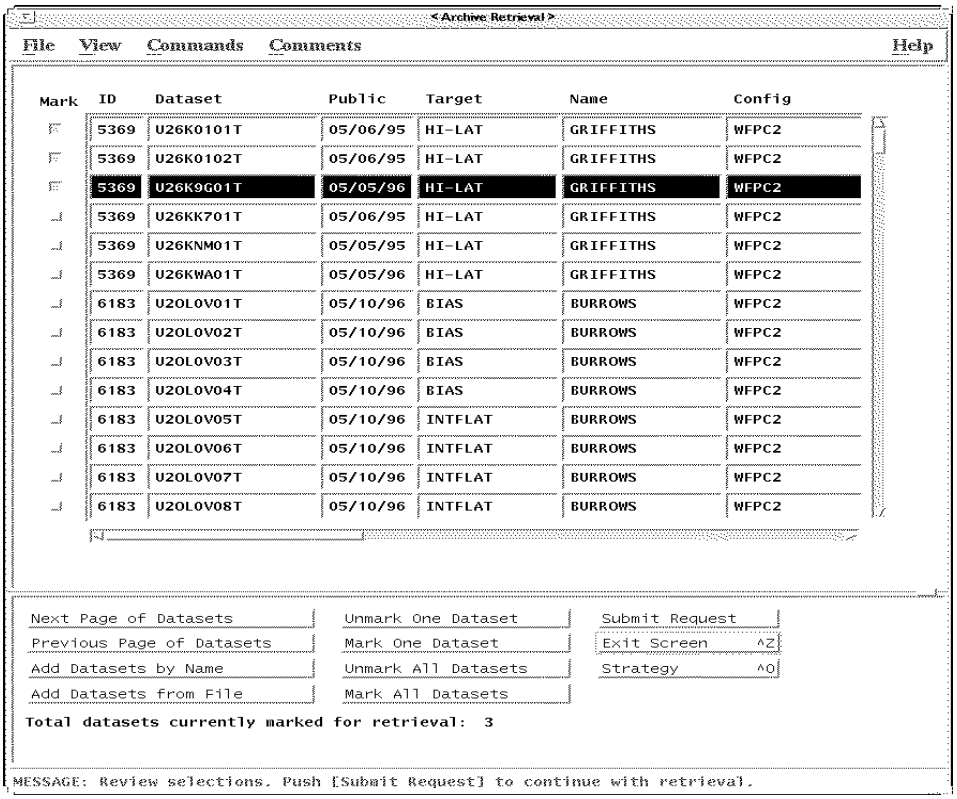
Reviewing the Retrieval Request

Once you have marked records for retrieval, you begin the retrieval process by displaying and reviewing the list of datasets to be retrieved:

1. Click on the **[Retrieve Marked Data]** button to exit the <Quick Search Results> screen and to begin the retrieval process by bringing up the <Archive Retrieval> screen.
2. Review the list of marked datasets.

The <Archive Retrieval> screen lists all of the datasets that you have marked for retrieval. In this case, you would see something like

Figure 1.6: The Archive Retrieval Screen



If you have marked numerous datasets, you may need to click on the **[Next Page of Datasets]** button to see additional screens of marked records. The total number of datasets that you have marked for retrieval is shown near the bottom of the screen.

If you wish to include additional datasets in your request, choose the **[Add Datasets by Name]** command from the <Archive Retrieval> screen (or use **[Add Datasets from File]** if you have a list of dataset names). Then enter the rootname (*no suffix*) of the calibration reference file(s) or science file(s) you wish to retrieve. (See Appendix B for more on rootnames and suffixes.)

