

7. Common Services

The FOS includes tools that facilitate ordinary tasks and services. These tools provide the following capabilities:

1. E-mail.
2. Event Message Monitoring via the Local and Event_Display-Global windows.
3. Message generation via the Quick-Message Generator. Messages are displayed on the Global Event Display window.
4. User customization.
5. File transfer via the Data Mover.
6. Browse on-line documentation via the Document Reader.
7. Help.
8. Snapshots.
9. Display page definition via the Display Builder.
10. Telemetry monitoring.
11. Room definition via the Room Builder.
12. Report generation.
13. Replay archived telemetry data.
14. Create Schematic Dynamic Pages with RTWorks.

7.1 E-mail

The FOS uses Netscape's commercial electronic mail software for composing, sending, and receiving electronic mail. Open Netscape and refer to Netscape's online documentation for instructions on using Netscape Mail.

7.2 Event Message Monitoring

The FOS generates and displays event messages - informational text messages generated by processes running at the EOC or IST. Event messages can indicate user actions, limit violations, and spacecraft and instrument status. Event messages are categorized by spacecraft ID (i.e., AM1) and event types (i.e., RMS). Appendix B contains a list of the FOS event messages which are defined in the PDB.

To open a Local or Event_Display-Global window:

The Event_Display-Local window displays events occurring on the userstation. The Event_Display-Global window displays events from the EOC, ISTs, the spacecraft, and instruments. Open the Local or Event_Display-Global window by clicking **Tools...** at the bottom of the Control window. The Tool Selection dialog box opens. Select **Event_Display-Local** (see Figure 7.2-1) or **Event_Display-Global** (see Figure 7.2-2) from the list of tools and click **OK**.

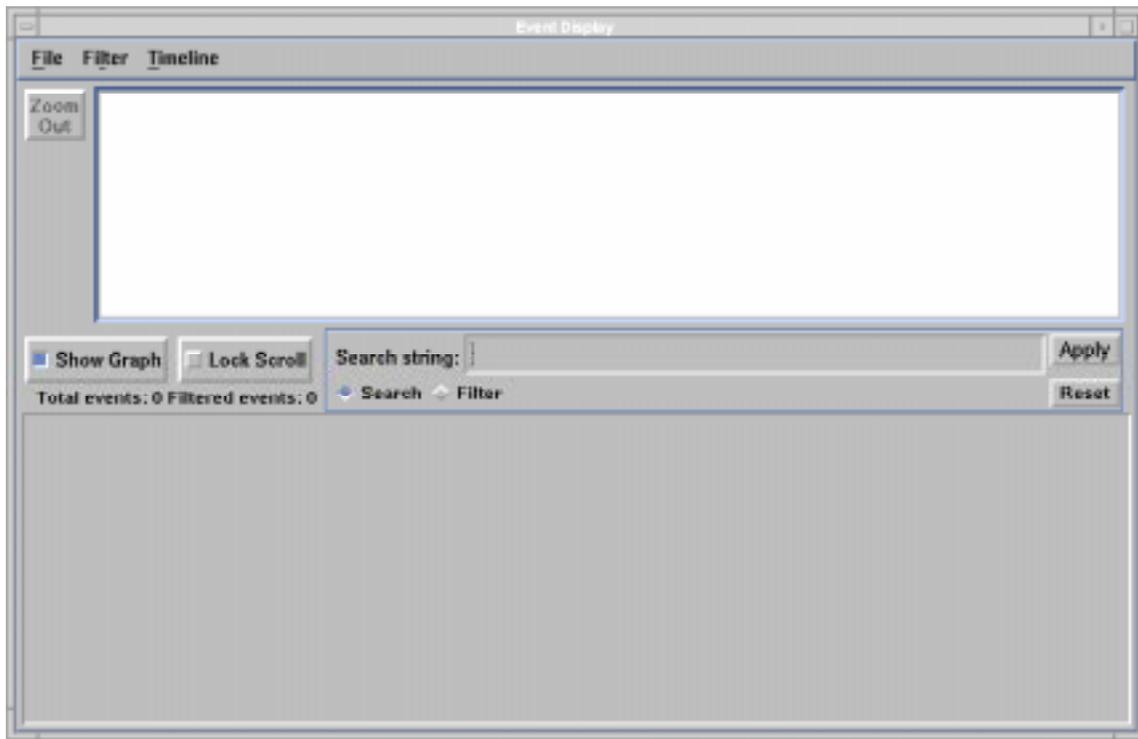


Figure 7.2-1. Event_Display-Local Window

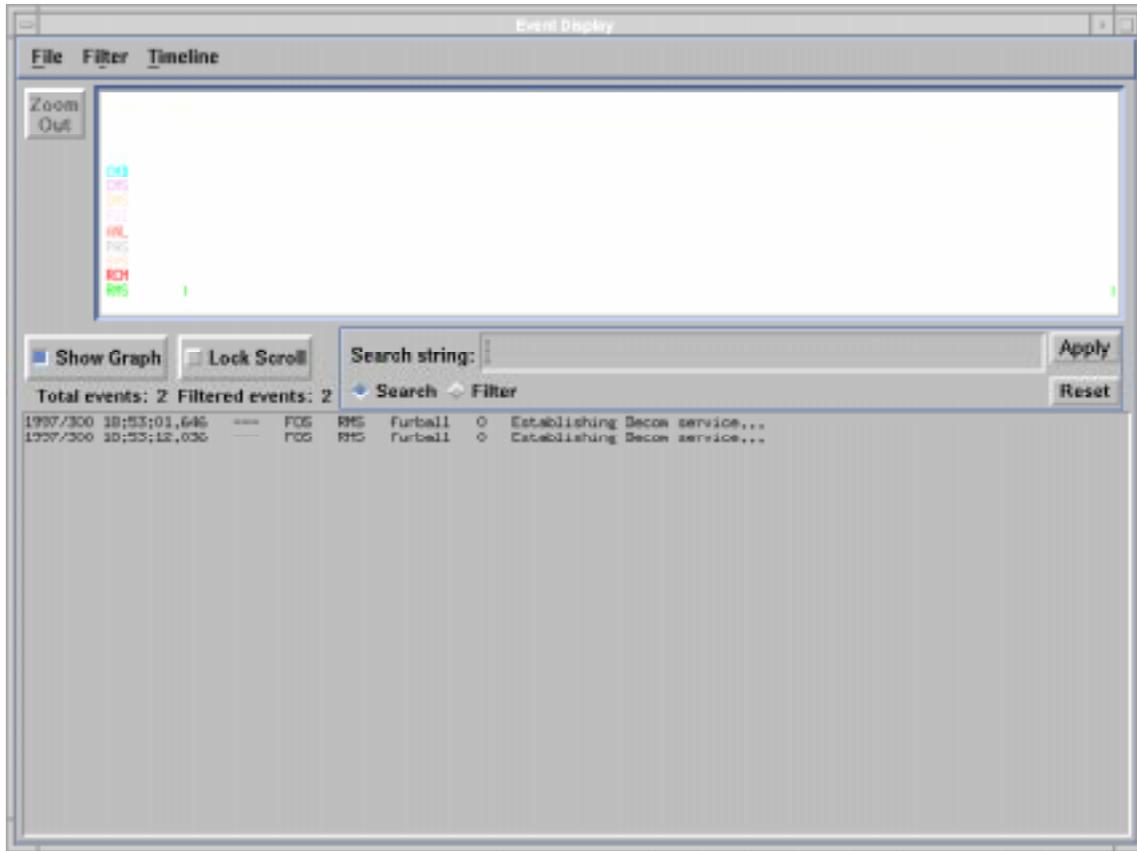


Figure 7.2-2. Event_Display-Global Window

To manipulate the Event Display window:

The Local and Event_Display-Global windows contain a timeline and scrolling chronological list of event messages. The list includes the time, spacecraft ID (if applicable), spacecraft subsystem, the FOS subsystem generating the event message, string ID (if applicable) or 0 (if the event message is not associated with a string), and the event message text. The event timeline contains a color-coded tick mark for each event in the listing. Selecting the tick mark in the timeline automatically highlights the associated event message.

To remove the event timeline from the Event Display window and enlarge the scrolling events display, click **Show Graph**. Restore the event timeline by clicking **Show Graph** again.

To freeze the scrolling Event Display window, click **Lock Scroll**. To restore the scrolling Event Display, click **Lock Scroll**.

To zoom in and out of the Event TimeLine:

To focus on events occurring in a specific time range, use the mouse to point and drag over a time range in the timeline at the top of the Event Display window. A small magnifying glass appears to

the left of the time-line and the selected time range becomes the timeline's new start and stop times. To zoom out and restore the view of all events in the timeline, click the **Zoom Out** to the left of the timeline. The zoom out state is the timeline's default state.

7.2.1 View Real-Time Event Messages

Real-time events are displayed on all userstations with an active Event Display window. The timeline displays events as they occur, beginning with the first event after the Event Display is active on the userstation.

The Control window displays the three most recent event messages in the Events list box. These event messages are color-coded as one of four message types: information - black lettering on gray background; warning - black lettering on yellow background; alarm - black lettering on red background; or fatal - white lettering on black background. Alarm messages blink on the screen until acknowledged. To acknowledge an alarm message, click the blinking message in the Control window and click **ACK**.

7.2.1.1 Monitor System Event Messages

Tivoli, a COTS product, monitors system resources at the EOC and generates event messages when EOC resources fall outside specified threshold values. These event messages are displayed via the Event_Display-Global window at the EOC and at ISTs. Although Tivoli was configured when the FOS software was delivered, the EOC System Administrator may reconfigure Tivoli to monitor additional or different system resources, specifying threshold values, polling intervals, and event messages for monitored resources. At present, Tivoli monitors events including: COTS application resources (i.e., Sybase daemon goes down), file system resources (i.e., Local disk partition (/usr/var/data/opt/tmp) has fewer than 150 inodes available), system resources (i.e., host goes down), network resources (i.e., client RPC bad calls increase 10%), print queues (i.e., availability of print queues). The System Administrator should refer to the Tivoli interface for the specific events Tivoli monitors and their corresponding threshold limits and polling intervals as well as events Tivoli could be configured to monitor.

7.2.2 Save and Open Events

Events being displayed in the Event Display window may be saved in ASCII format by selecting **Save** or **SaveAs** from the File menu. A saved event history file can be opened in a UNIX text editor.

7.2.3 Access the Event History Archive through Netscape

To access a complete event archive of global event message history, submit an FOS Event History form:

1. Start Netscape and type in the URL for the FOS Event History form, <http://www.eoc.ecs.nasa.gov/evhistform.html>.

2. In the Event History form (Figure 7.2.3-1), enter criteria in the fields you want to filter on. The following fields are displayed on the Event History form: Spacecraft; Subsystem; Spacecraft Time Stamp; FOS Event Type; Severity; FOS Time Stamp; FOS Event ID#; FOS Event Message (the message text); FOS Trigger; FOS Host; and Source File. Time Stamps are entered as a range of time. Leaving the form blank returns all events in the database.
3. Click **Submit**.
4. A Netscape page is returned which displays event messages matching the criteria entered in the event history form field (see Figure 7.2.3-2).

Netscape: Event History Database Access Form

File Edit View Go Bookmarks Options Directory Window Help

Back Forward Home Edit Reload Images Open Print Find Stop

Location:

What's New? What's Cool? Destinations Net Search People Software

Mini-EOC Development Event History Database



Spacecraft _____ : Subsystem _____ :

Spacecraft Time Stamp _ : (to)
(format YYYY:DDD:HH:MM:SS)

FOS Event Type _____ : Severity _____ :

FOS Time Stamp _____ : (to)
(format YYYY:DDD:HH:MM:SS)

FOS Event ID # _____ :

FOS Event Message _____ :

FOS Trigger _____ :

FOS Host _____ : Source File :

Figure 7.2.3-1. FOS Event History Form

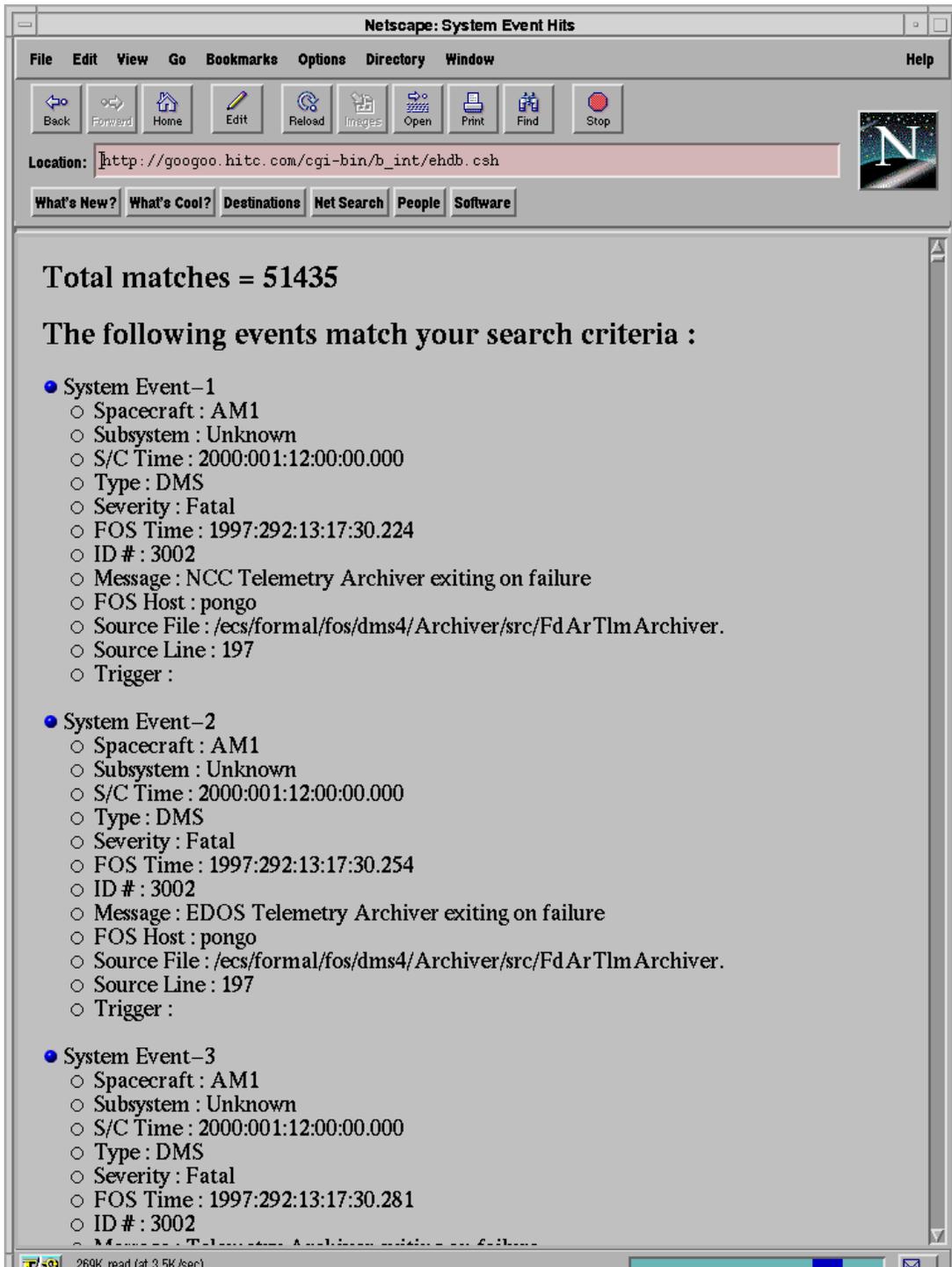


Figure 7.2.3-2. FOS Event History Report

7.2.4 Filtering Events

Events are filtered in order to focus on a particular type of event, or to monitor events generated by a designated subsystem or spacecraft. There are two methods of filtering events: selecting filtering options under the Filter menu or clicking the **Filter** toggle box on the Event Display window.

7.2.4.1 Filter Events via the Filter Menu

Select a filter under the Filter menu of the Event Display window: **Event Type**, **Subsystem**, **S/C ID** (Spacecraft ID), or **String ID**.

To filter events by Event Type:

Select **Event Type** to activate the Event Type Filter dialog box (see Figure 7.2.4.1-1). To display events associated with a particular event type, click in the box next to the event type under the columns labeled **Show**. The events will be displayed in the event display and on the timeline in the color indicated in the dialog box. Select **Bold** to display the event text in a bolded font. Click **All** to set the **Show** button on all the event types. Click **None** to clear the **Show** button on all the event types. Click **Apply** to activate your filter selections in the Event Display window. Close the filter dialog box by clicking **Close**.

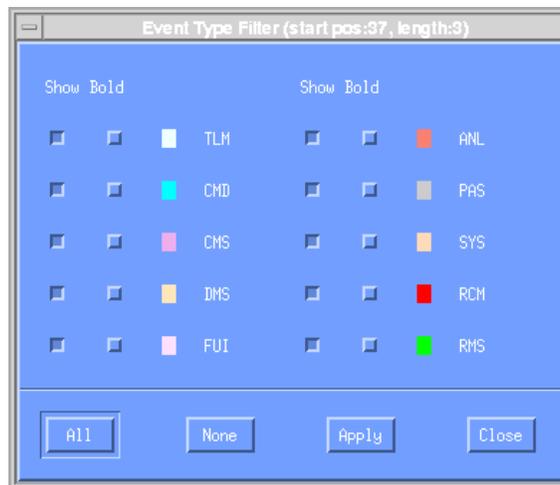


Figure 7.2.4.1-1. Event Type Filter Dialog Box

To filter events by Spacecraft Subsystem:

Select **Subsystem** to activate the Subsystem Filter dialog box (see Figure 7.2.4.1-2). To display events associated with a particular subsystem, click in the box next to the subsystem name under the columns labeled **Show**. The events will be displayed in the event display and on the timeline in the color indicated in the dialog box. Select **Bold** to display the events in the event display in a bolded font. Click **All** to set the **Show** button on all the subsystems. Click **None** to clear the

Show button on all the subsystems. Click **Apply** to activate your filter selections in the Event Display window. Close the filter dialog box by clicking **Close**.

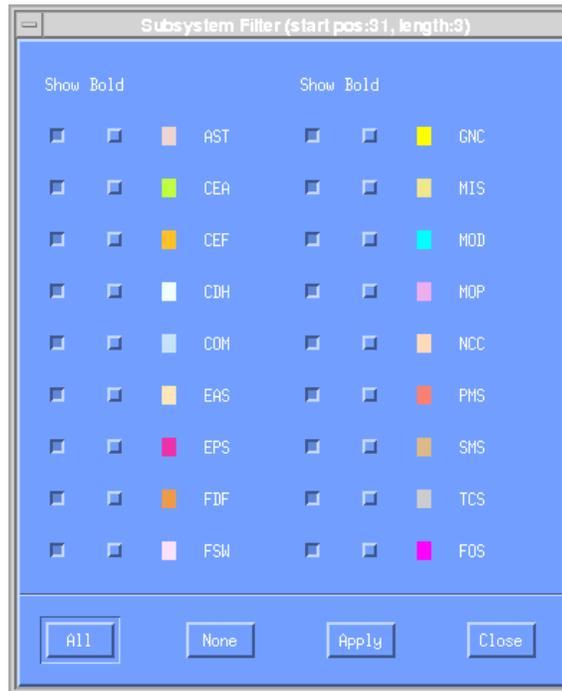


Figure 7.2.4.1-2. Subsystem Filter Dialog Box

To filter events by Spacecraft:

Select **S/C ID** to activate the S/C ID Filter dialog box (see Figure 7.2.4.1-3). To display events associated with a particular spacecraft, click in the box next to the spacecraft name under the columns labeled **Show**. The events will be displayed in the event display and on the timeline in the color indicated in the dialog box. Select **Bold** to display the event text in a bolded font. Click **All** to set the **Show** button on all the Spacecraft Iss. Click **None** to clear the **Show** button on all the Spacecraft Ids. Click **Apply** to activate your filter selections in the Event Display window. Close the filter dialog box by clicking **Close**.



Figure 7.2.4.1-3. Spacecraft ID Filter Dialog Box

To filter events by String ID:

Select **String ID** to activate the String ID Filter dialog box (see Figure 7.2.4.1-4). Select one or more string IDs to filter in the dialog box and click **OK**.

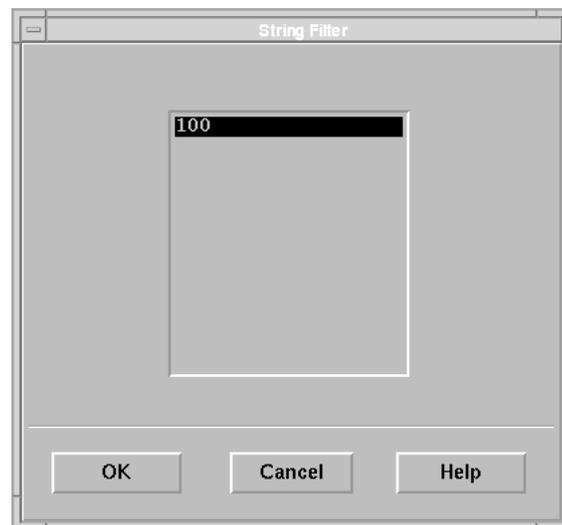


Figure 7.2.4.1-4. String ID Filter Dialog Box

7.2.4.2 Filter Events by String

To filter events based on a substring in the event text, click **Filter** in the Event Display window. Enter text in the **Search String** field and click **Apply**. Events matching the text entered in the Search String field are displayed in the Timeline and Event Display. Click **Reset** to remove the filter and display all events.