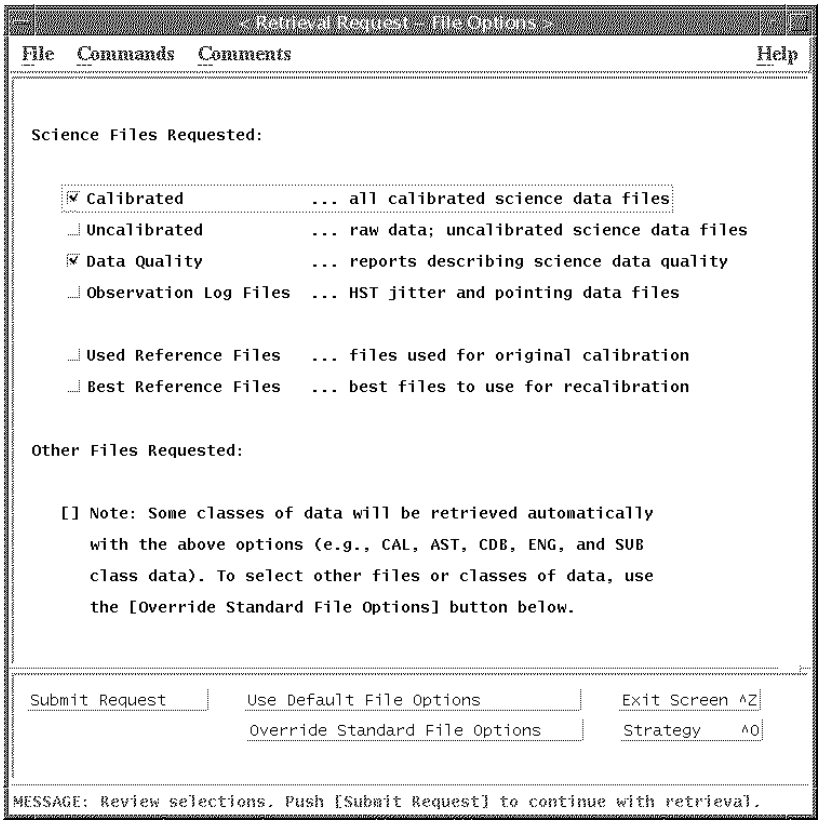
Specifying Formats and Media

To continue with the data retrieval process,:

1. Click the **[Submit Request]** button.
2. Specify the files that you want to retrieve.
3. Specify the type of medium (file transfer method) that you want.

When you click the **[Submit Request]** button, the <Retrieval Request - File Options> screen is displayed (Figure 1.7).

Figure 1.7: Retrieval Request - File Options Screen



The <Retrieval Request - File Options> screen indicates the kinds of files that will be retrieved. In this case the final calibrated science data files and the data quality report files will be retrieved. Click the **[Submit Request]** button to continue with the retrieval process.

If you plan to recalibrate your data, you can also request the uncalibrated data and the appropriate calibration reference files at this time. STIS users who need target acquisition data (ACQ or ACQ/PEAK images) should request uncalibrated data, because these images are not calibrated. NICMOS users who wish to obtain individual exposures that go into processed mosaics will also have to request the uncalibrated data. NICMOS users in particular may need to take care at this point not to exceed the ST-DADS dataset limit. This limit is currently set at 600 datasets, but be aware that multiple datasets can correspond to a single observation.

The <Retrieval Request - Media Options> screen is then displayed (Figure 1.8). You will need to enter your Archive user name and password, pressing Return after each entry. You can then choose how you would like to receive you data:

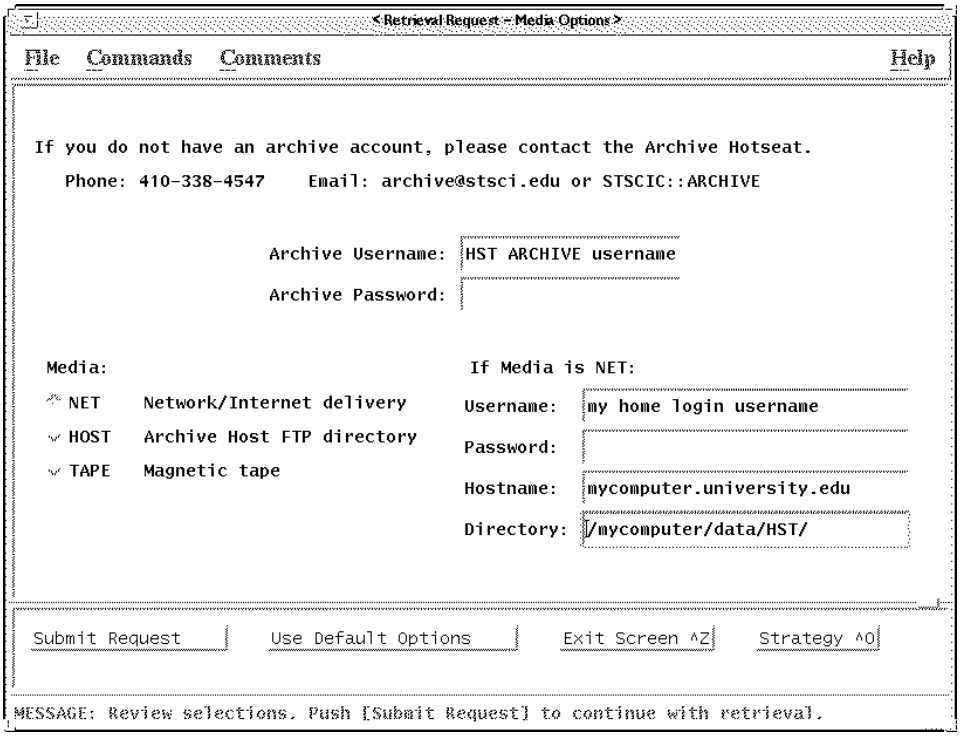
- Directly to your home computer via the Internet (NET).

- Via FTP from the Archive host computer (HOST).
- On magnetic tape shipped through the mail (TAPE).

To use the NET option, you must specify the Username and Password *of your own* computer account (or set Username to “anonymous” and Password to “archive@stsci.edu” if you opt to receive your data in an anonymous ftp site at your home institution), as well as the complete hostname of your workstation (e.g., `mycomputer.university.edu`) and full directory name (e.g., `/mycomputer/data/HST/`). All passwords are encrypted for secure transmission to STScI.

If you choose HOST delivery, your data will be sent to a subdirectory on `archive.stsci.edu` which will be named based on your archive username and a random number (e.g., SMITH1234) . To retrieve the data from this subdirectory, use anonymous FTP as described in “Transferring Your Data with FTP” on page 1-17.

Figure 1.8: Retrieval Request- Media Options Screen



The TAPE option is especially useful for large data requests.

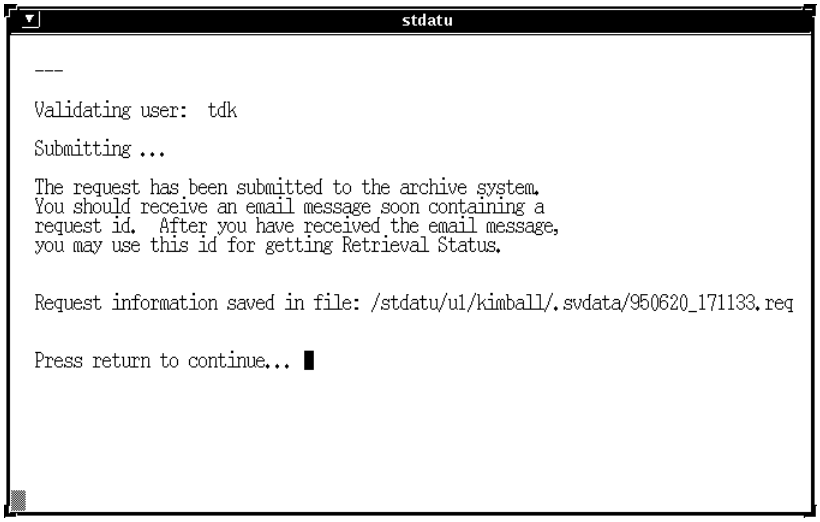
Submit the Request

Click on the **[Submit Request]** button to begin the submission process. StarView will validate your Archive account information and send your retrieval request to the Archive system.

At this point `xstarview` may want to interact with you using a special xterm window that it will initiate. Respond to any `xstarview` requests appearing in that window.

The list of datasets you have requested will be saved in a file named after the date and time of the request, with an extension of `.req`. StarView will display the name of this file in the xterm window. Figure 1.9 shows how a StarView screen might look at this stage.

Figure 1.9: Retrieval System Messages.



Press Return to exit from the retrieval process and to return to the StarView screen from which you initiated the retrieval request.

Shortly after your request is submitted, you will receive an E-mail message telling you that your request was accepted and queued by the Archive system and giving you the request ID.

You can use the request ID later to check the status of your request and also to locate your data on the Archive host's staging disk after it has been retrieved.