7.2.5 Search for Events

To search for events in the Event Display window, click **Search** in the Event Display window. Enter text in the **Search String** field and click **Apply**. The first event matching the text entered in the Search String field is highlighted in the Event Display. Click Apply again to highlight the next occurrence of the string in the **Search String** field. To clear **Search String** click **Reset**.

7.2.6 Timeline Setup

The timeline can be configured to graph the events three different ways. Events can be graphed by S/C Id, Subsystem, or Event Type. From the Timeline menu select **Event Type**, **Subsystem**, or **S/C Id**. When the Event Display window starts, the default setup is Event Type.

7.3 Quick-Message Generator

The Quick Message Generator sends messages (up to 240 characters) to every Global Event Display active at your site. Messages are assigned one of four severity levels by the sender: information - black lettering on gray background; warning - black lettering on yellow background; alarm - black lettering on red background; or fatal - white lettering on black background.

Monitor the messages you send and receive via the Global Event Display window, which displays events from the EOC, ISTs, the spacecraft, and instruments in a color corresponding to the message's severity level.

Start the Global Event Timeline by clicking **Tools...** at the bottom of the Control window. The Tool Selection dialog box opens. Select **Event_Display-Global** from the list of tools and click **OK**. The Global Event Display window opens (see Figure 7.2-2).

7.3.1 Send a Quick Message

1. **Start the Quick Message Generator (see Figure 7.3.1-1).**

Click **Tools...** at the bottom of the Control window. The Tools dialog box opens. Select **Quick_Message** from the list of tools.

2. **Enter a user name, subsystem or any character string.**

Regardless of the text entered in the To: box, the event message will be displayed on every userstation at your location with an active Global Event Timeline.

3. **Assign a severity level to the message.**

Click on the Severity menu and select the appropriate level - **Info**, **Warning**, **Alarm**, or **Fatal**.

4. **Type a message.**

Enter a message less than 240 characters in the box below the To: and Severity boxes.

5. **Send or cancel the message.**

Click **Cancel** to discard the message or **Send** to send the message.

The Event Message Generator closes.

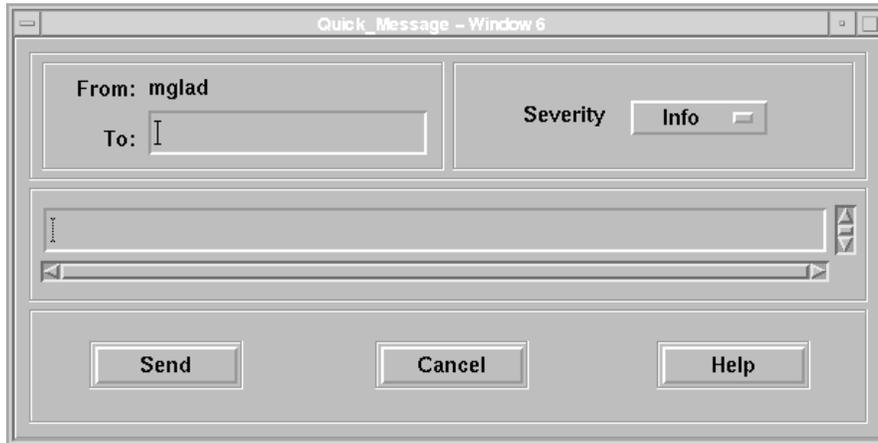


Figure 7.3.1-1. Quick Message Generator

7.4 User Customization

The FOS includes the capability to customize the user's environment by specifying fonts and window colors, selecting default printers, specifying data directories, associating function keys with ECL commands, associating the Control window room buttons with user-defined rooms, and establishing the background color for dynamic pages (also known as telemetry pages).

Open the User Customization window (see Figure 7.4-1) by clicking **Tools...** on the Control window or Mini Control window. When the Tool Selection dialog box opens, select **User Customization** from the list of tools and click **OK**.

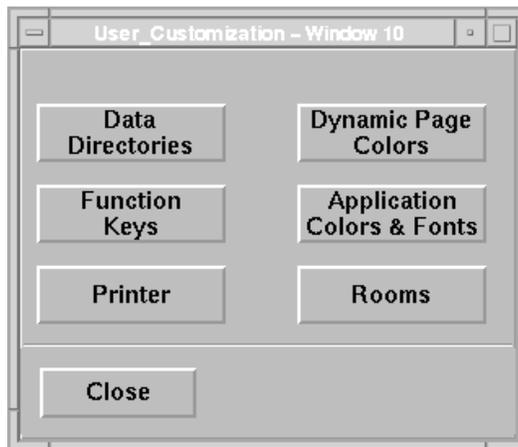


Figure 7.4-1. User Customization Window

7.4.1 Specify Fonts and Window Colors

1. **Open the Application Colors and Fonts Customization window (See Figure 7.4.1-1).**

Click **Application Colors & Fonts** on the User Customization window.

The right portion of the Application Colors and Fonts Customization window, labeled “Customization Preview”, is a preview area where you can view the color and font changes before application.

2. **Set the foreground color.**

Select **Foreground** from the Color Selector list box and drag the red, green, and blue slider bars to the left or right until the desired color is displayed in the preview area.

3. **Set the background color.**

Select **Background** from the Color Selector list box and drag the red, green, and blue slider bars to the left or right until the desired color is displayed in the preview area.

4. **Set the top shadow color.**

Select **Top Shadow** from the Color Selector list box and drag the red, green, and blue slider bars to the left or right until the desired color is displayed in the preview area.

5. **Set the bottom shadow color.**

Select **Bottom Shadow** from the Color Selector list box and drag the red, green, and blue slider bars to the left or right until the desired color is displayed in the preview area.

6. **Select the monospace font.**

Select a font from the list of monospaced fonts. The monospace font selected will update all monospace fonts.

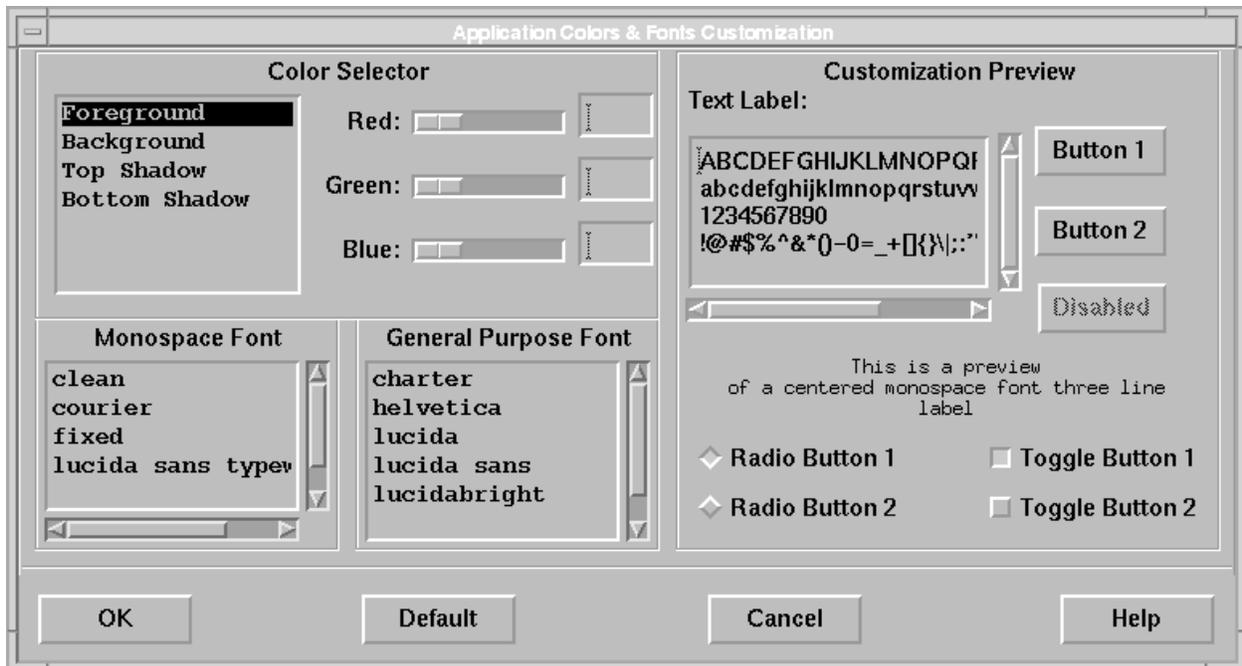


Figure 7.4.1-1. Application Colors and Fonts Customization Window

7. Select the general purpose font.

Select a font from the list of general purpose fonts. The font selected will update all fonts except monospace fonts.

8. Apply the window colors and fonts selected.

Click **OK**. The Application Colors and Fonts Customization window closes. After the current session, the window colors and fonts will return to their default settings.

or

Click **Default** to establish the window colors and fonts selected as the default settings. Click **OK** to close the Application Colors and Fonts Customization window.

7.4.2 Associate the Control Window Room Buttons with Rooms

1. Open the Room Customization window (see Figure 7.4.2-1).

Click **Rooms** on the User Customization window.

The list box on the left of the window labeled **Available Rooms**, lists system and user-defined rooms. The list of numbered rooms on the right labeled **Selected Rooms** represents the rooms associated with the room buttons (list item one represents the room associated with **R1** on the Control window and so on through **R5**).

2. **Clear all rooms associated with the room buttons.**

Click **Clear All**. If you do not wish to clear the room buttons, skip this step.

3. **Associate a room with one of the Control window room buttons.**

Select the room from the **Available Rooms** list box which you wish to associate with a room button. Using the middle mouse button, drag the selected room to one of the five text fields labeled one through five.

or

Double click the room in the **Available Rooms** list box to associate it with the first empty list box.

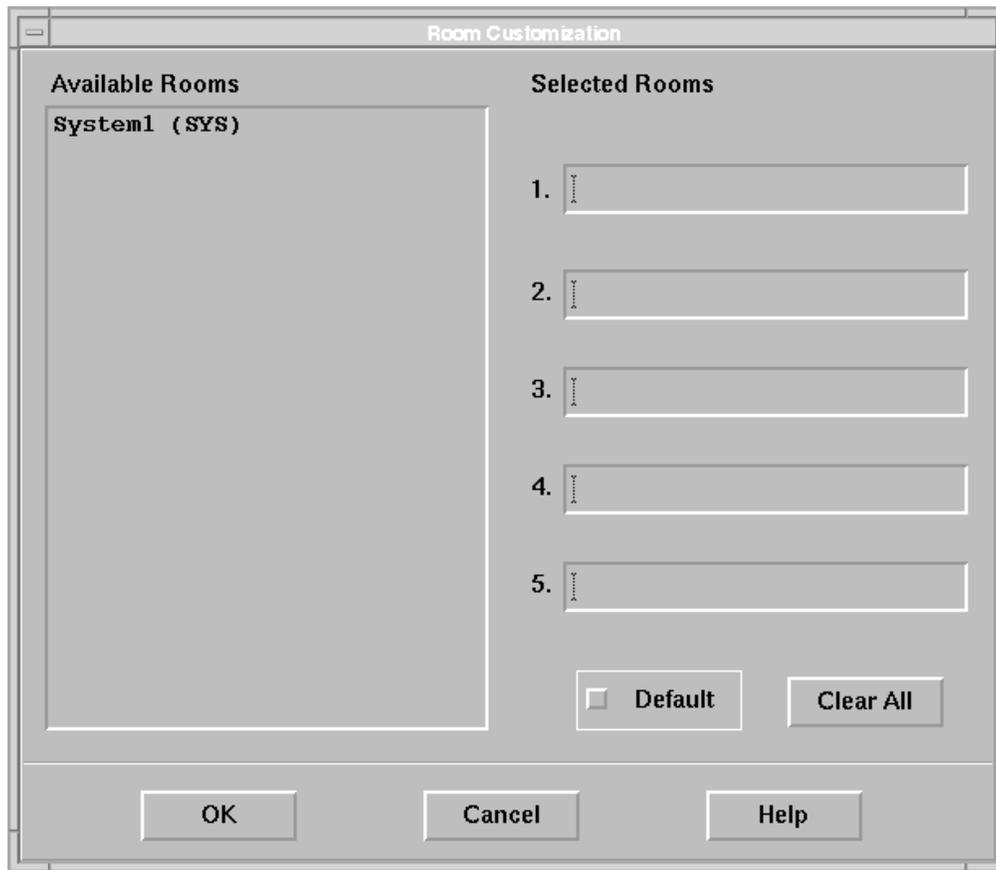


Figure 7.4.2-1. Room Customization Window

4. **Apply the rooms in the Selected Rooms list to the Control window room buttons for the current session only.**

Click **OK**. The Room Customization window closes. After the current session, the rooms buttons will return to their default settings.

or

Establish the rooms in the Selected Rooms as the default settings for the Control window room buttons.

Click **Default**. Click **OK** to close the Room Customization window.

or

Close the Room Customization window without updating the rooms associated with the room button.

Click **Cancel**.

7.4.3 Establish the Background Color for Dynamic Pages

1. Open the Dynamic Page Color Intensities Customization window (see Figure 7.4.3-1).

Click **Dynamic Page Colors** on the User Customization window.

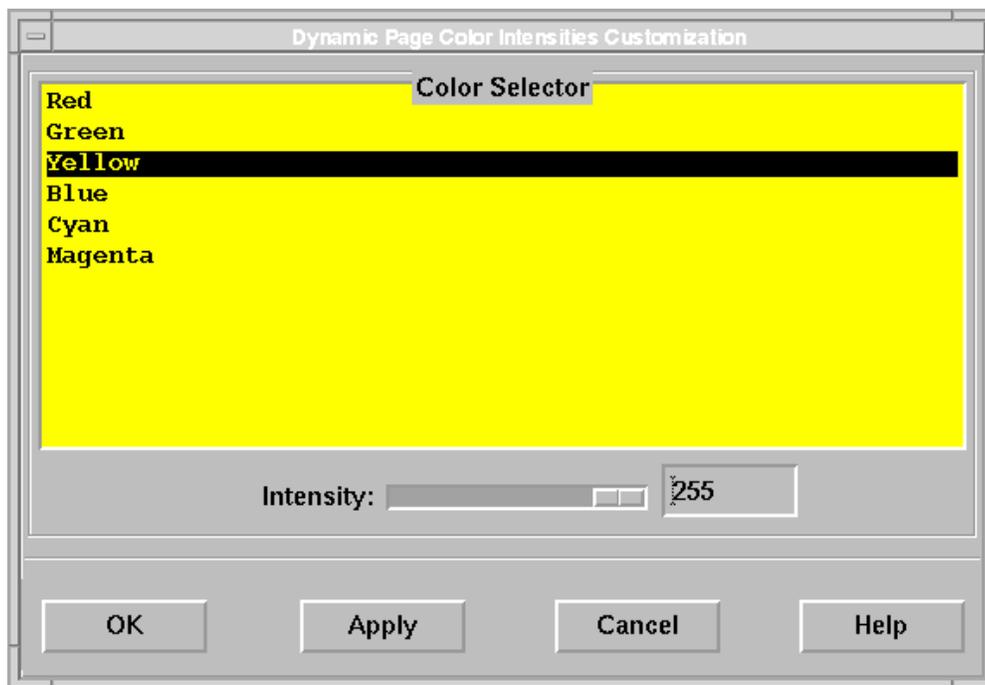


Figure 7.4.3-1. Dynamic Page Color Intensities Customization Window

2. **Select the background color for dynamic pages.**

Select a color in the **Color Selector** list box. Drag the **Intensity** slider bar to the left or right respectively to lighten or darken the background color.

3. **Apply the selected background color and close the Dynamic Page Color Intensities Customization window.**

Click **OK**.

or

Apply the selected background color and leave the Dynamic Page Color Intensities Customization window open.

Click **Apply**.

or

Close the Dynamic Page Color Intensities Customization window without updating the background color.

Click **Cancel**.

7.4.4 Assign an ECL Directive to a Function Key

1. **Open the ECL Directives Customization window (see Figure 7.4.4-1).**

Click **Function Keys** on the User Customization window.

2. **Select an unassigned function key to be associated with an ECL directive.**

Select a function key from the **Function Key** pull-down menu.

3. **Enter the ECL directive to be associated with the function key.**

Enter an ECL directive in the **ECL Directive** text field. Click **Add** to add the function key and directive to the table listing directives and their associated function keys. Repeat steps 2 and 3 to assign directives to additional function keys.

4. **Reassign a function key.**

Select the function key in the table which you wish to associate with a different directive. Click **Modify**. The function key is listed in the **Function Key** pull-down menu. Update the directive in the **ECL Directive** text field and click **Add**.

5. **Remove the association between a function key and a directive.**

Select one or more rows in the table listing function keys and their associated directives. Click **Delete**. A dialog box opens, prompting you to confirm the deletion of the function keys by clicking **Yes** or cancel by clicking **No**.

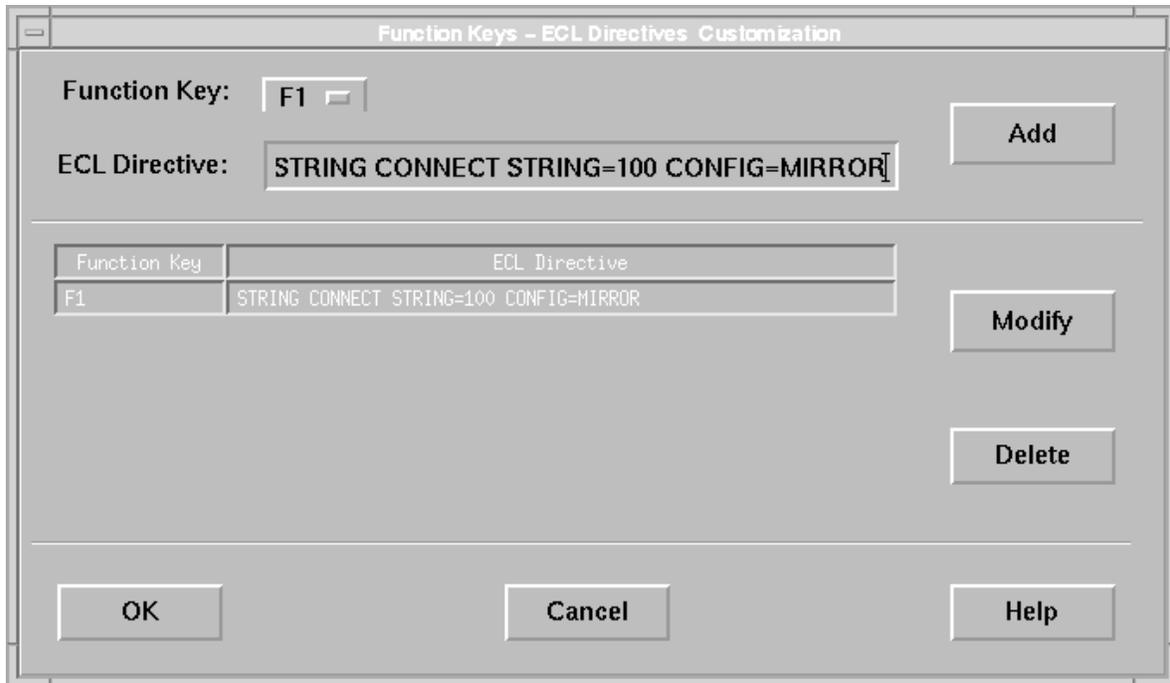


Figure 7.4.4-1. ECL Directives Customization Window

6. **Update the function keys with the directives listed in the table.**

Click **OK**. The ECL Directives Customization window closes.

or

Cancel changes made to function keys.

Click **Cancel** to discard the latest changes made to the assignment of directives to function keys. The ECL Directives Customization window closes

7.5 Data Mover

The Data Mover allows you to copy local files to a local or remote directory, delete local files, and copy remote files to a local directory.

To open the Data Mover:

Open the Data Mover by clicking **Tools...** on the Control window or Mini Control window. The Tool Selection dialog box opens; select **Data Mover** from the list of tools and click **OK**. The Data Mover window opens (see Figure 7.5-1).

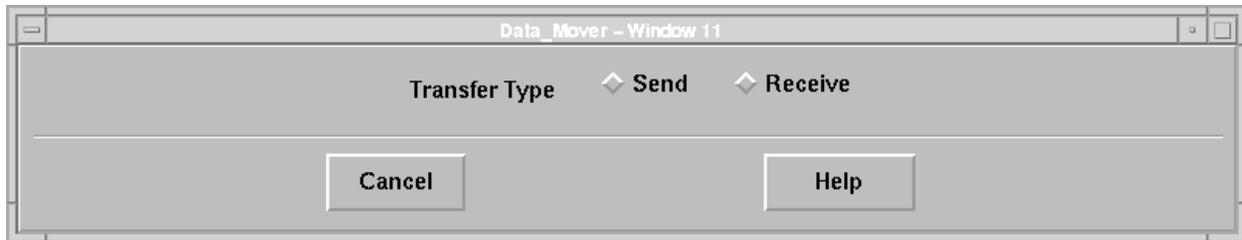


Figure 7.5-1. Data Mover Window

7.5.1 Copy Local Files to a Local Directory

- 1. Select Send as the Transfer Type.**

Click **Send**.

The Data Mover Send window opens (see Figure 7.5.1-1). If you entered a location and directory during the current session, the Location and Directory pull-down menus reflect the previously selected location and directory. The text field below the Directory pull-down menu is the full path for the previously selected directory. The box below the path lists the files in the directory.

If this is a new session (i.e., you have started the Data Mover and have not entered a location or directory) the Location pull-down menu reflects your local location. The Directory pull-down menu displays **Other** by default. The text field below the Directory pull-down menu is the full path of your home directory. The box below the path lists the files in your home directory.

- 2. Select the directory where the files are located.**

Click on the Directory pull-down menu and select the directory where the files to be transferred are located, or type the directory into the box below the Directory pull-down menu and press <Return>.

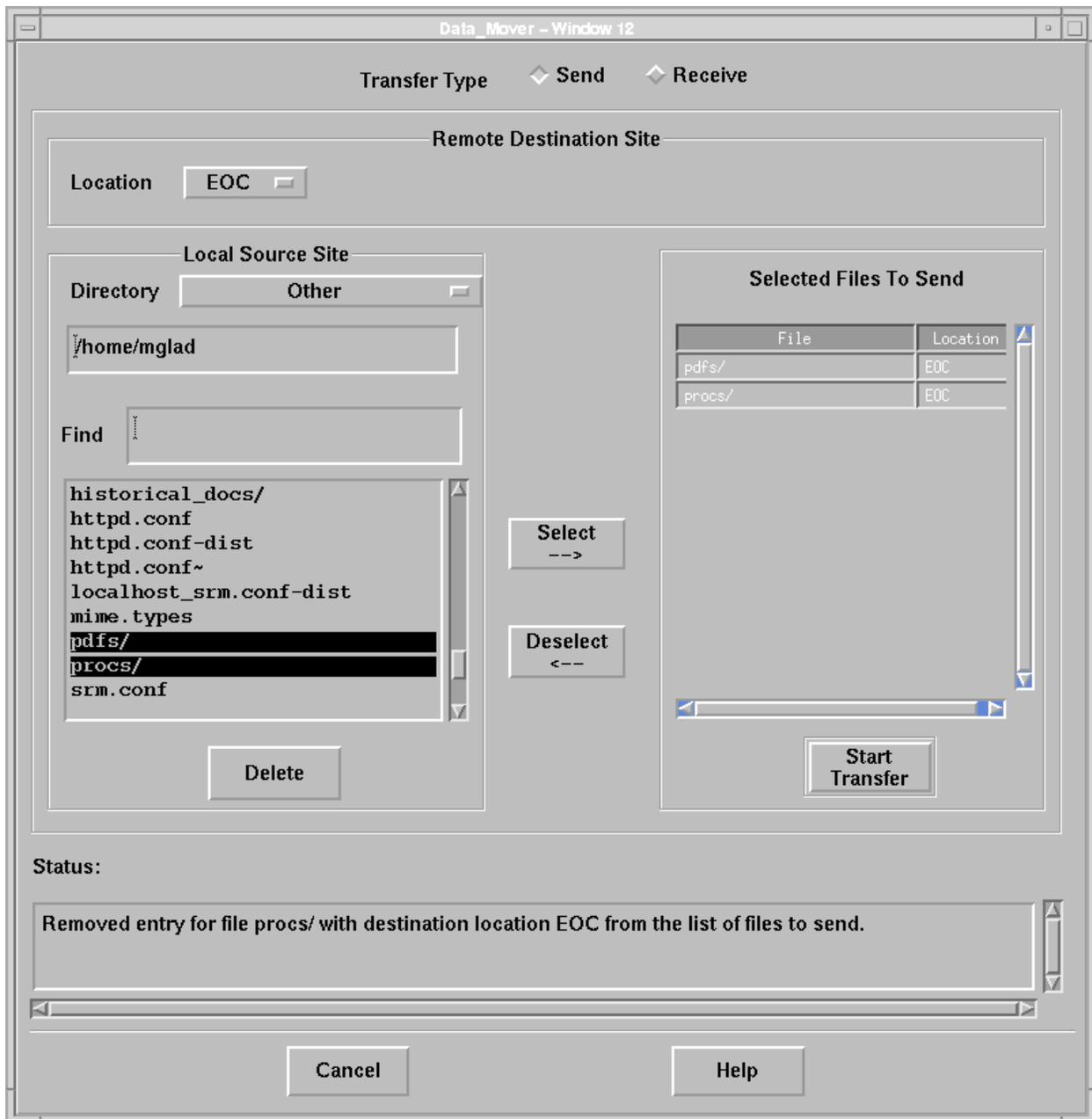


Figure 7.5.1-1. Data Mover Send Window

3. Select the files to be transferred.

The filename and location will appear in the “Selected Files to Send” box. Click on the file name of a file to be transferred in the list of files and click **Select**. Repeat this process until all the files to be transferred are listed in the box entitled “Selected Files to Send.” To

deselect a file from the list of files, select the file name in the “Selected Files to Send” box and click **Deselect**.

4. **Validate that the destination site reflects your local location.**

Check that the location in the Location pull-down menu reflects your local location. The files will be sent to a local transfer directory.

5. **Start the transfer.**

Click **Start Transfer**. The files in the “Selected Files to Send” list are sent to the local transfer directory. The status of the file transfer process is provided in the Status text box at the bottom the Data Mover Send window.

7.5.2 Copy Local Files to a Remote Location

1. **Select Send as the Transfer Type.**

Click **Send**.

The Data Mover Send window opens (see Figure 7.5.1-1). If you entered a location and directory during the current session, the Location and Directory pull-down menus reflect the previously selected location and directory. The text field below the Directory pull-down menu is the full path for the previously selected directory. The box below the path lists the files in the directory.

If this is a new session (i.e., you have started the Data Mover and have not entered a location or directory) the Location pull-down menu reflects your local location. The Directory pull-down menu displays **Other** by default. The text field below the Directory pull-down menu is the full path of your home directory. The box below the path lists the files in your home directory.

2. **Select the directory where the files are located.**

Click on the Directory pull-down menu and select the directory where the files to be transferred are located or type the directory into the box below and press <Return>.

3. **Select the files to be transferred.**

The filename and location will appear in the “Selected Files to Send” box. Click on the file name of a file to be transferred in the list of files and click **Select**. Repeat this process until all the files to be transferred are listed in the box entitled Selected Files to Send. To deselect a file from the list of files, select the file name in the “Selected Files to Send” box and click **Deselect**.

4. **Select the Remote destination.**

Select the location where the files will be sent under the Location pull-down menu: **ASTER, CERES, EOC, MISR, MODIS, MOPITT, SDVF**.

5. **Start the transfer.**

Click **Start Transfer**. The files in the Selected Files to Send are sent to the transfer directory established at the remote location for incoming files. The status of the file transfer process is provided in the Status text box at the bottom the Data Mover Send window.

7.5.3 Copy Files from a Remote Location

1. **Select Receive as the Transfer Type.**

Click **Receive**.

The Data Mover Receive window opens (see Figure 7.5.3-1). The Location pull-down menu reflects the default location, your local location. The Directory pull-down menu displays **Other** by default. The text field below the Directory pull-down menu is the full path for the default directory. The box below the path lists the files in the default directory.

2. **Select the remote location.**

Click on the Directory pull-down menu and select the directory where the files to be transferred are located or type the directory into the box below and press <Return>.

3. **Select the remote directory where the files are located.**

Click on the Directory pull-down menu and select the directory where the files to be copied are located.

4. **Select the files to be transferred.**

The filename and location will appear in the “Selected Files to Send” box. Click on the file name of a file to be transferred in the list of files and click **Select**. Repeat this process until all the files to be transferred are listed in the box entitled Selected Files to Send. To deselect a file from the list of files, select the file name in the “Selected Files to Send” box and click **Deselect**.

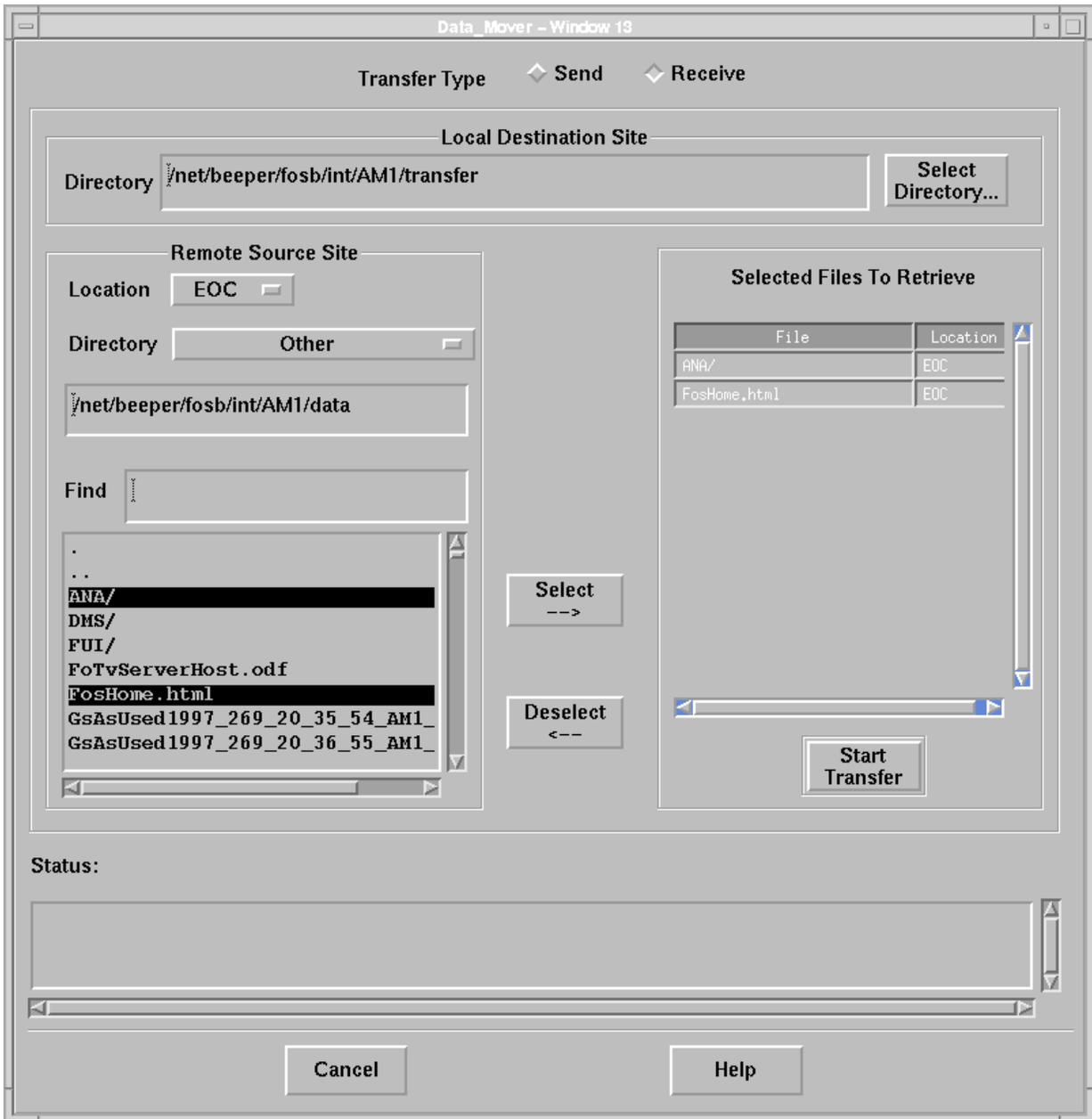


Figure 7.5.3-1. Data Mover Receive Window

5. Select the local destination directory.

Click **Select Directory....** The Data Mover Local Directory Selector window opens (see Figure 7.5.3-2). Select the destination directory under the Directory pull-down menu. The full path for the directory appears in the list box below the directory name.

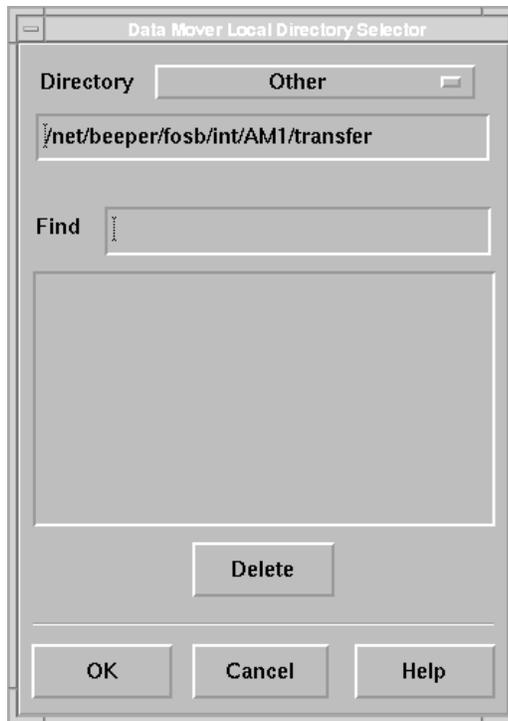


Figure 7.5.3-2. Data Mover Local Directory Selector Window

To find a directory or file, type filter criteria in the Find text box. Once you have selected the destination path, click **OK**. The Data Mover Local Directory Selection window closes.

6. **Start the transfer.**

Click **Start Transfer**. The files in the Selected Files to Retrieve are sent to the specified directory. The status of the file transfer process is provided in the Status text box at the bottom the Data Mover Send window.

7.5.4 Delete Local Files

1. **Select Send as the Transfer Type and select the directory where the files are located.**

Click **Send**.

The Data Mover Send window opens (see Figure 7.5.1-1). The Location pull-down menu reflects the default location, your local location. The Directory pull-down menu displays **Other** by default. The text field below the Directory pull-down menu displays the full path of your home directory. The box below the path lists the files in your home directory.

2. **Select the directory where the files are located.**

Click on the Directory pull-down menu and select the directory where the files to be deleted are located.

3. **Select the local files to be deleted.**

Click on the name of the files to be deleted in the list of files.

4. **Delete Files.**

Click **Delete**. The status will be displayed in the Status window for each file deleted.

7.5.5 Close the Data Mover

Click **Cancel** on the Data Mover window.

7.6 Document Reader

Document reader enables you to browse, search, and print on-line documentation via the Netscape browser.

7.6.1 Browse a Document

1. **Open Document Reader.**

Open the Document Reader by clicking **Tools...** on the Control window or Mini-Control window. The Tool Selection dialog box opens. Select **Document Reader** from the list of tools and click **OK**.

The Netscape browser opens.

2. **Open a World Wide Web (WWW) page.**

Select **Open Location** from the File menu. The Open Location dialog box opens. Type a Universal Resource Locator (URL) in the "Open Location" text field and click **Open In Browser** or **Open In Editor**.

The home page opens.

3. **Open a text or html document listed as a link on a home page.**

Click a link on a home page that gives you the option to open a document in text or html format.

or

Open a text or html file located on a local drive.

Select **Open File** from the File menu. The File Open dialog box opens. In the File Open dialog box, enter filter criteria in the "Filter" text area or select the directory to open in the "Directories" list box. Select the file in the "Files" list box and click **OK** to close the File

dialog box and open the file, or **Cancel** to close the File dialog box without opening the file.

4. **Scroll through the document.**

Page up or down in the document by pressing the <Page Up> or <Page Down> button or by pressing the up or down arrows at the top and bottom of the slider bar.

5. **Find text in the document.**

Select **Find...** under the Edit menu. Type the text in the Find dialog box, select the “Find Backwards” box to search back in the document and click the case sensitive toggle box to make the search case sensitive, and click **Find**. The next occurrence matching the text you entered is highlighted. Click **Close** to close the Find dialog box or **Find** to locate the next string matching the text you entered. If no text is found matching your entry in the direction you are searching, a dialog box opens indicating the search string was not found.

6. **Save the document.**

Select **Save As** from the File menu. The Save As dialog box opens. Select the folder to save the message in, select the file format.

7. **Edit the document.**

You cannot edit the document via the Netscape browser. Once you have saved the file, edit it using a text editor, such as vi or emacs, if the document was saved as a text file.

8. **Print the document.**

Specify the page setup by selecting **Page Setup** from the File menu. The Page Setup dialog box opens. Choose the setup options desired and click **OK** to apply the print options or **Cancel** to restore the default settings. Select **Print** from the File menu. The Print dialog box opens. Specify the printer, number of copies and print range; Click **OK** to print the range you indicated or **Cancel** to cancel the print job. The Print dialog box closes.

9. **Close the document.**

Select **Close** from the File menu.

10. **Close or minimize Netscape.**

Close Netscape by selecting **Exit** from the File menu. Minimize Netscape by selecting **Minimize** from the Netscape menu, located underneath the button in the top left corner of the Netscape window, or the button near the upper right corner.

7.7 On-Line Help

Access help by clicking the **Help** button in the window where you need help. The Netscape browser opens to a home page displaying context-sensitive help. To access the overview help

page which provides a list of help topics and links to help pages (see Figure 7.7-1), click the home button at the top of the Netscape window from any context sensitive page.



Figure 7.7-1. FOS Overview Help Page

7.8 Snapshots

The FOS uses commercial software (xv) to capture snapshots of windows to a file or send snapshots to a printer. These instructions are for xv version 3.00.

7.8.1 Take a Snapshot of a Window

1. Open xv via UNIX.

Enter the UNIX command initiating xv in a UNIX xterm window.

```
xv
```

The xv window opens (see Figure 7.8.1-1).

2. **Open the xv controls window.**

Position the pointer anywhere on the xv window and click the right mouse button to open the xv controls window (see Figure 7.8.1-2).

3. **Snap a window.**

Click **Grab** and then click the window you want to snap. The snapped window is duplicated on the screen and a message in the message bar on the xv controls window indicates the size of the captured window and indicates that all desired colors were captured.

4. **Save the snap to a file.**

Click **SAVE**. The xv save window opens (see Figure 7.8.1-3). Select the directory where the file should be saved, the file format, and color option. Type a file name in the Save file box and click **OK**.

5. **Open the saved file.**

Open the file you just saved by clicking **Load**, selecting the directory and file name, and clicking **OK**. The window snap opens.

6. **Print the snap.**

Enter the UNIX print command.

```
lpr filename
```

or

You can include the following alias in your startup script (i.e. .cshrc) to simplify the printing of snaps (printer variable must be set):

```
alias prscreen "sleep10; xwd -frame | xpr -device ps | lpr"
```

then type prscreen at a UNIX prompt, then click on your window.

7. **Close xv.**

Click **Quit**.

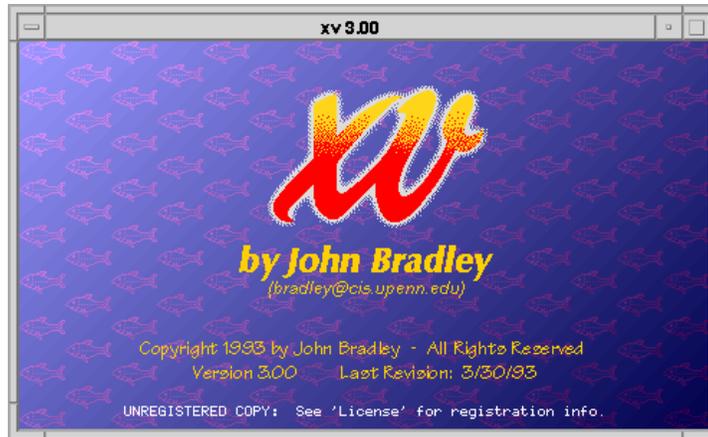


Figure 7.8.1-1. xv Window

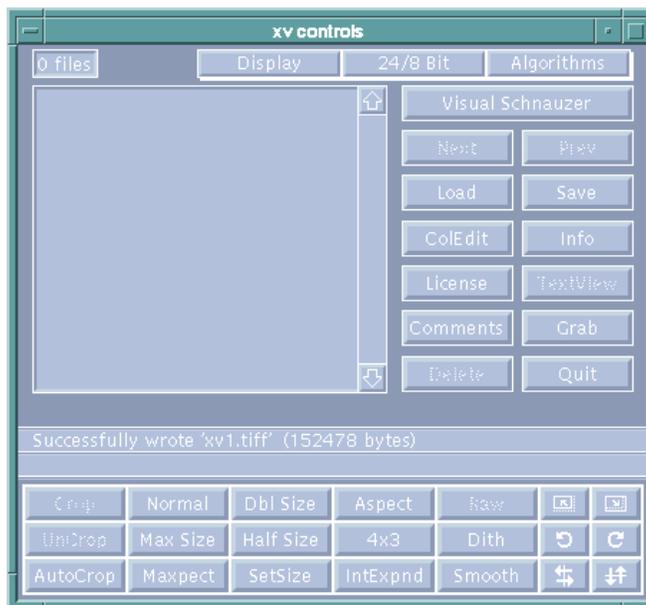


Figure 7.8.1-2. xv controls Window

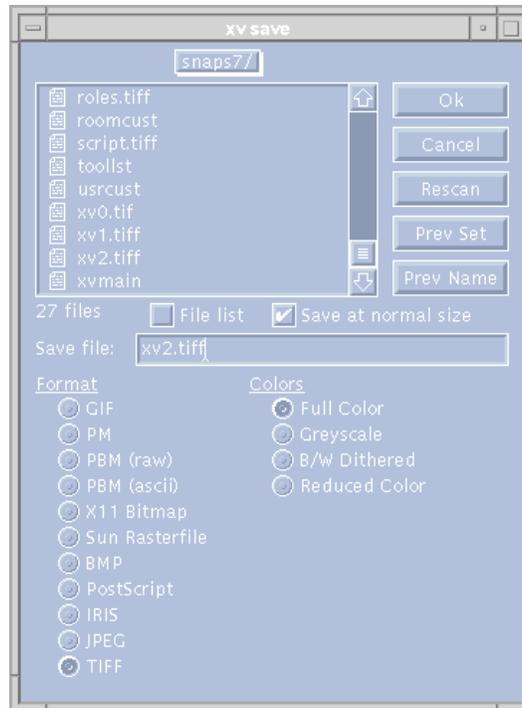


Figure 7.8.1-3. xv save Window

7.9 Display Builder

The Display Builder tool enables you to create telemetry display screens called “dynamic pages.” A dynamic page displays parameters from the logical strings associated with that page. These parameters or mnemonics can be displayed on a dynamic page as tables, graphs, or alphanumeric fields. Once you have created a page and made the page locally or globally available via the Control window by selecting **Build to Local** or **Build to CM**, you can monitor telemetry on the page. Refer to Section 7.10 for instructions on monitoring telemetry on a dynamic page.