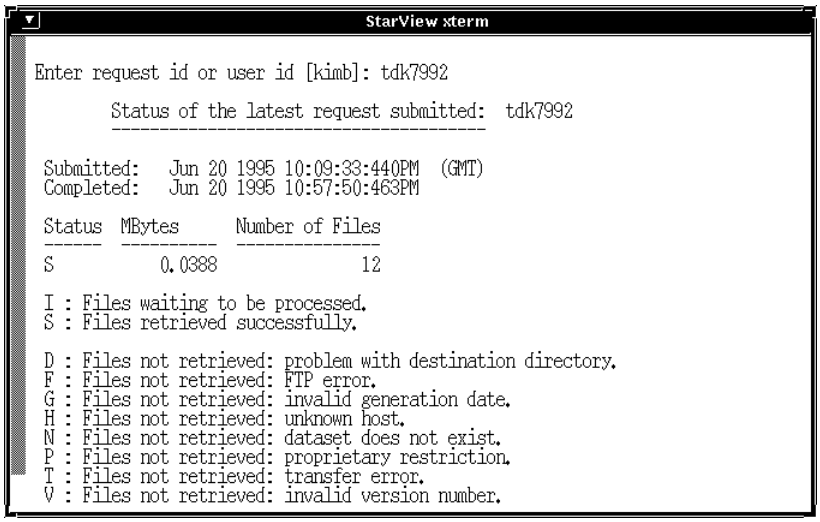
Checking Request Status

To check the status of your retrieval request:

1. Click on the **[Retrieval Status]** button from within the **| Retrieve |** menu on most StarView search screens, or click on the **| Commands |** menu from the <Welcome> screen.

2. You will be asked to enter your request ID, which will be E-mailed to you shortly after you submit your request. Type the request ID.
3. Press Return to continue with your StarView session. Figure 1.10 shows a sample retrieval status screen.

Figure 1.10: Sample Retrieval Status Screen



1.2.5 Exiting StarView

You can now either continue working in StarView, or you can exit. Press Control-X to exit StarView. A dialog box will appear asking you to confirm that you really want to exit. Click **[OK]** to exit.

1.2.6 Transferring Your Data with FTP

If you have chosen the HOST option, you will have to transfer your data yourself from `archive.stsci.edu` to your own disk via anonymous FTP. After your data have been retrieved from the Archive and placed in your `archive` subdirectory (e.g., SMITH1234 on `archive.stsci.edu`, see page 1-15), you will receive a second E-mail notification. You can then transfer the data to your home site as follows:

Figure 1.11: Retrieving Files Using FTP

Specify Binary

```
% ftp archive.stsci.edu
Connected to archive.stsci.edu.
220 archive.stsci.edu FTP server (Version 5.86) ready.
Name (archive.stsci.edu): anonymous
Password: Type your e-mail address
.
<message of the day displayed here>
.
ftp> cd tdk7992
250 CWD command successful.
ftp> binary
200 Type set to I.
ftp> prompt
Interactive mode off.
ftp> mget u*.fit
200 PORT command successful.
50 Opening BINARY mode data connection for u2900101t_c0f.fit
226 Transfer complete
.
.
ftp> bye
221 Goodbye.
```

Don’t forget to set the FTP transfer type to “binary” before transferring the files.

1.2.7 Running StarView via Remote Access

If you must use telnet to access the Archive, here’s how to do so.

```
% telnet archive.stsci.edu
Connected to archive.stsci.edu.
Escape character is ‘^]‘.
Login: guest
Password: archive
```

The username and password for the guest account

The X-Windows version will ask for your X display host name. You should respond with the name of your home workstation. You will then be instructed to add `archive` to your computer’s `xhost` file by typing the following line in another window and pressing Return to continue:

```
% xhost +archive.stsci.edu
```

You can now run the X-windows version of StarView remotely by typing

```
% xstarview
```

If you want to reduce networking overhead, you can use the terminal version instead by typing:

```
% starview
```

The terminal version of StarView will ask you to confirm your terminal setup. For example:

```
xterm 24 x 80 [Y]:
```

If this setup is correct, press Return to continue. If not, then answer "no" by pressing N followed by Return. If you answer "no", StarView will then ask some questions about your terminal type, number of lines, and number of columns. Type a question mark (?) to get help about your options.

Remember, if you have any problems or questions, contact the Archive hotseat at `archive@stsci.edu`.