7.9.1 Start Display Builder

Open the Display Builder.

Click **Tools...** on the Control window or Mini Control window. The Tool Selection dialog box opens; select **Display Builder** from the list of tools and click **OK**.

The Display Builder Palette, Display Item Format, Data Display Item Data Sources, and Display Builder Console windows open. An empty dynamic page also opens in the Display Builder’s Dynamic Page window (see Figure 7.9.1-1).

The Display Builder Palette and Dynamic Page remain open while the Display Builder Tool is running. To hide the Display Item Format, Display Item Data Sources, or Console

windows, select the name of the window from the Window menu of the Display Builder Palette window.

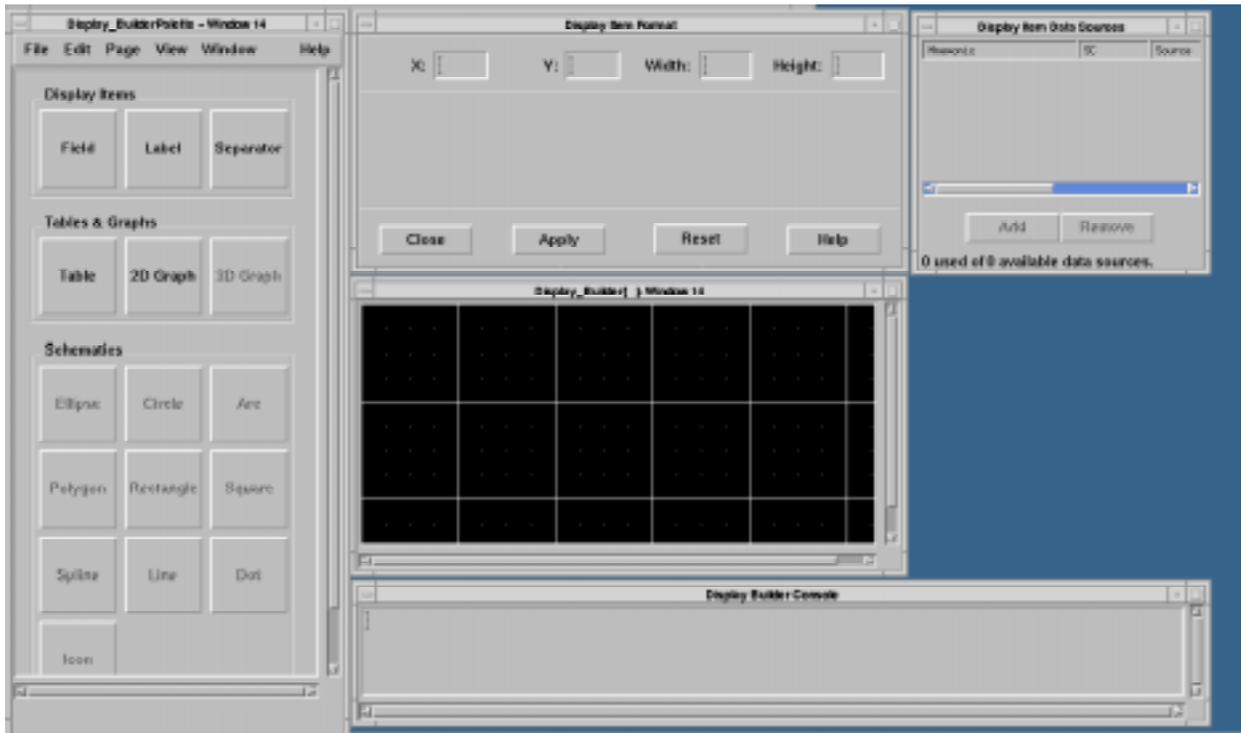


Figure 7.9.1-1. Display Builder Windows (Palette, Format, Data Sources, Dynamic Page, and Console)

7.9.2 Create a New Dynamic Page

When the Display Builder Tool starts, the Display Builder's Dynamic Page window opens with an empty page for editing. You can discard the page being edited and start over with a blank dynamic page by selecting **New** from the File menu of the Display Builder Palette window (see Figure 7.9.2-1).

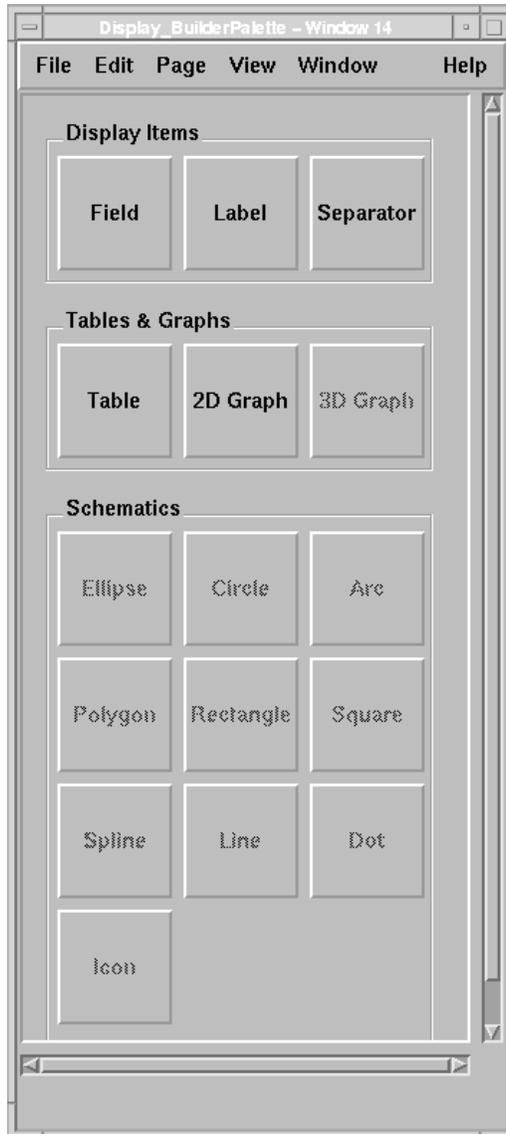


Figure 7.9.2-1. Display Builder Palette Window

7.9.3 Open an Existing Dynamic Page

- 1. Select Open from the File menu of the Display Builder Palette window.**
The Open dialog box opens (see Figure 7.9.3-1).
- 2. Filter on dynamic pages in your local pages directory.**
Click **Local**.

The dynamic pages in the pages subdirectory of your home directory are listed in the Files list box.

or

To filter on global system pages.

Click **System**.

The system dynamic pages are listed under **Files**.

or

Enter your own filter criteria.

To define filter criteria, such as a path or file extension, type the criteria in the **Filter** text box.

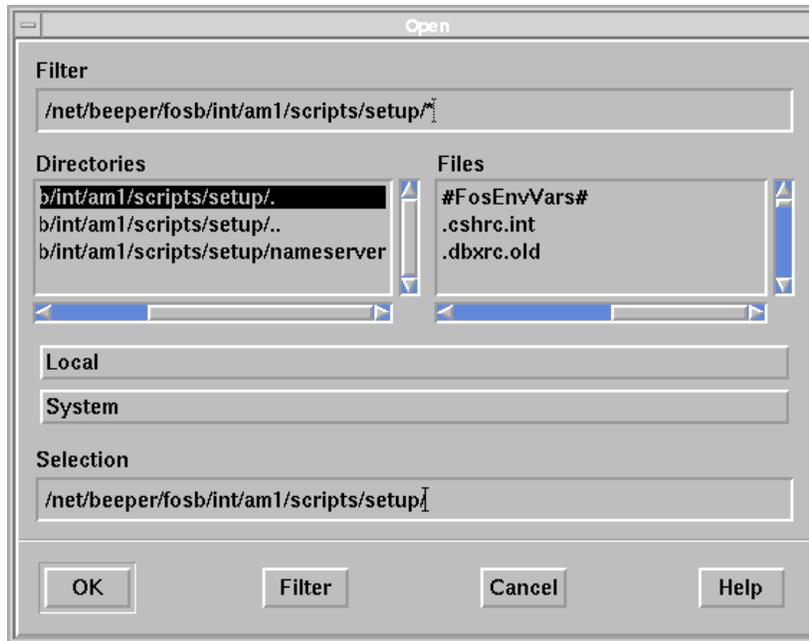


Figure 7.9.3-1. Open Dialog Box

3. **Select the dynamic page file to open from the Files list box.**

Highlight the file name and click **OK**.

The dynamic page file opens and the Open dialog box closes.

4. **Save the file.**

Select **Save** or **SaveAs** from the File menu of the Display Builder Palette window and enter a lower case file name for the dynamic page. Upper case letters are not permitted in a

dynamic page file name. Note that saving the file does not make the page accessible via the Control window. Refer to Section 7.9.11 for instructions on making a dynamic page accessible via the Control window.

5. Monitor the status of file operations.

The Display Builder Console window (see Figure 7.9.3-2) provides status on file operations.

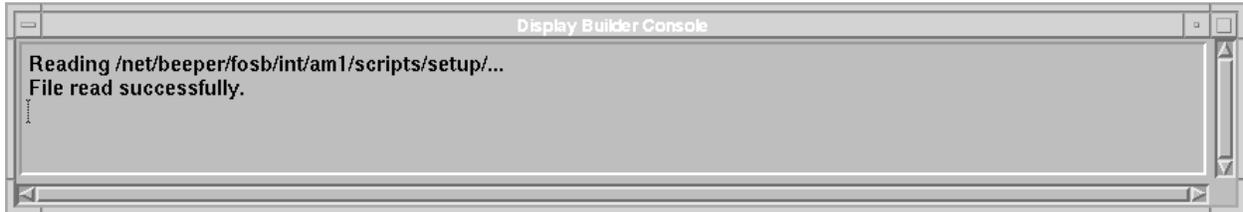


Figure 7.9.3-2. Display Builder Console Window

7.9.4 Associate a Logical String with a Dynamic Page

One or more logical strings must be associated with each dynamic page. The dynamic page displays parameters you select from the available parameters for logical strings associated with the page. Refer to Section 9 for a discussion of logical strings.

1. **Open the Dynamic Page Logical String Management window (see Figure 7.9.4-1).**

Select **Logical String Management** from the Page menu of the Display Builder Palette window.

2. **Select the Source and Mode.**

Specify the **Source (Real-Time, Replay, or Simulation)** and **Mode (Operational, Test or Training)** by selecting the appropriate options from the pull-down menus. Restore Source and Mode to their default settings by selecting * under the **Source** and **Mode** pull-down menus.

The logical strings with attributes matching the source and mode selected appear in the list box. Repeat step 2 to include additional logical strings with different Sources and Modes in the list box.

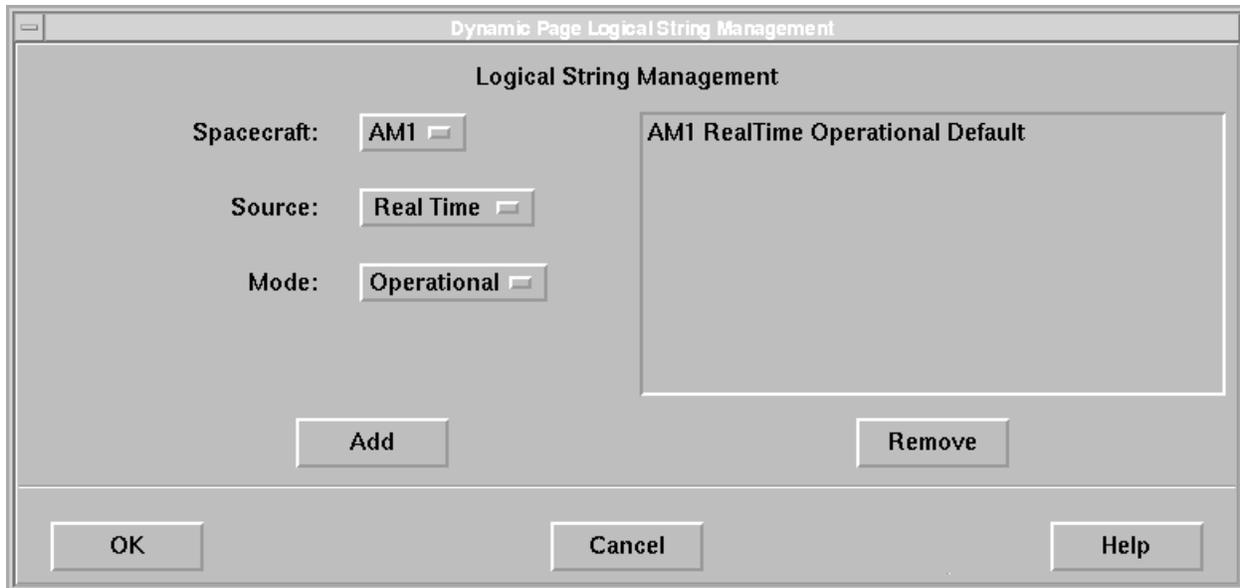


Figure 7.9.4-1. Dynamic Page Logical String Management Window

3. Establish the logical strings to associate with the dynamic page.

Select the logical strings from which parameters will be chosen by selecting the strings in the Logical String Management List box and clicking **Add**. To remove a logical string from the list box, highlight the string and click **Remove**.

Once the list box contains the logical strings you want to associate with the dynamic page, click **OK**.

7.9.5 Add a Display Item, Table or Graph to a Dynamic Page

One or more logical strings must be associated with the dynamic page as described in section 7.9.4 prior to adding a display item, table or graph to a dynamic page. On the Display Builder Palette window, click a Display Item (**Field**, **Label**, or **Separator**), or an item under Tables & Graphs (**Table** or **2D Graph**). Drag the item to the Display Builder Dynamic Page and release the mouse button.

Display items may be repositioned by clicking the item in the dynamic page and moving it with the mouse. Additional formatting options are available on the Display Item Format window. The options available in the Display Item Format window change based on the item selected for editing in the dynamic page (field, label, separator, or graph).

7.9.6 Associate a Parameter with a Display Item on a Dynamic Page

A field, table, or graph displays data from the parameters associated with the display item. A field may be associated with one parameter, a table with up to 50 parameters, and a graph may have up to six parameters plotted along its y-axis against either spacecraft time or another parameter.

1. **Select a field, table, or graph on the dynamic page.**
2. **Click Add on the Display Item Data Sources window (Figure 7.9.6-4).**

The Display Item Parameter Selector dialog box opens (see Figure 7.9.6-1). Click **Filter** on the Display Item Parameter Selector dialog box. The Selection Filter Dialog box opens (see Figure 7.9.6-2).

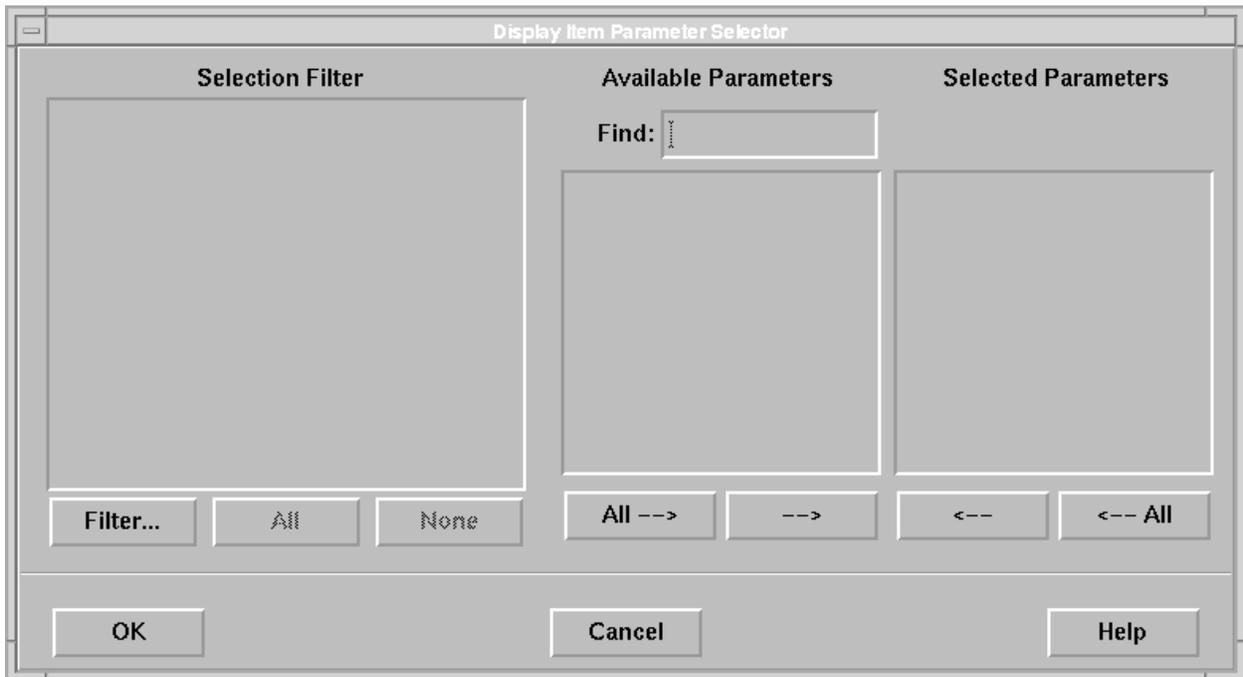


Figure 7.9.6-1. Display Item Parameter Selector Dialog Box

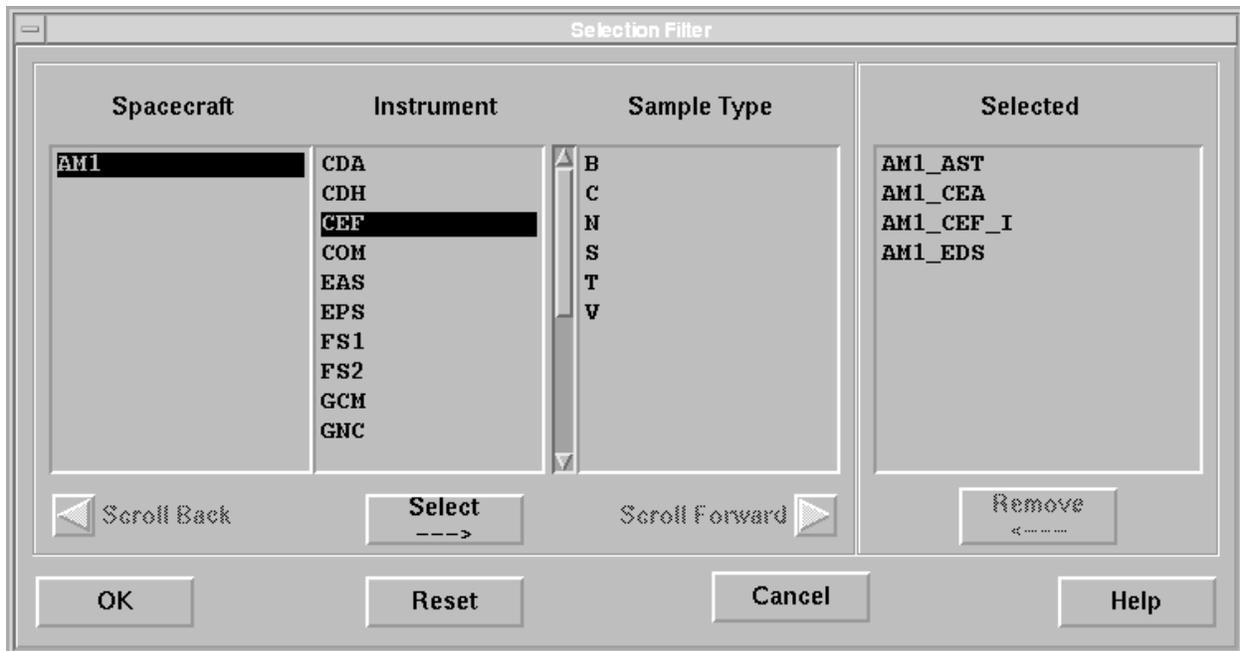


Figure 7.9.6-2. Selection Filter Dialog Box

3. Filter parameters.

On the Selection Filter, select the **Spacecraft** and **Instrument** to filter on. If applicable, select a sample type in the **Sample Type** list box. Click the **Select** button to move the highlighted parameter categories to the **Selected** list box. To remove a parameter category from the list of selected parameters, click the parameter in the **Selected** list box and click the **Remove** button. Once the **Selected** list box includes the parameter categories from which you want to select mnemonics, click **OK**. The Selection Filter dialog box closes and the **Selection Filter** list box on the Display Item Parameter Selector dialog box is updated with the parameter categories selected (see Figure 7.9.6-3).

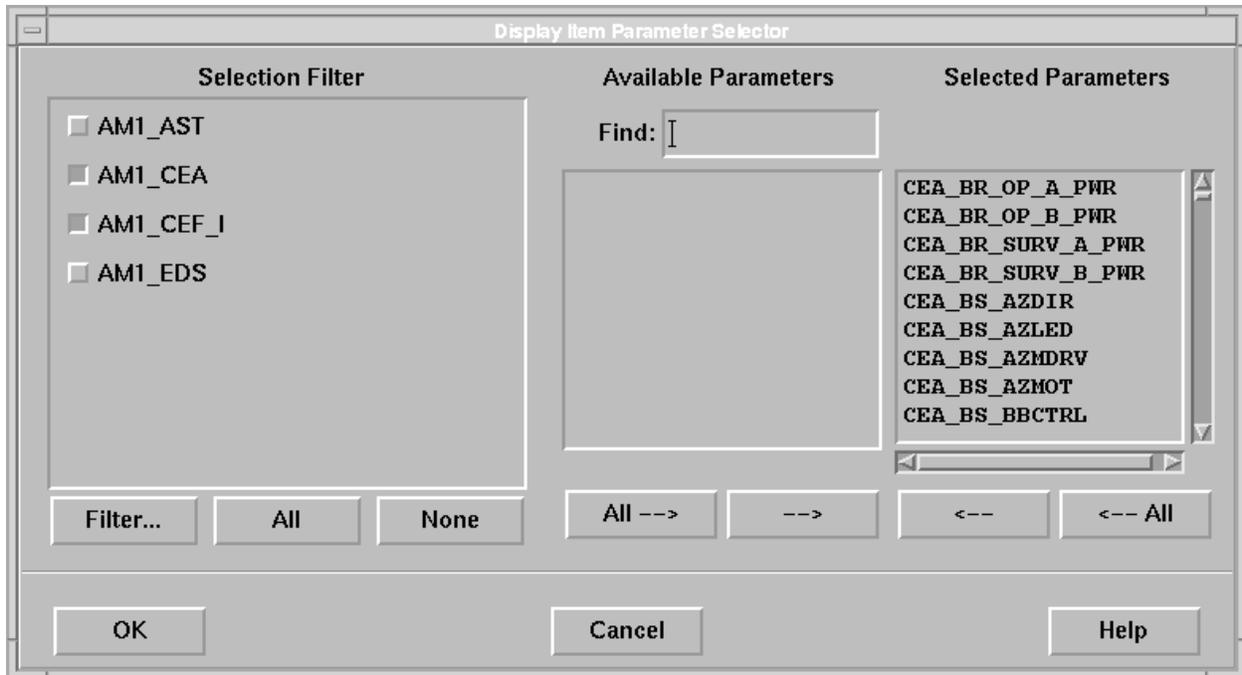


Figure 7.9.6-3. Display Item Parameter Selector Dialog Box

4. Select parameters to display.

On the Display Item Parameter Selector dialog box, select a filter in the Selection Filter list box or click **All** to display a list of mnemonics in the **Available Parameter** list box. Select one or more parameters in the **Available Parameter** list box and press the **→** button or press **All→** to move all parameters in the **Available Parameters** list to the **Selected Parameters** list box.

Remove a parameter from the Selected Parameters list box by highlighting it and clicking **←** or click **←All** to remove all parameters from the list. Once the **Selected Parameters** list box includes the parameters you want to associate with the display item, click **OK**. The Display Item Parameter Selector dialog box closes and the selected parameters are applied to the field, table or graph. If more parameters are selected than are allowed to be associated with a field, table, or graph, the first parameter up to the total number of parameters allowed will be associated with the display item.

5. View the parameters associated with a display item.

Select the field, table, or graph. The parameter associated with the selected display item are listed in the Display Item Data Sources window (see Figure 7.9.6-4).

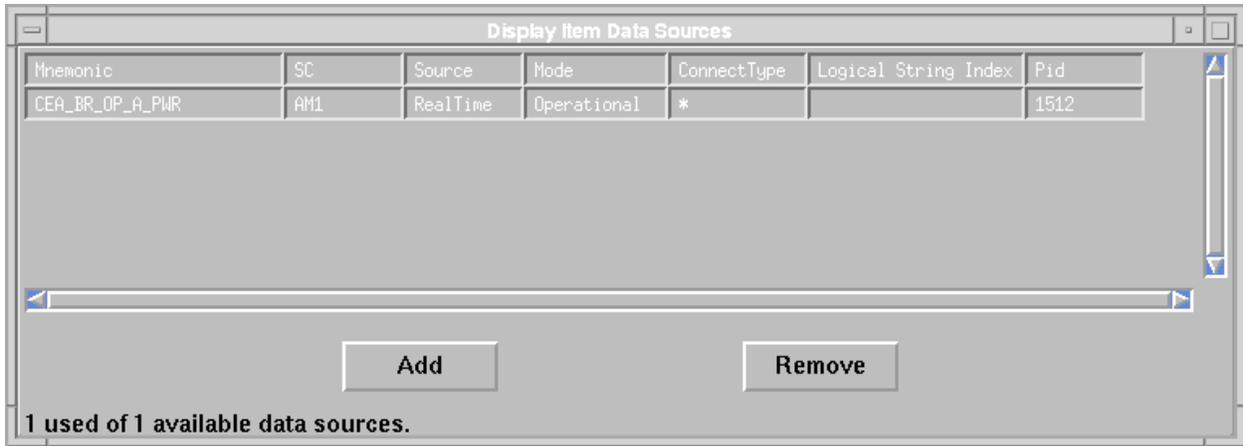


Figure 7.9.6-4. Display Item Data Sources Window

6. Set the update rate for the page.

Select Update Rate from the Page menu on the Display Builder Palette. The Update Rate dialog box opens (see Figure 7.9.6-5). Enter an update rate and click **OK**.

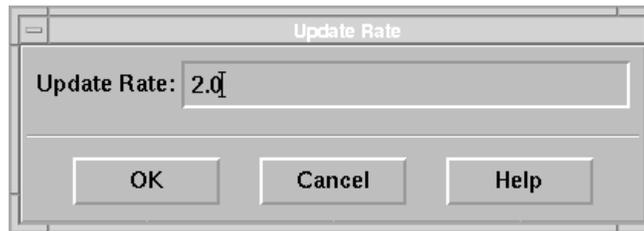


Figure 7.9.6-5. Update Rate Dialog Box

7.9.7 Edit Display Items on a Dynamic Page

To edit labels:

1. Select the label to be edited on the dynamic page.

The options available in the Display Item Format window (see Figure 7.9.7-1) change based on selection of a label to be edited in the dynamic page.

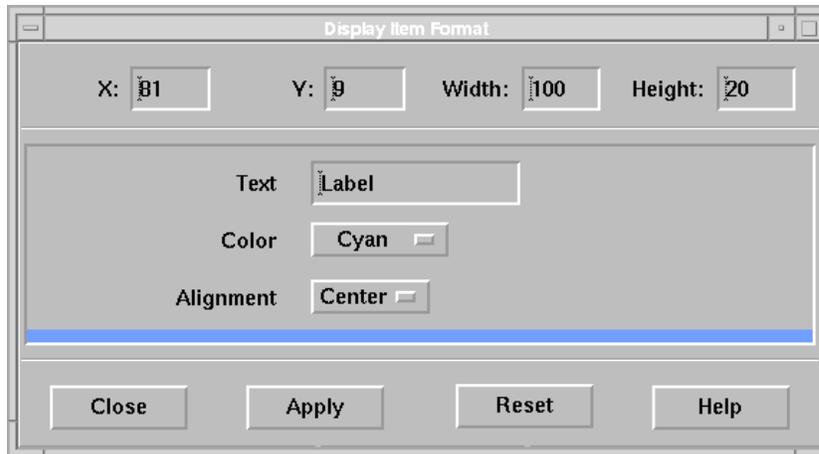


Figure 7.9.7-1. Display Item Format Window

2. Type the label and select formatting options.

Type the label and select its alignment, position and color. Click **Apply** to update the label on the Dynamic Page.

or

Click **Close** to hide the Display Item Format window without updating the label. The formatting changes made prior to selecting **Close** will not be applied to the label. These changes remain in the Display Item Format window and can be applied when the window is reopened by selecting **Apply**.

To edit separators:

1. Select the separator (a horizontal or vertical line) to be edited on the dynamic page.

The options available in the Display Item Format window change to formatting options for a separator as displayed in (see Figure 7.9.7-2.)

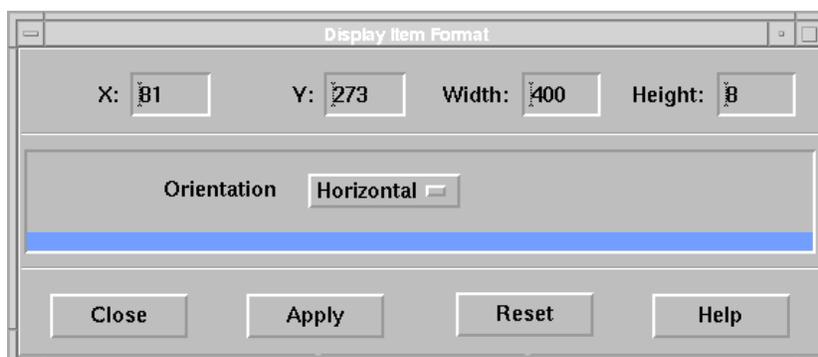


Figure 7.9.7-2. Display Item Format Window

2. Select separator formatting options.

Select the orientation, height, width and position of the separator. Click **Apply** to update the separator with the formatting options selected.

or

Click **Close** to hide the Display Item Format window without updating the label. The formatting changes made prior to selecting **Close** will not be applied to the separator. These changes remain in the Display Item Format window and can be applied when the window is reopened by selecting **Apply**.

7.9.8 Edit a Field

A field displays data from one parameter.

1. Select the field to be edited on the dynamic page.

The options available in the Display Item Format window change to reflect the selection of a field (see Figure 7.9.8-1).

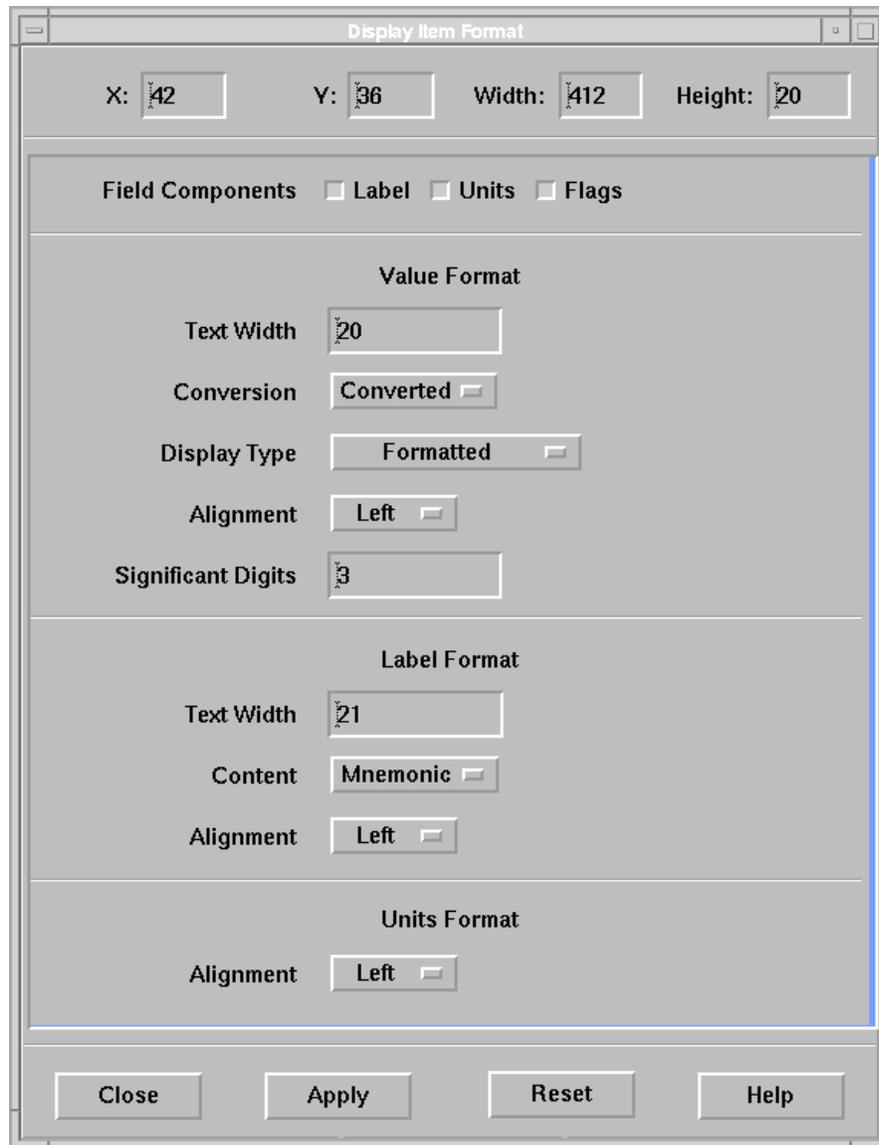


Figure 7.9.8-1. Display Item Format Window

2. Adjust the position, width and height for the field.

Change the x and y coordinates, width or height of the field, if desired.

3. Select the Field Components to display.

Click the box next to the field components (**L**abel, **U**nits, **F**lag) to be displayed for the field.

4. Select the Value Format.

Enter the text width, conversion type (**Converted**, **Decoded** or **Raw**), display type (**Formatted**, **Hex**, **Octal**, **Binary**, or **Scientific Notation**), alignment (Left, Center or Right), and the number of significant digits to show.

5. **Select the Label Format.**

Enter the text width, content (**Mnemonic** or **Descriptor**), and alignment (Left, Center, Right) for the label.

6. **Select the Units Format.**

Select the alignment for the units (**Left**, **Center** or **Right**).

7. **Apply the formatting to the Field.**

Click **Apply** to update the field with the formatting options selected.

or

Click **Close** to hide the Display Item Format window without updating the field. The formatting changes made prior to selecting **Close** will not be applied to the field. These changes remain in the Display Item Format window and can be applied when the window is reopened by selecting **Apply**.

7.9.9 Edit a Table

1. **Select the table to be edited on the dynamic page.**

The options available in the Display Item Format window change to reflect the selection of a table in the dynamic page (see Figure 7.9.9-1).

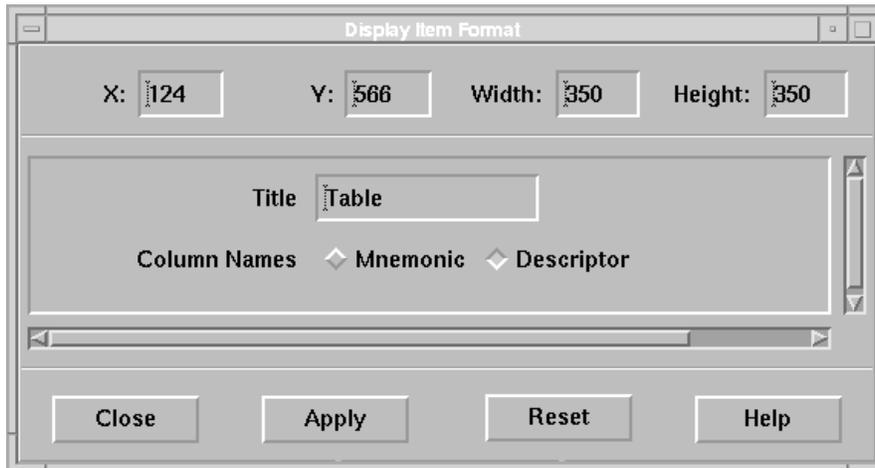


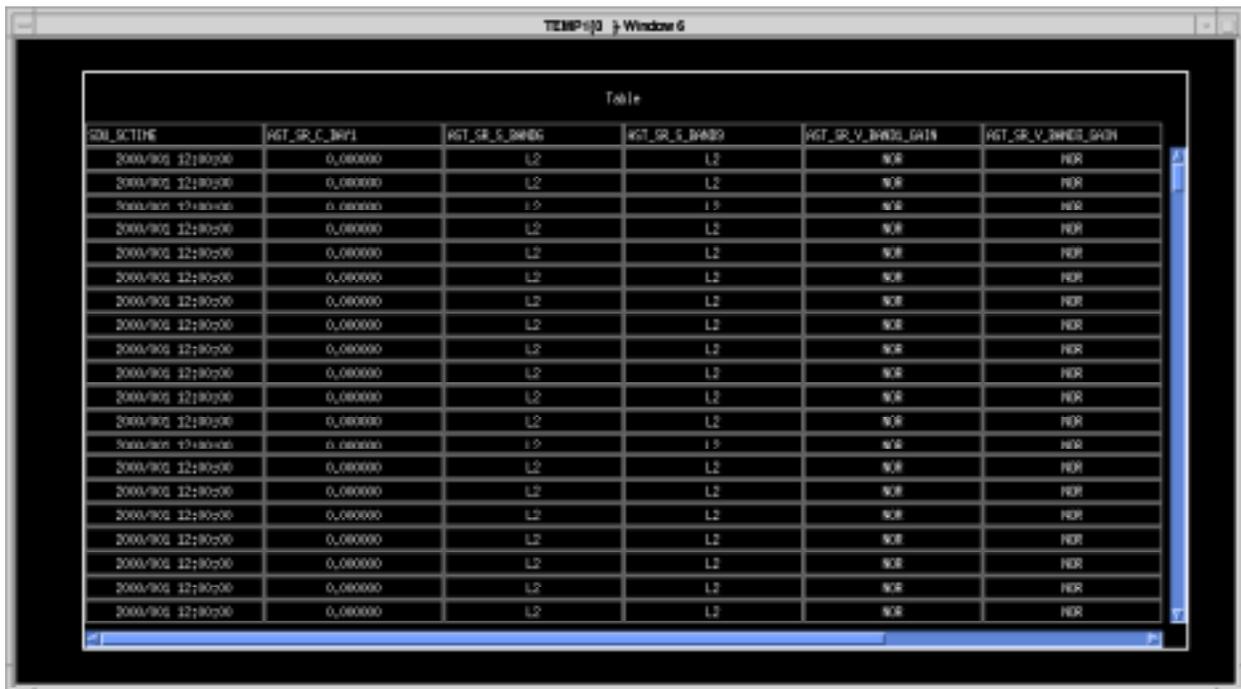
Figure 7.9.9-1. Display Item Format Window

2. Format the Table.

Adjust the position and size of the table, if desired. Type a title for the table and select the format for the table columns (**Mnemonic** or **Descriptor**). Click **Apply** to update the table with the formatting options selected. Figure 7.9.9-2 is a dynamic page displaying sample data.

or

Click **Close** to hide the Display Item Format window without updating the table. The formatting changes made prior to selecting close will not be applied to the table. These changes remain in the Display Item Format window and can be applied when the window is reopened by selecting **Apply**.



The screenshot shows a window titled "TEMP03 - Window 6" containing a table. The table has a title "Table" centered above it. The table has 6 columns and 20 rows. The columns are labeled: "CON_SEQUENCE", "AGT_SR_C_BWID", "AGT_SR_S_BWIDC", "AGT_SR_S_BWIDO", "AGT_SR_V_BWIDC_GAIN", and "AGT_SR_V_BWIDC_GAIN". The data in the rows is as follows:

CON_SEQUENCE	AGT_SR_C_BWID	AGT_SR_S_BWIDC	AGT_SR_S_BWIDO	AGT_SR_V_BWIDC_GAIN	AGT_SR_V_BWIDC_GAIN
2000/902 12:180700	0.000000	L2	L2	NOR	NOR
2000/902 12:180700	0.000000	L2	L2	NOR	NOR
2000/902 12:180700	0.000000	L2	L2	NOR	NOR
2000/902 12:180700	0.000000	L2	L2	NOR	NOR
2000/902 12:180700	0.000000	L2	L2	NOR	NOR
2000/902 12:180700	0.000000	L2	L2	NOR	NOR
2000/902 12:180700	0.000000	L2	L2	NOR	NOR
2000/902 12:180700	0.000000	L2	L2	NOR	NOR
2000/902 12:180700	0.000000	L2	L2	NOR	NOR
2000/902 12:180700	0.000000	L2	L2	NOR	NOR
2000/902 12:180700	0.000000	L2	L2	NOR	NOR
2000/902 12:180700	0.000000	L2	L2	NOR	NOR
2000/902 12:180700	0.000000	L2	L2	NOR	NOR
2000/902 12:180700	0.000000	L2	L2	NOR	NOR
2000/902 12:180700	0.000000	L2	L2	NOR	NOR
2000/902 12:180700	0.000000	L2	L2	NOR	NOR
2000/902 12:180700	0.000000	L2	L2	NOR	NOR
2000/902 12:180700	0.000000	L2	L2	NOR	NOR
2000/902 12:180700	0.000000	L2	L2	NOR	NOR
2000/902 12:180700	0.000000	L2	L2	NOR	NOR

Figure 7.9.9-2. Dynamic Page Containing a Table

7.9.10 Edit a Graph

To edit a graph's axes:

1. Select the graph to be edited on the dynamic page.
2. Format the graph.

Adjust the size and position of the graph by updating its x and y coordinates, width and height. Type a title in the **Title** list box and select the elements to display (**Legend, Grid, Axes, Footer**) in the graph.

3. **Select Axes from the Edit pull-down menu on the Display Item Format window.**

The options available in the Display Item Format window (see Figure 7.9.10-1) change to reflect the selection of axes from the Edit pull-down menu.