1.3 Identifying Calibration Reference Files

StarView provides calibration reference file screens for each instrument. These screens let you see which calibration files and tables were used by pipeline processing to calibrate a given dataset at the time the data were taken, which calibration files and tables are currently recommended, and the degree to which the files used differ from the files recommended. You can mark either the used or the recommended reference files and tables for retrieval and retrieve them through StarView.

Note that you can retrieve the calibration reference files for your data very simply, either when you retrieve your data intially or later on, by searching and marking your data for retrieval and clicking on the "Best Reference Files" in the <Retrieval Request - File Options Screen>. (See Figure 1.7.)

In this example, we use a StarView reference file screen to display both the "used" and "recommended" calibration files for an M87 dataset.

From the <Welcome> Screen (Figure 1.3).

1. Click the **[HST Instrument Searches]** button.[2] (We want to find the search screen for calibration reference files.) The **[HST Instrument Searches]** screen will be displayed (Figure 1.12).
2. Click the **[Reference]** button on the **WFPC2** line to display <WFPC2 Reference Files - Search Specification> screen.
3. Specify search criteria. We want to specify a particular dataset, so move the cursor to the "Dataset Name" field, then type the dataset name for the observation whose calibration files you desire. For example, enter `U2900101T` (see Figure 1.13).

2. Users of the terminal version can use the accelerator E+2.

4. Click on the **[Begin Search]** button to submit your catalog search request. The <WFPC2 Reference Files - Search Results> screen will be displayed for the observation that you specified (Figure 1.14).
5. Click **[Mark USED Files for One Dataset]** to mark for retrieval those calibration files actually used to calibrate the dataset. If the files listed in the RECOMMENDED column differ from those in the USED column, then you can click on **[Mark RECOMMENDED for One Dataset]** to retrieve the calibration files that are now recommended for calibrating the data.
6. Click the **[Retrieve Marked Data]** button to begin the retrieval process for the marked reference files. Continue with the data retrieval procedures as outlined in “Retrieving Datasets From the Archive” on page 1-12.

The defaults on the <Retrieval Request-File Option> screen, i.e., “Calibrated”, will return the correct files for the specified calibration reference files and tables.

Figure 1.12: HST Instrument Searches Screen

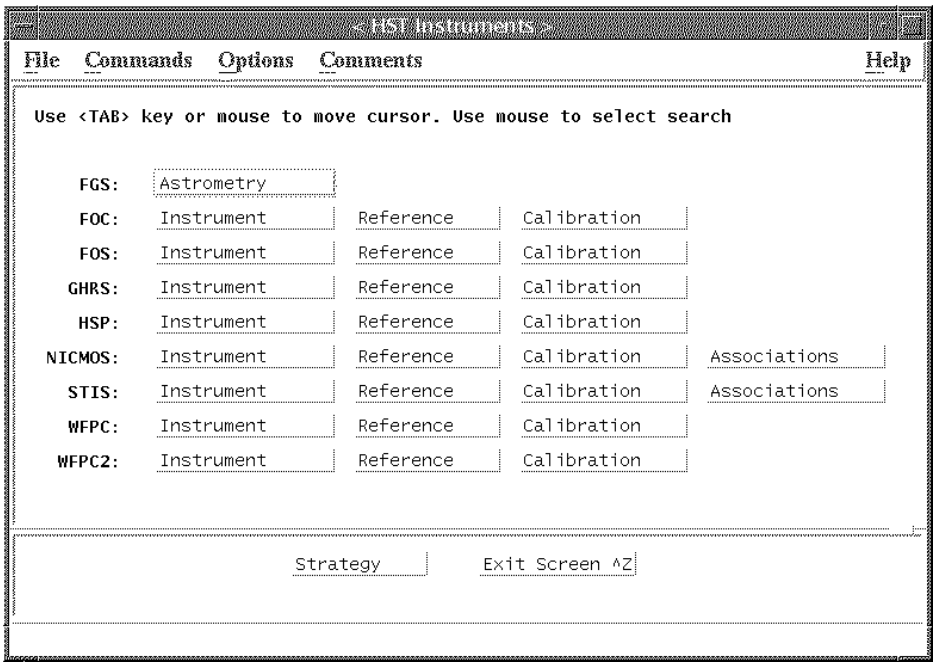


Figure 1.13: WFPC Reference Files - Search Specification Screen (Constrained)