Type the axes labels. Enter the x display interval (frequency of data refreshment), minimum and maximum axes values to display, and axes granularity (line thickness). One unit of time is 1.00000 day (24 hours). Click **Apply** to update the graph with the formatting options selected.

or

Click **Close** to hide the Display Item Format window without updating the graph. The formatting changes made prior to selecting close will not be applied to the graph. These changes remain in the Display Item Format window and can be applied when the window is reopened by selecting **Apply**.

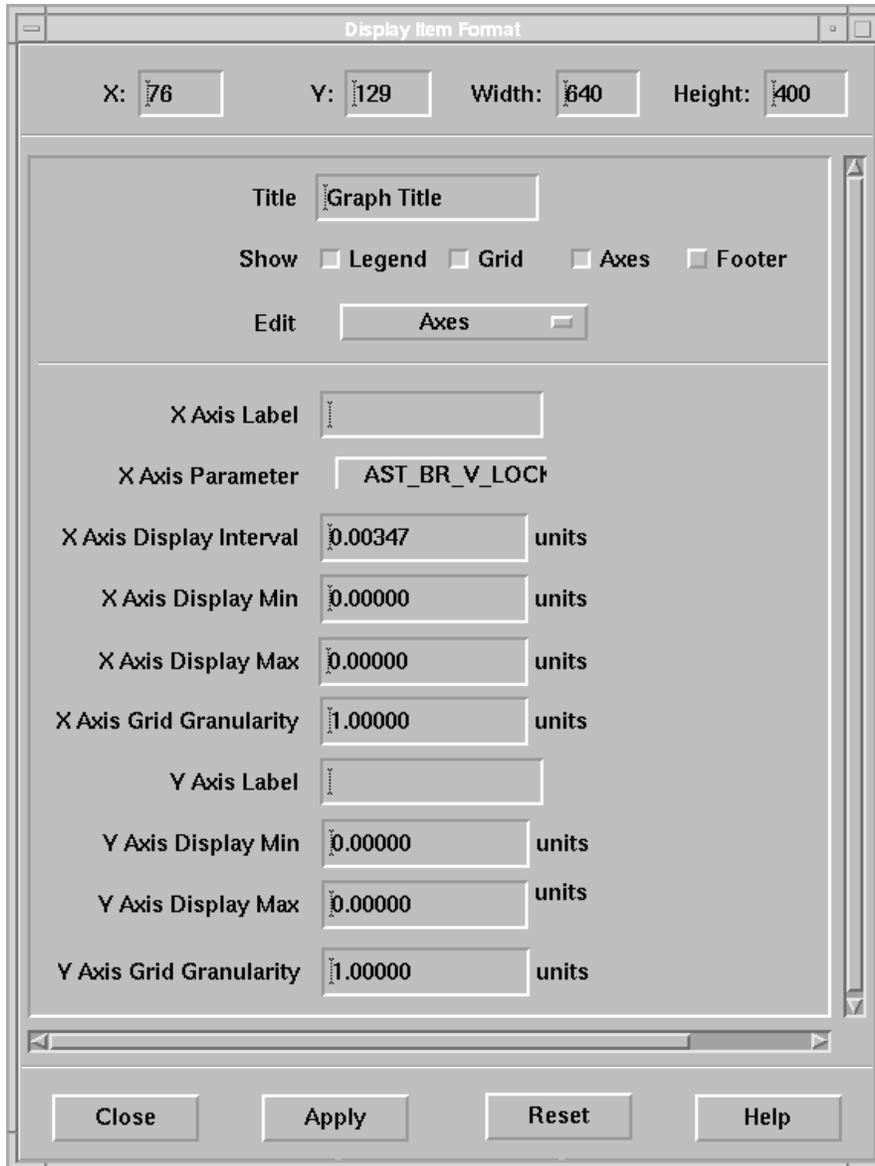


Figure 7.9.10-1. Display Item Format Window

4. **Select Legend from the Edit pull-down menu on the Display Item Format window.**

The options available in the Display Item Format window (see Figure 7.9.10-2) update to reflect legend formatting options.

Select the position and border for the legend and click **Apply** to update the legend with the formatting options selected.

or

Click **Close** to hide the Display Item Format window without updating the legend. The formatting changes made prior to selecting close will not be applied to legend. These changes remain in the Display Item Format window and can be applied when the window is reopened by selecting **Apply**.

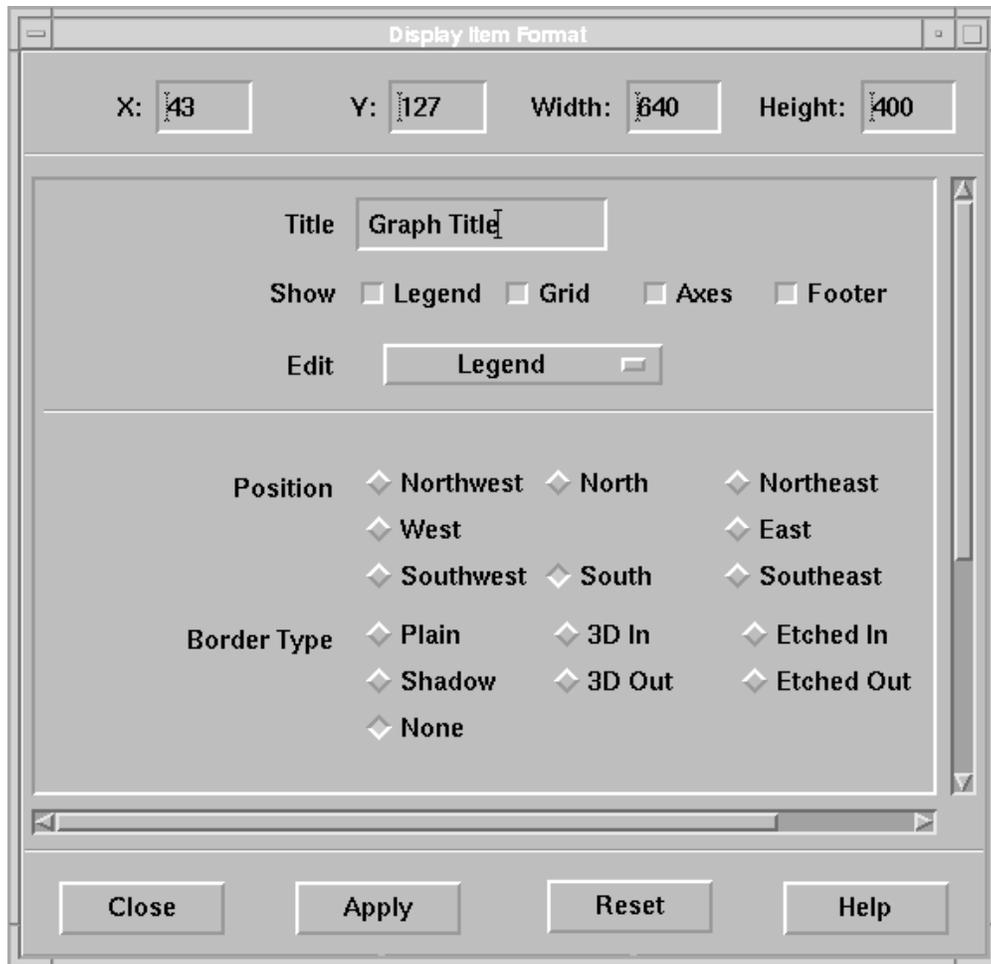


Figure 7.9.10-2. Display Item Format Window

5. Select **Color and Line Style** from the **Edit** pull-down menu on the **Display Item Format** window.

The options available in the Display Item Format window (see Figure 7.9.10-2) update to reflect color and line style formatting options. Select a parameter in the Parameter list box and select the attributes to associate with the line from the Line, Point, Color and Limit Line pull-down menus. Click **Apply** to update the graph with the formatting options selected.

or

Click **Close** to hide the Display Item Format window without updating the graph. The formatting changes made prior to selecting close will not be applied to graph. These changes remain in the Display Item Format window and can be applied when the window is reopened by selecting **Apply**.

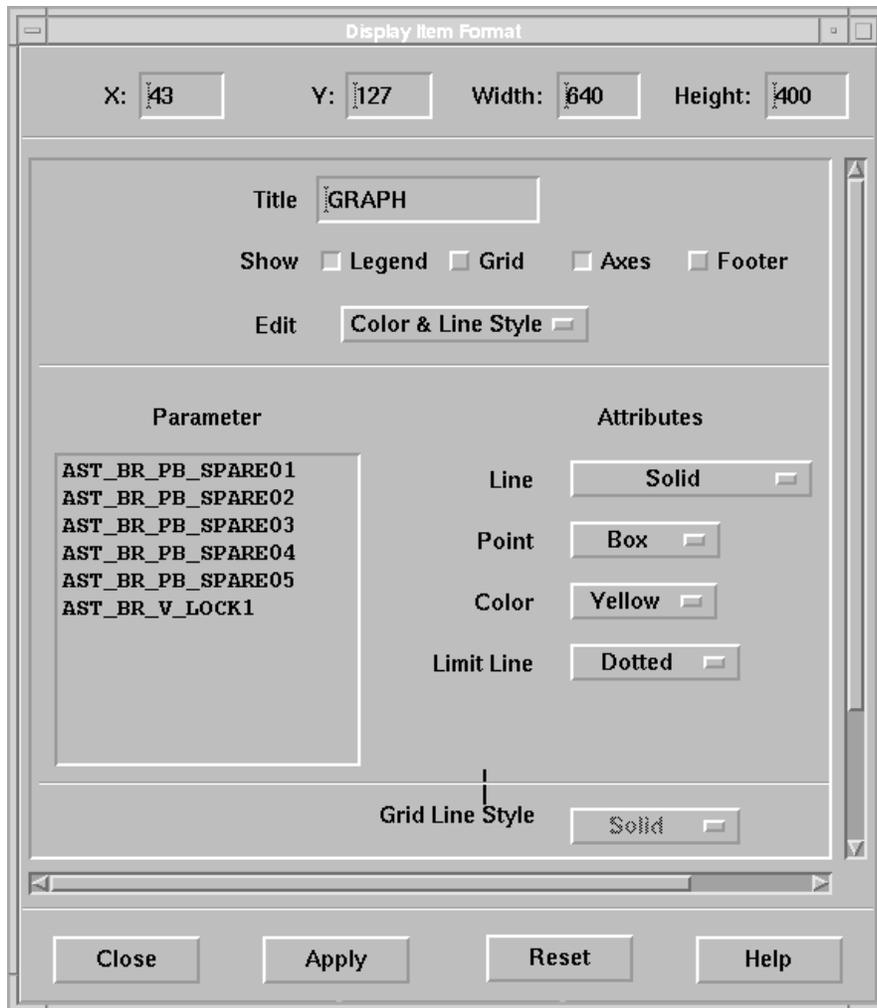


Figure 7.9.10-3. Display Item Format Window

6. **Select Footer from the Edit pull-down menu on the Display Item Format window.**

The Display Item Format window updates to reflect footer formatting options as displayed in Figure 7.9.10-4.

Type the footer and select the footer border type. Click **Apply** to update the graph with the formatting options selected.

or

Click **Close** to hide the Display Item Format window without updating the footer. The formatting changes made prior to selecting close will not be applied to footer. These changes remain in the Display Item Format window and can be applied when the window is reopened by selecting **Apply**.

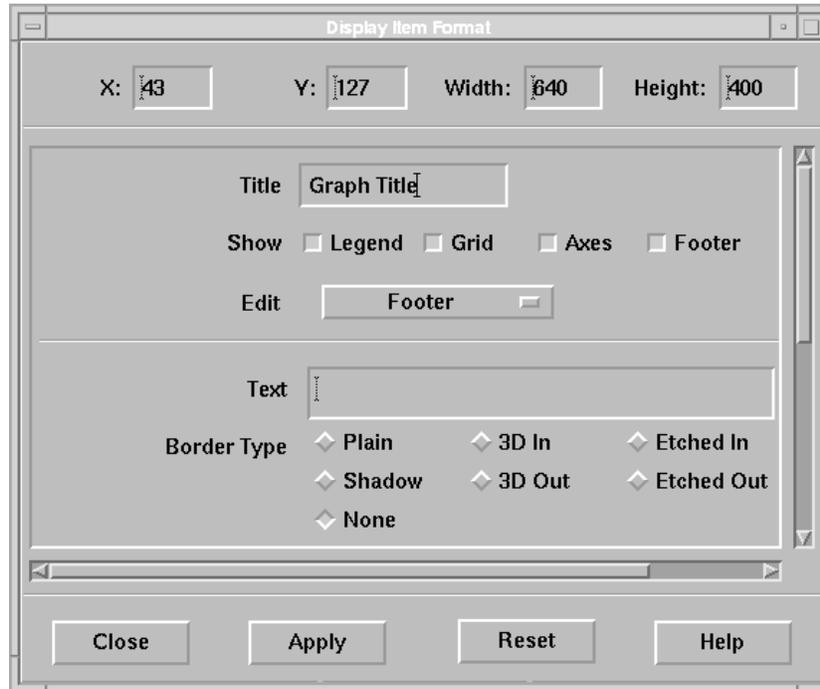


Figure 7.9.10-4. Display Item Format Window

To display Minimum, Maximum and Current mnemonic values:

To display the minimum, maximum, and current values for a graphed mnemonic, click on the line representing the mnemonic. The values are displayed at the bottom of the graph.

7.9.11 Save the Dynamic Page

Select **Save** or **SaveAs** from the File menu of the Display Builder Palette window to open the Save dialog box. Click on the **Local** button if you intend to build the page to local, click on the **System** button if you intend to build the page to CM. Local pages are saved to the "pages" subdirectory of your home directory while system pages are saved to ../displaydefs. Note that saving the file does not make the page accessible via the Control window. Refer to Section 7.9.12 for instructions on making a dynamic page accessible via the Control window.

7.9.12 Add a Dynamic Page to the List of Pages under the Control Window

Saving a dynamic page does not make the file accessible via the Control window where you enter ECL directives and connect to a logical string. To enable the page definition file to display telemetry while you are connected to a logical string, you must perform the following actions.

1. Open the file and select **Build to Local** or **Build to CM**.

Open the file you wish to make accessible to the Control window. If you wish to store the page definition file with your locally defined page definition files, select **Build to Local** under the File menu of the Display Builder Palette window. If you wish to store the file in the shared directory containing the global page definitions, select **Build to CM**.

NOTE

Selecting Build to CM makes display pages available in the system "displaydefs" directory on the network or standalone machine where the FOS software is installed. For example, if a user at an IST selects Build to CM, the page is copied to the "displaydefs" directory at the IST. Furthermore, pages in the "displaydefs" directory at the EOC are not visible to ISTs. ISTs and the FOT can exchange display page files via FTP or email. Newly received page files must be opened, saved to the local "pages" or system "displaydefs" directory and "built to local" or "built to CM" in order to be visible in the list of files accessed via the Tlm Wins_ button on the Control window.

2. Enable the dynamic page to be persistent in rooms where the Display Builder is not open.

Once the page definition has been Built to Local or Built to CM, the dynamic page can be present in rooms other than those containing the Display Builder tool. Select **Persistent** under the Pages menu of the Display Builder Palette window.

Once you select **Build to Local** or **Build to CM**, the page is accessible via the Control window. Open the Dynamic Page dialog box by clicking **Tlm Wins...** and select a page to open.

7.9.13 Exit the Display Builder

Select **Quit** under the File menu of the Display Builder Palette window.

7.10 Monitor Telemetry on a Dynamic Page

After creating a dynamic page and making it accessible via the Control window as described in Section 7.9, you can monitor telemetry by connecting to a real-time logical string and opening a dynamic page. In addition, you can switch the data source being displayed from one logical string to another string and create a temporary dynamic page.

The FOS provides two tools for controlling telemetry displays in an active dynamic page, the Data Source Selector and Quick Analysis, which are described here in detail. As long as the page is persistent, the Display Builder tool need not be open. Access a dynamic page telemetry menu by opening an active dynamic page, positioning the mouse pointer on the active page, and clicking the right mouse button. The dynamic page telemetry menu and associated telemetry monitoring functions are only accessible via an active dynamic page. The dynamic page telemetry menu includes the following options:

- a. **Pause/Resume:** **Pause** suspends the update of parameters on a dynamic page. Once **Pause** is selected, the menu option changes to **Resume**, continuing the update of parameters on the page.
- b. **Data Source Selector.** The button opens the Data Source Selector window displaying logical string information and enabling you to switch between strings.
- c. **Quick Analysis:** The Quick Analysis button opens the Quick Analysis window enabling you to build a temporary dynamic page to display telemetry mnemonics.
- d. **Converted:** The value of a parameter's mnemonic in a converted format designed to be comprehensible without interpretation. (May be a string or decimal.)
- e. **Decoded:** The parameter's mnemonic displayed as a floating point number.
- f. **Raw:** The parameter's mnemonic displayed in hexadecimal format.

Data Source Selector

The Data Source Selector window displays all logical strings your current connections, as well as all strings available for connection. It also enables you to switch the strings being displayed. Although you can switch between strings being displayed, you may not change the number of strings being displayed on the string while the page is active. Prior to switching to a string, connect to the string as described in Section 9. You must be connected to a string prior to switching to that string. Changes in the strings being displayed on the page are not saved and consequently do not affect the page file.

To switch between logical strings:

1. **Open a dynamic page.**

Click **TlmWins...** on the Control window to open the Telemetry Window Selection Box . Select a dynamic page from the list and click **OK**.

2. **Open the Data Source Selector window (see Figure 7.10.1-1).**

Position the pointer on the dynamic page, click the right mouse button and select **Data Source Selector** from the menu.



Figure 7.10.1-1. Data Source Selector

All logical strings you are connected to are displayed in the window's Assigned Connections table. All logical strings available for connection, including strings you are connected to, are listed in the Established Connections table. Choose one of the three options from the pull-down menu above the Established Connections table to display strings with processes running on your userstation (**Local WKS**), strings with processes running on the Real-Time server (**Real-Time Server**), or all logical strings (**All**).

3. Connect to a logical string.

If you are not connected to the string you wish to switch to, connect to the string as described in Section 9.6. After connecting to the string, click **Refresh** to update the Established Connections table to include the string.

4. Switch between logical strings.

Select a string in the Assigned Connections table and a string in the Established Connections table and click **Switch Connection**.

5. Close the Data Source Selector.

Click **Close**.

Quick Analysis

The Quick Analysis window enables you to create a temporary telemetry display page for analysis purposes. Parameters displayed on the page may be selected from the parameters displayed on the current, active dynamic page or the parameters from the string(s) associated with the dynamic page which are not currently displayed. Once the parameters for the temporary dynamic page are selected, they may be displayed in one of four formats:

- a. **Telemetry Attributes.** Display parameter attributes.
- b. **Alphanumeric.** Display parameters in field rows.

- c. **Table.** Display parameters in a table.
- d. **Graph.** Display parameters in a graph.

To create a temporary Telemetry Display page on the fly:

1. Open a dynamic page.

Click **TlmWins...** on the Control window to open the Telemetry Window Selection Box. Select a dynamic page from the list and click **OK**.

2. Open the Quick Analysis window (see Figure 7.10.2-1). From a Dynamic Page:

b. Position the pointer on the dynamic page, click the right mouse button, and select **Quick Analysis** from the menu. If Quick Analysis is accessed from a dynamic page, only the selected parameters in the open dynamic page will be available for the temporary dynamic page. These parameters will be listed in the **Available** list box on the Quick Analysis window.

c. From The Control Window: Click **Tools...** at the bottom of the Control window. The Tools dialog box opens. Select **Quick Analysis** from the list of tools and click **OK**. If Quick Analysis is accessed from the Control window, the parameters from strings you are connected to may be displayed on the temporary dynamic page.

3. Select parameters to display on the temporary dynamic page.

a. If you accessed Quick Analysis from an open, active dynamic page:

Parameters displayed on the dynamic page are listed in the **Available** list box if the parameters are selected on the dynamic page. Add additional parameters to the **Selected** list box by highlighting them in the **Available** list box and moving them to the list of selected parameters as described in step 4.

b. If you accessed Quick Analysis from the Control window:

Filter parameters by spacecraft subsystem.

Click **Filter...** to open the Selection Filter dialog box. Select the spacecraft and instrument(s) to filter by from the **Spacecraft** and **Instrument** list boxes and click **Select**. Once the **Selected** list box reflects the spacecraft and instruments you wish to filter by, click **OK** to close the Selection Filter dialog box. The parameters in the **Available** list box reflect parameters for the subsystems you selected.

or

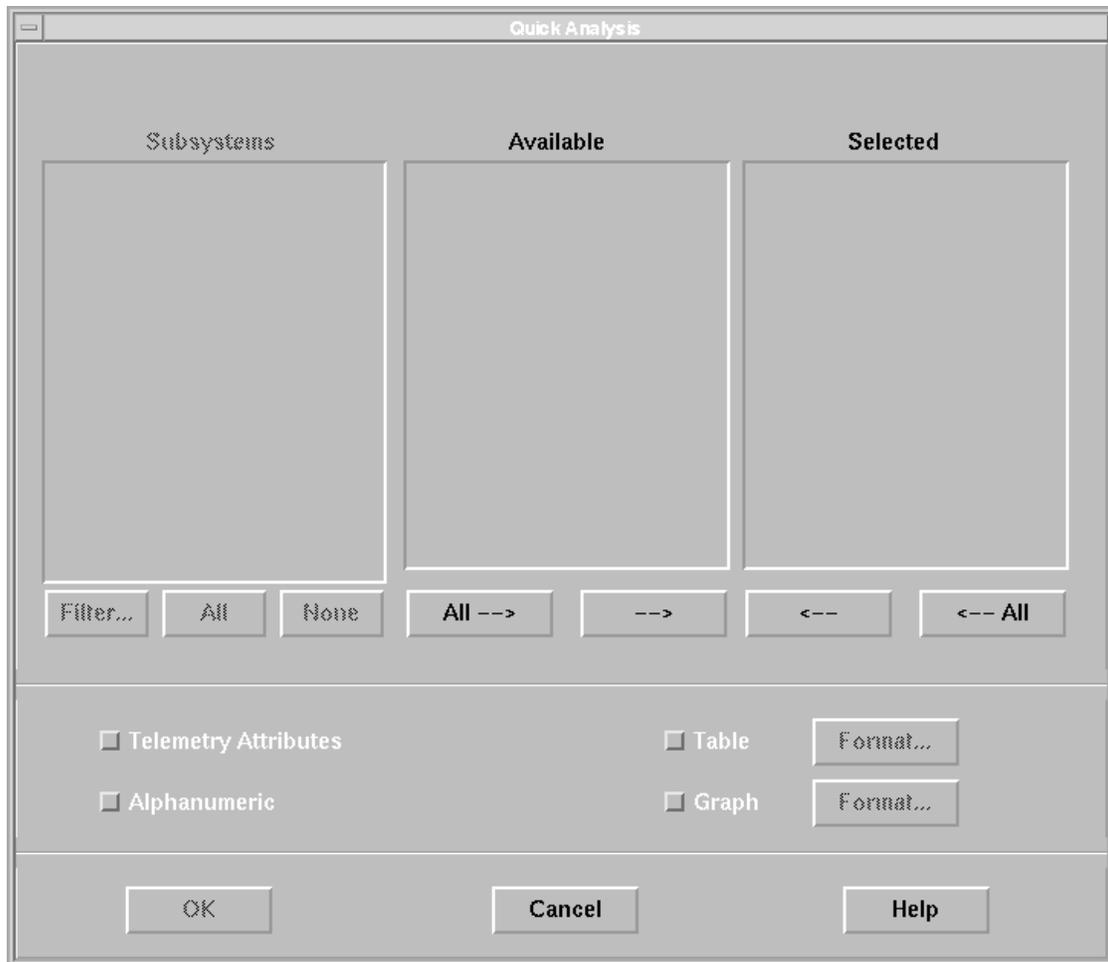


Figure 7.10.2-1. Quick Analysis Window

Select spacecraft subsystem(s) from which you wish to select parameters: Click the check box next to the pertinent subsystem(s) to add parameters for those subsystem(s) to the **Available** list box.

4. Add parameters to the Selected list box.

Select parameter(s) in the **Available** list box and click. To copy all available parameters to the **Selected** list box, click **All**. To remove parameters from the **Selected** list box, select the parameter(s) to be removed and click. Remove all parameters by clicking **All**.

5. Select the format for the temporary display page.

Once the **Selected** list box includes the parameters to be displayed on the temporary telemetry display page, select one of the four display options: **Telemetry Attributes**,

Alphanumeric, Table, or Graph. If the **Telemetry Attributes** or **Alphanumeric** format option is selected, proceed to step 7.

6. Format the table.

If the **Table** display option is selected, open the Table Format dialog box by clicking **Format....**

Enter a table title and select mnemonic or descriptive table names.

7. Format the graph.

If the **Graph** display option is selected, open the Graph Format dialog box (see Figure 7.10.2-2) by clicking **Format....**

a. Enter a graph title and select graph formatting options.

b. The options are:

1. Title
2. Show
 - a) Legend
 - b) Grid
 - c) Axes
 - d) Footer
3. Edit
 - e) Axes
 - f) Legend
 - g) Color & Line Style
 - h) Footer

8. Monitor telemetry via the temporary dynamic page.

Click **OK**.

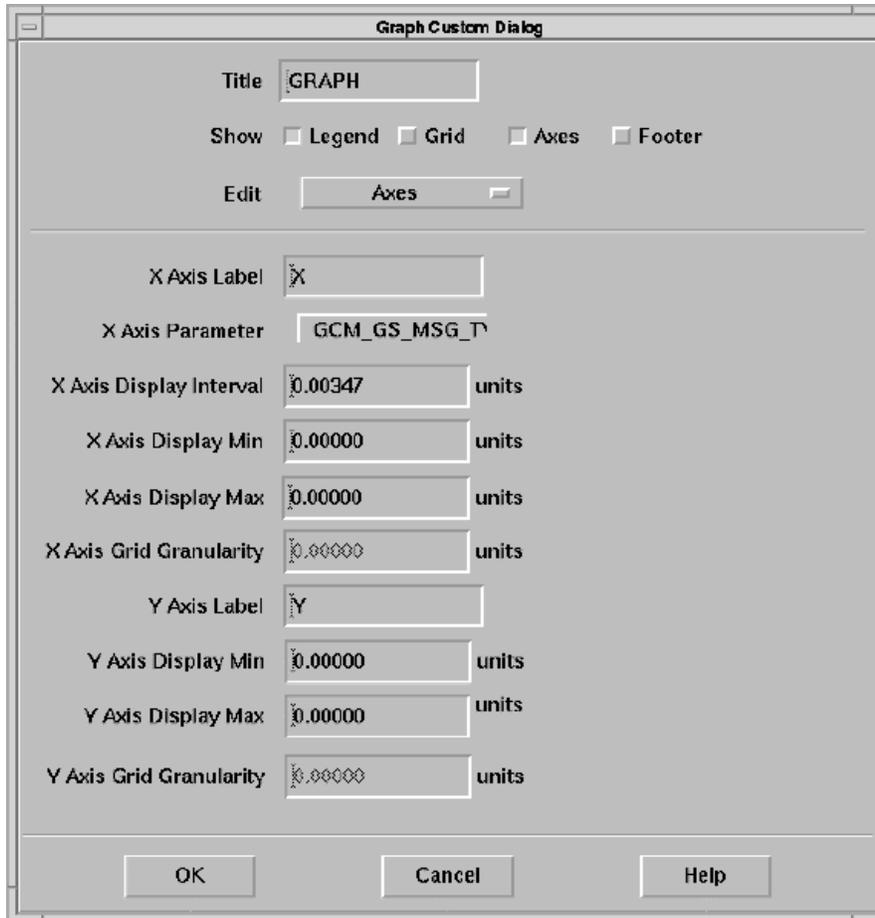


Figure 7.10.2-2 Graph Custom Dialog Box

7.11 Room Builder

The Room Builder tool enables you to create or modify room definitions. A room definition is a group of one or more windows, their size, position on the screen, and state (default or tiled) all are saved under a room name. The windows that comprise a room definition are called pages and may be tools or dynamic pages. The Control window is persistent in every room. Room definitions may be temporary - saved for the current session, or permanent - saved for future sessions.

7.11.1 Define a New Room

1. **Select the Pages to Comprise the Room.**

Open the tools and dynamic pages to be included in the room definition. To open a tool, select it from the Tools menu of the Control window. To open a dynamic page, click **TImWins...** on the Control window to open the Dynamic Page dialog box. Select a dynamic page from the list and click **OK**.

2. Position and Size Pages in the Room.

Move and resize the windows on the screen into the desired room configuration with the mouse or by entering the **PAGE** directive followed by the appropriate subdirective in the Control window's command line. The **PAGE** directive includes subdirectives for opening and manipulating a dynamic page. In addition, the frequency with which data displayed on the dynamic page is updated when you are attached to a logical string can be set via the **PAGE** directive. Refer to Appendix A for a complete list of ECL directives and their syntax.

3. Establish the State of each Page in the Room.

Iconify or restore windows into the desired room configuration using the Window menu or by entering the **PAGE** directive followed by the appropriate subdirective in the Control window command line.

4. Open the Room Builder window (see Figure 7.11.1-1).

Click **Tools...** at the bottom of the Control window. The Tools dialog box opens. Select **Room Builder** from the list of tools and click **OK**.

5. Enter a Name for the Room Definition.

Enter a name for the room in the Name text box of the Room Builder window.

6. Save the Room Definition.

To save the room definition for the current session only, click **Temporary**. To save the room definition for future sessions, click **Permanent**.

7. Establish the Current Configuration of the Room as Tiled or Untiled.

Each room definition may have two settings, default and tiled. Although these two settings are categorized as default and tiled, the two states may include windows in any setting - tiled or untiled.

To establish the current configuration of the room as the default setting, click **Default**.

If desired, alter the room's configuration to reflect the configuration you wish to delineate as the tiled layout and click **Tiled**.

8. Close the Room Builder tool.

Click **OK**.

The Room Builder window closes. The newly defined room is listed under the **Rooms...** button on the Control window.

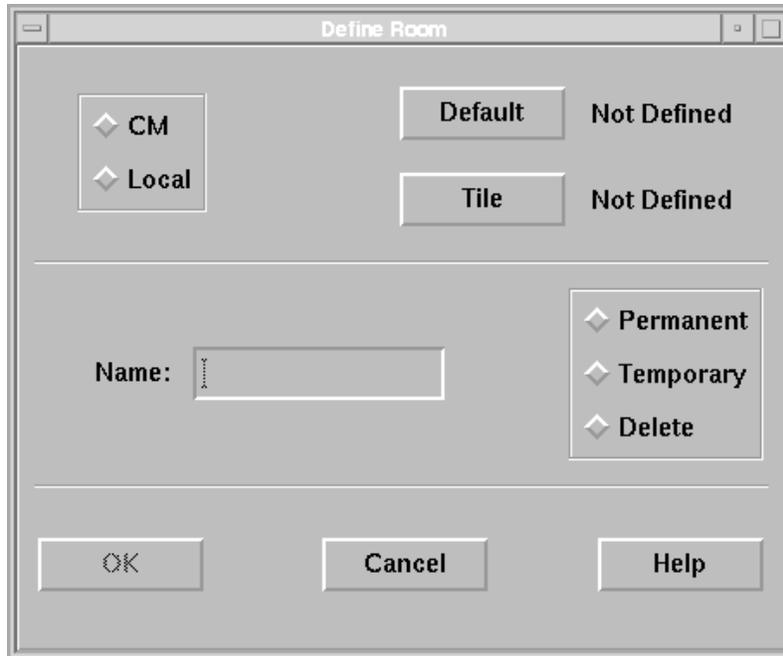


Figure 7.11.1-1. Room Builder Window

7.11.2 Modify an Existing Room

1. Enter the room to be modified.

Select the name of the room under the **Rooms...** button on the Control window or enter the ROOM directive in the Control window's command line.

2. Update the room's configuration or .

Add, delete, reposition, resize, or iconify windows as described in steps 1 through 3 of Section 7.11.1.

3 Open the Room Builder window.

Click **Tools...** at the bottom of the Control window. The Tools dialog box opens. Select **Room Builder** from the list of tools and click **OK**.

4. Enter the Name of the Room Definition.

Enter the room's name in the Name text box of the Room Builder window.

5. Save the Room Definition.

To save the room definition for the current session only, click **Temporary**. To save the room definition for future sessions, click **Permanent**.

6. Establish the Current Configuration of the Room as Tiled or Untiled.

Each room definition may have two settings, default and tiled. Although these two settings are categorized as default and tiled, the two states may include windows in any setting - tiled or untiled.

To establish the current configuration of the room as the default setting, click **Default**.

If desired, alter the room's configuration to reflect the configuration you wish to delineate as the tiled layout and click **Tiled**.

7. Close the Room Builder tool.

Click **OK**.

The Room Builder window closes. The existing room has been modified.

7.11.3 Switch Between Rooms

1. Enter the First Room.

Click **Rooms...** to open the Rooms dialog box and select the room from the list or enter the ROOM directive in the Control window command line.

2. Enter the Second Room.

Select the name of a second room under the **Rooms...** button on the Control window or enter the ROOM directive in the Control window command line.

The first room is not visible. The second room definition is visible on the screen.

3. Switch Back to the First Room.

Click the left arrow button on the Control window.

The second room you entered is not visible. The first room definition is visible on the screen.

4. Switch Back to the Second Room.

Click the right arrow button on the Control window.

The first room is not visible. The second room definition is visible on the screen.

7.11.4 Delete an Existing Room

1. Enter the room to be deleted.

Click **Rooms...** and select the name of the room from the Rooms dialog box or enter the ROOM directive in the Control window command line.

2. Open the Room Builder window.

Click the **Tools...** button at the bottom of the Control window. The Tools dialog box opens. Select **Room Builder** from the list of tools and click **OK**.

3. Delete the open room definition.

Click **Delete** or enter the ROOM DELETE directive in the Control window command line.

7.12 Report Generator

The Report Generator is not currently a FOS capability. Once Report Generator capabilities are implemented, this section of the Operations Tools Manual will be updated.

7.13 Data Replay Controller

The Data Replay Controller enables you to replay archived telemetry data and control the replay rate. Data played back from the database is displayed via system- or user-defined dynamic pages. Refer to the Display Builder section for instructions on creating, modifying, and making user-defined telemetry (dynamic) pages accessible via the Control window.

The data replay session can be dedicated - active on one userstation, or shared between multiple userstations. Any user may initiate a dedicated replay session or connect to an established shared replay session. However, a shared replay session may only be initiated by a user authorized to take Ground Control Authority. Prior to initiating a dedicated or shared replay session, open a dynamic page to view the telemetry data as described in the following text.

7.13.1 Open a Dynamic Page

Open one or more dynamic pages by clicking **TlmWins...** on the Control window to open the Telemetry Window Selection box. Select a dynamic page from the list and click **OK**. The dynamic pages will display parameter value changes that occurred during the interval specified in the data replay request. Once you have opened dynamic pages to display telemetry data, initiate a dedicated or shared replay session, or connect to a shared replay session.

Open the Data Replay Window:

Open the Data Replay window (see Figure 7.13.1-1) by clicking **Tools...** at the bottom of the Control window. The Tools dialog box opens. Select **Replay Control** from the list of tools and click **OK**. When the Data Replay Controller opens, the options in the bottom portion of the screen will be grayed out.

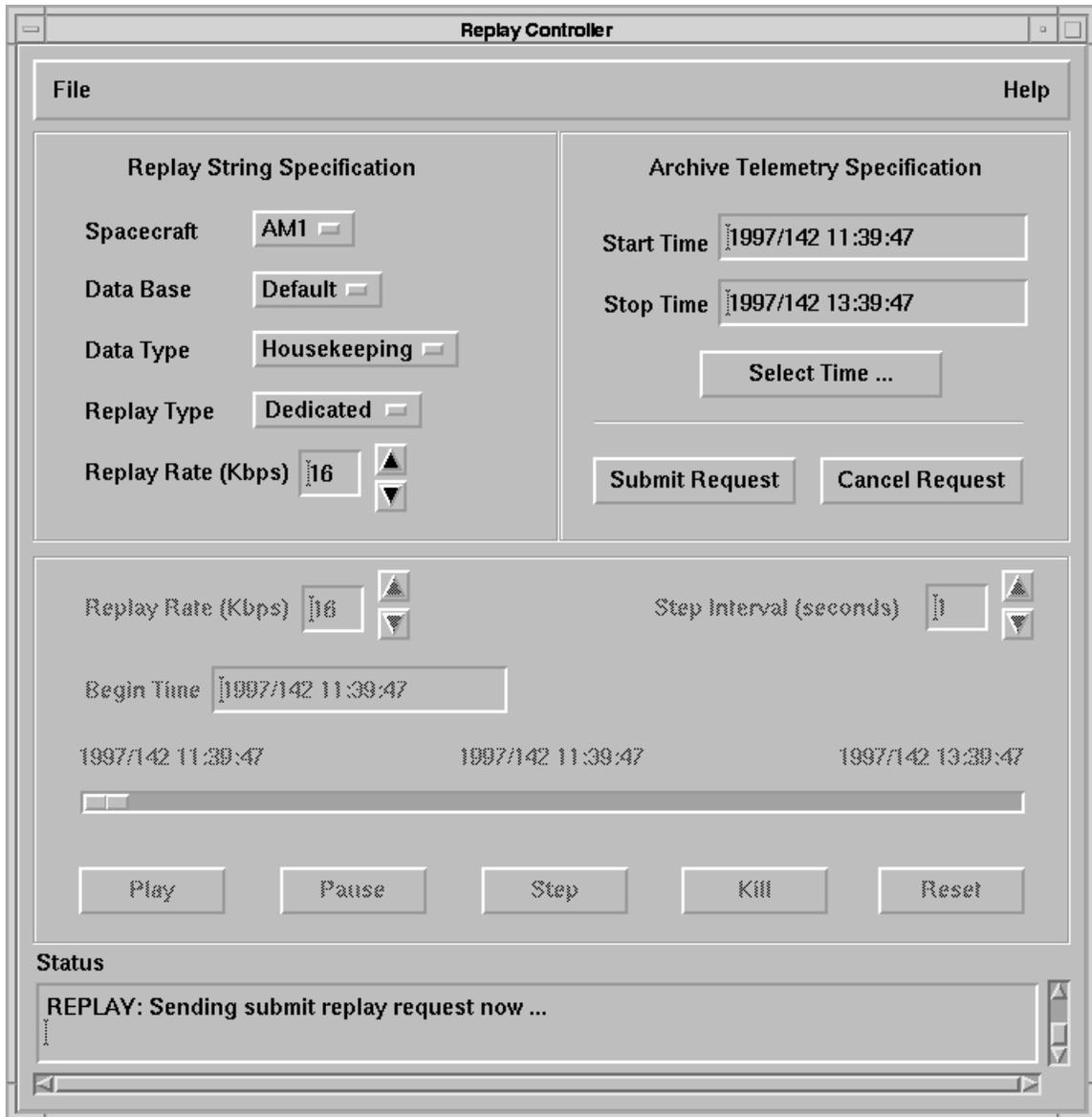


Figure 7.13.1-1. Data Replay Window

7.13.2 Dedicated Replay

On the Data Replay Controller window, select the spacecraft, database, data type, replay type (dedicated), and replay rate under Replay String Specification. Enter the year, day, and time to start and stop the telemetry data replay in spacecraft time format. Click **Submit Request** to submit the request. Click **Cancel Request** to discard the request. Once a request for archived telemetry data has been submitted by clicking **Submit Request**, the buttons in the bottom portion of the portion of the Replay Controller window are accessible.

To play archived telemetry data from a dedicated logical string:

The default begin time listed in the Begin Time dialog box is the start time submitted in the data replay request. However, you can shorten the playback interval by typing a new begin time that is subsequent to the start time in the Begin Time dialog box. Click **Play**; the data replay begins at the time specified in the Begin Time dialog box.

Monitor the dynamic page as it updates to reflect the telemetry data being played. The start and stop time span for the data replay is displayed in the bottom half of the Replay Controller window. As data plays, its time is displayed between the start and stop times, and the slider bar moves from left to right. To move ahead or behind in the replay time span, click the slider bar and drag it to the left or right.

Pause the replay by clicking **Pause**. Adjust the replay rate (in kilobits per second) by clicking the up or down arrow next to the Replay Rate dialog box. Click **Play** to play the data at the newly entered replay rate. To play the data starting from the begin time, click **Reset**.

To step through archived telemetry data:

Stepping through archived telemetry data enables you to play segments of the data span 1 to 59 seconds long. Drag the slider bar to the starting point for the step. Select a duration for the step interval in seconds by clicking the up and down arrows next to the Step Interval dialog box. Click **Step**. The interval plays for the number of seconds specified in the step interval text box and stops. Click **Step** to continue playing segments of the replay interval or **Play** to play the data at the rate specified in the Replay Rate dialog box.

To terminate the data replay session:

End the data replay session by clicking **Kill**. A dialog box opens, requesting that you verify your request to terminate the replay. Click **OK** to terminate the session or **Cancel** to cancel the termination request. The fields on the Replay Controller window return to their default settings, the start and stop times are blank, and the buttons in the lower portion of the window are grayed out.

7.13.3 Shared Replay

To initiate a shared replay session you must be eligible to receive Ground Control authority. Before submitting the request for a shared replay, connect to a logical string in a mirrored configuration, assume ground control privilege for the string you are connected to, create a shared logical string, connect to the newly created string in a mirrored configuration and, finally, assume ground control authority for the string. Detailed instructions are outlined in the following text. To connect to a shared replay session, refer to Section 7.13.4.

To connect to a real-time logical string:

In the command line of the Command Control window, enter the **STRING CONNECT** directive to associate your user station with the logical string established for the shared replay, for example **STRING CONNECT STRING=100 CONFIG=MIRROR**. Connecting to the string in a mirrored configuration is a prerequisite that enables you to take ground control.

To assume ground control for the string:

Once you have connected to the string, take ground control by entering the TAKE GROUNDCONTROL directive in the command line of the Command Control window. The string's three digit identifier follows the command, for example: TAKE GROUNDCONTROL STRING=100.

To create a shared logical string:

Enter the STRING CREATE directive in the Control window command line:

```
STRING CREATE REALTIME SPACECRAFTID=AM1 DATABASEID=1_0  
MODE=OPERATIONAL SERVER=1.
```

To submit a request for shared replay:

On the Data Replay Controller window, select the spacecraft, database, data type, replay type/server [shared/real-time server 1 (**RTS1**), 2 (**RTS2**), or 3 (**RTS3**)] and replay rate under Replay String Specification. Enter the year, day, and time to start and stop the telemetry data replay in spacecraft time format. Click **Submit Request** to submit the request. The submission of the request for shared replay will result in the creation of a shared logical string. Click **Cancel Request** to discard the request. The buttons in the lower portion of the Data Replay Controller are accessible once the request has been submitted.