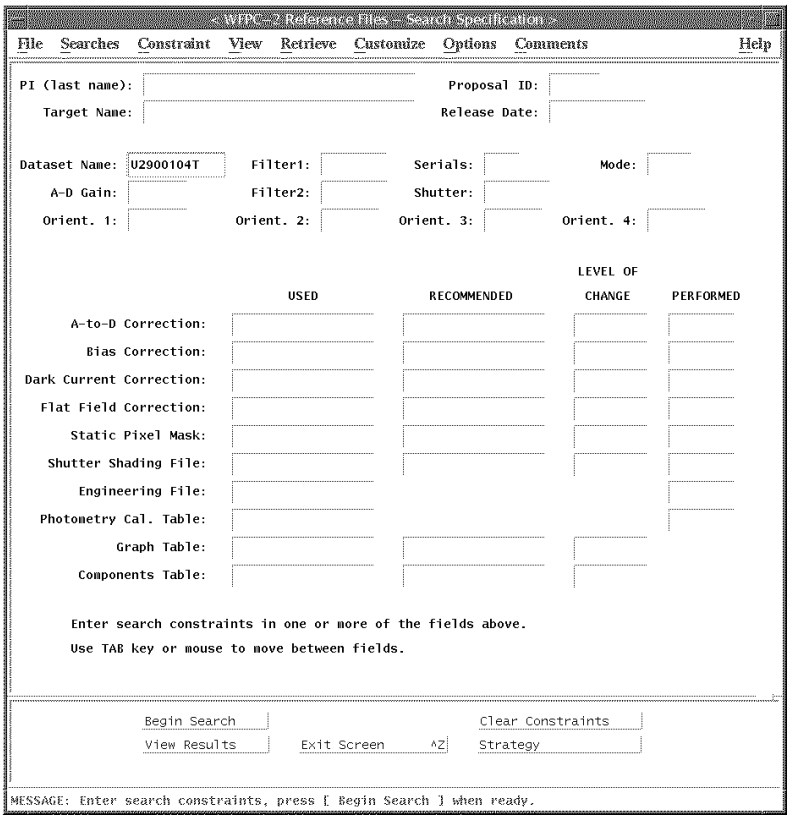
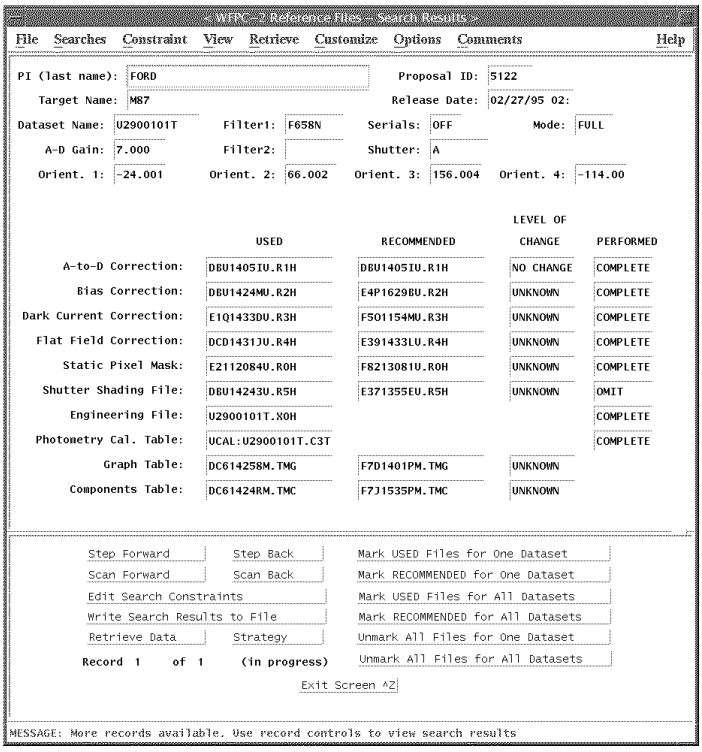


Figure 1.14: WFPC2 Reference Files - Search Results Screen



1.4 Reading HST Data Tapes

If you requested Exabyte or DAT tapes in your Phase II proposal, STScI will mail you one or more tapes containing your data within a few weeks of your HST observations. Your shipment of HST data ought to include:

- At least one data tape, together with a tape log listing its contents.
- Several printouts, called paper products, which are instrument-specific and are described in each instrument's Data Structures chapter.

Each of the files on your tape is in FITS (Flexible Image Transport System) format.[3] Any FITS reader should be able to read these files; however, GEIS (Generic Edited Information Set) is the standard format for analyzing all HST data other than STIS and NICMOS data. Chapter 2 discusses the HST implementations of the FITS and GEIS formats in more detail, explains the various types of HST data files, and interprets their names.

To read FITS files from your tape and write them to your disk, you can use the **strfits** task in IRAF/STSDAS. If you are not familiar with IRAF, consult the IRAF Primer in Appendix A before proceeding further. Chapter 3 contains additional information on STSDAS, the STScI data analysis software package.

The STSDAS **strfits** FITS reader preserves the multigroup format of an HST image. This format *must* be retained if you plan to recalibrate your data in STSDAS.

To read an HST data tape using **strfits**, you need to:

1. Start IRAF and load the **stsdas** and **fitsio** packages.
2. Mount the tape.
3. Set global parameters (e.g., `imtype`).
4. Set the **strfits** parameters and read the tape.

1.4.1 Loading Packages

Go to your IRAF home directory and start IRAF by typing:

```
cl
```

3. A description of the FITS format and the various options and parameters that can be used in the FITS standard can be found in the document "Implementation of the Flexible Image Transport System (FITS)," by the NASA/OSSA Office of Standards and Technology. The document is available via FTP to nssdca.gsfc.nasa.gov in the directory FITS. A listing of FITS standards and documentation is available from NRAO via the World Wide Web.

This action will start an IRAF session. Software in IRAF is organized into *packages*. To load a package, type its name. Once you are in IRAF, load the **stsdas** and **fitsio** packages by typing the following commands:

```
cl> stsdas
st> fitsio
```

The prompt (such as `fi>`) shows the first two letters of the most recently loaded package. The **fitsio** package contains tasks for handling the FITS format files used for HST images. You can use **catfits** (described on page 2-4) to produce a listing of the contents of your tape, and **strfits** to read the data onto disk. When you are done working with your data, you may choose to write it back to tape using **stwfits**.

1.4.2 Mounting the Tape

Mount the tape on your tape drive. Allocate the device within IRAF by typing:

`fi> allocate` *device*

where *device* is the IRAF name of the tape drive. If you are not sure how to mount tapes or don't know the IRAF names that match your tape drives, see your local system administrator for help.

1.4.3 Setting File Format

If you are reading FOC, FOS, FGS, GHRS, HSP, WF/PC-1, or WFPC2 data files, set the IRAF environment variable `imtype` to specify that your data files are to be written to your disk in GEIS format, for example:

```
fi> set imtype="hhh"
```

Currently **strfits** will also copy STIS and NICMOS files properly with `imtype` set to this value.

Then go to the directory in which you want your files to be stored. For example:

`fi> cd` */nem/data1/hstdata* ← **Replace this string with your directory path**

1.4.4 Using strfits

Like most IRAF and STSDAS tasks, **strfits** has several parameters that control the task's behavior. You can either specify the appropriate parameters on the command line or edit the parameter set using the **epar** task described on page A-8. In STSDAS version 2.0, most of the default parameters are set correctly for reading files from HST data tapes, so you need to specify only the name of the tape drive, the numbers of the data files to be read, and the oldirafname parameter.

For example, to read files 1 through 10 from the data tape on drive `mta`, type:

```
fi> strfits mta 1-10 oldirafname=yes
```

The tape log you received with your tape will tell you the number of each data file. You can also use the **catfits** task as follows to print a list of all the files on the tape to the screen:

```
fi> catfits mta 1-999 | page
```

Contact the Archive help desk at `archive@stsci.edu` if you have trouble reading your tape.

Be sure to set `oldirafname` and to “yes” or else the tape will not be read correctly and you will not be able to manipulate the data. This step is *vital* if you plan to recalibrate your data. (The parameter `xdimtogf` should be “yes” by default.)

Once your data are written on your disk, you can deallocate your tape drive by typing:

```
fi> deallocate device
```

You are now ready to work with your HST data files.

Deallocating the drive is important if you want to remain friends with your coworkers. No one else can use the drive until you deallocate it.