To start the data replay controller:

Open the Data Replay window by clicking **Tools...** at the bottom of the Control window. The Tools dialog box opens. Select **Replay Control** from the list of tools and click **OK**. When the Data Replay Controller opens, the options in the bottom portion of the screen will be grayed out.

To play archived telemetry data from a shared logical string:

If you established control of the shared string through the TAKE GROUNDCONTROL directive, you control the playback of telemetry data associated with that string. Other users may connect to the string and monitor the replay of telemetry data.

The default begin time listed in the Begin Time dialog box is the start time of your request. However, you can shorten the playback interval by typing a new begin time after the start time in the Begin Time dialog box. Click **Play**; the data replay begins at the time specified in the Begin Time entry box.

Monitor the dynamic page as it is updated to reflect the archived telemetry data. The start and stop time span for the data replay is displayed in the bottom half of the Replay Controller window. As data plays, its time is displayed between the start and stop times and the slider bar moves from left to right. To move ahead or behind in the replay time span, click the slider bar and drag it to the left or right.

Pause the replay by clicking **Pause**. Adjust the replay rate (in kilobits per second) by clicking the up or down arrow next to the Replay Rate text box. Click **Play** to play the data at the newly entered replay rate. To play the data starting from the begin time, click **Reset**.

To step through archived telemetry data:

Stepping through archived telemetry data enables you to play segments of the data span 1 to 59 seconds long. Drag the slider bar to the starting point for the step. Select a duration for the step interval in seconds by clicking the up and down arrows next to the Step Interval dialog box. Click **Step**. The interval plays for the number of seconds specified in the Step Interval dialog box and stops. Click **Step** to continue playing segments of the replay interval or **Play** to play the data at the rate specified in the Replay Rate dialog box.

To terminate the shared data replay session:

When all users are disconnected from the shared logical string, you may terminate the shared replay session by clicking **Kill**. A dialog box opens, requesting that you verify your request to terminate the replay. Click **OK** to terminate the session or **Cancel** to cancel the termination request. The fields on the Replay Controller window return to their default settings, the start and stop times are blank, and the buttons in the lower portion of the window are grayed out.

7.13.4 Connect to a Shared Replay Session

Open the Command Control window by entering `TOOL Command_Control` in the ECL command line of the Control window, or by selecting the Command Control window from the Tools menu of the Control window. Enter the `STRING CONNECT` directive to associate your workstation with the logical string established for the shared replay. Your connection to the string may have either a mirrored or tailored connection, depending on preference. Mirrored connections inherit the configuration defined by the Ground Controller for the string, while tailored connections enable you to tailor the string's configuration.

To monitor telemetry via display pages:

Monitor data played back from the database via system- or user-defined dynamic pages.

7.14 Schematics Definition

RTWorks is a suite of commercial software products you access via the **Schematic Builder** and **Schematic Display** options on the Tool Selection box to create schematic pages displaying telemetry mnemonics. Like a dynamic page, display items are placed on the schematic page and associated with parameters. For Release B, the drawings and graphs on a schematic page display parameters from logical string 100 only. It is not necessary to connect to string 100. The connection to the string is automatically accomplished by the software. This section presents a brief overview of a subset of the capabilities of RTWorks. For complete information on creating schematic pages, refer to RTDraw documentation.

7.14.1 Compose a Schematic Page

A schematic page contains a combination of graphs, drawings, and icons that may be customized to display data from parameters. To create a schematic page, the first step is to add graphs associated with parameters to the page. Once the page is saved, these graphs can be customized to display the data in a wide variety of user-defined formats.

1. Start the schematic display builder (see Figure 7.14.1-1).

Click **Tools...** at the bottom of the Control window. The Tools dialog box opens. Select **Schematic Display** from the list of tools and click **OK**.

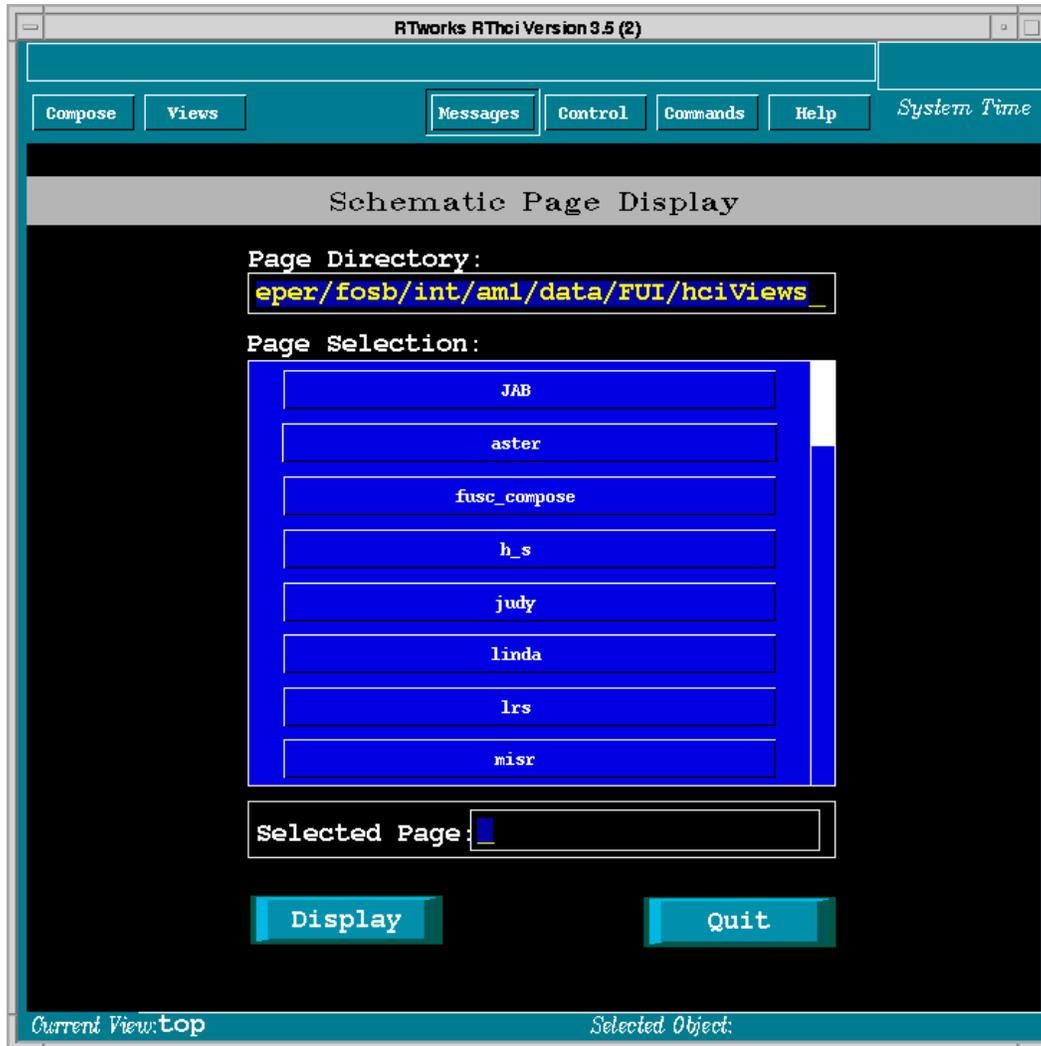


Figure 7.14.1-1. RTWorks Window

2. Create a schematic page.

Click **Compose** in the upper left corner of the RTWorks window.

The RThci Compose window opens (see Figure 7.14.1-2).

3. Select a parameter.

Select a parameter from the list on the right of the Compose window.

This parameter will be associated with the next graph you place on the page.

4. **Select a graph format.**

Select a graph format from the options listed under Graph type. For information about graph types, refer to RTDraw documentation.

5. **Add a graph to display the parameter.**

Click **Create Graph** and position the mouse pointer in the area of the Compose window where you wish to place the graph. Press the left mouse button, drag the mouse pointer to create a square or rectangle the size of the graph and click the left mouse button. Repeat steps 3, 4, and 5 to select additional parameters and to associate them with graphs.

6. **Save the schematic page.**

Position the mouse pointer inside the **Save As** box and click the left mouse button. Type a file name in the box and press <Enter>.

7. **Close the Compose window.**

Click **Close**.

The Compose window closes.

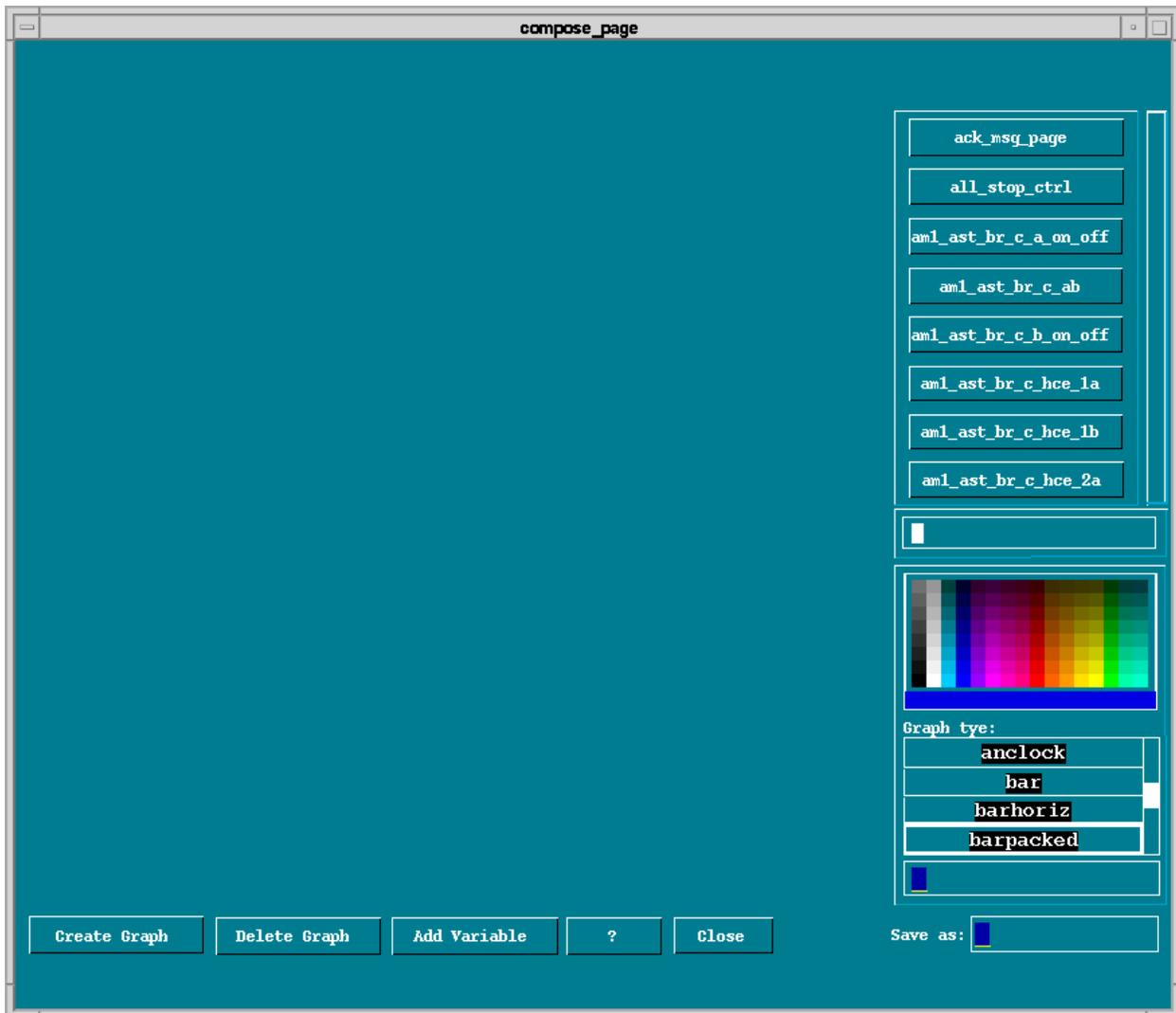


Figure 7.14.1-2. Compose Window

7.14.2 Customize a Schematic Page

Once a page contains graphs associated with parameters, the page recognizes the parameters. More graphs and schematics can be created to display the parameters, and previously created shapes, icons, or drawings can be edited to display the parameters. Refer to RTDraw documentation for instructions on customizing graphs to display telemetry in a variety of formats.

1. Start the schematic builder and open a page.

Select **Schematic Builder** from the Tools menu of the Control window and click **OK**.

The RTDraw window opens (see Figure 7.14.2-1).

2. **Open the page previously saved from the RThci Compose window.**

Select **Load View** from the Cmds> menu. Select the name of the file to open and click **OK**.

3. **Add new display items and associate them with parameters.**

Refer to RTDraw documentation for instructions on adding display items and associating them with parameters.

4. **Customize graphs to display parameters in a variety of formats.**

To reformat graphs which are associated with parameters, refer to the RTDraw documentation. Data for parameters displayed on the page are listed under the Data > menu.

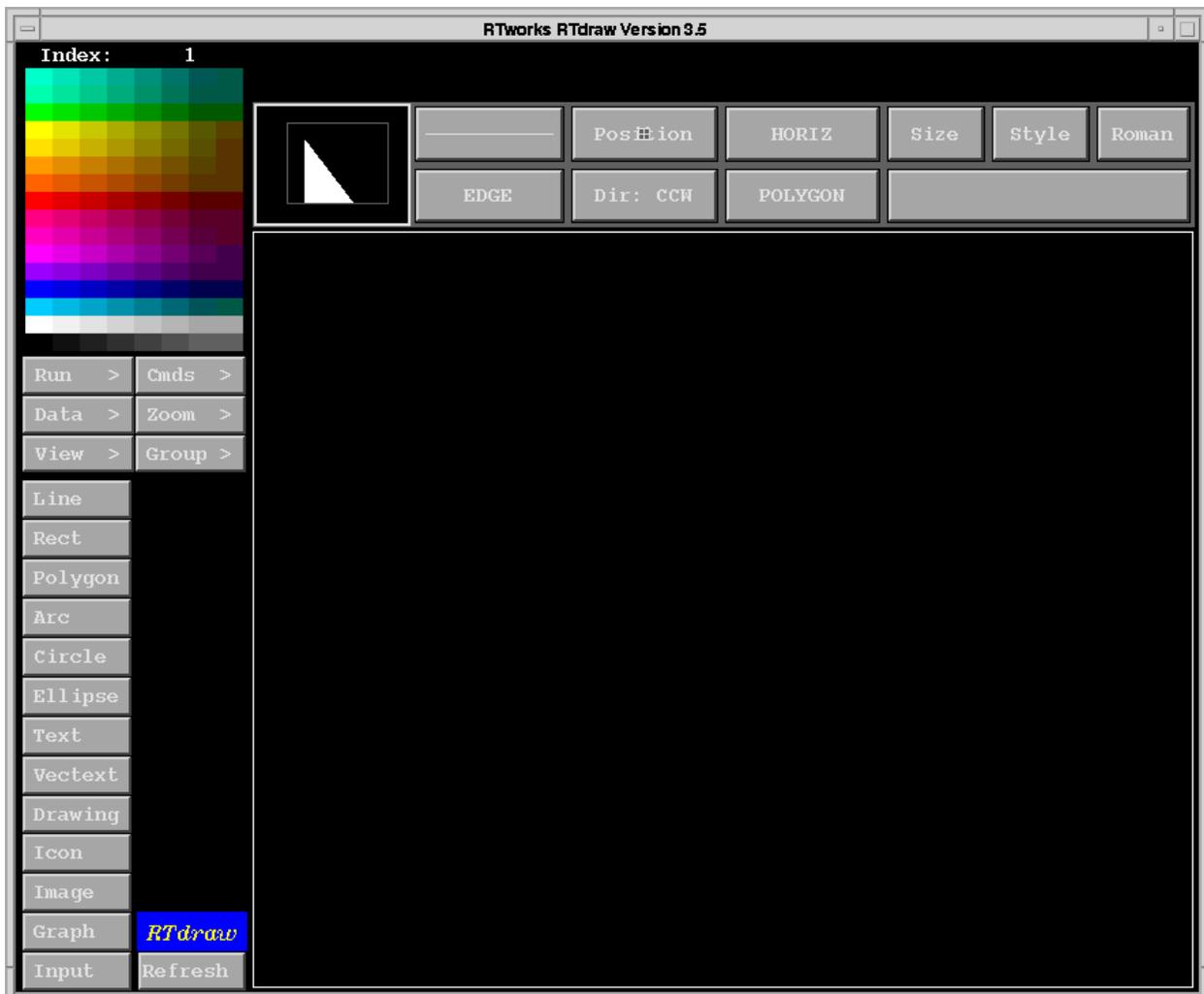


Figure 7.14.2-1. RTDraw Window

7.14.3 Monitor Telemetry Mnemonics on a Schematic Page

1. **Ensure the RTWorks Data server is running.**

Enter the following directive in the command line of the Control window to start the RTWorks Data server:

```
EA ENABLE String ID=100
```

If the RTWorks Data server is already running, entering the above command will generate an error message but will not negatively impact the system.

2. **Start the schematic display.**

Select **Schematic Display** from the Tools menu of the Control window and click **OK**.

The RTWorks window opens.

3. **Select the page to display in the Page Selection box and click Display.**

The schematic page opens (see Figure 7.14.3-1). The graphs and drawings update automatically to reflect incoming data from string 100.

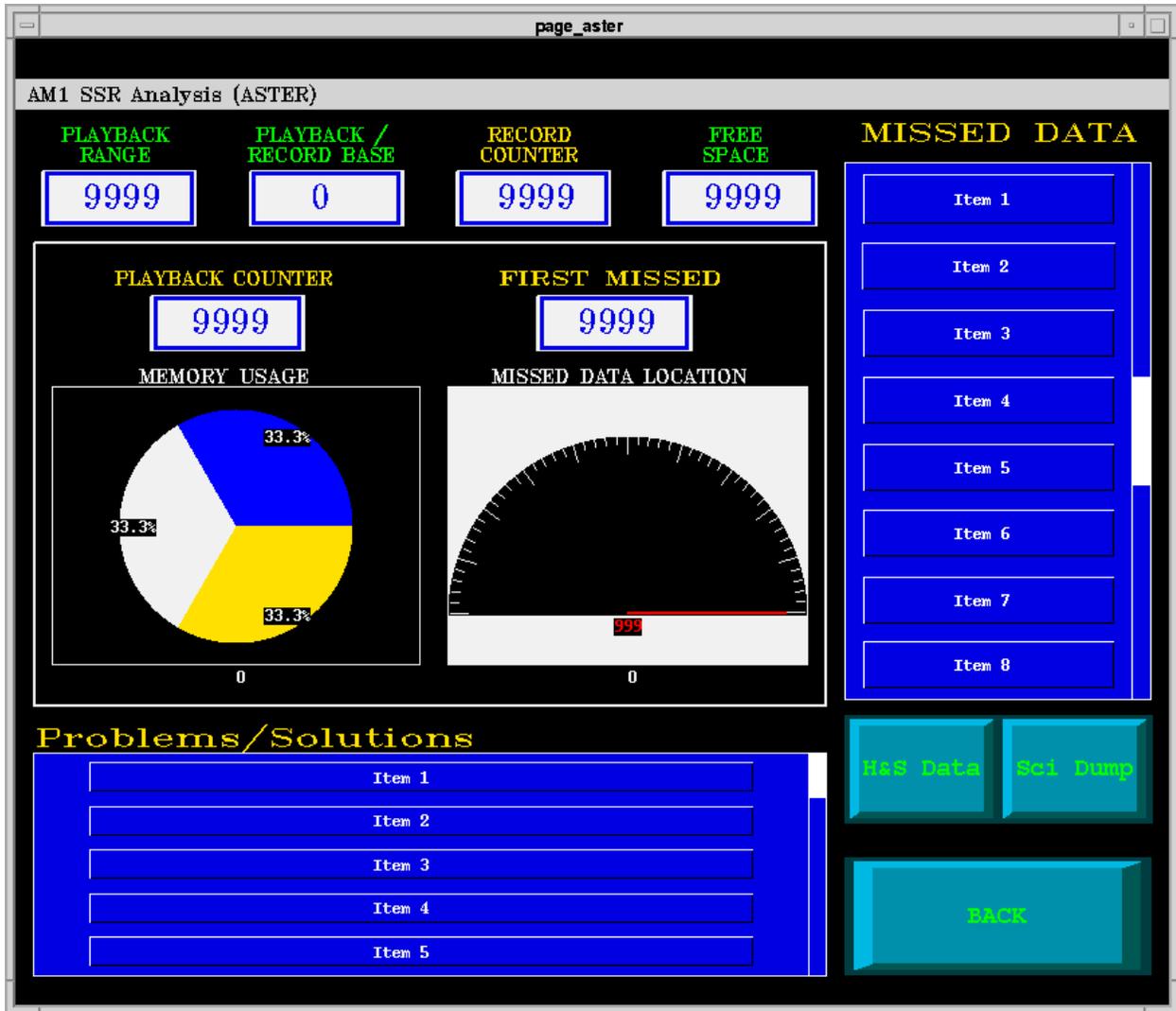


Figure 7.14.3-1. Schematic Page

7.14.4 Close RTWorks

Click Quit on the RTWorks window. To disable the RTWorks Data server, enter the command EA DISABLE String ID=100 in the Control window command line.